Applicable Country & Regions: USA & Canada

Service Manual for BenQ:

LCD E2220HD

(D-SUB +DVI-D +HDMI +

USB + Glossy black Bezel

with silver for mid frame)

Product Service Manual – Level 1~2

Version: 2nd
Date:09-02-2009

Notice:
For RO to input specific “Legal Requirement” in specific NS regarding to responsibility and liability statements.
Please check BenQ’s eSupport web site, http://esupport.benq.com, to ensure that you have the most recent version of this manual.

First Edition (July, 2009)

Content Index

Abbreviations & Acronyms

A	
ADC	Analog to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
B	
BenQ	BenQ Corporation
BTSC	Broadcast Television System Committee
C	
CPU	Central Process Unit
CVBS	Composite Video Blanking and Synchronization
D	
DLP	Digital Light Processing / Texas Instruments®
DMD	Digital Micromirror Device
DRAM	Dynamic RAM
DVI	Digital Video Interface
DVI-I	Digital Video Interface-Integrated
E	
EEPROM	Electrically Erasable and Programmable Read Only Memory
F	
FLASH	FLASH memory
G	
G-TXT	Green Teletext
H	
HDMI	High Definition Multimedia Interface, digital audio and video interface
HP	Head Phone
I	
I^2C	Integrated IC bus
L	
LED	Light Emitting Diode
LVDS	Low Voltage Differential Signal, data transmission system for high
M	
MOSFET	Metal Oxide Semiconductor Field Effect Transistor

N	
NC	Not Connected
NVM	Non Volatile Memory: IC containing TV related data (for example, options)
O	
OSD	On Screen Display
P	
PC	Personal Computer
PCB	Printed Circuit Board (or PWB)
R	
RC	Remote Control transmitter
RGB	Red, Green and Blue. The primary color signals for TV. By mixing levels of R, G and B, all colors (Y/C) are
ROM	Read Only Memory
S	
SDA	Data signal on I^2C bus
SDRAM	Synchronous DRAM
SW	Sub Woofer / Software
T	
THD	Total Harmonic Distortion
V	
VGA	Video Graphics Array
Y	
YPbPr	Component video (Y= Luminance, Pb/ Pr= Color difference signals B-Y and R-Y, other amplitudes w.r.t. to YUV)
Y/C	Video related signals: Y consists of luminance signal, blanking level and sync; C consists of color signal.

1. About this Manual

The purpose of Service Manual is to provide a guide line to engineers to repair different models. The appearance and capability is introduced in this Service Manual. It is better for repair engineer to have a rough idea of this model through reading the Service Manual. Please do pay attention to the item part of the disassembly when repair the machine and also do the protection of panel any time. When repairing the circuit board, please follow the requirement of RoHS and refer to the circuit diagram and repairing process that attached in the Service Manual. The method of firmware updated, the way of using the menu and some information that may be used when repairing are also attached in the Service Manual that provide repair engineer various choice.

1.1 Important

Only trained service personnel who are familiar with this BenQ Product shall perform service or maintenance to it. Before performing any maintenance or service, the engineer MUST read the “Important Safety Information”.

1.2 Trademark

2. Introduction

This section contains general service information, please read through carefully. It should be stored for easy access place.

2.1 RoHS (2002/95/EC) Requirements – Applied to all countries require RoHS.

The RoHS (Restriction of Hazardous Substance in Electrical and Electronic Equipment Directive) is a legal requirement by EU (European Union) for the global electronics industry which sold in EU and some counties also require this requirement. Any electrical and electronics products launched in the market after June 2006 should meet this RoHS requirements. Products launched in the market before June 2006 are not required to compliant with RoHS parts. If the original parts are not RoHS complaints, the replacement parts can be non ROHS complaints, but if the original parts are RoHS compliant, the replacement parts MUST be RoHS complaints.
If the product service or maintenance require replacing any parts, please confirming the RoHS requirement before replace them.

2.2 Safety Notice

1. Make sure your working environment is dry and clean, and meets all government safety requirements.
2. Ensure that other persons are safe while you are servicing the product.
3. DO NOT perform any action that may cause a hazard to the customer or make the product unsafe.
4. Use proper safety devices to ensure your personal safety.
5. Always use approved tools and test equipment for servicing.
6. Never assume the product's power is disconnected from the mains power supply. Check that it is disconnected before opening the product's cabinet.
7. Modules containing electrical components are sensitive to electrostatic discharge (ESD). Follow ESD safety procedures while handling these parts.
8. Some products contain more than one battery. Do not disassemble any battery, or expose it to high temperatures such as throwing into fire, otherwise it may explode.
9. Refer to government requirements for battery recycling or disposal.

2.3 Compliance Statement

Caution: This Optical Storage Product contains a Laser device. Refer to the product specifications and your local Laser Safety Compliance Requirements.

3. General Description

This new LCD (Liquid Crystal Display) monitor BenQ E2220HD offers numerous features and functions, for example:

- TFT display (Thin Film Transistor; active matrix)
- Minimal space requirements thanks to slim casing
- Optimum ergonomic characteristics (totally distortion-free, excellent picture definition and color purity right into the corners)
- Contrast ratio 1000:1, brightness 300 nits
- WUXGA resolution (1920x1080)
- Presentation of up to 16.7 M colors (in conjunction with an appropriate graphics card)
- Automatic scanning of horizontal frequencies from 24 to 83 kHz and refresh rates (vertical frequencies) from 50 to 76 Hz (absolutely flicker-free)
- Digital screen controller with microprocessor for storing 34 different display modes
- Freely adjustable color alignment for matching the screen colors to the colors of various input and output devices
- Convenient operation via integrated OSD (On-Screen-display) menu
- VESA E-EDID compatibility
- Power management for reducing power consumption when the computer is not in use
- Compliance with Worldwide regulations

This operating manual contains important information you require to start up and run your LCD monitor.
This specification defines the requirements for the 21.5” MICROPROCESSOR based Multi-mode supported high resolution color LCD monitor. This monitor can be directly connected to general 15-pin D-sub VGA connector, DVI-D connector and HDMI connector, also supports VESA DPMS power management.

Additional information

Due to the nature of liquid crystal display (LCD) technology, the picture resolution is always fixed. For the best display performance, please set the display resolution to 1920x1080 pixels with an aspect ratio of 16:9. This is called “Native Resolution” or maximal resolution – that is, the clearest picture. Lower resolutions are displayed on a full screen through an interpolation circuit. Image blurring across pixel boundaries can occur with the interpolated resolution depending upon the image type and its initial resolution.

4. Related service information

This Service Manual contains general information. There are 2 levels of service:

Level 1: Cosmetic / Appearance / Alignment Service

Level 2: Circuit Board or Standard Parts Replacement

Service Web Site

eSupport URL: **http://esupport.beng.com**

5. Product Overview

5.1 Monitor Specifications

		E2220HD
		D-sub (include component source)+ DVI-D + HDMI
Panel / Display	Panel Type (TN / VA / IPS)	TN
	Panel Size	21.5"W
	Display Area	476.64 (H) x 268.11 (V)
	Max. Resolution	1920 x 1080
	Pixel Pitch	0.248 (per one triad) x 0.248
	Brightness (Typ.)	300 nits
	Contrast Ratio (Typ.) / DCR (Min.)	1000:1 (Panel) / 50000:1 (DCR)
	Viewing Angle (H/V), CR≧10	170/160
	Display Colors	16.7M (6bit+Hi-FRC)
	Response Time	5ms (Tr+Tf)
	GtG response Time	N/A
	MPRT	N/A
	NTSC ratio	0.72
	Panel maker	AUO & CMO
Video	BenQ Senseye™ Technology	Yes
	BenQ Senseye™ Preset Modes	6 Modes (by hotkey) : Standard / Movie / Game / Photo / s-RGB / ECO
	Color Temperature Selection	Normal (6500°K) / Reddish (5800°K) / Bluish (9300°K) / User Mode
	Hor. Frequency (KHz)	24kz~83Kz
	Ver. Frequency (Hz)	50Hz~76Hz
	Video Bandwidth (MHz)	205Mhz
Audio	Speakers (built-in)	1.5W x 2
Input / Output	PC Video Input	D-sub + DVI-D + HDMI1.3 x2
	Audio line in	Yes
	Audio line out	Yes
	Earphone Jack	Yes

Power Supply	Voltage Rating	AC: 100~240V (Built-in)
	Power-On Mode	63W
	Standby Mode	<1W
	Power Off Mode	<0.5W
Mechanical Design	Chassis Colors (proposal A)	Glossy black (silver for mid frame), detail refer to artwork
	Carton	Brown Carton with at least C flute (A flute CTN for BQjp shipments)
	Power LED	Green (ON)/ Amber (Standby)
	Tilt (Up / Down)	20° ~ -5°
	VESA Wall Mount	100 x 100mm
	Kensington Lock	Yes
	Physical Dimension (WxHxD)	TBD
	Box Dimension (WxHxD)	TBD
	Net Weight (Esti.)	TBD
	Gross Weight (Esti.)	TBD
	Container Loading (40')	>1600
	Container Loading (20')	>800
Multi-language Support	OSD	17 Languages (English / Francais / Deutsch / Italiano / Espanol / Polish / Czech / Hungarian / Serbo-croatian / Romanian / Netherlands / Russian / Swedish / Portuguese / Japanese / Chinese / S-Chinese)
Other feature	Vista	Vista Premium
	HDMI RGB PC Range	RGB(0~255) / RGB(16~235)
	USB2.0	Yes (4 ports)
Accessories		VGA cable, power cord, audio cable, USB cable, warranty card, quick start guide, CD manual
Regulation Approvals		Refer to the worksheet "RFQ-Regulatory"

5.2 Packing

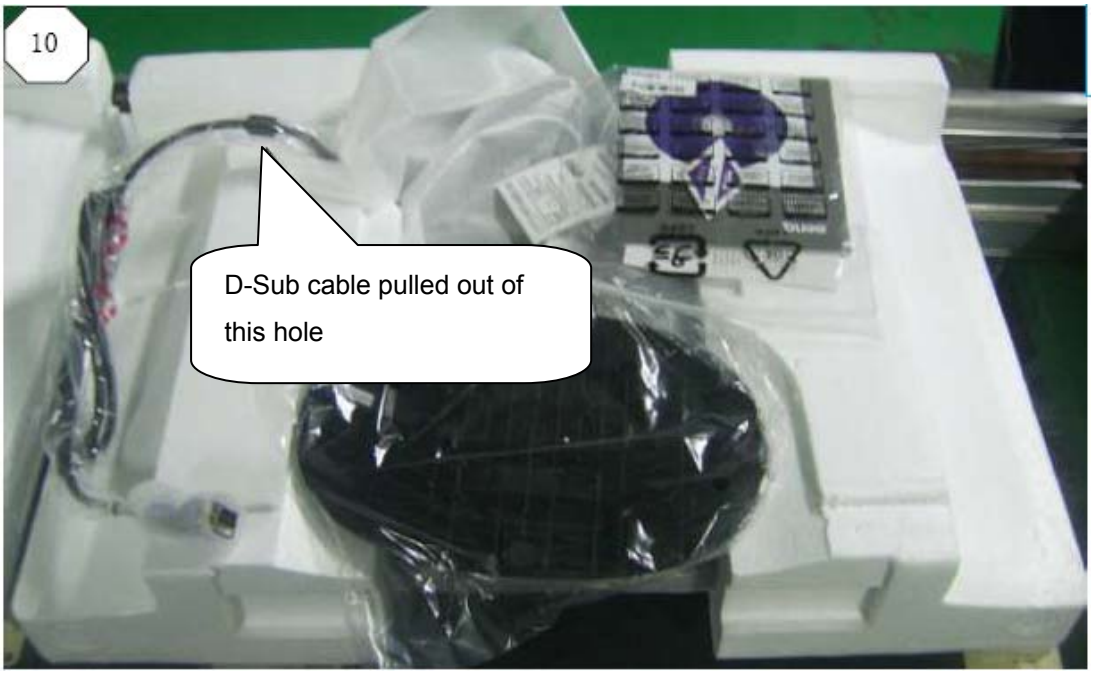
When packing the monitor into the carton, please follow the pictures as below.

1. Using the EPE bag to pack the monitor without base.

   Note: The four corners of the EPE bag can not be stretched.

2. Using the EPS to pack the monitor from left to right.

3. Putting the base, user manual and D-SUB cable in the position as the picture shows above.



4. Putting the monitor and accessories into the carton.

Level 1 Cosmetic / Appearance / Alignment Service

Visual Inspection & Cleaning

- Cleaning. Always unplug your monitor from the wall outlet before cleaning. Clean the LCD monitor surface with a lint-free, non-abrasive cloth. Avoid using any liquid, aerosol or glass cleaners.
- Slots and openings on the back or top of the cabinet are for ventilation. They must not be blocked or covered. Your monitor should never be placed near or over a radiator or heat source, or in a built-in installation unless proper ventilation is provided.
- Never push objects or spill liquid of any kind into this product.

Software/Firmware Upgrade Process

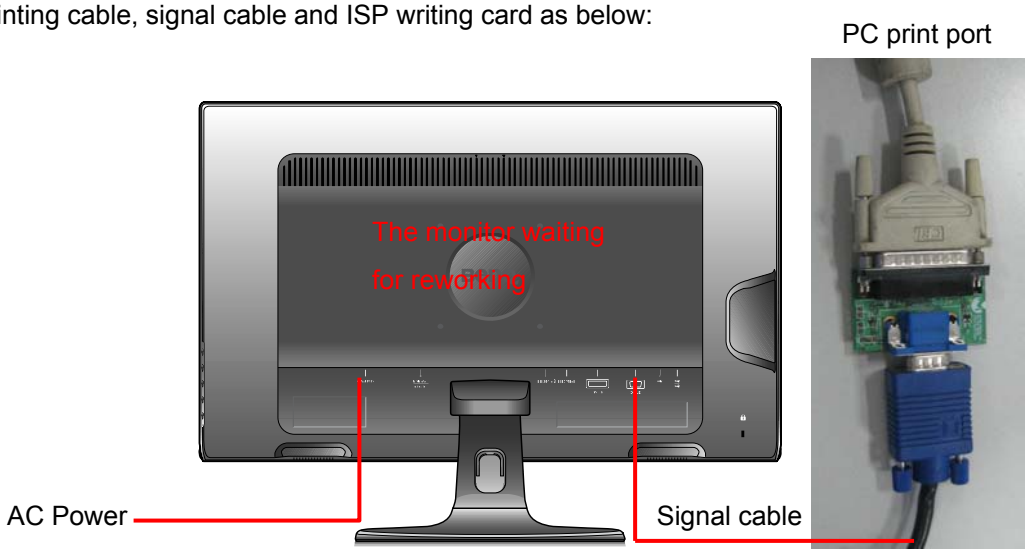
Operation condition:

1. The PC with print port,WIN98/NT/2000/XP OS at list;
2. PC Must install Port95nt printing driver if ISP can not be written after install ISP writing software, please install driver program by unzip and run“Port95nt.exe”
3. PC Must install ISP writing software before ISP writing, Install ISP writing software by unzip “ISP_Tool V4.3.4”
4. One ISP written card(see the picture as below);
5. The monitor waiting for rework;
6. Printing cable and signal cable for rework;

Wire connection instruction:

Connecting operation before ISP written:

1. Connect one of printing wire to PC print port;
2. Connect the other of printing wire to ISP writing card;
3. Connect the monitor waiting for reworking to ISP writing card with signal cable;
4. Printing cable, signal cable and ISP writing card as below:

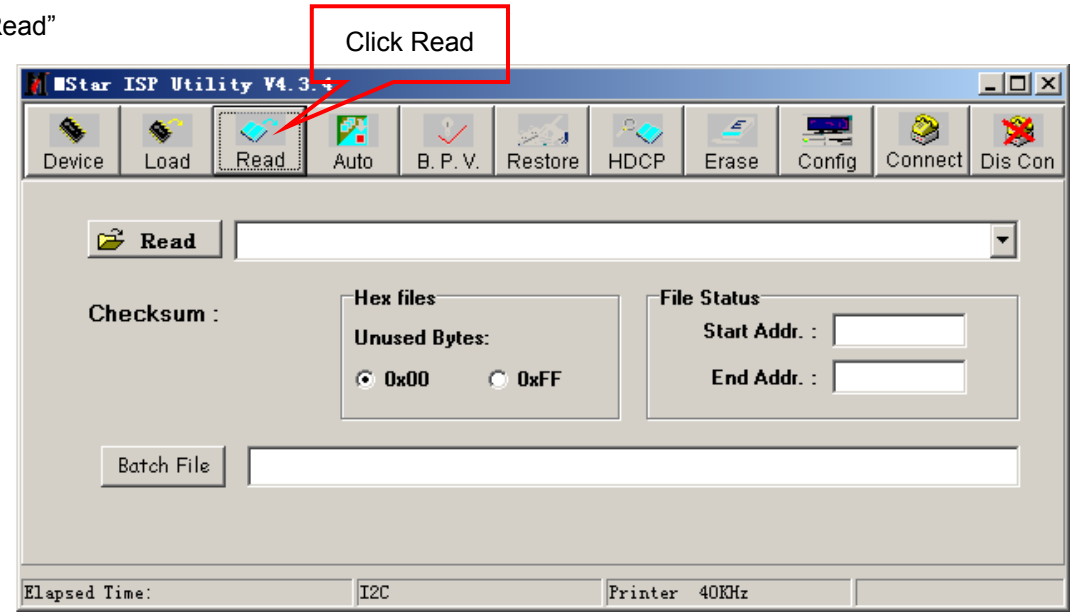


ISP writing card and connecting instruction

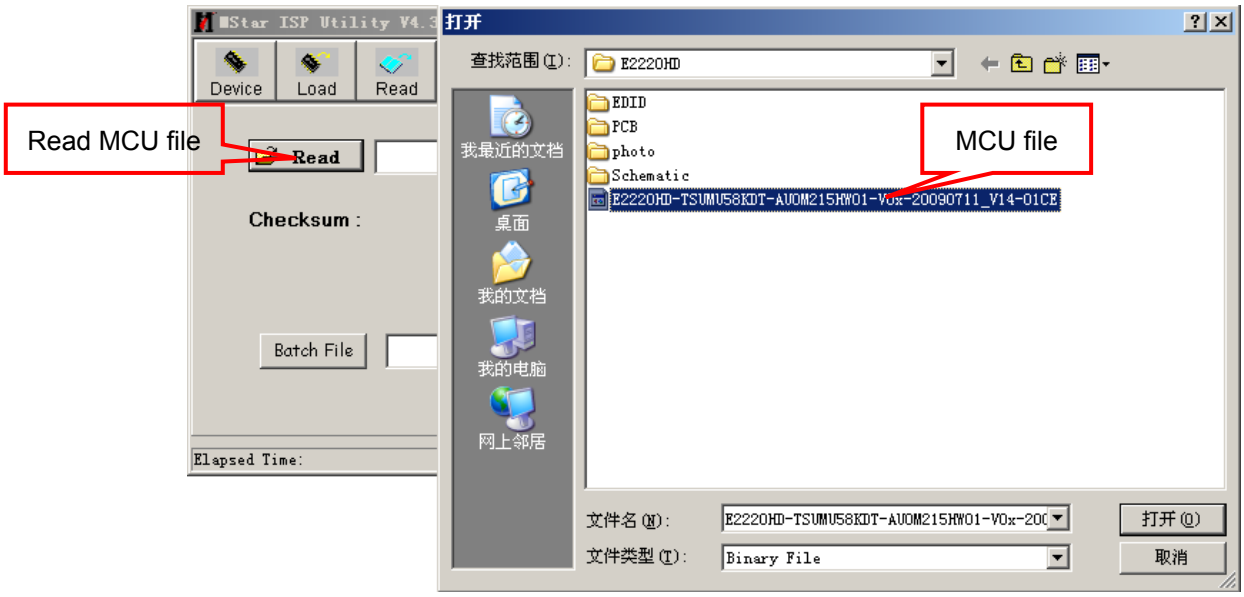
ISP setting:

1. Double click “Mstar ISP Utility V4.3.4”

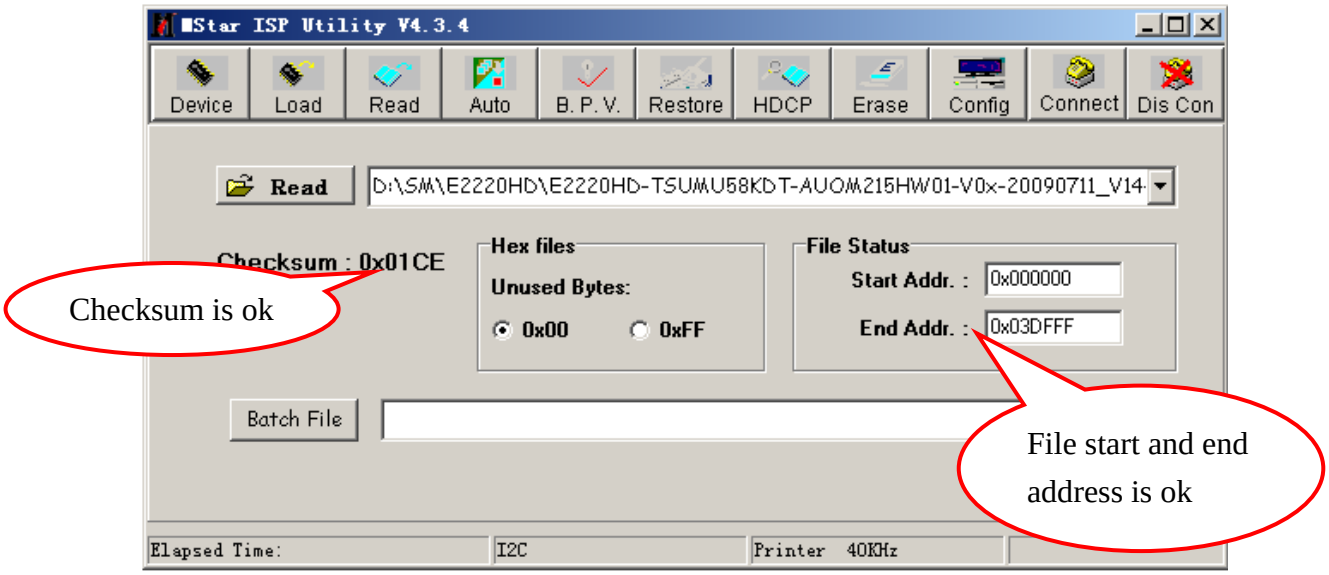
2. Click “Read”



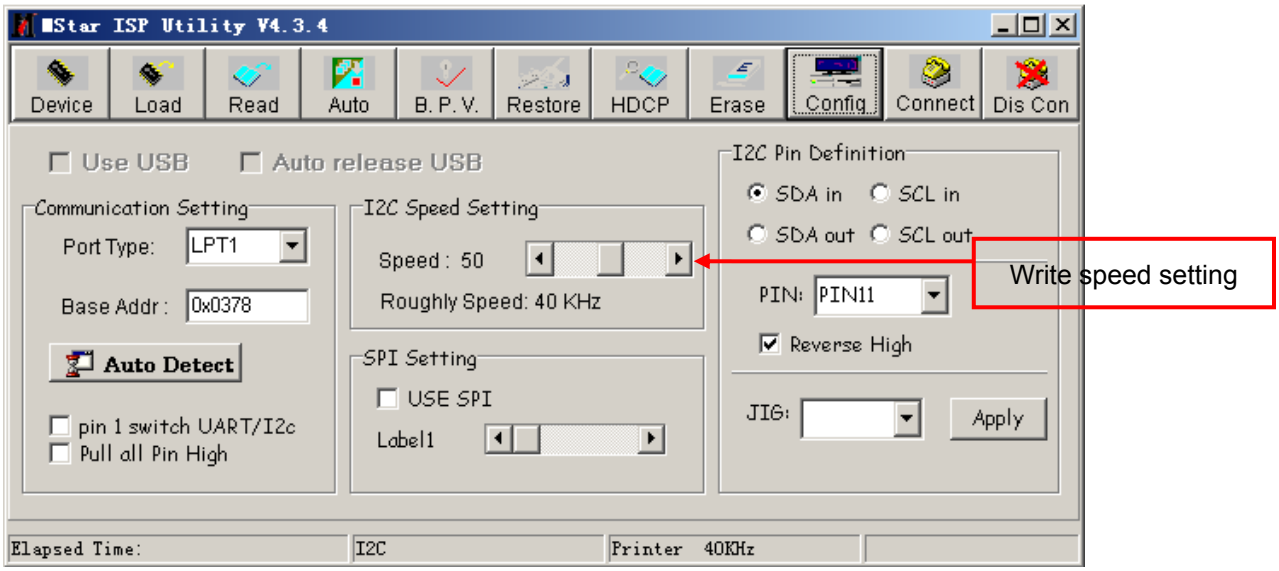
3. Click “Read” to read MCU file.



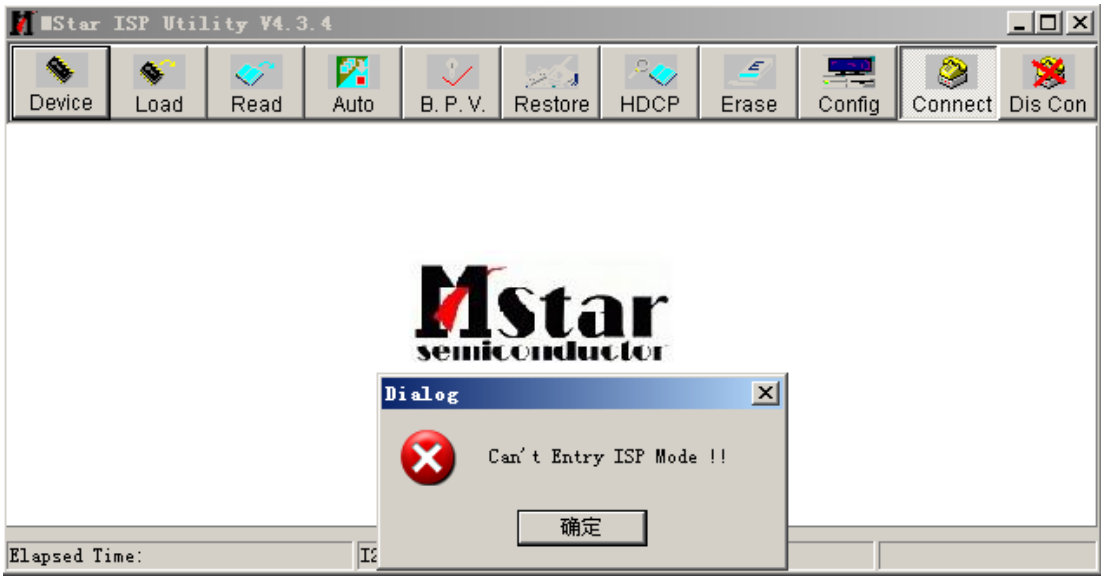
4. Check the “Checksum” and the “File Start and End Address”



5. Click “Config”

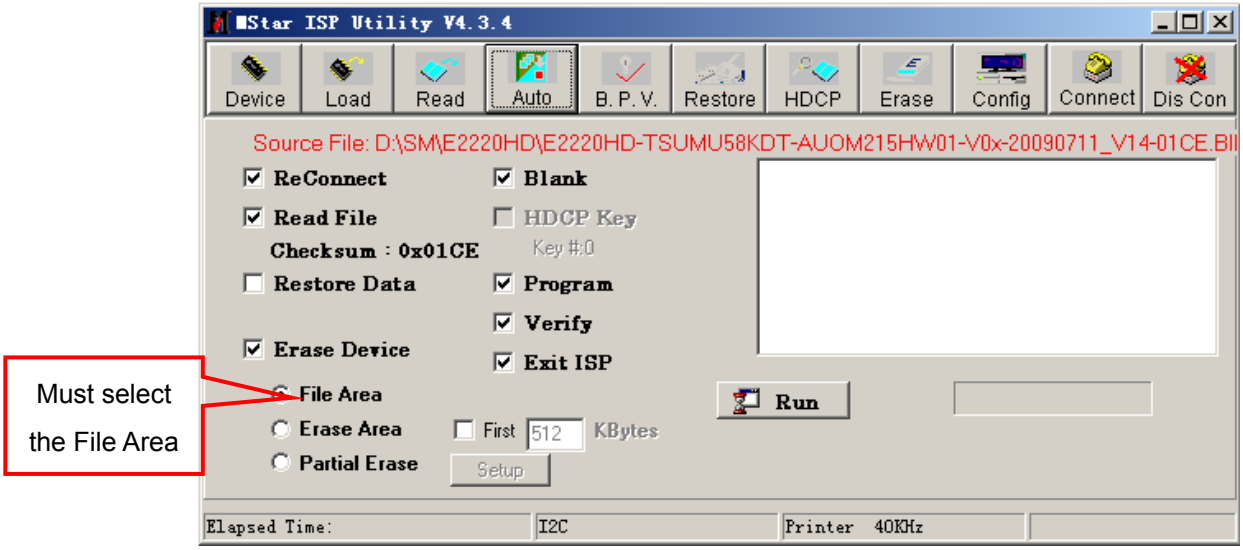


6. Click “connect”, if appears the dialog “Can’t Entry ISP Mode”, then click “Dis Con” and then click connect again.

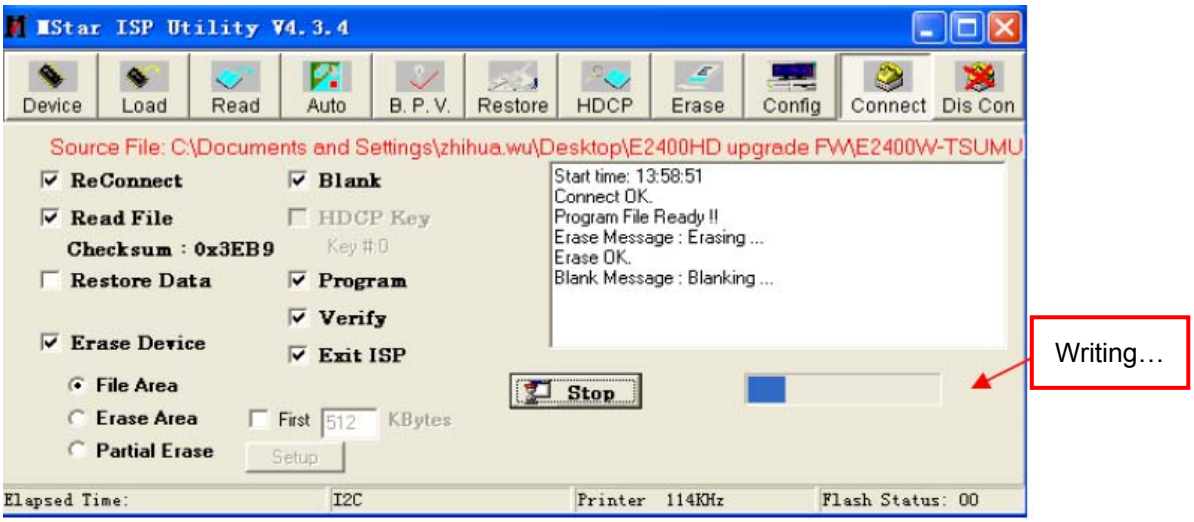


Program Writing

1. Click “Auto’



2. Click “Run” to start writing



3. Write over display “PASS”.

DDC instruction

General

DDC Data Re-programming

In case the main EEPROM with Software DDC which store all factory settings were replaced because a defect repaired monitor' the serial numbers have to be re-programmed.

It is advised to re- soldered the main EEPROM with Software DDC from the old board onto the new board if circuit board have been replaced, in this case the DDC data does not need to be re-programmed.

Additional information about DDC (Display Data Channel) may be obtained from Video Electronics Standards Association (VESA). Extended Display Identification Data (EDID) information may be also obtained from VESA.

1. When does the part, need the tools as follow:

a. An i486 (or above) personal computer or compatible.

b. Microsoft operation system Windows 95/98/2000/XP.

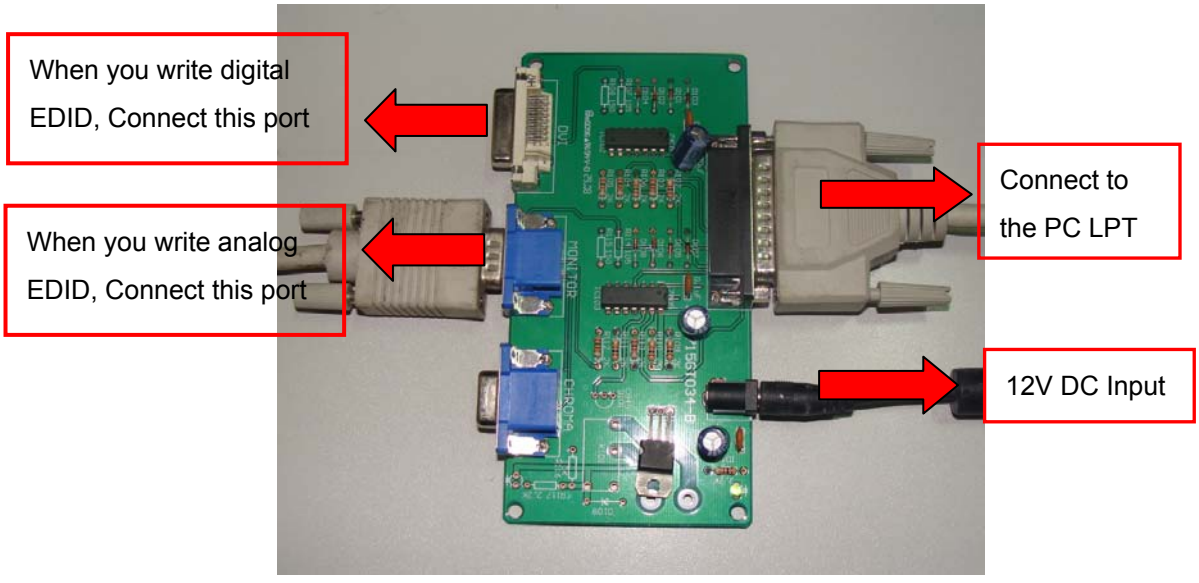
c. "PORT95NT.exe, TPVDDC.exe" program.

d. EDID BOARD (x1), Printer cable(x1), VGA cable (x1), DVI cable (x1), Power cord (x 2), 12V DC power source

2. Install the "PORT95NT.EXE", and restart the computer.

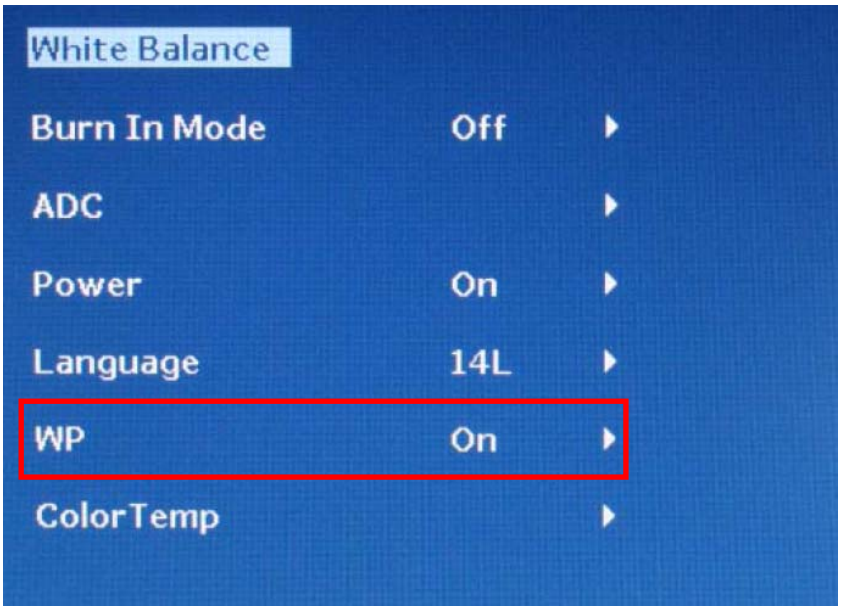
The process of installing "PORT95NT" has been specified in, so it will not be specified again. If you have any problem, please read it.

3. Connect the DDC Board as follow:



Note:

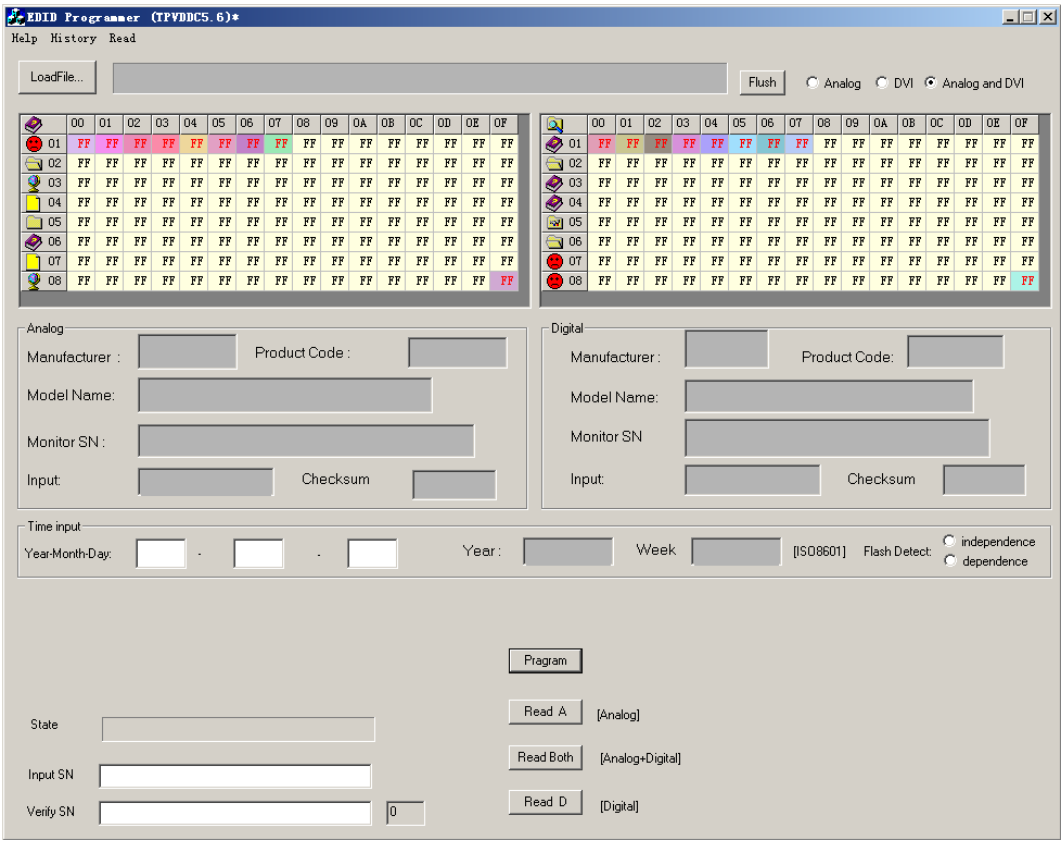
1. The monitor must be power on.
2. If you can not write the digital EDID, try to cut off the pin 15 of the connector.
3. Turn off the monitor, keep pressing the "MENU" + "ENTER" buttons, and turn on the monitor, then when we press the AUTO button, the factory OSD will be at the left top of the panel as below, set the WP "Off ".



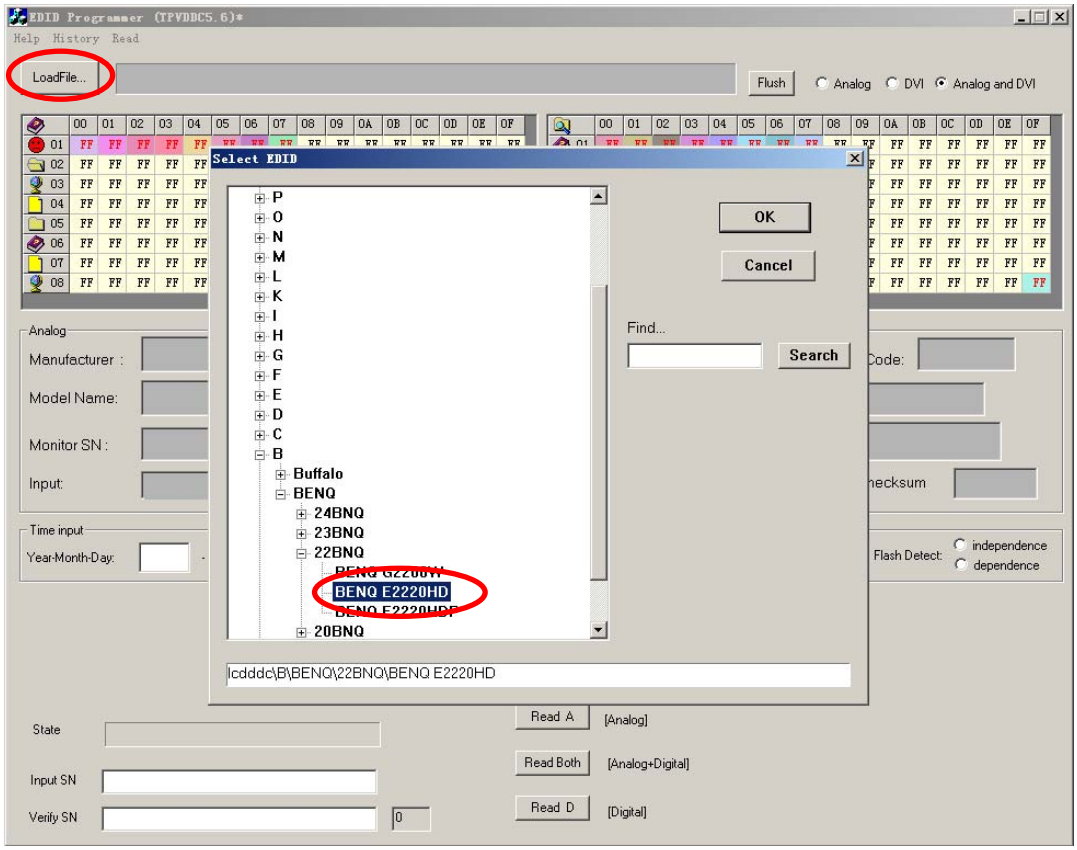
4. Take analog DDC write for example, as follow

a. Double-click 

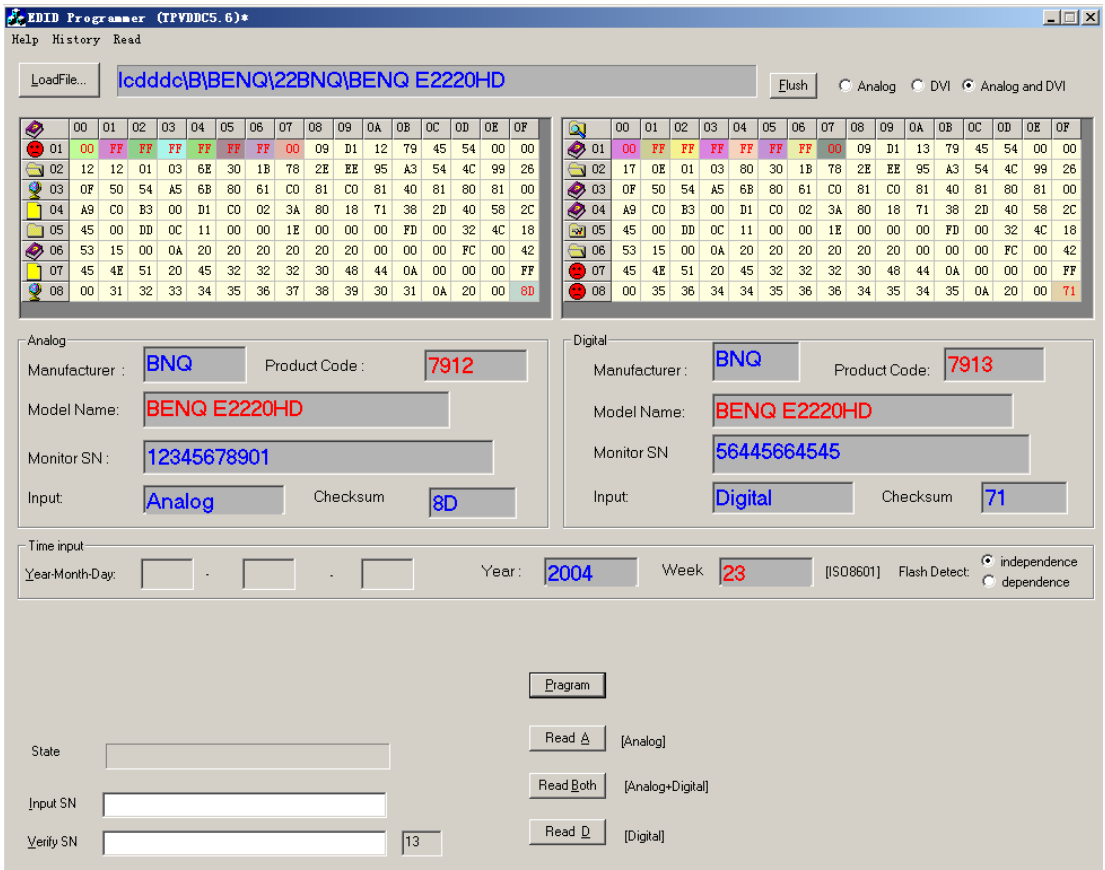
,appear as follow:



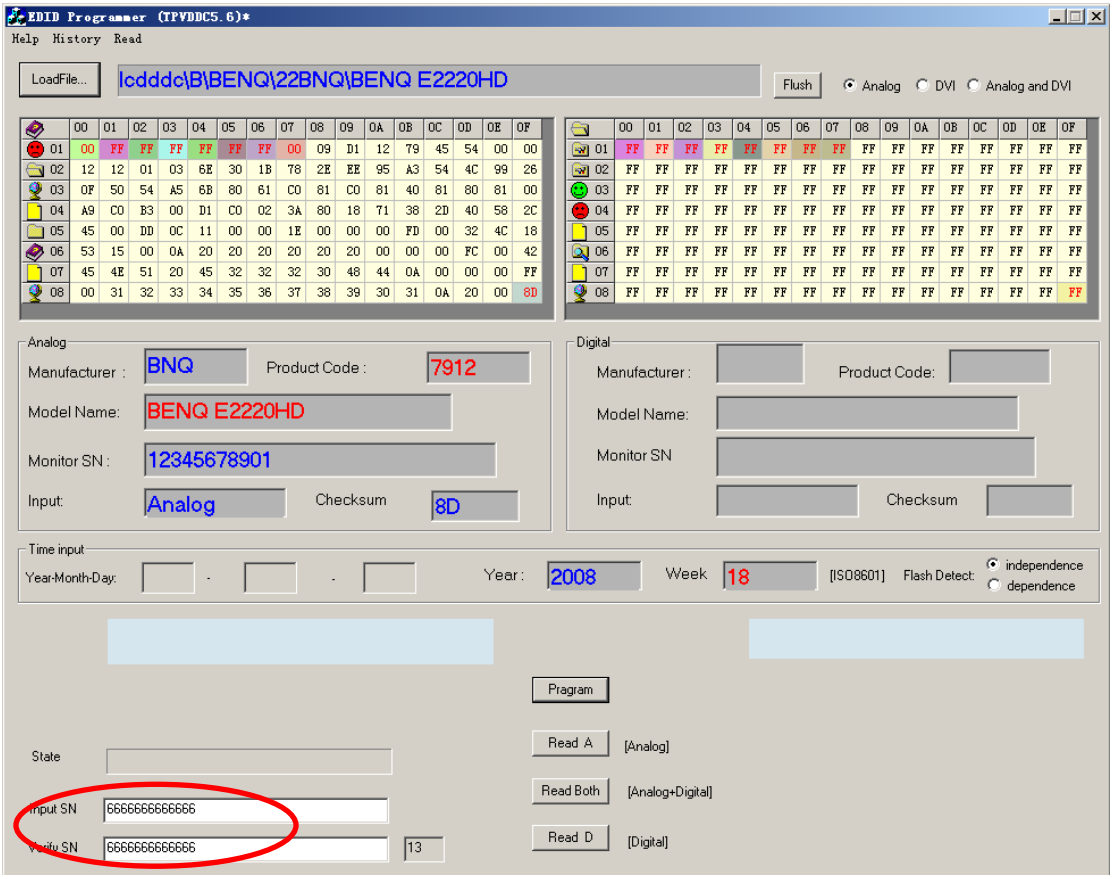
b. Click “Loadfile”, it will show the picture as follow:



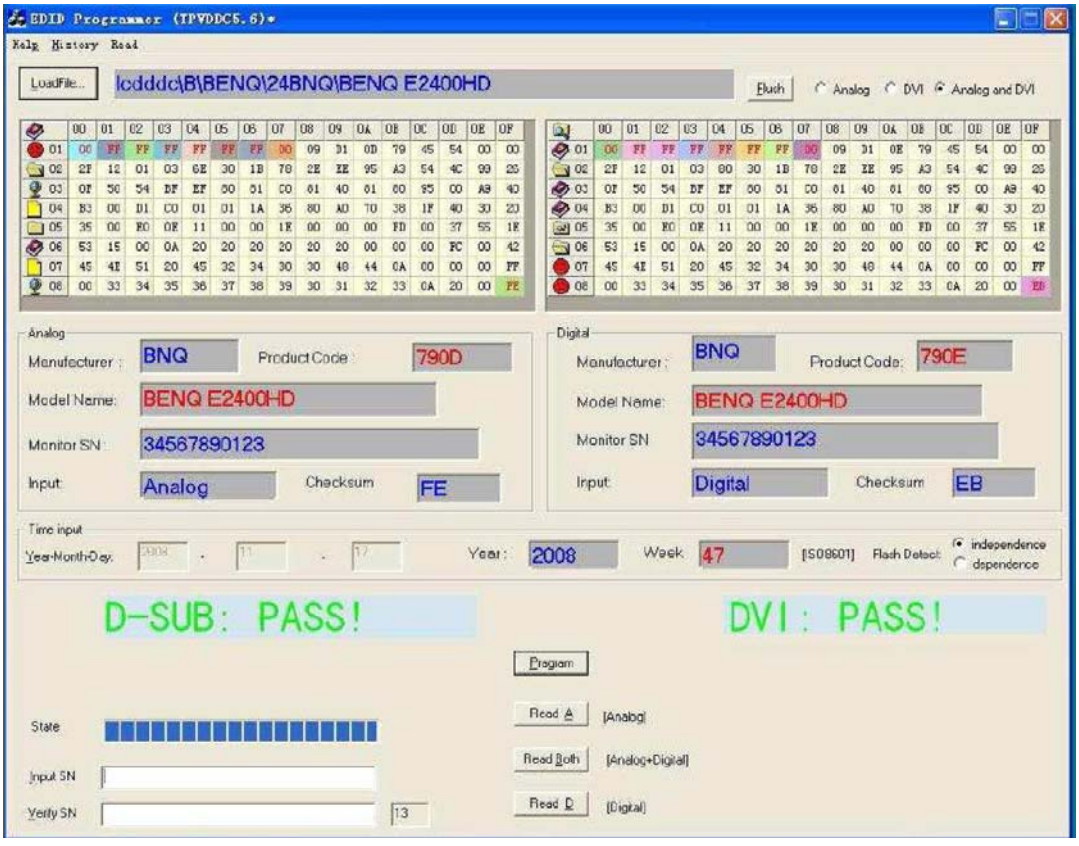
c. Click “OK”, it will show the picture as follow:



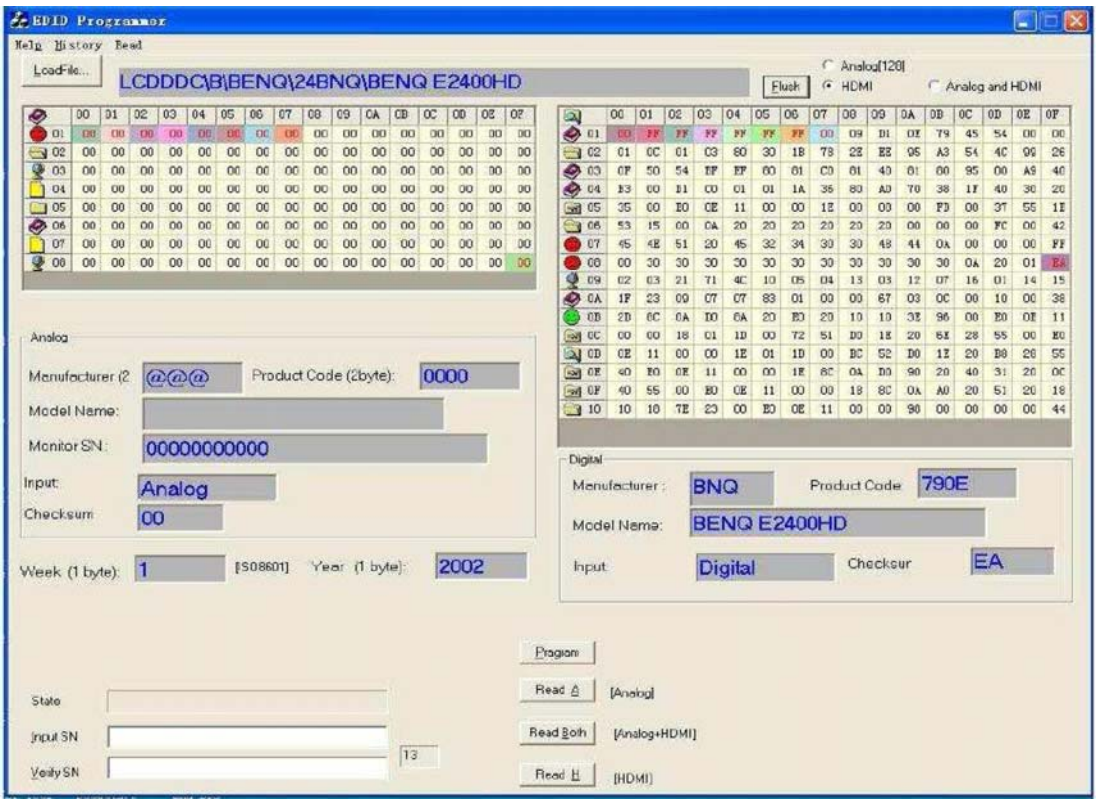
d. Key in the same 13 numbers in the Input SN and Verify SN,



e. Click “Program”, when the analog DDC Write complete, it will show the picture as follow:



The interface of HDMI DDC writing is as follow:



Note:

The way of HDMI DDC Writing is the same as analog and DVI.

E2220HD EDID

Analog

```
        00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
      -------------------------------------------------
 00| 00 FF FF FF FF FF FF 00 09 D1 12 79 45 54 00 00
 10| 12 12 01 03 6E 30 1B 78 2E EE 95 A3 54 4C 99 26
 20| 0F 50 54 A5 6B 80 61 C0 81 C0 81 40 81 80 81 00
 30| A9 C0 B3 00 D1 C0 02 3A 80 18 71 38 2D 40 58 2C
 40| 45 00 DD 0C 11 00 00 1E 00 00 00 FD 00 32 4C 18
 50| 53 15 00 0A 20 20 20 20 20 20 00 00 00 FC 00 42
 60| 45 4E 51 20 45 32 32 32 30 48 44 0A 00 00 00 FF
 70| 00 31 32 33 34 35 36 37 38 39 30 31 0A 20 00 8D
```

EDID Structure Version/Revision: 01 03

<-Vendor/Product Identification :->

ID Manufacturer Name: BNQ
ID Product Code: 7912
ID Serial Number: 21573
Week of Manufacture: 18
Year of Manufacture: 2008

<-Basic Display Parameters/Features :->

Video i/p definition: Analog
Max. H. Image Size: 48cm
Max. V. Image Size: 27cm
Display Gamma: 2.2

<-Color Characteristics :->

Rx: 0.640 Gx: 0.299 Bx: 0.150 Wx: 0.312
Ry: 0.330 Gy: 0.600 By: 0.060 Wy: 0.329

<-Established Timings :->

Established Timings 1:A5

720 x 400 @ 70Hz VGA, IBM
640 x 480 @ 60Hz VGA, IBM
640 x 480 @ 75Hz VESA
800 x 600 @ 60Hz VESA

Established Timings 2:6B

800 x 600 @ 75Hz VESA

832 x 624 @ 75Hz Apple, Mac II

1024 x 768 @ 60Hz VESA

1024 x 768 @ 75Hz VESA

1280 x1024 @ 75Hz VESA

Established Timings 3:80

1152 x 870 @75Hz Apple, Mac II

<-Standard Timing Identification :->

1024 x 576 @ 60Hz

1280 x 720 @ 60Hz

1280 x 960 @ 60Hz

1280 x 1024 @ 60Hz

1280 x 800 @ 60Hz

1600 x 900 @ 60Hz

1680 x 1050 @ 60Hz

1920 x 1080 @ 60Hz

<-Detailed Timing Descriptions :->

FC (Monitor Name): BENQ E2220HD

FD (Monitor Limits):

Min. V. rate: 50 Hz

Max. V. rate: 76 Hz

Min. H. rate: 24 KHz

Max. H. rate: 83 KHz

Max. P Clock: 210 MHz

FF (Monitor SN): 12345678901

Detailed Timing: 1920x1080 @ 60Hz

Extension Flag: 00

Block0 Checksum: 8D

Digital

```
        00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
       -------------------------------------------------
 00| 00 FF FF FF FF FF FF 00 09 D1 13 79 45 54 00 00
 10| 17 0E 01 03 80 30 1B 78 2E EE 95 A3 54 4C 99 26
 20| 0F 50 54 A5 6B 80 61 C0 81 C0 81 40 81 80 81 00
 30| A9 C0 B3 00 D1 C0 02 3A 80 18 71 38 2D 40 58 2C
 40| 45 00 DD 0C 11 00 00 1E 00 00 00 FD 00 32 4C 18
 50| 53 15 00 0A 20 20 20 20 20 20 00 00 00 FC 00 42
 60| 45 4E 51 20 45 32 32 32 30 48 44 0A 00 00 00 FF
 70| 00 35 36 34 34 35 36 36 34 35 34 35 0A 20 00 71
```

EDID Structure Version/Revision: 01 03

<-Vendor/Product Identification :->

ID Manufacturer Name: BNQ
ID Product Code: 7913
ID Serial Number: 21573
Week of Manufacture: 23
Year of Manufacture: 2004

<-Basic Display Parameters/Features :->

Video i/p definition: Digital
Max. H. Image Size: 48cm
Max. V. Image Size: 27cm
Display Gamma: 2.2

<-Color Characteristics :->

Rx: 0.640 Gx: 0.299 Bx: 0.150 Wx: 0.312
Ry: 0.330 Gy: 0.600 By: 0.060 Wy: 0.329

<-Established Timings :->

Established Timings 1:A5
720 x 400 @ 70Hz VGA, IBM
640 x 480 @ 60Hz VGA, IBM
640 x 480 @ 75Hz VESA
800 x 600 @ 60Hz VESA

Established Timings 2:6B
800 x 600 @ 75Hz VESA

832 x 624 @ 75Hz Apple, Mac II

1024 x 768 @ 60Hz VESA

1024 x 768 @ 75Hz VESA

1280 x1024 @ 75Hz VESA

Established Timings 3:80

1152 x 870 @75Hz Apple, Mac II

<-Standard Timing Identification :->

1024 x 576 @ 60Hz

1280 x 720 @ 60Hz

1280 x 960 @ 60Hz

1280 x 1024 @ 60Hz

1280 x 800 @ 60Hz

1600 x 900 @ 60Hz

1680 x 1050 @ 60Hz

1920 x 1080 @ 60Hz

<-Detailed Timing Descriptions :->

FC (Monitor Name): BENQ E2220HD

FD (Monitor Limits):

Min. V. rate: 50 Hz

Max. V. rate: 76 Hz

Min. H. rate: 24 KHz

Max. H. rate: 83 KHz

Max. P Clock: 210 MHz

FF (Monitor SN): 56445664545

Detailed Timing: 1920x1080 @ 60Hz

Extension Flag: 00

Block0 Checksum: 71

HDMI 1

```
      00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
       ----------Block 0----------
 00| 00 FF FF FF FF FF FF 00 09 D1 13 79 45 54 00 00
 10| 09 0B 01 03 80 30 1B 78 2E EE 95 A3 54 4C 99 26
 20| 0F 50 54 A5 6B 80 61 C0 81 C0 81 40 81 80 81 00
 30| A9 C0 B3 00 D1 C0 02 3A 80 18 71 38 2D 40 58 2C
 40| 45 00 DD 0C 11 00 00 1E 00 00 00 FD 00 32 4C 18
 50| 53 15 00 0A 20 20 20 20 20 20 00 00 00 FC 00 42
 60| 45 4E 51 20 45 32 32 32 30 48 44 0A 00 00 00 FF
 70| 00 32 33 31 32 31 33 32 33 31 31 32 0A 20 01 A2
       ----------Block 1----------
 00| 02 03 21 71 4C 10 05 04 13 03 12 07 16 01 14 15
 10| 1F 23 09 07 07 83 01 00 00 67 03 0C 00 10 00 38
 20| 2D 8C 0A D0 8A 20 E0 2D 10 10 3E 96 00 E0 0E 11
 30| 00 00 18 01 1D 00 72 51 D0 1E 20 6E 28 55 00 E0
 40| 0E 11 00 00 1E 01 1D 00 BC 52 D0 1E 20 B8 28 55
 50| 40 E0 0E 11 00 00 1E 8C 0A D0 90 20 40 31 20 0C
 60| 40 55 00 E0 0E 11 00 00 18 8C 0A A0 20 51 20 18
 70| 10 18 7E 23 00 E0 0E 11 00 00 98 00 00 00 00 44
```

Block 0:

EDID Structure Version/Revision: 01 03

<-Vendor/Product Identification :->

ID Manufacturer Name: BNQ
ID Product Code: 7913
ID Serial Number: 21573
Week of Manufacture: 9
Year of Manufacture: 2001

<-Basic Display Parameters/Features :->

Video i/p definition: Digital
Max. H. Image Size: 48cm
Max. V. Image Size: 27cm
Display Gamma: 2.2

<-Color Characteristics :->

Rx: 0.640 Gx: 0.299 Bx: 0.150 Wx: 0.312
Ry: 0.330 Gy: 0.600 By: 0.060 Wy: 0.329

<-Established Timings :->

Established Timings 1:A5

720 x 400 @ 70Hz VGA, IBM

640 x 480 @ 60Hz VGA, IBM

640 x 480 @ 75Hz VESA

800 x 600 @ 60Hz VESA

Established Timings 2:6B

800 x 600 @ 75Hz VESA

832 x 624 @ 75Hz Apple, Mac II

1024 x 768 @ 60Hz VESA

1024 x 768 @ 75Hz VESA

1280 x1024 @ 75Hz VESA

Established Timings 3:80

1152 x 870 @75Hz Apple, Mac II

<-Standard Timing Identification :->

1024 x 576 @ 60Hz

1280 x 720 @ 60Hz

1280 x 960 @ 60Hz

1280 x 1024 @ 60Hz

1280 x 800 @ 60Hz

1600 x 900 @ 60Hz

1680 x 1050 @ 60Hz

1920 x 1080 @ 60Hz

<-Detailed Timing Descriptions :->

Detailed Timing: 1920x1080 @ 60Hz

FD (Monitor Limits):

Min. V. rate: 50 Hz

Max. V. rate: 76 Hz

Min. H. rate: 24 KHz

Max. H. rate: 83 KHz

Max. P Clock: 210 MHz

FC (Monitor Name): BENQ E2220HD

FF (Monitor SN): 23121323112

Extension Flag: 01

Block0 Checksum: A2

Block 1:

Extended Block Type: CEA 861B

Detailed Timing Blocks start at Byte: 21

DTV Underscan NO

DTV Basic Audio YES

YCbCr (4:4:4) YES

YCbCr (4:2:2) YES

<-Video Short Block Description :->

1920 x 1080 P 59.94/60Hz 16:9

1920 x 1080 I 59.94/60Hz 16:9

1280 x 720 P 59.94/60Hz 16:9

1280 x 720 P 50Hz 16:9

720 x 480 P 59.94/60Hz 16:9

720 x 576 P 50Hz 16:9

720(1440) x 480 I 59.94/60Hz 16:9

720(1440) x 576 I 50Hz 16:9

640 x 480 P 59.94/60Hz 4:3

1920 x 1080 I 50Hz 16:9

720(1440) x 576 I 50Hz 4:3

1920 x 1080 P 50Hz 16:9

<-Audio Short Block Description :->

Numbers of Audio Channels: 2

Audio Format Description: Linear PCM

Audio Supported: 48KHz 44KHz 32 KHz

Audio Bit Rate: 24bit 20bit 16bit

<-Speaker Allocation :->

Speaker Allocation: FL/FR

<-Detailed Timing Descriptions: ->

Detailed Timing Descriptions: 720x480 @ 60Hz

H Image Size: 480 mm V Image Size: 270 mm

Pixel Clock: 27 Hz Refreshed Mode: Non-Interlaced

Detailed Timing Descriptions: 1280x720 @ 60Hz
H Image Size: 480 mm V Image Size: 270 mm
Pixel Clock: 74 Hz Refreshed Mode: Non-Interlaced

Detailed Timing Descriptions: 1280x720 @ 50Hz
H Image Size: 480 mm V Image Size: 270 mm
Pixel Clock: 74 Hz Refreshed Mode: Non-Interlaced

Detailed Timing Descriptions: 720x576 @ 50Hz
H Image Size: 480 mm V Image Size: 270 mm
Pixel Clock: 27 Hz Refreshed Mode: Non-Interlaced

Detailed Timing Descriptions: 1440x288 @ 50Hz
H Image Size: 480 mm V Image Size: 270 mm
Pixel Clock: 27 Hz Refreshed Mode: Interlaced
Block1 Checksum: 44

HDMI 2

00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
----------Block 0----------
00| 00 FF FF FF FF FF FF 00 09 D1 13 79 45 54 00 00
10| 09 0B 01 03 80 30 1B 78 2E EE 95 A3 54 4C 99 26
20| 0F 50 54 A5 6B 80 61 C0 81 C0 81 40 81 80 81 00
30| A9 C0 B3 00 D1 C0 02 3A 80 18 71 38 2D 40 58 2C
40| 45 00 DD 0C 11 00 00 1E 00 00 00 FD 00 32 4C 18
50| 53 15 00 0A 20 20 20 20 20 20 00 00 00 FC 00 42
60| 45 4E 51 20 45 32 32 32 30 48 44 0A 00 00 00 FF
70| 00 32 33 31 32 31 33 32 33 31 31 32 0A 20 01 A2
----------Block 1----------
00| 02 03 21 71 4C 10 05 04 13 03 12 07 16 01 14 15
10| 1F 23 09 07 07 83 01 00 00 67 03 0C 00 20 00 38
20| 2D 8C 0A D0 8A 20 E0 2D 10 10 3E 96 00 E0 0E 11
30| 00 00 18 01 1D 00 72 51 D0 1E 20 6E 28 55 00 E0
40| 0E 11 00 00 1E 01 1D 00 BC 52 D0 1E 20 B8 28 55
50| 40 E0 0E 11 00 00 1E 8C 0A D0 90 20 40 31 20 0C
60| 40 55 00 E0 0E 11 00 00 18 8C 0A A0 20 51 20 18
70| 10 18 7E 23 00 E0 0E 11 00 00 98 00 00 00 00 34

Block 0:

EDID Structure Version/Revision: 01 03

<-Vendor/Product Identification :->

ID Manufacturer Name: BNQ

ID Product Code: 7913

ID Serial Number: 21573

Week of Manufacture: 9

Year of Manufacture: 2001

<-Basic Display Parameters/Features :->

Video i/p definition: Digital

Max. H. Image Size: 48cm

Max. V. Image Size: 27cm

Display Gamma: 2.2

<-Color Characteristics :->

Rx: 0.640 Gx: 0.299 Bx: 0.150 Wx: 0.312

Ry: 0.330 Gy: 0.600 By: 0.060 Wy: 0.329

<-Established Timings :->

Established Timings 1:A5

720 x 400 @ 70Hz VGA, IBM

640 x 480 @ 60Hz VGA, IBM

640 x 480 @ 75Hz VESA

800 x 600 @ 60Hz VESA

Established Timings 2:6B

800 x 600 @ 75Hz VESA

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1024 x 768 @ 60Hz VESA

1024 x 768 @ 75Hz VESA

1280 x1024 @ 75Hz VESA

Established Timings 3:80

1152 x 870 @75Hz Apple, Mac II

<-Standard Timing Identification :->

1024 x 576 @ 60Hz

1280 x 720 @ 60Hz

1280 x 960 @ 60Hz

1280 x 1024 @ 60Hz
1280 x 800 @ 60Hz
1600 x 900 @ 60Hz
1680 x 1050 @ 60Hz
1920 x 1080 @ 60Hz

<-Detailed Timing Descriptions :->
Detailed Timing: 1920x1080 @ 60Hz
FD (Monitor Limits):
Min. V. rate: 50 Hz
Max. V. rate: 76 Hz
Min. H. rate: 24 KHz
Max. H. rate: 83 KHz
Max. P Clock: 210 MHz
FC (Monitor Name): BENQ E2220HD
FF (Monitor SN): 23121323112

Extension Flag: 01
Block0 Checksum: A2

Block 1:

Extended Block Type: CEA 861B
Detailed Timing Blocks start at Byte: 21
DTV Underscan NO
DTV Basic Audio YES
YCbCr (4:4:4) YES
YCbCr (4:2:2) YES

<-Video Short Block Description :->
1920 x 1080 P 59.94/60Hz 16:9
1920 x 1080 I 59.94/60Hz 16:9
1280 x 720 P 59.94/60Hz 16:9
1280 x 720 P 50Hz 16:9
720 x 480 P 59.94/60Hz 16:9
720 x 576 P 50Hz 16:9
720(1440) x 480 I 59.94/60Hz 16:9

720(1440) x 576 I 50Hz 16:9

640 x 480 P 59.94/60Hz 4:3

1920 x 1080 I 50Hz 16:9

720(1440) x 576 I 50Hz 4:3

1920 x 1080 P 50Hz 16:9

<-Audio Short Block Description :->

Numbers of Audio Channels: 2

Audio Format Description: Linear PCM

Audio Supported: 48KHz 44KHz 32 KHz

Audio Bit Rate: 24bit 20bit 16bit

<-Speaker Allocation :->

Speaker Allocation: FL/FR

<-Detailed Timing Descriptions: ->

Detailed Timing Descriptions: 720x480 @ 60Hz

H Image Size: 480 mm V Image Size: 270 mm

Pixel Clock: 27 Hz Refreshed Mode: Non-Interlaced

Detailed Timing Descriptions: 1280x720 @ 60Hz

H Image Size: 480 mm V Image Size: 270 mm

Pixel Clock: 74 Hz Refreshed Mode: Non-Interlaced

Detailed Timing Descriptions: 1280x720 @ 50Hz

H Image Size: 480 mm V Image Size: 270 mm

Pixel Clock: 74 Hz Refreshed Mode: Non-Interlaced

Detailed Timing Descriptions: 720x576 @ 50Hz

H Image Size: 480 mm V Image Size: 270 mm

Pixel Clock: 27 Hz Refreshed Mode: Non-Interlaced

Detailed Timing Descriptions: 1440x288 @ 50Hz

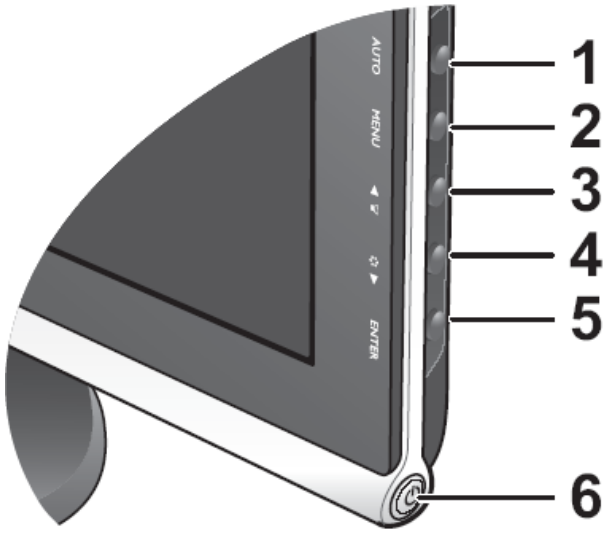
H Image Size: 480 mm V Image Size: 270 mm

Pixel Clock: 27 Hz Refreshed Mode: Interlaced

Block1 Checksum: 34

Adjustment / Alignment Procedure

The control panel



1. **AUTO**: Adjusts vertical position, phase, horizontal position and pixel clock automatically.
2. **MENU**: Activates OSD main menu and return to the previous menu or exit OSD.
3. ▲/**Volume**: For Up/Increase adjustment. The key is the hot key for volume.
4. ▼/**Mode**: For Down/Decrease adjustment. The key is the hot key for Mode.
5. **ENTER**: Enters sub menus and select items. For models with DVI inputs, this key is also the hot key for Input.
6. **Power**: Turns the power on or off.

OSD = On Screen Display.

The hot keys will display a graduated scale for adjusting the value of that setting, and will only operate while the OSD menu is not currently displaying. Hot key displays will disappear after a few seconds of no key activity.

Hot key mode

The monitor keys perform as hot keys to provide direct access to particular functions whenever the menu isn't currently displaying on-screen.

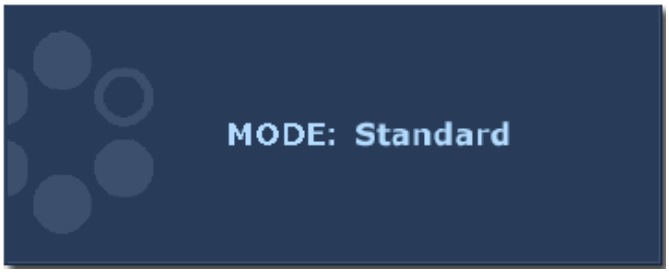
Volume hot key

Press the ▲ key to display the Volume indicators. Further press the ▲ key will increase the volume, while the ▼ key will decrease the volume.

To mute, press the Volume hot key for 3 seconds. To release Mute, press the Volume hot key for 3 more seconds.

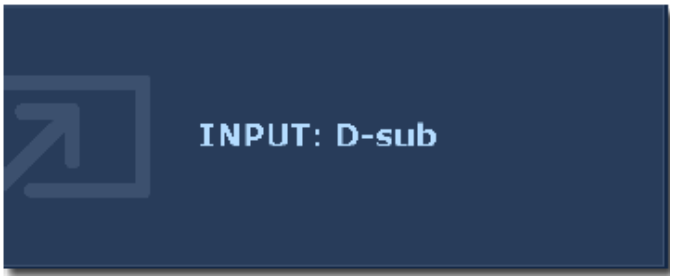
Mode hot key

Press the ▼ key continually to switch between the 6 modes for the main window, including **Standard**, **Movie**, **Game**, **Photo**, **sRGB,** and **ECO**. The setting will take effect immediately.



Input hot key (not available for analog-only models)

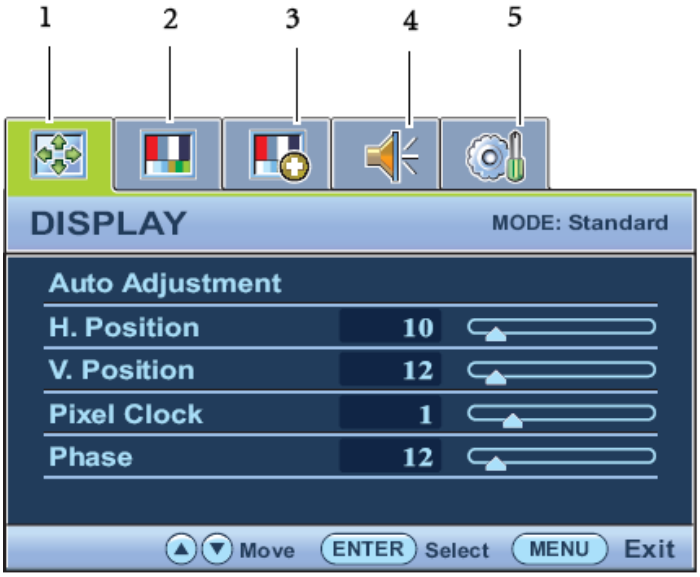
Press the **ENTER** key to toggle between different PC video signal inputs that may be connected to your monitor. The setting will take effect immediately.



Main menu mode

You can use the OSD (On Screen Display) menu to adjust all the settings on your monitor.

Press the **MENU** key to display the following main OSD menu.



There are five main OSD menus:

1. Display
2. Picture
3. Picture Advanced
4. Audio
5. System

Use the ▲ (up) or ▼ (down) keys to highlight a menu item, and press the **ENTER** key to enter the Menu item settings.

The OSD menu languages may differ from the product supplied to your region.

Display menu

1. Press the **MENU** key to display the main menu.
2. Press the ▲ or ▼ keys to select **DISPLAY** and then press the **ENTER** key to enter the menu.
3. Press the ▲ or ▼ keys to move the highlight to a menu item and then press the **ENTER** key to select that item.
4. Press the ▲ or ▼ keys to make adjustments or selections.
5. To return to the previous menu, press the **MENU** key.

Item	Function	Operation	Range
Auto Adjustment	Optimizes and adjusts the screen settings automatically for you. The **AUTO** key is a 'hot-key' for this function. When you connect a digital video output using a digital (DVI or HDMI) cable to your monitor, the **AUTO** key and the **Auto Adjustment** function will be disabled.	Press the **ENTER** key to select this option and make adjustment.	
H. Position	Adjusts the horizontal position of the screen image.	Press the ▲ or ▼ keys to adjust the value.	0 to 100
V. Position	Adjusts the vertical position of the screen image.		0 to 100
Pixel Clock	Adjusts the pixel clock frequency timing to synchronize with the analog input video signal. Not applicable to a digital input signal.		0 to 100
Phase	Adjusts the pixel clock phase timing to synchronize with the analog input video signal. Not applicable to a digital input signal.		0 to 63

Picture menu

1. Press the **MENU** key to display the main menu.
2. Press the ▲ or ▼ keys to select **PICTURE** and then press the **ENTER** key to enter the menu.
3. Press the ▲ or ▼ keys to move the highlight to a menu item and then press the **ENTER** key to select that item.
4. Press the ▲ or ▼ keys to make adjustments or selections.
5. To return to the previous menu, press the MENU button.

Item	Function	Operation	Range
Brightness	Adjusts the balance between light and dark shades.	Press the ▲ key to increase the brightness and press the ▼ key to decrease the brightness.	0 to 100
Contrast	Adjusts the degree of difference between darkness and lightness.	Press the ▲ key to increase the contrast and press the ▼ key to decrease the contrast	0 to 100
Sharpness	Adjusts the clarity and visibility of the edges of the subjects in the image.	Press the ▲ key to improve the crispness of the display and press the ▼ key to have softness effect on the display.	1 to 5
Gamma	Adjust the tone luminance. The default value is 2.2 (the standard value for Windows).	Press the ▲ key to increase the gamma value (tone becomes darker) and press ▼ key to decrease the gamma value (tone becomes lighter).	1.8 ~ 2.6
☞ The above options for Brightness, Contrast, Sharpness, and Gamma are available only in the standard mode.			
Color - Press **ENTER** to enter the Color menu. ☞ This color menu is available only in the standard mode.			

Normal	Allows video and still photographs to be viewed with natural coloring. This is the factory default color.	Press the ▲ or ▼ keys to select this option.	
Bluish	Applies a cool tint to the image and is factory pre-set to the PC industry standard white color.		
Reddish	Applies a warm tint to the image and is factory pre-set to the news print standard white color.		
User Mode	Tailors the image color tint. The blend of the Red, Green and Blue primary colors can be altered to change the color tint of the image. Decreasing one or more of the colors will reduce their respective influence on the color tint of the image. (e.g. if you reduce the blue level the image will gradually take on a yellowish tint. If you reduce Green, the image will become a magenta tint.)	Press the ▲ or ▼ keys and the **ENTER** key to select **Red**, **Green**, or **Blue**. Then use the ▲ or ▼ keys to make the color adjustments.	Red (0 to 100) Green (0 to 100) Blue (0 to 100)
	Hue: adjusts the degree of how we perceive colors.	Press the ▲ or ▼ keys to adjust the value.	0 to 100
	Saturation: adjust the purity degree of colors	Press the ▲ or ▼ keys to adjust the value.	0 to 100
	☞ The above options for Hue and Saturation are available only if the signal source is Component Video.		
Reset Color	Resets the **User Mode** custom color settings to the factory defaults.	Press the ▲ or ▼ keys to change the settings.	YES NO
Press **MENU** to leave the Color menu.			

Picture advanced menu

1. Press the **MENU** key to display the main menu.
2. Press the ▲ or ▼ keys to select **PICTURE ADVANCED** and then press the **ENTER** key to enter the menu.
3. Press the ▲ or ▼ keys to move the highlight to a menu item and then press the **ENTER** key to select that item.
4. Press the ▲ or ▼ keys to make adjustments or selections.
5. To return to the previous menu, press the **MENU** button.

Item	Function	Operation	Range
Picture Mode	Selects a picture mode that best suits the type of images shown on the screen. • Standard - for basic PC application. • Movie - for viewing videos. • Game - for playing video games. • Photo - for viewing still images. • sRGB - for better color matching representation with the peripheral devices, such as printers, DSCs, etc. • ECO- for saving electricity with low power consumption by providing minimum brightness for all running programs.	Press the ▲ or ▼ keys to change the settings.	• Standard • Movie • Game • Photo • sRGB • ECO
Senseye Demo	Displays the preview of screen images under the selected mode from Picture Mode. The screen will be divided into two windows; the left window demonstrates images of Standard mode, while the right window presents the images under the specified mode.	Press the ▲ or ▼ keys to change the settings.	• ON • OFF
Dynamic Contrast (available when the Picture Mode is set to Movie, Game, or Photo)	The function is to automatically detect the distribution of an input visual signal, and then to create the optimal contrast.	Press the **ENTER** key to select this option. Press the ▲ or ▼ keys to change the settings.	0 to 5
Display Mode	This feature is provided to allow aspect ratio's other than 16:9 to be displayed without geometric distortion. • Overscan – Slightly enlarges the input image. Use this feature to hide annoying edge noise if present around your image.	Press the ▲ or ▼ keys to change the settings. ☞ The options under Display Mode will be different depending on the input signal sources.	When the signal sources is from a DVI or D-sub source, and the input image is of non-wide aspect ratio:

	• Full - Scales the input image to fill the screen. Ideal for 16:9 aspect images. • Aspect - The input image is displayed without geometric distortion filling as much of the display as possible. 16:9 images will fill the screen horizontally while 4:3 images will fill the screen vertically.		• Full • Aspect Or when the signal source is from a HDMI source: • Overscans • Full • Aspect
Color Format	Determines the color space (RGB or YUV) based on the following detected video signal: • D-sub (VGA) from PC: the default color format is RGB. • D-sub (Component) from a video device: the default color format is YUV, ☞ You might need to manually set the color format if colors shown on the monitor screen do not display properly. • DVI: color format is automatically set to RGB. • HDMI: color format is not selectable. In other words, color format is automatically set depending on the input video source.	Press the **ENTER** key to select this option. Press the ▲ or ▼ keys to change the settings.	• RGB • YUV
HDMI RGB PC range (available only when HDMI input is in use)	Determines the range of color scales. Select an option that matches the RGB range setting on the connected HDMI device.	Press the **ENTER** key to select this option. Press the ▲ or ▼ keys to change the settings.	• RGB (0~255) • RGB (16~235)

Audio menu

1. Press the **MENU** key to display the main menu.
2. Press the ▲ or ▼ keys to select **AUDIO** and then press the **ENTER** key to enter the menu.
3. Press the ▲ or ▼ keys to move the highlight to a menu item and then press the **ENTER** key to select that item.
4. Press the ▲ or ▼ keys to make adjustments or selections.
5. To return to the previous menu, press the **MENU** button

Item	Function	Operation	Range
Volume	Adjusts the audio volume	Press the ▲ key to increase the volume and press the ▼ key to decrease the volume.	0~100
Mute	Mutes the audio input	Press the ▲ or ▼ keys to change the settings.	• ON • OFF
Audio Select	Allow users to select the audio source or let the monitor detect it automatically.	Press the ▲ or ▼ keys to change the settings.	• PC Audio • HDMI Audio 1 • HDMI Audio 2 • Auto Detect

System menu

1. Press the **MENU** key to display the main menu.
2. Press the ▲ or ▼ keys to select **SYSTEM** and then press the **ENTER** key to enter the menu.
3. Press the ▲ or ▼ keys to move the highlight to a menu item and then press the **ENTER** key to select that item.
4. Press the ▲ or ▼ keys to make adjustments or selections.
5. To return to the previous menu, press the **MENU** button

Item	Function	Operation	Range
Input	Use this to change the input to that appropriate to your video cable connection type.	Press the ▲ or ▼ keys to change the settings.	• DVI • D-sub (VGA) • HDMI 1 • HDMI 2
OSD Settings - Press **ENTER** to enter the **OSD Settings** menu.			
Language	Sets the OSD menu Language.	Press the ▲ or ▼ keys to change the settings. ☞ The language options displayed on your OSD may differ from those shown on the right, depending on the product supplied in your region.	• English • French • German • Italian • Spanish • Polish Japanese • Czech • Traditional Chinese • Hungarian • Simplified Chinese •Serbo-Croatian • Romanian • Dutch

			• Russian • Swedish • Portuguese
H. Position	Adjusts the horizontal position of the OSD menu.	Press the▲ or ▼keys to change the settings.	0 to 100
V. Position	Adjusts the vertical position of the OSD menu.		0 to 100
Display Time	Adjusts the display the OSD menu.		• 5 Sec. • 10 Sec. • 15 Sec. • 20 Sec. • 25 Sec. • 30 Sec.
OSD Lock	Prevents all the monitor settings from being accidentally changed. When this function is activated, the OSD controls and hotkey operations will be disabled.	Press the ▲ or ▼ keys to change the settings. ☞ To unlock the OSD controls when the OSD is preset to be locked, press and hold the "**MENU**" key for 15 seconds to enter the "OSD Lock" option and make changes. Alternatively, you may use the ▲ or ▼ keys to select "NO" in the "OSD Lock" submenu from the "OSD Settings" menu, and all OSD controls will be accessible.	• YES • NO
Press **MENU** to leave the **OSD Settings** menu.			
DDC/CI*	Allows the monitor settings to be set through the software on the PC.	Press the **ENTER** key to select this option. Press the ▲or ▼ keys to change the settings.	• ON • OFF
Information	Displays the current monitor property settings.		• Input • Current Resolution • Optimum Resolution (best with the monitor) • Model Name

HDMI Auto Switch	When this function is activated, HMDI port will be in the input auto select loop. Otherwise, HDMI can only be selected by input select or by hot key.	Press the **ENTER** key to select this option. Press the ▲ or ▼ keys to change the setting.	• ON • OFF
Reset All	Resets all mode, color and geometry settings to the factory default values.	Press the ▲ or ▼ keys to change the settings.	• YES • NO

*DDC/CI, short for Display Data Channel/Command Interface, which was developed by Video Electronics Standards Association (VESA). DDC/CI capability allows monitor controls to be sent via the software for remote diagnostics.

Display Timing Table

Pixel	Hor. (KHz)	Ver. (Hz)	Pixel CLK (MHz)	Source	21.5W
640 x 350	31.47	70.09	25.18	VGA	
640 x 480	31.47	59.94	25.175	VGA	
640 x 480	37.50	75.00	31.500	VGA	
720 x 400	31.47	70.08	28.321	VGA	
800 x 600	37.88	60.32	40.000	VESA	
800 x 600	46.88	75.00	49.500	VESA	
832 x 624	49.72	74.55	57.283	MAC	
1024 x 768	48.36	60.00	65.000	VESA	
1024 x738	60.02	75.03	78.750	VESA	
1152 x 720	44.86	60.00	66.750	CVT 0.83 MA	
11520 x 870	68.68	75.06	100.000	MAC	
1152 x 900	61.80	65.96	92.978	SUN	
1280 x768	47.396	60.0	68.25	CVT 0.98M9-R	
1280 x 800	49.702	59.81	83.5	CVT-8	
1280 x 800	62.8	75	106.5		
1280 x 720	45.00	59.94	75.25		

1280 x 720	44.77	59.86	74.5		
1280 x 720	56.46	74.78	95.75		
1280 x 960	60.00	60.00	108.000	VESA	
1280 x 1024	63.98	60.02	108.000	VESA	
1280 x 1024	79.98	75.02	135.000	VESA	
1360 x 768	47.7	60.01	85.5	VESA	
1366 x 768	47.76	59.85	85.5		
1440 x 900	55.94	59.89	106.500	CVT 1.30MA	
1440 x 900	70.6	75	136.75		
1600 x 900	55.54	59.87	97.75		
1600 x 1000	643648	60.00	108.50	CVT 1.60MA-R	
1600 x 1200	75.00	60.00	162.000	VESA	
1600 x 1200	93.80	75.00	202.500	VESA	
1680 x 1050	65.29	60.00	146.250	CVT 1.76MA	
1680 x 1050	82.3	75	187		
1920 x 1080-R	66.587	59.934	138.5		
1920 x 1080	67.158	60.00	173.00	CVT 2.07M9DTV 16:9	
1920 x 1080	67.5	60	148.5		

Factory OSD Menu

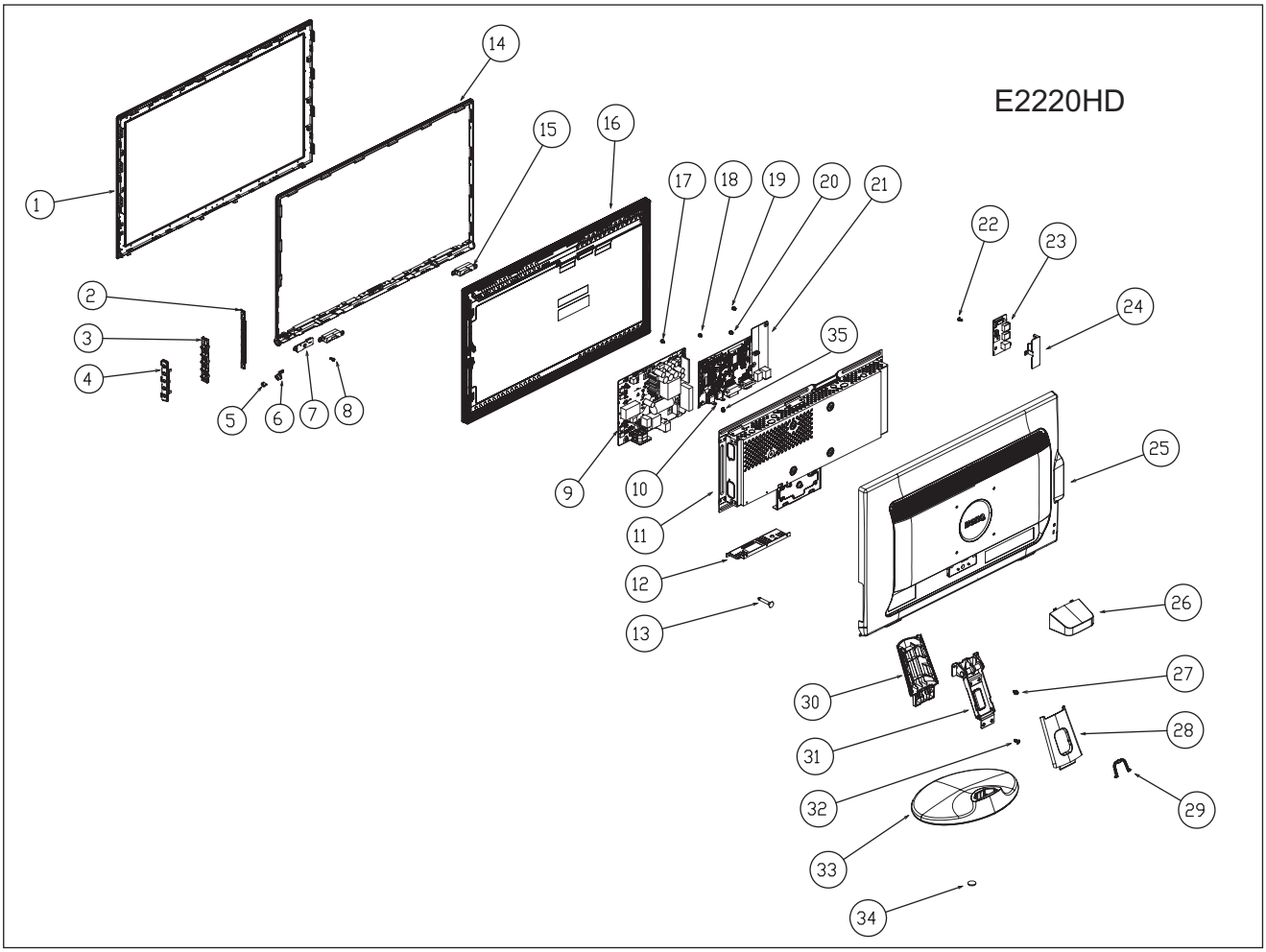
Turn off the monitor, keep pressing the “MENU” buttons, and turn on the monitor, then when we press the MENU button, the factory OSD will be at the left top of the panel as below.

BenQ Service Page

1. Trigger method: Press “Menu” key and Power on.
2. Press the Menu key will display the service page
3. Press menu key will close the service page.
4. Power off will quit the service mode
5. At the service mode, the key function is same as normal OSD define.
6. The timer can only reset at the service mode by “Timer Reset”. And need to have a warning message to double confirm the reset function.The timer should record up to 99999 hours
7. Add two select items for HDCP (DVI/HDMI port),DVI HDCP/HDMI HDCP at Service menu
   HDMI HDCP: To enable the hot plug pin detection. (HDMI port default: on)
   DVI HDCP: To disable the hot plug pin detection. (DVI port default: off)
8. Add BenQ logo on/off item, the default is “on”
9. Add the auto power on item, the default is “off ”
10. Add the timer reset warning message, when select the timer reset item, then the warning message will display and need to confirm it again and the default is “No”.
11. Panel type define need to have the panel version
12. F/W version need to define the dual or analog model , ex : E2200HD V001, 22/04, L17

Level 2 Circuit Board and Standard Parts Replacement

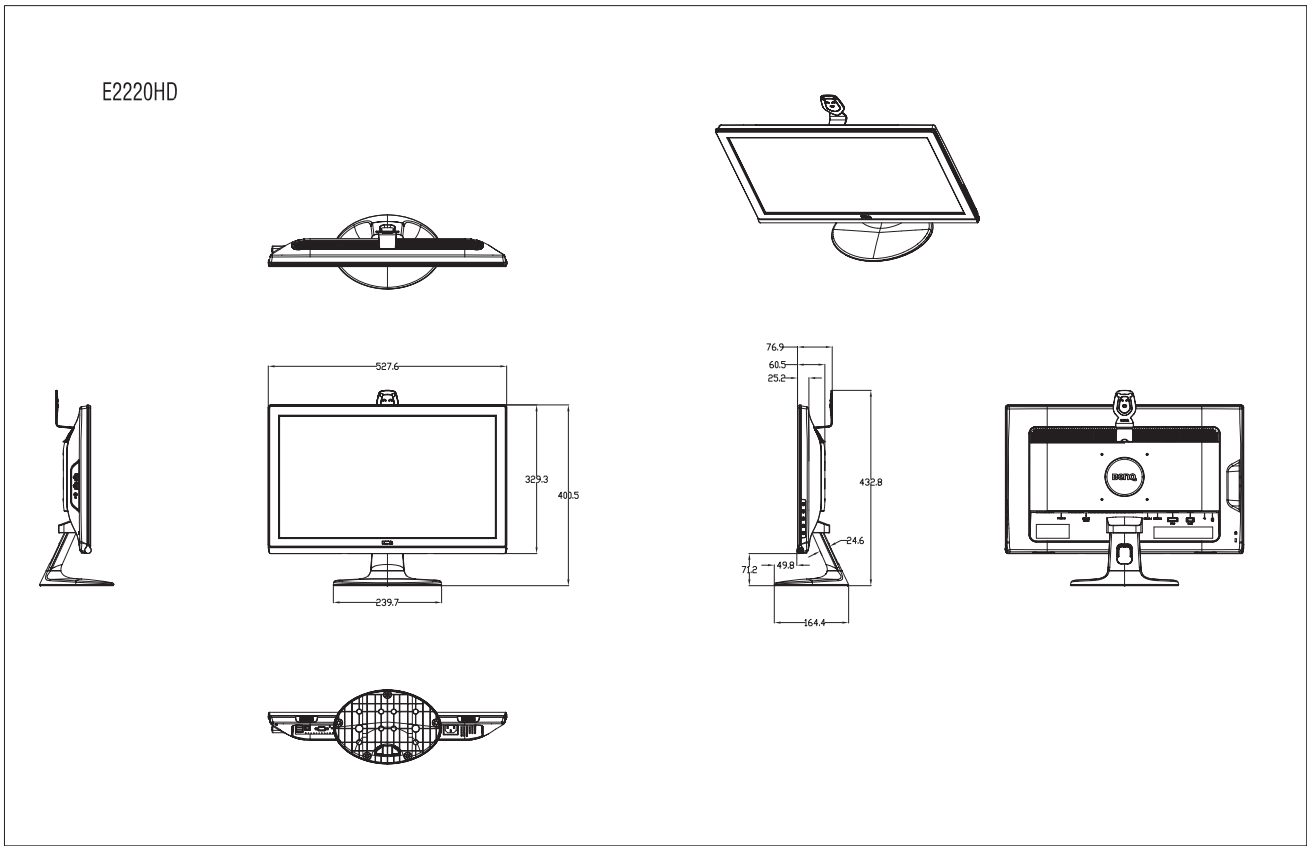
Product Exploded View



NO	Part NO	Description	QTY.	Remark
1	A34G1354ADPB1B0130	Bezel L215WA-9BENQ2	1	
2	KEPC9QBF	KEY BOARD	1	
3	A33G0707ADP 1L0100	FUNCTION BUTTON	1	
4	A33G0708ADP 1L0100	BUTTON COVER	1	
5	A33G0709BCNA1C0100	POWER BUTTON	1	Translucency white
6	A33G0710 1 1C0100	POWER LENS	1	Translucency red
7	KEPC9QBE	POWER BTN BOARD	1	
8	0Q1G1030 8120	SCREW Q3 X 8	1	PWB BTN PCB to middle frame
9	PWPC9B41AAA6	POWER BOARD	1	
10	CBPC9SBBQQ1	MAIN BOARD	1	

11	A15G0818101	MAINFRAME	1	
12	A85G0190101	POWER SHIELD	1	
13	Q11G0025 1	PCB SUPPORT	1	
14	A34G1357BCN 1B0100	MIDDLE FRAME	1	
15	078G 511 2 V	SPEAKER 4 OHM 2W	2	
16	750GLU215H1024M0BQ	PANEL M215HW01 V00A SH AUO	1	
17	0G1G1030 6120	SCREW Q3 X 6	4	Power PCB to mainframe
18	0M1G1030 6120	SCREW Q3 X 6	2	Main PCB to mainframe
19	0G1G1030 6120	SCREW Q3 X 6	1	USB PCB to mainframe
20	0M1G1030 6120	SCREW M3X6	1	USB PCB to mainframe
21	USB9QBE	USB BOARD	1	
22	0Q1G1030 8120	SCREW Q3 X 8	1	Earphone PCB to rear cover
23	USB9QB1	EARPHONE BOARD	1	
24	A85G0191101	USB SHIELD	1	
25	A34G1356ADP 1B0130	REAR COVER 21.5"	1	
26	A33G0711ADP 1L0100	HINGE COVER	1	
27	0M1G1740 10120	SCREW Q4 X 10	3	Hinge to rear cover
28	A34G1359ADP 1B0100	STAND BACK	1	
29	A33G0712ADP 1L0100	CABLE CLIP	1	
30	A34G1358ADP 1B0100	STAND FRONT	1	
31	A37G0122 1	HINGE	1	
32	0Q1G 140 10120	SCREW Q4 X 10	4	hinge to stand front
33	A34G1360ADP 1B0130	BASE	1	
34	Q12G6082 1	FOOT PAD	5	
35	0M1G 930 6120	SCREW Q3 X 6	2	Main PCB to mainframe

Six angles' view

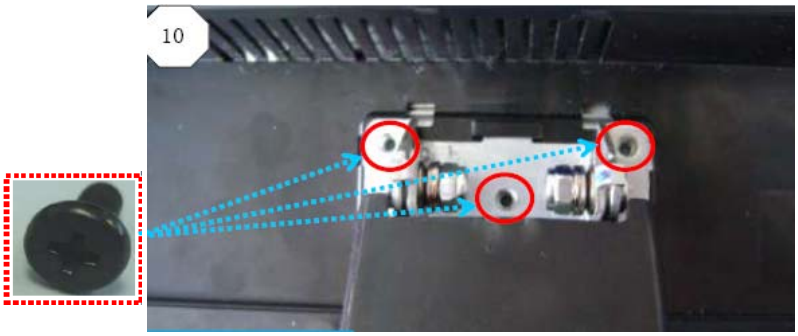


Product Disassembly

Step 1: Remove the stand-base ASSY

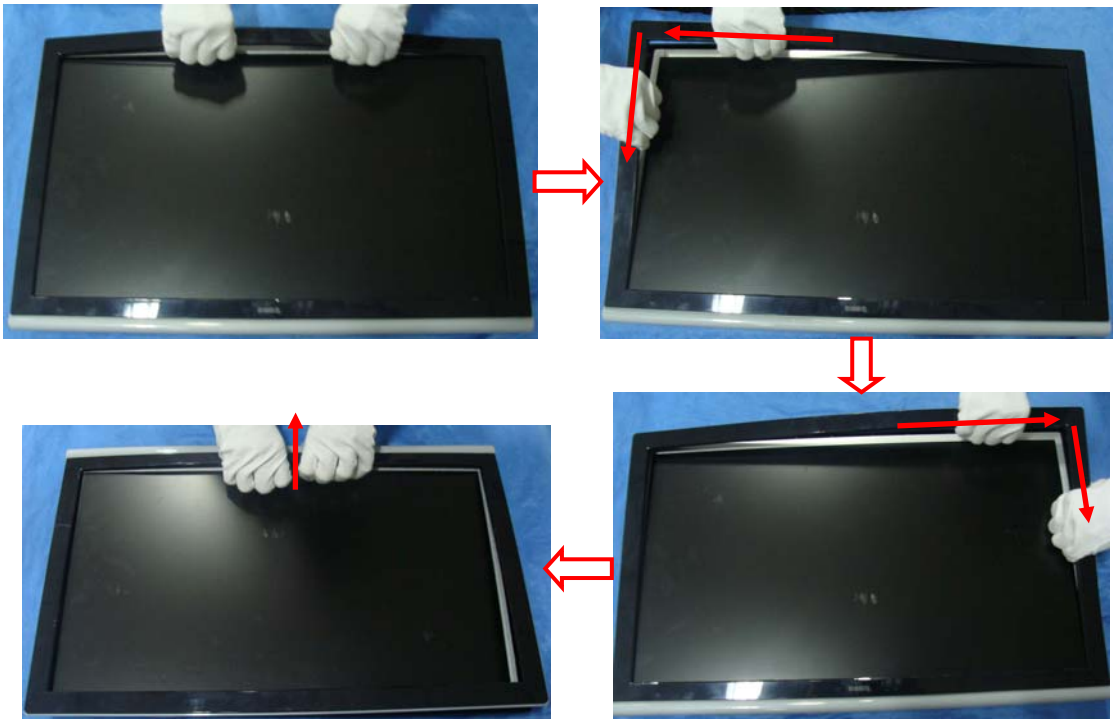
a. Place the monitor face down on a smooth surface. Be careful to avoid scratch and injury during the process of uninstall. And then remove the hinge cover.

b. Remove three screws in red to remove the stand-base assy.

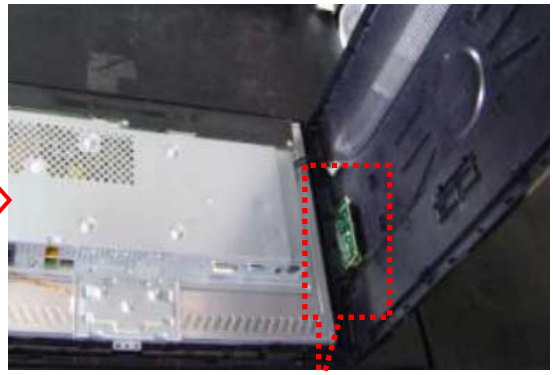


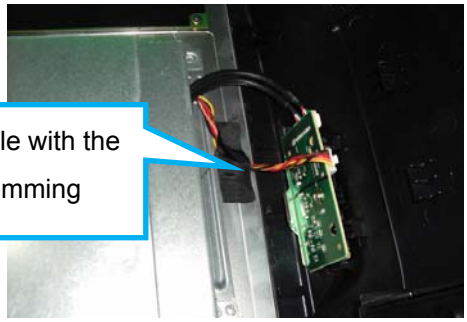
Step 2: Remove the rear cover

a. Remove the bezel as follow:

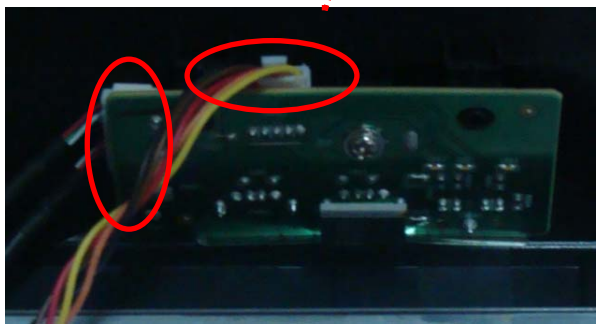


b. Disconnect the connectors to remove the rear cover as follow:





Secure the cable with the tape to avoid jamming

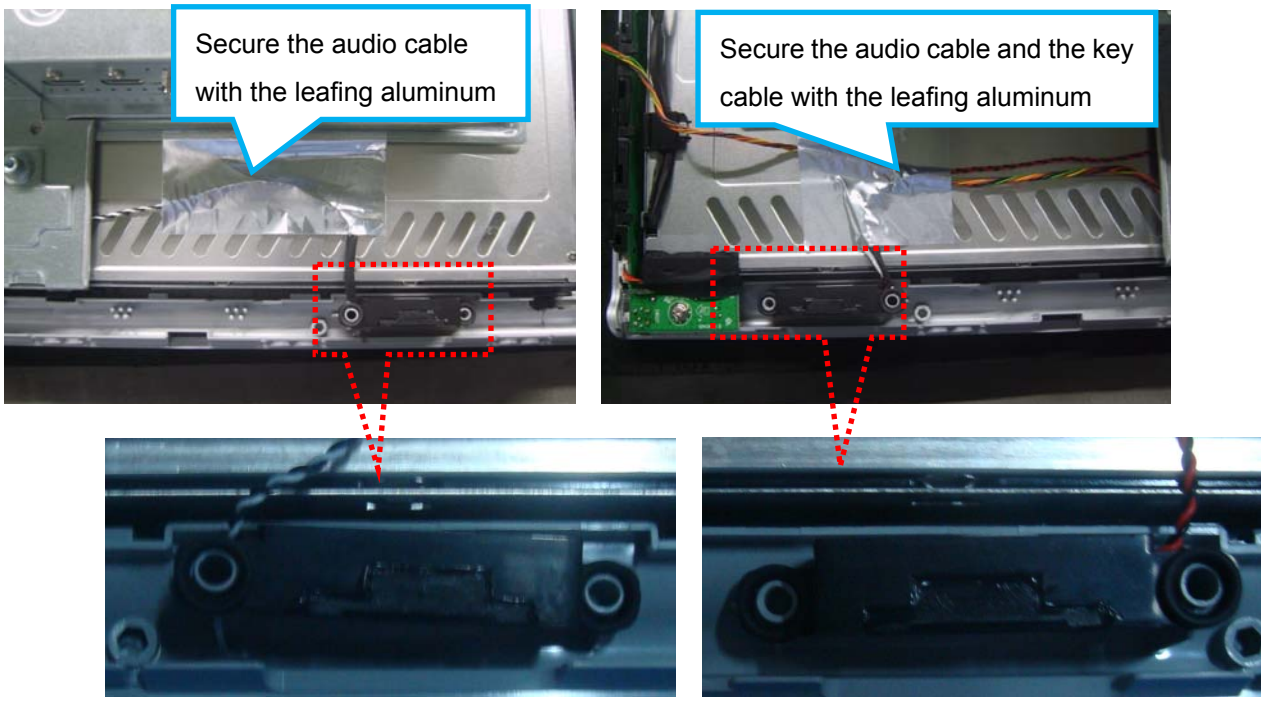


Step 3: Remove the bezel

a. Disconnect the connectors and release the screw to remove the key board from the bezel.

Secure the light wires with the tape

b. Remove the speakers.

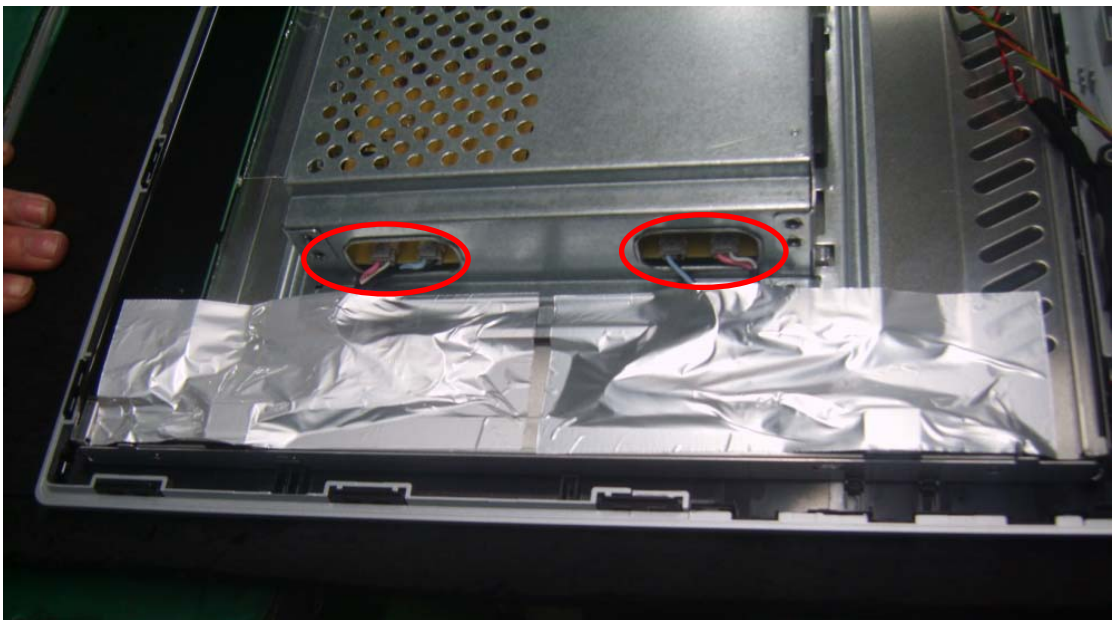


Step 4: Remove the Panel

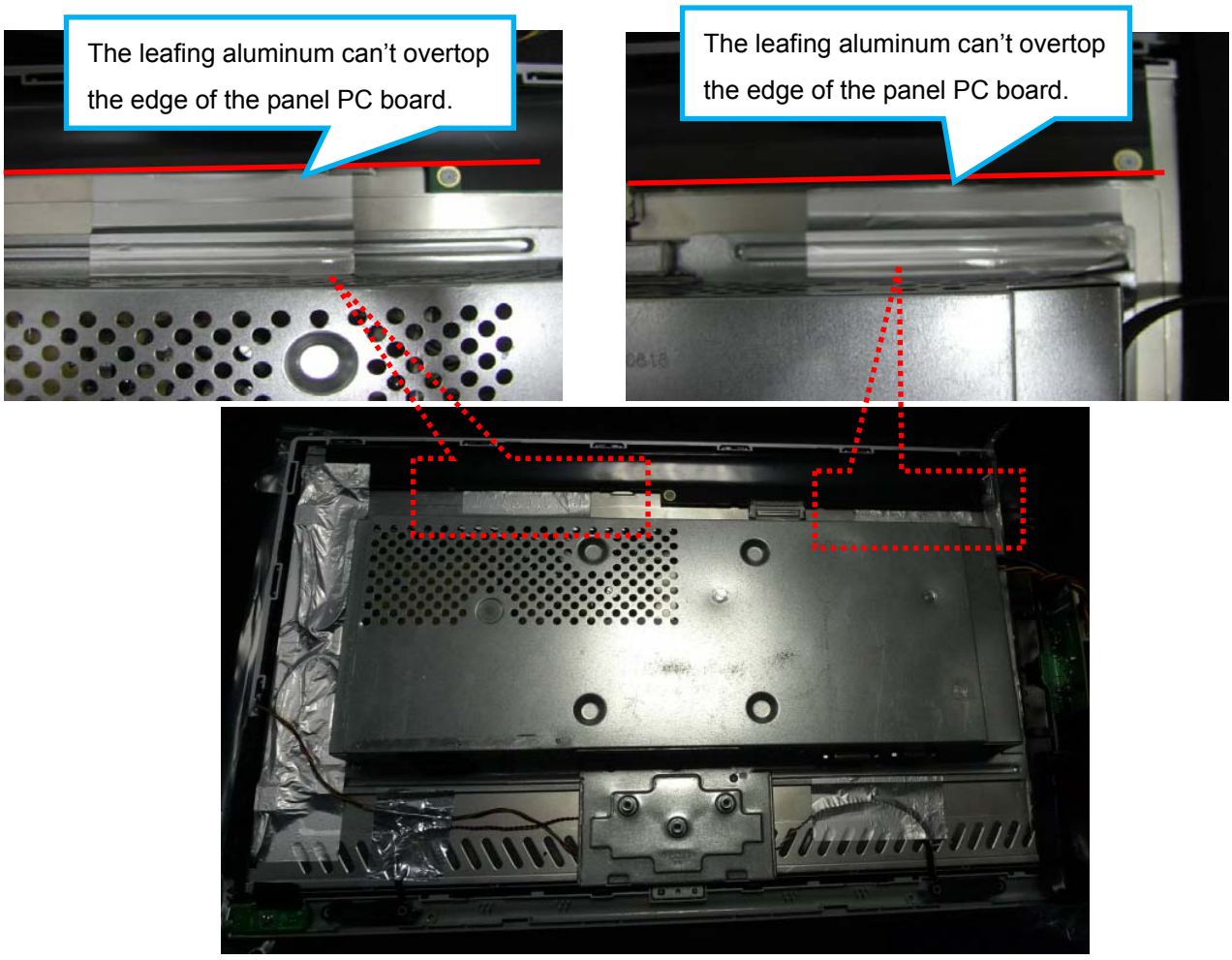
a. Remove the leafing aluminum and disconnect the Lamp connectors.

Note:

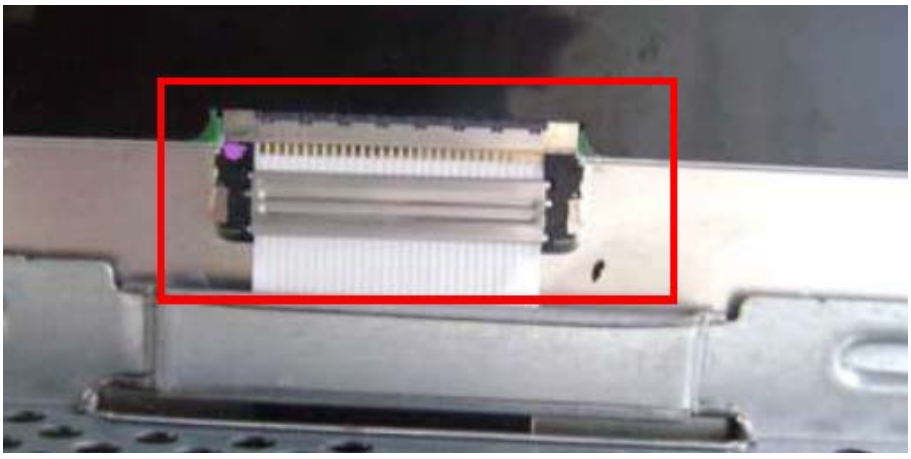
1. Secure the light wires with the leafing aluminum like the picture as below.
2. The leafing aluminum is not reused.



b. Remove the tapes.

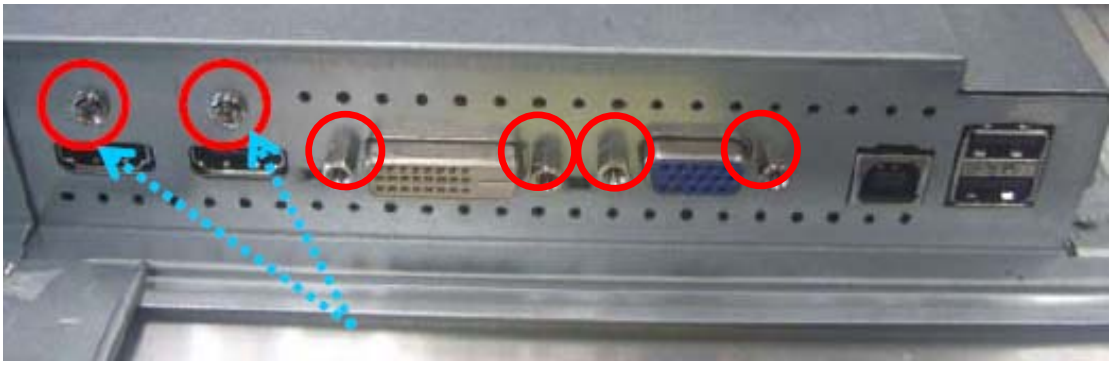


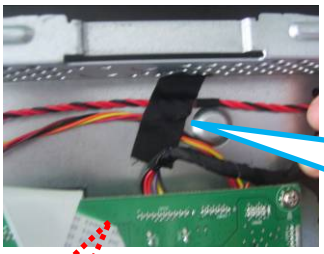
c. Disconnect the LVDS Cable connection.



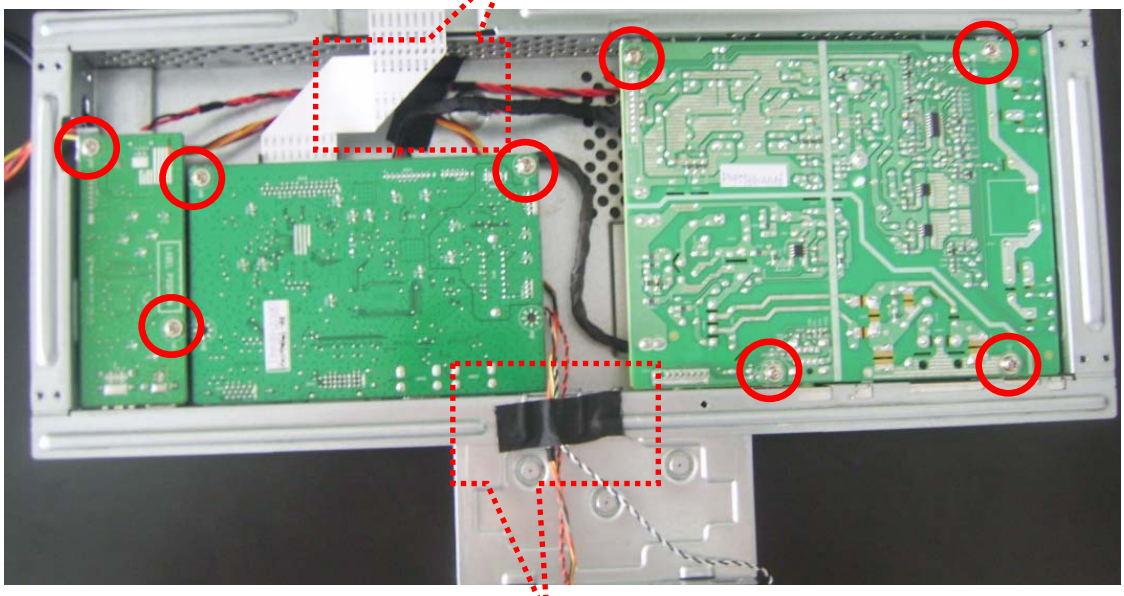
Step 5: Remove the boards

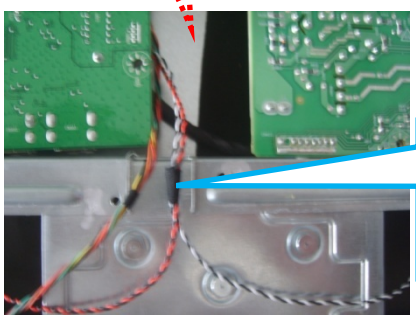
Release the screws to remove the power board, main board and USB board.





The tape is below the FFC cable.

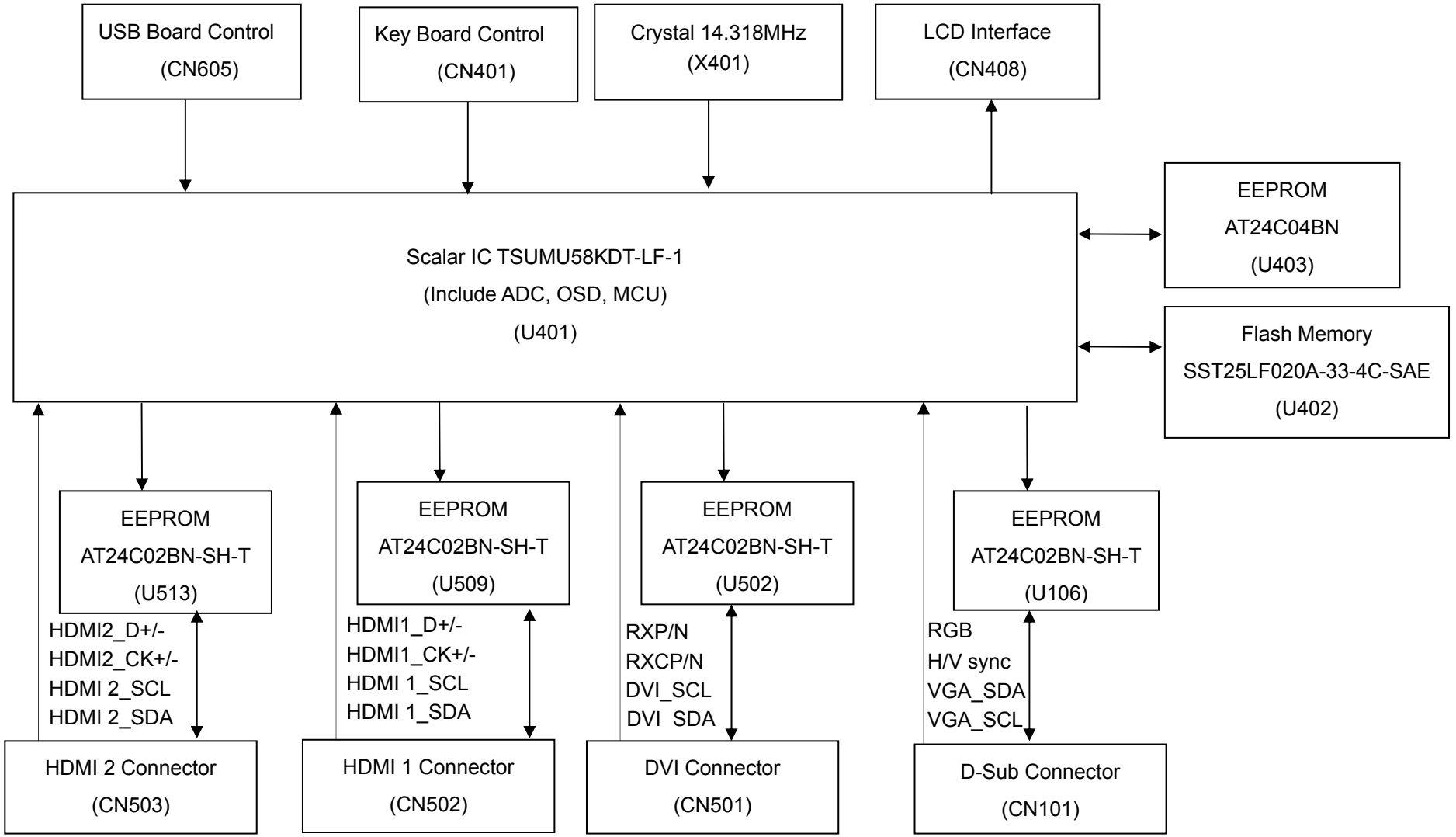




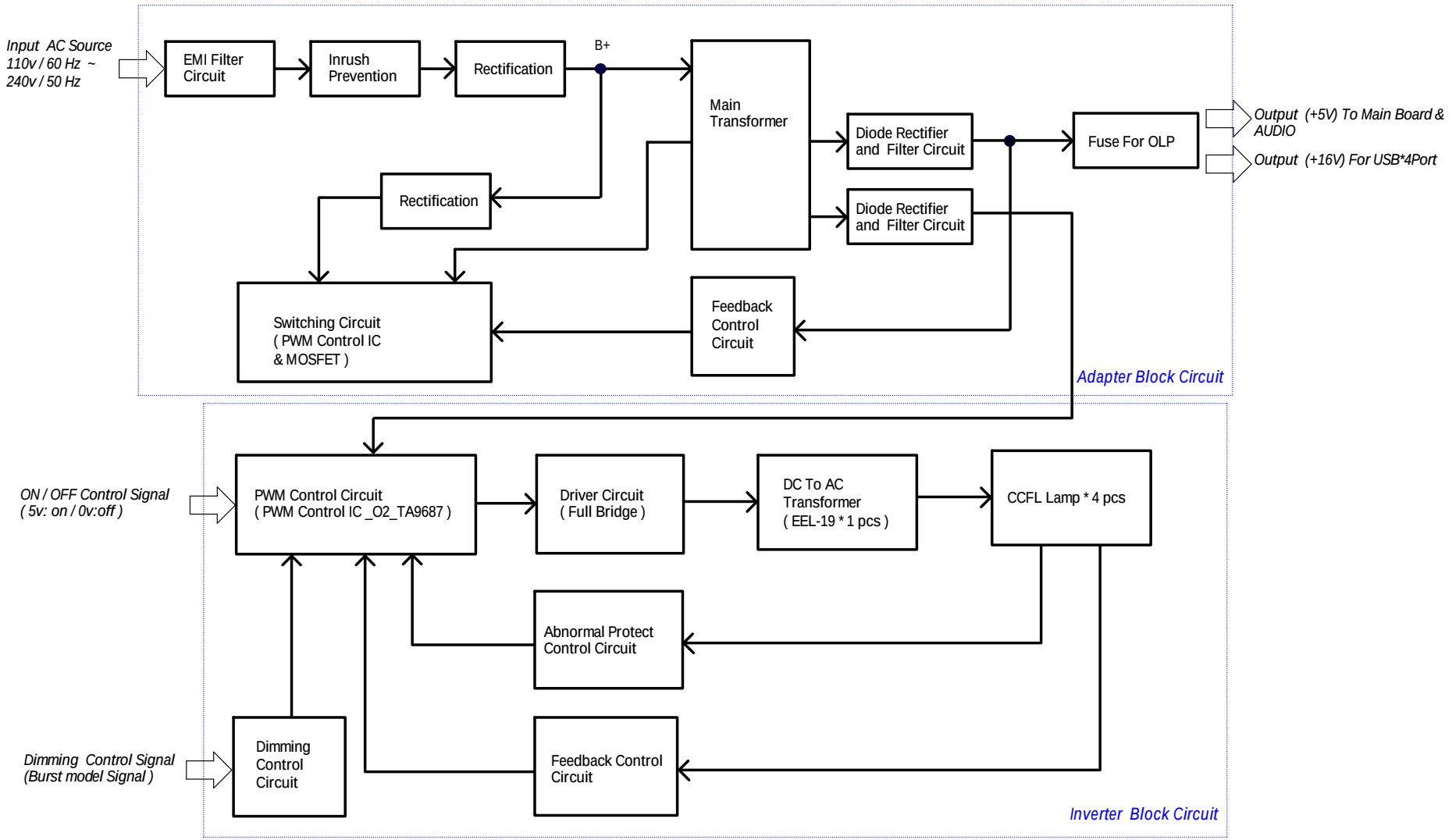
Place the cables in the slot of the mainframe and secure them with the tape.

Block Diagram

Main Board

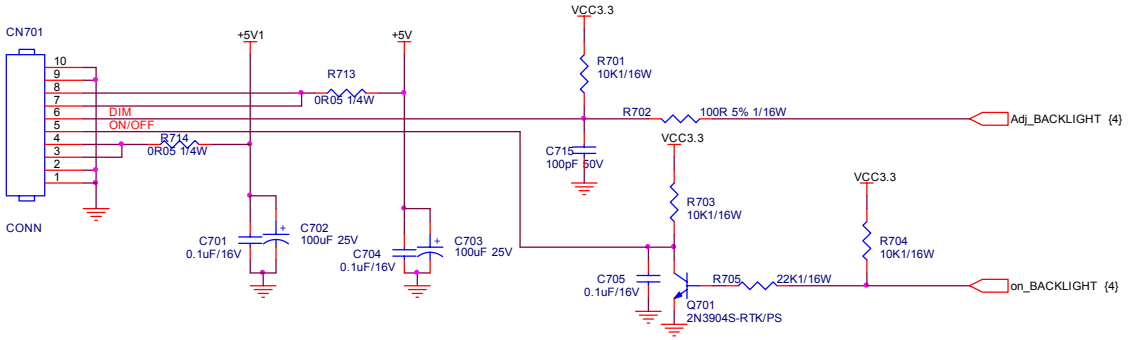


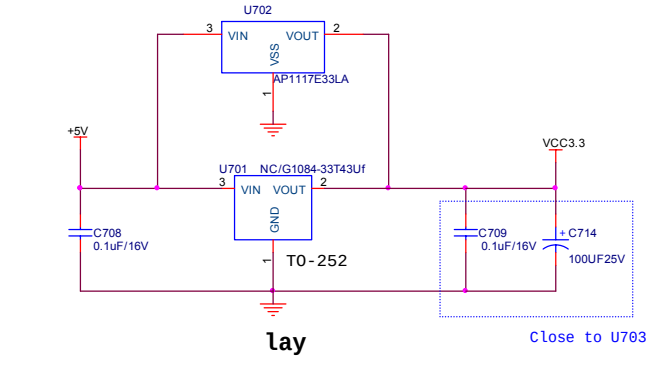
Power Board

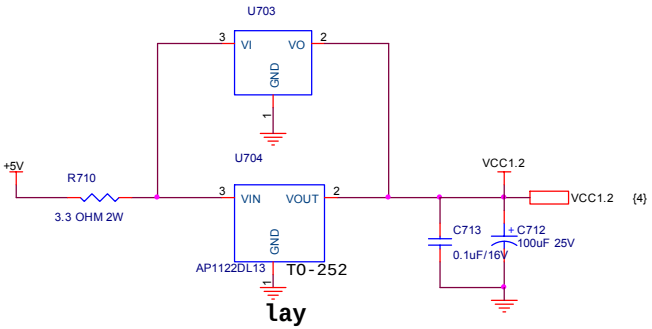

Input AC Source
110v / 60 Hz ~
240v / 50 Hz
EMI Filter Circuit
Inrush Prevention
Rectification
B+
Main Transformer
Diode Rectifier and Filter Circuit
Diode Rectifier and Filter Circuit
Fuse For OLP
Output (+5V) To Main Board & AUDIO
Output (+16V) For USB*4Port
Rectification
Switching Circuit (PWM Control IC & MOSFET)
Feedback Control Circuit
Adapter Block Circuit
ON / OFF Control Signal
(5v: on / 0v:off)
PWM Control Circuit (PWM Control IC _O2_TA9687)
Driver Circuit (Full Bridge)
DC To AC Transformer (EEL-19 * 1 pcs)
CCFL Lamp * 4 pcs
Abnormal Protect Control Circuit
Dimming Control Signal
(Burst model Signal)
Dimming Control Circuit
Feedback Control Circuit
Inverter Block Circuit

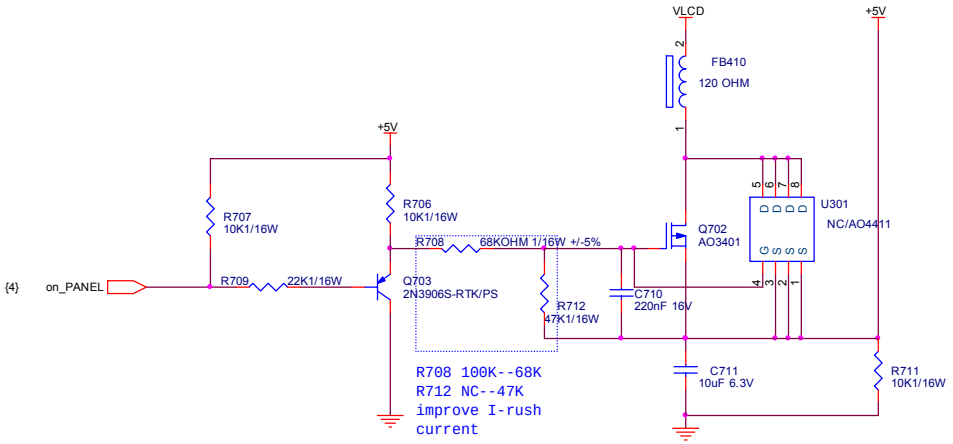
Schematic Diagram

Main Board

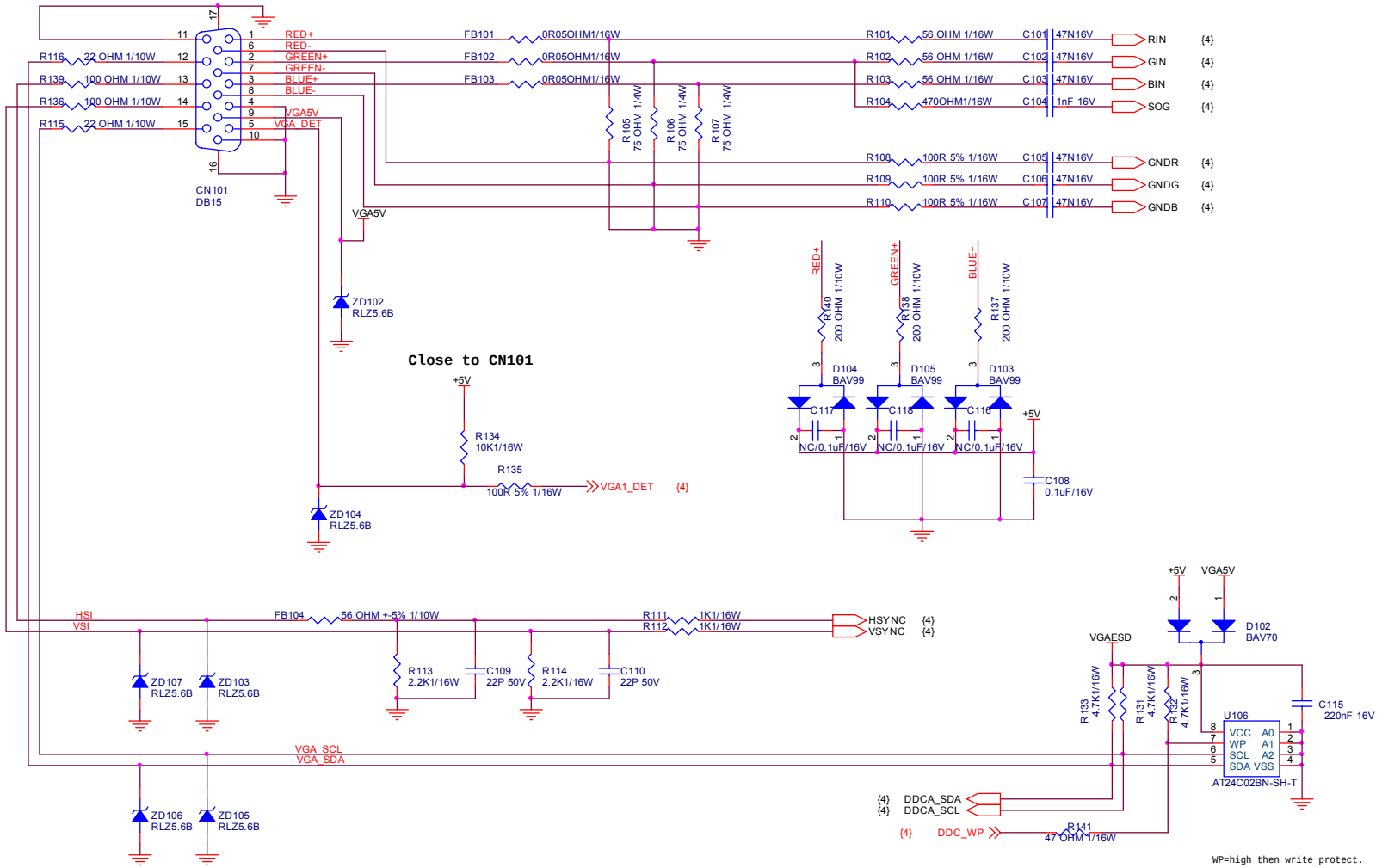




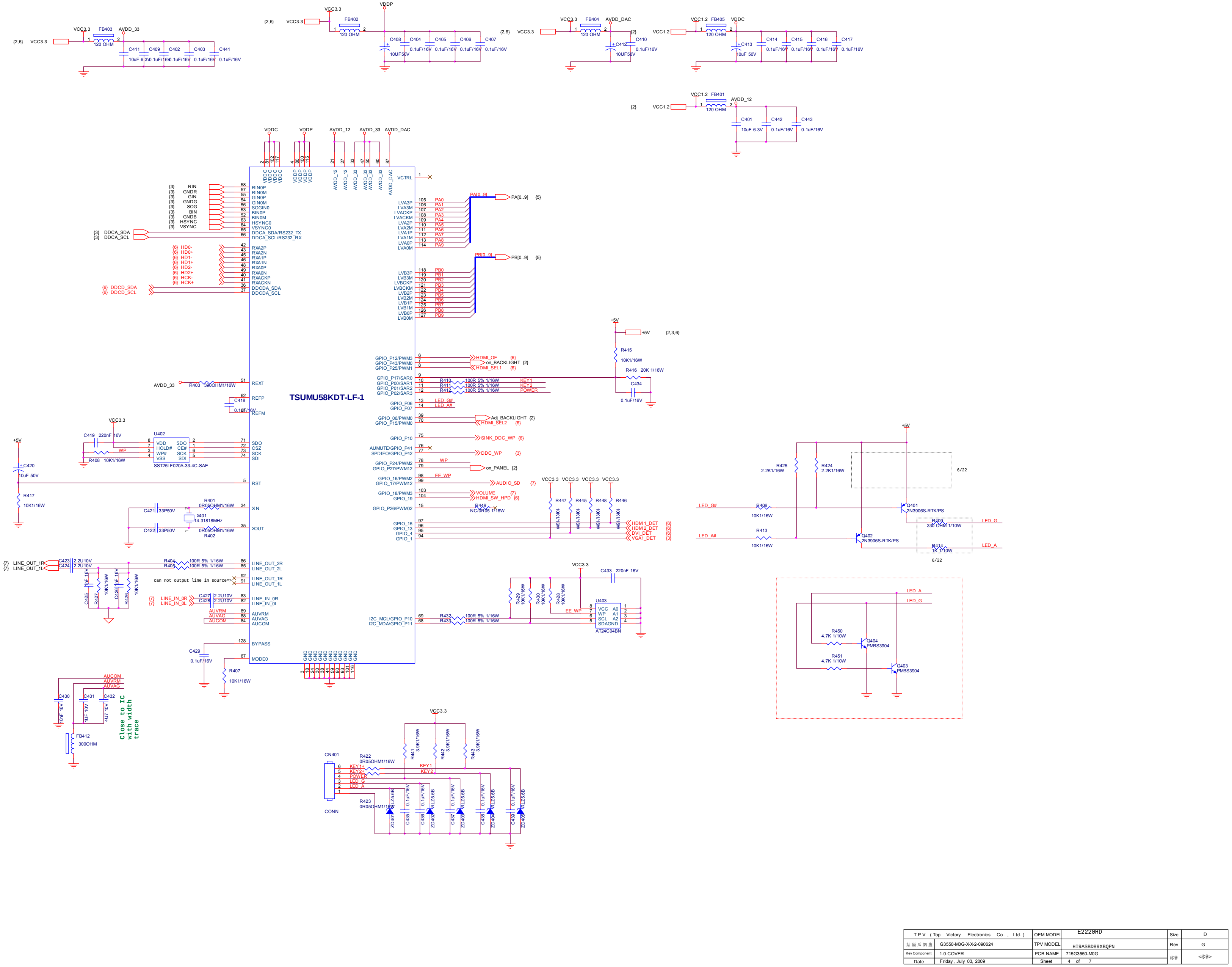


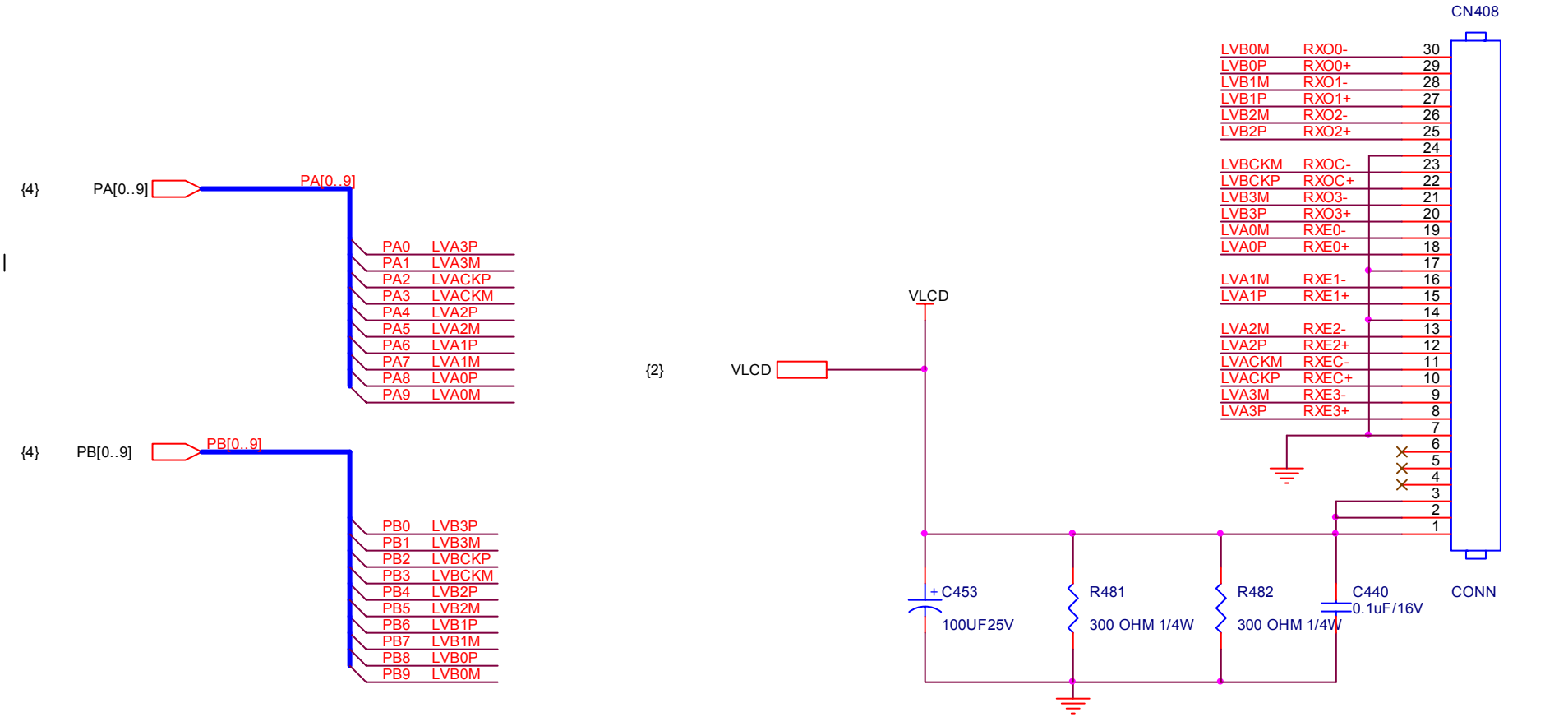


T P V (Top Victory Electronics Co . , Ltd.)		OEM MODEL	E2220HD	Size	B
結 陽 瓜 銅 腹	G3550-M0G-X-X-2-090624	TPV MODEL	HI9ASBD89XBQPN	Rev	G
Key Component	1.0.COVER	PCB NAME	715G3550-M0G	称 爹	<称爹>
Date	Friday, July 03, 2009	Sheet	2 of 7		

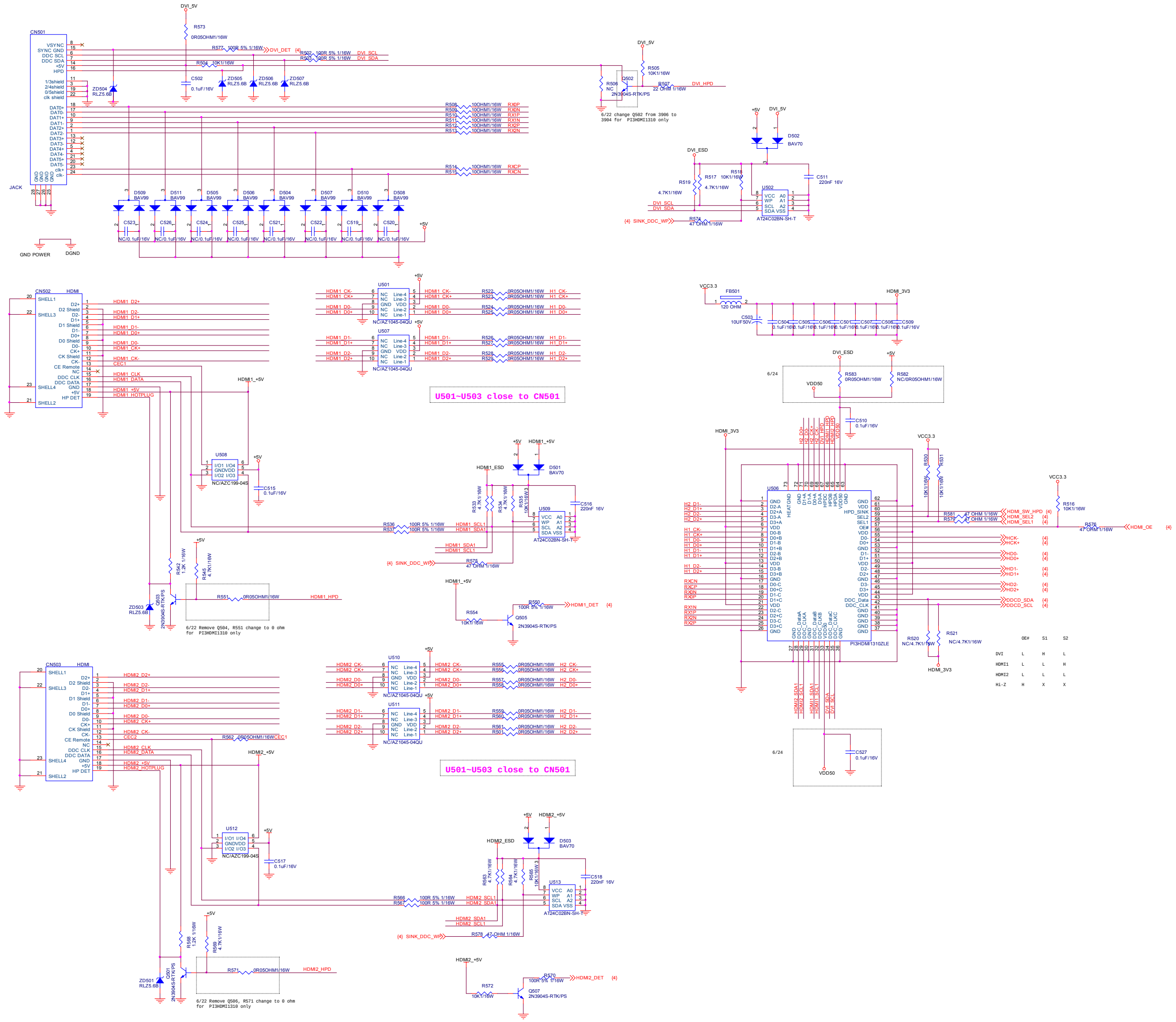


T P V (Top Victory Electronics Co . , Ltd.)		OEM MODEL	E2220HD	Size	B
結 隔 瓜 銅 膜	G3550-M0G-X-X-2-090624	TPV MODEL	HI9ASBD89XBQPN	Rev	G
Key Component	1.0.COVER	PCB NAME	715G3550-M0G	称爹	<称爹>
Date	Friday , July 03, 2009	Sheet	3 of 7		

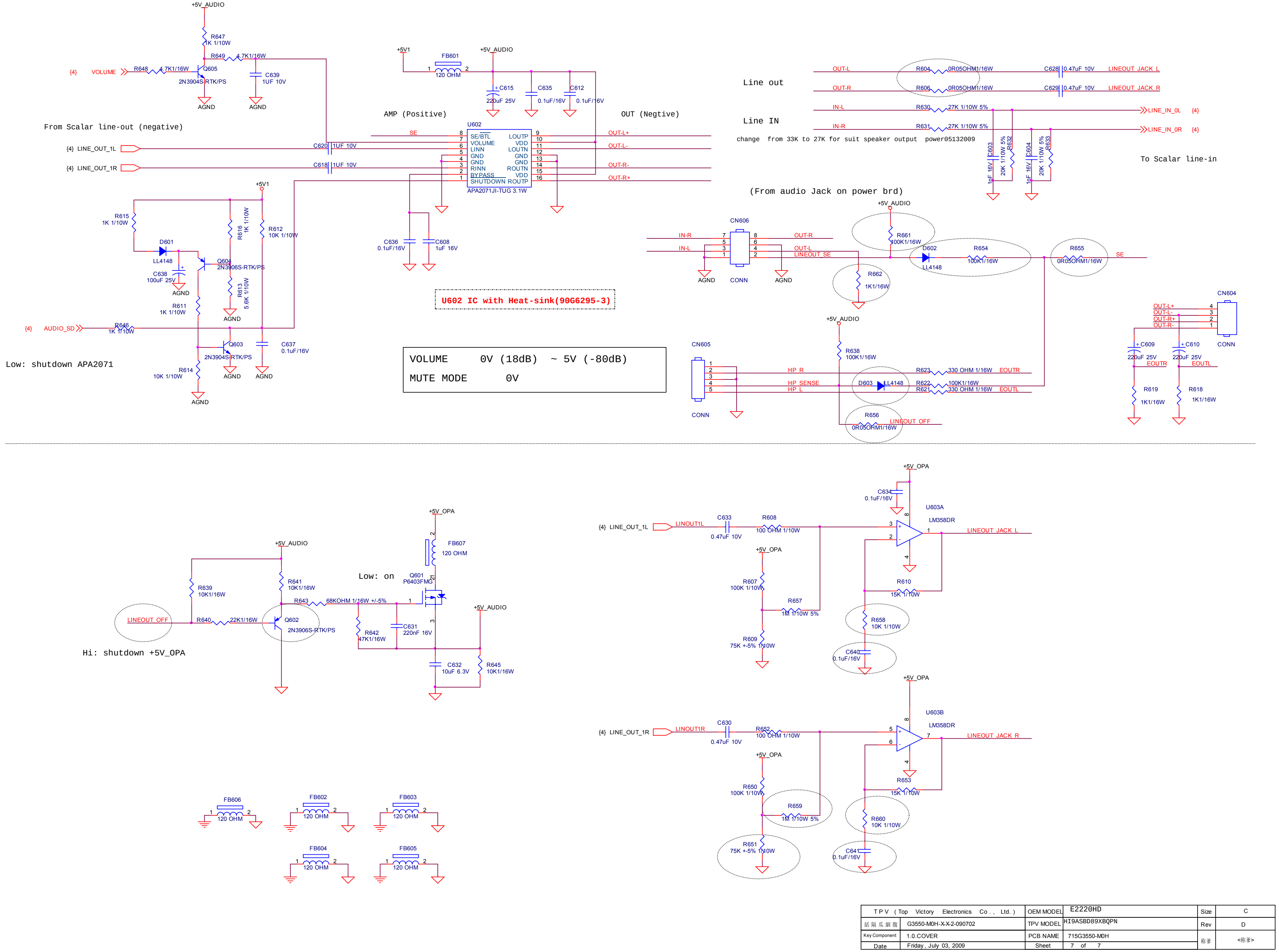

TSUMU58KDT-LF-1
VCC3.3
VDDP
VDDC
AVDD_33
AVDD_12
AVDD_DAC
VCC1.2
FB402
FB403
FB404
FB405
FB401
120 OHM
U402
SST25LF020A-33-4C-SAE
U403
AT24C04BN
CN401
CONN
Q401
Q402
2N3906S-RTK/PS
Q403
Q404
PMBS3904
LED_G#
LED_A#
LED_G
LED_A
HDMI_OE
on_BACKLIGHT
HDMI_SEL1
Adj_BACKLIGHT
HDMI_SEL2
SINK_DDC_WP
DDC_WP
on_PANEL
AUDIO_SD
VOLUME
HDMI_SW_HPD
HDMI1_DET
HDMI2_DET
DVI_DET
VGA1_DET
KEY1
KEY2
POWER
PA[0..9]
PB[0..9]
LINE_OUT_1R
LINE_OUT_1L
LINE_IN_0R
LINE_IN_0L
AUCOM
AUVRM
AUVAG
can not output line in source=>
close to IC with width trace
FB412
300OHM
14.31818MHz
E2220HD
G3550-M0G-X-X-2-090624
1.0.COVER
715G3550-M0G
Friday, July 03, 2009
Sheet 4 of 7



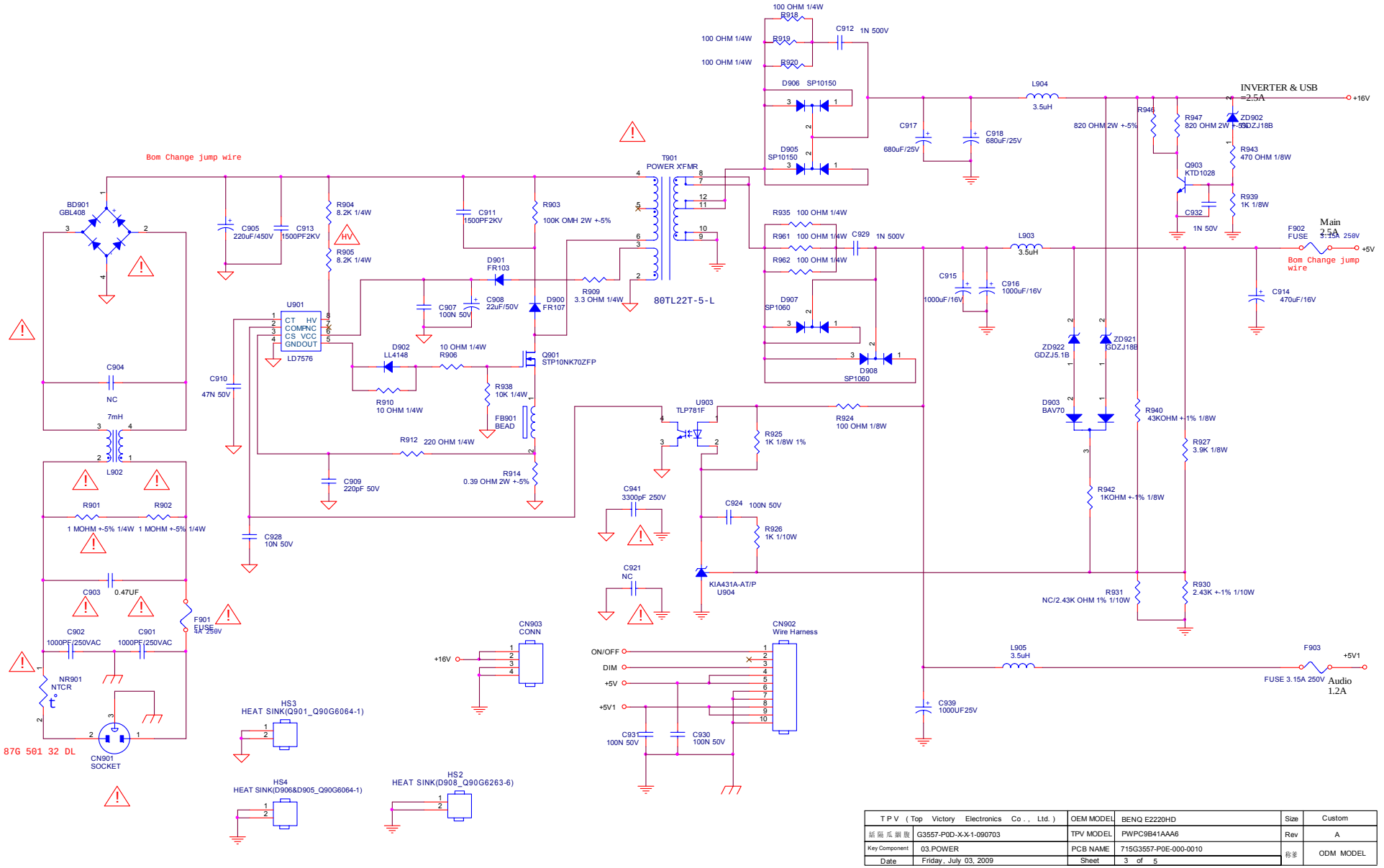
T P V （Top Victory Electronics Co . , Ltd. ）		OEM MODEL	E2220HD	Size	A
結 隔 瓜 網 腹	G3550-M0D-X-X-2-090511	TPV MODEL	HI9ASBD89XBQPN	Rev	D
Key Component	1.0.COVER	PCB NAME	715G3550-M0A	称爹	<称爹>
Date	Friday , July 03, 2009	Sheet	5 of 7		



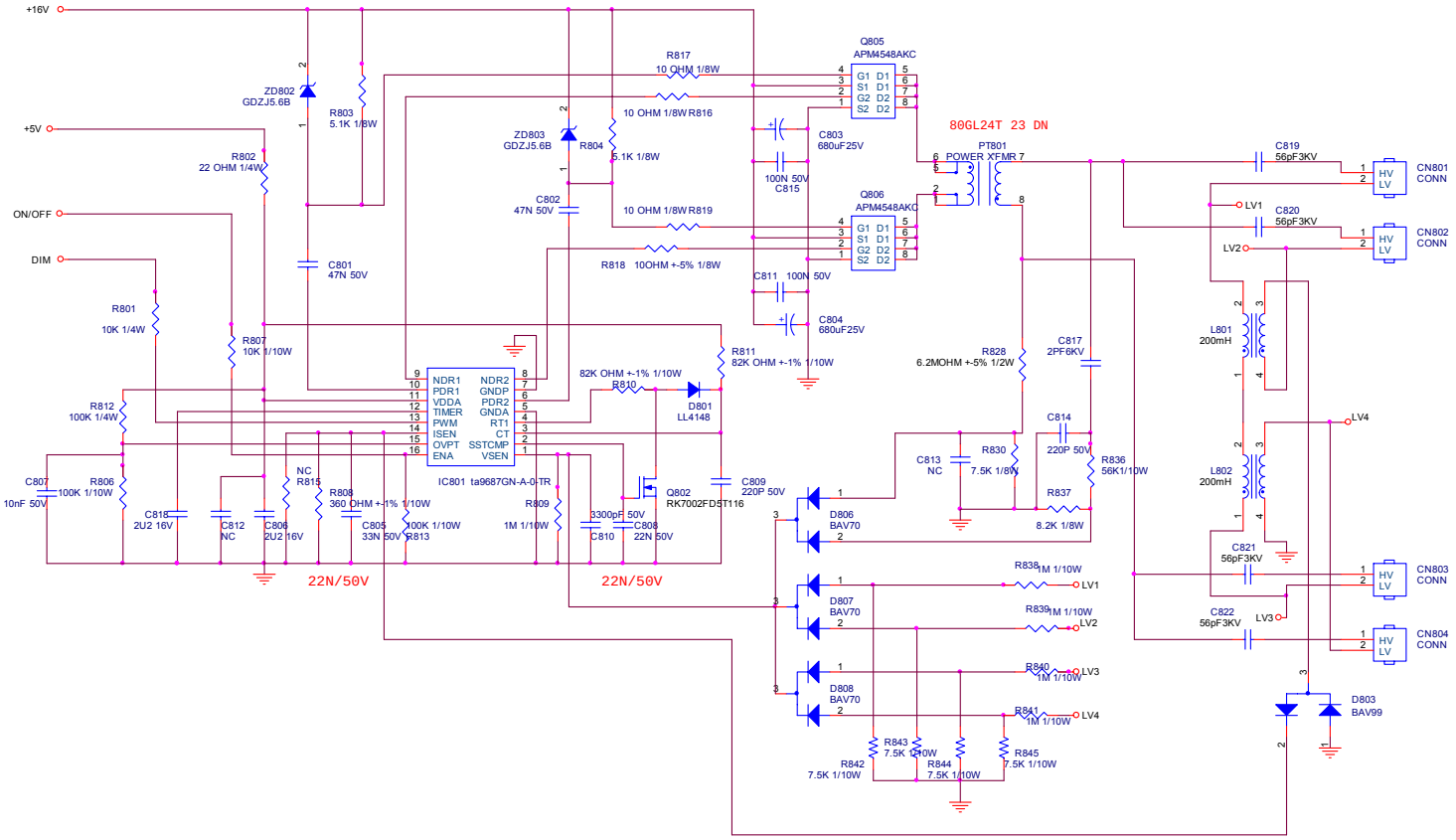
TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL	E2220HD	Size	A1
紙隔瓜緗腹	G3550-M0D-X-X-2-090624	TPV MODEL	HI9ASBD89XBQPN	Rev	D
Key Component	1.0.COVER	PCB NAME	715G3550-M0A	称爹	<称爹>
Date	Friday, July 03, 2009	Sheet	6 of 7		


From Scalar line-out (negative)
AMP (Positive)
OUT (Negtive)
U602
APA2071JI-TUG 3.1W
U602 IC with Heat-sink(90G6295-3)
VOLUME 0V (18dB) ~ 5V (-80dB)
MUTE MODE 0V
Low: shutdown APA2071
Line out
Line IN
change from 33K to 27K for suit speaker output power05132009
To Scalar line-in
(From audio Jack on power brd)
Low: on
Hi: shutdown +5V_OPA
U603A
LM358DR
U603B
LINEOUT_JACK_L
LINEOUT_JACK_R
TPV (Top Victory Electronics Co., Ltd.)
OEM MODEL E2220HD
TPV MODEL HI9ASBD89XBQPN
G3550-M0H-X-X-2-090702
1.0.COVER
PCB NAME 715G3550-M0H
Date Friday, July 03, 2009
Sheet 7 of 7
Size C
Rev D

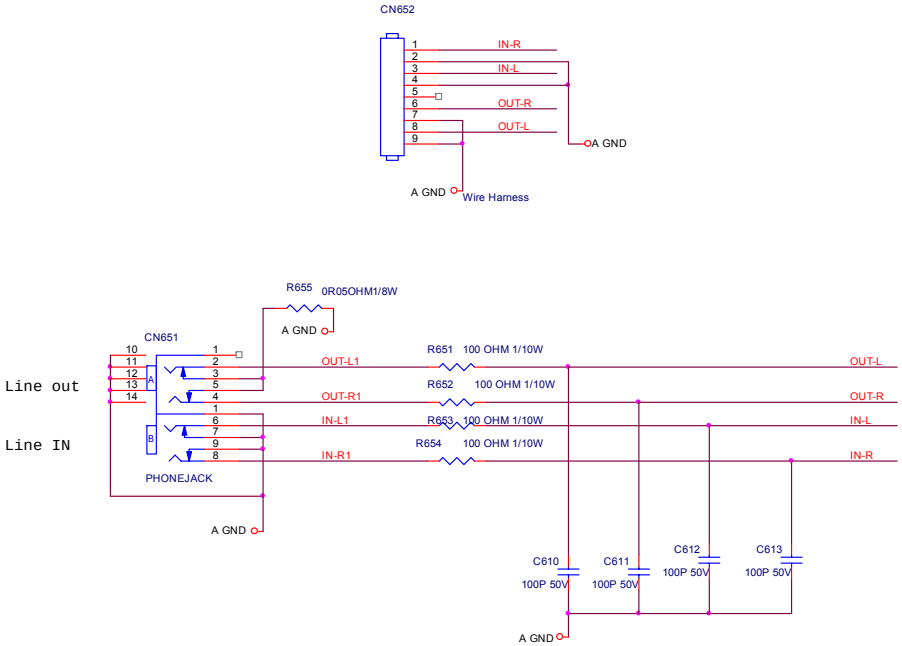
Power Board



T P V （Top Victory Electronics Co., Ltd.）		OEM MODEL	BENQ E2220HD	Size	Custom
結 屬 瓜 銅 腹	G3557-P0D-X-X-1-090703	TPV MODEL	PWPC9B41AAA6	Rev	A
Key Component	03.POWER	PCB NAME	715G3557-P0E-000-0010	称 爹	ODM MODEL
Date	Friday, July 03, 2009	Sheet	3 of 5		

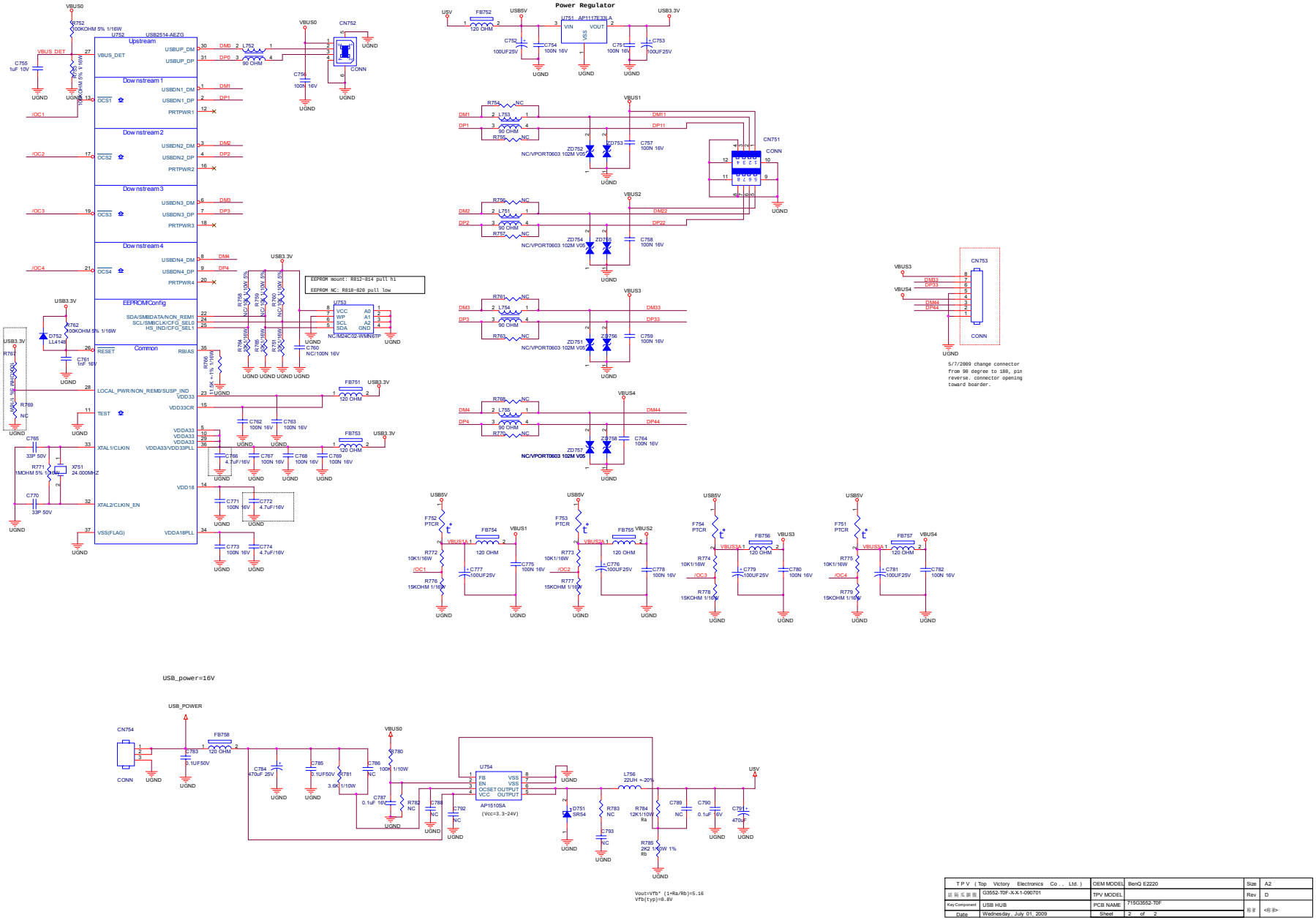


T.P.V (Top Victory Electronics Co., Ltd.)		OEM MODEL	BENQ E2220HD	Size	Custom
結構代號	G3557-P0D-X-X-1-090617	TPV MODEL	PWPC9B41AAA6	Rev	A
Key Component	03.INVERTER	PCB NAME	715G3557-P0D-000-0010	称多	ODM MODEL
Date	Wednesday, June 17, 2009	Sheet	3 of 5		



T P V （Top Victory Electronics Co . , Ltd. ）		OEM MODEL	BENQ E2220HD	Size	Custom
藍 陽 瓜 鋼 股	G3557-P0D-X-X-1-090617	TPV MODEL	PWPC9B41AAA6	Rev	A
Key Component	05.AUDIO	PCB NAME	715G3557-P0D-000-0010	孫爹	ODM MODEL
Date	Wednesday, June 17, 2009	Sheet	5 of 5		

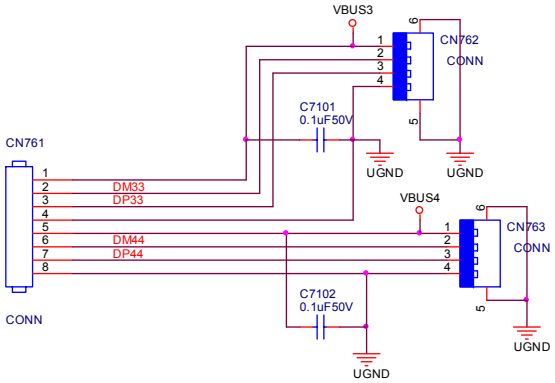
USB Board



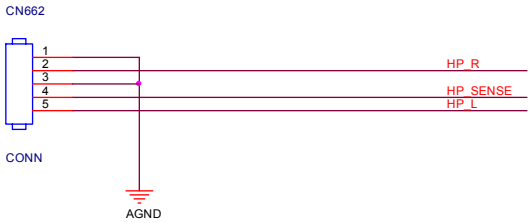
T P V (Top Victory Electronics Co . , Ltd.)	OEM MODEL	BenQ E2220	Size A2
	TPV MODEL		Rev D
Key Component USB HUB	PCB NAME	715G3552-T0F	
Date Wednesday, July 01, 2009	Sheet	2 of 2	

Earphone Board

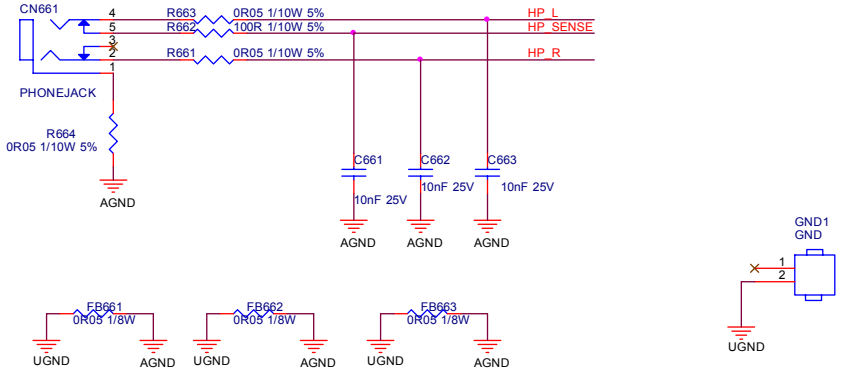
from Bottom USB Board



from MB

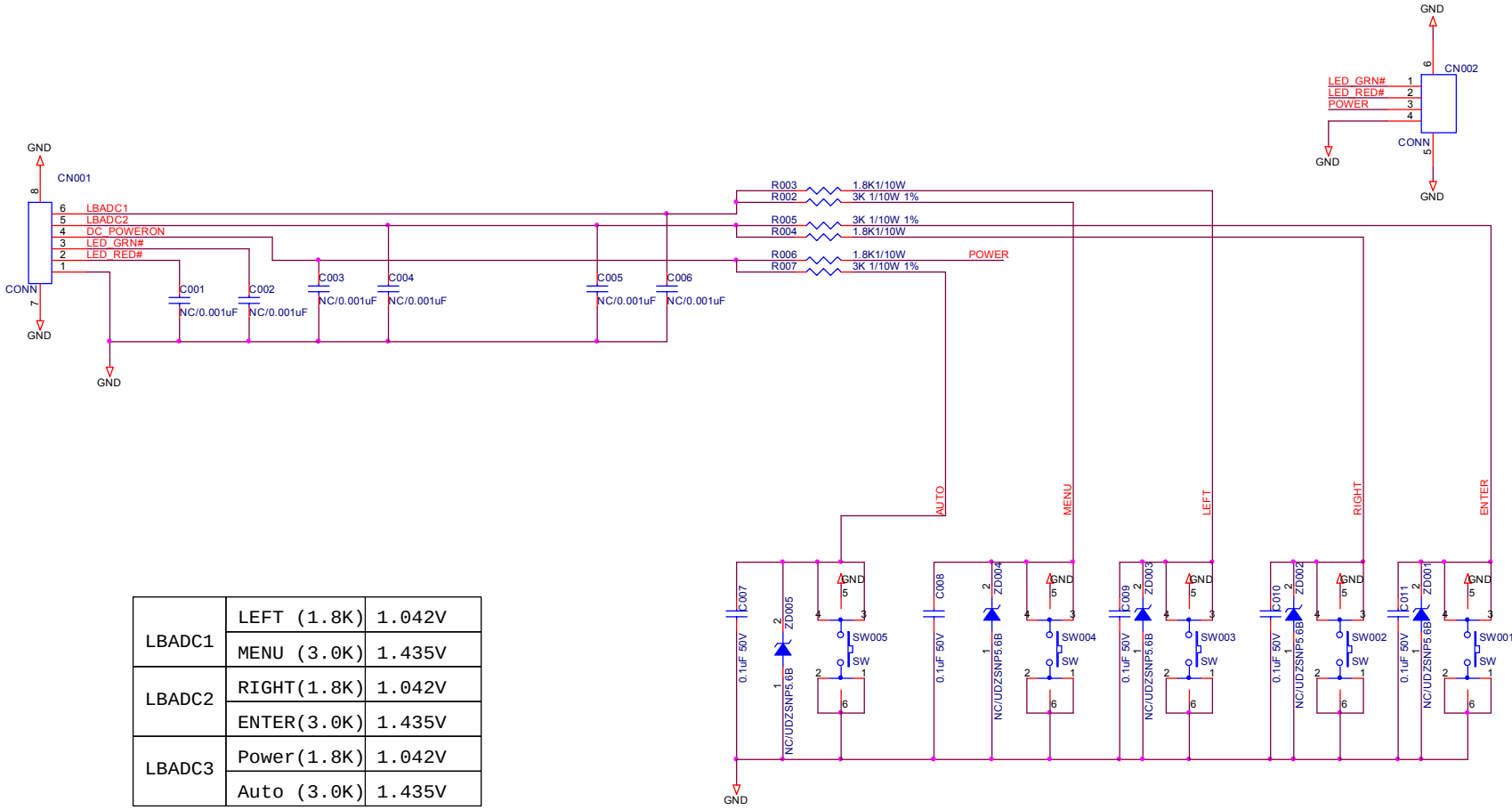


Headphone output

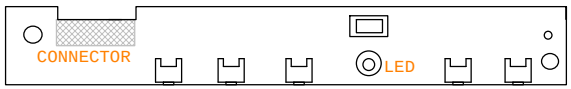


T P V (Top Victory Electronics Co . , Ltd.)		OEM MODEL		Size	B
結 隔 瓜 網 腹	G3575-T0D-X-X-1-090604	TPV MODEL		Rev	B
Key Component	3.0. HEADPHONE JACK	PCB NAME	715G3575-T0D	称多	<称多>
Date	Friday , June 12, 2009	Sheet	2 of 2		

Key Board

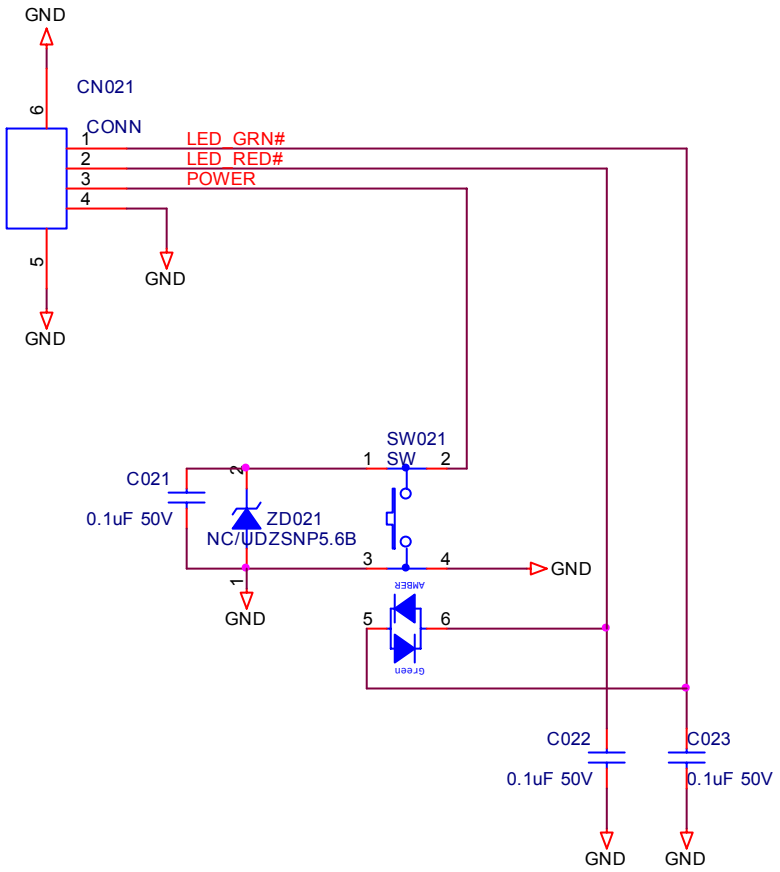


LBADC1	LEFT (1.8K)	1.042V
	MENU (3.0K)	1.435V
LBADC2	RIGHT(1.8K)	1.042V
	ENTER(3.0K)	1.435V
LBADC3	Power(1.8K)	1.042V
	Auto (3.0K)	1.435V



(AUTO)(MENU) (LEFT) (Power) (RIGHT)(ENTER)

T P V （Top Victory Electronics Co . , Ltd. ）		OEM MODEL		Size	B
結 隔 瓜 銅 腹	G3558-KOC-X-X-1-090612	TPV MODEL		Rev	B
Key Component	02.KEY BOARD	PCB NAME	715G3558-KOC	移 爹	
Date	Friday , June 12, 2009	Sheet	2 of 2		



T P V （Top Victory Electronics Co . , Ltd. ）		OEM MODEL		Size	A
絽 隔 瓜 綑 腹	G3559-C-X-X-1-090612	TPV MODEL		Rev	B
Key Component	02.KEY BOARD	PCB NAME	715G3559-C	称爹	
Date	Friday , June 12, 2009	Sheet	2 of 2		

Troubleshooting Guide

Equipments and Tools Requirement

1. Voltmeter.
2. Oscilloscope.
3. Pattern Generator.
4. DDC Tool with and Compatible Computer.
5. Alignment Tool.
6. LCD Color Analyzer.
7. Service Manual.
8. User Manual.

Frequently asked questions (FAQ)

The image is blurred:

☞Read the instructions on the link "**Adjusting the Screen Resolution**" on the CD, and then select the correct resolution, refresh rate and make adjustments based on these instructions.

How do you use a VGA extension cable?

☞Remove the extension cable for the test. Is the image now in focus? If not, optimize the image by working through the instructions in the "**Adjusting the refresh rate**" section on the link "**Adjusting the Screen Resolution**". It is normal for blurring to occur due to conduction losses in extension cables. You can minimize these losses by using an extension cable with better conduction quality or with a built-in booster.

Does the blurring only occur at resolutions lower than the native (maximum) resolution?

☞Read the instructions on the link "**Adjusting the Screen Resolution**" on the CD. Select the native resolution.

Pixel errors can be seen:

☞One of several pixels is permanently black, one or more pixels are permanently white, one or more pixels are permanently red, green, blue or another color.

- Clean the LCD screen.
- Cycle power on-off.
- These pixels are permanently on or off and that is a natural defect occurs in LCD technology.

The image has a faulty coloration:

☞It has a yellow, blue or pink appearance.

Select MENU > PICTURE > Color > Reset Color, and then choose “YES” in the “Caution” message box to reset the color settings to the factory defaults.

If the image is still not correct and the OSD also has faulty coloration, this means one of the three primary colors is missing in the signal input. Now check the signal cable connectors. If any pin is bent or broken off, please contact your dealer to get necessary support.

No image can be seen:

☞Is the prompt on the display illuminated in green?

If the LED is illuminated in green and there is a message “Out of Range” on the screen, this means you are using a display mode that this monitor does not support, please change the setting to one of the supported mode. Please read the “**Preset display modes**” section from the link "**Adjusting the Screen Resolution**".

Faint shadow from the static image displayed is visible on the screen:

- Activate the power management function to let your computer and monitor go into a low power "sleep" mode when not actively in use.
- Use a screensaver to prevent the occurrence of image retention.

Is the prompt on the display illuminated in orange?

If the LED is illuminated in orange, the power management mode is active. Press any button on the computer keyboard or move the mouse. If that does not help, check the signal cable connectors. If any pin is bent or broken off, please contact your dealer to get necessary support.

Is the prompt on the display not illuminated at all?

Check the power supply mains socket, the external power supply and the mains switch.

The image is distorted, flashes or flickers:

Read the instructions on the link "**Adjusting the Screen Resolution**" on the CD, and then select the correct resolution, refresh rate and make adjustments based on these instructions.

You are running the monitor at its native resolution, but the image is still distorted.

Images from different input sources may appear distorted or stretched on the monitor running at its native resolution. To have the optimal display performance of each type of input sources, you can use the "Display Mode" function to set a proper aspect ratio for the input sources.

The image is displaced in one direction:

Read the instructions on the link "**Adjusting the Screen Resolution**" on the CD, and then select the correct resolution, refresh rate and make adjustments based on these instructions.

The OSD controls are inaccessible:

- To unlock the OSD controls when the OSD is preset to be locked, press and hold the “MENU” key for 15 seconds to enter the “OSD Lock” option and make changes.
- Alternatively, you may use the ▲ or ▼ keys to select “NO” in the “OSD Lock” submenu from the “OSD Settings” menu (under SYSTEM), and all OSD controls will be accessible.

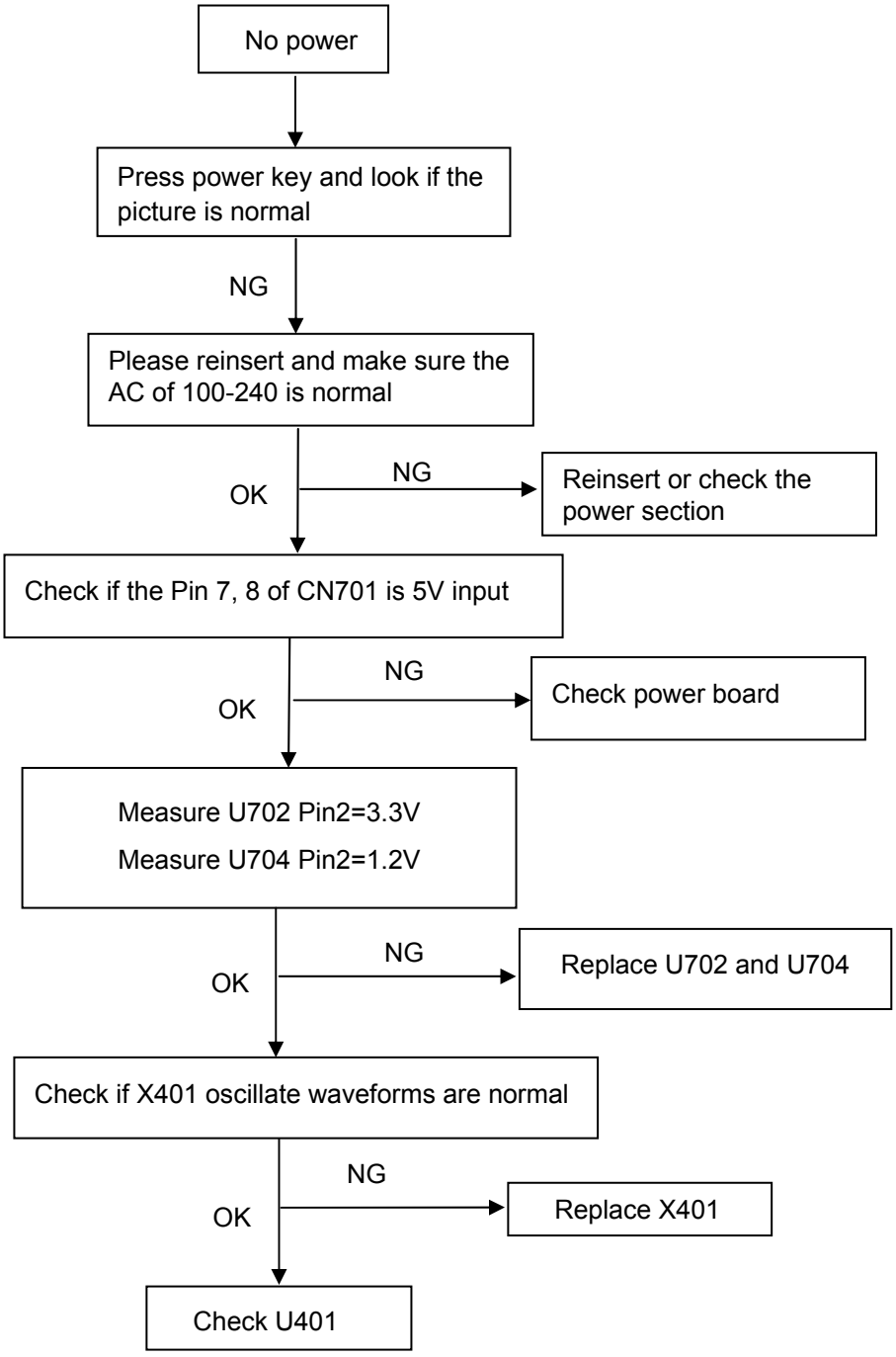
USB devices are not working:

- Check whether upstream and downstream USB are properly connected.
- Install a corresponding USB device driver if available.

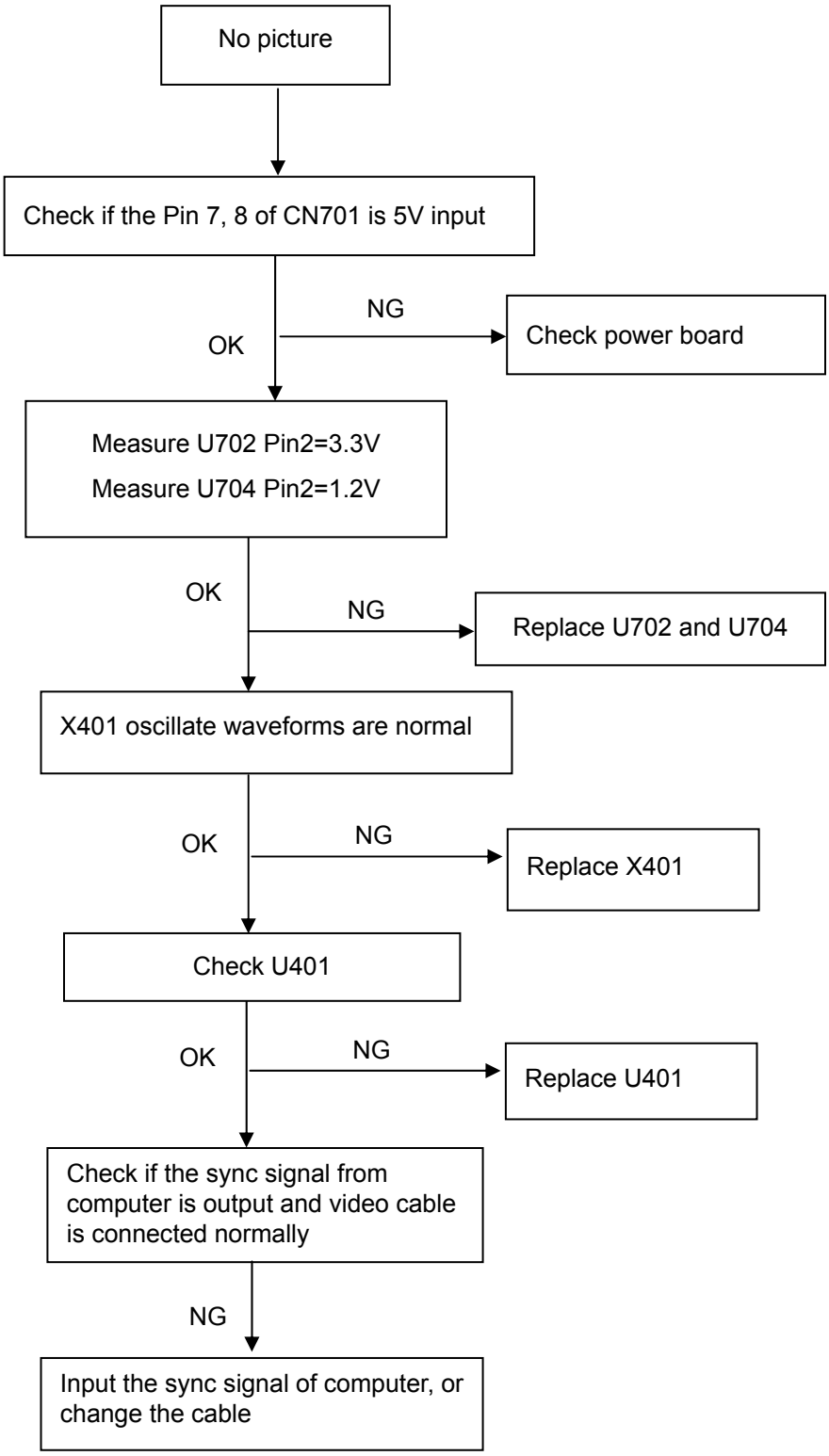
If your problems remain after checking this manual, please contact your place of purchase or e-mail us at: Support@BenQ.com

Main Board

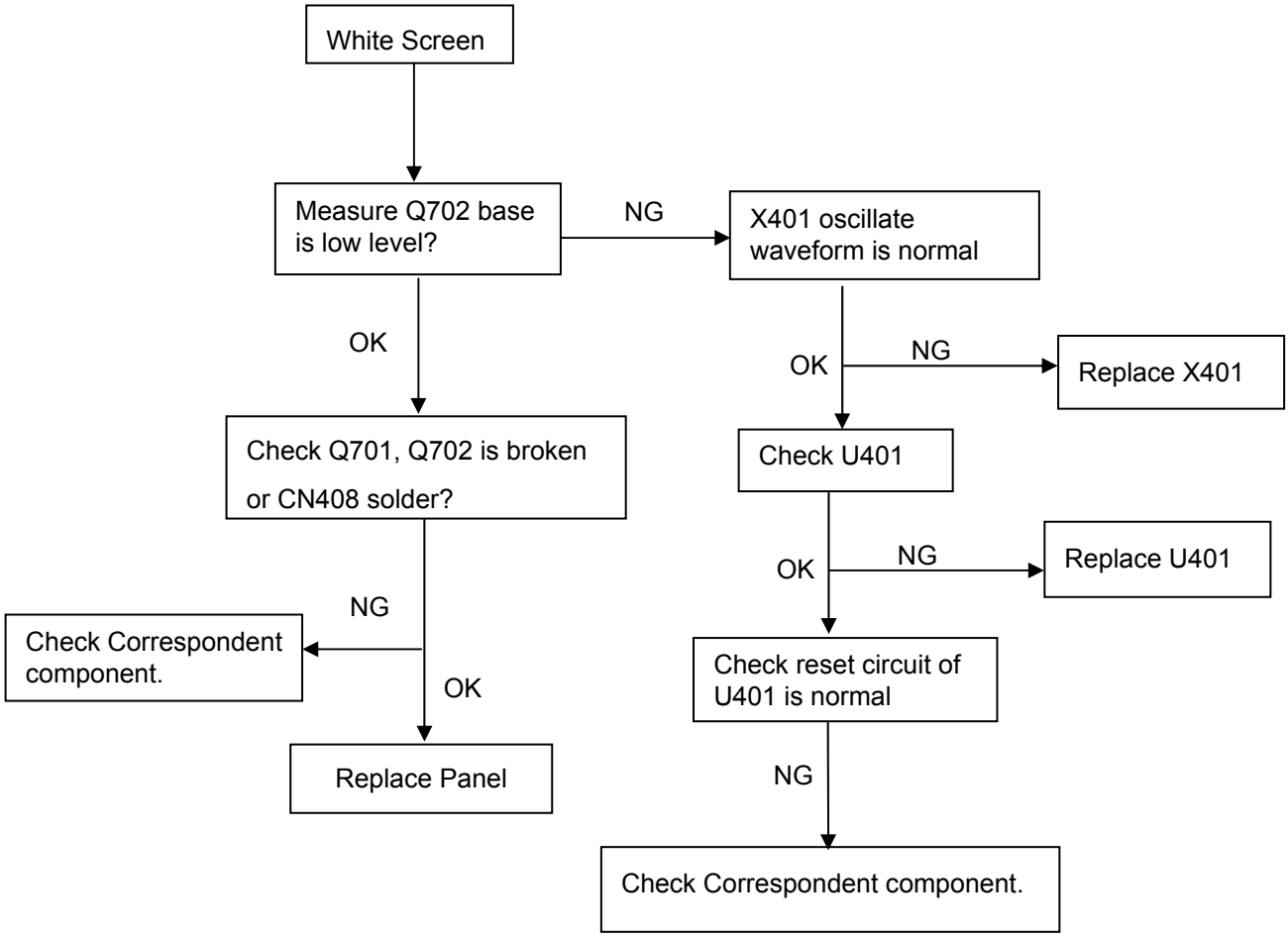
(1) No Power



(2) No picture

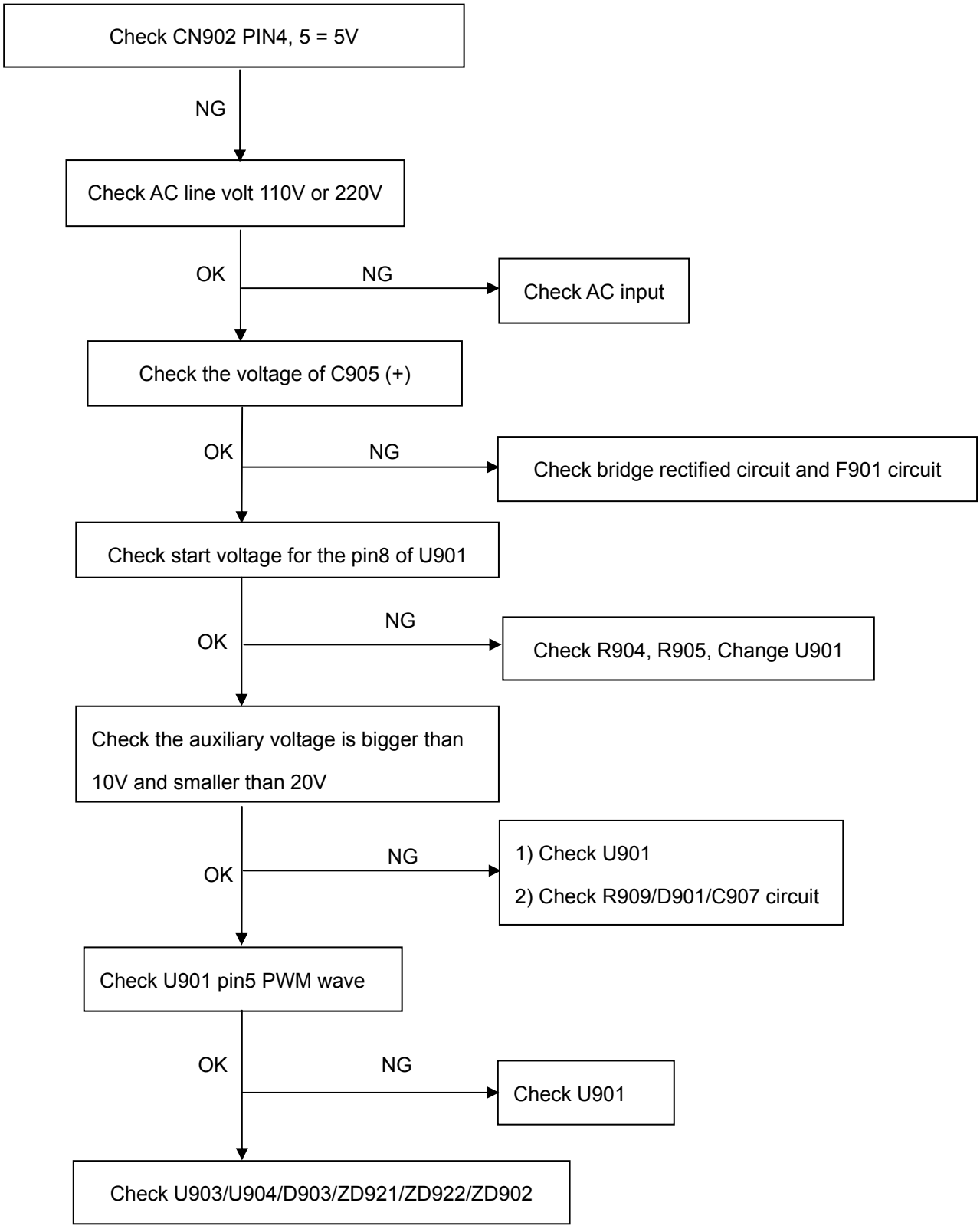

No picture
Check if the Pin 7, 8 of CN701 is 5V input
NG
OK
Check power board
Measure U702 Pin2=3.3V
Measure U704 Pin2=1.2V
OK
NG
Replace U702 and U704
X401 oscillate waveforms are normal
OK
NG
Replace X401
Check U401
OK
NG
Replace U401
Check if the sync signal from computer is output and video cable is connected normally
NG
Input the sync signal of computer, or change the cable

(3) White screen

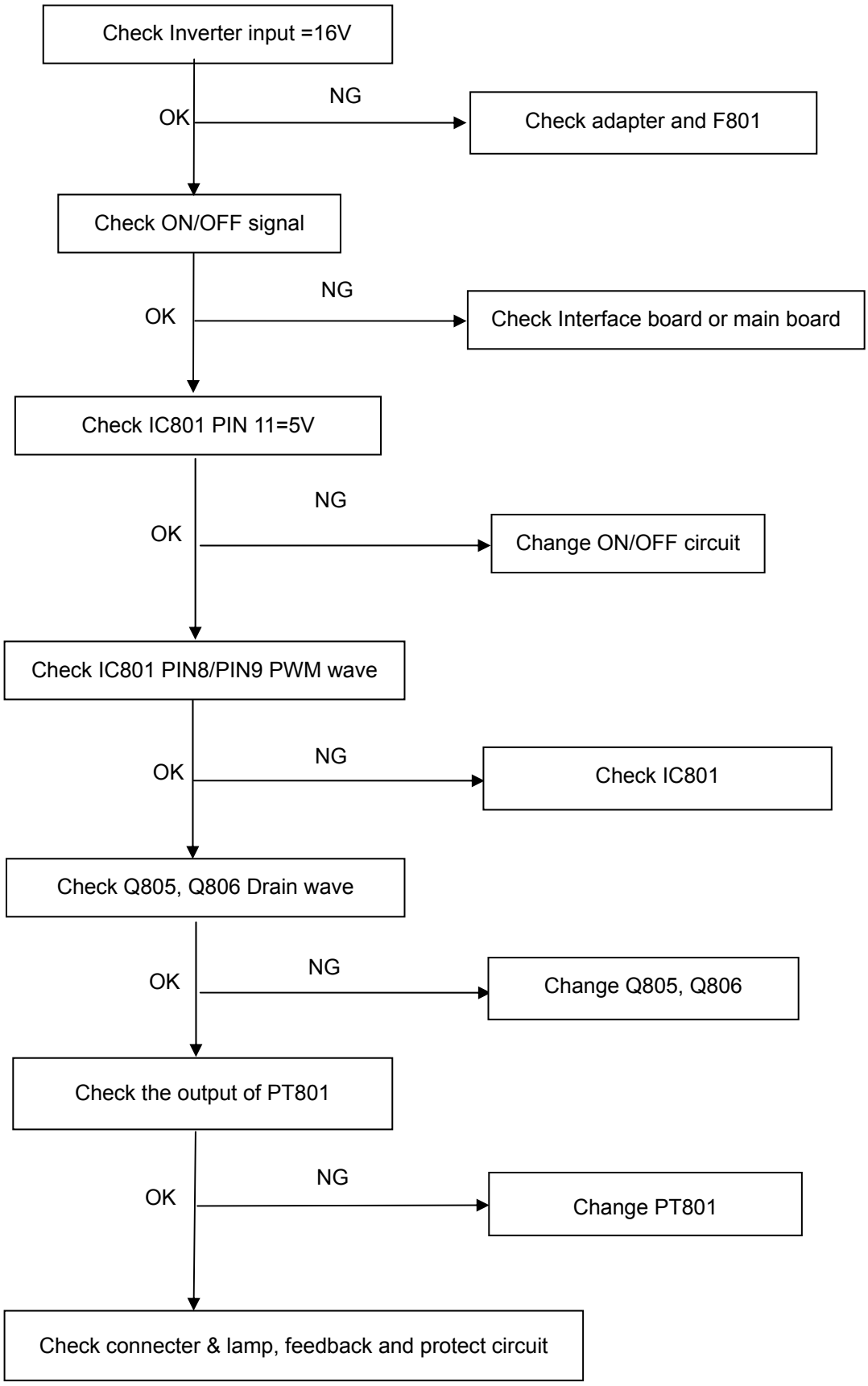


Power Board

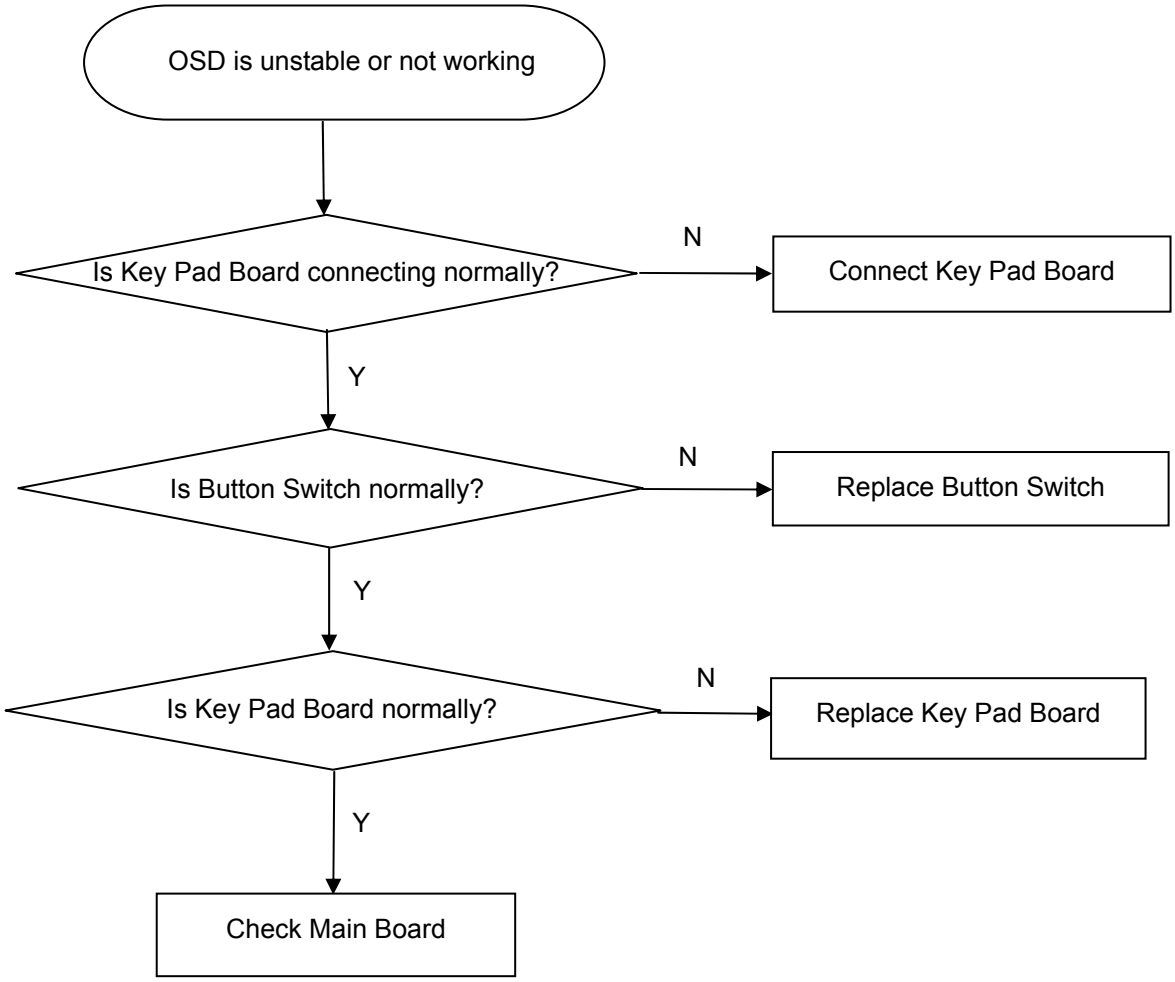
(1). No power



(2). W / LED, No Backlight

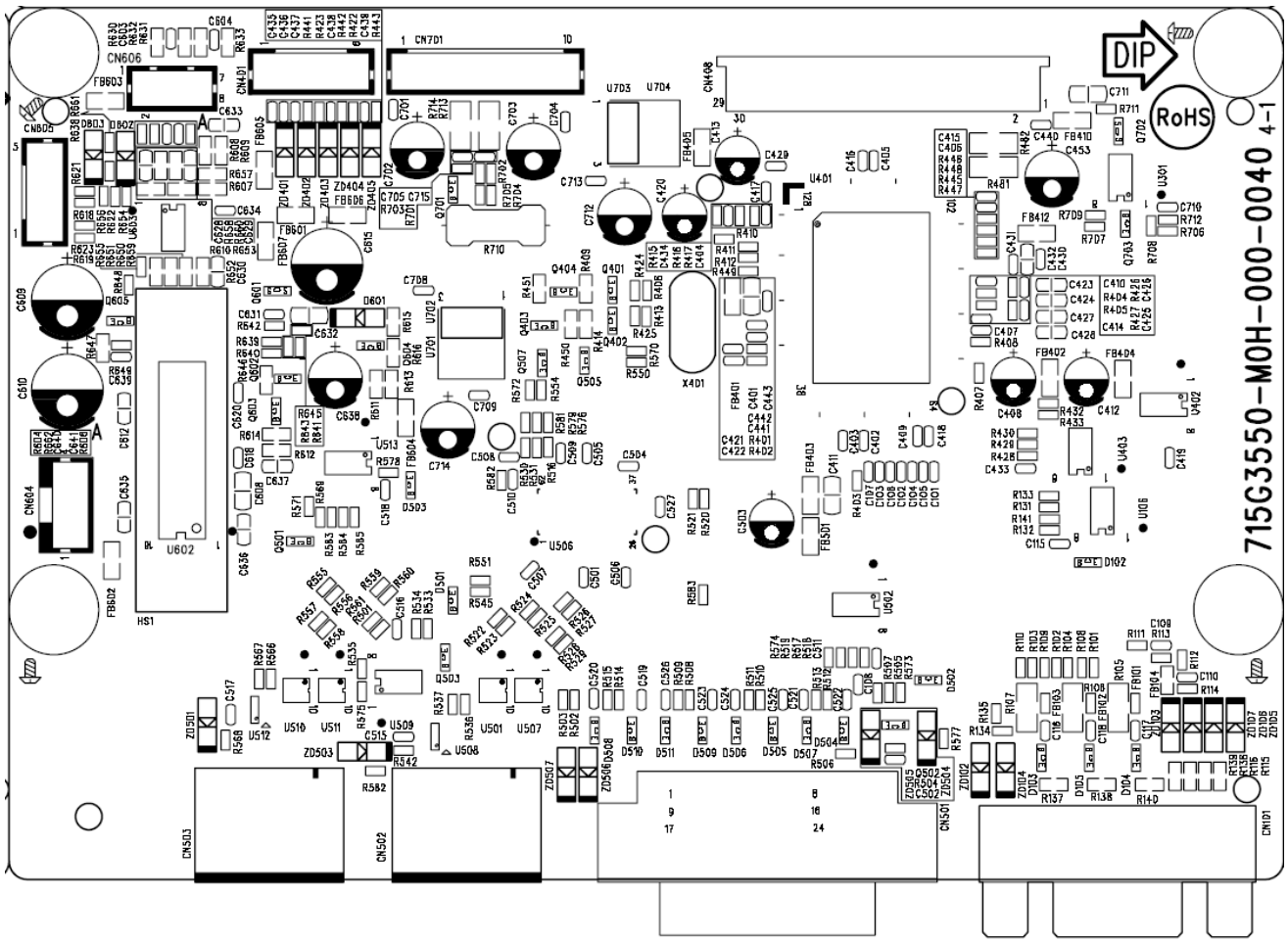


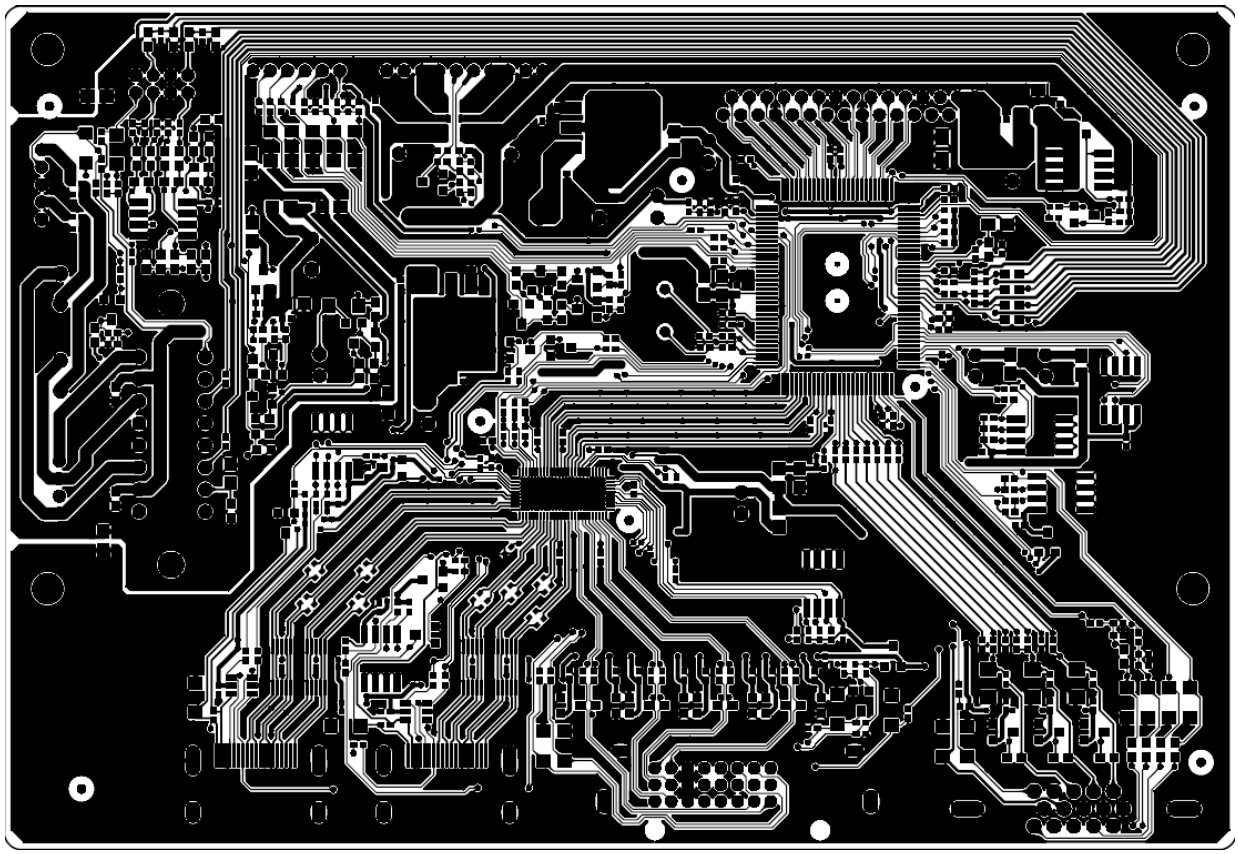
Key Board

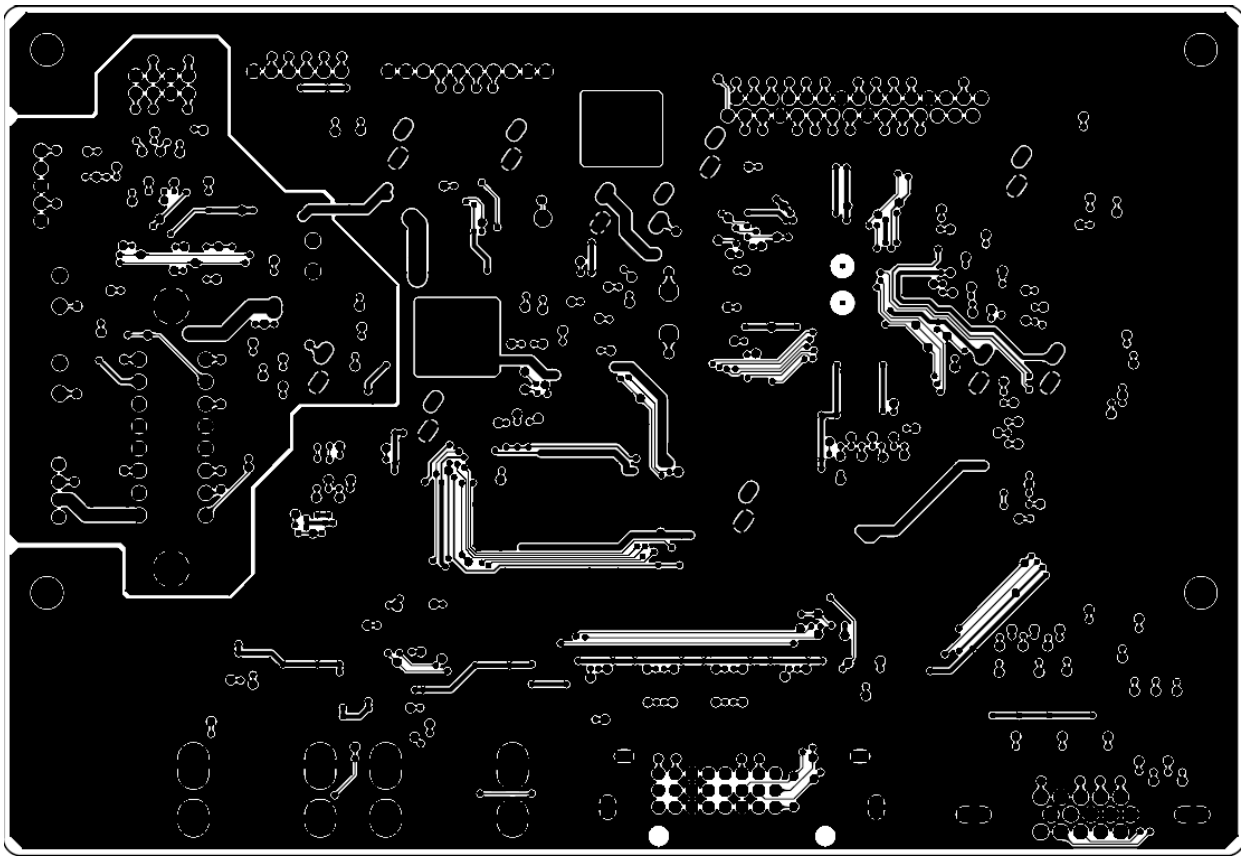

OSD is unstable or not working
Is Key Pad Board connecting normally?
N
Connect Key Pad Board
Y
Is Button Switch normally?
N
Replace Button Switch
Y
Is Key Pad Board normally?
N
Replace Key Pad Board
Y
Check Main Board

PCB LAYOUT

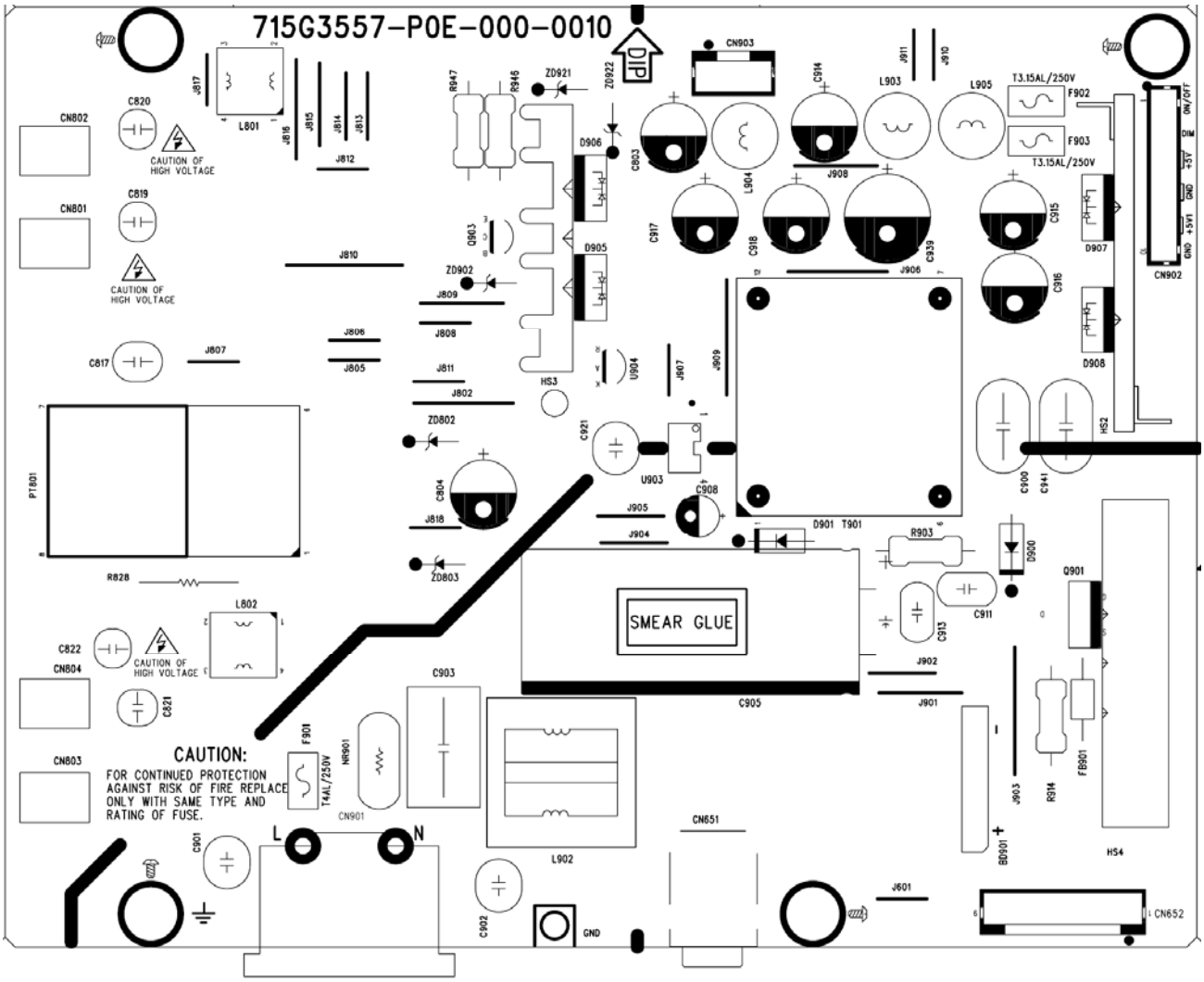
Main Board

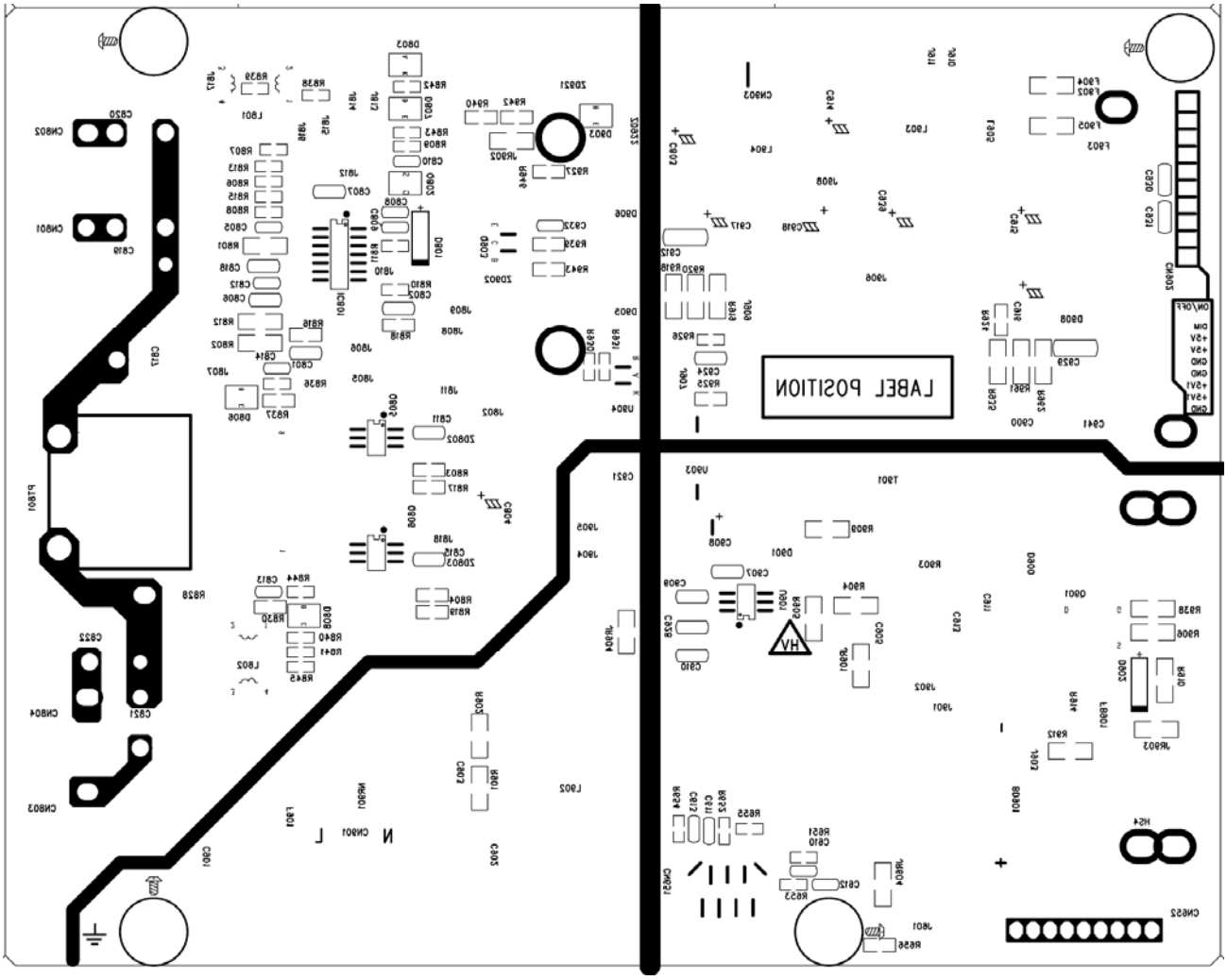


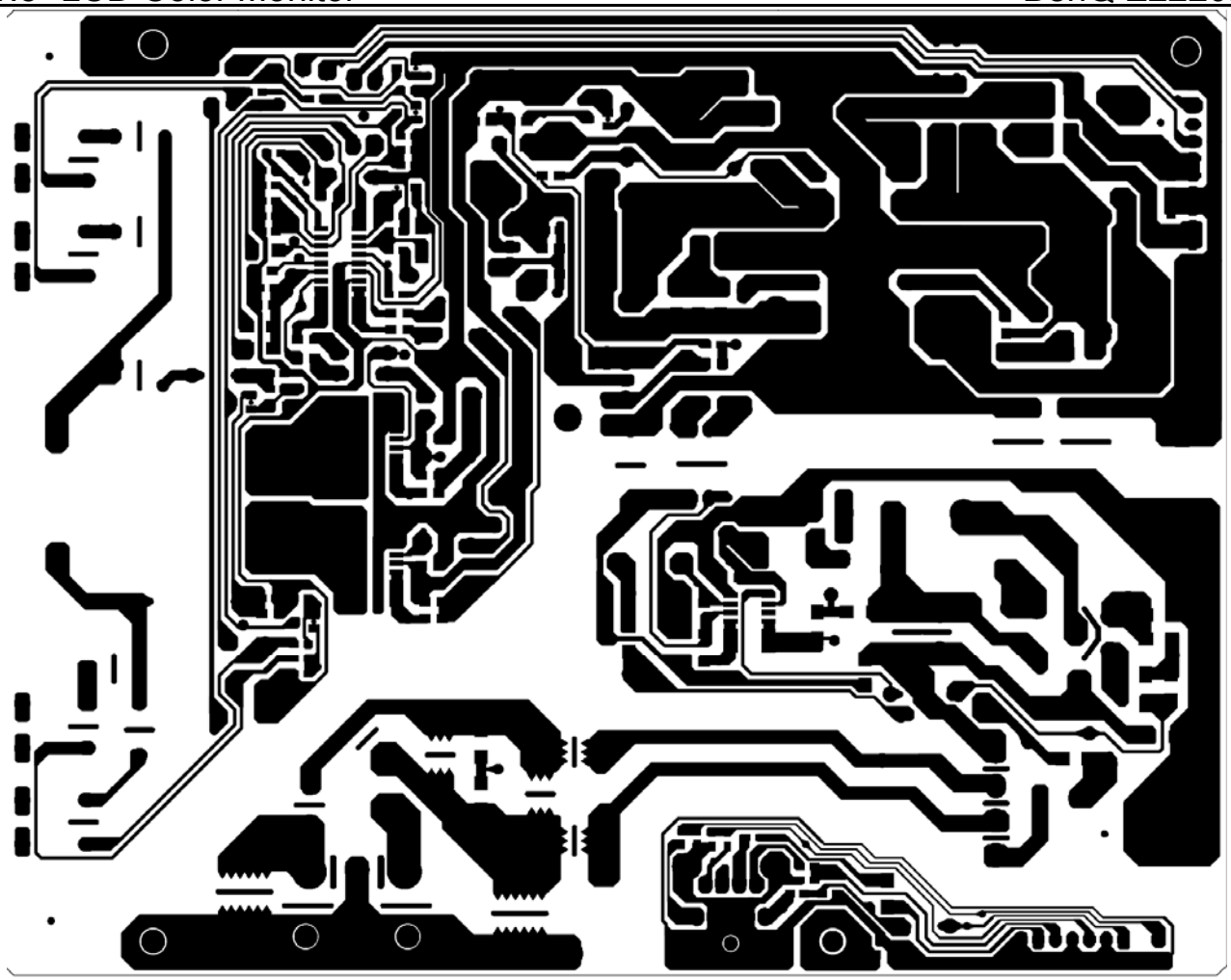




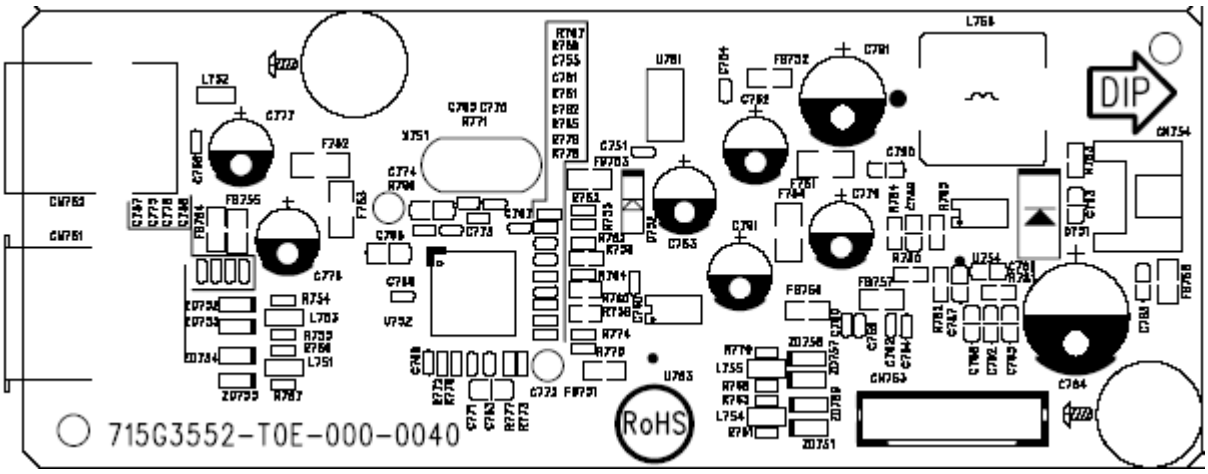
Power Board

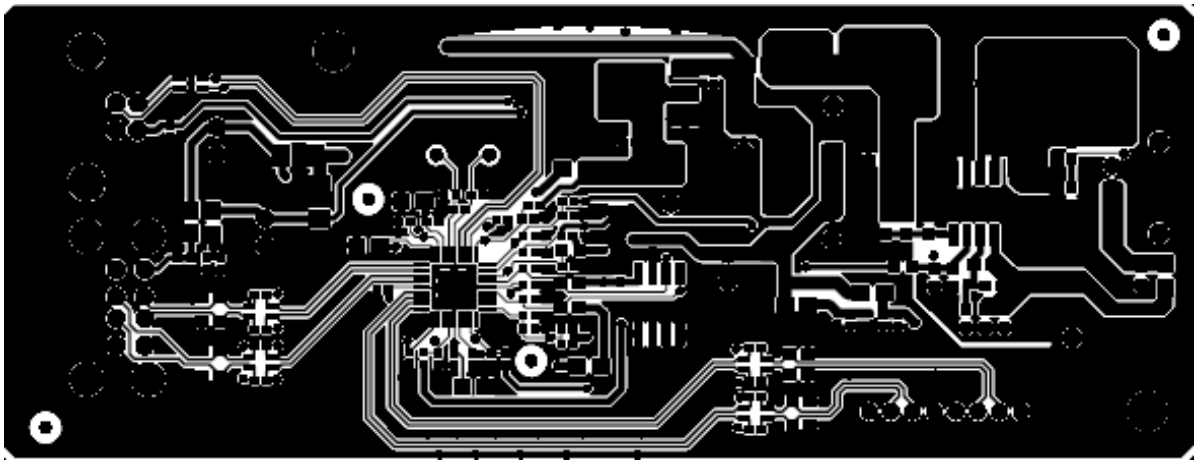

715G3557-P0E-000-0010
CAUTION:
FOR CONTINUED PROTECTION AGAINST RISK OF FIRE REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.
SMEAR GLUE
CAUTION OF HIGH VOLTAGE
L
N
GND

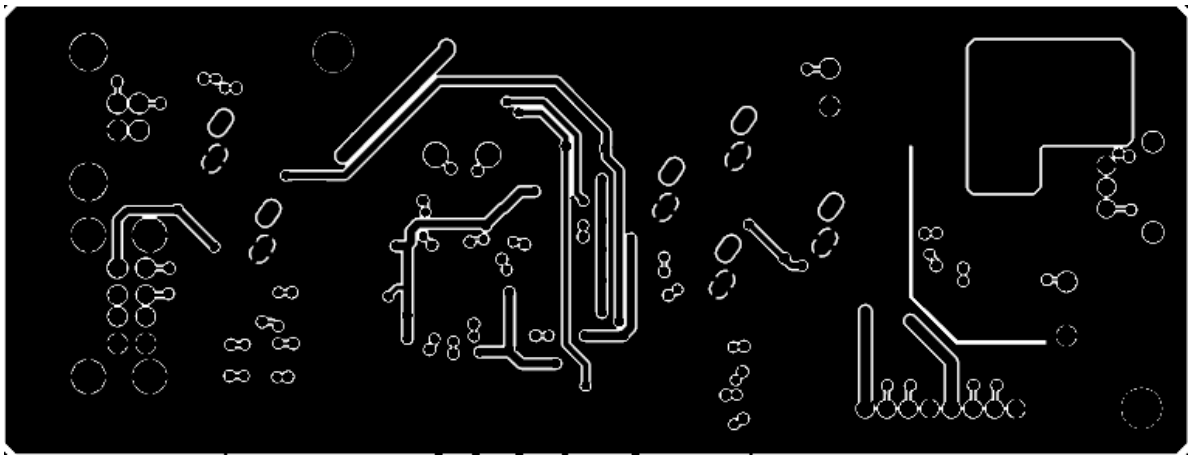

LABEL POSITION



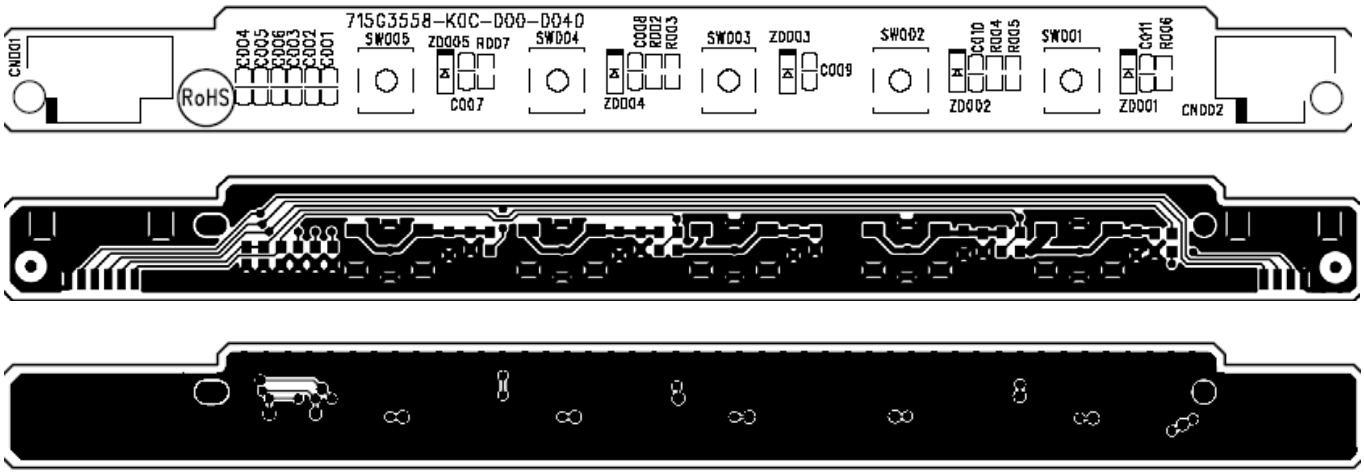
USB Board







Key Board


715G3558-K0C-D00-D04D
CND01
RoHS
SW005
SW004
SW003
SW002
SW001
ZD005
ZD004
ZD003
ZD002
ZD001
CND02

Appendix 1 – Screw List / Torque

(HI9ASBMK9XBQPN)

Part No.	Type	Description	Quantity	Torque
0G1G1030 6120	Q3 * 6	FOR POWER BOARD & MAINFRAME	4	6±1kgf.cm
0M1G 930 6120	Q3 * 6	FOR MAIN BOARD PCB TO MAINFRAME	2	6±1kgf.cm
0M1G1030 6120	Q3 * 6	FOR MAIN BOARD & MAINFRAME	2	6±1kgf.cm
0G1G1030 6120	Q3 * 6	FOR USB BOARD & MAINFRAME	1	6±1kgf.cm
0M1G1030 6120	M3 * 6	FOR USB BOARD & MAINFRAME	1	6±1kgf.cm
0Q1G1030 8120	Q3 * 8	FOR PWB BTN PCB TO MIDDLE FRAME	1	6±1kgf.cm
0Q1G1030 8120	Q3 * 8	FOR EARPHONE PCB TO REAR COVER	1	6±1kgf.cm
0M1G1740 10120	Q4 * 10	FOR HINGE TO REAR COVER	3	12±2kgf. Cm
0Q1G 140 10120	Q4 * 10	FOR HINGE TO STAND FRONT	4	~
AM1G1730 8120	Q3 * 8	FOR HEAT SINK	1	~
0M1G 930 8120	Q3 * 8	FOR HEAT SINK	2	~
0M1G 930 8120	Q3 * 8	FOR HEAT SINK	2	~