



§ SPECIFICATION APPROVAL SHEET §

Fdt Tech Module No	LT056N5xA0-FDR
Description:	5.6" Digital TFT-LCD Module
SPEC No.:	SAS-1103003
Version:	1.3
Issue Date:	June 11, 2014

※ This approval sheet contains 18 pages including the cover and appendix.

Customer:	APPROVED BY:
Date: / / 14	

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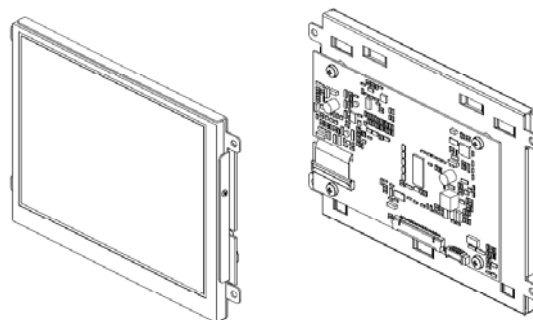
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5.6" Digital TFT-LCD Module



■ LT056N5xA0-FDR

1. General Descriptions

1.1 Features

- 18bits LVDS interface
- Image Reversion: Up/Down and Left/Right
- LED Backlight Circuit Operation Voltage: +5V
- 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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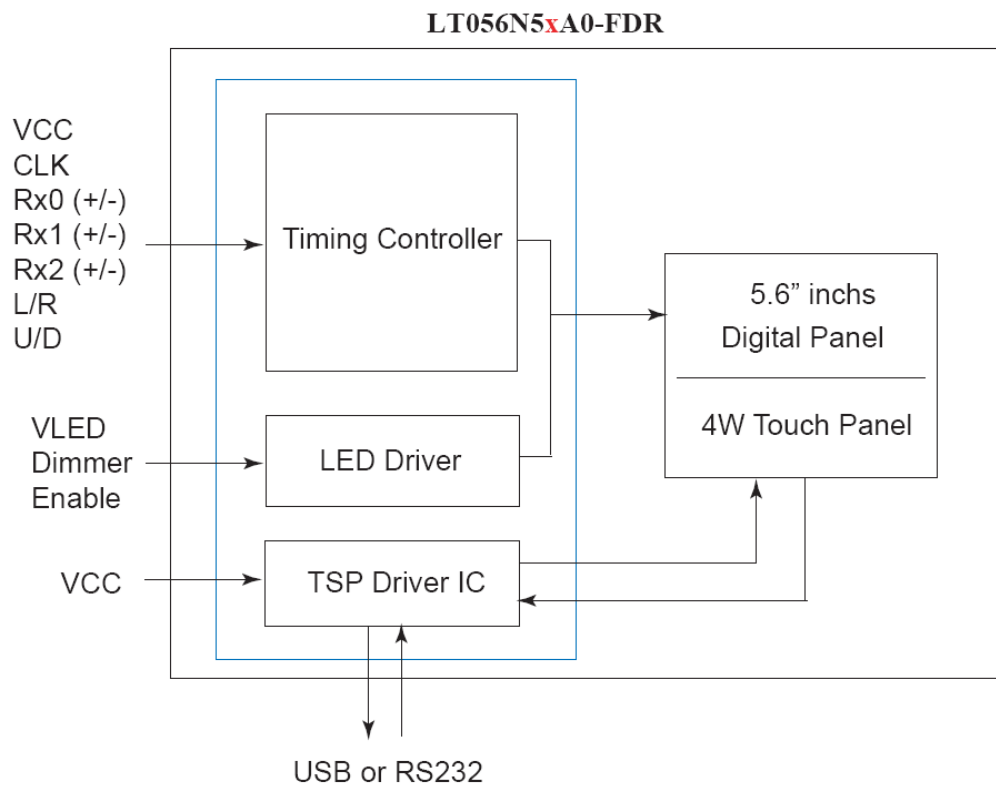


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3. Block Diagram

3.1 Block Diagram



4. TFT-LCD Information

4.1 TFT-LCD Mechanical Specifications

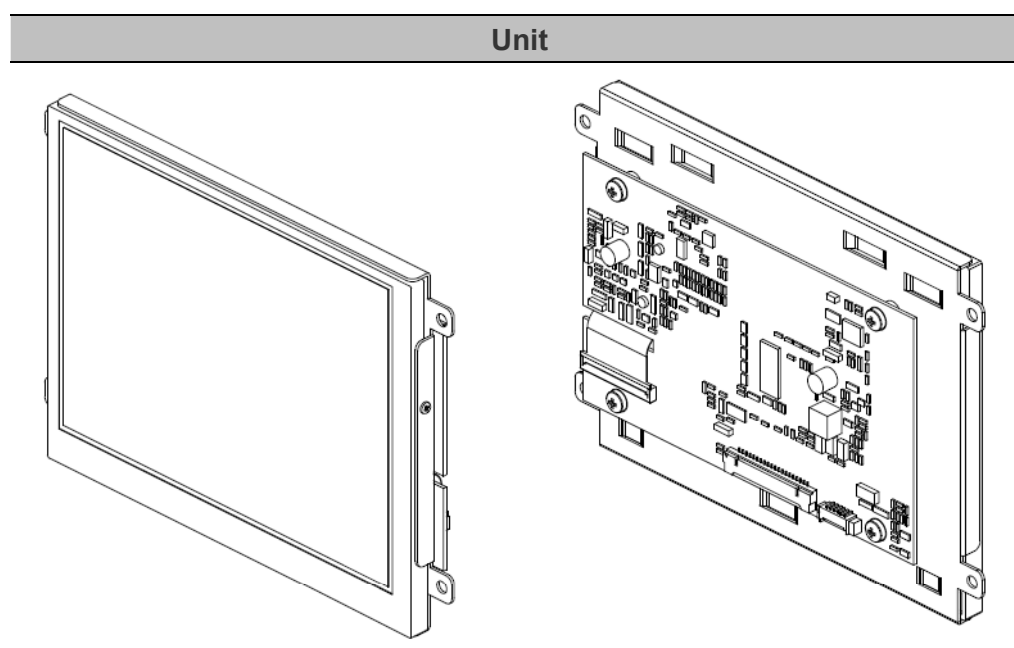
Parameter	Specifications	Unit
Screen Size	5.6 (Diagonal)	inch
Display Format	640 x (R.G.B) x 480	dot
Active Area	112.896 (W) x 84.672 (H)	mm
Pixel Pitch	0.1764 (W) x 0.1764 (H)	mm
Surface Treatment	Anti-glare	
Weight	TBD	g

4.2 TFT-LCD Optical Characteristics

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Left	CR >10	60	70	---	deg	
		Right		60	70	---		
	Vertical	Top		40	50	---	deg	
		Bottom		60	70	---	deg	
Contrast Ratio		CR	At optimized Viewing angle	400	500	---	---	
Response time	Rise Fall	Tr	$\theta = 0^\circ$	---	10	20	ms	
		Tf		---	15	30	ms	
Uniformity		U		70	75	---	%	
Brightness		L		300	350	---	cd/m ²	
Brightness With TSP		L		240	280	---	cd/m ²	
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			25°C	20000	---	---	Hr	

5. Order Information

5.1 Unit



Parameter	LT056N50A0-FDR	LT056N51A0-FDR	LT056N52A0-FDR
Signal Input Connector	20 PIN	20 PIN	20 PIN
Touch Panel Type	-	4W Resistive	4W Resistive
Touch Screen Interface	-	USB	RS-232
Bracket	⊙	⊙	⊙
Weigh	219 g	242.5 g	242.5 g

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.

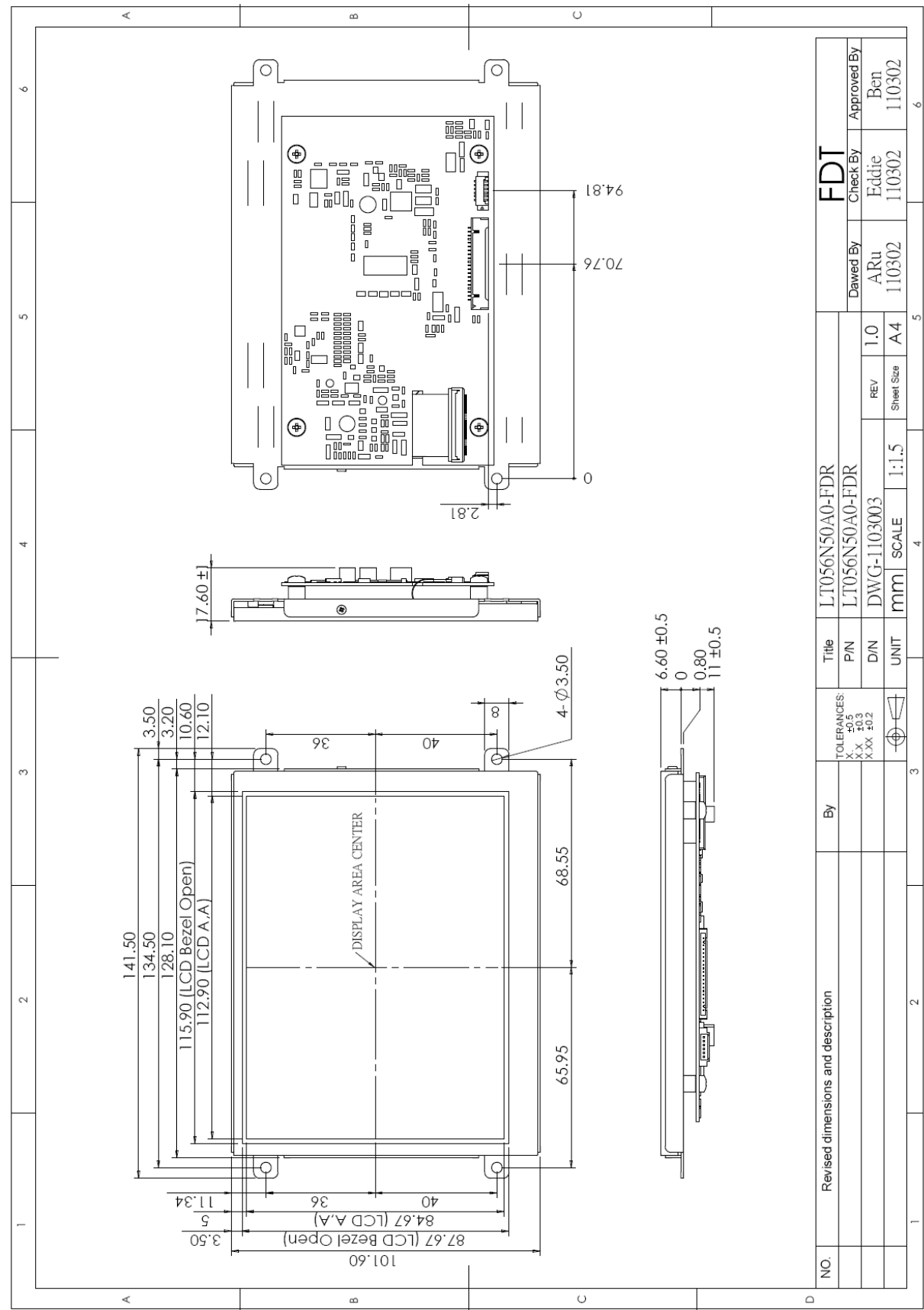
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6. Dimension Information

6.1 Unit (LT056N50A0-FDR)

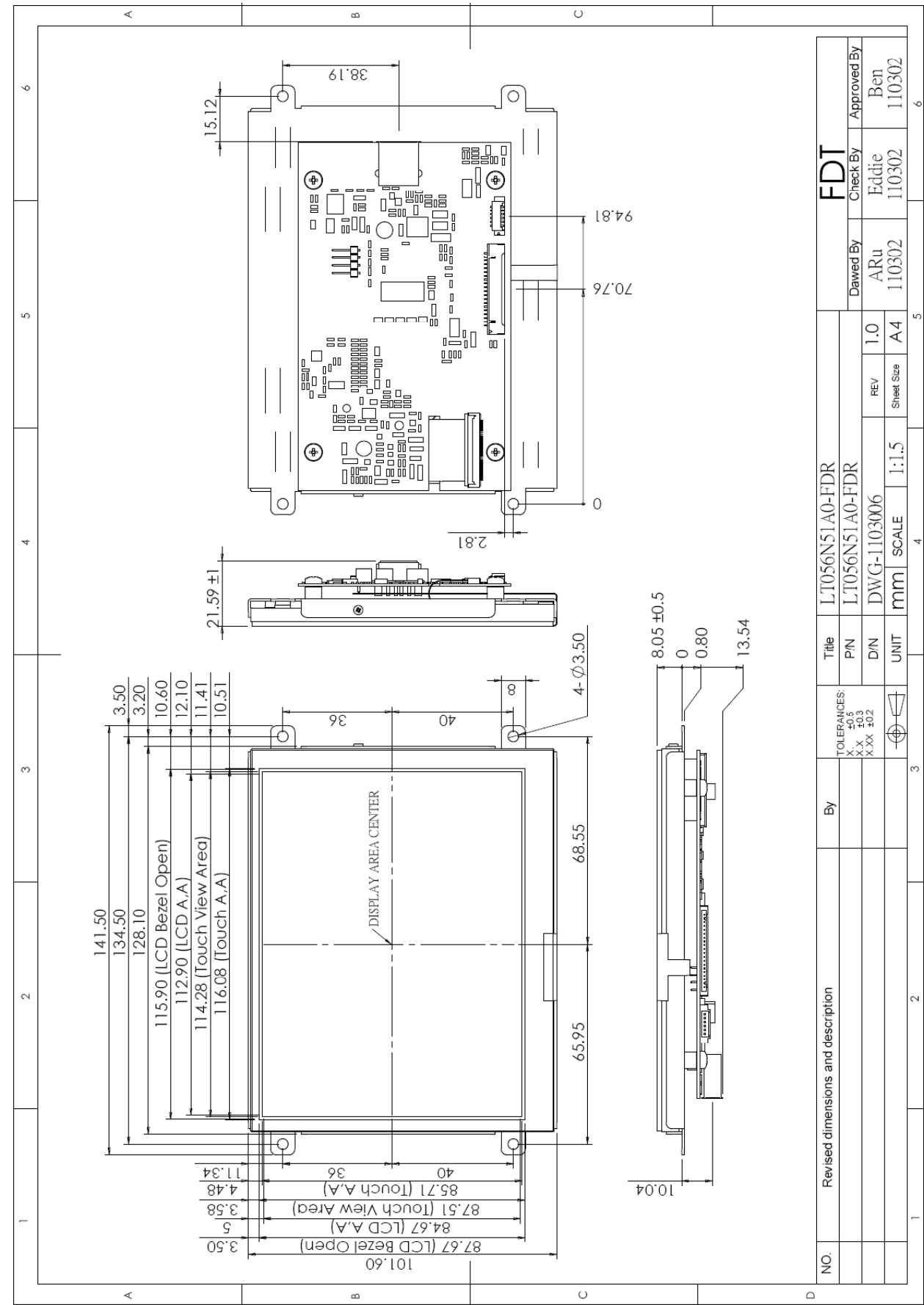


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6.2 Unit (LT056N51A0-FDR)



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7. Pin Description

7.1 J204 : LVDS I/O Terminals (Pitch 1.25mm 20Pin, Side Entry Type)

※ FDT Connector Part No.: MS240420G (STM) [Same as DF14-20P-1.25H (HIROSE)] ;

FDT Matching Connector Part No.: P240420 (STM) [Same as DF14-20S-1.25C (HIROSE)]

Pin No	Symbol	I/O	Description	Remark
1	VCC	I	Power Supply (3.3 V)	
2	VCC	I	Power Supply (3.3 V)	
3	GND	P	Ground	
4	GND	P	Ground	
5	RX0-	I	Differential Data Input, CH0 (Negative)	R0 ~ R5, G0
6	RX0+	I	Differential Data Input, CH0 (Positive)	
7	GND	P	Ground	
8	RX1-	I	Differential Data Input, CH1 (Negative)	G1 ~ G5, B0, B1
9	RX1+	I	Differential Data Input , CH1 (Positive)	
10	GND	P	Ground	
11	RX2-	I	Differential Data Input , CH2 (Negative)	B2 ~ B5, DE, Hsync, Vsync
12	RX2+	I	Differential Data Input , CH2 (Positive)	
13	GND	P	Ground	
14	CLK-	I	Differential Clock Input (Negative)	LVDS Level Clock
15	CLK+	I	Differential Clock Input (Positive)	
16	GND	P	Ground	
17	L/R	I	Horizontal Display Mode Select Signal	Note
18	U/D	I	Vertical Display Mode Select Signal	Note
19	GND	P	Ground	
20	GND	P	Ground	

Note: The definitions U/D & R/L

L/R=High , U/D=High



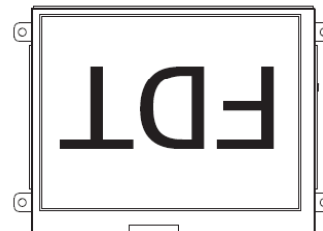
L/R=Low , U/D=High



L/R=High , U/D=Low



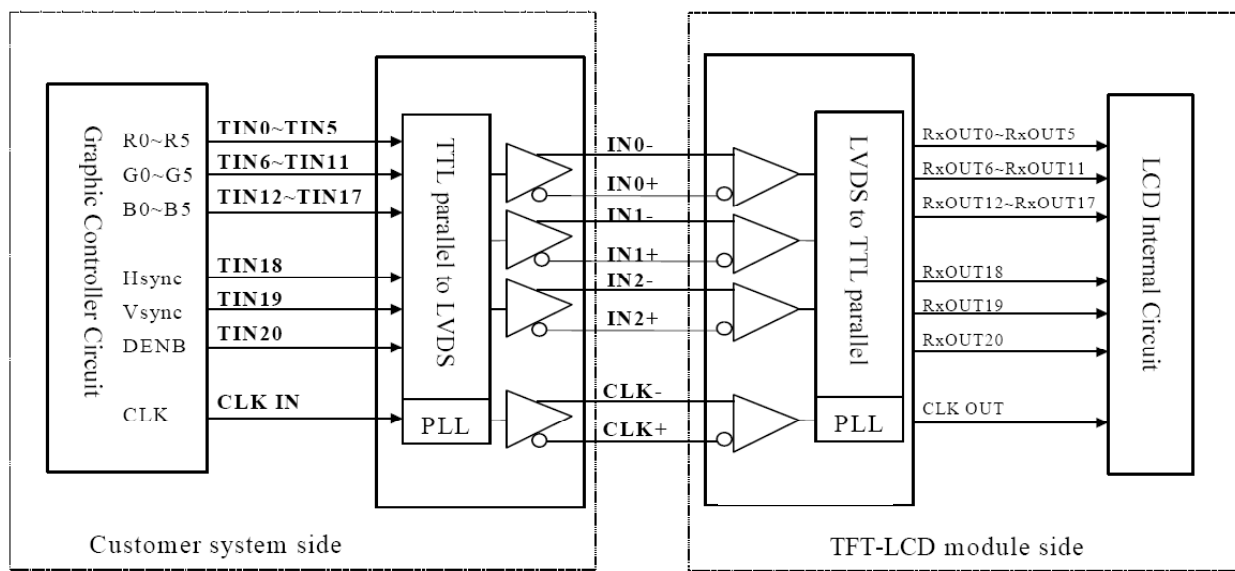
L/R=Low , U/D=Low



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LVDS Interface Block Diagram

7.2 J203: Pin Assignment of Inverter (Pitch 1.25mm 6Pin, Side Entry Type)

※ FDT Connector Part No.: MS24016R (STM) [Same as 53261-0619 (MOLEX)] ;

FDT Matching Connector Part No.: P24016 (STM) [Same as 51021-0600 (MOLEX)]

Pin No	Symbol	I/O	Description	Remark
1	VLED	-	Power Voltage For LED Backlight Circuit (+5V)	
2	VLED	-	Power Voltage For LED Backlight Circuit (+5V)	
3	ADJ	I	Adjust the LED brightness with PWM Pulse	
4	NC	-	No Connection	
5	GND	-	Power Ground	
6	GND	-	Power Ground	

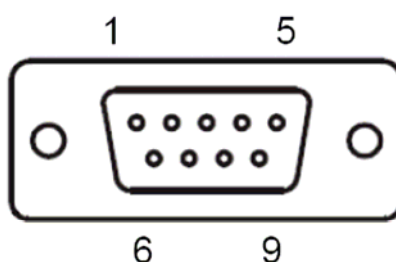
7.3 J404 : Pin Assignment of Touch USB (USBA-Female 2.0mm, Side Entry Type)(Option)

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



7.4 DB401 : Pin Assignment of Touch RS232 (D-SUB 9 MALE)(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	Vcc	+3	+3.6	V	
LED Driver Input Voltage	VLED	+4.5	+5.8	V	
Digital Input Signal	TTL	Vcc-0.5	Vcc+0.5	V	U/D, R/L
LVDS Receiver Input Voltage		-0.3	Vcc+0.3	V	
Operating Temperature		-20	+60	°C	
Storage Temperature		-30	+80	°C	
Operating Temperature With TSP		-20	+60	°C	
Storage Temperature With TSP		-30	+80	°C	

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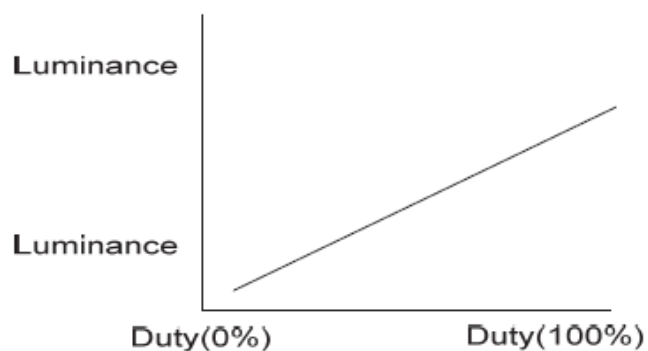
9. Recommended Operating Conditions

9.1 Electrical Characteristics

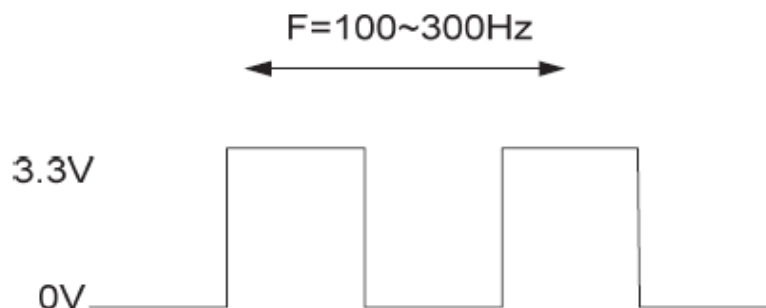
Parameter	Symbol	Min	Typ	Max	Unit	Note	Remark
Input Voltage	Vcc	+3.1	+3.3	+3.5	V		
Total Current	Icc (+3.3V) -		245	-	mA		±15%
LED Driver Input Voltage	VLED	+4.8	+5	+5.5	V	(Note 1)	
LED Driver Current	ILED	-	400	-	mA		@+5V
LED Driver Power Consumption		-	2	-	W		@+5V
Digital Input Signal	TTL	Vcc-0.3	Vcc	Vcc+0.3	V		U/D, R/L
Differential Input High Threshold	VTH	-	-	100	mV	(Note 3)	VCM=1.2V
Differential Input Low Threshold	VTL	-100	-	-	mV		VCM=1.2V
Dimmer Adjust	Dimmer	Duty 0%	-	Duty 100%		(Note 2)	Positive

Note 1: Vcc power input is recommended firstly. Till TFT-LCD is settled, backlight power can then turned on to avoid the unstable performance of TFT-LCD at initial.

Note 2: Adjust Brightness.



This illustration is only for reference but not a real case.



ADJ signal=0~3.3V,operation frequency:100~300Hz

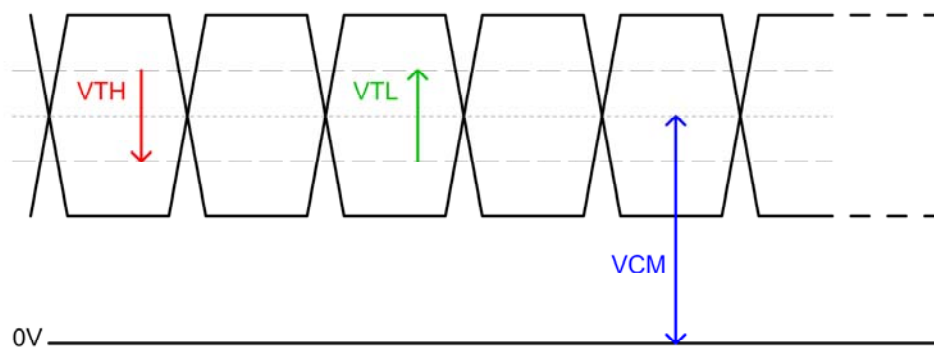
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Note 3:

Differential Signal



10.Interface Timing

10.1 Timing Parameters

Parameter	Symbol	Min	Typ	Max	Unit	Remark
PXLCLK clock time	Tclk	33.3	39.7	-	ns	
PXLCLK pulse duty	Tcwh	40	50	60	%	Tclk
DATA set-up time	Tdsu	12	-	-	ns	DATA to PXLCLK
DATA hold time	Tdhd	12	-	-	ns	DATA to PXLCLK
DE setup time	Tesu	12	-	-	ns	DE to PXLCLK
VSYNC setup time	Tvst	12	-	-	ns	
VSYNC hold time	Tvhd	12	-	-	ns	
HSYNC setup time	Thst	12	-	-	ns	
HSYNC hold time	Thhd	12	-	-	ns	
HSYNC period time	Th	22.91	31.76	-	us	
HSYNC width	Thwh	1	-	-	Tclk	
VSYNC width	Tvwh	1	-	-	Th	
HSYNC to CLKIN	Thc	-	-	1	Tclk	

DE Mode	Min	Typ	Max	Unit	Remark
THC	48	160	765	tclk	
THD	640	640	640	tclk	
TH	688	800	1405	tclk	1TH=1line
TVC	6	45	255	line	
TVD	480	480	480	line	
TV	486	525	735	line	1TV=1field

HV Mode	Min	Typ	Max	Unit	Remark
Thwh	-	10	-	tclk	
Thbp	-	134	-	Tclk	
Thfp	-	16	-	tclk	
THD	-	640	-	tclk	
TH	-	800	-	tclk	1TH=1 line
Tvwh	-	2	-	line	
Tvbp	-	11	-	line	
Tvfp	-	32	-	line	
TVD	-	480	-	line	
TV	-	525	-	line	1TV=1 field

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11. 4W Resistance Touch Panel Characteristics

11.1 Electrical Performance

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Terminal Resistance	X	330	-	1100	Ω	
	Y	100	-	900	Ω	
Input Voltage	VT	-	-	7.0	V	
Linearity		-	-	1.5	%	
Insulation Impedance		25	-	-	MΩ	DC 25V

11.2 Optical Performance

Parameter	Specifications
Transmittance	≥ 80% Typ.
Haze	5.0% Typ.

11.3 Mechanical Performance

Parameter	Specifications
Input Method	Finger or stylus pen
Operating Force	Max: 80gf
Surface Hardness	3H or more

11.4 Durability Performance

Parameter	Specifications
Pen Sliding Durability	≥ 100000 words, with R0.8 mm polyacetal stylus, 250g, 60 mm / sec
Finger knocking Durability	≥ 1000000 times, with R8.0 mm silicon rubber, 200g, 5Hz

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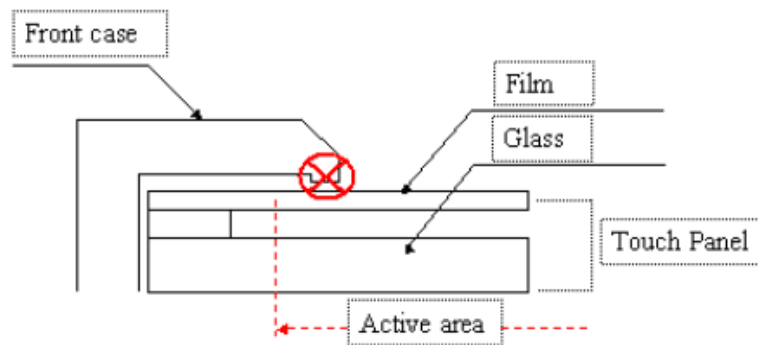
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11.5 Touch Screen Integration Design Guide

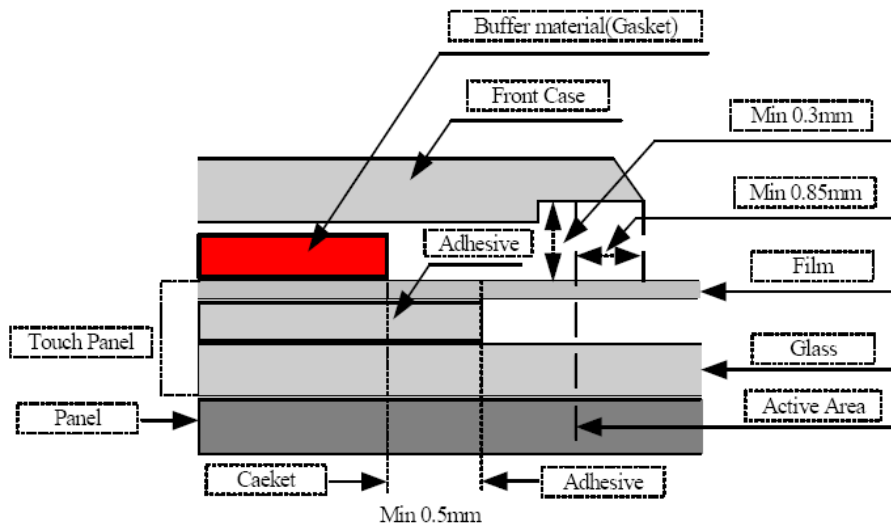
Avoid the design that Front-case overlap and press on the active area of the touch-panel.

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



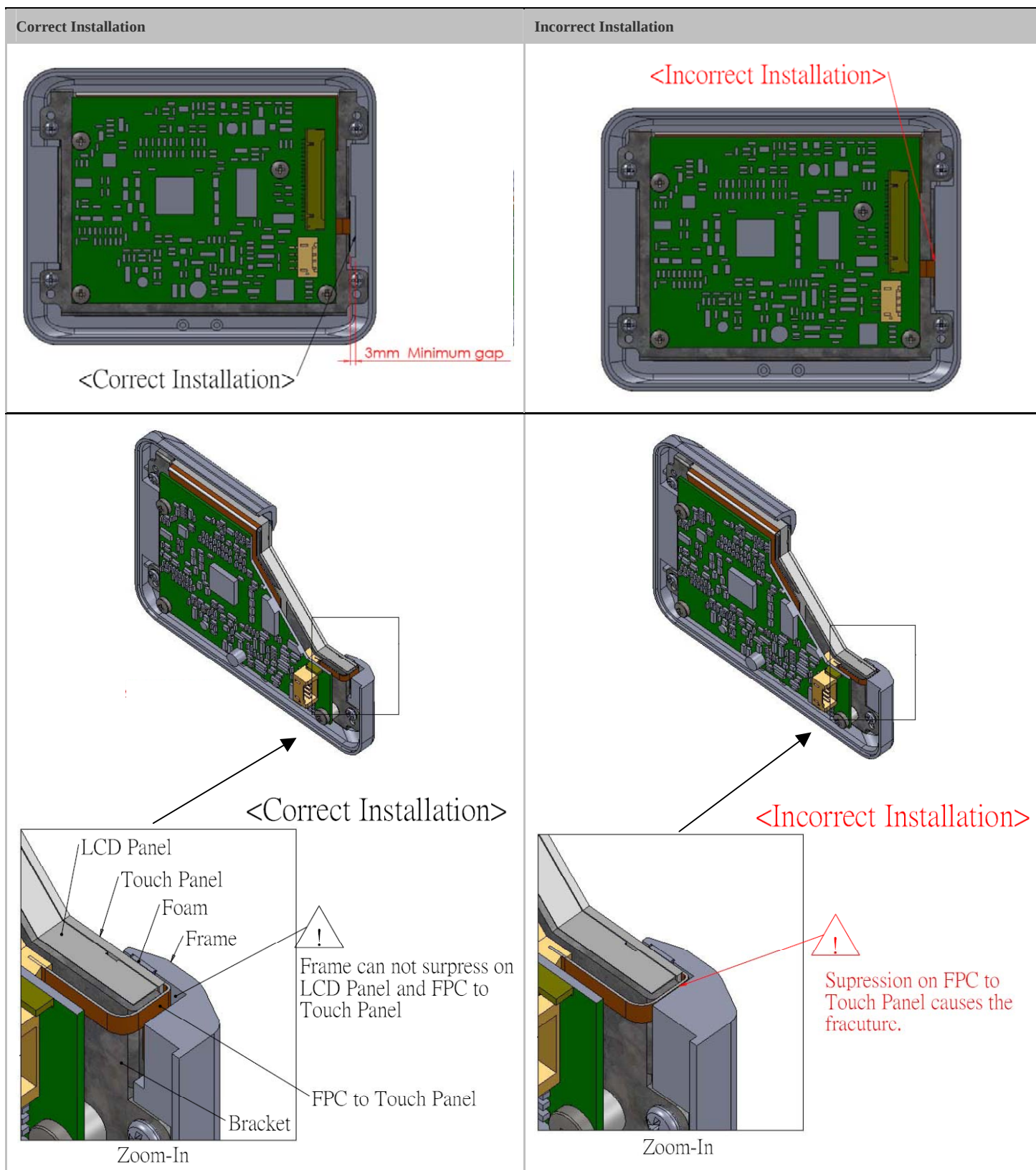
Use a buffer material (Gasket) between the touch-panel and front-case to protect damage and wrong operating.

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.

11.6 Mechanical Design Notice For Touch Panel



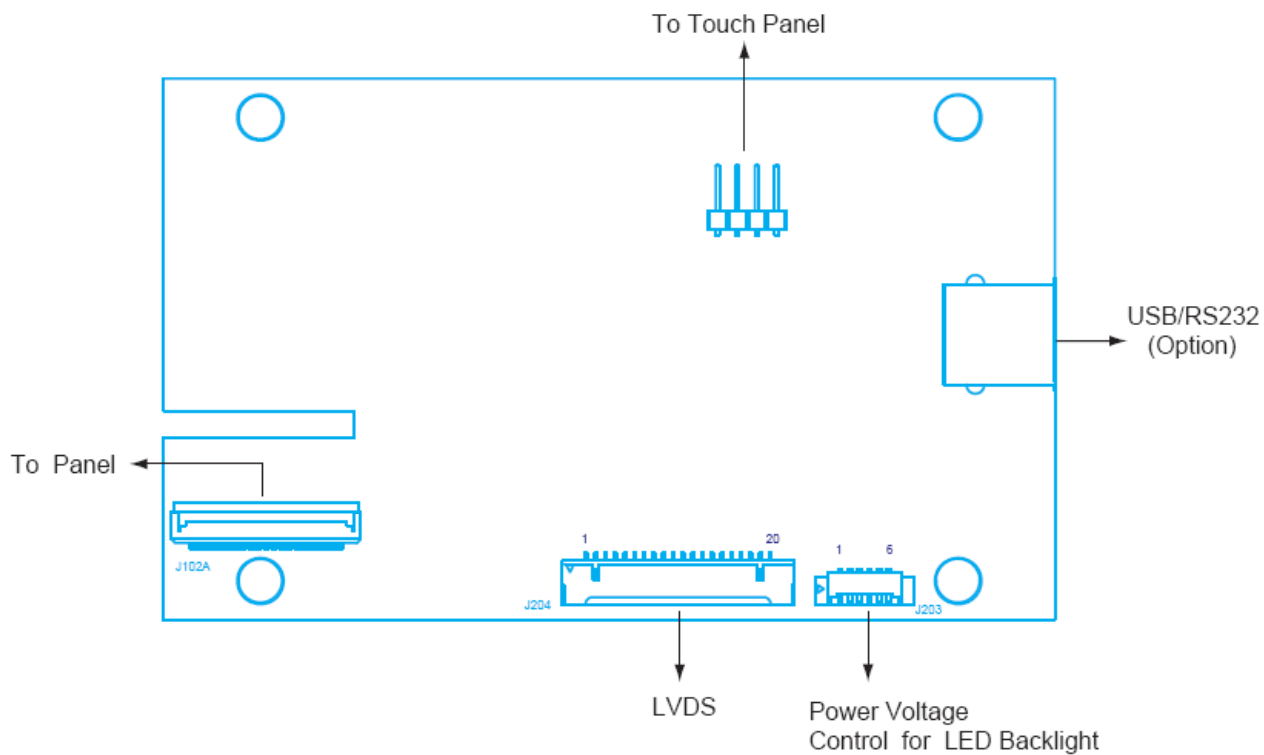
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12.Operation Manual

12.1 Driver Board Manual



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