PRODUCT SPECIFICATIONS

CUSTOMER	SEGA SAMMY CREATION INC.

MODEL NAME	DPD1334-STQ-Q06		
PRODUCT DESCRIPTION	13.3" LCD w/Wireless Charger Module		
SIGNATURE	PREPARED BY	REVIEWED BY	APPROVED BY
	Date:	Date:	Date:

SSC USE Only

SSC PARTS No.				
SSC DESCRIPTION				
SSC SUB ASSY No.				
SIGNATURE	PREPARED BY	REVIEWED BY	APPROVED BY	RECEIPT STAMP
DISTRIBUTION	MAKER		SSC	
			AMENDMENT	

LITEMAX Electronics Inc.

AUTHORIZED SIGNATURE

_____

LITEMAX

DPD1334-STQ-Q06

13.3" LCD w/Wireless Charger Module

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Record of Revision

Version	Date	Page	Description	Remark
V1	Jul/12/2023	all	Initial release	
V2	Aug/30/2023	P.7	Block Diagram	
		P.23	Wireless Charger Module Switch Frequency	
		P.25	Modify Wireless Charger Module Mechanical Drawing	
V3	Sep/15/2023	P.39	Removed 3.9 section	
V3	Sep/15/2023	P.59	Added spatial distance	

Contents

1   General Description

The DPD1334-STQ-Q06 is a 13.3inch industrial grade LCD with touch and wireless charger function for button deck. The LED backlight technology ensures high reliability and low power consumption, suitable for gaming application.

1.1   Features

- Resolutions: 1920 x 1080
- Aspect ratio of 16:9
- LED Backlight
- Touch function
- Wireless charger function
- BL MTBF: 30,000 hours

1.2   General Specifications

Model Name	DPD1334-STQ-Q06
Description	13.3" TFT LCD, 300 nits LED backlight, 1920x1080
Panel	BOE,13.3", DV133FHM-NN0
Screen Size	13.3"
Display Area (mm)	293.76(H) x 165.24(V)
Brightness	300 cd/m^2
Resolution	1920x1080
Aspect Ratio	16 : 9
Contrast Ratio	800 : 1
Pixel Pitch (mm)	0.153(H) x 0.153(V)
Pixel Pre Inch (PPI)	166
Viewing Angle	170°(H),170°(V)
Color Saturation (NTSC)	49%
Display Colors	16.7M
Response Time (Typical)	30ms
Panel Interface	LVDS
Input Interface	DP
Input Power	DC 12V (Input Voltage: Min. 10.8V , Max. 13.2V , Input Current: 2A Max.)
Power Consumption	8.9W
OSD Key	4 Keys (Power Switch, Menu, <, >)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position…etc
Dimensions (mm)	732 x 235.5 x 46.1
Weight (Net)	4.5kg
Operating Temperature	0 ˚C ~ 50 ˚C
Storage Temperature	-20 ˚C ~ 60 ˚C
Touch Point	1 Point (Support Multitouch 10 point)
Touch Transparency	Light transmission≧88%
Wireless Charger Input Voltage	DC 12V
Wireless Charger Output Power	10W (Max. load <1. 5A)

DPD= Panel + LED Driving Board + AD Control Board + TP + Wireless charger + Chassis

1.3   Block Diagram
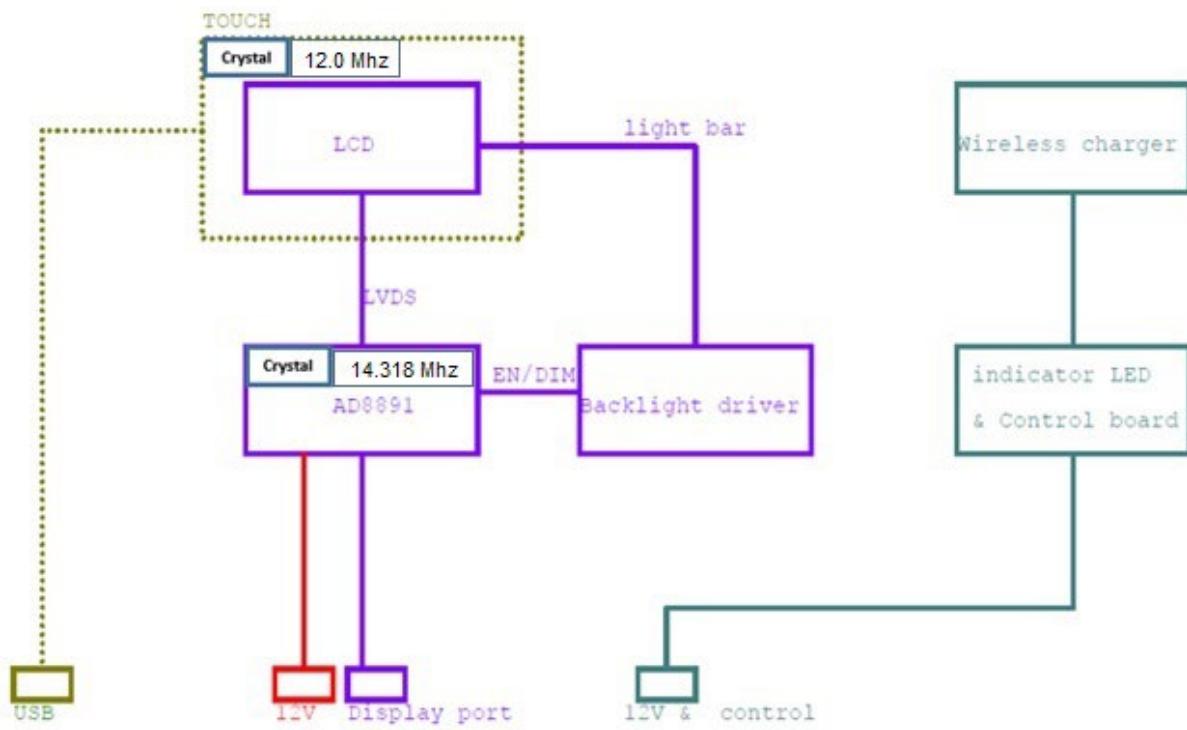
1. USB: USB B TYPE FEMALE   Litemax part no.: 810501602000
2. AD8891 12V: MOLEX 39-01-4043   Litemax part no.: 800402003080
3. AD8891 Display port: Display port   Litemax part no.: 747000020123
4. 12V & control: MOLEX 39-01-4063   Litemax part no.: 800403603000

USB B TYPE

Pin No	Function
1	V$_{Bus}$
2	D-
3	D+
4	GND

AD8891 12V Pin Assignment (MOLEX 39-01-4043)

Pin No	Function
1	12DC
2	NC
3	GND
4	NC

AD8891 Display port: Display port

Pin No.	Function	Pin No.	Function
1	RX3-	11	GND
2	GND	12	RX0+
3	RX3+	13	GND
4	RX2-	14	GND
5	GND	15	AUX+
6	RX2+	16	GND
7	RX1-	17	AUX-
8	GND	18	Hot plug detect
9	RX1+	19	GND
10	RX0-	20	DP +3.3V

12V & control: MOLEX 39-01-4063

PIN No	Symbol	Description
1	Vin	DC +12V
2	Vin	DC +12V
3	EN	ON/OFF Control
4	Status	Wireless charger module Status Feedback
5	GND	GND
6	GND	GND

2   Electrical Characteristics

2.1   Absolute Maximum Ratings

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in below Table.

Ta=25+/-2°C

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	-0.5	4.0	V	Note 1
Logic Supply Voltage	V_{IN}	V_{ss}-0.3	V_{DD}+0.3	V	
Operating Temperature	T_{OP}	0	+50	℃	Note 2
Storage Temperature	T_{ST}	-20	+60	℃	

Notes: 1. Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.
   2. Temperature and relative humidity range are shown in the figure below.
   90 % RH Max. (40 OC ≥ Ta)
   Maximum wet - bulb temperature at 39 OC or less. (Ta > 40 OC) No condensation.
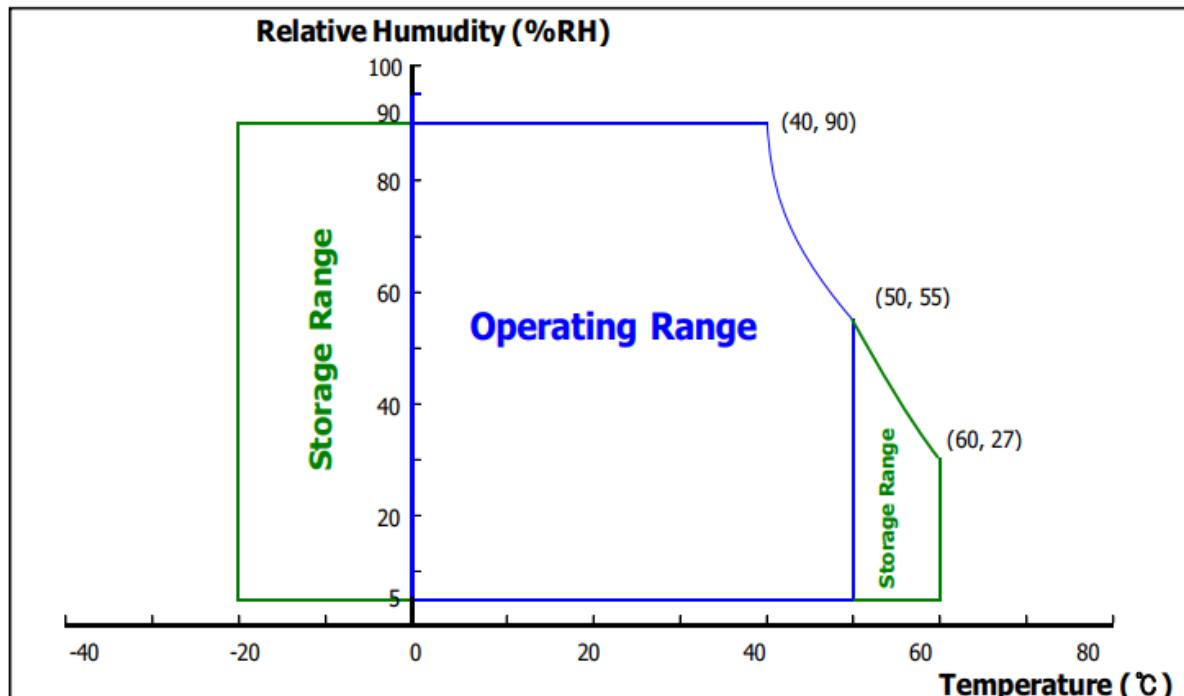
2.2 **TFT-LCD Panel driving**

Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	3.0	3.3	3.6	V	Note 1
Permissible Input Ripple Voltage	V_{RF}	-	-	100	mV	At V_{DD} = 3.3V
Power Supply Current	I_{DD}	-	TBD	-	mA	Note 1
Differential Input Low Threshold Voltage	VLVTL	-300		-100	mV	
Differential Input High Threshold Voltage	VLVTH	+100		+300	mV	
Common Input Voltage	VLVC	1.0	1.2	1.4	V	
Power Consumption	P_D	-	1.4	2.0	W	Note 1
	P_{BL}	-	-	3.9	W	Note 2
	P_{total}	-	-	5.9	W	

Note: 1. The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for 3.3V at 25℃.

a) Typ : Mosaic Pattern

b) Max R/G/B Pattern

2. IF × VF ×32/ efficiency = PLED

2.3 Interface Connection

The electronics interface connector is Yeonho 05002HR-H51G5(G) or Compatible.

Terminal	Symbol	Functions
Pin No.	Symbol	Description
1	NC	No Connection
2	NC	No Connection
3	GND	Ground
4	GND	Ground
5	LCD_VCC	+3.3V
6	LCD_VCC	+3.3V
7	BIST	Panel self test enable
8	GND	Ground
9	ODD A-	Odd pixel Negative LVDS differential data input.
10	ODD A+	Odd pixel Positive LVDS differential data input.
11	ODD B-	Odd pixel Negative LVDS differential data input.
12	ODD B+	Odd pixel Positive LVDS differential data input.
13	ODD C-	Odd pixel Negative LVDS differential data input.
14	ODD C+	Odd pixel Positive LVDS differential data input.
15	GND	Ground
16	ODD CLK-	Odd pixel Negative LVDS differential clock input.
17	ODD CLK+	Odd pixel Positive LVDS differential clock input.
18	GND	Ground
19	ODD D-	Odd pixel Negative LVDS differential data input.
20	ODD D+	Odd pixel Positive LVDS differential data input.
21	GND	Ground
22	EVEN A-	Even pixel Negative LVDS differential data input.
23	EVEN A+	Even pixel Positive LVDS differential data input.
24	EVEN B-	Even pixel Negative LVDS differential data input.

Terminal	Symbol	Functions
Pin No.	Symbol	Description
25	EVEN B+	Even pixel Positive LVDS differential data input.
26	EVEN C-	Even pixel Negative LVDS differential data input.
27	EVEN C+	Even pixel Positive LVDS differential data input.
28	GND	Ground
29	EVEN CLK-	Even pixel Negative LVDS differential clock input.
30	EVEN CLK+	Even pixel Positive LVDS differential clock input.
31	GND	Ground
32	EVEN D-	Even pixel Negative LVDS differential data input.
33	EVEN D+	Even pixel Positive LVDS differential data input.
34	GND	Ground
35	MSDA_P	I2C-SDA
36	MSCL_P	I2C-SCL
37	NC	No Connection
38	BL_GND	Ground
39	BL_GND	Ground
40	BL_GND	Ground
41	BL_GND	Ground
42	BL_EN	Backlight on/off Control pin
43	BL_PWM	Backlight PWM Dimming
44	NC	No Connection
45	NC	No Connection
46	BL_PWR	+12V
47	BL_PWR	+12V
48	BL_PWR	+12V
49	BL_PWR	+12V
50	NC	No Connection
51	NC	No Connection

2.4 LVDS interface block diagram
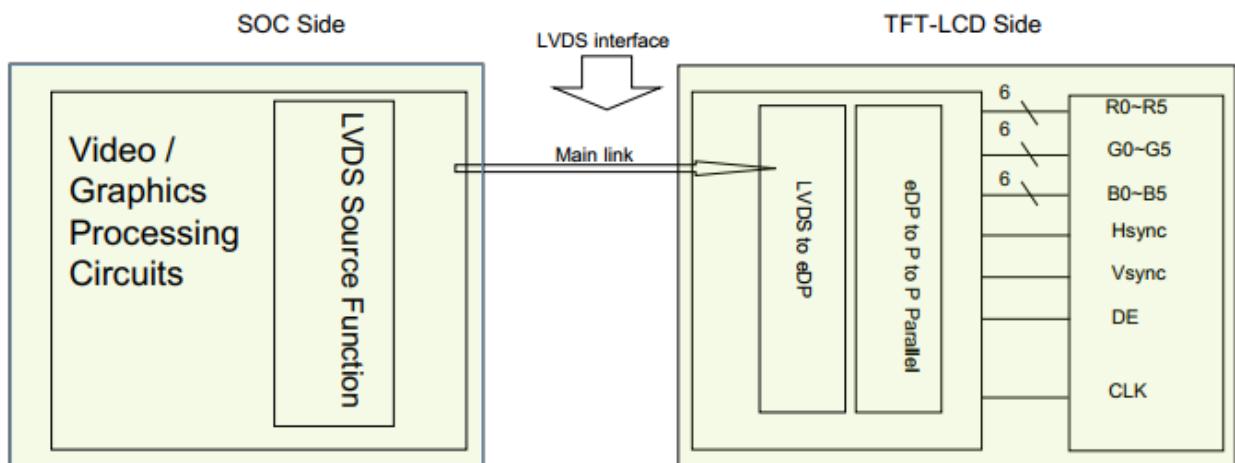
2.5 LVDS Input Signal

PORT 1	PORT 2
ODD A-	EVEN A-
ODD A+	EVEN A+
ODD B-	EVEN B-
ODD B+	EVEN B+
ODD C-	EVEN C-
ODD C+	EVEN C+
ODD CLK-	EVEN CLK-
ODD CLK+	EVEN CLK+
ODD D-	EVEN D-
ODD D+	EVEN D+

2.6 Back-light & LCM Interface Connection

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	LED-	Current Return	6	LED-	Current Return
2	LED-	Current Return	7	NC	No Connector
3	LED-	Current Return	8	LED+	Power Supply
4	LED-	Current Return	9	LED+	Power Supply
5	LED-	Current Return			

2.7 Timing Characteristics of Input Signals

The DV133FHM-NN0 is operated by the DE only.

| Item		Symbols	Min	Typ	Max	Unit
Clock	Frequency	1/Tc	60	74.25	78	MHz
Frame Period		Tv	1120	1140	1170	lines
			-	60	-	Hz
			-	16.67	-	ms
Vertical Display Period		Tvd	-	1080	-	lines
One line Scanning Period		Th	2020	2030	2400	clocks
Horizontal Display Period		Thd	-	1920	-	clocks

2.8 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in below Table.

Symbol	Description	Min	Typ.	Max	Units
$Rate_{LVDS}$	LVDS data rate per pair	420	519.75	546	Mbps
$f_{CLK-LVDS}$	LVDS input clock frequency	60	74.25	78	MHz
$V_{TH-LVDS}$	Differential input high threshold			0.1	V
$V_{TL-LVDS}$	Differential input low threshold	-0.1			V
$V_{CM-LVDS}$	LVDS common mode voltage	0.9		1.4	V

2.9 LVDS Rx Interface Timing Parameter

The specification of the LVDS input timing diagrams is shown in below table.

Symbol	Description	Min	Typ.	Max	Units
T_{RCP}	Clock period	12.82	13.47	16.67	ns
UI	1 data bit time		1/7		T_{RCP}
T_{RIP1}	Input Data 0	-0.2	0	0.2	UI
T_{RIP0}	Input Data 1	0.8	1	1.2	UI
T_{RIP6}	Input Data 2	1.8	2	2.2	UI
T_{RIP5}	Input Data 3	2.8	3	3.2	UI
T_{RIP4}	Input Data 4	3.8	4	4.2	UI
T_{RIP3}	Input Data 5	4.8	5	5.2	UI
T_{RIP2}	Input Data 6	5.8	6	6.2	UI
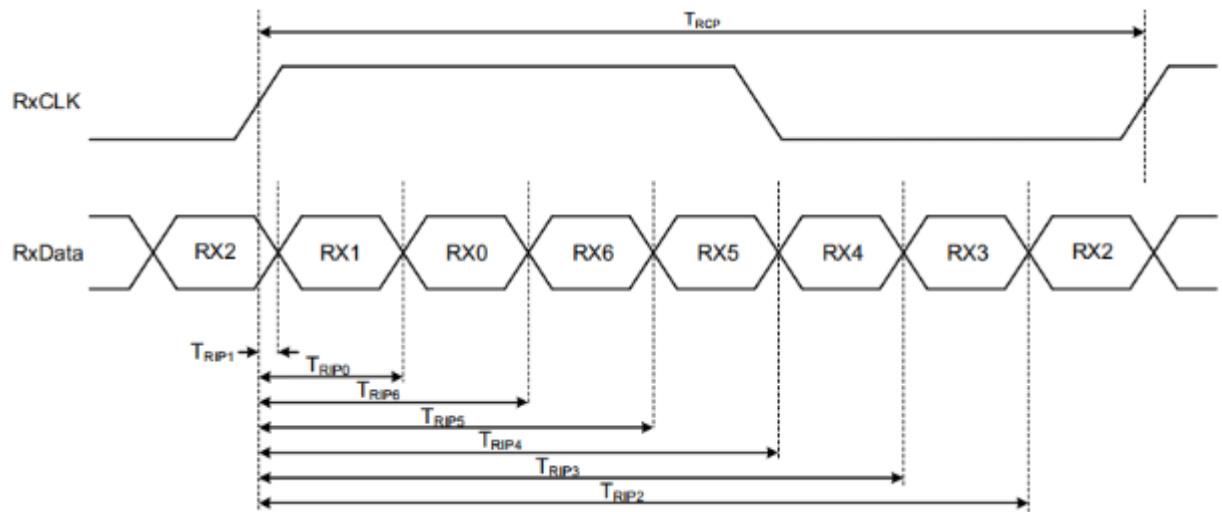
2.9.1 LVDS Rx Interface Timing Parameter

The specification of the LVDS Input Eye Diagram is shown in below table.

| Symbol	Description	Min	Typ.	Max	Units
T_{EYEW}	Input eye width	0.6			UI
T_{RSKM}	Input eye border			0.2	UI
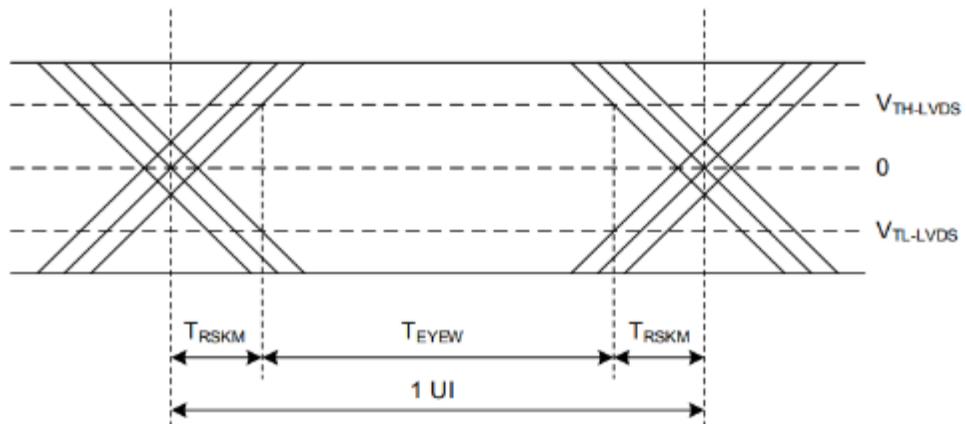
2.10 Input Signals, Basic Display Colors and Gray Scale of Each Color

	Colors & Gray scale	R0 R1 R2 R3 R4 R5	G0 G1 G2 G3 G4 G5	B0 B1 B2 B3 B4 B5
		Data signal		
Basic colors	Black	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	1 1 1 1 1 1
	Green	0 0 0 0 0 0	1 1 1 1 1 1	0 0 0 0 0 0
	Light Blue	0 0 0 0 0 0	1 1 1 1 1 1	1 1 1 1 1 1
	Red	1 1 1 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0
	Purple	1 1 1 1 1 1	0 0 0 0 0 0	1 1 1 1 1 1
	Yellow	1 1 1 1 1 1	1 1 1 1 1 1	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
Gray scale of Red	Black	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0
	△	1 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0
	Darker	0 1 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0
	△ / ▽	↑ ↓	↑ ↓	↑ ↓
	Brighter	1 0 1 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0
	▽	0 1 1 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0
	Red	1 1 1 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0
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	1 0 0 0 0 0	0 0 0 0 0 0
	Darker	0 0 0 0 0 0	0 1 0 0 0 0	0 0 0 0 0 0
	△ / ▽	↑ ↓	↑ ↓	↑ ↓
	Brighter	0 0 0 0 0 0	1 0 1 1 1 1	0 0 0 0 0 0
	▽	0 0 0 0 0 0	0 1 1 1 1 1	0 0 0 0 0 0
	Green	0 0 0 0 0 0	1 1 1 1 1 1	0 0 0 0 0 0
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	0 0 0 0 0 0	1 0 0 0 0 0
	Darker	0 0 0 0 0 0	0 0 0 0 0 0	0 1 0 0 0 0
	△ / ▽	↑ ↓	↓ ↓	↑ ↓
	Brighter	0 0 0 0 0 0	0 0 0 0 0 0	1 0 1 1 1 1
	▽	0 0 0 0 0 0	0 0 0 0 0 0	0 1 1 1 1 1
	Blue	0 0 0 0 0 0	0 0 0 0 0 0	1 1 1 1 1 1
Gray scale of White & Black	Black	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0
	△	1 0 0 0 0 0	1 0 0 0 0 0	1 0 0 0 0 0
	Darker	0 1 0 0 0 0	0 1 0 0 0 0	0 1 0 0 0 0
	△ / ▽	↑ ↓	↑ ↓	↑ ↓
	Brighter	1 0 1 1 1 1	1 0 1 1 1 1	1 0 1 1 1 1
	▽	0 1 1 1 1 1	0 1 1 1 1 1	0 1 1 1 1 1
	White	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1

2.11 Power Sequence

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below
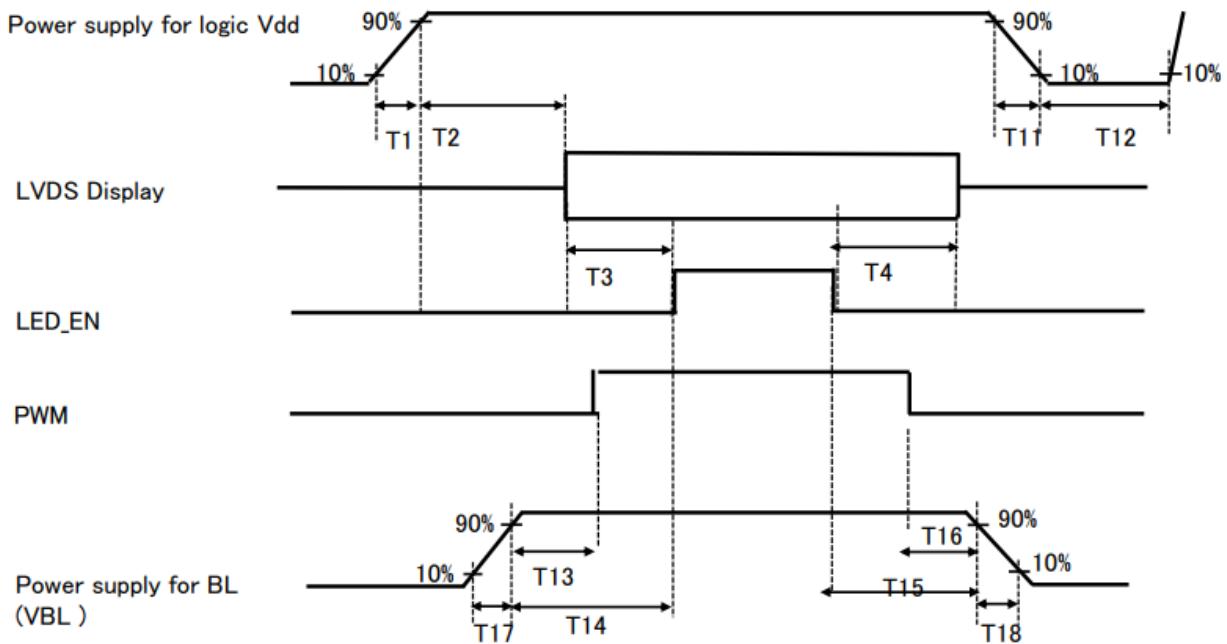
- 0.5ms ≤ T1 ≤ 10 ms
- 200ms ≤ T3
- 200ms ≤ T4
- 0ms ≤ T2 ≤ 200 ms
- 10ms ≤ T13
- 20ms ≤ T14
- 0.5ms ≤ T17 ≤ 20ms

- 3ms ≤ T11 ≤ 10 ms
- 500ms ≤ T12
- 20ms ≤ T15
- 10ms ≤ T16
- 0.5ms ≤ T18 ≤ 20ms

Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.

2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

2.12 Optical Specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 Klein K-10	0.561	0.591	0621	-	Test Mode: (1) (2) (3)
		Ry		0.333	0.363	0.393	-	
	Green	Gx		0.305	0.335	0.365	-	
		Gy		0.553	0.583	0.613	-	
	Blue	Bx		0.123	0.153	0.183	-	
		By		0.086	0.116	0.146	-	
	White	Wx		0.269	0.299	0.329	-	
		Wy		0.296	0.326	0.356	-	
Center Luminance of White		Lc	θx=0 θy=0 BM-7	-	300	-	cd/m^2	
Uniformity		Lu		-	83	-	%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10	-	800:1	-	-	Test Mode: (1) (4)
Color Saturation		NTSC		-	49	-	%	
Viewing Angle	Horizontal	θx+	CR ≥ 10	-	85	-	Deg	Test Mode: (1) (3)
		θx-		-	85	-		
	Vertical	θy+		-	85	-		
		θy-		-	85	-		

Test Mode：

(1) Definition of Viewing Angle (θx , θy):
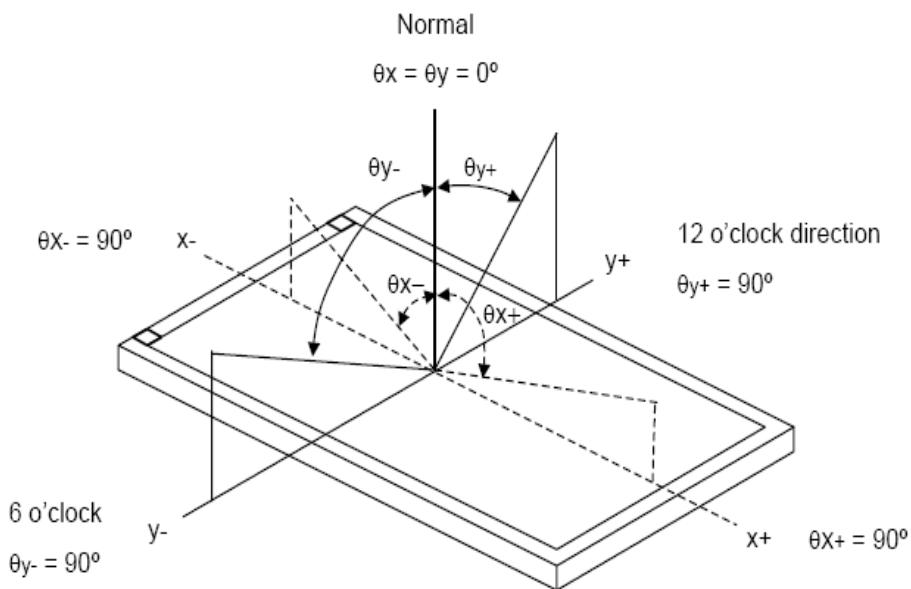
(2) Definition of Test Point:

Active Area
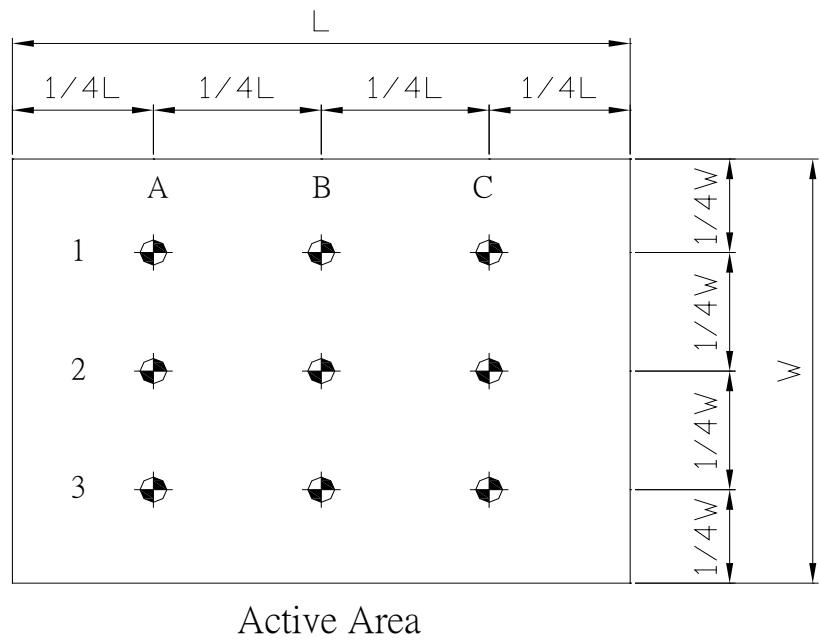
(3) BM-7 Measurement Setup:
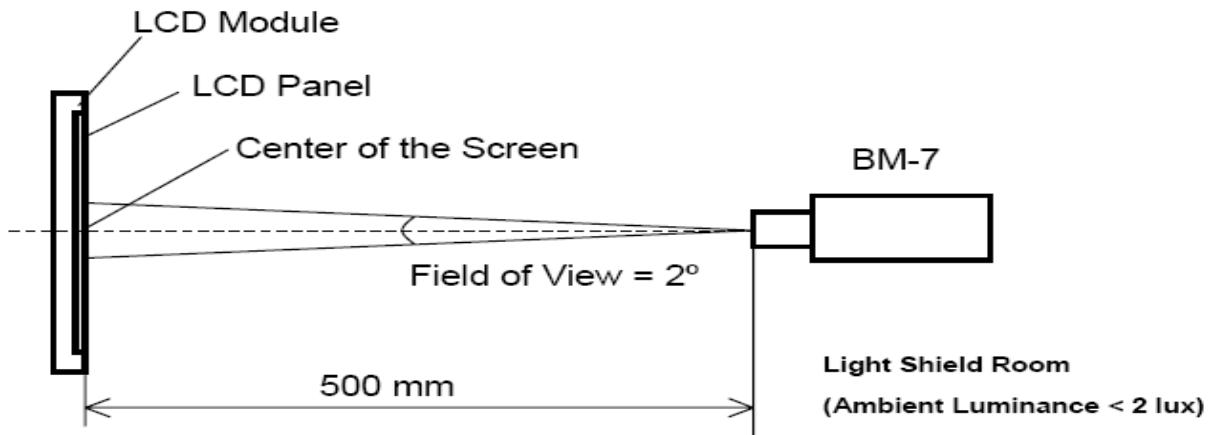
(4) Klein K-10 Measurement Setup:
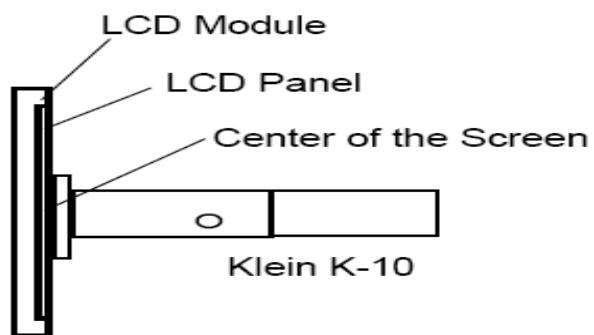
2.13 Backlight driving Section

Ta=25+/-2°C

| Parameter		Min.	Typ.	Max.	Unit	Remarks
LED Forward Voltage	V_F	-	-	2.9	V	
LED Forward Current	IF	-	20.6	-	mA	
LED Power Consumption	P_{LED}	-	-	3.3	W	Note 1
LED Life-Time	N/A	30,000	-	-	Hour	I_F = 20.6mA
Power supply voltage for LED Driver	V_{LED}	5	12	21	V	
Power supply voltage for LED Driver Inrush	Iled inrush	-	-	2	A	Note 4
EN Control Level	Backlight on	2.1	-	-	V	
	Backlight off	-	-	0.8	V	
PWM Control Level	PWM High Level	2.1	-	-	V	
	PWM Low Level	-	-	0.8	V	
PWM Control Frequency	F_{PWM}	-	20,000	-	Hz	
Duty Ratio	-	1	-	100	%	

Notes:

1. Power supply voltage12V for LED driver.

Calculator value for reference IF × VF ×48/driver efficiency = PLED

2. The LED life-time define as the estimated time to 50% degradation of initial luminous.

3. Measure condition

Inrush Measure Condition
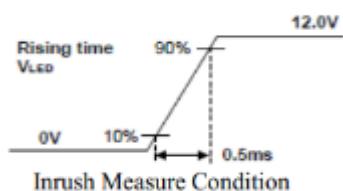
3 Wireless Charger Module Characteristics

3.1 General Description

Litemax part No.: 909908100010
Model No.: HL-10W-C

This is a charger solution that wirelessly charges mobile phones The wireless charger can support Qi standards, and operate with many Qi certificated receiver. Its maximum charger power can be up to 10 watts.

3.2 Electrical Specification

Rated Voltage Range	DC 9-14V
Rated Voltage	DC12V
Standby Power Consumption	<0.3W
Rated Input Current	<1.5Adc，10W Load，12V Input
Efficiency	>50%，10W Load，12V Input
Switch Frequency	112kHz~145kHz
Input Over-Power Limit (Power Transfer Phase)	26.4W
Input Over-Power Protection (Power Transfer Phase)	30W
Over Temperature Protection	85℃

3.3 Input Over-Power Protection

This product has input over power protection function. When input current is bigger than the set value, the transmitter will turn off immediately and try to reconnect receiver again. If over power protection happens twice, system will stop operation and be latched.

3.4 Over-Temperature Protection

This product has over temperature protection function. When transmitter's PCBA temperature is larger than the set value(85℃), the transmitter will turn off immediately. When transmitter's PCBA temperature is smaller than the set value(75℃), the transmitter will restart again.

3.5 Safety Specification

Satisfy following technical specification

Requirements	Item	Region	Standard
	CE,RE	Europe	EN55022
	CE,RE	North Amirica N/A	FCC part15

3.6 Temperature Rise

Under rated input and output situation during 23±2℃ environment, regular timely operation, this product can comply with related safety and standard requirements standard requirements.

3.7 Work Environment

Temperature	0℃–35℃
Humidity	10%–90%

3.8 Storage Environment

Temperature	−20℃–80℃
Humidity	5%–95%

3.9 Mechanical Drawing

the Spacing between:

PCB and Coil is 6mm
Coil and Iron Shell is 3mm
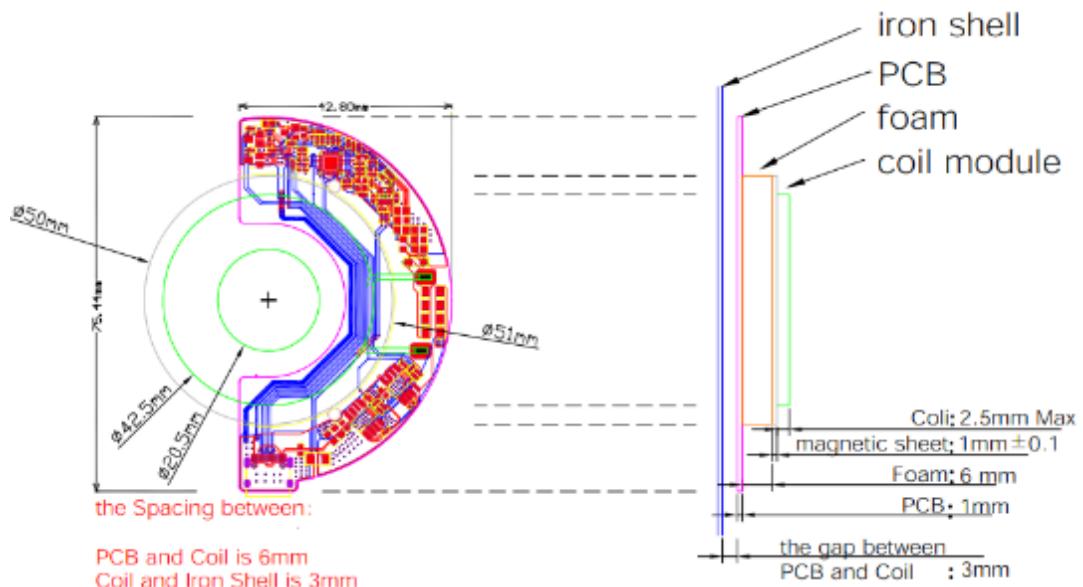
3.10 Wireless Charger Control Board

Charger control board is control ON/OFF & LED status for Wireless charger module using.

3.11 Operating Characteristics

LED		STATUS
RED	BLUE	
X	X	Power Off
◯	X	Power On Wating Device
◯	◯	Power On Device Charging

3.12 Connector Socket

Input Connector: CN1(2.0mm 6 pitch wafer or Compatible)

PIN No	Symbol	Description
1	Vin	DC +12V
2	Vin	DC +12V
3	EN	ON/OFF Control
4	Status	Wireless charger module Status Feedback
5	GND	GND
6	GND	GND

Output Connector :CN2(2.0mm 6 pitch wafer or Compatible)

PIN NO	Symbol	Description
1	Vout	DC +12V
2	Vout	DC +12V
3	LED_B	Blue LED control
4	LED_R	Red LED control
5	GND	GND
6	GND	GND

3.13 Cable Drawing (MOLEX4.2(F)TO PHR-06)
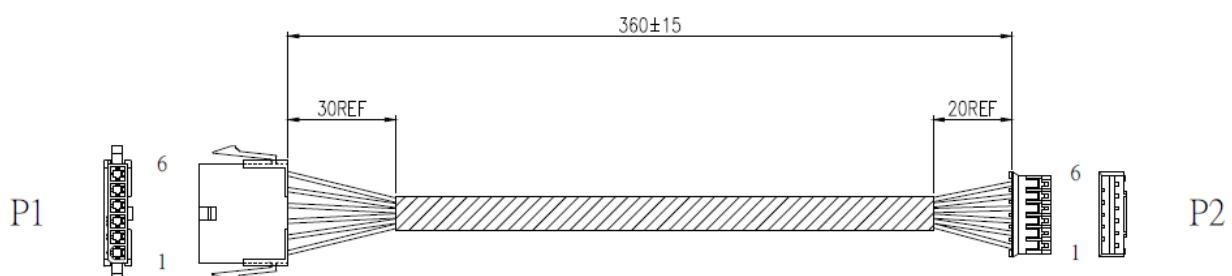
Pin No	Symbol
1	+12V
2	+12V
3	ON/OFF Control
4	Status
5	GND
6	GND

WIRING TABLE

P1	6	5	4	3	2	1
P2	6	5	4	3	2	1
COLOR	Black	Black	Blue	Green	Yellow	Yellow

3.14 Mechanical Characteristics

Dimension: 30mm*25mm*6mm
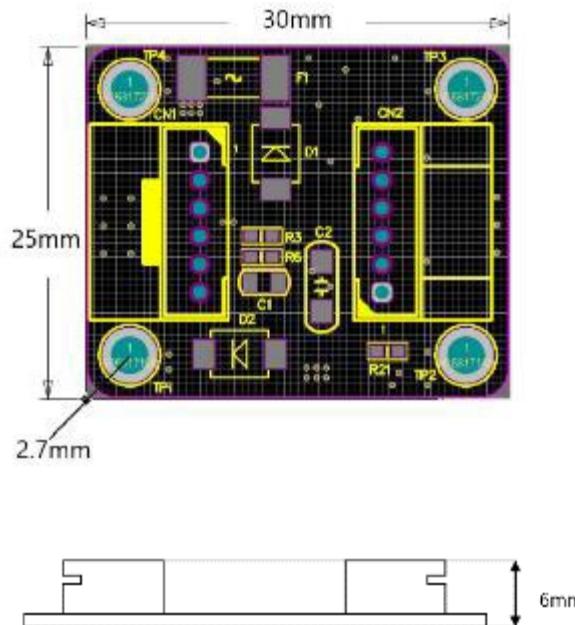
3.15 Design Circuit

Input(Host PC)
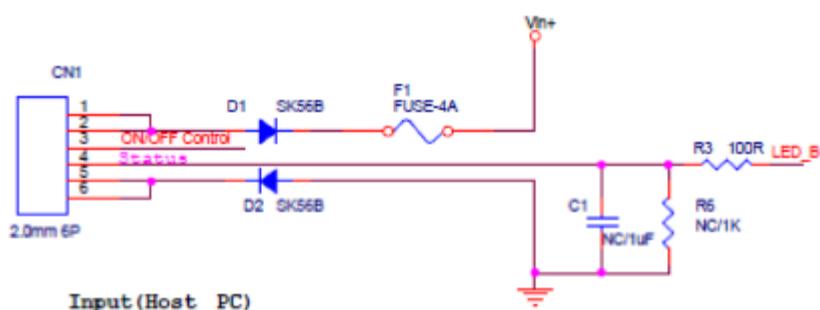
|		Waiting Device	5W Device Charging	15W Device Charging	Charge Complete
Status		High	Low	PWM output	Low

Vout+

R21
15K

R1   NC/5.11K

R4   10K 1G

R2   NC/5.11K

1G   R5   NC/10K   LED_R

R16
100R

Low Active

Q1
AO3401

Q2
NC/AO3401

R7
2K

R8
2K

LED_Blue

D3
LED

D4
LED   LED_RED

LED_Blue	wireless charging ON
LED_RED	charger power ON

Vin+

C2
22uf

R9
10K

U1
PQS6375

Vout+

Vin+

R11
NC/4.7K

R10
2K

C3
10uf

CN2

Vout+

R12   0R

R13
1K

Q3
2N7002K

C4
1uf

LED_B
LED_R

R14   NC/1K

ON/OFF Control

C5
0.1uF

2.0mm 6P

R15
10K

Q4
NC/2N3904

High Active

Output(Wireless Charging)

TP1

R17
NC

C6
1nF/50V

TP2

R18
NC

C7
1nF/50V

TP3

R19
NC

C8
1nF/50V

TP4

R20
NC

C9
1nF/50V

4 Projected Capacitive Touch

4.1 General specification

Touch Type: Projected Capacitive Touch
Litemax part No.: 431913610511
Model No.: STS-D13305-E
F/W Version: PCAP80H46_1001_00_M00
X/Y Resolution Start Position:
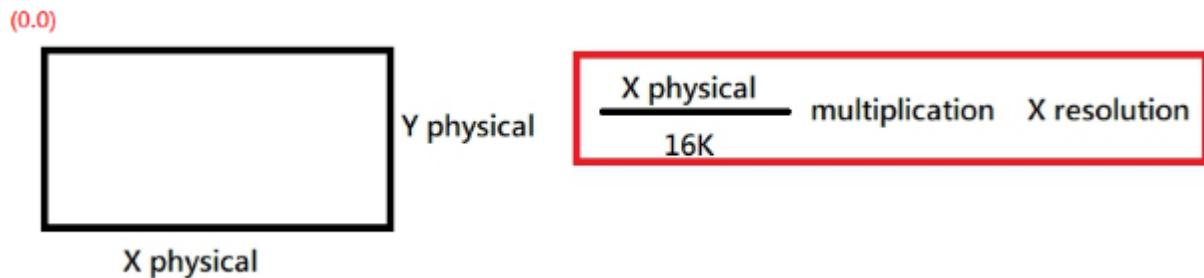
4.2 Construction

Product structure	Materials used	Material No.	Thickness
1. Cover lens	Chemical Strengthening Glass	/	T=4mm
2. Optical adhesive	SCA	/	T=0.25mm
3. Sensor	ITO Glass	/	T=0.7mm
4. FPC	/	/	T=0.3mm

4.3 Mechanical characteristics

Item	Description	Unit
Touch Module Size	13.3	Inch
Outer Dimension(with Cover LENS)	229.5(W)*730(L)	mm
View Area	166.25(W)*294.8(L)	mm
Sensor Area	183.24(W)*309.8(L)	mm
Touch Module trace number(Tx*RX)	25*44	/
Resolution	/	/
Input Type	USB	/
Controller Type	COF	/
Controller Chip	EXC80W46	/
Touch Function (point)	Multitouch (10 point)	/

4.4 Environment Conditions

Items	Condition
Operating temperature & Humidity	-30℃~+80℃，20%~90%RH
Storage temperature & Humidity	-30℃~+80℃，20%~90%RH

4.5 Optical characteristics

Items	Condition
Optical characteristics	Light transmission ≥88%±2%

4.6 Touch panel interface pin assignment

PIN	PIN Definition	
	J2	J1
1	EGND	RST
2	VDD(5V)	VDD3.3V
3	GND	GND
4	D+	INT
5	D-	SDA
6	/	SCL

4.7 Electrical characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Power supply	VDD	/	4.5	5	5.5	V
Current consumption for operation	I	VDD=5V	/	50	65	mA

4.8   Supported Operation System and Interfaces

OS	Version	Interface
Windows	Windows 10 IOT (#1)/ Windows 10/ Windows 8/ Windows 7 Windows Vista/ Windows 2000/ Windows XP (#1: Windows 10 IOT: support it with inbox driver only) (#2: I2C interface: need additional system configuration)	USB/ RS232 *I2C(#2)
Win CE	Win Embedded Compact 2013 / Win Embedded Compact 7 WinCE 6 / WinCE.Net	USB/ RS232
Linux	CentOS, Debian, Fedora, Gentoo, Mandrake (Mandriva), Meego, Red Hat, Slackware, SuSE (OpenSuSE), Ubuntu (Xubuntu) and Yellow Dog etc. Support most 32/64 bit Linux distribution versions, including Kernel 2.6.x / 3.x.x / 4.x.x	USB/ RS232 I2C
	Android 2.3 to latest version	USB/ I2C
Mac	OSX 10.7.5 to 10.12	USB
QNX	RTOS V6.3 to V6.6	USB/ I2C

4.9   Drawing

NOTES:
1. INPUT MODE : PROJECTED CAPACITIVE
2. OVERALL THICKNESS : 4.95±0.2mm
3. FRONT SURFACE : Clear
4. TAIL TYPE : FPC , COF
5. RECOMMENDED CONTROL BOARD : EETI EXC80746
6. OTHER SPEC : SEE APPROVAL SHEET
7. Unspecified dimensional tolerances : ±0.2   RoHS
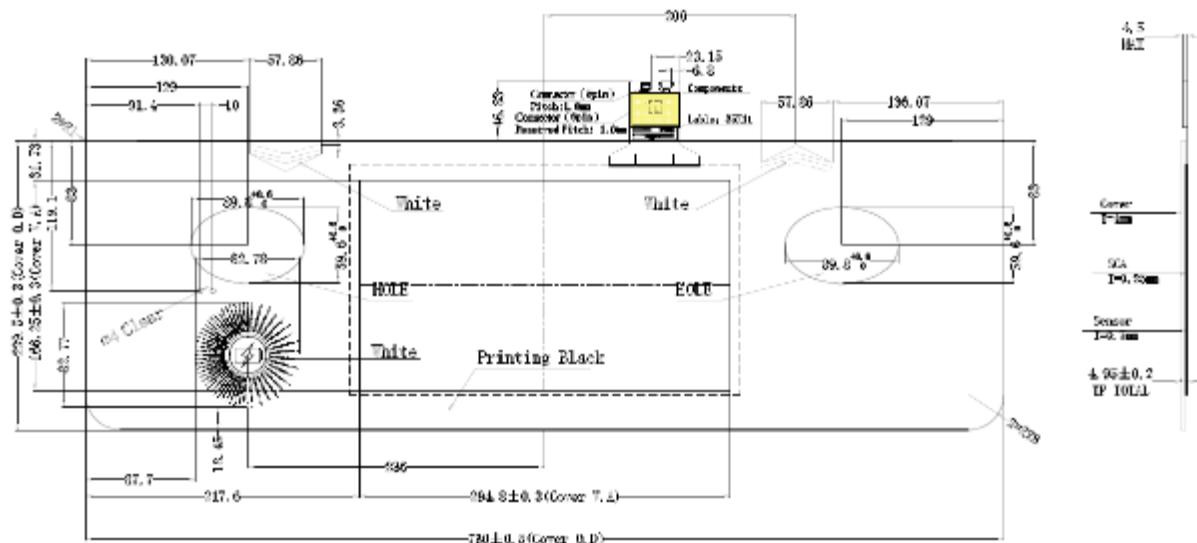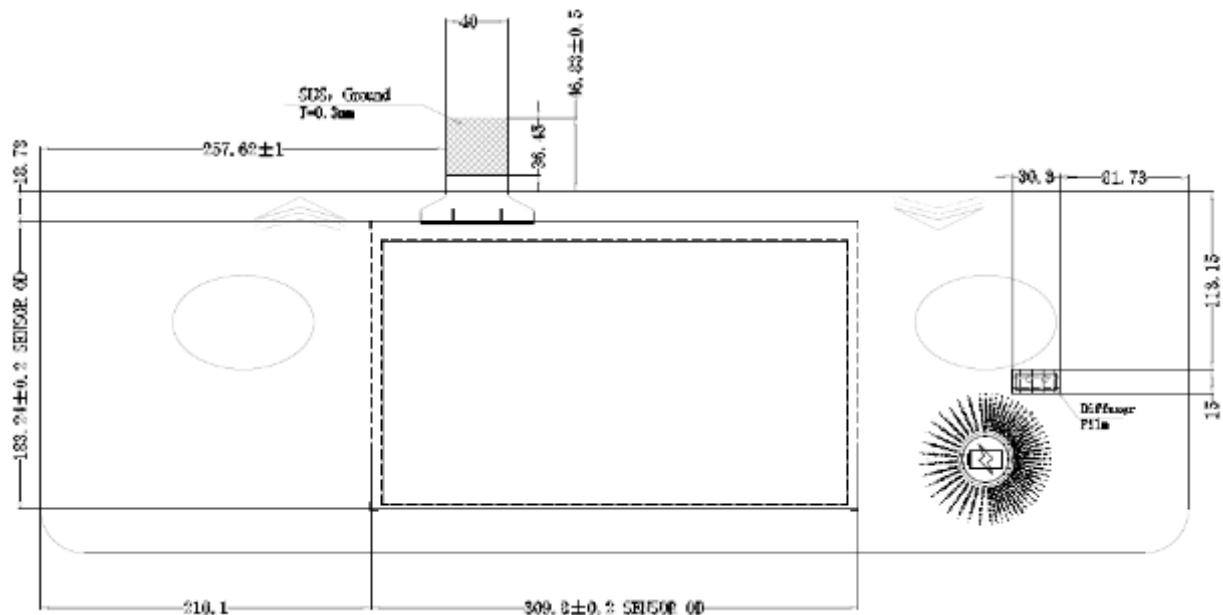
5   AD8891P Board & OSD Functions

We developed this A/D board to support industrial high brightness and commercial applications.

This A/D board has many functions. It has a display port. Rev.1 is European RoHS compliant.

General Description
- ■   **Max Resolution Up To Full HD**
- ■   **Analog RGB Input up to 205MHz**
- ■   **Dual/single LVDS interface**
- ■ **Support Panel DC 5V or 12V,3.3V Output**
- ■   **OSD Control**
- ■   **PWM/DC Dimming Control for backlight driver.**
- ■ **External RS232 control (optional)**
- ■ **Input Power 12Vdc or 24Vdc**
- ■ **Display port input. (Support display port 1.2a)**
- ■   **Audio in and 3Wx2 (4Ω)Audio Out(optional)**
- ■   ***External Digital light sensor brightness control (optional)**
- ■   ***External light sensor brightness control (optional)**
- ■ **Support output voltage 12V(1A) and 5V(1A)**
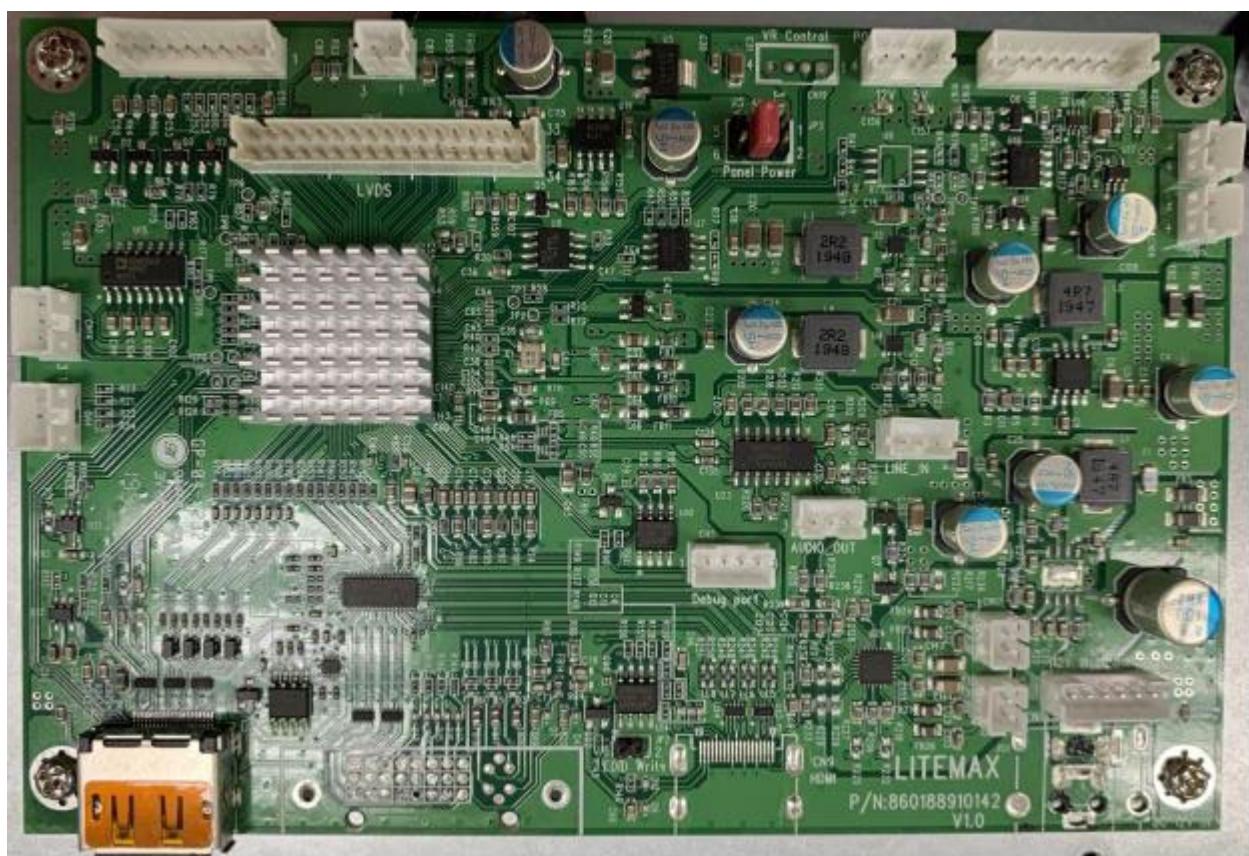
Outline Dimensions

AD8891   150mmX100mm

AD8891 Board Pin Define
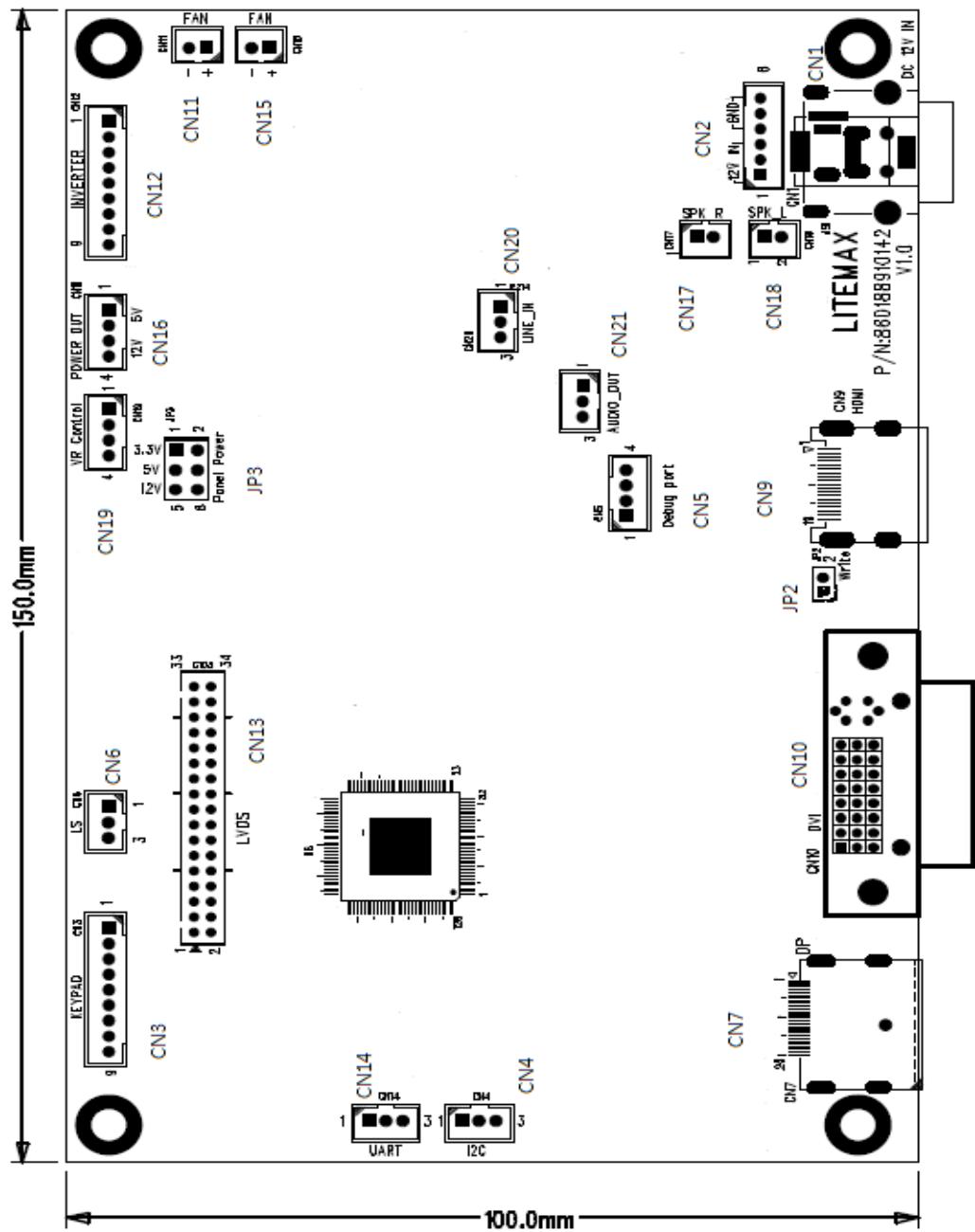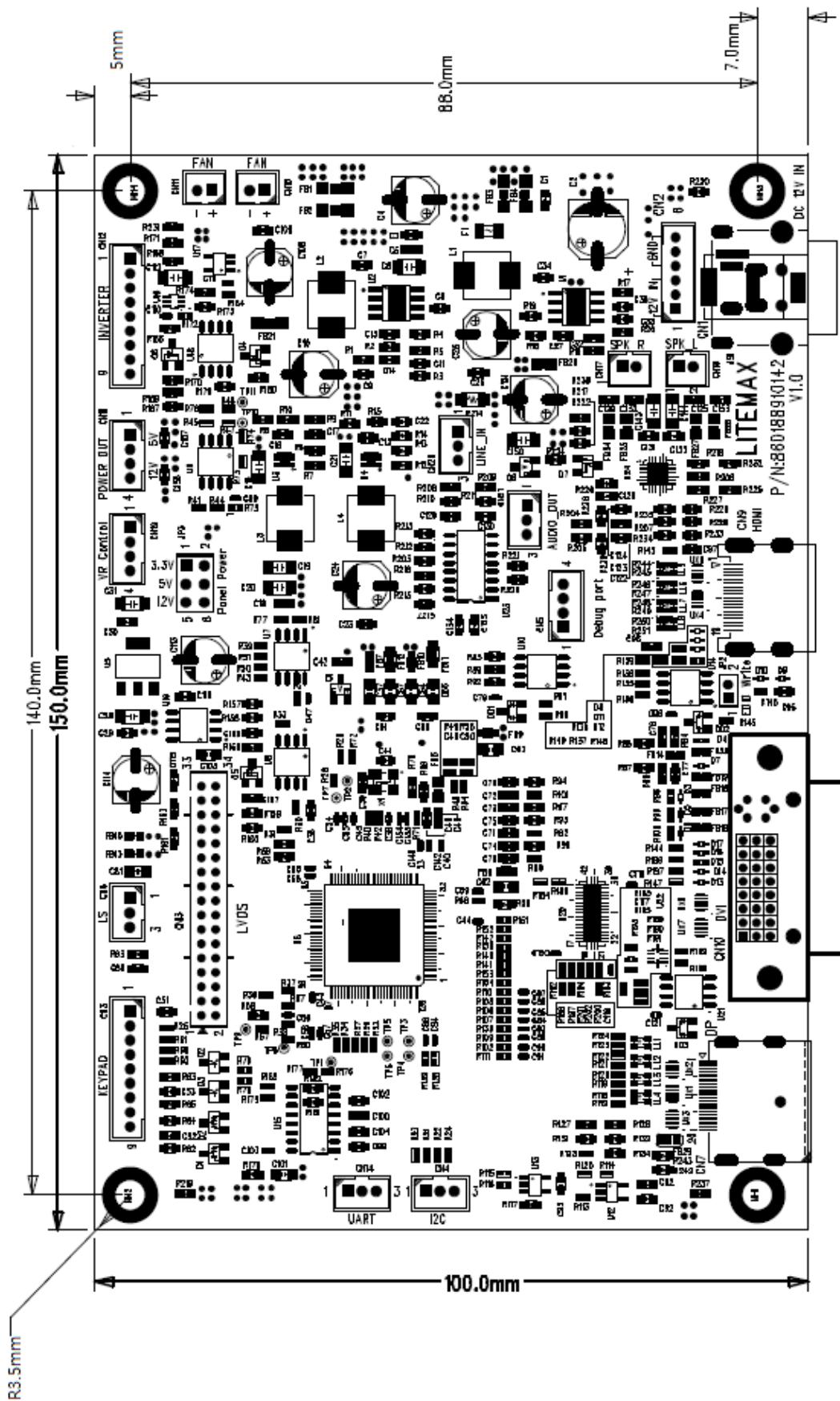
CN13: **Panel LVDS connector**

Pin No.	Function	Pin No.	Function
1	RxO0-	18	RxE1+
2	RxO0+	19	RxE2-
3	RxO1-	20	RxE2+
4	RxO1+	21	RxEC-
5	RxO2-	22	RxEC+
6	RxO2+	23	RxE3-
7	RxOC-	24	RxE3+
8	RxOC+	25	RxE4-
9	RxO3-	26	RxE4+
10	RxO3+	27	GND
11	RxO4-	28	GND
12	RxO4+	29	Pull Low
13	GND	30	Pull Height
14	GND	31	VLCD
15	RxE0-	32	VLCD
16	RxE0+	33	VLCD
17	RXE1-	34	VLCD

CN7: **DISPLAY PORT**

Pin No.	Function	Pin No.	Function
1	RX3-	11	GND
2	GND	12	RX0+
3	RX3+	13	GND
4	RX2-	14	GND
5	GND	15	AUX+
6	RX2+	16	GND
7	RX1-	17	AUX-
8	GND	18	Hot plug detect
9	RX1+	19	GND
10	RX0-	20	DP +3.3V

CN2: Power connector (12V) (6PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	12V/24VDC	2	12V/24VD
3	12V/24VD	4	GND
5	GND	6	GND

CN16: Touch Power connector

Pin No.	Function	Pin No.	Function
1	5V	2	GND
3	12V	4	GND

CN21: Inverter Connector(9PIN 2.0mm)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	DIM_SEL	PWM/DC SEL	6	GND	GND
2	ON/OFF	Backlight ON/OFF	7	12VDC	12INV
3	BRIGHT	Dimming adjust	8	12VDC	12INV
4	GND	GND	9	12VDC	12INV
5	GND	GND			

CN11, CN15: Fan control (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	12V	2	GND

CN3: Key Pad (9PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	POWER KEY	6	MENU KEY
2	GREEN LED	7	AUTO KEY
3	RED LED	8	GND
4	DOWN KEY	9	GND
5	UP KEY		

JP3: Panel Power

Pin No.	Function	Pin No.	Function
1-2	3.3	5-6	12V
3-4	5V		

CN14: RS232 Connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	UART TX	2	UART RX
3	GND		

CN20: LINE IN (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	AUDIO-R	2	AUDIO-L
3	GND		

CN17: Speaker Connector (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SPK_R+	2	SPK_R-

CN18: Speaker Connector (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SPK_L+	2	SPK_L-

CN19: Interrupt Control (4PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	5V	2	INT
3	GPIO	4	GND

Reserve for some control

CN6: Ambient (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3V/5V	2	Sensor Out

CN21: Audio out connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	Audio R out	2	Audio L out
3	GND		

For audio connect to another Audio AMP

CN4: I2C Connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	I2C_SDA	2	I2C_SCL
3	GND		

For digital LS

JP2: EDID Jumper (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3V	2	GND

When EDIE wan to update it must be short.

CN5: Debug Connector (4PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3V	2	DDCA_SCL
3	DDCA_SDA	4	GND

For F/W debug

5.1   OSD Function

MEMBRANE CONTROL BUTTOM
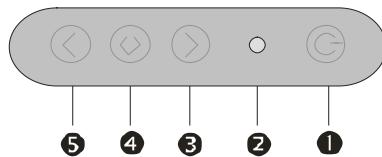
❶POWER SWITCH: Pushing the power switch will turn the monitor on.   Pushing it again to turn the monitor off.

❷Power LED: Power ON-Green / Power off-No.

❸Up Key >: Increase item number or value of the selected item.

❹Menu Key: Enter to the OSD adjustment menu.   It also used for go back to previous menu for sub-menu, and the change data don't save to memory.

❺Down Key <: Decrease item number or item value when OSD is on.

Screen Adjustment Operation Procedure

1. **Entering the screen adjustment**

    The setting switches are normally at stand-by.   Push the **Menu Key** once to display the main menu of the screen adjustment.   The adjustable items will be displayed in the main menu.

2. **Entering the settings**

    Use the **Down Key <** and **Up Key >** buttons to select the desired setting icon and push the SELECT button to enter sub-menu.

3. **Change the settings**

    After the sub-menu appears, use the **Down Key <** and **Up Key >** buttons to change the setting values.

4. **Save**

    After finishing the adjustment, push the SELECT button to memorize the setting.

5. **Return & Exit the main menu**

    Exit the screen adjustment; push the "MENU" button.   When no operation is done around 10 sec (default OSD timeout), it goes back to the stand-by mode and no more switching is accepted except MENU to restart the setting.

5.2 OSD Menu

Here are some instructions for you to use the OSD (On Screen Display). By pressing the "menu", you will see the below picture.
Timing shows resolution and V-frequency of the panel. This 2 information is not changeable by user.
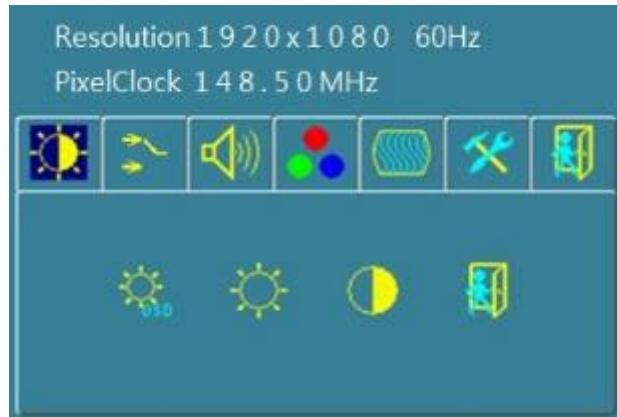
There are 7 sub menus within the OSD user interface:
Brightness, Signal Select, Sound, Color, Image, Tools, and Exit.

When you press the "menu" button, you enter the "Brightness" sub directory. In this directory, you will see 4 selections:

press "menu" once, you can go into the **Ambient light sensor**.

Ambient light sensor:
press this Icon,must to accompany with Litemax ambient light sensor to auto dimming.**(OPTION)**

OSD Brightness：

Press the "menu" once, to adjust the brightness. Press "left" to dim down the brightness to "0", press "right" to increase the brightness to "100"

Contrast：

Press "Menu" once, you can adjust the contrast from "0" to "100" by pressing the "Left" and "Right".

Exit: back to the beginning menu.

Resolution 1 9 2 0 x 1 0 8 0 60Hz
PixelClock 1 4 8 . 5 0 MHz

DP   Exit

 DP: DisplayPort input

 Exit: back to the beginning menu

Resolution 1 9 2 0 x 1 0 8 0 60Hz
PixelClock 1 4 8 . 5 0 MHz

 Audio Volume: Audio volume adjustment.

 UnMute/Mute: You can mute the speaker by pressing this option.

 Exit: back to the beginning menu.

Resolution 1 9 2 0 x 1 0 8 0 60Hz
PixelClock 1 4 8 . 5 0 MHz
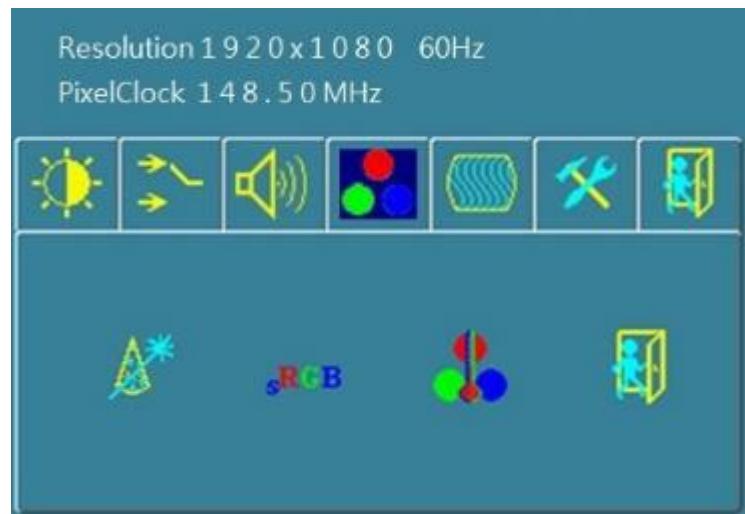
Auto Color：By navigating over to the "Auto Color" option, optimal color performance is invoked.

SRGB: Windows standard color setting

Resolution 1 9 2 0 x 1 0 8 0 60Hz
PixelClock 1 4 8 . 5 0 MHz

6500k   9300k

Color Temperature: You have 4 options in this selection
.

Color Temperature User Define: Default is 100 for "R", "G", and "B".

Color Tempture_6500K: Warm color scheme

Color Tempture_93OOK: Cold color scheme

Exit: back to the beginning menu.

Auto Adjust:

Choose this option and the AD6038 will adjust to the optimal horizontal and vertical frequency.

Clock: If you are not satisfied with the Auto tune result, you can adjust manually by pressing "Clock". Using this will make the image wider.

Phase: If "double images" appear around the characters, choose "Phase" to remove them.

HPos: You can shift the screen horizontally using this function.

Vpos: You can shift the screen vertically using this function.

Exit: back to the beginning menu.

OSD Control: Selecting this option, brings you to 4 more options:
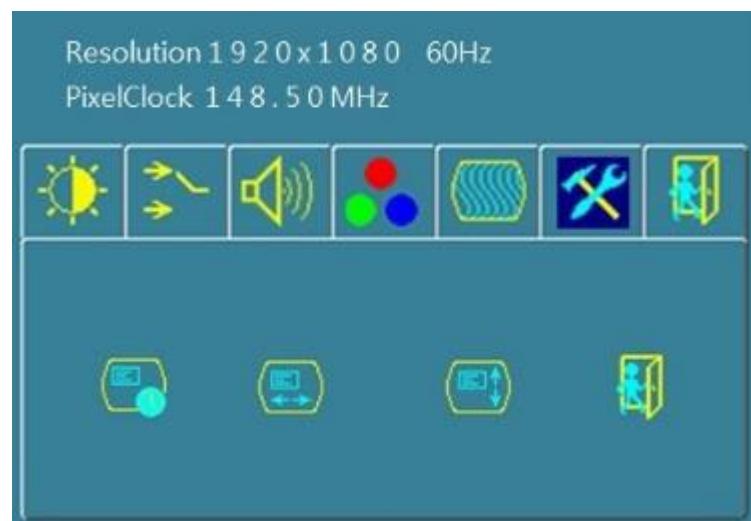
Osd_time: Select time for the OSD user interface to stay on screen, for 2 sec. to 16 sec. Default is 10 sec.

Osd_HPos: Moves the OSD user interface horizontally on screen.

Osd_VPos: Moves the OSD user interface vertically on screen.

Exit: You can exit this sub menu back to the beginning

Factory_Reset: By pressing this, the screen will revert to factory settings, and the previous settings will be deleted.

Sharpness: Sharpen characters.

Exit: back to the normal screen

OSD Lock Function：

It is possible to lock all the OSD buttons to prevent unauthorized changes to occur by pressing "**right >**" and "Menu" buttons simultaneously. You will see the "lock" icon below on the center of the screen for 8 ~ 9 seconds. If any button is pushed after the lock function is initiated, the below icon will appear on the screen.'


Keypad Lock

To release the OSD lock, press and "**right >**" and "Menu". The below icon will appear on the center of the screen for 8 ~ 9 seconds. Now all OSD keys are active again.

Keypad Unlock

# 6 Mechanical Drawing

DC 12V IN

4-M4X10_FH

4-KEY MEMBRANE

LABEL
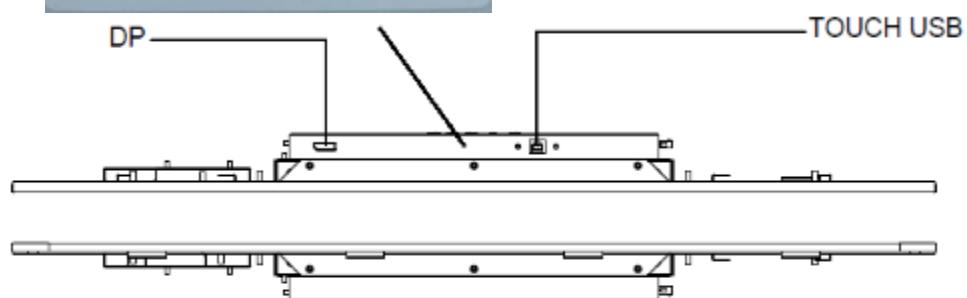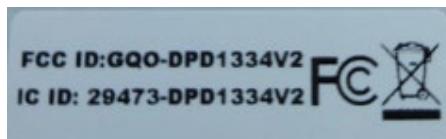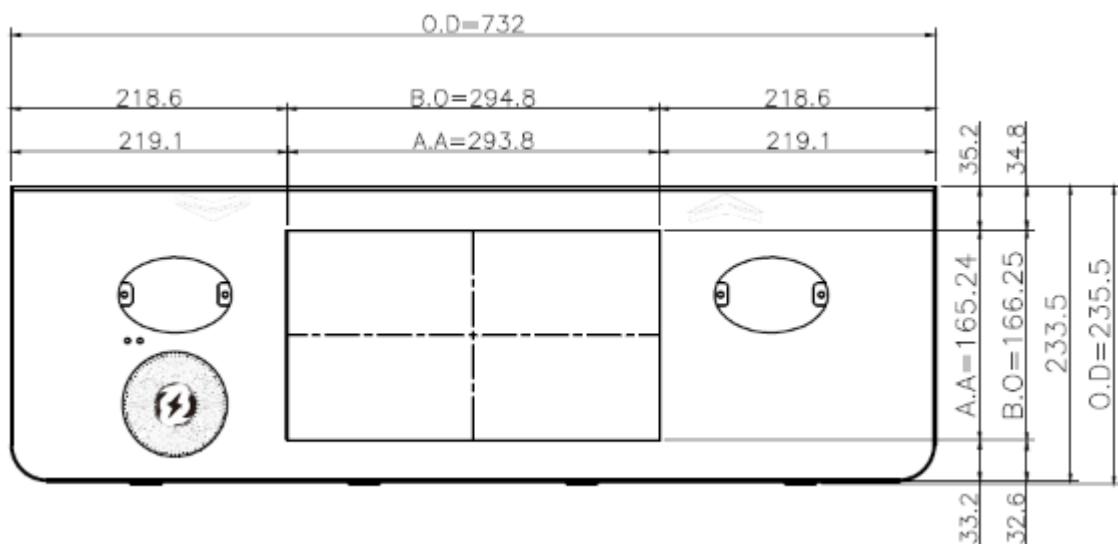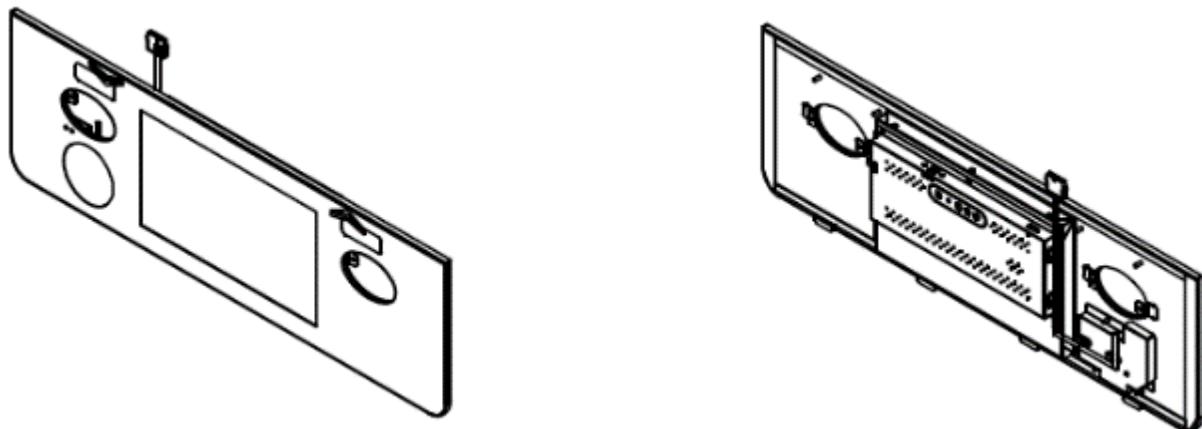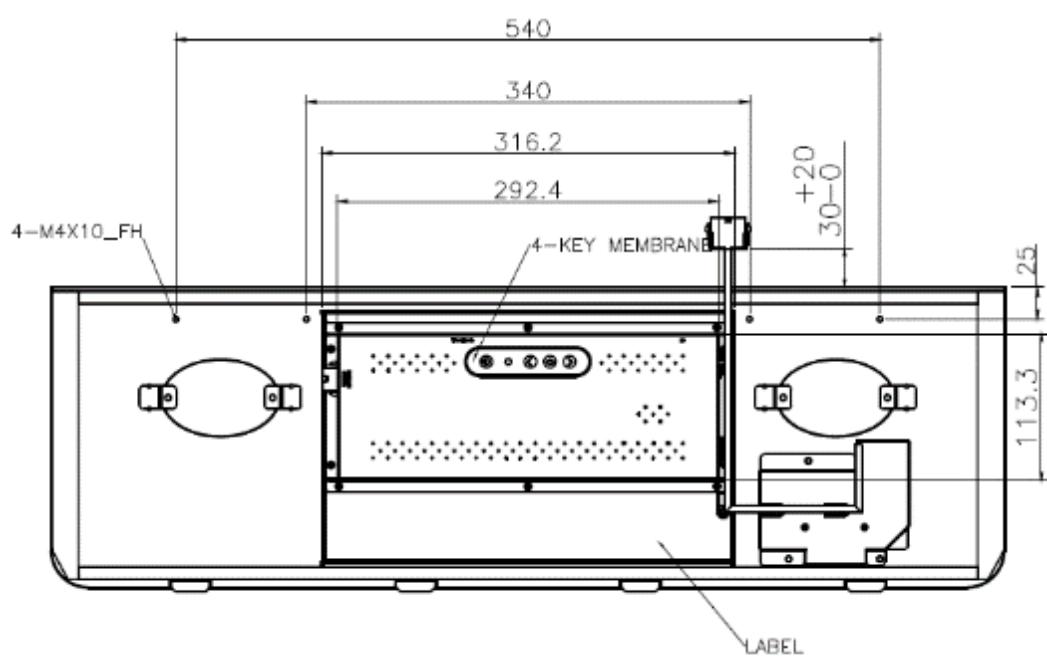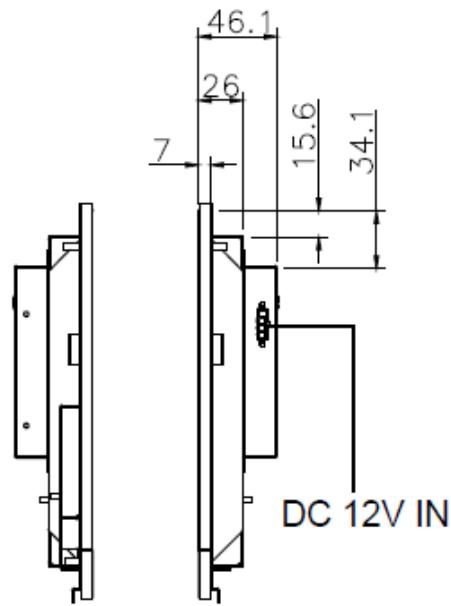
Note :
O.D. : Outline Dimension
B.O. : Bezel Opening
A.A. : LCD Active Area
M4 torque is 13.5±0.5Kgf.cm

7 Packing Exploded Diagram

Packing Box:831 x 574 x 368mm
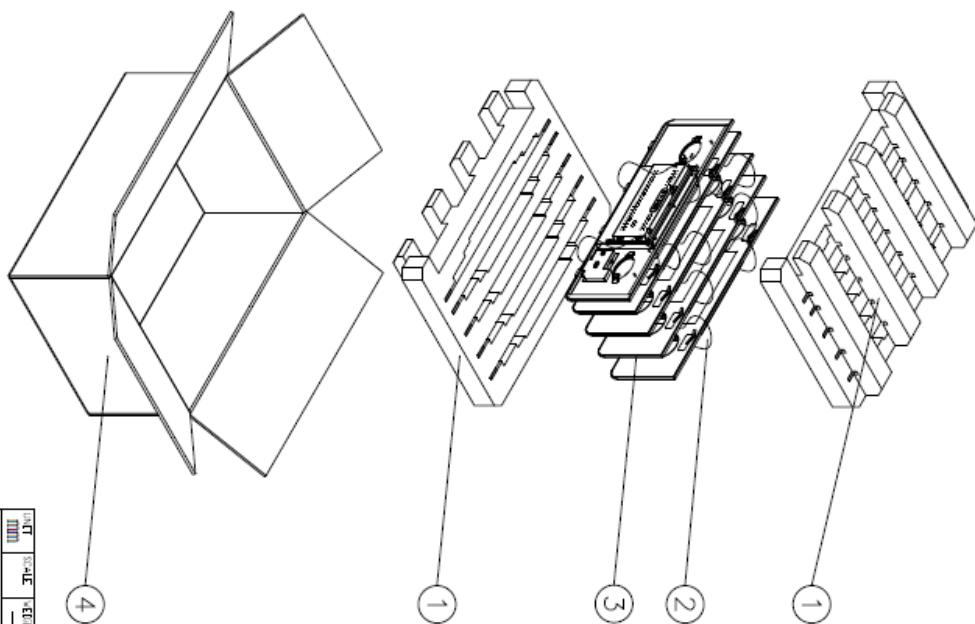
8 Inspection Specification

LITEMAX ELECTRONICS INC

● Initial Publishing ○ Revision ○ Abolishment ☐ Management Handbook ☐ Procedure Book ■ Instruction Book ☐ Form

Approval Form Of Document Making(Revision) Application   Date：2023/07/07

Document Name：DPD1334-STQ-Q06 Inspection Requirement	Document NO: QI-7500-2731

■ Making	**Cause Of Making/Revision/Abolishment：** This document defines the product inspection process and criteria for acceptance or rejection of defect.
☐ Revision	**Revised Items：**

APPROVAL DEPARTMENT

☐ President：	☐ System R&D：
☐ Administration：	☐ Electronic R&D：
☐ US Sales：	☐ Optical R&D：
☐ Europe Sales：	☐ IPC R&D：
☐ Asia Sales：	☐ Manufacturing：
☐ Marketing：	☐ Quality Assurance：
☐ Material：	☐ Technic Department：
☐ Purchasing：	☐ Document Control Center：

(☐ Abolishment)

☐ Reissue	**Cause Of Reissue:**
	Manager Of Reissue Department.:☐ Reissue Agreed ☐ Reissue Disagreed Signature：_____

Document Control Center		Application Department		
Manager	Executor	Approval	Dep. Manager	Executor
Ming Sun		Hank Wang	α	Ken Liang

FM-5000-020-A1

Doc. No.	QI-7500-2731	DPD1334-STQ-Q06 Inspection Requirement		Making Dep.	Quality Assurance
Edition	A0			Making Date	2023/07/07
Document Revision History					
Rev. Date	Rev. Page	Edition	Revision Summary		
Approval	Hank Wang		Check	α	Making	Ken Liang

FM-5000-021-A0

Doc. No.	Doc. Name	DPD1334-STQ-Q06 Inspection Requirement	Making Date	2023/07/07	Edition	A0
QI-7500-2731			Revision Date		Page	1/4

1. Purpose

This document defines the inspection procedure and criteria for quality control of outsourced manufacturing and LITEMAX manufacturing.

2. Scope

This document is applicable to the products manufactured by LITEMAX or outsourced unless otherwise specified by clients.

3. Definition of Terms

3.1 Critical Defect：

Any defects seriously cause the damage of product, the danger of user safety or violation of related law.

3.2 Major Defect：

Products do not meet the criteria of their specification, or any defects may results in functional failure or reduce the usability of products themselves.

3.3 Minor Defect：

Any defects do not reduce product usability or result in functional failure.

3.4 Inspection 'Lot'

Lot means the products are from the batch of same source, same specification and same condition, and is also the quantity of inspection.

3.5 Standard Item or Approved Sample

3.6 PCBA：Printed Circuit Board Assembly

3.7 LCD：Liquid Crystal Display

3.8 Durapixel：Back light module

4. Inspection criteria/Conditions/Tools

4.1 Follow these criteria for general inspection. Otherwise, refer to SOP or requirements if any items are not included in these criteria.

4.2 Inspection conditions

Environmental temperature：25±10℃

Environmental Luminance：500~900Lux

Viewing Distance：The distance between object and viewer's eyes should be 35±5 cm.

Viewing Angle：The angle between object and viewer's eyes should be 90 degree.

Viewing Time：Within 12 seconds.

Viewing Area：Active Area

LCD Power Input：DC 12V

Wireless charger Power Input：DC 12V

Signal Source：PC Source

Software：NOKIA/ISeeMT Calibration

4.3 Inspection Tools：Thickness Gauge、Dot-Line Gauge、5% ND Filter、BM9

4.4 Screen Resolution：1920*1080

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5. Sampling Criteria

5.1 Follow MIL-STD-105E LEVEL II single sampling inspection.

5.2 Major Defect (MA) 0.65%

　　Minor Defect (MI) 0.65%

5.3 Refer to client's requirement for specific case.

6. Inspection Items And Criteria

6.1 Appearance Inspection Items and Criteria

Appearance Inspection Items and Criteria				
Item	Item Description	MA	MI	Standard
1	Dot dust	●		$D \leq 0.2mm$, allowed $0.2mm < D \leq 0.5mm$, allow 5 dots $D > 0.5mm$ reject
2	Bubble/Dent	●		$D \leq 0.2mm$, allowed $0.2mm < D \leq 0.5mm$, allow 5 dots $D > 0.5mm$ reject
3	Line dust	●		$W \leq 0.03mm$, allowed $0.03mm < W \leq 0.1mm$, $L \leq 10mm$, allow 3 line, $L > 10mm$ or $W > 0.1mm$ reject
4	Panel scratch	●		$W \leq 0.03mm$, allowed $0.03mm < W \leq 0.1mm$, $L \leq 10mm$, allow 5 line, $L > 10mm$ or $W > 0.1mm$ reject
5	Outer carton labeling inconsistent with specification	●		According to BOM
6	Serial No Label missing or broken, or inconsistent with specification	●		According to BOM
7	Warranty sticker missing or broken	●		Not allowed
8	Appearance distortion	●		Not allowed
9	Screws missing		●	Not allowed
10	Packing material broken or dirty		●	Not allowed
11	Bezel		●	Raw material exposed not allowed
12	Accessories missing or wrong	●		According to BOM

Note: 1. Any inspection items not listed above, the judgment (MA/MI) should be classified by examined fact.

　　2. If any other defective functions or items, please list above.

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6.2 Electrical Inspection Items and Criteria

Electrical Inspection Items and Criteria				
Item	Item Description	MA	MI	Standard
1	Bright line	●		Not allowed
2	Input signal without response	●		Not allowed
3	No backlight	●		Not allowed
4	Corona spot	●		View with 5% filter
5	Light leakage	●		View with 5% filter
6	Mura	●		View with 5% filter
7	White dot	●		View with 5% filter
8	Bright dots/Dark dots/Total dots	●		0/5/5
9	Distance between dark dot and dark dot.	●		$L \geqq 5mm$
10	Two adjacent bright dots/ Two adjacent dark dots	●		0 pair/1 pair
11	Three adjacent bright dots/ Three adjacent dark dots	●		0 pair/0 pair
12	Brightness	●		According engineering standard
13	OSD function	●		OSD function incorrectly
14	OSD LED light	●		Green for signal, Orange for no signal
15	Brightness no alternation	●		Adjust from 0 to 100 and from 100 to 0, message window no vanishing
16	Contrast no alternation	●		Adjust from 0 to 100 and from 100 to 0,
17	Firmware version	●		According to BOM
18	Wireless charger LED light	●		Red light for Power on. Blue light for Charge.
19	Wireless charger Output	●		Watts $\geqq 9.7W$
20	Touch no action	●		Not allowed
21	Touch Glass Cracks	●		Not allowed
22	Touch Corner flaw	●		$X \leqq 3.0mm \cdot Y \leqq 3.0mm \cdot Z \leqq T$
23	Touch Edge flaw	●		$X \leqq 4.0mm \cdot Y \leqq 3.0mm \cdot Z \leqq T$

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Note:
1. Dot defect is defined as the defective area of the dot area is larger than 50% of the dot area.
2. The inspection with ND Filter; Holding ND filter in front of panel with 5cm distance and examine the panel from 35±5cm in the front view within 2~3 seconds.
3. Inspection by human's eyes first. If any defect is found, please use tools to do judgement.
4. D: Diameter、W: Width、L: Length
5. Touch Corner & Edge flaw description，T: Glass thickness
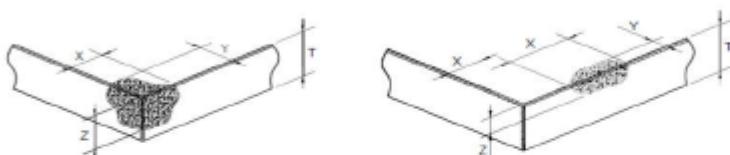
9   Product Warranty Terms and Conditions

1. LITEMAX warrants products free from defects in workmanship and materials under normal use for 1 year which is effective from the date of shipping from LITEMAX.
2. If the products have been proved defective within the applicable warranty period, LITEMAX will provide repair or replacement for equivalent product.
3. The period of repair or replacement is 14 working days from the date of receiving.
4. The repaired products will be given 3 months warranty for repaired defect problem.
5. All the products and parts repaired or replaced shall follow the original and remained period of warranty.
6. As soon as the RMA number is issued, the defective products must be packed securely in the original or other suitable shipping package to ensure not damaged in transit.
7. The RMA number must be prominently marked on the outside carton. Otherwise the item will be rejected and shipped back at sender's expense.
8. If the repair deadline exceeds 6 months of the date of RMA number applying and the case can not be finished, the RMA number will be automatically cancelled. If necessary, apply another new RMA number for new case.
9. If the repair items are pending without response from customer for 6 months since the date of product receiving, Litemax is no long responsible for product custody and the case shall be closed.
10. Any of the followings shall be invalid in RMA warranty: •The serial number label is unclear, revised or removed.

- The damage is due to misuse, abuse, negligence, the disaster of fire, flood, electroshock or thunder stroke.
- The maintenance or disassembly is implemented without authorization from LITEMAX.
- The damage is occurred in transit.
- The use of accessories or parts does not meet the specification from LITEMAX, such as batteries or adaptors.
- Keep the same image on screen without refreshing by screen saver program so that results in image sticking.
- The warranty sticker is fragmented or broken.
- The mechanism is damaged or LCD is broken by improper handle.
- The temperature of operation environment is too high that results in the color of temperature sticker on product changed.

11. Except the damages caused by natural disaster or misuse, any of the followings occurred within 3 months after delivery from LITEMAX shall meet DOA warranty:
12. No image shows up. •No power on.

- No function at panel control keypad.

13. Any of the followings shall be invalid in DOA warranty: •The serial number label is unclear, revised or removed.

- The warranty sticker is fragmented or broken.
- The cables or related accessories are missing.
- Except for LF and LH models, part of the complete unit is sent back.
- The use of accessories or parts does not meet the specification from LITEMAX.

14. Shipping Freight. The freight is defined as the following 3 categories: •In Warranty. Customer shall take the freight sending the defective products from customer to LITEMAX, and LITEMAX shall take the freight sending back from LITEMAX to customer. In case the defective products received are examined as no problem found, customer shall take the freight sending back from LITEMAX to customer.

- Out of Warranty. Customer shall take both back and forth freight for the defective products.
- DOA (Defect on Arrival). LITEMAX shall take both back and forth freight for the DOA products. In

case the DOA products received are examined as no problem found, customer shall take both back and forth freight. Therefore, customer shall contact RMA department before sending back the DOA products.

15. Repair Charge. The repair charge is classified as the following 3 categories: •In Warranty. The warranted products will be repaired with free of charge. However, for products which are invalid in RMA warranty will be charged for repair materials.

- Out of Warranty. Customer shall pay for repair hours and materials.
- DOA (Defect on Arrival). Swap new products for customer.

16. LITEMAX reserves the right to change, modify, add or remove portions of the provisions at its sole discretion at any time and without prior notice. Please check periodically for any modifications.

10   Precautions

10.1   Handling and Mounting Precautions

(1) The module should be assembled into the system firmly by using every mounting hole. Do not apply rough force such as bending or twisting to the LCD during assembly.

(2) You should consider the mounting structure so that uneven force (ex. Twisted stress, Concentrated stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the LCD module.

(3) While assembling or installing LCD modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.

(4) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.

(5) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily be scratched.

(6) Please attach the surface transparent protection film to the surface in order to protect the polarizer. Transparent protection film should have sufficient strength in order to the resist external force.

(7) When the transparent protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(8) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.

(9) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.

(10) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.

(11) Protect the LCD module from static electricity, it may cause damage to the C-MOS Gate Array IC.

(12) Do not disassemble the module.

(13) Do not pull or fold the lamp wire.

(14) Pins of I/F connector should not be touched directly with bare hands.

10.2   Storage Precautions

(1) High temperature or humidity may reduce the performance of LCD module. Please store LCD module within the specified storage conditions.

(2) If possible store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.

(3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.

(4) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

10.3 Operation Precautions

(1) Do not pull the I/F connector in or out while the LCD module is operating.
(2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
(3) Response time depends on the temperature. (In lower temperature, it becomes longer.)
(4) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods are very important to minimize the interference.
(7) Please do not give any mechanical and/or acoustical impact to module. Otherwise, module can't be operated its full characteristics perfectly.
(8) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.
(9) Do not display the fixed pattern for a long time because it may cause image sticking.
(10) In order to prevent image sticking, periodical power-off or screen save is needed after fixed pattern long time display.
(11) Black image or moving image is strongly recommended as a screen save.
(12) Static information display recommended to use with moving image. Cycling display between 10 minutes' information (static) display and 10 seconds' moving image.
(13) Background and character (image) color change is recommended. Use different colors for background and character, respectively. And change colors themselves periodically.
(14) LCD system is required to place in well-ventilated environment. Adapting active cooling system is highly recommended.
(15) Product reliability and functions are only guaranteed when the product is used under right operation usages.
(16) If product will be used in extreme conditions, such as high temperature/ humidity, shock and vibration it is strongly recommended to contact Litemax for filed application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, taxi-top, in vehicle and controlling systems.

11 Disclaimer

All information in this document are subject to change, please constant LiteMax for any new design.

12   Warning statement

a.   The spatial distance between the product and the consumer should keep more than 20 cm

b.   This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation of the device.

For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:
Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

☐Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.
☐This device and its antenna must not be colocated
or operating in conjunction with any other antenna or transmitter.

c.   Canada
This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference
(2) This device must accept any interference, including interference that may cause undesired operation of the device.
Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes:

(1)Cet appareil ne doit pas causer d'interférences
(2)Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

c. This device contains transmitters and receivers which emit Radio Frequency (RF) energy. The device is designed to comply with the limits for exposure to RF energy set by the Federal Communications Commission (FCC) of the United States and Industry Canada (IC) of Canada.
Cet appareil contient des émetteurs et des récepteurs qui émettent de l'énergie radiofréquence (RF). L'appareil est conçu pour respecter les limites d'exposition à l'énergie RF fixées par la Federal Communications Commission (FCC) des États-Unis et par Industrie Canada (IC) du Canada.

13 Appendix

13.1 <u>Declaration Letter of ROHS Compliance</u>

13.2 CB Test Certificate

13.3 FCC Test Certificate

13.4 CE Test Certificate

13.5 Canada IC Test Certificate