Specifications for LCD module

Customer	
Customer part no.	
Ampire part no.	**AM-19201200G3TZQW-THAH**
Approved by	
Date	

☐ **Preliminary Specification**
☑ **Formal Specification**

APPROVED BY	CHECKED BY	ORGANIZED BY
Patrick	Mark	Tank

*This specification is subject to change without notice.

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2020/08/10	--	New Release	Tank

1.0 General Descriptions

1.1 Introduction

The LCM is a Color Active Matrix Liquid Crystal Display composed of a TFT LCD panel, a driver circuit. The screen format is intended to support the 16:10 WUXGA, 1920(H) x1200(V) screen and 16M colors (RGB 6-bits + Hi-FRC).

1.2 Features

- Besides 3.3 V Logic Power input , TFT Panel power (VGL ,VGL ,AVDD, VCOM) are needed .
- LVDS (2ch) Interface for 1920RGB x 1200 resolution.
- 16M Colors (6bit + 2 bits Hi-FRC)
- Data Enable Signal Mode
- HDMI Board
- Projective Capacitive Touch (OGS)
  - Interface : USB
  - Touch Controller: ILI2511

1.3 Product Summary

Items	Specifications	Unit
Screen Diagonal	10.1	Inch
Active Area	217.44(H) x 135.9(V)	mm
Pixel Format	1920 (H) x RGB x 1200 (V)	-
Pixel Pitch	0.11325 (H) × 0.11325(V)	mm
Pixel Arrangement	R.G.B. Vertical Stripe	-
Display Mode	Normally Black (AHVA mode)	-
White Luminance	850 (Typ.)	cd /m^2
Contrast Ratio	800 : 1 (Typ.)	-
Support Color	16M (6bit + Hi-FRC)	-

2.0 Absolute Maximum Ratings

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VDD	-0.3	4.0	V	
	AVDD	6.5	13		
	VGH	-0.3	20		
	VGL	-9	0.3		
Operation temperature	TOP	-20	70	℃	
Storage temperature	TST	-30	80	℃	

Note(1)

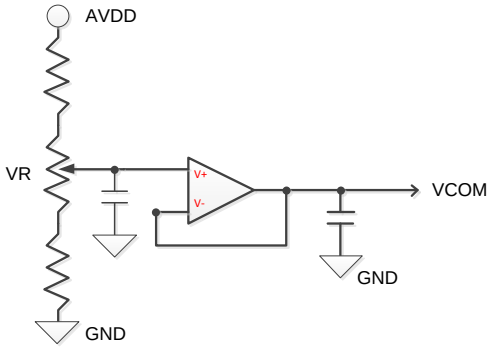
The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

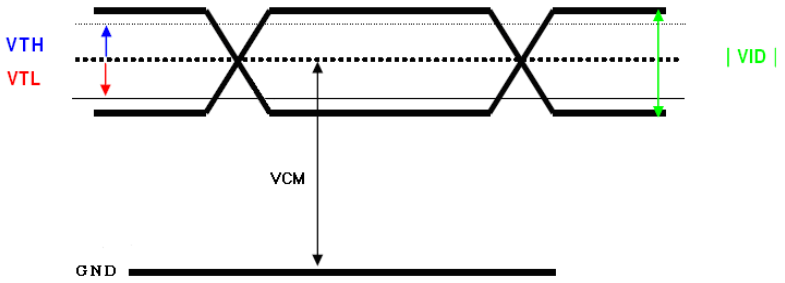
3.0 Electrical CHARACTERISTICS

3.1TFT-LCD

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Power Supply Voltage	VDD	3.0	3.3	3.6	V	GND=0V
Power Supply Current	I_{VDD}	--	(T.B.D)	(T.B.D)	mA	Max value are recommend power design spec.
Differential Input High Threshold	VTH	--	--	100	mV	VCM=1.2V
Differential Input Low Threshold	VTL	-100	--	--	mV	
Input current	IIN	-10	--	+10	uA	
Differential input Voltage	|VID|	0.2	--	0.6	V	
Common Mode Voltage Offset	VCM	$\frac{\|VID\|}{2}$	1.25	$2.4-\frac{\|VID\|}{2}$	V	

Note(1) TYP VCOM is only reference value. It must be optimized according to each LCM. Be sure to use VR and OP buffer on VCOM output. Please adjust VCOM to make the flicker level be minimum for getting excellent image.





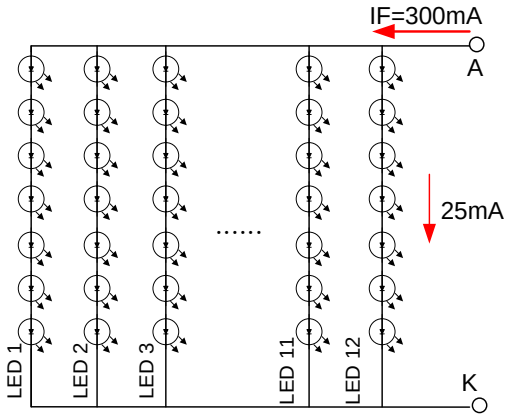
3.2 Backlight Unit

The distance of the LED A,K supply copper trace of the LED light-bar is 1.34mm at least.

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
LED voltage	VAK		24.5		V	Note 1
LED current	IF	--	300	--	mA	Note 1
LED life time	--	--	50000	--	Hrs	Note 2

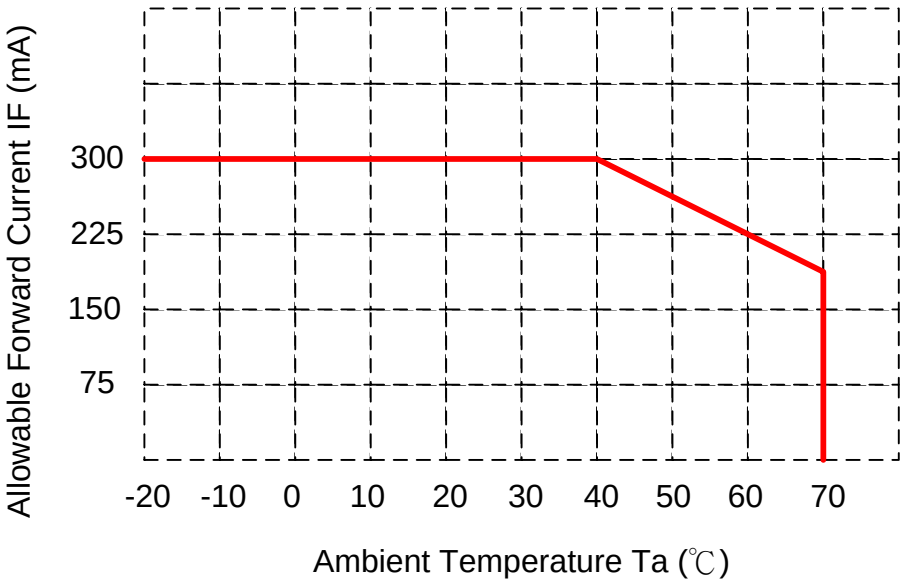
Note(1) The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IF=300 mA.

Note(2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IF=300mA. The LED lifetime could be decreased if operating IF is larger than 225mA.



Note(3)

When LCM is operated over 40℃ ambient temperature, the IF should be follow :



4.0 Optical Specifications

The optical characteristics are measured under stable conditions as following notes.

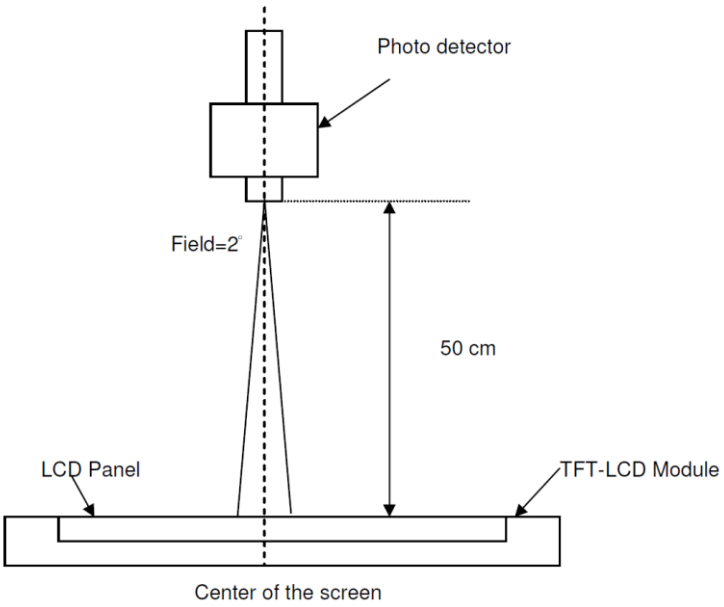
Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle （CR>10）	Horizontal	θ_L	-	80	-	degree	Note1
		θ_R	-	80	-		
	Vertical	θ_T	-	80	-		
		θ_B	-	80	-		
Contrast Ratio	Center		-	800	-	-	Note2
Response Time	Rising + Falling		-	-	50	ms	Note5
Color Chromaticity (CIE1931)	Red	x	Typ. -0.05	0.588	Typ. +0.05	-	Note3
	Red	y		0.307		-	
	Green	x		0.273		-	
	Green	y		0.592		-	
	Blue	x		0.145		-	
	Blue	y		0.132		-	
	White	x		0.296		-	
	White	y		0.318		-	
White Luminance	Center		680	850	-	cd/m^2	Note4
Luminance Uniformity	9Points		75	-	-	%	Note4

Note(1)
Viewing angle defines as the angle at the contrast ratio over 10. Besides, the viewing angles are determined by the horizontal (3, 9 o'clock) and vertical (6, 12 o'clock) direction with respect to the optical axis which is normal to the LCD surface (see Figure1).

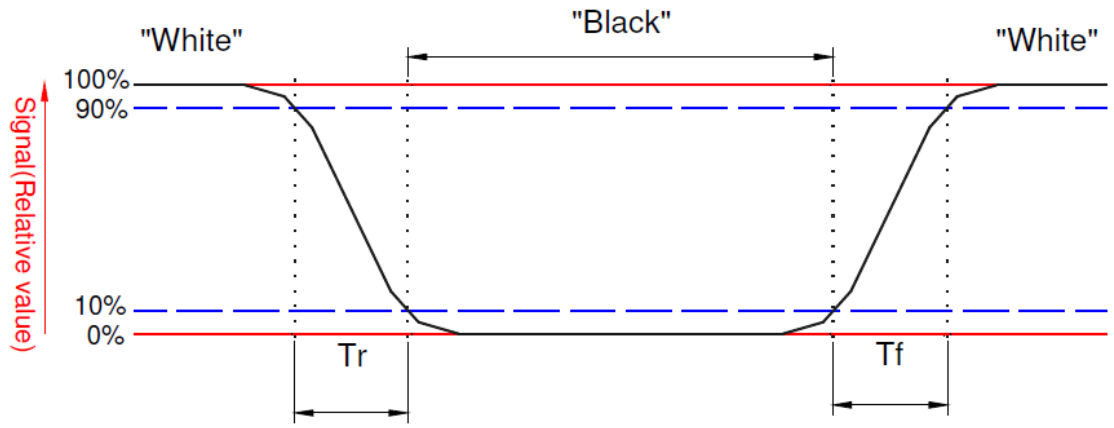
Note(2)
Contrast measurements shall be made at viewing angle Θ=0 and the center of the LCD surface. Luminance shall be measured with all pixels in the view field. Moreover, you need to set white at first, and then you have to change to dark (black) state (see Figure1). Luminance Contrast Ratio (CR) is defined mathematically as CR = Luminance as displaying a white raster / Luminance as displaying a black raster.

Note(3)
Reference only / Standard Front Surface Treatment Measured with green cover glass. The color chromaticity coordinates specified in Table 4, and it shall be calculated from the spectral data which measured with all pixels in red, green, blue, and white at first. Measurements shall be done at the center of the panel.

Note(4)
Measurement method: The LCD module should be stabilized at the 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, and it should be measured in the center of screen.



Note(5)
Definition of response time: The output signals of BM-7 or equivalent are measured when the input signals changed from “Black” to “White” (falling time) and from “White” to “Black” (rising time), respectively. The response time interval between the 10% and 90% signal, and it is shown below.



5.0 Interface Connections

5.1 LVDS Interface Connection

Pin #	Signal Name	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	VDD	Power Supply, 3.3V (typical)
4	VDD	Power Supply, 3.3V (typical)
5	NC	Not Connect
6	2-L3P	LVDS 2 data 3 (positive)
7	GND	Ground
8	2-L3N	LVDS 2 data 3 (negative)
9	GND	Ground
10	GND	Ground
11	1-L3P	LVDS 1 data 3 (positive)
12	2-LCNKP	LVDS 2 Clock (positive)
13	1-L3N	LVDS 1 data 3 (negative)
14	2-LCNKN	LVDS 2 Clock (negative)
15	GND	Ground
16	GND	Ground
17	1-LCNKP	LVDS 1 Clock (positive)
18	2-L2P	LVDS 2 data 2 (positive)
19	1-LCNKN	LVDS 1 Clock (negative)
20	2-L2N	LVDS 2 data 2 (negative)
21	GND	Ground
22	GND	Ground
23	1-L2P	LVDS 1 data 2 (positive)
24	2-L1P	LVDS 2 data 1 (positive)
25	1-L2N	LVDS 1 data 2 (negative)
26	2-L1N	LVDS 2 data 1 (negative)
27	GND	Ground
28	GND	Ground
29	1-L1P	LVDS 1 data 1 (positive)
30	2-L0P	LVDS 2 data 0 (positive)

31	1-L1N	LVDS 1 data 1 (negative)
32	2-L0N	LVDS 2 data 0 (negative)
33	GND	Ground
34	GND	Ground
35	1-L0P	LVDS 1 data 0 (positive)
36	NC	Not Connect
37	1-L0N	LVDS 1 data 0 (negative)
38	NC	Not Connect
39	NC	Not Connect
40	CABC_EN	CABC Function Enable Pin
41	NC	Not Connect
42	NC	Not Connect
43	NC	Not Connect
44	NC	Not Connect
45	NC	Not Connect

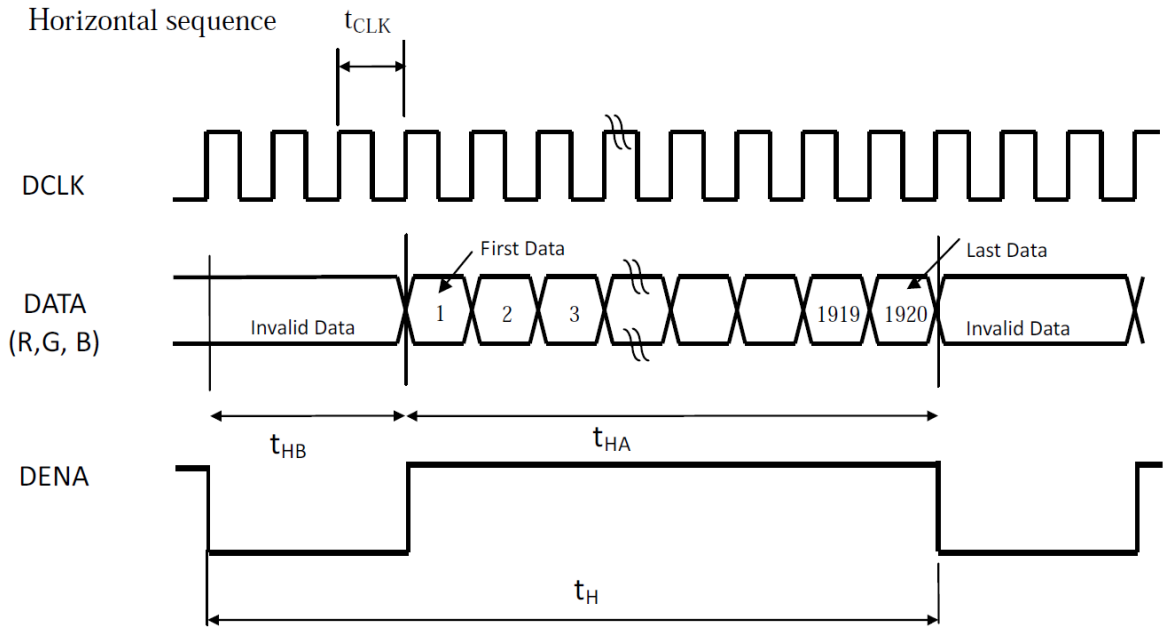
5.2 Backlight Interface

A	Red
K	White

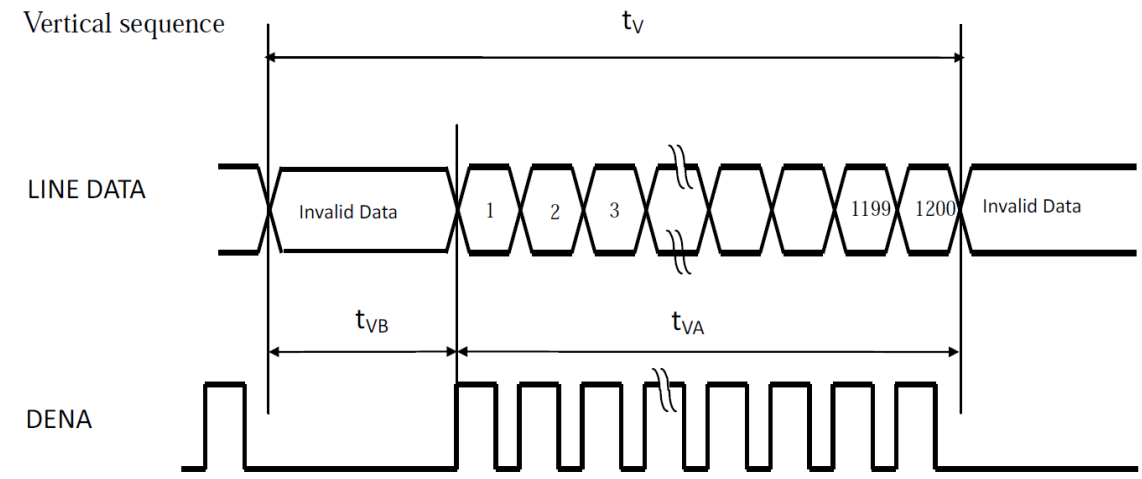
6. Interface Timings

6.1 LVDSTiming Characteristics

(a). LVDS input time sequence



(b) LCD input time sequence



(c) Data mapping

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB							LSB	MSB							LSB	MSB							LSB
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

【Note】

1) Gray level:

Color(n)：n is level order; higher n means brighter level.

2) DATA:

1: high，0: low

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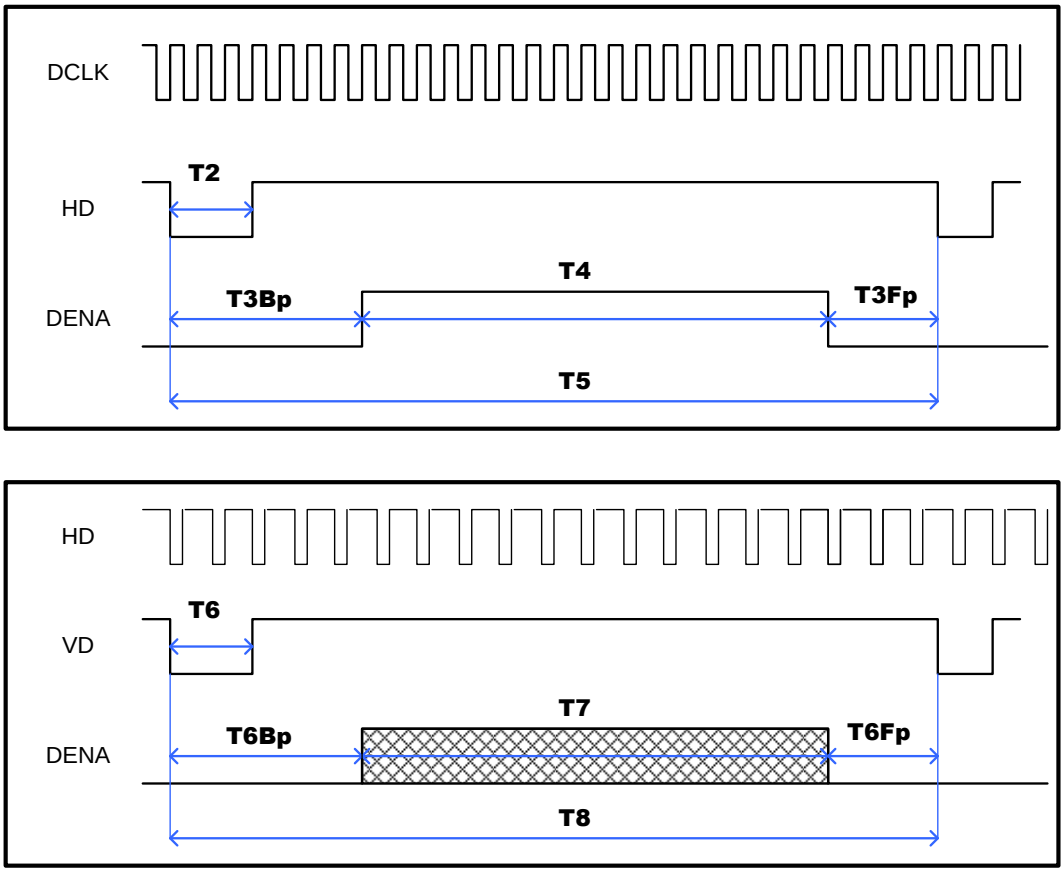
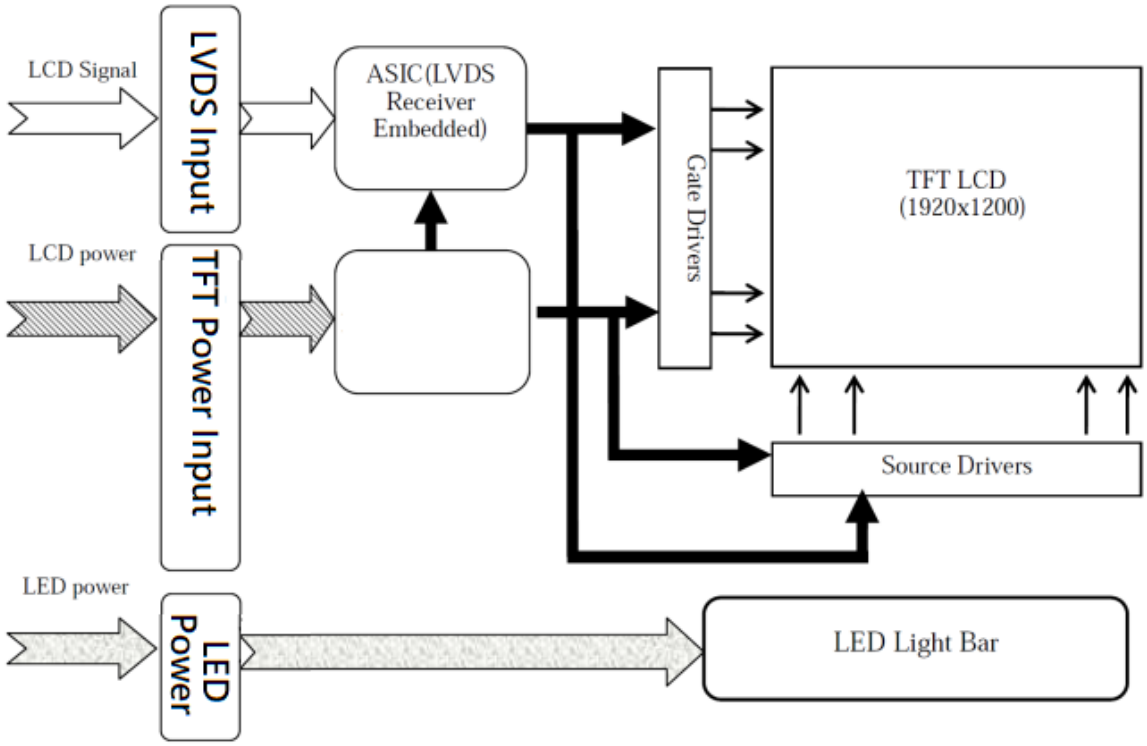
6.2 TTL Timing Table



ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Clock Frequency	1/T1	--	130	--	MHz
Horizontal Blanking	T3Fp+T3Bp	154	280	1374	Clocks
Horizontal Display Period	T4		1920		Clocks
Horizontal total Period	T5	2074	2200	3294	Clocks
Vertical Blanking	T6Fp+T6Bp	10	50	260	Lines
Vertical Display Period	T7		1200		Lines
Vertical total Period	T8	1210	1250	1460	Lines

7. BLOCK DIAGRAM



7. Touch Panel Unit

Basic Characteristic

ITEM	SPECIFICATION
Type	Projective Capacitive Touch Panel (OGS)
Activation	Multi-finger
X/Y Position Reporting	Absolute Position
Touch Force	No contact pressure required
Calibration	No need for calibration
Report Rate	Approx. 100 points/sec
Interface	USB
Control IC	ILI2511
Conductive susceptibility IEC/EN61000-4-6	10Vrms
Radiated Susceptibility IEC/EN61000-4-3	30V/m
Cover Glass	1.1mm chemically strength glass with black border

Specify the normal operating condition

(GND=0V)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	VDD(5V)	4.75	5.0	5.25	V	
Power Consumption	$I_{VDD(5V)}$		T.B.D		mA	

Interface

Pin No.	Symbol	Function
1	GND	IIC interface, keep NC.
2	VDD(3.3V)	
3	RST	
4	INT	
5	SDA	
6	SCL	
7	VDD(5V)	Power supply 5V
8	GND	Ground
9	D+	USB Data+
10	D-	USB Data-

8.0 RELIABILITY TEST and INCOMING INSPECTION STANDARD

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C , t=240 hrs	
Low Temperature Operation	-20±3°C , t=240 hrs	
High Temperature Storage	80±3°C , t=240 hrs	1,2
Low Temperature Storage	-30±3°C , t=240 hrs	1,2
Storage at High Temperature and Humidity	60°C, 90% RH , 240 hrs	1,2
Thermal Shock Test	-20°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 100 cycle(Dry)	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

Note 3 : The module shouldn't be tested more than one condition, and all the test conditions are independent.

Note 4 : All the reliability tests should be done without protective film on the module.

Definitions of life end point:

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.
- Appearance and display quality should not have degraded noticeably.
- Contrast ratio should be greater than 50% of the initial value.

9. General Precautions

9.1 Handling precautions

1) The polarizing plate may break easily so be careful when handling it. Do not touch, press or rub it with a hard-material tool like tweezers.
2) Do not touch the polarizing plate surface with bare hands so as not to make it dirty. If the surface or other related part of the polarizing plate is dirty, soak a soft cotton cloth or chamois leather in benzine and wipe off with it. Do not use chemical liquids such as acetone, toluene and isopropyl alcohol. Failure to do so may bring chemical reaction phenomena and deteriorations.
3) Remove any spit or water immediately. If it is left for hours, the suffered part may deform or decolorize.
4) If the LCD element breaks and any LC stuff leaks, do not suck or lick it. Also if LC stuff is stuck on your skin or clothing, wash thoroughly with soap and water immediately.

9.2 Installing precautions

1) The PCB has many ICs that may be damaged easily by static electricity. To prevent breaking by static electricity from the human body and clothing, earth the human body properly using the high resistance and discharge static electricity during the operation. In this case, however, the resistance value should be approx. 1MΩ and the resistance should be placed near the human body rather than the ground surface. When the indoor space is dry, static electricity may occur easily so be careful. We recommend the indoor space should be kept with humidity of 60% or more. When a soldering iron or other similar tool is used for assembly, be sure to earth it.
2) When installing the module and ICs, do not bend or twist them. Failure to do so may crack LC element and cause circuit failure.
3) To protect LC element, especially polarizing plate, use a transparent protective plate (e.g., acrylic plate, glass etc) for the product case.
4) Do not use an adhesive like a both-side adhesive tape to make LCD surface (polarizing plate) and product case stick together. Failure to do so may cause the polarizing plate to peel off.

9.3 Storage precautions

1) Avoid a high temperature and humidity area. Keep the temperature between 0°C and 35°C and also the humidity under 60%.
2) Choose the dark spaces where the product is not exposed to direct sunlight or fluorescent light.
3) Store the products as they are put in the boxes provided from us or in the same conditions as we recommend.

9.4 Operating precautions

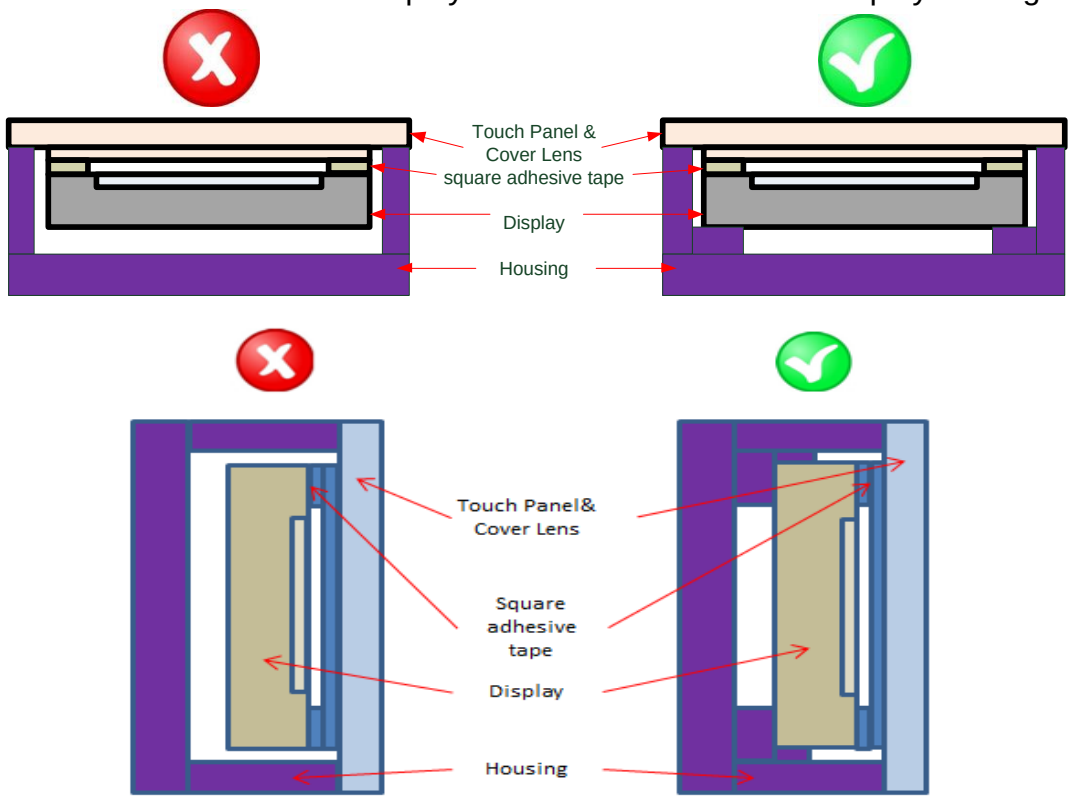
1) Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input connector is removed or inserted while the power is turned on, the LC module internal circuit may break.
2) The display response may be late if the operating temperature is under the normal standard, and the display may be out of order if it is above the normal standard. But this is not a failure; this will be restored if it is within the normal standard.
3) The LCD contrast varies depending on the visual angle, ambient temperature, power voltage etc. Obtain the optimum contrast by adjusting the LC dive voltage.
4) When carrying out the test, do not take the module out of the low-temperature space suddenly. Failure to do so will cause the module condensing, leading to malfunctions.
5) Make certain that each signal noise level is within the standard (L level: 0.2Vdd or less and H level: 0.8Vdd or more) even if the module has functioned properly. If it is beyond the standard, the module may often malfunction. In addition, always connect the module when making noise level measurements.
6) The CMOS ICs are incorporated in the module and the pull-up and pull-down function is not adopted for the input so avoid putting the input signal open while the power is ON.

7) The characteristic of the semiconductor element changes when it is exposed to light emissions, therefore ICs on the LCD may malfunction if they receive light emissions. To prevent these malfunctions, design and assemble ICs so that they are shielded from light emissions.

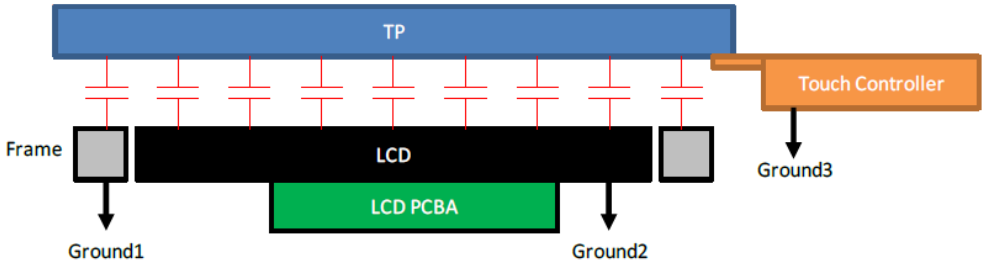
8) Crosstalk occurs because of characteristics of the LCD. In general, crosstalk occurs when the regularized display is maintained. Also, crosstalk is affected by the LC drive voltage. Design the contents of the display, considering crosstalk.

9.5 Mechanism

(1) Please mount LCD module by using mounting holes arranged in four corners tightly.
(2) The square adhesive tape which is between the touch panel and display can't provide well supporting in the long term and high ambient temperature condition. Whether upright or horizontal position the support holder which is in the back side of the display is needed. Do not let the display floating.



(3) TP needs to work in environment with stable stray capacitance. In order to minimize the variation in stray capacitance, all conductive mechanical parts must not be floating. Intermittent floating any conductive part around the touch sensor may cause significant stray capacitance change and abnormal touch function. It is recommended to keep all conductive parts having same electrical potential as the GND of the touch controller module.

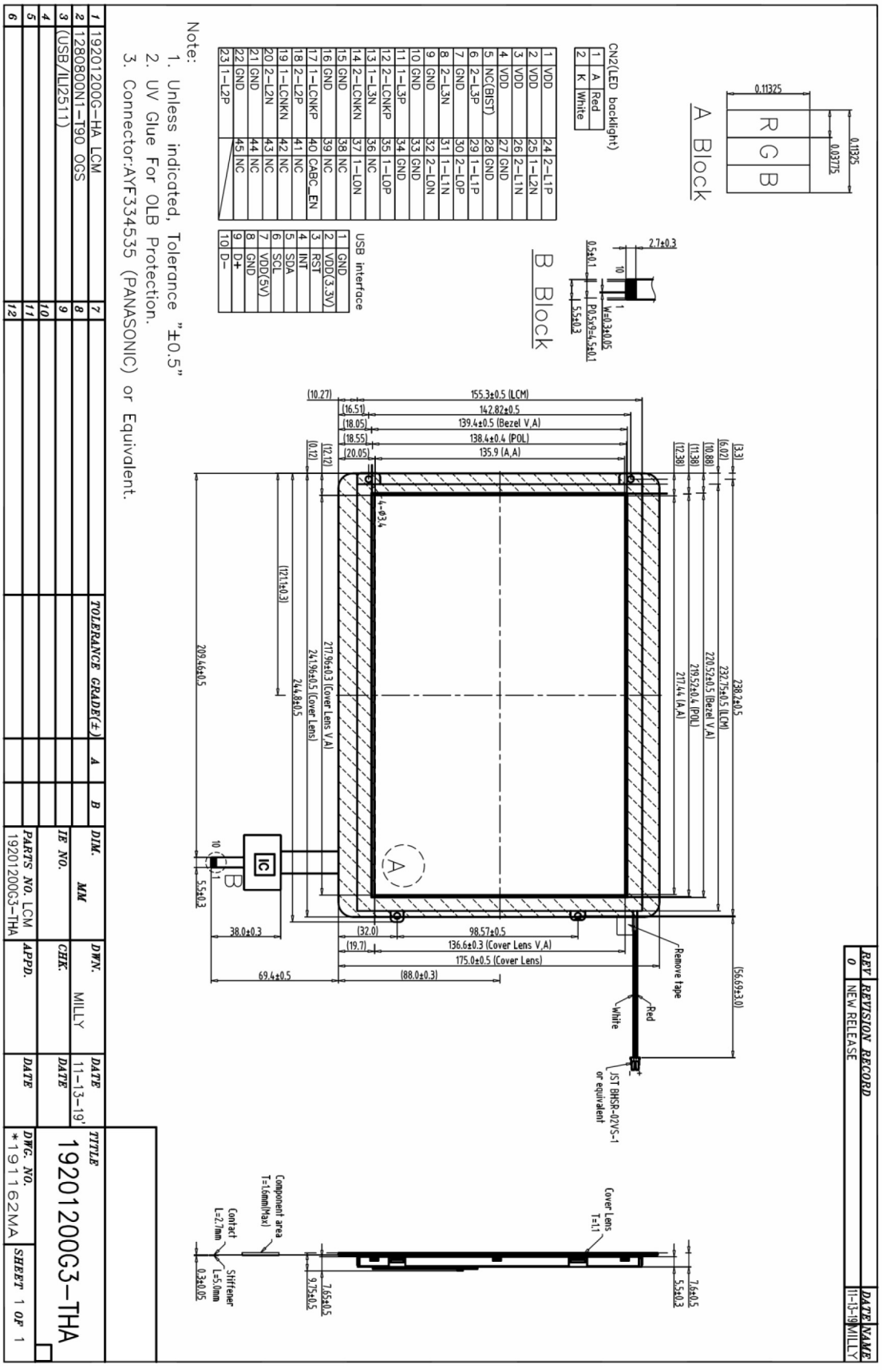


GND1, GND2 and GND3 should be connected together to have the same ground

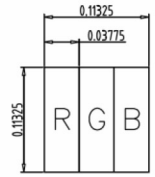
9.6 Other

1) Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.
2) Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver.
3) AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.

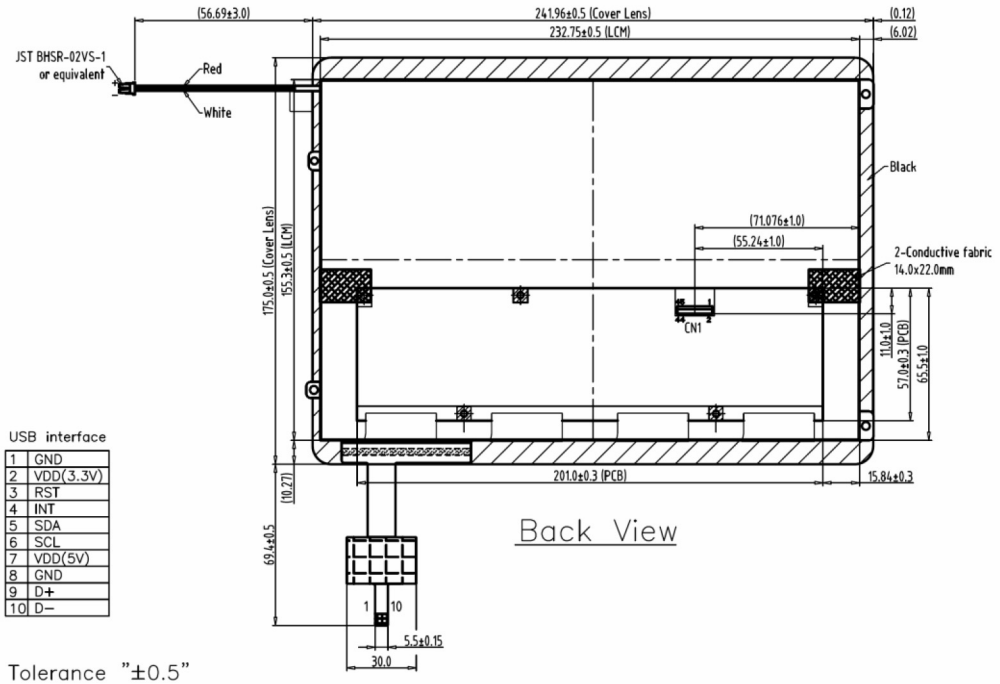
10.0 Outline Dimension



REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	11-13-19	MILLY



A Block



Back View

CN2(LED backlight)

1	A	Red
2	K	White

1	VDD	24	2-L1P
2	VDD	25	1-L2N
3	VDD	26	2-L1N
4	VDD	27	GND
5	NC(BIST)	28	GND
6	2-L3P	29	1-L1P
7	GND	30	2-L0P
8	2-L3N	31	1-L1N
9	GND	32	2-L0N
10	GND	33	GND
11	1-L3P	34	GND
12	2-LCNKP	35	1-L0P
13	1-L3N	36	NC
14	2-LCNKN	37	1-L0N
15	GND	38	NC
16	GND	39	NC
17	1-LCNKP	40	CABC_EN
18	2-L2P	41	NC
19	1-LCNKN	42	NC
20	2-L2N	43	NC
21	GND	44	NC
22	GND	45	NC
23	1-L2P		

USB interface

1	GND
2	VDD(3.3V)
3	RST
4	INT
5	SDA
6	SCL
7	VDD(5V)
8	GND
9	D+
10	D-

Note:
1. Unless indicated, Tolerance "±0.5"
2. UV Glue For OLB Protection.
3. Connector:AYF334535 (PANASONIC) or Equivalent.

				TOLERANCE GRADE(±)	A	B	DIM.	DWN.	DATE	TITLE
1	19201200G-HA LCM	7					MM	MILLY	11-13-19'	19201200G3-THA
2	1280800N1-T90 OGS	8					IE NO.	CHK.	DATE	
3	(USB/ILI2511)	9								
4		10								
5		11					PARTS NO. LCM-19201200G3-THA	APPD.	DATE	DWG. NO. *191163MA
6		12								SHEET 1 OF 1

Date: 2020/08/10

Auxiliary

AMPIRE HDMI Board

REV.D

Intelligent Display Solutions, Unit 2, Berkshire Business Centre, Berkshire Drive, Thatcham, Berkshire, RG19 4EW
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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2018/06/19	-	New Release	Mark

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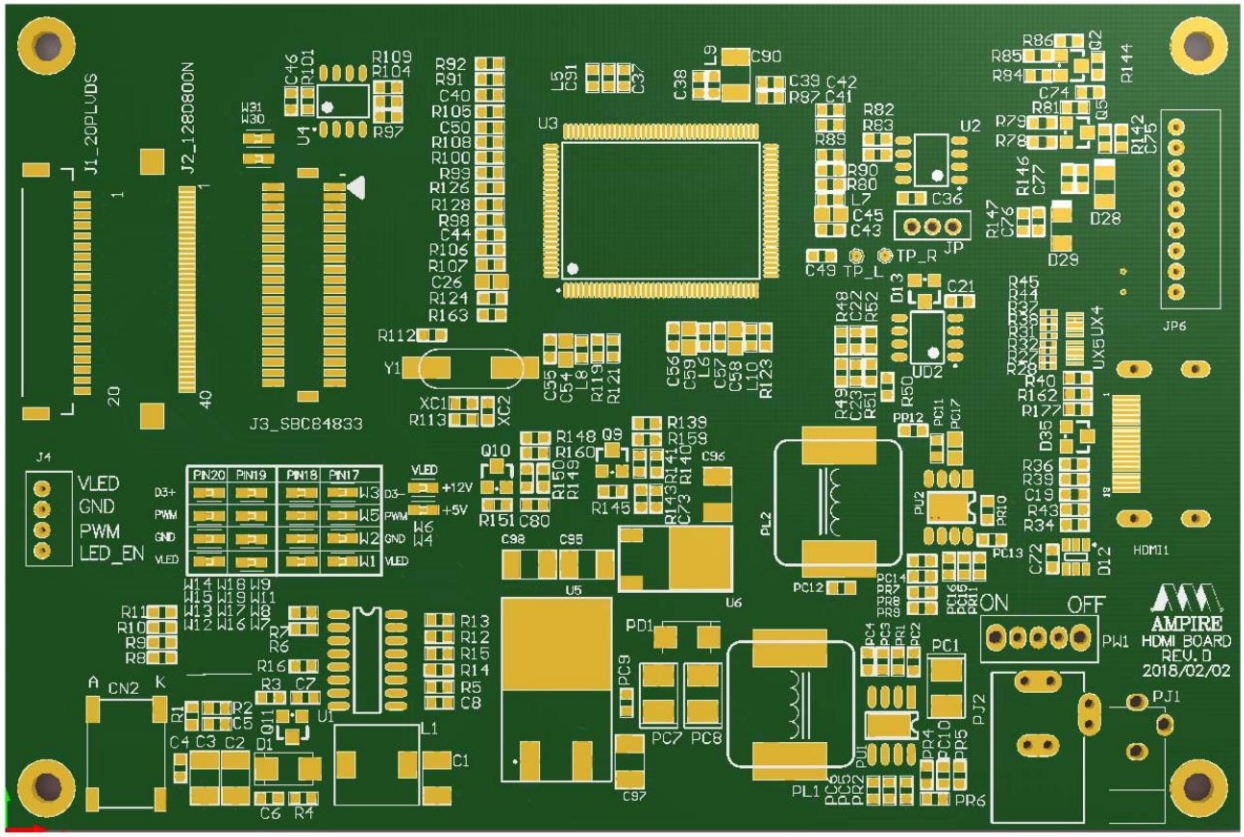
1. Features

HDMI to LCD interface board

- Single Power input: 12V / 2A power input. (Connector: PJ1 or PJ2).
- LCD LVDS output: 24 BIT Single LVDS
- HDMI Digital input : (Connector: HDMI1)
  - HDMI 1.4a Compliant
  - Single-link (Type A HDMI) on-chip TMDS receiver up to 225MHz. Support long cable.
  - Do not support HDCP.



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2. Support input video format :

Resolution	V Sync	Resolution	V Sync
640x480	60	1280x800	60
640x480	72	1280x800	75
640x480	75	1280x960	60
800x600	56	1280x1024	60
800x600	60	1280x1024	75
800x600	72	1360x768	60
800x600	75	1366x768	60
848x480	60	1400x1050	60
1024x768	60	1400x1050	75
1024x768	70	1440x900	60
1024x768	75	1440x900	75
1152x864	75	1600x900	60
1280x720	60	1680x1050	60
1280x768	60	1680x1050	75
1280x768	75	1920x1080	60

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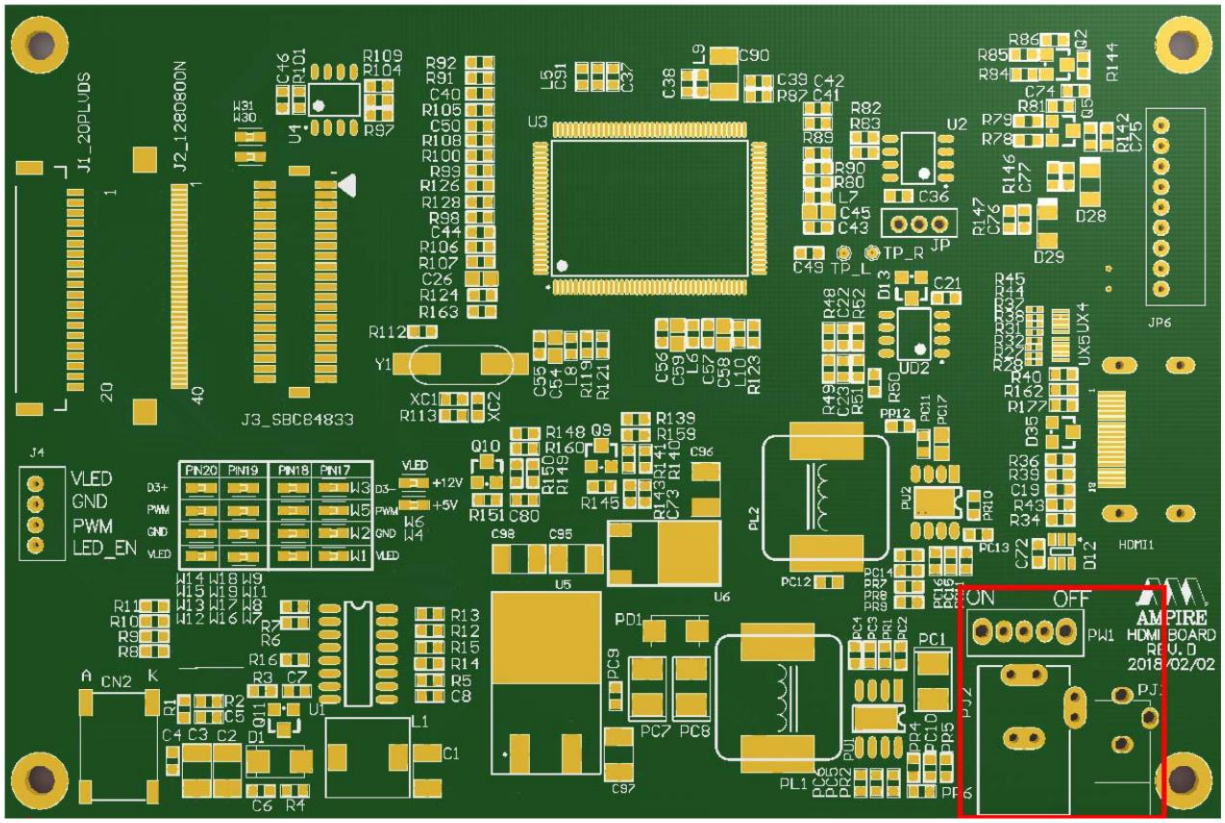
3. CONNECTOR

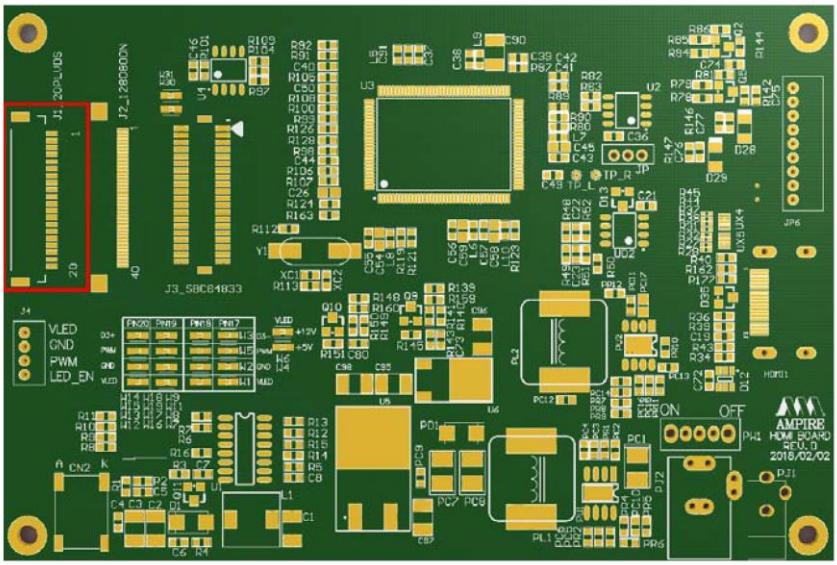
3.1 POWER CONNECTOR (PJ1、PJ2)

PIN	Symbol	Description
1	+12V	POWER SUPPLY +12V
3	GND	POWER SUPPLY GROUND



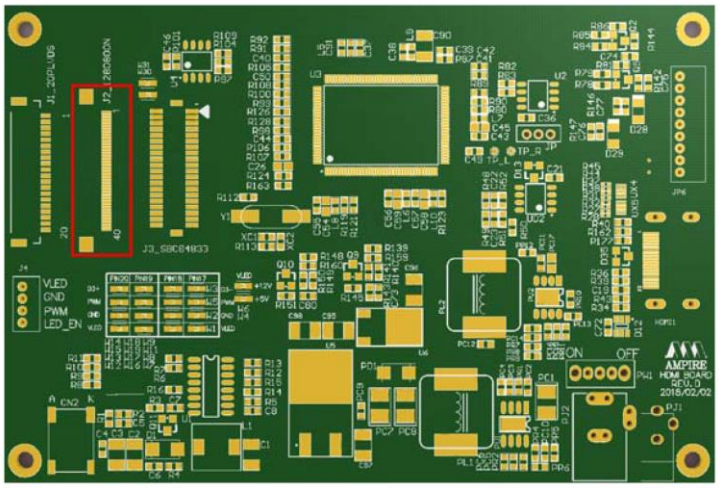
3.2 J1_20PIN LVDS

Pin No.	Symbol	Function
1	VDD	POWER SUPPLY:3.3V
2	VDD	POWER SUPPLY:3.3V
3	GND	Power Ground
4	GND	Power Ground
5	IN0-	Transmission Data of Pixels
6	IN0+	Transmission Data of Pixels
7	GND	Power Ground
8	IN1-	Transmission Data of Pixels 1
9	IN1+	Transmission Data of Pixels 1
10	GND	Power Ground
11	IN2-	Transmission Data of Pixels 2
12	IN2+	Transmission Data of Pixels 2
13	GND	Power Ground
14	CLK-	Sampling Clock
15	CLK+	Sampling Clock
16	GND	Power Ground
17	JUMP	JUMP
18	JUMP	JUMP
19	JUMP	JUMP
20	JUMP	JUMP



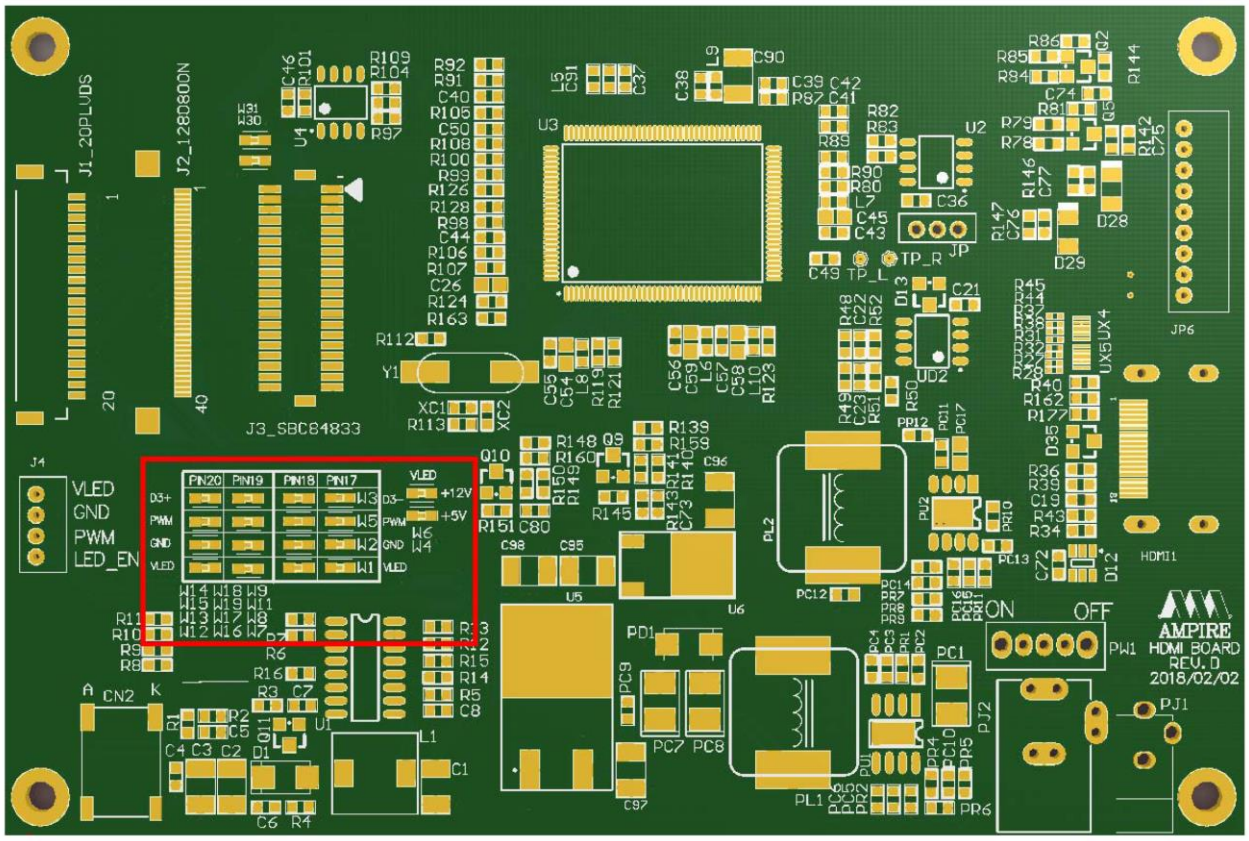
3.3 J2_40PIN LVDS

Pin #	Signal Name	Description	Remarks
1	NC	Not Connect	-
2	VDD	Power Supply, 3.3V (typical)	-
3	VDD	Power Supply, 3.3V (typical)	
4	NC	Not Connect	
5	NC	Not Connect	
6	NC	Not Connect	
7	NC	Not Connect	
8	LV0N	-LVDS differential data input	
9	LV0P	+LVDS differential data input	
10	GND	Ground	
11	LV1N	-LVDS differential data input	
12	LV1P	+LVDS differential data input	
13	GND	Ground	
14	LV2N	-LVDS differential data input	
15	LV2P	+LVDS differential data input	
16	GND	Ground	
17	LVCLKN	-LVDS differential data input	
18	LVCLKP	+LVDS differential data input	
19	GND	Ground	
20	LV3N	-LVDS differential data input	
21	LV3P	+LVDS differential data input	
22	GND	Ground	
23	LED_GND	Ground for LED Driving	
24	LED_GND	Ground for LED Driving	
25	LED_GND	Ground for LED Driving	
26	NC	Not Connect	
27	LED_PWM	PWM Input signal for LED driver	
28	LED_EN	LED Enable Pin	
29	Not Connect	NC	
30	NC	Not Connect	
31	LED_VCC	Power Supply for LED Driver	
32	LED_VCC	Power Supply for LED Driver	
33	LED_VCC	Power Supply for LED Driver	
34	NC	Not Connect	
35	BIST	BIST pin. (Keep NC or GND if not use.)	
36-40	NC	Not Connect	



JUMP FOR PIN17,18,19 and VLED

- **These jump only for J1_20PLVDS**
- **For Design reference only. These supply voltage and signals do not need to input by end user.**



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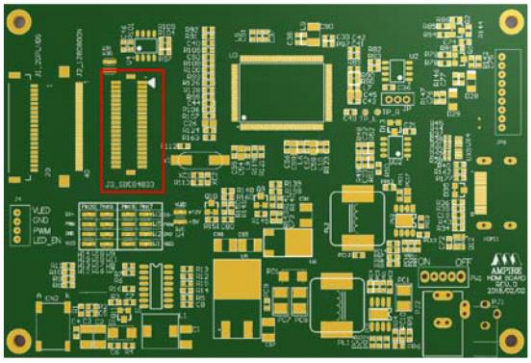
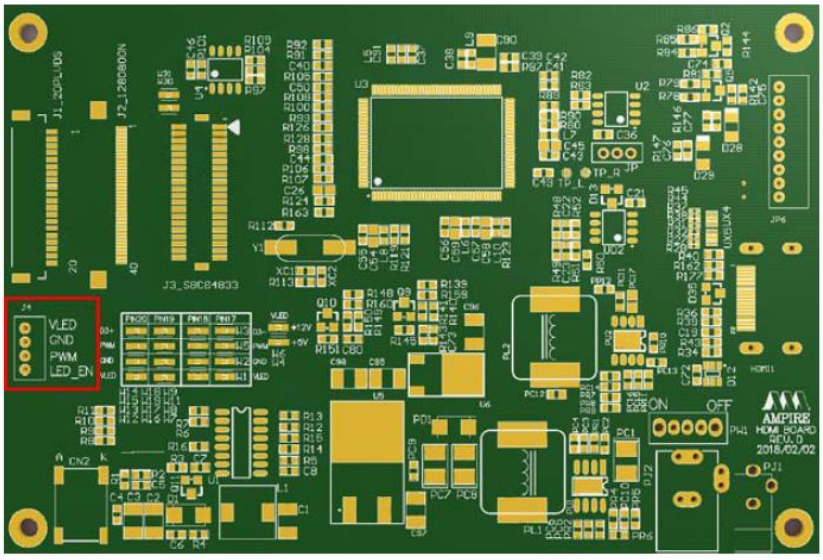
3.4 J3_40PIN LVDS

Pin #	Signal Name	Description	Remarks
1	VDD	Power Supply, 3.3V (typical)	-
2	VDD	Power Supply, 3.3V (typical)	-
3	VDD	Power Supply, 3.3V (typical)	
4	VDD	Power Supply, 3.3V (typical)	
5	VDD	Power Supply, 3.3V (typical)	
6	VDD	Power Supply, 3.3V (typical)	
7	NC	Not Connect	
8	NC	Not Connect	
9	GND	Ground	
10	GND	Ground	
11	LV8N	-LVDS differential data input	
12	LV5N	-LVDS differential data input	
13	LV8P	+LVDS differential data input	
14	LV5P	+LVDS differential data input	
15	GND	Ground	
16	GND	Ground	
17	LVCLK1N	-LVDS differential data input	
18	LV6N	-LVDS differential data input	
19	LVCLK1P	+LVDS differential data input	
20	LV6P	+LVDS differential data input	
21	GND	Ground	
22	GND	Ground	
23	LV0N	-LVDS differential data input	
24	LV7N	-LVDS differential data input	
25	LV0P	+LVDS differential data input	
26	LV7P	+LVDS differential data input	
27	GND	Ground	
28	GND	Ground	
29	LV1N	-LVDS differential data input	
30	LV3N	-LVDS differential data input	
31	LV3P	+LVDS differential data input	
32	LV7P	+LVDS differential data input	
33	GND	Ground	
34	GND	Ground	
35	LV2N	-LVDS differential data input	
36	LVCLK0N	-LVDS differential data input	
37	LV2P	+LVDS differential data input	
38	LVCLK0P	+LVDS differential data input	
39	GND	Ground	
40	GND	Ground	



3.5 J4_BackLight Controller Connector

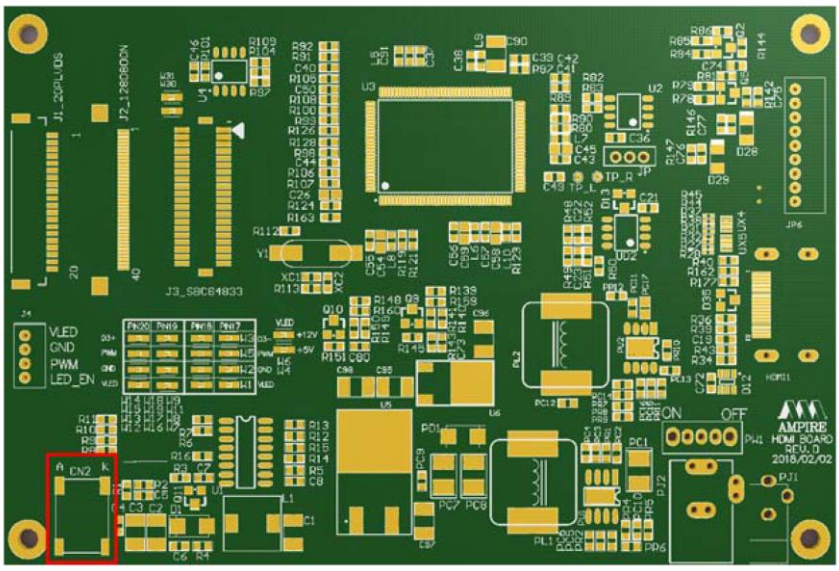
Pin No.	Symbol	I/O	Description	Note
1	VLED	P	Voltage for LED circuit (5.0V or 12V)	
2	GND	I	Power ground	
3	ADJ	P	Adjust the LED brightness by PWM	
4	LED_EN	I	LED BLU ON/OFF. High level: ON; Low level: OFF.	



3.6 BackLight _A,K Connector

- **Only for external backlight connector**

Pin No.	Symbol	Description
1	A	Anode
2	K	Cathode



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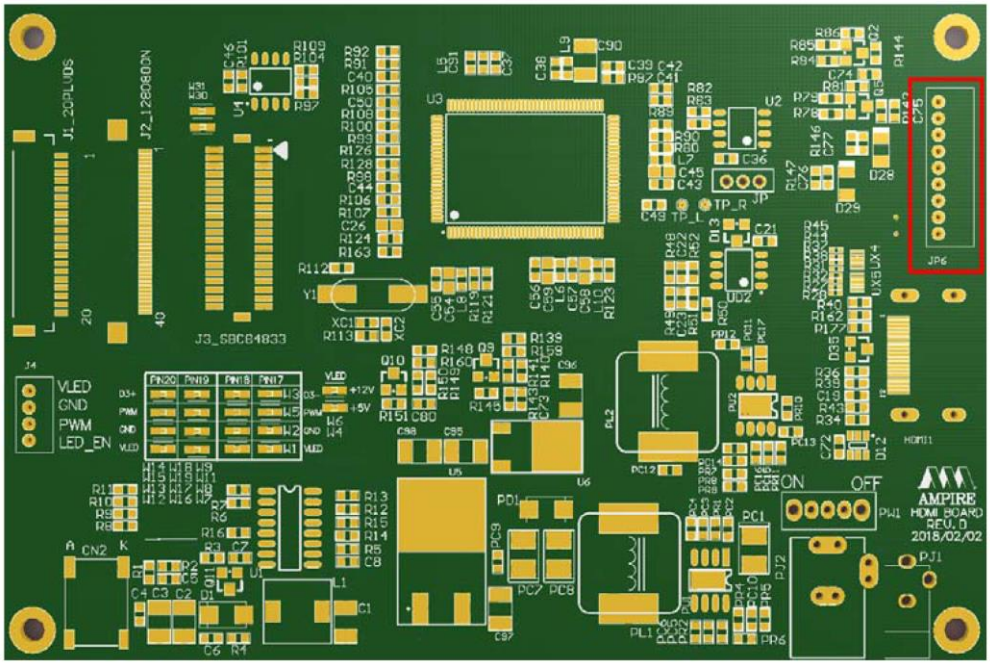
3.7 JP6 Keypad connector for HDMI Board

- **Optional item**
- **If customer need, please check with Ampire sales for new part no. and sample.**



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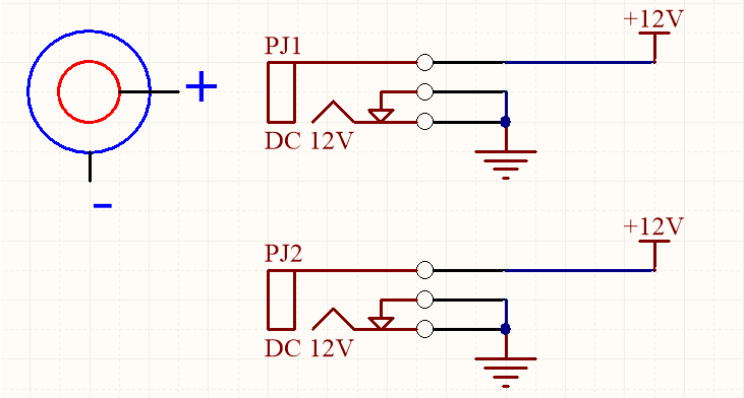
4. INTERFACE PIN CONNECTION

INTERFACE (HDMI Interface Board)

- **PJ1 & PJ2 Power Supply Power Jack:**

  Inner terminal is positive. Outer terminal is GND



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- **HDMI1: HDMI Type A Connector**

HDMI			
			
PIN	**SIGNAL**	**PIN**	**SIGNAL**
1	TMDS Data2+	11	TMDS Clock Shield (Ground)
2	TMDS Data2 Shield (Ground)	12	TMDS Clock-
3	TMDS Data2-	13	CEC (not used)
4	TMDS Data1+	14	Reserved (No Connection)
5	TMDS Data1 Shield (Ground)	15	SCL
6	TMDS Data1-	16	SDA
7	TMDS Data0+	17	DDC/CED (Ground)
8	TMDS Data0 Shield (Ground)	18	+5V input
9	TMDS Data0-	19	Hot Plug Detect
10	TMDS Clock+		

5. RELIABILITY TEST CONDITIONS

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C ,Dry t=240 hrs	
Low Temperature Operation	-20±3°C, Dry t=240 hrs	
High Temperature Storage	80±3°C , Dry t=240 hrs	1,2
Low Temperature Storage	-30±3°C ,Dry t=240 hrs	1,2
Thermal Shock Test	-20°C ~ 25°C ~ 70°C 30 m in. 5 min. 30 min. (1 cycle) Total 100 cycle(Dry)	1,2
Storage Humidity Test	60 °C, Humidity 90%, 240 hrs	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

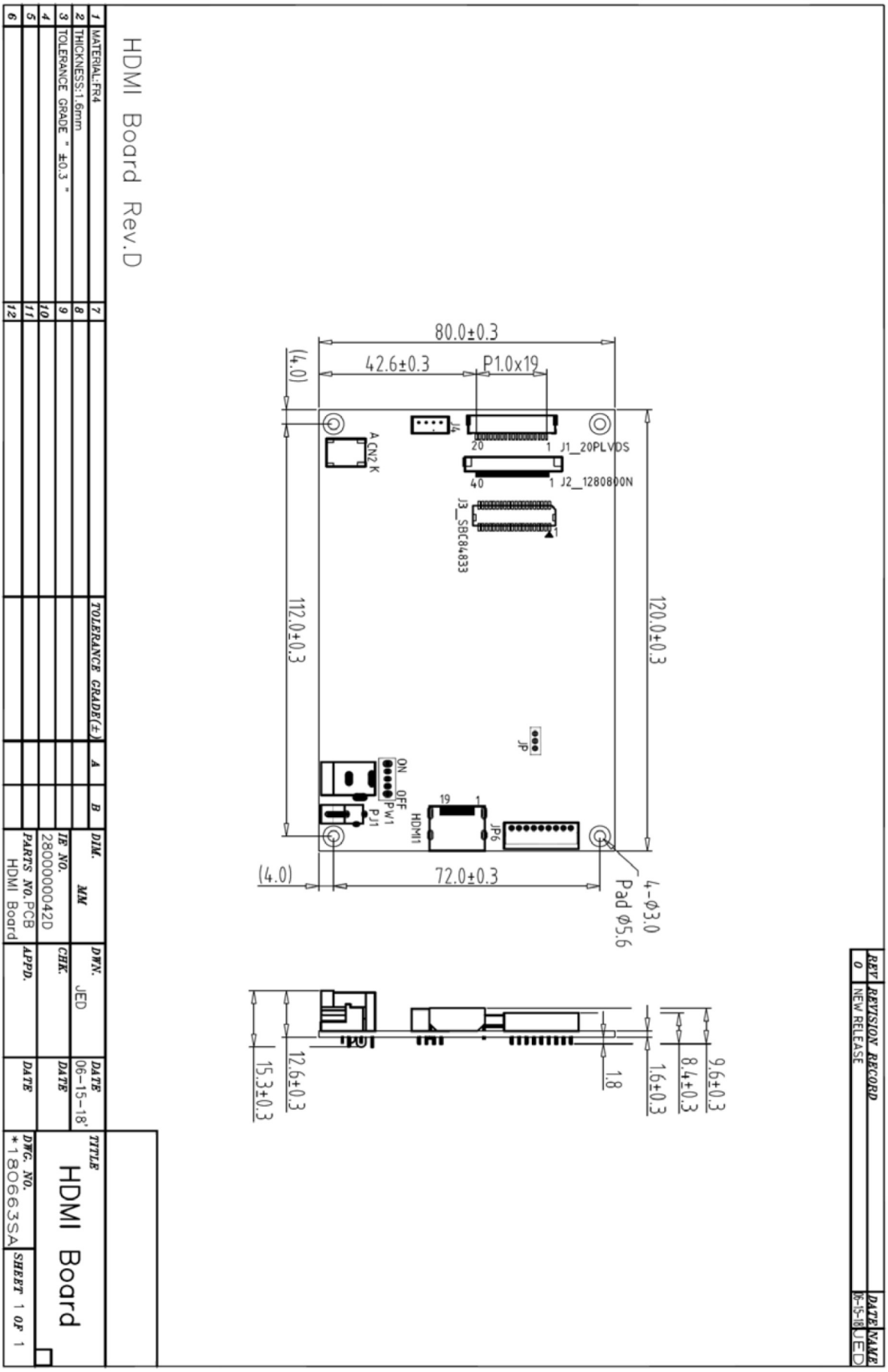
Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

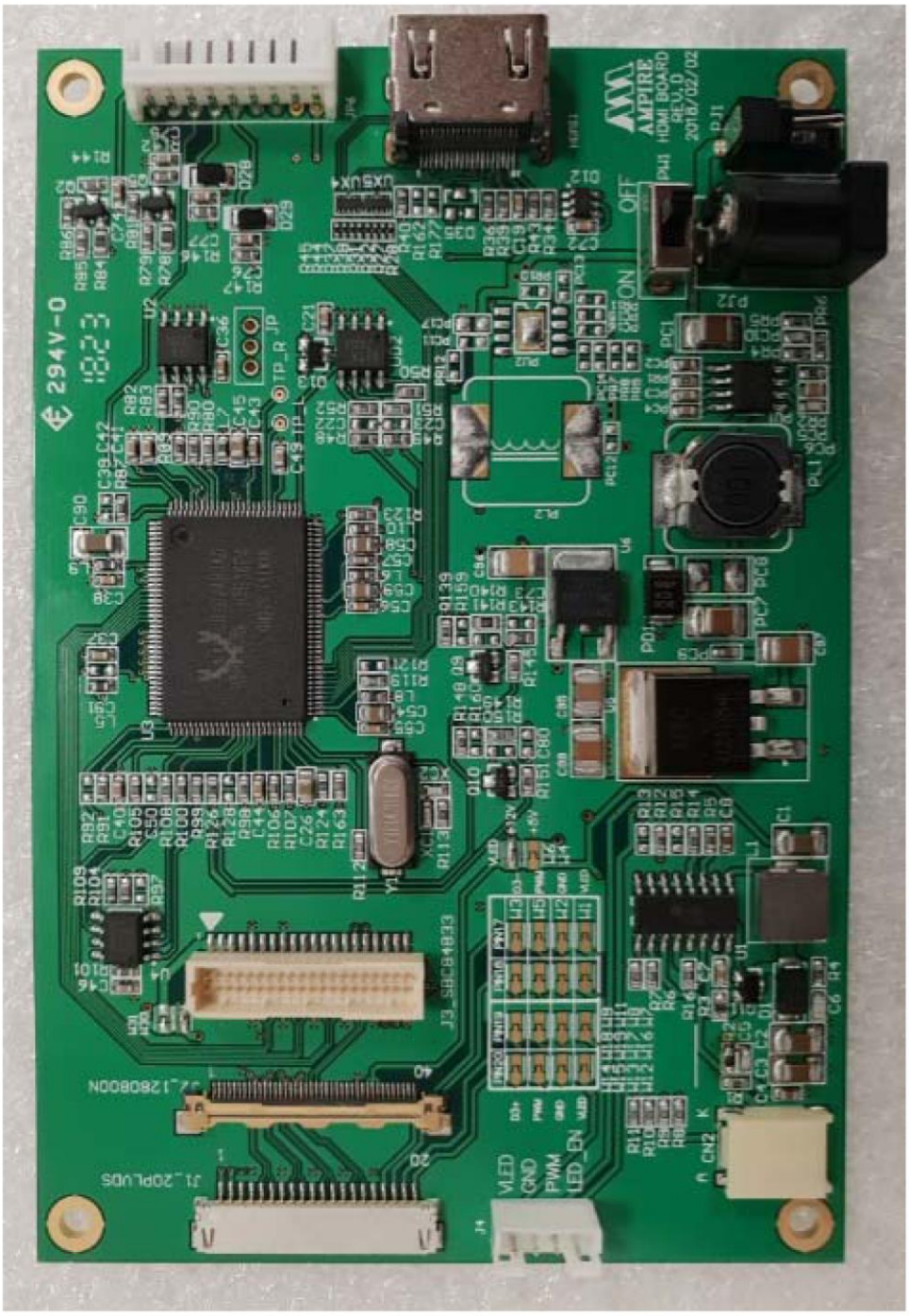
Definitions of life end point :

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.

6. Outline Dimension



7. Photo



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