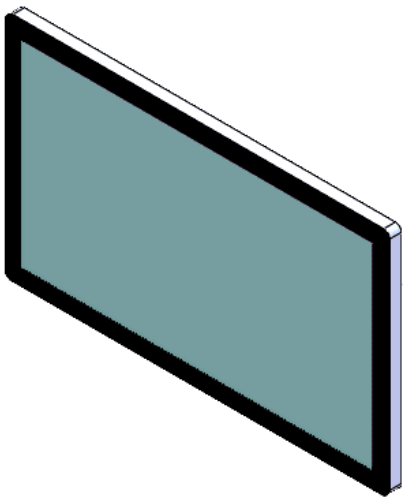
MODEL : 150TFTP2387

Zero Bezel with PCAP Touchscreen



Revision	Date	History
V0.1	2024.03.11	Initial Release.
V1.0	2024.03.19	Added Side M4 User Mounting Hole
V1.1	2024.05.20	Changed Input Voltage DC12V -→ DC24V

Draft _____ Date : _____

Checked: _____ Date : _____

Approved : _____ Date : _____

Contents

1. General Description

1.1 Overview

- **SUZOHAPP Open-frame LCD Monitor 150TFTP2387 is a high performance TFT LCD monitor providing a high quality screen image.**
- **This monitor supports HDMI and DP input. Other input options are available.**
- **Wide input resolution range up to UHD (3840 x 2160@60Hz).**
- **It is designed for industrial use with Auto power on, up scaling performance adequate for low-resolution applications and enhanced design margin for reliability.**
- **It is available in matching touch and non-touch designs.**

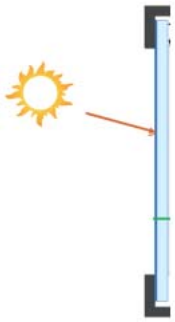
1.2 General Specifications

LCD Panel	**Size**	**23.8" Diagonal**
	Active Display Area	**525.66mm(H) x 295.7mm(V)**
	Type No.	**LG LM238WR2-SPE1**
	Number of Pixels	**3840 (H) x 2160(V)**
	Pixel Arrangement	**RGB Vertical Stripe**
	Pixel Pitch	**0.1369mm x 0.1369mm**
	Color Depth	**1.07M True Colors (RGB 8bit+Hi FRC)**
	Surface Treatments	**Anti-glare Haze 3%, Hard –coating (2H)**
	Viewing Angle (CR>10)	**R/L: 178 degree (89/89)** **U/D: 178 degree (89/89)**
	Contrast Ratio	**Typ. 1200 : 1**
	Response Time(Typ.)	**14ms**
	Average Brightness	**Typ. 540 cd/ m^2**
	Frame Rate	**Typ. 60Hz**
	Backlight Unit	**LED**
Input Resolution	**Prime**	**3840 x 2160@60Hz**
	Standard	**800x600 @60Hz,** **1024x768 @60Hz,** **1280x1024 @60Hz, 1280x720@60Hz** **1600x900@60Hz, 1680x1050@60Hz,** **1920x1080@60Hz, 1920x1200@60Hz** **2560x 1600@60Hz, 3840x2160@60Hz**

Input Signal Port	HDMI 2.0	19pin HDMI Jack x 1 Port
	DP(Display Port) 1.4	20pin DP Jack x 1 Port
	Power Jack	Mini-DIN 4P x 1 Port
Scanning Frequency	Horizontal	31 ~ 80Khz
	Vertical	55 ~75Hz
OSD Control		Menu, Select, Up, Down, Power
Plug & Play		VESA DDC 2B Ver1.3
Touchscreen	Touch Panel	P-CAP Touch : 23.8" Zero Bezel Touch / 10 Point (G1-238C-10984-1B)
	Controller	4805 (Control IC : ILITEK ILI2510)
	Controller Interface	USB 2.0 Type "B"
RoHS		RoHS2 Compliance
Mounting Options		100 x 100x 100mm M4 VESA Mounting Holes
Optional Accessories		Cables, Power Supply

Application Caution

1. Precautions for strong light exposure.
Strong light exposure causes degradation of polarizer and color filter.



2. Using Conditions.
- Temperature inside the cabinet should be controlled 'at room temp' (0 ~ 40ºC) by cooler and fan.

1.3 Environmental and Reliability Specification

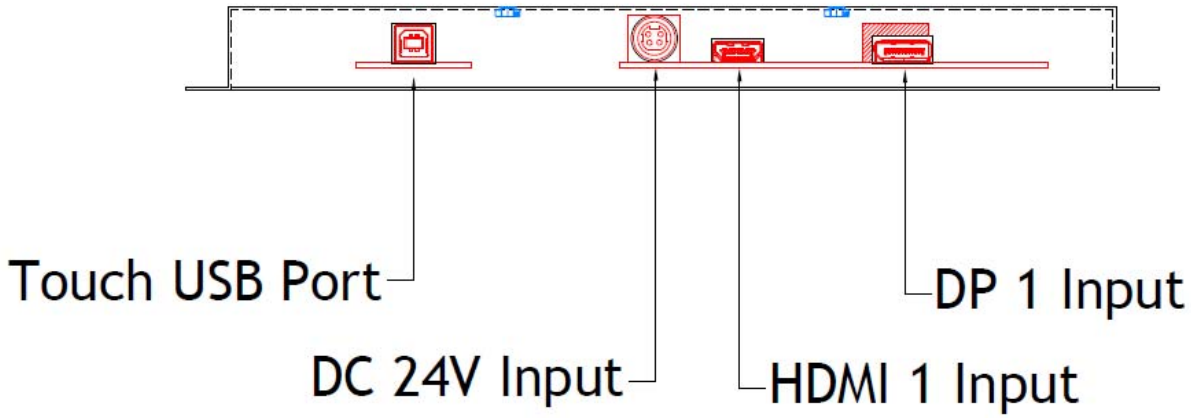
- **This specification depends on the LCD panel characteristics. Please refer to the manufacturer's panel specification for details.**

Item	Symbol	Min	Max	Unit
Operating Temperature	TOP	0	+50	°C
Operating Humidity	HOP	10	90	%
Storage Temperature	TST	-20	+60	°C
Storage Humidity	HST	10	90	%

1.4 Power Supply Rating

Optional PSU Input Voltage	AC 100 ~ 240VAC,50/60Hz
Optional PSU Output Voltage	DC 12V/5.0A
Monitor DC Input Voltage	24VDC
Power Consumption	TBD

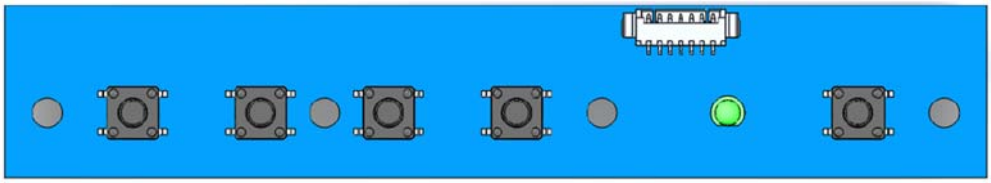
1.5 Input/Output Port

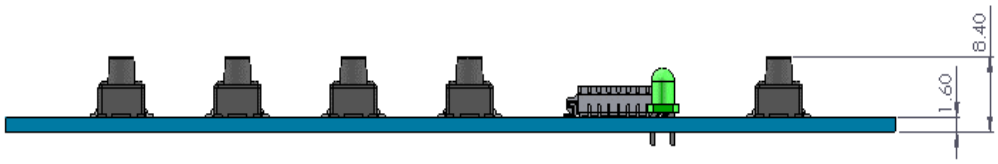


2. User Control & OSD

2.1 Key Control Board

K002





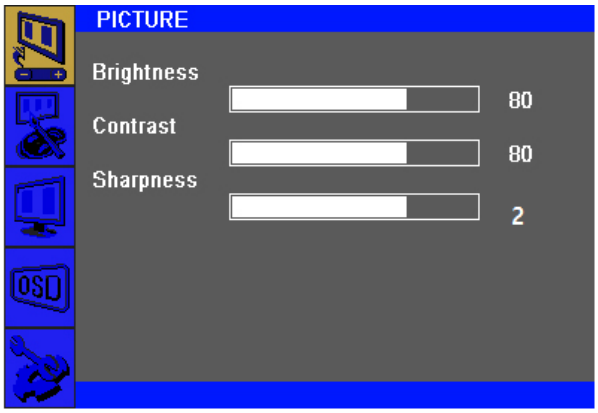
Button	Function	Status	HOT Key
LED	Indicates operation status	Green : Normal State Red : Off Mode Green Blinking : DPMS Mode	
POWER	Power on/off		
MENU	Enable MENU Window Disable MENU Window Exit from Sub function		
SELECT	Select function		No OSD Window, Input Source Change
DOWN	Move to Down or Left		No OSD Window, Auto Color
UP	Move to Up or Right		No OSD Window, Auto Configuration

2.2 OSD Control Function

The chosen OSD settings will be stored in memory. The OSD menu can be cleared from the screen by pressing the MENU button otherwise it will be automatically cleared after a few second of non-use.

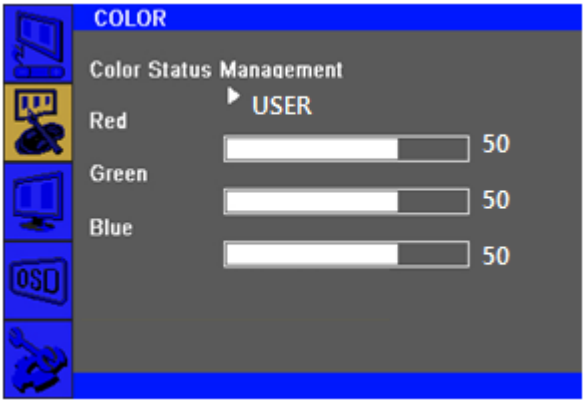
2.2.1 OSD Main Menu

1) PICTURE



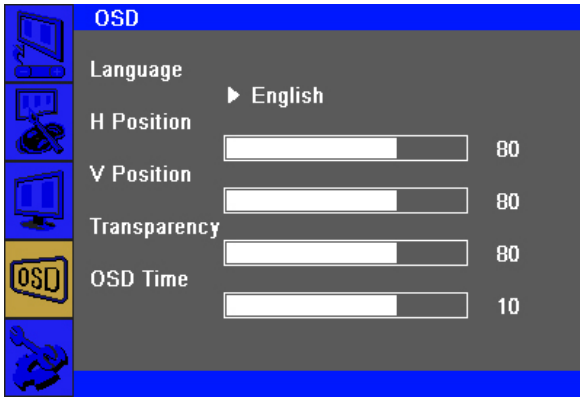
Brightness (0 ~ 100)	**Increases/decreases monitor Brightness. Default: 100**
Contrast (0 ~ 100)	**Increases/decreases monitor Contrast. Default: 100**
Sharpness (0 ~ 4)	**Adjusts Sharpness of the displayed images. Default : 2**

2) COLOR



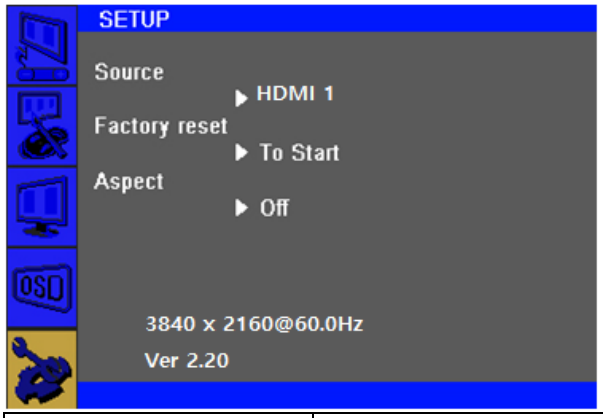
Color Status Management	**Selects the display's color temperature. The available color settings "Normal", "Warm", "Cool", "User" mode. Default : User**
Red (0 ~ 100)	**Increases/decreases Red Color Temperature. Default : 50**
Green (0 ~ 100)	**Increases/decreases Green Color Temperature. Default : 50**
Blue (0 ~ 100)	**Increases/decreases Blue Color Temperature. Default : 50**

3) OSD



Language	**Selects the OSD's display language. The available languages are English, Deutsch, Français, Italiano, Español, Korean. Default : English**
H Position (0 ~ 100)	**Adjusts the horizontal location of the OSD menus on the display. Default : 50**
V Position (0 ~ 100)	**Adjusts the vertical location of the OSD menus on the display. Default : 50**
Transparency (0 ~ 100)	**Adjusts the transparency of the OSD menus on the display. Default : 33**
OSD Time (0 ~ 60)	**Adjusts how long the touch monitor will wait without OSD button activity before closing the OSD. The adjustable range is between 0 and 60 seconds. Default : 10**

4) SETUP

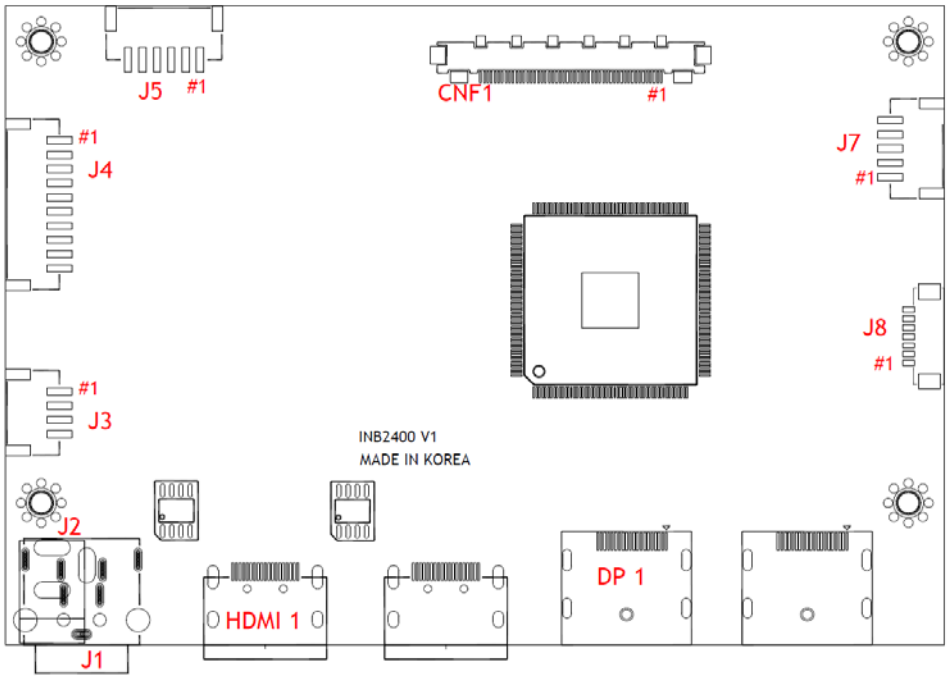


5) Input Source

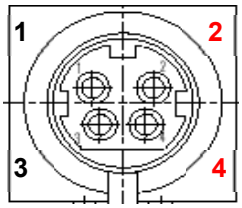
Source	**Selects Input Source HDMI1, DP1**
Factory reset	**Restores all factory default settings for OSD-adjustable parameters and for Preset Video Mode timings.**
Aspect	**Switches the scaling method between Full Scaling and Maintain Aspect Ratio. Default : Off**

3. Connector Description

3.1 Overview

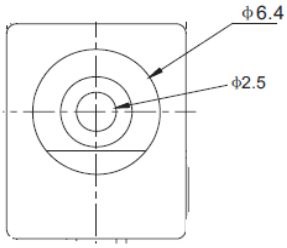


Reference	Item	Description	Type	Manufacture
J1	Jack	24V Input DC Power Jack (Optional)	KPJ-4S	-
J2	Jack	12V Input DC Power Jack (Optional)	DC-005	
J3	Connector	SMPS Input Power Connector	20022WR-04	YEONHO
J4	Connector	Backlight Inverter Connector	20022WR-10	YEONHO
J5	Connector	5V/12V DC Power Output Connector	20022WR-06	YEONHO
CNF1	Connector	V By One Output (8Lane)	FI-RE51S-HF	JAE
J6	Connector	eDP Output (4Lane / 8Lane / HBR2)	20453-040T	IPEX
J7	Connector	Auto-Dimming/RS232 Connector	20022WR-05	YEONHO
J8	Connector	OSD Board Connector	12505WR-07	YEONHO
HDMI1	Connector	HDMI Input(TMDS) Connector	HDMI 19P	-
DP1	Connector	DP Input(TMDS) Connector	DP 20P	-



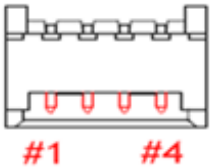
3.2 J1 :24VDC Power Input Jack

Pin No.	Symbol	Description
1,3	GND	Ground
2,4	VCC	VDC12V or VDC24V



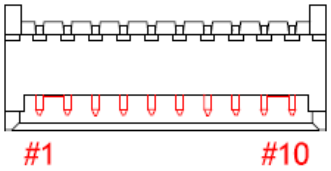
3.3 J2: 12VDC Power Input Jack (Optional)

Pin No.	Symbol	Description
-	GND	Ground
+	VCC	12VDC



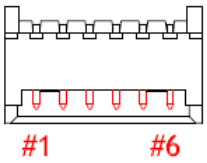
3.4 J3: SMPS Input Power Input Connector: 20022WR-04 (Yeonho or EQ)

Pin No.	Symbol	Description
1	VCC	12VDC
2	VCC	12VDC
3	GND	Ground
4	GND	Ground



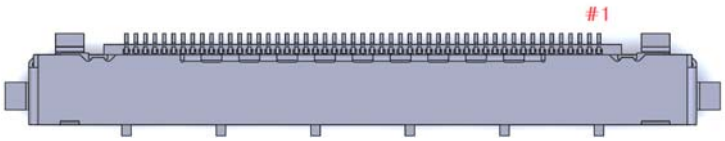
3.5 J4: Backlight Inverter Connector: 20022WR-10 (Yeonho or EQ)

Pin No.	Symbol	Description
10	DIM-ADJ	DIM-adjustment Analog diming or PWM control signal. * make sure inverter specification (Firmware Optional)
9	ON/OFF	Backlight digital ON (5.0V) / OFF (0V) signal.
5,6,7,8	GND	Ground
1,2,3,4	VCC	12VDC or 24VDC



3.6 J5: DC Power Output Connector: 20022WR-06 (Yeonho or EQ)

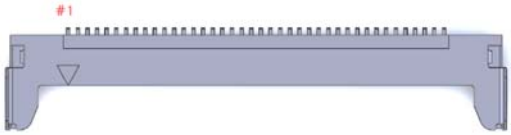
Pin No.	Symbol	Description
1,2	VCC	+12V
3,4	VCC	+5V
5,6	GND	Ground



3.7 CNF1: V by One (8Lane) Output Connector: FI-RE51S-HF (JAE or EQ)

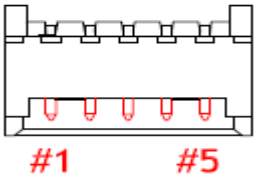
Pin No.	Symbol	Description
1	GND	Ground
2	VTX_TX7N	VTX_TX7N
3	VTX_TX7P	VTX_TX7P
4	GND	Ground
5	VTX_TX6N	VTX_TX6N
6	VTX_TX6P	VTX_TX6P
7	GND	Ground
8	VTX_TX5N	VTX_TX5N
9	VTX_TX5P	VTX_TX5P
10	GND	Ground

11	VTX_TX4N	VTX_TX4P
12	VTX_TX4P	VTX_TX4N
13	GND	Ground
14	VTX_TX3N	VTX_TX3P
15	VTX_TX3P	VTX_TX3N
16	GND	Ground
17	VTX_TX2N	VTX_TX2P
18	VTX_TX2P	VTX_TX2N
19	GND	Ground
20	VTX_TX1N	VTX_TX1P
21	VTX_TX1P	VTX_TX1N
22	GND	Ground
23	VTX_TX0N	VTX_TX0P
24	VTX_TX0P	VTX_TX0N
25	GND	Ground
26	VTX_PLL_Lock	VTX_PLL_Lock
27	VTX_HPD	V-by-One Hot Plug Detect
28	GND	Ground
29	V-by-one Bit Select	V-by-One 8bit/10bit Select
30	NC	LED Enable(Optional)
31	GND	No Connection
32	NC	No Connection
33	NC	No Connection
34	NC	No Connection
35	AUX_CH_N2	AUX_CH_N2
36	AUX_CH_P2	AUX_CH_P2
37	GND	Ground
38	AUX_CH_N1	AUX_CH_N1
39	AUX_CH_P1	AUX_CH_P1
40, 41, 42	GND	Ground
43	NC	No Connection
44, 45, 46, 47, 48, 49, 50, 51	PANEL_VDD	10V/12VDC Output for Panel



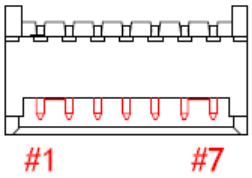
3.8 J6: eDP (4/8Lane) Output Connector: 20453-040T (IPEX or EQ)

Pin No.	Symbol	Description
1, 2, 3	PANE_VDD	10V/12VDC Output for Panel
5 ,6,7	GND	Ground
4, 8, 9, 10	NC	No Connection
11	eDP1_HPD	TX HPD1
12	2nd_AUXN	2nd TX_AUX_N
13	2nd_AUXP	2nd TX_AUX_P
14	GND	Ground
15	DPTX_L7N	DPTX_L7N
16	DPTX_L7P	DPTX_L7P
17	GND	Ground
18	DPTX_L6N	DPTX_L6N
19	DPTX_L6P	DPTX_L6P
20	GND	Ground
21	DPTX_L5N	DPTX_L5N
22	DPTX_L5P	DPTX_L5P
23	GND	Ground
24	DPTX_L4N	DPTX_L4N
25	DPTX_L4P	DPTX_L4P
26	eDP0_HPD	TX HPD0
27	1st_AUXN	1stTX_AUX_N
28	1st_AUXP	1stTX_AUX_P
29	GND	Ground
30	DPTX_L3N	DPTX_L3N
31	DPTX_L3P	DPTX_L3P
32	GND	Ground
33	DPTX_L2N	DPTX_L2N
34	DPTX_L2P	DPTX_L2P
35	GND	Ground
36	DPTX_L1N	DPTX_L1N
37	DPTX_L1P	DPTX_L1P
38	GND	Ground
39	DPTX_L0N	DPTX_L0N
40	DPTX_L0P	DPTX_L0P



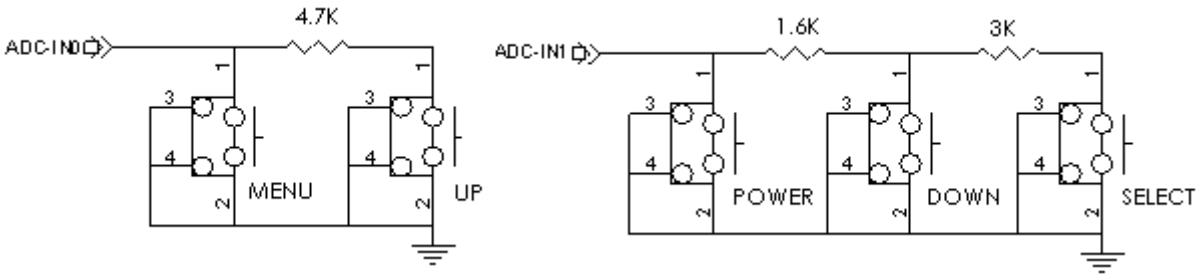
3.9 J7: Auto-Diming / RS232 Connector: 20022WR-05 (Yeonho or EQ)

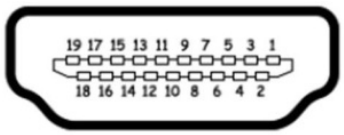
Pin No.	Symbol	Description
1	5VDC	VCC 5V
2	RS232 TX	RS232 TX
3	RS232 RX	RS232 RX
4	Auto- Backlight	Auto-Diming
5	GND	Ground



3.10 J8: OSD Board Connector: 12505WR-07 (Yeonho or EQ)

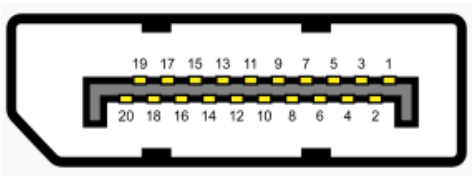
Pin No.	Symbol	Description
1	VCC	+5V Power for IR sensor
2	IRQ	Infrared rays signal line.
3	LED1	Green LED
4	LED2	Red LED
5	GND	Ground
6	ADC-IN0	Menu, Up
7	ADC-IN1	Power, Down, Up





3.11 HDMI 1: HDMI Input (TMDS) Connector

Pin No.	Symbol	Description
1	TMDS DATA2-	TMDS DATA2 Differential Negative Signal
2	TMDS DATA2+	TMDS DATA2 Differential Positive Signal
3	TMDS DATA2 Shield	Shield for TMDS Channel #2
4	TMDS DATA1-	TMDS DATA1 Differential Negative Signal
5	TMDS DATA1+	TMDS DATA1 Differential Positive Signal
6	TMDS DATA1 Shield	Shield for TMDS Channel #1
7	TMDS DATA0-	TMDS DATA0 Differential Negative Signal
8	TMDS DATA0+	TMDS DATA0 Differential Positive Signal
9	TMDS DATA0 Shield	Shield for TMDS Channel #0
10	TMDS CLOCK Shield	Shield for TMDS Clock differential Pair
11	TMDS CLOCK+	TMDS DATA0 Differential Positive Signal
12	TMDS CLOCK-	TMDS DATA0 Differential Negative Signal
13	CEC	CEC Function
14	NC	No Connection
15	DDC Clock	DDC Clock Signal
16	DDC data	DDC Data Signal
17	GND	Ground
18	+5V Power	+5V Power
19	HPD	Identify the presence of a monitor



3.12 DP1: DP Input Connector

Pin No.	Symbol	Description
1	LANE3-	Component Signal for Main Link 3
3	LANE3+	True Signal for Main Link 3
4	LANE2-	Component Signal for Main Link 2
6	LANE2+	True Signal for Main Link 2
7	LANE1-	Component Signal for Main Link 1
9	LANE1+	True Signal for Main Link 1
10	LANE0-	Component Signal for Main Link 0
12	LANE0+	True Signal for Main Link 0
13	CA DET	No Connection
14	DP DET+	No Connection
15	AUX CH+	True Signal for Auxiliary Channel
16	GND	Ground
17	AUX CH-	Component Signal for Auxiliary Channel
18	+5V Power	Identify the presence of a monitor
19	RETURN	No Connection
20	PWR OUT	No Connection

4. Standard Display Modes

Spec / Mode	Pixel Freq.	Horizontal Timing				Vertical Timing			
		Sync Polar	Freq.	Total	Active	SP	Freq.	Total	Active
	MHz		KHz	Pixel	Pixel		Hz	Line	Lind
640*480@60Hz	28.175	N	31.469	800	640	N	59.940	525	480
800*600@60Hz	40.000	P	37.879	1056	800	P	60.317	628	600
1024*768@60Hz	65.000	N	48.363	1344	1024	N	60.005	806	768
1280*720@60Hz	74.500	P	44.772	1664	1280	P	59.855	748	720
1366*768@60Hz	84.75	P	47.72	1776	1366	P	59.799	798	768
1280*1024@60Hz	108.000	P	63.981	1688	1280	P	60.020	1066	1024
1600*900@60Hz	97.750	P	55.540	1760	1600	N	59.948	926	900
1680*1050@60Hz	119.125	P	64.742	1840	1680	N	59.946	1080	1050
1920*1080@60Hz	138.625	P	66.647	2080	1920	N	59.988	1111	1080
1920*1200@60Hz	154.125	P	74.099	2080	1920	N	59.999	1235	1200
2560*1600@60Hz	268.500	P	98.713	2720	2560	N	60.010	1641	1600
3840*2160@60Hz	585.980	P	129.600	4480	3840		60.000	2180	2160

5. LED Backlight Driver Board Specification

5.1 Electrical Specification

Item	Symbol	Spec	Unit	Remarks
Input Voltage 1	Vin	10.8 ~12.6	VDC	
Input Voltage 2	ON / OFF	3.0 ~ 5.0	VDC	
Operating Temperature	TOP	0 ~ 50	℃	
Storage Temperature	Tstg	-20 ~60	℃	
Relative Humidity	RH	90	%	

5.2 Control Signal

Item	Symbol	Status	Action	Remarks
J2 #8	ON/OFF	HIGH	LAMP-ON	3.0V ~ 5.0
		LOW	LAMP-OFF	0.8V Max

5.3 Output Characteristics

NO	Item	Symbol	Condition	Min.	Typ.	Max	Unit
1	Input Voltage	Vin	-	10.8	12.0	12.6	VDC
2	Input Current	Iin	Vin=12V Dim=0V	-	-	3.0	A
3	Output Voltage	Vout	Vin=12V Dim=0V	37.7	40.5	43.3	VDC
4	Output Current	Iout	Vin=12V Dim=0V	90	100	110	mA
5	Backlight On/Off Control	ON	-	3.0		5.0	VDC
		OFF	-	-0.3		0.8	VDC

5.4 Interface

5.4.1 CN1 Connector: 12505WR-12(Yeon-Ho) or EQ

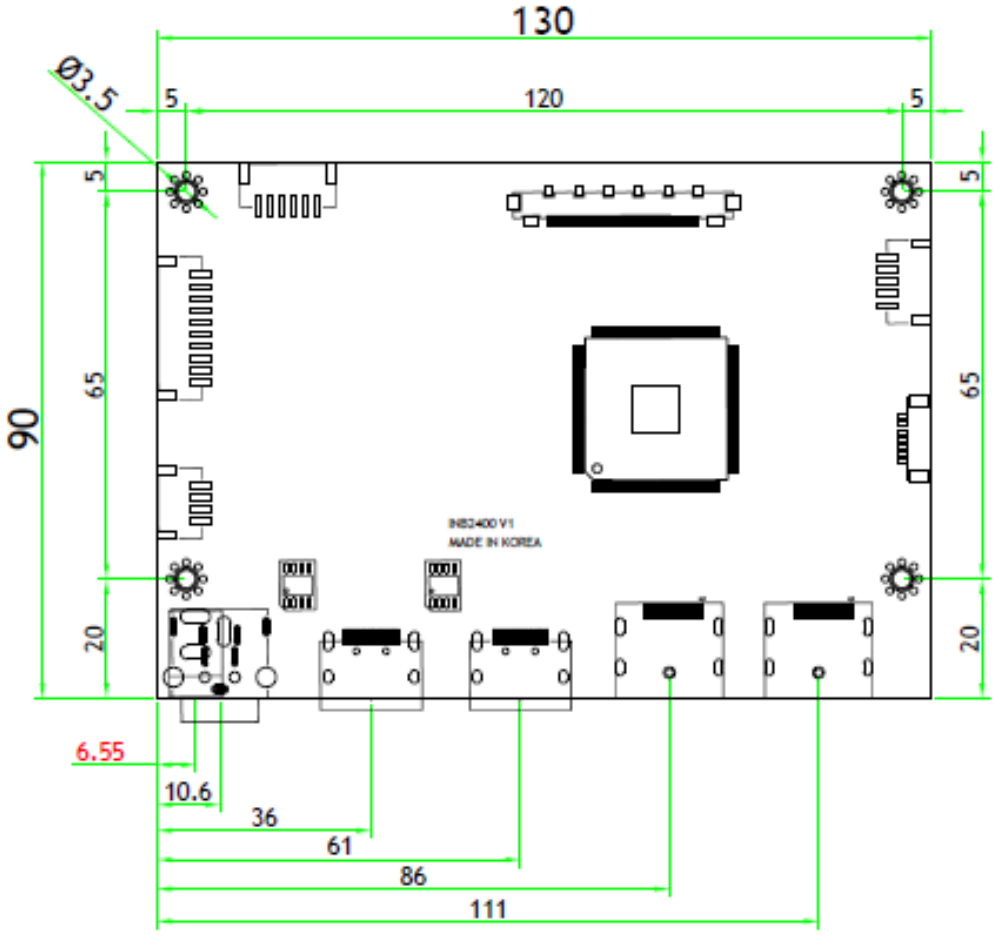
Pin No	Symbol	Remark
1,2,3	VIN	Voltage Input 12.0V
4,5,7,8,10,12	GND	GND
6	NC	NC
9	ON/OFF	LED Driver ON/OFF Signal (Active High)
11	DIM	10 ~ 100% (100Hz ~ 300Hz PWM Freq)

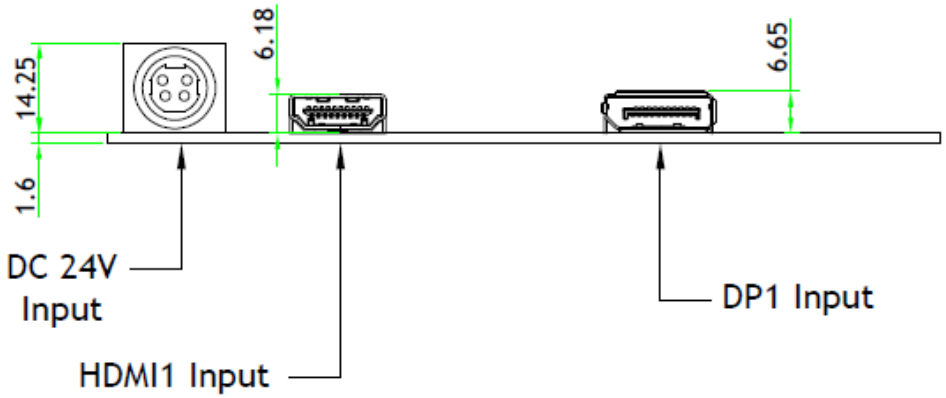
5.4.2 CN2, CN3 Connector: 12507WR-08L(Yeon-Ho) or EQ

Pin No	Symbol	Remark
1	RTN1	Feedback1 (Return 1)
2	RTN2	Feedback2 (Return 2)
5	RTN3	Feedback3 (Return 3)
6	RTN4	Feedback4 (Return 4)
3,4,7,8	VOUT	System Output

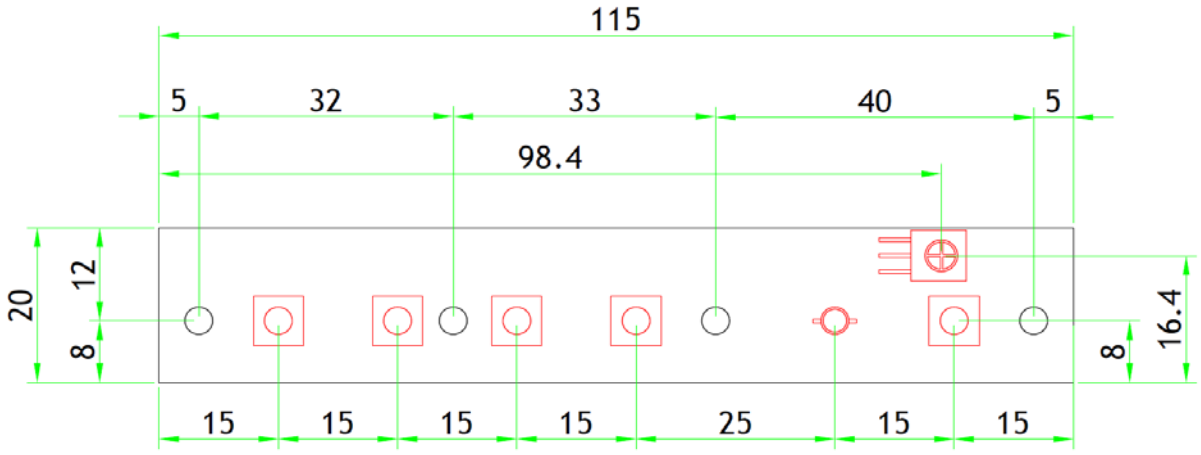
6. Board Dimensions

6.1 AD Board (INB2400A) Dimension (130mm x 90mm x 15.0mm)

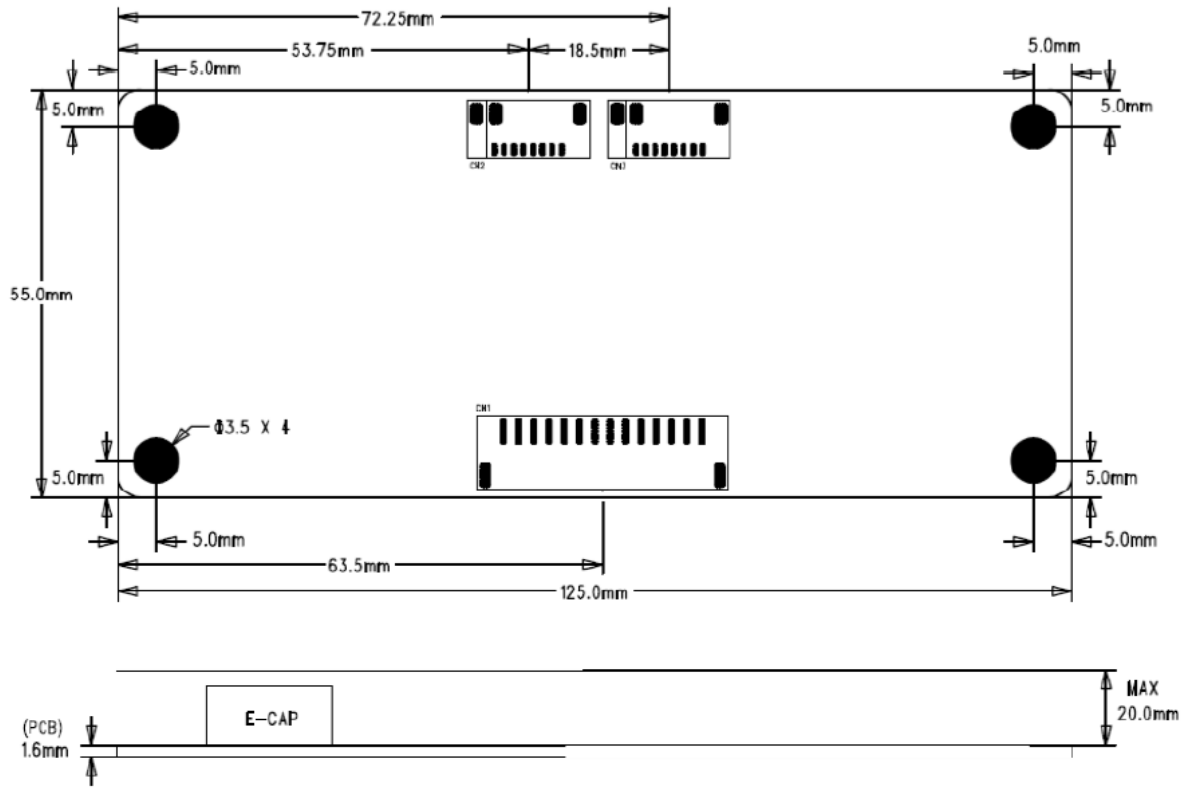




6.2 OSD Board (K002) Dimension (115mm x 20mm x 8.7mm)



6.3 LED Driver Board (GH734A(P3)) Dimension (125mm x 55mm x 20mm)



7. P-CAP Touchscreen Specification

7.1 Touch Controller Specifications

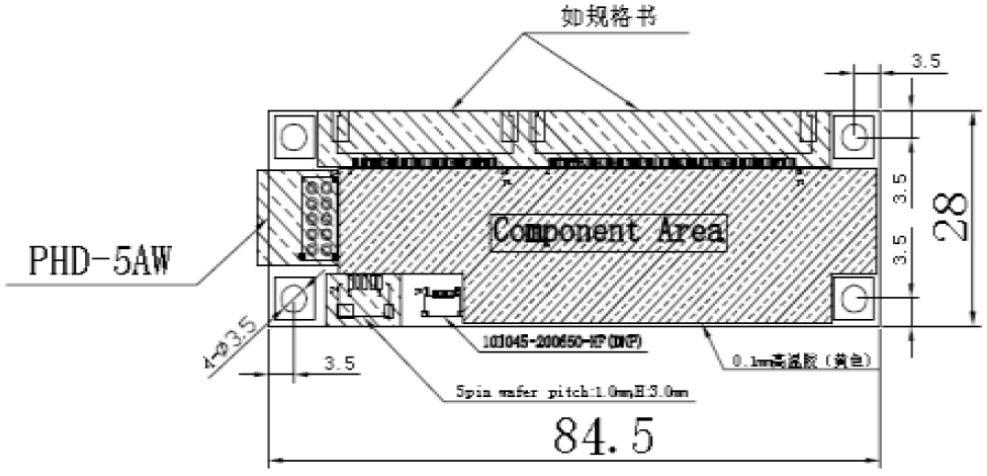
Product Features

项次Items	规格Specification
连接器界面 Interface	USB Standard 2.0 Full Speed
作业条件 Operation Condition	-20℃- +70℃ at Min 20% to Max 85% RH
储存条件 Storage Condition	-30℃- +80℃ at Min 20% to Max 85% RH
控制器外观尺寸 Size of the Controller Board	L 84.5mm*W 28mm*H 7.6mm±0.5mm

2.1电器特性 Electrical Property

项次 Items	规格 Specification	备注 Notes
连接器界面 Interface	USB	USB Standard 2.0 Full Speed
电源供给 Power Supply	5V	DC
工作电流 operating current	100mA(Typical)	120mA(Max.)
报点率 Report Rate	120HZ	50HZ（min）under windows7 or windows 8

7.2 Touch Control Board Dimension (84.5mm x 28.0mm)

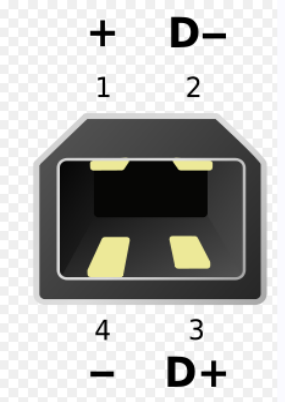


7.3. USB Connector (USB 2.0, Type “B”)

Number	Signal Name
1	+5V
2	D-
3	D+
4	GND

7.4 Touch Screen Dimension (588.0mm x 367.0mm x 4.4mm)

7.5. USB Interface Port



8. Packing Information

Item	Q’ty	Dimension (W x H x D)	Weight(Kg)	Remark
Open Frame	1Pcs	588.0mm x 367.0mm x 50.7mm	TBD	
Box Packing			TBD	
Pallet Size			TBD	
Pallet Packing			TBD	

9. Mechanical structure