
PART NO.: AG170TA-A07N-ROM-V1 (optical bond)
AG170TA-A07N-RTM-V1 (perimeter bond)

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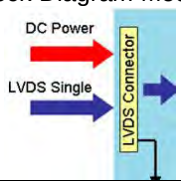
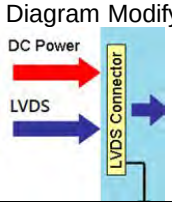
**( ) Preliminary Specification**
**(V) Final Specification**

| | |
|---|---|
| **Module** | 17.0” SXGA Color TFT-LCD Module |
| **Model Name** | AG170TA-A07N-ROM-V1 // AG170TA-A07N-RTM-V1 |

| | | | |
|---|---|---|---|
| **Customer** | **Date** | **Checked & Approved by** | **Date** |
| _____ | _____ | ***Crystal Hsieh*** | ***2017/09/09*** |
| **Checked & Approved by** | **Date** | **Prepared by** | **Date** |
| _____ | _____ | ***BinJou Huang*** | ***2017/09/09*** |

# Contents

# Record of Revision

| Version and Date | Page | Old description | New Description |
|---|---|---|---|
| 1.0 2017/09/09 | All | First Edition for Customer | |
| 1.1 2017/10/03 | 9 | Functional Block Diagram Modify   | Functional Block Diagram Modify   |
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# 1. Handling Precautions

1) Since front polarizer is easily damaged, pay attention 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 other soft cloth.
5) Since the panel is made of glass, it may break or crack 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 or modify the Module Assembly.
8) Do not press the reflector sheet at the back of the module to any directions.
9) In case if a Module has to be put back into the packing container slot after once it was taken out from the container, do not press the center of the LED light bar edge. Instead, press at the far ends of the LED light bar 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) After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
12) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950-1 or UL60950-1), or be applied exemption.
13) Continuous operating TFT-LCD display under high temperature environment may accelerate LED exhaustion and reduce luminance dramatically.
14) Continuous displaying fixed pattern may induce image sticking. It’s recommended to use screen saver or shuffle content periodically if fixed pattern is displayed on the screen.

## 2. General Description

This specification applies to the 17 inch Color TFT-LCD Module AG170TA-A07N-ROM-V1 (AG170TA-A07N-RTM-V1) .

The display supports the SXGA (1280(H) x 1024(V)) screen format and 16.7M colors. All input signals are Dual Channel LVDS interface compatible.

### 2.1 Display Characteristics

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

| Items | Unit | Specifications |
|---|---|---|
| Screen Diagonal | [mm] | 432 (17.0") |
| Active Area | [mm] | 337.920(H) × 270.336(V) |
| Pixels H x V | | 1280 × 3(RGB) × 1024 |
| Pixel Pitch | [mm] | 0.264(per one triad) × 0.264 |
| Pixel Arrangement | | R.G.B. Vertical Stripe |
| Display Mode | | Normally White |
| White Luminance | [cd/m2] | 800 (Typ) |
| Contrast Ratio | | 700 : 1 (Typ) |
| Optical Response Time | [msec] | 20 |
| Nominal Input Voltage VDD | [Volt] | +5.0 (Typ) |
| Power Consumption | [Watt] | Logic 4.5W (max) @ All Black pattern (max.)<br>BL 13.6W (max.) (w/o LED driver board) |
| Weight | [Grams] | 1590 (Max.) |
| Physical Size (H x V x D) | [mm] | 358.5(H) x 296.5(V) Typ. x 12.45(D) typ |
| Electrical Interface | | Dual Channel LVDS |
| Surface Treatment | | Anti-glare type, Hardness 3H |
| Support Color | | 16.7M colors (8-bits) |
| Temperature Range<br>Operating<br>Storage (Non-Operating) | <br>[ ]<br>[ ] | <br>-30 to +85<br>-30 to +85 |
| RoHS Compliance | | RoHS Compliance |

## 2.2 Optical Characteristics

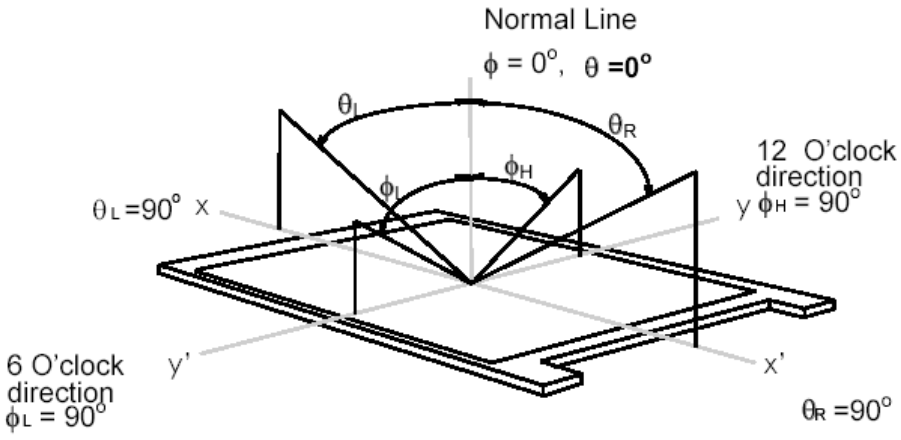
The optical characteristics are measured under stable conditions at 25 (Room Temperature):

| Item | Unit | Conditions | Min. | Typ. | Max. | Note |
|---|---|---|---|---|---|---|
| Viewing Angle | [degree] | Horizontal (Right)<br>CR = 10 (Left) | 70<br>70 | 80<br>80 | - | **1** |
| | | Vertical (Up)<br>CR = 10 (Down) | 50<br>60 | 70<br>70 | - | |
| Luminance Uniformity | [%] | 9 Points | 75 | 80 | - | **2, 3** |
| Contrast Ratio | | | 500 | 700 | - | **4** |
| White Luminance | [cd/m$^2$] | | 640 | 800 | - | **4** |
| Optical Response Time | [msec] | Rising | - | 15 | - | **5** |
| | | Falling | - | 5 | - | |
| | | Rising + Falling | - | 20 | - | |
| Color / Chromaticity Coordinates (CIE 1931) | | Red x<br>Red y | 0.590<br>0.293 | 0.640<br>0.343 | 0.690<br>0.393 | |
| | | Green x<br>Green y | 0.274<br>0.577 | 0.324<br>0.627 | 0.374<br>0.677 | |
| | | Blue x<br>Blue y | 0.106<br>0.016 | 0.156<br>0.066 | 0.206<br>0.116 | |
| | | White x<br>White y | 0.263<br>0.279 | 0.313<br>0.329 | 0.363<br>0.379 | |
| NTSC | [%] | | | 72 | | |

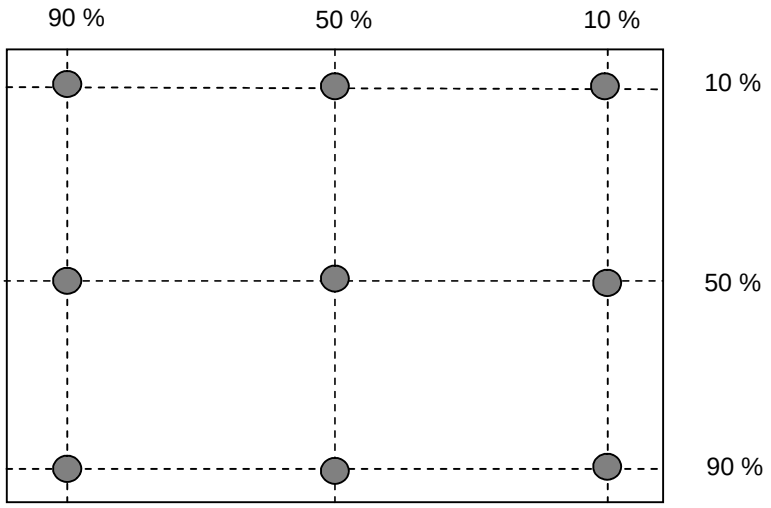
Optical Equipment: BM-5A, BM-7, PR880, or equivalent

**Note 1:** Definition of viewing angle

Viewing angle is the measurement of contrast ratio ≥10, at the screen center, over a 180° horizon tal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as follows; 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 about its center to develop the desired measurement viewing angle.




**Note 2:** 9 points position

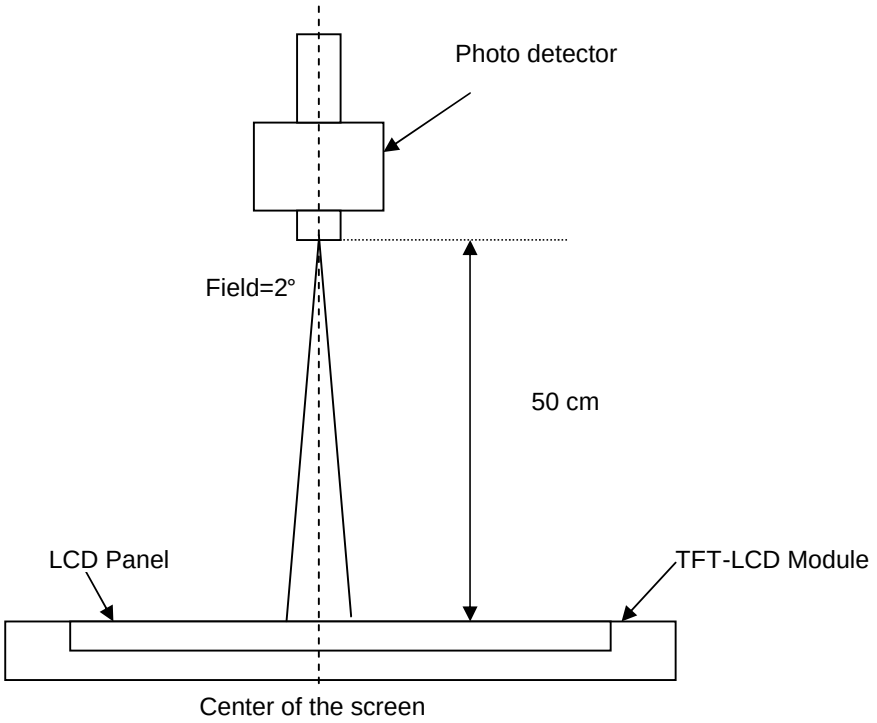



**Note 3:** The luminance uniformity of 9 points is defined by dividing the maximum luminance values by the minimum test point luminance

$$\delta_{W9} = \frac{\text{Minimum Luminance of 9 points}}{\text{Maximum Luminance of 9 points}}$$

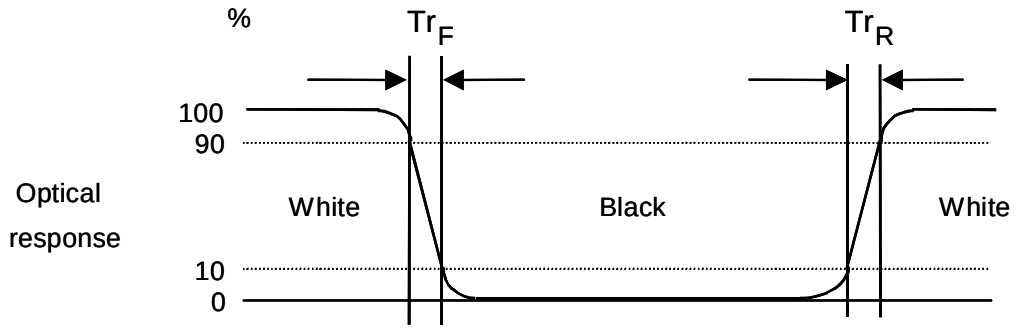
**Note 4:** Measurement method

The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a stable, windless and dark room.



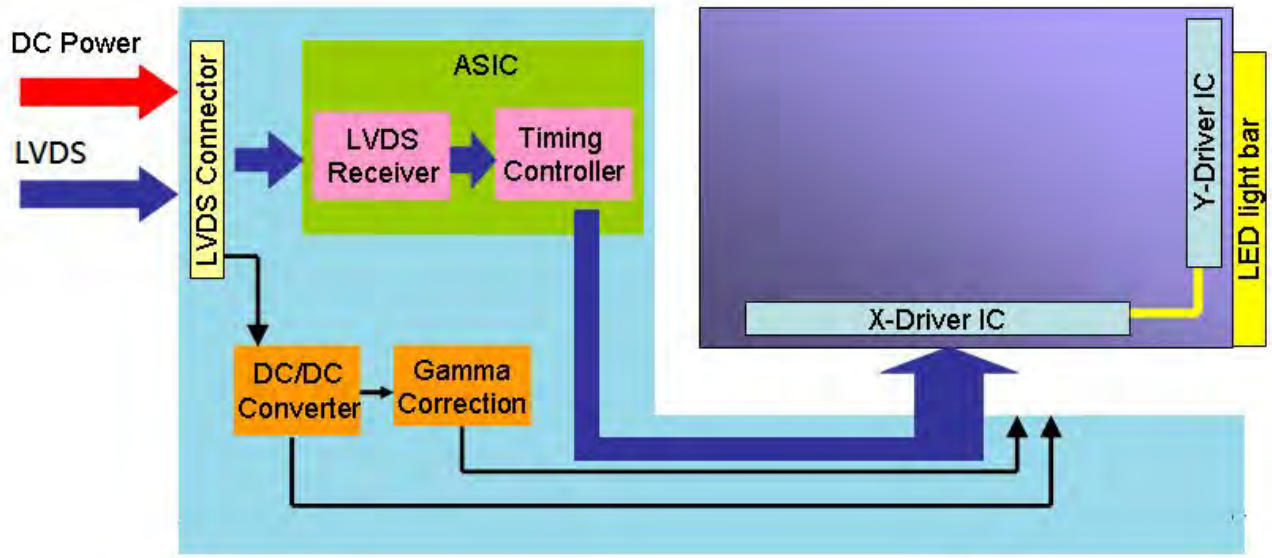

**Note 5:** Definition of response time:

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



## 3. Functional Block Diagram

The following diagram shows the functional block of the 17.0 inches Color TFT-LCD Module:



# 4. Absolute Maximum Ratings

An absolute maximum ratings of the module is as following:

## 4.1 TFT LCD Module

| Item | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| Logic/LCD Drive Voltage | VDD | -0.3 | +6 | [Volt] | ***Note 1,2*** |
| Signal Voltage | RxOINi-/+, RxEINi-/+ | -0.3 | 4 | [Volt] | ***Note 1,2, i=0,1,2,3*** |
| Signal Voltage | RxOCLKON-/+ RxECLKIN-/+ | -0.3 | 4 | [Volt] | ***Note 1,2*** |

## 4.2 Backlight Unit

| Item | Symbol | Min | Typ | Unit | Conditions |
|---|---|---|---|---|---|
| LED Forward Current | $I_F$ | - | 100 | [mA] | ***Note 1,2*** |

## 4.3 Absolute Ratings of Environment

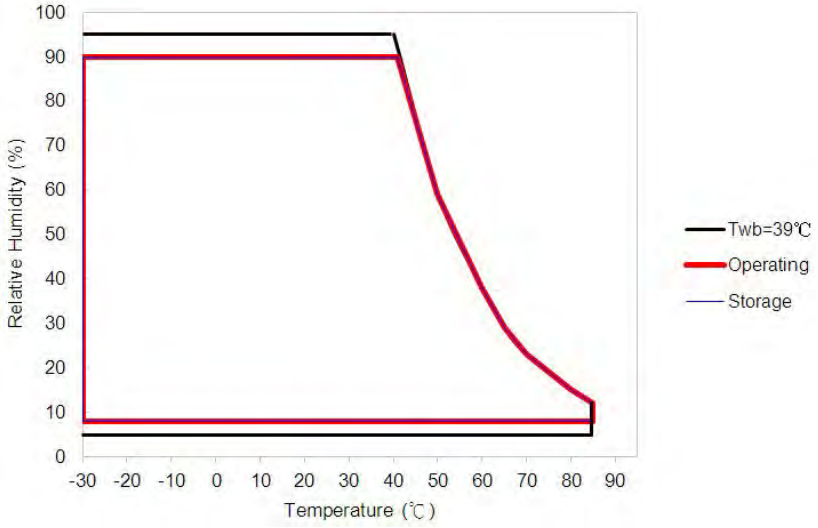
| Item | Symbol | Min | Max | Unit | Conditions |
|---|---|---|---|---|---|
| Operating Temperature | TOP | -30 | +85 | [°C] | ***Note 3*** |
| Operation Humidity | HOP | 8 | 90 | [%RH] | |
| Storage Temperature | TST | -30 | +85 | [°C] | |
| Storage Humidity | HST | 8 | 90 | [%RH] | |

**Note 1:** With in Ta (25 )

**Note 2:** Permanent damage to the device may occur if exceeding maximum values

**Note 3:** Temperature and relative humidity range are shown as the below

1. 90% RH Max
2. Max wet-bulb temperature at 39 or less. ( Ta 39 )
3. No condensation



# 5. Electrical Characteristics

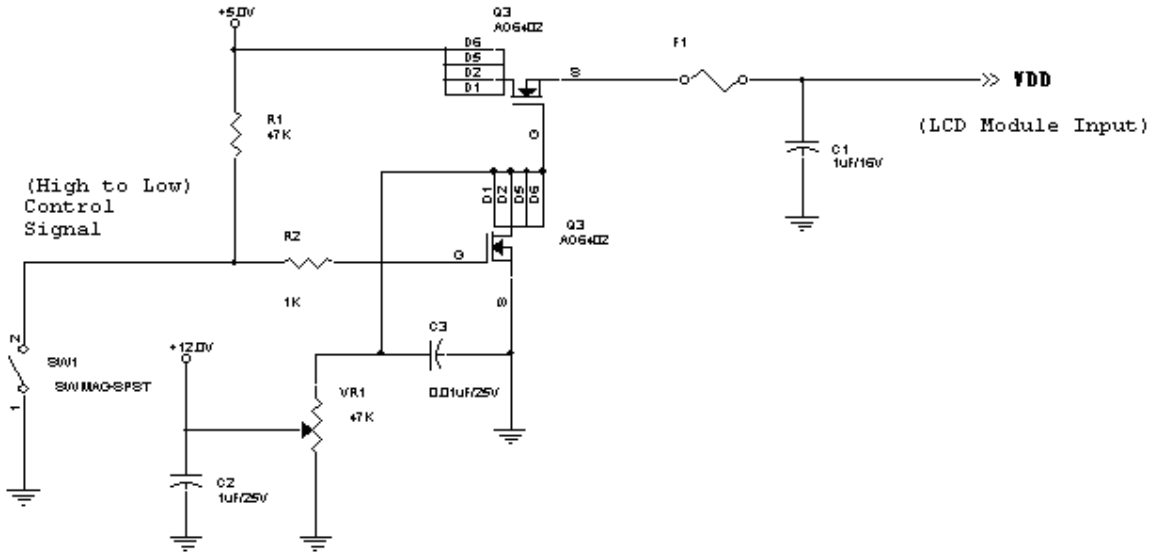
## 5.1 TFT LCD Module

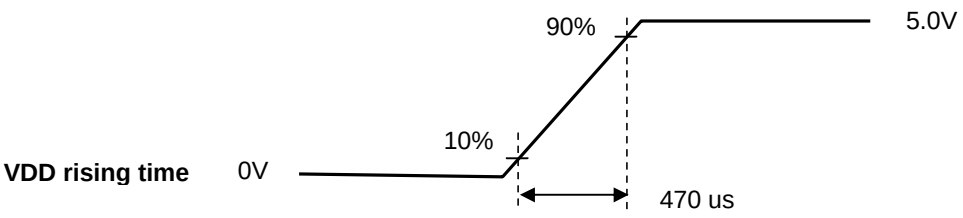
### 5.1.1 Power Specification

Input power specifications are as follows:

| Symble | Parameter | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| VDD | Logic/LCD Drive Voltage | 4.5 | 5.0 | 5.5 | [Volt] | ±10% |
| IDD | Input Current | - | 0.8 | 1.0 | [A] | VDD=5V , All Black Pattern, at 60Hz |
| IRush | Inrush Current | - | - | 2.5 | [A] | Note |
| PDD | VDD Power | - | 4 | 4.5 | [Watt] | VDD=5V , All Black Pattern, at 60Hz |
| VDDrp | Allowable Logic/LCD Drive Ripple Voltage | - | - | 200 | [mV] p-p | VDD=5V , All Black Pattern, at 60Hz |

**Note:** Measurement conditions:



### 5.1.2 Signal Electrical Characteristics

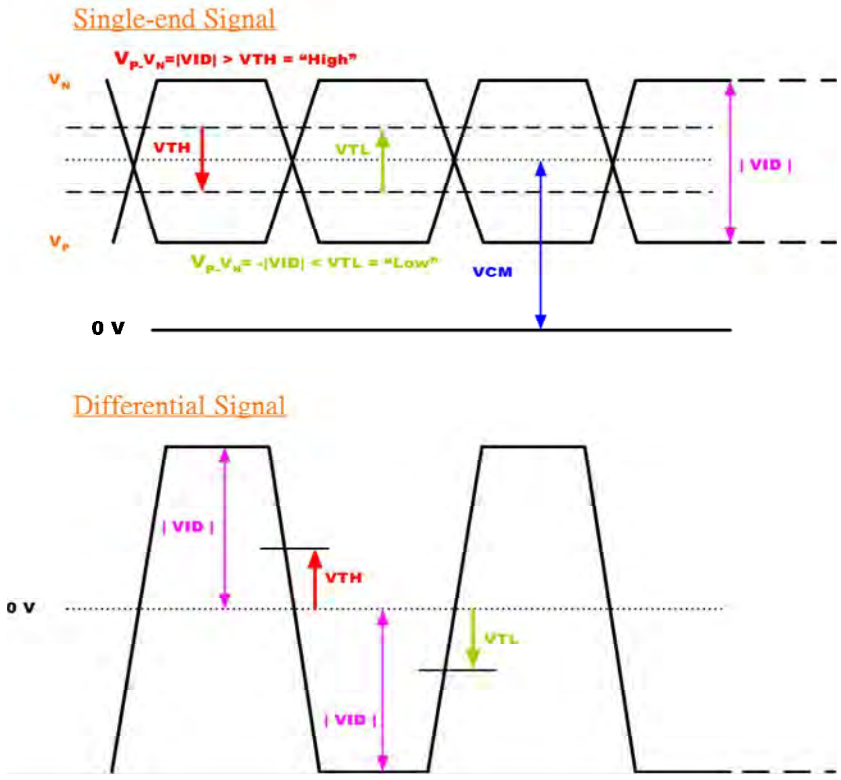
Input signals shall be low or Hi-Z state when VDD is off.

It is recommended to refer the specifications of SN75LVDS82DGG (Texas Instruments) in detail.

Each signal characteristics are as follows;

| Symbol | Parameter | Min | Typ | Max | Units | Condition |
|---|---|---|---|---|---|---|
| $V_{TH}$ | Differential Input High Threshold | - | - | +100 | [mV] | $V_{CM}$ = 1.2V<br>***Note*** |
| $V_{TL}$ | Differential Input Low Threshold | -100 | - | - | [mV] | $V_{CM}$ = 1.2V<br>***Note*** |
| $V_{ID}$ | Input Differential Voltage | 100 | 400 | 600 | [mV] | ***Note*** |
| $V_{CM}$ | Differential Input Common Mode Voltage | +1.0 | +1.2 | +1.5 | [V] | $V_{TH}$-$V_{TL}$ = 200mV (max)<br>***Note*** |

**Note:** LVDS Signal Waveform



### **5.1.3** Backlight Unit

Parameter guideline for LED driving is under stable conditions at 25 (Room Temperature)

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| $IR_{LED}$ | LED Operation Current | - | 100 | - | [mA] Note 1 | **Operating with fixed driving current** |
| $V_{LB}$ | Light Bar Operation Voltage (for reference) | - | 31 | 34 | [Volt] Note 2 | |
| $P_{BLU}$ | BLU Power consumption (for reference) | - | 12.4 | 13.6 | [Watt] | |
| $LT_{LED}$ | LED life Time (Typical) | 50,000 | - | - | [Hour] Note 3 | |

Note 1 :The specified current is input LED chip 100% duty current.

Note 2 : The value showed in the table is one light bar's operation voltage.

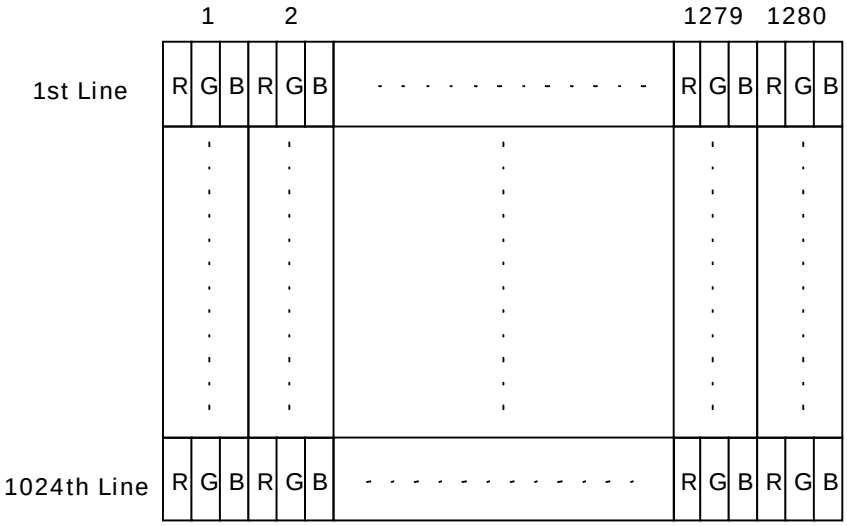
Note 3 : Definition of life time : brightness becomes 50% of its original value.

Note 4 : Each LED light bar consists of 40 pcs LED package ( 4 strings x 10 pcs / string ).

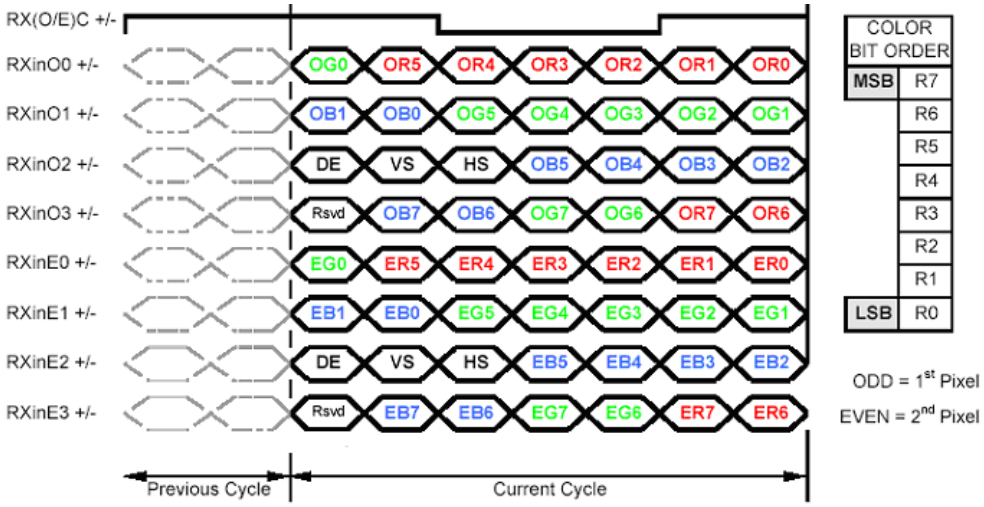
# 6. Signal Characteristic

## 6.1 Pixel Format Image

Following figure shows the relationship of the input signals and LCD pixel format.




## 6.2 The Input Data Format




**Note1:** Normally, DE, VS, HS on EVEN channel are not used.

**Note2:** Please follow PSWG.

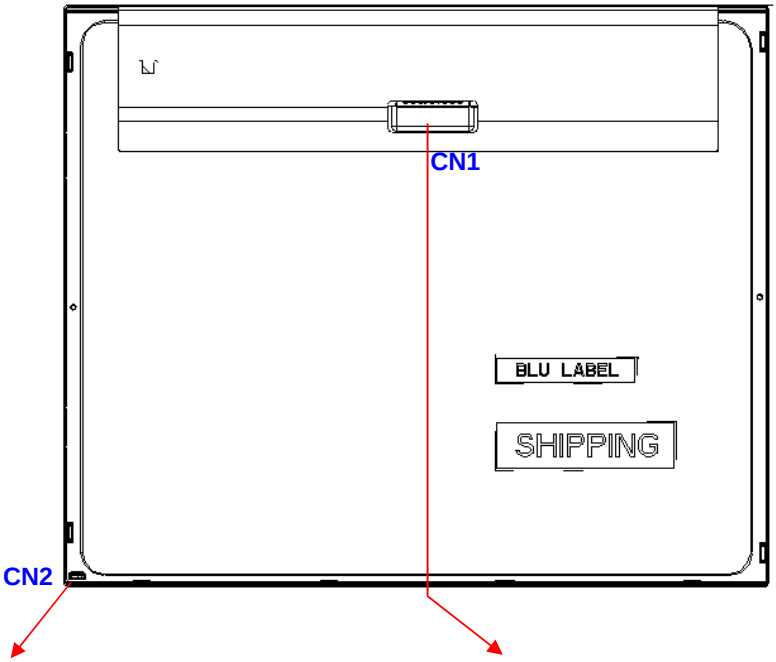
**Note3:** 8-bit in

## 6.3 Signal Description

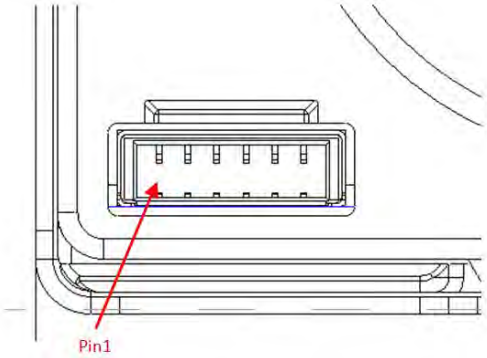
The module is using a pair of LVDS receiver SN75LVDS82DGG (Texas Instruments) or compatible. LVDS is a differential signal technology for LCD interface and high speed data transfer device. LVDS transmitter shall be SN75LVDS82DGG (negative edge sampling) or compatible**.** The first LVDS port (RxOxxx) transmits odd pixels while the second LVDS port (RxExxx) transmits even pixels.

**LVDS Connector Pin Assignment (CN1)**

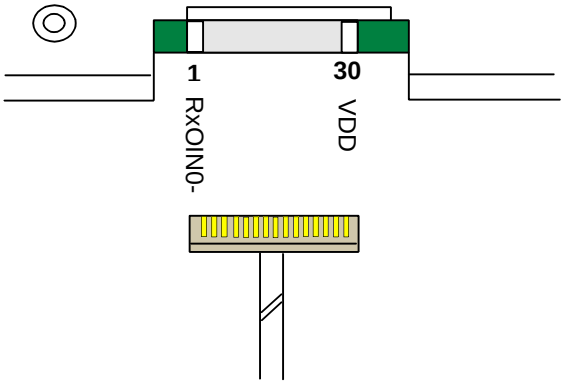
| PIN # | SIGNAL NAME | DESCRIPTION |
|---|---|---|
| 1 | RxOIN0- | Negative LVDS differential data input (Odd data) |
| 2 | RxOIN0+ | Positive LVDS differential data input (Odd data) |
| 3 | RxOIN1- | Negative LVDS differential data input (Odd data) |
| 4 | RxOIN1+ | Positive LVDS differential data input (Odd data) |
| 5 | RxOIN2- | Negative LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG) |
| 6 | RxOIN2+ | Positive LVDS differential data input (Odd data, H-Sync,V-Sync,DSPTMG) |
| 7 | GND | Power Ground |
| 8 | RxOCLKIN- | Negative LVDS differential clock input (Odd clock) |
| 9 | RxOCLKIN+ | Positive LVDS differential clock input (Odd clock) |
| 10 | RxOIN3- | Negative LVDS differential data input (Odd data) |
| 11 | RxOIN3+ | Positive LVDS differential data input (Odd data) |
| 12 | RxEIN0- | Negative LVDS differential data input (Even data) |
| 13 | RxEIN0+ | Positive LVDS differential data input (Even data) |
| 14 | GND | Power Ground |
| 15 | RxEIN1- | Negative LVDS differential data input (Even data) |
| 16 | RxEIN1+ | Positive LVDS differential data input (Even data) |
| 17 | GND | Power Ground |
| 18 | RxEIN2- | Negative LVDS differential data input (Even data) |
| 19 | RxEIN2+ | Positive LVDS differential data input (Even data) |
| 20 | RxECLKIN- | Negative LVDS differential clock input (Even clock) |
| 21 | RxECLKIN+ | Positive LVDS differential clock input (Even clock) |
| 22 | RxEIN3- | Negative LVDS differential data input (Even data) |
| 23 | RxEIN3+ | Positive LVDS differential data input (Even data) |
| 24 | GND | Power Ground |
| 25 | GND (AGMODE) | Power Ground (For AGD test Aging mode ) |
| 26 | GND | Power Ground |
| 27 | GND | Power Ground |
| 28 | VDD | +5.0V Power Supply |
| 29 | VDD | +5.0V Power Supply |
| 30 | VDD | +5.0V Power Supply |




**LED Driver Connector (CN2)**




**LVDS Connector (CN1)**



## 6.4 Timing Characteristics

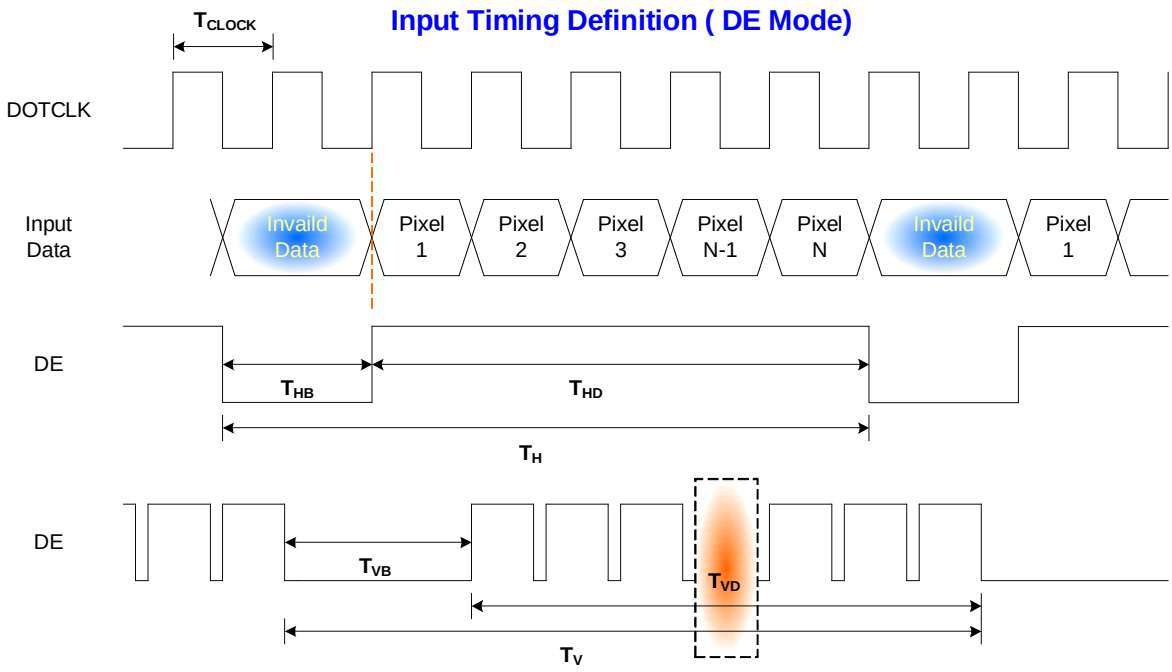
### 6.4.1 Timing Characteristics

Basically, interface timings described here is not actual input timing of LCD module but output timing of SN75LVDS82DGG (Texas Instruments) or equivalent.

| Signal | Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Vertical Section | Period | Tv | 1034 | 1066 | 1150 | Th |
| | Active | Tdisp(v) | 1024 | 1024 | 1024 | Th |
| | Blanking | Tbp(v)+Tfp(v)+PWvs | 10 | 42 | 126 | Th |
| Horizontal Section | Period | Th | 750 | 844 | 2048 | Tclk |
| | Active | Tdisp(h) | 640 | 640 | 640 | Tclk |
| | Blanking | Tbp(h)+Tfp(h)+PWhs | 110 | 204 | 400 | Tclk |
| Clock | Period | Tclk | 25 | 18.52 | 11 | ns |
| | Frequency | Freq | 40 | 54 | 91 | MHz |
| Frame rate | Frame rate | F | 51 | 60 | 76 | Hz |

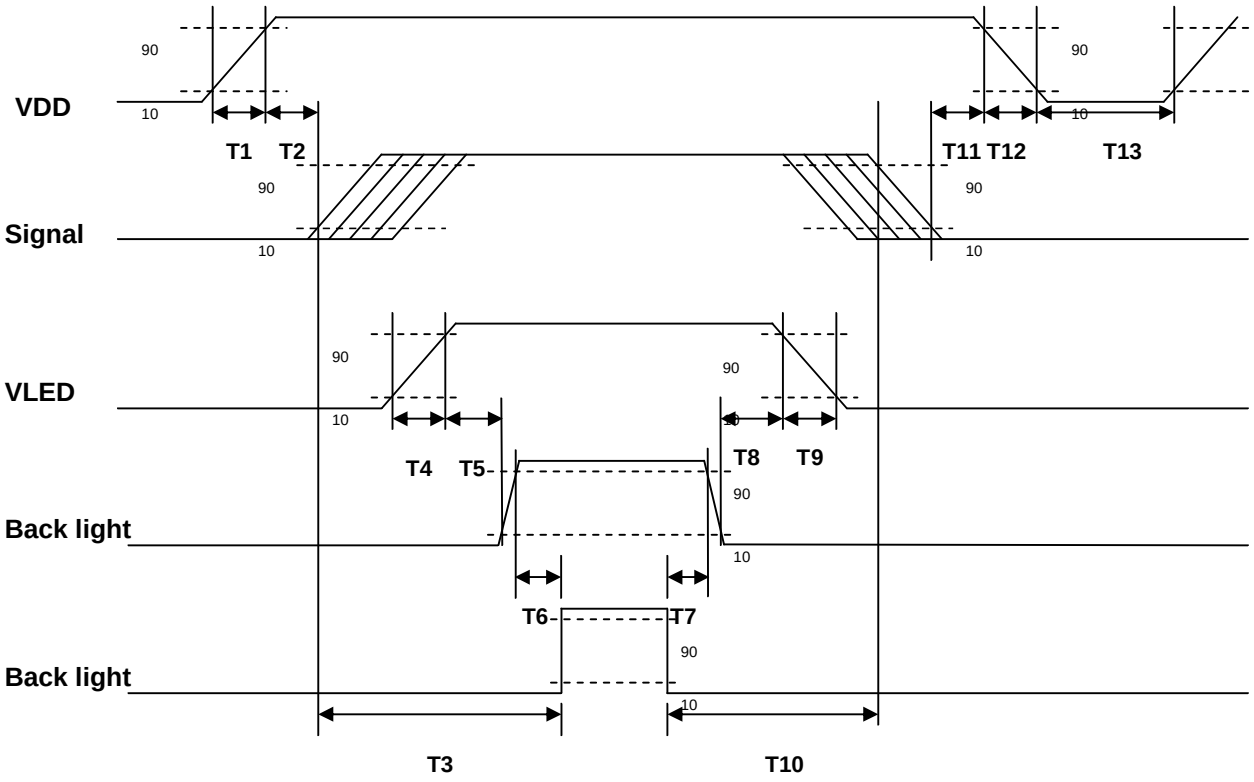
**Note** : DE mode only

### 6.4.2 Timing Diagram



## 6.5 Power ON/OFF Sequence

VDD power and LED on/off sequence is as follows. 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 Sequence Timing**

| Parameter | Value | | | Unit |
|---|---|---|---|---|
| | Min. | Typ. | Max. | |
| T1 | 0.5 | - | 10 | [ms] |
| T2 | 30 | 40 | 50 | [ms] |
| T3 | 200 | - | - | [ms] |
| T4 | 0.5 | - | 10 | [ms] |
| T5 | 10 | - | - | [ms] |
| T6 | 10 | - | - | [ms] |
| T7 | 0 | - | - | [ms] |
| T8 | 10 | - | - | [ms] |
| T9 | - | - | 10 | [ms] |
| T10 | 110 | - | - | [ms] |
| T11 | 0 | 16 | 50 | [ms] |
| T12 | - | - | 10 | [ms] |
| T13 | 1000 | - | - | [ms] |

# 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

### 7.1.1 Connector

| Connector Name / Designation | Interface Connector |
|---|---|
| Manufacturer | HRS |
| Type Part Number | MDF76URW-30S-1H(55) |
| Mating Housing Part Number | MDF76-30P-1C |

### 7.1.2 LVDS Pin Assignment (CN1)

| Pin# | Signal Name | Pin# | Signal Name |
|---|---|---|---|
| 1 | RxOIN0- | 2 | RxOIN0+ |
| 3 | RxOIN1- | 4 | RxOIN1+ |
| 5 | RxOIN2- | 6 | RxOIN2+ |
| 7 | GND | 8 | RxOCLKIN- |
| 9 | RxOCLKIN+ | 10 | RxOIN3- |
| 11 | RxOIN3+ | 12 | RxEIN0- |
| 13 | RxEIN0+ | 14 | GND |
| 15 | RxEIN1- | 16 | RxEIN1+ |
| 17 | GND | 18 | RxEIN2- |
| 19 | RxEIN2+ | 20 | RxECLKIN- |
| 21 | RxECLKIN+ | 22 | RxEIN3- |
| 23 | RxEIN3+ | 24 | GND |
| 25 | GND (AGMODE) | 26 | GND |
| 27 | GND | 28 | VDD |
| 29 | VDD | 30 | VDD |

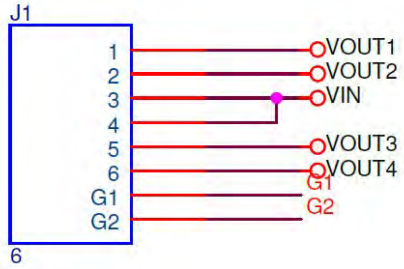
## 7.2 Backlight Unit

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

| Connector Name / Designation | LED Connector |
|---|---|
| Manufacturer | E&T |
| Connector Model Number | 3707K-S06N-00L |

### 7.2.1 Pin Assignment (CN2)

| Pin No. | Signal Name |
|---|---|
| 1 | VOUT1 |
| 2 | VOUT2 |
| 3 | VIN |
| 4 | VIN |
| 5 | VOUT3 |
| 6 | VOUT4 |



## 8. Reliability Test

Environment test conditions are listed as following table.

| Items | Required Condition | Note |
|---|---|---|
| Temperature Humidity Bias (THB) | Ta= 50℃, 80%RH, 240hours | 2 |
| High Temperature Operation (HTO) | Ta= 85℃, 240hours | 2 |
| Low Temperature Operation (LTO) | Ta= -30℃, 240hours | 2 |
| High Temperature Storage (HTS) | Ta= 85℃, 240hours | 2 |
| Low Temperature Storage (LTS) | Ta= -30℃, 240hours | 2 |
| Vibration Test<br>(Non-operation) | Acceleration: 1.5 Grms<br>Wave: Random<br>Frequency: 10 – 200 Hz<br>Sweep: 30 Minutes each Axis (X, Y, Z) | |
| Shock Test<br>(Non-operation) | Acceleration: 50 G<br>Wave: Half-sine<br>Active Time: 20 ms<br>Direction: ±X, ±Y, ±Z (one time for each Axis) | |
| Thermal Shock Test (TST) | -20℃/ 30min, 60℃/ 30min, 50 cycles | |
| On/Off Test | On/10sec, Off/10sec, 30,000 cycles | |
| ESD | Contact Discharge: ± 8KV, 150pF(330Ω ) 1sec,<br>8 points, 25 times/ point. | 1 |
| | Air Discharge: ± 15KV, 150pF(330Ω ) 1sec<br>8 points, 25 times/ point. | |

Note1: According to EN61000-4-2, ESD class B: Some performance degradation allowed. No data lost Self-recoverable. No hardware failures.

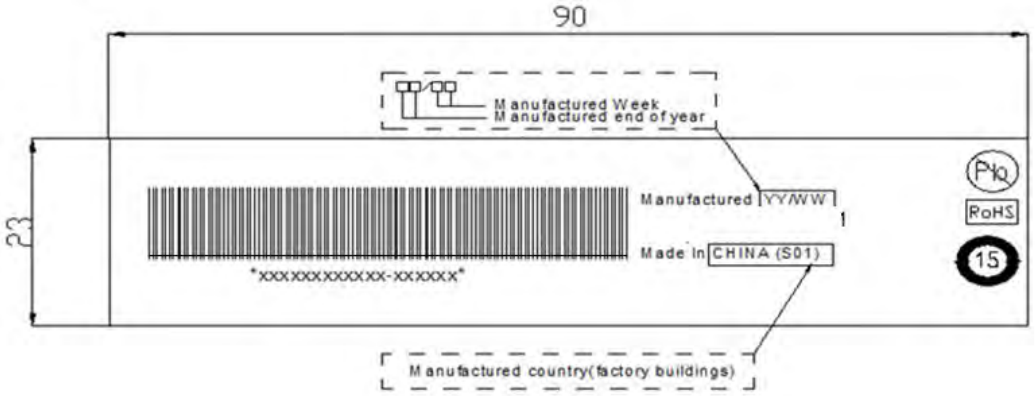
Note2:

- Water condensation is not allowed for each test items.
- Each test is done by new TFT-LCD module. Don't use the same TFT-LCD module repeatedly for reliability test.
- The reliability test is performed only to examine the TFT-LCD module capability.
- To inspect TFT-LCD module after reliability test, please store it at room temperature and room humidity for 24 hours at least in advance.
- No function failure occurs. Mura shall be ignored after high temperature reliability test.

# 9. Label and Packaging

## 9.1 Shipping Label

The shipping label format is shown as below.



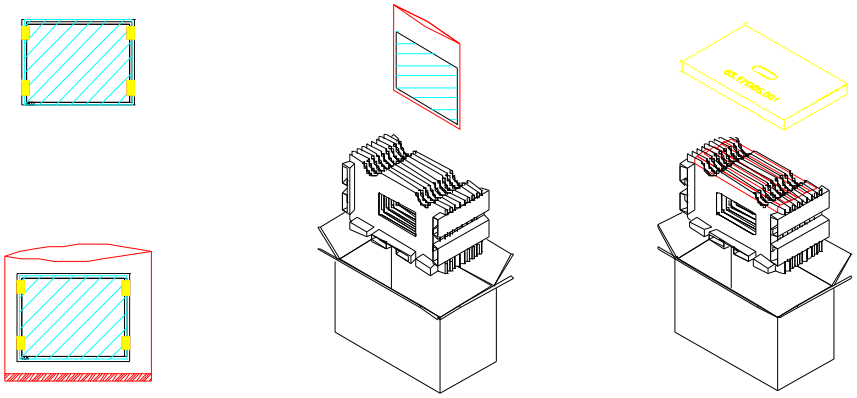

## 9.2 Carton Package

Max capacity：8 TFT-LCD module per carton

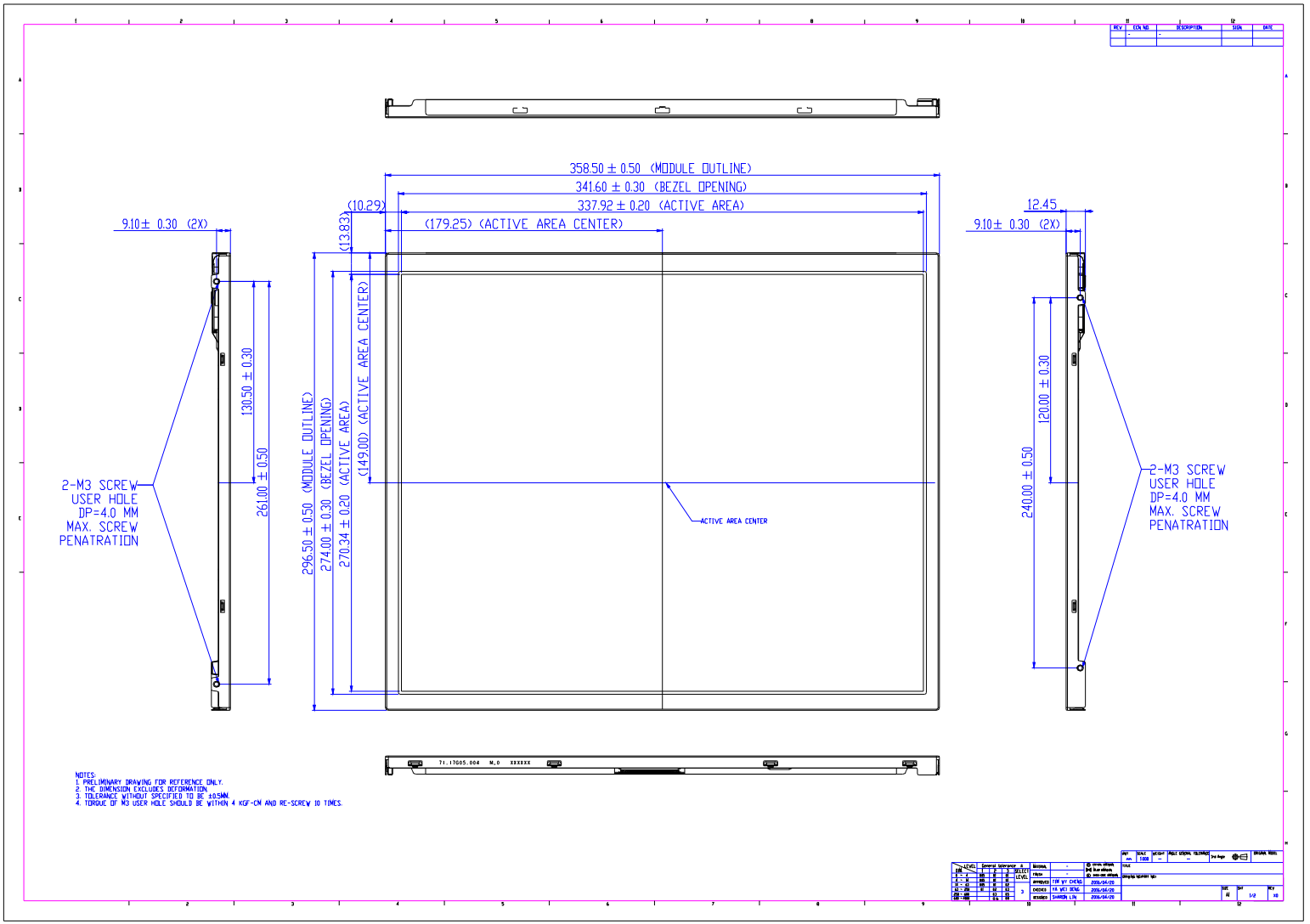
Max weight: 13.5 kg per carton

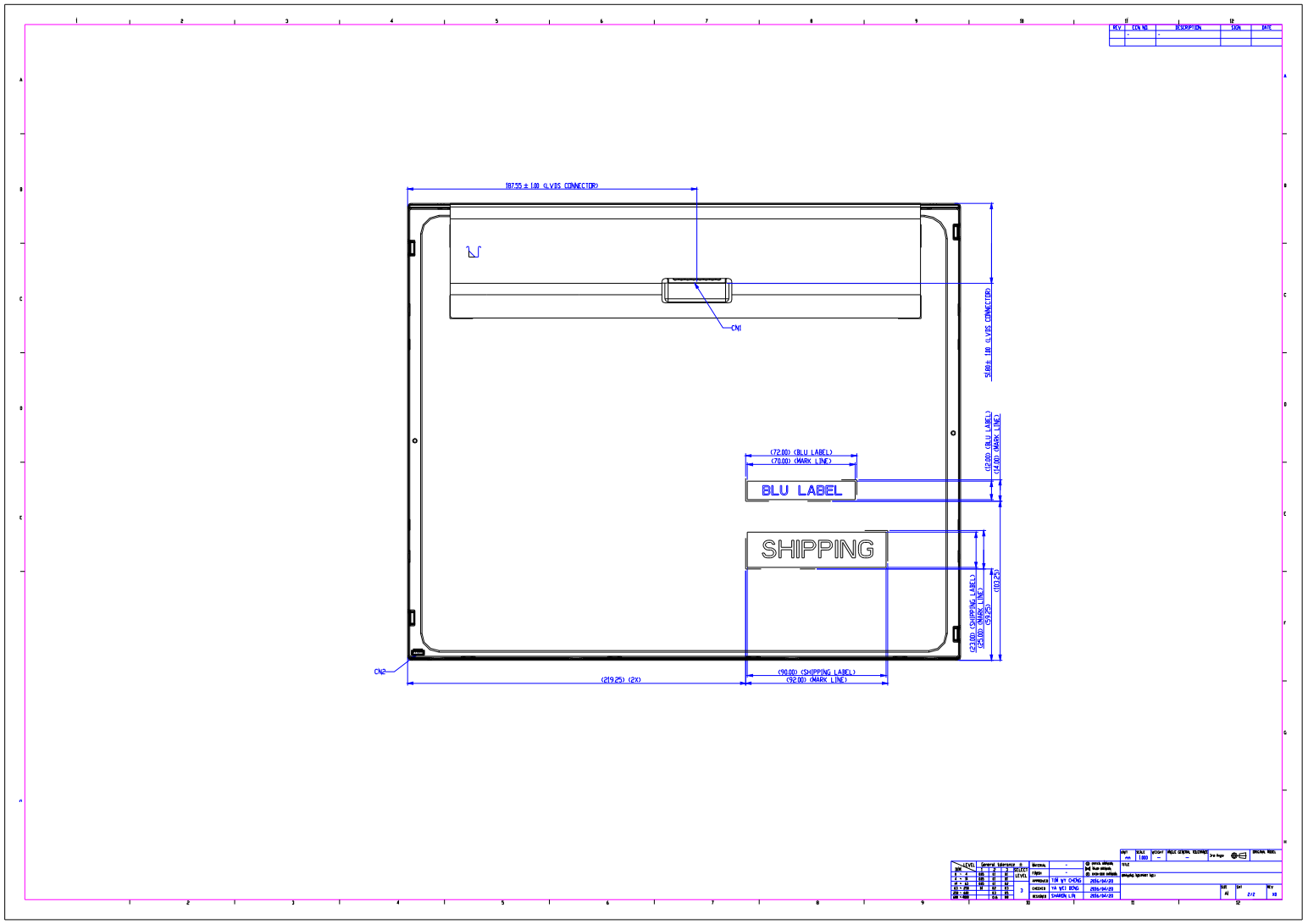
Outside dimension of carton:448(L)mm*283(W)mm*397(H)mm

Pallet size： 1150 mm *910 mm * 138mm



## 10. Mechanical Characteristics




187.55 ± 1.00 (LVDS CONNECTOR)
CN1
CN2
BLU LABEL
SHIPPING
(72.00) (BLU LABEL)
(70.00) (MARK LINE)
(90.00) (SHIPPING LABEL)
(92.00) (MARK LINE)
(219.25) (2X)


# Part No.: AG170M-RTP-USB-EX-V1
# Resistive Touch Screen

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# Record of revisions

| item | date | version | page | summary |
|---|---|---|---|---|
| 1 | 2013/3/13 | 01 | 10 | New establish |
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# Contents

# 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 | 356.00 x 286.50 mm ± 0.30mm |
| Viewable area | 343.00 x 275.50 mm ± 0.20mm |
| Active area | 337.00 x 269.50 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 )

.

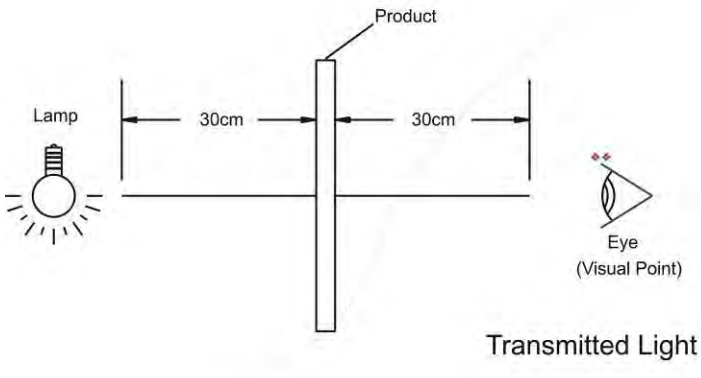



Figure 1.1

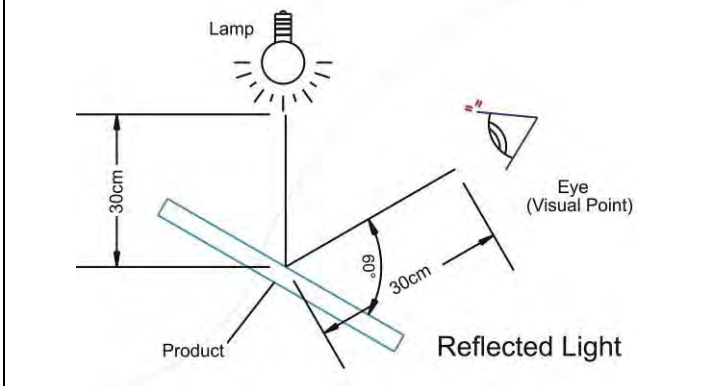



Figure 1.2

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 Impurities :

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 $\phi$ )

(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)

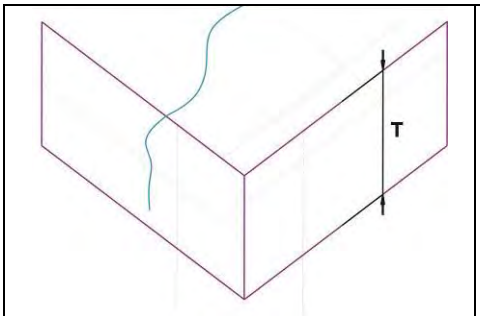



Figure 2.1

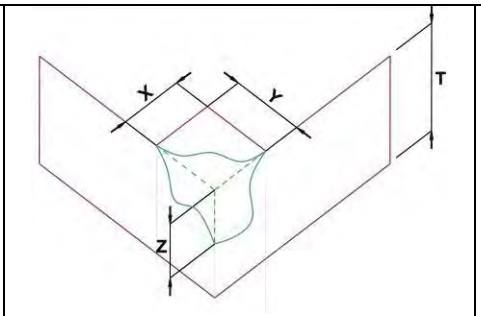



Figure 2.2

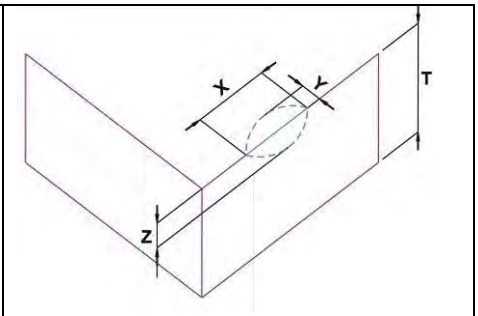



Figure 2.3

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)

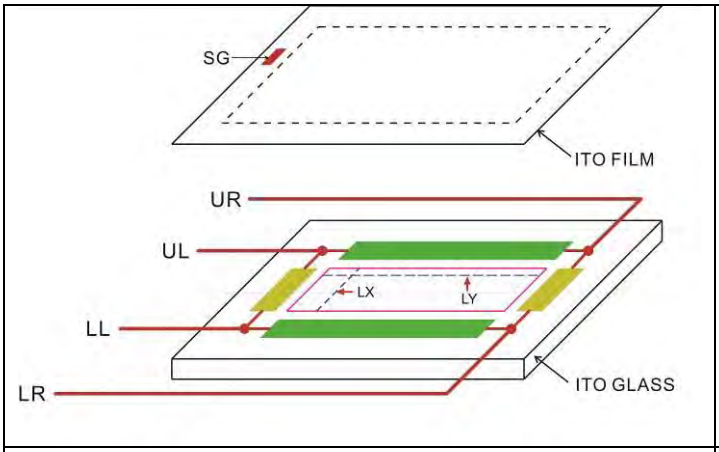



Figure 3.1

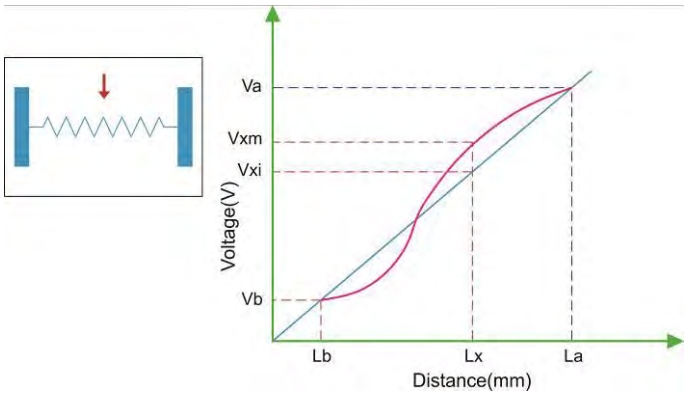



Figure 3.2

## 9.2 Specification

Linearity must meet the electrical characteristic specified in section 5.3

# 10. Warranty

AGD provide two years warranty of AGD 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 AGD retain the right of changing the materials with same grade and specification.

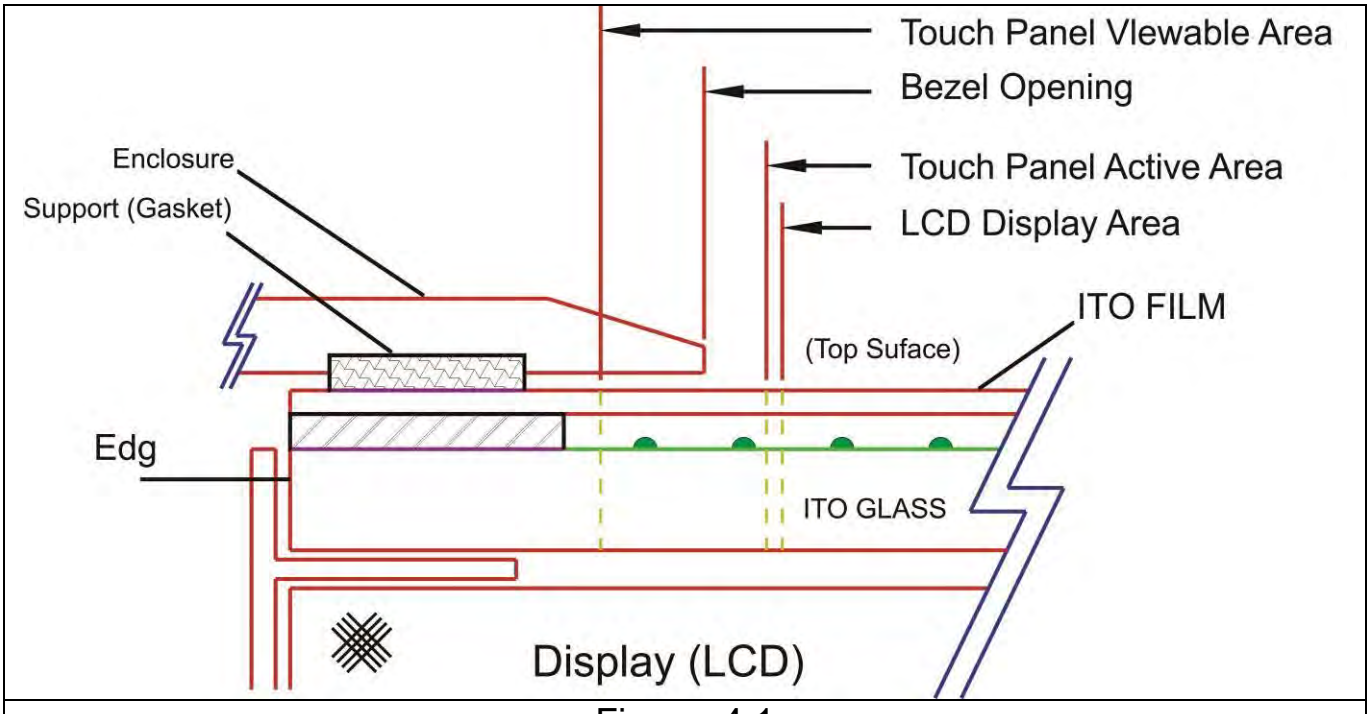
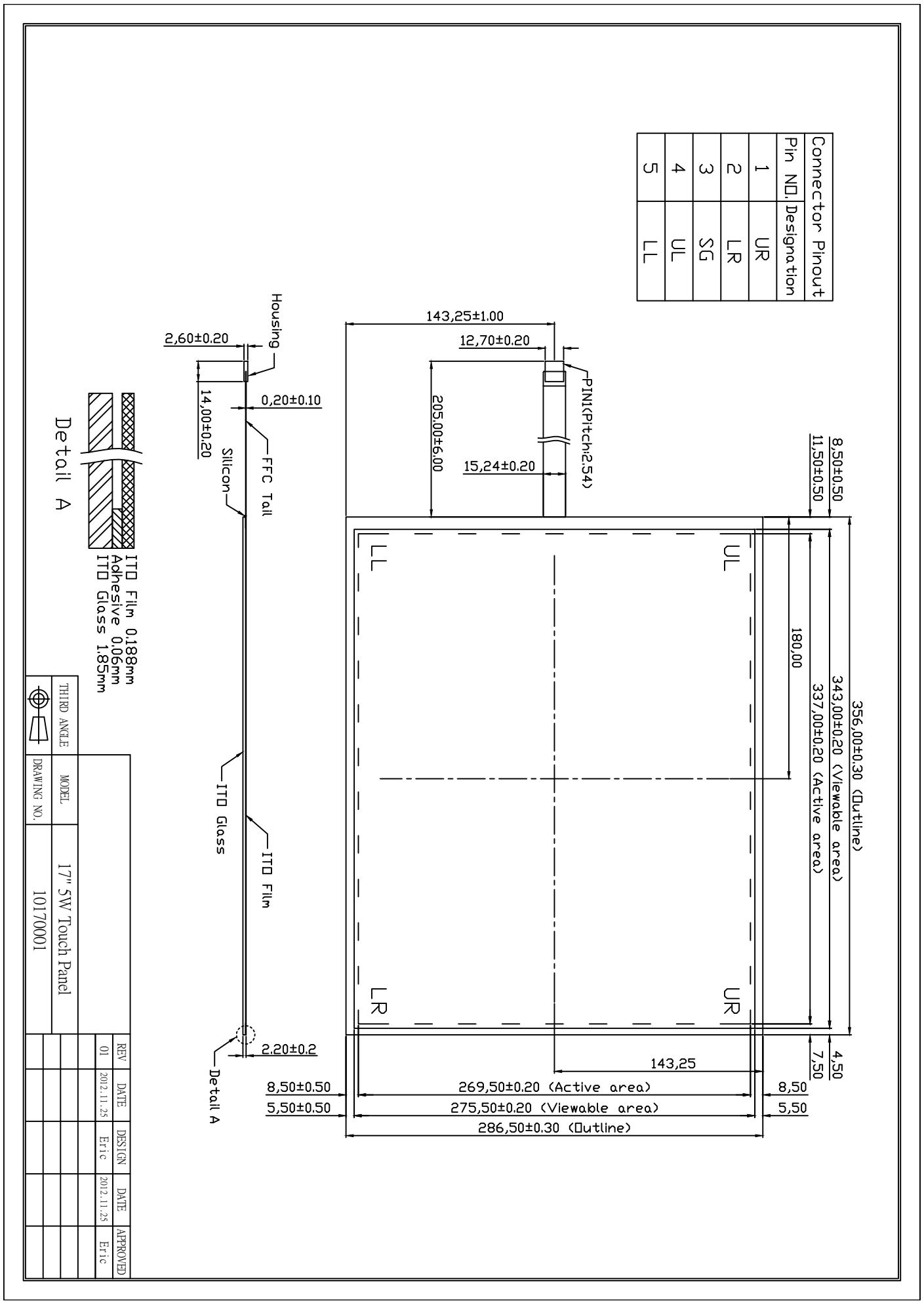



Figure 4.1


Connector Pinout
Pin NO. Designation
1 UR
2 LR
3 SG
4 UL
5 LL
143,25±1.00
12,70±0.20
205.00±6.00
15,24±0.20
PIN1(Pitch2.54)
8,50±0.50
11,50±0.50
356,00±0.30 (Outline)
343,00±0.20 (Viewable area)
337,00±0.20 (Active area)
180,00
LL
UL
LR
UR
4,50
7,50
143,25
8,50
5,50
269,50±0.20 (Active area)
275,50±0.20 (Viewable area)
286,50±0.30 (Outline)
8,50±0.50
5,50±0.50
Housing
2,60±0.20
14,00±0.20
0,20±0.10
Silicon
FFC Tail
ITO Glass
ITO Film
2,20±0.2
Detail A
Detail A
ITO Film 0.188mm
Adhesive 0.06mm
ITO Glass 1.85mm
THIRD ANGLE
MODEL
17" 5W Touch Panel
DRAWING NO.
10170001
REV
01
DATE
2012.11.25
DESIGN
Eric
DATE
2012.11.25
APPROVED
Eric


# Resistive Touch Controller Specification

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

# 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):** _____

_____

韌體版本 **(F/W Version:** _____

**晶片標示(IC mark):** _____

**驗證碼(Checksum):** _____

**APPROVAL BY:**

| |
|---|
| |

# Chapter 1. Product Overview

## 1.1 INTRODUCTION

AGDisplays 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.

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

## 1.2 PRODUCT DESCRIPTION

The AGD RC-3100C and RC-3000U resistive touch controller board **1.2. 1**

**Part Number**

- RC-3100C: 4/5-wire analog resistive USB & RS-232 touch controller board
- RC-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<br>- USB (2.0 compliant)<br>- RS-232 (9600 BAUD) |
| Protocol | - USB: Full Speed, HID Compliant at 12Mhz/sec, Support |

| | |
|---|---|
| | suspend and remote wakeup<br>- RS-232: 9600 bps, 8 data bits, none parity, 1 stop bit |
| USB Plug & Play | - USB mouse (HID-MOUSE) or<br>- Single-touch Win7 digitizer (HID-DIGITIZER) |
| Sensor support | - 4-wire<br>- 5-wire<br>- Touch screen resistance – max. 2K ohm contact resistance |
| Resolution | - 10-bit measurement(1024 x 1024)<br>- 12-bit reporting(4096 x 4096) of processed touch coordinates |
| Report Rate | USB: max. 200 points/sec<br>RS-232: max. 150 points/sec |
| Touch Operation Mode | - Drawing mode: position and linearity verification<br>- Button mode: Mouse left /right button emulation<br>- Sound Notification: enable/disable beep or audio sound for Touch down/Touch up<br>- 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<br>- Support edge-compensation |
| Power consumption | - Normal mode and touch inactive : less than 22 mA<br>- Normal mode and touch active: max 30mA (4-Wire touch panel, Rx-x: 800ohm, Ry-y:250ohm)<br>- USB suspend mode: less than 650uA<br>- 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<br>- Storage: 10% to 90% RH, non-condensing |
| ESD | Per EN 6100-4-2 1995: Level 4. Contact discharge 4kV, air discharge 8kV |

### 1.2. 3 Software and driver support

| | |
|---|---|
| Calibration | 4 /9/25 points calibration |
| OS support | - MS-DOS 6.22<br>- Microsoft Windows Series...<br>- Windows CE 4.0/4.2/5.0/6.0,..<br>- Linux OS...<br>- Android 4.0/4.1/4.2... |
| Languages | Utility support multiple languages<br>( 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<br>- drawing test<br>- auto pin definition detect |
| Display support | - Support display rotation<br>- Support multiple monitors<br>- Support split monitor |
| Right click support | - Auto right click<br>- manual right click |

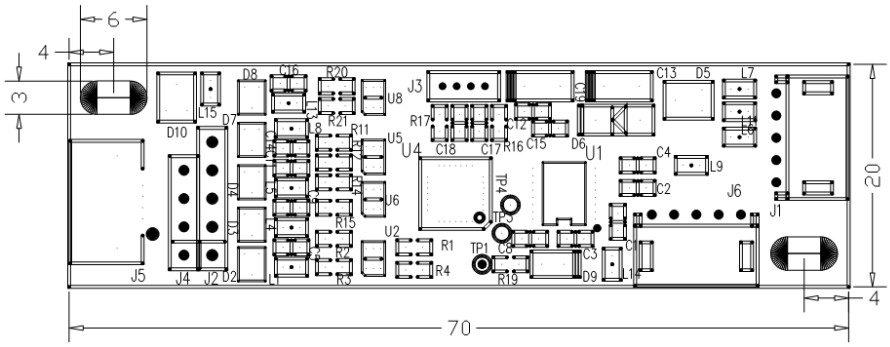
# Chapter 2. Mechanical

## 2.1 CONSTRUCTION

- Two-layers surface-mount PCB design

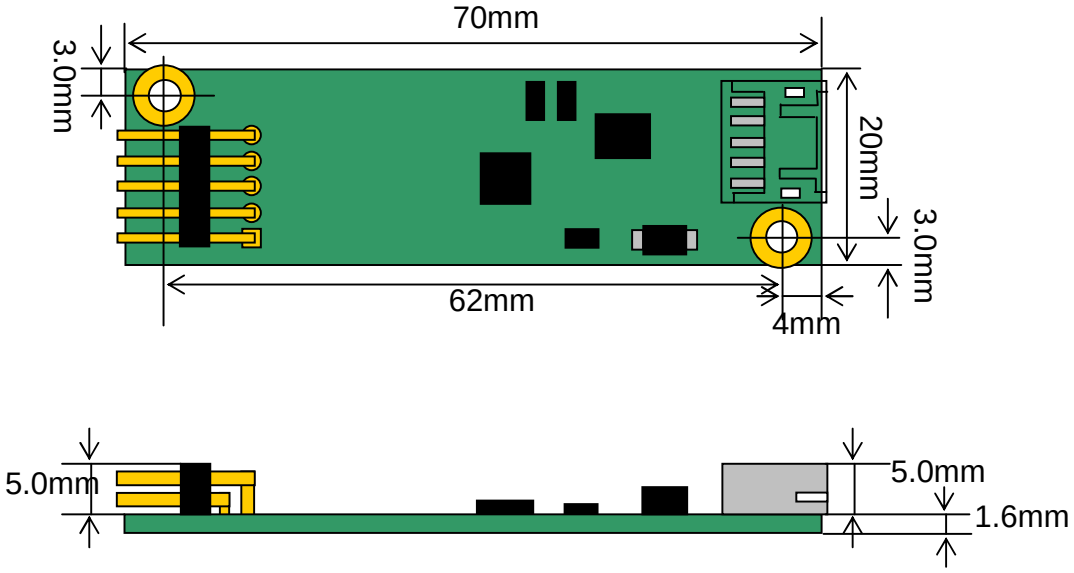
## 2.2 MECHANICAL DRAWING

### 2.2.1 RC-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 RC-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.

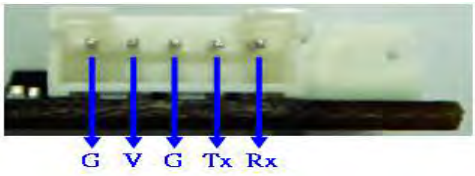
# Chapter 3. Connections

## 3.1 USB and RS-232 COMMUNICATION(RC-3100C)

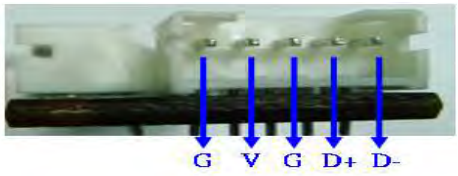
The connector configuration permits the controller to be placed in-line between the touch screen and serial I/O attachments

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

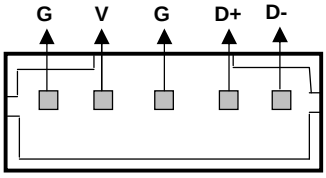
| Signal definition for RS-232 interface | | |
|---|---|---|
| **Signal Name** | **J6 pin** | **Signal Function** |
| G | 1 | Cable shield ground |
| V | 2 | +5V power drain from host side. |
| G | 3 | Signal ground |
| TxD | 4 | Serial data from controller to host |
| RxD | 5 | Serial data from host 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(RC-3000U)

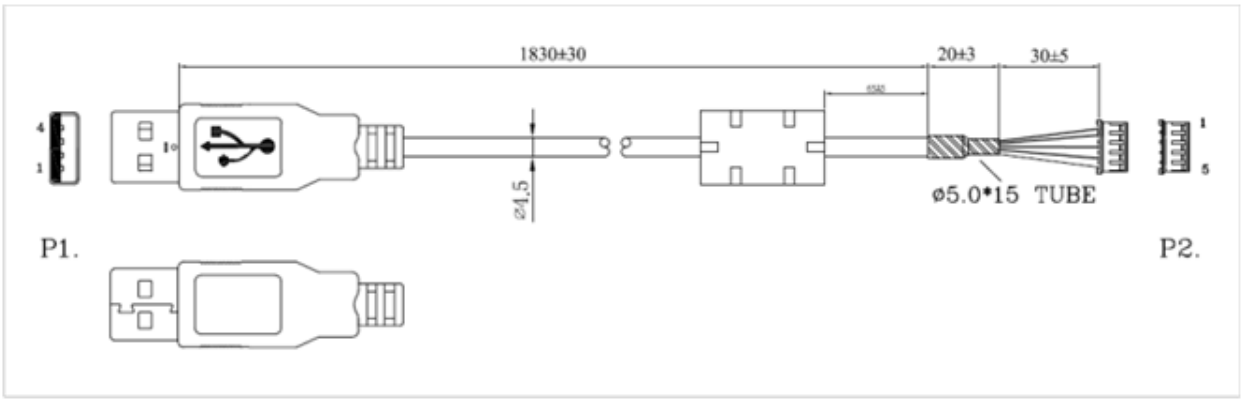
The connector configuration permits the controller to be placed in-line between the touch screen and serial I/O attachments

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- |

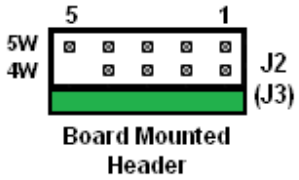



PIN ASSIGNMENT

| 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 RC-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<br>= 0 when no touch<br>R = 1 when generate right click<br>= 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<br>= 0 when no touch<br>R = 1 when generate right click<br>= 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.