42 inch FHD LCD PUBLIC DISPLAY

Service
Service
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BDL4230E/00

Service Manual

Horizontal frequencies
31 - 83 kHz

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SAFETY NOTICE

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

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

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

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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

LGD panel

LCD Panel	LC420WUN-SBA1
LCD size	42.02” inch
Display Resolution	1920(H) x 1080(V)
Pixel Pitch	0.4845 mm
Viewing Angle	R/L 178 degree (min)/ UD178 degree (min)
Display Response Time (Tr+Tf)	5 ms (G-to-G)
Display Color	1.06B (10bits)
Contrast Ratio	1400:1(Typ)
Luminance	500 cd/m2 (Typ.)
Surface 3H,	Haze10%
Lamp Life Time	50,000hrs (Min.)

Features

Max & Native Panel Resolution	1920 x 1080 @ 60 Hz
8-bit 162 MHz ADC	Yes
Picture in Picture(PIP)	Yes
3D comb-filter, 3D De-interlace	Yes
Fully Programmable White Balance functions	Yes
Enhanced H & V Sharpness	Yes
PC Auto Phase adjustment and Auto Mode Detect	Yes
Advanced video enhance. noise reduction	Yes
RS232 control in and out	Yes
Screen saver with image sticking protection	Yes
VGA input and output	Yes
Display wall support up to 5x5	Yes
Remote control lock in OSD	Yes
Front panel keypad lock	Yes
Scheduling Y	es
HDMI Overscan	Yes
Auto Adjustment	Yes

Power Requirement

Power Supply	Built-in AC power board
	By pass AC plug-in for external BOX PC
Power Cable	Detachable AC power cord
Power Supply Voltage	AC power adaptor: 90~264V AC 50/60Hz
Power Consumption	Power ON mode: < TBD W Standby mode: < 1 W Off mode < 1 W DPMS Support
Power Saving Mode	<1 W
Power Control	On/off control via IR/RS232/Push button

Interface Requirement

External Connector	Configuration	
	Input	Output
Power (AC)	1 	1 
Power hard switch	1 	0
VGA (D-sub)	1 	1 
DVI	1 	0
Audio (PC)	0	1 
HDMI	1 	0
Component (YPbPr)	1 	1 
Audio (RCA/YPbPr)	2 	2  1 
RS232	1 	1 
AV (VIDEO) BNC/CBVS	1 	1 
S-Video	1 	0

Environment Requirement

Operating Condition	
Operating Temperature	Temperature 0 to 40 degrees ℃
Humidity	Relative Humidity: 85%@50℃ (non-condensing)
Altitude	0 meter to +3000 meters above sea level
Storage Condition	
Temperature	Temperature-20 to 60 degree ℃
Humidity	Relative Humidity: 10~85%@50℃ (non-condensing)
Altitude	0 meter to 12,000 meters above sea level

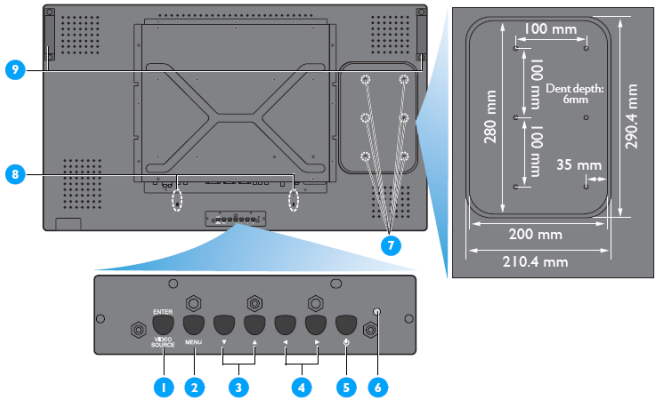
Installation

Front View Product Description

1. Remote control sensor, ambient light sensor and power indicator

- Receives command signals from the remote control.
- Detects the ambient lighting condition around the monitor.
- Indicates the operating status of the monitor:
  - lights blue when the monitor is turned on
  - lights amber when the monitor is in standby mode
  - blinks blue when remote control signal is received
  - blinks amber when the monitor enters DPMS mode
  - off when the main power of the monitor is turned off

Rear View



1. ENTER/VIDEO SOURCE button
- Use this button to select the input source.
- When the On Screen Display menu is active, use this as the **SET** button.

2. MENU button
- Use this button to engage the On Screen Display menu.
- When the On Screen Display menu is active, use this button to return to the previous menu.

3. ▲/▼ button
- When the On Screen Display menu is active, use these as the **UP/DOWN** menu buttons.
- Press and hold the ▲ and ▼ buttons simultaneously for 3 seconds to lock or unlock all buttons.

4. ◀ / ▶ button
- When the On Screen Display menu is active, use these as the **PLUS/MINUS** menu buttons.

5. POWER button
Use this button to turn the monitor on or put the monitor to standby.

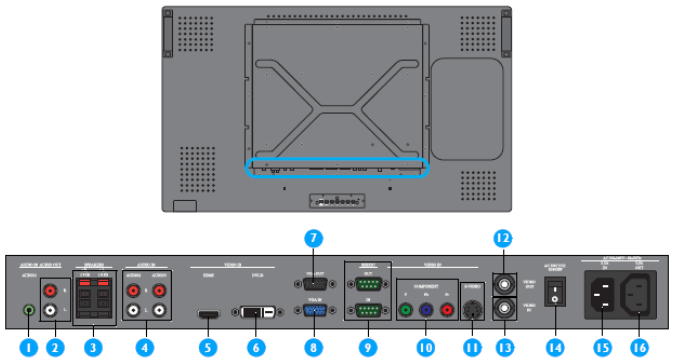
6. Power indicator
Indicates the operating status of the monitor:
- lights green when the monitor is turned on
- lights red when the monitor is in standby mode
- blinks red when the monitor enters DPMS mode
- off when the main power of the monitor is turned off

7. Mount PC installation holes
Install a mount PC using these holes and M4 screws. (Maximum load: 2kg)

8. Cable retainer installation holes
Install the cable retainer using these holes.

9. Carrying handle
Use these handles when carrying the monitor by hand.

Input/ Output Terminals



1. AUDIO IN (AUDIO1)
Connect to the audio output of a computer.

2. AUDIO OUT R/L
Outputs the audio signal from the **AUDIO IN (AUDIO1/AUDIO2/AUDIO3)** or **HDMI** jack.

3. SPEAKERS R/L
Outputs the audio signal from the **AUDIO IN (AUDIO1/AUDIO2/AUDIO3)** or **HDMI** jack to external speakers.

4. AUDIO IN (AUDIO2/AUDIO3)
Connect to the audio output of an AV device.

5. VIDEO IN (HDMI)
Connect to the HDMI output of an AV device or connect to the DVI output of a PC. (Using a DVI-HDMI cable)

6. VIDEO IN (DVI-D)
Connect to the DVI output of a PC or connect to the HDMI output of an AV device (Using a DVI-HDMI cable).

7. VGA OUT
Outputs the VGA signal from the **VGA IN** jack.

8. VGA IN
Connect to the VGA output of a computer.

9. RS232C (OUT/IN)
RS232C network connection input/output for the use of loop through function.

10. VIDEO IN (COMPONENT)
Component video input (YPbPr) for connecting to the component output of an AV device.

11. VIDEO IN (S-VIDEO)
S-Video input for connecting to the S-Video output of an AV device.

12. VIDEO OUT
Outputs the video signal from the **VIDEO IN** jack.

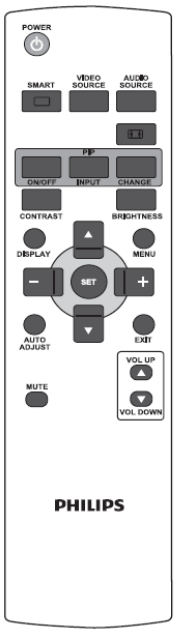
13. VIDEO IN
Connect to the video output of an AV device or another BDL4230E monitor.

14. Power switch
Press to switch the main power on/off.

15. AC IN (5.5 A)
Connect the supplied power cord to the wall outlet.

16. AC OUT (3.0 A)
Connect to the AC IN socket of another BDL4230E monitor or an external media device.

Remote Control



POWER button
Press to switch on the monitor from standby mode. Press again to turn it off to standby mode.

SMART button
To select smart picture mode from:
- **HIGHBRIGHT**: for moving image such as Video
- **STANDARD**: for images (factory setting)
- **sRGB**: for text based images
- **CINEMA**: for movies.
- **CUSTOM**: use your own picture setting. The mode is automatically selected after you change the settings in the **PICTURE** menu.

VIDEO SOURCE button
To activate the video source selection menu. Press it repeatedly to select the video input source from **HDMI**, **DVI-D**, **VGA**, **COMPONENT**, **S-VIDEO**, and **VIDEO**.

AUDIO SOURCE button
To activate the audio source selection menu. Press it repeatedly to select the video input source from **HDMI**, **AUDIO 1**, **AUDIO 2**, and **AUDIO 3**.

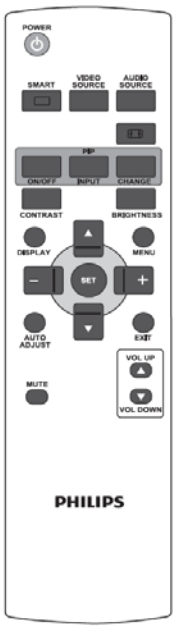
Picture format button
To switch screen aspect ratio between **FULL**, **NORMAL**, **DYNAMIC**, **CUSTOM**, **REAL**, and **21:9**.

PIP (Picture In Picture) buttons
- **ON/OFF** button: To turn PIP mode ON/OFF.
- **INPUT** button: To select the input signal for the sub-picture.
- **CHANGE** button: To exchange between the main picture and sub picture.

Note: The "PIP" mode does not work if the screen size is set to "CUSTOM", "DYNAMIC", "REAL" or "21:9".

CONTRAST button
Press to open the **CONTRAST** OSD selection, and then press the **PLUS** or **MINUS** button to adjust the value.

BRIGHTNESS button
Press to open the **BRIGHTNESS** OSD selection, and then press the **PLUS** or **MINUS** button to adjust the value.



DISPLAY button
To turn on/off the setting information displayed on the upper right corner of the screen.

MENU button
To turn the OSD menu on/off.

UP button
- To move the highlight bar up to adjust the selected item when OSD menu is on.
- To move the sub-picture up in "PIP" mode.

DOWN button
- To move the highlight bar down to adjust the selected item when OSD menu is on.
- To move the sub-picture down in "PIP" mode.

PLUS button
- To increase the adjustment with OSD menu.
- To move the sub-picture right in "PIP" mode.

MINUS button
- To decrease the adjustment with OSD menu.
- To move the sub-picture left in "PIP" mode.

SET button
To activate the setting with OSD menu.

AUTO ADJUST button
Note: For the VGA input only.
To execute the **AUTO ADJUST** function.

EXIT button
To turn to the previous OSD menu.

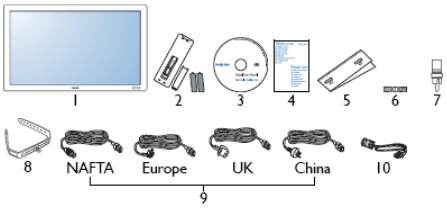
MUTE button
To turn the mute function on/off.

VOL UP button
To increase the audio output level.

VOL DOWN button
To decrease the audio output level.

Package Contents

Please verify that you received the following items with your package content:

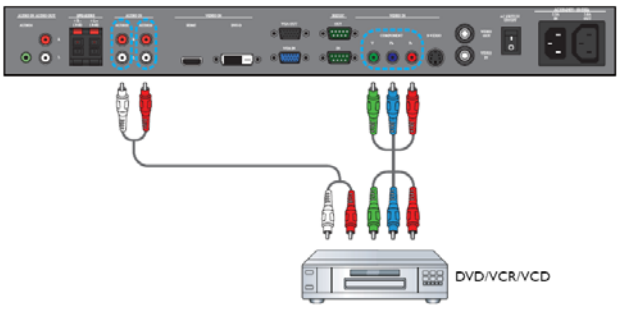


1. LCD monitor
2. Remote control with batteries
3. EDFU
4. Quick Start Guide
5. Logo guider
6. PHILIPS logo
7. BNC-to-RCA adapter (x 3)
8. Cable retainer (x 2)
9. Power cords
10. VGA cable

Connecting external equipment (DVD/ VCR/VCD)

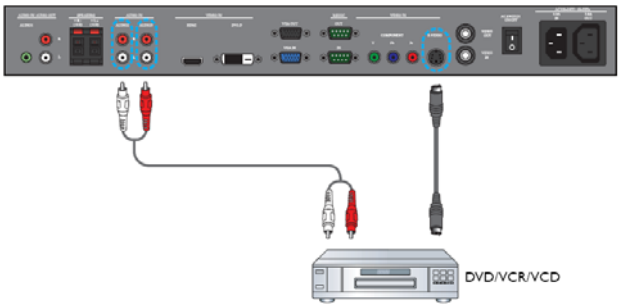
Using component video input

1. Connect the green-colored (labeled as "Y") jack of the device to the green-colored "Y" jack of the monitor.
2. Connect the blue-colored (labeled as "Pb") jack of the device to the blue-colored "Pb" jack of the monitor.
3. Connect the red-colored (labeled as "Pr") jack of the device to the red-colored "Pr" jack of the monitor.
4. Connect the red (R) and white (L) audio jacks of the device to the AUDIO IN (AUDIO2 or AUDIO3) jacks of the monitor.



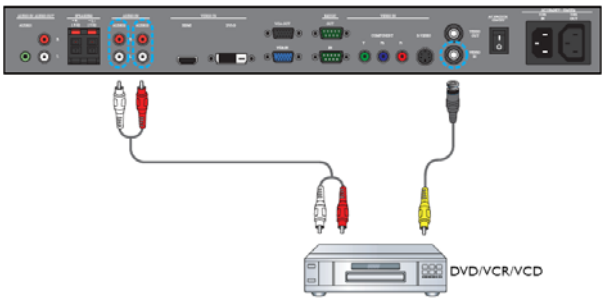
Using s-video input

1. Connect the S-Video connector of the external device to the S-VIDEO input of the monitor.
2. Connect the red (R) and white (L) audio jacks of the device to the AUDIO IN (AUDIO2 or AUDIO3) jacks of the monitor.



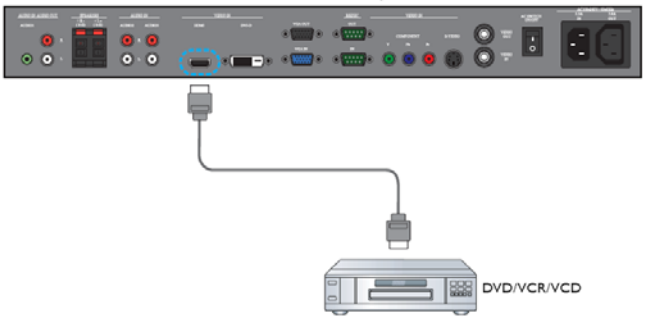
Using video input

1. Connect the Video connector of the external device to the VIDEO IN input of the monitor. Use the supplied BNC-to-RCA adapter if necessary.
2. Connect the red (R) and white (L) audio jacks of the device to the AUDIO IN (AUDIO2 or AUDIO3) jacks of the monitor.



Using HDMI input

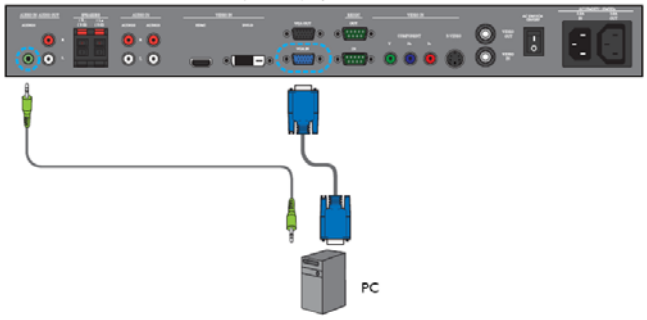
Connect the HDMI connector of the external device to the HDMI input of the monitor.



Connecting a PC

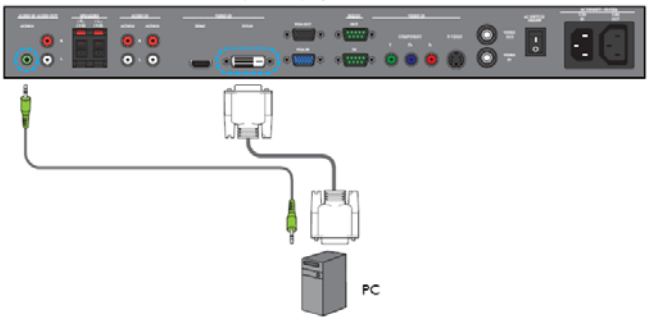
Using VGA input

1. Connect the 15-pin VGA connector of the PC to the VGA IN connector of the monitor.
2. Connect the audio cable to the AUDIO IN (AUDIO1) input of the monitor.



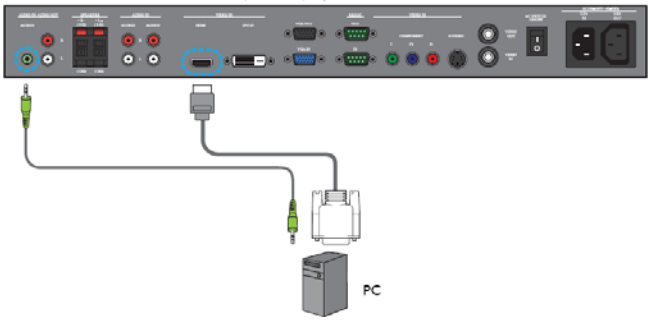
Using DVI input

1. Connect the DVI-D connector of the PC to the DVI-D connector of the monitor.
2. Connect the audio cable to the AUDIO IN (AUDIO1) input of the monitor.



Using DVI input

1. Connect the DVI connector of the PC to the HDMI connector of the monitor using a DVI-HDMI cable.
2. Connect the audio cable to the AUDIO IN (AUDIO1) input of the monitor.

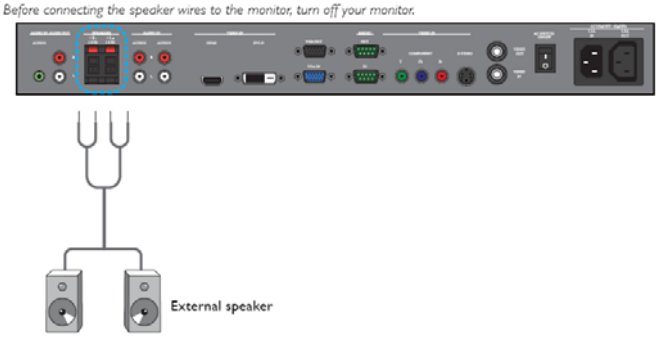


External audio connection

Connecting external speakers

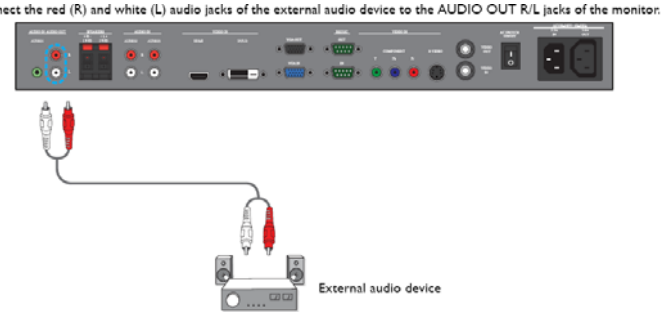
1. Connect the speaker wires to the external speaker (SPEAKERS) output of the monitor.
2. Turn on the monitor.

Note: Before connecting the speaker wires to the monitor, turn off your monitor.



Connecting external audio device

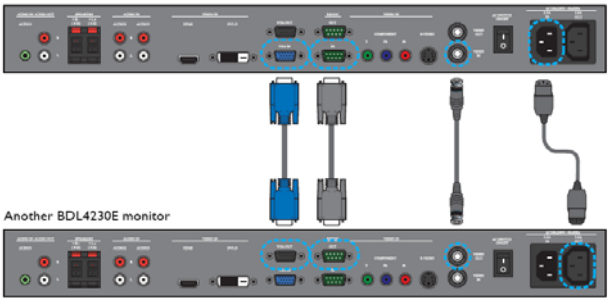
Connect the red (R) and white (L) audio jacks of the external audio device to the AUDIO OUT R/L jacks of the monitor.



Connecting another BDL4230E monitor

You can interconnect multiple BDL4230E monitors to create a daisy-chain configuration for applications like a TV wall.

- Connect the VGA OUT connector of the monitor to the VGA IN connector of another BDL4230E monitor.
- Connect the RS232C OUT connector of the monitor to the RS232C IN connector of another BDL4230E monitor.
- Connect the VIDEO OUT connector of the monitor to the VIDEO IN connector of another BDL4230E monitor.
- Connect the AC OUT connector of the monitor to the AC IN connector of another BDL4230E monitor.



Troubleshooting

Symptom	Possible Cause	Remedy
No picture is displayed	1. The power cord is disconnected. 2. The main power switch on the back of the monitor is not switched on. 3. The selected input has no connection. 4. The monitor is in standby mode in VGA mode.	1. Plug in the power cord. 2. Make sure the power switch is switched on. 3. Connect a signal connection to the monitor.
Interference displayed on the monitor or audible noise is heard	Caused by surrounding electrical appliances, cars/motorcycles or fluorescent lights.	Move the monitor to another location to see is the interference is reduced.
Color is abnormal	The signal cable is not connected properly	Make sure that the signal cable is attached firmly to the back of the monitor.
Picture is distorted with abnormal patterns	1. The signal cable is not connected properly. 2. The input signal is beyond the capabilities of the monitor.	1. Make sure that the signal cable is attached firmly. 2. Check the video signal source to see if it is beyond the range of the monitor. Please verify its specifications with this monitor's specification section.
Display image doesn't fill up the full size of the screen	The zoom mode is not correctly set.	Use the **ZOOM MODE** or **CUSTOM ZOOM** function in the **SCREEN** menu to fine tune display geometry and time frequency parameter.
Can hear sound, but no picture	Improperly connected source signal cable.	Make sure that both video inputs and sound inputs are correctly connected.
Can see picture but no sound is heard	1. Improperly connected source signal cable. 2. Volume is turned all the way down. 3. **MUTE** is turned on. 4. No external speaker connected	1. Make sure that both video inputs and sound inputs are correctly connected. 2. Use **VOL UP**/**VOL DOWN** button to hear sound. 3. Switch **MUTE** off by using the **MUTE** button. 4. Connect external speakers and adjust the volume to a suitable level.
Some picture elements do not light up	Some pixels of the display may not turn on.	This monitor is manufactured using an extremely high level of precision technology: however, sometimes some pixels of the monitor may not display. This is not a malfunction.
After-Images can still be seen on the monitor after the monitor is powered off. (Examples of still pictures include logos, video games, computer images, and images displayed in 4:3 normal mode)	A still picture is displayed for an over extended period of time	Do not allow a still image to be displayed for an extended period of time as this can cause a permanent after-image to remain on the monitor.

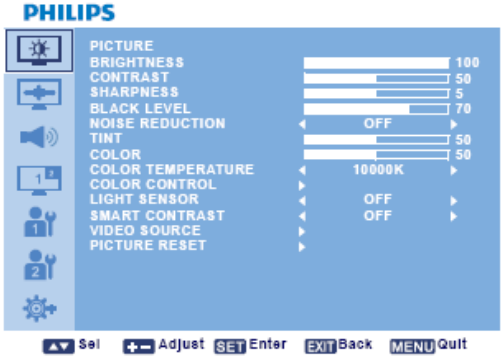
On-Screen Display

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:

Picture Menu



BRIGHTNESS

Adjust the overall image brightness by changing the intensity of the LCD panel's backlight.
Use the **PLUS/MINUS** button to adjust.

CONTRAST

Adjust to sharpen the picture quality. The black portions of the picture become richer in darkness and the white become brighter.
Use the **PLUS/MINUS** button to adjust.

SHARPNESS

Adjust to improve detail.
Use the **PLUS/MINUS** button to adjust.

BLACK LEVEL

Adjust to change the image brightness.
Use the **PLUS/MINUS** button to adjust.

NOISE REDUCTION

Note: For VIDEO, S-VIDEO, COMPONENT and HDMI inputs with interlaced video only.
Adjust to remove the noise in the image. You can select a suitable noise reduction level.
Use the **PLUS/MINUS** button to make selection.

On-Screen Display

TINT

Note: For VIDEO, S-VIDEO, COMPONENT, and HDMI inputs only.

Adjust to change the color tint of the image.

Use the **PLUS**/**MINUS** button to adjust. Press the **PLUS** button and the flesh tone color becomes greenish. Press the **MINUS** button and the flesh tone color becomes purplish.

COLOR

Note: For VIDEO, S-VIDEO, COMPONENT, and HDMI inputs only.

Adjusts to increase or decrease the intensity of colors in the image.

Press the **PLUS** button to increase color intensity, or press the **MINUS** button to decrease color intensity.

COLOR TEMPERATURE

Select a color temperature for the image. The image looks reddish with a lower color temperature, and looks bluish with a higher color temperature.

Use the **PLUS**/**MINUS** button to make selection.

COLOR CONTROL

Note: This function is only available when COLOR TEMPERATURE is set to USER.

With this function you can adjust the color tones of the image precisely by changing the R (Red), G (Green) and B (Blue) settings independently.

Press the **SET/PLUS** button to open the submenu. Press the **UP**/**DOWN** button to select **R**, **G** or **B**, and press the **PLUS**/**MINUS** button to adjust.

LIGHT SENSOR

Choose to enable or disable the ambient light sensor. Once enabled, the image brightness will be adjusted automatically when ambient lighting condition changes.

Use the **PLUS**/**MINUS** button to make selection.

SMART CONTRAST

When turned on, this function helps enhance image contrast when displaying dark scenes.

Use the **PLUS**/**MINUS** button to make selection.

VIDEO SOURCE

Select a video input source.

Press the **SET/PLUS** button to open the submenu, and then press the **UP**/**DOWN** button to toggle between

- **HDMI**
- **DVI-D**
- **VGA**
- **COMPONENT**
- **S-VIDEO**
- **VIDEO**

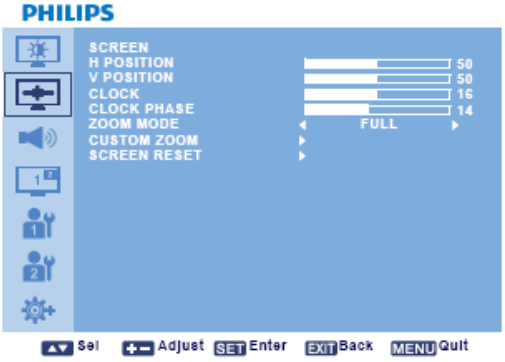
PICTURE RESET

Reset all settings in the **PICTURE** menu.

Press the **SET/PLUS** button to open the submenu, and then press the **UP**/**DOWN** button to make selection. Select **YES** and press the **SET** button to restore settings to factory preset values. Press the **EXIT** button to cancel and then return to the previous menu.

On-Screen Display

Screen Menu



H POSITION

Note: For the VGA input only.

Adjust the horizontal placement of the picture.

Press the **PLUS** button to move the image to the right, or press the **MINUS** button to move the image to the left.

V POSITION

Note: For the VGA input only.

Adjust the vertical placement of the picture.

Press the **PLUS** button to move the image up, or press the **MINUS** button to move the image down.

CLOCK

Note: For the VGA input only.

Adjust the width of the image.

Press the **PLUS** button to expand the width of the image, or press the **MINUS** button to shrink the width of the image.

CLOCK PHASE

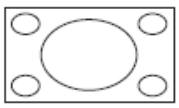
Note: For the VGA input only.

Adjust to improve the focus, clarity and stability of the image.

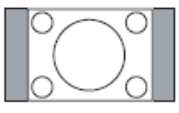
Use the **PLUS/MINUS** button to adjust.

ZOOM MODE

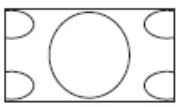
The pictures you receive may be transmitted in 16:9 format (widescreen) or 4:3 format (conventional screen). 16:9 pictures sometimes have a black band at the top and bottom of the screen (letterbox format). This function allows you to optimize the picture display on screen. The following zoom modes are available:



- **FULL** - This mode restores the correct proportions of pictures transmitted in 16:9 using the full screen display.



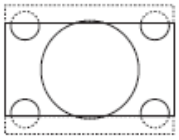
- **NORMAL** - The picture is reproduced in 4:3 format and a black band is displayed on either side of the picture.



- **DYNAMIC** - Fill the entire screen by stretching 4:3 pictures non-proportionally.
- **CUSTOM** - Choose to apply the custom zoom settings in the **CUSTOM ZOOM** submenu.

On-Screen Display

• **REAL** - This mode displays the image pixel-by-pixel on screen without scaling the original image size.



• **21:9** - The picture is enlarged to 16:9 format. This mode is recommended when displaying pictures that have black bands at the top and bottom (letterbox format).

CUSTOM ZOOM

Note: This item is only available when the ZOOM MODE setting is set to CUSTOM.

You can use this function to further customize the zoom settings to suit the image you want to display. Press the **SET/PLUS** button to open the submenu. Use the **UP/DOWN** button to toggle between the following items, and use the **PLUS/MINUS** button to adjust.

• **ZOOM** - Expands the horizontal and vertical sizes of the image simultaneously.

• **HZOOM** - Expands the horizontal size of the image only.

• **VZOOM** - Expands the vertical size of the image only.

• **H POSITION** - Moves the horizontal position of the image left or right.

• **V POSITION** - Moves the vertical position of the image up or down.

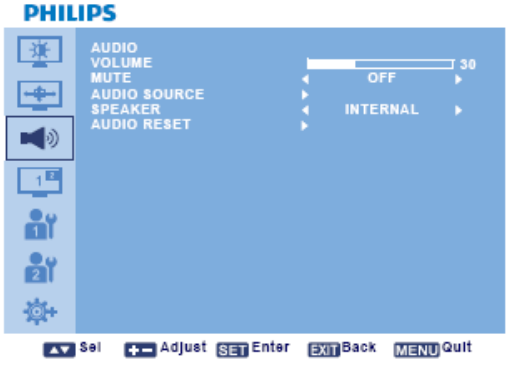
SCREEN RESET

Reset all settings in the **SCREEN** menu.

Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to make selection. Select **YES** and press the **SET** button to restore settings to factory preset values. Press the **EXIT** button to cancel and then return to the previous menu.

On-Screen Display

Audio Menu



VOLUME

Adjust to increase or decrease the audio output level.

Use the **PLUS/MINUS** button to adjust.

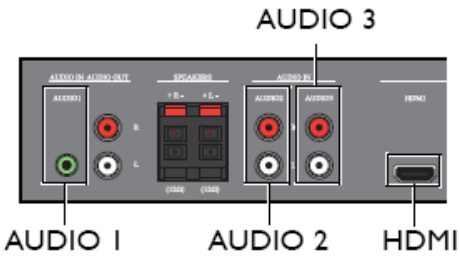
MUTE

To turn the mute function on/off.

Use the **PLUS/MINUS** button to make selection.

AUDIO SOURCE

To select the audio input source according to the audio signal source connected to the audio input and HDMI sockets on the monitor.



Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to toggle between

- **AUDIO 1**
- **AUDIO 2**
- **AUDIO 3**
- **HDMI**

SPEAKER

Set the monitor to play audio using the built-in (internal) speaker, external speakers or external audio devices (if connected).

Use the **PLUS/MINUS** button to toggle between

- **INTERNAL**
- **EXTERNAL**
- **LINE-OUT**

AUDIO RESET

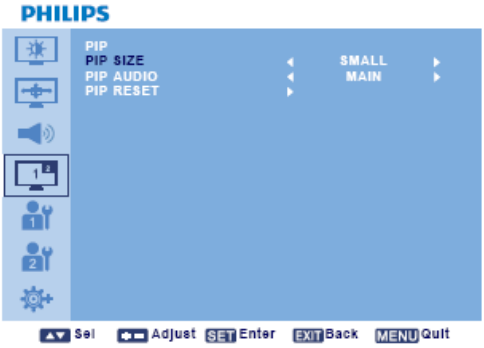
Reset all settings in the **AUDIO** menu.

Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to make selection. Select **YES** and press the **SET** button to restore settings to factory preset values. Press the **EXIT** button to cancel and then return to the previous menu.

On-Screen Display

PIP Menu

Note: For COMPONENT, VGA, DVI-D and HDMI inputs only.



PIP SIZE

Select the size of the sub picture in the PIP (Picture-in-Picture) mode.

Use the **PLUS/MINUS** button to toggle between

- **LARGE**
- **MIDDLE**
- **SMALL**

PIP AUDIO

Select the audio source in the PIP (Picture-in-Picture) mode.

Use the **PLUS/MINUS** button to toggle between

- **MAIN** - Select audio from the main picture
- **PIP** - Select audio from the sub picture.

PIP RESET

Reset all settings in the **PIP** menu.

Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to make selection. Select **YES** and press the **SET** button to restore settings to factory preset values. Press the **EXIT** button to cancel and then return to the previous menu.

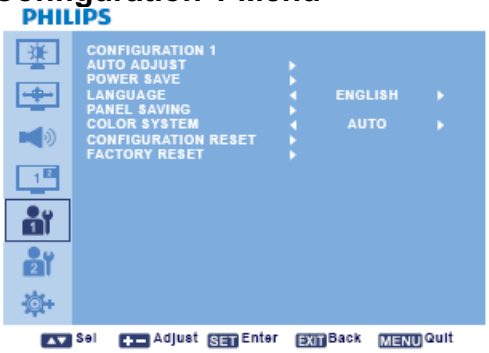
Note: the PIP function is only available under certain signal source combinations as shown in the table below.

		Main picture signal source					
		VIDEO	S-VIDEO	COMPONENT	VGA	DVI-D	HDMI
Sub picture signal source	VIDEO	X	X	X	X	X	X
	S-VIDEO	X	X	X	X	X	X
	COMPONENT	X	X	X	X	O	O
	VGA	X	X	X	X	O	O
	DVI-D	X	X	O	O	X	X
	HDMI	X	X	O	O	X	X

(O: PIP function available, X: PIP function unavailable)

On-Screen Display

Configuration 1 Menu



AUTO ADJUST

Note: For the VGA input only.

Use this function to let the monitor automatically optimize the display of VGA input image.

Press the **SET** button to adjust.

POWER SAVE

Set the monitor to reduce the power automatically.

Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to toggle between

- **RGB** - Select **ON** to let the monitor enter DPMS mode when no signal can be detected from the HDMI, DVI-D, and VGA inputs three times in a row. Use the **PLUS/MINUS** button to make selection.
- **VIDEO** - Select **ON** to let the monitor enter power saving mode when no signal is detected from the VIDEO, S-VIDEO, and COMPONENT inputs three times in a row. Use the **PLUS/MINUS** button to make selection.

LANGUAGE

Select the language for the OSD menu.

Use the **PLUS/MINUS** button to select a language.

PANEL SAVING

Choose to enable the panel saving functions to reduce the risk of the "image persistence". Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to toggle between

- **BRIGHTNESS** - Select **ON** and the brightness of the image will be reduced to an appropriate level, and the **BRIGHTNESS** setting in the **PICTURE** menu will become unavailable. Use the **PLUS/MINUS** button to make selection.
- **PIXEL SHIFT** - Select the time interval for the monitor to slightly expand the image size and shift the position of pixels in four directions (up, down, left, and right). Use the **PLUS/MINUS** button to make selection (**OFF-900** seconds from current time).

COLOR SYSTEM

Select the color system depending on the input video format.

Use the **PLUS/MINUS** button to toggle between

- **AUTO**
- **PAL 4.43**
- **PAL 3.58**
- **SECAM**
- **NTSC 4.43**
- **NTSC 3.58**

CONFIGURATION RESET

Reset all settings in the **CONFIGURATION 1** menu.

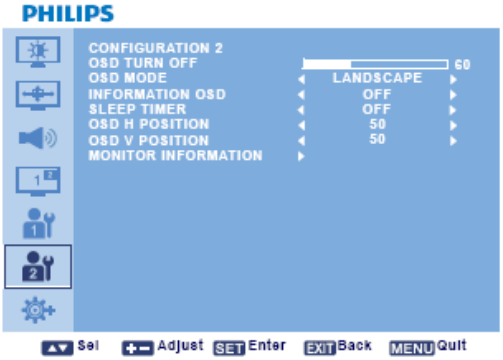
On-Screen Display

Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to make selection. Select **YES** and press the **SET** button to restore settings to factory preset values. Press the **EXIT** button to cancel and then return to the previous menu.

FACTORY RESET

Reset all settings in the **PICTURE**, **SCREEN**, **AUDIO**, **PIP**, **CONFIGURATION 1**, **CONFIGURATION 2**, and **ADVANCED OPTION** menus. Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to make selection. Select **YES** and press the **SET** button to restore settings to factory preset values. Press the **EXIT** button to cancel and then return to the previous menu.

Configuration 2 Menu



OSD TURN OFF

Set the period of time the OSD menu stays on the screen. (from **5** to **120** seconds)

Use the **PLUS/MINUS** button to adjust.

OSD MODE

Select the orientation of the OSD according to the orientation the monitor is installed.

Use the **PLUS/MINUS** button to toggle between

- **PORTRAIT**
- **LANDSCAPE**

INFORMATION OSD

Set the period of time the information OSD stays on the screen. The information OSD will display when input signal is changed, or when there is no signal or the input signal is out of range.

Use the **PLUS/MINUS** button to adjust. The information OSD will not disappear when **OFF** is selected.

SLEEP TIMER

Set the monitor to turn itself off to standby mode within an amount of time you specify. (**OFF-24** hours from current time)

Use the **PLUS/MINUS** button to adjust.

Note: When the SLEEP TIMER is activated, the SCHEDULE settings will be disabled.

OSD H POSITION

Adjust the horizontal position of the OSD menu.

Use the **PLUS/MINUS** button to adjust.

OSD V POSITION

Adjust the vertical position of the OSD menu.

Use the **PLUS/MINUS** button to adjust.

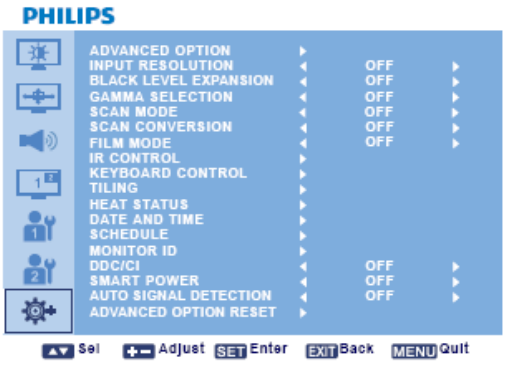
MONITOR INFORMATION

Displays the information about your monitor, including model name, serial number, operating hours and software version.

Press the **SET** button to view the information. Press the **EXIT** button to return to the previous menu.

On-Screen Display

Advanced Option Menu



INPUT RESOLUTION

Note: For the VGA input only.

Set the resolution of the VGA input. This is only required when the monitor is unable to detect the VGA input resolution correctly.

Use the **PLUS/MINUS** button to toggle between

- **AUTO**
- **1024x768**
- **1280x768**
- **1360x768**
- **1366x768**

BLACK LEVEL EXPANSION

Note: For VIDEO, S-VIDEO, COMPONENT, and HDMI (video mode) inputs only.

Select a suitable black level expansion setting to reveal more details in the dark parts of an image.

Use the **PLUS/MINUS** button to toggle between

- **OFF**
- **LOW**
- **MIDDLE**
- **HIGH**

GAMMA SELECTION

Select a display gamma value to best suit the image and optimize image brightness and contrast.

Use the **PLUS/MINUS** button to toggle between

- **2.2**
- **2.4**
- **NATIVE**

SCAN MODE

Note: For VIDEO, S-VIDEO, COMPONENT, and HDMI (video mode) inputs only.

Change the display area of the image.

Use the **PLUS/MINUS** button to toggle between

- **OVERSCAN** - Display about 95% of the original size of the image. The rest of the areas surrounding the image will be cut off.
- **UNDERSCAN** - Display the image in its original size.

SCAN CONVERSION

Note: For VIDEO, S-VIDEO, COMPONENT, and HDMI (video mode) inputs only.

Choose to enable or disable the IP (Interlace to Progressive) conversion function.

Use the **PLUS/MINUS** button to toggle between

- **PROGRESSIVE** - Enable the IP conversion function (recommended). Once enabled, the interlace input signal will be converted to progressive format for better display quality.
- **INTERLACE**: Disable the IP function. This mode is suitable for displaying motion pictures, but it increases the chance of image retention.

On-Screen Display

FILM MODE

Note: For VIDEO, S-VIDEO, COMPONENT, and HDMI (video mode) inputs only.

Choose to turn on or off the film mode frame conversion function.

Use the **PLUS/MINUS** button to toggle between

- **AUTO** - Enable the film mode frame conversion function for movies and motion pictures. The monitor converts a 24 frames-per-second (24 fps) input signal format to DVD video signal format. Once this function is enabled, it is recommended that you set the **SCAN CONVERSION** function to **PROGRESSIVE**.
- **OFF** - Disable the film mode frame conversion function. This mode is suitable for TV broadcasting and VCR signals.

IR CONTROL

Select the operation mode of the remote control when multiple BDL4230E monitors are connected via the RS232C connection.

Press the **SET/PLUS** button to open the submenu, and then press the **UP/DOWN** button to toggle between

- **NORMAL** - All monitors can be operated normally by the remote control.
- **PRIMARY** - Designate this monitor as the primary monitor for remote control operation. Only this monitor can be operated by the remote control.
- **SECONDARY** - Designate this monitor as the secondary monitor. This monitor can not be operated by the remote control, and will only receive the control signal from the primary monitor via the RS232C connection.
- **LOCK** - Lock the remote control function of this monitor. To unlock, press and hold the **DISPLAY** button on the remote control for 5 seconds.

KEYBOARD CONTROL

Choose to enable or disable the function of the keyboard (control buttons) on the monitor.

Use the **PLUS/MINUS** button to toggle between

- **LOCK** - Disable the keyboard.
- **UNLOCK** - Enable the keyboard.

TILING

Note: For the VGA input only.

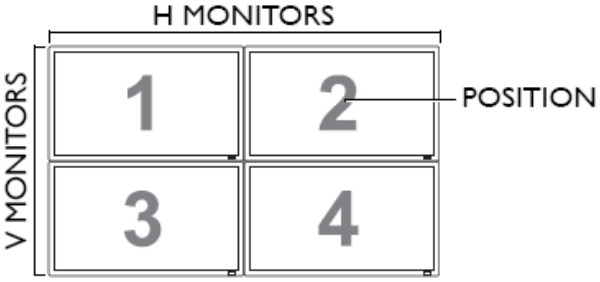
With this function you can create a single large screen matrix (display wall) that consists of up to 25 BDL4230E monitors (5 monitors each on the vertical and horizontal sides). This requires you to connect each BDL4230E monitor in a daisy-chain configuration.

Example:

2 x 2 screen matrix (4 monitors)

H MONITORS = 2

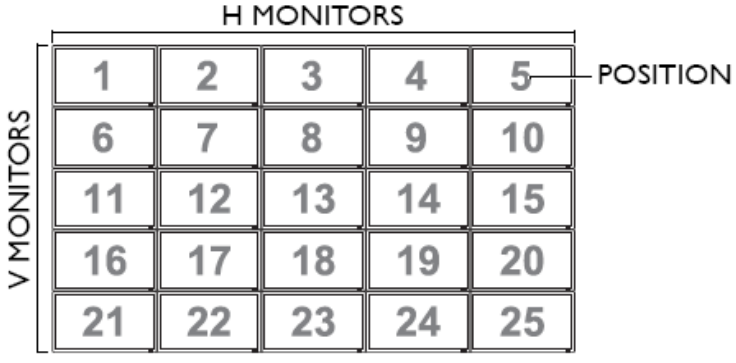
V MONITORS = 2



5 x 5 screen matrix (25 monitors)

H MONITORS = 5

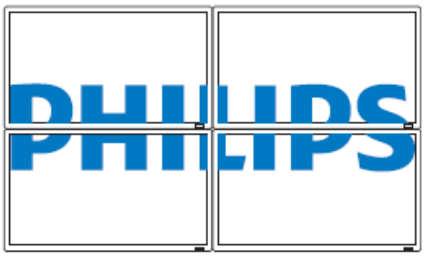
V MONITORS = 5



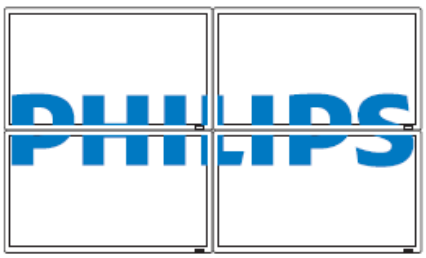
On-Screen Display

- **H MONITORS** - Select the number of monitors on the horizontal side.
- **V MONITORS** - Select the number of monitors on the vertical side.
- **POSITION** - Select the position of this monitor in the screen matrix.
- **FRAME COMP** - Choose to turn on or off the frame compensation function. If turned on, the monitor will adjust the image to compensate for the width of the monitor bezels in order to accurately display the image.

FRAME COMP - OFF



FRAME COMP - ON



- **ENABLE**: Choose to enable or disable the **TILING** function. If enabled, the monitor will apply the settings in **H MONITORS**, **V MONITORS**, **POSITION**, and **FRAME COMP**.

Note: The PIP function will be disabled when the TILING function is enabled, and vice versa.

HEAT STATUS

This function allows you to check the thermal status of the monitor at any time. The accuracy of the temperature indicated is ±5 degrees.

Press the **SET** button to view the heat status. Press the **EXIT** button to return to the previous menu.

DATE AND TIME

Adjust current date and time for the monitor's internal clock.

Press the **PLUS** button to open the submenu. Press the **UP/DOWN** button to toggle between the **YEAR**, **MONTH**, **DAY**, **HOUR**, **MINUTE**, and **DAYLIGHT SAVING TIME** settings, and then press the **PLUS/MINUS** button to adjust.

SCHEDULE

Note: You should set up current date and time in DATE AND TIME before using this function.

This function allows you to program up to seven different scheduled time intervals for the monitor. You can select the time the monitor turns on and turns off, the days in a week the monitor is activated, and which input source the monitor will use for each scheduled activation period.

1. Press the **SET** button to open the submenu.

2. Press the **UP/DOWN** button to select a schedule item (item 1 through item 7), and then press the **PLUS** button.
3. With the **ON** item highlighted, press the **SET** button and then press the **UP/DOWN** button to set the hour when the monitor will be turned on, then press the **PLUS** button to move to the minute slot to set the minute. If you do not want to use a power on time, select "--" for the hour slot, and "00" for the minute slot.

On-Screen Display

4. Press the **EXIT** button, and then press the **PLUS** button to highlight the **OFF** item. Press the **SET** button, and then press the **UP**/**DOWN** button to set the hour when the monitor will be turned off, then press the **PLUS** button to move to the minute slot to set the minute. If you do not want to use a power off time, select "--" for the hour slot, and "00" for the minute slot.
5. Press the **EXIT** button, and then press the **PLUS** button to highlight the **INPUT** item, and then press the **UP**/**DOWN** button to select an input source. If no input source is selected, the default input source (**VIDEO**) will be used.
6. Press the **PLUS** button to select what days in a week this schedule item will be take effect, and then press the **SET** button.
7. If you want to set up more schedule items, press the **EXIT** button and then repeat the steps above. A check mark in the box next to the number of the schedule item indicates that the selected schedule is in effect.

Notes:

- *The selection of EVERY DAY within a schedule item takes priority over other schedules that are set up to operate weekly.*
- *When schedule items overlap, scheduled power on time has priority over scheduled power off time.*
- *If there are two schedule items programmed for the same time, then the highest numbered schedule has priority.*

MONITOR ID

Set the ID number for controlling the monitor via the RS232C connection. Each monitor must have an unique ID number when multiple BDL4230E monitors are connected.

Use the **PLUS**/**MINUS** button to select a monitor ID.

DDC/CI

Choose to turn **ON** or **OFF** the DDC/CI communication function. Select ON for normal use.

Use the **PLUS**/**MINUS** button to make selection.

SMART POWER

Set the monitor to reduce the power consumption automatically.

Use the **PLUS**/**MINUS** button to toggle between

- **OFF**
- **MEDIUM**
- **HIGH**

AUTO SIGNAL DETECTION

Choose to let the monitor detect and display available signal sources automatically.

- **ON** - Set the monitor to display the image automatically once a signal is connected.
- **OFF** - Once a signal is connected, it can only be selected manually.

Use the **PLUS**/**MINUS** button to make selection.

ADVANCED OPTION RESET

Reset all settings in the **ADVANCED OPTION** menu.

Press the **SET**/**PLUS** button to open the submenu, and then press the **UP**/**DOWN** button to make selection. Select **YES** and press the **SET** button to restore settings to factory preset values. Press the **EXIT** button to cancel and then return to the previous menu.

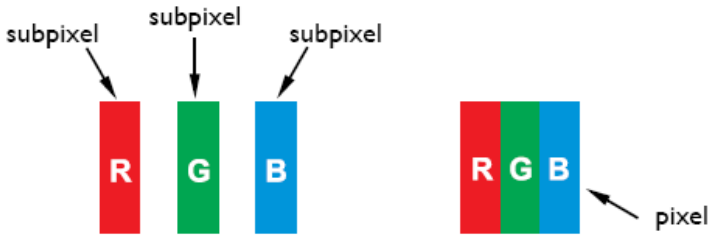
Philips Pixel Defect Policy

Philips' Flat Panel Displays 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 PDP / TFT panels used in Plasma- & LCD- displays are sometimes unavoidable. No manufacturer can guarantee that all panels will be free from pixel defects, but Philips guarantees that any Plasma- & LCD- displays with an unacceptable number of defects will be repaired during the warranty period in line with your local guarantee conditions. This notice explains the different types of pixel defects and defines the acceptable defect level for the BDL4230E LCD screen. In order to qualify for repair under warranty, the number of pixel defects must exceed a certain level which is given in the reference table. If the LCD screen is within specification a warranty exchange / claim back will be refused. Additionally, because some types or combinations of pixel defects are more noticeable than others, Philips sets even higher quality standards for those.

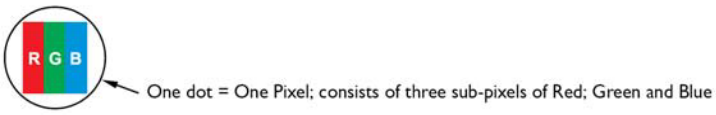
Pixels and Sub pixels

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.



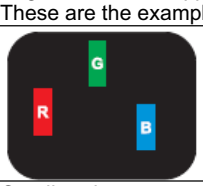
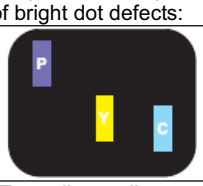
Types of Pixel Defects + Dot Definition

Pixel and sub-pixel defects appear on the screen in different ways. There are three categories of pixel defects and several types of sub-pixel defects within each category. Dot definition = What is a defective "Dot"? : One or more defective, adjacent sub-pixel are defined as one "dot". The no. of defective sub-pixels are not relevant to define a defective dot. This means that a defective dot can consist of one, two or three defective sub-pixels which can be dark or lit.



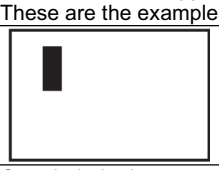
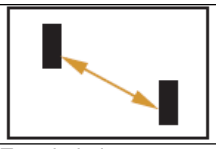
Bright Dot Defects

Bright dot defects appear as pixels or sub-pixels that are always lit or "on". These are the examples 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 dot)

Dark Dot Defects

Black dot defects appear as pixels or sub-pixels that are always dark or "off". These are the examples of black dot defects

		
One dark dot I	Two adjacent dark dots = 1 pair of dark dots Green = Yellow - Green + Blue = Cyan (Light Blue)	Two dark dots, specifications defines the minimum distance between dark dots

Proximity of Pixel Defects

Because pixel and sub-pixels defects of the same type that are nearby one another may be more noticeable, Philips also specifies tolerances for the proximity of pixel defects. In the table below you can find specifications about: • Allowed amount of adjacent dark dots = (adjacent dark dots =1 pair of dark dots) • Minimum distance between dark dots • Total no. of all defective dots

Pixel Defect Tolerances

In order to qualify for repair due to pixel defects during the warranty period, a PDP / TFT panel in a Philips Plasma / LCD- display must have pixel or sub-pixel defects exceeding the tolerances listed in the following table.

BRIGHT DOT DEFECTS	ACCEPTABLE LEVEL
MODEL	BDL4230E
1 lit sub pixel	3
2 adjacent lit sub pixels	1
3 adjacent lit sub pixels (one white pixel)	0
50% ~ Less Dot (Weak Dot)	7
Distance between two bright dot defects*	5mm
Total bright dot defects of all types	7

BLACK DOT DEFECTS	ACCEPTABLE LEVEL
MODEL	BDL4230E
1 dark sub pixel	9
2 adjacent dark sub pixels	3
3 adjacent dark sub pixels	1
Distance between two black dot defects*	NA
Total black dot defects of all types	9

TOTAL DOT DEFECTS	ACCEPTABLE LEVEL
MODEL	BDL4230E
TOTAL DOT DEFECTS OF ALL TYPES	10

Note:

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

Mechanical Instruction

Preparation before disassemble

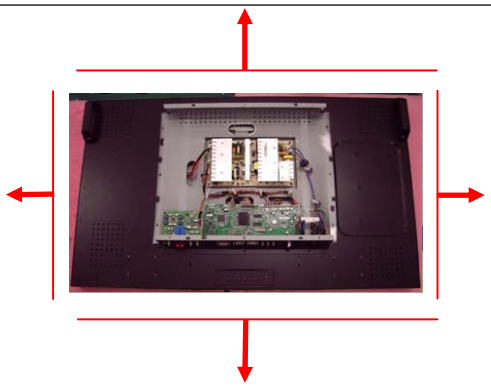
1.Clean the room for disassemble

2.Identify the area for monitor

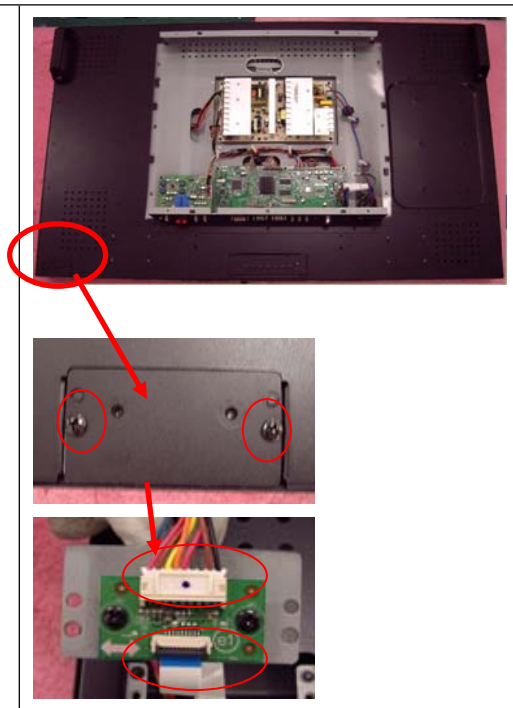
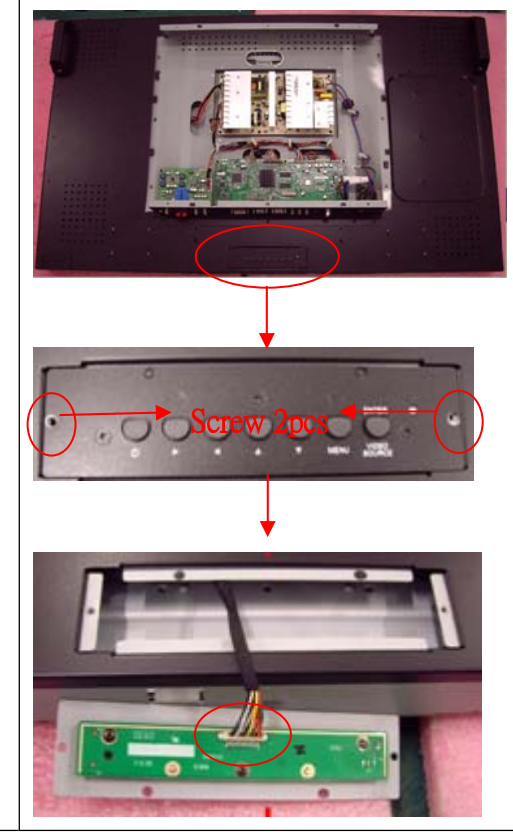
3.Check the position that the monitors be placed and the quantity of the monitor ;prepare the area for material flow; according to the actual condition plan the disassemble layout

4.Prepare the implement, equipments, materials as bellow:

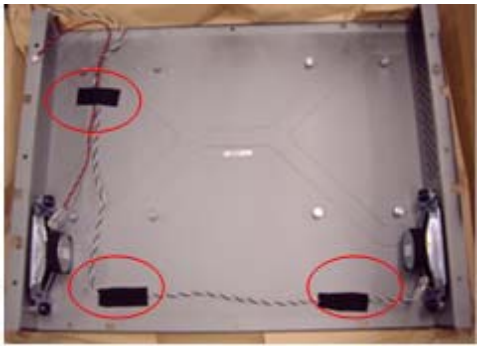
1) Press-fixture
2) working table
3) Screw-driver
4) knife*1
5) glove
6) cleaning cloth
7) ESD protection

item	picture	Operation	Tool	Notes
1	 	Disassemble the VESA bkt→ 12 screws, After take off speakers of connector	Screw-driver	
2		disassembly the bezel from the monitor take off 17 pcs screw,	Screw-driver	

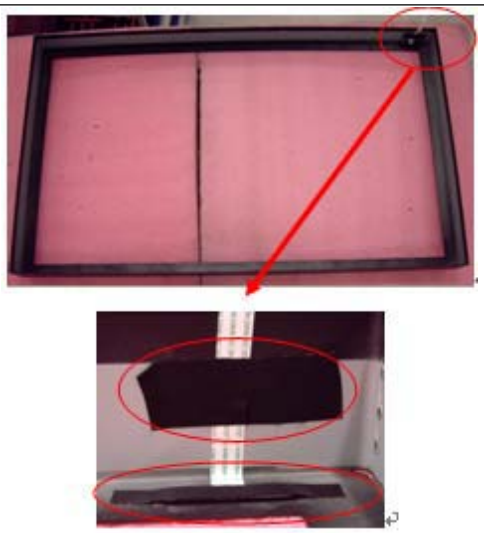
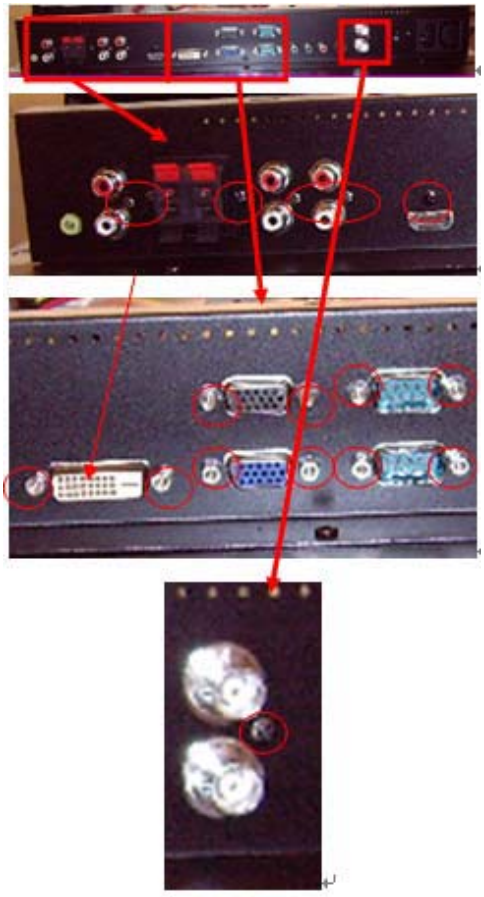
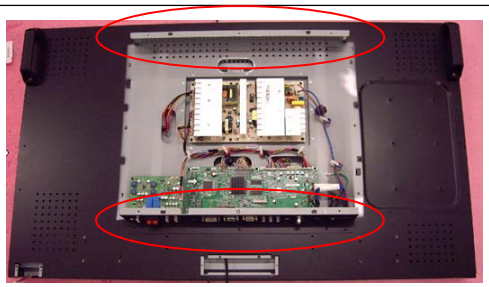
Mechanical Instruction

3		disassembly the transfer board from the case rear take off 2 pcs screw, After take off 2wires from transfer board	Screw-driver	
4		Disassembled the keypad from the case rear take off wire	Screw-driver	

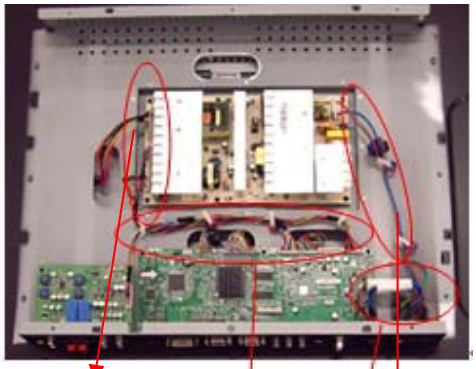
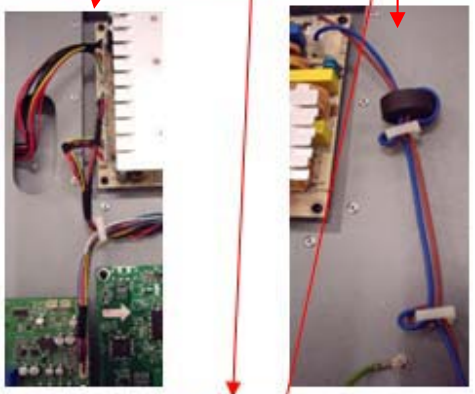
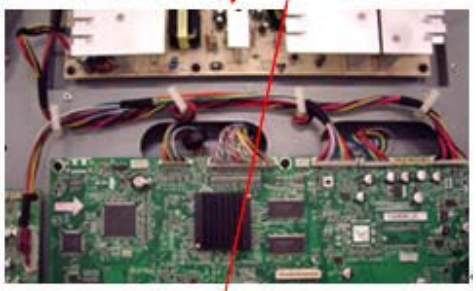
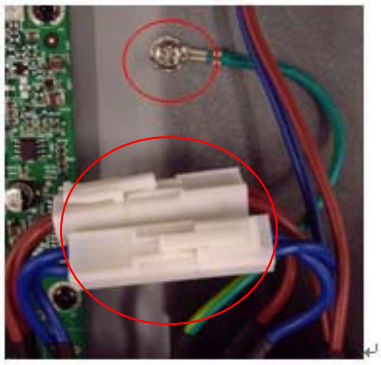
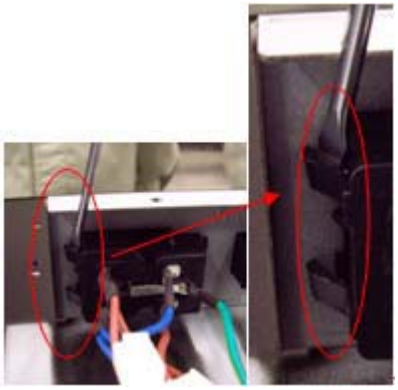
Mechanical Instruction

5		Take off 2 pcs screw	Screw-driver	
6		Take off 3 pcs screw	Screw-driver	
7		Take off 3 pcs tape		
8		Disassembled the speakers form vesa bkt take off 4 screws	Screw-driver	

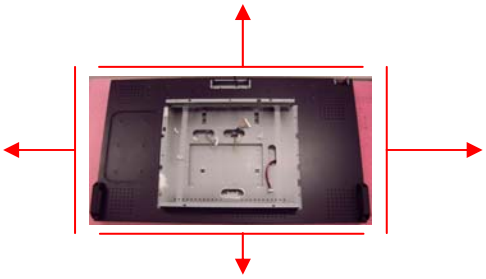
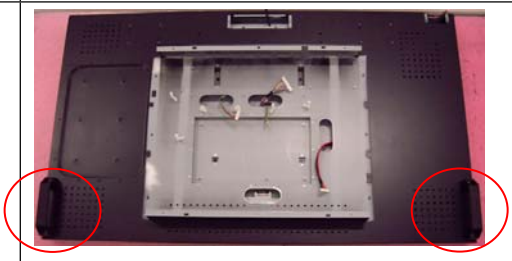
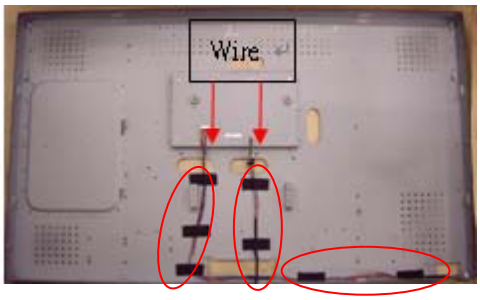
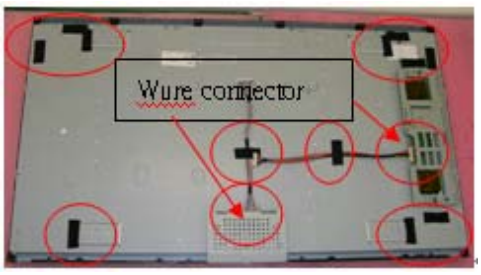
Mechanical Instruction

9		Take off 2 tapes from bzl ,After disassemble IR lens		
10		Take off 17 screws	Screw-driver	
11		Disassemble the I/O bkt and top bkt → take off 6 screws	Screw-driver	

Mechanical Instruction

12	    	Disassemble the wires →1 screw	Screw-driver	

Mechanical Instruction

13		Disassemble power bd , audio bd, main bd,→15 screws	Screw-driver	
14		Take off 17 screws from 4side of case rear	Screw-driver	
15		Disassemble the handles →4 screws	Screw-driver	
16		Tear out the acetic tape 7pcs		
17		Disassemble the R,L bkt → 12 Screws	Screw-driver	
18		Tear out the acetic tape 12 pcs and disassemble wires		

Color Adjustment

Color adjustment

(1). Input source set the YPbPr (VGA / DVI / HDMI) input
(2). After ADC Calibration
(3). Set the picture mode to standard mode at user OSD
(4). Set input timing to SDTV480P with“80% white” pattern
(5). Enter factory OSD, select Color Temp Turning.
(6). Use CA210 read the color coordinate.
(7). Adjust the Red, Green, Blue driver to let the color coordinate to meet the table1 spec.
(8). Go to step (6) until the 80% white pattern meet the table 1 spec.
(9). Add the following “offset” values to drive/offset values of 10000°KColor Temperature to get9300°K Color Temperature.
(10). Add the following “offset” values to drive/offset values of 6500°KColor Temperature to get 5800°K Color Temperature.

YPbPr (VGA / DVI / HDMI)

Color Temp	R drive	G drive	B drive	R offset	G offset	B offset
9300° K	10000° K R -2	10000° K G +0	10000° K B +5	10000° K R +0	10000° K G +0	10000° K B +0

Color Temp	R drive	G drive	B drive	R offset	G offset	B offset
5800°K	6500°K R +8	6500°K G +0	6500°K B -15	6500°K R +0	6500°K G +0	6500°K B +0

Video Color adjustment

(1). Input source set the CVBS1 (CVBS2 / S-Video) input.
(2). Set the picture mode to standard mode at user OSD.
(3). Setup input timing to NTSC with“80% white” pattern
(4). Enter factory OSD, select Color Temp Turning
(5). Use CA210 read the color coordinate.
(6). Adjust the Red, Green, Blue driver to let the color coordinate to meet the table1 spec.
(7). Go to step (5) until the 80% white pattern meet the table 1 spec.
(8). Add the following “offset” values to drive/offset values of 10000°K Color Temperature to get 9300°K Color Temperature.
(9). Add the following “offset” values to drive/offset values of 6500°K Color Temperature to get 5800°K Color Temperature.

CVBS1 (CVBS2 / S-VIDEO)

Color Temp	R drive	G drive	B drive	R offset	G offset	B offset
9300° K	10000° K R +0	10000° K G +0	10000° K B -8	10000° K R +0	10000° K G +0	10000° K B +0

Color Temp	R drive	G drive	B drive	R offset	G offset	B offset
5800°K	6500°K R +8	6500°K G +0	6500°K B -14	6500°K R +0	6500°K G +0	6500°K B +0

Screen Uniformity

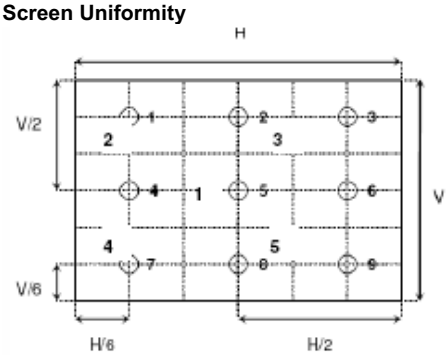


Fig.1 Optical measurement point

(1). Timing SDTV480P @ 60Hz , YPbPr source
(2). DEFAULT the unit and select the ANSI BRIGHTNESS GRID pattern.
(3). Change the unit to MAX/MAX for Contrast/Brightness , Color temperature default setting 9300°K.
(4). Surface luminance is luminance value at point 1 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see Fig. When VDDB =24V,IDDB = 12.5 A. LWH=Lon1, Where Lon1 is the luminance with all pixels displaying white at center 1 location. just for reference , no spec.
(5). Position the CA-210 at the locations indicated on the grid , there are 9 points see Fig .1. Measure and Record the values when the GRID is OFF.
(6). Panel spec brightness minimum 400 nits , typical 500 nits , Luminance Variation 1.3(Max). The variation in surface luminance, WHITE is defined under 100% brightness as: Δwhite(9P)=Maximum(Lon1, Lon2,…,Lon9)/Minimum(Lon1, Lon2,…Lon9)

Spec and Table list

(1). Reference: The variance of color coordinate via Red, Green, Blue :

	X	Y
Red drive ↓	x ↓	-
Green drive ↓	-	Y ↓
Blue drive ↓	x ↑	Y ↑
Red offset ↑	x ↑	-
Green offset ↑	-	Y ↑
Blue offset ↑	x ↓	Y ↓

(2). Table 1-1,1-2,1-3 : Color temperature spec
User OSD (AV Signal Black Level =40，contrast =72)
(YPbPr Signal Black Level=49, contrast =55)
(VGA Signal Black Level =48, contrast = 50)

Table 1-1

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO / VGA / YPbPr / DVI / HDMI
Color temperature	10000°K
x	0.278±0.01
y	0.291±0.01

Table 1-2

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO / VGA / YPbPr / DVI / HDMI
Color temperature	9300°K
x	0.283±0.01
y	0.298±0.01

Table 1-3

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO / VGA / YPbPr / DVI / HDMI
Color temperature	6500°K
x	0.312±0.01
y	0.329±0.01

Table 1-4

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO / VGA / YPbPr / DVI / HDMI
Color temperature	5800°K
x	0.326±0.01
y	0.342±0.01

Color Adjustment

Table 2 : default value of internal gain RGB drive & offset:

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO	VGA / YPbPr / DVI / HDMI
Color temperature	10000°K	10000°K
Red drive	127	127
Green drive	127	127
Blue drive	135	136
Red offset	127	130
Green offset	127	127
Blue offset	127	120

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO	VGA / YPbPr / DVI / HDMI
Color temperature	9300°K	9300°K
Red drive	127	127
Green drive	127	127
Blue drive	127	127
Red offset	127	137
Green offset	127	127
Blue offset	127	127

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO	VGA / YPbPr / DVI / HDMI
Color temperature	6500°K	6500°K
Red drive	127	127
Green drive	127	127
Blue drive	127	127
Red offset	127	127
Green offset	127	127
Blue offset	127	127

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO	VGA / YPbPr / DVI / HDMI
Color temperature	5800°K	5800°K
Red drive	135	135
Green drive	127	127
Blue drive	113	112
Red offset	127	127
Green offset	127	127
Blue offset	127	127

Table 3 : limit value of RGB drive & offset:

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO	VGA / YPbPr / DVI / HDM
Color temperature	10000°K	10000°K
Red drive	100~140	100~140
Green drive		
Blue drive		
Red offset	110~140	110~140
Green offset		
Blue offset		

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO	VGA / YPbPr / DVI / HDMI
Color temperature	9300°K	9300°K
Red drive	110~130	110~130
Green drive		
Blue drive		
Red offset	110~140	110~140
Green offset		
Blue offset		

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO	VGA / YPbPr / DVI / HDMI
Color temperature	6500°K	6500°K
Red drive	110~130	110~130
Green drive		
Blue drive		
Red offset	110~140	110~140
Green offset		
Blue offset		

Color temp item @factory OSD	CVBS1 / CVBS2 / S-VIDEO	VGA / YPbPr / DVI / HDMI
Color temperature	5800°K	5800°K
Red drive	100~140	100~140
Green drive		
Blue drive		
Red offset	110~140	110~140
Green offset		
Blue offset		

PC Auto Timing Check

(1) Timing list:

Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Dot Clock Frequency (MHz)	Remark
800×600	37.879	60.317	40.0	VESA

(2) Setup input timing VESA-800x600 (37.9K, 60Hz) “16-Grays pattern” pattern.
(3) Select timing from above timing list.
(4) If position is wrong, press “Auto Adjust” function at user OSD to check this function

PC (RGB) ADC Calibration

(1) Setup input timing VESA-800x600 (37.9K, 60Hz) & 16-Grays pattern to DSUB connector.
(2) Setup “source” to “VGA”.
(3) Select 16:9 format
(4) Enter factory OSD
(5) Enter the “ADC CAL….” page and run “Calibration…” function
(6) Execute “Input 16 grays scale pattern for PC” to start calibration.

4. YPbPr ADC Calibration:

(1) Setup input timing SDTV480P & “SMPTE Color Bar (0 IRE, 75% Color)” pattern to component connectors.
(2) Setup “source” to “YpbPr”.
(3) Select 16:9 format.
(4) Enter factory OSD.
(5) Enter the “ADC CAL….” page and run “Calibration” function.
(6) Execute “Input SMPTE 75 color bar for 480P” to start calibration

Electrical Instructions

Electrical characteristics

1. PC input signal requirements

- Pixel rate capability -86 MHz.
- VGA sync input - TTL level, separate H/V sync only, "+" or "-" polarity, terminated with ≥ 2.2kΩ impedance.
- HDMI input

  TMDS channel:
  - Carries video data.
  - Signaling method: According to DVI 1.0 specification. Single-link (Type A HDMI).
  - Video pixel rate: 25 MHz to 165 MHz (Type A)

  DDC channel:
  - Allows source to interrogate capabilities of sink.
  - I²C signaling with 100 kHz clock.
  - E-EDID data structure according to EIA/CEA-861B and VESA Enhanced EDID.
- VGA analog RGB level - 0 ~ 700mV linear, positive polarity, terminated with 75Ω impedance.
- I²C DDC signal - DDC2B required, DDC serial Data & Clock, DDC components are connected to both display Vcc and DDC +5V (from PC via video cable), that the PC can read the DDC data also when the display is powered off. To prevent current feedback into PC, blocking diodes are required at display side.
- Audio input -Sensitivity 500mVrms, the amplifier outputs full power when the input level reaches 500mVrms, terminated with impedance >10kΩ.
- Lineout output - Stereo, 2Vrms output.
- Speaker output - 2 x 10 Wrms back firing speakers, with T.H.D. < 10%.

2. AV input signal requirements

- CVBS input -1000mVpp (including 300 mV sync level), terminated with input impedance of 75Ω.
- S-Video input - Y: 1000mVpp, C: 300mVpp, terminated with input impedance of 75Ω.
- Component video input -Y: 1000mVpp, PbPr: ±350mVpp, terminated with input impedance of 75Ω. 480i/p, 576i/p, 720p, 1080i signal handling capability.
- HD ready -HD ready logo not required, but requirements to be fulfilled as-Display, display engine:
  - The minimum native resolution of the display or display engine is 720 physical lines in wide aspect ratio.
- Video Interfaces:
  - The display device accepts HD input via:
    - Analog YPbPr. "HD ready" displays support analog YPbPr as a HD input format to allow full compatibility with today's HD video sources in the market. Support of the YPbPr signal should be through common industry standard connectors directly on the HD ready display or through an adaptor easily accessible to the consumer; and
  - HDMI HD capable inputs accept the following HD video formats:
    - 1280x720 @ 50 and 60Hz progressive scan ("720p")
    - 1920x1080 @ 50 and 60Hz interlaced ("1080i")
  - The HDMI input supports copy protection (HDCP).
- FHD-FHD ready logo not required, but requirements to be fulfilled as:1080p/23.98, 1080p/24, 1080p/25, 1080p/29.97, 1080p/50, and 1080p/60.

- HDMI Input -Compliance with HDMI Specification 1.3 or later, 480i/p, 576i/p, 720p, 1080i/p signal handling capability.

TMDS channel:
- Carries audio, video and auxiliary data.
- Signaling method: According to HDMI Ver. 1.3b specification. (Type A HDMI).
- Video pixel rate: 25 MHz to 165 MHz (Type A)
- Pixel encodings: RGB 4:4:4, YCbCr 4:2:2, YCbCr 4:4:4.
- Audio sample rates: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96kHz, 176.4 kHz, 192 kHz.
- Audio channels: up to 8.

Electrical Instructions

DDC channel:

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

Content protection:

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

- Audio input -Sensitivity 500mVrms, the amplifier outputs full power when the input level reaches 500mVrms, terminated with input impedance of >10kΩ.
- Speaker output -Back firing speakers 2 x 10 Wrms, with T.H.D. < 10%.
- No signal input - While no signal at external inputs, screen goes blue before entering standby mode.

3. Timing requirement

MODE		ASPECT RATIO HANDLING							
STANDARD	RESOLUTION	FS*Full-Screen	AR Aspect Ratio	Composite	S-Video	YPBPR	RGB	HDMI	DVI
VESA	640x480 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	640x480 @ 72Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	640x480 @ 75Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
	720x400 @ 70Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	800x600 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	800x600 @ 75Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1024x768 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
	1024x768 @ 75Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1280 x 768 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1280 x 800 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1280x960 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1280x1024 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1360 x 768 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1366 x 768 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1600x1200 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1920x1080 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
VESA	1920x1200 @ 60Hz	1920x 1080	16:09	NA	NA	NA	Y	Y	Y
PAL	576i(50Hz)	1920x 1080	16:09	Y	Y	Y	NA	Y	NA
NTSC	480i(60Hz)	1920x 1080	16:09	Y	Y	Y	NA	Y	NA
DVD	480p(60Hz)	1920x 1080	16:09	NA	NA	Y	NA	Y	NA
	576p(50Hz)	1920x 1080	16:09	NA	NA	Y	NA	Y	NA
	720p(50Hz)	1920x 1080	16:09	NA	NA	Y	NA	Y	NA
	720p(60Hz)	1920x 1080	16:09	NA	NA	Y	NA	Y	NA
	1080i (50Hz)	1920x 1080	16:09	NA	NA	Y	NA	Y	NA
	1080i (60Hz)	1920x 1080	16:09	NA	NA	Y	NA	Y	NA
	1080p(50Hz)	1920x 1080	16:09	NA	NA	Y	NA	Y	NA
	1080p(60Hz)	1920x 1080	16:09	NA	NA	Y	NA	Y	NA

- * = Default Setting, ** = these modes also works on every source input.
- Aspect Ratio control is saved to memory, tied to input.

Electrical Instructions

White color adjustment

The picture color temperature shall be able to be chosen out of 5 modes 10000K,9300K, 6500K, 5800K, and USER. 10000K, 9300K, 6500K, 5800K are factory setting (fixed color) and “USER” is adjustable mode. (The default color of “USER” mode is the same color as 6500K mode.)

A/D converter calibration of the scalar shall be performed with 0V/0.730Vp-p black/white level signal to obtain adequate dynamic range for video signal output level deviation. White balance adjustment and inspection shall be carried out using 0.700Vp-p level signal.

Measurement condition – Measurement point : Center of screen
Measurement distances : 50cm
Measurement Angle : 90°

Measurement equipment – Color Analyzer : CA210 or Equivalent
Signal Generator : VG828 or Equivalent
Video Signal : White pattern

Color Temperature Table:

Mode	x	y	Specification
10000K	0.278	0.291	±0.03
9300K	0.283	0.298	±0.03
6500K	0.313	0.329	±0.03
5800K	0.326	0.342	±0.03

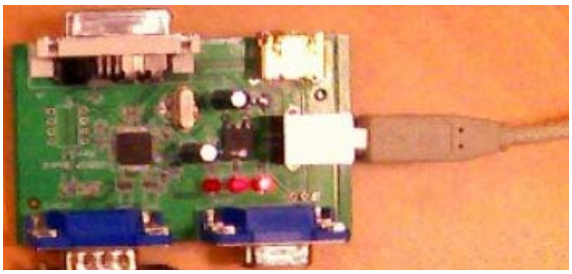
Service tool-Hardware

F/W Writing Tool: RS232 Cable:

P/N	Description
5K.0R505.501	CABLE D-SUB 9/9P UL20276 11M

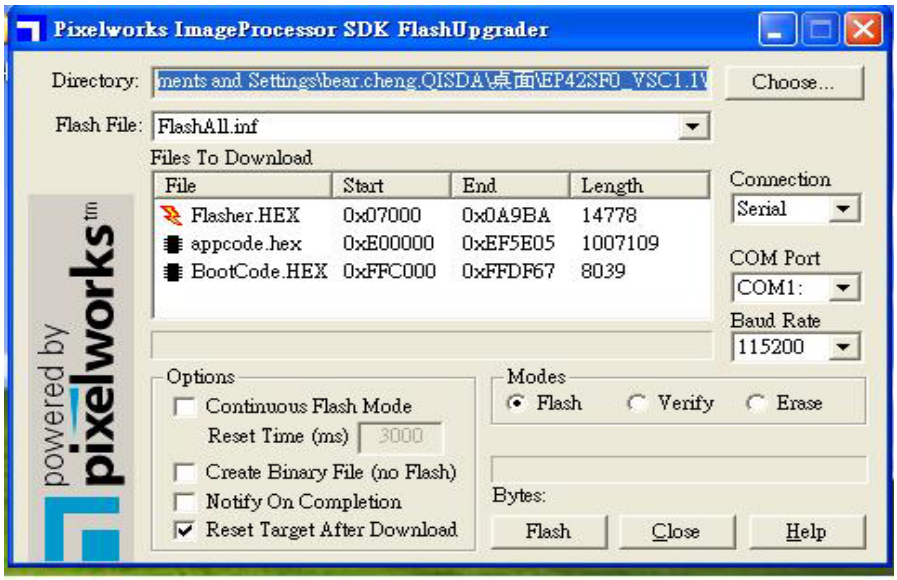
EDID Writing Tool: USB Cable and Jig BD

P/N	Description
5K.L1E03.501	Service Tool-Cable-VOARD (CABLE USB 2.0A/B B-PVC 1.8M)
5E.0RC38.001	Service Tool-Board-VOARD (PCBA JIG BD MI WP42SF0)

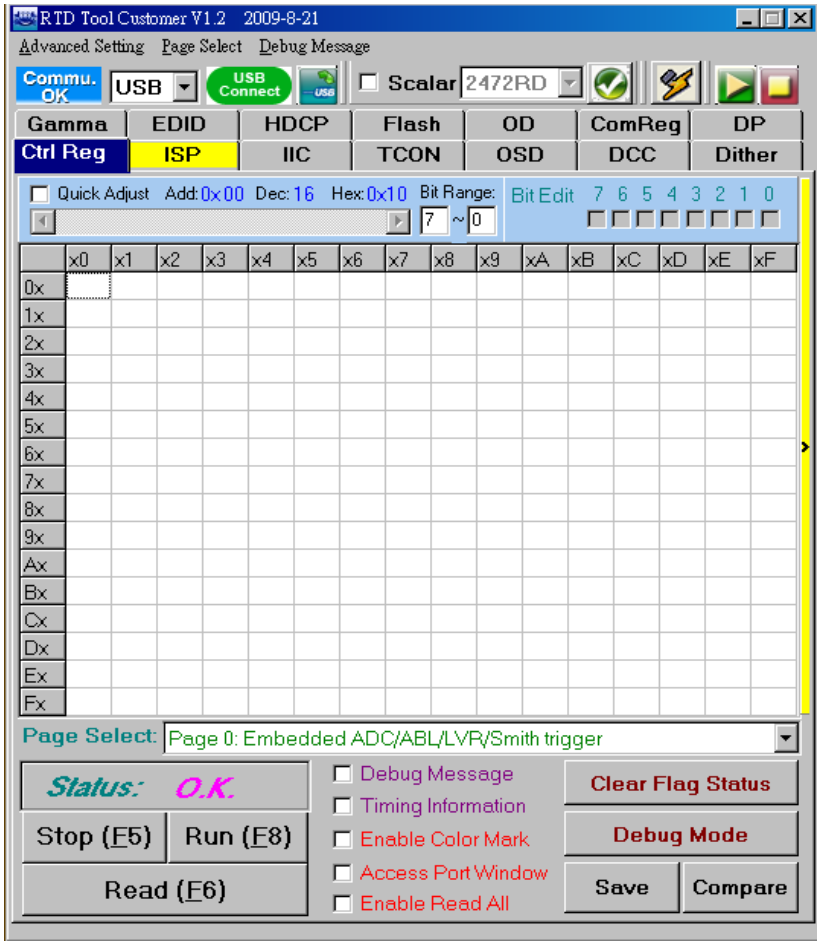


Service tool-Software

FW writing tool: Pixelworks ImageProcessor SDK FlashUpgrader



EDID writing tool: RTD_CustomerTool_V1.2



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

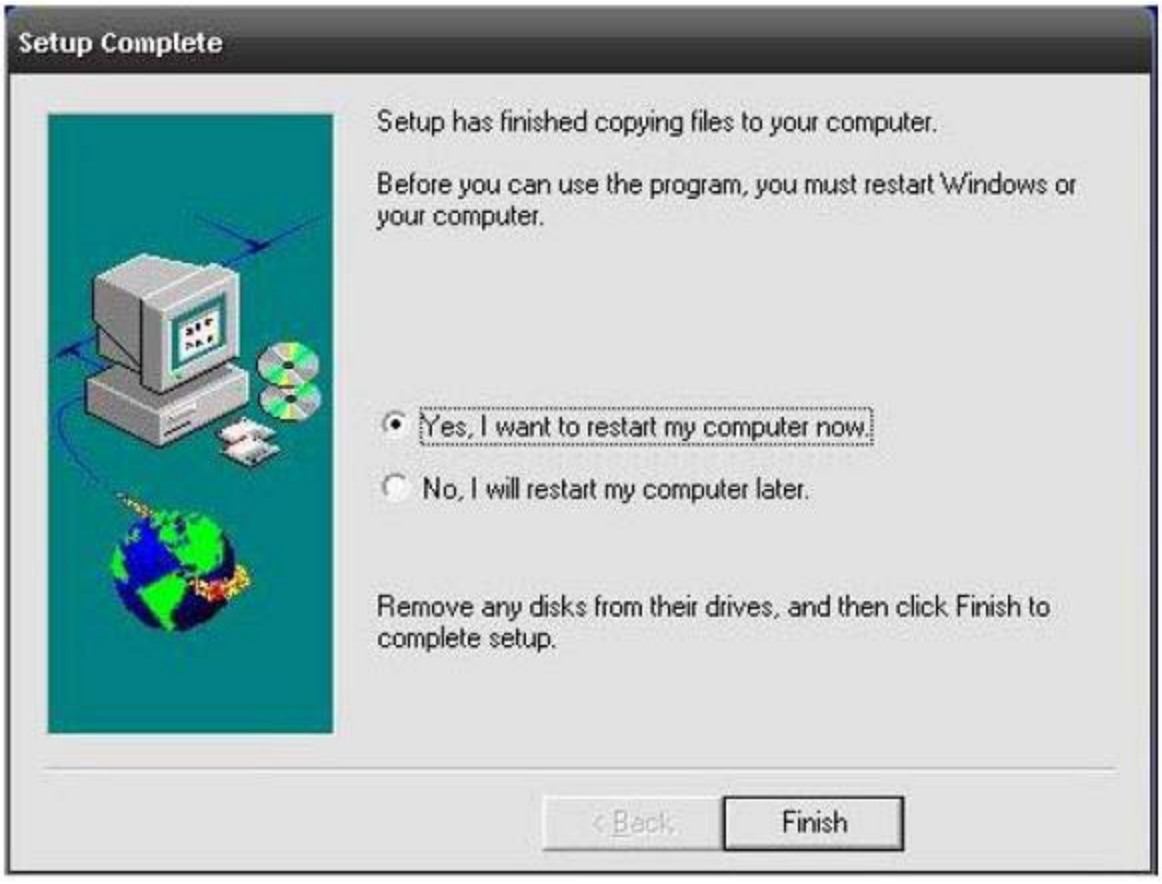
1.Install “CustomerTool_V1.2” in PC or NB

2. Press “Y” to install DriverLINX Port I/O Driver

DDC Instructions

3. Follow the installed steps and press ” NEXT” to Install Driver

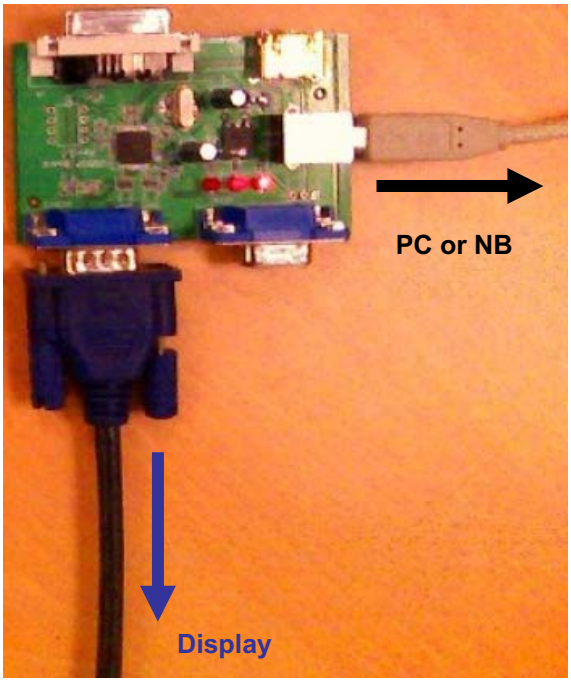
4. When setup has finished, restart computer

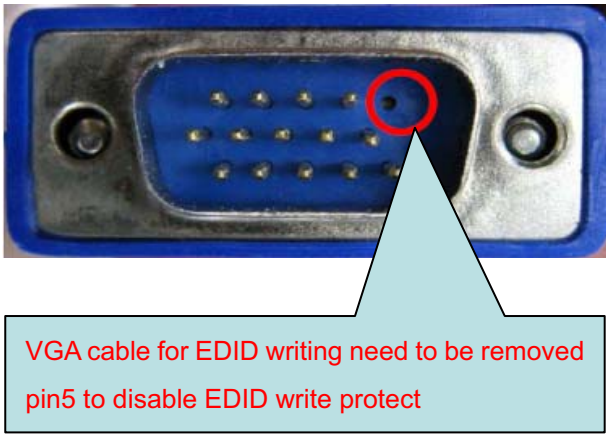


DDC Instructions

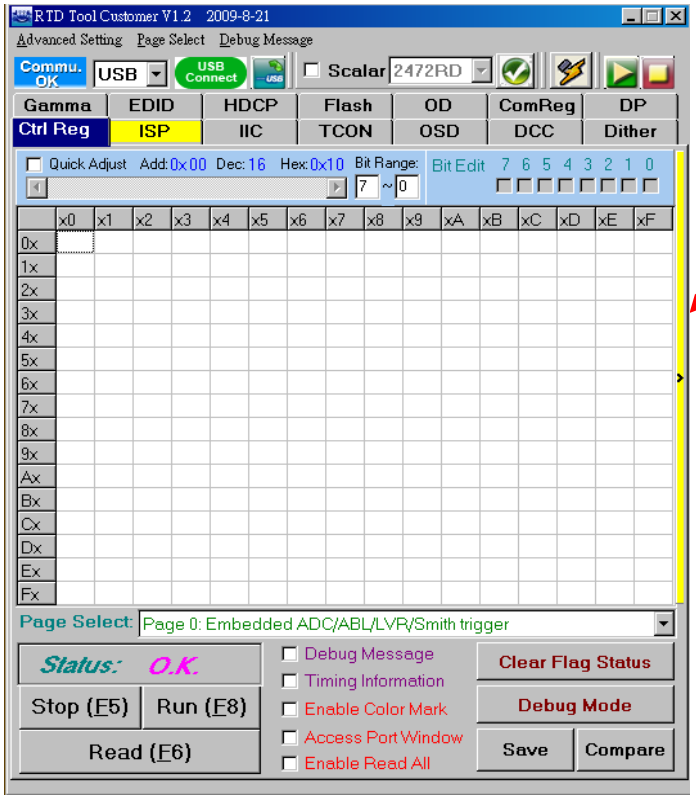
5. Prepare the download equipment.

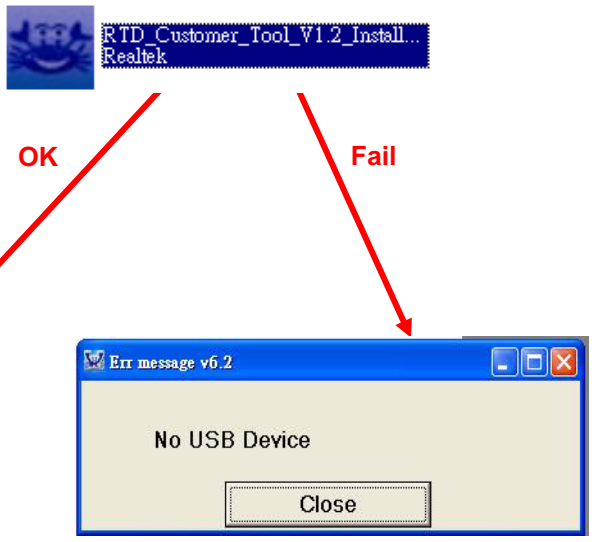
- Use USB cable connect to PC and Tool Board
- Use VGA cable connect to Tool Board and Display





6. Plug power cord into Display and run "DebugTool_V6.2" file

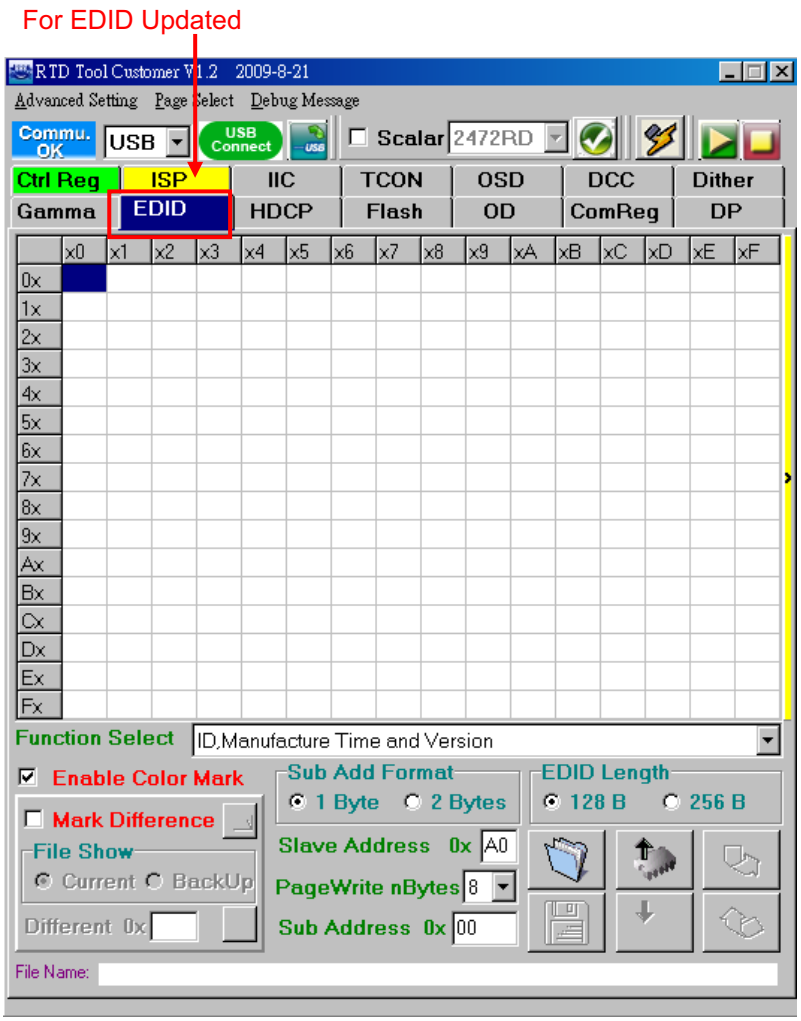




DDC Instructions

7. Update EDID – select “EDID Update”

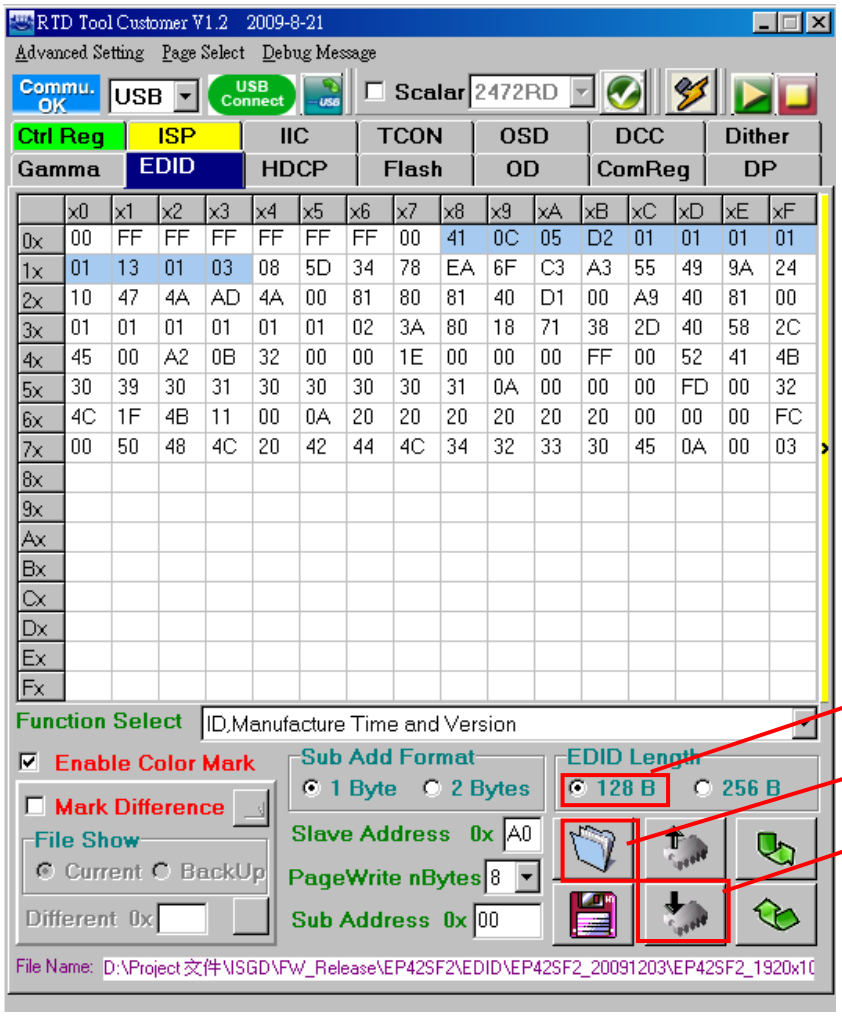
   Communication – select “USB”, ISP Type – select “Serial Flash”



DDC Instructions

8. EDID upload(**VGA**) – EDID length select 

and then press  to select EDID file and then press  to write EDID into display



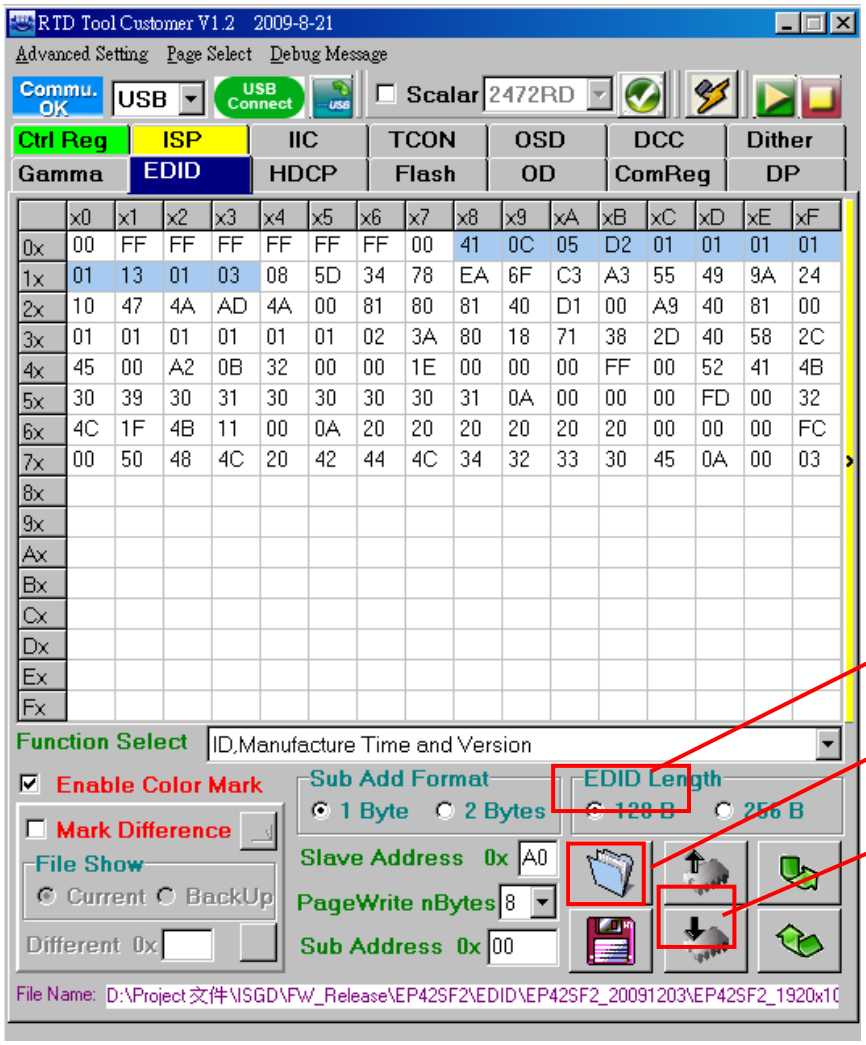
	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x	00	FF	FF	FF	FF	FF	FF	00	41	0C	05	D2	01	01	01	01
1x	01	13	01	03	08	5D	34	78	EA	6F	C3	A3	55	49	9A	24
2x	10	47	4A	AD	4A	00	81	80	81	40	D1	00	A9	40	81	00
3x	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
4x	45	00	A2	0B	32	00	00	1E	00	00	00	FF	00	52	41	4B
5x	30	39	30	31	30	30	30	30	31	0A	00	00	00	FD	00	32
6x	4C	1F	4B	11	00	0A	20	20	20	20	20	20	00	00	00	FC
7x	00	50	48	4C	20	42	44	4C	34	32	33	30	45	0A	00	03
8x																
9x																
Ax																
Bx																
Cx																
Dx																
Ex																
Fx																

DDC Instructions

(Power off status and LED: Red)

9. EDID upload(**DVI**)-EDID length select 

and then press  to select EDID file and then press  to write EDID into display

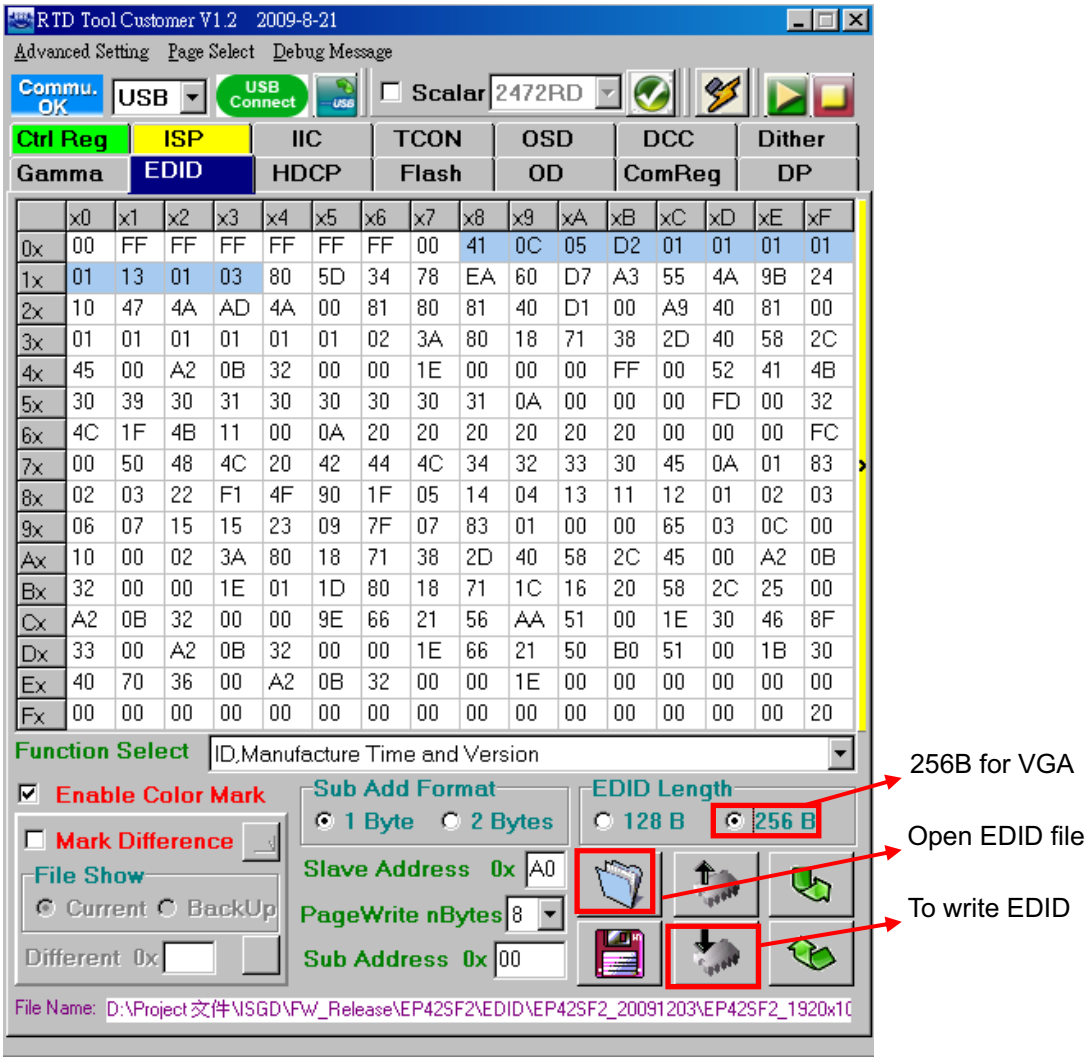


DDC Instructions

(Power off status and LED: Red)

10. EDID upload(**HDMI**) – EDID length select 

and then press  to select EDID file and then press  to write EDID into display

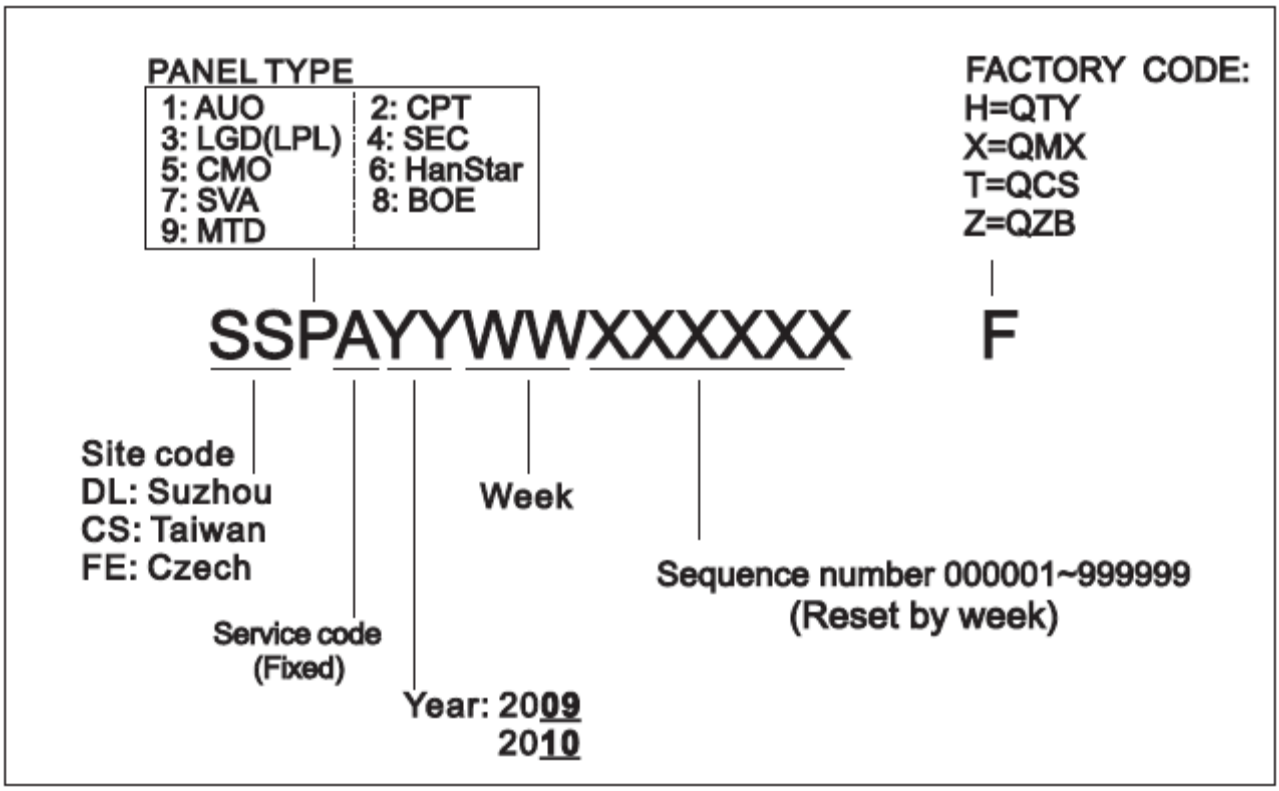


	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x	00	FF	FF	FF	FF	FF	FF	00	41	0C	05	D2	01	01	01	01
1x	01	13	01	03	80	5D	34	78	EA	60	D7	A3	55	4A	9B	24
2x	10	47	4A	AD	4A	00	81	80	81	40	D1	00	A9	40	81	00
3x	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
4x	45	00	A2	0B	32	00	00	1E	00	00	00	FF	00	52	41	4B
5x	30	39	30	31	30	30	30	30	31	0A	00	00	00	FD	00	32
6x	4C	1F	4B	11	00	0A	20	20	20	20	20	20	00	00	00	FC
7x	00	50	48	4C	20	42	44	4C	34	32	33	30	45	0A	01	83
8x	02	03	22	F1	4F	90	1F	05	14	04	13	11	12	01	02	03
9x	06	07	15	15	23	09	7F	07	83	01	00	00	65	03	0C	00
Ax	10	00	02	3A	80	18	71	38	2D	40	58	2C	45	00	A2	0B
Bx	32	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C	25	00
Cx	A2	0B	32	00	00	9E	66	21	56	AA	51	00	1E	30	46	8F
Dx	33	00	A2	0B	32	00	00	1E	66	21	50	B0	51	00	1B	30
Ex	40	70	36	00	A2	0B	32	00	00	1E	00	00	00	00	00	00
Fx	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	20

11. EDID upload finished and successful as below

DDC Instructions

Serial Number Definition



DDC DATA

Analog DDC

00 FF FF FF FF FF FF 00
41 0C 05 D2 00 00 00 00
01 14 01 03 08 5D 34 78
EA 6F C3 A3 55 49 9A 24
10 47 4A AD 4A 00 81 80
81 40 A9 40 81 00 01 01
01 01 01 01 01 01 02 3A
80 18 71 38 2D 40 58 2C
45 00 A2 0B 32 00 00 1E
00 00 00 FF 00 52 41 4B
30 39 30 31 30 30 30 30
31 0A 00 00 00 FD 00 32
4C 1F 4B 11 00 0A 20 20
20 20 20 20 00 00 00 FC
00 50 48 4C 20 42 44 4C
34 32 33 30 45 0A 00 D5
Decoded EDID data

DVI DDC

00 FF FF FF FF FF FF 00
41 0C 05 D2 00 00 00 00
01 14 01 03 80 5D 34 78
EA 6F C3 A3 55 49 9A 24
10 47 4A AD 4A 00 81 80
81 40 A9 40 81 00 01 01
01 01 01 01 01 01 02 3A
80 18 71 38 2D 40 58 2C
45 00 A2 0B 32 00 00 1E
00 00 00 FF 00 52 41 4B
30 39 30 31 30 30 30 30
31 0A 00 00 00 FD 00 32
4C 1F 4B 11 00 0A 20 20
20 20 20 20 00 00 00 FC
00 50 48 4C 20 42 44 4C
34 32 33 30 45 0A 00 5D

HDMI DDC

00 FF FF FF FF FF FF 00
41 0C 05 D2 00 00 00 00
01 14 01 03 80 5D 34 78
EA 60 D7 A3 55 4A 9B 24
10 47 4A AD 4A 00 81 80
81 40 A9 40 81 00 01 01
01 01 01 01 01 01 02 3A
80 18 71 38 2D 40 58 2C
45 00 A2 0B 32 00 00 1E
00 00 00 FF 00 52 41 4B
30 39 30 31 30 30 30 30
31 0A 00 00 00 FD 00 32
4C 1F 4B 11 00 0A 20 20
20 20 20 20 00 00 00 FC
00 50 48 4C 20 42 44 4C
34 32 33 30 45 0A 01 55
02 03 22 F1 4F 90 1F 05
14 04 13 11 12 01 02 03
06 07 15 15 23 09 7F 07
83 01 00 00 65 03 0C 00
10 00 02 3A 80 18 71 38
2D 40 58 2C 45 00 A2 0B
32 00 00 1E 01 1D 80 18
71 1C 16 20 58 2C 25 00
A2 0B 32 00 00 9E 66 21
56 AA 51 00 1E 30 46 8F
33 00 A2 0B 32 00 00 1E
66 21 50 B0 51 00 1B 30
40 70 36 00 A2 0B 32 00
00 1E 00 00 00 00 00 00
00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 20

Firmware Upgrade for CPU

1. Preparation:

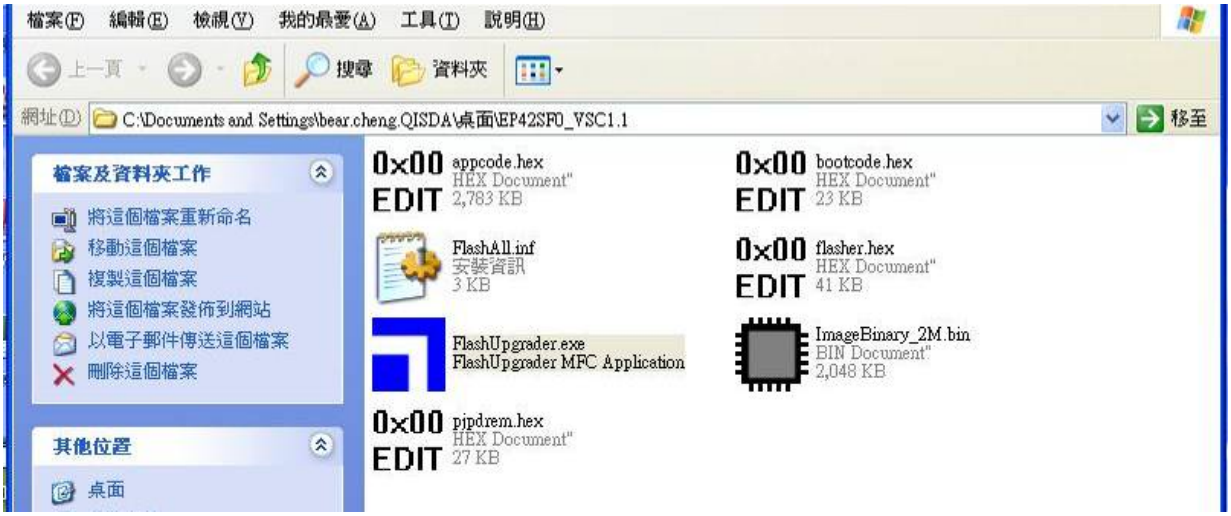
1.1 Tool:

- Download cable(**RS232 cable** connect between PC/Notebook with tool board)
- #RS232 is RXD and TXD interlaced line
- Personal computer or Notebook
- Download tool program “Pixelworks ImageProcessor SDK FlashUpgrader”.

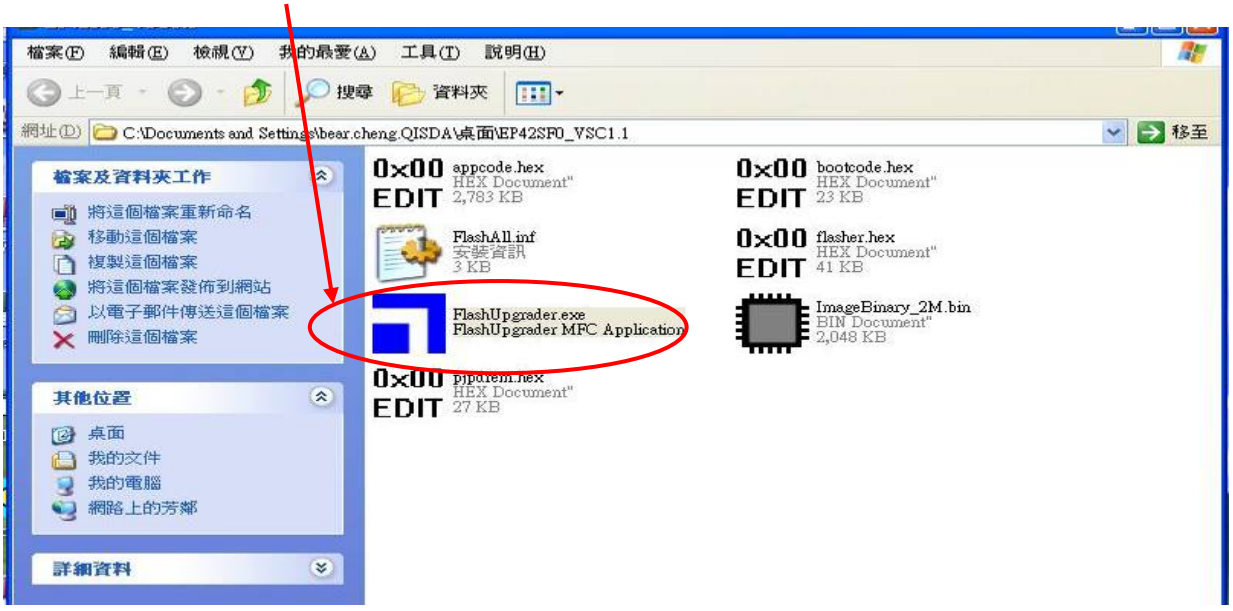
1.2 Firmware files

2. Procedure：

1. Open firmware program files

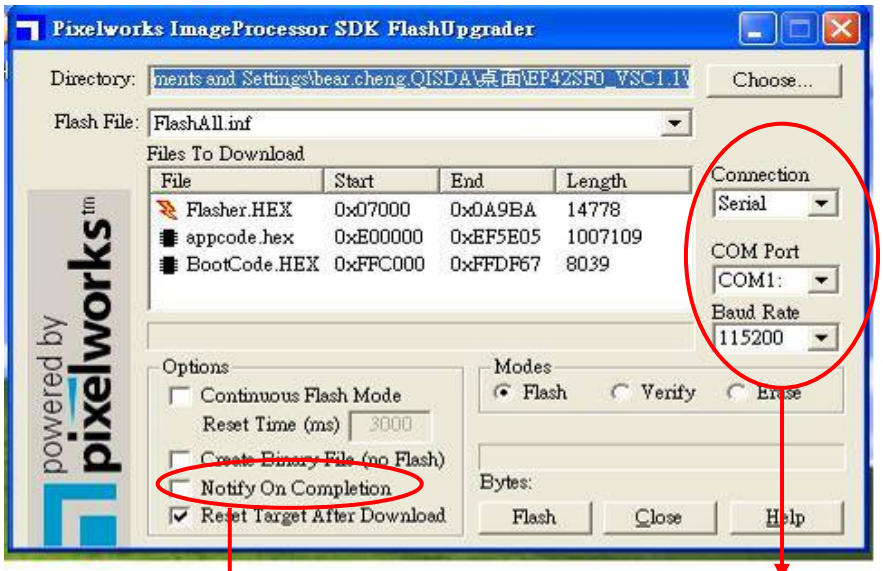


2. Choose FlashUpgrar.exe files.



Firmware Upgrade for CPU

3. Show the Pixelworks ImageProcess K FlashUpgrader picture.

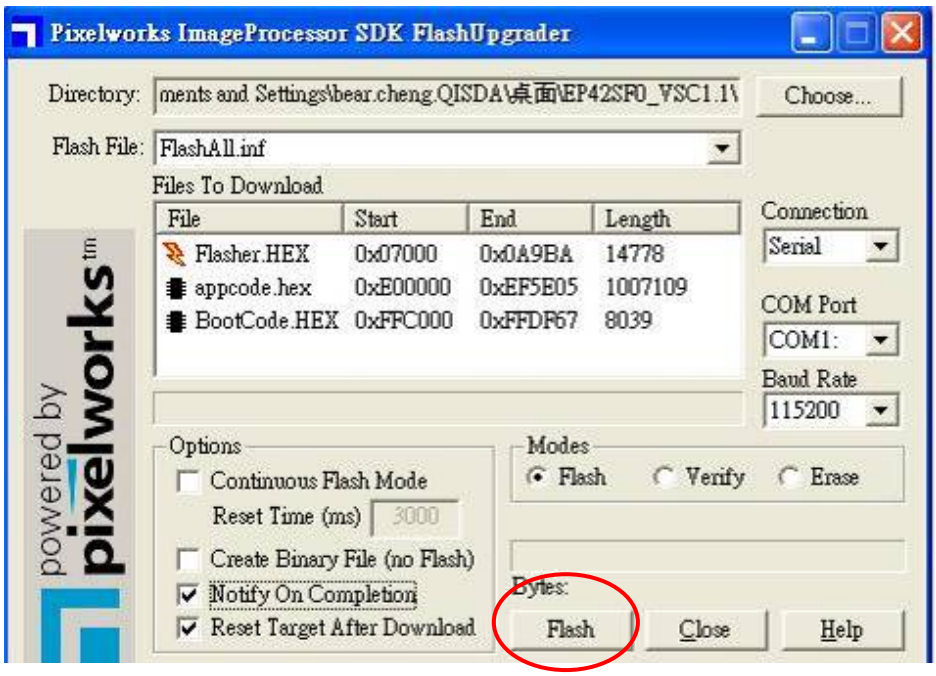


#The Connection, COM Port in accordance with user by oneself PC/NB choose.

#The Notify On Completion in accordance with user by oneself PC/NB choose.

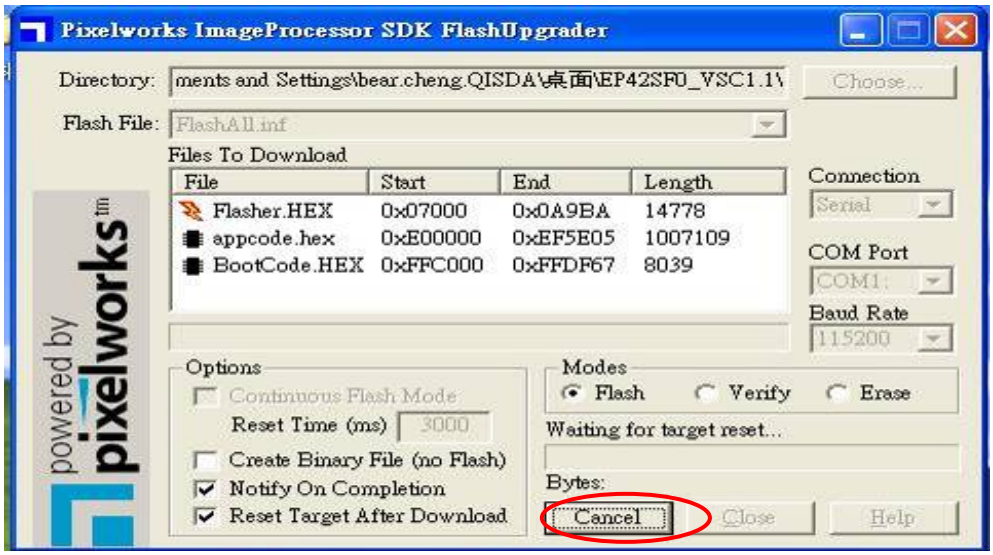
4. The RS232 Download cable insert RS232 INPUT pin.

5. Press Flash key of Pixelworks ImageProcess or SDK FlashUpgrader

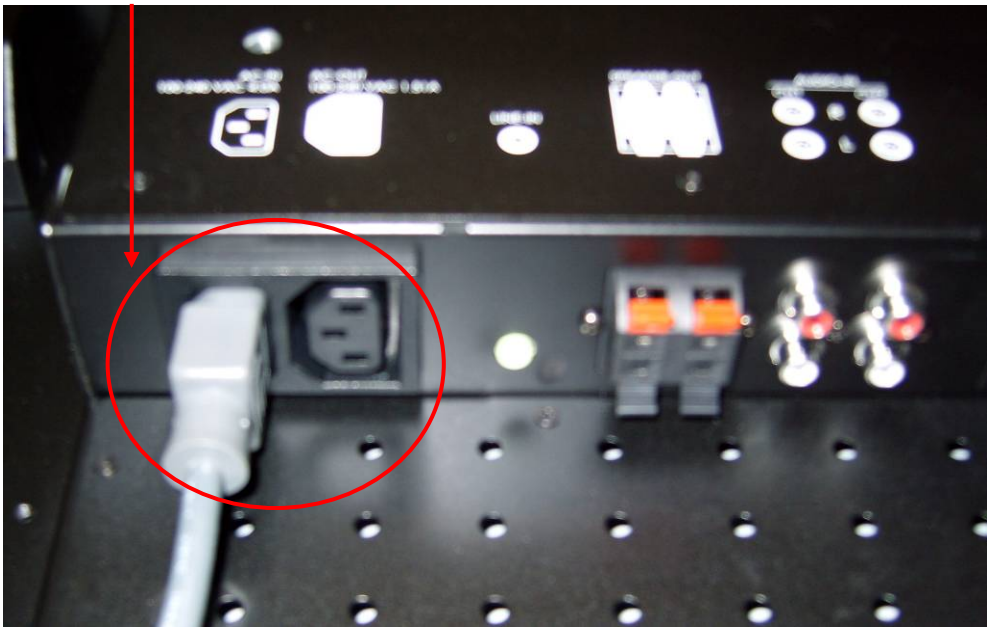


Firmware Upgrade for CPU

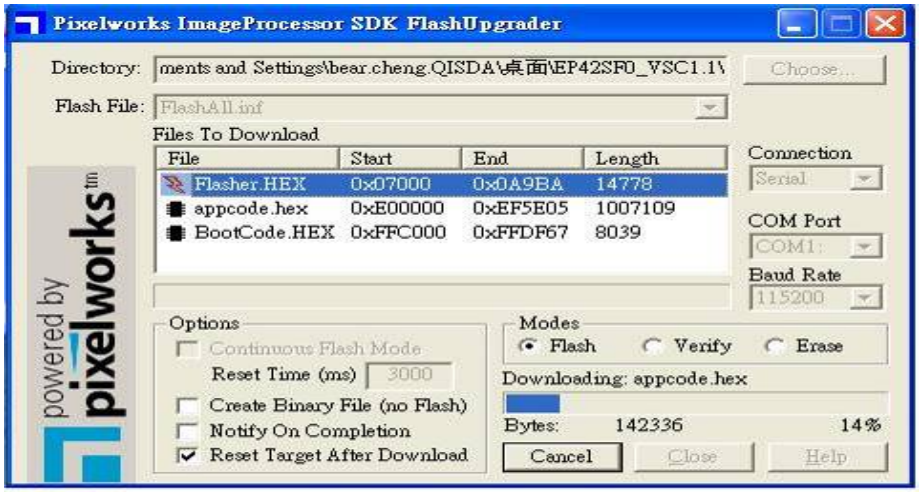
6. The key change to **cancel** after Press Flash key,



7. The **Power code** cable insert.

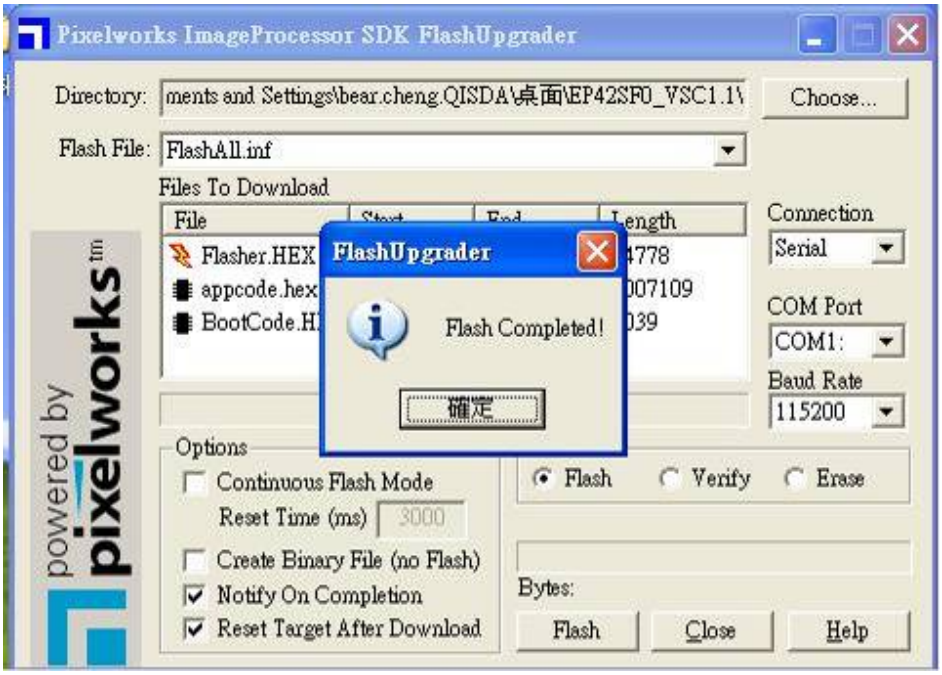


8. The pixelworks ImageProcess or SDK FlashUpgrader program download start.



Firmware Upgrade for CPU

9. The firmware download will finish after about 5 minutes.



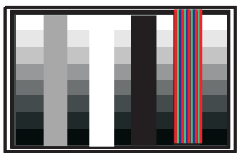
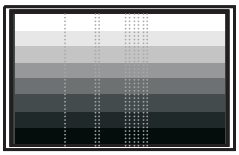
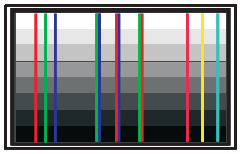
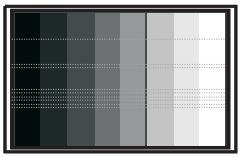
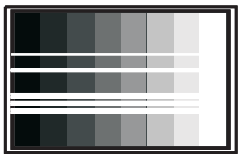
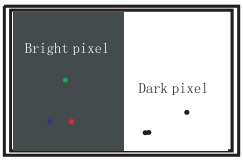
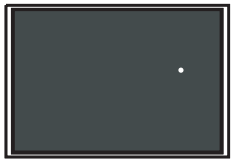
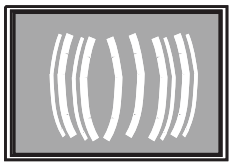
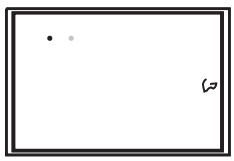
10. Please press “確定”. Download program finish.

11. Please pull out Power code, RS232 Download cable.

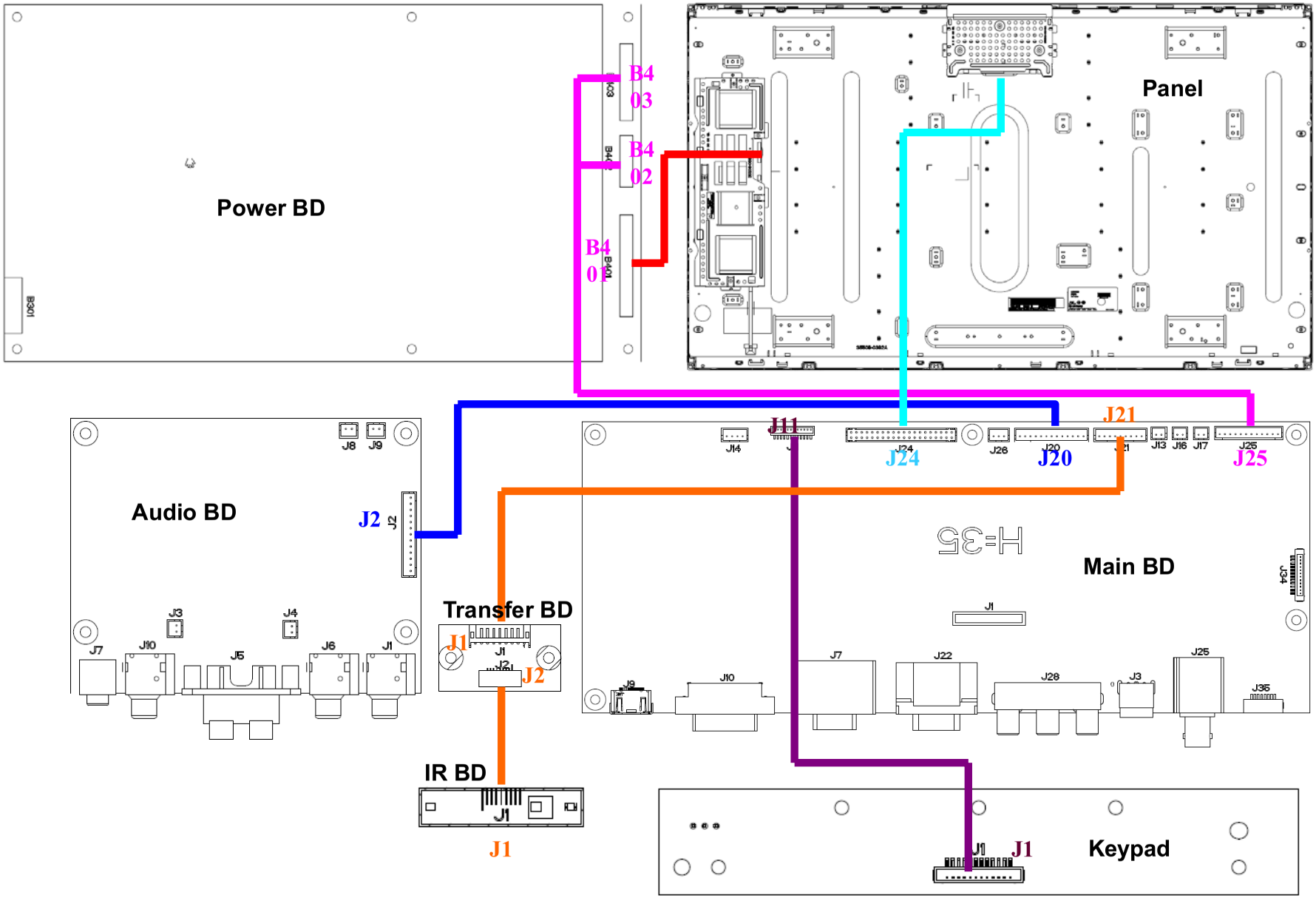
Failure Mode Of Panel

Quick reference for failure mode of LCD panel

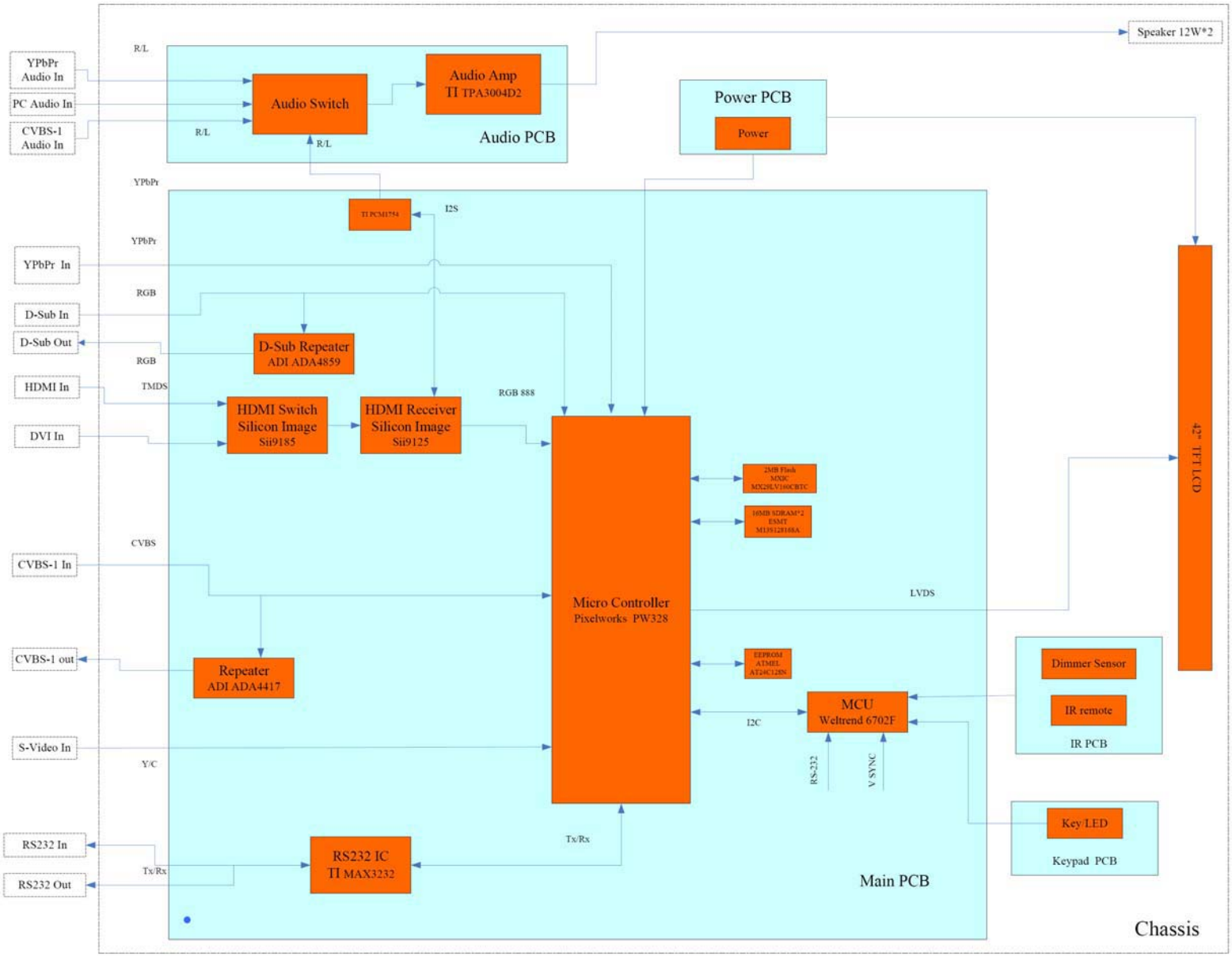
this page presents problems that could be made by LCD panel.
It is not necessary to repair circuit board. Simply follow the mechanical instruction on this manual to eliminate failure by replace LCD panel.

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	

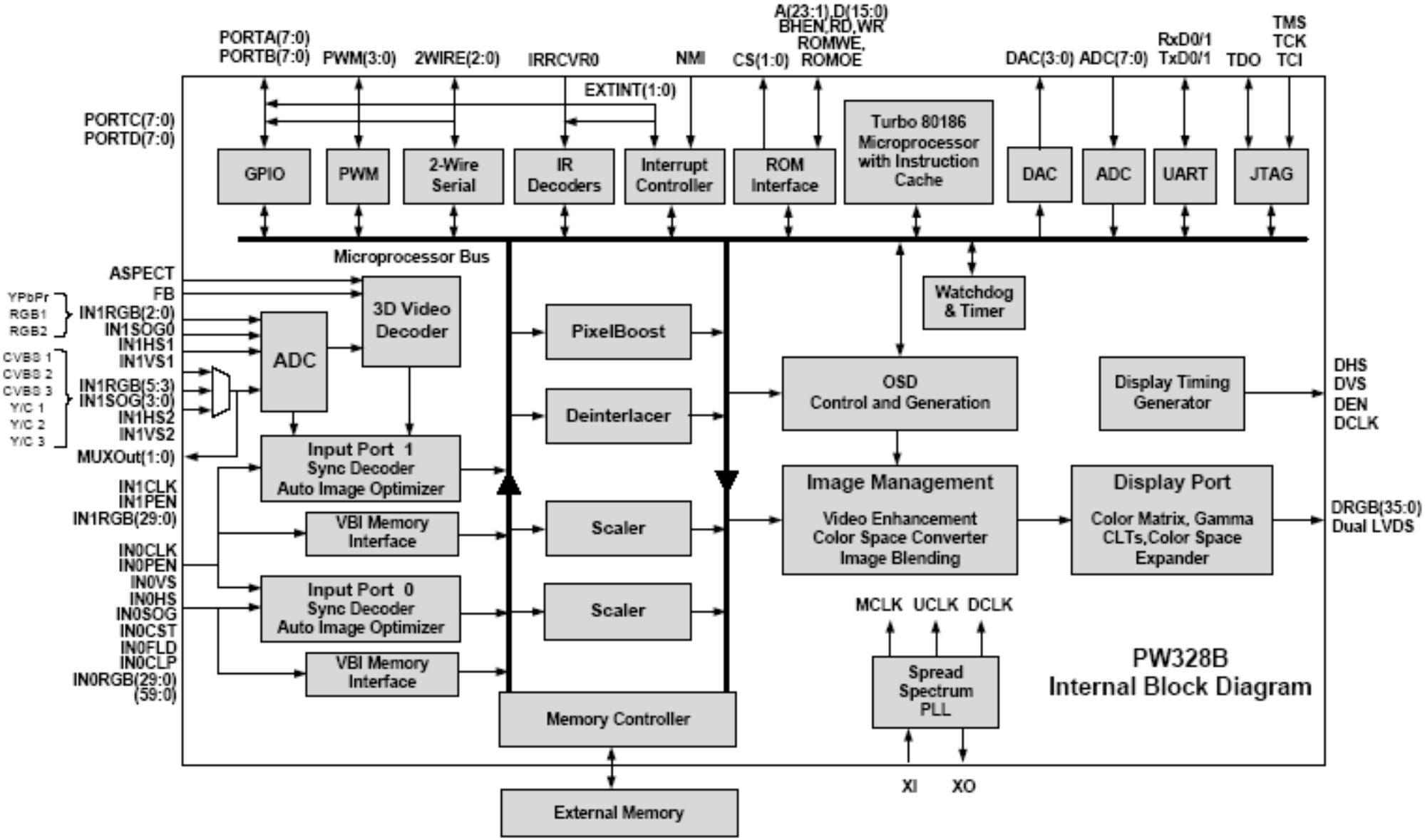
Wiring Diagram

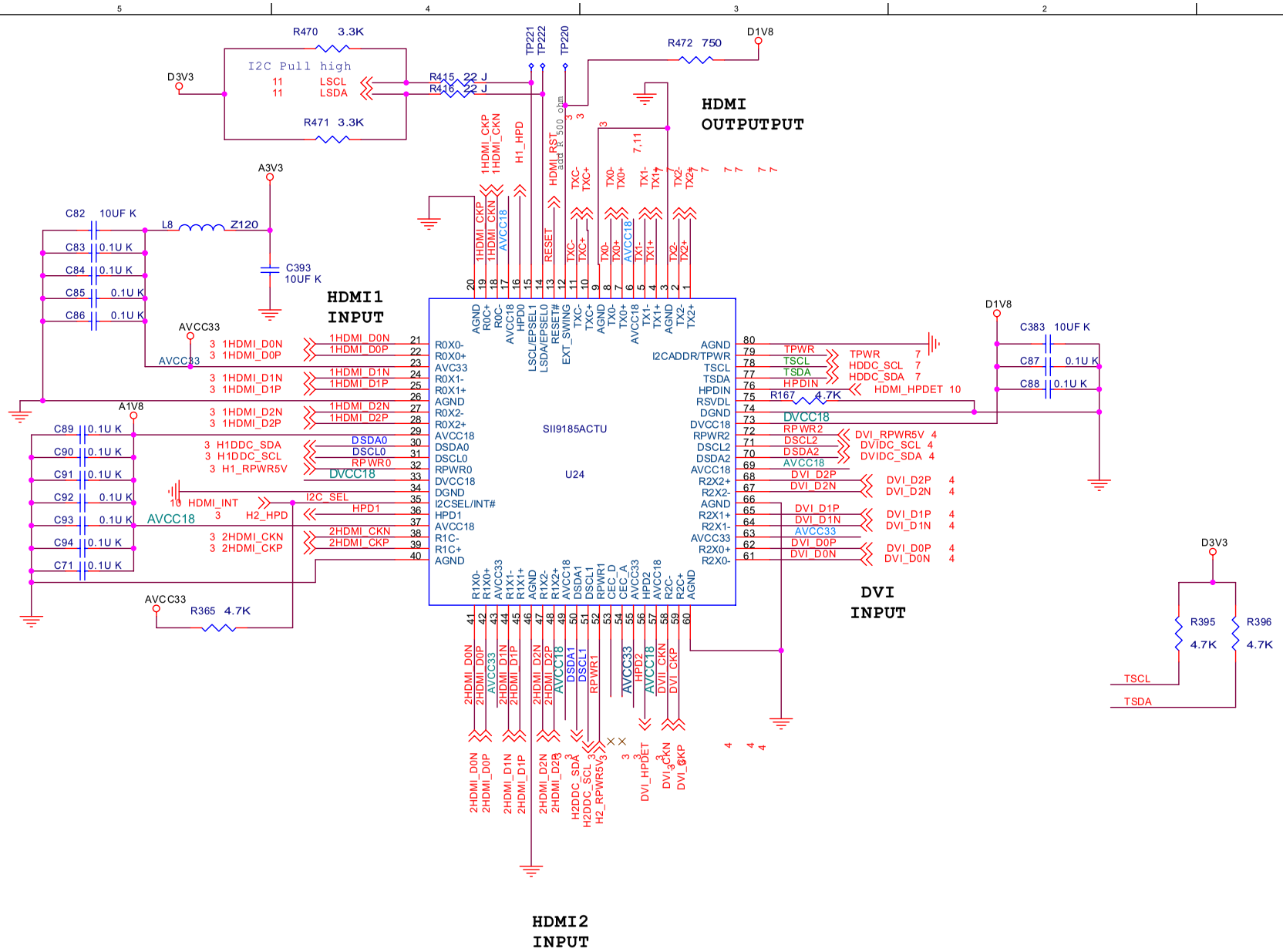


Block Diagram

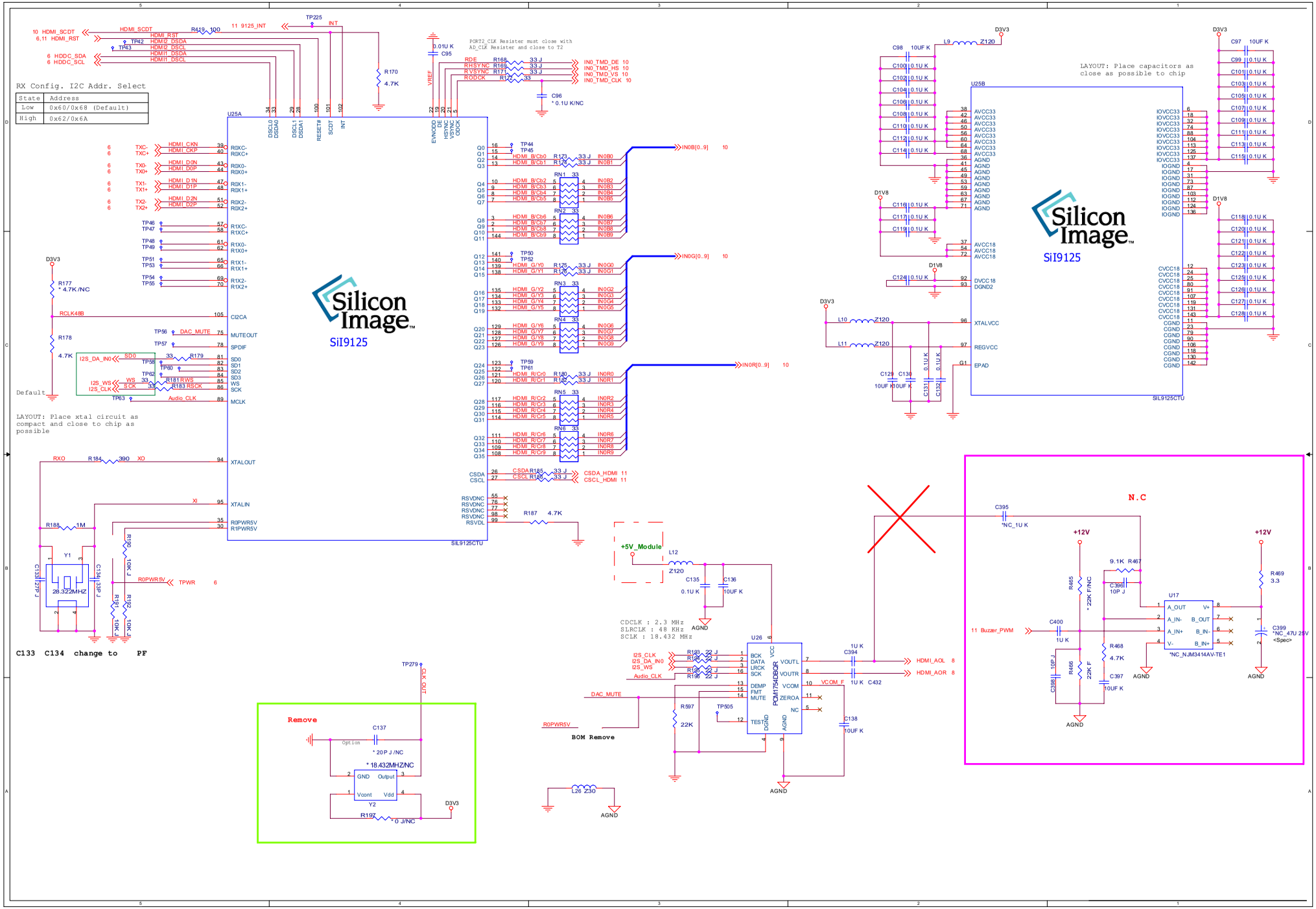


Block Diagram

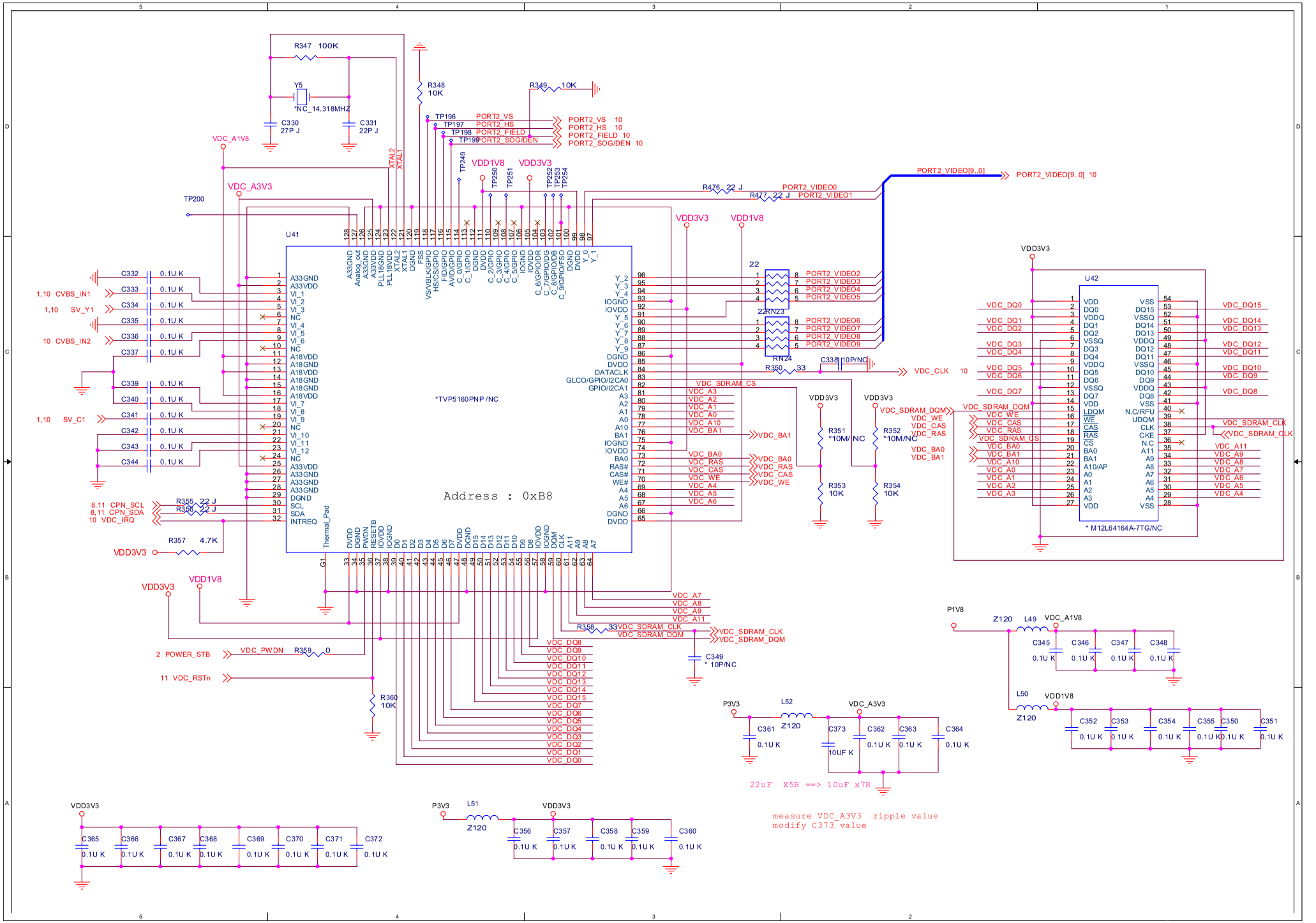



HDMI1
INPUT
HDMI2
INPUT
HDMI
OUTPUTPUT
DVI
INPUT
SII9185ACTU
U24
R470 3.3K
R471 3.3K
I2C Pull high
R415 22 J
R416 22 J
R472 750
D1V8
D3V3
A3V3
A1V8
AVCC33
AVCC18
DVCC18
L8 Z120
C393 10UF K
C82 10UF K
C83 0.1U K
C84 0.1U K
C85 0.1U K
C86 0.1U K
C89 0.1U K
C90 0.1U K
C91 0.1U K
C92 0.1U K
C93 0.1U K
C94 0.1U K
C71 0.1U K
C383 10UF K
C87 0.1U K
C88 0.1U K
R167 4.7K
R365 4.7K
R395 4.7K
R396 4.7K
HDMI_RST
HDMI_INT
I2C_SEL
H1_HPD
H2_HPD
TPWR
HDDC_SCL
HDDC_SDA
HDMI_HPDET
DVI_RPWR5V
DVIDC_SCL
DVIDC_SDA
TSCL
TSDA

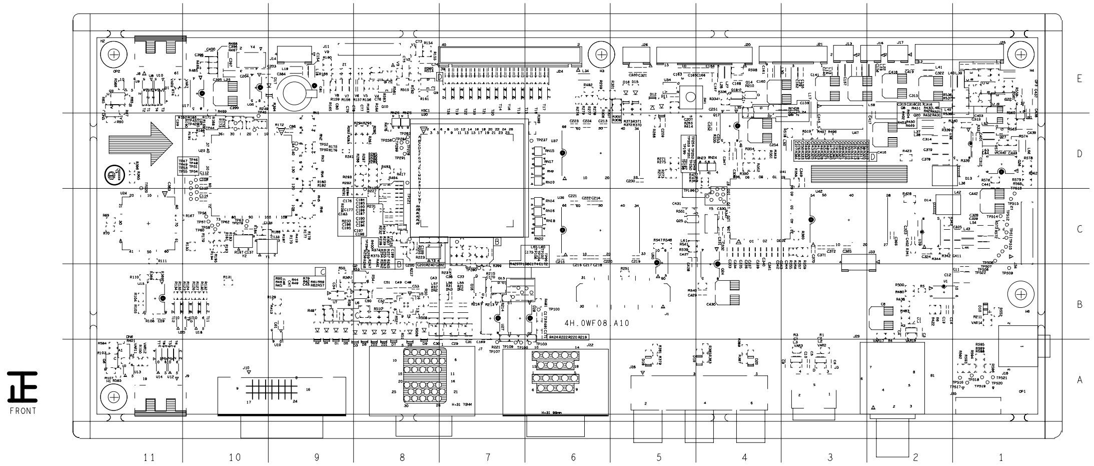
Scalar Diagram & C.B .A



Scalar Diagram & C.B .A



Scalar Diagram & C.B .A



Information
Y1: 22
Y2: 44
Y3: 66
Y4: 88
X1: 250
X2: 225
X3: 200
X4: 175
X5: 150
X6: 125
X7: 100
X8: 75
X9: 50
X10: 25

Top Side
A1:J35
A1:J18
A1:R596
A1:R595
A1:R594
A1:R593
A1:R592
A1:R589
A1:R588 A1:R288
A2:B1
A2:J29
A3:J3
A3:VAR3
A3:VAR2
A3:R3
A3:R1
A3:L3
A3:L2
A3:C9
A3:C6
A3:C5
A3:C10
A3:C7
A3:C2
A4:J28
A4:R389
A4:R387
A4:R385
A4:R383
A4:D20
A4:D19
A5:R381
A5:R379
A5:D18
A6:J22
A8:J7
A9:J10
A11:T8
A11:T7
A11:T6
A11:T5
A11:J9
A11:U14
A11:U12
A11:VAR12
A11:VAR11
A11:U13
A11:R100
A11:R585
A11:R584
A11:R401
A11:R107
A11:R103
A11:Q6
A11:DN6
B1:VAR14
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B1:R211
B1:D10
B1:C12
B1:C11
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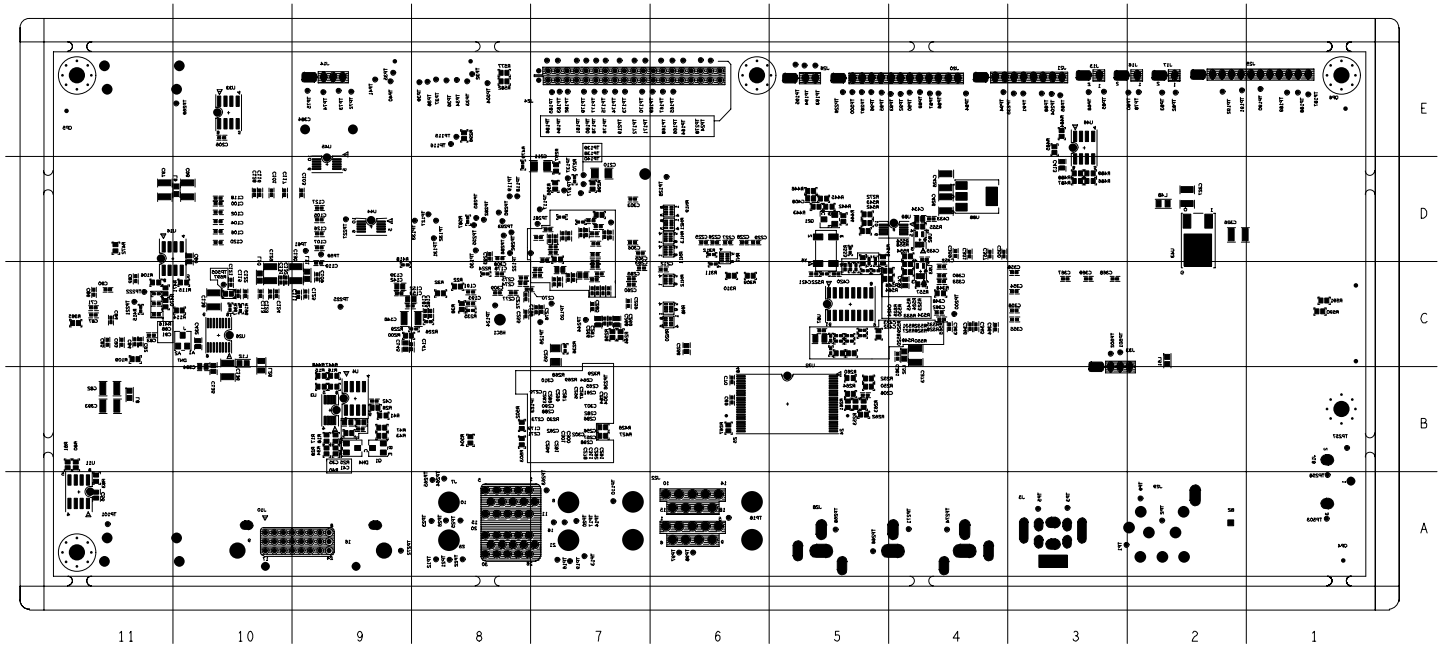
Scalar Diagram & C.B .A



Information
Y1: 22
Y2: 44
Y3: 66
Y4: 88
X1: 250
X2: 225
X3: 200
X4: 175
X5: 150
X6: 125
X7: 100
X8: 75
X9: 50
X10: 25

Bottom Side
A2:B2
A11:U11
A11:R83
A11:C56
B5:U32
B5:R264
B5:R263
B5:R262
B5:R261
B5:R260
B5:R253
B5:R252
B5:R250
B5:C208
B6:R267
B6:C70
B6:C69
B7:R427
B7:R426
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B8:R503
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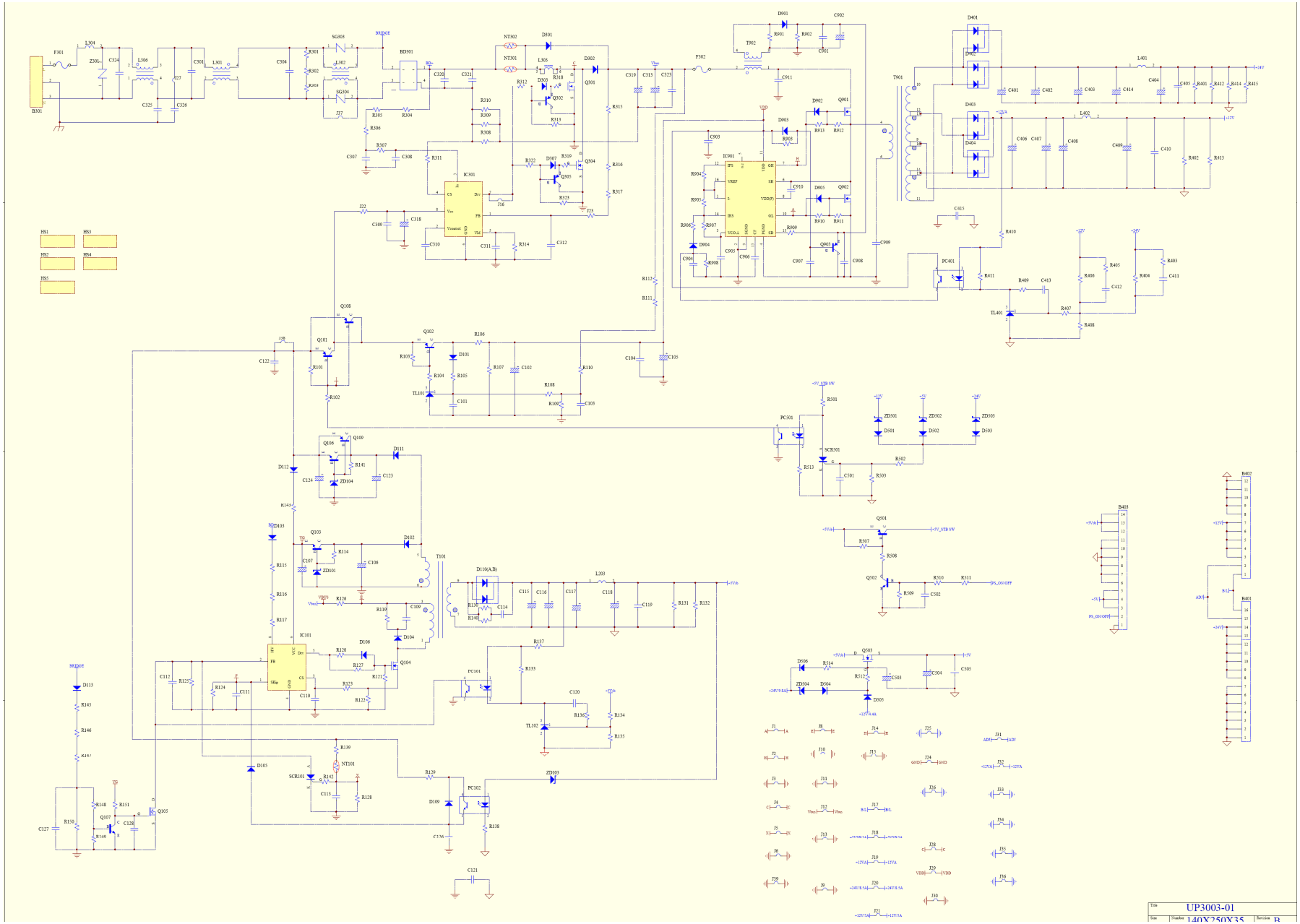
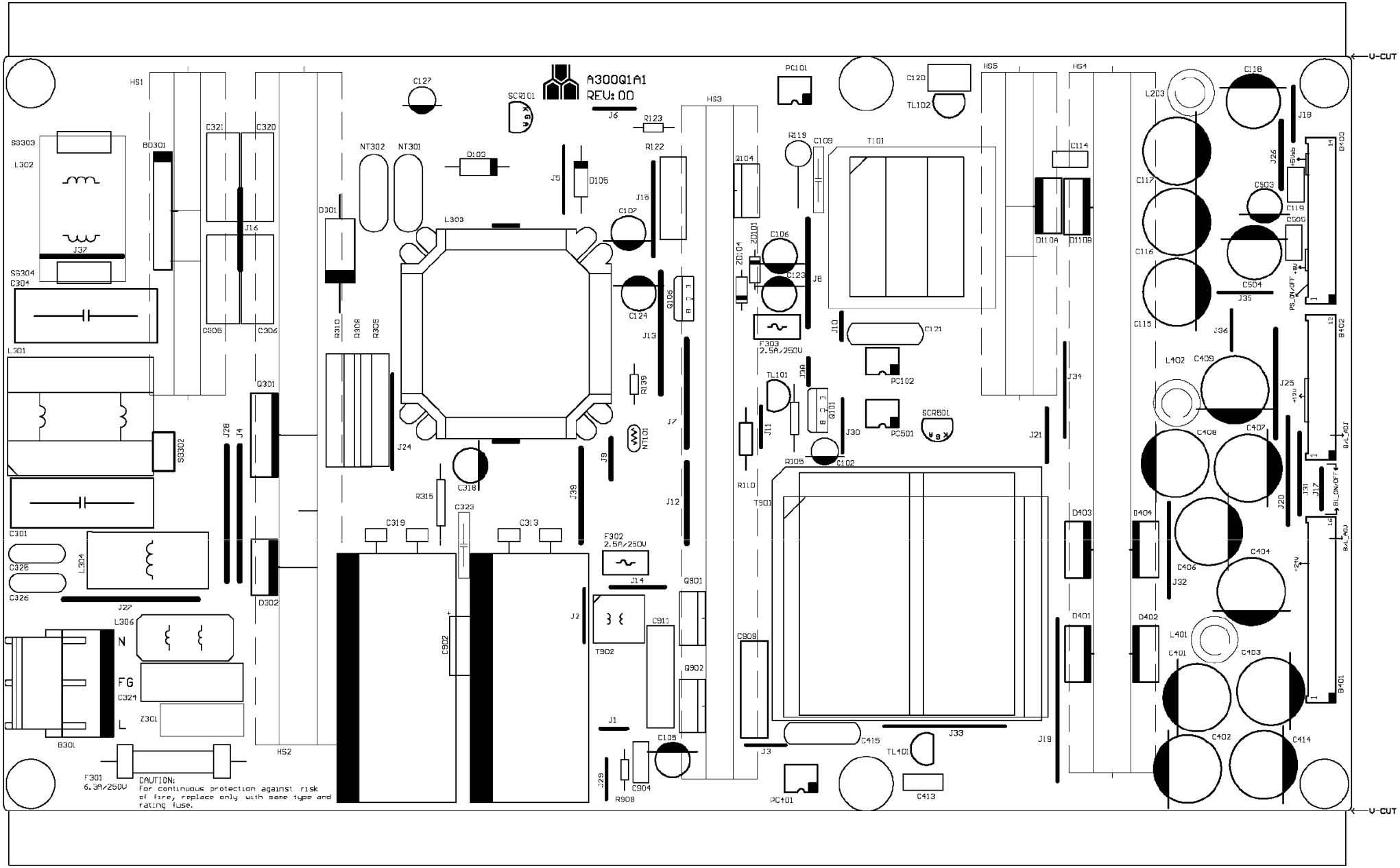
D10:C128
D10:C120
D10:C118
D10:C117
D10:C116
D10:C106
D10:C104
D10:C102
D10:C101
D10:C100
D11:U16
D11:R472
D11:C97
E3:U46
E3:R485
E3:R484
E8:R582
E8:R577
E8:R296
E10:U32
E10:C206

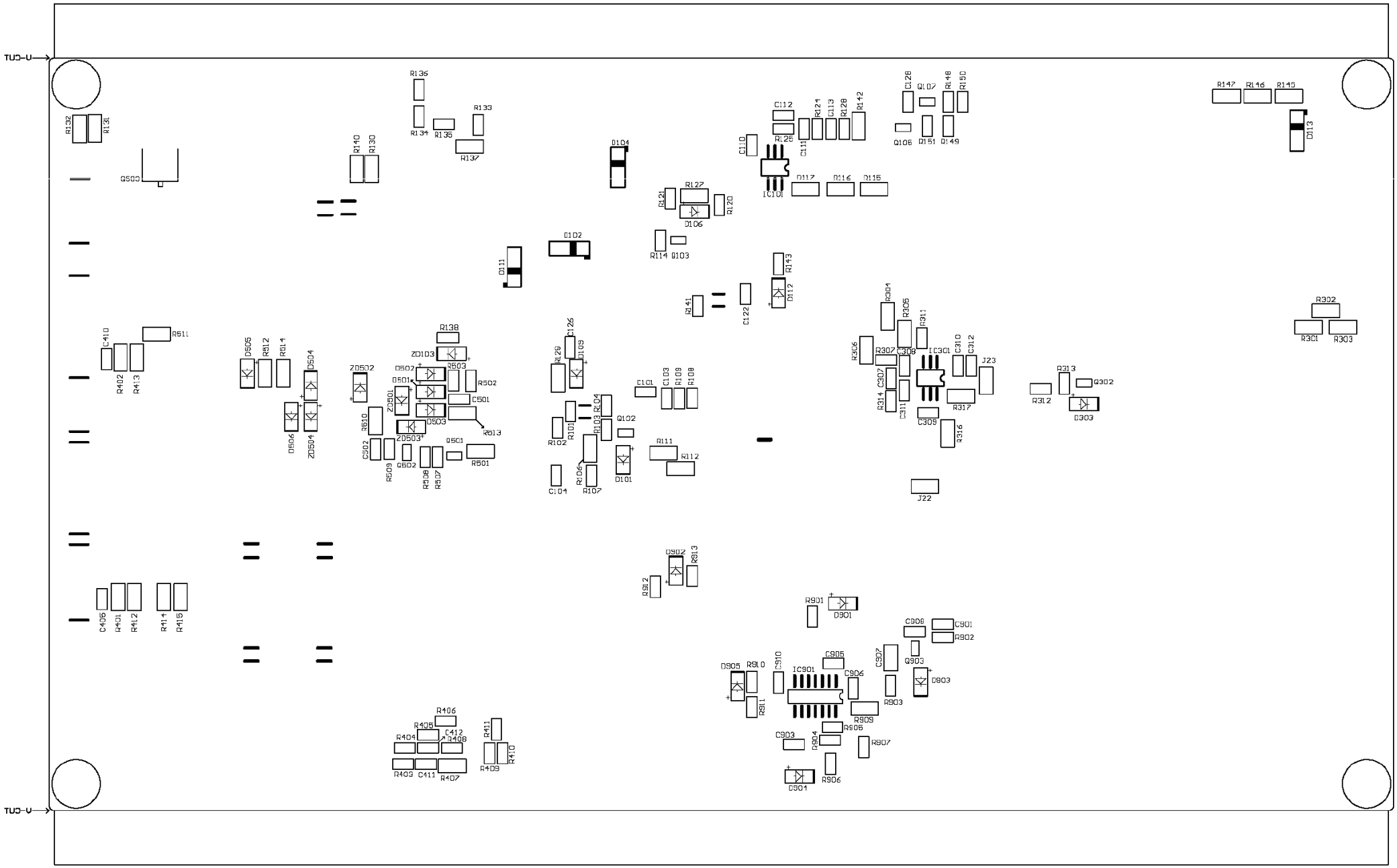
Power Diagram & C.B.A



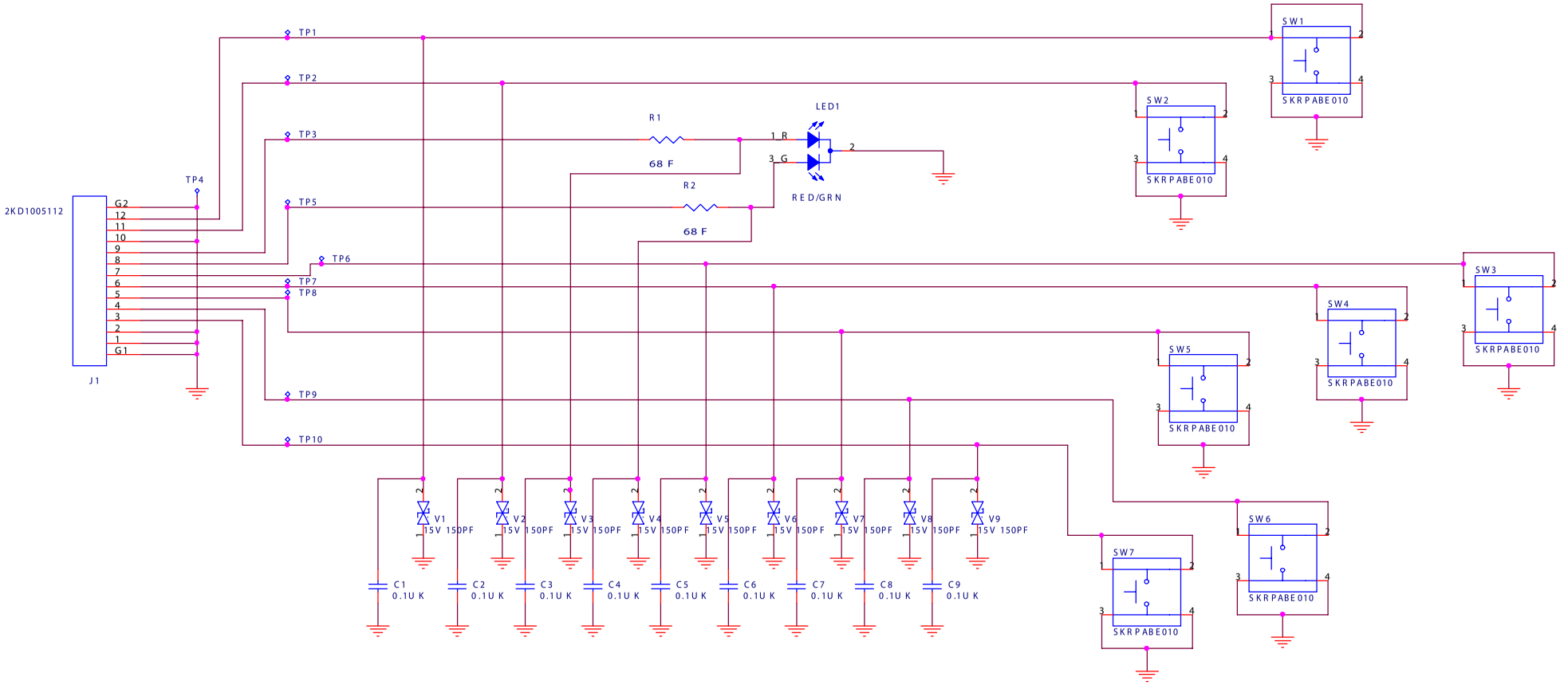
Power Diagram & C.B.A



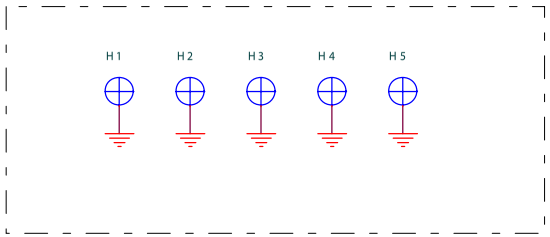
Power Diagram & C.B.A



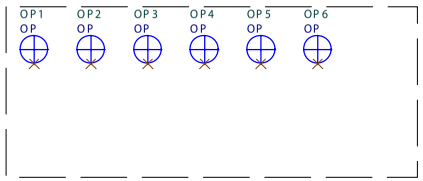
Control Diagram & C.B .A.



Screw Holes



Optical Points



Control Diagram & C.B .A.

Top Side

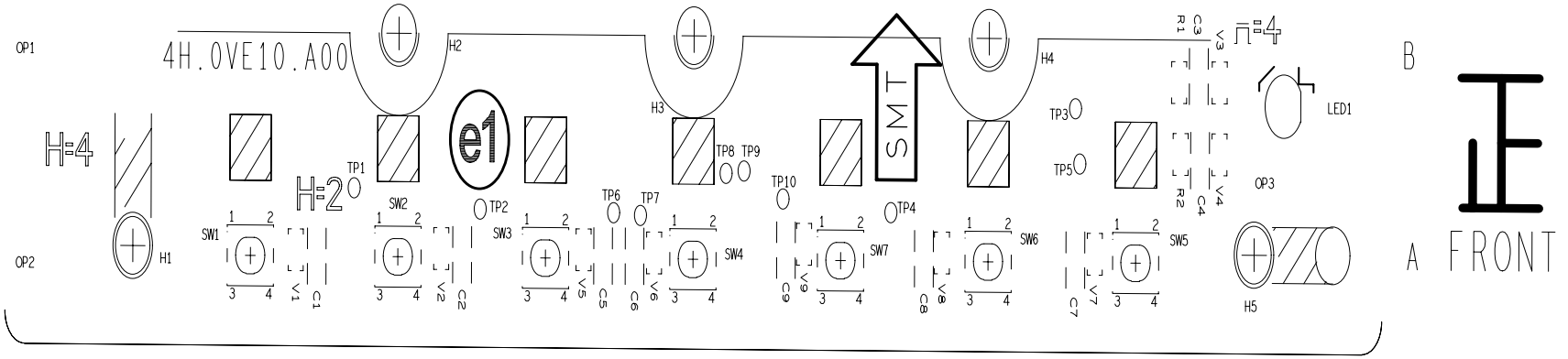
A1:V4
A2:V7
A2:SW6
A2:SW5
A2:R2
A2:C7

A3:V9
A3:V8
A3:SW
A3:C9
A3:C8

A5:V2
A5:V1
A5:SW2
A5:SW1
A5:C1

B1:V3
B1:LED1
B2:R1
B2:C4
B2:C3

A4:V6
A4:V5
A4:SW4
A4:SW3
A4:C6
A4:C5
A4:C2



General Product Specification

Product Identification

42” BDL LCD DISPLAY BDL4230E/00

Issued by:

Technical Marketing Manager
Larry Yang

General Product Specification

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DOCUMENT REVISION HISTORY

Revision no.	Date	Description
V0.9	2009/09/25	Draft for discussion
	2009/10/27	Revise for final spec.

General Product Specification

1. SCOPE

This specification describes the feature and performance of the LCD public/business display, which includes PC video connector for Display application and AV connectors for multiple video format inputs.

- Product Name - PHL BDL4230E (in EDID)
- Manufacturer ID - PHL (in EDID)
- Product ID - D205 (in EDID)
- Serial no. - xxxx (in EDID & NVM)

1.1 General Product Features

- Screen of 16:9 aspect ratio, 42” Full HD LCD color display
- Universal power supply
- PC analog 15pin D-sub input/output
- Supports PC mode via D-sub, DVI and HDMI connector
- Multi-system PAL, SECAM, NTSC playback
- Support components video, S-Video, composite video input and audio input.
- Support HDMI Ver.1.3b. with HDCP, audio included (meet EIA-861B standard)
- User-friendly and family look OSD menu
- User-friendly and professional look remote controller
- DPM power management for PC mode
- VESA standard wall mount
- Portrait mounting (extra ventilation slots have to be considered)
- Tiled matrix up to 5x5
- Software upgrade should be done easily
- Network controllability through RS-232
- Smart Power
- Fault diagnostics
- Advanced anti image sticking
- Automatic Long Cable Compensation
- PIP/POP/PBP support
- Scheduling

1.2 Product Range

Display	Destination	Mains Cord	Cabinet Color
BDL4230E/00	EU, NA, China	EU, UK, NA, CN	

2. ELECTRICAL REQUIREMENTS

All performance specifications are defined under “STANDARD TESTING CONDITIONS”, unless otherwise specified.

2.1 Standard Testing Conditions

- Warm up time - ≥ 30 min.
- Ambient temperature - 15°C ~35 °C.
- Ambient light - 400-600 lux
- Relative humidity - 25% ~ 75%.
- Barometric pressure - 860 mbar ~ 1013 mbar.
- Dark room conditions - < 1 lux for optical measurements

General Product Specification

2.2 Video / Audio Input Signals

2.2.1 PC input signal requirements

- Pixel rate capability - 86 MHz.
- VGA sync input - TTL level, separate H/V sync only, "+" or "-" polarity, terminated with ≥ 2.2kΩ impedance.
- HDMI input - TMDS channel:
  - Carries video data.
  - Signaling method: According to DVI 1.0 specification. Single-link (Type A HDMI).
  - Video pixel rate: 25 MHz to 165 MHz (Type A)

  DDC channel:
  - Allows source to interrogate capabilities of sink.
  - I²C signaling with 100 kHz clock.
  - E-EDID data structure according to EIA/CEA-861B and VESA Enhanced EDID.
- VGA analog RGB level -0 ~ 700mV linear, positive polarity, terminated with 75Ω impedance.
- I²C DDC signal - DDC2B required, DDC serial Data & Clock, DDC components are connected to both display Vcc and DDC +5V (from PC via video cable), that the PC can read the DDC data also when the display is powered off. To prevent current feedback into PC, blocking diodes are required at display side.
- Preset timings - 53 preset modes sets, 15 factory preset mode sets, timing, size and centering have been pre-aligned in factory according to specifications.

Preset mode definition:

- Need to support those timing:

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Req. ID	Resolution according to VESA DMT standard Specification					
	Resolution	**Refresh Rate**	**Horizontal Frequency**	**Pixel Clock**	**Standard Type**	**Original Document Date**
PCRES4	640 x 480	60 Hz	31.5 kHz	25.175 MHz	Industry Standard n/a	n/a
PCRES5	640 x 480	72 Hz	37.9 kHz	31.500 MHz	VESA Standard VS901101	12/2/92
PCRES6	640 x 480	75 Hz	37.5 kHz	31.500 MHz	VESA Standard VDMT75HZ	10/4/93
PCRES9	800 x 600	60 Hz	37.9 kHz	40.000 MHz	VESA Guidelines VG900602	8/6/90
PCRES11	800 x 600	75 Hz	46.9 kHz	49.500 MHz	VESA Standard VDMT75HZ	10/4/93
PCRES16	1024 x 768	60 Hz	48.4 kHz	65.000 MHz	VESA Guidelines VG901101A	9/10/91
PCRES18	1024 x 768	75 Hz	60.0 kHz	78.750 MHz	VESA Standard VDMT75HZ	10/4/93
PCRES23	1280 x 768	60 Hz	47.8 kHz	79.500 MHz	CVT AddDMT	3/Apr/2003
PCRES28	1280 x 800	60 Hz	49.7 kHz	79.500 MHz	CVT	1/May/2007
PCRES32	1280 x 960	60 Hz	60.0 kHz	108.000 MHz	VESA Standard VDMTPROP	3/1/96
PCRES35	1280 x 1024	60 Hz	64.0 kHz	108.000 MHz	VESA Standard VDMTREV	12/18/96
PCRES39	1360 x 768	60 Hz	47.7 kHz	85.500 MHz	VESA Standard AddDMT	2003/4/3
PCRES41	1366 x 768	60 Hz	47.7 kHz	85.500 MHz	VESA Standard AddDMT	2007/11/30
PCRES53	1600 x 1200	60 Hz	75.0 kHz	162.000 MHz	VESA Standard VDMTREV	12/18/96
PCRES70	1920 x 1080	60 Hz	67.5 kHz	148.500 MHz	VESA Standard VDMTREV	2007/11/30
PCRES71	1920 x 1200	60 Hz	74.0 kHz	154.000 MHz	CVT Red. Blanking AddDMT	2003/4/3
PCRES89	720x400	70 Hz			DOS	
PCRES90	All supported resolutions will meet the timings specified separately in paragraphs in the VESA and Industry Standards and Guidelines for Computer Display Monitor Timing (DMT) Version 1.0, Revision 11, May 1 2007 or higher					
VIRES1	1080i@50	50Hz			HD interlaced	
VIRES2	1080i@60	60 Hz			HD interlaced	
VIRES3	720p@50	50Hz			HD progressive	
VIRES4	720p@60	60 Hz			HD progressive	
VIRES5	576i	50Hz			SD PAL	
VIRES6	576p	50Hz			ED	
VIRES7	480i	60Hz			SD NTSC	
VIRES8	480p	60Hz			ED	
VIRES9	1080p@50	50Hz			Full HD	
VIRES10	1080p@60	60Hz			Full HD	

Factory preset mode definition (green highlhigh light):

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

- User modes - 10 user mode sets, user timings can be stored by first in first out. Auto adjustment can be used for optimal picture performance.

User mode definition:

1. Can save those timing that not in Preset mode and can be showed (not over scalar or Panel spec.)
2. Usually need to reserve around 10 sets in memory

User mode timing specifications: besides timings listed in VESA-timing DMT, CVT; some other special detailed timings are listed as below.

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- 85Hz timings can display, but don't guarantee Picture.
- 1920X1080 should not be scaled. The position must be center. The outside area of display must be black.

- Audio input - Sensitivity 500mVrms, the amplifier outputs full power when the input level reaches 500mVrms, terminated with impedance >10kΩ.
- Lineout output - Stereo, 2Vrms output.
- Speaker output - 2 x 10 Wrms back firing speakers, with T.H.D. < 10%.

2.2.2 AV input signal requirements

- CVBS input - 1000mVpp (including 300 mV sync level), terminated with input impedance of 75Ω.

- S-Video input - Y: 1000mVpp, C: 300mVpp, terminated with input impedance of 75Ω.

- Component video input - Y: 1000mVpp, PbPr: ±350mVpp, terminated with input impedance of 75Ω. 480i/p, 576i/p, 720p, 1080i signal handling capability.

- HD ready - HD ready logo not required, but requirements to be fulfilled as-Display, display engine:
  - The minimum native resolution of the display or display engine is 720 physical lines in wide aspect ratio.

  Video Interfaces:
  - The display device accepts HD input via:
    - Analog YPbPr. "HD ready" displays support analog YPbPr as a HD input format to allow full compatibility with today's HD video sources in the market. Support of the YPbPr signal should be through common industry standard connectors directly on the HD ready display or through an adaptor easily accessible to the consumer; and:
  - HDMI HD capable inputs accept the following HD video formats:
    - 1280x720 @ 50 and 60Hz progressive scan ("720p")
    - 1920x1080 @ 50 and 60Hz interlaced ("1080i")
  - The HDMI input supports copy protection (HDCP).

- FHD FHD ready logo not required, but requirements to be fulfilled as: 1080p/23.98, 1080p/24, 1080p/25, 1080p/29.97, 1080p/50, and 1080p/60.

- HDMI Input - Compliance with HDMI Specification 1.3 or later, 480i/p, 576i/p, 720p, 1080i/p signal handling capability.

  TMDS channel:
  - Carries audio, video and auxiliary data.
  - Signaling method: According to HDMI Ver. 1.3b specification. (Type A HDMI).
  - Video pixel rate: 25 MHz to 165 MHz (Type A)
  - Pixel encodings: RGB 4:4:4, YCbCr 4:2:2, YCbCr 4:4:4.
  - Audio sample rates: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96kHz, 176.4 kHz, 192 kHz.
  - Audio channels: up to 8.

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DDC channel:

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

Content protection:

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

- Audio input - Sensitivity 500mVrms, the amplifier outputs full power when the input level reaches 500mVrms, terminated with input impedance of >10kΩ.
- Speaker output - Back firing speakers 2 x 10 Wrms, with T.H.D. < 10%.
- No signal input - While no signal at external inputs, screen goes blue before entering standby mode.

2.3 DDC channel

- E-EDID data structure according to VESA Enhanced EDID 1.3 (and EIA/CEA-861B for HDMI).
- Allows source to interrogate capabilities of the Display & AV inputs.
- Separate EDID for VGA input and HDMI input.

2.3.1 EDID content for Analog

TBD

2.3.2 EDID content for Digital

TBD

2.3.3 DDC/CI

DDC/CI (Command Interface) specifies a means for a computer to send commands to the monitor, as well as receive sensor data from the monitor, over the bidirectional link such as DDC2Ab/Bi/B+. Specific commands to control monitors are defined in a separate Monitor Control Command Set (MCCS) standard.

DDC/CI monitors are sometimes supplied with an external color sensor to allow automatic calibration of the monitor's color balance. Some tilting DDC/CI monitors support an auto pivot function, where a rotation sensor in the monitor enables the operating system to keep the display upright as the monitor is moved between its portrait and landscape positions.

The following DDC/CI commands should be supported via command line:

No.	Commands
1	Set Brightness
2	Set Contrast
3	Set Red Gain
4	Set Green Gain
5	Set Blue Gain
6	Get Brightness
7	Get Contrast
8	Get Red Gain
9	Get Green Gain
10	Get Blue Gain

General Product Specification

2.4 Service mode

Detailed technical specification refers to Service delta technical specs.

- Software Update:
  - Wireless data cloning (IR transmission).
  - Through RS-232

2.5 Power Supply

2.5.1 Power supply features

- AC line voltage range - 90Vac ~ 264Vac.
- AC line frequency range - 50-60 Hz ± 3 Hz.
- DC tact switch - Minimal power consumption when switch off
- AC mains switch - No power consumption when switch off.
- Inrush current - < 40A at 240Vac when cold start.
- Leakage current - < 0.5mA at 240Vac.
- Power factor correction - According to EN61000-3-2

2.5.2 Power consumption

- Normal on - TBD w (typical), TBD w(max.)
- Standby - < 1w, RC standby mode
- Switch off (DC or TACT) - < 1w, RC in-active
- Switch off (AC mains) - < No power consumption.

2.5.3 Display DPM standby (D-sub & HDMI input)

- DPM - The Display enters DPM off (sleep) mode when no H&V sync, one of H-sync / V-sync input or digital clock is absent. “No Video Input” message appears before entering DPM mode. A delay of 30 seconds before entering the power saving state is required to avoid misunderstanding of display resolution and timing mode changes.

- Recovery from DPM - Power & function recover when either H & V syncs or digital clock are detected.

- Standby - The Display enters “AV standby mode” when it’s switched off by RC. “Standby/Power” key or SLEEP TIMER function is activated or no AV signal input for 30 minutes.

- Recovery from Standby - Power & function recovers when RC “Standby” or “CH +/-” or “AV” is pressed. Hidden key control “Menu” or “CH +/-” key is toggled.

2.6 User Control Interface

Controlled via top control keypads or remote control or RS-232.

2.6.1 Hidden controls

It can’t be easily accessed in front of the set.
TBC

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To be revised according to new graphic sheet.

Key	PC mode	AV mode
⏻	DC switch power standby	DC switch power standby
◄	Decrease/Volume down	Decrease/Volume down
►	Increase/Volume up	Increase/Volume up
▲	MENU Select Down	Menu Select Down/Channel Down
▼	MENU Select Up	Menu Select Up/Channel up
MENU	Enter /Exit OSD menu	Enter /Exit OSD menu
INPUT		

- Power On/Off DC switch.
- Access main menu by pressing “MENU” key
- Select function via “▲ / ▼” keys, increase/decrease via “◄ / ► ” keys.
- “◄ / ► ” are also for Volume Hot Key.

2.6.2 Front controls

- LED indicator - 4 States.

LED Status	Power Status	LED behavior
LED Active	Normal on	Blue
	Standby	Amber
	RC command	Blue blinking
	Switch off	Blank
LED Not-active	Normal on/Standby/RC command/Switch off	Blank

- RC sensor – Receiver for Display control, transmitter for ITV data cloning.

Operation Angle	RC operational distance
0° (for H & V)	≥ 10m
30° (for H & V)	≥ 8m
45° (for H only)	≥ 6m

- Remote Control – Philips protocol.

Philips protocol is used for remote control communication.

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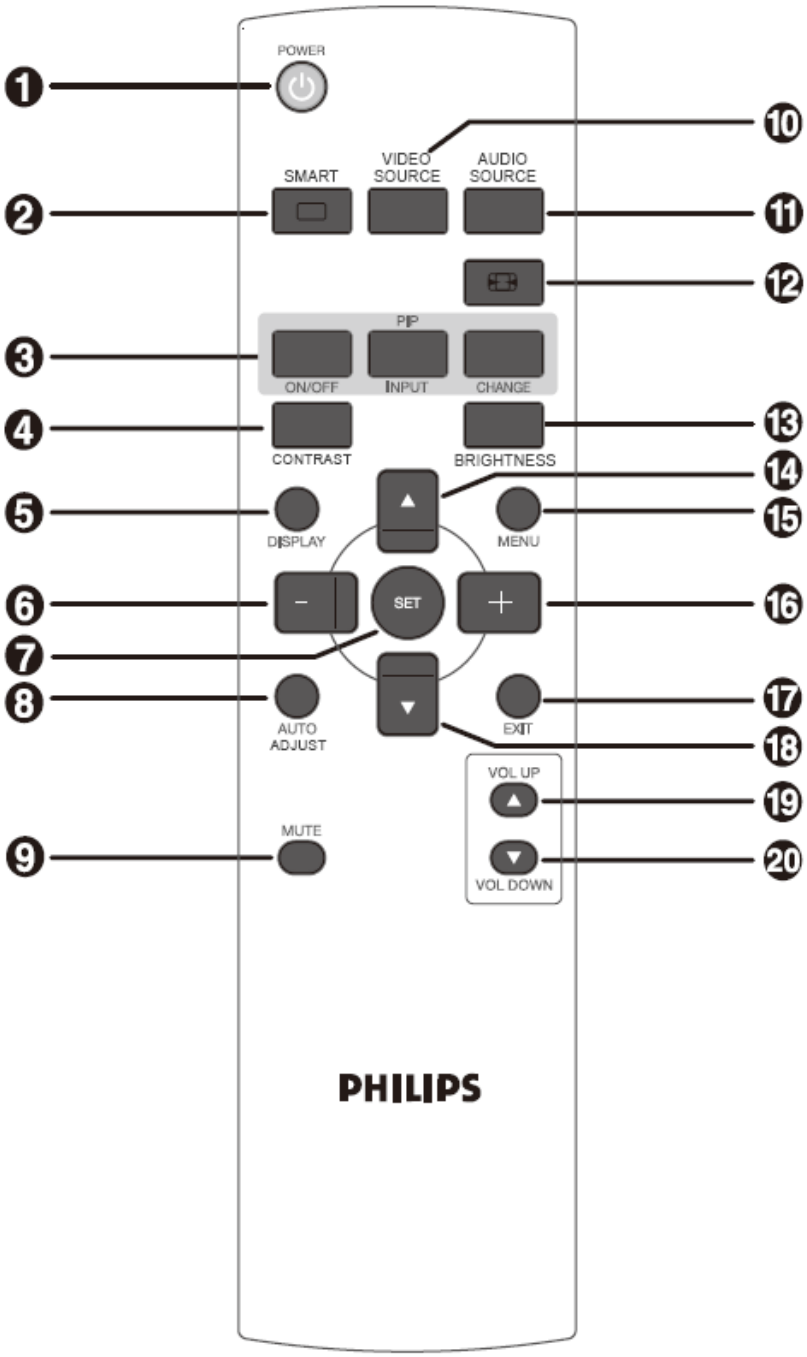

❶ POWER button
To turn the power on/off.
If LED Power Indicator on the monitor is not lightening, then the remote control will not work.

❷ SMART PICTURE button
To select smart picture mode from [HIGHBRIGHT], [STANDARD], [sRGB], [CINEMA].
HIGHBRIGHT: for moving image such as Video
STANDARD: for images (Factory setting)
sRGB: for text based images
CINEMA: for movies.

❸ PIP (Picture In Picture) button
ON/OFF button: To turn PIP mode ON/OFF.
INPUT button: To select the input signal for the sub-picture.
CHANGE button: To exchange between the main picture and sub-picture.
Note:
The “PIP” and “POP” modes do not work if the screen size is “CUSTOM” or “REAL”.

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❹ **CONTRAST button**
To start **CONTRACT** OSD selection, and then push "**+**" or "**-**" button to adjust the value.

❺ **DISPLAY button**
To turn on/off the setting information displayed on the right-up corner of the screen.

❻ **MINUS button**
To decrease the adjustment with OSD menu.
To move the sub-picture left when in “PIP” mode.

❼ **SET button**
To activate the setting with OSD menu.

❽ **AUTO ADJUST button**
To execute the AUTO ADJUST function.

❾ **MUTE button**
To turn the mute function on/off.

❿ **VIDEO SOURCE button**
To set the video source by toggle selection from [HDMI1], [PC-A], [CVI], [VIDEO<S>] and [VIDEO].

⓫ **AUDIO SOURCE button**
To set the audio source by toggle selection from [AUDIO1] to [AUDIO2], [AUDIO3] and [HDMI].
Note 1: You cannot select the audio source for video source is set to [VIDEO<S>] or [VIDEO].
Note 2: [HDMI] is selectable only when the video source is [HDMI 1] or [HDMI 2].

⓬ **SIZE button**
To select the picture size from [FULL], [NORMAL], [CUSTOM] , [DYNAM IC] and [REAL].

⓭ **BRIGHTNESS button**
To start the **BRIGHTNESS** OSD selection, and then push "**+**" or "**-**" button to adjust the value.

⓮ **UP button**
To move the highlight bar up to adjust the selected item when OSD menu is on.
To move the sub-picture up when in “PIP” mode.

⓯ **MENU button**
To turn the OSD menu on/off.

⓰ **PLUS button**
To increase the adjustment with OSD menu.
To move the sub-picture right when in “PIP” mode.

⓱ **EXIT button**
To turn to the previous OSD menu.

⓲ **DOWN button**
To move the highlight bar down to adjust the selected item when OSD menu is on.
To move the sub-picture down when in “PIP” mode.

⓳ **VOLUME UP button**
To increase the audio output level.

⓴ **VOLUME DOWN button**
To decrease the audio output level.

General Product Specification

RC key definition:

Remote Key		***Customer Code :*** *0x80*	
Key Name	**Data Code**	**Function Description**	**Activity**
POWER	0x03	Software Power ON/OFF	
VIDEO SOURCE	0x01	Input signal select (Note1)	
AUDIO SOURCE	0x1E	Switch Audio Input	AUDIO1 -> AUDIO2 ->AUDIO3->HDMI->AUDIO1
SMART	0x1D	Change the picture mode setting	Standard -> sRGB -> Cinema -> High Bright -> Standard
SIZE	0x29	Toggle the ZOOM mode	Note2
PIP ON/OFF	0x24	Switch the PIP/POP and OFF	OFF -> PIP -> POP -> Side by Side1 -> Side by Side2 -> OFF
PIP INPUT	0x25	Select the input source of PIP	Note3
PIP CHANGE	0x26	Change the PIP/MAIN.	
CONTRAST	0x27	Adjust contrast	
BRIGHTNESS	0x28	Adjust Brightness	
MENU	0x20		
UP	0x15		
DOWN	0x14		
SET	0x23		
PLUS	0x22		
MINUS	0x21		
EXIT	0x1F		
DISPLAY	0x19	Message display	IR control shall be set to "Normal" if the "DISPLAY" button is pushed more than 5 sec.
AUTO ADJUST	0x1C		
MUTE	0x1B	Mute On/Off	
VOL UP	0x17	audio volume up	
VOL DOWN	0x16	audio volume down	

All RC buttons generate RC commands. All those commands should be interpreted into the correct actions.

2.6.3 OSD MENU

- 9 languages - English, French, German, Italian, Spanish, Polish, Turkish, Russian, Simple Chinese.
- OSD tree

Control		**Default Value (PC Mode)**	**Default Value (Video Mode)**	**Range**
Picture	Brightness	-		0~100
	Contrast			0~100
	Sharpness			0~100
	Black Level			0~100

General Product Specification

Picture	Noise Reduction			Off/Low/Middle/High
	Tint	-		0~100
	Color	-		0~100
	Color Temperature			5800K/6500K/9300K/10000K
	Color Control	-		R/G/B: 0~255
	Light Sensor			On/Off
	Smart Contract			On/Off
	Video Source			AV/S-Video/ VGA/DVI/HDMI/YPbPr
	Picture Reset			No/Yes
Screen	H Position			0~100
	V Position			0~100
	Clock	-		0~100
	Clock Phase	-		0~100
	Zoom Mode			Full/Normal/Dynamic/Custom/Real
	Custom Zoom	-		ZOOM/HZOOM/VZOOM
	Screen Reset			No/Yes
	Volume			0~100
	Mute			On/Off
	Audio Source			Audio 1/Audio 2/Line-in/HDMI
	Speaker			Internal/External/Line-out
	Audio Reset			No/Yes
PIP	PIP Size			Small/Middel/Large
	PIP Audio			MAIN/SUB
	PIP Reset			No/Yes
Configuration 1	Auto Adjust	-		Auto/On/Off
	Power Save			VGA: On/Off
				Video: On/Off
	Language	English		English/ German / Spanish / French / Italian / Spanish / Russian / Polish / Turkish /Simplified Chinese
	Panel Saving			Cooling Fan: Auto/On/Off
				Brightness: Auto/Off
				Pixel Shift: (10~900 Seconds)
	Color System	-		Auto/NTSC/PAL/SECAM/
				PAL60/4.43NTSC
	Configuration Reset			No/Yes
	Factory Reset			No/Yes

General Product Specification

Configuration 2	OSD Turn Off	60		0, 5, 10~120 Seconds
	OSD Mode			Protrait/Landscape
	Information OSD			Off/1~10 Seconds
	Sleep Timer			Off/1~24 Hours
	OSD H Position			0~100
	OSD V Position			0~100
	Monitor Information			Model Number
				Serial Number
				Operation Hours
				SW Version
Advanced Option	Input Resolution	-		Auto/1024x768/1280x768/1360x768
	Black Level Expansion	-		Off/Low/Middle/High
	Gamma Selection			Native/2.2/2.4
	Scan Mode	-		Underscan/Overscan
	Scan Conversion	-		Progressive/Interlace
	Film Mode	-		Auto/Off
	IR Control			Normal/Primary/Secondary/Lock
	Keyboard Control			Lock/Unlock
	Tiling			H Monitors: 1~5
				V Monitors: 1~5
				Position: 1~25
				Frame Comp.: No/Yes
				Enable: No/Yes
	Heat Status			Fan/Temperature Status
	Date And Time			Year/Month/Day/Hour/Minute
				Daylight/Current Time
	Schedule			On/Off/Input
	Monitor ID			1~26
	DDC/CI			On/Off
	Smart Power			High/Medium/Low/Off
	Advanced Option Reset			No/Yes

General Product Specification

PICTURE TBC

■ **BRIGHTNESS**

Adjusts the overall image and background screen brightness.

Press ▶ button to increase brightness.

Press ◀ button to decrease brightness.

■ **CONTRAST**

Adjusts the image brightness for the input signal.

Press ▶ button to increase contrast.

Press ◀ button to decrease contrast.

■ **SHARPNESS**

This function is digitally capable to keep crisp image at any timings. It is adjustable to get a distinct image or a soft one as you prefer and set independently for each
picture mode.

Press ▶ button to increase sharpness.

Press ◀ button to decrease sharpness.

■ **BLACK LEVEL**

Adjusts the image brightness for the background.

Press ▶ button to increase black level.

Press ◀ button to decrease black level.
NOTE: sRGB picture mode is standard and cannot be changed.

■ **NOISE REDUCTION** * : INPUT VIDEO<S>, VIDEO only

Adjusts the noise reduction level.

Press ▶ button to increase reduction level.

Press ◀ button to decrease reduction level.

■ **TINT** * : INPUT HDMI1, 2(HDMI INPUT MODE-HD), CVI, VIDEO<S>, VIDEO only

Adjusts the tint of the screen.

Press ▶ button the flesh tone color becomes greenish.

Press ◀ button the flesh tone color becomes purplish.

General Product Specification

■ **COLOR** * : INPUT HDMI1, 2(HDMI INPUT MODE-HD), CVI, VIDEO<S>, VIDEO only

Adjusts the color of the screen.

Press ▶ button to increase color depth.

Press ◀ button to decrease color depth.

■ **COLOR TEMPERATURE**

Is used to adjust the color temperature.
The image becomes reddish as the color temperature decreases, and becomes bluish as the color temperature increases.

■ **COLOR CONTROL**

The color levels of red, green, and blue are adjusted by the color bars.
R: Red, G: Green,
B: Blue

■ **LIGHT SENSOR**

It is used to turn on/off light sensor function.

■ **SMART CONTRAST**

It is used to turn on/off dynamic contrast ratio function.

■ **VIDEO SOURCE**

It is used to select video source.

■ **PICTURE RESET**

Selecting Picture reset allows you to reset all OSD settings about PICTURE setting.
Select “Yes” and press “SET” button to restore to factory preset data.
Press “EXIT” button to cancel and then return to the previous menu.

SCREEN TBC

■ **H POSITION**

Controls Horizontal Image position within the display area of the LCD.

Press ▶ button to move screen to right.

Press ◀ button to move screen to left.

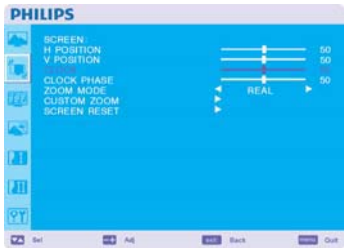
General Product Specification

■ **V POSITION**

Controls Vertical Image position within the display area of the LCD.

Press ▶ button to move screen to UP.

Press ◀ button to move screen to DOWN.



■ **CLOCK** * : INPUT PC-A only

Press ▶ button to expand the width of the image on the screen the right.

Press ◀ button to narrow the width of the image on the screen the left.

■ **CLOCK PHASE** * : INPUT PC-A only

Improves focus, clarity and image stability by increasing or decreasing this setting.

■ **ZOOM MODE**

You can select “FULL”, “NORMAL” and “CUSTOM” and “REAL”. (INPUT HDMI1,HDMI2,PC-A only)
You can also select “FULL”,“NORMAL” “DYNAMIC” and “CUSTOM” and “REAL”. (INPUT CVI, VIDEO<S>, VIDEO only)
Selecting “DYNAMIC” will make the screen display panoramic with the expansion of the middle and outside of the screen changed. (The upper and the bottom of the image will be cut by expansion.)
Dynamic image is the same as FULL size image when HDTV signal is input.
Selecting “REAL” image will be displayed 1 by 1 pixel.

■ **CUSTOM ZOOM**

“CUSTOM ZOOM” will be selected when you select “CUSTOM” on the screen “ZOOM” mode.
ZOOM: expands the horizontal and the vertical size simultaneously.
HZOOM: expands the horizontal size only.
VZOOM: expands the vertical size only.
H POSITION: moves to the right with + button. moves to the left with – button.
V POSITION: moves up with + button. moves down with – button.

General Product Specification

■ **SCREEN RESET**

Selecting Screen reset allows you to reset all OSD settings from PICTURE setting.
Select “Yes” and press “SET” button to restore the factory preset data.
Press “EXIT” button to cancel and then return to the previous menu.

AUDIO TBC

■ **VOLUME**

Adjusts the volume of speaker

Press ▶ button to move the stereo sound image to right.
Sound of the left side will be small.

Press ◀ button to move the stereo sound image to left.

■ **MUTE**

It is to turn on/off volume .

■ **AUDIO SOURCE**

It is to select audio input source .

■ **SPEAKER**

It is to select internal speaker/external speaker/external line out speaker.

■ **AUDIO RESET**

Selecting Audio reset allows you to reset all OSD settings from AUDIO setting.
Select “YES” and press “SET” button to restore the factory preset.
Press “EXIT” button to cancel and then return to the previous menu.

PIP (PICTURE IN PICTURE) TBC

Note: The “PIP” and “POP” modes do not function when the screen size is “CUSTOM” or “REAL”.

■ **PIP SIZE**

Selecting the size of picture inserted at the “Picture-in-Picture” (PIP) mode.
“Large”, “Middle” and “Small” are available.

General Product Specification

■ **PIP AUDIO**

Selecting the sound source in PIP mode.
When selecting “MAIN AUDIO”, you will get the sound for the main picture and when selecting
“PIP AUDIO”, you will get the sound for the picture instead.

■ **PIP RESET**

Selecting PIP Reset allows you to reset all OSD settings from PIP setting.
Select “Yes” and press “SET” button to restore the factory preset data.
Press “EXIT” button to cancel and then return to the previous menu.

CONFIGURATION 1 TBC

■ **AUTO ADJUST** * : INPUT PC-A only

Press "SET" button to automatically adjust screen size, horizontal position, vertical position, clock,
clock phase, white level and black level.
Press "EXIT" button to cancel execution AUTO ADJUST and then will return to the previous menu.

■ **POWER SAVE**

Selecting RGB "ON", the monitor will go to power management mode when HDMI1,HDMI2,PC-A, sync is lost.
Selecting VIDEO "ON", the monitor will go to power management mode after about 10 minutes delay from when CVI and VIDEO input signal is lost.

■ **LANGUAGE**

OSD control menus are available in eight languages.
(English, German, French, Italian, Spanish, Polish, Turkish, Russian, Simple Chinese)

General Product Specification

■ **PANEL SAVING**

Select "PANEL SAVING" functions to reduce the risk of the "image persistence".
COOLING FAN: Regulation of temperature when the display working.
" AUTO" in the state .The fan will automatically open when the display reaches a certain temperature.
" ON " in the state, displays the beginning of the state, fans will always open.
BRIGHTNESS: The brightness is decreased to lowest when selected "ON".
PIXEL SHIFT: Image is slightly expanded and moves 4 directions (UP, DOWN, RIGHT, LEFT) periodically
(Need setting the time for movement).
Movement area is approximately +/- 10mm from original position; Please locate the important information such as text within 90% area of screen image.
See note (1) for this functions.
PIP and STILL will be disabled when "MOTION" is active.

■ **COLOR SYSTEM** * : INPUT VIDEO<S>, VIDEO only

Selecting the Color System depends on your input video format.
AUTO: NTSC, PAL, SECAM, PAL60 or 4.43 NTSC is automatically selected.
NTSC: Specific selection of NTSC.
PAL: Specific selection of PAL.
SECAM: Specific selection of SECAM.
PAL-60: Specific selection of PAL60.
4.43NTSC: Specific selection of 4.43 NTSC.

■ **CONFIGURATION RESET**

Selecting the CONFIGURATION RESET allows you to reset all configuration settings.
Select "Yes" and press "SET" button to restore the factory preset data.
Press "EXIT" button to cancel and return the previous menu.

■ **FACTORY RESET**

Selecting "YES" allows you to reset PICTURE, SCREEN, AUDIO, CONFIGURATION1,2 and
ADVANCED OPTION will be back to factory settings (except LANGUAGE, DATE AND TIME and SCHEDULE).
Select "YES" and press "SET" button to restore the factory preset data. Press "EXIT" button to cancel and return the previous menu.

General Product Specification

CONFIGURATION 2 TBC

OSD TURN OFF

The OSD control menu will stay on as long as it is use. In the OSD Turn Off submenu, you can select how long the monitor waits after the last touch of a button to shut off the OSD control menu.
The preset choices are 5 -120 seconds.

INFORMATION OSD

Selects the information OSD display or not.
The information OSD will display when input signal or source change or warning message like as
no-signal or out-of range.
A time between 1 to 10 seconds is available.

SLEEP TIMER

To select SLEEP TIMER mode ON/OFF.
In the SLEEP TIMER menu, you can preset the monitor to automatically power down.
A time between 1 to 24 hours is available.
When the SLEEP TIMER is set, the SCHEDULE settings will be disabled.

OSD H POSITION

Adjusts the horizontal position of the OSD menu.

OSD V POSITION

Adjusts the vertical position of the OSD menu.

MONITOR INFORMATION

Indicates the model and serial number of your monitor.

General Product Specification

ADVANCED OPTION TBC

■ **INPUT RESOLUTION** * : INPUT PC-A only

Selects to decision of input signal about below timings, 1024x768, 1280x768 and 1360x768.
AUTO: Determines the resolution automatically.
1024x768: Determines the resolution as 1024x768
1280x768: Determines the resolution as 1280x768
1360x768: Determines the resolution as 1360x768
The setting you select becomes effective when POWER is turned OFF and ON again.

■ **BLACK LEVEL EXPANSION** * : INPUT HDMI1,2(HDMI INPUT MODE-HD), VIDEO<S>, VIDEO only

Selects a level of black expansion from “OFF”, “MIDDLE” and “HIGH.”
In case of go under the black cut-off level, please adjust the “Black level” in moderation on OSD menu.

■ **GAMMA SELECTION**

Selects a display gamma, It’s refer to the brightness performance curve of signal input.
2.2
2.4
Native
NOTE: sRGB picture mode is standard and cannot be changed.

■ **SCAN MODE** * : INPUT HDMI1,2(HDMI INPUT MODE-HD), CVI, VIDEO<S>, VIDEO only

Changes the display area of the image.
OVERSCAN: Set to display area about 95%
UNDERSCAN: Set to display area about 100%

■ **SCAN CONVERSION** * : INPUT HDMI1,2(HDMI INPUT MODE-HD), CVI, VIDEO<S>, VIDEO only

Selects IP (Interlace to Progressive) converter function.
PROGRESSIVE: Enable the IP function, to convert interlace signal to progressive. Normally use this setting.
INTERLACE*: Disable the IP function.
*NOTE: This mode is better suited for motion pictures, but it increases chance of image retention.

General Product Specification

■ **FILM MODE** * : INPUT HDMI1,2(HDMI INPUT MODE-HD), CVI, VIDEO<S>, VIDEO only

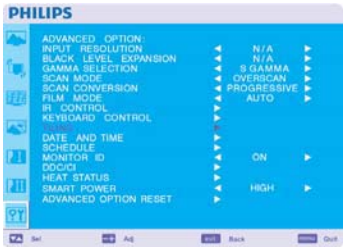
Selects Film mode function.
AUTO: Enable the Film mode function. This mode is better suited for movies, which is converted 24 Frames/sec source to DVD Video. We recommend to select “PROGRESSIVE” in “SCAN CONVERSION”.
OFF: Disable the Film mode function. This mode is better suited for Broadcasting or VCR source.

■ **IR CONTROL**

Selects the operation mode of the remote controller when multiple BDL4635E monitors are connected via RS-232C.
The item in this menu will become effective by pressing “SET” button on the selected item.
NORMAL: The monitor will be controlled normally by remote controller.
PRIMARY: The first BDL4230E monitor of those multi-connected via RS-232C is designated as PRIMARY.
SECONDARY: BDL4230E monitors other than the first one multi-connected via RS-232C are designated as SECONDARY.
LOCK: Disable the monitor control by infrared remote controller. Keep pressing “DISPLAY” button during 5 sec or more, this setting will return to “NORMAL”.

■ **KEYBOARD CONTROL**

Selects the operation mode of the keyboard control.
Select “YES” to disable the keyboard.
Select “NO” to enable the keyboard.



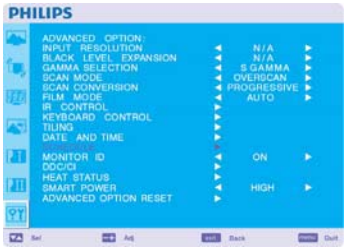
■ **TILING**

TILING demonstrates multiple screens. This feature provides a single large screen using up to 25 monitors.
It will be able to divide up to 5 each H and V.
This requires you to feed the PC output into each of the monitors through a distributor.
H MONITORS: Select number of horizontal divide.
V MONITORS: Select number of vertical divide.
POSITION: Select a position to expand the screen.
FRAME COMP: Works in tandem with TILING to compensate for the width of the tile bezels in order to accurately display the image.
ENABLE: Select “YES”, the monitor will expand the selected position.
PIP and STILL will be disabled when “TILING” is activated.

General Product Specification

DATE AND TIME

Adjusts the current date and time for internal clock.
You should set this function when you use “SCHEDULE”.



SCHEDULE

Programs the monitor's working schedule.
Schedule the power on and power off with hour and a day of the week. Also sets the input port.
This OSD can't remove except EXIT.

MONITOR ID

ID numbers for remote control are assigned to BDL4635E monitors that are multi-connected via RS-232C.
ID numbers 1 to 26 are selectable.

DDC/CI

Use to turn ON or OFF the DDC/CI communication function. Select ON for normal use.

HEAT STATUS

HEAT STATUS allows you to watch the thermal status at any time *via the OSD menu and/or via RS232 commands*. The indicated temperature has a accuracy of 3 degrees (plus and minus).
Press “SET” button to enter the submenu to monitor the heat status.
Press “EXIT” button to cancel and then return the previous menu.

SMART POWER

Selecting SMART POWER allows you to choose a certain level of power saving condition.
Select “OFF” to set the system in normal power condition
Select “MEDIUM” to set the system in medium level power saving status.
Select “HIGH” to set the system in high level power saving status
Press “EXIT” button to cancel and then return the previous menu.

ADVANCED OPTION RESET

Selecting ADVANCED OPTION RESET allows you to reset all OSD settings from ADVANCED OPTION settings, except for GAMMA SELECTION, DATE AND TIME, SCHEDULE, HDMI 1 INPUT MODE, HDMI 2 INPUT MODE, MONITOR ID, and DDC/CI.
Select “YES” and press “SET” button to restore the factory preset data.
Press “EXIT” button to cancel and then return the previous menu.
GAMMA SELECTION is reset when carrying out the PICTURE RESET in the PICTURE.

General Product Specification

2.7 I /O Connectors

Connectivity overview: TBC

RGB will be renamed to VGA.

Rear connectors:

- Power input: 3-pin IEC-320-C13 socket mains AC in.
- AC switch: Mains switch at line.
- PC input: 15 pins VGA D-Sub Female connector with lime green 3.5mm Mini-jack audio stereo connector.

VGA D-Sub connector pin assignment:

Pin	Signal Assignment	Pin	Signal Assignment
1	Red video	2	Green video
3	Blue video	4	GND
5	GND	6	Red GND
7	Green GND	8	Blue GND
9	+5V (Supply from PC for DDC circuit)	10	Sync GND
11	GND	12	DDC serial data
13	H-sync	14	V-sync
15	DDC serial clock		

- HDMI input: Type A includes digital video and audio, HDCP supported.
  HDMI type A connector pin assignment:

Pin	Signal Assignment	Pin	Signal Assignment
1	TMDS Data2+	2	TMDS Data2 Shield
3	TMDS Data2–	4	TMDS Data1+
5	TMDS Data1 Shield	6	TMDS Data1–
7	TMDS Data0+	8	TMDS Data0 Shield
9	TMDS Data0–	10	TMDS Clock+
11	TMDS Clock Shield	12	TMDS Clock–
13	CEC	14	Reserved (N.C. on device)
15	SCL	16	SDA
17	DDC/CEC Ground	18	+5V Power
19	Hot Plug Detect		

- YPbPr input: YPbPr with R/L Cinch audio in.
- AV input: S-Video, CVBS Cinch video and R/L Cinch audio in.
- Stereo audio output: 12w (at 8ohm) cinch audio stereo connector for stereo audio.
- Speaker output 10w (at 8ohm) stereo output snap type connectors.
- RS232: DB9 RS232 male type connector.

General Product Specification

3. VISUAL PERFORMANCE

3.1 LCD Module Characteristics

Vendor	First Panel AUO	Second Panel N/A
Panel Type Number	P645HW01 V0	
Module Dimensions (mm)	1482.4(V) x 862.0 (H) x 58.9 (D)	
Display Area (H x V)	1428 (H) x 803.52 (V)	
Aspect Ratio		
Pixel Format		
Pixel Pitch (mm)	0.744	
Color Pixel Arrangement	RGB Vertical Stripe	
Display Operating Mode	Transmissive, Normally Black	
Color Depth	1073.7M(10bit)	
Gamut (color saturation)	72% NTSC	
White Chromaticity		
Luminance (cd/m^2)	700 cd/m^2	
Brightness Uniformity	1.3	
Backlight	56pcs	
Response Time	8ms (typ. G-to-G)	
Contrast Ratio	2500:1 (typ.)	
View Angle (CR > 10)	89/89/89/89	
Frame Rate		
Electrical Interface		
Power Consumption	420 (typ.)	
Module Weight	30KG (max)	

3.2 Front of Screen Performance

- Peak brightness - 500 nits (typ.), brightness & contrast controls are at 100%
- Luminance uniformity - < 10% (5 points measured).
- Chromatic uniformity - Deviation $\Delta x, \Delta y < 0.015$ (5 points measured)
- Color tracking - $\Delta x, \Delta y < 0.015$ for all grey levels (5 points measured).
- Luminance variation - The variation in surface luminance , δ WHITE and δ BLACK are defined as :

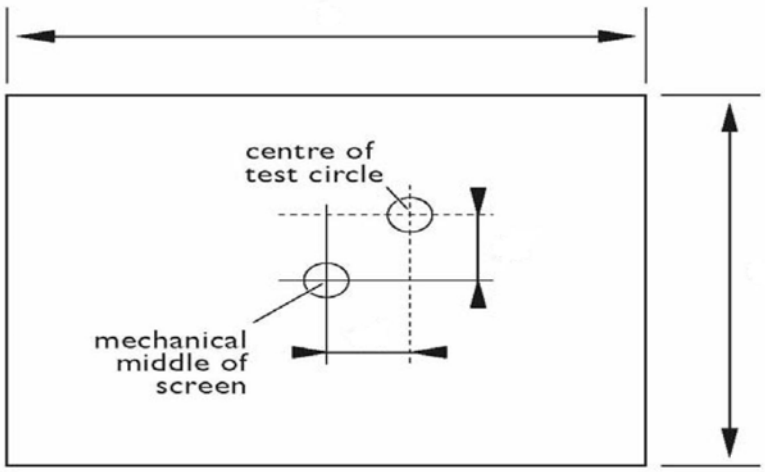
δ WHITE(5P) = Maximum(Lon1,Lon2, Lon3, Lon4, Lon5) / Minimum(Lon1,Lon2, Lon3, Lon4, Lon5)=1.3
δ BLACK(5P) = Maximum(Lon1,Lon2, Lon3, Lon4, Lon5) / Minimum(Lon1,Lon2, Lon3, Lon4, Lon5)=1.7
Where Lon1 to Lon5 are the luminance with all pixels displaying white at 5 locations.

- Display video color - Picture at full white, pattern, brightness at 50 %, and contrast at 50%. The color, temperature at the screen center should be:

CCT	9300º K	10000º K	6500º K	5800 º K
x	0.283 ± 0.015	0.278 ± 0.015	0.313 ± 0.015	0.326 ± 0.015
y	0.297 ± 0.015	0.291 ± 0.015	0.329 ± 0.015	0.342 ± 0.015

General Product Specification

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



- Over scan - ≤ 3 % (top) & ≤ 3 % (bottom) for Display, 480i, 576i
  ≤ 3% (left) & ≤ 3 % (right) for Display, 480i, 576i ≤ 3 % (top) & ≤ 3% (bottom) for 480p, 576p, 720p, 1080i/p ≤ 3 % (left) & ≤ 3 % (right) for 480p, 576p, 720p, 1080i/p 0% (fit to screen) for PC mode vertically and horizontally.
- Contrast Ratio - 1000: 1 (brig0htness controls is at 50%, contrast is at 100%)
- View angle (CR>10) - H & V > 178º.
- Residual image - Recover < 2 min. after burn in the checkerboard image for 2 hours.
- Contouring - Minimum contouring visible.
- Blue stretch - No
- Green enhance - No
- Black stretch - No
- De-interlace - 3D MA (motion adaptive)
- Y/C separation - 3D comb filter
- Video artifact reduction - High quality
- Motion compensated de-interlacing
- 3/2 - 2/2 motion pull down
- Noise reduction

4. FUNCTIONAL REQUIREMENTS

4.1 Power

When POWER ON = FORCED ON, Display goes to On state when mains is applied, secondary user actions cannot switch off the Display.

When POWER ON = STANDBY , Display goes to STANDBY when mains is applied.

When POWER ON = ON , Display goes to On state when mains is applied.

When POWER ON = LAST STATUS, Display goes to Last status (ON or STANDBY) depending of the previous state of Display before power off.

4.2 Picture

Picture control handles the initialization of the video parameters and the recall of the video personal preferences. Some video parameters can also be changed via the picture sub menu.

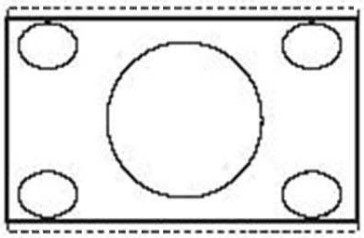
4.2.1 Wide Screen Signalling Bit (WSSB) picture size

CVBS input must support WSSB function.

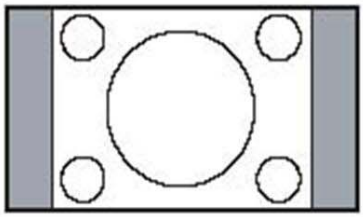
General Product Specification

4.2.2 Picture format

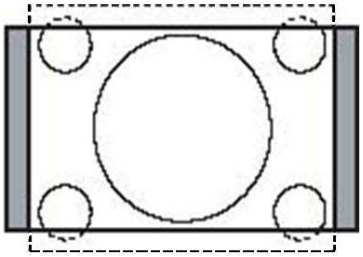
There are 6 picture formats: super zoom, 4:3, zoom 14:9, zoom 16:9, subtitle zoom and wide screen.



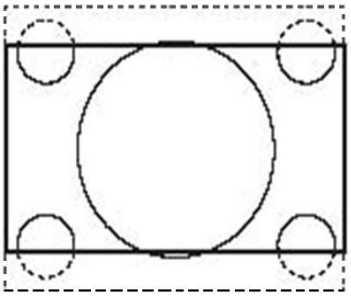
Super zoom



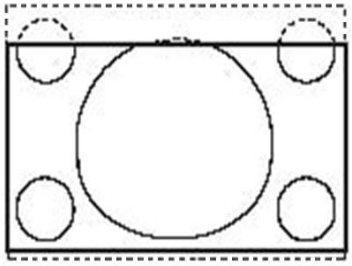
4:3



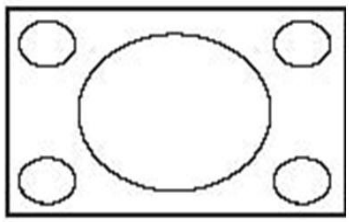
zoom 14:9



zoom 16:9



subtitle zoom



Wide screen

4.2.3 Picture in Graphics

PIP Specification

Input	VGA	DVI	HDMI	YPbPr	AV	S-video
VGA	–	Yes	Yes	–	–	–
DVI	Yes	–	–	Yes	No	No
HDMI	Yes	–	–	Yes	No	No
YPbPr	–	Yes	Yes	–	–	–
AV	–	No	No	–	–	–
S-video	–	No	No	–	–	–

4.3 Audio

Audio control handles the initialization of the audio parameters and the recall of the audio last status.
Some audio parameters can be also changed via the sound submenu.
A 5-band equalizer is used for tone control.

4.3.1 Sound mode

Sound Mode selections:

Source	Detected Sound System	Current Sound Mode	New Sound Mode
External	ANY TYPE	Mono (forced)	Stereo
		Stereo	Mono (forced)

General Product Specification

4.3.2 Sound related requirements

- Volume control - Should be gradual change of sound level from zero to maximum output.
- Soft mute - A short and gradual increase of the sound to prevent the pop sound during AC plug in/out, standby on/off, channel change, mute on/off.
- Lip Sync - -20 to +40 ms
- Rattling - No distortion / rattling at 80% max volume

4.4 Picture Shifting

On mode : To detect A,B,C,D,E to judge the picture content.
Same picture content: to execute the burn-in prevention program.
Different picture content: don't execute the burn-in prevention program.

Off mode : Don't execute the burn-in prevention program.

BDS screens and burn-in prevention_m

4.5 PC Picture Auto Adjustment Function ----- D-Sub input

Perfect Front Of Screen after auto adjustment.
Perfect FOS : Full Screen, w/o flash & unstable status at any picture.
When a new VGA source is detected, then automatically an auto adjustment should be performed.
The "Auto" button on the remote control will act as a manual button for auto adjustment

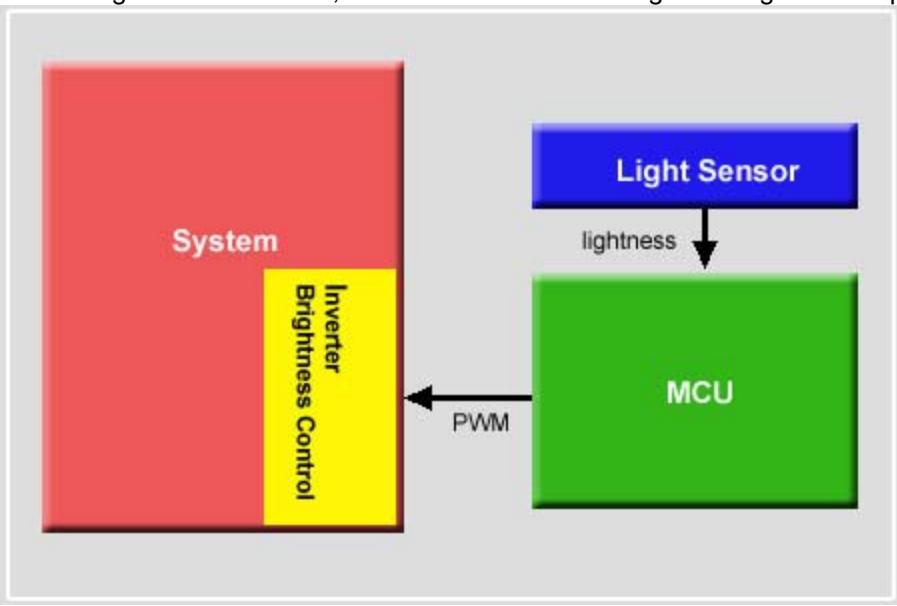
4.6 ESP (Energy Saving Programmability)

Limit the time the Display can be ON after the last interaction with a user. It is provided to allow the Lodging establishment to limit the time the display remains activated once a Guest has checked-out of his room.
Range: Off, 1,….99 (hours).

4.7 Light Sensor

The lighter sensor measures the outside brightness according to different environments and sends the information to display. Display will adjust the brightness automatically.
With lighter condition (Outdoor/Sun-light) the brightness will increase; in the opposite condition, the brightness will be decreased to fit darker environment.

Light sensor detects the change of illumination outsiee, then it send the signal to MCU via I^2C interface. MCU will ask inverter to switch the brightness if the outside illumination was change over the default.MCU will transmit PWM signal to the inverter, amd the inverter will change the brightness of panel.



General Product Specification

Light sensor design has three-steps brightness settings based on Smart Power settings: High, Medium, Off.

Smart Power Setting	Illumination (Lux)	Display Brightness
High	Dark Room	50%
Medium	Office/meeting room	75%
Off	Public Place	100%

Each step has its own illuminate range according different environment illumination. This technology makes the use of visual application more friendly and intelligently.

4.8 Heat Monitoring and Definition

This function is for overheating protection with temperature controlled fans, and the temperature limit can be defined by users
When the Panel Saving\Cooling Fan is set to AUTO in OSD Configuration 1 menu, the temperature sensor will detect the temperature and do the following actions:
1. If the temperature reaches to 50°C, the fan will be turned ON in low speed, if the temperature decreases to 45°C then the fan will be turned off
2. If the temperature reaches to 55 °C, the fan will be turned on in middle speed, if the temperature decrease to 50 °C, the fan will be turned on in low speed.
3. If the temperature reaches to 60°C, the fan will be turned on in max speed, if the temperature decrease to 55 °C, the fan will be turned on in middle speed.
4. If the temperature reaches to 65°C, the OSD warning message will appear on screen, if the temperature decrease to 60 °C, the OSD message will be turned off.

4.9 Smart Power

This function allows you to choose a certain level of power saving condition:
"OFF": to set the system in normal power condition
"MEDIUM": to set the system in medium level power saving status.
"HIGH": to set the system in high level power saving status
1) Audio:
internal: RL = 8Ω / max. power 2x5W @ 10%THD
external: RL = 8Ω / max. power 2x7W @ 10%THD
2) Smart Power requirements:

Smart Power Level	Power	RS232 DATA[1]		OSD
Off	(A)W	0x00	no difference in power mode	OFF
Low	(A)W	0x01		
Middle	(B)W	0x02		Middle / Medium
High	(C)W	0x03		High

(A)W: to be defined by supplier for optimal picture quality at Brightness level =50 and Contrast level = 50
(B)W: reduce backlight current such that (A) - (B) = approx 15W
(C)W: reduce backlight current such that (B) - (C) = approc 25W

5. NON FUNCTIONAL REQUIREMENTS

5.1 Start up behavior

LED indication should respond in 1 seconds and picture shows up within 5 seconds when the Display wakes from standby, or power on with DC switch or cold start.
The first time AC On , power status is in Standby mode.

5.2 Default/Reset Control Values

The default/reset values (out-of-box setting) of the various controls are listed:

Switch	Default Position
AC Power Switch	ON
Speaker Switch	N/A

General Product Specification

5.3 Time-out

Summary of Time-out values:

Description	Value
Setup Menu	60s.
AV source display (without AV source input)	3s

5.4 Last Status

A variable can be classified as “last status” variable. This means if the variable is changed it may take up to 3 seconds before the variable is stored in NVM. This automatic storage mechanism is not operational when the Display is in Factory mode.

5.4.1 Audio last status

Region	Audio Last Status
ALL	Volume, Mute, Audio Source, Speaker

5.4.2 Video last status

Region	Video Last Status
ALL	Brightness, Color, Contrast, Sharpness, and Smart Picture.

5.4.3 Function last status

Region	Function Last Status
ALL	Language, Smart Port, RS232 ID , Speed , DCM type , welcome message , Switch On Channel , Switch On Volume , Switch On PIC FMT , Power On ,Volume Indicator, Display , Power LED , Keyboard Lock , ESP , min. volume , Max. volume , Sleeptimer , Smart Power

5.5 Channel Tables

N.A.

5.6 Life time indication (show on OSD menu to be defined)

Burn-in hour reporting based on generic service requirements for OEM (D04.1) + study of data-sheets

5.7 External communication

5.7.1 Timing between each message should be a minimum of 500 ms
5.7.2 There should be a menu selection (e.g. in the service menu) for the baud rate of 1200,4800,9600, 19200, 57600, 115200

General Product Specification

6. ACCESSORIES

6.1 Cables

● Power cord -	EU, UK, NA, China, Length: 1.8 M +/- 50 mm	
● VGA Interface Cable (option) -	Length: 1.8 M +/- 50 mm	
● BNC to RCA adapter -	× 3	

6.2 Remote Control

Remote Control:	Type number: EURT57B093	
Batteries included.	Type number: R03-B500/01S	

6.3 DFU

DFU: English / German / Spanish / French / Italian / Russian / Polish / Turkish /Simplified Chinese on CD.

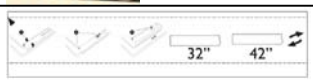
6.4 Quick User Guide

QSG: English / German / Spanish / French / Italian / Russian / Polish / Turkish /Simplified Chinese on CD.

6.5 Warranty card

Philips warranty card
English, German, Italian, French, Spanish, Polish, Turkish, Russian, simplified Chinese

6.6 Others

Logo nameplate		
Logo Guider		
Power cover	(Screw included)	

7. MECHANICAL

7.1 Cosmetic

Philips ID -

7.2 Mechanical Data Files

ProE files required. Provide mechanical drawings with key dimensions.

General Product Specification

7.3 Location of Philips Logo

Per Philips make-up sheet
Gap between panel and front bezel < 1.2 mm

7.4 Location of Icons

Per Philips make-up sheet

7.5 Color for Resin / Paint

Black 30% gloss front/Silver brush gloss decoration part/Stealth Black in mould back-cover.

7.6 Resins

- RoHS requirements.
- WEEE requirements.
- PC+ABS
- China Rohs required. (sales in China only)

7.7 Paint Used

- RoHS requirements.
- WEEE requirements.

7.8 Plastic Mold Tooling

- Tooling to be designed to minimize cosmetic defects induced by molding process (sink, blush, weld lines, gate marks, ejector marks, etc.).
- Painting to cover up cosmetic defects due to molding is strongly discouraged.

7.9 Plastics Flammability

- All Plastics to be Flame Retardant UL 94-V0 or Better (if Display weighs less than 18kg; UL94-V0 is OK).
- Base / Pedestal to be Flame Retardant UL 94-HB.
- All major plastic parts (bezel, back cover, base) need to be molded from same resin. Base / Pedestal otherwise specified.

7.10 Texture/Glossing of Housing

- The texture area and texture no should follow Philips make-up sheet.
- The exterior surfaces shall have a uniform texture.
- Philips must approve the mold texturing.
- Detail document for texture refer to UN-D249.
- The gloss value of texture area < = 20 gloss units.

7.11 Base Tilt / Swivel Range

- Tilt - N.A. (per commercial spec request)
- Swivel Range - 0°
- Base detach - Should be directly disassembled from main body, so as for easy install the Display to wall mount.
- Tip over - 15° minimum in worst case, base dimension designed so that ID and tip over requirements can be met.

7.12 Movement of Unit with Base

- Base must have non-marring, non-staining feet.
- Unit must tilt up and down with no “Stick / Slip”.
- Base must provide sufficient friction to hold unit in desired position after adjusting tilt.

General Product Specification

7.13 Wall Mount Method

- VESA in back-cover.

7.14 Label

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

7.15 Product Dimension / Weight

- Unit dimension (with stand) - TBD
- Packed unit dimension (carton) - TBD
- Net weight - TBD
- Gross weight - TBD

7.16 Transportation

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 perXTN-0009,UAN-D636.

Packaging unit should be protected by corner protector on 4 corner, don't use surrounding cardboard.

General pallet requirement refer to **wood packaging reqs SBMT-ISBM15-16-03-06.pdf**.

7.16.1 Transportation packages

The overall test sequence is: vibration test, drop test and when applicable cold drop test. The sequential tests have to be carried out using the same packaging.

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

7.16.2 Transportation test procedures

Transportation test specification refers to XTN-0009.pdf, for all regions.

Packaging test

- Vibration and drop or cant-drop test (UAN-D 1534/01)
- Vibration and cold/drop test (UAN-D 1534/01, UAN-D 1534/02 and UAN-D 636)
- Vibration, bump and drop test only for China & India(UAN-D 1534/02)
- Multiple drop test only for China & India(UAN-D 1534/02)
- Bump test only for China & India(UAN-D 1534/02)

Un-packaging test

- Fragility test optionally (UAN-D 1534/01)
- Drop onto a face (IEC 60068-2-31 test Ec)
- Vibration test (IEC 60068-2-6 test Fc)
- Vibration test, screen size < 56cm, only for China & India (GB 9384 / 97)

7.17 Pallet / Container Loading

- Air shipment - TBC
- Sea container 20'(pallet/slip sheet) - ?/?
- Sea container 40'(pallet/slip sheet) - ?/?
- Sea container 40' High Cube (pallet/slip sheet) - ?/?

General Product Specification

- Container loading -

Quantity	CONTAINER SIZE				
	40'		20'		40' High Cube
	W/ Pallet		W/ Pallet		W/ Pallet
	Yes	No	A.1.1.1.1 Yes	No	No
Layers					
Sets / Layer					
Sets / Block					
Blocks/Container					
Total Sets					

8. RELIABILITY / ENVIRONMENT

8.1 MTBF prediction

>60k hours (excluding Panel)

8.2 Demonstration MTBF

> 60k hours with 90% confidence level at CR (excluding Panel)

8.3 Temperature

- Operating (guaranteed performance according to spec requirements): 0 to 40 degree
- Storage - -20 to 60 ºC
- Shipping - -40 to 65 ºC

8.4 Humidity

- Operating (non-condensing) - 20 to 80%
- Storage (non-condensing) - 5 to 95%
- Shipping (non-condensing) - 5 to 95%

8.5 Altitude

- Operating - 0 to 4500m
- Storage - 0 to 9000m
- Shipping - 0 to 9000m

8.6 Air pressure

- Operating - 795 to 1013 mbar
- Storage - 300 to 1013 mbar
- Shipping - 300 to 1013 mbar

8.7 Environmental test

- Cold test (-25 degree,96 hours)
- Damp heat steady state (40 degree, 95% RH, 96 hours)
- Dry heat test (70 degree, 96 hours)

General Product Specification

9. REGULATORY COMPLIANCE

9.1 Worldwide Regulatory

REGION (RSO)	COUNTRY (NSO)	DOMAIN	SAFETY / EMC / ERGONOMICS / STANDARDS	DOCUMENTS	REFERENCE LOGO	APPLICANT	Mandatory
World wide	World wide	Sa	IEC60950-1:2001. Group and national differences of all countries listed in CB Bulletin No. 107A, or IEC60950-1:2005 and National difference of all countries	CB Report, certificate		Supplier	Yes
Europe	EUROPE	Sa	European Low Voltage Directives 2006/95/EC	Declaration of Conformity		MMD	Yes
		E	European Electromagnetic Compatibility Directive 2004/108/EC EN55022:2006+A1:2007 EN55024:1998+A1:2001+A2:2003, EN61000-3-2:2006, EN61000-3-3:1995+A1:2001+A2:2005 EN 55013:2001+A1:2003+A2:2006 (for TV) EN 55020:2007	EMC/CE test report		Supplier	Yes
		O	EUP Directive 2005/32/EC Energy Saving	EUP		Supplier	Yes
	Eastern Europe	Sa	EN60950-1:2001 or EN60950-1:2006	Certificate of Conformity		MMD	Yes
		E	EN55022,EN55024, IEC61000-3-2 ,IEC61000-3-3	Certificate of Conformity		MMD	Yes
	RUSSIA	Sa	GOST R 50377-1992	GOST certificate		Supplier	Yes
	All EU	O	WEEE	WEEE report and declaration		Supplier	Yes
	CHINA	Sa	GB4943-2001 (IEC60950-1)	CCC certificate		Supplier	Yes
		E	GB9254-2008 (CISPR22) GB17625.1-2003 (IEC61000-3-2)	CCC certificate		Supplier	Yes

General Product Specification

Europe		O	GB21520-2008	CECP certificate (中國節能專案)		Supplier	option al
NAFTA	USA	E	FCC Part 15 Class B	FCC report and DoC		Supplier	Yes

Sa = Safety
E = Electromagnetic Compatibility
O = Other which including recycling, energy saving, ergonomics ,GreenMark
X=X-Ray
Remark:
1. Supplier to provide all approbation documents, samples before CR
2. Supplier to pay approbation samples and transportation cost.
3. Supplier to pay Switzerland approbation cost and provide EN62311 report.
4. AC/DC adaptor have to meet California Energy Commission requirement
5. Supplier have to check regulation information on rating label, carton label, user manual to meet all mandatory regulation
6. Supplier have to apply all mandatory regulation base on sales country.

9.2 EMC Requirements

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

9.4 RoHS

Restriction on the use of certain hazardous substances.
Lead, Cadmium, Mercury, Hexavalent Chromium, Polybrominated Bipheny1 (PBB) and Polybrominated Bipheny1 Ether (PBDE)(flame retardant).

9.5 WEEE

Producer (Philips) responsible for retailer take back schemes and recycling.
-- System implemented.
-- Collection and recycle targets.

9.6 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.

10. DQE Test Items Template

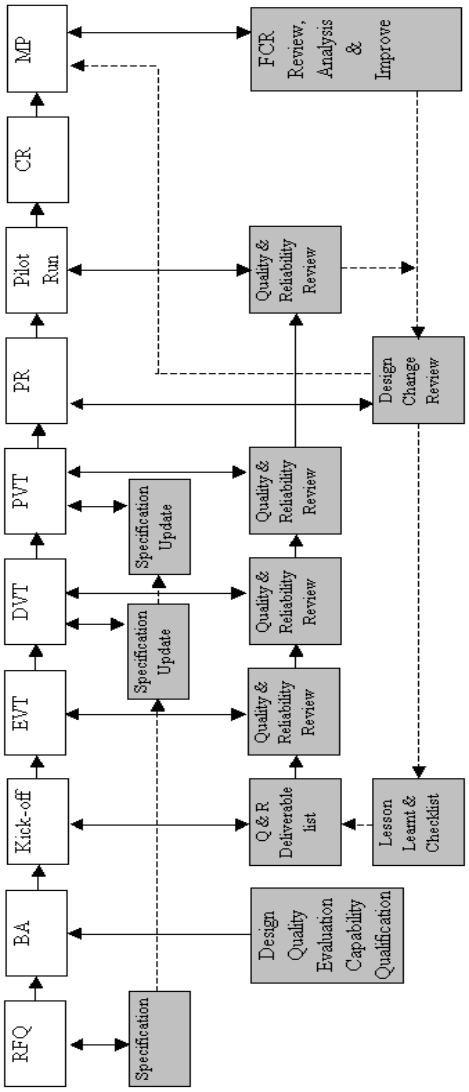
Product Release Test: DQE/DQA:
The objective of Design Quality Assurance process is to define the activities to be taken by concerning within the Product Creation Process to manage the quality and reliability of products in a more coherent and systematic approach.

The scope of Design Quality Assurance process covers all activities to ensure the design quality and reliability in Product Creation Process that starts from RFQ, Kick-off, EVT, DVT and PVT, Product release phase & Pilot run and CR & MP phase.

Design Quality Assurance procedure covers the system flow charts and the activities described as below.

General Product Specification

10.1 System flow chart



10.2 Specification input and update

The product specification shall be initiated by MMD and supported by concerned engineering department such as E/M/S, Safety/Approbation Group and DQE before RFQ. It must be updated in each product creation milestone. DQE engineers will be responsible to make product quality and reliability definition based on the product characteristics and requirements.

10.3 Design quality evaluation capability qualification

During the product creating process, the DQE has to support to regulate the supplier design quality and reliability evaluation capability to ensure the supplier is qualified to create the best quality and reliability product to provide to MMD.

General Product Specification

10.4 Quality and reliability deliverables list

During product creation RFQ milestone the DQE has to provide deliverables list to supplier and discuss with them to perform quality and reliability evaluation and testing report per request in list to DQE for design quality and reliability review and validation.

Model No. :		Date :						Supplier Milestone
Test Item		MMD Milestone						Philip v.s. Qisda EVT/DVT v.s. EVT ; PVT v.s. PVT
		EVT	DVT	EVT	補	PVT	PVT	
1	Front of screen tests							
1.1	Brightness/Contrast							
1.1.1	Brightness control range		v	1		v	1	Refer to Qisda
1.1.2	Contrast control range		v	1		v	1	Refer to Qisda
1.1.3	Luminance uniformity		v	2		v	1	Refer to Qisda
1.1.4	Luminance transition		v	1		v	1	Refer to Qisda
1.1.5	Contrast ratio		v	1		v	1	Refer to Qisda
1.1.6	Luminance-full white		v	1		v	1	Refer to Qisda
1.1.7	Dimming range		v	1				Refer to Qisda
1.1.8	Contrast vs. viewing angles		v	1				Refer to Qisda
1.1.9	Luminance variation curve		v	1				Refer to Qisda
1.1.10	Peak white luminance							No need
1.2	Colour							
1.2.1	Colour Temperature		v	1		v	1	Refer to Qisda
1.2.2	Chromaticity		v	1		v	1	Refer to Qisda
1.2.3	Chromaticity uniformity		v	1		v	1	Refer to Qisda
1.2.4	Colour saturation		v	1		v	1	Refer to Qisda
1.2.5	Color tracking		v	1		v	1	Refer to Qisda
1.2.6	Purity							No need
1.2.7	Hue/Tint control range		v	1		v	1	Refer to Qisda
1.2.8	Colour transition		v	1		v	1	Refer to Qisda
1.2.9	Colour shift vs. viewing angles		v	1		v	N/A	attach panel spec
1.2.10	Gamma value		v	1		v	1	Refer to Qisda
1.2.11	RGB and W Gamma curve		v	1		v	1	Refer to Qisda
1.2.12	Deagussing							No need
1.3	Image							
1.3.1	Geometry		v	1		v	1	Refer to Qisda
1.3.2	Over/Under Scan		v	1		v	1	Refer to Qisda
1.3.3	Centring error		v	1		v	1	Refer to Qisda
1.3.4	Position/Ratation		v	1		v	1	Refer to Qisda
1.3.5	Convergence							No need
1.3.6	Jitter/Flicker/Flag waving		v	1		v	1	Refer to Qisda
1.3.7	Cross talk		v	1		v	1	Refer to Qisda
1.3.8	Residual image		v	1		v	1	Refer to Qisda
1.3.9	Image sticking		v	1		v	1	B/W pattern for 10hrcheck 殘影
1.3.10	Brush effect (PDP)		v	N/A		v	N/A	No need
1.3.11	Halation		v	1		v	1	Refer to Qisda
1.3.12	Luminance loading		v	1		v	1	Refer to Qisda
1.3.13	Pixel defects		v	1		v	1	Refer to Qisda
1.3.14	Noise and self pollution		v	1		v	1	Refer to Qisda

General Product Specification

1.3.15	Microphony		v	1		v	1	Refer to Qisda
1.3.16	High voltage regulation							No need
1.3.17	Earth magnetic sensitivity							No need
1.3.18	Local dooming							No need
1.3.19	MANNHEIM effect							No need
1.3.20	Interlacing							No need
1.3.21	Contouring (PDP)		v	N/A		v	N/A	No need
1.4	Resolution							
1.4.1	Display resolution		v	1		v	1	Refer to Qisda
1.4.2	Sharpness/Smearing		v	1		v	1	Refer to Qisda
1.4.3	Overshoot/Undershoot/Ring		v	1		v	1	Refer to Qisda
1.4.4	Focus		v	1		v	1	Refer to Qisda
1.4.5	Readability		v	1		v	1	Refer to Qisda
1.4.6	Moire/Mura		v	1		v	1	Refer to Qisda
1.4.7	Response time		v	1		v	1	Refer to Qisda
1.4.8	Video bandwidth							
1.4.9	Video sag							
1.4.10	Video black level stability (PDP)		v	N/A		v	N/A	No need
1.4.11	Video spurious response							
1.4.12	Video rising/falling time							
2	Audio Tests							
2.1	Maximum output power		v	1	1	v	1	Refer to Qisda
2.2	Power Bandwidth		v	1	1			Refer to Qisda
2.3	THD		v	TBC	TBC			
2.4	S/N ratio		v	1	1			Refer to Qisda
2.5	Pop noise		v	1	1	v	1	Refer to Qisda
2.6	Hum		v	N/A				Refer to Qisda
2.7	Noise		v	1	1			Refer to Qisda
2.8	Rattle		v	N/A		v	N/A	Refer to Qisda
2.9	Tone & Volume control range		v	1	1	v	1	Refer to Qisda
2.10	Channel seperation		v	N/A		v	N/A	
2.11	Channel unbalance		v	N/A		v	N/A	
2.12	Crosstalk attenuation		v	N/A		v	N/A	
2.13	Mute and Plop		v	N/A		v	N/A	
2.14	Supresssion		v	N/A		v	N/A	
2.15	Available surrond mode performance		v	N/A		v	N/A	
2.16	Dolby		v	N/A		v	N/A	
2.17	Virtual dolby		v	N/A		v	N/A	
2.18	Unweighted and filter		v	N/A		v	N/A	
2.19	Headphone performance		v	N/A		v	N/A	
2.20	Auxiliary In/out Level		v	N/A		v	N/A	
2.21	Thermal click noise		v	N/A		v	N/A	
3	**TV Front end and Remote control**		—	—	—	—	—	
3.1	Tuner sensitivity		v	N/A		—	—	NA
3.2	Tuning range		v	N/A		—	—	NA
3.3	Interference on IF harmonics		v	N/A		—	—	NA
3.4	Search tuning behavious		v	N/A		—	—	NA
3.5	AFC catch in and holding range		v	N/A		—	—	NA

General Product Specification

3.6	AGC overload		v	N/A		—	—	NA
3.7	Tuner/IF parameter		v	N/A		—	—	NA
3.8	Amplitude response to modulation frequency		v	N/A		—	—	NA
3.9	Group delay of Luma		v	N/A		—	—	NA
3.10	Amplitude and Group delay of chroma		v	N/A		—	—	NA
3.11	Frequency stability vs AFC		v	N/A		—	—	NA
3.12	Local oscillator leakage		v	N/A		—	—	NA
3.13	Maximum usable multiple RF input signal		v	N/A		—	—	NA
3.14	selectivity		v	N/A		—	—	NA
3.15	Cross modulation		v	N/A		—	—	NA
3.16	Cross luminance		v	N/A		—	—	NA
3.17	V-chip, Closed captions and Extended data service		v	N/A		—	—	NA
3.18	Remote transmitter frequency stability		v	1	1	—		Refer to Qisda
3.19	Remote transmitter phase condition of Rf-carrier		v	1	1	—	—	Refer to Qisda
3.20	Remote transmitter key bounce		v	1	1	v	1	Refer to Qisda
3.21	Remote transmitter multiple key activation		v	1	1	v	1	Refer to Qisda
3.22	Remote transmitter data pulse width		v	1	1	—	—	Refer to Qisda
3.23	Remote transmitter message repetition and interval		v	1	1	—	—	Refer to Qisda
3.24	Remote transmitter radiant intensity		v	1	1	—	—	Refer to Qisda
3.25	Remote transmitter radiant intensity loss with filter cover		v	1	1	—	—	Refer to Qisda
3.26	Remote transmitter battery lifetime		v	1	1	—	—	Refer to Qisda
3.27	Remote receiver sensitivity		v	1	1			Refer to Qisda
3.28	H&V optical viewing angle		v	N/A		—	—	NA
3.29	Maximum IR power loss cause by cover		v	N/A		—	—	NA
3.30	Disturbance immunity of Remote receiver		v	N/A		—	—	NA
4	**Mains power and Inverter tests**							
4.1	Under voltage		v	1				
4.2	Over voltage operation (290Vac)		v	1				MMD wants to be 290V, not 275V
4.3	Over voltage protection		v	1		v	1	
4.4	Operational variation (+/- 20%)		v	1		v	1	
4.5	Brown in voltage		v	1				
4.6	Brown out voltage		v	1				
4.7	Mains frequency		v	1		v	1	
4.8	Start up and off behavious		v	1		v	1	
4.9	Power dissipation		v	1		v	1	
4.10	Current consumption		v	1				
4.11	Gain and Phase margin		v	1				
4.12	Output voltage and Cross regulation		v	1				
4.13	Transient Response		v	1				
4.14	Line and load regulation		v	1				
4.15	Ripple and noise level		v	1				
4.16	Inrush current		v	1		—	—	
4.17	Mains Harmonic/ Power factor		v	1		v	1	
4.18	Earth leakage current		v	1		v	1	
4.19	Inverter/CCFL strike voltage and time		v	1		—	—	

General Product Specification

5	**Software and OSD Tests**		—	—	—	—	—	
5.1	Power Management Function		v	1		v	1	
5.2	Key pad / Remote control Function		v	1		v	1	
5.3	Video Mode Detection (All Mode)		v	1		v	1	
5.4	Picture Performance (All Mode)		v	1		v	1	
5.5	New Modes storge function		v	1		v	1	
5.6	Video mode operation frequency Range		v	1		—	—	
5.7	Catch in Range		v	1		—	—	
5.8	Holding Range		v	1		—	—	
5.9	Synchronization behavious		v	1		—	—	
5.10	OSD Function		v	1		v	1	
5.11	OSD Warning Message		v	1		v	1	
5.12	EEPROM Read/Write		v	1		—	—	
5.13	Check Mode Independent Functions		v	1		—	—	
5.14	DDC2B/CI Function		v	1		v	1	
5.15	Color Function		v	1		v	1	
5.16	Disply Image Test		v	1		v	1	
5.17	Check Frequency Sweep		v	1		—	—	
5.18	Noise Test (EEPROM data loss)		v	1		—	—	
5.19	Wake Up from Off Mode		v	1		v	1	
5.20	Timer Function		v	1		v	1	
5.21	Light Frame Function		v	1		v	1	
5.22	DVI/HDCP Mode		v	1		v	1	
5.23	HDMI/HDCP Mode		v	1		v	1	
5.24	AV Mode		v	1		v	1	
5.25	TV Mode		v	N/A		v	N/A	
5.26	Input Selection Function		v	1		v	1	
5.27	PIP Function		v	1		v	1	
5.28	Audio Test		v	1		v	1	
5.29	Check Smart Control Function		v	1		v	1	
5.30	EEPROM mapping after power on-off cycle		v	1		—	—	
5.31	I2C Function Test		v	1		—	—	
5.32	Display size control Function		v	1		v	1	
5.33	Reset function		v	1		v	1	
5.34	Zoom Function		v	1		v	1	
5.35	Extra function key		v	1		v	1	
5.36	BDS Serial Xpress communication test		v	1		v	1	
6	**Design Quality and Reliability tests**							
6.1	Component derating		v				1	Refer to Qisda (PVT)
6.2	Thermal stress	v	v	1	1			Refer to Qisda thermal profile
6.3	Capacitor stress check		v	1				RD provide data
6.4	Capacitor life calculation		v	1				RD provide data
6.5	DPMS cycling		v	1	1	v	1	Power on/Stand by/Sleep cycle test
6.6	Power/DPMS cycling		v	1	1			Different video input auto scan with white pattern for 15 cycle

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6.7	Power off/on interval		v	1	1			Refer to Qisda
6.8	Mode cycling / OSD check		v	1	1			Refer to Qisda
6.9	MTBF Prediction	v	v	-				Refer to Qisda
6.10	MTBF demo		v	3		v	2	Refer to Qisda
6.11	Acoustic noise		v	1		v	1	Refer to Qisda
6.12	Father/Mother		v	1				Check power after 100 times unplug
6.13	EHT							
6.14	X-ray protection							
6.15	Flash over							
6.16	Mechnical assembler quality		v	1		v	1	Refer to 8.xx
6.17	Vibration (2G/3 axial)/Thermal cycling		v	N/A				Reserve to discuss due to panel did not test
7	**Environment Reliability tests**							
7.1	Cold, non operational and packed		v	1				MMD: -25 degree for 96 hours
7.2	Dry heat, non operational and packed		v	1				MMD: 70 degree for 96 hours
7.3	Thermal step stress, operational and non packed		v	1				84 hours, original is 168hrs
7.4	Cold start up, operational and non packed		v	1				24 hours
7.5	Cold storage, operational and non packed		v	1				Add -10 degree storage 24 hours before cold start (not in US model) -10, operating for 4 hours -10, storage for 20 hours 2 cycles
7.6	Dry heat, non packed and w/o operational		v	1				70 degree 96 hours
7.7	Altitude (Low air pressure) (PDP and CRT)		v	N/A				
8	**Mechanical (Transportation) Tests**							
8.1	Non operational and packed random vibration test		v	1		v	1	Refer to Qisda
8.2	Operational vibration test		v	1		v	1	Refer to Qisda
8.3	Drop test		v	1		v	1	Refer to Qisda (could refer to 8.4)
8.4	Boundary drop test		v	1		v	1	Drop +10% height
8.5	Cold drop test		v	1		v	1	-10 degree, storage for 16 hours, then do drop test
8.6	Half-sine shock test		v	N/A		v	N/A	Reserve to discuss due to panel did not test
8.7	Bump		v	N/A		v	N/A	
8.8	DBC		v	-		v	N/A	Provide panel data
8.9	Compression test		v	-		v	N/A	Provide vendor's report
8.10	Mechanical Aspect and Tests							
8.10.1	Assembled stand (salt spray)		v	N/A				
8.10.2	Stand base warpage		v	N/A		v	N/A	
8.10.3	Positioning (slant, assembly)		v	N/A		v	N/A	

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8.10.4	Stability (floor stand base)		v	N/A				
8.10.5	Stability (tilt over)		v	N/A				
8.10.6	Bump test (for set >7kg)		v	N/A				
8.10.7	Wobbling test (mainbody vs standbase)		v	N/A				
8.10.8	Stand loading (strength)		v	1				Refer to Qisda
8.10.9	Hinge cycling test (foldable set)		v	N/A				
8.10.10	Stand base feet assembly(moving and feet contact)		v	N/A				
8.10.11	Wall mount (VESA spacing)		v	1				Refer to Qisda
8.10.12	Cosmetic and appreance (assembly)		v	N/A		v	N/A	
8.10.13	Impact test(glass element)		v	N/A				
8.10.14	Fragmentation (glass element)		v	N/A				
8.10.15	Screw torque test (glass element)		v	N/A				
8.10.16	Bending force test (glass element)		v	N/A		v	N/A	
9	**HALT Tests**							
9.1	Voltage test		v	N/A				No need
9.2	Thermal step stress test		v	N/A				No need
9.3	Rapid thermal transition test		v	N/A				No need
9.4	Vibration step stress test		v	N/A				No need
9.5	Combined test		v	N/A				No need
10	**Compatibility Test**		v	1				HDMI compatibility test. Rest follow Qisda
11	**Winlog**							No need
12	**DFMEA**							No need
13	**DFSS of critical parameter**					v	N/A	No need
14	**DQE Test Plan**	v		1				
	Road Test					v	TBD	
	Allion Test		v	1				
	HDMI ATC		v	R				Refer to 42"

Except the above tests, Vendor and MMD will do more verify and acceptance based on CRS in development stage:

- Functionality and Performance Test
- VGA/HDMI EDID Test

VGA:

Req. ID	Resolution according to VESA DMT standard Specification					
	Resolution	**Refresh Rate**	**Horizontal Frequency**	**Pixel Clock**	**Standard Type**	**Original Document Date**
PCRES4	640 x 480	60 Hz	31.5 kHz	25.175 MHz	Industry Standard n/a	n/a
PCRES5	640 x 480	72 Hz	37.9 kHz	31.500 MHz	VESA Standard VS901101	12/2/92
PCRES6	640 x 480	75 Hz	37.5 kHz	31.500 MHz	VESA Standard VDMT75HZ	10/4/93
PCRES9	800 x 600	60 Hz	37.9 kHz	40.000 MHz	VESA Guidelines VG900602	8/6/90
PCRES11	800 x 600	75 Hz	46.9 kHz	49.500 MHz	VESA Standard VDMT75HZ	10/4/93
PCRES16	1024 x 768	60 Hz	48.4 kHz	65.000 MHz	VESA Guidelines VG901101A	9/10/91
PCRES18	1024 x 768	75 Hz	60.0 kHz	78.750 MHz	VESA Standard VDMT75HZ	10/4/93
PCRES23	1280 x 768	60 Hz	47.8 kHz	79.500 MHz	CVT AddDMT	3/Apr/2003
PCRES28	1280 x 800	60 Hz	49.7 kHz	79.500 MHz	CVT	1/May/2007
PCRES32	1280 x 960	60 Hz	60.0 kHz	108.000 MHz	VESA Standard VDMTPROP	3/1/96
PCRES35	1280 x 1024	60 Hz	64.0 kHz	108.000 MHz	VESA Standard VDMTREV	12/18/96
PCRES39	1360 x 768	60 Hz	47.7 kHz	85.500 MHz	VESA Standard AddDMT	2003/4/3
PCRES41	1366 x 768	60 Hz	47.7 kHz	85.500 MHz	VESA Standard AddDMT	2007/11/30

General Product Specification

PCRES53	1600 x 1200	60 Hz	75.0 kHz	162.000 MHz	VESA Standard VDMTREV	12/18/96
PCRES70	1920 x 1080	60 Hz	67.5 kHz	148.500 MHz	VESA Standard VDMTREV	2007/11/30
PCRES71	1920 x 1200	60 Hz	74.0 kHz	154.000 MHz	CVT Red. Blanking AddDMT	2003/4/3
PCRES89	720x400	70 Hz			DOS	
PCRES90	All supported resolutions will meet the timings specified separately in paragraphs in the VESA and Industry Standards and Guidelines for Computer Display Monitor Timing (DMT) Version 1.0, Revision 11, May 1 2007 or higher					

H
DMI:

Req. ID	Resolution according to VESA DMT standard Specification					
	Resolution	**Refresh Rate**	**Horizontal Frequency**	**Pixel Clock**	**Standard Type**	**Original Document Date**
PCRES4	640 x 480	60 Hz	31.5 kHz	25.175 MHz	Industry Standard n/a	n/a
PCRES5	640 x 480	72 Hz	37.9 kHz	31.500 MHz	VESA Standard VS901101	12/2/92
PCRES6	640 x 480	75 Hz	37.5 kHz	31.500 MHz	VESA Standard VDMT75HZ	10/4/93
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PCRES35	1280 x 1024	60 Hz	64.0 kHz	108.000 MHz	VESA Standard VDMTREV	12/18/96
PCRES39	1360 x 768	60 Hz	47.7 kHz	85.500 MHz	VESA Standard AddDMT	2003/4/3
PCRES41	1366 x 768	60 Hz	47.7 kHz	85.500 MHz	VESA Standard AddDMT	2007/11/30
PCRES53	1600 x 1200	60 Hz	75.0 kHz	162.000 MHz	VESA Standard VDMTREV	12/18/96
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PCRES71	1920 x 1200	60 Hz	74.0 kHz	154.000 MHz	CVT Red. Blanking AddDMT	2003/4/3
PCRES89	720x400	70 Hz			DOS	
PCRES90	All supported resolutions will meet the timings specified separately in paragraphs in the VESA and Industry Standards and Guidelines for Computer Display Monitor Timing (DMT) Version 1.0, Revision 11, May 1 2007 or higher					
VIRES1	1080i@50	50Hz			HD interlaced	
VIRES2	1080i@60	60 Hz			HD interlaced	
VIRES3	720p@50	50Hz			HD progressive	
VIRES4	720p@60	60 Hz			HD progressive	
VIRES5	576i	50Hz			SD PAL	
VIRES6	576p	50Hz			ED	
VIRES7	480i	60Hz			SD NTSC	
VIRES8	480p	60Hz			ED	
VIRES9	1080p@50	50Hz			Full HD	
VIRES10	1080p@60	60Hz			Full HD	

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General Product Specification

ST:

Input		
VGA PC Input +Audio L/R	R	VGA D-sub
Component video 1 (HD/SD) + Audio L/R	R	YPbPr(480i/p, 720p, 1080i, 1080p)
CVBS + Audio L/R x 1	R	1
S-video x 1	R	1
HDMI input with HDCP (version 1.3) x 2	R	HDMI with HDCP (480i/p, 576 i/p, 720p, 1080i, 1080p)
Displayport (version 1.1a)	W	1
EDID tables filled in for all supported PC and Video modes	R	EDID version 1.3
Output		
VGA PC Output (loopthrough)	R	VGA-D-sub
CVBS + Audio L/R x 1	W	
Speaker connector (amplified out, 2x10Watt RMS minimum, shortcircuit protected)	R	standard speaker terminal for speaker wires
Control		
Serial Port for Remote Management via RS232 in	R	RS232 - D-sub 9 pin
Serial Port for Remote Management via RS232 out for LoopThrough	R	RS232 - D-sub 9 pin
Compliance to broadcast standards for reception and/or video playback playback (DVD, VCR, STB)		
Video play back support for various video coding standards	R	PAL, SECAM, NTSC
Wide Screen Signalling support (16:9 / 4:3)	R	WSS

- Pictures Motion Test
- RS232 SCIP and Control Test

	Command Code
Communication Control	0x00
Platform and version labels	0xA2
Power state get	0x19
Power state set	0x18
User Input Control get	0x1D
User Input Control set	0x1C
Power state at cold start	0xA3
Input Source	0xAC
Current Source	0xAD
Video parameters get	0x33
Video parameters set	0x32
Picture Format get	0x3B
Picture Format set	0x3A
Picture-in-picture	0x3C
PIP source	0x84
Audio parameters get	0x43
Audio parameters set	0x42
Volume get	0x45
Volume set	0x44
Miscellaneous info	0x0F
Smart power	0xDD
Video alignment	0x70
Auto Adjust	0x70
Image Flip Get	0x2B
Image Flip Set	0x2A
Temperature Get	0x2F
Tiling Get	0x23
Tiling Set	0x22

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- Compatibility Test
- 3rd Party HDMI/PC Test: TBD

10.5 Design quality and reliability review and validation procedure

These are activities that should be executed by Supplier and MMD group per product creating process. Supplier must provide whole quality and reliability testing and evaluation report to DQE. DQE will be responsible for reviewing the design quality and reliability report with verification and validation.

10.5.1 There are design quality and reliability reviews for each product respectively

The design quality and reliability review is required whenever a new product is starting to be created from supplier in either electrical or mechanical parts.
During design and evaluation phase, detailed design quality and reliability reviews are required from EVT stage to DVT and PVT stage respectively.

10.5.2 Quality and Reliability evaluation and testing report

Supplier should provide product quality and reliability evaluation and testing report in each product developing milestone to DQE for review. This is not limited to three times. Intensive and comprehensive design reviews are recommended whenever required.

10.5.3 General Review Procedure

1) Review DQE pending items of previous review meetings.
2) Check the current status of all tests and evaluations which should be done and provided by supplier before the meeting.
3) Discuss the design quality and reliability by means of circuit walk through, assembly and disassembly and assess the potential risks.
4) List down suggestions /attention points /remaining problems and action plan. (Or countermeasure).

10.5.4 Design quality and reliability review validation items (Supported by test data or report from supplier)

a) Electrical items
   - Electrical functions /performances
   - Software for user interface
   - Thermal behavior
   - Design critical parameter
   - Design quality and reliability

b) Mechanical items
   - Mechanical functions /performance
   - Design for assembly/disassembly
   - Design critical parameter
   - Design quality and reliability

10.5.5 DQE Report

The DQE report will issue the design quality and reliability review and verification reports to project team and keep the reports traceable.

10.6 Design quality review and validation evaluation process

DQE will performs review and validation on the reports and activities of design quality and reliability evaluation in product creation process, which is performed by supplier. If necessary, supplier needs to provide third party verification and certification report. The third party must be approved by MMD.

10.7 Design change review and confirmation

All design changes after product release shall follow the engineering change notes (ECN) procedures. Before Product release that all design changes follow design quality and reliability review procedure 1.5.4. For design quality improvement and lesson learnt of product creation experiences, the Deliverables list will be updated with these new experiences.

General Product Specification

10.8 Design quality improvement

10.8.1 Customer complaints

10.8.2 Field Call Rate

10.8.3 Analyze root cause & Work out solution

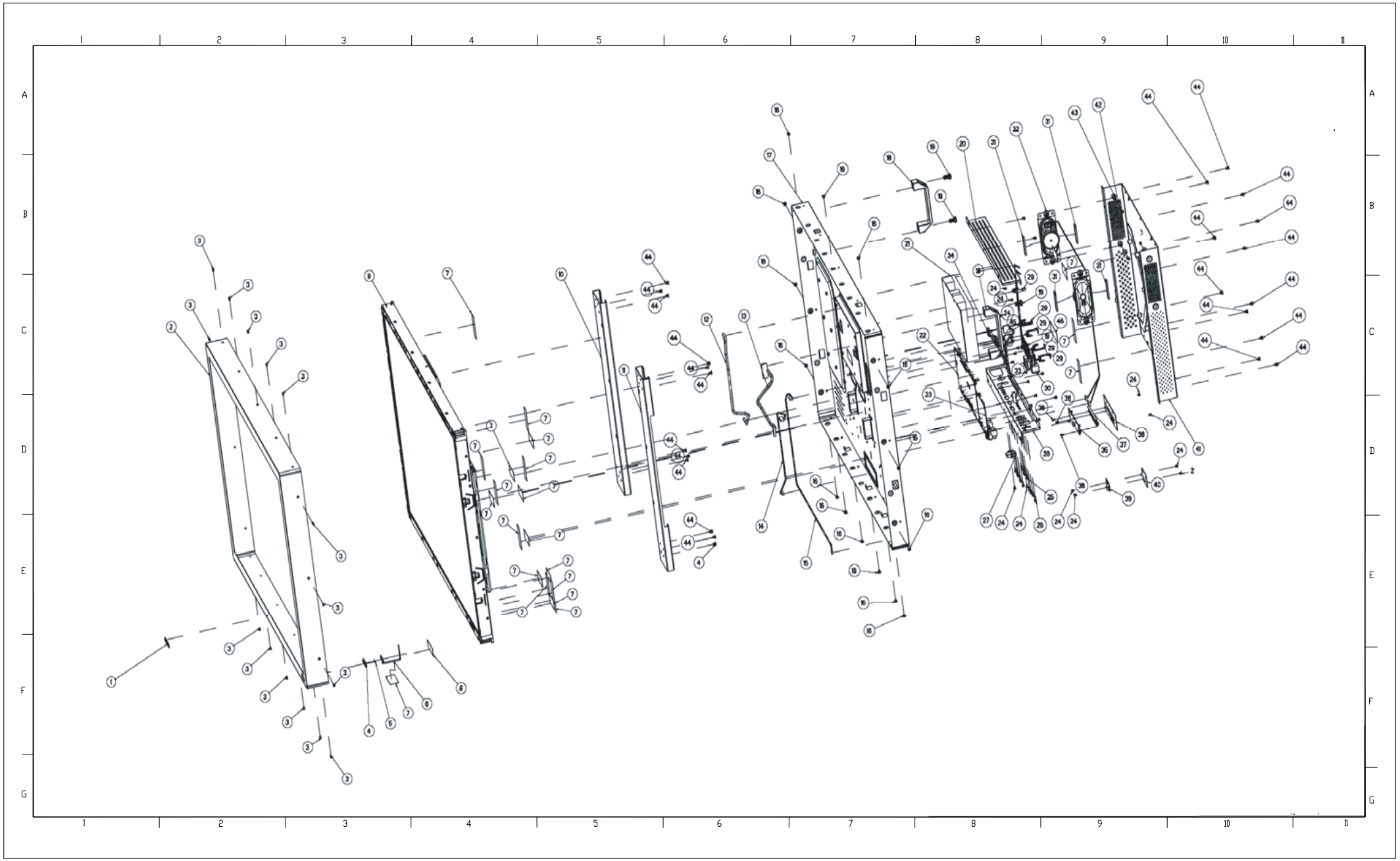
10.8.4 Verify solution effectiveness

10.8.5 Review issue technical report

10.8.6 Verification of ECN

10.8.7 Update the deliverables list

Exploded View-BDL4230E



Spare / Recommended parts list

◎ **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		BDL4230E/00 (AUS/EU)	BDL4230E/00 (China)
				0LU	0LC
location	Description	PCM code	Philips 12NC	LPL	LPL
22	MAIN (I/F) BOARD ASS'Y	9B.12W01.001		V	V
21	POWER BOARD ASS'Y	5D.0RC07.001		V	V
35	ASSY Key BD WITH CABLE	9B.0VE02.QBU		V	V
23	PCBA Audio BD	9B.0WF02.001		V	V
6	PCBA IR BD	9B.0WF03.011		V	V
39	PCBA Transfer BD	9B.0WF04.011		V	V
9	LCDM42W LC420WUN-SBA1/LGD	5F.MLPLP.011		V	V
12	LVDS Cable	5K.12W01.001		V	V

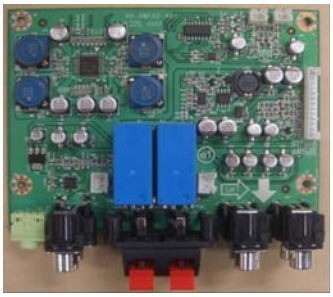
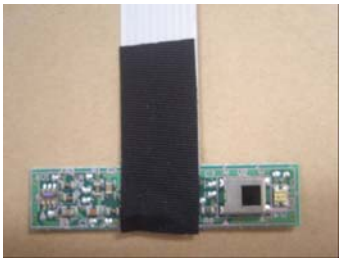
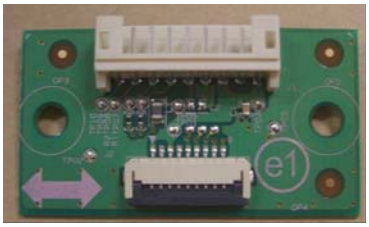
Mechanical Styling		Model		BDL4230E/00 (AUS/EU)	BDL4230E/00 (China)
location	Description	PCM code	Philips 12NC	LPL	LPL
2	FRONT BEZEL ASS'Y	3K.12W01.001		V	V
17	REAR COVER ASS'Y	3K.12W02.001		V	V
10	Bracket_R SPK	3K.12W03.001		V	V
11	Bracket_L	3K.12W04.001		V	V
38	Bracket_KEYPAD	3K.12W05.001		V	V
40	Bracket_DUMMY BD	3K.12W06.001		V	V
28	Bracket_I/O	3K.12W07.001		V	V
20	Bracket_TOP	3K.12W08.001		V	V
41	Bracket_VESA	3K.12W09.001		V	V
27	COVER_SWITCH	3D.0WF02.001		V	
37	BUTTON KEY	4B.0VE01.001		V	V
4	IR LENS	4B.12W01.001		V	V
18	HANDLE	4B.0RC05.001		V	V
1	LOGO	4K.0WF01.001		V	V
32	SPK*2	2C.40WF0.001		V	V

Packing Styling		Model		BDL4230E/00 (AUS/EU)	BDL4230E/00 (China)
location	Description	PCM code	Philips 12NC	LPL	LPL
100	CUSHION TOP LEFT	4G.12W01.001		V	V
101	CUSHION TOP RIGHT	4G.12W02.001		V	V
111	CUSHION BOTTOM LEFT	4G.12W04.001		V	V
110	CUSHION BOTTOM RIGHT	4G.12W03.001		V	V
120	CARTON TOP	4D.12W01.001		V	V
121	CARTON BOTTOM	4D.0RC05.001		V	V

Accessory Styling		Model		BDL4230E/00 (AUS/EU)	BDL4230E/00 (China)
location	Description	PCM code	Philips 12NC	LPL	LPL
122	ACCESSORY BOX	4D.0WF03.001		V	V
~~200~~	~~QSG PHILIPS BDL4230E~~	~~4J.0WF01.001~~		~~V~~	~~V~~
200	QSG PHILIPS BDL4230E	4J.12W01.002		V	V
~~210~~	~~CD PHILIPS BDL4230E~~	~~5B.12W01.001~~		~~V~~	~~V~~
210	CD PHILIPS BDL4230E	5B.12W01.002		V	V
48	REMOTE CONTROL	TY.5F010.003		V	V
49	ASSY PLUG*3 BNC-RCA ADT	TY.6E010.008		V	V
53	ASSY PLUG*2 RCA-BNC ADT	6E.12W01.001		V	V
50	Signal Cable	5K.L2H06.501		V	V
47	CORD H05VV-F 10A250V EUR 1.8M	2G.00921.001		V	V
47	CORD SVT125V WO/SH US 1.8M	2G.01111.001		V	V
47	CORD H05VV-F 13A 1.8M UK	2G.03149.021		V	V
47	CORD RVV 250V 1.8M BLK CHINA	2G.04245.001		V	V
51	Service Tool-Cable-VOARD (CABLE USB 2.0A/B B-P	5K.L1E03.501		V	V
52	Service Tool-Board-VOARD (PCBA JIG BD MI WP42S	5E.0RC38.001		V	V

Critical components		Model		BDL4230E/00 (AUS/EU)	BDL4230E/00 (China)	
Location	Description	PCM code	Philips 12NC	LPL	LPL	Remark
U30	IC CTRL PW328B-30L HSBGA 548P	7A.00328.C0U		V	V	Image processor , video decoder
U87	IC CTRL 6702F-SG161WT SON-16P	7A.06702.001		V	V	IC controller ,/ system power control
U25	IC HDMI SIL9125CTU TQFP 144P	7A.09125.00G		V	V	HDMI receiver
U24	IC HDMI SII9185ACTU TQFP 80P	7A.09185.00E		V	V	HDMI switch
U11,U15,U16,U4	#IC EEPROM AT24C02BN-SH-T SON8	7B.02402.C01		V	V	EEPROM/ EDID
~~U36,U37~~	~~IC DDR SDRAM M13S128168A-5TG~~	~~7B.12816.009~~		~~V~~	~~V~~	~~SDRAM~~
U36,U37	IC DDR SDRAM M13S128168A-5TG2T	7B.12816.B09		V	V	SDRAM
U32	IC FLASH MX29LV160DBTI-70G 48P	7B.29160.L39		V	V	Flash Ram /Firmware code storage
U6,U7	IC CMOS 74AHCT1G125GW SOT-353	7C.74125.0JH		V	V	Buffer IC
U34	IC RESET G690L293T71F SOT-23	7D.00690.B3B		V	V	Reset IC / System reset
U35	IC CLOCK ISL1208IU8Z MSOP 8P	7D.01208.0CW		V	V	RTC clock

Panel & PCBA photos

ITEM	PCM	Philips 12NC	Description	Photo
1	5F.MLPLP.011		LCDM42W LC420WUN-SBA1/LGD	
2	5D.0RC07.001		PCBA PWR BD 300W UP3003-01G	
3	9B.12W01.001		SKD PCBA MAIN BD EP42SF2	
4	9B.0VE02.QBU		SKD ASSY KEY BD WP08SF0	
5	9B.0WF02.001		SKD PCBA AUDIO BD EP65SF0	
6	9B.0WF03.011		SKD PCBA IR BD EP65SF0	
7	9B.0WF04.011		SKD TRANSFER BD EP65SF0	

Repair Tips

0. Warning

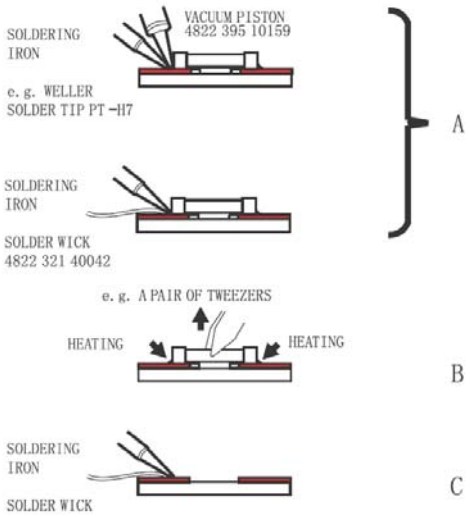
All ICs and many other semi -conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically . When repairing, make sure that you are connected with the same potential as the mass of the unit via a wrist wrap with resistance. Keep components and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

1. Servicing of SMDs (Surface Mounted Devices)

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

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

Fig. 1 DISMOUNTING



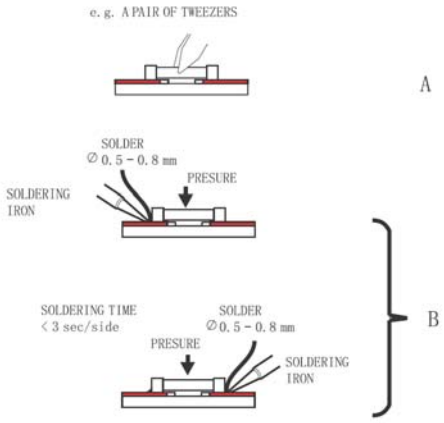
While holding the SMD with a pair of tweezers, take it off gently using the soldering iron's heat applied to each terminal (see Fig. 1 B).
- Remove the excess solder on the solder lands by means of litz wire or a solder sucker (see Fig. 1C).

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

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

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

Fig. 2 MOUNTING



2. Caution when attaching SMDs

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

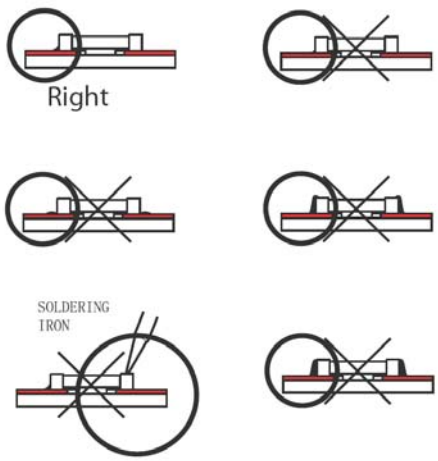


Fig.3 Examples

Repair Tips

3. Lead-free product identification

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

4. Lead-free product repair instruction

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

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

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

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

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

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

5. Rework on BGA (Ball Grid Array) ICs

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

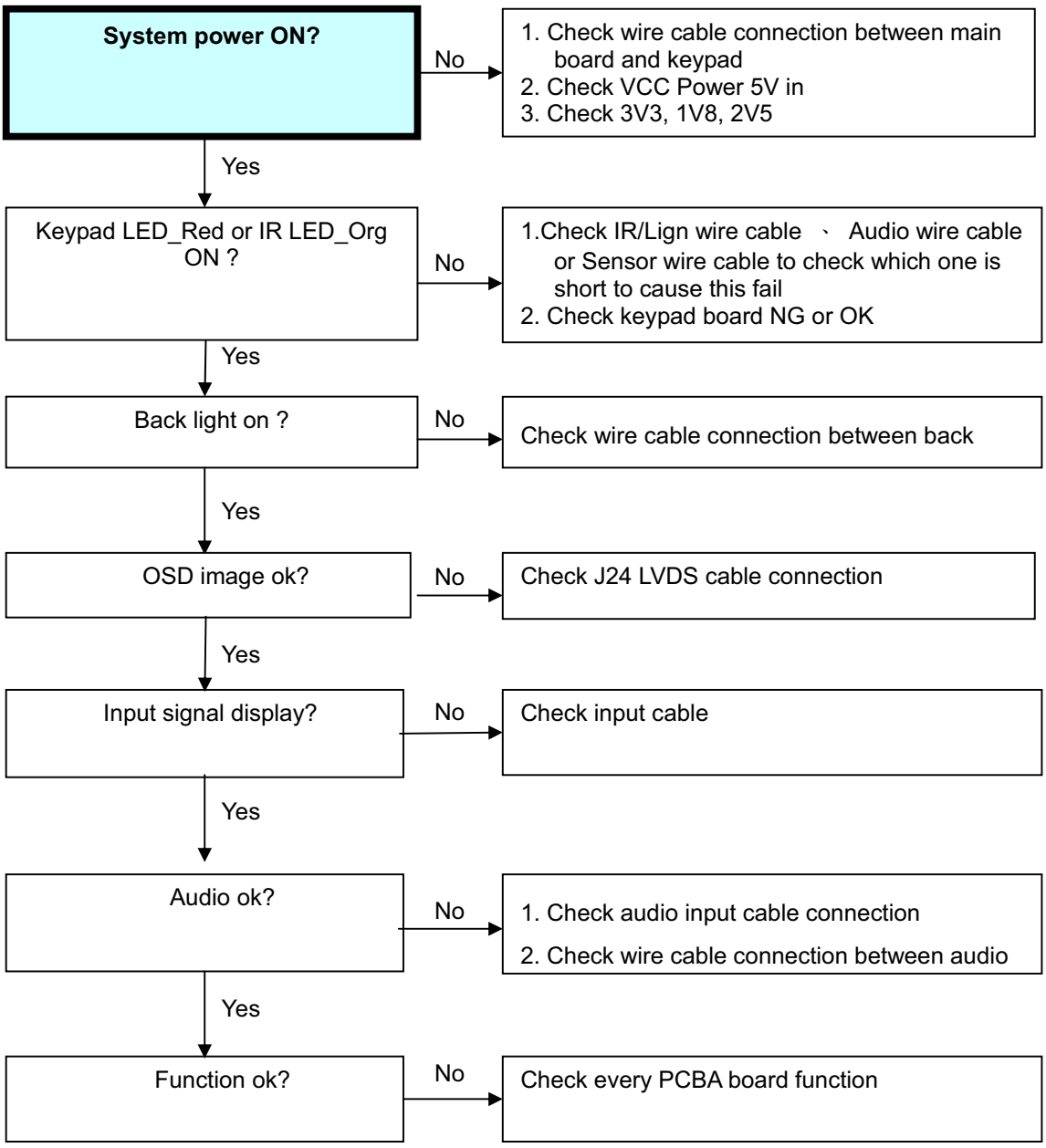
Device Removal
As is the case with any component that, it is essential when removing an (LF) BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform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

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

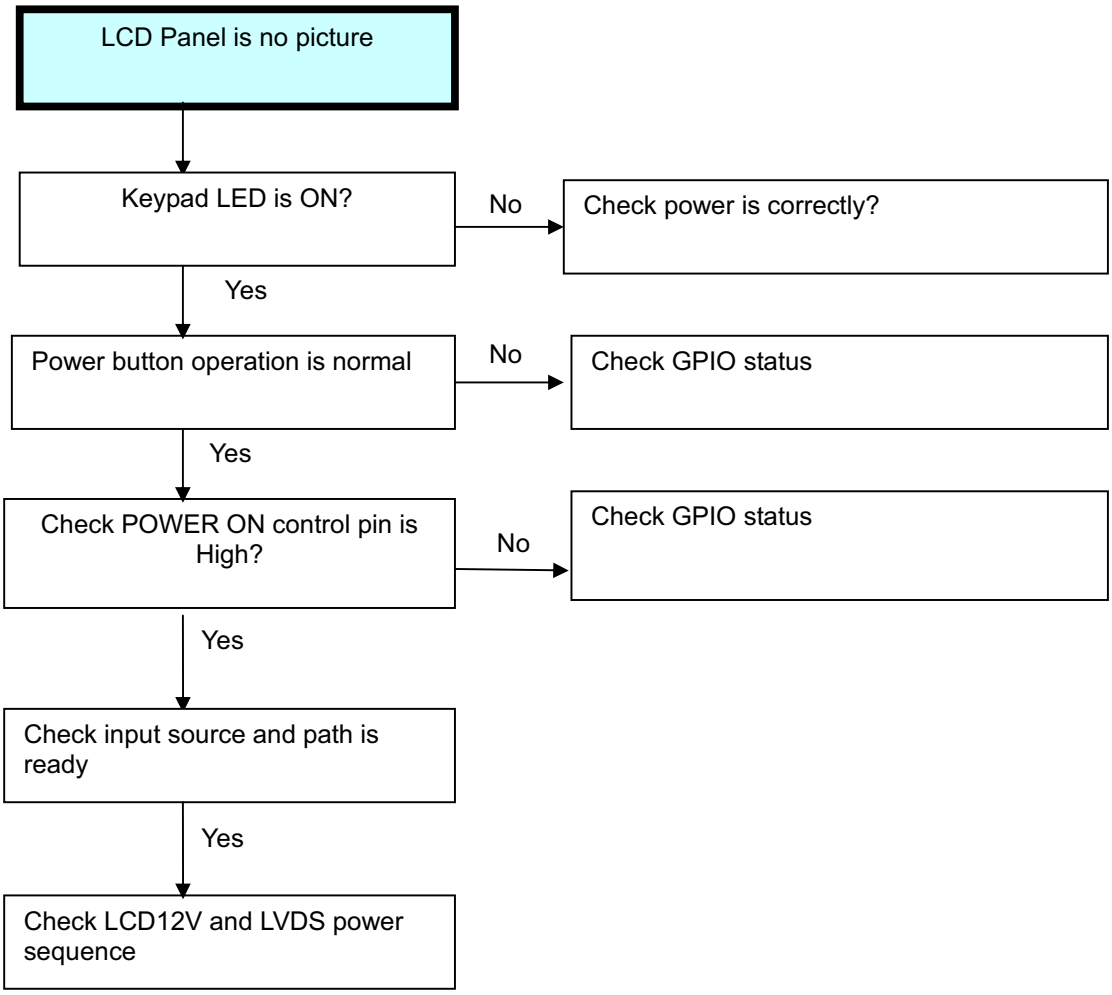
Device Replacement
The last step in the repair process is to solder the new component on the board. Ideally, the (LF) BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers. To reflow the solder , apply a temperature profile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

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

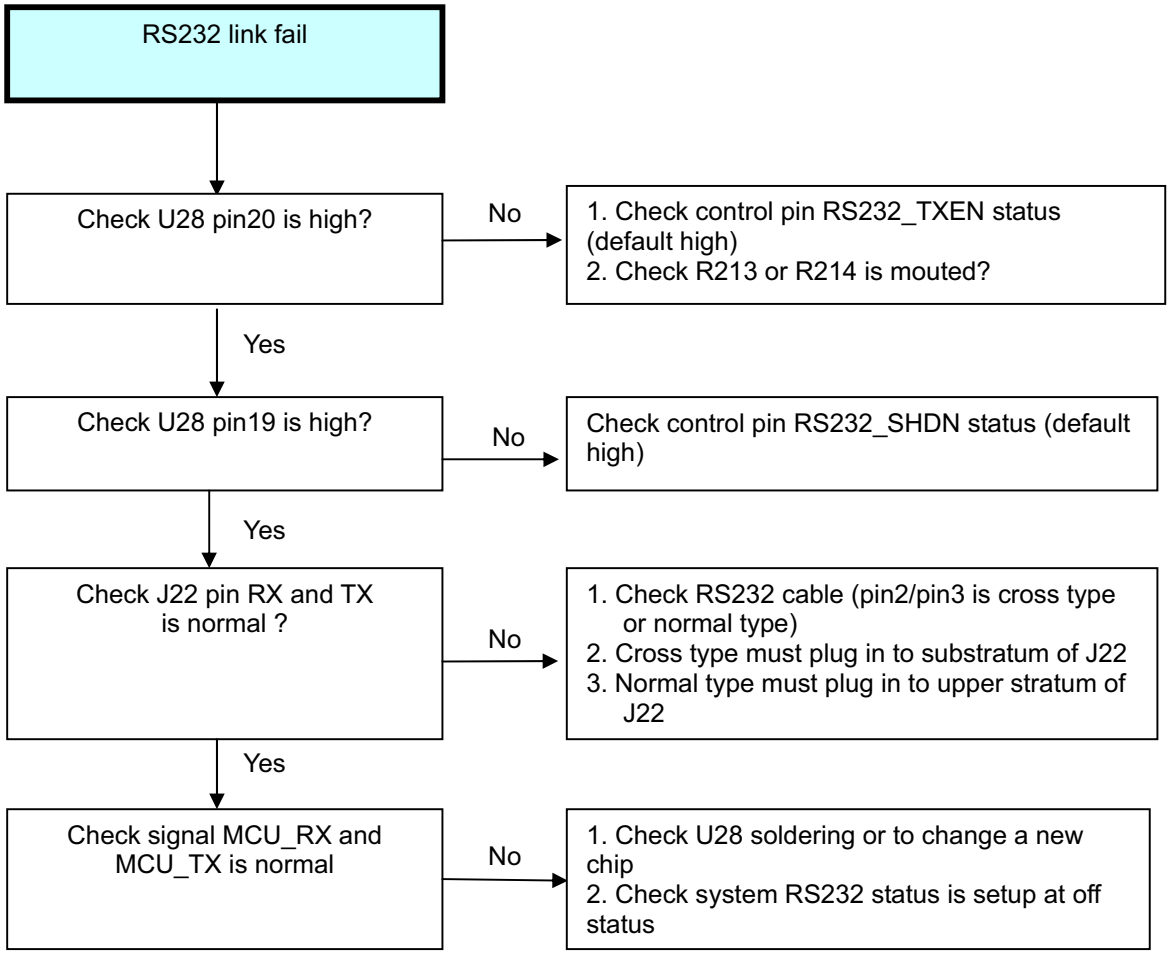
Repair Flow Chart



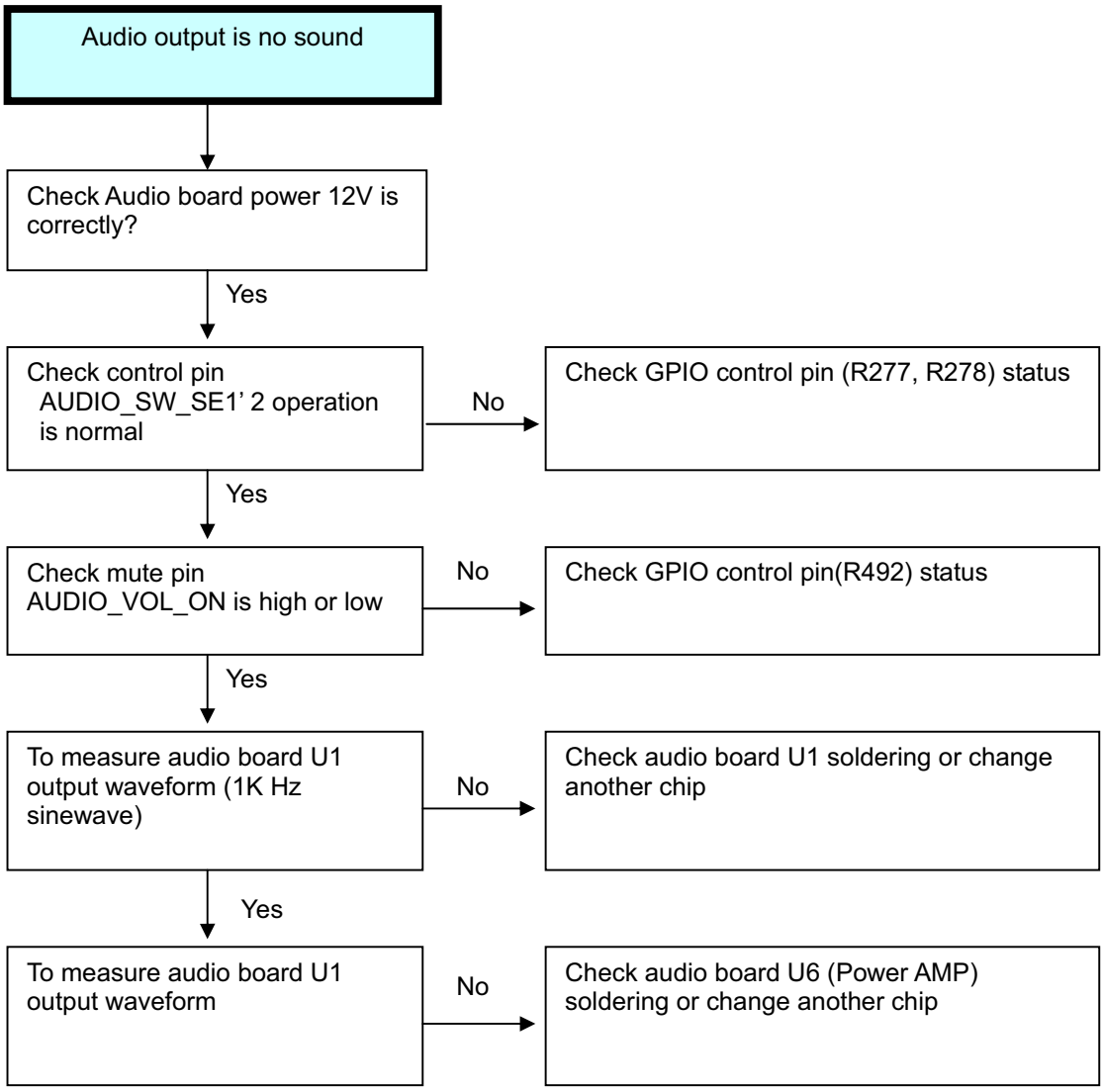
Repair Flow Chart



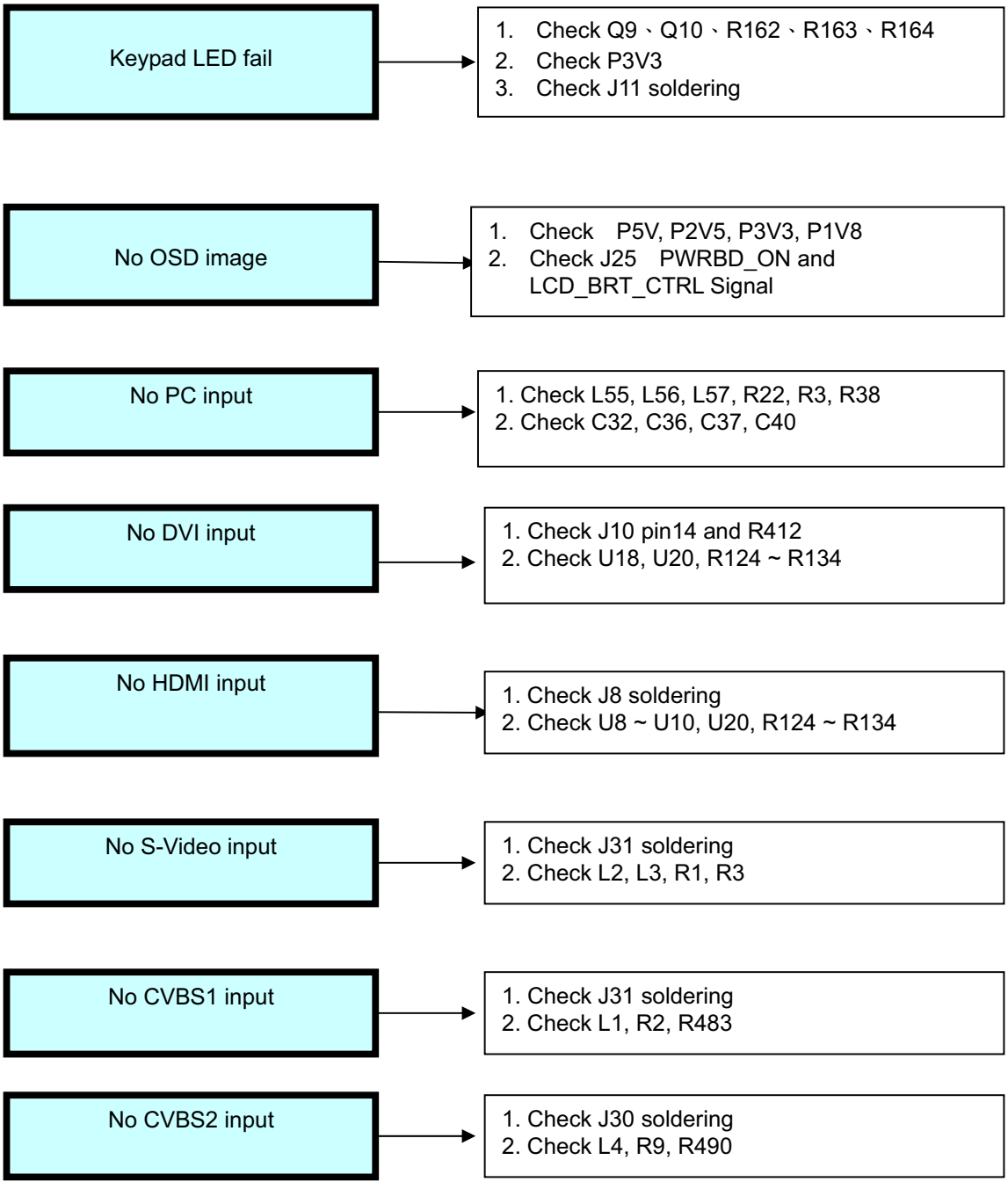
Repair Flow Chart



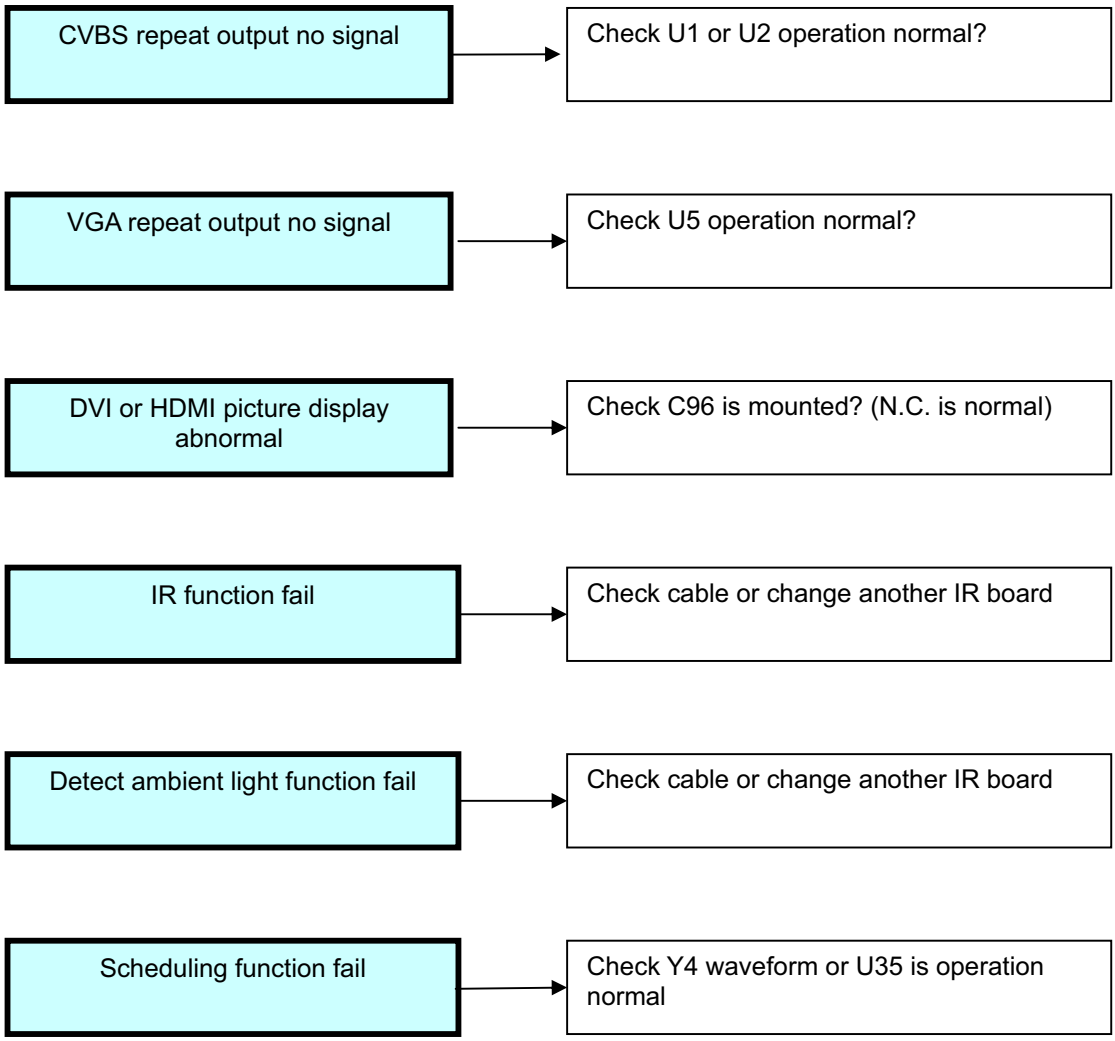
Repair Flow Chart



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

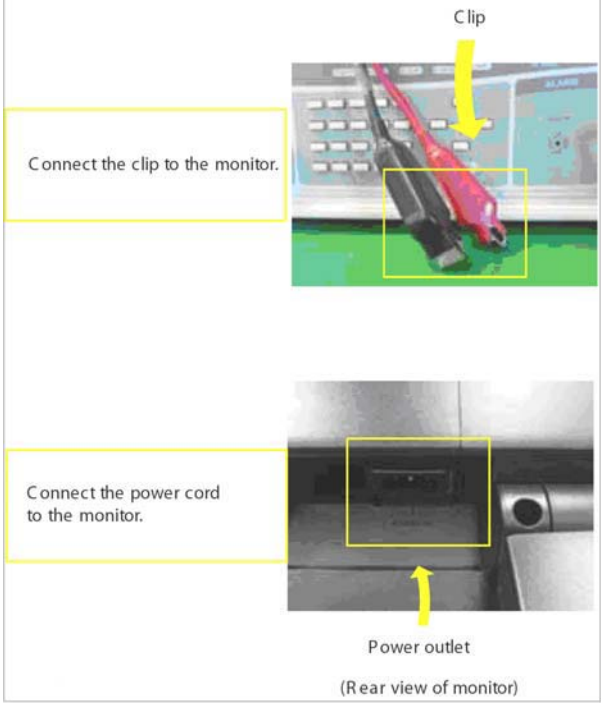
Condition	Hi-Pot Test for products where the mains input is 220V AC	Hi-Pot Test for products where the mains input is 110V AC	Ground Continuity Test requirement
Test voltage	2820VDC (2000VAC)	1700VDC (1200VAC)	Test current: 25A, AC Test time: 3 seconds Resistance required: <=0.09+Rohm, R is the resistance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

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

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

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

(Zentech 9032 tester)



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