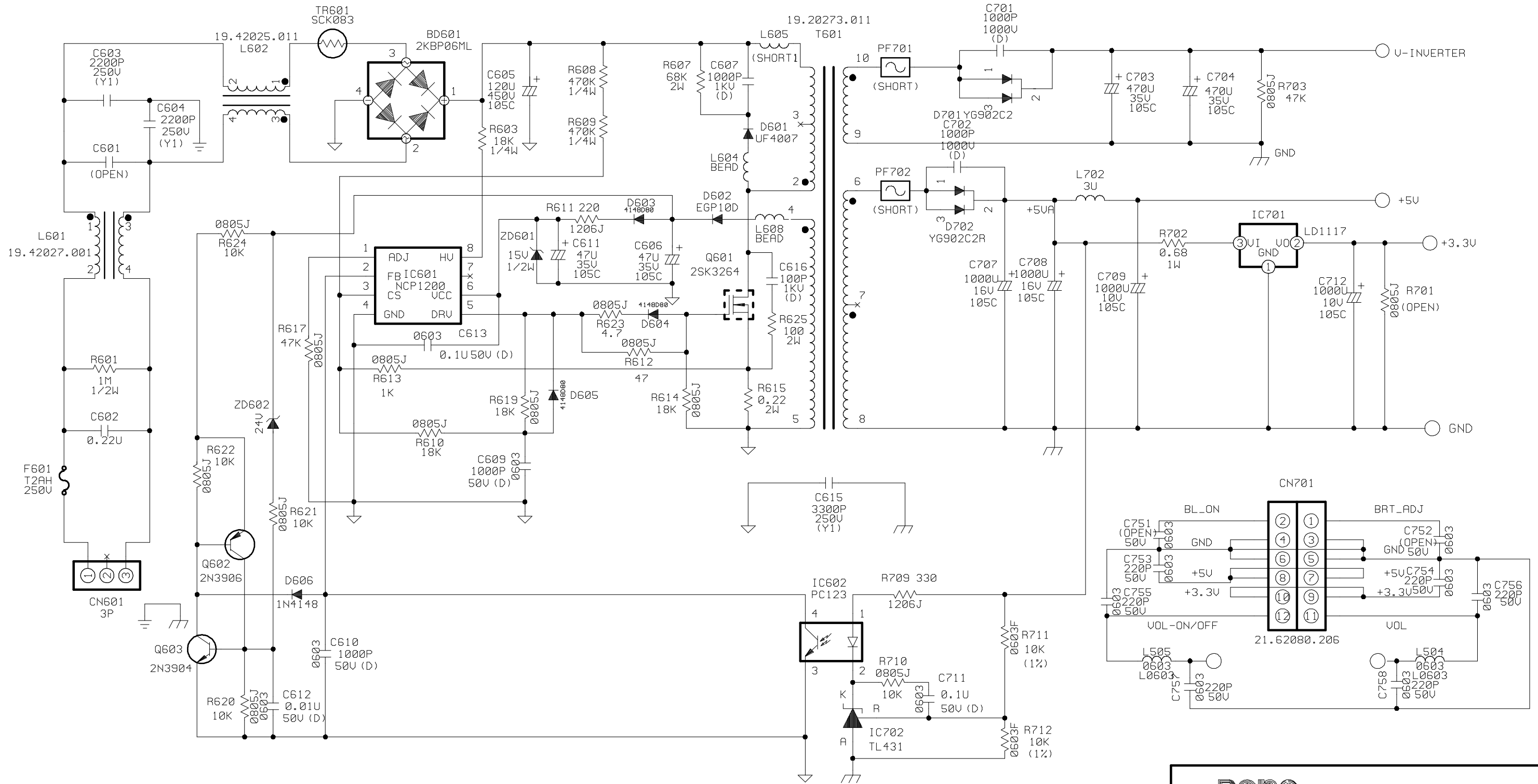


BENQ LCD Q7C4 (FP71V+) Spare Parts List

P/N: 99.L0Y72.ESE/ESA/EST

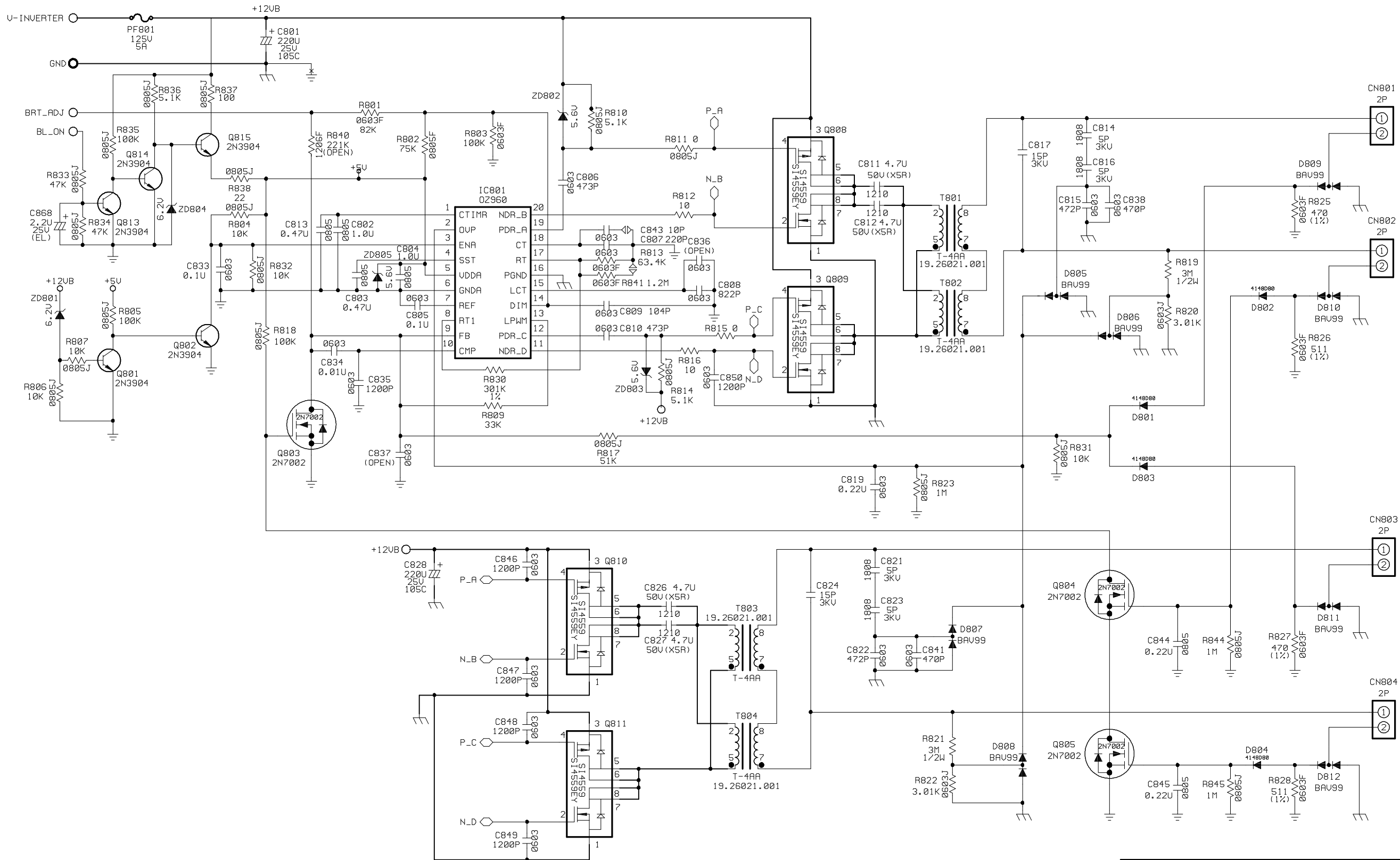
ITEM	DESCRIPTION	PART NO.	LOCATION
1	PCBA I/F BD Q7C4 GLARE MI	55.L0Y01.013	
2	IC OVERDRIVE VTI03601 LQFP208	71.03601.00E	U11
3	IC LCD CTRL GM5221(BQ6100) 208P	71.05221.B0E	U4
4	IC EEPROM AT24C02N-10SI-1.8SON	72.02402.C01	U1,U3
5	IC EEPROM AT24C16AN-10SI-1.8SON	72.02416.N01	U7
6	IC FLASH PM39LV020-70JC PLCC32	72.39020.C33	U5
7	IC SDRAM K4S161622H-TC60 TSOP	72.61622.209	U13,U14,U15,U16
8	IC CMOS 74LVC14A SO-N 14P	73.07414.061	U2
9	IC RESET V6300C LO-2.8V SOT23	74.06300.C3B	U6
10	IC VR G952T-63U 4P SOT223	74.95263.03C	U8
11	IC DR G960T63U SOT-223 3P	74.96063.03C	U10
12	PCBA SPS BD NEW INVERTER GLARE	55.L0Y02.003	
13	PCBA CTRL BD ACCACM MI	55.L0Y03.011	
14	LCDM 17 M170EG01 V.3/AUO	56.91L83.061	
15	ASSY RC ABS Y5003A Q7C4	60.L0Y04.001	
16	ASSY COLUMN ABS Y5003A Q7C4	60.L0Y05.001	
17	ASSY BZL ABS 8020C Q7C4-FP71V+	60.L0Y16.002	
18	CTN B 456*423*157 Q7C4/BENQ	44.L0Y01.002	
19	CSN F EPS Q7C4	47.L0Y01.001	
20	CSN B EPS Q7C4	47.L0Y02.001	
21	SIGNAL/C DVI-D 20276 2000MM BK	50.L3012.501	
22	CABLE SIGNAL 15/15P CORE*1 1.5M	50.L9005.501	
23	CD MANUAL FP71V+ Q7C4	53.L0Y03.001	
24	ASSY PACK BASE Q7C4	60.L0Y07.003	

*** THIS PARTS LIST MAY BE SUBJECT TO CHANGE
WITH PRIOR NOTICE BY CSD OF BENQ.**



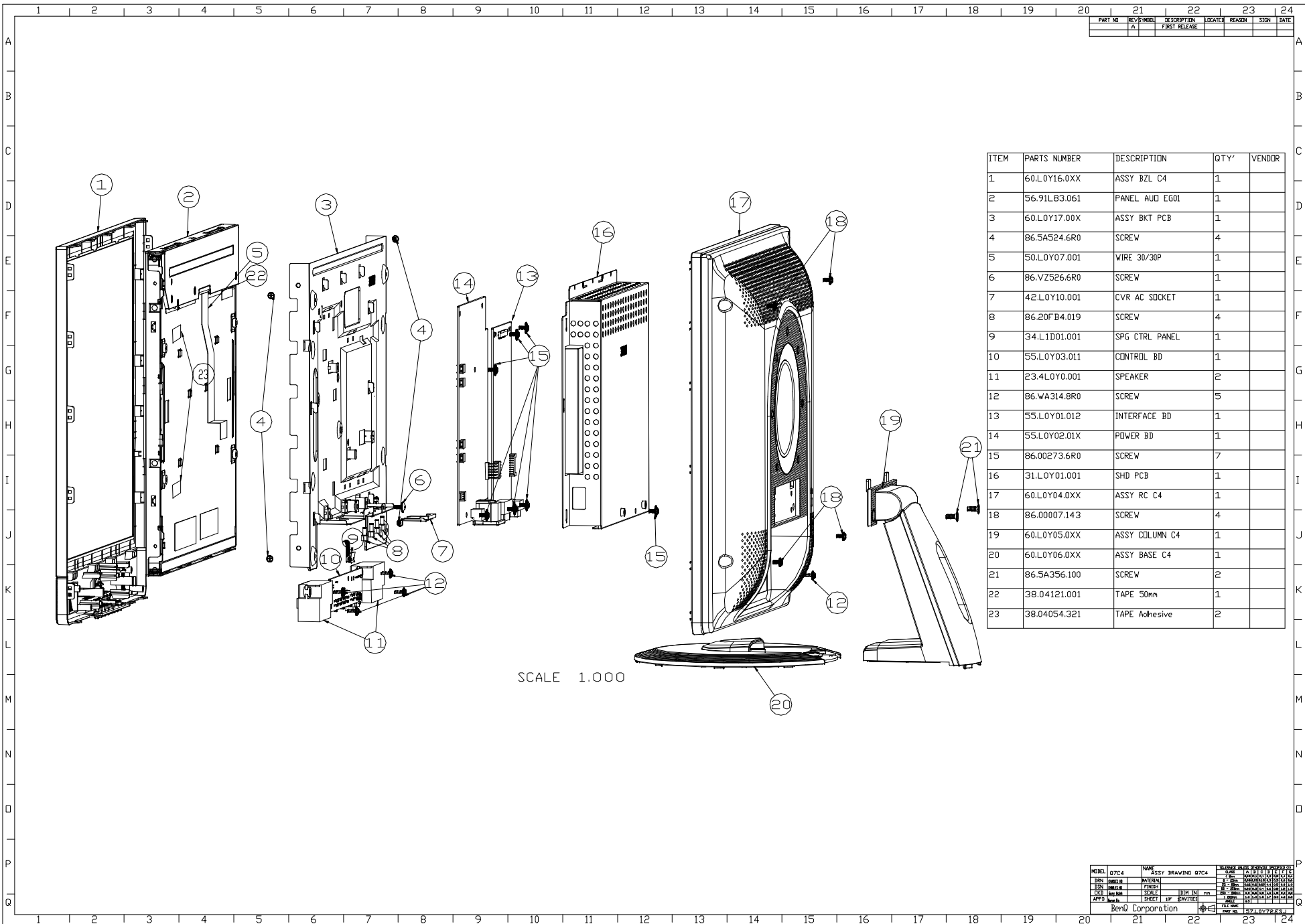
NOTES: 1. Resistor values are in ohm, K=1,000 ohm, M=1,000,000 ohm
 2. All resistors are 1/8 watt, 5% except where otherwise indicated
 3. --- --- --- Represents PCB common ground.

BenQ			
Q7C4 SPS BOARD		SCHEMATICS	
SIZE A4	L0Y02S11.SCH	Project Code. 99.L0Y72.001	REV. 0
DATE : 10/15/2004		Sheet 1 OF 2	
Doc.No. 99.L0Y72.000-C3-304-005			
Prepared By ANGEL HU 10/15/2004	Reviewed By GARY HUANG 10/15/2004	Approved By H.J. WONG 10/15/2004	



- NOTES: 1. Resistor values are in ohm, K=1,000 ohm, M=1,000,000 ohm
 2. All resistors are 1/8 watt, 5% except where otherwise indicated
 3. ∇ ∇ ∇ Represents PCB common ground.

BENQ			
Q7C4 SPS BOARD SCHEMATICS			
SIZE A3	L0Y02S11.SCH	Project Code. 99.L0Y72.001	REV. 0
DATE : 10/15/2004	Sheet 2 OF 2		
Doc.No. 99.L0Y72.000-C3-304-005			
Prepared By ANGEL HU 10/15/2004	Reviewed By GARY HUANG 10/15/2004	Approved By H.J. WONG 10/15/2004	



SCALE 1.000

PART NO	REV	DATE	DESCRIPTION	LOCATOR	REASON	SIGN	DATE
A			FIRST RELEASE				

ITEM	PARTS NUMBER	DESCRIPTION	QTY	VENDOR
1	60.L0Y16.0XX	ASSY BZL C4	1	
2	56.91L83.061	PANEL AUD EGO1	1	
3	60.L0Y17.00X	ASSY BKT PCB	1	
4	86.5A524.6R0	SCREW	4	
5	50.L0Y07.001	WIRE 30/30P	1	
6	86.VZ526.6R0	SCREW	1	
7	42.L0Y10.001	CVR AC SOCKET	1	
8	86.20FB4.019	SCREW	4	
9	34.L1D01.001	SPG CTRL PANEL	1	
10	55.L0Y03.011	CONTROL BD	1	
11	23.4L0Y0.001	SPEAKER	2	
12	86.WA314.8R0	SCREW	5	
13	55.L0Y01.012	INTERFACE BD	1	
14	55.L0Y02.01X	POWER BD	1	
15	86.00273.6R0	SCREW	7	
16	31.L0Y01.001	SHD PCB	1	
17	60.L0Y04.0XX	ASSY RC C4	1	
18	86.00007.143	SCREW	4	
19	60.L0Y05.0XX	ASSY COLUMN C4	1	
20	60.L0Y06.0XX	ASSY BASE C4	1	
21	86.5A356.100	SCREW	2	
22	38.04121.001	TAPE 50mm	1	
23	38.04054.321	TAPE Adhesive	2	

MODEL	NAME	DATE	DESCRIPTION	LOCATOR	REASON	SIGN	DATE
07C4	ASSY DRAWING 07C4						

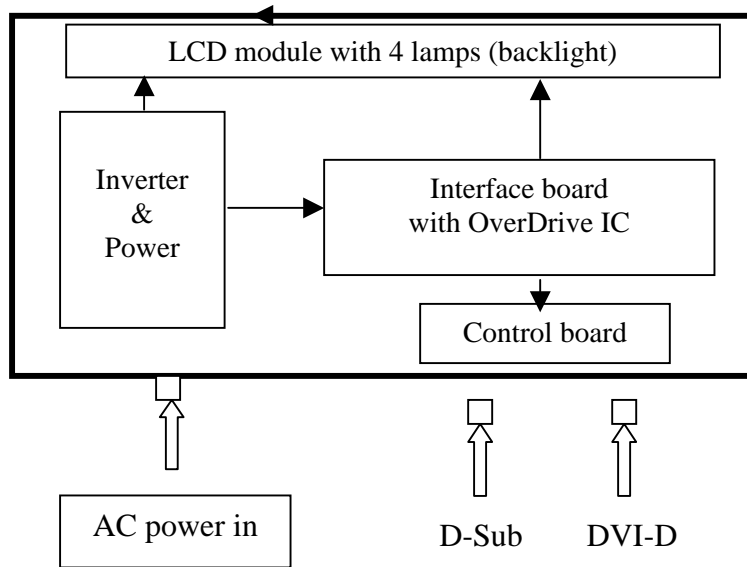
BenQ Corporation

I. Introduction:

The Q7C4 is a 17" SXGA (1280x1024), 16.2M colors (R/G/B 6-bit + FRC) TFT LCD monitor with multi-media function. It's a Dual (analog and digital) interface LCD monitor with a 15 pins D-sub signal cable and a 24 pins DVI-D cable. 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 "I-Key" which can auto adjusting all controlled items. Q7C4 also offer DDC2 function to meet VESA standard.

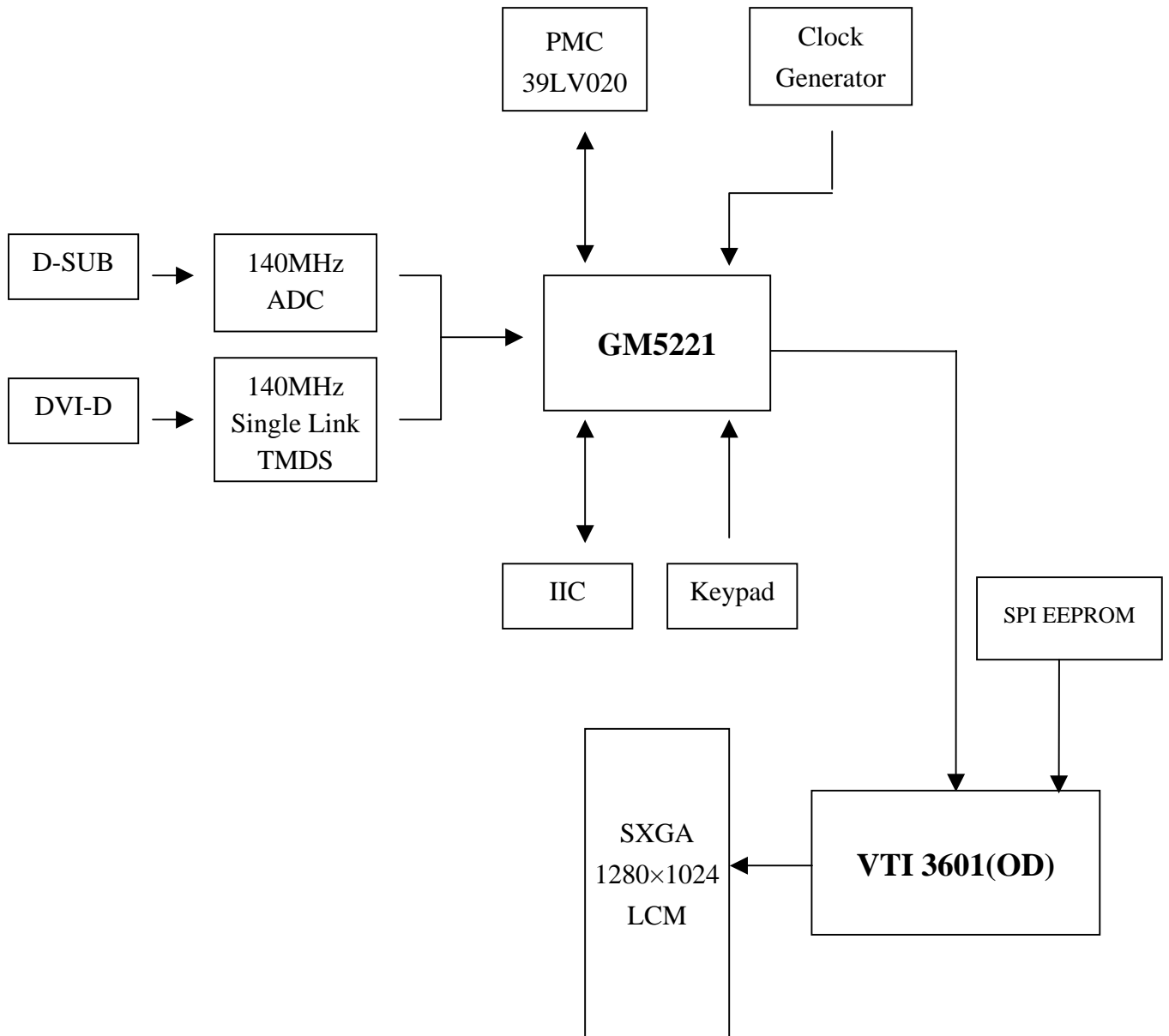
II. Block diagram

The Q7C4 consists of a head and a stand (base). The head consists of a LCD module with 4 lamps, a power board (include AC/DC, DC/DC and inverter board), a control board and an interface board. The block diagram is shown as below.



III. Circuit operation theory:

A-1.) Interface board diagram:



(a) Circuit operation theory:

A basic operation theory for the interface board is to convert input signal into digital RGB. Analog RGB signal is converted to digital signal through ADC. DVI-D signal is converted through TMDS receiver. The microprocessor GM5221 receives video data and optimizes the image automatically. It also supports input source selection, 16 color from a 64k palette bitmap OSD, and keypad controlling. The output data are sent to LCD module.

(b) IC introduction:

- 1) DDC (Display Data Channel) function: We use DDC IC to support DDC2B 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 DDC2B.
- 2) GM5221 IC: There are A/D, Scaling and OSD functions in the GM5221 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) EEPROM: We use 24C16 to store all the adjustable data and user settings, and use two 24C02s to store DVI and D-Sub EDID data.
- 4) PMC 39LV020: FrashROM. It contains final firmware.
- 5) VTI3601 IC: OverDrive IC. It can decrease the LCD response time.
- 6) ATMEL 25F512N: Serial EEPROM. It store OD table.

A-2.) Power board diagram:

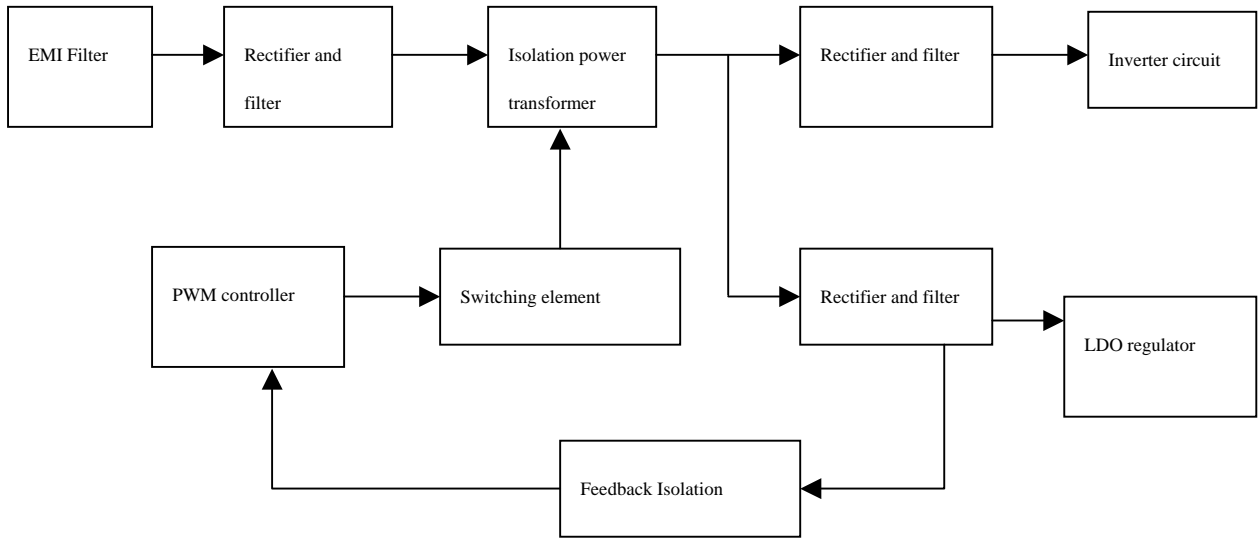


Fig.1

#1 EMI Filter

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

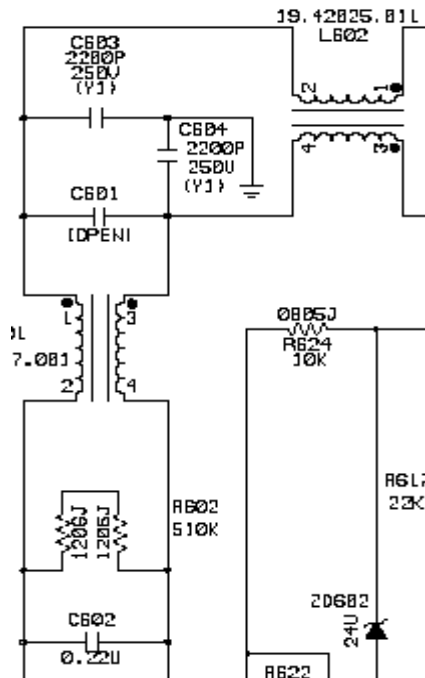


Fig. 2

#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)

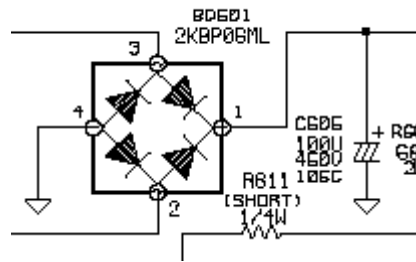


Fig. 3

#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 voltage-snubber circuit. R615 is current sense resistor to control output power. (See Fig.4)

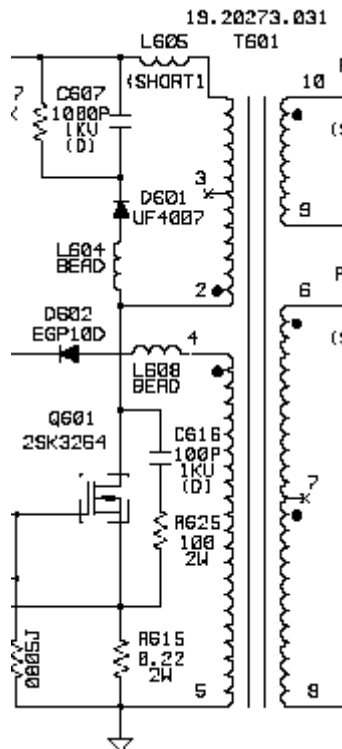


Fig. 4

#4 Rectifier and filter

D701 and C703 C704 are to produce DC output. (See Fig.5)

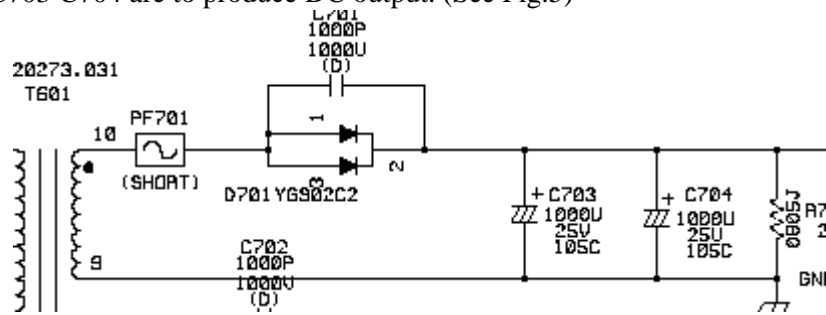


Fig. 5

#5 PWM Controller

The PWM controller NCP1200A implements a standard current mode architecture. With an internal structure operating at a fixed 40KHz. Where the switch time is dictated by the peak current setting-point. When the current setting-point falls below a given value. The output power demand diminish, the IC automatically enters the so-called skip cycle mode and provides excellent efficiency.

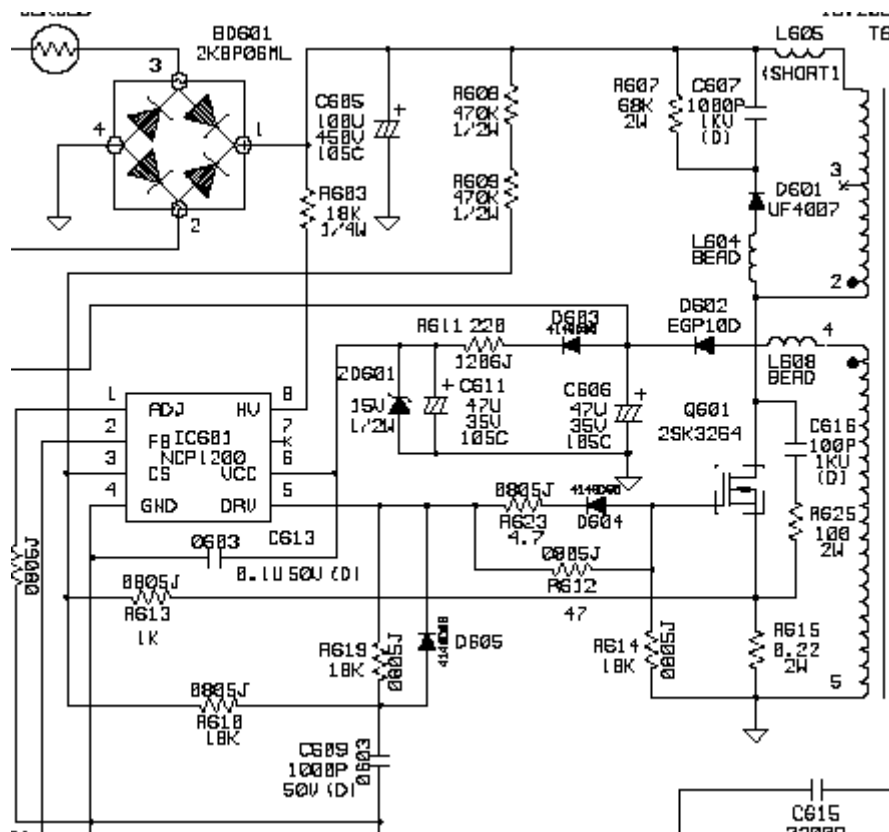


Fig. 6

#6 Feedback circuit

PC123 is a photo-coupler and TL431 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)

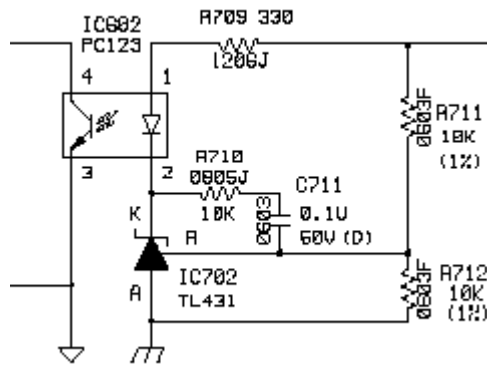
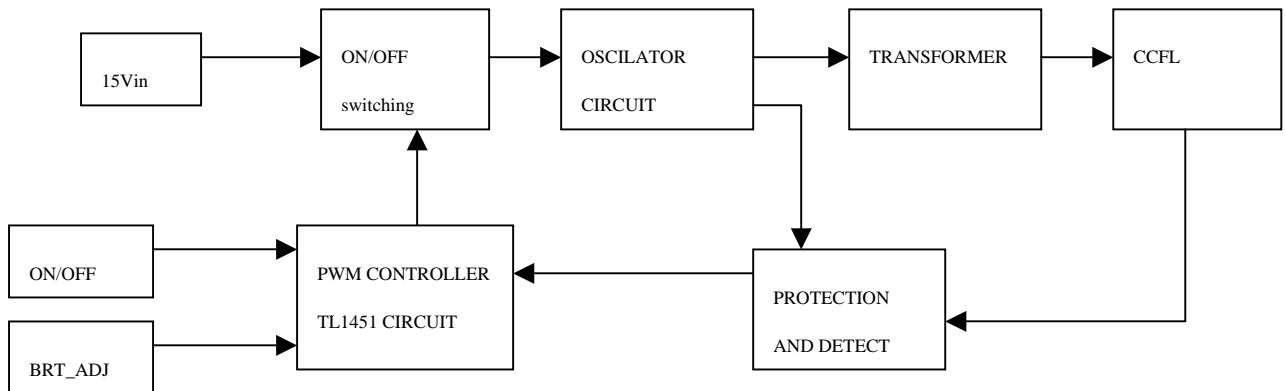


Fig.7

A-3.) Inverter diagram:

1. Block Diagram

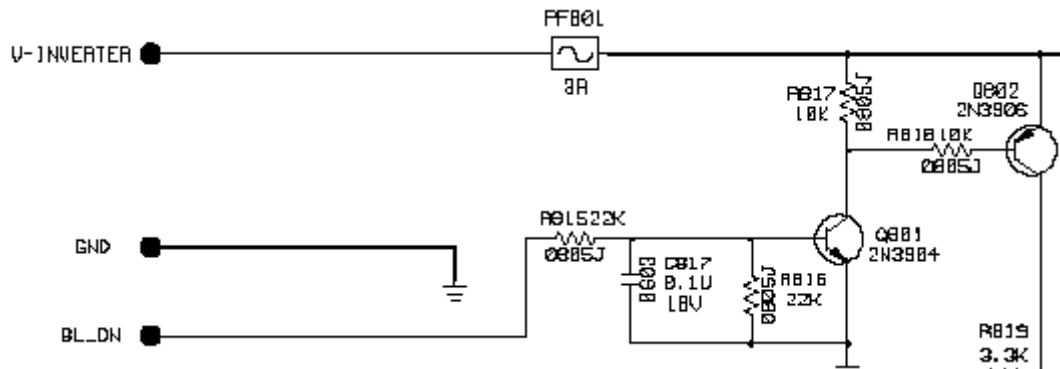


2. General Specification

- Input Voltage: 14.5V
- Input Current: 2A max.
- ON/OFF Voltage: 3.3V
- Output Requirement:**
- Max. Output Current: 8mA
- Min. Output Current: 3mA
- Lamp Working Voltage: 700Vrms
- Open Lamp Voltage: 1500Vrms
- Frequency: 40-80KHz

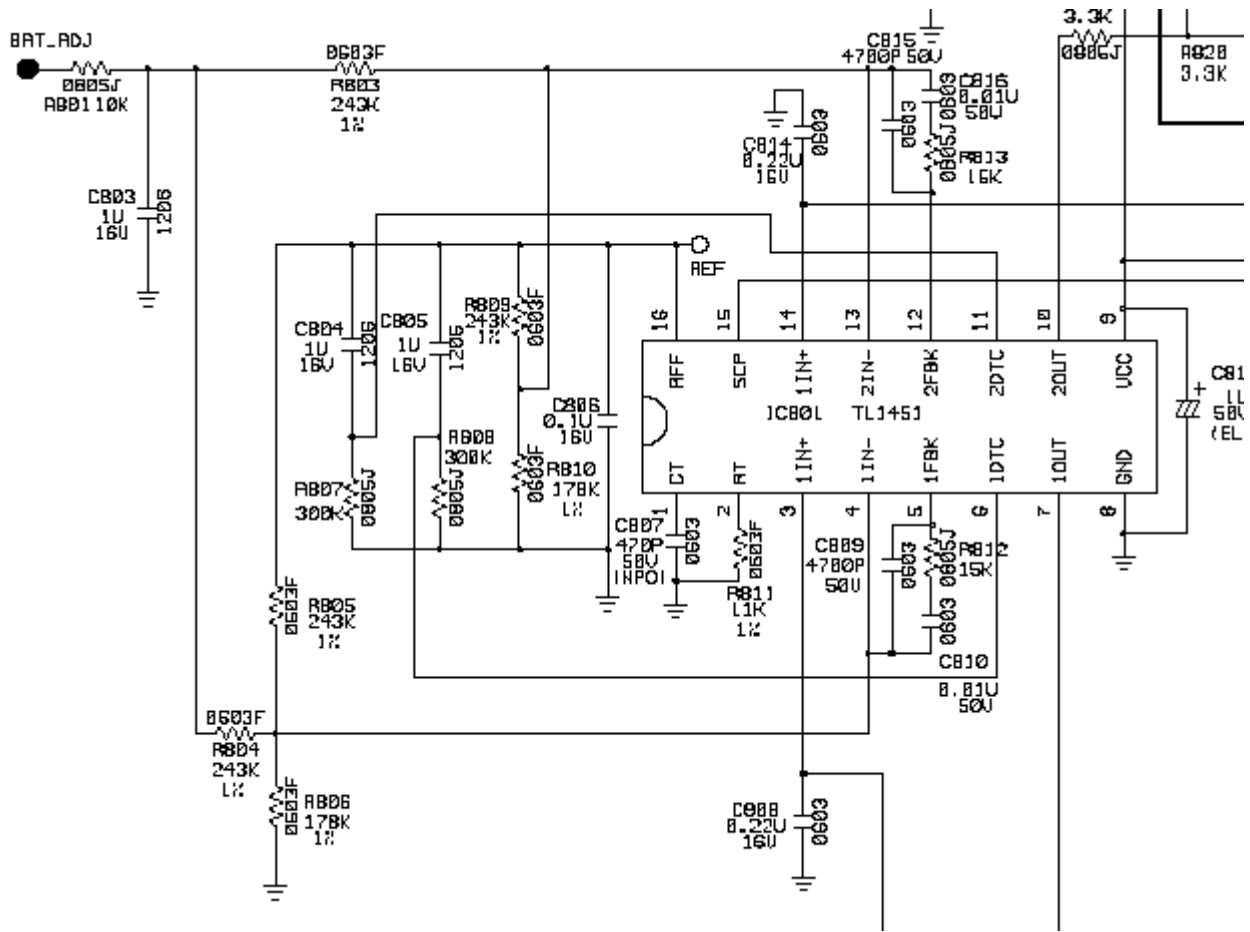
3. Circuit Operation Theorem

3.1 ON/OFF SWITCH



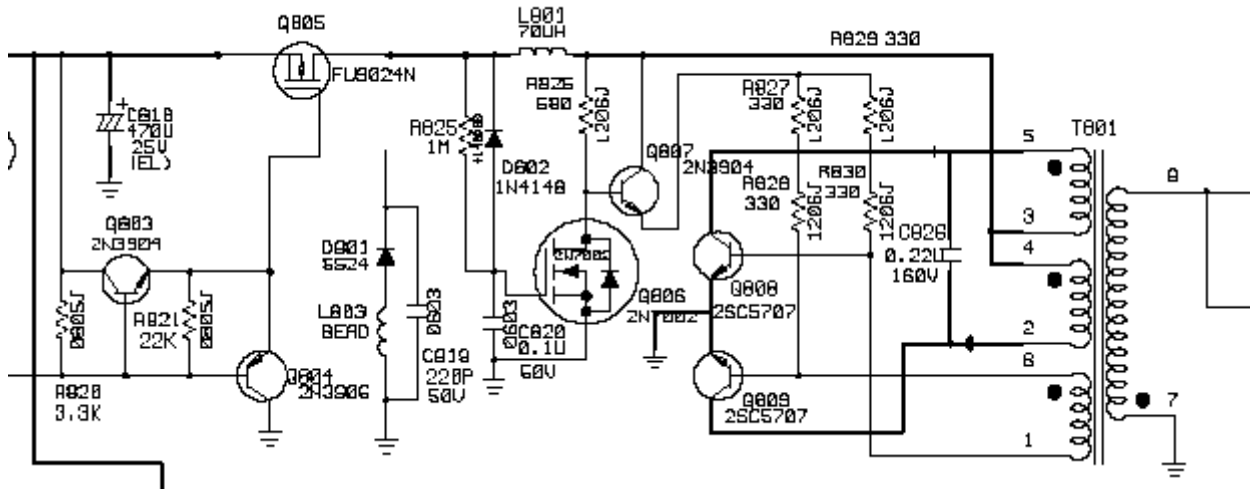
The turn-on voltage was controlled by R815 and R816. The inverter was turned on or off by the switching transistors Q801 and Q802. Also regulator IC801 is control by Q801 and Q802 decide supply 12.5V to inverter part or instead.

3.2 PWM Control circuit



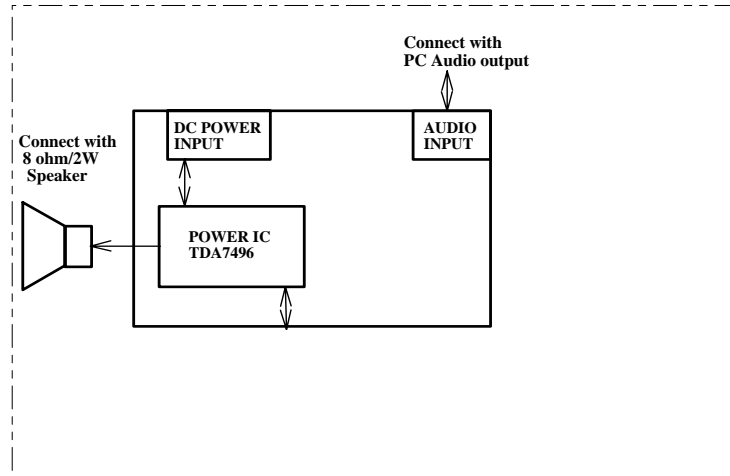
TL1451 is a dual PWM controller. C807 and R811 decide the working frequency. BLT_ADJ signal is from control board, control pulse width then decide how much energy delivery to CCFL also decide CCFL brightness. Q803 and Q804 be the buffer to rise the drive capability and the totem poles circuit can improve a capable of driving for Q805. C813 decide the striking time delay.

3.3 Oscillator Circuit



Royer circuit uses the characteristic of transformer saturation to oscillate. When the DC power inject, Q808 or Q809 will turns on, and the current I_c increases. After a period, the transistor will leave the saturation status and V_{ce} increase. The result causes the voltage of primary coil get lower. Finally the transistor turn off, and another transistor turn on. These statuses are repeated and the pin7 and pin8 of T801 will get a Sin Wave to turn on CCFL.

A-3.) Audio block diagram:



The audio block consists of an audio board and dual speaker drivers. The speaker drivers are using 62 x 33 x 20 mm² audio box (rated 2W/CH) with DC volume control, power is supplied by power board and audio input is from PC audio output (Line Out).

1. **Power IC:** Use ST POWER IC TDA7496 which is stereo AB Class output amplifiers with DC volume control. The devices are designed for use in TV and monitor, but are also suitable for battery-feed portable recorders and radios. Use +14.5V from power board and connect speaker drivers to offer 1W/CH.
2. **DC Power Input:** To supply +14.5V for TDA7496 power source.
3. **Audio Input:** Connect with PC audio output in 3.5mm to 3.5mm signal line.

4. Speaker driver: Use 8 ohm / 62 x 33 x 20 mm² speaker driver (rated 2W/CH).

5. DC Volume Control: The voltage range is 0 ~ 3.3V (from MCU).

A-4.) Control board introduction:

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

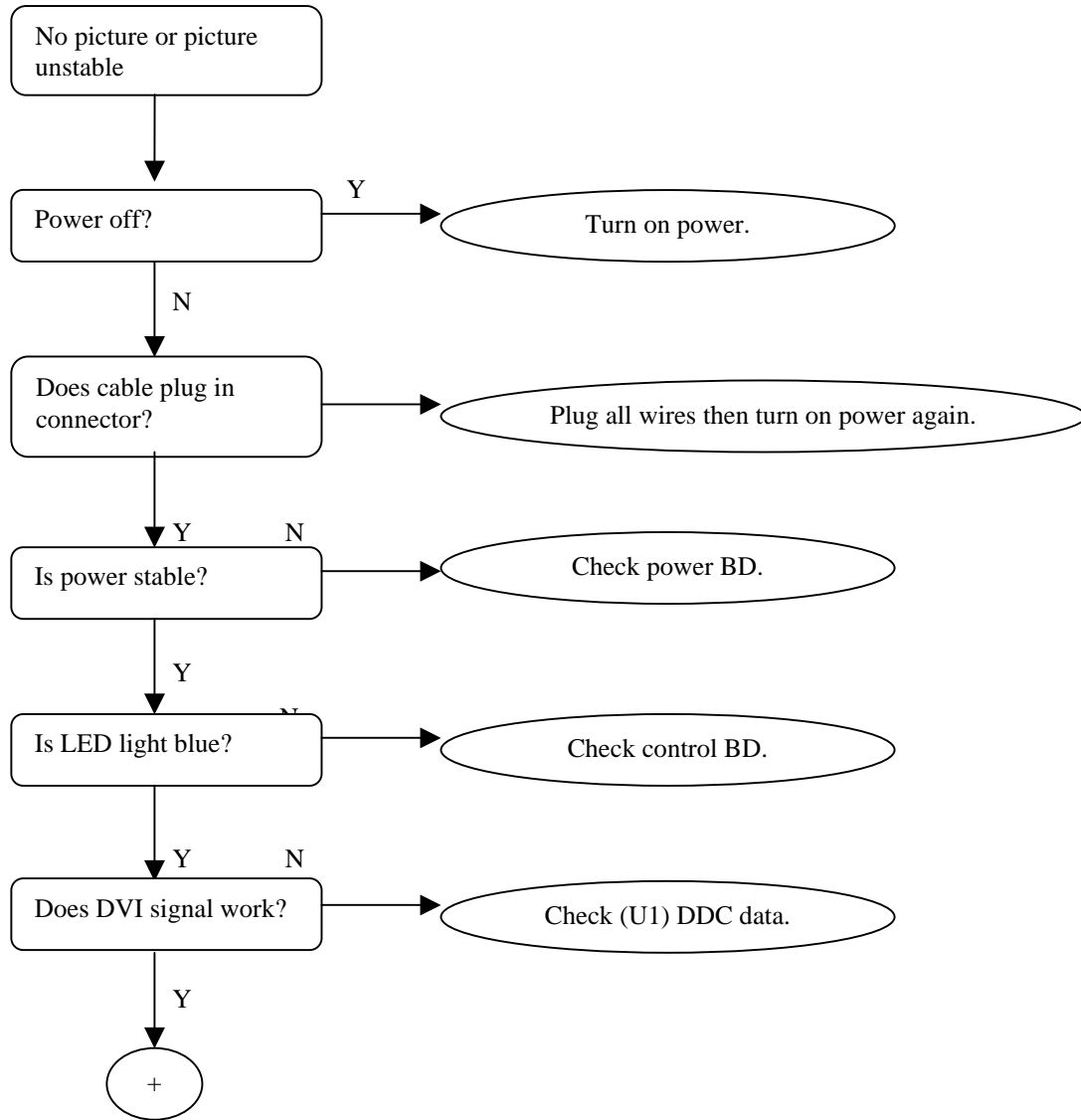
(a) Push button: It's a simple switch function. Pressing it for "ON" to do the auto adjustment, select (unselect) adjustment or adjusting bar.

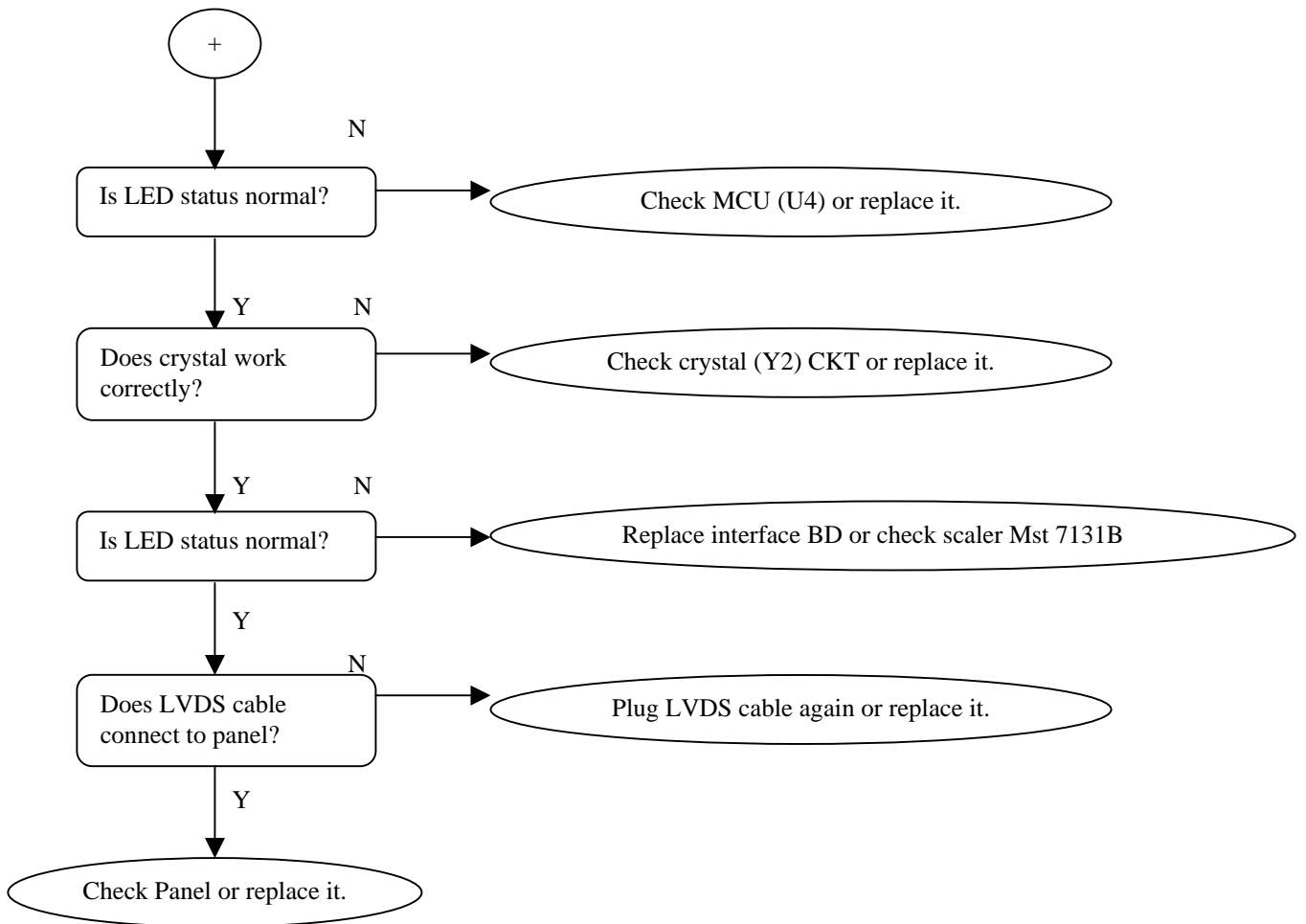
(b) LED: It indicates the DPMS status of this LCD monitor; blue light means DPMS on (Normal operating condition), amber light means DPMS off (Power off condition).

Q7C4 TROUBLE SHOOTING GUIDE

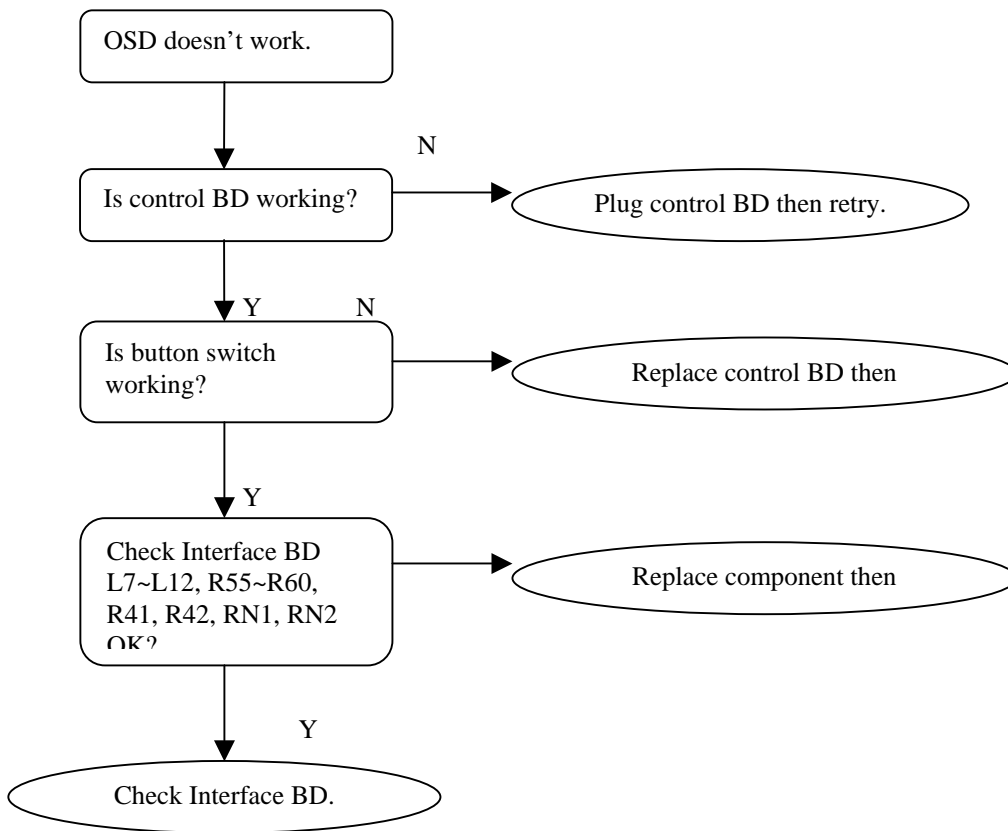
1. No Display or display is unstable

Interface Board -

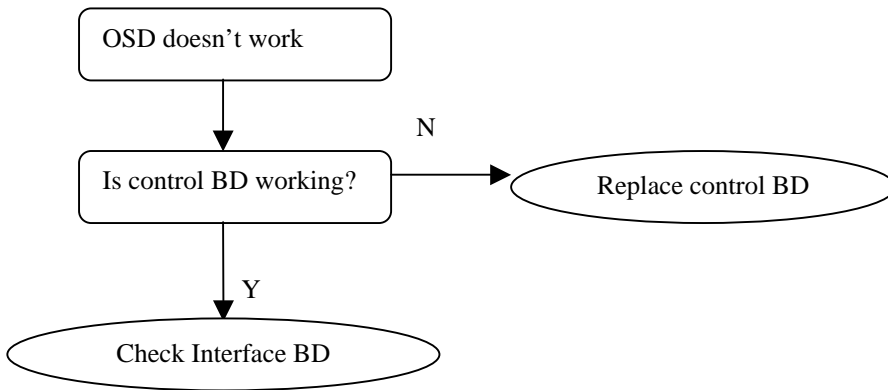




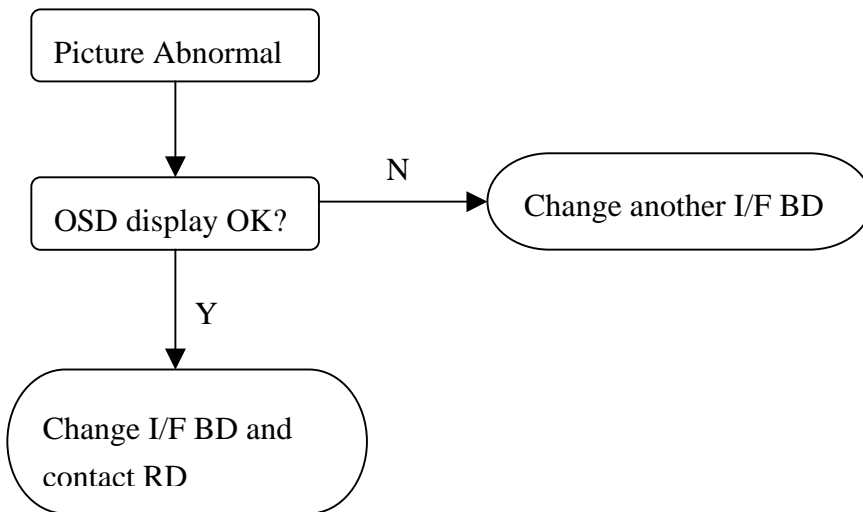
2. BUTTON function
Control board -



3. OSD function



4. OD function



4. Power Board

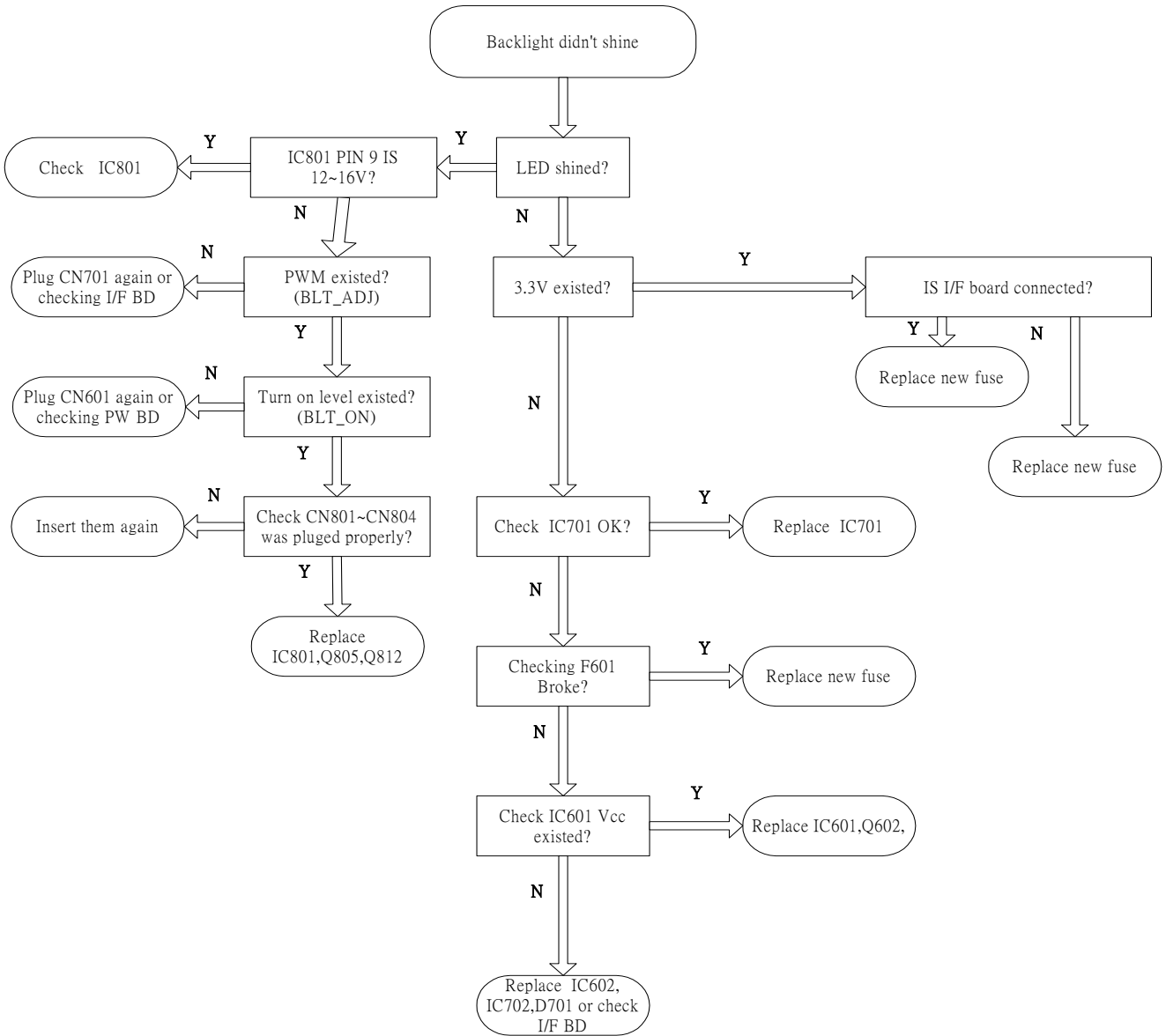


Table of Contents

1. ALIGNMENT PROCEDURE (FOR FUNCTION ADJUSTMENT)..... 2
The list of necessary alignment for a LCD monitor 2
A. Preparation..... 2
B. Geometry adjustment & checking (for preset timing modes)..... 2
C. ADC calibration (White Balance)..... 2
D. Color temperature adjustment..... 3
E. Writing EDID data into monitor..... 3
F. Command definition..... 3
2. EEPROM MAPPING..... 6
3. AUDIO TEST PROCEDURE 7
A. Audio spec..... 7
B. Audio Test Procedures..... 7
4. WIRE DRESSING 8
- ASSEMBLY STEP BY STEP 8
6. ADD GLUE..... 17

1. Alignment procedure (for function adjustment)

The list of necessary alignment for a LCD monitor

Items	Description	Remark
1	Geometry adjustment & checking	For Preset timing modes
2	ADC calibration (Auto color balance adjustment)	UVGA7 (1024x768/75Hz)
3	Color temperature adjustment	C1/Bluish, C2/Reddish & C3/sRGB
4	Writing EDID data into monitor	Analog/DVI-D

A. Preparation

1. Setup input timing to any preset modes or patterns.
2. Enter factory mode (press “EXIT” & “ENTER” & “Power” buttons at the same time to turn on monitor).
3. Press “I-Key” into “Burn In Mode” tag and select “On” to enable burn-in mode.
4. Power off the monitor, remove the input source and then power on again.
5. Setup unit and keep it warm up for at least 30 minutes.

B. Geometry adjustment & checking (for preset timing modes)

1. Enter factory mode (press “EXIT” & “ENTER” & “Power” buttons at the same time to turn on monitor).
2. Select timing mode from figure-1 and input full screen display pattern to monitor.
3. Select “Auto Adjust” to run “AUTO” function for geometry adjustment.
4. Check if the position, phase and clock of the image are correct to make sure controlled functions and performance are ok.
5. Select “Recall All ” to erase user settings.
6. Turn off the monitor power.
7. Turn on the monitor power again to check if monitor’s image settings are ok and with following settings.
 CONTRAST = 50
 BRIGHTNESS = 90
 COLOR = Reddish (default setting)
 OSD time = 20
 VOLUME = 30

Figure-1: Preset Timing modes list

Input Timing				Actual Output	OK	N.A	Remark
Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Dot Clock Frequency (MHz)	Actual display Resolution			
720x400	31.47(N)	70.08(P)	28.32	1280x1024	√		DOS
800x600	46.87(P)	75.00(P)	49.5	1280x1024	√		VESA
1024x768	48.36(N)	60.00(N)	65.00	1280x1024	√		VESA
1024x768	60.02(P)	75.00(P)	78.75	1280x1024	√		VESA
1152x870	68.68(N)	75.06(N)	100.00	1280x1024	√		Mac
1152x900	71.81(N)	76.14(N)	108.00	1280x1024	√		VESA
1280x1024	80.00(P)	75.00(P)	135.00	1280x1024	√		VESA
1280x1024	81.18(N)	76.16(N)	135.09	1280x1024	√		SUN

C. ADC calibration (White Balance)

~~Analog only, it is not required for DVI-D input source

FP71V+(Q7C4) LCD Monitor Service Guide

Alignment Procedure

1. Setup input timing UVGA7 (1024x768/75Hz), pattern 42 (5-Mosaic pattern with white color block) with Analog signals from Chroma video pattern generator. (it depends on Scaler IC supplier's recommendation)
2. Enter factory mode (press "EXIT" & "ENTER" & "Power" buttons at the same time to turn on monitor).
3. Press "I-Key" into "Burn In Mode" tag and select "On" to enable burn-in mode.
4. Change color temperature from "Reddish" (default) to "User Preset".
5. Press hot-key "CONTRAST" to run "White Balance" function. (This procedure will get optimal gain/offset (clamp values)
6. Checking if the picture is ok, or reject this monitor and check its circuit board or wire/cable connection.

D. Color temperature adjustment

1. Setup input timing to any preset modes, pattern 41 (full white color pattern) with Analog signals from Chroma video pattern generator.
2. Enter factory mode (press "EXIT" & "ENTER" & "Power" buttons at the same time to turn on monitor).
3. Make sure ADC calibration (White Balance) had already been done.
4. Measure color temperature by Minolta CA-110 (or equivalent equipment).
5. Adjust the color temperature ~ Two methods can be used to adjust RED, GREEN, BLUE value of each color temperature, C1/Bluish, C2/Reddish & C3/sRGB to meet following spec. requirement, the 1st method is by using external PC and IIC alignment protocol to do automatic adjustment, and the 2nd method is by manually and must be in factory mode.

Color temperature (C1/9300K/Bluish set on OSD)	X+-	0.283+(-) 0.03
	Y+-	0.297+(-) 0.03
Color temperature (C2/5800K/Reddish set on OSD)	X+-	0.326+(-) 0.03
	Y+-	0.342+(-) 0.03
Color temperature (C3/6500K/sRGB set on OSD)	X+-	0.313+(-) 0.03
	Y+-	0.329+(-) 0.03

6. Turns off the monitor power.

E. Writing EDID data into monitor

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 analog EDID data into EEPROM for analog input (ie. 15-pin D-sub).
5. Repeat step 4 and write the digital EDID data into EEPROM for DVI-D input (ie. 24-pin DVI-D).
6. Read both EEPROM data and confirm it to match with the C212 definition.

(Note: The DVI-D input may not operation correctly if the digital EDID data do not exist.)

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	√		
Read Contrast from MCU RAM	C3	55	XX	cksum	√		
Read Brightness from MCU RAM	C3	56	XX	cksum	√		

Alignment Procedure

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	√		
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	√		

Alignment Procedure

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
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	√		

Alignment Procedure

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

2. EEPROM mapping

User Area	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	EDID DATA																
10																	
20																	
30																	
40																	
50																	
60																	
70																	
80	MonitorFlag	PowerOnValue	BurnInEriValue	Brightness	Contrast	ColorTemp	Language	ManagementFlag	OsdiStart	OsdiVStart	OsdiTime	OsdiTransparency	TotalMin			80	
90	BackLightMin				InputType	UserModelIndex	Sharpness	cksum									90
A0	AdcRedGain	AdcGreenGain	AdcBlueGain	AdcRedOffset	AdcGreenOffset	AdcBlueOffset	FAdcRedGain	FAdcGreenGain	FAdcBlueGain	FAdcRedOffset	FAdcGreenOffset	FAdcBlueOffset	RedColor	GreenColor	BlueColor	RedColor3300K	A0
B0	GreenColor9300K	BlueColor9300K	RedColor6500K	GreenColor6500K	BlueColor6500K	RedColor5800K	GreenColor5800K	BlueColor5800K	UserRedGain	UserGreenGain	UserBlueGain					B0	
C0	SrcVFreq		SrcVFreq		SrcPolarity	ModeSel	HiStart	VStart		HiStart		Phase	AutoTimes	DefaultHiStart		C0	
D0	DefaultVStart		DefaultHiStart						Mode 1						D0		
E0					Mode 1				Mode 2								E0
F0					Mode 2								Mode 3				F0
100									Mode 3								
110									Mode 4								
120	Mode 4								Mode 5								
130					Mode 5								Mode 6				
140									Mode 6				Mode 7				
150									Mode 7								
160									Mode 8								
170	Mode 8												Mode 9				
180					Mode 9								Mode 10				
190									Mode 10								
1A0									Mode 11								
1B0									Mode 12								
1C0	Mode 12												Mode 13				
1D0					Mode 13								Mode 14				
1E0									Mode 14				Mode 15				
1F0									Mode 15								

3. Audio Test Procedure

A. Audio spec.

Amplifier	Spec.	Note
Input Sensitivity @ 1KHz	1Vrms	
Output Power	1Wrms/CH	
THD @1KHz 1W (%)	< 1%	
S/N Ratio (dB)	> 40dB	
Cross Talk	< -50dB	
R/L Channel Check	OK	
Pop Sound Check	OK	
Speaker		
Nominal Speaker Impedance @1KHz 1V	8 Ohm±15%	
Resonant Frequency	180~20KHz SPL-10dB	
Rated/Max Power	2W/3W	
Output SPL @2W 50cm	84 ± 3 dB (1W 0.5M)	
Distortion	< 5%	

B. Audio Test Procedures

1.) PC Playback

- (a) Plug in the Audio input to a PC I/O ports.
- (b) Playback a specified CD, listening to the playback music.

Reject criteria:

- (a) Playback sound is not clear or distorted.
- (b) Loss of high or low frequencies.
- (c) Abnormal or no sound is heard.

2.) Left and right speaker functions and polarity check

- (a) Playback music by switching off the right channel, listen to the music.
- (b) Playback music by switching off the left channel, listen to the music.

Reject criteria:

- (a) Both left and right channels sounded.
- (b) The left and right channels playback are reversed.
- (c) Abnormal or no sound is heard during right or left channels playback.

3.) Volume control check

- (a) Playback and listen to the music.
- (b) Turn the volume control from normal position to maximum then to minimum then back to normal position again.

Reject criteria:

- (a) The sound output level is not decrease or increase smoothly.
- (b) Abnormal sound is heard during the volume control is turning.
- (c) Sound is heard when the volume control turn to minimum.
- (d) No increase or decrease of sound level when turning the volume control.

4.) Power saving

- (a) Playback and listen to the music.
- (b) Into power saving mode, the Left and Right speakers is muted.

Reject criteria:

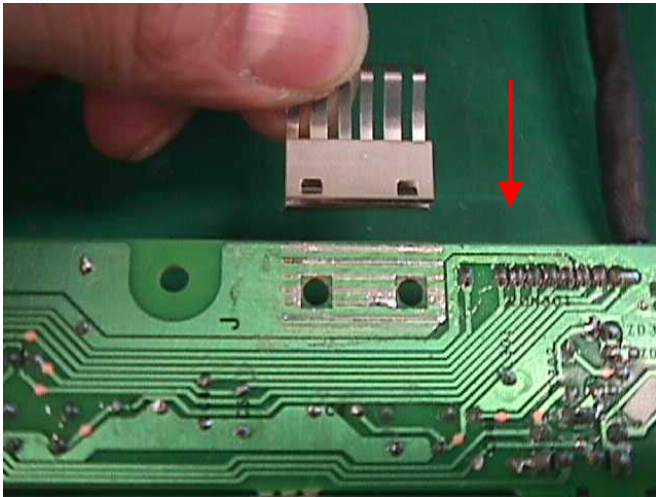
- (a) The Left & Right speakers output are not muted.
- (b) One of the Left or Right speaker is not muted.

4. Wire Dressing **- Assembly step by step**

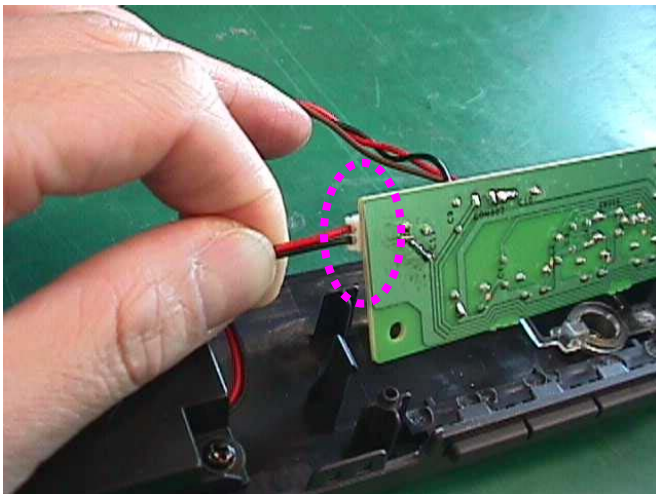
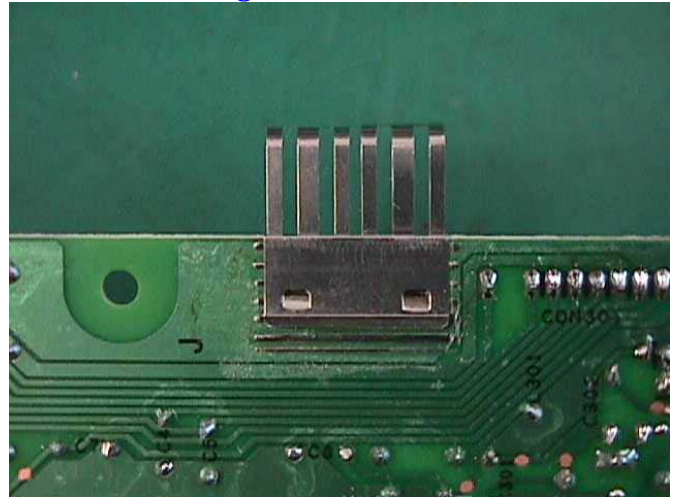


A. Screw up Speaker Drivers on the Bazel. (4 screws)

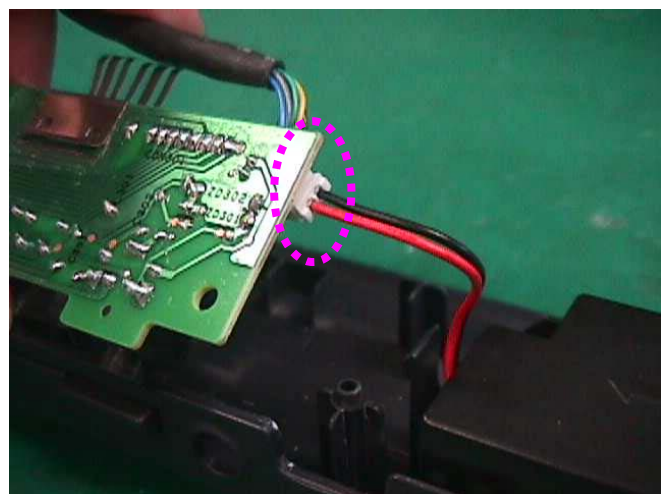
Alignment Procedure

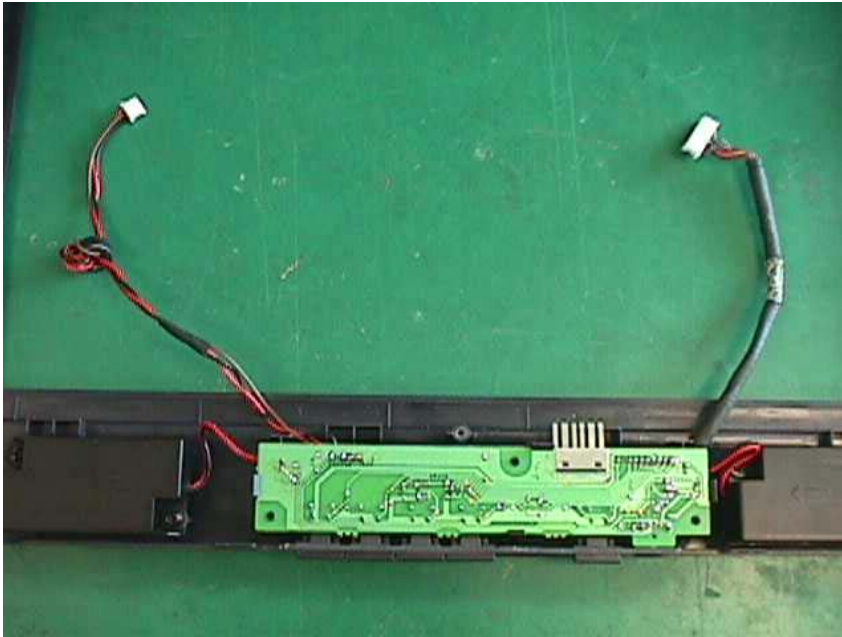


B. Put the Clip together with the Ctrl BD.

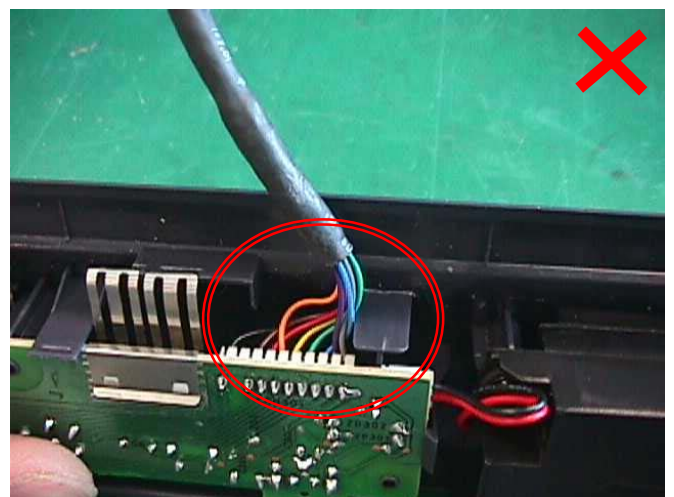
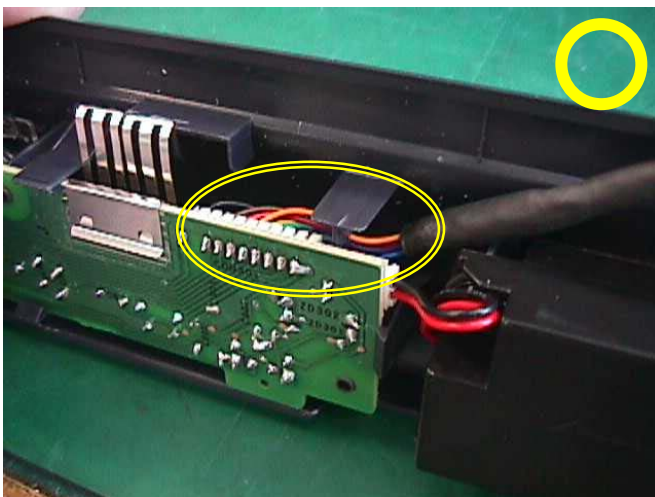


C. Connect the speaker wires to the Ctrl BD on the both sides.

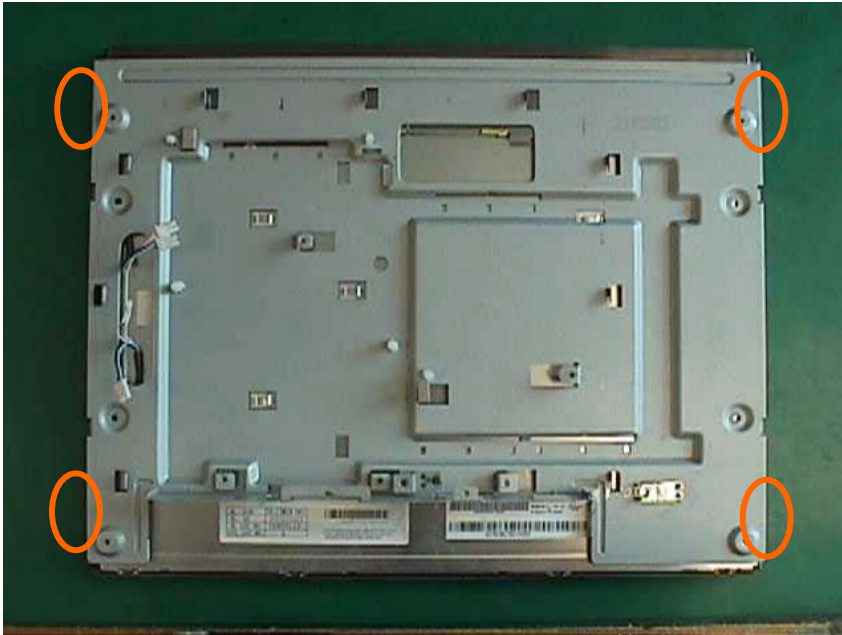




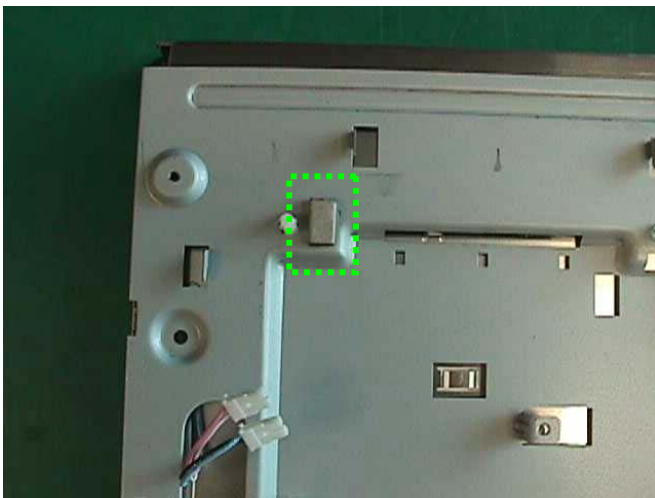
D. Clip the Ctrl BD on the Bazel.



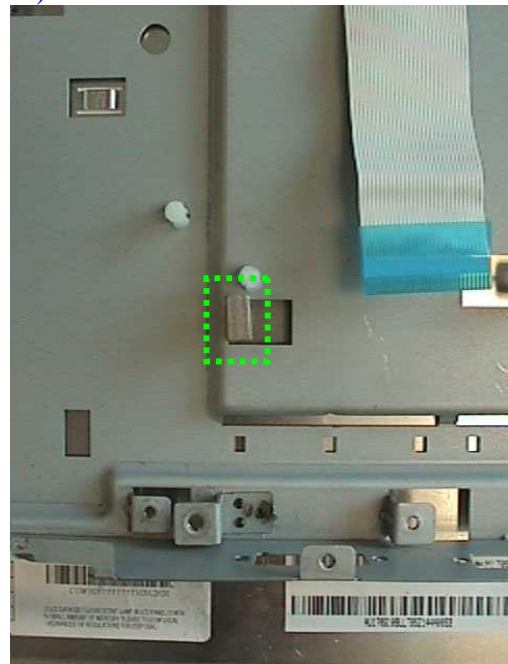
E. Dress the wire which is connected to I/F BD as above left picture showed to avoid any interference against with the Upcase.

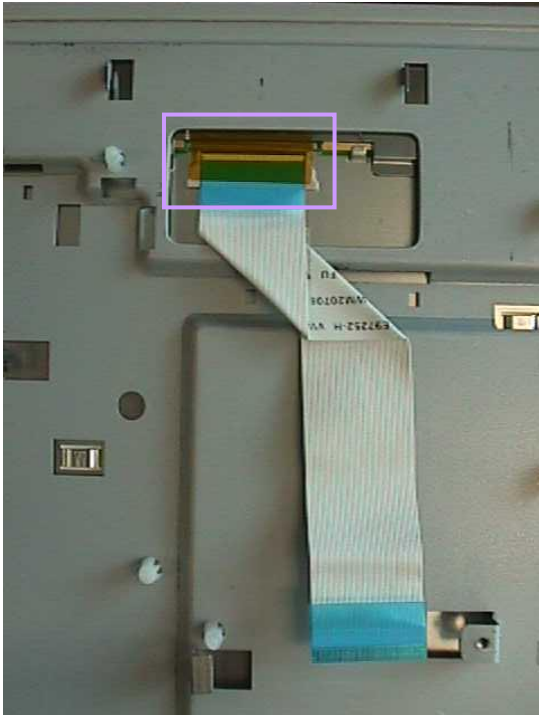


F. Assembly the panel with the Main Bracket. (4 side-mount)

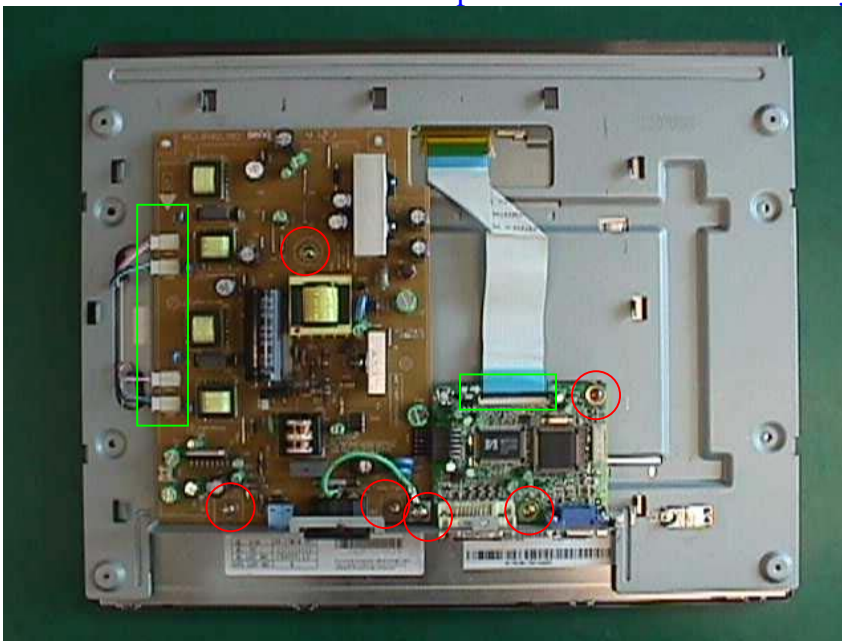


G. Check the 2 gaskets if stuck on the Main Bracket.



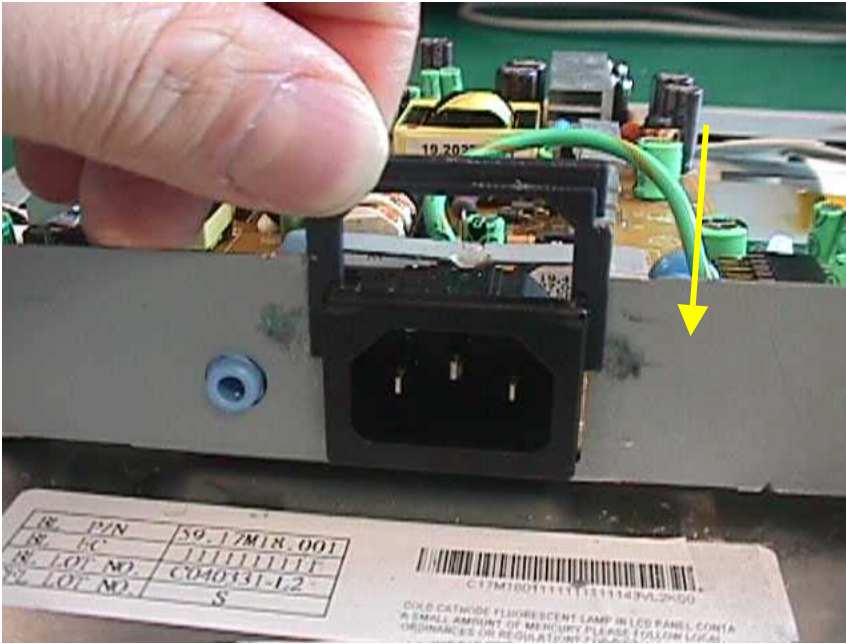


H. Insert the LVDS FFC into the panel connector and stick the yellow tape on them.

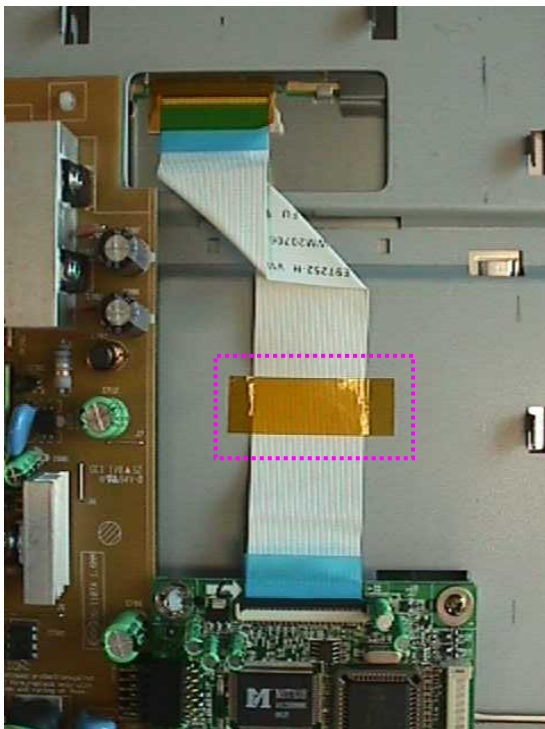


I. Assemble the I/F & Power BD together with the Main Bracket.

J. Screw up the boards (6 screws) and connect wires (lamp wires & FFC).



K. Insert the COVER AC-Socket.



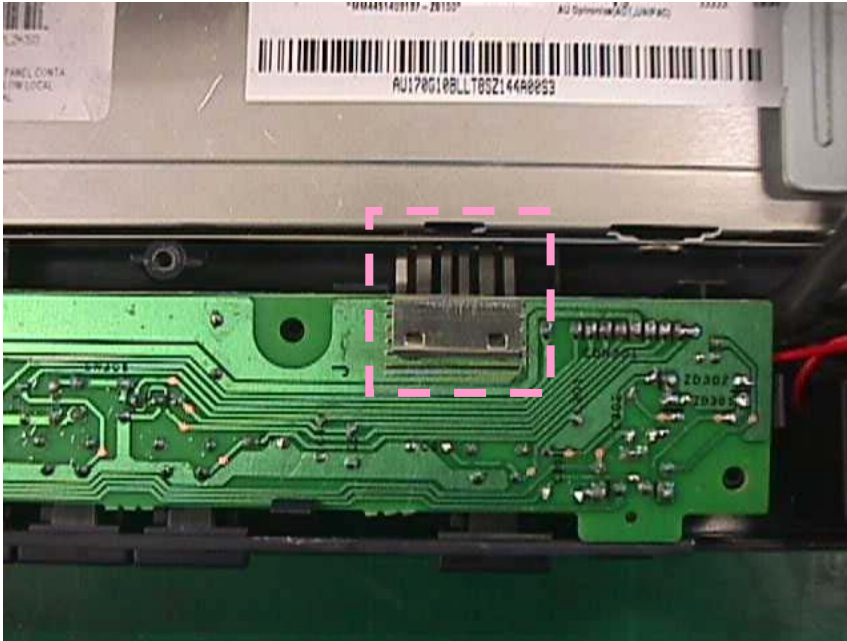
L. Stick the yellow tape to make the FFC flatten along the Main Bracket.



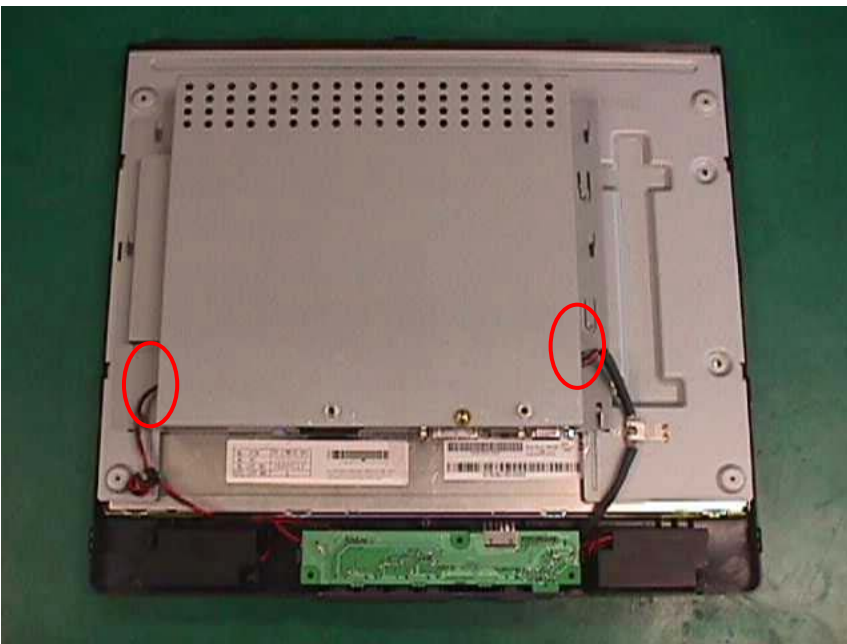
M. Assembly the Main Cover with the Main Bracket. (1 screw)



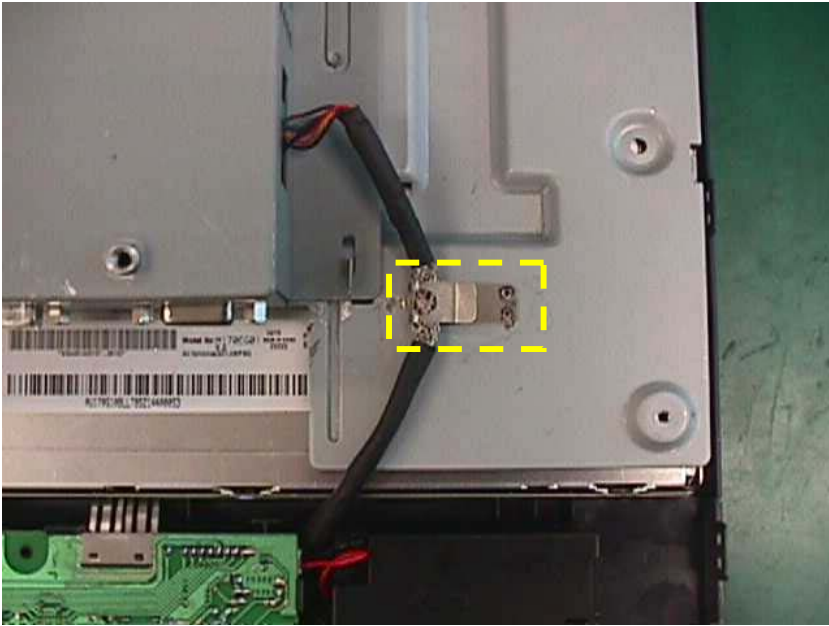
N. Put the Head set together with the Bazel set.



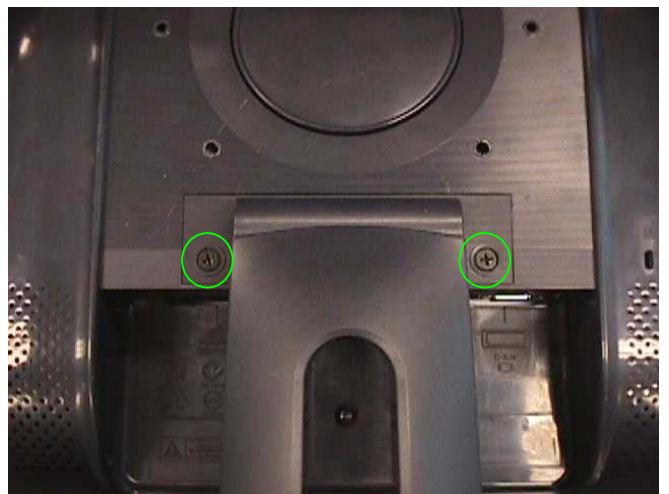
O. Make sure if the Clip touch the panel firmly.



P. Connect the wires with the I/F & Power BD.

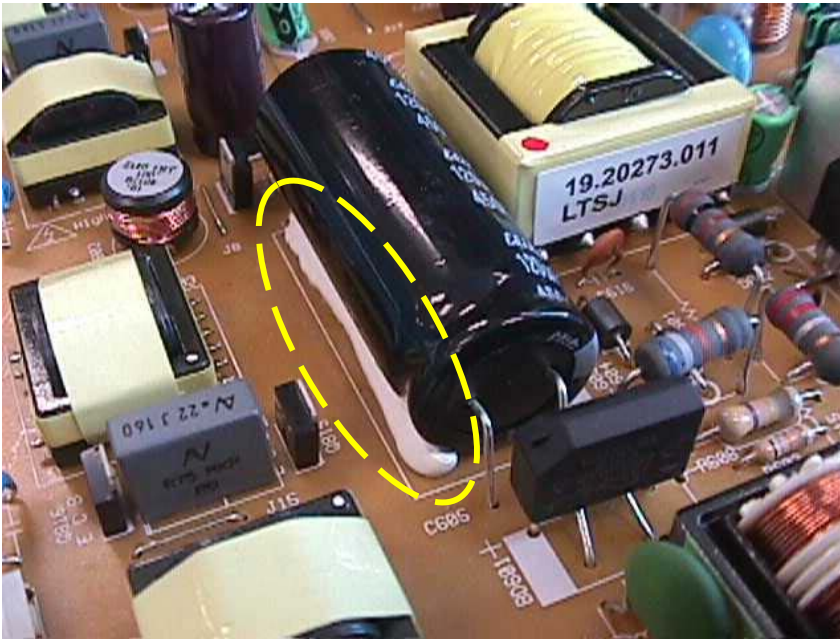


Q. The method to clip the Ctrl BD wire.

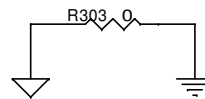
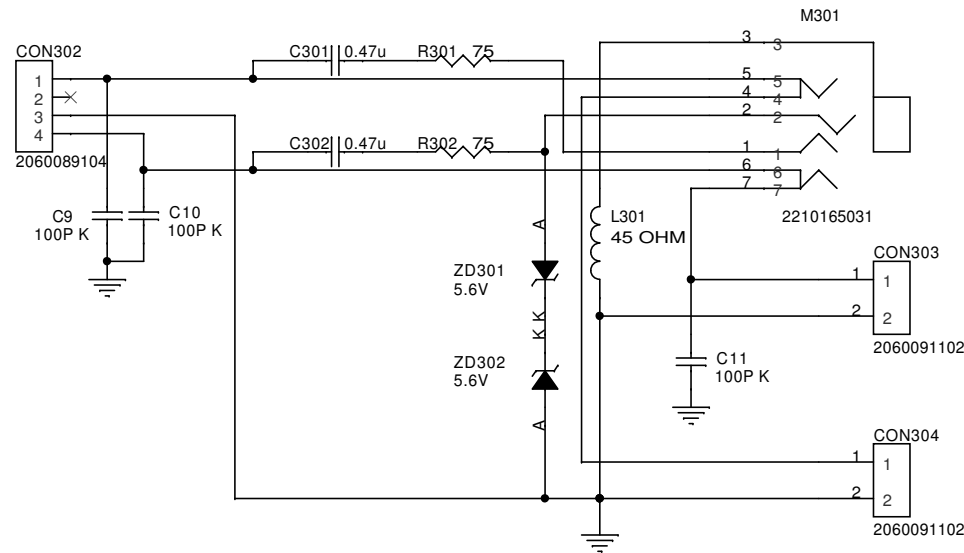
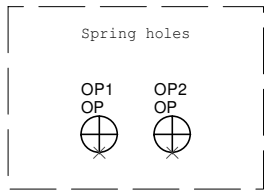
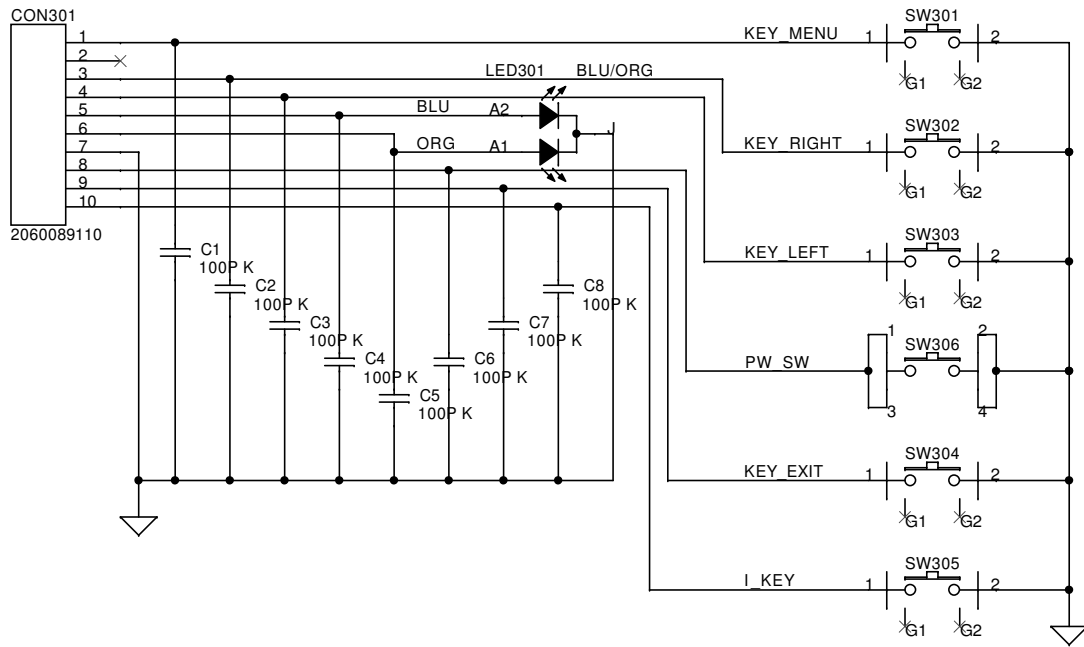


R. Assembly the Upcase (5 screws) and the Base (2 screws).

6. Add Glue



C605 (Power BD)



Benq Corporation				
Project Code	Model Name	OEM/ODM Model Name		
99.L0Y72.001	Q7C4	NA		
Title				
CTRL BOARD				
Size	PCB P/N	PCB Rev.	Document Number	Rev.
<Size>	48.L0Y03.S03	S03	99.L0Y72.000-C3-304-002	2
Date: Thursday, June 17, 2004		Sheet 1 of 1		
Prepared By		Reviewed By		Approved By
ANGEL HU		JEFF CHI		DAVEN WU

Table of Contents

1. Introduction 3

2. Operational Specification 3

 2.1 Power supply 3

 2.2 Signal interface 4

 2.3 Video performance 5

 2.4 Scan range 5

 2.5 Plug & Play DDC2B Support..... 6

 2.6 Support Timings 6

3. Operational & Functional Specification 7

 3.1 Video performance 7

 3.2 Brightness Adjustable Range..... 7

 3.3 Acoustical Noise 7

 3.4 Environment 7

 3.5 Transportation..... 8

 3.6 Electrostatic Discharge Requirements 8

 3.7 EMC 8

 3.8 Reliability 9

 3.9 Audio performance 9

4. LCD Characteristics 9

 4.1 The Physical definition & Technology summary of LCD panel..... 9

 4.2 Optical characteristics of LCD panel..... 9

5. User Controls 10

 5.1 User’s hardware control definition 10

 5.2 OSD control function definition 10

6. Mechanical Characteristics 11

 6.1 Dimension..... 11

 6.2 Weight..... 11

 6.3 Plastic 11

 6.4 Carton 12

Table of Contents

7. Pallet & Shipment	12
7.1 Container Specification	12
7.2 Carton Specification	12
Product:	12
Package:.....	12
8. Certification	13
Appendix: Physical Dimension Front View and Side view	14

1. Introduction

This specification describes Q7C4, which is a 17.0” analog and digital interface color TFT LCD monitor with audio. The monitor supports up to 1280x1024 pixel resolution and refresh rate of 75 Hz. The independent 6 bits R, G, B colors are capable of displaying 16.2M colors (RGB-6bit + FRC data). In addition, dithering function is supported. The features summary is shown below,

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

Feature items	Specifications	Remark
Panel supplier & module name	Yes	AUO M170EG01 V.3
Screen diagonal	Yes	432(17.0”)
Display Format	Yes	RGB
Pixel Pitch	Yes	0.264x0.264
Viewing Angle (@ Contrast Ratio = 10)	Yes	70/70/70/60
Analog interface with Scaling supported	Yes	Genesis GM5221
DVI interface with Scaling supported	Yes	Genesis GM5221
Video interface with Scaling supported	No	
Max resolution mode supported	Yes	1280x1024@76Hz
Number of Display Colors supported	Yes	16.2M
Contrast Ratio	Yes	500:1
Luminance	Yes	400
AC power input	Yes	90~264V
DC power input (with AC power adapter)	No	
DPMS supported	Yes	<1W(110V) ,<2W(220V)
LED indicator for power status showed	Yes	
OSD for control & information supported	Yes	
Multi-language supported for OSD	Yes	
Buttons control supported	Yes	
Flywheel control supported	No	
Scaling function supported	Yes	
Auto adjustment function supported	Yes	
DDC function supported (EDID ver. 1.3)	Yes	
Audio speakers supported	Yes	
Audio Jack (input connector) supported	Yes	
Earphone Jack (input connector) supported	Yes	
Microphone function supported	No	
Mechanical Tilt base design	Yes	From -2 to +20 degree
VESA wall mounting design	Yes	
Mechanical Rotate design	No	N.A.
Mechanical Lift base design	No	N.A.
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	≤ 40 W	√		

FP71V+(Q7C4) LCD Monitor Service Guide

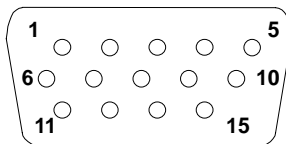
Engineering Specification

DPMS	DPMS "Off" state	≤ 1 W in power preferred mode, 115V ≤ 2 W, 230V	√		
Inrush Current	110 VAC 220 VAC	< 30 A (peak) < 60 A (peak)	√		
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	√		
Power Line Transient	IEC1000-4-4	1KV	√		
	IEC1000-4-5 (Surge)	Common: 2KV, Differential: 1KV	√		
CCFL operation range	90 ~ 264VAC	3 mA ~8mA	√		
CCFL Frequency	90 ~ 264VAC	40KHz ~ 80KHz	√		
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	√		
	24-pin DVI-D connector	See Note-2	√		
Video input	Signal type	Separate analog R/G/B		√	
	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)	√		
	Level	Logic High: 2.4V ~ 5.5V Logic Low: 0V ~ 0.5V (TTL level)	√		
	Impedance	Minimum 2.2K Ω (pull down)	√		
	Sync Pulse Width (SPW)	$0.7 \mu s < H\text{-SPW}$ $1H < V\text{-SPW}$	√		

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



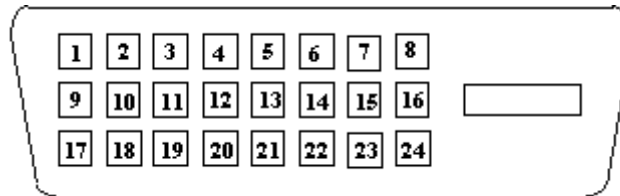
Pin	Signal Assignment	Pin	Signal Assignment
1	Red video	9	PC5V (+5 volt power)
2	Green video	10	Sync Ground
3	Blue video	11	Ground
4	Ground	12	SDA

FP71V+(Q7C4) LCD Monitor Service Guide

Engineering Specification

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
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		135 MHz	√		
Max. Resolution		1280 x 1024	√		
Rise time + Fall time		< 6.25 ns (50% of minimum pixel clock period)	√		
Settling Time after overshoot /undershoot		< 5% final full-scale value	√		
Overshoot/Undershoot		< 12% of step function voltage level over the full voltage range	√		

2.4 Scan range

Item	Condition	Spec	OK	N.A	Remark
Horizontal		30 ~ 83 KHz	√		
Vertical		56 ~ 76 Hz	√		

2.5 Plug & Play DDC2B Support

Item	Condition	Spec	OK	N.A	Remark
DDC channel type		DDC2B	√		
EDID		Version 1.3	√		

2.6 Support Timings

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

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

Item	Condition	Spec	OK	N.A	Remark
Resolution	Any input resolution modes which are under 1280 x 1024	1280 x 1024	√		
Contrast ratio		500:1 (typ.)	√		
Brightness	At R/G/B saturated condition	400 cd/m ² (typ.) @ 7.5mA	√		
Response time	Rising + Falling time	8 ms (typ.)	√		
Viewing angle	At Contrast ratio = 10	R/L: 70/70 degrees (typ.)	√		
	At Contrast ratio = 10	U/D: 70/60 degrees (typ.)	√		
CIE coordinate of White		(0.31, 0.33) +/- (0.03, 0.03)	√		
Display colors		16.2M colors (RGB 6-bits + FRC data)	√		

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	√		400 ~ 105

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-operating	10 ~ 90%	√		
Altitude	Operating	0~3048m (10,000ft)	√		
	Non-operating	0~12,192m (40,000ft)	√		

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	√		

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	√		
CCFL Life time	At 25±2°C, under 7.0mA	50,000 Hours (typ.)	√		

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 7.5mA lamp current.

3.9 Audio performance

Item	Condition	Spec	OK	N.A	Remark
Preamp + Power amp					
(1)Output power		1 Wrms/CH @ 1KHz	√		
(2)THD (@ 1W)		<1%	√		
(3)S/N ratio		>40dB	√		
Speaker Driver					
(1)Nominal impedance		8 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		62x33cx20 mm ²	√		
Audio Control					
(1)Volume range		0 ~100 levels	√		
(2)Mute		On/Off	√		

4. LCD Characteristics

4.1 The Physical definition & Technology summary of LCD panel

Item	Condition	Spec	OK	N.A	Remark
LCD Panel Supplier		AUO	√		
Panel type of Supplier		M170EG01 V3	√		
Screen Diagonal		432mm(17.0")	√		
Display area	Unit=mm	337.920(H) x 270.336(V)	√		
Physical Size	Unit=mm	358.5(H) x 296.5(V) x 17.0 (D) (typ.)	√		
Weight	Unit=gram	1900 (typ.)	√		
Technology		TN type	√		
Pixel pitch	Unit=mm	0.264 x 0.264	√		
Pixel arrangement		R/G/B vertical stripe	√		
Display mode		Normally white	√		
Support color		16.2M colors (RGB 6-bits + FRC data)	√		

4.2 Optical characteristics of LCD panel

Item	Unit	Conditions	Min.	Typ.	Max.	Remark
Viewing Angle	[degree]	Horizontal (Right)	60	70		
	[degree]	CR = 10 (Left)	60	70		
	[degree]	Vertical (Up)	60	70		
	[degree]	CR = 10 (Down)	50	60		
Contrast ratio		Normal Direction	300	500		
	[msec]	Rising Time		6	9	

Response Time	[msec]	Rising Time		6	9	
	[msec]	Falling Time		8	18	
Color / Chromaticity Coordinates (CIE)		Red x	0.61	0.64	0.67	
		Red y	0.31	0.34	0.37	
		Green x	0.26	0.29	0.32	
		Green y	0.58	0.61	0.64	
		Blue x	0.11	0.14	0.17	
		Blue y	0.04	0.07	0.10	
Color Coordinates (CIE) White		White x	0.28	0.31		
		White y	0.30	0.33		
Luminance Uniformity	[%]	9 points measurement	75	80		
White Luminance @ CCFL 7.5mA (center)	[cd/m ²]		TBD	400		
Crosstalk (in 75Hz)	[%]				1.5	

* 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

Item	Condition	Spec	OK	N.A	Remark
Monitor Power button			√		
Enter button			√		
Right/Inc. button			√		
Left/Dec. button			√		
Exit /Volume button			√		
I-key button			√		
Mode Selection button			√		
Mute button				√	
Input source select 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 sRGB User: Separate R/G/B adjustment	√		
OSD Position		OSD Horizontal position OSD Vertical position	√		
OSD Time		From 5 sec to 60 sec	√		
Language		8 languages	√		
Recall		Color recall Recall All	√		

Mode Selection			√		
Input Select		D-sub DVI	√		
Sharpness			√		
Display Information		For input timing	√		
Volume			√		
Mute			√		
Hot key for Brightness			√		
Hot key for Contrast			√		
Hot key for Volume			√		
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		339.8 x 272.2 mm	√		
Monitor without Stand	L x W x H mm	349.7*375.3*72mm	√		
Monitor with Stand	L x W x H mm	385.8*375.3*201.1 mm	√		
Carton Box (outside)	L x W x H mm	456 x 423 x 157mm	√		
Tilt and Swivel range		Tilt: -2 ~ +20 degree Swivel: 0 degrees	√		

6.2 Weight

Item	Condition	Spec	OK	N.A	Remark
Monitor (Net)		4.7 Kg	√		
Monitor with packing (Gross)		6.2 Kg	√		

6.3 Plastic

Item	Condition	Spec	OK	N.A	Remark
Flammability		94-HB	√		
Heat deflection To	ABS	65 °C	√		
UV stability	ABS	Delta E < 8.0	√		
Resin		MPRII: ABS (VW55/VE0856/D350)	√		
Texture		MT-11020	√		Bezel texture MT-11010
Color		BCS-Y5003A	√		Bezel painting T8020C

6.4 Carton

Item	Condition	Spec	OK	N.A	Remark
Color		Kraft	√		
Material		B Flute	√		
Compression strength		288 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'	780	Pallet A: 78	Pallet A: 6
			Pallet B: 52	Pallet B: 6
	40'	1820	Pallet A: 78	Pallet A: 14
			Pallet B: 52	Pallet B: 14
Without pallet	20'	974	X	X
			X	X
	40'	2099	X	X
			X	X

7.2 Carton Specification

Product:

Net Weight (Kg)	Gross Weight (Kg)	Dimension w/o Base L*W*H (mm)	Dimension w/ Base L*W*H (mm)
4.7Kg	6.2Kg	349.7 x 375.3 x 72	385.82 x 375.3 x 201.1

Package:

Carton Interior Dimension (mm) L*W*H	Carton External Dimension (mm) L*W*H
448 x 415 x 143	456 x 423 x 157

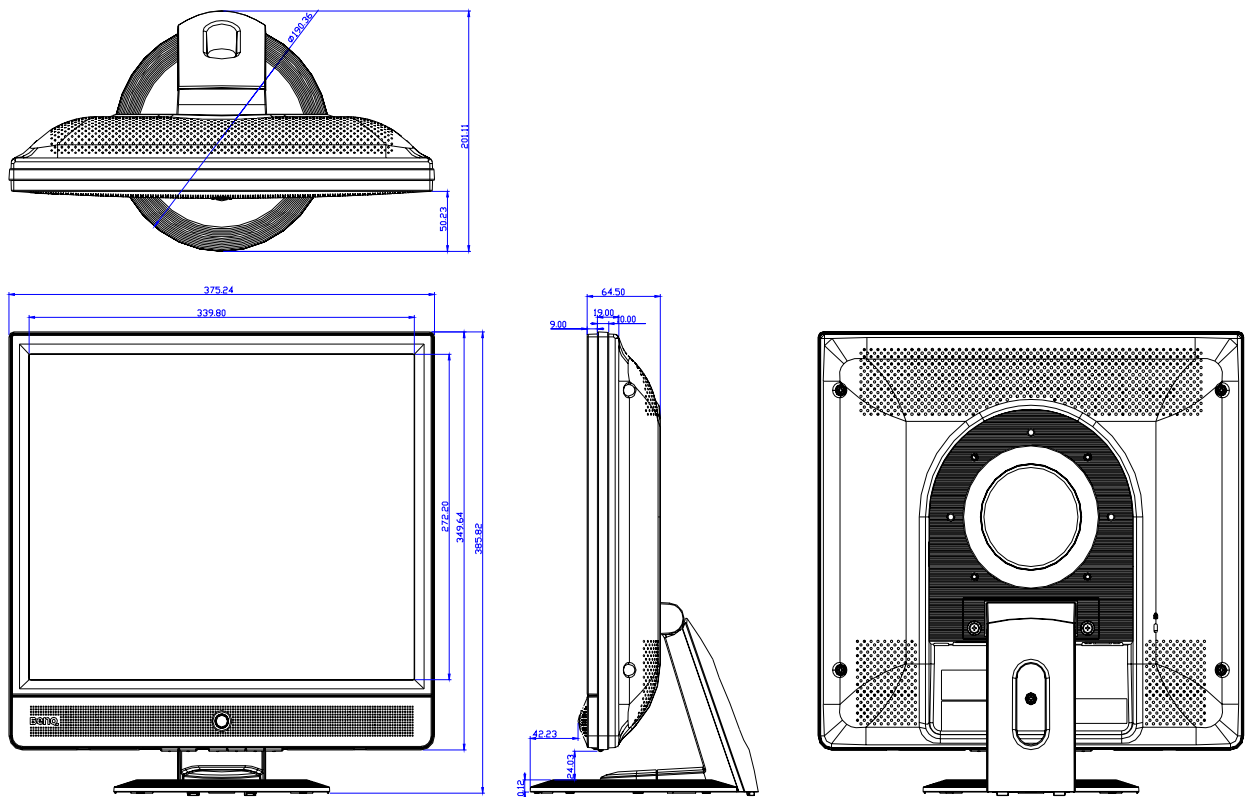
8. Certification

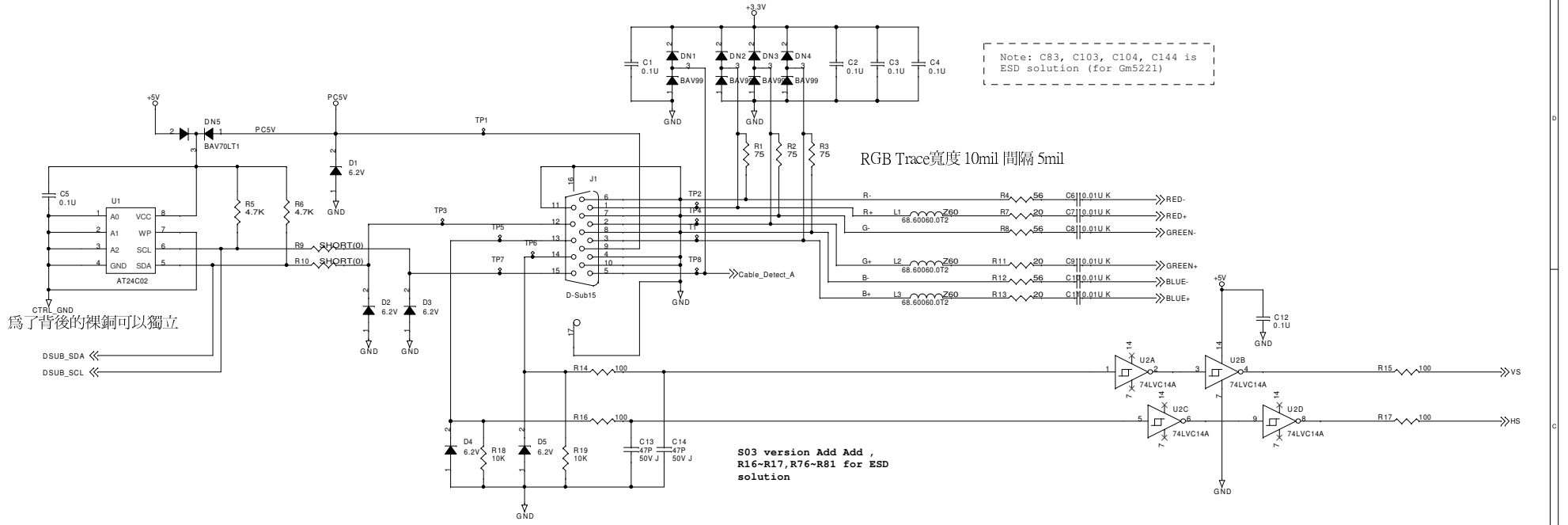
Item	Condition	Spec	OK	N.A	Remark
Environment	Green design	API Doc. 715-C49	√		
	Blue Angel	German Standard		√	
	E-2000	Switzerland		√	
	EPA	USA Standard	√		
	TCO'99		√		
	TCO'03		√		
	Green Mark		√		
PC-Monitor	Microsoft Windows	PC98/99	√		
	DPMS	VESA	√		
	DDC 2B	Version 1.3	√		
	USB	External		√	
Safety	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	√		
	IEC60950		√		
	EN60950		√		
	CB	EN60950	√		
	TUV/GS	EN60950 / EK1-ITB 2000:2003	√		
	CCC (China)		√		
	GOST	EN60950	√		
	SASO		√		
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	√		
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

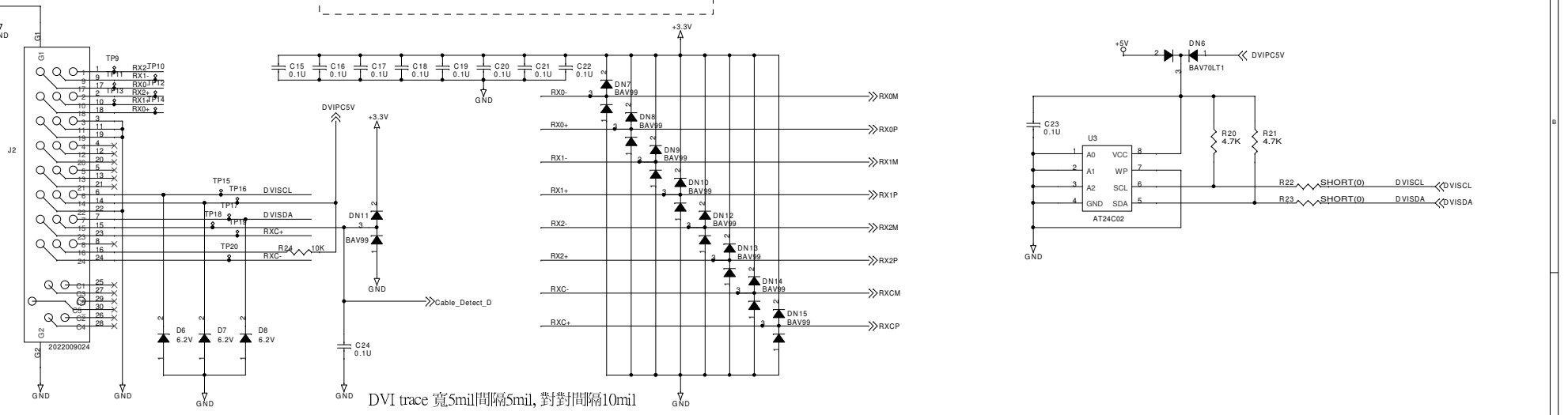
Fig. 1 Physical Dimension Front View and Side view



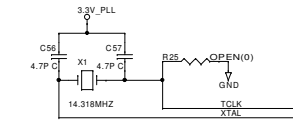
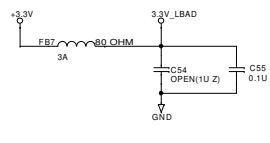
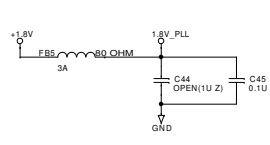
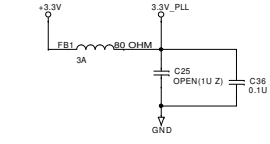
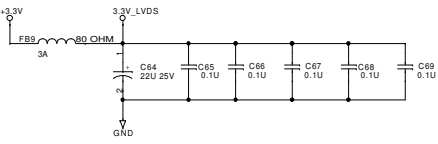
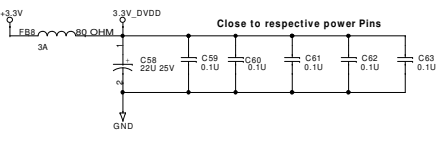
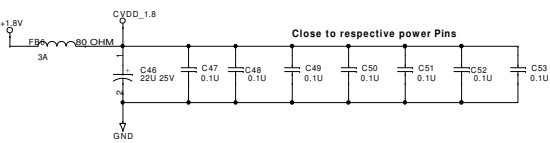
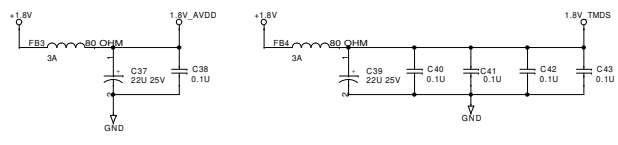
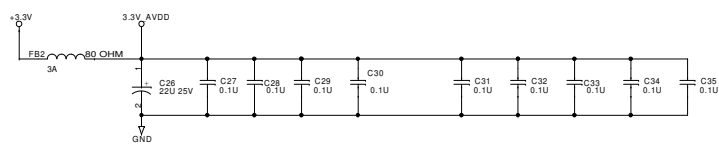


爲了背後的裸銅可以獨立

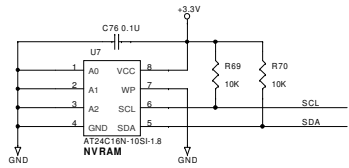
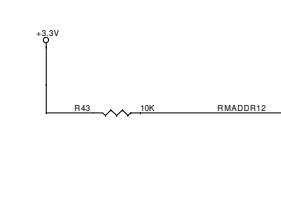
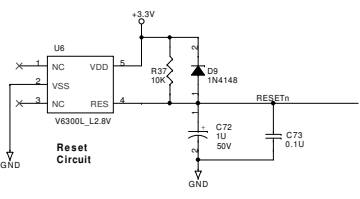
Note: C145, C146, C147, C148, C149, C150, C151, C152 is ESD solution (for Gm5221)



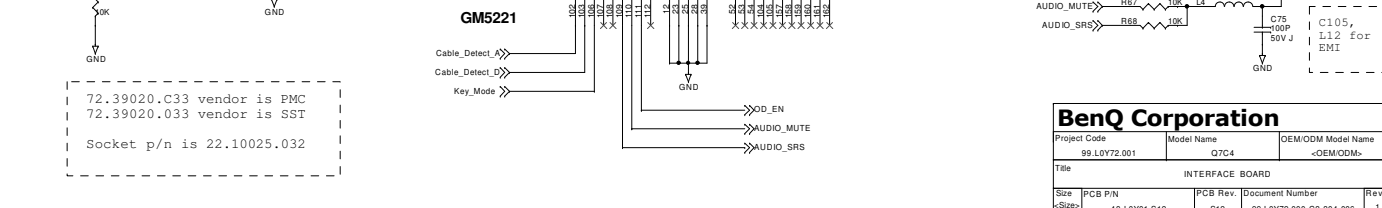
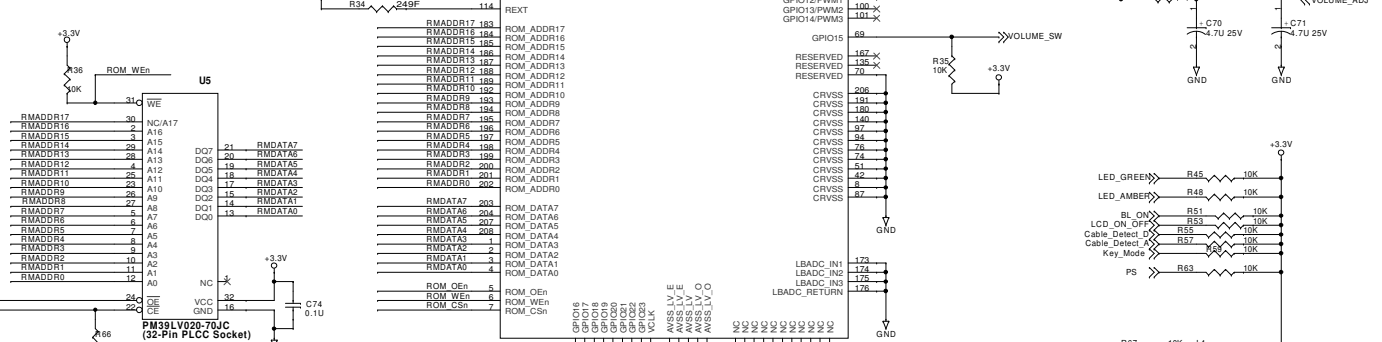
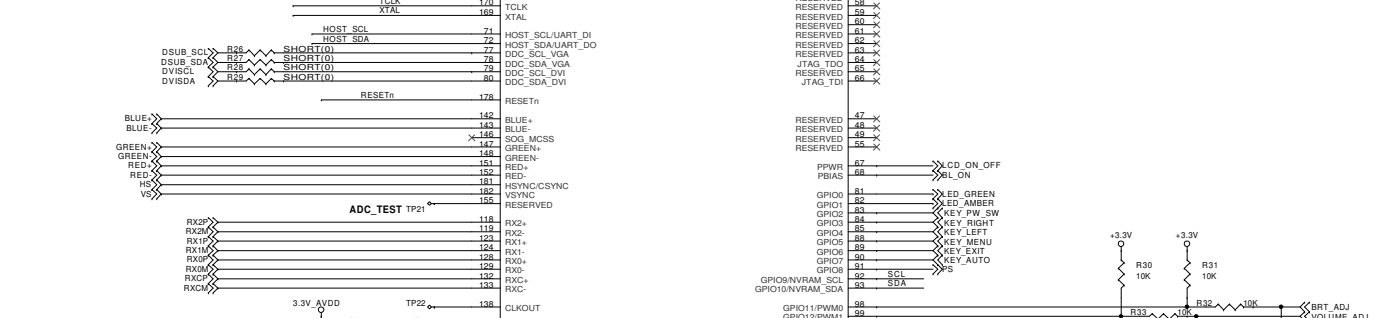
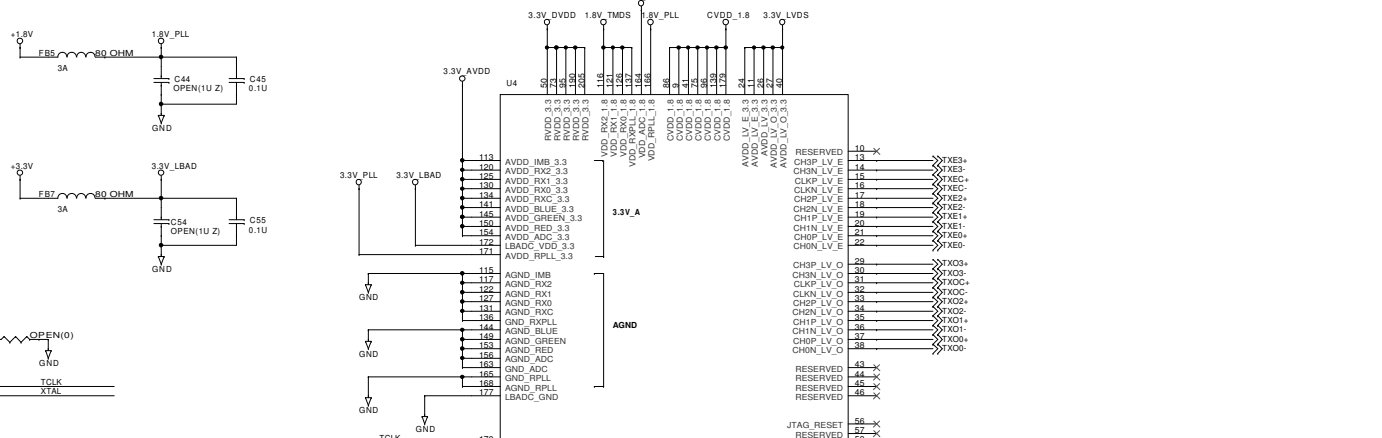
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Title INTERFACE BOARD		
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Date: Friday, November 19, 2004	Sheet 1 of 6	Rev. 1
Prepared By ANGEL HU	Reviewed By LINIX CHENG	Approved By DAVEN WU



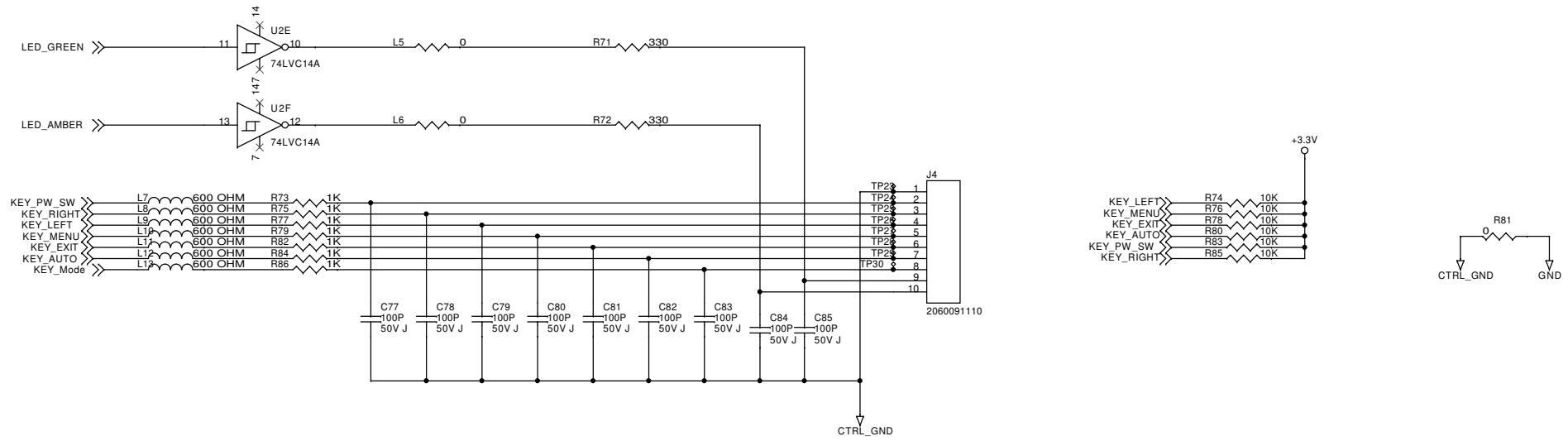
The 2.8V is threshold voltage
 If +3.3V pin below 2.8V, it will output "L"
 When +3.3V pin over 2.8V, after 50ms, will output "H"



72.39020.C33 vendor is PMC
 72.39020.033 vendor is SST
 Socket p/n is 22.10025.032

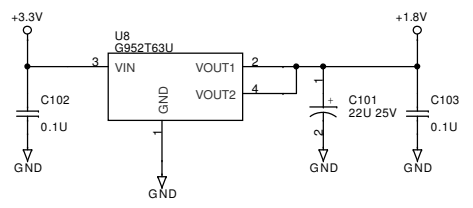
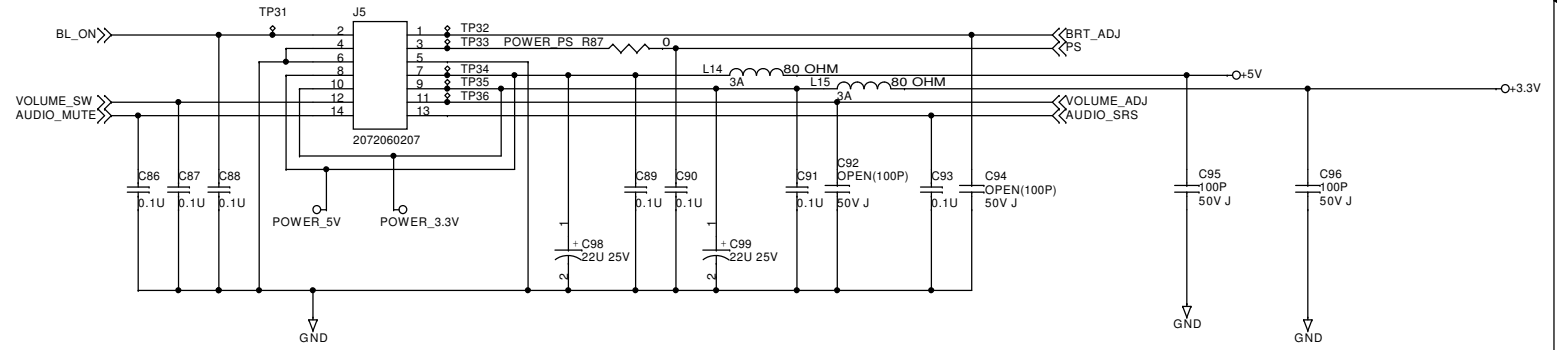


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Date:	Friday, November 19, 2004	Sheet	2 of 6
Prepared By	Reviewed By	Approved By	
ANGEL HU	LINX CHENG	DAVEN WU	

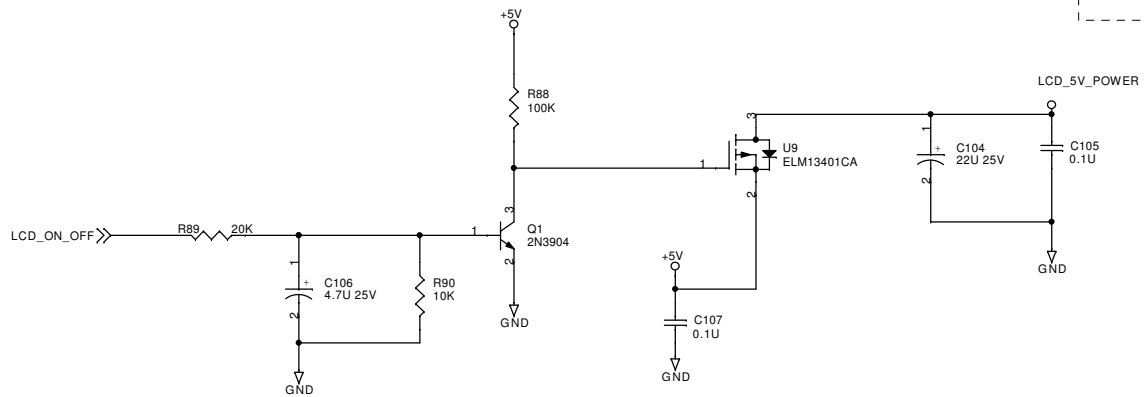


Reserve AUDIO_MUTE circuit for if powerBD is too small and could not fit all audio curcuit

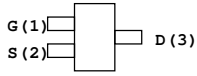
Warning: Q7C4是pin 1在左邊



BenQ Corporation			
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Size <Size>	PCB P/N 48.L0Y01.S12	PCB Rev. S12	Document Number 99.L0Y72.000-C3-304-006
Date: Friday, November 19, 2004	Sheet 3 of 6		Rev. 1
Prepared By ANGEL HU	Reviewed By LINIX CHENG	Approved By DAVEN WU	



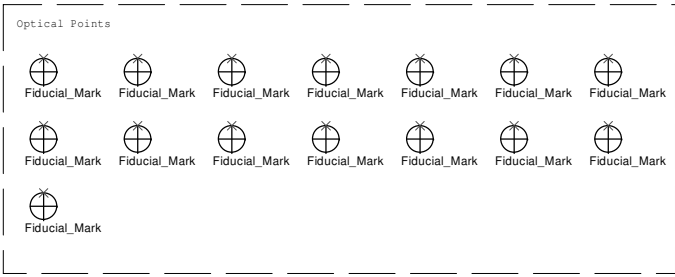
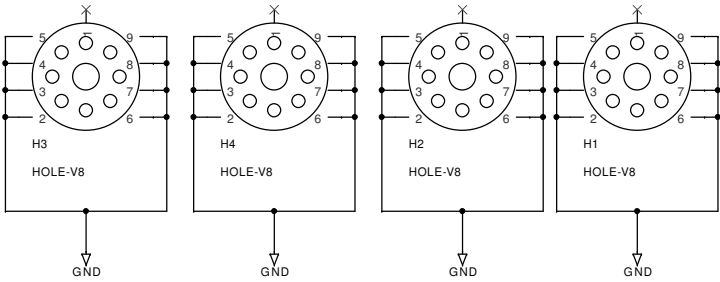
U9 spec.
 Vds=-30V, Vgs=+/-12V
 Id=-3.5A when ambient temp.=70 degree



LCD_5V_POWER supply:
 1.samsung L02 panel max. 1.05A
 2.OD max. ?A
 3.samsung 1Mx4 SDRAM max. 1.212A
 4. 5v convert to 3.3v regulator ?A

Total: A

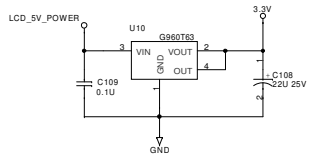
Screw Holes



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Date: Friday, November 19, 2004		Sheet 4 of 6	
Prepared By ANGEL HU	Reviewed By LINIX CHENG	Approved By DAVEN WU	

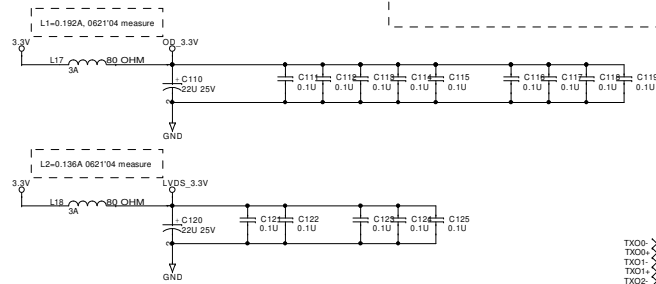
You can replace it to LD1117-3.3V
p/n: 74.01117.03C

Warning: This regulator is 1A
You MUST measure output current when ICs working

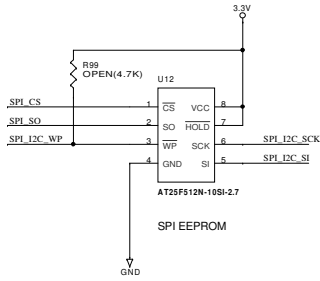


Current estimation:
Samsung SDRAM 1Mx16
power consumption: 1W
1W/3.3V=0.303A
0.303*4=1.212A
VTIO3601 power consumption: unknown
total: 1.212A at least

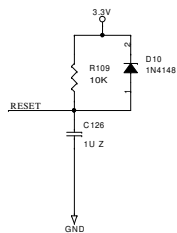
Real measurement:
4 SDRAM current= 2x 0.058=0.116A
VTIO3601 current= 0.192+0.136=0.328A
total: 0.444A



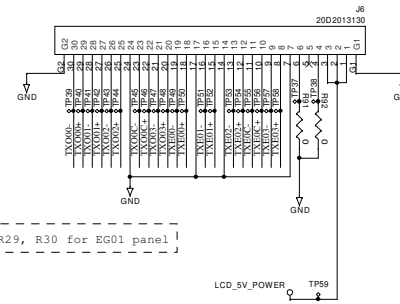
LVDS Input



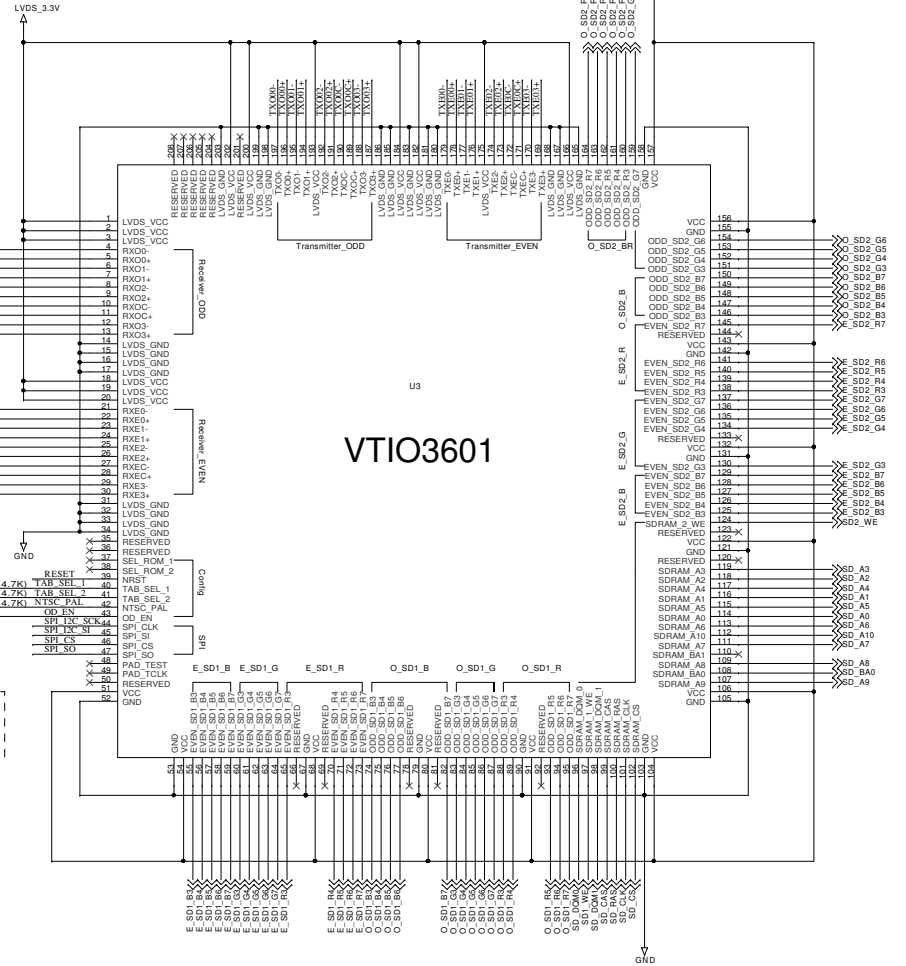
LOW RESET



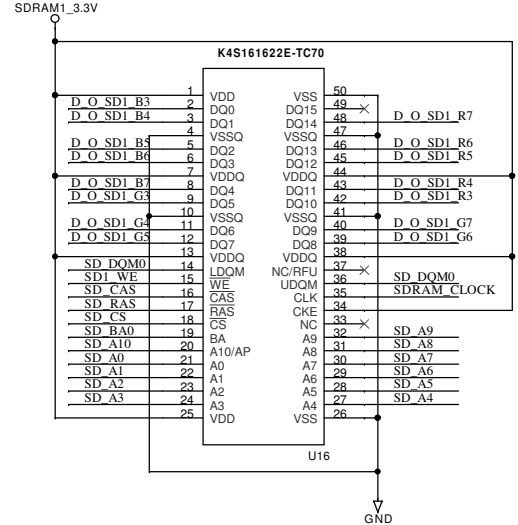
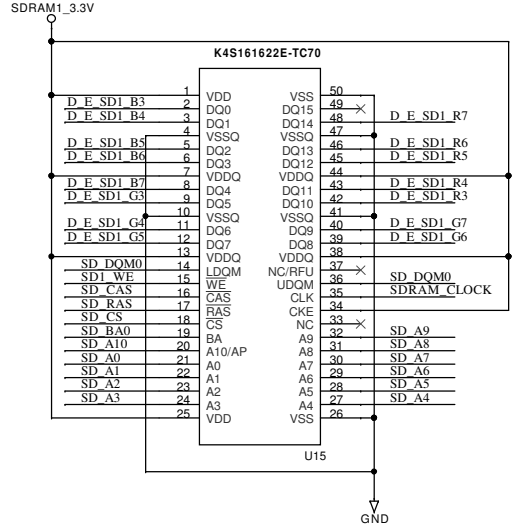
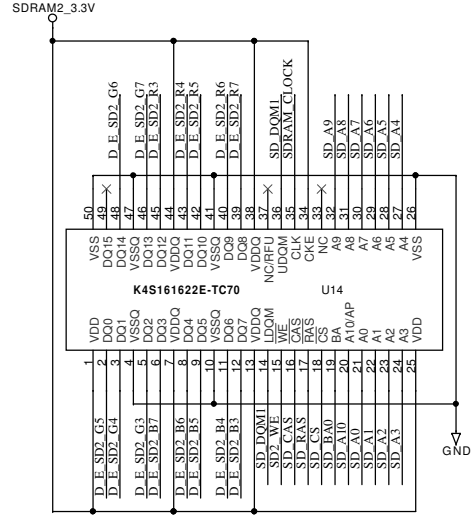
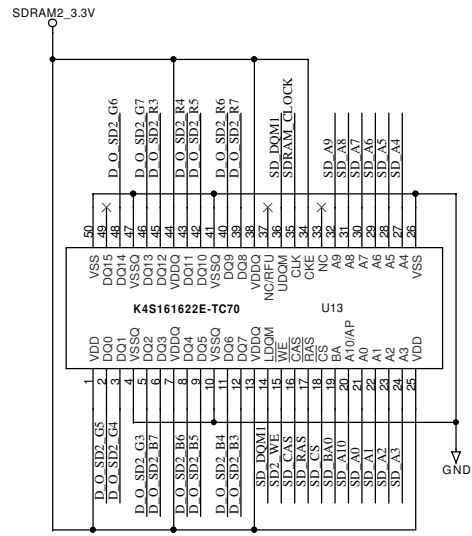
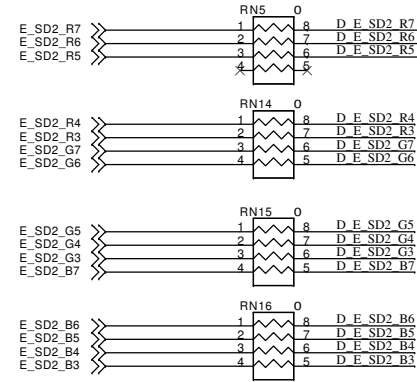
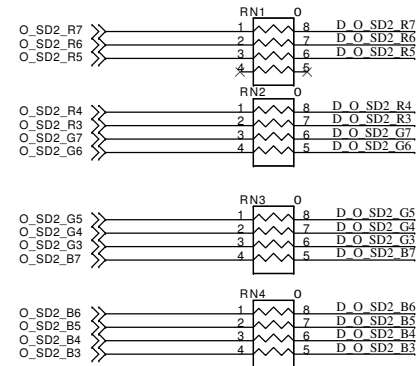
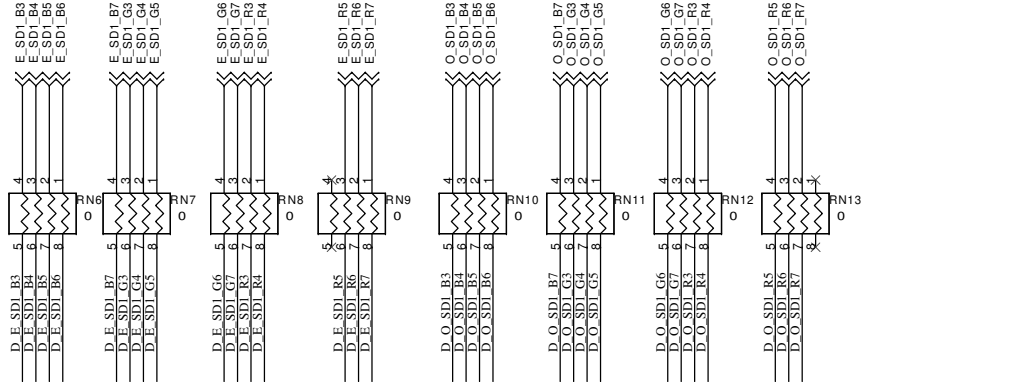
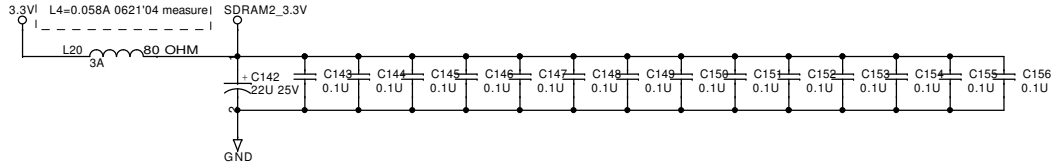
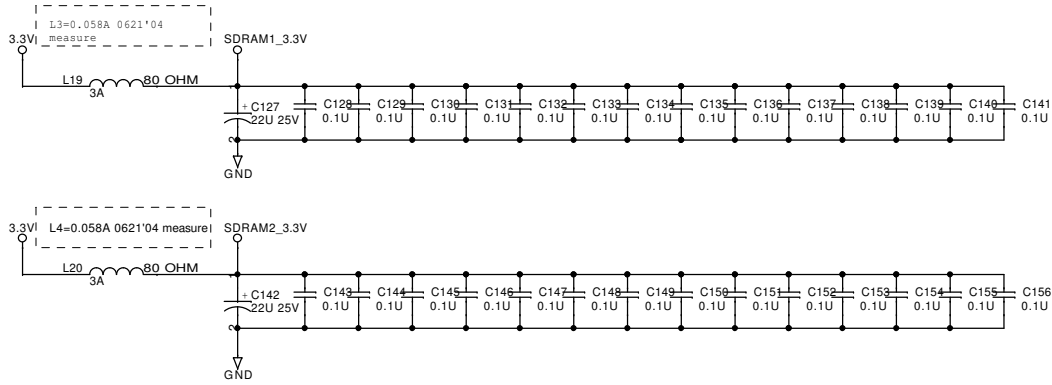
Pin38, 37 are ROM type selection --- internal pull low
Pin42,41,40 are OD table selection (have 8 choice) --- internal pull low
Pin43 (OD_EN) --- internal pull low



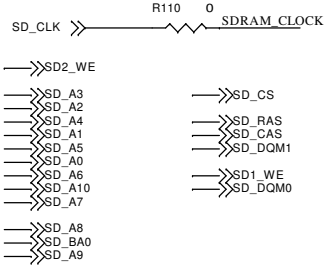
Note: R29, R30 for EG01 panel



BenQ Corporation				
Project Code	Model Name	OEM/ODM Model Name		
99.L0Y72.001	Q7C4	<OEM/ODM>		
Title: INTERFACE BOARD				
Size	PCB P/N	PCB Rev.	Document Number	Rev.
<Size>	48.L0Y91.S12	S12	99.L0Y72.000-C3-304-006	1
Date:	Friday, November 19, 2004	Sheet	5 of 6	6
Prepared By:	Reviewed By:	Approved By:		
ANGEL HU	LINK CHENG	DAVEN WU		



If bead array is too small (now is 0805), you can change to 1206 (use p/n:68.12160.AQ1)



BenQ Corporation		
Project Code	Model Name	OEM/ODM Model Name
99.L0Y72.001	Q7C4	<OEM/ODM>
Title		
INTERFACE BOARD		
Size	PCB P/N	PCB Rev. Document Number
<Size>	48.L0Y01.S12	S12 99.L0Y72.000-C3-304-006
Date: Friday, November 19, 2004	Sheet 6 of 6	Rev. 1
Prepared By	Reviewed By	Approved By
ANGEL HU	LINX CHENG	DAVEN WU