

Bolymin, Inc.



TFT LCD MODULE SPECIFICATION

MODEL NO.

ST-104VA01

(TFT 10.4" MODULE)

☆ VGA FUNCTION IS NOT AVAILABLE YET

FOR MESSRS:

ON DATE OF :

APPROVED BY:



1. APPLICATION

This 10.4" TFT LCD module is good for application on products such as NAVIGATION, GPS (airline, car, boat), INSTRUMENT, SEAT VIDEO (airline, car, boat), SECURITY, VIDEO PHONE, DOOR PHONE, and MINI TELEVISION.

2. FEATURES

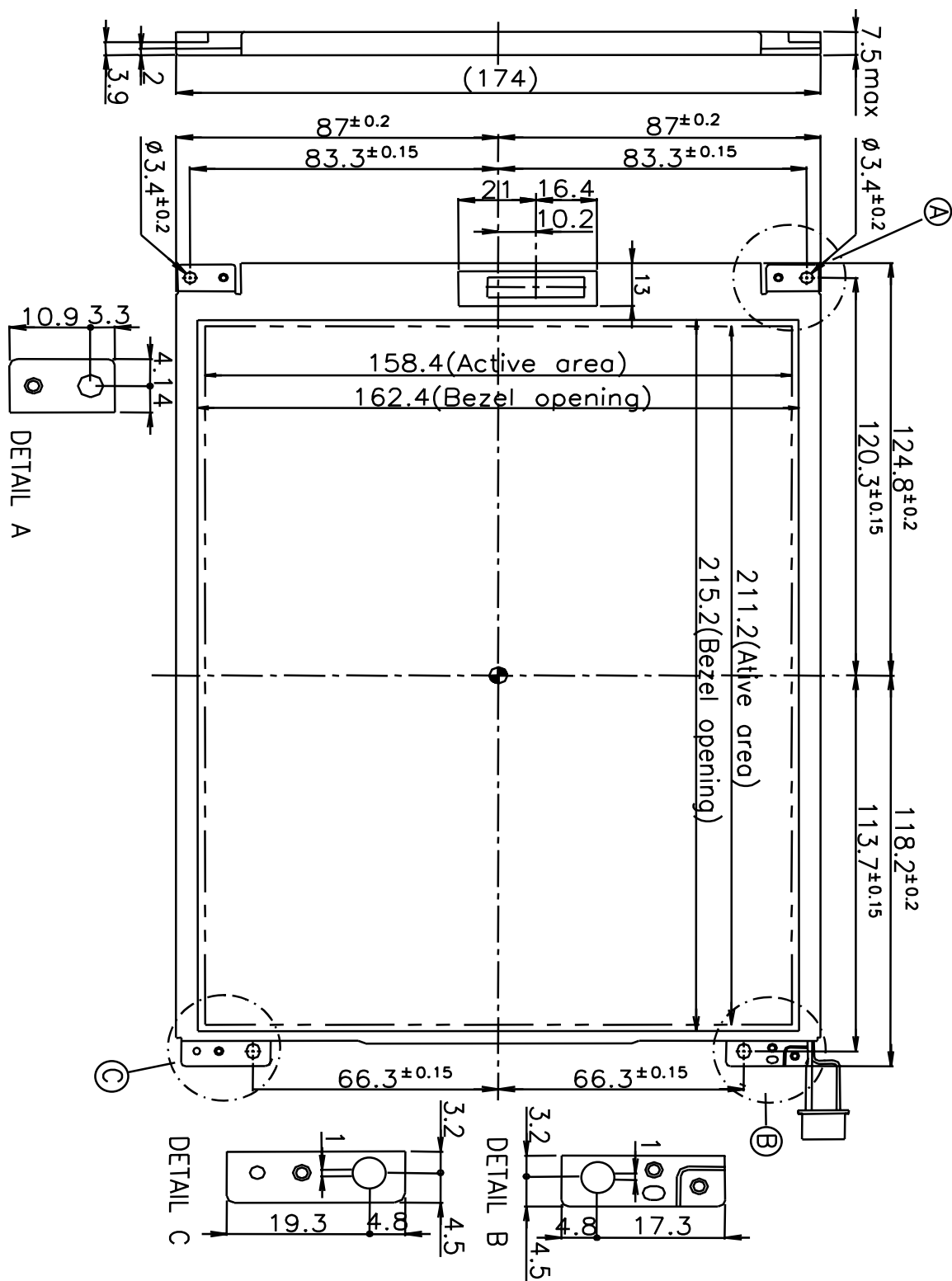
- HIGH RESOLUTION
- LOW POWER CONSUMPTION
- NO RADIATION
- SPEEDY RESPONSE TIME
- WIDE VIEW ANGLE

3. PHYSICAL SPECIFICATIONS

No.	Item	Specification	Remark
1	Display Resolution (pixel)	800(H)×600(V)	
2	Active Area (mm)	211.2(W)×158.4(H)	
3	Screen Size (inch)	10.4 (Diagonal)	
4	Pixel pitch (mm)	0.264(W)×0.264(H)	
5	Color Configuration	R.G.B Vertical stripe	
6	Outline Dimension(mm)	243.5(W)×174.5(H)×7.5(T)	Note 1
7	Surface treatment	Hard-coating 2H	

Note 1: Refer to Fig. 1

Fig.1 Outside dimensions of TFT-LCD module





4. ELECTRICAL SPECIFICATIONS:

4.1 PCB ASSEMBLY OF 10.4" AV MODULE

Symbol	Description	Remark
AD Board	Analog to Digital and Video Decoder	Note 2
Invetter Board	For Backlight	Note 2
VGA Board	DC 12V IN & VGA Signal IN	Note 2
AV & AUX Board	AV Signal IN & Tuner	Note 2
Keyboard	OSD Keyboard	Note 2
IR Board	For Remote Controller	Note 2

4.2 AD BOARD

Pin No.	Symbol	I/O	Description	Remark
J1	Panel	O	Panel (TTL) Signal Interface	Note 2
J5	Keyboard	I/O	Keyboard & LED Interface	Note 2
J6	IR	I/O	Remote Control Interface	Note 2
J7	Composite Video	I/O	AV & Tuner Interface	Note 2
J8	Backlight	O	Panel Backlight Control Interface	Note 2
J9	Audio-L out	O	Speaker _L	Note 2
J10	Power	I	Power(DC12V) Input Port	Note 2
J12	Analog RGB	I	PC (VGA) Interface	Note 2
J13	Audio-R out	O	Speaker _R	Note 2

4.3 INVERTER BOARD

Pin No.	Symbol	I/O	Description	Remark
CN1	Power/control	I	Power , On/Off , Brightness	Note 2
CN2	BK_OUT	O	Backlight 420Vrms/3.2mArms	Note 2

4.4 DC12V & VGA BOARD

Pin No.	Symbol	I/O	Description	Remark
J1	DC IN	I	Power Supply For Board & Panel	Note 2
J3	VGA IN	I	PC Analog RGB Signal Input	Note 2

4.5 AV&AUX BOARD

Pin No.	Symbol	I/O	Description	Remark
J4	A/V IN	I	Audio/ Video Signal Input	Note 2
J2	Tuner	I/O	TV signal Input & Tuner Control	Note 2



4.6 ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Typical	Max	Unit	Remark
Composite Signal Video	AV IN	0.8Vp-p	1.0Vp-p	1.2Vp-p	V	Note 2
Composite Signal Audio	AV IN			70	mV rms	Note 2
Supply Voltage	DC IN	10.8	12	13.2	V	Note 2
Audio Out	AUDIO OUT		1		W	Note 2
Analog RGB	VGA IN		0.714Vp-p		V	Note 2

4.7 CURRENT CONSUMPTION

Parameter	Condition	Min	Typical	Max	Units	Remark
Current For Unit	Vcc=12V			AV 0.79 PC 0.95	mA	Note 2

Note 2: Refer to Fig. 2.3.4.5



Fig.2 SYSTEM DESIGN

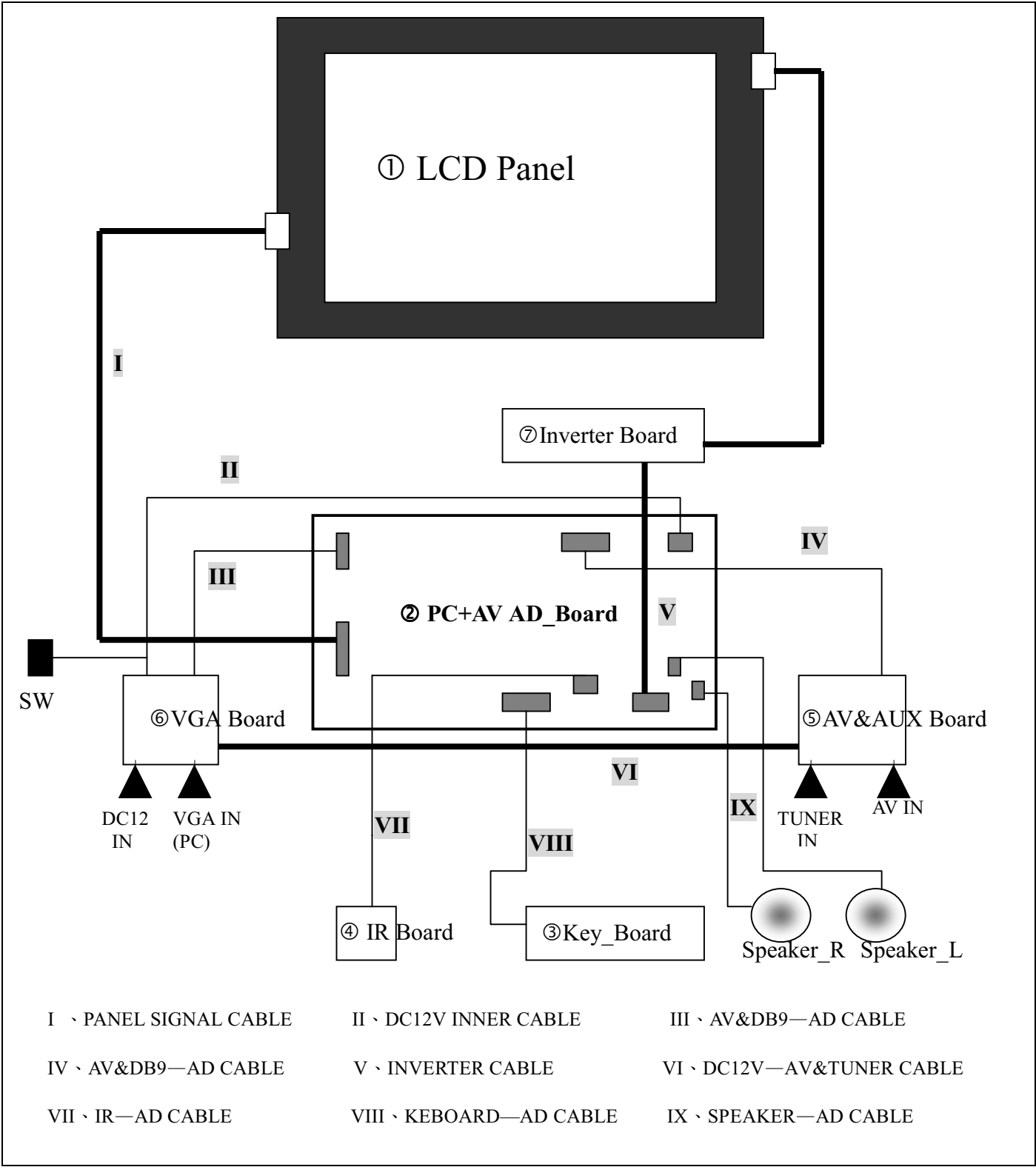
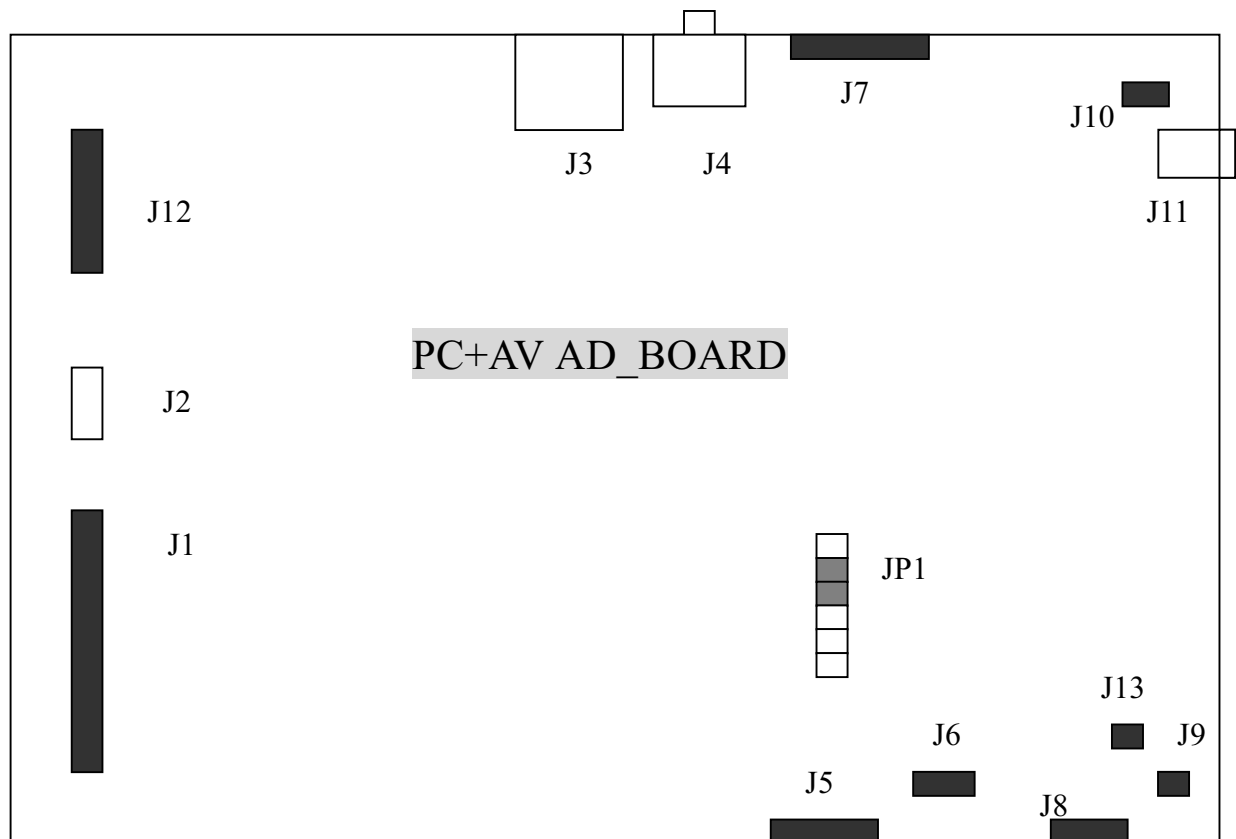




Fig.3 PC+AV AD_Board Connectors reference



AD_BOARD CONNECTORS & PINOUTS

J1 (32pin) ~ Panel signal 1

J3 ~ DIN,S-VIDEO CONN.

J5 (8pin) ~ Keyboard function controls

J7 (10pin) ~ AV&TUNER signal inport

J9 (2pin) ~ Audio_R outport

J11 ~ 5.5mm phono jack for 12V DC supply

J13 ~ Audio_L outport

JP1~Conclude to CUP Status

J2 (5 pin) ~ Panel signal 2

J4 ~ PHONE-ST-SW for A/V signal inport

J6 (3pin) ~ IR signal inport

J8 (5pin) ~ Inverter (Back Light) controls outport

J10(2pin) ~Aux power DC12V inport

J12(10pin)~ CONN, PC_VGA Single Interface

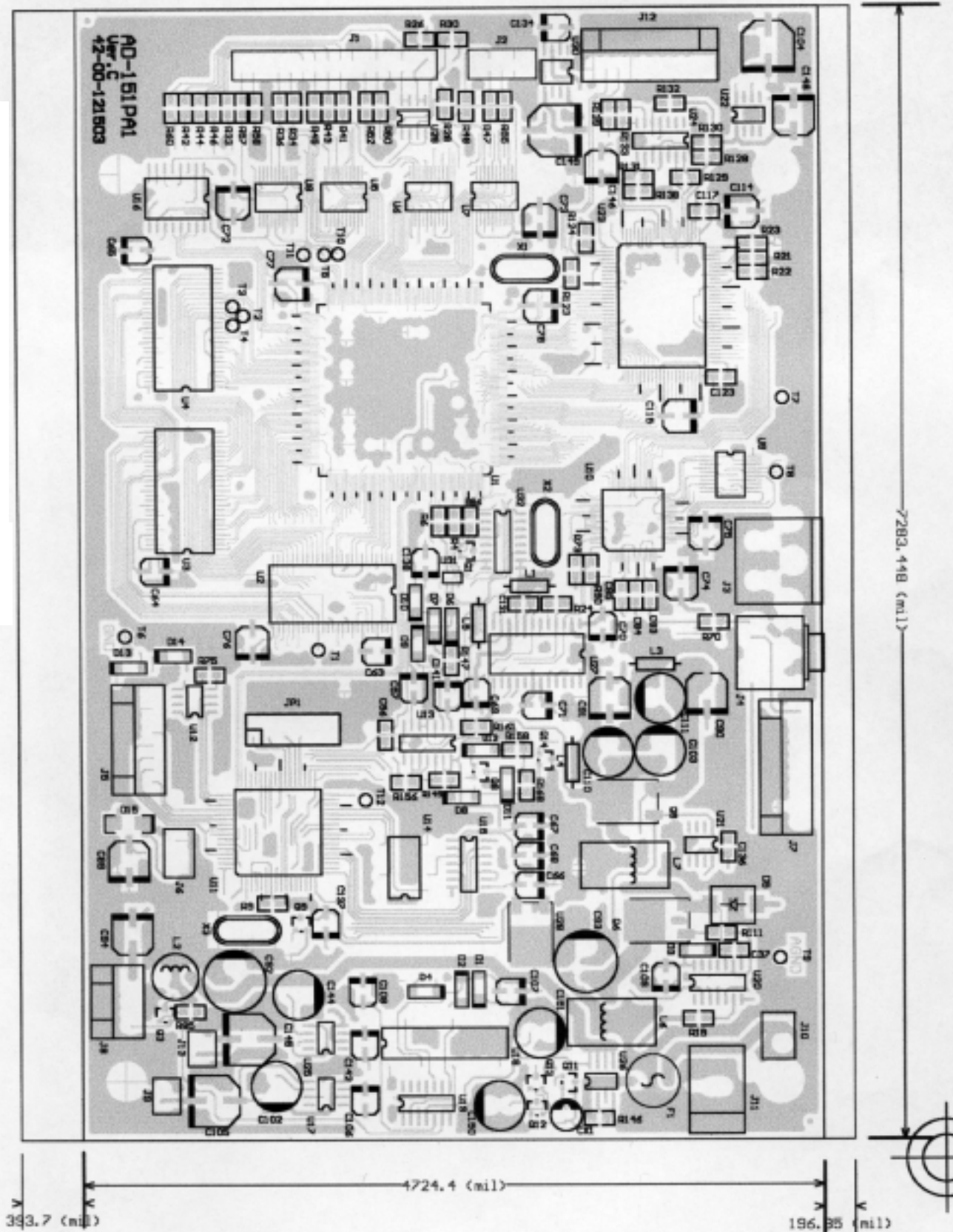
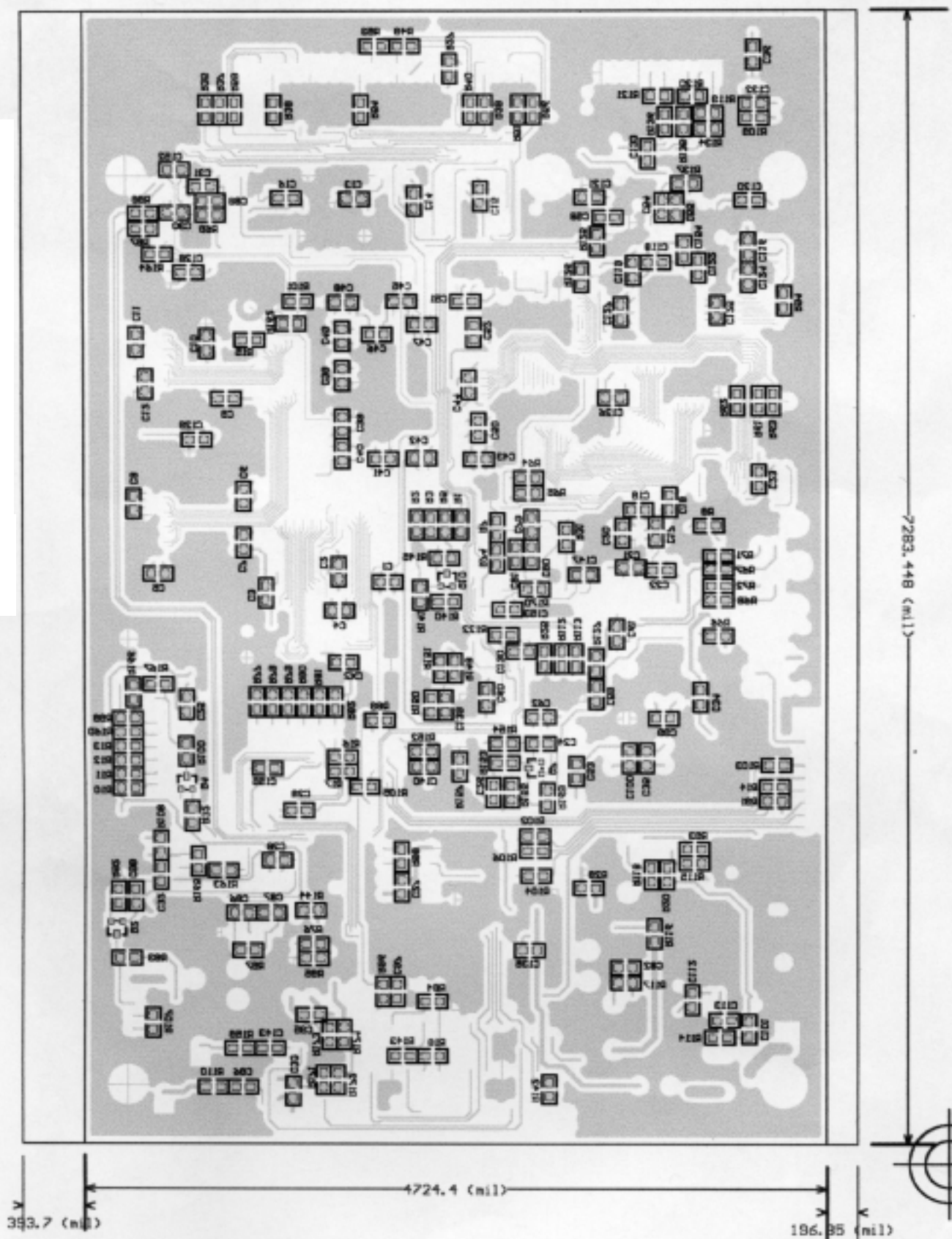


FIG-4





5.OPTICAL SPECIFICATIONS

Optical characteristics are determined after the unit has been ‘ON’ and stable for approximately 30 minutes in a dark environment at 25°C. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and θ equal to 0°.

Appendix A presents additional information concerning the specified characteristics.

Table 2 OPTICAL CHARACTERISTICS

Parameter	Symbol	Values			Units	Notes
		Min.	Typ.	Max.		
Contrast Ratio	CR	60	100	-	cd/m ²	1
Surface Brightness, white(I _{BL} =3mA)	SB _{WH}	50	70			2
Brightness Variation	SB _V		1.35	1.45		3
Response Time						
Rise Time	Tr _R		50		msec	4
Decay Time	Tr _D		50		msec	4
CIE Color Coordinates						
Red	x _R	0.54	0.58	0.62		
	y _R	0.30	0.34	0.38		
Green	x _G	0.27	0.31	0.35		
	y _G	0.51	0.55	0.59		
Blue	x _B	0.11	0.15	0.19		
	y _B	0.10	0.14	0.18		
White	x _W	0.28	0.32	0.36		
	y _W	0.29	0.33	0.37		
Viewing Angle(CR>5)						
x axis, right (Φ =0°)	θ			40	degree, °	5
x axis, left(Φ =180°)	θ			40		
y axis, up(Φ =90°)	θ			10		
y axis, down (Φ =270°)	θ			30		

Notes 1. Contrast Ratio (CR) is defined mathematically as:

$$\frac{(\text{Surface Brightness with all white pixels})}{(\text{Surface Brightness with all black pixels})}$$



2. Surface brightness is the average of 5 measurement across the LCD surface 50cm from the surface with all pixels displaying white. For more information see Fig A.
3. The variation in surface brightness, SB_v is determined by measuring B_{ON} at each test position 1 through 5, and then dividing the maximum B_{ON} by the minimum B_{ON} .

$$\frac{\text{Maximum } (B_{ON1}, B_{ON2}, \dots, B_{ON5})}{\text{Minimum } (B_{ON1}, B_{ON2}, \dots, B_{ON5})}$$

4. Response time is the time required for the display to transition from white to black (Rise Time, Tr_R) and from black to white (Decay Time, Tr_D). For additional information see Fig B.
5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see Fig C.

Fig A. Brightness

<measuring point>

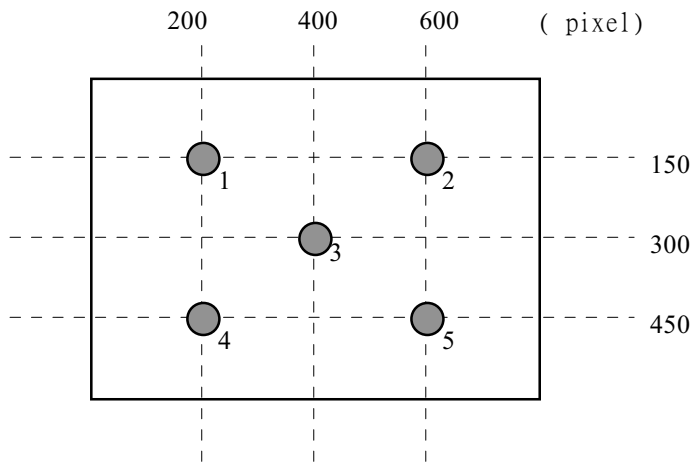




Fig B. RESPONSE TIME

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.

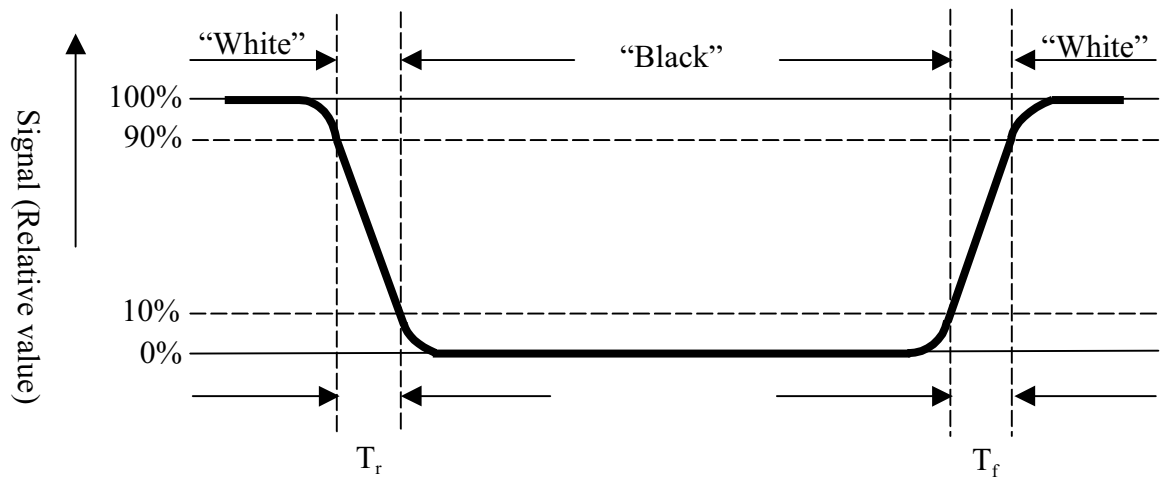
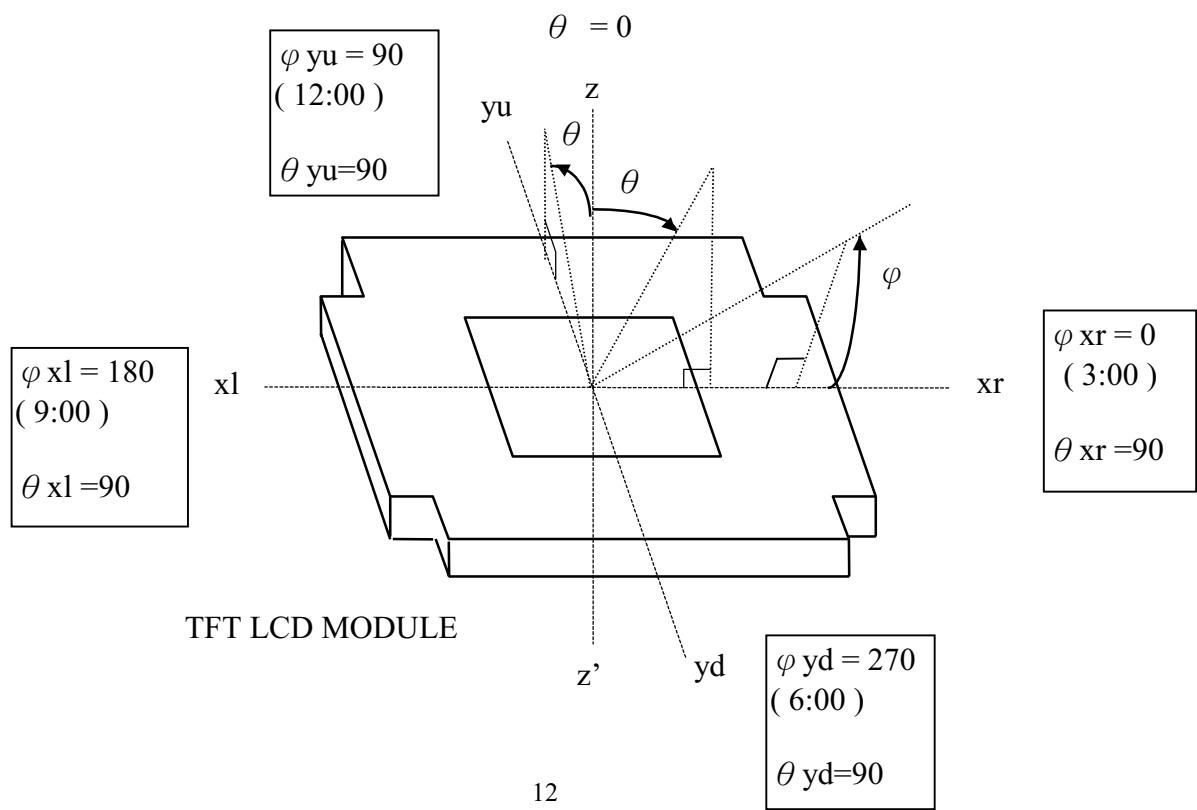


Fig C. Viewing angle

<Definition of viewing angle range>





6.RELIABILITY TEST ITEMS:

No.	Test Item	Test Condition	Remark
1	High temperature storage	Ta = +40℃ , 168 H	
2	Low temperature storage	Ta = 0℃ , 168 H	
3	High temperature operation	Ta = +40℃ , 168 H	
4	Low temperature operation	Ta = 0℃ , 168 H	
5	High temperature and high humidity	Ta = 40℃ , 80% RH , 168 H	No Condensation
6	Heat shock	-25℃~+60℃/50 cycles 2H/cycle	Non-operation
7	Electrostatic discharge	± 200V,150pf(150Ω),once for each terminal	Non-operation
8	Vibration	Frequency range:10~55Hz Stroke :1.5mm Sweep :10~55Hz~10Hz 2 hours for each direction of X,Y,Z (6 hours for total)	Operation Jis c7021,A-10 Condition A
9	Mechanical shock	100G. 2ms± X± Y± Z 3 times for each direction	Operation Jis c7021,A-7 condition
10	Vibration (with carton)	Random vibration: 0.5G/Hz from 5~500Hz -6dB/Octave from 200~500Hz	IEC 68-34
11	Drop (with carton)	Height:80cm 1 corner,3 deges,6 surfaces	

Note:Ta:Ambitient temperature



Fig.D PC/AV Monitor OSD function & descriptions:

No	Icons	Function & Description	Adjustment display	Push key	IR Key	Note
1		Brightness control Luminance Brightness	BRIGHTNESS 	-/+	▼ VOLUME ▲	
2		Contrast control Luminance Contrast	CONTRAST 	-/+	▼ VOLUME ▲	
3		Color control Chrominance Saturation	COLOR 	-/+	▼ VOLUME ▲	
4		Hue control (Chrominance Hue) AV MODE Signal phase control PC MODE	HUE PHASE 	-/+	▼ VOLUME ▲	AV→HUE PC→PHASE
5		Volume control Internal speaker volume	VOLUME 	-/+	▼ VOLUME ▲	
6		PAN image to Left/Right	USE ▲▼ TO ADJUST	-/+	▼ VOLUME ▲	
7		PAN image to Up/Down	USE ▲▼ TO ADJUST	-/+	▼ VOLUME ▲	
8		Size Horizontally	USE ▲▼ TO ADJUST	-/+	▼ VOLUME ▲	
9		Size Vertically	USE ▲▼ TO ADJUST	-/+	▼ VOLUME ▲	
10		Expansion screen	OFF , *ON	-/+	▼ VOLUME ▲	
11		Mute internal audio	OFF , ON	-/+	▼ VOLUME ▲	
12		Signal input select Signal input A/V or PC A/V: Composite A/V signal PC: VGA digital video signal	AV/PC --- AUTO PC/AV --- AUTO AV PC	-/+	▼ VOLUME ▲	
13		Filter function ON: Soften image OFF: Sharpen image	OFF , ON	-/+	▼ VOLUME ▲	
14		Color System Support multi. Color system to fit into different countries.	Select list items 1. NTSC-M/PAL-BGHI 2. PAL4.43/NTSC4.43:50Hz 3. NTSC4.43:60Hz/PAL-N 4. PAL-M/NTSC-N 5. PAL4.43/SECAM	-/+	▼ VOLUME ▲	If PC mode → SHUT
15		Reset to factory setting All user setting will be overwrote to default.	NO , YES	-/+	▼ VOLUME ▲	

* **Bold** with *italic* characters is default setting.