HPX TFT-LCD

MODEL: HPX480V1

Issue Date : 2019/1/23

(*)Preliminary Specifications
( )Final Specifications

HPX	Drafter By	
	Approved By	
Customer	Signature	

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REVISION HISTORY

Version	Date	Page	Description
2.0	2019/01/23	All	First release

1. GENERAL DESCRIPTION

1.1 OVERVIEW

This specification applies to the 48 inch Color TFT-LCD Module HPX480V1. This LCD module has a TFT active matrix type liquid crystal panel 1920x238 pixels, and diagonal size of 48 inch. This module supports 1920x1080 mode. Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 10-bit gray scale signal for each dot. The HPX480V1 has been designed to apply the 10-bit 2 channel LVDS interface method. It is intended to support displays where high brightness, wide viewing angle, high color saturation, and high color depth are very important.

1.2 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Screen Size	48	Inch	-
Driver Element	a-Si TFT active matrix	-	-
Pixel Number	1920 x R.G.B. x 238	Pixel	
Pixel Number	0.63 (H) x 0.63(W)	mm	
Pixel Arrangement	RGB vertical stripe	-	
Display Colors	1.07B (Dithered 10bit) 16.7 millions	Color	
Transmissive Mode	Normally Black	-	
Surface Treatment	Hard coating (3H), AG (Haze 10%)	-	
Luminance, White	700 (typical)	cd/m2	
Color Gamut	72% of NTSC(Typ.)	-	
Power Consumption	Total 51.3W (Max.) @ cell 11.7W (Max.), BL 39.6W (Max.)		(1)

Note(1) The specified power consumption: Total=cell(reference 4.3.1)+BL(reference 4.3.3)

2. MECHANICAL SPECIFICATIONS

Item		Min	Typ.	Max	Unit	Note
Module Size	Horizontal(H)	Typ.-0	1249.6	Typ.+1	mm	(1)
	Vertical (V)	Typ.-0	190.75	Typ.+1	mm	
	Thickness (T)	Typ.-0.5	28	Typ.+0.5	mm	
Bezel Area	Horizontal	Typ.-0.5	1213.2	Typ.+0.5	mm	
	Vertical	Typ.-0.5	154		mm	
Active Area	Horizontal	-	1209.6	-	mm	
	Vertical	-	150		mm	
Weight		-	8.5	-	Kg	

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

3. ABSOLUTE MAXIMUM RATINGS

3.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	TST	-20	+60	ºC	(1)
Operating Ambient Temperature	TOP	0	+50	ºC	(1),(2)

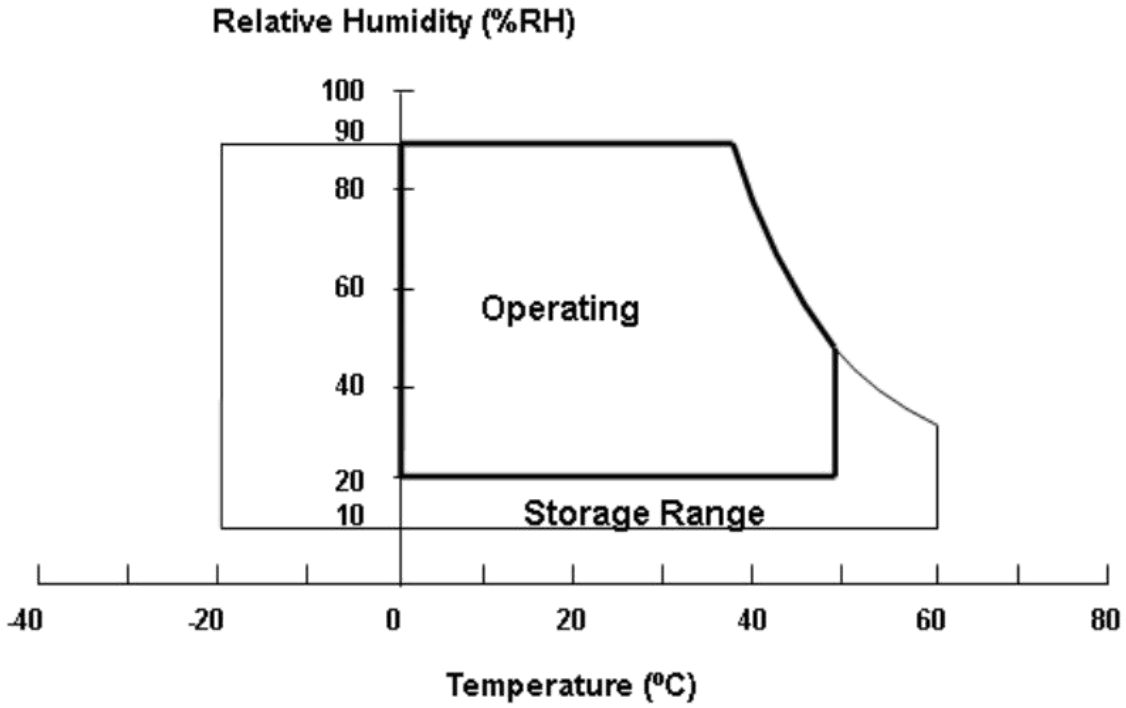
Note (1)

(a) 90 %RH Max. (Ta <= 40 ºC).

(b) Wet-bulb temperature should be 39 ºC Max. (Ta > 40 ºC).

(c) No condensation.

Note (2) The temperature of panel surface should be 0 ºC min. and 60 ºC max.



3.2 ELECTRICAL ABSOLUTE RATINGS

3.2.1 BACKLIGHT UNIT

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Forward Current Per Input Pin	I_F	-	-	60	mA	(1),(2) Duty=100%
LED Pulse Forward Current Per Input Pin	I_P	-	-	600	mA	(1),(2) Pulse Width≦ 10msec. and Duty= 100%

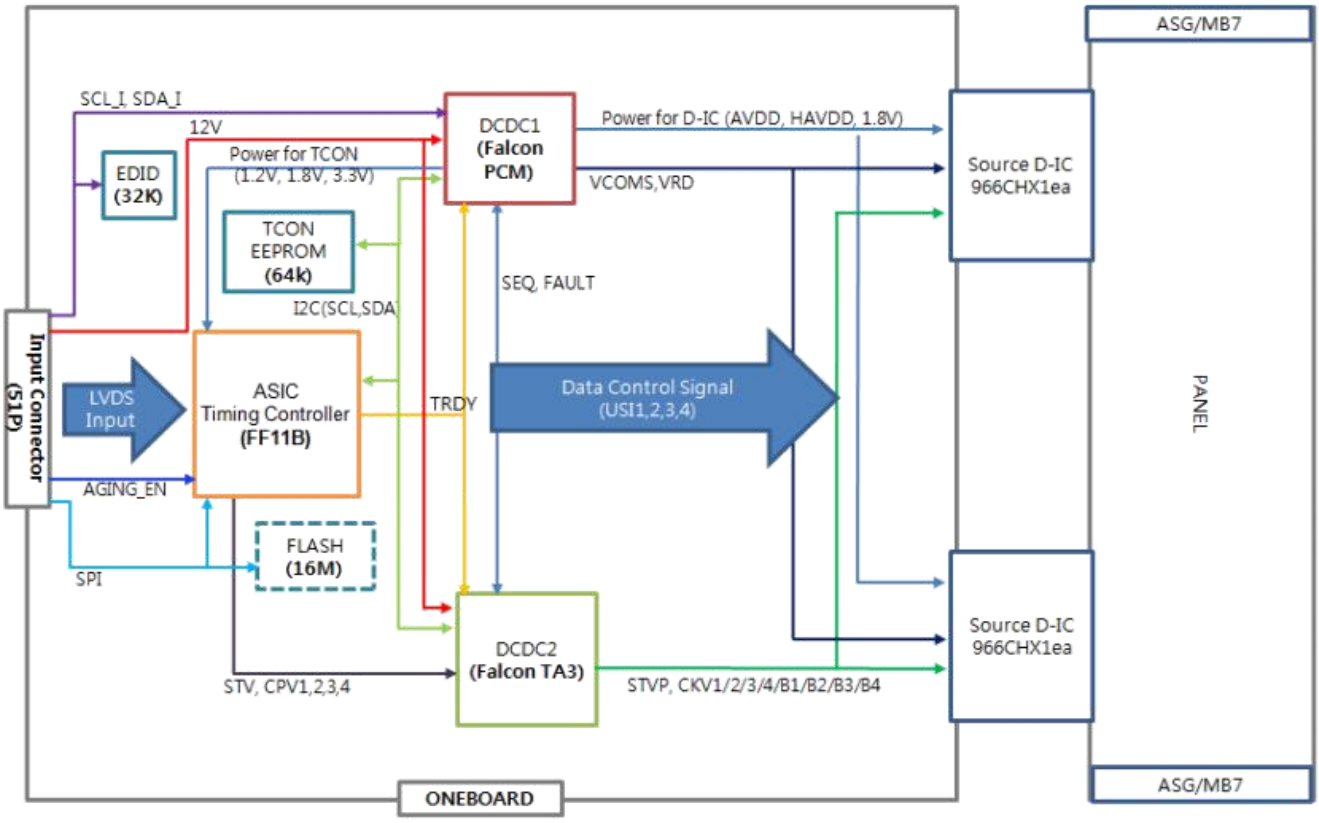
Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for input pin of LED light bar at Ta=25±2 ºC (Refer to 4.3.3 and 4.3.4 for further

information).

4. ELECTRICAL SPECIFICATIONS

4.1 FUNCTION BLOCK DIAGRAM



4.2 INTERFACE CONNECTIONS

PIN ASSIGNMENT

Pin	Symbol	Description	Pin	Symbol	Description
1	NC	No Connection	26	NC	No Connection
2	NC	No Connection	27	NC	No Connection
3	NC	No Connection	28	RX2[A]N	Even LVDS Signal-
4	NC	No Connection	29	RX2[A]P	Even LVDS Signal+
5	NC	No Connection	30	RX2[B]N	Even LVDS Signal-
6	NC	No Connection	31	RX2[B]P	Even LVDS Signal+
7	NC	No Connection	32	RX2[C]N	Even LVDS Signal-
8	NC	No Connection	33	RX2[C]P	Even LVDS Signal+
9	NC	No Connection	34	GND	Ground
10	NC	No Connection	35	RX1[CLK]N	LVDS Clock-
11	GND	Ground	36	RX1[CLK]P	LVDS Clock+
12	RX1[A]N	Odd LVDS Signal-	37	GND	Ground
13	RX1[A]P	Odd LVDS Signal+	38	RX2[D]N	Even LVDS Signal-
14	RX1[B]N	Odd LVDS Signal-	39	RX2[D]P	Even LVDS Signal+
15	RX1[B]P	Odd LVDS Signal+	40	RX2[E]N	Even LVDS Signal-
16	RX1[C]N	Odd LVDS Signal-	41	RX2[E]P	Even LVDS Signal+

17	RX1[C]P	Odd LVDS Signal+	42	NC	No Connection
18	GND	Ground	43	NC	No Connection
19	RX1[CLK]N	LVDS Clock-	44	GND	Ground
20	RX1[CLK]P	LVDS Clock+	45	GND	Ground
21	GND	Ground	46	GND	Ground
22	RX1[D]N	Odd LVDS Signal-	47	NC	No Connection
23	RX1[D]P	Odd LVDS Signal+	48	12V	DC power supply
24	RX1[E]N	Odd LVDS Signal-	49	12V	DC power supply
25	RX1[E]P	Odd LVDS Signal+	50	12V	DC power supply
			51	12V	DC power supply

Note (1)

LCD Connector : FI-R51 S-HF(manufactured by JAE) or KN25-51 P-0.5SH(manufactured by Hirose)

Mating Connector : FI-R51HL(JAE) or compatible

4.3 ELECTRICAL CHRARCTERISTICS

4.3.1 LCD ELETRONICS SPECIFICATION

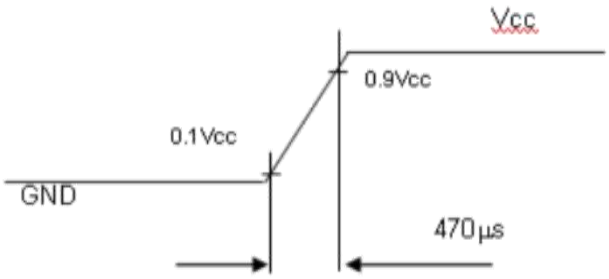
The ambient temperature is Ta = 25 ± 2 ºC.

Item		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		Vcc	10.8	12.0	13.2	V	(1)
Rush Current		I_{RUSH}	-	-	2	A	(2)
Power Consumption	White	P_T	-	6	7.79	W	(3)
	Black	P_T	-	6.516	9.64	W	
	Horizontal Stripe	P_T	-	8.052	11.67	W	
Power Supply Current	White	P_T	-	0.500	0.666	A	
	Black	P_T	-	0.543	0.730	A	
	Horizontal Stripe	P_T	-	0.671	0.884	A	
LVDS interface	Differential Input High Threshold Voltage	V_{LVTH}	+100	-	+300	mV	(4)
	Differential Input Low Threshold Voltage	V_{LVTL}	-300	-	-100	mV	
	Common Input Voltage	V_{CM}	1.0	1.2	1.4	V	
	Differential Input Voltage	$\|V_{ID}\|$	200	-	600	mV	
	Terminating Resistor	R_T	-	100	-	ohm	
CMOS interface	Input High Threshold Voltage	V_{IH}	2.7	-	3.3	V	
	Input Low Threshold Voltage	V_{IL}	0	-	0.7	V	

Note (1) The module should be always operated within the above ranges.
The ripple voltage should be controlled under 10% of Vcc (Typ.).

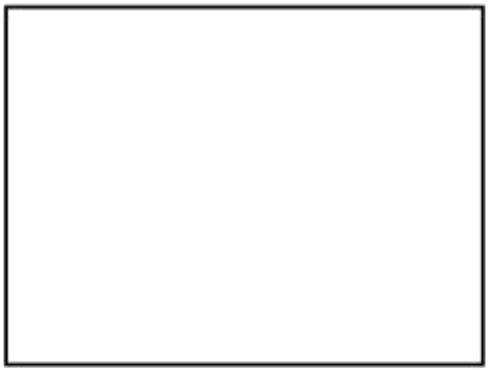
Note (2) Measurement Conditions:

Vcc rising time is 470μs



Note (3) The specified power supply current is under the conditions at Vcc = 12.0 V, Ta = 25 ± 2 ºC, Fr = 60Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern

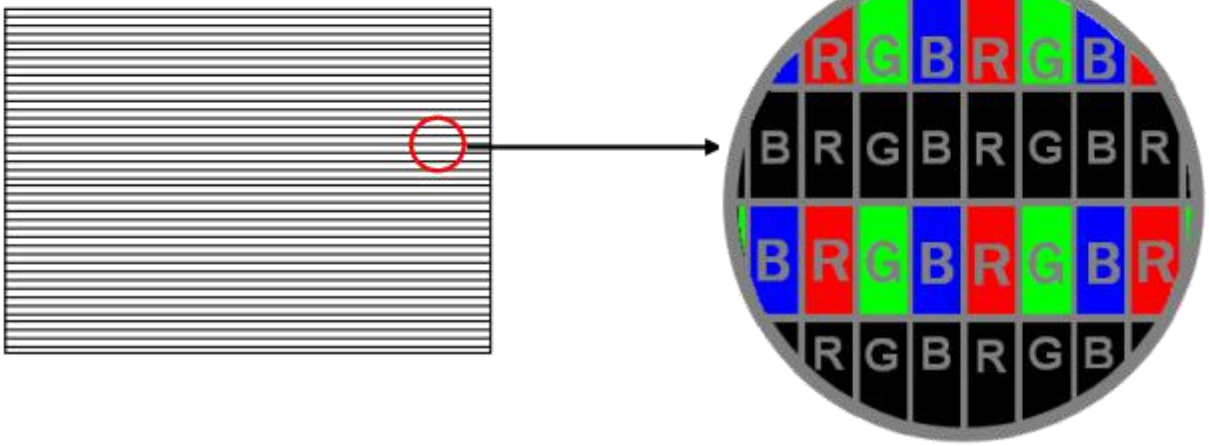


Active Area

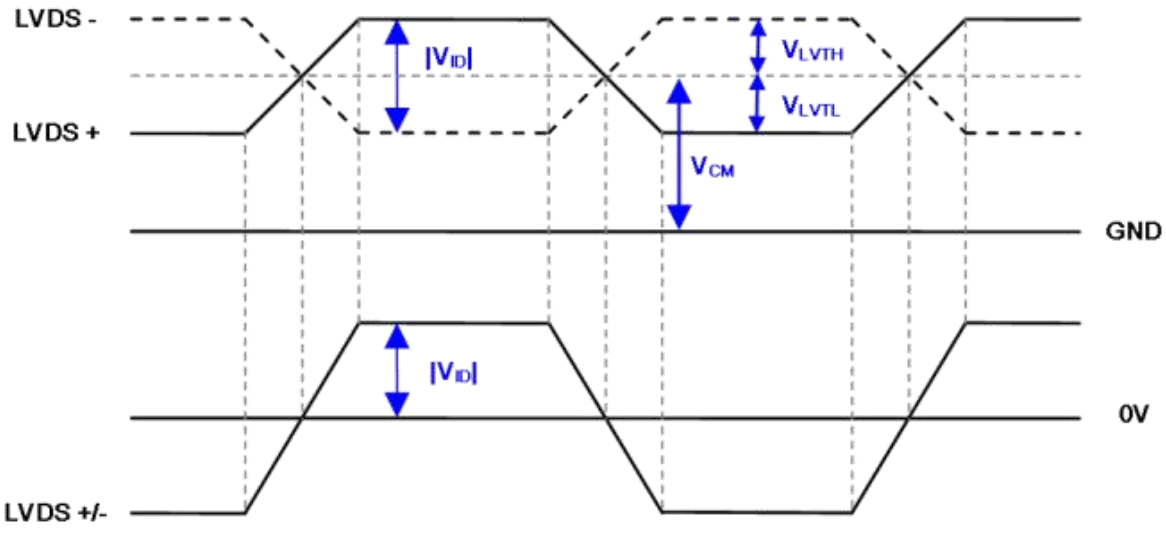
b. Black Pattern

Active Area

c. Horizontal Stripe



Note (4) The LVDS input characteristics is shown as below :



4.3.2 BACKLIGHT UNIT

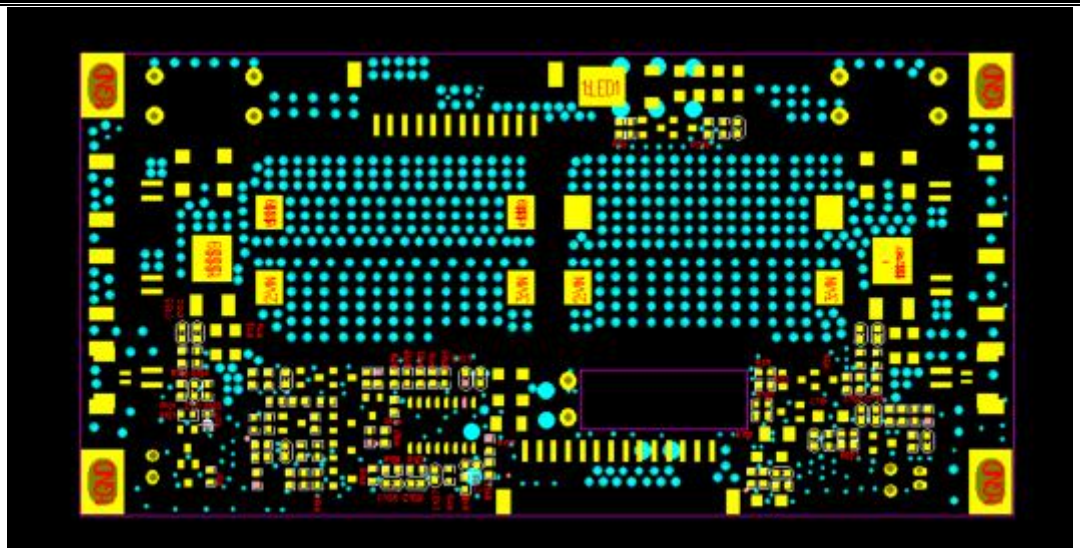
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Light Bar Input Voltage Per Input Pin	VPIN	-	-	66	V	(1) Duty=100% IPIN=90mA
LED Light Bar Current Per Input Pin	IPIN	-	-	300	mA	(1),(2) Duty=100%
LED Life Time	LLED	-	50000	-	Hrs	(3)
Power Consumption	PBL	-	-	39.6	W	(1) Duty=100%,

Note (1) LED light bar input voltage and current are measured by utilizing a true RMS multimeter as shown below:

Note (2) PBL(Typ) = IPIN(Typ) × VPIN(Typ) × (2),PBL(Max)=IPIN(TYP) ×VPIN(Max) ×(2) , LED light bar circuit is (11)Series, (6)Parallel.

Note (3) The lifetime of LED is defined as the time when LED packages continue to operate under the conditions at Ta = 25 ±2 ℃ and I= 65 mA (per chip) until the brightness becomes ≦ 50% of its original value.

4.3.3 LED DRIVER BOARD CONNECTOR



外形尺寸：130*64*10mm

CON1 Pin	Symbol	Description
1	VCC	Operating Voltage Supply, 12~24V DC regulated
2	VCC	Operating Voltage Supply, 12~24V DC regulated
3	VCC	Operating Voltage Supply, 12~24V DC regulated
4	VCC	Operating Voltage Supply, 12~24V DC regulated
5	VCC	Operating Voltage Supply, 12~24V DC regulated
6	GND	Ground and Current Return
7	GND	Ground and Current Return
8	GND	Ground and Current Return
9	GND	Ground and Current Return
10	GND	Ground and Current Return
11	NC	Not connect
12	BL ON/OFF	BLU On-Off control: High/Open (2~5.5V) : BL On ; Low (0~0.8V/GND) : BL Off
13	ADJ	External PWM (10~100% Duty, open for 0%)
14	NC	Not connect

CON2 Pin	Symbol	Description
1	LED1+	Operating Voltage Supply
2	LED1+	Operating Voltage Supply
3	LED1-	Current Return
4	LED1-	Current Return
5	LED1-	Current Return
6	LED1-	Current Return
7	LED1-	Current Return
8	LED1-	Current Return
9	LED1-	Current Return
10	LED1-	Current Return
11	LED1+	Operating Voltage Supply
12	LED1+	Operating Voltage Supply

4.4 LVDS INPUT SIGNAL SPECIFICATIONS

4.4.1 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

COLOR	DISPLAY (8bit)	DATA SIGNAL																								GRAY SCALE LEVEL
		RED								GREEN								BLUE								
		R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7	
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	-
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	-
	GREEN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	-
	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	-
	RED	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	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	-
GRAY SCALE OF RED	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	R0
	DARK ↑	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1
		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			R3~ R252
	↓ LIGHT	:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			
		1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R253
		0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R254
	RED	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R255
GRAY SCALE OF GREEN	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	G0
	DARK ↑	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G1
		0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G2
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			G3~ G252
	↓ LIGHT	:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			
		0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G253
		0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G254
	GREEN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G255
GRAY SCALE OF BLUE	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	B0
	DARK ↑	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	B1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	B2
		:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			B3~ B252
	↓ LIGHT	:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	:			
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	B253
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	B254
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	B255

Rn : Red gray, Gn : Green gray, Bn : Blue gray (n = Gray level)

Input signal : 0 = Low level voltage, 1 = High level voltage

4.5 DISPLAY TIMMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

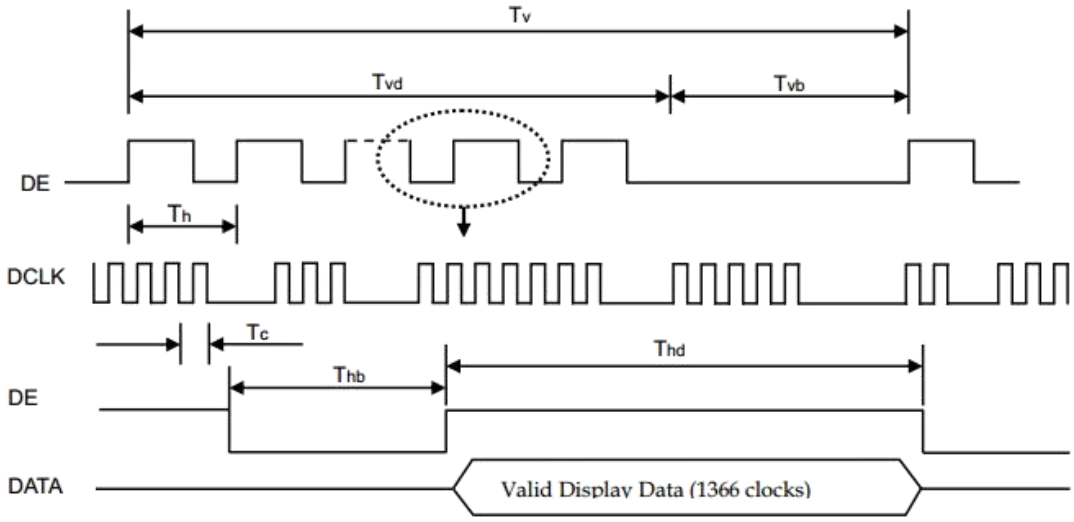
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Receiver Clock	Frequency	Fclkin(=1/TC)	120	148.5	153.5	MHz	
	Input cycle to cycle jitter	Trcl	-	-	200	ps	(3)
	Spread spectrum modulation range	Fclkin_mod	Fclkin-2%	-	Fclkin+2%	MHz	(4)
	Spread spectrum modulation frequency	FSSM	-	-	200	KHz	
LVDS Receiver Data	Receiver Skew Margin	TRSKM	-400	-	400	ps	(5)
Vertical Active Display Term	Frame Rate	Fr5	47	50	53	Hz	(6)
		Fr6	57	60	63	Hz	
	Total	Tv	1115	1125	1380	Th	Tv=Tvd+Tvb
	Display	Tvd	1080	1080	1080	Th	—
	Blank	Tvb	35	45	300	Th	—
Horizontal Active Display Term	Total	Th	2115	2200	2345	Tc	Th=Thd+Thb
	Display	Thd	1920	1920	1920	Tc	—
	Blank	Thb	195	280	425	Tc	—

Note (1) Please make sure the range of pixel clock has follow the below equation :

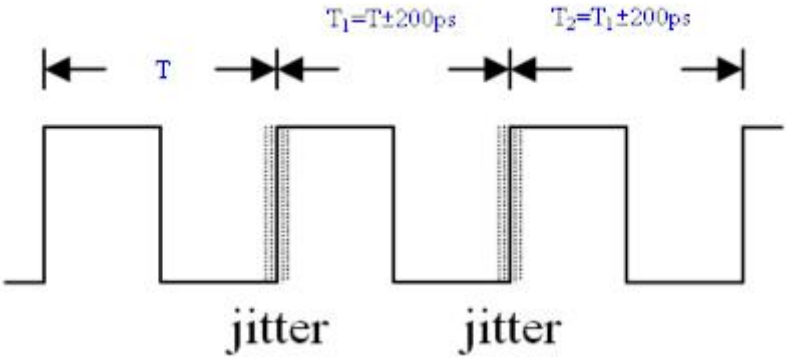
$Fclkin(max) \geqq Fr6 \times Tv \times Th$

$Fr5 \times Tv \times Th \geqq Fclkin\ (min)$

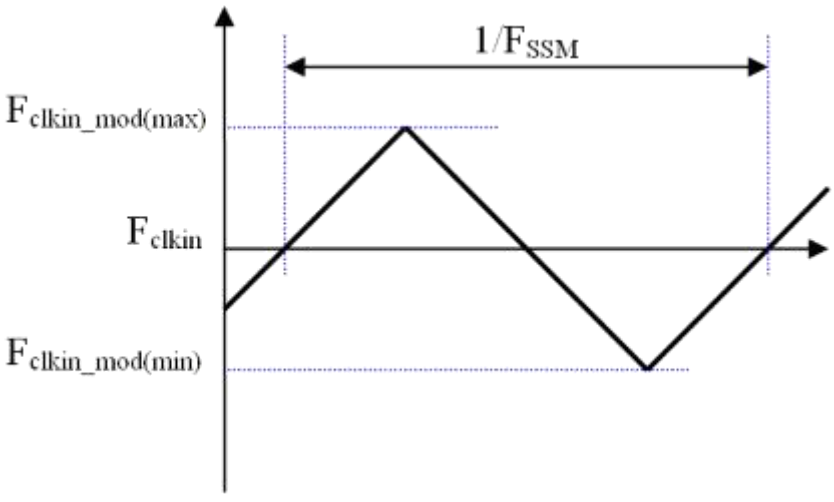
Note (2) This module is operated in DE only mode and please follow the input signal timing diagram below :



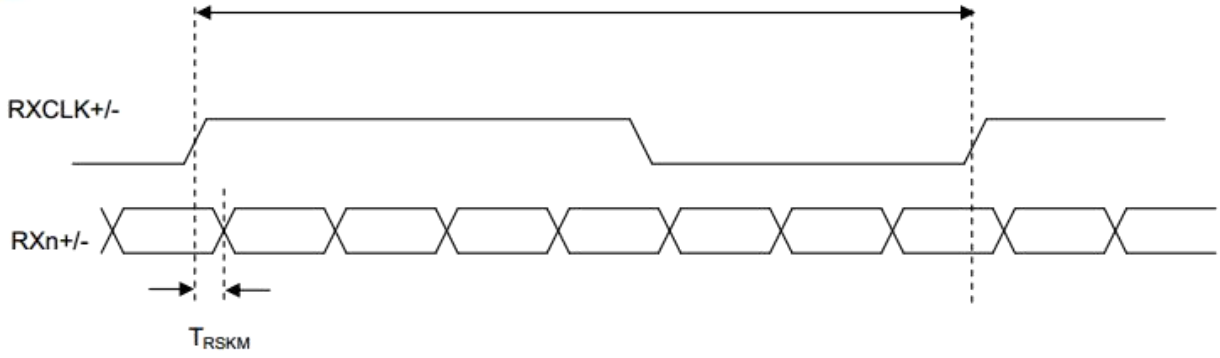
Note (3) The input clock cycle-to-cycle jitter is defined as below figures. Trcl = | T1 – T|



Note (4) The SSCG (Spread spectrum clock generator) is defined as below figures.

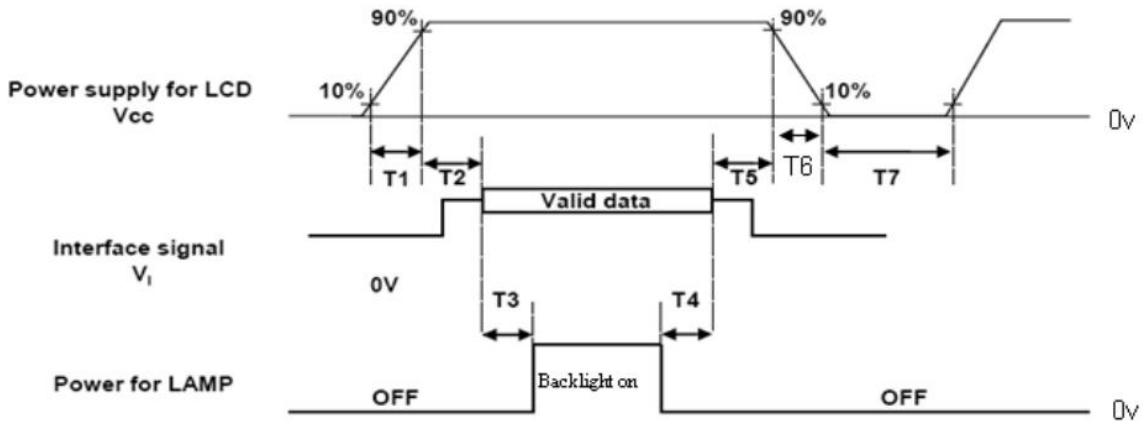


Note (5) The LVDS timing diagram and the receiver skew margin is defined and shown in following figure.



4.6 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should be as the diagram below.



Parameters	Values			Units
	Min.	Typ.	Max.	
T1	0.5		10	ms
T2	0	30	50	ms
T3	500	600		ms
T4	100	250		ms
T5	0	20	50	ms
T6	0.1		100	ms
T7	1000			ms

Note (1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.

Note (2) When the backlight turns on before the LCD operation of the LCD turns off, the display may momentarily become abnormal screen.

Note (3) In case of VCC = off level, please keep the level of input signals on the low or keep a high impedance.

Note (4) T7 should be measured after the module has been fully discharged between power off and on period.

Note (5) Interface signal shall not be kept at high impedance when the power is on.

Note (6) CMI won't take any responsibility for the products which are damaged by the customers not following the Power Sequence.

Note (7) There might be slight electronic noise when LCD is turned off (even backlight unit is also off). To avoid this symptom, we suggest "Vcc falling timing" to follow "t6 spec".

5. OPTICAL CHARACTERISTICS

5.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	ºC
Ambient Humidity	Ha	50±10 %R	%RH
Vertical Frame Rate	Fr	60	Hz
Supply Voltage	Vcc	12±1.2	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
LED Light Bar Input Current Per Input Pin	I_{PIN}	**75**	mA
PWM Duty Ratio	D	100	%

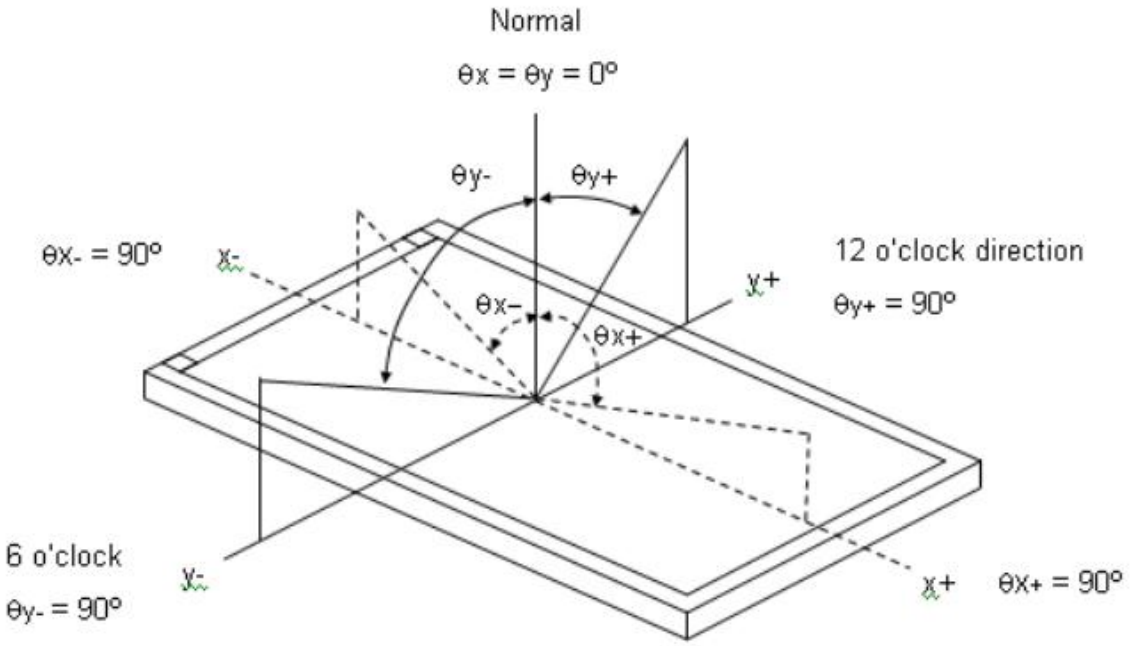
5.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 5.2. The following items should be measured under the test conditions described in 5.1 and stable environment shown in Note (5).

Item		Symbol	Condition	Min.	Typ.	Max.	Uint	Note
Color Chromaticity (CIE)	Red	Rcx	Normal θx=0° , θY =0° Viewing Angle	Typ – 0.03	0.647	Typ + 0.03	-	
		Rcy			0.337			
	Green	Gcx			0.305			
		Gcy			0.611			
	Blue	Bcx			0.150			
		Bcy			0.061			
	White	Wcx			0.287			
		Wcy			0.299			
Center Luminance of White (Center of Screen)		LC		500	700	-	cd/m2	(4),(5)
Contrast Ratio		CR		-	4000	-	-	(2),(5)

Response Time		G-to-G	θx=0° , θY =0°	-	6	15	ms	(3)
White variation		δW	θx=0° , θY =0°	75	80		-	(5),(6)
Viewing Angle	Horizontal	θx	CR ≧ 10	-	89	-	Deg.	(1),(5)
	Vertical	θy		-	89	-		
Viewing Angle	Horizontal	θx		-	89	-	Deg.	(1),(5)
	Vertical	θy		-	89	-		

Note (1) Definition of Viewing Angle (θx, θy):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L255 / L0

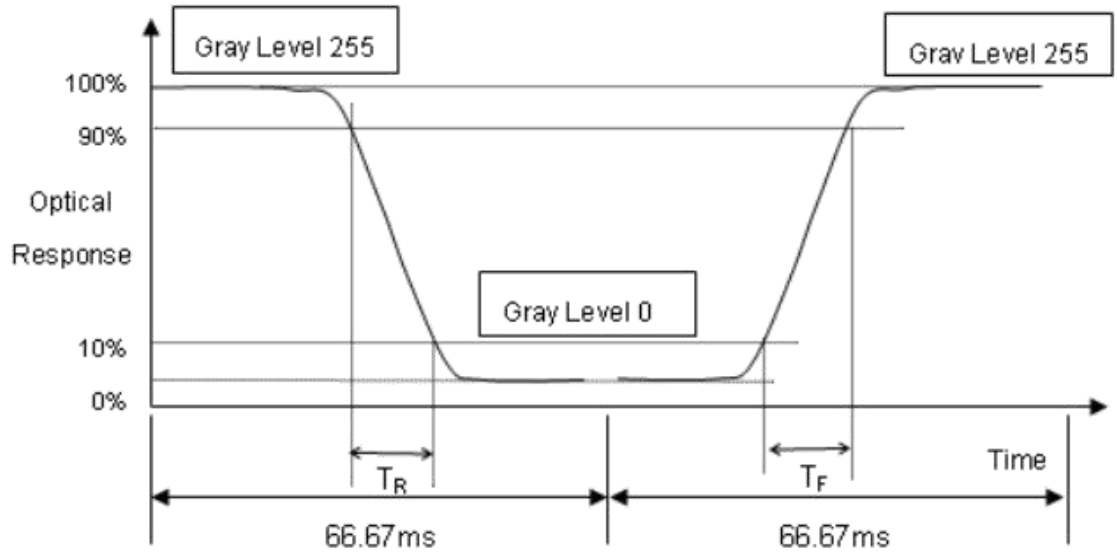
L255: Luminance of gray level 255

L 0: Luminance of gray level 0

CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time (T_R, T_F):



Note (4) Definition of Luminance of White (Lc):

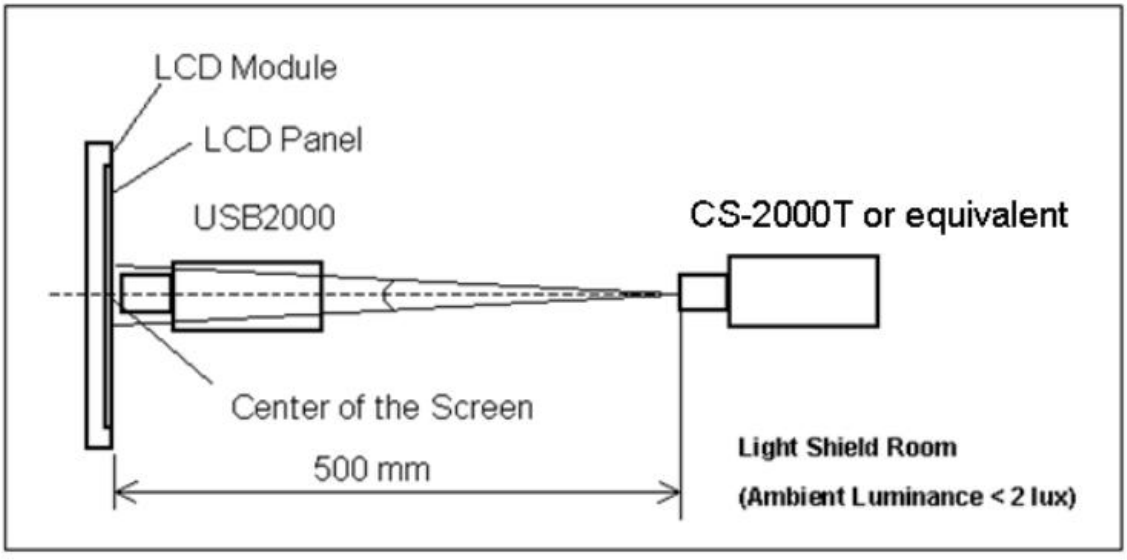
Measure the luminance of gray level 255 at center point

Lc = L (5)

L (x) is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setup:

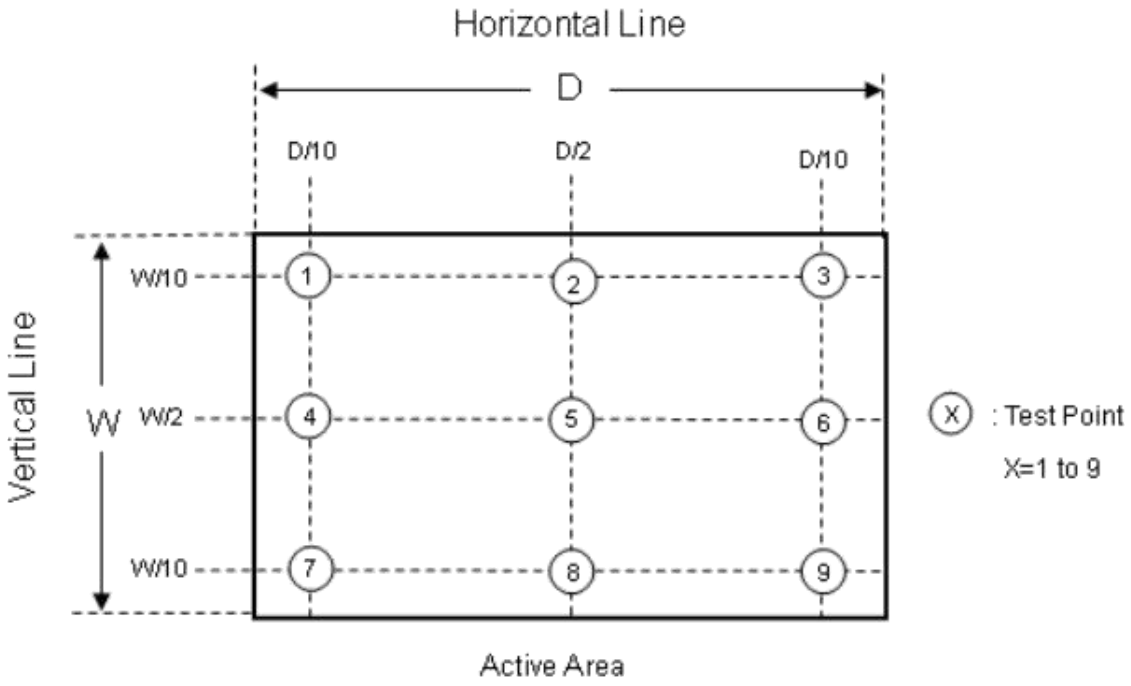
The LCD module should be stabilized at given temperature for 40 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 40 minutes in a windless room.



Note (6) Definition of White Variation (δW):

Measure the luminance of gray level 255 at 9 points

δW = (Minimum [L (1) ~ L (9)] / Maximum [L (1) ~ L (9)]) *100%



6. RELIABILITY TEST ITEM

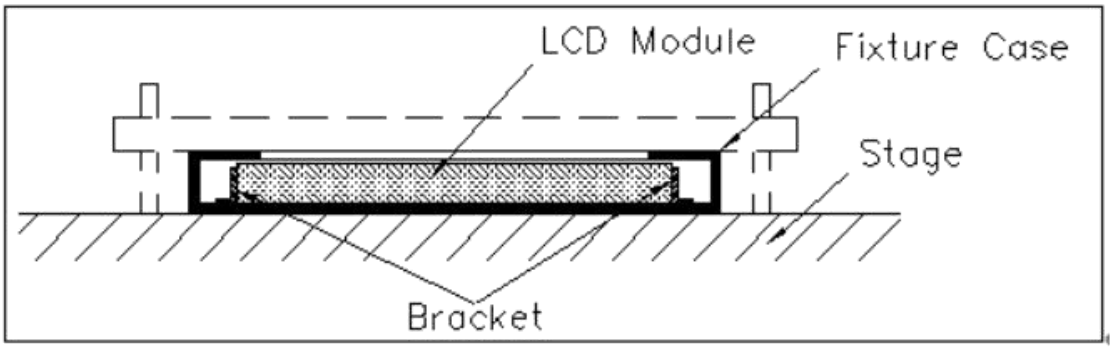
Item	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50℃ , 80%RH, 240hours	
High Temperature Operation (HTO)	Ta= 50℃ , 240hours	
Low Temperature Operation (LTO)	Ta= 0℃ , 240hours	
High Temperature Storage (HTS)	Ta= 60℃ , 240hours	
Low Temperature Storage (LTS)	Ta= -20℃ , 240hours	
Vibration Test (Non-operation)	Acceleration: 1.5 G Wave: Sine Frequency: 10 - 300 Hz Sweep: 30 Minutes each Axis (X, Y, Z)	
Shock Test (Non-operation)	Acceleration: 50 G Wave: Half-sine Active Time: 11 ms Direction : ± X, ± Y, ± Z.(one time for each Axis)	
Thermal Shock Test (TST)	-20℃ /30min , 60℃ / 30min , 100 cycles	
On/Off Test	25℃ ,On/10sec , Off /10sec , 30,000 cycles	
ESD (Electro Static Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω) Air Discharge: ± 15KV, 150pF(330Ω)	
Altitude Test	Operation:10,000 ft / 24hours Non-Operation:30,000 ft / 24hours	

Note (1) criteria : Normal display image with no obvious non-uniformity and no line defect.

Note (2) Evaluation should be tested after storage at room temperature for more than two hour

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

The fixing condition is shown as below:



7. PACKGING

TBD.

8. MODULE LABEL

TBD.

9. PRECAUTIONS

9.1 ASSEMBLY AND HANDLING PRECAUTIONS

(1) Do not apply rough force such as bending or twisting to the module during assembly.
(2) To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
(3) It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
(4) Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.
(5) Do not pull the I/F connector in or out while the module is operating.
(6) Do not disassemble the module.
(7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
(8) It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.
(9) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
(10)When ambient temperature is lower than 10ºC may reduce the display quality. For example, the response time will become slowly.

9.2 STORAGE PRECAUTIONS

(1) Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0℃ to 35℃ and relative humidity of less than 70%
(2) Do not store the TFT – LCD module in direct sunlight
(3) The module should be stored in dark place. It is prohibited to apply sunlight or fluorescent light in storing

9.3 OPERATION PRECAUTIONS

(1) The LCD product should be operated under normal condition.
Normal condition is defined as below :
Temperature : 20±15℃
Humidity: 65±20%
Display pattern : continually changing pattern(Not stationary)

(2) If the product will be used in extreme conditions such as high temperature,high humidity,high altitude ,display pattern or operation time etc…It is strongly recommended to contact CMI for application engineering advice . Otherwise , Its reliability and function may not be guaranteed.

9.4 SAFETY PRECAUTIONS

(1) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.

(2) After the module's end of life, it is not harmful in case of normal operation and storage.

9.5 SAFETY STANDARDS

The LCD module should be certified with safety regulations as follows:

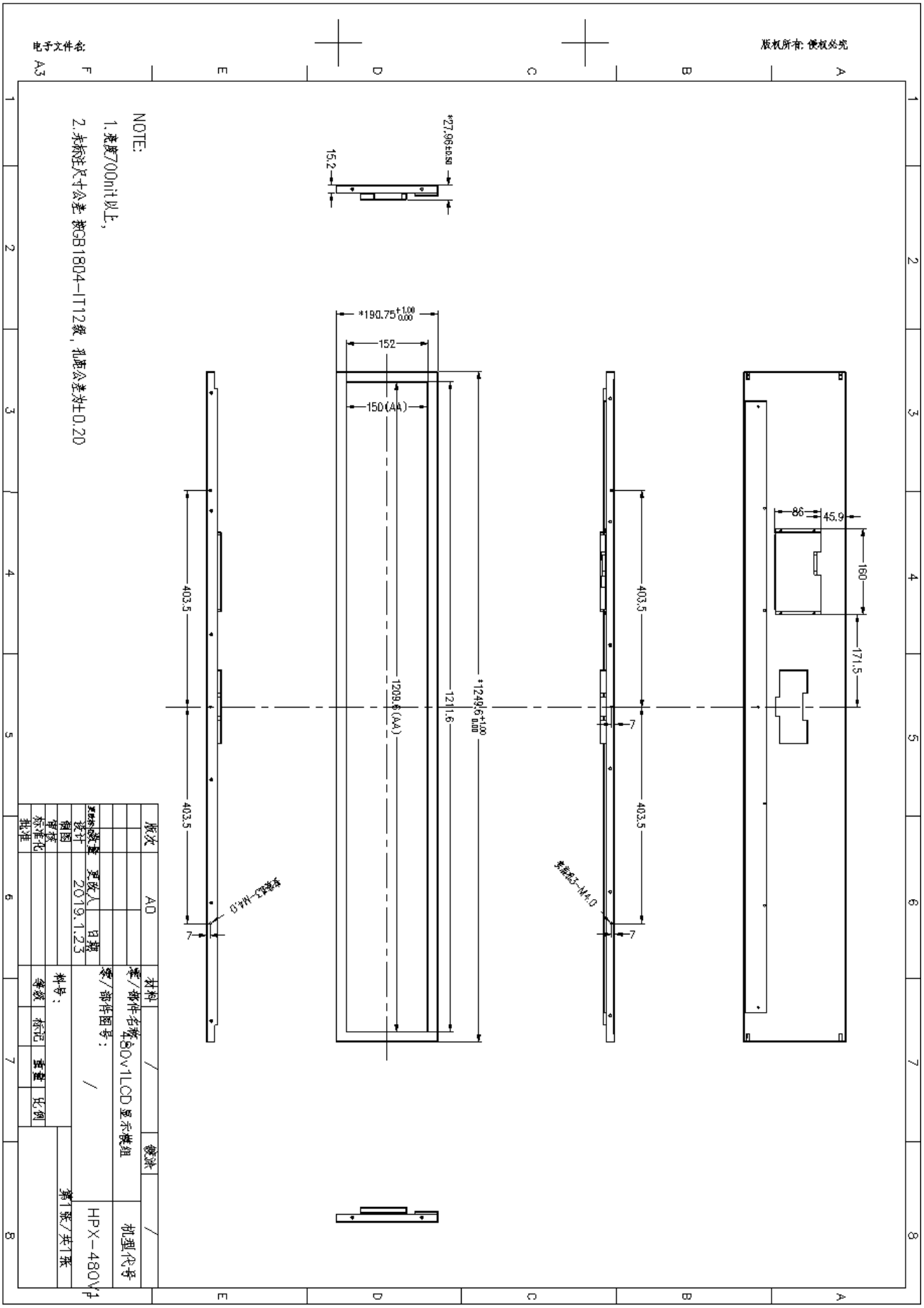
(1) UL60950-1 or updated standard.

(2) IEC60950-1 or updated standard.

9.6 OTHER

When fixed patterns are displayed for a long time ,remnant image is likely to occur.

Appendix. OUTLINE DRAWING


电子文件名:
版权所有: 侵权必究
NOTE:
1.表面700nit以上,
2.未标注尺寸公差 按GB1804-IT12级, 孔距公差为±0.20
*27.96±0.50
15.2
*190.75+1.00 0.00
152
150(AA)
*124.6+1.00 0.00
121.6
120.9(AA)
403.5
403.5
403.5
403.5
86
45.9
160
171.5
7
7
7
HPX-480V1
机型代号
480v1LCD显示模组
第1张/共1张