Subject: Product Specification of Delta HTD-8650 400W 3D Projection System

Revision History

Revision	Description	Revisor	Date
01	Preliminary	Delta	2011 / 11 / 21

Approvals:

Digital Projection Marketing	**Date**
Digital Projection Engineering	**Date**
DELTA Engineering	**Date**
DELTA Quality Assurance	**Date**

Table of Content

Section 1 Projector Types and Lens Options

Delta Model No.	Items
HTD-8650 QDPAC	400W UHP Projector with Short Throw Lens (TR: 1.56 ~ 1.86)
HTD-8650 QDPAA	400W UHP Projector with Standard Lens (TR: 1.85 ~ 2.40)
5050014505 (3797712800-S) TR0.8	Conversion Lens A – 0.8X (TR: 1.25~1.5 = Short Throw Lens + Converter Lens A)
5050014605 (3797712900-S) TR1.25	Conversion Lens B – 1.25x (TR:2.3~3.0 = Long Throw Lens + Converter Lens B)

Section 2 General Concept

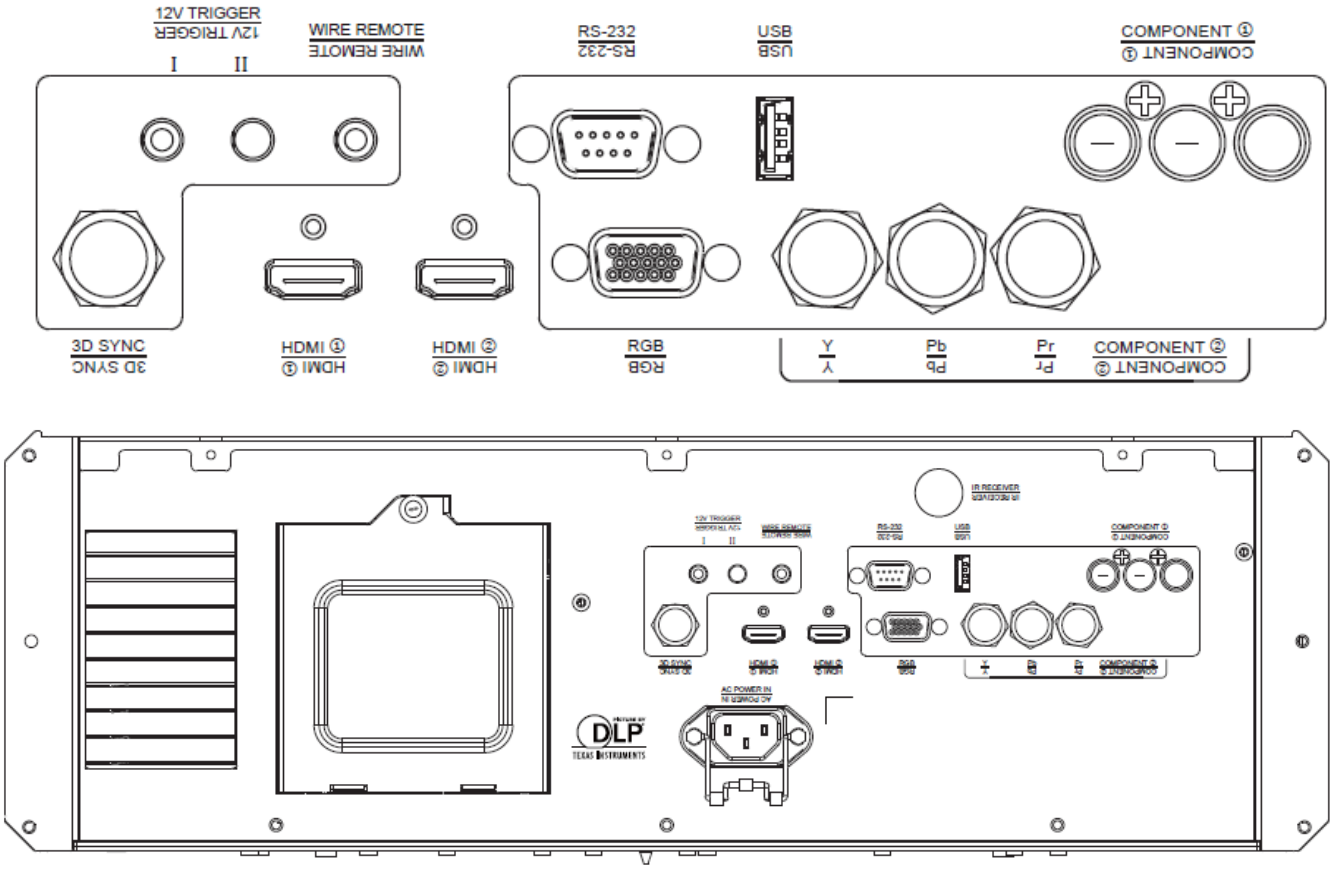
HTD-8650 projector is a standalone 1080p 400W 3D UHP lamp projector. This document specifies the performance and functionality of the projector.

Section 3 Input Description

Input/output connectors

Connectivity	Function
3 RCA (3 x cinch connections)	PrYPb
3 BNC (3 x Bayonet Neill Concelman)	PrYPb
D-Sub 15	RGB HV
HDMI x 2	1) Support HDMI 1.3 2) Support HDCP 1.1 3) Support DVI 1.0

Connectivity	Function
	4) Support 1080p frame sequential as dual HDMI inputs 5) Support side-by-side 3D format as dual HDMI inputs
D-Sub 9 (RS-232 In)	1) Support RS232 standard 2) Firmware download 3) Switch on & off 4) RS232 commands
3.5 mm mini Jack	12V trigger (400mA) for screen control
3.5 mm mini Jack	12V trigger (400mA) for aspect ratio control
3.5mm Jack	IR INPUT. Provides input for Niles/Xantech compatible IR repeater systems
USB	For firmware upgrade only
1 BNC Connector	3D Synchronization Signal Input



Section 4 Optical Configuration

A. DMD specification

- Panel Size: 0.95”
- Resolution: 1920 x 1080
- DarkChip Level: DC2
- Pixel Size: 10.8 μm

B. Engine Performance

Parameter	Value	Production Measurement Definition
Brightness	Standard color wheel (RGBYCW)	PJ LENS: TR: 1.85 ~2.4 Standard Lens
	In Brightness Mode	PJ LENS: TR: 1.56 ~1.86 Short Throw Lens
Minimum	4100 lumens (Standard Lens)	Screen Size: 60 inches
Typical	4800 lumens	Lens state: Wide
		Distance: 2.4 m
Minimum	3560 lumen (Short Throw Lens)	Test Pattern: Internal Test Pattern 11 - White
Typical	4180 lumens	Background
		Position: ANSI 9 points
Minimum		Meter: Minolta CL-200
Typical		Light Source Mode: 400W High Power Mode
		Environment: 0-0.1lux
Native Contrast Ratio		PJ LENS: TR: 1.85 ~2.4 Standard Lens
		PJ LENS: TR: 1.56 ~1.86 Short Throw Lens
Minimum	1480:1 (Standard Lens)	PJ LENS: TR: 0.73 Fixed Lens
Typical	1800:1	Screen Size: 20 inches
		Lens state: Tele
Minimum	1480:1 (Short Throw Lens)	Input source:
Typical	1800:1	Internal pattern white background
		Position: center
Minimum		Meter: Minolta CL-200
Typical		Test mode:1920 * 1080 @ 60 HZ
		Environment: 0.1lux
ANSI Contrast Ratio		Test Pattern : Internal Test Pattern 13 Checkboard
		Formula：(Average center brightness of 8
Minimum	250:1	white checkers) / (Average center brightness
Typical	350:1	of 8 black checkers)

Parameter	Value	Production Measurement Definition
Brightness Uniformity Minimum Typical (ANSI 9 Standard)	 70% 85%	Measurement same as brightness. Formulate: Brightness uniformity standard - Min(Brightness of ANSI 9 point)/Max(Brightness of ANSI 9 point) } x 100% Max= brightness of brightness point (ANSI 9) Min = brightness of darkest point (ANSI 9) Avg = Average of brightness
Color Uniformity	d(u',v') ≦ 0.01 (Max) d(u',v') ≦ 0.005(Typical)	PJ LENS: TR: 1.85 ~2.4 Standard Lens PJ LENS: TR: 1.56 ~1.86 Short Throw Lens PJ LENS: TR: 0.73 Fixed Lens (TBC) NOTE: The color uniformity spec for the fixed les needs to be confirmed. Calibrated Meter: Minolta CL-200 100% full white pattern Position: ANSI 9 Points Formulate: $u'_i = \frac{4x_i}{-2x_i + 12y_i + 3}$ $v'_i = \frac{9y_i}{-2x_i + 12y_i + 3}$ $i = 1..9$
Color Temperature	Bright Mode: (x=0.310, y=0.350) D65 Bright Mode: (x=0.310, y=0.330) D65 Color Mode: (x=0.310, y=0.330)	D65 Bright Mode and D65 Color Mode will be activated via RS-232 command.

<table>
<tr><th>Parameter</th><th>Value</th><th>Production Measurement Definition</th></tr>
<tr><td>Color
Coordinates</td><td>
<table>
<tr><th></th><th>x</th><th>y</th></tr>
<tr><td>R</td><td>0.66
+/-0.03</td><td>0.33
+/-0.03</td></tr>
<tr><td>G</td><td>0.30
+/-0.03</td><td>0.60
+/-0.03</td></tr>
<tr><td>B</td><td>0.145
+/-0.015</td><td>0.056
+/-0.015</td></tr>
</table>
</td><td>PJ LENS: TR: 1.85 ~2.4 Standard Lens
PJ LENS: TR: 1.56 ~1.86 Short Throw Lens

NOTE: The color coordinates spec for the fixed les needs to be confirmed.
Screen Size: 60 inches
Distance: 2.4 m
Input source: Internal patterns of red, green, blue and white background
Position: center
Meter: Minolta CL-200
Test mode: 1080 * 1920 @ 60Hz
Environment: 0-0.1lux</td></tr>
</table>

C. Lens

- **Long Throw Lens (Standard Projection Lens)**

Parameter	Value	Remark
Lens shift Vertical Horizontal	 Adjustable from -120% to +120 % off axis Adjustable from -30% to +30 % off axis	 All shifts manually
Throw Ratio	1.85 ~ 2.40	From projection screen to first element of projection lens
Focus Range	2.5m~ 10m	Full optical performance range (Object to surface of 1st lens)
F/No	(W)2.17-(T)2.46	
MTF	40 lp/mm	Limiting sample using
TV-Distortion	Horizontal / Vertical < 1.5 %	@ 3.3m

- **Short Throw Lens (Option Projection Lens)**

Parameter	Value	Remark
Lens shift Vertical Horizontal	 Adjustable from +120% to -120 % off axis Adjustable from +30% to -30 % off axis	All shifts manually
Throw Ratio	1.56 ~ 1.86	From projection screen to first element of projection lens
Focus Range	2m~ 7m	Full optical performance range (Object to surface of 1st lens)
F/No	(W)2.5~(T)2.76	
MTF	47 lp/mm	Limiting sample using
TV-Distortion	Horizontal / Vertical < 1.5 %	@ 3.3m

- **Fixed Lens**

Parameter	Value	Remark
Throw Ratio	0.73:1	From projection screen to first element of projection lens
Focus Range	TBD	Focus range of the fixed lens is to be confirmed.
F/No	2.5	
MTF	36 lp/mm	All Field > 55 %

- **Longer Zoom Lens**

Parameter	Value	Remark
Lens shift Vertical Horizontal	 Adjustable from -80% to +80 % off axis Adjustable from -20% to +20 % off axis	All shifts manually
Throw Ratio	2.40 ~ 4.0	From projection screen to first element of projection lens
Focus Range	2.5m~ 10m	Full optical performance range (Object to surface of 1st lens)

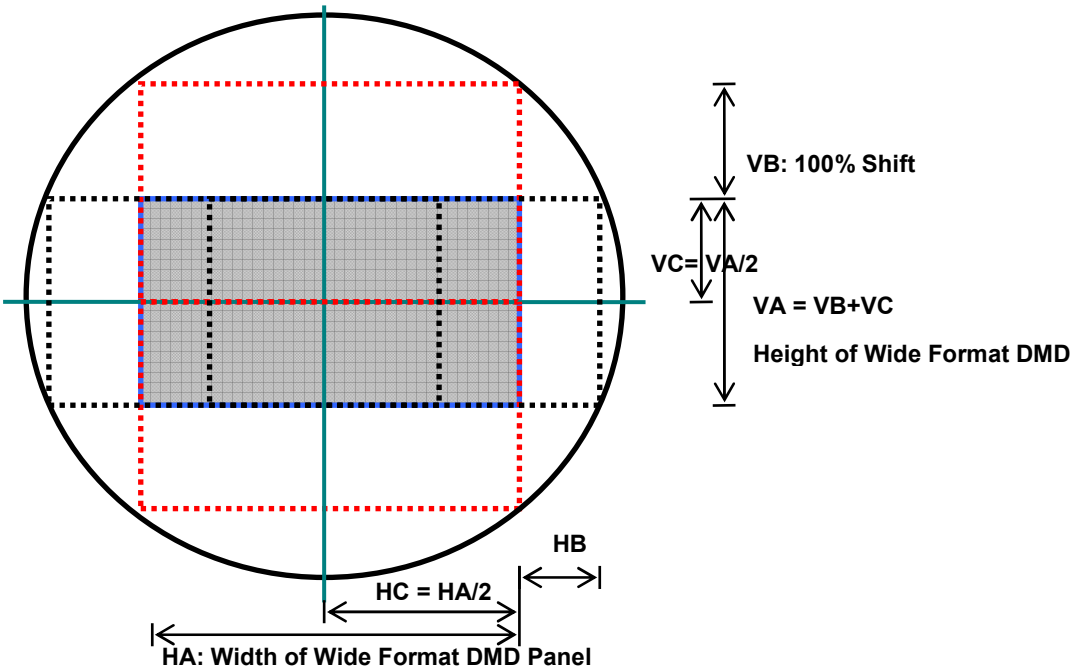
Parameter	Value	Remark
F/No	(W)2.1 - (T)2.75	
MTF	47 lp/mm	Limiting sample using
TV-Distortion	Horizontal / Vertical <= +/-1.5 % (TBD after lens development completed)	@ 0% shift range

D. Lens Shift Definition

- Vertical VB=VC, Lens Shift 100%
- Formula of Horizontal is the same

Lens Shift Range Table

Lens Type	Standard Lens (1.85-2.40)	Short Throw Lens (1.56-1.86)	Standard Lens (1.85-2.40)	Short Throw Lens (1.56-1.86)
Converter Lens			1.25X Converter lens	0.8X Converter lens
Vertical	+/- 120%	+/- 120%	+/- 60%(wide) +/- 120%(tele)	+/- 120%
Horizontal	+/- 30%	+/- 30%	+/- 10%	+/- 30%



Converter Lens

- Converter Lens A: 0.8x
- Converter Lens B: 1.25x

Color Wheel

- 2X RGBYCW CW (R:82° G:78° B:75° C:33° W:48° Y:44°)

Light Source

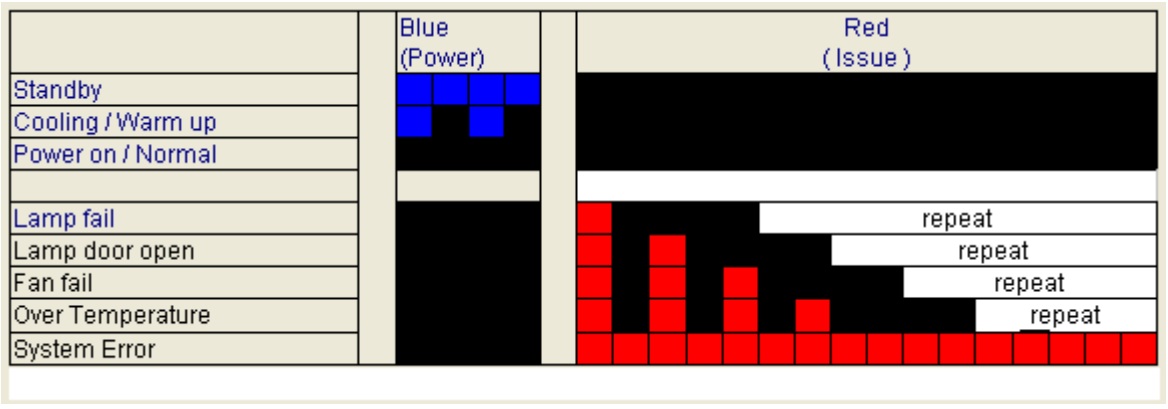
- Type: Philips UHP 400-320W 1.3 E21.9 LAMP
- Driver: EUC 400c E/N01 BALLAST
- Average Life (Lamp) : Lamp lifetime: 1000 hours (Typical) at Normal mode (400W)
  (Conditions:
  1. 2hrs on, 15 min off.
  2. More than 50% of lamp population have light output >50% of initial lumen output at the lamp life time.)

Lamp Light output: 19000 lm (typical) 17100 lm (minimum)

Section 5 Power Consumption

	Normal Mode	Standby Mode
110Vac	505W	< 1W
240Vac	500W	< 1W

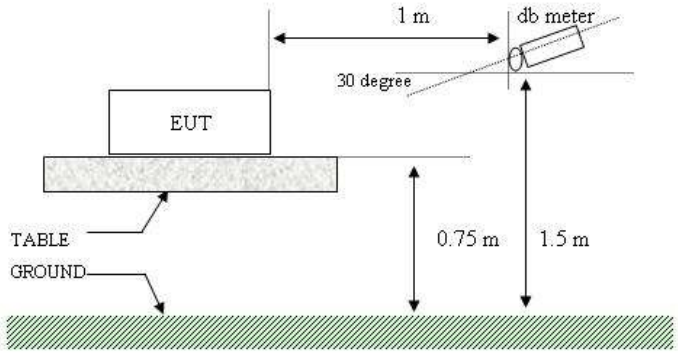
Section 6 LED Error Codes



Section 7 Acoustic Noise and Stray Light

A. Acoustic Noise

- Acoustic Noise Measurement follow the standard of ECMA 74, ISO 7779
- Typical Noise Level: 41dB(A) at lamp normal mode
- Fan Number: 8



Noise Measurement Procedure:

1. Transform sound pressure level (SPL) of each side (front, rear, left, right) to equivalent sound energy (ESE)
2. Average the sum of each side's ESE
3. Inverse ESE to SPL value
4. Testing environmental temperature: 25 degree.

Rear

Right

Left

Front

B. Stray Light Emission Specification

- Stray light: Tabletop and Ceiling Reflections

The following measurements should be made with a spot meter such as the Minolta LS-100 or equivalent with a sensitivity of 0.01 nits (cd/m2) or lower. The lamp should be set to its highest power setting and the lens should be set at 100% offset. Using visual inspection, the zoom position should be chosen that produces the highest stray light. While projecting a black image, on a white sheet of paper placed on the table under the projector at all 4 sides, there can be no more than 3 nits at any point.

- Stray light: Emissions from All Sides except Front.

These measurements should be made with a spot meter such as the Minolta LS-100 or equivalent with a sensitivity of 0.01 nits (cd/m2) or lower. The lamp should be set to its highest power setting. On a white sheet of paper or 1.0 gain screen placed vertically 60 cm away from the projector on all sides except the front, there can be no more than 0.5 nits at any point.

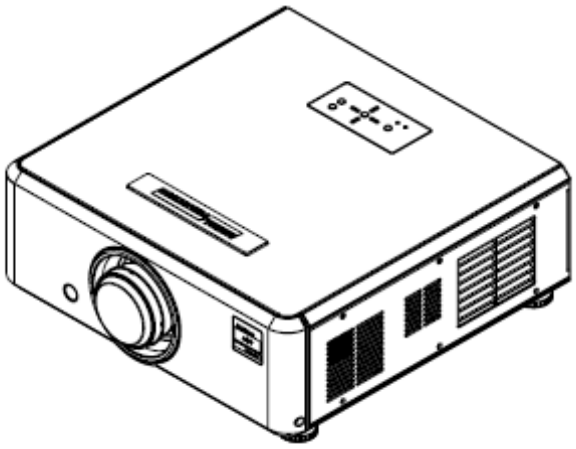
- Stray Light: Around Active Image.

These measurements should be made with a spot meter or incident light meter. The lamp should be set to its highest power setting and the projector should be set to its highest contrast mode. The projection distance should be chosen so that all measurements are within the light meter's sensitivity range. The tested area should be 3 times the width and height of the active image. Using visual inspection, the lens should be set at the zoom position and offset (within the operation range) that produces the highest stray light. On the screen while projecting a black image, the brightness of any point outside of the active image can be no more than 100% of the brightness at the center of the active image.

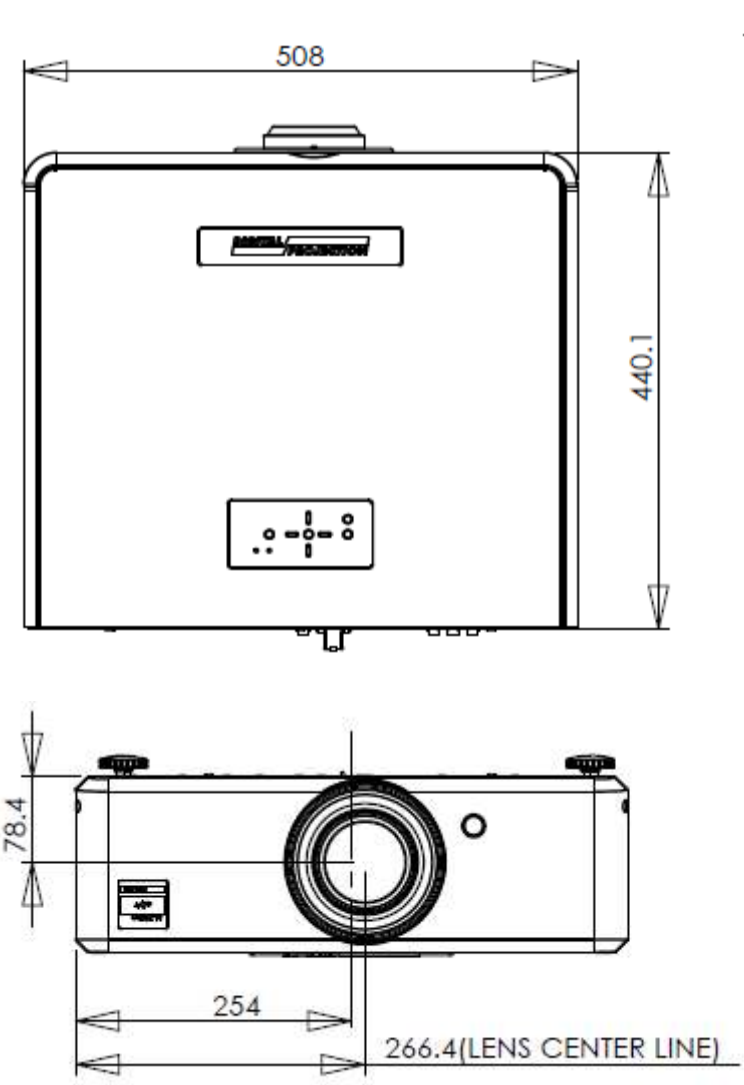
- Stray Light: Inside Active Image.

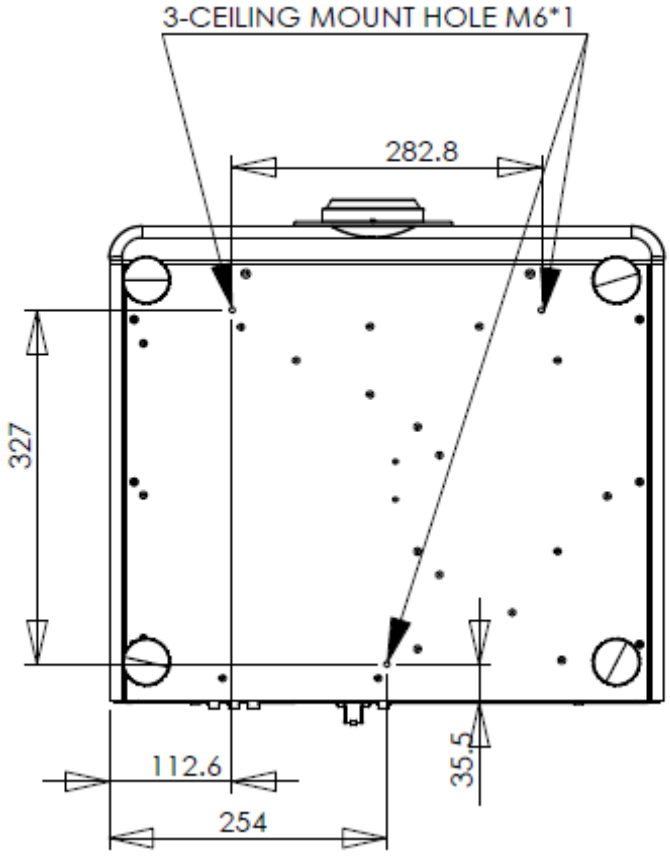
The criteria for stray light within the active image shall be the DMD Customer Image Quality Specification for "Major Light Blemishes" corresponding to the DMD device used in the projector (DMD Customer Image Quality Specification will be provided separately.)

Section 8 Aesthetics

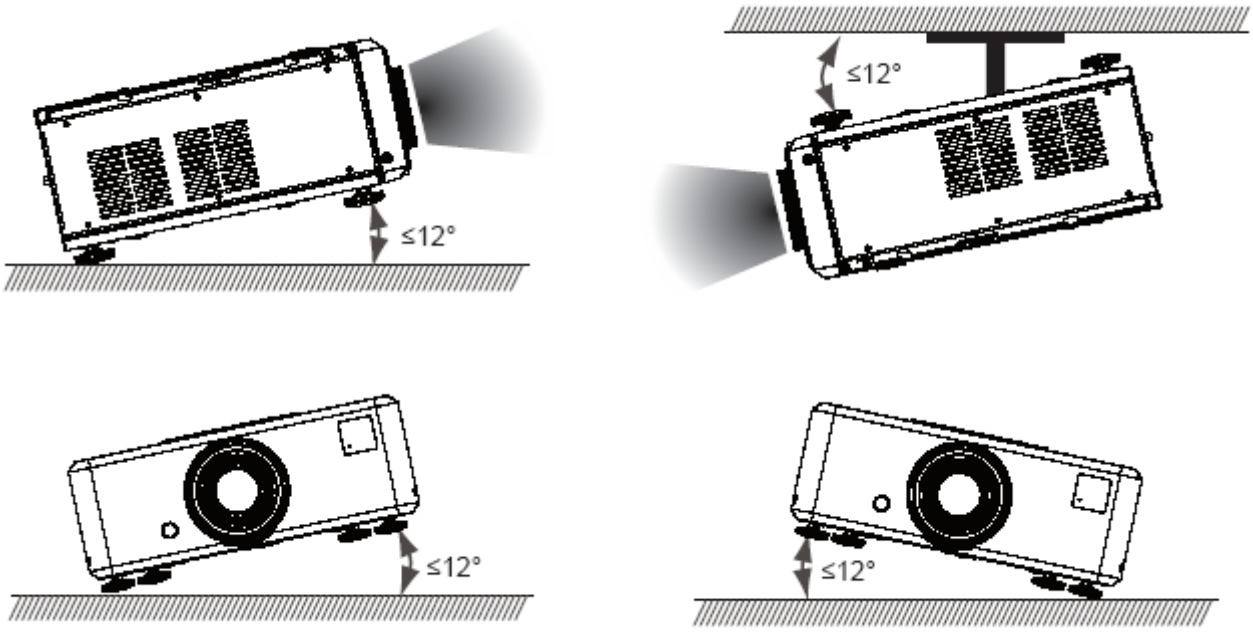


- Dimensions must be reduced with following priority:
- Height: 161.7mm (w/o adjustment foot)
- Depth: 440.1 mm
- Width: 508mm
- Material: Sheet Metal
- Cabinet Colour: Black
- Logo: Digital Projection
- Weight: 12 Kg (TBD)





- Tilt Angles



Section 9 Video Format List

Table 2.9.1: Compatible Video Sources										
Signal Type	**Resolution**	**Frame Rate**	**Y-Pr-Pb**	HD15 - RGBHV	HD15 - YUV	HDMI - RGB	HDMI - YUV 8-bit	HDMI - YUV 10-bit	HDMI - YUV 12-bit	**References**
PC	640x480	59.94		x		x				VESA DMT
	640x480	74.99		x		x				VESA DMT
	640x480	85		x		x				VESA DMT
	800x600	60.32		x		x				VESA DMT
	800x600	75		x		x				VESA DMT
	800x600	85.06		x		x				VESA DMT
	848x480	47.95		x		x				VESA CVT
	848x480	59.94		x		x				VESA CVT
	1024x768	60		x		x				VESA DMT
	1024x768	75.03		x		x				VESA DMT
	1024x768	85.03		x		x				VESA DMT
	1024x768	70.1		x		x				VESA DMT
	1280x720	47.95		x		x				VESA GTF
	1280 x 768	60.0		x		x				VESA DMT
	1280 x 768	60.0		x		x				VESA DMT Reduced Blanking
	1280 x 768	75.0		x		x				VESA DMT
	1280 x 768	85.0		x		x				VESA DMT
	1280 x 800	50.0		x		x				
	1280 x 800	60.0		x		x				VESA DMT
	1280 x 800	75.0		x		x				VESA DMT
	1280x1024	60.02		x		x				VESA DMT
	1280x1024	75.02		x		x				VESA DMT
	1280x1024	85.02		x		x				VESA DMT
	1440 x 900	60.0		x		x				VESA DMT
	1440 x 900	75.0		x		x				VESA DMT
	1400 x 1050	60.0		x		x				VESA DMT
	1400 x 1050	75.0		x		x				VESA DMT
	1600x1200	60		x		x				VESA DMT

Table 2.9.1: Compatible Video Sources										
Signal Type	**Resolution**	**Frame Rate**	**Y-Pr-Pb**	HD15 - RGBHV	HD15 - YUV	HDMI - RGB	HDMI - YUV 8-bit	HDMI - YUV 10-bit	HDMI - YUV 12-bit	**References**
	1920x1080	47.95		x		x				VESA CVT
	1600 x 1200	60.0		x		x				VESA DMT
	1920 x 1200	60.0		x		x				Reduced Blanking
	1680x1050	59.94		x		x				VESA CVT
Apple Mac	640x480	66.59		x		x				VESA DMT
	832x624	74.54		x		x				VESA DMT
NTSC	NTSC (M, 4.43)	59.94								ITU-R BT.1700, SMPTE 170M
PAL	PAL (B,G,H,I)	50								ITU-R BT.1700
	PAL (N)	50								ITU-R BT.1700
	PAL (M)	59.94								ITU-R BT.1700
SECAM	SECAM (M)	50								ITU-R BT.1700
SDTV	RGBS	50								RS-170, ITU-R BT.656
	480i	59.94	x			x	x	x	x	SMPTE 125M, CEA-861-D
	576i	50	x			x	x	x	x	ITU-R BT.601, CEA-861-D
EDTV	480p	59.94	x	x	x	x	x	x	x	SMPTE 293M, CEA-861-D
	576p	50	x	x	x	x	x	x	x	ITU-R BT.1358, CEA-861-D

Table 2.9.1: Compatible Video Sources										
Signal Type	**Resolution**	**Frame Rate**	**Y-Pr-Pb**	HD15 - RGBHV	HD15 - YUV	HDMI - RGB	HDMI - YUV 8-bit	HDMI - YUV 10-bit	HDMI - YUV 12-bit	**References**
HDTV	1080i	50	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080i (Aus)	50	x	x	x	x	x	x	x	SMPTE 295M
	1080i	59.94	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080i	60	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	720p	50	x	x	x	x	x	x	x	SMPTE 296M, CEA-861-D
	720p	60	x	x	x	x	x	x	x	SMPTE 296M, CEA-861-D
	1080p	23.98	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080p	24	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080p	25	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080p	29.97	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080p	30	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080p	50	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080p	59.94	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D
	1080p	60	x	x	x	x	x	x	x	SMPTE 274M, CEA-861-D

Section 10 3D Video Format

10.1 Side by Side

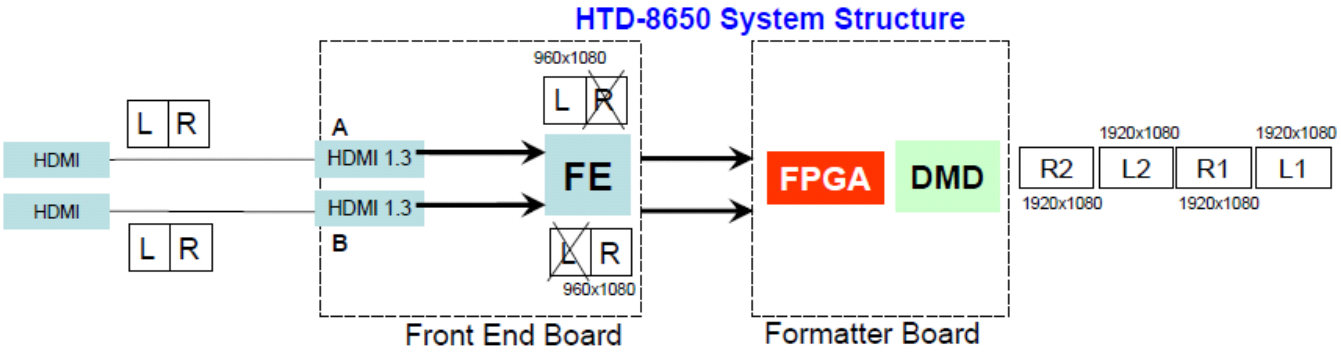
Both HDMI channels input with same side by side content.

Supported timing.

1920 x 1080p 60Hz / 1920 x 1080p 50Hz

1920 x 1080i 60Hz / 1920 x 1080i 50Hz

1280 x 720p 60Hz / 1280 x 720p 50Hz



10.2 Dual port (Left and Right)

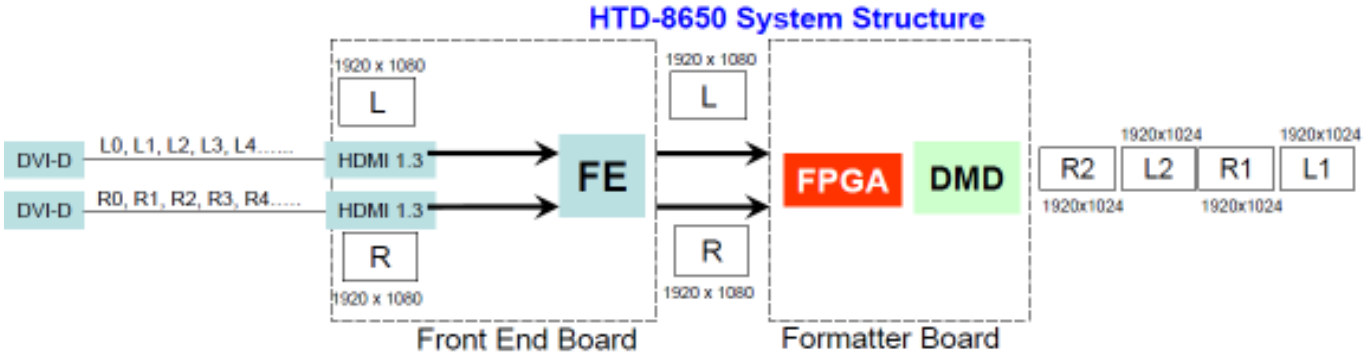
Left scene connect to HDMI1 and Right scene connect to HDMI2.

Supported timing.

1920 x 1080p 60Hz / 1920 x 1080p 50Hz

1920 x 1080i 60Hz / 1920 x 1080i 50Hz

1280 x 720p 60Hz / 1280 x 720p 50Hz



10.3 3D signal operation method:

3D stereoscopy relies on two completely different images (one for each eye) being displayed in alternating order. In case the images are displayed in wrong order comparing with the equipped active glasses or passive polarizer module, the projector supports to swap the input signals between HDMI 1 (Channel A) and HDMI 2 (Channel B) to match the correct order. For detailed comments, please refer to the serial command listed in **Section 15 Communication.**

Section 11 Reliability

Environmental Test Condition

NO	TEST ITEM	CONDITION
1	Random Vibration (With Packaged)	Random: 5 ~ 500Hz, 1.06Grms x, y, z axis , 1hours / axis PSD : 5 ~ 100Hz , 0.004g2 / Hz 100 ~ 137Hz , -6db 137 ~ 350Hz , 0.002g2 / Hz 350 ~ 500Hz , -6db
2	Shock (with packing)	1. 20G 11ms 2.Number of shocks : 3 shock/ per position 3.Test : 6 positions (+- x,y,z)
3	High Temp. & High Humidity (Operation)	1. Set temp at 35°C and humidity at 90% RH for 24 hrs(The temperature will CFM with R/D if need). 2. Down to 25°C by 4 hrs. 3. On table simulation and ceiling mount simulation 4.Timing: VGA 60Hz/SVGA 75Hz/XGA 85Hz change/ 30Second 5.Pattern:Crosshatch/W
4	Low Temperature (operation)	1. Set temp. at 0°C for 2 hrs, then power on the device and keep 0°C for 2 hr(The temperature will CFM with R/D if need) 2. Up to 25°C by 4hrs 3. On table simulation and celling mount simulation 4. Timing: VGA 60Hz/SVGA 75Hz/XGA 85Hz change/ 30Second
5	High Temp. & High Humidity (Storage)	1. Place the packaged unit in simulation chamber and set temperature and humidity at 60℃/90% RH for 24 hours 2. After that, check the performance at normal environment
6	Low Temperature (storage)	1. Place the packaged unit in simulation chamber and set temperature at -20℃ for 24 hours

		2. After that, Up to 25℃ by 12 hrs 3. After that, check the performance at normal environment

Item		Specification
Low line voltage range		Nominal: 100-120V
High line voltage range		Nominal: 200-240V
Inrush current		75A
Temperature	Operating	10~ 35 °C
	Non-Operating (Storage)	-20°C ~ 60°C
Altitude	Operating	Sea level to 10,000 feet
	Non-Operating (Storage)	Sea level to 40,000 feet
Humidity	Operating	85% (with maximum temperature of 40°C)
	Non-Operating (Storage)	10% to 90%

Section 12 Regulation Compliance

Safety Standards

- UL: 60950-1 2nd, CSA C22.2 No.60950-1-07, 2nd ; CSA C22.2 No. 60950-1-03, 1st Edition, 2006-07
- CB: IEC60950-1:2005, also investigated to EN60950-1:2006+A11:2009
- CCC: GB4943-2001, GB9254-2008(Class A), GB17625.1-2003
- IEC 60950-1/EN60950-1 :2001+A11: 2004, the product have to 100% test on production line with the condition 2121 Vdc /10 mA, / 3sec. between Primary and GND

Electromagnetic Compatibility EMC

- EN 55022: 2006+A1:2007 Class A
- EN 55024: 1998+A1:2001+A2:2003
- EN 61000-3-2:2006
- EN 61000-3-3:2008
- EN 61000-4-2: 2008
- EN 61000-4-3: 2008
- EN 61000-4-4: 2004
- EN 61000-4-5 : 2005
- EN 61000-4-6: 2008
- EN 61000-4-8:2009
- EN 61000-4-11: 2004
- FCC CFR TITLE 47 Part 15 Subpart B:2009 Class A
- ANSI C63.4: 2003
- ICES-003 Issue 4:2004 Class A
- CISPR 22: 2008

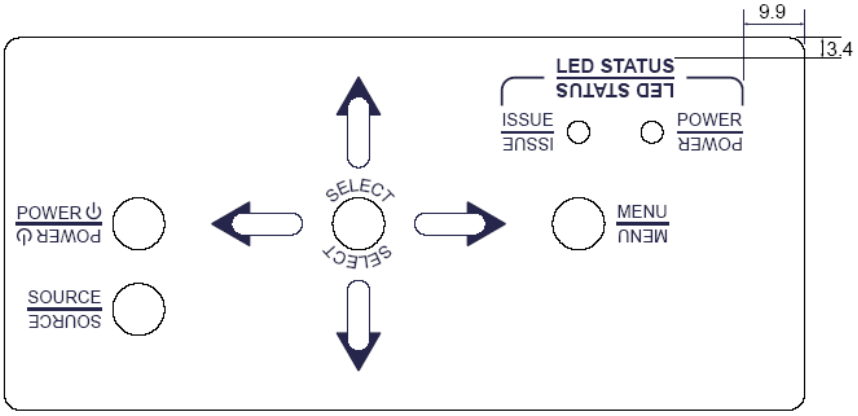
Electrostatic Discharge ESD

EN61000-4-2: 1995

Contact discharge: 4KV

Air discharge: 8KV

Section 13 Keypad Definition



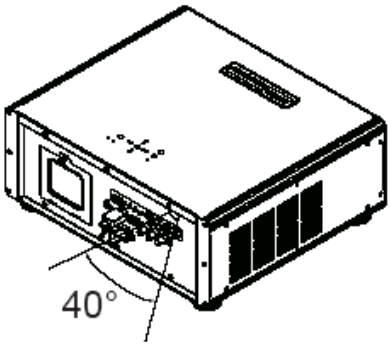
System Keypad Layout

Section 14 Remote Control Function

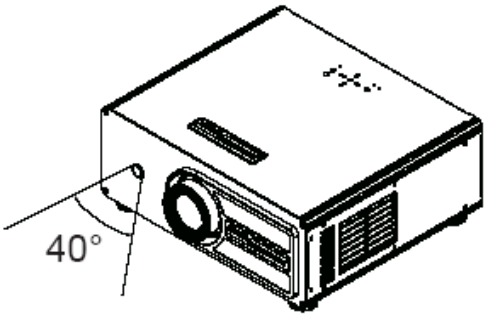
The projector and remote control will use the NEC IR protocol. Some details of the remote control are as follows:

- The projector and the remote is designed together to have a minimum 20 feet range from the front of the projector and a minimum 20 feet range from the rear.
- Two IR receivers included in the projector- one in the front and one in the rear. IR reception angles picture as below.

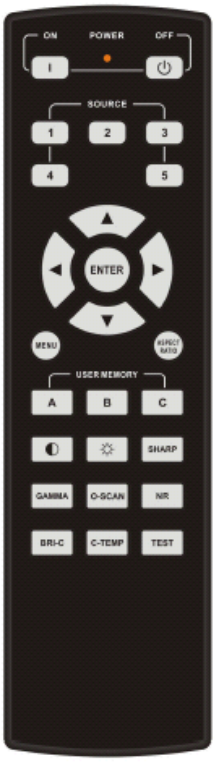
Rear IR Angle



Front IR Angle



- The remote control button layout is shown below



Remote Control Button Layout

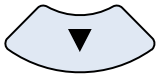
Section 15 Communications

You may control the projector by using remote control or by external control system or PC via serial interface, using a terminal-emulation program, such as HyperTerminal, configure the RS-232 parameters as follows: 9600 bps, 8 data bits, no parity, 1 stop bit and no flow control.

op for operation commands.

Operation commands allow more flexible and direct control of the projector. The syntax for operation commands is as follows:

op <operation> <Command> [CR]

Remote Control Key Code & Keynames		
Code 1	**Buttons on the Remote**	**Description**
0x01		Turn power on.
0x09		Turn power off.
0x15		Bring up or cancel menu display.
0x17		Keypad enter.
0x18		Keypad down arrow.
0x1A		Keypad up arrow.
0x1D		Keypad left arrow.
0x1F		Keypad right arrow.
0x80		Bring up or cancel brightness slider.

Remote Control Key Code & Keynames		
Code 1	**Buttons on the Remote**	**Description**
0x81		Bring up or cancel contrast slider.
0x82		Bring up or cancel sharpness slider.
0x83		Bring up or cancel noise reduction slider.
0x85		Switch to the next gamma.
0x8B		Switch the active source to source 1.
0x8C		Switch the active source to source 2.
0x8D		Switch the active source to source 3.
0x8E		Switch the active source to source 4.
0x8F		Switch the active source to source 5.
0x93		Switch to the next Overscan mode.
0x98		Recall user memory associated with the Preset A key.
0x99		Recall user memory associated with the Preset B key.
0x9A		Recall user memory associated with the Preset C key.
0xA3		Toggles between Brilliant Color On and Brilliant Color Off.
0xAA		Change to next Color Temperature
0xAD		Activate Test Patterns

Operation Commands			
Operation	**Command**	**Values**	**Notes**
powon	(execute)		Power on command
powoff	(execute)		Power off command
s3d.mode	*= ?*	*0 = 2D mode (3d mode off)* *1 = 3D mode – side by side (2 channels)* *2 = 3D mode – frame sequential (2 channels)*	*If the projector is in side-by-side mode and user intend to switch to frame sequential mode, then, it is required to switch back to 2D mode first and then 3D frame sequential. Vice versa* *If user did not follow the instruction by skipping switching back to 2D mode, projector will not execute the command.*
s3d.chswap	*= ?*	*0 = input images of HDMI 1 / HDMI 2 (Ch A / Ch B) sequential displayed* *1 = input images of HDMI 2 / HDMI 1 (Ch B / Ch A) sequential displayed*	*In case the images for left-eye and right-eye are displayed in wrong order comparing with the equipped active glasses or passive polarizer module, the projector supports to swap the input signals between HDMI 1 (Channel A) and HDMI 2 (Channel B) to match the correct order.*
aspect	= ?	0 = 16:9 1 = Theaterscope 2 = 4:3 3 = 4:3 Narrow 4 = Native	DP's Theaterscope is same with original Letterbox function.
recall.mem	= ?	0 = Preset A 1 = Preset B 2 = Preset C 3 = Preset D 4 = Default	Recall memory settings

Operation Commands			
Operation	**Command**	**Values**	**Notes**
save.mem	= ?	0 = Preset A 1 = Preset B 2 = Preset C 3 = Preset D	Save memory settings
brightness	= ?	0 – 200	
contrast	= ?	0 – 200	
saturation	= ?	0 – 200	
hue	= ?	0 – 200	
sharpness	= ?	0 – 200	
nr	= ?	0 – 200	
overscan	= ?	0 = Off 1 = Crop 2 = Zoom	
input	= ?	0 = HDMI 1 1 = HDMI 2 2 = D-sub (RGB) 3 = YPrPb 1 (RCA) 4 = YPrPb 2 (BNC)	
resync	(execute)		
colorspace	*= ?*	*0 = Auto* *1 = REC709* *2 = REC601* *3 = RGB-PC* *4 = RGB-Video*	
gamma	= ?	0 = CRT 1 = Film 2 = Video 3 = Punch 4 = Graphics	
color.temp	= ?	0 = 5500K 1 = 6500K 2 = 7500K 3 = 9300K 4= Native	

Operation Commands			
Operation	**Command**	**Values**	**Notes**
frame.rate	= ?	0 = Auto 2 = 48 Hz 3 = 50 Hz 4 = 60 Hz	To switch DLP frame rate
color.gamut	= ?	0 = Auto 1 = REC709 2 = SMPTE C 3 = EBU 4 = Native	
bc	= ?	0 = Off 1 = On	
red.offset	*= ?*	*0-200*	
green.off	*= ?*	*0-200*	
blue.off	*= ?*	*0-200*	
red.gain	*= ?*	*0-200*	
green.gain	*= ?*	*0-200*	
blue.gain	*= ?*	*0-200*	
vert.pos	= ?	0-200	Available in firmware version MD08.
hori.pos	= ?	0-200	Available in firmware version MD08.
phase	= ?	0-200	
tracking	= ?	0-200	
sync.level	= ?	0-200	
blank.screen	= ?	*0 = Logo* *1 = Black* *2 = Blue* *3 = White*	
auto.poweroff	= ?	0 = Off 1 = On	
auto.poweron	= ?	0 = Off 1 = On	
rear.mode	= ?	0 = Off 1 = On (Rear Projection)	

Operation Commands			
Operation	**Command**	**Values**	**Notes**
ceil.mode	= ?	0 = Off 1 = On (Ceiling)	
model.name	?	<string>	Not available now
ser.number	?	<string>	Not available now
soft.version	?	<string>	Retrieve software version
Input	*= ?*	*0 = HDMI 1* *1 = HDMI 2* *2 = D-Sub 15 (RGB)* *3 = YPrPb 1 (RCA)* *4 = YPrPb 2 (BNC)*	
h.refresh	?	<number>	kHz
v.refresh	?	<number>	Hz
pixel.clock	?	<number>	MHz
signal	?	<string>	
lamp.hours	?	<number>	
total.hours	?	<number>	
factory.reset	(execute)		
pattern	=	0 = White 1 = Black 2 = Red 3 = Green 4 = Blue 5 = Cyan 6 = Magenta 7 = Yellow 8 = ANSI Checkerboard 9 = Horizontal Gray Ramp 10 = Focus Grid 11 = Off	Not available now
altitude	= ?	0 = auto (Default) 1 = high	

Operation Commands			
Operation	**Command**	**Values**	**Notes**
status.check	?	0 = standby 1 = warm up 2 = imaging 3 = cooling 4 = error	
trig1	*= ?*	*0 = Screen (Def)* *1 = 16:9* *2 = Theaterscope* *3 = 4:3* *4 = 4:3 Narrow* *5 = RS-232*	
trig2	*= ?*	*0= Screen (Def)* *1= 16:9* *2 = Theaterscope* *3 = 4:3* *4 = 4:3 Narrow* *5 = RS-232*	
color.mode	*= ?*	*0 = Bright Mode (Default)* *1 = D65 Bright Mode* *2 = D65 Color Mode*	This command is good for 2D mode use only.
adcontrast	*= ?*	*0 = Off (Default)* *1 = On*	
blue.only	*= ?*	*0 = Off (Default)* *1 = On*	
lamp.pow	*= ?*	*0 = Standard / Full Power Mode (Default)* *1 = Economy mode*	
act.source	*?*		
bootop	*= ?*	*3 = for bootloader* *4 = for NXP* *9 = for FPGA*	

Operation Commands			
Operation	**Command**	**Values**	**Notes**
osd.timer	*= ?*	*0 = OSD Always On* *1 = Display OSD for 5 sec.* *2 = Display OSD for 10 sec.* *3 = Display OSD for 15 sec.* *4 = Display OSD for 20 sec.* *5 = Display OSD for 25 sec.* *6 = Display OSD for 30 sec.* *7 = Display OSD for 35 sec.* *8 = Display OSD for 40 sec.* *9 = Display OSD for 45 sec.* *10 = Display OSD for 50 sec.* *11 = Display OSD for 55 sec.* *12 = Display OSD for 60 sec.*	
ir.enable	*= ?*	*0 = Disable* *1 = Enable (Default)*	

Section 16 Accessories

The accessories included in the projector are:

- US Power Cord x 1
- EU Power Cord x 1
- Alan wrench for lens shift adjustment x 1
- Remote control x 1
- Batteries for Remote Control x 1
- 3 meter HDMI Cable x 1