DIGITAL PROJECTION

HIGHlite 660 3D / Laser 3D Series
INSIGHT 4K Laser Series
Mercury 930 Series
M-Vision 930 Series
Titan LED / 930 / Quad Series

PROTOCOL GUIDE

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About This Document

Please follow the instructions in this guide carefully to ensure safe and long-lasting use of the projector.

Keep this guide handy for future reference.

Note symbol used in this manual

Most pages in this document have a dedicated area for notes. The information in that area is accompanied by the following symbol:

NOTE: this symbol indicates that there is some important information that you should read.

Product revision

Because we at Digital Projection continually strive to improve our products, we may change specifications and designs, and add new features without prior notice.

Legal notice

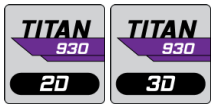
Notes

Which products are covered in this document?

This document describes the control protocols that can be used with the following projectors:

Products	Section	Badges

• HIGHlite Series:
  • HIGHlite 660 2D and 3D, HIGHlite 740
  • HIGHlite Laser 3D
	A
	A
	B
		

• INSIGHT 4K Laser	C	
• Mercury 930	A	
• M-Vision 930 3D	B	
• Titan LED	A	
• Titan 930	A	

• Titan Quad Series:
  • Titan Quad
  • Titan Super Quad / Quad 2000
	A
	A
		

To see if a particular command applies to a specific projector, check the list of product badges at the beginning of the corresponding table.

Notes

The control protocol can be used with HIGHlite 660 2D and 740 2D models only if the projector has had a manufacturer's upgrade.

CONTENTS

CONTENTS (continued)

Introduction to Section A and Section B

The projector can be controlled by using an external control system or a PC via an RS232 or LAN interface, using a terminal-emulation program.

Network setup

1. Connect the projector to a LAN network.
2. Open the **Setup > Network** menu and edit network settings. The default IP address is **192.168.0.100** and the TCP port number is **7000**.

Serial Port setup

- Baud rate 38,400 bps (***Section A***)
  9,600 bps (***Section B***)
- Data length 8 bits
- Stop bits one
- Parity none
- Flow control none

Notes

For details on connecting the projector to an RS232 or LAN network, or changing network settings, see the user manual.

Only one control path at a time should be used for protocol control. Attempts to send commands to both serial and network ports at the same time may result in unpredictable behavior.

*To find out which projectors are covered in **Section A** or **Section B**, see **Which products are covered in this document** at the beginning of this guide.*

Protocol commands

Commands are used to simulate menu operations and determine the settings of the projector, and use the following format:

- All commands consist of ASCII text strings starting with an asterisk∗ and ending with an ASCII Carriage Return character↵ (code 13): **`*command operator <value>`**↵
- The **`<command>`** string determines which setting the command will affect.
- Spaces are required before the operator and before the value.
- The **`<operator>`** string can take one of the following formats:

Command type	<operator>	Description
Set	`= <value>`	Makes the setting take the `<value>`.
Get	`?`	Asks what the current value is. The value is returned as an ASCII text string.
Execute		Performs an action. No operator is entered for this type of command.

Examples

`*orientation = 3`↵ sets the orientation to Rear Ceiling (for a celing mounted projector positioned behind the screen)

`*aspect.ratio ?`↵ asks what the current aspect ratio is

`*zoom.in`↵ commands the projector to zoom in

`*orientation=3`↵ is an invalid instruction because of the missing spaces before the operator and the value

Responses

If the command has been successful, the projector response begins with `ACK` or `ack` (“acknowledged”). For example, if the command is `*aspect.ratio = 1`↵, the projector will return `ACK aspect.ratio = 1`↵ or `ack aspect.ratio = 1`↵, depending on the model. In either case the projector will then will change the aspect ratio accordingly.

If the command has not been acknowledged, due to a syntax error or another problem, the projector response will be `NAK` or `nack`, followed by a brief description of the problem.

Notes

To set the default value of a command, simply enter the command name and ↵, without an operator. For example `*orientation`↵ *will set the orientation to 0 (Desktop Front).*

You must wait for the complete response to a command before sending another command.

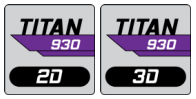
SECTION A

Command Guides for the following projectors:

HIGHlite 660 / 740

Mercury 930

Titan LED



Titan 930

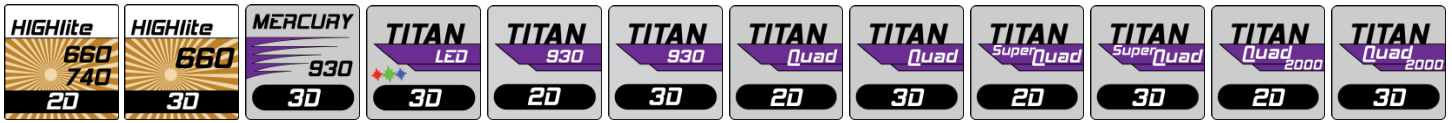
Titan Quad

Titan Super Quad & Quad 2000

Inputs

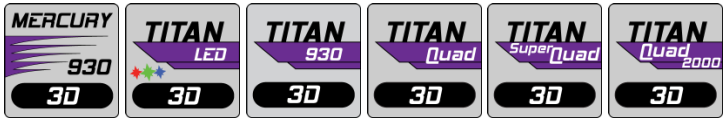
Notes

The `input` command can assign the values in the table below to the following projectors:



<command>	<operator>	<values>
`input`	`= ?`	0 = CVBS 1 1 = CVBS 2 2 = S-Video 3 = Component 4 = VGA 5 = 3G-SDI 6 = DVI 7 = HDMI 8 = Test Pattern

The `input` command can assign additional values to the following projectors:



<command>	<operator>	<values>
`input`	`= ?`	9 = Main/DVI 10 = Sub/HDMI 11 = Dual Pipe

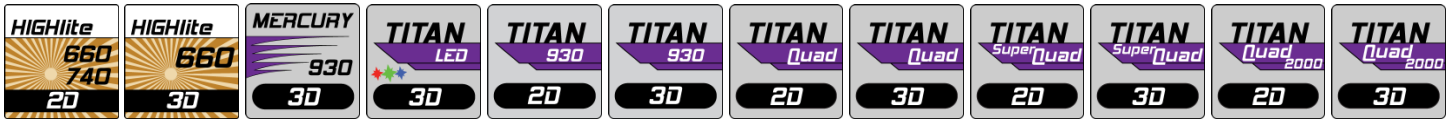
The `input` command can assign additional values to HIGHlite 660 3D projectors:

<command>	<operator>	<values>
`input`	`= ?`	9 = HDBaseT 10 = DVI 2 11 = HDMI 2 12 = HDMI 3 13 = Dual Pipe

Notes

Test Patterns

The `test.pattern` and `formatter.pattern` commands can be used with all projectors:



<command>	<operator>	<value>
`test.pattern`	`= ?`	0 = Grey V Bars 1 = Grey H Bars 2 = Aspect Test 3 = Alignment Grid 4 = Warp Adjust 5 = SMPTE 6 = Checkerboard 7 = White Field 8 = Black Field 9 = Screen Layout
`formatter.pattern`		0 = white 1 = black 2 = green 3 = red 4 = blue 5 = magenta 6 = cyan 7 = yellow 8 = checker 9 = align 10 = h-ramp 11 = v-ramp 12 = max lumens 13 = native white 14 = native black 15 = native green 16 = native red 17 = native blue 18 = native magenta 19 = native cyan 20 = native yellow 21 = off

Notes

The `test.pattern` *command is only accessible if the* `input` *command is set to 8 (Test Pattern):*
`*input = 8`↵.

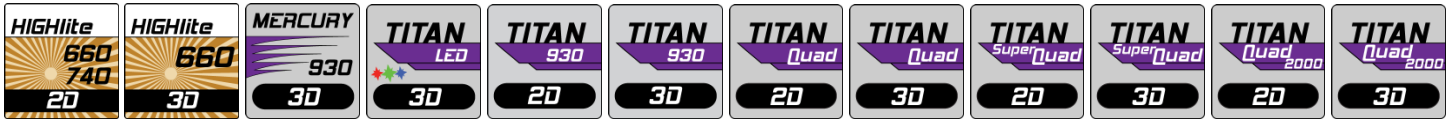
The `formatter.pattern` *command is used to display formatter test patterns. The patterns are shown as soon as they are selected, regardless of which input the projector may be set to. The* ***off*** *command must be sent in order to return to normal picture:*

`*formatter.pattern = 21`
↵.

When formatter test patterns are displayed, the OSD is not available.

Lens

The commands in the table below can be used with all projectors:



<command>	<operator>	<value>
zoom.in	(execute)	
zoom.out	(execute)	
focus.near	(execute)	
focus.far	(execute)	
lens.center	(execute)	
lens.up	=	0 - 3 (integer, movement speed: 0 = slowest, 3 = fastest)
lens.down	=	0 - 3 (integer, movement speed: 0 = slowest, 3 = fastest)
lens.left	=	0 - 3 (integer, movement speed: 0 = slowest, 3 = fastest)
lens.right	=	0 - 3 (integer, movement speed: 0 = slowest, 3 = fastest)
lens.stop	(execute)	
nudge.up	=	0 - 3 (integer, nudge time: 0 = shortest, 3 = longest)
nudge.down	=	0 - 3 (integer, nudge time: 0 = shortest, 3 = longest)
nudge.left	=	0 - 3 (integer, nudge time: 0 = shortest, 3 = longest)
nudge.right	=	0 - 3 (integer, nudge time: 0 = shortest, 3 = longest)

Notes

When `lens.up`, `lens.down`, `lens.left` *or* `lens.right` *is sent, the movement will continue until either a* `lens.stop` *command is sent or the limit is reached. Use a* `nudge` *command to produce a brief movement of the lens in the specified direction.*

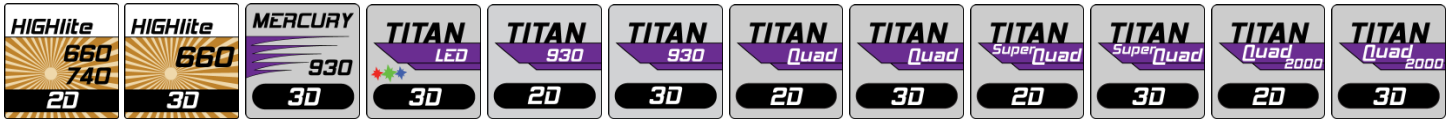
The commands in the table below can be used with the following projectors:

<command>	<operator>	<values>
calibrate.zoom	(execute)	
calibrate.focus	(execute)	
lensmemory.save	=	0 - 9 (integer)
lensmemory.recall	=	0 - 9 (integer)

Notes

Image

The commands in the table below can be used with all projectors:



<command>	<operator>	<value>
brightness	= ?	-50 to 50 (integer)
contrast	= ?	-50 to 50 (integer)
gamma	= ?	0 = 1.0 1 = 1.8 2 = 2.0 3 = 2.2 4 = 2.4 5 = 2.6 6 = 2.8
freeze	= ?	On, Off
hue	= ?	-50 to 50 (integer)
saturation	= ?	-50 to 50 (integer)
blacklevel.offset	= ?	0 = 0 IRE, 1 = 7.5 IRE
sharpness	= ?	-50 to 50 (integer)
detail	= ?	0 to 100
luma.sharpness	= ?	0 = Off 1 = Low 2 = High
chroma.sharpness	= ?	0 = Off 1 = Low 2 = High

Notes

When `freeze` *is switched on, the image freezes and the projector will keep displaying the frozen frame until* `*freeze = off`↵ *is sent. The frozen image will persist even if you disconnect the source.*

<command>	<operator>	<value>
recursive.nr	= ?	0 = Off 1 = Low 2 = Medium 3 = High
mosquito.nr	= ?	0 = Off 1 = Low 2 = Medium 3 = High
ccs	= ?	0 = Off 1 = On
vga.phase	= ?	-15 to 15 (integer)
vga.samples	= ?	0 to 1444 (integer)
vga.auto	(execute)	

Notes

The ccs *command is identical to the* **Cross Color Suppression** *setting in the* **Image > Video Filters** *menu.*

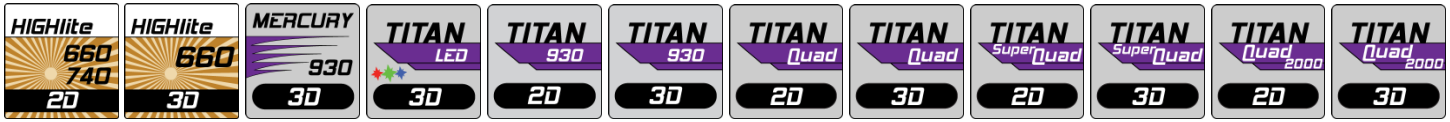
The vga.phase *command is identical to the* **Phase** *setting in the* **Image > VGA Setup** *menu.*

The vga.samples *command is identical to the* **Total H Samples** *setting in the* **Image > VGA Setup** *menu.*

The vga.auto *command is identical to the* **Auto Setup** *command in the* **Image > VGA Setup** *menu.*

Color

The commands in the table below can be used with all projectors:



<command>	<operator>	<values>
gamut	= ?	0 = Peak 1 = HDTV 2 = SDTV 3 = 3200K 4 = 5400K 5 = 6500K 6 = 8000K 7 = 9000K 8 = User 1 9 = User 2
mcgd.data	= ?	green-x, green-y, red-x ,red-y, blue-x, blue-y, white-x, white-y
tcgd1.data tcgd2.data	= ?	green-x, green-y, red-x ,red-y, blue-x, blue-y, white-x, white-y
red.lift	= ?	-50 to +50 (integer)
green.lift	= ?	-50 to +50 (integer)
blue.lift	= ?	-50 to +50 (integer)
red.gain	= ?	-50 to +50 (integer)
green.gain	= ?	-50 to +50 (integer)
blue.gain	= ?	-50 to +50 (integer)
red.dmd	= ?	On, Off
green.dmd	= ?	On, Off
blue.dmd	= ?	On, Off

Notes

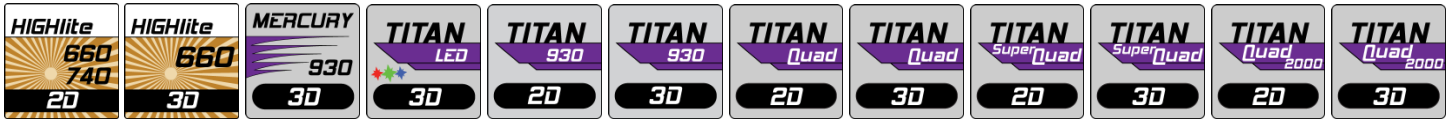
gamut *sends a selection of factory set target data or the two user tables defined by* tcgd1.data *and* tcgd2.data.

mcgd.data, tcgd1.data *and* tcgd2.data *allow for MCGD data or user TCGD data to be sent as comma separated x and y co-ordinates in the specified order. Must be preceded by leading 0, e.g. 0.663,0.332.*

red.dmd *enables and disables the red DMD™. Likewise, the* green.dmd *and* blue.dmd *commands control the other two DMDs.*

Geometry

The commands in the table below can be used with all projectors:



<command>	<operator>	<values>
aspect.ratio	= ?	0 = Source 1 = Fill & Display 2 = Fill & Crop 3 = Anamorphic 4 = TheaterScope
overscan	= ?	0 = 0% 1 = 2.5% 2 = 5% 3 = 7.5%
sizepos.enable	= ?	On, Off
sizepos.setting	= ?	Global, Modal
h.position	= ?	-50 to +50 (integer)
v.position	= ?	-50 to +50 (integer)
h.size	= ?	50 to 400 (integer)
sizepos.aspect	= ?	On, Off
v.size	= ?	50 to 400 (integer)
blanking.enable	= ?	On, Off
blanking.top	= ?	1 to 100 (integer)
blanking.bottom	= ?	1 to 100 (integer)
blanking.left	= ?	1 to 255 (integer)
blanking.right	= ?	1 to 255 (integer)

Notes

☞ `sizepos.enable` *is identical to the* **Enable** *setting in the* **Geometry > Size & Position** *menu.*

☞ `sizepos.setting` *is identical to the* **Setting** *setting in the* **Geometry > Size & Position** *menu.*

☞ `sizepos.aspect` *is identical to the* **Aspect Lock** *setting in the* **Geometry > Size & Position** *menu.*

<command>	<operator>	<values>
geometry.engine	= ?	0 = Off 1 = Keystone 2 = 4 Corner 3 = Rotation 4 = Warp
h.keystone	= ?	-40 to +40 (integer)
v.keystone	= ?	-30 to +30 (integer)
pin.barrel	= ?	-20 to +20 (integer)
4corner.ulx 4corner.uly 4corner.urx 4corner.ury 4corner.llx 4corner.lly 4corner.lrx 4corner.lry	= ?	-1000 to +1000
rotation	= ?	-180 to 180 (integer)
warp.map	= ?	0 to 8 (integer)

Notes

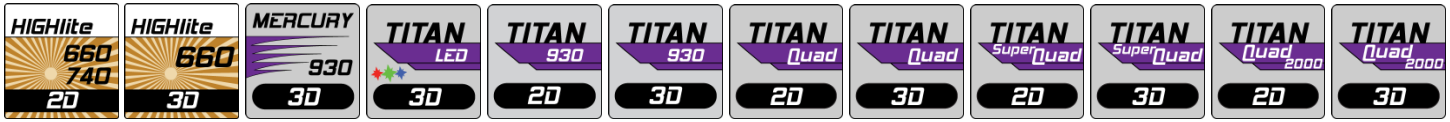
☞ pin.barrel *sets pincushion / barrel distortion when* geometry.engine *is set to 1 (keystone) or 3 (rotation).*

☞ *The* 4corner *commands provide X and Y adjustment for each corner of the image. They are identical to the settings within the* **Geometry > Cornerstone** *menu.*

☞ warp.map *is identical to the* **Warp Map** *setting in the* **Geometry** *menu. Set to 0 to switch this off.*

Edge Blend

The commands in the table below can be used with all projectors:



<command>	<operator>	<values>
array.width	= ?	1 to 4 (integer)
array.height	= ?	1 to 4 (integer)
array.hset	= ?	0 to 3 (integer)
array.vset	= ?	0 to 3 (integer)
scurve.value	= ?	10 to 25 (integer, corresponding to real values of 1.0 to 2.5)
blending	= ?	0 = Off 1 = On 2 = Alignment Pattern
segmentation	= ?	On, Off
eb.top	= ?	0 to a value of up to 720, depending on eb.bottom (integer, pixels)
eb.bottom	= ?	0 to a value of up to 720, depending on eb.top (integer, pixels)
eb.left	= ?	0 to a value of up to 1280, depending on eb.right (integer, pixels)
eb.right	= ?	0 to a value of up to 1280, depending on eb.left (integer, pixels)

Notes

The array.width *and* array.height *commands set the width and height of the segmented array respectively.*

array.hset *and* array.vset *set the horizontal and vertical position of the projector within the segmented array.*

scurve.value *affects the shape of the S-curve which is applied to gradually reduce the brightness in the overlapped regions.*

eb.top *and* eb.bottom *are identical to the* **Top Blend Region** *and* ***Bottom Blend Region*** *settings from the* **Edge Blend > Blend Width** *menu.*

The maximum value for one region will equal 720 minus the pixels already applied to the other region.

eb.left *and* eb.right *are identical to* **Left Blend Region** *and* **Right Blend Region** *from the* **Edge Blend > Blend Width** *menu.*

The maximum value for one region will equal 1280 minus the pixels already applied to the other region.

<command>	<operator>	<values>
eb.blu.unblended	= ?	0 to 63 (integer)
eb.blu.topl	= ?	0 to 63 (integer)
eb.blu.top	= ?	0 to 63 (integer)
eb.blu.topr	= ?	0 to 63 (integer)
eb.blu.bottoml	= ?	0 to 63 (integer)
eb.blu.bottom	= ?	0 to 63 (integer)
eb.blu.bottomr	= ?	0 to 63 (integer)
eb.blu.midl	= ?	0 to 63 (integer)
eb.blu.midr	= ?	0 to 63 (integer)
eb.blu.x1	= ?	0 to 100 (integer)
eb.blu.y1	= ?	0 to 100 (integer)
eb.blu.x2	= ?	-100 to 0 (integer)
eb.blu.y2	= ?	-100 to 0 (integer)
eb.blu.x3	= ?	0 to 100 (integer)
eb.blu.y3	= ?	0 to 100 (integer)
eb.blu.x4	= ?	-100 to 0 (integer)
eb.blu.y4	= ?	-100 to 0 (integer)
eb.reset	=	1 = reset width 2 = reset offset 3 = reset width and offset 4 = reset black level uplift 5 = reset width and black level uplift 6 = reset offset and black level offset 7 = reset all

Notes

eb.blu.unblended *is identical to the* **Unblended Region** *setting in the* **Edge Blend > Black Level Uplift** *menu.*

eb.blu.topl, eb.blu.top *and* eb.blu.topr *are identical to the* **Upper Left**, **Upper Middle** *and* **Upper Right** *settings in the* **Edge Blend > Black Level Uplift** *menu.*

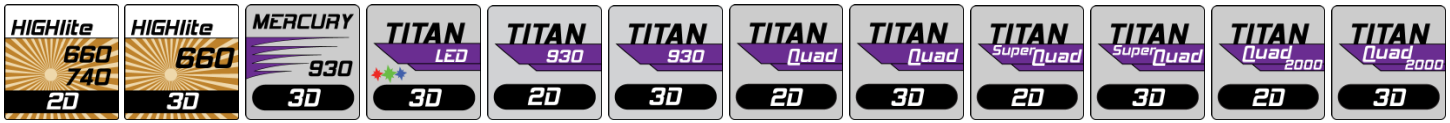
eb.blu.bottoml, eb.blu.bottom *and* eb.blu.bottomr *are identical to the* **Lower Left**, **Lower Middle** *and* **Lower Right** *settings in the* **Edge Blend > Black Level Uplift** *menu.*

eb.blu.midl *and* eb.blu.midr *are identical to the* **Middle Left** *and* **Middle Right** *settings in the* **Edge Blend > Black Level Uplift** *menu.*

The eb.blu *x and y commands are identical to the X and Y settings from the* **Edge Blend > Reduce Black Level Uplift Width** *menu. 1 is top left, 2 is top right, 3 is bottom left, 4 is bottom right.*

PIP

The commands in the table below can be used with all projectors:



<command>	<operator>	<values>
pip.mode	= ?	0 = Off 1 = PIP 2 = PAP 3 = POP
pip.input	= ?	0 = CVBS 1 1 = CVBS 2 2 = S-Video 3 = Component 4 = VGA 5 = 3G-SDI 6 = DVI 7 = HDMI
pip.size	= ?	0 = small 1 = medium 2 = large
pip.position	= ?	0 = Top Left 1 = Top Right 2 = Bottom Left 3 = Bottom Right 4 = Custom
pip.hpos	= ?	0 to 100 (integer)
pip.vpos	= ?	0 to 100 (integer)

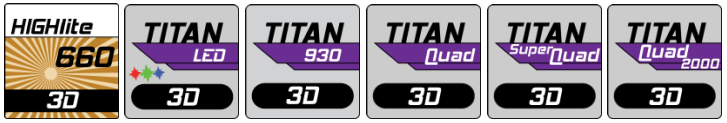
Notes

3D

The commands in the table below can be used the following 3D projectors:

<command>	<operator>	<values>
3d.enable	= ?	On, Off
3d.frmultiplier	= ?	1 = x1, 2 = x2, 3 = x3
3d.darktime	= ?	0 = 0 µs 1 = 650 µs 2 = 1300 µs 3 = 7500 µs
3d.syncoffset	= ?	-15 to +15 (integer)
3d.syncpolarity	= ?	pos, neg
3d.dominance	= ?	left, right

In addition, the 3d.format command can be used the following 3D projectors:



<command>	<operator>	<values>
3d.format	= ?	auto, seq, fpack, tab, sbs

Notes

The values -15 to +15 represent -1500 µs to +1500 µs.

Lamps

Commands for single, dual and quad lamp projectors

The commands in the table below can be used with all single, dual and quad lamp projectors:

<command>	<operator>	<values>
lamp1.hours	?	
lamp1.strikes	?	
lamp1.serial	?	
lamp1.status	?	0 = Off 1 = Pre cooling 2 = Ignition 3 = Ignition confirm 4 = Enable communication 5 = Delay cooling 6 = Warm up eco mode 7 = Warm up 8 = Cool down no restrike 9 = Cool down ok restrike 10 = Normal 11 = Error 12 = Ignition retry 13 = Re strike delay 14 = Enable CSI 15 = Deferred shutdown 16 = Shutdown confirm 17 = Error shutdown 18 = Lamp warmup stage 1 19 = Lamp warmup stage 2
lamp.power	= ?	1 to 100 (integer)

Notes

The lamp1.hours *command returns the lamp hours in HH:MM format.*

Depending on the projector model, the lamp.power *command has a different value range as follows:*

- *For **HIGHlite 660** / **740**, the range is between 85 and 100. Any value lower than 85 will be interpreted as 85 by the projector.*
- *For **Mercury 930**, **Titan 930**, **Titan Quad**, **Titan Super Quad** and **Titan Quad 2000**, the range is between 80 and 100. Any value lower than 80 will be interpreted as 80 by the projector.*

Commands for dual and quad lamp projectors

The commands in the table below can be used with all dual and quad lamp projectors:

<command>	<operator>	<values>	
lamp.mode	= ?	Dual lamp projectors: 0 = both lamps 1 = lamp 1 2 = lamp 2 3 = auto 1	Quad lamp projectors: 0 = all lamps 1 = auto 3 2 = auto 2 3 = auto 1 4 = lamps 1,2 and 3 5 = lamps 1,2 and 4 6 = lamps 1,3 and 4 7 = lamps 2,3 and 4 8 = lamps 1 and 2 9 = lamps 1 and 3 10 = lamps 1 and 4 11 = lamps 2 and 3 12 = lamps 2 and 4 13 = lamps 3 and 4 14 = lamp 1 15 = lamp 2 16 = lamp 3 17 = lamp 4
lamp2.hours	?		
lamp2.strikes	?		
lamp2.serial	?		

Notes

The lamp2.hours *command returns the lamp hours in HH:MM format.*

<command>	<operator>	<values>
lamp2.status	?	0 = Off 1 = Pre cooling 2 = Ignition 3 = Ignition confirm 4 = Enable communication 5 = Delay cooling 6 = Warm up eco mode 7 = Warm up 8 = Cool down no restrike 9 = Cool down ok restrike 10 = Normal 11 = Error 12 = Ignition retry 13 = Re strike delay 14 = Enable CSI 15 = Deferred shutdown 16 = Shutdown confirm 17 = Error shutdown 18 = Lamp warmup stage 1 19 = Lamp warmup stage 2

Notes

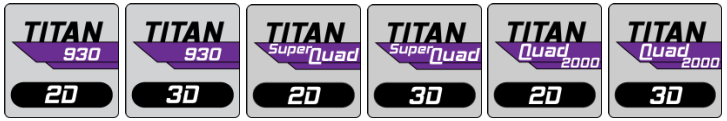
Commands for dual and quad lamp projectors (continued)

Notes

The `compensation.mode` and `compensation` commands can be used with the following projectors:

<command>	<operator>	<values>
`compensation.mode`	`= ?`	auto manual
`compensation`	`= ?`	1 to 200 (integer)

The `conditioning` command can be used with the following projectors:



<command>	<operator>	<values>
`conditioning`	`= ?`	On, Off

Commands for quad lamp projectors

The commands in the table below can be used with all quad lamp projectors:

<command>	<operator>	<values>
`lamp3.hours` `lamp4.hours`	?	
`lamp3.strikes` `lamp4.strikes`	?	
`lamp3.serial` `lamp4.serial`	?	
`lamp3.status` `lamp4.status`	?	0 = Off 1 = Pre cooling 2 = Ignition 3 = Ignition confirm 4 = Enable communication 5 = Delay cooling 6 = Warm up eco mode 7 = Warm up 8 = Cool down no restrike 9 = Cool down ok restrike 10 = Normal 11 = Error 12 = Ignition retry 13 = Re strike delay 14 = Enable CSI 15 = Deferred shutdown 16 = Shutdown confirm 17 = Error shutdown 18 = Lamp warmup stage 1 19 = Lamp warmup stage 2

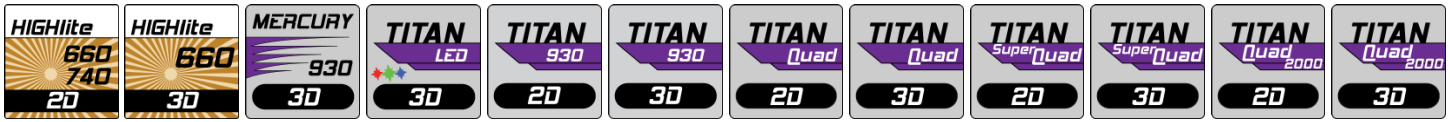
Notes

The `lamp3.hours` *and* `lamp4.hours` *commands return the lamp hours in HH:MM format.*

Commands for dual and quad lamp projectors (continued)

Setup

The commands in the table below can be used with all projectors:



<command>	<operator>	<values>
orientation	= ?	0 = Desktop Front 1 = Ceiling Front 2 = Desktop Rear 3 = Ceiling Rear
control.dhcp	= ?	On, Off
control.ip	= ?	A valid IP address in the following format: *xxx.xxx.xxx.xxx*
control.subnet	= ?	A valid subnet address in the following format: *xxx.xxx.xxx.xxx*
shutter	= ?	on or open off or close
ir.address	= ?	0 to 255
power	= ?	On, Off
factory.reset	(execute)	
identify	(execute)	
latency	= ?	0 = Low Latency 1 = Best Video
dvi.boosteq	= ?	On, Off
digital.colspace	= ?	0 = RGB 1 = YPbPr 2 = Auto
digital.range	= ?	0 = full 1 = limited 2 = auto
dvi.port	= ?	0 = digital 1 = analog

Notes

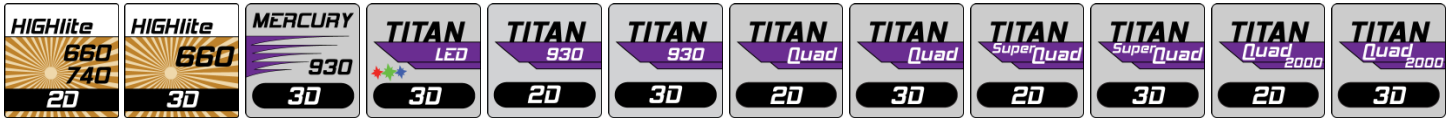
`identify` *flashes the keypad lights for 10 seconds to identify the projector.*

<command>	<operator>	<values>
component.colspace	= ?	0 = RGB 1 = YPbPr
component.synctype	= ?	0 = 3 wire 1 = 4 wire 2 = Auto
3gsdi.stream	= ?	0 = Stream 1 1 = Stream 2
lan.dhcp	= ?	On, Off
lan.ip	= ?	A valid IP address in the following format *xxx.xxx.xxx.xxx*
lan.subnet	= ?	A valid subnet address in the following format *xxx.xxx.xxx.xxx*
configuration	= ?	0 = PIP 1 = Edge Blend

Notes

Information

The commands in the table below can be used with all projectors:



<command>	<operator>	<values>
sw.version	?	
board.id	?	
fw.version	?	
from.version	?	
lens.version	?	
seq.version	?	
model.name	?	
serial	?	
inlet.temp	?	
dmd.temp	?	

The commands in the table below can be used with all 3D projectors:

<command>	<operator>	<values>
board.id3d	?	
fw.version3d	?	

Notes

- `sw.version` *returns the software release version, identical to* **Information > Configuration > Interface**.
- `board.id` *is identical to* **Information > Configuration > Hardware**.
- `fw.version` *returns the firmware version.*
- `from.version` *returns the factory ROM version.*
- `lens.version` *returns the lens mount version - identical to* **Information > Configuration > Lens**.
- `seq.version` *returns the formatter sequences version, identical to* **Information > Configuration > Sequences**.
- `inlet.temp` *and* `dmd.temp` *return the temperature in °C at the air inlets and the DMD™ respectively.*
- `board.id3d` *is identical to* **Information > Configuration > 3D Hardware**.
- `fw.version3d` *is identical to* **Information > Configuration > 3D Firmware**.

Virtual OSD

The ***LAN IP Address*** of the projector can be set by using the **Network** submenu, which can be found in the **Setup** menu.
Once the LAN IP Address has been set, it is possible to control all the functions available on the OSD by using the embedded Virtual OSD.

To access the Virtual OSD, do one of the following:

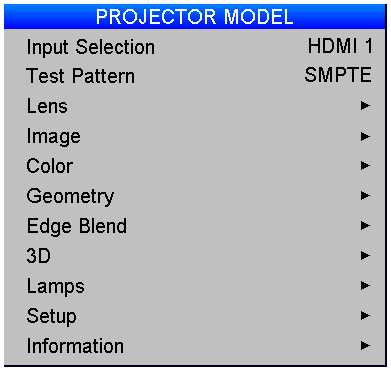
- Type the URL ***http://<LAN IP Address>*** into the address bar of your browser, then press **ENTER**.
- Use the *DiscoveryTool_V1.0.exe* application.

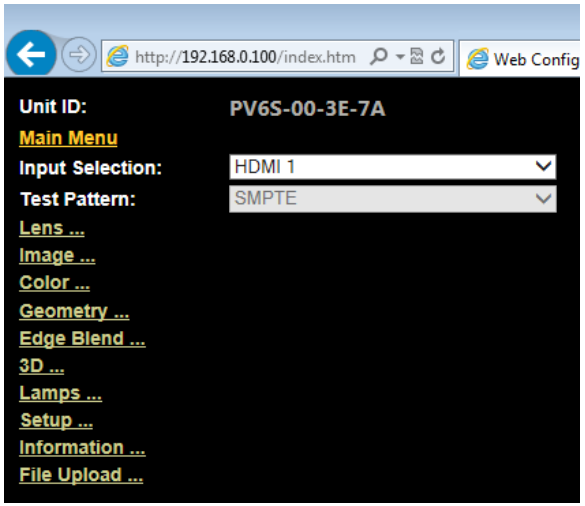
The embedded webpage shown below right should appear.

Menu examples

The webpages mirror the OSD menus, as shown in the following examples:

- The last 3 bytes of the projector's ***MAC Address*** are shown in the **Unit ID**, ***00-3E-7A*** in the example shown here.
- The menu name is shown in orange underlined text, as in the **Main Menu** shown here.
- Drop-down lists are represented by similar drop-down lists, as in the **Input Selection** list shown here.
- Sub-menus are represented by yellow underlined links, as shown here.



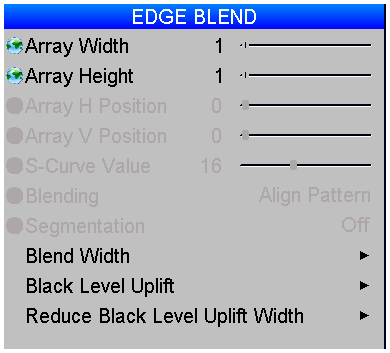


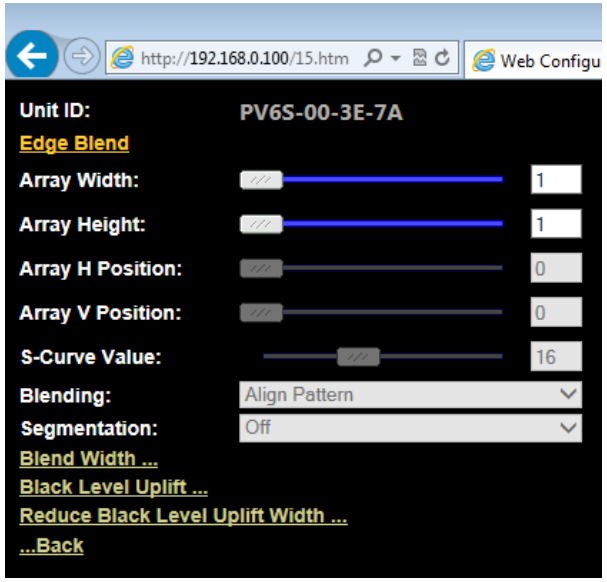
Notes

*See **Using the Discovery Tool to view your network** later in this section.*

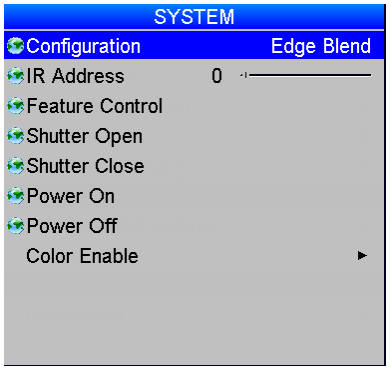
Examples (continued)

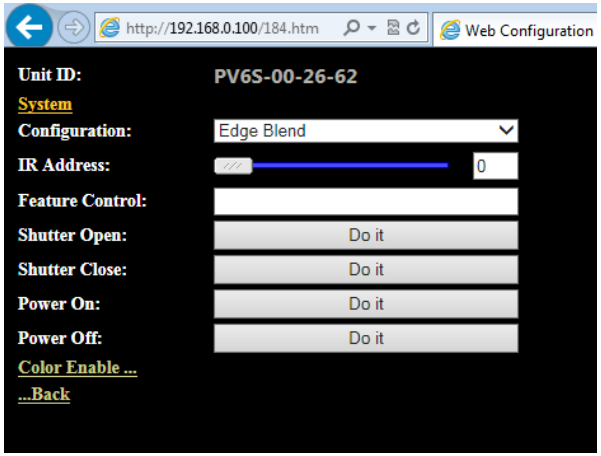
- Sliders are represented by similar sliders, as in the **Array Width** and **Array Height** sliders shown here.
- Items that are not available are shown grayed-out, as shown here.
- To return from a sub-menu to the previous menu, click on the **Back** link at the bottom of the menu.





- Commands are represented by **Do it** buttons, as shown here.



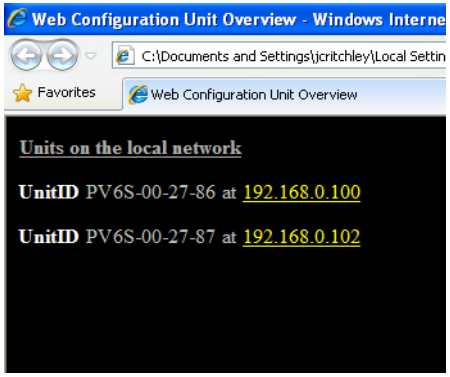


Notes

Using the Discovery Tool to view your network

The Discovery Tool allows you to view the IP addresses of all projectors in your network.

The tool opens the following page in your browser:



Click on a projector IP address to access the Virtual OSD for that projector.

Notes

The tool will only find projectors from the same subnet as the host computer. The IP addresses of these projectors will be identical up to the third octet as shown in the example.

SECTION B

Command Guides for the following projectors:

HIGHlite Laser 3D

M-Vision 930 3D

Inputs

The `input` command assigns different values to each projector:

<command>	<operator>	<values>	
`input`	`= ?`	**HIGHlite Laser 3D:** 0 = HDMI 1 1 = HDMI 2 2 = VGA 3 = Component 1 4 = Component 2 5 = DVI 6 = HDBaseT 7 = 3GSDI	**M-Vision 930 3D:** 0 = HDMI 1 1 = HDMI 2 2 = VGA 3 = Component 1 4 = Component 2 5 = DVI 6 = HDBaseT

Notes

Test Patterns

The `test.pattern` command can be used with both projectors:

<command>	<operator>	<value>
`test.pattern`	`= ?`	0 = Off 1 = White 2 = Black 3 = Red 4 = Green 5 = Blue 6 = ANSI Checkboard 7 = Focus Grid 8 = V Burst 9 = H Burst 10 = Color Bar

Notes

Lens

The commands in the table below can be used with both projectors:

<command>	<operator>	<value>
zoom.in	(execute)	
zoom.out	(execute)	
focus.near	(execute)	
focus.far	(execute)	
lens.center	(execute)	
lens.up	(execute)	
lens.down	(execute)	
lens.left	(execute)	
lens.right	(execute)	

Notes

Image

The commands in the table below can be used with both projectors:

<command>	<operator>	<value>
brightness	= ?	0 to 200 (integer)
contrast	= ?	0 to 200 (integer)
gamma	= ?	0 = 1.0 1 = 1.8 2 = 2.0 3 = 2.2 4 = 2.35 5 = 2.5
adcontrast	= ?	0 = Off 1 = On
saturation	= ?	0 to 200 (integer)
hue	= ?	0 to 200 (integer)
sharpness	= ?	0 to 200 (integer)
nr	= ?	0 to 200 (integer)
h.position	= ?	0 to 200 (integer)
v.position	= ?	0 to 200 (integer)
vga.phase	= ?	0 to 200 (integer)
tracking	= ?	0 to 200 (integer)
sync.level	= ?	0 to 200 (integer)
resync	(execute)	

Notes

The `vga.phase` *command is identical to the* **Phase** *setting in the* **Image > Position and Phase** *menu.*

The commands in the table below can be used with M-Vision 930 3D:

<command>	<operator>	<value>
picture.mode	= ?	0 = Bright 1 = Presentation 2 = Video
dblack	= ?	0 = Off 1 = On

Notes

Color

The commands in the table below can be used with both projectors:

<command>	<operator>	<values>	
color.space	= ?	0 = Auto 1 = YPbPr 2 = YCbCr 3 = RGB PC 4 = RGB Video	
color.temp	= ?	**HIGHlite Laser 3D:** 0 = 5500K 1 = 6500K 2 = 7500K 3 = 9300K 4 = Native 5 = 3200K	**M-Vision 930 3D:** 0 = 5500K 1 = 6500K 2 = 7500K 3 = 9300K 4 = Native
color.gamut	= ?	**HIGHlite Laser 3D:** 0 = Auto 1 = REC709 2 = SMPTE-C 3 = EBU 4 = Native 5 = User	**M-Vision 930 3D:** 0 = Auto 1 = REC709 2 = SMPTE-C 3 = EBU 4 = Native
red.lift	= ?	0 to 200 (integer)	
green.lift	= ?	0 to 200 (integer)	
blue.lift	= ?	0 to 200 (integer)	
red.gain	= ?	0 to 200 (integer)	
green.gain	= ?	0 to 200 (integer)	
blue.gain	= ?	0 to 200 (integer)	

Notes

In addition, the following commands can be used with HIGHlite Laser 3D:

<command>	<operator>	<values>
user.std.rx	= ?	550 to 750 (integer)
user.std.ry	= ?	250 to 450 (integer)
user.std.gx	= ?	200 to 400 (integer)
user.std.gy	= ?	400 to 750 (integer)
user.std.bx	= ?	50 to 250 (integer)
user.std.by	= ?	0 to 120 (integer)
user.std.wx	= ?	200 to 400 (integer)
user.std.wy	= ?	250 to 450 (integer)
user.target.rx	= ?	550 to 750 (integer)
user.target.ry	= ?	250 to 450 (integer)
user.target.gx	= ?	200 to 400 (integer)
user.target.gy	= ?	400 to 750 (integer)
user.target.bx	= ?	50 to 250 (integer)
user.target.by	= ?	0 to 120 (integer)
user.target.wx	= ?	200 to 400 (integer)
user.target.wy	= ?	250 to 450 (integer)
user.target.cx	= ?	125 to 325 (integer)
user.target.cy	= ?	225 to 425 (integer)
user.target.mx	= ?	200 to 400 (integer)
user.target.my	= ?	50 to 250 (integer)
user.target.yx	= ?	300 to 500 (integer)
user.target.yy	= ?	400 to 600 (integer)

Notes

The `user.std` *commands are identical to the settings in the* **Color > User Gamut > Measure Gamut** *menu. Protocol values are multiples of 1000.*

The `user.target` *commands are identical to the settings in the* **Color > User Gamut > Target RGBW Gamut** *and* **Target MCY Gamut** *menus. Protocol values are multiples of 1000.*

<command>	<operator>	<values>
user.p7.set	(execute)	
user.p7.rst	(execute)	

Notes

The `user.p7.set` *command implements user gamut values as defined in the* `user.std` *and* `user.target` *commands above.* `user.p7.set` *will not work unless* `color.gamut` *is set to 5 (user) in advance.*

Geometry

The commands in the table below can be used with both projectors:

<command>	<operator>	<values>
aspect.ratio	= ?	0 = 16:9 1 = TheaterScope 2 = 4:3 3 = 4:3 Narrow 4 = 16:10 5 = 5:4 6 = Source
overscan	= ?	0 = Off 1 = Crop 2 = Zoom
h.keystone	= ?	-350 to +350 (integer)
v.keystone	= ?	-200 to +200 (integer)
rotation	= ?	-20 to +20 (integer)
pin.barrel	= ?	-100 to +100 (integer)
4corner.ulx 4corner.uly 4corner.urx 4corner.ury 4corner.llx 4corner.lly 4corner.lrx 4corner.lry	= ?	-100 to +100 (integer)
warp.reset	(execute)	

Notes

<command>	<operator>	<values>
blanking.top	= ?	0 to 360 (integer)
blanking.bottom	= ?	0 to 360 (integer)
blanking.left	= ?	0 to 534 (integer)
blanking.right	= ?	0 to 534 (integer)
blanking.reset	(execute)	

Notes

Edge Blend

The commands in the table below can be used with both projectors:

<command>	<operator>	<values>
eb.stat	= ?	0 = Off 1 = On
eb.adl	= ?	0 = Off 1 = On
eb.top	= ?	0, 200 to 500
eb.bottom	= ?	0, 200 to 500
eb.left	= ?	0, 200 to 800
eb.right	= ?	0, 200 to 800
eb.blu.top	= ?	0, 8, 16, 24, 32
eb.blu.bottom	= ?	0, 8, 16, 24, 32
eb.blu.left	= ?	0, 4, 8, 12, 16, 20, 24, 28, 32
eb.blu.right	= ?	0, 4, 8, 12, 16, 20, 24, 28, 32
eb.all	= ?	0 to 32 (integer)
eb.red	= ?	0 to 32 (integer)
eb.green	= ?	0 to 32 (integer)
eb.blue	= ?	0 to 32 (integer)
eb.reset	(execute)	

Notes

3D

The commands in the table below can be used with both projectors:

<command>	<operator>	<values>
3d.format	= ?	0 = Off 1 = Auto 2 = Side-By-Side (Half) 3 = Top-And-Bottom 4 = Dual-Pipe
3d.dominance	= ?	0 = Normal 1 = Reverse
3d.darktime	= ?	0 = 0.65 ms 1 = 1.3 ms 2 = 1.95 ms 3 = 2.5 ms
3d.syncoffset	= ?	0 to 60 (integer)

In addition, the 3d.dlplink command can be used with M-Vision 930 3D:

<command>	<operator>	<values>
3d.dlplink	= ?	0 = Off 1 = On

Notes

Lamps

The commands in the table below can be used with M-Vision 930 3D:

<command>	<operator>	<values>
lamp.mode	= ?	0 = Auto 1 1 = Dual 2 = Lamp1 3 = Lamp2
power.mode	= ?	0 = Eco 1 = Normal 2 = Power
lamp.power	= ?	0 = 77% 1 = 78% 2 = 79% 3 = 80% 4 = 82% 5 = 83% 6 = 84% 7 = 85% 8 = 86% 9 = 87% 10 = 89% 11 = 90% 12 = 91% 13 = 92% 14 = 93% 15 = 94% 16 = 95% 17 = 97% 18 = 98% 19 = 99% 20 = 100%
altitude	= ?	0 = Off 1 = On

Notes

<command>	<operator>	<values>
lamp1.status	?	0 = Off 1 = On
lamp2.status	?	0 = Off 1 = On
lamp1.hours	?	string
lamp2.hours	?	string

Notes

Laser

The commands in the table below can be used with HIGHlite Laser 3D:

<command>	<operator>	<values>
laser.mode	= ?	0 = Eco 1 = Normal 2 = Custom 3 = Quiet
laser.power	= ?	0 = 30 1 = 32.5 2 = 35 3 = 37.5 4 = 40 5 = 42.5 6 = 45 7 = 47.5 8 = 50 9 = 52.5 10 = 55 11 = 57.5 12 = 60 13 = 62.5 14 = 65 15 = 67.5 16 = 70 17 = 72.5 18 = 75 19 = 77.5 20 = 80 21 = 82.5 22 = 85 23 = 87.5 24 = 90 25 = 92.5 26 = 95 27 = 97.5 28 = 100

Notes

laser.power *is only effective if* laser.mode *is set to custom.*

<command>	<operator>	<values>
altitude	= ?	0 = Off 1 = On
laser.status	?	0 = Off 1 = On
laser.hours	?	number

Notes

Setup

The commands in the table below can be used with both projectors:

<command>	<operator>	<values>
orientation	= ?	0 = Front Tabletop 1 = Front Ceiling 2 = Rear Tabletop 3 = Rear Ceiling
auto.poweroff	= ?	0 = Off 1 = On
auto.poweron	= ?	0 = Off 1 = On
startup.logo	= ?	0 = Off 1 = On
blank.screen	= ?	0 = Splash 1 = Black 2 = Blue 3 = White
trig.1	= ?	0 = Screen 1 = 16:9 2 = Theaterscope 3 = 4:3 4 = 4:3 Narrow 5 = RS-232 6 = RS232 On 7 = RS232 Off
trig.2	= ?	0 = Screen 1 = 16:9 2 = Theaterscope 3 = 4:3 4 = 4:3 Narrow 5 = RS-232 6 = RS232 On 7 = RS232 Off

Notes

<command>	<operator>	<values>
auto.source	= ?	0 = Off 1 = On
ir.enable	= ?	0 = Off 1 = On
lan.dhcp	= ?	0 = Off 1 = On
lan.ip	= ?	A valid IP address in the following format: *xxx.xxx.xxx.xxx*
lan.subnet	= ?	A valid subnet address in the following format: *xxx.xxx.xxx.xxx*
lan.gateway	= ?	A valid gateway address in the following format: *xxx.xxx.xxx.xxx*
lan.dns	= ?	A valid DNS address in the following format: *xxx.xxx.xxx.xxx*
lan.standby	= ?	0 = Off 1 = On
osd.menupos	= ?	0 = Top Left 1 = Top Right 2 = Bottom Left 3 = Bottom Right 4 = Center
osd.trans	= ?	0 = 0% 1 = 25% 2 = 50% 3 = 75%
osd.timer	= ?	0 = Always On 1 = 10 seconds 2 = 30 seconds 3 = 60 seconds
osd.msgbox	= ?	0 = Off 1 = On
recall.mem	= ?	0 = Preset A 1 = Preset B 2 = Preset C 3 = Preset D 4 = Default

Notes

<command>	<operator>	<values>
save.mem	=	0 = Preset A 1 = Preset B 2 = Preset C 3 = Preset D

Notes

Information

The commands in the table below can be used with both projectors:

<command>	<operator>	<values>	
model.name	?	string	
serial	?	string	
sw.version	?	string	
act.source	?	**HIGHlite Laser 3D:** 0 = HDMI 1 1 = HDMI 2 2 = VGA 3 = Component 1 4 = Component 2 5 = DVI 6 = HDBaseT 7 = 3GSDI	**M-Vision 930 3D:** 0 = HDMI 1 1 = HDMI 2 2 = VGA 3 = Component 1 4 = Component 2 5 = DVI 6 = HDBaseT
signal	?	string	
h.refresh	?	string	
v.refresh	?	string	
pixel.clock	?	string	
factory.reset	(execute)		

Notes

The `laser.hours` command can be used with HIGHlite Laser 3D:

<command>	<operator>	<values>
`laser.hours`	?	string

The `lamp1.hours` and `lamp2.hours` commands can be used with M-Vision 930 3D:

<command>	<operator>	<values>
`lamp1.hours`	?	string
`lamp2.hours`	?	string

Notes

Miscellaneous

The commands in the table below can be used with both projectors:

<command>	<operator>	<values>
power	= ?	0 = Off 1 = On
shutter	= ?	0 = Open 1 = Close

Notes

SECTION C

Command Guide for the following projector:

INSIGHT 4K Laser

Introduction

TCP Port 43728

Command structure

Byte	Description	Comments
0	Command One (1)	First level commands
1	Command Two (2)	Second level commands
2	Command Three (3)	Third level commands
3	Length (MSB)	Number of bytes of command data
4	Length (LSB)	Number of bytes of command data
5 … n	Command Data 0 … n	
n + 1	Checksum	The LSB of the sum of all preceding bytes

In this section bytes are shown separated for clarity: each string is placed in a table where each byte occupies a separate cell.

All values are in hexadecimal format unless explicitly stated otherwise.

Checksum must be correctly calculated. The projector does not respond to an incorrect checksum.

Command example: Laser On

Byte	Value	Description
0	03	Command 1
1	2f	Command 2
2	00	Command 3
3	00	Length (MSB)
4	02	Length (LSB)
5	12	Data
6	01	
7	47	Checksum (see ***Example 1*** in the note for calculation)

The control system should wait for the full response to a command before transmitting the next command.

Notes

If the checksum is greater than 100, then only the least significant byte shall be sent.

Example 1

*The **Laser On** command looks like this:*

*03 2f 00 00 02 12 01 **47**,*

where the checksum 47 is obtained by adding up all preceding bytes:

3 + 2f + 0 + 0 + 2 + 12 + 1 = 47

Example 2

*The checksum of the **Set Light Power Leve**l command with a light power value of 1e (30%) is obtained by adding up all preceding bytes:*

*3 + 10 + 0 + 0 + 5 + c1 + ff + 0 + 1e + 0 = **1f6***

*The checksum **1f6** contains more than one byte, therefore only the LSB will be sent with the command:*

*03 10 00 00 05 c1 ff 00 1e 00 **f6***

*Similarly, if the light power value is 64 (100%), the checksum will be **23c** and the actual command will look like this:*

*03 10 00 00 05 c1 ff 00 64 00 **3c***

Command Guide

Control commands

Power On

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Checksum
02	00	00	00	00	02

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Checksum
22	00	00	c0	00	e2

Notes

Power Off

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Checksum
02	01	00	00	00	03

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Checksum
22	01	00	c0	00	e3

Notes

Light On

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
03	2f	00	00	02	12	01	47

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data 1	Data 2	Checksum
23	2f	00	c0	02	12	00	26

Notes

Light Off

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
03	2f	00	00	02	12	02	48

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data 1	Data 2	Checksum
23	2f	00	c0	02	12	00	26

Notes

Set Light Power Level

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data					Checksum
								Light Power Level		
03	10	00	00	05	c1	ff	00	**1e**	00	f6

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data 1	Data 2	Checksum
23	10	00	c0	02	00	00	f5

Notes

Light Power Level *is represented as a percentage between 30% and 100% (in hex), as in the following examples:*

1e = 30 decimal
63 = 99 decimal
64 = 100 decimal

Change the byte in bold and recalculate the checksum.

Get Light Power Level

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data			Checksum
03	05	00	00	03	c1	00	00	cc

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Response Data														Checksum
											Light Power Level								
23	05	00	c0	10	02	64	00	1e	00	00	00	**63**	00	07	00	01	00	00	ff	ff	e5

Notes

Light Power Level *is represented as a percentage between 30% and 100% (in hex), as in the following examples:*

1e = 30 decimal
63 = 99 decimal
64 = 100 decimal

Get Light Status

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data	Checksum
03	2f	00	00	01	1e	51

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Response Data														Checksum
						Light Hours		Light Warning Time		Light % Remaining	Light Strike Count								
23	2f	00	c0	0f	1e	**42**	**00**	**20**	**4e**	**64**	**47**	**00**	00	00	20	4e	64	00	00	6c

Notes

***Light Hours**: 0042 = 66 hours*

***Light Warning Time**: 4e20 = 20,000 hours*

***Light % Remaining**: 64 = 100%*

***Light Strike Count**: 0047 = 71 strikes*

Douser Close

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Checksum
02	16	00	00	00	18

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Checksum
22	16	00	c0	00	f8

Notes

Douser Open

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Checksum
02	17	00	00	00	19

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Checksum
22	17	00	c0	00	f9

Notes

Douser Status

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data	Checksum
00	85	00	00	01	03	89

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7	Data 8	Data 9	Data 10	Data 11	Data 12	Data 13	Data 14	Data 15	Data 16	Checksum
20	85	00	c0	10	**81**	00	00	00	00	00	00	00	00	00	ff	ff	ff	ff	ff	ff	f0

Notes

*In the **Douser Status** response:*

81 = Douser closed
00 = Douser open

Running Status

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data	Checksum
00	85	00	00	01	01	87

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Response Data															Checksum
						External Control	Power	Light Cooling Status	Power Processing	Projector Status / Mode				Light Status	Light On / Off Status					
20	85	00	c0	10	00	**00**	**01**	**00**	**00**	**0c**	00	00	00	**00**	**00**	ff	00	00	00	00	81

Notes

***External Control**:*

00 = Off, 01 = On

***Power**:*

00 = Off, 01 = On

***Light Cooling Status**:*

00 = Normal, 01 = On

***Power Processing**:*

00 = Normal
01 = Powering up or down

***Projector Status / Mode**:*

00 = Standby
01 = Power on protect
02 = Ignition first attempt
03 = Power on running
04 = Running: power on, light on
05 = Cooling
06 = ----- (reserved)
07 = Reset wait
08 = Fan stop error
09 = Light ignition retry
0a = Light error
0c = Running: power on, light off

***Light Status**:*

00 = Off, 01 = On

***Light On / Off Status**:*

00 = Normal
01 = Powering up or down

Lens commands

Move Up

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	03	7f	9e

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Move Down

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	03	81	a0

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Stop Up/Down Movement

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	03	00	1f

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Move Left

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	02	81	9f

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Move Right

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	02	7f	9d

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Stop Left/Right Movement

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	02	00	1e

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Zoom In

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	00	7f	9b

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Zoom Out

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	00	81	9d

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Stop Zoom

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	00	00	1c

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Focus In

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	01	7f	9c

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Focus Out

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	01	81	9e

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Stop Focus

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
02	18	00	00	02	01	00	1d

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	18	00	c0	01	00	fb

Notes

Title selection commands (Preset buttons)

Set Title

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data		Checksum
						Title Number	
02	03	00	00	02	06	**00**	0d

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Data	Checksum
22	03	00	c0	01	00	e6

Notes

***Title number**: 00 to 63 (i.e. between 0 and 99 decimal).*

Title count in the protocol begins from 00. To set the correct title number, convert the decimal value to hex and then decrease the result by 1. For example, if you want to set title 12, send a value of 0b, the hex equivalent of (decimal) 11.

Get Current Title

Send

Command 1	Command 2	Command 3	Length MSB	Length LSB	Command Data	Checksum
02	85	00	00	01	02	88

Response (example)

Response 1	Response 2	Response 3	Response 4	Length	Response Data														Checksum
						Title Number													
20	85	00	c0	10	00	**0e**	04	0d	02	00	00	00	ff	00	00	00	00	00	00	95

Notes

***Title number**: 00 to 63 (i.e. between 0 and 99 decimal).*

*Title count in the protocol begins from 00. To get the real title number, convert the protocol value to decimal and then increase the result by 1. For example, if **Get Current Title** returns a value of 0e (14 in decimal), the current title is 15.*

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