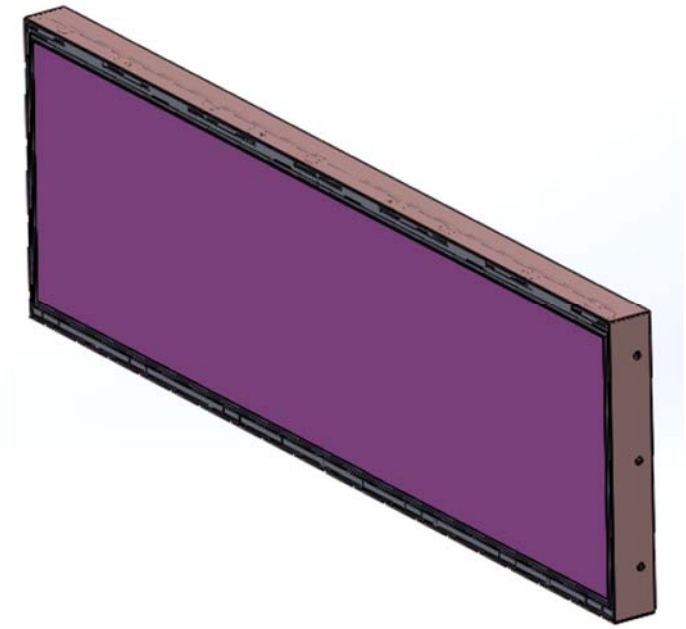
MODEL : 150TFT2901

BAR LCD Open Frame Monitor



Revision	Date	History
V0.1	2019.05.21	Initial Release

Draft _____ **Date :** _____

Checked: _____ **Date :** _____

Approved : _____ **Date :** _____

Contents

1. General Description

1.1 Overview

- SUZOHAPP Open-frame LCD Monitor 150TFT2901 is a high performance TFT LCD monitor providing a high quality screen image
- This monitor supports VGA, DVI-D and DP input
- Wide input resolution range up to Full HD (1920 x 1080@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.

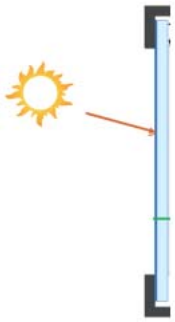
1.2 Reference table of characteristics

LCD Panel	**Size**	**29.0" Diagonal**
	Active Display Area	**698.4(H) x 196.425(V)mm**
	Type No.	**INNOLUX S290AJ1-LE2**
	Number of Pixels	**1920 (H) x 540 (V)**
	Pixel Arrangement	**RGB Vertical Stripe**
	Pixel Pitch	**0.36375mm x 0.36375mm**
	Color Depth	**16.7M True Colors**
	Surface Treatments	**Anti-Glare Haze 2.4%, Hardness (3H)**
	Viewing Angle (CR>10)	**R/L: 178 degree (89/89)** **U/D: 178 degree (89/89)**
	Contrast Ratio	**Typ. 4500 : 1**
	Response Time(Typ.)	**10ms**
	Average Brightness	**Typ. 500 cd/ m^2**
	Frame Rate	**Typ. 60Hz**
	Backlight Unit	**LED**
Input Resolution	**Prime**	**1920 x 1080 @ 60 Hz**
	Standard	**640x480 @60Hz/70Hz/75Hz** **800x600 @56/60/72/75 Hz,** **1024x768 @60/70/75 Hz,** **1280x1024 @60/75 Hz, 1280x720@60Hz** **1366x768@60Hz,1600x900@60Hz,** **1680x1050@60Hz,1920x1080@60Hz**

Input Signal Port	**VGA**	**15pin D-Sub x 1Port**
	DVI-D	**24pin DVI-D x 1 Port**
	DP(Display Port)	**20pin DP Jack x 1 Port**
	Audio Input	**3.5Pai Stereo Jack x 1 Port**
	Power Input	**Power 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**
RoHS		**RoHS2 Compliance**
Mounting Options		**M4 User 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

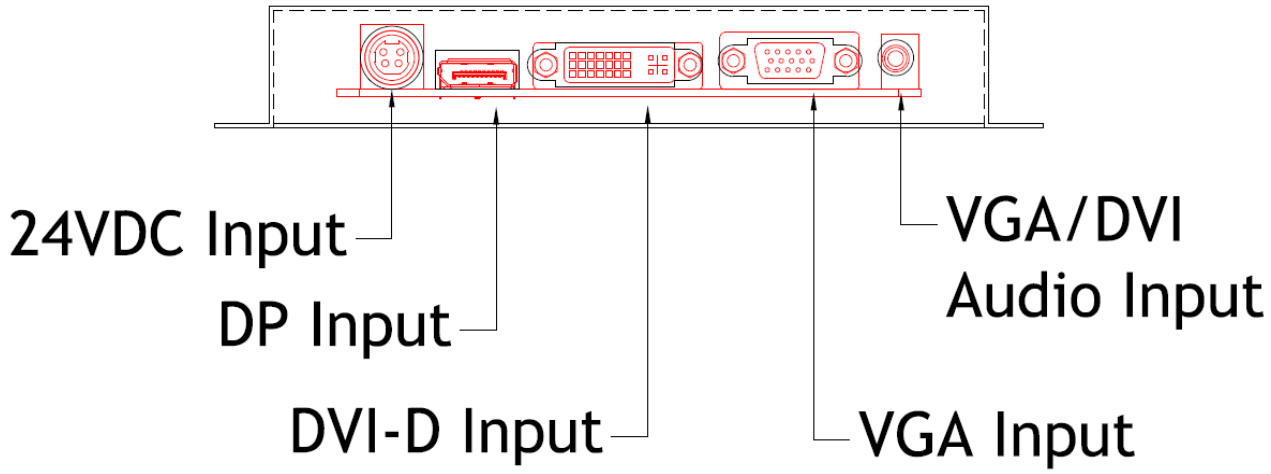
- This specification depends on the LCD panel characteristics. Please refer to the manufacturer's panel specification for details

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 24V/5.0A**
Monitor DC Input Voltage	**24VDC**
Power Consumption	**TBD**

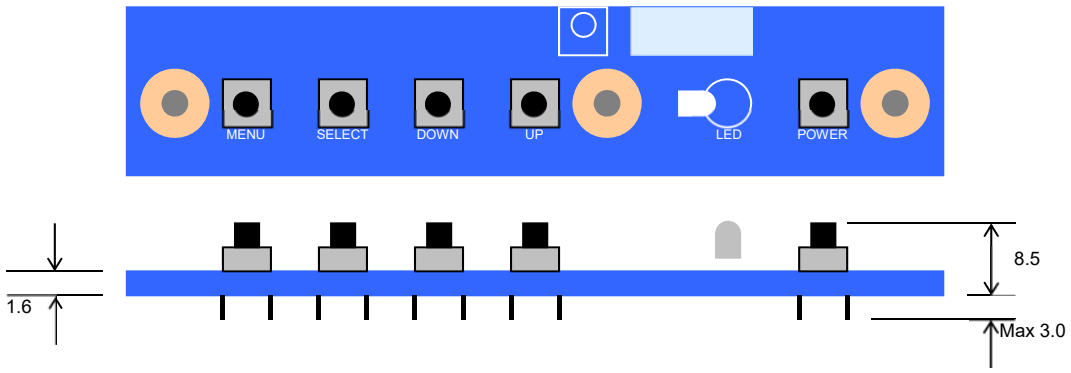
1.5 Input/Output Port



2. User Control & OSD

2.1 Key Control Board

K002



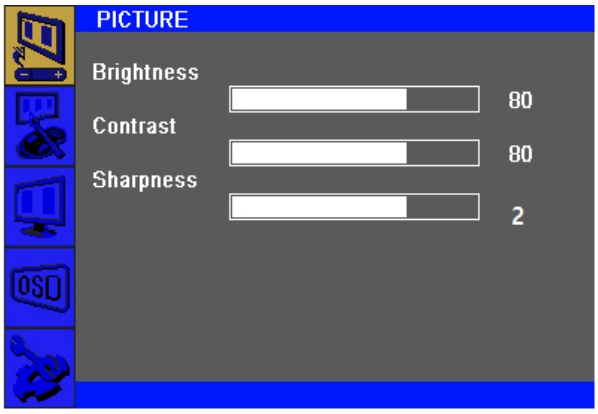
Button	Function	Status	HOT Key
LED	Indicates operation status	Green : Normal State Red : Off Mode Green Blinking : DPMS Mode	
POWER	Power on/off		
MENU	Enable MENU Window Disable MENU Window Exit from Sub function		
SELECT	Select function		No OSD Window, Input Source Change
DOWN	Move to Down or Left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

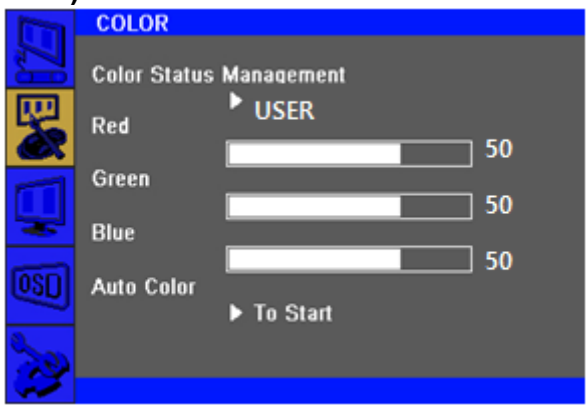
2.2.1 OSD Main Menu

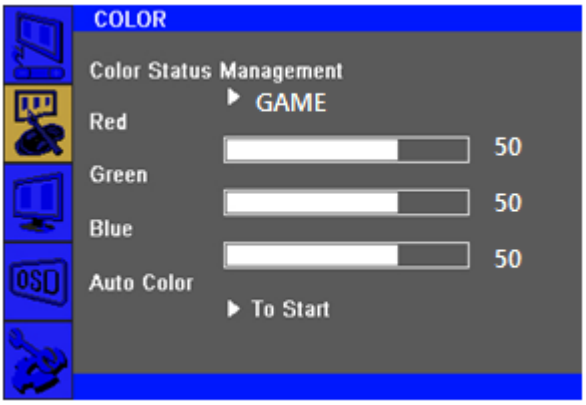
1). PICTURE



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**

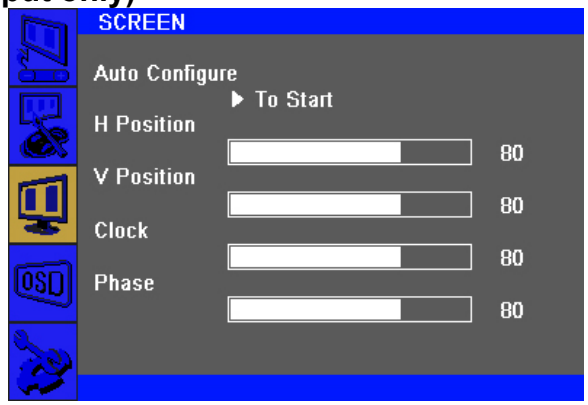
2). COLOR





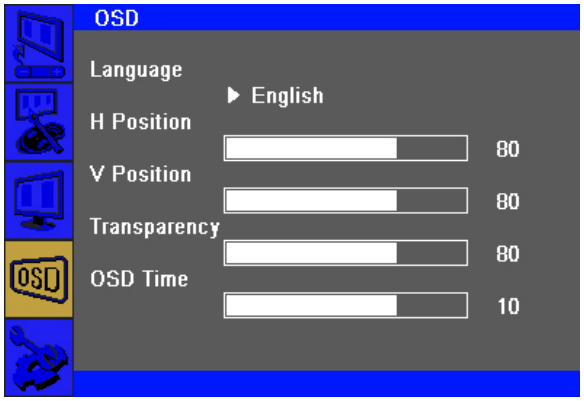
Color Status Management	**Selects the display's color temperature. The available color settings "Normal", "Warm", "Cool", "User", "Game" mode Default : User**
Red (0 ~ 100)	**Increases/decreases Red Color Temperature Default : 50**
Green (0 ~ 100)	**Increases/decreases Green Color Temperature Default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

3). SCREEN (VGA input only)



Auto Configure	**Automatically adjusts the system clock to the input VGA**
H Position (0 ~ 100)	**Moves the image horizontally on the display in single-pixel increments Default : 50**
V Position (0 ~ 100)	**Moves the image vertically on the display in single-pixel increments Default : 50**
Clock (0 ~ 100)	**Allows fine adjustments of the panel's pixel dot clock Default : 50**
Phase (0 ~ 100)	**Allows fine adjustments of the panel's pixel dot clock phase Default : 50**
WXGA Mode	**Selects WXGA Mode Off, 1024 x 768, 1280 x 768, 1360 x 768, 1366 x 768 Default : Off**

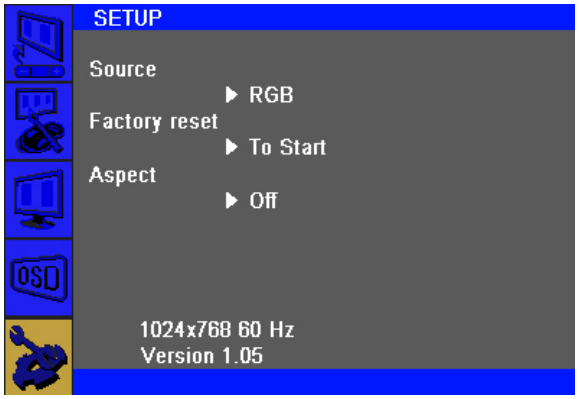
4). OSD



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**

5). SETUP

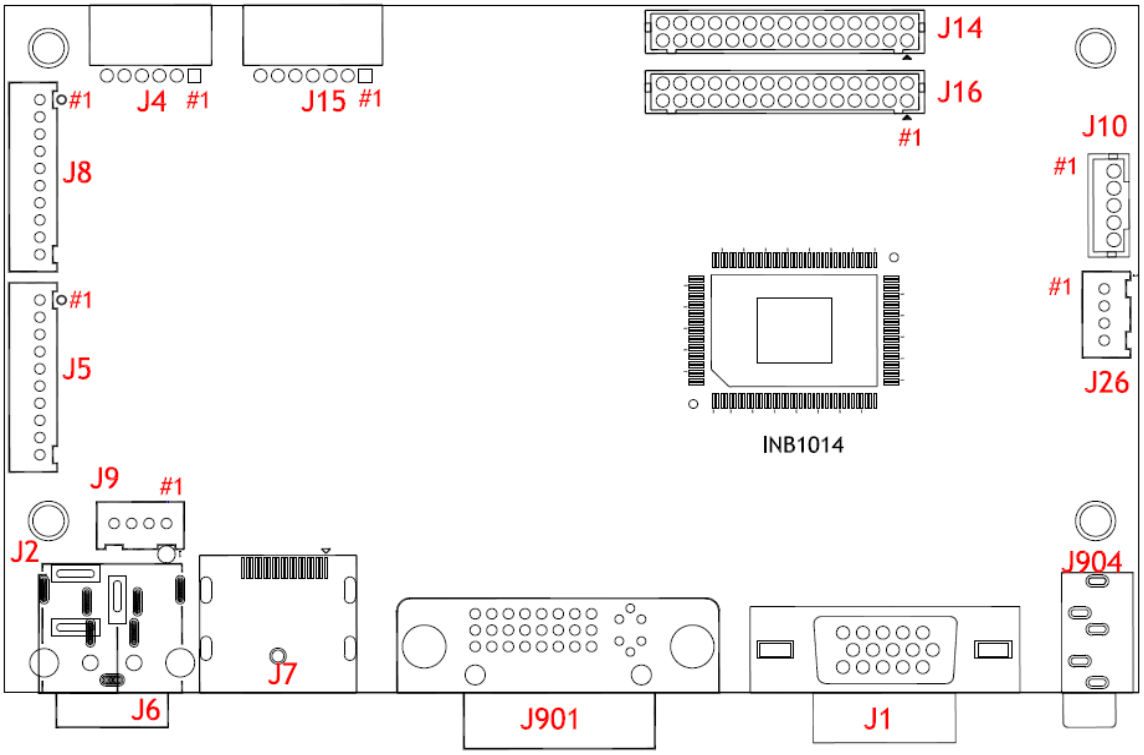


Source	**Selects Input Source VGA (RGB), DVI, DP, Auto**
Factory reset	**Restores all factory default settings for OSD-adjustable parameters and for Preset Video Mode timings.**
Aspect	**Switches the scaling method between Full Scaling and Maintain Aspect Ratio Default : Off**

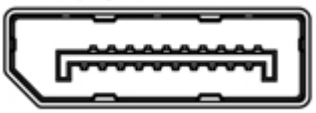
3. Connector Description

3.1 Summary

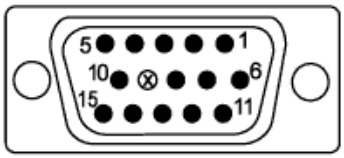
Reference	Item	Description	Type	Manufacture
J7	Connector	DP Input Connector	20P DP	-
J1	Connector	VGA Input Connector	15P D-SUB	-
J2	Jack	12V Input DC Power Jack	DC-005	(Optional)
J6	Jack	24V Input DC Power Jack	KPJ-4S-S	
J4	Connector	12VDC/5VDC External Output Conector	SMW200-06	YEONHO
J5,J8	Connector	LCD Backlight Inverter Connector	20010WS-10	YEONHO
J9	Connector	External 12V/24V Power Input	SMW200-04	YEONHO
J10	Connector	Auto-Dimming / RS-232C	SMW200-05	YEONHO
J14,16	Connector	LCD Interface Connector (2Ch LVDS)	YDW200-30	YEONHO
J15	Connector	OSD Board Connector	SMAW200-07	YEONHO
J26	Connector	Speaker Output	SMW200-04	YEONHO
J901	Connector	DVI-D Input(TMDS) Connector	DVI-D24P	-
J904	Connector	VGA / DVI Audio Input Jack	3.5Pai Stereo	



3.2 J7: DP (Display Port) Input



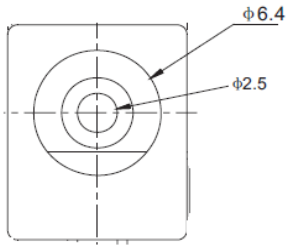
Pin No.	Symbol	Description
1	LANE3-	Component Signal for Main Link 3
3	LANE3+	True Signal for Main Link 3
4	LANE2-	Component Signal for Main Link 2
6	LANE2+	True Signal for Main Link 2
7	LANE1-	Component Signal for Main Link 1
9	LANE1+	True Signal for Main Link 1
10	LANE0-	Component Signal for Main Link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



3.3 J1: VGA Input Connector

Pin No.	Symbol	Description
1	Red1	Red analog input
2	Green1	Green analog input
3	Blue1	Blue analog input
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	NC	Not connected
10	GND	Ground
11	GND	Ground

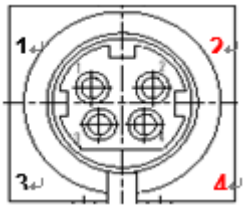
12	DSDA	DDC-SDA
13	HSYNC	Horizontal Sync
14	VSYNC	Vertical Sync
15	DSCL	Serial Clock Input



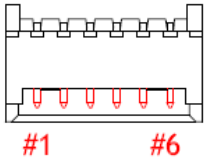
3.4 J2 : 12V Power Input Jack (Optional)

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

3.5 J6 : 24V Power Input Jack

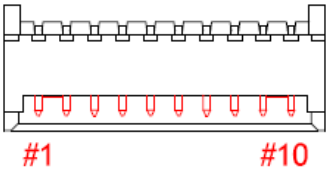


Pin No.	Symbol	Description
1,3	GND	Ground
2,4	VCC	24VDC



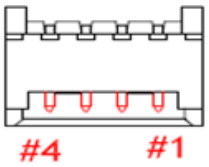
3.6 J4: 12VDC / 5VDC External Output Connector

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



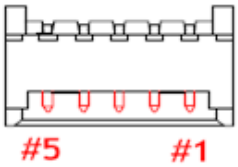
3.7 J5 / J8: LCD Backlight Inverter Connector

Pin No.	Symbol	Description
1	DIM-ADJ	DIM-adjustment analog dimming control signal * make sure inverter specification
2	ON/OFF	Inverter digital ON(3.3V)/OFF(0V) signal
3,4,5,6	GND	Ground
7,8,9,10	VCC	VCC 24V



3.8 J9: 12VDC / 24VDC Power Input Connector

Pin No.	Symbol	Description
1	VCC	12VDC / 24VDC
2	VCC	12VDC / 24VDC
3	GND	Ground
4	GND	Ground

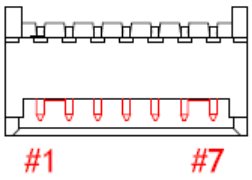


3.9 J10: Auto-Dimming / RS-232C Connector

Pin No.	Symbol	Description
1	VCC	+5V Power For RS-232C
2	RS232	RS232 RX
3	RS232	RS232 TX
4	Auto- Bright	Auto-Dimming
5	GND	Ground

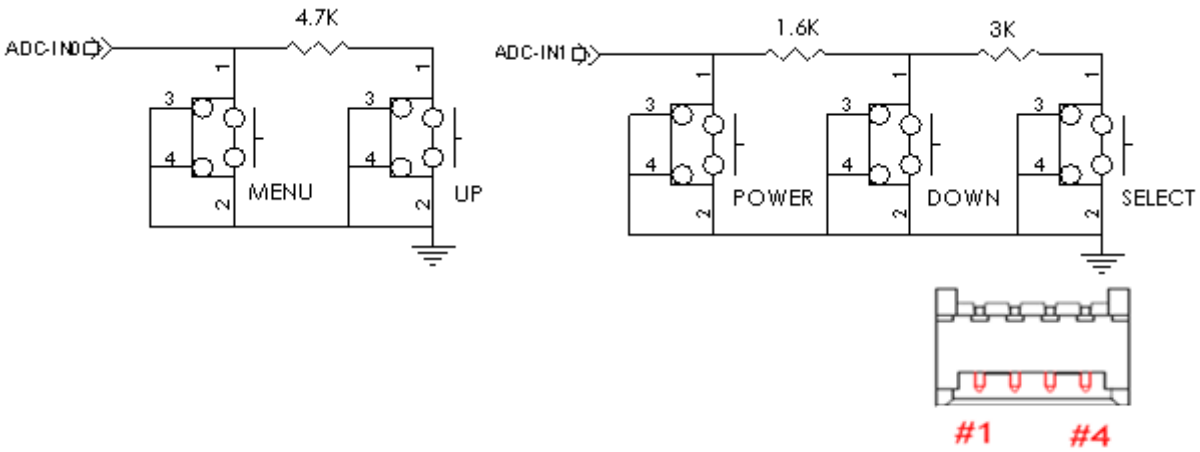
3.10 J14 / J16: LCD Interface Connector (8bit 2Ch LVDS)

Pin No.	Symbol	Description
1	MOD_PWR	Panel Power (12V, 5V or 3.3V)
2	MOD_PWR	Panel Power (12V, 5V or 3.3V)
3	Option	High/Low for LCD Option
4	MOD_PWR	Panel Power (12V, 5V or 3.3V)
5, 6	NC	Not Connection
7	GND	Ground
8	GND	Ground
9	Y3N-EVEN	Negative(-) LVDS differential second 3 data
10	Y3P-EVEN	Positive(+) LVDS differential second 3 data
11	YCN-EVEN	Negative(-) LVDS differential second Clock
12	YCP-EVEN	Positive(+) LVDS differential second Clock
13	Y2N-EVEN	Negative(-) LVDS differential second 2 data
14	Y2P-EVEN	Positive(+) LVDS differential second 2 data
15	Y1N-EVEN	Negative(-) LVDS differential second 1 data
16	Y1P-EVEN	Positive(+) LVDS differential second 1 data
17	Y0N-EVEN	Negative(-) LVDS differential second 0 data
18	Y0P-EVEN	Positive(+) LVDS differential second 0 data
19	GND	Ground
20	GND	Ground
21	Y3N- ODD	Negative(-) LVDS differential first 3 data
22	Y3P-ODD	Positive(+) LVDS differential first 3 data
23	YCN- ODD	Negative(-) LVDS differential first Clock
24	YCP- ODD	Positive(+) LVDS differential first Clock
25	Y2N- ODD	Negative(-) LVDS differential first 2 data
26	Y2P- ODD	Positive(+) LVDS differential first 2 data
27	Y1N- ODD	Negative(-) LVDS differential first 1 data
28	Y1P- ODD	Positive(+) LVDS differential first 1 data
29	Y0N- ODD	Negative(-) LVDS differential first 0 data
30	Y0P- ODD	Positive(+) LVDS differential first 0 data



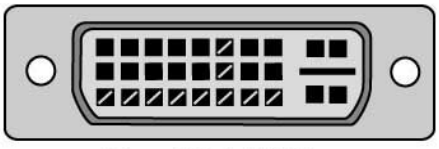
3.11 J15: OSD Board Connector

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



3.12 J26 : Speaker Output Connector

Pin No.	Symbol	Description
1	ROUT+	Speaker Right Output +
2	ROUT-	Speaker Right Output -
3	LOUT+	Speaker Left Output +
4	LOUT-	Speaker Left Output -



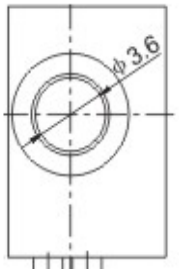
3.13 J901: DVI-D Input (TMDS) Connector

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	NC	No Connection
5	NC	No Connection
6	DDC Clock	The Data Line for the DDC Interface
7	DDC Data	The Clock Line for the DDC Interface
8	NC	No Connection
9	TMDS DATA1-	TMDS DATA1 Differential Negative Signal
10	TMDS DATA1+	TMDS DATA1 Differential Positive Signal
11	TMDS DATA1 Shield	Shield for TMDS Channel #1
12	NC	No Connection
13	NC	No Connection
14	+5V Power	+5 Volt signal for EDID (Un-powered Monitor)
15	GND(for +5V)	Ground for +5 Volt Power pin, Sync return
16	HPD	Identify the Presence of a Monitor
17	TMDS DATA0-	TMDS DATA0 Differential Negative Signal
18	TMDS DATA0+	TMDS DATA0 Differential Positive Signal
19	TMDS DATA0 Shield	Shield for TMDS Channel #0
20	NC	No Connection
21	NC	No Connection
22	TMDS CLOCK Shield	Shield for TMDS Clock Differential Pair
23	TMDS CLOCK+	TMDS DATA0 Differential Positive Signal
24	TMDS CLOCK-	TMDS DATA0 Differential Negative Signal

3.14 J904 : Audio Input (VGA / DVI Input Only) Connector

Pin No.	Symbol	Description
1	GND	GND
2	AR IN-	Sound Right Output
3	AR IN+	Sound Right Ground
4	AL IN-	Sound Left Ground
5	AL IN+	Sound Left Output



4. Standard Display Mode

ITEM	STD	Resolution	Pixel Frequency (MHz)	Vertical Frequency (Hz)	Horizontal Frequency (KHz)	Sync. Polarity (H/V)	Remark
1		640*400	25.175	59.940	31.469		
2		640*480	25.175	59.940	31.469		VGA
3	VESA	640*480	25.200	60.000	31.500		VGA
4	VESA	640*480	31.500	72.809	37.861		VGA
5	VESA	640*480	31.500	75.000	37.500		VGA
6	IBM	720*400	28.322	70.087	31.469		
7	VESA	800*600	36.000	56.250	35.156		SVGA
8	VESA	800*600	40.000	60.317	37.879		SVGA
9	VESA	800*600	50.000	72.188	48.077		SVGA
10	VESA	800*600	49.500	75.000	46.875		SVGA
11	VESA	1024*768	65.000	60.000	48.363		XGA
12	VESA	1024*768	75.000	70.069	56.476		XGA
13	VESA	1024*768	78.750	75.029	60.023		XGA
14		1152*864	94.500	70.012	63.851		
15	VESA	1152*864	108.000	75.000	67.500		
16		1280*720	74.501	59.856	44.772		WXGA
17		1280*768	79.499	59.870	47.776		WXGA
18	VESA	1280*960	108.000	60.000	60.000		WXGA
19		1360*768	72.000	59.960	47.368		WXGA
20	VESA	1280*1024	108.000	60.020	63.981		SXGA
21	VESA	1280*1024	135.000	75.025	79.976		
22		1680*1050	146.250	59.954	65.290		WSXGA+
23		1600* 900	118.998	55.920	60.000		
24		1920*1080	138.500	59.934	66.587		
25		1920*1080	148.500	60.000	67.500		1080P
26		1920*1080	148.352	59.940	67.433		1080P

5. LCD Backlight Driver Board Specification

5.1 ELECTRICAL SPECIFICATION

Item	Symbol	Spec	Unit	Remarks
Input Voltage 1	Vin	23.0 ~25.0	V	
Input Voltage 2	ON / OFF	0 ~ 5.0	V	
Operating Temperature	TOP	0 ~ 50	℃	
Storage Temperature	Tstg	-20 ~60	℃	
Relative Humidity	RH	80	%	

5.2 Control Signal

Item	Symbol	Status	Action	Remarks
CN1 #12	ON/OFF	HIGH	LED-ON	5.0V
		LOW	LED-OFF	0V

5.3 Output Characteristics

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Consumption	P_{BL}	-	35.9	42	W	(1), (2)
Converter Input Voltage	VBL	22.8	24.0	25.2	VDC	
Converter Input Current	I_{BL}	-	1.5	1.75	A	Non Dimming
Input Inrush Current	I_R	-	-	5	Apeak	V_{BL}=22.8V, (3)
Dimming Frequency	FB	150	160	170	Hz	
Dimming Duty Ratio	DDR	5	-	100	%	(4)
Life Time	-	30,000	-	-	Hrs	(5)

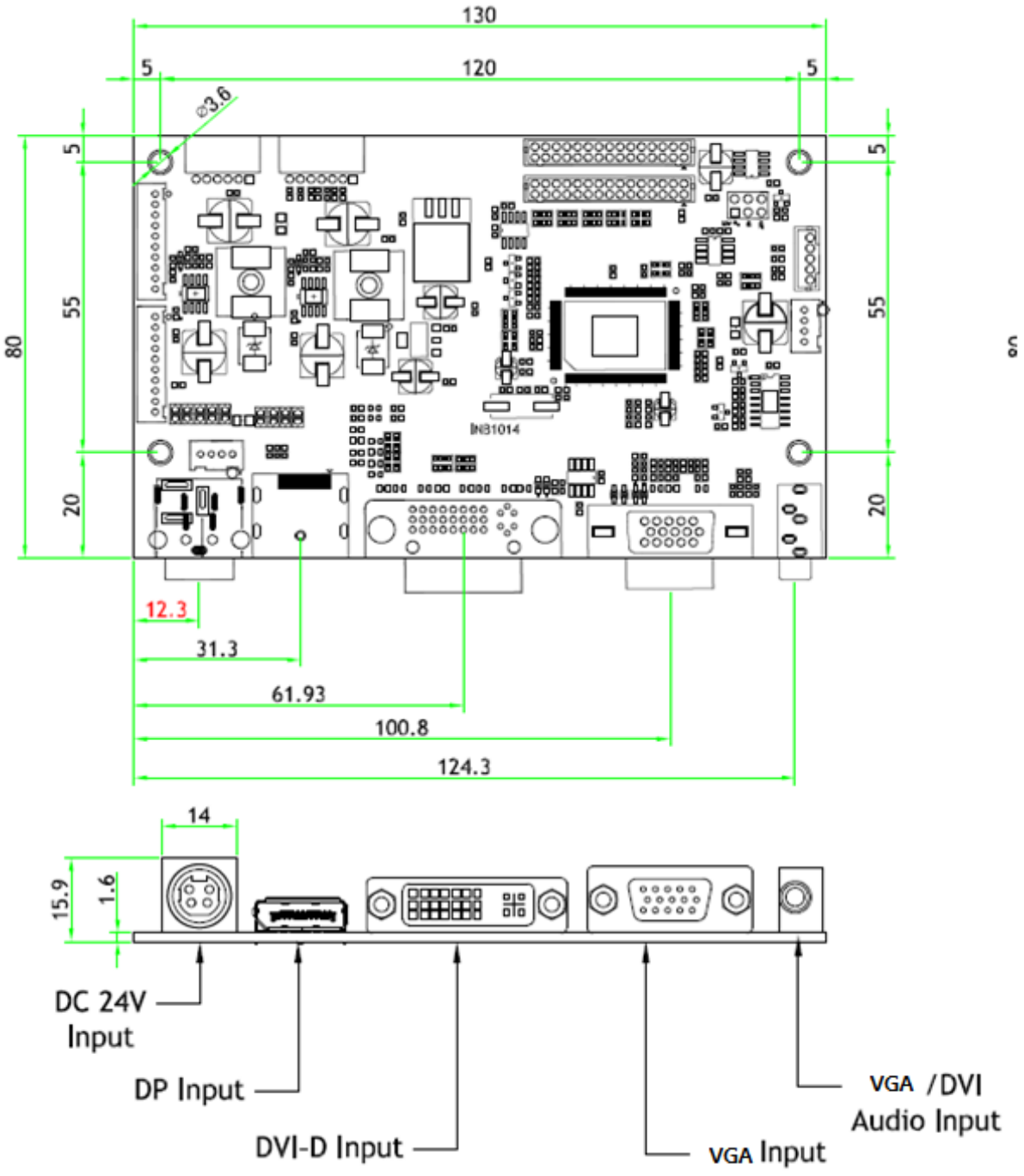
5.4 Interface

5.4.1 CN1 Connector: 20010WR-14 (YeonHo) or EQ

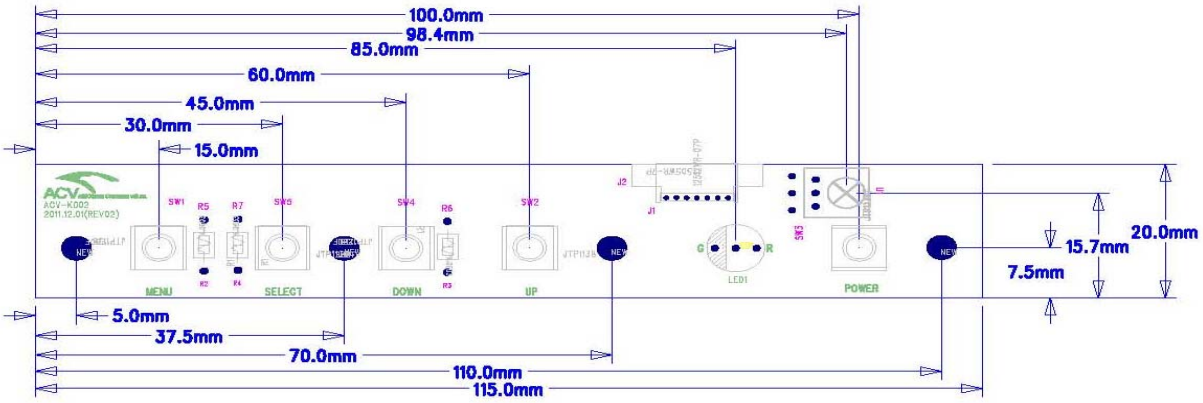
Pin	Symbol	Remarks
1,2,3,4,5	Vin	Input Voltage 24VDC
6,7,8,9,10	GND	GND
11	ERR	Normal (GND), Abnormal (Open Collector)
12	On/Off	Backlight On/Off (5V:On, 0V : Off)
13	NC	Not Conection
14	PDIM	External PWM

6. Board Dimensions

6.1 AD Board (INB1014) Dimension (130mm x 80mm x 14.5mm)



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

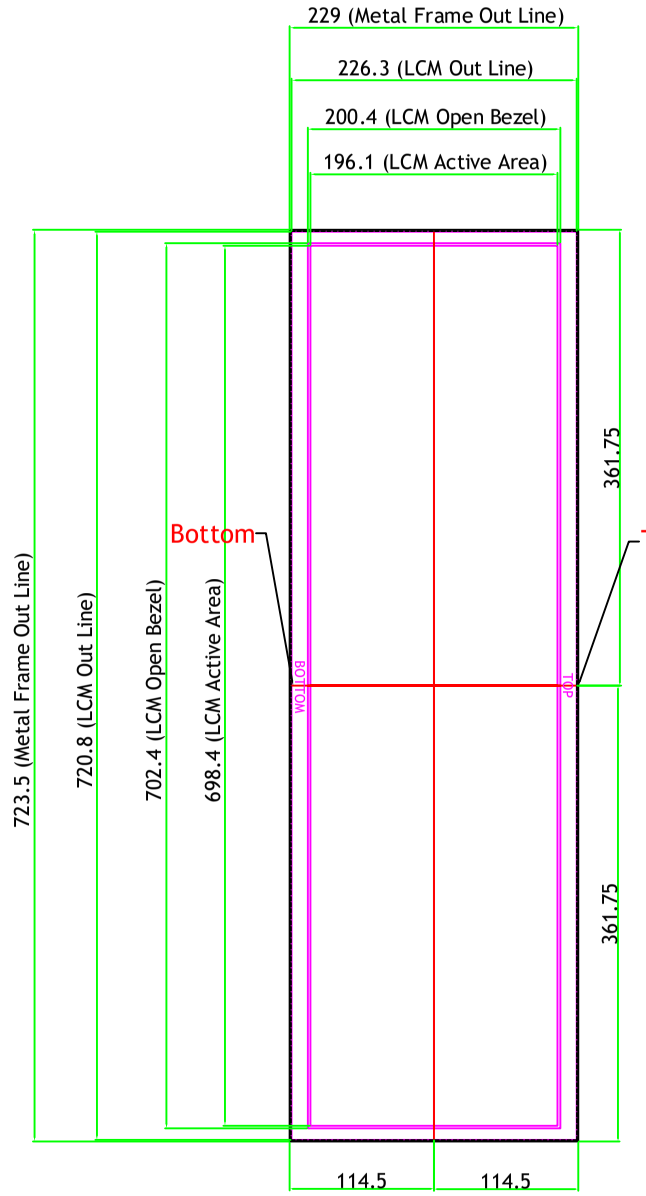


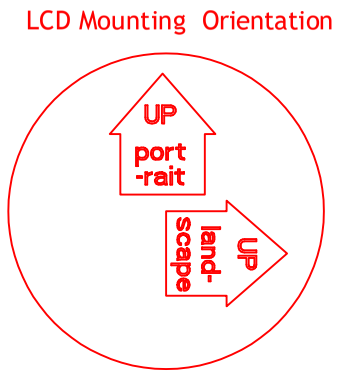
7. Packing Information

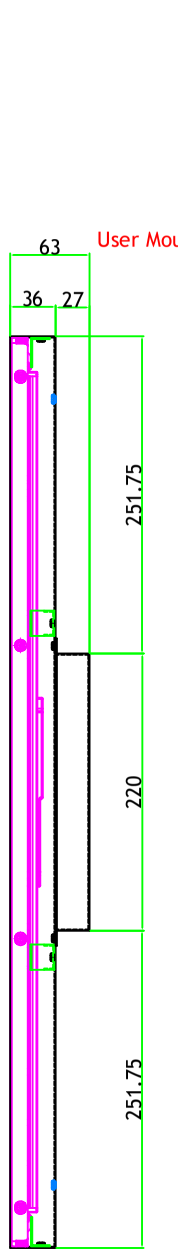
Item	Q'ty	Dimension (W x D x H)	Weight(Kg)	Remark
Open Frame	1Pcs	723.5mm x 229.0mm x 63.0mm	TBD	
Box Packing	TBD	TBD	TBD	
Pallet Size	1	TBD	TBD	
Pallet Packing	TBD	TBD	TBD	

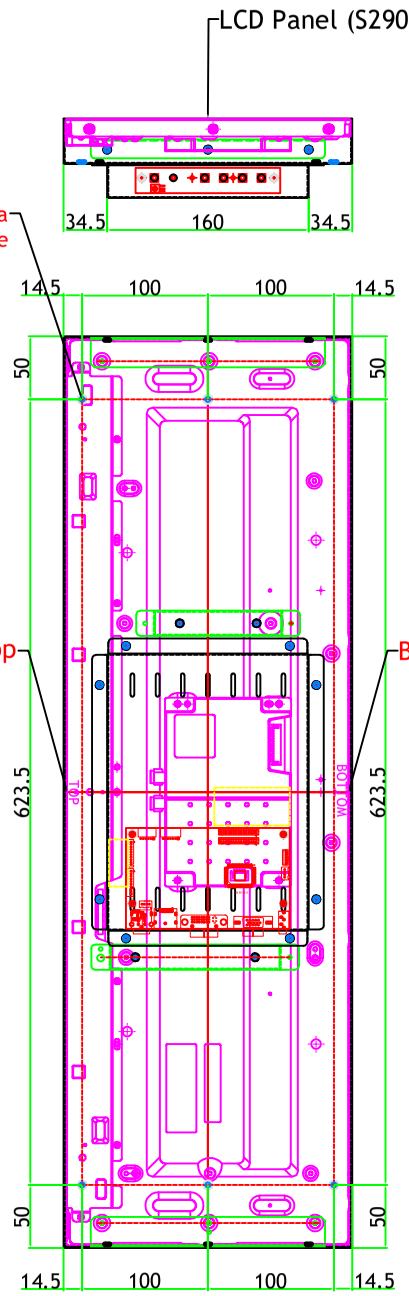
8. Mechanical structure

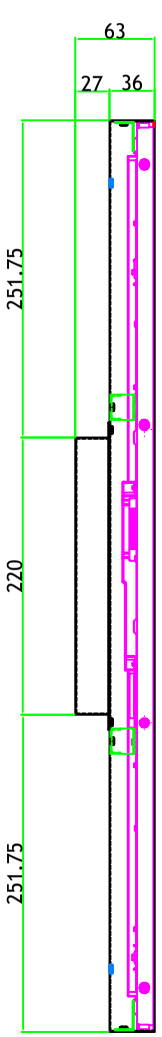
Rev	AMEND	DATE	CHECK	APPR.
P1	Proto	2019.05.21	H.I.Woo	H.Y.Sohn
P2				
P3				

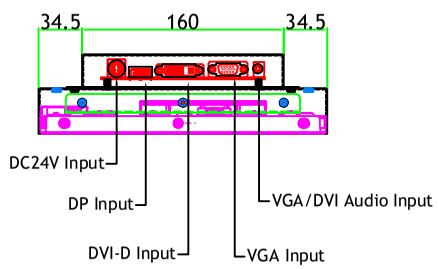












SUZOHAPP			MODEL NO	150TFT2901	VIEW :		UNIT : mm
			NAME	29.0"Open Frame	Q'ty	1	REV. P1
DRAWN	CHECKED	APPROVED	DWG. NO	4M2903003-00	SCALE		1 / 1
H.I.Woo		H.Y.Sohn	MATERIAL / FINISH	GI T=1.0	DATE		2019.05.21