



§ SPECIFICATION APPROVAL SHEET §

Fdt Tech Module No: **LP101G0BDx-FNR**

Description: **10.1" Digital TFT-LCD Module**

SPEC No.: **SAS-1703004**

Version: **0.0**

Issue Date: **April 5, 2017**

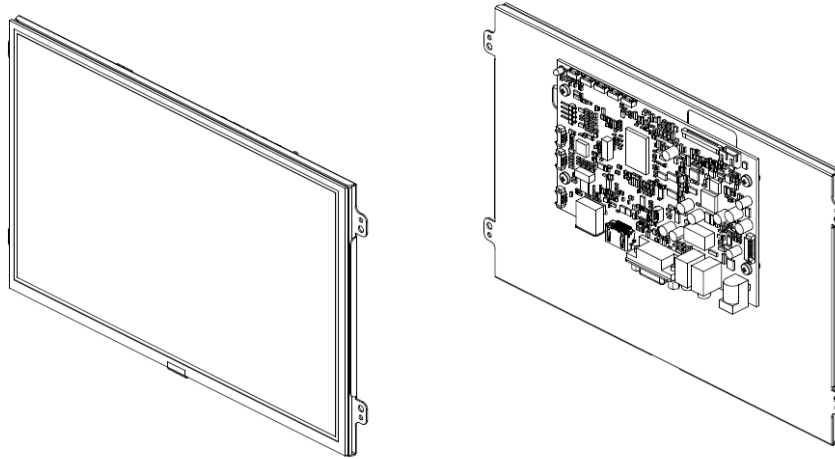
※ This approval sheet contains 25 pages including the cover and appendix.

Customer:	Approved By:
Date: / / 17	

Approved By:

Checked By:

Designed By:



1. General Description

1.1 Features

- 10.1" (1280x800) Digital TFT LCD
- Aspect Ratio: 16:9
- Input Signal VGA / HDMI 1.3a
- Maximum Support Resolution 1920x1080
- Headphone Driver, 46mW@32Ω
- Projected Capacitive Touch
- 5 Key Buttons Controls
- 8 Language OSD Menu
- LED Backlight
- Single Operation Voltage +12V

1.2 Applications

- Industrial
- Medical Environment
- Instrument Display
- Kiosk
- Security
- Signage
- Office Electronics
- Home Application
- Educate Application

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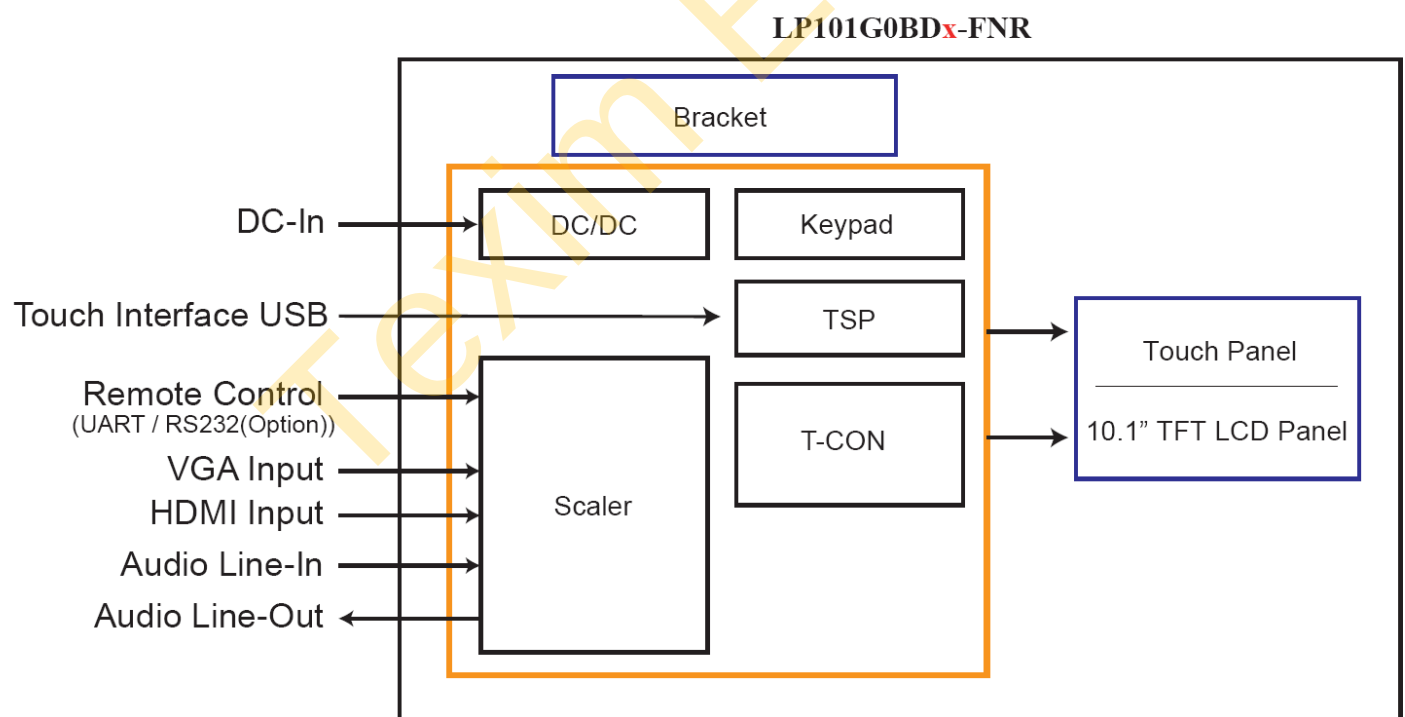
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3. Specifications

LCD	
Panel Size	10.1"
Resolution (Pixels)	1280x800
Luminance without RTP	300 cd/m ²
Luminance (RTP)	234 cd/m ²
Luminance (PCAP)	255 cd/m ²
Contrast Ratio	800
View Angle	85 / 85 / 85 / 85
LED Life Time	20K (Min)
Power Requirement	
Power Input (DC Jack 2.1 ϕ)	+12 VDC
Touch Screen	
Resistive / PCAP Type	USB Interface
Resistive Type Support OS	Windows / Linux / DOS / Mac / QNX
Projected Capacitive Touch Support OS	Windows / Linux

Input Signal				
VGA		D-Sub15		
HDMI		1.3a		
Audio				
Headphone Driver (Line In & out)		46mW@32Ω		
		Phone Jack ϕ3.5		
Controls				
Key		5 Buttons		
Serial Remote Control		UART / RS232 (Option)		
Environment				
		Without RTP	4W RTP	PCAP
Temperature Range	Operating	0 ~ +50℃	0 ~ +50℃	0 ~ +50℃
	Storage	-20 ~ +60℃	-20 ~ +60℃	-20 ~ +60℃
High Temperature & High Humidity (Non-condensing)	Operating	+40℃ / 90%	+40℃ / 90%	+40℃ / 90%

4. Block Diagram



5. Order Information

5.1 **Unit**

Parameter	LP101G0BD0-FNR	LP101G0BD4-FNR	LP101G0BDP-FNR	Unit	Remark
VGA	⊙	⊙	⊙		
HDMI	⊙	⊙	⊙		
Touch Panel Type	-	4W Resistive	Projected Capacitive Touch		
Touch Screen Interface	-	USB	USB		
Headphone Driver (Line In & out)	⊙	⊙	⊙		
5 Keys	⊙	⊙	⊙		
UART Remote Control	⊙	⊙	⊙		
Dimensions	244.5 x 150.9 x 22.83	244.5 x 150.9 x 24.68	250 x 186.6 x 25.78	mm	
Weight	485.5	592.5	692	g	±10%
Condition	Standard	Standard	Standard		

Note: 1. The assembling of panel and bracket is aimed for delivery, packaging and experiment. If the demand of shockproof and long-term fix, pls. have it into consideration of mechanism design.

Parameter	Condition
RS232 Remote Control	Non-standard
External Key	
Accessories (Option)	Standard

Note: Special order condition will apply to non-standard items and pls. contact salespersons in FDT.

6. Accessories (Option)

Before you begin installing the KIT, please make sure that the following materials have been shipped:



A. LASTD12033-FDR



B. LAACD18000-FDR



C. LACABLE068-FDR



D. LAVGA18000-FDR



E. LAUSB18000-FDR



F. LACABLE045-FDR



G. LACABLE070-FDR

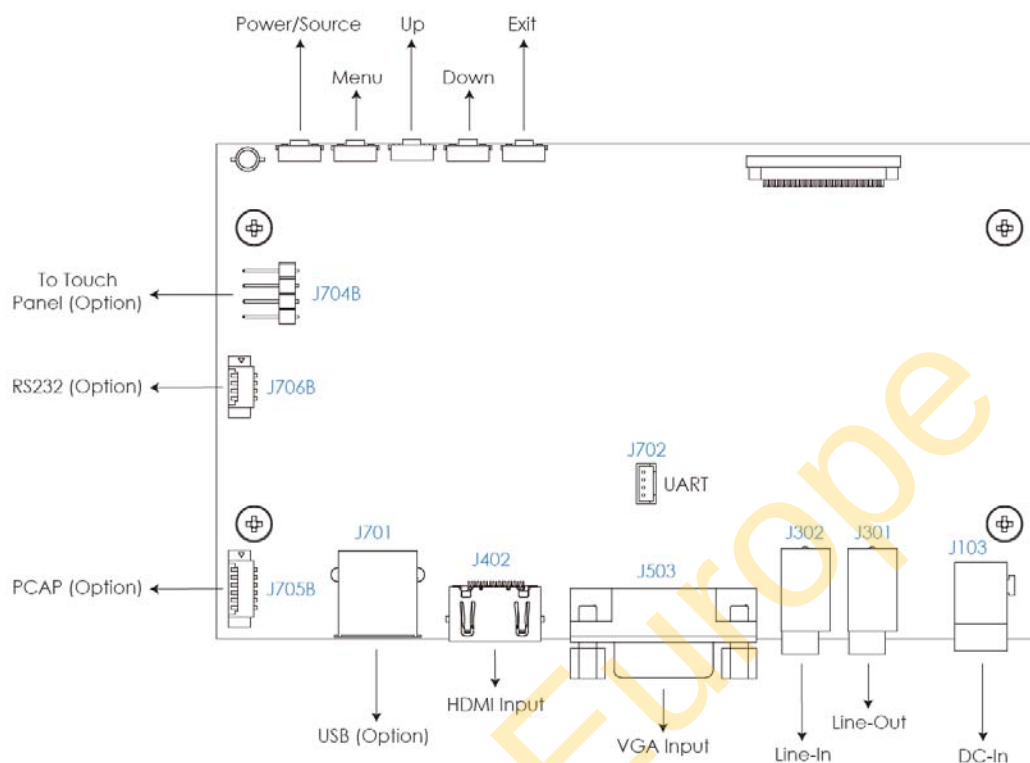


H. LAVCD00002-FDR

- A. AC to DC Adapter (L:1500mm, 100-240V_{AC} 50-60Hz to +12V_{DC} @ 3.3A, ϕ 2.1)
- B. Power Cord (L:1800mm, Plug Type B for USA)
- C. HDMI Cable (L:1800mm)
- D. VGA Cable (L:1800mm)
- E. USB Cable (L:1800mm)
- F. RS232 Cable (L:1800mm, Null Modem)
- G. AUDIO Cable (L:1800mm)
- H. Touch Screen Driver CD Disk / User Manual

7. Operation manual / Connection

7.1 Driver Board Manual



8. Pin Description

8.1 J101A : Pin Assignment of Power Input (DC-Jack Inside Diameter:2.1 ϕ Outside Diameter:5.5 ϕ Side Entry Type)

Pin No.	Symbol	I/O	Description	Remark
1	DC-In	I	+12Vdc Input Voltage	
2	GND	-	Power Ground	

8.2 J702 : Pin Assignment of UART (Pitch 1.25mm 4Pin, Top Entry Type)

※ FDT Connector Part No.: MS24014 (STM) [Same as 53398-0471 (MOLEX)] ;

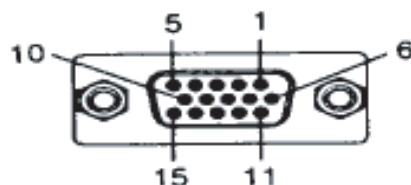
※ FDT Matching Connector Part No.: P24014 (STM) [Same as 51021-0400 (MOLEX)].

Pin No.	Symbol	I/O	Description	Remark
1	TX / RS232 TX (Option)	O	UART / RS232 (Option) Transmission Data	
2	RX / RS232 RX (Option)	I	UART / RS232 (Option) Receive Data	
3	GND	-	Ground	
4	+3.3Vdc	O	+3.3Vdc Output Voltage	

Note: All Functions can be controlled by UART, About UART command list please contact FDT sales.

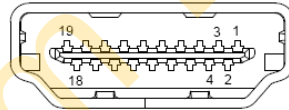
8.3 J801 : Pin Assignment of Analog RGB Input (D-Sub 15Pin)

Pin No.	Symbol	I/O	Description	Remark
1	RI+	I	Analog Red Signal	
2	GI+	I	Analog Green Signal	
3	BI+	I	Analog Blue Signal	
4	GND	-	Ground	
5	VGA-Det	I	VGA Detect	
6	AGND	-	Analog Ground	
7	AGND	-	Analog Ground	
8	AGND	-	Analog Ground	
9	VGA5V	-	VGA +5Vdc Input	
10	GND	-	Ground	
11	GND	-	Ground	
12	VGA_SDA	-	DDC2 Data	
13	HS_IN	I	TTL Horizontal sync.	
14	VS_IN	I	TTL Vertical sync.	
15	VGA_SCL	-	DDC2 Clock	



8.4 J401 : Pin Assignment of HDMI-A Type Input (HDMI 1.3a -19Pin Female)

Pin No.	Symbol	I/O	Description	Remark
1	DATA2+	I	Positive HDMI Input for B Link Data Channel 2	
2	DET_HDMI	-	HDMI Detect	
3	DATA2-	I	Negative HDMI Input for B Link Data Channel 2	
4	DATA1+	I	Positive HDMI Input for B Link Data Channel 1	
5	GND	-	Ground	
6	DATA1-	I	Negative HDMI Input for B Link Data Channel 1	
7	DATA0+	I	Positive HDMI Input for B Link Data Channel 0	
8	GND	-	Ground	
9	DATA0-	I	Negative HDMI Input for B Link Data Channel 0	
10	DCLK+	I	Positive HDMI Input for B Link Clock Channel	
11	GND	-	Ground	
12	DCLK-	I	Negative HDMI Input for B Link Clock Channel	
13	NC	-	No Connection	
14	NC	-	No Connection	
15	HDMI_SCL	I	DDC2 Clock	
16	HDMI_SDA	I	DDC2 Data	
17	GND	I	DDC/CEC Ground	
18	HDMI5V	I	HDMI +5Vdc Input	
19	HDMI_HPD	I	Hot Plug Detect	



8.5 J601C : Pin Assignment of Key Board (Pitch 1.25mm 12Pin , Side Entry Type)(Option)

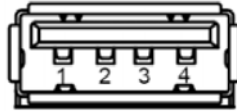
※ FDT Connector Part No.: MS240112R (STM) [Same as 53261-1219 (MOLEX)] ;

※ FDT Matching Connector Part No.: P240112 (STM) [Same as 51021-1200 (MOLEX)].

Pin No.	Symbol	I/O	Description	Remark
1	-	-	Don't Connect	
2	SW5	I	EXIT	
3	SW4	I	DOWN	
4	SW3	I	UP	
5	SW2	I	MENU / S	
6	SW1	I	POWER / SOURCE	
7	GND	-	Ground	
8	VDDP	-	+3.3Vdc Output Voltage	
9	-	-	Don't Connect	
10	RED	O	Indicator red LED for power off control	
11	GREEN	O	Indicator green LED for power on control	
12	GND	-	Ground	

8.6 J701A : Pin Assignment of Touch USB (USB A Type - Female 2.0mm, Side Entry Type)(Option)

Pin No.	Symbol	I/O	Description	Remark
1	VBUS	-	USB VCC	
2	D-	-	DATA (-)	
3	D+	-	DATA (+)	
4	DGND	-	Digital Ground	



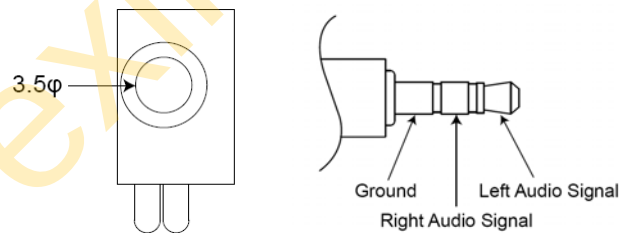
8.7 J706B : Pin Assignment of Touch RS232 (Pitch 1.25mm 5Pin , Side Entry Type)(Option)

※ FDT Connector Part No.: MS24015R (STM) [Same as 53261-0519 (MOLEX)] ;

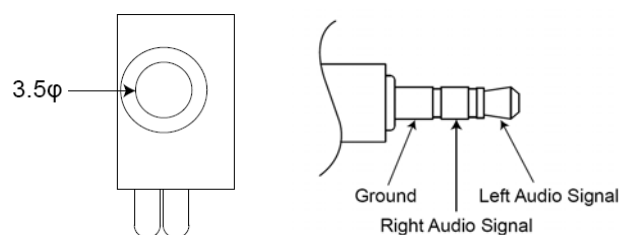
※ FDT Matching Connector Part No.: P24015 (STM) [Same as 51021-0500 (MOLEX)].

Pin No.	Symbol	I/O	Description	Remark
1	VCC	-	RS232 VCC	
2	RXD	I	Receive Data	
3	TXD	O	Transmit Data	
4	GND	-	Ground	
5	NC	-	No Connection	

8.8 J301 : Pin Assignment of Headphone Line-Out (Outside Diameter:3.5 φSide Entry Type)



8.9 J302 : Pin Assignment of Headphone Line-In (Outside Diameter:3.5 φSide Entry Type)



9. Absolute Maximum Ratings

9.1 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Remark
Input Voltage	V _{in}	+11	+13.5	V	
Analog RGB Input Signal	Analog RGB in	0.5	2.0	V _{p-p}	
Digital Input Signal	TTL	0.3	3.6	V	
HDMI Input Signal		-	165	MHz	
Operating Temp. without RTP		0	+50	°C	
Storage Temp. without RTP		-20	+60	°C	
Operating Temp. with 4W RTP		0	+50	°C	
Storage Temp. with 4W RTP		-20	+60	°C	
Operating Temp. with PCAP		0	+50	°C	
Storage Temp. with PCAP		-20	+60	°C	
High Temperature & High Humidity (Non-condensing) without RTP		-	+40 / 90	°C / %	
High Temperature & High Humidity (Non-condensing) with 4W RTP		-	+40 / 90	°C / %	
High Temperature & High Humidity (Non-condensing) with PCAP		-	+40 / 90	°C / %	

10. Recommended Operating Conditions

10.1 Electrical Characteristics

Parameter	Symbol	I/O	Min	Typ	Max	Unit	Note
Input Voltage	DC-in	I	+11.5	+12	+13	V	
Total Current	I _{in}	I	-	580	-	mA	+12V
Power Consumption		I	-	6.96	-	W	±15% @Without Headphone
Output Voltage	V _{DD}	O	3.2	3.3	3.4	V	
Analog RGB Input Signal	Analog RGB in	RGB	I	0.7	-	V _{p-p}	@75Ω
HDMI Input Signal			-	-	165	MHz	

10.2 VGA Mode Characteristics

Dots per inch	H	Unit	Polarity	V	Unit	Polarity	Note
640 × 480	31.47	KHz	Positive	59.9	Hz	Positive	
800 × 600	37.88	KHz	Positive	60.3	Hz	Positive	
1024 × 768	48.36	KHz	Positive	60	Hz	Positive	
1280 × 800	49.2	KHz	Positive	59.7	Hz	Positive	
1280 × 1024	63.98	KHz	Positive	60	Hz	Positive	
1600 × 1200	75	KHz	Positive	60	Hz	Positive	
1920 × 1080	67.5	KHz	Positive	60	Hz	Positive	

11. Touch Panel Characteristics

11.1 4W Resistance Touch Panel Characteristics

-11.1.1 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Note
Terminal Resistance	X	300		1000	Ω	
	Y	100		450	Ω	
Linearity				1.5	%	
Insulation Impedance		20			MΩ	DC 25V
Response Time				15	ms	

-11.1.2 Optical Performance

Parameter	Specifications
Light Transmittance	78% ±2%
Haze	< 9.5%±2%

-11.1.3 Mechanical Performance

Parameter	Specifications
Input Method	Stylus or Finger
Operating Force	R0.8 Silicon Rubber, 20~150 gf
Surface Hardness	3H pencil

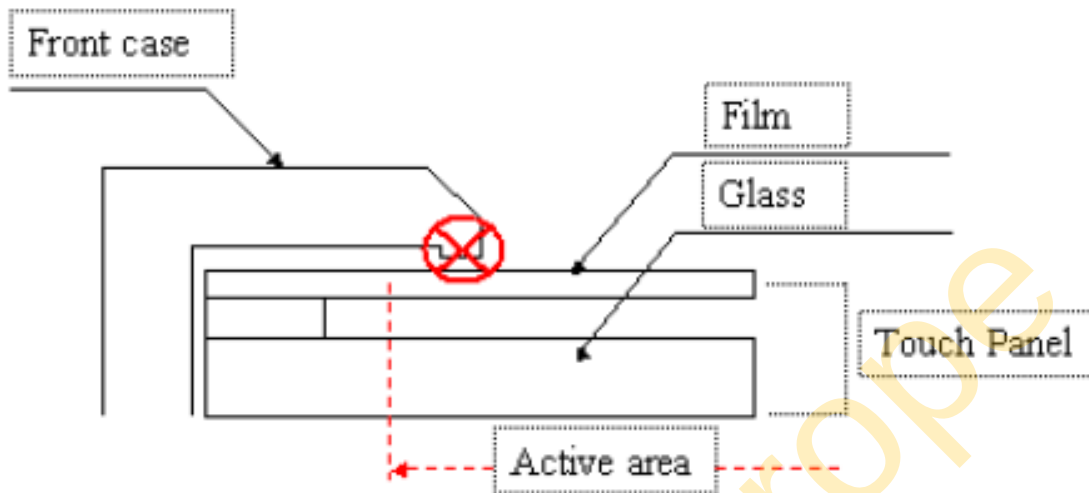
-11.1.4 Durability Performance

Parameter	Specifications
Knock Test	10,000,000 times

-11.1.5 Resistive Touch Panel Integration Design Guide

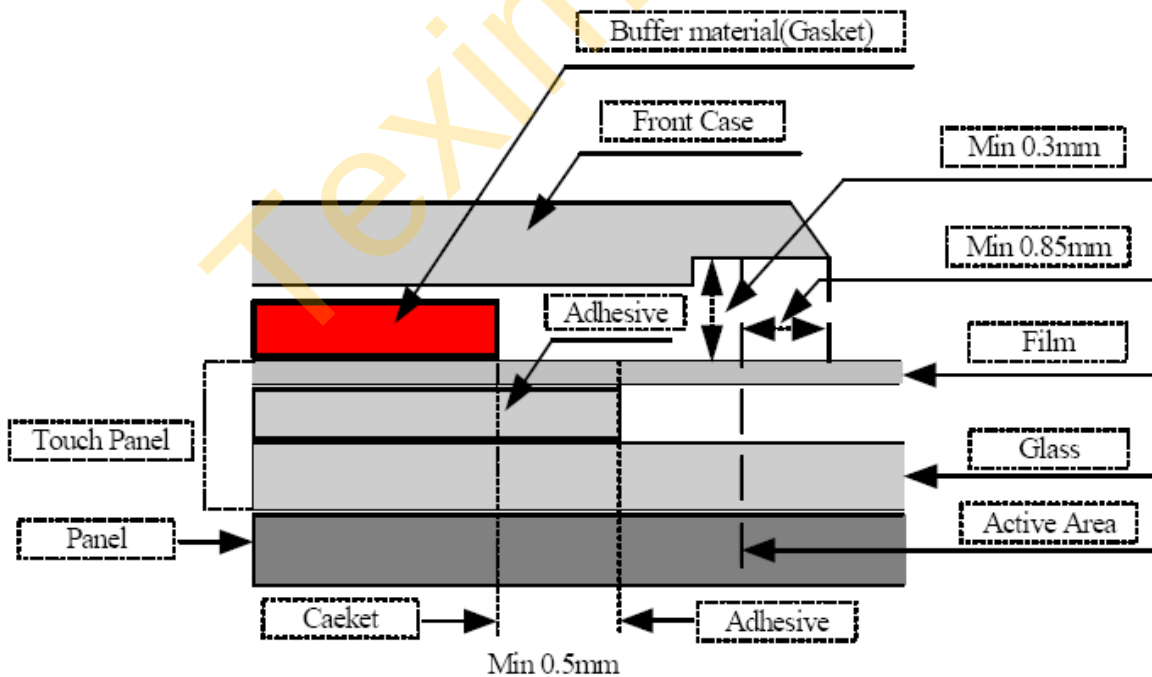
Avoid the design that Front-case overlap and press on the active area of the touch-panel.

Give enough gap (over 0.5mm at compressed) between the front case and touch-panel to protect wrong operating.

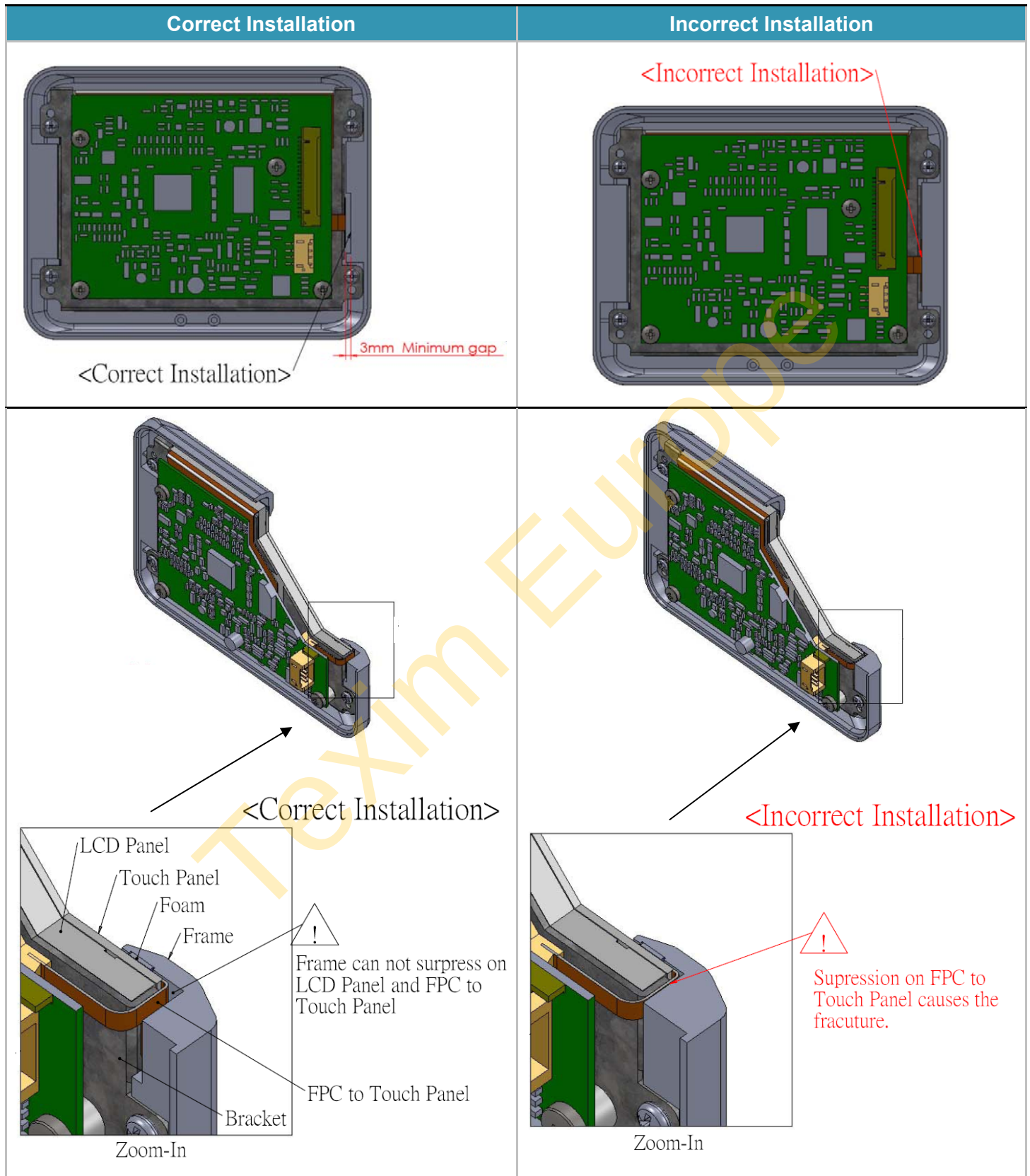


Use a buffer material (Gasket) between the touch-panel and front-case to protect damage and wrong operating.

Avoid the design that buffer material overlap and press on the inside of touch-panel viewing area.



-11.1.6 Mechanical Design Notice For Resistive Touch Panel



11.2 Projected Capacitive Touch Panel Characteristics

-11.2.1 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Note
Operating Voltage		-	-	5V		

-11.2.2 Optical Performance

Parameter	Specifications
Light Transmittance	Min 85%

-11.2.3 Mechanical Performance

Parameter	Specifications
Input Method	Finger
Interface	USB
Surface Hardness	7H
Cover Spec.	T=1.2mm Black Printing
Knock Test	≥ 1 Million times

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11.3 Touch Panel Operation System Support

Driver Vender : EETI (eGalax_eMPIA Technology Inc.)

OS	Version	Interface
Windows	Windows XP Embedded	RS232/USB
	Windows Vista, XP, 2000	
	Windows Embedded POSReady 2009	
	Windows Embedded 7, 8	
	Windows 7, 8, 8.1, 10	
Windows CE	Windows CE.Net (4.x / 5.0)	RS232/USB
	Windows CE 6.0	
	Windows Embedded Compact 7	
	Windows Embedded Compact 2013	
Linux	Kernel 2.4.x (x86)	USB
	Kernel 2.6.23 Downward (X86)	
	Kernel 2.6.24 Upward and 3.x.x (X86 / ARM / MIPS)	
Android	Android Version 2.3.x upwards (X86 / ARM / MIPS)	USB
Mac OS	Mac OS X 10.5.3 Leopard (Power PC)	USB
	Mac OS X 10.7.4 Earlier (32Bit) (Intel CPU)	
	Mac OS X 10.7.4 Earlier (64Bit) (Intel CPU)	
	Mac OS X 10.7.5 (32Bit) (Intel CPU)	
	Mac OS X 10.7.5 (64bit) (Intel CPU)	
	Mac OS X 10.8.x Mountain Lion (Intel CPU)	
	Mac OS X 10.9.x Mavericks (Intel CPU)	
	Mac OS X 10.10.x Yosemite (Intel CPU)	
QNX	QNX RTOS V6.3	USB
	QNX Neutrino RTOS V6.5/6.4	
DOS	DOS	PS2

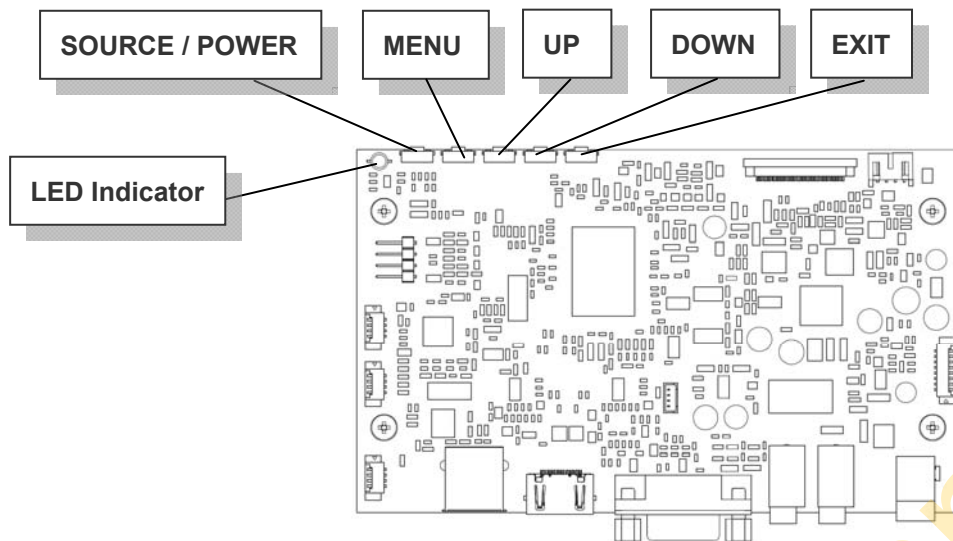
Note: 1. How to use Touch Driver, please refer to Readme of Touch Screen Driver CD Disk (LAVCD00002-FDR).

2. Please refer to the FDT website for the latest driver version and support operating system.

FDT website: <http://www.fdt.com.tw>

12. Key Function by OSD

12.1 Menu Operation

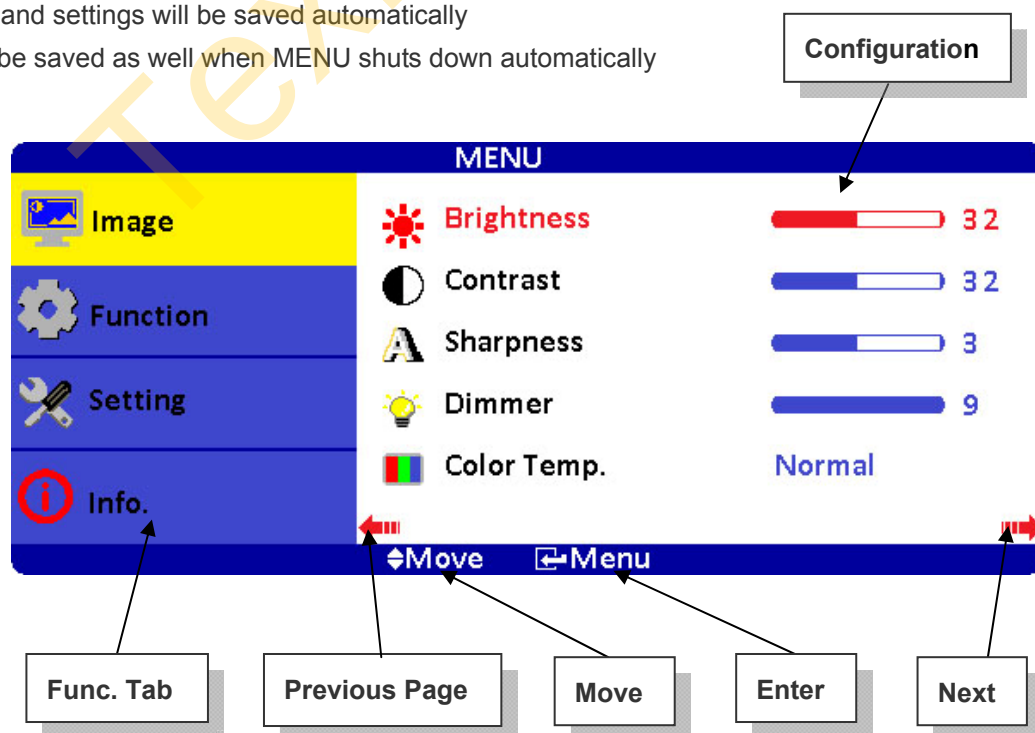


OSD ICON Instructions :

1. POWER : Power On/Off (※Press for 3 secs to turn off)
2. MENU / ENTER : (After turning on MENU, only ENTER is available)
3. UP : Move Upward / Increase Value / Option Switch
4. DOWN : Move Downward / Decrease Value / Option Switch
5. EXIT : Return to Previous Page
6. LED Indicator
 - Waiting : Flickering Green
 - Power ON : Green
 - Power OFF : Red

Save OSD Setting:

1. EXIT MENU and settings will be saved automatically
2. Settings will be saved as well when MENU shuts down automatically



Overview of the Menu :



Image

Indicator	Meaning	Default	Adjustable range	Remark
	Brightness	32	0~63	Adjust-Bar
	Contrast	32	0~63	Adjust-Bar
	Sharpness	3	1~5	Adjust-Bar
	Dimmer	15	0~15	Adjust-Bar
	Color Temp.	Normal	Normal / Warm / Cool	
	H-Position	0	-25~+25	VGA only
	V-Position	0	-25~+25	VGA only
	Clock	0	-25~+25	VGA only
	Phase	32	0~63	VGA only
	Auto	By different resolution		VGA only
	Exit			



Function

ICON	Meaning	Default	Adjustable range	Function	Remark
	Show Status	On	On / Off	Information of input source	ON: Show ; OFF: Hidden
	Blue Screen	On	On / Off	No signal input shows blue or black screen.	ON: Blue ; OFF: Black
	Auto Power On	On	On / Off	Modules turns on automatically without power key input.	ON: Auto ; OFF: Manual
	Detect Source	On	On / Off	Auto detect input source.	ON: Auto ; OFF: Normal
	Auto Power Saving	Off	6s / 15s / 30s / Off	Modules go ready when no input source is detected.	ON: Auto ; OFF: Normal
	Auto Sleep	Off	15M / 30M / 60M / Off	Modules go sleep when set timing is out.	ON: Auto ; OFF: Normal
	Exit				

Note : After configuration is set, RESET won't restore to default setting.



Setting

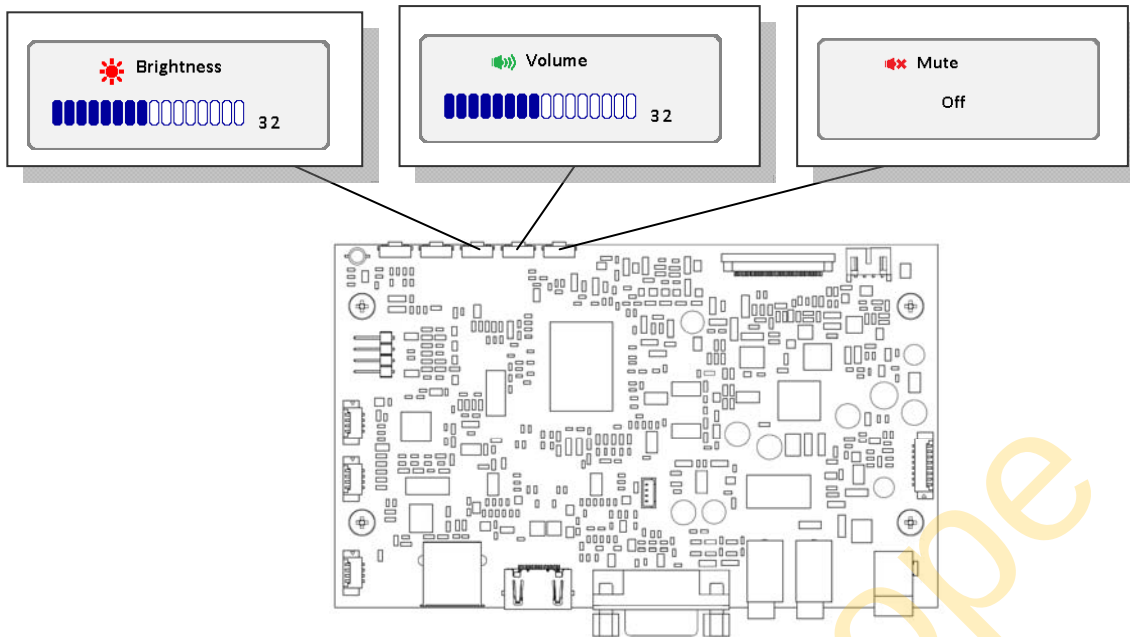
Indicator	Meaning	Default	Adjustable range	Remark
	Source	VGA	VGA / HDMI	
	Volume	32	0~63	
	Mute	Off	On / Off	On : Mute · Off : Sound
	Mirror	Off	On / Off	Left-Right Reversal
	Flip	Off	On / Off	Upside Down
	Language	English	English / 中文 / 日本語 / 한국의 / Française / Deutsch / Italiano / Española / Português	
	Reset			Restore to default
	Exit			



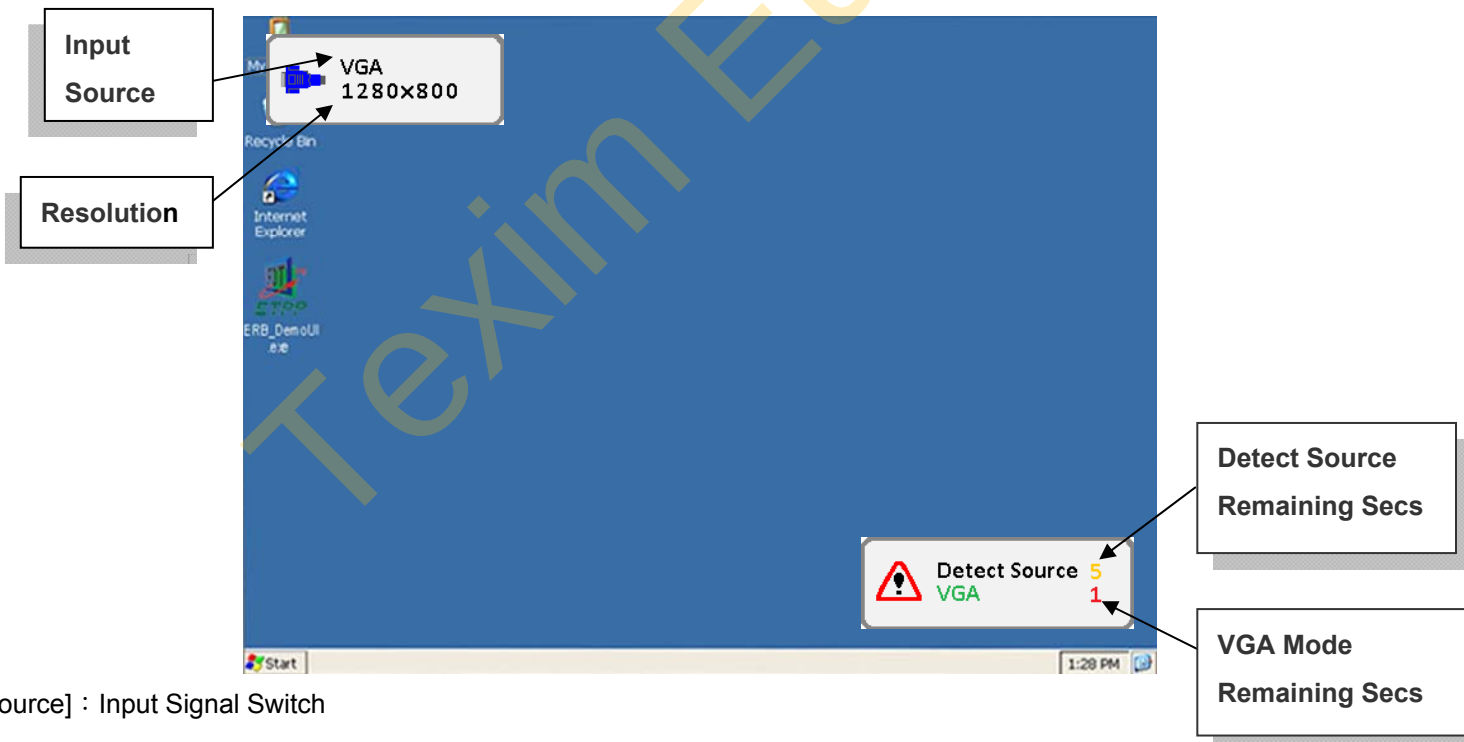
Info.

MENU	
 Image	Source : VGA
 Function	Resolution : 1280×800
 Setting	H-Position : 49.2KHz
 Information	V-Position : 59.7Hz
	Program Ver : 1.00
	Command Ver : 1.00
 Move  Exit / Menu	

Hot Key When OSD Menu is Off :



Information of Input Source and Functionality :



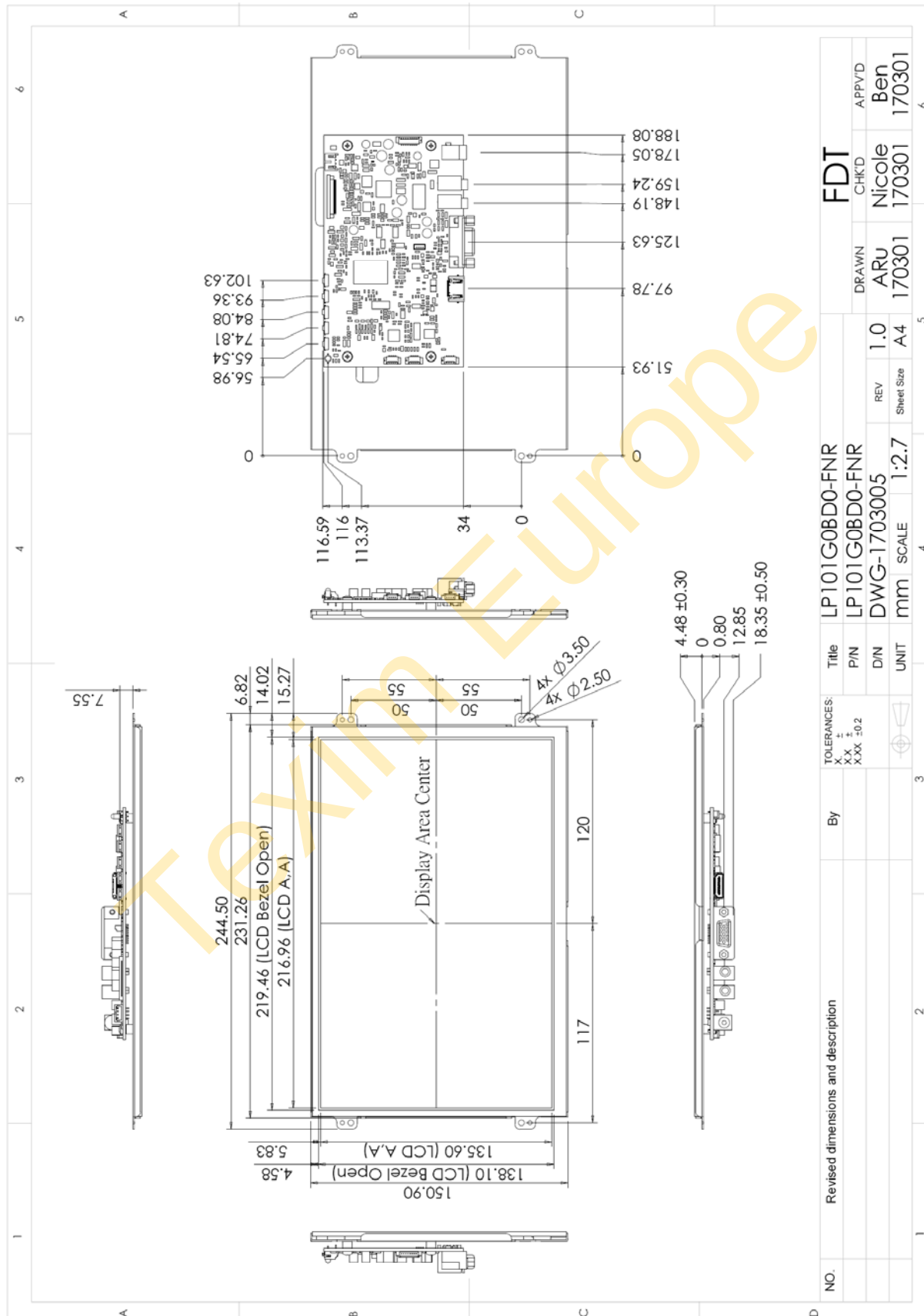
[Source] : Input Signal Switch

Overview of Input Signals :

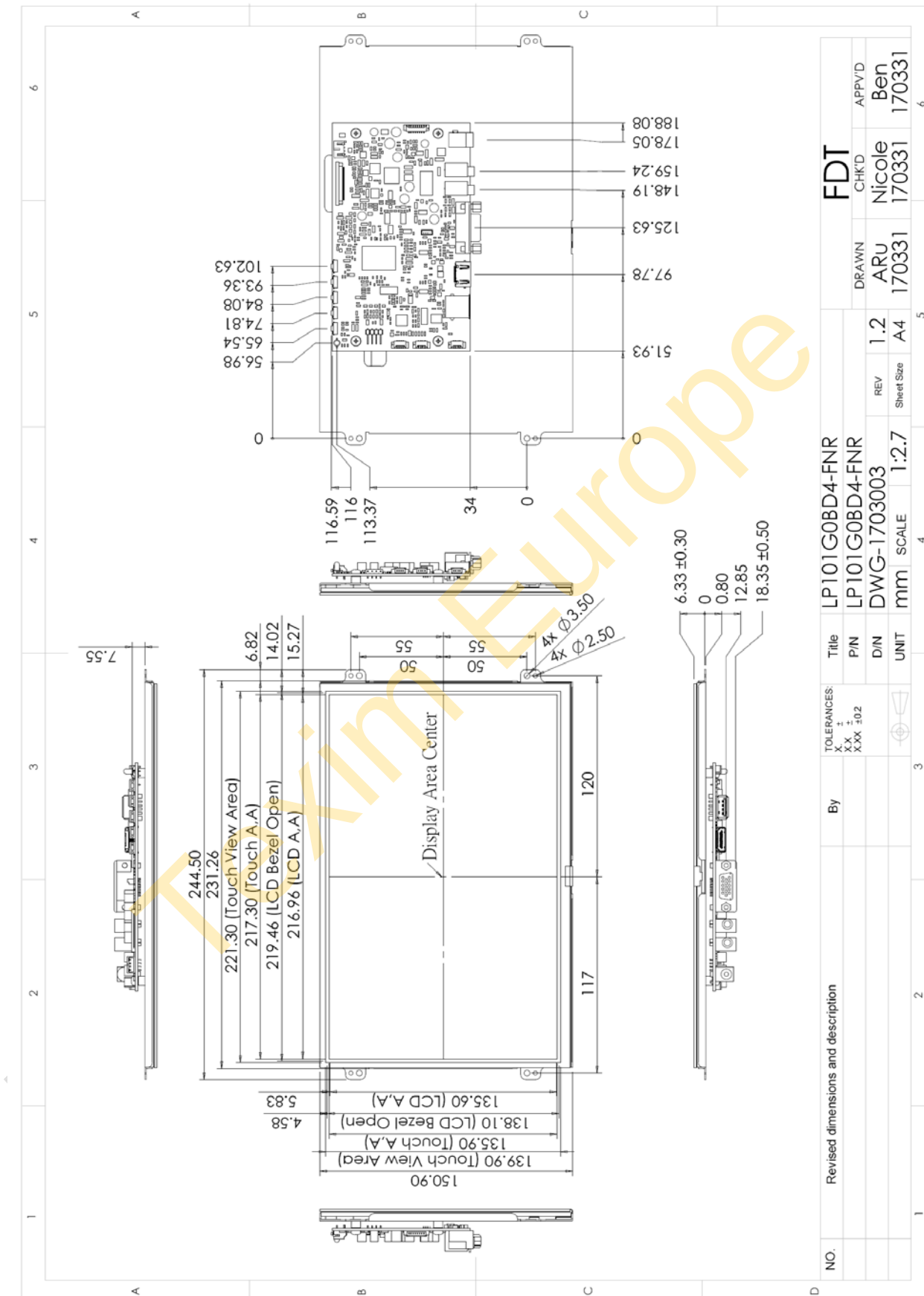
Indicator	Interface
	VGA
	HDMI

13. Dimension Information

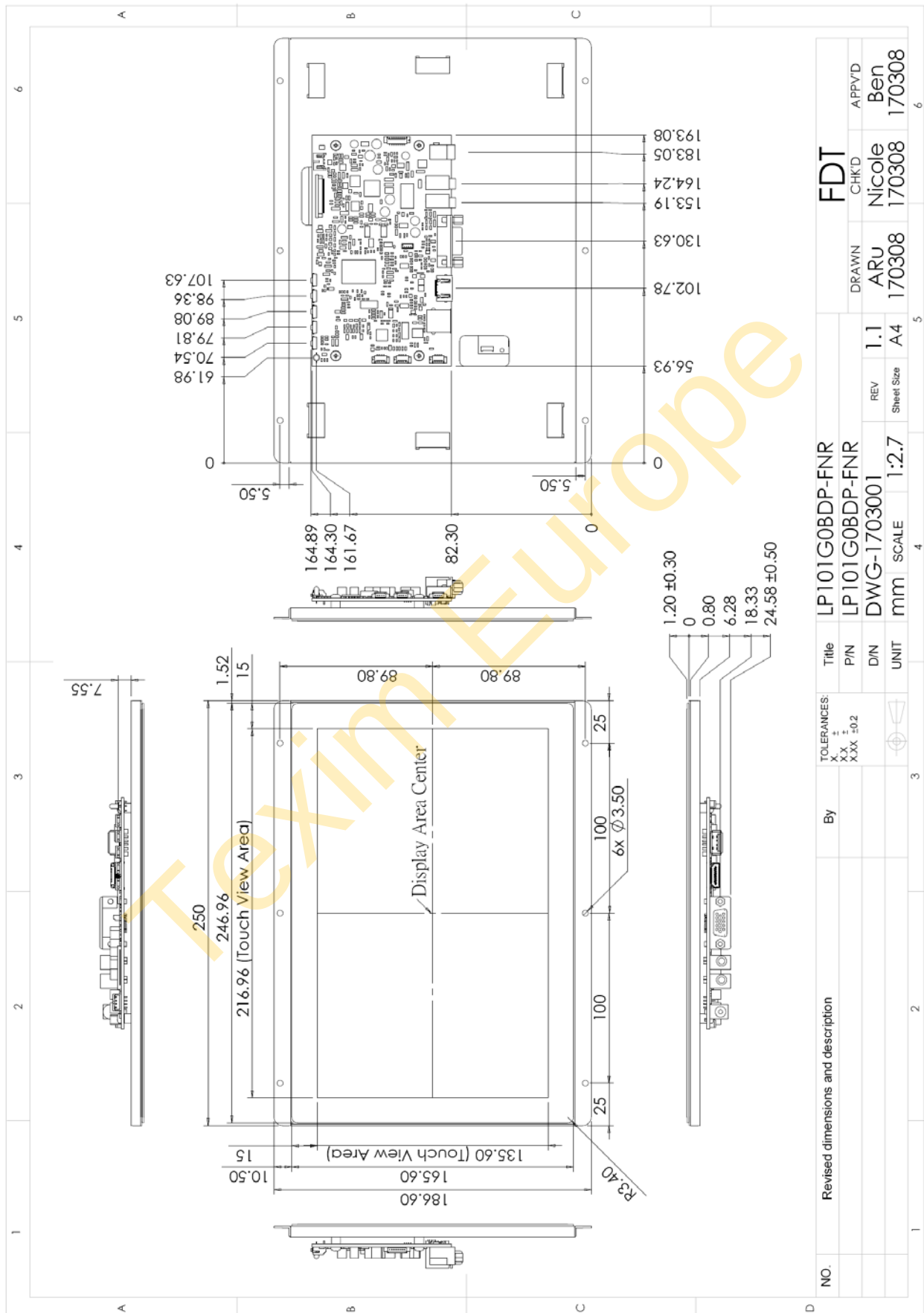
13.1 Unit (LP101G0BD0-FNR)



13.2 Unit (LP101G0BD4-FNR)



13.3 Unit (LP101G0BDP-FNR)



14. Appendix

14.1 TFT-LCD Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	10.1 (diagonal)	Inch
Display Format	1280 x (R.G.B) x 800	Dot
Active Area	216.96 (H)× 135.6(V)	mm
Pixel Pitch	0.1695(H) x 0.1695(V)	mm
Pixel Arrangement	RGB stripe	

14.2 TFT-LCD Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	75	85	---	deg	
		Right	75	85	---	deg	
	Vertical	Top	75	85	---	deg	
		Bottom	75	85	---	deg	
Contrast Ratio	CR	At optimized Viewing angle	600	800	---	---	
Luminance without RTP	L		250	300	---	cd/m ²	
LED Life Time		25℃	20000	---	---	Hrs	Note

Note: The "LED Life Time" is defined as the module brightness decrease to 50% original.