OLED TV
SERVICE MANUAL

CHASSIS : EB34D

MODEL : 55EA9800  55EA9800-TA

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.
SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by in the Schematic Diagram and Exploded View. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.

General Guidance

An isolation Transformer should always be used during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ. When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit

![Leakage Current Hot Check circuit](image)

When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω

*Base on Adjustment standard
SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the SAFETY PRECAUTIONS on page 3 of this publication.

NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions
1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   **CAUTION:** A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe.
   Do not test high voltage by “drawing an arc”.
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10 % (by volume) Acetone and 90 % (by volume) isopropyl alcohol (90 % - 99 % strength)
   **CAUTION:** This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts is not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.
   **CAUTION:** Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices
Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor “chip” components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.
1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, 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 bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines
1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500 °F to 600 °F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25 cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature. (500 °F to 600 °F)
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   **CAUTION:** Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
   b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   **CAUTION:** Work quickly to avoid overheating the circuit board printed foil.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.
IC Remove/Replacement
Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal
1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement
1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush.
   (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor
Removal/Replacement
1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device
Removal/Replacement
1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement
1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor
Removal/Replacement
1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair
Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections
To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).
1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections
Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.
1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
   CAUTION: Be sure the insulated jumper wire is dressed so that it does not touch components or sharp edges.
1. Application range
This specification is applied to the OLED TV with EB34D chassis.

2. Requirement for Test
Each part is tested as below without special appointment.

1) Temperature: 25 °C ± 5 °C(77 °F ± 9 °F), CST: 40 °C ± 5 °C
2) Relative Humidity: 65 % ± 10 %
3) Power Voltage
   : Standard input voltage (AC 100-240 V~, 50/60 Hz)
   * Standard Voltage of each products is marked by models.
4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method
1) Performance: LGE TV test method followed
2) Demanded other specification
   - Safety : UL, CSA, CE, IEC specification
   - EMC : FCC, ICES, CE, IEC specification
   - Wireless : Wireless HD Specification (Option)

4. Model General Specification

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<th>Item</th>
<th>Specification</th>
<th>Remarks</th>
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<td>Market</td>
<td>Asia, Oceania, Africa, Middle East (PAL/DVB Market)</td>
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<td>2</td>
<td>Broadcasting system</td>
<td>Digital : DVB-T Analog : PAL-BG, DK, I/I', SECAM-DK/BG/I</td>
<td>* Australia/India : only PAL-BG(B)</td>
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<td>Receiving system</td>
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<td>▶ DVB-T</td>
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5. External Input Support Format

5.1. 2D Mode

(1) Component (Y, Cb/Pb, Cr/Pr)

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<th>No.</th>
<th>Resolution</th>
<th>H-freq(kHz)</th>
<th>V-freq.(Hz)</th>
<th>Pixel clock</th>
<th>Proposed</th>
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## (2) HDMI Input(PC/DTV)

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### 5.2. 3D Mode

#### (1) RF Input

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<th>H-freq(kHz)</th>
<th>V-freq.(Hz)</th>
<th>Pixel clock(MHz)</th>
<th>Proposed</th>
<th>Remarks</th>
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<tbody>
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#### (2) HDMI Input

1) HDMI 1.3 (3D Supported mode manually)

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### (3) HDMI-PC Input (3D Supported mode manually)

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(2) USB Input (3D Supported mode manually)

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<td>Side by Side, Top &amp; Bottom, Checkerboard, Single Frame Sequential, Row Interleaving, Column Interleaving (Photo : Side by Side, Top &amp; Bottom)</td>
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### (5) DLNA Input

1) DLNA Input (3D Supported mode automatically)

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<th>Proposed</th>
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<td>Side by Side, Top &amp; Bottom, Checkerboard, MPO (Photo)</td>
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2) DLNA Input (3D Supported mode manually)

<table>
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<th>V-freq.(kHz)</th>
<th>Pixel clock(MHz)</th>
<th>Proposed</th>
<th>3D input proposed mode</th>
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<td>30.000</td>
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<td>HDTV 1080P</td>
<td>Side by Side, Top &amp; Bottom, Checkerboard, Single Frame Sequential, Row Interleaving, Column Interleaving (Photo : Side by Side, Top &amp; Bottom)</td>
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</tbody>
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### (6) Component Input

<table>
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<th>H-freq.(kHz)</th>
<th>V-freq.(kHz)</th>
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<th>3D input proposed mode</th>
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**Remark: 3D Input mode**
ADJUSTMENT INSTRUCTION

1. Application Range
This specification sheet is applied to EB34D Chassis applied OLED TV all models manufactured in TV factory.

2. Designation
(1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
(2) Adjustment must be done in the correct order.
(3) The adjustment must be performed in the circumstance of 25 °C ± 5 °C of temperature and 65 % ± 10 % of relative humidity if there is no specific designation.
(4) The input voltage of the receiver must keep AC 100-240 V~, 50/60 Hz.
(5) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15 °C.

In case of keeping module is in the circumstance of 0 °C, it should be placed in the circumstance of above 15 °C for 2 hours.

In case of keeping module is in the circumstance of below -20 °C, it should be placed in the circumstance of above 15 °C for 3 hours.

[Caution]
When still image is displayed for a period of 20 minutes or longer (Especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area.

3. MAIN PCBA Adjustments
3.1. ADC Calibration
- An ADC calibration is not necessary because MAIN SoC (LGExxxx) is already calibrated from IC Maker
- If it needs to adjust manually, refer to appendix

3.2. MAC Address, ESN, Widevine, HDCP2.0 key download
(1) Equipment & Condition
1) Play file: keydownload.exe
(2) Communication Port connection
1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)
(3) Download process
1) Select the download items.
2) Mode check: Online Only
3) Check the test process : DETECT → MAC_WRITE → WIDEVINE_WRITE
4) Play: START
5) Check of result: Ready, Test, OK or NG
6) Printer out (MAC Address Label)

(4) Communication Port connection
1) Connect
: PCBA Jig → RS-232C Port == PC → RS-232C Port

(5) Download
1) AJ/JA/IL models (13Y_H13)
- MAC+ Widevine + ESN + HDCP 2.0

(6) Inspection
- In INSTART menu, check these keys.

3.3. LAN Inspection(Ping Test)
3.3.1. Equipment setting
(1) Play the LAN Port Test PROGRAM.
(2) Input IP set up for an inspection to Test Program.
*IP Number : 12.12.2.2
Connect SET → LAN Port == PC → LAN Port

3.3.2. LAN PORT inspection(PING TEST)
(1) Play the LAN Port Test Program.
(2) Connect each other LAN Port Jack.
(3) Play Test (F9) button and confirm OK Message.
(4) Remove LAN cable.
3.4. EDID download

3.4.1. Overview
It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

3.4.2. Equipment
(1) Since embedded EDID data is used, EDID download JIG, HDMI cable are not need.
(2) Adjustment remote control

3.4.3. Download method
(1) Press Adj. key on the Adjustment remote control
(2) Select EDID D/L menu.
(3) By pressing Enter key, EDID download will begin
(4) If Download is successful, OK is display, but If Download is failure, NG is displayed.
(5) If Download is failure, Re-try downloads.
Caution) When EDID Download, must remove HDMI Cable.

3.4.4. EDID DATA
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<td>01</td>
</tr>
<tr>
<td>40</td>
<td>45</td>
<td>00</td>
<td>40</td>
<td>84</td>
<td>63</td>
<td>00</td>
<td>00</td>
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<td>63</td>
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<td>01</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>60</td>
<td>3E</td>
<td>1E</td>
<td>53</td>
<td>10</td>
<td>00</td>
<td>00</td>
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<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>70</td>
<td>00</td>
<td>4C</td>
<td>47</td>
<td>20</td>
<td>54</td>
<td>56</td>
<td>0A</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

EDID Block 1, Bytes 128-255 [80H-FFH]

| 0 | 02 | 03 | 3A | F1 | 4E | 10 | 9F | 04 | 13 | 05 | 14 | 03 | 02 | 12 | 20 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 10 | 22 | 15 | 01 | 29 | 3D | 06 | C0 | 15 | 07 | 50 | 09 | 57 | 07 | 78 | 03 |
| 20 | 00 | 10 | 00 | 6B | 02 | 0D | C0 | 0E | 01 | 4F | 3F | FC | 08 | 10 | 18 |
| 30 | 00 | 10 | 16 | 10 | 28 | 10 | E3 | 03 | 01 | 02 | 3A | 00 | 18 | 71 | 38 |
| 40 | 00 | 10 | 58 | 2C | 45 | 00 | 40 | 84 | 63 | 00 | 00 | 01 | 01 | 01 | 01 |
| 50 | 1C | 16 | 20 | 58 | 2C | 25 | 00 | 40 | 84 | 63 | 00 | 00 | 00 | 00 | FC |
| 60 | 72 | 51 | 0D | 0E | 20 | 6E | 28 | 05 | 00 | 40 | 84 | 63 | 00 | 00 | 01 |
| 70 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | XX |

* Checksum (HDMI 1/2/3/4)

<table>
<thead>
<tr>
<th>Input</th>
<th>FFh (Checksum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDMI1</td>
<td>E8 81</td>
</tr>
<tr>
<td>HDMI2</td>
<td>E8 71</td>
</tr>
<tr>
<td>HDMI3</td>
<td>E8 61</td>
</tr>
<tr>
<td>HDMI4</td>
<td>E8 51</td>
</tr>
</tbody>
</table>

4. Final Assembly Adjustment

4.1. White Balance Adjustment

4.1.1. Overview
(1) W/B adj. Objective & How-it-works
1) Objective: To reduce each Panel’s W/B deviation
2) How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
3) Adjustment condition: normal temperature
   ① Surrounding Temperature: 25 °C ± 5 °C
   ② Warm-up time: About 5 Min
   ③ Surrounding Humidity: 20 % ~ 80 %
   ④ Before White balance adjustment, Keep power on status, don’t power off
(2) Adj. condition and cautionary items
1) Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
2) Probe location: Color Analyzer(CA-210) probe should be within 10 cm and perpendicular of the module surface (80°~100°)
3) Aging time
   ① After Aging Start, Keep the Power ON status during 5 Minutes.
   ② In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

4.1.2. Equipment
(2) Adjustment Computer(During auto adj., RS-232C protocol is needed)
(3) Adjustment Remote control
(4) Video Signal Generator MSPG-925F 720p/204-Gray
   (Model: 217, Pattern: 49)
   * Color Analyzer Matrix should be calibrated using CS-1000.

4.1.3. Equipment connection

* If TV internal pattern is used, not needed
4.1.4. Adj. Command (Protocol)

- RS-232C Command used during auto-adjustment.

<table>
<thead>
<tr>
<th>RS-232C COMMAND</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wb 00 00</td>
<td>Begin White Balance adj.</td>
</tr>
<tr>
<td>Wb 00 ff</td>
<td>End White Balance adj. (internal pattern disappears)</td>
</tr>
</tbody>
</table>

- Adj. Map

<table>
<thead>
<tr>
<th>Adj. item</th>
<th>Command (lower case ASCII)</th>
<th>Data Range (Hex.)</th>
<th>Default (Decimal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R Gain</td>
<td>j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td>G Gain</td>
<td>g</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td>B Gain</td>
<td>i</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td>R Cut</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G Cut</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Cut</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Cool

<table>
<thead>
<tr>
<th>Mode</th>
<th>Coordinate</th>
<th>Temp</th>
<th>Δuv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool</td>
<td>0.276</td>
<td>11,000 K</td>
<td>0.0000</td>
</tr>
<tr>
<td>Medium</td>
<td>0.285</td>
<td>9,300 K</td>
<td>0.0000</td>
</tr>
<tr>
<td>Warm</td>
<td>0.313</td>
<td>6,500 K</td>
<td>+0.0030</td>
</tr>
</tbody>
</table>

- Standard color coordinate and temperature using CA-210(CH-14)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Coordinate</th>
<th>Temp</th>
<th>Δuv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool</td>
<td>0.276±0.002</td>
<td>11,000 K</td>
<td>0.0000</td>
</tr>
<tr>
<td>Medium</td>
<td>0.285±0.002</td>
<td>9,300 K</td>
<td>0.0000</td>
</tr>
<tr>
<td>Warm</td>
<td>0.313±0.002</td>
<td>6,500 K</td>
<td>+0.0030</td>
</tr>
</tbody>
</table>

4.1.5. Adjustment method

1) Auto WB calibration
   1) Set TV in ADJ mode using P-ONLY key (or POWER ONLY key).
   2) Place optical probe on the center of the display
      - It need to check probe condition of zero calibration before adjustment
   3) Connect RS-232C Cable
   4) Select mode in ADJ Program and begin a adjustment.
   5) When WB adjustment is completed with OK message, check adjustment status of pre-set mode (Cool, Medium, Warm)
   6) Remove probe and RS-232C cable.

2) LED White balance table
   1) Cool Mode
      - Purpose: Especially G-gain fix adjust leads to the luminance enhancement. Adjust the color temperature to reduce the deviation of the module color temperature.
      - Principle: To adjust the white balance without the saturation, Adjust the G gain more than 172 (If R gain or G gain is more than 255, G gain can adjust less than 172) and change the others (R/B Gain).
      - Adjustment mode: mode - Cool
   2) Medium / Warm Mode
      - Purpose: Adjust the color temperature to reduce the deviation of the module color temperature.
      - Principle: To adjust the white balance without the saturation, Fix the one of R/G/B gain to 192 (default data) and decrease the others.
      - Adjustment mode: Two modes - Medium / Warm

4.1.6. Reference (White balance Adj. coordinate and color temperature)

- Luminance: 204 Gray, 80IRE
- Standard color coordinate and temperature using CS-1000 (over 26 inch)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Coordinate</th>
<th>Temp</th>
<th>Δuv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool</td>
<td>0.276</td>
<td>11,000 K</td>
<td>0.0000</td>
</tr>
<tr>
<td>Medium</td>
<td>0.285</td>
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<td>0.0000</td>
</tr>
<tr>
<td>Warm</td>
<td>0.313</td>
<td>6,500 K</td>
<td>+0.0030</td>
</tr>
</tbody>
</table>

- Standard color coordinate and temperature using CA-210(CH-14)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Coordinate</th>
<th>Temp</th>
<th>Δuv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool</td>
<td>0.276±0.002</td>
<td>11,000 K</td>
<td>0.0000</td>
</tr>
<tr>
<td>Medium</td>
<td>0.285±0.002</td>
<td>9,300 K</td>
<td>0.0000</td>
</tr>
<tr>
<td>Warm</td>
<td>0.313±0.002</td>
<td>6,500 K</td>
<td>+0.0030</td>
</tr>
</tbody>
</table>

4.2. Tool Option setting & Inspection per countries

4.2.1. Overview

(1) Tool option selection is only done for models in Non-USA North America due to rating

(2) Applied model: LA02D and LA02E Chassis applied to CANADA and MEXICO

4.2.2. Country Group selection

(1) Press ADJ key on the Adj. R/C, and then select Country Group Menu

(2) Depending on destination, select KR or US, then on the lower Country option, select US, CA, MX. Selection is done using +, - KEY

4.2.3. Tool Option Inspection

(1) Press Adj. key on the Adj. R/C, and then check Tool option.

4.3. Magic Motion remote control Check

4.3.1. Required Instruments

(1) RF-remote control for check, IR-KEY-CODE remote control.

(2) Check AA battery before test. A recommendation is that a tester change battery every lots.

4.3.2. Test procedures

(1) Make pairing with TV set by pressing “Start key(Wheel key)” on RCU.

(2) Check a cursor on screen by pressing “Wheel key” of RCU.

(3) Stop paring with TV set by pressing “Back+ Home” key of RCU.
4.4. WIFI MAC ADDRESS CHECK
   a. Using RS232
   b. check the menu on in-start

<table>
<thead>
<tr>
<th>Command</th>
<th>Set ACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>[A][I][ ][Set ID][ ][20][Cr]</td>
<td>[O][K][X] or [NG]</td>
</tr>
</tbody>
</table>

4.5. 3D pattern test(Only for 3D models)

4.5.1. Test equipment
   (1) Pattern Generator MSHG-600 or MSPG-6100 (HDMI 1.4 support)
   (2) Pattern: HDMI mode (model No. 872, pattern No. 83)

4.5.2. Test method
   (1) Input 3D test signal as below.
   (2) Press 'OK' key as a 3D input OSD is shown.
   (3) Check pattern as Fig2 without 3D glasses. (3D mode without 3D glasses)

4.6. EYE-Q function check

   (1) Turn on TV.
   (2) Press EYE key of Adjustment remote control.
   (3) Cover the Eye Q sensor on the front of the set using your hand and wait for 6 seconds.
   (4) Confirm that value is lower than 100 of the “Sensor Data”. If the value is not lower than 100 after 6 seconds, replace Eye Q sensor.
   (5) Remove3 your hand from the Eye Q sensor and wait 6 seconds.
   (6) Confirm that “ok” pop up. If change is not seen, replace Eye Q sensor

4.7. Speaker Inspection

   (1) Input "Check-S" key of adjust remote control to inspect speaker.
   1) When you click the first, the output volume of left &right main speakers must be 50.
   2) When you click the second, the output volume of left &right main speakers must be 80.
   3) When you click the third, the output volume of left &right main speakers must be 100.
   4) When you click the fourth, the output volume of left main speaker must be 50.
   5) When you click the fifth, the output volume of right main speaker must be 50.
   6) When you click the sixth, the output volume of left sub speaker must be 100.
   7) When you click the seventh, the output volume of right sub speaker must be 100.
   8) When you click the eighth, the output volume of all speakers(left &right main speaker and left &right sub speaker) must be 30.
4.8. Control PCB Inspection
** Before you start a test, you must run a “Power-only mode”
   After you touch soft touch key of set, local key check display will start.
(1) Tab test
   : Touch Soft touch key of set quickly
(2) Left test
   : Touch Soft touch key of set to the left side
(3) Right test
   : Touch Soft touch key of set to the right side
(4) Long tab test
   : Touch Soft touch key of SET long

** The picture on your left side will pop up while tab test is progressed. The color of passed test will be changed green.
'TEST OK' will pop up the very bottom if you pass all test.

4.9. HDMI ARC Function Inspection
4.9.1. Test equipment
- Optic Receiver Speaker
- MSHG-600 (SW: 1220 ↑)
- HDMI Cable (for 1.4 version)

4.9.2. Test method
(1) Insert the HDMI Cable to the HDMI ARC port from the master equipment (HDMI1)
(2) Check the sound from the TV Set
(3) Check the Sound from the Speaker or using AV & Optic TEST program (It's connected to MSHG-600)

* Remark: Inspect in Power Only Mode and check SW version in master equipment

4.10. PIP/ W&R Function Inspection
(1) Objective : To check the connection between sub tuner and PCBA, and their Function
(2) Test Method : This Inspection is available only Power-Only Status.
   2) Check that the SUB TUNER pop up window on the TV Set.
   3) Check that the normal operation (picture, sound) of DTV on the TV Set.

4.11. Ship-out mode check (In-stop)
• After final inspection, press In-Stop key of the Adj. R/C and check that the unit goes to Stand-by mode.
5. AUDIO output check

5.1. AUDIO output check
(1) RF input: Mono, 1 KHz sine wave signal, 100 % Modulation
(2) CVBS, Component: 1 KHz sine wave signal (0.5 Vrms)

5.2. Specification

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Audio practical max Output, L/R</td>
<td>9.0</td>
<td>10.0</td>
<td>12.0</td>
<td>W</td>
<td>(1) Measurement condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- EQ/AVL/Clear Voice: Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2) Speaker (8Ω Impedance)</td>
</tr>
<tr>
<td></td>
<td>(Distortion=10% max Output)</td>
<td>8.5</td>
<td>8.9</td>
<td>9.9</td>
<td>Vrms</td>
<td>(1) Test voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- GND: 1.5 KV/min at 100 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- SIGNAL: 3 KV/min at 100 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2) Speaker (8Ω Impedance)</td>
</tr>
</tbody>
</table>

6. GND and HI-POT Test

6.1. GND & HI-POT auto-check preparation
- Check the POWER cable and SIGNAL cable insertion condition

6.2. GND & HI-POT auto-check
(1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
(2) Connect the AV JACK Tester.
(3) Controller (GWS103-4) on.
(4) GND Test (Auto)
   - If Test is failed, Buzzer operates.
   - If Test is passed, execute next process (Hi-pot test).
   - (Remove A/V CORD from A/V JACK BOX)
(5) HI-POT test (Auto)
   - If Test is failed, Buzzer operates.
   - If Test is passed, GOOD Lamp on and move to next process automatically.

6.3. Checkpoint
(1) Test voltage
   - GND: 1.5 KV/min at 100 mA
   - SIGNAL: 3 KV/min at 100 mA
(2) TEST time: 1 second
(3) TEST POINT
   - GND Test = POWER CORD GND and SIGNAL CABLE GND.
   - Hi-pot Test = POWER CORD GND and LIVE & NEUTRAL.
(4) LEAKAGE CURRENT: At 0.5 mArms

7. USB S/W download(Service only)
(1) Put the USB Stick to the USB socket.
(2) Automatically detecting update file in USB Stick.
   - If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.
(3) Show the message "Copying files from memory".
(4) Updating is starting.
(5) Updating Completed, The TV will restart automatically.
(6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
   * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. If all channel data is cleared, you didn't have a DTV/ATV test on production line.
   * After downloading, have to adjust TOOL OPTION again.
     1) Push "IN-START" key in service remote control.
     2) Select "Tool Option 1" and push "OK" key.
     3) Punch in the number. (Each model has their number.)
8. Optional adjustments

8.1. Manual ADC Calibration

8.1.1. Equipment & Condition

(1) Adjustment Remote control
(2) 801GF (802B, 802F, 802R) or MSPG925FA Pattern Generator
- Resolution: 480i Comp1 (MSPG-925FA: model-209, pattern-65)
- Resolution: 1080p Comp1 (MSPG-925FA: model-225, pattern-65)
- Resolution: 1080p RGB (MSPG-925FA: model-225, pattern-65)
- Pattern: Horizontal 100% Color Bar Pattern
- Pattern level: 0.7±0.1 Vp-p

8.1.2. Adjust method

(1) Check connected condition of Comp cable to the equipment
(2) Give a 480i Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA → Model: 209, Pattern: 65)
(3) Change input mode as Component1 and picture mode as "Standard"
(4) Press the In-start key on the ADJ remote control after at least 1 min of signal reception. Then, select 7.External ADC. And Press OK or Right key for going to sub menu.
(5) Press OK in Comp 480i menu
(6) Give a 1080p Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA → Model: 225, Pattern: 65)
(7) Press OK in Comp 1080p menu
(8) If ADC Comp is successful, "ADC Component Success" is displayed.
(9) If ADC calibration is failure, "ADC Component Fail" is displayed.
(10) If ADC calibration is failure, after rechecking ADC pattern or condition, retry calibration
(11) If ADC calibration is failure, after recheck ADC pattern or condition, retry calibration

8.2. Manual White balance Adjustment

8.2.1. Adj. condition and cautionary items

(1) Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
(2) Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)
(3) Aging time
  1) After Aging Start, Keep the Power ON status during 5 Minutes.
  2) In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

8.2.2. Equipment

(1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
(2) Adj. Computer (During auto adj., RS-232C protocol is needed)
(3) Adjust Remote control
(4) Video Signal Generator MSPG-925F 720p/216-Gray (Model: 217, Pattern: 78)

8.2.3. Adjustment

(1) Set TV in Adj. mode using POWER ON
(2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
(3) Press ADJ key → EZ adjust using adj. R/C → 6. White-Balance then press the cursor to the right (KEY►). When KEY► is pressed 216 Gray internal pattern will be displayed.
(4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
(5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

• If internal pattern is not available, use RF input. In EZ Adj. menu 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by △ in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RAY RADIATION. FILTER AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.
The symbol mark of this schematic diagram incorporates special features important for protection from X-radiation. Fire and electrical shock hazards, when servicing if is essential that only manufacturers specified parts be used for the critical components in the symbol mark of the schematic.
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.
The symbol mark of this schematic diagram incorporates special features important for protection from X-radiation, flame, and electrical shock hazards. When servicing it is essential that only manufacturer-specified parts be used for the critical components in the symbol mark of the schematic.
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

Place this cap. near IC Ethernet Block

Route Single 50 Ohm, Differential 100 Ohm

Place this cap. near IC

Place 0.1uF close to each power pins

Place this Res. near IC

Place near IC

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Only for training and service purposes

LGE Internal Use Only
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
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THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.
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B-CAS (SMART CARD) INTERFACE

Place CLK C3 far from C2, C7, C4 and C8

75 ohm in I/O is for short circuit Protection

B-CAS (SMART CARD) INTERFACE

+3.3V_Normal

SMARTCARD_VCC/SD_EMMC_CMD

SMARTCARD_RST/SD_EMMC_DATA[1]

SMARTCARD_RST/SD_EMMC_DATA[2]

SMARTCARD_DET/SD_EMMC_DATA[3]

SMARTCARD_CLK/SD_EMMC_DATA[0]

+3.3V_Normal

+3.3V_Normal

+3.3V_Normal

INT CMDVCC : STATUS

---------------------------------  HIGH    HIGH      CARD PRESENT  LOW     HIGH      CARD not PRESENT

CLKDIV1  CLKDIV2  : F_CRD_CLK-----------------------------   1        0        CLKIN

B-CAS (SMART CARD) INTERFACE

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Don't Connect Power At VDDI
(Just Internal LDO Capacitor)
OLED TV Repair Guide
`13 years New Models

< Applicable Model >
55EA9800
Main PCB for Broadband

55EA9800

Clear Speaker

CAM USB

Local Dim.
To PSU

Module

wifi
Motion assy
IR + Digital Eye
Front Spk
Local Key

1. Main processor_Digital(LG1152D), DDR Memory, Flash Memory
2. Main processor_analog(LG1152A)
3. Micom for Key/IR sensing
4. Audio AMP (Max 12W)
5. HDMI switch (4:1)
H13 Block diagram

H13
LG1154

[AV_L/R_IN]

[SC_L/R_IN]

[AUD_ADC_SIF]

[AUD_A OUT]

[AUD_ADC_CH1_IN]

[AUD_ADC_CH2_IN]

[AUD_ADC_CH3_IN]

[SPDIF_OUT_ARC]

[PHY0_ARC_OUT_0]

[IEC958OUT]

[TUNER_SIF]

[MICOM]

[SCART_MUTE]

[SCART]

[AUD_SCK/LRCK/LRCH]

[PHIO21]

[SPDIF_OUT]

[SPDIF_OUT_ARC]

[Mute CTRL [TR]]

[AO.Component]

[MICOM]

[TAS5733]

[SCART_MUTE]

[SCART_AUDIO L/R OUT]

[4P wafer]

[LPF]

[LPF]

[2P wafer]

[LPF]

[LPF]

[MAIN]

[TAS5733]

[WOOFER]

[TAS5733]

[AMP_RESET_N]

[AMP_MUTE]

[TPA6138A2 Headphone AMP]

[HP_L/ROUT_MAIN]

[HEAD PHONE & line out]
H13 Block diagram

H13 LG1154D

HDMI Switch (IC3201 / SII9587CNUC)

HDMI1
- HDMI Out (8 bits)
- I2C_SCL/SDA (5 pins)
- CEC_REMOTE
- TMDS Link (8 bits)
- DDC_I2C (2 bits)
- SPDIF_OUT_ARC
- HDMI_GE_ARC

HDMI2
- HDMI Out (8 bits)
- I2C_SCL/SDA (5 pins)
- CEC_REMOTE
- TMDS Link (8 bits)
- DDC_I2C (2 bits)
- HDMI_GE_ARC

HDMI3
- HDMI Out (8 bits)
- I2C_SCL/SDA (5 pins)
- CEC_REMOTE
- TMDS Link (8 bits)
- DDC_I2C (2 bits)
- HDMI_GE_ARC

HDMI4
- HDMI Out (8 bits)
- I2C_SCL/SDA (5 pins)
- CEC_REMOTE
- TMDS Link (8 bits)
- DDC_I2C (2 bits)
- MHL_DET

MICOM (IC3000 / R5F100GEAFB)

OCP (IC3202 / TPS2051)
Interconnection - 1

55EA9800

[PCBs]

1. Main PCB
2. PSU
3. WIFI ASSY
4. BT MOTION ASSY
5. IR PCB
6. Touch Key / Logo
## Contents of LCD TV Standard Repair Process

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<td>No video/Normal audio</td>
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<td>No video/No audio</td>
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<td>Exterior defect</td>
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</table>

First of all, Check whether there is SVC Bulletin in GCSC System for these model.
First of all, Check whether all of cables between board is inserted properly or not. (Main B/D↔ Power B/D, EPI Cable, Speaker Cable, IR B/D Cable,..)

1. No video 
   Normal audio 
   Move to No video/No audio

   A1
   Check OLED Light 
   On with naked eye

   A18
   Check Power Board 
   24V output

   A18
   Repair Power Board or parts

   Normal voltage
   Replace Inverter or module

   End

   Repair Power Board or parts

※ Precaution A4 & A2
Always check & record S/W Version and White Balance value before replacing the Main Board
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>A. Video error</th>
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<tbody>
<tr>
<td></td>
<td>No video/ No audio</td>
<td></td>
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</tbody>
</table>

**Standard Repair Process**

**A. Video error**

**No Video/ No audio**

- Check various voltages of Power Board (3.5V, 12V, 20V or 24V...)
- Normal voltage?
  - Yes: Check and replace MAIN B/D
  - No: Replace Power Board and repair parts

**End**

*Established date: 2013.01.31*

*Revised date: 2/16*

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### A. Video error

**Picture broken/ Freezing**

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<th>A. Video error</th>
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<td></td>
<td>Normal Picture?</td>
<td>2013.01.31</td>
<td>3/16</td>
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</tbody>
</table>

- **Check RF Signal level**
  - By using Digital signal level meter
  - By using Diagnostics menu on OSD
    - (Setting → Set up → Manual Tuning → Check the Signal)
    - Signal strength (Normal: over 50%)
    - Signal Quality (Normal: over 50%)

- **Check RF Cable Connection**
  1. Reconnection
  2. Install Booster

- **Check whether other equipments have problem or not.**
  - (By connecting RF Cable at other equipment)
  - → DVD Player, Set-Top-Box, Different maker TV etc.

- **Check S/W Version**

- **SVC Bulletin?**

- **Check Tuner soldering**

- **Close**

- **Contact with signal distributor or broadcaster (Cable or Air)**

- **S/W Upgrade**

- **Normal Picture?**

- **Replace Main B/D**

- **Close**
Standard Repair Process

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<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>A. Video error</th>
<th>Established date</th>
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<tr>
<td></td>
<td>Color error</td>
<td></td>
<td>Revised date</td>
<td>4/16</td>
</tr>
</tbody>
</table>

A6
- Check color by input
  - External Input
  - COMPONENT
  - AV
  - HDMI

Y N

- Color error?
  - N
    - Check error color input mode

Y

- Check color by input
  - External Input
  - COMPONENT
  - AV
  - HDMI

Y

- Check and replace Link Cable (EPI) and contact condition
  - Y
    - Replace Main B/D
  - N
    - Color error?
      - Y
        - Replace module
      - N
        - End

A7
- Color error?
  - Y
    - Replace Main B/D
  - N

A8
- Check Test pattern

Y

- External Input/Component error
  - Y
    - Replace Main B/D
  - N
    - External device/Cable normal
      - Y
        - Replace Main B/D
      - N
        - Request repair for external device/cable

Y

- HDMI error
  - Y
    - Replace Main B/D
  - N
    - External device/Cable normal
      - Y
        - Replace Main B/D
      - N
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>A. Video error</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Vertical / Horizontal bar, residual image, light spot, external device color error</td>
<td></td>
<td>2013.01.31</td>
<td>5/16</td>
</tr>
</tbody>
</table>

**Vertical/Horizontal bar, residual image, light spot**

☞ **A6**
Check color condition by input
- External Input
- Component
- HDMI

- Screen normal?
  - Y: Check external device connection condition
  - N: Replace Module

- Normal?
  - Y: Check and replace Link Cable
  - N: Replace Main B/D (adjust VCOM)

End

☞ **A7**
Replace Main B/D

For LGD panel

For other panel

☞ **A8**
Check Test pattern

**External device screen error-Color error**

Check S/W Version

- N: Check version
  - N: S/W Upgrade
  - Y: Screen normal?
    - Y: End
    - N: Normal screen?
      - Y: End
      - N: External Input error

- Component error
  - Y: Connect other external device and cable (Check normal operation of External Input, Component, RGB and HDMI/DVI by connecting Jig, pattern Generator, Set-top Box etc.)
  - N: Replace Main B/D

- HDMI/DVI
  - Y: Connect other external device and cable (Check normal operation of External Input, Component, RGB and HDMI/DVI by connecting Jig, pattern Generator, Set-top Box etc.)
  - N: Replace Main B/D

Screen normal?

- Y: Replace Main B/D
- N: Request repair for external device
A17
Check Logo LED
Power LED On?
Y
DC Power on by pressing Power Key
On Remote control
N
Check Power cord was inserted properly
Normal?
N
Y
Close
Check ST-BY 3.5V
A18
Normal voltage?
Y
Replace Main B/D
N
Replace Power B/D

A18
Normal operation?
N
Check Power On "High"
Y
OK?
Y
Replace Power B/D
N
Replace Main B/D

Measure voltage of each output of Power B/D
A18
Normal voltage?
Y
Replace Main B/D
N
Replace Power B/D

Replace Power B/D

Stand-By: Red or Turn Off
Operating: Turn Off

Established date: 2013.01.31
Revised date: 6/16
**Standard Repair Process**

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</thead>
<tbody>
<tr>
<td></td>
<td>Off when on, off while viewing, power auto on/off</td>
<td></td>
<td>2013.01.31</td>
<td>7/16</td>
</tr>
</tbody>
</table>

- Check outlet
- Check A/C cord
- Check for all 3-phase power out
- Fix A/C cord & Outlet and check each 3 phase out

**Check Power Off Mode**

- Error?
  - Y: A18 (If Power Off mode is not displayed) Check Power B/D voltage
    - Normal?
      - Y: Replace Main B/D
      - N: Replace Power B/D
  - N: Replace Main B/D

- CPU Abnormal
  - Replace Main B/D

**Check Power B/D voltage**

- Normal?
  - Y: Replace Main B/D
  - N: Replace Power B/D

**A19**

**Caution**
- Check and fix exterior of Power B/D Part

* Please refer to the all cases which can be displayed on power off mode.

**Status** | **Power off List** | **Explanation**
---|---|---
Normal | "POWEROFF_REMOTETKEY" | Power off by REMOTE CONTROL |
| "POWEROFF_OFFTIMER" | Power off by OFF TIMER |
| "POWEROFF_SLEEPTIMER" | Power off by SLEEP TIMER |
| "POWEROFF_INSTOP" | Power off by INSTOP KEY |
| "POWEROFF_AUTOOFF" | Power off by AUTO OFF |
| "POWEROFF_ONTIMER" | Power off by ON TIMER |
| "POWEROFF_20V_DET" | Power off by AC OFF |
| "POWEROFF_RESREC" | Power off by Reserved Record |
| "POWEROFF_RECEND" | Power off by End of Recording |
| "POWEROFF_SSWDOWN" | Power off by S/W Download |
| "POWEROFF_UNKNOWN" | Power off by unknown status except listed case |
Abnormal | "POWEROFF_ABNORMAL1" | Power off by abnormal status except CPU trouble |
| "POWEROFF_CPUABNORMAL" | Power off by CPU Abnormal |
## Standard Repair Process

### LCD TV

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<th>C. Audio error</th>
<th>Established date</th>
<th>Revised date</th>
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<tbody>
<tr>
<td>No audio/ Normal video</td>
<td></td>
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</tr>
</tbody>
</table>

### C. Audio error

1. **A20**
   - Check user menu > Speaker off
   - **Off**
     - **N**
       - Cancel OFF
     - **Y**
       - **A21+A18**
         - Check audio B+ 24 of Power Board
         - **Normal voltage**
           - **Y**
             - Replace Power Board and repair parts
           - **N**
             - **Disconnection**
               - **Y**
                 - Replace Speaker
               - **N**
                 - Replace MAIN Board
               - **End**

   - **Y**
     - **End**
→ abnormal audio/discontinuation/noise is same after “Check input signal” compared to No audio

Check input signal
- RF
- External Input signal

Signal normal?
Y
N

(WHEN RF signal is not received)
Request repair to external cable/ANT provider

(In case of External Input signal error)
Check and fix external device

(Wrecked audio/Discontinuation/Noise for all audio)
Check and replace speaker and connector

(Wrecked audio/Discontinuation/Noise only for D-TV)
Replace Main B/D

(Wrecked audio/Discontinuation/Noise only for Analog)
Replace Power B/D

(Wrecked audio/Discontinuation/Noise only for External Input)
Connect and check other external device

Normal audio?
Y
N

Check and fix external device

A21+A18
Check audio B+ Voltage (24V)

Normal voltage?
Y
N

End
1. Remote control (R/C) operating error

- **Check R/C itself Operation**
  - Normal operating?:
    - Y: **A22** Check & Repair Cable connection Connector solder
    - N: Replace R/C

- **Check R/C Operating When turn off light in room**
  - Normal operating?:
    - Y: Close
    - N: Check & Replace Battery of R/C

- If R/C operate, Explain the customer cause is interference from light in room.

- **Check 3.5v on Power B/D**
  - Replace Power B/D or Replace Main B/D (Power B/D don’t have problem)

- **Check B+ 3.5V On Main B/D**
  - Normal Voltage?:
    - Y: **Check IR Output signal**
    - N: Replace Main B/D

- **Check IR Output signal**
  - Normal Signal?:
    - Y: Repair/Replace IR B/D
    - N: Replace Main B/D
2. MR13/P (Magic Remocon) operating error

- Check the INSTART menu
  - Y: Check MR13/P itself Operation
  - N: Check & Replace Battery of MR13/P

- Check & Repair RF assy connection
  - Y: Close
  - N: Replace MR13

- RF Receiver ver is “00.00”? (A4)
  - Y: Close
  - N: Check MR13/P operating
    - Y: Press the wheel
      - Y: Is show ok message?
        - Y: Turn off/on the set and press the wheel
        - N: Close
      - N: Is show ok message?
        - Y: Press the back key about 5sec
        - N: Close
    - N: Normal operating?
      - Y: Close
      - N: Replace MR13

- RF Receiver ver is “00.00”? (A23)
  - Y: Close
  - N: Close

Down load the Firmware

* INSTART MENU→02.11 Remocon Test→3. Firmware download

- If you conduct the loop at 3times, change the MR13/P.
3. Wifi operating error

- Check the INSTART menu
  - Wi-Fi Mac value is "NG"?
    - N: Check the Wifi wafer 1 pin
    - Y: Check & Repair Wifi cable connection
      - A4
      - Y: A24
      - A24: Replace Main B/D
      - N: Close
  - A4: Wi-Fi Mac value is "NG"?
    - N: Close
    - Y: Change the Wifi assy
4. Camera operating error

Check the INSTART menu

Camera Ver. is “NG”?

Check & Repair Camera cable connection

Replace Camera B/D

Normal Voltage?

Change the Camera assy

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Revised date: 13/16

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LGE Internal Use Only
D. Function error

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<td>External device recognition error</td>
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</table>

**Check technical information**
- Fix information
- S/W Version

**Check input signal**

Y: Signal input?
N: Check and fix external device/cable

Y: Check technical information
- Fix information
- S/W Version

N: Technical information?
Y: Fix in accordance with technical information
N: External Input and Component Recognition error

- Replace Main B/D

Y: HDMI/DVI, Optical Recognition error
N: Replace Main B/D
E. Noise

Circuit noise, mechanical noise

Identify nose type

- Circuit noise
  - Check location of noise
  - Replace PSU

- Mechanical noise
  - Check location of noise

※ Mechanical noise is a natural phenomenon, and apply the 1st level description. When the customer does not agree, apply the process by stage.
※ Describe the basis of the description in “Part related to nose” in the Owner’s Manual.

※ When the nose is severe, replace the module (For models with fix information, upgrade the S/W or provide the description)

OR

※ If there is a “Tak Tak” noise from the cabinet, refer to the KMS fix information and then proceed as shown in the solution manual (For models without any fix information, provide the description)
### Standard Repair Process

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<th>F. Exterior defect</th>
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<td></td>
<td></td>
<td>Exterior defect</td>
<td>2013.01.31</td>
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</tr>
</tbody>
</table>

**Diagram:**

- **Module damage**
  - Zoom part with exterior damage → Replace module
- **Cabinet damage**
  - Replace cabinet
- **Remote controller damage**
  - Replace remote controller
- **Stand dent**
  - Replace stand
### Contents of LCD TV Standard Repair Process Detail Technical Manual

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<td>LCD-TV Version checking method</td>
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<td></td>
<td>Exchange Module (1)</td>
<td>A−4/5</td>
<td></td>
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<tr>
<td>14</td>
<td></td>
<td>Exchange Module (2)</td>
<td>A−5/5</td>
<td></td>
</tr>
</tbody>
</table>

<Appendix>
Defected Type caused by T-Con/Inverter/Module

Continue to the next page
## Contents of LCD TV Standard Repair Process Detail Technical Manual

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<td>Check front display LED</td>
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<td>POWER OFF MODE checking method</td>
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<td>Tool option changing method</td>
<td>A26</td>
<td></td>
</tr>
</tbody>
</table>
### Error symptom
A. Video error_No video/Normal audio

### Content
Check LCD back light with naked eye

---

After Remove the Rear Cover, turning on the power and disassembling the case, check with the naked eye.
Entry method

1. Press the ADJ button on the remote controller for adjustment.

2. Enter into White Balance of item 9.

3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>A. Video error_Video error, video lag/stop</th>
<th>Established date</th>
<th>2013.01.31</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Content</td>
<td>TUNER input signal strength checking method</td>
<td>Revised date</td>
<td>A3</td>
</tr>
</tbody>
</table>

Settings ➔ Channel ➔ Manual Tuning ➔ select channel

When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)
### LCD TV

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>A. Video error, Video error, video lag/stop</th>
<th>Established date</th>
<th>Revised date</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LCD-TV Version checking method</td>
<td>2013.01.31</td>
<td>A4</td>
<td></td>
</tr>
</tbody>
</table>

#### 1. Checking method for remote controller for adjustment

Press the IN-START with the remote controller for adjustment.

![Remote Controller Image](Image)
Checking method:
1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.
<table>
<thead>
<tr>
<th>Error symptom</th>
<th>Content</th>
<th>Established date</th>
<th>Revised date</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Video error: Vertical/Horizontal bar, residual image, light spot</td>
<td>LCD TV connection diagram (1)</td>
<td>2013.01.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As the part connecting to the external input, check the screen condition by signal
### Standard Repair Process Detail Technical Manual

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>A. Video error_Color error</th>
<th>Established date</th>
<th>Revised date</th>
<th>A7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Check Link Cable (EPI) reconnection condition</td>
<td>2013.01.31</td>
<td>A7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Check the contact condition of the Link Cable, especially dust or mis insertion.**
You can view 6 types of patterns using the ADJ Key

Checking item : 1. Defective pixel  2. Residual image  3. MODULE error (ADD-BAR,SCAN BAR..)  4. Video error (Classification of MODULE or Main-B/D!)

A8
Appendix: Exchange the Module (1)

Vertical Block
Brightness difference
Line Dim
Crosstalk
Press damage
Crosstalk
Burnt

Un-repairable Cases
In this case please exchange the module.
Appendix : Exchange the Module (2)

Un-repairable Cases
In this case please exchange the module.

A – 2/2
B. Power error _No power

Content
Check front display Logo

Established date 2013.01.31
Revised date A17

Screen
Power button
Speaker
LG logo Light
Remote control sensor

Front LED control:
Menu → Option → Standby Light → ON/Off

ST-BY condition: On or Off
Power ON condition: Turn Off
### Error symptom

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>B. Power error <em>No power</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>Check power input voltage and ST-BY 3.5V</td>
</tr>
</tbody>
</table>

### Check the DC 24V, 12V, 3.5V.

#### 18 Pin (Power Board ↔ Main Board)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Power on</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>DRV ON</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.5V</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>3.5V</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>24V</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>GND</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>12V</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>12V</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>GND</td>
<td>18</td>
</tr>
</tbody>
</table>
**Entry method**

1. Press the IN-START button of the remote controller for adjustment
2. Check the entry into adjustment item 3
## Checking method

1. Press the Setting button on the remote controller
2. Select the Sound function of the Menu
3. Select the Sound Setting
4. Select TV Speaker

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>Content</th>
<th>Established date</th>
<th>Revised date</th>
<th>A20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C. Audio error_No audio/Normal video</td>
<td>Checking method in menu when there is no audio</td>
<td>2013.01.31</td>
<td>A20</td>
<td></td>
</tr>
</tbody>
</table>
Checking order when there is no audio

① Check the contact condition of or 24V connector of Main Board

② Measure the 24V input voltage supplied from Power Board
   (If there is no input voltage, remove and check the connector)

③ Connect the tester RX1 to the speaker terminal and if you hear the Chik Chik sound when you touch the GND and output terminal, the speaker is normal.
Checking order

1. Check Touch cable condition between Touch & Main board.
2. Check the st-by 3.5V on the terminal 4, 7.
3. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.
### LCD TV

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>D. Function error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion</td>
<td>Remote operation checking method</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th></th>
<th></th>
<th>Established date</th>
<th>Revised date</th>
<th>A23</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+3.5V_WOL</td>
<td>2013.01.31</td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td>+3.3V</td>
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<tr>
<td>3</td>
<td>USB_DM</td>
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<tr>
<td>4</td>
<td>RTS</td>
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<td>5</td>
<td>USB_DP</td>
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<td>6</td>
<td>RX</td>
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<tr>
<td>16</td>
<td>GND</td>
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<tr>
<td>17</td>
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<td>18</td>
<td>EYE_SDA</td>
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</tr>
</tbody>
</table>

### Checking order

1. Check Motion cable condition between Motion assy & Main board.
2. Check the 3.3V on the terminal 2.
Checking order

1. 2. Check Wifi cable condition between Wifi assy & Main board.
3. Check the 3.3V on the terminal 2.
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>D. Function error</th>
<th>Established date</th>
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</thead>
<tbody>
<tr>
<td>Content</td>
<td>Camera operation checking method</td>
<td></td>
<td>2013.01.31</td>
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</tr>
</tbody>
</table>

### Checking order

1. Check Camera cable condition between Camera assy & Main board.
2. Check the 3.5V on the terminal 2.

#### P4200

| 1 | CAM_SLIDE_DET |
| 2 | +3.5V_CAM |
| 3 | AUD_LRCH |
| 4 | AUD_LRCK |
| 5 | AUD_SCK |
| 6 | GND |
| 7 | CAM_PWR_ON_CMD |
| 8 | ST_BY_DET_CAM |
| 9 | GND |
| 10 | USB_CAMERA_DP |
| 11 | USB_CAMERA_DM |
| 12 | GND |
Changing method

1. Contact the USB memory. (USB 1,2,3 jack)
2. Enter the password. (ex. 000000)

* Access USB Memory has each password.