

LCD Controller Board

(Preliminary Spec)

CUSTOMER: _____

MODEL NO.: LCD Controller Board (HDMI/VGA/SV/AV) _____

PART NO.: TVB-50 _____

DATE: 2015/4/25 _____

Revision: V 0.1

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1. SCOPE

The LCD Controller board ,TVB50 Series can support HDMI / VGA/DVI and the Video Source including the Composite(PAL or NTSC) and S-Video Input with Audio Output(optional) for the high performance of LCD controller board.

1.1 PRODUCT FEATURES

VIDEO

- Horizontal Synchronization 30 KHz to 83 KHz.
- Vertical Synchronization 55 Hz to 75 Hz.
- Support HDMI V1.1 (1080P)
- Support DVI (Option)
- Support CVBS,S-Video ×1 (NTSC/PAL)
- Output data type : LVDS 18bit,24bit,36Bit,48bit.

AUDIO (Optional, Available in TVB50A)

- HDMI/VGA / DVI sound input.
- CVBS/S-Video ×1 sound input.
- TV sound input.
- Includes 2W+2W audio amplifier.

POWER

- Two input for control board : 12V DC
 - (a) Jack 5.5×2.1Φ
 - (b) Wafer 4P 2.0mm (for multi-power source)
- Output for LCD panel : 3.3V / 5V / 12V. (Default is 5V)
- VESA DPMS compliant.



Model Name definition:

- TVB50: Standard Models with 12V DC IN
- TVB50H: DC with 12V to 24V input Range
- TVB50A: TVB50+Audio
- TVB50AH: TVB50+Audio+24V

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2. ELICTRICAL PERFORMANCE

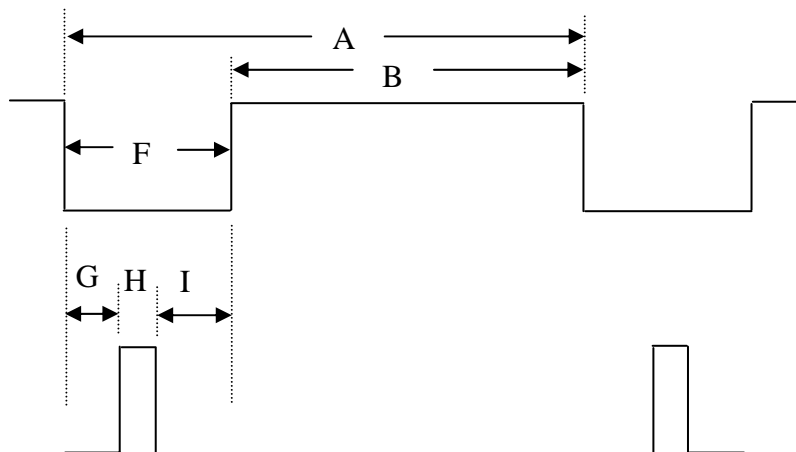
All tests must be performed under “standard testing conditions”
(item 2.1) unless otherwise specified.

2.1 OPERTION TEMPERATURE

- Warm up time : $\geq 30\text{min.}$
- Operation Temperature : $-20^{\circ}\text{C} \sim 65^{\circ}\text{C}$
- Storage Temperature : $-20^{\circ}\text{C} \sim 70^{\circ}\text{C}$
- Operation Humidity : $10\% \sim 80\%$
- Storage T Humidity : $5\% \sim 90\%$

2.2 PRESET TIMING CHART

2.2.1 DEFINITION



Item	Description
A	Total time

B	Active display area
F	Blanking time
G	Front porch
H	Sync-width
I	Back porch

2.2.2 FACTORY PRESETTED AND PREDEFINED TIMINGS

VESA MODES			
Mode	Resolution	Horizontal Frequency	Vertical Frequency
1	640 × 480@60Hz	31.469 KHz	59.940 Hz
2	640 × 480@72Hz	37.861 KHz	72.809 Hz
3	640 × 480@75Hz	37.500 KHz	75.00 Hz
4	800 × 600@56Hz	35.156 KHz	56.250 Hz
5	800 × 600@60Hz	37.879 KHz	60.317 Hz
6	800 × 600@72Hz	48.077 KHz	72.188 Hz
7	800 × 600@75Hz	46.875 KHz	75.000 Hz
8	1024 × 768@60Hz	48.363 KHz	60.004 Hz
9	1024 × 768@70Hz	56.476 KHz	70.609 Hz
10	1024 × 768@75Hz	60.023 KHz	75.029 Hz
11	1280 × 1024@60Hz	63.981 KHz	60.020 Hz
12	1280 × 1024@75Hz	79.976 KHz	75.025 Hz
13	1360 × 768@60Hz	47.712 KHz	60.015 Hz
14	1440 × 900@60Hz	55.935 KHz	59.887 Hz
15	1440 × 900@75Hz	70.635 KHz	74.984 Hz
16	1680 × 1050@60Hz	65.290 KHz	59.954 Hz
17	1680 × 1050@75Hz	82.306 KHz	74.892 Hz

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18	1920 ×1080@60Hz	67.158 KHz	59.963 Hz
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3. DIMENSIONS

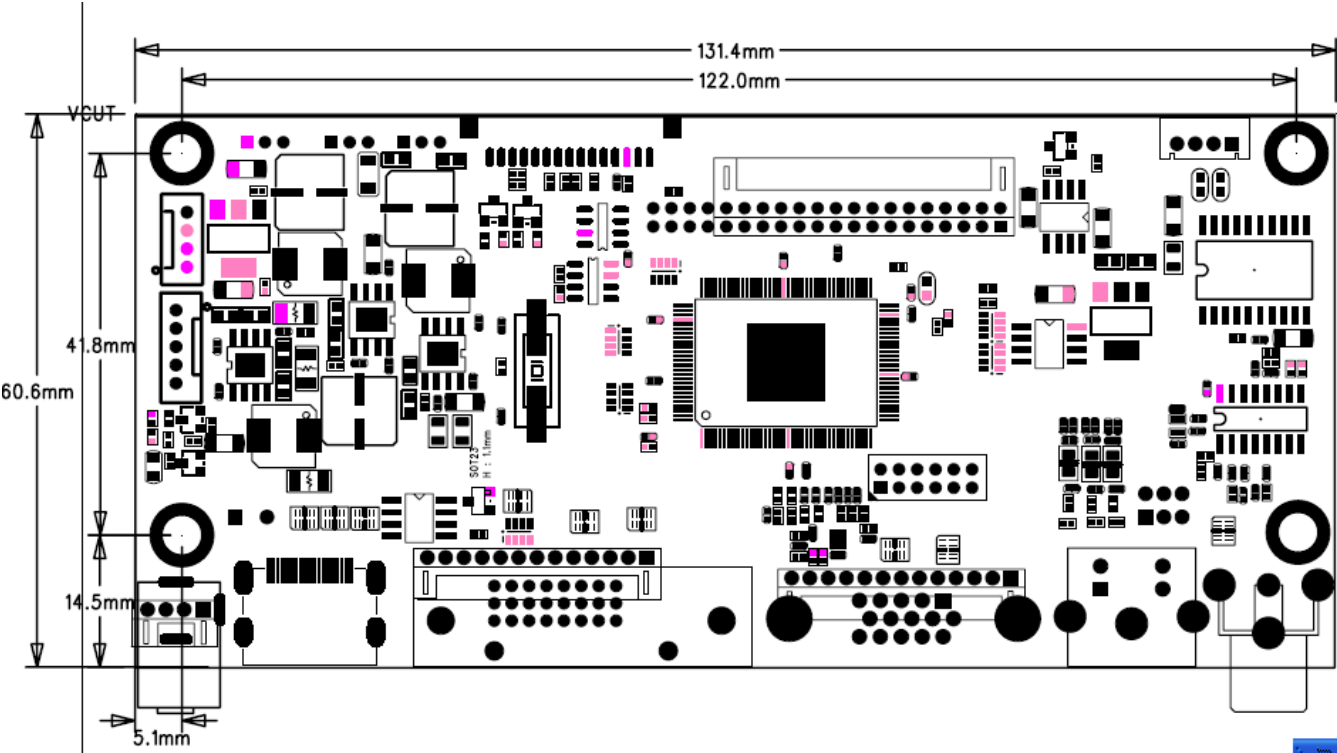
3.1 COMPONENT SIZE



3.2 SOLDER SIDE

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3.3 PCB DIMENSIONS



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4. CONNECTOR

4.1 POWER CONNECTOR (DJ1) 5.5×2.1Φ

PIN	Symbol	Description
1	DC IN	POWER SUPPLY DC IN (12V or 12-24V)
3	GND	POWER SUPPLY GROUND

4.2 POWER CONNECTOR (J9) Wafer 4P 2.0 mm

PIN	Symbol	Description
1		
2	Gnd	Ground
3	Gnd	Ground
4	DC IN	Power DC IN

4.3 VGA INPUT CONNECTOR (CON3)—D-Sub 15P

PIN	Symbol	Description	PIN	Symbol	Description
1	VGA IN R	Red analog signal	9	DDC_VDD	DDC power supply
2	VGA IN G	Green analog signal	10	GND	Digital ground
3	VGA IN B	Blue analog signal	11	N.C	N.C
4	N.C	N.C	12	DDC SDA	DDC Serial Data
5	GND	Digital ground	13	Hor. SYNC	Horizontal
6	GND-R	Analog ground of Red	14	Ver. SYNC	Vertical
7	GND-G	Analog ground of Green	15	DDC SCL	DDC Serial Clock
8	GND-B	Analog ground of Blue			

4.4 VGA INPUT CONNECTOR (J4)—Wafer connector 13P , 2.0mm

PIN	Symbol	Description	PIN	Symbol	Description
1	VGA IN B	Blue analog signal	7	H SYNC	Hsync
2	GND-B	Analog gnd of Blue	8	V SYNC	Vsync
3	VGA IN G	Green analog signal	9	GND	GND
4	GND-G	Analog gnd Green	10	GND	GND
5	VGA IN R	Red analog signal	11	DDC SDA	DDC Serial Data
6	GND-R	Analog gnd of Red	12	DDC SCL	DDC Serial Clock
			13	GND	GND

4.5 DVI Connector (J5) Wafer connector (13P 2.0mm)

Pin	Function	Note
1	TMDS 0+	
2	TMDS 0-	
3	TMDS 1+	
4	TMDS 1-	
5	TMDS 2+	
6	TMDS 2-	
7	TMDS CK+	
8	TMDS CK-	
9	GND	
10	DVI Power	
11	Hot Plug	
12	DVI_SCL	
13	DVI_SDA	

4.6 HDMI CONNECTOR (JP13)—D-19P

PIN	Symbol	Description	PIN	Symbol	Description
1	HDMI_0+	HDMI_0+	11	GND	Ground
2	GND	Ground	12	HDMI_CLK-	HDMI_CLK-
3	HDMI_0-	HDMI_0-	13	CEC	CEC
4	HDMI_1+	HDMI_1+	14	N.C	NO Connection
5	GND	Ground	15	HDMI_SCL	HDMI_SCL
6	HDMI_1-	HDMI_1-	16	HDMI_SDA	HDMI_SDA
7	HDMI_2+	HDMI_2+	17	GND	Ground
8	GND	Ground	18	HD_5V	+5V input
9	HDMI_2-	HDMI_2-	19	HDMI_PLGDET1	HDMI_PLGDET
10	HDMI_CLK+	HDMI_CLK+			

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4.7 CVBS CONNECTOR (RCA)--RCA JACK

PIN	Symbol	Description
1	AV_CVBS	CVBS signal input
2	GND	GROUND

4.8 S-VIDEO CONNECTOR (J13)—MINI-DIN 4P

PIN	Symbol	Description
1	Y_IN	S-Video Y signal input
2	C_IN	S-Video C signal input
3	GND	GROUND
4	GND	GROUND

4.9 AV/PC AUDIO INPUT CONNECTOR (J15, Pin Header 3x2, 2mm)

PIN	Symbol	Description
1	PC_Audio_R	Audio Left input
2	PC_Audio_L	Audio right input
3	GND	GROUND
4	GND	GROUND
5	AV_Audio_R	
6	AV_Audio_L	

4.10 AV OUT CONNECTOR (CON8)--Wafer 5Pin 2.0mm

PIN	Symbol	Description
1	AV_CVBS	CVBS signal output
2	GND	GROUND
3	AUDIO-R	Audio right input
4	GND	GROUND
5	AUDIO-L	Audio Lift input

4.11 SPEAKER OUTPUT CONNECTOR (JP10)--Wafer 4Pin 2.0mm

PIN	Symbol	Description
1	R-OUT	To speaker R
2	GND	GROUND
3	GND	GROUND
4	L-OUT	To speaker L

4.12 LVDS OUTPUT CONNECTOR (JP9)--Header 2x20 Pin 2.0mm

PIN	Symbol	Description	PIN	Symbol	Description
1	Reserved		2	Reserved	
3	Reserved		4	Reserved	
5	Reserved		6	Reserved	
7	BLK_VCC	Backlight VCC	8	Reserved	
9	PNL_VCC	LCD VCC	10	PNL_VCC	LCD VCC
11	BLK_EN	Backlight Enable	12	PWM	Backlight_PWM
13	Reserved		14	Reserved	
15	Reserved		16	GND	
17	RXE3-	LVDS RXE3-	18	RXE3+	LVDS RXE3+
19	RXEC-	LVDS RXEC-	20	RXEC+	LVDS RXEC+
21	RXE2-	LVDS RXE2-	22	RXE2+	LVDS RXE2+
23	RXE1-	LVDS RXE1-	24	RXE1+	LVDS RXE1+
25	RXE0-	LVDS RXE0-	26	RXE0+	LVDS RXE0+
27	GND	Ground	28	GND	Ground
29	RXO3-	LVDS RXO3-	30	RXO3+	LVDS RXO3+
31	RXOC-	LVDS RXOC-	32	RXOC+	LVDS RXOC+
33	RXO2-	LVDS RXO2-	34	RXO2+	LVDS RXO2+
35	RXO1-	LVDS RXO1-	36	RXO1+	LVDS RXO1+
37	RXO0-	LVDS RXO0-	38	RXO0+	LVDS RXO0+
39	GND	Ground	40	GND	Ground

Note:

4.13 Backlight/LED CONNECTOR (J11)--Wafer 5Pin 2.0mm

PIN	Symbol	Description
1	BLK_VCC	Backlight VCC
2	GND	Ground
3	Analog Dimming	Brightness Analog dimming Adjust
4	Digital PWM	Brightness Digital PWM dimming adjust
5	BLK_EN	GROUND

4.14 TTL OUTPUT CONNECTOR (J3)--Wafer 40P 0.5mm

PIN	Symbol	Description	PIN	Symbol	Description
1	N.C	NO Connection	21	GND	GROUND
2	N.C	NO Connection	22	GND	GROUND
3	N.C	NO Connection	23	GRN7	TTL GREEN7
4	GND	GROUND	24	GRN6	TTL GREEN6
5	GND	GROUND	25	GRN5	TTL GREEN5
6	VDD	LCD VDD (*)	26	GRN4	TTL GREEN4
7	VDD	LCD VD D (*)	27	GND	GROUND
8	VDD	LCD VD D (*)	28	GRN3	TTL GREEN3
9	VDD	LCD VD D (*)	29	GRN2	TTL GREEN2
10	GND	GROUND	30	GND	GROUND
11	HS	Hor. SYNC	31	GND	GROUND
12	VS	Ver. SYNC	32	GND	GROUND
13	GND	GROUND	33	BLU7	TTL BLUE7
14	EN	Data Enable	34	BLU6	TTL BLUE6
15	GND	GROUND	35	BLU5	TTL BLUE5
16	CLK	Data Clock	36	BLU4	TTL BLUE4
17	GND	GROUND	37		
18	RED7	TTL RED7	38	BLU3	TTL BLUE3
19	RED6	TTL RED6	39	BLU2	TTL BLUE2
20	RED5	TTL RED5	40	GND	GROUND

4.15 KeyPad Switch (J2)--Wafer 12P 1.25mm

PIN	Symbol	Description	PIN	Symbol	Description
1	Power	Function key	9	NC KEY	NC
2	Menu	Function key	10	IR	IR Receiver
3	Up	Function key	11	TX	UART TX
4	Down	Function key	12	RX	UART RX
5	Exit	Function key	13	5V	VCC
6	LED_G	Led Indicator	14	SDA	I2C_SDA
7	LED_R	LED indicator	15	SCL	I2C_SCL
8	GND	GND			

4.16 How To Set the Voltage of LCD VDD

PIN	Symbol	Description
1	LCD 3.3V	TBD
2	LCD 5V	TBD
3	LCD 12V	TBD
4		
5		
6		

5 CORRESPONDING KEYPAD SCHEMATIC

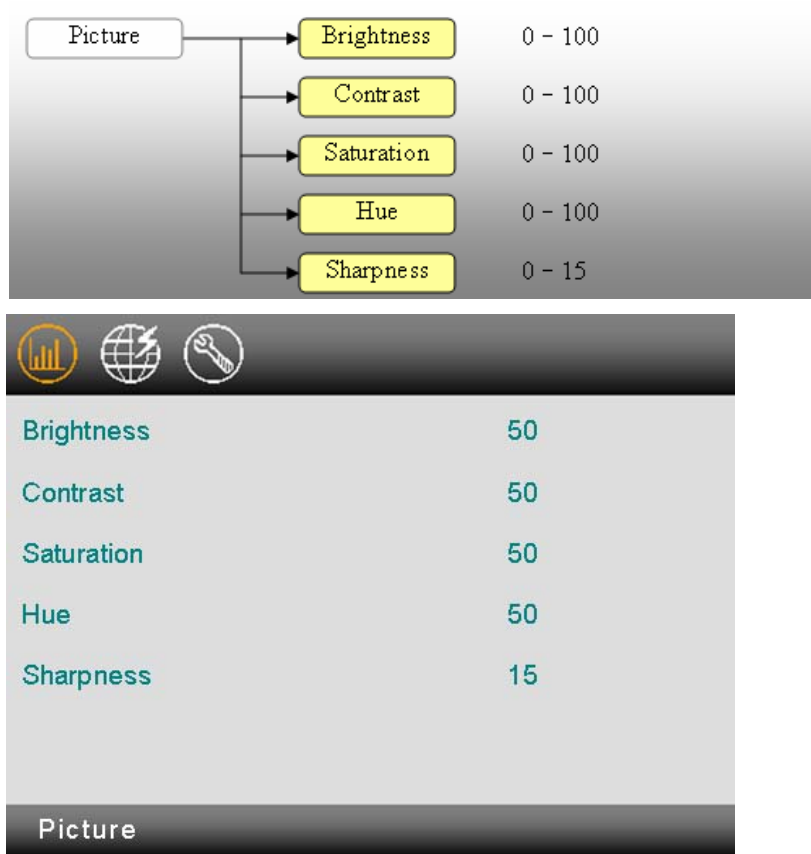
6 OSD WINDOW OPERATION

1. **Power Switch &** : Power switch.
2. **MENU** : Pressing this button pops up the OSD menu on the screen, or used to select the OSD control options on the screen.
3. **ENTER** : Pressing this button is used to confirm the OSD control options on the screen.
4. **UP-** : This button is used to adjust the decreasing value of selected.
5. **DOWN+** : This button is used to adjust the increasing value of selected.
6. **EXIT** : **Back to Previous**

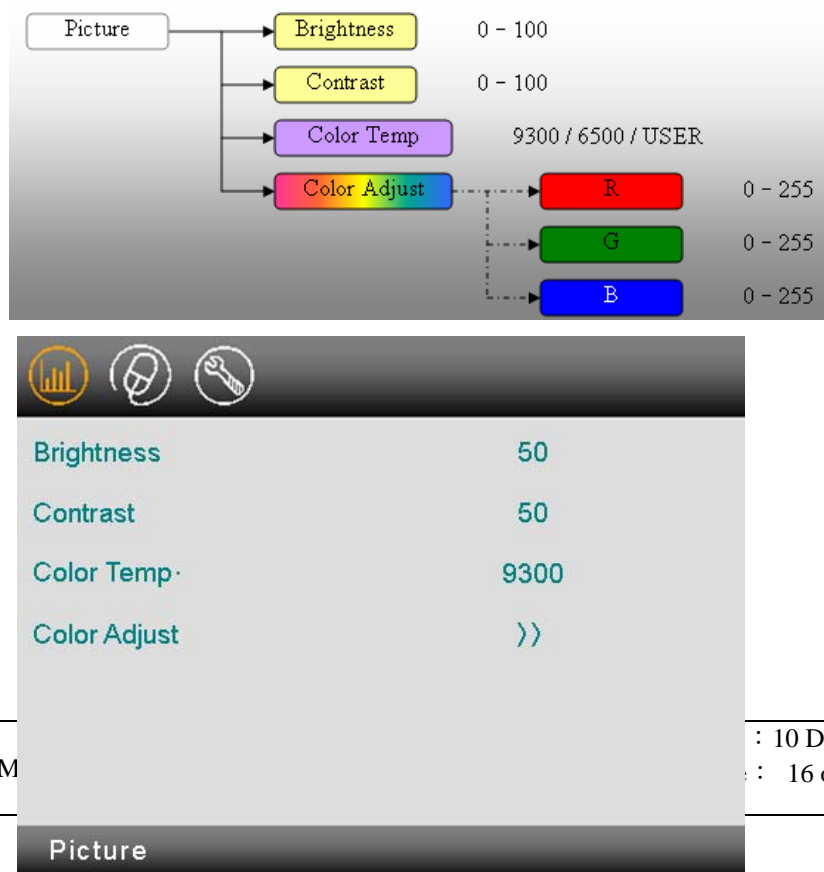
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★ OSD windows operate
Picture Menu

CVBS / SVIDEO



D-Sub / HDMI mode

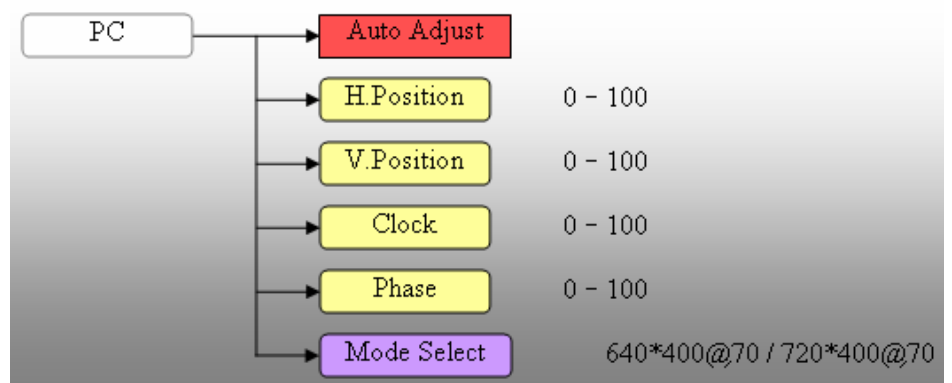


OSD Menu item	Description
Brightness	Adjusts the luminance of the image by adjustable Bar.
Contrast	Adjusts the contrast ratio by adjustable Bar.
Saturation	Adjusts the color saturation, making colors more or less intense by adjustable Bar.
Hue	Adjusts the color Hue by adjustable Bar.
Sharpness	Adjusts the sharpness of the image by adjustable Bar.
Color Temp ·	The item has three options.They are 9300k, 6500k and user color. If you select user color. You can adjust in" Color Adjust"option.
Color Adjust	If you in " Color Temp · "select user color then press "Enter",there are three options "R" , "G" and "B" will appear.

R	Adjusts the Red gain value to user the setting. The adjustable number is 0 to 255.
G	Adjusts the Green gain value to user the setting. The adjustable number is 0 to 255.
B	Adjusts the Blue gain value to user the setting. The adjustable number is 0 to 255.

PC Menu

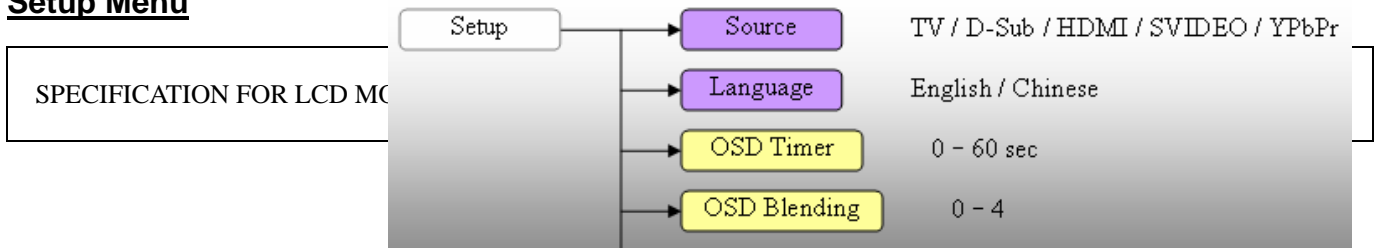
Only in D-Sub mode



SPECIFICATION FOR LCD MONITOR	Auto Adjust	>>
	H· Position	50
	V· Position	50

OSD Menu	Description
Auto Adjust	Automatically adjusts to the best image position, as well as the best clock and phase settings.
H.Position	Adjusts the horizontal position of the image by adjustable Bar. Press the Navigation (VOL – or VOL +) buttons to adjust the setting. The adjustable number is 0 to 100.
V.Position	Adjusts the vertical position of the image by adjustable Bar. Press the Navigation (VOL – or VOL +) buttons to adjust the setting. The adjustable number is 0 to 100.
Clock	Adjusts your LCD TV to match the video input source by adjustable Bar. Press the Navigation (VOL – or VOL +) buttons to adjust the setting. The adjustable number is 0 to 100.Used when patterns appear.
Phase	Adjusts the picture to remove any noise by adjustable Bar. Press the Navigation (VOL – or VOL +) buttons to adjust the setting. The adjustable number is 0 to 100.
Mode Select	PC Mode Select.(Only in 640×400 or 720×400 can select)

Setup Menu





OSD Menu item	Description
Source	There are 5 input main sources to select, press the Navigation (VOL – or VOL +) buttons to select when you decide which source is your selection then press "ENTER" key to set.
Language	There are two languages in the OSD menu can be selected. They are English or Chinese.
OSD Timer	Set the time of OSD Timeout by adjustable Bar. Press the Navigation (VOL – or VOL +) buttons to adjust the setting. The adjustable number is 0 to 60.
OSD Blending	Adjust the transparency of OSD window background. Press the Navigation (VOL – or VOL +) buttons to adjust the setting. The adjustable number is 0 to 4.
Recall	Resets display settings to the factory default.

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