22 inch TFT WXGA LCD Colour Monitor Chassis: HUDSON 9

Service
Service
Service

220SW9FS/00
220SW9FB/69
220SW9FB/00
220SW9FB/75
220SW9FB/93
220SW9FB/27

Service Manual

Horizontal frequencies
30 - 83 kHz

TABLE OF CONTENTS

SAFETY NOTICE

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

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

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

Published by Philips Consumer Lifestyle Jun.9. 2008 GB 312278517980

飛利浦 PHILIPS 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 are 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 service trade 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 service 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

SEC panel

Type NR. : SEC LTM220M1-L01
Resolution : 1680 x 1050 (WSXGA+)
Outside dimensions : 493.7(H) x 320.1(V) Typ. x 17.0(D) Max.
Pitch (mm) : 0.282mm x 0.282mm
Color pixel arrangement : RGB vertical stripe
Display surface : Haze 25% Hard coating (3H)
Color depth : 16.7M (6 bit Hi-FRC)
Backlight : 4 CCFL
Active area (W x H) : 473.76(H) x 296.1(V) mm
View angle (CR=10) : =160 for Right/Left (Typ)
: =160 for Up/Down (Typ)
Contrast ratio : 1000:1 (Typ)
White luminance : 300(Typ.)
Color gamut : >=72%
Gate IC : TOSHIBA
Source IC : NEC
Response time : Tr + Tf <=5 ms (Typ)
Vertical frequency range: 53~76Hz

Scanning frequencies

Hor. : 30 – 83 K Hz
Ver. : 56 - 76 Hz
Video dot rate : < 210 MHz for VGA and < 170 MHz for DVI, warning message must be displayed while over 165 MHz (supplier to provide accurate scaler bandwidth number)
Power input : 90-264 V AC, 50/60 ± 2 Hz
Power consumption : <50W maximum, <45W (typ.)
< TBDWatt (with audio)

Ambient temperature: 0 °C - 40 °C

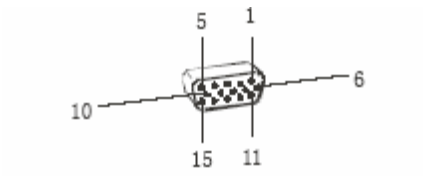
Power input connection

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

Power management

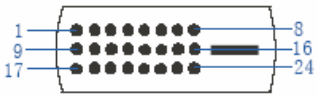
The monitor must comply with the Microsoft On Now specification, and meet EPA requirements.

Mode	HSYNC	VSYNC	Video	Pwr-cons.	Indication	Rec. time
Power-On	On	On	active	45TYP	Blue LED	--
Off	Off	Off	blanked	< 1 W	Blanking Blue LED	< 3 s
DC Power Off			N/A	< 1 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		

nput 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-

Susceptibility of display to external environment

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

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

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

Technical Data

LPL Panel

Type NR. : LPL LM220WE1-TLE2/4
Resolution : 1680 x 1050 (WSXGA+)
Outside dimensions : 493.7(H) x 320.1 (V) x 16.5(D) mm (Typ.)
Pitch (mm) : 0.282mm x 0.282mm
Color pixel arrangement : 1680 horizontal By 1050 vertical Pixels
RGB stripe arrangement
Display surface : Hard coating (3H), Anti-glare treatment of the front polarizer
Color depth : 16.7M colors
Backlight : 4 CCFL
Active area (W x H) : 21.995 inches(558.673mm) diagonal
Aspect(ratio 16:10)
View angle (CR>=10) : R/L 170(Typ.), U/D 160(Typ.)
Contrast ratio : >1000:1 (Typ)
White luminance : 300 cd/m2(Typ. Center 1 point)
Color gamut : >=72%
Gate IC : N/A
Source IC : Magna , OKI
Response time : <=5 ms (Typ)
Vertical frequency range: 50~75Hz

Scanning frequencies

Hor. : 30 – 83 K Hz
Ver. : 56 - 76 Hz
Video dot rate : < 210 MHz for VGA and < 170 MHz for DVI, warning message must be displayed while over 165 MHz (supplier to provide accurate scaler bandwidth number)
Power input : 90-264 V AC, 50/60 ± 2 Hz
Power consumption : <50W maximum, <45W (typ.)
< TBDWatt (with audio)

Ambient temperature: 0 C - 40 C

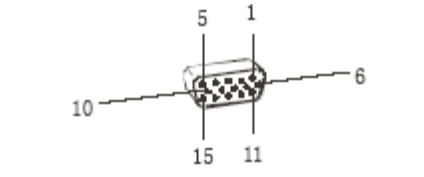
Power input connection

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

Power management

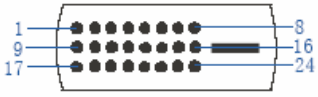
The monitor must comply with the Microsoft On Now specification, and meet EPA requirements.

Mode	HSYNC	VSYNC	Video	Pwr-cons.	Indication	Rec. time
Power-On	On	On	active	45TYP	Blue LED	--
Off	Off	Off	blanked	< 1 W	Blanking Blue LED	< 3 s
DC Power Off			N/A	< 1 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		

nput 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

Susceptibility of display to external environment

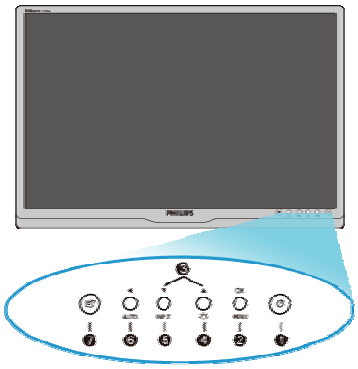
Operating
- Temperature : 0 to 40 degree C
- Humidity : 80% max
- Altitude : 0-3658m
- Air pressure : 600-1100 mBAR

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

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

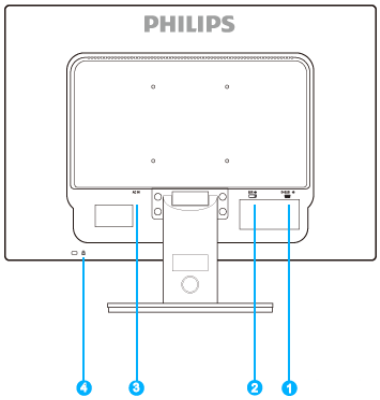
Installation

Front View Product Description



1		To switch monitor's power On and Off
2	MENU / OK	To access OSD menu
3	▲ ▼	To adjust the OSD menu
4		To adjust brightness of the display
5	Input	To change the signal input source.
6	AUTO / ◀	Automatically adjust the horizontal position, vertical position phase and clock settings / Return to previous OSD level.
7		SmartImage. There are five modes to be selected: Office Work, Image Viewing, Entertainment Economy, and Off.

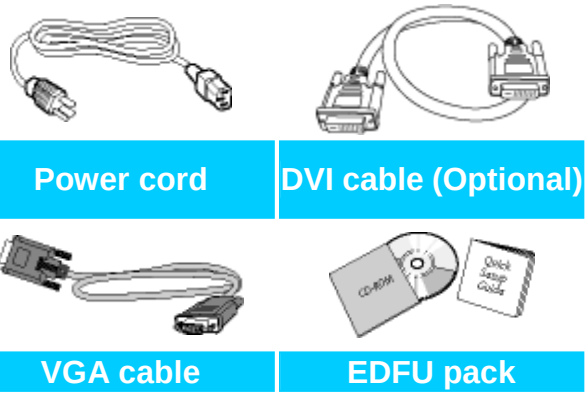
Rear View



1 VGA input
2 DVI-D input (available for selective models)
3 AC power input
4 Kensington anti-thief lock

Accessory Pack

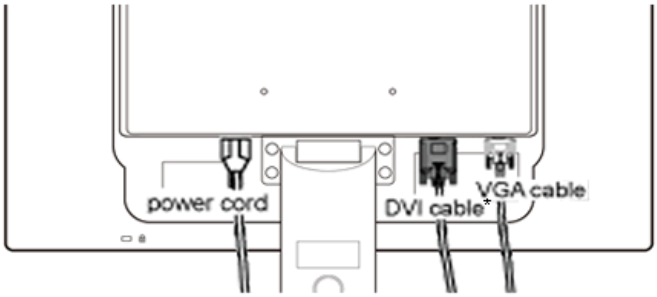
Unpack all the parts



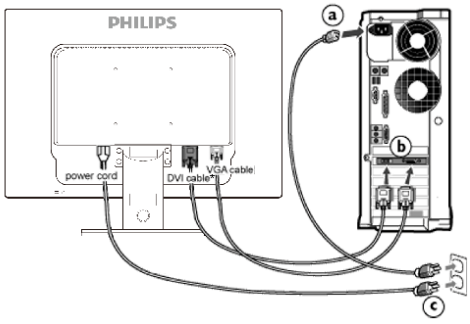
Power cord	DVI cable (Optional)
VGA cable	EDFU pack

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.



available for selective models



available for selective models

2) Connect to PC

(a) Turn off your computer and unplug its power cable.

(b) Connect the monitor signal cable to the video connector on the back of your computer.

(c) Plug the power cord of your computer and your monitor into a nearby outlet.

(d) Turn on your computer and monitor. If the monitor displays an image, installation is complete.

Trouble shooting

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

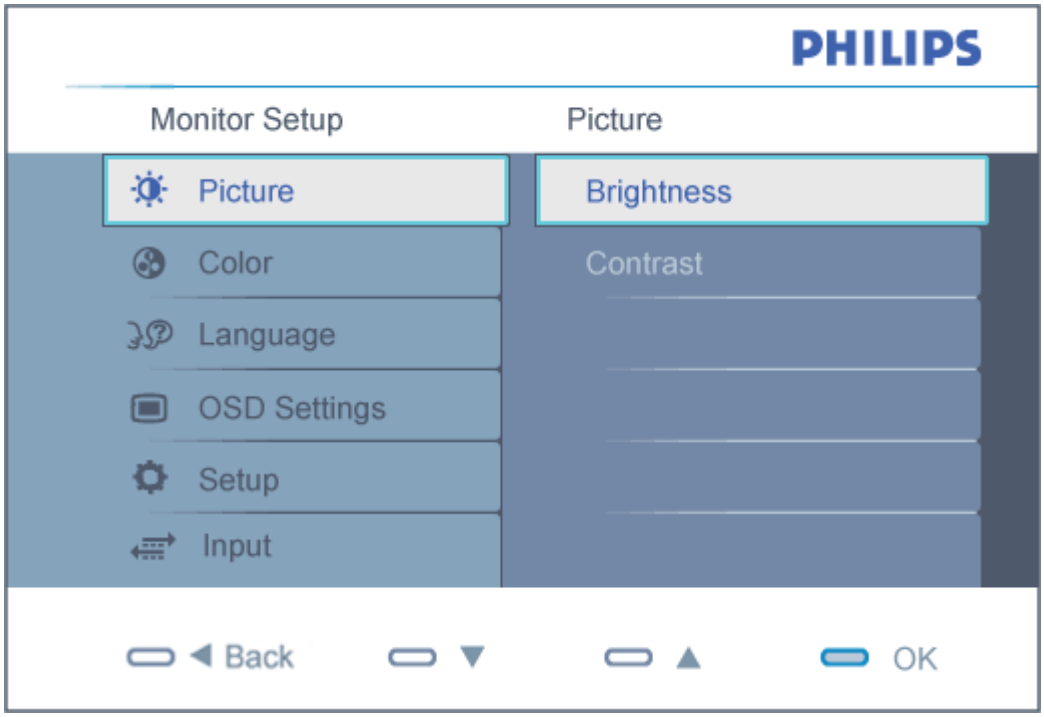
Common Problems	
Having this problem	Check these items
No Picture (Power LED not lit)	1.Make sure the power cord is plugged into the power outlet and into the back of the monitor. 2.First, ensure that the power button on the front of the monitor is in the OFF position, then press it to the ON position.
No Picture (Power LED is amber or yellow)	1.Make sure the computer is turned on. 2. Make sure the signal cable is properly connected to your computer. 3.Check to see if the monitor cable has bent pins. 4.The Energy Saving feature may be activated
Screen says 	1. Make sure the monitor cable is properly connected to your computer. (Also refer to the Quick Set-Up Guide). 2.Check to see if the monitor cable has bent pins. 3. Make sure the computer is turned on.
AUT O button not working properly	1.The Auto Function is designed for use on standard Macintosh or IBM-compatible PCs running Microsoft Windows. 2. It may not work properly if using nonstandard PC or video card.
Imaging Problems	
Display position is incorrect	1.Press the Auto button. 2. Adjust the image position using the Horizontal Position and/or Vertical Position in OSD Main Controls.
Image vibrates on the screen	Check that the signal cable is properly connected to the graphics board or PC.
Vertical flicker appears 	1. Press the Auto button. 2. Eliminate the vertical bars using the More Settings of Phase/Clock in OSD Main Controls.
Horizontal flicker appears 	1. Press the Auto button. 2. Eliminate the vertical bars using the More Settings of Phase/Clock in OSD Main Controls.
The screen is too bright or too dark	Adjust the contrast and brightness on OSD Main Controls. (The backlight of the LCD monitor has a fixed life span. When the screen becomes dark or begins to flicker, please contact your dealer).
An after-image appears	If an image remains on the screen for an extended period of time, it may be imprinted in the screen and leave an afterimage. This usually disappears after a few hours.
An after-image remains after the power has been turned off.	This is characteristic of liquid crystal and is not caused by a malfunction or deterioration of the liquid crystal. The after-image will disappear after a peroid of time.
Green, red, blue, dark, and white dots Remains	The remaining dots are normal characteristic of the liquid crystal used in today's technology.

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 :



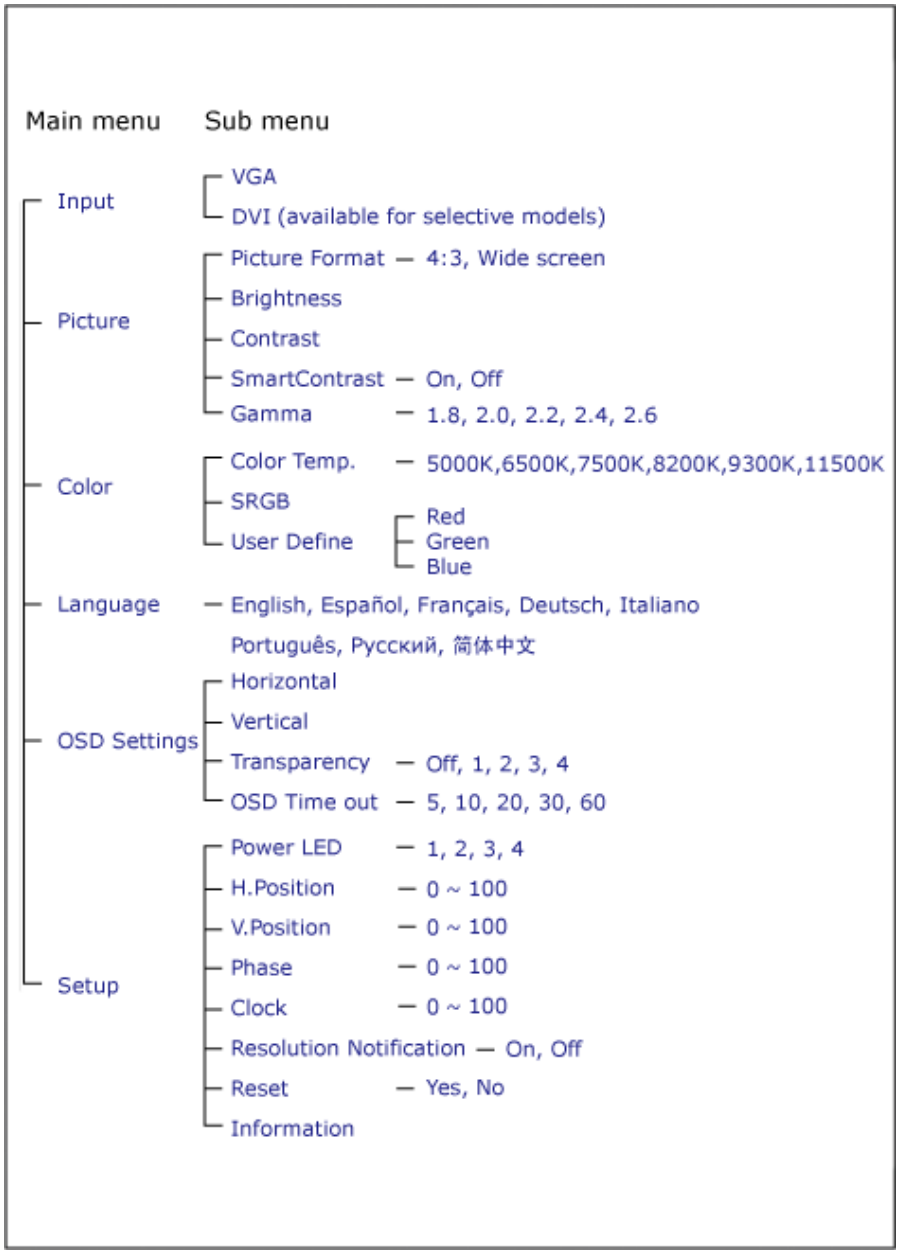
Basic and simple instruction on the control keys.

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.



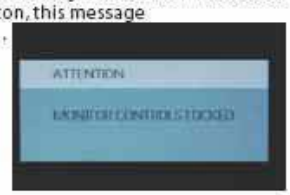
Resolution notification

This monitor is designed for optimal performance at its native resolution, 1680X1050@60Hz. When the monitor is powered on at a different resolution, an alert is displayed on screen: Use 1680x1050@60Hz for best results.

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

Lock/Unlock, Aging,Factory Mode

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



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

Access Factory Mode

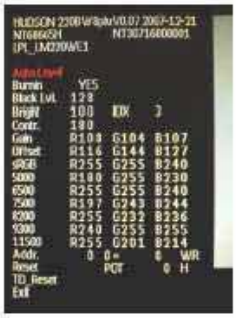
1). Turn off monitor.
2). [Push "AUTO" & "MENU" buttons at the same time and hold them]
+[Press "power" button until comes out 'Windows screen"]
=> then release all buttons
3).Press "MENU" button, wait until the OSD menu with Characters 'HUDSON 220SW8 V0.07 2007-12-21 "(below OSD menu) come on the Screen 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 Offset R G B function can be used on reduce or eliminate snowy noise on the background when the resolution of video signal is 1680*1050vertical 60Hz. Slightly increase or decrease the value until snowy noise completely disappear.

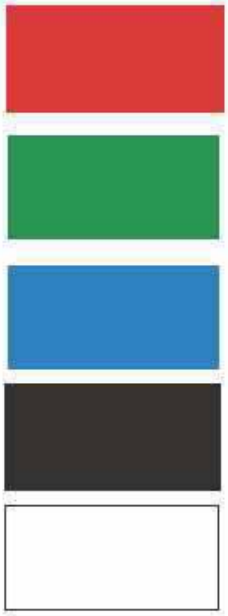
Access Aging Mode

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



Step 3 : Disconnect interface cable between Monitor and PC.

After 3 seconds, bring up:

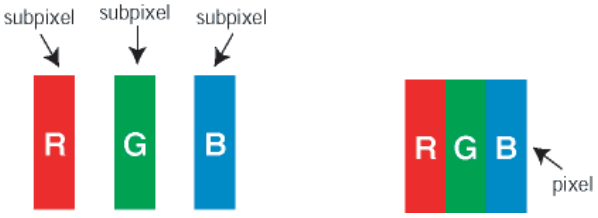


repeatly
Connect Signal cable again=> go back to normal display

Philips Pixel Defect Policy

Philips' Flat Panel Monitors Pixel Defect Policy

Philips strives to deliver the highest quality products. We use some of the industry's most advanced manufacturing processes and practice stringent quality control. However, pixel or sub pixel defects on the TFT LCD panels used in flat panel monitors are sometimes unavoidable. No manufacturer can guarantee that all panels will be free from pixel defects, but Philips guarantees that any monitor with an unacceptable number of defects will be repaired or replaced under warranty. This notice explains the different types of pixel defects and defines acceptable defect levels for each type. In order to qualify for repair or replacement under warranty, the number of pixel defects on a TFT LCD panel must exceed these acceptable levels. For example, no more than 0.0004% of the sub pixels on a 19" XGA monitor may be defective. Furthermore, Philips sets even higher quality standards for certain types or combinations of pixel defects that are more noticeable than others. This policy is valid worldwide.



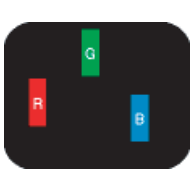
Pixels and Sub pixels

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

Types of Pixel Defects

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

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



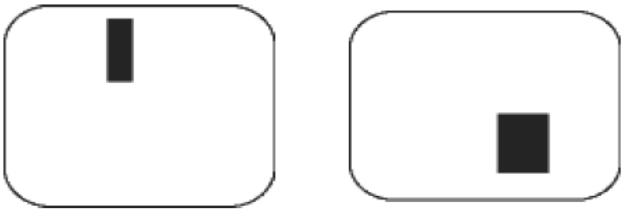
One lit red, green or blue sub pixel

Two adjacent lit sub pixels:
- Red + Blue = Purple
- Red + Green = Yellow
- Green + Blue = Cyan (Light Blue)

Three adjacent lit sub pixels (one white pixel)

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

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



One dark sub pixel

Two or three adjacent dark sub pixels

Proximity of Pixel Defects

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

Pixel Defect Tolerances

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

BRIGHT DOT DEFECTS	ACCEPTABLE LEVEL
MODEL	220SW9
1 lit subpixel	3
2 adjacent lit subpixels	1
3 adjacent lit subpixels (one white pixel)	0
Distance between two bright dot defects*	>25mm
Total bright dot defects of all types	3

BLACK DOT DEFECTS	ACCEPTABLE LEVEL
MODEL	220SW9
1 dark subpixel	5
2 adjacent dark subpixels	2
3 adjacent dark subpixels	0
Distance between two black dot defects*	>15mm
Total black dot defects of all types	5

TOTAL DOT DEFECTS	ACCEPTABLE LEVEL
MODEL	220SW9
Total bright or black dot defects of all types	5

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

Mechanical Instruction

Front view

Back view

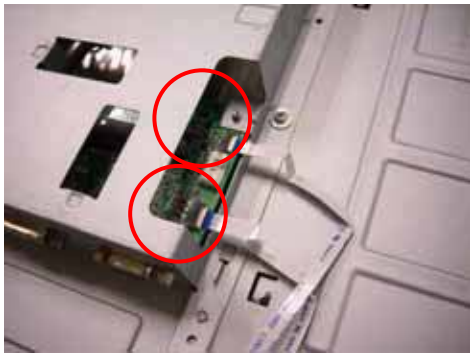
Step1.
Remove base by pushing the release button.

Step2.
Unscrew 4 screws to release the neck column.

Step3.
Remove the back cover by using 2 release holes.

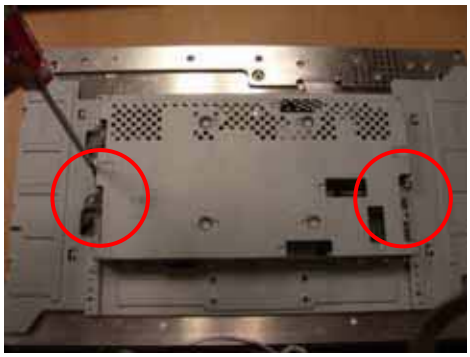
Step4.
Release lamp wire from power board.

Step5.
Release control board and led board cable.

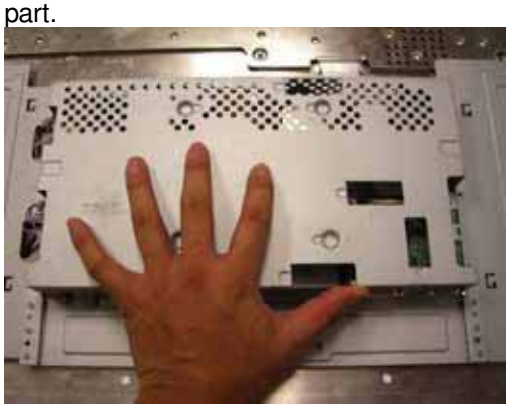


Mechanical Instruction

Step6.
Unscrew 2 screws to remove the main shielding



Step7.
Release the main shielding by pushing the metal part.

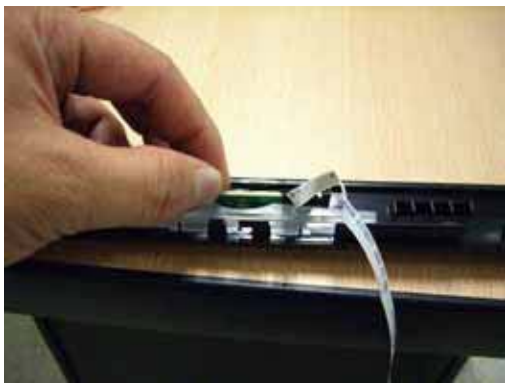


Step8.
Take the LVDS cable off from panel.

Step9.
Unscrew 7 screws to release power board and interface board.

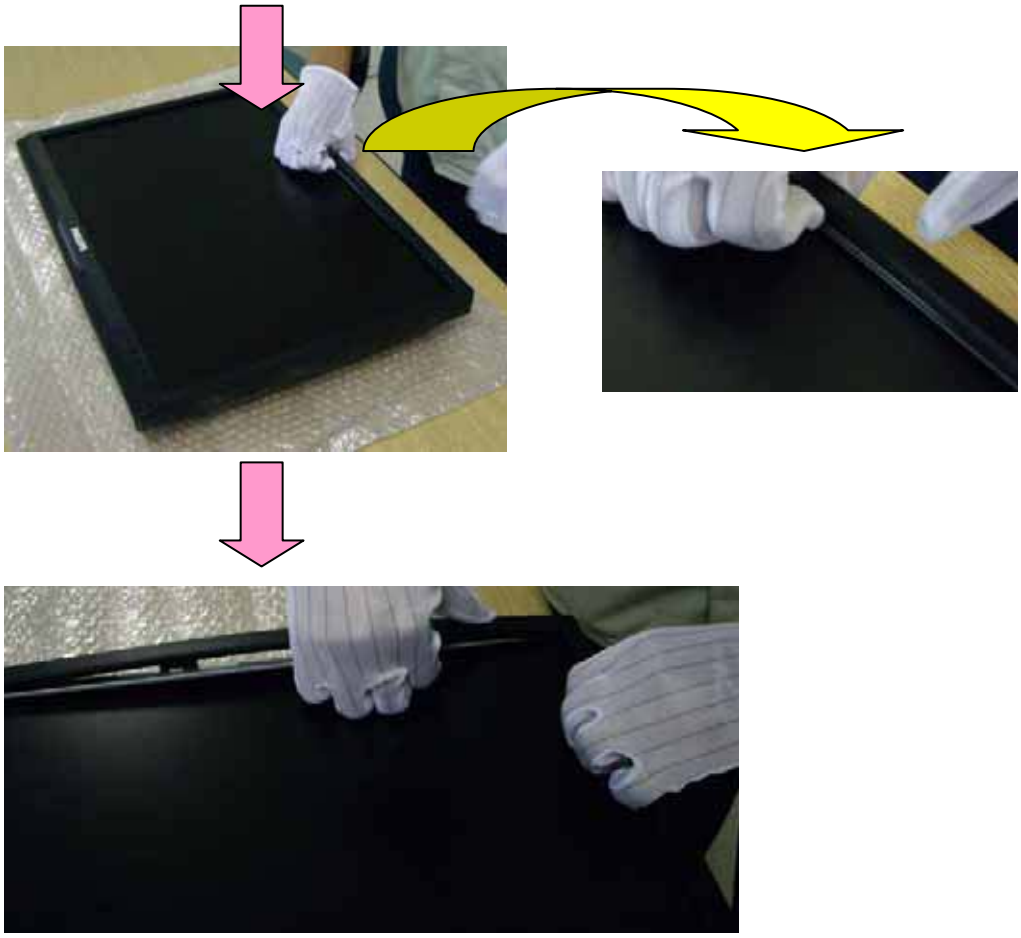
Step10.
Unscrew 3 screws to release control board.

Step11.
Remove the led board by hand carefully.

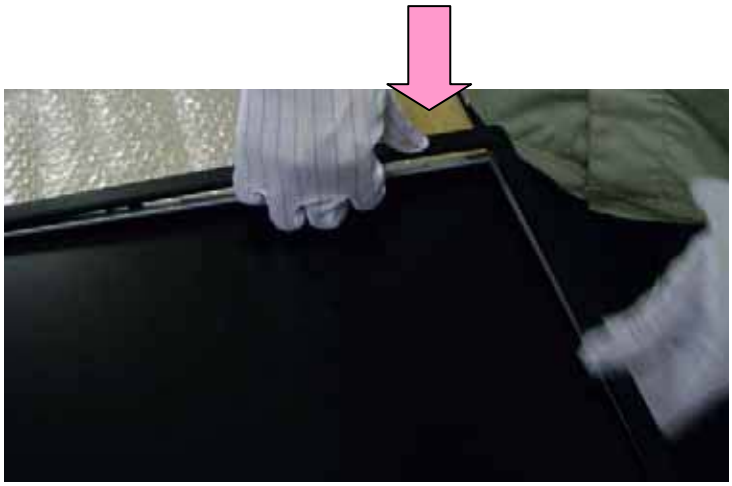


220SW9 Disassemble Bezel and Rear Cover Flow

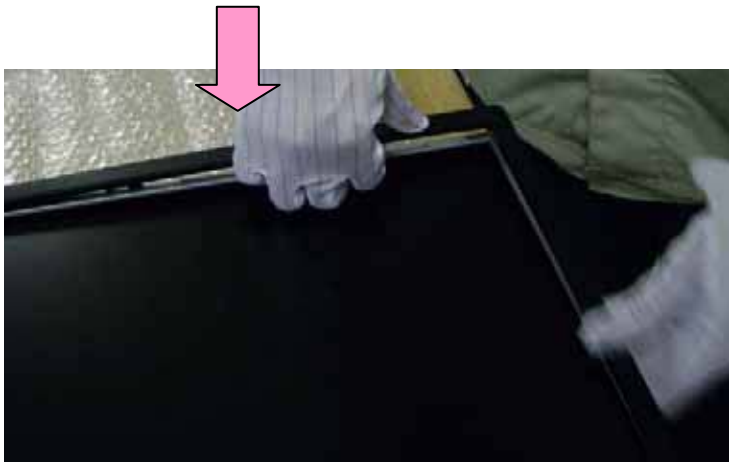
1. Two hands are from the inside of bezel and take it up.
(两手从内侧将面板向上抬起)



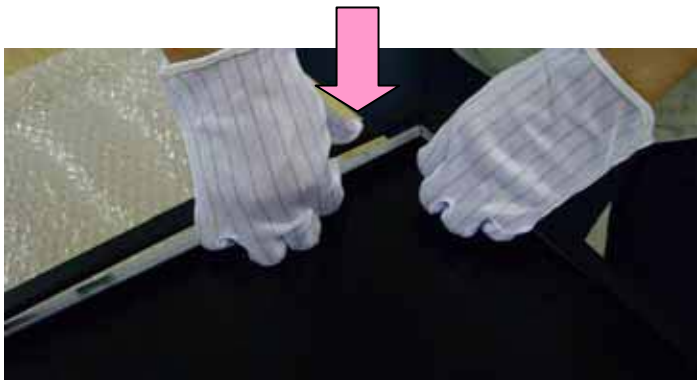
2. Please take a note we should use one hand to take the bezel up from right corner slowly, and the other hand should press the middle of another side.
(注意需从右侧拐角处缓慢向上抬起面板，其中一个手用力在天侧，另一个手用力在中间一侧)



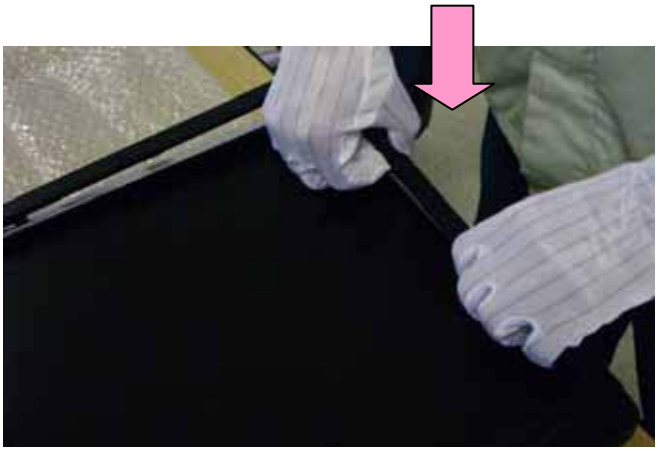
3. The hand which located in the middle side please follow the bezel' clips and disassemble slowly.
(位于中间一侧的手顺着卡钩慢慢地向下侧拆分)

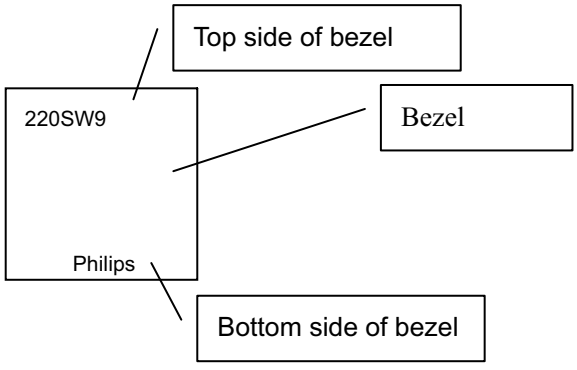


4. From another middle of the side, please take the bezel up by hand
(从中间的另外一侧用手将面板向上抬起)



5. Follow the bezel clips to disassemble another middle side bezel to bottom side slowly.
(顺着卡钩缓慢将中间另一侧的面板向地侧拆分)





6. Use the hand and try to take the bezel up from the bottom side slowly.
(用手尝试将地侧稍稍向上抬起即可)

7. Turn off the monitor and make the rear cover up.
(将机台翻转过来，后盖向上)

8. Use two hands to take the rear cover up slowly, also please pay attention that we need follow the clips of rear cover to take the bezel up.
(缓慢地用两手抬起后盖，注意后盖需顺着卡钩抬起)

9. Disassemble finish and check the clip of bezel.
(拆分 OK)

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 .

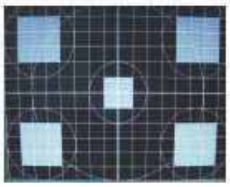


Fig. 1

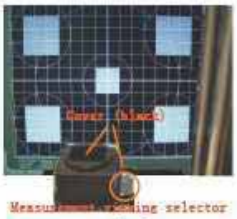
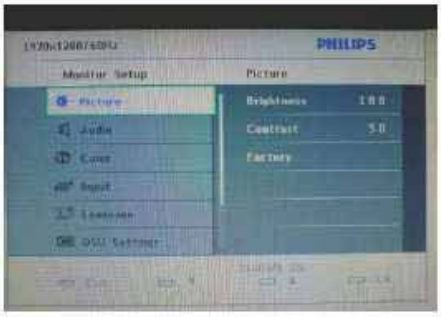


Fig. 2

4. Access Factory Mode

1). Turn off monitor.
2). [Push "AUTO" & "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' HUDSON 240BW8 V0.13 2007-08-10 ' (below OSD menu) come on the Screen of the monitor. as shown in Fig3.



Factory Mode indicator

Fig. 3

4). Press "MENU" button, then select factory mode indicator by "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 White color adjustment

There are three factory preset white color 9300K , 6500K , sRGB.
Apply full white pattern, with brightness in 100% position and the contrast control at 50 % position.
The 1931 CIE Chromaticity (color triangle) diagram (x ,y) coordinate for the screen center should be:

Production		Product SPEC	
5000K	x = 0.345 ± 0.006	5000K	x = 0.345 ± 0.02
	y = 0.357 ± 0.006		y = 0.357 ± 0.02
6500K	x = 0.313 ± 0.006	6500K	x = 0.313 ± 0.02
	y = 0.329 ± 0.006		y = 0.329 ± 0.02
7500K	x = 0.298 ± 0.006	7500K	x = 0.298 ± 0.02
	y = 0.314 ± 0.006		y = 0.314 ± 0.02
8200K	x = 0.291 ± 0.006	8200K	x = 0.291 ± 0.02
	y = 0.306 ± 0.006		y = 0.306 ± 0.02
9300K	x = 0.283 ± 0.006	9300K	x = 0.283 ± 0.02
	y = 0.297 ± 0.006		y = 0.297 ± 0.02
11500K	x = 0.270 ± 0.006	11500K	x = 0.270 ± 0.02
	y = 0.281 ± 0.006		y = 0.281 ± 0.02

Quality inspect

5000K	x = 0.345 ± 0.015
	y = 0.357 ± 0.015
6500K	x = 0.313 ± 0.015
	y = 0.329 ± 0.015
7500K	x = 0.298 ± 0.015
	y = 0.314 ± 0.015
8200K	x = 0.291 ± 0.015
	y = 0.306 ± 0.015
9300K	x = 0.283 ± 0.015
	y = 0.297 ± 0.015
11500K	x = 0.270 ± 0.015
	y = 0.281 ± 0.015

FAQs (Frequently Asked Questionis)

General FAQs

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

A: Recommended video mode for Philips 22": 1680x1050 @ 60Hz.
1. Unplug all cables, then connect your PC to the monitor that you used previously.
2. 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 slidebar to 1680x1050 pixels (22").
3. Open 'Advanced Properties' and set the Refresh Rate to 60Hz, then click OK.
4. Restart your computer and repeat step 2 and 3 to verify that your PC is set at 1680x1050@ 60Hz (22").
5. Shut down your computer, disconnect your old monitor and reconnect your Philips LCD monitor.
6. Turn on your monitor and then turn on your PC.

Q: What does 'refresh rate' mean in connection with an LCD monitor?

A: The refresh rate is of much less relevance for LCD monitors. LCD monitors display a stable, flicker-free image at 60Hz. There is no visible difference between 85Hz and 60Hz.

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

A: 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.

Q: How do I adjust the resolution?

A: 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".

Q: What if I get lost when I am making monitor adjustments?

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

Q: What is the Auto function?

A: The AUTO adjustment key restores the optimal screen position, phase and clock settings by pressing of a single button …without the need to navigate through OSD (On Screen Display) menus and control keys.
Note: Auto function is available in selected models only.

Q: My Monitor has no power (Power LED does not light up). What should I do?

A: Make sure the AC power cord is connected between the monitor and AC outlet, and click a key on keyboard/mouse to wake up the PC.

Q: Will the LCD monitor accept an interlaced signal under PC models?

A: No. If an Interlace signal is used, the screen displays both odd and even horizontal scanning lines at the same time, thus distorting the picture.

Q: What does the Refresh Rate mean for LCD?

A: Unlike CRT display technology, in which the speed of the electron beam is swept from the top to the bottom of the screen determines flicker, an active matrix display uses an active element (TFT) to control each individual pixel and the refresh rate is therefore not really applicable to LCD technology.

Q: Will the LCD screen be resistant to scratches?

A: A protective coating is applied to the surface of the LCD, which is durable to a certain extent (approximately up to the hardness of a 2H pencil). In general, it is recommended that the panel surface is not subject to any excessive shocks or scratches.

Q: How should I clean the LCD surface?

A: 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.

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

A: Yes, you can change your color setting through OSD control as the following procedures,
1. Press "OK" to show the OSD (On Screen Display) menu
2. Press "Down Arrow" to select the option "Color" then press "OK" to enter color setting, there are three settings as below.
a. Color Temperature; The six settings are 5000K, 6500K, 7500K, 8200K, 9300K and 11500K. With settings in the 5000K range the panel appears •warm,' with a red-white color tone, while a 11500K temperature yields •cool, blue-white toning."
b. sRGB; this is a standard setting for ensuring correct exchange of colors between different device (e.g. digital cameras, monitors, printers, scanners, etc)
c. User Define; the user can choose his/her preference color setting by adjusting red, green blue color.
d. Gamma; The five settings are 1.8, 2.0, 2.2, 2.4, and 2.6.
*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.

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

A: Yes. Philips LCD monitors have this optional feature. For 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 to contact your Philips sales representative for more information.

Screen Adjustments

Q: When I install my monitor, how do I get the best performance from the monitor?

A:For best performance, make sure your display settings are set at 1680x1050@ 60Hz for 22". Note: You can check the current display settings by pressing the OSD OK button once. The current display mode is shown in OSD setup information page

Q: How do LCDs compare to CRTs in terms of radiation?

A: Because LCDs do not use an electron gun, they do not generate the same amount of radiation at the screen surface.

Compatibility with other Peripherals

Q: Can I connect my LCD monitor to any PC, workstation or Mac?
A: 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.

FAQs (Frequently Asked Questionis)

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

A: Yes, the monitors are Plug-and-Play compatible with Windows® 95, 98, 2000, XP and Vista.

Q: What is USB (Universal Serial Bus)?

A: Think of USB as a smart plug for PC peripherals. USB automatically determines resources (like driver software and bus bandwidth) required by peripherals. USB makes necessary resources available without user intervention. There are three main benefits of USB. USB eliminates "case anxiety," the fear of removing the computer case to install circuit board cards -- that often requires adjustment of complicated IRQ settings -- for add-on peripherals. USB does away with "port gridlock." Without USB, PCs are normally limited to one printer, two Com port devices (usually a mouse and modem), one Enhanced Parallel Port add-on (scanner or video camera, for example), and a joystick. More and more peripherals for multimedia computers come on the market every day. With USB, up to 127 devices can run simultaneously on one computer. USB permits "hot plug-in." No need to shut down, plug in, reboot and run set up to install peripherals. No need to go through the reverse process to unplug a device. Bottom line: USB transforms today's "Plug-and-Pray" into true Plug-and-Play!
Please refer to glossary for more information about USB.

Q: What is a USB hub ?

A: A USB hub provides additional connections to the Universal Serial Bus. A hub's upstream port connects a hub to the host, usually a PC. Multiple downstream ports in a hub allows connection to another hub or device, such as a USB keyboard, camera or printer.

LCD Panel Technology

Q: What is a Liquid Crystal Display?

A: A Liquid Crystal Display (LCD) is an optical device that is commonly used to display ASCII characters and images on digital items such as watches, calculators, portable game consoles, etc. LCD is the technology used for displays in notebooks and other small computers. Like light-emitting diode and gas-plasma technologies, LCD allows displays to be much thinner than cathode ray tube (CRT) technology. LCD consumes much less power than LED and gas-displays because it works on the principle of blocking light rather than emitting it.

Q: What differentiates passive matrix LCDs from active matrix LCDs?

A: An LCD is made with either a passive matrix or an active matrix display grid. An active matrix has a transistor located at each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active matrix display can be switched on and off more frequently, improving the screen refresh time (your mouse pointer will appear to move more smoothly across the screen, for example). The passive matrix LCD has a grid of conductors with pixels located at each intersection in the grid.

Q: What are the advantages of TFT LCD compared with CRT?

A: In a CRT monitor, a gun shoots electrons and general light by colliding polarized electrons on fluorescent glass. Therefore, CRT monitors basically operate with an analog RGB signal. A TFT LCD monitor is a device that displays an input image by operating a liquid crystal panel. The TFT has a fundamentally different structure than a CRT: Each cell has an active matrix structure and independent active elements. A TFT LCD has two glass panels and the space between them is filled with liquid crystal. When each cell is connected with electrodes and impressed with voltage, the molecular structure of the liquid crystal is altered and controls the amount of inlet lighting to display images. A TFT LCD has several advantages over a CRT, since it can be very thin and no flickering occurs because it does not use the scanning method.

Q: Why is vertical frequency of 60Hz optimal for an LCD monitor?

A: Unlike a CDT monitor, the TFT LCD panel has a fixed resolution. For example, an XGA monitor has 1024x3 (R, G, B) x 768 pixels and a higher resolution may not be available without additional software processing. The panel is designed to optimize the display for a 65MHz dot clock, one of the standards for XGA displays. Since the vertical/horizontal frequency for this dot clock is 60Hz/48kHz, the optimum frequency for this monitor is 60Hz.

Q: What kind of wide-angle technology is available? How does it work?

A: The TFT LCD panel is an element that controls/displays the inlet of a backlight using the dual-refraction of a liquid crystal. Using the property that the projection of inlet light refracts toward the major axis of the liquid element, it controls the direction of inlet light and displays it. Since the refraction ratio of inlet light on liquid crystal varies with the inlet angle of the light, the viewing angle of a TFT is much narrower than that of a CDT. Usually, the viewing angle refers to the point where the contrast ration is 10. Many ways to widen the viewing angle are currently being developed and the most common approach is to use a wide viewing angle film, which widens the viewing angle by varying the refraction ratio. IPS (In Plane Switching) or MVA (Multi Vertical Aligned) is also used to give a wider viewing angle.

Q: Why is there no flicker on an LCD Monitor?

A: Technically speaking, LCDs do flicker, but the cause of the phenomenon is different from that of a CRT monitor -- and it has no impact of the ease of viewing. Flickering in an LCD monitor relates to usually undetectable luminance caused by the difference between positive and negative voltage. On the other hand, CRT flickering that can irritate the human eye occurs when the on/off action of the fluorescent object becomes visible. Since the reaction speed of liquid crystal in an LCD panel is much slower, this troublesome form of flickering is not present in an LCD display.

Q: Why is an LCD monitor virtually low of Electro Magnetic Interference?

A: Unlike a CRT, an LCD monitor does not have key parts that generate Electro Magnetic Interference, especially magnetic fields. Also, since an LCD display utilizes relatively low power, its power supply is extremely quiet.

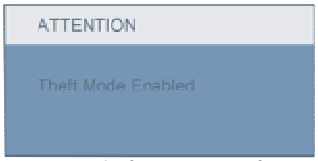
Ergonomics, Ecology and Safety Standards

Q: What is the CE mark?

A: The CE (Conformité Européenne) mark is required to be displayed on all regulated products offered for sale on the European market. This 'CE' mark means that a product complies with the relevant European Directive. A European Directive is a European 'Law' that relates to health, safety, environment and consumer protection, much the same as the U.S. National Electrical Code and UL Standards.

Q: Does the LCD monitor conform to general safety standards?
A: Yes. Philips LCD monitors conform to the guidelines of MPR-II and TCO 99/03 standards for the control of radiation, electromagnetic waves, energy reduction, electrical safety in the work environment and recyclability. The specification page provides detailed data on safety standards.

Q: After I change new PC, I found this information on screen, how can I do?



A: Because you activate Theft Deterrence function in SmartControl II. Please contact IT manager or Philips Service Center.

Electrical Instructions

1.Electrical Characteristics

1.1 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-/+)

1.2 Interface

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

1.3 Timing requirement

1.3.1 Mode storing capacity

Factory preset modes : D-sub :18 , DVI : 17
Preset modes : 49
User modes : 10

1.3.2 Factory preset modes (D-sub18 modes)

20W and 22W Preset Mode

Item	H.Freq. (KHz)	Mode	Resolution	V.Freq. (Hz)	BW(MHz)	Remark
1	31.469	IBM VGA 1DH	640x350	70.086		Can't put it in EDID, change to preset mode
2	31.469	IBM VGA 3H	720x400	70.087		
3	31.469	IBM VGA 12H	640x480	59.94		
4	35	MACINTOSH	640x480	67		
5	37.861	VESA	640x480	72.809		
6	37.5	VESA	640x480	75		
7	43.269	VESA	640x480	85.008		Vfreq over panel spec. Out of range information still need to be shown on screen. Auto function sill can do
8	35.156	VESA	800x600	56.25		
9	37.879	VESA	800x600	60.317		
10	48.077	VESA	800x600	72.188		
11	46.875	VESA	800x600	75		
12	53.674	VESA	800x600	85.061		Vfreq over panel spec. Out of range information still need to be shown on screen. Auto function sill can do
13	49.7	MACINTOSH	832x624	75		
14	56.4	-	960x720	75		960x720 and 1280x720 information are same, need to do AUTO to separate them. Default timing is 1280x720
15	44.75	-	960x720	60		960x720 and 1280x720 information are same, need to do AUTO to separate them. Default timing is 1280x720
16	48.363	VESA	1024x768	60.004		
17	56.476	VESA	1024x768	70.069		1280x768 and 1360x768 information are same, need to do AUTO to separate them. Default timing is 1280x768
18	60.023	VESA	1024x768	75.029		1280x768 and 1360x768 information are same, need to do AUTO to separate them. Default timing is 1280x768
19	61.08	IBM XGA-2	1024x768	75.781		1280x768 and 1360x768 information are same, need to do AUTO to separate them. Default timing is 1280x768
20	68.677	VESA	1024x768	84.997		Vfreq over panel spec. Out of range information still need to be shown on screen. Auto function sill can do
21		CVT 2.3MA	1280 x768	60		1280x768 and 1360x768 information are same, need to do AUTO to separate them. Default timing is 1280x768
22	60.289	CVT 2.3MA	1280 x768	75		1280x768 and 1360x768 information are same, need to do AUTO to separate them. Default timing is 1280x768
23	54.1		1152x864	60		
24	63.851	VESA	1152x864	70.012		
25	67.5	VESA	1152x864	75		
26	68.7	MACINTOSH	1152x870	75		
27	61.845	SUN WS	1152x900	66.004		
28	71.81	SUN WS	1152x900	76.15		
29	60	VESA	1280x960	60		
30	75	VESA	1280x960	75		
31	63.981	VESA	1280x1024	60.02		
32	71.691	SUN WS	1280x1024	67.189		
33	76	DOS/V	1280x1024	72		
34	79.976	VESA	1280x1024	75.025		
35	81.13	SUN WS	1280x1024	76.11		
36	91.1	VESA	1280x1024	85		Vfreq over panel spec. Out of range information still need to be shown on screen. Auto function sill can do
37	44.772	-	1280x720	60		960x720 and 1280x720 information are same, need to do AUTO to separate them. Default timing is 1280x720
38	52.5	-	1280x720	70		960x720 and 1280x720 information are same, need to do AUTO to separate them. Default timing is 1280x720
39	64	CVT	1400x1050	60	121.75	
40	80	CVT	1400x1050	75	156.001	
~~41~~	~~91.1~~	~~CVT~~	~~1400x1050~~	~~85~~	~~180.5~~	pixel clock 180, out of range, suggest to remove
42	55.469	VESA reduced blanking mode	1440x900	59.901	88.75	
43	55.935	VESA	1440x900	59.887	106.5	
44	70.635	VESA	1440x900	74.984	136.75	
45	75	VESA	1600x1200	60	161	
46	66.587	CVT 2.3MA-R	1920x1080	60	138.5	2006/08/22, Joshua/Paul> Not put into EDID, some DELL N/B will use it as power on default timing, it cause display fails
47	65.29	CVT1.76MW	1680x1050	60	146	1680x1050 and 1440x1050 information are same , need to do AUTO to separate them Default timing is 1680x1050
48		CVT1.76MW-R	1680x1050	60	119	1680x1050 and 1440x1050 information are same , need to do AUTO to separate them Default timing is 1680x1050
49		CVT 1.02	1280x800	60		
50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Factory Preset mode: 17 Sets
Preset mode: 49 Sets
User mode: 10 Sets

Electrical Instructions

2. White color adjustment

There are three factory preset white color 9300K, 6500K, sRGB. Apply full white pattern, with brightness in 100 % position and the contrast control at 50 % position. The 1931 CIE Chromaticity (color triangle) diagram (x,y) coordinate for the screen center should be:

Production		Product SPEC	
5000K	x = 0.345 ± 0.006	5000K	x = 0.345 ± 0.02
	y = 0.357 ± 0.006		y = 0.357 ± 0.02
6500K	x = 0.313 ± 0.006	6500K	x = 0.313 ± 0.02
	y = 0.329 ± 0.006		y = 0.329 ± 0.02
7500K	x = 0.298 ± 0.006	7500K	x = 0.298 ± 0.02
	y = 0.314 ± 0.006		y = 0.314 ± 0.02
8200K	x = 0.291 ± 0.006	8200K	x = 0.291 ± 0.02
	y = 0.306 ± 0.006		y = 0.306 ± 0.02
9300K	x = 0.283 ± 0.006	9300K	x = 0.283 ± 0.02
	y = 0.297 ± 0.006		y = 0.297 ± 0.02
11500K	x = 0.270 ± 0.006	11500K	x = 0.270 ± 0.02
	y = 0.281 ± 0.006		y = 0.281 ± 0.02

Quality inspect

5000K	x = 0.345 ± 0.015
	y = 0.357 ± 0.015
6500K	x = 0.313 ± 0.015
	y = 0.329 ± 0.015
7500K	x = 0.298 ± 0.015
	y = 0.314 ± 0.015
8200K	x = 0.291 ± 0.015
	y = 0.306 ± 0.015
9300K	x = 0.283 ± 0.015
	y = 0.297 ± 0.015
11500K	x = 0.270 ± 0.015
	y = 0.281 ± 0.015

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)

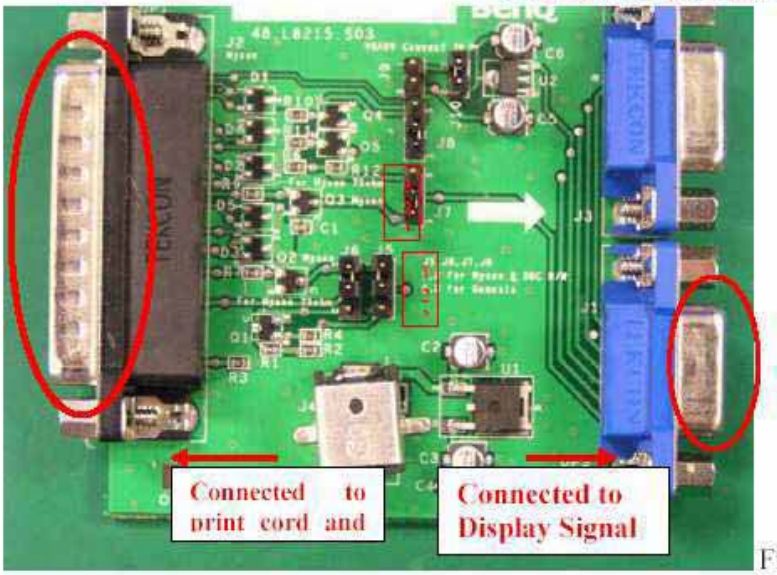


Fig.1

DDC Instructions

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

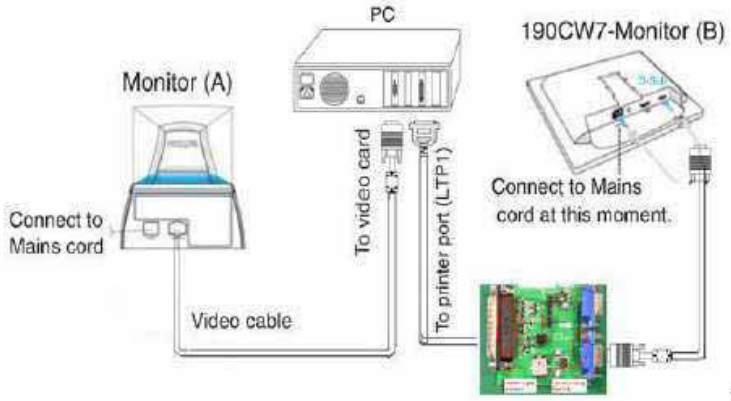
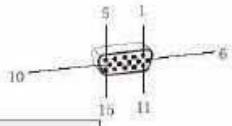


Fig.2

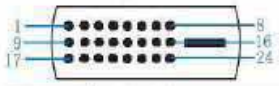
Pin assignment

A. 15-pin D-Sub Connector



PIN No.	SIGNAL
1	Red video input
2	Green video input / sync on green
3	Blue video input
4	GND
5	GND - Cable detect
6	Red video GND
7	Green video GND
8	Blue video GND
9	DDC +5.0V or +5V
10	Logic GND
11	GND
12	Serial data line (SDA)
13	H-sync / H+V
14	V-sync
15	Data clock line (SCL)

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) - Cable detect
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-

Fig. 2a

DDC Instructions

6. Setup the Philips-IMS EDID Tools program
Step 1: Make a folder in your PC as shown in Fig. 3.
For example: C:\EDID
Step 2: Copy PI-EDID Software into your folder as shown in Fig.3.

Fig.3

Step 3: Copy the
LCD_Analog.ddc and LCD_DVI.ddc
to C:\EDID as shown in Fig. 4 .

Fig.4

DDC Instructions

Update the DDC
1. Connect DSUB Cable to I2C Board.
Double click the PI-EDID.exe icon in desktop then appears window as shown in Fig.5.

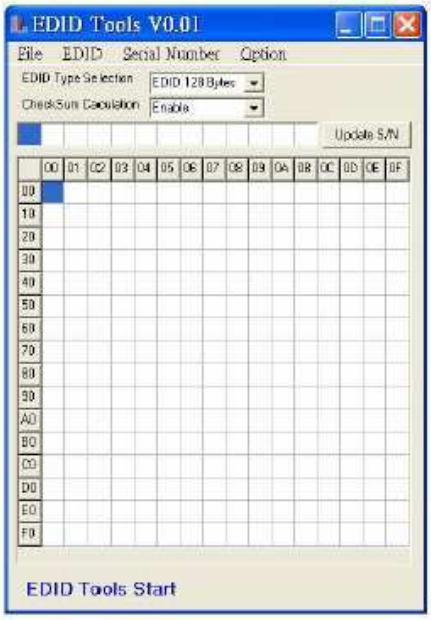


Fig.5

2. Press File->OPEN EDID to Load DDC file as shown in Fig.6.
Load Analog EDID file LCD_Analog.ddc to PI-EDID.exe

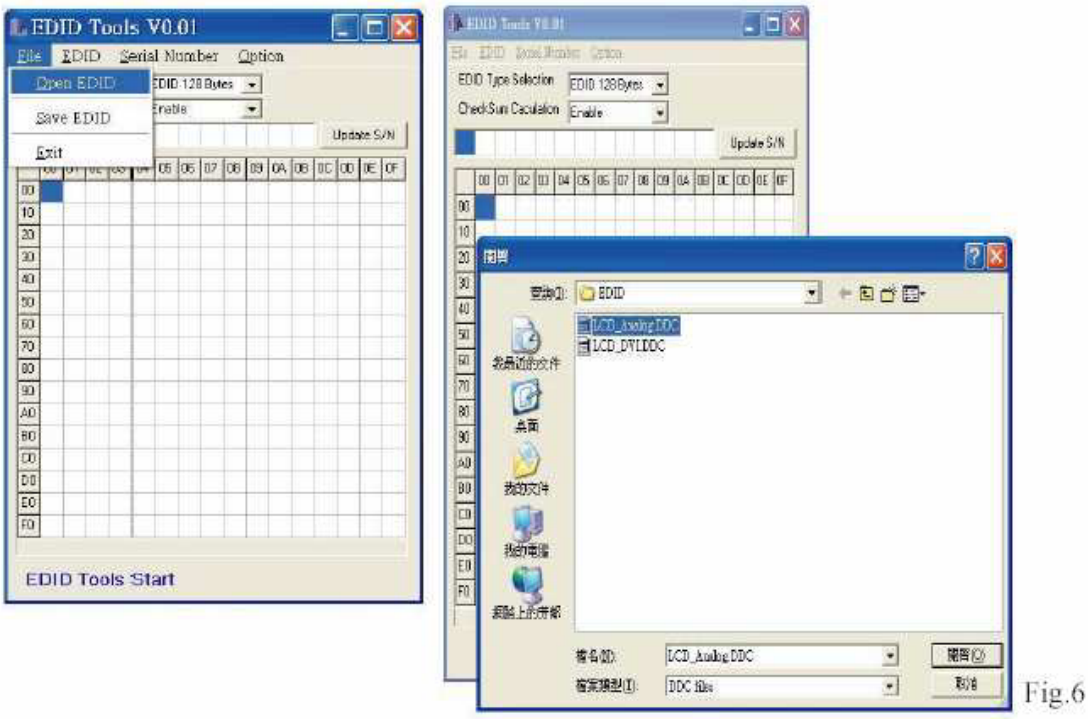


Fig.6

DDC Instructions

3. Load EDID file OK as shown in Fig.7.

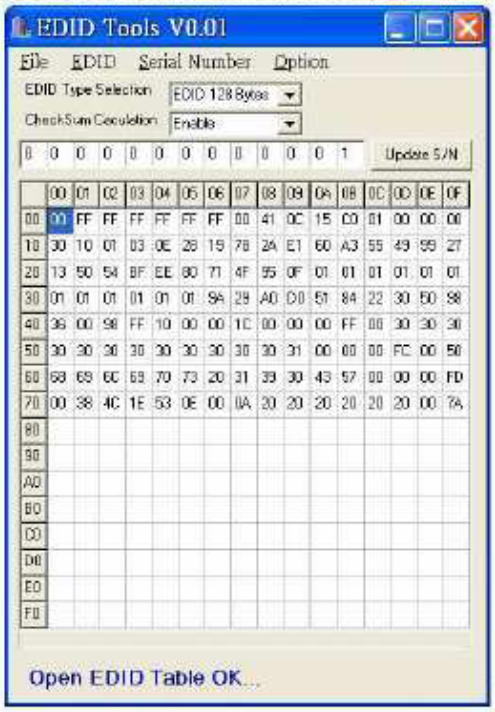


Fig.7

4. Modify Serial Number then Press "Update S/N" button asshown in Fig.8.

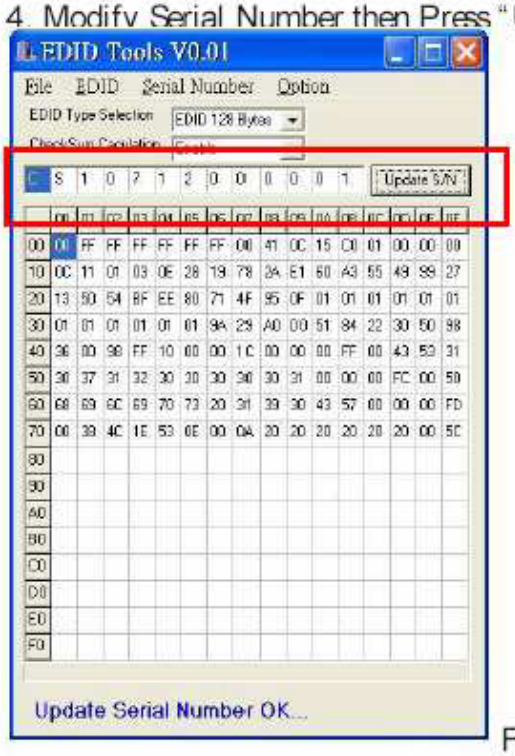


Fig.8

DDC Instructions

5. Press EDID->Write to write EDID data to EEPROM as shown in Fig. 9.

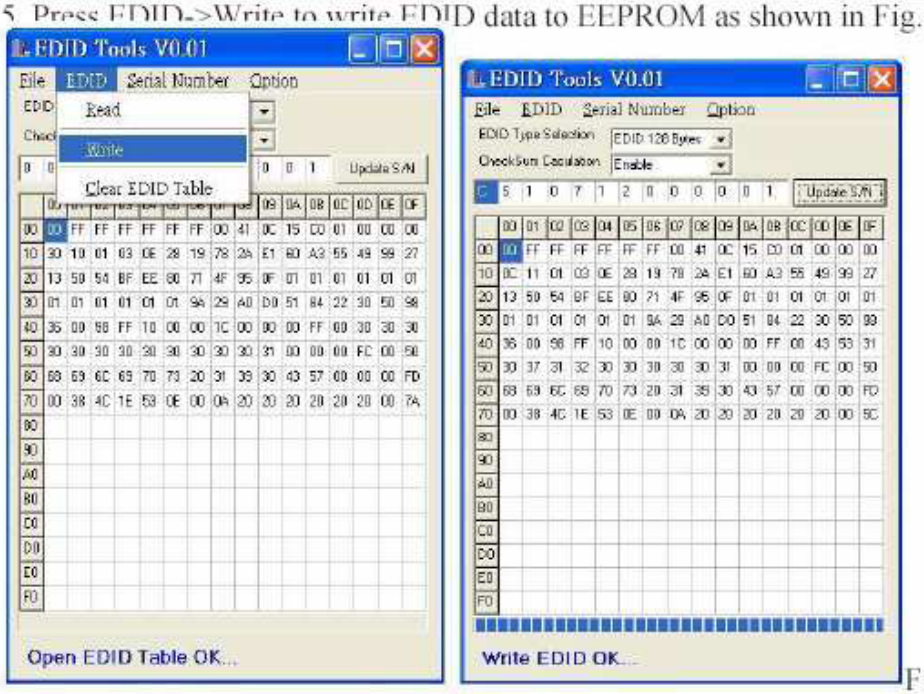


Fig.9

6. Connect DVI Cable to I2C Board.
   Repeat Step 1~5 to write DVI EDID file.

7. Enter Factory Mode then Press the Serial Number->Write EDIDS/N to EEPROM as shown in Fig.10
   Note: If not enter Factory Mode, this Wrote EDID S/N will not work.

Fig.10

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.

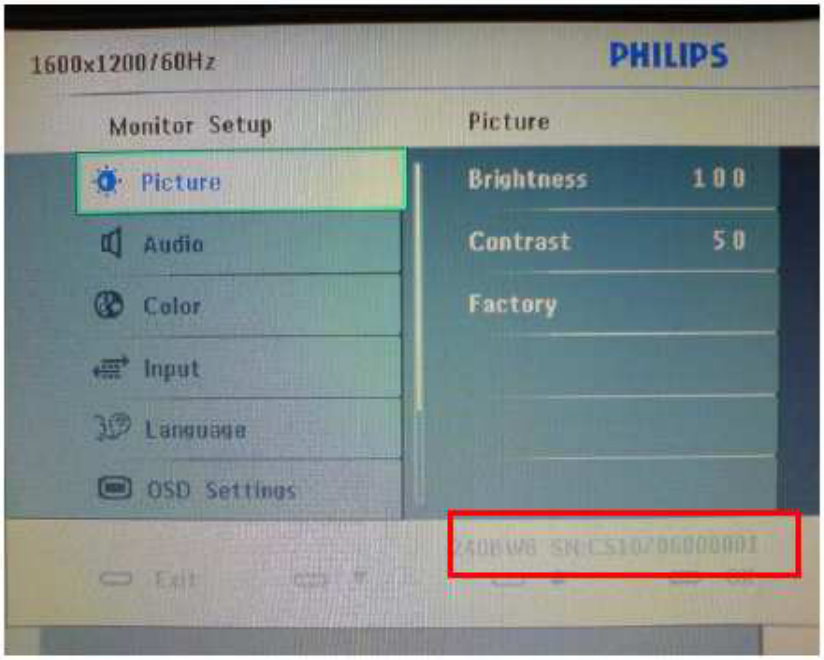
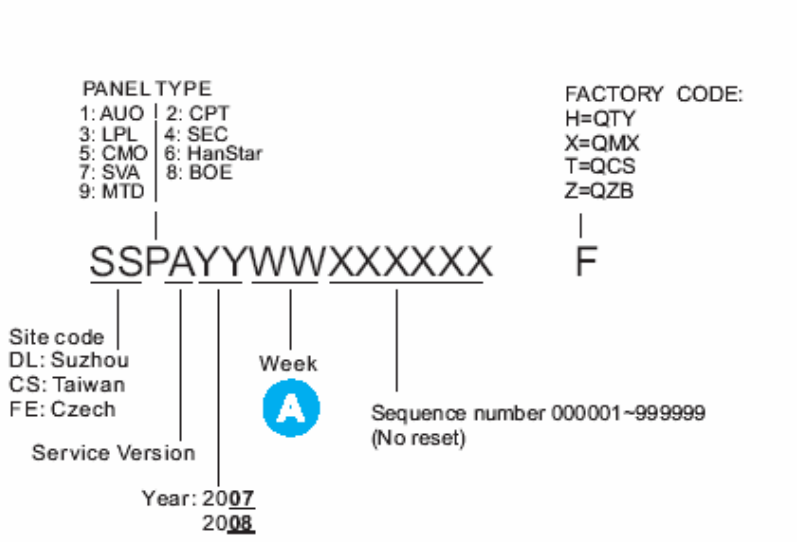


Fig.14

9 Turn off the monitor, exit the factory mode.

Serial Number Definition



DDC DATA

//////////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: 6F  08  01  00  00  00  07  12  01  03
 20: 0E  2F  1D  78  EE  B5  05  A5  56  4A
 30: 9A  25  12  50  54  BF  EF  80  B3  00
 40: 81  80  81  8F  95  00  95  0F  B3  0F
 50: A9  40  A9  4F  08  39  90  30  62  1A
 60: 27  40  68  B0  36  00  DA  28  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  30  53  57  00  00
110: 00  FD  00  38  4C  1E  53  11  00  0A
120: 20  20  20  20  20  20  00  09
```

Decoded EDID data

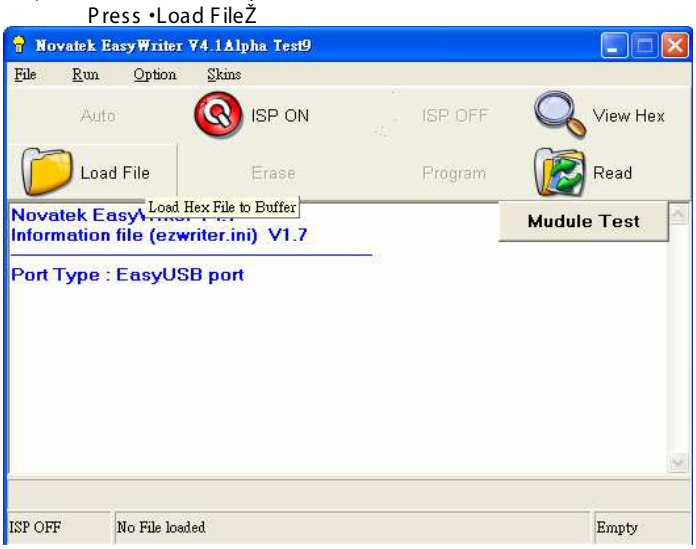
```
<---Header--->
    Header:                         00 FF FF FF FF FF FF 00
<-x-Header-x->

 <---Vendor/Product Identification--->
    ID Manufacturer Name:       PHL
    ID Product Code:            086F
    ID Serial Number:           00000001
    Week of Manufacture:        7
    Year of Manufacture:        2008
  <-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:        47 cm.
    Max Vert Image Size:        29 cm.
    Display Gamma:                  2.2
    Display Type:                   RGB color display
    Standard Default Color Space:   Yes
    Features, Preferred 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:              0.646484
    Red y:              0.338867
    Green x:            0.290039
    Green y:            0.602539
    Blue x:             0.144531
    Blue y:             7.03125e-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
            - 1152x870 @ 75Hz
    Established Timings 3:          80
    <-x-Established Timings-x->

 <---Standard Timing Identification--->
    Standard Timing:            1680x1050 @ 60Hz
    Standard Timing:            1280x1024 @ 60Hz
    Standard Timing:            1280x1024 @ 75Hz
    Standard Timing:            1440x 900 @ 60Hz
    Standard Timing:            1440x 900 @ 75Hz
    Standard Timing:            1680x1050 @ 75Hz
    Standard Timing:            1600x1200 @ 60Hz
    Standard Timing:            1600x1200 @ 75Hz
    <-x-Standard Timing Identification-x->

    <---Detailed Timing Descriptions--->
    Detailed Timing:        1680x1050 @ 59Hz
    Detailed Timing:        FF (Monitor SN) 'CS30715000001'
    Detailed Timing:        FC (Monitor name) 'Philips 220SW'
    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
```

DDC DATA

```
//////////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: 6F  08  01  00  00  00  07  12  01  03
 20: 80  2F  1D  78  EE  B5  05  A5  56  4A
 30: 9A  25  12  50  54  BF  EF  80  B3  00
 40: 81  80  81  8F  95  00  95  0F  A9  40
 50: 01  01  01  01  7C  2E  90  A0  60  1A
 60: 1E  40  30  20  36  00  DA  28  11  00
 70: 00  1A  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  30  53  57  00  00
110: 00  FD  00  38  4C  1E  53  11  00  0A
120: 20  20  20  20  20  20  00  4B

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:           2159
      ID Serial Number:          00000001
      Week of Manufacture:       7
      Year of Manufacture:       2008
      <-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:   No
      Composite Sync. support:   No
      Vsync. Pulse:              serration not required
      Max Horz Image Size:       47 cm.
      Max Vert Image Size:       29 cm.
      Display Gamma:             2.2
      Display Type:              RGB color display
      Standard Default Color Space:  Yes
      Features, Preferred 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:                     0.646484
      Red y:                     0.338867
      Green x:                   0.290039
      Green y:                   0.602539
      Blue x:                    0.144531
      Blue y:                    7.03125e-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:           1680x1680 @ 60Hz
      Standard Timing:           1280x1024 @ 60Hz
      Standard Timing:           1280x1024 @ 75Hz
      Standard Timing:           1440x1440 @ 60Hz
      Standard Timing:           1440x1440 @ 75Hz
      Standard Timing:           1600x1200 @ 60Hz
      <-x-Standard Timing Identification-x->

      <---Detailed Timing Descriptions--->
      Detailed Timing:           1680x1050 @ 59Hz
      Detailed Timing:           FF (Monitor SN) 'CS30715000001'
      Detailed Timing:           FC (Monitor name) 'Philips 220SW'
      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:                  4B
```

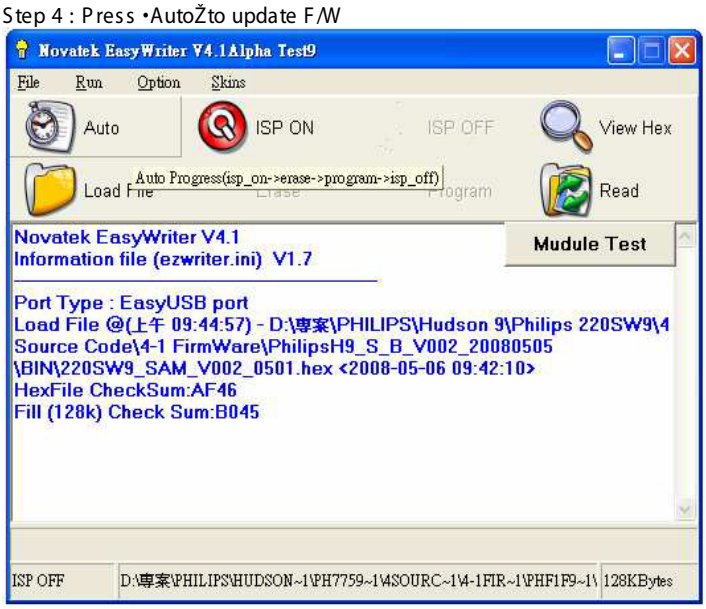
Firmware Upgrade for CPU

Step 1 : Install •Port95nt.exeŽ
Restart computer.
Step 2 : Dobule click •EasyUSB Writer\Writer_t9.exeŽ
Press •Load FileŽ

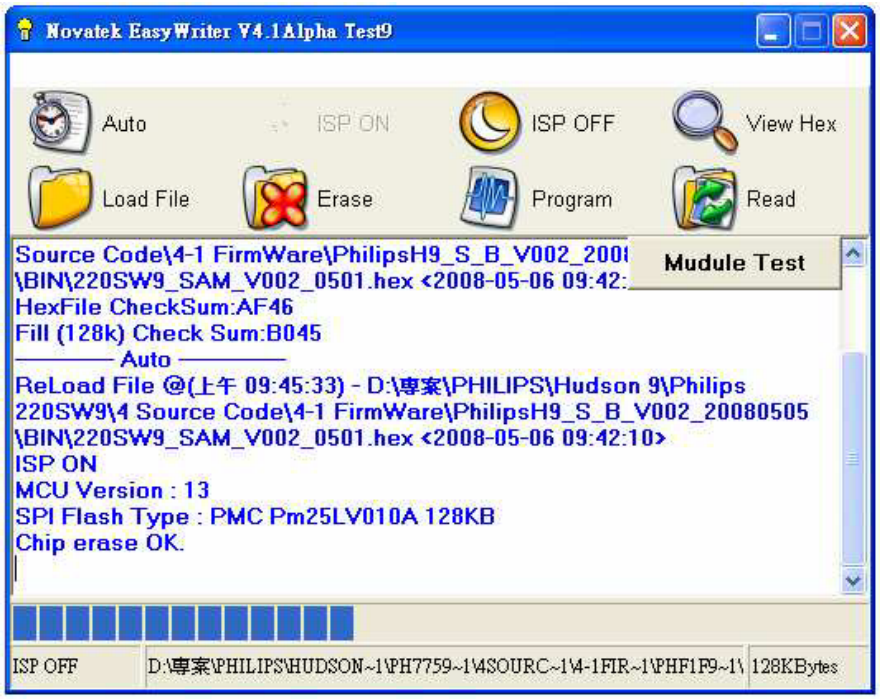


Step 3 : Choose *.hex

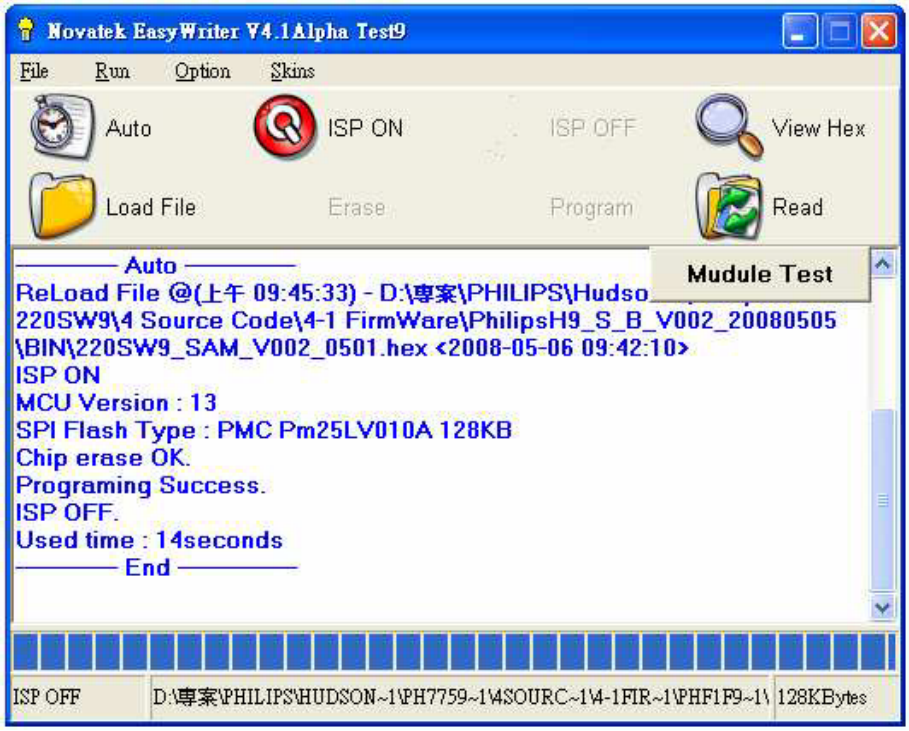
Step 4 : Press •AutoŽto update F/W



Firmware Upgrade for CPU



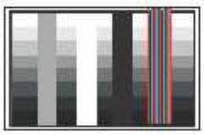
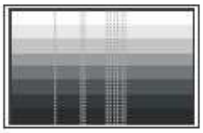
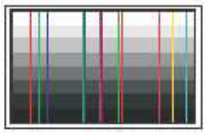
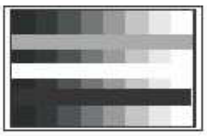
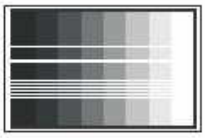
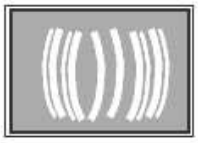
Step 5 : Update OK !!



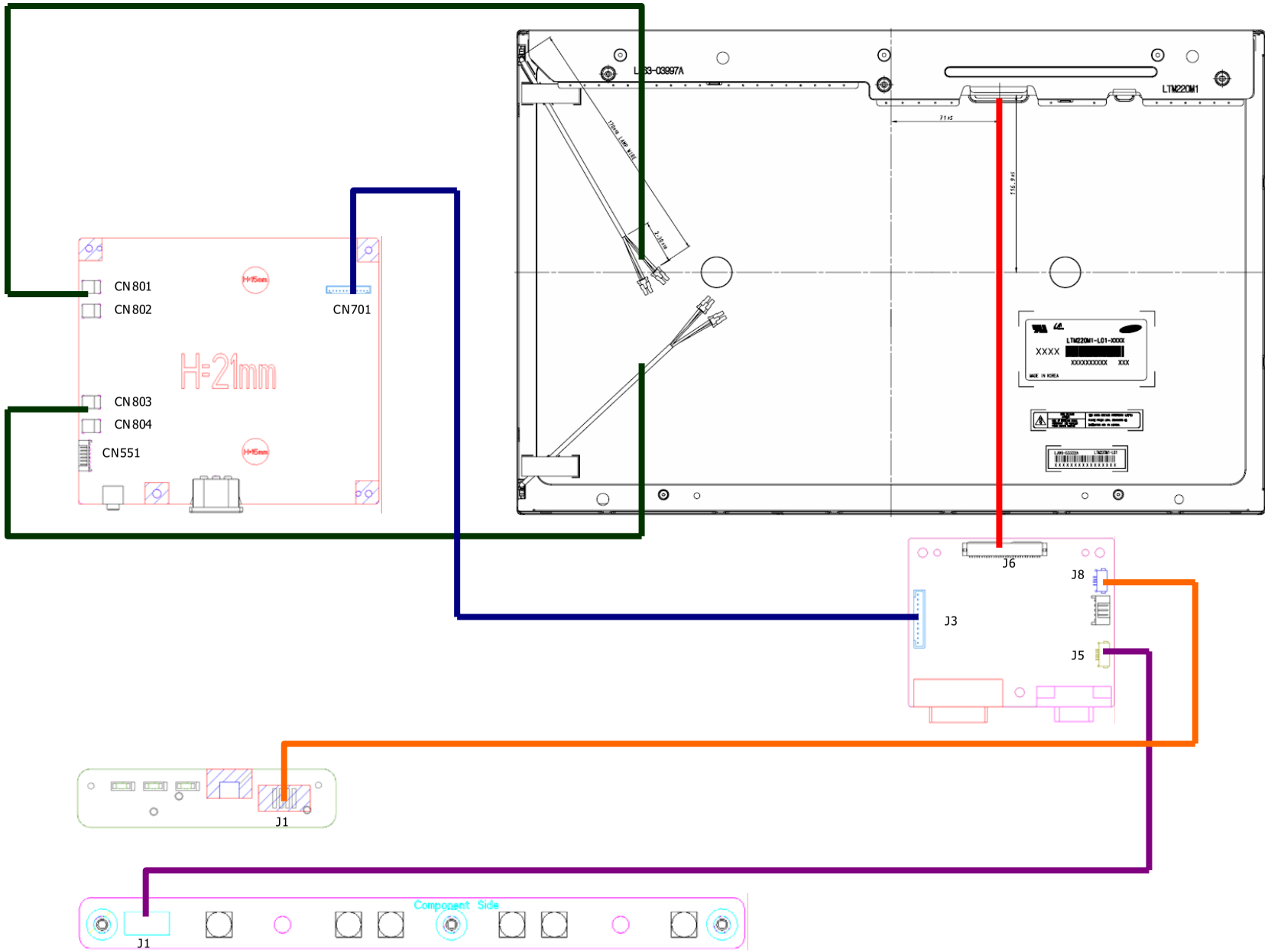
Failure Mode Of Panel

Quick reference for failure mode of LCD panel

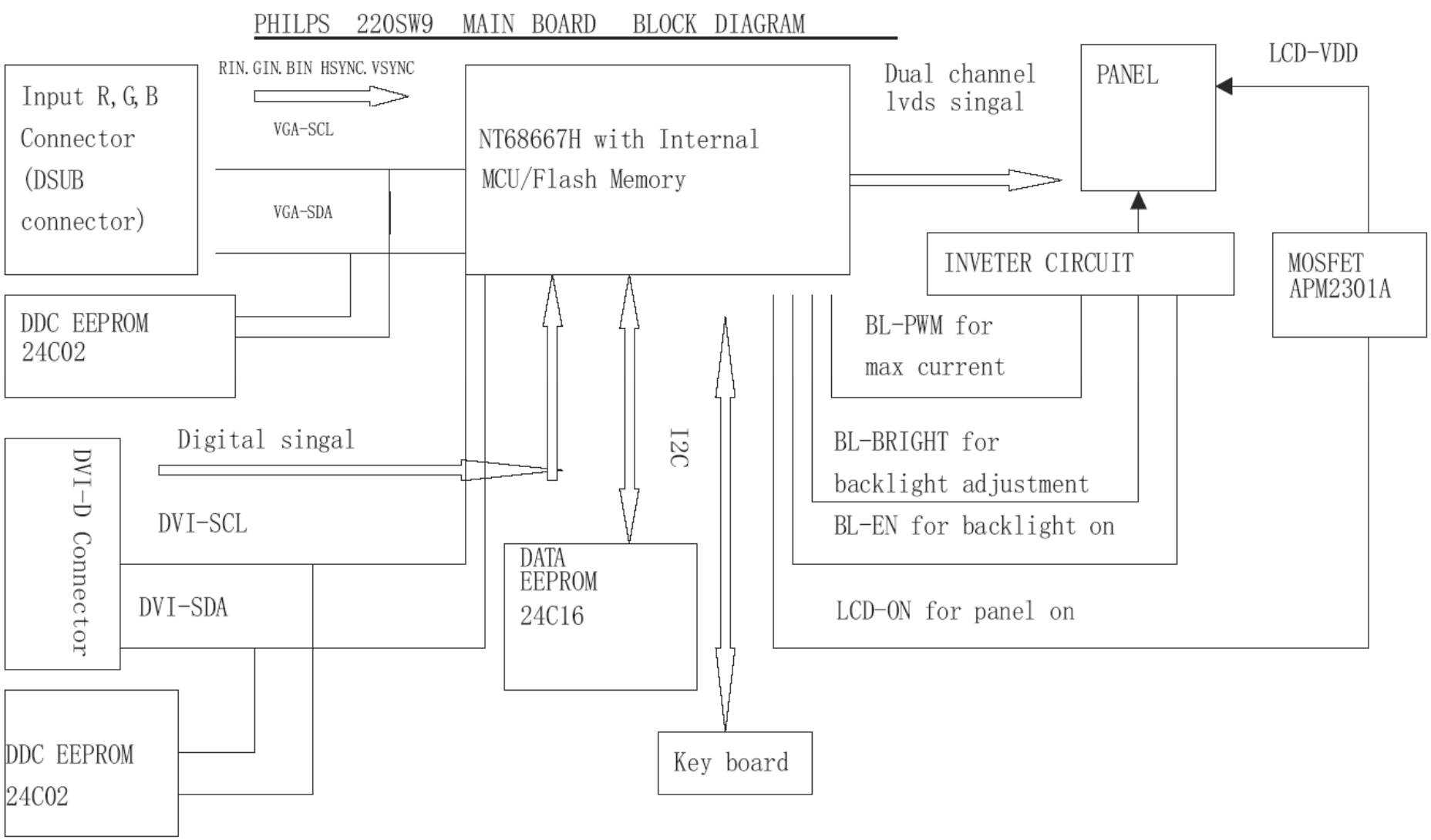
this page presents problems that could be made by LCD panel.
It is not necessary to repair circuit board. Simply follow the mechanical instruction on this manual to eliminate failure by replace LCD panel.

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	

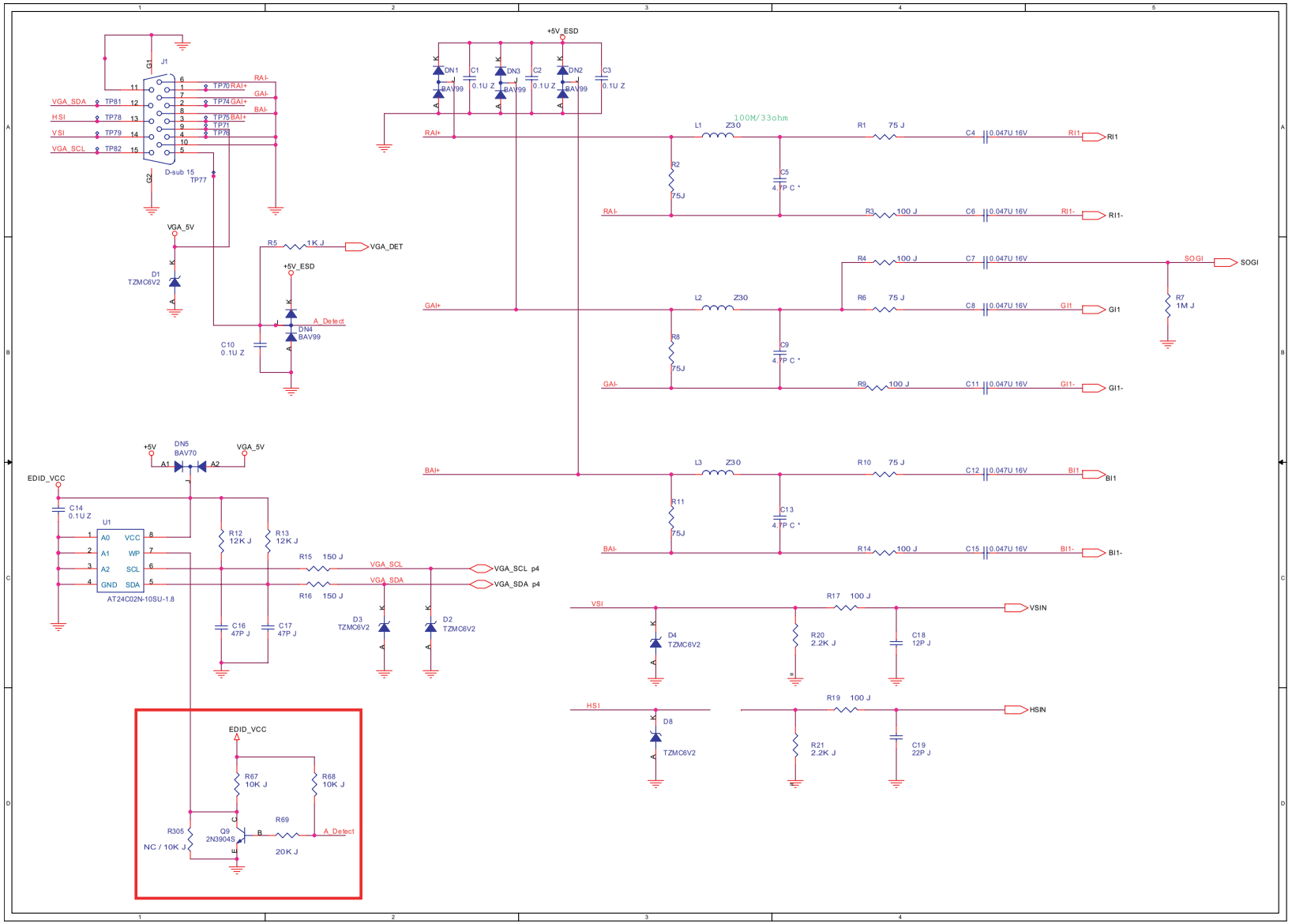
Wiring Diagram



Block Diagram

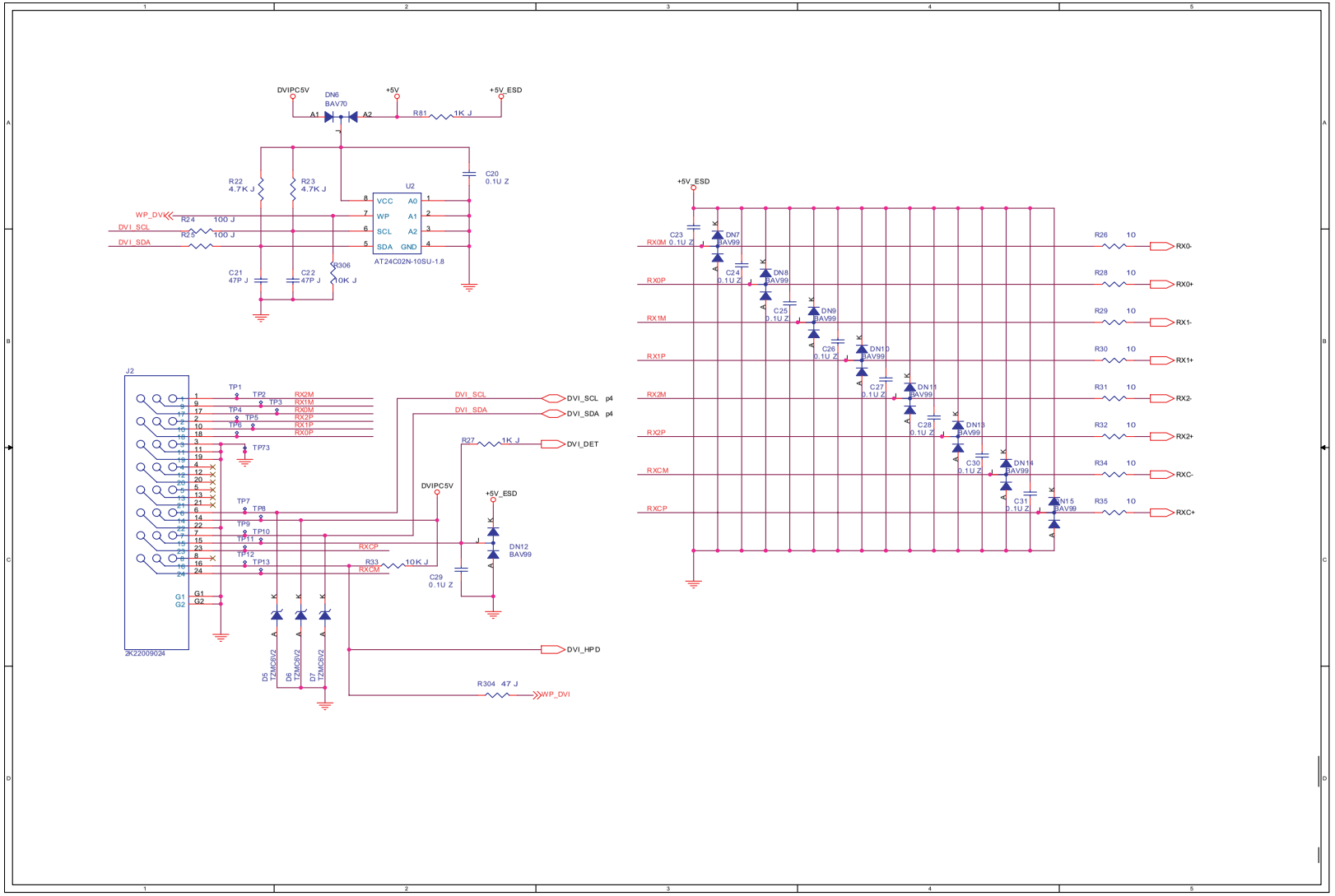


Scaler Diagram & C.B.A



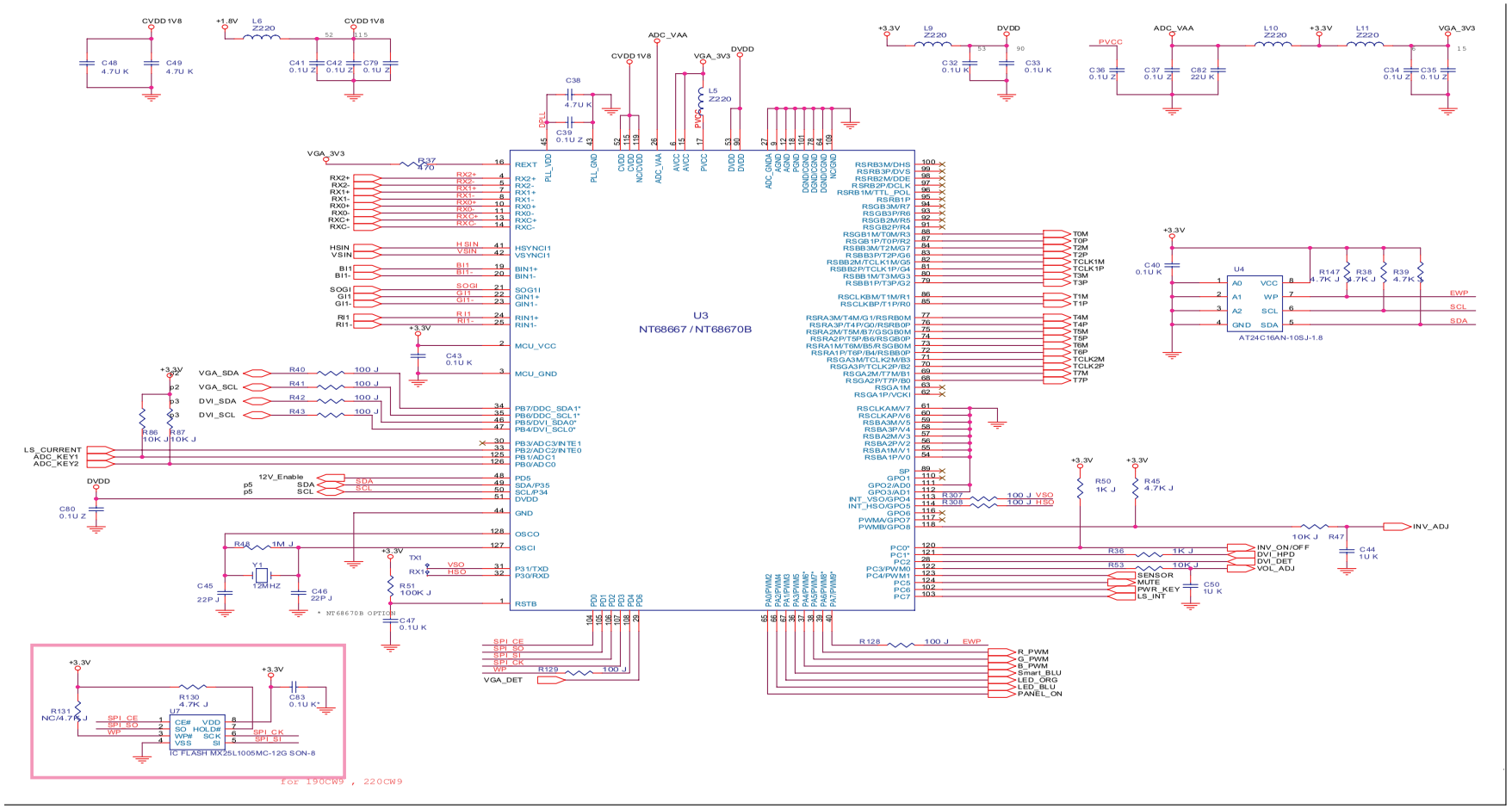
C1	A2
C10	B1
C11	B4
C12	C4
C13	C3
C14	C1
C15	C4
C16	C1
C17	C1
C18	C4
C19	D4
C2	A3
C3	A3
C4	A4
C5	A3
C6	A4
C7	B4
C8	B4
C9	B3
D1	B1
D2	C2
D3	C2
D4	C3
D8	D3
DN1	A2
DN2	A3
DN3	A2
DN4	B2
DN5	B1
J1	A1
L1	A3
L2	B3
L3	C3
Q9	D1
R1	A4
R10	C4
R11	C3
R12	C1
R13	C1
R14	C4
R15	C2
R16	C2
R17	C4
R18	D3
R19	D4
R2	A3
R20	C4
R21	D4
R3	A4
R4	B4
R5	A2
R6	B4
R67	D1
R68	D2
R69	D2
R7	B5
R8	B3
R9	B4
U1	C1

Scaler Diagram & C.B.A



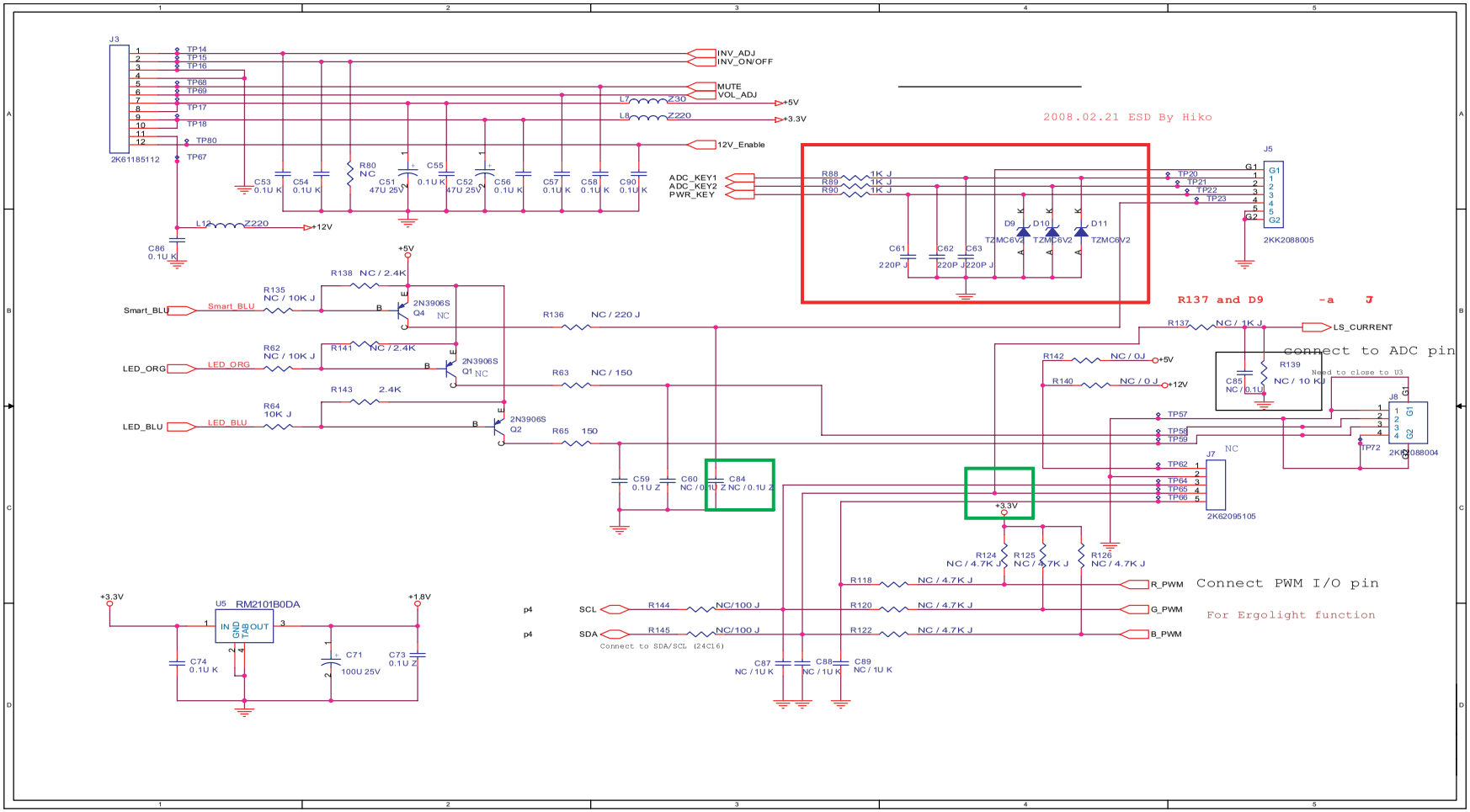
C20	A2
C21	B1
C22	B2
C23	A3
C24	B3
C25	B3
C26	B4
C27	B4
C28	B4
C29	C2
C30	C4
C31	C4
D5	C1
D6	C2
D7	C2
DN10	B4
DN11	B4
DN12	C2
DN13	B4
DN14	C4
DN15	C4
DN6	A2
DN7	A3
DN8	B3
DN9	B4
J2	B1
R22	A1
R23	A2
R24	A1
R25	B1
R26	B5
R27	B2
R28	B5
R29	B5
R30	B5
R304	D2
R306	B2
R31	B5
R32	B5
R33	C2
R34	C5
R35	C5
R81	A2
U2	A2

Scaler Diagram & C.B.A



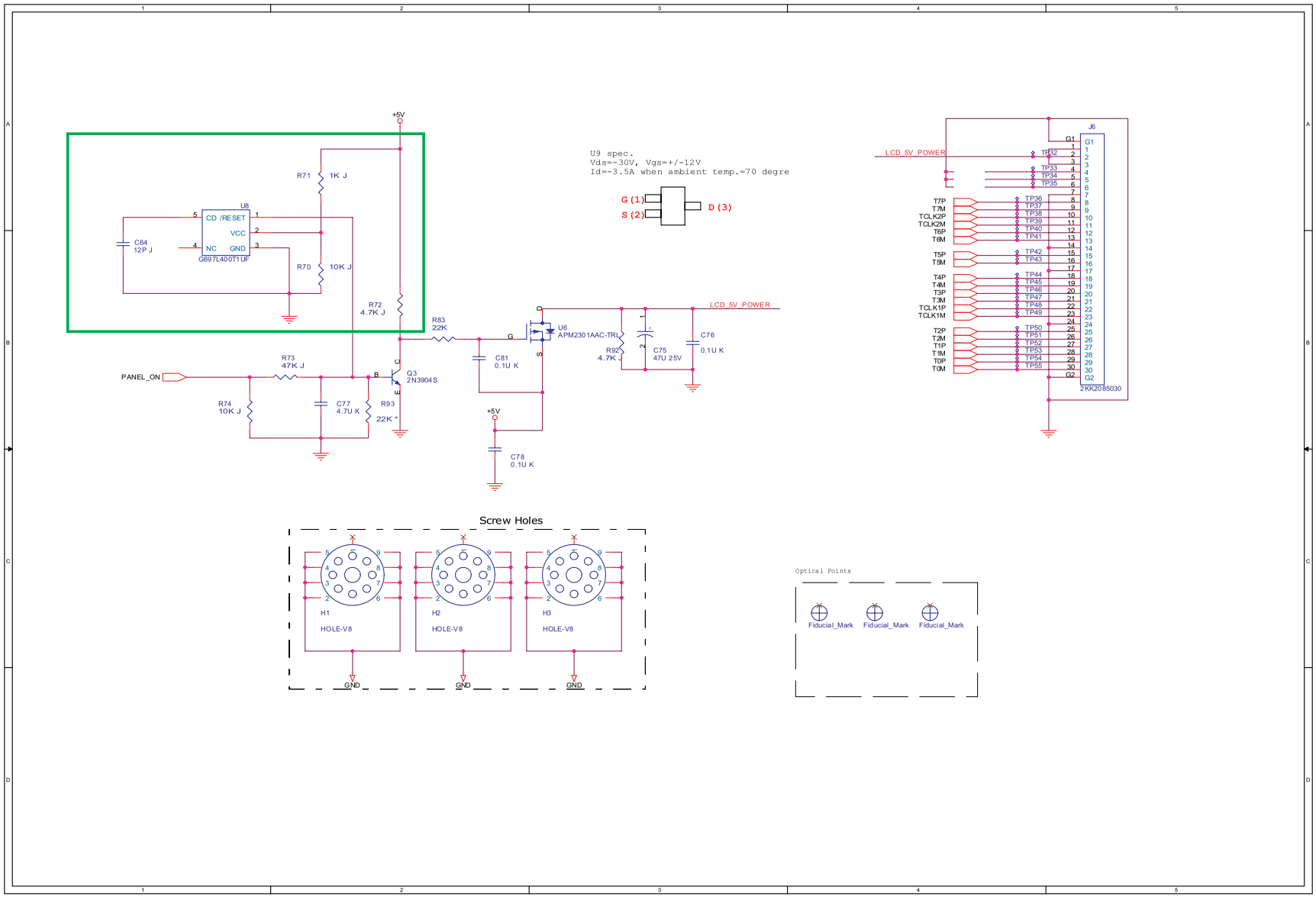
C32	A4
C33	A4
C34	A5
C35	A5
C36	A4
C37	A4
C38	A2
C39	A2
C40	B4
C41	A2
C42	A2
C43	B2
C44	C5
C45	C1
C46	C1
C47	D2
C48	A1
C49	A1
C50	C4
C79	A2
C80	C1
C82	A4
C83	D1
L10	A5
L11	A5
L5	A3
L6	A1
L9	A4
R128	D3
R129	D2
R130	D1
R147	B5
R307	C4
R308	C4
R36	C4
R37	A2
R38	B5
R39	B5
R40	B2
R41	B2
R42	B2
R43	C2
R45	C4
R47	C5
R48	C1
R50	C4
R51	C2
R53	C4
R86	C1
R87	C1
U3	A2
U4	B5
U7	D1
Y1	C1

Scaler Diagram & C.B.A



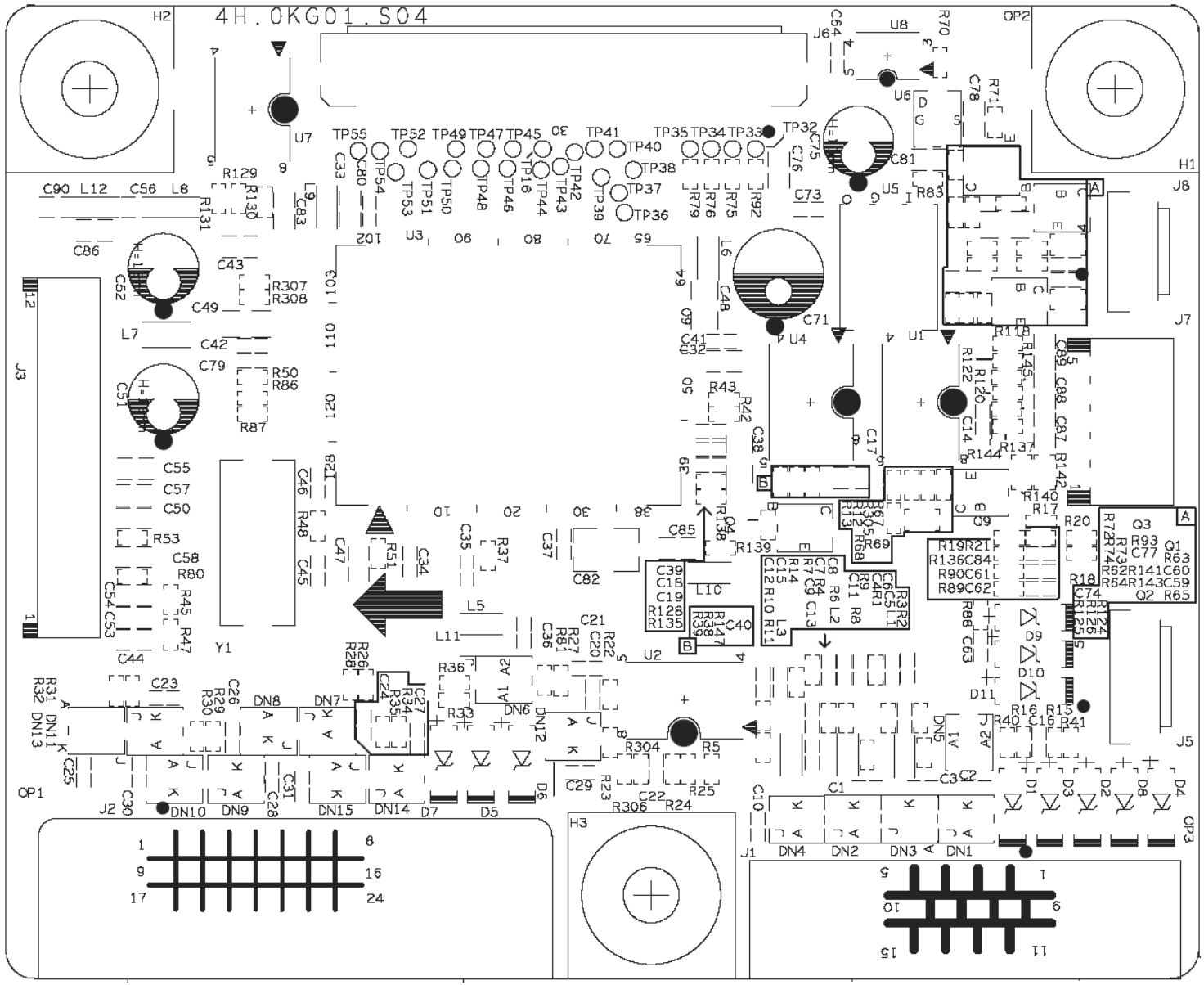
C51	A2
C52	A2
C53	A1
C54	A1
C55	A2
C56	A2
C57	A2
C58	A2
C59	B2
C61	A3
C62	A3
C63	A3
C71	C1
C73	C2
C74	C1
C86	A1
C90	A2
D10	A4
D11	A4
D9	A4
J3	A1
J5	A4
J8	B5
L12	A1
L7	A2
L8	A2
Q2	B2
R143	B2
R64	B1
R65	B2
R88	A3
R89	A3
R90	A3
U5	C1

Scaler Diagram & C.B.A



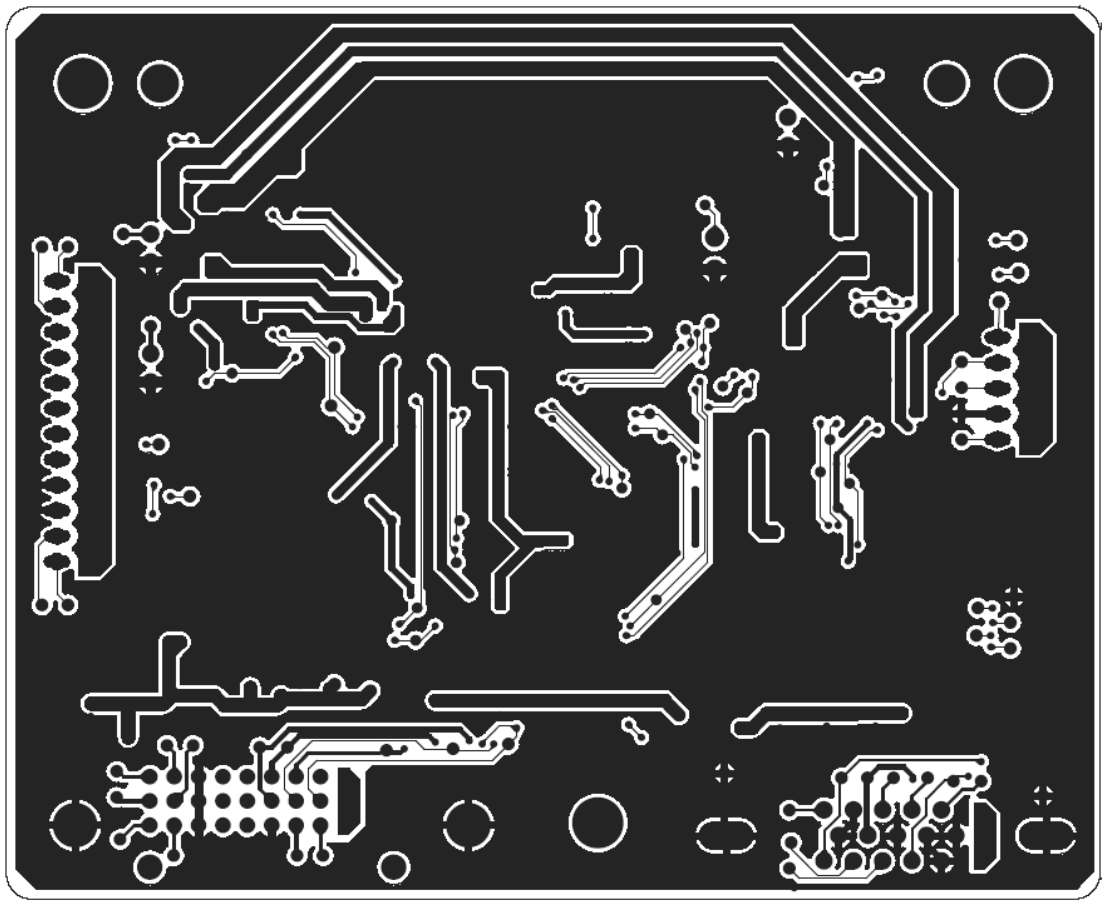
C64	B1
C75	B3
C76	B3
C77	B2
C78	B2
C81	B2
J6	A5
Q3	B2
R70	B2
R71	A2
R72	B2
R73	B2
R74	B1
R83	B2
R92	B3
R93	B2
U6	B2
U8	A1

Scaler Diagram & .C B.A.

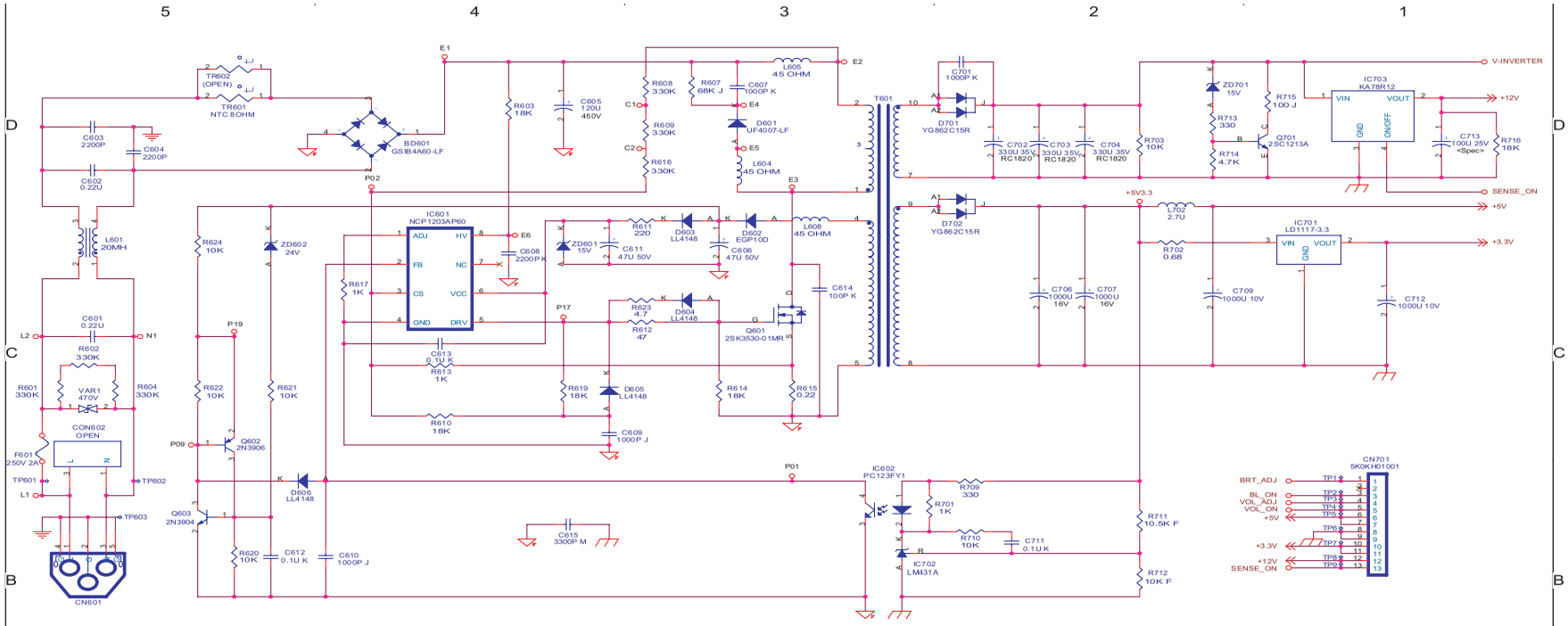


U1 C2
U2 B3
U3 D4
U4 C2
U6 D2

Scaler Diagram & C.B.A.

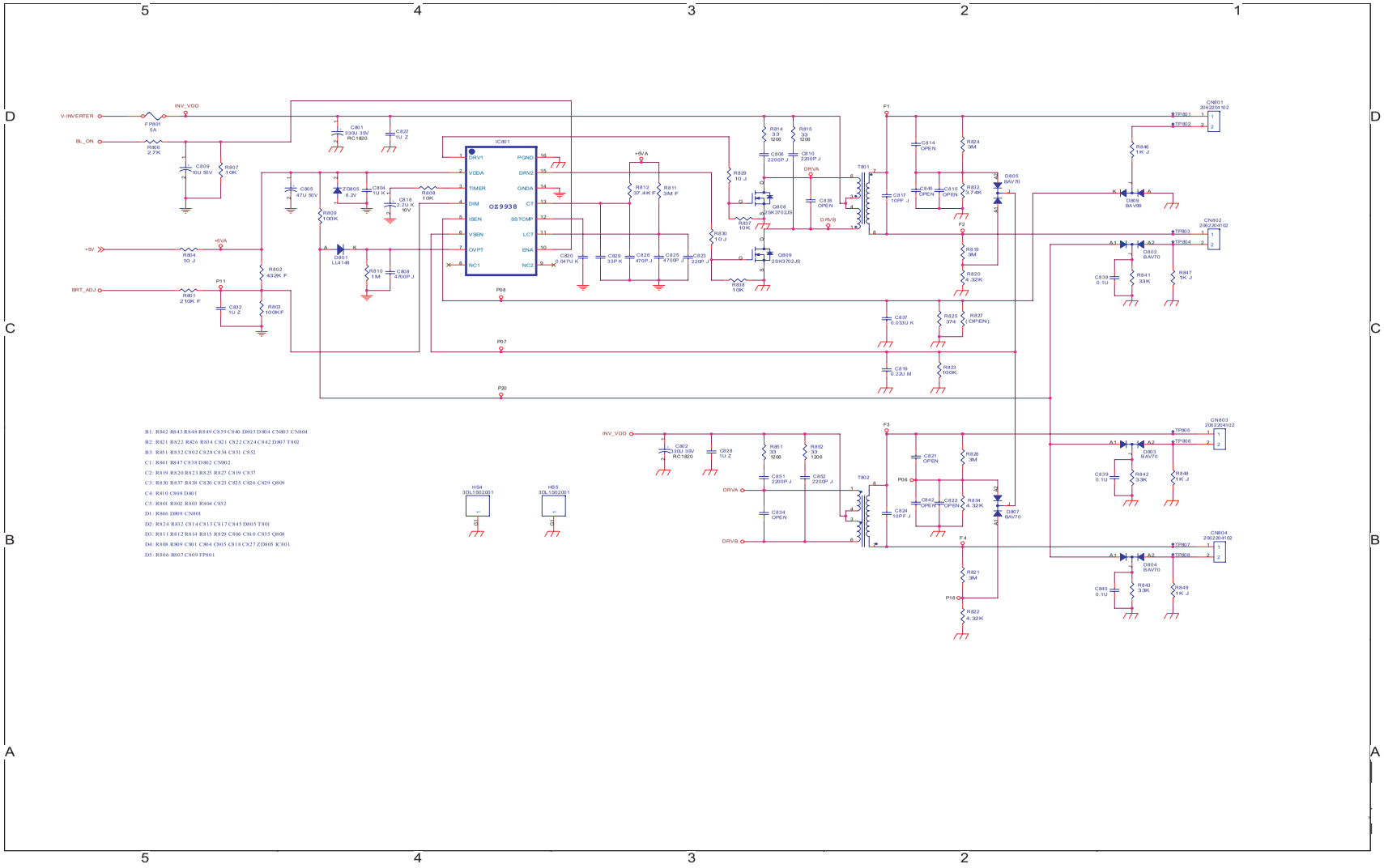


Power Diagram & C.B.A.

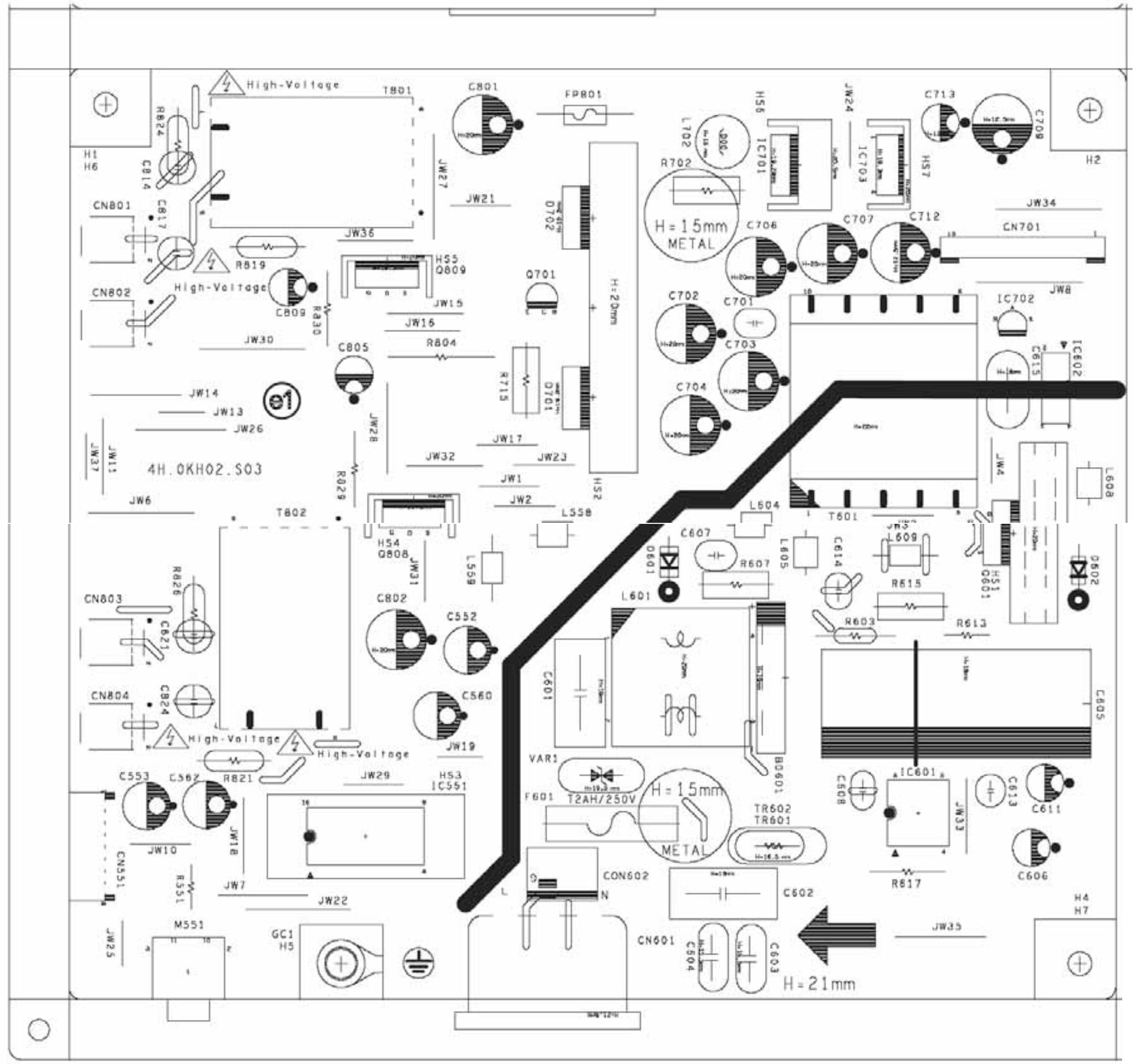


B1: CN701
B2: R709 R710 R711 R712 C711
B3: R701 IC602 IC702
B4: C610 C615
B5: R620 C612 Q603 D606 CN601
C1: C712 IC701
C2: R702 C706 C707 C709
C3: R612 R614 R615 R623 C606 C614 Q601 D604
C4: R610 R613 R617 R619 C608 C609 C611 D605 ZD601 IC601
C5: R601 R602 R604 R621 R622 R624 C601 Q602 ZD602 F601 L601 VAR1 CON602
D1: R715 R716 C713 Q701 IC703
D2: R703 R713 R714 C701 C702 C703 C704 D701 D702 ZD701 L702
D3: R607 R608 R609 R611 R616 C607 D601 D602 D603 L604 L605 L608 T601
D4: R603 C605 BD601
D5: C602 C603 C604 TR601 TR602

Power Diagram & C.B.A.

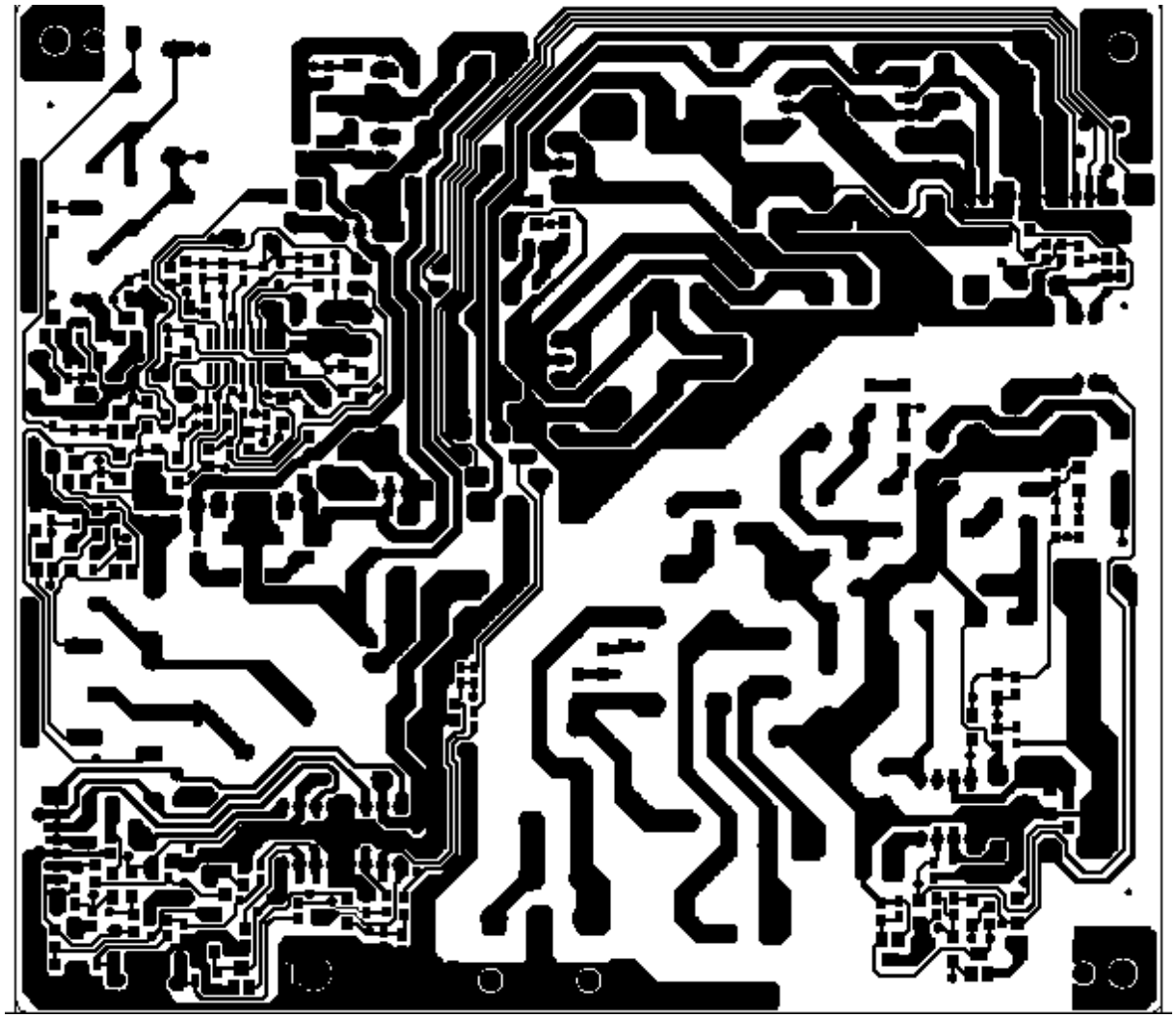


Power Diagram & C.B.A

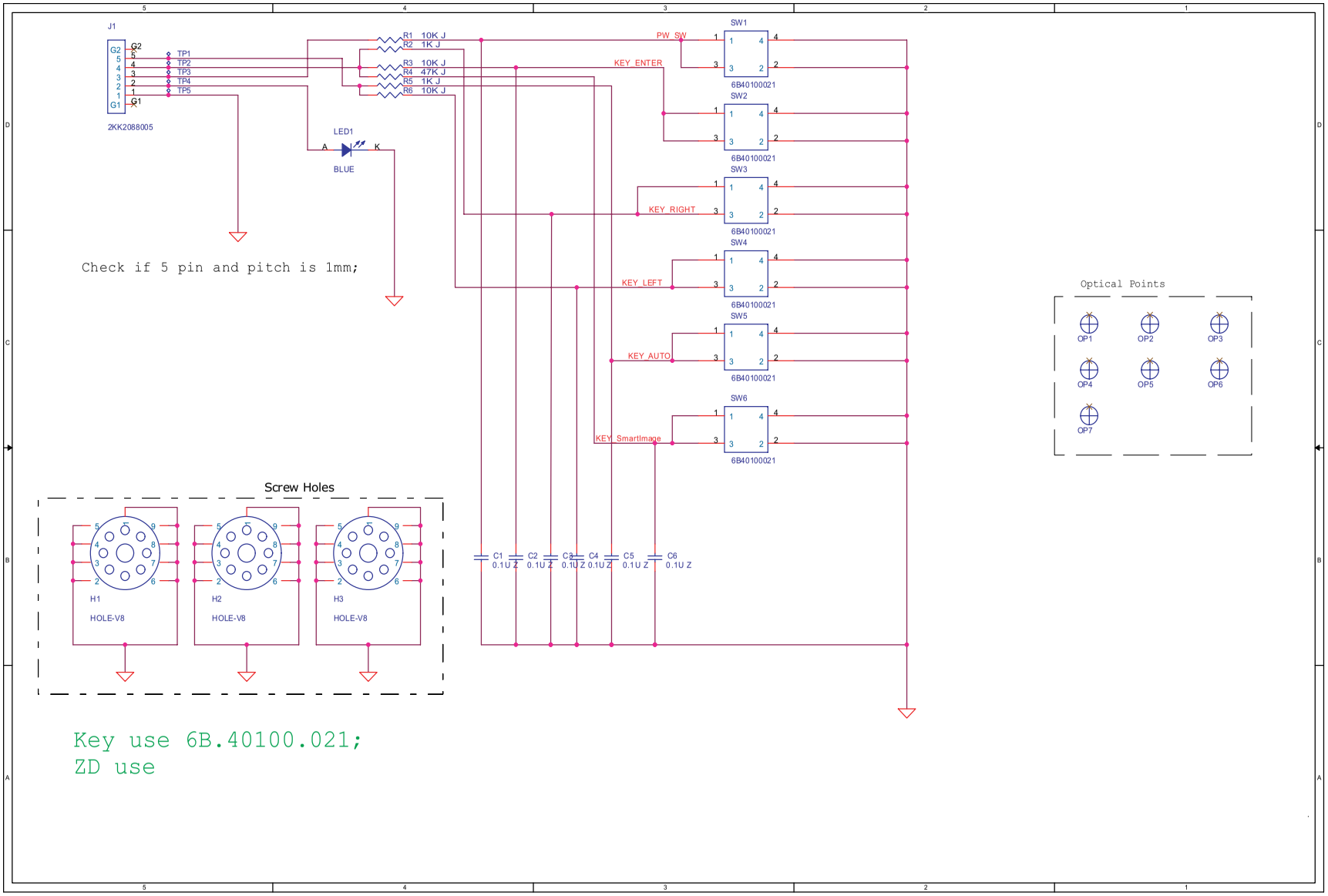


T801	D4
T802	C4
VAR1	B3
T601	C2

Power Diagram & C.B.A.

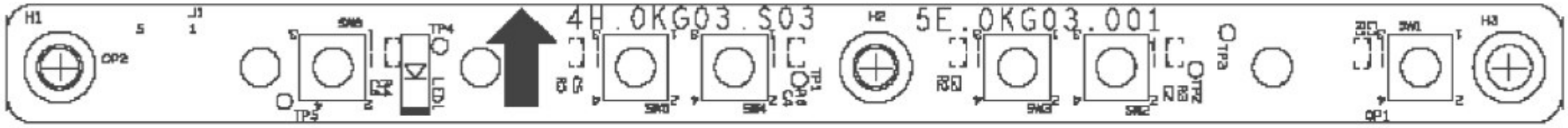


Control Diagram & C.B.A.



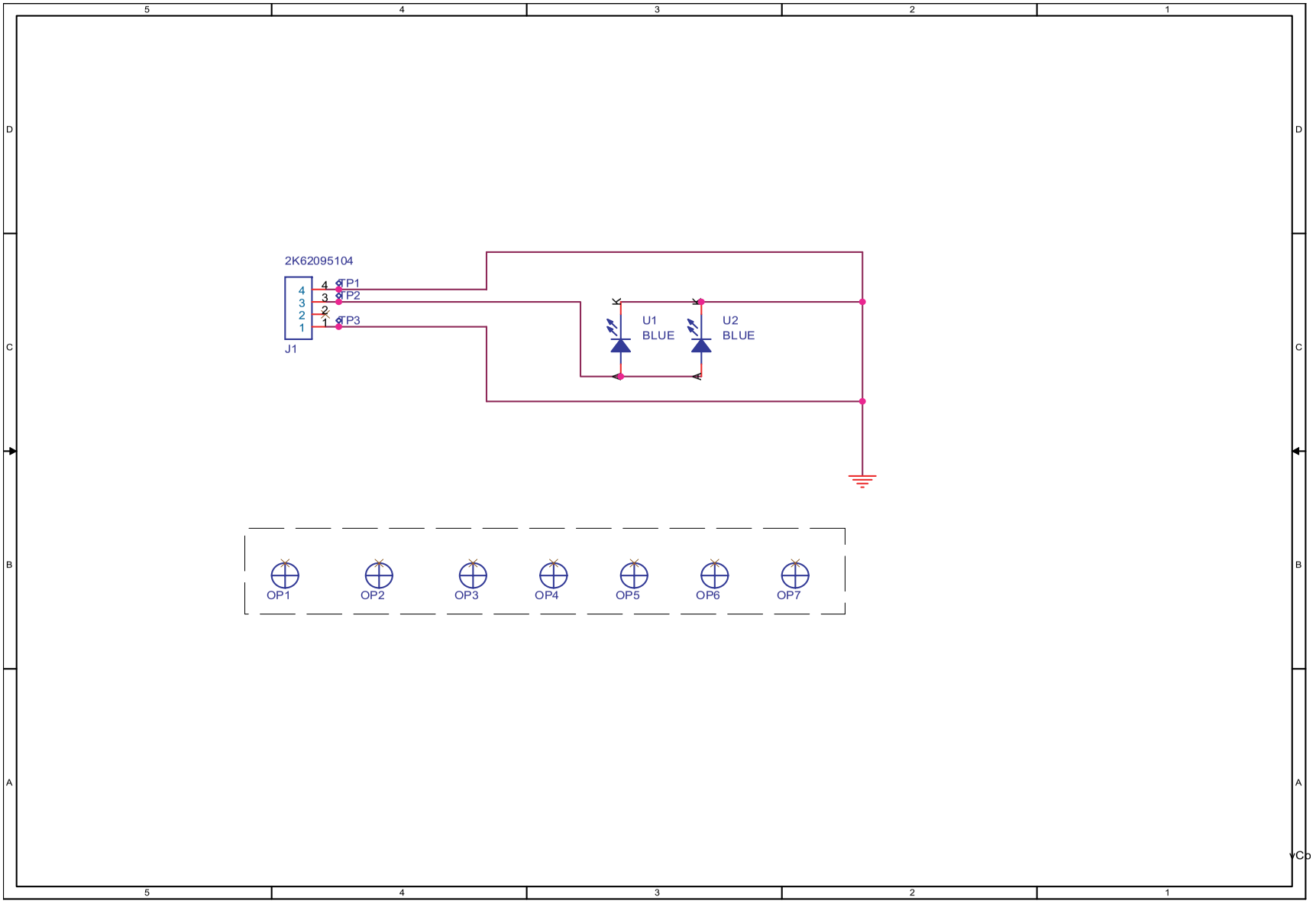
R1	D4
R3	D4
R6	D4
R2	D4
R5	D4
R4	D4
SW1	D3
SW2	D3
SW3	D3
SW4	C3
SW5	C3
SW6	C3

Control Diagram & C.B.A

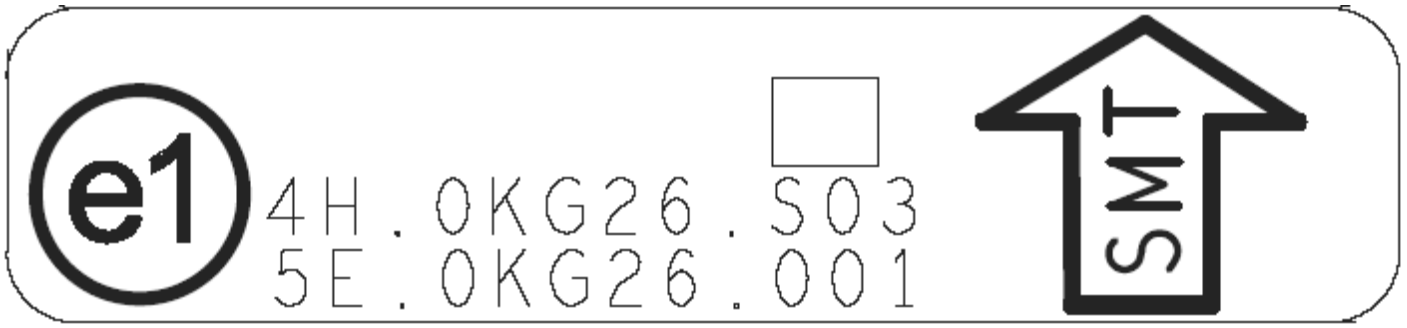


LED Diagram & C.B.A

U1 C3



LED Diagram & C.B.A



General Product Specification

HUDSON 9-220SW9
GENERAL PRODUCT
SPECIFICATION

Issued by: / Argent Chan

Revision History

Ver.	Date (yy.mm.dd)	Author	Brief Description

Blue: Changes than last version

Red: TBD

General Product Specification

. ANALOG AND DIGITAL (optional) DUAL INPUT

. AUTO PICTURE ADJUSTMENT

. 17 FACTORY PRESET MODES AND 49 PRESET MODES WHICH CAN BE RECOVERED TO PRESET MODES, 10 USER MODES

. USER FRIENDLY OSD DISPLAY FOR MODE IDENTIFICATION /ADJUSTMENT

. MAX. RESOLUTION 1680 x 1050 NON-INTERLACED AT 75 Hz (VGA)

. 22ŽCOLOR 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

~~. Audio support~~

~~. USB PLUG~~

. SMART CONTROL & SMART MANAGEMENT REQUIREMENT

. SMART Contrast

. SMART Image

. ~~SMART Response~~

. PerfecTune, FACTORY GAMMA Alignment

. PHILIPS LOGO displayed while power on

. WEEE REQUIREMENT

. RoHS REQUIREMENT

General Product Specification

. TCO03 REQUIREMENT

General Product Specification

CONTENTS

General Product Specification

General Product Specification

General Product Specification

1 FOREWORD

This specification describes a 22" WSXGA+ multi-scan color TFT LCD monitor with maximum resolution up to 1680 x 1050 /75Hz non-interlaced (VGA).

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

2 PRODUCT PROFILE

EDID header

1	User visible strings on .inf file	Philips 220SW (22inch LCD MONITOR 220SW9)
2	Manufacturer ID (EDID data)	PHL
3	Product ID, "xxxx" 4 codes	MSB(byte 12): 08
		LSB (byte 11): 6F
4	maximum resolution	1680 x1050
5	Horizontal Frequency Range	30~83 KHz
6	Vertical Frequency Range	56~76Hz
7	Monitor Name (13 characteries max.)	Philips 220SW9

* Detail timing descriptor in DVI EDID: Reduced blanking 1680 x1050 x60Hz

LCD

Based on panel spec.

Vendor to fill in detailed data.

SEC/LPL and vendor recommendation

SEC

Type NR.	: SEC LTM220M1-L01
Resolution	: 1680 x 1050 (WSXGA+)
Outside dimensions	: 493.7(H) x 320.1(V) Typ. x 17.0(D) Max.
Pitch (mm)	: 0.282mm x 0.282mm
Color pixel arrangement	: RGB vertical stripe
Display surface	: Haze 25% Hard coating (3H)
Color depth	: 16.7M (6 bit Hi-FRC)
Backlight	: 4 CCFL
Active area (W x H)	: 473.76(H) x 296.1(V) mm
View angle (CR=10)	: =160 for Right/Left (Typ)
	: =160 for Up/Down (Typ)
Contrast ratio	: 1000:1 (Typ)
White luminance	: 300(Typ.)
Color gamut	: >=72%
Gate IC	: TOSHIBA
Source IC	: NEC
Response time	: Tr + Tf <=5 ms (Typ)
Vertical frequency range	: 53~76Hz

General Product Specification

LPL

Type NR.	: LPL LM220WE1-TLE2/4
Resolution	: 1680 x 1050 (WSXGA+)
Outside dimensions	: 493.7(H) x 320.1 (V) x 16.5(D) mm (Typ.)
Pitch (mm)	: 0.282mm x 0.282mm
Color pixel arrangement	: 1680 horizontal By 1050 vertical Pixels. RGB stripe arrangement
Display surface	: Hard coating (3H), Anti-glare treatment of the front polarizer
Color depth	: 16.7M colors
Backlight	: 4 CCFL
Active area (W x H)	: 21.995 inches(558.673mm) diagonal (Aspect ratio 16:10)
View angle (CR>=10)	: R/L 170(Typ.), U/D 160(Typ.)
Contrast ratio	: >1000:1 (Typ)
White luminance	: 300 cd/m2(Typ. Center 1 point)
Color gamut	: >=72%
Gate IC	: N/A
Source IC	: Magna , OKI
Response time	: <=5 ms (Typ)
Vertical frequency range	: 50~75Hz

2.1 Scanning frequencies

Hor. : 30 ..83 K Hz
Ver. : 56 - 76 Hz
Video dot rate: < 210 MHz for VGA and < 170 MHz for DVI, warning message must be displayed while over 165 MHz (supplier to provide accurate scaler bandwidth number)
Power input: 90-264 V AC, 50/60 2 Hz
Power consumption : <50W maximum, <45W (typ.)
< TBDWatt (with audio)

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, HDCP supported.

2.2 Ambient temperature:

0 C - 40 C

3 Electrical characteristics

Scaler should be capable of below items.

1) Scaler must support color engine for Image enhancement feature (SmartImage)

2) Scaler must have enough memory to support PerfecTune feature and Philips OSD

3) Scaler must support Dynamic Contrast Ratio (DCR), 3000:1 DCR preferred

4) ~~Can be shared with 220SW9~~

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)

General Product Specification

2). DVI-D Digital
Input signal: Single TMDS link (Three channels: RX0-/+, RX1-/+, RX2-/+)

3). USB PLUG 2.0 (not required in 220SW9)
USB port (1 upstream, 1 downstream)

4). Audio (not required in 220SW9)
Input signal: 1000 mVrms
Loudspeaker: 1W+ 1W stereo of RMS Power
Frequency range: (WAIT FOR SUPPLIER INPUT)
Headphone connection will mute speakers

3.2 Interface

3.2.1 D-Sub Cable

Length : 1.8 M +/- 50 mm
Fix with monitor when packing, with transplant pin protective cover.

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

Pin assignments :

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

3.2.2 DVI Cable

The input signals are applied to the display through DVI-D cable.
Length : 1.8 M +/- 50 mm

General Product Specification

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

Pin Assignment:

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

3.2.3 Software control functions via OSD / control adjustable functions:

OSD definitions:

philips_H8_OSD_Definition.doc

20080320xls

Reset - No: Exit
Yes: Auto adjustment for displaying timing mode and recall factory preset

8 OSD Languages:
ENGLISH, ESPANOL, FRANCAIS, DEUTSCH, ITALIANO,
PORTUGUES, RUSSIAN, SIMPLIFIED CHINESE

Power On Logo: Power On show up Philips logo 3 seconds change to input signal.

1024x768philips_desktop-1bmp

(This picture is reference only. The official drawing will send out by Product Manager.)

Audio Selection -

General Product Specification

Stand-alone …On: Isolate video and audio control input
Stand-alone …Off: Integrate video and audio control input
Mute …On: Turn off audio input
Mute …Off: Turn on audio input

When Stand-alone-On: Volume can be adjusted in standby mode(TBD LED) and warning messages mode, like •Check cable connection, •No Video input(Blue LED)

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 scaler or Panel spec.)
2. It needs to reserve the 10 timings space in memory size.

3.3.1 Mode storing capacity

Factory preset modes	:	D-sub :18 , DVI : 17
Preset modes	:	49
User modes	:	10

3.3.2 Factory preset modes (D-sub18 modes)

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

D:\ENG\monitor projects\timingtable

2. Only vertical frequency ranges of all panels can have 50Hz input, to add 50Hz video timings in internal firmware support
50Hz: 576p/720p/1080i/1080p @ 50Hz
60Hz: 480p/720p/1080i/1080p @ 60Hz

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	<	Blue LED	--
Off	Off	Off	blanked	< 1 W	TBD	< 3 s
DC Power Off			N/A	< 1 W	LED Off	

3.8 VGA Display identification

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

3.9 DVI Display identification

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

3.10 USB support (not required in 220SW9)

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 V6.1, and Protrait Display Tune at least.

3.12 Hot-key definition

D:\ENG\monitor projector\spec\H8\hotk

3.13 Smart contrast (Dynamic contrast ratio)

Smart Contrast is a kind of dynamic backlight control.

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

General Product Specification

At least the minimum contrast ratio has to be 3000:1 (typ.).

3.14 Smart image

3.14.1 Smart Image OSD outlook

3.14.1.1 Position

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

3.14.1.2 Smart Image Logo & Banner

As design to keep the LightFrame logo at header but change the name to •SmartImageŽ with bitmap format.

3.14.1.3 Icon of each profile

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

3.14.1.4 User Operation Procedure

A. 5 different modes are switched to next in the sequence from 1 to 5 then back to 1 while pressing this button: 1) Office Work 2) Image Viewing 3) Entertainment 4) Economy 5) Off. The default setting is •OffŽ
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 Smart Image 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 and 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 •Smart ImageŽprofile status.

General Product Specification

For example, Smart Image is on with •OfficeŽprofile at VGA input, when switch to DVI input, the Smart Image will revert to previous profile of DVI.
In the input switching process the •Smart ImageŽOSD will also show up to present which profile is selected if •Smart ImageŽis 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.

3.14.1.5 Linkage between Smart Image 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.

3.14.1.6 Profile Definitions (system integrators to input at design stages)

A. Office Work
   i. Purpose: Design for general office application, like word processing, Spreadsheet and email. The screen is dominated by text.
   ii. Enhancement point:
      1. A little sharpness for increasing the details of e.g. an excel grid.
         No other type of enhancement as it won't bring value.
      2. Color temperature remains in 6500°K.
      3. Brightness level should be 70%.
      4. ~~Smart Response set to •OffŽ~~
      5. Smart Contrast set to •OffŽ

B. Entertainment
   i. Purpose: Design for video application, Like Microsoft Media Player or Real Player. The screen is dominated by video.
   ii. Enhancement Point:
      1. Dynamic contrast enhancement by histogram analysis (DLC) should be implemented.
      2. Sharpness enhanced 90%.
      3. Color enhancement set as the same with Video.
      4. Color temperature set to 7500° (Based on final PQ settings) (if higher)

General Product Specification

5. Brightness level sets to maximum.
6. ~~SmartResponse set to •HighŽ~~(N/A for this model)
7. Gamma Table turn off to achieve
8. Fastest response time. (N/A for this model)
9. Smart Contrast set to •OnŽ

C. Image Viewing

i. Purpose: Design for image viewing application, especially in slide show. The screen is dominated by picture. Power point presentation could use this profile also.

ii. Enhancement Point:

1. Dynamic contrast enhancement by histogram analysis (DLC) should be off.
2. Sharpness and color to be enhanced 75%.
3. Color temperature 6500°K
4. Brightness level sets to maximum.
5. ~~Smart Response set to •OffŽ~~ (N/A for this model)
6. Smart Contrast set to •OffŽ

D. Economy

i. Purpose: Adjust brightness level for reducing power consumptions

ii. No optimization by Smart Image.

iii. Design:

1. Brightness level set to 70%, a little higher brightness level than laptop PC, fine tune brightness level before DVT exit.
2. Color temperature set to 6500K.
3. Gamma Table is turn on.

E. Off

i. Purpose: 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. Gamma Table is turn on to reduce bad color tracking.

3.14.1.7 Demo mode

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

B. Design:

General Product Specification

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 Lite & SmartResponse DemonstrationŽin left frame and •Original ImageŽin right frame.

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

iv. The demo profile will be •Video PlaybackŽprofile with •HighŽODC setting.

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

C. Hot keys to trigger:

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

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

When the demo mode is enabled, the blue LED will flash until demo mode disabled.

3.15 PerfectTune

A. PerfectTune must be done after warming 30 minutes at least.
B. PerfectTune must be performed after Auto Color.
C. PerfectTune must be conducted through DVI or scaler embedded patterns.
D. Delta E < 2.5

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, 1680 x 1050 non-interlaced mode (1680 x 1050@ 75Hz), signal sources must have 75 ohm output impedance.

(2) Luminance setting : controls to be set to 300 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 337.920 mm x 270.336 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

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

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 :

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

4.6 Color temperature adjustment

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

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

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

Product specification

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

General Product Specification

Production alignment spec.

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

Quality Inspection specification:

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

5 Mechanical characteristics

5.1 Cosmetic -

Qisda OTS ID with Philips front bezel

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

< 1.2mm

5.5 Location of Control icons -

Per Philips Graphic sheet

5.6 Color for resin/paint -

Per Philips make-up sheet

General Product Specification

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 •TYV61-90007Ž

Painting to cover up cosmetic defects due to molding is strongly discouraged.

China RoHS mark requested.

5.11 Plastics flammability

– All Plastics to be Flame Retardant UL 94-HB ~~or Better~~.

Base / Pedestal to be Flame Retardant UL 94-HB.

All major plastic parts (bezel, back cover) need to be molded from same resin.

Plastic resin type selection should be referred to •plastic-Philips Pool monitorŽ

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-D249Ž, •UN-D 600Ž

< = 20 gloss units

5.13 Tilt and swivel base

Tilt angle : -5 +2/- 0 (forward)

+20 + 0/- 3 (backward)

Swivel angle : 45°

High Adjustment : 70mm

Portrait Display : _____ nil

General Product Specification

5.14 Kensington Lock

Must meet Kensington_slot.spec •TYE-M0004Ž

MMD request metal plate in Kensington hole.

5.15 Label

Regulatory label / Carton label should follow Philips requirement.

China RoHS label

Detail document refer to Philips Engineering Reference Book.

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

Unit dimension : 518.76 x 454.89 x 211.05 mm

Packed unit dimension: 590 x 532 x 185 mm

Net weight : 5.6 Kg

Gross weight 6.8Kg

5.17 Transportation

Transportation standards refer to TYE-M0002.

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 TYE-M0002.

The cushion material shall be constructed using EPS material.

The doggy hole is requested.

5.17.2 Transportation Test

Overall tests refer to TYE-M0002.

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

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)

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

Transportation standards refer to TYE-M0002 and UAW-0309.

General Product Specification

Air shipment -

Sea container 20'(pallet/slip sheet)

Sea container 40'(pallet/slip sheet)

Sea container 40' High Cube (pallet/slip sheet)

Land 53• MEGA Trailer (pallet/slip sheet)

Land 53• MEGA Trailer per HQ (pallet/slip sheet)

Truck shipment-

Transportation request for all regions except China/India

A. Air shipment

B. Container loading for WW

C. Land 53• MEGA Trailer

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

Storage

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

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

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

General Product Specification

7 Reliability

7.1 Mean Time between Failures

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

8 Quality assurance requirements

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

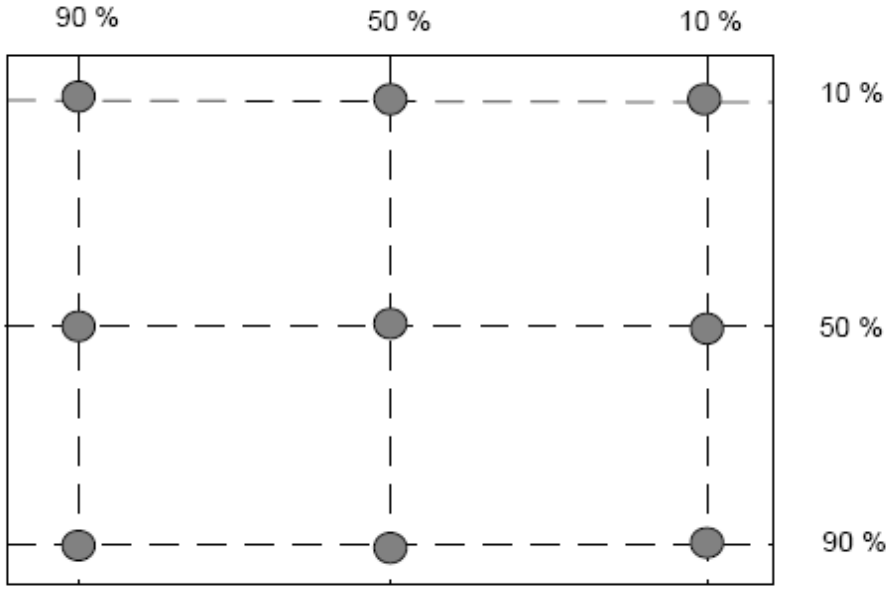
BRIGHT DOT DEFECTS	ACCEPTABLE LEVEL		
MODEL	220SW9		
1 lit sub-pixel	3		
2 adjacent lit sub-pixels	1		
3 adjacent lit sub-pixels (one white pixel)	0		
Distance between two bright dots	15mm		
Bright dot defects within 20 mm circle	0		
Total bright dot defects of all type	3		

BLACK DOT DEFECTS	ACCEPTABLE LEVEL		
MODEL	220SW9		
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	220SW9		
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)

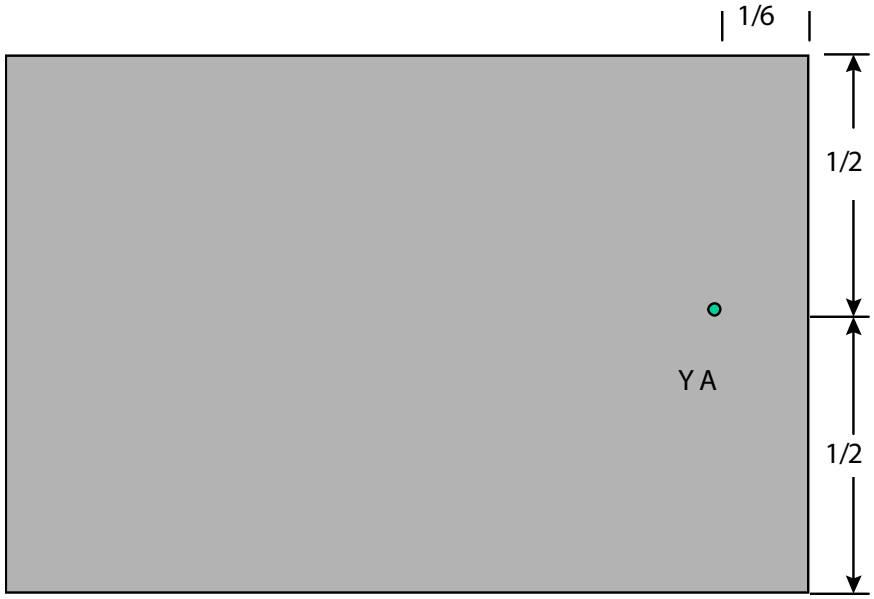
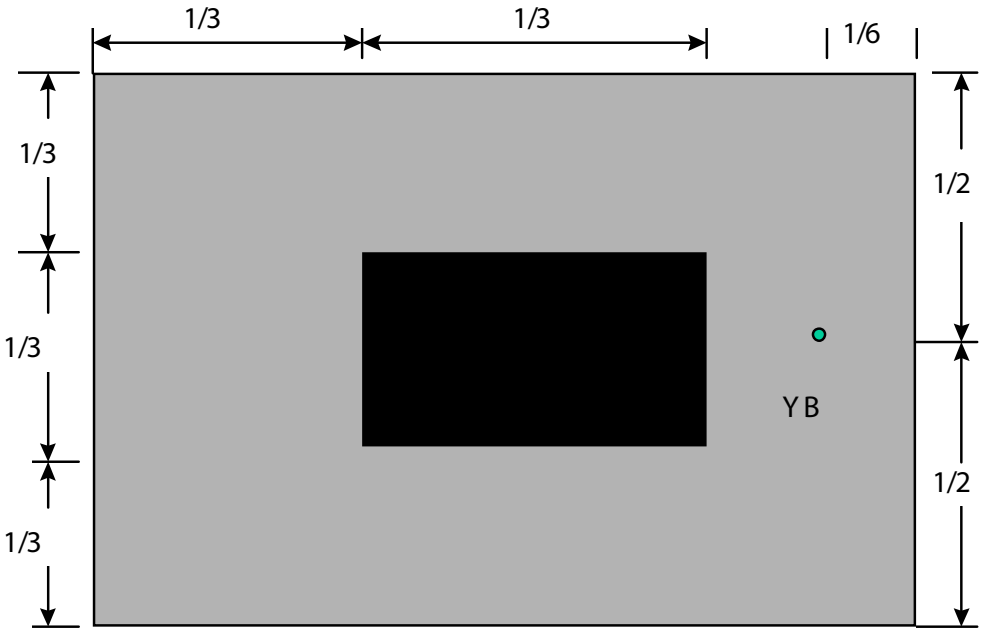
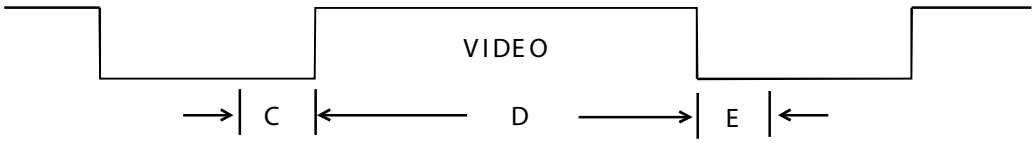


Fig 3: Cross talk Pattern
Center at Gray level 0 (Black)

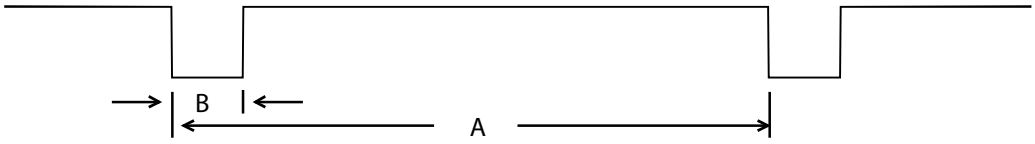


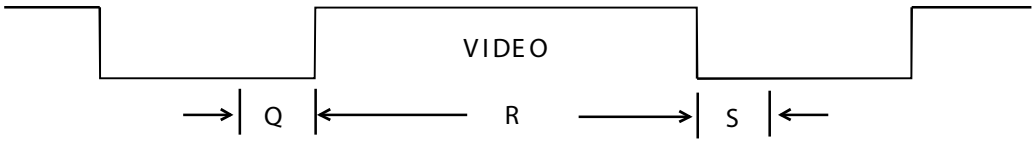
General Product Specification

SEPARATE SYNC.

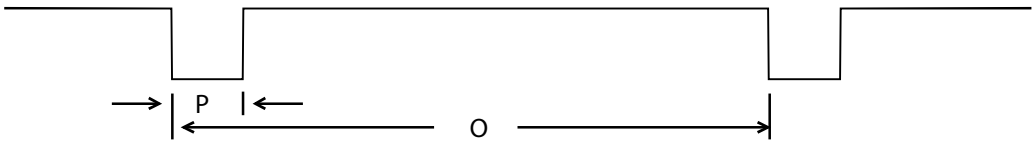


HORIZONTAL

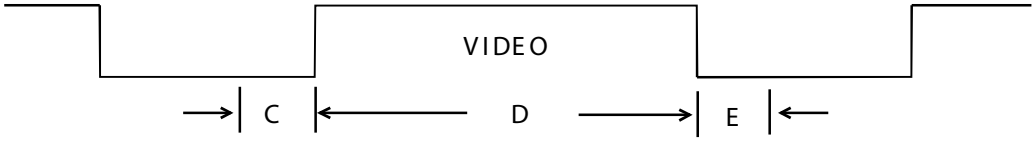




VERTICAL



COMPOSITE SYNC.



HORIZONTAL

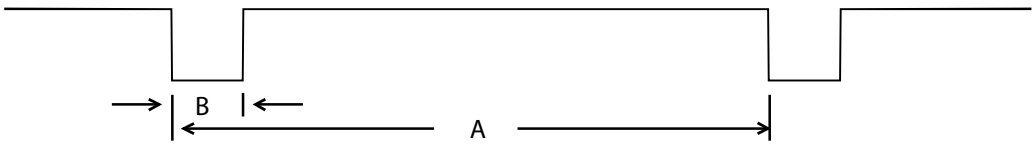


FIG-4 TIMING CHART -1

General Product Specification

10 REGULATORY COMPLIANCE

10.1 Worldwide Regulatory

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, which 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).

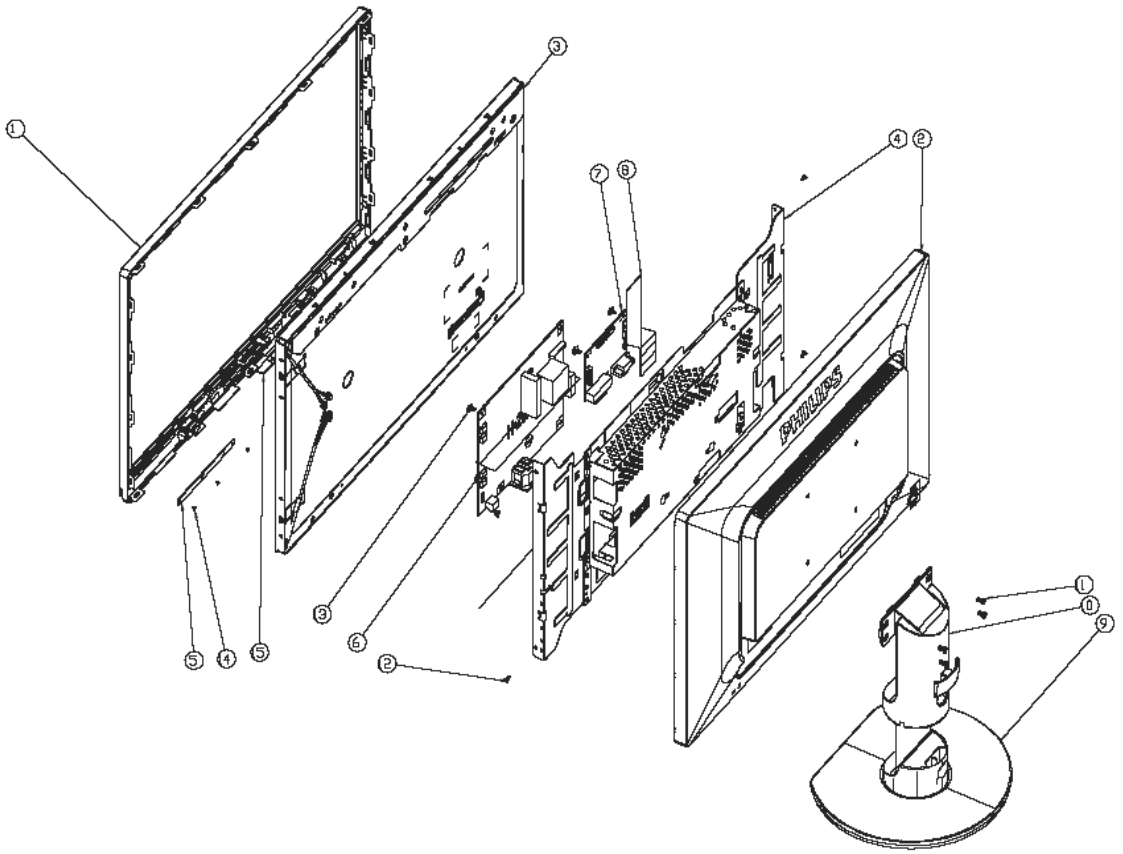
10.4 WEEE

Producers (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: 220SW9

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		220SW9FS/00			220SW9FB/69			220SW9FB/00			220SW9FB/75			220SW9FB/93			220SW9FB/27		
location	Description	PCM code	Philips 12NC	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO
7	MAIN (I/F) BOARD ASS'Y	5E.0KG01.011	996510017934	V			V			V			V			V			V		
		5E.0KG01.001	996510018954		V			V			V			V			V			V	
		5E.0KG01.021	996510020549			V			V			V			V			V			V
6	POWER BOARD ASS'Y	5E.0KG02.001	996510017936	V	V		V	V		V	V		V	V		V	V		V	V	
		5E.0KG02.002	996510020550			V			V			V			V			V			V
5	ASSY CTRL BD WITH CABLE	6K.0KG19.001	996510017942	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
15	ASSY LED BD WITH CABLE	6K.0KG18.001	996510017941	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
3	LCDM LM220WE1-TLE2/TLE4(LPL)	5F.LLBP9.001	996510017933	V			V			V			V			V			V		
	LTM220M1-L01 (SEC)	5F.LSBVP.011	996510019015		V			V			V			V			V			V	
	LCDM M22Z01-L03 C1 CMO 22W P	5F.LMBPP.001	996510020548			V			V			V			V			V			V
8	FFC CABLE 30P	5K.0KG03.N01	996510017937	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
20	CABLE SIGNAL (D-SUB)	5K.L2H06.501	996510006065	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Mechanical Styling		Model		220SW9FS/00			220SW9FB/69			220SW9FB/00			220SW9FB/75			220SW9FB/93			220SW9FB/27		
location	Description	PCM code	Philips 12NC	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO
9	BASE ASS'Y	6K.0KG05.001	996510017948	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
10	COLUMN ASS'Y	6K.0KG04.001	996510017940	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
1	FRONT BEZEL ASS'Y (Silver)	6K.0KG02.011		V	V																
		6K.0KG02.012		V	V	V															
	FRONT BEZEL ASS'Y (BLACK)	6K.0KG02.001	996510017938				V	V		V	V		V	V		V	V		V	V	
		6K.0KG02.002					V	V	V	V	V	V	V	V	V				V	V	V
	FRONT BEZEL ASS'Y (BLACK)	6K.0KG02.021	996510020346													V	V	V			
		6K.0KG02.022														V	V	V			
2	REAR COVER ASS'Y	6K.0KG03.001	996510017939	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Packing Styling		Model		220SW9FS/00			220SW9FB/69			220SW9FB/00			220SW9FB/75			220SW9FB/93			220SW9FB/27		
location	Description	PCM code	Philips 12NC	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO
100	CUSHION FRONT	4G.0KG01.001	996510017944	V	V	V	V	V	V	V	V	V	V	V	V	V	V		V	V	V
		4G.0KG03.001	996510020347													V	V	V			
110	CUSHION BACK	4G.0KG02.001	996510017945	V	V	V	V	V	V	V	V	V	V	V	V	V	V		V	V	V
		4G.0KG04.001	996510020348													V	V	V			
120	CARTON	4D.0KG01.001	996510017943	V	V		V	V		V	V		V	V							
		4D.0KG02.001	996510018249													V	V				
		4D.0KG01.002	996510020343	V	V		V	V		V	V		V	V		V	V		V	V	
		4D.0KG01.003		V	V	V	V	V	V	V	V	V	V	V	V				V	V	V
		4D.0KG02.002	996510020552													V	V	V			

Accessory Styling		Model		220SW9FS/00			220SW9FB/69			220SW9FB/00			220SW9FB/75			220SW9FB/93			220SW9FB/27		
location	Description	PCM code	Philips 12NC	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO
200	QSG PHILIPS 220SW9	4J.0KG01.001	996510017946				V	V					V	V		V	V				
		4J.0KG01.002	996510020344	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
210	CD MANUAL PHILIPS 220SW9	5B.0KG01.001	996510017947	V	V		V	V		V	V		V	V		V	V				
	CD 220SW9	5B.0KG01.002	996510020345	V	V		V	V		V	V		V	V		V	V		V	V	
	CD MANUAL PHILIPS 220SW9	5B.0KG01.003	996510020553	V	V		V	V		V	V		V	V					V	V	
	CD MANUAL PHILIPS CEL 220SW9	5B.0KG01.004		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
30	POWER CORD H05VV-F 10A250V EUR 1.8M	2G.00921.001	996510007306	V	V	V				V	V	V									
	POWER CORD H05VV-F 13A 1.8MM UK	2G.03149.021	996510007304				V	V	V												
	CORD 3ASL/75DU-IN 250V1.8M AUS	2G.01343.001	996510007305										V	V	V						
	CORD RVV 250V 1.8M BLK CHINA	2G.04245.001	996510006066													V	V	V			
	CORD SVT125V WO/SH US 1.8M I-S	2G.01111.001																	V	V	V

Critical components		Model		220SW9FS/00			220SW9FB/69			220SW9FB/00			220SW9FB/75			220SW9FB/93			220SW9FB/27			
Location	Description	PCM code	Philips 12NC	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	LPL	SEC	CMO	Remark
IC601	IC PWM CURRENT NCP1203P60G 8P	0D.01203.101	996510007138	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Power controller IC
T601	XFORM PWR ER2828 600U 1908FP	1J.20273.091	996510007141	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Power transformer
T801 T802	XFORM INVERT 640MH EEL19 VW202	1J.26049.101	996510010634	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Inverter Transformer
VAR1	TVS 10D 470V TVR10471KFC3FW	2D.50009.031	996510007143	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Varistor
IC801	IC PWM CTRL OZ9938GN SON-16P	7A.09938.001	996510007146	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Inverter Controller IC
U3	IC CTRL NT68667HFG QFP 128P	7A.68667.A0E	996510017935	V	V		V	V		V	V		V	V		V	V		V	V		CPU & firmware are included within this Scalar IC
	IC CTRL NT68667HFG QFP 128P V.C	7A.68667.C0E	996510020559			V			V			V			V			V			V	
U1 U2	IC EEPROM AT24C02BN-SH-T SON-8	7B.02402.C01	996510007137	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	DDC for D-sub or DVI
U4	IC EEPROM AT24C16BN-SH-T SON-8	7B.02416.N01	996510007136	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	It's EEPROM to record HDCP key, FGA data and other paramete
U6	~~EET MOS AO3401 PC SOT-23~~	~~8D.03401.A31~~	~~996510010626~~																			FET MOS
	FET MOS APM2301CAC-TRL PC 3F	8D.02301.C32	996510018320	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	

Panel & PCBA photos

ITEM	PCM	Philips 12NC	Description	Photo
1	5F.LLBP9.001	996510017933	LCDM LM220WE1-TLE2/TLE4(LPL)	
2	5F.LSBVP.011	996510019015	LCDM LTM220M1-L01 SD(SEC)	
3	5F.LMBPP.001	996510020548	LCDM M22Z01-L03 C1 CMO 22W P	
4	5E.0KG01.011	996510017934	MAIN (I/F) BOARD ASS'Y	
5	5E.0KG01.001	996510018954	MAIN (I/F) BOARD ASS'Y	
6	5E.0KG01.021	996510020549	MAIN (I/F) BOARD ASS'Y	
7	5E.0KG02.001	996510017936	POWER BOARD ASS'Y	
8	5E.0KG02.002	996510020550	POWER BOARD ASS'Y	
9	6K.0KG19.001	996510017942	ASSY CTRL BD WITH CABLE	
10	6K.0KG18.001	996510017941	ASSY LED BD WITH CABLE	

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)

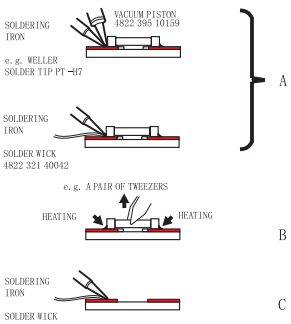
1.1 General cautions on handling and storage

- 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 solder (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).

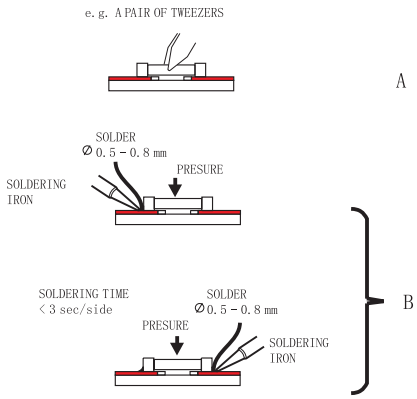
1.3 Caution on removal

- When handling the soldering.iron. use suitable pressure 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).

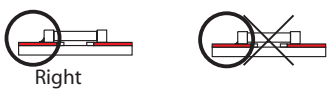
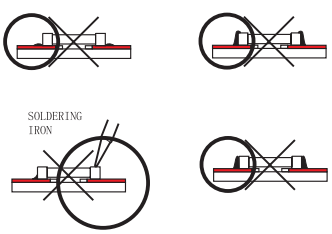


Fig.3 Examples



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 excee d ~ 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 PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

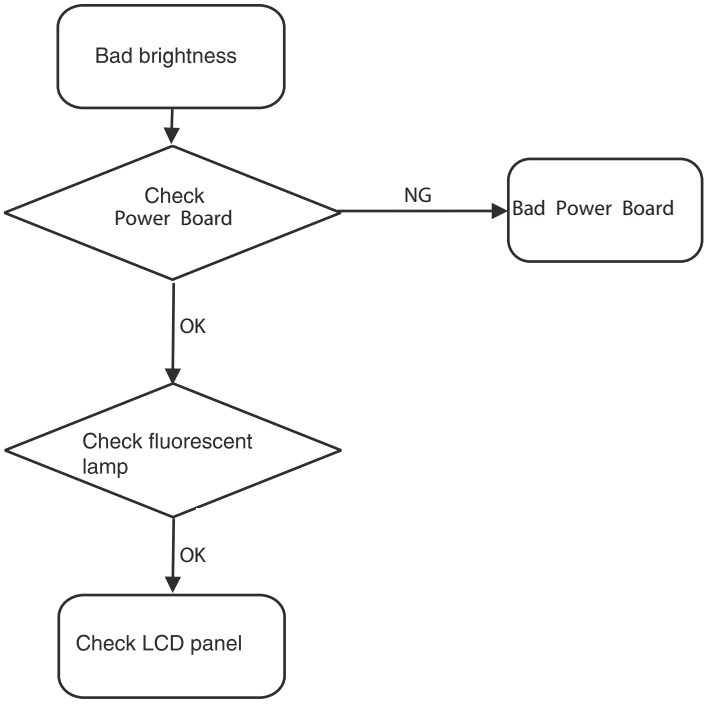
Device Removal
As is the case with any component that, it is essential when removing an (LF)BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature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

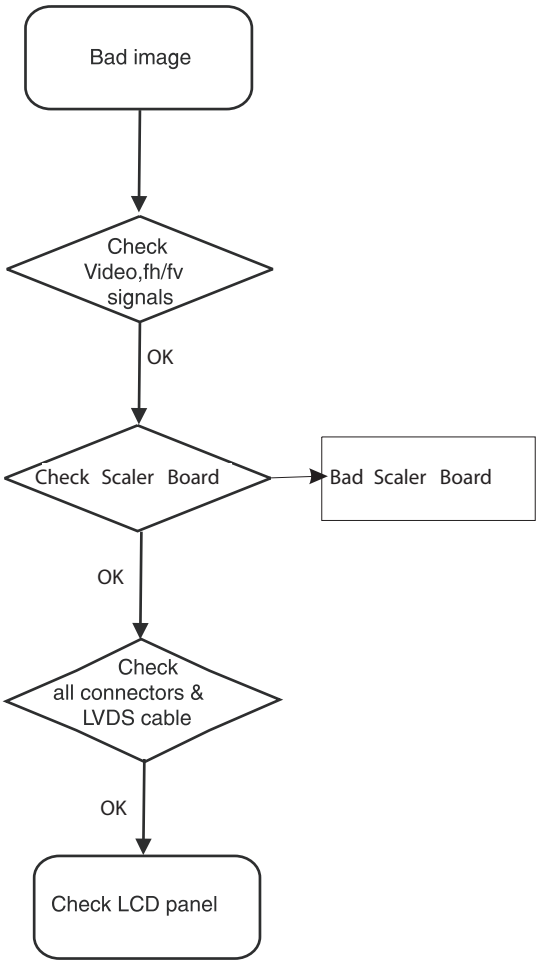
Area Preparation
When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA.
Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be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

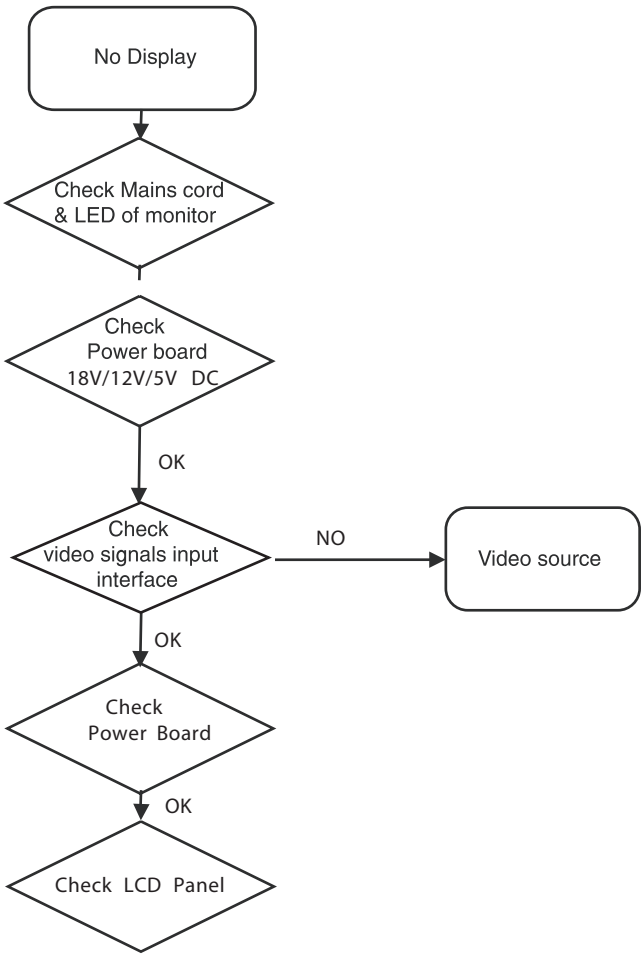
More Information
For more information on how to handle BGA devices, visit this URL: http://wwwatyourservice.ce.philips.com (needs subscription). After login, select Magazine , then go to Workshop Information . Here you will find Information on how .to deal with BGA-ICs.

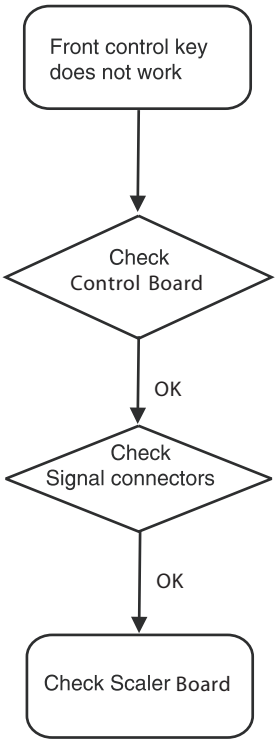
Repair Flow Chart



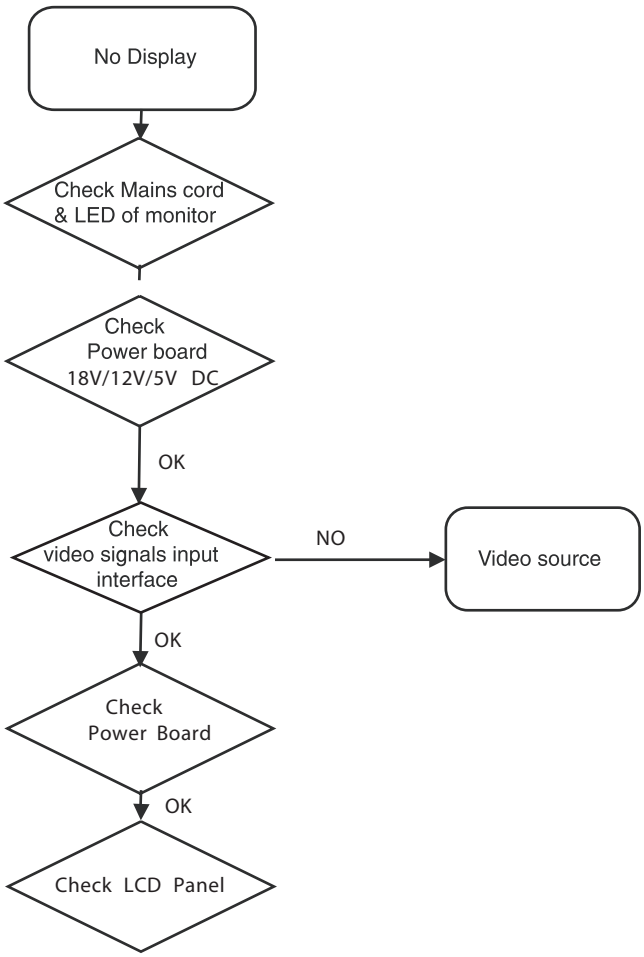


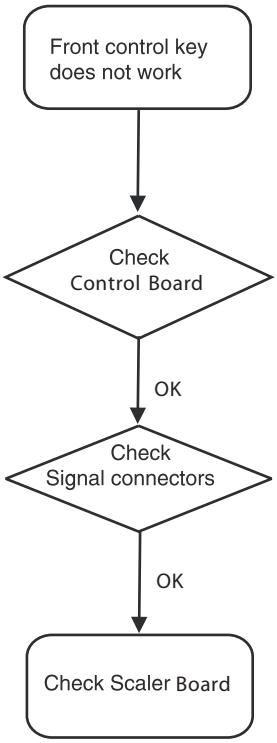
Repair Flow Chart





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 mainscord and all accessible metal parts of the product.

2.1.2 Before carrying out the test, reliable conductive connections must be ensured and thereafter be maintained throughout the test period.

2.1.3 The mains switch(es) must be in the "ON" position.

2.2 Test Requirements

All products should be HiPot and Ground Continuity tested as follows:

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

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

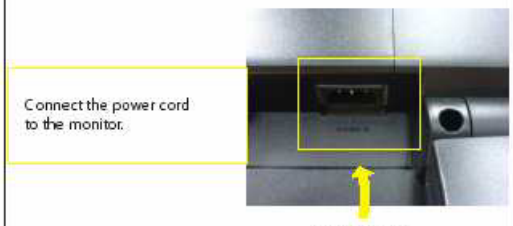
For example :

- Zentech 9032 PROGRAMMABLE AUTO SAFETY TESTER

3.2. Connection

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

(Zentech 9032 tester)



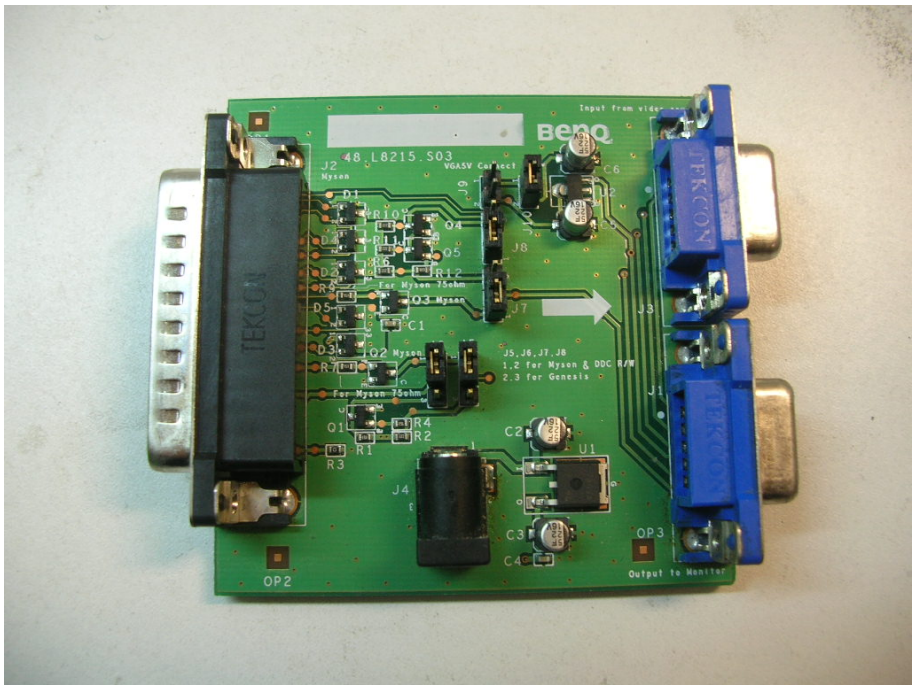
(Rear view of monitor)

4. Recording

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

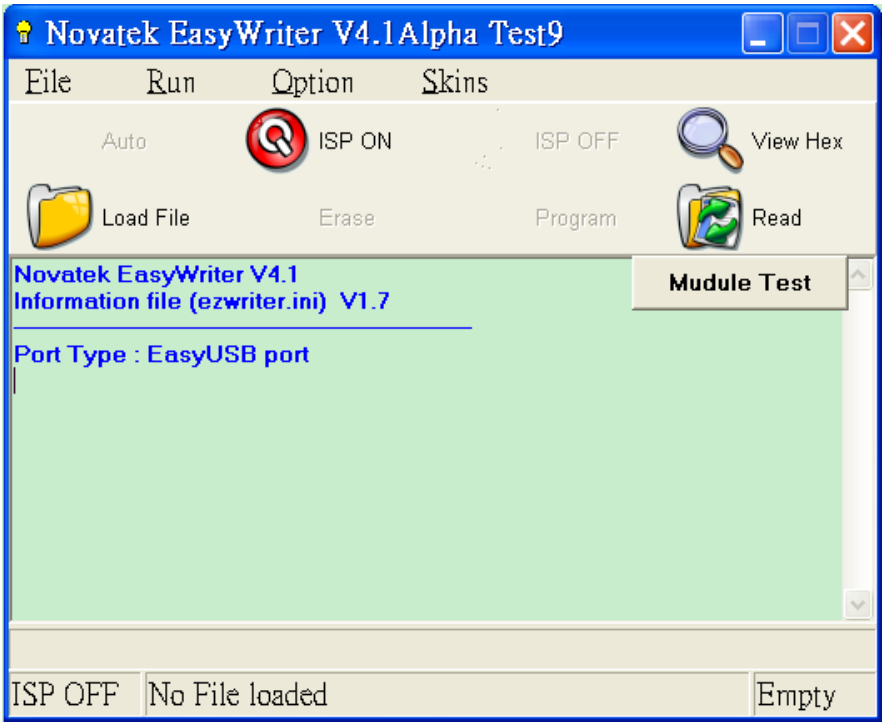
Service tool-Hardware

PCM code	12NC
5E.L8215.001	996510019769



Service tool-Software

FW writing tool: Easy Writer V4.1



DDC writing tool: Q-EDID-V16