BESTECH Corporation

TFT LCD MONITOR SPECIFICATION

Model : BTL270WILA21MU

RoHs
Compliant

BESTECH Corporation
www.bestvision.co.kr

CONTENTS

1. REVISION HISTORY

Revision	Description of Change	Date
1.0	First Release	Dec.2012

2. GENERAL DESCRIPTION

BTL270XXXX TFT-LCD Monitor has been designed to drive up to 1920 X 1080 @ 60Hz. which is a high quality TFT-LCD display solution for industrial display device.

- Audio (Stereo-In) functions is optional on customer's requirement.

3. FEATURES

- State of the art high performance picture quality
- Analog RGB & DVI
- Multi-sync capability up to 1920 X 1080 resolution @ 60Hz. (max)
- True color (16.7M) data processing and display driving
- On-Screen-Display (OSD) user interface
- Multi language support (into OSD menu)
- VESA DDC1/2B compliant
- operating temperature: 0 to 50°C

4. Monitor Composition

Description	Part Name	Manufacture
LCD Panel	LM270WF5-SL..	LG Display
Touch Panel	98-0003-4147-3	3M
A/D Board	Bestvision101	Bestech Corp
LED driver Board	GH515A(A13)	Green C&C
Adaptor	PA-1041-01IL	LITEON

5. ELECTRICAL PARAMETERS

5-1 Input Power

Item	Specification
Power Voltage	DC 12V / 3.33A
Power Consumtion	40W (MAX)

5-2 Overal parameters

Symbol	Description	Min.	Typ.	Max.	Unit
Vcc	+12V DC	10.8	12.0	13.2	V
Vi(sync)	Analog Input level	0.5	0.7	1.0	Vpp
F_{HS}	H sync Frequency	64	66	83	KHz
F_{VS}	V sync Frequency	48	60	75	Hz
V_{IH}	Digital input high level	2.0			V
V_{IL}	Digital input Low level			0.8	V
Dclk	Dot clock	114	144	175	MHz
Storage temperature		-20		60	℃
Operating temperature		0		50	℃

5-3 Adaptor Specification

1. Description

This product is a AC to DC power transfer device, it can provide for a 40W single dc output with constant voltage source.

2. Electrical

2.1 Input Voltage
a. 100 - 240Vac Nominal.
b. 90 - 264Vac Universal.

2.2 Input Frequency
47- 63Hz.

2.3 Input Current
1.2 A max. at 90Vac input & dc output full-loading.

2.4 Inrush Current
Inrush peak current and Joule integral will be measured at different line voltage at high ambient temperture.
Peak current is within specified limit and Joule integral well below fuse and bridge spec.

2.5 Hold-Up time
10msec min. at dc output full-loading and 115Vac input.

2.6 Input wattage
Less than 0.3W at 230Vac input & no load condition.

2.7 Efficiency
Average efficiency 85.5% minimum min. at 25%, 50%, 75% & 100% of full-loading and 115/230Vac input (After warm up 20 minutes).

2.8 Output Voltage and Current

Vout (V)	Range (V)	Iout (min)	Iout (max)
12V	11.4V~12.6V	0A	3.33A

6. Applicable Graphic Mode

Standard (VESA) Graphic Mode

No.	Resolution	H-freq' [KHz]	Refresh rate [Hz]	Rixel Clock [MHz]	Remarks
1	640 X 350	31.5	70.0	25.1	Text
2	720 X 400	31.5	70.0	28.3	Text
3	640 X 480	35.0	66.6	30.2	MAC
4	640 X 480	31.5	59.9	25.1	VESA
5	640 X 480	37.8	72.0	31.5	VESA
6	640 X 480	37.5	75.0	31.5	VESA
7	800 X 600	37.9	60.3	40.0	VESA
8	800 X 600	48.0	72.2	50.0	VESA
9	800 X 600	46.9	75.0	49.5	VESA
10	1024 X 768	48.4	60.0	65.0	VESA
11	1024 X 768	56.4	70.0	75.0	VESA
12	1024 X 768	60.0	75.0	78.5	VESA
13	1152 X 864	67.5	75.0	108.0	VESA
14	1280 X 720	44.7	60.0	74.2	VESA
15	1280 X 800	49.7	59.8	83.5	VESA
16	1280 X 1024	64.0	60.0	108.0	VESA
17	1280 X 1024	80.0	75.0	135.0	VESA
18	1360 X 768	47.7	60.0	85.5	VESA
19	1600 X 900	60.0	60.0	108.0	VESA
20	1680 X 1050	65.2	59.9	146.2	VESA
21	1920 X 1080	67.5	60.0	148.5	VESA

7. TFT LCD Panel Spec

General Features

Active Screen Size	27 inches(68.6cm) diagonal
Outline Dimension	630.0(H) x 368.2(V) x 11.7(D) mm(Typ.)
Pixel Pitch	0.3114 mm x 0.3114 mm
Pixel Format	1920 horiz. By 1080 vert. Pixels RGB stripes arrangement
Color Depth	16.7M colors
Luminance, White	250 cd/m2 (Center 1Point, typ)
Viewing Angle(CR>10)	View Angle Free (R/L 178(Typ.), U/D 178(Typ.))
Power Consumption	Total 19.4 Watt (Typ.) (3.8 Watt @ V_{LCD}, 15.6 Watt @250cd/㎡)
Weight	3150g (typ.)
Display Operating Mode	Transmissive mode, normally Black
Surface Treatment	Hard coating (3H), Anti-glare treatment of the front polarizer

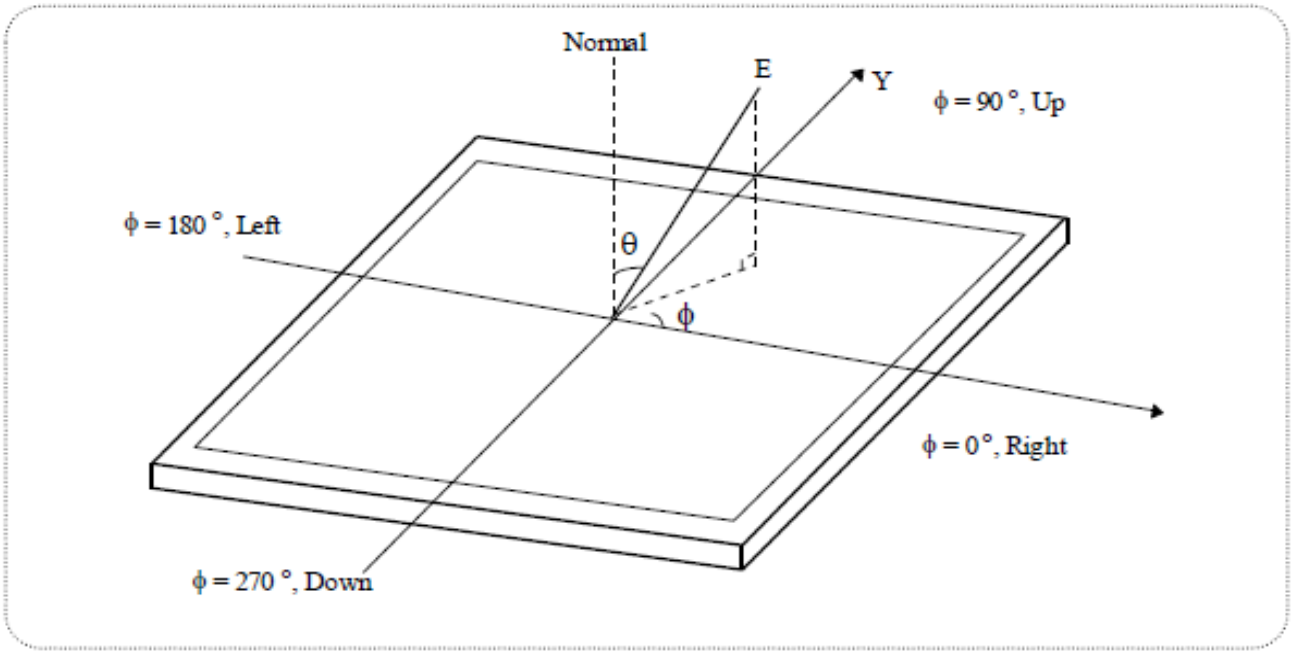


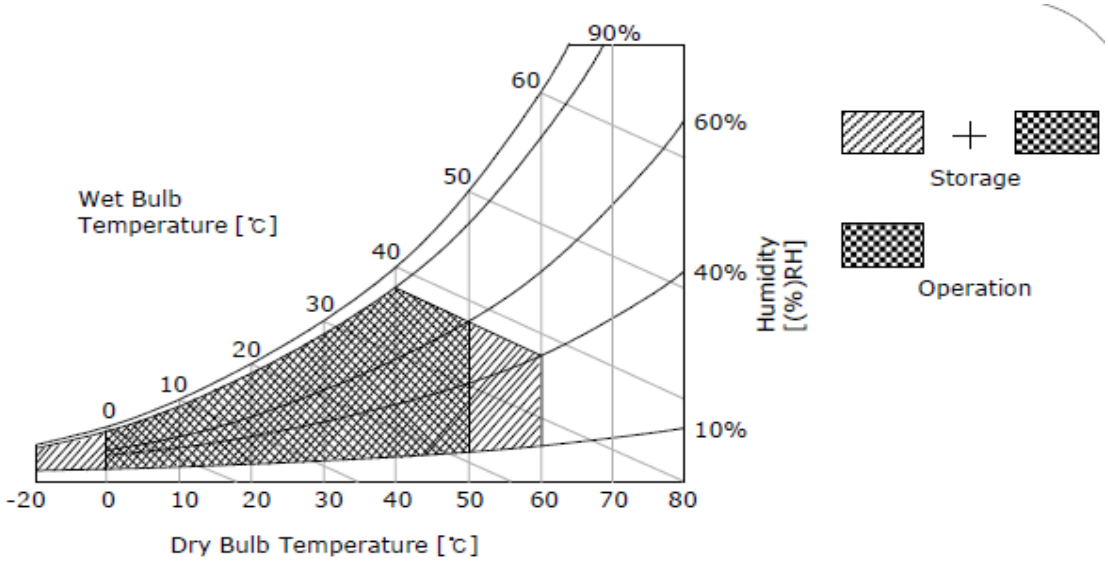
FIG.10 Viewing angle

7. TFT LCD Panel Spec

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Values		Units	Notes
		Min	Max		
Power Input Voltage	VLCD	0.3	5.5	Vdc	at 25 ± 2°C
Operating Temperature	TOP	0	50	°C	
Storage Temperature	TST	-20	60	°C	
Operating Ambient Humidity	HOP	10	90	%RH	
Storage Humidity	HST	10	90	%RH	
LCM Surface Temperature(operation)	Tsurp	0	65	°C	

Note : 1. Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39 °C Max, and no condensation of water.
2. Maximum Storage Humidity is up to 40℃, 70% RH only for 4 corner light leakage Mura.
3. Storage condition is guaranteed under packing condition
4. LCM Surface Temperature should be Min. 0℃ and Max. 65℃ under the VLCD=5.0V,
fV=60Hz, 25℃ ambient Temp. no humidity control and LED string current is typical value.



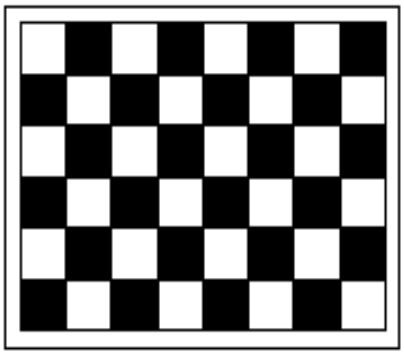
7. TFT LCD Panel Spec

LCD module ELECTRICAL CHARACTERISTICS

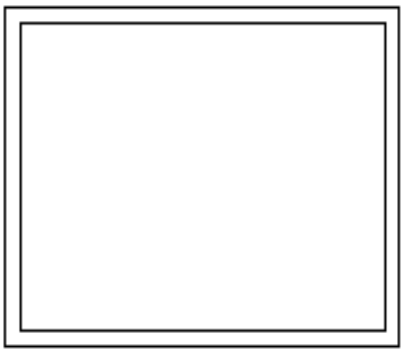
Parameter	Symbol	Values			Unit
		Min	Typ	Max	
MODULE :					
Power Supply Input Voltage	VLCD	4.5	5	5.5	Vdc
Permissive Input Voltage Ripple	VRF			400	mVp-p
Power Supply Input Current	ILCD	-	765	955	mA
		-	1100	1375	mA
Power Consumption	Pc TYP	-	308	4.8	Watt
	Pc MAX	-	6.6	6.88	Watt
Rush current	IRUSH	-	-	3.0	A

1. The specified current and power consumption are under the VLCD=5.0V, 25 2°C,fV=60Hz condition whereas mosaic pattern(8 x 6) is displayed and fV is the frame frequency.
2. The current is specified at the maximum current pattern.
3. Permissive power ripple should be measured under VLCD=5.0V, maximum frame rate (fV) at 25°C. Additionally, we recommend the bandwidth configuration of oscilloscope is to be under 20MHz.
4. The duration of rush current is about 5ms and rising time of power Input is 500us 20%.

• **Power consumption** (V_{LCD} =5V, 25°C, fV (frame frequency=60Hz condition)



Typical power Pattern



Maximum power Pattern

FIG.3 Mosaic pattern & White Pattern for power consumption measurement

7. TFT LCD Panel Spec

LED Bar ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
LED :						
LED String Current	Is		-	120	130	mA
LED String Voltage	Vs		40.6	43.4	46.2	V
Power Consumption	PBar			15.6	16.6	Watt
LED Life Time	LED_LT		30,000	-	-	Hrs

Notes) The LED Bar consists of 42 LED packages, 3 strings (parallel) x 14 packages (serial)

7. TFT LCD Panel Spec

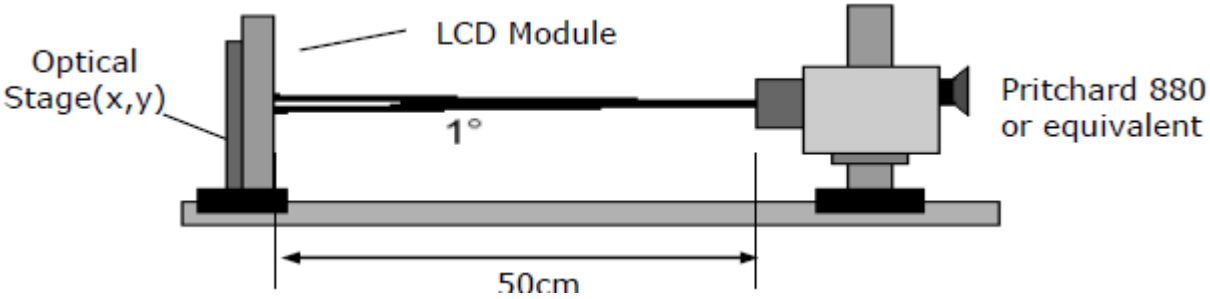
Optical specification
Optical characteristics are determined after the unit has been „ON" for 30 minutes in a dark environment at 25°C.

OPTICAL CHARACTERISTICS (Ta=25 °C, V_{LCD}=5V, f_V=60Hz Fclk=54MHz, IBL=60mA)

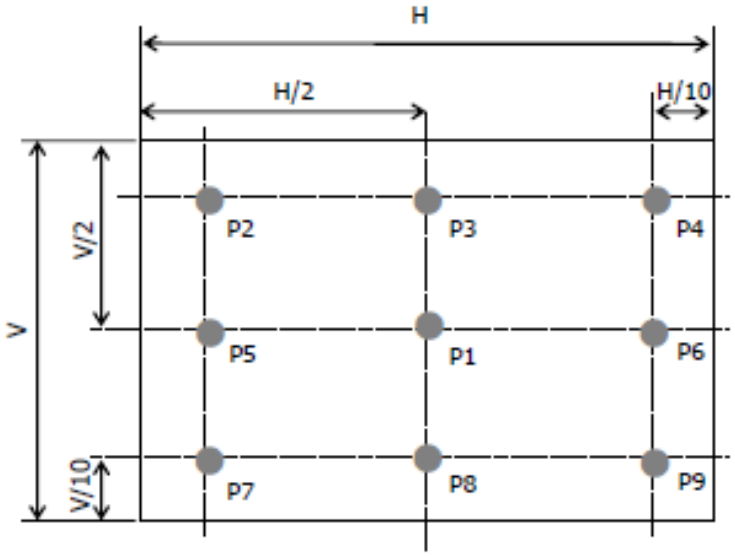
Parameter		Symbol	Values			Units
			Min	Typ	Max	
Contrast Ratio		CR	600	1000	-	
Surface Luminance, white		L_{WH}	200	250	-	cd/m^2
Response Time	Rise Time	Tr_R	-	14	25	ms
	Decay Time	Tr_D	-			ms
Color Coordinates [CIE1931] (By PR650)	RED	Rx	Typ -0.03	0.635	Typ +0.03	
		Ry		0.337		
	GREEN	Gx		0.320		
		Gy		0.612		
	BLUE	Bx		0.150		
		By		0.068		
	WHITE	Wx		0,313		
		Wy		0.329		
Viewing Angle (CR>10)						
	x axis, right(ϕ=0°)	θr		89		Degree
	x axis, left (ϕ=180°)	θl		89		
	y axis, up (ϕ=90°)	θu		89		
	y axis, down (ϕ=270°)	θd		89		

7. TFT LCD Panel Spec

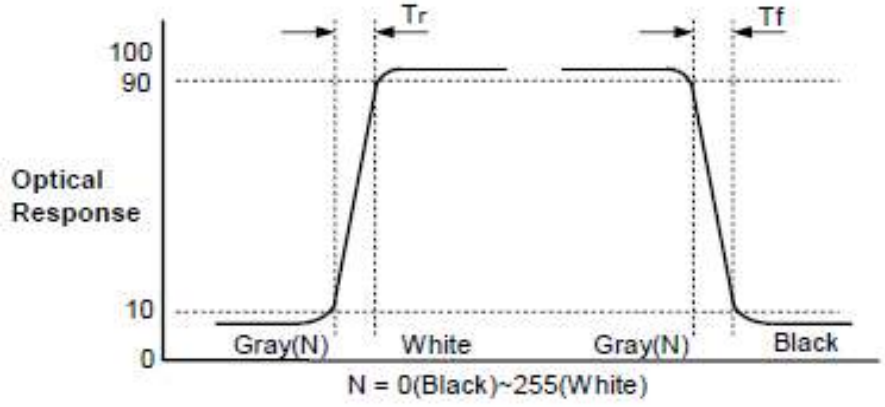
Optical characteristic measurement equipment and method



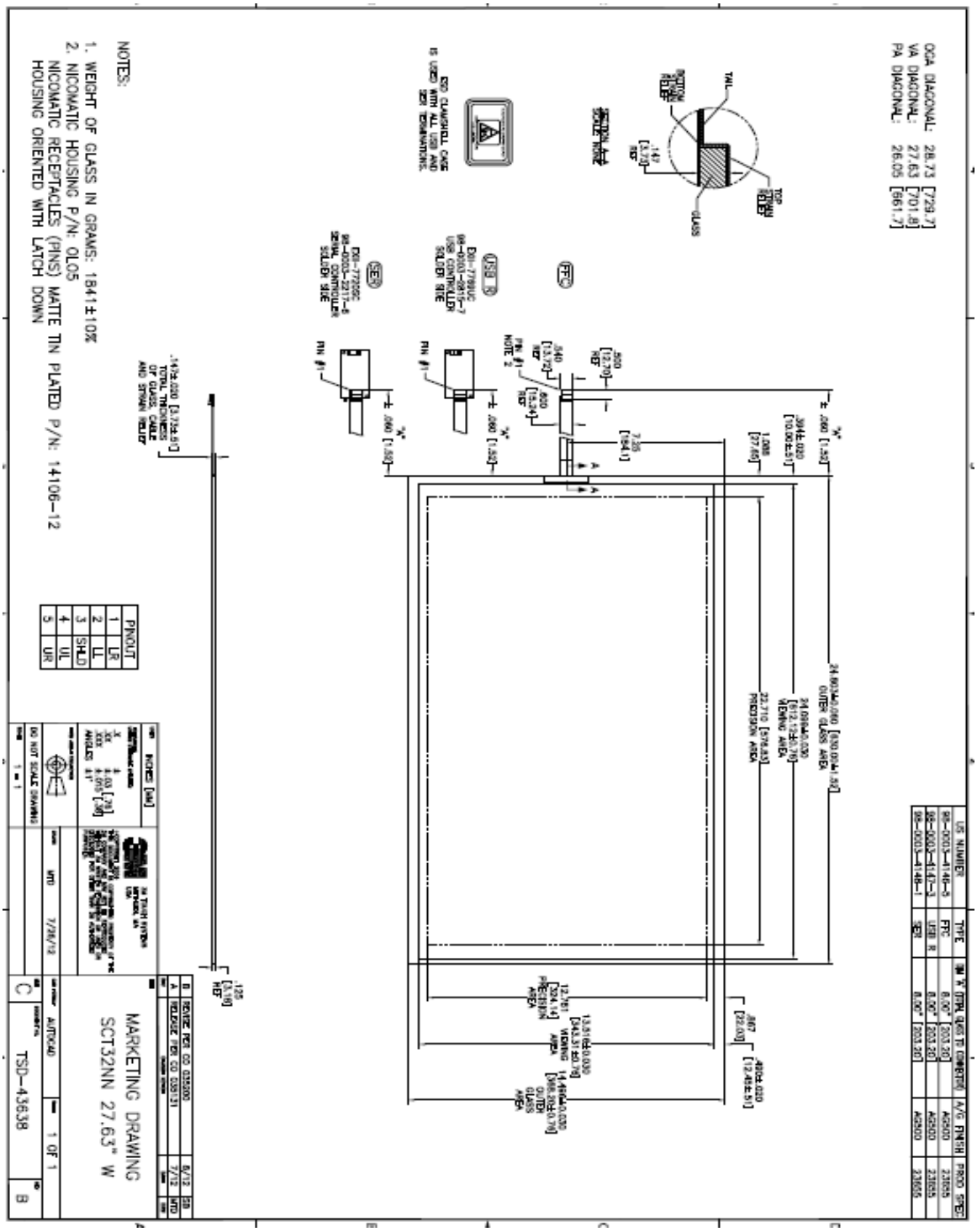
Luminance measuring point



Response time (measurement equipment : RD-80S)



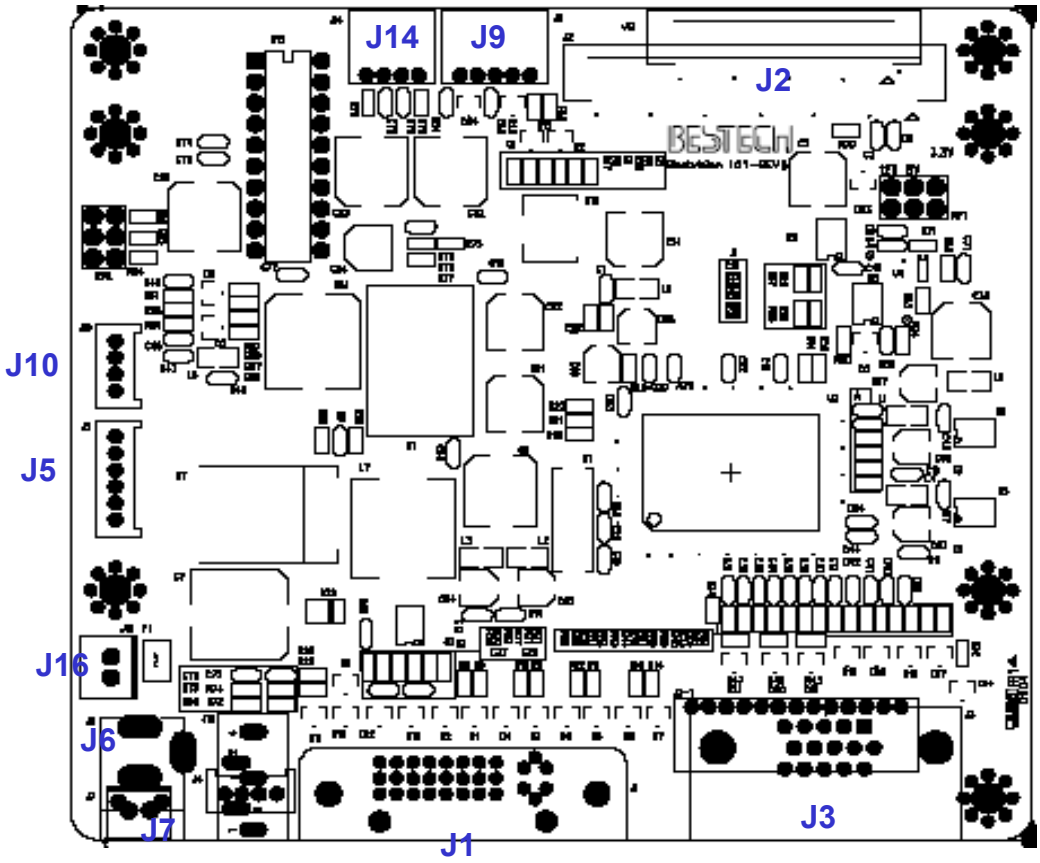
8. Touch Panel Specification



9. A/D Board Specification

9-1 A/D Board DIMENSION & CONNECTORS

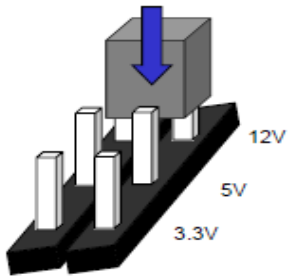
Dimension : 110mm(W) X 100mm(L) X 14mm(H)



Connectors & Jumper

Ref	Item	Function	Part Number
J6	Jack	DC Input	
J4	Jack	Audio In	
J1	Connector	DVI	
J3	Connector	D-Sub 15pin (F)	
J5	Connector	Inverter	
J10	Connector	Power output	
J16	Connector	Power input	
J7	Connector	Power input	
J14	Connector	Audio Out	
J9	Connector	OSD	
J2	Connector	LVDS Output	
RP1	Jumper	Panel Vol. Adjust	

RP1 : Jumper - Panel Power adjust

Description	Jumper setting
3.3V / 5V / 12V CAUTION : Incorrect setting can damage the panel	

J1 : DVI Input

Pin No.	Symbol	Description
1	TMDS Data 2-	TMDS Data Negative signal (R-)
2	TMDS Data 2+	TMDS Data Positive signal (R+)
6	DDC Clock	Clock for EDID
7	DDC Data	Data for EDID
9	TMDS Data 1-	TMDS Data Negative signal (G-)
10	TMDS Data 1+	TMDS Data Positive signal (G+)
14	+5V Signal	+5V for EDID
15		
16	+5V	HPD
17	TMDS Data 0-	TMDS Data Negative signal (B-)
18	TMDS Data 0+	TMDS Data Positive signal (B+)
23	TMDS Clock+	TMDS Clock+
24	TMDS Clock-	TMDS Clock-
4,5,8,12,13,20,21,25,26,27,28,29	NC	No-Connection
3,11,19 22,30	GND	Ground

J3 : Analog RGB Input

Pin No.	Symbol	Description
1	R	RED Analog Input
2	G	Green Analog Input
3	B	Blue Analog Input
5	Detector	Signal Detector
12	SDA	Serial Data
13	H Sync	Horizontal Sync
14	V Sync	Vertical Sync
15	CLK	Serial Clock
9	V out	5V Output
4,6,7,8, 10,11	GND	Ground

J5 : Inverter

Pin No.	Symbol	Description
1,2	+12V	+12V
3,4	GND	Ground
5	On/Off	Backlight On/Off
6	Adjust	Backlight Adjust (Dimming)

J10 : Power Output

Pin No.	Symbol	Description
1	12Pout	12V Power Output for a Touch board
3	5Pout	5V Power Output for a Touch board
2,4	GND	Ground

J14 : Audio Output

Pin No.	Symbol	Description
1	Audio Out	Audio out - Left
4	Audio Out	Audio out - Right
2,3	GND	Ground

J9 : OSD

Pin No.	Symbol	Description
1	LED	LED1
2	LED	LED2
3	GND	Ground
4	Key1	Menu, Select, Power
5	Key2	Down, Up

J7, J16 : Power Input

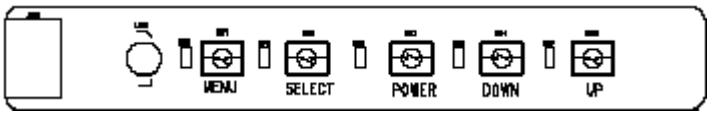
Pin No.	Symbol	Description
1	Pin	12V Power Input
2	GND	Ground

J2 : LVDS Interface connector

Pin No.	Symbol	Description	
1	Vcc	Power In	
2	Vcc	Power In	
3	Vcc	Power In	
4	N/C	No Connection	
5	N/C	3.3V	
6	N/C	No Connection	
7	GND	Ground	
8	RxE3+	LVDS Signal of Even Channel 3(+)	Second Pixel Data
9	RxE3-	LVDS Signal of Even Channel 3(-)	
10	RxEC+	LVDS Signal of Even Channel Clock(+)	
11	RxEC-	LVDS Signal of Even Channel Clock(-)	
12	RxE2+	LVDS Signal of Even Channel 2(+)	
13	RxE2-	LVDS Signal of Even Channel 2(-)	
14	GND	Ground	
15	RxE1+	LVDS Signal of Even Channel 1(+)	
16	RxE1-	LVDS Signal of Even Channel 1(-)	
17	GND	Ground	
18	RxE0+	LVDS Signal of Even Channel 0(+)	
19	RxE0-	LVDS Signal of Even Channel 0(-)	
20	RxO3+	LVDS Signal of Odd Channel 3(+)	First Pixel Data
21	RxO3-	LVDS Signal of Odd Channel 3(-)	
22	RxOC+	LVDS Signal of Odd Channel Clock(+)	
23	RxOC-	LVDS Signal of Odd Channel Clock(-)	
24	GND	Ground	
25	RxO2+	LVDS Signal of Odd Channel 2(+)	
26	RxO2-	LVDS Signal of Odd Channel 2(-)	
27	RxO1+	LVDS Signal of Odd Channel 1(+)	
28	RxO1-	LVDS Signal of Odd Channel 1(-)	
29	RxO0+	LVDS Signal of Odd Channel 0(+)	
30	RxO0-	LVDS Signal of Odd Channel 0(-)	

9-2. OSD Board

Dimension : 110mm(W) X 15mm(L) X 10mm



MENU	Activate OSD menu or save OSD setting and EXIT
SELECT	Select the menu icons
POWER	Turn on or off the main board
UP	Increase setting or right shift the menu
DOWN	Decrease setting or left shift the menu

Press the Menu button to display OSD menu.
Move to requirement OSD Menu and Press the SELECT button to enter the menu.
Move to requirement sub-menu and Press the SELECT button to adjust value
Press 'DOWN' or 'UP' button, you can adjust your image.
Press MENU button to save current setting and exit MENU.

10. OSD USER Manual

SUMMARY OF OSD MAP

PICTURE	Brightness	
	Contrast	
	H Position	
	V Position	
	Phase	
	Clock	
COLOR	Color Temp	User
	Red	Reddish (6500)
	Green	Bluish (9300)
	Blue	
	Auto Color	
	Backlight	
OSD	OSD H Position	
	OSD V Position	
	OSD Timer	
	Transparence	
MISC	Language	English
	Recall	Korean
	Input Select	Espanol
	Audio	Francais
	Volume	Deutsch
	Auto Adjust	

The OSD (On Screen Display) provides certain functions to have clear image and others.
This board supports 5 buttons OSD operation as a standard.
The control functions defined on OSD operation are as below

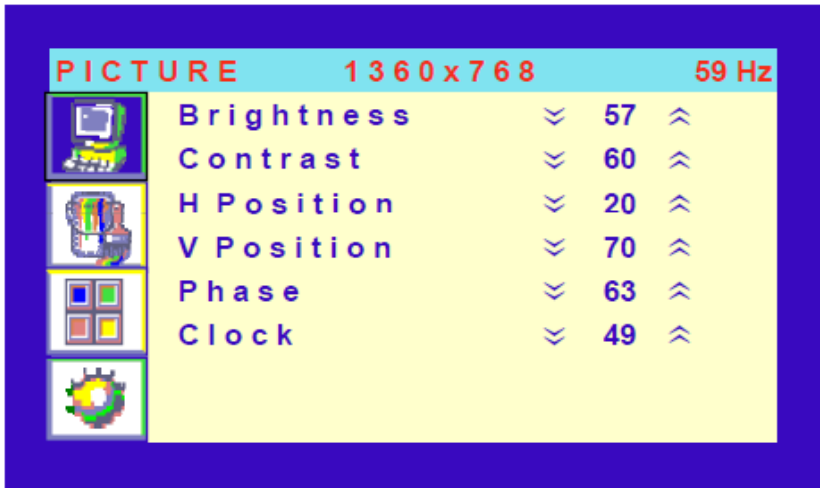
Functions on OSD Menu

Brightness	Adjust the brightness of the screen
Contrast	Adjust the contrast of the screen
H POSITION	Adjust the horizontal position of the screen's image
V POSITION	Adjust the vertical position of the screen's image
PHASE	Adjust the focus of the screen's image
CLOCK	Adjust the horizontal size of the screen's image
Color Temp	Color Temperature change
R, G, B Gain	Adjust the Gain of RED, Green and Blue
Auto Color	Automatically adjust the R,G,B offset.
Backlight	Adjust the inverter dimming
LANGUAGE	Select one of the Five language(English, Korean, Espanol, Deutsch, Francias) Default is ENGLISH
Imput select	Select the input mode between Analog RGB and Digital (DVI-D)
RECALL	Initial EEPROM
Auto Adjust	Automatically adjust the Horizontal position, Vertical position, Horizontal size, and Phase.
Miscellaneous	OSD H,V position, Time, Transparence, Audio, Volume

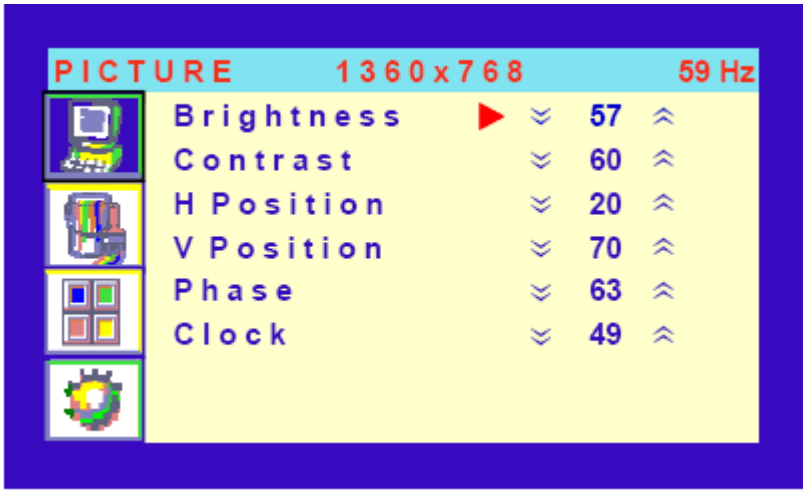
Hotkey Function

OSD Key	Function
SEL	Immediately Auto Adjustment

[PICTURE]

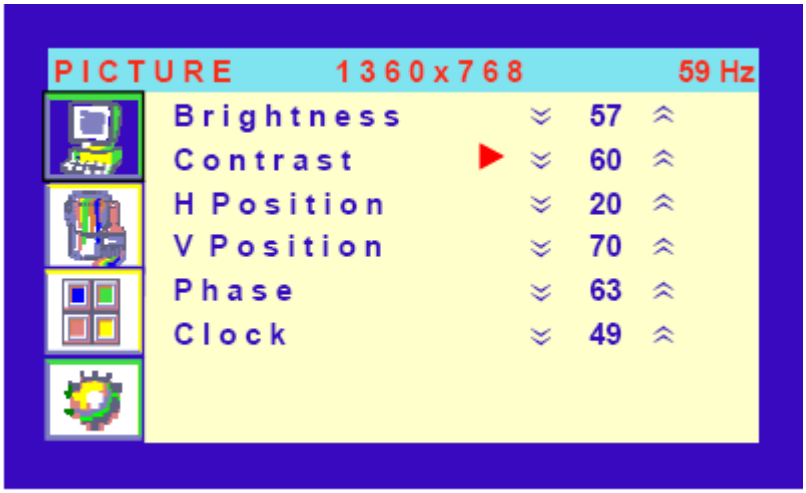


Press the Menu button to display OSD menu and press the Select button to enter the PICTURE menu.

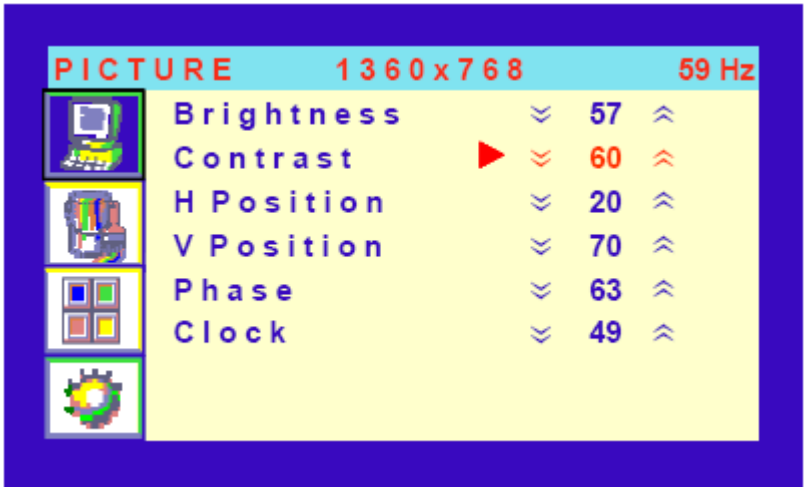


Move to your requirement sub-menu and press the Select button to adjust value.
Press down or up button, you can adjust your image.
Press Menu button to save current setting and exit the OSD.

[PICTURE] – Adjust ex: Contrast adjust from 60 to 61

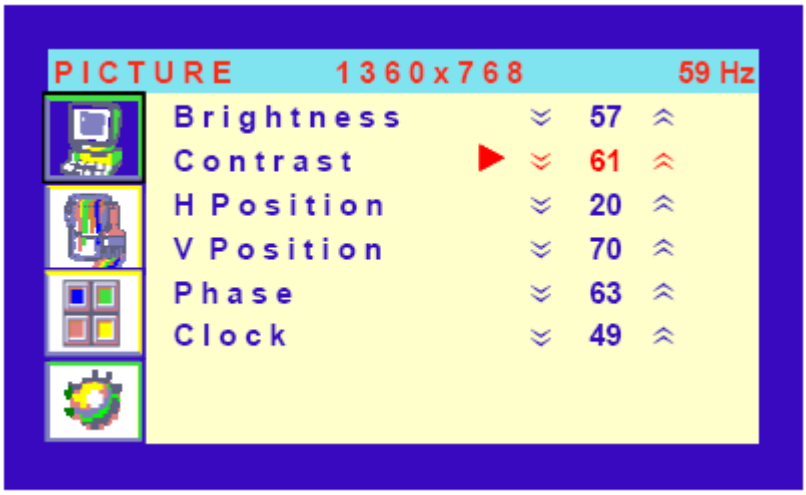


Move to Contrast sub-item by Up or Down button.

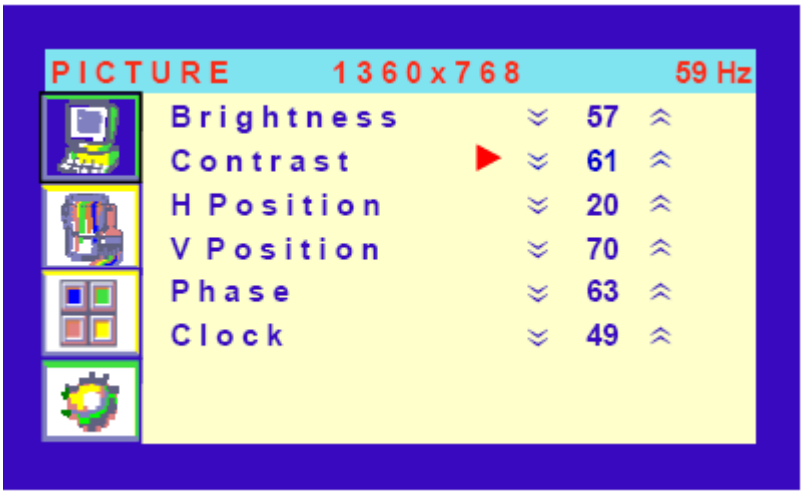


Press the select button then color will be change to RED.

[PICTURE] – Adjust ex: Contrast adjust from 60 to 61

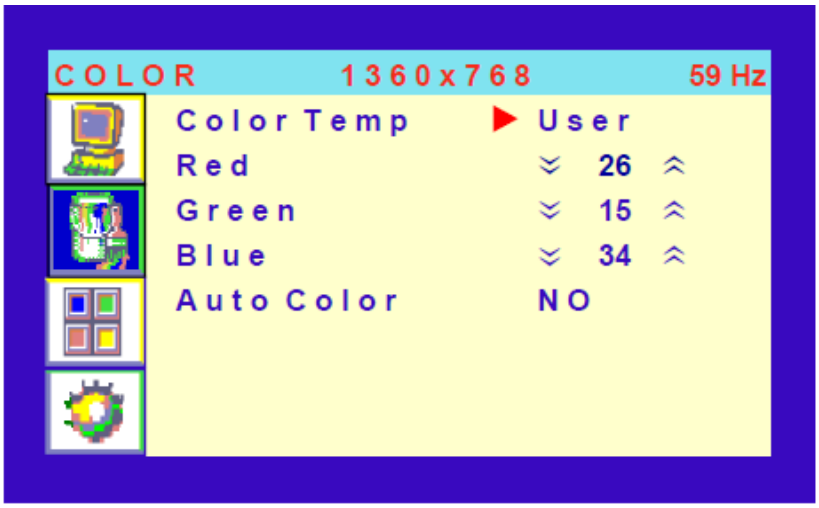


Press the Up button for value change to 61.

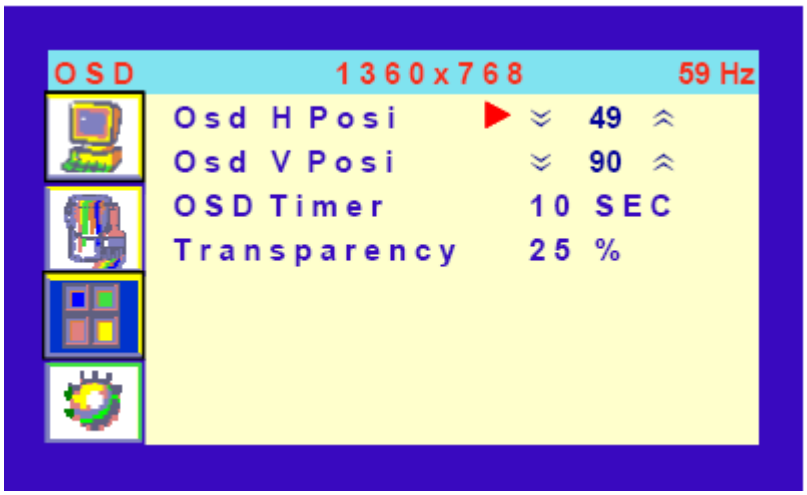


Press Menu button to save current setting and exit the Sub-item.

[COLOR]


COLOR
1360x768
59 Hz
Color Temp
User
Red
26
Green
15
Blue
34
Auto Color
NO

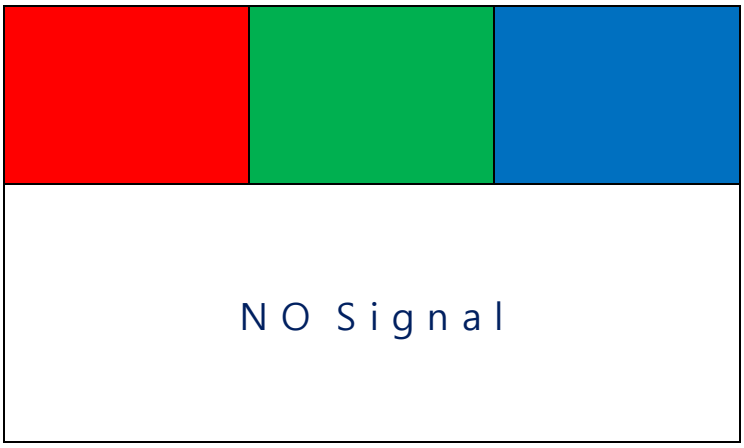
[OSD]


OSD
1360x768
59 Hz
Osd H Posi
49
Osd V Posi
90
OSD Timer
10 SEC
Transparency
25 %

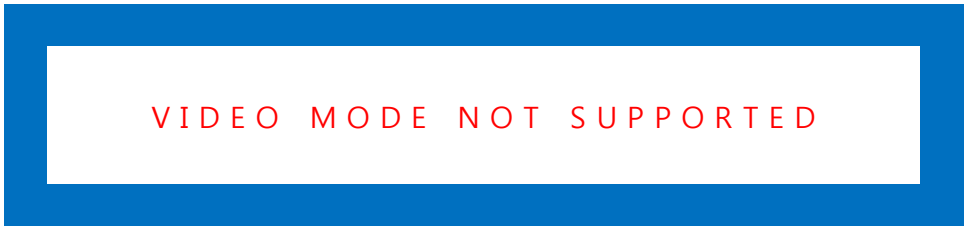
[MISCELLANOUS]

[Warning Message]

1. CHECK SIGNAL CABLE



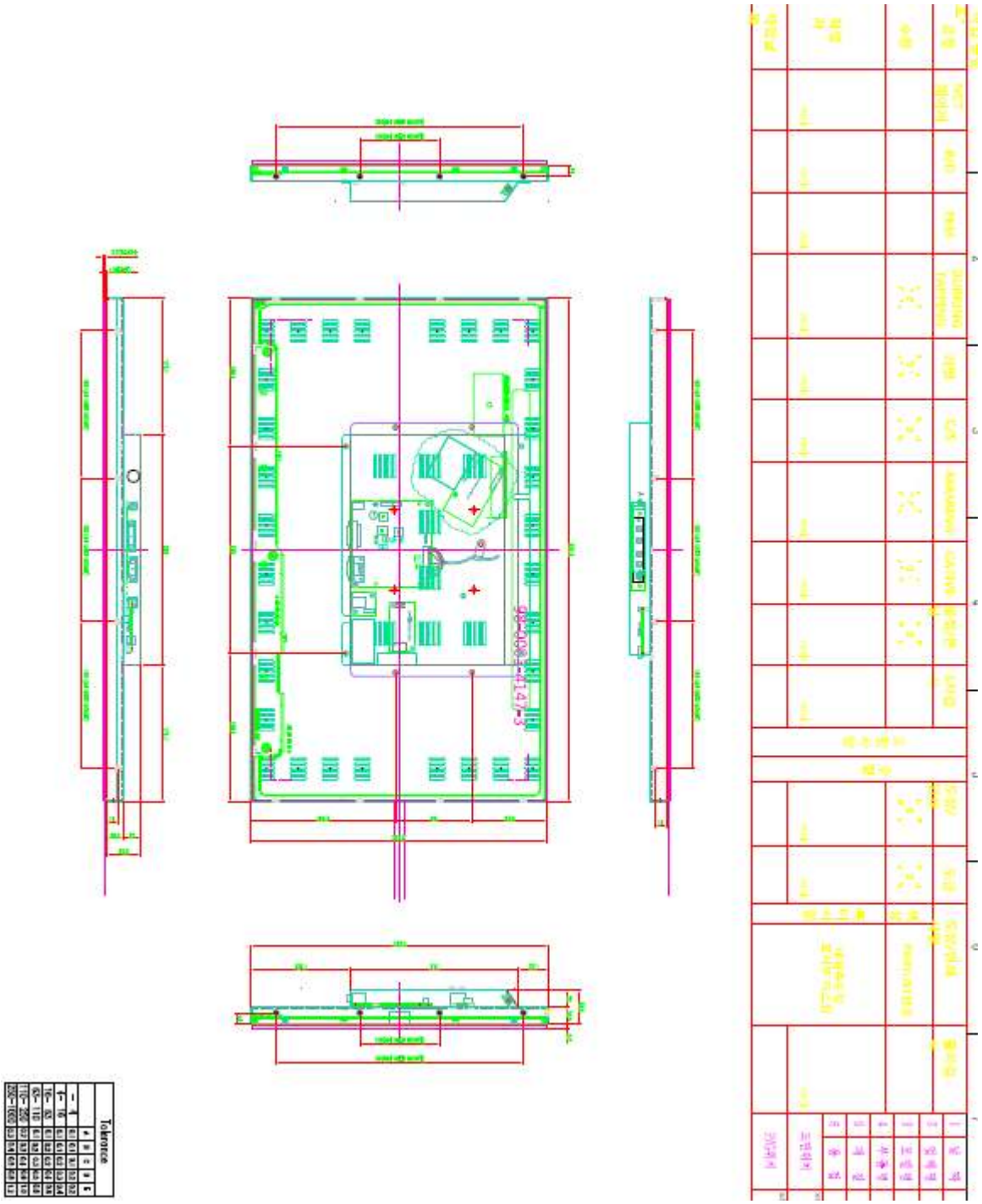
2. CHECK INPUT SIGNAL Resolution



11. Signal cable

Standard VGA cable w/14-pin D-sub
Standard DVI cable w/24-pin DVI-D

12. Metal Frame



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