SPECIFICATION
FOR
TFT LCD MODULE

CUSTOMER : _____

CUSTOMER MODULE : _____

HL MODEL : HG097XG006T01

☐**Preliminary Specification**

■**Final Specification**

Customer Confirmation column:

Approved by : _____ Dept. : _____ Data : _____

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

Designed by	Checked by	Approved by

Revision History

Version NO.	DATE	Description	Remak
V1.0	2020.01.13	FIRST ISSUE	

CONTENTS

1. GENERAL INFORMATION

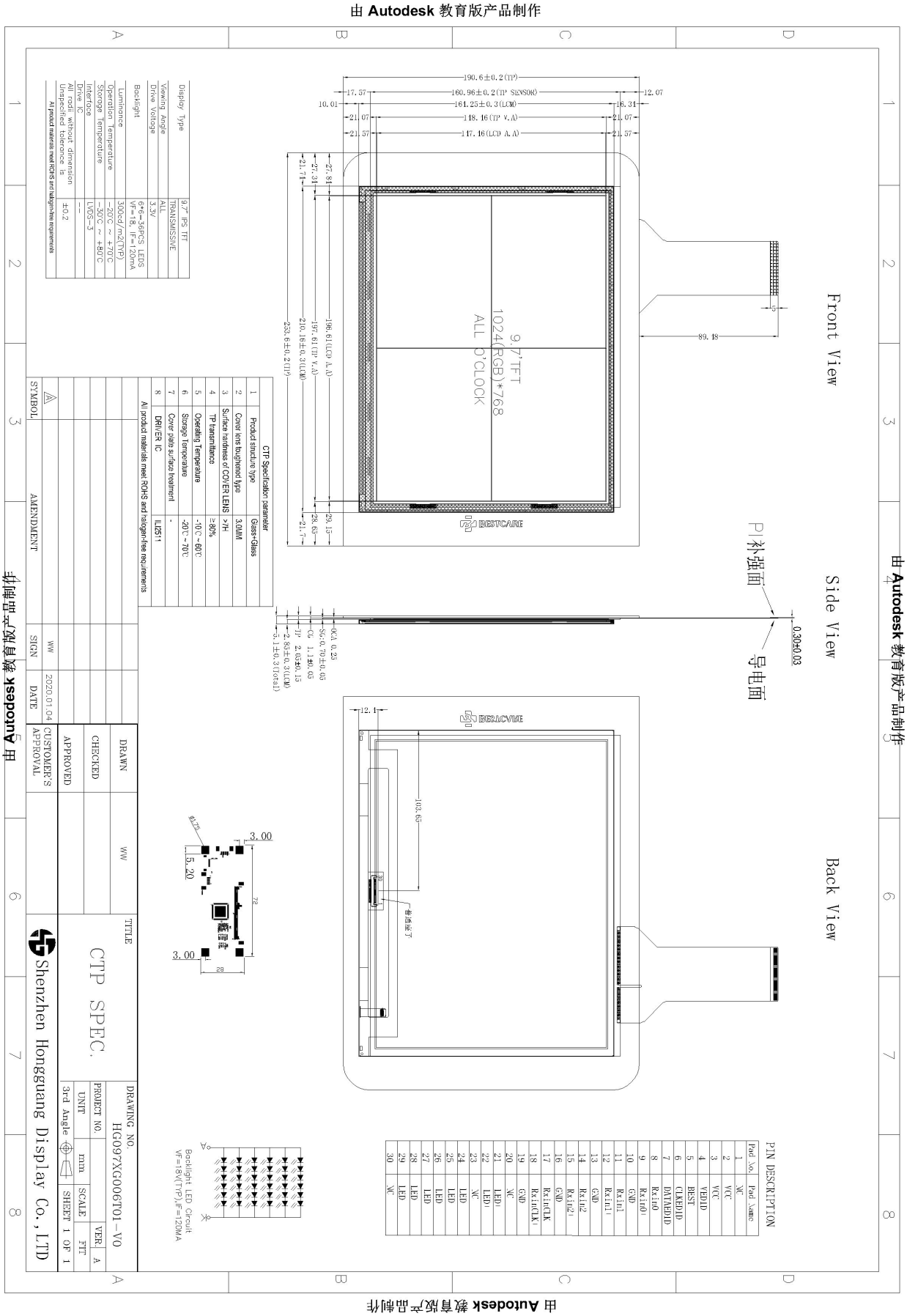
1.1 features

1) Structure: TFT PANNEL+IC+FPC+BL+CTP+PCBA
2) IPS Type LCD 1024 dot-segment and 768 dot-common outputs
3) 16.7M Color can be selected by software
4) White LED back light
5) LVDS-3 interface
6) Operation Temperature : -10~60℃
7) Storage Temperature : -20~70℃
8) CTP cover lens : 1.1mm Asahi glass
9) CTP structure : G+G,USB PCB
10) LED life time: -/

1.2 General specification

Item of	Contents	Unit
Panel Size	9.7	inch
LCD Type	a-si/TRANSMISSIVE	/
Display mode	Normally Black	/
Pixel arrangement	1024*3(RGB)*768	Dots
Pixel pitch (W*H)	0.192(H)*0.192 (V)	um
Active Area	196.61(V)×147.46(H)	Mm
Module area (W*H*T)	253.6(V)×190.6(H) ×5.1(T)	Mm
Recommended Viewing Direction	ALL	O’ clock
IC	-	/
Interface	3 lane LVDS	/
Luminance for LCM+TP	270	cd/m2
Weight	TBD	g

2. DIAGRAM FOR LCM+TP



Display Type	9.7" IPS TFT
Viewing Angle	TRANSMISSIVE
Drive Voltage	ALL
Backlight	3.3V
Luminance	6*6=36PCS LEDS VF=18. IF=120mA
Operation Temperature	300cd/m2(TYP)
Storage Temperature	-20℃ ~ +70℃
Interface	-30℃ ~ +80℃
Drive IC	LVDS-3
All radii without dimension	--
Unspecified tolerance is	±0.2

All product materials meet ROHS and halogen-free requirements

	CTP Specification parameter	
1	Product structure type	Glass+Glass
2	Cover lens thickness type	3.0MM
3	Surface hardness of COVER LENS	>7H
4	TP transmittance	≥80%
5	Operating Temperature	-10℃~60℃
6	Storage Temperature	-20℃~70℃
7	Cover plate surface treatment	-
8	DRIVER IC	IL251

All product materials meet ROHS and halogen-free requirements

Pad No.	Pad Name
1	NC
2	VCC
3	VCC
4	VEDID
5	BEST
6	CLKEDID
7	DATAEDID
8	Rx1n0
9	Rx1p0
10	GND
11	Rx1n1
12	Rx1p1
13	GND
14	Rx1n2
15	Rx1p2
16	GND
17	Rx1nCLK
18	Rx1pCLK
19	GND
20	NC
21	LED-
22	LED-
23	NC
24	LED-
25	LED-
26	LED-
27	LED-
28	LED-
29	LED-
30	NC

3. LCM main parameters

3.1 I/O connection

LCM Pin NO.	Symbol	Description
1	**NC**	NC
2-3	**VCC**	VCC 3.3V
4	**VEDID**	NC
5	**BIST**	NC
6	**CLKEDID**	NC
7	**DATAEDID**	NC
8	**Rxin0-**	LVDS differential data input
9	**Rxin0+**	LVDS differential data input
10	**GND**	Ground
11	**Rxin1-**	LVDS differential data input
12	**Rxin1+**	LVDS differential data input
13	**GND**	Ground
14	**Rxin2-**	LVDS differential data input
15	**Rxin2+**	LVDS differential data input
16	**GND**	Ground
17	**RxinCLK-**	LVDS differential clock input
18	**RxinCLK+**	LVDS differential clock input
19	**GND**	Ground
20	**NC**	NC
21-22	**LED+**	LED Cathode（Positive）
23	**NC**	NC
24-29	**LED Cathode 6B**	LED Cathode（Negative）
30	**NC**	NC

3.2. ABSOLUTE MAXIMUM RATINGS

(GND=AGND=0V)

Parameter of absolute maximum ratings 参数	Symbol 符号	Min 最小值	Max 最大值	Unit 单位
Power supply voltage1	VCC	-0.3	4	V
Backlight forward current	I_{LED}	-0.001	30	mA(For each led)
Operating temperature	Top	-10	60	°C
Storage temperature	Tst	-20	70	°C
Humidity	RH	-	90%(Max)/50°C	RH

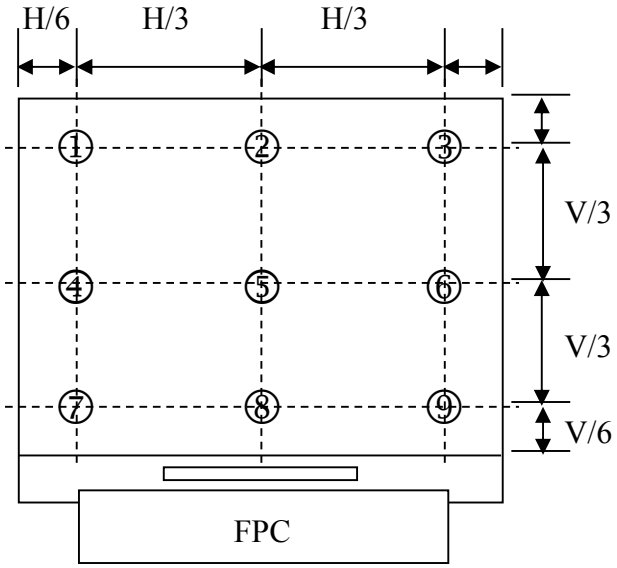
3.3. ELECTRO-OPTICAL CHARACTERISTICS

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center point)		C/R	-	600	800	-	-	Note(1)
Luminance uniformity		U_W	θ = 0. Normal viewing angle B/L On Note(1)	70	80	-	%	Note(2)
Response Time		Tr + Tf		-	16	25	ms	Note(3)
Color Chromaticity (CIE 1931)	White	W_X			0.306		参考值	Note(5)
		W_Y			0.320			
	Red	R_X			0.642			
		R_Y			0.335			
	Green	G_X		-0.02	0.315	+0.02		
		G_y			0.609			
	Blue	B_X			0.154			
		B_Y			0.054			
Viewing Angle	Hor.	∅ 3R	C/R≥10		80	-	Deg	Note(4)
		∅ 9L			80	-		
	Ver.	∅ 12U			80	-		
		∅ 6D		-	80	-		

Note1 Definition of Contrast Ratio (CR):

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note2: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas (Shown in below), every measuring point is placed at the center of each measuring area.



The spot locations for luminance measurement

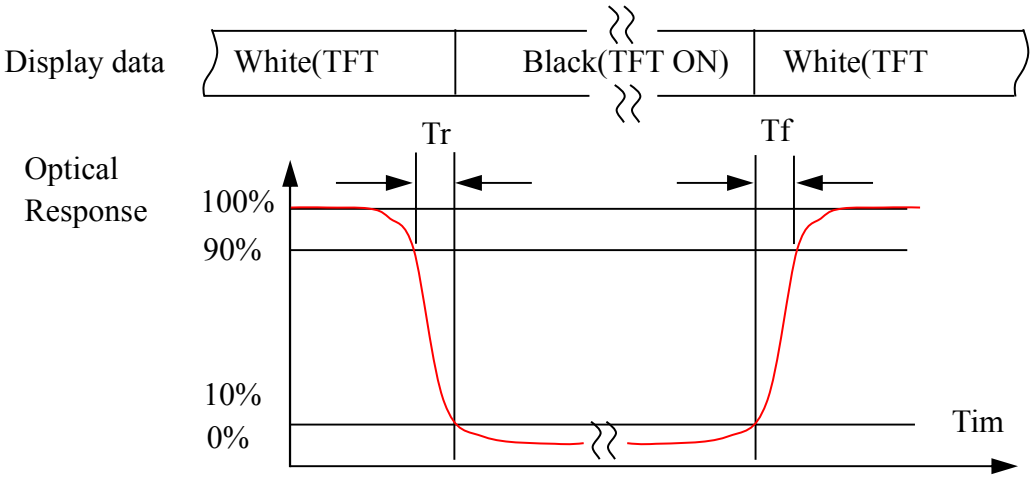
$$\text{Luminance Uniformity} = \frac{B_{min}}{B_{max}} \times 100\%$$

H/6 : V/6

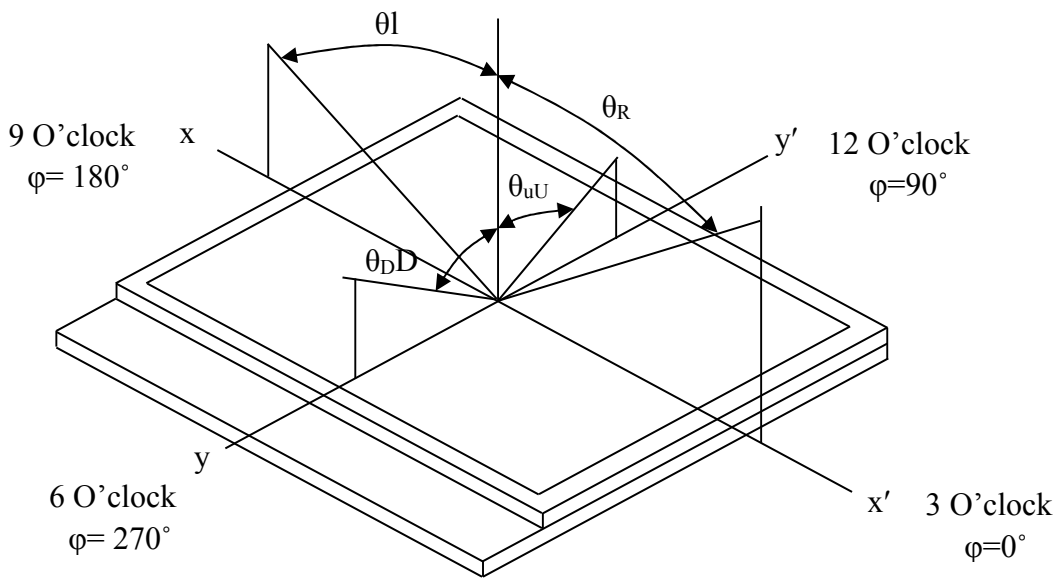
B_{max}: The measured maximum luminance of all measurement position.

B_{min}: The measured minimum luminance of all measurement position.

Note 3:Definition of Response time: Sum of Tr and Tf



Note4.Definition of Viewing Angle: The viewing angle range that the CR≥10



Note 5: Definition of Color Chromaticity (CIE 1931)
Color coordinate of white & red, green, blue at center point.

4. PCB 参数

4.1 概要

HG2680HV-V11LCD 驱动板主要针对 TFT 类液晶屏设计，适用于液晶显示屏和其它一些平板显示屏。

1.输入信号类型：数字高清(HDMI)、模拟(RGB,VGA),PAL/NTSC 制式的复合视频/VIDEO(默认 NC)。

2.板卡支持宽电压输入 8V~25V;典型值 12V（屏供电为 12V 时，板卡供电必须为 12V）

3.宽温工作范围：-20℃~+70℃

4.可支持跳帽选择屏参 800x480~~190x1200。☜

5.板卡自带 LED 背光驱动电路；支持中小尺寸 LED 背光 9~25V 电压驱动。

6.板卡自带 T-CON 电路，可直接驱动中小尺寸 LVDS/TTL 不带 T-CON 的 LCD

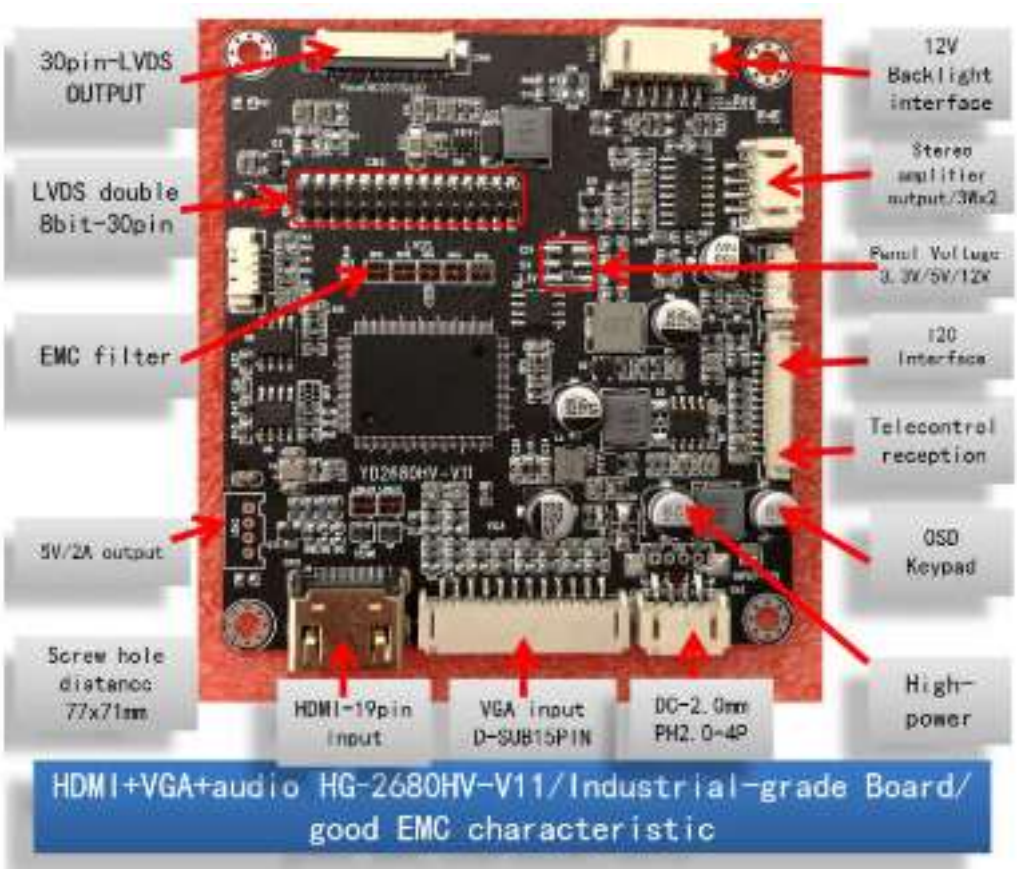
7.背光供电支持 5V/12V（默认 12V），支持 PWM 占空比调节背光亮度

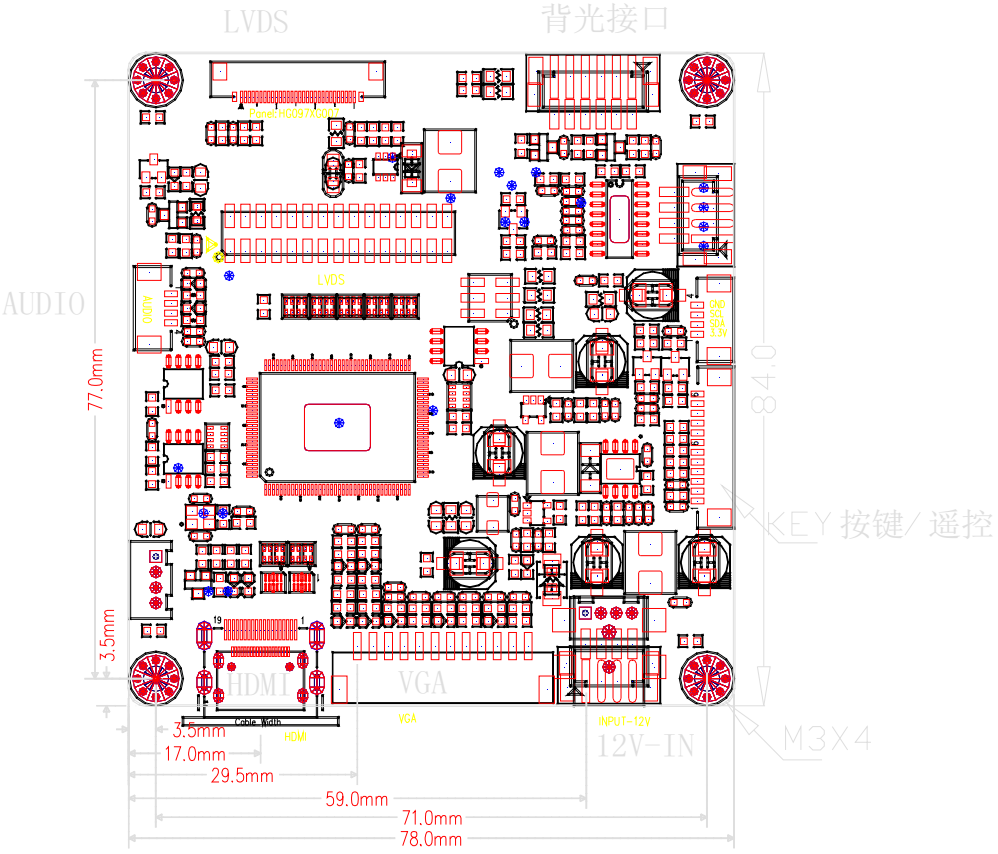
8.显示输出接口：LVDS 双 8BIT、TTL18bit/24bit

9.适应 PC(个人计算机)显卡的高清 HDMI、模拟 RGB(VGA)的分辨率:480x272,VGA，SVGA，XGA，SXGA，WXGA+，UXGA，1920X1200 等 VESA 标准信号；

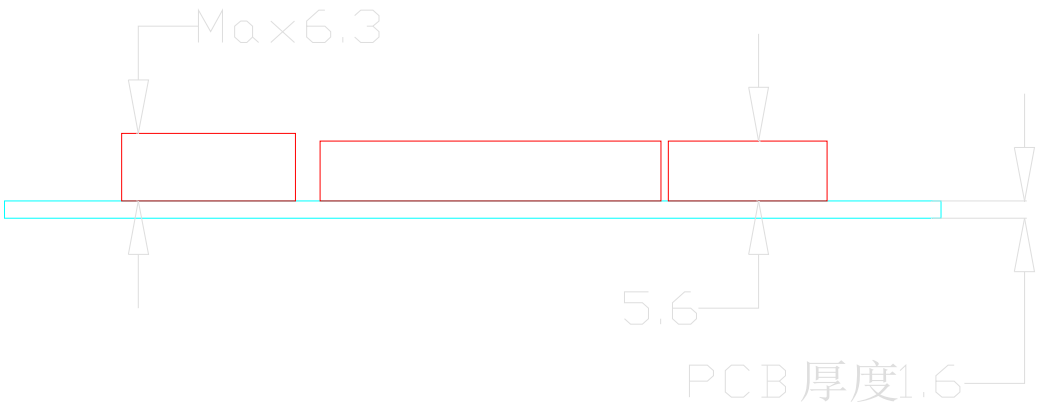
10.特点：此板卡具有操作简单、性能可靠的特点。

4.2 布局与尺寸图


30pin-LVDS OUTPUT
LVDS double 8bit-30pin
EMC filter
5V/2A output
Screw hole distance 77x71mm
12V Backlight interface
Stereo amplifier output/3Wx2
Panel Voltage 3.3V/5V/12V
I2C Interface
Telecontrol reception
OSD Keypad
High-power
HDMI-19pin input
VGA input D-SUB15PIN
DC-2.0mm PH2.0-4P
HDMI+VGA+audio HG-2680HV-V11/Industrial-grade Board/ good EMC characteristic


LVDS
背光接口
AUDIO
KEY 按键/遥控
77.0mm
84.0
3.5mm
M3X4
3.5mm
17.0mm
29.5mm
59.0mm
71.0mm
78.0mm

高度尺寸：



4.2 接口概览

接口	用途	连接器说明	备注
CN1	12V 直流电源输入	4P，2.0Pitch，单排，180°，插座（JST/CVILUX）	
CN2	12V 直流电源输入	DC JACK，内正外负，正极外径Φ2.0mm，负极内径Φ5.5mm（JST/CVILUX）	默认 NC
CN30	逆变器接口	6P，2.0Pitch，单排，180°，插座	
CN12	HDMI 输入	HDMI-19pin,90 度，台湾插座	
CN5	LVDS/输出接口	2×15P，2.0pitch，双排，180°，插座（JST/CVILUX）	
CN3	OSD 调节键盘接口	12P，1.25mmPitch，单排，90°，插座（molex）	
CN26	I2C 接口	4P，1.25mmPitch，单排，90°，插座（molex）	默认 NC
CN9	VGA 输入	12P，2.0Pitch，单排，90°，插座（JST/CVILUX）	默认 NC
CN11	立体声/左右声道音频输出	4P，2.0Pitch，单排，90°，插座（JST/CVILUX）	
CN18	audio 输入/输出	4P，1.25mmPitch，单排，90°，插座（molex）	默认 NC
CN17	5V/2A 输出	4P，1.25mmPitch，单排，90°，插座（molex）	默认 NC
J1	液晶屏供电选择	1-2 短路为 3.3V，3-4 短路为 5V，5-6 短路为 12V	

5. RELIABILITY TEST CONDITIONS

No	Test Item	Test Condition	STANDARD
1	High Temperature Storage	+70°C / 48Hours	1. Functional test is OK. Missing Segment, short, unclear segment, on-display, display abnormally and liquid crystal leak are un-allowed. 2. No low temperature bubbles, end seal loose and fall, frame rainbow.
2	Low Temperature Storage	-20°C / 48Hours	
3	High Temperature Operating	+60°C / 48Hours	
4	Low Temperature Operating	-10°C / 48Hours	
5	Thermal and cold shock	0°C⇆+50°C x 10cycles (30min) (5min) (30min)	
6	Operate at High Temperature and Humidity	50°C x 90%RH / 24H	
7	Vibration Test	Frequency: 10Hz~55Hz~10Hz Amplitude:1.5mm, 2 hours for each direction of X, Y, Z	1. Function test is OK. 2. No glass crack, chipped glass, end seal loose and fall, epoxy frame crack and so on. 3. No structure loose and fall.
8	Dropping test	Drop to the ground from 0.6m height, 1 corner, 3 edges, 6 surfaces.	
9	ESD test	Contact: ±6KV Air: ±10KV 150PF/330Ω,5Points/panel,5times	The test results shall be subject to the whole machine test.

NOTE:

1. The reliability items will be fully performed in new sample qualification,
2 .The reliability status will be tested as monitor during mass production. Individual reliability test shall be performed by lot , Moreover, the individual reliability item shall be decided according to reliability plan.
3. All samples are inspected after keeping in the room with normal temperature and humidity for 2 hours or above.
4. Vibration test: It is not necessary to test for those products without assembly frame , backlight , PCB and so on.
5. Dropping test : It is necessary for affirming new package.
6. For the high temperature and high humidity test, pure water of over 10 MΩ.cm should be used.
7. Each test item applies for test LCM only once .Then tested LCM cannot be used again in any other test item.
8. The quantity of LCM examination for each test item is 5pcs to 10pcs.

6. INSPECTION STANDARDS

6.1 AQL Sampling inspection standard

使用 GB/T 2828-2003 一般 II 水平,采用正常检查一次抽样方式；具体抽检方式参照《成品检验管理程序》、《抽样管理规范》

缺陷区分	AQL 允收水准
严重缺陷	0 收 1 退
重缺	0.4
轻缺	1.0

6.2 Inspect the condition

6.2.1 在 20—40W 日光灯的照明条件下，样品离检查者眼睛约 30cm 处进行检查。检验方向以垂直线前后左右 45°（以时钟 3 点、6 点、9 点、12 点）

6.2.2 检验者视力需达到标准视力 1.0 以上。

6.2.3 检验者需戴静电手环、两手八个手指套。

6.2.4 外观检验者以目视检查或以菲林对比卡比对。

6.2.5 电性测试使用电测测架,主板,电源线及单片机。

6.2.6 若标准与规格书不符时，以产品发行之规格书特殊检验规格、工程变更为准

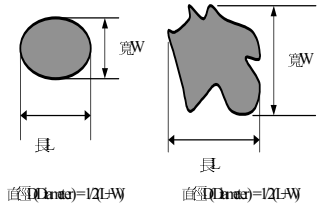
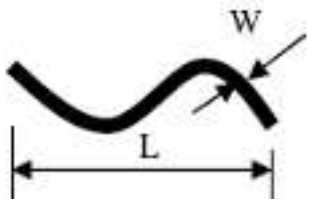
6.2.7 辉色度检测请参照样品,检测方法依照辉色度检验标准。

6.2.8 电测检验环境:照度为 200LUX 以下,外观检验环境：照度为 600LUX-1000LUX，检验时间：1 秒-3 秒。

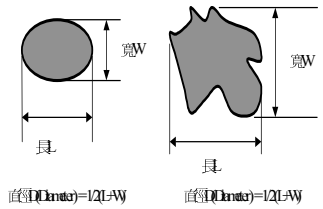
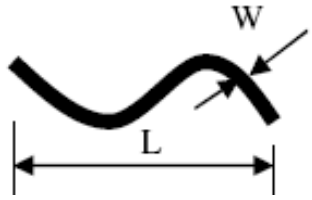
6.2.9 检验工具:电测测架,主板,电源线及单片机,菲林对比卡,游标卡尺,放大镜,实体显微镜(必要时)等等。

6.3 Judgment criterion

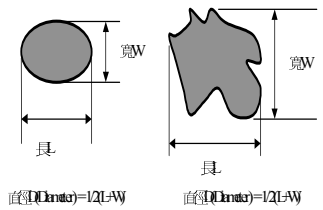
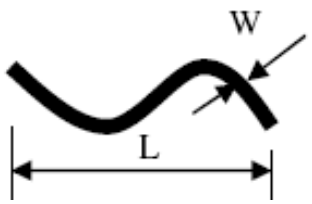
小尺寸点、线判定标准：（6.2 寸以内）

1	点状缺陷（磨伤、异物、针孔、凹痕、缺膜、气泡，白点、彩点、脏点）		判定（A/B/C 区）	*D≤0.10，忽略不计，但密集型不允许*	MI	OK
				0.1<D≤0.15，ds≥10		N≤2
				0.15<D≤0.2，ds≥10		N≤1
				LCD 亮点：0.15<D		N≤1
				D>0.2		NG
			判定（D 区）	同背面丝印油墨区杂质判定标准		
			注：1）D 区的点状缺陷需在不影响 CTP 功能、客户组装及整机的外观的情况下，判定 OK		MI	
2	线状缺陷（磨伤、无感划伤、毛屑、纤维等）		判定（A/B/C 区）	*W≤0.03mm，L≤3mmm，ds≥10*	MI	N≤2
				0.03mm<W≤0.05mm，L≤3mm，ds≥10		N≤1
				W>0.05mm 或 L>3mm		NG

中尺寸点、线判定标准：（6.2 8 寸以内）

1	点状缺陷（磨伤、异物、针孔、凹痕、缺膜、气泡，白点、彩点、脏点）		判定（A/B/C 区）	*D≤0.10，忽略不计，但密集型不允许*	MI	OK
				0.15＜D≤0.25，ds≥10		N≤2
				0.25＜D≤3，ds≥10		N≤1
				LCD 亮点：0.2＜D		N≤1
				D＞0.3		NG
			判定（D 区）	同背面丝印油墨区杂质判定标准		
			注：1）D 区的点状缺陷需在不影响 CTP 功能、客户组装及整机的外观的情况下，判定 OK		MI	
2	线状缺陷（磨伤、无感划伤、毛屑、纤维等）		判定（A/B/C 区）	*W≤0.03mm，L≤3mmm，ds≥10*	MI	N≤2
				0.03mm＜W≤0.05mm，L≤3mm，ds≥10		N≤1
				W＞0.05mm 或 L＞3mm		NG

大尺寸点、线判定标准：（8.1~13.3 寸以内）

1	点状缺陷（磨伤、异物、针孔、凹痕、缺膜、气泡，白点、彩点、脏点）		判定（A/B/C 区）	*D≤0.1，忽略不计，但密集型不允许*	MI	OK
				0.15＜D≤0.3，ds≥10		N≤2
				0.3＜D≤0.35，ds≥10		N≤1
				LCD 亮点：0.25＜D		N≤1
				D＞0.35		NG
			判定（D 区）	同背面丝印油墨区杂质判定标准		
			注：1）D 区的点状缺陷需在不影响 CTP 功能、客户组装及整机的外观的情况下，判定 OK		MI	
2	线状缺陷（磨伤、无感划伤、毛屑、纤维等）		判定（A/B/C 区）	*W≤0.05mm，L≤5mmm，ds≥10*	MI	N≤2
				0.05mm＜W≤0.07mm，L≤5mm，ds≥10		N≤1
				W＞0.07mm 或 L＞5mm		NG

7. PACKAGE DRAWING