

Product System (PS)

Subject:	C5-501 Service Manual	Part No.:	99.L2C72.000	Rev.:	0
		Doc. No.	99.L2C72.000-C5-501-001		
Project Code:	99.L2C72.001	Component Part. No.:	NA	Page	1 of 50
Model Name:	FP202W	Marketing Description :			

Q20W5 – FP202W Service Manual

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Chapter 1 Engineering Specification

1. Introduction

This specification describes FP202W, which is a 20.1" analog/digital interface color TFT LCD monitor without audio. The monitor supports maximum resolution up to 1680x1050 with analog and digital inputs.

The features summary is shown below,

***All panel spec. in C201 definition depends on the variance of panel source.**

***All spec. of monitor need to warm up at least 1hr.**

Feature items	Specifications	Remark
Panel supplier & module name	CPT CLAA201W01	TN
Screen diagonal	20.1" (51.05cm)	433.44(H) x 270.9(V)
Display Format	1680 (H) x 1050 (V)	Panel Display information
Pixel Pitch	0.258 mm x 0.258 mm	per one triad
Viewing Angle (@ Contrast Ratio >= 10)	R/L: 70/70 degrees (typ) and U/D: 70/60 degrees (typ) R/L: 65/65 degrees (min) and U/D: 65/55 degrees (min)	
Analog interface with Scaling supported	Yes	With 15-pin D-sub connector
DVI interface with Scaling supported	Yes	With 24-pin DVI-D connector
Video interface with Scaling supported	No	
Max resolution mode supported	1680x1050@60Hz	
Number of Display Colors supported	16.7 millions	8 bits data depth
Contrast Ratio	600:1 (typ.), 450:1 (min)	Test Condition: Set Contrast at 50, Brightness at 100, Color at User preset
Luminance	300 cd/m ² (typ.), 250 cd/m ² (min)	Test Condition : Set contrast at 100 , brightness at 100 , color at User preset.
AC power input	Yes	90-264 Volts, 47-63 Hz.
DC power input (with AC power adapter)	No	
DPMS supported	Yes	≤1W
LED indicator for power status showed	Yes	Green/Amber/Non
OSD for control & information supported	Yes	
Multi-language supported for OSD	Yes	6 languages(Asia) 14 language(Europe)
Buttons control supported	Yes	8 buttons including 1 monitor power on/off control button.
Flywheel control supported	No	
Scaling function supported	Yes	
Auto adjustment function supported	Yes	"I-Key" function
DDC function supported (EDID ver. 1.3)	Yes	DDC2B
Audio speakers supported	No	
Audio Jack (input connector) supported	No	
Earphone Jack (input connector) supported	No	
Microphone function supported	No	

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Mechanical Tilt base design	Yes	From -2 to +22 degree
VESA wall mounting design	Yes	
Mechanical Rotate design	No	
Mechanical Lift base design	No	
Kensington compatible lock design	Yes	

2. Operational Specification

2.1 Power supply

Item	Condition	Spec	OK	N.A	Remark
Input Voltage range	Universal input full range	90~264VAC /47~63Hz	√		
Input Current range	90 ~ 264VAC	≤ 2.0 Arms	√		
Power Consumption	Normal "On" operation	< =60 W (w/o speaker)	√		LED: Blue
DPMS	DPMS "Off" state	≤ 1 W	√		LED: Amber
Inrush Current	110 VAC 220 VAC	< 30 A (peak) < 60 A (peak)	√		Cold-start
Earth Leakage Current	264 VAC/50Hz	< 3.5 mA	√		
Hi-Pot	1. 1500VAC, 1 sec 2. Ground test: 30A, 1sec	Without damage < 0.1 ohm	√		(on-line test) (in-lab test)
Power Line Transient	IEC1000-4-4	1KV	√		
	IEC1000-4-5 (Surge)	Common: 2KV, Differential: 1KV	√		
CCFL operation range	90 ~ 264VAC	3.0 mA ~6.0mA	√		Depends on panel source
CCFL Frequency	90 ~ 264VAC	40KHz ~ 60KHz	√		Depends on panel source
Power cord		Color: Black Length: 1500 +/- 50 mm	√		

2.2 Signal interface

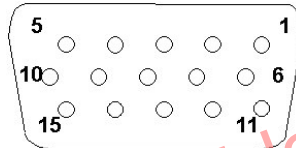
Item	Condition	Spec	OK	N.A	Remark
Signal Cable	15-pin D-Sub	Color: Black Length: 1500 +/- 30 mm	√		
	24-pin DVI-D	Color: Black Length: 2000 +/- 50 mm	√		
Pin assignment	15-pin D-sub connector	See Note-1	√		For 15-pin D-sub
	24-pin DVI-D connector	See Note-2	√		For 24-pin DVI-D
Video input	Signal type	Separate analog R/G/B	√		For 15-pin D-sub
	Level	700 mV (peak to peak)	√		
	Impedance	75 Ohms +/- 1.5 Ohms	√		
Sync input	Signal type	Separate H/V-sync Composite H/V-sync (Positive/Negative)	√		For 15-pin D-sub

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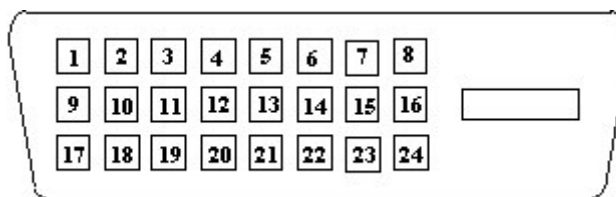
	Level	Logic High: 2.4V ~ 5.5V Logic Low: 0V ~ 0.5V (TTL level)	√	Refer to VESA VSIS Standard V1R1
	Impedance	Minimum 2.2KΩ (pull down)	√	10KΩ for application
	Sync Pulse Width (SPW)	0.7 μs < H-SPW 1H < V-SPW	√	

Note-1: The pin assignment of 15-pin D-sub connector is as below,



Pin	Signal Assignment	Pin	Signal Assignment
1	Red video	9	PC5V (+5 volt power)
2	Green video	10	Sync Ground
3	Blue video	11	Ground
4	Ground	12	SDA
5	Cable Detected	13	H-Sync (or H+V)
6	Red Ground	14	V-sync
7	Green Ground	15	SCL
8	Blue Ground		

Note-2: The pin assignment of 24-pin DVI-D connector is as below,



Pin	Signal Assignment	Pin	Signal Assignment
1	TMDS RX2-	13	Floating
2	TMDS RX2+	14	+5V Power
3	TMDS Ground	15	Ground
4	Floating	16	Hot Plug Detect
5	Floating	17	TMDS RX0-
6	DDC Clock	18	TMDS RX0+
7	DDC Data	19	TMDS Ground
8	Floating	20	Floating
9	TMDS RX1-	21	Floating
10	TMDS RX1+	22	TMDS Ground

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11	TMDS Ground	23	TMDS Clock+
12	Floating	24	TMDS Clock-

2.3 Video performance

Item	Condition	Spec	OK	N.A	Remark
Max. support Pixel rate		165 MHz	√		
Max. Resolution		1680 x 1050	√		
Rise time + Fall time		< 3.0 ns (50% of minimum pixel clock period)	√		1680 x 1050 @ 60Hz (max. support timing)
Settling Time after overshoot /undershoot		< 5% final full-scale value	√		Refer to VESA VSIS Standard V1R1
Overshoot/Undershoot		< 12% of step function voltage level over the full voltage range	√		Refer to VESA VSIS Standard V1R1

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2.4 Scan range

Item	Condition	Spec	OK	N.A	Remark
Horizontal		30 ~ 82 KHz	√		
Vertical		56 ~ 76 Hz	√		With Frame buffer

2.5 Plug & Play DDC2B Support

Item	Condition	Spec	OK	N.A	Remark
DDC channel type		DDC2B	√		
EDID		Version 1.3	√		Refer to FP202W S/W spec. document to see the detailed EDID data definition.

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2.6 Support Timings

Input Timing				Actual Output			
Resolution	Horizontal	Vertical	Dot Clock	Actual display	OK	N.A	Remark
640x350	31.47(P)	70.08(N)	25.17	1280x943	√		DOS
720x400	31.47(N)	70.08(P)	28.32	1280x1024	√		DOS
640x480	31.47(N)	60.00(N)	25.18	1280x1024	√		DOS
640x480	35.00(N)	67.00(N)	30.24	1280x1024	√		Macintosh
640x480	37.86(N)	72.80(N)	31.5	1280x1024	√		VESA
640x480	37.50(N)	75.00(N)	31.5	1280x1024	√		VESA

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800x600	37.88(P)	60.32(P)	40.00	1280x1024	√	VESA
800x600	48.08(P)	72.19(P)	50.00	1280x1024	√	VESA
800x600	46.86(P)	75.00(P)	49.50	1280x1024	√	VESA
832X624	49.72(N)	74.55(N)	57.29	1280x1024	√	Macintosh
1024x768	48.36(N)	60.00(N)	65.00	1280x1024	√	VESA
1024x768	56.48(N)	70.10(N)	75.00	1280x1024	√	VESA
1024x768	60.02(P)	75.00(P)	78.75	1280x1024	√	VESA
1024X768	60.24(N)	74.93(N)	80.00	1280x1024	√	Macintosh
1152x864	67.50(P)	75.00(P)	108.00	1280x1024	√	VESA
1152x870	68.68(N)	75.06(N)	100.00	1280x1024	√	Macintosh
1152x900	61.80(N)	66.00(N)	94.50	1280x1024	√	SUN 66
1152x900	71.81(N)	76.14(N)	108.00	1280x1024	√	SUN
1280x1024	64.00(P)	60.00(P)	108.00	1280x1024	√	VESA
1280x1024	75.83(N)	71.53(N)	128.00	1280x1024	√	IBM1
1280x1024	80.00(P)	75.00(P)	135.00	1280x1024	√	VESA
1280x1024	81.18(N)	76.16(N)	135.09	1280x1024	√	SPARC2

Note-3: “P”, “N” stands for “Positive”, “Negative” polarity of incoming H-sync/V-sync (input timing).

3. Operational & Functional Specification

3.1 Video performance

*All spec. of monitor need to warm up at least 1hr.

Item	Condition	Spec	OK	N.A	Remark
Resolution	Any input resolution modes which are under 1680x1050	1680 x 1050	√		
Contrast ratio		600:1 (typ.),450:1(min)	√		Test Condition: Set Contrast at 50, Brightness at 100, Color at User preset.
Brightness	At R/G/B saturated condition	300 cd/m ² (typ.),250(min)	√		Test Condition : Set contrast at 100 , brightness at 100 , color at User preset.
Response time	Rising + Falling time	8 ms (typ.),12ms(max)	√		Test Equipment: Westar TRD 100 or equal level equipment ;

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Viewing angle	At Contrast ratio = 10	R/L: 70/70 degrees (typ.) 65/65 degrees (min)	√		
	At Contrast ratio = 10	U/D: 70/60 degrees (typ.) 65/55 degrees (min)	√		
CIE coordinate of White		(0.31, 0.33) +/- (0.03, 0.03)	√		
Display colors		16.7 Millions colors	√		

3.2 Brightness Adjustable Range

Item	Condition	Spec	OK	N.A	Remark
Brightness adjustable range	At default contrast level (saturate point) & Full-white color pattern	(Max. brightness value – Min. brightness value) ≥ 100 cd/m ²	√		

3.3 Acoustical Noise

Item	Condition	Spec	OK	N.A	Remark
Acoustical Noise	At 1 meter distance & "Audio" function disabled	≤ 40 dB/A		√	

3.4 Environment

Item	Condition	Spec	OK	N.A	Remark
Temperature	Operating	0 ~ +40 °C	√		
	Non-operating	-20 ~ +60 °C	√		
Humidity	Operating	10 ~ 90%	√		Non-condensing
	Non-operating	10 ~ 90%	√		Non-condensing
Altitude	Operating	0~3048m (10,000ft)	√		Without packing
	Non-operating	0~12,192m (40,000ft)	√		With packing

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3.5 Transportation

Item	Condition	Spec	OK	N.A	Remark
(1) Vibration	Package, Non-Operating	(1) Sine wave 5~200Hz 1.5G, 1 octave/min, 15 min dwell on each resonant frequency, all primary axis, one sweep (30 min minimum) per orientation, total of 90+ min. (2) Random 5 ~100 Hz, 0 dB/Oct- 0.015 g ² /Hz 100 ~200 Hz, -6 dB/Oct. 200 Hz, 0.0038 g ² /Hz Equivalent to 1.47 Grms, All primary axis, 20 min per- orientation, total is 60 min. (3) Procedure: Confirmed sample with appearance and function ready before testing then compare with after test record as brightness, uniformity and contrast ratio. Perform random vibration after sine-wave vibration test.	√		
(2) Unpackaged Vibration	Unpackaged, Non-Operating	Test Spectrum: 20 Hz 0.0185(g ² /Hz) 200Hz 0.0185(g ² /Hz) Duration : 5 Minutes Axis : 3 axis (Horizontal and Vertical axis ,Z axis)	√		
(3) Drop	Package, Non-Operating	91 cm Height (MP stage) (1 corner, 3 edges, 6 faces)	√		
(4) Shock	Wooden package, Non-Operating	Waveform: half sine Faces: 6 sides/ per orientation 3 shocks. Duration: <3ms Velocity accelerate: 75g	√		

3.6 Electrostatic Discharge Requirements

Item	Condition	Spec	OK	N.A	Remark
Electrostatic Discharge	IEC801-2 standard	Contact: 8KV Air: 15KV	√		

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3.7 EMC

Item	Condition	Spec	OK	N.A	Remark
TCO03	Electric	Band 1 < 10 V/m Band 2 < 1 V/m	√		
	Magnetic	Band 1 < 200nT Band 2 < 25nT	√		
EMI	FCC part 15J class B	After Mass production under 1dBuv for constant measure. Besides DNSF and VCCI class-2 are optional.	√		
	EN55022 class B				

3.8 Reliability

Item	Condition	Spec	OK	N.A	Remark
MTBF Prediction	Refer to MIL-217F	> 60,000 Hours	√		Excluding CCFL
CCFL Life time	At 25±2°C, under 6.0mA	50,000 Hours (min)	√		See Note-4

Note-4: CCFL lifetime is determined as the time at which brightness of lamp is 50%. The typical lifetime of CCFL is on the condition at 6.0mA lamp current.

3.9 Audio performance (Optional)

Item	Condition	Spec	OK	N.A	Remark
Preamp + Power amp					
(1)Output power		2 Wrms/CH @ 1KHz		√	
(2)THD (@ 1W)		<1%		√	
(3)S/N ratio		>40dB		√	
Speaker Driver					
(1)Nominal impedance		4 ohm		√	
(2)Rated input power		2 W/CH		√	
(3)Frequency response		180~20KHz SPL-10dB		√	
(4)Output sound pressure level		84 ± 3 dB (1W 0.5M)		√	
(5)Dimension of box		284x60x27mm ²		√	
Audio Control					
(1)Volume range		0 ~100 levels		√	
(2)Mute		On/Off		√	

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4. LCD Characteristics

4.1 The Physical definition & Technology summary of LCD panel

Item	Condition	Spec	OK	N.A	Remark
LCD Panel Supplier		CPT	√		
Panel type of Supplier		CLAA201WA01	√		
Screen Diagonal		510.5mm(20.1")	√		
Display area	Unit=mm	433.44(H) x 270.9(V)	√		
Physical Size	Unit=mm	459.4(W) x 296.4(H) x 21.6(D)	√		
Weight	Unit=gram	3100(Max.)	√		
Technology		TN type	√		
Pixel pitch	Unit=mm	0.258(H) x 0.258(W)	√		Per one triad
Pixel arrangement		R/G/B vertical stripe	√		
Display mode		Normally White	√		
Support color		16.7 Millions colors	√		

4.2 Optical characteristics of LCD panel

Item	Unit	Conditions	Min.	Typ.	Max.	Remark
Viewing Angle	[degree]	Horizontal (Right)	65	70	-	
	[degree]	CR = 10 (Left)	65	70	-	
	[degree]	Vertical (Up)	65	70	-	
	[degree]	CR = 10 (Down)	55	60	-	
Contrast ratio		Normal Direction	450	600		
Response Time	[msec]	Rising Time	-	3	5	
	[msec]	Falling Time	-	5	7	
	[msec]	Rising + Falling	-	8	12	
Color / Chromaticity Coordinates (CIE)		Red x	-	-	-	
		Red y	-	-	-	
		Green x	-	-	-	
		Green y	-	-	-	
		Blue x	-	-	-	
		Blue y	-	-	-	
Color Coordinates (CIE) White		White x	0.28	0.313	0.343	
		White y	0.299	0.329	0.359	
Luminance Uniformity	[%]	9 points measurement	75	80		
White Luminance @ CCFL 6.0mA (center)	[cd/m ²]		250	300	-	
Crosstalk (in 75Hz)	[%]				1	

* The test methods for the above items' definition, please refer to the relative panel specification.

5. User Controls

5.1 User's hardware control definition

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Item	Condition	Spec	OK	N.A	Remark
Power button			√		
Enter button			√		
Right/Inc. button			√		
Left/Dec. button			√		
Exit /Volume or Input Select button			√		
Mode button			√		
Input Select button			√		
iKey button			√		
Mute button				√	

5.2 OSD control function definition

Item	Condition	Spec	OK	N.A	Remark
Auto Adjust		Auto-Geometry	√		
Brightness			√		
Contrast			√		
Horizontal Position			√		
Vertical Position			√		
Pixel Clock			√		
Phase			√		
Color		Bluish Reddish Normal User: Separate R/G/B adjustment	√		
OSD Position		OSD Horizontal position OSD Vertical position	√		
OSD Time		From 5 sec to 60 sec	√		
Language		6/14 languages for Asia/Europe Version	√		
Recall		Color recall Recall All	√		
Mode		Standard / Movie1 / Movie2 / Photo	√		
Input Select		D-sub DVI	√		
Sharpness			√		
Display Information		For input timing	√		
Volume				√	
Mute				√	
Hot key for Brightness			√		
Hot key for Contrast			√		

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Hot key for Volume				√	
Hot key for Input Select			√		
Hot key for Mode			√		

* The detailed firmware functions' specification, please refer to C212 S/W spec. document.

6. Mechanical Characteristics

6.1 Dimension

Item	Condition	Spec	OK	N.A	Remark
Bezel opening		435.58x 273.08 mm	√		
Monitor without Stand	W x H x D mm	479.6*317.1*76.0mm	√		
Monitor with Stand	W x H x D mm	479.6*396.7*169.87 mm	√		
Carton Box (outside)	L x W x H mm	456*570*170	√		
Tilt and Swivel range		Tilt: -2 ~ +22 degree Swivel: 0 degree	√		

6.2 Weight

Item	Condition	Spec	OK	N.A	Remark
Monitor (Net)		5.7 Kg	√		
Monitor with packing (Gross)		7.7Kg	√		

6.3 Plastic

Item	Condition	Spec	OK	N.A	Remark
Flammability		>ABS<,94-HB	√		
Heat deflection To	ABS	65 °C	√		
UV stability	ABS	Delta E < 8.0	√		
Resin		MPRII: ABS (SD0150/GP35/D350/PA757)	√		
Texture		MT-11010	√		RC partial texture MT-11020
Color		BCS-7015A	√		Button painting BCS-Y8010C

6.4 Carton

Item	Condition	Spec	OK	N.A	Remark
Color		Kraft	√		

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Material		C Flute	√		
Compression strength		360 KGF	√		
Burst Strength		16 KGF/cm ²	√		
Stacked quantity		13 Layers	√		

7. Pallet & Shipment

7.1 Container Specification

Stowing Type	Container	Quantity of products (sets) (Every container)	Quantity of Products (sets) (Every Pallet)	Quantity of pallet (sets) (Every Container)
With pallet	20'	576	Pallet A: 48	Pallet A: 12
	40'	1248	Pallet A: 48	Pallet A: 26
Without pallet	20'	624	X	X
			X	X
	40'	1352	X	X
			X	X

7.2 Carton Specification

Product:

Net Weight (Kg)	Gross Weight (Kg)	Dimension w/o Base W*H*D (mm)	Dimension w/ Base W*H*D (mm)
5.7Kg	7.7Kg	479.6*317.1*76.0mm	479.6*396.7*169.87 mm

Package:

Carton Interior Dimension (mm) L*W*H	Carton External Dimension (mm) L*W*H
446*560*156	456*570*170

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8. Certification

Item	Condition	Spec	OK	N.A	Remark
Environment	Green design	API Doc. 715-C49	√		ISO14000 Requirement
	Blue Angel	German Standard		√	
	E-2000	Switzerland		√	
	EPA	USA Standard	√		
	TCO'99			√	
	TCO'03			√	
	Green Mark		√		
PC-Monitor	Microsoft Windows	PC98/99	√		
	DPMS	VESA	√		
	DDC 2B	Version 1.3	√		
	USB	External		√	
Safety	UL (USA)	UL60950 3 rd edition	√		
	CSA (Canada)	CAN/CSA-C22.2 No. 60950	√		
	Nordic / D.N.S.F	EN60950		√	
	FIMKO	EN60950	√		
	CE Mark	73/23/EEC	√		
	CB	IEC60950	√		
	CB	EN60950	√		
	TUV/GS	EN60950 / EK1-ITB 2000:2003		√	
	CCC (China)	CB4943	√		
	GOST	EN60950	√		
	SASO	IEC60950	√		
EMC	CE Mark	89/336/EEC	√		
	FCC (USA)	FCC Part 15 B	√		
	EN55022	Class B	√		
	CISPR 22	Class B	√		
	VCCI (Japan)	VCCI Class B	√		
	BSMI (Taiwan)	CNS 13438	√		
	C-Tick (Australia)	AS/ NZS CISPR22	√		

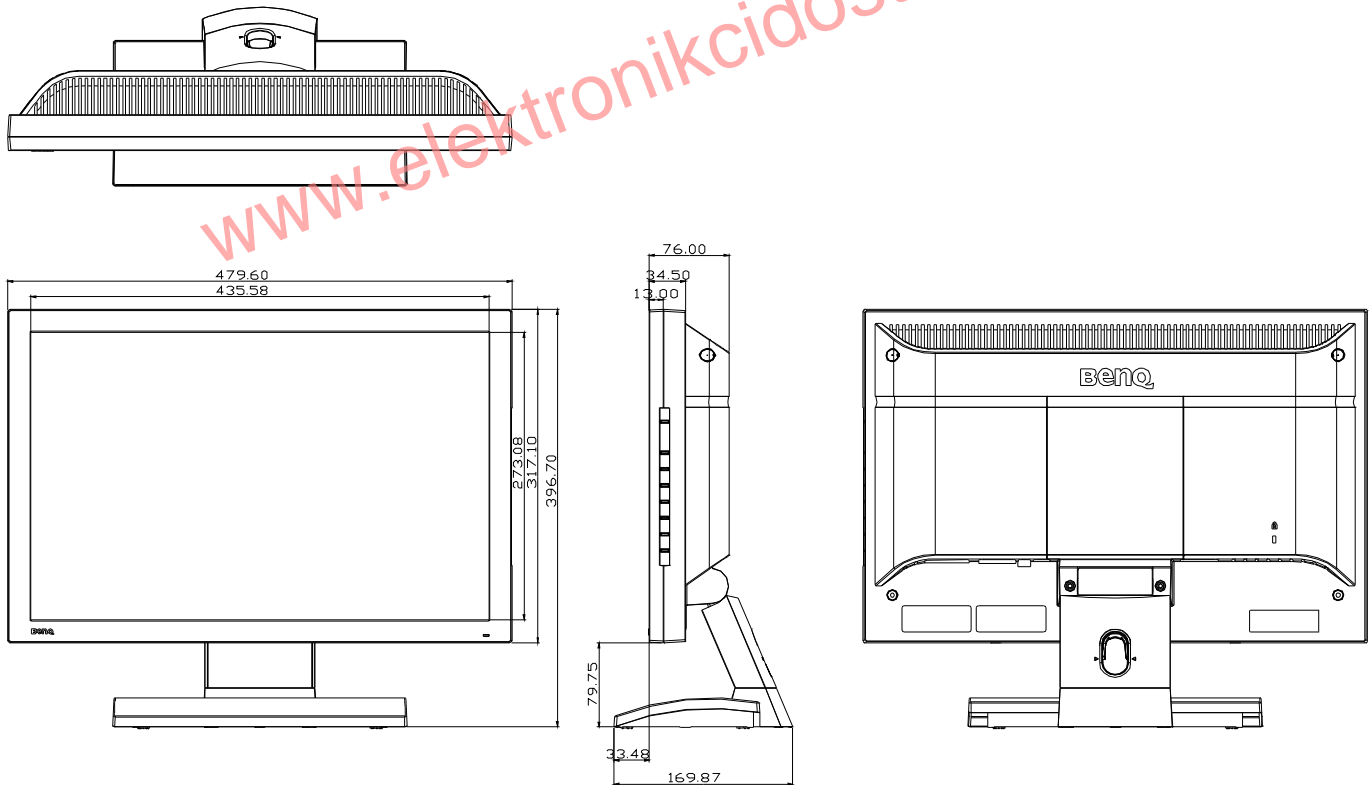
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X- Ray Requirement	DHHS (21 CFR)	USA X- Ray Standard		√	
	DNHW			√	
	PTB	German X- Ray standard		√	
Ergonomics	TUV / Ergo			√	
	ISO 13406-2			√	
	prEN50279			√	

Appendix: Physical Dimension Front View and Side view

Fig. 1 Physical Dimension Front View and Side view



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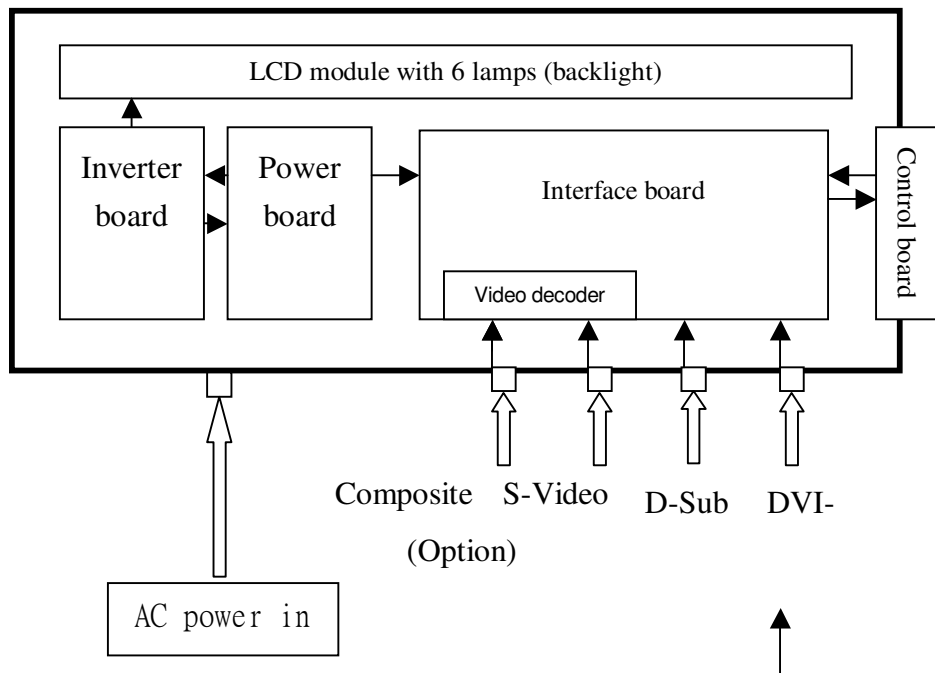
Chapter 2 Circuit Operation Theory

I. Introduction:

The FP202W is a 20.1" WSXGA+ (1680x1050) , 16.7M colors(R, G, B 8-bit data) TFT LCD monitor. It has 2 typical inputs, D-Sub and DVI-D, has 2 optional video inputs, S-video and Composite. It's compliant with VESA specification to offer a smart power management and power saving function. It also offers OSD menu for users to control the adjustable items and get some information about this monitor, and the best function is to offer users an easy method to set all adjustable items well just by pressing one key, we called it "Auto key" which can auto adjusting all controlled items. FP202W also offer DDC2 function to meet VESA standard.

II. Block diagram :

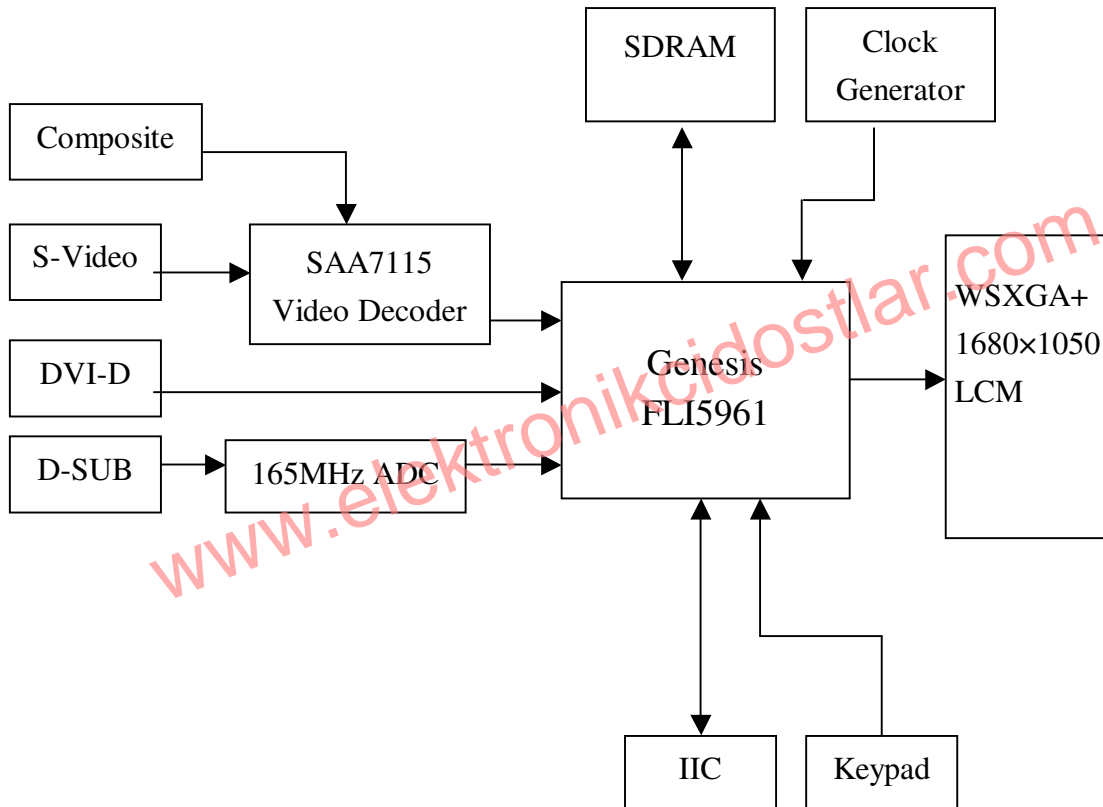
The FP202W consists of a LCD module with 6 lamps, a power board, a control board, a Led board and a interface board. The block diagram is shown as below.



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III. Circuit operation theory:

A-1.) Interface board diagram:



(a) Circuit operation theory:

A basic operation theory for the interface board D-Sub input is to convert input signal to digital RGB.

Analog RGB signal is converted to digital signal through ADC. The Scaler FLI5961 receives video data and optimizes the image automatically. It also supports 16 color from a 64k palette bitmap OSD, and keypad controlling. The output data are sent to LCD module.

Digital Visual Interface (DVI) is a standard. For DVI-D input, we connect to FLI5961 DVI receiver directly. The output data are also transmit to LCD module.

The video signals from S-Video or Composite input first through Video decoder (SAA-7115) for pre-processing, and then transfer to FLI5961 as ITU-656 Video format. After FLI5961 Video processing, the output data are also

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sent to LCD module.

(b) IC introduction:

- 1.) DDC (Display Data Channel) function: We use DDC IC to support DDC/2B function. DDC data is stored in 24C02(EEPROM). Those data related to LCD monitor specification. PC can read them by "SDA" and "SCL" serial communication for I²C communication for DDC/2B.
- 2.) FLI5961 IC: There are triple ADC, LVDS transmitter ,Scaling, Video Processing PIP and OSD functions in the FLI5961 IC. Scaling IC is revolutionary scaling engine, capable of expanding any source resolution to a highly uniform and sharp image, combined with the critically proven integrated 8 bit triple-ADC and patented Rapid-lock digital clock recovery system. It also support detect mode and DPMS control.
- 3.) SAA7115: To decode the video signals as digital signals, and transfer to back components for other processing.
- 4.) EEPROM: We use 24C16 to store all the adjustable data and user settings.And use 24C02 to store DVI EDID data.

A-2.) Control board introduction:

There are 8 keys for user's control which includes "Power", "Enter", "Up/Plus", "Down/Minus" , "Exit", "Senseye mode key", "Input select key "and "iKey" . The following descriptions are the introduction of these keys.

- (1) Power key: to turn/off power of monitor
- (2) "Enter" key: to enter sub-menus or select items.
- (3) "Up/Plus key: to select previous and to increase adjustment
- (4) "Down/Minus" key: to select next and to decrease adjustment
- (5) "Exit" key: to back to previous menu, or leave OSD (auto save)
- (6) "iKey" key: to perform auto adjustment
- (7) "Senseye" key: to select the senseye mode(movie1,movie2,photo).
- (8) "Input select" key: to perform the Input port selection.

(9) LED: It indicates the DPMS status of this LCD monitor; green light means DPMS on (Normal operating condition). Amber light means DPMS off (Powersaving).

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A-3.) Power board diagram:

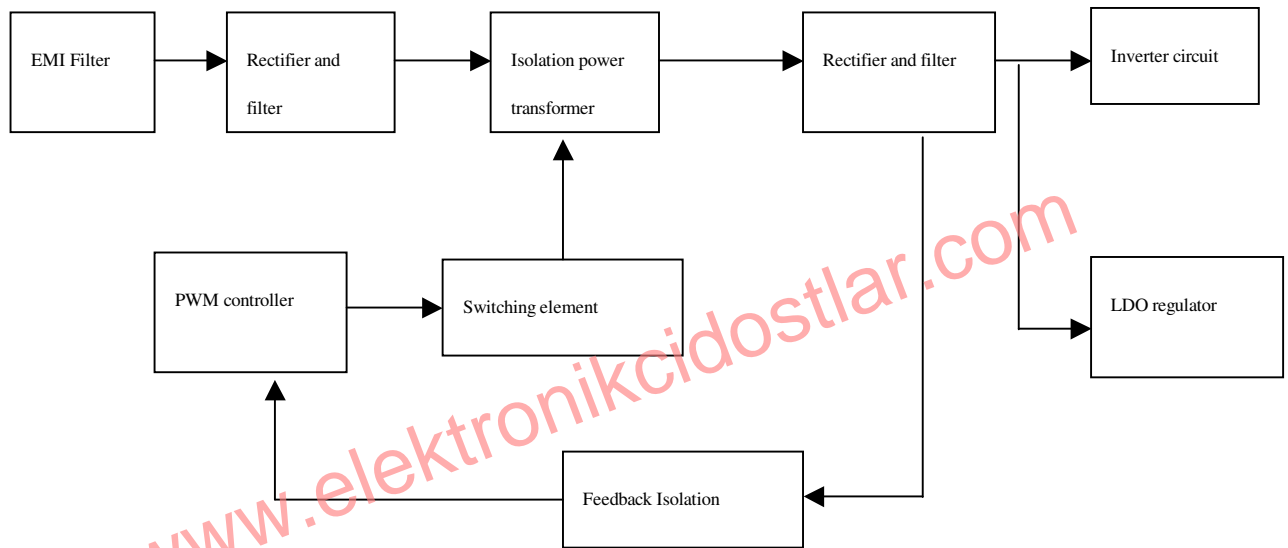


Fig.1

#1 EMI Filter

This circuit (fig. 2) is designed to inhibit electrical and magnetic interference for meeting FCC, VDE, VCCI standard requirements.

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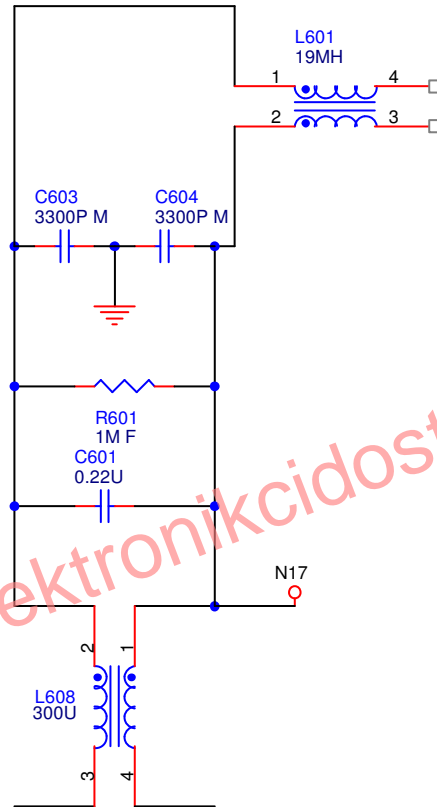


Fig. 2

#2 Rectifier and filter

AC Voltage (90-264V) is rectified and filtered by BD601, C605 (See Fig 3) and the DC Output voltage is 1.4*(AC input). (See Fig.3)

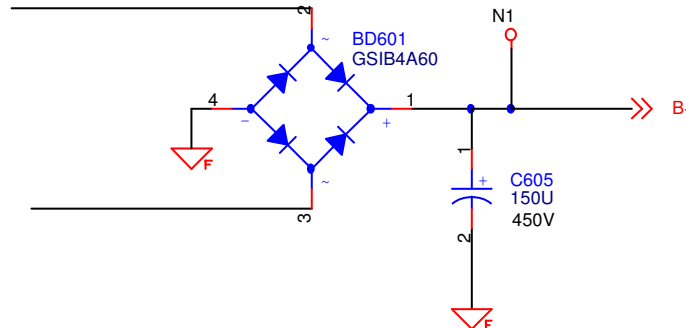


Fig. 3

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#3 Switching element and Isolation power transformer

When the Q601 turns on, energy is stored in the transformer. During Q601 turn-off period, the stored energy is delivered to the secondary of transformer. R607, C607 and D601 is a snubber circuit. R615 is current sense resistor to control output power. (See Fig.4)

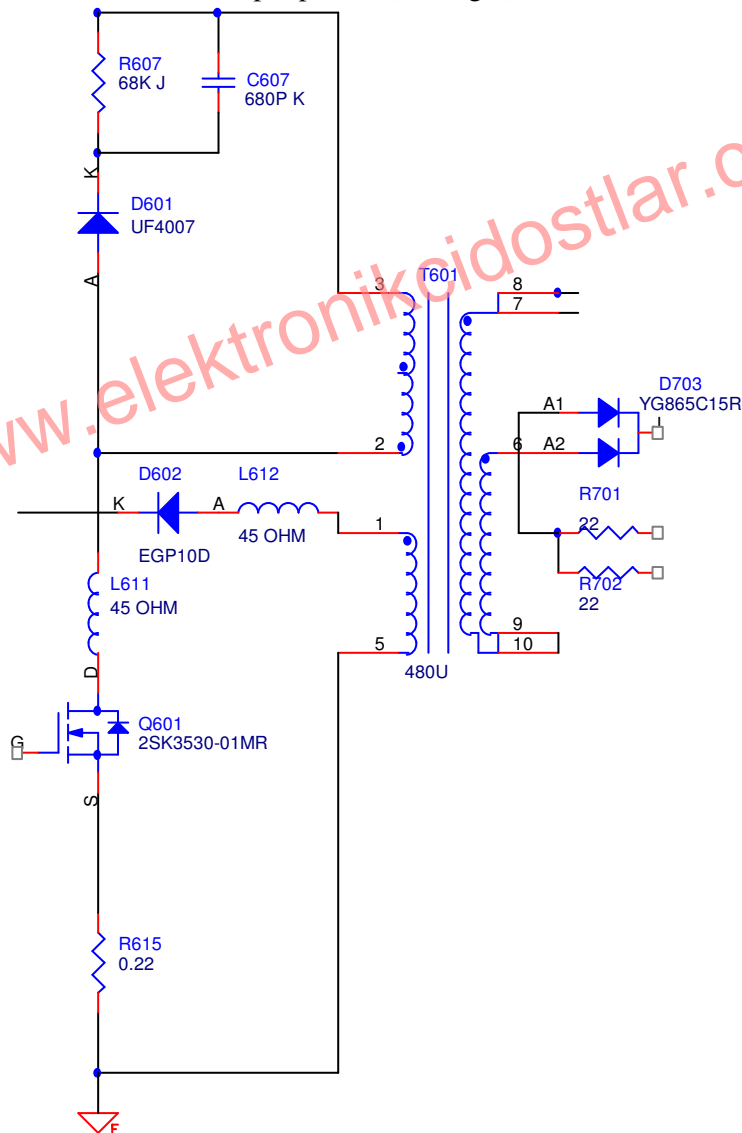


Fig. 4

□ Product System (PS)

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#4 Rectifier and filter

D701 ,D702 and C711,C712, C713 are to produce DC output. C709,C710 is used to suppress high Frequency switching spikes. (See Fig.5)

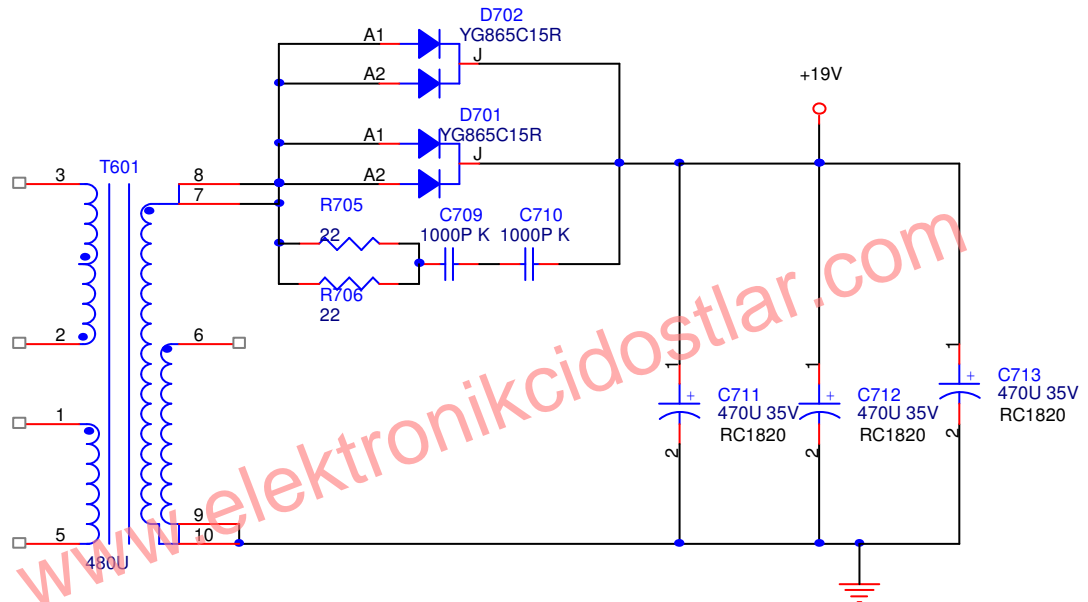


Fig. 5

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#5 PWM Controller

The PWM controller NCP1200A implements a standard current mode architecture. With an internal structure operating at a fixed 60KHz. Where the switch time is dictated by the peak current set-point. When the current set-point falls below a given value. The output power demand diminishes, the IC automatically enters the so-called skip cycle mode and provides excellent efficiency.

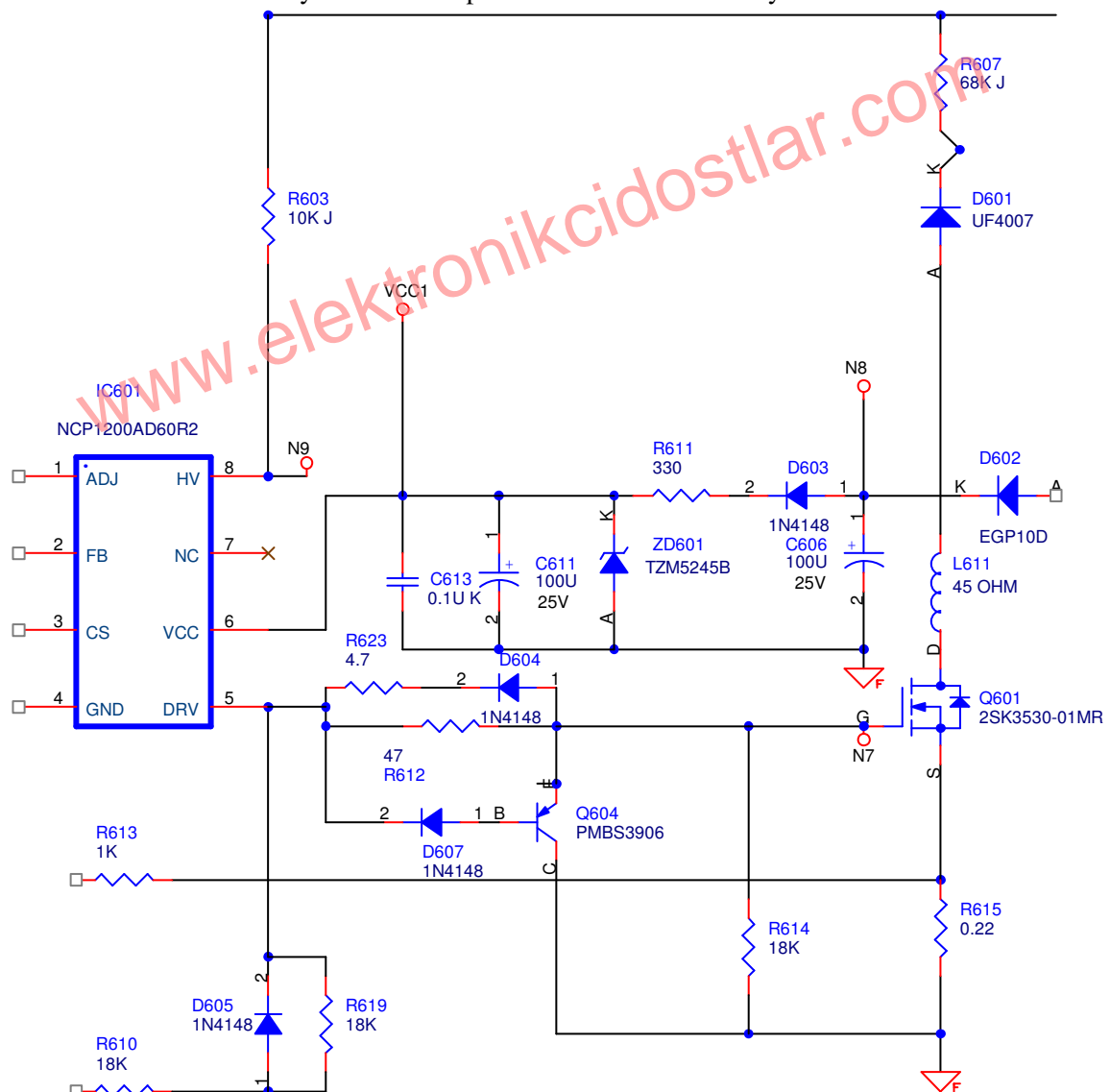


Fig. 6

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#6 Feedback circuit

PC123FY1 is a photo-coupler and LM431 is a shunt regulation. They are used to detect the output voltage change and be the primary and secondary isolation. When output voltage changes, the feedback voltage will be compared and duty cycle will be decided to control the correct output voltage. (See Fig.7)

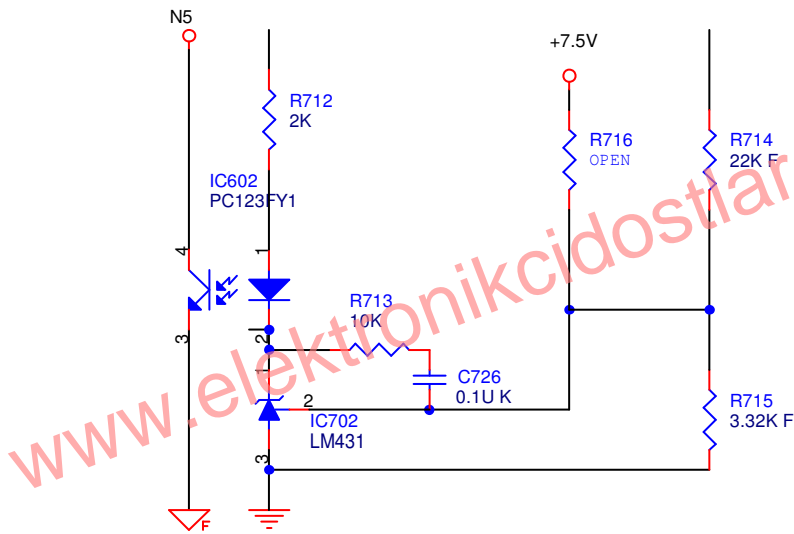


Fig. 7

A-3.) Control board introduction:

The main parts of the control board are a push button, and a LED.

(a) Push button: It's a simple switch function, pressing it for "ON" to do the auto adjustment function, releasing it for "OFF" to do nothing.

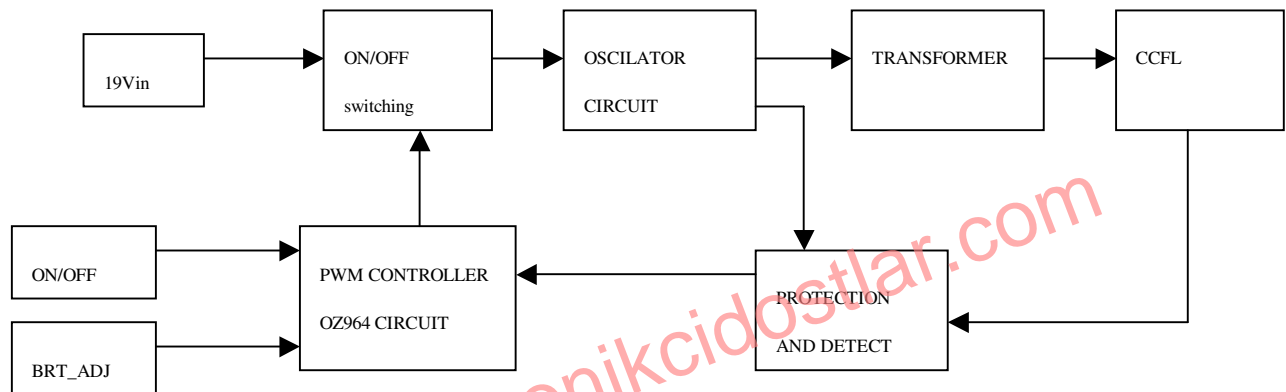
(c) LED: It indicates the DPMS status of this LCD monitor; green light means DPMS on (Normal operating condition). Amber light means DPMS off (Power off condition).

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A-4.) Inverter diagram:

1. Block Diagram:



2. General Specification

Input Voltage: 19V

Input Current: 2A max.

ON/OFF Voltage: 3.3V

PWM Duty: 5V/50KHz

Output Requirement:

Max. Output Current: 6.5mA

Min. Output Current: 3.0mA

Lamp Working Voltage: 780Vrms

Open Lamp Voltage: 1750Vrms

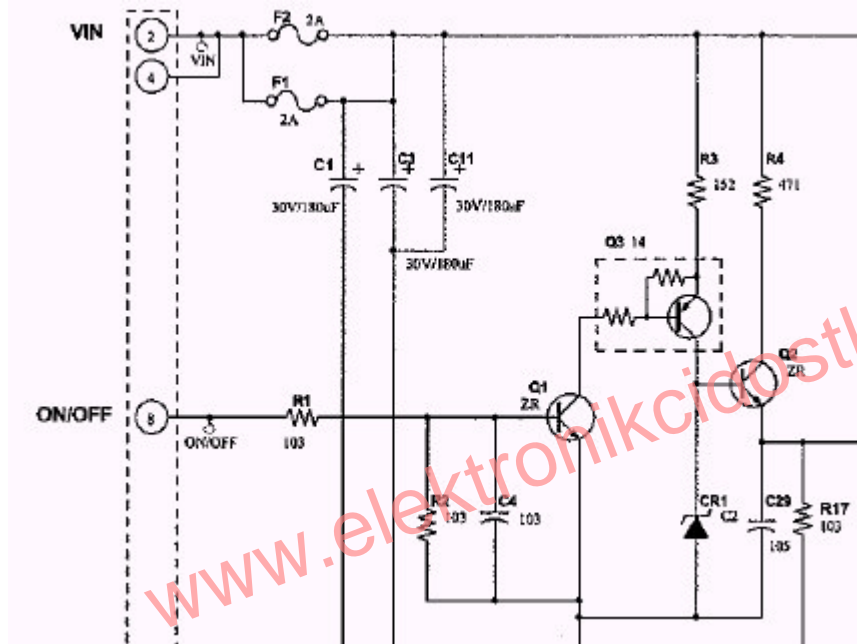
Frequency: 50KHz

□ Product System (PS)

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3.Circuit Operation Theorem

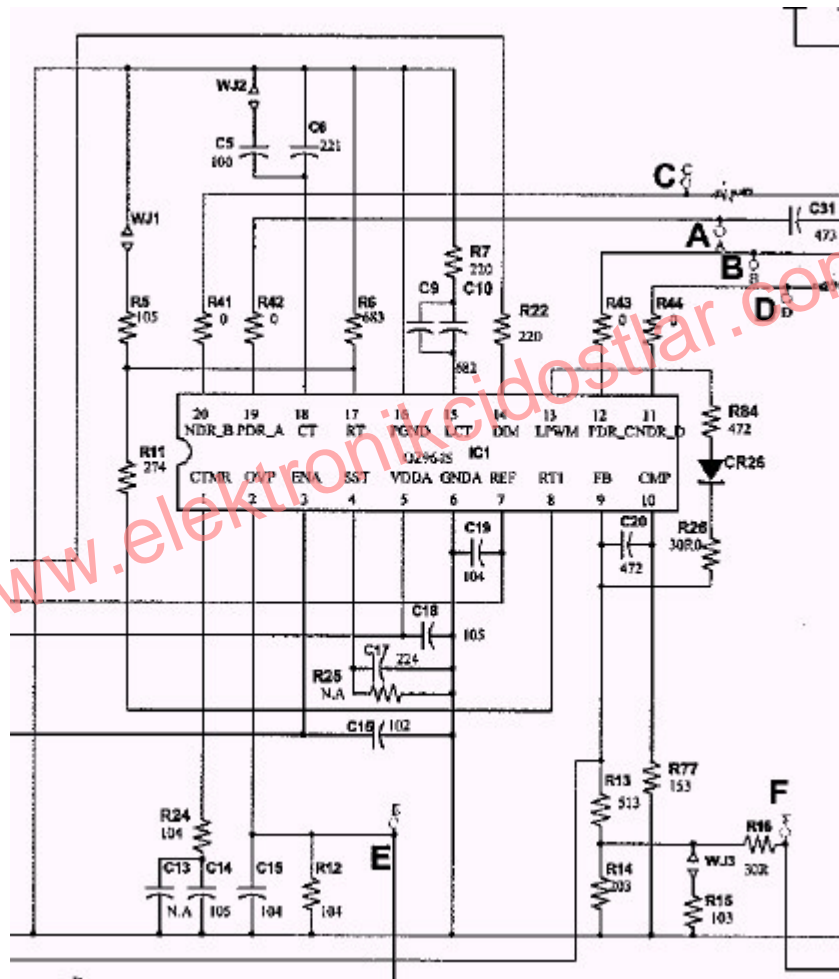
3.1 ON/OFF SWITCH



The turn-on voltage was controlled by R1 and R2. The inverter was turned on or off by the switching transistors Q1, Q2 and Q3.

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3.2 PWM Control circuit



OZ964 is a dual PWM controller. C6 and R6 decide the working frequency. BLT_ADJ signal is from control board, control pulse width then decide how much energy delivery to CCFL also decide CCFL brightness. The OZ964 drives a full-bridge power train where transformer couples the energy from the power source to the secondary CCFL load, The switches in the bridge denoted as A ,B ,C,and D are configured such that A ,B ,C,and D are turn on complementarily. The duration of A ,B ,C,and D turn on simultaneously determines an amount of energy put into the transformer which in turn delivers to CCFL . The current in CCFL is sensed via resistor and regulated through the adjustment of the turn on time for both diagonal switches. This is accomplished through an error amplifier in the current feedback loop. A voltage loop is also established to monitor the output voltage so that a programmable striking voltage is achieved.

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PIN DESCRIPTION

Names	Pin No.	I/O	Description
CTIMR	1	I	Capacitor for CCFL ignition duration
OVP	2	I	Output voltage sense $V_{th}=2.0V$
ENA	3	I	Enable input; TTL signal is applicable
SST	4	I	Soft-start capacitor
VDDA	5	I	Voltage source for the IC
GND A	6	I	Analog signal ground reference
REF	7	O	Reference voltage output; 2.5V typical
RT1	8	I	Resistor for programming ignition frequency
FB	9	I	CCFL current feedback signal
CMP	10	O	Compensation output of the current error amplifier
NDR_D	11	O	NMOSFET drive output
PDR_C	12	O	PMOSFET drive output
LPWM	13	O	Low-frequency PWM signal for burst-mode dimming control
DIM	14	I	Input analog signal for burst-mode dimming control
LCT	15	I	Triangular wave for burst-mode dimming; frequency
PGND	16	I	Power ground reference
RT	17	I	Timing resistor set operating frequency
CT	18	I	Timing capacitor set operating frequency
PDR_A	19	O	PMOSFET drive output
NDR_B	20	O	NMOSFET drive output

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Chapter 3 Alignment Procedure

1. Alignment procedure (for function adjustment)

A. Preparation:

1. Setup input timing VESA-CVT(1680x1050@60Hz), 32-Grays pattern.
2. Setup unit and keep it warm up at least 30 minutes.

B. Timing adjustment:

1. Enter factory setting area (press “ENTER”, “EXIT” and then press “SOFTPOWER”).
2. Check the settings to following values:

Contrast = 50

Brightness = 90

OSD time = 20

Color = Normal

Language = English

Then, turn off the monitor power.

3. Turn on power enter user area.

C. Color balance adjustment:

1. Enter factory setting area (press “ENTER”, “I-Key” and then press “SOFTPOWER”).
2. Setup input timing VESA-CVT(1680x1050@60Hz), 32-Gray pattern (pattern 48) .
3. Press “I-KEY”, and than OSD will show “White Balance” item and than press “ENTER” button to do auto color.

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D. Color adjustment:

1. Setup input timing VESA-CVT, white pattern .
2. Confirm auto color adjustment had already done.
3. Measure color temperature by Minolta CA-110 (or equivalent equipment).
4. Check the color temperature Bluish, Reddish & Normal. The color temperature specification as follows:

White Balance	X+-	0.283+(-) 0.03
(Bluish, 9300K set on OSD)	Y+-	0.297+(-) 0.03
White Balance	X+-	0.326+(-) 0.03

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(Reddish, 5800K set on OSD)	Y+-	0.342+(-) 0.03
White Balance	X+-	0.313+(-) 0.03
(sRGB, 6500K set on OSD)	Y+-	0.329 +(-) 0.03

5. Setup input timing , 32 -Gray pattern.

To check if there are any abnormal display problems of preset timing modes .

Check the following preset timings with General pattern:

No.	Mode	H	V
1	720×400 @ 70Hz	31.468	70.8
2	640×480 @ 60Hz	31.469	59.940
3	640×480 @ 75Hz	37.500	75.000
4	800×600 @ 60Hz	37.879	60.317
5	800×600 @ 75Hz	46.875	75.000
6	1024×768 @ 60Hz	48.363	60.004
7	1024×768 @ 75Hz	60.023	75.029
8	1152×864 @ 75Hz	67.500	75.000
9	1280×1024 @ 60Hz	63.981	60.020
10	1280×1024 @ 75Hz	79.976	75.025
11	1680×1050-R @ 60Hz	64.67	59.88
12	1680×1050 @ 60Hz	65.29	59.95

6. Checking if the picture is no good, reject this monitor.
7. To check the power consumption by disabling “burn-in mode” setting
8. To clear user data and program complete DDC data to monitor by IIC bus communication.

E. Writing EDID file:

1. Setup a PC with DDC card.
2. Connect PC to monitor with a D-sub signal cable.
3. Please refer to the C212 for the correct EDID file.
4. Runs the writing program to write the EDID file into EEPROM .
5. Read EEPROM data and confirm it to match with the C212 document definition.

F. Command definition :

PC Host will send 0x7C IIC slave address and then following 4 bytes command

I2C Send Command	Byte1	Byte2	Byte3	Byte4	OK	N.A.	Remark
Write Contrast to MCU RAM	CA	55	Data	cksum	√		Write data to MCU RAM and update the related register to refresh the screen immediately. Don't store data to EEPROM.
Write Brightness to MCU RAM	CA	56	Data	cksum	√		
Write Red Gain to MCU RAM	CA	57	Data	cksum	√		
Write Green Gain to MCU RAM	CA	58	Data	cksum	√		
Write Blue Gain to MCU RAM	CA	59	Data	cksum	√		

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Read Contrast from MCU RAM	C3	55	XX	cksum	√		
Read Brightness from MCU RAM	C3	56	XX	cksum	√		
Read Red Gain from MCU RAM by color index	C3	57	XX	cksum	√		
Read Green Gain from MCU RAM by color index	C3	58	XX	cksum	√		Base on current color index to read back the right gain value.
Read Blue Gain from MCU RAM by color index	C3	59	XX	cksum	√		
Write C1 (Bluish) R-Gain Data to EEPROM	AA	3C	Data	cksum	√		
Write C1 (Bluish) G-Gain Data to EEPROM	AA	3D	Data	cksum	√		
Write C1 (Bluish) B-Gain Data to EEPROM	AA	3E	Data	cksum	√		
Write C2 (sRGB) R-Gain Data to EEPROM	AA	4C	Data	cksum	√		
Write C2 (sRGB) G-Gain Data to EEPROM	AA	4D	Data	cksum	√		
Write C2 (sRGB) B-Gain Data to EEPROM	AA	4E	Data	cksum	√		
Write C3 (Reddish) R-Gain Data to EEPROM	AA	5C	Data	cksum	√		
Write C3 (Reddish) G-Gain Data to EEPROM	AA	5D	Data	cksum	√		
Write C3 (Reddish) B-Gain Data to EEPROM	AA	5E	Data	cksum	√		
Write User R-Gain Data to EEPROM	AA	6C	Data	cksum	√		
Write User G-Gain Data to EEPROM	AA	6D	Data	cksum	√		
Write User B-Gain Data to EEPROM	AA	6E	Data	cksum	√		
Write Cx R-Gain Data to EEPROM	AA	7C	Data	cksum		√	Reserved for some model have extra color temperature
Write Cx G-Gain Data to EEPROM	AA	7D	Data	cksum		√	
Write Cx B-Gain Data to EEPROM	AA	7E	Data	cksum		√	
Write Contrast to EEPROM	AA	92	Data	cksum	√		
Write Brightness to EEPROM	AA	93	Data	cksum	√		
Write C/T index to EEPROM	AA	94	0~4	cksum	√		1=C1/9300/Bluish, 2=C2/6500/sRGB/, 3=C3/5800/Reddish, 4=User, 5=Cx
Write OSD-Hpos to EEPROM	AA	95	Data	cksum	√		
Write OSD-Vpos to EEPROM	AA	96	Data	cksum	√		
Write Language to EEPROM	AA	97	0~7	cksum	√		0=DE, 1=EN, 2=ES, 3=FR, 4=IT, 5=JA, 6=繁中, 7=簡中 (Also Update MCU RAM)
Write EEPROM OSD Timer	AA	98	Data	cksum	√		
Write EEPROM Volume	AA	99	Data	cksum	√		
Write EEPROM Gamma index	AA	9A	Data	cksum		√	For model with Gamma curve selection function
Write OSD Transparency to EEPROM	AA	9E	Data	cksum		√	
Write OSD Rotation to EEPROM	AA	9F	Data	cksum		√	
Read C1 (Bluish) R-Gain data from EEPROM	A3	3C	XX	cksum	√		
Read C1 (Bluish) G-Gain data from EEPROM	A3	3D	XX	cksum	√		
Read C1 (Bluish) B-Gain data from EEPROM	A3	3E	XX	cksum	√		
Read C2 (sRGB) R-Gain data from EEPROM	A3	4C	XX	cksum	√		
Read C2 (sRGB) G-Gain data from EEPROM	A3	4D	XX	cksum	√		

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Read C2 (sRGB) B-Gain data from EEPROM	A3	4E	XX	cksum	√	
Read C3 (Reddish) R-Gain data from EEPROM	A3	5C	XX	cksum	√	
Read C3 (Reddish) G-Gain data from EEPROM	A3	5D	XX	cksum	√	
Read C3 (Reddish) B-Gain data from EEPROM	A3	5E	XX	cksum	√	
Read User R-Gain data from EEPROM	A3	6C	XX	cksum	√	
Read User G-Gain data from EEPROM	A3	6D	XX	cksum	√	
Read User B-Gain data from EEPROM	A3	6E	XX	cksum	√	
Read Cx R-Gain data from EEPROM	A3	7C	XX	cksum	√	Reserved for some model have extra color temperature
Read Cx G-Gain data from EEPROM	A3	7D	XX	cksum	√	
Read Cx B-Gain data from EEPROM	A3	7E	XX	cksum	√	
Read Contrast from EEPROM	A3	92	XX	cksum	√	
Read Brightness from EEPROM	A3	93	XX	cksum	√	
Read C/T index from EEPROM	A3	94	XX	cksum	√	1=C1/9300/Bluish, 2=C2/6500/sRGB/ 3=C3/5800/Reddish, 4=User, 5=Cx
Read OSD-Hpos EEPROM	A3	95	XX	cksum	√	
Read OSD-Vpos from EEPROM	A3	96	XX	cksum	√	
Read Language from EEPROM	A3	97	XX	cksum	√	0=DE, 1=EN, 2=ES, 3=FR, 4=IT, 5=JA, 6=繁中, 7=簡中
Read OSD Timer from EEPROM	A3	98	XX	cksum	√	
Read Volume from EEPROM	A3	99	XX	cksum	√	
Read Gamma index from EEPROM	A3	9A	XX	cksum	√	For model with Gamma curve selection function
Read OSD Transparency from EEPROM	A3	9E	XX	cksum	√	
Read OSD Rotation from EEPROM	A3	9F	XX	cksum	√	
Change Color Temp. to C1/9300K/Bluish	CC	01	XX	cksum	√	Change C/T immediately. And store C/T index to EEPROM.
Change Color Temp. to C2/6500K/sRGB	CC	02	XX	cksum	√	
Change Color Temp. to C3/5800K/Reddish	CC	03	XX	cksum	√	
Change Color Temp. to User	CC	04	XX	cksum	√	
Change Color Temp. to Cx	CC	05	XX	cksum	√	Reserved
Change Input Source to D-Sub	CD	01	XX	cksum	√	
Change Input Source to DVI	CD	02	XX	cksum	√	
On burn in mode	CE	01	XX	cksum	√	Store data to EEPROM
Off burn in mode	CE	XX*	XX	cksum	√	XX* = Non "1" value Store data to EEPROM
Monitor is forced power saving	CF	01	XX	cksum	√	
Monitor wake up from power saving	CF	XX*	XX	cksum	√	XX* = Non "1" value
User mode to factory mode	1A	5A	XX	cksum	√	
Auto Color (Offset1, Offset2, Gain)	1B	5A	XX	cksum	√	
Copy EDID Serial number to EEPROM	1C	5A	XX	cksum	√	For specified "Industry Customer" model.
Factory mode to User mode	1E	5A	XX	cksum	√	
Clear user mode and factory recall	1F	5A	XX	cksum	√	Store data to EEPROM

□ Product System (PS)

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Write EDID data to MCU DDC RAM	55	NA	NA	NA	√		For MTV312 MCU type
Copy DDC RAM data to EEPROM	BB	NA	NA	NA	√		For MTV312 MCU type
Drive WP pin to low to enable write DDC IC	55	NA	NA	NA		√	For stand alone DDC IC
Drive WP pin to high to disenable write function	BB	NA	NA	NA		√	For stand alone DDC IC
EEPROM Bank R/W (For Debug using only, not for Production Line Write EEPROM directly)							
Read EEPROM Bank 0	B0	Address	XX	cksum	√		
Read EEPROM Bank 1	B1	Address	XX	cksum	√		
Read EEPROM Bank 2	B2	Address	XX	cksum		√	(For 24C08 type)
Read EEPROM Bank 3	B3	Address	XX	cksum		√	(For 24C08 type)
Write EEPROM Bank 0	B8	Address	Data	cksum	√		
Write EEPROM Bank 1	B9	Address	Data	cksum	√		
Write EEPROM Bank 2	BA	Address	Data	cksum		√	(For 24C08 type)
Write EEPROM Bank 3	BB	Address	Data	cksum		√	(For 24C08 type)

Note A: Byte4 (cksum) = Byte1 + Byte2 + Byte3

Note B: Data = The value write to MCU or EEPROM

Note C: XX = don't care, any value (<=0xFF).

When PC Host sends 0x7D command to MCU, MCU must return as following (2 bytes)

Return Code	R-Byte1	R-Byte2
Checksum error code	FC	AA
Normal return code	the above Byte3 (/data)	FC
If normal return code is exact FCh	FC	CF

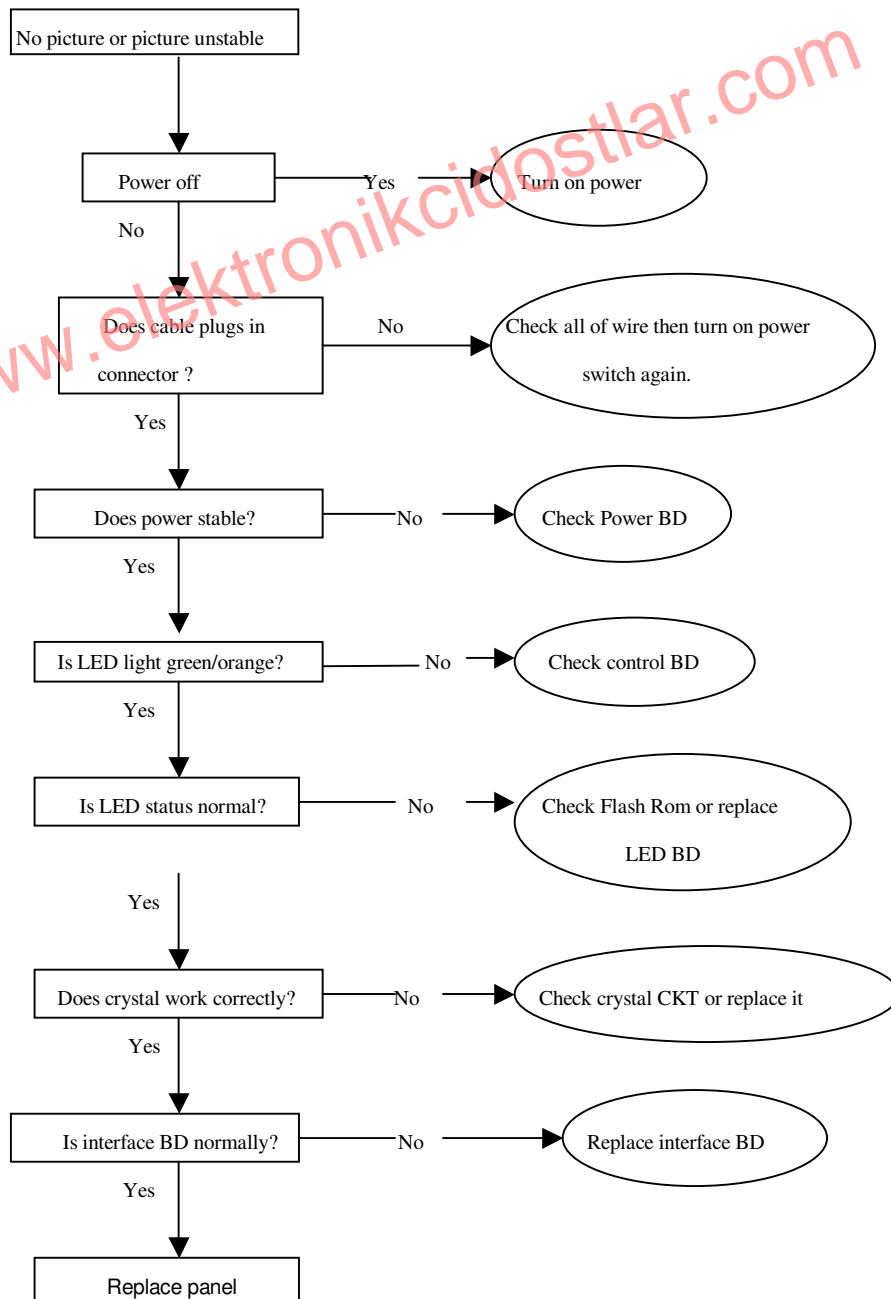
Subject:	C5-501 Service Manual	Part No.:	99.L2C72.000	Rev.:	0
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Chapter 4 Trouble Shooting Guide

Q20W5 TROUBLE SHOOTING GUIDE

No Display or display is unstable:

1.1 Interface Board:

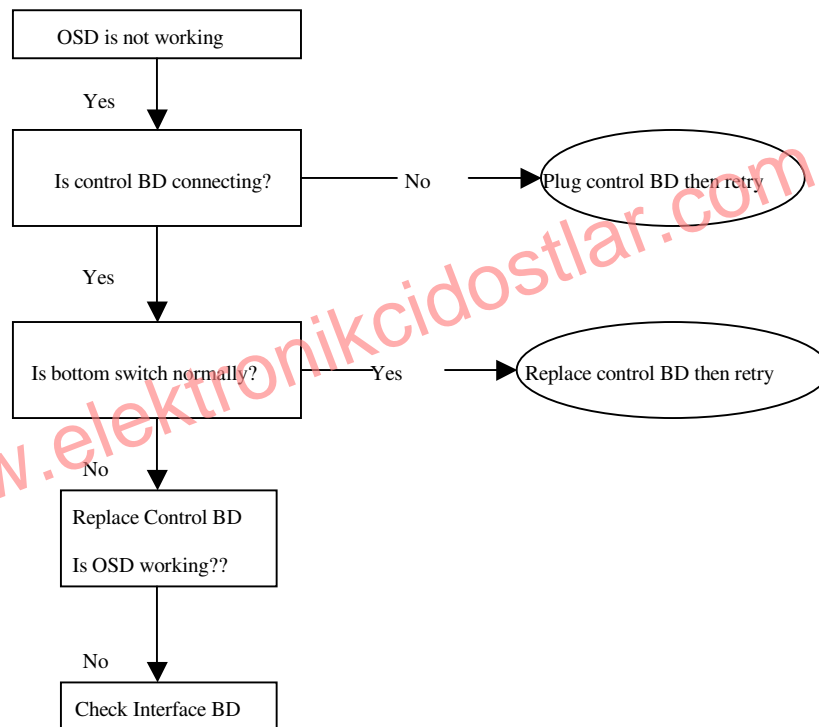


□ Product System (PS)

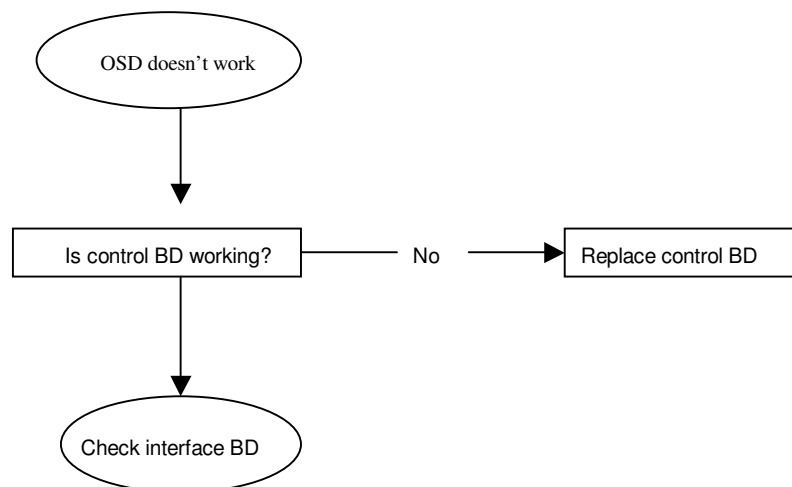
Subject:	C5-501 Service Manual	Part No.:	99.L2C72.000	Rev.:	0
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2. BUTTON function:

2.1 Control Board



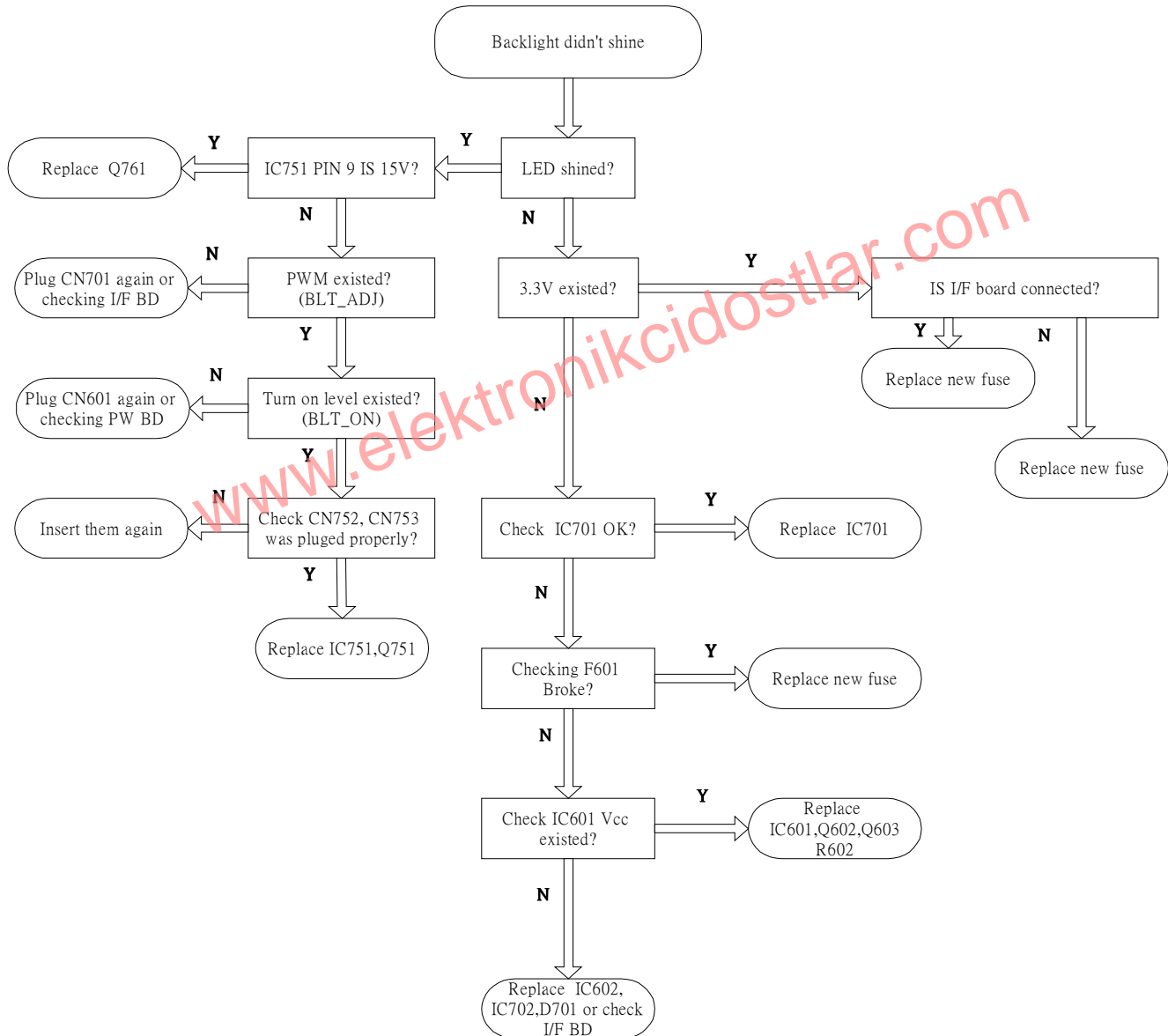
3. OSD function:



□ Product System (PS)

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4. Power Board



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Chapter 5 Screw Torque

(A) STANDARD SCREW TORQUE SPEC.

ITEM	P/N	DESCRIPTION	MOUNTING MATERIAL	TORQUE (KG-CM)	HOLE SIZE (MM)	Screw Head
1	86.20FB4.019 8F.20FB4.019	SCRW MACH HEX #4-40*0.3" NI	METAL	5.0±0.6	#4-40	X
2	86.5A224.6R0 8F.5A224.6R0	SCRW MACH FLAT M3*6L ZN	METAL	Side mount:3±0.6 Other: 4±0.6	M3*0.5	#2
3	86.8A356.100 8F.8A356.100	SCREW MACH FPH M4*10L B-ZN NYL	METAL	11.0±1.0	M4*0.7	#2
4	86.8A325.6R0 8F.8A325.6R0	SCRW MACH FLAT-P M3*6L B-ZN	METAL	Side mount:3±0.6 Other: 4±0.6	M4*0.7	#2
5	86.5A356.8R0 8F.5A356.8R0	SCRW MACH FH M4*8L B-ZN NYL	METAL	9.0±1.0	M4*0.7	#2
6	86.5A356.120 8F.5A356.120	SCRW MACH FH M4*12L B-ZN NYL	METAL	11.0±1.0	M4*0.7	#2
7	60.L7204.001 6K.L7204.001	ASSY SCREW M4*10 FP527	METAL	11.0±1.0	M4*0.7	#2
8	60.L8810.001 6K.L8810.001	ASSY SCREW M4*8 FP726A NLK ISU	METAL	9.0±1.0	M4*0.7	#2
9	86.WA314.8R0 8F.WA314.8R0	SCRW TAP CAP M3*1.34P*8L B-ZN	PLASTIC	5.0±1.0	Ø2.35±0.05	#2
10	86.XA314.8R0 8F.XA314.8R0	SCRW TAP FLAT M3*1.34P*8L B-ZN	PLASTIC	4.5±0.5	Ø2.35±0.05	#2
11	86.00274.8R0 8F.00274.8R0	SCREW FPH TAP M3*8L NI	PLASTIC	5.0±1.0	Ø2.35±0.05	#2
12	86.VG314.120 8F.VG314.120	SCRW TAP PH W/FL PT M3*12L B-Z	PLASTIC	5.0±1.0	Ø2.35±0.05	#2
13	86.VA314.100 8F.VA314.100	SCRW TAP PAN PT M3*10L B-ZN	PLASTIC	5.0±1.0	Ø2.35±0.05	#2
14	86.VA514.100 8F.VA514.100	SCRW TAP PAN PT M3*10L NI	PLASTIC	5.0±1.0	Ø2.35±0.05	#2
15	86.VZ526.6R0 8F.VZ526.6R0	SCRW TAP FLAT+EXT M4*6L ZN-W	STANOFF	10.0±1.0	M4*0.7	#2
16	86.XA326.100 8F.XA326.100	SCRW TAP FLAT M4*10L B-ZN	PLASTIC	9.0±1.0	Ø3.35±0.05	#2
17	86.5A422.2R4 8F.5A422.2R4	SCRW MACH FLAT-P M2*2.4L C-ZN	PLASTIC	1.0±0.1	Ø1.4±0.05	#1
18	86.00273.6R0 8F.00273.6R0	SCRW TAP PH F/10WSH M3*6L C-ZN	METAL	No thread : 8~10 Have thread:6~8	Ø2.65±0.05	#2
19	86.VG434.6R0 8F.VG434.6R0	SCRW TAP PAN F/WSH M3*6L C-ZN	METAL	No tread : 8~10 Have thread:6~8	Ø2.65±0.05	#2
20	86.XA213.8R0 8F.XA213.8R0	SCRW TAP FLAT/PT M2.5*8L ZN	PLASTIC	4.0±0.5	Ø2.0±0.05	#1

□ Product System (PS)

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(B) SPECIAL SCREW TORQUE SPEC.

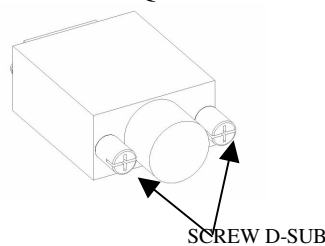
ITEM	P/N	DESCRIPTION	MOUNTING MATERIAL	TORQUE (KG-CM)	HOLE SIZE (MM)	Screw Head
21	86.00003.143 8F.00003.143	SCRW TAP PAN #4-40*3/8	Aluminum	3.3±0.3	Φ2.6±0.03	#2
22	60.L8811.001 6K.L8811.001	ASSY SCREW M4*6 FP726A NLK ISU	METAL	9.0±1.0	M4*0.7	#2
23	60.L1G06.001 6K.L1G06.001	ASSY SCRW M4*12L L1740	METAL	11.0±1.0	M4*0.7	#2
24	86.00007.143 8F.00007.143	SCREW TAP CAP M3*6L B ZN	Metal	No tread : 8~10 Have tread:6~8 Aluminum:4~5	Φ2.68±0.03	#2
25	86.XA356.6R0 8F.XA356.6R0	SCRW TAP FLAT M4*6L B-ZN NYL	METAL	9.0±1.0	M4*0.7	#2
26	86.VA512.4R0 8F.VA512.4R0	SCRW TAP PH M2*4L NI	PLASTIC	1.0±0.2	Ø1.6±0.05	#1
27	86.XA524.6R0 8F.XA524.6R0	SCRW TAP FLT M3*6L NI	PLASTIC	4.5±0.5	Ø2.35±0.05	#2
28	86.PA526.8R0 8F.PA526.8R0	SCREW TAP PAN M4*8L NI	PLASTIC	8.0±1.0	Ø3.35±0.05	#2
29	86.PA526.120 8F.PA526.120	SCRW TAP PAN M4*12L NI	PLASTIC	9.0±1.0	Ø3.35±0.05	#2
30	86.VG434.4R0 8F.VG434.4R0	SCRW TAP PAN F/WSH M3*4L C-ZN	METAL	No thread : 8~10 Have thread:6~8 Aluminum:4~5	Ø2.68±0.03	#2
31	8F.5A224.5R0	SCRW MACH FLAT M3*5L ZN	Metal	Side mount:3±0.6 Other: 4±0.6	M3*0.5	#2
32	8F.8A224.6R0	SCRW MACH FLAT-P M3*6L ZN	METAL	Side mount:3±0.6 Other: 4±0.6	M4*0.7	#2
33	86.00007.144 8F.00007.144	SCREW TAP CAP #4-40*10 ZN	Aluminum	3.3±0.3	Φ2.6±0.03	#2
34	86.1A356.100 8F.1A356.100	SCRW MACH PAN M4*10L B-ZN NYLO	METAL	11.0±1.0	M4*0.7	#2
35	8F.MA325.6R0	SCRW TAP FLAT-P M3*6L B-ZN	METAL	No thread : 8~10 Have thread:6~8 Aluminum:4~5	Ø2.68±0.03	#2

*SCREW Q'TYPE AND POSITION
REFERRED TO C328.

*NOTES:

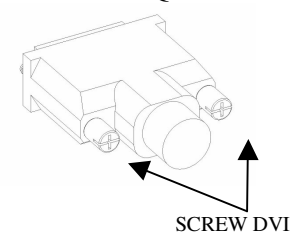
1. (A)STANDARD SCREW TORQUE SPEC.
2. (B)SPECIAL SCREW TORQUE SPEC.
3. T: TAPPING SCREW.
4. M: MACHING SCREW.
5. GP SCREW : 8F.- & 6K.-

D-SUB Connector
SCREW TORQUE SPEC.



SCREW TORQUE: 3±0.5
(KG-CM)

DVI Connector
SCREW TORQUE SPEC.

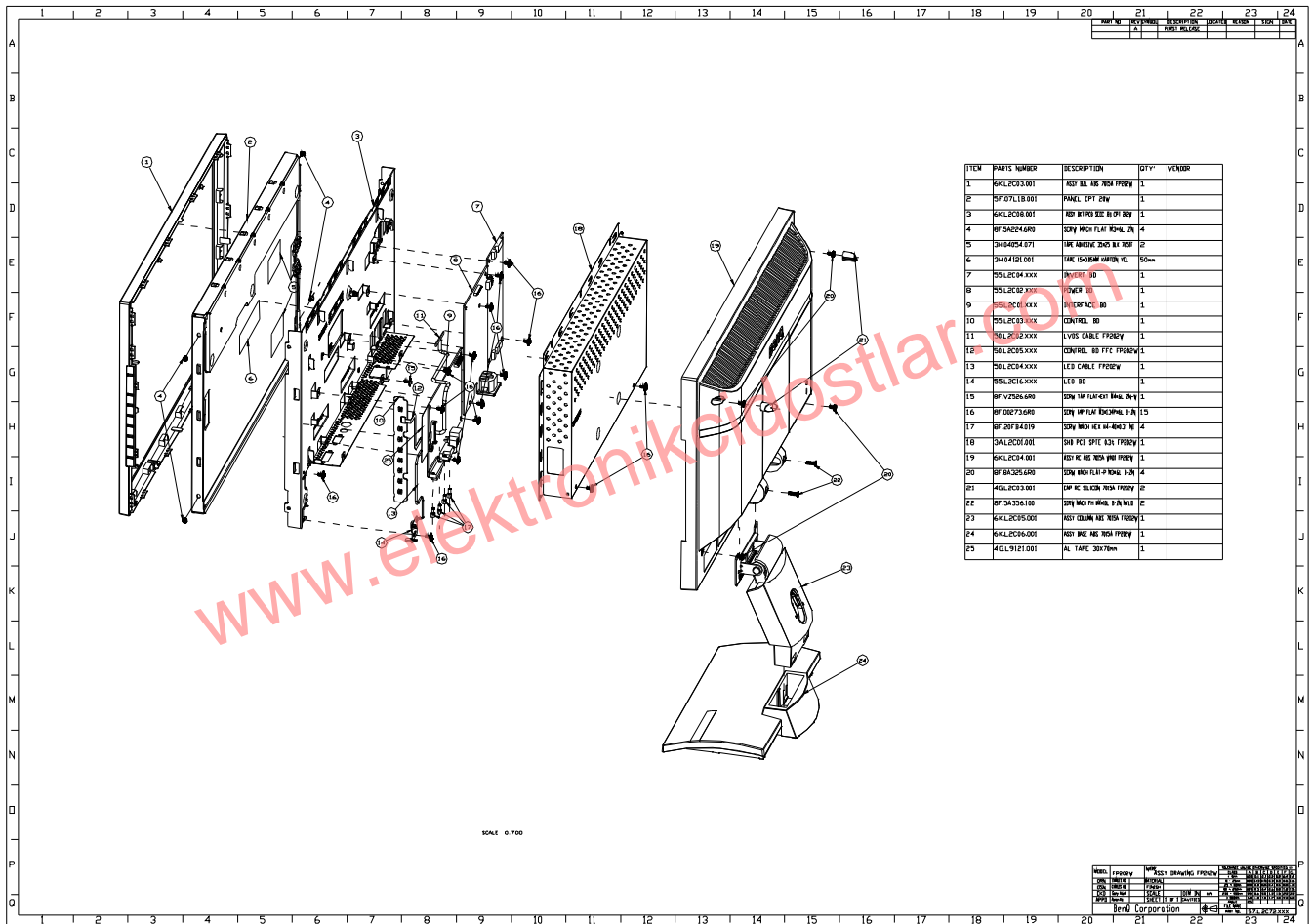


SCREW TORQUE :
3±0.5(KG-CM)

Product System (PS)

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Chapter 6 Exploded Diagram



□ Product System (PS)

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Chapter 7 Customer Acceptance Criteria

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- 1.0 SCOPE
- 2.0 PURPOSE
- 3.0 APPLICATION
- 4.0 DEFINITION
- 5.0 CLASSIFICATION OF DEFECTS
- 6.0 CLASSIFICATION OF DEFECTIVES
- 7.0 EXPRESSION OF DEFECTIVES
- 8.0 INSPECTION STANDARD
- 9.0 GENERAL RULES
- 10.0 TEST CONDITIONS
- 11.0 TEST EQUIPMENTS

PART I VISUAL INSPECTION CRITERIA

- 1. PACKING
- 2. ACCESSORIES
- 3. APPEARANCE
- 4. AC POWER AND SIGNAL CABLE
- 5. INTERIOR OF THE PRODUCT

PART II OPERATIONAL INSPECTION CRITERIA

- 1. TEST PATTERN
- 2. SPECIFICATIONS
- 3. OPERATIONAL INSPECTION CRITERIA

PART III PANEL INSPECTION CRITERIA

□ Product System (PS)

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Q20W5 LCD Color Monitor

Customer Acceptance Criteria

1.0 SCOPE

This document establishes the general workmanship standards and functional Acceptance criteria for LCD color monitor model Q20W5 Produced by BenQ, Inc.

2.0 PURPOSE

The purpose of this publication is to define a procedure for inspection of the LCD monitor by means of a customer acceptance test, the method of evaluation of defects and rules for specifying acceptance levels.

3.0 APPLICATION

The "Customer Acceptance Criteria" is applicable to the inspection of the LCD monitor, completely packed and ready for dispatch to customers. **Unless otherwise specified, the customer acceptance inspection should be conducted at manufacturer's site.**

4.0 DEFINITION

The "Customer Acceptance Criteria" is the document defining the process of examining, testing or otherwise comparing the product with a given set of specified technical, esthetic and workmanship requirements leading to an evaluation of the "degree of fitness for use", including possible personal injury or property damage for the user of the product.

5.0 CLASSIFICATION OF DEFECTS

The defects are grouped into the following classes:

5.1 Critical defect

A critical defect is a defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, maintaining or depending upon the product.

5.2 Major defect

A major defect is a defect, other than critical, that is likely to result in failure, or to reduce materially the usability of the product for its intended purpose.

5.3 Minor defect

A minor defect is a defect that is not likely to reduce materially the usability of the product for its intended purpose, or is a departure from established standards having little bearing on the effective use of operation of the product.

6.0 CLASSIFICATION OF DEFECTIVES

A defective is a product which contains one or more defects. The defective will be classified into following classes:

6.1 Critical defective

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A critical defective contains one or more critical and may also contain major and/or minor defects.

6.2 Major defective

A major defective contains one or more defects and may also contain minor defects but contains no critical defect.

6.3 Minor defective

A minor defective contains one or more minor defects but contains no critical and major defects.

7.0 EXPRESSION OF DEFECTIVES

$$\text{Percent of defects} = \frac{\text{Number of defects}}{\text{Number of products inspected}} \times 100\%$$

8.0 INSPECTION STANDARD

Unless otherwise specified, the inspection standard will be defined by MIL- STD-105E(ISO-2859), SINGLE SAMPLING PLAN, level II is in use all the time , inspection levels are normal ,reduce and tighten .

8.1 Acceptance Quality Level

8.1.1 When a critical defect is found, this must be reported immediately upon detection, the lot or batch shall be rejected and further shipments shall be held up pending instructions from the responsible person in relevant organization.

8.1.2

Major Defective: 0.4 AQL
Minor Defective: 1.50 AQL

9.0 GENERAL RULES

The inspection must be carried out by trained inspectors having good knowledge of the meaning of "fitness for use". The inspection must be based upon the documents concerning the completely assembled and packed product. When more defects appear with the same cause only the most serious defect must be taken into account. Defects found in accessories packed with the product as connecting cables, plugs, adapters and the like, and being inspected as a part of the complete product, must be included in the evaluation.

The evaluation must be within the limits of the product specification and, for not specified characteristics, be related to the design model, limit samples or judgment of a jury of experts.

Faults must be demonstrable.

10.0 TEST CONDITIONS

Product System (PS)

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Unless otherwise prescribed, the test conditions are as follows:

- . Nominal mains voltage
- Temperature: +5~+35°C
- . Warm up time : 30minutes minimum .
- . Visual inspection shall be down with the distance from eyes to the sample 35-50 cm .
- . Display mode: Primary mode 1280*1024

11.0 TEST EQUIPMENTS

- 11.1 BenQ PCs with display adapter or other specific display adapter which is agreed upon by both parties
- 11.2 Test program by API
- 11.3 Ruler
- 11.4 Power saving test tool
- 11.5 Minolta color analyzer (CA-110 or BM-7)

PART I VISUAL INSPECTION CRITERIA

1. PACKING
2. ACCESSORIES
3. APPEARANCE
4. AC POWER AND SIGNAL CABLE
5. INTERIOR OF THE PRODUCT

No	Description	Class
----	-------------	-------

□ Product System (PS)

Subject:	C5-501 Service Manual	Part No.:	99.L2C72.000	Rev.:	0
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1.12	Label on box missing or damaged	Major
1.13	Strange object in the box	Major
1.14	Unit not corresponding to model stated on external label	Major
1.15	Superficial breaking 5 ~ 10 cm dia	Minor
2	Accessories	
2.1	Missing accessory parts	Major
2.2	Wrong Accessory parts	Major
3	Appearance of product	
3.1	Incorrect color of cabinet	Major
3.2	Incorrect color of tilt/swivel base	Major
3.3	Wrong logo or name plate	Major

No	Description	Class
3.4	Poor print of logo or name plate	Major
3.5	Label on product Wrong or missing	Major
3.6	Scratched or dirty but legible spec. label	Minor
3.7	GAP between LCD and front bezel is over 2.0 mm	Major
3.8	Dot/area discolor over 1mm dia. in front or over 2mm dia. in other areas	Major
3.9	Cabinet warped, sagged or bulging >0.5% of surface length	Major
3.10	Cabinet warped, sagged or bulging noticeable but <0.5% of surface length	Minor
3.11	Sharp stud or edge, which can cause damage not safe	Major
3.12	Finishing of piece parts will not arrived in good condition at the customer	Major
3.13	Cabinet step (between housing and bezel) >1.0mm , < 1.5mm	Minor
3.14	Cabinet step (between housing and bezel) >1.5mm	Major
3.15	Wiring or fixing cord comes out of cabinet or jammed	Major
3.16	Auxiliary material used during production not removed	Major
3.17	Cabinet parts come loose during normal handling, not safe	Critical
3.18	Cabinet parts come loose during normal handling, but safe	Major
3.19	Tilt/swivel too flexible/not working	Major
3.20	Tilt/swivel stiff	Minor
3.21	Dirty front bezel and housing can't remove	Major

□ Product System (PS)

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3.22	Dirty front bezel and housing removable easily	Minor
3.20	Sticker or loose user control switch which will not function correctly	Major
3.21	Missing knob or switch, not safe	Critical
3.23	Missing knob or switch, but safe	Major
3.24	Poor functional user controls in mechanical	Major
3.25	Unreadable printing of user controls label	Major
3.26	Rubber foot missing	Major
3.27	LED wrong material or missing	Major
3.28	LED sagged >1.0mm or bulging>0.5mm	Minor
3.29	Wrong S/N between spec. label and monitor display	Major
4	AC power and signal cable	
4.1	AC power or connector not correct or damaged, not safe	Critical
4.2	AC power or connector not correct or damaged, but safe	Major
4.3	Signal cable contact pin dirty	Minor
4.4	Signal cable plug dirty or surface damaged, but safe	Minor
4.5	Cable crack	Major
4.6	Cable scratch (wire not exposed), or dirty	Major

No	Description	Class
4.7	AC-DC adapter no function	Minor
4.8	Signal cable contact pin dirty	Major
5	Interior of the product	
5.1	Use Non-QVL (Qualify vendor list)component	Major
5.2	Wrong parts, broken component, but safe	Major
5.3	Foreign material	
	Conductive (Has potential to short circuit)	Major
	Non-conductive (Moveable)	Minor
5.4	Missing hardware, component or screw, stripped screw	Major
5.5	Loose hardware/screw or insufficient torque	Major
5.6	Poor wire routing, which is no concerned on EMI	Minor
5.7	Cold soldering/loose connections (Electrical)	Major

□ Product System (PS)


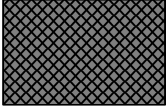
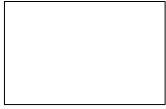
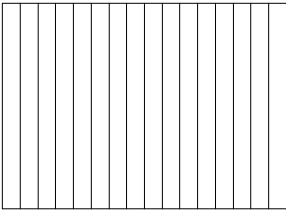
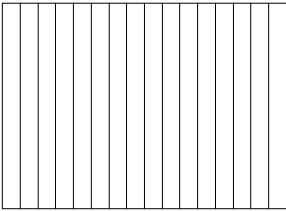
Subject:	C5-501 Service Manual	Part No.:	99.L2C72.000	Rev.:	0
		Doc. No.	99.L2C72.000-C5-501-001		
Project Code:	99.L2C72.001	Component Part. No.:	NA	Page 47 of 50	
Model Name:	FP202W	Marketing Description :			

5.8	Wires and mechanical structure do not meet UL/CSA or TUV	Critical
5.9	Wrong parts, broken component, not safe	Critical
5.10	Component burn	Critical

PART II OPERATIONAL INSPECTION CRITERIA

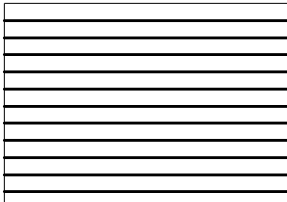
1. TEST PATTERN
2. SPECIFICATIONS
3. OPERATIONAL INSPECTION CRITERIA

1.List of test pattern

KEY	PATTERN	TEST ITEM
A	FULL WHITE 	H - Size , V – Size .Viewing Angle Light Output Impurity, Spot check Contrast Ratio Brightness adjust Range
E	DARK 	Background, Spot check
F	FULL W , R , G , B 	Impurity, Spot check .CIE Coordinate check
G	256 COLORS 	Color Check
H	16 GREY 	Gray Check

□ Product System (PS)

Subject:	C5-501 Service Manual	Part No.:	99.L2C72.000	Rev.:	0
		Doc. No.	99.L2C72.000-C5-501-001		
Project Code:	99.L2C72.001	Component Part. No.:	NA	Page 48 of 50	
Model Name:	FP202W	Marketing Description :			

H	Black/White stripe pattern 	Electric characteristics
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2. Video performance

Item	Condition	Spec	OK	N.A	Remark
Max. support Pixel rate		165 MHz	√		
Max. Resolution		1680 x 1050	√		
Rise time + Fall time		< 3.0 ns (50% of minimum pixel clock period)	√		1680 x 1050 @ 60Hz (max. support timing)
Settling Time after overshoot /undershoot		< 5% final full-scale value	√		Refer to VESA VSIS Standard V1R1
Overshoot/Undershoot		< 12% of step function voltage level over the full voltage range	√		Refer to VESA VSIS Standard V1R1

Resolution	Any input resolution modes which are under 1680x1050	
Contrast ratio		60
Brightness	At R/G/B saturated condition	300
Response time	Rising + Falling time	8
Viewing angle	At Contrast ratio = 10	R/
	At Contrast ratio = 10	U/
CIE coordinate of White		(0.3
Display colors		

□ Product System (PS)

Subject:	C5-501 Service Manual	Part No.:	99.L2C72.000	Rev.:	0
		Doc. No.	99.L2C72.000-C5-501-001		
Project Code:	99.L2C72.001	Component Part. No.:	NA	Page 49 of 50	
Model Name:	FP202W	Marketing Description :			

3. Support Timings

Input Timing		Actual Output					
Resolution	Horizontal	Vertical	Dot Clock	Actual display	OK	N.A	Remark
640x350	31.47(P)	70.08(N)	25.17	1280x943	√		DOS
720x400	31.47(N)	70.08(P)	28.32	1280x1024	√		DOS
640x480	31.47(N)	60.00(N)	25.18	1280x1024	√		DOS
640x480	35.00(N)	67.00(N)	30.24	1280x1024	√		Macintosh
640x480	37.86(N)	72.80(N)	31.5	1280x1024	√		VESA
640x480	37.50(N)	75.00(N)	31.5	1280x1024	√		VESA
800x600	37.88(P)	60.32(P)	40.00	1280x1024	√		VESA
800x600	48.08(P)	72.19(P)	50.00	1280x1024	√		VESA
800x600	46.86(P)	75.00(P)	49.50	1280x1024	√		VESA
832X624	49.72(N)	74.55(N)	57.29	1280x1024	√		Macintosh
1024x768	48.36(N)	60.00(N)	65.00	1280x1024	√		VESA
1024x768	56.48(N)	70.10(N)	75.00	1280x1024	√		VESA
1024x768	60.02(P)	75.00(P)	78.75	1280x1024	√		VESA
1024X768	60.24(N)	74.93(N)	80.00	1280x1024	√		Macintosh
1152x864	67.50(P)	75.00(P)	108.00	1280x1024	√		VESA
1152x870	68.68(N)	75.06(N)	100.00	1280x1024	√		Macintosh
1152x900	61.80(N)	66.00(N)	94.50	1280x1024	√		SUN 66
1152x900	71.81(N)	76.14(N)	108.00	1280x1024	√		SUN
1280x1024	64.00(P)	60.00(P)	108.00	1280x1024	√		VESA
1280x1024	75.83(N)	71.53(N)	128.00	1280x1024	√		IBM1
1280x1024	80.00(P)	75.00(P)	135.00	1280x1024	√		VESA
1280x1024	81.18(N)	76.16(N)	135.09	1280x1024	√		SPARC2

Note-3: "P", "N" stands for "Positive", "Negative" polarity of incoming H-sync/V-sync (input timing).

□ Product System (PS)

Subject:	C5-501 Service Manual	Part No.:	99.L2C72.000	Rev.:	0
		Doc. No.	99.L2C72.000-C5-501-001		
Project Code:	99.L2C72.001	Component Part. No.:	NA	Page	50 of 50
Model Name:	FP202W	Marketing Description :			

PART III PANEL INSPECTION CRITERIA

Inspection Item	Specification
Line defect	Can't be seen
Bright Dot	<=3 dots
Green bright dots	<=2 dots
Dark dots	<=4 dots
Total dots defect	<=5 dots
Continuous Defect	Two continuous bright dots(vertical ,horizontal, oblique):<=1 pair Exclude continuous green-green bright dots
	Three or more continuous bright dots (vertical, horizontal ,oblique):Not allowed
	Two continuous dark dots(vertical ,horizontal, oblique):<=2 pairs
	Three or more continuous dark dots(vertical, horizontal, oblique):Not allowed
	Distance between 2B dots:>=15mm Distance between 2Ddots:>=15mm Distance between B and D dot :>=10mm