



FLAT DISPLAY TECHNOLOGY



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§ SPECIFICATION APPROVAL SHEET §

Fdt Tech Module No	LP070T8IBX-FXR
Description:	7" Digital TFT-LCD Module
SPEC No.:	SAS-0906004
Version:	1.3
Issue Date:	January 9, 2014

※ This approval sheet contains 30 pages including the cover and appendix.

Customer:

APPROVED BY:

Date: / / 14

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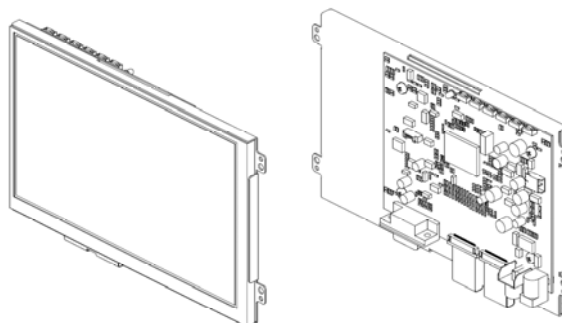
CHECKED BY:

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FLAT DISPLAY TECHNOLOGY

7" Digital TFT-LCD Module



■ LP070T8IB~~x~~-F~~x~~R

1. General Descriptions

1.1 Features

- 7" 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.

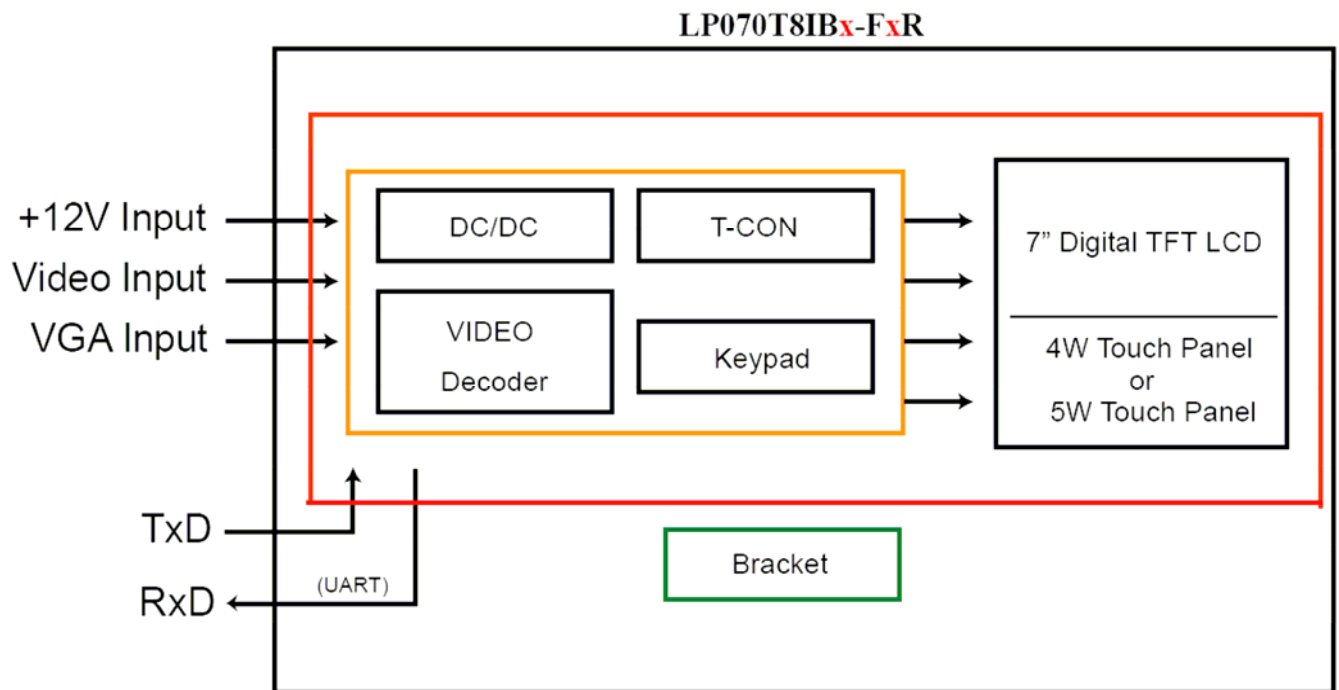
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3. Block Diagram

3.1 Block Diagram



4. TFT-LCD Information

4.1 TFT-LCD Mechanical Specifications

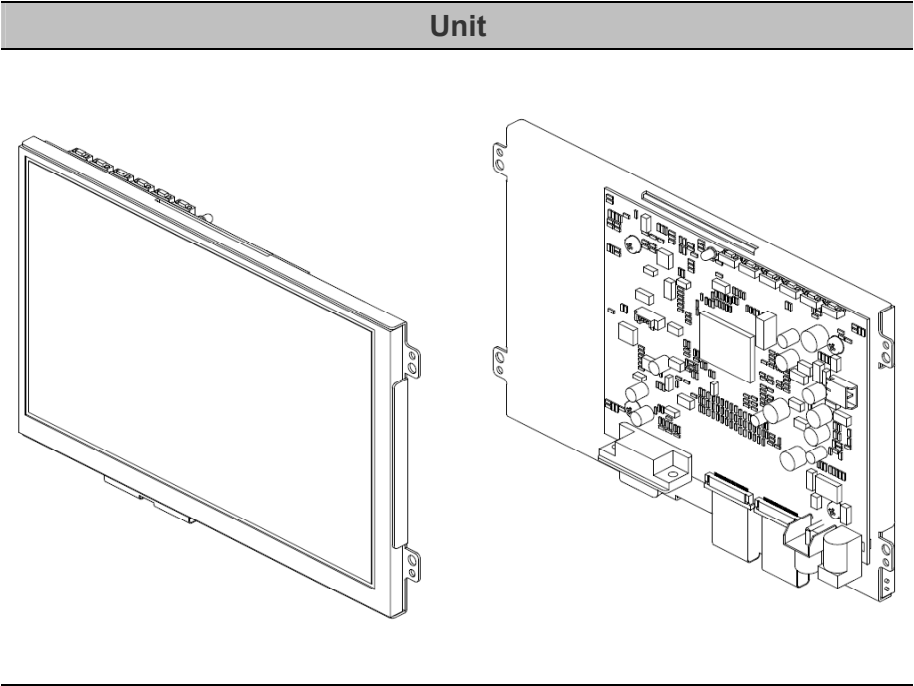
Parameter	Specifications	Unit
Screen Size	7 (Diagonal)	inch
Display Format	800 x (R.G.B) x 480	dot
Display Mode	Normally white, Transmissive	
Active Area	152.4(H) x 91.44(V)	mm
Pixel Pitch	0.1905(H) x 0.1905(V)	mm
Outline Dimension	165(W) x 104(H) x 5.5(typ.)(D)	mm
Surface Treatment	Anti-glare	
Weight	170(Typ)	g

4.2 TFT-LCD Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	60	70	-	deg	
		Right	60	70	-	deg	
	Vertical	Top	40	50	-	deg	
		Bottom	60	70	-	deg	
Contrast Ratio	CR	At optimized Viewing angle	400	500	-		
Response time	Rise Fall	Tr	-	10	20	ms	
		Tf	-	15	30	ms	
Uniformity	U		70	75	-	%	
Brightness	L	$\theta = 0^\circ / \phi = 0$	360	450	-	cd/m ²	
Brightness with TSP			288	360			
White Chromaticity	x	$\theta = 0^\circ$	0.26	0.31	0.36		
	y	$\theta = 0^\circ$	0.28	0.33	0.38		
LED Life Time			20000			Hrs	At 180mA

5. Order Information

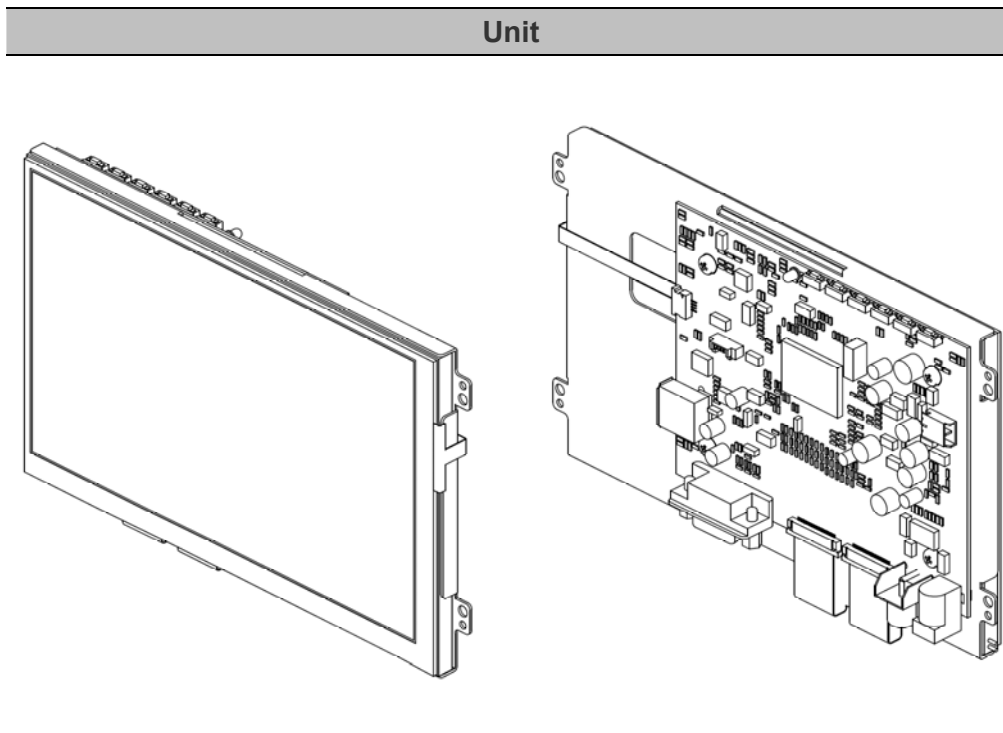
5.1 Unit



Parameter	LP070T8IB1-FBR	LP070T8IB1-FNR	Unit
CVBS	1	1	
VGA (D-Sub15 / 2.0mm 14Pin)	D-Sub15	D-Sub15	
AC to DC Adapter 12V/2.5A (LASTD12025-FDR)	⊙	-	
Power Cord Plug Type B for USA (LAAC818000-FDR)	⊙	-	
Video Cable (LAVDO18000-FDR)	⊙	-	
VGA Cable (LAVGA16000-FDR)	⊙	-	

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

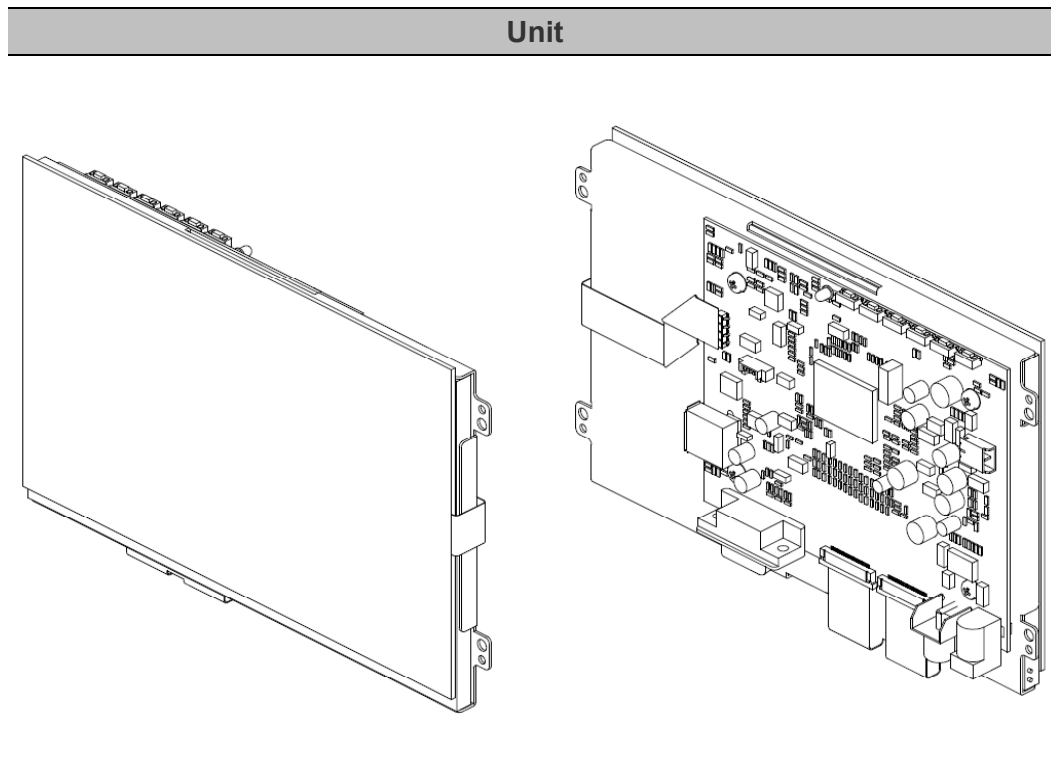
5.2 Unit (4W Touch)



Parameter	LP070T8IB4-FBR	LP070T8IB5-FBR	LP070T8IB4-FNR	LP070T8IB5-FNR	Unit
CVBS	1	1	1	1	
VGA (D-Sub15 / 2.0mm 14Pin)	D-Sub15	D-Sub15	D-Sub15	D-Sub15	
Touch Panel Type	4W Resistive	4W Resistive	4W Resistive	4W Resistive	
Touch Screen Interface	USB	RS232	USB	RS232	
AC to DC Adapter 12V/2.5A (LASTD12025-FDR)	⊙	⊙	-	-	
Power Cord Plug Type B for USA (LAAC818000-FDR)	⊙	⊙	-	-	
Video Cable (LAVDO18000-FDR)	⊙	⊙	-	-	
VGA Cable (LAVGA16000-FDR)	⊙	⊙	-	-	
USB Cable (LAUSB18000-FDR)	⊙	-	-	-	
RS-232 Cable (LARS218000-FDR)	-	⊙	-	-	
Touch Screen Driver CD Disk	⊙	⊙	-	-	

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

5.3 Unit (5W Touch)



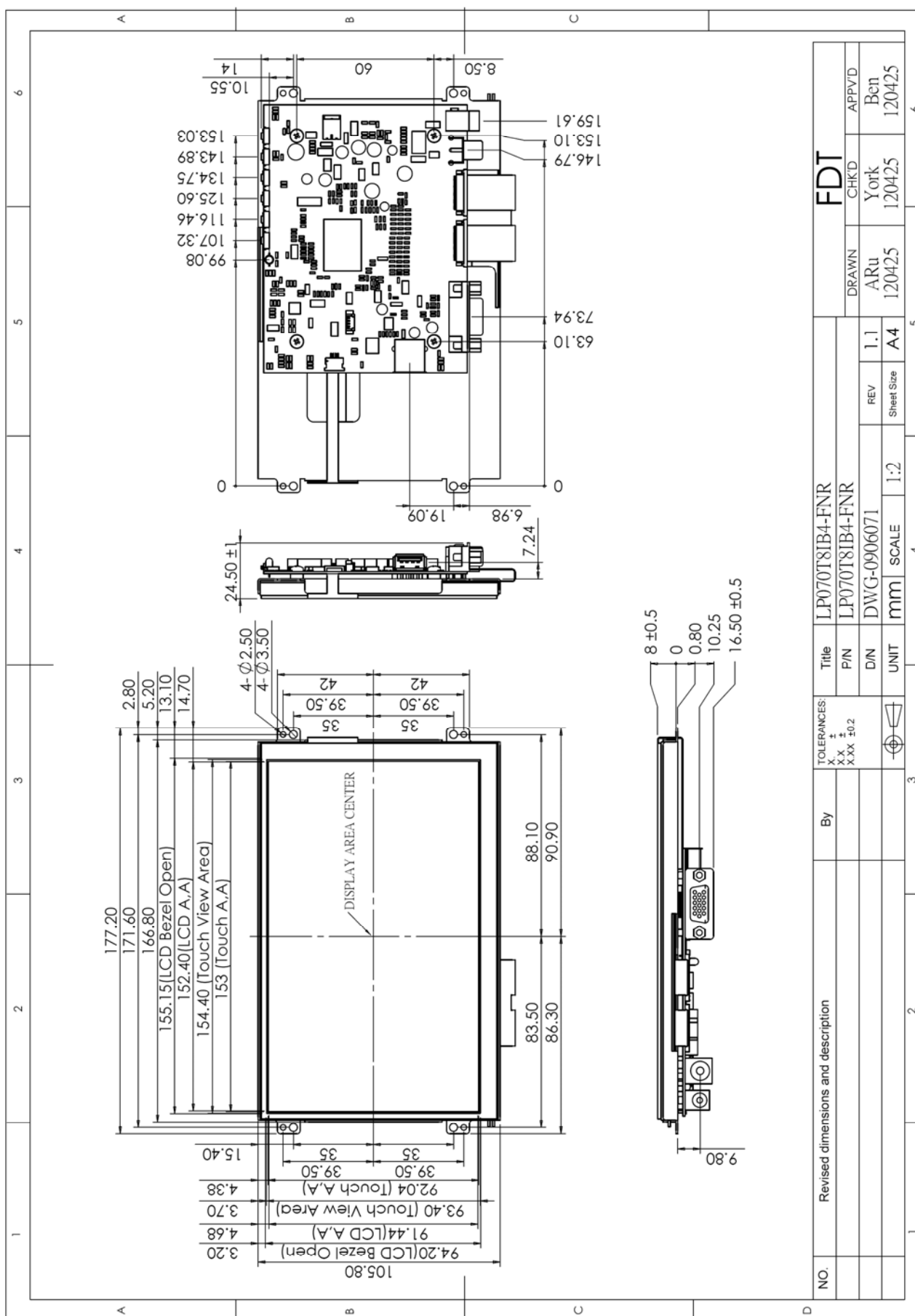
Parameter	LP070T8IBV-FBR	LP070T8IBU-FBR	LP070T8IBV-FNR	LP070T8IBU-FNR	Unit
CVBS	1	1	1	1	
VGA (D-Sub15 / 2.0mm 14Pin)	D-Sub15	D-Sub15	D-Sub15	D-Sub15	
Touch Panel Type	5W Resistive	5W Resistive	5W Resistive	5W Resistive	
Touch Screen Interface	USB	RS232	USB	RS232	
AC to DC Adapter 12V/2.5A (LASTD12025-FDR)	⊙	⊙	-	-	
Power Cord Plug Type B for USA (LAAC818000-FDR)	⊙	⊙	-	-	
Video Cable (LAVDO18000-FDR)	⊙	⊙	-	-	
VGA Cable (LAVGA16000-FDR)	⊙	⊙	-	-	
USB Cable (LAUSB18000-FDR)	⊙	-	-	-	
RS-232 Cable (LARS218000-FDR)	-	⊙	-	-	
Touch Screen Driver CD Disk	⊙	⊙	-	-	

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

6.1 Unit (LP070T8IB1-FNR)

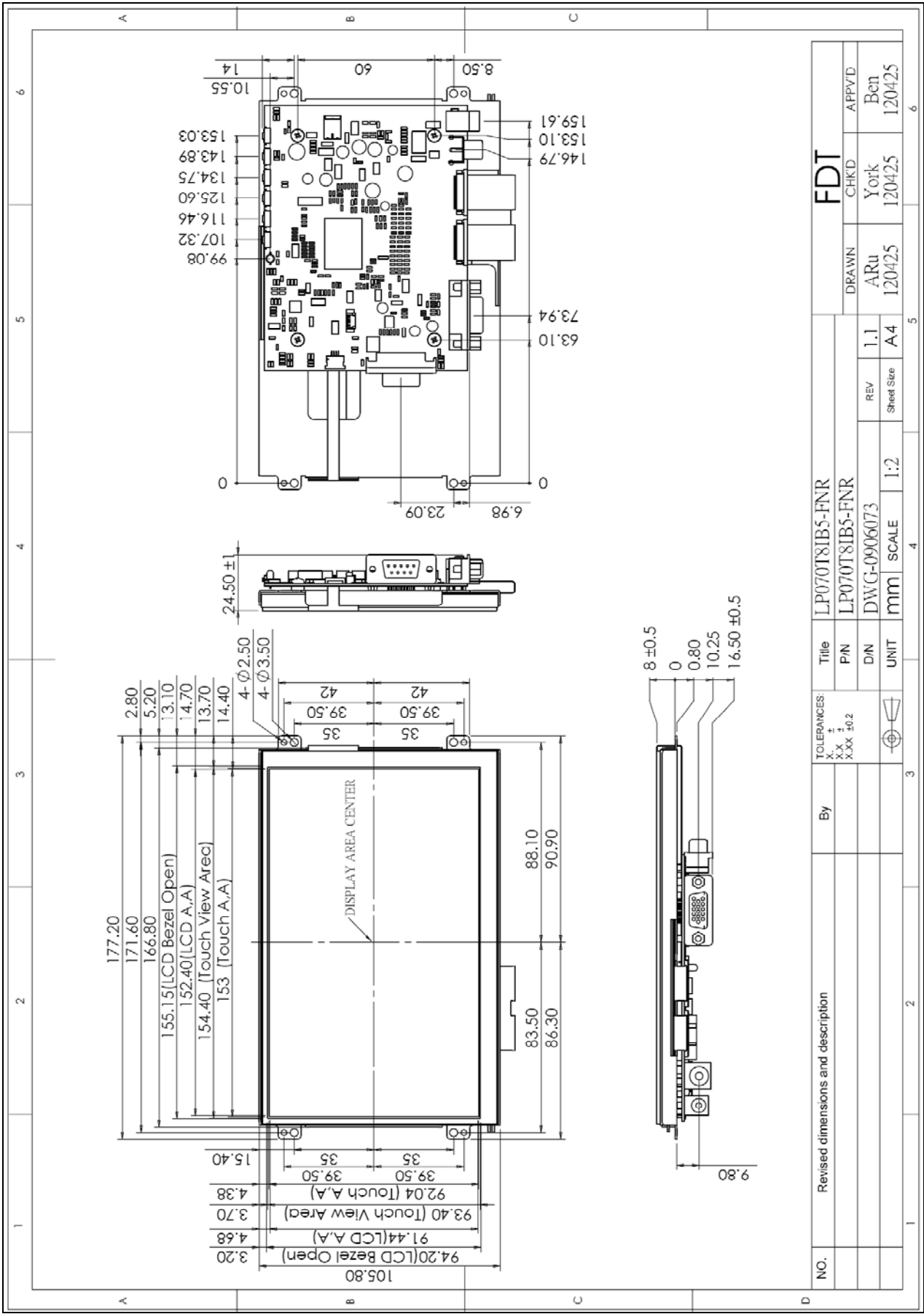


6.2 Unit (LP070T8IB4-FNR)



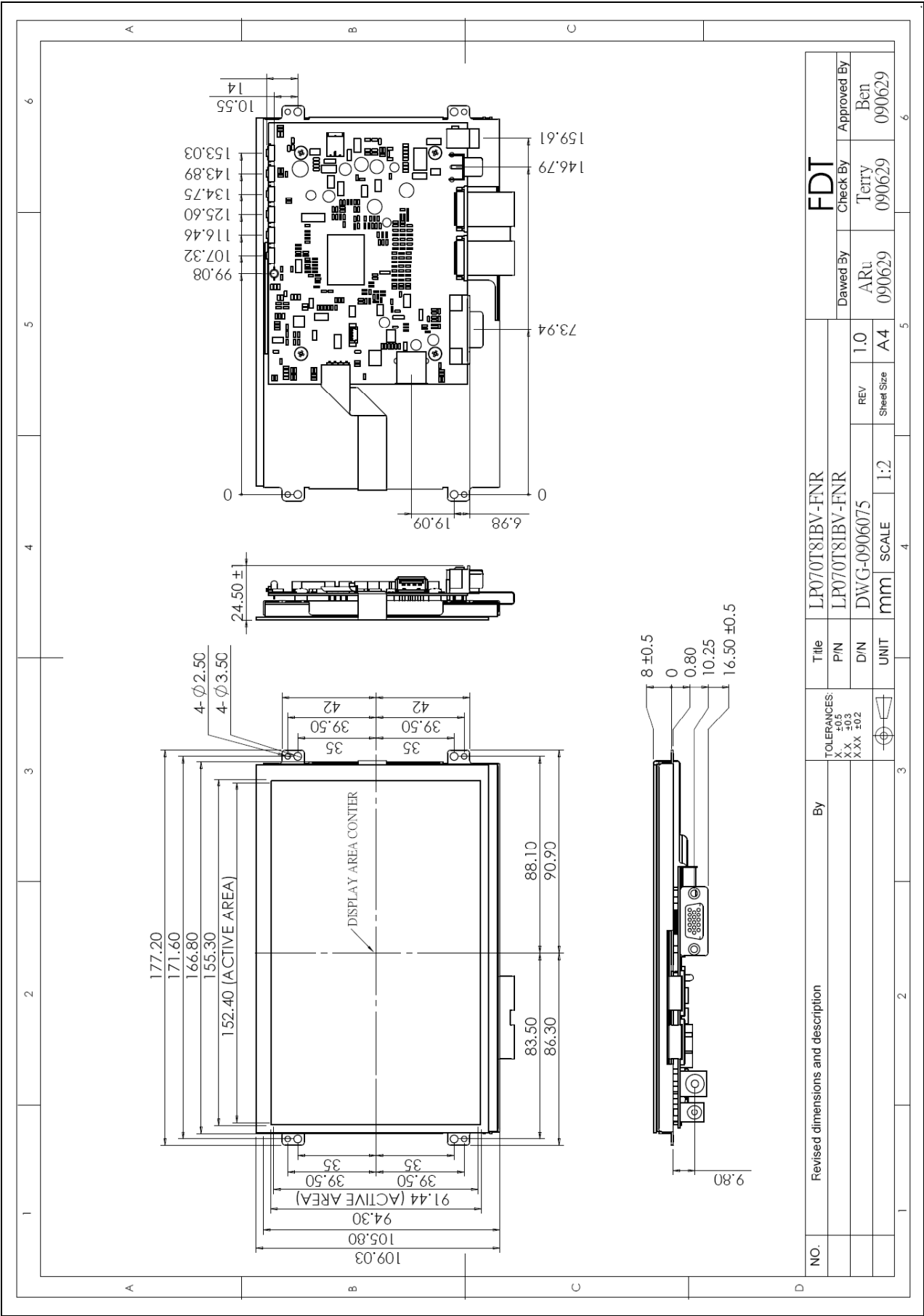
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6.3 Unit (LP070T8IB5-FNR)

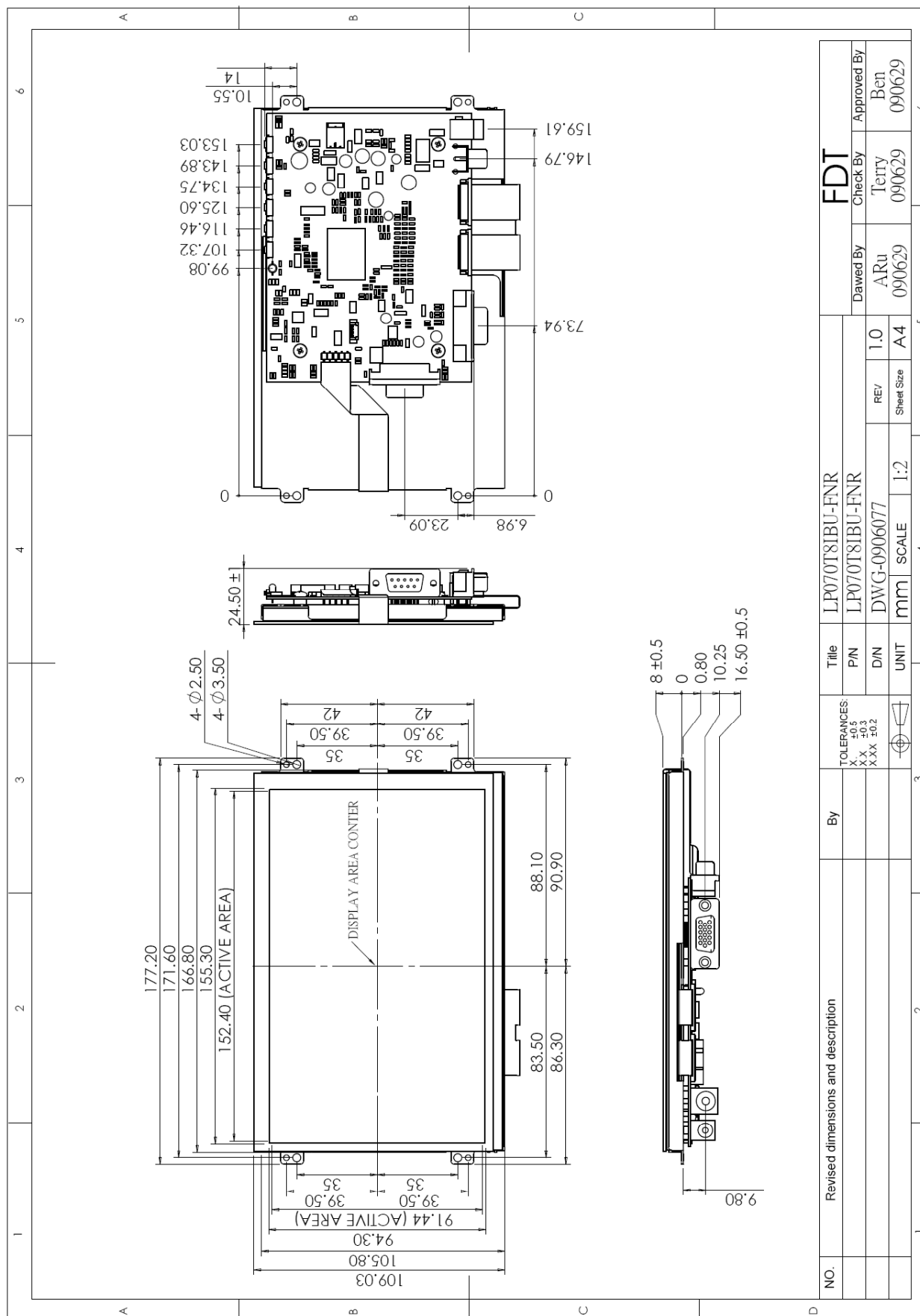


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6.4 Unit (LP070T8IBV-FNR)



6.5 Unit (LP070T8IBU-FNR)



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7. Pin Description

7.1 CN1 : TFT-LCD Panel I/O Terminals (FPC 30 Pin Below Contact Type)

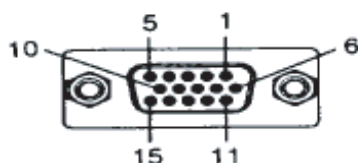
Pin No	Symbol	I/O	Description	Remark
1	POL	I	Polarity selection	
2	STVD	I/O	Vertical start pulse input when U/D= H	
3	OEV	I	Output enable	
4	CKV	I	Vertical clock	
5	STVU	I/O	Vertical start pulse input when U/D= L	
6	GND	P	Power Ground	
7	EDGSL	I	Select rising edge or falling edge	
8	DVDD	P	Power for Digital Circuit	
9	V9	I	Gamma voltage level 9	
10	VGL	P	Gate OFF voltage	
11	V2	I	Gamma voltage level 2	
12	VGH	P	Gate ON voltage	
13	V6	I	Gamma voltage level 6	
14	U/D	I	Up/down selection	
15	VCOM	I	Common voltage	
16	GND	P	Power Ground	
17	AVDD	P	Power Voltage for Analog Circuit	
18	V14	I	Gamma voltage level 14	
19	V11	I	Gamma voltage level 11	
20	V8	I	Gamma voltage level 8	
21	V5	I	Gamma voltage level 5	
22	V3	I	Gamma voltage level 3	
23	GND	P	Power Ground	
24	R5	I	Red data (MSB)	
25	R4	I	Red data	
26	R3	I	Red data	
27	R2	I	Red data	
28	R1	I	Red data	
29	R0	I	Red data (LSB)	
30	GND	P	Power Ground	

7.2 CN2 : TFT-LCD Panel I/O Terminals (FPC 30 Pin Below Contact Type)

Pin No	Symbol	I/O	Description	Remark
31	GND	P	Power Ground	
32	G5	I	Green data (MSB)	
33	G4	I	Green data	
34	G3	I	Green data	
35	G2	I	Green data	
36	G1	I	Green data	
37	G0	I	Green data (LSB)	
38	STHL	I/O	Horizontal start pulse input when R/L = L	
39	REV	I	Control signal are inverted or not	
40	GND	I	Power Ground	
41	DCLK	I	Sample clock	
42	DVDD	P	Power Voltage for Digital Circuit	
43	STHR	I/O	Horizontal start pulse input when R/L =H	
44	LD	I	Latches the polarity of outputs and Switches the new data to outputs	
45	B5	I	Blue data (MSB)	
46	B4	I	Blue data	
47	B3	I	Blue data	
48	B2	I	Blue data	
49	B1	I	Blue data	
50	B0	I	Blue data (LSB)	
51	R/L	I	Right/ left selection	
52	V1	I	Gamma voltage level 1	
53	V4	I	Gamma voltage level 4	
54	V7	I	Gamma voltage level 7	
55	V10	I	Gamma voltage level 10	
56	V12	I	Gamma voltage level 12	
57	V13	I	Gamma voltage level 13	
58	AVDD	P	Power for Analog Circuit	
59	GND	P	Power Ground	
60	VCOM	I	Common voltage	

7.3 J405 : 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	VGA5V	-	VGA +5V Input	
10	VGA-Det	I	VGA Detect	
11	NC	-	No Connection	
12	NC	-	No Connection	
13	HS_IN	I	TTL Horizontal sync	
14	VS_IN	I	TTL Vertical sync	
15	N.C	-	No Connection	



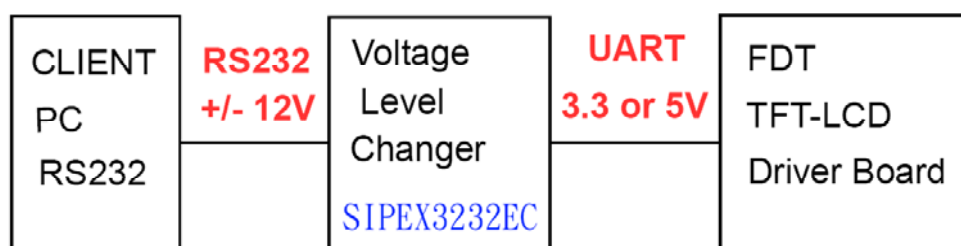
7.4 J101: Pin Assignment of UART (Pitch 1.25mm 4Pin, Top Entry Type)

※ 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	+3.3VA	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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7.5 DC JACK: 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	

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

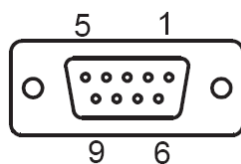
Pin No	Symbol	I/O	Description	Remark
1	Video	I	Video Input	
2	AGND	-	Analog Ground	

7.7 J601 : Pin Assignment of Touch USB (USBA-Female 2.0mm, Side Entry Type)(Option)

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

7.8 DB601 : 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	9	15	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	+80	°C	
Operating Temperature With 5W Resistive		-10	+60	°C	
Storage Temperature With 5W Resistive		-20	+70	°C	

9. Recommended Operating Conditions

9.1 Electrical Characteristics

Parameter	Symbol	I/O	Min	Typ	Max	Unit	Note
Input Voltage	Vin	I	+10	+12	+14	V	
Total Current	Iin (+12V)	I	290	320	360	mA	±15%
Power Consumption		I	3.4	3.8	4.3	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	H	Unit	Polarity	V	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	

9.3 Panel Backlight Data

Parameter	Symbol	Min	Typ	Max	Unit	Note
Voltage for LED Backlight	VL	8.7	9.3	9.9	V	IL = 180mA, (±10%)
Current for LED Backlight	IL	170	180	200	mA	

9.4 Optics Sample Test Data (4W Touch)

Parameter	White Window	Red	Green	Blue	Remark
S/N : 001 x	0.312	0.587	0.329	0.144	±15%
.y	0.347	0.340	0.609	0.099	
L(cd/m²)	224.5				
TC(°K)	6465				

Note: 1. Luminance Meter : BM-7 FAST(TOPCON)

2.Video Pattern Generator: FLUKE PM54200

3. Measurement Distance : 500mm±50mm

4. TOPCON BM-7 Luminance Meter 2° filed of view is used in the testing

(After 10min ~20min operation)

9.5 Optics Sample Test Data (5W Touch)

Parameter	White Window	Red	Green	Blue	Remark
S/N : 001 x	0.374	0.558	0.326	0.143	±15%
.y	0.330	0.339	0.599	0.096	
L(cd/m²)	198.1				
TC(°K)	7001				

Note: 1. Luminance Meter : BM-7 FAST(TOPCON)

2.Video Pattern Generator: FLUKE PM54200

3. Measurement Distance : 500mm±50mm

4. TOPCON BM-7 Luminance Meter 2° filed of view is used in the testing

(After 10min ~20min operation)

10. Touch Panel Characteristics

10.1 4W Resistance Touch Panel Characteristics

- 10.1.1 Pin Assignment

Pin No	Symbol	Description	Remark
1	YU	Upper Electrode Y (Upper Side)	
2	XR	Lower Electrode X (Right Side)	
3	YD	Upper Electrode Y (Down Side)	
4	XL	Lower Electrode X (Left Side)	

- 10.1.2 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Terminal Resistance	X	390	-	1350	Ω	
	Y	100	-	800	Ω	
Linearity		-	-	1.5	%	
Insulation Impedance		10	-	-	MΩ	DC 25V

- 10.1.3 Optical Performance

Parameter	Specifications
Transparency	≥83% Typ.
Haze	5% Typ.

- 10.1.4 Mechanical Performance

Parameter	Specifications
Input Method	Finger or stylus pen
Operating Force	≤50gf
Surface Hardness	3H or more

- 10.1.5 Durability Performance

Parameter	Specifications
Hitting Durability	≥1000000 times, with R8.0 mm silicon rubber, 200g, 5 time / sec
Sliding Durability	≥100000 times, with R0.8 mm polyacetal stylus, 250g, 60 mm / sec

10.2 5W Resistance Touch Panel Characteristics

- 10.2.1 Pin assignment

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

- 10.2.2 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Loop Resistance	X	20	-	500	Ω	
	Y	20	-	500	Ω	
Input Voltage	VT	3.3	-	5	V	
Linearity		-	-	1.5	%	
Insulation Impedance		20	-	-	MΩ	DC 25V
Response Time		-	-	10	ms	

- 10.2.3 Optical Performance

Parameter	Specifications
Transparency	80%±5%
Haze	<15%

- 10.2.4 Mechanical Performance

Parameter	Specifications
Input Method	Finger or stylus pen
Operating Force	less than 4 ounces(113 grams)
Surface Hardness	3H or more

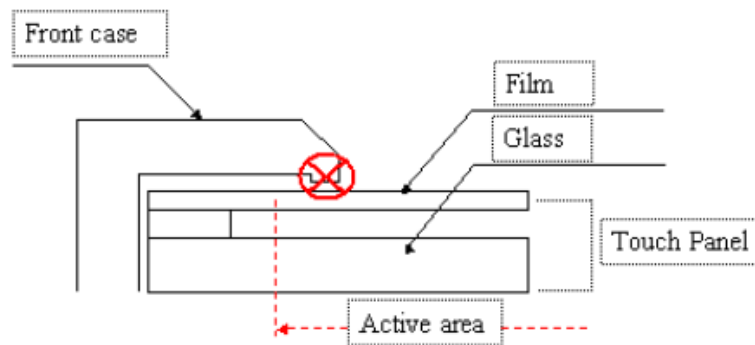
- 10.2.5 Durability Performance

Parameter	Specifications
Knock Test	10,000,000 times

10.3 Touch Screen Integration Design Guide

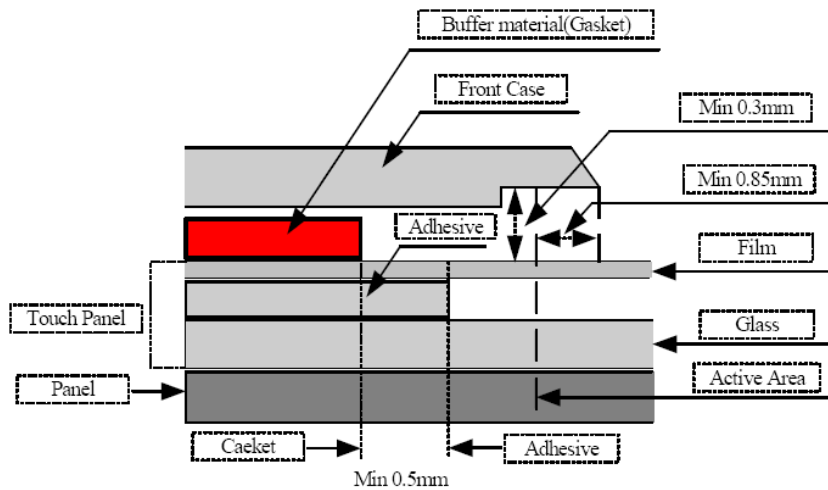
Avoid the design that Front-case overlap and press on the active area of the touch-panel.

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



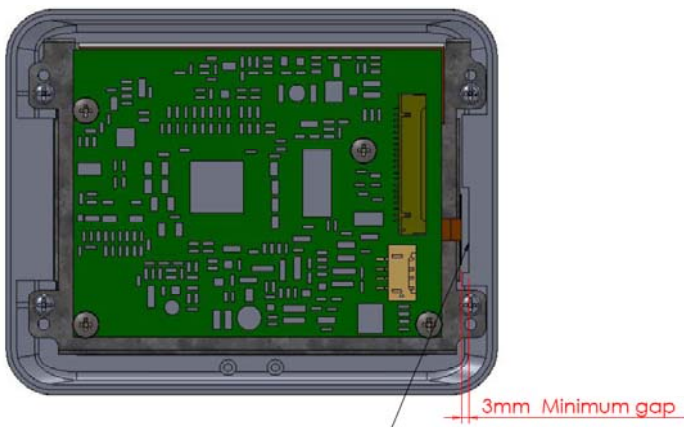
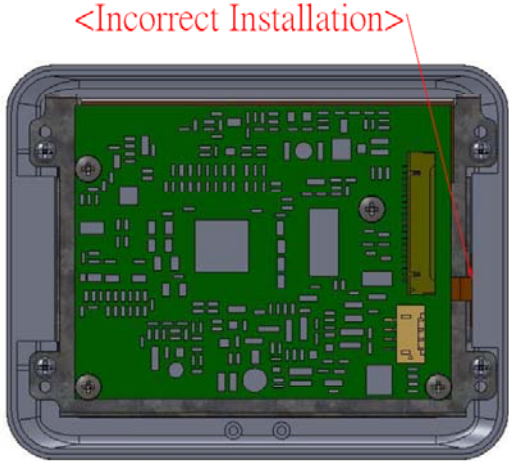
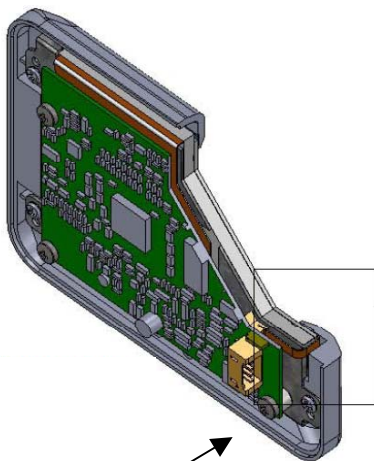
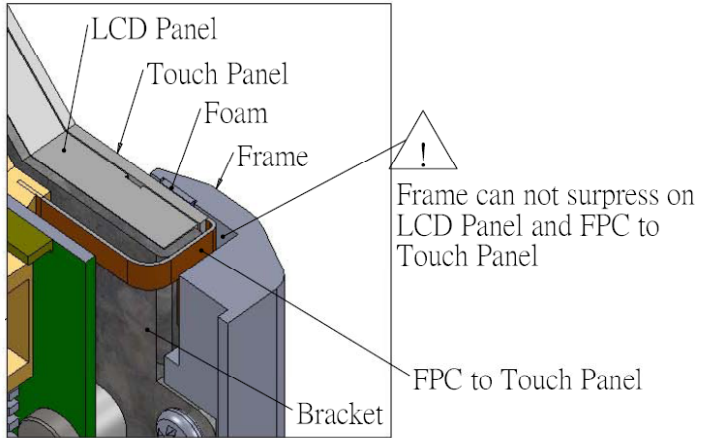
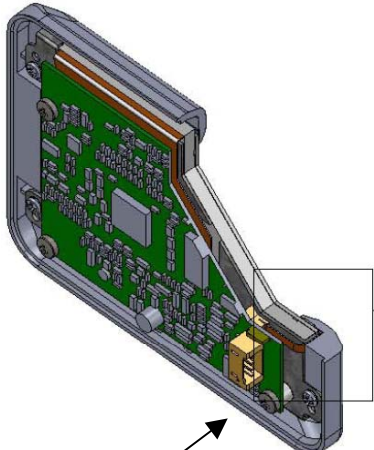
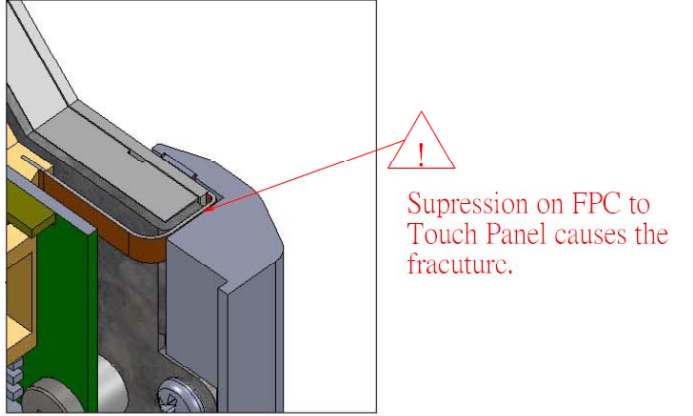
Use a buffer material (Gasket) between the touch-panel and front-case to protect damage and wrong operating.

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



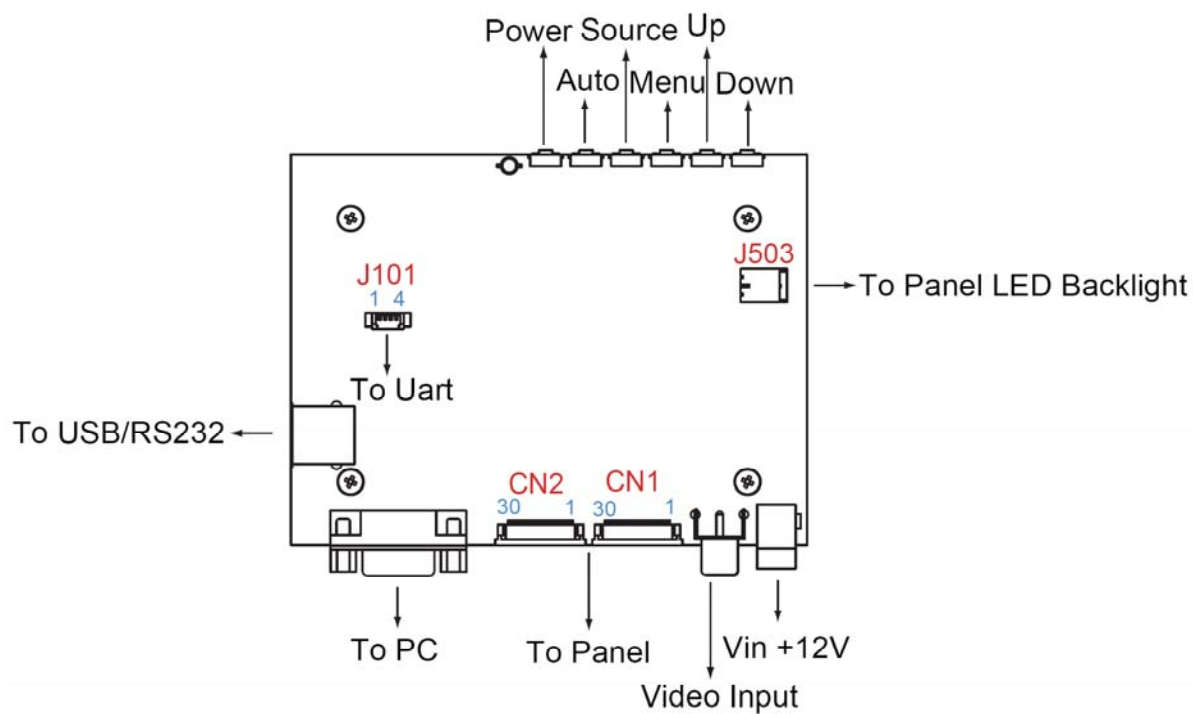
Note: We strongly suggest to follow above design guide to avoid the linear defect happened on the touch panel.

10.4 Mechanical Design Notice For Touch Panel

Correct Installation	Incorrect Installation
 3mm Minimum gap <Correct Installation>	 <Incorrect Installation>
 <Correct Installation>  LCD Panel Touch Panel Foam Frame FPC to Touch Panel Bracket Zoom-In ! Frame can not suppress on LCD Panel and FPC to Touch Panel	 <Incorrect Installation>  Zoom-In ! Suppression on FPC to Touch Panel causes the fracture.

11.Operation Manual

11.1 Driver Board Manual



12. Packing List

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



A. LASTD12025-FDR



B. LAAC818000-FDR



C. LAVDO18000-FDR



D. LAVGA16000-FDR



E. LAUSB18000-FDR



F. LARS218000-FDR



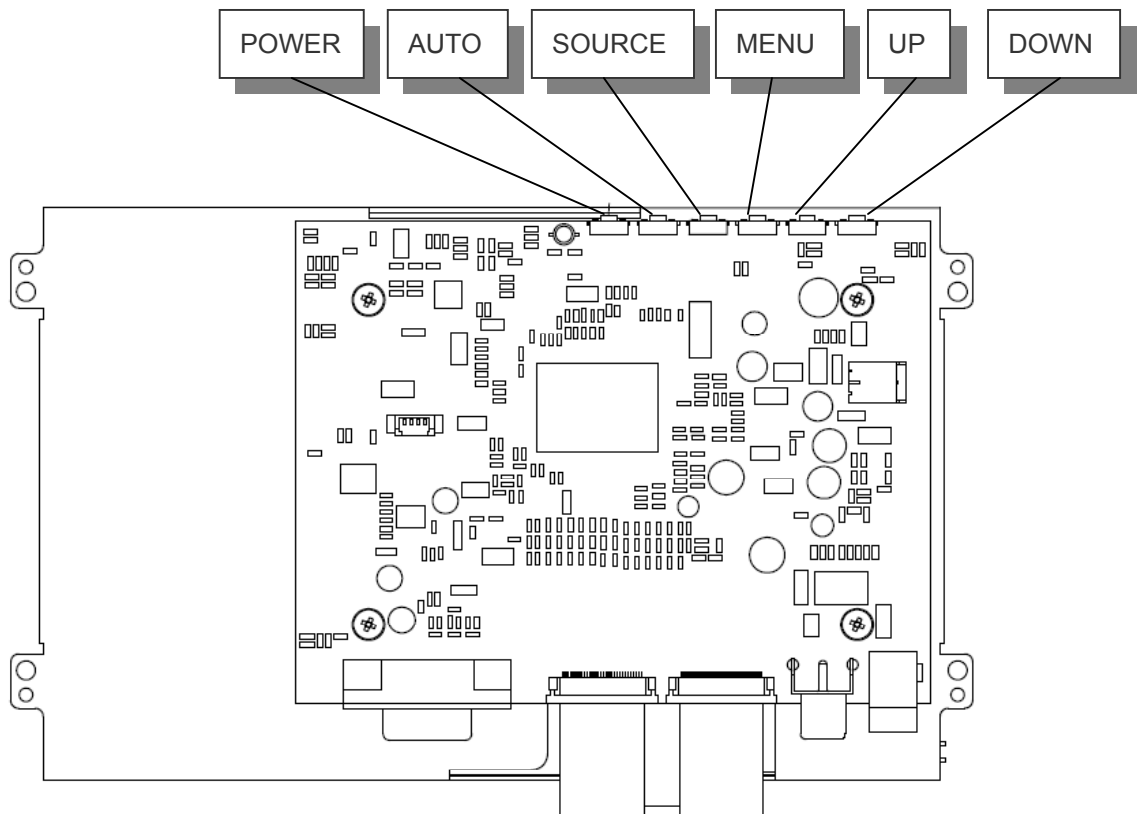
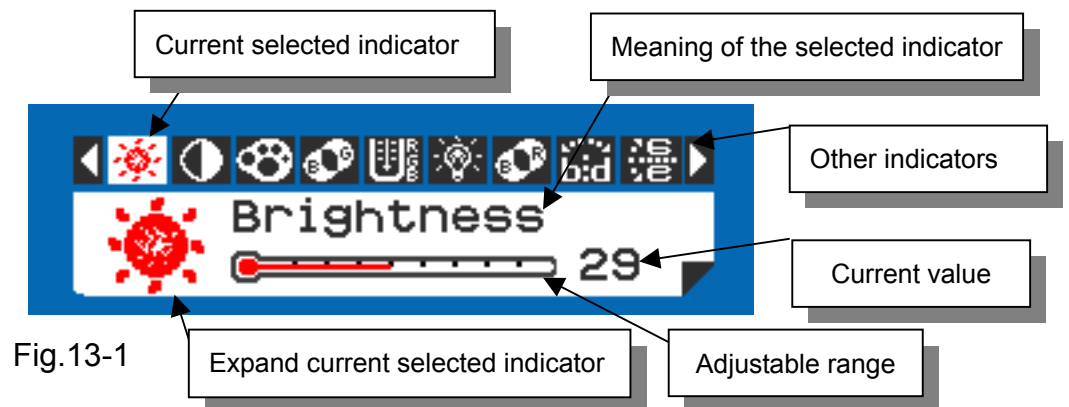
G.

- A. AC to DC Adapter (L:1500mm,100-240VAC 50-60Hz to +12VDC @ 2.5A)
- 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 :

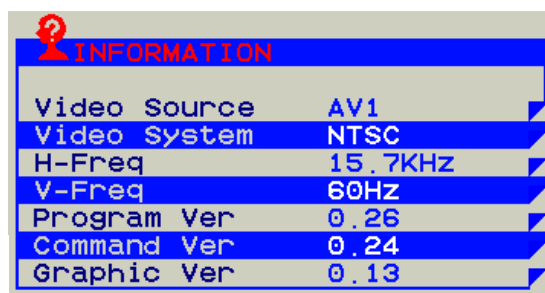
1. To navigate the menu, press **[MENU]**. (Fig.13-1)
2. The indicator lighting up in white color is the selected adjustment item.
3. To Next Item of the menu, press **[MENU]** again.
4. The operations below are only available when "Menu" is started.
5. Press **[UP]** / **[DOWN]** to adjust the value 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	
	Mirror	OFF / ON	AV / VGA	
	Flip	OFF / ON	AV / VGA	
	H-Position	-25 ~ +25	AV / VGA	Balance-Bar
	V-Position	-10 ~ +10	AV / VGA	Balance-Bar
	Auto		VGA	
	Scale	Full / 4:3	AV / VGA	
	Display mode	800x600/800x480	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



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

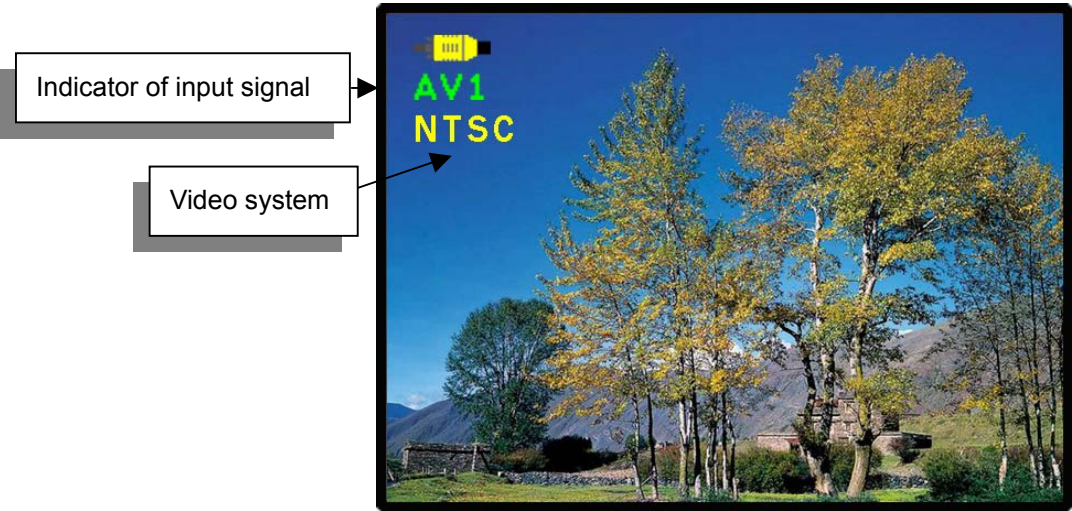


Fig.13-4

[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