21.5 inch FHD TFT LCD Colour Monitor

Chassis: MERIDIAN 2

Service
Service
Service

222EL2SB/00
222EL2SB/10 (EU)
222EL2SB/62
222EL2SB/69
222EL2SB/75
222EL2SB/96
222EL2SB/93
222EL2SB/00 (AP)
222EL2SB/67
222EL2SB/01
222EL2SB/70

Service Manual

Horizontal frequencies
30 - 83 kHz

TABLE OF CONTENTS

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 VOL TAGES.

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

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

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May 24 2010 GB

飛利浦

PHILIPS

Important Safety Notice

Proper service and repair is important to the safe, reliable operation of all Philips Consumer Electronics Company equipment. The service procedures recommended by Philips and described in this service manual a re effective methods of performing service operations . Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should becarefully read in order to minimize the risk of personal injury to service personnel . The possibility exists that improper service methods may damage the equipment. It is also important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Philips could not possibly know, evaluate and advise the servic etrade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Philips has not undertaken any such broad evaluation. Accordingly, who uses a servi ce procedure or tool which is not recommended by Philips must first satisfy himself thoroughly that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

* * Hereafter throughout this manual, Philips Consumer Electronics Company will be referred to as Philips. * *

FOR PRODUCTS CONTAINING LASER :

DANGER - Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.

CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION - The use of optical instruments with this product will increase eye hazard.

TO ENSURE THE CONTINUED RELIABILITY OF THIS PRODUCT, USE ONLY ORIGINAL MANUFACTURER'S REPLACEMENT PARTS, WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THIS SERVICE MANUAL.

WARNING

Critical components having special safety characteristics are identified with a by the Ref. No. in the parts list and enclosed within a broken line
(where several critical components are grouped in one area) along with the safety symbol on the schematics or exploded views.

Use of substitute replacement parts which do not have the same specified safety characteristics may create shock, fire, or other hazards .

Under no circumstances should the original design be modified or altered without written permission from Philips. Philips assumes no liability, express or implied, arising out of any unauthorized modification of design.

Servicer assumes all liability.

Take care during handling the LCD module with backlight unit

- Must mount the module using mounting holes arranged in four corners.
- Do not press on the panel, edge of the frame strongly or electric shock as this will result in damage to the screen.
- Do not scratch or press on the panel with any sharp objects, such as pencil or pen as this may result in damage to the panel.
- Protect the module from the ESD as it may damage the electronic circuit (C -MOS).
- Make certain that treatment body are grounded through wrist band.
- Do not leave the module in high temperature and in areas of high humidity for a long time.
- Avoid contact with water as it may as hort circuit within the module.
- If the surface of panel become dirty, please wipe it off with a soft material. (Cleaning with a dirty or rough cloth may damage the panel.)

Technical Data

AUO

Type NR.	: AUO M215HW01 V6
Resolution	: 1920x1080 (Full HD)
Outside dimensions	: 495.6(H) x 292.2(V) x 9.9(D) Typ
Pitch (mm)	: 0.248mm x 0.248mm
Color pixel arrangement	: 1920 horiz. By 1080 vert
Display surface	: Hard coating (3H), Anti-glare treatment
Color depth	: 16.7M (8 bit with A-FRC)
Backlight	: LED Blacklight
Active area (W x H)	: 476.64(H) × 268.11(V) mm
View angle (CR=10)	: >=160 for Right/Left (Typ) : >=160 for Up/Down (Typ)
Contrast ratio	: >=1000:1 (Typ)
White luminance	: 250 (center,Typ)
Color gamut	: >=72%
Gate IC	: Raydium / Novatek
Source IC	: Raydium / Novatek
Response time	: 5 ms (Typ)
Vertical frequency range	: 50~75Hz

Scanning frequencies

Hor.: 30 – 83 K Hz

Ver.: 56 - 76 Hz

Video dot rate: D-sub < 205 MHz ; DVI < 165 MH)

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

Power consumption: Normal on: < 30 W (max)

Functions:

(1) D-SUB analog R/G/B separate inputs, H/V sync separated, Composite (H+V) TTL level, SOG sync.

(2) DVI digital Panel Link TMDS inputs.

Ambient temperature: 0 °C - 40 °C

Power input connection

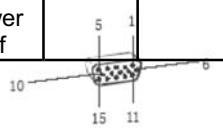
Power cord length : 1.8 M

Power cord type : 3 leads power cord with protective earth plug.

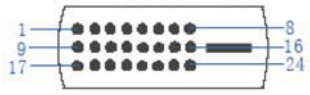
Power management

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	<30 W (max.)	White LED	--
Power Saving	Off	Off	blanked	< 0.5W	Blinking White LED Period: 3sec On, 3sec Off	<3s
DC Power Off			N/A	< 0.5 W	LED Off	



PIN No.	SIGNAL	PIN No.	SIGNAL
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		



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-

Susceptibility of display to external environment

Operating

- Temperature : 0 to 35 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 %

Technical Data

CMO

Type NR.	: CMO M215H3-LA1
Resolution	: 1920x1080 (Full HD)
Outside dimensions	: 495.6(H) x 292.2(V) x 11.5(D) Typ
Pitch (mm)	: 0.248mm x 0.248mm
Color pixel arrangement	: 1920 horiz. By 1080 vert
Display surface	: Hard coating (3H), Anti-glare treatment
Color depth	: 16.7M (8 bit with A-FRC)
Backlight	: LED Blacklight
Active area (W x H)	: 476.64(H) × 268.11(V) mm
View angle (CR=10)	: >=160 for Right/Left (Typ) : >=160 for Up/Down (Typ)
Contrast ratio	: >=1000:1 (Typ)
White luminance	: 250 (center,Typ)
Color gamut	: >=72%
Gate IC	: Raydium / Novatek
Source IC	: Raydium / Novatek
Response time	: 5 ms (Typ)
Vertical frequency range	: 50~75Hz

Scanning frequencies

Hor.: 30 – 83 K Hz

Ver.: 56 - 76 Hz

Video dot rate: D-sub < 205 MHz ; DVI < 165 MH)

Power input: 90-264 V AC, 50/60 ± 3 Hz

Power consumption: Normal on: < 30 W (max)

Functions:

(1) D-SUB analog R/G/B separate inputs, H/V sync separated, Composite (H+V) TTL level, SOG sync.

(2) DVI digital Panel Link TMDS inputs.

Ambient temperature: 0 °C - 40 °C

Power input connection

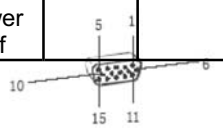
Power cord length : 1.8 M

Power cord type : 3 leads power cord with protective earth plug.

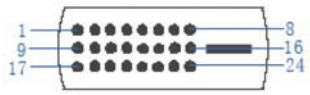
Power management

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	<30 W (max.)	White LED	--
Power Saving	Off	Off	blanked	< 0.5W	Blinking White LED Period: 3sec On, 3sec Off	<3s
DC Power Off			N/A	< 0.5 W	LED Off	



PIN No.	SIGNAL	PIN No.	SIGNAL
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		



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-

Susceptibility of display to external environment

Operating

- Temperature : 0 to 35 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 %

Technical Data

AUO

Type NR.	: AUO M215HW01 VB
Resolution	: 1920x1080 (Full HD)
Outside dimensions	: 495.6(H) x 292.2(V) x 9.9(D) Typ
Pitch (mm)	: 0.248mm x 0.248mm
Color pixel arrangement	: 1920 horiz. By 1080 vert
Display surface	: Hard coating (3H), Anti-glare treatment
Color depth	: 16.7M (8 bit with A-FRC)
Backlight	: LED Blacklight
Active area (W x H)	: 476.64(H) × 268.11(V) mm
View angle (CR=10)	: >=160 for Right/Left (Typ) : >=160 for Up/Down (Typ)
Contrast ratio	: >=1000:1 (Typ)
White luminance	: 250 (center,Typ)
Color gamut	: >=72%
Gate IC	: Raydium / Novatek
Source IC	: Raydium / Novatek
Response time	: 5 ms (Typ)
Vertical frequency range	: 50~75Hz

Scanning frequencies

Hor.: 30 – 83 K Hz

Ver.: 56 - 76 Hz

Video dot rate: D-sub < 205 MHz ; DVI < 165 MH)

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

Power consumption: Normal on: < 30 W (max)

Functions:

(1) D-SUB analog R/G/B separate inputs, H/V sync separated, Composite (H+V) TTL level, SOG sync.

(2) DVI digital Panel Link TMDS inputs.

Ambient temperature: 0 °C - 40 °C

Power input connection

Power cord length : 1.8 M

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	<30 W (max.)	White LED	--
Power Saving	Off	Off	blanked	< 0.5W	Blinking White LED Period: 3sec On, 3sec Off	<3s
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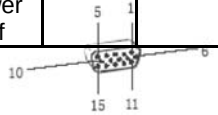

PIN No.	SIGNAL	PIN No.	SIGNAL
1	Red	9	DDC +3.3V or +5V
2	Green/ SOG	10	Logic GND
3	Blue	11	Sense (GND)
4	Sense (GND)	12	Bi-directional data
5	Cable Detect (GND)	13	H/H+V sync
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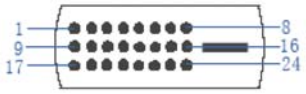

Pin No.	Description
1	T.M.D.S. data2-
2	T.M.D.S. data2+
3	T.M.D.S. data2 shield
4	No Connect
5	No Connect
6	DDC clock
7	DDC data
8	No Connect
9	T.M.D.S. data1-
10	T.M.D.S. data1+
11	T.M.D.S. data1 shield
12	No Connect
13	No Connect
14	+5V Power
15	Ground (for +5V)
16	Hot plug detect
17	T.M.D.S. data0-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

Susceptibility of display to external environment

Operating

- Temperature : 0 to 35 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 %

Technical Data

QISDA ASSEMBLY

Type NR.	: ASSY M215Q01 V0
Resolution	: 1920x1080 (Full HD)
Outside dimensions	: 495.6(H) x 292.2(V) x 9.9(D) Typ
Pitch (mm)	: 0.248mm x 0.248mm
Color pixel arrangement	: 1920 horiz. By 1080 vert
Display surface	: Hard coating (3H), Anti-glare treatment
Color depth	: 16.7M (8 bit with A-FRC)
Backlight	: LED Blacklight
Active area (W x H)	: 476.64(H) × 268.11(V) mm
View angle (CR=10)	: >=160 for Right/Left (Typ) : >=160 for Up/Down (Typ)
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Color gamut	: >=72%
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Source IC	: Raydium / Novatek
Response time	: 5 ms (Typ)
Vertical frequency range	: 50~75Hz

Scanning frequencies

Hor.: 30 – 83 K Hz

Ver.: 56 - 76 Hz

Video dot rate: D-sub < 205 MHz ; DVI < 165 MH)

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

Power consumption: Normal on: < 30 W (max)

Functions:

(1) D-SUB analog R/G/B separate inputs, H/V sync separated, Composite (H+V) TTL level, SOG sync.

(2) DVI digital Panel Link TMDS inputs.

Ambient temperature: 0 °C - 40 °C

Power input connection

Power cord length : 1.8 M

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	<30 W (max.)	White LED	--
Power Saving	Off	Off	blanked	< 0.5W	Blinking White LED Period: 3sec On, 3sec Off	<3s
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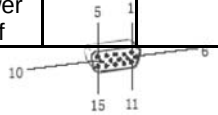

PIN No.	SIGNAL	PIN No.	SIGNAL
1	Red	9	DDC +3.3V or +5V
2	Green/ SOG	10	Logic GND
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4	Sense (GND)	12	Bi-directional data
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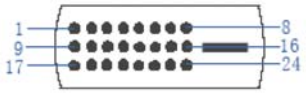


Pin No.	Description
1	T.M.D.S. data2-
2	T.M.D.S. data2+
3	T.M.D.S. data2 shield
4	No Connect
5	No Connect
6	DDC clock
7	DDC data
8	No Connect
9	T.M.D.S. data1-
10	T.M.D.S. data1+
11	T.M.D.S. data1 shield
12	No Connect
13	No Connect
14	+5V Power
15	Ground (for +5V)
16	Hot plug detect
17	T.M.D.S. data0-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

Susceptibility of display to external environment

Operating

- Temperature : 0 to 35 degree C
- Humidity : 80% max
- Altitude : 0-3658m
- Air pressure : 600-1100 mBAR

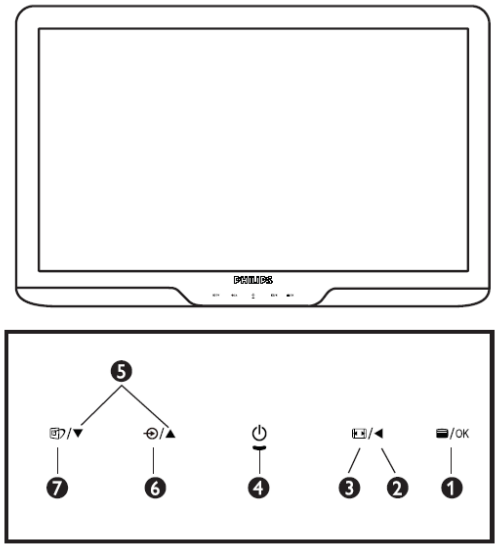
Storage

- 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 %

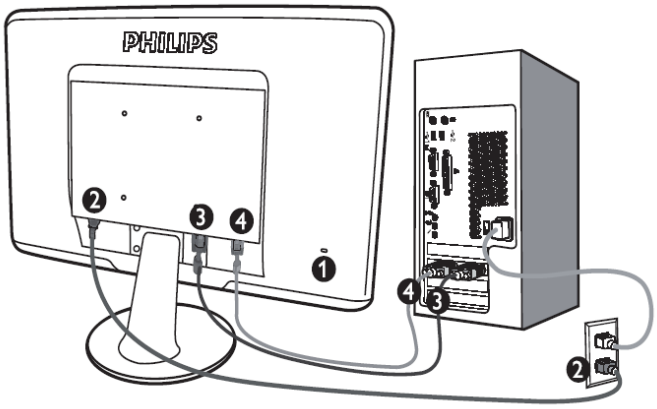
Installation

Front View Product Description



1. /OK: To access OSD menu.
2. ◄ : Return to previous OSD level.
3. : Change to 4:3 display.
4. : To switch monitor's power on and off.
5. ▲▼ : To adjust the OSD menu.
6. : To change the signal input.
7. : SmartImage Lite. There are 3 modes to be selected: Office, Standard, Internet and Game.

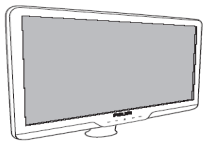
Rear View



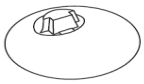
1. Kensington anti-thief lock
2. AC power input
3. DVI-D input (available for selecting model)
4. VGA input

Accessory Pack

Unpack all the parts

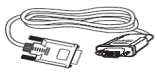

Monitor

Quick start guide


Base stand


EDFU CD

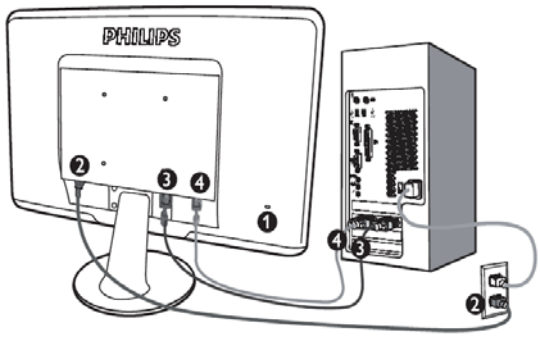

Power cord


VGA signal cable (optional)


DVI cable (optional)

Connecting to Your PC

1) Connect the power cord to the back of the monitor firmly. (Philips has pre-connected VGA cable for the first installation.



1. Kensington anti-thief lock
2. AC power input
3. DVI-D input (available for selecting model)
4. VGA input

Connect to PC

1. Connect the power cord to the back of the montior firmly.
2. Turn off your computer and unplug its power cable.
3. Connect the monitor signal cable to the video connector on the back of your computer.
4. Plug the power cord of your computer and your monitor into a nearby outlet.
5. Turn on your computer and monitor. If the monitor displays an image, installation is complete.

7 Troubleshooting & FAQs

7.1 Troubleshooting

This page deals with problems that can be corrected by a user. If the problem still persists after you have tried these solutions, contact Philips customer service representative.

1 Common Problems

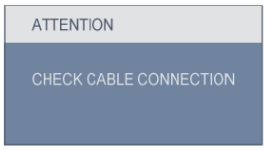
No Picture (Power LED not lit)

- Make sure the power cord is plugged into the power outlet and into the back of the monitor.
- First, ensure that the power button on the front of the monitor is in the OFF position, then press it to the ON position.

No Picture (Power LED is white blinking)

- Make sure the computer is turned on.
- Make sure the signal cable is properly connected to your computer.
- make sure the monitor cable has no bent pins on the connect side. If yes, repair or replace the cable.
- The Energy Saving feature may be activated

Screen says



- Make sure the monitor cable is properly connected to your computer. (Also refer to the Quick Set-Up Guide).
- Check to see if the monitor cable has bent pins.
- Make sure the computer is turned on.

AUTO button doesn't function

- The auto function is applicable only in VGA-Analog mode. If the result is not satisfactory, you can do manual adjustments via the OSD menu.

Note

The Auto Function is not applicable in DVI-Digital mode as it is not necessary.

Visible signs of smoke or sparks

- Do not perform any troubleshooting steps
- Disconnect the monitor from mains power source immediately for safety
- Contact with Philips customer service representative immediately.

2 Imaging Problems

Image is not centered

- Adjust the image position using the "Auto" function in OSD Main Controls.
- Adjust the image position using the Phase/ Clock of Setup in OSD Main Controls. It is valid only in VGA mode.

Image vibrates on the screen

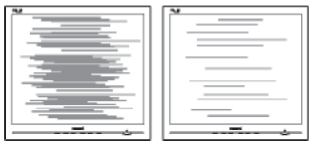
- Check that the signal cable is properly securely connected to the graphics board or PC.

Vertical flicker appears

- Adjust the image using the "Auto" function in OSD Main Controls.
- Eliminate the vertical bars using the Phase/ Clock of Setup in OSD Main Controls. It is valid only in VGA mode.

Troubleshooting

Horizontal flicker appears



- Adjust the image using the "Auto" function in OSD Main Controls.
- Eliminate the vertical bars using the Phase/ Clock of Setup in OSD Main Controls. It is valid only in VGA mode.

Image appears blurred, indistinct or too dark

- Adjust the contrast and brightness on On-Screen Display.

An "after-image", "burn-in" or "ghost image" remains after the power has been turned off.

- 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.
- Always activate a moving screen saver program when you leave your monitor unattended.
- Always activate a periodic screen refresh application if your LCD monitor will display unchanging static content.
- 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.

Image appears distorted. Text is fuzzy or blurred.

- Set the PC's display resolution to the same mode as monitor's recommended screen native resolution.

Green, red, blue, dark, and white dots appears on the screen

- The remaining dots are normal characteristic of the liquid crystal used in today's technology, Please refer the pixel policy for more detail.

The "power on" light is too strong and is disturbing

- You can adjust "power on" light using the power LED Setup in OSD main Controls.

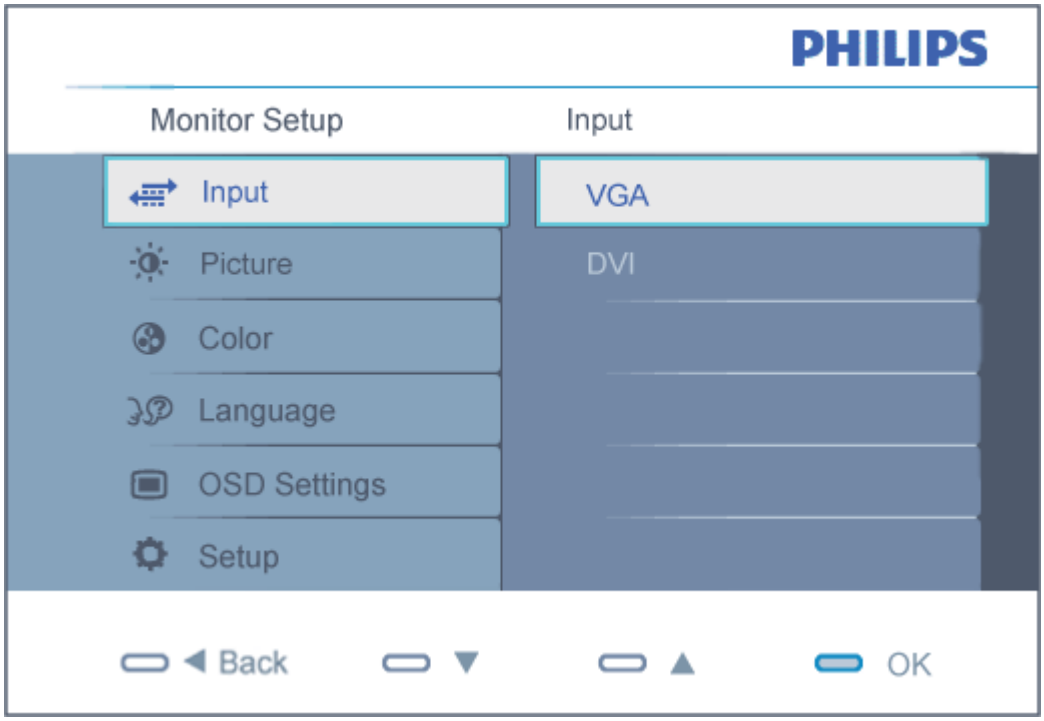
For further assistance, refer to the Consumer Information Centers list and contact Philips customer service representative.

On-Screen Display

Description of the On Screen Display

What is the On-Screen Display?

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 :



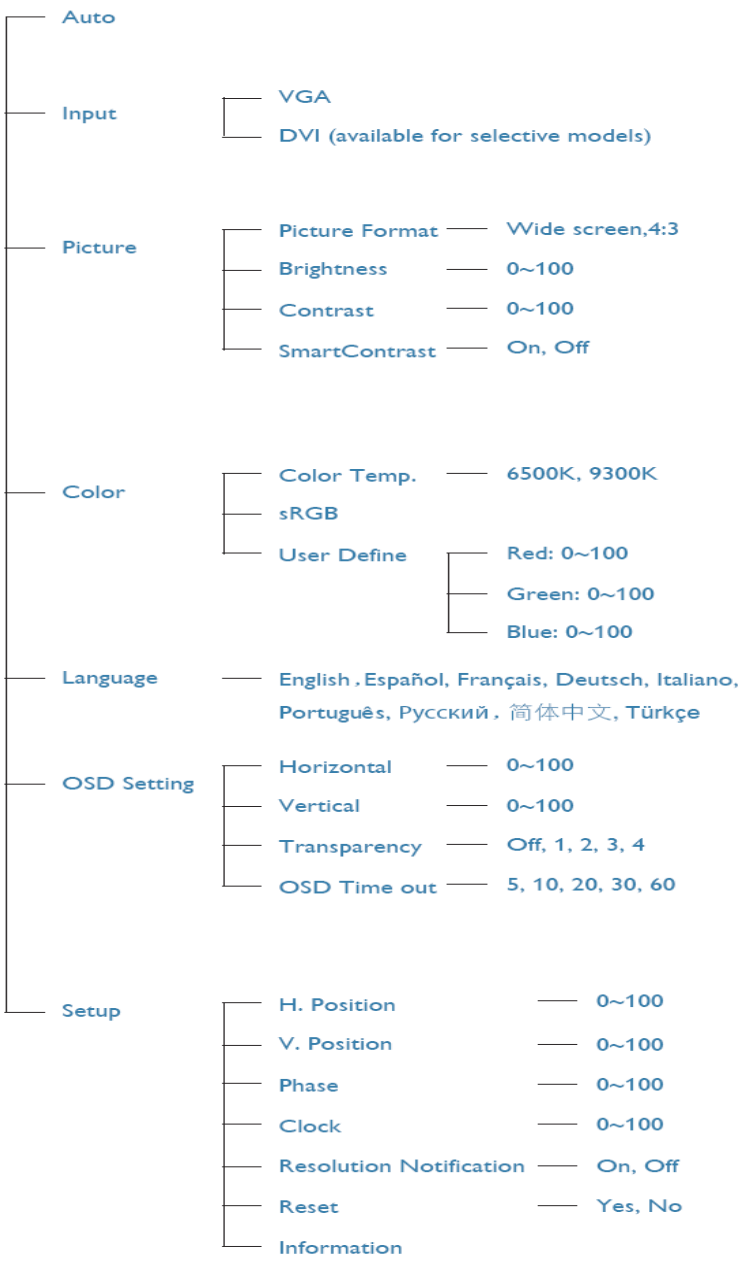
Basic and simple instruction on the control keys.

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

On-Screen Display

The OSD Tree

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.



Resolution notification

This monitor is designed for optimal performance at its native resolution, 1920X1080@60Hz. When the monitor is powered on at a different resolution, an alert is displayed on screen: Use 1920X1080@60Hz for best results.

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

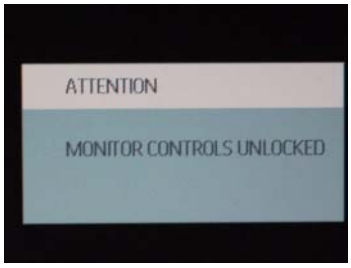
Lock/Unlock,Aging,Factory Mode

To lock/unlock OSD FUNCTION(User Mode)

The OSD function can be locked by pressing"OK"button(1) for more than 10 seconds, the screen shows following windows for 4 seconds. Every time when you press"OK" button, this message appears on the screen automatically .

Unlock OSD function

Unlocked OSD function can be released by pressing "OK" button for more than 10 seconds again.



Access Factory Mode

1). Turn off monitor.
2). [Push "EXIT" & "MENU" buttons at the same time and hold them]+[Press "power" button until comes out "Windows screen"] => then release all buttons
3).Press "MENU" button, wait until the OSD menu with Characters "MERIDIAN 222EL2 V2.1 2010-05-14" (below OSD menu) come on the Screen of the monitor.

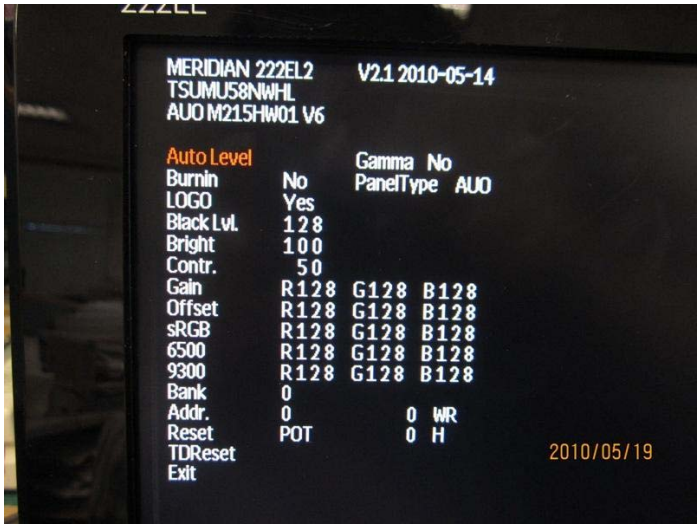
Factory Mode indicator

Factory Menu

Cursor can move on gray color area
Hot key function: by pressing " UP " and " DOWN " key Simultaneously at User Mode (or Factory Mode) (PS: The Of fset R G B function can be used on reduce or eliminate snowy noise on the background when the resolution of video signal is 1680*1050vertical 60Hz. Slightly increase or decrease the value until snowy noise completely disappear .

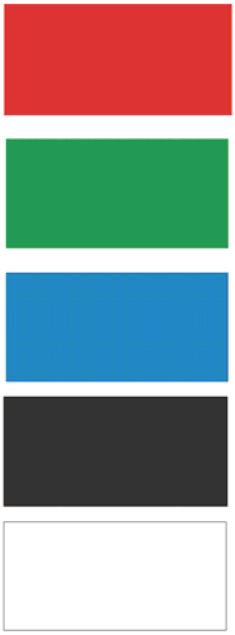
Access Aging Mode

Step 1 : Access Factory Mode then enter Factory Menu.
Step 2 : By pressing " UP" and " DOWN " key to Burning Icon. Press "MENU then press " UP" and "DOWN " key to turn on Aging Mode.



Step 3 : Disconnect interface cable between Monitor and PC.

After 3 seconds, bring up:

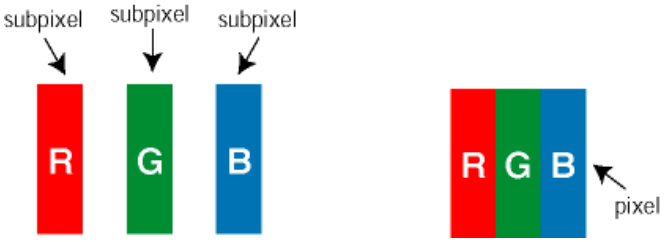


repeatly
Connect Signal cable again=> go back to normal display

Philips Pixel Defect Policy

Philips' Flat Panel Monitors Pixel Defect Policy

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 LCD 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 LCD panel must exceed these acceptable levels. For example, no more than 0.0004% of the sub pixels on a 19" XGA 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.



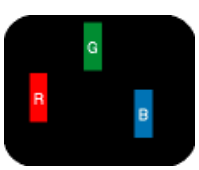
Pixels and Sub pixels

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

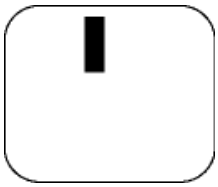
Two adjacent lit sub pixels:

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

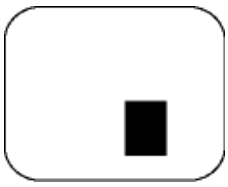
Three adjacent lit sub pixels (one white pixel)

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:



One dark sub pixel



Two or three adjacent dark sub pixels

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 LCD 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
MODEL	**222EL2**
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
MODEL	**222EL2**
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

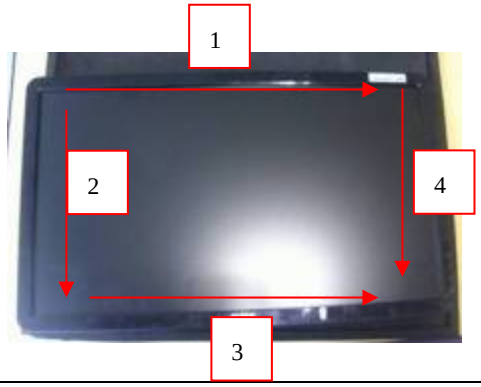
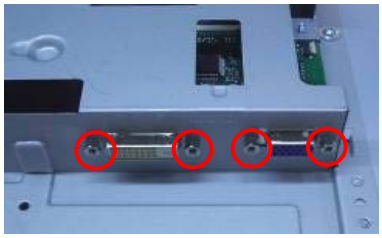
TOTAL DOT DEFECTS	ACCEPTABLE LEVEL
MODEL	**222EL2**
Total bright or black dot defects of all types	5 or fewer

Note:

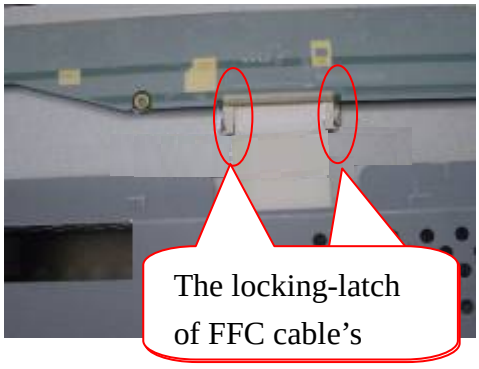
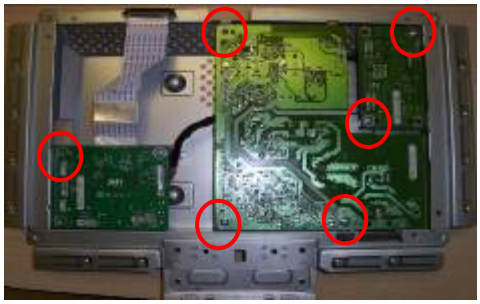
** 1 or 2 adjacent sub pixel defects = 1 dot defect*

Mechanical Instruction

Preparation before disassemble
1.Clean the room for disassemble
2.Identify the area for monitor
3.Check the position that the monitors be placed and the quantity of the monitor ;prepare the area for material flow; according to the actual condition plan the disassemble layout
4.Prepare the implement, equipments, materials as bellow:
1) Press-fixture 2)working table 3)Screw-driver 4)knife*1 5)glove 6)cleaning cloth 7)ESD protection

item	picture	Operation	Tool	Notes
1		Tear off four piece of Mylar Disassemble the stand → 4 screws	Screw-driver	
2		disassembly the bezel from the monitor, notice the disassembly order : 1.Top (1) parts of bezel 2.Left (2) parts of bezel 3.Bottom (3) parts of bezel 4. Right (4) parts of bezel Don't draw the BZL		When disassembly the bezel , notice don't bend the C/B . man must wear glove The purpose is loose the BZL
3		Turn over the monitor , Bring the Rear cover from the monitor		
4		Draw the control board cable Take the entire internal mechanism from Bezel and then put it on the cushion		
5		Disassembled the Main-BKT : hexagonal screw *4	Screw-driver	

Mechanical Instruction

6	For AUO panel：  For CMO panel： 	Draw the lamp cables		
7	For all panel：  For AUO panel： 	Tear off the AL foils		
8		Unlock the FFC by using two hands(see note).		
9		Disassemble the Power board、ITF-board and LED drive board → 6 screws	Screw-driver	
10		Take the PCBA from Main-BKT and then put it on the cushion		

Color Adjustment

Alignment procedure

1. Turn on the LCD monitor
2. Turn on the Timing/pattern generator. See Fig.1
3. Preset LCD color Analyzer CA-1 10
-Remove the lens protective cover of probe CA-A30.
-Set measuring/viewing selector to measuring position for reset analyzer .(zero calibration) as Fig.2
- Turn on the color analyzer (CA-1 10)
-Press 0-CAL button to starting reset analyzer .

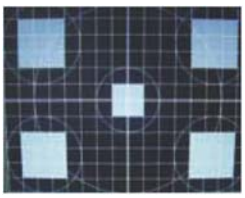


Fig. 1

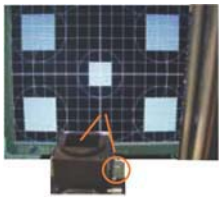


Fig.2

4. Access Factory Mode
1). Turn off monitor.
2). [Push "AUT O" & "MENU" buttons at the same time and hold them]
+[Press "power" button untill comes out "Windows screen"]
=> then release all buttons
3).Press "MENU button, wait until the OSD menu with
Characters " MERIDIAN 222EL2 V2.1 2010-05-14" (below OSD menu) come on the Screen of the monitor as shown in Fig3.

Factory Mode indicator

Fig. 3

4). Press button, then select factory mode indicator by "MENU" "LEFT" or "RIGHT" button .Press"MENU" button to bring up submenu windows as below:

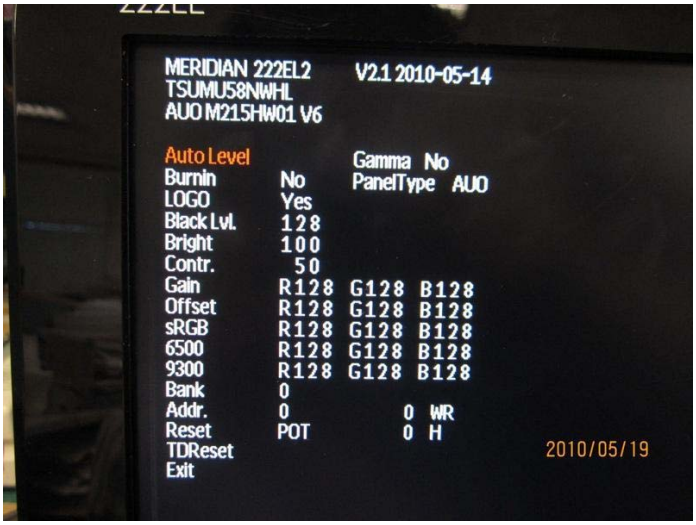


Fig. 4

Fig.5

5.Display
Press "UP" or "DOWN" button to select . Change the value by "UP" or "DOWN" key until the X, Y co-ordinates as below

5.1 Color temperature adjustment
There are six factory preset white color 11500K, 9300K, 8200K, 7500K, 6500K, sRGB, 5000K
Align by Philips PerfecTune (also called FGA) function.
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		**Production alignment spec.**	
	x = 0.283 ± 0.02	9300K	x = 0.283 ± 0.006
9300K	y = 0.297 ± 0.02	6500K/sRGB	y = 0.297 ± 0.006
6500K/sRGB	x = 0.313 ± 0.02		x = 0.313 ± 0.006
	y = 0.329 ± 0.02		y = 0.329 ± 0.006
	x = 0.313 ± 0.02	sRGB	x = 0.313 ± 0.006
sRGB	y = 0.329 ± 0.02	9300K	y = 0.329 ± 0.006
9300K	x = 0.283 ± 0.02		x = 0.283 ± 0.006
	y = 0.297 ± 0.02		y = 0.297 ± 0.006
	x = 0.313 ± 0.02	6500K/sRGB	x = 0.313 ± 0.006
6500K/sRGB	y = 0.329 ± 0.02	sRGB	y = 0.329 ± 0.006
sRGB	x = 0.313 ± 0.02		x = 0.313 ± 0.006
	y = 0.329 ± 0.02		y = 0.329 ± 0.006

Quality Inspection specification:

9300K	x = 0.283 ± 0.015
6500K/sRGB	y = 0.297 ± 0.015
	x = 0.313 ± 0.015
	y = 0.329 ± 0.015
sRGB	x = 0.313 ± 0.015
9300K	y = 0.329 ± 0.015
	x = 0.283 ± 0.015
	y = 0.297 ± 0.015
6500K/sRGB	x = 0.313 ± 0.015
sRGB	y = 0.329 ± 0.015
	x = 0.313 ± 0.015
	y = 0.329 ± 0.015

FAQs (Frequently Asked Questions)

Q1: When I install my monitor what should I do if the screen shows 'Cannot display this video mode'?

Ans.: Recommended resolution for Philips 21.5": 1920x1080 @60Hz.

- Unplug all cables, then connect your PC to the monitor that you used previously.
- In the Windows Start Menu, select Settings/ Control Panel. In the Control Panel Window, select the Display icon. Inside the Display Control Panel, select the 'Settings' tab. Under the setting tab, in box labeled 'desktop area', move the sidebar to 1920x1080 pixels (21.5").
- Open 'Advanced Properties' and set the Refresh Rate to 60Hz, then click OK.
- Restart your computer and repeat step 2 and 3 to verify that your PC is set at 1920x1080@60Hz (21.5").
- Shut down your computer, disconnect your old monitor and reconnect your Philips LCD monitor.
- Turn on your monitor and then turn on your PC.

Q2: What does the recommended refresh rate for LCD monitor?

Ans.: Recommended refresh rate in LCD monitors is 60Hz, In case of any disturbance on screen, you can set it up to 75Hz to see if that removes the disturbance.

Q3: What are the .inf and .icm files on the CD-ROM? How do I install the drivers (.inf and .icm)?

Ans.: These are the driver files for your monitor. Follow the instructions in your user manual to install the drivers. Your computer may ask you for monitor drivers (.inf and .icm files) or a driver disk when you first install your monitor. Follow the instructions to insert the (companion CD-ROM) included in this package. Monitor drivers (.inf and .icm files) will be installed automatically.

Q4: How do I adjust the resolution?

Ans.: Your video card/graphic driver and monitor together determine the available resolutions. You can select the desired resolution under Windows® Control Panel with the "Display properties".

Q5: What if I get lost when I am making monitor adjustments via OSD?

Ans.: Simply press the OK button, then select 'Reset' to recall all of the original factory settings.

Q6: Is the LCD screen resistant to scratches?

Ans.: In general it is recommended that the panel surface is not subjected to excessive shocks and is protected from sharp or blunt objects. When handling the monitor, make sure that there is no pressure or force applied to the panel surface side. This may affect your warranty conditions.

FAQs (Frequently Asked Questions)

Q7: How should I clean the LCD surface?

Ans.: For normal cleaning, use a clean, soft cloth. For extensive cleaning, please use isopropyl alcohol. Do not use other solvents such as ethyl alcohol, ethanol, acetone, hexane, etc.

Q8: Can I change the color setting of my monitor?

Ans.: Yes, you can change your color setting through OSD control as the following procedures,

- Press "OK" to show the OSD (On Screen Display) menu
- Press "Down Arrow" to select the option "Color" then press "OK" to enter color setting, there are three settings as below.
  1. Color Temperature; The 2 settings are 6500K, and 9300K.
  2. sRGB; this is a standard setting for ensuring correct exchange of colors between different device (e.g. digital cameras, monitors, printers, scanners, etc)
  3. User Define; the user can choose his/her preference color setting by adjusting red, green blue color.

Note:

A measurement of the color of light radiated by an object while it is being heated. This measurement is expressed in terms of absolute scale, (degrees Kelvin). Lower Kevin temperatures such as 2004K are red; higher temperatures such as 9300K are blue. Neutral temperature is white, at 6504K.

Q9: Can the Philips LCD Monitor be mounted on the wall?

Ans.: Yes. Philips LCD monitors have this optional feature. Four standard VESA mount holes on the rear cover allows the user to mount the Philips monitor on most of the VESA standard arms or accessories. We recommend you to contact your Philips sales representative for more information.

Q10: Can I connect my LCD monitor to any PC, workstation or Mac?

Ans.: Yes. All Philips LCD monitors are fully compatible with standard PCs, Macs and workstations. You may need a cable adapter to connect the monitor to your Mac system. Please contact your Philips sales representative for more information.

Q11: Are Philips LCD monitors Plug-and- Play?

Ans.: Yes, the monitors are Plug-and-Play compatible with Windows 7/Vista/XP/NT, Mac OSX, Linux

Q12: What kind of wide-angle technology is available?

Ans.: Currently, the IPS type panels offer the best Contrast Ratio, compared to MVA, or PVA technologies. TN panels have improved over the years, but IPS panel still gives superior results over TN panel.

Electrical Instructions

Electrical characteristics

1. Interface signals
   1.1 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
   Sync on green video 0.3 Vp-p Negative (Video 0.7 Vp-p Positive)
   1.2 DVI-D Digital
   Input signal: Single TMDS link (Three channels: RX0-/+, RX1-/+, RX2-/+)

2. Interface
   2.1 D-Sub Cable
   Length : 1.8 M +/- 50 mm
   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
   2.2 DVI Cable
   The input signals are applied to the display through DVI-D cable.
   Length : 1.8 M +/- 50 mm
   Connector type : DVI-D male with DDC-2B pin assignments
   White connector thumb-operated jackscrews
   With transplant pin protective cover.
3. Timing requirement
   3.1 Factory Preset mode definition:
   3.1.1 Perfect FOS while presenting those timings.
   3.1.2 Will specify those timing in User's Manual
   3.2 Preset mode definition:
   3.2.1 Need to support those timings.
   3.2.2 Perfect FOS after auto adjustment.
   3.3 User mode
   3.3.1 Can save those timing that not in Preset mode and can be showed (not over scalar or Panel spec.)
   3.3.2 It needs to reserve the 10 timings space in memory size.
   3.3.3 Factory modes and preset modes are defined in the enclosed timing table file

No	Preset mode	Factory Preset Timing	Resolution			Pixel Rate (MHz)	Horizontal (KHz)	Vertical (Hz)	V_Total (Line)	Polarity (H / V)	Chroma
1	*		DOS		640x350/70	25.18	31.47	70.09	449	p / n	#112
2	*	*	DOS		720x400/70	28.32	31.47	70.09	449	n / p	#180
3	*	*	DMT	4:3	640x480/60	25.18	31.47	59.94	525	n / n	#114
4	*		MAC		640x480/67	30.24	35	66.67	525	n / n	#116
5	*		DMT	4:3	640x480/72	31.5	37.86	72.81	520	n / n	#125
6	*	*	DMT	4:3	640x480/75	31.5	37.5	75	500	n / n	#190
7	*		DMT	4:3	800x600/56	36	35.16	56.25	625	p / p	#35
8	*	*	DMT	4:3	800x600/60	40	37.88	60.32	628	p / p	#118
9	*		DMT	4:3	800x600/72	50	48.08	72.19	666	p / p	#119
10	*	*	DMT	4:3	800x600/75	49.5	46.88	75	625	p / p	#192
11	*		MAC		832x624/75	57.28	47.73	74.55	667	n / n	#158
12	*	*	DMT	4:3	1024x768/60	65	48.36	60	806	n / n	#197
13	*		DMT	4:3	1024x768/70	75	56.48	70.07	806	n / n	#121
14	*	*	DMT	4:3	1024x768/75	78.75	60.02	75.03	800	p / p	#187
15	*		IBM		1024x768/76	83.1	61.1	76	803	p / p	#290
16	*				1152x864/60	79.9	54	60	900	p / p	#393
17	*				1152x864/70	94.5	63.9	70	912	p / p	#235
18	*		DMT		1152x864/75	108	67.5	75	900	p / p	#237
19	*		MAC		1152x870/75	100	68.68	75.06	915	n / n	#160
20	*		SUN		1152x900/66	92.94	61.8	65.95	937	p / p	#244
21	*		SUN		1152x900/76	105.56	71.71	76.05	943	p / p	#123
22	*	*	CVT	16:9	1280x720/60	74.5	44.77	59.86	748	n / p	#148
23	*		CVT	16:9	1280x720/75	95.75	56.46	74.78	755	n / p	#149
24	*		CVT	15:9	1280x768/60	79.5	47.78	59.87	796	n / p	#252
25	*		CVT	15:9	1280x768/75	102.25	60.29	74.89	805	n / p	#253
26	*	*	CVT	16:10	1280x800/60	83.5	49.7	59.81	831	n / p	#141
27	*		CVT	16:10	1280x800/75	106.5	62.8	74.93	838	n / p	#245
28	*		DMT	4:3	1280x960/60	108	60	60	1000	p / p	#238
29	*		CVT	4:3	1280x960/75	130	75.23	74.86	1005	n / p	#239
30	*	*	DMT	5:4	1280x1024/60	108	63.89	60.02	1066	p / p	#241
31	*		SUN	5:4	1280x1024/66	117	71.7	67	1067	p / p	#147
32	*		DOS	5:4	1280x1024/72	130.22	76	72	1064	p / p	#343
33	*	*	DMT	5:4	1280x1024/75	135	79.98	75.03	1066	p / p	#202
34	*		SUN	5:4	1280x1024/76	138.01	81.1	76	1066	n / n	#130
35	*		DMT	16:9	1360x768/60	85.5	47.71	60.02	795	p / p	#300
36	*		CVT	16:9	1360x768/75	109	60.29	74.89	805	n / p	#306
37	*		CVT		1440x900/60_RB	88.75	55.47	59.90	926	p / n	#278
38	*		CVT		1440x900/60	106.50	55.94	59.89	934	n / p	#277
39			CVT		1440x900/75	136.75	70.64	74.98	942	n / p	#276
40	*		CVT		1600x1000/60	132.25	62.15	60	1038	n / p	#281
41	*		DMT	4:3	1600x1200/60	162	75	60	1250	p / p	#231
42	*		CVT	16:10	680x1050/60_RB	119	64.67	59.88	1080	p / n	#270
43	*		CVT	16:10	1680x1050/60	146.25	65.29	59.95	1089	n / p	#271
44	*		CVT	16:9	920x1080/60_RB	138.5	66.59	59.93	1111	p / n	#250
45	*		CVT	16:10	920x1200/60_RB	154	74.04	59.95	1235	p / n	#260
46	*	*	CVT	16:9	1920x1080/60	148.5	67.5	60	1125	p / p	#243

Electrical Instructions

White color adjustment

There are three factory preset white color 9300K, 6500K, sRGB.
Apply full gray64 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 screencenter should be:

Product specification

CIE coordinates	(x,y)	
9300K	x = 0.283 ± 0.02 y = 0.297 ± 0.02	PerfectuneII
6500K/sRGB	x = 0.313 ± 0.02 y = 0.329 ± 0.02	PerfectuneII
sRGB	x = 0.313 ± 0.02 y = 0.329 ± 0.02	PerfectuneII

Production alignment spec.

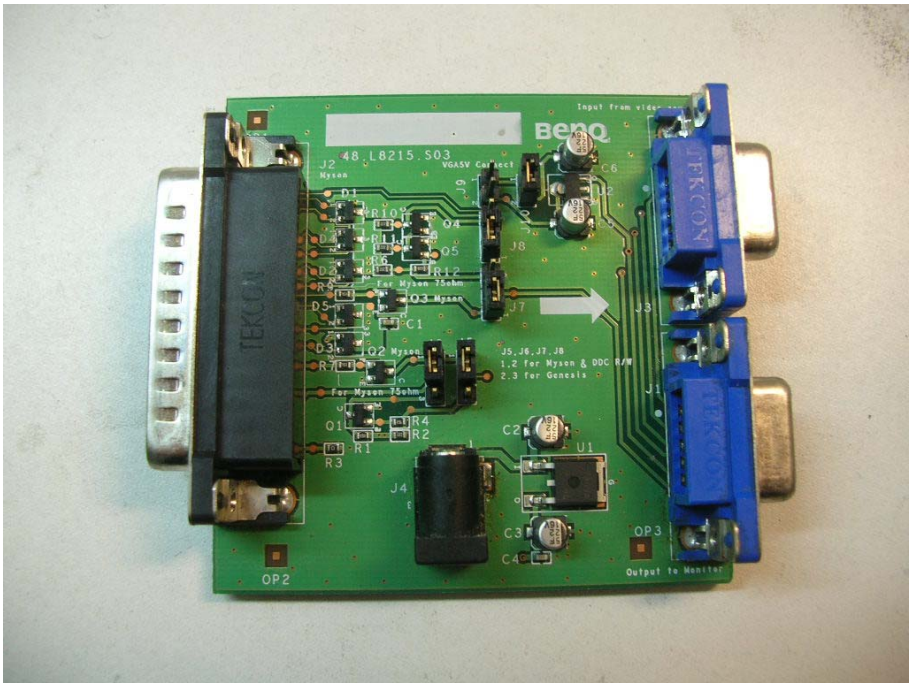
CIE coordinates	(x,y)	
9300K	x = 0.283 ± 0.006 y = 0.297 ± 0.006	PerfectuneII
6500K/sRGB	x = 0.313 ± 0.006 y = 0.329 ± 0.006	PerfectuneII
sRGB	x = 0.313 ± 0.006 y = 0.329 ± 0.006	PerfectuneII

Quality Inspection specification:

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

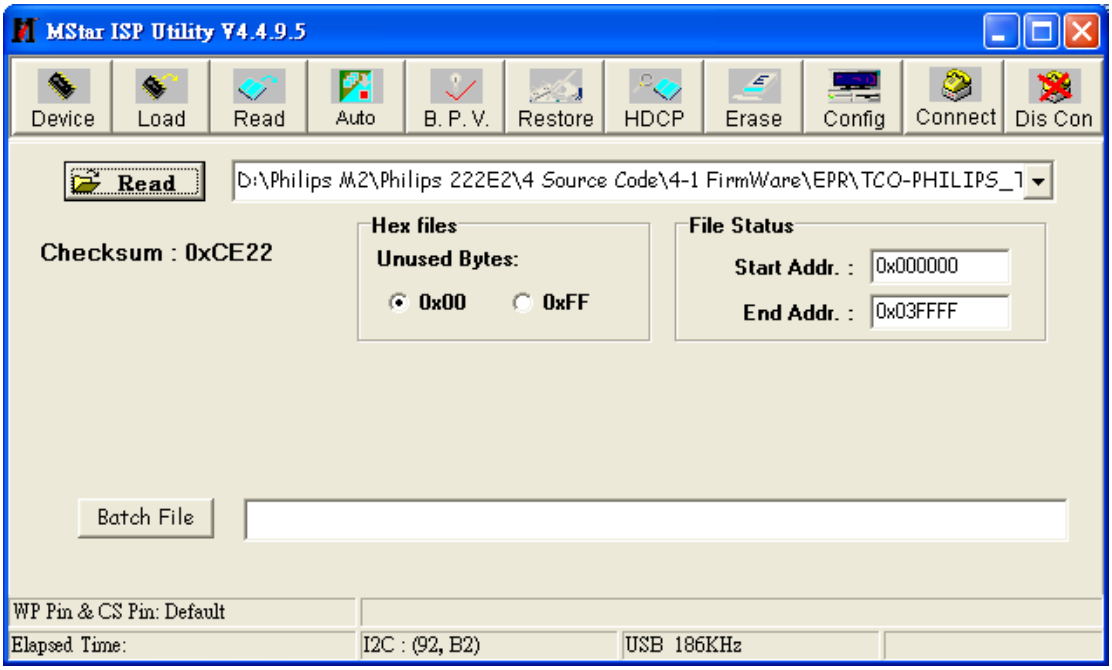
Service tool-Hardware

PCM code	12NC
5E.L8215.001	996510019769

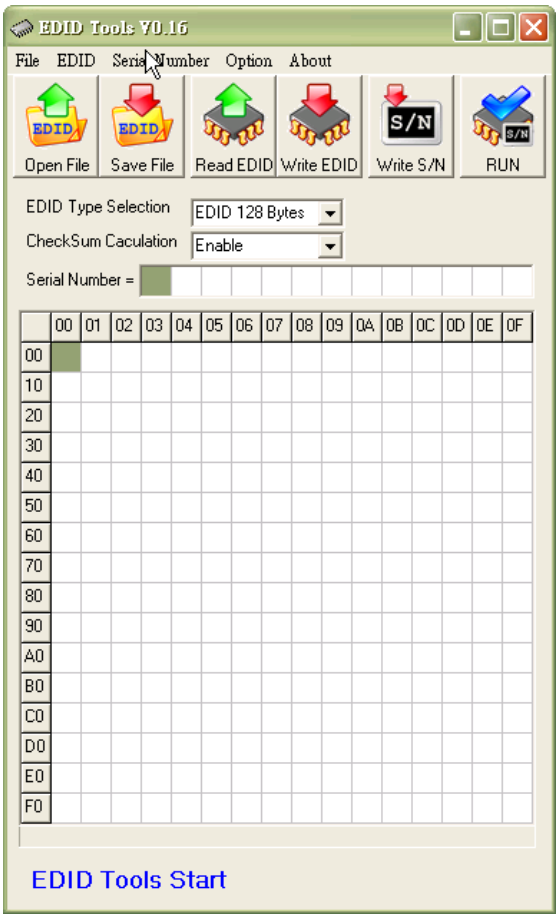


Service tool-Software

Firmware writing tool : MStar ISP Utility V4.4.9.5



DDC writing tool: Q-EDID-V16



DDC Instructions

DDC Data Re-programming

In case the DDC data memory IC or main EEPROM which storage all factory settings were replaced due to a defect, the serial numbers have to be re-programmed "Analog DDC IC, Digital DDC IC & EEPROM".

It is advised to re-soldered DDC IC and main EEPROM 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

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.

Configuration and procedure

"PI-EDID" The software is provided by IMS to upgrade the firmware of CPU.

PI-EDID Tools is for the interface between "Parallel Port of PC" and "15 pin-D-SUB connector of Monitor".

It is a windows-based program, which cannot be run in MS-DOS.

System and equipment requirements

1. An Pentium (or above) personal computer or compatible.
2. Microsoft operation system Windows 95/98/2000/XP and Port95NT.exe.
3. EDID Software "PI-EDID.exe"
4. ISP boardas shown in Fig. 1

And I2C Board Jump wire should follow J10 (short), J9 (open), J5/J6/ (1and 2 pin short) J7/J8 (1 and 2 pin short)

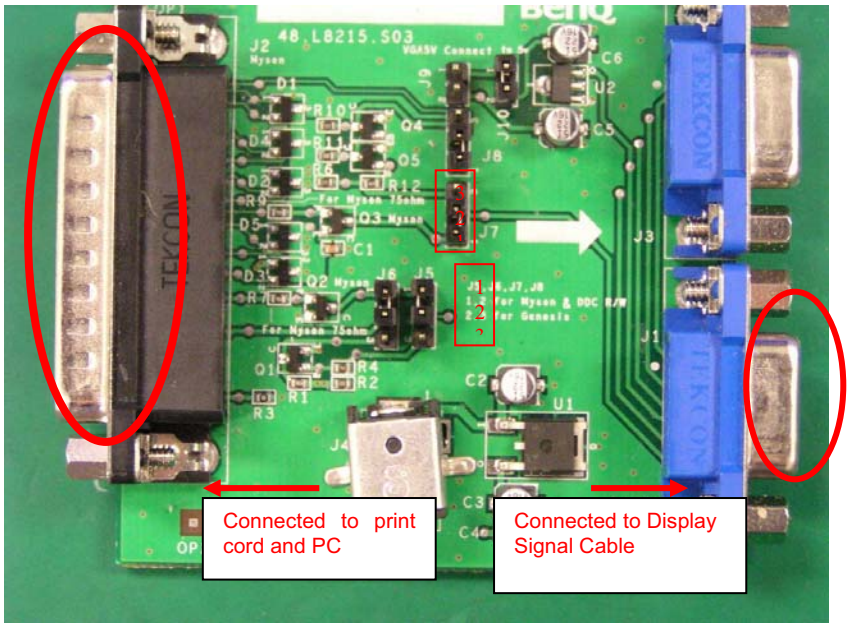


Fig.1

DDC Instructions

5. Connect and Mains cord to Monitor as shown in Fig.2.

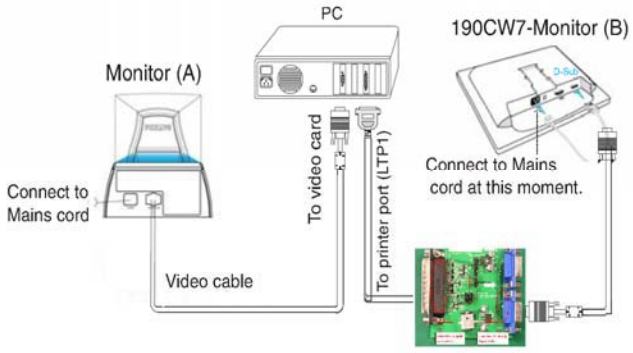
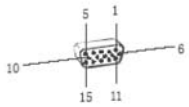


Fig.2

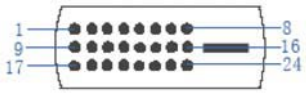
Pin assignments :



A. 15-pin D-Sub Connector

PIN No.	SIGNAL	PIN No.	SIGNAL
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		

B. Input DVI-D Connector pin



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-

DDC Instructions

6. Setup the Philips-IMS EDID Tools program

Step 1: Open Q-EDID Software into your folder as shown in Fig.3. and Fig.4.

Fig.3

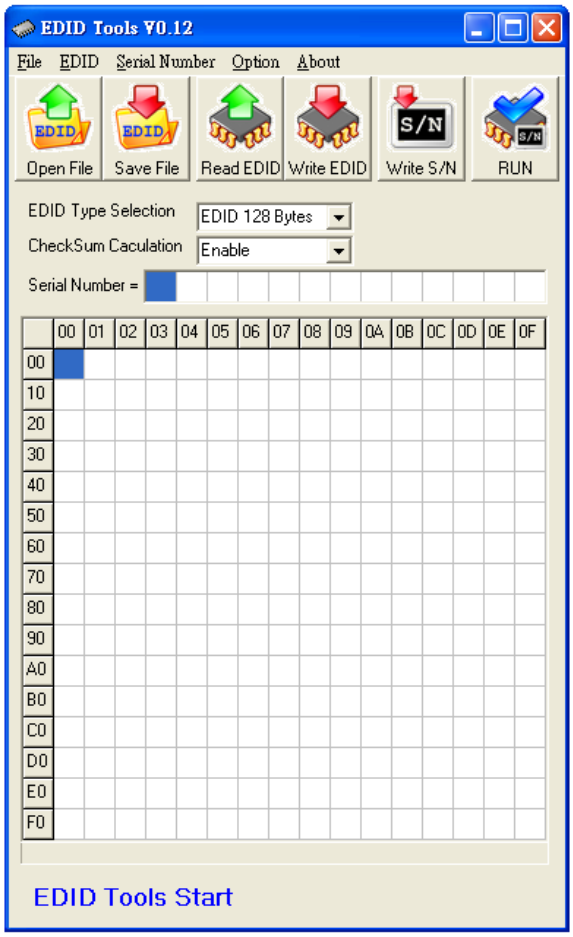


Fig.4

DDC Instructions

Step 2: Press “Open File” then choose
LCD_Analog.ddc or LCD_DVI.ddc as shown in Fig. 5 .

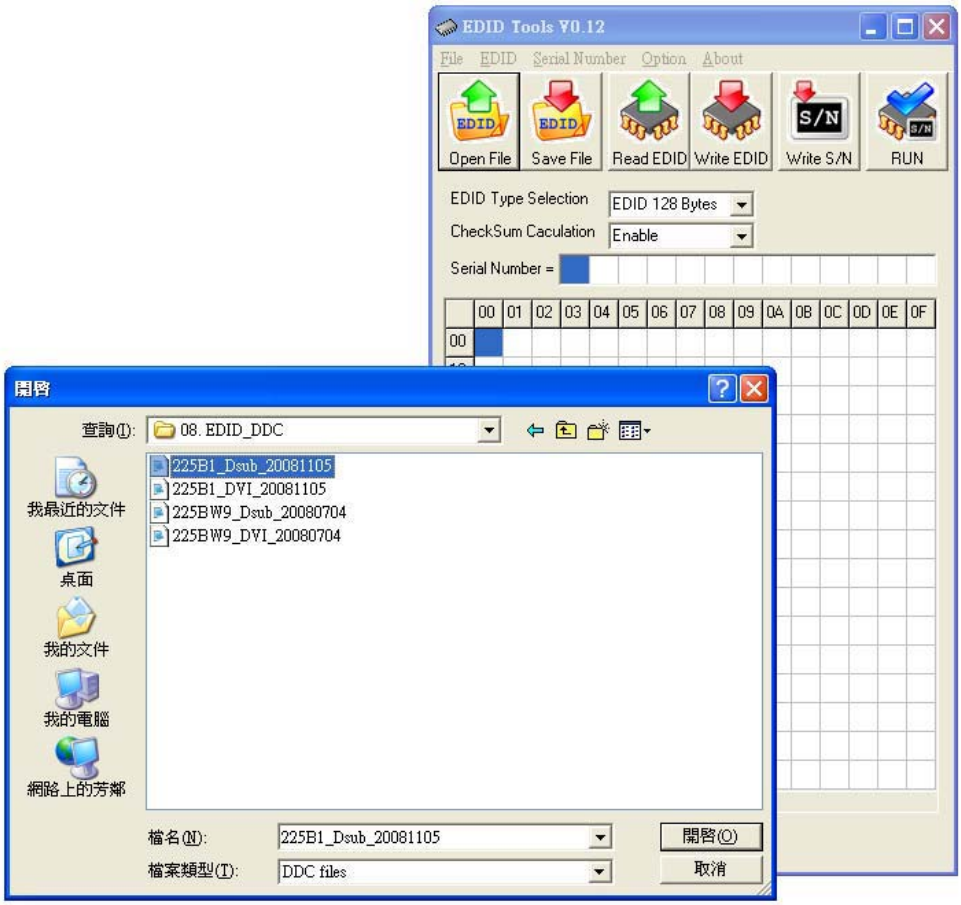


Fig.5

DDC Instructions

Step 3 : Load DDC file success as shown in Fig. 6 .

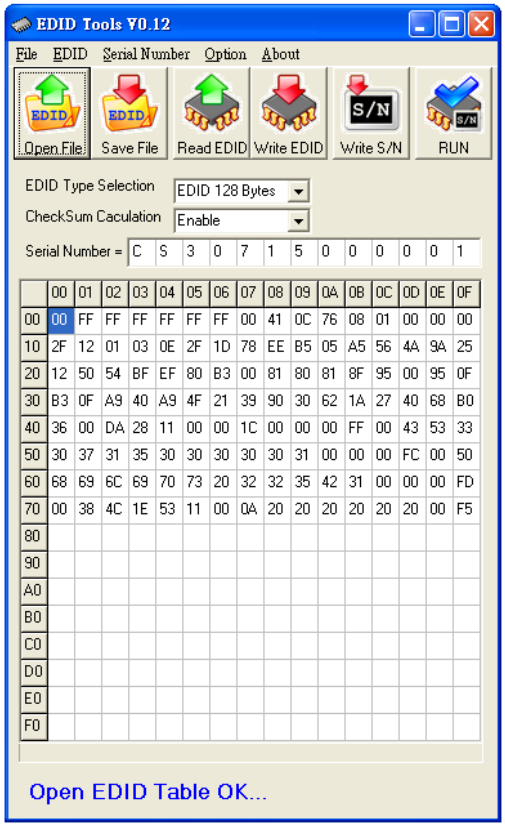


Fig.6

Step 4 : update Serial number and press enter to correct S/N number shown as Fig.7 .

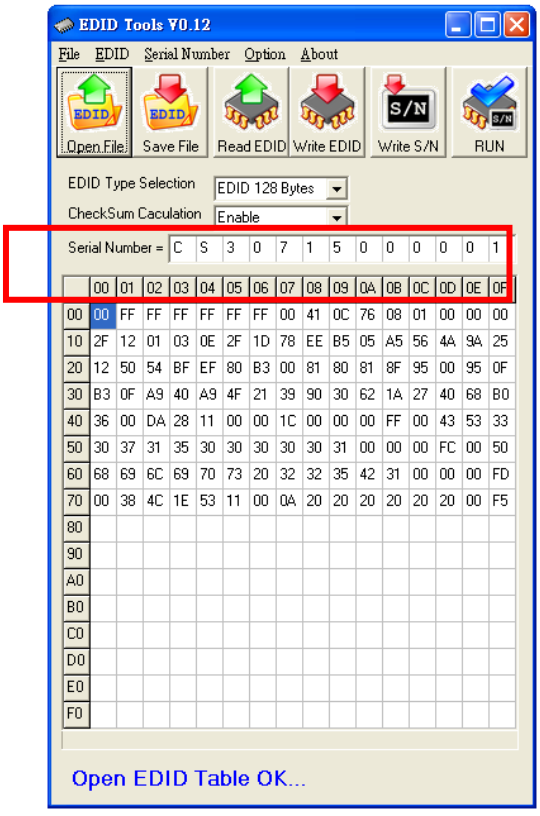


Fig.7

DDC Instructions

Step 5 : Press “RUN” to write EDID and serial number shown as Fig.8 .

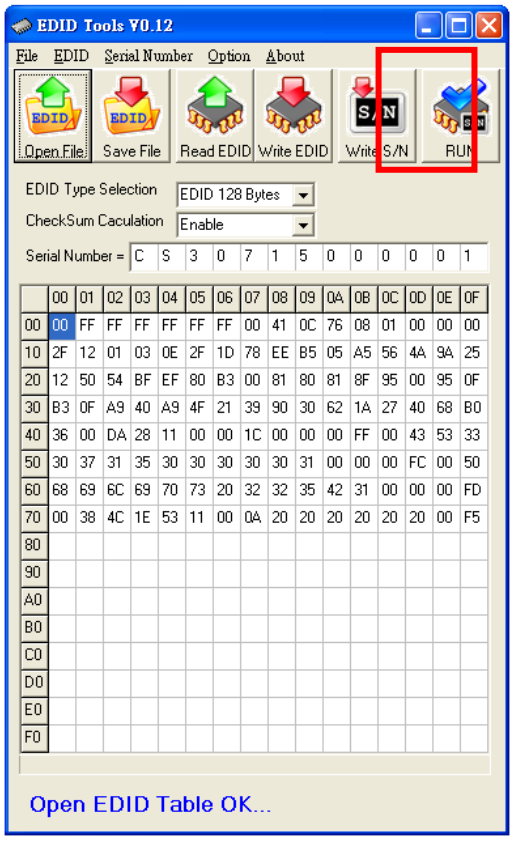


Fig.8

Step 6 : EDID and serial number update success shown as Fig.9

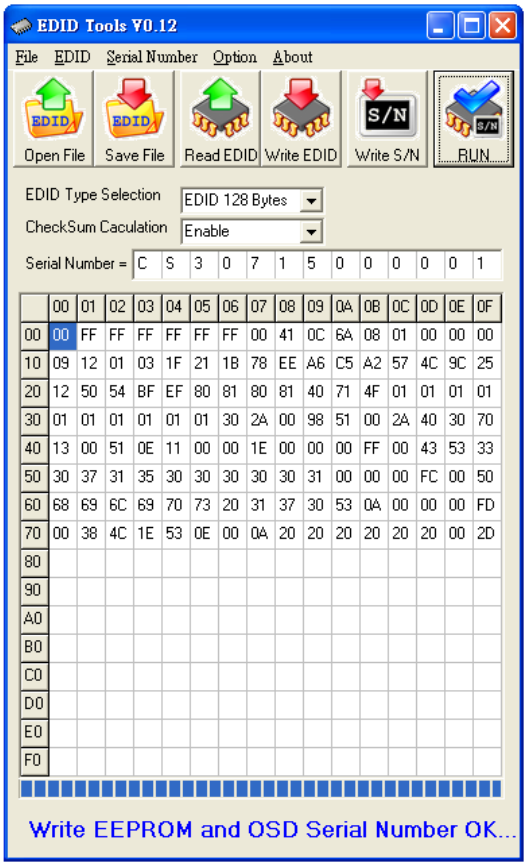


Fig.9

DDC Instructions

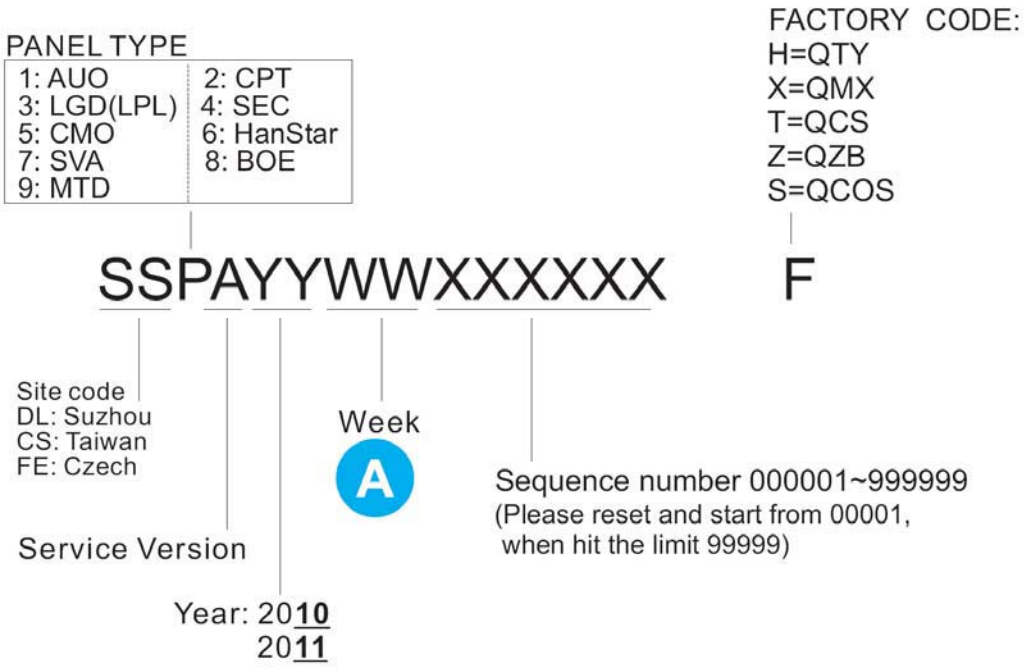
8. Press Monitor Menu Key to check OSD Serial number is the same as PI-EDID write data as shown in Fig.10

Note: If not the same, please rewrite EDID S/N again.

Fig.14

9 Turn off the monitor, exit the factory mode.

Serial Number Definition



DDC DATA

Analog DDC

//////////Displaying Monitor EDID//////////

128 bytes EDID Data (Hex):

```
        0   1   2   3   4   5   6   7   8   9

  0: 00  FF  FF  FF  FF  FF  FF  00  41  0C
 10: 52  C0  F1  42  0B  00  12  14  01  03
 20: 6E  30  1B  78  EE  EE  95  A3  54  4C
 30: 99  26  0F  50  54  BF  EF  80  D1  C0
 40: 81  C0  81  00  81  80  01  01  01  01
 50: 01  01  01  01  02  3A  80  18  71  38
 60: 2D  40  58  2C  45  00  DC  0C  11  00
 70: 00  1E  00  00  00  FF  00  44  4C  31
 80: 31  30  31  38  37  33  38  30  33  33
 90: 00  00  00  FC  00  50  68  69  6C  69
100: 70  73  20  32  32  32  45  4C  00  00
110: 00  FD  00  38  4C  1E  53  15  00  0A
120: 20  20  20  20  20  20  00  E5
```

Decoded EDID data

<---Header--->
Header: 00 FF FF FF FF FF FF 00
<-x-Header-x->

<---Vendor/Product Identification--->
ID Manufacturer Name: PHL
ID Product Code: 49234
ID Serial Number: 000B42F1
Week of Manufacture: 18
Year of Manufacture: 2010
<-x-Vendor/Product Identification-x->

<---EDID Structure Version/Revision--->
EDID Version#: 1
EDID Revision#: 3
<-x-EDID Structure Version/Revision-x->

<---Basic Display Parameters/Features--->
Video i/p definition: VGA
Setup: Blank-to-Black not expected
Seperate Syncs. support: Yes
Composite Sync. support: Yes
Vsync. Pulse: serration required
Max Horz Image Size: 48 cm.
Max Vert Image Size: 27 cm.
Display Gamma: 2.2
Display Type: RGB color display
Standard Default Color Space: Yes
Features, PTiming Mode: In first detailed block
Features, GTF support: No
DPMS Features, Stand-by: Yes
DPMS Features, Suspend: Yes
DPMS Features, Active Off: Yes
<-x-Basic Display Parameters/Features-x->

<---Color Characteristics--->
Red x: 0.639648
Red y: 0.330078
Green x: 0.299805
Green y: 0.599609
Blue x: 0.150391
Blue y: 5.95703e-002
White x: 0.313477
White y: 0.329102
<-x-Color Characteristics-x->

<---Established Timings--->
Established Timimgs 1: BF
- 720x400 @70Hz
- 640x480 @60Hz
- 640x480 @67Hz
- 640x480 @72Hz
- 640x480 @75Hz
- 800x600 @56Hz
- 800x600 @60Hz

Established Timimgs 2: EF
- 800x600 @72Hz
- 800x600 @75Hz
- 832x624 @75Hz
- 1024x768 @60Hz
- 1024x768 @70Hz
- 1024x768 @75Hz
- 1280x1024 @75Hz
- 1152x870x75Hz

Established Timings 3: 80
<-x-Established Timings-x->

<---Standard Timing Identification--->
Standard Timing: 1920x1080 @60Hz
Standard Timing: 1280x720 @60Hz
Standard Timing: 1280x1280 @60Hz
Standard Timing: 1280x1024 @60Hz
<-x-Standard Timing Identification-x->

<---Detailed Timing Descriptions--->
Detailed Timing: 1920x1080 @60Hz
Detailed Timing: FF (Monitor SN) 'DL11018738033'
Detailed Timing: FC (Monitor name) 'Philips 222EL'
Detailed Timing: FD (Monitor limits)
Vert: 56 - 76 Hz
Horz: 30 - 83 KHz
Clk: 210 MHz
<-x-Detailed Timing Descriptions-x->
Extension Flag: 00
Checksum: E5

DDC DATA

DVI DDC

//////////Displaying Monitor EDID//////////

128 bytes EDID Data (Hex):

```
        0   1   2   3   4   5   6   7   8   9

  0: 00  FF  FF  FF  FF  FF  FF  00  41  0C
 10: 51  C0  D2  04  00  00  0A  14  01  03
 20: 80  30  1B  78  EE  EE  95  A3  54  4C
 30: 99  26  0F  50  54  BF  EF  80  D1  C0
 40: 81  C0  81  00  81  80  8B  C0  95  00
 50: B3  00  01  01  02  3A  80  18  71  38
 60: 2D  40  58  2C  45  00  DC  0C  11  00
 70: 00  1E  00  00  00  FF  00  43  53  33
 80: 30  37  31  35  30  30  30  30  30  31
 90: 00  00  00  FC  00  50  68  69  6C  69
100: 70  73  20  32  32  32  45  0A  00  00
110: 00  FD  00  38  4C  1E  53  11  00  0A
120: 20  20  20  20  20  20  00  09
```

<---Header--->

Decoded EDID data

<---Header--->
Header: 00 FF FF FF FF FF FF 00
<-x-Header-x->

<---Vendor/Product Identification--->
ID Manufacturer Name: PHL
ID Product Code: 49233
ID Serial Number: 000004D2
Week of Manufacture: 10
Year of Manufacture: 2010
<-x-Vendor/Product Identification-x->

<---EDID Structure Version/Revision--->
EDID Version#: 1
EDID Revision#: 3
<-x-EDID Structure Version/Revision-x->

<---Basic Display Parameters/Features--->
Video i/p definition: Digital
Setup: Blank-to-Black not expected
Seperate Syncs. support: No
Composite Sync. support: No
Vsync. Pulse: serration not required
Max Horz Image Size: 48 cm.
Max Vert Image Size: 27 cm.
Display Gamma: 2.2
Display Type: RGB color display
Standard Default Color Space: Yes
Features, Timing Mode In first detailed block
Features, GTF support: No
DPMS Features, Stand-by: Yes
DPMS Features, Suspend: Yes
DPMS Features, Active Off: Yes
<-x-Basic Display Parameters/Features-x->

<---Color Characteristics--->
Red x: 0.639648
Red y: 0.330078
Green x: 0.299805
Green y: 0.599609
Blue x: 0.150391
Blue y: 5.95703e-002
White x: 0.313477
White y: 0.329102
<-x-Color Characteristics-x->

<---Established Timings--->
Established Timimgs 1: BF
- 720x400 @70Hz
- 640x480 @60Hz
- 640x480 @67Hz
- 640x480 @72Hz
- 640x480 @75Hz
- 800x600 @56Hz
- 800x600 @60Hz

Established Timimgs 2: EF
- 800x600 @72Hz
- 800x600 @75Hz
- 832x624 @75Hz
- 1024x768 @60Hz
- 1024x768 @70Hz
- 1024x768 @75Hz
- 1280x1024 @75Hz
- 1152x870x75Hz

Established Timings 3: 80
<-x-Established Timings-x->

<---Standard Timing Identification--->
Standard Timing: 1920x1080 @60Hz
Standard Timing: 1280x720 @60Hz
Standard Timing: 1280x1280 @60Hz
Standard Timing: 1280x1024 @60Hz
Standard Timing: 1360x765 @60Hz
Standard Timing: 1440x900 @60Hz
Standard Timing: 1680x1680 @60Hz
<-x-Standard Timing Identification-x->

<---Detailed Timing Descriptions--->
Detailed Timing: 1920x1080 @60Hz
Detailed Timing: FF (Monitor SN) 'CS30715000001'
Detailed Timing: FC (Monitor name) 'Philips 222E'
Detailed Timing: FD (Monitor limits)
Vert: 56 - 76 Hz
Horz: 30 - 83 KHz
Clk: 170 MHz
<-x-Detailed Timing Descriptions-x->
Extension Flag: 00
Checksum: 09

Firmware Upgrade for CPU

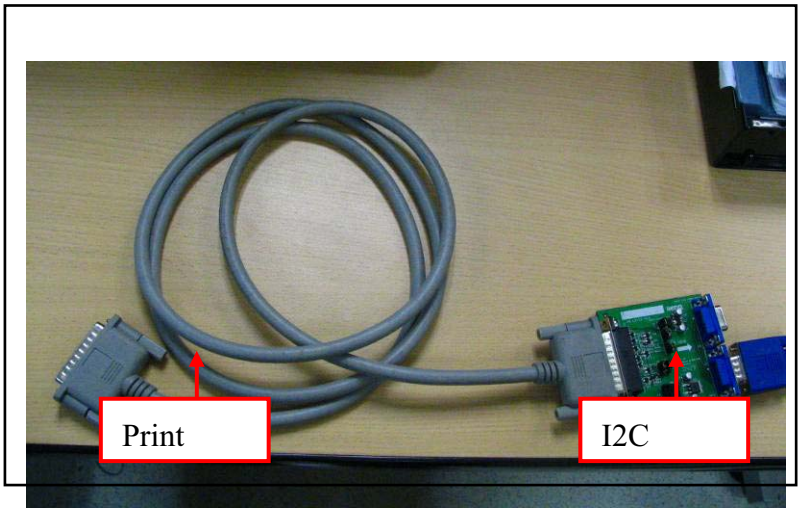
1. Hardware Requirement:

1.1. I2C board x 1 (a.Print Board b. I2C Board)

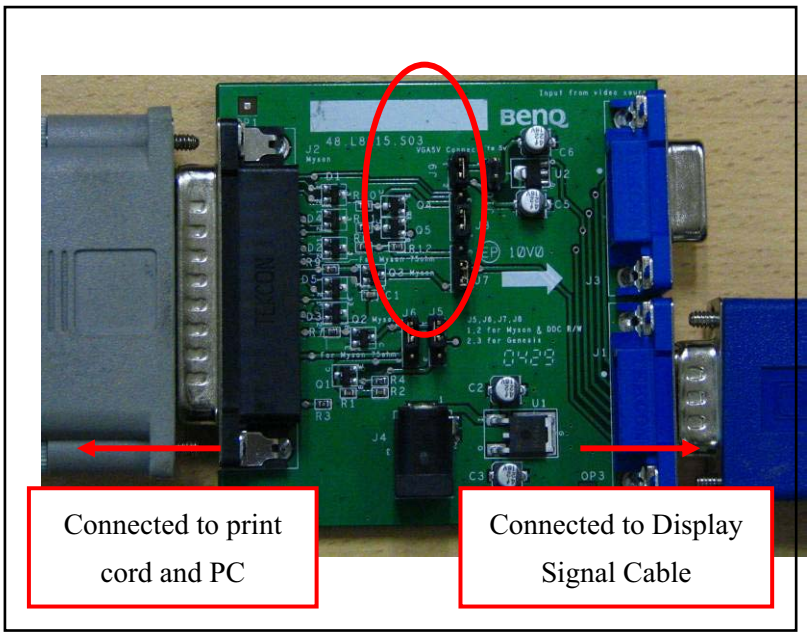
1.2. DSUB VGA cables x 2

1.3. Printer cable (with one male connector and another female connector) x 1.

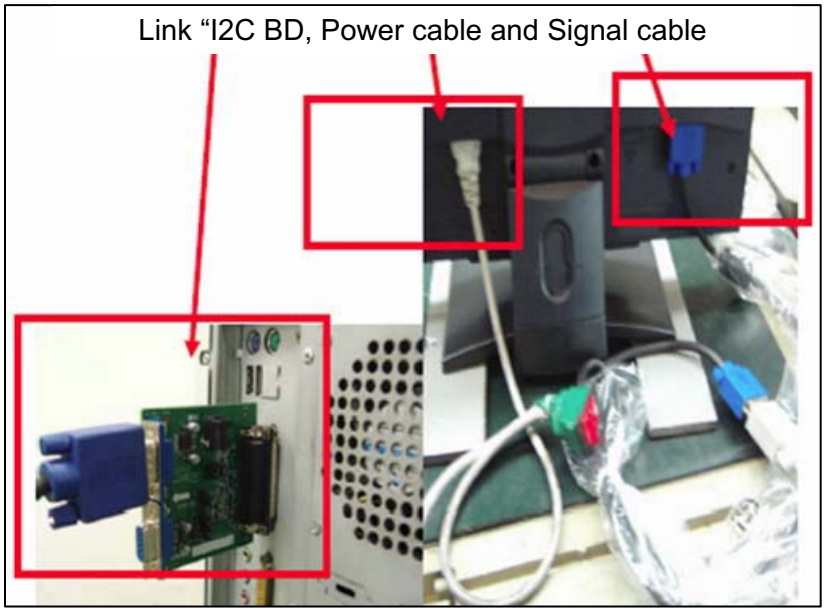
1.4. PC or Notebook with parallel (printer) port x1.



1.5 Check the Jumpers on the I2C circuit board (make sure J5/J6/J7/J8 are set at Pin 1 & Pin 2 short)



Firmware Upgrade for CPU



2. Software prepare

MStar ISP Utility V4.4.9.5

MSTAR

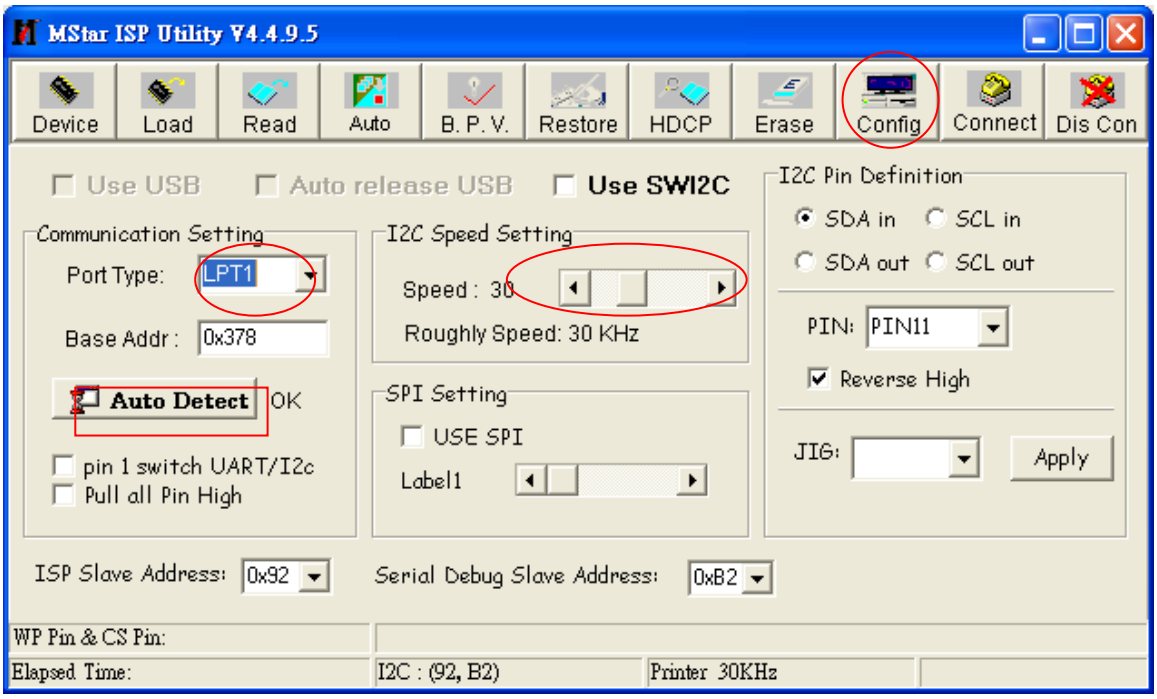
ISP Tool 4.4.9.5

DebugTool_V6.7_200

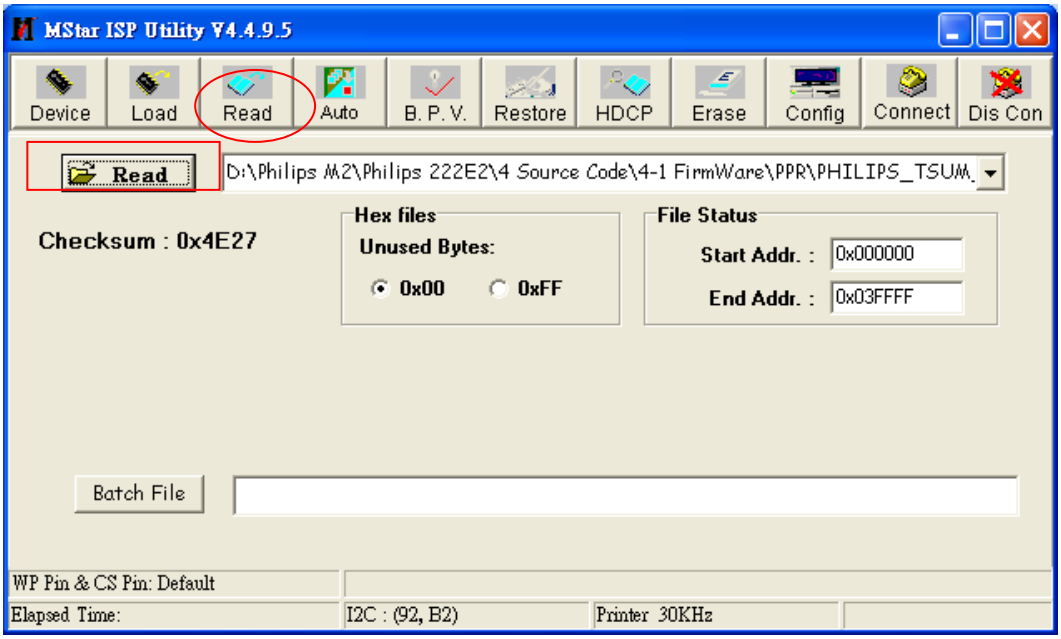
D:\Tool\MSTAR\
ISP_Tool 4.4.9.5.rar

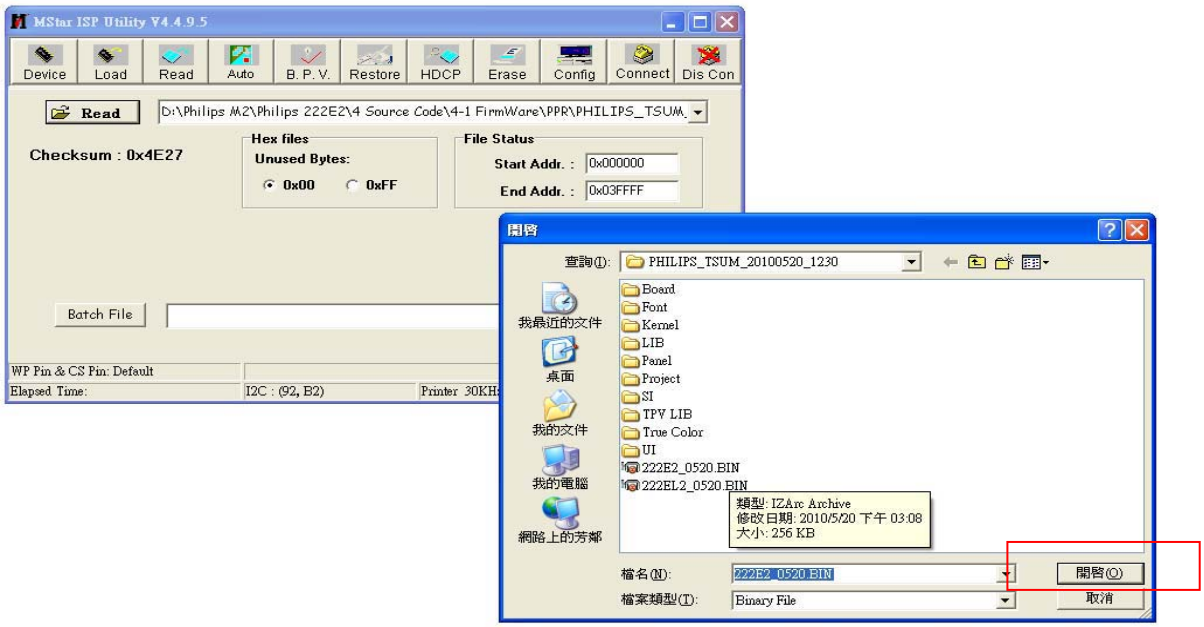
Step 1: Press MStar ISP Tool

Step 2: Choose Option “Config”, set Port type to “LPT1”; set I2C Speed Setting to 30 , Press “Auto Detect” till the tool shows “ok”

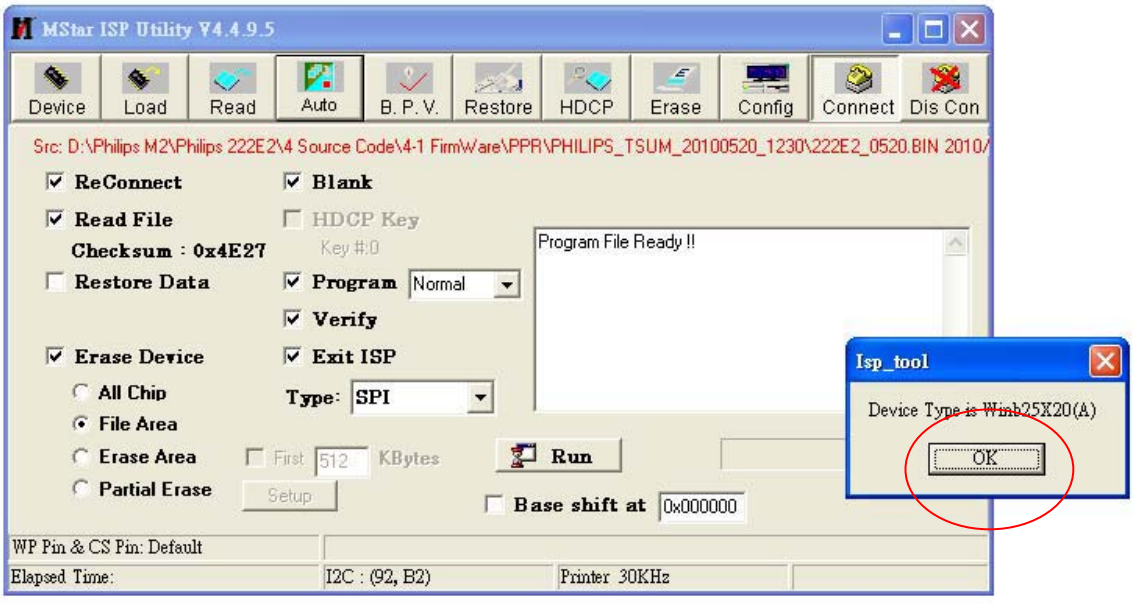


Firmware Upgrade for CPU



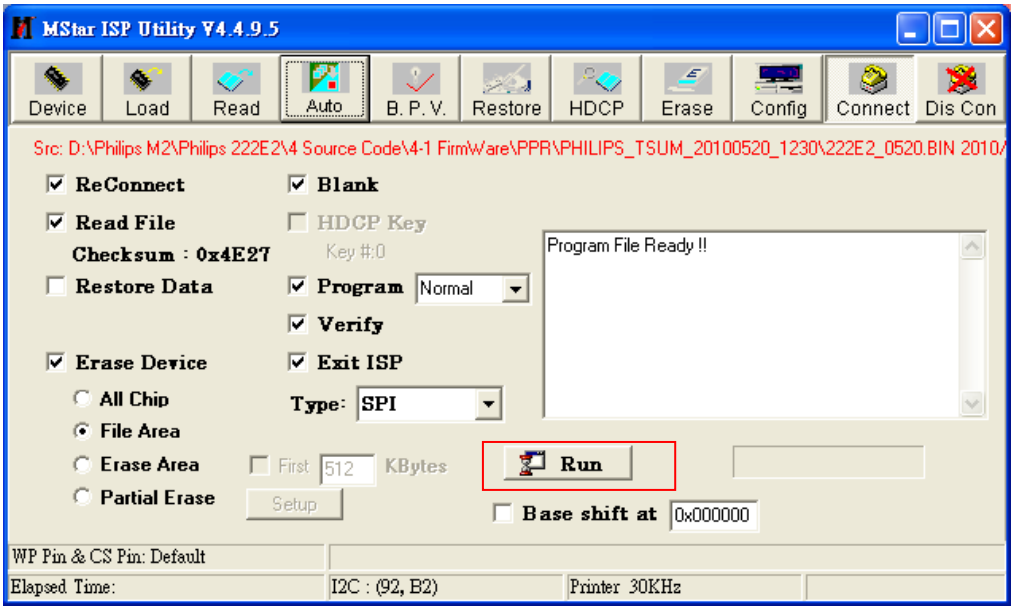


Step 4: Choose Option “Connect”, the tool will show FLASH type as below, then press “OK”

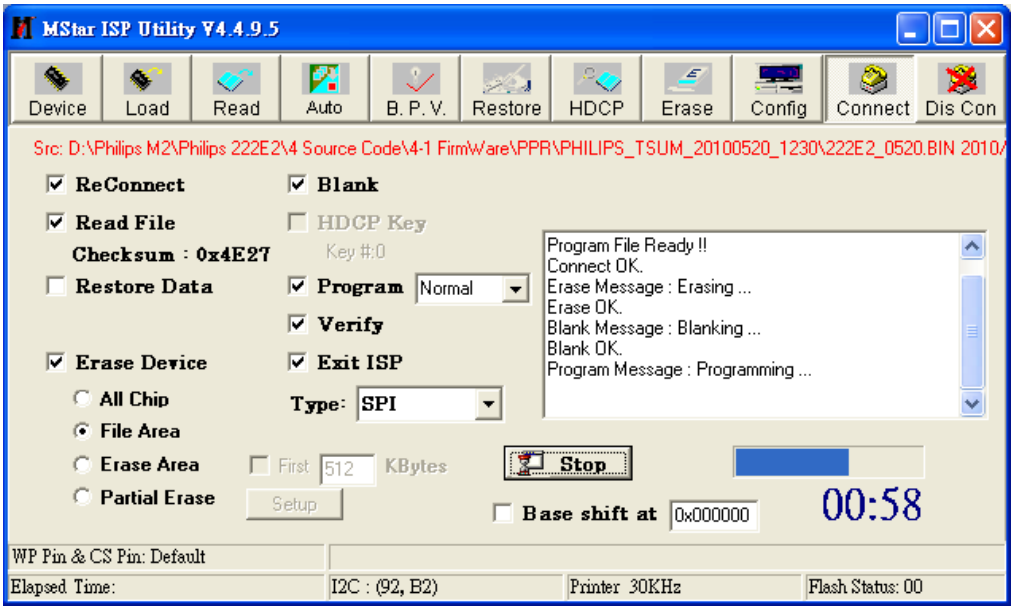


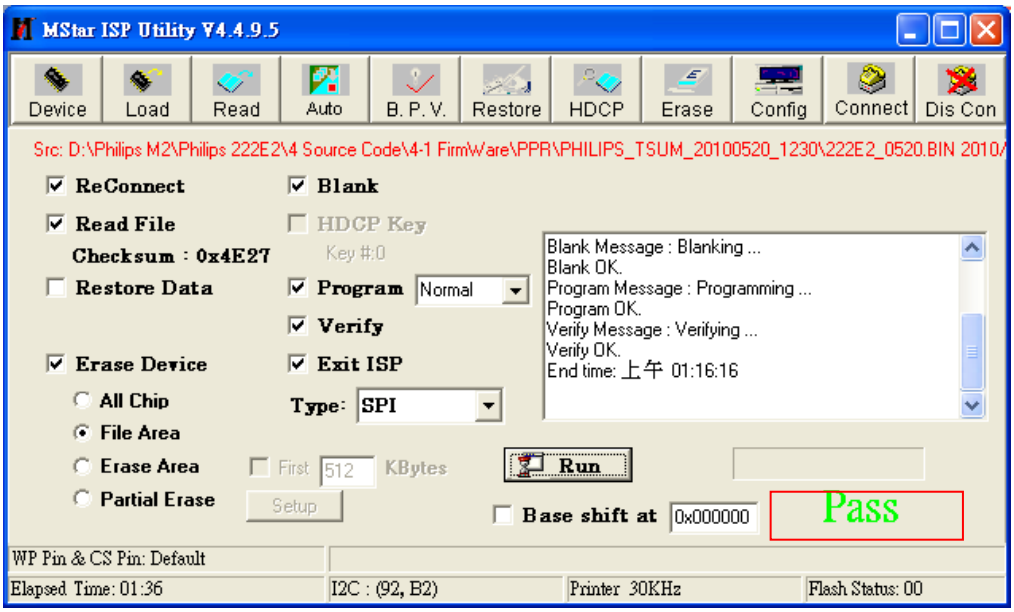
Firmware Upgrade for CPU

Step 5: Choose Option “Auto”, then press “Run”



Step 6: Choose Option “Auto”, and then press “Run”; the firmware will upgrade complete after the message shows “PASS”

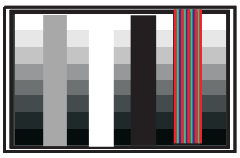
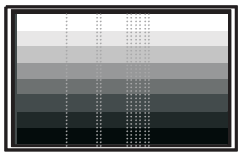
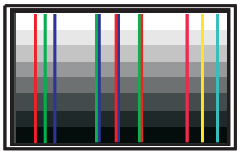
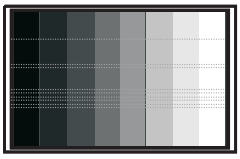
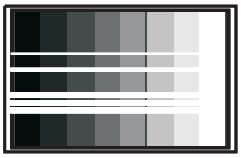
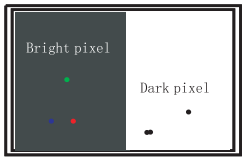
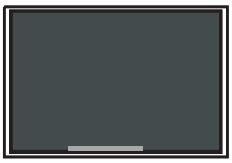
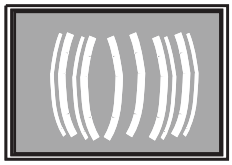
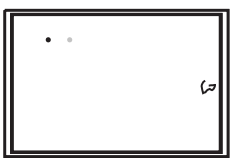




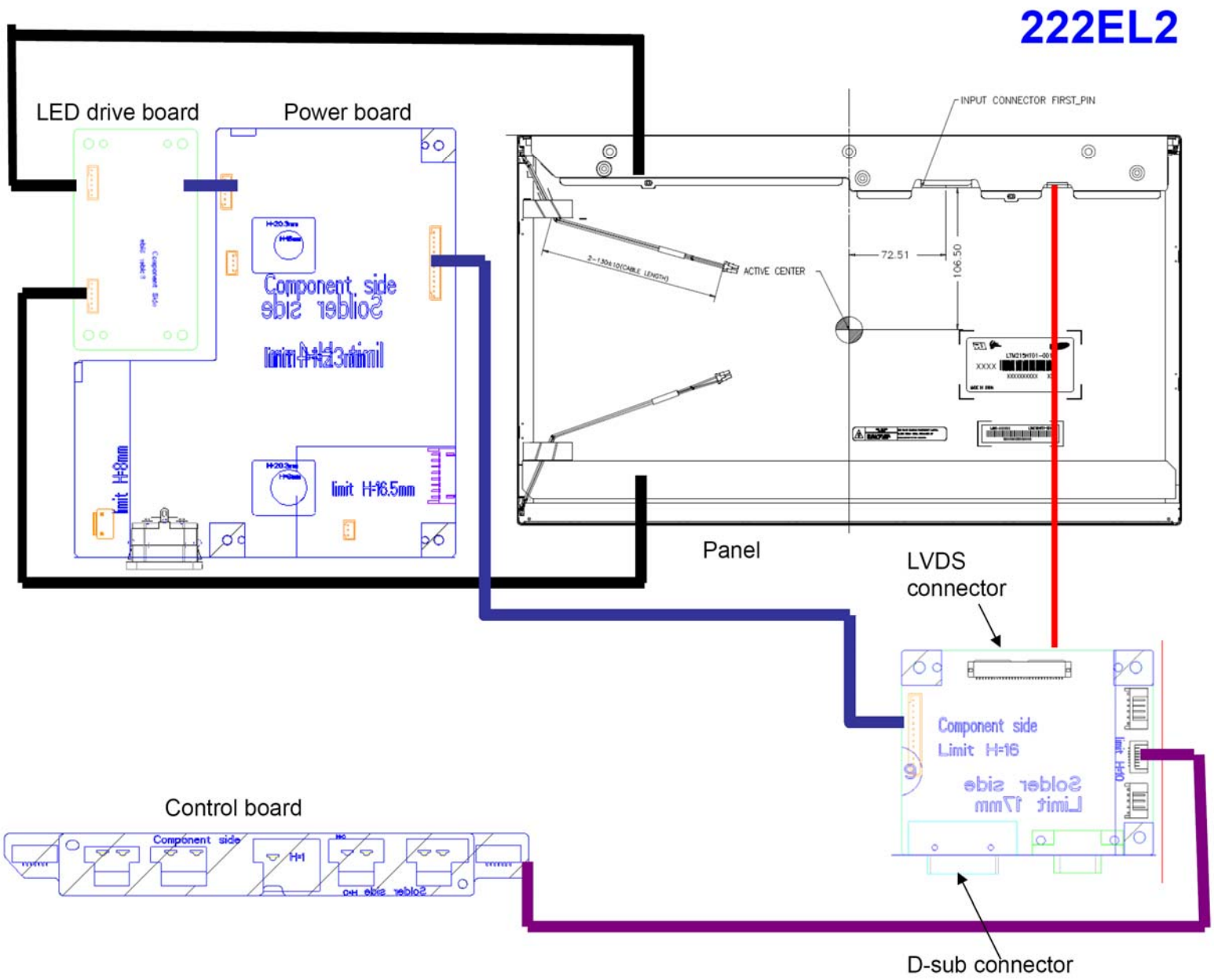
Failure Mode Of Panel

Quick reference for failure mode of LCD panel

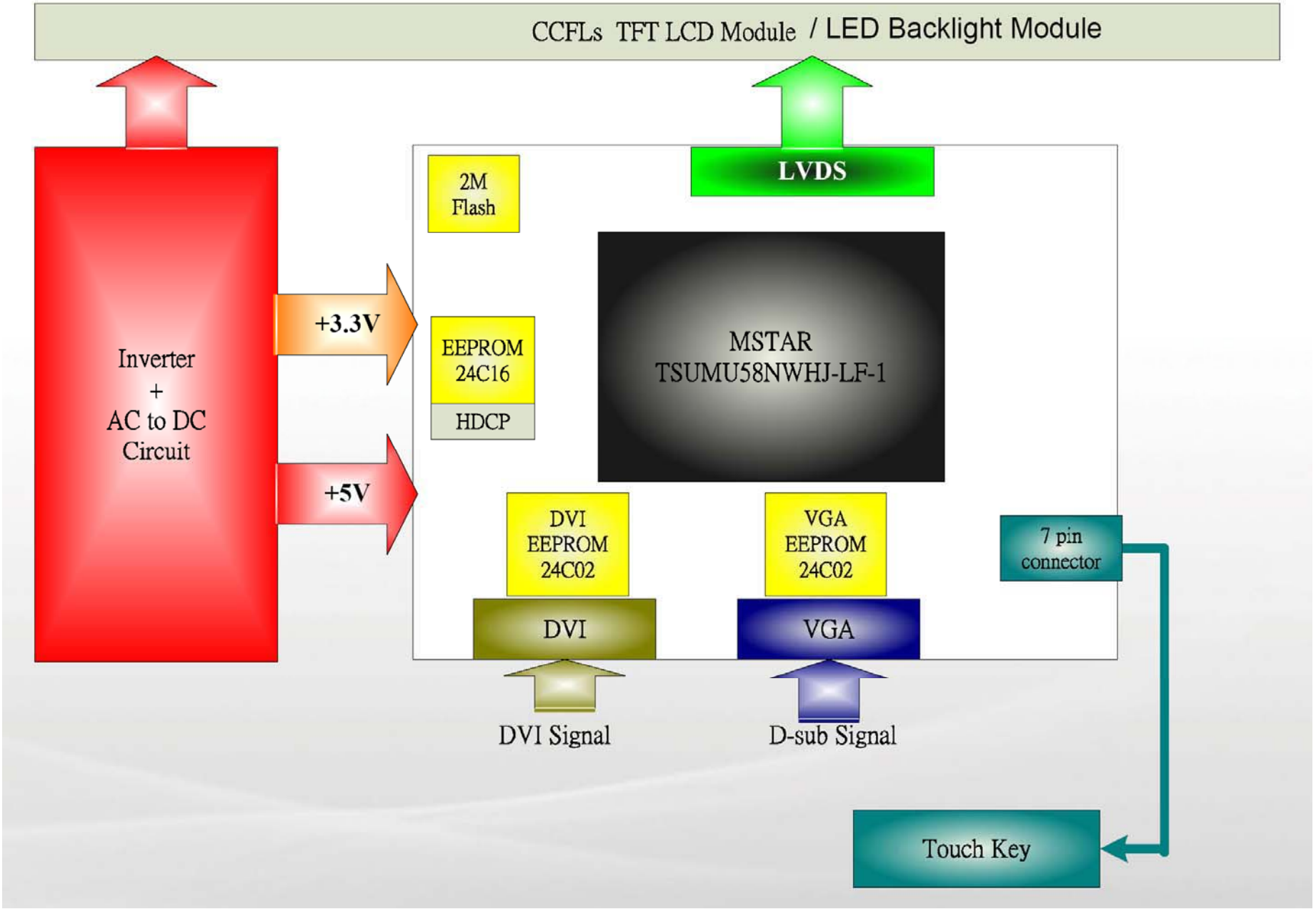
this page presents problems that could be made by LCD panel.
It is not necessary to repair circuit board. Simply follow the mechanical instruction on this manual to eliminate failure by replace LCD panel.

Failure description	Phenomenon
Vertical block defect	
Vertical dim lines	
Vertical lines defect (Always bright or dark)	
Horizontal block defect	
Horizontal dim lines	
Horizontal lines defect (Always bright or dark)	
Has bright or dark pixel	
Polarizer has bubbles	
Polarizer has bubbles	
Foreign material inside polarizer. It shows liner or dot shape.	
Concentric circle formed	
Bottom back light of LCD is brighter than normal	
Back light un-uniformity	
Backlight has foreign material. Black or white color, liner or circular type	

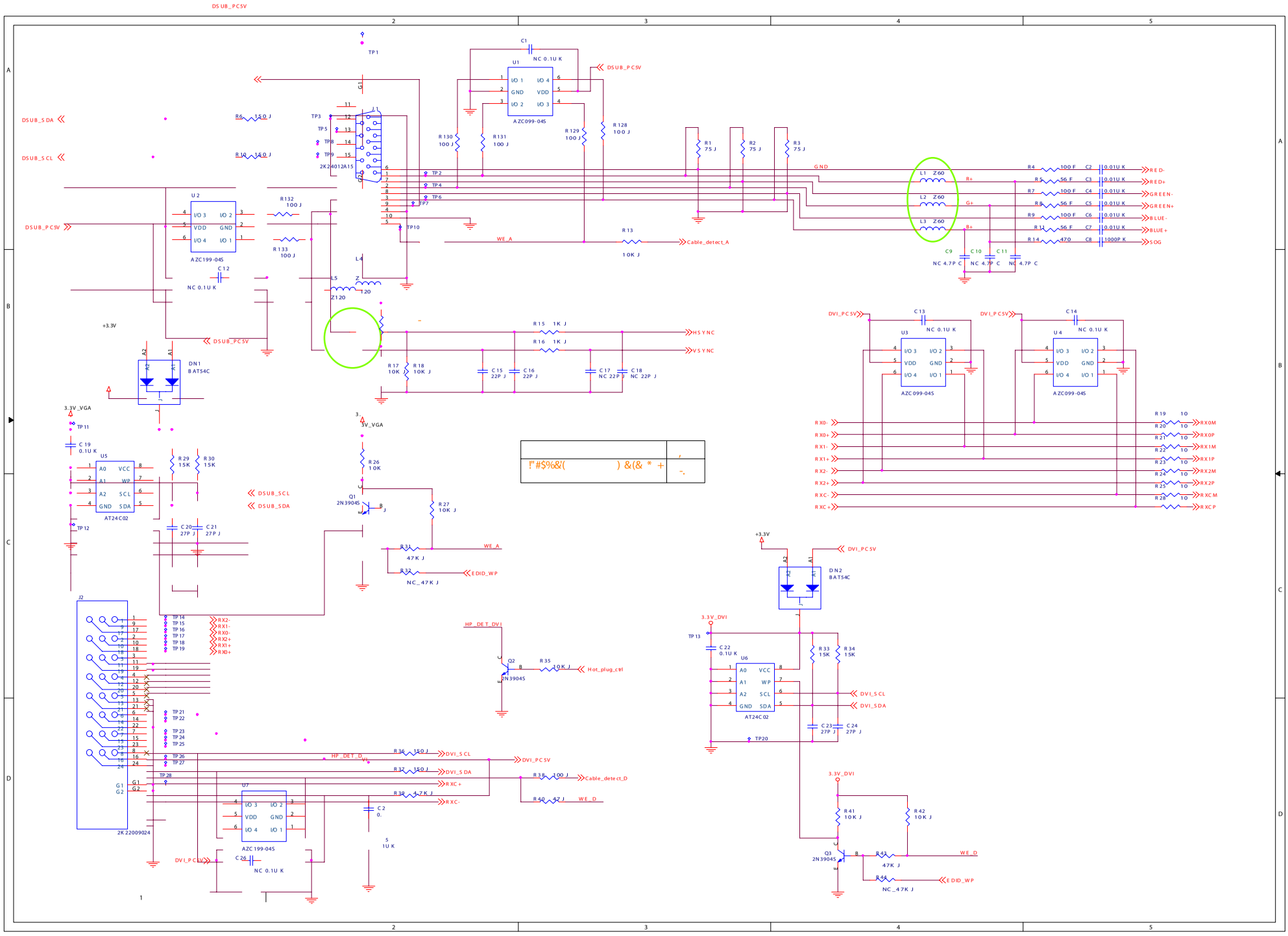
Wiring Diagram



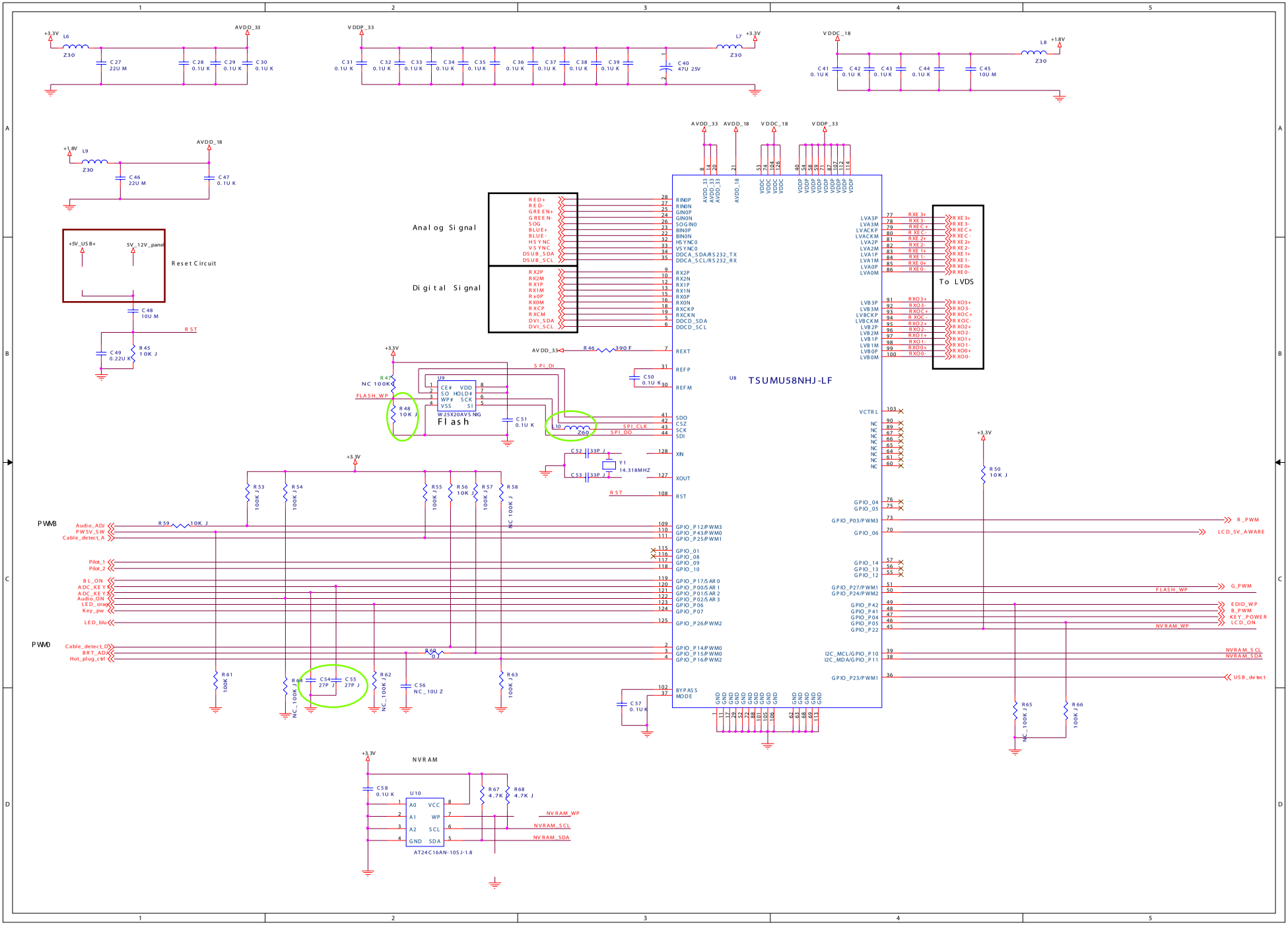
Block Diagram



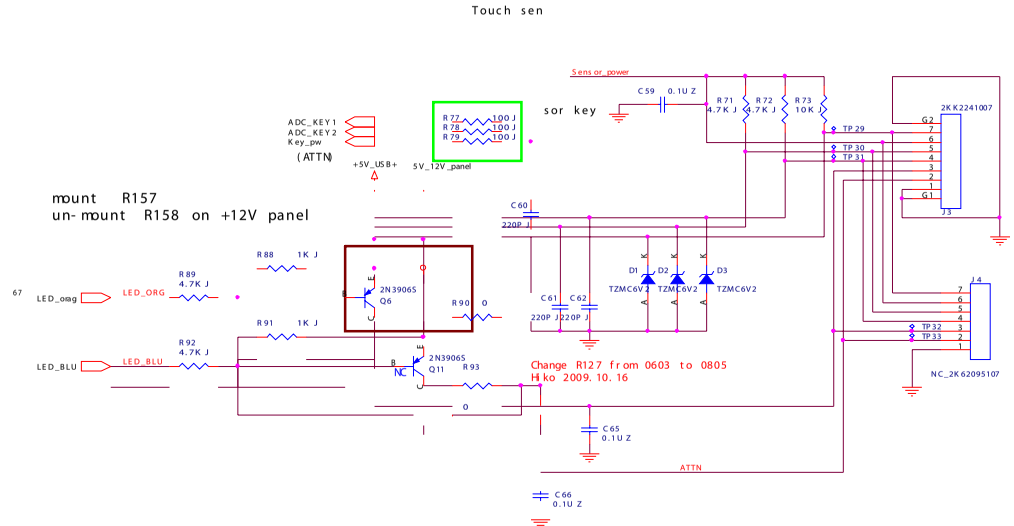
Scalar Diagram & C.B.A

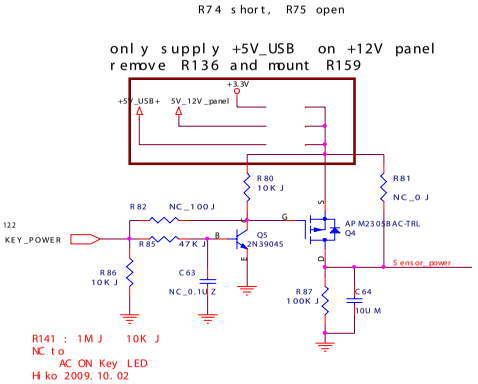


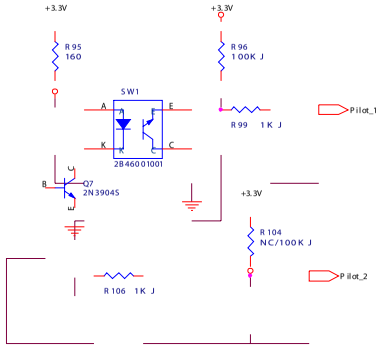
Scalar Diagram & C.B.A

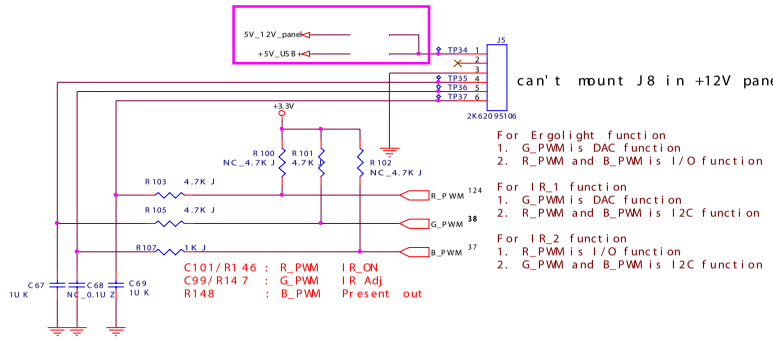


Scalar Diagram & C.B.A

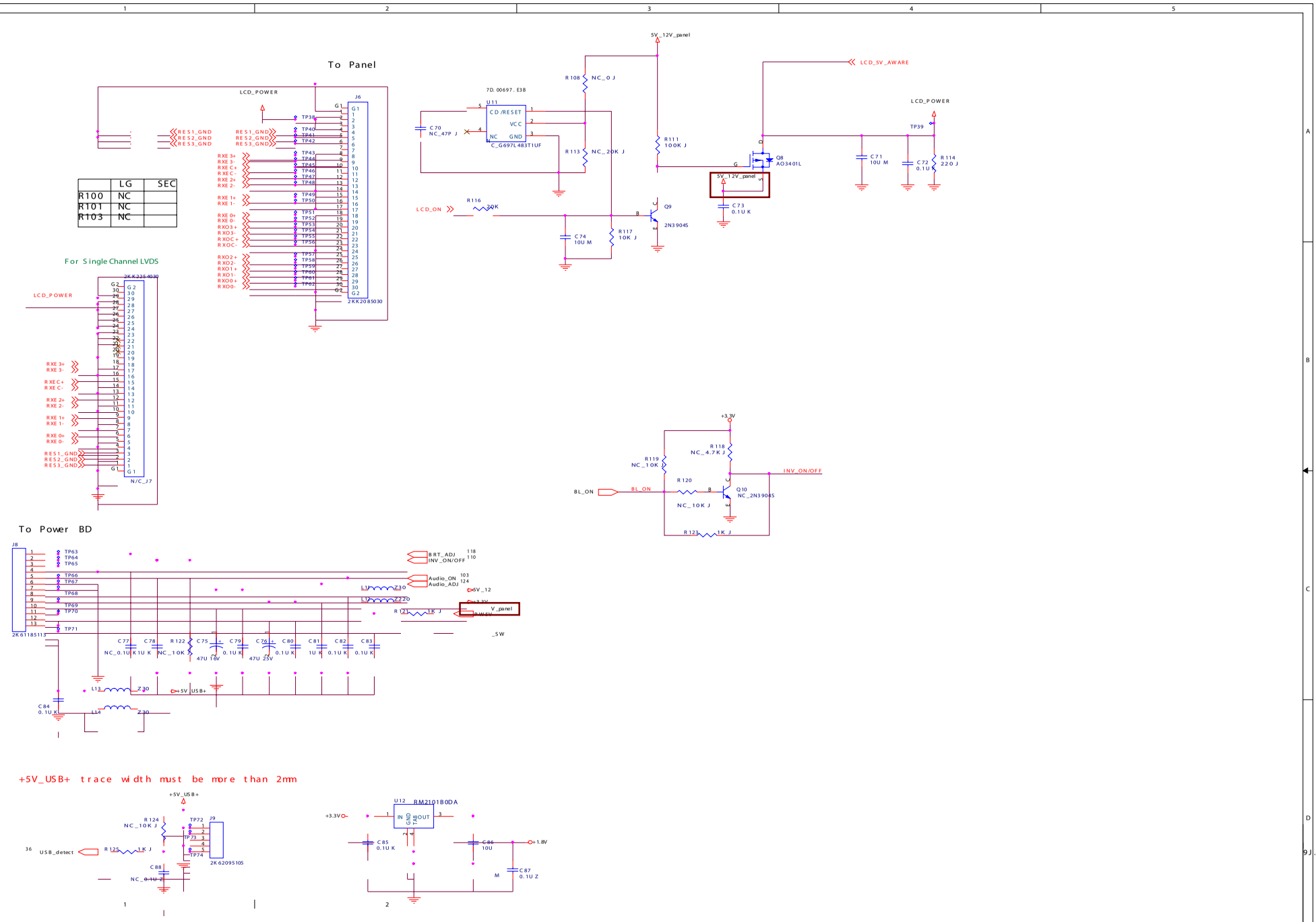




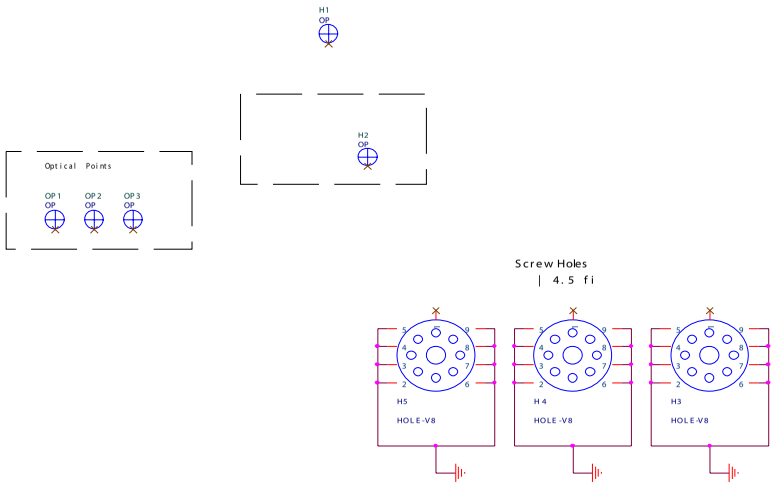




Scalar Diagram & C.B.A



Scalar Diagram & C.B.A

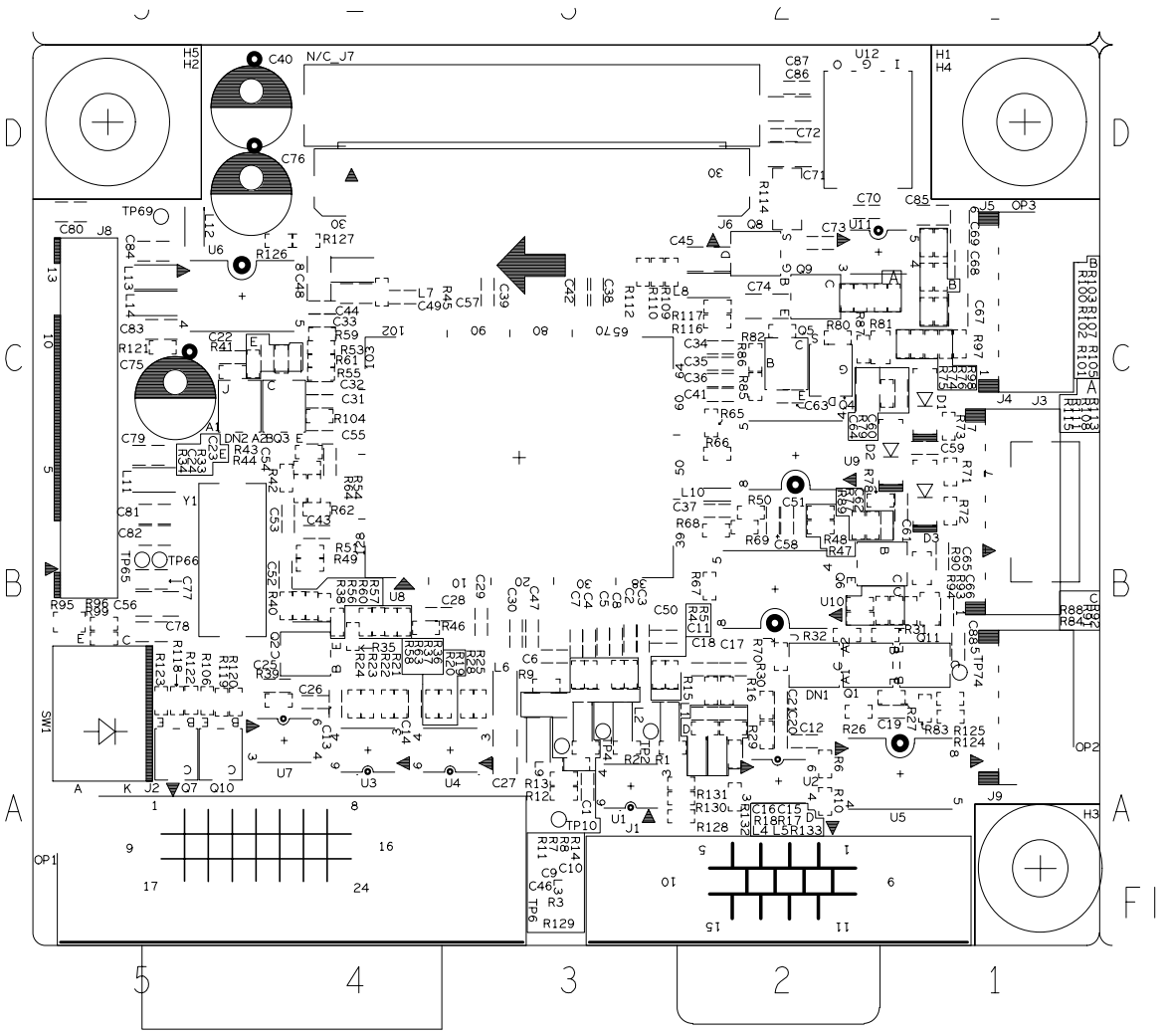


Scalar Diagram & C.B.A

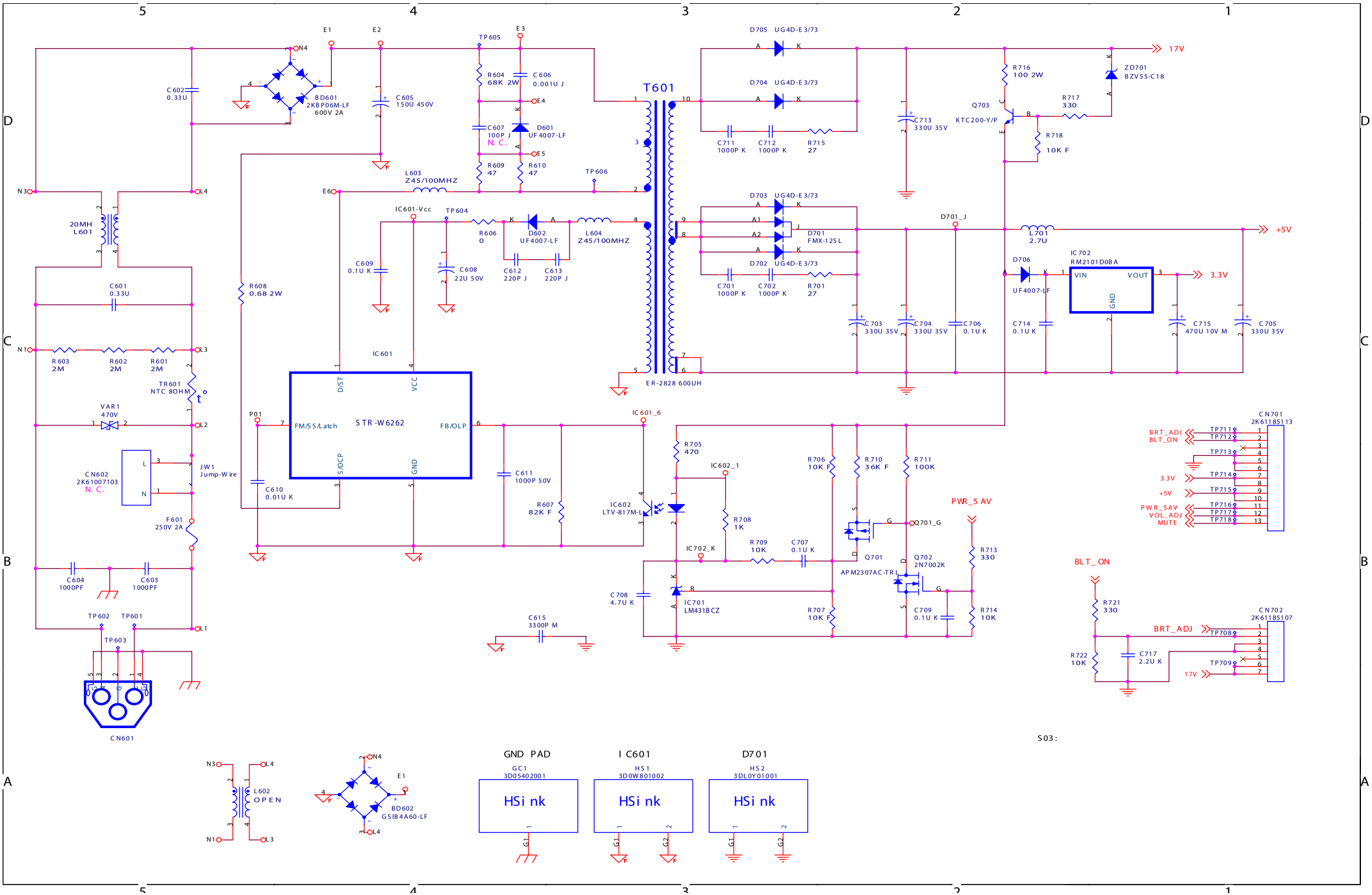
1. R74 short, R75 open
2. R90 75ohm to 0 ohm
3. Pin70 to LCD_5V_AWARE
4. LED_BLU/Key_pw change
5. change C75/C76 from 0J.47612.089 to 0J.4761D.20V
6. Change C40 from 0J.22612.21B to 0J.4761D.20V
7. C15/16/17/18 27p to 22p
8. Use SMD type for Single channel LVDS

Scalar Diagram & C.B.A

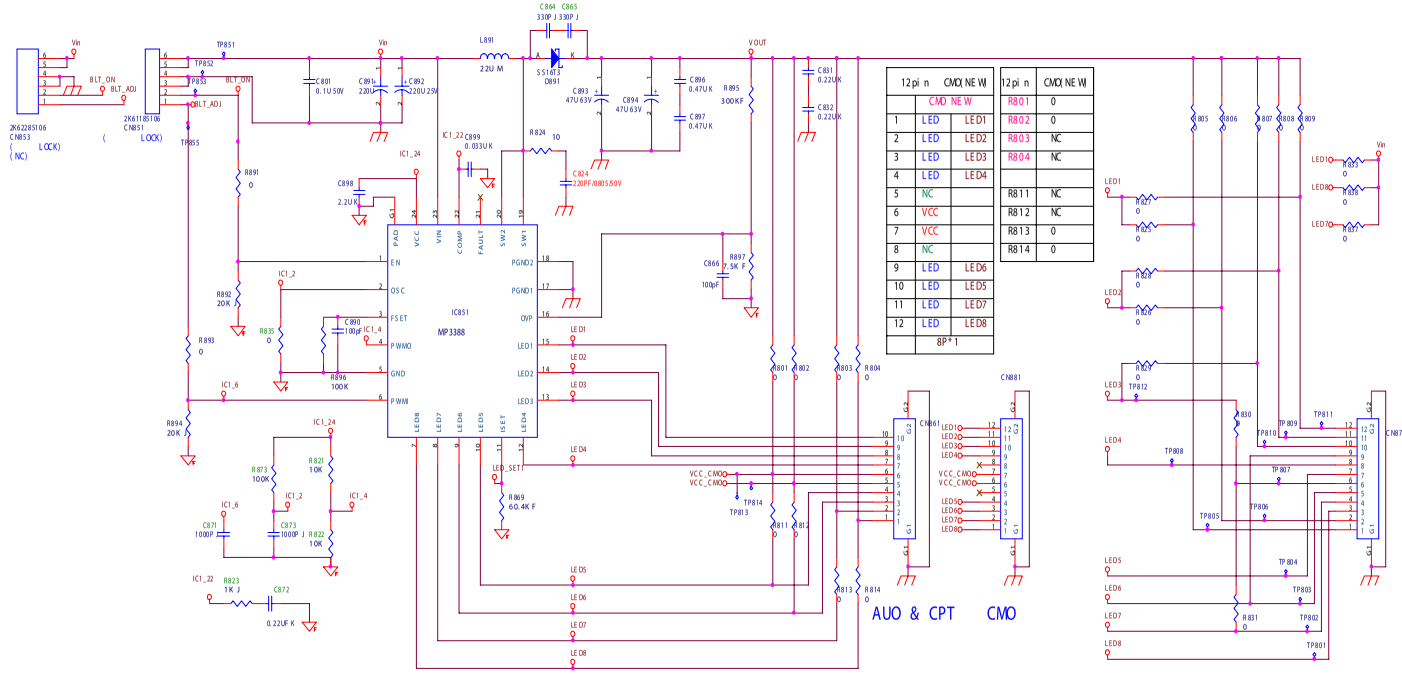
```
Information
V1:  688.98
V2:  1377.95
V3:  2066.93
X1:  2693.07
X2:  2019.84
X3:  1346.56
X4:  673.28

Top Side
A1:J9       B3:C5     C3:C42
A2:U5       B3:C47    C3:C39
A2:U2       B3:C4     C3:C38
A2:R133     B3:C30    C4:R64
A2:R132     B3:C3     C4:R61
A2:R131     B3:C29    C4:R59
A2:R130     B3:C2     C4:R55
A2:R128     B3:C11    C4:R54
A2:R6       B3:C10    C4:R53
A2:R29      B4:U8     C4:R45
A2:R18      B4:R63    C4:R44
A2:R17      B4:R62    C4:R43
A2:R10      B4:R60    C4:R42
A2:L5       B4:R58    C4:R34
A2:L4       B4:R57    C4:R33
A2:J1       B4:R56    C4:R104
A2:C20      B4:R51    C4:Q3
A2:C12      B4:R49    C4:C69
A3:U4       B4:R46    C4:C67
A3:U1       B4:R40    C4:C65
A3:R129     B4:R39    C4:C64
A3:R3       B4:R38    C4:C44
A3:R2       B4:R37    C4:C33
A3:R13      B4:R36    C4:C32
A3:R12      B4:R35    C4:C31
A3:R1       B4:R24    C4:C24
A3:L9       B4:R23    C4:C23
A3:L3       B4:R22    C5:U6
A3:L2       B4:R21    C5:R41
A3:L1       B4:R20    C5:R121
A3:C27      B4:R19    C5:L14
A3:C1       B4:Q2     C5:L13
A4:U7       B4:C53    C5:L11
A4:U3       B4:C52    C5:J8
A4:J2       B4:C43    C5:DN2
A5:Q7       B4:C28    C5:C83
A5:Q10      B4:C26    C5:C79
B1:R90      B4:C25    C5:C55
B1:R93      B4:C14    C5:C22
B1:R94      B4:C13    D1:R103
B1:R92      B5:Y1     D1:R100
B1:R83      B5:SW1    D1:C85
B1:R72      B5:R95    D1:C68
B1:R125     B5:R99    D2:U12
B1:R124     B5:R96    D2:U11
B1:Q11      B5:R123   D2:R114
B1:J4       B5:R122   D2:Q8
B1:J3       B5:R120   D2:J6
B1:C88      B5:R119   D2:C86
B1:C66      B5:R118   D2:C71
B1:C65      B5:R106   D2:C45
B1:C62      B5:C56    D2:C35
B1:C61      B5:C82    D2:C37
B2:U10      B5:C81    D2:C73
B2:R91      B5:C78    D2:C72
B2:R89      B5:C77    D2:C70
B2:R88      C1:R98    D3:NC
B2:R84      C1:R97    D3:R112
B2:R78      C1:R79    D3:R110
B2:R77      C1:R76    D3:R109
B2:R70      C1:R75    D4:R127
B2:R69      C1:R74    D4:R126
B2:R68      C1:R73    D4:L7
B2:R67      C1:R71    D4:C48
B2:R50      C1:R113   D4:C76
B2:R48      C1:R107   D5:L12
B2:R47      C1:R105   D5:C84
B2:R32      C1:R102   D5:C80
B2:R31      C1:R101
B2:R30      C1:J5
B2:R27      C1:D3
B2:R26      C1:D2
B2:R16      C1:D1
B2:R15      C1:C67
B2:Q6       C1:C60
B2:Q1       C1:C59
B2:DN1      C2:U9
B2:C58      C2:R81
B2:C51      C2:R87
B2:C37      C2:R86
B2:C21      C2:R85
B2:C19      C2:R82
B2:C18      C2:R80
B2:C17      C2:R66
B2:C16      C2:R65
B2:C15      C2:R117
B3:R9       C2:R116
B3:R8       C2:R115
B3:R7       C2:R111
B3:R5       C2:R108
B3:R4       C2:Q4
B3:R28      C2:Q9
B3:R25      C2:Q5
B3:R14      C2:L8
B3:R11      C2:L10
B3:L6       C2:C64
B3:C46      C2:C74
B3:C9       C2:C63
B3:C8       C2:C41
B3:C7       C2:C36
B3:C6       C2:C35
B3:C50      C2:C34
```



Power Diagram & C.B .A



LED Diagram & C.B .A--AUO



12pi n	CMO(NEW)	
	CMO	NEW
1	LED	LED1
2	LED	LED2
3	LED	LED3
4	LED	LED4
5	NC	
6	VCC	
7	VCC	
8	NC	
9	LED	LED6
10	LED	LED5
11	LED	LED7
12	LED	LED8
	8P*1	

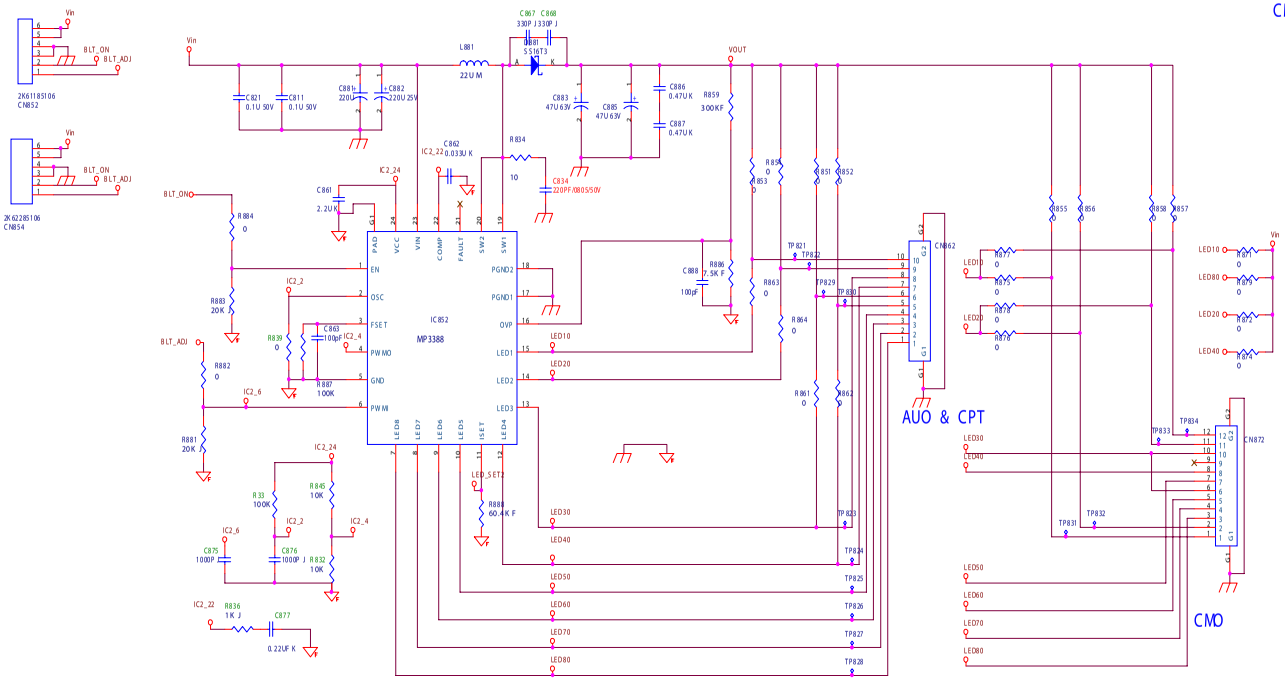
12pi n	CMO(NEW)
R801	0
R802	0
R803	NC
R804	NC
R811	NC
R812	NC
R813	0
R814	0

10pi n	AUO		CPT		CMO 21.5	
1	NC	LED8	LED	LED8	VCC	LED8
2	LED	LED7	LED	LED7	VCC	LED7
3	LED	LED6	LED	LED6	NC	LED6
4	LED	LED5	LED	LED5	NC	LED5
5	VCC		VCC		LED	LED6
6	VCC		VCC		LED	LED5
7	LED	LED4	LED	LED4	LED	LED4
8	LED	LED3	LED	LED3	LED	LED3
9	LED	LED2	LED	LED2	LED	LED2
10	NC	LED1	LED	LED1	LED	LED1
	5P*2	LED1 LED8	8P*2		6P*2	LED7 LED8

12pi n	CMO 18.5		CMO 20		CMO 23.6	
1	VCC		LED	LED1	VCC	
2	VCC		LED	LED2	VCC	
3	NC	LED8	LED	LED8	NC	LED8
4	LED	LED7	LED	LED7	NC	LED7
5	LED	LED6	LED	LED6	NC	LED6
6	NC	LED7	LED	LED3	LED	LED7
7	LED	LED5	LED	LED5	LED	LED5
8	LED	LED4	LED	LED4	LED	LED4
9	NC	LED6	NC	LED6	LED	LED6
10	LED	LED3	VCC		LED	LED3
11	LED	LED2	VCC		LED	LED2
12	LED	LED1	VCC		LED	LED1
	7P*2	LED8	8P*1		7P*2	LED8

10pi n	AUO	CPT	CMO 21.5
R801	0	0	NC
R802	0	0	NC
R803	NC	NC	0
R804	NC	NC	0
R811	NC	NC	0
R812	NC	NC	0
R813	0	0	NC
R814	0	0	NC
R833	0		
R838	0		0
R837			0

12pi n	18.5	20	23.6
R805	0	NC	0
R806	0	NC	0
R807	NC	0	NC
R808	NC	0	NC
R809	NC	0	NC
R825	NC	0	NC
R826	NC	0	NC
R827	0	NC	0
R828	0	NC	0
R829	0	NC	0
R830	NC	0	NC
R831	NC	NC	0
R833			
R838	0		0
R837			



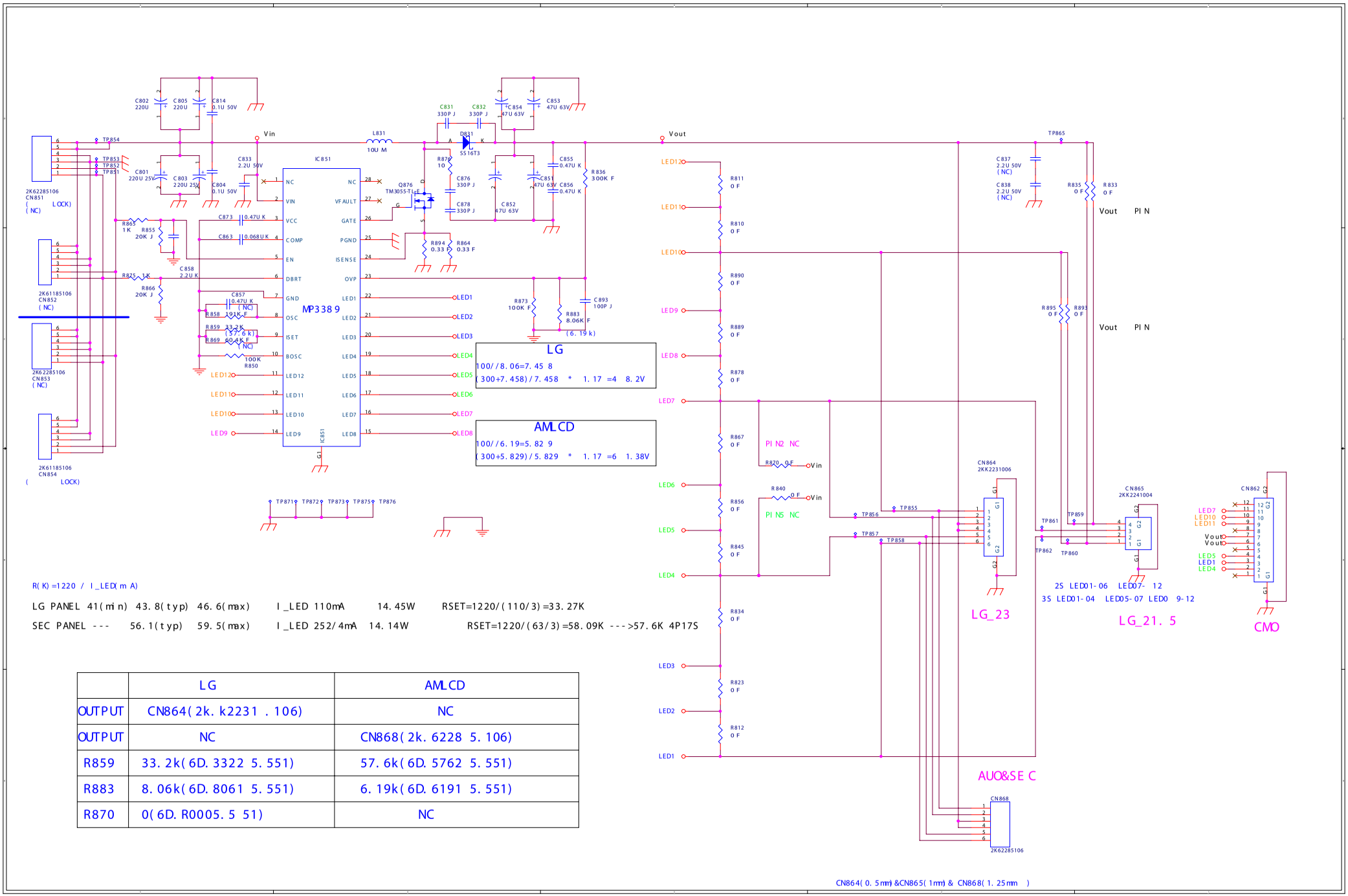
10pi n	AUO		CPT		CMO 21.5	
1	NC	LED80	LED	LED80	LED	LED80
2	LED	LED70	LED	LED70	LED	LED70
3	LED	LED60	LED	LED60	LED	LED60
4	LED	LED50	LED	LED50	LED	LED50
5	VCC		VCC		LED	LED40
6	VCC		VCC		LED	LED30
7	LED	LED40	LED	LED40	NC	
8	LED	LED30	LED	LED30	NC	
9	LED	LED20	LED	LED20	VCC	
10	NC	LED10	LED	LED10	VCC	
	5P*2	LED10 LED80	8P*2		6P*2	LED10 LED20

12pi n	CMO 18.5				CMO 23.6	
1	VCC				LED	LED10
2	VCC				LED	LED20
3	NC	LED80			LED	LED80
4	LED	LED70			LED	LED70
5	LED	LED60			LED	LED60
6	NC	LED30			LED	LED30
7	LED	LED50			LED	LED50
8	LED	LED40			NC	LED40
9	NC				NC	
10	LED	LED30			NC	LED30
11	LED	LED20			VCC	
12	LED	LED10			VCC	
	7P*2	LED80	8P*1		7P*2	LED40

10pi n	AUO	CPT	CMO 21.5
R851	0	0	NC
R852	0	0	NC
R853	NC	NC	0
R854	NC	NC	0
R861	NC	NC	0
R862	NC	NC	0
R863	0	0	NC
R864	0	0	NC
R871	0		0
R879	0		
R872			0
R874			

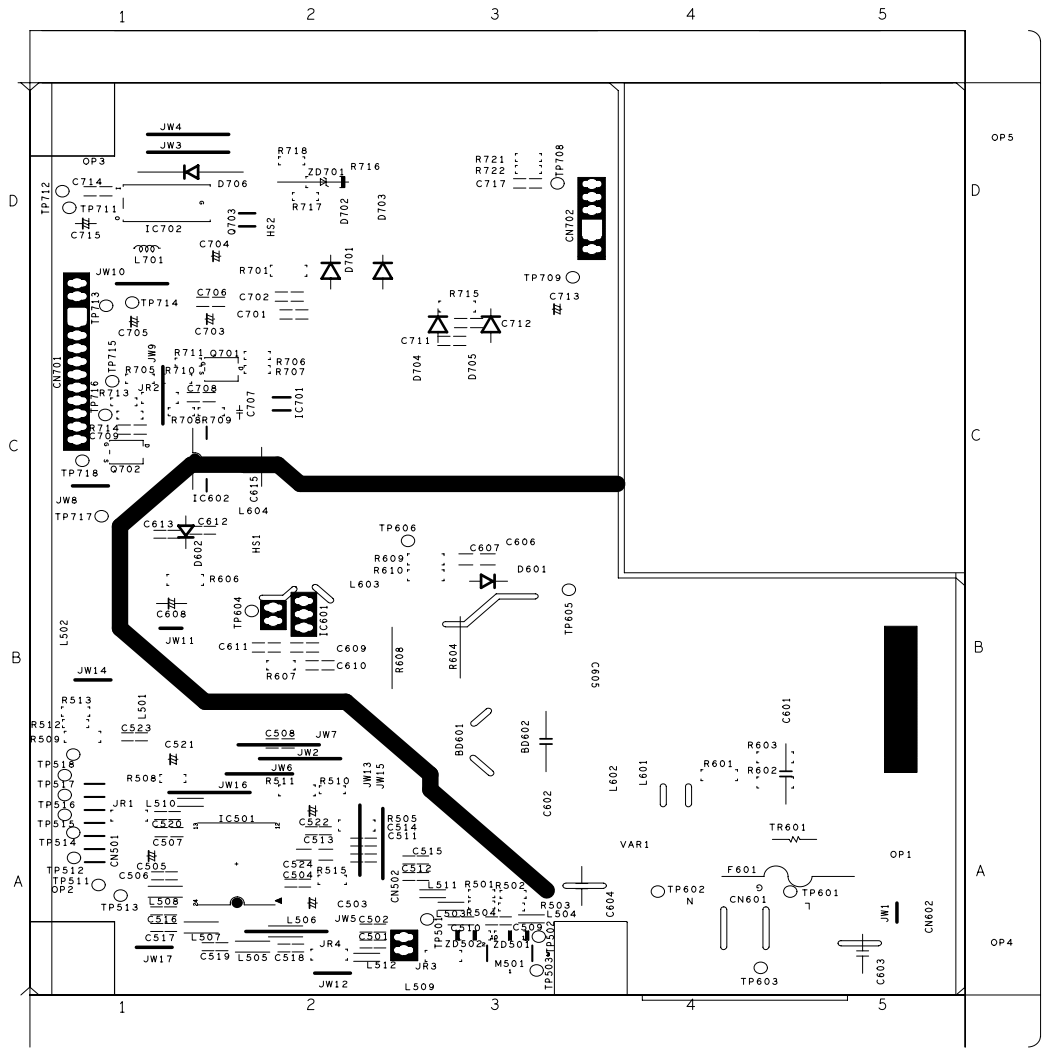
12pi n	18.5	20	23.6
R855	0	NC	0
R856	0	NC	0
R857	NC	0	NC
R858	NC	0	NC
R875	NC	0	NC
R876	NC	0	NC
R877	0	NC	0
R878	0	NC	0
R871	0		
R879			
R872			
R874			0

LED Diagram & C.B .A--CMO



	LG	AMLCD
OUTPUT	CN864(2k.k2231 .106)	NC
OUTPUT	NC	CN868(2k.6228 5.106)
R859	33.2k(6D.3322 5.551)	57.6k(6D.5762 5.551)
R883	8.06k(6D.8061 5.551)	6.19k(6D.6191 5.551)
R870	0(6D.R0005.5 51)	NC

Power Diagram & C.B .A

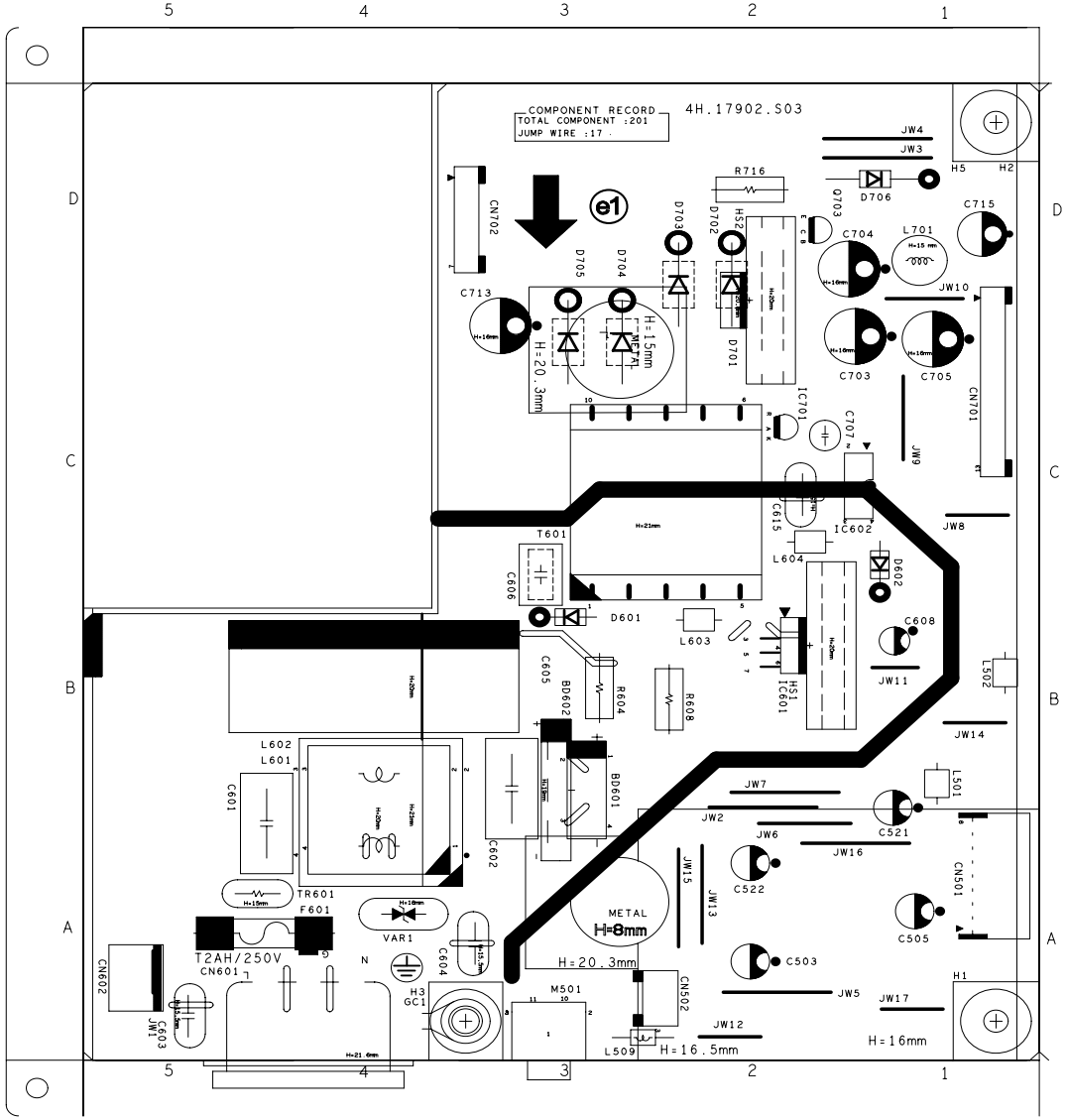


Information
Y1: 1720
Y2: 3440
Y3: 5160
X1: 4880
X2: 3660
X3: 2440
X4: 1220

Bottom Side
A1:L508
A1:L507
A1:L510
A1:JR1
A1:R508
A1:C507
A1:C520
A1:C519
A1:C517
A1:C516
A1:C506
A2:R515
A2:L506
A2:L505
A2:L512
A2:JR4
A2:R511
A2:R505
A2:R510
A2:IC501
A2:C524
A2:C502
A2:C501
A2:C518
A2:C514
A2:C513
A2:C511
A2:C504
A3:ZD502
A3:ZD501
A3:L511
A3:L504
A3:L503
A3:JR3
A3:R504
A3:R503
A3:R502
A3:R501
A3:C515
A3:C512
A3:C510
A3:C509
A4:R602
A4:R601
B1:R513
B1:R606
B1:R509
B1:R512
B1:C523
B2:R607
B2:C611
B2:C610
B2:C609
B2:C508
B3:R610
B3:R609
B3:C607
B4:R603
C1:R710
C1:R705
C1:Q702
C1:JR2
C1:R714
C1:R713
C1:R711
C1:R709
C1:R708
C1:C709
C1:C708
C1:C613
C1:C612
C2:Q701
C2:R707
C2:R706
C2:C701
C3:C712
C3:C711
D1:IC702
D1:C714
D1:C706
D2:ZD701
D2:R701
D2:R718
D2:R717
D2:C702
D3:R715
D3:R721
D3:R722
D3:C717

Power Diagram & C.B .A

```
Information
Y1: 1720
Y2: 3440
Y3: 5160
X1: 4880
X2: 3660
X3: 2440
X4: 1220

Top Side
A1:JW17
A1:JW16
A1:CN5001
A1:C505
A2:L509
A2:JW5
A2:JW12
A2:JW15
A2:JW6
A2:JW13
A2:CN502
A2:C522
A2:C503
A3:M501
A3:GC1
A3:C604
A4:VAR1
A4:L602
A4:CN601
A5:TR601
A5:JW1
A5:F601
A5:CN602
A5:C603
B1:L502
B1:L501
B1:JW11
B1:JW14
B1:C608
B1:C521
B2:R608
B2:L603
B2:JW7
B2:JW2
B2:IC601
B3:R604
B3:D601
B3:C606
B3:C605
B3:C602
B3:BD602
B3:BD601
B4:L601
B5:C601
C1:JW9
C1:JW8
C1:IC602
C1:D602
C1:C705
C2:T601
C2:L604
C2:IC701
C2:C707
C2:C703
C2:C615
C3:D705
C3:D704
D1:L701
D1:JW4
D1:JW3
D1:JW10
D1:D706
D1:CN701
D1:C715
D2:D701
D2:R716
D2:Q703
D2:D703
D2:D702
D2:C704
D3:C713
D4:CN702
```



LED Diagram & C.B .A--AUO

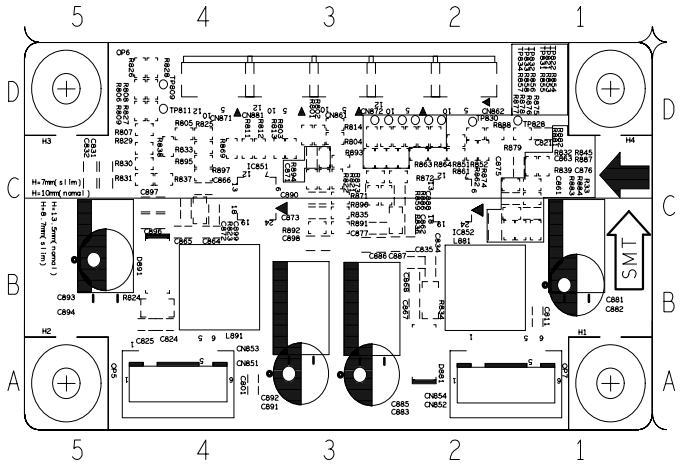
Information
Y1: 490
Y2: 980
Y3: 1470
X1: 2840
X2: 2130
X3: 1420
X4: 710

△Top Side
A2:CN852
A2:CN854
A2:D881
A3:C892
A3:C885
A3:C891
A3:C883
A4:CN851
A4:C801
A5:CN853
B1:C882
B1:C881
B1:C811
B2:R834
B2:L881
B2:C835
B2:C834
B2:C868
B2:C867
B3:C898
B3:C887
B3:C886
B4:L891
B4:D891
B4:C825
B4:C824
B5:R824
B5:C894
B5:C893

C1:R845
C1:R33
C1:R887
C1:R882
C1:R881
C1:C876
C2:R839
C2:R832
C2:R884
C2:R883
C2:R875
C2:R874
C2:R872
C2:R864
C2:R863
C2:R862
C2:R861
C2:IC852
C2:C875
C2:C863
C2:C862
C2:C861
C3:R836
C3:R873
C3:R835
C3:R822
C3:R821
C3:R896
C3:R894
C3:R893
C3:R892
C3:R891
C3:R886
C3:R878
C3:R877
C3:R876
C3:R871
C3:R859
C3:R857
C3:R813
C3:R803
C3:C877
C3:C873
C3:C871
C3:C890
C3:C888

C4:R823
C4:R897
C4:R895
C4:R869
C4:R838
C4:R837
C4:R833
C4:R812
C4:R811
C4:IC851
C4:C865
C4:C864
C4:C872
C4:C899
C4:C866
C4:C897
C5:R831
C5:R829
C5:C832
C5:C831
C5:C896

D1:C821
D2:R888
D2:R879
D2:R855
D2:R854
D2:R853
D2:R852
D2:R851
D2:CN872
D2:CN862
D3:R858
D3:R856
D3:R814
D3:R804
D3:R802
D3:R801
D3:CN881
D3:CN861
D4:R828
D4:R827
D4:R825
D4:R808
D4:R805
D4:CN871
D5:R826
D5:R809
D5:R807
D5:R806



LED Diagram & C.B .A--CMO

Information
Y1: 660
Y2: 1320
X1: 2655
X2: 1770
X3: 885

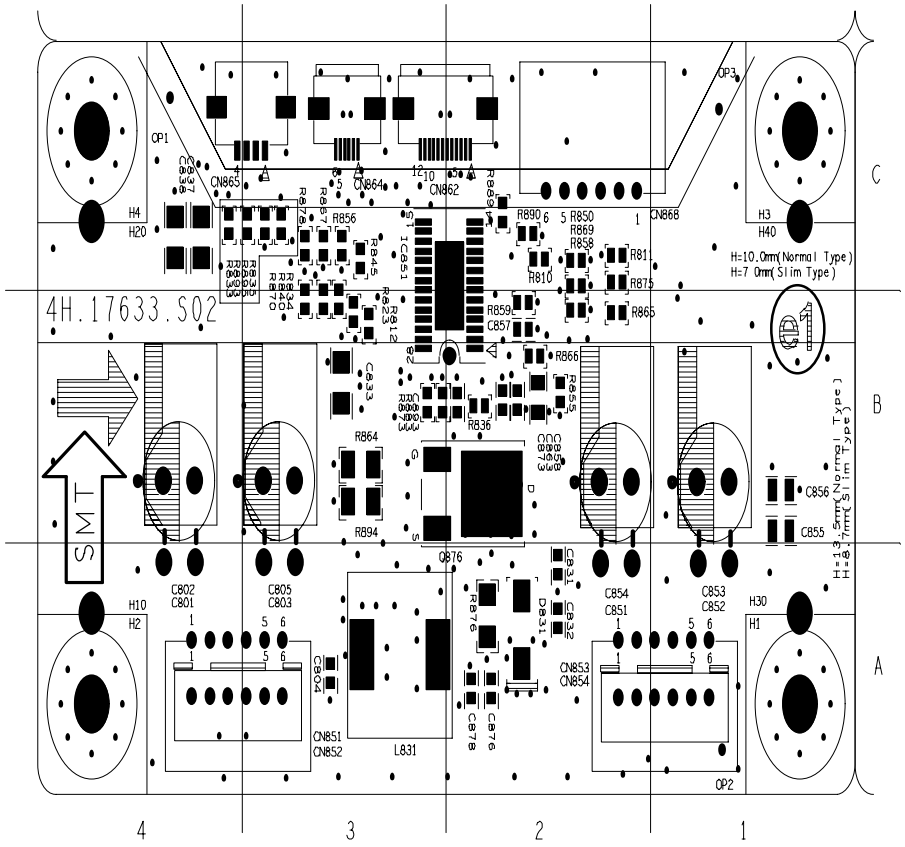
△

Top Side
A1:CN854
A1:C852
A2:CN853
A2:R876
A2:D831
A2:C878
A2:C832
A2:C831
A2:C876
A2:C851
A3:L831
A3:C804
A3:C803
A4:CN851
A4:CN852
A4:C801

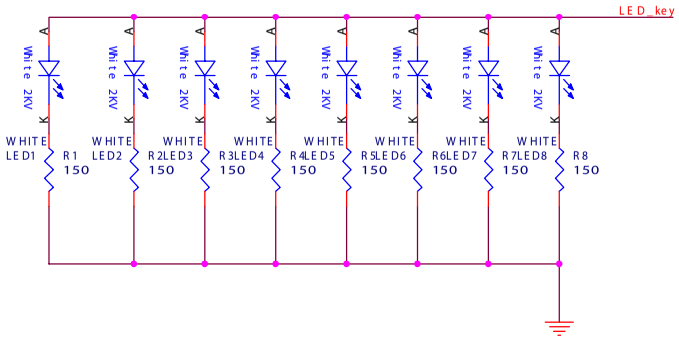
B1:C856
B1:C855
B1:C853
B2:R866
B2:R865
B2:R859
B2:R858
B2:R855
B2:R836
B2:C858
B2:C893
B2:C873
B2:C863
B2:C857
B2:C854

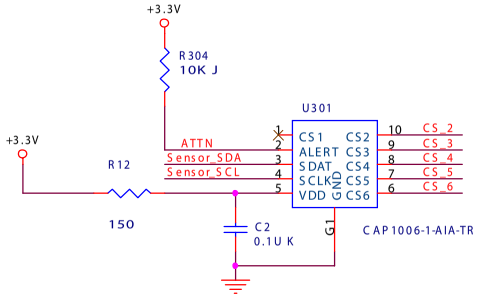
B3:C833
B3:R894
B3:R864
B3:R883
B3:R873
B3:R834
B3:R823
B3:R812
B3:Q876
B3:C805
B4:C802
C2:CN868
C2:R890
C2:R889
C2:R875
C2:R869
C2:R850
C2:R811
C2:R810
C2:IC851

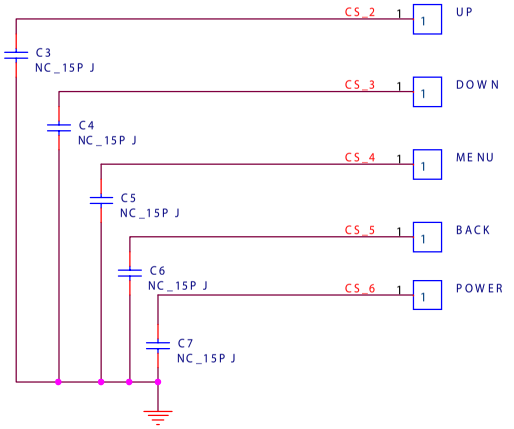
C3:CN862
C3:R895
C3:R893
C3:R878
C3:R870
C3:R867
C3:R856
C3:R845
C3:R840
C3:R835
C3:CN865
C3:CN864
C4:C838
C4:C837
C4:R833

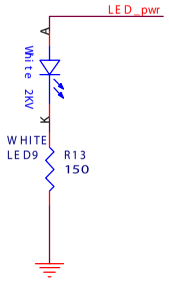


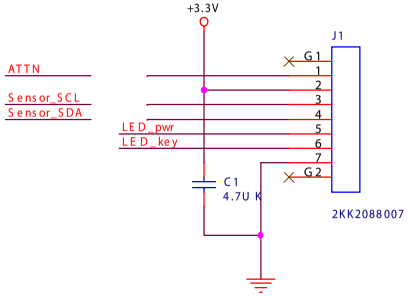
Control Diagram & C.B.A.











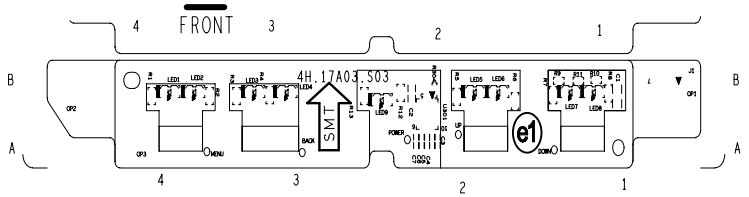
	CS2	CS3	CS4	CS5	CS6
#043	121	116	120	123	94
#026	114	114	109	126	94
#039	127	118	124	126	94

Control Diagram & C.B.A.

Information
Y1: 300
X1: 3990
X2: 2660
X3: 1330

Top Side

A1:DOWN			
A2:C7	B1:R8	B2:R12	B3:R4
A2:C6	B1:R7	B2:R6	B3:R3
A2:C5	B1:R9	B2:R5	B3:R13
A2:C4	B1:R11	B2:U301	B3:LED4
A2:C3	B1:R10	B2:R304	B3:LED3
A2:UP	B1:LED8	B2:LED9	B4:R2
A2:POWER	B1:LED7	B2:LED6	B4:R1
A3:BACK	B1:J1	B2:LED5	B4:LED2
A4:MENU	B1:C1	B2:C2	B4:LED1



General Product Specification

Meridian 1- 222EL2
GENERAL PRODUCT
SPECIFICATION

Issued by: Paul Tsai/ Argent Chan

Revision History

Ver.	Date (yy.mm.dd)	Author	Brief Description
0.1	2010.02.05	UC	Initiate version

Red : pending Philips or INL final conclusion

Blue : agreed changes in this version

General Product Specification

. ANALOG AND DIGITAL INPUT

. AUTO PICTURE ADJUSTMENT

. 12 FACTORY PRESET MODES ~~AND~~ ， VGA:46 PRESET MODES ， DVI 46 PRESET MODES， WHICH CAN BE RECOVERED TO PRESET MODES, 10 USER MODES

. USER FRIENDLY OSD DISPLAY FOR MODE IDENTIFICATION /ADJUSTMENT

. MAX. RESOLUTION 1920 x 1080 NON-INTERLACED AT 75 HZ

. 23” WIDE COLOR TFT LCD FLAT PANEL

. FULL RANGE POWER SUPPLY 90 – 264 VAC

. CE ENVIRONMENTAL POLICY

. ANTI-GLARE TO REDUCE LIGHT REFLECTION

. POWER MANAGEMENT CAPABILITY

. SOG SUPPORT

. Windows Vista Premium Logo Certification

. HDCP support

. USB PLUG

. SMART CONTROL & SMART MANAGEMENT REQUIREMENT

. SMART Contrast 20M:1

. SMART Image

. SMART Response

. TrueVision (formerly PerfectTuneII or FGA, FACTORY GAMMA ALIGNMENT)

. PHILIPS LOGO displayed while power on

. WEEE REQUIREMENT

. RoHS REQUIREMENT

. TCO05 REQUIREMENT

General Product Specification

CONTENTS

General Product Specification

General Product Specification

General Product Specification

1 FOREWORD

This specification describes a 21.5" FHD multi-scan color TFT LCD monitor with maximum resolution up to 1920 x 1080 /60Hz non-interlaced.
All optical characteristics (including WHITE-D, Brightness, and so on) are determined according to panel specification aPaulfter warming up approximate 30 minutes that brightness stability is optimal, and follow strictly after panel specification.

2 PRODUCT PROFILE

This display monitor unit is a color display monitor enclosed in PHILIPS styling cabinet which has an integrated tilt base.

2.1 EDID Header

Data for EDID & .inf file

1	User visible strings on .inf file	Philips 222EL (21.5inch WIDE LCD MONITOR 222EL2)
2	Manufacturer ID (EDID data)	PHL
3	Product ID, "xxxx" 4 codes	MSB(byte 12): C0
		LSB (byte 11): 52
4	maximum resolution	1920x1080
5	Horizontal Frequency Range	30~83 KHz
6	Vertical Frequency Range	56~76Hz
7	Monitor Name (13 characters max.)	Philips 222EL

2.2 LCD

AUO

Type NR. : AUO M215HW01 V6
Resolution : 1920 x 1080 (FHD)
Outline dimensions : 495.6(H) x 292.2(V) x 9.9(D) mm
Pixel Pitch (mm) : 0.248mm x 0.248mm
Color pixel arrangement :
Display surface treatment : Hard coating (3H), anti-glare treatment of the front polarizer.
Color depth : 16.7 M colors 8-bit with A-FRC, 16.777.216 colors
Backlight : LED backlight
Active area (W x H) : Vertical 476.64mm x Horizontal 268.11mm
View angle (CR>10) : >=160 for H/V

General Product Specification

Contrast ratio : 1000:1(Typ.)
White luminance : 250 nit(Typ.)
Color gamut : >=72%
Gate IC :
Source IC :
Response time : 5 ms
Vertical frequency range : Hz

CMO

Type NR. : CMO M215H3-LA1
Resolution : 1920 x 1080 (FHD)
Outline dimensions : 495.6(H) x 292.2(V) x 11.5(D) mm
Pixel Pitch (mm) : 0.248mm x 0.248mm
Color pixel arrangement :
Display surface treatment : Hard coating (3H), anti-glare treatment of the front polarizer.
Color depth : 16.7 M colors 8-bit with A-FRC, 16.777.216 colors
Backlight : LED backlight
Active area (W x H) : Vertical 476.64mm x Horizontal 268.11mm
View angle (CR>10) : >=160 for H/V
Contrast ratio : 1000:1(Typ.)
White luminance : 250 nit(Typ.)
Color gamut : >=72%
Gate IC :
Source IC :
Response time : 5 ms
Vertical frequency range : Hz

2.3 Scanning frequencies

Hor.: 30 – 83 K Hz
Ver.: 56 - 76 Hz
Video dot rate: Analog < 205 MHz, EDID: 210 MHz
Digital < 165MHz, EDID: 170 MHz
Power input: 90-264 V AC, 50/60 ± 2 Hz
Power consumption:
< 30W(maximum),

< 21W(typ.)

Functions:
(1) D-SUB analog R/G/B separate inputs, H/V sync separated, Composite (H+V) TTL level, SOG sync
(2) DVI digital Panel Link TMDS inputs

General Product Specification

2.4 Ambient temperature: 0 °C - 40 °C

3 Electrical characteristics

3.1 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). USB PLUG (not implement for 222EL2)
USB port (1 upstream, 1 downstream), black jack color

3.2 Interface

3.2.1 D-Sub Cable

Length : 1.8 M +/- 50 mm
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

General Product Specification

3.2.2 DVI Cable

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

Length : 1.8 M +/- 50 mm

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-

3.3 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.

General Product Specification

User mode

1. Can save those timing that not in Preset mode and can be showed (not over scalar or Panel spec.)
2. It needs to reserve the 10 timings space in memory size.

3.3.1 Mode storing capacity

Factory preset modes : 12
Preset modes : 46(VGA)/46(DVI)
User modes : 10

NOTE :

VGA timing table:

1 For V-Freq is 85 HZ, The message "THIS IS 85HZ ~~OVERSCAN~~OVERDRIVE, CHANGE COMPUTER DISPLAY INPUT TO 1920 x 1080@60HZ"is shown on screen.

2 when the input signal is out of range, the message "CANNOT DISPLAY THIS VIDEOMODE, CHANGE COMPUTER DISPLAY INPUT TO 1920X1080@60 HZ" is shown on screen.

~~3 For Timing 960x720 @ 60HZ, OSD information shows 1280X720@60HZ.~~

~~4 For Timing 1400x1050@60HZ, OSD information shows 1680X1050@60HZ.~~

~~5 For Timing 1400x1050@75HZ, OSD information shows 1680X1050@75HZ.~~

6 The Timings (Green color highlighted) are factory preset mode (12 Sets).

7 Total 46 Sets

DVI timing table:

1. When input signal is DVI or HDMI, the recommend timing shown in OSD message should be timing 1920X1080@60R (pixel clock =148.5MHZ), not1920X1080@60,because this model do not support timing 1920x1080@60 (pixel clock =173MHZ) under DVI or HDMI.
2. Total 46 Sets

3.3.2 Factory preset modes (12 modes)

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

222EL2_timing_table.xls

General Product Specification

- Video timing mode (internal firmware support) ,
  60Hz: 480i/480p/720p/1080i/1080p
  50Hz: 576i/576p/720p/1080i/1080p

3.3.3 Software control functions via OSD / control adjustable functions:

Please refer to following Hudson9 OSD definitions, if any deviation, then refer to PVT Exit sample.

ITEM			
1	OSD DEFINITIONS	 M2 OSD Button definition _ 20100125	Reset - No: Exit Yes: Auto adjustment for displaying timing mode and recall factory preset
2	OSD LANGUAGES	 M1 OSD translation 20081128.xls  M1 new item translation_20081126  M2 new item translation _ 2010101	9 LANGUAGES
3	OSD TREE	 M2 OSD Button definition _ 20100125	
4	POWER ON LOGO	 23W_1920x1080_new.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.

3.4 Horizontal scanning

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

General Product Specification

3.5 Vertical scanning

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

3.6 Power input connection

Power cord length : 1.8 M
Power cord type : 3 leads power cord with protective earth plug.

3.7 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	< 30W max 21W Typ.	White LED	--
Standby*	Off	Off	blanked	110VAC < 0.5 W 220VAC< 0.5W	Blinking White LED Period: 3sec On, 3sec Off	< 3 s
DC Power Off			N/A	< 0.5 W	LED Off	

3.8 VGA Display identification

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

3.9 DVI Display identification

In accordance with DVI requirement (DDWG digital Visual Interface revision 1.0) use DDC-2B, DDC/CI, and EDID V1.3

3.10 USB support

Connect the upstream port of the monitor to host PC's USB port via USB cable, Then attach external device to the downstream port of the monitor.
Check if the device can work properly.

3.11 DDC /CI Support and Smart Manage/Control

General Product Specification

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

3.12 Hot-key definition

Hot key operation for
MERIDIAN Monitors

3.13 SmartContrast

SmartContrast is a kind backlight control.

This function changes panel backlight according to the frame brightness histogram.

Smart contrast ratio is typical **20M:1**.

3.14 SmartImage

SmartImage Lite OSD outlook

SmartImage Lite
Standard
Internet
Game

Default: Standard

Position

The position of the button is at the bottom center of the screen.

SmartImage Lite Logo & Banner

As design to keep the LightFrame logo at header but change the name to “SmartImage” with bitmap format.

General Product Specification

Icon of each profile

Each profile will use text instead of icon & text before.

User Operation Procedure

A. 3 different modes are switched to next in the sequence from 1 to 3 then back to 1 while pressing this button: 1) Standard 2) Internet 3)Game. The default setting is 'Standard".
B. The FOS optimization will be changed in real time by which profile to be scrolled, users don't need to confirm to enable.
C. The SmartImage Lite OSD will remain on screen for 5 seconds after user last action. Or user can also press [MENU] to close the Smart Image OSD immediately.
D. Except using [MENU] button to scroll down profile. If Smart Image OSD already launched onscreen. User is allowed to use up/down key to choose profile and press [MENU] to confirm selection and close the Smart Image OSD.
E. If the model has multiple inputs including VGA , DVI , each input has their own set of profiles. When user switch input, the profile to be applied will also change.
F. Each input can memorize their individual "SmartImage Lite" profile status.

For example, SmartImage is on with "Game" profile at VGA input, when switch to DVI input, the Smart Image will revert to previous profile of DVI.
In the input switching process the "SmartImage" OSD will also show up to present which profile is selected if "Smart Image" is enabled at that input.

The Smart Image status will also be stored after the monitor is resumed from AC on/off or power switch on/off.

Linkage between SmartImage Lite OSD and main OSD

A. Settings within main OSD have linkage with Smart Image OSD.
   i. Brightness
   ii. Contrast
   iii. Color Temperature
   iv.

General Product Specification

B. Because each preset profiles will define default setting of these 3 parameters. Users can understand what is the value of that in preset profile by open the main OSD.

C. When any SmartImage Lite profile had been enabled. The parameters in main OSD are still available for user to adjust. But these adjustments are temporary only. If users switch to another profile and then go back. The setting in main OSD will show preset values of that SmartImage profile enabled.

Profile Definitions (system integrators to input at design stages)

A. Standard

i. Purpose: Default out of box settings, No optimization by SmartImage.

ii. Design:

1. This will follow user OSD setting. If any change by user, it will be saved. When switch back from other SmartImage profiles, it will go back to last saved setting.
2. Default out of box settings
3. Same as OFF mode settings in SmartImage

B. Internet

i. Purpose: Design for Internet application, especially web browsing. The screen is mixed by text & picture. Desktop publish could use this profile also.

ii. Enhancement Point:

1. The enhancement will be mostly based on the "Image viewing" settings that are also under definition, made milder by the higher probability of strong compression typical of the Internet photos and clips.
2. Color temperature should be 6500° K
3. Brightness level should be around 90%
4. SmartResponse set to “Low”.
5. Smart Contrast set to “Off”.

General Product Specification

C. Game

i. Purpose: Design for PC game software and game boxes, e.g. PS3 and Xbox. The screen is dominated by artificial animation with rich color.

ii. Enhancement Point:

1. Dynamic contrast enhancement by histogram analysis should be implemented.
2. Sharpness enhanced 90%.
3. Color enhancement set as the same with Video.
4. Color temperature set to panel native(original color temp)
5. Brightness level sets to maximum.
6. SmartResponse set to “High”
7. Gamma Table turn off to achieve fastest response time.
8. SmartContrast set to “On”

Demo mode

A. Purpose: Built-in demo mode for sales in-store demo.

B. Design:

i. Dynamically split screen to 2 vertical frames with one vertical white line. The line width is 2 pixels. The left frame will be enhanced by SmartImage Lite and right frame remains original performance.

ii. There is OSD showing “SmartImage on” in left frame and “Original Image” in right frame.

iii. The OSD word color is white with transparent background.

iv. The demo profile will be “Video Playback” profile with “High” ODC setting.

~~v. The current SmartContrast value also be shown on the bottom of the screen.~~

C. Hot keys to trigger:

Press [Smart Image] 3 seconds or more to trigger the demo mode.

When demo mode is On, press 3 seconds or more to turn off the demo mode.

General Product Specification

3.14.2

3.15 Smart response (over drive) [N/A in 222EL2]
Response time < 2 msec GtG (Typical),

4 Visual characteristics

4.1 Test conditions

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

(1) Input signal : As defined in 3.3, 1920x1080 non-interlaced mode (1920X1080@60Hz 148.5MHz), 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

4.2 Brightness

Follow Panel specification.

4.3 Image size

Actual display size 473.76 mm x 296.1 mm

4.4 Brightness uniformity

Set contrast at 100% and turn the brightness to get average above 300 nits at centre of the screen.
Apply the Fig 1, it should comply with the following formula:

$$\frac{B\_min}{B\_max} \times 100\% > 75\%$$

Where B_max =Maximum brightness
B_min = Minimum brightness

General Product Specification

4.5 Check Cross talk (S)

Apply Pattern 2. Set contrast and brightness at 100 %.
Measure YA. Then output Pattern 3 and measure YB.
the cross talk value :

$$\frac{ABS(YA - YB)}{YA} \times 100\% < 1.5\ \%$$

4.6 White color adjustment

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

Apply full gray64 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~~	~~PerfectuneII~~
9300K	x = 0.283 ± 0.02 y = 0.297 ± 0.02	PerfectuneII
~~8200K~~	~~x = 0.291 ± 0.02~~ ~~y = 0.306 ± 0.02~~	~~PerfectuneII~~
~~7500K~~	~~x = 0.298 ± 0.02~~ ~~y = 0.314 ± 0.02~~	~~PerfectuneII~~
6500K/sRGB	x = 0.313 ± 0.02 y = 0.329 ± 0.02	PerfectuneII
sRGB	x = 0.313 ± 0.02 y = 0.329 ± 0.02	PerfectuneII
~~5000K~~	~~x = 0.345 ± 0.02~~ ~~y = 0.357 ± 0.02~~	~~PerfectuneII~~

General Product Specification

Production alignment spec.

CIE coordinates	(x,y)	
~~11500K~~	~~x = 0.270 ± 0.006~~ ~~y = 0.281 ± 0.006~~	~~PerfectuneII~~
9300K	x = 0.283 ± 0.006 y = 0.297 ± 0.006	PerfectuneII
~~8200K~~	~~x = 0.291 ± 0.006~~ ~~y = 0.306 ± 0.006~~	~~PerfectuneII~~
~~7500K~~	~~x = 0.298 ± 0.006~~ ~~y = 0.314 ± 0.006~~	~~PerfectuneII~~
6500K/sRGB	x = 0.313 ± 0.006 y = 0.329 ± 0.006	PerfectuneII
sRGB	x = 0.313 ± 0.006 y = 0.329 ± 0.006	PerfectuneII
~~5000K~~	~~x = 0.345 ± 0.006~~ ~~y = 0.357 ± 0.006~~	~~PerfectuneII~~

Quality Inspection specification:

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

General Product Specification

5 Mechanical characteristics

5.1 Cosmetic -
Philips ID

5.2 Mechanical data files -
ProE files required

5.3 Location of Philips logo -
Per Philips make-up sheet

5.4 Gap between panel and front bezel
< 1.2(typ.) mm

5.5 Location of Control icons -
Per Philips Graphic sheet

5.6 Color for resin/paint -
Per Philips make-up sheet

5.7 Fire enclosure request-
Shielding Cover should fulfill international standard

5.8 Resins

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

5.9 If paint is used

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

5.10 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.

5.11 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".

5.12 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

5.13 Tilt and swivel base

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

5.14 Kensington Lock

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

5.15 Label

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

General Product Specification

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

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

5.17 Transportation

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

5.17.1 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.

5.17.2 Transportation Test

- The overall test refer to UAN-D1534/00/01/02.
- The test result should be passed by UAN-D1534/01 request.
- The test result of UAN-D1534/02 is for reference only.
- 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

General Product Specification

1. Half sine shock test (non operation)

B. Transportation test specification for China/India(reference)

- 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)

5.18 Pallet / Container loading

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

Request by transportation items:

- 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) for EU
- Land 45‘ Truck and Trailer (1000X1200mm pallet) for UK
- Truck shipment-

Stacking request in different transportation for all regions except EU/UK(SHT560)

A. Air shipment
B. 20’/40’/40’HQ Container loading
C. Truck shipment-

Stacking request in different transportation for EU/UK(SHT560)

A. Land 45‘ Truck and Trailer (800X1200mm pallet) for EU
B. Land 45‘ Truck and Trailer (1000X1200mm pallet) for UK

General Product Specification

6 Environmental characteristics

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

6.1 Susceptibility of display to external environment

Operating

- Temperature : 0 to 35 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 %

6.2 Transportation tests

Refer to 5.15.2

6.3 Display disturbances from external environment

According to IEC 801-2 for ESD disturbances

6.4 Display disturbances to external environment

7 Reliability

7.1 Mean Time Between Failures

System MTBF (Including the LCD panel and CCFL) : 50,000 hrs

8 Quality assurance requirements

General Product Specification

8.1 Acceptance test

According to MIL-STD-1916D Control III level

AQL: NA
(Please also refer to annual quality agreement)
Customer acceptance criteria: UAW0377/00

General Product Specification

9 Philips' Flat Panel Monitors Pixel Defect Policy

Philips' Flat Panel Monitors Pixel Defect Policy

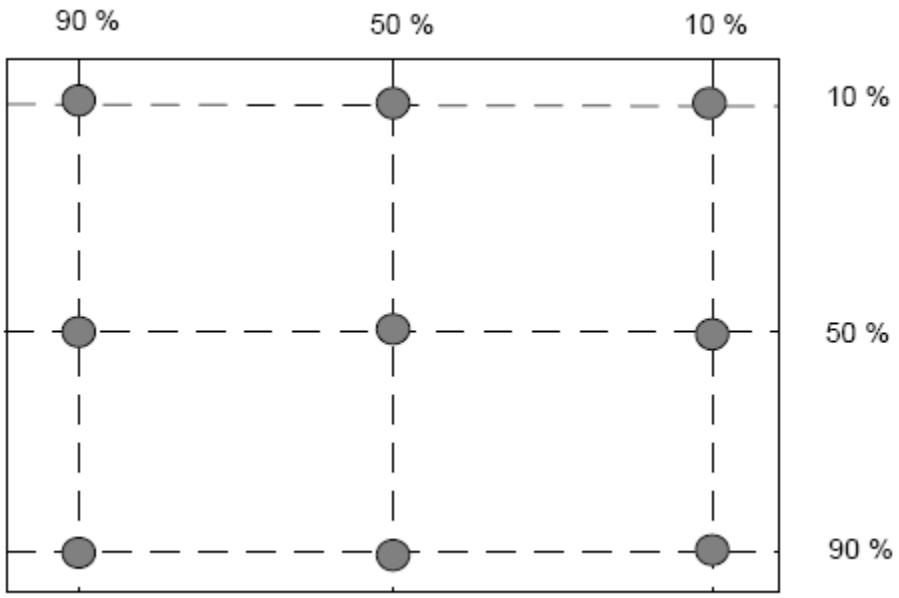
BRIGHT DOT DEFECTS	**ACCEPTABLE LEVEL**		
MODEL	**222EL2**		
1 lit sub-pixel	0		
2 adjacent lit sub-pixels	0		
3 adjacent lit sub-pixels (one white pixel)	0		
Distance between two bright dots	15mm		
Bright dot defects within 20 mm circle	0		
Total bright dot defects of all type	0		

BLACK DOT DEFECTS	**ACCEPTABLE LEVEL**		
MODEL	**222EL2**		
1 dark sub-pixel	5		
2 adjacent dark sub-pixels	2		
3 adjacent dark sub-pixels (one white pixel)	1		
Distance between two black dots	15mm		
Black dot defects within 20 mm circle*	1		
Total black dot defects of all type	5		

TOTAL DOT DEFECTS	**ACCEPTABLE LEVEL**		
MODEL	**222EL2**		
Total bright or black dot defects of all type	5		

General Product Specification

Fig 1: Measurement locations of Brightness Uniformity



General Product Specification

Fig 2: Cross talk pattern
Gray level 46 (64 Gray level)

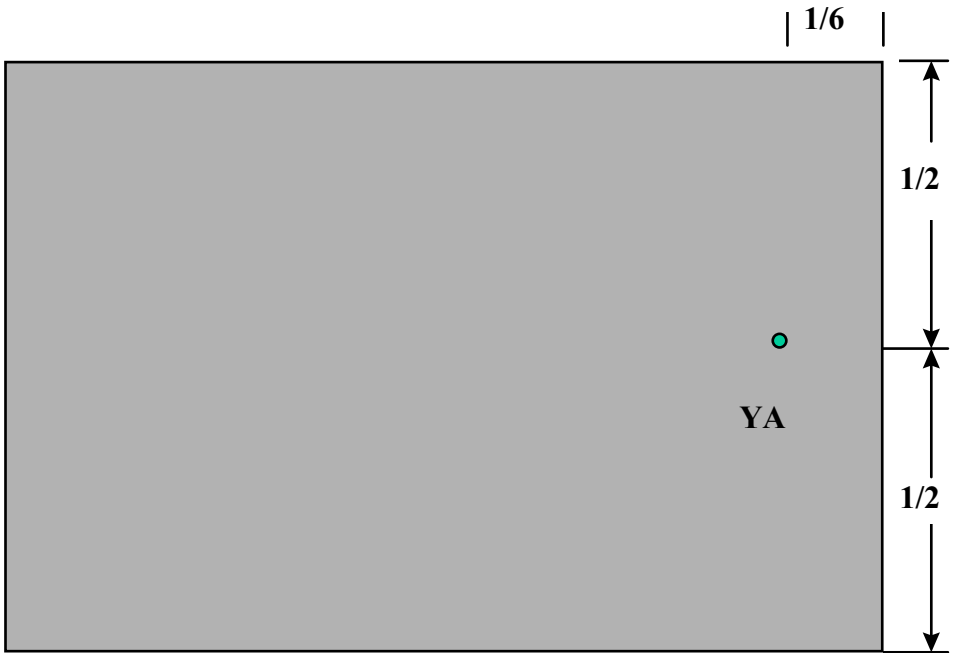
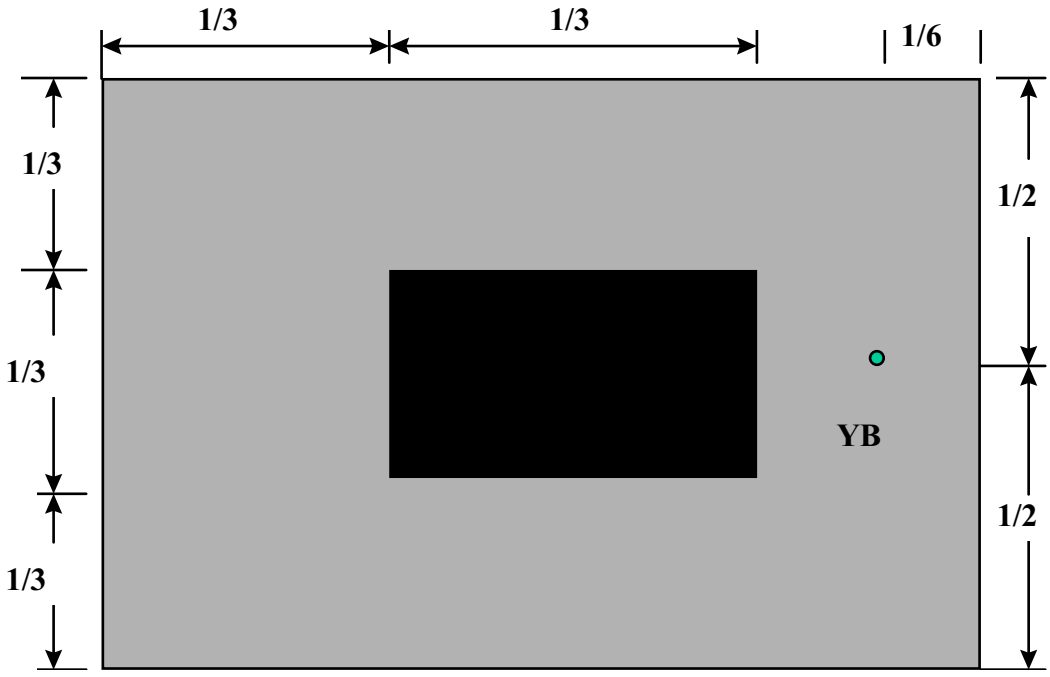
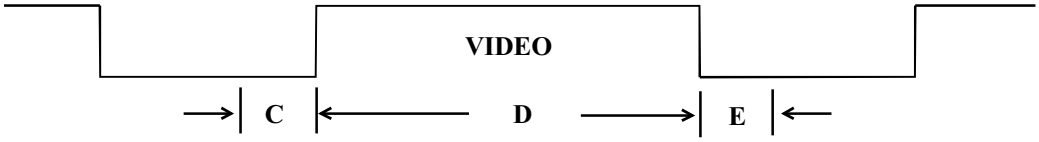


Fig 3: Cross talk Pattern
Center at Gray level 0 (Black)

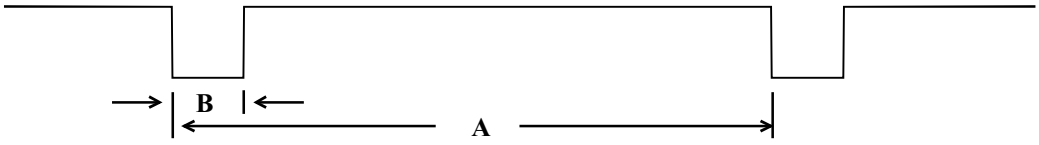


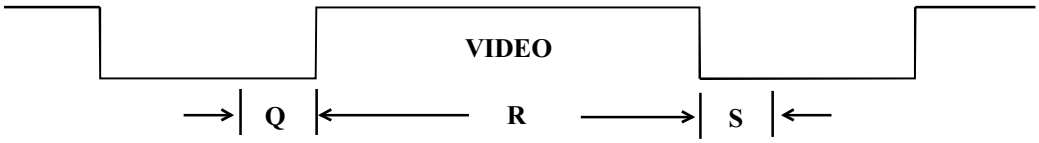
General Product Specification

SEPARATE SYNC.

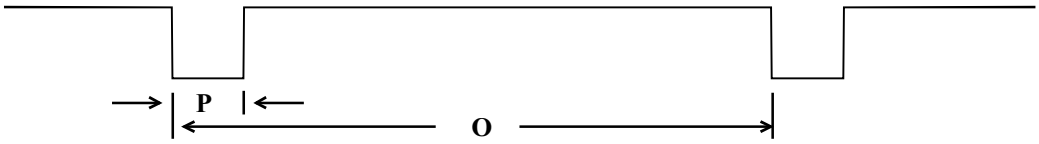


HORIZONTAL

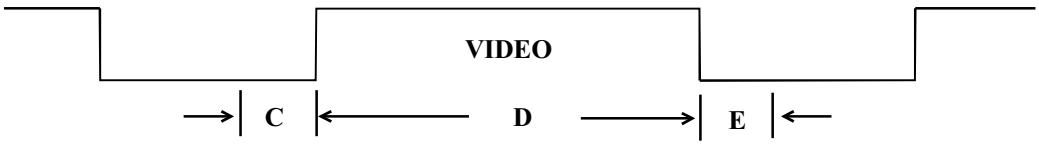




VERTICAL



COMPOSITE SYNC.



HORIZONTAL

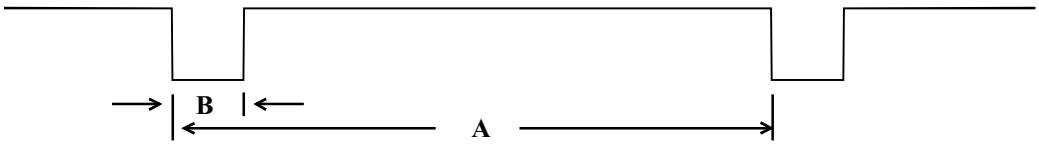


FIG-4 TIMING CHART -1

General Product Specification

10 REGULATORY COMPLIANCE

10.1 Worldwide Regulatory

TYE-A0004 LCD
MNT International Re

10.2 EMC Requirements

Supplier DVT EMI test result must be submitted prior to DVT samples delivery, and PVT EMI test result must be submitted again prior to PVT samples delivery. It also has to meet Philips' immunity testing specification.

10.3 RoHS

Restriction on the use of certain hazardous substances.

Lead, Cadmium, Mercury, Hexavalent Chromium, Polybrominated Bipheny1 (PBB) and Polybrominated Bipheny1 Ether (PBDE)(flame retardant).

10.4 WEEE

Producer (Philips) responsible for retailer take back schemes and recycling.

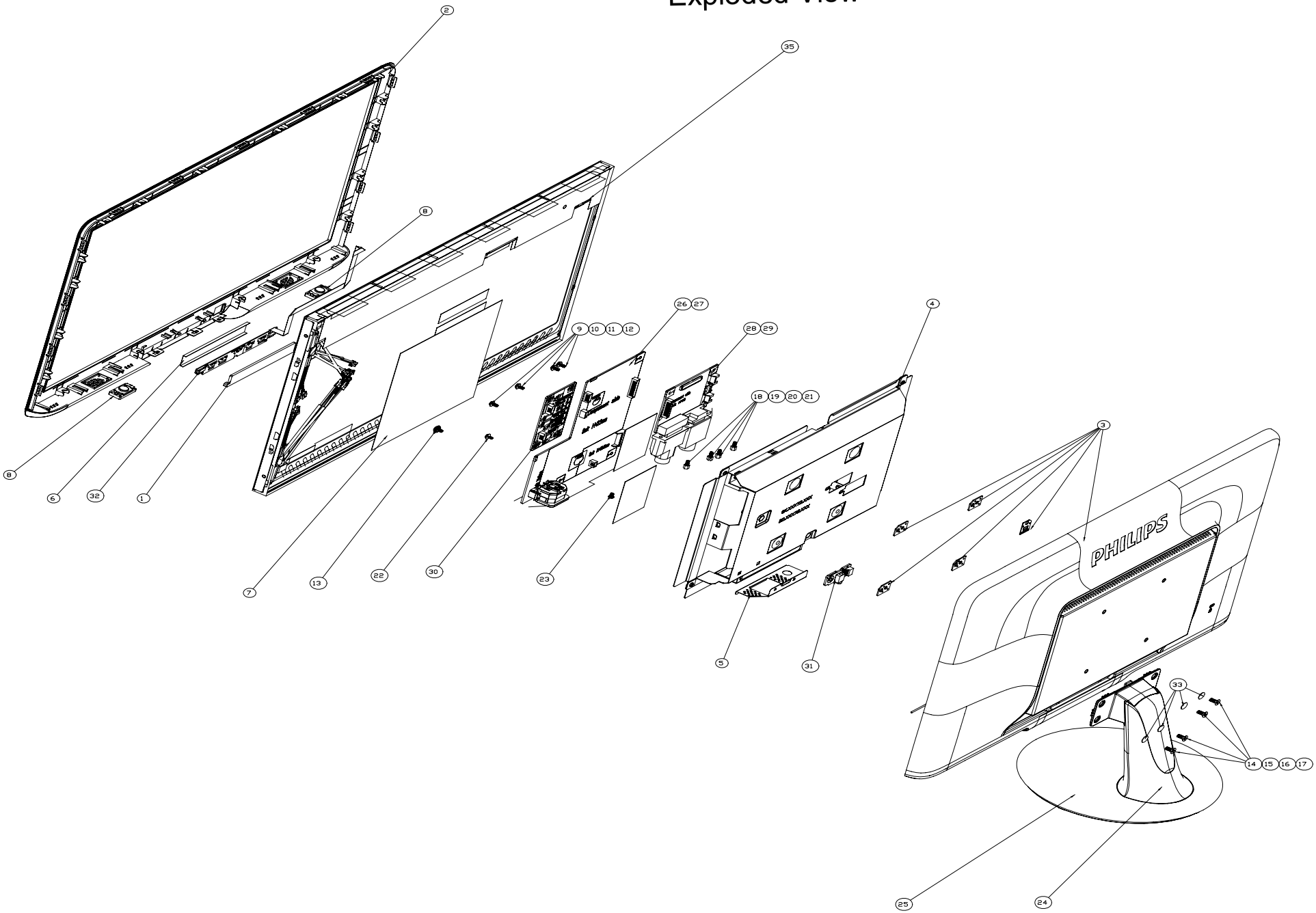
--System implemented.

--Collection and recycle targets.

10.5 Ongoing Regulatory

There's a possibility that other regulatory certificates will be required during the life of the product. It is the responsibility of the supplier to provide related documentation.

Exploded View



Spare / Recommended Parts List

Model:222EL2

Spare parts change rule:
Gray color: old parts can be ALT to new parts
Gray color with delete line: old parts can not be used to this model
Spare parts upgrade rule: last number +1 --> Latest version parts number

Example old : 6K.0QC01.011 /
new : 6K.0QC01.012

Panel+PCBA Styling

location	Description	PCM code	222EL2SB/00				222EL2SB/00(AP)				222EL2SB/69				222EL2SB/75				222EL2SB/67				222EL2SB/91				222EL2SB/70				222EL2SB/96				222EL2SB/96				222EL2SB/96				222EL2SB/93				222EL2SB/10(EU) 1A				222EL2SB/62 1A			
		9J.17972.***	AB1	CB1	DB1	QB1	AB5	CB5	DB5	QB5	AB7	CB7	DB7	QB7	AB6	CB6	DB6	QB6	ABH	CBH	DBH	QBH	ABM	CBM	DBM	QBM	ABK	CBK	DBK	QBK	AB3	CB3	DB3	QB3	ABG	CBG	DBG	QBG	ABJ	CBJ	DBJ	QBJ	AB4	CB4	DB4	QB4	A2A	C2A	D2A	Q2A	A28	C28	D28	Q28
			AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS
28	MAIN (I/F) BOARD ASS'Y	5E.17901.001	V	~~V~~			V				V	~~V~~			V	~~V~~			V				V				V				V	~~V~~			V	~~V~~			V				V	~~V~~										
		5E.17901.011		V				V				V				V				V				V				V				V				V				V				V										
		5E.17901.003			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V									
		5E.17901.002																																														V	V			V	V		
		5E.17901.012																																														V				V			
		5E.17901.004																																															V	V			V	V		
27	POWER BOARD ASS'Y	5E.17902.001	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
32	CTRL BD ASS'Y	5E.17803.001	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
33	LEDDRIVER BD ASS'Y	5E.17933.004	V				V				V				V				V				V				V				V				V				V				V				V				V			
		5E.17933.001		V				V				V				V				V				V				V				V				V				V				V				V			
		5E.1A833.001			V				V				V				V				V				V				V				V				V				V						V				V	
		5E.1A833.002				V				V				V				V				V				V				V				V				V				V						V				V	
35	LCDM21.5W M215HW01-V60B/60C Z	5F.LUAV0.071	V				V				V				V				V				V				V				V				V				V				V				V				V			
	<LT>LCDM21.5W M215HW01-V60B/60C P	5F.LUAVP.071	V				V				V				V				V				V				V				V				V				V				V				V				V			
	LCDM21.5W M215H3-LA1 WLED P (CMO)	5F.LMAPP.011		V				V				V				V				V				V				V				V				V				V				V				V				V			
	LCDM21.5W M215HW01 V8 Z/G (AUO)	5F.LUAV0.091			V				V				V				V				V				V				V				V				V				V				V				V				V			
	ASSY LCDM21.5W M215G01 V0 Z (QISDA)	6P.QUAV0.001				V				V				V				V				V				V				V				V				V				V				V				V			
31	FFC CABLE 30P 16TH	5K.17803.N01	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Mechanical Styling

location	Description	PCM code	222EL2SB/00				222EL2SB/00(AP)				222EL2SB/69				222EL2SB/75				222EL2SB/67				222EL2SB/91				222EL2SB/70				222EL2SB/96				222EL2SB/96				222EL2SB/96				222EL2SB/93				222EL2SB/10(EU) 1A				222EL2SB/62 1A			
			AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS
25	BASE ASS'Y	6K.17810.001	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
24	COLUMN ASS'Y	6K.17809.001	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
2	FRONT BEZEL ASS'Y (Black)	6K.17901.001	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
3	REAR COVER ASS'Y	~~6K.17902.003~~	~~V~~				~~V~~				~~V~~				~~V~~																~~V~~												~~V~~											
		6K.17902.002	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V	
		~~6K.17904.001~~	~~V~~								~~V~~																				~~V~~												~~V~~											
		6K.17904.002		V				V				V				V				V				V				V				V				V				V				V											
		6K.17908.001																																														V				V		V	V
		6K.17910.001																																																			V			

Packing Styling

location	Description	PCM code	222EL2SB/00				222EL2SB/00(AP)				222EL2SB/69				222EL2SB/75				222EL2SB/67				222EL2SB/91				222EL2SB/70				222EL2SB/96				222EL2SB/96				222EL2SB/96				222EL2SB/93				222EL2SB/10(EU) 1A				222EL2SB/62 1A			
			AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS
		~~4G.17803.001~~	V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V							V	V		
100	CUSHION FRONT	4G.17805.001	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
		~~4G.17801.001~~																																												V	V						
		4G.17807.001																																												V	V	V	V				
110	CUSHION BACK	~~4G.17804.001~~	V	V			V	V			V	V			V	V															V	V											V	V			V	V						
		4G.17806.001	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
		~~4G.17808.001~~																																											V	V						
		4G.17808.001																																												V	V	V	V				
120	CARTON	~~4D.17801.021~~	V	V			V	V			V	V			V	V															V	V			V	V			V	V			V	V							V	V		
		4D.17801.022	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
		~~4D.17802.021~~																																											V	V						
		4D.17802.022																																												V	V	V	V				

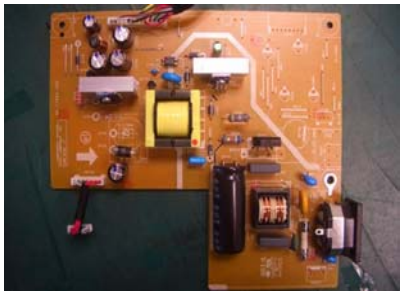
Accessory Styling

location	Description	PCM code	222EL2SB/00				222EL2SB/00(AP)				222EL2SB/69				222EL2SB/75				222EL2SB/67				222EL2SB/91				222EL2SB/70				222EL2SB/96				222EL2SB/96				222EL2SB/96				222EL2SB/93				222EL2SB/10(EU) 1A				222EL2SB/62 1A			
			AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS
		~~4J.17801.001~~	V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V							V	V		
200	QSG PHILIPS 222E2/222EL2	4J.17801.002	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
210	CD PHILIPS 222E2/222EL2/224E2	~~5B.17801.001~~	V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V							V	V		
		~~5B.17801.002~~	V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V			V	V							V	V		
		5B.17801.003	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
30	CORD H05VV-3G 10A250V 1500 EUR	2G.02718.051	V	V	V	V	V	V	V	V									V	V	V	V	V	V	V	V	V	V	V	V																					V	V	V	V	V	V	V	V
	<ALT>CORD H05VV-3G 10A250V 1500 EUR	2G.02718.05H	V	V	V	V	V	V	V	V									V	V	V	V	V	V	V	V	V	V	V	V																					V	V	V	V	V	V	V	V
	CORD H05VV-F 13A250V 1.5M UK	2G.03131.031									V	V	V	V																																											
	CORD 3ASL/75DU-IN 250V1.5M AUS	2G.01343.031													V	V	V	V																																							
	<ALT>CORD 3ASL/75DU-IN 250V1.5M AUS	2G.01343.061													V	V	V	V																																							
	CORD VCTF 7A 125V 1.5M CNS-TW	2G.04811.021																													V	V	V	V	V	V	V	V	V	V	V	V												
	CORD RVV300/500 10A25V1.5MM 3C	2G.03745.001																																																					
	<ALT>CORD RVV300/500 10A25V1.5MM 3C	ZG.03745.00H																																																				
36	CABLE SIGNALIC H+V OD 5.5 1.8M	5K.17906.501	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
34	CABLE DVI-D/DVI-D 1.8M IS_8	5K.05407.511																																																				

Critical components

Location	Description	PCM code	222EL2SB/00				222EL2SB/00(AP)				222EL2SB/69				222EL2SB/75				222EL2SB/67				222EL2SB/91				222EL2SB/70				222EL2SB/96				222EL2SB/96				222EL2SB/96				222EL2SB/93				222EL2SB/10(EU) 1A				222EL2SB/62 1A			
			AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS	AUO	CMO	AUO	QIS
VAR1	TVS_10D 470V TVR10471KFC3FW_	2D.50009.031	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
U8	IC CTRL TSUMU58NWHJ-LF-1 PQFP	7A.00058.E0E	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
U301	IC TOUCH SENSOR CAP1006-1-AIA	7D.01006.0B5	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
IC702	IC LR RM2101D0BA 3.3V TO-252	7D.02101.F3M	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
LED1	LED WHITE LTW-008ZDL 2.5*0.8	8C.00008.070	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Panel & PCBA photos

ITEM	PCM	Description	Photo
1	5F.LUAV0.071	LCDM21.5W M215HW01-V60B/60C Z (AUO)	
2	5F.LMAPP.011	LCDM21.5W M215H3-LA1 WLED P (CMO)	
3	5E.17901.001	MAIN (I/F) BOARD ASS'Y	
4	5E.17902.001	POWER BOARD ASS'Y	
5	5E.17803.001	CTRL BD ASS'Y	

Repair Tips

0. Warning

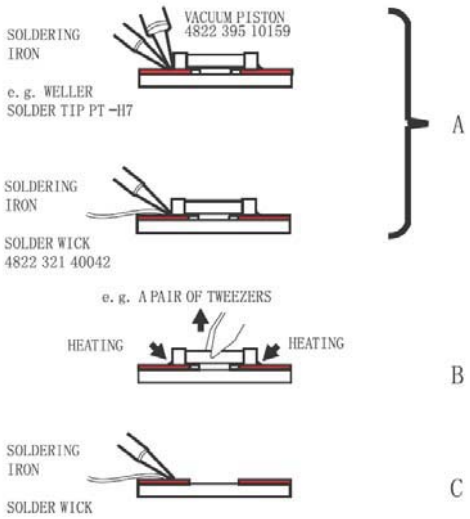
All ICs and many other semi -conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically . When repairing, make sure that you are connected with the same potential as the mass of the unit via a wrist wrap with resistance. Keep components and tools also at the same potential!

1. Servicing of SMDs (Surface Mounted Devices)

1.1 General cautions on handling and storage
- Oxidation on the terminals of SMDs results in poor soldering.
Do not handle SMDs with bare hands.
- Avoid using storage places that are sensitive to oxidation such as places with sulphur or chlorine gas, direct sunlight, high temperatures or a high degree of humidity. The capacitance or resistance value of the SMDs may be affected by this.
- Rough handling of circuit boards containing SMDs may cause damage to the components as well as the circuit boards. Circuit boards containing SMDs should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections may be damaged due to the stress. Never rub or scrape chip components as this may cause the value of the component to change.
Similarly, do not slide the circuit board across any surface.

1.2 Removal of SMDs
- Heat the solde r (for 2-3 seconds) at each terminal of the chip. By means of litz wire and a slight horizontal force, small components can be removed with the soldering iron.
They can also be removed with a solder sucker (see Fig. 1A)

Fig. 1 DISMOUNTING



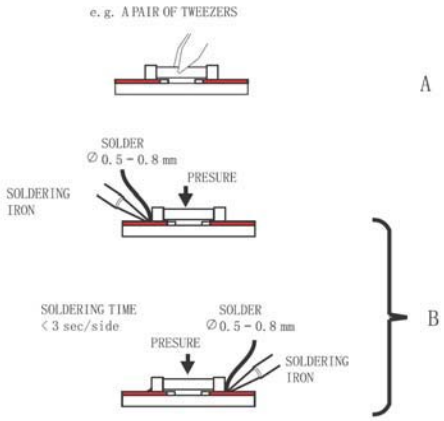
While holding the SMD with a pair of tweezers, take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1 B).
- Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

While holding the SMD with a pair of tweezers, take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1 B).
- Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

1.3 Caution on removal
- When handling the soldering.iron. use suitable pressur e and be careful.
- When removing the chip, do not use undue force with the pair of tweezers.
- The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250 C).
- The chip, once removed, must never be reused.

1.4 Attachment of SMDs
- Locate the SMD on the solder lands by means of tweezers and solder the component on one side. Ensure that the component is positioned correctly on the solder lands (see Fig.2A).
- Next complete the soldering of the terminals of the component (see Fiq. 2B).

Fig. 2 MOUNTING



2. Caution when attaching SMDs

- When soldering the SMD terminals, do not touch them directly with the soldering iron. The soldering should be done as quickly as possible, care must be taken to avoid damage to the terminals of the SMDs themselves.
- Keep the SMD's body in contact with the printed board when soldering.
- The soldering iron to be used (approx. 30 W) should preferably be equipped with a thermal control (soldering temperature: 225 to 250 C).
- Soldering should not be done outside the solder land.
- Soldering flux (of rosin) may be used, but should not be acidic.
- After soldering, let the SMD cool down gradually at room temperature.
- The quantity of solder must be proportional to the size of the solder land. If the quantity is too great, the SMD might crack or the solder lands might be torn loose from the printed board (see Fig. 3).

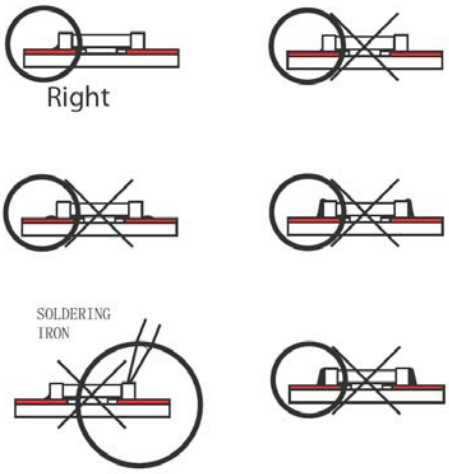


Fig.3 Examples

Repair Tips

3. Lead-free product identification

You can identify lead-free product by Philips-lead-free logo on PCB.

4. Lead-free product repair instruction

4.1 Use only lead-free Solder Alloy 0622 149 00106(1.2mm SAC305) or 0622 14900108(1.0mm SAC305).
Remark: For lead free soldering material, please visit www.alphametals.com website for details. This is recommended by Philips.

4.2 Use only adequate solder tools applicable for lead-free soldering-tin. The solder tool must be able to reach at least a solder-temperature of 400, to stabilize the adjusted temperature at the solder-tip and to exchange solder-tips for different applications.
Small Passives/Actives to be removed with thermal tweezers
Automated system for IC and BGA repair (Microscope, Camera, Beam split optics, Computer, Programmer, Heat controllers, Vacuum system, Laser pointer) Solder Hand-Tool (Adjustable in temperature height, Temperature shall be held constant, Flexible tips)

4.3 Adjust your solder tool so that a temperature around 360 -380 is reached and stabilized at the solder joint.
Heating-time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400 otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. Corrosion of Tool-Spikes can be avoided when using SAC305 and a temperature of less than 400.

4.4 Mix of lead-free solder-tin/parts with leaded soldering-tin/parts is possible but not recommended. If not to avoid clean carefully the solder-joint from old tin and re-solder with new tin.

4.5 Use only original spare-parts listed in the Service-Manuals. Standard-material (consumables) can also be purchased at external companies.

4.6 Special information for lead-free BGA-ICs: this ICs will be delivered in so-called dry-packaging to protect the IC against moisture and with lead-free logo on it. This packaging may only be opened shortly before it is used (soldered). Otherwise the body of the IC gets wet inside and during the heating time the structure of the IC will be destroyed due to high (steam-) pressure. If the packaging was opened before usage the IC has to be heated up for some hours (around 90) for drying (Take attention for ESD-protection!)

5. Rework on BGA (Ball Grid Array) ICs

General
Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF) BGA is removed from a P WB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

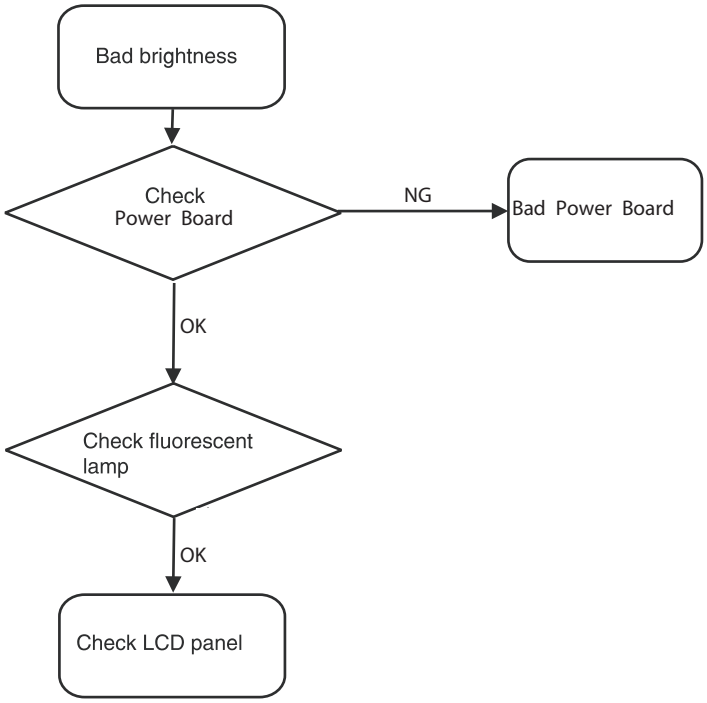
Device Removal
As is the case with any component that, it is essential when removing an (LF) BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the chance of warping the PWB.
To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

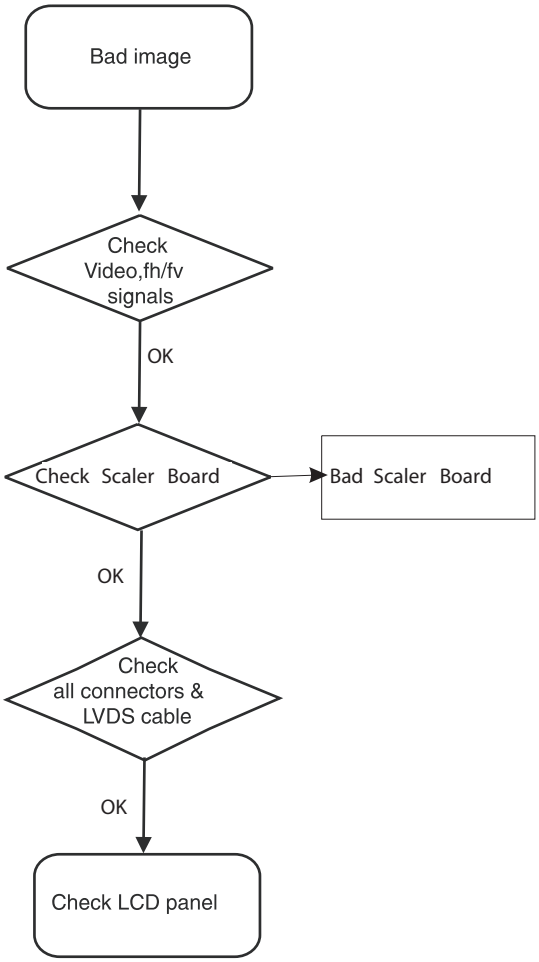
Area Preparation
When the component has been removed, the vacant IC area must be cleaned before replacing the (LF) BGA. Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent. After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA
Note: Do not apply solder paste, as this has shown to result in problems during re-soldering.

Device Replacement
The last step in the repair process is to solder the new component on the board. Ideally, the (LF) BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers. To reflow the solder , apply a temperature profile according to the IC data sheet. So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times.

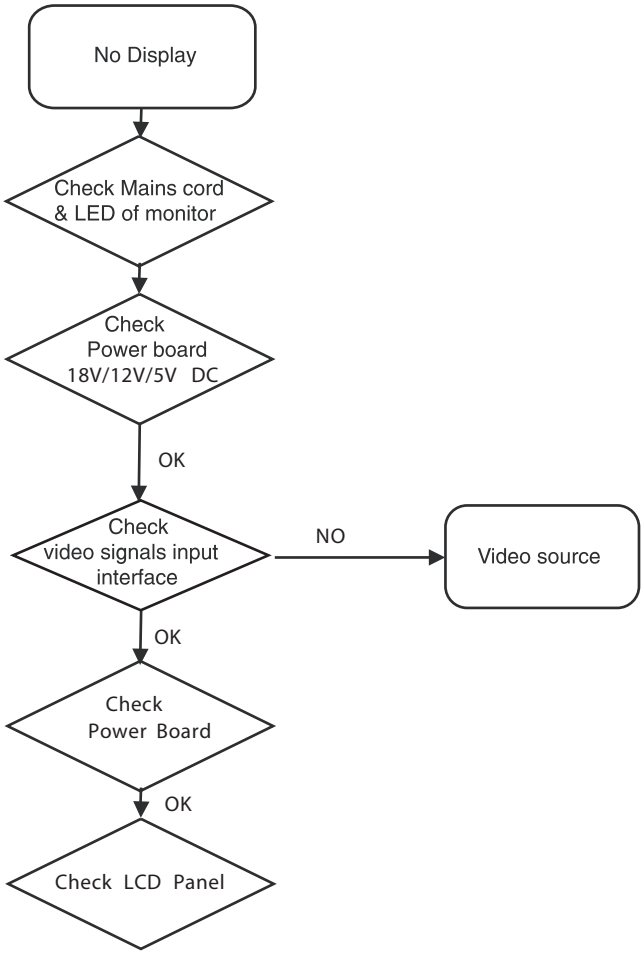
More Information
For more information on how to handle BGA devices, visit this URL: http://www.atyourservice.ce.philips.com (needs subscription). After login, select Magazine, then go to Workshop Information. Here you will find Information on how to deal with BGA-ICs.

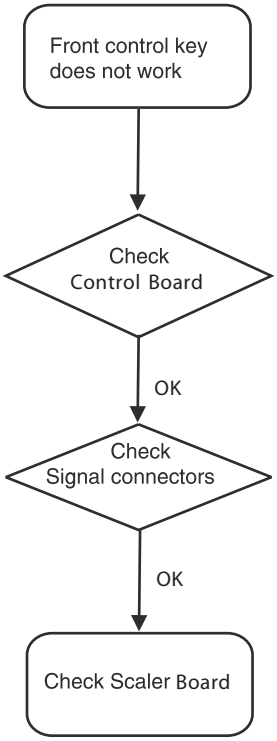
Repair Flow Chart





Repair Flow Chart





Safety Test Requirements

All units that are returned for service or repair must pass the original manufactures safety tests. Safety testing requires both Hipot and Ground Continuity testing.

HI-POT TEST INSTRUCTION

1.Application requirements
1.1 All mains operated products must pass the Hi-Pot test as described in this instruction.
1.2 This test must be performed again after the covers have been refitted following the repair , inspection or modification of the product.

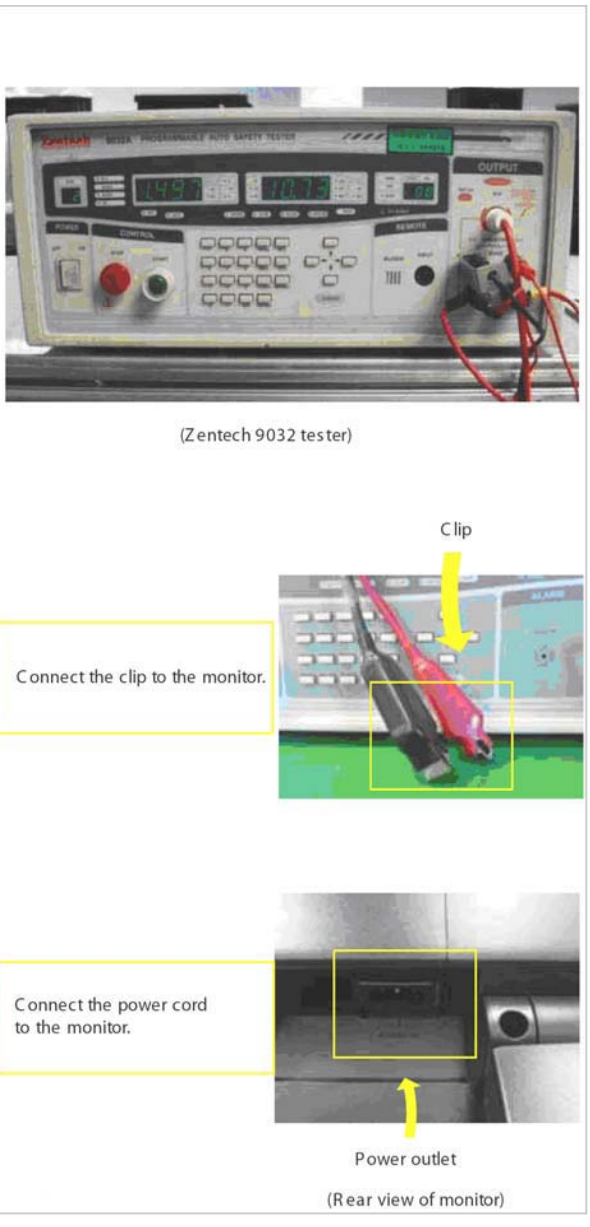
2. Test method
2.1 Connecting conditions
2.1.1 The test specified must be applied between the parallel blade plug of the main scord and all accessible metal parts of the product.
2.1.2 Before carrying out the test, reliable conductive connections must be ensured and thereafter be maintained throughout the test period.
2.1.3 The mains switch(es) must be in the "ON" position.
2.2 Test Requirements
All products should be HiPot and Ground Continuity tested as follows:

Condition	Hi-Pot Test for products where the mains input is 220V AC	Hi-Pot Test for products where the mains input is 110V AC	Ground Continuity Test requirement
Test voltage	2820VDC (2000VAC)	1700VDC (1200VAC)	Test current: 25A, AC Test time: 3 seconds Resistance required: <=0.09+Rohm, R is the resistance of the mains cord. 91 220CW9 LCD
Test time	3 seconds	1 seconds	
Trip current (Tester)	Set at 100uA for Max limit; Set at 0.1uA for Min limit.	5mA	
Ramp time (Tester)	Set at 2 seconds	X	

2.2.1 The minimum test duration for Quality Control Inspector must be 1 minute.
2.2.2 The test voltage must be maintained within the specified voltage + 5%.
2.2.3 There must be no breakdown during the test.
2.2.4 The grounding blade or pin of mains plug must be conducted with accessible metal parts.

3. Equipments and Connection
3.1. Equipments
For example :
- Zentech 9032 PROGRAMMABLE AUT O SAFETY TESTER

3.2. Connection
* Turn on the power switch of monitor before Hipot and Ground Continuity testing.



4. Recording
Hipot and Ground Continuity testing records have to be kept for a period of 10 years.