PRODUCT DATA SHEET

MSV2

4K HDMI / DP Multi Scaler Viewer

Revision History

Version Number	Revision Date	Page	Description of Changes
0.1	Sep 07, 2017	ALL	Initial Version
0.2	Apr 05, 2018	4,5,6,9,10	Hardware configuration change according to Main IC changed.
		4,9	User Control (Web control, OSD) added.
0.3	Oct 19, 2018	4	Layout mode configuration has been changed.
		5	Video Output Specification changed
		9,10	Ivory colored cases have been added.
0.4	Feb 18, 2019	5	Resolution information updated.
0.5	Apr 18, 2019	5	Video Input Specification updated
		9,10,11	Assembly 2D drawing for MSV2 updated.
0.6	Jul 12, 2019	5,6,7	Input, output resolution updated.
1.0	Jul 15, 2019	8,9,11	Absolute Maximum Ratings, Electrical Specification and LED features are updated.
	Oct 16, 2019	6	YCbCr420 4K@60 support updated.
		ALL	RoHS, REACH pages added and Typo correction.
	Oct 30, 2019	11	USB and Service port descriptions are added.
1.1	Oct 30, 2019	ALL	Renewal of Specification

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1. General Description

MSV2, The 4K HDMI / DisplayPort(DP) Multi Scaler Viewer is an advanced video processor for multimedia presentations. It is a video signal processing device that can one output of 4 input video signals to one video display device and provides 4 screen output modes.

  4ch Inputs of MSV2 have 2 HDMI ports and 2 selectable ports(HDMI or DisplayPort), the user can select the input video the DisplayPort 1.2a or HDMI 2.0 Basically, it supports various output resolutions including up / down scale and supports seamless channel change.

- Input: HDMI x 2
  HDMI / DP x 2 (Selectable)
- Output: HDMI x 1
- Full range of input and output format (Up to 4K@60Hz)
- 4 Preset modes and 5 user modes
- HDMI 2.0, DisplayPort 1.2a compliant
- Supports DisplayPort 1, 2, 4 lanes
- Supports HDMI 1.4 / 2.0
- Compliant with HDMI 2.0, data rate up to 6Gbps
- HDCP 1.4 / 2.2 compliant
- User control: Web, OSD, RS232
- 1U Rack type

Preset mode	Layout	Preset mode	Layout
Quad		3 side	
3 bottom		Full screen mode (CH 1 ~ 4)	
5 User modes	User configurable		
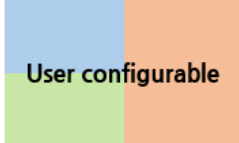
2. General Specification

2.1 Video Input Specification

Parameter	Symbol
Port Type	HDMI x 2 HDMI / DisplayPort x 2 (Selectable)
Resolutions	4096x2160p@60Hz (Maximum)
Signal Formats	HDMI, DP

- Supporting Input Resolutions

MSV2 Input Resolution			
Resolution	HDMI 1,2	HDMI 3,4	DP 1,2
TV Format			
480i@59.94/60	O	O	X
576i@50	O	O	X
1080i@50/59.94/60	O	O	O
480p@59.94/60/119/120/239.76/240	O	O	O
576p@50/100/200	O	O	O
720p@29.97/30/50/59.94/60/100/119.88/120	O	O	O
1080p@23.976/24/25/29.97/30/50/59.94/60/100/119.88/120	O	O	O
2160p@23.976/24/25/29.97/30/50/59.94/60	O	O	O
720x576@50/100/200	O	O	O
1680x720@23.976/24/25/29.97/30/50/59.94/60/100	O	O	O
2560x1080@23.976/24/25/29.97/30/50/60/119.88/120	O	O	O
4096x2160@23.976/24/25/29.97/30/50/59.94/60	O	O	O
PC Format			
640x350@85	O	O	O
640x400@85	O	O	O
640x480@59.94/60/67/72/75/85	O	O	O
720x400@70/85	O	O	O
800x600@56/60/72/75/85	O	O	O
832x624@75	O	O	O
848x480@60	O	O	O
852x480@60	O	O	O
1024x576@60	O	O	O

MSV2 Input Resolution			
Resolution	**HDMI 1,2**	**HDMI 3,4**	**DP 1,2**
PC Format			
1024x768@60/70/75/85	O	O	O
1152x864@75	O	O	O
1152x870@75	O	O	O
1280x720@60	O	O	O
1280x768@60/75/120	O	O	O
1280x768@85	O	O	O
1280x800@60/75/85/120	O	O	O
1280x960@60/85	O	O	O
1280x1024@60/75/85	O	O	O
1280x1024@96	O	X	O
1360x768@60	O	O	O
1366x768@60	O	O	O
1400x788@60	O	O	O
1400x1050@60	O	O	O
1440x900@60/75/85	O	O	O
1440x960@72	O	O	O
1600x900@60	O	O	O
1600x1024@60	O	O	O
1600x1200@50/60/65/70/75/85	O	O	O
1680x1050@60	O	O	O
1792x1344@60/75	O	O	O
1856x1392@60/75	O	O	O
1920x1080@60	O	O	O
1920x1200@50/60	O	O	O
1920x1440@60/75	O	O	O
2048x1152@60	O	O	O
2048x1280@60	O	O	O
2560x1600@60/85	O	O	O
2048x1080p@23/24/25/29/30/50/59/60	O	O	O
3840x2160p@23/24/25/29/30/50/59/60	O	O	O
4096x2160p@23/24/25/29/30/50/59/60	O	O	O

(1) Up to 4096x2160@60Hz (The interlace is red.)

NOTE-Resolutions not listed in the table may not be supported.

YCbCr420 is not supported at 4K@60.

2.2 Video Output Specification

Parameter	Symbol
Port Type	HDMI x 1
Resolutions	4K (4096x2160, 24Hz/30Hz/60Hz)
	4K (3840x2160, 25Hz/30Hz/50Hz/60Hz)
	1080p(1920x1080, 50Hz/60Hz)
	720p(1280x720, 50Hz/60Hz)
	1920x1200@60Hz
	1680x1050@60Hz
	1650x1050@60Hz
	1600x1200@60Hz
	1400x1050@60Hz
	1360x768@60Hz
	1280x1024@60Hz
	1280x960@60Hz
	1280x768@60Hz
	1024x768@60Hz
Signal Formats	HDMI

3. Absolute Maximum Ratings

Parameter	Rating
Storage temperature	-20°C ~ +70°C Non-Condensing
Operating temperature	0°C ~ +40°C Non-Condensing
Transportation temperature	-20°C ~ +70°C Non-Condensing
Power Supply	+12.0 V
Relative Humidity	10 ~ 80 %

NOTICE

Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.   This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operations section for extended periods of time may affect reliability.
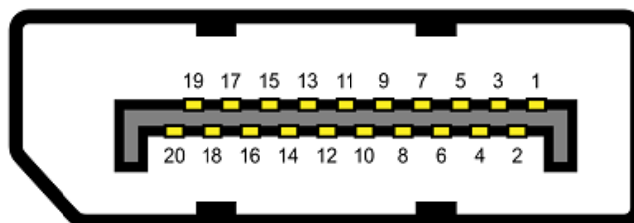
4. Electrical Specification

4.1 Electrical Specification

Parameter		Symbol	Min	Typ	Max	Units	Condition
P O W E R	Supply Voltage (Option External Power)	Vcc		+12		V	
	Supply Current	Icc		2.1		A	
	Power Dissipation	Po		25.2		W	

4.2 Connector Pin Assignment

4.2.1 DisplayPort

Pin	Signal Assignment	Pin	Signal Assignment
1	Main Link Lane3 (Negative)	11	Ground
2	Ground	12	Main Link Lane0 (Positive)
3	Main Link Lane3 (Positive)	13	Config1
4	Main Link Lane2 (Negative)	14	Config2
5	Ground	15	AUX Channel (Positive)
6	Main Link Lane2 (Positive)	16	Ground
7	Main Link Lane1 (Negative)	17	AUX Channel (Negative)
8	Ground	18	HPD
9	Main Link Lane1 (Positive)	19	Return
10	Main Link Lane0 (Negative)	20	DP PWR (+3.3V)

4.2.2 HDMI
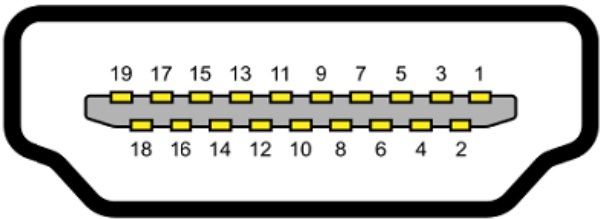
| Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	TMDS DATA2+	9	TMDS DATA0-	17	DDC Ground
2	TMDS DATA2 SHIELD	10	TMDS CLOCK+	18	+5V
3	TMDS DATA2-	11	TMDS CLOCK SHIELD	19	HPD
4	TMDS DATA1+	12	TMDS CLOCK-		
5	TMDS DATA1 SHIELD	13	CEC		
6	TMDS DATA1-	14	NC		
7	TMDS DATA0+	15	SCL		
8	TMDS DATA0 SHIELD	16	SDA		

5. Mechanical Specification

5.1 Case Dimension

- MSV2 Case Construction Features
    - Button : Power, Layout select buttons, Layout / OSD control buttons
    - LED : CH 1~4 input signal check LEDs, Active/ Network check LEDs
    - Switch : Input signal select switches
    - Input video : HDMI x 2
        HDMI / DisplayPort x 2 (Selectable)
    - Output video: HDMI x 1
    - USB port: Firmware upgrade
    - Service port: Used in the production process
    - Size : 436(W) x 44(D) x 213(H) mm
    - Color : Black, Ivory
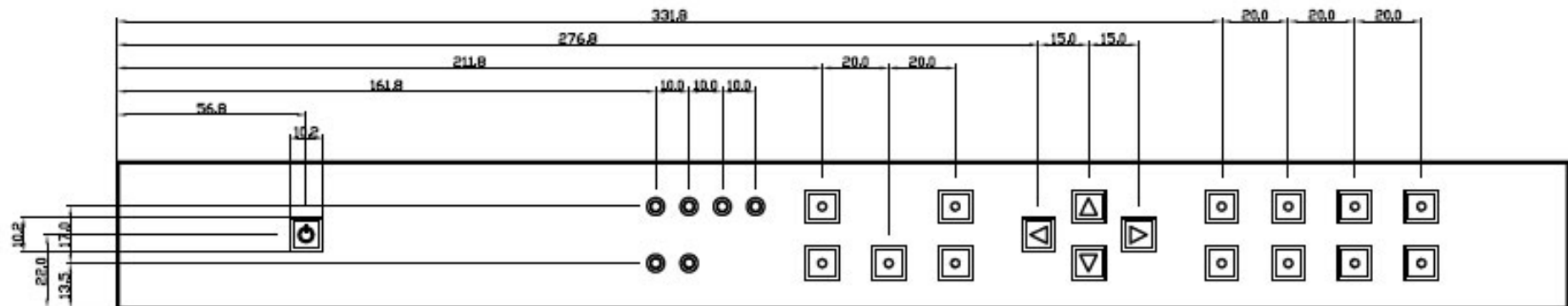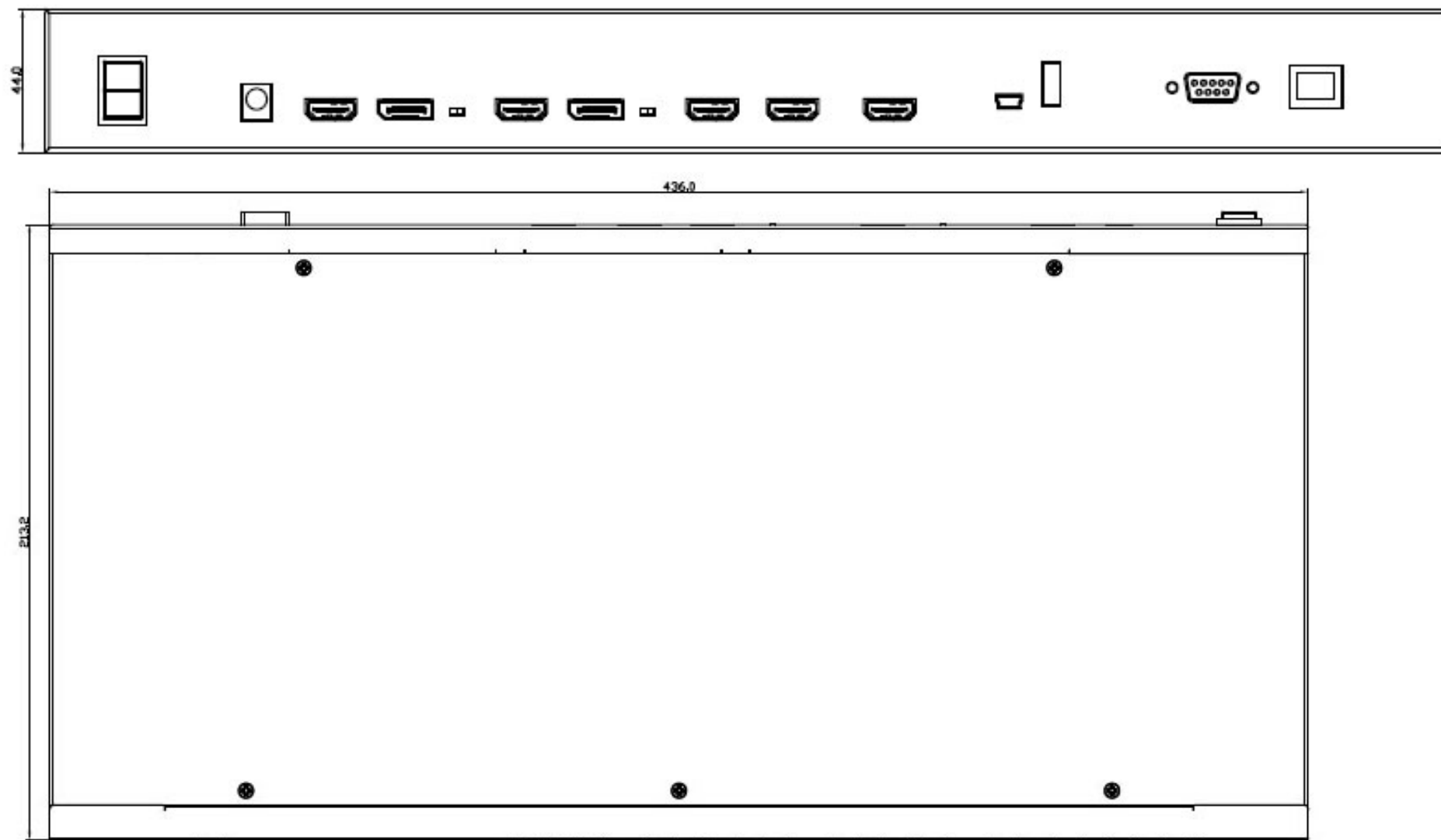
5.2 Design Drawing

✓ MSV2-BLACK Color

REAR VIEW

TOP VIEW

FRONT VIEW

✓ MSV2-IVORY Color
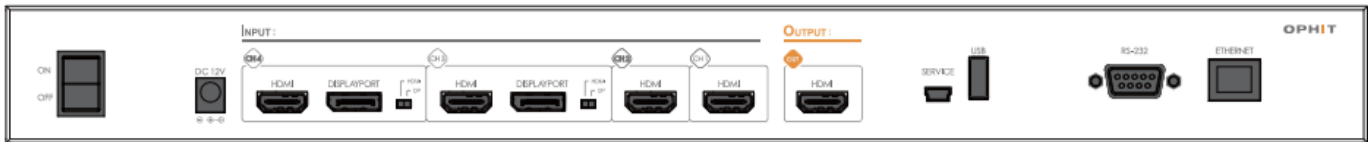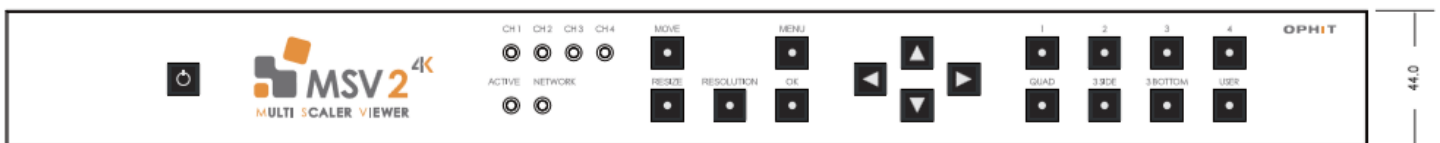
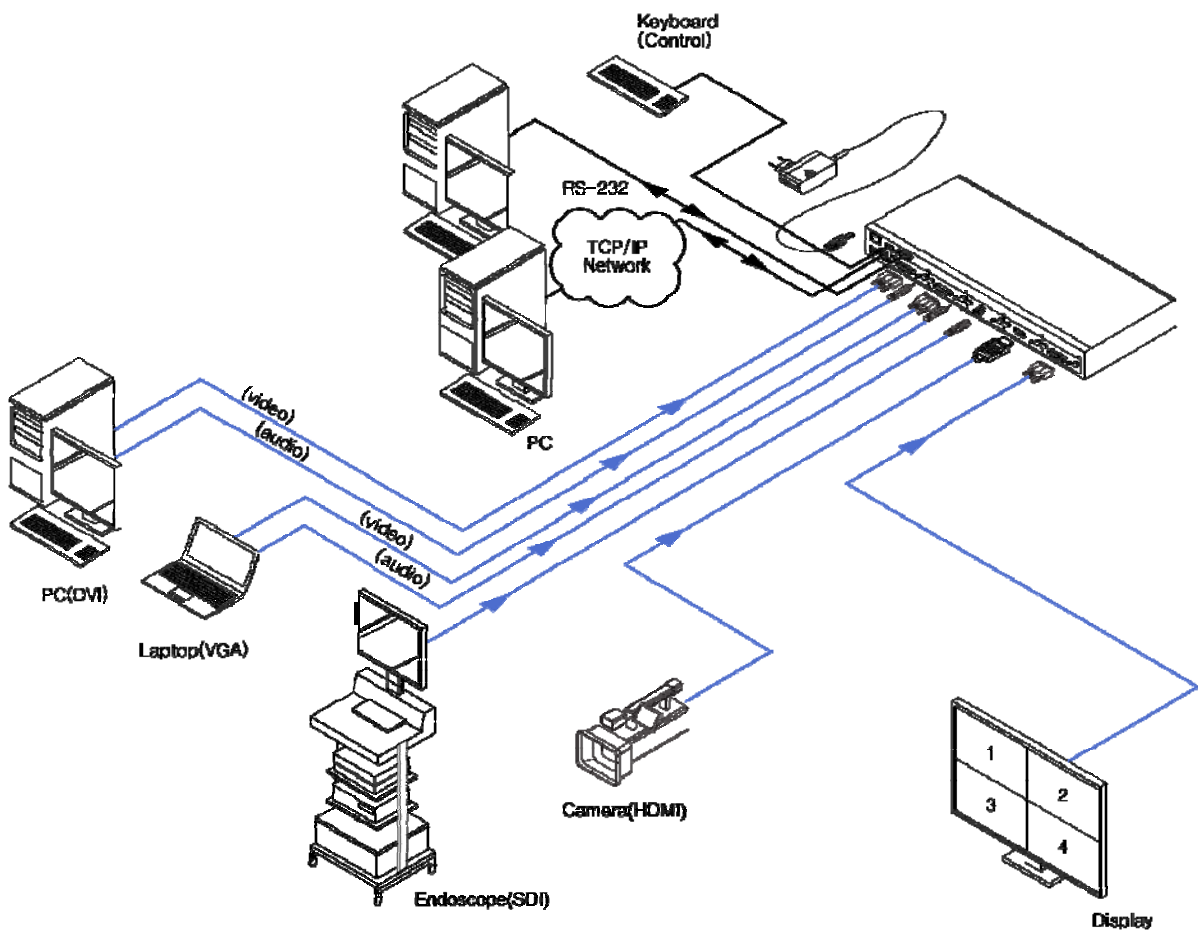**REAR VIEW**

TOP VIEW

436.0

213.0

FRONT VIEW

44.0

5.3 Connection

6. Regulatory

6.1 EMC & Safety Agency approval
6.1.1 CE-EMC compliance:
This Product is investigated to EN55032:2015:2015, EN55035:2017, EN61000-3-2:2014
and EN61000-3-3:2013

6.1.2 FCC compliance:
This Product is investigated to FCC 47CFR part 2 and part 15(ANSI C63.4:2014)

7. Packing Information

Set(Unpacking, MSV2 Only)	436.0mm*213.2mm*44.0mm	2.83Kg
Package(1Set, Inner Box Packing)	526.0mm*375.0mm*114.0mm	4.20Kg
Package(4Multi, PCS Packing)	545.0mm*485.0mm*400.0mm	18.0Kg

8. RoHS

OPHIT is fully aware of the requirement under the **Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive EU 2015/863(RoHS3), which adds four new restricted substances to the previous Directive 2011/65/EU(RoHS2).**

Hereby we guarantee that we do not intentionally use the substances
described below and based on third party chemical analysis the thresholds of the substances as indicated are not exceeded for our all products.

Substance	CAS #	RoHS Limity by % (PPM)
Lead (PB)	7439-92-1	0.1% (1000 PPM)
Mercury (Hg)	7439-97-6	0.1% (1000 PPM)
Hexavalent Chromium (CrVI)	15840-29-9	0.1% (1000 PPM)
Polybrominated Biphenyls (PBB)	-	0.1% (1000 PPM)
Polybrominated Diphenyl Ethers (PBDE)	-	0.1% (1000 PPM)
Cadmium (Cd)	7440-43-9	0.01% (100 PPM)
Bis(2-Etylhexyl) phthalate(DEHP)	117-81-7	0.1% (1000 PPM)
Benzyl butyl phthalate(BBP)	85-68-7	0.1% (1000 PPM)
Dibutyl Phthalate(DBP)	84-74-2	0.1% (1000 PPM)
Disobutyl Phthalate(DIBP)	84-69-5	0.1% (1000 PPM)

Banned Substances by RoHS Directive 2011/65/EU+2015/863/EU, EN50581:2012

OPHIT will continue to monitor any new amendments/changes to Directive and subsequently review our all products with regards to compliance. OPHIT will also ensure that any new information is communicated to its customers, suppliers and stakeholders as required.

Signature : Jong-Kook, Moon
Title/Issue date : President/July.22.2019

9. REACH

The European REACH Regulation 1907/2006 on Registration, Evaluation, Authorization, and Restriction of Chemicals(REACH), Annex XVⅡ entered into Force in June 2009, and affects all companies producing. Importing, using, or placing Products on the European market. The aim of the REACH regulation is to ensure a high Level of protection of human health and the environment from chemical substances.

OPHIT Co., Ltd substances management system follow and complies with the current revision of the REACH Regulation on the substances as identified by ECHA(European Chemical Agency).

OPHIT Co., Ltd products are considered articles as defined in REACH Article 3(3). These products/articles under normal and reasonable conditions of use do not have intended release of substances. Therefore the requirement in REACH Article 7(1)(b) for registration of substances contained in these products/articles does not apply.

OPHIT Co., Ltd products/articles, do not contain **Substances of very High Concern** or if there **SVHC** in the product/article, the content is less than the 0.1%(wt/wt) as defined by REACH Article 57, Annex XIV, Directive 67/548/EEC. Therefore the requirement in REACH Article 7(2) to notify ECHA if a product/article contains more than 0.1% wt/wt of an SVHC and tonnage exceeding 1 tone per importer per year is not applicable.
OPHIT's European operations do not manufacture or import chemicals, therefore OPHIT Co., Ltd has no obligation to resister substances.

Jong-Kook, Moon
President

OPHIT Co., Ltd ACCEPTS NO DUTY TO NOTIFY USERS OF THIS OF DECLARATION OF UPDATES OR CHANGES TO THIS DECLARATION.