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TLD5500-L
Transparency 55” OLED Digital Signage
User Manual

Approved by	Checked by	Prepared by

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Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Sep/2/2025	all		Initial release	

Contents

1 General Description

TLD5500-L is an innovative market-leading transparency OLED, resolution 1920x1080, self-emissive without backlight, high contrast ratio, and high color saturation. It is an innovative, both front and back sides are made by glass, and the air separation between it is strengthened OLED transparent. Combined with the connecting rods on both sides, can be fixed to the wall, ceiling or floor, allowing the space to be used more effectively. it provides transparency OLED panel with specific aspect ratios for digital signage, AI Interactive virtual, transparent window, exhibition hall, museums and boutiques.

1.1 Features

- Transparency OLED display
- Wide screen 16:9
- Connecting rods on both sides can be fixed to the wall, ceiling or floor and customized design.
- Transparent Ratio 43%(typ.)
- Low power consumption
- Life Time 30,000Hrs

1.2 General Specifications

Model Name	TLD5500-L
Description	55” Transparency OLED, 1920x1080
Screen Size	55”
Display Area (mm)	680.4(H)x1209.6(V)
Brightness	Normal 200 cd/m^2 and Peak 600 cd/m^2
Resolution	1920x1080
Aspect Ratio	16:9
Contrast Ratio	17,000:1
Pixel Pitch (mm)	0.63(H) x 0.63(V)
Pixel Pre Inch (PPI)	40
Viewing Angle	120°(H),120°(V)
Color Saturation (NTSC)	87%
Display Colors	1.07 Billion colors
Response Time (Typical)	8ms
Panel Interface	V-by-One
Input Power	DC 24V
Power Consumption	108W
OSD Key	5 Keys (Power Switch, Menu, +, -,Exit)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position…etc
Dimensions (mm)	770.4x1453x110
Bezel Size(U/B/L/R)	45/198.4/45/45 mm
Weight (Net)	78kg
Operating Temperature	0 ˚C ~ 45 ˚C
Storage Temperature	-20 ˚C ~ 60 ˚C

TLD= OLED Panel+ Android Board + Chassis

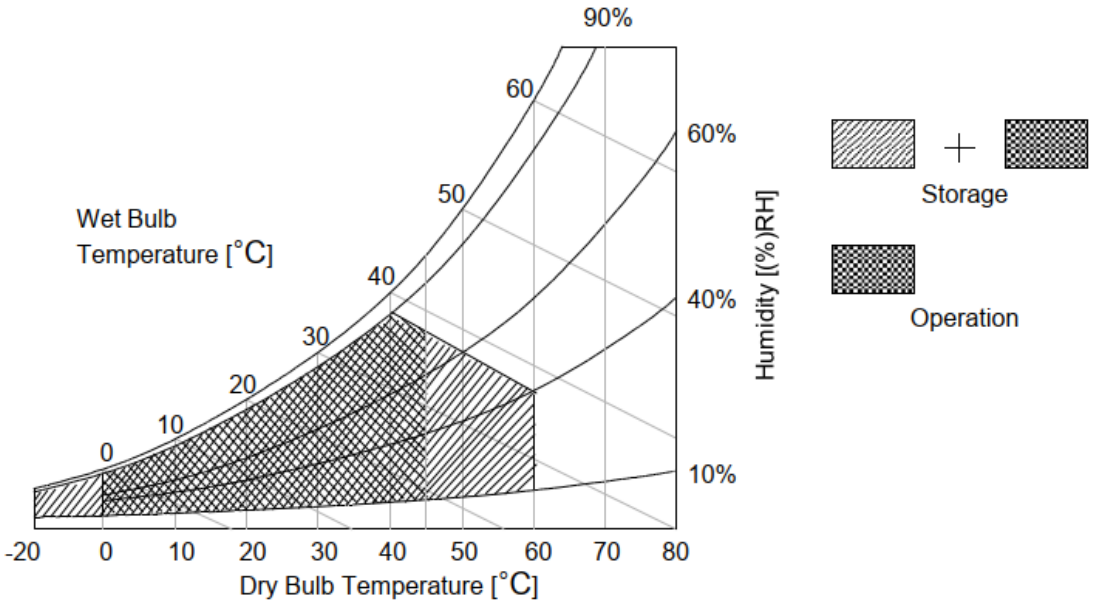
1.3 Absolute Maximum Ratings

The following items are maximum values which, if exceeded, may cause faulty operation or damage to the OLED module.

Parameter		Symbol	Value		Unit	Note
			Min	Max		
Power Input Voltage	Logic	VDD	-0.3	+14.0	V_{DC}	1
	OLED Panel	EVDD	-0.3	+ 27.0	V_{DC}	
T-Con Option Selection Voltage		V_{LOGIC}	-0.3	+3.7	V_{DC}	
Operating Temperature		T_{OP}	0	+45	°C	2
Storage Temperature		T_{ST}	-20	+60	°C	
Operating Ambient Humidity		H_{OP}	10	90	%RH	2
Storage Humidity		H_{ST}	10	90	%RH	

Notes:

1. Ambient temperature condition (Ta = 25±2 °C)
2. Temperature and relative humidity range are shown in the figure below.
   Wet bulb temperature should be Max 39°C, and no condensation of water.



2 Electrical Specifications

2.1 Electrical Characteristics

It requires two power inputs. One is employed to power for the circuit. The other is used for the EVDD.

Parameter	Symbol		Values			Unit	Notes
			Min	Typ	Max		
Power Input Voltage	VDD		10.8	12.0	13.2	V	
	EVDD		23.8	25.0	26.3		
Power Input Current	I_{VDD}		-	0.97	1.06	A	1-1/1-2
			-	1.21	1.33		2
	I_{EVDD}		-	2.06	2.37		1-1
			-	2.00	2.30		1-2
			-	7.00	7.70		3
T-CON Option Voltage	V_{IL}		0	-	0.8	V	
	V_{IH}		2.7	-	3.6	V	
Power Consumption	P_{VDD}		-	11.64	12.80	Watt	1-1/1-2
			-	14.52	15.97		2
	P_{EVDD}		-	51.40	59.11		1-1
			-	49.86	57.34		1-2
			-	175.00	192.50		3
Rush current	I_{RUSH}	I_{RUSH_VDD}	-	-	9	A	
		I_{RUSH_EVDD}	-	-	15		
		T_{RUSH_VDD}	-	-	100	us	
		T_{RUSH_EVDD}	-	-	2	ms	

Note

1-1. The specified current and power consumption are under the VDD=12.0V, EVDD=25.0V Ta=25±2°C, fV=120Hz, condition whereas standard moving picture(IEC62087) is displayed and fV is the frame frequency.

1-2. The specified current and power consumption are under the VDD=12.0V, EVDD=25.0V Ta=25±2°C, fV=120Hz condition whereas standard moving picture(CLASP) is displayed and fV is the frame frequency.

2. The current (IVDD) is specified at the maximum current pattern (1by1 Horizontal Pattern) and under the VDD=12.0V, EVDD=25.0V Ta=25±2°C condition.

3. The current (IEVDD) is specified at the maximum current pattern (Secondary Color Pattern) and under the VDD=12.0V, EVDD=25.0V Ta=25±2°C condition.

2.2 Electrical Interface Connection

This OLED module employs two kinds of interface connection, 51-pin connector is used for the module electronics and 14-pin connector is used for the EVDD.

OLED Module:

-VDD Connector (CN400): GT05S-51S-H38(LSM)
-Mating Connector: FI-RE51HL(JAE) or compatible

Table. MODULE CONNECTOR(CN400) PIN CONFIGURATION

No	Symbol	Description	No	Symbol	Description
1	VDD	Power Supply +12.0V	27	GND	Ground
2	VDD	Power Supply +12.0V	28	Rx0N	V-by-One HS Data Lane0
3	VDD	Power Supply +12.0V	29	Rx0P	V-by-One HS Data Lane0
4	VDD	Power Supply +12.0V	30	GND	Ground
5	NC (Reserved)	No Connection (Reserved)	31	Rx1N	V-by-One HS Data Lane1
6	GND	Ground	32	Rx1P	V-by-One HS Data Lane1
7	GND	Ground	33	GND	Ground
8	GND	Ground	34	Rx2N	V-by-One HS Data Lane2
9	GND	Ground	35	Rx2P	V-by-One HS Data Lane2
10	JB&Off-RS Power_off done	JB&Off-RS&Power_off done (H), Set ← Module (Note 3)	36	GND	Ground
11	AC_DET	AC_DET (H= On), Set → Module	37	Rx3N	V-by-One HS Data Lane3
12	Error Detection	H' = Error , 'L' = Normal (note 4)	38	Rx3P	V-by-One HS Data Lane3
13	I2C_SDA1	I2C for Customer	39	GND	Ground
14	I2C_SCL1		40	NC (Reserved)	No Connection (Reserved)
15	NC (Reserved)	No Connection (Reserved)	41	NC (Reserved)	No Connection (Reserved)
16	NC (Reserved)	No Connection (Reserved)	42	NC (Reserved)	No Connection (Reserved)
17	NC (Reserved)	No Connection (Reserved)	43	NC (Reserved)	No Connection (Reserved)
18	I2C_SDA	I2C for Customer	44	NC (Reserved)	No Connection (Reserved)
19	I2C_SCL		45	NC (Reserved)	No Connection (Reserved)
20	EVDD_DET	EVDD reset, Set ← Module	46	NC (Reserved)	No Connection (Reserved)
21	NC (Reserved)	No Connection (Reserved)	47	NC (Reserved)	No Connection (Reserved)
22	GND	AGP2 (note 6)	**48**	**Reverse**	**Reverse='H' , Normal (Default)='L' OR 'NC'**
23	GND	AGP1 (note 6)	49	QSMEN	QSMEN (Set→Module)
24	GND	Ground	50	ON_RF	On_RF_Done (Set ← Module)
25	HTPDN	Hot plug detect	51	NC (Reserved)	No Connection (Reserved)
26	LOCKN	Lock detect	-	-	-

Notes

1.) All GND (ground) pins should be connected together.
2.) All Input levels of V-by-One signals are based on the V-by-One HS Standard.
3.) Specific pin No. #10 is used for compensation when Power turn off.
4.) Specific pin No. #12 is used for "Power Error detection" of the OLED module.
5.) Specific pins #5, #15~17, #21, #40~47, #51 are used only for Litemax. (Do not connect)
6.) Specific pins No. #22 and #23 are used for "No signal detection" of system signal interface.
It should be GND for NSB (No Signal Black) while the system interface signal is not
If this pin is "H" or "NC", OLED module displays AGP (Auto Generation Pattern).

OLED Module (EVDD)

-EVDD Connector (CN404): 20022WR-H14B2
-Mating Connector: 2022HS-14B2(BK)
-VLC Connector (CN402, 403): 12507WR-H05G

Table.
EVDD CONNECTOR(CN404) PIN CONFIGURATION

No	Symbol	Description
1	EVSS	OLED Panel Ground
2	EVSS	OLED Panel Ground
3	EVSS	OLED Panel Ground
4	EVSS	OLED Panel Ground
5	EVSS	OLED Panel Ground
6	EVSS	OLED Panel Ground
7	NC	Don't care
8	EVDD	OLED Panel Power Supply +25V
9	EVDD	OLED Panel Power Supply +25V
10	EVDD	OLED Panel Power Supply +25V
11	EVDD	OLED Panel Power Supply +25V
12	EVDD	OLED Panel Power Supply +25V
13	EVDD	OLED Panel Power Supply +25V
14	EVDD	OLED Panel Power Supply +25V

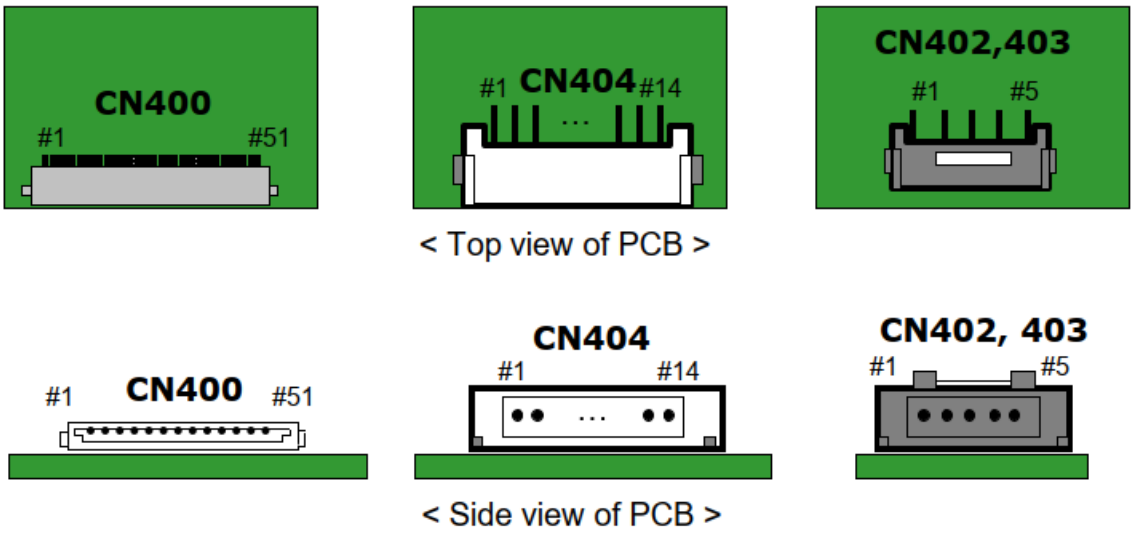
Table.
VLC Tx CONNECTOR(CN402)
PIN CONFIGURATION

No	Symbol	Description
1	APLC_TXCLK_P	VLC LVDS Tx CLK +
2	APLC_TXCLK_N	VLC LVDS Tx CLK -
3	GND	Ground
4	APLC_TXDAT_P	VLC LVDS Tx Data +
5	APLC_TXDAT_N	VLC LVDS Tx Data -

Table.
VLC Rx CONNECTOR(CN403)
PIN CONFIGURATION

No	Symbol	Description
1	APLC_RXDAT_N	VLC LVDS Rx Data -
2	APLC_RXDAT_P	VLC LVDS Rx Data +
3	GND	Ground
4	APLC_RXCLK_N	VLC LVDS Rx CLK -
5	APLC_RXCLK_P	VLC LVDS Rx CLK +

Rear view of OLED Module



2.3 Signal Timing Specification

Timing Table shows the signal timing required at the input of the Vx1 transmitter. All of the interface signal timings should be satisfied with the following specification for normal operation.

Timing Table (DE Only Mode)

ITEM		Symbol	Min	Typ	Max	Unit	Note
Horizontal	Display Period	t_{HV}	480	480	480	tCLK	1920 / 4
	Blank	t_{HB}	60	70	100	tCLK	1
			0.82	0.94	1.28	us	3
	Total	t_{HP}	540	550	580	tCLK	
Vertical	Display Period	t_{VV}	1080	1080	1080	Lines	
	Blank	t_{VB}	44 (252)	45 (270)	46 (276)	Lines	1
			326.0	333.3	328.4	us	3
	Total	t_{VP}	1124 (1332)	1125 (1350)	1126 (1356)	Lines	

ITEM		Symbol	Min	Typ	Max	Unit	Note
Frequency	DCLK	f_{CLK}	74.00	74.25	74.50	MHz	
	Horizontal	f_H	133.20	135	136.80	KHz	2
	Vertical	f_V	118 (95)	120 (100)	121 (102)	Hz	2 NTSC (PAL)

Notes:

1. The input of HSYNC & VSYNC signal does not have an effect on normal operation (DE Only Mode). If you use spread spectrum of EMI, add some additional clock to minimum value for clock margin.
2. The performance of the electro-optical characteristics may be influenced by variance of the vertical refresh rate and the horizontal frequency.
3. If you change the DCLK, must satisfy the minimum horizontal & vertical blank time.

※ This OLED module supports Spread Spectrum Clocking tolerance with up to 40kHz / ±0.5%

※ Timing should be set based on clock frequency.

Timing Table (Only Gaming mode : VRR Mode)

ITEM		Symbol	Min	Typ	Max	Unit	Note
Horizontal	Display Period	t_{HV}	480	480	480	tCLK	1920 / 4
	Blank	t_{HB}	70	70	70	tCLK	
	Total	t_{HP}	550	550	550	tCLK	
Vertical	Display Period	t_{VV}	1080	1080	1080	Lines	
	Blank	t_{VB}	45	45	2295	Lines	
	Total	t_{VP}	1125	1125	3375	Lines	

ITEM		Symbol	Min	Typ	Max	Unit	Note
Frequency	DCLK	f_{CLK}	74.25	74.25	74.25	MHz	297 / 4
	Horizontal	f_H	135	135	135	KHz	
	Vertical	f_V	40	120	120	Hz	

Note:

1.) Only applicable to Gaming mode with VRR operation

2.) The device could not work properly in case it is operated by VRR mode.

(1.) This OLED module supports adaptive sync timing only under moving picture in room temperature(25±5℃)

(2.) It would not work usually under still image & reliability test.

(3.) Under those condition, the phenomenon such as image sticking, flickering, flashing and dither noise in low gray could be found on the screen.

2.4 V by One input Signal Characteristics

V by One Input Signal Timing Diagram

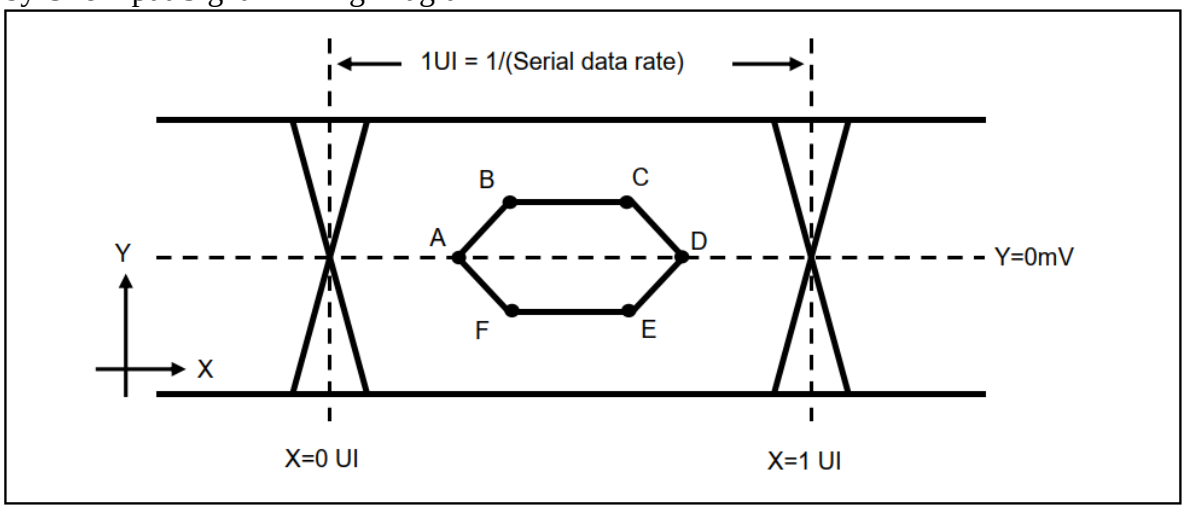


Table. Eye Mask Specification

	X [UI]	Note	Y [mV]	Note
A	0.25 (max)	2	0	-
B	0.30 (max)	2	50	3
C	0.70 (min)	3	50	3
D	0.75 (min)	3	0	-
E	0.70 (min)	3	|-50|	3
F	0.30 (max)	2	|-50|	3

Notes:

1.1 All Input levels of V by One signals are based on the V by One HS Standard.

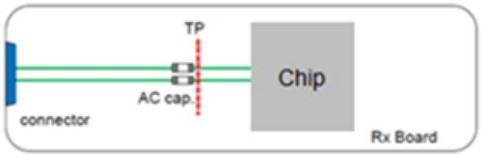
1.2 When using the Tx's Pre-Emphasis function to be set to a minimum value that meets the EYE Mask Spec.

2. This is allowable maximum value.

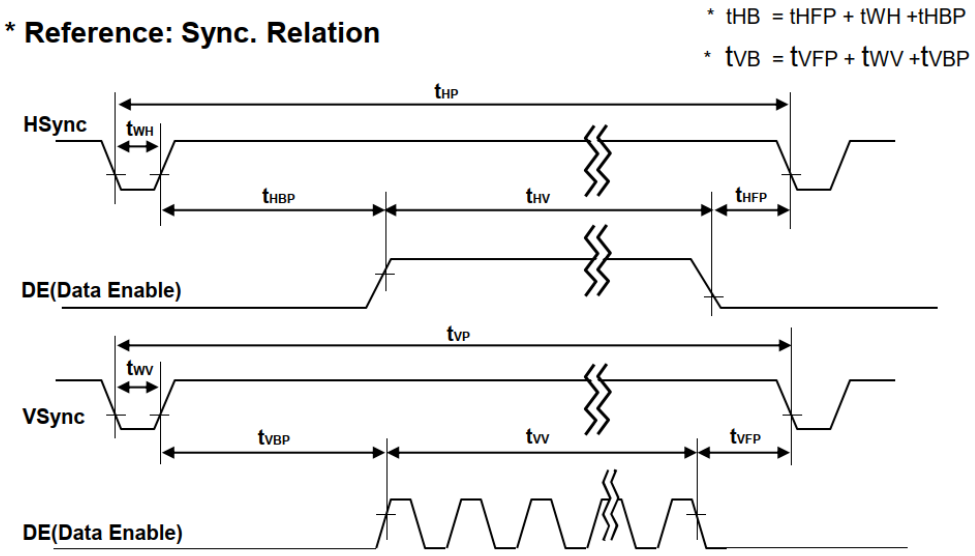
3. This is allowable minimum value

4. The eye diagram is measured by the oscilloscope and receiver CDR characteristic must be emulated.
   - PLL Type: 2nd Order
   - PLL bandwidth: 10MHz
   - Damping Factor: 2

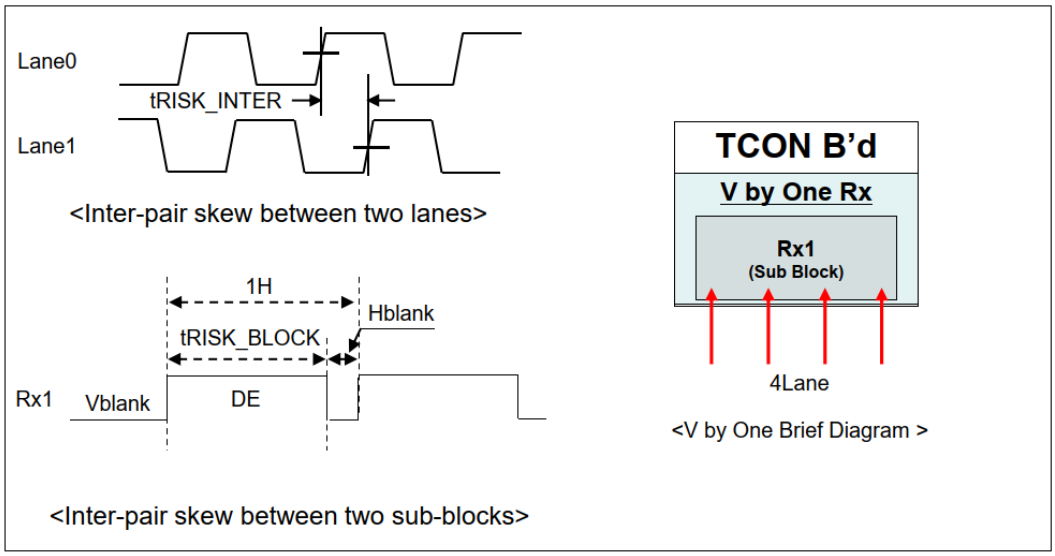
5. EYE mask measuring point



2.5 Signal Timing Waveforms of Interface Signal



AC Specification

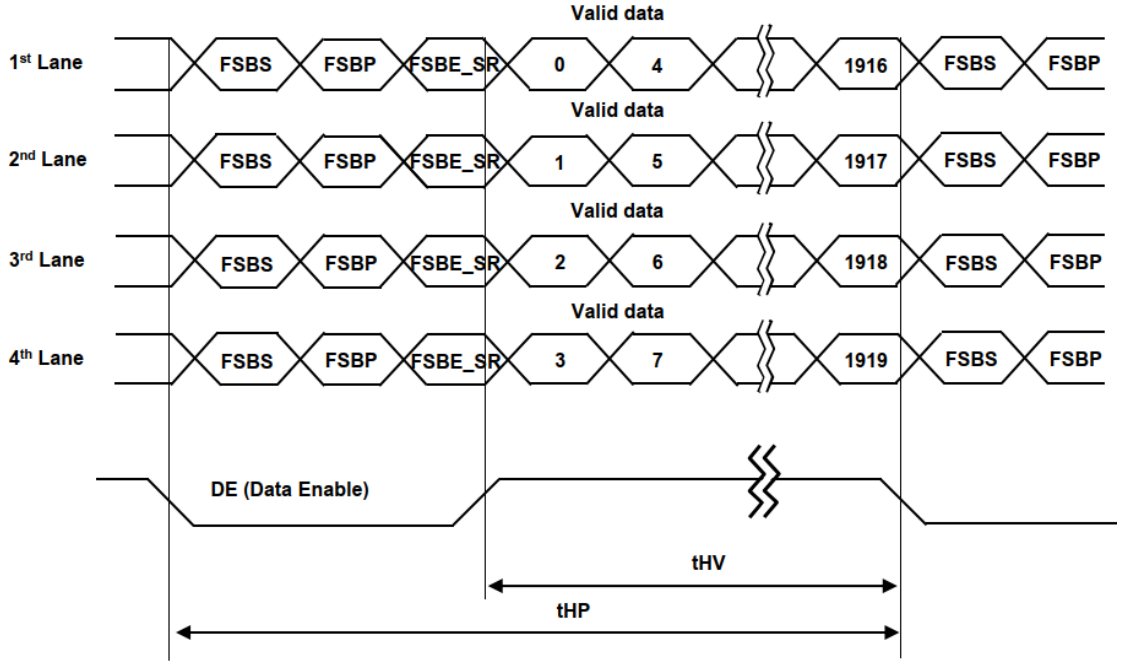


Description	Symbol	Min	Max	Unit	Note
Allowable inter-pair skew between lanes	tRISK_INTER	-	5	UI	1, 3
Allowable inter-pair skew between sub-blocks	tRISK_BLOCK	-	1	DE	1, 4

Notes:

1. 1UI = 1/serial data rate
2. It is the time difference between the true and complementary single-ended signals.
3. It is the time difference of the differential voltage between any two lanes in one sub block.
4. It is the time difference of the differential voltage between any two blocks in one IP.
5. APL packet of Vx1 Input
   5-1) APL data transmission should be completed between after 5H from frame last DE falling and 10H before next frame DE rising.
   5-2) APL data transmission should be inputted only one time during V blank period.

V by One Input Signal Timing Diagram



2.6 Color Data Reference

The brightness of each primary color (red, green, blue) is based on the 10bit gray scale data input for the color. The higher binary input, the brighter the color. Table 8 provides a reference for color versus data input.

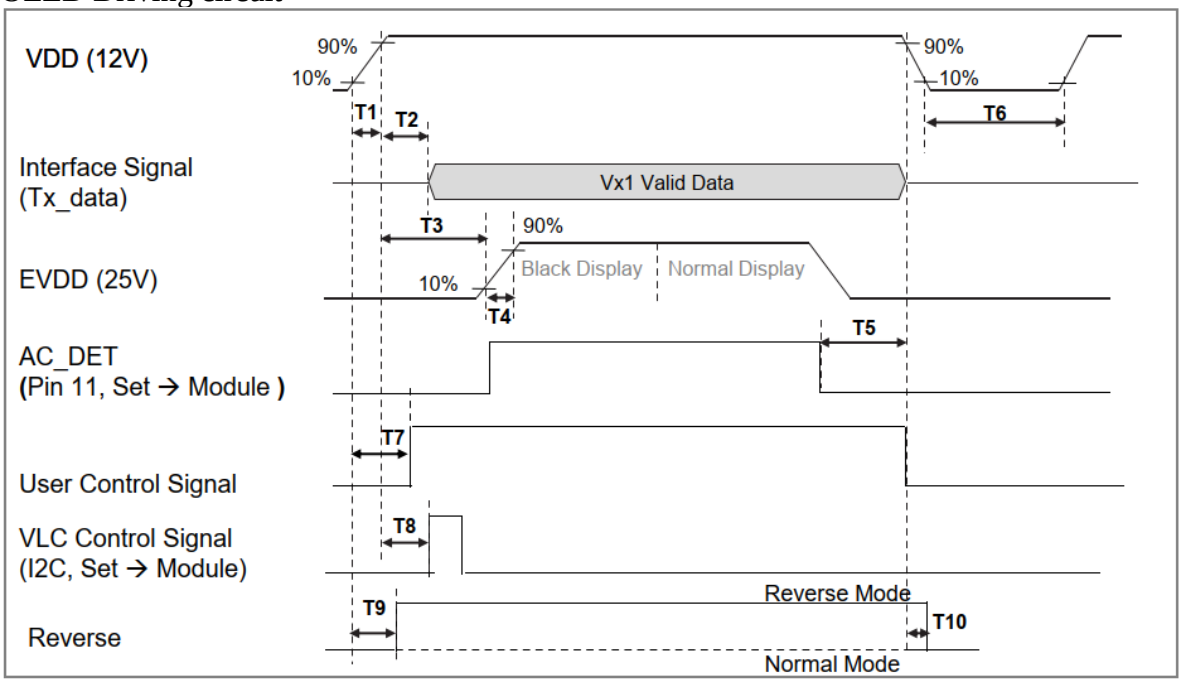
Color Data Reference

Packer input & Unpacker output		30bpp RGB (10bit)
Byte0	D[0]	R[2]
	D[1]	R[3]
	D[2]	R[4]
	D[3]	R[5]
	D[4]	R[6]
	D[5]	R[7]
	D[6]	R[8]
	D[7]	R[9]
Byte1	D[8]	G[2]
	D[9]	G[3]
	D[10]	G[4]
	D[11]	G[5]
	D[12]	G[6]
	D[13]	G[7]
	D[14]	G[8]
	D[15]	G[9]
Byte2	D[16]	B[2]
	D[17]	B[3]
	D[18]	B[4]
	D[19]	B[5]
	D[20]	B[6]
	D[21]	B[7]
	D[22]	B[8]
	D[23]	B[9]
Byte3	D[24]	Don't care
	D[25]	Don't care
	D[26]	B[0]
	D[27]	B[1]
	D[28]	G[0]
	D[29]	G[1]
	D[30]	R[0]
	D[31]	R[1]

Notes 1. 30bpp RGB (10bit) is 4 byte mode

2.7 Power Sequence

OLED Driving circuit



Power Sequence

Parameter	Value			Unit	Notes
	Min	Typ	Max		
T1	1	-	20	ms	1
T2	58	-	-	ms	
T3	0.6	-	-	sec	2
T4	5	-	50	ms	
T5	30	-	-	ms	
T6	1.5	-	-	sec	3
T7	0	-	T1+T2	ms	4
T8	1	-	T3	sec	
T9	0	-	40	ms	5
T10	0	-	-	ms	5

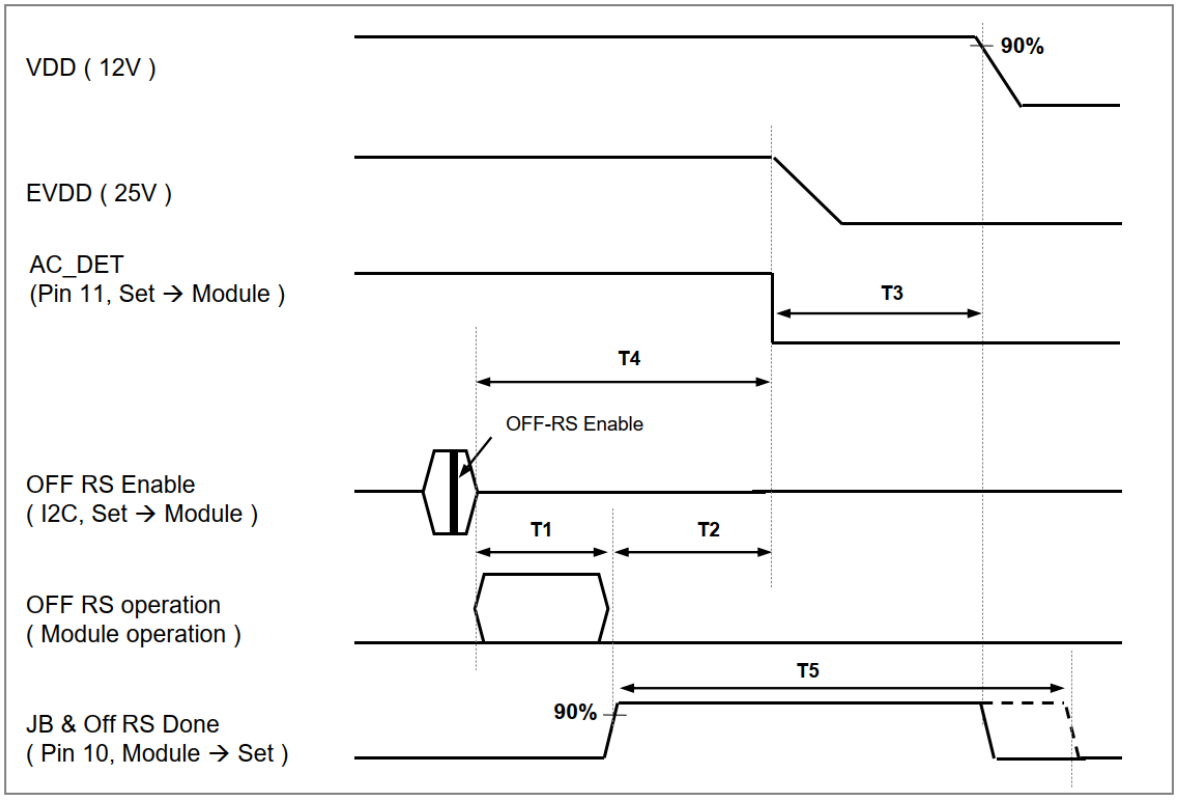
Notes

1. The T3 is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem. T3 should be larger than T2.
2. T6 should be measured after the module has been fully discharge between power off and on period.
3. If the on time of signals (Interface signal and user control signals) precedes the on time of Power (VDD). It will be happened abnormal display. When T7 is NC status, T7 doesn't need to be measured.
4. I2C is able to be accessed from 600ms after VDD 90% rising.
5. Reverse Signal has to be input by T9 max, and should be fixed during operation. (VDD off + T10)

※ Black pattern is displayed during black display period before normal display. (ON RF Time 2.3S)

※ When the power for logic (VDD) turns on , EVDD should be less than 5V. But, it does not matter if there is no garbage image.

OFF RS Compensation Operation



Power Sequecne

Parameter	Value			Unit	Notes
	Min	Typ	Max		
T1	100	-	170	sec	1
T2	0	-	10	sec	
T3	30	-	-	ms	
T4	100	-	180	sec	2-1
	180	-	500	sec	2-2
T5	0.5	7	10	sec	

Note:

1. It is the actual RS sensing time. This timing is determined according to the characteristics of the panel. (Display Internal timing)

2-1. When Off-RS Done Signal is transferred normally.

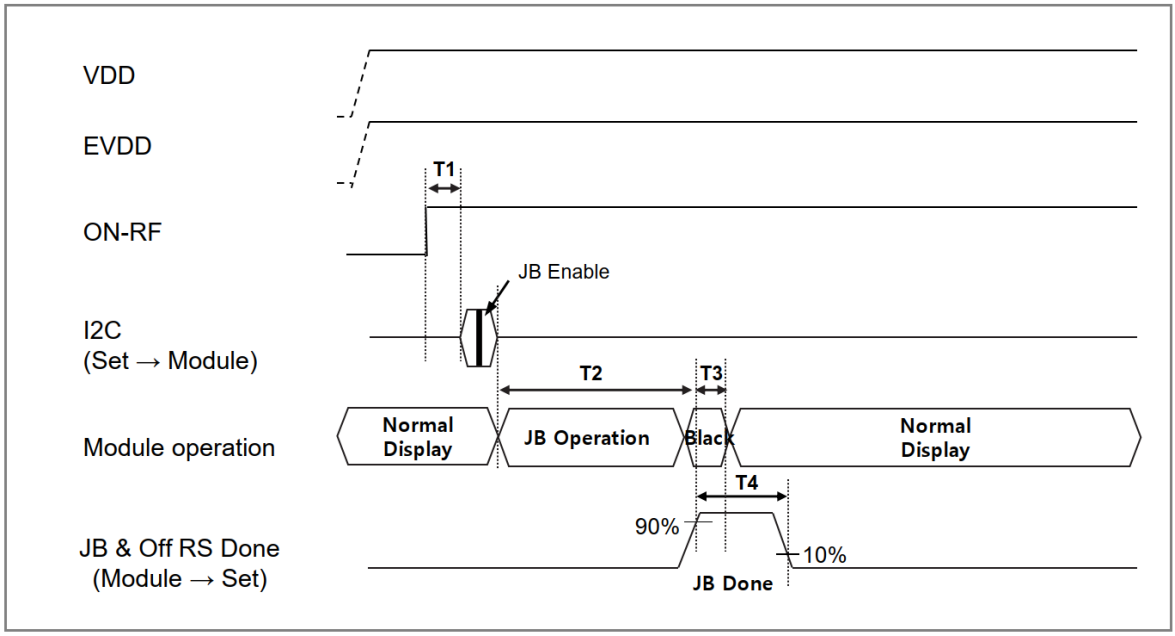
2-2. When Off-RS Done Signal is not transferred.

※When there is power on action before completing OFF RS operation, don't change OFF RS enable signal (1→0). Just do power off and power on.

※Off RS Enable is only available during Normal Display period

※In order to prevent mura defects, it is recommended that customer do Off-RS in their lines.

JB compensation operation



JB Power Sequence

Parameter	Value			Unit	Notes
	Min	Typ	Max		
T1	200	-	-	ms	
T2	2	-	15	sec	
T3	210.0	-	508.0	ms	Black PTN
T4	0.5	7	10	sec	

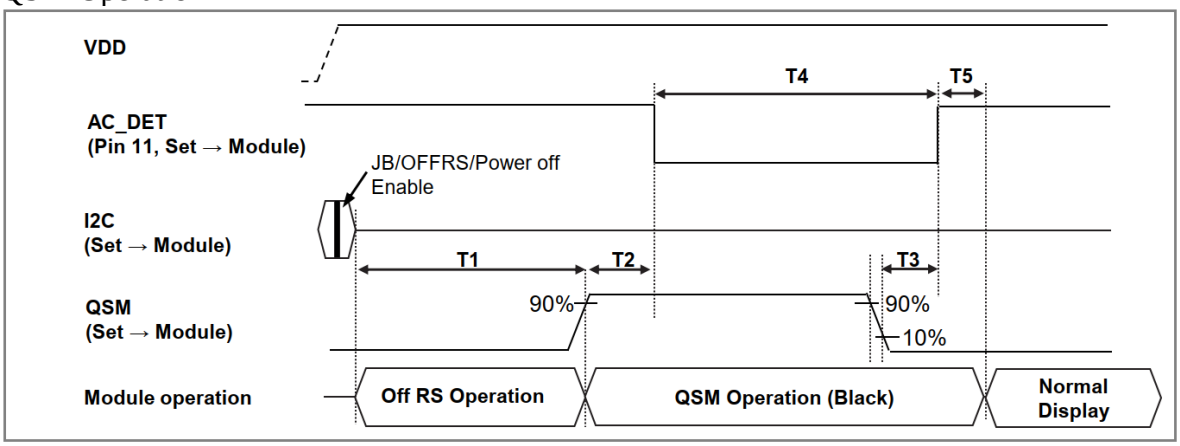
Notes:

※ At VRR mode, T3 can change by adaptive sync timing(T3 need 19 frame) (VRR only)

※ T3 can change by adaptive sync timing(T3 need 19 frame) (VRR only)

※ T2 is the actual JB sensing time. This timing is determined according to the characteristics of the panel. (Display Internal timing)

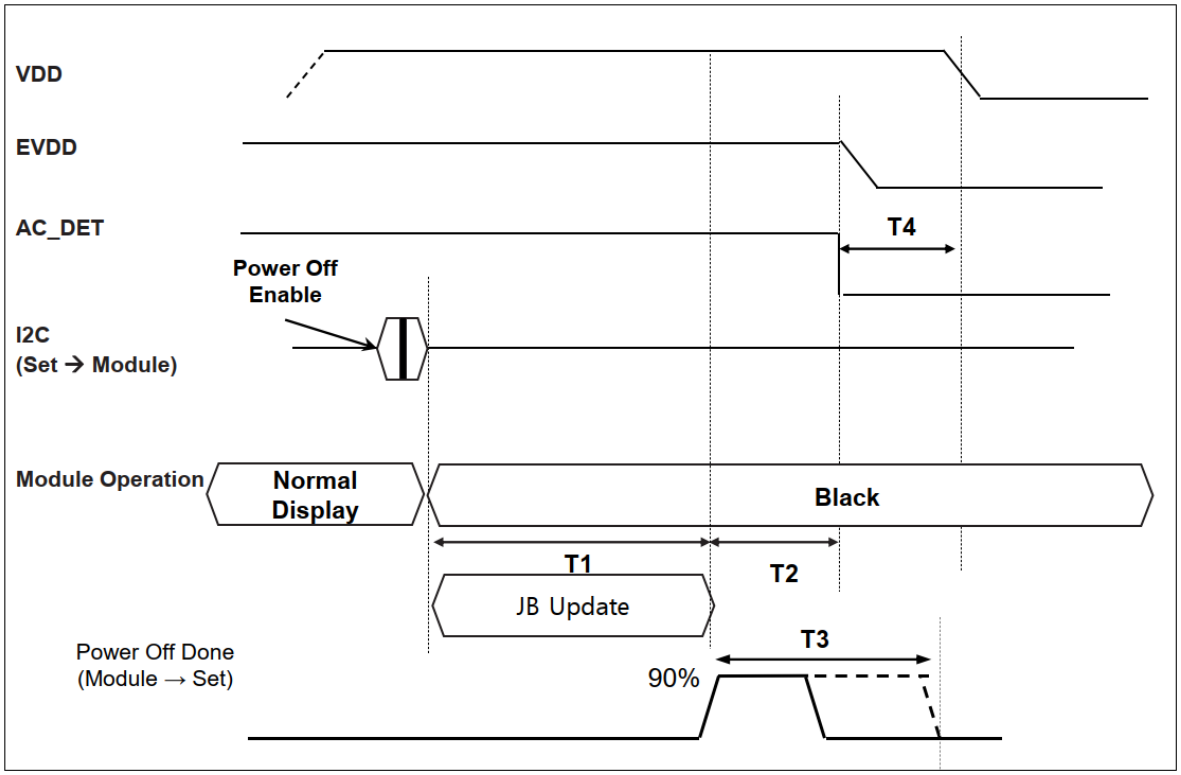
QSM Operation



QSM Sequence

Parameter	Value			Unit	Notes
	Min	Typ	Max		
T1	3	-	-	Sec	
T2	75	-	-	ms	
T3	10	-	-	ms	
T4	1	-	-	sec	
T5	200	-	500	ms	

Power off sequence



Power Sequence

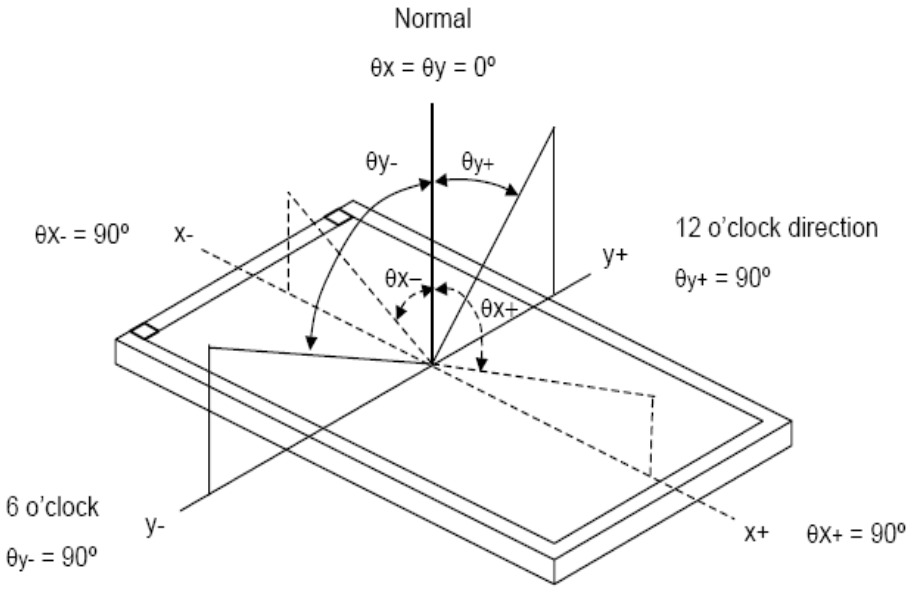
Parameter	Value			Unit	Notes
	Min	Typ	Max		
T1	-	-	16.5	sec	
T2	30	-	-	ms	
T3	5	7	10	sec	
T4	30	-	-	ms	

3 Optical Specification

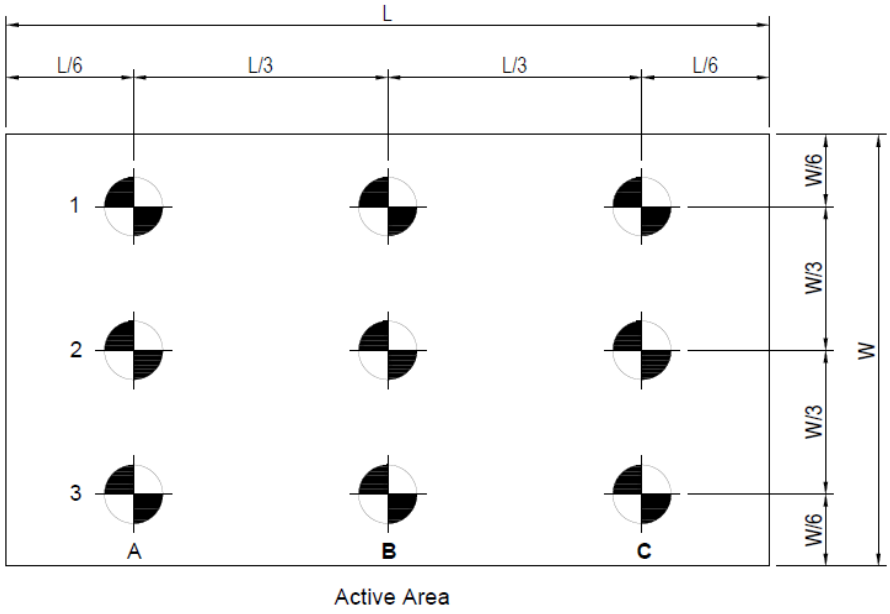
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 CA-410	0.634	0.664	0.694	-	Test Mode: (2) (3)
		Ry		0.301	0.331	0.361	-	
	Green	Gx		0.272	0.302	0.332	-	
		Gy		0.622	0.652	0.682	-	
	Blue	Bx		0.117	0.147	0.177	-	
		By		0.025	0.055	0.085	-	
	White	Wx		0.254	0.284	0.314	-	
		Wy		0.266	0.296	0.326	-	
Center Luminance of White		Lc	θx=0 θy=0 CA-410	180	200	260	cd/m^2	
Uniform		Lu			96		%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10	15300	17000:1		-	Test Mode: (4)
Color Saturation		NTSC			87		%	
Viewing Angle	Horizontal	θx+	CR ≥ 10	60			Deg	Test Mode: (1)
		θx-		60				
	Vertical	θy+		60				
		θy-		60				

Test Mode：

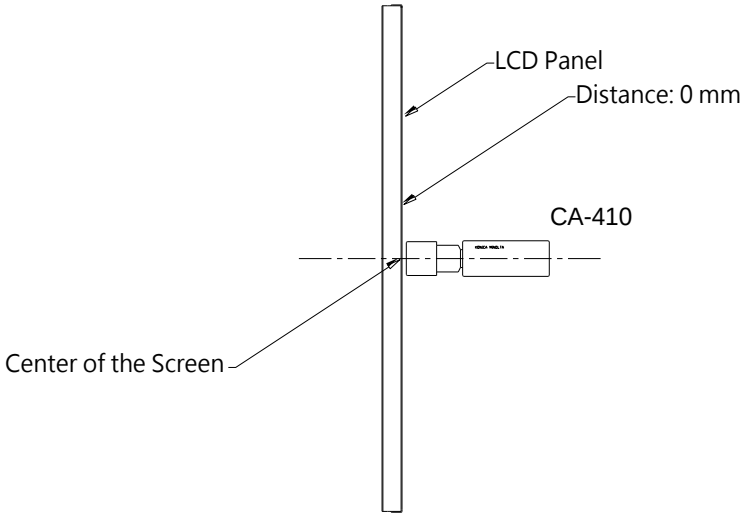
(1) Definition of Viewing Angle (θx , θy):



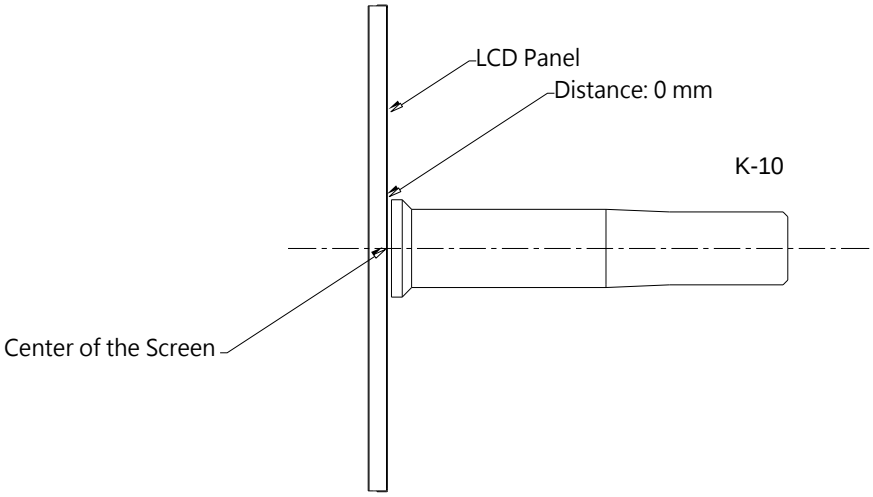
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:

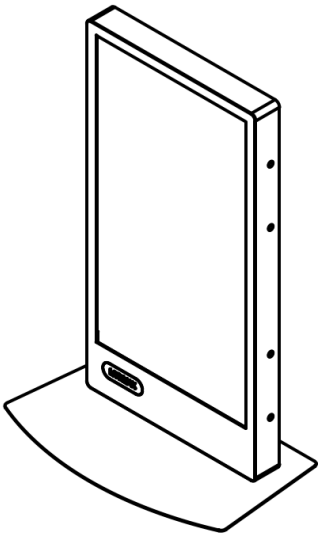


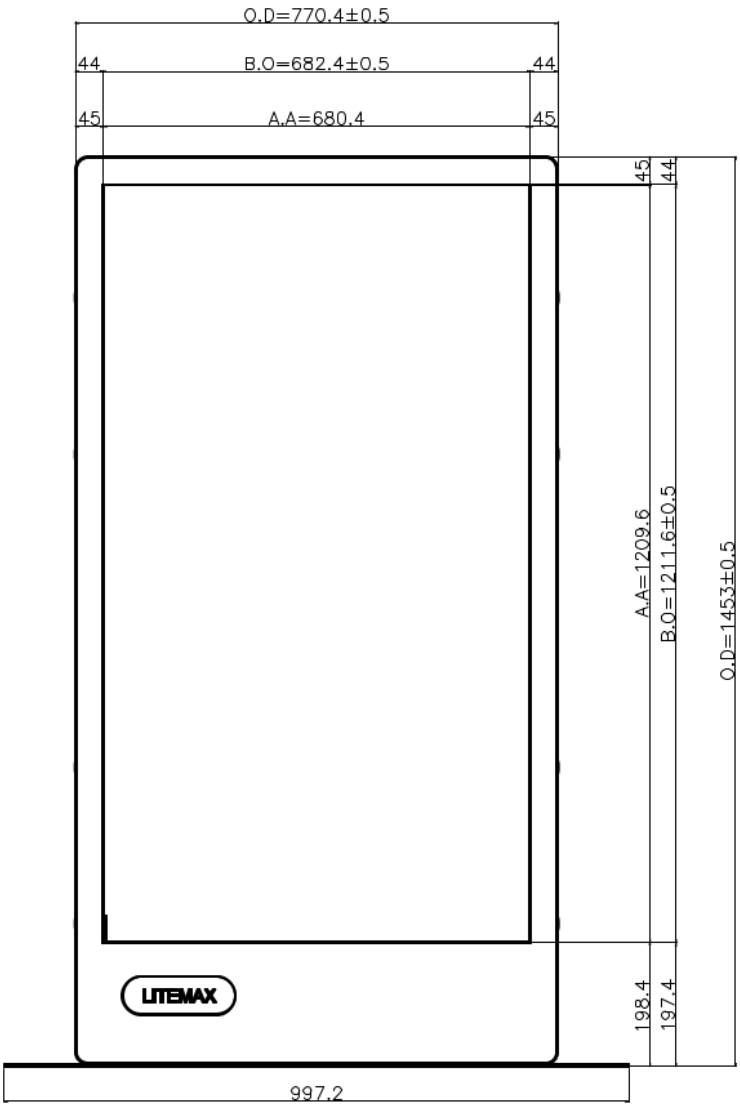
(4) Klein K-10 Measurement Setup:

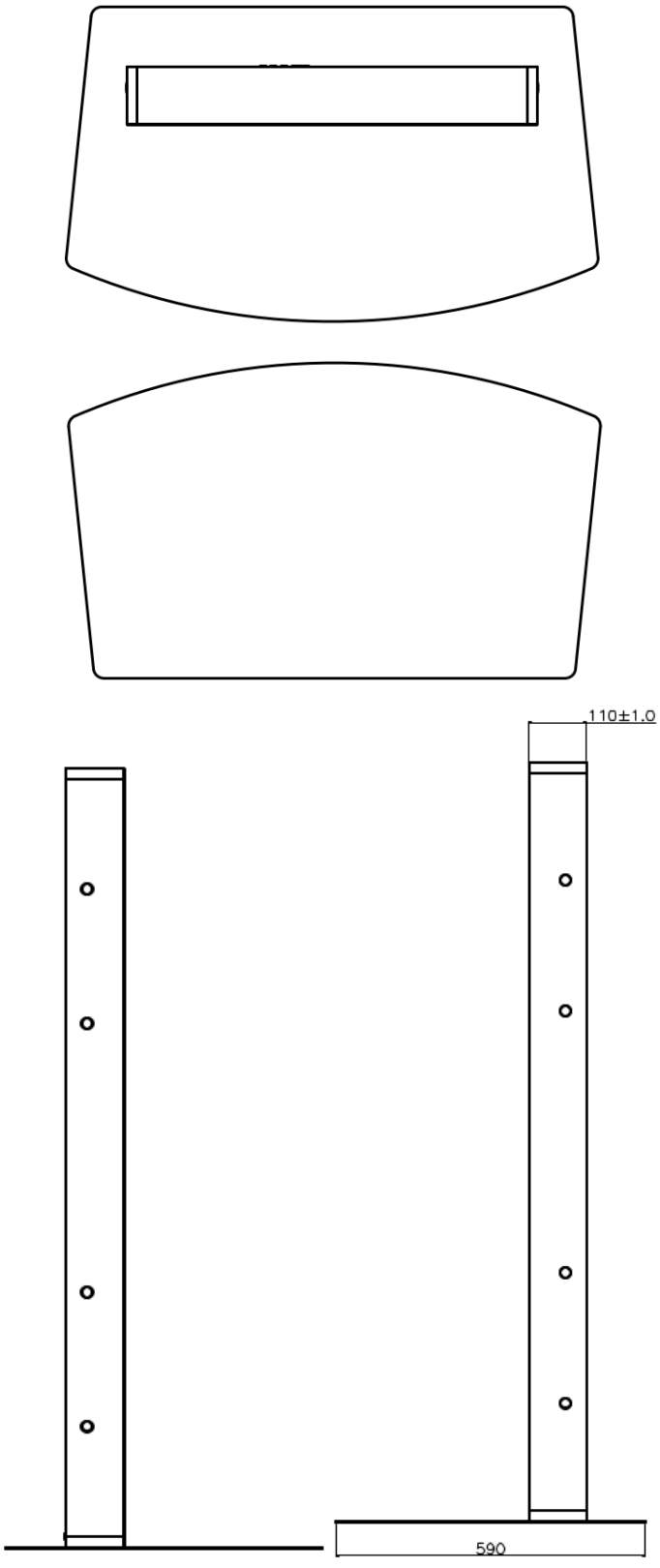


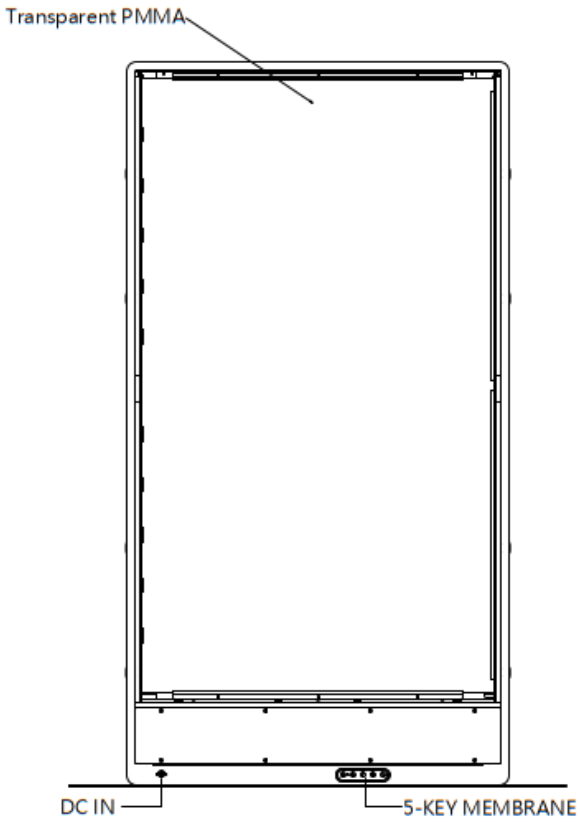
4 Mechanical Drawing

Unit:mm






110±1.0
590



Note：
O.D. : Outline Dimension
B.O. : Bezel Opening
A.A. : LCD Active Area
A: 8-M10 USER HOLE

5 Intelligent Main Board & SW User Guide

Intelligent Main Board

※MT9630V1.0 is an smart commercial display motherboard. It is suitable for the global market and supports 2K transparent OLED panel.
※MT9630V1.0 supports RJ45,HDMI,TF(Micro SD),USB input.

1- Detailed Feature:

CHIPSET		MT9630
MARKET AREA		Global market
OSD Language		English, Chinese, French, German, Italian, Spanish, Portuguese, Russian, Korean, Japanese
SYSTEM		Android 9.0
CPU		MT9630 main frequency 1.5GHz, quad-core A53
GPU		Multi-core G52（2EE）MC1 GPU
INTERNAL MEMORY		Built-in DDR 2G
MEMORY		EMMC 8G
V-by-One OUTPUT		1-way 51 Pin V-by-One output interface, up to support FHD 1920×1080@120Hz
HDMI INPUT		Supports CEC and ARC, UART functions
TF (Micro SD)		Support for TF(Micro SD) input
USB INTERFACE		Support for 2-way single-layer USB2.0 input
UART INTERFACE		Support 3 channels TTL serial port input, 2 channels support RS232, 1 channel supports PM
MIC INTERFACE		Support for 1-way digital microphone input, PH1.25mm5P
WIFI/BT		WIFI-2.4G+5G+BT+AC（2T2R+BT5.0）
RJ45 NETWORK PORT		10M-100M Adaptive Ethernet
SPECIFIC FUNCTION		Support G-Sensor auto rotation, local playback
SYSTEM SUPPORT		TF(Micro SD) / USB / OTA upgrade
PANEL	Panel Type	OLED

	Panel Interface	V-By-One
	Max Resolution	FHD（1920×1080）120Hz
Audio Output	Frequency Response	100Hz-15KHz @ ±12dB (1KHz, -12dB reference signal)
	Max Output Power	2×10W (8Ω) THD+N<10%@1KHz (Supply 24V, input 0.5Vrms)
Power	Requirement	Single 12V input
	Panel Power	V-By-One
	Power management	Standby Power Consumption <0.5W (Board Only)
Key function		Power

2- USB MULTIMEDIA PLAYBACK FORMAT

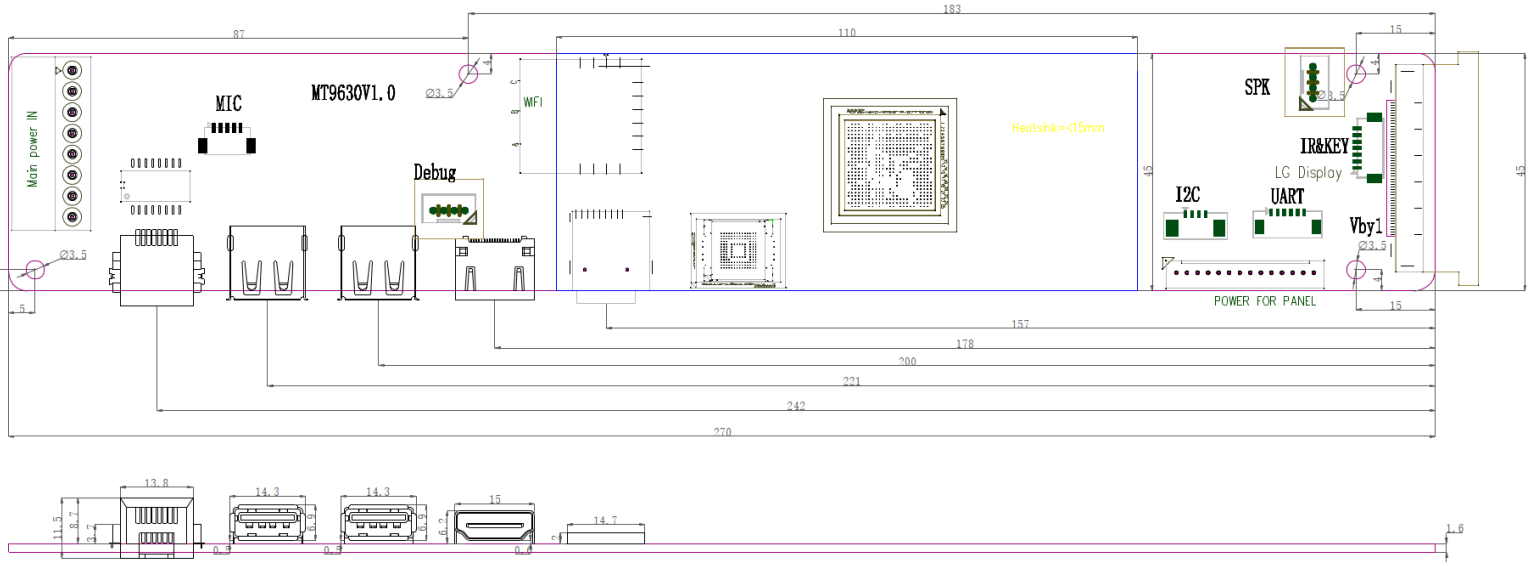
Media	File EXT.	Codec		Remark
		Video	Audio	
MOVIE	.mpg	MPEG-1, MPEG-2	MP3, PCM	Max Solution:1920*1080 Max Data Rate:40Mbps
	.avi	Xvid, MJPE G		Max Solution:1920*1080 Max Data Rate:20Mbps
	.avi	MPEG-4 SP/ASP, H.263/H.264/H.265		
	.ts	MPEG-2, HEVC		
	.mov	MPEG-4 SP/ASP, H.263/H.264, HEVC		
	.mkv	MPEG-4 SP/ASP, H.263/H.264, HEVC		
	.dat	MPEG-1		
	.mp4	MPEG-4 SP/ASP, H.263/H.264, HEVC		
	.vob	MPEG-2		Max Solution:720*576 Max Data Rate:40Mbps
MUSIC	.mp3	-	MP3	Sample rate:8K~48KHZ Bit rate:32K-320Kbps
	.m4a	-	-	Sample rate: 16K~48KHZ Bit rate: 32K-442Kbps Channel: Mono/Stereo
PHOTO	.jpg	Progressive JPEG		Max Solution: 1024*768
	.jpeg	Baseline JPEG		Max Solution: 15360*8640

	.bmp	BMP	Max Solution:9600*6400 Pixel Depth:1/4/8/16/24/32bpp
	.png	Non-Interlaced	Max Solution:9600*6400
		Interlaced	Max Solution:1280*800

Front View Of MT9630V1.0

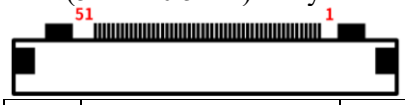
1	2	3	4	5
RJ45	USB1	USB2	HDMI（ARC）	TF(Micro SD)

Outline Dimensions



Interface Pin Definition

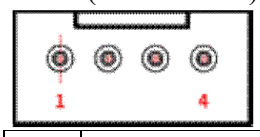
CN4 (51PIN/0.5mm) V-By-One interface (V-By-One)



No.	Symbol	Description
1	VDD	Power Supply +12.0V
2	VDD	Power Supply +12.0V
3	VDD	Power Supply +12.0V
4	VDD	Power Supply +12.0V
5	NC(Reserved)	No Connection (Reserved)
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	JB&Off-RS Power_off done	JB&Off-RS & Power_off done (H), Set ← Module
11	AC_DET	AC_DET (H= On), Set → Module
12	Error Detection	H=Error, L=Normal
13	I2C_SDA1	I2C for Customer
14	I2C_SCL1	I2C for Customer
15	NC(Reserved)	No Connection
16	NC(Reserved)	No Connection
17	TPC	TPC Status
18	I2C_SDA	I2C for Customer
19	I2C_SCL	I2C for Customer
20	EVDD_DET	EVDD reset, Set ← Module
21	NC(Reserved)	No Connection
22	GND	AGP2 Ground
23	GND	AGP1 Ground
24	GND	Ground
25	HTPDN	Hot plug detect
26	LOCKN	Lock detect
27	GND	Ground
28	Rx0N	V-By-One HS Data Lane0
29	Rx0P	V-By-One HS Data Lane0
30	GND	Ground
31	Rx1N	V-By-One HS Data Lane1

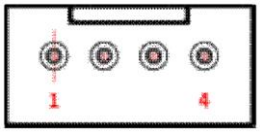
32	Rx1P	V-By-One HS Data Lane1
33	GND	Ground
34	Rx2N	V-By-One HS Data Lane2
35	Rx2P	V-By-One HS Data Lane2
36	GND	Ground
37	Rx3N	V-By-One HS Data Lane3
38	Rx3P	V-By-One HS Data Lane3
39	GND	Ground
40	NC(Reserved)	No Connection (Reserved)
41	NC(Reserved)	No Connection (Reserved)
42	NC(Reserved)	No Connection (Reserved)
43	NC(Reserved)	No Connection (Reserved)
44	NC(Reserved)	No Connection (Reserved)
45	NC(Reserved)	No Connection (Reserved)
46	NC(Reserved)	No Connection (Reserved)
47	NC(Reserved)	No Connection (Reserved)
48	Reverse	Reverse=‘H’, Normal (Default)=‘L’ or ‘NC’
49	QSMEN	QSMEN (Set → Module)
50	ON_RF	On_RF_Done (Set ← Module)
51	NC(Reserved)	No Connection (Reserved)

ACN1 (4PIN/2.0mm) Speaker interface



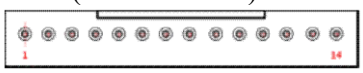
No.	Symbol	Description
1	SPK_RP	Positive right audio channel out
2	SPK_RN	Negative right audio channel out
3	SPK_LN	Negative left audio channel out
4	SPK_LP	Positive left audio channel out

CN21 (4PIN/2.0mm) Built-in UART port



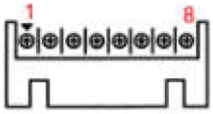
No.	Symbol	Description
1	GND	Ground
2	UART_RX	Receive Data
3	UART_TX	Transmit Data
4	VCC_UART	+3.3V/+5V DC power ≤200mA

CN20 (14PIN/2.0mm) Panel 24V interface



No.	Symbol	Description
1	24V	OLED Panel Power +24/25V
2	24V	OLED Panel Power +24/25V
3	24V	OLED Panel Power +24/25V
4	24V	OLED Panel Power +24/25V
5	24V	OLED Panel Power +24/25V
6	24V	OLED Panel Power +24/25V
7	24V	OLED Panel Power +24/25V
8	GND	OLED Panel Ground
9	GND	OLED Panel Ground
10	GND	OLED Panel Ground

CN17 (8PIN/3.96mm) POWER input interface

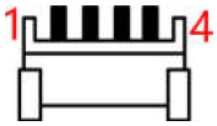


No.	Symbol	Description
1	24V	Power Supply +24/25V
2	24V	Power Supply +24/25V
3	24V	Power Supply +24/25V
4	24V	Power Supply +24/25V
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground

CN19 (6PIN/1.25mm) External input (RS232)

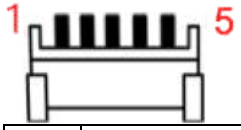
No.	Symbol	Description
1	+3.3Vnormal	+3.3V/+5V DC power ≤200mA
2	GND	Ground
3	RX2	Receive Data2
4	TX2	Transmit Data2
5	RX3	Receive Data3
6	TX3	Transmit Data3

CN18 (4PIN/1.25mm) I2C interface



No.	Symbol	Description
1	+5V_Normal	+5V DC power ≤200mA
2	EX_SCL	I2C for SCL
3	EX_SDA	I2C for SDA
4	GND	Ground

CN22 (5PIN/1.25mm) MIC interface



No.	Symbol	Description
1	3.3V_NOM	3.3V Normal
2	MIC_CLOCK	MIC Clock
3	MIC_DAT1	MIC Data1
4	MIC_DAT2	MIC Data2
5	GND	Ground

5.1 Remote Control Unit Description

No use

① Power On / Off

② Mute

③ TV Input Source (HDMI)

④ **Number Keys**

⑤ DEL key

⑥ Volume Up / Down

⑦ **Home**

⑧ Screen Brightness Up / Down

⑨ **Virtual Mouse On / Off**

⑩ **Back**

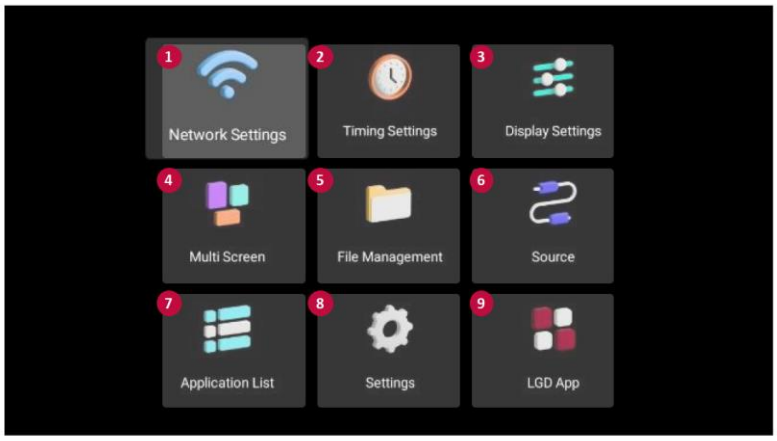
⑪ **Navigation (Up/Down/Left/Right), OK button**

⑫ **Display / Sound Control Menu Pop UP**

After Switched to External source (HDMI)

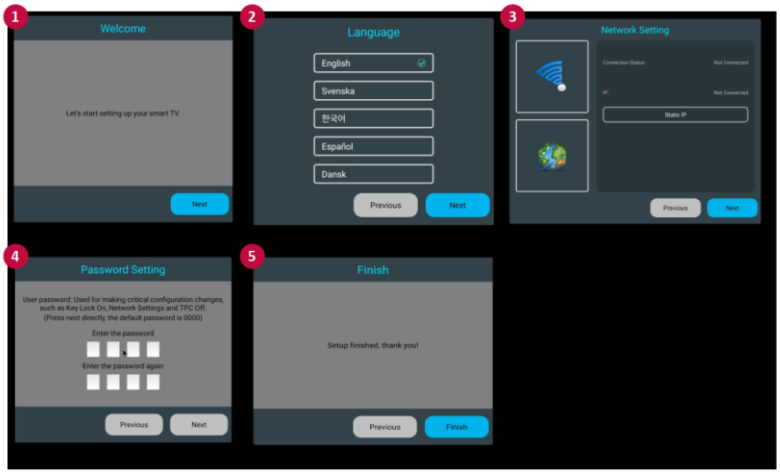
5.2 SW User Guide

(1.) Home Launcher Screen

	Description
	1 Network Connection (Wi-Fi / Wired) 2 Settings for Power Timer / Volume Timer 3 Settings for Luminance / Status Bar / Assistive Touch 4 Play Photos/Videos in a split screen. 5 File Management 6 Switch to external input (HDMI) 7 Application List. 8 General Settings (including Languages, Off-RS, JS) 9 LGD app that automatically removes image background for making an optimal image for transparent OLED.

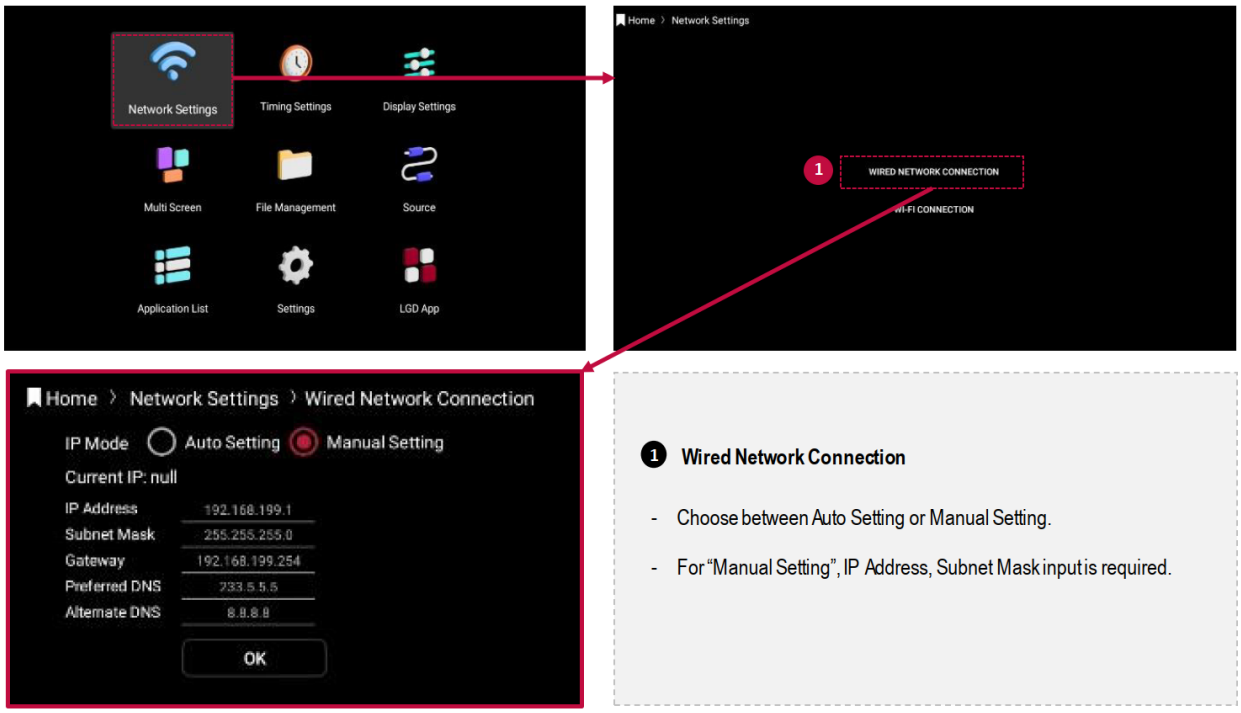
(2.) Install Wizard (Start-up Settings)

Setup Wizard operation after first boot and system reset.

Install Wizard Screen	Detailed info.
	❶ Enable Install Wizard after initial boot or reset. ❷ Select SET Language ❸ Setting Wire/Wireless network ❹ Setting Password ※ The default password is set to 0000 when moving to the next step without setting a password. ❺ Finish ※ When you select "Finish," will be redirected to the home screen.

(3.) Network Settings

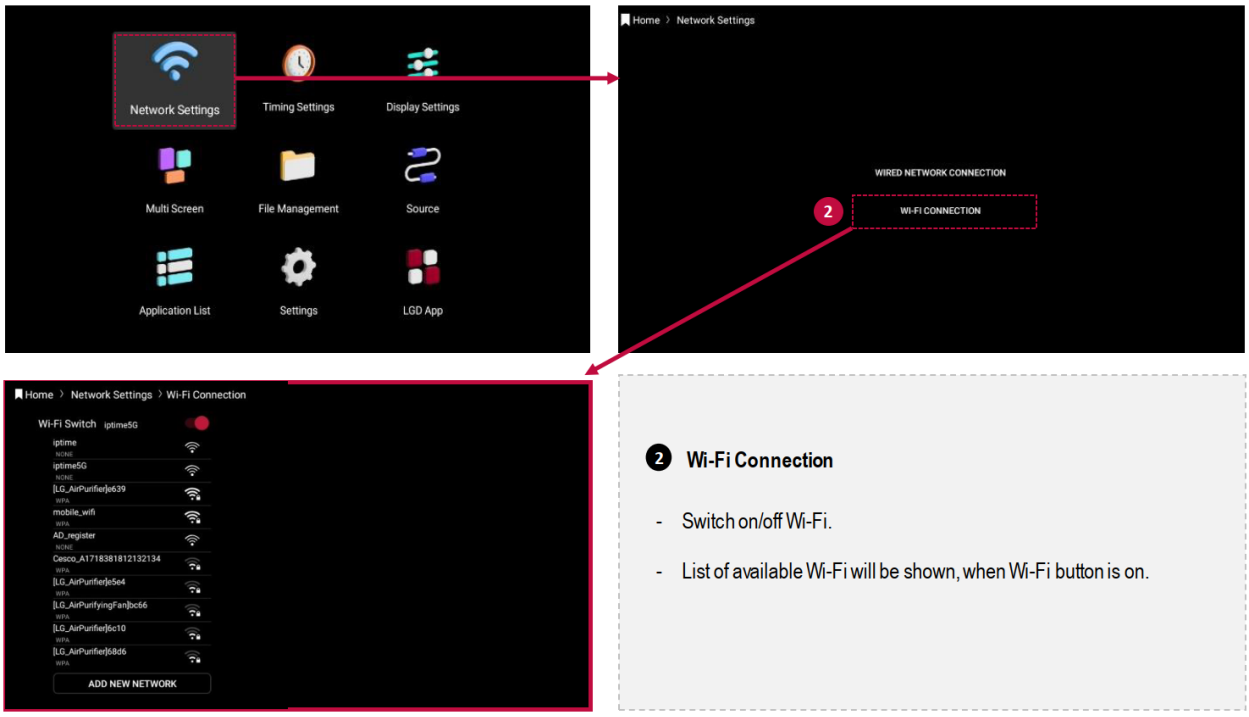
-Wired Network Connection



1 Wired Network Connection

- Choose between Auto Setting or Manual Setting.
- For "Manual Setting", IP Address, Subnet Mask input is required.

-Wi-Fi Connection

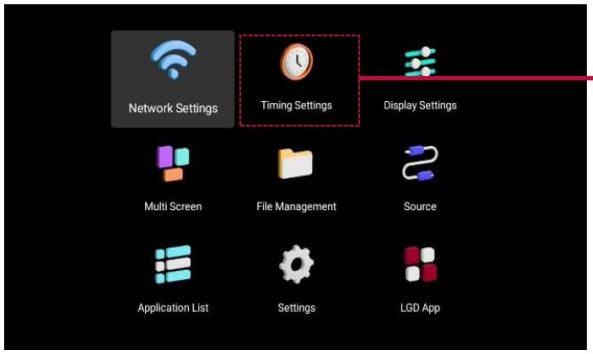


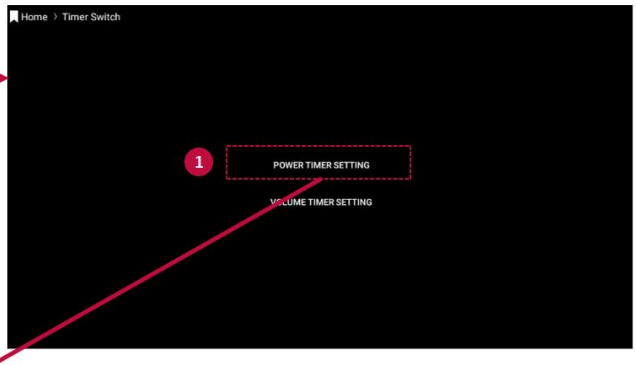
2 Wi-Fi Connection

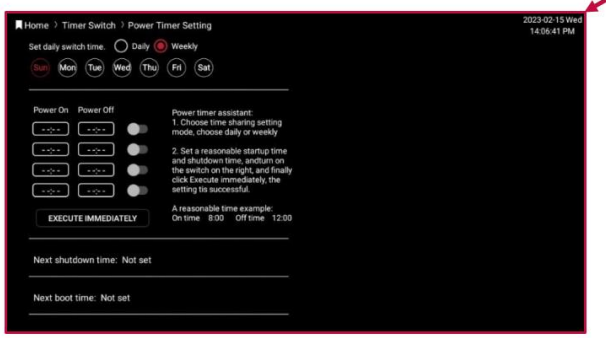
- Switch on/off Wi-Fi.
- List of available Wi-Fi will be shown, when Wi-Fi button is on.

(4.)Timing Settings

-Sleep On/Off the Display at User's Set time.







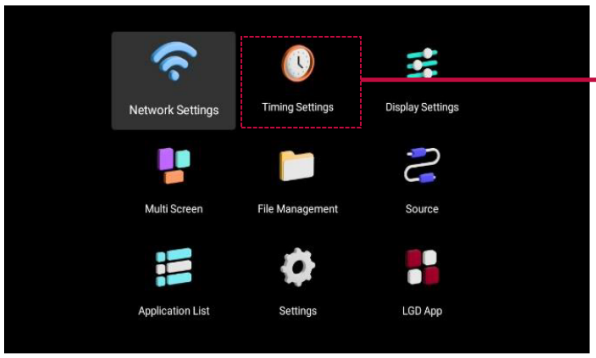
1 Power Timer Setting ※ When connected to network, SET time can be synced to the network time.

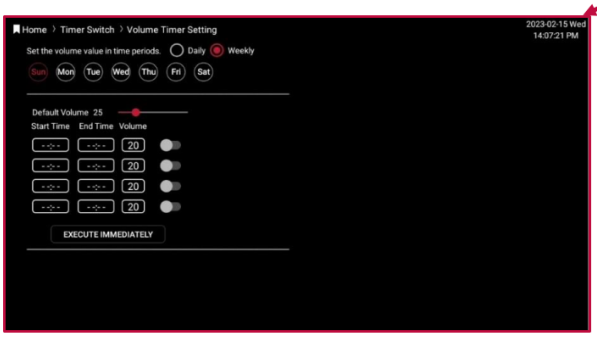
(1) Set the switch time, rather daily or weekly.

(2) Set up the startup time and shutdown time.
Turn on the switch to the right. ※ Users can save up to 4 options.

(3) Click "Execute Immediately" button.

-Set the Volume at User's Set Time.





2 Volume Timer Setting ※ When connected to network, SET time can be synced to the network time.

(1) Select whether to apply the timer settings daily or weekly.

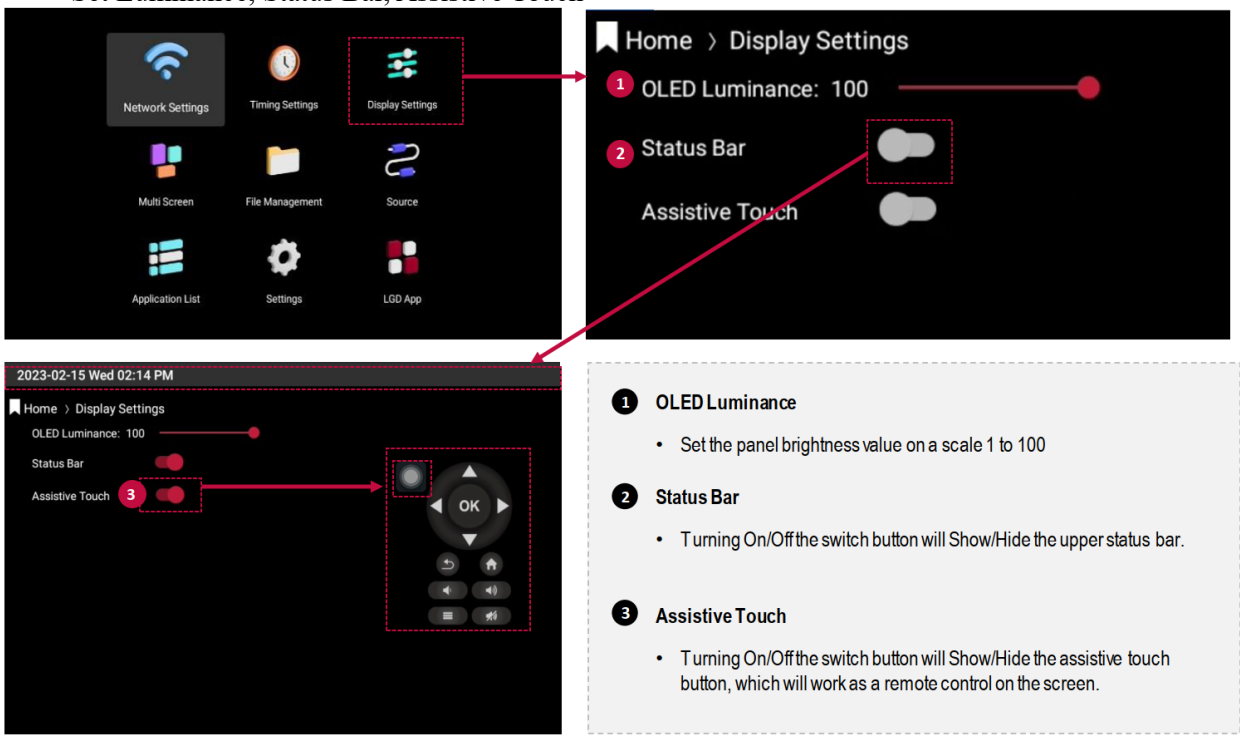
(2) Set the default volume value.

(3) Set Start time/End time, Volume size, and then turn on the switch to the right, to save changes. ※ Users can save up to 4 options.

(4) Click "Execute Immediately" button.

(5.) Display Settings

-Set Luminance, Status Bar, Assistive Touch



1 OLED Luminance

- Set the panel brightness value on a scale 1 to 100

2 Status Bar

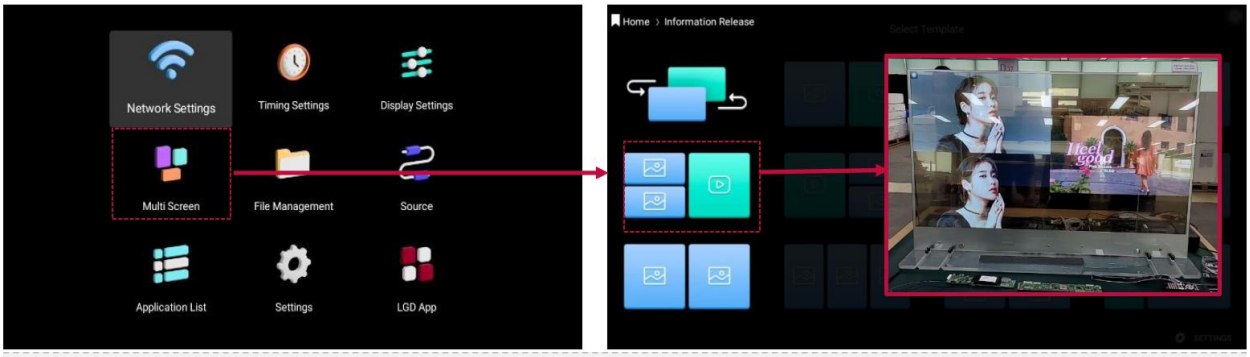
- Turning On/Off the switch button will Show/Hide the upper status bar.

3 Assistive Touch

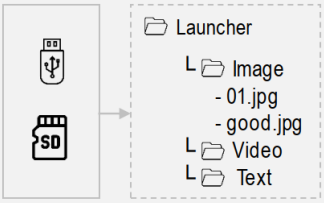
- Turning On/Off the switch button will Show/Hide the assistive touch button, which will work as a remote control on the screen.

(6.) Multi-Screen

-By Selecting the Templates, Play Photos and Videos in a Split Screen.



1 How to set which content to show in a multi screen template.



(1) Create a folder named "Launcher" at external storage (ex. USB or SD card)

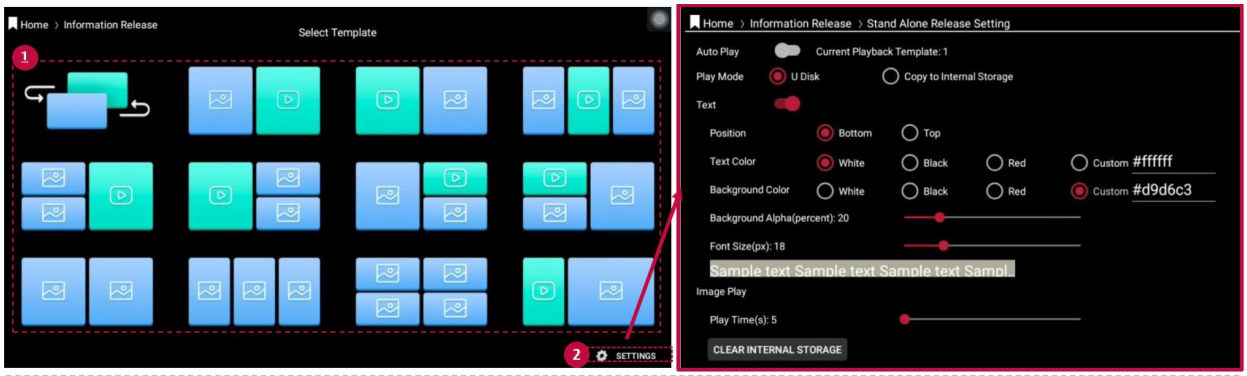
(2) Under the "Launcher" folder, Create folders named "Image", "Video", "Text".

(3) Put images, videos, and text files in each of the folders.

(4) When external storage is connected to the SET, images/videos/texts inside "Launcher" folder will be played according to the chosen template.

*** Supported file formats**

- Photo : .jpg, jpeg, bmp, png
- Video : .mpg, .avi, .ts, .mov, .mkv, .dat, .mp4, .vob
- Music : .mp3



❷ **Select template**

❸ **Settings : Users can set the Image/Video play mode.**

- Auto Play : If (1) the switch button has been turned on to the right and (2) user does not select any templates for 20 seconds, the show will automatically start with the most recently selected template.
- Play mode : If "Copy to Internal Storage" is selected, "Image/Video/Text" Folders will be copied to Internal Storage.
- Text : If set to "On", the text files inside "Launcher/Text" root will be overlaid with the contents, like the subtitles.
- Clear Internal Storage : All the image/video/text files saved to Internal Storage will be deleted.

(7.) File Management

- Check the Files in Internal/External storage.

❶ **When clicking each icon, users can filter and check only the files of that type stored in Internal Storage(Local storage).**

For example, when clicking the "Picture" icon, only the files with image format (jpg,png) will be shown.

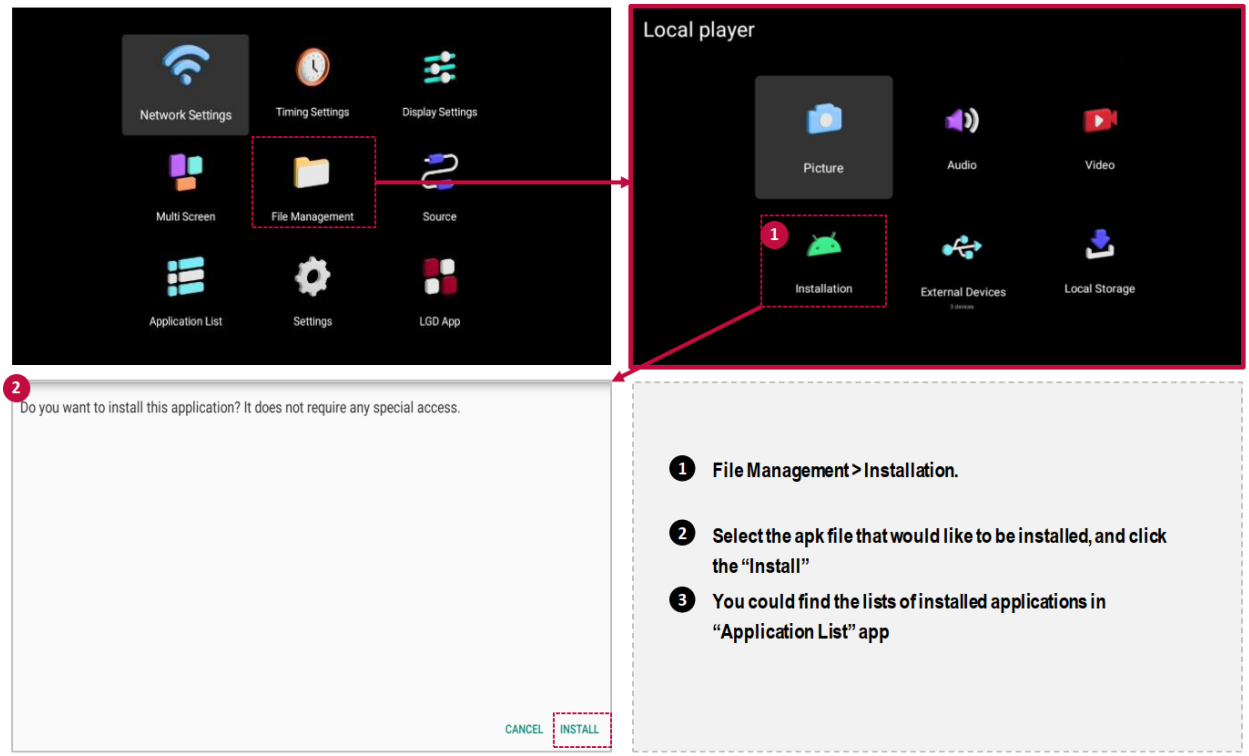
- ex. Picture : image files / Audio : audio files / Video : video files / Installation : apk files

❷ **Click "external devices" to check the lists of all the files in the external devices.**

❸ **Click "Local Storage" to check all the lists of files inside local storages.**

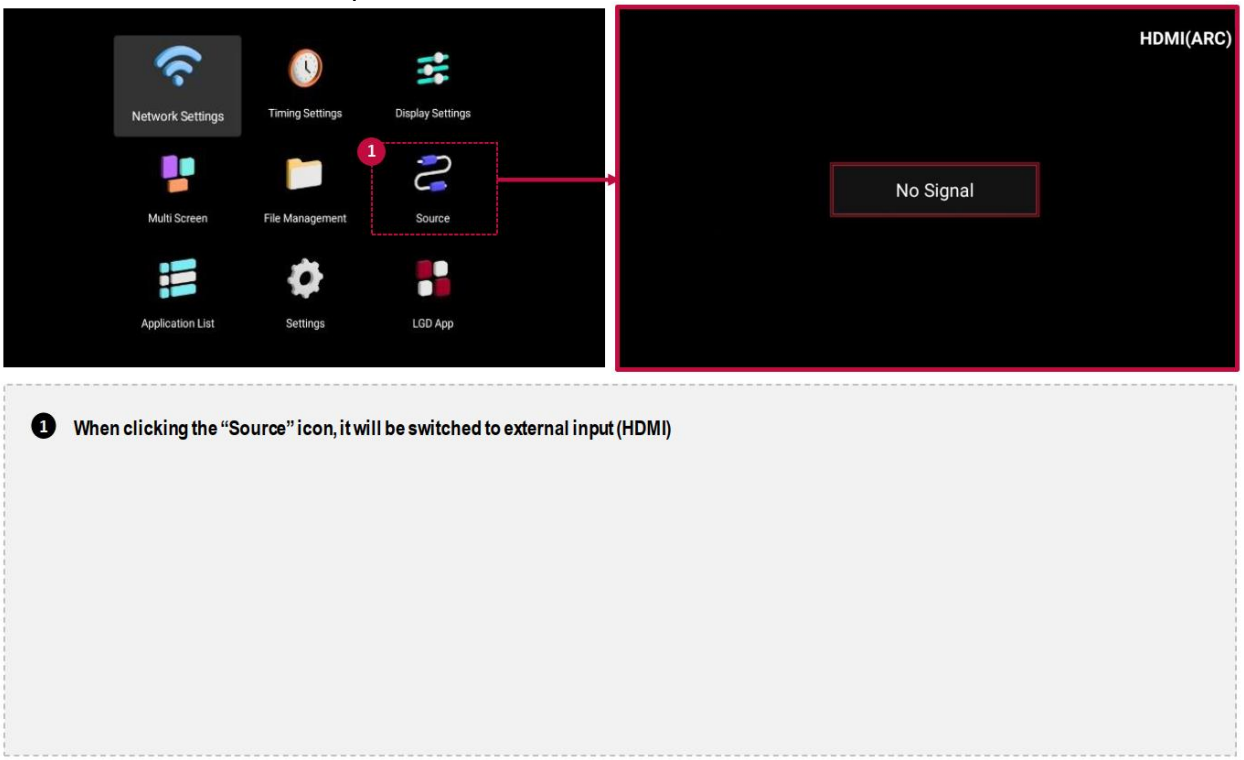
- Users can find all the files in any formats (Images / audios / video / apk file)

- How to Install the APK files.

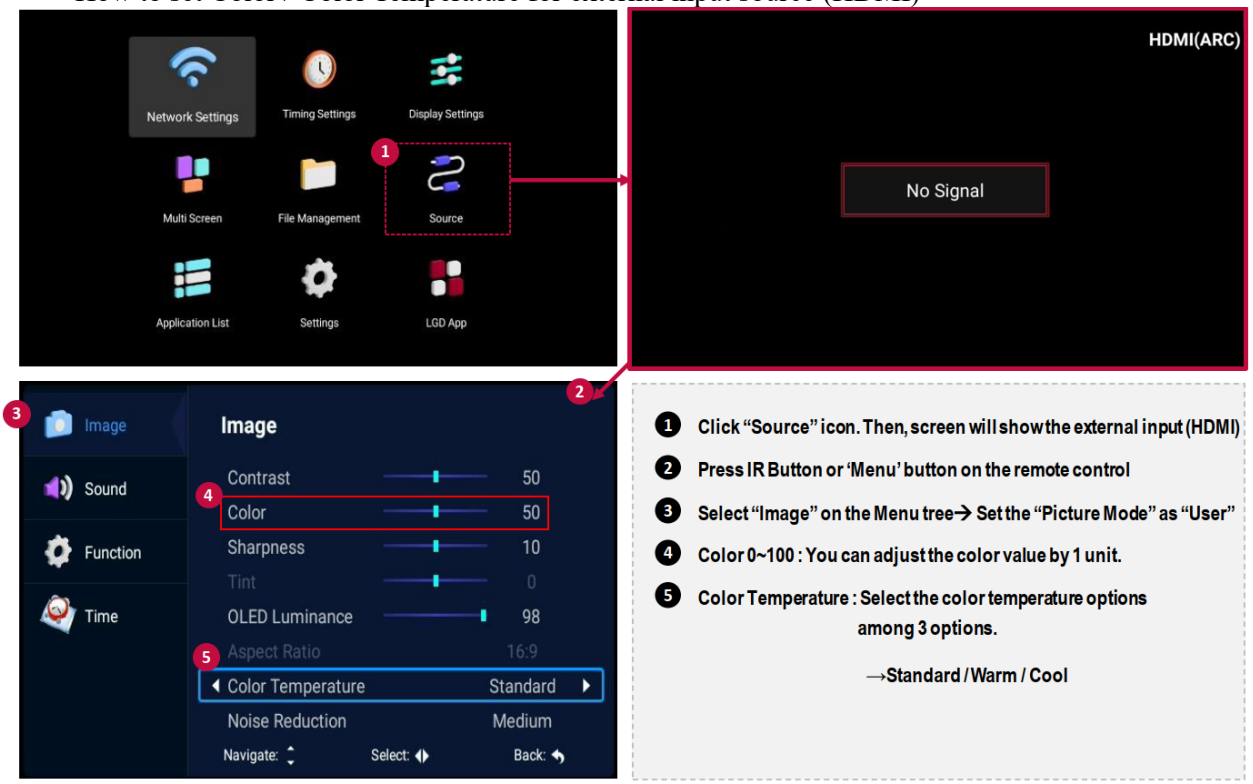


(8.) Source

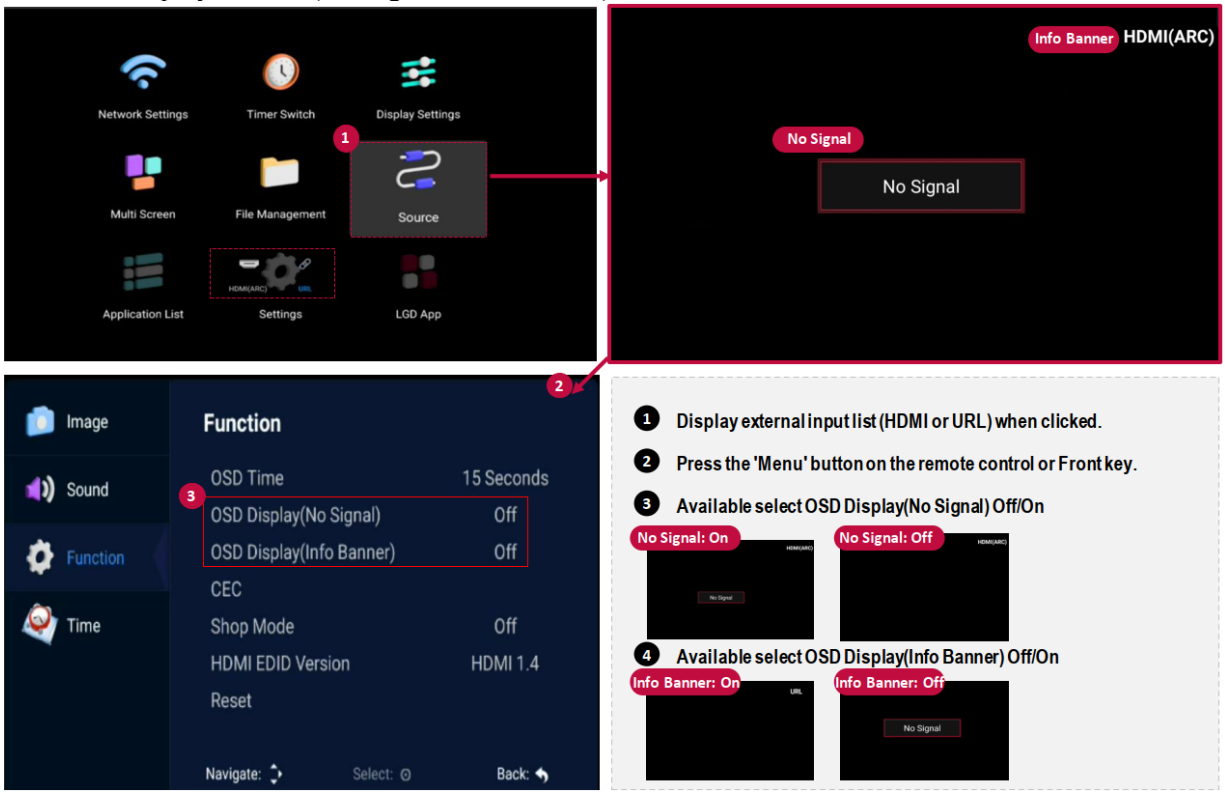
-How to Switch to External Input



-How to set Color / Color Temperature for external input source (HDMI)

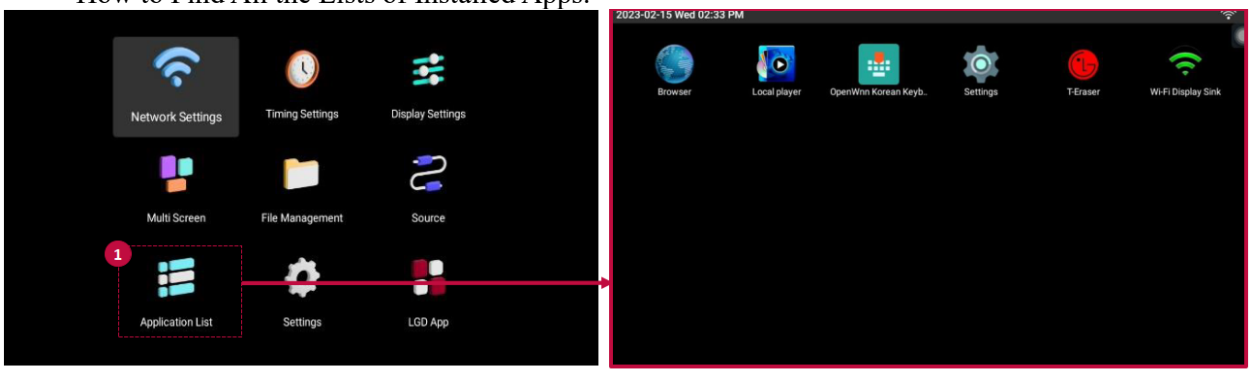


-OSD Display On/Off (No Signal / Info Banner)



(9.) Application List

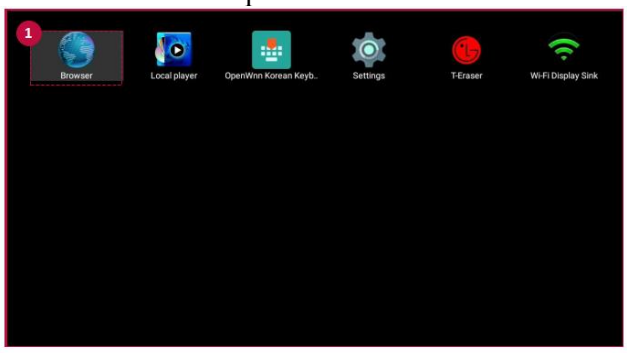
-How to Find All the Lists of Installed Apps.

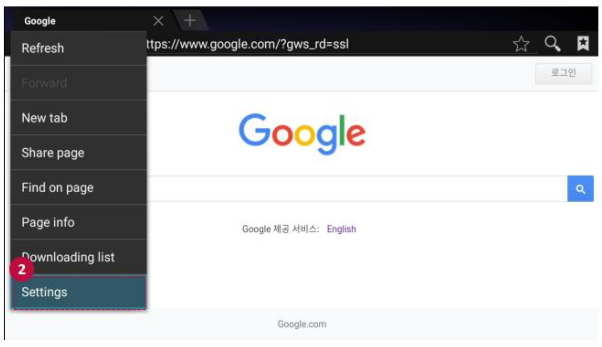


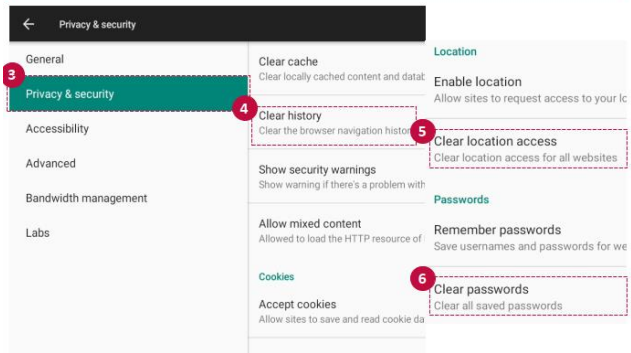
1 **You can find all the installed applications here.**

- Browser : an access to internal browser.
- Local Player
- Settings
- T-Eraser : LGD app that generates optimal image for transparent display, by automatically removing the image background
- Wi-Fi Display Sink : LGD screen mirroring app.

-How to delete private information on Browser Application







1 Click Browser app icon.

2 Select 'Settings' after Press the 'Menu' button on RCU

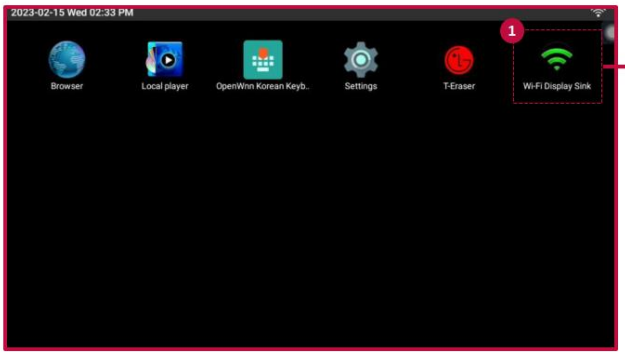
3 Select 'Privacy & Security'

4 Select & Operate Clear History

5 Select & Operate Clear location access

6 Select & Operate Clear Passwords

-How to do screen mirroring (How to use Wi-Fi Display Sink App)



1 **Click Wi-Fi Display Sink app icon.** (Application List > Wifi Display Sink app)

- Your current device name will be shown on "My Device Name"

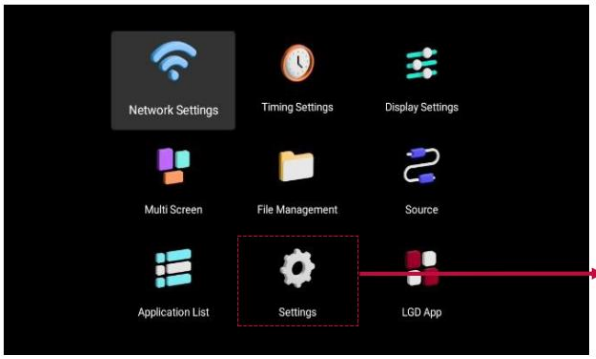
2 **Turn on Screen Mirroring Function on Android Mobile (ex. Cast / Smart View etc)**

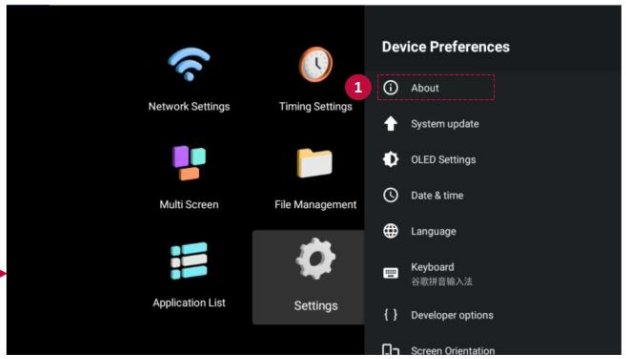
- Among the Mobile 'Mirroring' List, find and select the Transparent OLED Device Name(ex. Android TV)

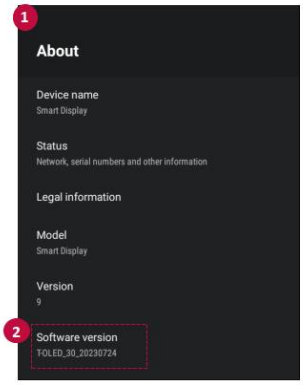
3 **Check if your mobile screen has been mirrored well.**

(10.) Settings

-General Settings (Check Software Version)







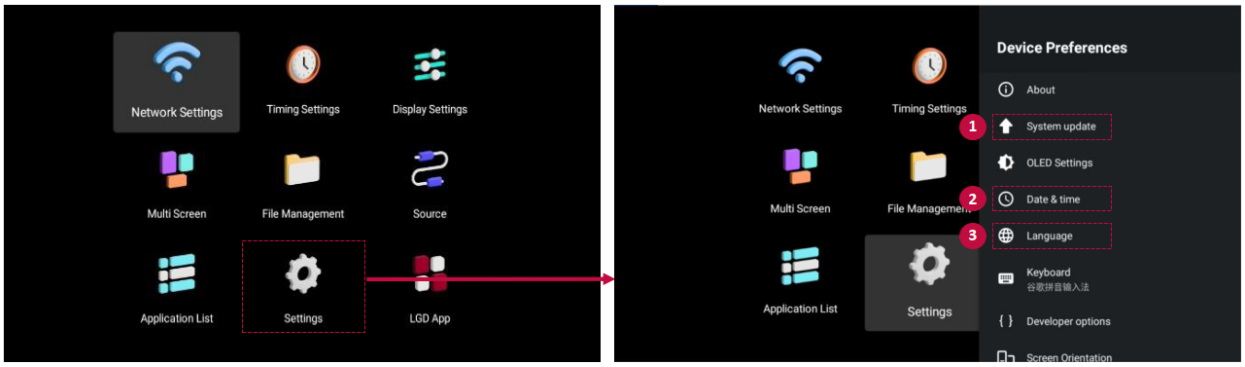
1 **About**

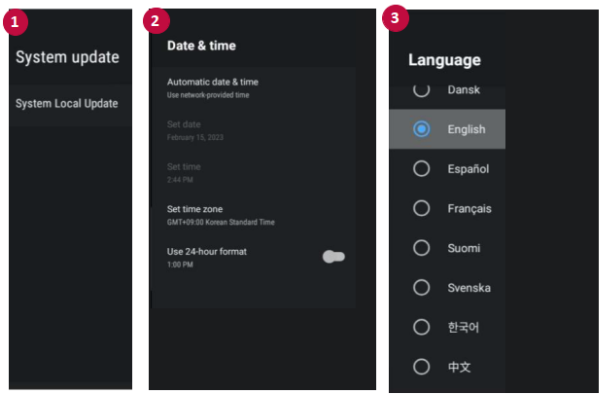
2 **Software Version**

- Check Software Version

Ex) T-OLED_55_20230724

-General Settings (System Update, Date/Time, Languages)





1 System Update

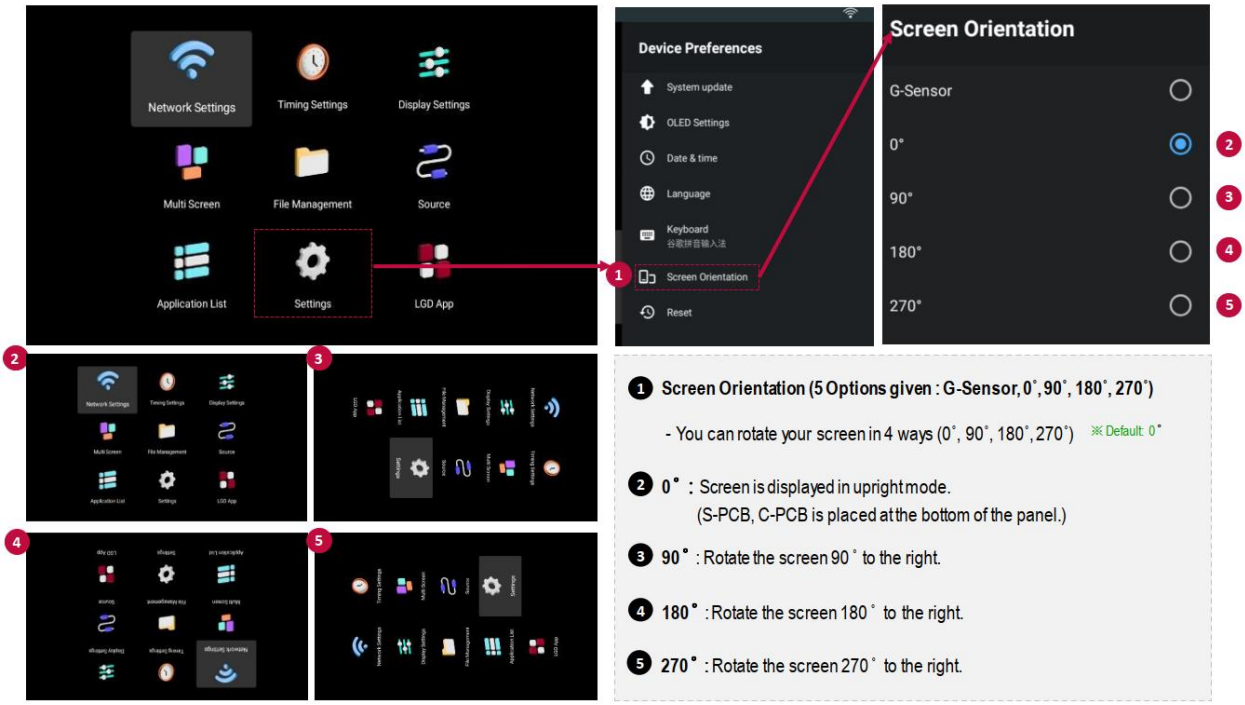
2 Date & Time

- When connected to the internet, user can choose automatic date & time option (automatic sync to network-provided time)

3 Language

- Select the language.

-Screen Orientation (1/2) > Screen Rotation Function



1 Screen Orientation (5 Options given : G-Sensor, 0˚, 90˚, 180˚, 270˚)

- You can rotate your screen in 4 ways (0˚, 90˚, 180˚, 270˚) ※Default: 0˚

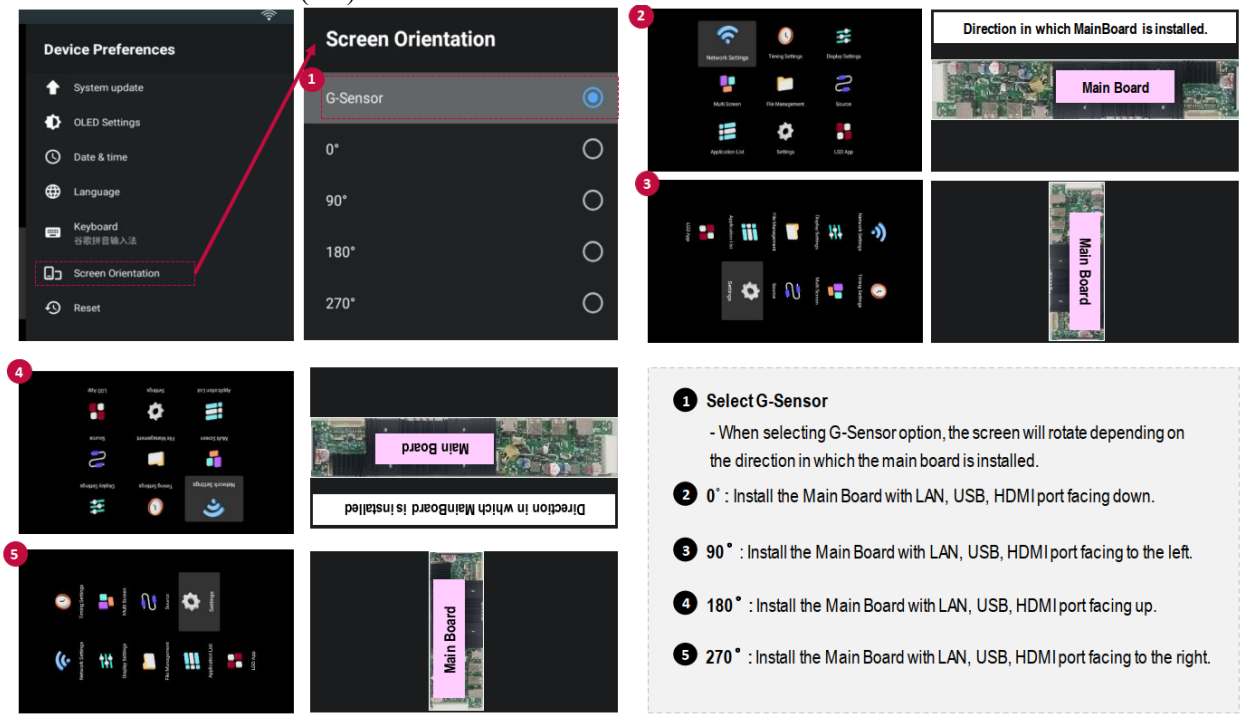
2 0˚ : Screen is displayed in upright mode.
(S-PCB, C-PCB is placed at the bottom of the panel.)

3 90˚ : Rotate the screen 90 ˚ to the right.

4 180˚ : Rotate the screen 180 ˚ to the right.

5 270˚ : Rotate the screen 270 ˚ to the right.

-Screen Orientation (2/2) > G Sensor Function



1 **Select G-Sensor**
- When selecting G-Sensor option, the screen will rotate depending on the direction in which the main board is installed.

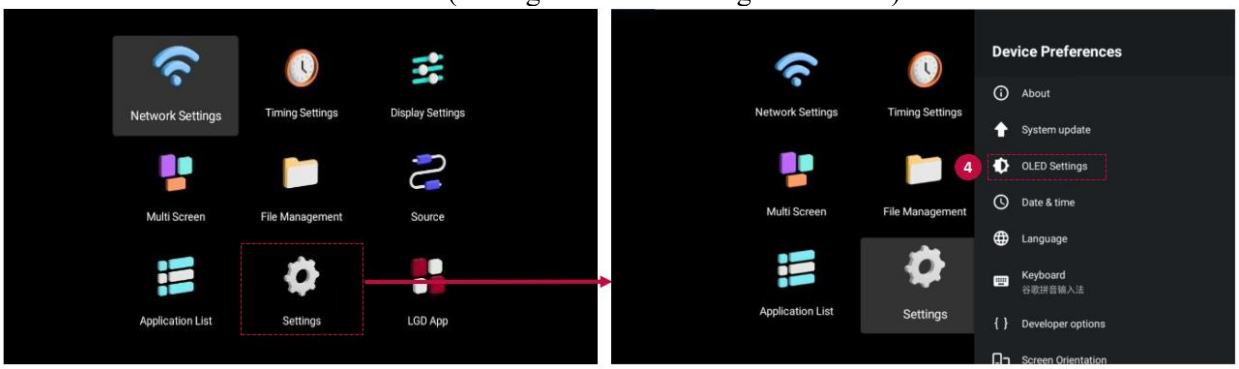
2 **0°** : Install the Main Board with LAN, USB, HDMI port facing down.

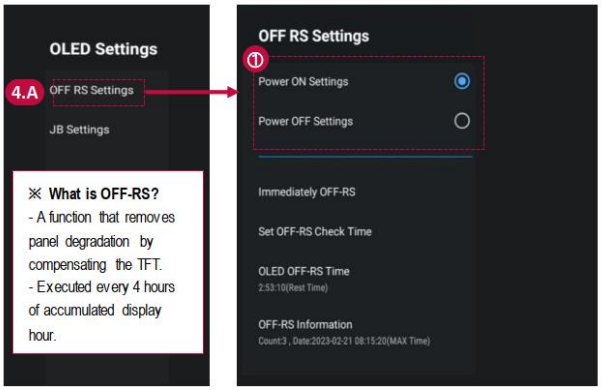
3 **90°** : Install the Main Board with LAN, USB, HDMI port facing to the left.

4 **180°** : Install the Main Board with LAN, USB, HDMI port facing up.

5 **270°** : Install the Main Board with LAN, USB, HDMI port facing to the right.

-How to Reduce the Panel Noise (Settings > OLED Settings > OFF RS)





4 **Click "OLED Settings"**

4.A **Click "OFF RS Settings"** ※ Default: Power On Settings

① **Choose between 2 options** ("Power ON Settings" or "Power OFF settings")

- Power On Settings : Off-RS will start when Set Power is turned on.

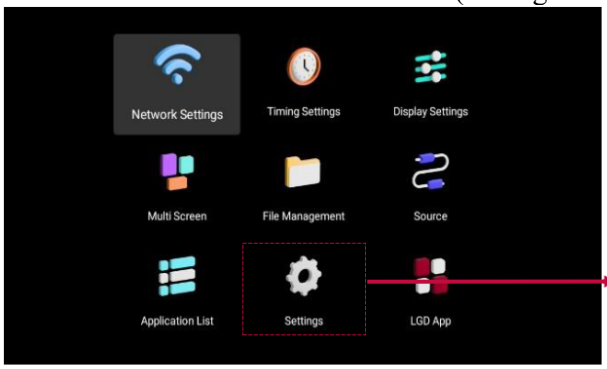
- Power Off Settings : Off-RS will start when Set Power is turned off.

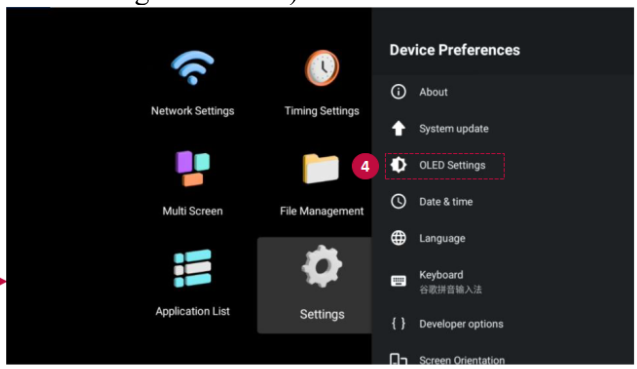
※ For users who turn off the power by unplugging the cord, setting the Off-RS settings as "Power On Settings" is recommended.

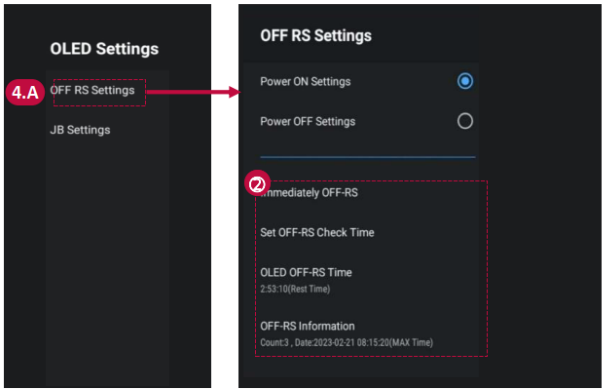
※ Uses can turn the power on/off in following ways : By using (1) the remote control (2) Keypad buttons (3) Unplugging the power cord. (AC)

A few horizontal lines may appear on the screens while running the Clear Panel Noise feature (OFF-RS). This is normal, so there is no need for concern

-How to Reduce the Panel Noise (Settings > OLED Settings > OFF RS)





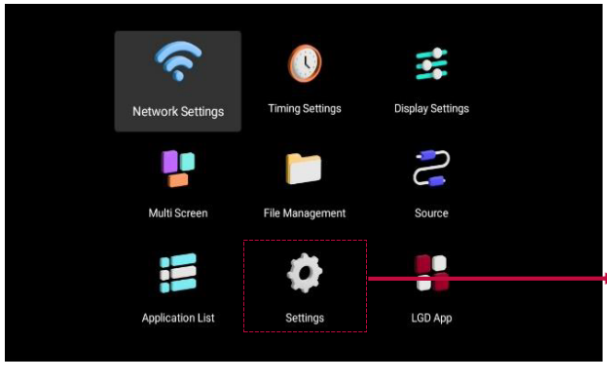


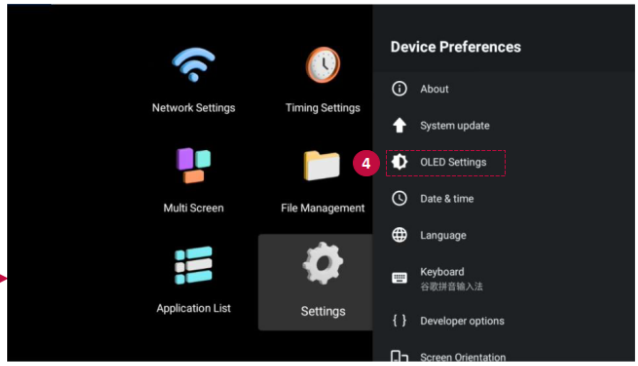
4 Click "OLED Settings"

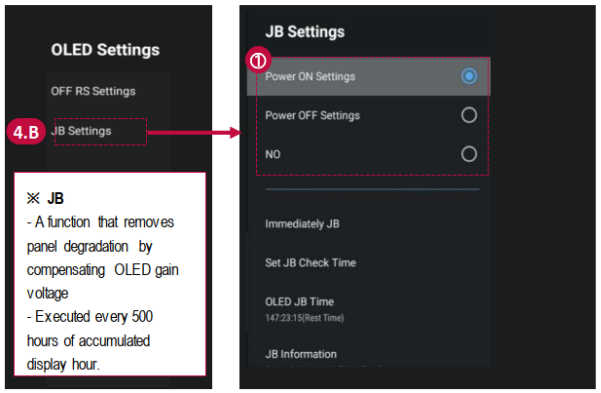
4.A Click "OFF RS Settings"

② - ImmediatelyOFF-RS : Execute Off-RS immediately
- Set OFF-RS Check Time : Set cycle to execute OFF-RS. ※ Default : 4 hours
- OLED OFF-RS Time : Screen time since the last OFF-RS.
- OFF-RS Information :
  - Count : Total number of times OFF-RS has been executed.
  - Date : Date and time when OFF-RS was last executed.

-How to Reduce the Panel Noise (Settings > OLED Settings > JB)







4 Click OLED Settings > 4.B Click JB Settings

① Choose 1 of the 3 options. ※ Default: Power On Settings

(1) Power On Settings : Execute JB when turning the power on.

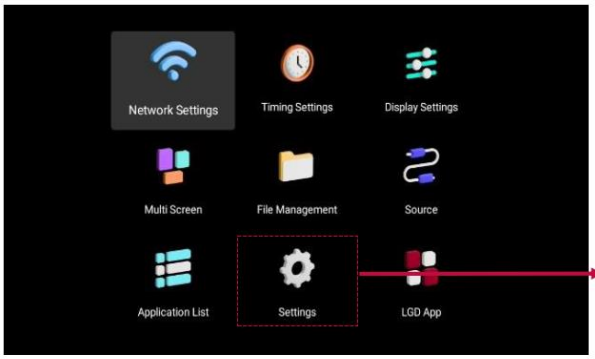
(2) Power Off Settings : Execute JB when turning the power off.

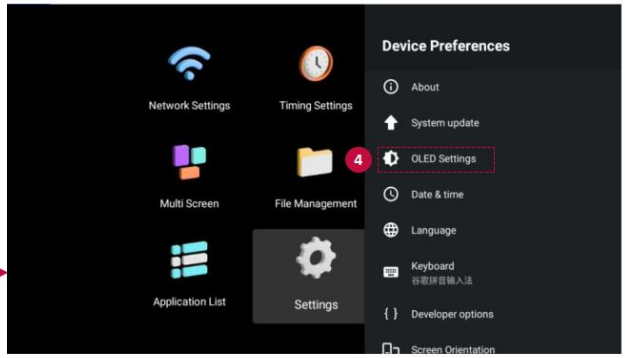
(3) NO : Turn off JB function.

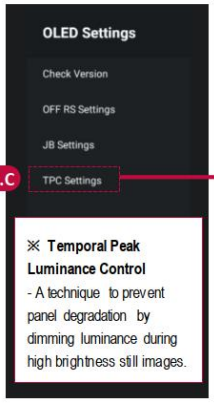
※ For users who turn off the power by unplugging the cord, setting the JB Settings as "Power On Settings" is recommended.

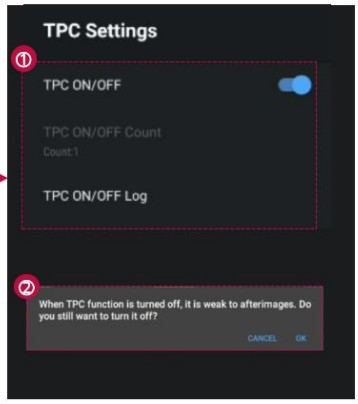
※ Uses can turn the power on/off in following ways :
By using (1) the remote control (2) Keypad buttons (3) Unplugging the power cord. (AC)

-Settings > OLED Settings > TPC On/Off









4 Select OLED Settings > 4.C Select TPC Settings

① TPC Settings ※ Default: TPC On

(1) TPC ON: Peak luminance reduced when still image is sustained

(2) TPC OFF: Maintain peaks over still images

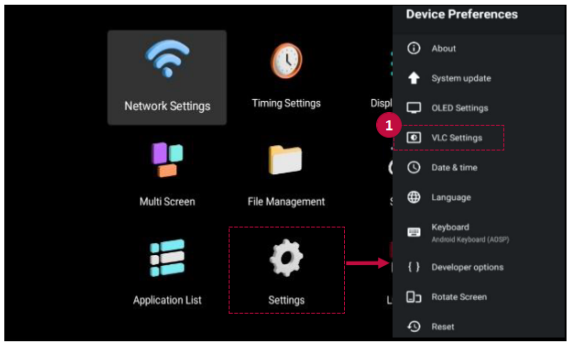
(3) TPC ON/OFF Count: Display TPC Off count

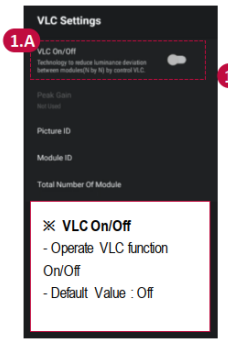
(4) TPC ON/OFF Log: Record Last TPC Off / On time

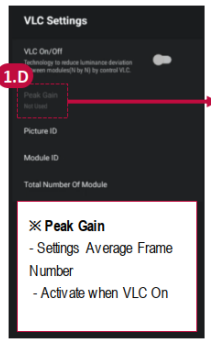
② Display warning message when settings TPC Off

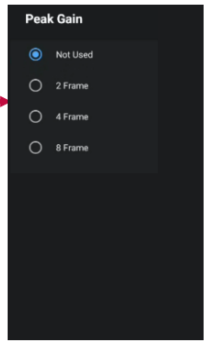
※ If you turn off the image sticky prevention function, it may be vulnerable to residual images. It is recommended to set it to 'On Settings'

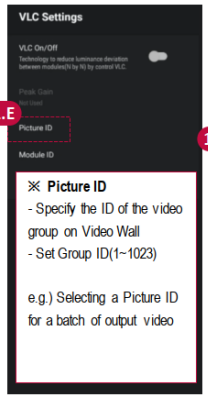
-Settings > VLC Settings (1/2)

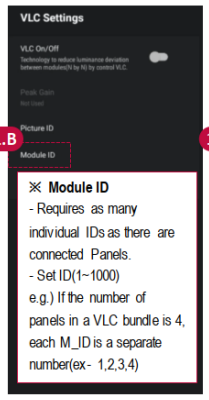


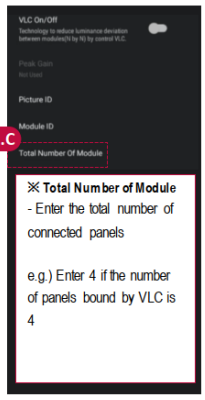












※ Default: VLC Off, Picture ID: 1, Module ID: 1, Total Number of Module: 0

1 Select VLC Settings > 1.A Select VLC On/Off

*** Set required options for VLC operation**

(A) VLC ON

(B) Module ID

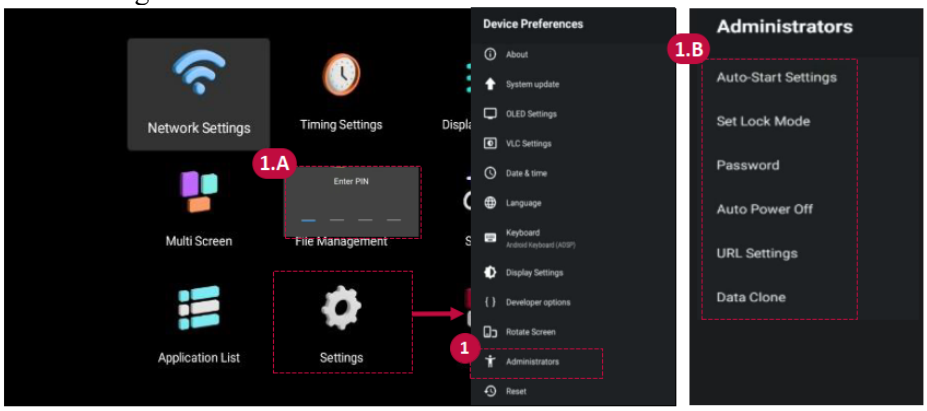
(C) Total Number of Module(Total number)

*** Setting Selection Options for VLC operation**

(D) Peak Gain

(E) Picture ID

-Settings > Device Preferences > Administrators



1 **Select Administrators > 1.A Show Password input window**

*** Available to access when the set password is entered(Access is denied if the password is incorrect)**

(A) Auto-Start Settings : Function that preset auto-mode operation after boot-up

(B) Set Lock Mode : Physical key lock function on KeyPad / Icon entry on Home menu On/Off function (password input required)

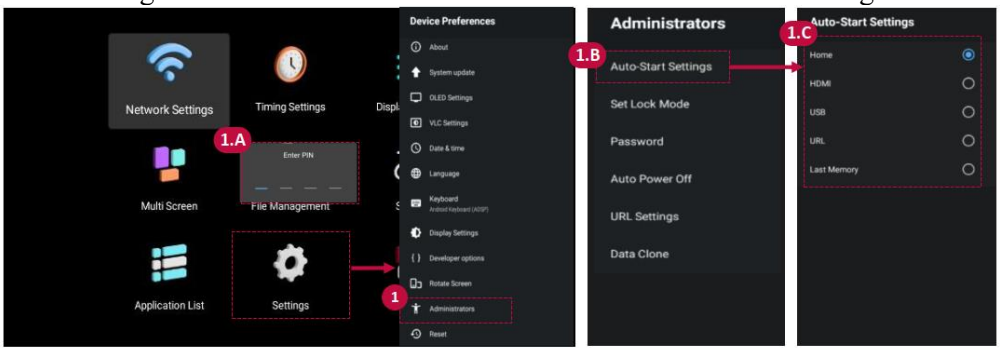
(C) Password : Function that change password

(D) Auto Power Off : Function to power off after a period of inactivity/no signal

(E) URL Settings : Function to set the URL address to run in URL mode

(F) Data Clone : Export/import functionality for device setting values

-Settings > Device Preferences > Administrators > Auto-Start Settings



1 **Select Administrators > 1.A Show Password input window**

*** Available to access when the set password is entered(Access is denied if the password is incorrect)**

1.B Auto-Start Settings Boot-up with setted mode when power on.

(A) Home: Boot-up Home Launcher

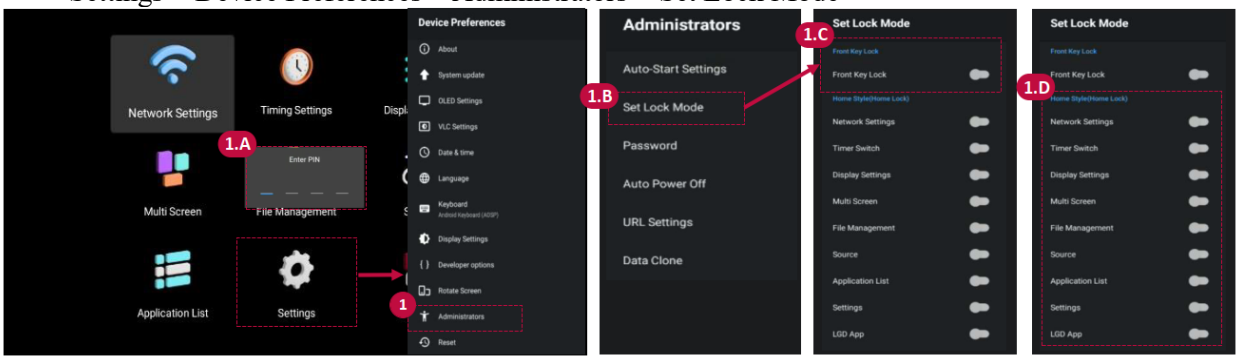
(B) HDMI: Boot up with HDMI Mode

(C) USB: Connected USB Root directory > Launcher > Video > Play Video in folder sequentially

(D) URL: Operate URL Mode with setted URL address

(E) Last Memory: Boot up with last operate mode

-Settings > Device Preferences > Administrators > Set Lock Mode



1 **Select Administrators** > **1.A** **Show Password input window**

*** Available to access when the set password is entered(Access is denied if the password is incorrect)**

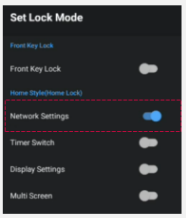
1.B Set Lock Mode – ⓐ Front Key Lock ⓑ Home Lock function

1.C Front Key Lock On/Off
On: IR/Front key Lock
Off: IR/Front key Lock 해제

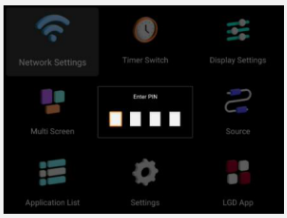
1.D Home Style(Home Lock) – Lock On/Off on each menu entry in Home
On: Required input Password when enter the menu
Off: **Not** Required input Password when enter the menu

Ex)

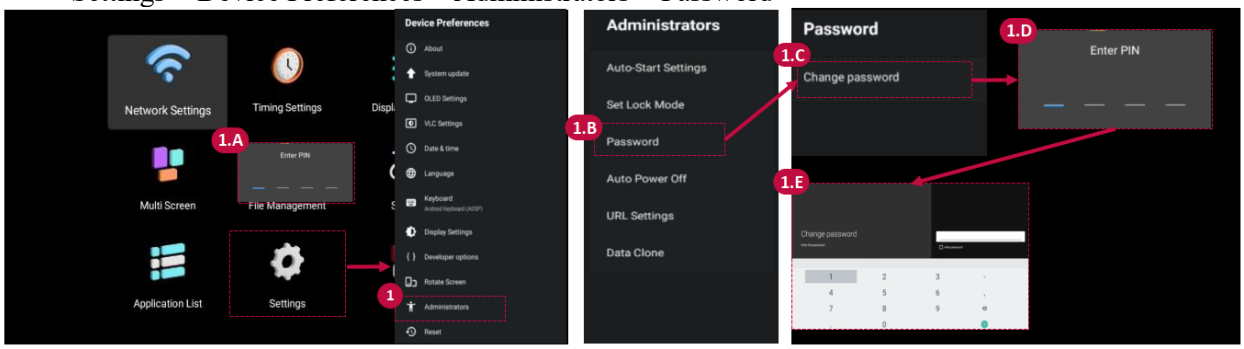
Network Settings Lock On



Pop-up password input window when select Network Settings on Home menu



-Settings > Device Preferences > Administrators > Password



1 **Select Administrators** > **1.A** **Show Password input window**

*** Available to access when the set password is entered(Access is denied if the password is incorrect)**

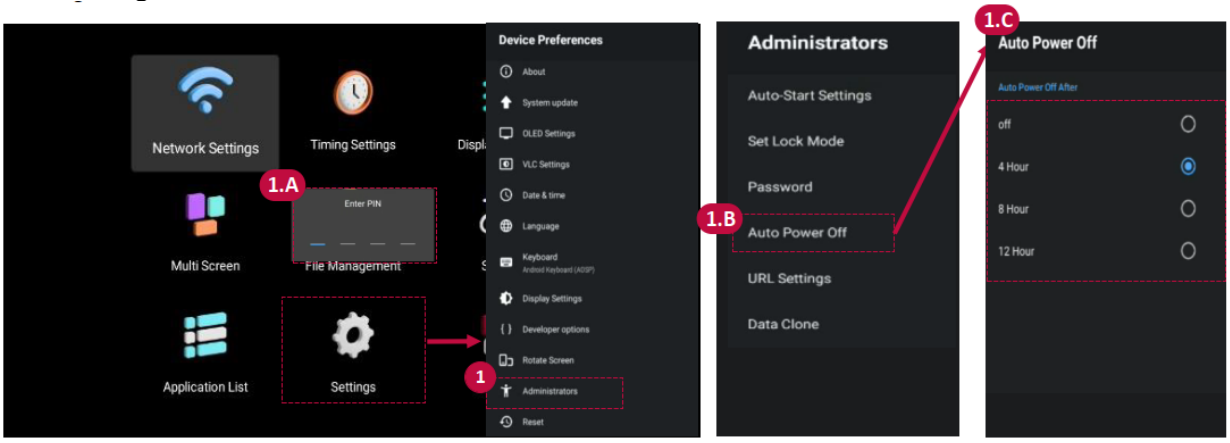
1.B Password – Change Password from old password

1.C Change Password – Edit Password

1.D Enter PIN – Function to change a previously set password

1.E Change Password – Changed when the same password is entered twice.

-Settings > Device Preferences > Administrators > Auto Power Off



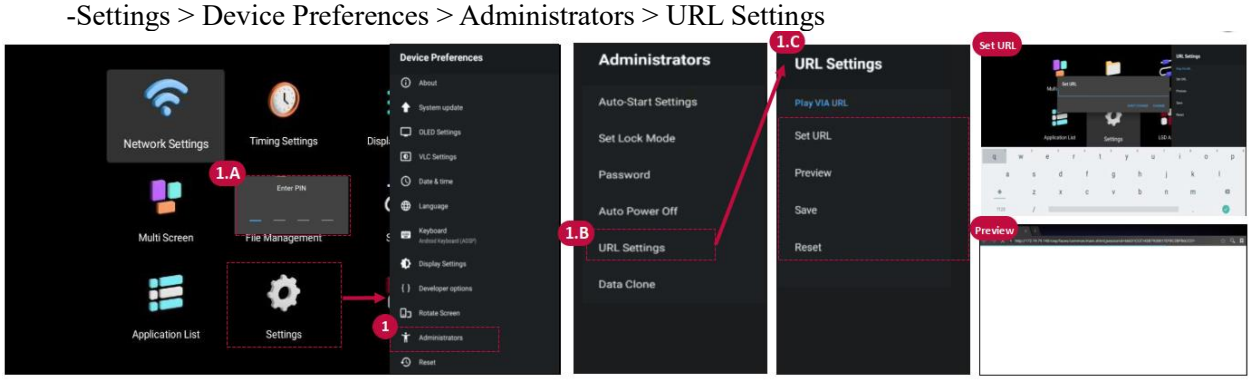
1 **Select Administrators > 1.A Show Password input window**

*** Available to access when the set password is entered(Access is denied if the password is incorrect)**

1.B Auto Power Off – Device shuts down after a set time for no-signal/no-operation

1.C Off - (Default) Set does not power off even no signal/no operation.
4 Hour - Set power off after 4 hours no signal/no operation.
8 Hour - Set power off after 8 hours no signal/no operation.
12 Hour - Set power off after 12 hours no signal/no operation.

-Settings > Device Preferences > Administrators > URL Settings



1 **Select Administrators > 1.A Show Password input window**

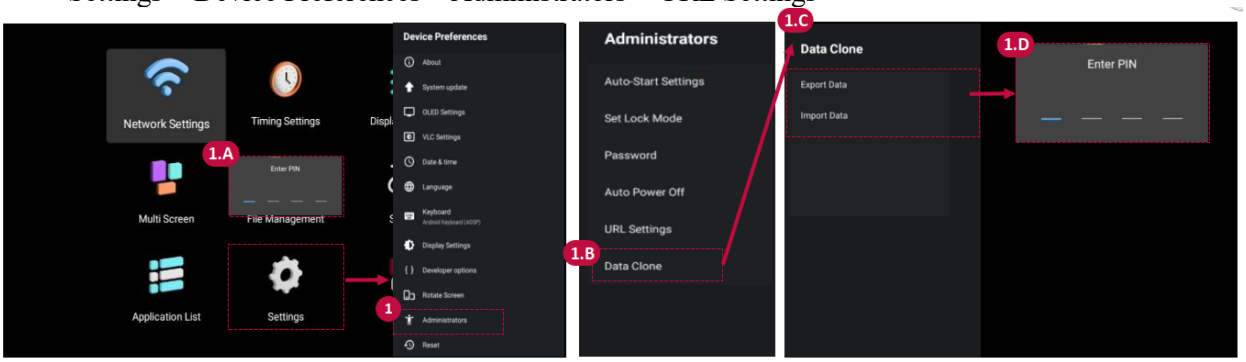
*** Available to access when the set password is entered(Access is denied if the password is incorrect)**

1.B URL Settings – URL address configurable menu in Auto Start Mode

1.C Set URL – Write the URL address
Preview – Preview the webpage of the written URL
Save – Save the written URL for use on URL Mode
Reset – Reset the written URL

※ If you run Preview immediately after writing/saving the URL address, the page may not run (please wait for 2 seconds before running)

-Settings > Device Preferences > Administrators > URL Settings



1 Select Administrators - 1.A Show Password input window

* Available to access when the set password is entered(Access is denied if the password is incorrect)

1.B Data Clone – Function to export / import of Device data

1.C Export – Function to export of Device data
Import – Function to import the data of the exported device.

1.D Export – If select, input Password, Available export after input correct Password
Import – Enter password if selected and display import complete message.

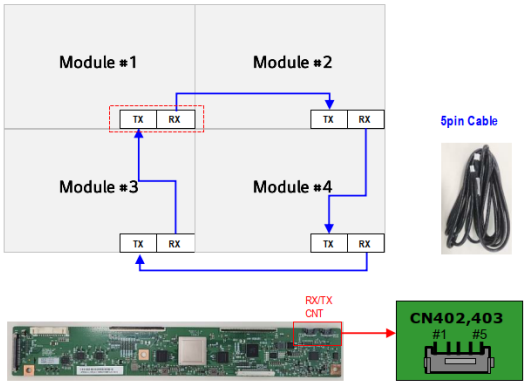
※ Device Reboot after complete import data

-Settings > VLC Settings (2/2)

Connect RX/TX CNT of Control PCB with using 5pin cable for VLC function.

(e.g.. Use 5pin cable 4ea when install 2x2 OLED Module)

<Connect Hardware>



V23 55FHD Transparent OLED Control PCB

Table 1. VLC Tx CONNECTOR(CN402) PIN CONFIGURATION

No	Symbol	Description
1	APLC_TXCLK_P	VLC LVDS Tx CLK +
2	APLC_TXCLK_N	VLC LVDS Tx CLK -
3	GND	Ground
4	APLC_TXDAT_P	VLC LVDS Tx Data +
5	APLC_TXDAT_N	VLC LVDS Tx Data -

Table 2. VLC Rx CONNECTOR(CN403) PIN CONFIGURATION

No	Symbol	Description
1	APLC_RXDAT_N	VLC LVDS Rx Data -
2	APLC_RXDAT_P	VLC LVDS Rx Data +
3	GND	Ground
4	APLC_RXCLK_N	VLC LVDS Rx CLK -
5	APLC_RXCLK_P	VLC LVDS Rx CLK +

<Software setting>

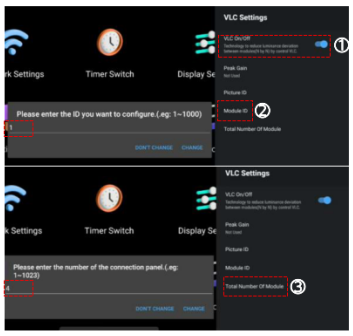
Ex) When installation 2X2

※ Mandatory option

① VLC On/off : VLC On

② Module ID : Input 1,2,3,4 number on each module

③ Total Number Module : Input "4" number of total module



※ Required option

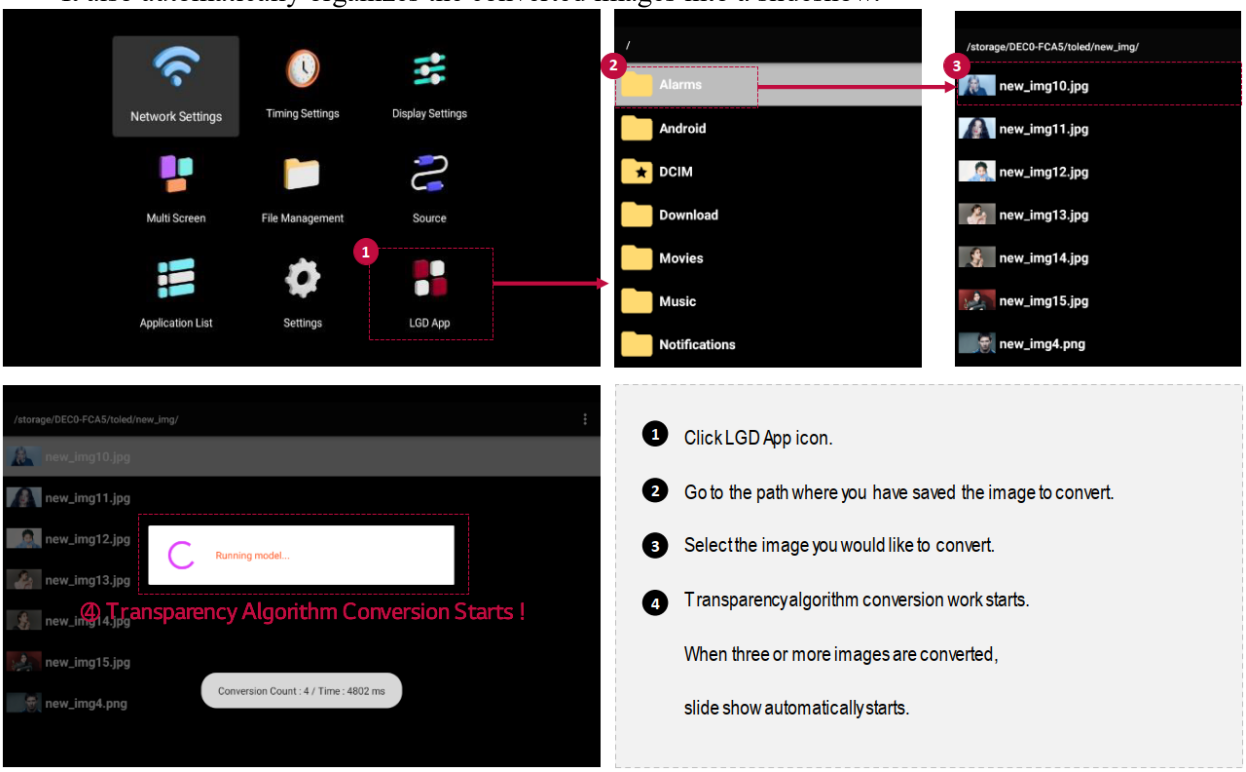
④ Peak Gain : Settings number of Running Average Frame on Peak Gain

※ Occur can flicker on screen when change peak value by each frame, Options to change to average peak values of 2/4/8 frame for mitigation purposes.

⑤ Picture ID : Select Group ID of Videowall video(Group of outputted video)

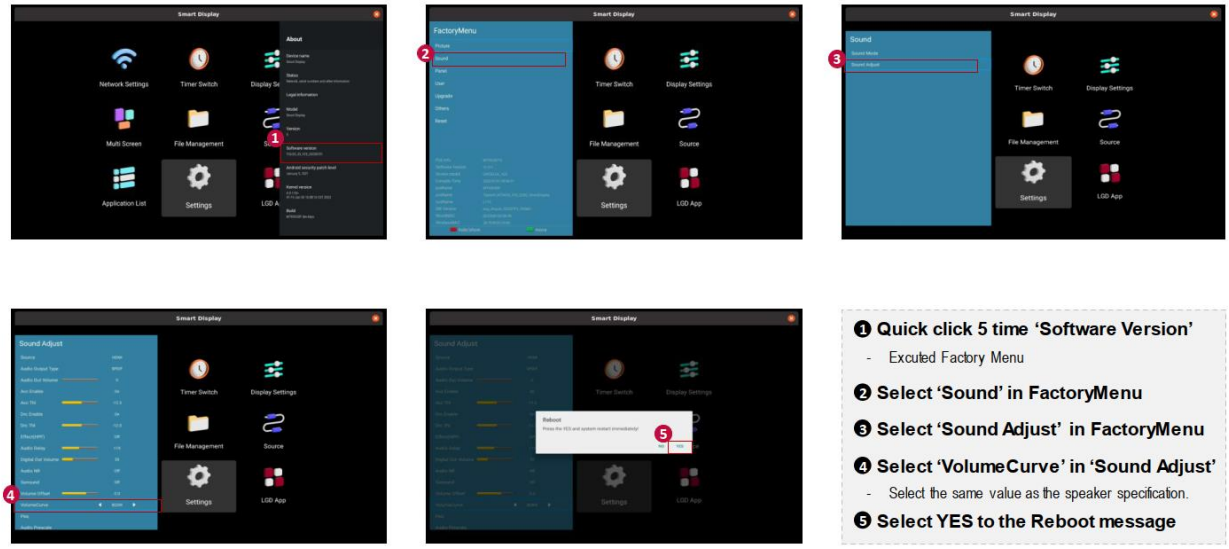
(11.) LGD App (Picture Transfer Algorithm App based on AI)

-LGD App that removes image background based on AI algorithm.
It also automatically organizes the converted images into a slideshow.



(12.) Appendix. Change Speaker Volume Curve

-Enable change Volume Curve 8Ω3W, 8Ω5W, 8Ω8W, 8Ω10W
- *Pre-path→Settings→Device Preferences→About



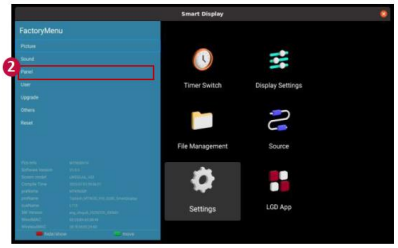
(13.) Factory Menu – Rotation HDMI Screen

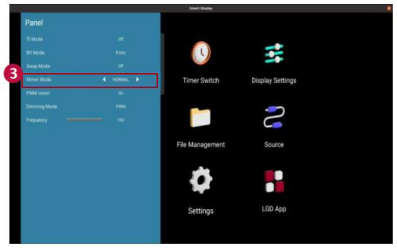
-Operated function for ‘Top and Bottom’ Reverse (Mirror) HDMI Screen

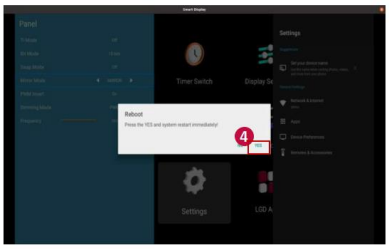
<Normal>

<Mirror>

-*Pre-path: Settings > Device Preferences > About







❶ **Quick click 5 time ‘Software Version’**
- Executed Factory Menu

❷ **Select ‘Panel’ in FactoryMenu**

❸ **Change ‘Mirror Mode’ in FactoryMenu**
- Normal Mode(0 degree), Mirror Mode(180 degree)
- Select ‘Normal’ or ‘Mirror’

❹ **Reboot after Select ‘YES’**
- If select 'No', may not operate 'Mirror' mode

❺ **Check HDMI display after enter the Source**

6 Precautions

6.1 Handling Precautions

(1) The module should be assembled into the system firmly by using every mounting hole. Do not apply rough force such as bending or twisting to the LCD during assembly.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress, Concentrated stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the LCD module.
(3) While assembling or installing LCD modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
(4) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
(5) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily be scratched.
(6) Please attach the surface transparent protection film to the surface in order to protect the polarizer. Transparent protection film should have sufficient strength in order to the resist external force.
(7) When the transparent protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
(8) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
(9) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
(10) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
(11) Protect the LCD module from static electricity, it may cause damage to the C-MOS Gate Array IC.
(12) Do not disassemble the module.
(13) Do not pull or fold the lamp wire.
(14) Pins of I/F connector should not be touched directly with bare hands.

6.2 Storage Precautions

(1) High temperature or humidity may reduce the performance of LCD module. Please store LCD module within the specified storage conditions.
(2) If possible store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.
(3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
(4) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

6.3 Operation Precautions

(1) Do not pull the I/F connector in or out while the LCD module is operating.
(2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
(3) Response time depends on the temperature. (In lower temperature, it becomes longer.)
(4) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods are very important to minimize the interference.
(7) Please do not give any mechanical and/or acoustical impact to module. Otherwise, module can't be operated its full characteristics perfectly.
(8) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.
(9) Do not display the fixed pattern for a long time because it may cause image sticking.
(10) In order to prevent image sticking, periodical power-off or screen save is needed after fixed pattern long time display.
(11) Black image or moving image is strongly recommended as a screen save.
(12) Static information display recommended to use with moving image. Cycling display between 10 minutes' information (static) display and 10 seconds' moving image.
(13) Background and character (image) color change is recommended. Use different colors for background and character, respectively. And change colors themselves periodically.
(14) LCD system is required to place in well-ventilated environment. Adapting active cooling system is highly recommended.
(15) Product reliability and functions are only guaranteed when the product is used under right operation usages.
(16) If product will be used in extreme conditions, such as high temperature/ humidity, shock and vibration it is strongly recommended to contact Litemax for filed application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, taxi-top, in vehicle and controlling systems.

7 Disclaimer

All information in this document are subject to change, please constant LiteMax for any new design.