

Service
Service
Service

237E4QSD/93

237E4QSD/01

237E4QSD/00

237E4QSD/96



Service Manual

Description	Page	Description	Page
Table of Contents.....	1	6.2 Key Board.....	22
Revision List.....	2	7. PCB Layout.....	23
Important Safety Notice.....	3	7.1 Scaler Board.....	23
1. Monitor Specifications.....	5	7.2 Key Board.....	23
2. LCD Monitor Description.....	8	8. Wiring Diagram.....	24
3. Operation Instructions.....	9	9. Scaler Board Overview.....	25
3.1 General Instructions.....	9	10. Mechanical Instructions.....	26
3.2 Control Buttons.....	9	11. Repair Flow Chart.....	28
3.3 OSD Menu.....	10	12. ISP Instructions.....	32
4. Input/output Specification.....	11	13. DDC Instructions.....	39
4.1 Input Signal Connector.....	11	14. White Balance, Luminance Adjustment.....	49
5. Block Diagram.....	15	15. Monitor Exploded View.....	52
5.1 Scaler Board.....	15	16. Recommended & Spare Parts List.....	53
6. Schematic Diagram.....	16	17. Different Parts List.....	55
6.1 Scaler Board.....	16	18. General Product Specification.....	56

SAFETY NOTICE

ANY PERSON ATTEMPTING TO SERVICE THIS CHASSIS MUST FAMILIARIZE HIMSELF WITH THE CHASSIS AND BE AWARE OF THE NECESSARY SAFETY PRECAUTIONS TO BE USED WHEN SERVICING ELECTRONIC EQUIPMENT CONTAINING HIGH VOLTAGES.

CAUTION: USE A SEPARATE ISOLATION TRANSFORMER FOR THIS UNIT WHEN SERVICING

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

Copyright 2012 Philips Consumer Lifestyle Subject to modification ® Jun.27, 2012

Revision List

[illegible]

Important Safety Notice

This electronic user guide is intended for anyone who uses the Philips monitor. Take time to read this user manual before you use your monitor. It contains important information and notes regarding operating your monitor. The Philips guarantee applies provided the product is handled properly for its intended use, in accordance with its operating instructions and upon presentation of the original invoice or cash receipt, indicating the date of purchase, dealers name and model and production number of the product.

Warnings

Use of controls, adjustments or procedures other than those specified in this documentation may result in exposure to shock, electrical hazards and/or mechanical hazards. Read and follow these instructions when connecting and using your computer monitor.

Operation

- Keep the monitor out of direct sunlight and away from stoves or any other heat source.
- Remove any object that could fall into ventilation holes or prevent proper cooling of the monitor's electronics.
- Do not block the ventilation holes on the cabinet.
- When positioning the monitor, make sure the power plug and outlet are easily accessible.
- If turning off the monitor by detaching the power cable or DC power cord, wait for 6 seconds before attaching the power cable or DC power cord for normal operation.
- Please use approved power cord provided by Philips all the time. If your power cord is missing, please contact with your local service center. (Please refer to Customer Care Consumer Information Center)
- Do not subject the monitor to severe vibration or high impact conditions during operation.
- Do not knock or drop the monitor during operation or transportation.

Maintenance

- To protect your monitor from possible damage, do not put excessive pressure on the LCD panel. When moving your monitor, grasp the frame to lift; do not lift the monitor by placing your hand or fingers on the LCD panel.
- Unplug the monitor if you are not going to use it for an extensive period of time.
- Unplug the monitor if you need to clean it with a slightly damp cloth. The screen may be wiped with a dry cloth when the power is off. However, never use organic solvent, such as, alcohol, or ammonia-based liquids to clean your monitor.
- To avoid the risk of shock or permanent damage to the set, do not expose the monitor to dust, rain, water, or excessive moisture environment.
- If your monitor gets wet, wipe it with dry cloth as soon as possible.
- If foreign substance or water gets in your monitor, please turn the power off immediately and disconnect the power cord. Then, remove the foreign substance or water, and send it to the maintenance center.
- Do not store or use the monitor in locations exposed to heat, direct sunlight or extreme cold.
- In order to maintain the best performance of your monitor and use it for a longer lifetime, please use the monitor in a location that falls within the following temperature and humidity ranges.
 - Temperature: 0-40°C 32-95°F
 - Humidity: 20-80% RH

- **IMPORTANT:** Always activate a moving screen saver program when you leave your monitor unattended. Always activate a periodic screen refresh application if your monitor will display unchanging static content. Uninterrupted display of still or static images over an extended period may cause “burn in”, also known as “after-imaging” or “ghost imaging”, on your screen. “Burn-in”, “after-imaging”, or “ghost imaging” is a well-known phenomenon in LCD panel technology. In most cases, the “burned in” or “after-imaging” or “ghost imaging” will disappear gradually over a period of time after the power has been switched off.

Warning

Severe “burn-in” or “after-image” or “ghost image” symptoms will not disappear and cannot be repaired. The damage mentioned above is not covered under your warranty.

Service

- The casing cover should be opened only by qualified service personnel.
- If there is any need for any document for repair or integration, please contact with your local service center. (Please refer to the chapter of “Consumer Information Center”)
- For transportation information, please refer to “Technical Specifications”.
- Do not leave your monitor in a car/trunk under direct sun light.

Note

Consult a service technician if the monitor does not operate normally, or you are not sure what procedure to take when the operating instructions given in this manual have been followed.

1. Monitor Specifications

Picture/Display	
Monitor Panel Type	IPS LCD
Backlight	LED
Panel Size	23" W (58.42cm)
Aspect Ratio	16:9
Pixel Pitch	0.265 x 0.265 mm
Brightness	250 cd/m ²
SmartContrast	20,000,000:1
Contrast Ratio (typ.)	1000:1
Response Time (typ.)	14ms
SmartResponse (available for selected models)	7ms
Optimum Resolution	1920x1080@60Hz
Viewing Angle	178° (H) / 178° (V) @ C/R > 10
Picture Enhancement	SmartImage Lite
Display Colors	16.7M
Vertical Refresh Rate	56Hz - 76Hz
Horizontal Frequency	30kHz - 83kHz
MHL	1080P@30Hz
sRGB	YES
Connectivity	
Signal Input	237E4QSD:VGA(Analog), DVI(Digital,HDCP) 237E4QHAD, 237E4QHSD:VGA(Analog), HDMI(Digital,HDCP), MHL-HDMI (Digital, HDCP)
Audio In/Out	237E4QHAD : PC audio-in, Earphone out 237E4QHSD : HDMI audio out
Input Signal	Separate Sync, Sync on Green

Picture/Display	
Optimum Resolution	1920x1080@60Hz
Viewing Angle	170° (H) / 160° (V) @ C/R > 10
Picture Enhancement	SmartImage Lite
Display Colors	16.7M
Vertical Refresh Rate	56Hz - 76Hz
Horizontal Frequency	30kHz - 83kHz
sRGB	YES
Connectivity	
Signal Input	237E4LSB:VGA(Analog), DVI(Digital,HDCP) 237E4LHAB, 237E4LHSB:VGA(Analog), HDMIx2(Digital,HDCP)
Audio In/Out	237E4LHSB : HDMI audio out 237E4LHAB : PC audio-in, Earphone out
Input Signal	Separate Sync, Sync on Green

Convenience	
User Convenience	237E4QSD, 237E4LSB, 237E4QHSD, 237E4LHSB:  237E4QHAD, 237E4LHAB: 
OSD Languages	English, French, German, Spanish, Italian, Russian, Simplified Chinese, Portuguese, Turkish
Other Convenience	Kensington Lock
Plug & Play Compatibility	DDC/CI, sRGB, Windows 7/Vista/XP, Mac OSX, Linux
Stand	
Tilt	-5° / +20°

Power	
On Mode	33.3W(typ.)
Sleep (typ.)	0.5W
Off (typ.)	0.3W
Power LED indicator	On mode: White, Standby/Sleep mode: White (blinking)
Power Supply	External, 100-240VAC, 50-60Hz

Dimension	
Product with stand (WxHxD)	547 x 420 x 193 mm
Product without stand (WxHxD)	597 x 335 x 37 mm
Weight	
Product with stand	2.89 kg
Product without stand	2.62 kg
Product with packaging	4.66 kg

Operating Condition	
Temperature range (operation)	0°C to 40 °C
Temperature range (Non-operation)	-20°C to 60°C
Relative humidity	20% to 80%
MTBF	30,000hrs

Environmental	
ROHS	YES
EPEAT	Silver (www.epeat.net)
Packaging	100% recyclable
Specific Substances	100% PVC BFR free housing
Energy Star	YES

Compliance and standards	
Regulatory Approvals	CE Mark, FCC Class B, GOAST, SEMKO, TCO Certified, UL/cUL, BSMI, ISO9241-307

Cabinet	
Color	237E4L: Black/237E4Q: Black Cherry, or other color options as applicable in your region
Finish	Glossy

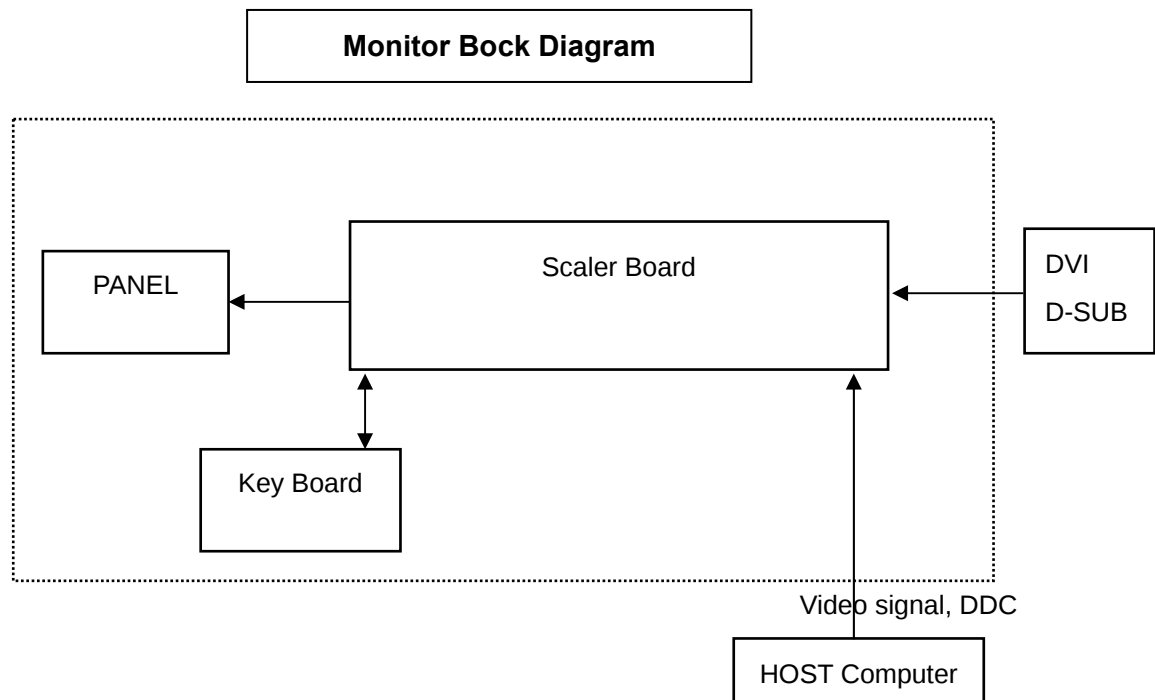
**Note:**

1. EPEAT Gold or Silver is valid only where Philips registers the product. Please visit www.epeat.net for registration status in your country.
2. This data is subject to change without notice. Go to www.philips.com/support to download the latest version of leaflet.

2. LCD Monitor Description

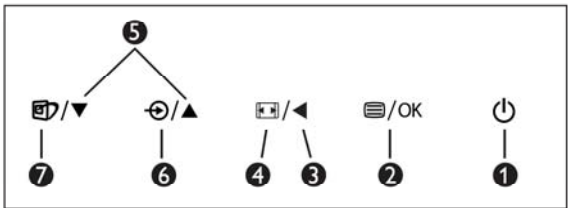
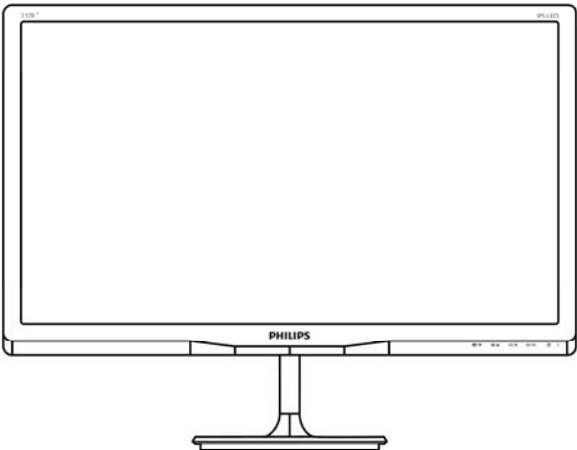
The LCD monitor will contain a scaler board, a power board, a LED board and a key board. The scaler board houses the flat panel control logic, brightness control logic and DDC.

The power board will provide AC to DC inverter voltage to drive the backlight of panel and the scaler board chips each voltage.



3. Operating Instructions

Model 237E4QSD, 237E4LSB, 237E4QHSD, 237E4LHSB:



1		Switch monitor's power ON and OFF.
2	/OK	Access the OSD menu.
3		Return to previous OSD level.
4		Change display format.
5		Adjust the OSD menu.
6		Change the signal input source.
7		SmartImage Lite. There are three modes to be selected: <i>Standard</i> , <i>Internet</i> and <i>Game</i> .

2 Description of the On Screen Display

What is On-Screen Display (OSD)?

On-Screen Display (OSD) is a feature in all Philips LCD monitors. It allows an end user to adjust screen performance or select functions of the monitors directly through an on-screen instruction window. A user friendly on screen display interface is shown as below:

Basic and simple instruction on the control keys

In the OSD shown above, you can press ▼ ▲ buttons at the front bezel of the monitor to move the cursor, and press OK button to confirm the choice or change.

The OSD Menu

Below is an overall view of the structure of the On-Screen Display. You can use this as a reference when you want to work your way around the different adjustments later on.

Model 237E4QSD, 237E4LSB:



Main menu	Sub menu
Input	- VGA - DVI (available for selective models) - HDMI, HDMI2 (available for selective models) - MHL-HDMI (available for selective models)
Picture	- Picture Format — Wide Screen, 4:3 - Brightness — 0~100 - Contrast — 0~100 - SmartResponse (available for selective models) — Off, Fast, Faster, Fastest - SmartContrast — On, Off - Pixel Orbiting (available for selective models) — On, Off - Over Scan (available for selective models) — On, Off - Volume (available for selective models) — 0~100 - Stand-Alone — On, Off - Mute — On, Off - Color Temperature — 6500K, 9300K - sRGB - User Define - Red: 0~100 - Green: 0~100 - Blue: 0~100
Audio	
Color	
Language	English, Español, Français, Deutsch, Italiano, Português, Русский, 简体中文, Türkçe
OSD Settings	- Horizontal — 0~100 - Vertical — 0~100 - Transparency — Off, 1, 2, 3, 4 - OSD Time Out — 5s, 10s, 20s, 30s, 60s
Setup	- Auto - H.Position — 0~100 - V.Position — 0~100 - Phase — 0~100 - Clock — 0~100 - Resolution Notification — On, Off - Reset — Yes, No - Information

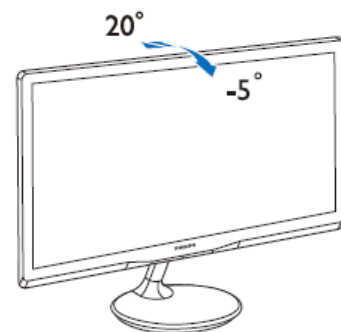
3 Resolution notification

This monitor is designed for optimal performance at its native resolution, 1920×1080@60Hz. When the monitor is powered on at a different resolution, an alert is displayed on screen: Use 1920×1080@60Hz for best results.

Display of the native resolution alert can be switched off from Setup in the OSD (On Screen Display) menu.

4 Physical Function

Tilt



4. Input/Output Specification

4.1 Input Signal Connector

Analog Connectors

Pin No.	Signal Name	Pin No.	Signal Name
1	Red	9	DDC +3.3V or +5V
2	Green/ SOG	10	Logic GND
3	Blue	11	Sense (GND)
4	Sense (GND)	12	Bi-directional data
5	Cable Detect (GND)	13	H/H+V sync
6	Red GND	14	V-sync
7	Green GND	15	Data clock
8	Blue GND		

HDMI Connectors (Option)

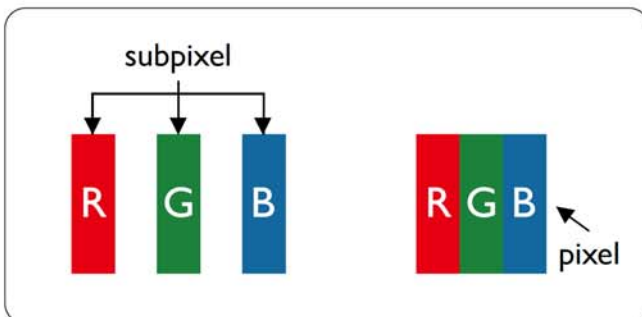
Pin No.	Signal Name	Pin No.	Signal Name
1	TMDS Data2+	11	TMDS Clock Shield
2	TMDS Data2 Shield	12	TMDS Clock–
3	TMDS Data2–	13	CEC
4	TMDS Data1+	14	Reserved (HDMI 1.0-1.3c), HEC Data- (Optional, HDMI 1.4+ with Ethernet)
5	TMDS Data1 Shield	15	SCL (I ² C Serial Clock for DDC)
6	TMDS Data1–	16	SDA (I ² C Serial Data Line for DDC)
7	TMDS Data0+	17	DDC/CEC/HEC Ground
8	TMDS Data0 Shield	18	+5 V Power (max 50 mA)
9	TMDS Data0–	19	Hot Plug Detect (All versions) and HEC Data+ (Optional, HDMI 1.4+ with Ethernet)
10	TMDS Clock+	20	

Digital Connectors (Option)

Pin No.	Signal Name	Pin No.	Signal Name
1	T.M.D.S. data2-	13	No Connect
2	T.M.D.S. data2+	14	+5V Power
3	T.M.D.S. data2 shield	15	Ground (for +5V)
4	No Connect	16	Hot plug detect
5	No Connect	17	T.M.D.S. data0-
6	DDC clock	18	T.M.D.S. data0+
7	DDC data	19	T.M.D.S. data0 shield
8	No Connect	20	No Connect
9	T.M.D.S. data1-	21	No Connect
10	T.M.D.S. data1+	22	T.M.D.S. clock shield
11	T.M.D.S. data1 shield	23	T.M.D.S. clock+
12	No Connect	24	T.M.D.S. clock-

4.2 Philips' Flat Panel Monitors Pixel

Philips strives to deliver the highest quality products. We use some of the industry's most advanced manufacturing processes and practice stringent quality control. However, pixel or sub pixel defects on the TFT Monitor panels used in flat panel monitors are sometimes unavoidable. No manufacturer can guarantee that all panels will be free from pixel defects, but Philips guarantees that any monitor with an unacceptable number of defects will be repaired or replaced under warranty. This notice explains the different types of pixel defects and defines acceptable defect levels for each type. In order to qualify for repair or replacement under warranty, the number of pixel defects on a TFT Monitor panel must exceed these acceptable levels. For example, no more than 0.0004% of the sub pixels on a monitor may be defective. Furthermore, Philips sets even higher quality standards for certain types or combinations of pixel defects that are more noticeable than others. This policy is valid worldwide.



Pixels and Sub pixels

A pixel, or picture element, is composed of three sub pixels in the primary colors of red, green and blue. Many pixels together form an image. When all sub pixels of a pixel are lit, the three colored sub pixels together appear as a single white pixel. When all are dark, the three colored sub pixels together appear as a single

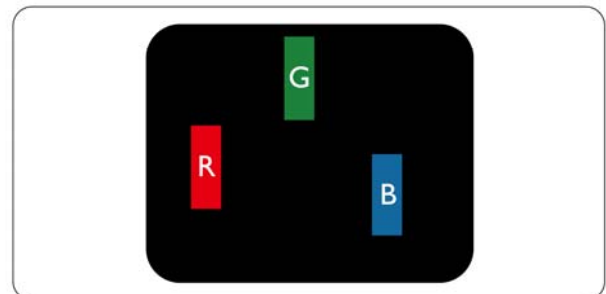
black pixel. Other combinations of lit and dark sub pixels appear as single pixels of other colors.

Types of Pixel Defects

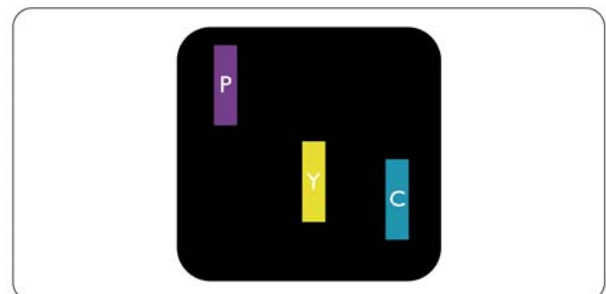
Pixel and sub pixel defects appear on the screen in different ways. There are two categories of pixel defects and several types of sub pixel defects within each category.

Bright Dot Defects

Bright dot defects appear as pixels or sub pixels that are always lit or 'on'. That is, a bright dot is a sub-pixel that stands out on the screen when the monitor displays a dark pattern. There are the types of bright dot defects.

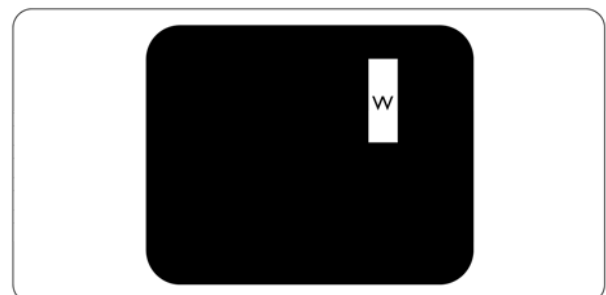


One lit red, green or blue sub pixel.



Two adjacent lit sub pixels:

- Red + Blue = Purple
- Red + Green = Yellow
- Green + Blue = Cyan (Light Blue)



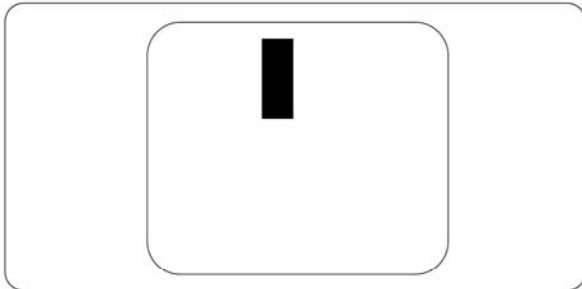
Three adjacent lit sub pixels (one white pixel).

Note

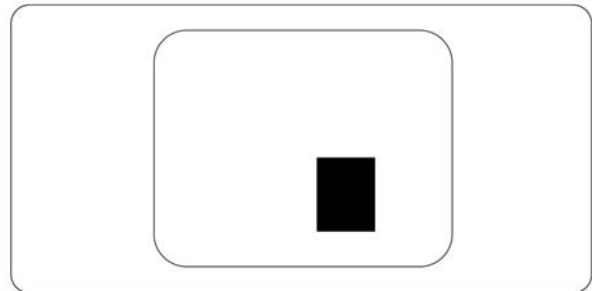
A red or blue bright dot must be more than 50 percent brighter than neighboring dots while a green bright dot is 30 percent brighter than neighboring dots.

Black Dot Defects

Black dot defects appear as pixels or sub pixels that are always dark or 'off'. That is, a dark dot is a sub-pixel that stands out on the screen when the monitor displays a light pattern. These are the types of black dot defects.

**Proximity of Pixel Defects**

Because pixel and sub pixels defects of the same type that are near to one another may be more noticeable, Philips also specifies tolerances for the proximity of pixel defects.

**Pixel Defect Tolerances**

In order to qualify for repair or replacement due to pixel defects during the warranty period, a TFT Monitor panel in a Philips flat panel monitor must have pixel or sub pixel defects exceeding the tolerances listed in the following tables.

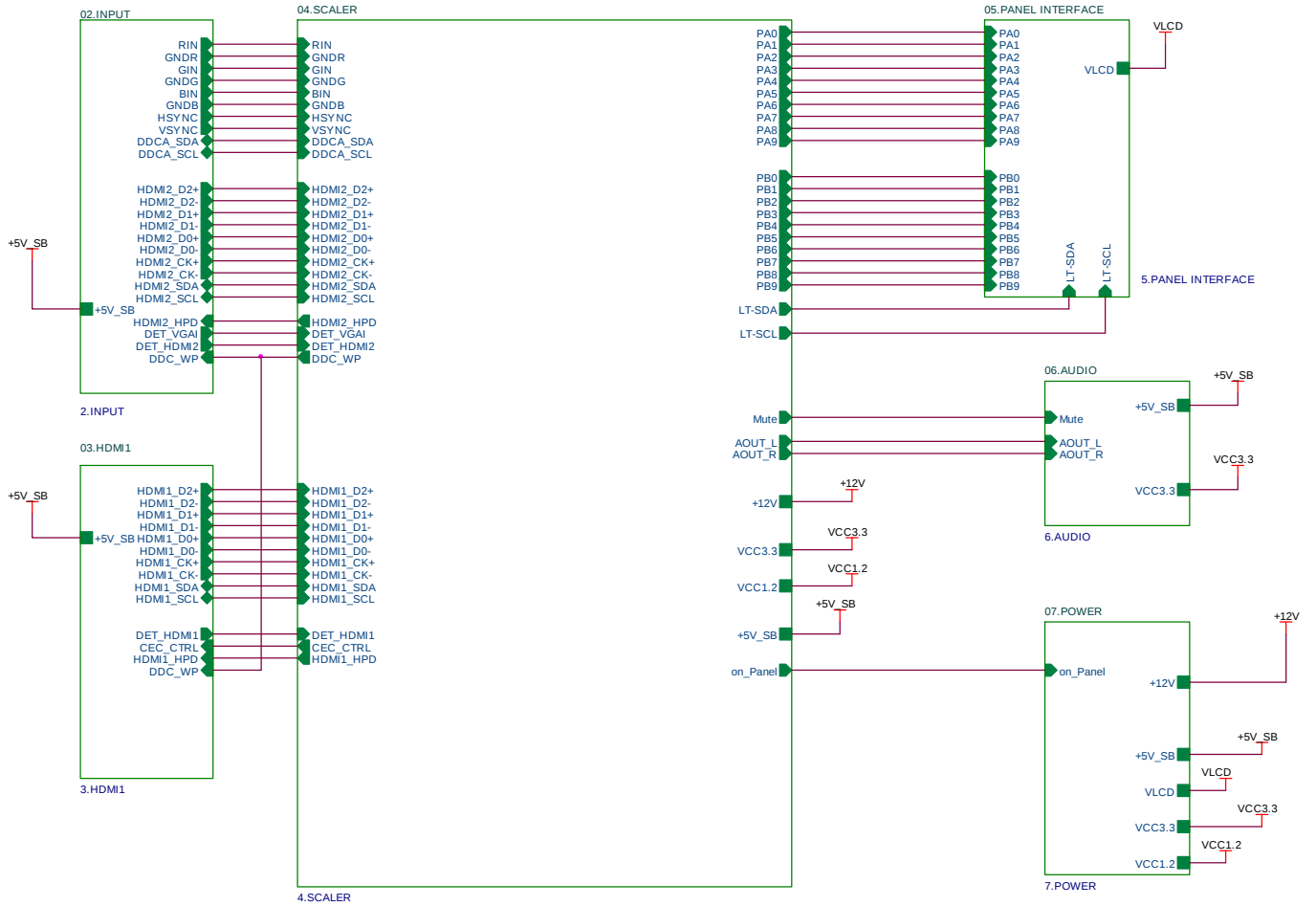
BRIGHT DOT DEFECTS	ACCEPTABLE LEVEL
1 lit subpixel	3
2 adjacent lit subpixels	1
3 adjacent lit subpixels (one white pixel)	0
Distance between two bright dot defects*	>15mm
Total bright dot defects of all types	3
BLACK DOT DEFECTS	ACCEPTABLE LEVEL
1 dark subpixel	5 or fewer
2 adjacent dark subpixels	2 or fewer
3 adjacent dark subpixels	0
Distance between two black dot defects*	>15mm
Total black dot defects of all types	5 or fewer
TOTAL DOT DEFECTS	ACCEPTABLE LEVEL
Total bright or black dot defects of all types	5 or fewer

Note

- 1 or 2 adjacent sub pixel defects = 1 dot defect
- This monitor is ISO9241-307 compliant (ISO9241-307: Ergonomic requirement, analysis and compliance test methods for electronic visual displays)

5. Block Diagram

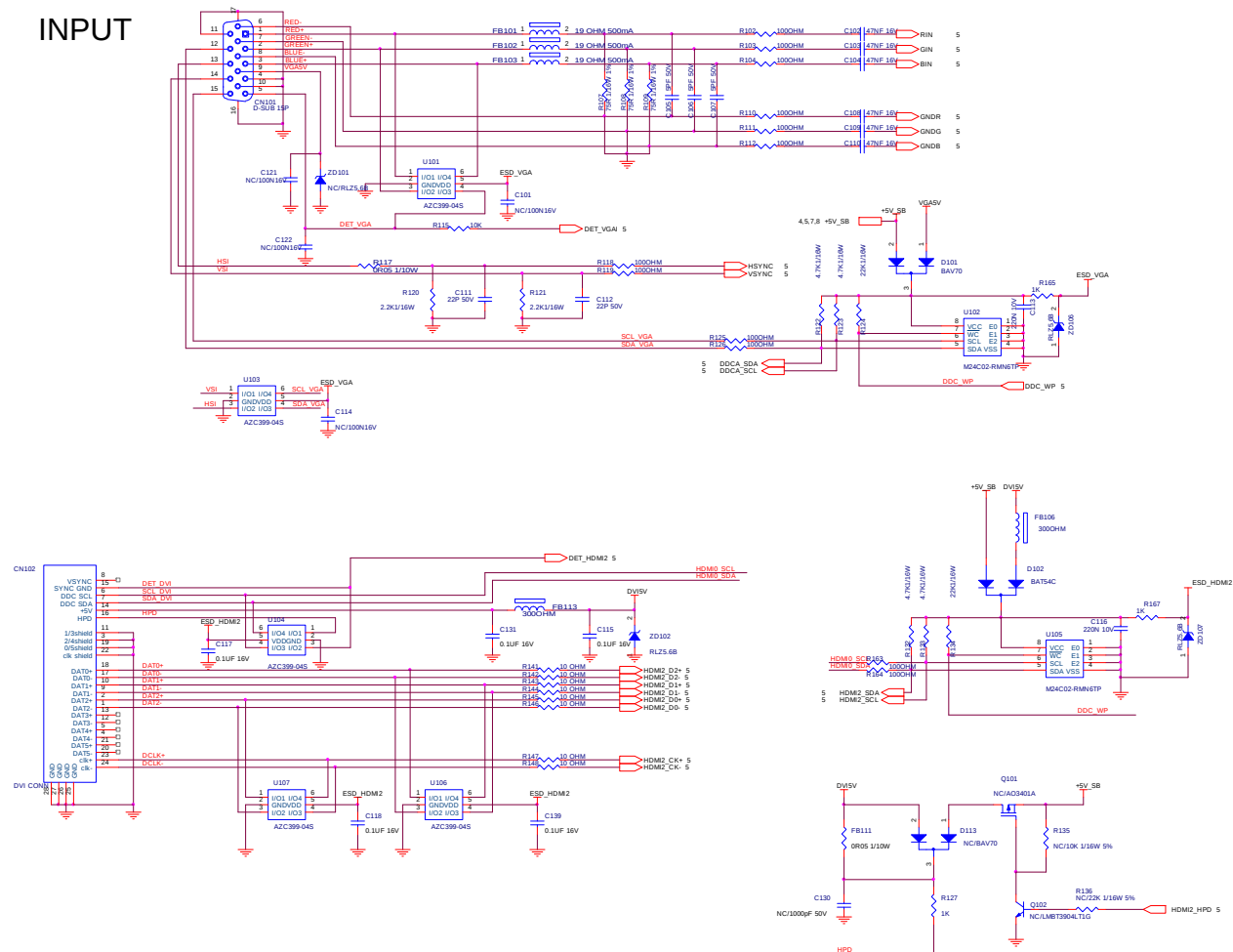
5.1 Scaler Board(715G5283M02000004S)



6. Schematic

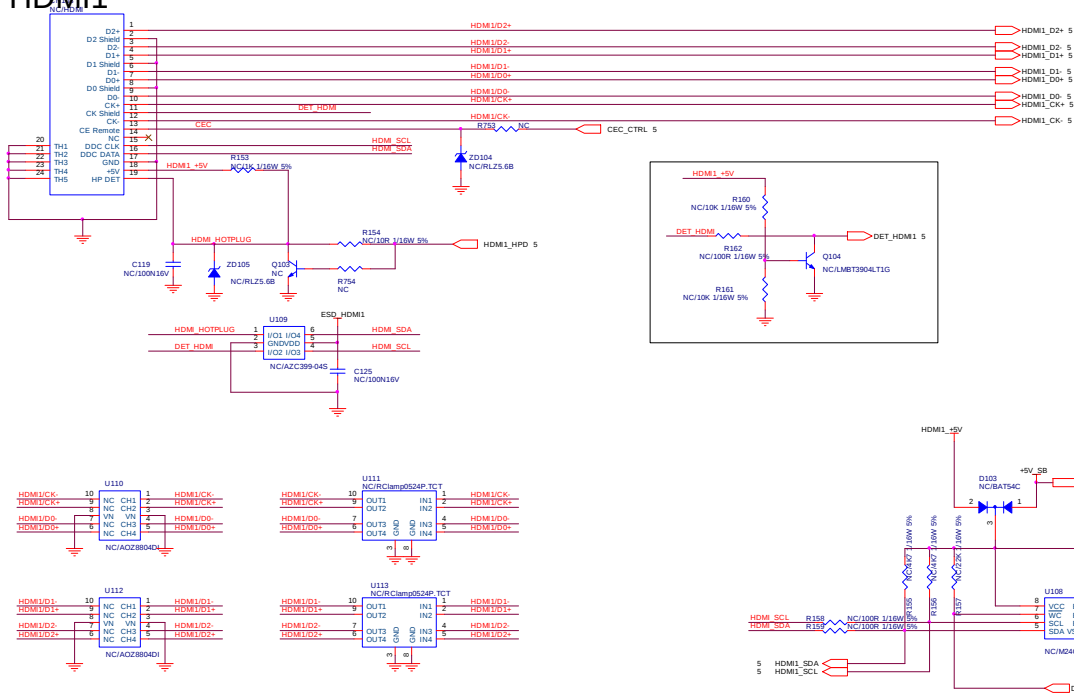
6.1 Scaler Board(715G5283M02000004S)

Remark: Parts position can be searched by using FIND function in PDF.

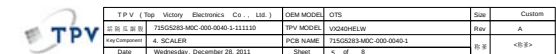


Remark: Parts position can be searched by using FIND function in PDF.

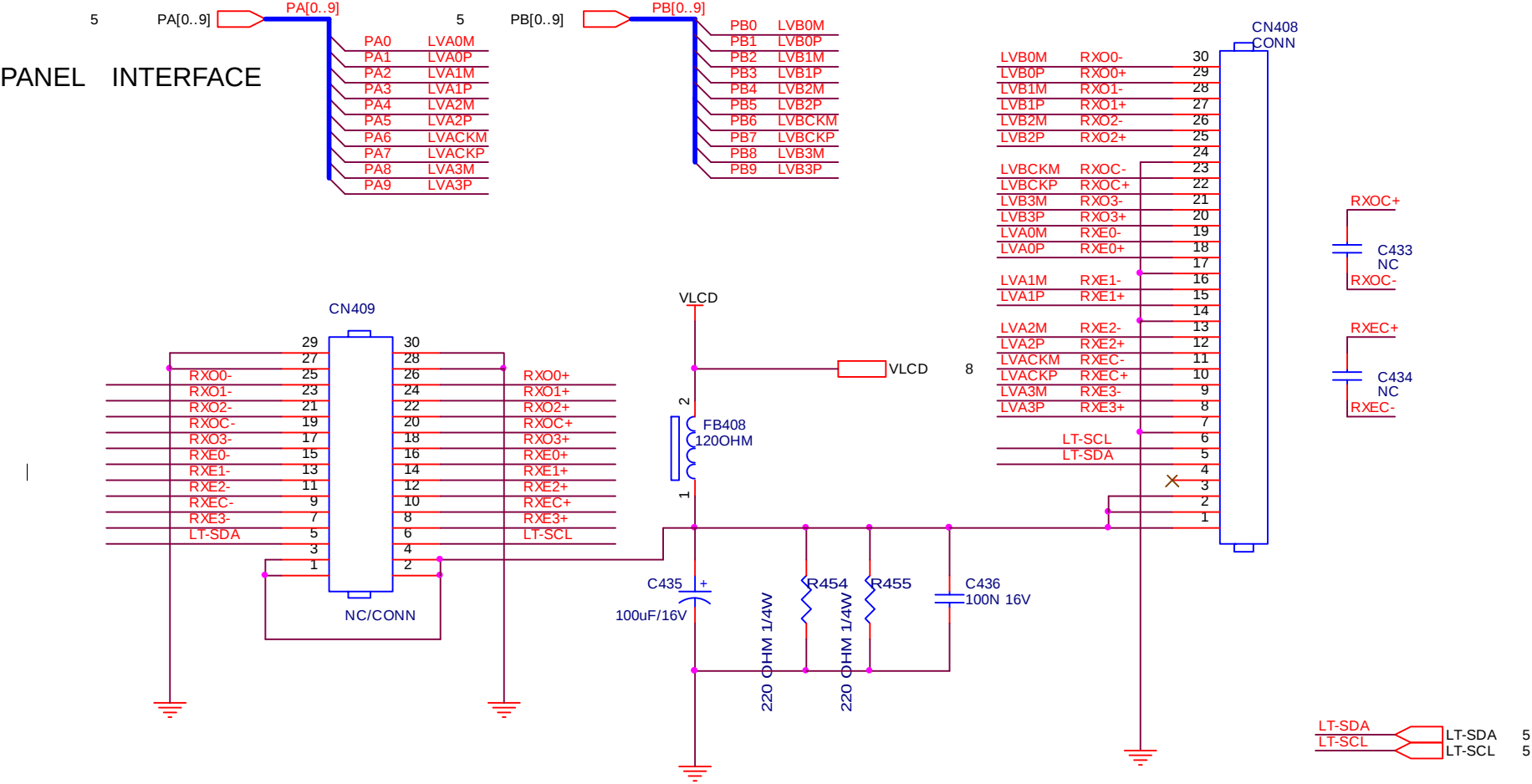
HDMI1



TPV (Top Victory Electronics Co., Ltd.)	OEM MODEL	OTS	Size	C
715G5283-MOC-000-0040-1-111110	TPV MODEL	VX240HELW	Rev	A
Key Component	3. HDM	PCB NAME	715G5283-MOC-000-0040-1	
Date	Enforce	Sheet		
2011	November 25	1 of 9		



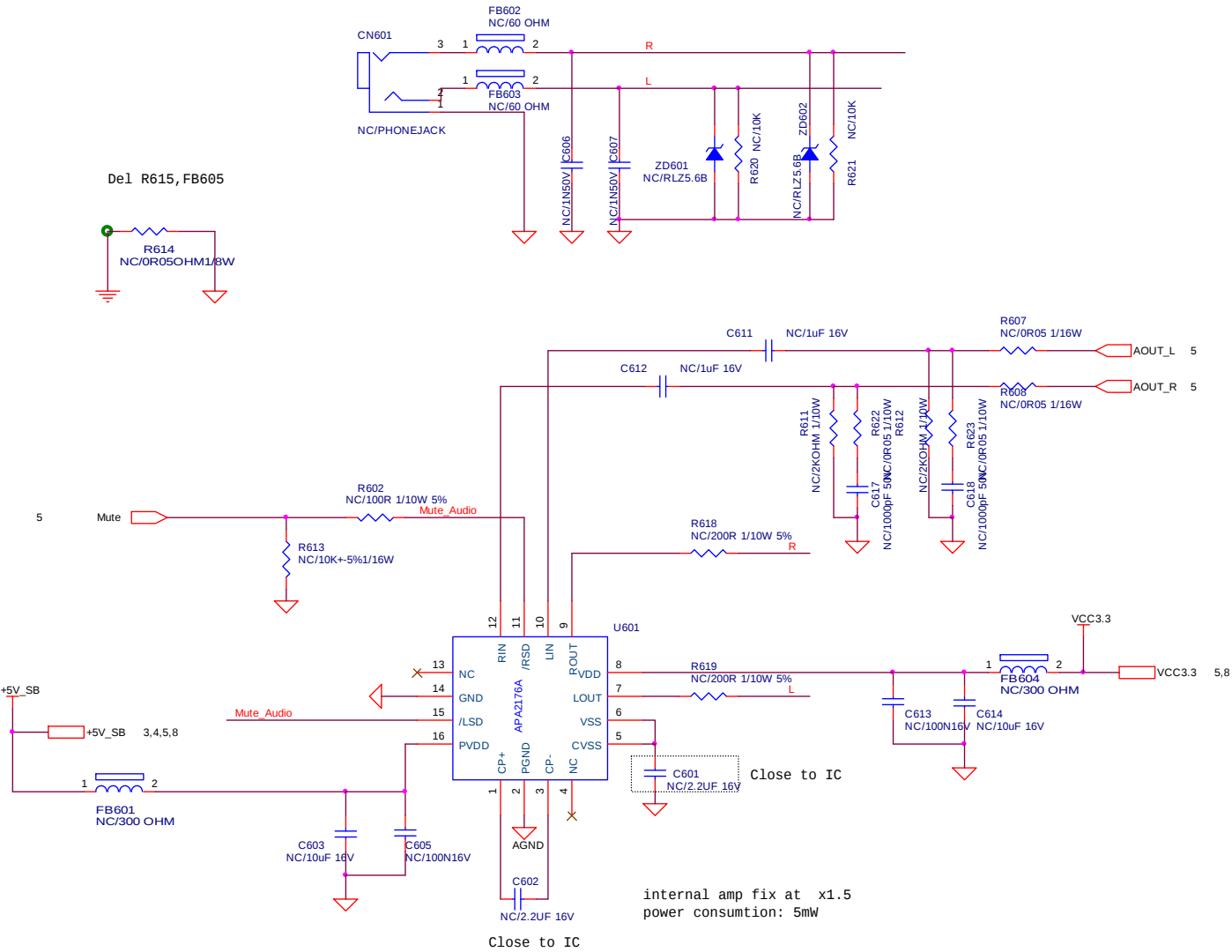
Remark: Parts position can be searched by using FIND function in PDF.



T P V (Top Victory Electronics Co . , Ltd.)		OEM MODEL	OTS	Size	A
紙隔瓜網腹	715G5283-M0C-000-0040-1-111110	TPV MODEL	VX240HELW	Rev	A
Key Component	5. PANEL INTERFACE	PCB NAME	715G5283-M0C-000-0040-1	称爹	<称爹>
Date	Thursday, December 29, 2011	Sheet	6 of 8		

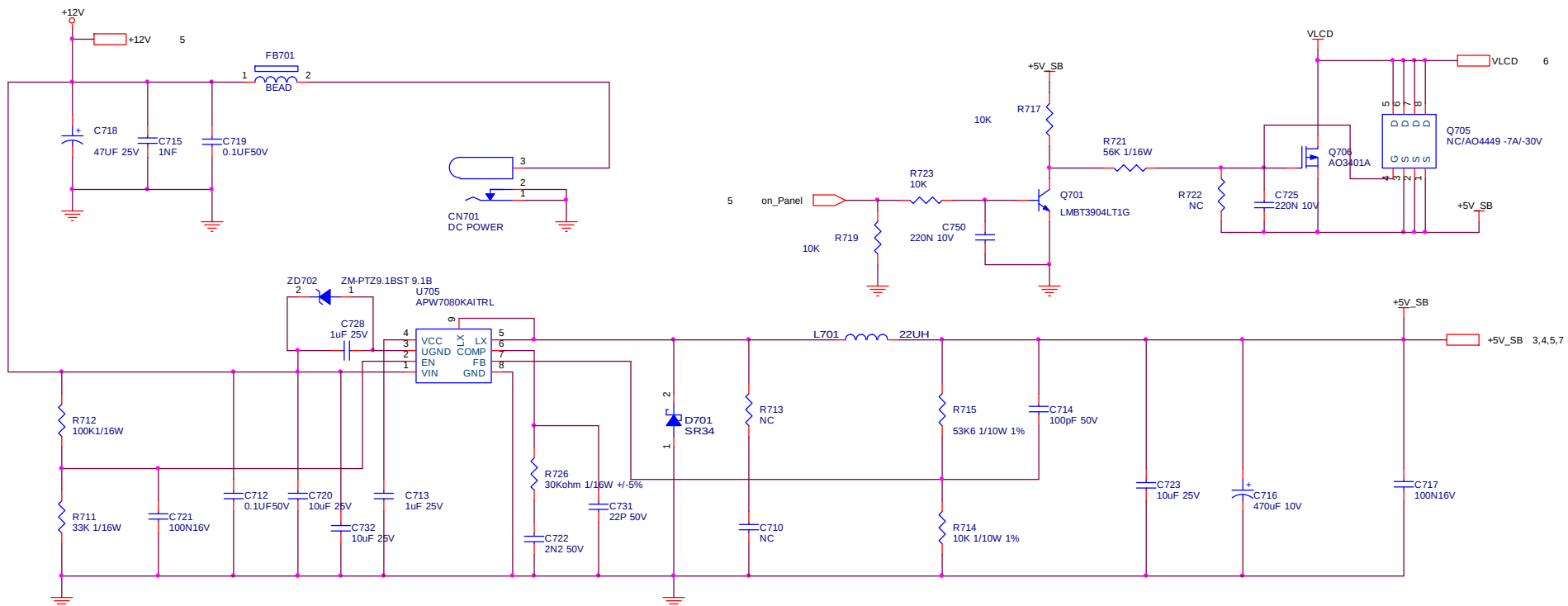
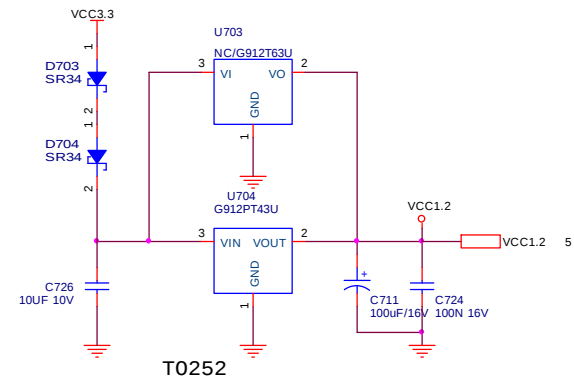
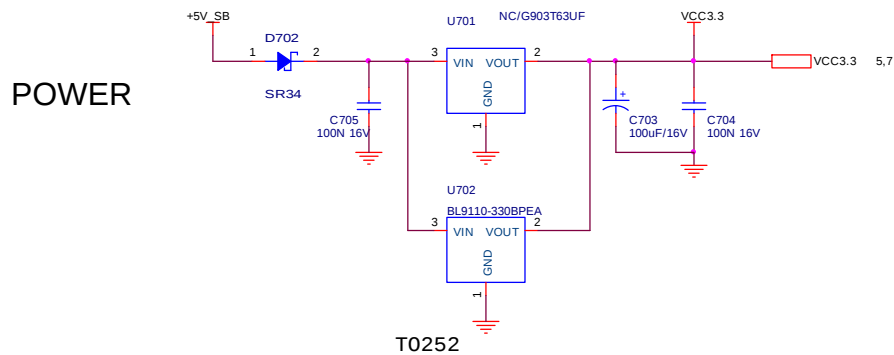
Remark: Parts position can be searched by using FIND function in PDF.

AUDIO



T P V (Top Victory Electronics Co . , Ltd .)	OEM MODEL	OTS	Size	B
715G5283-MOC-000-0040-1-111110	TPV MODEL	VX240HELW	Rev	A
Key Component	6. AUDIO	PCB NAME	715G5283-MOC-000-0040-1	称 爹 <称爹>
Date	Thursday , December 22, 2011	Sheet	7 of 8	

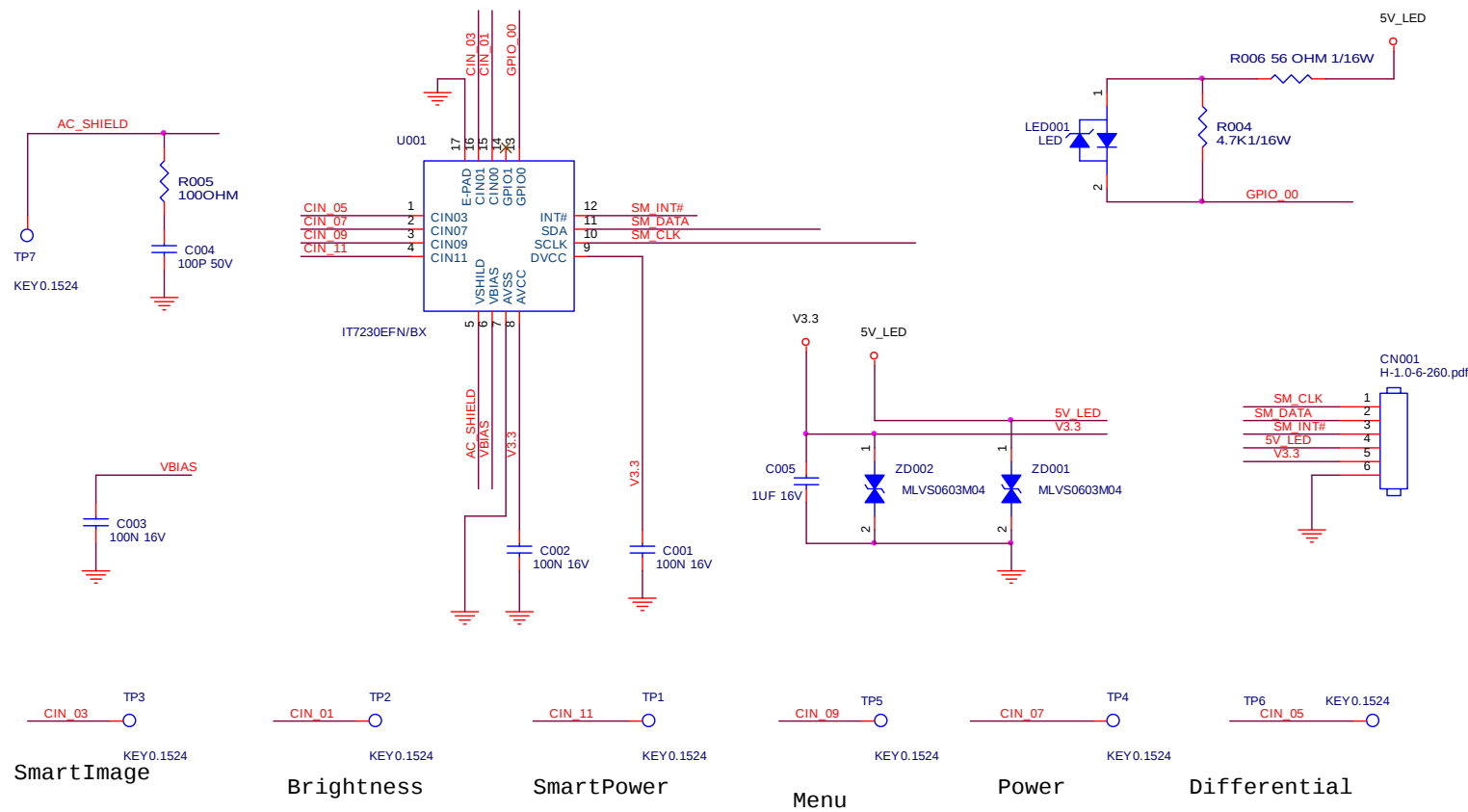
Remark: Parts position can be searched by using FIND function in PDF.



TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL	OTS	Size	B
纸隔瓜塑膜	715G5283-MOC-000-0040-1-111110	TPV MODEL	VX240HELW	Rev	A
Key Component	7. POWER	PCB NAME	715G5283-MOC-000-0040-1	称爹	<称爹>
Date	Wednesday, January 04, 2012	Sheet	8 of 8		

6.2 Key board (715G5453K01000004S)

Remark: Parts position can be searched by using FIND function in PDF.



SmartImage	Brightness	SmartPower	Menu	Power
------------	------------	------------	------	-------

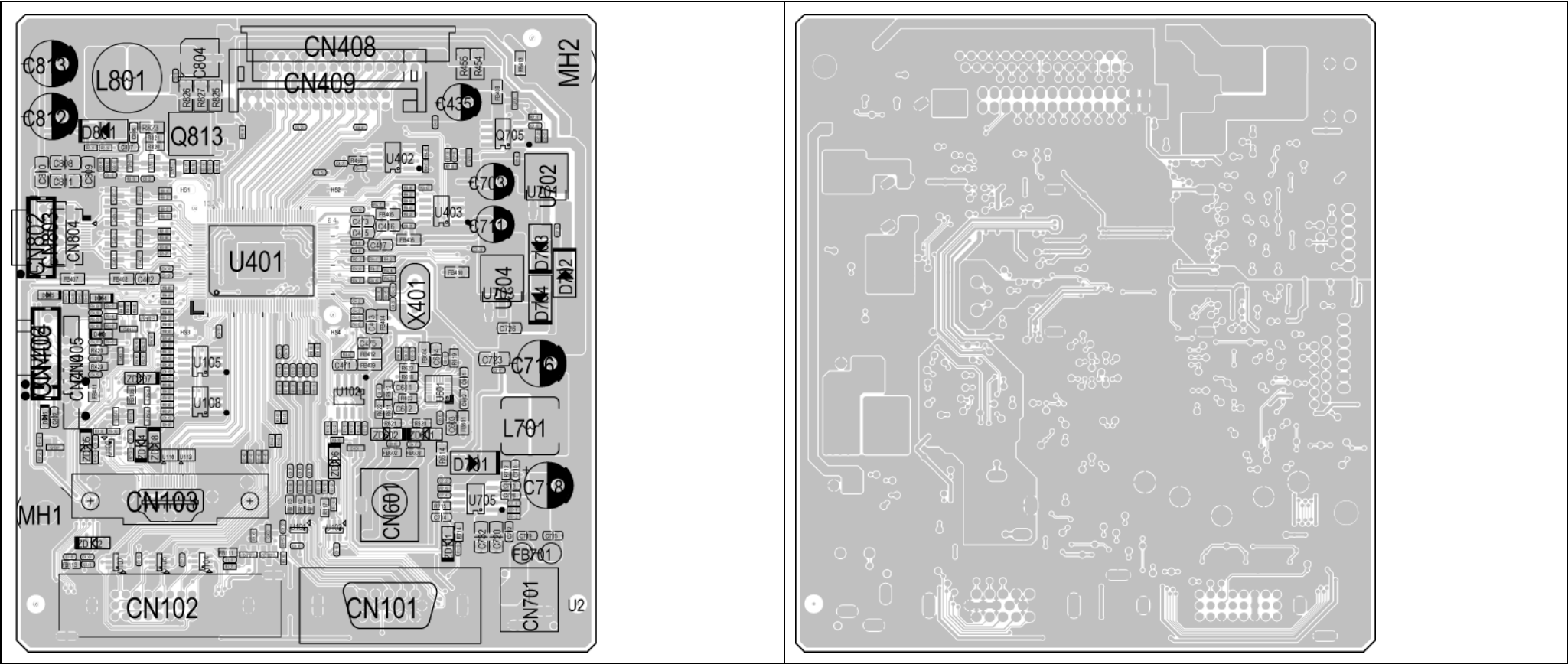


TPV (Top Victory Electronics Co., Ltd.)	OEM MODEL	PHILIPS	Size	A4
結構圖	715G5453-K0A-000-0040-111123	TPV MODEL	227E4	Rev
Key Component	12.KEY-TOUCHPAD_LED	PCB NAME	715G5453-K0A-000-0040	称
Date	Wednesday, December 28, 2011	Sheet	2 of 2	<称>

7. PCB Layout

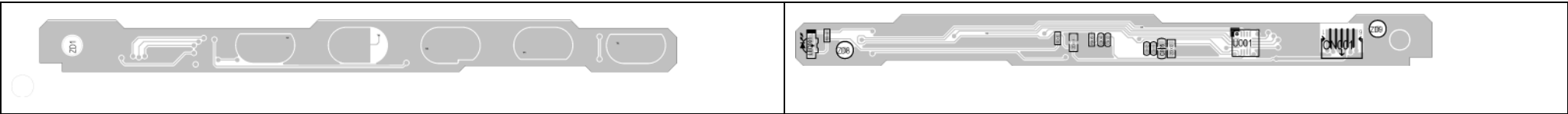
7.1 SCALER BOARD (715G5283M0200004S)

REMARK: PARTS POSITION CAN BE SEARCHED BY USING FIND FUNCTION IN PDF.

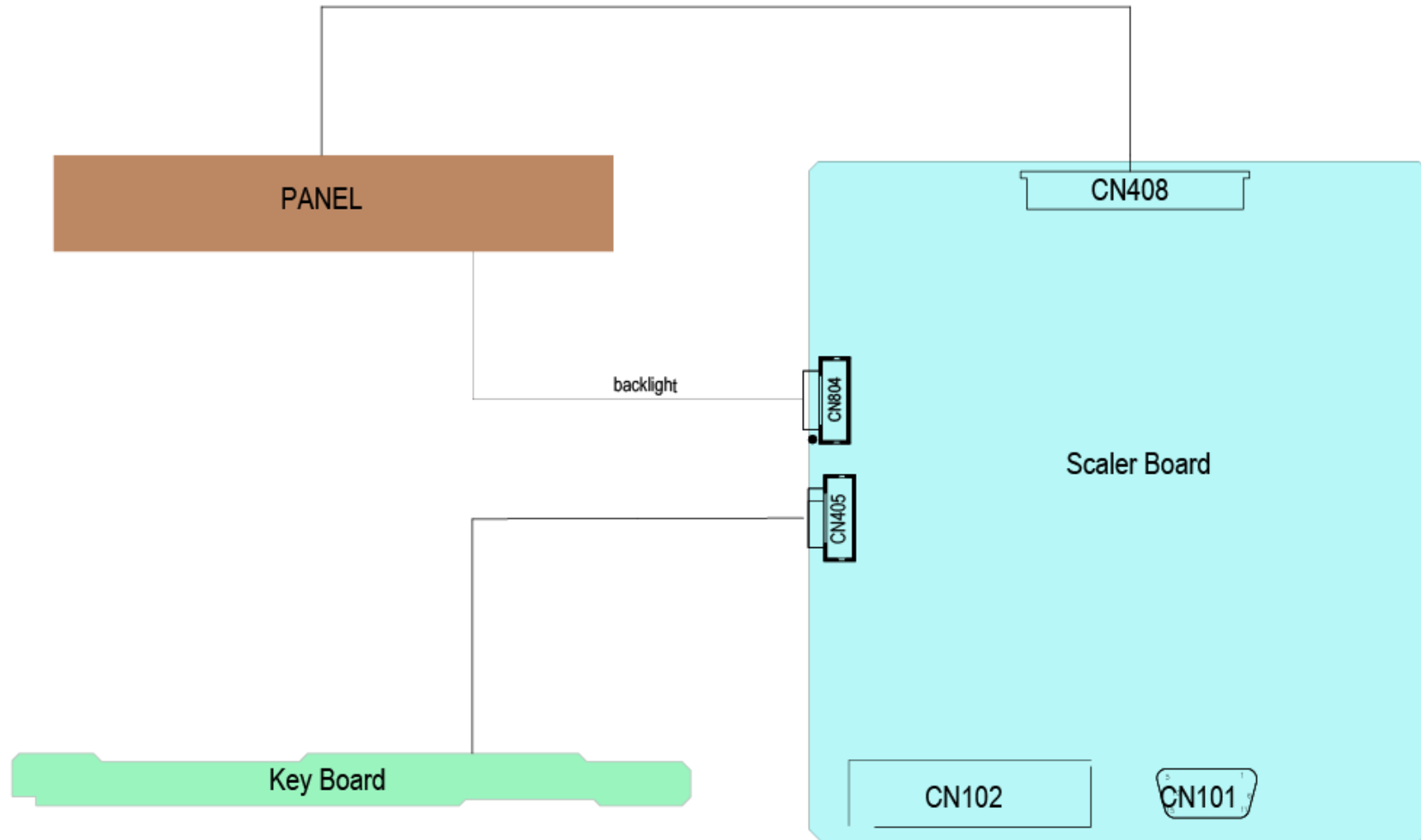


7.2 KEY BOARD (715G5453K0100004S)

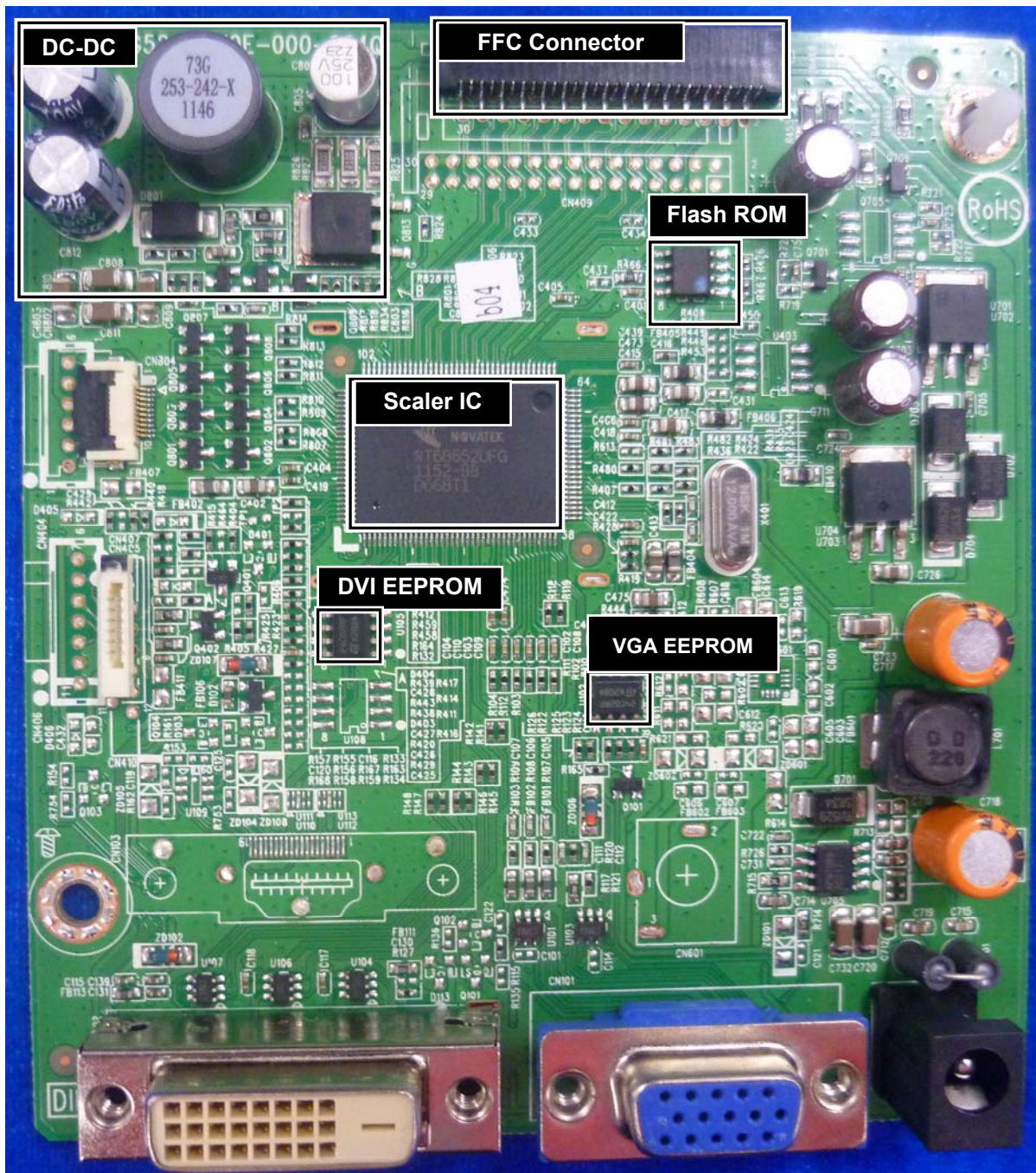
Remark: Parts position can be searched by using FIND function in PDF.



8.Wiring Diagram



9. Scaler Board Overview



10. Mechanical Instructions



Step 1: Remove the stand base ASSY and rear cover

1. Open the latches and along the red arrowhead direction as the picture to open other latches.

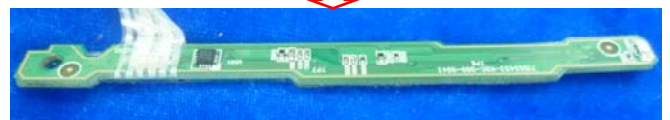


2. Unscrew the screws as following step



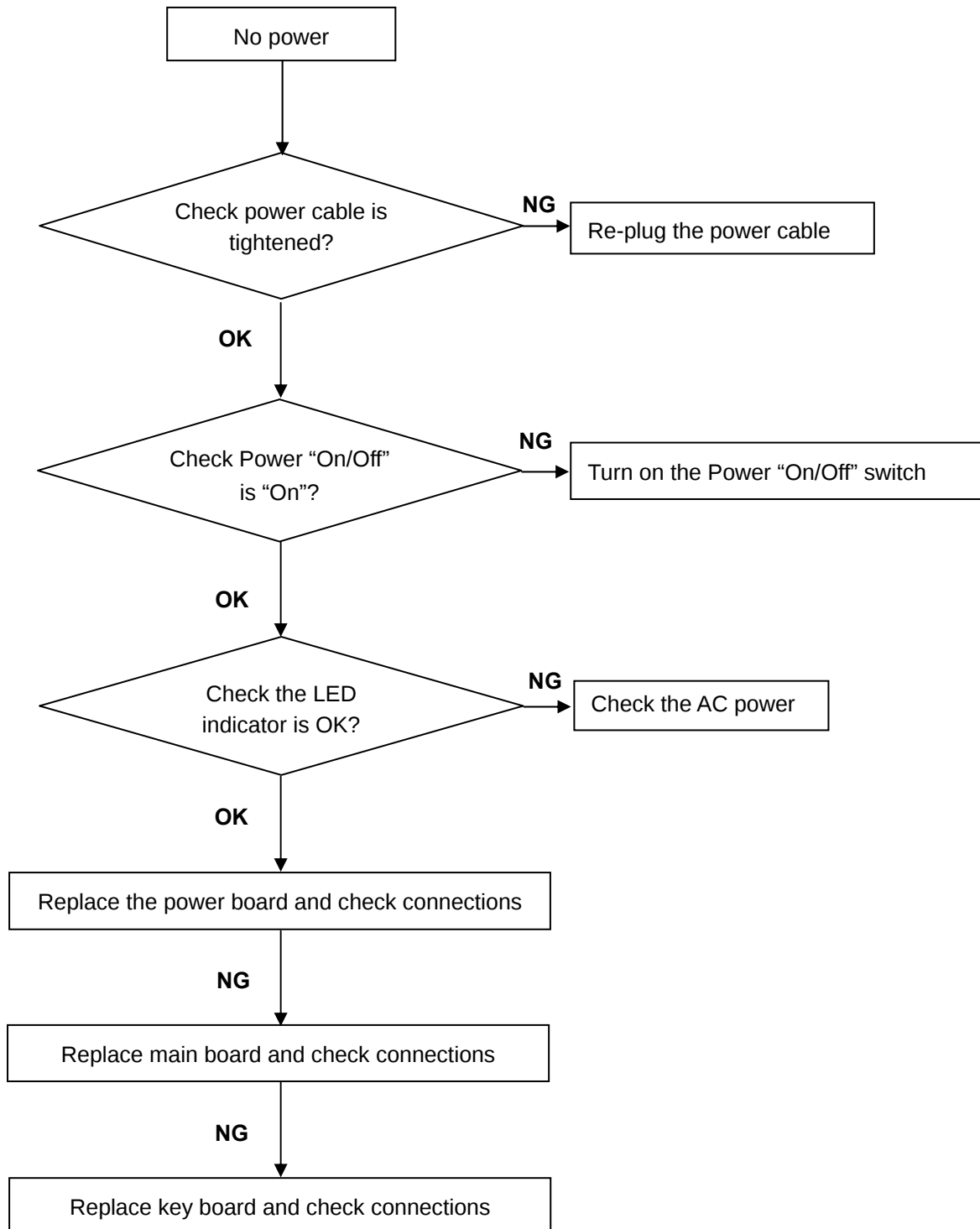
Step 2: Remove the main board

3. Disconnect all cables move out the chips. And unscrew the two screws

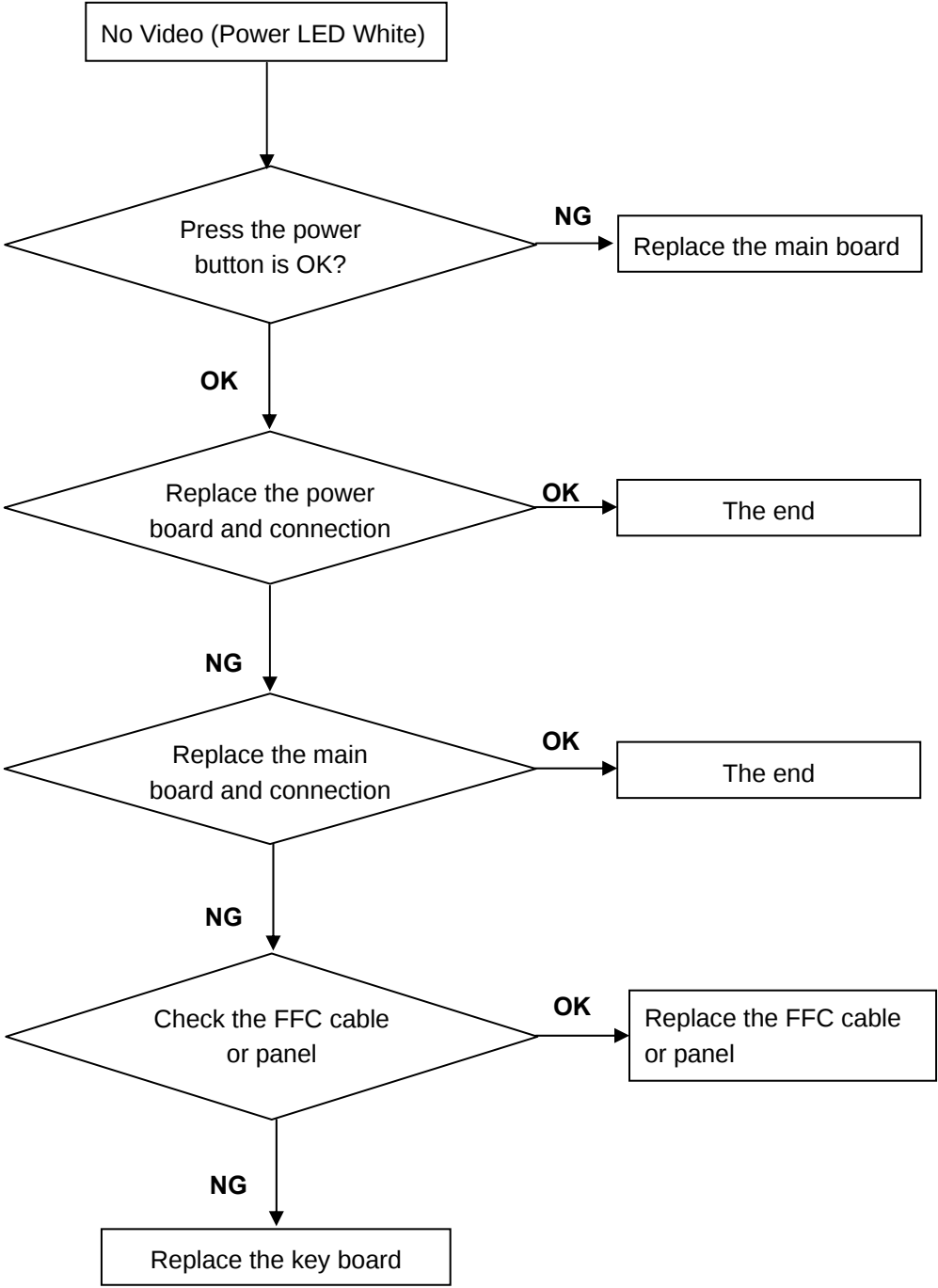


11. Repair Flow Chart

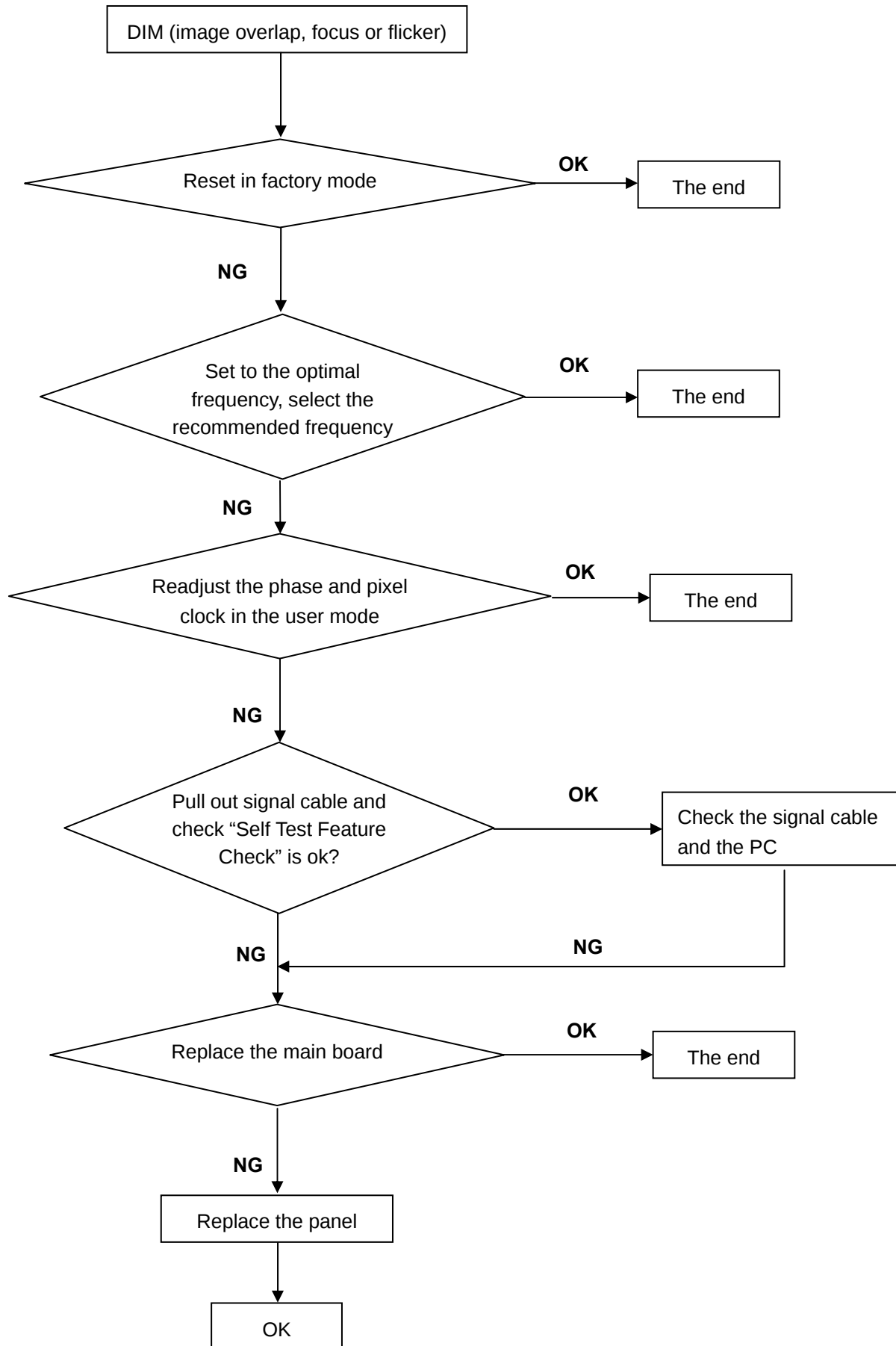
1. No Power



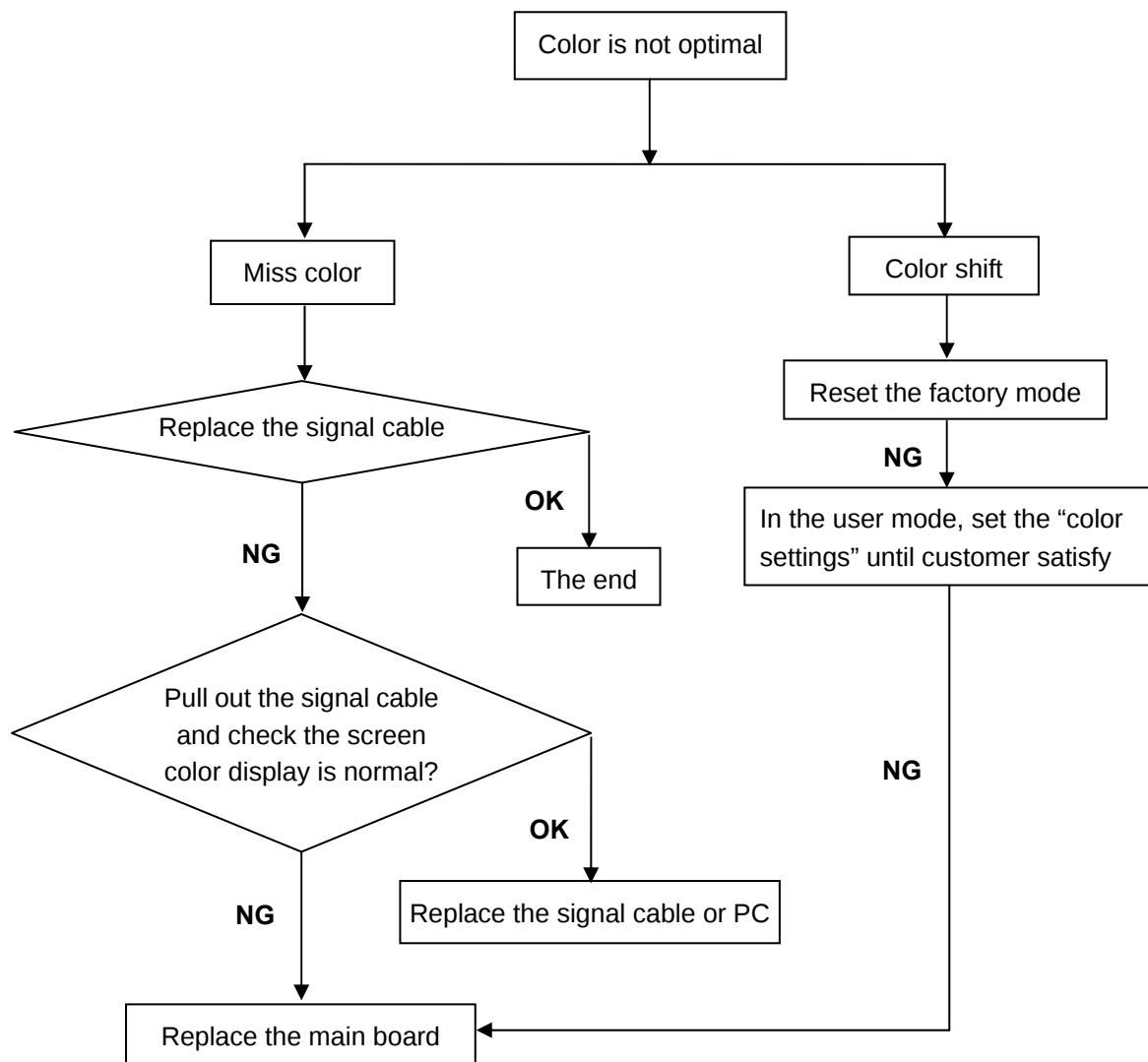
2. No Video (Power LED White)



3. DIM



4. Color is not optimal

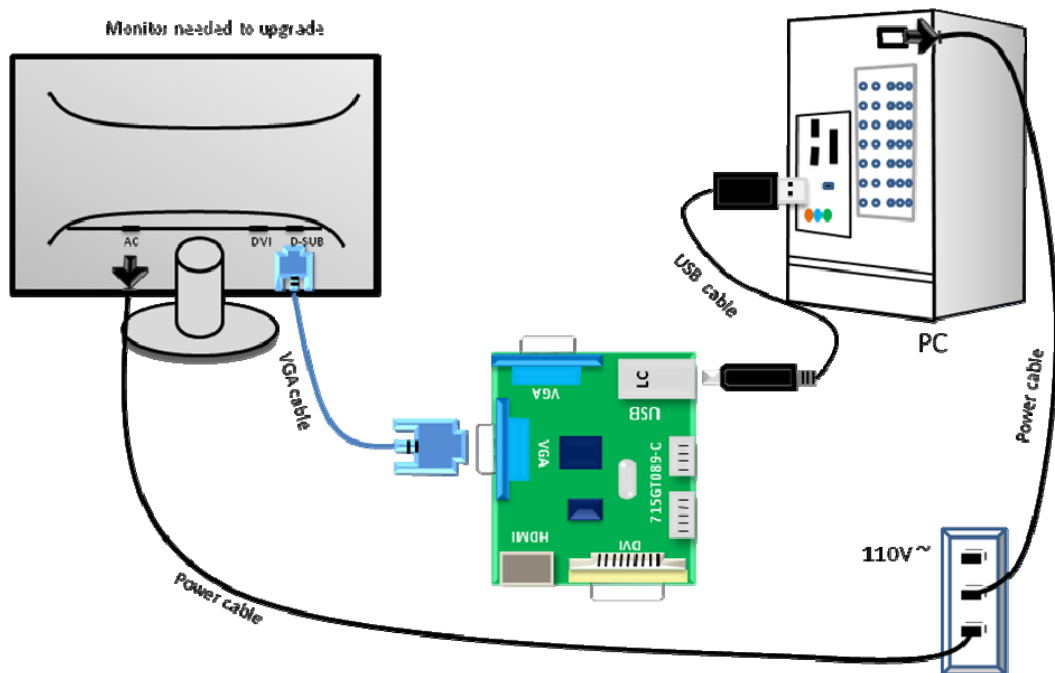


12. ISP Instruction

When do the parts, need the tools as follow:

1. An i486 (or above) personal computer or compatible.
2. Microsoft operation system Windows 95/98/2000/XP.
3. USB port driver and ISP tool "EasyWrite V2011.0209.exe"
4. ISP JIG (715GT089-B/C) x1
5. Power cable x 2, VGA cable x1, USB cable x 1
6. The monitor and the new software

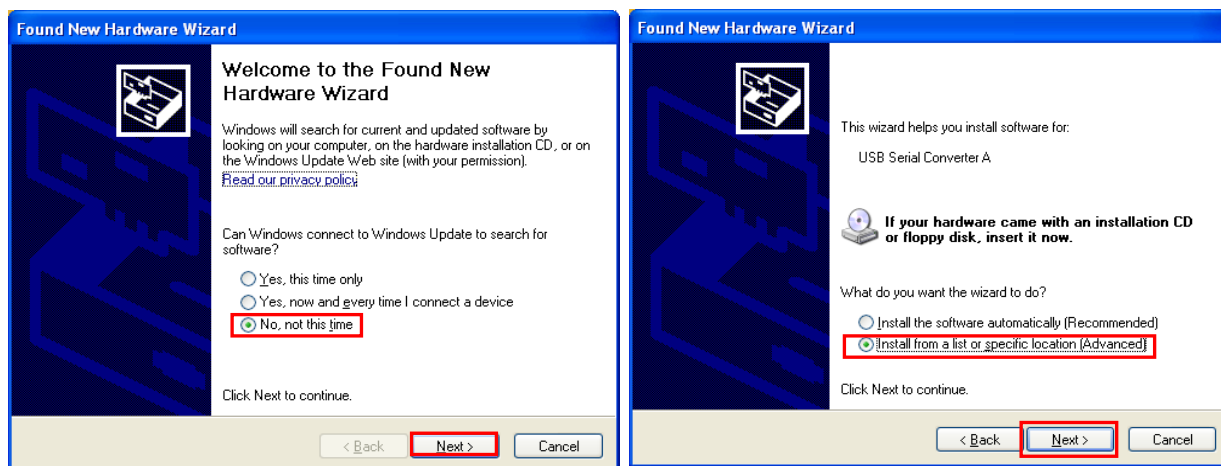
12.1 Connection

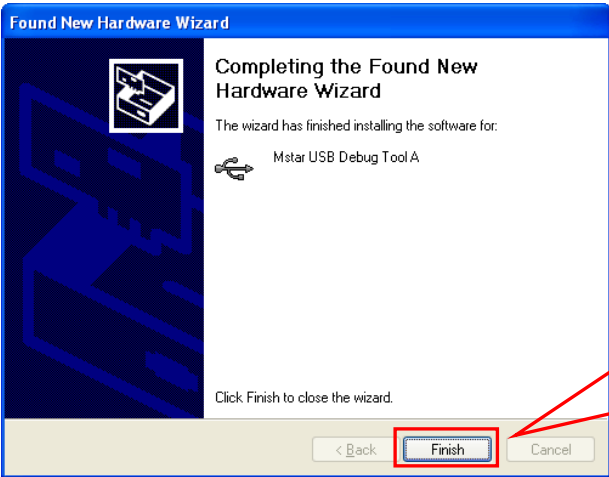
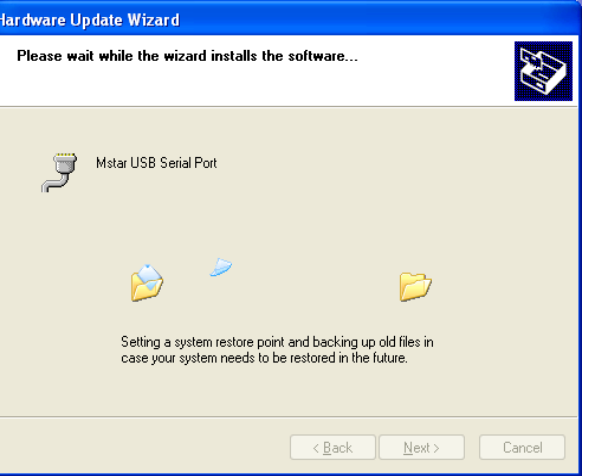
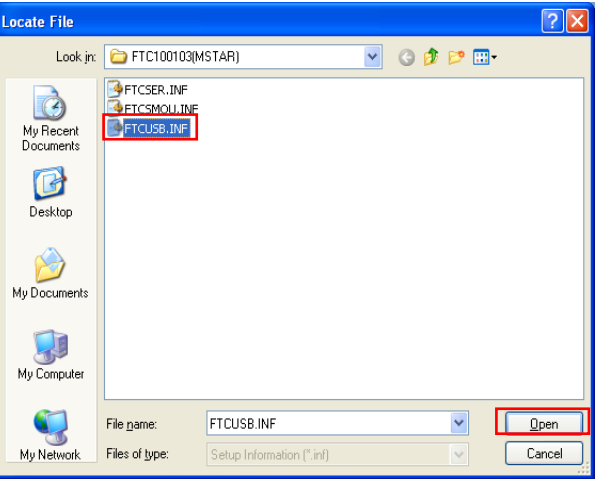
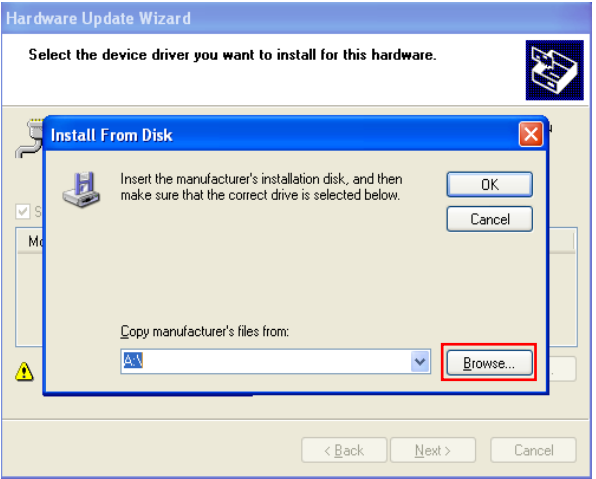
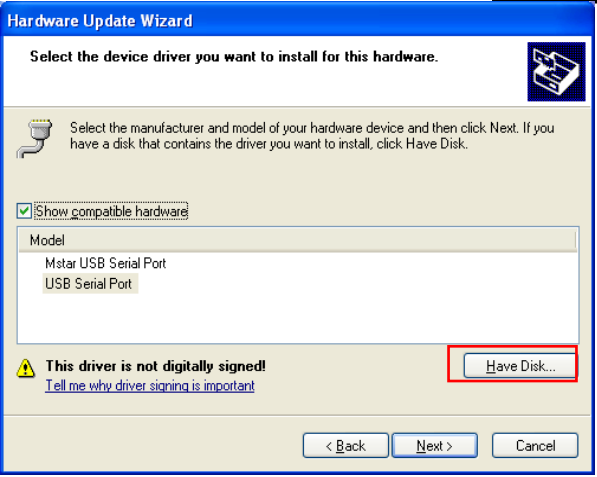
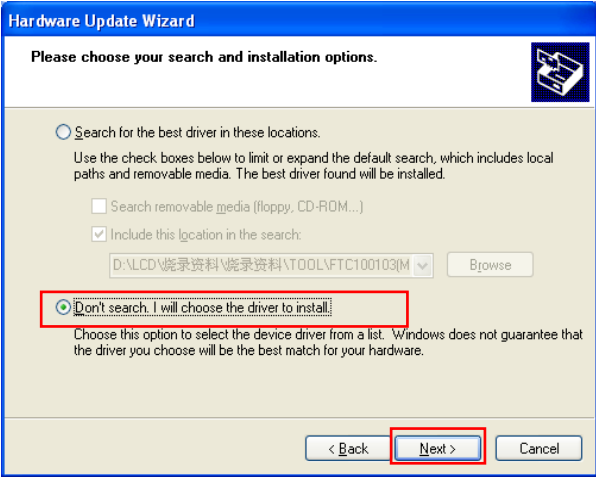


12.2 Install the USB driver

When insert the USB cable to PC USB port, will pop up a Hardware Wizard to help you install the USB driver if you use this ISP board first time. You can install it successfully as the below instruction step by step.

Remark: The USB driver files path: D:\FTC100103(Mstar)\FTCUSB.INF



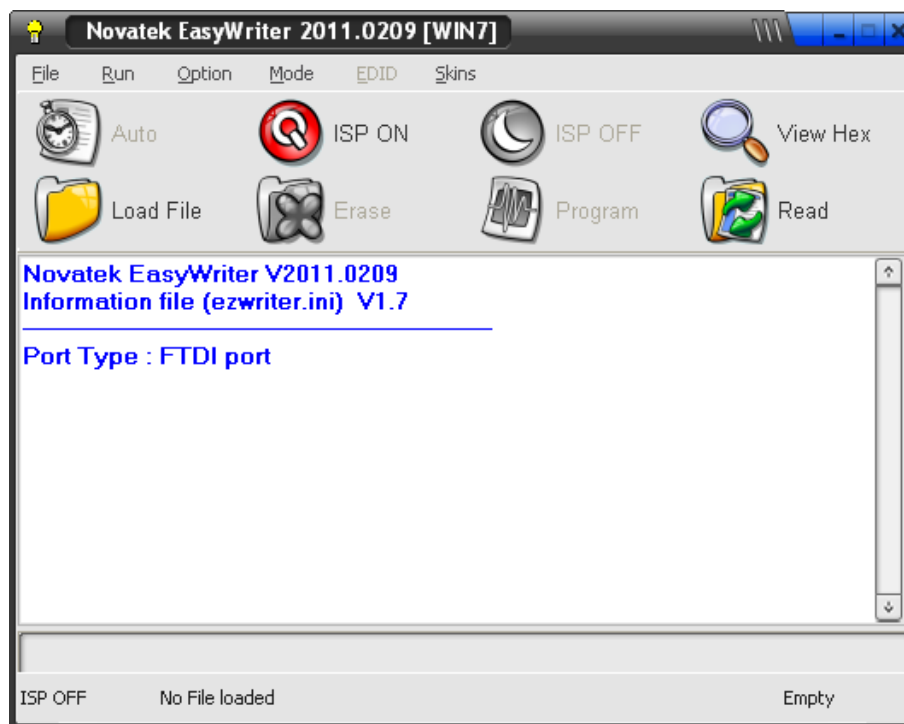


Click "Finish" to complete the USB serial port driver installation.

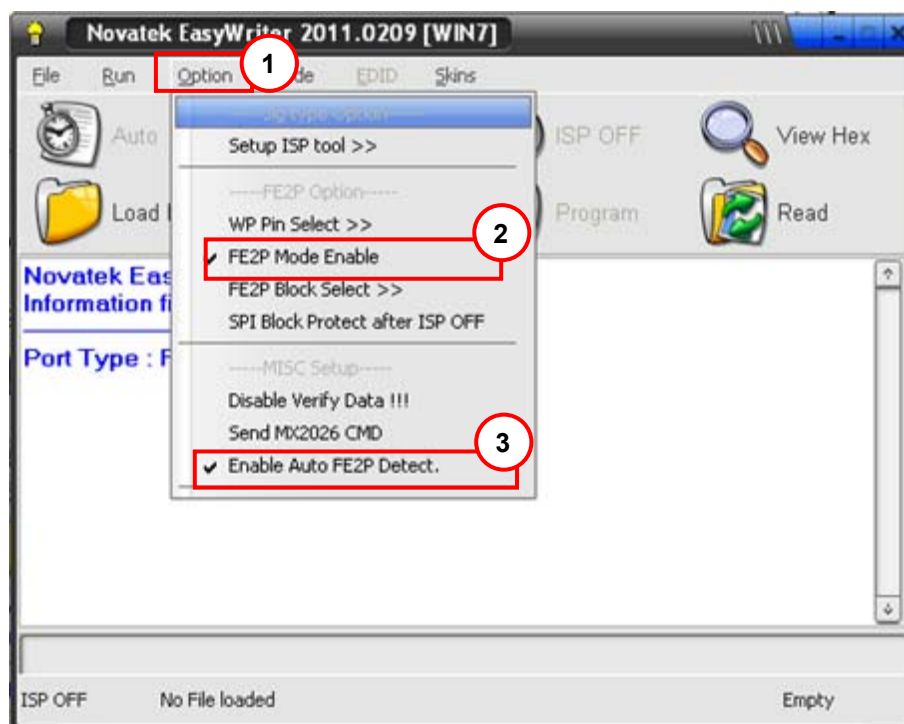
12.3 Install the ISP tool

Take 227E3L for example:

1. Double-click  to install ISP program.
2. Double-click  to run the ISP tool.

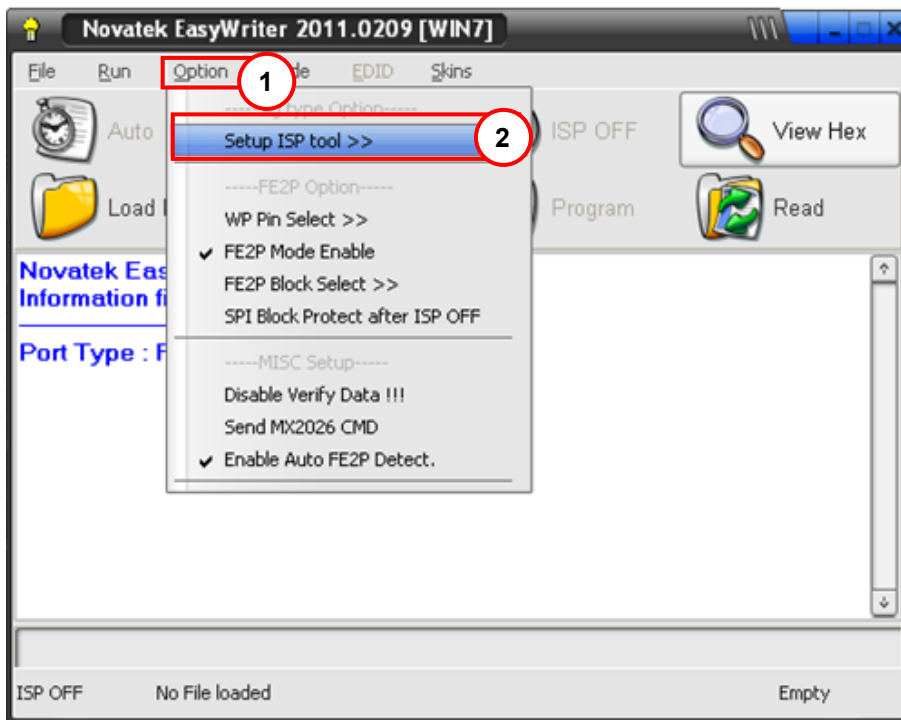


3. Set the parameters to restore the HDCP key if the monitor has DVI or HDMI port.

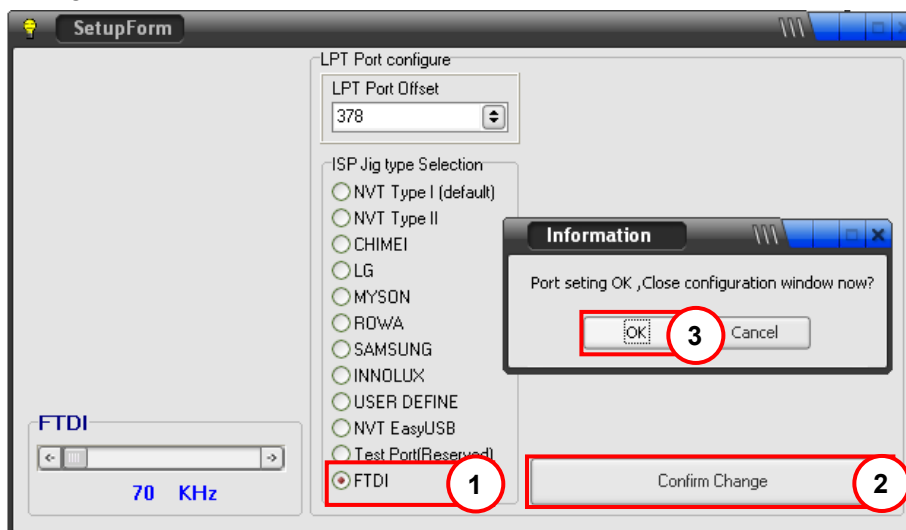


- (1) Click the "Option" item.
- (2) Tick "FE2P Mode Enable".
- (3) Tick "Enable Auto FE2P Detect".

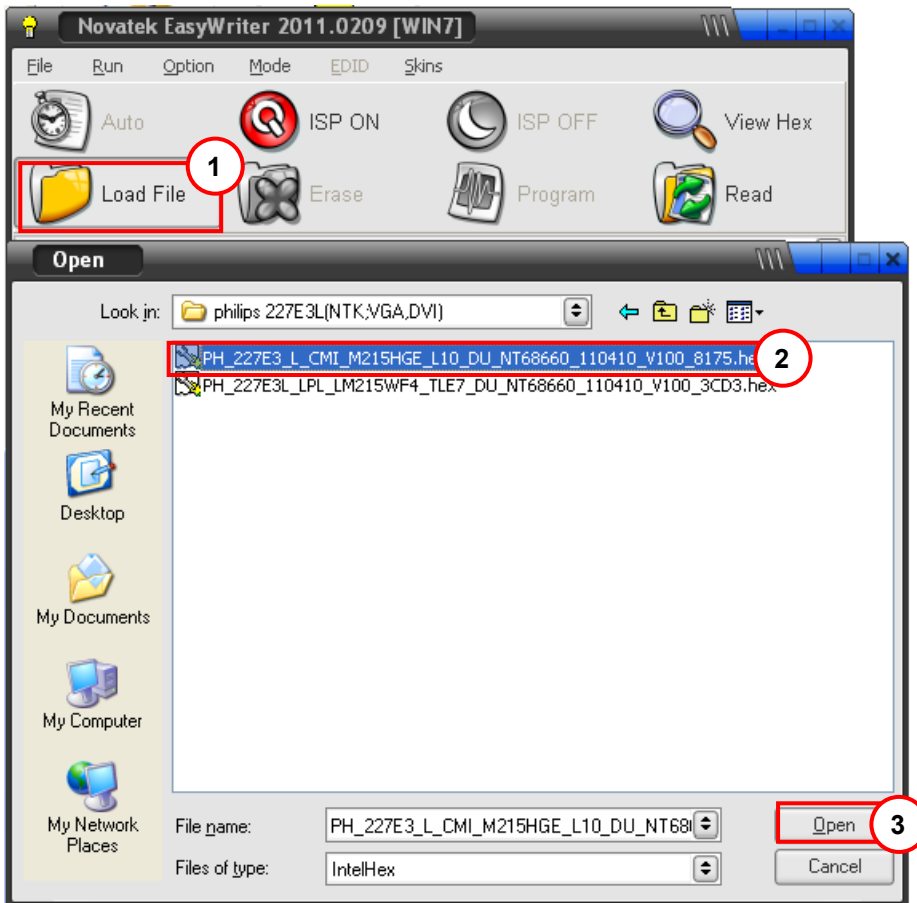
Setup ISP tool. Click “Setup ISP tool” to open the configuration window.



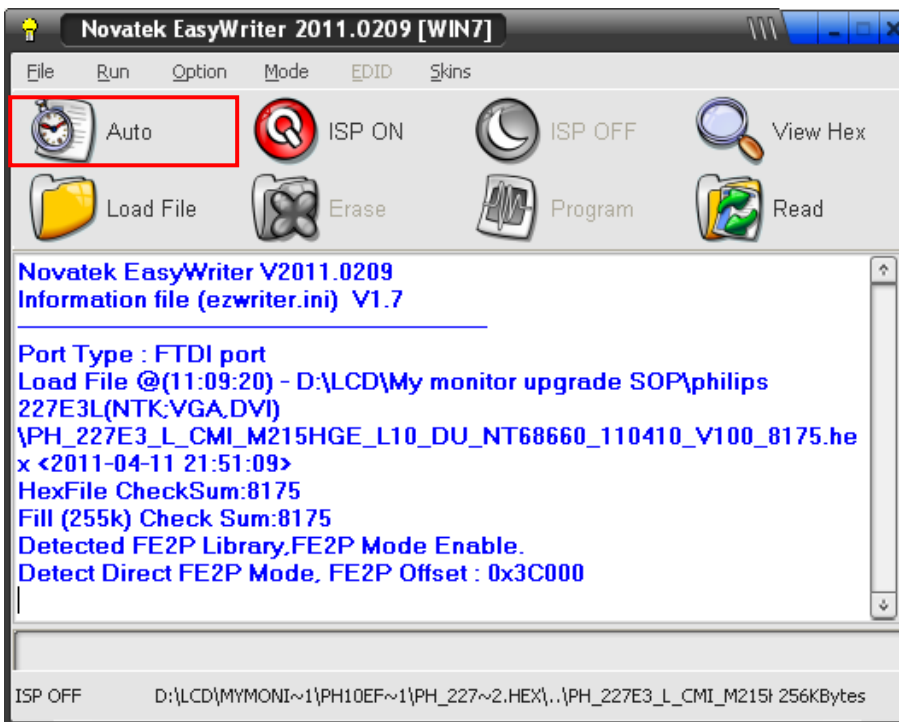
4. Configuration for ISP tool. Tick “FTDI”.



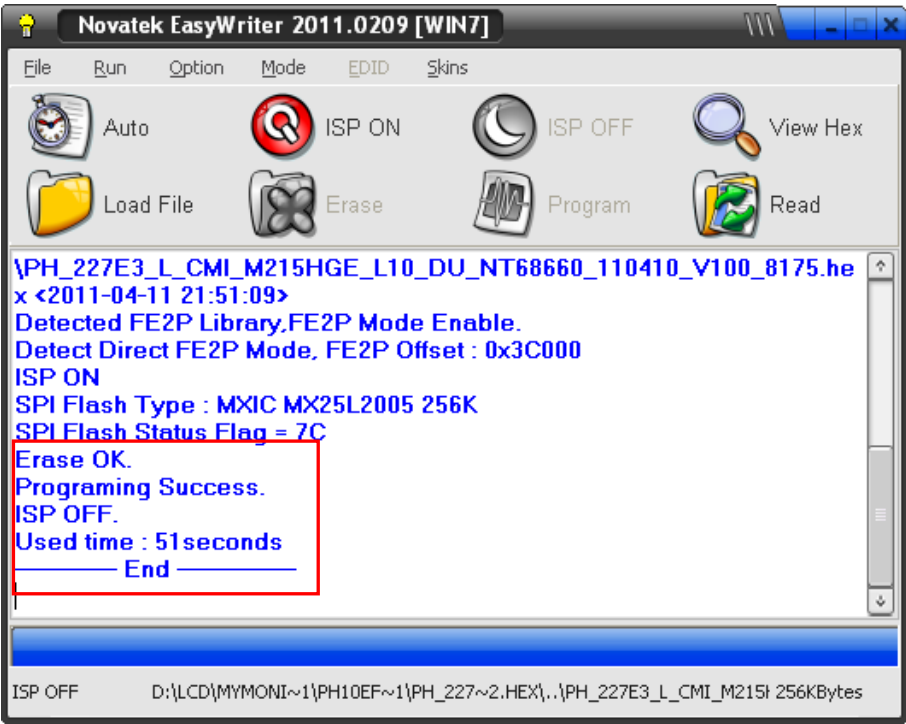
5. Load the F/W you want to upgrade.



6. Start to program. Click "Auto" to start programming.



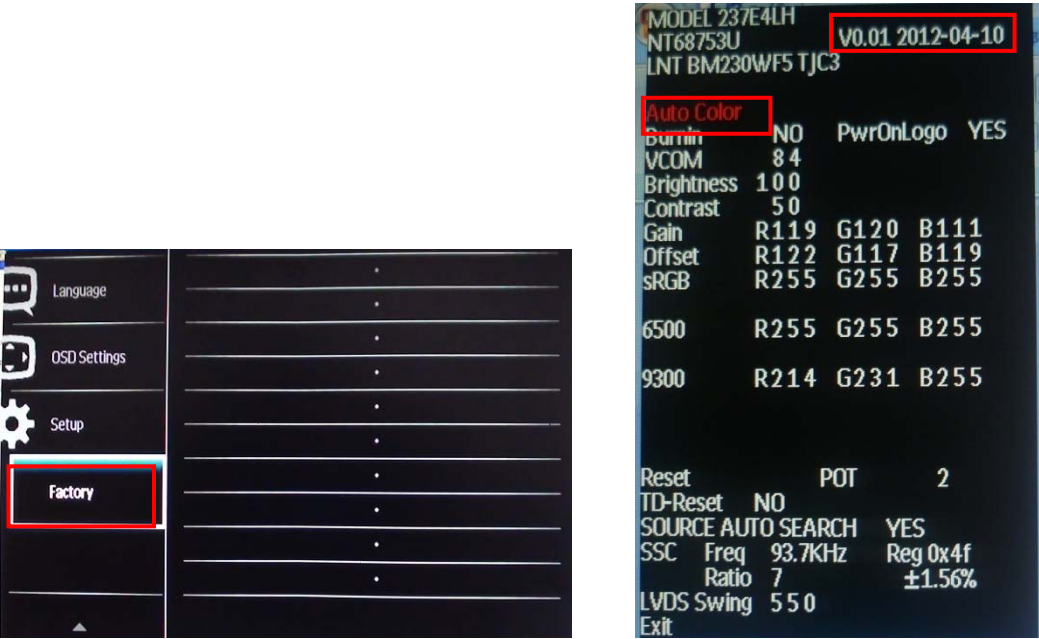
7. Programing success. There will be the message in the red frame after successful programming.



12.4 Check the FW version after upgrade.

The way to open factory menu.

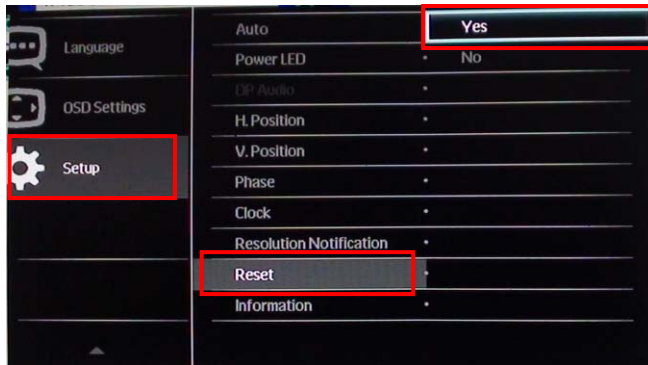
1. Connect the video source to monitor and AC on.
2. The way to factory menu: Press /▼ and /OK buttons at the same time, power on the monitor. When the screen lights, release the two buttons and press the “MENU” again, the picture will appear on the top left corner.
3. Select the “Factory” and press the “MENU” button to enter the factory mode. Take 237E4LH for example:



4. Please do “Auto Color” in factory menu after change main board and upgrade F/W.
5. Power off to exit the factory mode.

Reset the factory setting

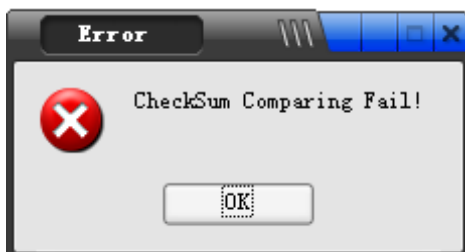
1. Power on the monitor and open the user menu.
2. Do factory reset: Setup – Reset – Yes.



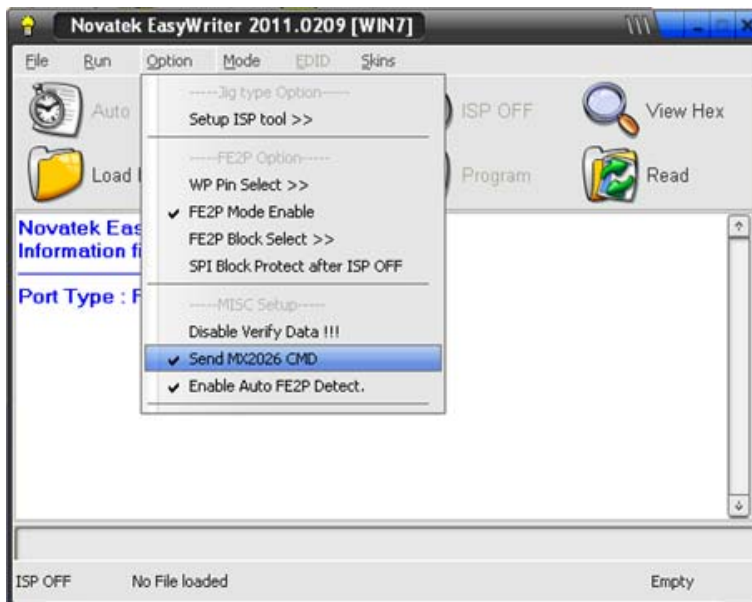
3. Factory reset will turn off “Burn in” mode which screen color switches among red, green, blue and black.

12.5 Troubleshooting:

“Checksum Comparing Fail!” error.



Method: Tick the “Send MX2060 CMD” at Option item.



When can't upgrade, please retry below several ways to upgrade.

- (1) When the tool appears erase error, you can change another version tool to try.
- (2) The program must be in the monitor standby state, while the fail communication with monitor might result the monitor power off. In this situation, you may AC off the monitor for a while and then AC on to retry. Maybe the defect will be cured.
- (3) Change ISP JIG or cable.
- (4) Change PC.

13. DDC Instruction

General

DDC Data Re-programming

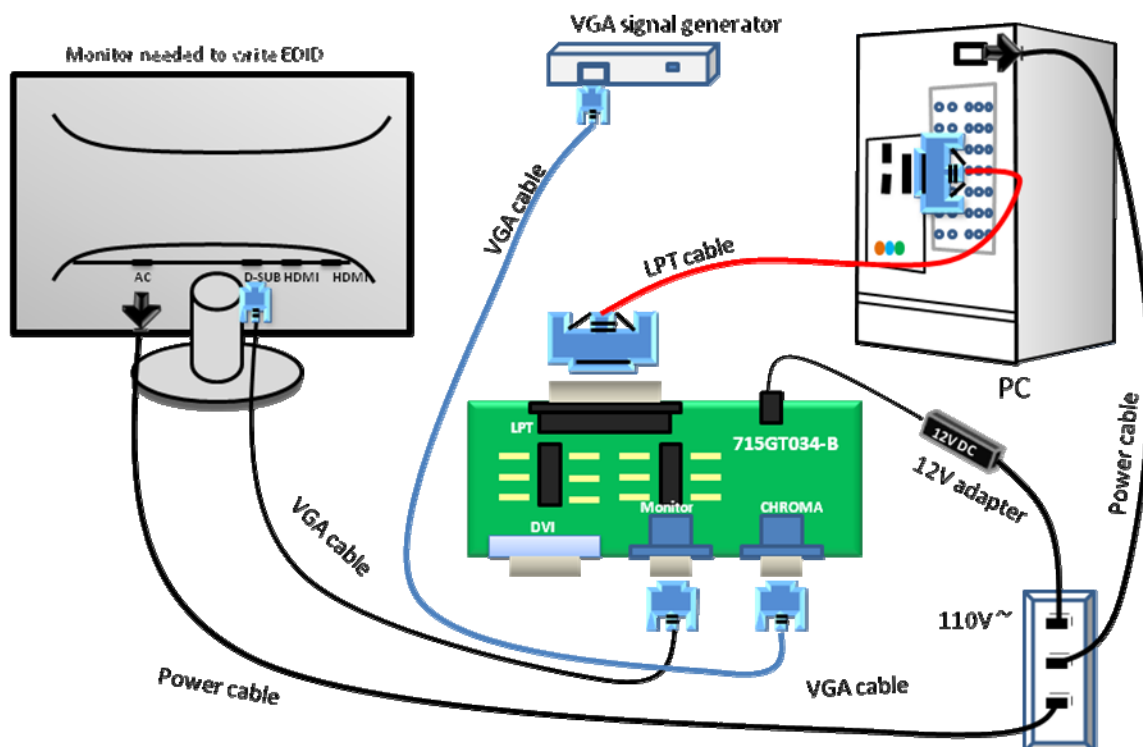
In case the main EEPROM with Software DDC which store all factory settings were replaced because a defect repaired monitor' the serial numbers have to be re-programmed.

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. An i486 (or above) personal computer or compatible.
2. Microsoft operation system Windows 95/98/2000/XP.
3. LPT port driver "PORT95NT.exe" and EDID tool "VGASinglePort.exe"
4. EDID JIG (715GT034-B) x1,
5. LPT cable (male to male) x1, VGA cable x 1, power cable x 2
6. 12V DC power source
7. The monitor and the EDID data

13.1 Connect the ISP board, PC and monitor as follow:

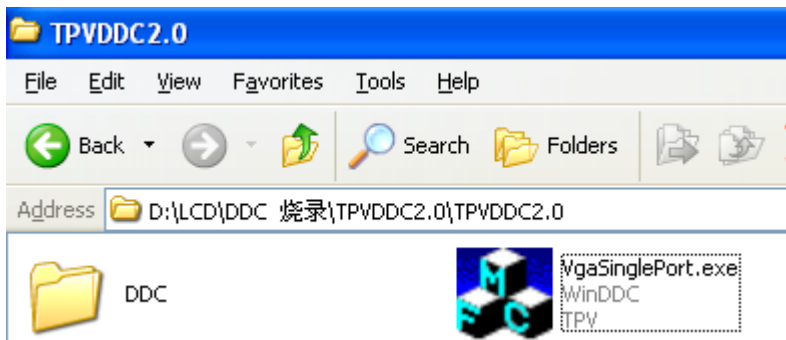


13.2 Install the LPT drive

1. Double click the icon  to install the driver.
2. Restart the PC after the LPT driver installation.

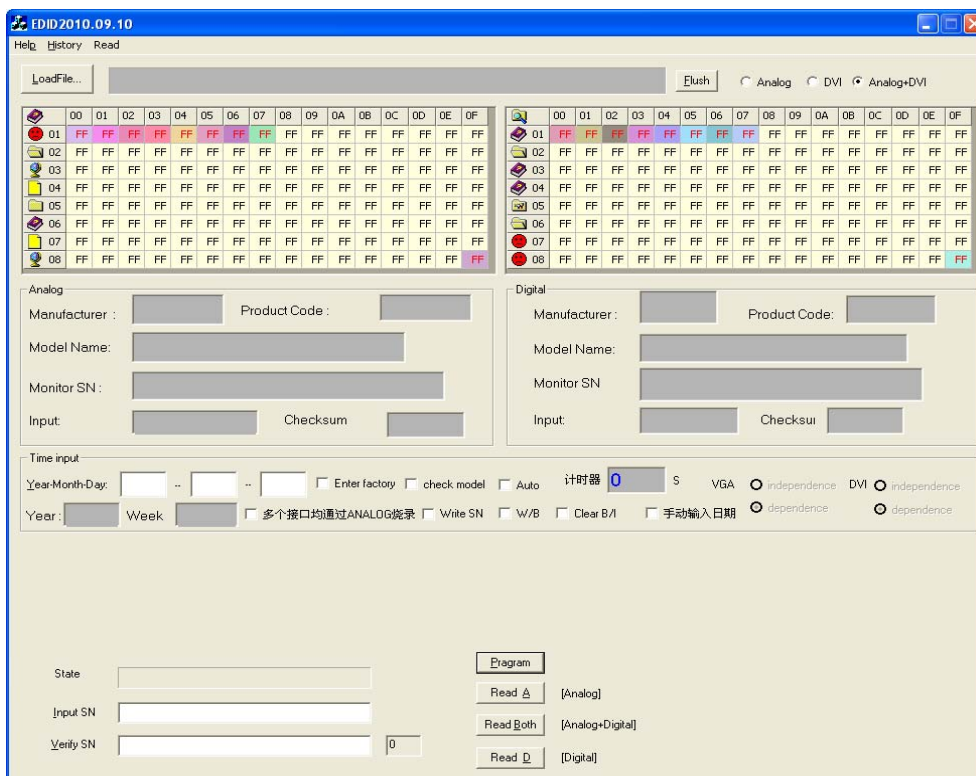
13.3 Prepare the EDID written

1. EDID file has been putted in the DDC folder.
2. The VgaSinglePort.exe is the EDID writing tool.
3. The two file must be putted together as below.

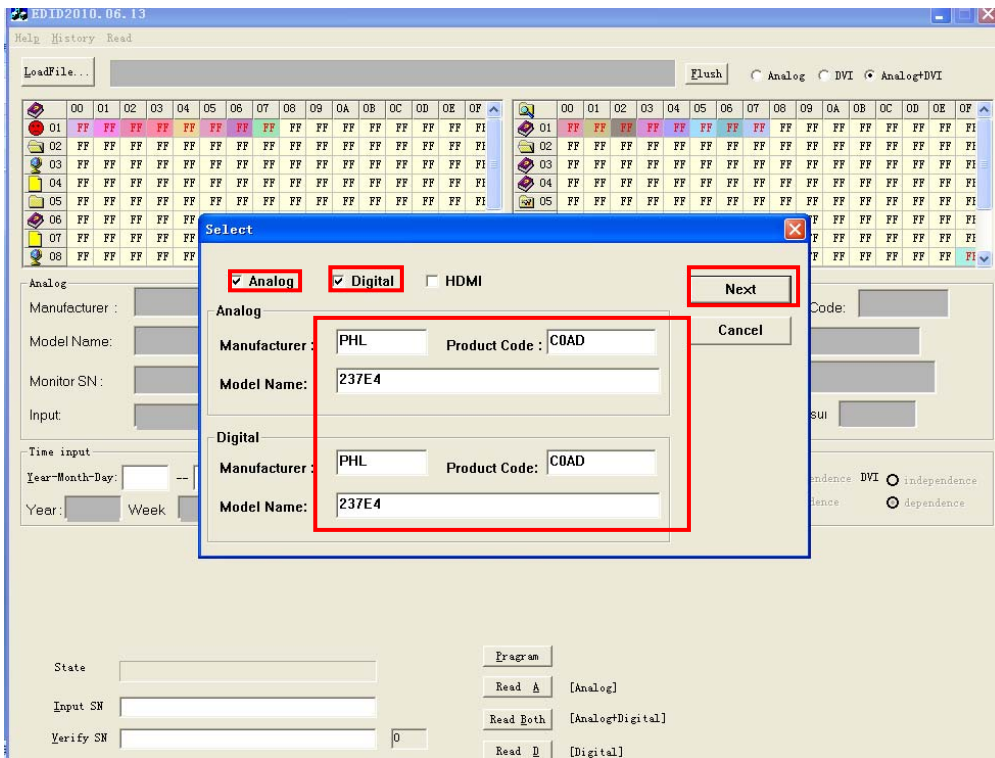


13.4 The process of writing EDID and SN

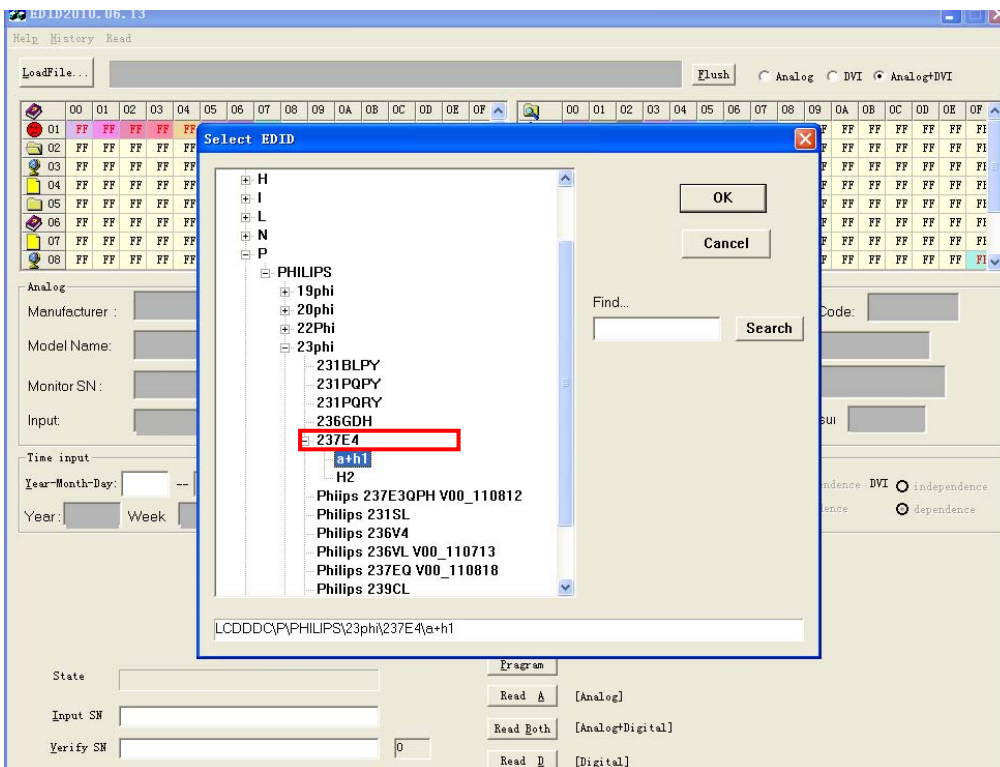
1. Double-click the icon  to open the tool.



Tick the “Analog +DVI”, and click “Loadfile” to set the parameters. And click the “Next” to load the EDID file.



2. Select the “Philips 237E4” and then click “OK”, the tool will read the EDID information:

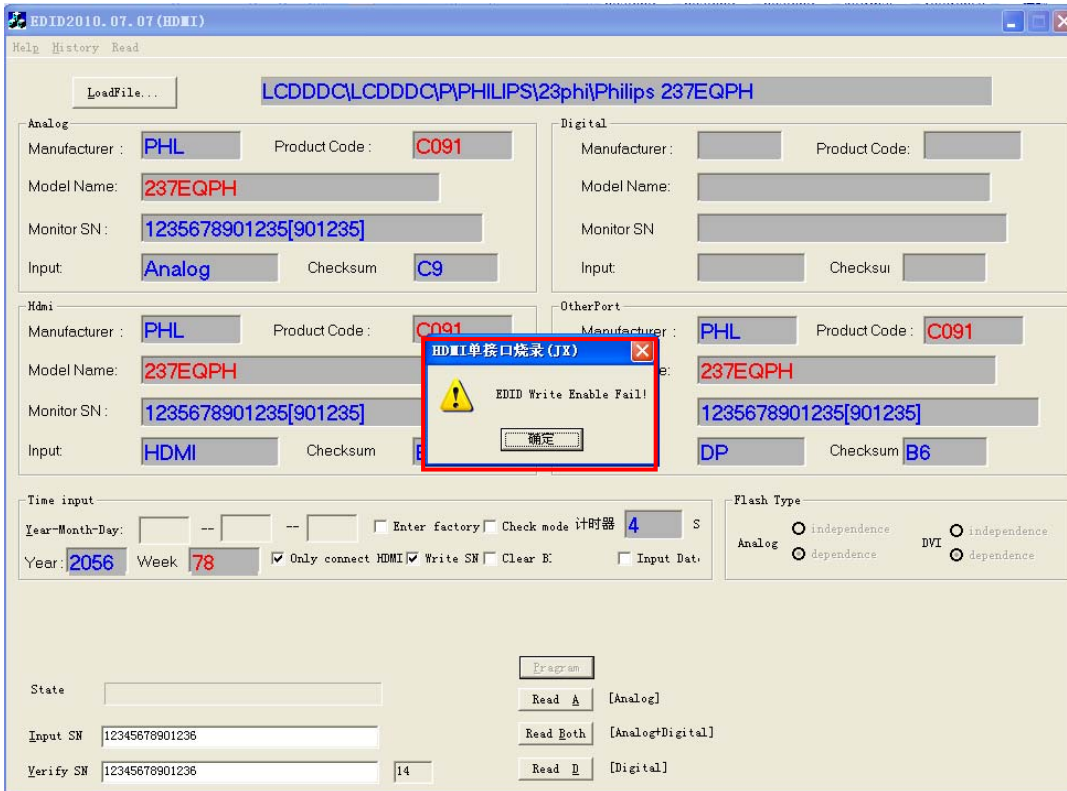


3. Choose the “Only connect VGA” and “Write SN”, and key in the date and the 14 digital S/N.

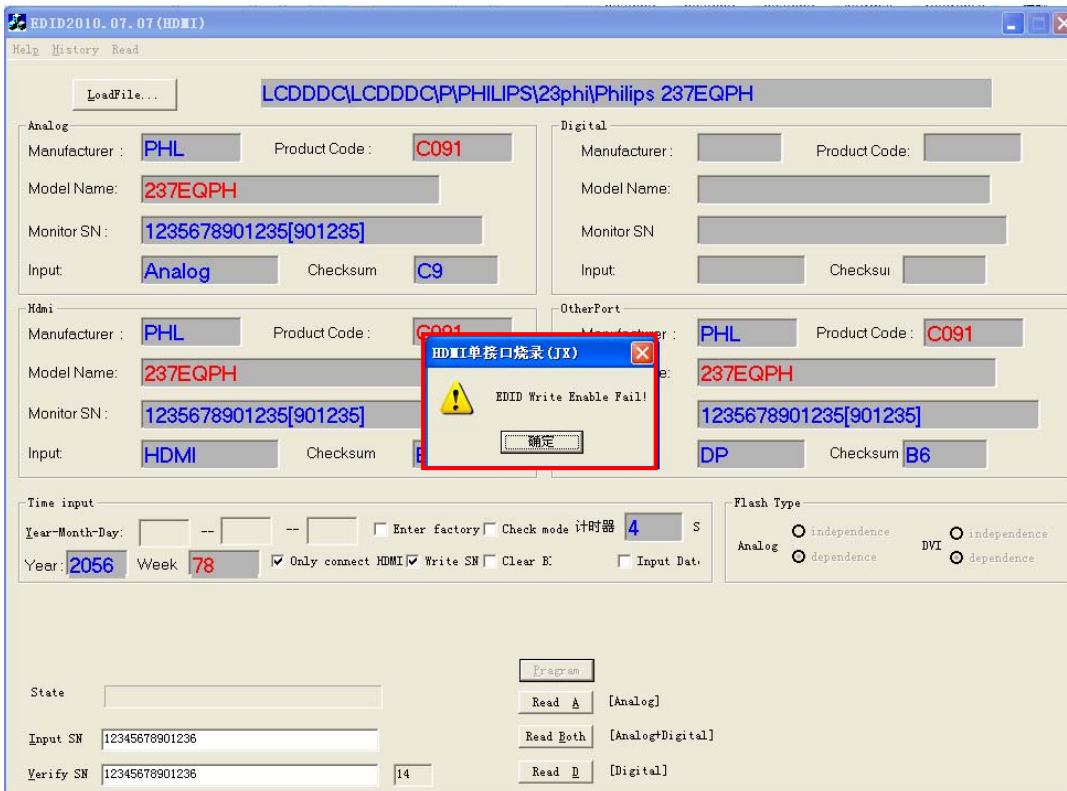
Remark: Please turn on the monitor before clicking “Program”. Or you maybe write EDID fail.

3. Click the “Program” to start programming after monitor power on. When it shows “Analog: PASS!, SN write OK! and DVI: PASS!”. The EDID and SN writing process are finished.

4 Click “program”, if the 12V connector is not OK, it will show the picture as follow:



5 Click “program”, if the cable connector is not OK, it will show the picture as follow:



13.5 Check the SN

1. Connect the video source and power on monitor.
2. Press the "MENU" button to enter the user menu and select "Input", you can check the 14 digital SN. Take 227E3L for example:



3. If this SN number is the same as what we had written by EDID tool, the EDID and SN writing is completed finally.

13.6 Troubleshooting

1. Can't write error.
2. Try below few ways to cure can't write errors!
 - (1) AC on the monitor and turn on it.(Restart the monitor)
 - (2) Take apart the monitor and connect the 7pin of EEPROM to GND to diable write protection then write EDID one by one.
 - (3) Set the Burn in on last to try again.

Analog EDID:

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 41 0C AD C0 01 01 01 01
10| 07 16 01 03 6E 33 1D 78 2A 6E 95 A3 54 4F 9F 26
20| 11 50 54 BD 4B 00 D1 C0 81 80 95 0F 95 00 B3 00
30| 81 C0 01 01 01 01 02 3A 80 18 71 38 2D 40 58 2C
40| 45 00 FD 1E 11 00 00 1E 00 00 00 FF 00 0A 20 20
50| 20 20 20 20 20 20 20 20 20 20 00 00 00 FC 00 32
60| 33 37 45 34 0A 20 20 20 20 20 20 20 00 00 00 FD
70| 00 38 4C 1E 53 11 00 0A 20 20 20 20 20 20 00 EB
  
```

EDID Structure Version/Revision: 01 03

<-Vendor/Product Identification:->

ID Manufacturer Name: PHL

ID Product Code: C0AD
ID Serial Number: No Use
Week of Manufacture: 7
Year of Manufacture: 2012

<-Basic Display Parameters/Features:->

Video i/p definition: Analog
Max. H. Image Size : 51cm
Max. V. Image Size : 29cm
Display Gamma : 2.2

<-Color Characteristics:->

Rx: 0.638 Gx: 0.311 Bx: 0.150 Wx: 0.313
Ry: 0.330 Gy: 0.623 By: 0.067 Wy: 0.329

<-Established Timings:->

Established Timings 1:BD

720 x 400 @ 70Hz VGA,IBM
640 x 480 @ 60Hz VGA,IBM
640 x 480 @ 67Hz Apple,Mac II
640 x 480 @ 72Hz VESA
640 x 480 @ 75Hz VESA
800 x 600 @ 60Hz VESA

Established Timings 2:4B

800 x 600 @ 75Hz VESA
1024 x 768 @ 60Hz VESA
1024 x 768 @ 75Hz VESA
1280 x 1024 @ 75Hz VESA

Established Timings 3:00

<-Standard Timing Identification:->

1920 x 1080 @ 60Hz
1280 x 1024 @ 60Hz
1440 x 900 @ 75Hz
1440 x 900 @ 60Hz
1680 x 1050 @ 60Hz
1280 x 720 @ 60Hz

<-Detailed Timing Descriptions:->

FC (Monitor Name) : 237E4

FD (Monitor Limits):

Min. V. rate: 56 Hz

Max. V. rate: 76 Hz

Min. H. rate: 30 KHz

Max. H. rate: 83 KHz

Max. P Clock: 170 MHz

FF (Monitor SN) :

Detailed Timing : 1920x1080 @ 60Hz

Extension Flag : 00

Block0 Checksum : EB

Digital EDID :

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 41 0C AD C0 01 01 01 01

10| 07 16 01 03 80 33 1D 78 2A 6E 95 A3 54 4F 9F 26

20| 11 50 54 BD 4B 00 D1 C0 81 80 95 0F 95 00 B3 00

30| 81 C0 01 01 01 01 02 3A 80 18 71 38 2D 40 58 2C

40| 45 00 FD 1E 11 00 00 1E 00 00 00 FF 00 0A 20 20

50| 20 20 20 20 20 20 20 20 20 00 00 00 FC 00 32

60| 33 37 45 34 0A 20 20 20 20 20 20 00 00 00 FD

70| 00 38 4C 1E 53 11 00 0A 20 20 20 20 20 00 D9

EDID Structure Version/Revision: 01 03

<-Vendor/Product Identification:->

ID Manufacturer Name: PHL

ID Product Code: C0AD

ID Serial Number: No Use

Week of Manufacture: 7

Year of Manufacture: 2012

<-Basic Display Parameters/Features:->

Video i/p definition: Digital
 Max. H. Image Size : 51cm
 Max. V. Image Size : 29cm
 Display Gamma : 2.2

<-Color Characteristics:->

Rx: 0.638 Gx: 0.311 Bx: 0.150 Wx: 0.313
 Ry: 0.330 Gy: 0.623 By: 0.067 Wy: 0.329

<-Established Timings:->

Established Timings 1:BD

720 x 400 @ 70Hz VGA,IBM
 640 x 480 @ 60Hz VGA,IBM
 640 x 480 @ 67Hz Apple,Mac II
 640 x 480 @ 72Hz VESA
 640 x 480 @ 75Hz VESA
 800 x 600 @ 60Hz VESA

Established Timings 2:4B

800 x 600 @ 75Hz VESA
 1024 x 768 @ 60Hz VESA
 1024 x 768 @ 75Hz VESA
 1280 x 1024 @ 75Hz VESA

Established Timings 3:00

<-Standard Timing Identification:->

1920 x 1080 @ 60Hz
 1280 x 1024 @ 60Hz
 1440 x 900 @ 75Hz
 1440 x 900 @ 60Hz
 1680 x 1050 @ 60Hz
 1280 x 720 @ 60Hz

<-Detailed Timing Descriptions:->

FC (Monitor Name) : 237E4
 FD (Monitor Limits):
 Min. V. rate: 56 Hz

Max. V. rate: 76 Hz

Min. H. rate: 30 KHz

Max. H. rate: 83 KHz

Max. P Clock: 170 MHz

FF (Monitor SN) :

Detailed Timing : 1920x1080 @ 60Hz

Extension Flag : 00

Block0 Checksum : D9

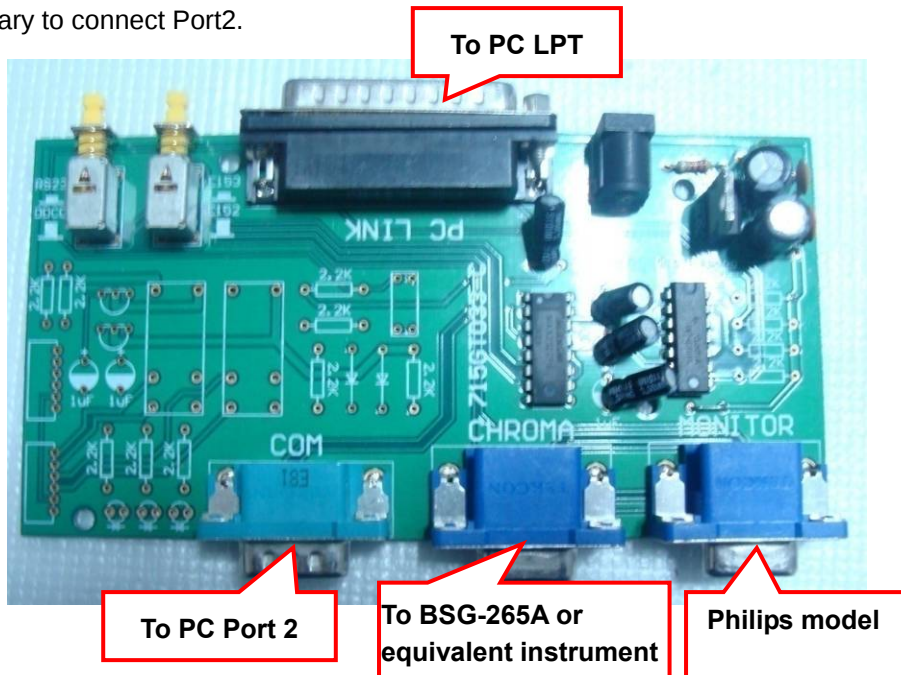
14. White Balance, Luminance Adjustment

1. Apparatuses and program: analyzer CA-210, PC, tool, FGA adjustment program (PhilipsLEDFGA.DDCI), Pattern generator.

2. Equipment installation:

- Connect analyzer CA-210 to PC by USB connector, install drive program CA-SDK Ver4.00 for CA-210 and restart PC after finish installing
- Install Port95NT drive program, set PC printer connector mode as ECP mode and reset PC after finish installing.
- Connect tool as follow:

Note: It's not necessary to connect Port2.



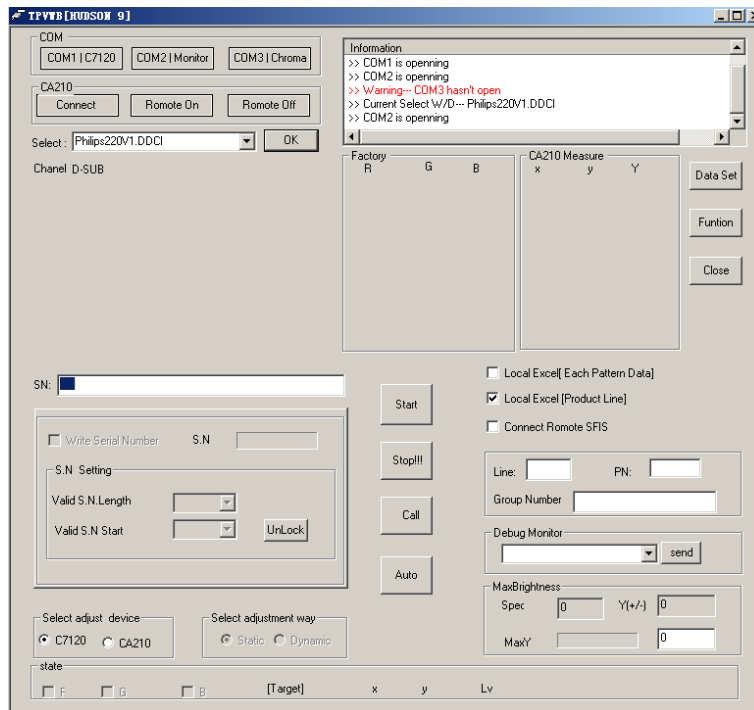
3. Adjustment

Preparation before adjustment:

- Monitor should be warmed up for more than half an hour.
- Make sure that the tools are connected right and drive programs have been installed OK.

4. Adjustment process:

- Press the power of CA-210, shut off the lens, press 0-Cal and open the lens after analyzer reset.
- Open white balance adjustment program, select the right parameter according with the program and click OK.
- Make sure that the lens of CA-210 aims at the center of the screen, then click START to adjust.
- After finish adjusting, the adjustment program displays PASS, and the START button changes for NEXT, which means that you can adjust another monitor.



5. Color Temp confirmation

Connect the signal to the monitor, the monitor displays white-picture, use CA-210 to measure the Color Temp of the screen center and select the OSD to make sure whether the Color Temps accord with the SPEC.

227E3L

CIE coordinates	11500K	9300K	8200K	7500K	6500K/sRGB	sRGB	5000K
x	0.270±0.02	0.283±0.02	0.291±0.02	0.298±0.02	0.313±0.02	0.313±0.02	0.345±0.02
y	0.281±0.02	0.297±0.02	0.306±0.02	0.314±0.02	0.329±0.02	0.329±0.02	0.357±0.02

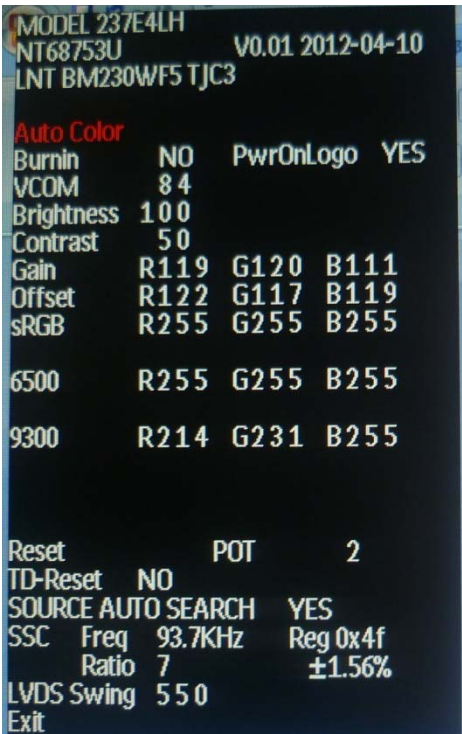
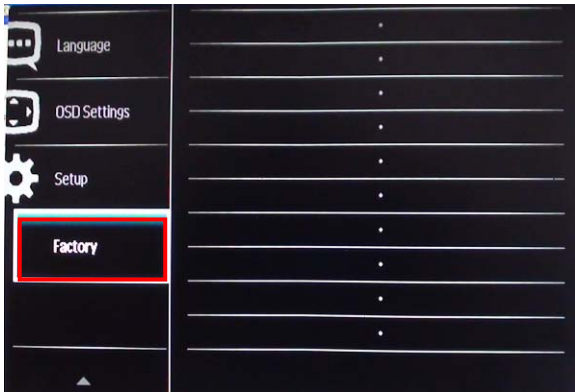
247E3L

CIE coordinates	9300K	6500K/sRGB	sRGB
x	0.283±0.02	0.313±0.02	0.313±0.02
y	0.297±0.02	0.329±0.02	0.329±0.02

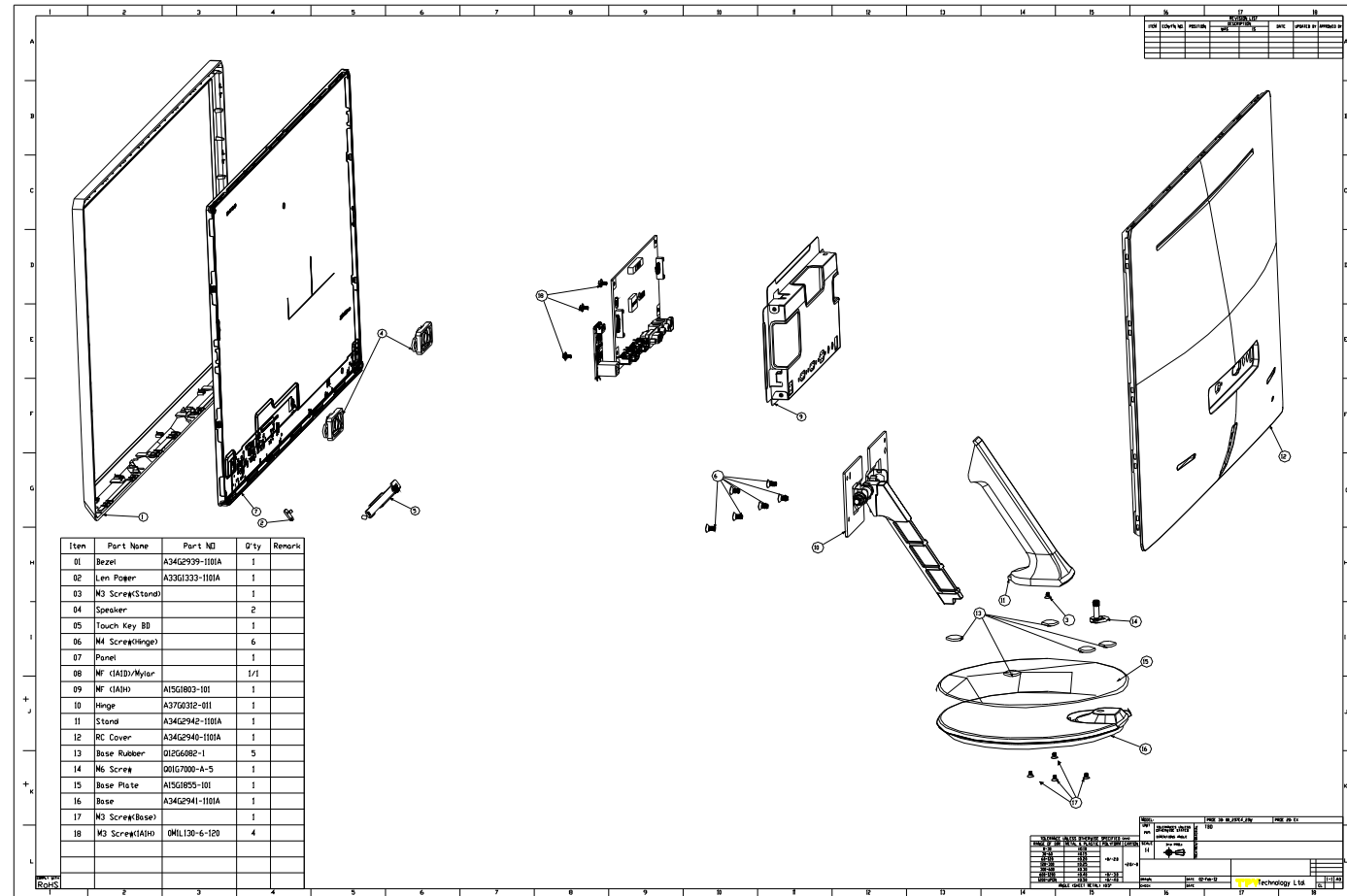
6. How to enter into the factory mode

1. Connect the video source to monitor and AC on.
2. The way to factory menu: Press /▼ and  buttons at the same time, power on the monitor. When the screen lights, release the two buttons and press the “MENU” again, the picture will appear on the top left corner.

3. Select the “Factory” and press the “MENU” button to enter the factory mode. Take 237E4LH for example:



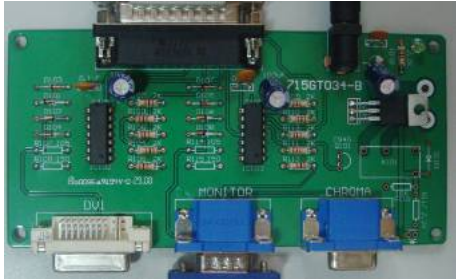
15. Monitor Exploded View



16. Recommended & Spare Parts List

Recommended Parts List

LOCATION	PCM CODES	DESCRIPTION	REMARK
E8903	089G1745CAA-AC	DVI CABLE 1500MM COMLINK	
E8903	089G1745HAA-AC	DVI CABLE 1500MM HONGLIN	2ND SOURCE
E8903	089G1745LAA-AC	DVI CABLE 1500MM HONGSHUO	2ND SOURCE
E8901	089G414A15N-JR	POWER CORD 1500MM China jianrun	
E8901	089G414A15N-HL	POWER CORD 1500MM CHINA HONGLIN	2ND SOURCE
	380GLA19044H00	Adapter 19V 3.42A ADS-65LSI-19-1 19065G HONOR	
E750	750GBT230W3C21N000	PANEL BM230WF3-SJC2-8F1-A0	
U402	056G2233501	IC FLASH MX25L2026DM1I-12G 2Mb SOP-8 MXIC	
	A15G1765601	main frame	
	A15G1855102	BKT_BASE	
	A33G1333--2-1C0100	LENS_POWER	
	A34G2939ANBD2B0130	BEZEL	
	A34G2940ANC-6B0100	REAR_COVER	
	A34G2941ANC-1B0100	BASE	
	A34G2942ANC-1B0100	STAND	
	A37G0312011	HINGE_ASS'Y	
	CBPCVN6PHQM	MAIN BOARD	
U401	056G-562A13	IC SCALER NT68652UFG/B LQFP128 NOVATEK	
U704	056G-563256--C	IC LDO G912PT43U 1A 1.2V TO-252 GMT	
U702	056G-563377	IC LDO TJ3940GRS-3.3 1A/3.3V TO252 HTC Korea	
U101	056G-662-52	IC ESD PROTECT AZC398-04S.R7G SOT23-6 Amazing	
U102	056G1133158	IC EEPROM CAT24C02WI-GT3A 2Kb SOIC-8 ON	
	056G1133-34--1	IC EEPROM M24C02-RMN6TP 2Kb SO-8 ST	2ND SOURCE
U402	056G2233501	IC FLASH MX25L2026DM1I-12G 2Mb SOP-8 MXIC	
U705	356G0563419	IC LDO DC/DC APW7089KAI-TRG 4A 26V SOP-8P ANPEC	
E08906	F95G176J-10345	FFC CABLE 10PIN 407MM P0.5MM KOTL	
E08906	F95G176T-10345	FFC CABLE 10PIN 407MM P0.5MM TPV	2ND SOURCE
E08905	F95G179J30N251	FFC CABLE 30PIN 253MM P1.0MM KOTL	
E08905	F95G179T30N251	FFC CABLE 30PIN 253MM P1.0MM TPV	2ND SOURCE
	KEPCCQPH	KEY BOARD FOR SMT	
U001	056G-669-45	IC TOUCH KEY IT7230EFN/BX QFN16 ITE	

Description	Part No.	Picture
ISP JIG	715GT089-B/C	
EDID JIG	715GT034-B	

17. Different Parts List

Diversity of compared with					
Location	PCM Codes	Description	Location	PCM Codes	Description

Diversity of compared with					
Location	PCM Codes	Description	Location	PCM Codes	Description

18. General Product Specification

M4-237 Series GENERAL PRODUCT SPECIFICATION

Issued by: Argent Chan/Paul Tsai

Revision History

Ver.	Date (yy.mm.dd)	Author	Brief Description
0.1	2012.04.05	Brad Chiu	Initial version

Blue: Changes than last version

Red: TBD

Quick Specification table:

Model	Input	Feature
237E4QSD	1A1D	e-IPS panel
237E4QHAD	1A2H+OD+MHL+Speaker	e-IPS panel
237E4QHSD	1A2H+OD+MHL+HDMI audio out	e-IPS panel
237E4LSB	1A1D	TN panel
237E4LHAB	1A2H+OD+Speaker	TN panel
227E4LHSB	1A2H+OD+HDMI audio out	TN panel

FOREWORD

This specification describes a **23" FHD** multi-scan color TFT LCD monitor with maximum resolution up to **1920 x 1080 /60Hz** non-interlaced. This model uses **250nits** panel.

All optical characteristics are determined according to panel specification after warming up longer than 30 minutes.

PRODUCT PROFILE

EDID header

Data for EDID & .inf file

1	User visible strings on .inf file	Philips 237E (23inch Wide LCD MONITOR 237E4)
2	Manufacturer ID (EDID data)	PHL
3	Product ID, "xxxx" 4 codes	MSB(byte 12): C0
		LSB (byte 11): AD
4	maximum resolution	1920x1080
5	Horizontal Frequency Range	30~83 KHz
6	Vertical Frequency Range	56~76Hz
7	Monitor Name (13 characters max.)	Philips 237E

LCD

Suppliers to offer panel specifications.

Panel incoming specification: Follow Philips' specification.

LnT

Type NR.	: LnT BM230WF3-SJC2 e-IPS panel
Resolution	: 1920 x 1080 (WSXGA+)
Outside dimensions	: 534(H) x 313.3(V) Typ. x 10.6(D) Typ.
Pitch (mm)	: 0.265mm x 0.265mm
Color pixel arrangement	: RGB vertical stripe
Display surface	: Hard coating (3H)
Color depth	: 16.7M (6 bit Hi-FRC)
Backlight	: LED
Active area (W x H)	: 509.76(H) x 286.74(V) mm
View angle (CR=10)	: =178 for Right/Left (Typ)
	: =178 for Up/Down (Typ)
Contrast ratio	: 1000:1 (Typ), 600:1(Min.)
White luminance	: 250cd/m2(Typ.), 200cd/m2(Min.)
Color gamut	: 70% (Typ.)
Gate IC	: N/A
Source IC	: N/A
Response time	: Tr + Tf <=14 ms (Typ)
Vertical frequency range	: 48~76Hz

LnT

Type NR.	: LnT BM230WF5-TJC3
Resolution	: 1920 x 1080 (WSXGA+)
Outside dimensions	: 536.5(H) x 312(V) Typ. x 8.4(D) Typ.
Pitch (mm)	: 0.265mm x 0.265mm
Color pixel arrangement	: RGB vertical stripe
Display surface	: Hard coating (3H), Anti-glare treatment of the front polarizer
Color depth	: 16.7M colors
Backlight	: LED

Gate IC	: N/A
Source IC	: N/A
Response time	: <=5 ms (Typ)

Type NR.	: SEC LTM230HT10
Resolution	: 1920 x 1080 (WSXGA+)
Outside dimensions	: 534(H) x 311.7(V) Typ. x 10.7(D) Typ.
Pitch (mm)	: 0.265mm x 0.265mm
Color pixel arrangement	: RGB vertical stripe
Display surface	: Hard coating (3H), Anti-glare treatment of the front polarizer
Color depth	: 16.7M colors
Backlight	: LED
Active area (W x H)	: 509.76(H) x 286.74(V) mm
View angle (CR>=10)	: R/L 160(Typ.), U/D 160(Typ.)
Contrast ratio	: 600:1(min.), 1000:1 (Typ)
White luminance	: 200 cd/m2(Min.), 250 cd/m2(Typ. Center 1 point)
Color gamut	: 70% (Typ.)
Gate IC	: N/A
Source IC	: N/A
Response time	: <=5 ms (Typ)
Vertical frequency range	: 50~75Hz

Hor. : 30 – 83 K Hz
Ver. : 56 - 76 Hz

Video dot rate: < 170 MHz for VGA and < 170 MHz for DVI, warning message must be displayed while over 165 MHz (supplier to provide accurate scaler bandwidth number)

Power input: 90-264 V AC, 50/60 ± 2 Hz

Functions:

- (1) D-SUB analog R/G/B separate inputs, H/V sync separated, Composite (H+V) TTL level,
- (2) SOG sync : a. Sync select: H + V
 b. Sync select: SERR
 c. XS SYNC SELECT: H EOR V
- (3) DVI digital Panel Link TMDS inputs, HDCP supported.

0 °C - 40 °C

FULL RANGE POWER SUPPLY 90 – 264 VAC

Scaler should be capable of below items.

- Monitor automatically adjusts and optimizes resolution and frequency based on input signal defined by "Source" function. "NO VIDEO INPUT" (source) (Note A) message to be displayed on screen while no signal is detected. Monitor will automatically optimize resolution and frequency whenever connected to different signal source. When press the "Auto", the screen also show a status bar. During adjustment period, a status bar will show on screen from 0% to 100% to indicate the progress of adjustment.
- Auto auto adjustment : new timing & preset modes (non- factory preset mode) should do auto

date into memory.

adjustment at first time detection and save the related

Resolution $\leq$ 800x600 , do not do auto auto adjustment.

Note A : source maybe D-SUB,DVI,HDMI

Interface signals

1). D-Sub Analog

Input signal : Video, Hsync., Vsync

Video : 0.7 Vp-p, input impedance, 75 ohm @DC

Sync. : Separate sync TTL level , input impedance 2.2k ohm terminate

Hsync Positive/Negative

Vsync Positive/Negative

Composite sync TTL level, input impedance 2.2k ohm terminate (Positive/Negative)

Sync on green video 0.3 Vp-p Negative (Video 0.7 Vp-p Positive)

2). DVI-D Digital

Input signal: Single TMDS link (Three channels: RX0-/+, RX1-/+, RX2-/+))

3) HDMI (option , refer to Quick specification table)

Follow [HDMI 1.4](#) specification

TMDS channel:

- Carries audio, video and auxiliary data.
- Signaling method: According to DVI 1.0 specification. Single-link (Type A HDMI).
- Video pixel rate: 25 MHz to 165 MHz (Type A)
- Pixel encodings: RGB 4:4:4, YCbCr 4:2:2, YCbCr 4:4:4.
- Audio sample rates: 32 kHz, 44.1 kHz, 48 kHz
- Audio channels: 2.

DDC channel:

- Allows source to interrogate capabilities of sink.
- I²C signaling with 100 kHz clock.
- E-EDID data structure according to EIA/CEA-861D and VESA Enhanced EDID.

Content protection:

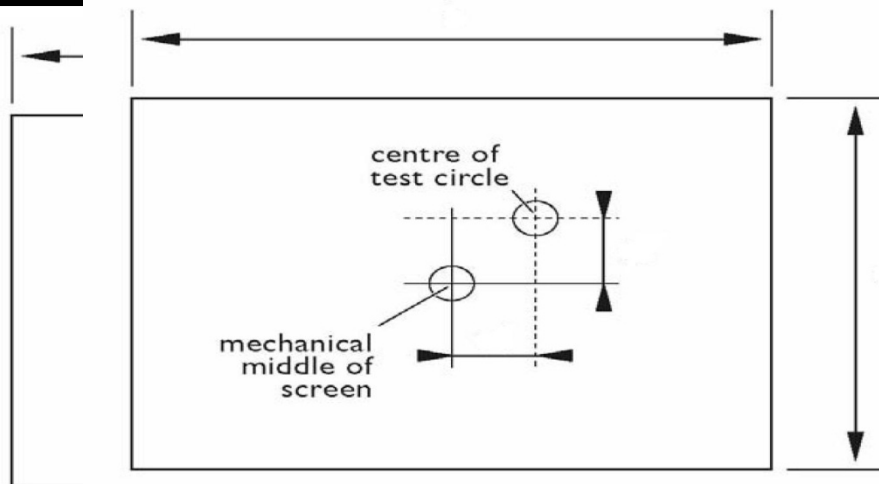
According to High-Definition Content Protection (HDCP) Specification 1.10.

HDMI video input should support timing defined in **CEA 861-D** specification with extended EDID blocks

Video Timing Support :

Format	Resolution	Type	Vertical frequency
480i	720 x 480	SD	60Hz
480p	720 x 480	SD	60Hz
576i	720 x 576	SD	50Hz
576p	720 x 576	SD	50Hz
720p	1280 x 720	HD	50Hz , 60Hz
1080i	1920 x 1080	HD	50Hz , 60Hz
1080p	1920 x 1080	HD	24Hz, 25Hz, 30Hz, 50Hz, 60Hz

- Picture centering - H & V $\leq$ 0.5 %. (for TV, 480i/p, 576i/p, 720p, 1080i/p)



Over Scan -

1. RGB signal : OFF (no this function)
2. YUV signal : (Video timing) ON (Be use and set ON/OFF)
(But only 1080p define is OFF)

PC timing: to follow PC timing table

TMDS/+5V/DDC/HPD/CEC Signals

(TMDS Signal)

Termination Supply Voltage AV_{CC} :	$3.3V \pm 5\%$
Differential Voltage Level :	$150mV - 1200mV$
Common Mode Voltage :	$(AV_{CC} - 300mV) - (AV_{CC} - 37.5mV)$
Differential Sensitivity :	$150mVp-p$
Maximum differential Voltage :	$1560mVp-p$

(+5V Power)

Power Supply Voltage :	$4.7V - 5.3V$
Maximum Current Consumption :	$50mA$

(DDC Signal)

Maximum Capacitance :	$50pF$
-----------------------	--------

(HPD Signal)

High Voltage Level :	$2.4V - 5.0V$
Low Voltage Level :	$0 - 0.4V$
Output Resistance :	$1K\Omega \pm 20\%$

(CEC Signal, not supported by this model)

Input Low Voltage :	$< 0.8V$
Input High Voltage :	$> 2.0V$
Output Low Voltage:	$0 - 0.4V$
Output High Voltage:	$2.5V - 3.6V$
Pull-up Resistor:	$2.7K\Omega \pm 10\%$
Leakage Current in standby/off :	$< 1.8\mu A$
Maximum Capacitance:	$100pF$

- 4). DisplayPort (option , refer to Quick specification table)
Follow [DisplayPort 1.1](#) specification.

- 5). USB Hub 2.0 (option , refer to Quick specification table)
USB port (1 upstream, 2 or 4 downstream)
- 6). Audio in (option , refer to Quick specification table)
Input signal: 1Vrms
Loudspeaker: stereo of RMS Power
Frequency range: (WAIT FOR SUPPLIER INPUT)
Headphone connection will mute speaker
- 7). USB PLUG (option , refer to Quick specification table)
USB port (1 upstream, 1 downstream), black jack color
- 8). HDMI audio out (headphone): (option, refer to Quick specification table)
Stereo, > 50mVrms for headphone of 32Ω

Interface

D-Sub Cable

Length : Please refer to M3 cable bundle summary file
Fix with monitor when packing, with transplant pin protective cover.

Connector type : D-Sub male with DDC2B pin assignments.
Blue connector thumb-operated jack screws

Pin assignments:

PIN No.	SIGNAL
1	Red
2	Green/ SOG
3	Blue
4	Sense (GND)
5	Cable Detect (GND)
6	Red GND
7	Green GND
8	Blue GND
9	DDC +3.3V or +5V
10	Logic GND
11	Sense (GND)
12	Bi-directional data
13	H/H+V sync
14	V-sync
15	Data clock

DVI Cable

The input signals are applied to the display through DVI-D cable.

Length : Please refer to M3 cable bundle summary file

Connector type : DVI-D male with DDC-2B pin assignments
White connector thumb-operated jackscrews
With transplant pin protective cover.

Pin Assignment:

Pin No.	Description
---------	-------------

1	T.M.D.S. data2-
2	T.M.D.S. data2+
3	T.M.D.S. data2 shield
4	No Connect
5	No Connect
6	DDC clock
7	DDC data
8	No Connect
9	T.M.D.S. data1-
10	T.M.D.S. data1+
11	T.M.D.S. data1 shield
12	No Connect
13	No Connect
14	+5V Power
15	Ground (for +5V)
16	Hot plug detect
17	T.M.D.S. data0-
18	T.M.D.S. data0+
19	T.M.D.S. data0 shield
20	No Connect
21	No Connect
22	T.M.D.S clock shield
23	T.M.D.S. clock+
24	T.M.D.S. clock-

HDMI Cable

The input signals are applied to the display through HDMI cable.
 Length : [Please refer to M3 cable bundle summary file](#)
 Connector type : HDMI male with DDC-2B pin assignments
 White connector thumb-operated jackscrews
 With transplant pin protective cover.

Pin Assignment:

Pin No.	Description
1	TMDS Data2+
2	TMDS Data2 Shield
3	TMDS Data2–
4	TMDS Data1+
5	TMDS Data1 Shield
6	TMDS Data1–
7	TMDS Data0+
8	TMDS Data0 Shield
9	TMDS Data0–
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock–
13	CEC
14	Reserved (HDMI 1.0-1.3c), HEC Data- (Optional, HDMI 1.4+ with Ethernet)
15	SCL (I ² C Serial Clock for DDC)
16	SDA (I ² C Serial Data Line for DDC)
17	DDC/CEC/HEC Ground
18	+5 V Power (max 50 mA)
19	Hot Plug Detect (All versions) and HEC Data+ (Optional, HDMI 1.4+ with Ethernet)

Timing requirement

Factory Preset mode definition:

1. Perfect FOS while presenting those timings.
2. Will specify those timing in User's Manual

Preset mode definition:

1. Need to support those timings.
2. Perfect FOS after auto adjustment.

User mode

1. Can save those timing that not in Preset mode and can be showed (not over scaler or

Panel spec.)

2. It needs to reserve the 10 timings space in memory size.

Mode storing capacity

Factory preset modes : Refer to Timing table_
 preset modes : Refer to Timing table
 User modes : Refer to Timing table

Timing pixel clock over H/W limitation do not support.

Timing pixel clock over H/W limitation do not support.

VGA Video timing : interlace modes do not support.

1. Factory preset modes and preset modes are defined in the enclosed timing table file



Timing table.xls

2. Video timing mode for DVI/HDMI (internal firmware support) ,
 60Hz: 480p/720p/1080i/1080p
 50Hz: 576p/720p/1080i/1080p

OSD/Keypad functions

ITEM			
1	OSD/keypad definition	 M4 OSD Button definition _ 2012	Reset - No: Exit Yes: Auto adjustment for displaying timing mode and recall factory preset
2	OSD Translation	 MMD OSD_Function OSD_String_M4_201 definition _FW SP 11128.xls	English , French , German , Spanish , Italian , Russian , Simplified Chinese , Portuguese , Turkish (9)
3	Power On logo	 Philips_Logo_1920x 1080.bmp	Power On Logo: Power On → Show up Philips logo 3 seconds → Change to input signal.

			This picture is reference only. The official drawing will send out by PM.
4	Audio Selection	Stand-alone – On: Isolate video and audio control input Stand-alone – Off: Integrate video and audio control input Mute – On: Turn off audio Mute – Off: Turn on audio	

Horizontal scanning

Sync polarity : Positive or Negative
Scanning frequency : 30 – 83 K Hz

PS : Item 3.4 and 3.5 , as far as possible to be display (another Horizontal and Vertical)

Vertical scanning

Sync polarity : Positive or Negative
Scanning frequency : 56 - 76 Hz

Power input connection

Power cord length : please refer to M3 cable bundle summary file
Power cord type : 3 leads power cord with protective earth plug.

Power management

The monitor must comply with the Microsoft On Now specification, and meet EPA requirements.

Mode	HSYNC	VSYNC	Video	Pwr-cons.	Indication	Rec. time
Power-On	On	On	Active	<35W (typ.) < 40W (max.)	White LED	--
Standby (Sleep mode)	Off	Off	Blanked	< 0.5W	Blinking white LED Period 3sec on, 3sec off	Note 1 Note 2
DC Power Off			N/A	< 0.3W	LED Off	

Note 1 :

- a. D-SUB ,HDMI mode,
Normal mode to Power saving mode: 19/s (typ.)
Power saving mode to Normal: 4/s(typ.)
Source / timing change : 10/s (typ.)
- b. DVI mode,
Normal mode to Power saving mode: 19/s(typ.)
Power saving mode to Normal: 10s(typ.)
Source / timing change : 10/s (typ.)

Note 2 :

Measurement power Saving.



measurement of
power saving.pdf



Power consumption
measure the way -090

PS: SmartImage Economy mode: < EPA5.0 spec. (Brightness=20%)
EPA 5.0 spec. as below

Panel size	Native resolution	Max. Power (W)
16"(16:9)	1366x768	14.5
17"(4:3)	1280x1024	21.9
17"(16:10)	1440x900	21.2
18.5"(16:9)	1366x768	16.6
19"(16:10)	1440x900	22.7
19"(4:3)	1280x1024	23.6
20"(16:10)	1680x1050	28
20"(16:9)	1600x900	24.5
22"(16:10)	1680x1050	30
22"(16:9)	1920x1080	31.6
23"(16:9)	1920x1080	32.9
24"(16:10)	1920x1200	36.8
24"(16:9)	1920x1080	34

EPA 5.1 VS EPA6.0

Maximum On Mode Power Requirements ($P_{ON MAX}$)				
Viewable Diagonal screen size (inch) $d < 30.0$		A (inch ²)	EPA displays v.5.1 Tier 1 2009-10-30	EPA displays v.6.0 draft 2 2012-09-30
			$P_{ON MAX}$ (W), A in inch ²	$P_{ON MAX}$ (W), A in inch ²
$d < 12.0$				
$12.0 \leq d < 25.0$	15.6	104.0	14.5	11.8
	17	141.0	21.8	13.9
	18.5	146.2	16.6	12.4
	19	176.1	23.6	14.4
	19	162.2	22.8	14.1
	20	170.9	24.5	15.1
	21.5	197.5	31.5	19.3
	22	217.5	29.8	17.7
	23	226.0	33.0	19.7
	23.6	238.0	33.6	19.9
	24	258.9	36.7	21.6
$25.0 \leq d < 30.0$	25	267.1	35.0	20.5
	26	288.9	36.1	24.4
	27	311.5	37.2	28.5
	28	352.4	41.4	37.2

VGA Display identification

In accordance with VESA Display Channel Standard Ver.1.0 and DDC 2B capability

DVI Display identification

In accordance with DVI requirement (DDWG digital Visual Interface revision 1.0)

use DDC-2B, DDC/CI, and EDID V1.3

DDC /CI Support and Smart Manage/Control

In accordance with VESA DDC/CI and MCCS ver.2.0, the monitor should be workable with ,
Philips SmartManage, SmartControl V6.1, and Protrait Display Tune at least.

Hot-key definition



M4 OSD Button
definition _ 20111207

Smart image



SmartImage
Profile Definitio

PerfectTune II (formerly FGA, FACTORY GAMMA Alignment)

- A. PerfectTune must be done after warming 30 minutes at least.
- B. PerfectTune must be performed after Auto Color.
- C. PerfectTune must be conducted through DVI or scaler embedded patterns.
- D. Delta E < 10

audio

3.17.1 Frequency Response

The amplifier and speaker combination shall provide a frequency response of 300 Hz to 20 kHz, with +/- 3 dB variation over the entire response range.

3.17.2 Total Harmonic Distortion

Total harmonic distortion shall be limited to 5% THD at the maximum wattage speaker rating specified in section 1.3, at 1 kHz, when the input is 1.0Vrms.

3.17.3 Power Handling

Each speaker transducer shall accept up to the specified Wattage of audio power without damage or exceeding the frequency response and total harmonic distortion specifications.

3.17.4 Audio Amplifier

The amplifier shall provide two channels of audio up to 2.0 Watts per channel from 100 Hz to 20 kHz, based upon an audio signal input of 1.0V RMS per channel.

3.17.5 Volume Control

For monitors with a manual volume control, the direction (at the bottom) of the bezel volume control is "-" key for Minimum volume and "+" key for Maximum volume. The default shipping position of the Volume Control shall be approximately 90%.

3.17.6 Speaker Sensitivity

The speakers shall support a minimum sensitivity of 75 dB +/- 3 dB at 2W/1m at 1 kHz.

3.17.7 Maximum Audio Card Output

The monitor audio amplifier shall accept a maximum input voltage of 1.5 Vrms and meet the following requirements at the maximum monitor volume setting:

1. The ratings of the audio amplifier may not be exceeded.
2. The ratings of the speakers may not be exceeded.
3. There must not be any clipping of the audio amplifier output signal.

Voltage dividers may be used to reduce the input signal level.

3.17.8 Monitor Audio Amplifier Input Impedance

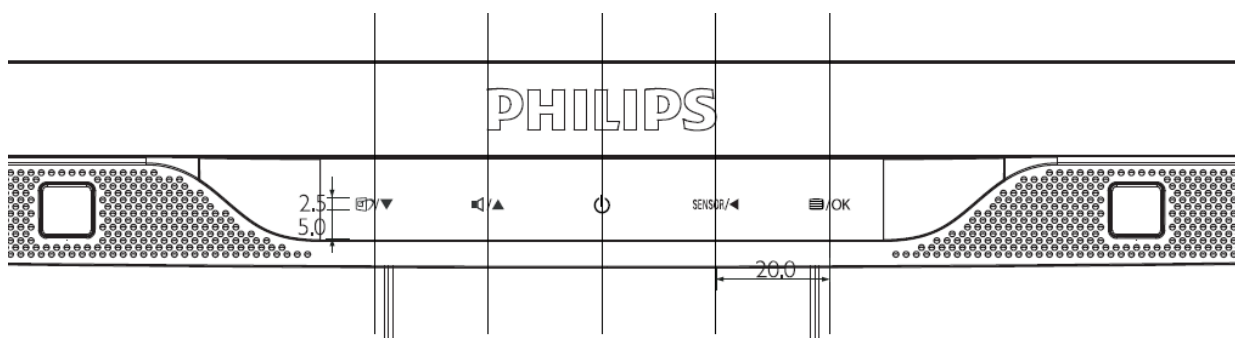
The monitor audio amplifier shall have minimum 10K Ohm AC input impedance

Power sensor (option)

FUNCTIONAL Requirements for the front detection

For the presence sensor functionality, the following requirements are defined:

- Two IRs be used for user present detections, one IR is for transmission signals, the other one is for receiving reflection IR signals



- User must be detected in the following range:
40 up to 100 cm (+ 20cm).
- Detection angle:
+/- 35 degree (for IR LED)
- SENSOR key control,
Adjust detection distances (0~4 scales), default is 3 , tolerance : (± 10 cm)
 - 0 : OFF
 - 1 : 90 cm
 - 2 : 100 cm
 - 3 : 110 cm
 - 4 : >130 cm

- SENSOR distance measure :
 1. Cotton material color : black
 2. Monitor center straight distance (90 deg)
 3. Body width : about 40cm
 4. Body horizontal move : Monitor center $\pm$ 5cm
- Anti-interference between two monitors,
Monitors must have anti-interference methods(coding ..etc) to prevent monitors to talk to each other

- power sensor Functional behavior

Time Period	60sec	60sec ~ 180sec	180sec ~
PowerSensor	No ACTION	Lower down backlight brightness	Backlight & LCD panel shutdown
Power Saving	0	50%	80%

- The following set-up's will be supported

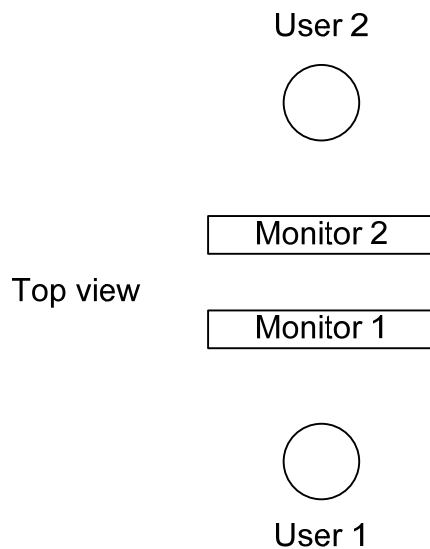


Fig. 2: 2 monitors standing back to back.

The monitors may influence each other. So Monitor 1 may produce unexpected brightness-switches in monitor 2 (and vice versa). Furthermore, user 1 could perhaps (via monitor 1) influence the powersensor readout on monitor 2.

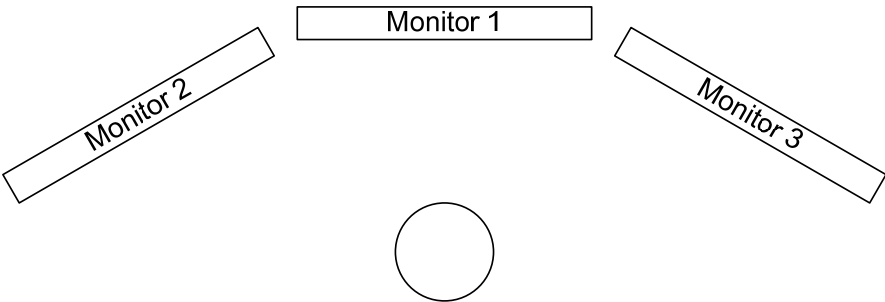
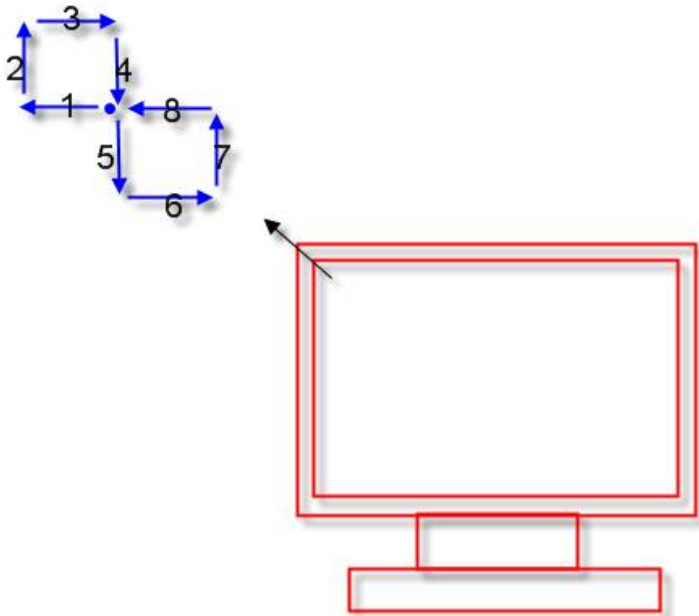


Fig. 3: set up of multiple monitors under an angle

Pixel –orbiting function (option)

On wide view angle models(IPS/e-IPS/AMVA/PVA/MVA)
Functional description

Every 1min to shift one pixel for whole picture,8 min. to original point and Routing path
(H-1,V+1,H+1,V-1,V-1,H+1,V+1,H-1)



VISUAL CHARACTERISTICS

Test conditions

Unless otherwise specified, this specification is defined under the following conditions.

- (1) Input signal : As defined in 3.3, [1920 x 1080 non-interlaced mode \(1920 x 1080@60Hz\)](#), signal sources must have 75 ohm output impedance.
- (2) Luminance setting : controls to be set to [250](#) nits with full screen 100 % duty cycle white signal
- (3) Warm up: more than 30 minutes after power on with signal supplied.
- (4) Ambient light: 400 -- 600 lux.
- (5) Ambient temperature: 20 ± 5 °C

Brightness/ [Brightness uniformity](#)

Follow Panel specification.

Color temperature adjustment

There are three factory preset white color 9300K, 6500K, sRGB.

Apply full white pattern, with brightness in 100 % position and the contrast control at 50 % position.

The 1931 CIE Chromaticity (color triangle) diagram (x ,y) coordinate for the screen center should be:

Product specification

CIE coordinates	(x,y)	
11500K	x = 0.270 ± 0.02 y = 0.281 ± 0.02	PerfecTune II
9300K	x = 0.283 ± 0.02 y = 0.297 ± 0.02	PerfecTune II
8200K	x = 0.291 ± 0.02 y = 0.306 ± 0.02	PerfecTune II
7500K	x = 0.298 ± 0.02 y = 0.314 ± 0.02	PerfecTune II
6500K/sRGB	x = 0.313 ± 0.02 y = 0.329 ± 0.02	PerfecTune II
sRGB	x = 0.313 ± 0.02 y = 0.329 ± 0.02	PerfecTune II

5000K	$x = 0.345 \pm 0.02$ $y = 0.357 \pm 0.02$	PerfecTune II
-------	--	---------------

Production alignment spec.

CIE coordinates	(x,y)	
11500K	$x = 0.270 \pm 0.006$ $y = 0.281 \pm 0.006$	PerfecTune II
9300K	$x = 0.283 \pm 0.006$ $y = 0.297 \pm 0.006$	PerfecTune II
8200K	$x = 0.291 \pm 0.006$ $y = 0.306 \pm 0.006$	PerfecTune II
7500K	$x = 0.298 \pm 0.006$ $y = 0.314 \pm 0.006$	PerfecTune II
6500K/sRGB	$x = 0.313 \pm 0.006$ $y = 0.329 \pm 0.006$	PerfecTune II
sRGB	$x = 0.313 \pm 0.006$ $y = 0.329 \pm 0.006$	PerfecTune II
5000K	$x = 0.345 \pm 0.006$ $y = 0.357 \pm 0.006$	PerfecTune II

Quality Inspection specification:

CIE coordinates	(x,y)	
9300K	$x = 0.283 \pm 0.015$ $y = 0.297 \pm 0.015$	
6500K/sRGB	$x = 0.313 \pm 0.015$ $y = 0.329 \pm 0.015$	
sRGB	$x = 0.313 \pm 0.015$ $y = 0.329 \pm 0.015$	

MECHANICAL CHARACTERISTICS

Cosmetic -

Philips ID

Mechanical data files -

ProE files required

Location of Philips logo -

Per Philips make-up sheet

Gap between panel and front bezel

< 1.2mm(typ.)

Location of Control icons -

Per Philips Graphic sheet

Color for resin/paint -

Per Philips make-up sheet

Fire enclosure request

Shielding Cover should fulfill international standard

Resins

- RoHS required
- WEEE required.
- Resin type/selection refer to Project Book Section 7.2 Plastic material.

If paint is used

- RoHS required
- WEEE require
- If new painting type need to implement, refer to UN-D 1235.

Plastic mold tooling

- Tooling to be designed to minimize cosmetic defects induced by molding process (sink, blush, weld lines, gate marks, ejector marks, etc.). Refer to "TYV61-90007".
- Painting to cover up cosmetic defects due to molding is strongly discouraged.
- China RoHS mark requested.

Plastics flammability

- All Plastics to be Flame Retardant UL 94-HB or Better.
- Base / Pedestal to be Flame Retardant UL 94-HB.
- All major plastic parts (bezel, back cover) need to be molded from same resin.
- Plastic resin type selection should be referred to "plastic-Philips Pool monitor".

Texture/Glossing of housing

- The texture area and texture no should follow Philips make-up sheet.
- The exterior surfaces shall have a uniform texture.

- Philips must approve the mold texturing.
- Detail document for texture refer to "UN-D249", "UN-D 600".
- **Glossy surface > = 80 gloss units**

Tilt and swivel base

- Tilt angle : -5 ° +2/- 0 ° (forward)
+20 ° + 0/- 3 ° (backward)
- Swivel angle : nil
- High Adjustment : nil
- Portrait Display : nil

Kensington Lock

- Must meet Kensington_slot.spec "TYE-M0004".
- MMD request metal plate in Kensington hole.

Label

- Regulatory label / Carton label should follow Philips requirement.
- Detail document refer to Philips Engineering Reference Book.

Product dimension / Weight (Refer to Philips approved SHT 191/SHT560)

- Unit dimension
- Packed unit dimension:
- Net weight :
- Gross weight

Transportation

Transportation standards refer to UAN-D1534/00/01/02.

Transportation packages

- Net weight Packaging and wrapping shall be sufficient to protect the product against damage or loss during shipment from the supplier to the destination specified in the purchase order.
All packaging materials are subject to test and evaluation per UAN-D1534/00/01/02.
- The cushion material shall be constructed using EPS material.
- The doggy hole is requested.

Transportation Test_

Overall tests refer to UAN-D1534/00/01/02.

Vibration, drop test should be performed at ambient temperature (20°C to 23°C) and relative humidity (40% to 65%).

A. Transportation test specification for all regions except China/India

- Package test
 1. Random Vibration test

- 2. Drop test
- 3. Cold Drop test (for design reference)
- Un-package test
 - 1. Half sine shock test (non operation)

B. Transportation test specification for China / India

- Package test
 - 1. Random Vibration test
 - 2. Drop test
 - 3. Cold Drop test (for design reference)
- Un-package test
 - 1. Sine vibration (operating)
 - 2. Half sine shock test (non operation)

Pallet / Container loading (Refer to Philips approved SHT 560)

Transportation standards refer to TYE-M0002 ,UAN-D1534 and UAW-0309.

- Air shipment -
- Sea container 20'(pallet/slip sheet)
- Sea container 40'(pallet/slip sheet)
- Sea container 40' High Cube (pallet/slip sheet)
- Land 45' Truck and Trailer (800X1200mm pallet)
- Land 45' Truck and Trailer (1000X1200mm pallet) for UK
- Truck shipment-

Transportation request for all regions except China/India

- A. Air shipment
- B. 20'/40'/40'HQ Container loading for WW with Pallet
- C. 20'/40'/40'HQ Container loading for WW with slip sheet

Transportation request for China and India

- A. Container loading for China and India
- B. Truck loading

Transportation request for EU

- A. Land 45' Truck and Trailer (1000X1200mm pallet)

ENVIRONMENTAL CHARACTERISTICS

The following sections define the interference and susceptibility condition limits that might occur between external environment and the display device.

Susceptibility of display to external environment

Operating

- Temperature : 0 to 40 degree C
- Humidity : 80% max
- Altitude : 0-3658m
- Air pressure : 600-1100 mBAR

Storage

- Temperature : -20 to 60 degree C
- Humidity : 95% max
- Altitude : 0-12192m
- Air pressure : 300-1100 mBAR

Note: recommend at 5 to 35°C, Humidity less than 60 %

Transportation tests

Refer to 5.15.2

Display disturbances from external environment

According to IEC 801-2 for ESD disturbances

Display disturbances to external environment