



§ SPECIFICATION APPROVAL SHEET §

Fdt Tech Module No: **LP070A065x-FNR**

Description: **7" Digital TFT-LCD Module**

SPEC No.: **SAS-1406003**

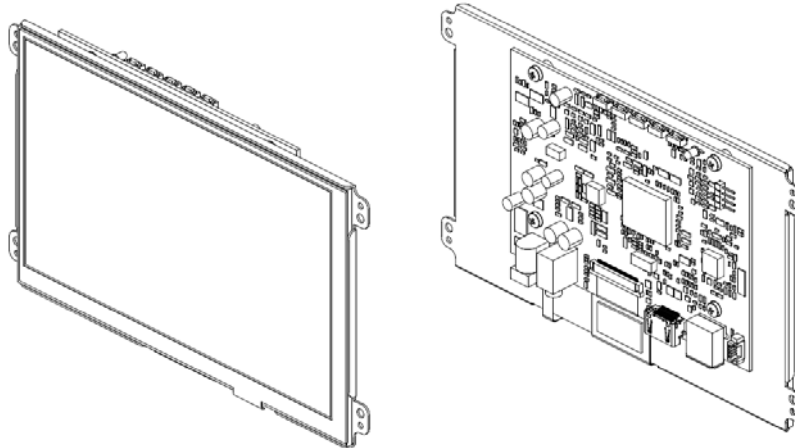
Version: **1.0**

Issue Date: **October 16, 2014**

※ This approval sheet contains 22 pages including the cover and appendix.

<p>Customer:</p> <p>Date: / / 14</p>	<p>Approved By:</p>
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Approved By: _____ Checked By: _____ Designed By: _____



1. General Description

1.1 Features

- 7" (1024x600) Digital TFT LCD
- Aspect Ratio: 16:9
- Input Signal HDMI 1.3a
- Maximum Support Resolution 1920x1080
- Headphone Driver, 46mW@32Ω
- Touch Screen 4W Resistive
- 5 Key Buttons Control
- UART / RS232 Serial Remote Control (Optional)
- 8 Language OSD Menu
- LED Backlight
- Single Operation Voltage +5V

1.2 Applications

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



2. Contents

Contents	Page
1. General Description.....	1
1.1 Features	1
1.2 Applications	1
2.Contents.....	2-3
3 .Specifications.....	4
4. Black Diagram.....	4
5. TFT-LCD Information.....	5
5.1 TFT-LCD Mechanical Specifications	5
5.2 TFT-LCD Optical Characteristics	5
6. Order Information.....	6
6.1 Unit	6
7. Dimension Information.....	7-8
7.1 Unit (LP070A0650-FNR)	7
7.2 Unit (LP070A0654-FNR)	8
8. Pin Description.....	9-10
8.1 J101 : Pin Assignment of Power Input (DC-Jack Inside Diameter:2.5 ϕ Outside Diameter:5.5 ϕ Side Entry Type)	9
8.2 J702: Pin Assignment of UART (Pitch 1.25mm 4Pin, Top Entry Type)	9
8.3 J401 : Pin Assignment of HDMI-A Type Input (HDMI 1.3a -19Pin Female)	9
8.4 J601D : Pin Assignment of Key Board (Pitch 1.25mm 12Pin , Side Entry Type)	10
8.5 J701 : Pin Assignment of Touch USB (USB A Type - Female 2.0mm, Side Entry Type)(Option)	10
8.6 J301 : Pin Assignment of Phone Jack (Outside Diameter:3.5 ϕ Side Entry Type)	10
9. Absolute Maximum Ratings.....	11
9.1 Absolute Maximum Ratings	11
10. Recommended Operating Conditions.....	11
10.1 Electrical Characteristics	11
10.2 Support Display Mode Characteristics	11
11. 4W Resistive Touch Panel Characteristics.....	12-14
11.1 4W Electrical Performance	12
11.2 4W Optical Performance	12
11.3 4W Mechanical Performance	12
11.4 4W Durability Performance	12
11.5 Resistive Touch Panel Operation System Support	12
11.6 Resistive Touch Panel Integration Design Guide	13
11.7 Mechanical Design Notice For Resistive Touch Panel	14
12. Operation manual / Connection.....	15
12.1 Driver Board Manual	15



<i>13. Accessories (Option).....</i>	16
<i>14. Key Function by OSD.....</i>	17-20
14.1 Menu Operation	17-20
<i>15. Revision History.....</i>	21
15.1 Record of Revision	21

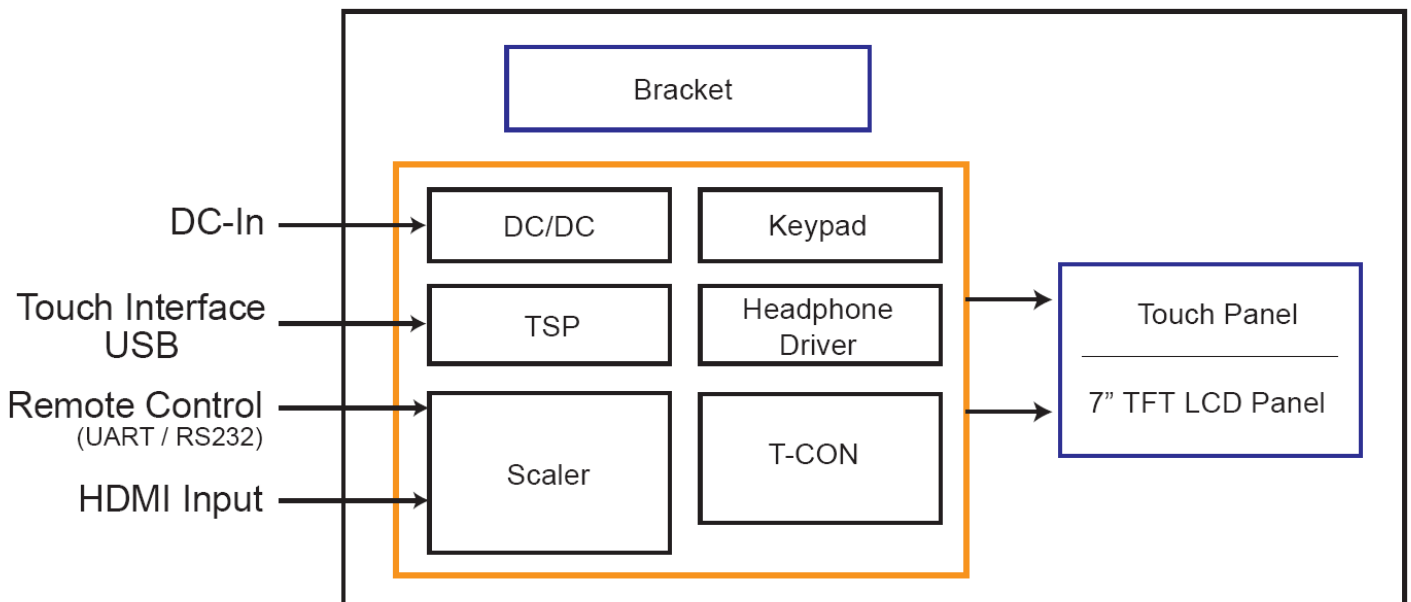
3. Specifications

LCD	
Panel Size	7"
Resolution (Pixels)	1024x600
Color	262K
Luminance w/o RTP	250 cd/m ²
Luminance (RTP)	200 cd/m ²
Contrast Ratio	700
Viewing Angle	75 / 75 / 70 / 75
Backlight Life Time (LED)	15K (Min)
Power Requirement	
Power Input (DC Jack 2.5 φ)	+5Vdc
Power Consumption	3.6 Watts
Touch Screen	
Resistive Type	USB Interface
Resistive Type Support OS	Windows / Linux / DOS / Mac / QNX

Input Signal	
HDMI	1.3a
Audio	
Headphone Driver	46mW@32Ω Phone Jack φ 3.5
Controls	
Key	5 Buttons
Serial Remote Control	UART / RS232 (Optional)
Environment	
Operating Temp. w/o RTP	-10~+50(Ts)°C
Storage Temp. w/o RTP	-20~+60°C
Operating Temp. 4W RTP	-10~+50(Ts)°C
Storage Temp. 4W RTP	-20~+60°C

4. Block Diagram

LP070A065x-FNR





5. TFT-LCD Information

5.1 TFT-LCD Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	7 (diagonal)	Inch
Display Format	1024 x (R.G.B) x 600	Dot
Active Area	153.6(W) × 90.0(H)	mm
Pixel Pitch	0.15(H) x 0.15(V)	mm
Pixel Arrangement	RGB-stripe	
Surface Treatment	Clear	

5.2 TFT-LCD Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	CR ≥ 10	65	75	---	deg
		Right		65	75	---	deg
	Vertical	Top		60	70	---	deg
		Bottom		65	75	---	deg
Contrast Ratio	CR	At optimized Viewing angle	500	700	---	---	
Luminance w/o RTP	L		200	250	---	cd/m ²	
Backlight Life Time (LED)		25°C	15000	---	---	Hrs	



6. Order Information

6.1 Unit

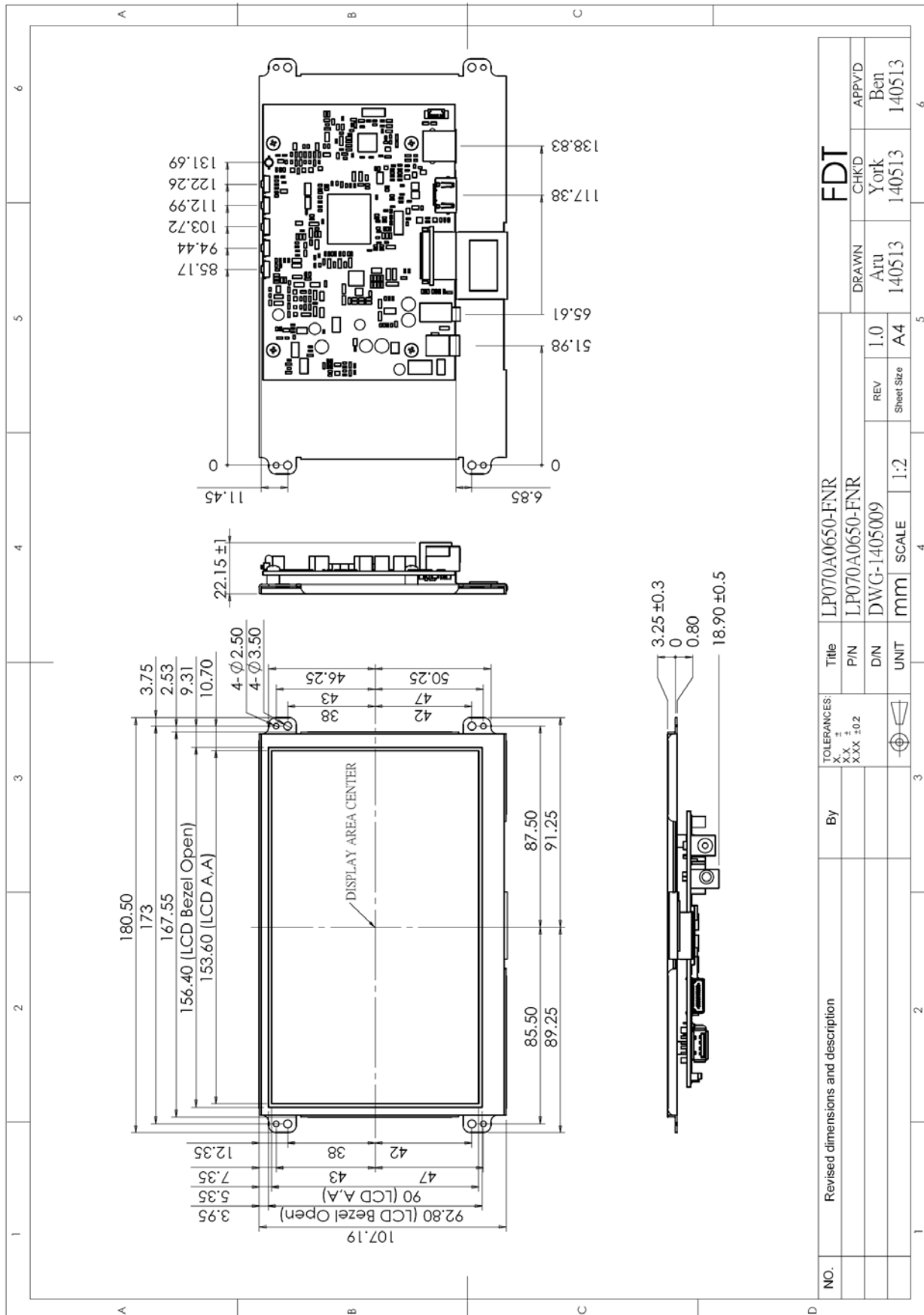
Parameter	LP070A0650-FNR	LP070A0654-FNR
HDMI	⊙	⊙
Touch Panel Type	-	4W Resistive
Touch Screen Interface	-	USB
Headphone Driver	⊙	⊙
5 Keys	⊙	⊙
UART Remote Control	⊙	⊙

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.

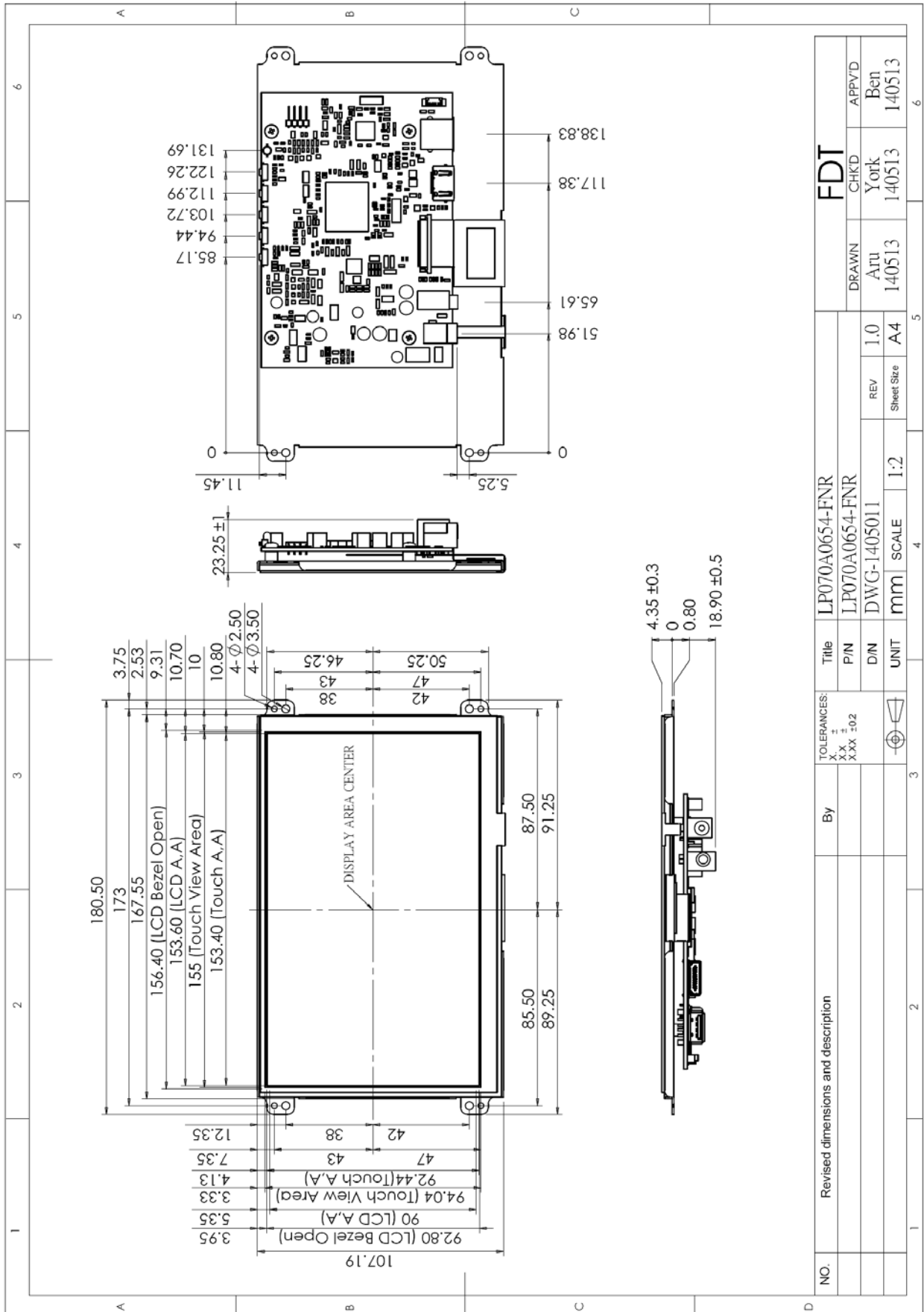
Optional Functions	
Parameter	<ul style="list-style-type: none"> - RS232 Remote Control - External Key - Accessories (Refer to Page 22)

7. Dimension Information

7.1 Unit (LP070A0650-FNR)



7.2 Unit (LP070A0654-FNR)



8. Pin Description

8.1 J101 : Pin Assignment of Power Input (DC Jack Inside Diameter:2.5 φ Outside Diameter:5.5 φ Side Entry Type)

Pin No.	Symbol	I/O	Description	Remark
1	DC-In	I	+5 Vdc Input Voltage	
2	GND	-	Power Ground	

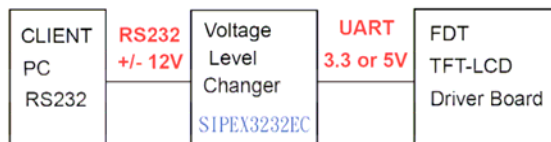
8.2 J702 : Pin Assignment of UART (Pitch 1.25mm 4Pin, Top Entry Type)

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

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

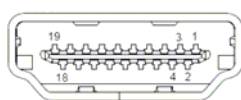
Pin No.	Symbol	I/O	Description	Remark
1	TX / RS232 TX (Option)	O	UART / RS232 (Option) Transmission Data	
2	RX / RS232 RX (Option)	I	UART / RS232 (Option) Receive Data	
3	GND	-	Ground	
4	+3.3Vdc	O	+3.3Vdc Output Voltage	

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



8.3 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	



8.4 J601D : Pin Assignment of Key Board (Pitch 1.25mm 12Pin , Side Entry Type)(Option)

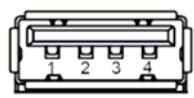
※ FDT Connector Part No.: MS240112R (STM) [Same as 53261-1219 (MOLEX)] ;

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

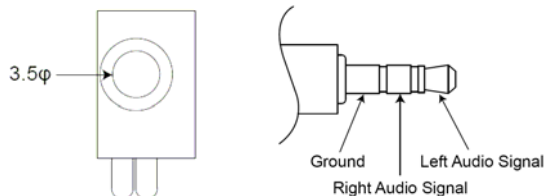
Pin No.	Symbol	I/O	Description	Remark
1	-	-	Don't Connect	
2	SW5	I	EXIT	
3	SW4	I	DOWN	
4	SW3	I	UP	
5	SW2	I	MENU / S	
6	SW1	I	POWER / SOURCE	
7	GND	-	Ground	
8	VDDP	-	VDDP +3.3Vdc Output Voltage	
9	-	-	Don't Connect	
10	RED	O	Indicator red LED for power off control	
11	GREEN	O	Indicator green LED for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

8.5 J701 : 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	



8.6 J301 : Pin Assignment of Phone Jack (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}	+4.5	+6	V	
Digital Input Signal	TTL	0.3	3.6	V	
HDMI Input Signal		-	165	MHz	
Operating Temp. w/o TP		-10	+50 (Ts)	°C	
Storage Temp. w/o TP		-20	+60	°C	
Operating Temp. 4W RTP		-10	+50 (Ts)	°C	
Storage Temp. 4W RTP		-20	+60	°C	

10. Recommended Operating Conditions

10.1 Electrical Characteristics

Parameter	Symbol	I/O	Min	Typ	Max	Unit	Note
Input Voltage	DC-in	I	+4.8	+5	+5.8	V	
Total Current	I _{in}	I		720		mA	+5V
Power Consumption		I		3.6		W	
Output Voltage	VDD	O	3.2	3.3	3.4	V	
HDMI Input Signal				165	MHz		

10.2 Support Display Mode Characteristics

Dots per inch	H	Unit	Polarity	V	Unit	Polarity	Note
800*600	37.88	KHz	Positive	60.3	Hz	Positive	
1024*600	37.54	KHz	Positive	60	Hz	Positive	
1024*768	48.36	KHz	Positive	60	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. 4W Resistive Touch Panel Characteristics

11.1 4W Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Note
Terminal Resistance	X	20		500	Ω	
	Y	20		500	Ω	
Linearity				1.5	%	
Insulation Impedance		20			MΩ	DC 25V
Response Time				10	ms	

11.2 4W Optical Performance

Parameter	Specifications
Light Transmittance	>80%
Haze	< 10%

11.3 4W Mechanical Performance

Parameter	Specifications
Input Method	Stylus or Finger
Operating Force	100g, R8 Silicon Rubber, 60HS
Surface Hardness	3H pencil, pressure 1N/45°

11.4 4W Durability Performance

Parameter	Specifications
Knock Test	1,000,000 times, Weight ≤ 100g. 2 times/sec (Tip R8 mm Silicone rubber)
Pen Sliding Test	100,000 times, Weight ≤ 100g. 30 times/sec (Tip R0.8 mm Stylus pen)

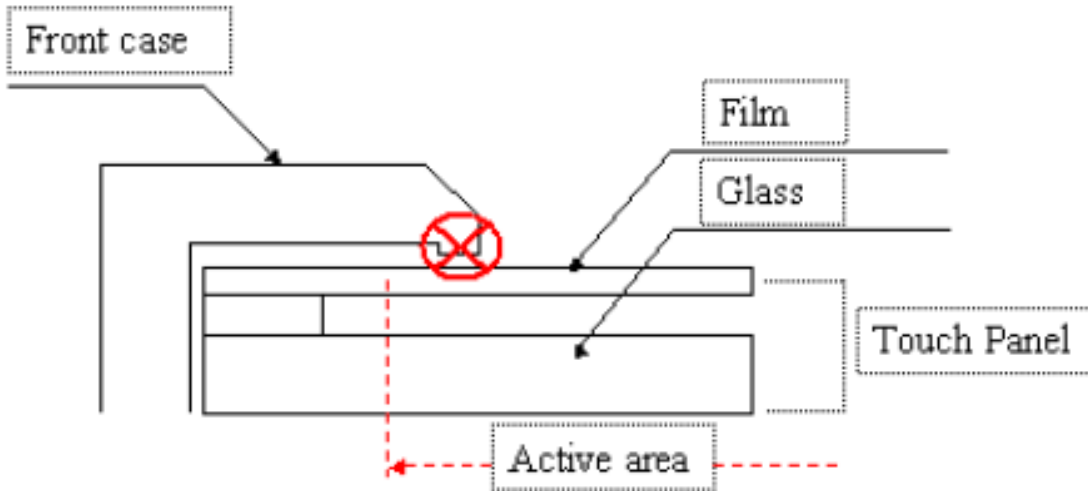
11.5 Resistive Touch Panel Operation System Support

OS	Version	Interface
Windows	Windows Vista, XP / 200, 9x / ME	USB
	Windows Embedded	
	Windows 7	
	Windows 8 / 8.1	
Linux	Kernel 2.4.x (x86 32bit)	USB
	Kernel 2.6.x Upwards (x86 32 / 64bit)	
	Kernel 2.6.24 Upwards (ARM , MIPS)	
	Android 1.5 / 1.6 / 2.x / 4.x – Google	
Mac	Mac OS9, Mac OS X (IBM, Intel CPU)	USB
QNX	QNX RTOS v6.3	USB

11.6 Resistive Touch Panel Integration Design Guide

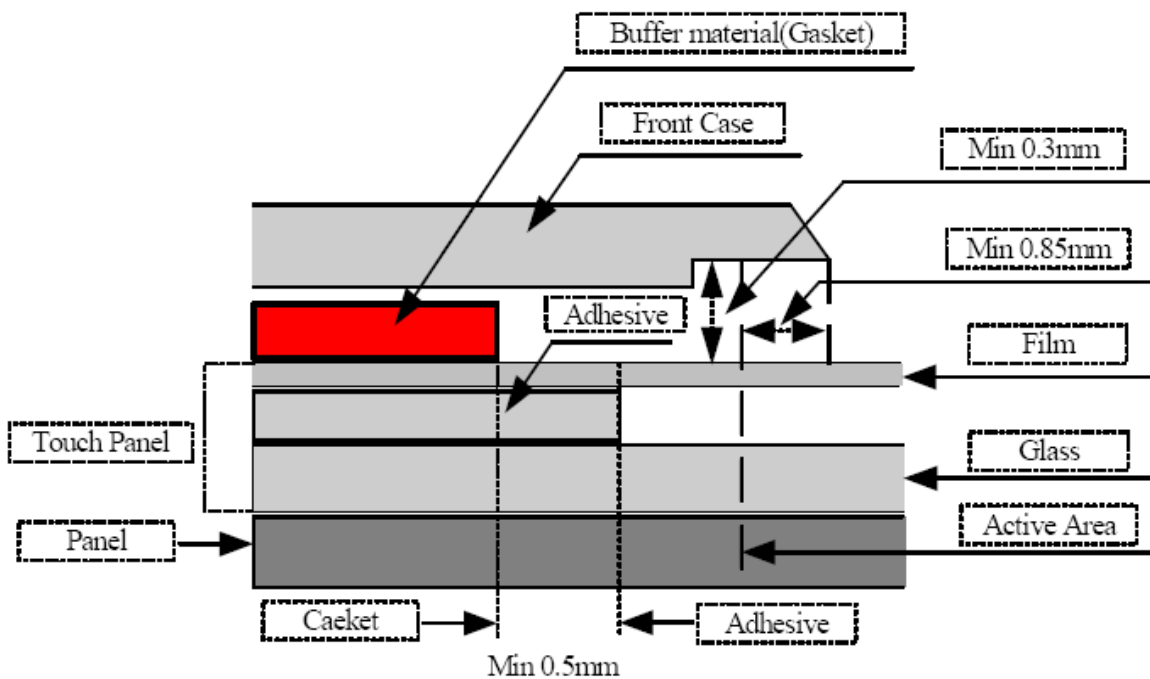
Avoid the design that Front-case overlap and press on the active area of the touch-panel.

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

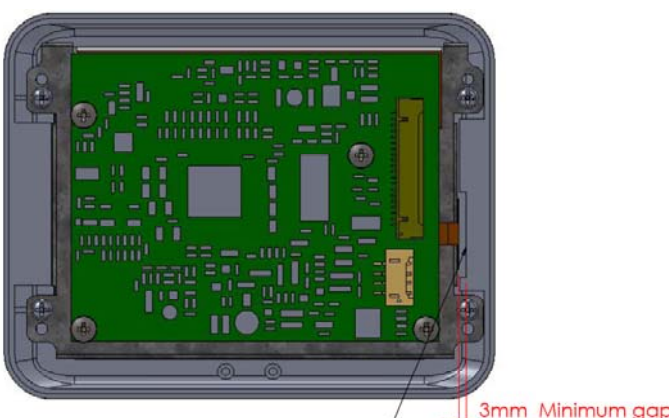
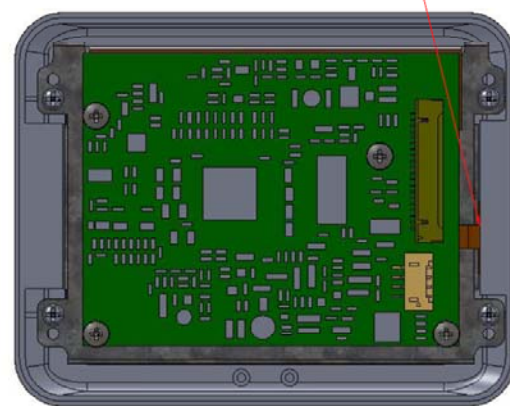
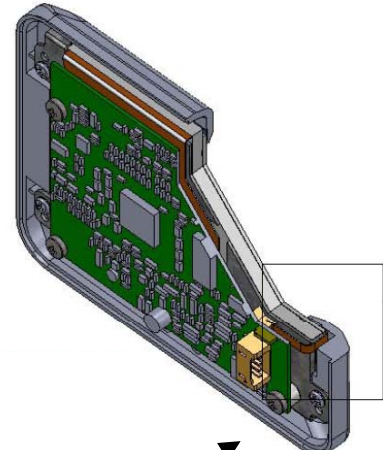
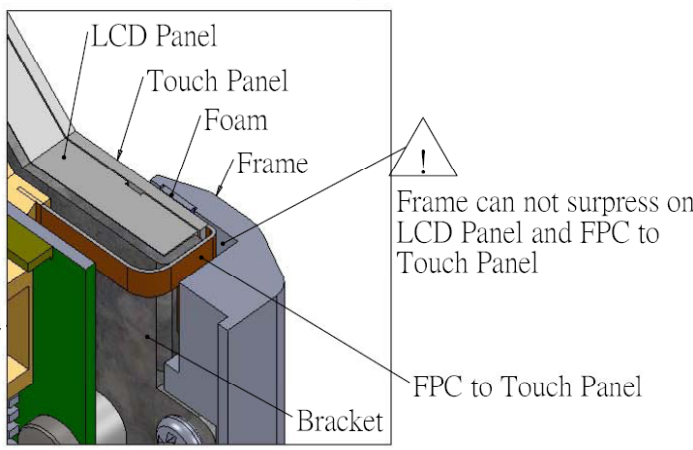
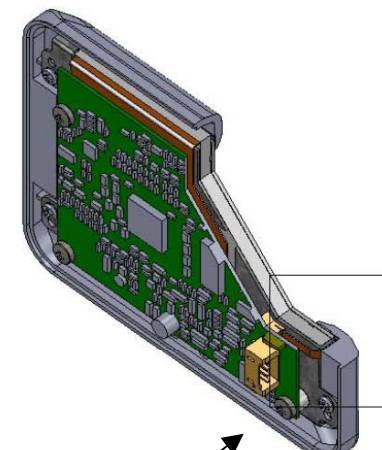
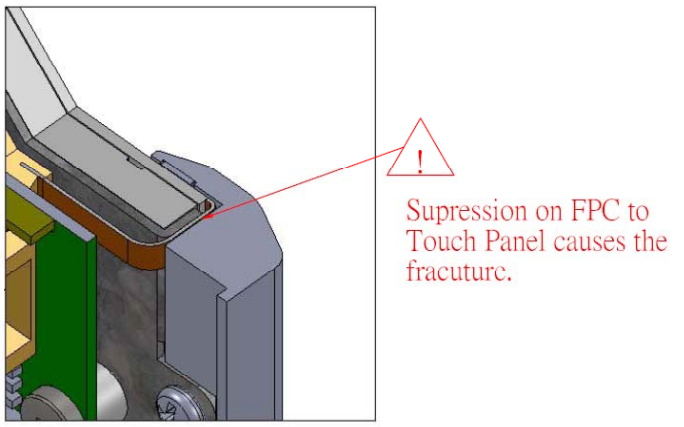


Use a buffer material (Gasket) between the touch-panel and front-case to protect damage and wrong operating.

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

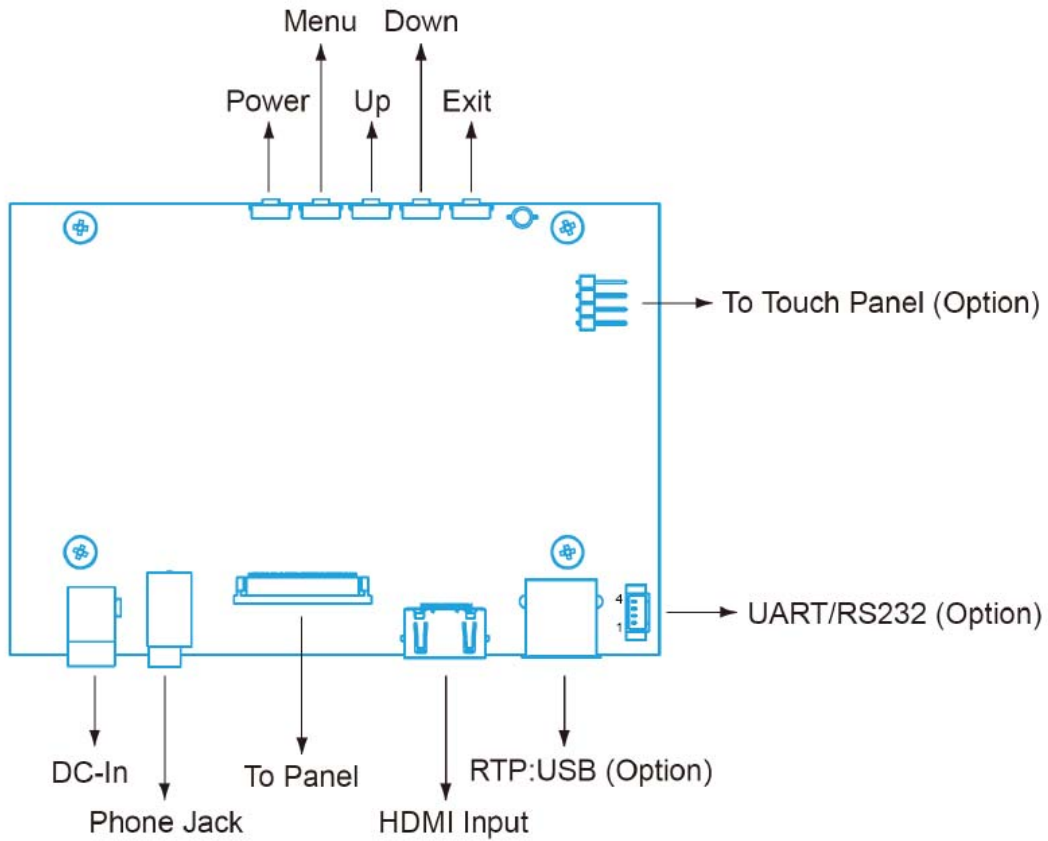


11.7 Mechanical Design Notice For Resistive Touch Panel

Correct Installation	Incorrect Installation
 <p data-bbox="159 750 478 795"><Correct Installation></p> <p data-bbox="542 716 766 750">3mm Minimum gap</p>	 <p data-bbox="957 324 1308 369"><Incorrect Installation></p>
 <p data-bbox="399 1355 766 1400"><Correct Installation></p>  <p data-bbox="223 1848 335 1881">Zoom-In</p>	 <p data-bbox="1117 1366 1500 1411"><Incorrect Installation></p>  <p data-bbox="957 1836 1069 1870">Zoom-In</p>

12. Operation manual / Connection

12.1 Driver Board Manual



13. Accessories (Option)

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



A. LASTD05030-FDR



B. LAAC818000-FDR



C. LACABLE068-FDR



D. LAUSB18000-FDR



E. LACABLE070-FDR

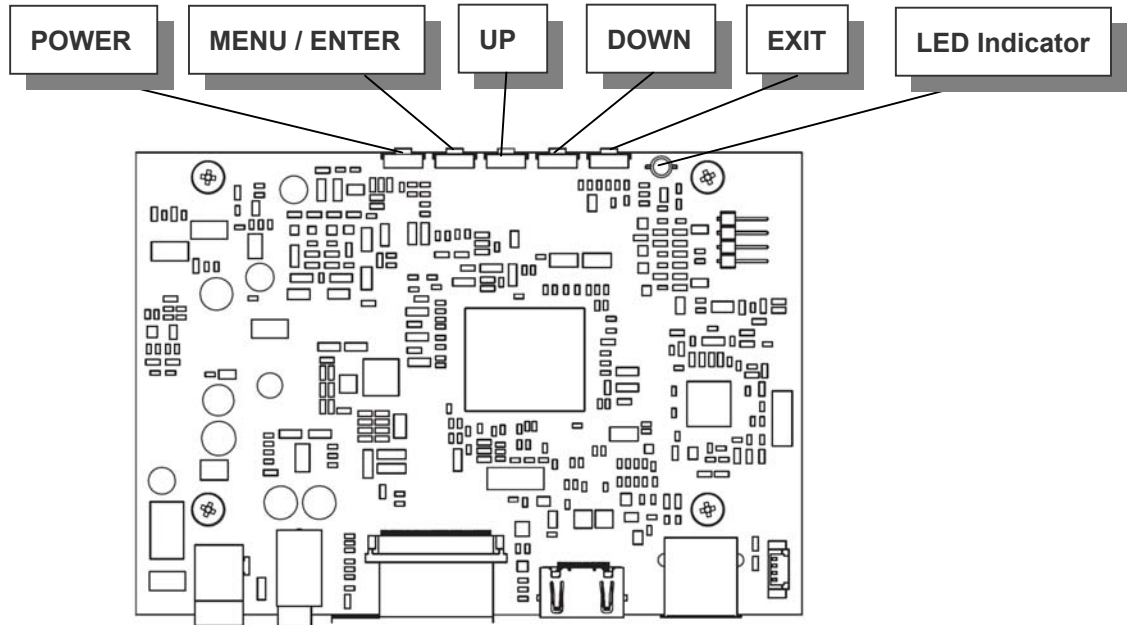


F. LAVCD00002-FDR

- A. AC to DC Adapter (L:1500mm,100-240V_{AC} 50-60Hz to +5V_{DC} @ 3A, ϕ 2.5)
- B. Power Cord (L:1800mm, Plug Type B for USA)
- C. HDMI Cable (L:2000mm)
- D. USB Cable (L:1800mm)
- E. AUDIO Cable (L:1800mm)
- F. Touch Screen Driver CD Disk / User Manual

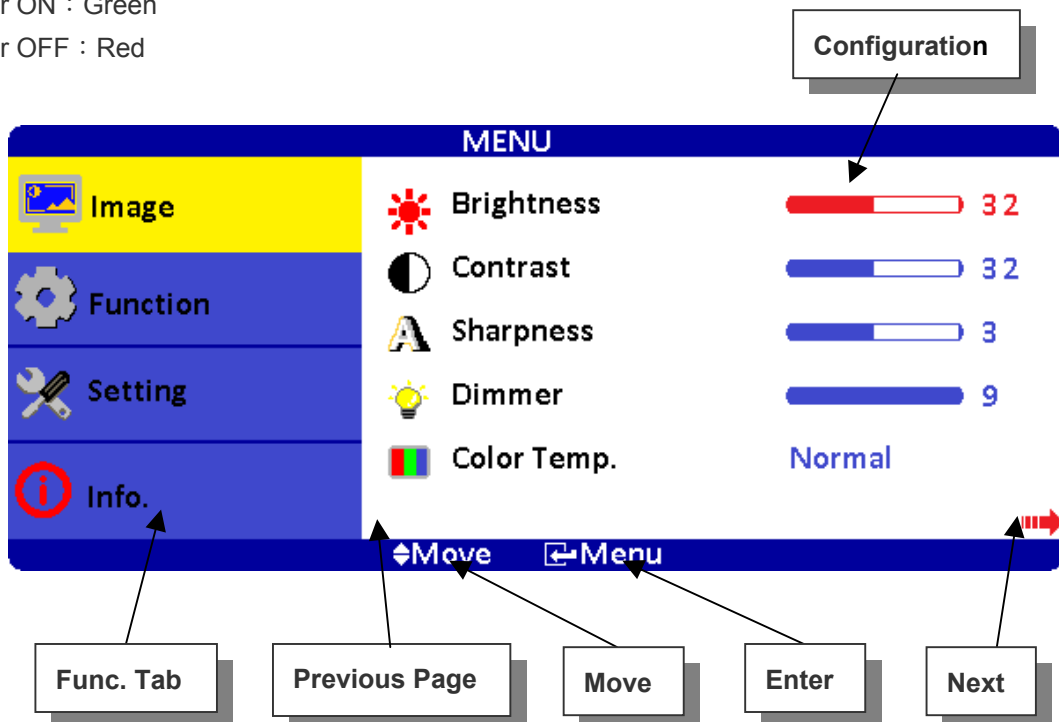
14. Key Function by OSD

14.1 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
 - 6.1 Waiting : Flickering Green
 - 6.2 Power ON : Green
 - 6.3 Power OFF : Red



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	
	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 w/o power input.	ON: Auto ; OFF: Manual
	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
	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 won't restore to default setting
	Reset			Restore to default
	Exit			



Info.

MENU

Image

Source : HDMI

Function

Resolution : 1024x600

Setting

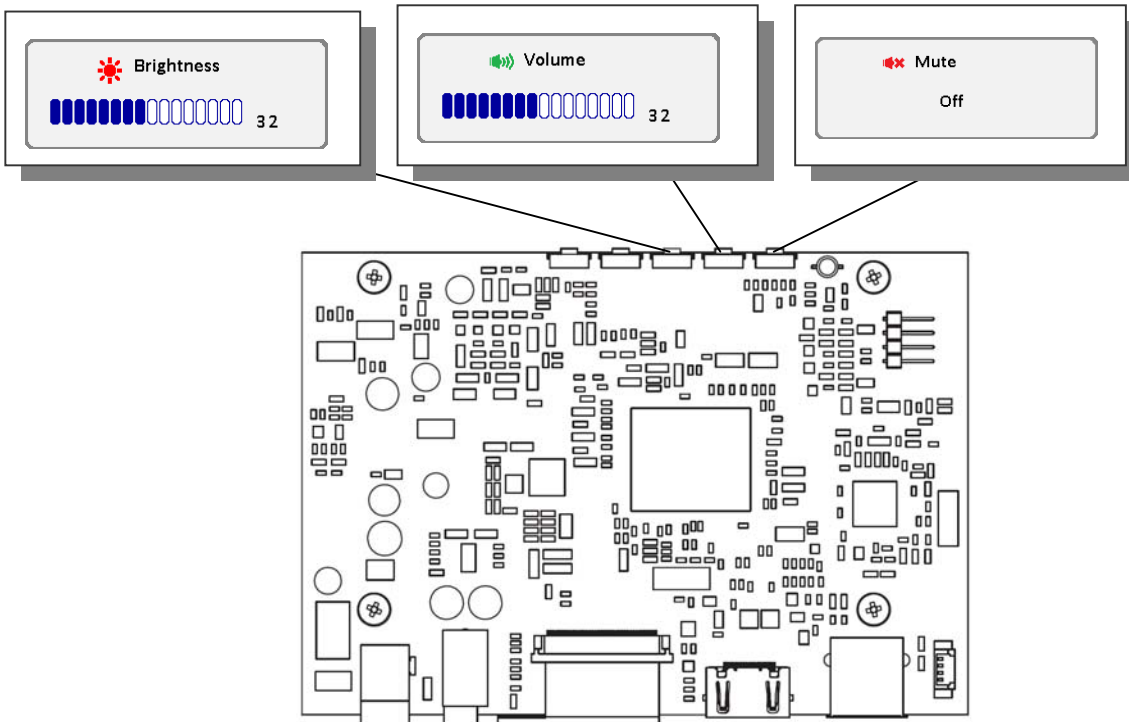
H-Position : 37.5KHz
V-Position : 59.8Hz

Information

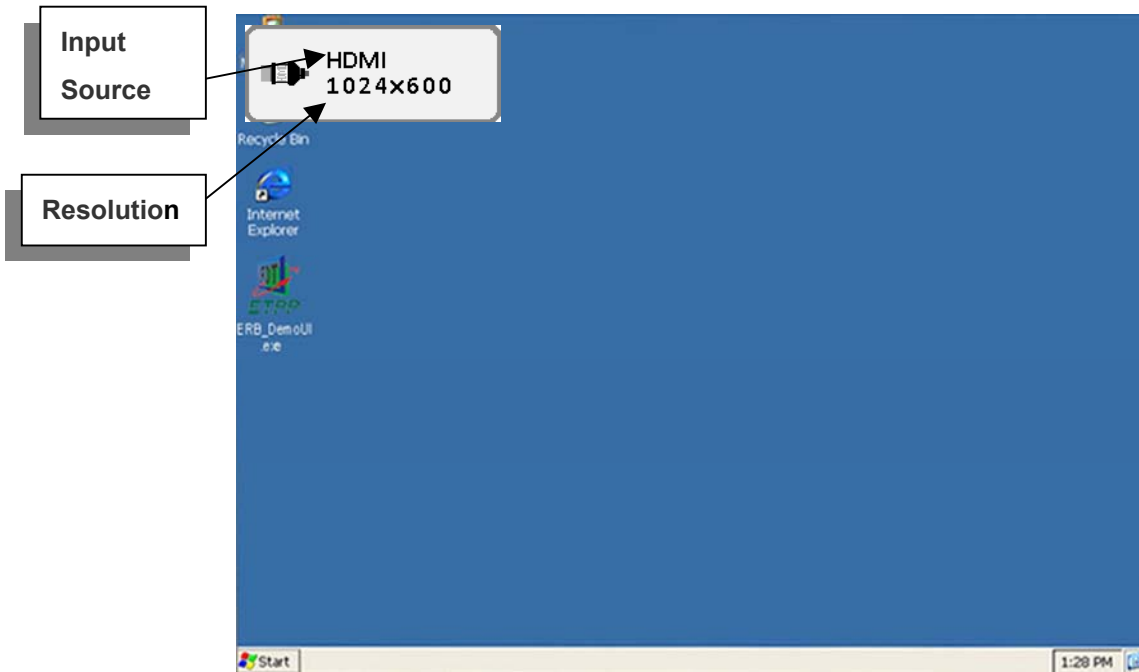
Program Ver : 1.00
Command Ver : 1.00

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
	HDMI



15. Revision History

15.1 Record of Revision

NO	Date	Description	Page	Note
1.0	October 6, 2014	· First draft	21	