Liquid crystal display

Chassis: **WDQ2**

Model: **S23A750D**

S27A750D

Service Manual

Thin film liquid crystal displays

S23A750D / S27A750D

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1. Precautions

1-1. Safety Precautions

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock.

1-1-1. Warnings

⚠ Warning

1. For continued safety, do not attempt to modify the circuit board.
2. Disconnect the AC power and DC power jack before servicing.

1-1-2. Servicing the LCD TV Monitor

1. When servicing the LCD TV Monitor, disconnect the AC line cord from the AC outlet.
2. It is essential that service technicians have an accurate voltage meter available at all times. Check the calibration of this meter periodically.

1-1-3. Fire and Shock Hazard

Before returning the monitor to the user, perform the following safety checks:

1. Inspect each lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the monitor.
2. Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor/capacitor networks, mechanical insulators, etc.
3. Leakage Current Hot Check (Figure 1-1):

⚠ Warning

Do not use an isolation transformer during this test.
Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI C101.1, Leakage Current for Appliances), and Underwriters Laboratories (UL Publication UL1410, 59.7).

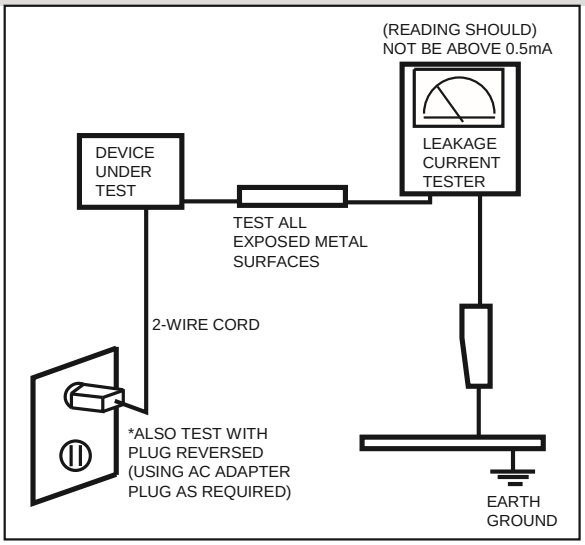


Figure 1-1. Leakage Current Test Circuit

4. With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: metal cabinets, screwheads and control shafts.
   The current measured should not exceed 0.5 milliamp.
   Reverse the power-plug prongs in the AC outlet and repeat the test.

1-1-4. Product Safety Notices

Some electrical and mechanical parts have special safetyrelated characteristics which are often not evident from visual inspection. The protection they give may not be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by ⚠ on schematics and parts lists. A substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

1-2. Servicing Precautions

⚠ Warning An electrolytic capacitor installed with the wrong polarity might explode.

⚠ Caution Before servicing units covered by this service manual, read and follow the Safety Precautions section of this manual.

Note: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions, always follow the safety precautions.

1-2-1 General Servicing Precautions

1. Always unplug the unit's AC power cord from the AC power source and disconnect the DC Power Jack before attempting to: (a) remove or reinstall any component or assembly, (b) disconnect PCB plugs or connectors, (c) connect a test component in parallel with an electrolytic capacitor.
2. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
3. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the area around the serviced part has not been damaged.
4. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
5. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500 V) to the blades of the AC plug.
   The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
6. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the positive lead; always remove the instrument's ground lead last.

1-3. Static Electricity Precautions

Some semiconductor (solid state) devices can be easily damaged by static electricity. Such components are commonly called Electrostatically Sensitive Devices (ESD). Examples of typical ESD are integrated circuits and some field-effect transistors. The following techniques will reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. To avoid a shock hazard, be sure to remove the wrist strap before applying power to the monitor.
2. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of an electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a grounded-tip soldering iron to solder or desolder ESDs.
5. Use only an anti-static solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

⚠Caution Be sure no power is applied to the chassis or circuit and observe all other safety precautions.

8. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting your foot from a carpeted floor can generate enough static electricity to damage an ESD.

1-4. Installation Precautions

1. For safety reasons, more than a people are required for carrying the product.
2. Keep the power cord away from any heat emitting devices, as a melted covering may cause fire or electric shock.
3. Do not place the product in areas with poor ventilation such as a bookshelf or closet. The increased internal temperature may cause fire.
4. Bend the external antenna cable when connecting it to the product. This is a measure to protect it from being exposed to moisture. Otherwise, it may cause a fire or electric shock.
5. Make sure to turn the power off and unplug the power cord from the outlet before repositioning the product. Also check the antenna cable or the external connectors if they are fully unplugged. Damage to the cord may cause fire or electric shock.
6. Keep the antenna far away from any high-voltage cables and install it firmly. Contact with the highvoltage cable or the antenna falling over may cause fire or electric shock.
7. When installing the product, leave enough space (10cm) between the product and the wall for ventilation purposes. A rise in temperature within the product may cause fire.

2. Product specifications

2-1. Feature & Specifications

Feature
□ Elegance Touch of Color Design □ Energy Saving □ Interactive Energy Saving (luminance/proximity sensor) □ Deeper Color expression with Dynamic Contrast Ratio □ High picture quality and advanced functions - FHD 120Hz 3D compatibility, 16:9 aspect ratio, high DCR, software optimized to Windows 7, low power consumption, and more

Specifications		
Item	**Description**	
Model	**S23A750D**	**S27A750D**
LCD Panel	TFT-LCD panel, RGB vertical stripe, normally white transmissive	
	23” Wide viewable 0.2655(H) x 0.2655(W) mm pixel pitch	27” Wide viewable 0.31125(H) x 0.31125(W) mm pixel pitch
Scanning Frequency	Horizontal: 24 kHz ~ 138 kHz / Vertical: 27 Hz ~ 120 Hz	
Display Colors	16.7 million color (Hi-FRC)	
Maximum resolution	Horizontal : 1920 pixels Vertical : 1080 pixels	
Brightness	250cd/m[1]	300cd/m[2]
Contrast	1000:1	
Dynamic Contrast Ratio	MEGA(Typ.)	
Supported Resolution	VGA ~ WSXGA+	
Input Signal	HDMI , DP Interface	
Input Sync Signal	Seperate H/V sync, Composite H/V, Sync-on-Green Level: TTL level	
Maximum Pixel Clock rate	300 MHz	

[1] -1

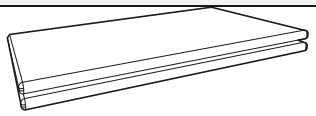
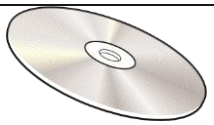
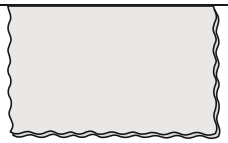
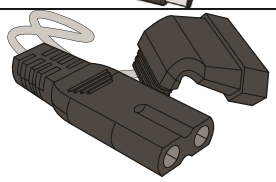
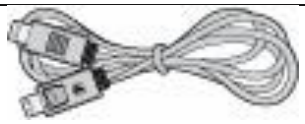
Active Display (Horizontal/Vertical)	509.76 (H) x 286.74 (V)	597.6 (H) x 336.15 (V)
AC power voltage & Frequency	AC 110 ~ 240V, 50 ~ 60 Hz	
Power Consumption	Typical 45 W / Max 48 W DPMS: Typical 1 watt / Max 1 watt	Typical 53 W / Max 56 W DPMS: Typical 1 watt / Max 1 watt
Dimensions Set (W x D x H)	543.4 x 404.5 x 191.1 mm (with Stand) 543.4 x 321.0 x 18.9 mm (without Stand)	631.2 x 453.9 x 191.1 mm (with Stand) 631.2 x 370.4 x 18.9 mm (without Stand)
Weight Set (After installation Stand)	5.2 Kg (without Stand) 7.6 Kg (with Stand)	4.5 Kg (without Stand) 7.0 Kg (with Stand)
Environmental Considerations	Operating Temperature: 10˚C ~ 50˚C(50˚F ~ 122˚F) Operating Humidity: 10% ~ 90% Storage Temperature: -20˚C ~ 45˚C(-4˚F ~ 113˚F) Storage Humidity: 5% ~ 90%	
Note: Designs and specifications are subject to change without prior notice.		

2. Product specifications

2-2. Spec Comparison to the Old Models

Model		[SA750] S23A750D / S27A750D	[CREAM] 2233RZ
Design			
Size		**23 "/27"**	22 "
Resolution		**1920 X 1080**	1680 X 1050
DCR		**MEGA**	20,000:1
IN/OUT	DP	**O**	X
	DVI-DL	**X**	O
	HDMI	**O**	X
	HP-OUT	**O**	X
3D Function	3D format compatible	**O**	X
	2D -> 3D	**O**	X
	3D game compatible (3D Driver)	**O**	o (Nvidia)
	PS3, X-Box, BD Player	**O**	X
	3D glasses type	**BT**	IR
Feature	HDCP	O	O
Panel		**LED**	LCD

2-3. Accessories

Product	Description	Code. No	Remark
	Safety Guide	BN68-03413A	Samsung Electronics Service center
	Warranty Card (Not available in all locations)	BH68-00344C	
	User Manual	BN68-03632B	
	Cleaning Cloth	BN63-02368B	
	Adapter	BN44-00461A	
	Power Cord	3903-000598	
	DP Cable	BN39-01501A	
	3D Glasses Assy	BN96-18236A	

3. Disassembly and reassembly

Repair manual this chapter describes the display disassembly and reassembly step.

Warning: This display contains electrostatic sensitive devices. Should use caution when handling these parts.

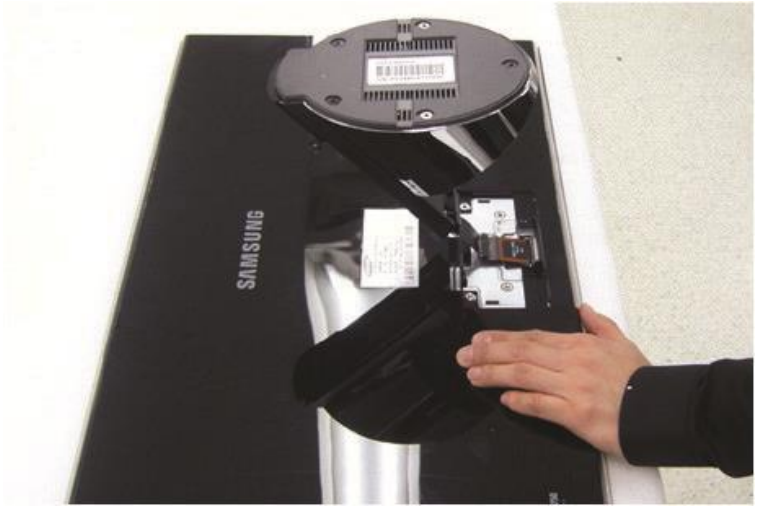
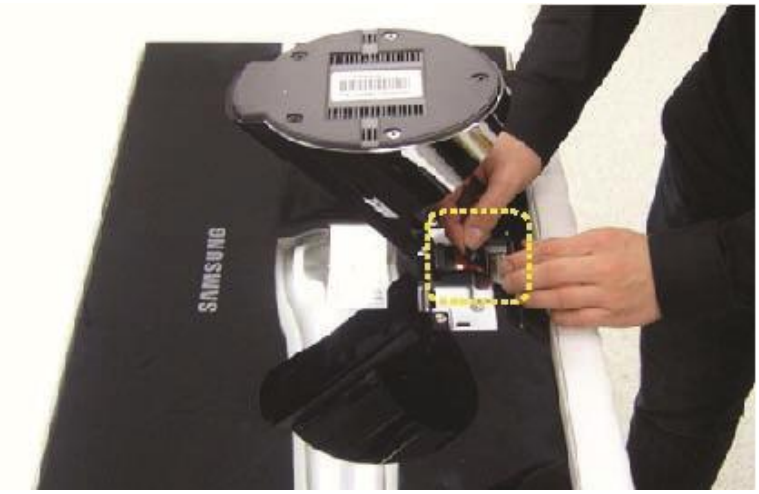
3-1. Disassembly

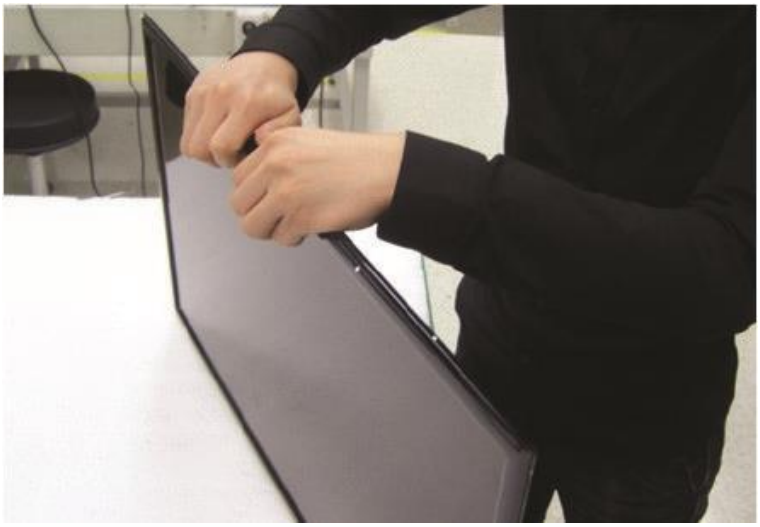
Be careful: 1. As before, please turn off the monitor.

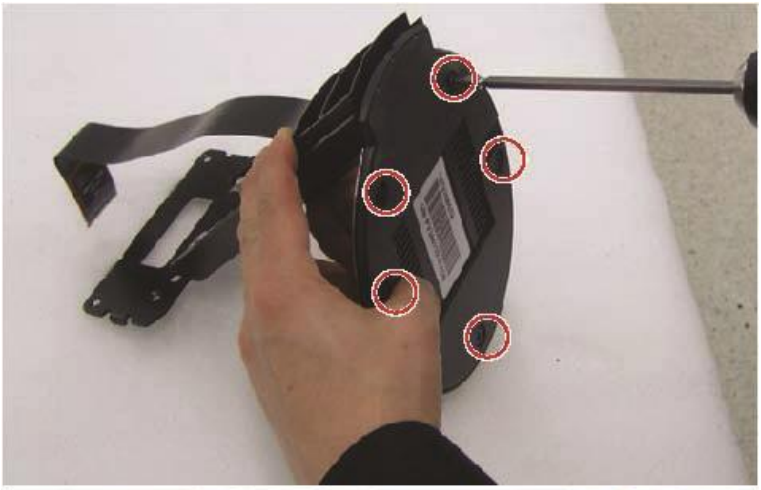
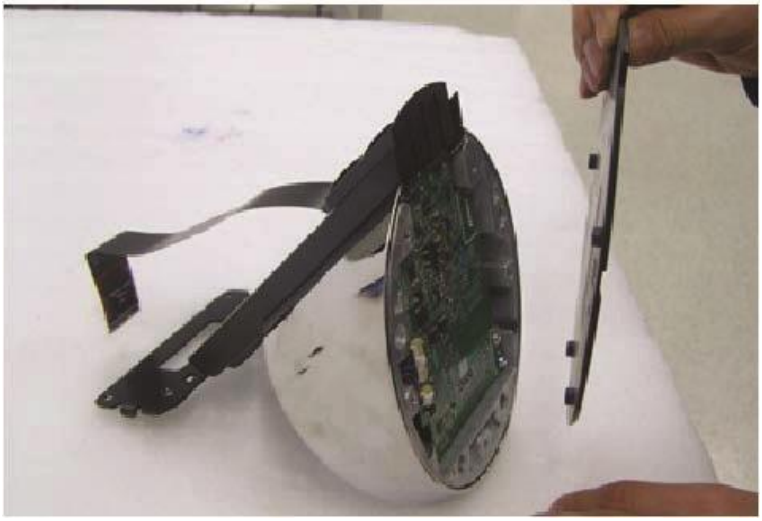
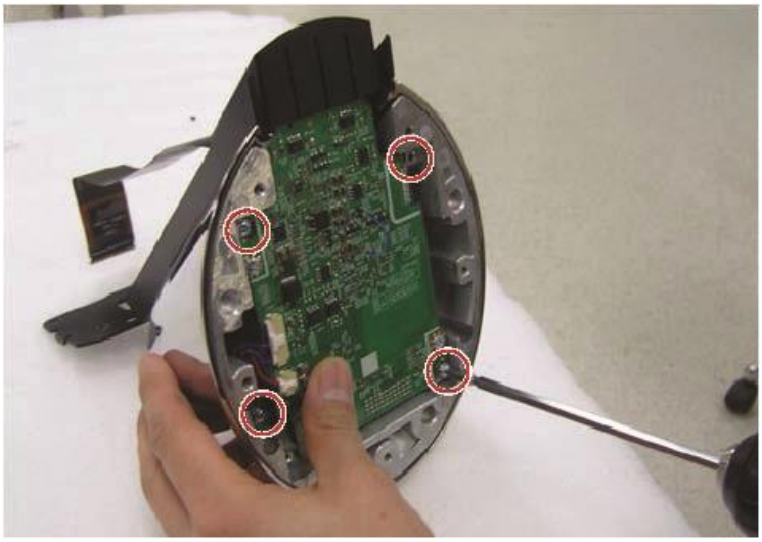
2.When removing the display, do not use the open metal tools other than the tools provided.

3.Please follow the steps below carefully remove the display.

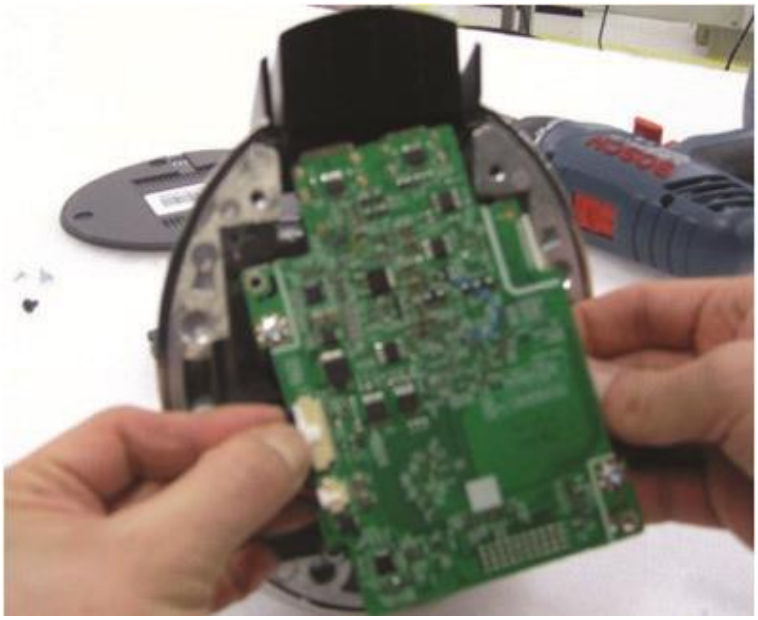
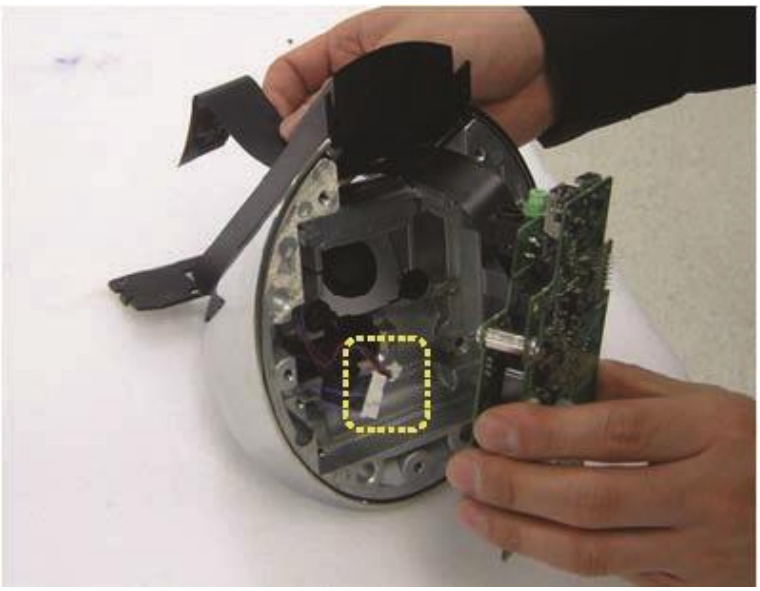
Introductions	Pictures
1. As shown and pull the arrow and remove the bottom cover at the back.	
2. According to diagram the arrows and pull the back cover and remove liner.	

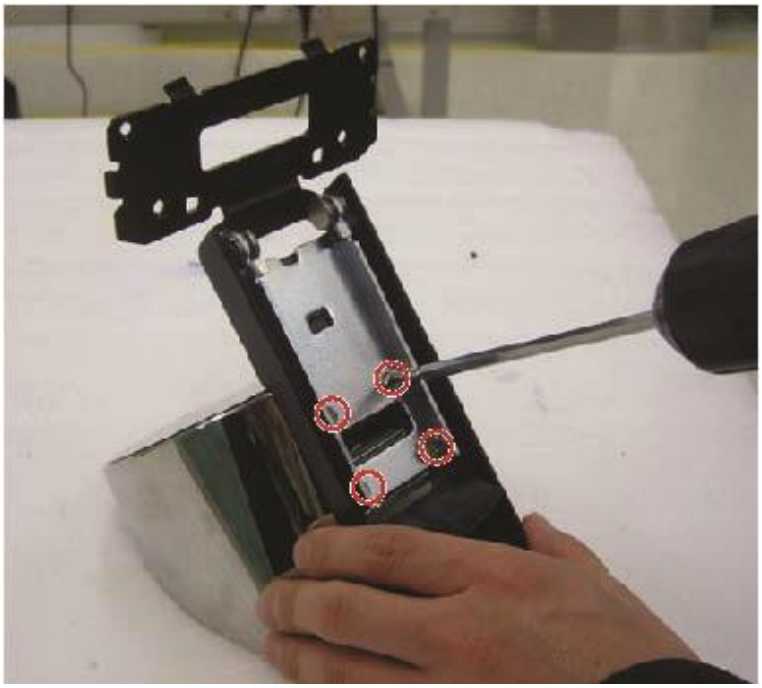
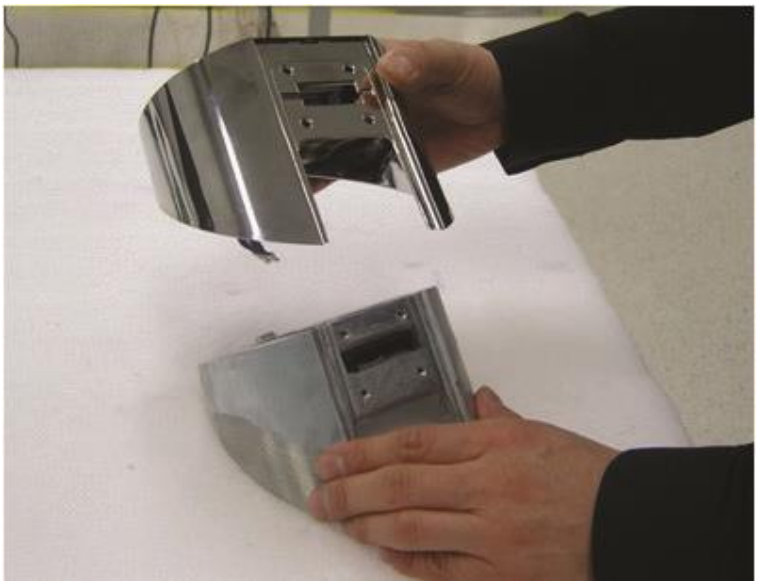
Introductions	Photo caption
3. Disassembly 4 A screw. Scre 6001-001114 4 个	
4. As backward tilt base as shown in the figure.	
5. Removal of the mark shown LVDS Wiring.	

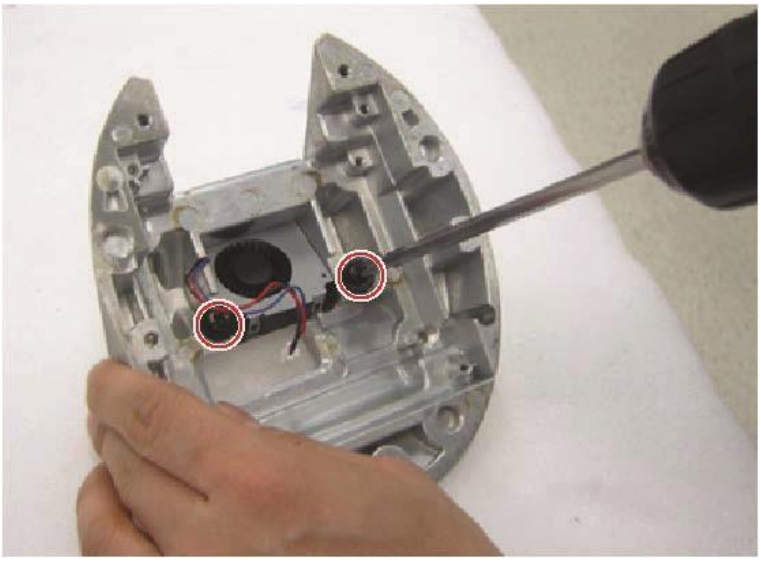
Introductions	Photo caption
6. Remove the front cover as shown in the figure.	
7. As shown in Figure remove rear cover.	

Introductions	Photo caption
8. Release 5 Screws and remove the base cover. Scre 6003-001785 5 个	 
9. Release 4 Screws, and remove the printed circuit board. Scre 6003-000264 4 个	

Introductions	Photo caption

10. As shown in diagram disassembly and fan hub.	
11. As shown in the figure and remove LVDS Wiring and printed circuit boards.	

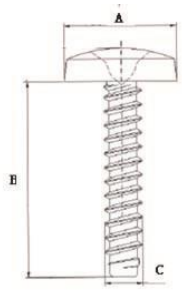
Introductions	Photo caption
12. Release 4 A screw, and remove the hinge at the neck and the base cover.  	
13. As shown in the figure, and remove it from the base frame the base Central cover.	

Introductions	Photo caption
14. Release 2 Screws, and remove the fan.  	

*Reassembly step and disassembly steps instead.

Screw size

Code number	A (mm)	B (mm)	C (mm)	The number of	
6001-001114	8	6	4	4 EA	
6003-000264	6	6	3	4 EA	
6003-001374	8	12	4	4 EA	
6006-001096	8	12	4	2 EA	
6003-001785	8	8	4	5 EA	



4 Troubleshooting

4-1. Troubleshooting

1. In front of the repair, set the custom mode as follows:

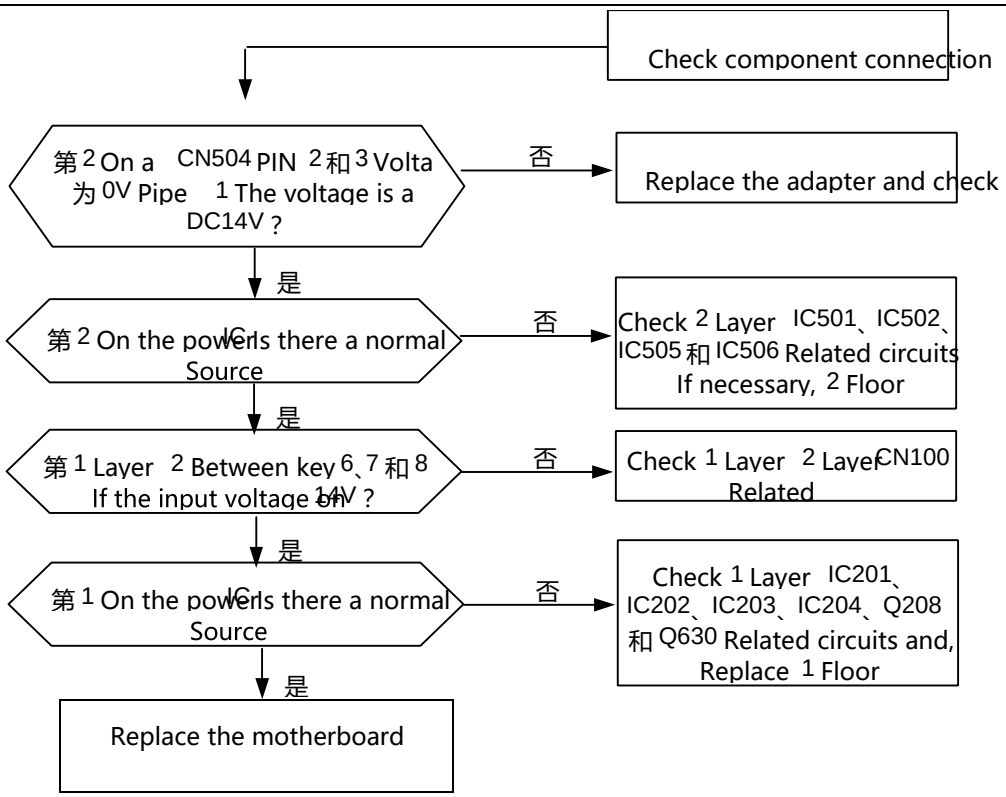
   - Resolution:1920×1080
   - Horizontal frequency:67.5 kHz
   - Vertical frequency:60 Hz

2. If no image appears, ensure that the power cables are properly connected.

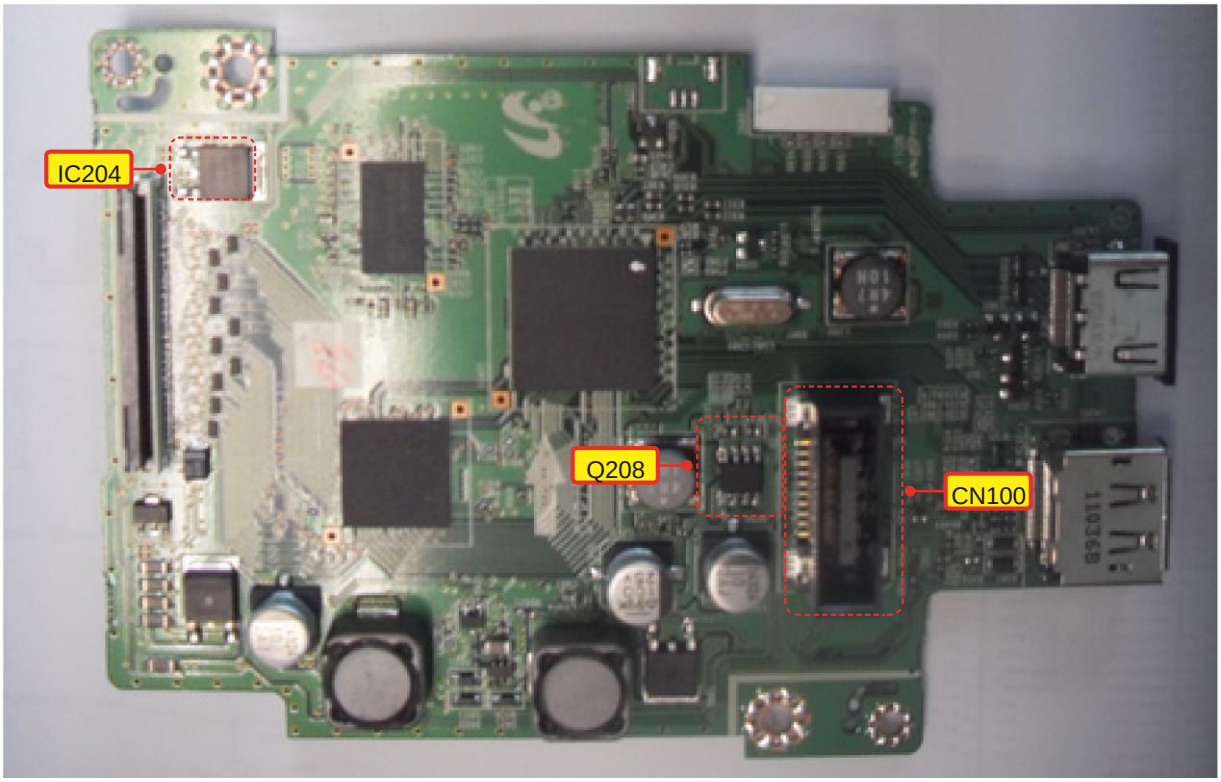
3. Check the following circuit:
   - If the screen is black: functional printed circuit board Assembly, printed circuit board assemblies
   - If LED Background lights not lit, despite LED Open: check LED Drive, 1 And 2 Connector between the layers and FPC LVDS Wiring
   - If W/R/G/B Test chart can display, although the background light is lit: check 60 针 FFC Wiring, 1 And 2 Connector between the layers and FPC LVDS Wiring

4. Press [Menu] Button and change the brightness and contrast 0, Then press and hold "↵ (Confirmation/Source)" Button for more than 5 Seconds, the display will automatically go to factory reset.

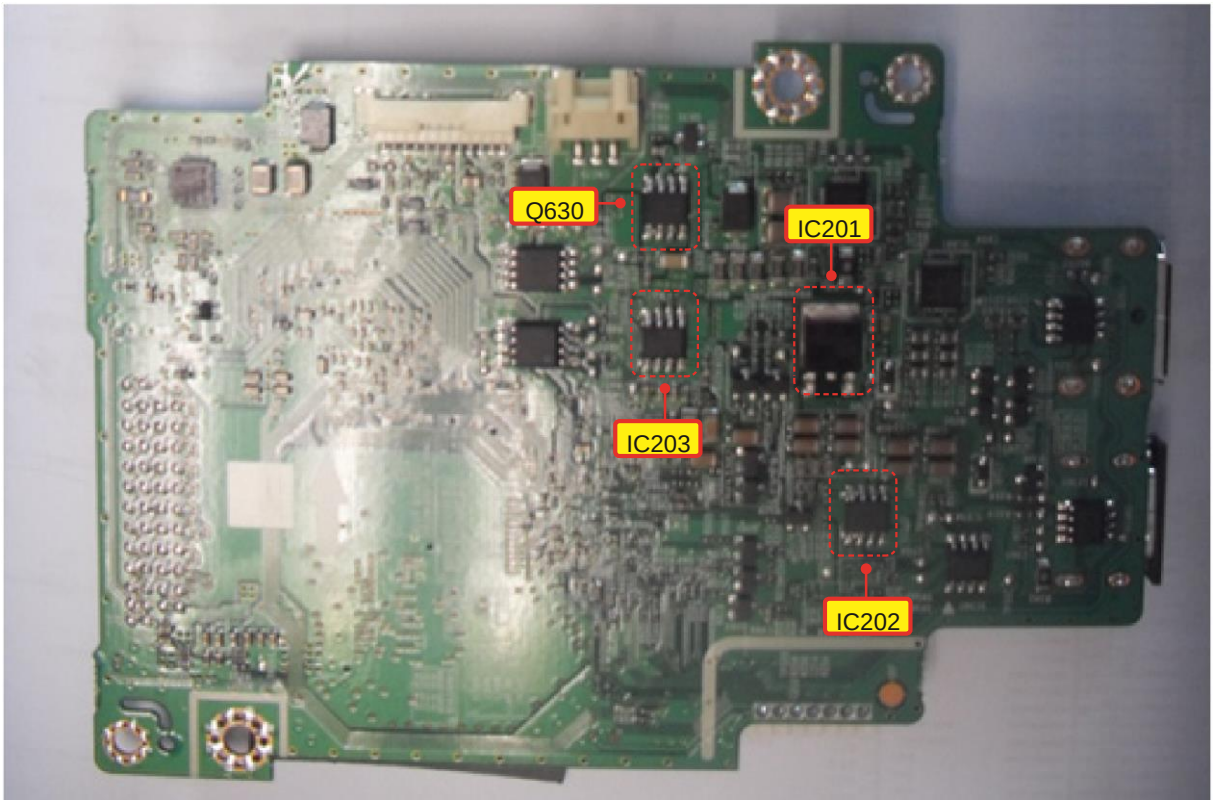
4-2 When the power supply is not available

Sign	-After connecting the power supply turn on the power button, the front of the monitor LED is not running.
Mainly a checkpoint	-Check the screens at the back of the monitor power switch is turned on. -Check whether the adapter and connector are connected correctly. -Check that the connector is properly connected to the 1 And 2 Between the layers.
Diagnosis	
Attention	Check the make sure to disconnect power before connecting the motherboard.

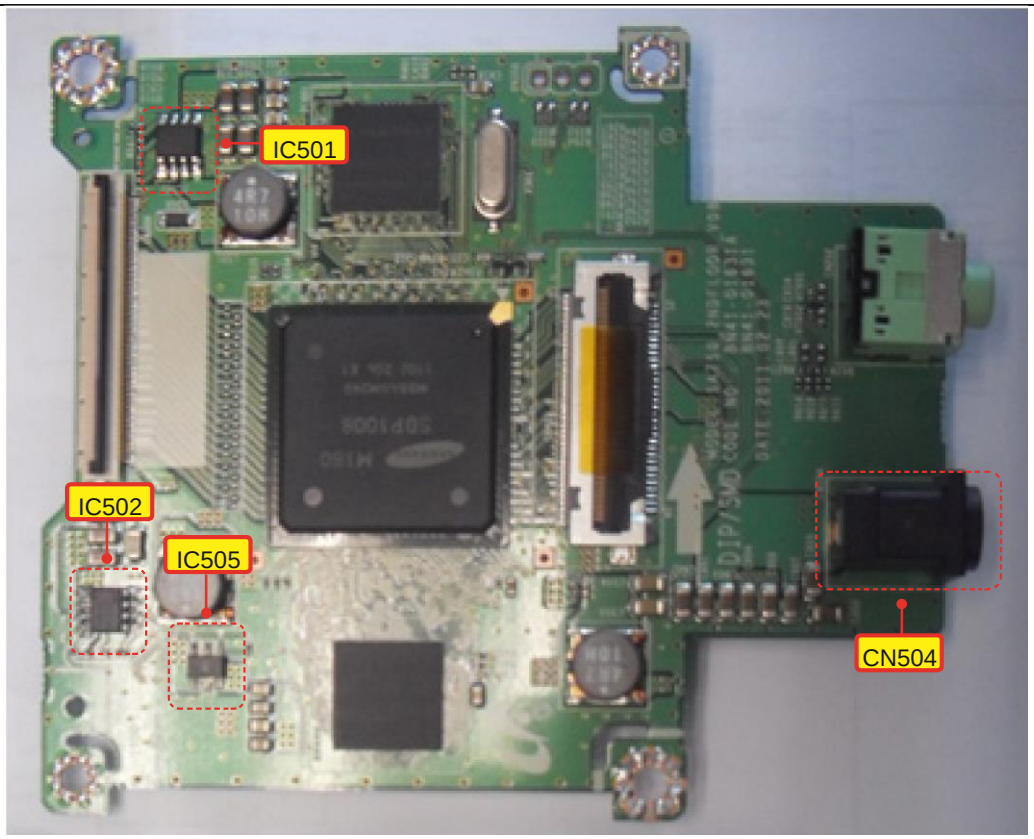
Main PBA – 1st Floor_Top



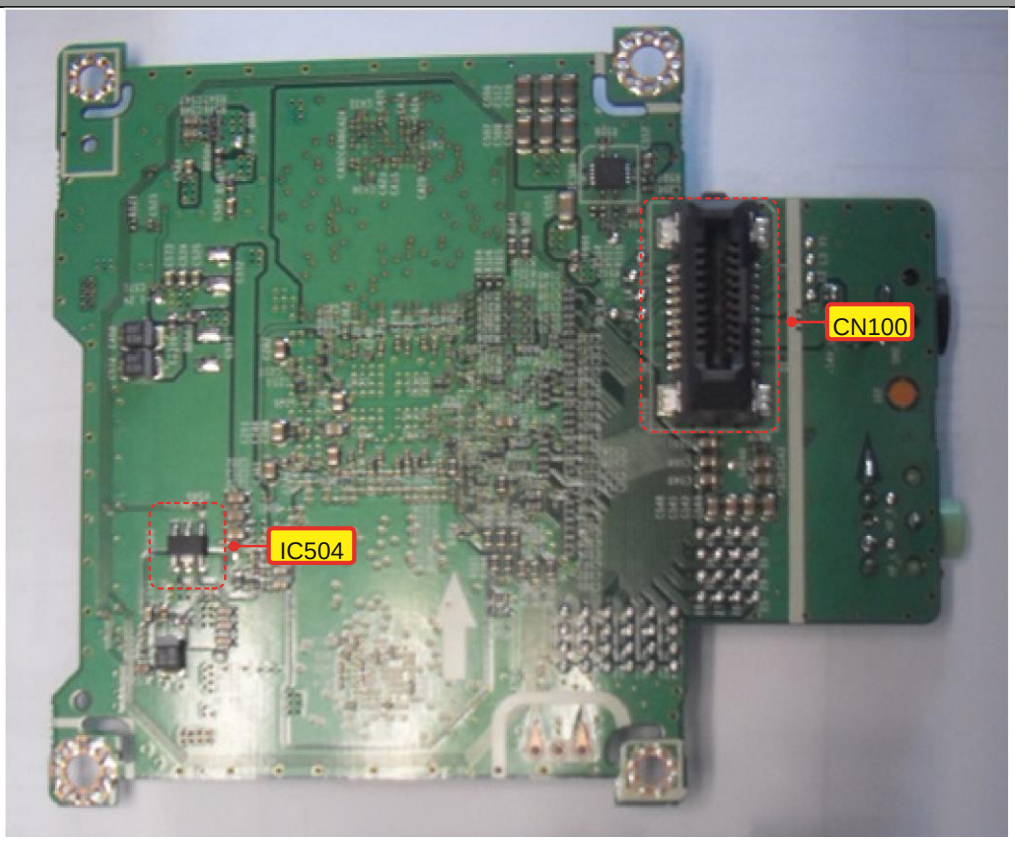
Main PBA – 1st Floor_Bottom



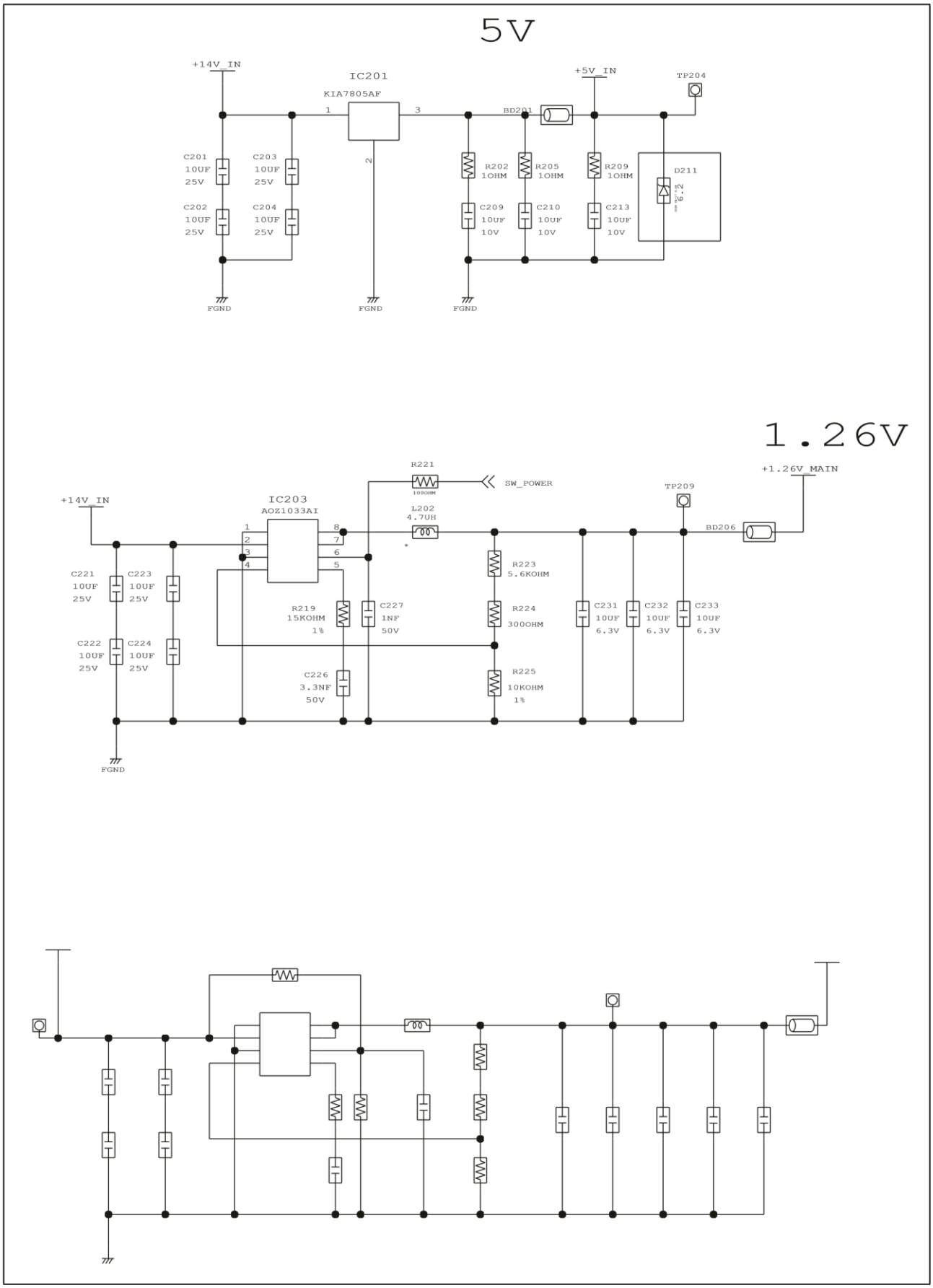
Main PBA – 2st Floor_Top



Main PBA – 2st Floor_Bottom



4-2-1 When power is not available in the circuit diagram (**1** Circuit)


5V
+14V_IN
IC201
KIA7805AF
1
3
2
+5V_IN
TP204
BD201
C201
10UF
25V
C203
10UF
25V
C202
10UF
25V
C204
10UF
25V
R202
1OHM
R205
1OHM
R209
1OHM
D211
C209
10UF
10V
C210
10UF
10V
C213
10UF
10V
FGND
FGND
FGND
1.26V
R221
100OHM
SW_POWER
+1.26V_MAIN
TP209
+14V_IN
IC203
AOZ1033AI
L202
4.7UH
BD206
C221
10UF
25V
C223
10UF
25V
C222
10UF
25V
C224
10UF
25V
R219
15KOHM
1%
C227
1NF
50V
C226
3.3NF
50V
R223
5.6KOHM
R224
300OHM
R225
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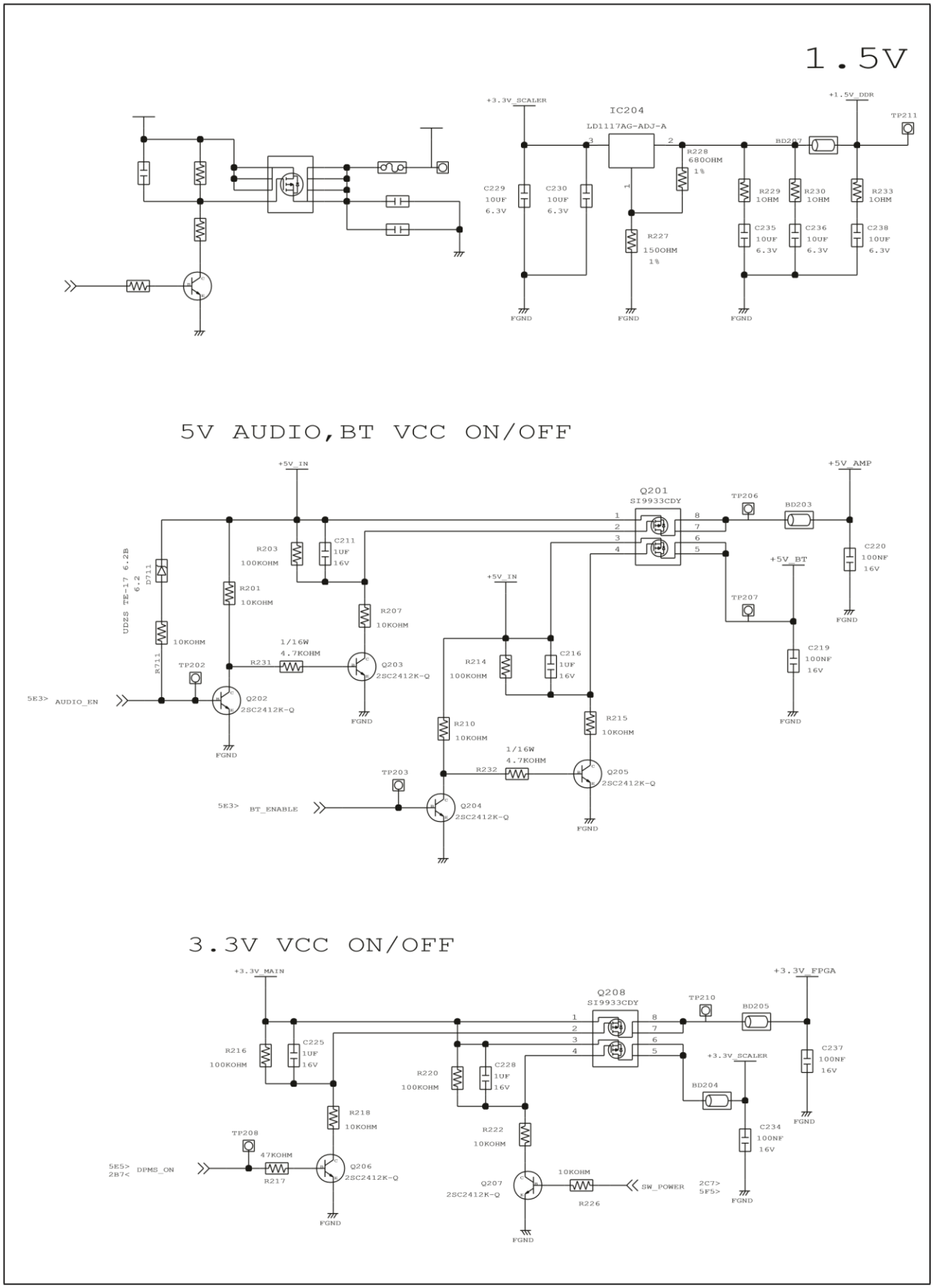
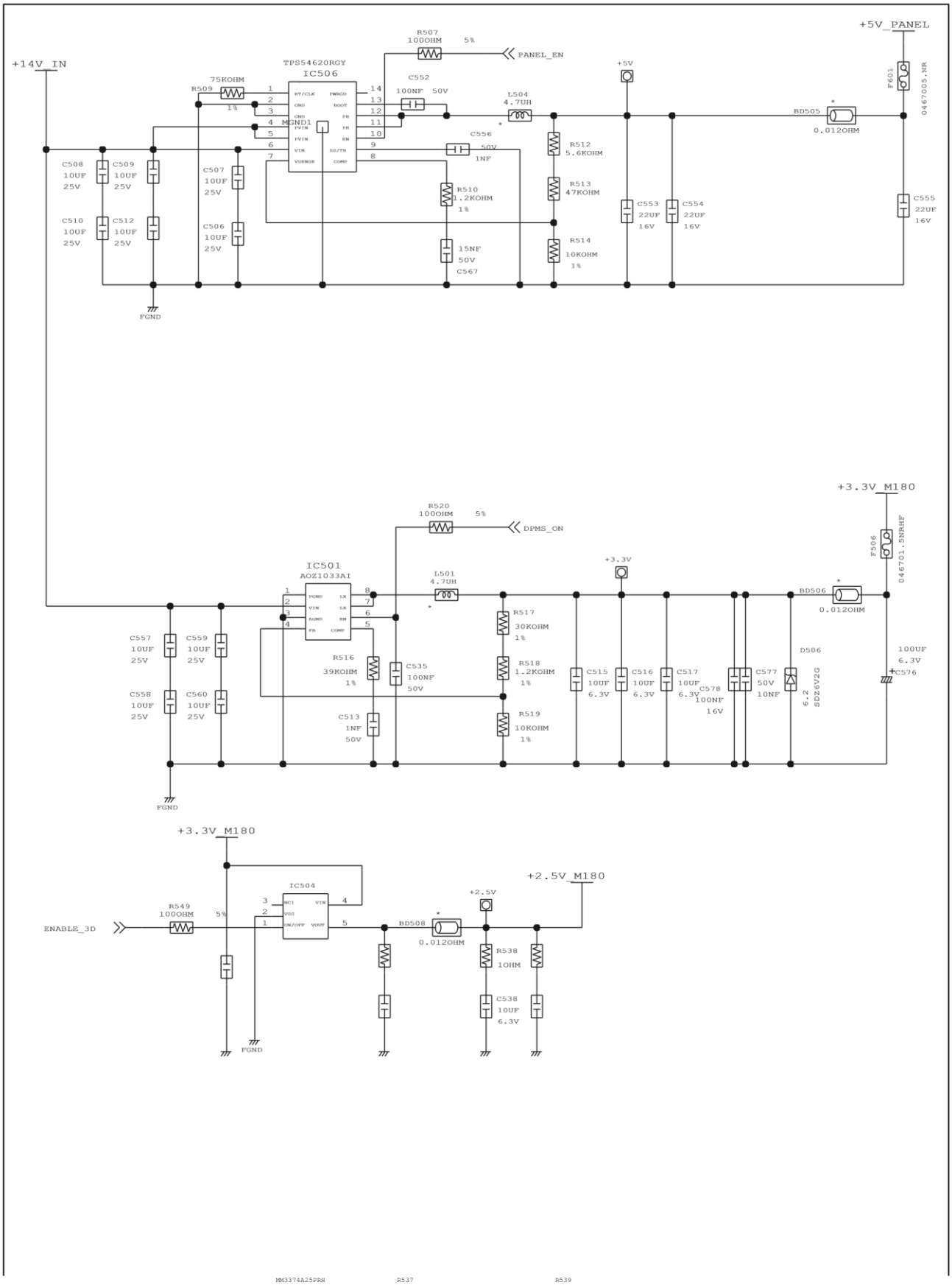
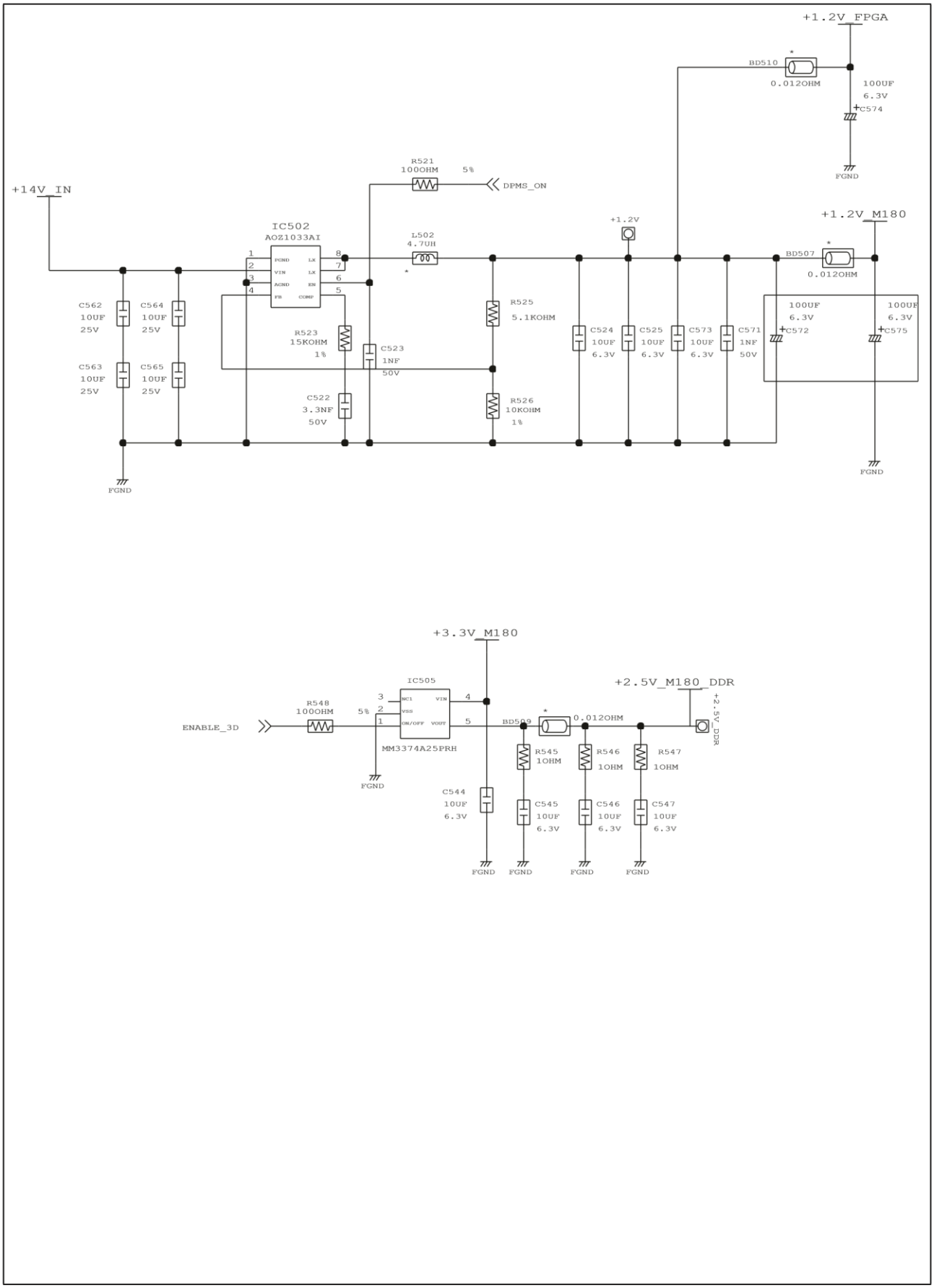
10UF
6.3V
C233
10UF
6.3V
FGND

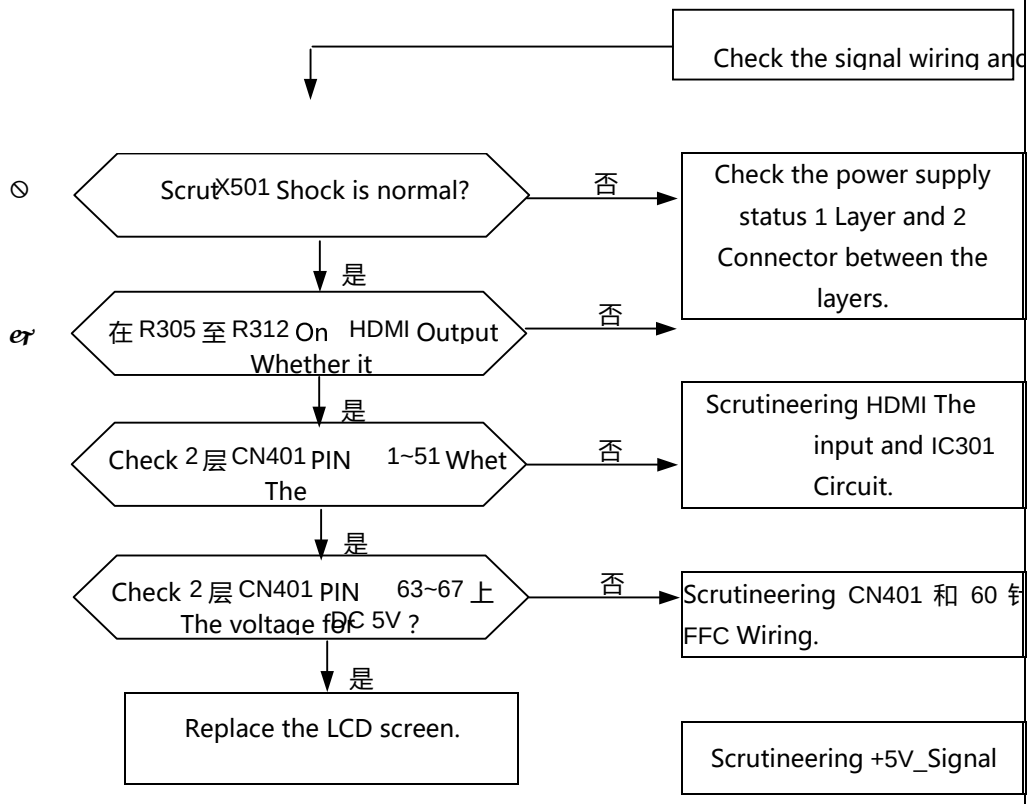


4-2-2 When power is not available in the circuit diagram (**2** Circuit)

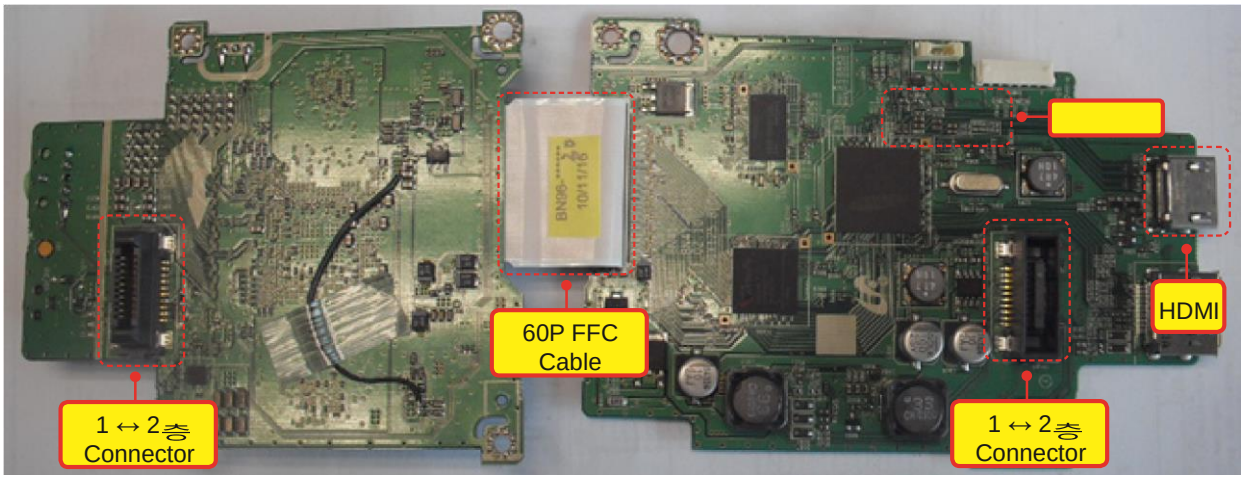

+5V_PANEL
+14V_IN
R507
100OHM
5%
PANEL_EN
TPS54620RGY
IC506
R509
75KOHM
1%
C552
100NF 50V
L504
4.7UH
+5V
BD505
0.012OHM
F601
0467005.NR
MGND1
C556
50V
1NF
R512
5.6KOHM
R513
47KOHM
R514
10KOHM
1%
R510
1.2KOHM
1%
15NF
50V
C567
C508
10UF
25V
C509
10UF
25V
C510
10UF
25V
C512
10UF
25V
C507
10UF
25V
C506
10UF
25V
C553
22UF
16V
C554
22UF
16V
C555
22UF
16V
FGND
+3.3V_M180
R520
100OHM
5%
DPMS_ON
IC501
AOZ1033AI
L501
4.7UH
+3.3V
BD506
0.012OHM
F506
046701.5NRHF
R517
30KOHM
1%
R518
1.2KOHM
1%
R519
10KOHM
1%
R516
39KOHM
1%
C535
100NF
50V
C513
1NF
50V
C515
10UF
6.3V
C516
10UF
6.3V
C517
10UF
6.3V
C578
100NF
16V
C577
50V
10NF
D506
SD26V2G
100UF
6.3V
C576
C557
10UF
25V
C559
10UF
25V
C558
10UF
25V
C560
10UF
25V
FGND
+3.3V_M180
IC504
R549
1000HM
5%
ENABLE_3D
BD508
0.012OHM
+2.5V
+2.5V_M180
R538
1OHM
C538
10UF
6.3V
FGND
MM3374A25PRH
R537
R539
C53110UF
1OHM
1OHM
6.3V
C537
C539 10UF
10UF 6.3V
6.3V
FGND
FGND
FGND
FGND

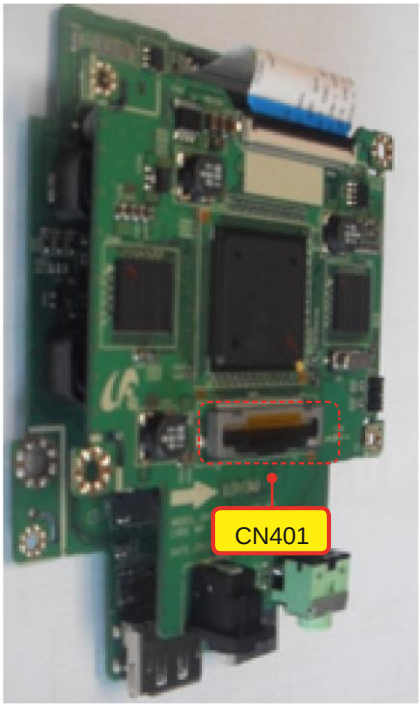

+1.2V_FPGA
BD510
0.012OHM
100UF
6.3V
C574
FGND
R521
100OHM
5%
DPMS_ON
+14V_IN
IC502
AOZ1033AI
L502
4.7UH
+1.2V
+1.2V_M180
BD507
0.012OHM
C562
10UF
25V
C564
10UF
25V
C563
10UF
25V
C565
10UF
25V
R523
15KOHM
1%
C523
1NF
50V
C522
3.3NF
50V
R525
5.1KOHM
R526
10KOHM
1%
C524
10UF
6.3V
C525
10UF
6.3V
C573
10UF
6.3V
C571
1NF
50V
100UF
6.3V
C572
100UF
6.3V
C575
FGND
+3.3V_M180
IC505
MM3374A25PRH
+2.5V_M180_DDR
+2.5V_DDR
R548
100OHM
5%
ENABLE_3D
BD509
0.012OHM
R545
1OHM
R546
1OHM
R547
1OHM
C544
10UF
6.3V
C545
10UF
6.3V
C546
10UF
6.3V
C547
10UF
6.3V
FGND

4-3. When you monitor black screen (**HDMI**)

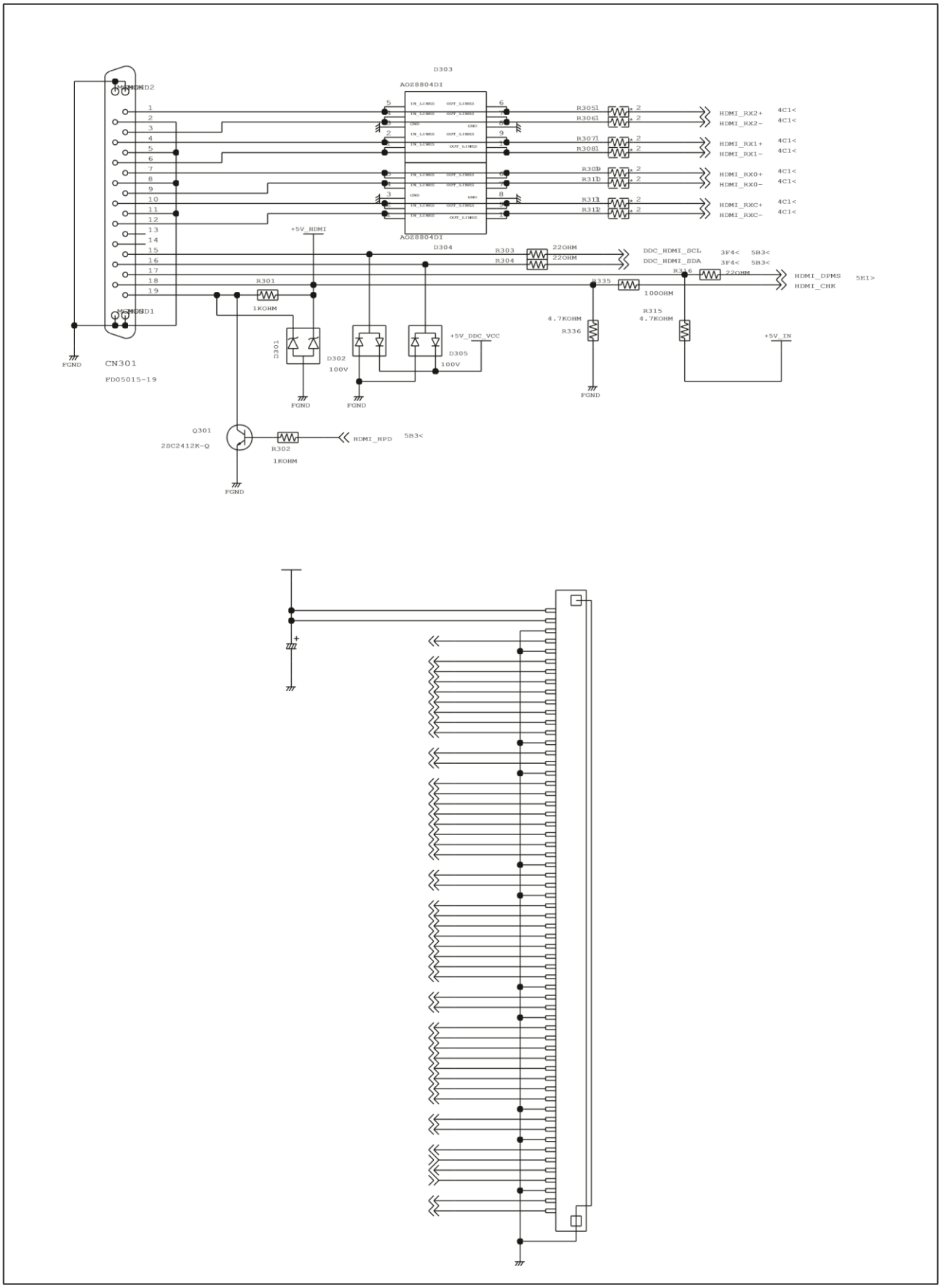
Sign	-当 HDMI When the wiring is connected, the power LED Is on and the screen black screen or W/R/G/B Pattern interruption-style display.
Mainly a checkpoint	-Scrutineering HDMI Wiring connections. -Scrutineering LVDS The wiring is correctly connected to the Panel. -Check 1 Layer and 2 Between connector and 60 针 FFC The wiring is connected properly.
Diagnosis	
Attention	Check the make sure to disconnect power before connecting the motherboard.

Main PBA



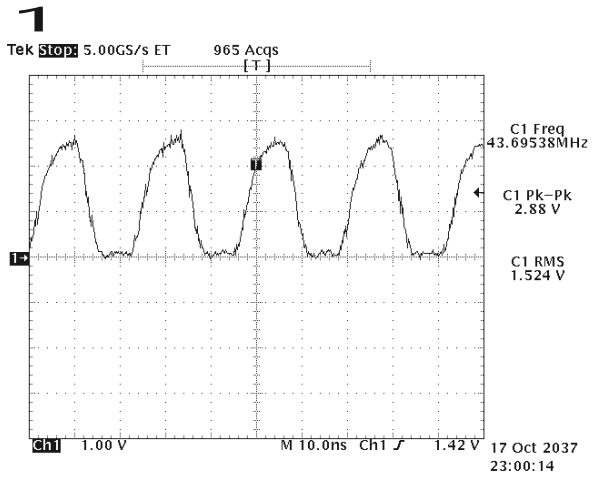


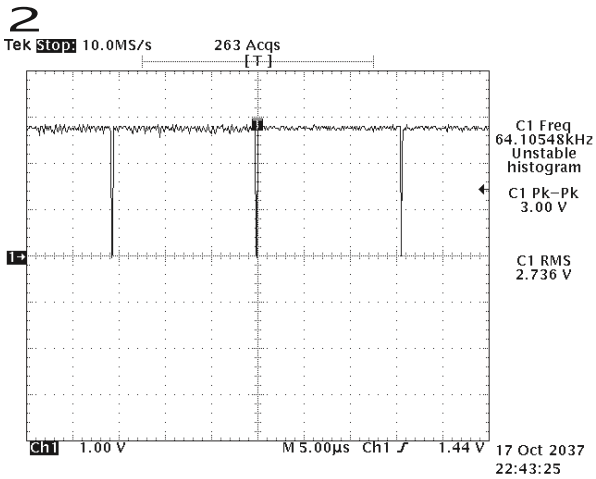
4-3-1. Black screen appears when the circuit diagram (**HDMI**)


D303
AOZ8804DI
D304
AOZ8804DI
R3051
R3061
R3071
R3081
R3091
R3101
R3111
R3121
HDMI_RX2+
HDMI_RX2-
HDMI_RX1+
HDMI_RX1-
HDMI_RX0+
HDMI_RX0-
HDMI_RXC+
HDMI_RXC-
+5V_HDMI
R303
R304
220HM
220HM
DDC_HDMI_SCL
DDC_HDMI_SDA
R316
220HM
HDMI_DPMS
HDMI_CHK
R335
1000HM
R315
4.7KOHM
R336
4.7KOHM
+5V_IN
R301
1KOHM
D301
D302
100V
D305
100V
+5V_DDC_VCC
FGND
CN301
FD05015-19
Q301
2SC2412K-Q
R302
1KOHM
HDMI_HPD

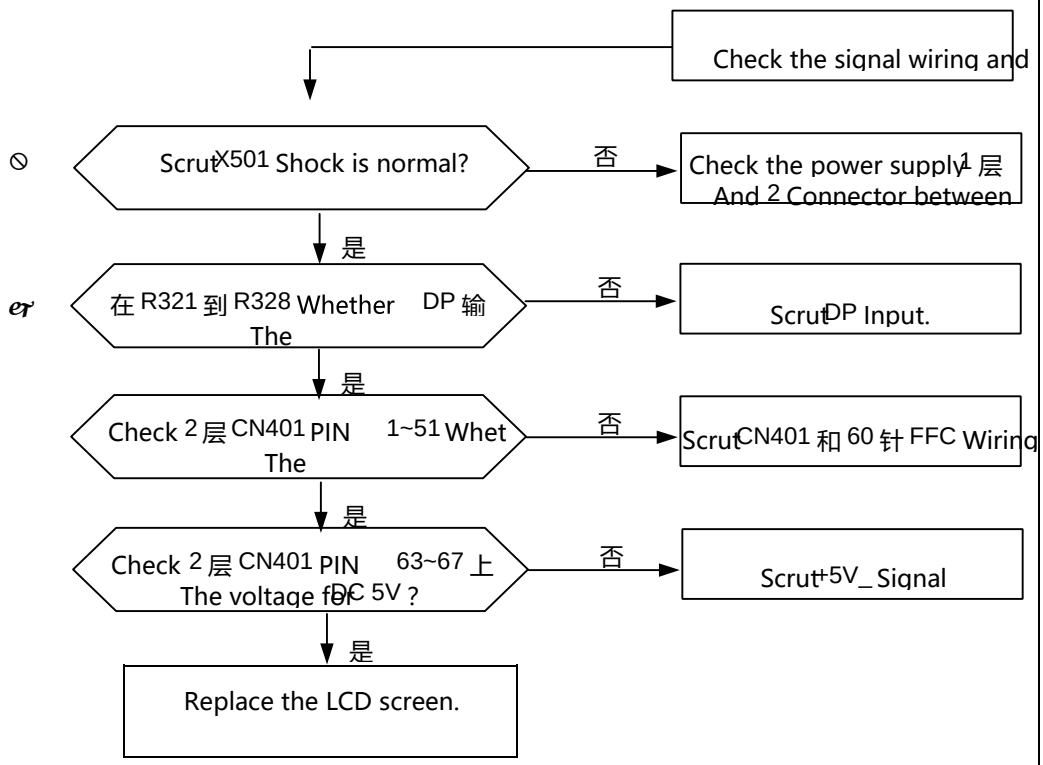
HDMI INPUT

4-3-2.Screen no display of HDMI）

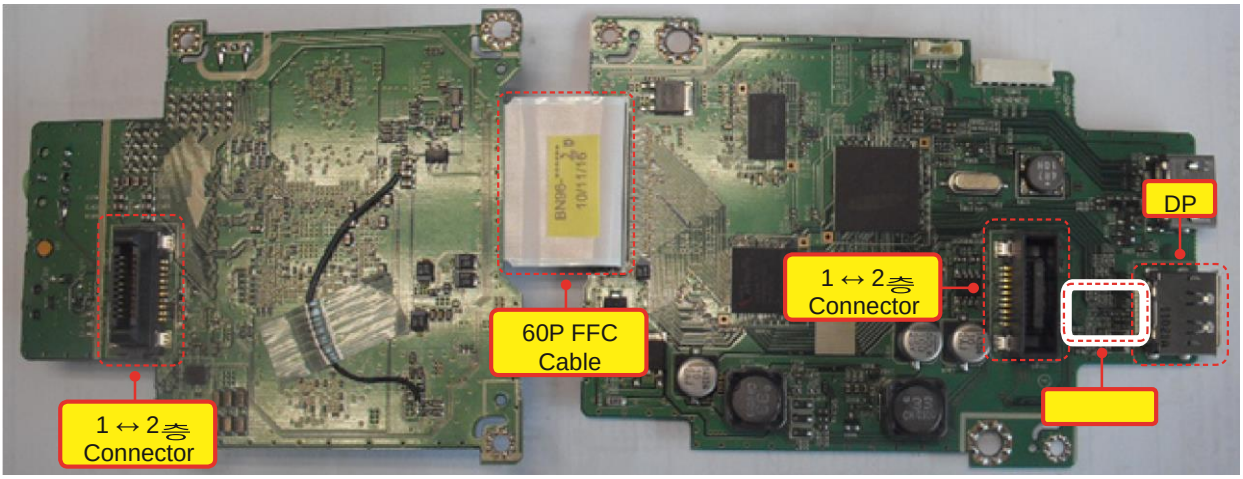


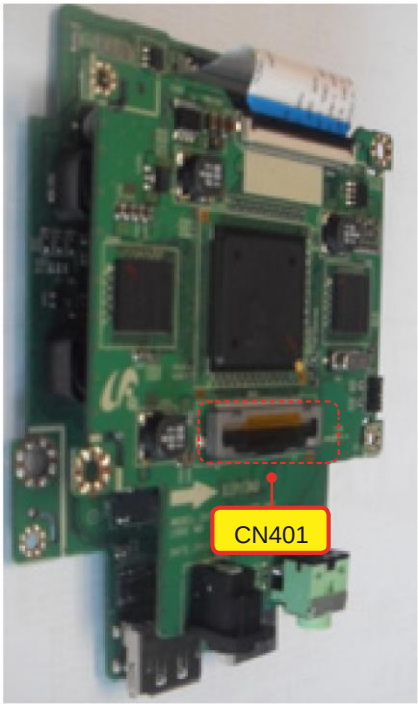


4-4. When you monitor black screen (DP)

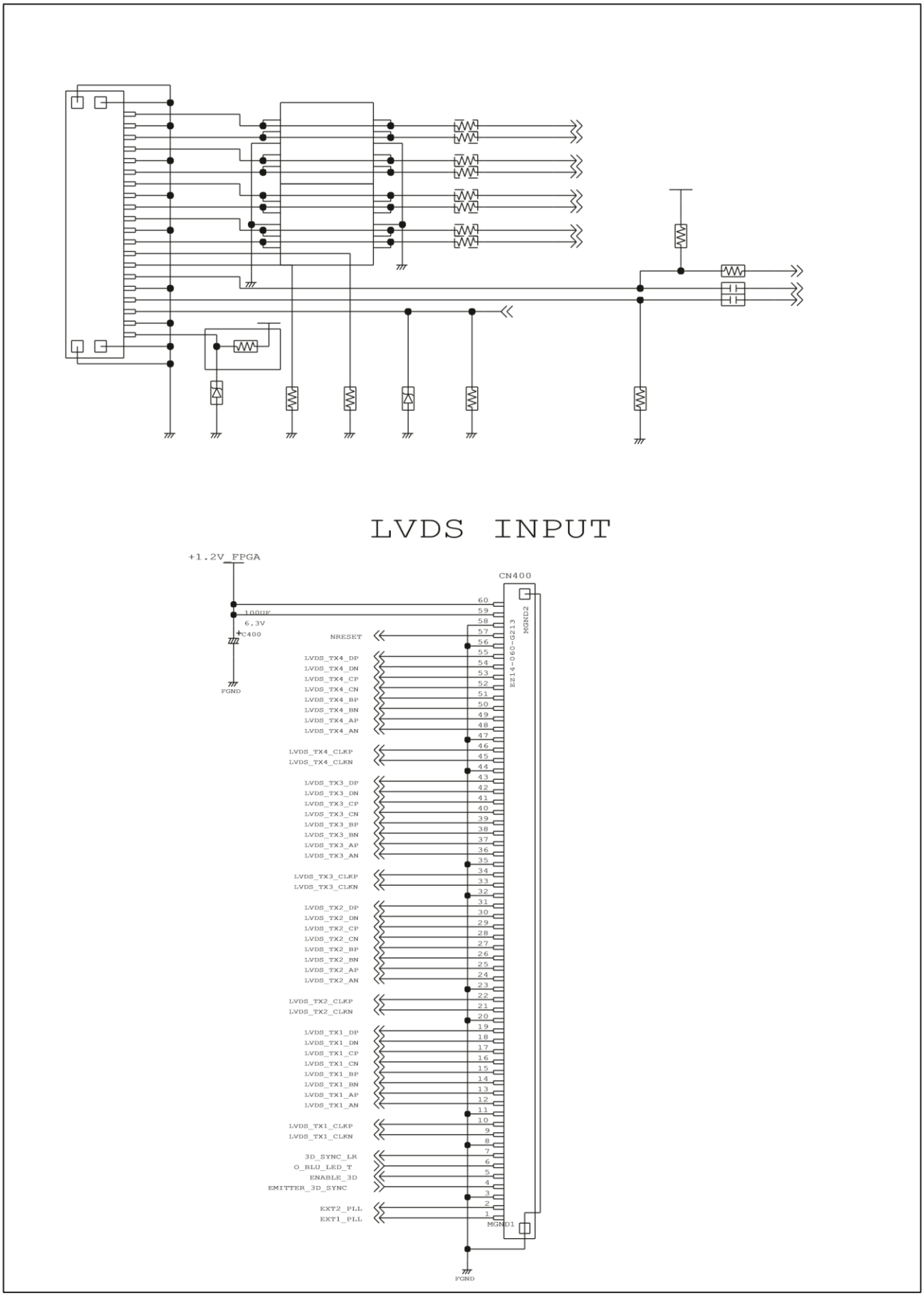
Sign	-当 DP When the wiring is connected, the power LED Is on and the screen black screen or W/R/G/B Pattern interruption-style display.
Mainly a checkpoint	-Scrutineering DP Wiring connections. -Scrutineering LVDS The wiring is correctly connected to the Panel. -Check 1 Layer and 2 Between connector and 60 针 FFC The wiring is connected properly.
Diagnosis	
Attention	Check the make sure to disconnect power before connecting the motherboard.

Main PBA



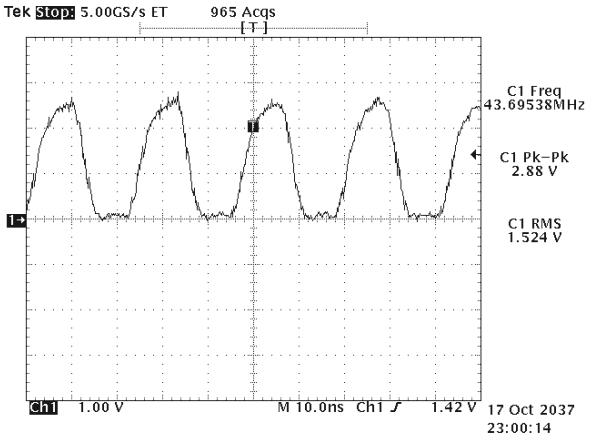


4-4-1. Black screen appears when the circuit diagram (**DP**)

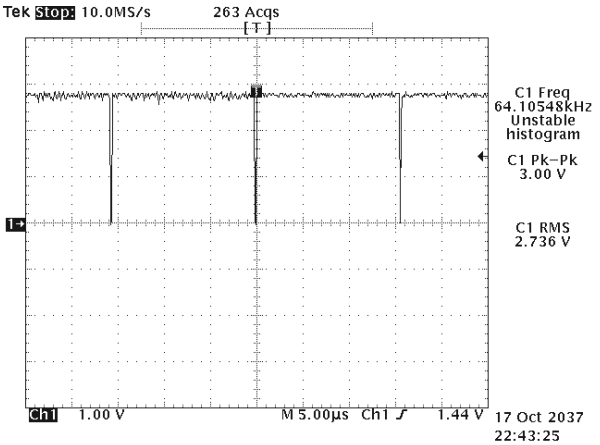


4-4-2. Screen no display of waveforms (**DP**)

1


Tek Stop: 5.00GS/s ET
965 Acqs
C1 Freq
43.69538MHz
C1 Pk–Pk
2.88 V
C1 RMS
1.524 V
Ch1 1.00 V
M 10.0ns Ch1 ƒ 1.42 V
17 Oct 2037
23:00:14

2


Tek Stop: 10.0MS/s
263 Acqs
C1 Freq
64.10548kHz
Unstable
histogram
C1 Pk–Pk
3.00 V
C1 RMS
2.736 V
Ch1 1.00 V
M 5.00µs Ch1 ƒ 1.44 V
17 Oct 2037
22:43:25

4-5. Examples of faults and corrective actions

Failure pictures	Symptoms and corrective actions	Notes
	Symptom: when you turn the monitor on, regardless of whether there is signal, continuous display of full white pattern. Reason: an LVDS Connection failure or error connections. Corrective action: replace or correctly connect LVDS Wiring.	
	Indication: in the connection DVD The screen noise emission. Reason: HDCPKey cannot be inserted. Corrective action: enable HDCPKey.	

4-6. Regulation

4-6-1 . Conditions of repairs

Maintenance considerations for adjusting

1） Check for repairs if the device is functioning properly.

2） In order to secure large enough to remove the display.

3） Prepare a cushion before the demolition.

Enter maintenance mode

Enter:

Exit:

After replacing the basic maintenance items

1.Scrutineering PC Color adjustment.

2.DDC Input (analog and digital input)

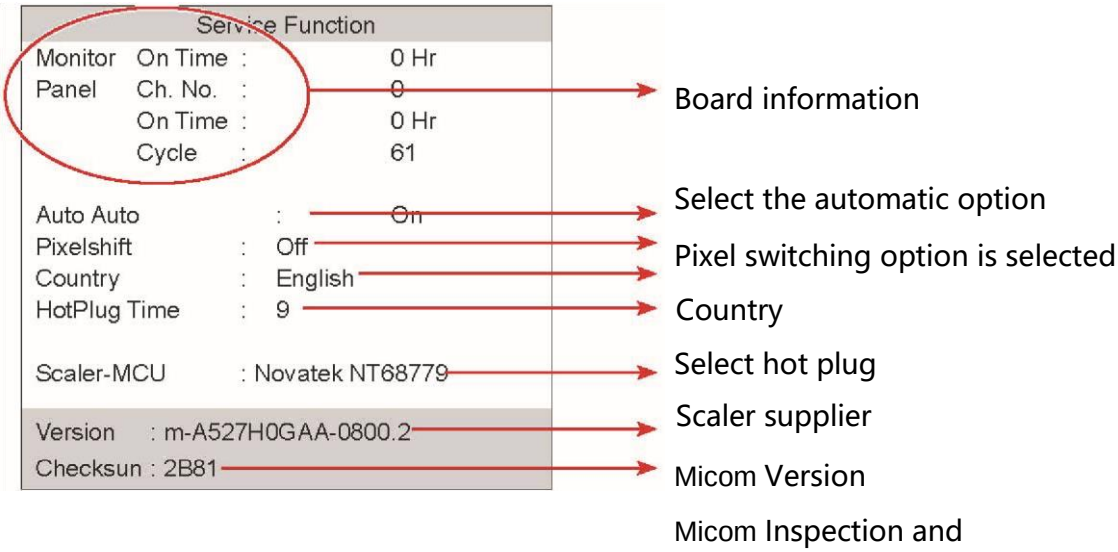
3.Check that the model is suitable MCU Code input.

4.Enter maintenance mode after power off and reset.

4-6-2. Maintenance of functional specifications

■ Checking the version code

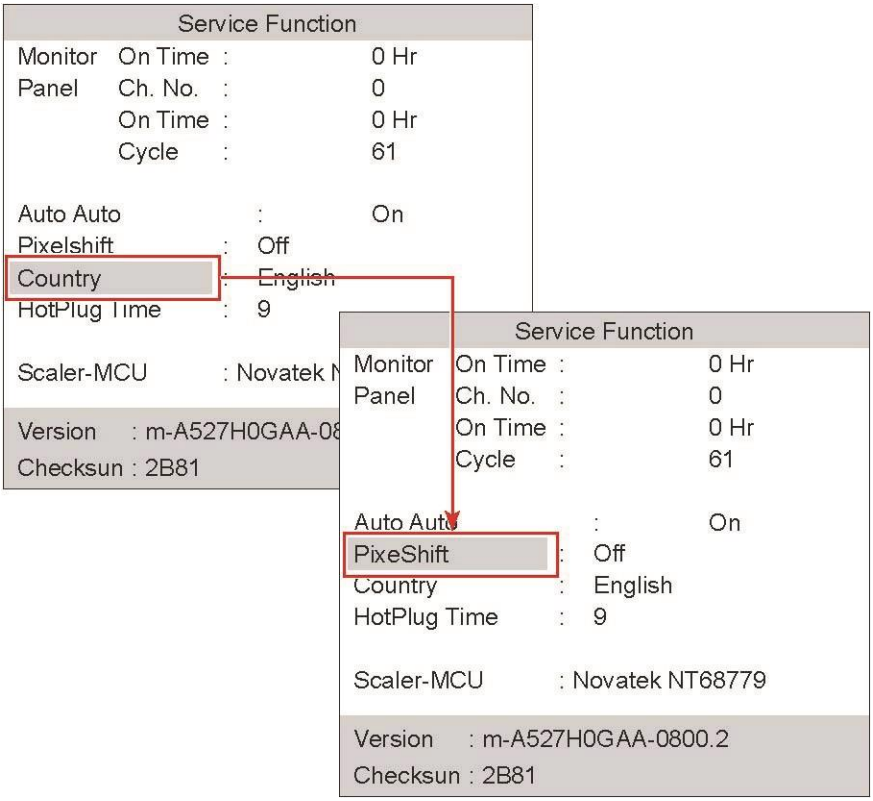
1. In SVC Model checking MCU Code revision and inspection.
2. In SVC Model
   - Adjust the brightness and contrast values for 0。
   - Press enter five (5) Seconds
   - SVC Function OSD On the show.
   - If you want to exit SVC Function, turn off the power.
3. Safe mode
   - When the input signal when supported by higher frequency signals than the product, safe mode gives the user some time (1 Minutes) change the graphics mode are set to the recommended setting.



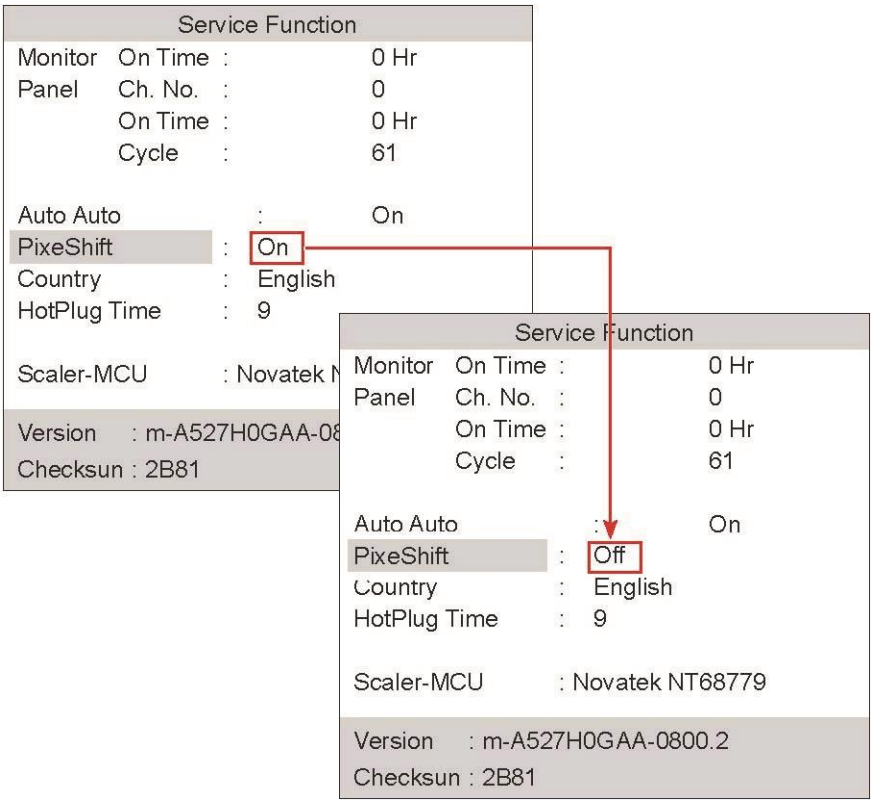
SVC Function OSD Included 103(Width)X 82(Height) grid, Board information, and display the software version and Micom Inspection and.

■ Maintenance mode (move)

1.Press▼Button to move to the other options.

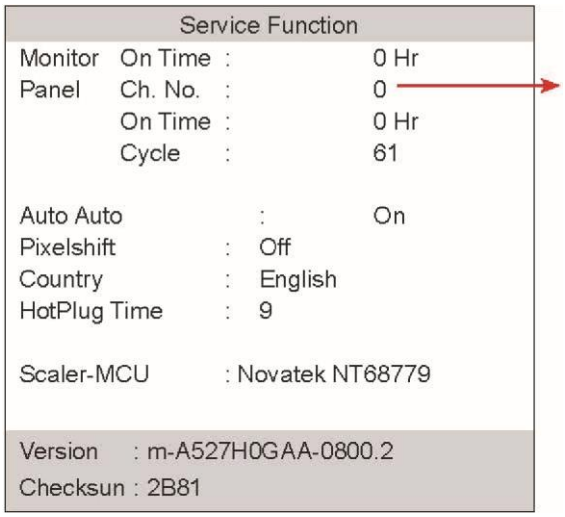


2.Press▲Button, change the setting to on or off.



■ When panels are replaced

Replace the Panel, select a Panel item and press the menu button five (5) Seconds. Plate surface Ch. No will increase 1 and time information will be changed to 0。



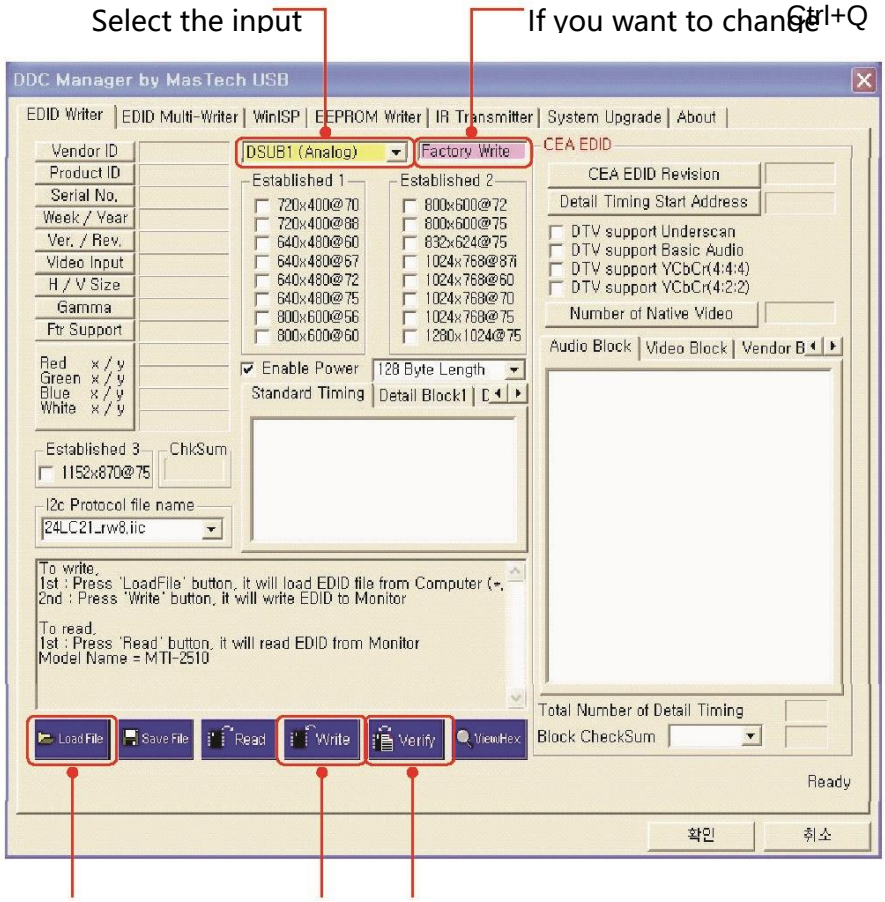
This number increased 1

4-6-3. Enter DDC (MTI-2510)

WinDDCU Pop-up menu

Pop-up menu	Function
EDID Logger	Run a recorder and verified by computer on the monitor EDID Data (*.ddc) File. The menu is mainly being used to enter EDID Data files (*.ddc) For more information.
EDID Multi-purpose logger	Enter number EDID Data (up to 6) (*.ddc) File for more information.
WinISP	The implementation of MICOM Upgrade.
EEPROM Logger	The implementation of EEPROM Upgrade.
IR Transmitter	New on the computer allIRData and usesMTI-2510Data display equipment.
System upgrade	Using the system Hex Files to upgrade or downgrade your system version.

EDID Recorder menu



Loading*.ddc File Start recording Start verify

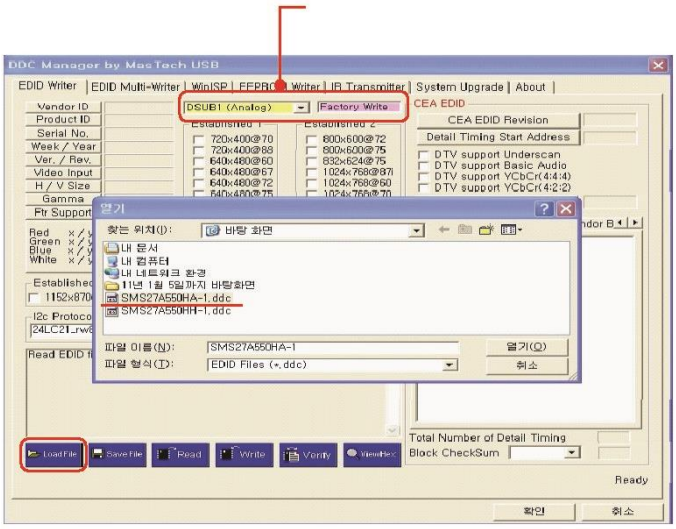
EDID Logger mode

- Factories in write mode: write and validate EDID Data. (This is the most commonly used mode.)
- Quality read mode: read only EDID Data.
- Management edit mode: perform all of the functions (write, read, and modify data, etc).
- Bar code write mode: reading the serial number barcode and direct the writing process.

The implementation of **EDID** Logger

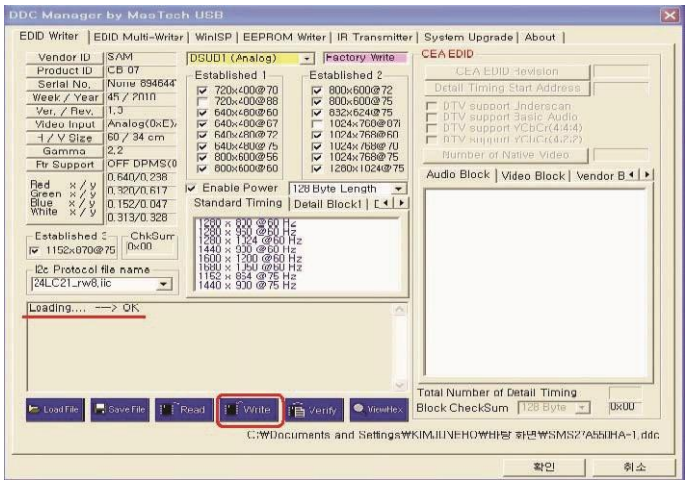
1.The implementation of[Load file], And select a ddc File input for more information.

DDCFile name	
S23A750D	**S27A750D**
SMS23A750DH.ddc	SMS27A750DH.ddc

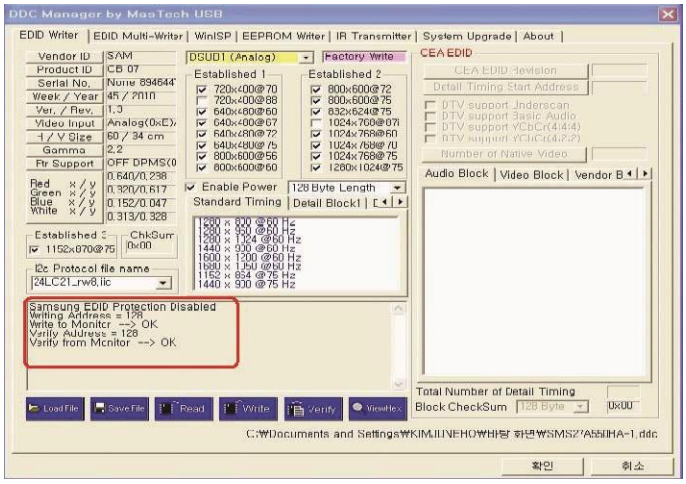


Select an input port and mode Don't forget to check these locations!!

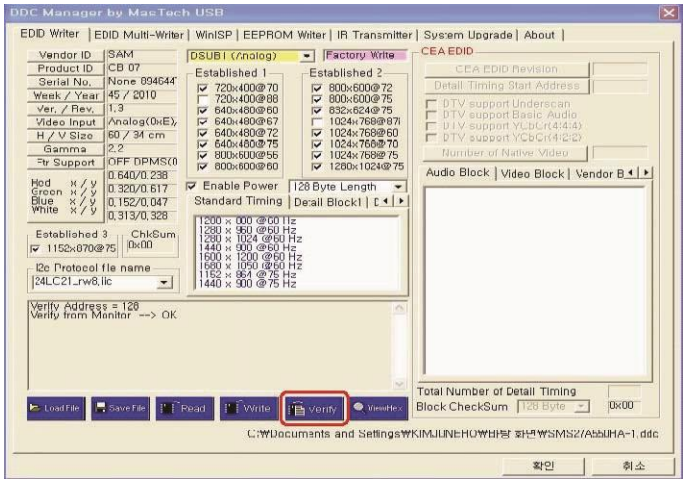
2.Check the loading process→Display a confirmation, click on the[Logger]Begin writing.



3.Write to complete. In factEDID The writing process was not complete at this stage.

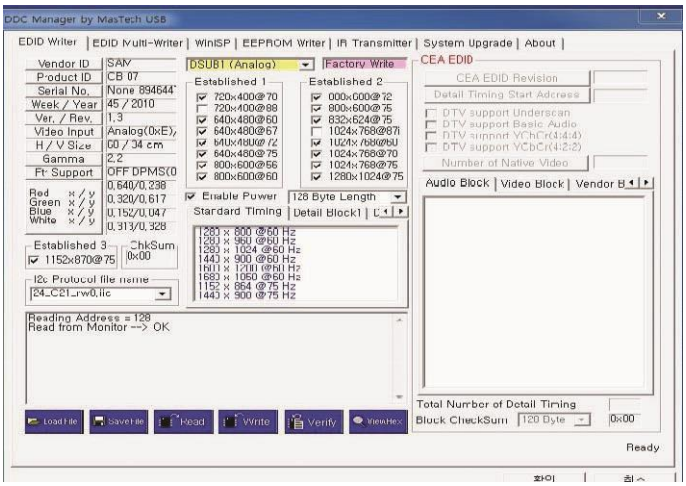


4.Click Verify. Because of the tests included in the writing process, this option can be selected is not enforced.

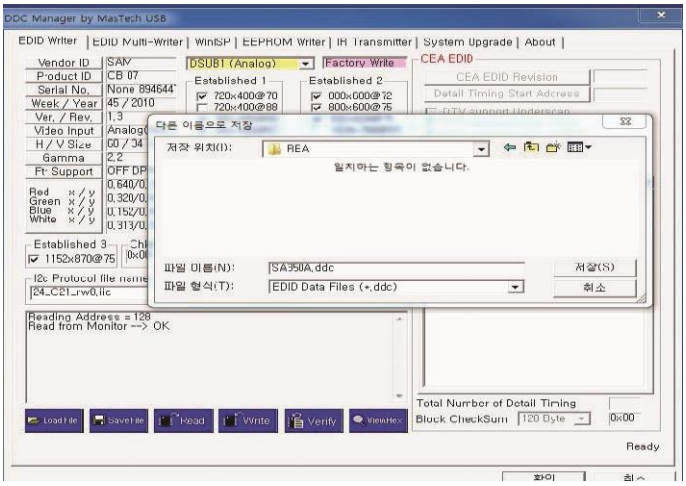


DDC Data backup

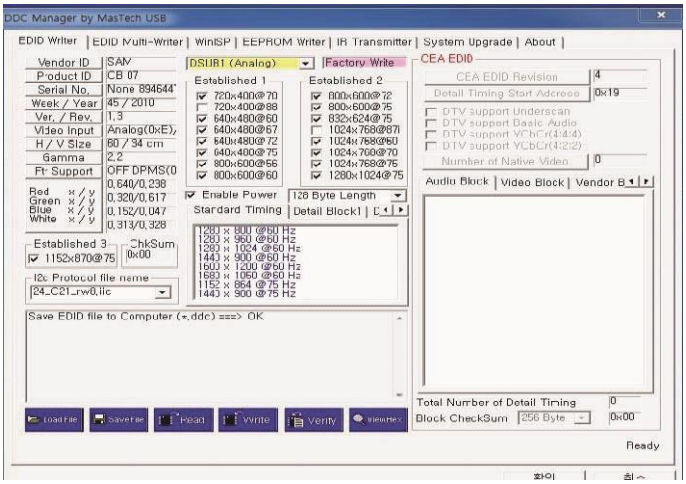
1. 在 EDID Selected in the formula bar[Read]。



2. Enter a file name and keep the backup data.



3. DDC Data backup is complete.

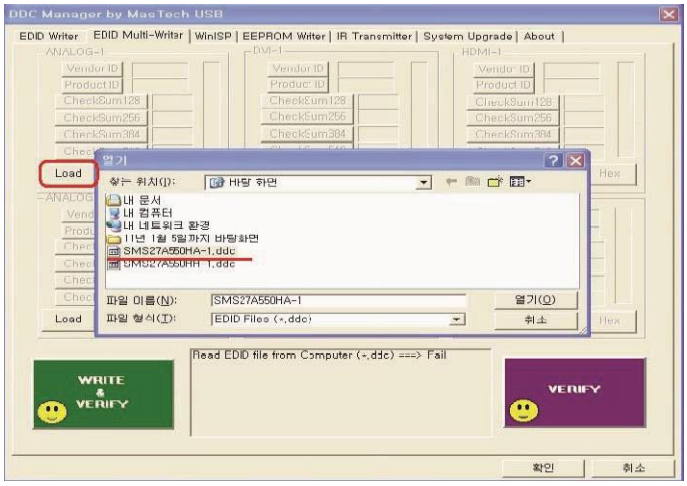


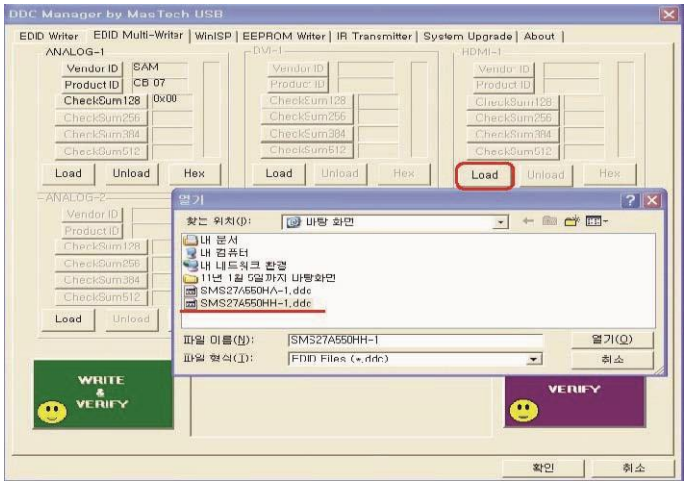
DDC Data backup requirements are as follows.

-When many of the same model is used, you should check DDC Files for defects. Run **EDID** Multi-purpose logger (for analog and **HDMI** Input signal)

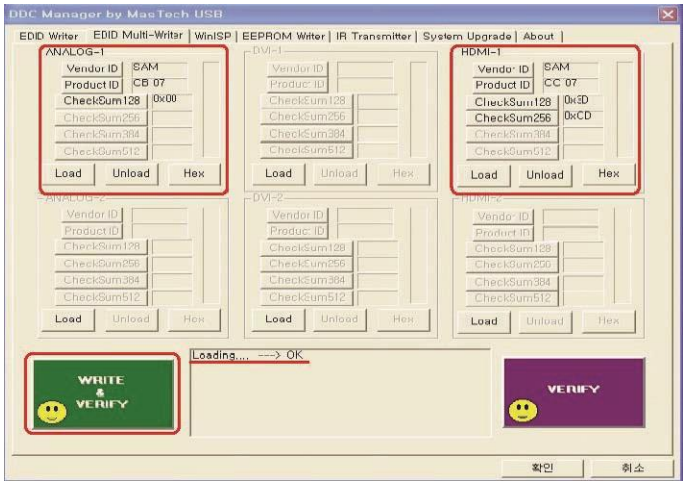
1. For analog input signal: click[Loading]And select simulation ddc File.

For HDMI Input signal: click[Loading], And select HDMI ddc File.

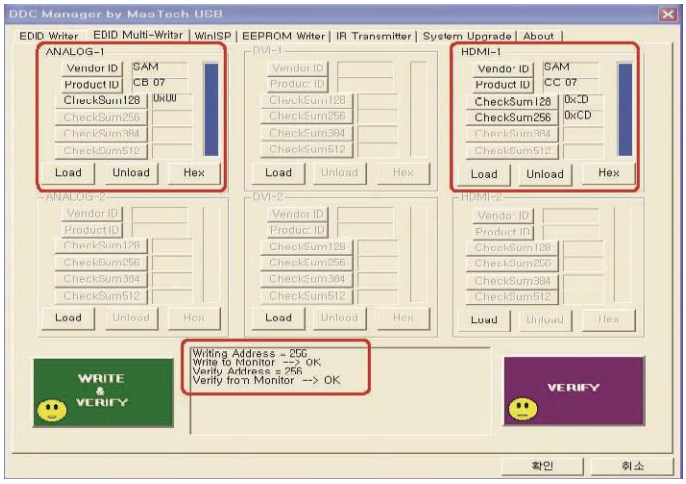




2.Check the loading process→Display a confirmation, click on the[Logger and verify]。



3.EDID Multi-purpose logger process to complete.



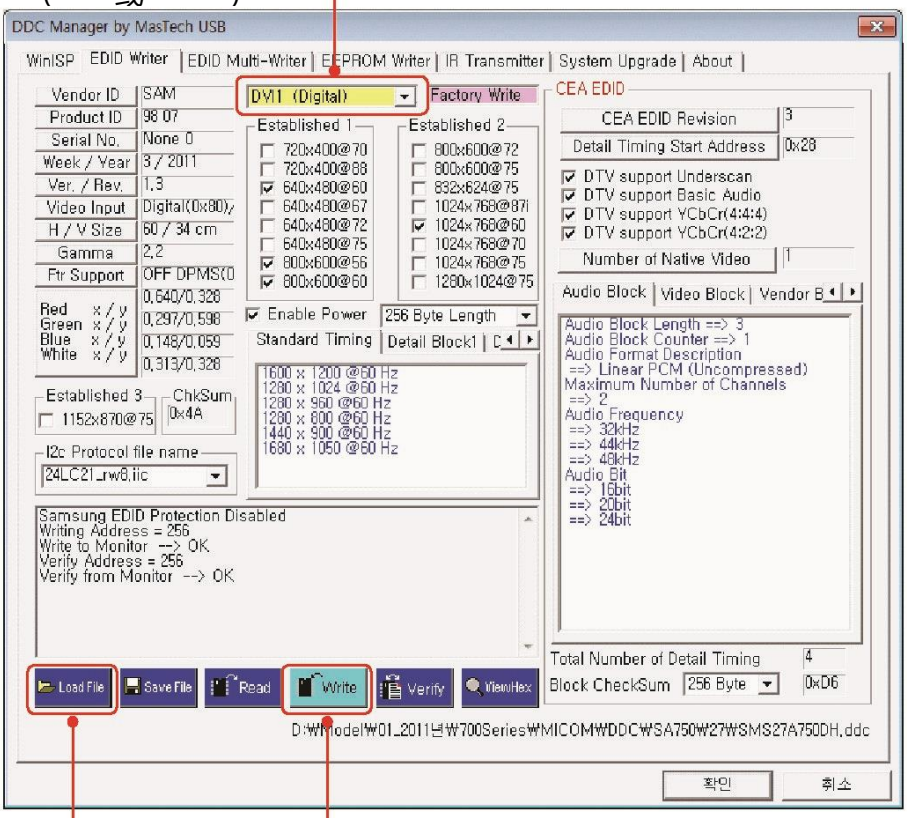
4-6-4.Enter **EDID**

Connection

Connection DDC Manager to your computer; next, use DVI 或 HDMI Wiring connections DDC Manager to the display.

Menu

Select an input port
（DVI 或 HDMI）



Loading*.ddc File

Confirm change

1. Click on the[Load file]。
2. Choose DDC File.
3. Choose[Write]Buttons.
4. If EDID Upgrade intact, you can see the following information.

*DP EDID Has been included in the MICOM , So you don't need to upgrade DP EDID。

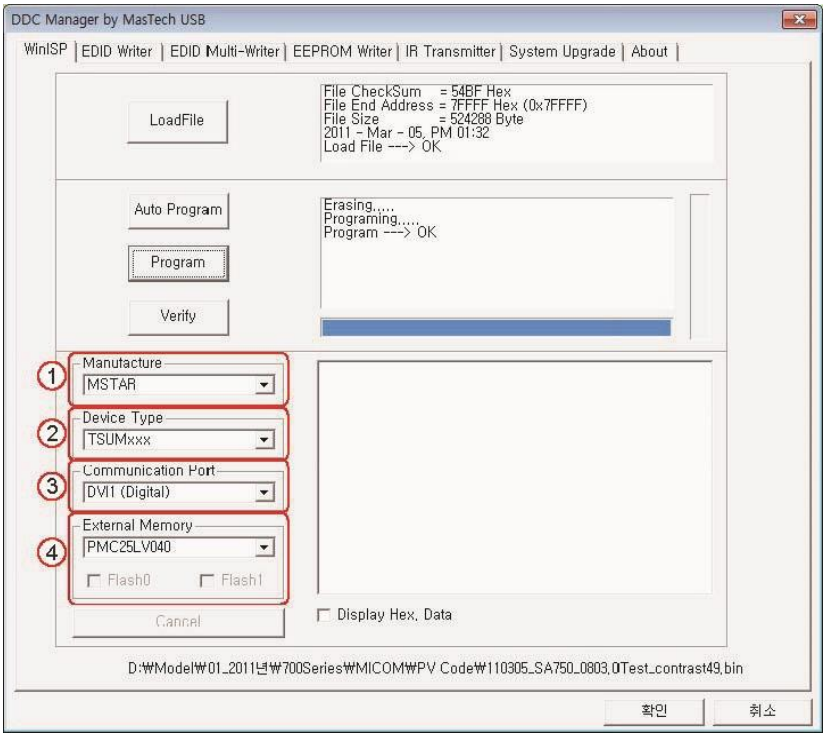
DDCFile name	
S23A750D	**S27A750D**
SMS23A750DH.ddc	SMS27A750DH.ddc

4-6-5. Enter **Micom**

Connection

Connection DDC Management devices to your computer USB Port connect HDMI-DVI Connection to DDC Management unit and the back of the product HDMI Port.

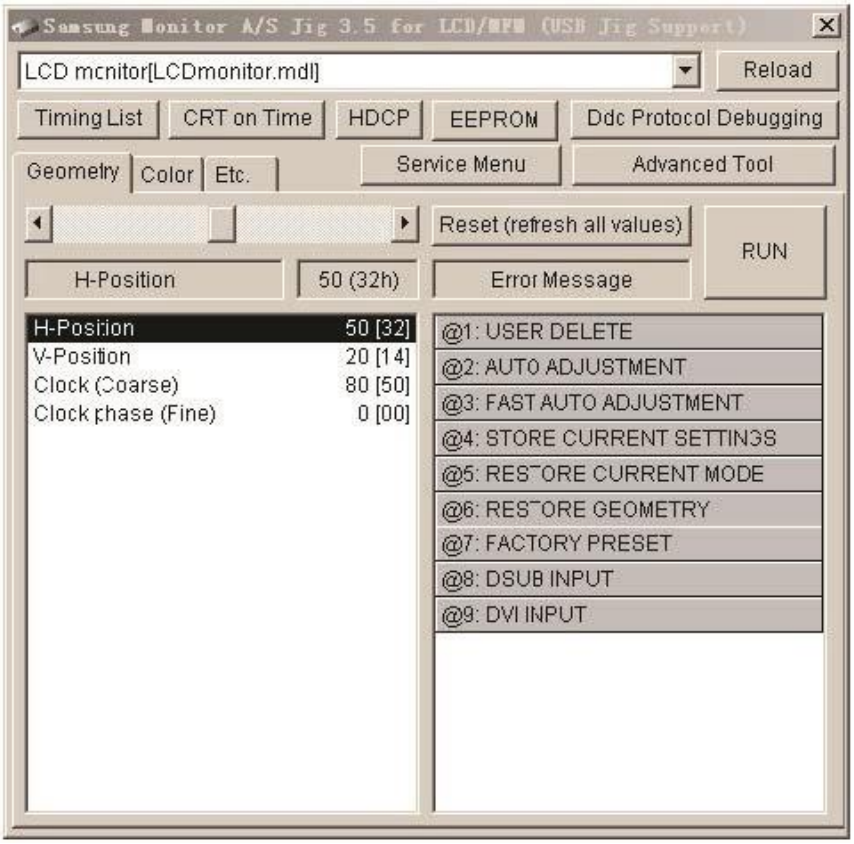
WinISP Menu



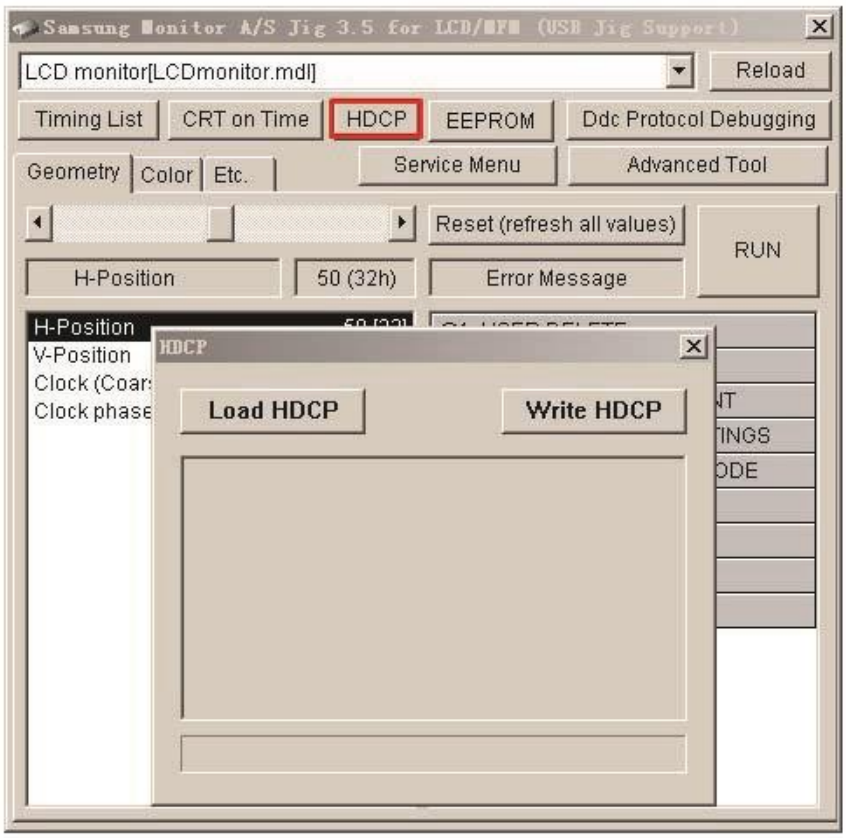
1. ChooseManufactureSelectMicomConstructor.
2. Select the type of device.
3. Select the input port.
4. Select external memory storage capacity.

4-6-6. Enter the code (**HDCP**)

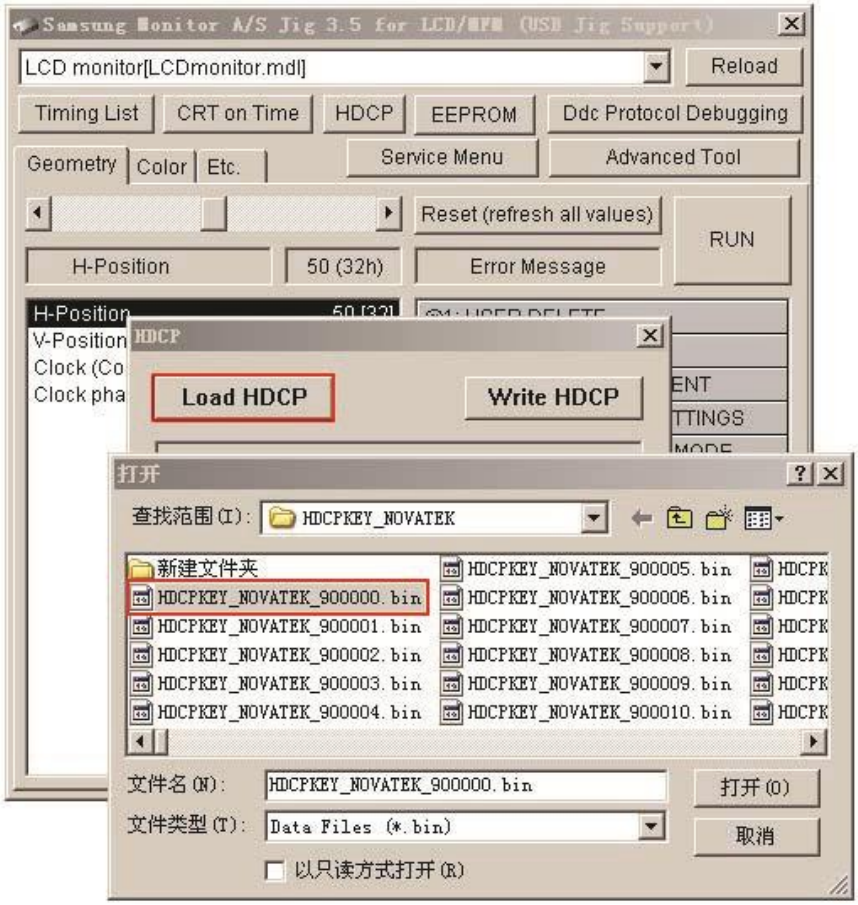
1.Runservice.exeFile.



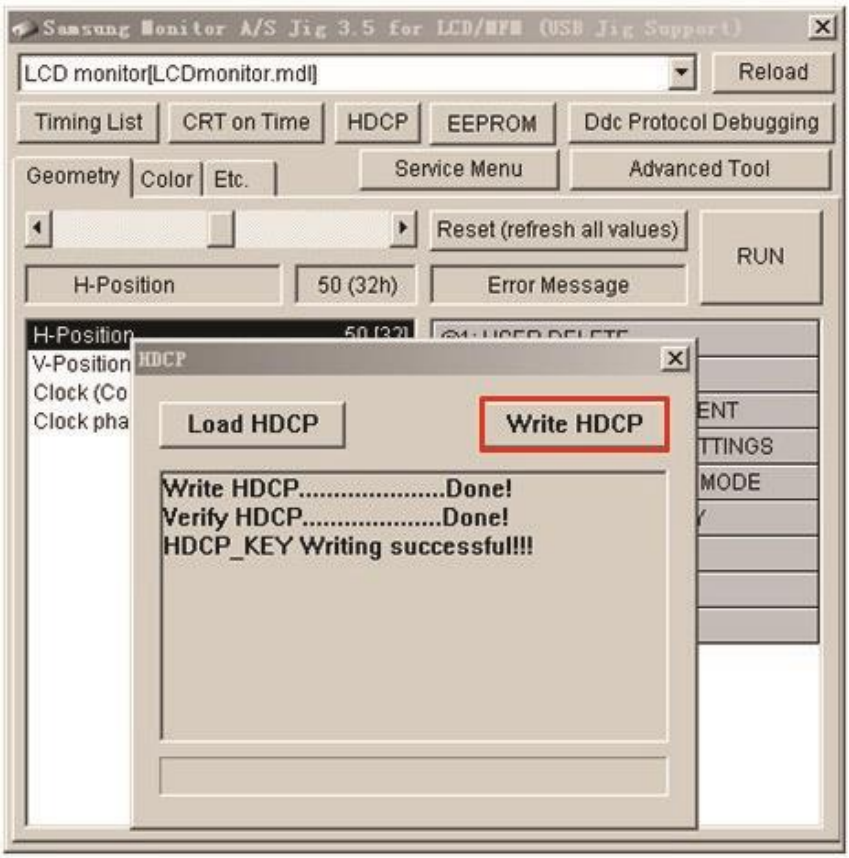
2.Click on the HDCP Buttons.



3.点击 HDCP 写入按钮并选择 Mstar_HDCPKEY。

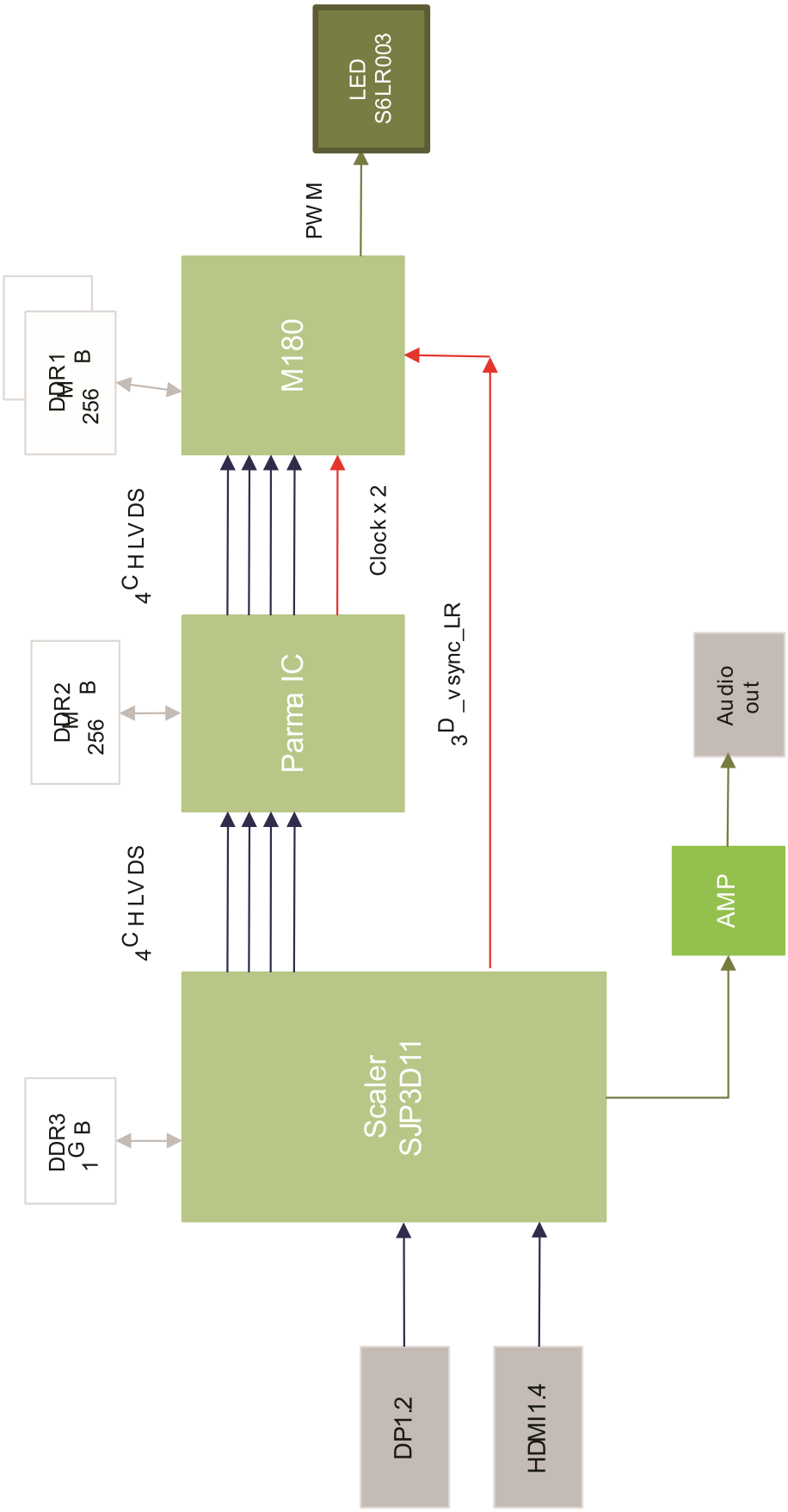


4.输入 HDCP 密钥已完成。

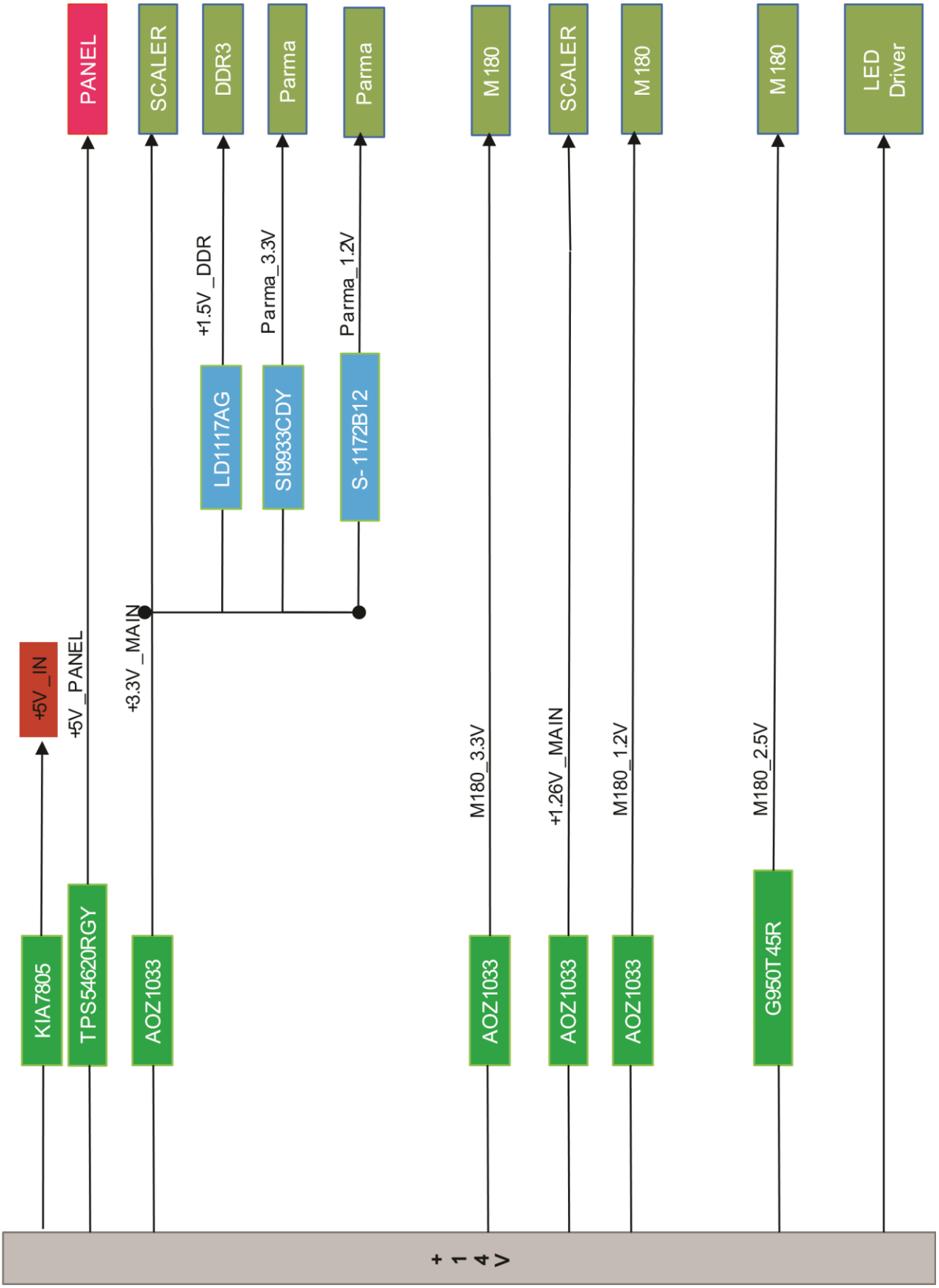


5. Wiring Diagram

5-1. Wiring Diagram
Schematic

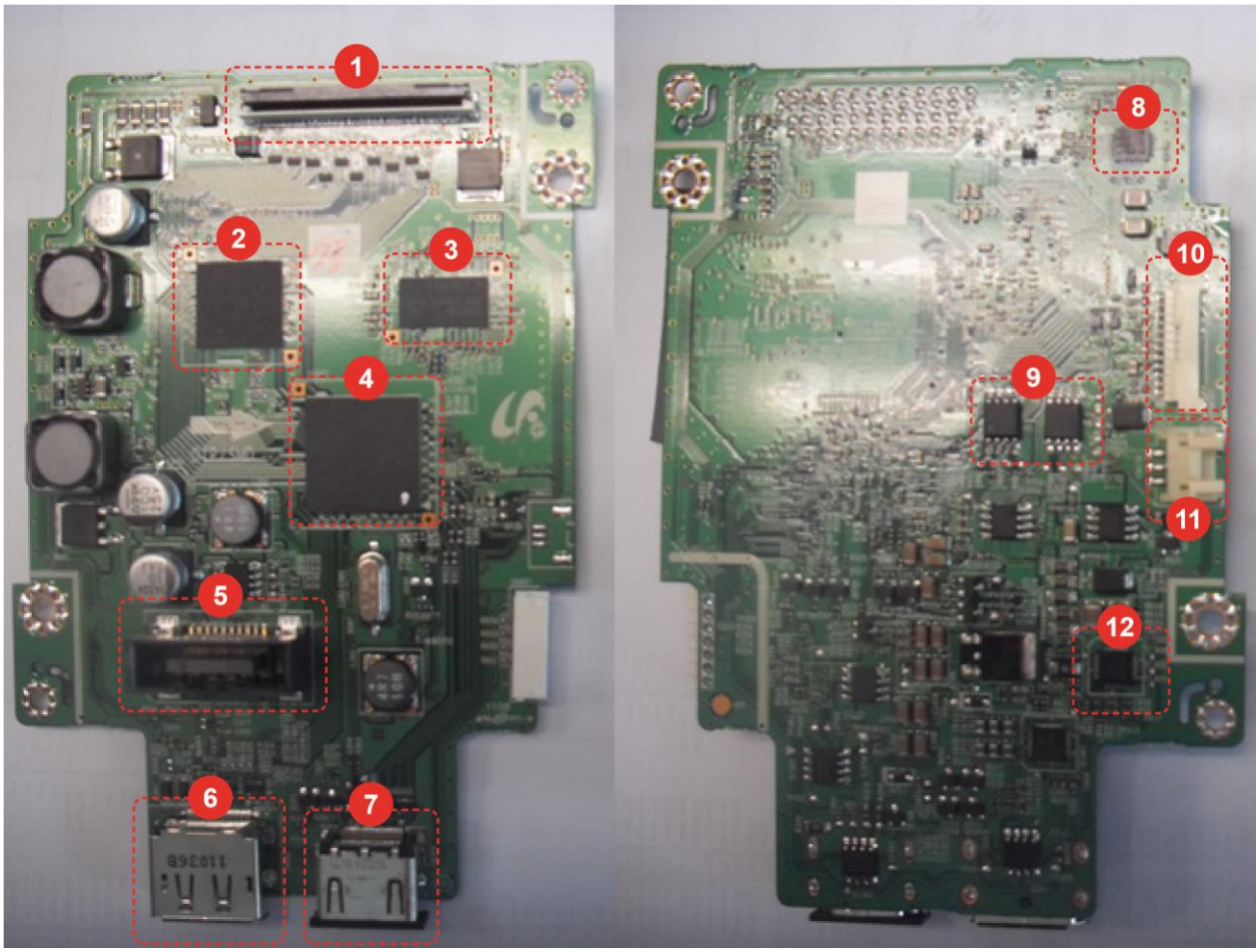


5-2. Power Flow Chart



5-3. Board Connection

Main PBA – 1st Floor



Location	Block	Functions
1	LVDS connector between the 1st and 2nd floors	Connects the LVDS signal from the 1st floor to the 2nd floor
2	FPGA	Receives and bypasses the LVDS 4 channel input, creates the 148.5MHz output, and puts the output into the M180 system clock on the 2nd floor
3	DDR3	Starts the scaler
4	Scaler	This main IC receives the external input and displays pictures on the screen.
5	B to B connector between the 1st and 2nd floors	Transmits the signals between the 1st and 2nd floors
6	DP	Stands for Display Port and offers a higher input port performance than a DVI
7	HDMI	Connects to an AV device or PC
8	LED Driver	Turns on the backlight of the LED panel
9	Flash	This IC is where MICOMs for the scaler and FPGA are saved.
10	Function + Bluetooth	Connects the Function Assy and BT module
11	FAN	Starts the fan

2	LED Driver	Turns on the backlight of the LED panel

DP Signal Input Connector			
1	DP_LANE3-	11	GND
2	GND	12	DP_LANE0+
3	DP_LANE3+	13	GND
4	DP_LANE2-	14	GND
5	GND	15	DP_AUX+
6	DP_LANE2+	16	GND
7	DP_LANE1-	17	DP_AUX-
8	GND	18	DP_HPD
9	DP_LANE1+	19	GND
10	DP_LANE0-	20	VCC

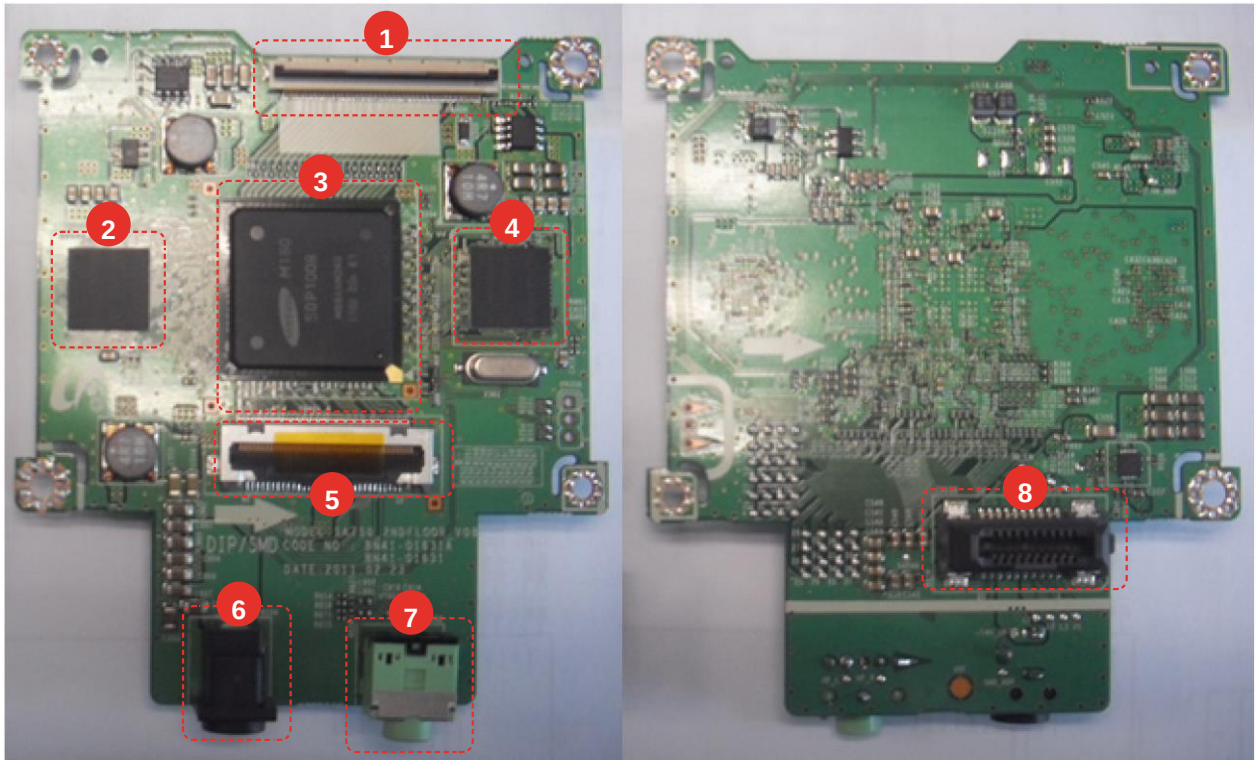
FAN Connector	
1	FAN_FB
2	GND
3	+7V_FAN_IN

HDMI Signal Input Connector			
1	HDMI_RX2+	11	GND
2	GND	12	HDMI_RXC-
3	HDMI_RX2-	13	NC
4	HDMI_RX1+	14	NC
5	GND	15	DDC_HDMI_SCL
6	HDMI_RX1-	16	DDC_HDMI_SDA

1 ↔ 2 LVDS Connector			
1	AU_MCLK	31	LVDS_TX2_DN
2	AU_SCLK	32	LVDS_TX2_CP
3	AU_LRCLK	33	LVDS_TX2_CN
4	AU_SDOUT	34	LVDS_TX2_BP
5	GND	35	LVDS_TX2_BN
6	LVDS_TX4_DP	36	LVDS_TX2_AP
7	LVDS_TX4_DN	37	LVDS_TX2_AN
8	LVDS_TX4_CP	38	GND
9	LVDS_TX4_CN	39	LVDS_TX2_CLKP
10	LVDS_TX4_BP	40	LVDS_TX2_CLKN
11	LVDS_TX4_BN	41	GND
12	LVDS_TX4_AP	42	LVDS_TX1_DP
13	LVDS_TX4_AN	43	LVDS_TX1_DN
14	GND	44	LVDS_TX1_CP
15	LVDS_TX4_CLKP	45	LVDS_TX1_CN
16	LVDS_TX4_CLKN	46	LVDS_TX1_BP
17	GND	47	LVDS_TX1_BN
18	LVDS_TX3_DP	48	LVDS_TX1_AP
19	LVDS_TX3_DN	49	LVDS_TX1_AN
20	LVDS_TX3_CP	50	GND
21	LVDS_TX3_CN	51	LVDS_TX1_CLKP
22	LVDS_TX3_BP	52	LVDS_TX1_CLKN
23	LVDS_TX3_BN	53	GND
24	LVDS_TX3_AP	54	3D_SYNC_LR
25	LVDS_TX3_AN	55	O_BLU_LED_T
26	GND	56	ENABLE_3D
27	LVDS_TX3_CLKP	57	EMIT_3D_SYNC
28	LVDS_TX3_CLKN	58	GND
29	GND	59	NRESET_M180
20	LVDS_TX2_DP	60	EXT1_PLL

7	HDMI_RX0+	17	HDMI_DPMS
8	GND	18	HDMI_CHK
9	HDMI_RX0-	19	VCC
10	HDMI_RXC+		
1 ↔ 2 B-to-B Connector			
1	VLED1	11	LED6
2	LED3	12	LED5
3	LED2	13	LED4
4	LED1	14	VLED3
5	GND	15	GND
6	+14V	16	SUB_SDA
7	+14V	17	SUB_SCL
8	+14V	18	DPMS_ON
9	HP_MUTE	19	PANEL_EN
10	NC	20	+5V_PANEL
Function + BT Connector			
1	BT_TEST	8	ENABLE_3D
2	EMIT_3D_SYNC	9	GND
3	GND	10	+3.3V_FUNC
4	USB_P	11	GND
5	USB_N	12	FUNC_SDA
6	+5V_BT	13	FUNC_SCL
7	PAIRING	14	FUNC_GPIO

Main PBA – 2nd Floor



Location	Block	Functions
1	LVDS connector between the 1st and 2nd floors	Connects the LVDS signal from the 1st floor to the 2nd floor
2	DDR1	Starts M180
3	M180	This Samsung patent-applied IC starts the 3D function.
4	DDR1	Starts M180
5	LVDS Connector	Connects the LVDS 4 channel and LED driver signal panel
6	DC Jack	Supplies 14V power
7	Audio Jack	Outputs audio from the HDMI/DP input
8	B to B connector between the 1st and 2nd floors	Transmits the signals between the 1st and 2nd floors

Power Adaptor Connector	
1	+14V_VCC
2	GND
3	GND
4	GND

Headphone Out Connector	
1	GND
2	HP_L_OUT
3	HP_L_OUT
4	HP_R_OUT
5	HP_R_OUT

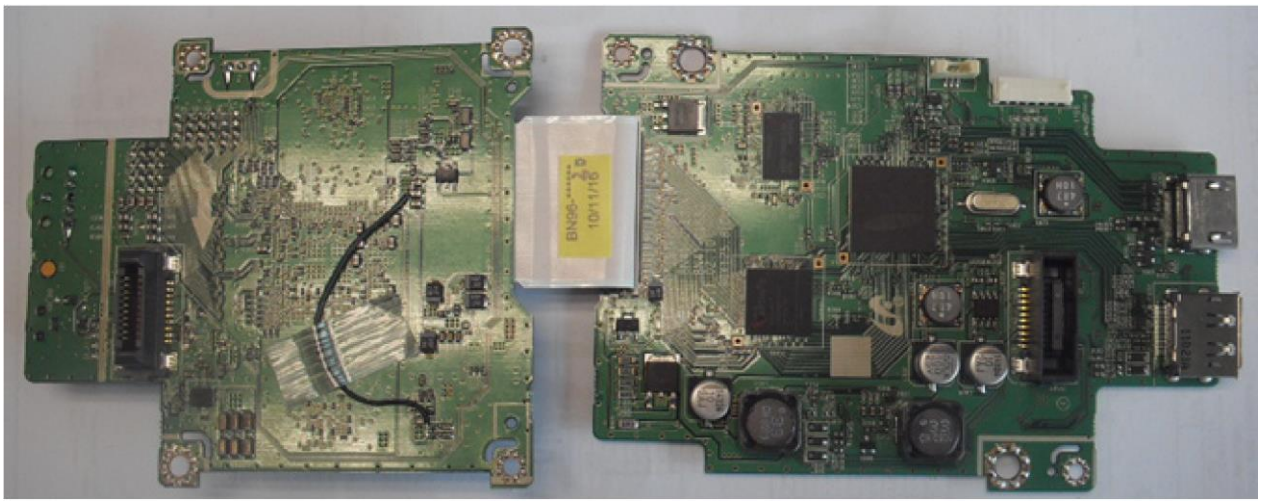
1 ↔ 2 B-to-B Connector			
1	VLED1	11	LED6
2	LED3	12	LED5
3	LED2	13	LED4
4	LED1	14	VLED3
5	GND	15	GND
6	+14V	16	SUB_SDA
7	+14V	17	SUB_SCL
8	+14V	18	DPMS_ON
9	HP_MUTE	19	PANEL_EN
10	NC	20	+5V_PANEL

1 ↔ 2 LVDS Connector			
1	AU_MCLK	31	LVDS_TX2_DN
2	AU_SCLK	32	LVDS_TX2_CP
3	AU_LRCLK	33	LVDS_TX2_CN
4	AU_SDOUT	34	LVDS_TX2_BP
5	GND	35	LVDS_TX2_BN
6	LVDS_TX4_DP	36	LVDS_TX2_AP
7	LVDS_TX4_DN	37	LVDS_TX2_AN
8	LVDS_TX4_CP	38	GND
9	LVDS_TX4_CN	39	LVDS_TX2_CLKP
10	LVDS_TX4_BP	40	LVDS_TX2_CLKN
11	LVDS_TX4_BN	41	GND
12	LVDS_TX4_AP	42	LVDS_TX1_DP
13	LVDS_TX4_AN	43	LVDS_TX1_DN
14	GND	44	LVDS_TX1_CP
15	LVDS_TX4_CLKP	45	LVDS_TX1_CN
16	LVDS_TX4_CLKN	46	LVDS_TX1_BP
17	GND	47	LVDS_TX1_BN
18	LVDS_TX3_DP	48	LVDS_TX1_AP
19	LVDS_TX3_DN	49	LVDS_TX1_AN
20	LVDS_TX3_CP	50	GND
21	LVDS_TX3_CN	51	LVDS_TX1_CLKP
22	LVDS_TX3_BP	52	LVDS_TX1_CLKN
23	LVDS_TX3_BN	53	GND
24	LVDS_TX3_AP	54	3D_SYNC_LR
25	LVDS_TX3_AN	55	O_BLU_LED_T
26	GND	56	ENABLE_3D
27	LVDS_TX3_CLKP	57	EMIT_3D_SYNC
28	LVDS_TX3_CLKN	58	GND
29	GND	59	NRESET_M180
20	LVDS_TX2_DP	60	EXT1_PLL

To Panel LVDS Connector							
1	B_RXE3P	22	B_RXO1P	43	F_RXOCP	64	VIN_5V
2	B_RXE3N	23	B_RXO1N	44	F_RXOCN	65	VIN_5V
3	GND	24	B_RXO0P	45	GND	66	VIN_5V
4	B_RXECP	25	B_RXO0N	46	F_RXO2P	67	VIN_5V
5	B_RXECN	26	GND	47	F_RXO2N	68	NC
6	GND	27	F_RXE3P	48	F_RXO1P	69	NC(CTL)
7	B_RXE2P	28	F_RXE3N	49	F_RXO1N	70	NC(CE)
8	B_RXE2N	29	GND	50	F_RXO0P	71	GND

9	B_RXE1P	30	F_RXECP	51	F_RXO0N	72	GND
10	B_RXE1N	31	F_RXECN	52	FB6	73	SDATA
11	B_RXE0P	32	GND	53	FB5	74	SCLK
12	B_RXE0N	33	F_RXE2P	54	FB4	75	STV
13	GND	34	F_RXE2N	55	VCC_LED2	76	GND
14	B_RXO3P	35	F_RXE1P	56	VCC_LED1	77	NC(Sync_o)
15	B_RXO3N	36	F_RXE1N	57	FB3	78	BIST_EN
16	GND	37	F_RXE0P	58	FB2	79	NC(ELIT_EN)
17	B_RXOCP	38	F_RXE0N	59	FB1	80	PWMI
18	B_RXOCN	39	GND	60	GND	81	Frame_sel
19	GND	40	F_RXO3P	61	GND	82	GND
20	B_RXO2P	41	F_RXO3N	62	VIN_5V		
21	B_RXO2N	42	GND	63	VIN_5V		

Main PBA – Coupling struc ture



5-4. Connector Functions

Connector	Functions
CN301 (1st floor)	HDMI signal input port * Failure symptoms: No HDMI Output error may occur.
CN302 (1st floor)	DP signal input port * Failure symptoms: No DP Output error may occur.
CN100 (1st floor)	Port that connects the power and signals between the 1st and 2nd floors * Failure symptoms: No Power error may occur or the LED backlight may not turn on.

CN400 (1st floor)	Port that connects the LVDS signal between the 1st and 2nd floors * Failure symptoms: Panel Test Pattern (W/R/G/B) may appear repeatedly.
CN504 (2nd floor)	14V power input port that connects the power and signals between the 1st and 2nd floors * Failure symptoms: No Power error may occur or a function may not work.
CN202 (2nd floor)	Headphones-output port * Failure symptoms: No Sound Output error may occur.
CN400 (2nd floor)	Port that connects the LVDS signal between the 1st and 2nd floors * Failure symptoms: Panel Test Pattern (W/R/G/B) may appear repeatedly.
CN100 (2nd floor)	Port that connects the power and signals between the 1st and 2nd floors * Failure symptoms: No Power error may occur or the LED may not turn on.
CN401 (2nd floor)	LVDS output port * Failure symptoms: Panel Test Pattern (W/R/G/B) may appear repeatedly or the LED backlight may not turn on.

5-5. Cables

Use	LVDS 60Pin FFC Cable	LVDS 82 Pin FPC Cable
Code	BN96-18862A	BN96-14108U
Photo