



§ SPECIFICATION APPROVAL SHEET §

Fdt Tech Module No

LP150L6I~~xx~~-F~~x~~R

Description:

15" Digital TFT-LCD Module

SPEC No.:

SAS-1403008

Version:

1.0

Issue Date:

October 23, 2014

※ This approval sheet contains 27 pages including the cover and appendix.

Customer:

APPROVED BY:

Date: / / 14

APPROVED BY:

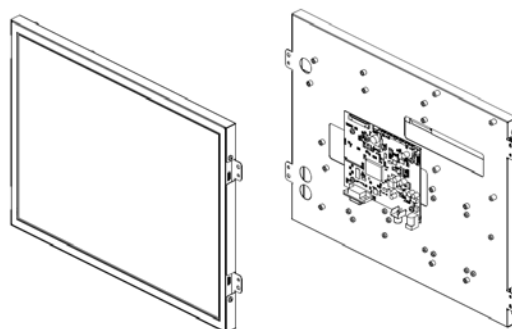
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FLAT DISPLAY TECHNOLOGY

15" Digital TFT-LCD Module



■ LP150L6Ixx-FNR

1. General Description

1.1 Features

- 15" Digital TFT LCD
- Ultra Compact
- NTSC/PAL/SECAM Video Auto Switch
- Single Operation Voltage +12V
- CVBS / Analog RGB (PC Mode) Signal Input
- All Functions can be controlled by UART
- Support Touch Screen Function (Option)

1.2 Applications

- Portable product
- Industrial
- Hand-held
- Security
- Instrument Display
- Office Electronics

1.3 Application Precautions

Do not use the products herein for the following equipment which demands extremely high performance in terms of functionality, reliability, or accuracy.

- Aerospace equipment
- Communication equipment for trunk lines.
- Control equipment for the nuclear power industry.
- Medical equipment related to life support, etc.

The other application that demands high reliability and functionality should first contact a sales representative.

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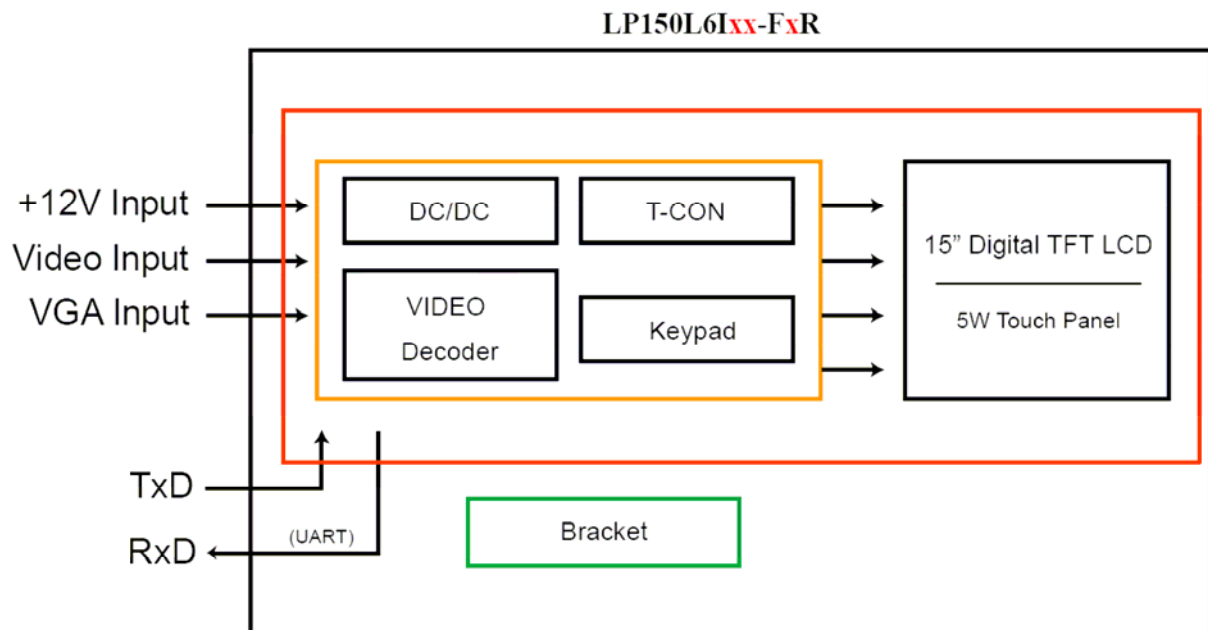
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3. Block Diagram

3.1 Block Diagram



4. TFT-LCD Information

4.1 TFT-LCD Mechanical Specifications

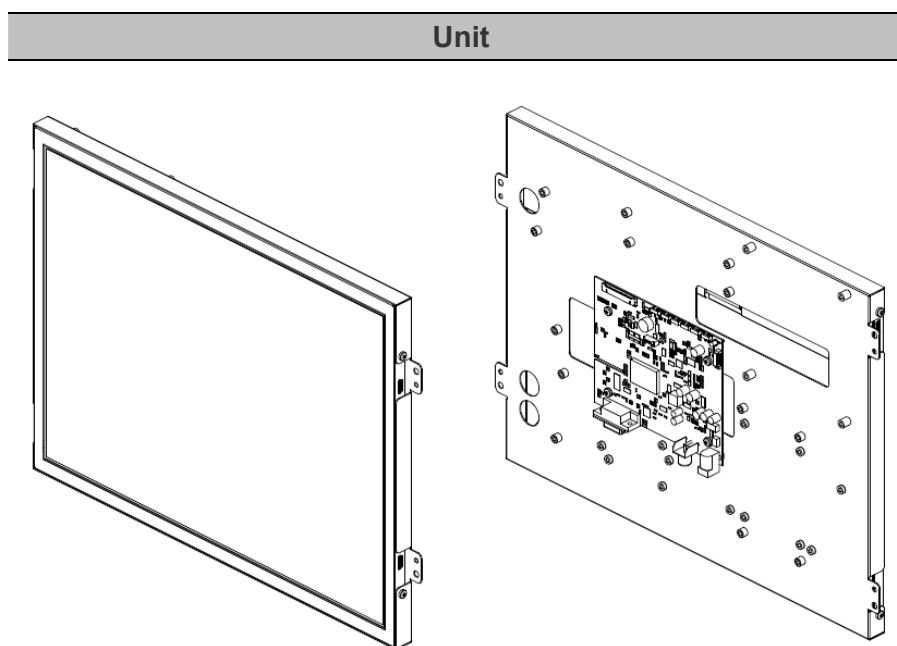
Parameter	Specifications	Unit
Screen Size	15 (diagonal)	inch
Display Format	1024 x (R.G.B) x 768	dot
Active Area	304.128 (H) x 228.096 (V)	mm
Pixel Pitch	0.297 (H) x 0.297 (V)	mm
Pixel Arrangement	RGB vertical stripe	
Surface Treatment	Hard Coating, Anti-Glare	

4.2 TFT-LCD Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	70	80	---	deg	
		Right	70	80	---		
	Vertical	Top	55	70	---	deg	
		Bottom	60	70	---	deg	
Contrast Ratio	CR	At optimized Viewing angle	450	700	---	---	
Response time	Rise Fall	Tr	---	5	10	ms	
		Tf	---	11	16	ms	
Brightness	L		300	400	---	cd/m ²	
Brightness With TP			240	320		cd/m ²	
White Chromaticity	x	$\theta = 0^\circ$	0.263	0.313	0.363		
	y	$\theta = 0^\circ$	0.279	0.329	0.379		
LED Life Time		25°C	50000	---	---	Hr	

5. Order Information

5.1 Unit (CVBS / PC)



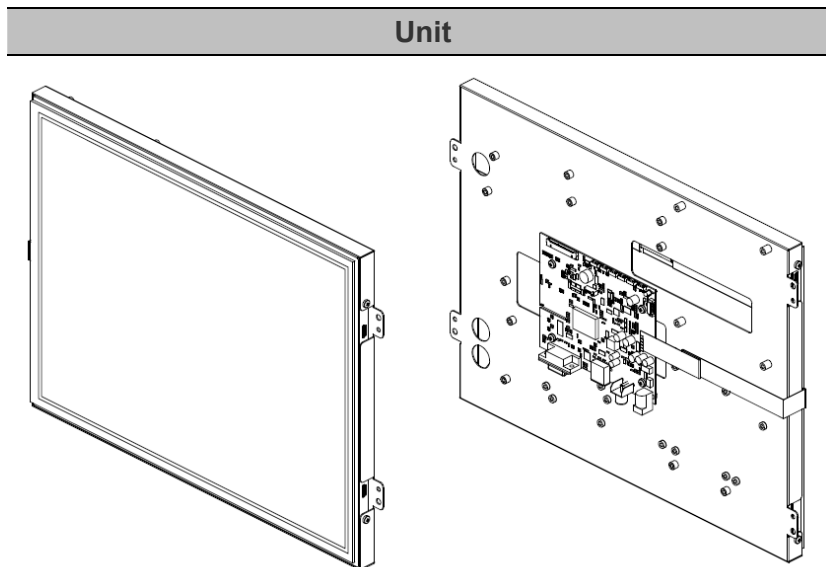
Parameter	LP150L6IBY-FBR	LP150L6IBY-FNR	Unit
CVBS	1	1	
VGA (D-Sub15 / 2.0mm 14Pin)	D-Sub15	D-Sub15	
AC to DC Adapter 12V/3A (LASTD12030-FDR)	⊙	-	
Power Cord Plug Type B for USA (LAACD18000-FDR)	⊙	-	
Video Cable (LAVDO18000-FDR)	⊙	-	
VGA Cable (LAVGA16000-FDR)	⊙	-	

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5.2 Unit (CVBS / PC / 5W Touch)



Parameter	LP150L6IBV-FBR	LP150 L6IBU -FBR	LP150 L6IBV -FNR	LP150 L6IBU -FNR	Unit
CVBS	1	1	1	1	
VGA (D-Sub15 / 2.0mm 14Pin)	D-Sub15	D-Sub15	D-Sub15	D-Sub15	
Touch Panel Type	5W Resistive	5W Resistive	5W Resistive	5W Resistive	
Touch Screen Interface	USB	RS232	USB	RS232	
AC to DC Adapter 12V/3A (LASTD12030-FDR)	⊙	⊙	-	-	
Power Cord Plug Type B for USA (LAACD18000-FDR)	⊙	⊙	-	-	
Video Cable (LAVDO18000-FDR)	⊙	⊙	-	-	
VGA Cable (LAVGA16000-FDR)	⊙	⊙			
USB Cable (LAUSB18000-FDR)	⊙	-	-	-	
RS-232 Cable (LARS218000-FDR)	-	⊙	-	-	
Touch Screen Driver CD Disk	⊙	⊙	⊙	⊙	

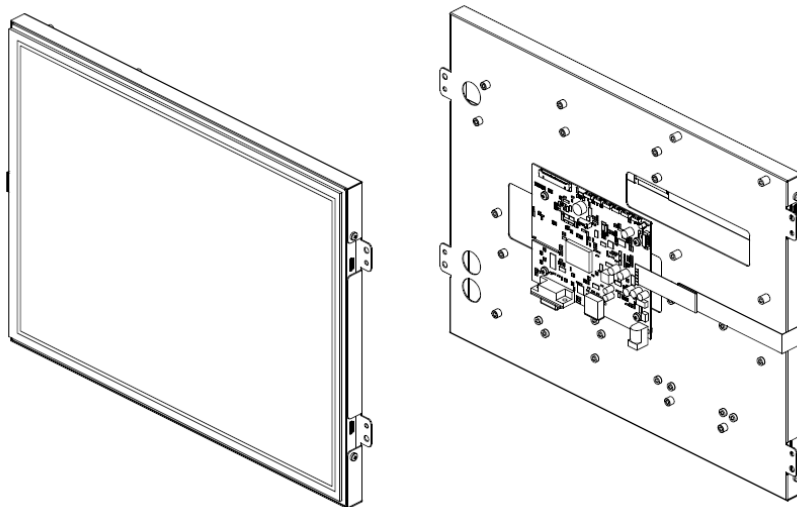
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5.3 Unit (PC Only)

Unit



Parameter	LP150L6ICV-FBR	LP150 L6ICV -FNR	Unit
CVBS	-	-	
VGA (D-Sub15 / 2.0mm 14Pin)	D-Sub15	D-Sub15	
Touch Panel Type	5W Resistive	5W Resistive	
Touch Screen Interface	USB	USB	
AC to DC Adapter 12V/3A (LASTD12030-FDR)	⊙	-	
Power Cord Plug Type B for USA (LAACD18000-FDR)	⊙	-	
Video Cable (LAVDO18000-FDR)	-	-	
VGA Cable (LAVGA16000-FDR)	⊙	-	
USB Cable (LAUSB18000-FDR)	⊙	-	
Touch Screen Driver CD Disk	⊙	⊙	

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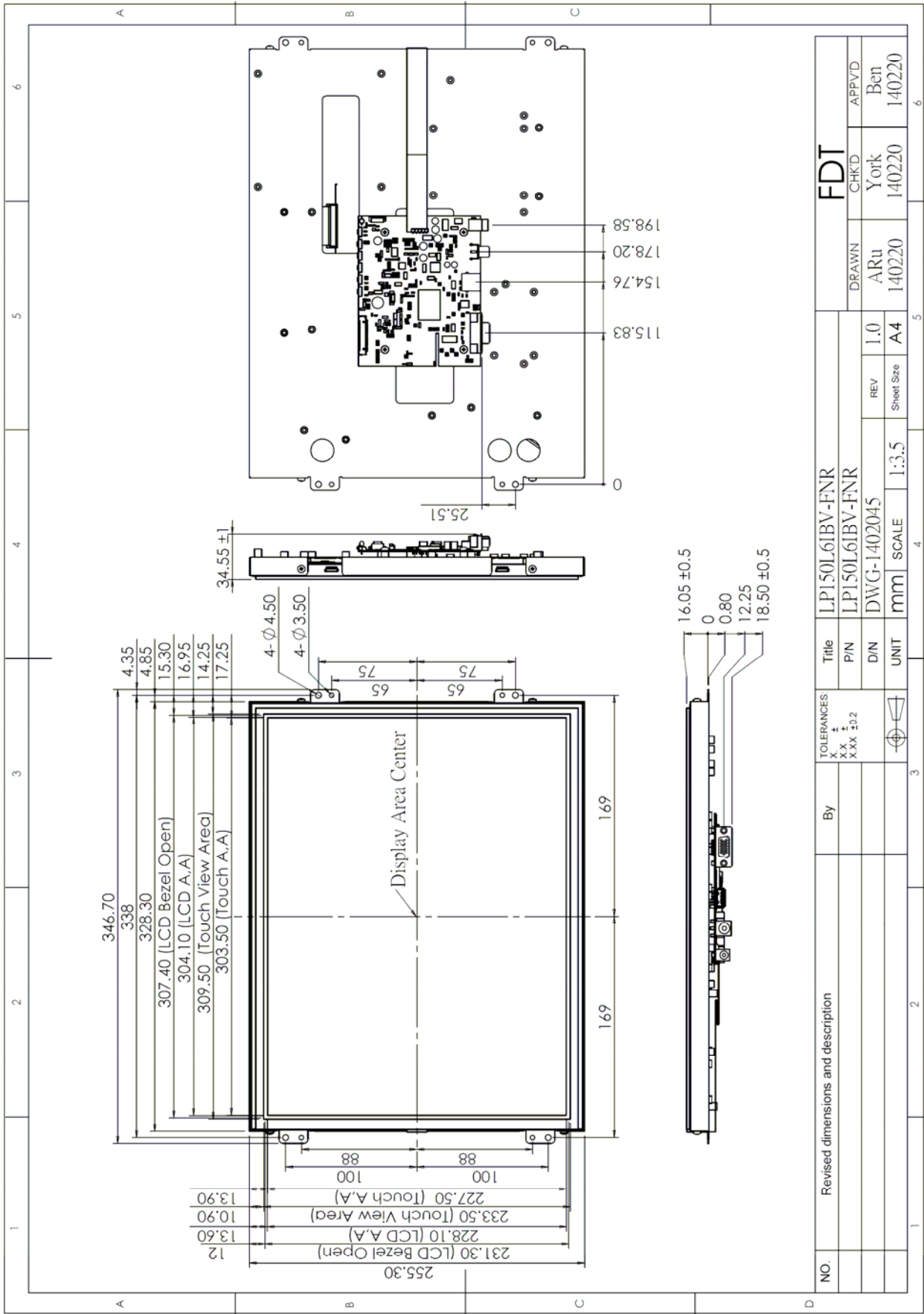
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6.1 Unit (LP150L6IBY-FNR)



6.2 Unit (LP150L6IBV-FNR)

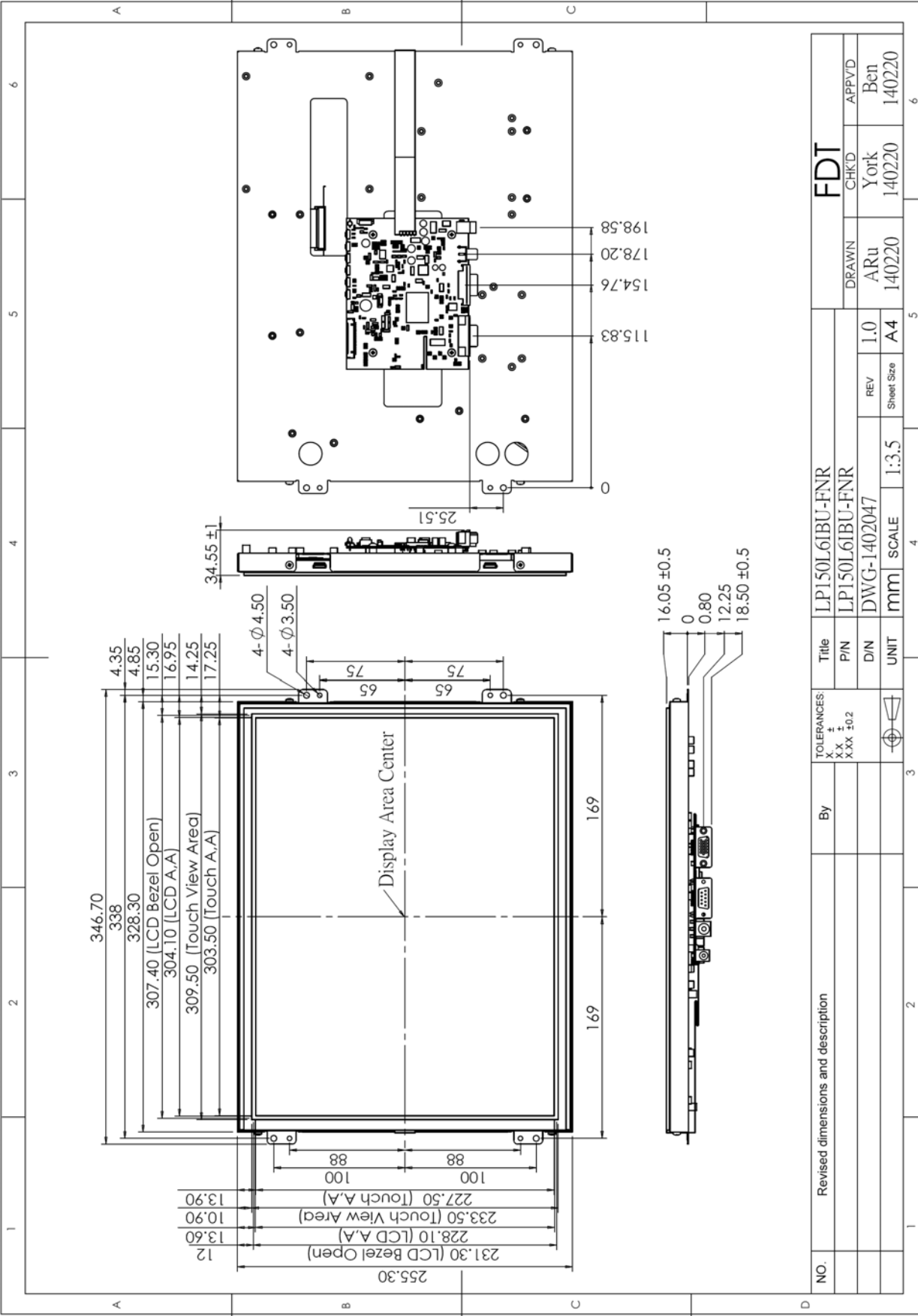


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6.3 Unit (LP150L6IBU-FNR)

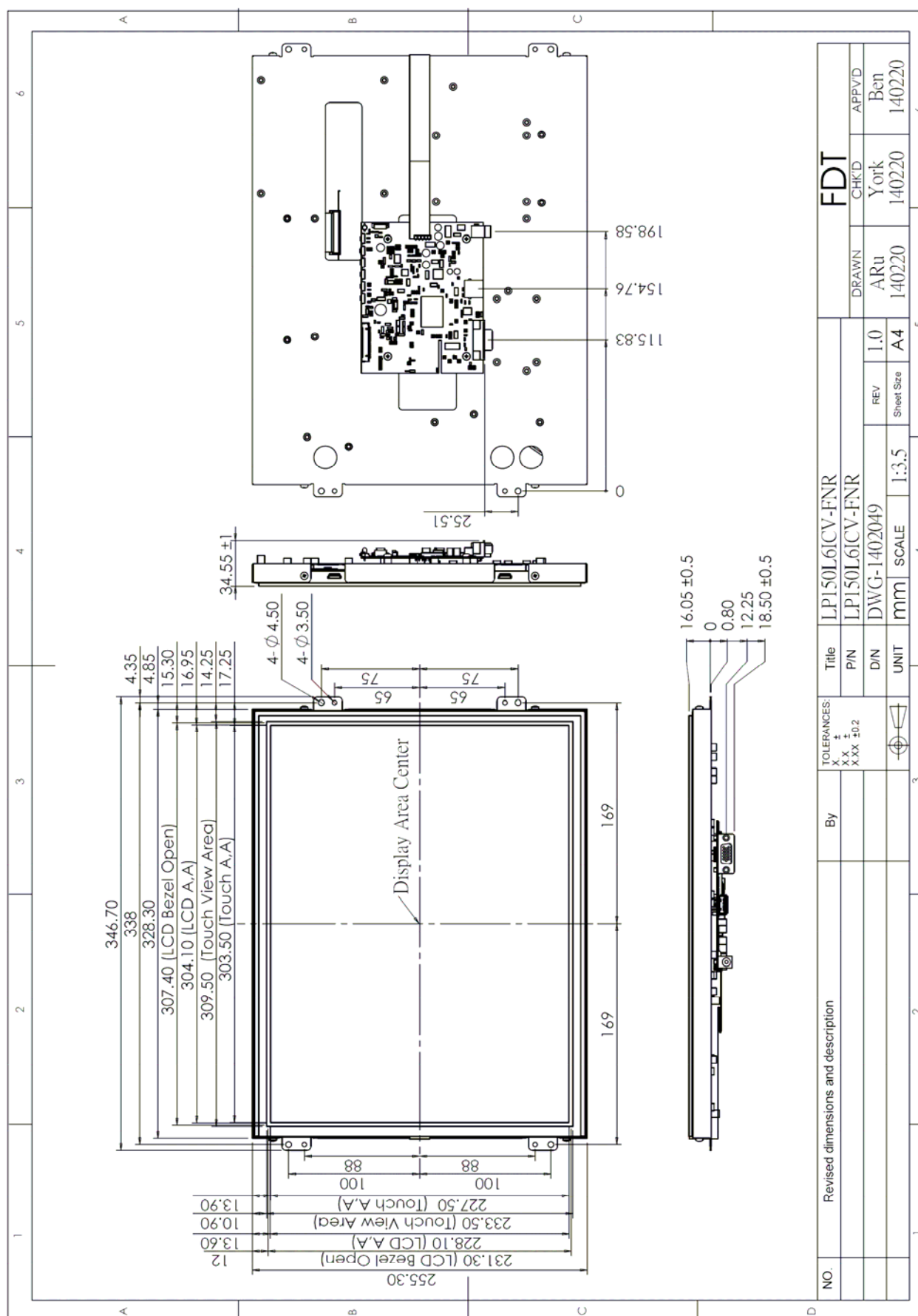


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6.4 Unit (LP150L6ICV-FNR)



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7. Pin Description

7.1 LCD Panel I/O Terminals (Pitch 1.25mm 20Pin DF14H, Side Entry Type)

Pin No	Symbol	I/O	Description	Remark
1	VDD	I	Power Supply +3.3V(typical)	
2	VDD	I	Power Supply +3.3V(typical)	
3	GND	P	Ground	
4	LR/UD	I	Reverse Scan Control H or NC = Normal Mode. L = Horizontal/ Vertical Reverse Scan.	
5	RX0-	I	LVDS Differential Data Input Negative	
6	RX0+	I	LVDS Differential Data Input Positive	
7	GND	P	Ground	
8	RX1-	I	LVDS Differential Data Input Negative	
9	RX1+	I	LVDS Differential Data Input Positive	
10	GND	P	Ground	
11	RX2-	I	LVDS Differential Data Input Negative	
12	RX2+	I	LVDS Differential Data Input Positive	
13	GND	P	Ground	
14	RXCLK-	I	LVDS Differential Data Input Negative	
15	RXCLK+	I	LVDS Differential Data Input Positive	
16	GND	P	Ground	
17	RX3-	I	LVDS Differential Data Input Negative	
18	RX3+	I	LVDS Differential Data Input Positive	
19	GND	P	Ground	
20	SEL6/8	I	LVDS 6/8 bit select function control, High _ 6bit Input Mode. Low or NC _ 8bit Input Mode.	

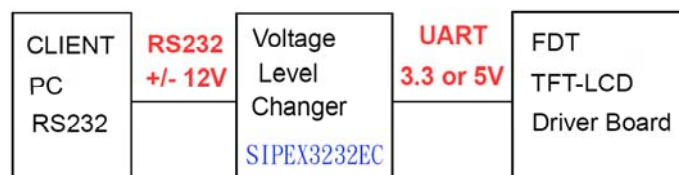
7.2 J104: Pin Assignment of UART (Pitch 1.25mm 4Pin, Top Entry Type)

※ 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	O	UART Transmission Data	
2	RX	I	UART Receive Data	
3	GND	-	Ground	
4	+3.3V	O	+3.3V Output Voltage	

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



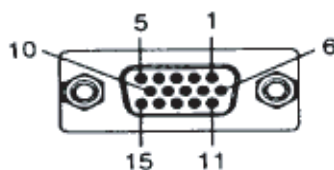
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7.3 J106B : Pin Assignment of Analog RGB Input (D-Sub 15Pin)

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	NC	-	No Connection	
5	GND	-	Ground	
6	AGND	-	Analog Ground	
7	AGND	-	Analog Ground	
8	AGND	-	Analog Ground	
9	NC	-	No Connection	
10	NC	-	No Connection	
11	NC	-	No Connection	
12	NC	-	No Connection	
13	HS_IN	I	TTL Horizontal sync	
14	VS_IN	I	TTL Vertical sync	
15	NC	-	No Connection	



7.4 DC 101: Pin Assignment of Power Input (Inside Diameter:2.1 ϕ Outside Diameter:5.5 ϕ Side Entry Type)

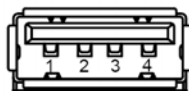
Pin No	Symbol	I/O	Description	Remark
1	VIN	I	+12V Input Voltage	
2	GND	-	Power Ground	

7.5 RCA 101: Pin Assignment of Video Input (RCA JACK Yellow, Side Entry Type)

Pin No	Symbol	I/O	Description	Remark
1	Video	I	Video Input	
2	AGND	-	Analog Ground	

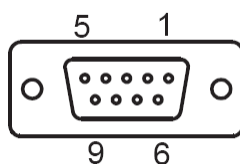
7.7 J404 : Pin Assignment of Touch USB (USBA-Female, Side Entry Type)(Option)

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



7.8 DB401 : Pin Assignment of Touch RS232 (D-SUB 9 FEMALE)(Option)

Pin No	Symbol	I/O	Description	Remark
1	NC	-	No Connection	
2	TXD	-	Transmit Data	
3	RXD	-	Receive Data	
4	NC	-	No Connection	
5	GND	-	Ground	
6	NC	-	No Connection	
7	NC	-	No Connection	
8	NC	-	No Connection	
9	NC	-	No Connection	



8. Absolute Maximum Ratings

8.1 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Remark
Input Voltage	Vin	+11	+13.5	V	
Video Input Signal	Video in	0.5	2.0	Vp-p	@75Ω
Analog RGB Input Signal	Analog RGB in	0.5	2.0	Vp-p	@75Ω
Digital Input Signal	TTL	+0.3	+3.6	V	
Operating Temperature		-20	+70	°C	
Storage Temperature		-30	+70	°C	
Operating Temperature With TP		-20	+70	°C	
Storage Temperature With TP		-30	+70	°C	

9. Recommended operating conditions

9.1 Electrical Characteristics

Parameter	Symbol	I/O	Min	Typ	Max	Unit	Note
Input Voltage	Vin	I	+11.5	+12	+13	V	
Total Current	Iin (+12V)	I		965		mA	±15%
Power Consumption		I		11.58		W	@+12V
Output Voltage	VDD	O	+3.2	+3.3	+3.4	V	I=10mA
Video Input Signal	Video in	I		1.0		Vp-p	@75Ω
Analog RGB Input Signal	Analog RGB in	RGB I		0.7		Vp-p	@75Ω

9.2 VGA Mode Characteristics

Dots per inch	Hor.	Unit	Polarity	Ver.	Unit	Polarity	Note
640*480	31.469	KHz	Negative	59.941	Hz	Negative	
800*600	37.879	KHz	Positive	60.317	Hz	Positive	
1024*768	48.363	KHz	Negative	60.004	Hz	Negative	

10. 5W Resistance Touch Panel Characteristics

10.1 Pin assignment

Pin No	Symbol	Description	Remark
1	RT	Right & Top electrode	
2	RL	Right & Lower electrode	
3	SG	Signal Ground	
4	LT	Left & Top electrode	
5	LL	Left & Lower electrode	

10.2 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Loop Resistance	X	20	-	500	Ω	
	Y	20	-	500	Ω	
Linearity		-	-	1.5	%	
Insulation Impedance		20	-	-	M Ω	DC 25V
Response Time		-	-	15	ms	

10.3 Optical Performance

Parameter	Specifications
Transparency	80% $\pm$ 5%
Haze	Antiglare: <15%

10.4 Mechanical Performance

Parameter	Specifications
Input Method	Finger or stylus pen
Operating Force	R8 Silicon Rubber, 60HS
Surface Hardness	$\geq$ 3H

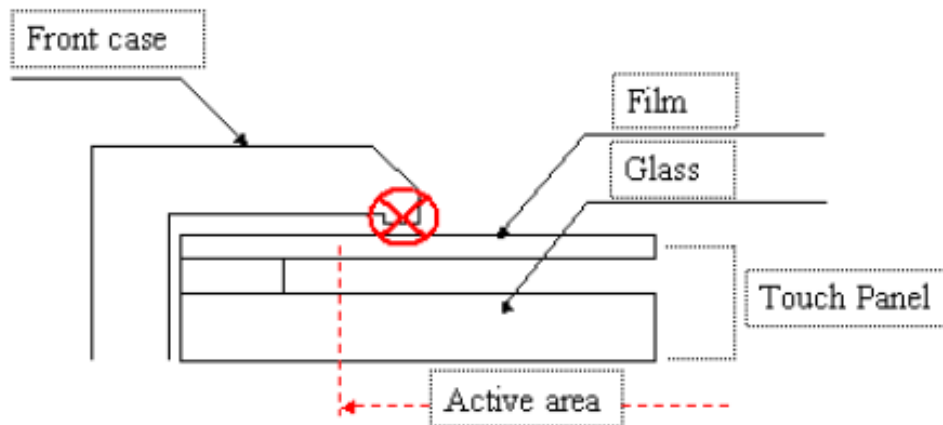
10.5 Durability Performance

Parameter	Specifications
Knock Test	10,000,000 times

10.6 Touch Screen Integration Design Guide

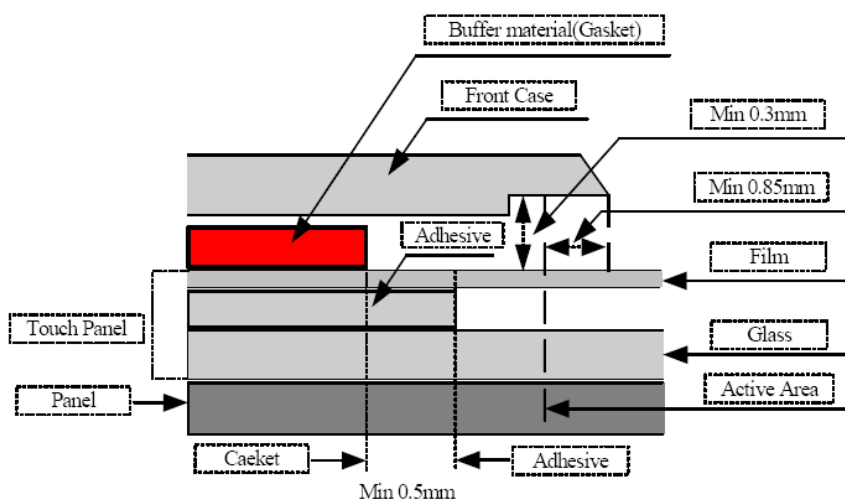
Avoid the design that Front-case overlap and press on the active area of the touch-panel.

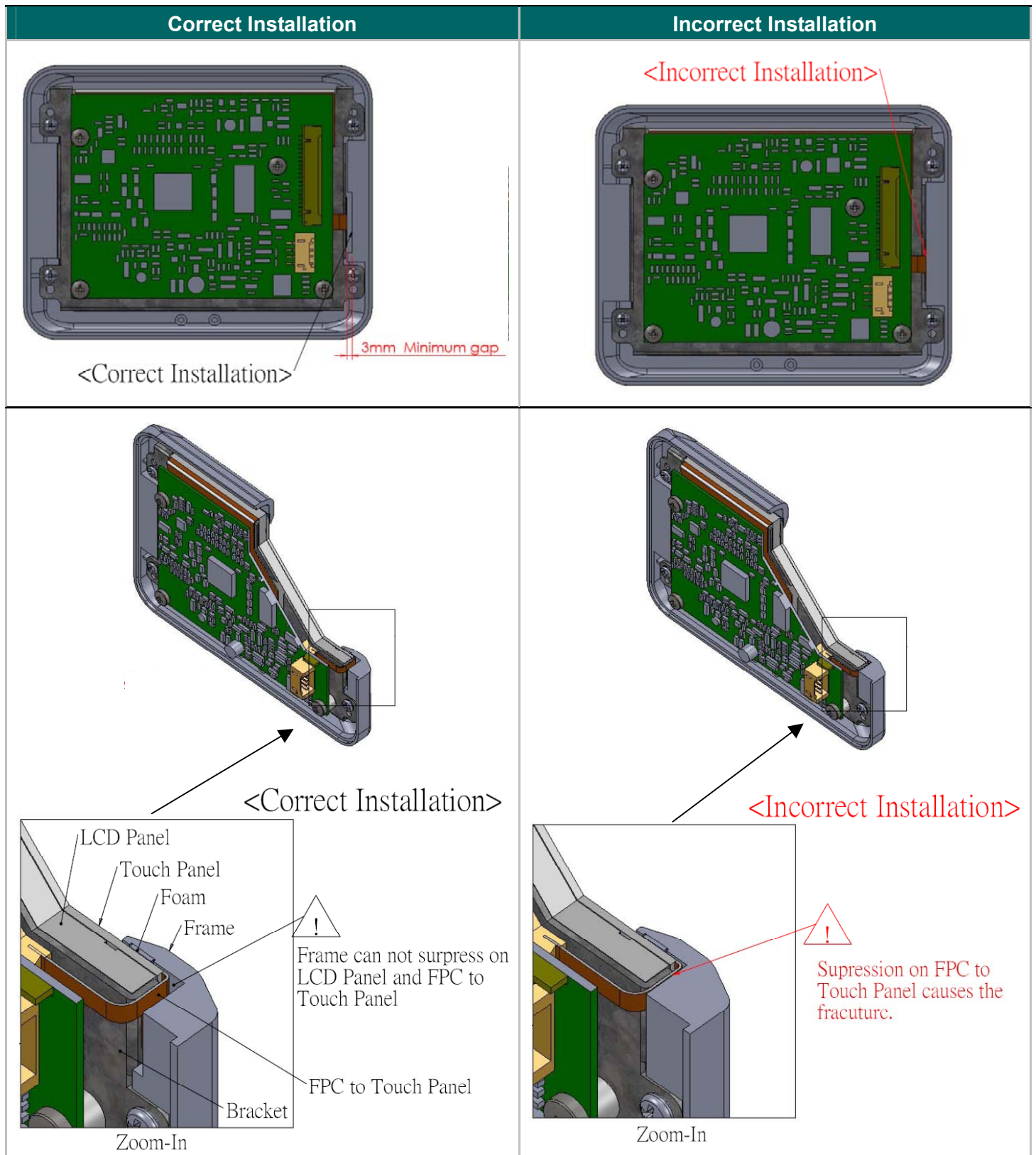
Give enough gap (over 0.5mm at compressed) between the front case and touch-panel to protect wrong operating.



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

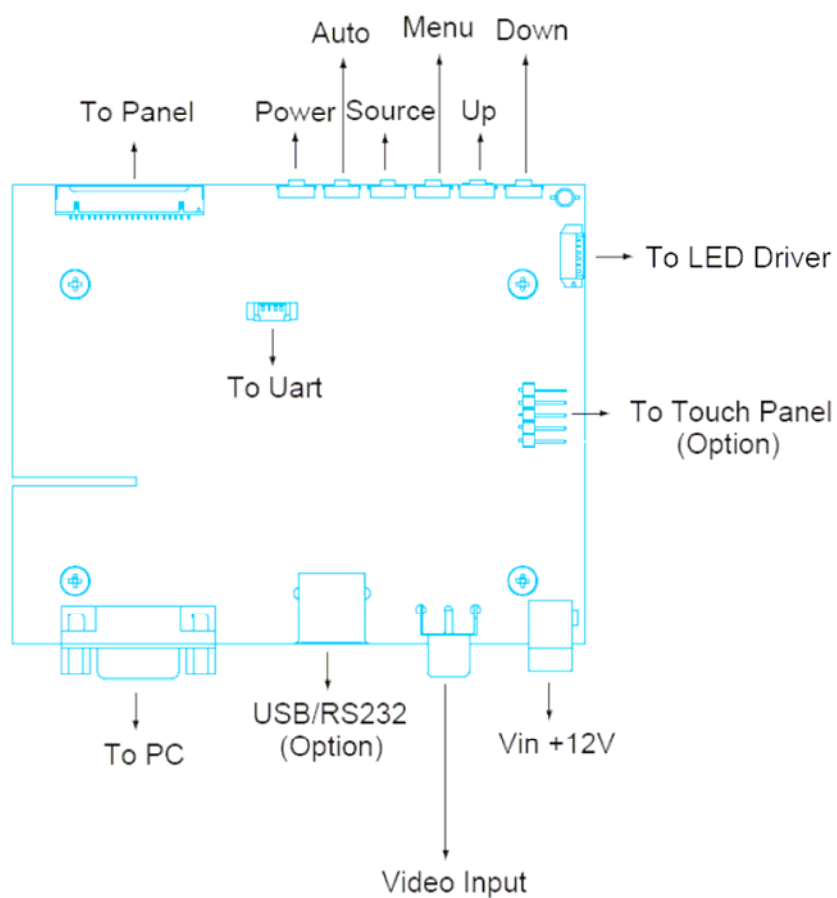
Avoid the design that buffer material overlap and press on the inside of touch-panel viewing area.





11.Operation manual

11.1 Driver Board Manual



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12. Packing List

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



A. LASTD12030-FDR



B. LAACD18000-FDR



C. LAVDO18000-FDR



D. LAVGA16000-FDR



E. LAUSB18000-FDR



F. LARS218000-FDR



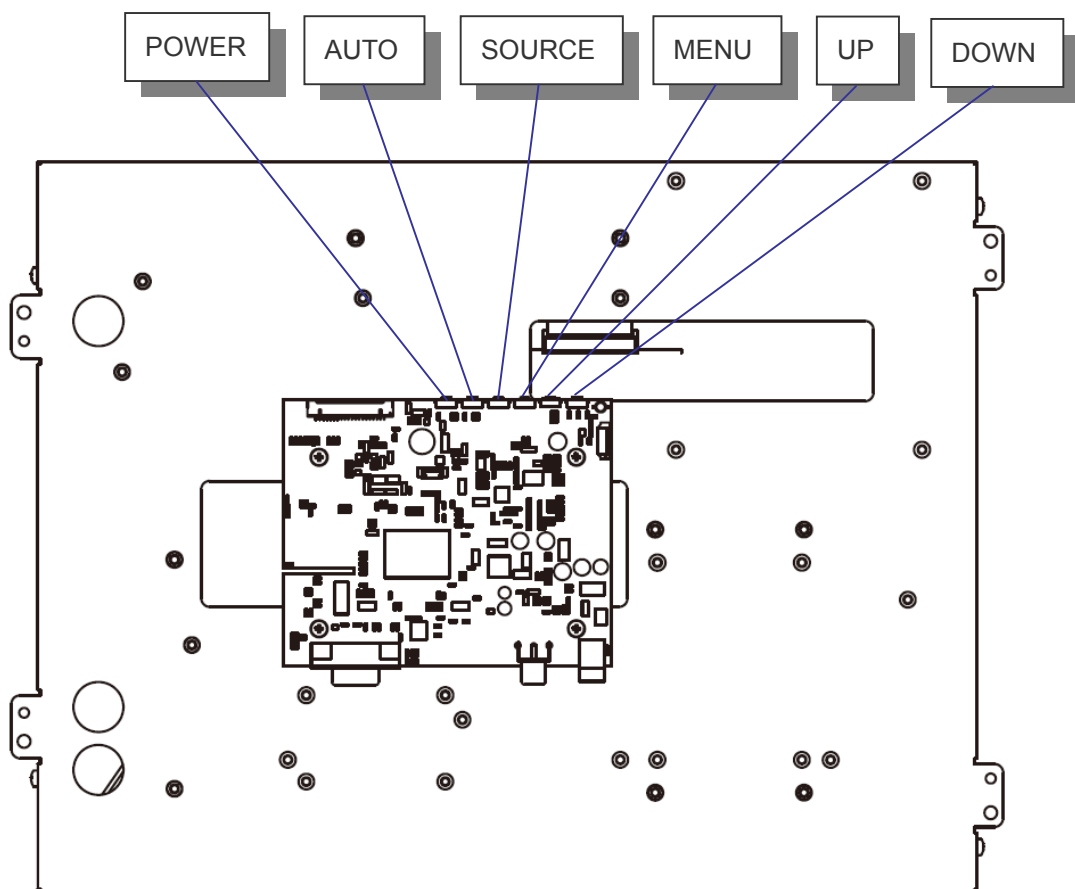
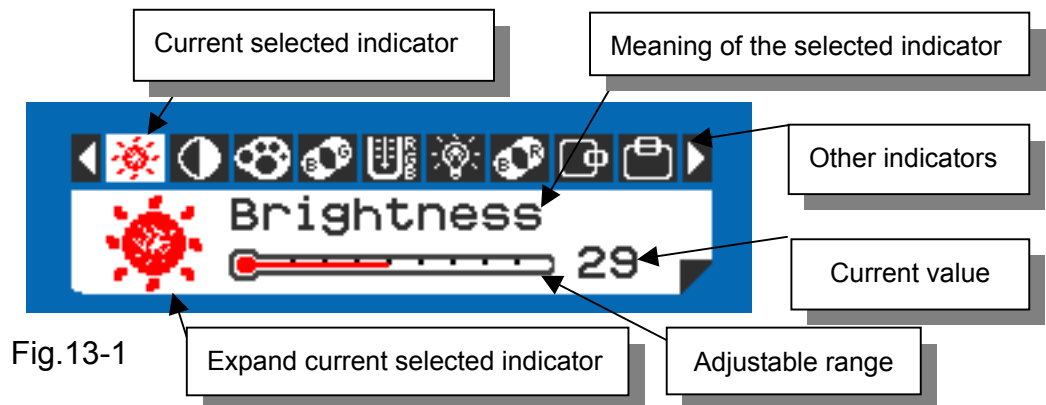
G.

- A. AC to DC Adapter (L:1500mm,100-240VAC 50-60Hz to +12VDC @ 3A)
- B. Power Cord (L:1800mm, Plug Type B for USA)
- C. Video Cable (L:1800mm)
- D. VGA Cable (L:1600mm)
- E. USB Cable (L:1800mm)
- F. RS-232 Cable (L:1800mm)
- G. Touch Screen Driver CD Disk / User Manual

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

13. Key Function by OSD

13.1 Menu Operation



Operations of key board :

1. To navigate the menu, press [MENU]. (Fig.13-1)
2. The indicator lighting up in white color is the selected adjustment item.
3. To Next Item of the menu, press [MENU] again.
4. The operations below are only available when "Menu" is started.
5. Press [UP] / [DOWN] to adjust the value of the selected item.

Overview of the menu :

Firmware must be $\geq$ VER 0.26

Indicator	Meaning	Adjustable range	For	Remark
	Brightness	0 ~ 64	AV / VGA	Adjust-Bar
	Contrast	0 ~ 64	AV / VGA	Adjust-Bar
	Color	0 ~ 64	AV	Adjust-Bar
	Tint	0 ~ 32	AV	Adjust-Bar
	Sharpness	0 ~ 16	AV	Adjust-Bar
	Dimmer	0 ~ 9	AV / VGA	
	Color Tone	Normal / Warm / Cool	AV / VGA	
	H-Position	-25 ~ +25	AV / VGA	Balance-Bar
	V-Position	-10 ~ +10	AV / VGA	Balance-Bar
	Auto		VGA	
	Scan	Over Scan / Under Scan	AV	
	Information		AV / VGA	Fig.13-2
	Setup		AV / VGA	Fig.13-3
	Factory Set		AV / VGA	
	Exit		AV / VGA	

Fig.13-2

INFORMATION	
Video Source	AV1
Video System	NTSC
H-Freq	15.7KHz
V-Freq	60Hz
Program Ver	0.26
Command Ver	0.24
Graphic Ver	0.13

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Setup Menu :



Fig.13-3

Indicator	Meaning	Adjustable range	Function	Remark
	Show Status	ON / OFF	Show signal status.	ON: Show OFF: Hidden
	Blue Screen	ON / OFF	If loss signal will put on the blue or black screen.	ON: Blue OFF: Black
	Auto Power On	ON / OFF	Power input module will be auto turn on.	ON: Auto OFF: Manual
	Auto Saving	OFF / 3s / 5s / 15s / 30s	If signal lost over setting times will be power off.	ON: Auto OFF: Normal
	Detect Source	ON / OFF	Auto detection which source is existence and change.	ON: Auto OFF: Normal
	Return			

Note : 1.VGA only type don't have Detect Source function.

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

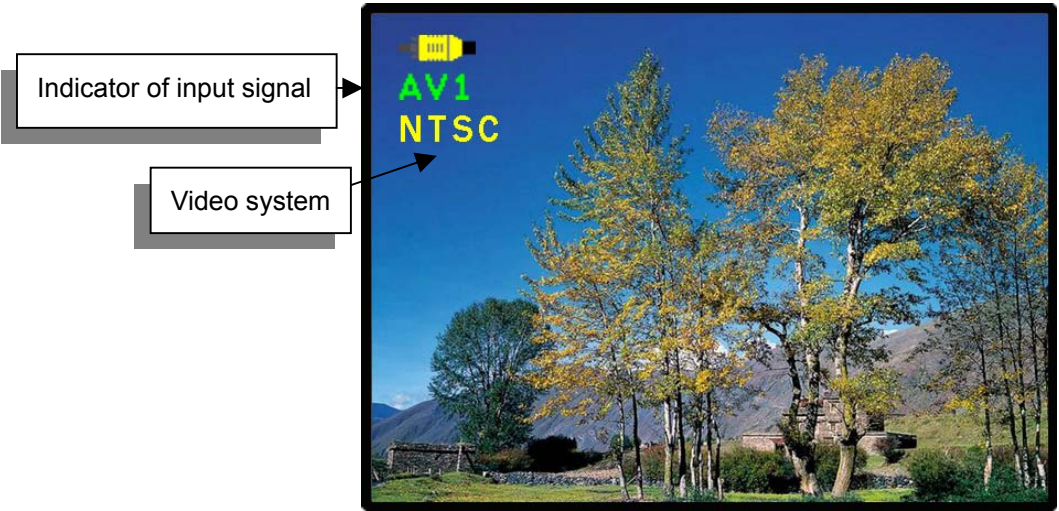


Fig.13-4

[Power] : Monitor power on / off
[Source] : Input signal switch

Overview of input signals :

Indicator	Input signal	Interface	Video system
	AV1	Composite	NTSC / PAL / SECAM
	VGA	Analog RGB	640x480_60 / 800x600_60 / 1024x768_60

14. Revision History

14.1 Record of Revision

NO.	Date	Description	Page	Note
1.0	October 23, 2014	· First draft	25	