Advanced Display Solutions Specialist

PART NO.: AG150XA-B16N-ROM-V1

PH: 724-552-4904

FAX: 724-552-4905

EMAIL: sales@agdisplays.com

WEB: www.agdisplays.com

ADDRESS: 220 Huff Ave, Suite 400
Greensburg, PA 15601

產品分類	機種	版次	修訂日期	核准	校訂	撰寫
	ET150C06	V0				

項次	ITEM	數量	內容說明
1		1	AG150XA-B16N-ROM-V1
2	5WR10150084	1	Miracle touch 5WR 10150084
3	ST-3100C		5WR Touch controller ST3100C (RS232+USB Combo) +USB Cable
4	Optical Bonding	1	Optical Bonding T=0.3mm
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

(V) Preliminary Specifications
( ) Final Specifications

Module	15 Inch Color TFT-LCD
Model Name	AG150XA-B16N-ROM-V1

Customer **Date** **Checked & Approved by** _____ _____	**Approved by** **Date** _____ 2017/08/11 **Prepared by** _____
Note: This Specification is subject to change without notice.	

Contents

1. Operating Precautions 4
2. General Description 5
2.1 Display Characteristics 5
2.2 Optical Characteristics 6
3. Functional Block Diagram 9
4. Absolute Maximum Ratings 10
4.1 Absolute Ratings of TFT LCD Module 10
4.2 Absolute Ratings of Environment 10
5. Electrical Characteristics 11
5.1 TFT LCD Module 11
5.2 Backlight Unit 13
6. Signal Characteristic 14
6.1 Pixel Format Image 14
6.2 Scanning Direction 14
6.3 Signal Description 15
6.4 The Input Data Format 16
6.5 Interface Timing 17
6.6 Power ON/OFF Sequence 18
7. Connector & Pin Assignment 19
7.1 TFT LCD Module: LVDS Connector 19
7.2 Backlight Unit: Light Bar Connector 21
7.3 LED Driver Pin Assignment 21
8. Mechanical Characteristics 23
8.1 LCM Outline Dimension (Front View and back view) 23

Record of Revision

Version and Date	Page	Old description	New Description
0.0 2016/08/01	All	First Edition	

1. Operating Precautions

1) Since front polarizer is easily damaged, please be cautious and not to scratch it.
2) Be sure to turn off power supply when inserting or disconnecting from input connector.
3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
4) When the panel surface is soiled, wipe it with absorbent cotton or soft cloth.
5) Since the panel is made of glass, it may be broken or cracked if dropped or bumped on hard surface.
6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
7) Do not open nor modify the module assembly.
8) Do not press the reflector sheet at the back of the module to any direction.
9) In case if a module has to be put back into the packing container slot after it was taken out from the container, do not press the center of the LED Reflector edge. Instead, press at the far ends of the LED Reflector edge softly. Otherwise the TFT Module may be damaged.
10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
11) TFT-LCD Module is not allowed to be twisted & bent even force is added on module in a very short time. Please design your display product well to avoid external force applying to module by end-user directly.
12) Small amount of materials without flammability grade are used in the TFT-LCD module. The TFT-LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950-1 or UL60950-1), or be applied exemption.
13) Severe temperature condition may result in different luminance, response time.
14) Continuous operating TFT-LCD Module under high temperature environment may accelerate LED light bar exhaustion and reduce luminance dramatically.
15) The data on this specification sheet is applicable when TFT-LCD module is placed in landscape position.
16) Continuous displaying fixed pattern may induce image sticking. It's recommended to use screen saver or moving content periodically if fixed pattern is displayed on the screen.

NOTE:
1) Try not to run the LCD in a closed environment. Suitable venting on the system cover would be helpful for cooling.

2) It is better to adapt active cooling with fans for long time displaying, especially for high luminance LCD model.

2. General Description

AG150XA-B16N-ROM-V1 is a Color Active Matrix Liquid Crystal Display composed of a TFT-LCD display, a driver circuit, and a backlight system. The screen format is intended to support XGA (1024(H) x768(V)) screen and 16.2M or 262K colors. All input signals are LVDS interface compatible. AG150XA-B16N-ROM-V1 is designed for industrial display applications.

2.1 Display Characteristics

The following items are characteristics summary on the table under 25 ℃ condition:

Items	**Unit**	**Specifications**
Screen Diagonal	[inch]	15
Active Area	[mm]	304.128(H) x 228.096(V)
Pixels H x V		1024x3(RGB) x 768
Pixel Pitch	[mm]	0.297 x 0.297
Pixel Arrangement		R.G.B. Vertical Stripe
Display Mode		TN, Normally White
Nominal Input Voltage VDD	[Volt]	3.3 typ.
Typical Power Consumption	[Watt]	PDD=1.485W, BLU with DRIVER=16W
Weight	[Grams]	1250g
Physical Size	[mm]	326.5(H)x 253.5(V) x 12.0(D) (max.)
Electrical Interface		LVDS
Surface Treatment		Anti-Glare
Support Color		16.2M/262K
Temperature Range Operating Storage (Non-Operating)	 [℃] [℃]	 -30 to +85 (Panel surface temp.) -30 to +85
RoHS Compliance		RoHS Compliance
Light Bar Unit		LED, Non-replaceable

2.2 Optical Characteristics

The optical characteristics are measured under stable conditions at 25℃ (Room Temperature):

Item	Unit	Conditions	Min.	Typ.	Max.	Note
White Luminance	[cd/m2]	Center point	1400	1600	-	1
Uniformity	%	9 Points	75	80	-	1, 2, 3
Contrast Ratio			400	700	-	4
Cross talk	%		-	1.2	1.5	5
Response Time	[msec]	Rising	-	5.7		6
	[msec]	Falling	-	2.3		
	[msec]	Raising + Falling	-	8		
Viewing Angle	[degree]	Horizontal (Right) CR = 10	70	80	-	7
	[degree]	(Left)	70	80	-	
	[degree]	Vertical (Upper) CR = 10	50	60	-	
	[degree]	(Lower)	70	80	-	
Color / Chromaticity Coordinates (CIE 1931)		Red x	0.567	0.617	0.667	
		Red y	0.296	0.346	0.396	
		Green x	0.286	0.336	0.386	
		Green y	0.562	0.612	0.662	
		Blue x	0.109	0.159	0.209	
		Blue y	0.015	0.065	0.115	
		White x	0.261	0.311	0.361	
		White y	0.272	0.322	0.372	
Color Gamut	%			60	-	

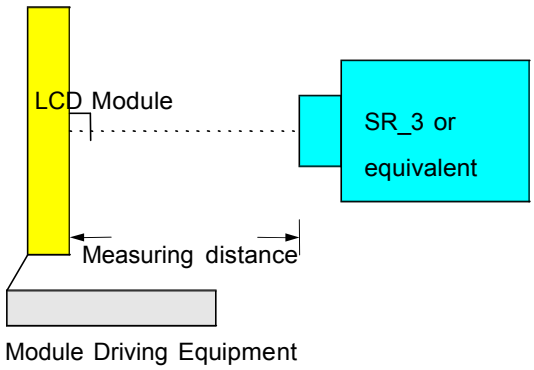
Note 1: Measurement method

Equipment Pattern Generator, Power Supply, Digital Voltmeter, Luminance meter (SR_3 or equivalent)

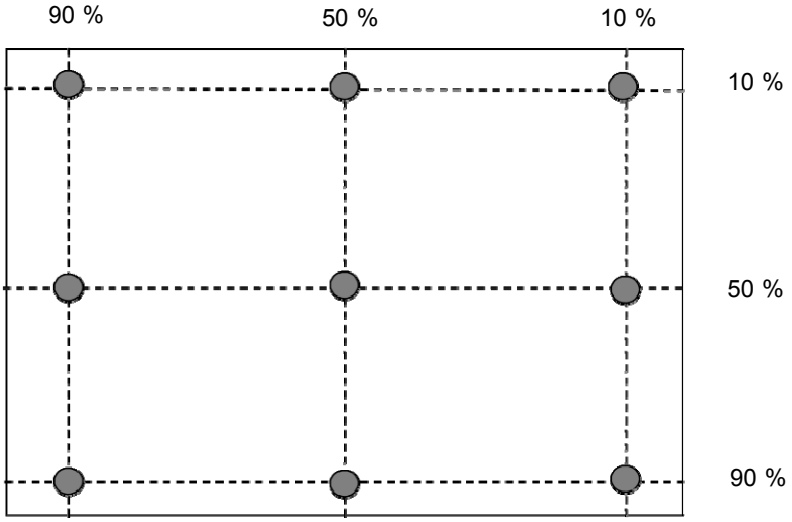
Aperture 1° with 50cm viewing distance

Test Point Center

Environment *< 1 lux*



Note 2: Definition of 9 points position (Display active area : 304.128(H) x 228.096(V))



Note 3: The luminance uniformity of 9 points is defined by dividing the minimum luminance values by the maximum test point luminance

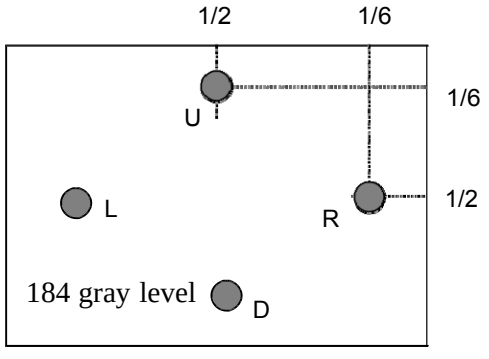
$$\delta_{W9} = \frac{\text{Minimum Brightness of nine points}}{\text{Maximum Brightness of nine points}}$$

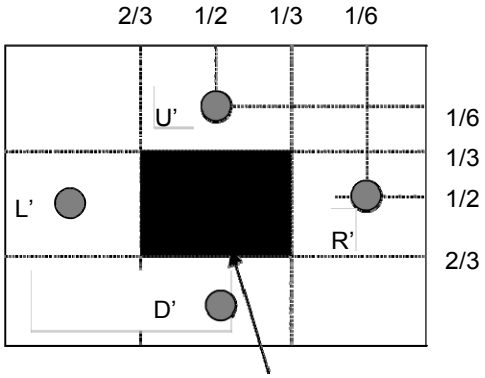
Note 4： Definition of contrast ratio (CR):

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the “White” state}}{\text{Brightness on the “Black” state}}$$

Note 5： Definition of cross talk (CT)

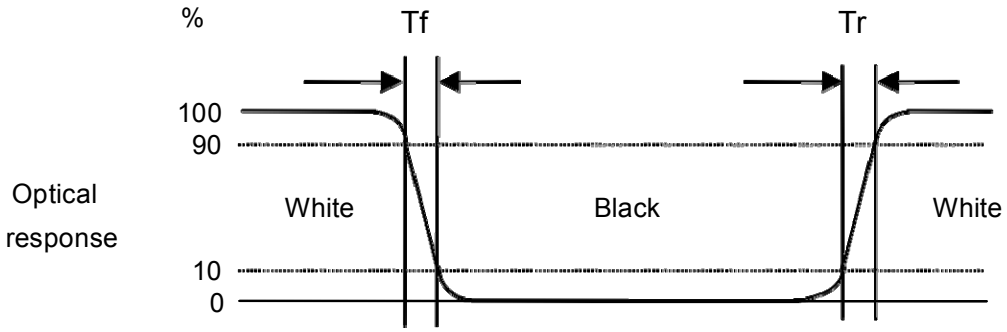
CT = max(| Y’ – Y | / Y × 100 (%)), Y = U/D/L/R
Where
Y = Luminance of measured location without gray level 0 pattern (cd/m2)
Y’ = Luminance of measured location with gray level 0 pattern (cd/m2)





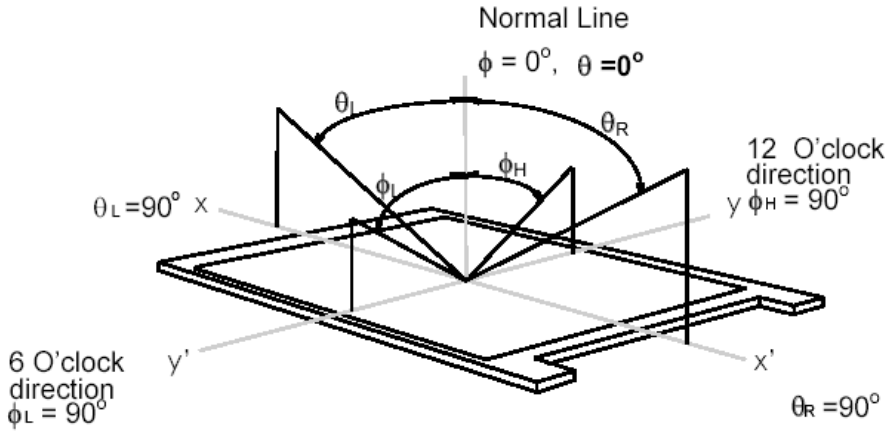
Note 6: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “White” to “Black” (falling time) and from “Black” to “White” (rising time), respectively. The response time interval is between 10% and 90% of amplitudes. Please refer to the figure as below.



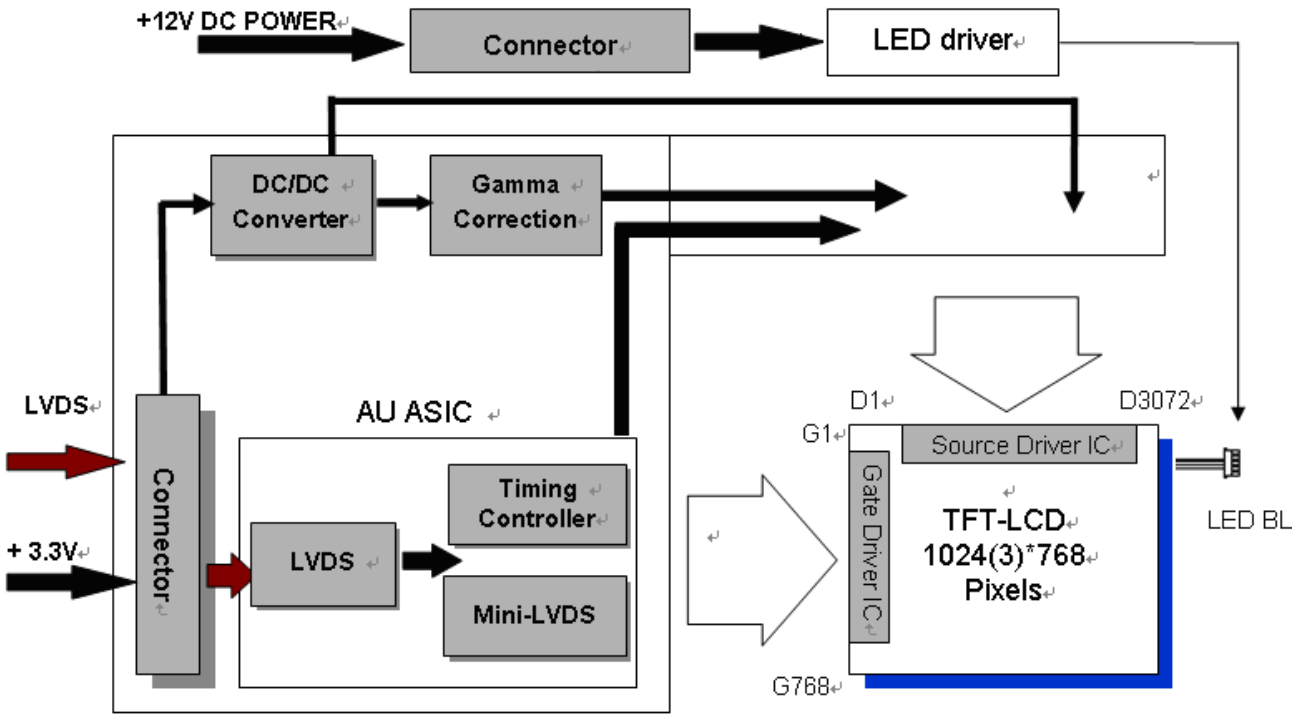
Note 7: Definition of viewing angle

Viewing angle is the measurement of contrast ratio ≧10, at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as below: 90° (Θ) horizontal left and right, and 90° (Φ) vertical high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated to its center to develop the desired measurement viewing angle.



3. Functional Block Diagram

The following diagram shows the functional block of the 15 inch color TFT/LCD module:



4. Absolute Maximum Ratings

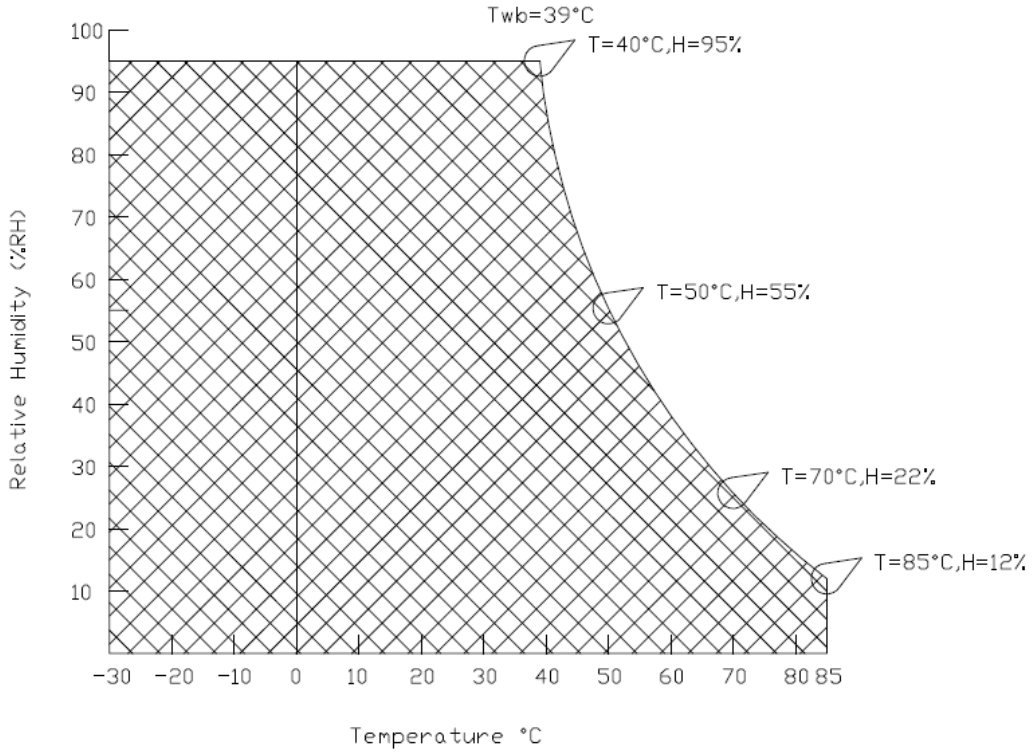
4.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min	Max	Unit
Logic/LCD Drive Voltage	Vin	-0.3	+3.6	[Volt]

4.2 Absolute Ratings of Environment

Item	Symbol	Min	Max	Unit
Operating Temperature	TOP	-30	+85	[°C]
Operation Humidity	HOP	8	90	[%RH]
Storage Temperature	TST	-30	+85	[°C]
Storage Humidity	HST	8	90	[%RH]

Note: Maximum Wet-Bulb should be 39℃ and no condensation.



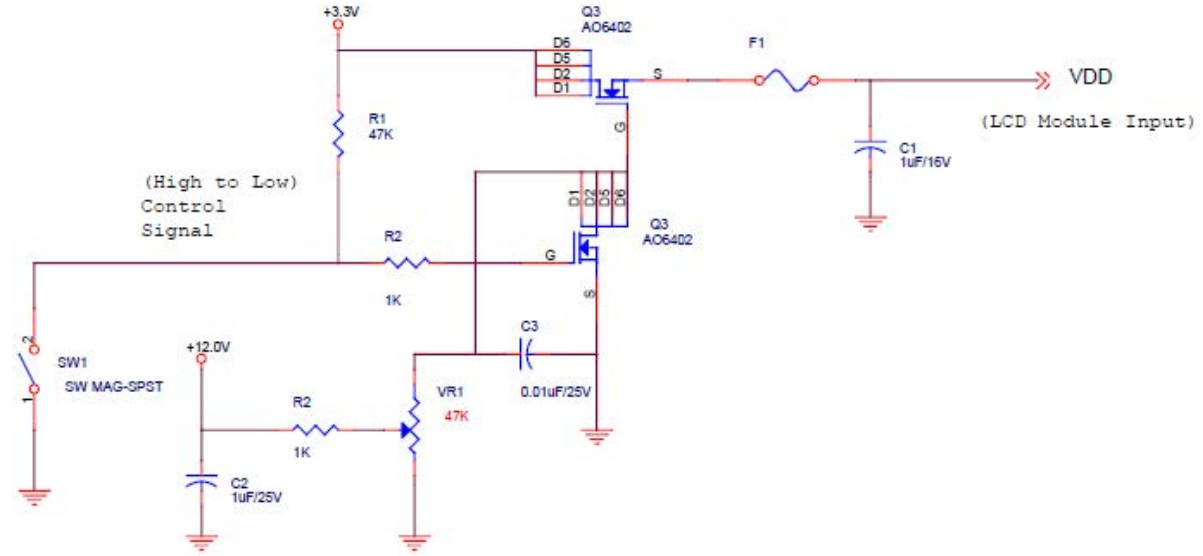
5. Electrical Characteristics

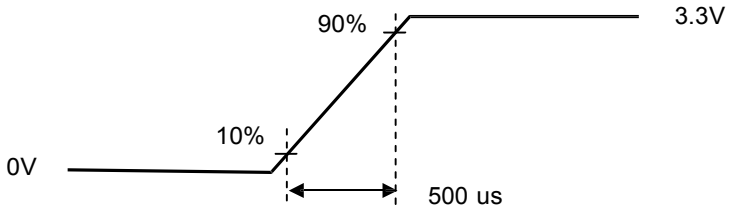
5.1 TFT LCD Module

5.1.1 Power Specification

Symbol	Parameter	Min	Typ	Max	Units	Remark
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	±10%
IDD	VDD Current	-	450	750	[mA]	64 Gray Bar Pattern (VDD=3.3V, at 60Hz)
Irush	LCD Inrush Current	-	-	2	[A]	Note 1
PDD	VDD Power	-	1.485	2.475	[Watt]	64 Gray Bar Pattern (VDD=3.3V, at 60Hz)

Note 1: Measurement condition:





VDD rising time

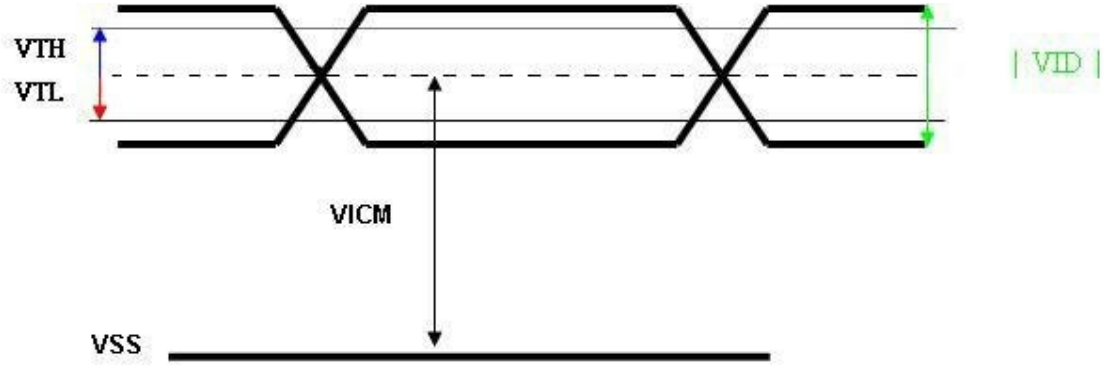
64 Gray pattern

5.1.2 Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when VDD is off.

Symbol	Item	Min.	Typ.	Max.	Unit	Remark
VTH	Differential Input High Threshold	-	-	100	[mV]	VCM=1.2V
VTL	Differential Input Low Threshold	-100	-	-	[mV]	VCM=1.2V
| VID |	Input Differential Voltage	100	400	600	[mV]	
VICM	Differential Input Common Mode Voltage	1.15	1.2	1.45	[V]	VTH/VTL=±100mV

Note: LVDS Signal Waveform.



5.2 Backlight Unit

5.2.1 Parameter guideline for LED

Following characteristics are measured under stable condition using a LED driving board at 25℃ (Room Temperature).

Symbol	Parameter	Min	Typ	Max	Unit	Remark
Vcc	Input Voltage	10.8	12	13.2	Volt	
Ivcc	Input Current	-	1.33	-	A	100% Dimming
PLED	Power Consumption	-	16	-	Watt	100% Dimming
Irush	Inrush Current	-		2	A	
VLED on/off	On Control Voltage	3.0		5.5	Volt	
	Off Control Voltage	-		0.8	Volt	
FPWM	PWM Dimming Frequency	200	-	20k	Hz	
	High Voltage	3.0		5.5	Volt	
	Low Voltage	-		0.8	Volt	
	Dimming Duty Cycle	5	-	100	%	
I_F	Light Bar Forward Current	-	840		mA	Ta = 25°C
LED Life time		50000		-	Hrs	Ta = 25°C

Note 1: Ta means ambient temperature of TFT-LCD module.

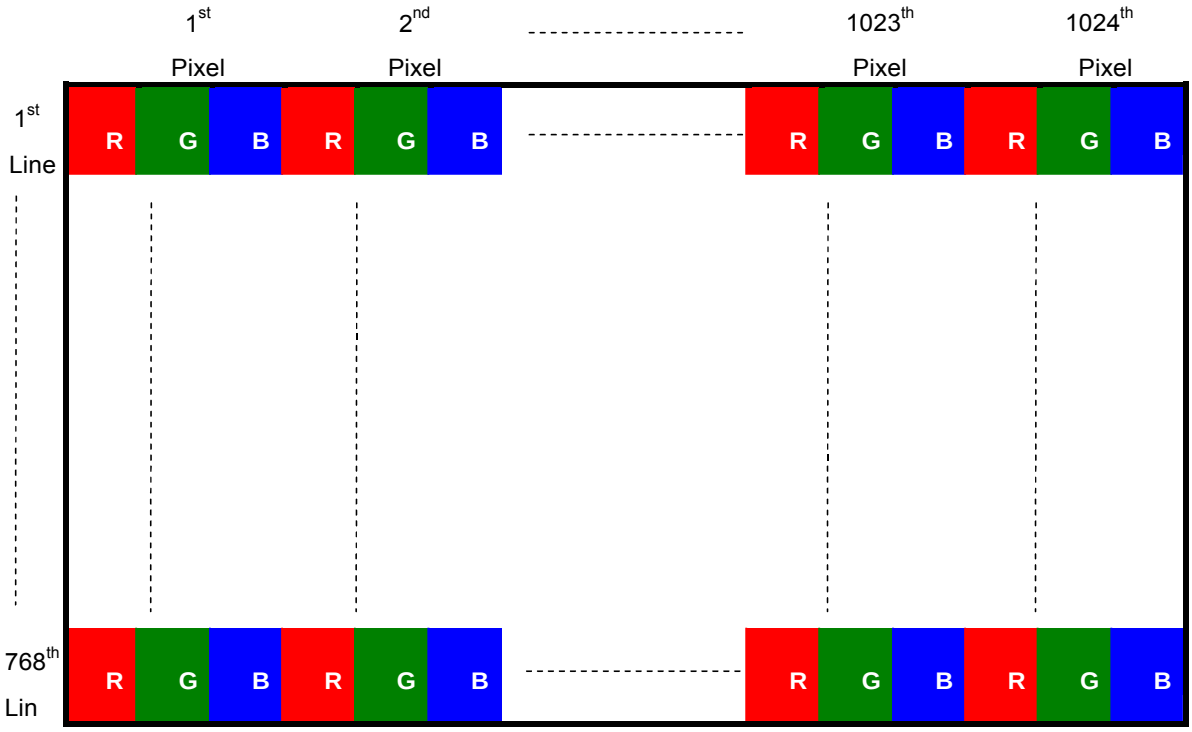
Note 2: If ED150C19 V3A(G150XTN06.2) module is driven at high ambient temperature & humidity condition. The operating life will be reduced.

Note 3: LED life time means brightness goes down to 50% initial brightness. Min. LED life time is estimated data.

6. Signal Characteristic

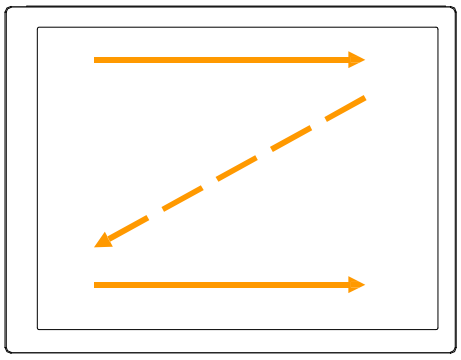
6.1 Pixel Format Image

Following figure shows the relationship between input signal and LCD pixel format.



6.2 Scanning Direction

The following figures show the image seen from the front view. The arrow indicates the direction of scan.



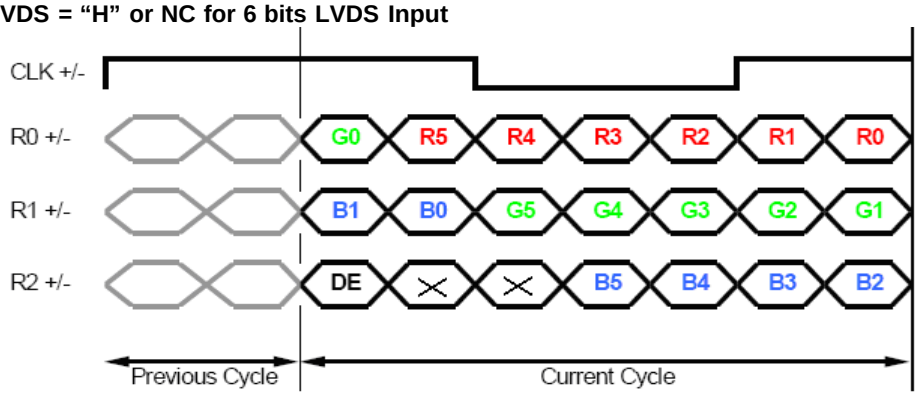
6.3 Signal Description

LVDS is a differential signal technology for LCD interface and high speed data transfer device.

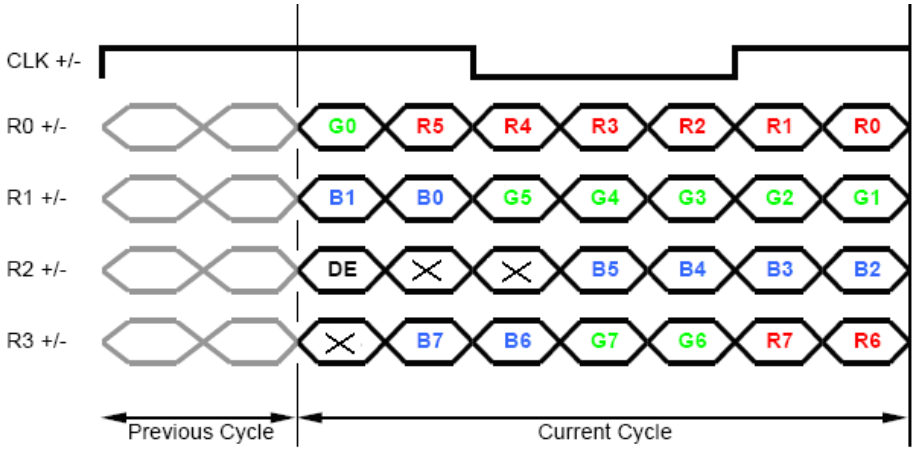
Pin No.	Symbol	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	NC	No Connect
4	NC	No Connect
5	Rin1-	- LVDS differential data input
6	Rin1+	+ LVDS differential data input
7	VSS	Ground
8	Rin2-	- LVDS differential data input
9	Rin2+	+ LVDS differential data input
10	VSS	Ground
11	Rin3-	- LVDS differential data input
12	Rin3+	+ LVDS differential data input
13	VSS	Ground
14	ClkIN-	- LVDS differential clock input
15	ClkIN+	+ LVDS differential clock input
16	VSS	Ground
17	Rin4-	- LVDS differential data input
18	Rin4+	- LVDS differential data input
19	VSS	Ground
20	SEL LVDS	H or NC: 6bit/L: 8bit

6.4 The Input Data Format

SEL LVDS = “H” or NC for 6 bits LVDS Input



SEL LVDS =”L” for 8 bits LVDS Input



Note1: Please follow PSWG.
Note2: R/G/B data 7:MSB, R/G/B data 0:LSB

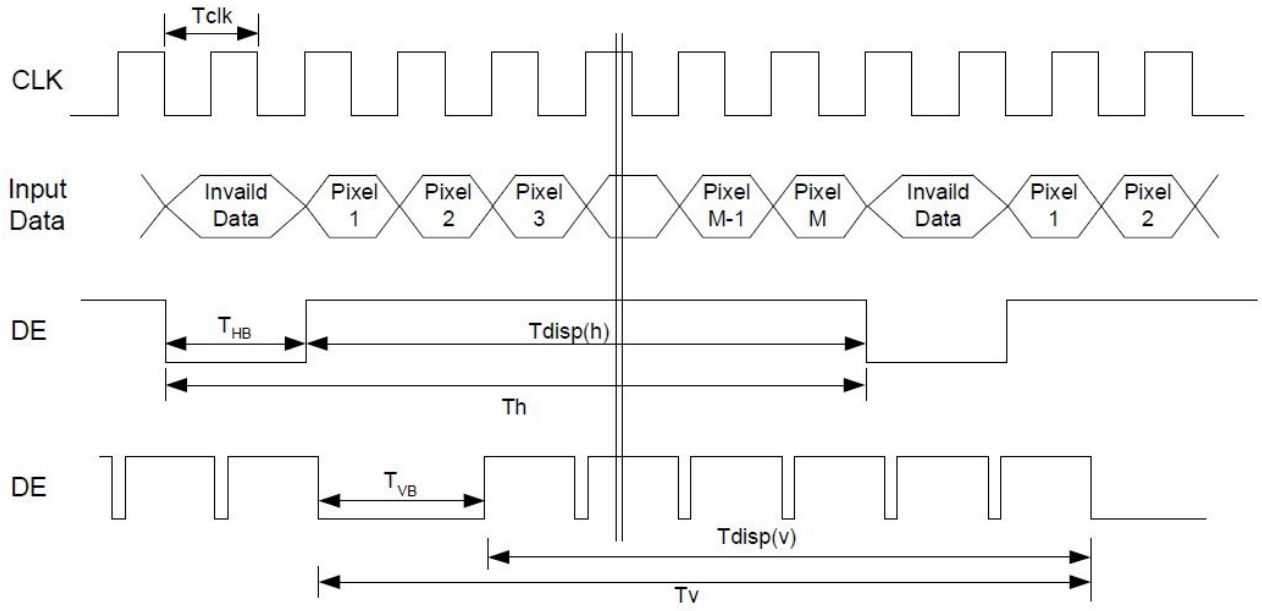
6.5 Interface Timing

6.5.1 Timing Characteristics

Signal	Parameter		Symbol	Min.	Typ.	Max.	Unit
Clock Timing	Clock frequency		1/ T_{Clock}	50	65	80	MHz
Vsync Timing	Vertical Section	Period	T_V	776	806	990	Vsync Timing
		Active	T_{VD}	-	768	-	
		Blanking	T_{VB}	8	38	222	
Hsync Timing	Horizontal Section	Period	T_H	1094	1344	1720	Hsync Timing
		Active	T_{HD}	-	1024	-	
		Blanking	T_{HB}	70	320	696	
Frame Rate			F	50	60	75	Hz

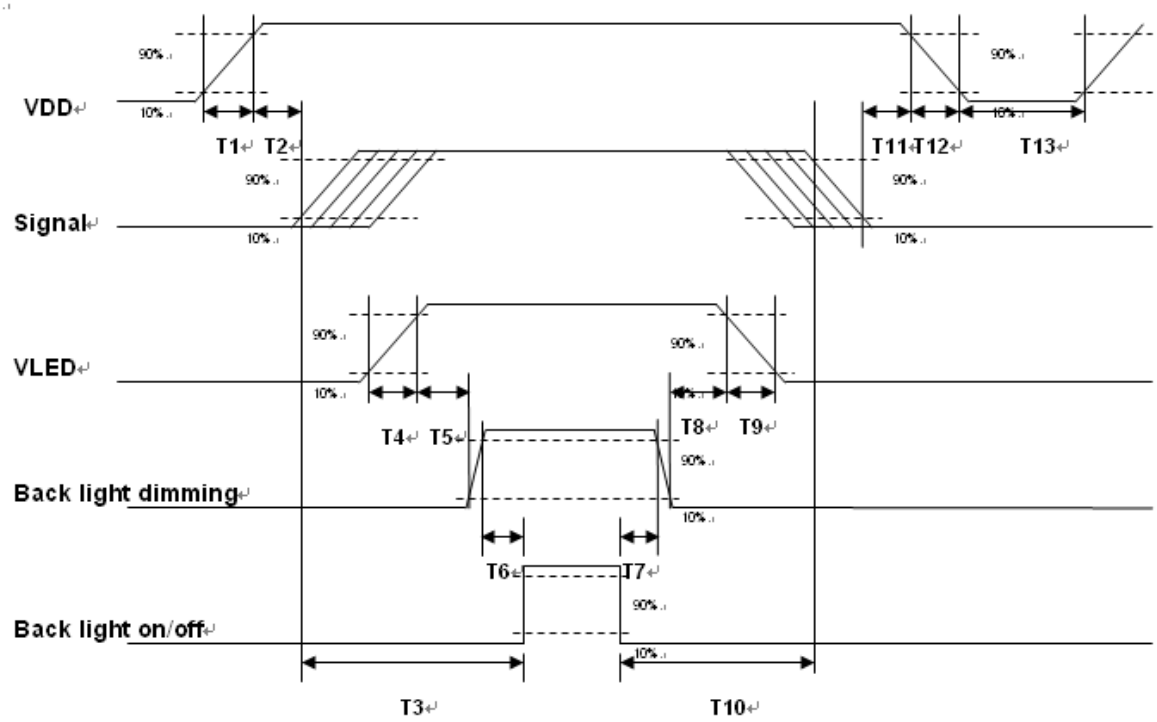
Note: DE mode only.
Note : Typical value refer to VESA STANDARD

6.5.2 Input Timing Diagram



6.6 Power ON/OFF Sequence

VDD power and LED on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	220	-	-	[ms]
T4	0.5	-	10	[ms]
T5	10	-	-	[ms]
T6	10	-	-	[ms]
T7	0	-	-	[ms]
T8	10	-	-	[ms]
T9	100	-	-	[ms]
T10	110	-	-	[ms]
T11	0	16	50	[ms]
T12	-	-	10	[ms]
T13	1000	-	-	[ms]

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

7. Connector & Pin Assignment

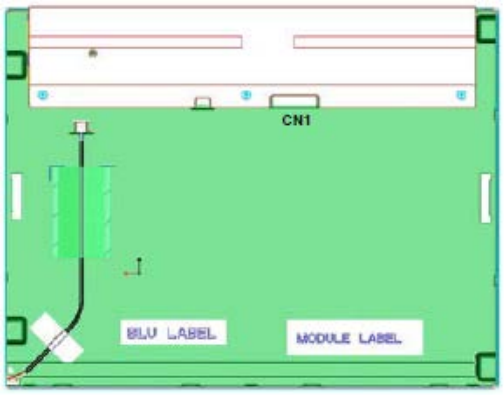
Physical interface is described as for the connector on module. These connectors are capable of accommodating the following signals and will be following components.

7.1 TFT LCD Module: LVDS Connector

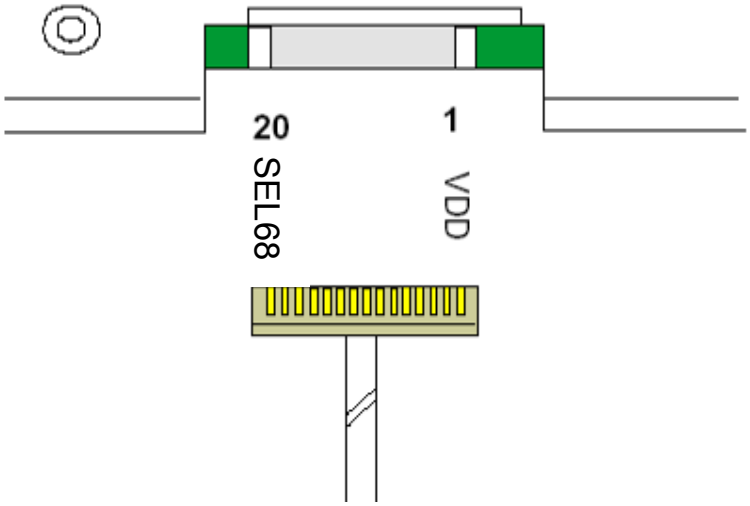
Connector Name / Designation	Signal Connector
Manufacturer	STM or compatible
Connector Model Number	MSB240420E or compatible
Mating Model Number	P240420 or compatible

Pin#	Signal Name	Pin#	Signal Name
1	VDD	2	VDD
3	NC	4	NC
5	Rin1-	6	Rin1+
7	VSS	8	Rin2-
9	Rin2+	10	VSS
11	Rin3-	12	Rin3+
13	VSS	14	ClkIN-
15	ClkIN+	16	VSS
17	Rin4-	18	Rin4+
19	VSS	20	SEL68

7.1.1 Connector Illustration



LVDS(CN1):



7.2 Backlight Unit: Light Bar Connector

Connector Name / Designation	Lamp Connector
Manufacturer	
Connector Model Number	A20D/HD2-2P
Mating Model Number(CN3)	S2B-PH-SM4-TB or compatible

Pin No.	symbol	Description	Color
Pin1	H	LED anode	Red
Pin2	L	LED cathode	Black

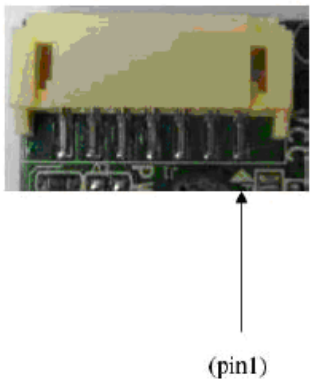
7.3 LED Driver Pin Assignment

Model Name : S7B-PH-SM4-TB(JST)

(J1)

Connector Type: 2.0mm 7pin Wafer （SMD）

Pin No.	Description
1	+12V
2	+12V
3	+12V
4	Ground
5	PWM or Vadj control
6	Ground
7	ON/OFF Control



Output connector : J2 , J3
Model Name : S2B-PH-SM4-TB(JST)

(J2)

Connector Type: 2.0mm 2pin Wafer （SMD）

Pin No.	Description
1	VLED+
2	VLED-

(J3)

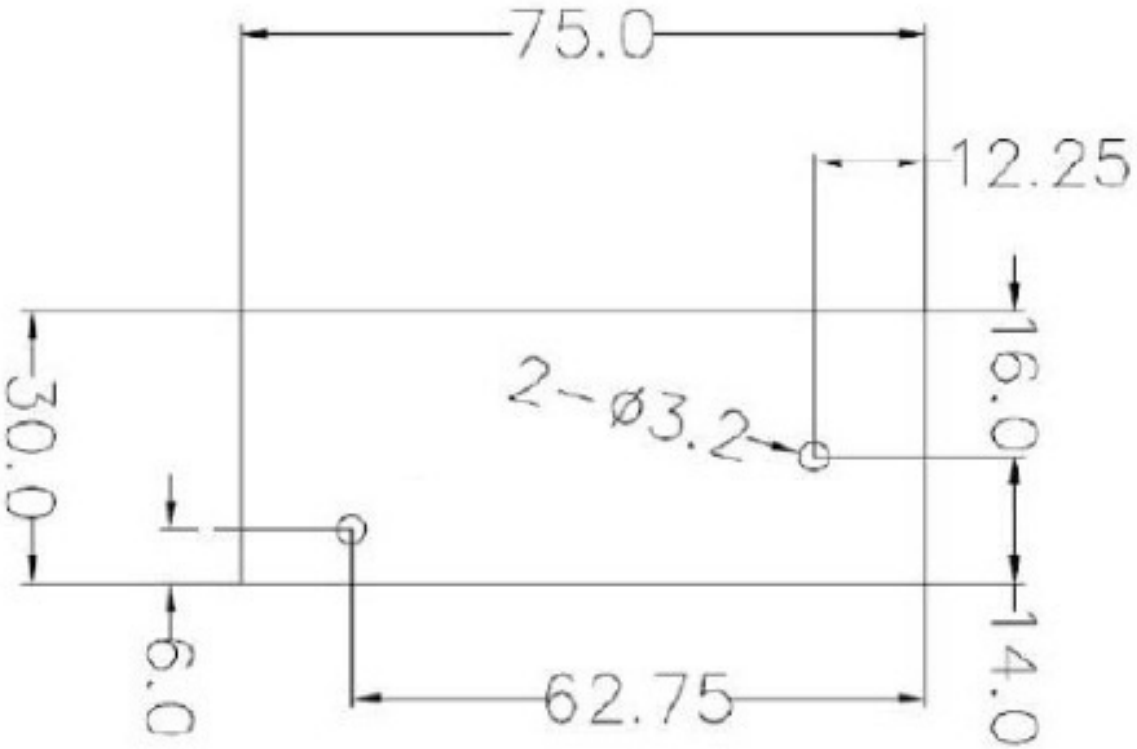
Connector Type: 2.0mm 2pin Wafer （SMD）

Pin No.	Description
1	VLED+
2	VLED-

Note: J2 = J3 , only one connector for single light bar use

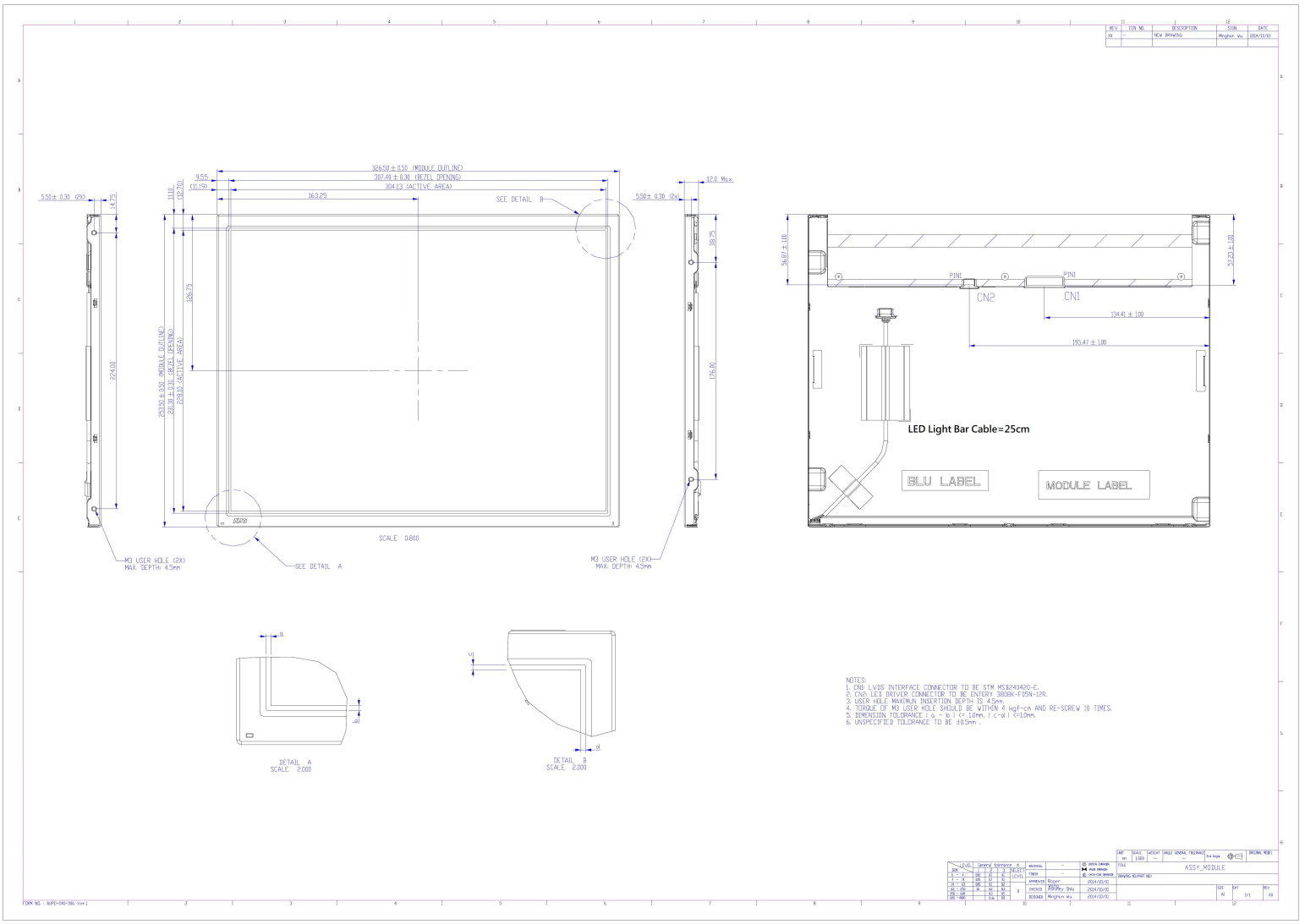
LED Driving Board Outline Dimension

Dimension : 75(L)*30(W)*8.65(H)mm



8. Mechanical Characteristics

8.1 LCM Outline Dimension (Front View and back view)



Record of revisions

item	date	version	page	summary
1	2016/6/7	01	10	New establish

Remark:

1. General

1.1 This document is included the specifications of touch screen.
1.2 This touch screen is 5 wires analog resistive type.
1.3 It is designed to be activated by pressure of finger or stylus.

2. Environmental Specifications

2.1 Storing Environment
Temperature Range：- 20℃ ～ 70℃
Humidity Range：20% RH ～ 90% RH (Non Condensing)

2.2 Operating Environment
Temperature Range： -10℃ ～60℃
Humidity Range：20% RH ～80% RH (Non Condensing)

2.3 The above envionment is under normal pressure of the atmosphere.

3. Mechanical Specifications

3.1 Touch panel style

style : Analog resistance

3.2 Dimension Specifications:

Dimension outline	322.00 x 245.50 mm ± 0.30mm
Viewable area	309.50 x 233.50 mm ± 0.20mm
Active area	303.50 x 227.50 mm ± 0.20mm
Total thickness	2.20 mm ± 0.20mm
Tail length	205.00 mm ± 6.00mm

3.3 Operating Force ≦ 80g (R0.8 Touch Pen)

3.4 Surface Hardness ≧ 3H (ASTM D3363, pressure 750g/45°)

3.5 Static Load : 5 kg within 10cm² area for 30sec

3.6 Impact : Impact at center area one time , no damage (25.0ψDIA. Steel Ball/67g , Height=50cm)

3.7 Bending : 90° 10 times left & right

3.8 Peeling : 800g by vertical 90°

4. Optical Specifications

4.1 Transparency ： 80 ±3% (BYK Gardner , 550nm , ASTM D1003)

4.2 Haze：8 ±3%(BYK Gardner , ASTM D1003)

5. Electrical Specifications

5.1 Loop resistance X:20Ω ～ 500Ω , Y:20Ω ～ 500Ω

5.2 Voltage endurance DC 50V/60sec.

5.3 Linearity deviation X≦ 1.5% ，Y≦ 1.5%

5.4 Insulation resistance ≧ 20MΩ/25V DC

5.5 Chattering ≦10ms

6. Appearance Inspection

6.1 The inspection shall be performed by using one 17w fluorescent lamp as back or side light . The panel shall be placed at 30cm away from eyes. (Figure1.1 and Figure1.2)

.

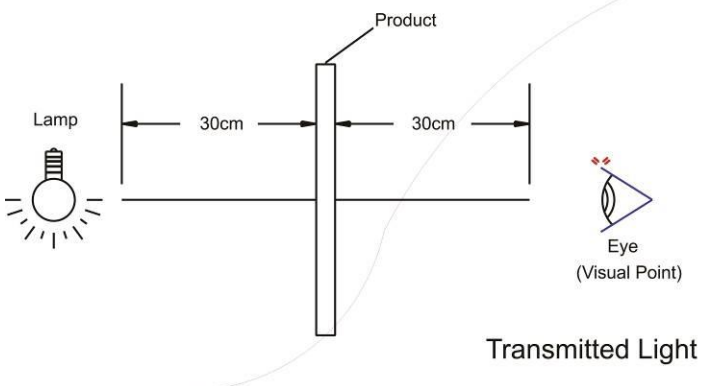


Figure 1.1

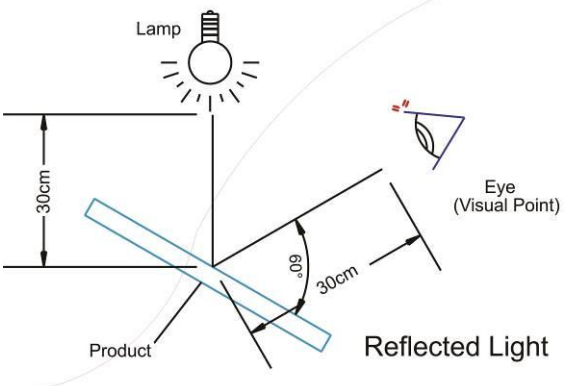


Figure 1.2

6.2 The flaws and Impurities are allowed outside viewing area except those affecting electrical functions.

Inside the viewing area , it meets the following :

(1) Linear Object :

W ≦ 0.05 mm OK

0.05 mm < W ≦ 0.1 mm and L≦20, total≦5 OK

W > 0.1 mm No good

(W : width of flaws , L : length of flaws)

(2) Dot-shaped lmpurities :

D ≦ 0.4 mm OK

0.4 mm < D ≦ 0.6 mm , each area contains≦3, total≦6 OK

D > 0.6 mm No good

(D : average of diameter , Each area contains=20 ϕ)

(3) Scratch：

W ≦ 0.04 OK

0.04 mm < W ≦ 0.06 mm and L ≦ 12 mm , total≦7 OK

0.07 mm < W ≦ 0.1 mm and L ≦ 6 mm , total≦6 OK

W > 0.1 mm ，No good

(W : width of scratch , L : length of scratch)

Glass Flaw

(1) Progressive Flaw : No good (Figure2.1)

(2) corner chips : X ≦ 3 mm , Y ≦ 3 mm , Z ≦ T (Figure2.2)

(3) border chips : X ≦ 10 mm , Y ≦ 3 mm , Z ≦ T (Figure2.3)

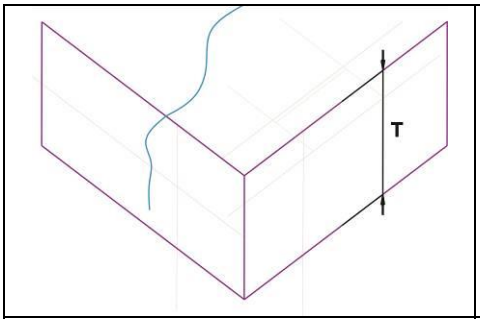


Figure 2.1

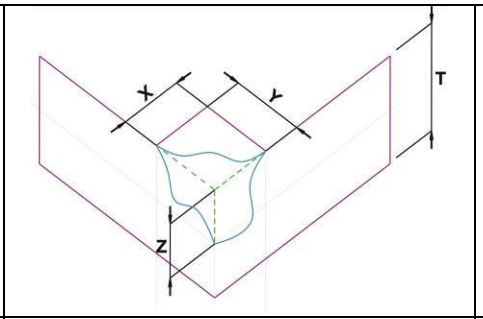


Figure 2.2

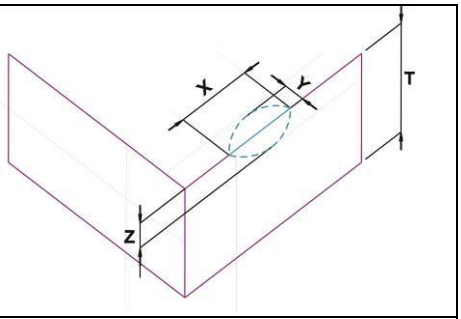


Figure 2.3

X : Width direction against the edge line.
Y : Length direction against the edge line.
Z : Thickness direction against the edge line.

The chips are not supposed to affect any of the electrical functions.

7. Durability

Knock test : 10,000,000 times keystrokes

They still meet the specification required in section 5.1 and 5.4 , and section 5.3 satisfies X≦2.5%, Y≦2.5% ; Operating force must not exceed 250g after reliability test

8. Reliability

8.1 High temperature test
After putting panels at 70℃ for 240 hours and allow panels stay in normal environment for 4 hours , they still meet the specification required in section 5.1 and 5.4 , and section 5.3 satisfies X≦2.5%, Y≦2.5% ; Operating force must not exceed 250g after reliability test

8.2 Low temperature test
After putting panels at -20℃ for 240 hours and allow panels stay in normal environment for 4 hours , they still meet the specification required in section 5.1 and 5.4 , and section 5.3 satisfies X≦2.5%, Y≦2.5% ; Operating force must not exceed 250g after reliability test

8.3 High temperature and high humidity test
After putting panels at 60℃ , 90% RH for 240 hours and allow panels stay in normal environment for 4 hours , they still meet the specification required in section 5.1 and 5.4 , and section 5.3 satisfies X≦2.5%, Y≦2.5% ; Operating force must not exceed 250g after reliability test

8.4 Thermal shock test
1 Cycle : -20℃ →70℃ (60 minutes period)
After putting panels for 50 cycles and allow panels stay in normal environment for 4 hours , they still meet the specification required in section 5.1 and 5.4 , and section 5.3 satisfies X≦2.5%, Y≦2.5% ; Operating force must not exceed 250g after reliability test

8.5 All the above tests may cause the film puffed .

9. Inspection Method

9.1 Linearity

(1) Short UR and LR(or short LR and LL).
(2) apply voltage DC 5V.
(3) short UL and LL (or short UR and UL).
(4) apply grounding.
(5) draw points along Lx and Ly at 5.0mm intervals within pattern area and detect the voltage at SG.
(6) measure the voltage differences between UR and UL(or UR and LR)

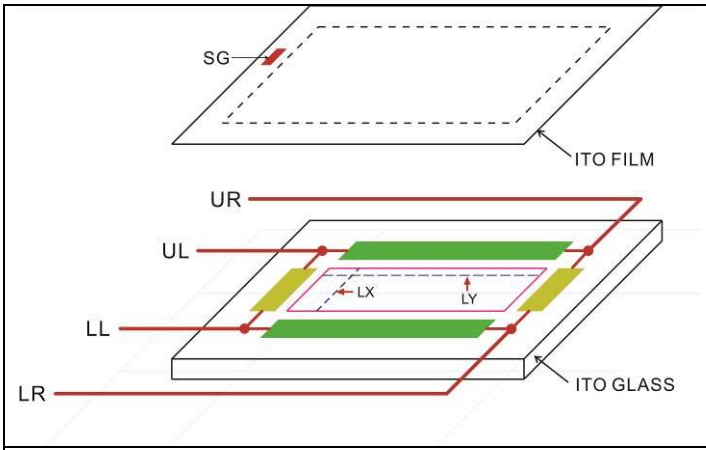


Figure 3.1

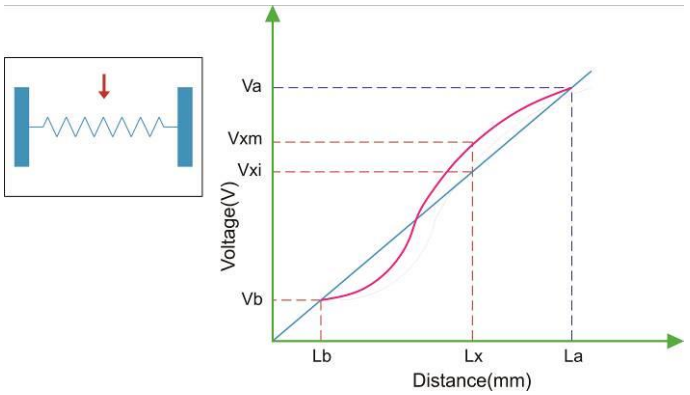


Figure 3.2

9.2 Specification

Linearity must meet the electrical characteristic specified in section 5.3

10. Warranty

Miracletouch provide two years warranty of Miracletouch products.

The followings are not in guaranty:

(1) Damages caused by improper handling from clients, including shipping, installation and integration.
(2) Damage caused by self-repairs, modifications or disassembling of the product.
(3) Damages caused by disasters, either by natural causes or human factors, after the delivery of products

11.Cautions

11.1 The bezel which contacts with PET film should keep a distance at least 3 mm from the active area to avoid short.

11.2 The bezel which contacts with PET film should not place heavy pressure on the film and the surface of bezel should be kept smooth.

11.3 Please keep clean on the surface of PET film , Don't attach any tape on that.

11.4 Neither pull tail upward nor push downward with an angle of 90° It should keep an arch at least R5.

11.5 If there exist any high voltage power , please make an adequate protect.

11.6 To avoid the high voltage static power to damage panel , please don't operate touch panel without connecting controller.

11.7 The panel could be cleaned with cloth containing ethanol or neutral cleaner. It is no effects to the characteristics

11.8 Miracletouch retain the right of changing the materials with same grade and specification.

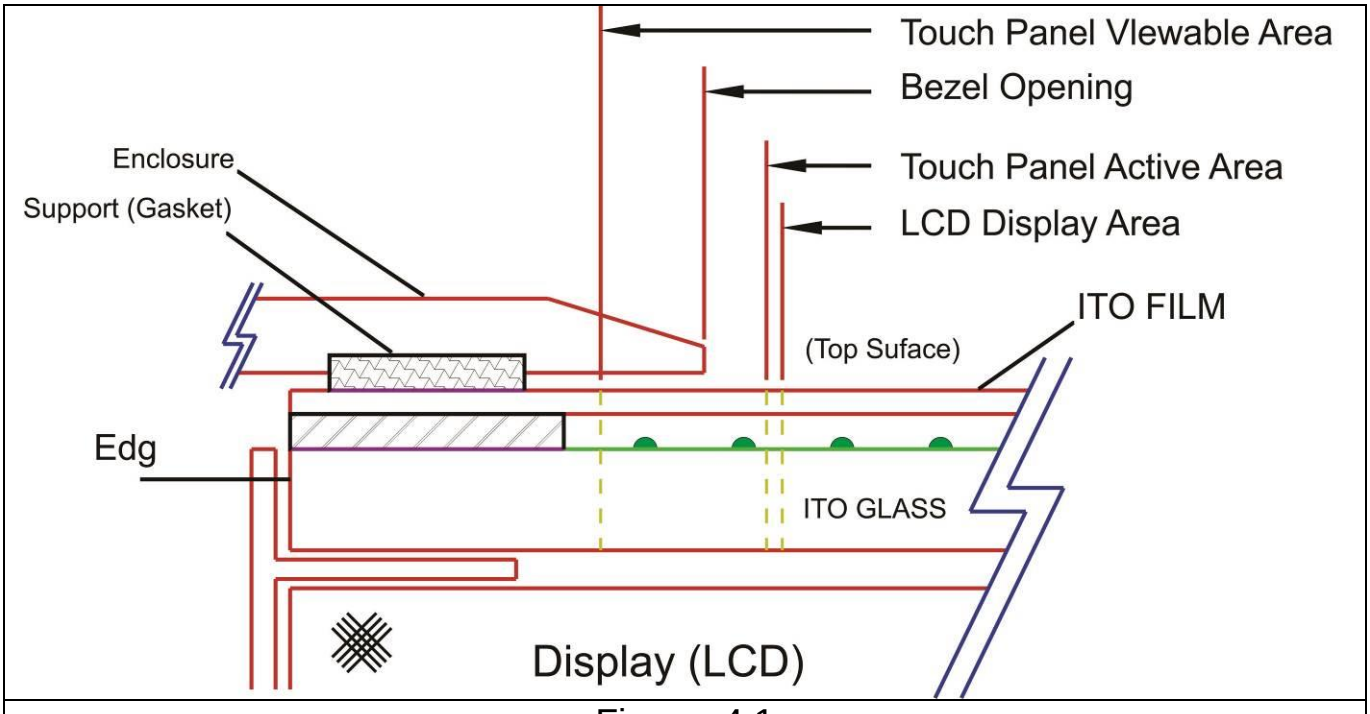
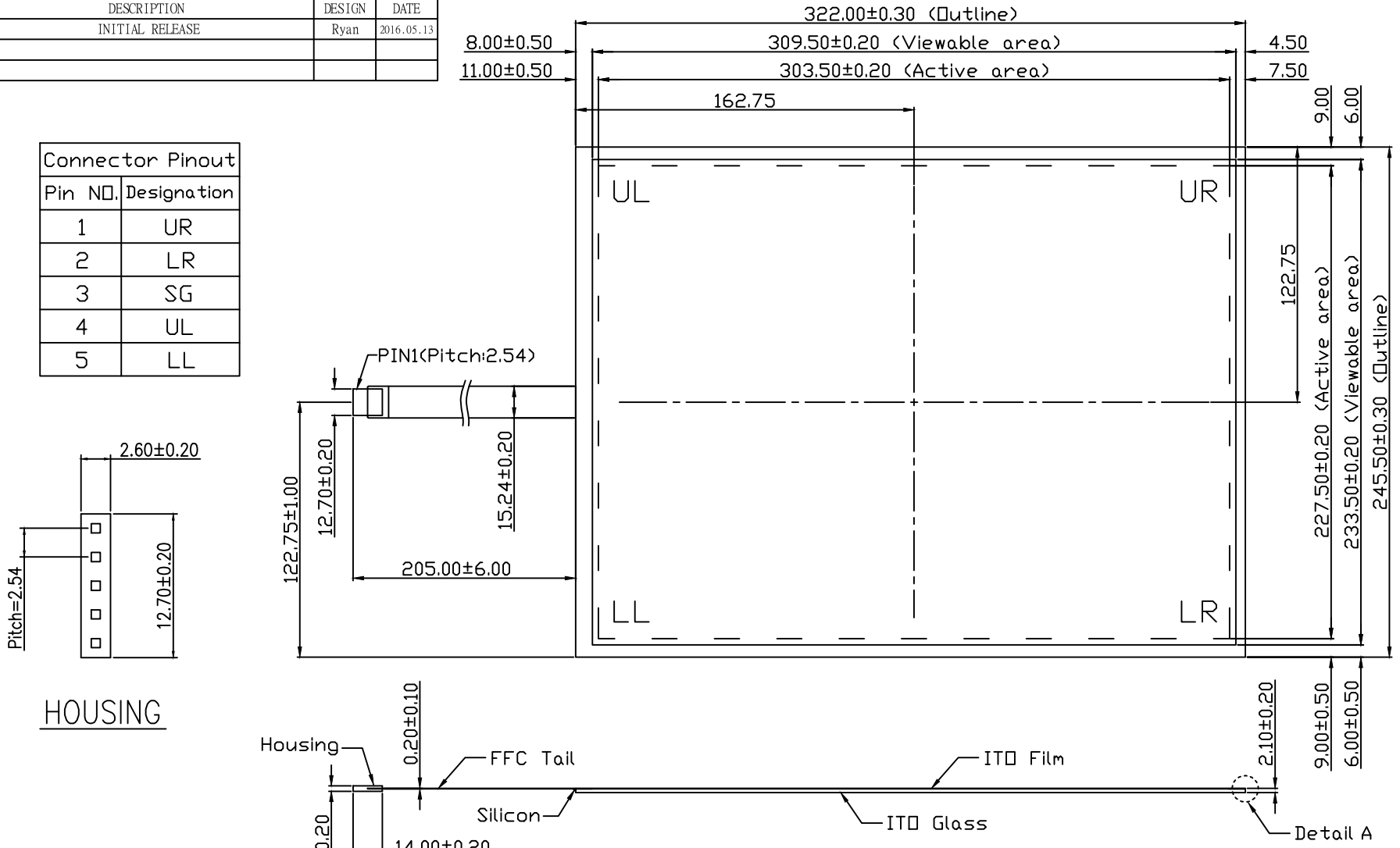


Figure 4.1

REVISIONS			
REV	DESCRIPTION	DESIGN	DATE
01	INITIAL RELEASE	Ryan	2016.05.13

Connector Pinout	
Pin NO.	Designation
1	UR
2	LR
3	SG
4	UL
5	LL



NOTES:
1. Optical Specifications:
   1.1 Transparence: 79±3%
   1.2 Haze: 8±3% (Anti Glare)
2. Electrical Specifications
   2.1 Loop resistance X: 20Ω~500Ω, Y: 20Ω~500Ω
   2.2 Voltage endurance DC 50V/60sec.
   2.3 Linearity deviation X ≦ 1.5%, Y ≦ 1.5%
   2.4 Insulation resistance ≧ 20MΩ/25VDC

UNIT	mm.		
THIRD ANGLE		MODEL	15" 5W Touch Panel
		DRAWING NO.	10150084

REV	DATE	DESIGN	DATE	APPROVED
01	2016.05.13	Ryan	2016.05.13	Eric

SPECIFICATION FOR APPROVAL

客戶名稱(Customer): _____

客戶產品料號(Product P/N) : _____

承認書編號(Approval sheet No.): _____

承認日期(Approval Date): _____

產品品名(Description): ST-3100C & ST-3000U Resistive Touch Controller

韌體版本 (F/W Version: _____

晶片標示(IC mark): _____

驗證碼(Checksum): _____

APPROVAL BY:

盛仕科技股份有限公司(Sense Touch Technology, Inc)
新北市汐止區新台五路一段 77 號 14F(B 室)
TEL: 886-2-26983331
FAX: 886-2-26983332
http://www.sensetouch.com.tw/

ST-3100C & ST-3000U
Resistive USB and RS-232
Touch Controller

Chapter 1. Product Overview

1.1 INTRODUCTION

SENSE TOUCH Technology Incorporation (SENSETECH) provides cutting-edge touch total solutions to customers. Our solution is including chips, module boards to be fit in the needs for various system design and platforms.

Our touch controllers can be used in various computer products such as desktops, laptop computers, Point of Sales (POS) automatic machines, PDAs, digital cameras, and GPS devices. To satisfy these demands, we provide flexible firmware and driver supports on operating systems such as Windows 8/7/Vista/XP/2000/98/95, WinCE 5/6, DOS, MacOS and most Linux distributions like Ubuntu, Fedora, RedHat , Debian and so on.

SENSETECH also provides customized design service for special application fields, such as embedded system integration and multi-monitor applications.

1.2 PRODUCT DESCRIPTION

The SENSETECH ST-3100C and ST-3000U resistive touch controller board

1.2. 1 Part Number

- ST-3100C: 4/5-wire analog resistive USB & RS-232 touch controller board
- ST-3000U: 4/5-wire analog resistive USB touch controller board

1.2. 2 Features

Supply voltage requirement	Supply voltage: 5V +/- 5%
Host interface	- Automatically detects communication type - USB (2.0 compliant) - RS-232 (9600 BAUD)
Protocol	- USB: Full Speed, HID Compliant at 12Mhz/sec, Support

	suspend and remote wakeup - RS-232: 9600 bps, 8 data bits, none parity, 1 stop bit
USB Plug & Play	- USB mouse (HID-MOUSE) or - Single-touch Win7 digitizer (HID-DIGITIZER)
Sensor support	- 4-wire - 5-wire - Touch screen resistance – max. 2K ohm contact resistance
Resolution	- 10-bit measurement(1024 x 1024) - 12-bit reporting(4096 x 4096) of processed touch coordinates
Report Rate	USB: max. 200 points/sec RS-232: max. 150 points/sec
Touch Operation Mode	- Drawing mode: position and linearity verification - Button mode: Mouse left /right button emulation - Sound Notification: enable/disable beep or audio sound for Touch down/Touch up - COM port support: COM1~255 for Windows and Linux, COM1 ~ 8 for DOS
Response Time	Max. 15ms
Chip Package	28 pin MLP
Calibration	- Support 4 / 9 / 25-point calibration - Support edge-compensation
Power consumption	- Normal mode and touch inactive : less than 22 mA - Normal mode and touch active: max 30mA (4-Wire touch panel, Rx-x: 800ohm, Ry-y:250ohm) - USB suspend mode: less than 650uA - Power down mode for RS-232 : 80uA
Permanent data storage	calibration data and system parameters stored on local Flash memory. No need external EEPROM, real SoC

	solution
Operating Temperature	-20℃ to 85℃
Storage Temperature	-65℃ to 150℃
Humidity	- Operating: 10% to 90% RH, non-condensing - Storage: 10% to 90% RH, non-condensing
ESD	Contact discharge 6kV, air discharge 8kV

1.2. 3 Software and driver support

Calibration	4 /9/25 points calibration
OS support	- MS-DOS 6.22 - Microsoft Windows Series... - Windows CE 4.0/4.2/5.0/6.0,.. - Linux OS... - Android 4.0/4.1/4.2...
Languages	Utility support multiple languages (English, Traditional Chinese, Simplified Chinese, Arabic, French, German, Greek, Hungarian, Korean, Portuguese, Russia, Spanish, Thai, Turkic)
Sound	Support audio sound and beep sound
Software Utility	- controller setting utility - drawing test - auto pin definition detect
Display support	- Support display rotation - Support multiple monitors - Support split monitor
Right click support	- Auto right click - manual right click

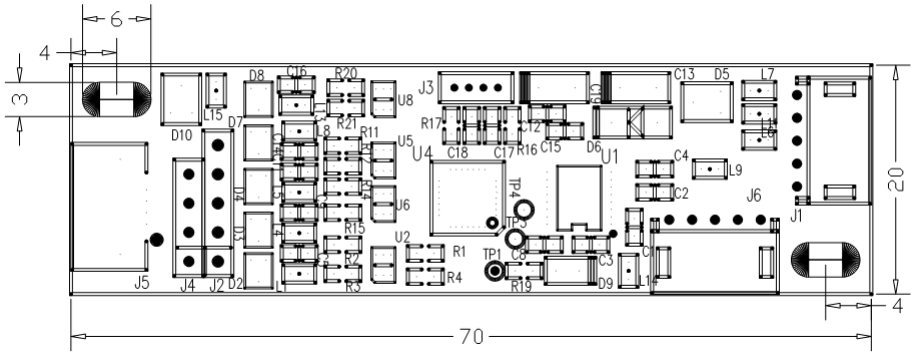
Chapter 2. Mechanical

2.1 CONSTRUCTION

- Two-layers surface-mount PCB design

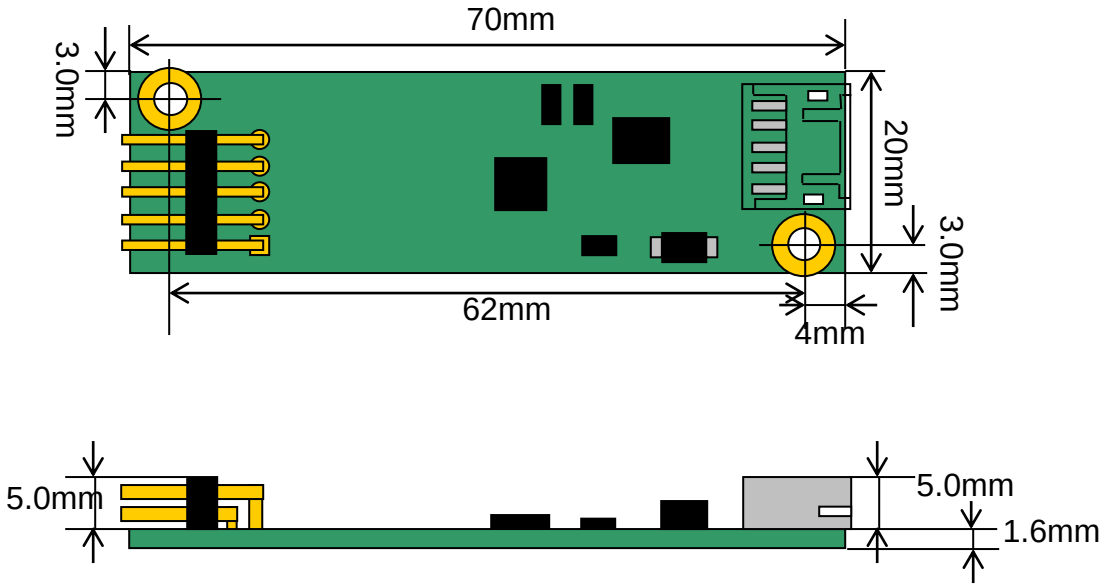
2.2 MECHANICAL DRAWING

2.2.1 ST-3100C



- Total Width: 20 mm
- Total Length: 70 mm (include connector)
- Total height: 8.5mm (include Through Hole Lead Trim Length)
- All mounting holes are plated through for chassis ground connection.

2.2.2 ST-3000U



- Total Width: 20 mm
- Total Length: 70 mm (include connector)
- Total height: 8.5mm (include Through Hole Lead Trim Length)
- All mounting holes are plated through for chassis ground connection.

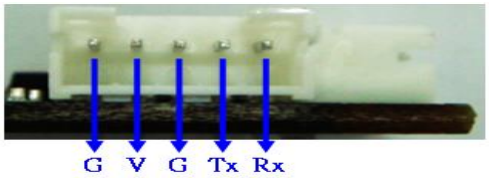
Chapter 3. Connections

3.1 USB andRS-232 COMMUNICATION(ST-3100C)

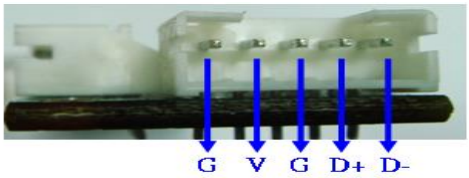
The connector configuration permits the controller to be placed in-line between the touch screen and serial I/O attachments

The USB and RS-232 I/O connector, J1/J6 is a 5-pins header(2.0mm pitch). Refer to the following figure for pin number locations.

Pin diagram for USB and RS-232 connector, J1/J6, as viewed from connector mating surfaces



RS-232 Interface



USB Interface

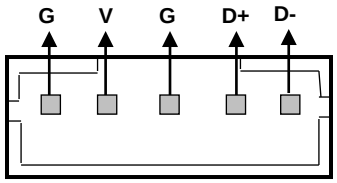
Signal definition for RS-232 interface		
Signal Name	**J6 pin**	**Signal Function**
G	1	Cable shield ground
V	2	+5V power drain from host side.
G	3	Signal ground
TxD	4	Serial data from controller to host
RxD	5	Serial data from host to controller
Signal definition for USB interface		
Signal Name	**J1 pin**	**Signal Function**
G	1	Cable shield ground
V	2	+5V power drain from host USB port
G	3	Signal ground
D+	4	USB bus signal D+
D-	5	USB bus signal D-

3.2 USB COMMUNICATION(ST-3000U)

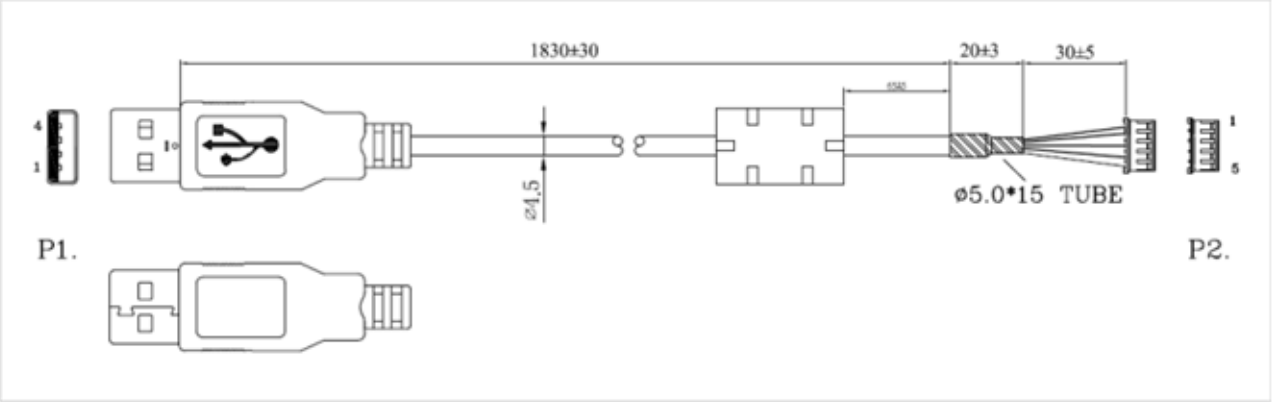
The connector configuration permits the controller to be placed in-line between the touch screen and serial I/O attachments

The USB I/O connector, J1, is a 5-pins header(2.0mm pitch). Refer to the following figure for pin number locations.

Pin diagram for USB connector, J1, as viewed from connector mating surfaces



Signal definition for USB interface		
Signal Name	**J1 pin**	**Signal Function**
G	1	Cable shield ground
V	2	+5V power drain from host USB port
G	3	Signal ground
D+	4	USB bus signal D+
D-	5	USB bus signal D-

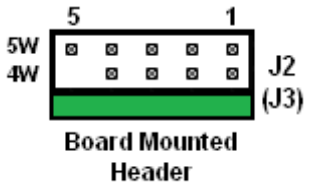


PIN ASSIGNMENT

USB AM		HOUSING
1	RED	4
2	WHITE	1
3	GREEN	2
4	BLACK	3
SHIELD		5

3.2 SENSOR CONNECTION

The touch screen connector, J3, is a dual row by five-position header with 0.025-inch square pins spaced on 0.1 inch centers. 5W sensor must be connected to the upper row of the connector. 4W sensor must be connected to the low row of the connector. The pins are numbered as shown in the figure.



The 5 Wire Touch screen connector, J3 upper row, and signal descriptions

*Note : Pin 5,4,2,1 can be redefinition using ***autodetect.exe*** utility software

Signal name	J3 pin	Signal function
LR(Y-)	5	Connect to touch screen Lower Right Conner of glass layer
LL(X-)	4	Connect to touch screen Lower Left Conner of glass layer
WIPPER	3	Connect to touch screen film layer
UR(Y+)	2	Connect to touch screen Upper Right Conner of glass layer
UL(X+)	1	Connect to touch screen Upper Left Conner of glass layer

The 4 Wire Touch screen connector, J3 lower row, and signal descriptions

*Note : Pin 4,3,2,1 can be redefinition using ***autodetect.exe*** utility software.

Signal name	J3 pin	Signal function
None	5	Leave this pin not connect.
Y-	4	Connect to 4 Wire touch screen Y-
X-	3	Connect to 4 Wire touch screen X-
Y+	2	Connect to 4 Wire touch screen Y+
X+	1	Connect to 4 Wire touch screen X+

Chapter 4. Data protocol

4.1 COMMUNICATION

The ST-3000U Touch Controller Board supports USB interface. The USB support HID-MOUSE and HID-DIGITIZER, the controller can be configured to power-up as either of this two type devices but the factory default is HID-MOUSE.

4.2 DATA FORMAT

The touch report data format for each communication protocol is defined below. The HID-MOUSE and HID-DIGITIZER are compatible with intrinsic drivers of Windows®

4.2.1 USB Report Packet

Byte	**Bit field (Bit7-Bit0)**								**Description**
0	1	D	0	1	1	0	0	R	D = 1 when touched = 0 when no touch R = 1 when generate right click = 0 when no right click
1	X7	X6	X5	X4	X3	X2	X1	X0	X Axis Coordinate
2	0	0	0	0	X11	X10	X9	X8	X range = 0 to 4095
3	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0	Y Axis Coordinate
4	0	0	0	0	Y11	Y10	Y9	Y8	Y range = 0 to 4095

Note:

1. Please execute calibration process at least once.

2. RCS1100 can emulate “Right” button click. To generate a “Right” button event just press the sensor statically on the same position for a short while.

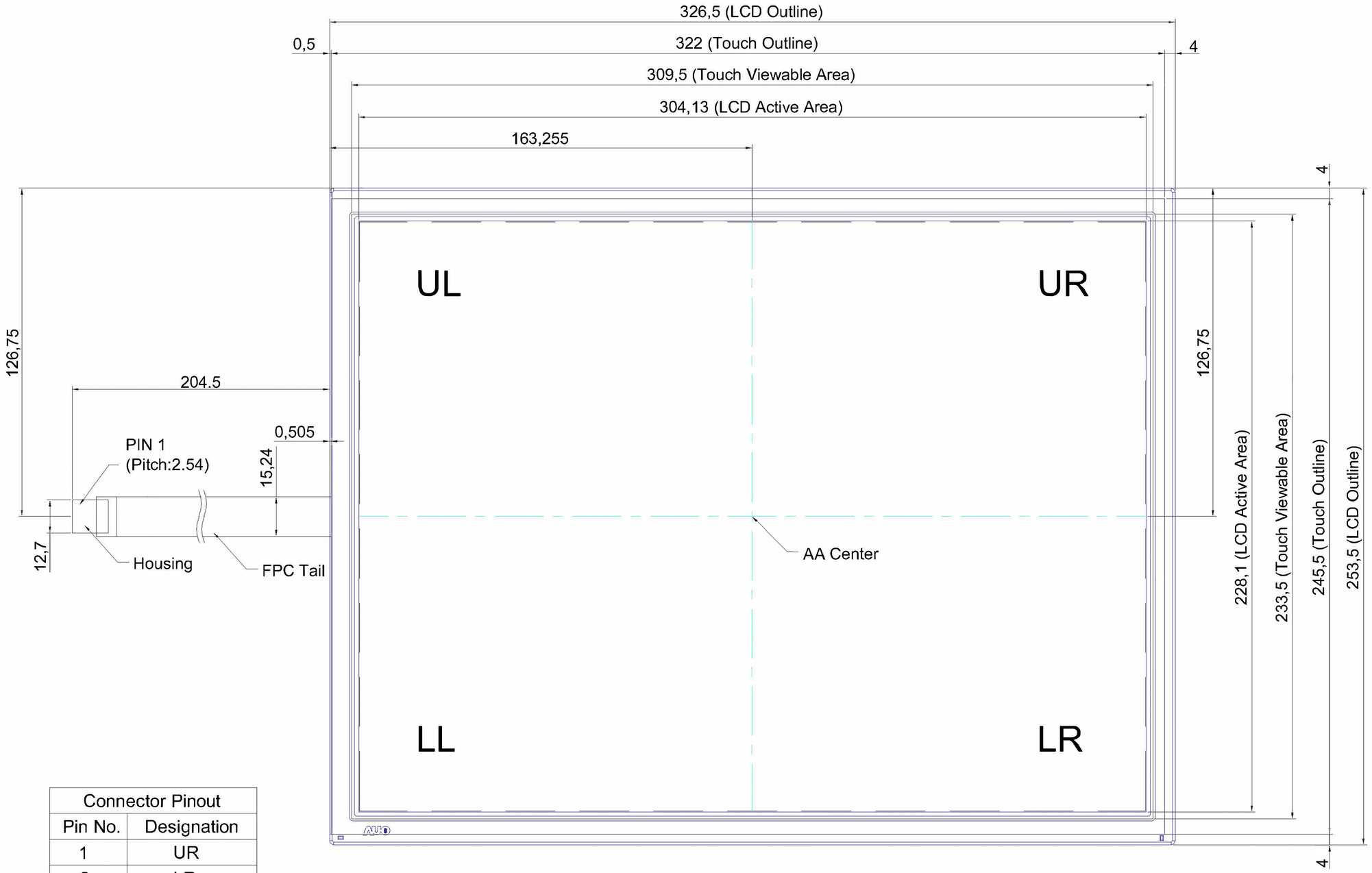
3. Our USB controller support Microsoft standard HID mouse mode, generally you can plug and play the touch controller without installing extra driver on Windows.

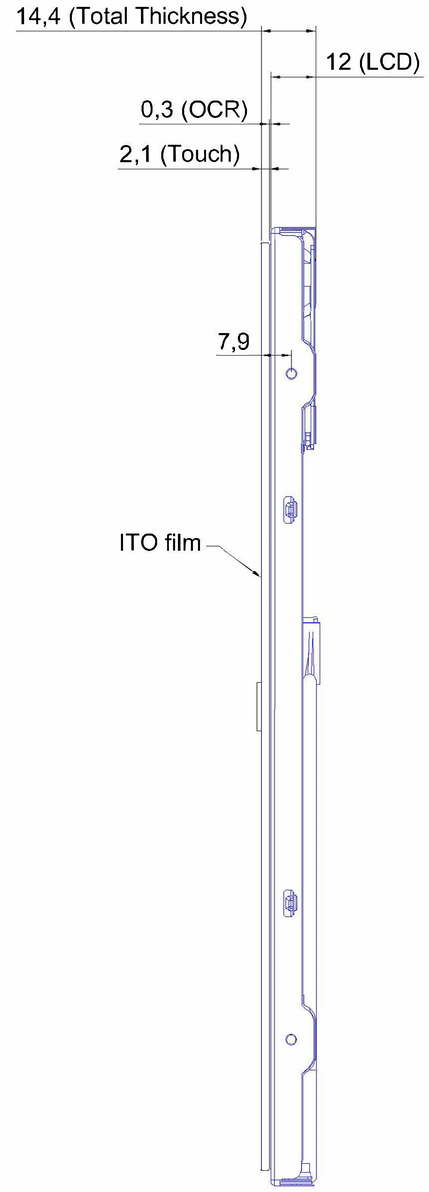
4.2.2 RS-232 Report Packet

Byte	Bit field (Bit7-Bit0)								Description
0	1	D	0	1	1	0	0	R	D = 1 when touched = 0 when no touch R = 1 when generate right click = 0 when no right click
1	0	X6	X5	X4	X3	X2	X1	X0	X Axis Coordinate
2	0	0	0	X11	X10	X9	X8	X7	X range = 0 to 4095
3	0	Y6	Y5	Y4	Y3	Y2	Y1	Y0	Y Axis Coordinate
4	0	0	0	Y11	Y10	Y9	Y8	Y7	Y range = 0 to 4095

Note:

1. Please execute calibration process at least once.
2. RCS1100 can emulate “Right” button click. To generate a “Right” button event just press the sensor statically on the same position for a short while.





Connector Pinout	
Pin No.	Designation
1	UR
2	LR
3	SG
4	UL
5	LL

NOTES:
1. ARES model No.: ET150C06 V0
2. Use LCD AUO G150XTN06.2 1600nits, 5W RTP 10150084