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1 SCOPE

This short specification describes the electrical, optical and functional performance requirements for a 43.1cm (17") TFT LCD color TV monitor with VGA/CVBS/S-Video/COMPONENT/TV compatible interface.

1.1 PRODUCT FEATURES

- 43.1 cm (17") a-si TFT Active matrix LCD panel, 0.289 mm dot pitch, 262.144 colors.
- Microprocessor controlled scan technology
- 12 factory presets
- Vertical refresh rate 55Hz to 75 Hz
- Horizontal frequency 29KHz to 61KHz
- Resolutions: 640 x 480 up to 1280 x 768
- Recommended Resolution 1024 x 768 @ 60Hz
- Universal power supply designed for worldwide application
- UL, FCC, CE certification
- Speaker 2.5W x 2
- Closed Caption(OPTION)
- V-CHIP(OPTION)
- BTSC Stereo/SAP or NICAM Stereo/ DUAL

1.2 MAIN DIMENSIONS / WEIGHT

	Monitor	Packed Monitor
Width:	518mm	586mm
Height:	333mm	502mm
Depth:	198mm	154mm
Weight:	5.0kg (Net Weight)	6.8kg (Gross Weight)

1.3 LOADING QUANTITY

1120 sets for 40' container(w. pallet)

560 sets for 20' container(w. pallet)

1.4 CLOSED CAPTION (OPTION)

- Support caption & text mode of TV
- Channel 1/2 selectable

1.5 BTSC or NICAM

- Support stereo/ SAP / mono. selection
- Support stereo/ DUAL / mono. Selection

1.6 V-CHIP (OPTION)

- Support MPAA grade for movie and TV Parental Guidelines for TV
- Password changeable

2 ELECTRICAL PERFORMANCE

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

2.1 STANDARD TESTING CONDITIONS

- Warm up time	: >30 min.
- AC supply voltage	: 110V or 230V± 5%, 50± 3 Hz
- Ambient temperature	: 20°C ± 5°C
- Humidity	: 65% ± 20%
- Display mode	: 1024x768@ 60 Hz , all white
- Contrast control	: Set to factory preset value, which allows that the brightest two of 32 linear distributed gray-scales (0 ~ 700mv) can be distinguished.
- Brightness control	: Set to maximum value
- Input signal	: 0.7Vpp
- Picture position and size	: Factory preset value,
- Viewing angle	90 ° H and V
- Viewing distance	100 cm for LCD performance, 30 cm for LCD failures
Ambient illumination	Dark room (< 1 cd/m2)

2.2 VIDEO SIGNALS

2.2.1 ANALOG RGB VIDEO INPUTS

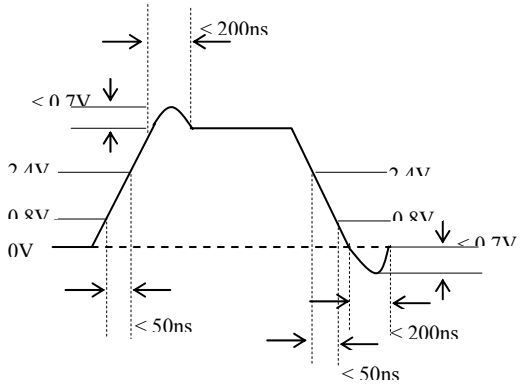
Level	**: 0.7Vpp**
Polarity	: positive
Impedance	: 75 Ohm
Max. dot clock	: 80 MHz

2.2.2 ANALOG RGB SYNC INPUTS

Level: L = 0V ~ 0.8V H = 2.4V ~ 5V

Separate sync. Polarity: positive or negative

The Monitor has to operate up to the following specified TTL-input signals:



H- Sync. and V – Sync. signals at the monitor input

High logic level	: ≥ 2.4V
Low logic level	: ≤ 0.8V
Rise time	: 0.8V ~ 2.4V: < 50ns
Fall time	: 2.4V ~ 0.8V: < 50ns
Overshoot	: ≤ 0.7V
Undershoot	: ≤ 0.7V

2.2.3 ANALOG RGB VIDEO BLANKING

Video is blanked for a period of 2sec. to 3sec. during change of modes or if undefined signals are applied. No switching effects are visible.

2.2.4 ANALOG RGB SIGNAL TIMING

VESA MODES							
			Horizontal		Vertical		
Mode	Resolution	Total	Nominal Frequency (KHz)	Sync Polarity	Nominal Freq. (Hz)	Sync Polarity	Nominal Pixel Clock (MHz)
VGA	640x480@60Hz	800 x 525	31.469	N	59.940	N	25.175
	640x480@72Hz	832 x 520	37.861	N	72.809	N	31.500
	640x480@75Hz	840 x 500	37.500	N	75.00	N	31.500
SVGA	800x600@56Hz	1024 x 625	35.156	N/P	56.250	N/P	36.000
	800x600@60Hz	1056 x 628	37.879	P	60.317	P	40.000
	800x600@72Hz	1040 x 666	48.077	P	72.188	P	50.000
	800x600@75Hz	1056x625	46.875	P	75.000	P	49.500
XGA	1024x768@60Hz	1344x806	48.363	N	60.004	N	65.000
	1024x768@70Hz	1328x806	56.476	N	70.069	N	75.000
	1024x768@75Hz	1312x800	60.023	P	75.029	P	78.750

IBM MODES							
			Horizontal		Vertical		
Mode	Resolution	Total	Nominal Frequency (KHz)	Sync Polarity	Nominal Freq. (Hz)	Sync Polarity	Nominal Pixel Clock (MHz)
DOS*	720x400@70Hz	900 x 449	31.469	N	70.087	P	28.322
DOS	640x350@70Hz	800 x 449	31.469	P	70.087	N	25.175

2.2.5 CVBS/S-VIDEO INPUTS

S-Video	Type	Y/C	: NTSC/PAL
	Level	0.7Vpp	
	Impedance	75 ohm terminated	
Composite Video	Type	Composite	: NTSC/PAL
	Level	0.7Vpp	
	Impedance	75 ohm terminated	
Component	Type	Y , Cb ,Cr	: NTSC/PAL
	Level	0.7Vpp	
	Impedance	75 ohm terminated	

2.2.6 NTSC TV INPUTS

Tuner Model Name	: FI/FQ1236/F	: PHILIPS	
Receiving System	: NTSC		
Channel System	: US Air / Cable		
US	: VHF Low	: 55.25MHz ~ 160.00MHz	
	: VHF High	: 160.00MHz ~ 442.00MHz	
	: UHF	: 442.00MHz ~ 801.25MHz	
IF Frequency	: PIF	: 45.75MHz	
	: CIF	: 42.17MHz	; PIF-3.58MHz
	: SIF	: 41.25MHz	; PIF-4.5MHz
Impedance	: 75 ohm terminated		
Output	: Video	: CVBS (NTSC)	
	: Sound	: BTSC	

2.2.7 PAL TV INPUTS

Tuner Model Name	: FI/FQ1216	: PHILIPS	
Receiving System	: PAL		
Channel System	: Air / Cable		
US	: VHF Low	: 48.25MHz ~ 160.00MHz	
	: VHF High	: 160.00MHz ~ 442.00MHz	
	: UHF	: 442.00MHz ~ 863.25MHz	
IF Frequency	: PIF	: 38.90MHz	
	: CIF	: 34.47MHz	
	: SIF1/SIF2	: B/G: 33.40MHz	; 33.16MHz
		: D/K: 32.40 MHz	
		: I: 32.9 MHz	
	NICAM	: B/G, D/K: 33.05 MHz	:32.348 MHz
Impedance	: 75 ohm terminated		
Output	: Video	: CVBS (PAL)	
	: Sound	: Normal / NICAM	

2.3 DDC SIGNALS (VESA DDC1/2B)

This monitor is equipped with VESA DDC 1/2B according to VESA DISPLAY DATA CHANNEL STANDARD V. 1.0 Rev.1 (tt.mm.199j)

It transmits the EDID-file as a continuous data stream, clocked by V-SYNC (DDC 1); the controller may increase the Vert. frequency to 25 kHz max. for improved transmission rate.

As an alternative, it sends the EDID-file upon request by the host-system (Read EDID, Device A0h Start address 00h) in an I^2C compatible format (DDC 2).

The monitor has installed a 10kΩ pull-up on the SCL-line (pin 15 of 15-pin VGA-connector).

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
00:	00	FF	FF	FF	FF	FF	FF	00	0E	0C	50	17	01	00	00	00
10:	04	0D	01	03	68	25	17	78	EA	4C	70	A6	57	4C	97	26
20:	23	50	54	BF	EE	00	01	01	01	01	01	01	01	01	01	01
30:	01	01	01	01	01	01	C3	1E	00	20	41	00	20	30	10	60
40:	13	00	71	D D	10	00	00	1E	00	00	00	FD	00	37	4B	1D
50:	3D	08	00	0A	20	20	20	20	20	20	00	00	00	FC	00	43
60:	4F	4D	50	41	4C	20	4C	56	38	37	54	0A	00	00	00	FF
70:	00	31	0A	20	20	20	20	20	20	20	20	20	20	20	00	00

2.4 DIGITAL CONTROL OPERATION

Signals used for mode detection:

- Nominal horizontal frequency (+-0.5 KHz from center frequency)
- Nominal vertical frequency (+-1 Hz from center frequency)
- Horizontal sync. pulse polarity
- Vertical sync. pulse polarity

2.4.1 FACTORY RECALL MODES

Starting the “RECALL” function in the OSD-MENU will clear all old settings of auto configuration in preset modes.

2.4.2 PROTECTION CIRCUIT

Missing or improper sync pulses will not damage the monitor. Additionally, under these conditions, the monitor shall not cause damage to the driving source

2.5 POWER SUPPLY

2.5.1 FEATURES

A/C Line voltage range	: 100 V ~ 240 V
A/C Line frequency range	: 50 ± 3Hz, 60 ± 3Hz
Current	: 1.5A max. at 90V, 0.75A max. at 265V
Peak surge current	: < 50A peak at 220 VAC, : < 30A peak at 110 VAC and cold starting
Leakage current	: < 3.5mA
Power line surge	: No advance effects (no loss of information or defect) with a maximum of 1 half-wave missing per second

2.5.2 AC ADAPTER OUTPUT

Voltage	: 12VDC ± 5%
Current	:5.0 Amp (max)

2.5.3 POWER CONSUMPTION

The monitor is equipped with a power-management according to the below.
There is a delay of 5s … 7s before the transition from On-state to any power saving state to avoid unintentionally entering of a power saving stage during display resolution and timing mode changes. Transition from any power saving state to another can be instantaneous.
The recovery from Off-state requires no manual power on.

Mode	H-Sync.	V-Sync.	Video	Pw-cons.	Indicator	Rec. time*
Power-On	on	on	active	< 65W	Green LED	--
Power-off	off	off	blanked	< 3 W	Orange LED	< 5S
Switch-off				< 3W	Dark LED	

SYNC. On means: Normal operation

SYNC. Off means: H sync. F < 10KHz duty cycle > 25%
V sync. F < 10Hz duty cycle > 25%

2.5.4 INVERTER SPECIFICATION

2.5.4.1 Electrical Characteristics:

No.	Item	Sym	Condition	Min	Typ.	Max.	Unit
1	Input Voltage	Vin	Vin -5% / +15%	11.4	12	12.6	V
2	Input Current	Iin	Vin=12V±5% Vbri=3.3V	-	2	-	A
3	Input Power	Pin	Vin=12V±5% Vbri=3.3V	-	35	-	W
4	Inrush current	Irush	Vin –5% ,under 14 times of rating current of Fuse	-	-	TBD	A
5	Output Voltage	Vout	Vin=12V, Vbri =1.8V	590	630	670	Vrms
6	Output Current	Iout(max)	Vin=12V, Vbri =1.8V	9.5	10.5	11	mArms
7	Output Power	Pout	Vin=12V, Vbri =1.8V	-	26.5	-	W
8	Working Frequency	Fo	Vin=12V –5%/+5%, Vbri =0.45~1.8V	40	50	60	KHz
9	Backlight ON/OFF Control	ON	Normal Operation	2	-	5.5	V
		OFF	Shutdown (Lamp off)	0	-	1.0	V
10	Lamp Current Control	Vbri	Adjustable continuou mode (Fdimm)	-	-	-	%
11	Kick off voltage	Vkickoff	No load, Vin=12V - 5%	1600	-	-	Vrms
12	Efficiency	Efficiency	Vin=12V , Vbri =1.8V	-	75	-	%
13	Time Delay to strike	Ts	ON/OFF=5V , Vin=12V	60	80	100	ms
14	Open lamp period /every lamp	Topen	Vin=12V, ON/OFF=5V	1000	-	1200	ms
15	udible Noise		30mm upon the part	-	-	34	dBm
16	Vin drop and Td	Vd Td	When Vin drop to Vd and recovery to the normal voltage during Td, the inverter won't be locked (don't need to release the input voltage and apply it again)	8 200	- -	- -	V ms
17	Case Temp. of part and derating of parts	-	Vin=12V –5%, ON/OFF=5V,Vbri=1.8V, Please refer the derating table to design	-	-	65	℃

2.5.4.2 Fuse rating:

2.5.4.2.1 Rating current is under 60% of rating current decreasing curve of fuse at maximum ambient temperature.

2.5.4.2.2 Inrush current

Fuse vender guarantee 100,000 cycles.

Rush current is under 14 times of rating current of Fuse.

IΛ2t is under 25% of vender's I2t-T curve.

2.5.4.3 Functional Pin Description:

2.5.4.3.1 Input Connector: E&T 4500 10P P2.0

Pin No.	**Symbol**	**Description**
1,2	Vcc	5V
3,4,5	GND	Power System Return
6	ON/OFF	ON/OFF Control ON>2.0V OFF <1.0V
7	Vbri	Lamp Current Control
8,9,10	Vin	Input Voltage (11.4V TO 12.6V)
11	Lin	Backlight ON/OFF control (Active High) ON:1.5~5.5V, OFF:-0.3~1.0V
12	Rin	+5Vdc supply to micro-P, always on.
13	GND/Audio	

2.5.4.3.2 Output Connector: JST SM04(4.0)B-BHS-1 or equivalent

Pin No.	**Symbol**	**Description**
1,2	Lamp H1, H2	High voltage connection to high side of lamp.
4	Lamp L1	Low voltage connection to low side of lamp.

2.5.5 DC/DC Specification

2.5.5.1 Electrical Characteristics:

No.	Item	Sym	Condition	Min	Typ.	Max.	Unit
1	Input Voltage	Vin	Vin -5% / +5%	11.4	12	12.6	V
2	Output Voltage	Vout	Vout -5% / +5%	4.9	5	5.2	V
3	Output Current	Iout	Vin=12V±5%	0	1.0	1.5	A
4	Output Power	Pout	Vin=12V±5%	-	5	7.5	W
5	Efficiency	Efficiency	Vin=12V , Vbri =3.3V	-	75	-	%
6	Regulation	⊿Vout	Item 1, 2, 3 condition	-5	-	+5	%

7	Ripple	Vripple	Item 1, 2, 3 condition	-	-	50	mVpp
8	Noise	Vnoise	Item 1, 2, 3 condition	-	-	150	mVpp

2.5.5.2 Functional Pin Description:

Input Connector: SCD437CCS DIA:2.0mm

Pin No.	Symbol	Description
1	Vin	+12V
2,3	GND	Ground

2.6 CONNECTORS / CONTROLS

2.6.1 CONNECTORS

- Power : Monitor rear side : Φ2.5mm DC Jack
- Analog RGB : Monitor rear side / Data Cable : 15-pin D-sub female / male

Pin – Assignment of 15-pin D-sub:

1	Red Video	9	+5V FOR DDC
2	Green Video	10	Detect
3	Blue Video	11	Serial Data for ISP
4	Serial Clock for ISP	12	Serial Data for DDC
5	Ground	13	H-Sync.
6	Red Ground	14	V-Sync.
7	Green Ground	15	Serial Clock for DDC
8	Blue Ground		

- S-Video (Y/C) : Monitor rear side : 4 Pin Mini-DIN female
- Composite Video : Monitor rear side : RCA female (Yellow)

Component : Monitor rear side : RCA female(G, B, R)

- TV : Monitor rear side : F or IEC type female
- Audio : Monitor rear side :

- PC I/P for PC : 3.5mm Stereo female

AV1 for S-Video & Composite Video : RCA female (Red/White)

AV2 for Component Video : RCA female (Red/White)

2.6.2 MONITOR CONTROL KEYS

KEY : Power , Menu , Function Up/Down , Vol. Up/Down , Source

2.6.3 POSITION OF CONTROLS

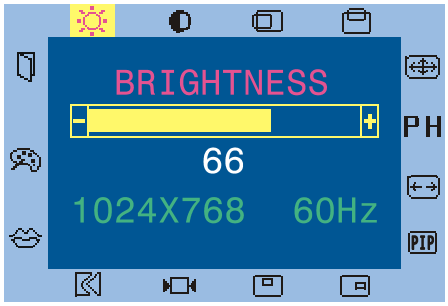
Position of all switches : Top side of front bezel

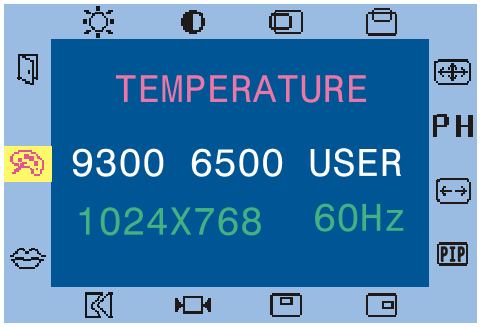
Position of LED and IR sensor : Bottom side of front bezel

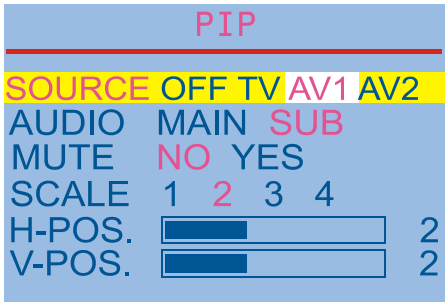
2.6.4 MONITOR CONTROL FUNCTION

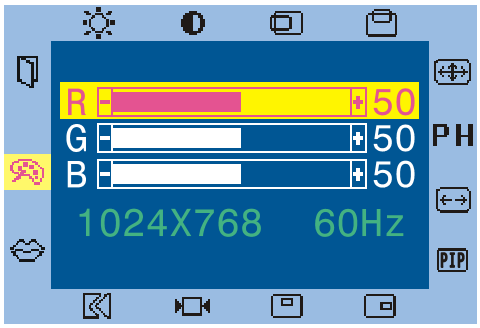
PC mode	Bright , Contrast , Picture position , OSD position , Auto adjustment , Clock , Phase , OSD Transparence , Language , Color Temperature Graphic/Text select
VIDEO mode	AUDIO , VIDEO , SYSTEM
TV mode	AUDIO , VIDEO , SYSTEM , CC (Option) , V-CHIP (Option), PAL (Option)

2.6.5 MONITOR OSD Pattern

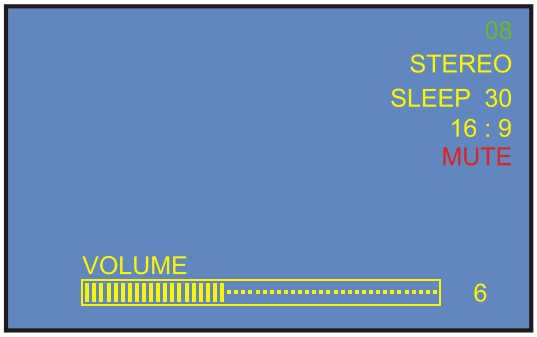


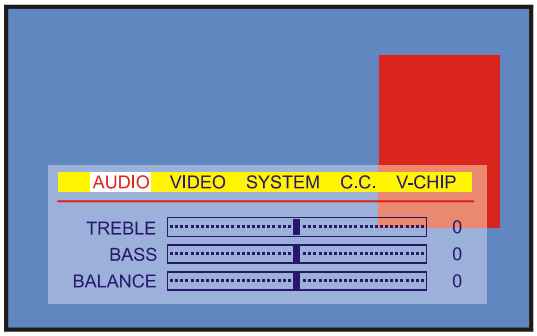


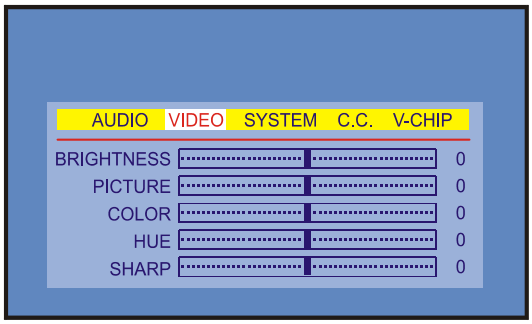


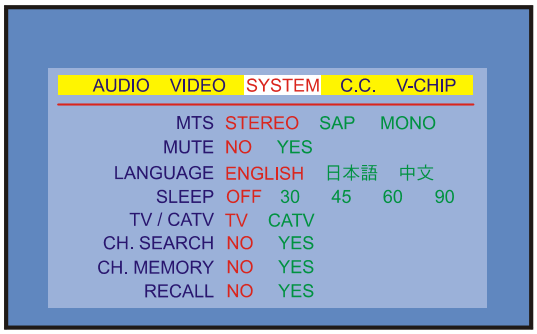


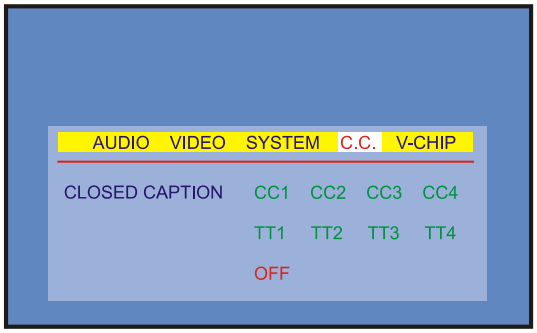
Only for LV87A

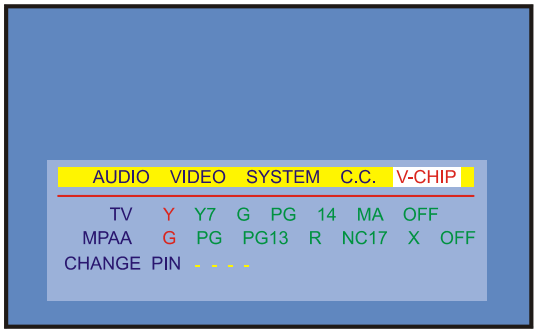




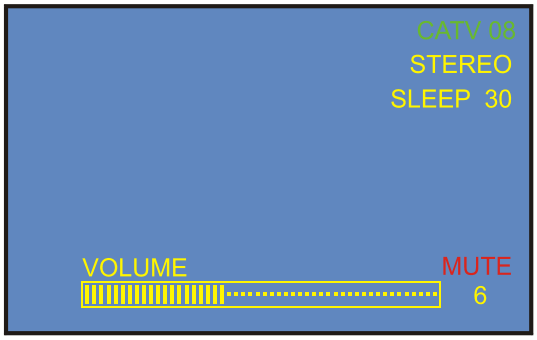


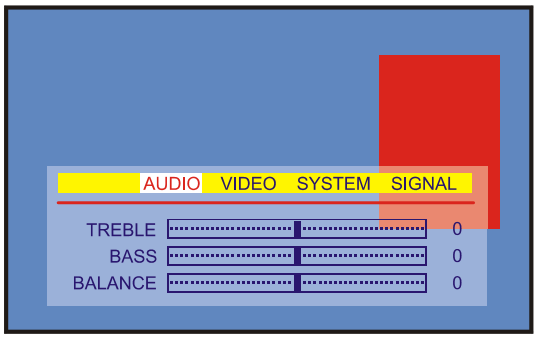


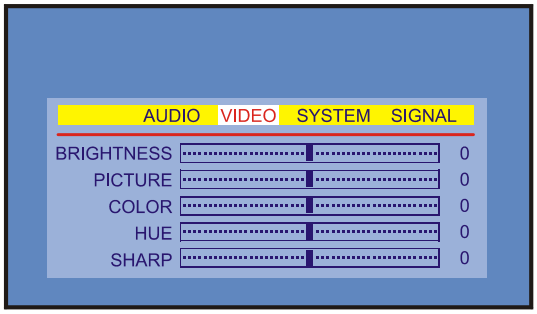


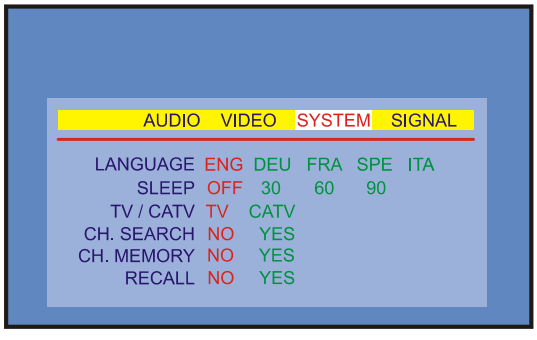


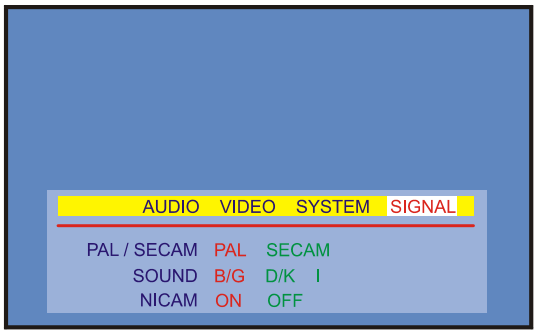
Only for LV87C



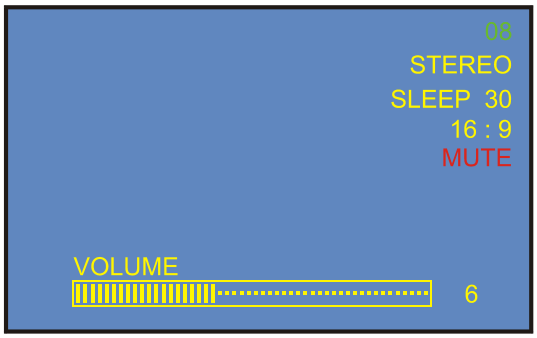


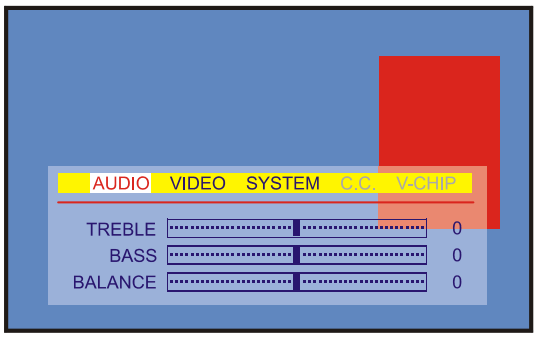


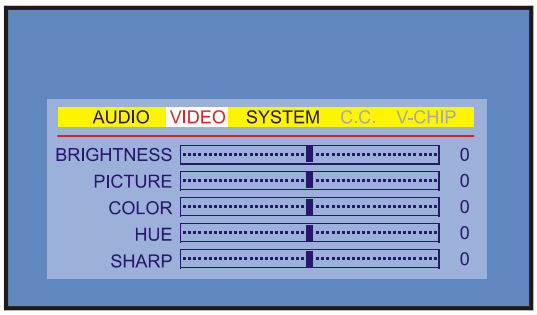


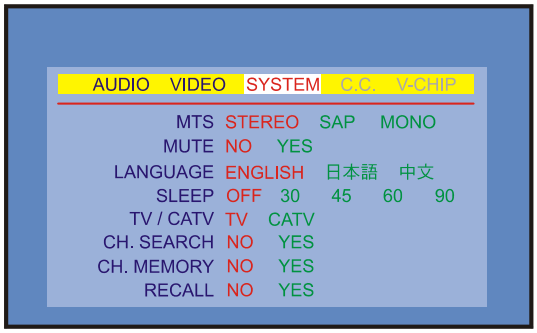


Only for LV87T









2.7 TESTING CONDITIONS

Pattern	Checking	
Circle	Overall Linearity , Geometry Framing. Reflections aspect ratio format	On a black background is suited for checking the overall linearity and geometry The white circle changes automatically to black when used with the white pattern and is useful for checking reflection.
Center Cross	Pin-cushion correction Deflection Linearity	It is applied to check the deflection linearity And for pin-cushion correction
Crosshatch	Static convergence Dynamic convergence **Pin-cushion correction**	Full screen definition pattern of 8vert. Bars 0.8MHz to 4.8MHz.

Multi burst	Video Bandwidth Amplitude response/resolution	Contains eight full screen vertical bars of definition lines in the frequency ranges 0.8, 1.8,2.8,3.0,3.2,3.4,3.8,and 4.8 MHz This checks the bandwidth of the video or luminance amplifier in black and white or color TV as well as the resolution of monitor and video recorders
Color Bars	Overall color performance Burst keying Sub-carrier regenerator Matrix circuit RGB amplifiers Delay color versus b/w signal Saturation check 562.5KHz interference check	The vertical bars are white, yellow, cyan, green, magenta, red, blue, and black. The luminance content depends on the TV system selected and is automatically correct after the user makes the selection. The color bar pattern in fact provides sufficient information for a good overall check on color performance. This includes the checks on burst keying, sub-carrier regeneration, RGB amplifiers, the delay color versus B/W signal and saturation check
VCR	White level Amplitude response, resolution of VCR and other video recorders Linearity of chroma amplitude Sensitivity color amplitude Color AGC Ratio chroma / luminance Writing current Recording performance Slow/quick-motion Still picture	Check the bandwidth , linearity , sensitivity , and AGC of the chroma amplifiers in color video recorders . This combined test pattern is divided into the following four horizontal segments: -Horizontal 100% white bar covering 1/16 field for exact level adjustment -Eight bars of resolution of which 2.8-3.0-3.2-3.4MHz are used to align the high-pass filter for a maximum resolution in VCR bandwidth -The next part of the pattern contains eight steps of decreasing linear levels of saturation of 100%to 0% to check the chroma amplifier linearity and color AGC circuitry. For example, if the chroma writing current is too high, color will be visible in the last bar where no color should be seen normally -The bottom section consists of black horizontal bar with a moving white field to check moving pictures on video recorders

3 VISUAL PERFORMANCE

3.1 MEASUREMENT CONDITIONS

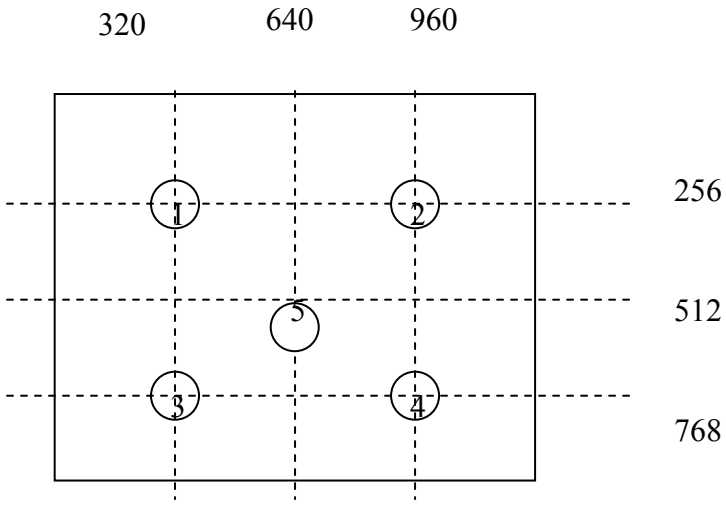
Warm up time: 30min.

Angle for measurement: 90°H and V

Distance: 100cm

Equipment: Minolta CS-100

Measurement positions:



Grey scale definition: White means digital value for RGB=255,255,255
50% gray, RGB=127,127,127
Black, RGB=0,0,0

3.2 PICTURE SIZE AND CENTERING

For 1280 X 768 resolution the picture size is equal to the active area of the display. For Smaller Resolution (SVGA, VGA Text and VGA Graphics) there is an expansion algorithm which expands the picture to a maximum possible size. The display is centered with respect to the front bezel opening with a tolerance of 0.5mm

3.2.1 SIZE CONTROL RANGE

The picture size can be adjusted to achieve activation of all pixels of the

display in1280 X 768 resolution
Resolution, for XGA, SVGA, VGA Text and VGA Graphics the conditions of 3.2 can be met.

3.2.2 POSITION CONTROL RANGE

The picture position can be adjusted that a complete picture can be displayed centered

3.2.3 Max. BRIGHTNESS : PC Mode

340(MIN.), 400(Typ.) cd/m2

Test conditions:
- center of display (5)
- video input (RGB) = 0.7Vpp
- brightness control is set to max.
- contrast control is set to max.

3.2.4 MIN. BRIGHTNESS : PC Mode

< 100 cd/m2

Test conditions:
- center of display (5)
- video input (RGB) = 0.700V
- brightness control is set to min.
- contrast control is set to min..

3.2.5 CONTRAST RATIO : PC Mode

The contrast ratio(CR) measured at center position (5) of the display for it should be better than 210(MIN.), 400(Typ.).
and is calculated according to the following formula.

$$CR = \frac{\text{Brightness of all pixels white}}{\text{Brightness of all pixels black}}$$

3.3 BRIGHTNESS UNIFORMITY

The brightness uniformity has to be better than 70% and is calculated according to to the following formula:

$$\triangle Y = [\ \frac{Ymin}{Ymax}\ ] \quad X\ 100\%$$

With Y1 to Y5 as the brightness values with all pixels white at the 5 measurement positions

3.4 WHITE COLOR COORDINATES

The white color temperature should be app. (CIE1931, Normal : 9300 and 6500),A 3th channel should be available, which can be defined by the user. The measurement position is the center of the display(5) at brightness set to maximum and Contrast set to center. The tolerance of the color coordinates should be less than ± 0.020

3.5 WHITE COLOR UNIFORMITY

The deviation of the white color coordinates at the 4 positions (1)….(4) should not exceed ± 0.020 with respect to the measurement at the center position(5).

3.6 PURITY

Purity is defined as the uniformity of the chromaticity of the three primary colors. The Deviation of the color coordinates of the primary colors red/green/blue at the 4 positions (1)…(4) should not exceed ± 0.020 with respect to the measurement at the center position(5)

3.7 RESPONSE TIME

The response time of the display for Fujitsu should be better than 15ms typ. The response time is measured from 90% to 10% (tr) and from 10% to 90% (tf) for a transition from white (100%) to black (0%) to white (100%)

3.8 VIEWING ANGLE

Panel	Horizontal view angle	Vertical view angle at CR >10
Fujitsu	**160**	**160**

3.9 SURFACE TREATMENT OF FRONT POLARIZER

The front polarize should have hard coating (3H) and anti-glare treatment.

4. AUDIO Electrical Performance

4.1 Standard Testing Conditions :

4.1.1 Test Equipment : Audio Analyzer test equipment

4.1.2 Conditions of Input Signal

1). Input Impedance : 600 ohm

2). Input Level : 700m Vrms ± 10%

3). Signal Frequency : 1 KHz

4.1.3 Ambient Temperature : 25℃± 5℃

4.1.4 Warm up Time : minimum 10 minutes after power on and audio signal input

4.1.5 Test Distance : 50cm from monitor screen and at the center of left and right speaker

4.1.6 Output Impedance : 4.5 ohm ± 15%

4.1.7 Output Voltage : Effective output state means standard testing conditions

4.2 Amplifier Characteristic

4.2.1 Output Power (Unit : Watt)

1). Effective Output : 2.5 Watts (measure at the output voltage of 1% Distortion Factor)

2). Maximum Output : 3 Watts (measure at the output voltage of 20% Distortion Factor)

3). Measurement method

- Set Test Equipment

Meas : LEVEL , Freq : 1KHz

AMPTD : Vrms, HPF/LPF : OFF RANGE : AUTO

- Measure output voltage (RMS)

- Output calculation formula : P=V2/R

V: RMS value of output voltage P : Output Power R: Speaker Impedance

4.3 Speaker Characteristic :

4.3.1 Input : Normal 2.5 Watt

4.3.2 Impedance : 4.5 ohm ±15% ohm at 1KHz

4.3.3 Resonant Frequency (f0) : 150± 10% Hz

4.3.4 Frequency Range: 20Hz ~ 20KHz

5 TUNER Electrical Performance

5.1 Applications

5.1.1 Receiving System : (NTSC STANDARD SYSTEM)

Channel VHF Low BAND : 55.25MHz ~ 160.00MHz
High BAND : 160.00MHz ~ 442.00MHz
UHF BAND : 442.00MHz ~801.25MHz

Intermediate Frequency PIF : (45.75)MHz
CIF : (42.17)MHz
SIF : (41.25)MHz

Input Impedance : UHF/VHF Terminal (75) Ohm, Unbalanced

Output Impedance : VIDEO : C.V.B.S
AUDIO : AF/MPX
IF : SECOND IF

Band Chang - Over System : (PLL Control System)

Tuning System : (Electronic Tuning System With PLL)

5.1.2 Receiving System : (PAL STANDARD SYSTEM)

Channel VHF Low BAND : 48.25MHz ~ 160.00 MHz
High BAND : 160.00MHz ~ 442.00 MHz
UHF BAND : 442.00MHz ~863.25 MHz

Intermediate Frequency PIF : (38.90)MHz
CIF : (34.47)MHz
SIF : B/G: 33.40 MHz : 33.16 MHz
D/K: 32.40 MHz
I: 32.9 MHz
B/G, D/K: 33.05 MHz : I : 33.348 MHz

Input Impedance : UHF/VHF Terminal (75) Ohm, Unbalanced

Output Impedance : VIDEO : C.V.B.S
AUDIO : AF/MPX
IF : SECOND IF

Band Chang - Over System : (PLL Control System)

Tuning System : (Electronic Tuning System With PLL)

5.2 RATINGS AND TEST CONDITIONS

Measurement must be executed under the ambient conditions of the room temperature and humidity. (Temp. 25℃±2℃, Humidity 65±5% RH)

5.2.1 Environment Condition

-. Storage Temperature : -20℃ ~ +70℃

-. Operation Temperature : -10℃ ~ +65℃

-. Relative humidity : 95% MAX

5.3 RECEIVING CHANNEL FREQUENCY TABLE

5.3.1 Only for LV87A and LV87T

Air

CH No.	CH Name	Picture Carrier Frequency
1	1	49.25
2	2	55.25
3	3	61.25
4	4	67.25
5	5	77.25
6	6	83.25
7	7	175.25
8	8	181.25
9	9	187.25
10	10	193.25
11	11	199.25
12	12	205.25
13	13	211.25
14	14	471.25
15	15	477.25
16	16	483.25
17	17	489.25
18	18	495.25
19	19	501.25
20	20	507.25
21	21	513.25
22	22	519.25
23	23	525.25
24	24	531.25
25	25	537.25
26	26	543.25
27	27	549.25
28	28	555.25
29	29	561.25
30	30	567.25
31	31	573.25
32	32	579.25
33	33	585.25
34	34	591.25
35	35	597.25
36	36	603.25
37	37	609.25
38	38	615.25
39	39	621.25
40	40	627.25
41	41	633.25
42	42	639.25
43	43	645.25
44	44	651.25
45	45	657.25

CH No.	CH Name	Picture Carrier Frequency
46	46	663.25
47	47	669.25
48	48	675.25
49	49	681.25
50	50	687.25
51	51	693.25
52	52	699.25
53	53	705.25
54	54	711.25
55	55	717.25
56	56	723.25
57	57	729.25
58	58	735.25
59	59	741.25
60	60	747.25
61	61	753.25
62	62	759.25
63	63	765.25
64	64	771.25
65	65	777.25
66	66	783.25
67	67	789.25
68	68	795.25
69	69	801.25
70	70	807.25
71	71	813.25
72	72	819.25
73	73	825.25
74	74	831.25
75	75	837.25
76	76	843.25
77	77	849.25
78	78	855.25

Cable

CH No.	CH Name	Picture Carrier Frequency		
		STD		
1	5A	73.25		
2	2	55.25		
3	3	61.25		
4	4	67.25		
5	5	77.25		
6	6	83.25		
7	7	175.25		
8	8	181.25		
9	9	187.25		
10	10	193.25		
11	11	199.25		
12	12	205.25		
13	13	211.25		
14	A	121.25		
15	B	127.25		
16	C	133.25		
17	D	139.25		
18	E	145.25		
19	F	151.25		
20	G	157.25		
21	H	163.25		
22	I	169.25		
23	J	217.25		
24	K	223.25		
25	L	229.25		
26	M	235.25		
27	N	241.25		
28	O	247.25		
29	P	253.25		
30	Q	259.25		
31	R	265.25		
32	S	271.25		
33	T	277.25		
34	U	283.25		
35	V	289.25		
36	W	295.25		
37	W+1	301.25		
38	W+2	307.25		
39	W+3	313.25		
40	W+4	319.25		
41	W+5	325.25		
42	W+6	331.25		
43	W+7	337.25		
44	W+8	343.25		
45	W+9	349.25		

CH No	CH Name	Picture Carrier Frequency STD		
46	W+10	355.25		
47	W+11	361.25		
48	W+12	367.25		
49	W+13	373.25		
50	W+14	379.25		
51	W+15	385.25		
52	W+16	391.25		
53	W+17	397.25		
54	W+18	403.25		
55	W+19	409.25		
56	W+20	415.25		
57	W+21	421.25		
58	W+22	427.25		
59	W+23	433.25		
60	W+24	439.25		
61	W+25	445.25		
62	W+26	451.25		
63	W+27	457.25		
64	W+28	463.25		
65	W+29	469.25		
66	W+30	475.25		
67	W+31	481.25		
68	W+32	487.25		
69	W+33	493.25		
70	W+34	499.25		
71	W+35	505.25		
72	W+36	511.25		
73	W+37	517.25		
74	W+38	523.25		
75	W+39	529.25		
76	W+40	535.25		
77	W+41	541.25		
78	W+42	547.25		
79	W+43	553.25		
80	W+44	559.25		
81	W+45	565.25		
82	W+46	571.25		
83	W+47	577.25		
84	W+48	583.25		
85	W+49	589.25		
86	W+50	595.25		
87	W+51	601.25		
88	W+52	607.25		
89	W+53	613.25		
90	W+54	619.25		

CH No	CH Name	Picture Carrier Frequency STD		
91	W+55	625.25		
92	W+56	631.25		
93	W+57	637.25		
94	W+58	643.25		
95	A-5	91.25		
96	A-4	97.25		
97	A-3	103.25		
98	A-2	109.25		
99	A-1	115.25		
100	W+59	649.25		
101	W+60	655.25		
102	W+61	661.25		
103	W+62	667.25		
104	W+63	673.25		
105	W+64	679.25		
106	W+65	685.25		
107	W+66	691.25		
108	W+67	697.25		
109	W+68	703.25		
110	W+69	709.25		
111	W+70	715.25		
112	W+71	721.25		
113	W+72	727.25		
114	W+73	733.25		
115	W+74	739.25		
116	W+75	745.25		
117	W+76	751.25		
118	W+77	757.25		
119	W+78	763.25		
120	W+79	769.25		
121	W+80	775.25		
122	W+81	781.25		
123	W+82	787.25		
124	W+83	793.25		
125	W+84	799.25		

5.3.2 Only for LV87C and LV87C

6 STANDARD ACCESSORIES

6.1 ANALOG VGA CABLE

Type	: Worldwide type	
Length	: 1.5m + 5cm/-5cm	
Color	: black	
Connectors	: Monitor -side	: 15 pin D-Sub Blue compliant with PC99
	: PC-side	: 15 pin D-Sub Blue compliant with PC99

6.2 POWER CABLE

Type	: Worldwide type	
Length	: 1.8m + 5cm/-5cm	
Color	: black	
Connectors	: Monitor -side	: IEC 320 female
	: Mains-side	:

6.2.1 AUDIO STEREO CABLE

Length	: 1.8m + 5cm/-5cm
Connector	:Φ3.5mm plug housing

6.3 EXTERNAL ADAPTER

Type	: Worldwide type	
Length of DC cable	: 1.5m + 1.5cm/-0cm	
Color of adapter	: black	
Connectors	: Monitor-side	: Φ2.5mm DC plug
	: Mains-side	: IEC 320 male

6.4 REMOTE CONTROL & BATTERIES

Remote Control	: 27 keys
Battery	: 1.5V AAA x 2 pcs

7 ENVIRONMENTAL

7.1 ENVIRONMENTAL CONDITIONS (CLIMATIC)

Operation (according to IEC 721 / EN 60721 Class 3K3) : (unpacked for a long time)

Temperature	+0°C ~ + 40°C
Humidity	10% ~ 85%
Max. Dew Point Temperature	+27°C
Max. abs. Air Humidity	25 g/m^3
Max. change of Temperature	0.5°C/min
Height	3000m
Air pressure	700~1060 mbar (70~10Kpa)
Dewing	Not allowed

Storage (according to IEC 721 / EN 60721 Class 1K2): (unpacked for a long time)

Temperature	-10°C ~ + 50°C
Relative Humidity	5% ~ 85%
Absolute Air Humidity	1 ~ 25 g/m^3
Max. Change of Temperature	0.5°C/min. (max. 10°C/30min.)
Air pressure	700~1060 mbar (70~106Kpa)
Radiation Solar heat	700 W/m^2

7.2 ENVIRONMENTAL CONDITION (MECHANICAL)

Storage and Transport: (according to IEC 721 / EN 60721 class 2M2)

	Test Procedure IEC 68/EN 60068		
Vibration (random vibration) IEC 68-2-64 EN 60068-2-64	Freq. range	Hz	5~10 10~100 100~500
	Change	db/oct	+12 -6
	Spectral acceleration density	m^2/s^3	0.75
	Accel. RMS	m/s^2	11.4
	Axis	-	3
	Duration/Axis	Minutes	30
Free fall ISO 2248 EN 22248	Weight	kg	0~9.1 9.1~18.2 18.2~27.2
	Fall height	m	0.9 0.76 0.61
	Direction and number		1 time on 1 corner, 3 edge, 6 surface
	Underground		concrete

8 MECHANICAL REQUIREMENTS

8.1 Vibration and shock

All testing shall be done in each of three mutually perpendicular axes, referenced to the position of the system as it is in front of the user (i.e., front-to back, side-to-side, and top-to-bottom).

8.1.1 Non-Operating

The unit should suffer minimal visible cosmetic damage or damage that presents a safety hazard, or impairs the setup and operation of the system after testing.

Sinusoidal Vibration: 0.75 G zero-to-peak, 10 to 500Hz, 0.5 octave / minute sweep rate. This requires one sweep, 10 to 500 to 10Hz, along each of the three axes.

Random Vibration: 0.008 G^2/Hz, 10 to 500 Hz, nominal 2 GRMS. The test shall be for one hour for each of the three axes.

Half Sine Wave Shock: 120 G peak, half sine pulse, 2 ms pulse duration. Testing shall consist of one shock in each direction in each axis, for a total of 6 shock inputs.

Square Wave Shock: 40 G peak acceleration, 160 inches / second velocity change. There shall be one shock in each direction in each axis, for a total of 6 shock inputs.

8.2 Package Drop Specification

Listed below are standards of drop heights for monitor product

Product Weight	height Specs
<9.1 kg	0.91 m
9.2~18.2 kg	0.76 m
18.3~27.2 Kg	0.61 m
27.3~45.4 Kg	0.46 m

8.2.1 Drop Test Sequence

Drop Order	Drop point	Drop Times
1	Right Front Bottom Corner	1
2	Right Bottom Edge	1
3	Right Front Edge	1
4	Front Bottom Edge	1
5	Bottom Side	1
6	Top Side	1
7	Front Side	1
8	Back Side	1
9	Left Side	1
10	Right Side	1

8.3 Dimension Size and Weight

Dimension size	518 (W) x 333 (H) x 198 (D)
Net Weight	5.0 Kg
Gross Weight	6.8 Kg

8.4 Gap Spec.

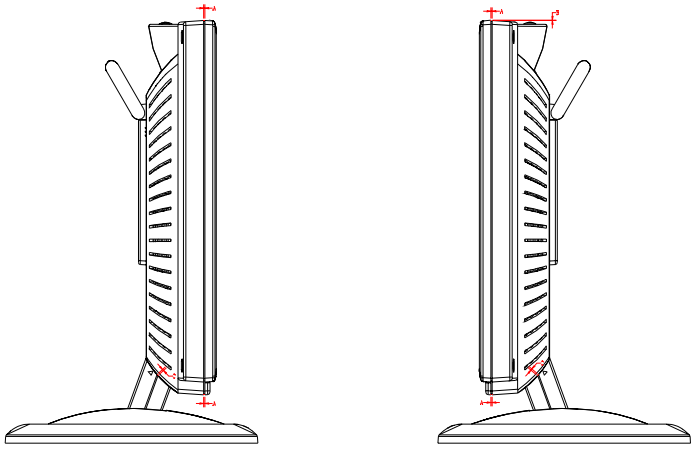
8.4.1 The step between front bezel and back cover shall be within specification.

Back Cover & Bezel Gap Neck Front & Neck Back

1.0mm ≤ A ≤ 1.4mm 1.0mm ≤ C ≤ 1.4mm

Back Cover & Bezel Alignment

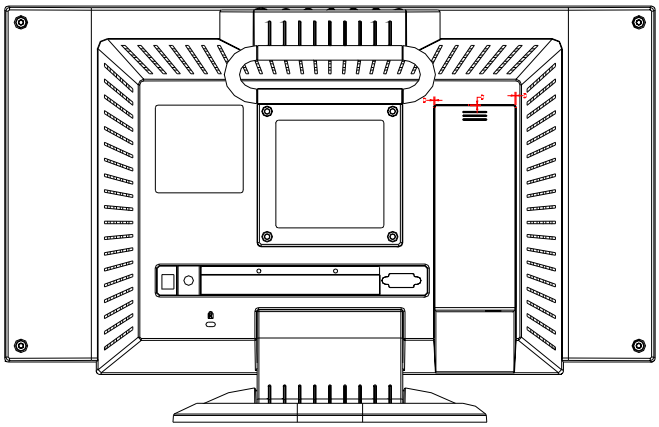
0 mm ≤ B ≤ 0.5mm



LV171-E06

Back Cover & Tuner Door

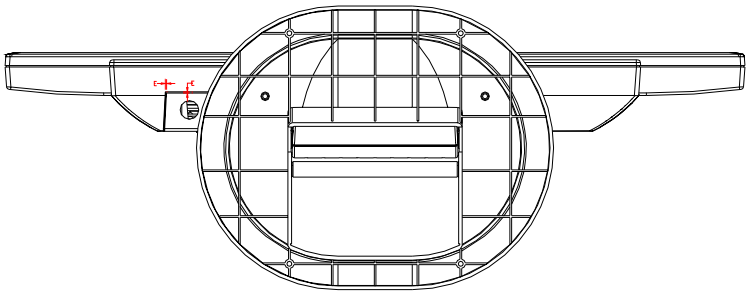
0.8 mm ≤ D ≤ 1.2mm



LV171-E07

Back Cover & Tuner Door

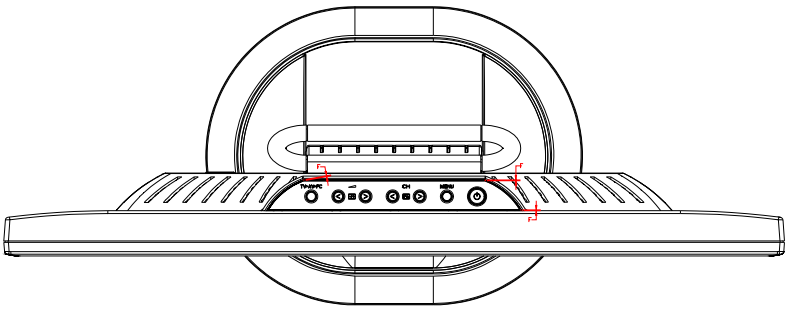
0.8 mm ≤ E ≤ 1.2 mm



LV171-E08

Back Cover & Key Plate

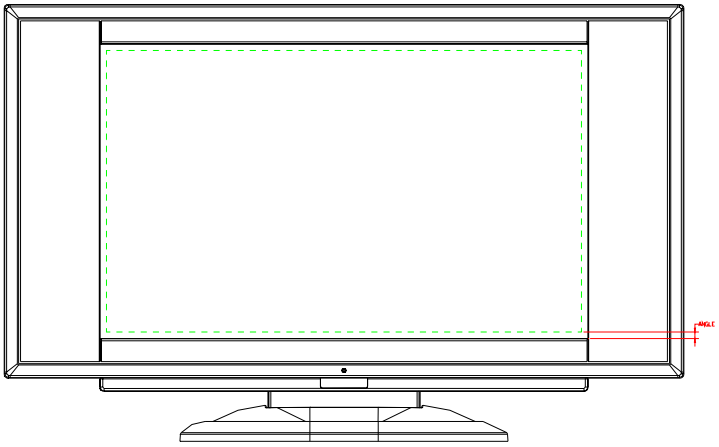
0.6 mm ≤ F ≤ 1.2 mm



LV171-E09

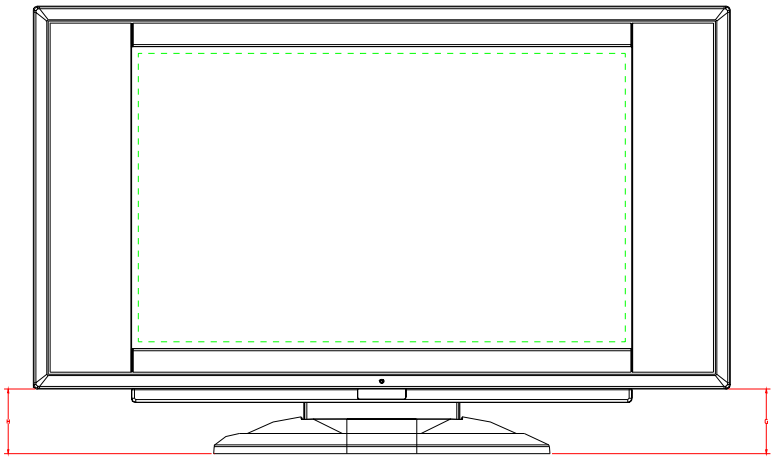
8.4.2 LCD Horizontally

The angle between front bezel and LCD unit in bottom side should be not large than 1.0mm.



LV171-E10

The distance G-H of the LCD display unit from left side to right should be not large than 4.0mm.



LV171-E11

Tilt Base Rotation

Tilt up 25 ± 1°/ down 5 ±1°

8.5 Plastic Material

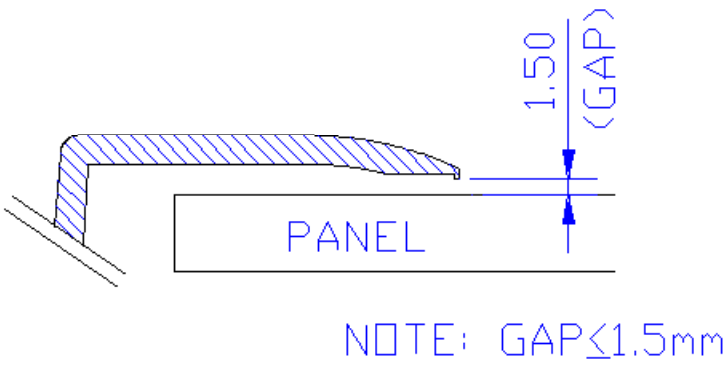
Front Bezel ABS 94HB, 94V-0

Back Cover ABS 94HB, 94V-0

The Others ABS 94HB

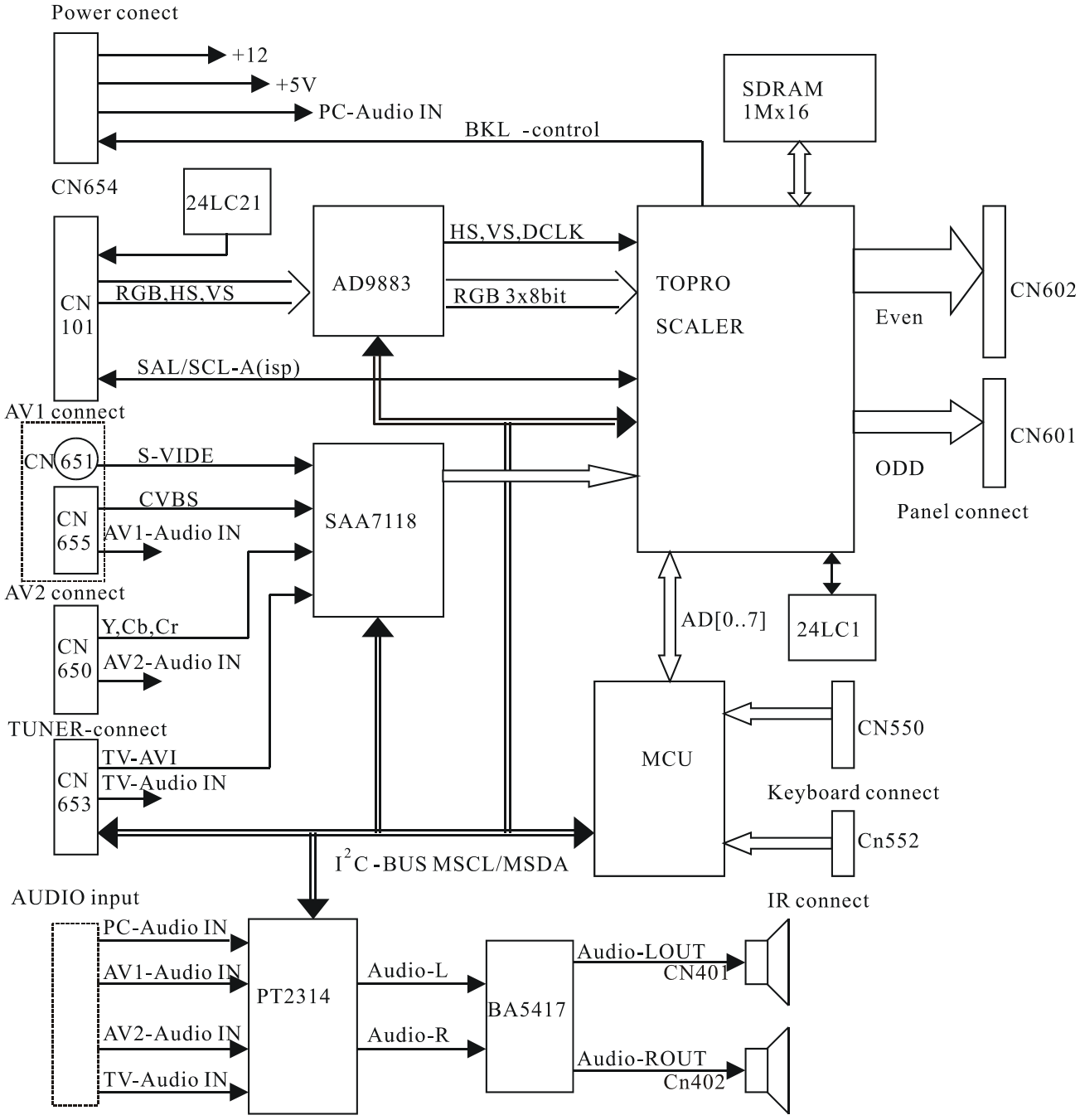
8.6 GAP Spec.

Gap between panel with bezel is 0.2 mm < gap < 1.5 mm

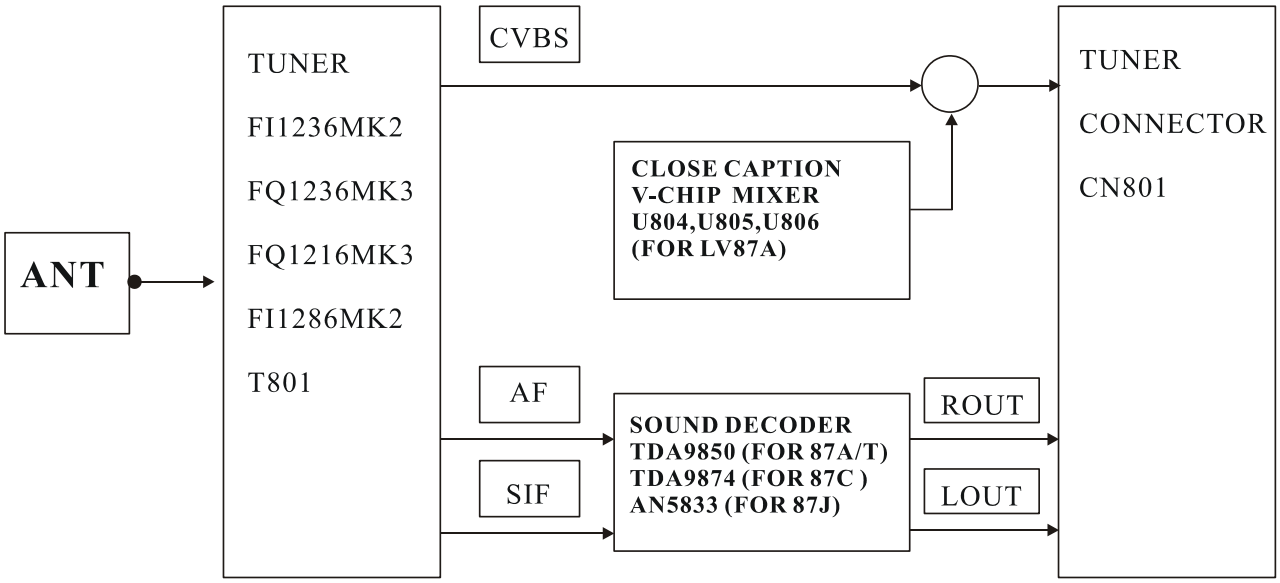


9 Block

9.1 LV87X Main Board Block Diagram



9.2 LV 87X Tuner Board Block Diagram



10 Connect

10.1 PCBA Connector location

10.1.1 K701-DM

K701-DM.pdf

10.1.2 R701-DM

R701-DM.pdf

10.1.3 VTV-N7902-1DM

VTV-N7902-1DM.pdf

10.1.4 VTV-N7903-1DM

VTV-N7903-1DM.pdf

10.1.5 VTV-N7905-0BDM

VTV-N7905-0BDM pdf

10.1.6 VTV-VL701-1DM

VTV-VL701-1DM.pdf

10.2 Connector P/N assignment

10.2.1 CONNECTOR Function

Location	Function	Type
CN101	VGA I/P	D-sub 15P Female -A
CN201/CN552	Remote control	5P Housing
CN202/CN550	KEY pad control	8P Housing
CN1/CN654	Inverter PW I/P	13P Housing
CN653/CN801	Tuner IN connector	D-sub 15P M/Female -R
CN301/CN652	Tuner I/P	6P wire
CN651	S-Video I/P	4 Pin Mini-DIN female
CN650	Component I/P	RCA female(G, B, R)
CN655	Composite I/P	RCA female(Y, W, R)
CN656	Component audio I/P	RCA female(W, R)
CN401	Speaker L	2P Housing
CN402	Speaker R	3P Housing
CN601	Panel ODD O/P	40P Housing
CN602	Panel EVEN O/P	30P Housing
JZ1	PC Audio I/P	3P Wafer
CN2	Power I/P	2P Wafer

10.2.2 CONNECTOR PIN ASSIGNMENT

Location\ PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CN101	R-IN	G-IN	B-IN	ISP-SCL	GND	GND	GND	GND	DDC 5V	DET.	ISP-DDC	DDC-SDA	Hsync	Vsync	DDC-SCL
CN201/ CN552	PWR-G	PWR-Y	5V	GND	IR-DAT										
CN202/ CN550	OSD-S7	OSD-S6	OSD-S5	OSD-S4	OSD-S3	OSD-S2	OSD-S0	GND							
CN1/ CN654	5V	5V	GND	GND	GND	PAN-ON	PAN-BRI	12V	12V	12V	PC-RIN	PC-LIN	GND		
CN653/ CN801	TV-AVOUT	PW-TV	TV-LOUT	TV-ROUT	GND	GND	MSDA	MTS-SU	VHS-2	MODE	MSCL	MTS-ST	MTS-MA	5V	12V
CN301/ CN652	VHS-2	TV-AVOUT	GND	TV-ROUT	GND	TV-LOUT									
CN651	GND	GND	S-LUM	S-CHR											
CN650	GND	AU1-R	GND	AU1-L	GND	AV-CVBS									
CN655	GND	COMP-Cr	GND	COMP-Cb	GND	COMP-Y									
CN656	GND	AU2-R	GND	AU2-L											
CN401	LFSPEAK	GND													
CN402	RFSPEAK	NC	GND												
CN601	REF. Schematic														
CN602	REF. Schematic														