21.5 inch FHD TFT LCD Colour Monitor

Chassis: MERIDIAN 2

Service
Service
Service

222E2SB/00
222E2SB/10 (EU)
222E2SB/62
222E2SB/27
222E2SB/00 (AP)
222E2SB/69
222E2SB/71
222E2SB/73
222E2SB/94
222E2SB/75
222E2SB/96
222E2SB/93

ENERGY STAR

# Service Manual

Horizontal frequencies
30 - 83 kHz

TABLE OF CONTENTS


| Description | Page |
|---|---|
| Important Safety Notice | 2 |
| Technical Data | 3~4 |
| Installation | 5 |
| Troubleshooting | 6~7 |
| On Screen Display | 8~9 |
| Lock/unlock, Aging,Factory mode | 10 |
| Philips Pixel Defect Policy | 11 |
| Mechanical Instructions | 12~15 |
| Color adjustment | 16 |
| FAQs (Frequently Asked Questions) | 17~18 |
| Electrical instruction | 19~20 |
| Service Tool | 21~22 |
| DDC Instructions & Serial Number | 23~29 |
| DDC DATA | 30~31 |
| Firmware Upgrade for CPU- | 32~35 |

| Description | Page |
|---|---|
| Failure Mode Of Panel | 36 |
| Wiring Diagram | 37 |
| Block Diagram | 38 |
| Scaler Diagram & C.B.A. | 39~45 |
| Power Diagram & C.B.A. | 46~50 |
| Control Diagram & C.B.A. | 51~52 |
| General product specification | 55~82 |
| Exploded View | 83 |
| Spare/ Recommended Parts List | 84 |
| PCBA photos | 85 |
| Repair tips | 86~87 |
| Repair Flow chart | 88~89 |
| Safety Test Requirments | 90 |


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

Published by Philips Consumer Lifestyle Copyright reserved Subject to modification 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 V0 |
| Resolution | : 1920x1080 (Full HD) |
| Outside dimensions | : 495.6(H) x 292.2(V) x 16.35(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 | : 4 CCFL |
| Active area (W x H) | : 476.64(H) × 268.11(V) mm |
| View angle (CR=10) | : >=160 for Right/Left (Typ)<br>: >=160 for Up/Down (Typ) |
| Contrast ratio | : >=1000:1 (Typ) |
| White luminance | : 300 (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: < 48 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**

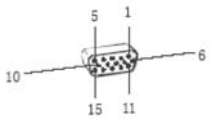
Power cord length : 1.5 M

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

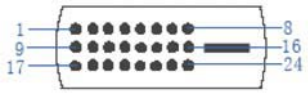
**Power management**

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 | <48 W (max.) | White LED | -- |
| Power Saving | Off | Off | blanked | < 0.5W | Blinking White LED<br>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

**CPT**

| | |
|---|---|
| Type NR. | : CPT CLAA215FA01 |
| Resolution | : 1920x1080 (Full HD) |
| Outside dimensions | : 495.6(H) x 292.2(V) x 16.35(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 | : 4 CCFL |
| Active area (W x H) | : 476.64(H) × 268.11(V) mm |
| View angle (CR=10) | : >=160 for Right/Left (Typ)<br>: >=160 for Up/Down (Typ) |
| Contrast ratio | : >=1000:1 (Typ) |
| White luminance | : 300 (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: < 48 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**

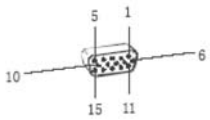
Power cord length : 1.5 M

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

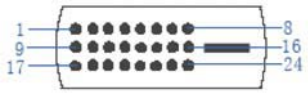
**Power management**

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 | <48 W (max.) | White LED | -- |
| Power Saving | Off | Off | blanked | < 0.5W | Blinking White LED<br>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

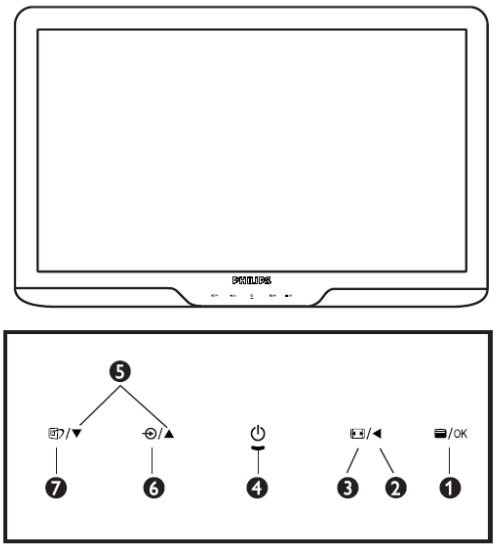
Storage

- 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 %

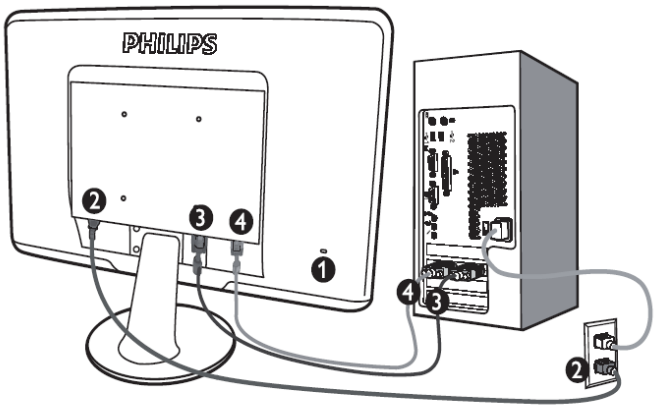
# Installation

## 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.

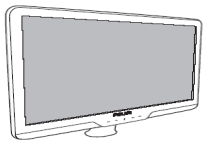
## Rear View



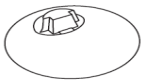

1. Kensington anti-thief lock
2. AC power input
3. DVI-D input (available for selecting model)
4. VGA input

## Accessory Pack

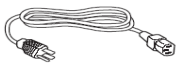
Unpack all the parts

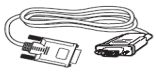

Monitor

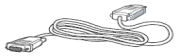
Quick start guide


Base stand

EDFU CD

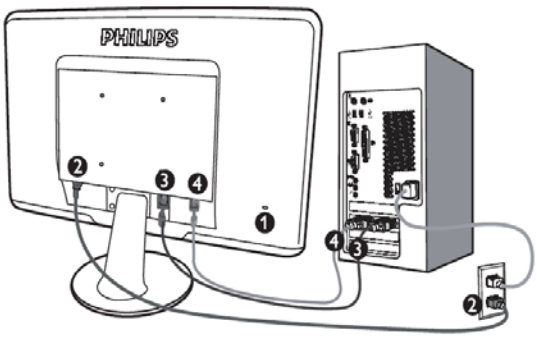

Power cord


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

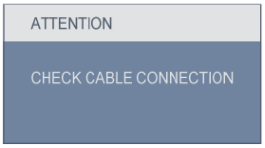
**No Picture (Power LED not lit)**

- 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.

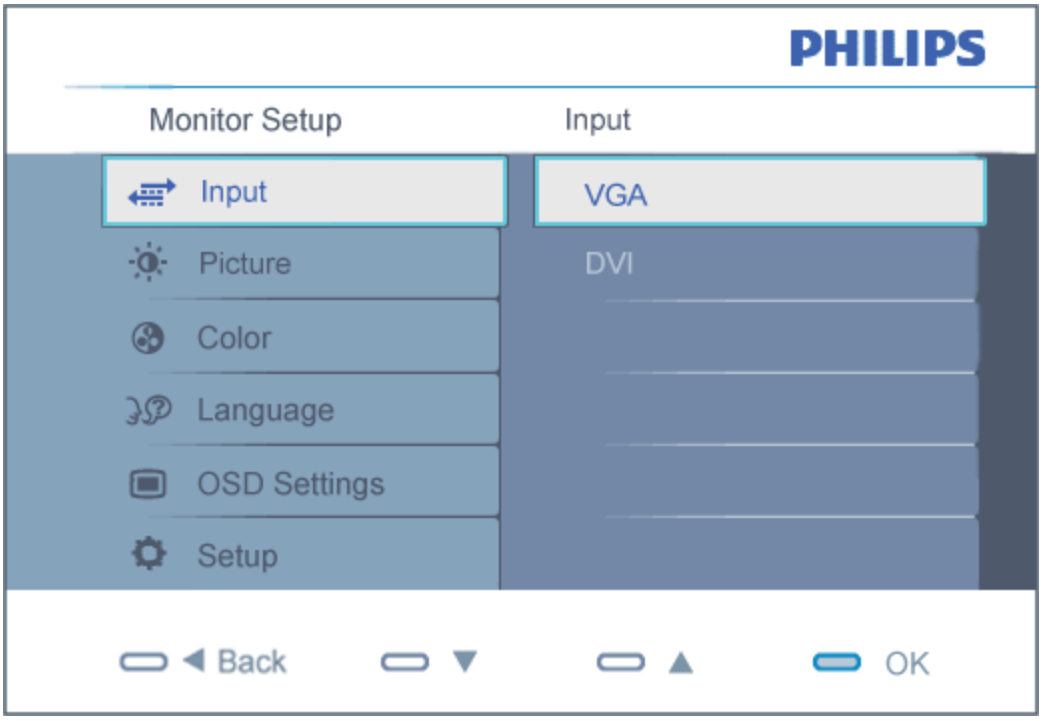
For further assistance, refer to the Consumer Information Centers list and contact Philips customer service representative.

# 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 :



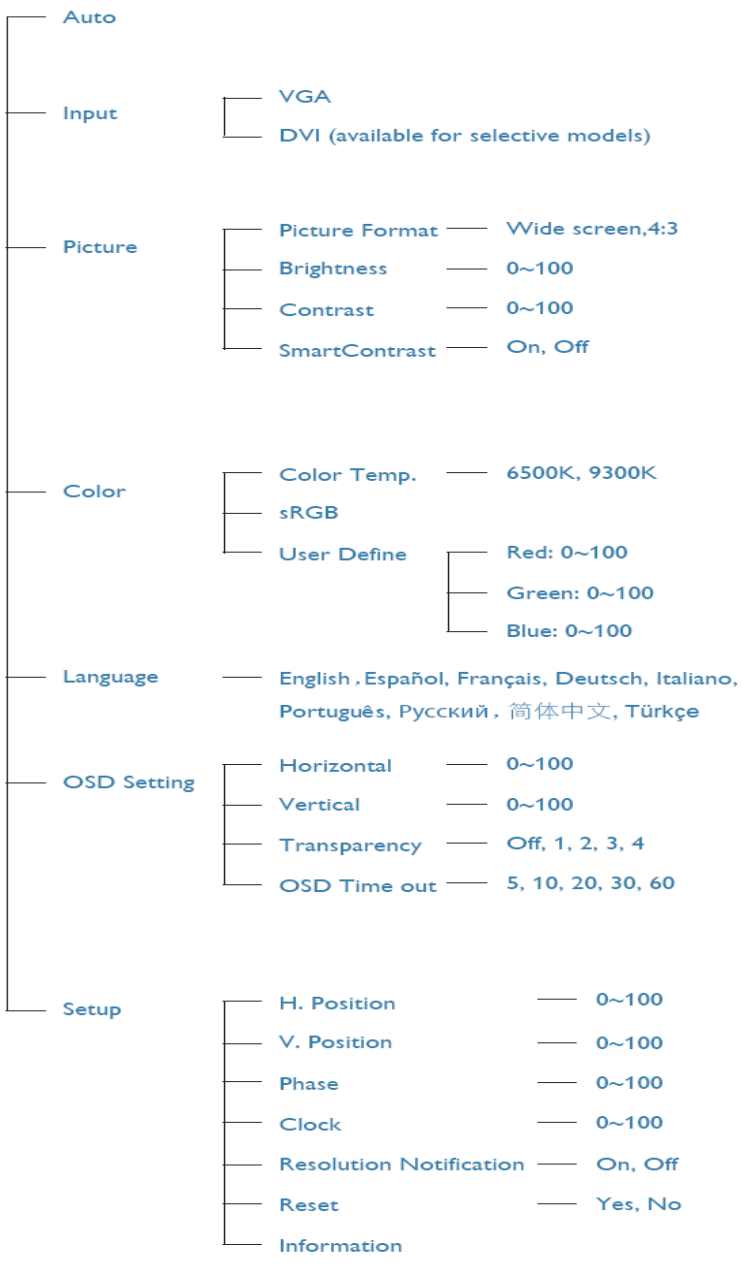

***Basic and simple instruction on the control keys.***

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.



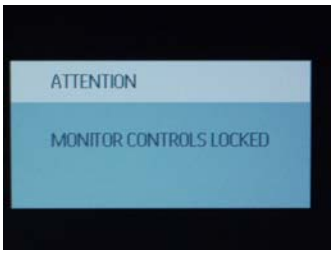

## Resolution notification

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.

## 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.

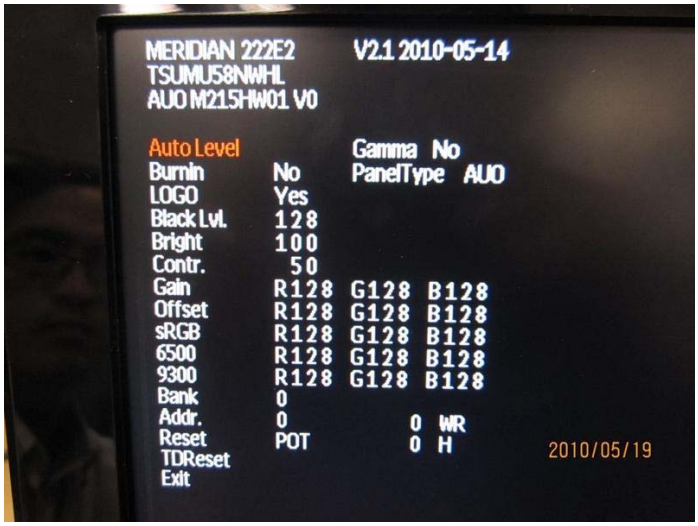
1). Turn off monitor.
2). [Push "EXIT" & "MENU" buttons at the same time and hold them]+[Press "power" button until comes out "Windows screen" ] => then release all buttons
3).Press "MENU" button, wait until the OSD menu with Characters "MERIDIAN 222E2 V2.1 2010-05-14" (below OSD menu) come on the Screen of the monitor.

Factory Mode indicator

## Factory Menu

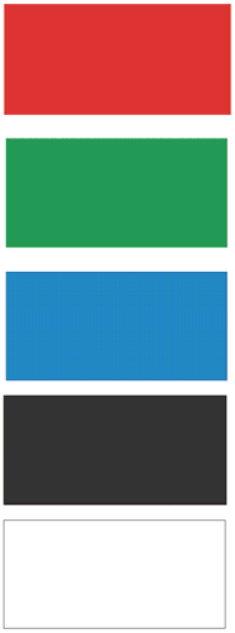
Cursor can move on gray color area
Hot key function: by pressing " UP " and " DOWN " key Simultaneously at User Mode (or Factory Mode) (PS: The Of fset R G B function can be used on reduce or eliminate snowy noise on the background when the resolution of video signal is 1680*1050vertical 60Hz. Slightly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

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:

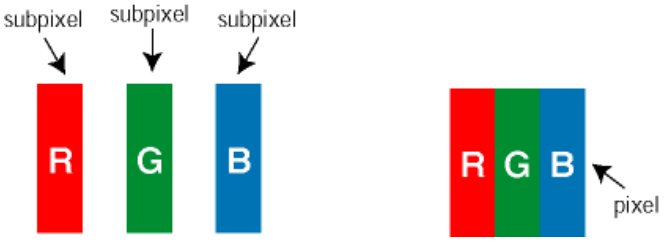


repeatly
Connect Signal cable again=> go back to normal display

# 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

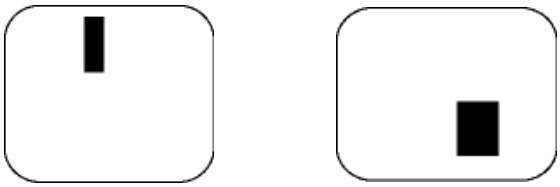
Two adjacent lit sub pixels:

- 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* | **222E2** |
| 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* | **222E2** |
| 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* | **222E2** |
| Total bright or black dot defects of all types | 5 or fewer |

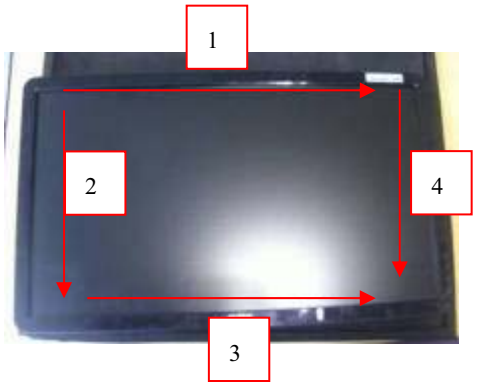
*Note:*

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

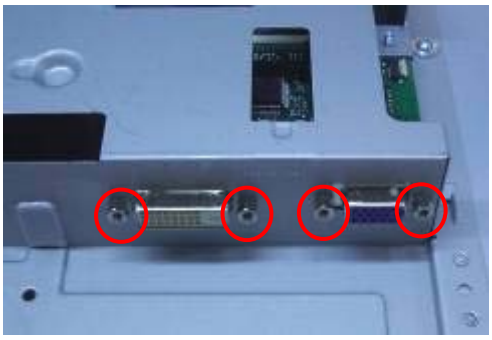
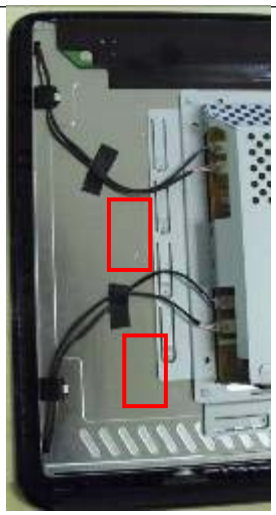
# Mechanical Instruction

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:

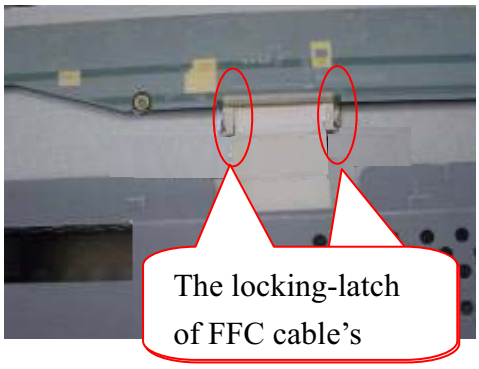
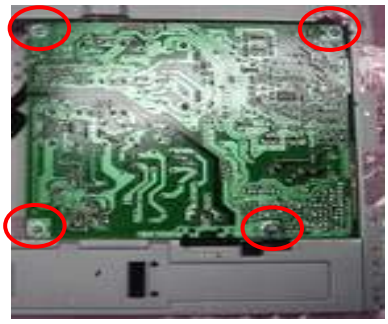
1) Press-fixture
2) working table
3) Screw-driver
4) knife*1
5) glove
6) cleaning cloth
7) ESD protection

| item | picture | Operation | Tool | Notes |
|---|---|---|---|---|
| 1 | | Tear off four piece of Mylar<br>Disassemble the stand<br>→ 4 screws | Screw-driver | |
| 2 |  | disassembly the bezel from the monitor, notice the disassembly order :<br>1.Top (1) parts of bezel<br>2.Left (2) parts of bezel<br>3.Bottom (3) parts of bezel<br>4. Right (4) parts of bezel<br>Don't draw the BZL | | When disassembly the bezel ,<br>notice don't bend the C/B .<br>man must wear glove<br>The purpose is loose the BZL |
| 3 | | Turn over the monitor ,<br>Bring the Rear cover from the monitor | | |

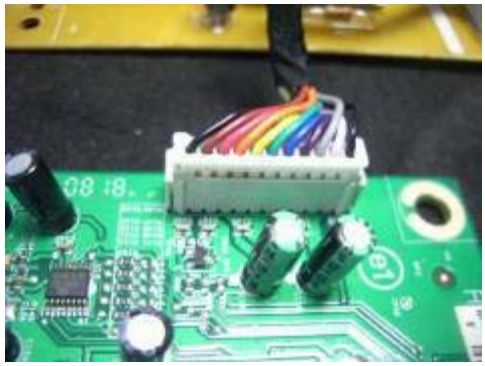
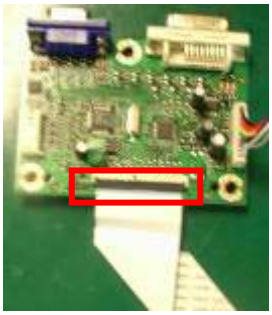
# Mechanical Instruction

| | | | | |
|---|---|---|---|---|
| 4 | | Draw the control board cable<br>Take the entire internal mechanism from Bezel and then put it on the cushion | | |
| 5 |  | Disassembled the Main-BKT : hexagonal screw *4 | Screw-driver | |
| 6 | | Tear off al foil on the left of Main-BKT | | |
| 7 |  | For AUO panel : Tear off the acetic tape<br><br>Pull out the lamp cables | | Notes the below PIC Then the designed Main-BKT will help to pull out the wires<br><br>Man can raise the Lock of Lamp and then Pull out the lamp easily |

# Mechanical Instruction

| | | | | |
|---|---|---|---|---|
| 8 |  | Unlock the FFC by using two hands(see note). | | Please carefully use two hands(one hand presses the locking-latch of FFC cable's housing, and at the same time another hand pulls out the FFC cable.) for this step to avoid from deforming the terminals of positive-locking type FFC cable. |
| 9 |  | Disassemble the Power board<br>→ 4 screws | Screw-driver | |
| 10 | | Disassemble the ITF-board<br>→ 1 screws | Screw-driver | |
| 11 | | Take the PCBA from Main-BKT and then put it on the cushion | | |

# Mechanical Instruction

| | | | | |
|---|---|---|---|---|
| 12 |  | Pull out the cable of Power board | | Notes: Pull the connect upright |
| 13 |  | Draw the ffc cable | | |
| 14 | | Take the panel out of the bezel and then tear off a piece of Mylar AL foil on the left | | |

# 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 .

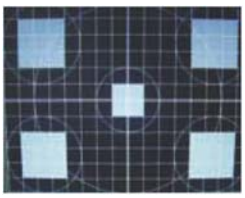


Fig. 1

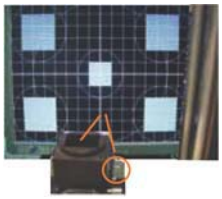


Fig.2

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 222E2 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 | Factory | Resolution | | | Pixel Rate | Horizontal | Vertical | V Total | Polarity | 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 | #236 |
| 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 | #129 |
| 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 | 798 | 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 | #246 |
| 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 | 1680x1050/60 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 | 1920x1080/60 RB | 138.5 | 66.59 | 59.93 | 1111 | p / n | #250 |
| 45 | * | | CVT | 16:10 | 1920x1200/60 RB | 154 | 74.04 | 59.95 | 1235 | p / n | #260 |
| 46 | * | * | CVT | 16:9 | 1920x1080/60 | 148.5 | 67.5 | 60 | 1125 | p / p | #249 |

# 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<br>y = 0.297 ± 0.02 | PerfectuneII |
| 6500K/sRGB | x = 0.313 ± 0.02<br>y = 0.329 ± 0.02 | PerfectuneII |
| sRGB | x = 0.313 ± 0.02<br>y = 0.329 ± 0.02 | PerfectuneII |

**Production alignment spec.**

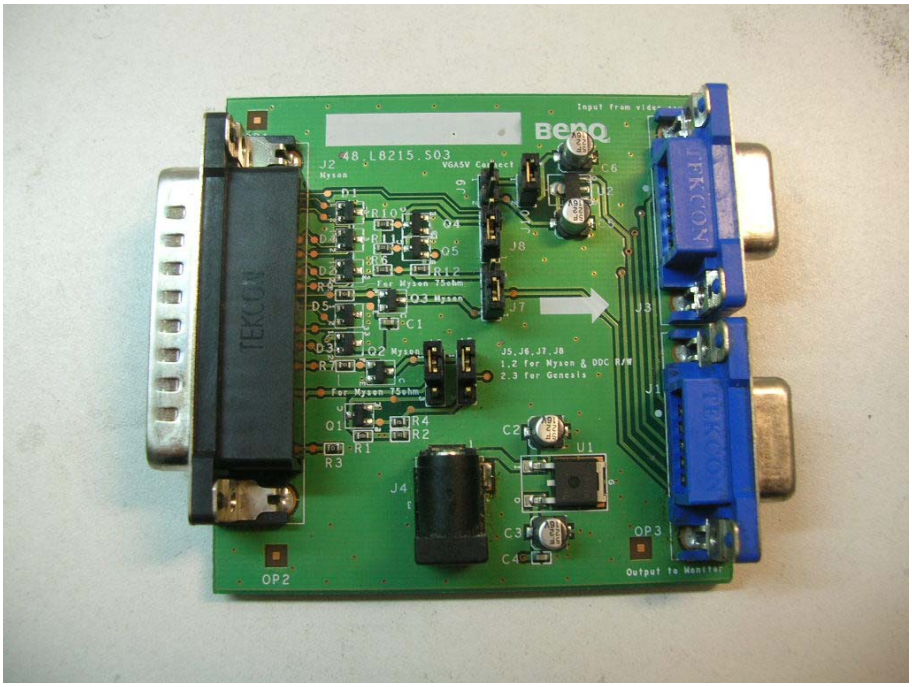
| CIE coordinates | (x,y) | |
|---|---|---|
| 9300K | x = 0.283 ± 0.006<br>y = 0.297 ± 0.006 | PerfectuneII |
| 6500K/sRGB | x = 0.313 ± 0.006<br>y = 0.329 ± 0.006 | PerfectuneII |
| sRGB | x = 0.313 ± 0.006<br>y = 0.329 ± 0.006 | PerfectuneII |

**Quality Inspection specification:**

| CIE coordinates | (x,y) | |
|---|---|---|
| 9300K | x = 0.283 ± 0.015<br>y = 0.297 ± 0.015 | |
| 6500K/sRGB | x = 0.313 ± 0.015<br>y = 0.329 ± 0.015 | |
| sRGB | x = 0.313 ± 0.015<br>y = 0.329 ± 0.015 | |

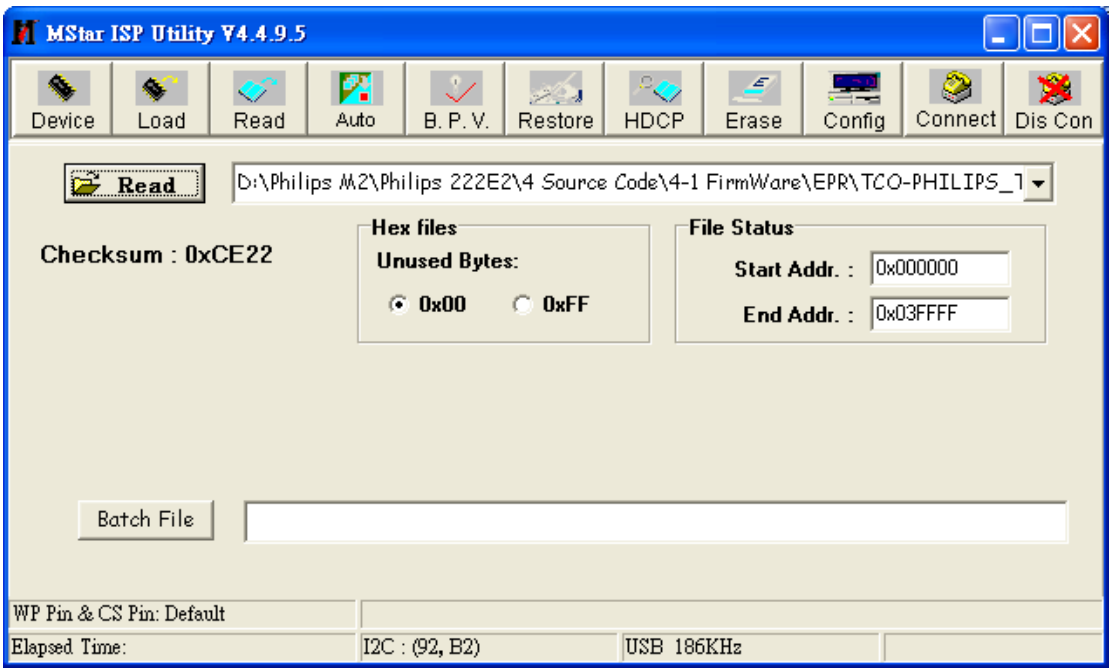
# Service tool-Hardware

| PCM code | 12NC |
|---|---|
| 5E.L8215.001 | 996510019769 |

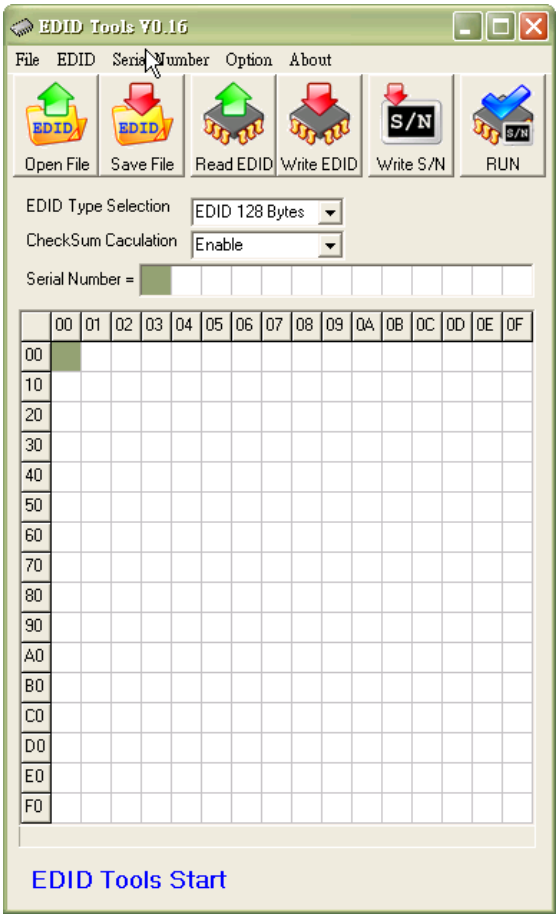


# Service tool-Software

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)**

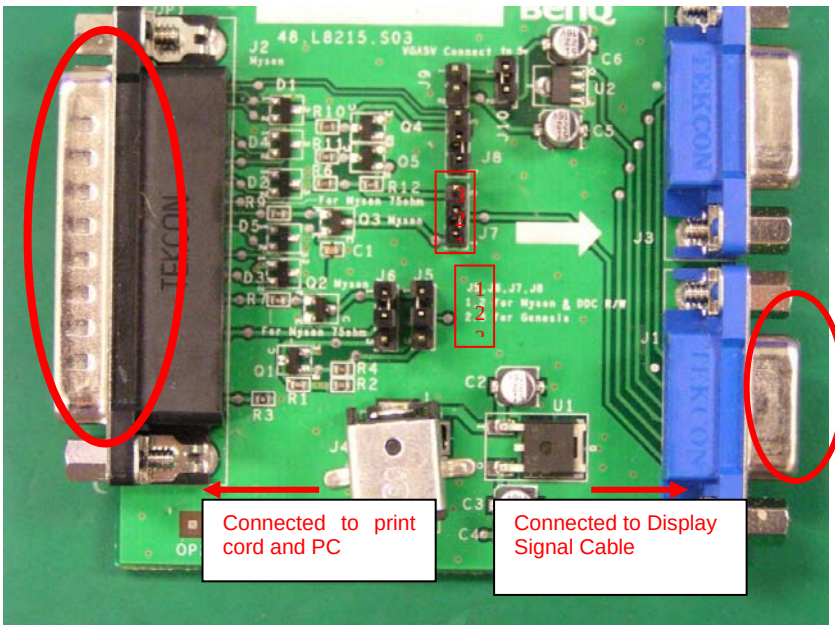



Fig.1

# DDC Instructions

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

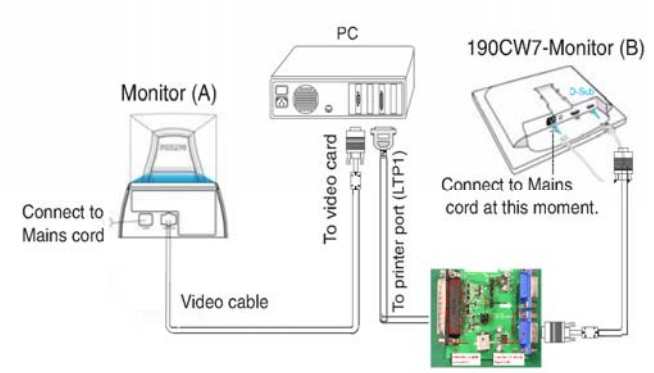
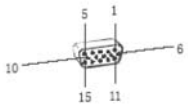



Fig.2

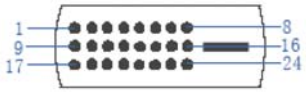
Pin assignments :

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

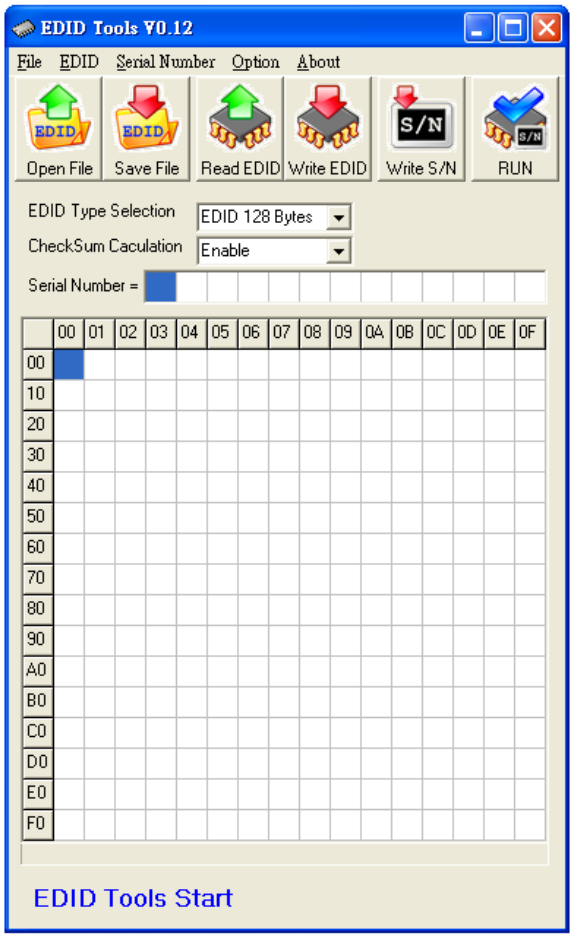



Fig.4

# DDC Instructions

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

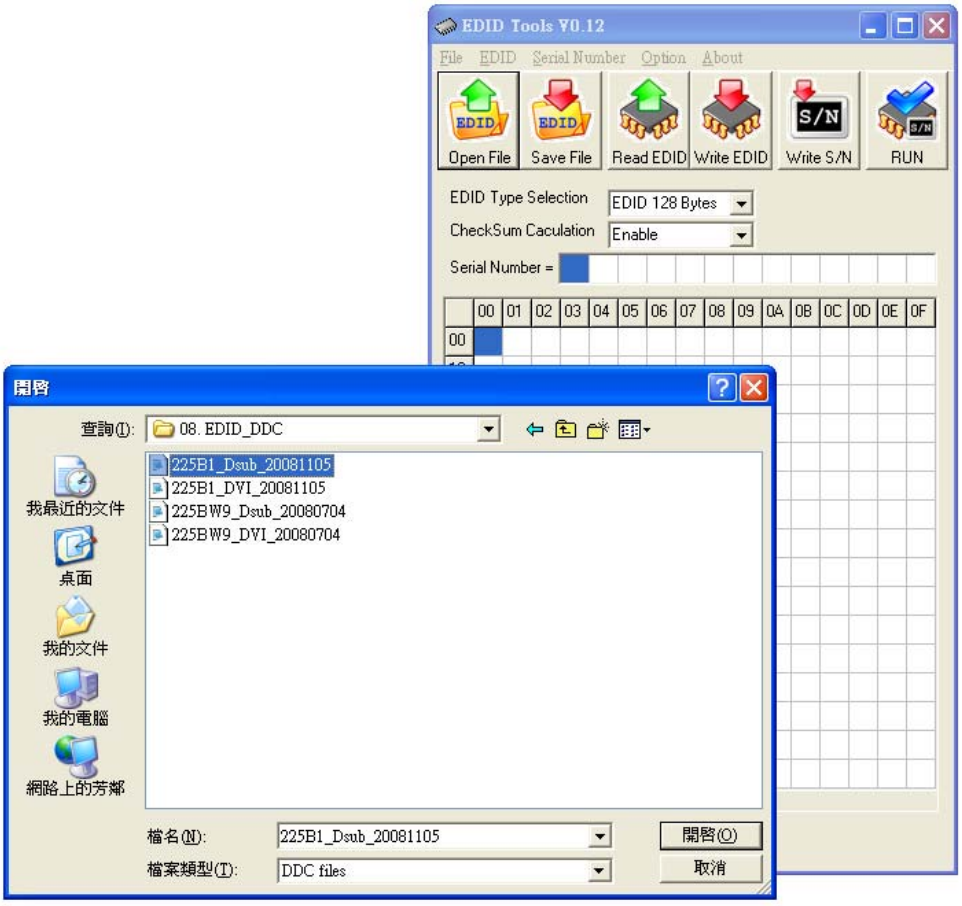



Fig.5

# DDC Instructions

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

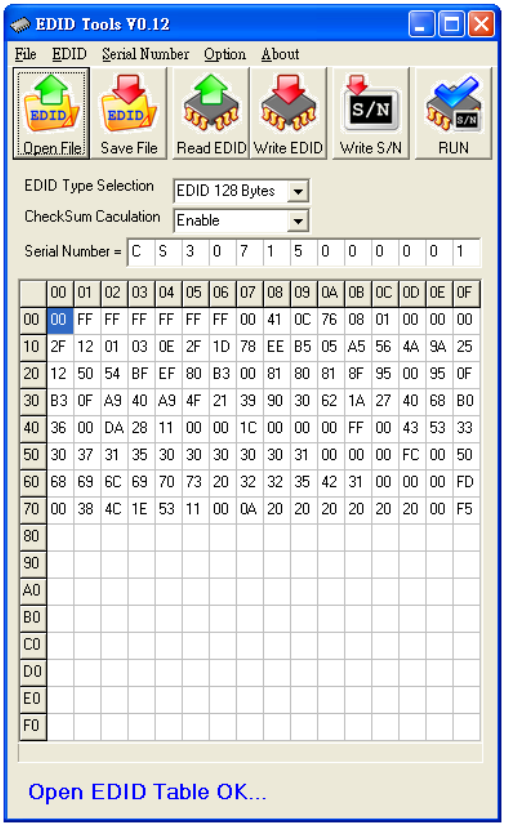



Fig.6

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

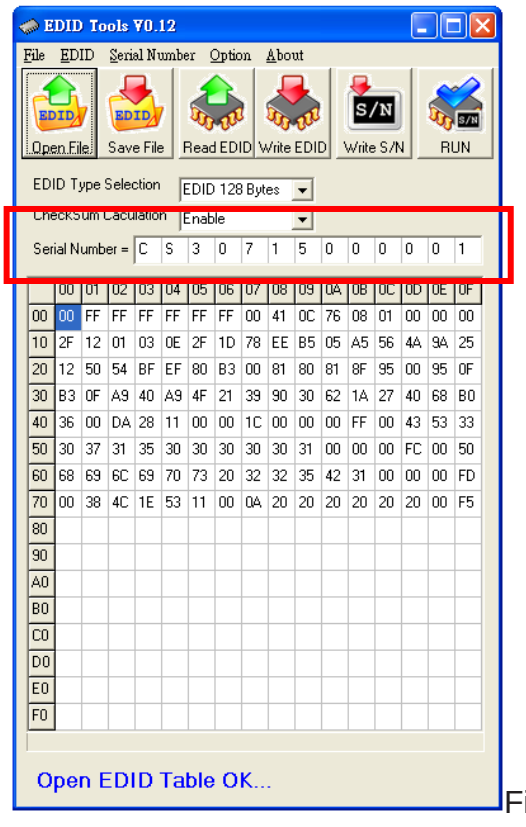



Fig.7

# DDC Instructions

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

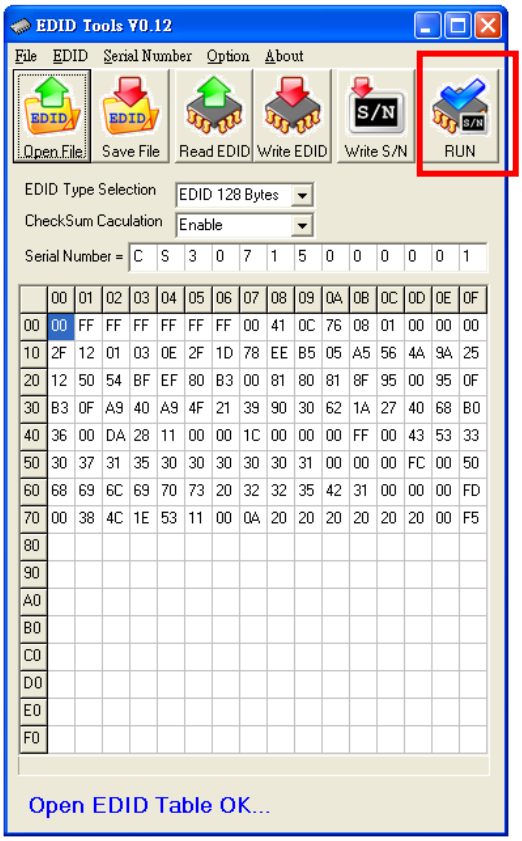



Fig.8

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

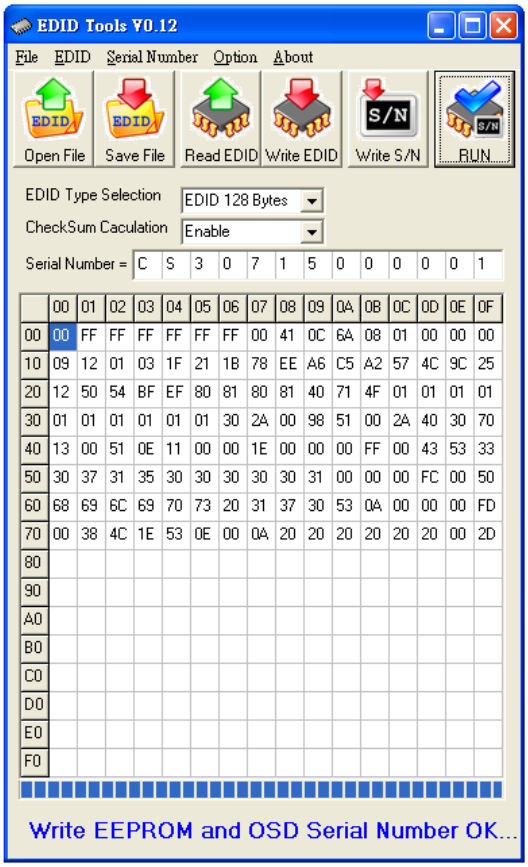



Fig.9

# DDC Instructions

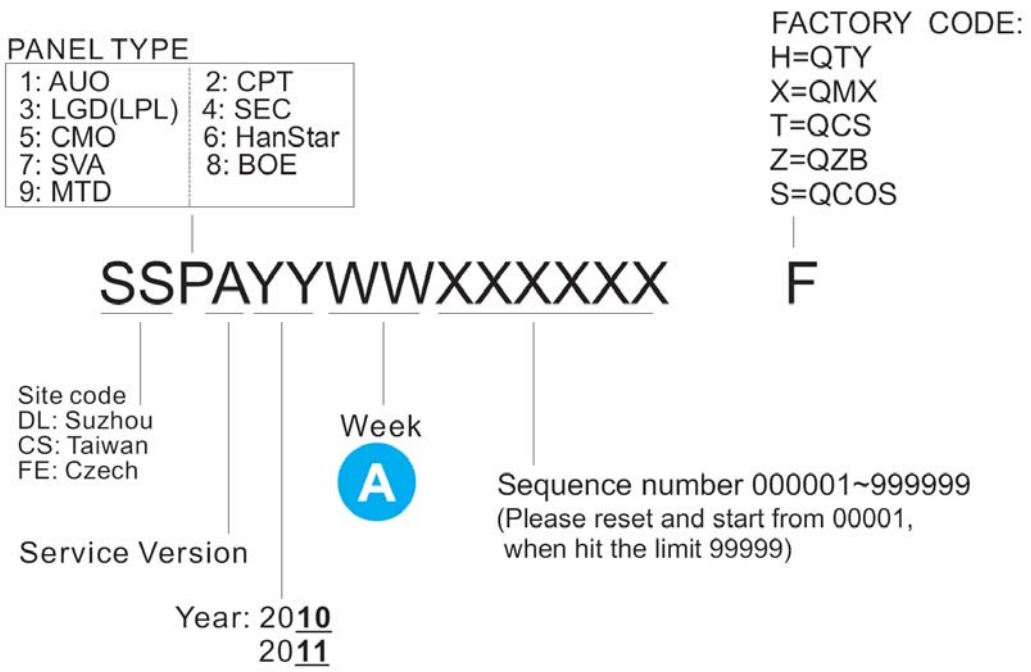
8. Press Monitor Menu Key to check OSD Serial number is the same as PI-EDID write data as shown in Fig.10

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: 51  C0  D2  04  00  00  0A  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  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  15  00  0A
120: 20  20  20  20  20  20  00  A4
```

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: Analog
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, 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
<-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: 210 MHz
<-x-Detailed Timing Descriptions-x->
Extension Flag: 00
Checksum: A4

# 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: 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

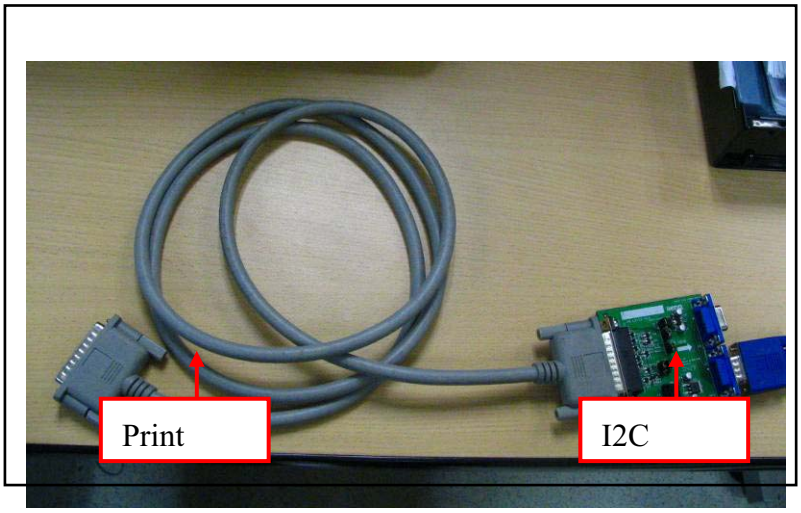
## 1. Hardware Requirement:

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

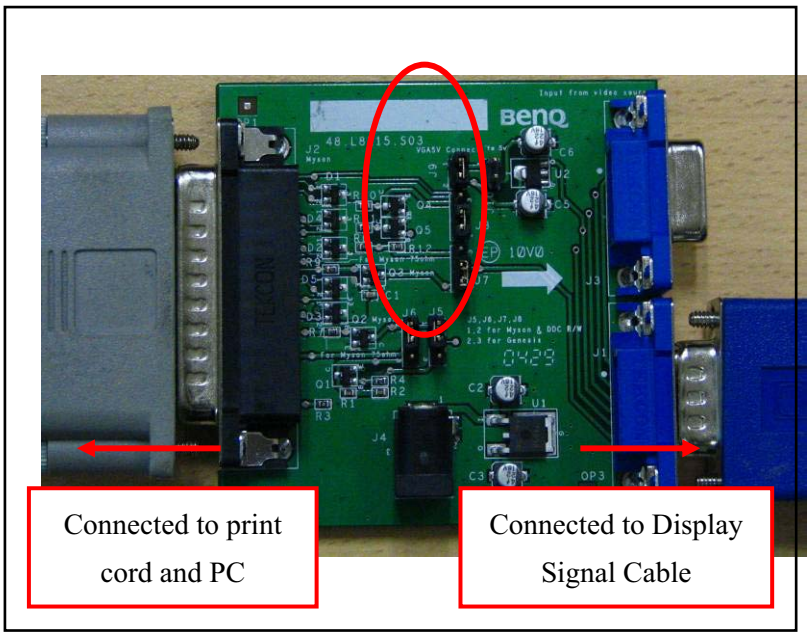
1.2. DSUB VGA cables x 2

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

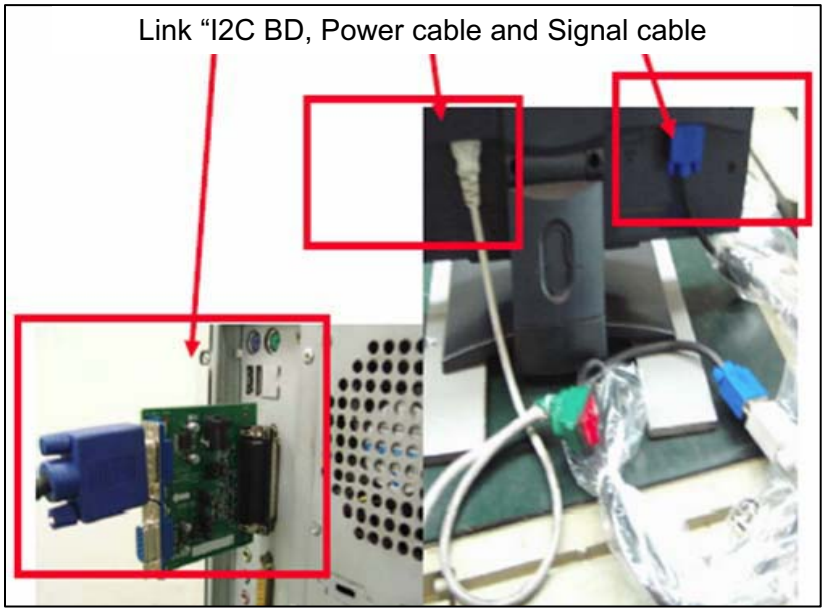
1.4. PC or Notebook with parallel (printer) port x1.




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

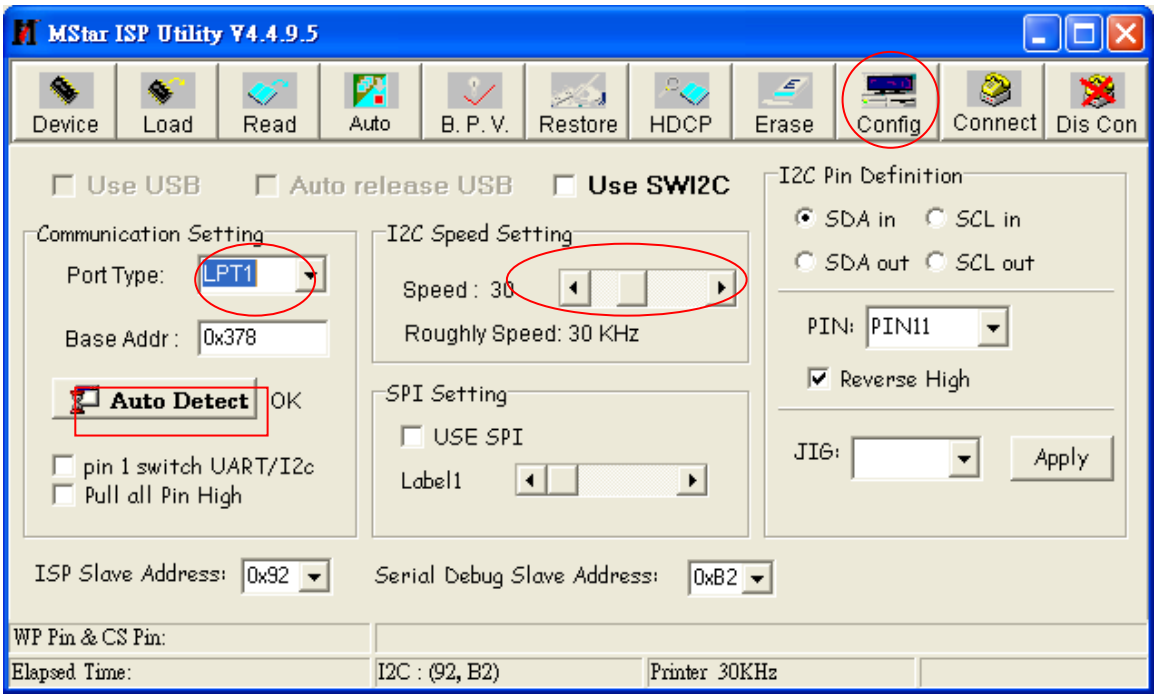
ISP Tool 4.4.9.5

DebugTool_V6.7_200

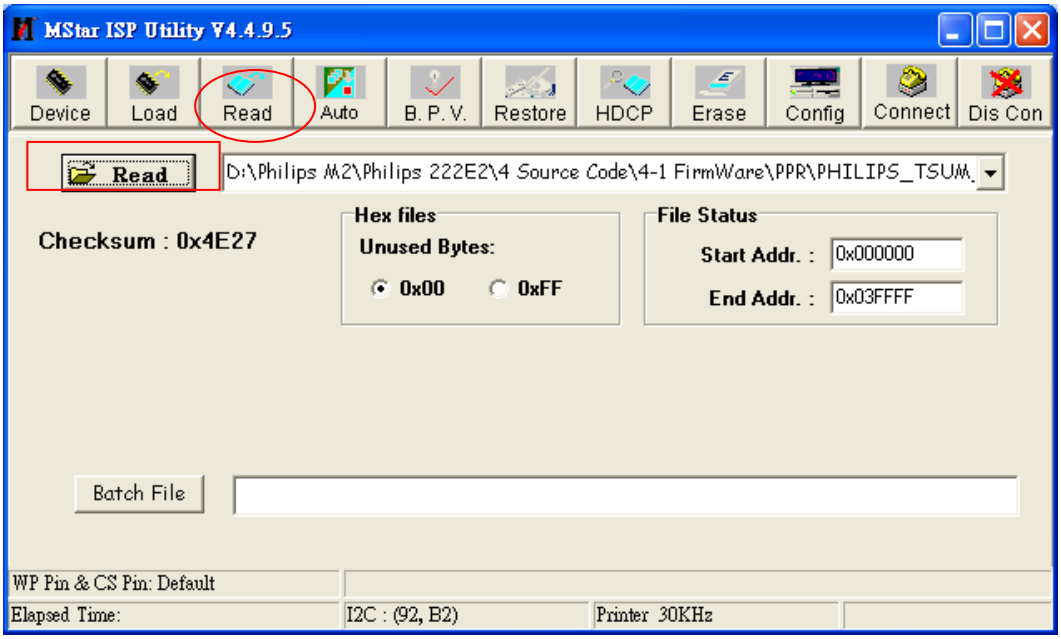
D:\Tool\MSTAR\
ISP_Tool 4.4.9.5.rar

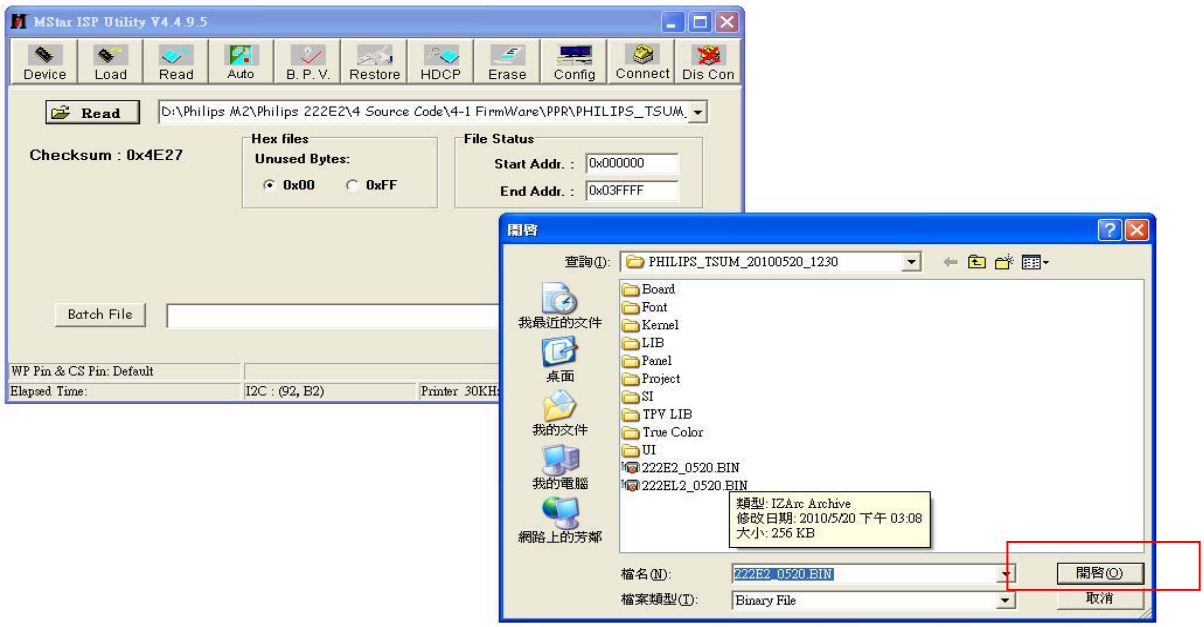
Step 1: Press MStar ISP Tool

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

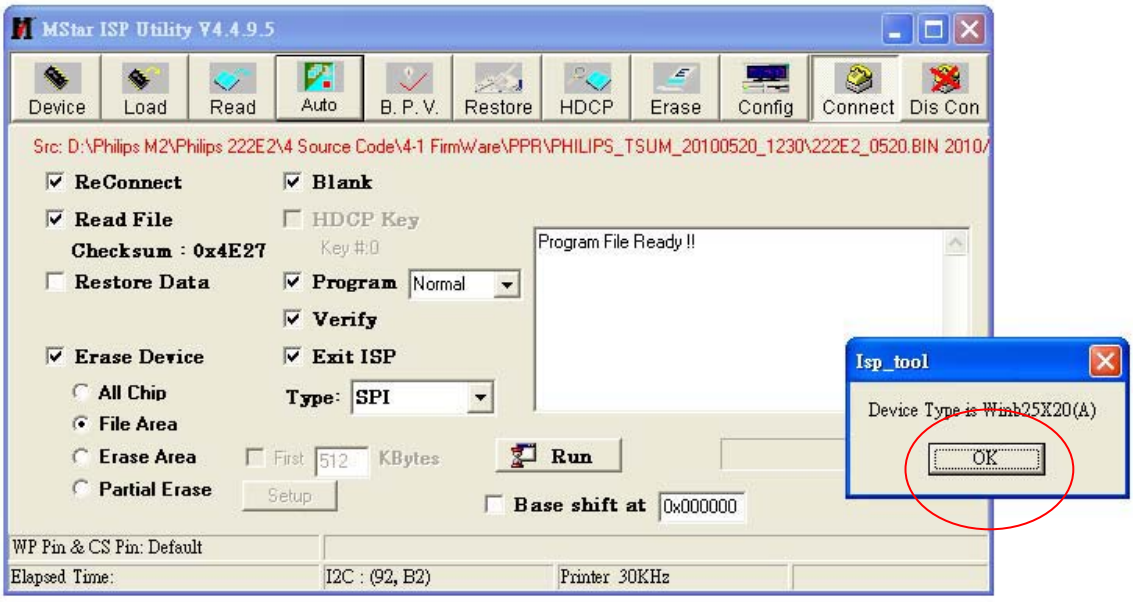


# Firmware Upgrade for CPU



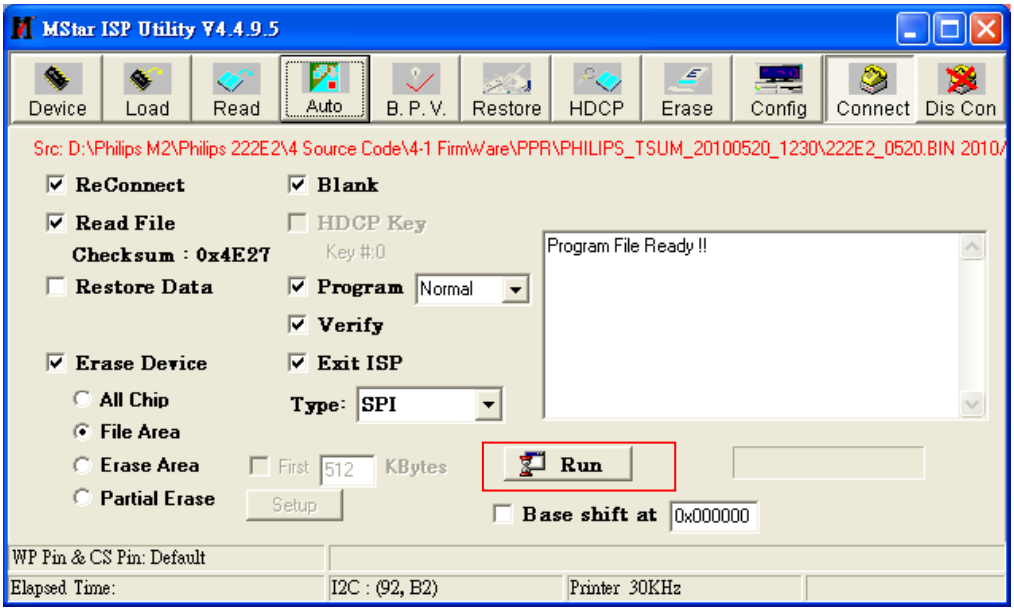




Step 4: Choose Option “Connect”, the tool will show FLASH type as below, then press “OK”

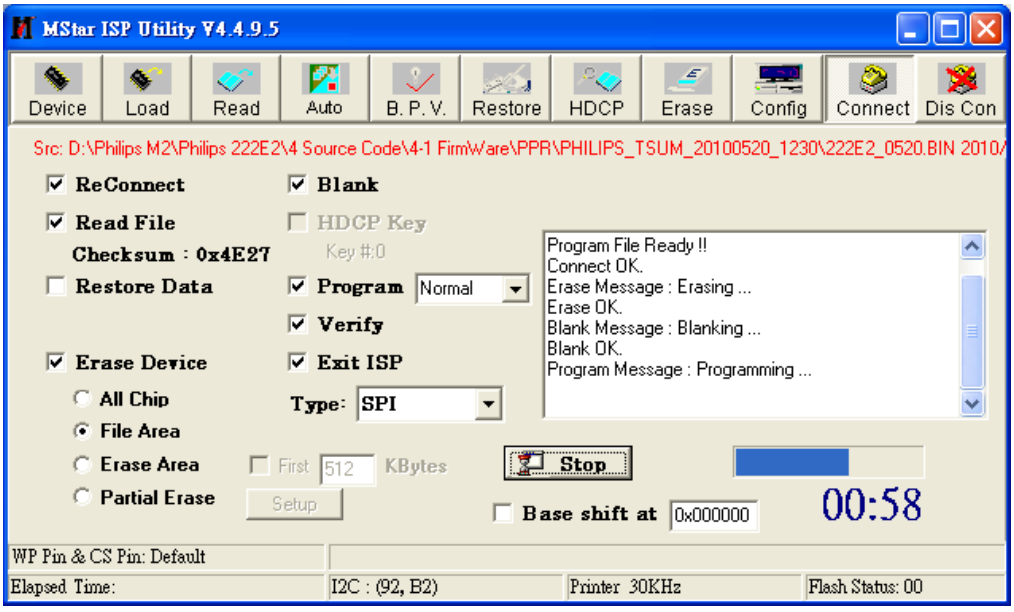


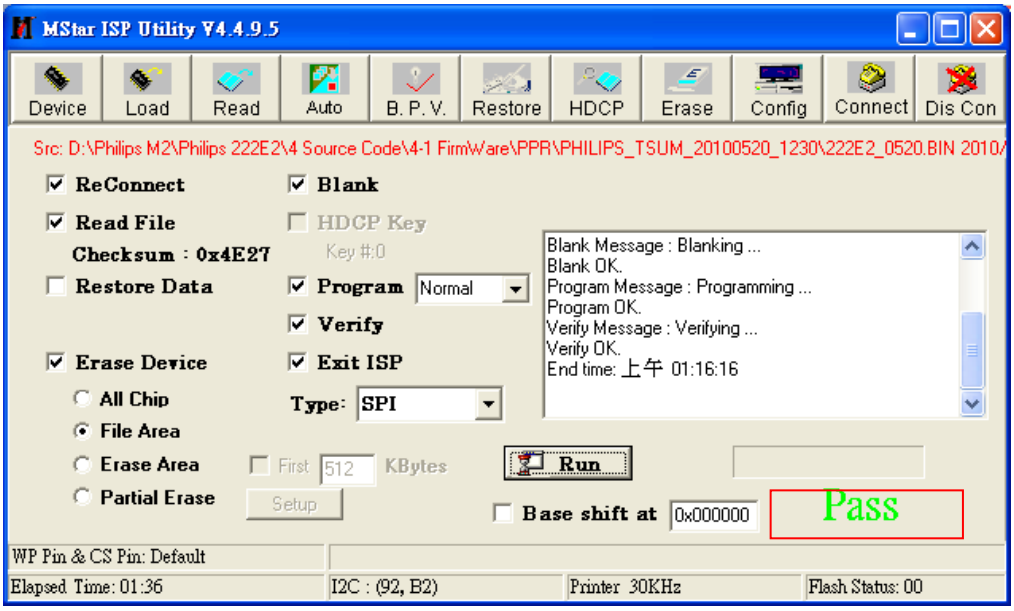
# Firmware Upgrade for CPU

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”

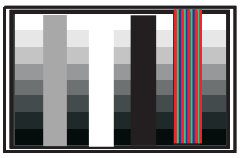
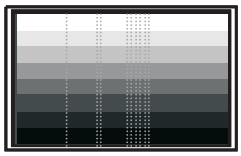
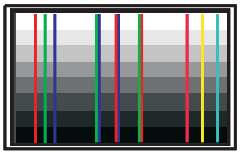
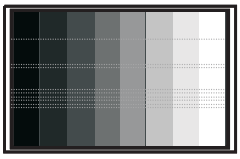
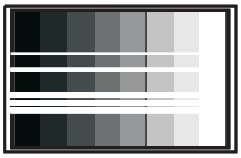
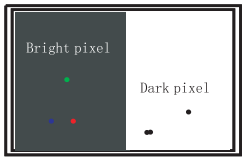
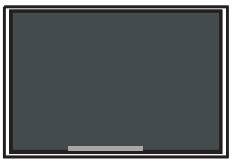
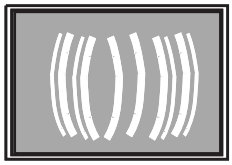
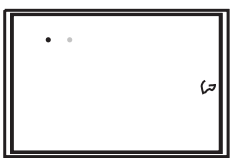


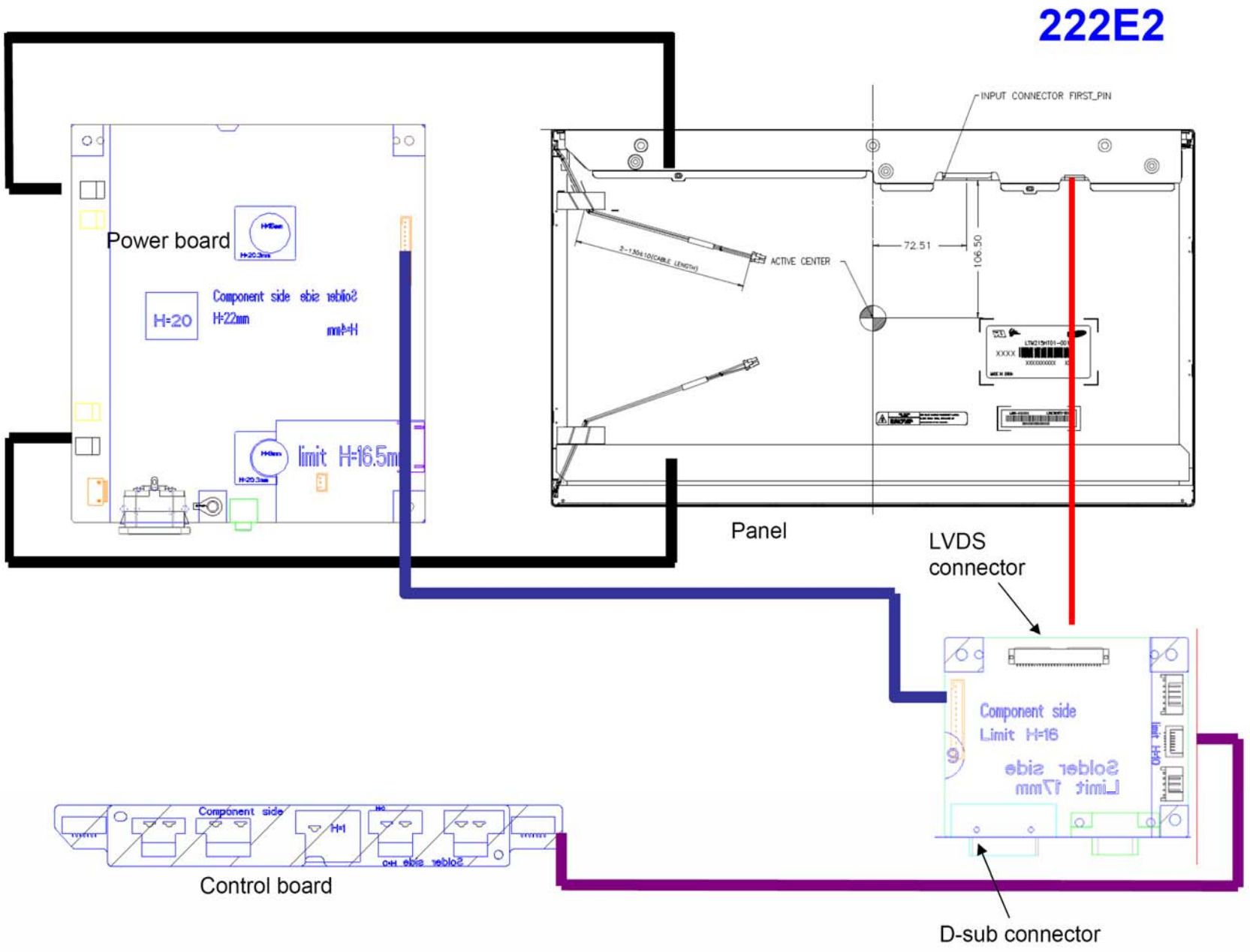
# Failure Mode Of Panel

Quick reference for failure mode of LCD panel

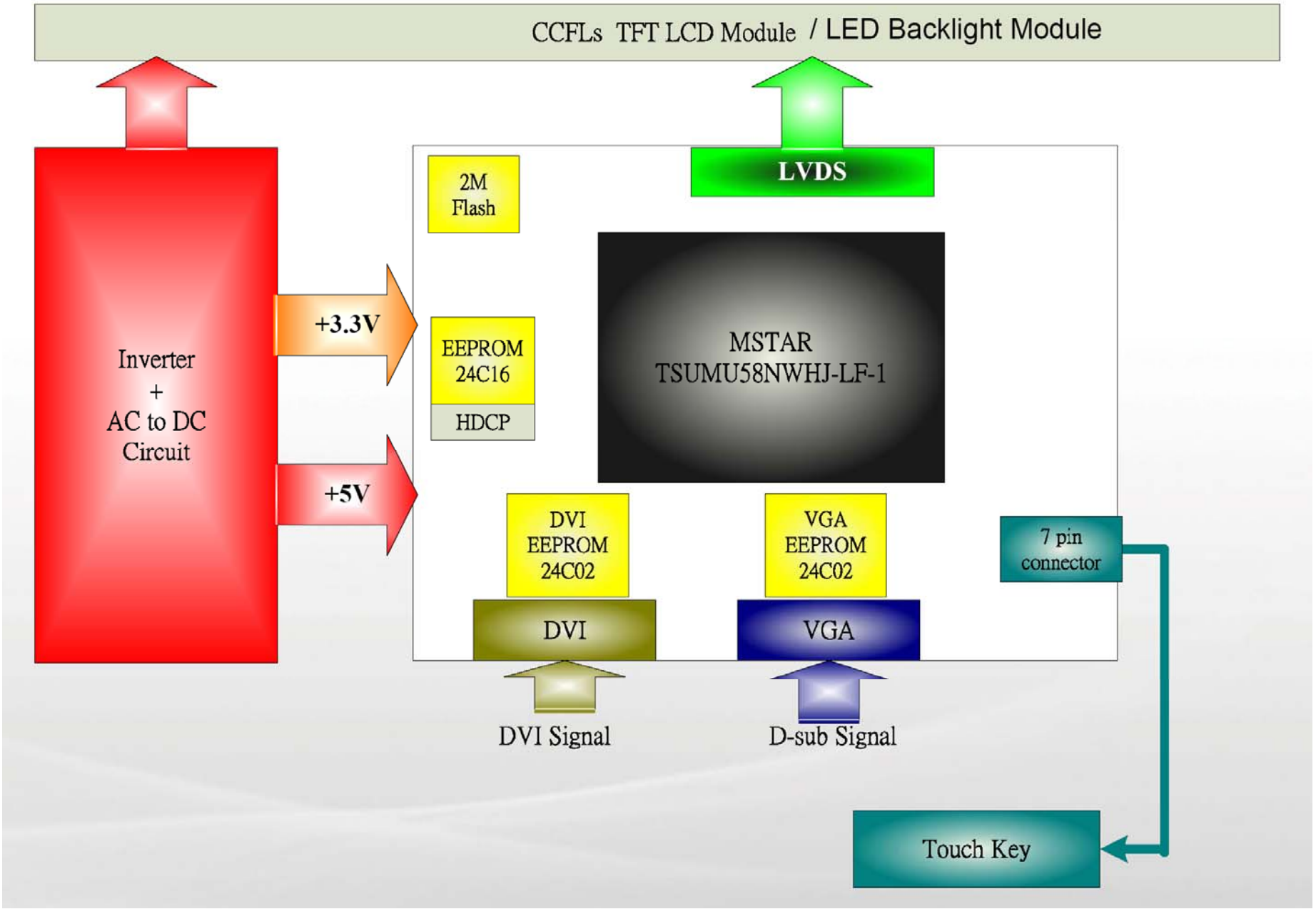
this page presents problems that could be made by LCD panel.
It is not necessary to repair circuit board. Simply follow the mechanical instruction on this manual to eliminate failure by replace LCD panel.

| 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 |  |

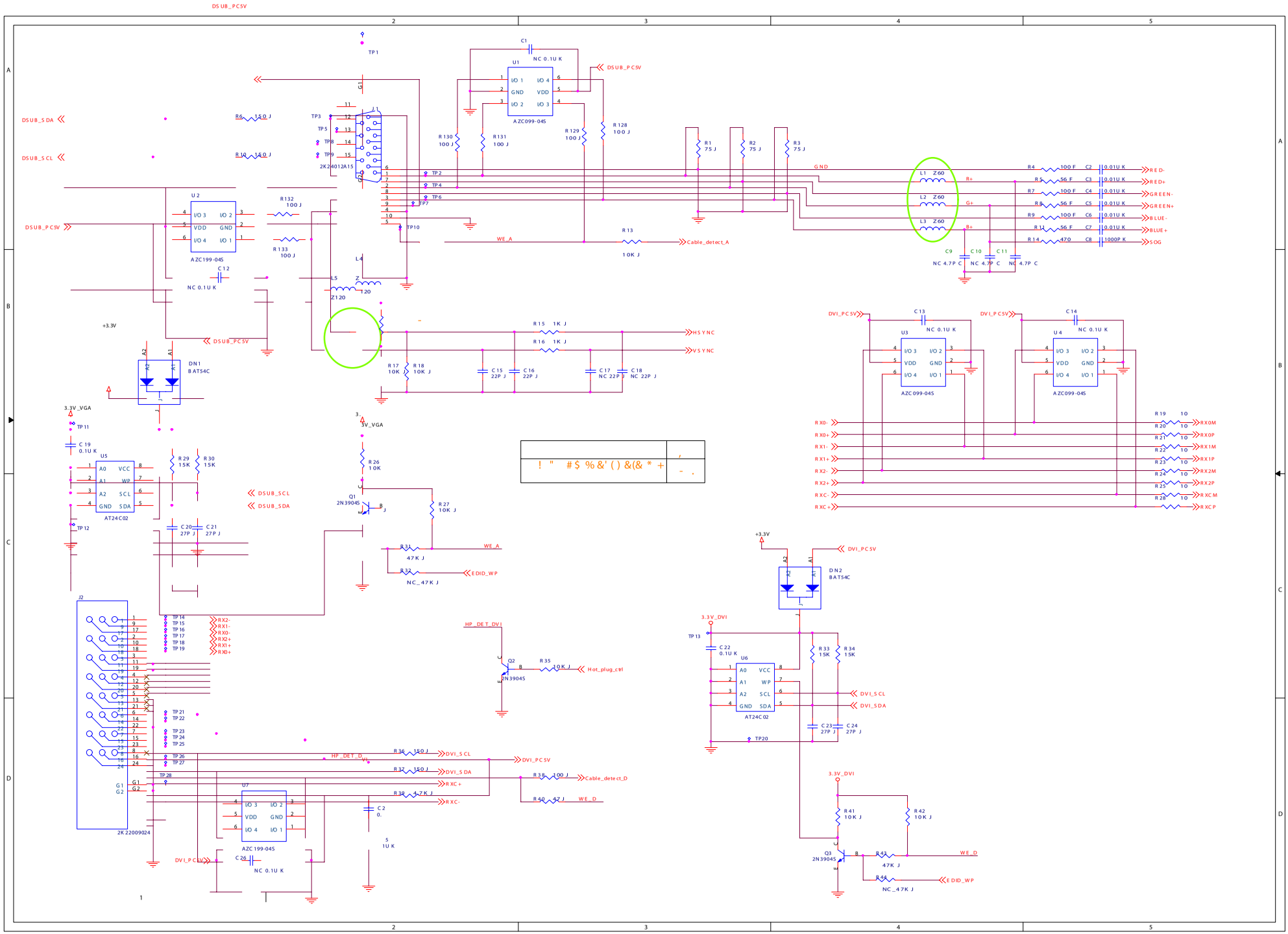
# Wiring Diagram



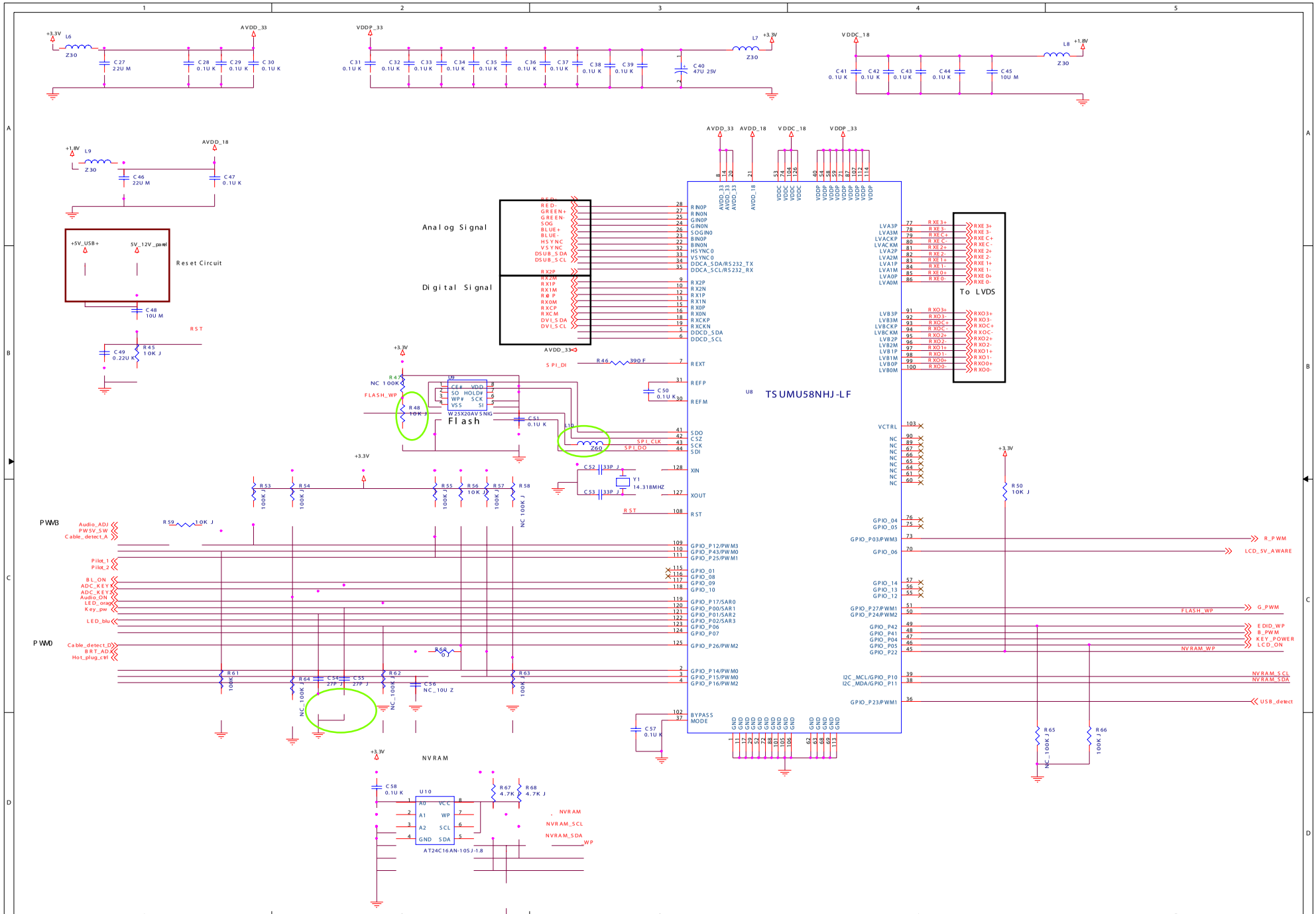
# Block Diagram



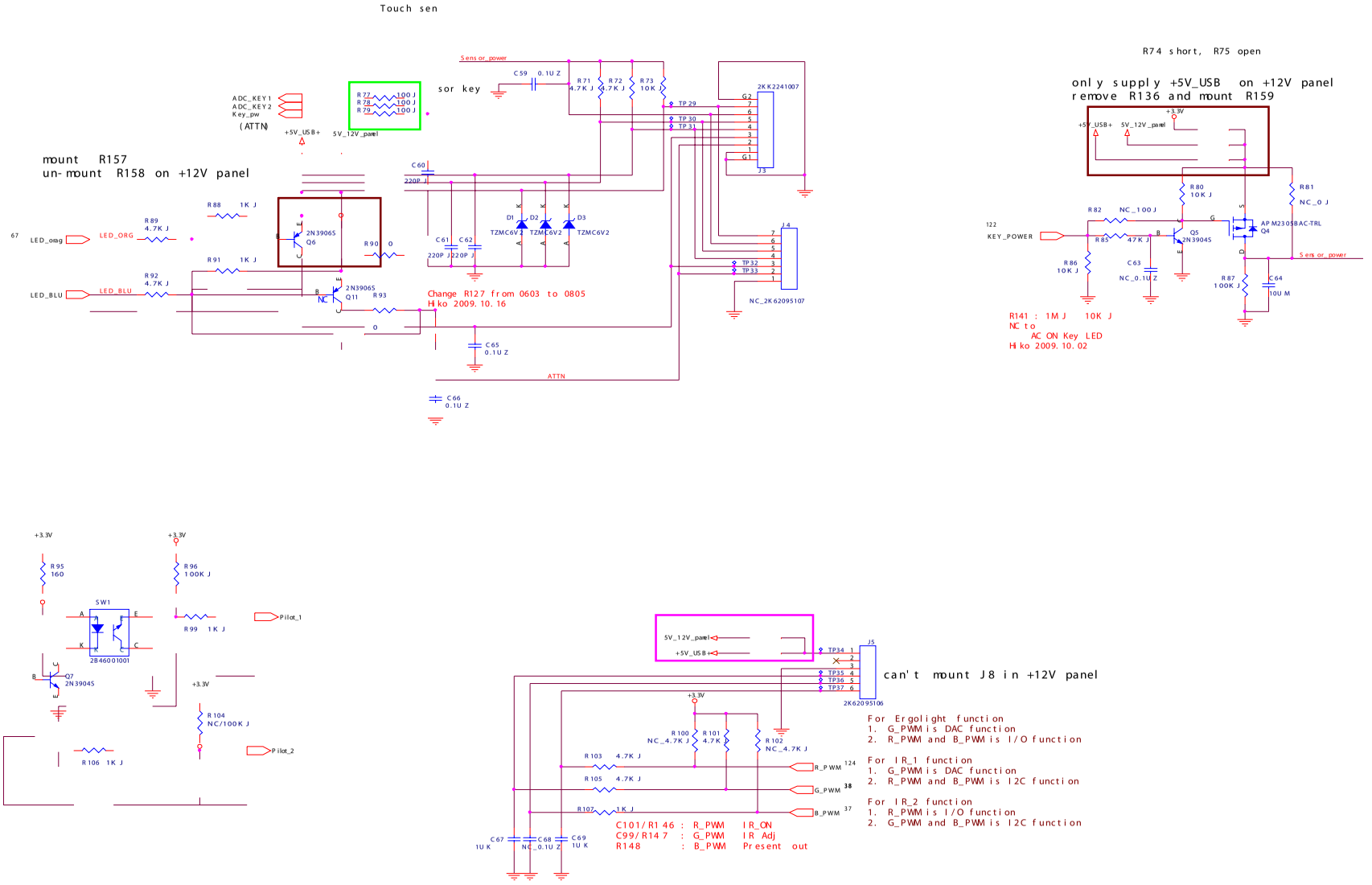
# Scalar Diagram & C.B.A



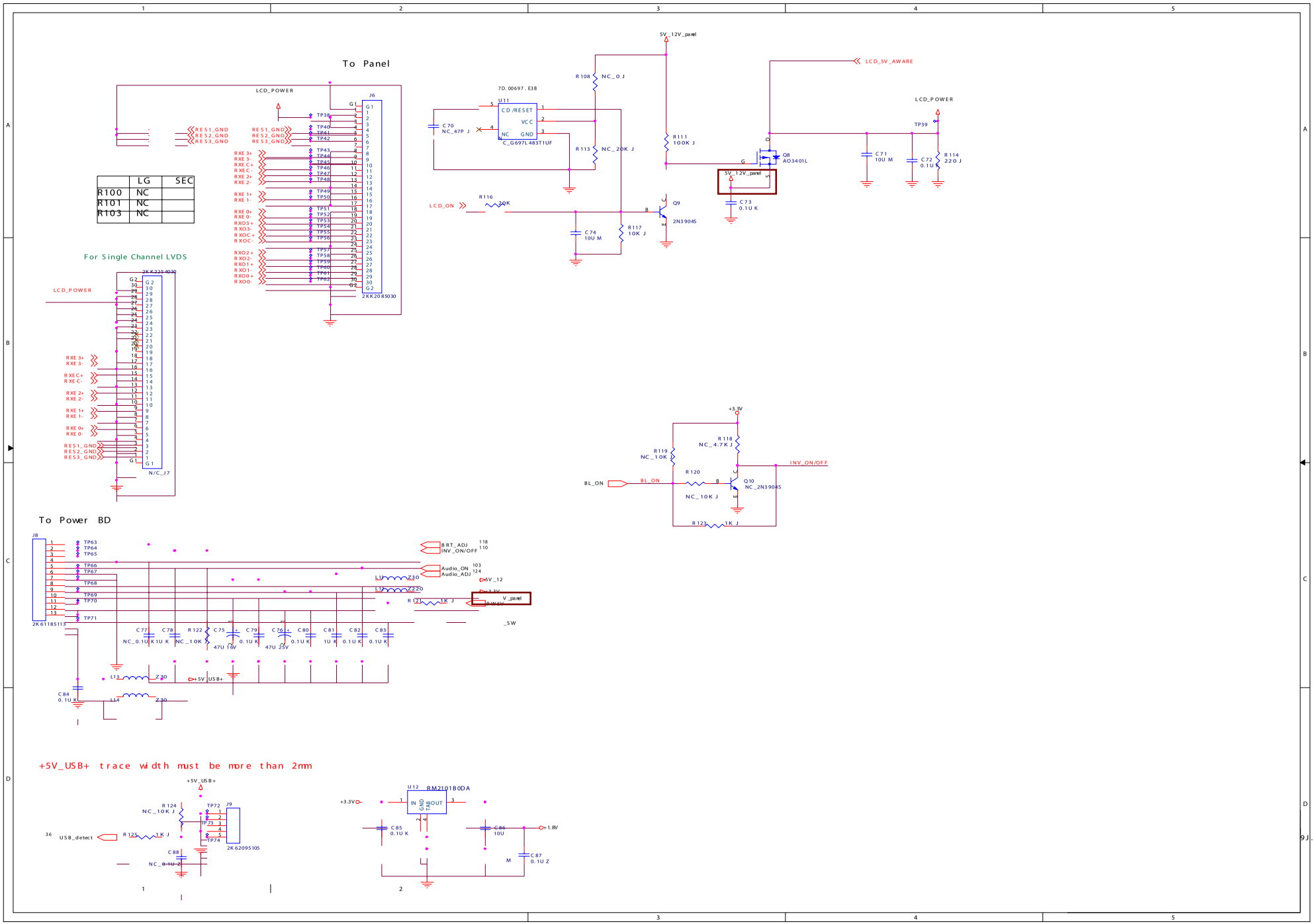
# Scalar Diagram & C.B.A



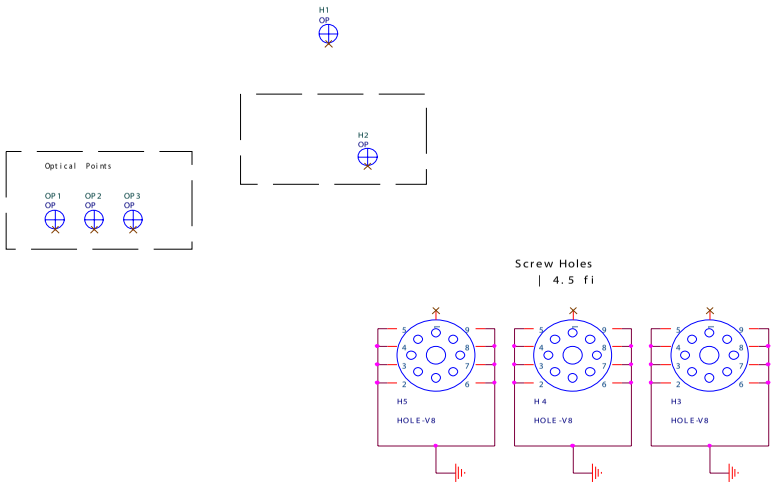
# Scalar Diagram & C.B.A



# Scalar Diagram & C.B.A



# Scalar Diagram & C.B.A

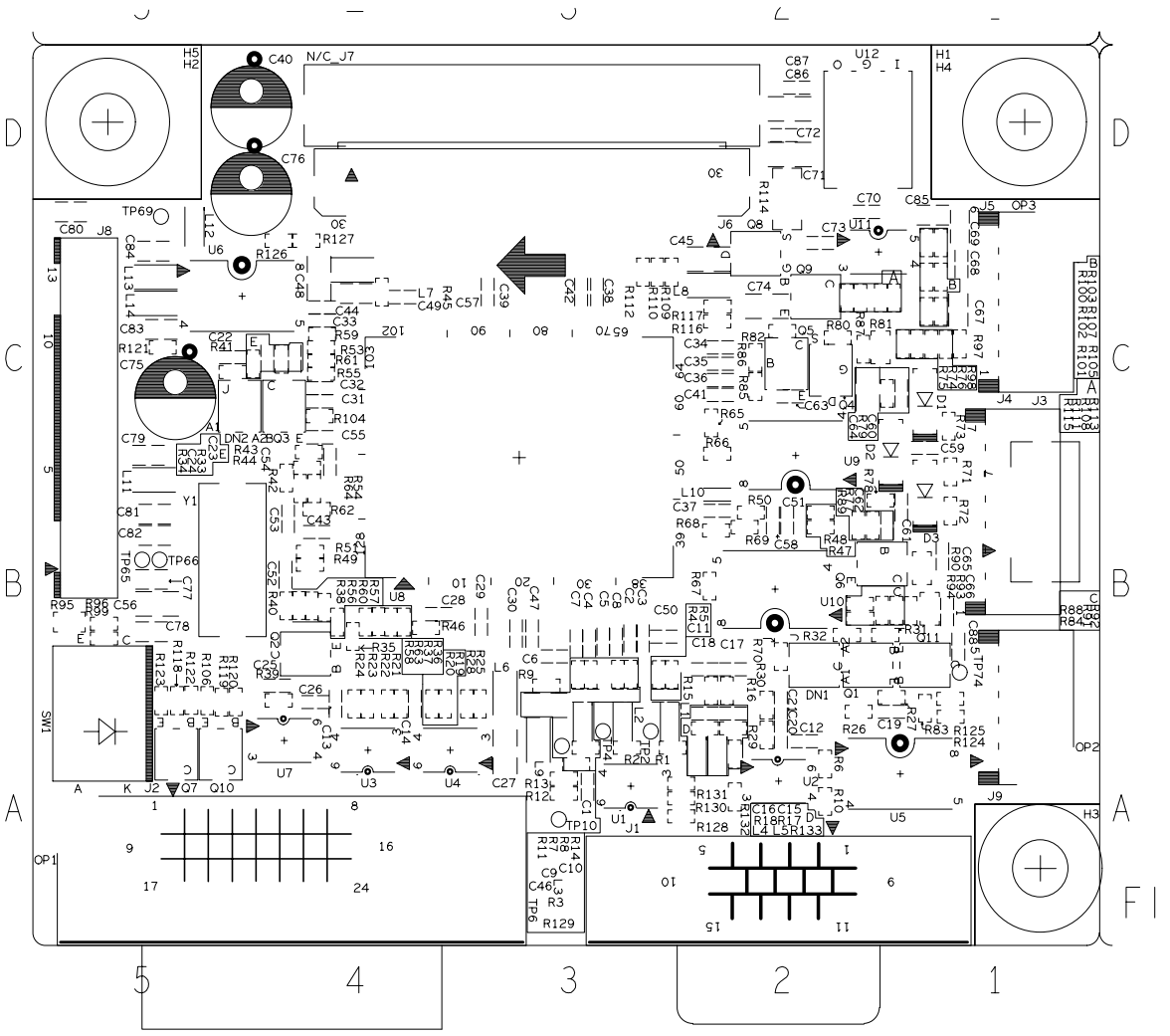


# Scalar Diagram & C.B.A

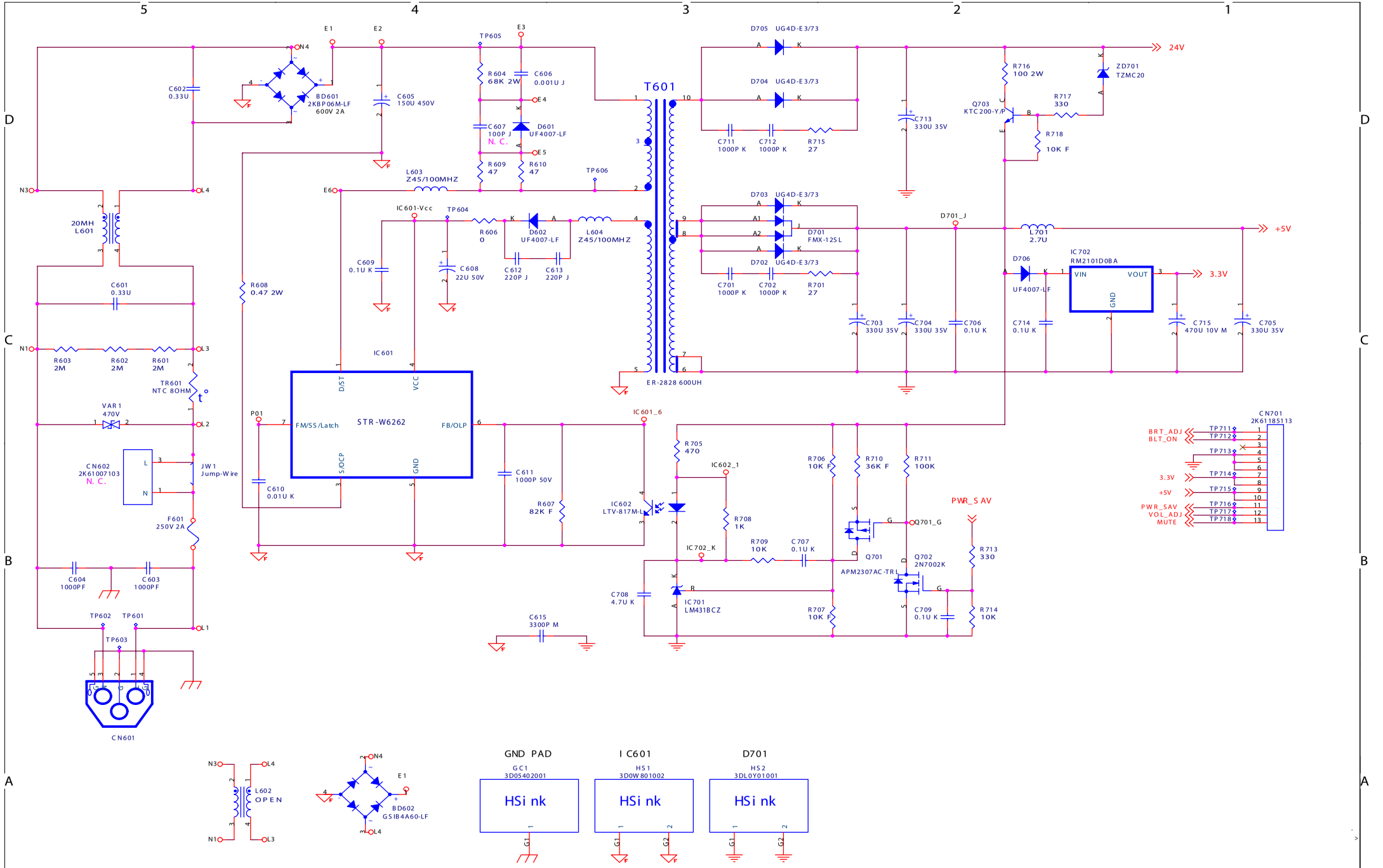
1. R74 short, R75 open
2. R90 75ohm to 0 ohm
3. Pin70 to LCD_5V_AWARE
4. LED_BLU/Key_pw change
5. change C75/C76 from 0J.47612.089 to 0J.4761D.20V
6. Change C40 from 0J.22612.21B to 0J.4761D.20V
7. C15/16/17/18 27p to 22p
8. Use SMD type for Single channel LVDS

# Scalar Diagram & C.B.A

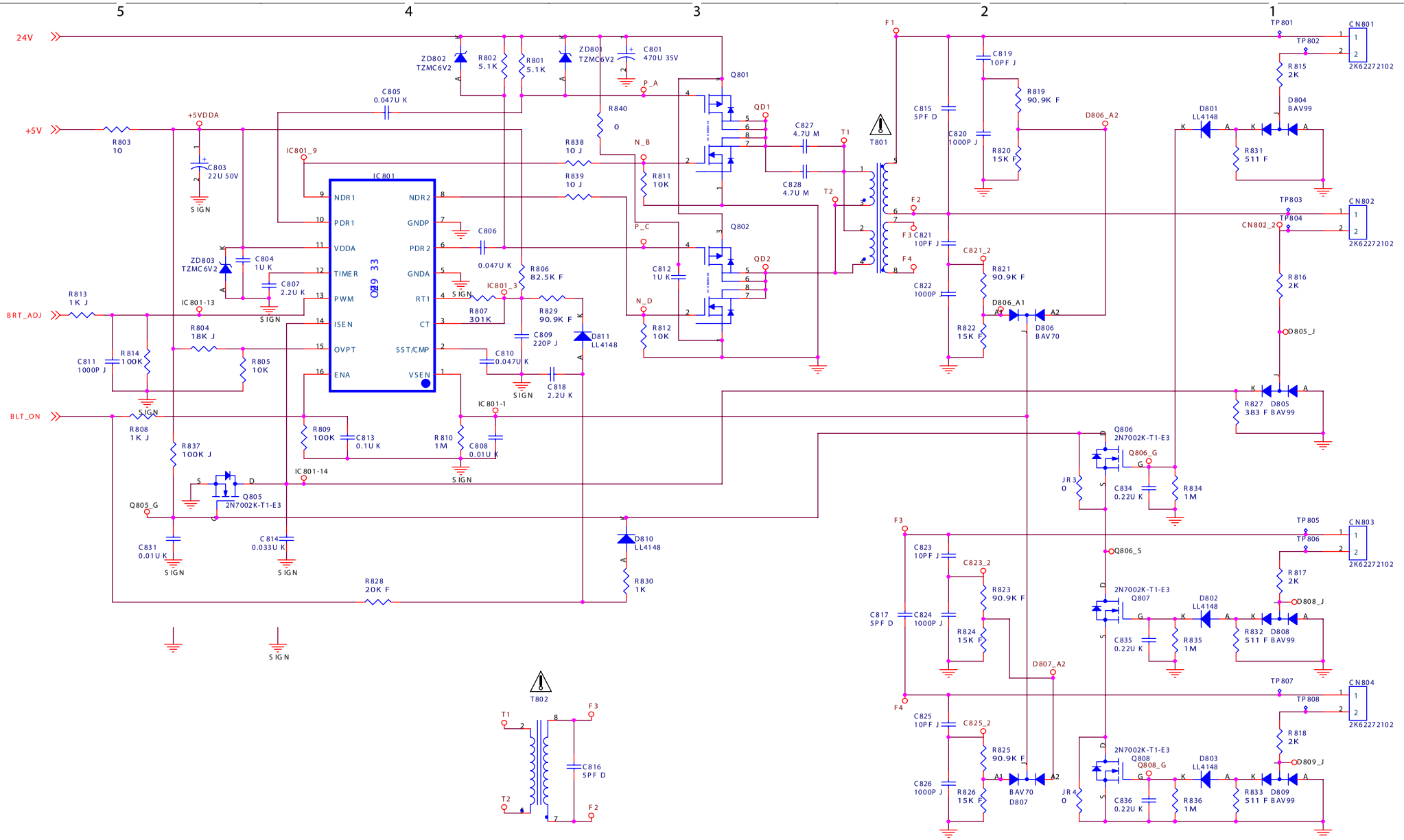
```
Information
V1:  688.98
V2:  1377.95
V3:  2066.93
X1:  2693.07
X2:  2019.84
X3:  1346.56
X4:  673.28

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:C99
A2:C12      B4:R49    C4:C97
A3:U4       B4:R46    C4:C95
A3:U1       B4:R40    C4:C54
A3:R129     B4:R39    C4:C44
A3:R3       B4:R38    C4:C33
A3:R2       B4:R37    C4:C32
A3:R13      B4:R36    C4:C22
A3:R12      B4:R35    C4:C21
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    D1:C67
B1:R124     B5:R96    D2:U12
B1:Q11      B5:R123   D2:U11
B1:J4       B5:R122   D2:R114
B1:J3       B5:R120   D2:Q8
B1:C88      B5:R119   D2:J6
B1:C66      B5:R118   D2:C86
B1:C65      B5:R106   D2:C71
B1:C62      B5:C56    D2:C45
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   D4:C40
B2:R47      C1:R105   D5:L12
B2:R32      C1:R102   D5:C84
B2:R31      C1:R101   D5:C80
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
```



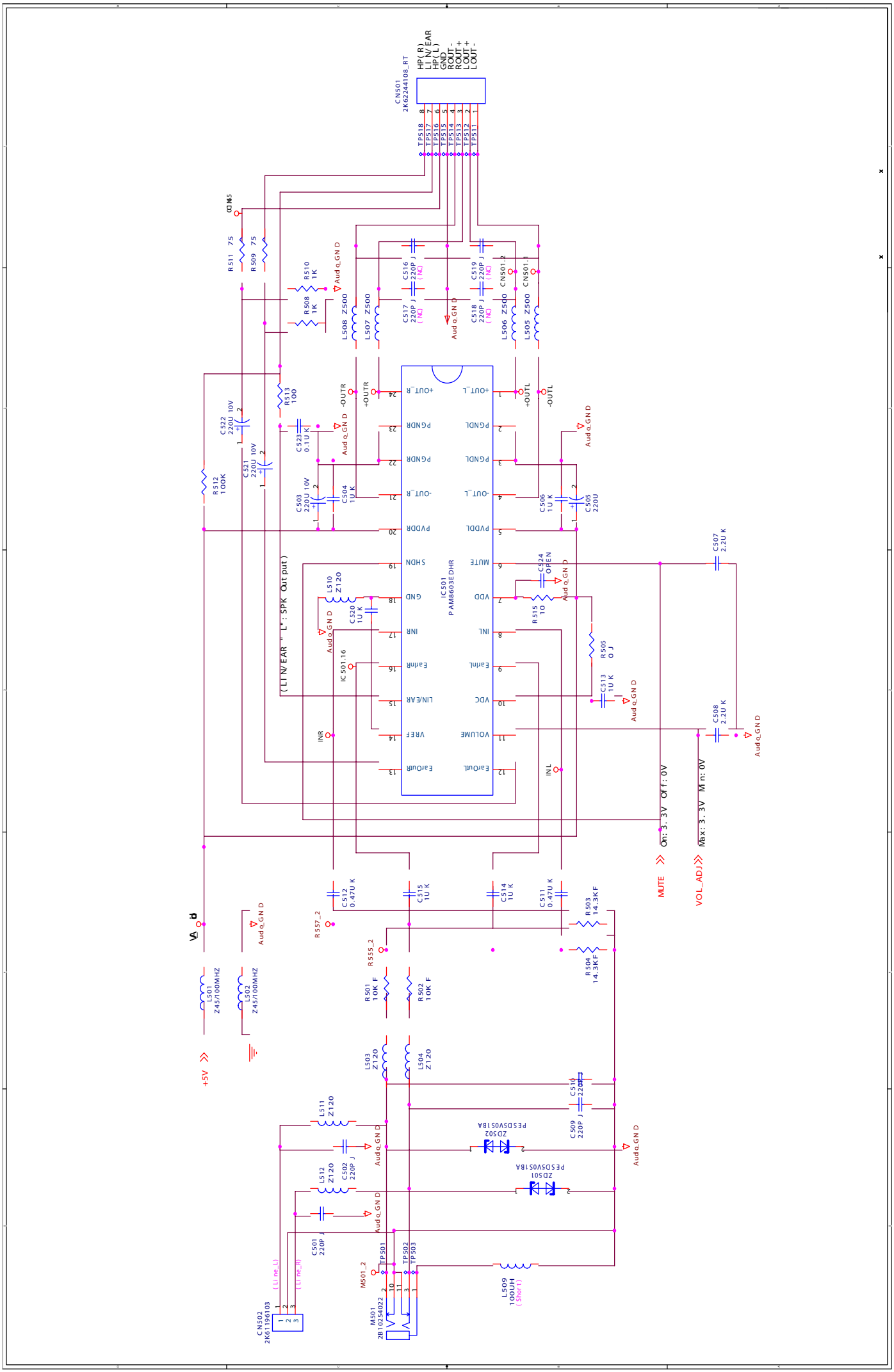
# Power Diagram & C.B .A



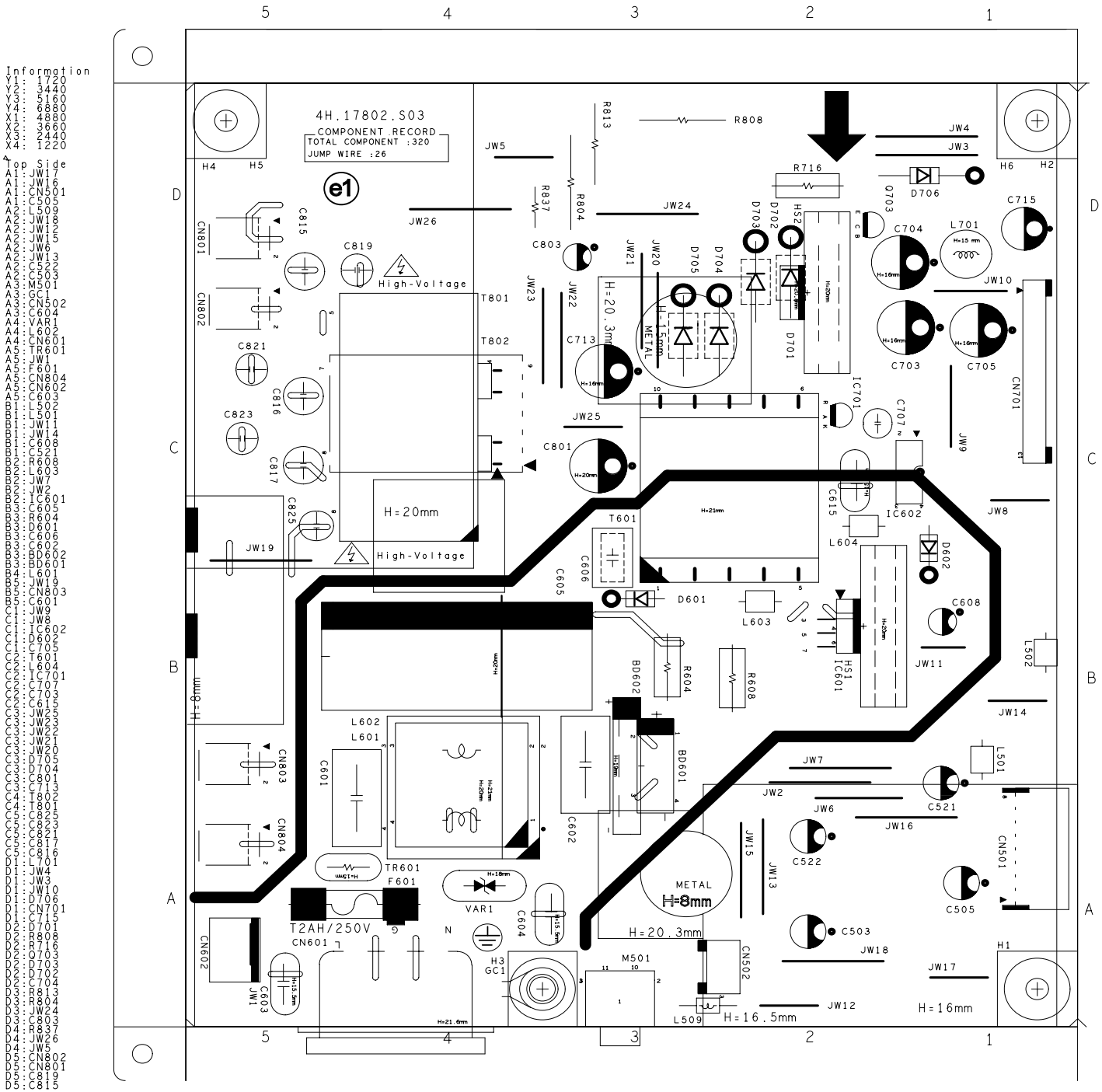
# Power Diagram & C.B .A



# Power Diagram & C.B .A



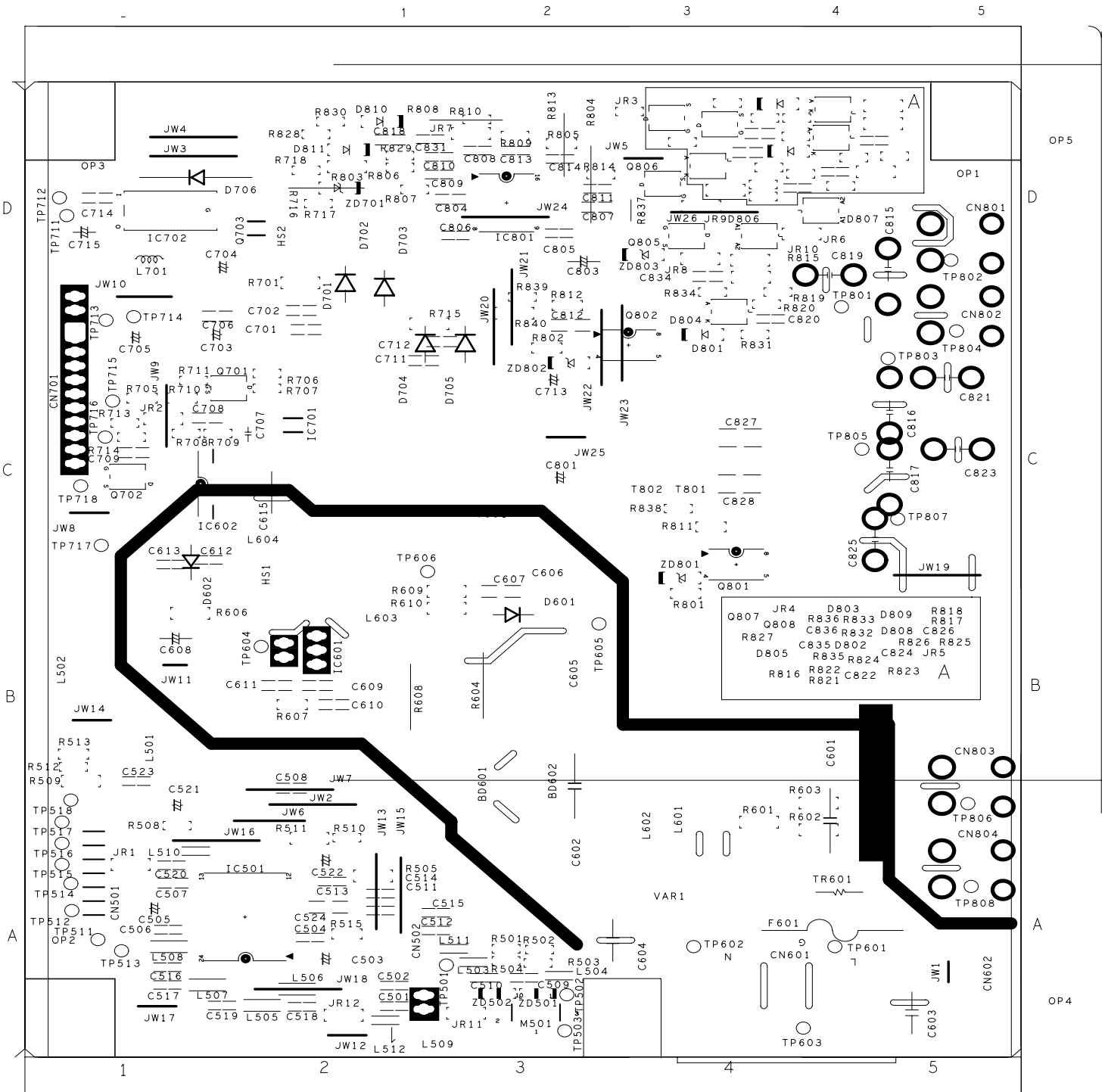
# Power Diagram & C.B .A




Information
Y1: 1720
Y2: 3440
Y3: 5160
Y4: 6880
X1: 4880
X2: 3660
X3: 2440
X4: 1220

Top Side
A1:JW17
A1:JW16
A1:CN501
A1:C505
A2:L509
A2:JW18
A2:JW12
A2:JW15
A2:JW6
A2:JW13
A2:C522
A2:C503
A3:M501
A3:GC1
A3:CN502
A3:C604
A4:VAR1
A4:L602
A4:CN601
A5:TR601
A5:JW1
A5:F601
A5:CN804
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:C605
B3:R604
B3:D601
B3:C606
B3:C602
B3:BD602
B3:BD601
B4:L601
B5:JW19
B5:CN803
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:JW25
C3:JW23
C3:JW22
C3:JW21
C3:JW20
C3:D705
C3:D704
C3:C801
C3:C713
C4:T802
C4:T801
C5:C825
C5:C823
C5:C821
C5:C817
C5:C816
D1:L701
D1:JW4
D1:JW3
D1:JW10
D1:D706
D1:CN701
D1:C715
D2:D701
D2:R808
D2:R716
D2:Q703
D2:D703
D2:D702
D2:C704
D3:R813
D3:R804
D3:JW24
D3:C803
D4:R837
D4:JW26
D4:JW5
D5:CN802
D5:CN801
D5:C819
D5:C815

# Power Diagram & C.B .A

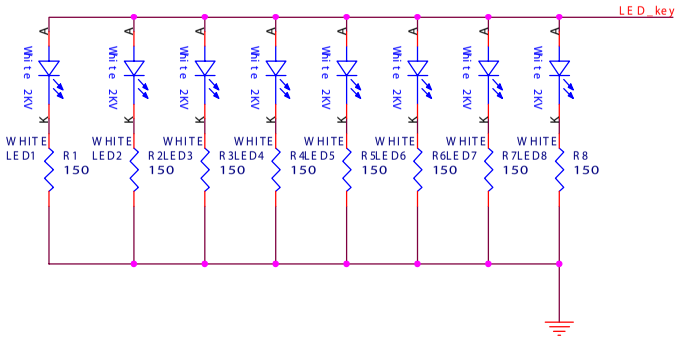


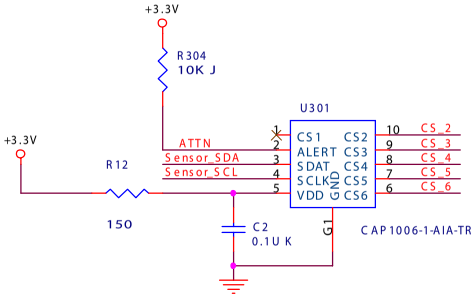
Information
Y1: 1720
Y2: 3440
Y3: 5160
Y4: 6880
X1: 4880
X2: 3660
X3: 2440
X4: 1220

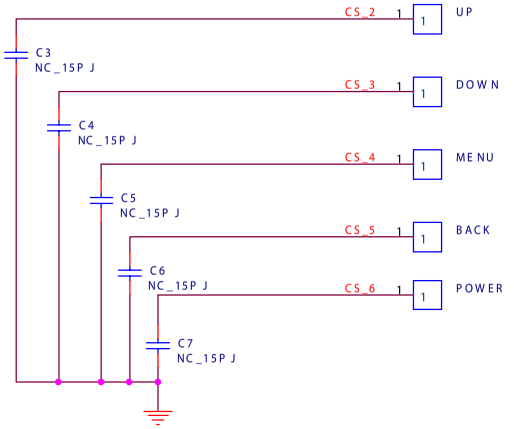
Bottom Side

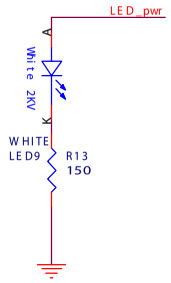
D1:IC702 A1:L508
D1:C714 A1:L507
D1:C706 A1:L510
D2:ZD701 A1:JR1
D2:R803 A1:R508
D2:R701 A1:C507
D2:R718 A1:C520
D2:R830 A1:C519
D2:R829 A1:C517
D2:R828 A1:C516
D2:R807 A1:C506
D2:R806 A2:R515
D2:R717 A2:L506
D2:D811 A2:L505
D2:D810 A2:L512
D2:C702 A2:JR12
D2:C818 A2:R511
D3:R805 A2:R505
D3:R804 A2:IC501
D3:JR3 A2:C524
D3:R715 A2:C522
D3:JR7 A2:C502
D3:R839 A2:C501
D3:R814 A2:C518
D3:R810 A2:C514
D3:R809 A2:C513
D3:IC801 A2:C512
D3:C812 A3:ZD502
D3:C807 A3:ZD501
D3:C804 A3:L511
D3:C831 A3:L504
D3:C814 A3:L503
D3:C813 A3:JR11
D3:C811 A3:R504
D3:C810 A3:R503
D3:C809 A3:R502
D3:C808 A3:R501
D3:C806 A3:C515
D3:C805 A3:C512
D4:ZD803 A3:C510
D4:Q808 A3:C509
D4:Q807 A4:R602
D4:Q806 A4:R601
D4:Q805 B1:R513
D4:R816 B1:R606
D4:R815 B1:R509
D4:JR9 B1:R512
D4:JR8 B1:C523
D4:JR6 B2:R607
D4:JR10 B2:C611
D4:JR4 B2:C610
D4:JR3 B2:C609
D4:R836 B2:C508
D4:R835 B3:R610
D4:R834 B3:R609
D4:R833 B3:C607
D4:R832 B4:ZD801
D4:R827 B4:R801
D4:R824 B4:R603
D4:R822 C1:R710
D4:R821 C1:R705
D4:R820 C1:Q702
D4:R819 C1:JR2
D4:D807 C1:R714
D4:D806 C1:R713
D4:D805 C1:R711
D4:D804 C1:R709
D4:D803 C1:R708
D4:C836 C1:C709
D4:C835 C1:C708
D4:C824 C1:C613
D5:R818 C1:C612
D5:R817 C2:R707
D5:JR5 C2:C711
D5:R826 C2:C701
D5:R825 C3:ZD502
D5:R823 C3:R802
D5:D809 C3:C712
D5:D808 C4:R811
D5:C826 C4:Q802
C4:Q801
C4:R838
C4:R831
C4:D801

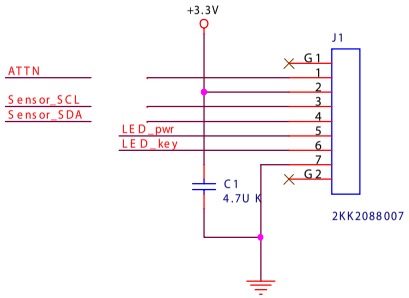
# Control Diagram & C.B.A.



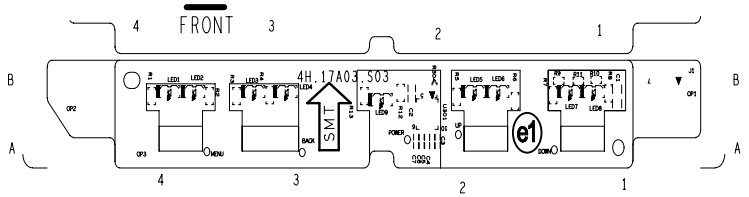
| | CS2 | CS3 | CS4 | CS5 | CS6 |
|---|---|---|---|---|---|
| #043 | 121 | 116 | 120 | 123 | 94 |
| #026 | 114 | 114 | 109 | 126 | 94 |
| #039 | 127 | 118 | 124 | 126 | 94 |

# 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- 222E2**
**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 500K: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**


**1 FOREWORD ..... 6**

**2 PRODUCT PROFILE ..... 6**

**2.1 EDID HEADER ..... 6**

**2.2 LCD ..... 6**

**2.3 SCANNING FREQUENCIES ..... 7**

**2.4 AMBIENT TEMPERATURE: 0 °C - 40 °C ..... 8**

**3 ELECTRICAL CHARACTERISTICS ..... 8**

**3.1 INTERFACE SIGNALS ..... 8**

**3.2 INTERFACE ..... 8**

**3.3 TIMING REQUIREMENT ..... 10**

**3.4 HORIZONTAL SCANNING ..... 12**

**3.5 VERTICAL SCANNING ..... 12**

**3.6 POWER INPUT CONNECTION ..... 12**

**3.7 POWER MANAGEMENT ..... 12**

**3.8 VGA DISPLAY IDENTIFICATION ..... 12**

**3.9 DVI DISPLAY IDENTIFICATION ..... 12**

**3.10 USB SUPPORT ..... 13**

**3.11 DDC /CI SUPPORT AND SMART MANAGE/CONTROL ..... 13**

**3.12 HOT-KEY DEFINITION ..... 13**

**3.13 SMART CONTRAST (DYNAMIC CONTRAST RATIO) ..... 13**

**3.14 SMARTIMAGE ..... 13**

**4 VISUAL CHARACTERISTICS ..... 17**

**4.1 TEST CONDITIONS ..... 17**

**4.2 BRIGHTNESS ..... 17**

**4.3 IMAGE SIZE ..... 17**

# General Product Specification


**4.4 BRIGHTNESS UNIFORMITY** ..... 17

**4.5 CHECK CROSS TALK (S)** ..... 18

**4.6 WHITE COLOR ADJUSTMENT** ..... 18

**5 MECHANICAL CHARACTERISTICS** ..... **20**

**5.1 COSMETIC -** ..... 20

**5.2 MECHANICAL DATA FILES -** ..... 20

**5.3 LOCATION OF PHILIPS LOGO -** ..... 20

**5.4 GAP BETWEEN PANEL AND FRONT BEZEL** ..... 20

**5.5 LOCATION OF CONTROL ICONS -** ..... 20

**5.6 COLOR FOR RESIN/PAINT -** ..... 20

**5.7 FIRE ENCLOSURE REQUEST-** ..... 20

**5.8 RESINS** ..... 20

**5.9 IF PAINT IS USED** ..... 20

**5.10 PLASTIC MOLD TOOLING** ..... 20

**5.11 PLASTICS FLAMMABILITY** ..... 21

**5.12 TEXTURE/GLOSSING OF HOUSING** ..... 21

**5.13 TILT AND SWIVEL BASE** ..... 21

**5.14 KENSINGTON LOCK** ..... 21

**5.15 LABEL** ..... 21

**5.16 PRODUCT DIMENSION / WEIGHT (( REFER TO PHILIPS APPROVED SHT 191/SHT560 ) )** ..... 22

**5.17 TRANSPORTATION** ..... 22

**5.18 PALLET / CONTAINER LOADING** ..... 23

**6 ENVIRONMENTAL CHARACTERISTICS** ..... **24**

**6.1 SUSCEPTIBILITY OF DISPLAY TO EXTERNAL ENVIRONMENT** ..... 24

**6.2 TRANSPORTATION TESTS** ..... 24

**6.3 DISPLAY DISTURBANCES FROM EXTERNAL ENVIRONMENT** ..... 24

**6.4 DISPLAY DISTURBANCES TO EXTERNAL ENVIRONMENT** ..... 24

**7 RELIABILITY** ..... **24**

7.1 MEAN TIME BETWEEN FAILURES ..... 24
8 QUALITY ASSURANCE REQUIREMENTS ..... 24
8.1 ACCEPTANCE TEST ..... 25
9 PHILIPS' FLAT PANEL MONITORS PIXEL DEFECT POLICY ..... 26
10 REGULATORY COMPLIANCE ..... 30
10.1 WORLDWIDE REGULATORY ..... 30
10.2 EMC REQUIREMENTS ..... 30
10.3 ROHS ..... 30
10.4 WEEE ..... 30
10.5 ONGOING REGULATORY ..... 30

# 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 222E (21.5inch WIDE LCD MONITOR 222E2) |
| 2 | Manufacturer ID ( EDID data) | PHL |
| 3 | Product ID, "xxxx" 4 codes | MSB(byte 12): C0 |
| | | LSB (byte 11): 51 |
| 4 | maximum resolution | 1920x1080 |
| 5 | Horizontal Frequency Range | 30~83 KHz |
| 6 | Vertical Frequency Range | 56~76Hz |
| 7 | Monitor Name (13 characters max.) | Philips 222E |

### 2.2 LCD

AUO

Type NR. : AUO M215HW01 V0
Resolution : 1920 x 1080 (FHD)
Outline dimensions : 495.6(H) x 292.2(V) x 16.35(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 : 4 CCFL
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 : 300 nit(Typ.)
Color gamut : >=72%

# General Product Specification

Gate IC :
Source IC :
Response time : 5 ms
Vertical frequency range : Hz

CPT

Type NR. : CPT CLAA215FA01
Resolution : 1920 x 1080 (FHD)
Outline dimensions : 495.6(H) x 292.2(V) x 16.35(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 : 4 CCFL
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 : 300 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:
< 48W(maximum),

< 42W(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 222E2)
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 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 |

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 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- |

# General Product Specification

### 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.

**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

222E2_timing_table.xls

- 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 -<br>No: Exit<br>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:<br>Power On → Show up Philips logo 3 seconds → Change to input signal.<br><br>This picture is reference only. The official drawing will send out by PM. |

# General Product Specification

### 3.4 Horizontal scanning

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

### 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 | <48 W max<br>42W Typ | White LED | -- |
| Standby* | Off | Off | blanked | 110VAC < 0.5 W<br>220VAC< 0.5W | Blinking White LED<br>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

# General Product Specification

## 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

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 **500K:1**.

## 3.14 SmartImage

**SmartImage Lite OSD outlook**

| SmartImage Lite |
|---|
| Standard |
| Internet |
| Game |

Default: Standard

# General Product Specification

**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.

**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.

# General Product Specification

**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

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.

# General Product Specification

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”.

**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.

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.

**3.14.2**

**3.15** Smart response (over drive) [ N/A in 222E2]
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:

# General Product Specification

$$\frac{B_min}{B_max} \quad X\ 100\% \ >75\%$$

Where B_max =Maximum brightness
B_min = Minimum brightness

### 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 :

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

### 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~~<br>~~y = 0.281 ± 0.02~~ | ~~PerfectuneII~~ |
| 9300K | x = 0.283 ± 0.02<br>y = 0.297 ± 0.02 | PerfectuneII |
| ~~8200K~~ | ~~x = 0.291 ± 0.02~~<br>~~y = 0.306 ± 0.02~~ | ~~PerfectuneII~~ |
| ~~7500K~~ | ~~x = 0.298 ± 0.02~~<br>~~y = 0.314 ± 0.02~~ | ~~PerfectuneII~~ |
| 6500K/sRGB | x = 0.313 ± 0.02<br>y = 0.329 ± 0.02 | PerfectuneII |
| sRGB | x = 0.313 ± 0.02<br>y = 0.329 ± 0.02 | PerfectuneII |
| ~~5000K~~ | ~~x = 0.345 ± 0.02~~<br>~~y = 0.357 ± 0.02~~ | ~~PerfectuneII~~ |

# General Product Specification

**Production alignment spec.**

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

**Quality Inspection specification:**

| CIE coordinates | (x,y) | |
|---|---|---|
| 9300K | x = 0.283 ± 0.015<br>y = 0.297 ± 0.015 | |
| 6500K/sRGB | x = 0.313 ± 0.015<br>y = 0.329 ± 0.015 | |
| sRGB | x = 0.313 ± 0.015<br>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.

# General Product Specification

### 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

1. Half sine shock test (non operation)



# General Product Specification

**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

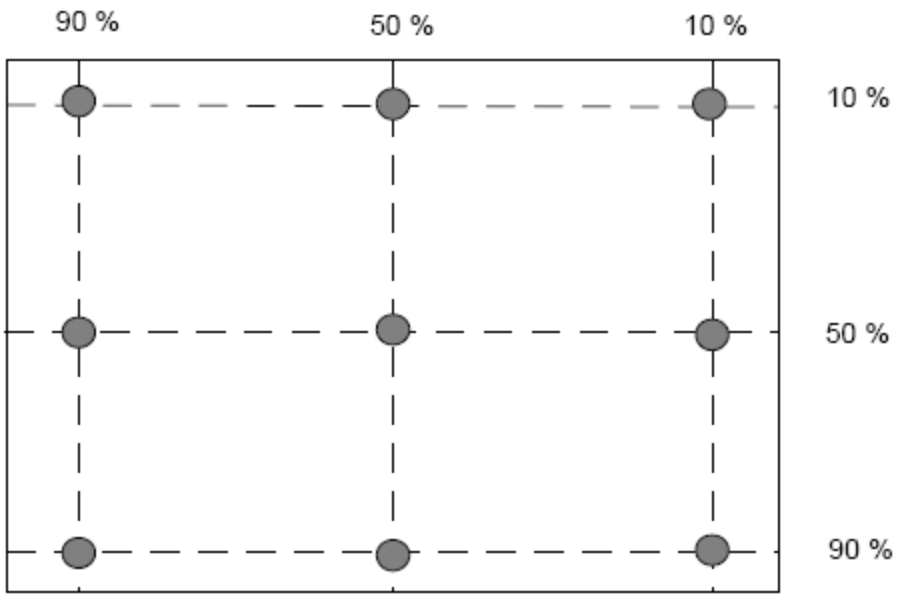
| **BRIGHT DOT DEFECTS** | **ACCEPTABLE LEVEL** | | |
|---|---|---|---|
| *MODEL* | **222E2** | | |
| 1 lit sub-pixel | 0 | | |
| 2 adjacent lit sub-pixels | 0 | | |
| 3 adjacent lit sub-pixels (one white pixel) | 0 | | |
| Distance between two bright dots | 15mm | | |
| Bright dot defects within 20 mm circle | 0 | | |
| Total bright dot defects of all type | 0 | | |

| **BLACK DOT DEFECTS** | **ACCEPTABLE LEVEL** | | |
|---|---|---|---|
| *MODEL* | **222E2** | | |
| 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* | **222E2** | | |
| 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)**

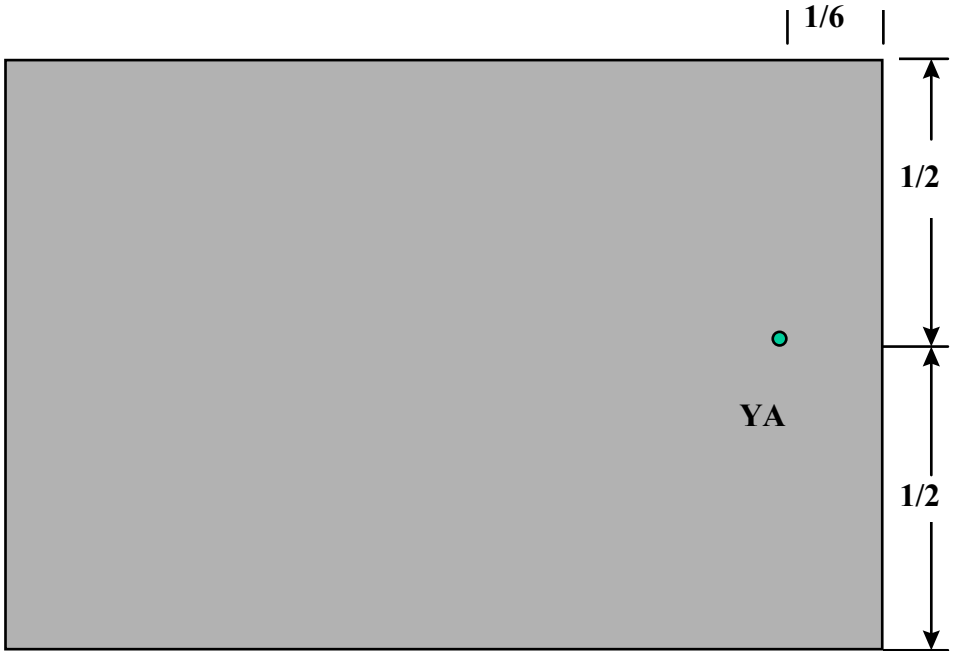
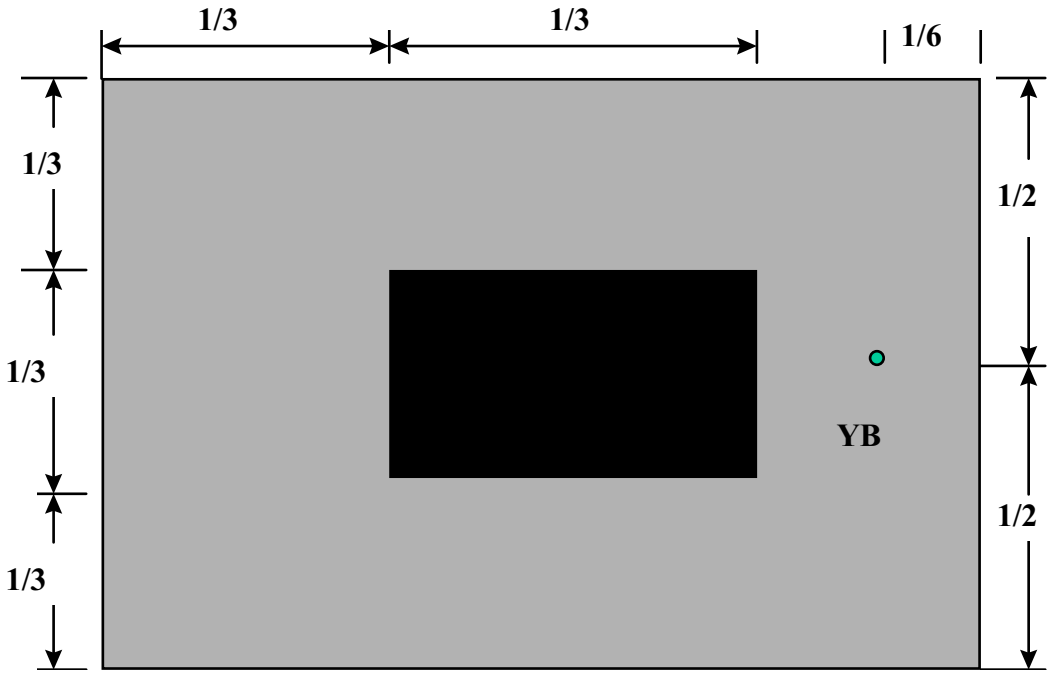
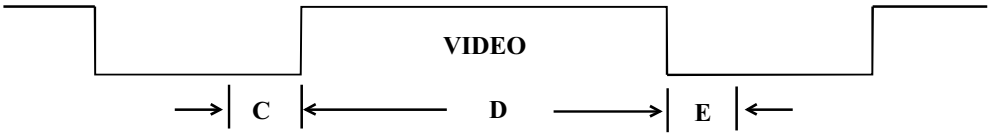



**Fig 3: Cross talk Pattern**
**Center at Gray level 0 (Black)**

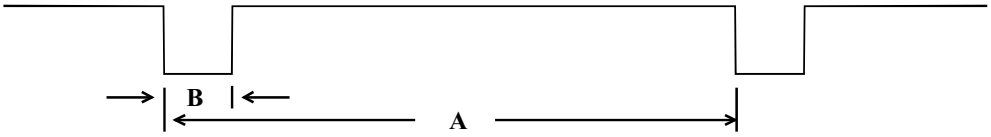


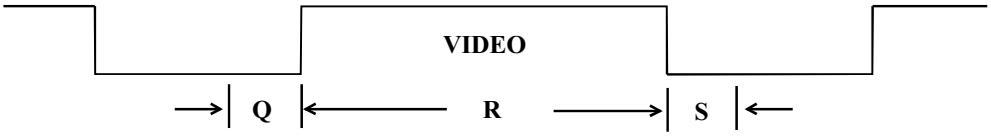
# General Product Specification

**SEPARATE SYNC.**

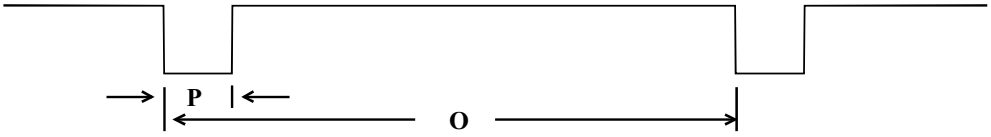



**HORIZONTAL**

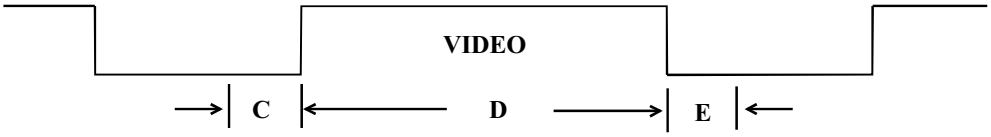



**VERTICAL**




**COMPOSITE SYNC.**




**HORIZONTAL**

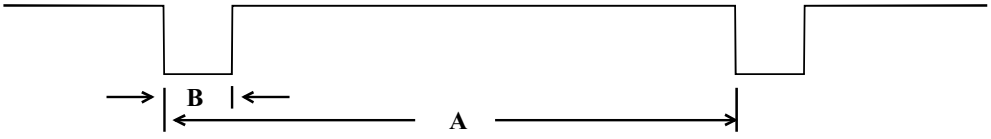



**FIG-4 TIMING CHART -1**

# 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.

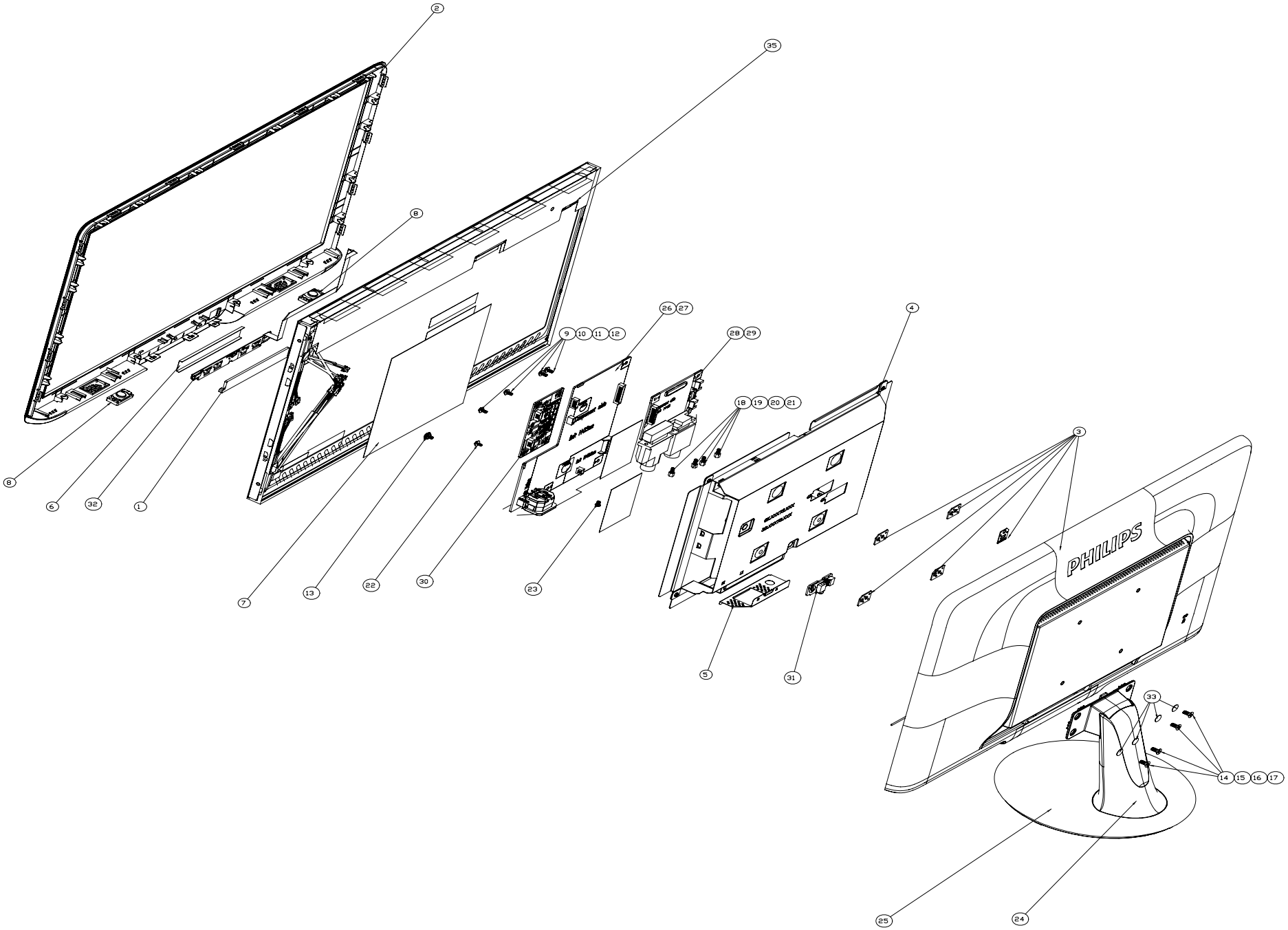
--System implemented.

--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:222E2**

**◎ 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 | | Model | 222E2SB/00 | | 222E2SB/10(EU) | | 222E2SB/62 | | 222E2SB/27 | | 222E2SB/00(AP) | | 222E2SB/69 | | 222E2SB/71(Philipp | | 222E2SB/73(S. Afri | | 222E2SB/84 | | 222E2SB/75 | | 222E2SB/96 | | 222E2SB/93 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 9J.17872.*** | AB1 | PB1 | ABA | PBA | AB8 | PB8 | AB9 | PB9 | AB5 | PB5 | AB7 | PB7 | ABC | PBC | ABF | PBF | ABN | PBN | AB6 | PB6 | AB3 | PB3 | AB4 | PB4 |
| location | Description | PCM code | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT |
| 28 | MAIN (I/F) BOARD ASS'Y | 5E.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 |
| 26 | POWER BOARD ASS'Y | 5E.17802.001 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |
| 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 |
| 35 | LCDM21.5W M215HW01 V00L/0P Z | 5F.LUAV0.061 | V | | V | | V | | V | | V | | V | | V | | V | | V | | V | | V | | V | |
| | LCD21.5W CLAA215FA01 CPT P (CPT) | 5F.LTAPP.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 |

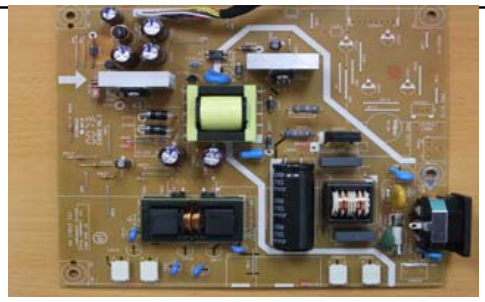
| Mechanical Styling | | Model | 222E2SB/00 | | 222E2SB/10 | | 222E2SB/62 | | 222E2SB/27 | | 222E2SB/00(AP) | | 222E2SB/69 | | 222E2SB/71 | | 222E2SB/73 | | 222E2SB/84 | | 222E2SB/75 | | 222E2SB/96 | | 222E2SB/93 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| location | Description | PCM code | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT |
| 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 |
| 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 |
| 2 | FRONT BEZEL ASS'Y (Black) | 6K.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 |
| 3 | REAR COVER ASS'Y | 6K.17803.001 | V | | V | | V | | V | | V | | V | | V | | V | | V | | V | | V | | V | |
| | | 6K.17804.001 | | V | | V | | V | | V | | V | | V | | V | | V | | V | | V | | V | | V |

| Packing Styling | | Model | 222E2SB/00 | | 222E2SB/10 | | 222E2SB/62 | | 222E2SB/27 | | 222E2SB/00(AP) | | 222E2SB/69 | | 222E2SB/71 | | 222E2SB/73 | | 222E2SB/84 | | 222E2SB/75 | | 222E2SB/96 | | 222E2SB/93 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| location | Description | PCM code | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT |
| 100 | CUSHION FRONT | 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 | | |
| | | 4G.17801.001 | | | | | | | | | | | | | | | | | | | | | | | V | V |
| 110 | CUSHION BACK | 4G.17804.001 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | | |
| | | 4G.17802.001 | | | | | | | | | | | | | | | | | | | | | | | V | V |
| 120 | CARTON | 4D.17801.001 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | | |
| | | 4D.17802.001 | | | | | | | | | | | | | | | | | | | | | | | V | V |

| Accessory Styling | | Model | 222E2SB/00 | | 222E2SB/10 | | 222E2SB/62 | | 222E2SB/27 | | 222E2SB/00(AP) | | 222E2SB/69 | | 222E2SB/71 | | 222E2SB/73 | | 222E2SB/84 | | 222E2SB/75 | | 222E2SB/96 | | 222E2SB/93 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| location | Description | PCM code | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT |
| 200 | QSG PHILIPS 222E2/222EL9 | 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 |
| 210 | CD PHILIPS 222E2/222EL2/224E9 | 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 |
| 30 | CORD H05VV-3G 10A250V 1500 EUR | 2G.02718.051 | V | V | V | V | V | V | | | V | V | | | | | V | V | | | | | | | | |
| | <ALT>CORD H05VV-3G 10A250V 1500 EU | 2G.02718.05H | V | V | V | V | V | V | | | V | V | | | | | V | V | | | | | | | | |
| | CORD SVT125V WO/SH 1.5M US | 2G.01111.031 | | | | | | | V | V | | | | | | | | | | | | | | | | |
| | CORD H05VV-F 13A 1.8MM UK | 2G.03149.021 | | | | | | | | | | | V | V | | | | | | | | | | | | |
| | <ALT>CORD H05VV-F 13A 1.8M UK | 2G.03149.02H | | | | | | | | | | | V | V | | | | | | | | | | | | |
| | CORD VCTF 2P W/G PSE 1.5M JAP | 2G.03513.031 | | | | | | | | | | | | | V | V | | | | | | | | | | |
| | CORD H05VV 250V 1.8M BLK INDIA | 2G.04133.001 | | | | | | | | | | | | | | | | | V | V | | | | | | |
| | CORD 3ASL/75DU-IN 250V1.5M AUS | 2G.01343.031 | | | | | | | | | | | | | | | | | | | V | V | | | | |
| | <ALT>CORD 3ASL/75DU-IN 250V1.5M AU | 2G.01343.061 | | | | | | | | | | | | | | | | | | | V | V | | | | |
| | CORD VCTF 7A 125V 1.5M CNS-TW | 2G.04811.021 | | | | | | | | | | | | | | | | | | | | | V | V | | |
| | CORD RVV300/500 10A25V1.5MM 3C | 2G.03745.001 | | | | | | | | | | | | | | | | | | | | | | | V | V |
| | <ALT>CORD RVV300/500 10A25V1.5MM | 2G.03745.00H | | | | | | | | | | | | | | | | | | | | | | | V | V |
| 32 | CABLE SIGNAL/C H+V OD_5.5 1.8M | 5K.L2H06.501 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | | |
| 33 | CABLE DVI-D/DVI-D 1.8M IS_8 | 5K.05407.511 | | | | | | | | | | | | | | | | | | | | | | | V | V |

| Critical components | | Model | 222E2SB/00 | | 222E2SB/10 | | 222E2SB/62 | | 222E2SB/27 | | 222E2SB/00(AP) | | 222E2SB/69 | | 222E2SB/71 | | 222E2SB/73 | | 222E2SB/84 | | 222E2SB/75 | | 222E2SB/96 | | 222E2SB/93 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Description | PCM code | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | AUO | CPT | Remark |
| IC601 | IC SR STR-W6262 T0220-6P | 0D.06262.030 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | Power PWM IC |
| 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 | Varistor |
| 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 | CPU & firmware are included within this Scal |
| IC801 | #IC PWM CTRL OZ9933GN SON-16P | 7A.09933.001 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | Inverter controller IC |
| 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 | Touch sensor IC |
| 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 | For 5V to 3.3V DC-DC converter |
| 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 | LED |
| Q801<br>Q802 | #FET MOS RM4614H0R SON 8P | 8D.04614.A37 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | Power MOSFET |

# Panel & PCBA photos

| ITEM | PCM | Description | Photo |
|---|---|---|---|
| 1 | 5F.LUAV0.061 | LCDM21.5W M215HW01 V00L/0P Z (AUO) | |
| 2 | 5F.LTAPP.001 | LCD21.5W CLAA215FA01 CPT P (CPT) | |
| 3 | 5E.17801.001 | MAIN (I/F) BOARD ASS'Y | |
| 4 | 5E.17802.001 | POWER BOARD ASS'Y |  |
| 5 | 5E.17803.001 | CTRL BD ASS'Y | |

# Repair Tips

## 0. Warning

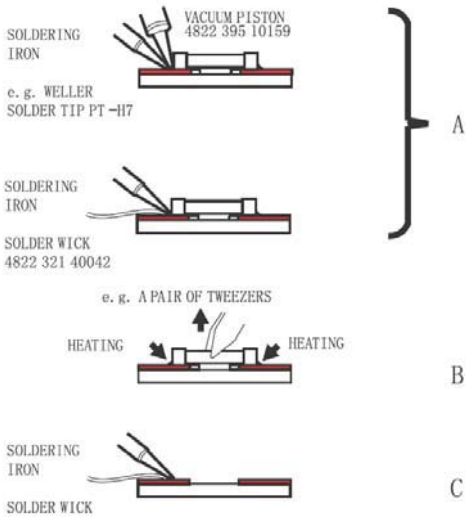
All ICs and many other semi -conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically . When repairing, make sure that you are connected with the same potential as the mass of the unit via a wrist wrap with resistance. Keep components and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



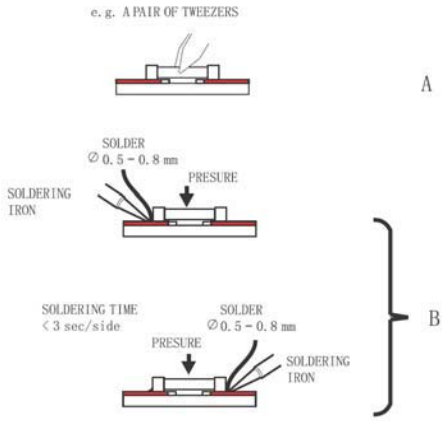

While holding the SMD with a pair of tweezers, take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1 B).
- Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

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).

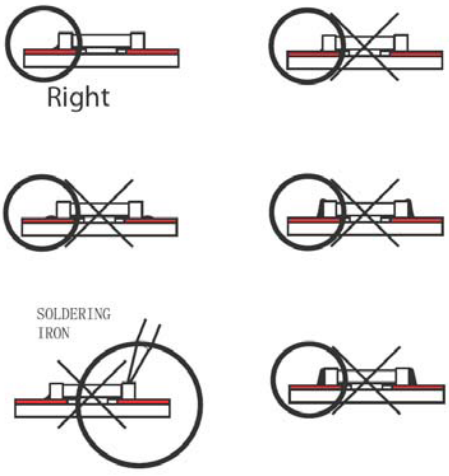



Fig.3 Examples

# 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.

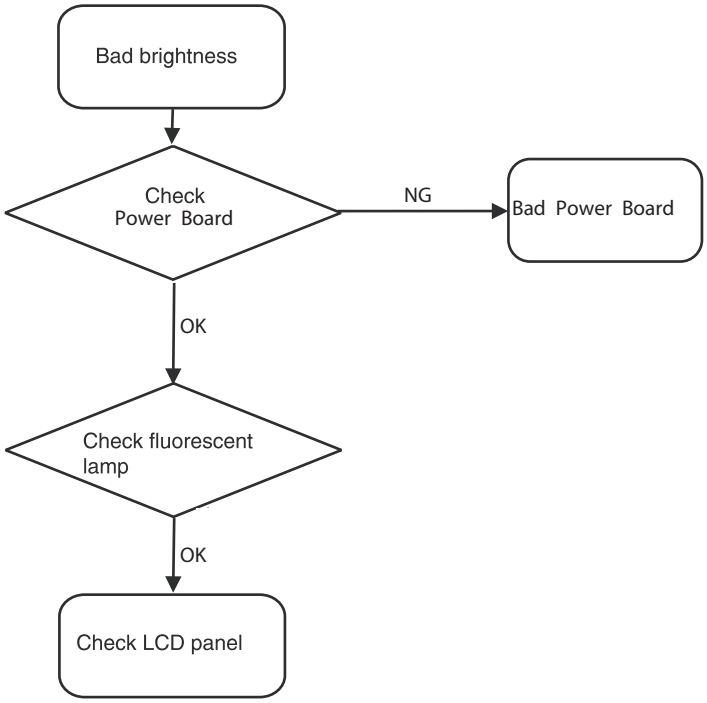
Device Removal
As is the case with any component that, it is essential when removing an (LF) BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform 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.

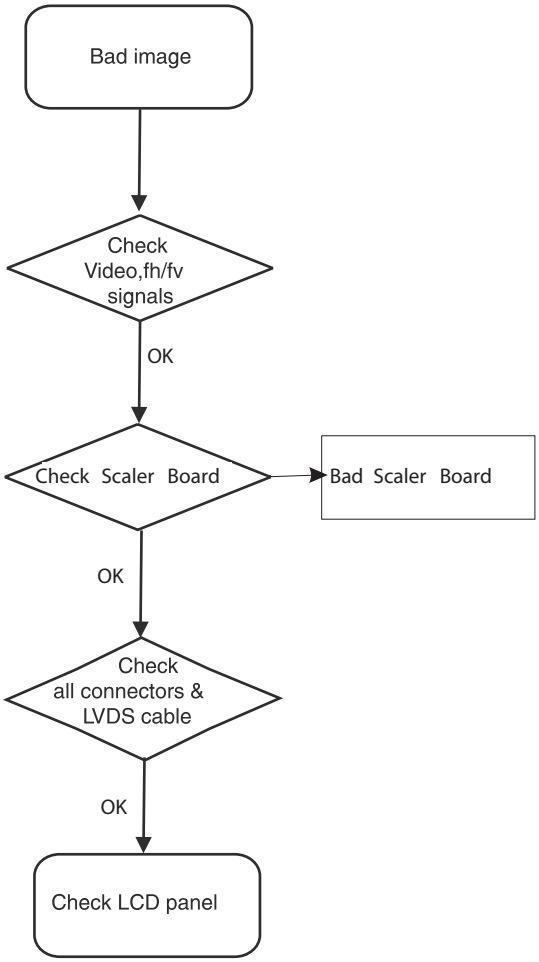
Area Preparation
When the component has been removed, the vacant IC area must be cleaned before replacing the (LF) BGA. Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can 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.

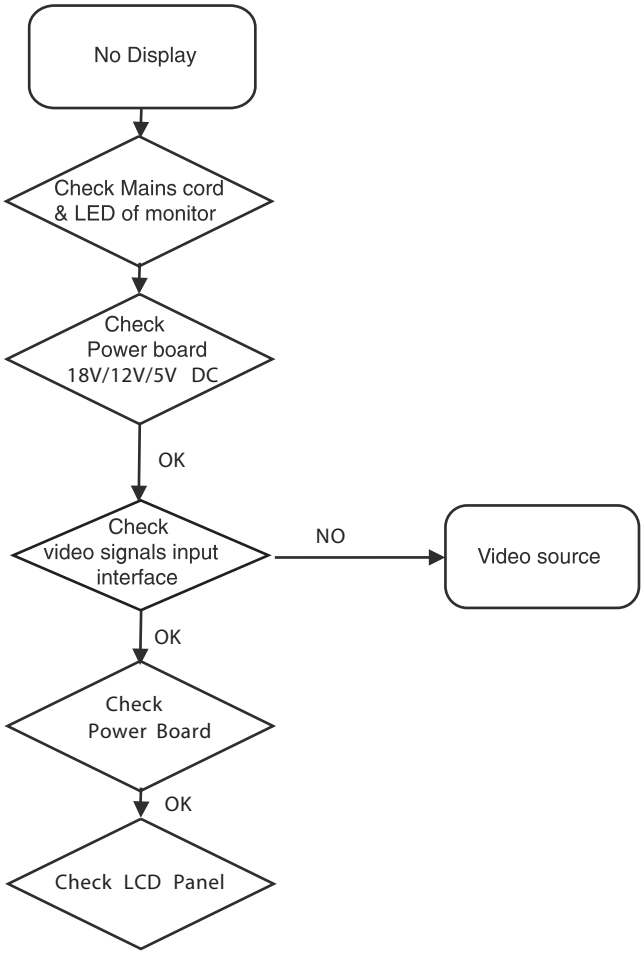
More Information
For more information on how to handle BGA devices, visit this URL: http://www.atyourservice.ce.philips.com (needs subscription). After login, select Magazine, then go to Workshop Information. Here you will find Information on how to deal with BGA-ICs.

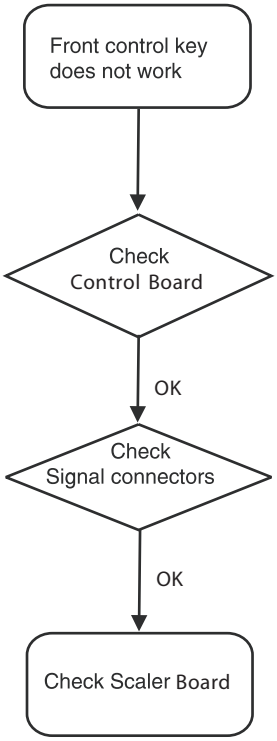
# Repair Flow Chart



# 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:

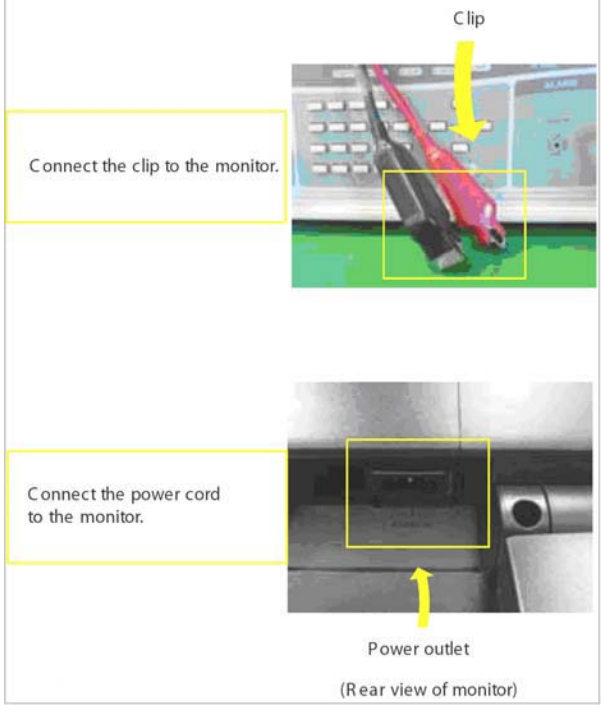
| Condition | Hi-Pot Test for products where the mains input is 220V AC | Hi-Pot Test for products where the mains input is 110V AC | Ground Continuity Test requirement |
|---|---|---|---|
| Test voltage | 2820VDC (2000VAC) | 1700VDC (1200VAC) | Test current: 25A, AC<br>Test time: 3 seconds<br>Resistance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

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.

(Zentech 9032 tester)




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