LCD TV
SERVICE MANUAL

CHASSIS : LD91A
MODEL : 19LH2000  19LH2000-ZA
            19LH2020  19LH2020-ZC

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 1W), keep the resistor 10mm 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 1MΩ and 5.2MΩ. 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 1.5K/10watt resistor in parallel with a 0.15uF 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 0.5mA.

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

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

*Base on Adjustment standard
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.

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 commonly 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 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 of 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 1.25cm) brush with a metal handle.

5. Do not use freon-propelled spray-on cleaners.

6. Do not use an anti-static type solder removal device or with solder braid.

CAUTION: Work quickly to avoid overheating the circuit board printed foil.

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.

Copyright ©2009 LG Electronics. Inc. All right reserved. - 4 - LGE Internal Use Only
Only for training and service purposes
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 y 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 the it does not touch components or sharp edges.
SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range
   This specification is applied to the LCD TV used LD91A chassis.

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

   1) Temperature : 25±5°C (77±9°F), CST : 40±5°C
   2) Relative Humidity : 65±10%
   3) Power Voltage : Standard input voltage (100-240V@50/60Hz)
      * Standard Voltage of each products is marked by models.
   4) Specification and performance of each parts are followed
c      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: CE, IEC specification
      - EMC: CE, IEC

4. Module General Specification

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Specification</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screen Device</td>
<td>19” wide color display module</td>
<td>LCD</td>
</tr>
<tr>
<td>2</td>
<td>Aspect Ratio</td>
<td>16:9</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>LCD Module</td>
<td>19” TFT LCD HD</td>
<td>LGD/AUO</td>
</tr>
<tr>
<td>4</td>
<td>Storage Environment</td>
<td>Temp. : -20 ~ 60 deg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Humidity : 10 ~ 90 %</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Input Voltage</td>
<td>AC100-240V~ 50/60Hz</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Power Consumption</td>
<td>LGD Typ : 13.48</td>
<td>LCD(Module) + Backlight(Lamp)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUO Typ : 14</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Module Size</td>
<td>LGD 430.4(H) x 254.6(V) x 13.0(D)</td>
<td>Without Inverter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUO 430.37(H) x 254.6(V) x 16.5(D)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pixel Pitch</td>
<td>LGD 0.1 RGB(H) x 0.3(V)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AUO 0.3(per one triad) x 0.3</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Back Light</td>
<td>2 CCFL</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Display Colors</td>
<td>1.06Billion(FHD LGD), 16.7M (others)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Coating</td>
<td>3H, AG</td>
<td></td>
</tr>
</tbody>
</table>
5. Chroma & Brightness
- Module optical specification

(1) LGD Module

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Viewing Angle&lt;CR&gt;10&gt;</td>
<td>Right/Left/Up/Down</td>
<td></td>
<td>170</td>
<td></td>
<td>Degree</td>
</tr>
<tr>
<td>2.</td>
<td>Luminance</td>
<td>Luminance (cd/m²)</td>
<td>250</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variation</td>
<td></td>
<td>75</td>
<td>-</td>
<td>1.3</td>
<td>MAX/MIN</td>
</tr>
<tr>
<td>3.</td>
<td>Contrast Ratio</td>
<td>CR</td>
<td>600</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>CIE Color Coordinates</td>
<td>White</td>
<td>WX</td>
<td>0.313</td>
<td></td>
<td>Typ ±0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WY</td>
<td>0.392</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RED</td>
<td>Xr</td>
<td>0.642</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yr</td>
<td>0.334</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
<td>Xg</td>
<td>0.304</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yg</td>
<td>0.608</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue</td>
<td>Xb</td>
<td>0.146</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yb</td>
<td>0.073</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Standard Test Condition (The unit has been ‘ON’)
2) Stable for approximately 30 minutes in a dark environment at 25±2°C.
3) The values specified are at approximate distance 50Cm from the LCD surface
4) Ta=25±2°C, VLCD=12.0V, fV=60Hz, Dclk=74.25MHz VBR_A=1.65V, ExtVBR_B=100%

(2) AUO Module

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Viewing Angle&lt;CR&gt;10&gt;</td>
<td>Right/Left/Up/Down</td>
<td>150</td>
<td>170</td>
<td></td>
<td>Degree</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Up/Down</td>
<td>140</td>
<td>160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Luminance</td>
<td>Luminance (cd/m²)</td>
<td>240</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variation</td>
<td></td>
<td>75</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Contrast Ratio</td>
<td>CR</td>
<td>600</td>
<td>1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>CIE Color Coordinates</td>
<td>White</td>
<td>WX</td>
<td>0.313</td>
<td></td>
<td>Typ ±0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WY</td>
<td>0.392</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RED</td>
<td>Xr</td>
<td>0.648</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yr</td>
<td>0.339</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
<td>Xg</td>
<td>0.292</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yg</td>
<td>0.603</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue</td>
<td>Xb</td>
<td>0.143</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yb</td>
<td>0.070</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Standard Test Condition (The unit has been ‘ON’)
2) Stable for approximately 30 minutes in a dark environment at 25±2°C.
3) The values specified are at approximate distance 50Cm from the LCD surface
4) Ta=25±2°C, VLCD=12.0V, fV=60Hz, Dclk=74.25MHz VBR_A=1.65V, ExtVBR_B=100%
### 6. Component Video Input (Y, Cb/Pb, Cr/Pr)

<table>
<thead>
<tr>
<th>No</th>
<th>Resolution</th>
<th>H-freq(kHz)</th>
<th>V-freq(Hz)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>720x480</td>
<td>15.73</td>
<td>60.00</td>
<td>SDTV, DVD 480i</td>
</tr>
<tr>
<td>2</td>
<td>720x480</td>
<td>15.63</td>
<td>59.94</td>
<td>SDTV, DVD 480i</td>
</tr>
<tr>
<td>3</td>
<td>720x480</td>
<td>31.47</td>
<td>59.94</td>
<td>480p</td>
</tr>
<tr>
<td>4</td>
<td>720x480</td>
<td>31.50</td>
<td>60.00</td>
<td>480p</td>
</tr>
<tr>
<td>5</td>
<td>720x576</td>
<td>15.625</td>
<td>50.00</td>
<td>SDTV, DVD 625 Line</td>
</tr>
<tr>
<td>6</td>
<td>720x576</td>
<td>31.25</td>
<td>50.00</td>
<td>HDTV 576p</td>
</tr>
<tr>
<td>7</td>
<td>1280x720</td>
<td>45.00</td>
<td>50.00</td>
<td>HDTV 720p</td>
</tr>
<tr>
<td>8</td>
<td>1280x720</td>
<td>44.96</td>
<td>59.94</td>
<td>HDTV 720p</td>
</tr>
<tr>
<td>9</td>
<td>1280x720</td>
<td>45.00</td>
<td>60.00</td>
<td>HDTV 720p</td>
</tr>
<tr>
<td>10</td>
<td>1920x1080</td>
<td>31.25</td>
<td>50.00</td>
<td>HDTV 1080i</td>
</tr>
<tr>
<td>11</td>
<td>1920x1080</td>
<td>33.75</td>
<td>60.00</td>
<td>HDTV 1080i</td>
</tr>
<tr>
<td>12</td>
<td>1920x1080</td>
<td>33.72</td>
<td>59.94</td>
<td>HDTV 1080i</td>
</tr>
<tr>
<td>13</td>
<td>1920x1080</td>
<td>56.250</td>
<td>50</td>
<td>HDTV 1080p</td>
</tr>
<tr>
<td>14</td>
<td>1920x1080</td>
<td>67.5</td>
<td>60</td>
<td>HDTV 1080p</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No</th>
<th>Specification</th>
<th>Pixel Clock(MHz)</th>
<th>Proposed</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>720*400</td>
<td>31.468</td>
<td>28.321</td>
<td>VESA</td>
</tr>
<tr>
<td>2</td>
<td>640*480</td>
<td>31.469</td>
<td>25.17</td>
<td>VESA</td>
</tr>
<tr>
<td>3</td>
<td>800*600</td>
<td>37.879</td>
<td>40.00</td>
<td>VESA</td>
</tr>
<tr>
<td>4</td>
<td>1024*768</td>
<td>48.363</td>
<td>65.00</td>
<td>VESA(XGA)</td>
</tr>
<tr>
<td>5</td>
<td>1280*768</td>
<td>47.78</td>
<td>79.5</td>
<td>WXGA</td>
</tr>
<tr>
<td>6</td>
<td>1360*768</td>
<td>47.72</td>
<td>84.75</td>
<td>WXGA</td>
</tr>
<tr>
<td>7</td>
<td>1280*1024</td>
<td>63.595</td>
<td>108.875</td>
<td>SXGA</td>
</tr>
<tr>
<td>8</td>
<td>1920*1080</td>
<td>66.587</td>
<td>138.625</td>
<td>WUXGA</td>
</tr>
</tbody>
</table>

### 7. RGB (PC)

<table>
<thead>
<tr>
<th>No</th>
<th>Resolution</th>
<th>H-freq(kHz)</th>
<th>V-freq(Hz)</th>
<th>Pixel Clock(MHz)</th>
<th>Proposed</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>720*400</td>
<td>31.468</td>
<td>70.08</td>
<td>28.321</td>
<td>VESA</td>
<td>For only DOS mode</td>
</tr>
<tr>
<td>2</td>
<td>640*480</td>
<td>31.469</td>
<td>59.94</td>
<td>25.17</td>
<td>VESA</td>
<td>Input 848<em>480 60Hz, 852</em>480 60Hz -&gt; 640*480 60Hz Display</td>
</tr>
<tr>
<td>3</td>
<td>800*600</td>
<td>37.879</td>
<td>60.31</td>
<td>40.00</td>
<td>VESA</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1024*768</td>
<td>48.363</td>
<td>60.00</td>
<td>65.00</td>
<td>VESA(XGA)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1280*768</td>
<td>47.78</td>
<td>59.87</td>
<td>79.5</td>
<td>WXGA</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1360*768</td>
<td>47.72</td>
<td>59.8</td>
<td>84.75</td>
<td>WXGA</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1280*1024</td>
<td>63.595</td>
<td>60.0</td>
<td>108.875</td>
<td>SXGA</td>
<td>FHD model</td>
</tr>
<tr>
<td>8</td>
<td>1920*1080</td>
<td>66.587</td>
<td>59.93</td>
<td>138.625</td>
<td>WUXGA</td>
<td>FHD model</td>
</tr>
</tbody>
</table>
## 8. HDMI Input (PC/DTV)

### (1) DTV Mode

<table>
<thead>
<tr>
<th>No.</th>
<th>Resolution</th>
<th>H-freq(kHz)</th>
<th>V-freq.(Hz)</th>
<th>Pixel clock(MHz)</th>
<th>Proposed</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>720*480</td>
<td>31.469 /31.5</td>
<td>59.94 /60</td>
<td>27.00/27.03</td>
<td>HDCP</td>
<td>SDTV 480P</td>
</tr>
<tr>
<td>2.</td>
<td>720*576</td>
<td>31.25</td>
<td>50</td>
<td>54</td>
<td></td>
<td>SDTV 576P</td>
</tr>
<tr>
<td>3.</td>
<td>1280*720</td>
<td>37.500</td>
<td>50</td>
<td>74.25</td>
<td></td>
<td>HDTV 720P</td>
</tr>
<tr>
<td>4.</td>
<td>1280*720</td>
<td>44.96 /45</td>
<td>59.94 /60</td>
<td>74.17/74.25</td>
<td></td>
<td>HDTV 720P</td>
</tr>
<tr>
<td>5.</td>
<td>1920*1080</td>
<td>33.72 /33.75</td>
<td>59.94 /60</td>
<td>74.17/74.25</td>
<td></td>
<td>HDTV 1080I</td>
</tr>
<tr>
<td>6.</td>
<td>1920*1080</td>
<td>28.125</td>
<td>50.00</td>
<td>74.25</td>
<td></td>
<td>HDTV 1080I</td>
</tr>
<tr>
<td>7.</td>
<td>1920*1080</td>
<td>26.97 /27</td>
<td>23.97 /24</td>
<td>74.17/74.25</td>
<td></td>
<td>HDTV 1080P</td>
</tr>
<tr>
<td>8.</td>
<td>1920*1080</td>
<td>33.716 /33.75</td>
<td>29.976 /30.00</td>
<td>74.25</td>
<td></td>
<td>HDTV 1080P</td>
</tr>
<tr>
<td>9.</td>
<td>1920*1080</td>
<td>56.250</td>
<td>50</td>
<td>148.5</td>
<td></td>
<td>HDTV 1080P</td>
</tr>
<tr>
<td>10.</td>
<td>1920*1080</td>
<td>67.43 /67.5</td>
<td>59.94 /60</td>
<td>148.35/148.50</td>
<td></td>
<td>HDTV 1080P</td>
</tr>
</tbody>
</table>

### (2) PC Mode

<table>
<thead>
<tr>
<th>No.</th>
<th>Resolution</th>
<th>H-freq(kHz)</th>
<th>V-freq.(Hz)</th>
<th>Pixel clock(MHz)</th>
<th>Proposed</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>720*400</td>
<td>31.468</td>
<td>70.08</td>
<td>28.321</td>
<td></td>
<td>HDCP</td>
</tr>
<tr>
<td>2.</td>
<td>840*480</td>
<td>31.469</td>
<td>59.94</td>
<td>25.17</td>
<td>VESA</td>
<td>HDCP</td>
</tr>
<tr>
<td>3.</td>
<td>800*600</td>
<td>37.879</td>
<td>60.31</td>
<td>40.00</td>
<td>VESA</td>
<td>HDCP</td>
</tr>
<tr>
<td>4.</td>
<td>1024*768</td>
<td>48.363</td>
<td>60.00</td>
<td>65.00</td>
<td>VESA(XGA)</td>
<td>HDCP</td>
</tr>
<tr>
<td>5.</td>
<td>1280*768</td>
<td>47.78</td>
<td>59.87</td>
<td>79.5</td>
<td>WXGA</td>
<td>HDCP</td>
</tr>
<tr>
<td>6.</td>
<td>1360*768</td>
<td>47.72</td>
<td>59.8</td>
<td>84.75</td>
<td>WXGA</td>
<td>HDCP</td>
</tr>
<tr>
<td>7.</td>
<td>1280*1024</td>
<td>63.595</td>
<td>60.0</td>
<td>108.875</td>
<td>SXGA</td>
<td>HDCP/FHD model</td>
</tr>
<tr>
<td>8.</td>
<td>1920*1080</td>
<td>67.5</td>
<td>60.00</td>
<td>138.625</td>
<td>WUXGA</td>
<td>HDCP/FHD model</td>
</tr>
</tbody>
</table>
ADJUSTMENT INSTRUCTION

1. Application Range
This specification sheet is applied to all of the LCD TV with LD91A chassis.

2. Designation
1) The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
2) Power Adjustment: Free Voltage
3) Magnetic Field Condition: Nil.
4) Input signal Unit: Product Specification Standard
5) Reserve after operation: Above 5 Minutes (Heat Run)
   Temperature: at 25±5°C
   Relative humidity: 65±10%
   Input voltage: 220V, 60Hz
6) Adjustment equipments: Color Analyzer (CA-210 or CA-110), DDC Adjustment Jig equipment, SVC remote controller
7) Push The “IN STOP KEY” - For memory initialization.

Case1 : Software version up
1. After downloading S/W by USB, TV set will reboot automatically
2. Push “In-stop” key
3. Push “Power on” key
4. Function inspection
5. After function inspection, Push “1 n-stop” key.

Case2 : Function check at the assembly line
1. When TV set is entering on the assembly line, Push “In-stop” key at first.
2. Push “Power on” key for turning it on.
   -> If you push “Power on” key, TV set will recover channel information by itself.
3. After function inspection, Push “In-stop” key.

3. Main PCB check process
   * APC - After Manual-Insult, executing APC

   * Boot file Download
   1. Execute ISP program “Mstar ISP Utility” and then click “Config” tab.
   2. Set as below, and then click “Auto Detect” and check “OK” message
      If “Error” is displayed, Check connection between computer, jig, and set.
   3. Click “Read” tab, and then load download file (XXXX.bin) by clicking “Read”

4. Click “Connect” tab. If “Can’t” is displayed, check connection between computer, jig, and set.
5. Click “Auto” tab and set as below
6. Click “Run”.
7. After downloading, check “OK” message.

* USB DOWNLOAD
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 staring.

5) Fishing the version uploading, you have to put USB stick and “AC Power” off.
6) After putting “AC Power” on and check updated version on your TV.

* 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 controller
2) Select “Tool Option 1” and Push “OK” button.
3) Punch in the number. (Each model has their number)
4) Completed selecting Tool option.

3.1. ADC Process
(1) ADC
• Input signal : Component 480i
• Signal equipment displays.

3.2 Function Check
(1) Check display and sound
- Check Input and Signal items. (cf. work instructions)
  1. TV
  2. AV (SCART1/SCART2/ CVBS)
  3. COMPONENT (480i)
  4. RGB (PC : 1024 x 768 @ 60hz)
  5. HDMI
  6. PC Audio In
- Display and Sound check is executed by Remote controller.
4. Total Assembly line process

4.1. Adjustment Preparation

- W/B Equipment condition
  - CA210 : CH 9, Test signal : Inner pattern (85IRE)
  - Above 5 minutes H/run in the inner pattern. (*power on key of adjust remote control)

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Cool 9,300k K</th>
<th>Medium 8,000k K</th>
<th>Warm 6,500k K</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Y</td>
<td>X</td>
<td>Y</td>
</tr>
<tr>
<td>Test Signal</td>
<td>0.285±0.002</td>
<td>0.295±0.002</td>
<td>0.313±0.002</td>
</tr>
<tr>
<td>Inner pattern</td>
<td>0.293±0.002</td>
<td>0.305±0.002</td>
<td>0.329±0.002</td>
</tr>
<tr>
<td>(216gray,85IRE)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Connecting picture of the measuring instrument
  (On Automatic control)
  Inside PATTERN is used when W/B is controlled. Connect to auto controller or push Adjustment R/C POWER ON -> Enter the mode of White-Balance, the pattern will come out

* Auto-control interface and directions
  1) Adjust in the place where the influx of light like floodlight around is blocked. (illumination is less than 10ux).
  2) Adhere closely the Color Analyzer (CA210) to the module less than 10cm distance, keep it with the surface of the Module and Color Analyzer’s Prove vertically (80~100°).
  3) Aging time
     - After aging start, keep the power on (no suspension of power supply) and heat-run over 15minutes.
     - Using ‘no signal’ or ‘full white pattern’ or the others, check the back light on.

* Auto adjustment Map(RS-232C)

4.2. DDC EDID Write (RGB 128Byte)

- Connect D-sub Signal Cable to D-sub Jack.
- Write EDID Data to EEPROM(24C02) by using DDC2B protocol.
- Check whether written EDID data is correct or not.
  * For SVC main Ass’y, EDID have to be downloaded to Insert Process in advance.

4.3. DDC EDID Write (HDMI 256Byte)

- Connect HDMI Signal Cable to HDMI Jack.
- Write EDID Data to EEPROM(24C02) by using DDC2B protocol.
- Check whether written EDID data is correct or not.
  * For SVC main Ass’y, EDID have to be downloaded to Insert Process in advance.

4.4. EDID DATA

  1) All Data : HEXA Value
  2) Changeable Data :
     * : Serial No : Controlled / Data:01
     ** : Month : Controlled / Data:00
     *** : Year : Controlled
     **** : Check sum

  - After enter Service Mode by pushing “ADJ” key,
  - Enter White Balance by pushing “►” key at “3. White Balance”.

* After done all adjustments, Press “In-start” button and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable. If it is not same, then correct it same with BOM and unplug AC cable. For correct it to the model’s module from factory JIG model.
  * Push The “IN STOP KEY” after completing the function inspection.

** Caution **

- Color Temperature : COOL, Medium, Warm.
- One of R Gain=G Gain/ B Gain should be kept on 0xC0, and adjust other two lower than C0. (when R/G/B Gain are all C0, it is the FULL Dynamic Range of Module)
### Auto Download
- After enter Service Mode by pushing “ADJ” key,
- Enter EDID D/L mode.
- Enter “START” by pushing “OK” key.

* Edid data and Model option download (RS232)

<table>
<thead>
<tr>
<th>Item</th>
<th>CMD1</th>
<th>CMD2</th>
<th>Data0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Download</td>
<td>A</td>
<td>A</td>
<td>0 0</td>
</tr>
<tr>
<td>‘Mode In’</td>
<td>0 When transfer the ‘Mode In’, Carry the command.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Download</td>
<td>A</td>
<td>E</td>
<td>00 10</td>
</tr>
<tr>
<td>Automatically Download (The use of a internal pattern)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Manual Download
- Caution
1) Use the proper signal cable for EDID Download
   - Analog EDID : Pin3 exists
   - Digital EDID : Pin3 exists
2) Never connect HDMI & D-sub Cable at the same time.
3) Use the proper cables below for EDID Writing
4) Download HDMI1, HDMI2, separately because HDMI1 is different from HDMI3

For Analog EDID
- D-sub to D-sub

For HDMI EDID
- DVI-D to HDMI or HDMI to HDMI

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Condition</th>
<th>Hex Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ManufacturerID</td>
<td>GSM</td>
<td>1E6D</td>
</tr>
<tr>
<td>2</td>
<td>Version</td>
<td>Digital : 1</td>
<td>01</td>
</tr>
<tr>
<td>3</td>
<td>Revision</td>
<td>Digital : 3</td>
<td>03</td>
</tr>
</tbody>
</table>

### (1) Analog Data 128Byte (2Bi)

### (2) Digital DATA(HDMI-1/2/3/4) 256Byte

* Detail EDID Options are below

<table>
<thead>
<tr>
<th>Model Name</th>
<th>HEX</th>
<th>EDID Table</th>
<th>DDC Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHD Model</td>
<td>0001</td>
<td>01 00</td>
<td>Analog/Digital</td>
</tr>
<tr>
<td>HD Model</td>
<td>0000</td>
<td>00 00</td>
<td>Analog/Digital</td>
</tr>
</tbody>
</table>

- Serial No: Controlled on production line.
- Month, Year: Controlled on production line:
  - ex) Monthly : '09' -> '09'
  - Year : '2006' -> '10'
- Model Name(Hex):

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MODEL NAME(HEX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>00 00 00 FC 00 47 20 54 56 0A 20 20 20 20 20</td>
</tr>
</tbody>
</table>

- Checksum: Changeable by total EDID data.
- Vendor Specific(HDMI)
4.5. V-COM Adjust (Only 37/42/47LH4000-ZA)

- Why need Vcom adjustment?
  - The Vcom (Common Voltage) is a Reference Voltage of Liquid Crystal Driving.
  - Liquid Crystal need for Polarity Change with every frame.

- Adjust sequence
  - After enter Service Mode by pushing “ADJ” key.
  - Enter V-Com Adjust mode by pushing “G” key at “10. V-Com”
  - As pushing the right or the left button on the remote controller, Find the V-COM value that is stopped the Flicker.
  - If there is no flicker at default value, turn down or turn up at least 20 step and check the flicker. Then go to the default value.

- Push the store button by “OK” key in the ADJ remocon.

4.6. Outgoing condition Configuration

- When pressing IN-STOP key by SVC remocon, Red LED are blinked alternated. And then Automatically turn off.
  (Must not AC power OFF during blinking)

4.7. Internal pressure

Confirm whether is normal or not when between power board’s ac block and GND is impacted on 1.5kV(dc) or 2.2kV(dc) for one second

5. Serial number D/L

- press “Power on” key of service remocon.
  (Baud rate : 115200 bps)
- Connect RS232 Signal Cable to RS-232 Jack.
- Write Serial number by use RS-232.
- Must check the serial number at the Diagnostics of SET UP menu. (Refer to below).

5.1. Signal TABLE

<table>
<thead>
<tr>
<th>CMD</th>
<th>LENGTH</th>
<th>ADH</th>
<th>ADL</th>
<th>DATA_1</th>
<th>……</th>
<th>Data_n</th>
<th>CS</th>
<th>DELAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0h</td>
<td>84h+n</td>
<td>n-bytes</td>
<td>Write (n = 1~16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2. Command Set

<table>
<thead>
<tr>
<th>No.</th>
<th>Adjust mode</th>
<th>CMD(hex)</th>
<th>LENGTH(hex)</th>
<th>ADH</th>
<th>ADL</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EEPROM WRITE</td>
<td>A0h</td>
<td>84h</td>
<td>n-bytes</td>
<td>Write (n = 1–16)</td>
<td></td>
</tr>
</tbody>
</table>

5.3. method & notice

A. Serial number D/L is using of scan equipment.
B. Setting of scan equipment operated by Manufacturing Technology Group.
C. Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.
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 CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

Special features important for protection from manipulation, such as the following, must be used for essential that one of the two are applied in the schematic.
37 GIP Block Diagram

**TCON with FRC**

- **MST7327N**
- **IC101**

- **SPI_CZ/CK & DI/DO**
- **DDR_A_D[0:15]**
- **DDR_A_A[0:12]**
- **DDR_B_A[0:12]**

**DDR2 SDRAM**

- HYNIX
- **IC201**
- **IC202**

**Serial Flash**

- W25X32VSSIG
- **IC102**

**Multi Channel DC/DC Converter**

- TPS 65161
- **IC401**

**P-Gamma IC**

- BUF16821
- **IC402**

**Level Shifter**

- MAX17108
- **IC403**

**SOC**

- **POL**

**VCC**

- **VDD**

**LVDS (10Bit)**

- **SOE**

**Panel 12V**

**From Main Board**

**To Left LCD Panel**

**To Right LCD Panel**

- **SOE**
- **POL**
- **VCOM**
- **GAMMA**
- **P-Gamma IC**
- **BUF16821**
- **IC402**

**Shifted level**

- (HIGH=VGH/Low=VGL)

**In different**

**LVDS Wafer P & Q**

- **Left mini-LVDS (8Bit)**
- **Right mini-LVDS (8Bit)**

**DC/DC Converter**

- TPS 65161
- **IC301**

**LDO**

- SC4215
- **IC303**

**LVDS Wafer P & Q**

- **LVDS (10Bit)**

- **FRC IIC**

- **FRC Reset**

- **Panel 12V**

- **LVDS Wafer P & Q**

- **FRC IIC**

- **FRC Reset**

- **Panel 12V**

- **LVDS Wafer P & Q**

**Only for 37LH4000**

*M+S : Main B/D + T-con B/D*

- Only for training and service purposes

Copyright © 2009 LG Electronics, Inc. All right reserved.
**Block diagram**

*Only for 42/47LH4000*

**42/47 Normal Block Diagram**

**TCON with FRC**

MST7327N IC101

To Left LCD Panel

- DDR_A_D[0:15]
- DDR_A_A[0:12]
- SPI_CZ/CK & DI/DO
- DDR2 SDRAM (512MB / 533MHz) HYNIX IC202
- Serial Flash W25X32VSSIG IC102

To Right LCD Panel

- DDR_B_D[16:31]
- DDR_B_A[0:12]
- SPI_CZ/CK & DI/DO
- DDR2 SDRAM (512MB / 533MHz) HYNIX IC202

**Multi Channel DC/DC Converter**

TPS 65162 IC401

**From Main Board**

- LVDS Wafer P
- Panel 12V

**To Left LCD Panel**

- mini-LVDS Wafer P

**To Right LCD Panel**

- mini-LVDS Wafer P

---

Copyright © 2009 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only
## Contents of LCD TV Standard Repair Process

<table>
<thead>
<tr>
<th>No.</th>
<th>Error symptom (High category)</th>
<th>Error symptom (Mid category)</th>
<th>Page</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A. Video error</td>
<td>No video/Normal audio</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>No video/No audio</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Video error, video lag/stop</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Color error</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Vertical/Horizontal bar,</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>residual image, light spot,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>external device color error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>B. Power error</td>
<td>No power</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Off when on, off while</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>viewing, power auto on/off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>C. Audio error</td>
<td>No audio/Normal video</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Wrecked audio/discontinuation/noise</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>D. Function error</td>
<td>No response in remote</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>controller, key error,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>recording error, memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>E. Noise</td>
<td>External device recognition</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>error</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>F. Exterior error</td>
<td>Exterior defect</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</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, LVDS Cable, Speaker Cable, IR B/D Cable,..)

- **No video/Normal audio**
  - **Check Back Light On with naked eye**
    - **Y**: Check Power Board 12v, 5v etc.
      - **Y**: Normal voltage
        - **N**: Replace Inverter or module
      - **N**: Repair Power Board or parts
    - **N**: Move to No video/No audio
      - **Y**: Check Power Board 20V/12V or 24v output
      - **N**: Repair Power Board or parts

- **Normal audio**
  - **Y**: Replace Main Board
  - **N**: Replace T-con Board or module And Adjust VCOM

*Precaution*

Always check & record S/W Version and White Balance value before replacing the Main Board

- Replace Main Board
  - Re-enter White Balance value

---

Copyright © 2009 LG Electronics. Inc. All right reserved.  
Only for training and service purposes
Standard Repair Process

<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>
<tr>
<td></td>
<td>No video/ No audio</td>
<td>Check various voltages of Power Board (5V, 12V, 20V or 24V...)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Normal voltage? Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check and replace MAIN B/D</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace Power Board and repair parts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>End</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A. Picture Problem

Check RF Signal level

- By using Digital signal level meter
- By using Diagnostics menu on OSD
  (Menu → Setup → Diagnostic)
- Signal strength (Normal: over 50%)
- Signal Quality (Normal: over 50%)

Check RF Cable Connection
1. Reconnection
2. Install Booster

Check RF Signal level

Normal Signal?

Y

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

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?

Y

Check RF Signal level

Normal Signal?

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture?
**A. Video error**

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

- **Check color condition by input** - External Input, Component, RGB, HDMI/DVI
  - **Screen normal?**
    - **Y**: Check external device connection condition
    - **N**: Replace module
  - **N**: Replace T-Con Board and Adjust VCOM

- **Check and replace Link Cable**
  - **Screen normal?**
    - **Y**: Replace Main B/D
    - **N**: Screen normal?
      - **Y**: Replace module in abnormal displaying after exchanging T-Con B’d
      - **N**: Replace module

**External device screen error-Color error**

- **Check S/W Version**
  - **Y**: S/W Upgrade
  - **N**: Normal screen?
    - **Y**: End
    - **N**: Screen normal?
      - **Y**: Replace Main B/D
      - **N**: Screen normal?
        - **Y**: Request repair for external device
        - **N**: Replace Main B/D
B. Power error

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No power</td>
<td>2008. 3.05</td>
<td>6/13</td>
</tr>
</tbody>
</table>

- **Power LED On?**
  - Y: DC Power on by pressing Power Key On Remote control
  - N: Normal operation?
    - Y: Check Power On "High"
    - N: Replace Power B/D

- **Check Power LED**
  - On?
    - Y: Power LED On?
    - N: Power LED On?

- **Check Power cord was inserted properly**
  - Y: OK?
  - N: Replace Main B/D

- **Check & Repair Mechanical Power switch on Local control of TV**
  - Y: Close
  - N: Check ST-BY 5V

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

- **Measure voltage of each output of Power B/D**
  - Y: Replace Main B/D
  - N: Replace Power B/D

- '09 years new model apply mechanical power switch to reduce power consumption in stand-by status.
  - If mechanical power switch off
    - Doesn’t turn on by remote control
    - Doesn’t appear LED light
  - Please refer to the A21 Page
Standard Repair Process

**B. Power error**

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off when on, off while viewing, power auto on/off</td>
<td>2008. 3.05</td>
<td>7/13</td>
</tr>
</tbody>
</table>

- **Check outlet**
- **Check A/C code**
- **Check for 3 wave length**

**Check Power Off Mode**

1. **Error?**
   - N: **Check Power Off Mode**
   - Y: Fix A/C code & Outlet and describe 3 wave length

2. **CPU Abnormal**
   - Replace Main B/D
   - **Normal?**
     - Y: End
     - N: **Replace Power B/D**

3. **Normal voltage?**
   - Y: Replace Main B/D
   - N: Replace Power B/D

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

### Status

<table>
<thead>
<tr>
<th>Status</th>
<th>Power off List</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&quot;POWEROFF_REMOTEKEY&quot;</td>
<td>Power off by REMOTE CONTROL</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_OFFTIMER&quot;</td>
<td>Power off by OFF TIMER</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_SLEEPTIMER&quot;</td>
<td>Power off by SLEEP TIMER</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_INSTOP&quot;</td>
<td>Power off by INSTOP KEY</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_AUTOOFF&quot;</td>
<td>Power off by AUTO OFF</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_ONTIMER&quot;</td>
<td>Power off by ON TIMER</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_RS232C&quot;</td>
<td>Power off by RS232C</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_RESREC&quot;</td>
<td>Power off by Reservated Record</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_RECEND&quot;</td>
<td>Power off by End of Recording</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_SWDOWN&quot;</td>
<td>Power off by S/W Download</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_UNKNOWN&quot;</td>
<td>Power off by unknown status except listed case</td>
</tr>
<tr>
<td>Abnormal</td>
<td>&quot;POWEROFF_ABNORMAL1&quot;</td>
<td>Power off by abnormal status except CPU trouble</td>
</tr>
<tr>
<td></td>
<td>&quot;POWEROFF_CPUABNORMAL&quot;</td>
<td>Power off by CPU Abnormal</td>
</tr>
</tbody>
</table>

* Please refer to the all cases which can be displayed on power off mode.
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>C. Audio error</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No audio/ Normal video</td>
<td></td>
<td>2008. 3.05</td>
<td>8/13</td>
</tr>
</tbody>
</table>

**Standard Repair Process**

- **No audio**
  - Screen normal
  - Check user menu > Speaker off
  - Off
    - N: Check audio B+ 20V or 24V of Power Board
      - Normal voltage
        - Y: Replace Power Board and repair parts
        - N: Replace MAIN Board
          - End
    - Y: Replace Speaker
  - N: Replace Speaker
→ Wrecked 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?
  - N
  - Y

  Check and fix external device

  Check audio B+ Voltage (20V or 24V)

  Normal voltage?
  - Y
  - N

  Replace Main B/D

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

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

- Check R/C Operating When turn off light in room
  - Normal operating? Y: Replace Battery of R/C
  - Normal operating? N: If R/C operate, Explain the customer cause is interference from light in room.

- Check R/C Operating When turn off light in room
  - Normal operating? Y: Replace Battery of R/C
  - Normal operating? N: If R/C operate, Explain the customer cause is interference from light in room.

2. Local(Mechanical) switch operating error

- Check R/C Operation
  - Normal operating? Y: Check & Repair Cable connection Connector solder
  - Normal operating? N: Move Power problem Section

- Check & Repair Assembly status (Key PCB + tool)
  - Normal operating? Y: Check Key Output signal
  - Normal operating? N: Replace Local switch B/D

- Check & Repair Assembly status (Key PCB + tool)
  - Normal operating? Y: Check Key Output signal
  - Normal operating? N: Replace Local switch B/D

- Check B+ 5V On Main B/D
  - Normal operating? Y: Replace Power B/D or Replace Main B/D (Power B/D don't have problem)
  - Normal operating? N: Check 5v on Power B/D

- Battery of R/C
  - Normal operating? Y: Replace Battery of R/C
  - Normal operating? N: If R/C operate, Explain the customer cause is interference from light in room.
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>D. Function error</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>External device recognition error</td>
<td>2008. 3.05</td>
<td>11/13</td>
</tr>
</tbody>
</table>

**Standard Repair Process**

1. **Check input signal**
   - Signal input?
     - Y: Check technical information
       - Fix information
       - S/W Version
     - N: Check and fix external device/cable

2. **Check technical information**
   - Technical information?
     - Y: Fix in accordance with technical information
     - N: External Input and Component Recognition error
       - RGB, HDMI/DVI, Optical Recognition error
       - Replace Main B/D

3. **Replace Main B/D**
E. Noise

Circuit noise, mechanical noise

- Identify noise type
  - Circuit noise
    - Check location of noise
      - Replace inverter
      - OR
        - Replace LIPS B/D
  - 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 noise is severe, replace the module (For models with fix information, upgrade the S/W or provide the description)

※ 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)
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>F. Exterior defect</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Exterior defect</td>
<td>2008. 3.05</td>
<td>13/13</td>
</tr>
</tbody>
</table>

**Standard Repair Process**

- **Zoom part with exterior damage**
  - Module damage
    - Replace module
      - Adjust VCOM
  - Cabinet damage
    - Replace cabinet
  - Remote controller damage
    - Replace remote controller
  - Stand dent
    - Replace stand
<table>
<thead>
<tr>
<th>No.</th>
<th>Symptom (L)</th>
<th>Input Block</th>
<th>Page</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power Problem</td>
<td>Power-up Boot fail</td>
<td>1~2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>No OSD</td>
<td>3~4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Digital TV</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Analog TV</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Video Problem</td>
<td>AV (Scart / CVBS/ S-Video)</td>
<td>7~12</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Component</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>RGB(D-SUB)</td>
<td>14~15</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>HDMI</td>
<td>16~17</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Audio Problem</td>
<td>All Input</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Digital TV</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Analog TV</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>AV / Component / RGB, HDMI-PC/ HDMI-DTV</td>
<td>21~26</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>AV Audio out / No Audio (Headphone &amp; SPDIF)</td>
<td>27~30</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>USB / Remocon Problem</td>
<td>USB no connect / Remocon</td>
<td>31~33</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Intelligent Sensor</td>
<td>Intelligent Sensor</td>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>
## LCD TV Symptom

**Power-Up Boot Fail**

<table>
<thead>
<tr>
<th>Voltage Level</th>
<th>Replace Power Board</th>
<th>Replace MAIN B'D Q801</th>
<th>Replace MAIN B'D IC801</th>
<th>Replace MAIN B'D IC805</th>
<th>Replace MAIN B'D IC806</th>
<th>Replace MAIN B'D IC100</th>
<th>Replace MAIN B'D IC102 NAND FLASH</th>
<th>Replace MAIN B'D IC103 Serial Flash</th>
<th>Replace MAIN B'D IC300, IC301 DDR2 Memory</th>
<th>Replace MAIN B'D IC100</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>5V</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>12V</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>24V</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>3.3V</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>1.26V</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>3.3V</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>12MHz</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>

### Notes:
- 26~42LH2000
- 32~47LH3000/LH4000

Copyright © 2009 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only
## LCD TV Symptom: Power-Up Boot Fail

<table>
<thead>
<tr>
<th>Checking Item</th>
<th>Decision 1</th>
<th>Decision 2</th>
<th>Decision 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>P801 Pin #5-#6 Voltage Level = 5V?</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>P801 Pin #1, #2 = 15V?</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>MAIN B’D L803 = 3.3V?</td>
<td>NO</td>
<td>Replace MAIN B’D IC801</td>
<td>YES</td>
</tr>
<tr>
<td>MAIN B’D L813 = 1.26V?</td>
<td>NO</td>
<td>Replace MAIN B’D IC805</td>
<td>YES</td>
</tr>
<tr>
<td>MAIN B’D L805 = 3.3V?</td>
<td>NO</td>
<td>Replace MAIN B’D IC806</td>
<td>YES</td>
</tr>
<tr>
<td>Check MAIN B’D X100 Clock 12MHz</td>
<td>NO</td>
<td>Replace MAIN B’D IC100</td>
<td>YES</td>
</tr>
<tr>
<td>Replace MAIN B’D IC102 NAND FLASH</td>
<td>NO</td>
<td>Replace MAIN B’D IC103 Serial Flash</td>
<td>NO</td>
</tr>
<tr>
<td>Replace MAIN B’D IC100</td>
<td>NO</td>
<td>Replace MAIN B’D IC100</td>
<td>NO</td>
</tr>
<tr>
<td>Replace MAIN B’D IC300, IC301 DDR2 Memory</td>
<td>NO</td>
<td>Replace MAIN B’D IC100</td>
<td>NO</td>
</tr>
</tbody>
</table>

19~22LH2000

**Making:** 2009. 2. 1  
**Revision:** 2/34
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Symptom</th>
<th>No OSD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Making</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revision</td>
</tr>
</tbody>
</table>

26~42LH2000
32~47LH3000/LH4000

**P800 Pin #20**
- Voltage level = 2V
- Check Power connector OK?
  - NO
  - YES
  - Replace Power Board

**P800 Pin #13, 14 = 12V**
- NO
  - Replace MAIN B'D Q802

**P800 Pin #17, 18 = 24V?**
- NO
  - Replace MAIN B'D Q806

**MAIN B'D L1300 = 12V?**
- NO
  - Replace Main Board

**Check LVDS Cable OK?**
- YES
  - Replace LVDS Cable

- NO
  - Replace LVDS Cable
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Symptom</th>
<th>No OSD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Making**: 2009.2.1  
**Revision**: 4/34

---

**Symptom**: No OSD

1. **P801 Pin #1, 2 = 15V?**
   - **NO**: Check Power connector OK? → **YES**: Replace Power Board
   - **YES**: P801 Pin #9 Voltage level = 2V → **NO**: Replace MAIN B'D Q802

2. **MAIN B'D L1300 = 12V?**
   - **NO**: Replace MAIN B'D Q806
   - **YES**: Check LVDS Cable OK? → **YES**: Replace Main Board

3. **Replace LVDS Cable**
Check RF Cable

MAIN B'D L1201 = 5V ?
  YES
  MAIN B'D L1202 = 3.3V ?
    YES
    MAIN B'D IC804
    Pin #2 = 1.2V ?
      YES
      MAIN B'D R1210 Clock ?
        YES
        Replace MAIN B'D TU1200
      NO
      Replace MAIN B'D IC804
    NO
    Replace MAIN B'D IC809
  NO
  Replace MAIN B'D IC808

Replace MAIN B'D IC809

Replace MAIN B'D IC804

Replace MAIN B'D TU1200
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Symptom</th>
<th>Analog TV Video Problem</th>
<th>Making</th>
<th>2009. 2 . 1</th>
<th>Revision</th>
<th>6/34</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Check RF Cable**
  - **YES**
  - **MAIN B'D L1201 = 5V ?**
    - **NO**
      - Replace MAIN B'D IC808
    - **YES**
  - **NO**

- **MAIN B'D L1202 = 3.3V ?**
  - **NO**
    - Replace MAIN B'D IC809
  - **YES**

- **MAIN B'D IC804**
  - **Pin #2 = 1.2V ?**
    - **NO**
      - Replace MAIN B'D IC804
    - **YES**
  - **YES**

- **MAIN B'D R1210 Clock ?**
  - **NO**
    - Replace MAIN B'D TU1200

---

26~42LH2000
32~47LH3000/LH4000
Check Signal format
Is it supported?

Check the SCART Cable

Check MAIN B'D R1117 Video Signal?

Replace MAIN B'D IC 100

Replace MAIN B'D JK1100

Replace MAIN B'D C210

MAIN B'D JK1100 Check

替换 MAIN B’D JK1100

替换 MAIN B’D C210

替换 MAIN B’D IC 100

AV1(Scart CVBS) No Video Problem

LCD TV | Symptom | Making | Revision
---|---|---|---
| | 2009. 2. 1 |

26~42LH2000
32~47LH3000/LH4000

Copyright © 2009 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only
Check Signal format
Is it supported?
YES

Check the SCART Cable
YES

Check MAIN B'D JK1100
NO
Replace MAIN B'D JK1100

YES

Check MAIN B'D C200 (RED)
C201 (GREEN)
C202 (BLUE)
Video Signal?
NO
Replace MAIN B'D C200, C201, C202

YES

Replace MAIN B'D IC 100

Copyright © 2009 LG Electronics, Inc. All right reserved.
Only for training and service purposes
**AV2 No Video Problem**

- **Check Signal format**
  - Is it supported?  
  - **YES**

- **Check the SCART Cable**
  - **YES**

- **Check MAIN B'D R1133 Video Signal?**
  - **NO**  
  - MAIN B'D JK1101 Check  
  - **NO**  
  - Replace MAIN B'D JK1101  
  - **YES**  

- **Check MAIN B'D C211 Video Signal ?**
  - **NO**  
  - Replace MAIN B'D C211  
  - **YES**  

- Replace MAIN B'D IC 100

---

**Symptom:** AV2 No Video Problem

**Making:** 2009. 2 . 1

**Revision:** 9/34

**Model Numbers:**
- 26~42LH2000
- 32~47LH3000/LH4000
**AV3(CVBS) No Video Problem**

- Check Signal format
  - Is it supported?
  - YES
  - Check the CVBS Cable
    - YES
    - Check MAIN B’D R400 Video Signal?
      - NO
      - Replace MAIN B’D JK402
      - YES
      - MAIN B’D JK402 Check
        - NO
        - Replace MAIN B’D JK402
        - YES
        - Replace MAIN B’D IC 100

**Symptom**

- LCD TV

**AV3(CVBS) No Video Problem**

- Making: 2009. 2. 1
- Revision: 10/34

---

26~42LH2000
32~47LH3000/LH4000

Copyright © 2009 LG Electronics, Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Symptom</th>
<th>AV1 No Video Out Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Making 2009.2.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revision 11/34</td>
</tr>
</tbody>
</table>

### Symptom: AV1 No Video Out Problem

- **Check Spec (Refer to User Manual)**
  - Is it supported?
  - **YES**
  - **NO**

- **Check the SCART Cable**
  - **YES**
  - **NO**

- **Check MAIN B’D C1107 Video Signal?**
  - **YES**
  - **NO**

- **Check MAIN B’D R1205 Video Signal?**
  - **YES**
  - **NO**

- **Replace MAIN B’D Q1205**

### Notes
- 2009.2.1
- Making
- Revision
- LCD TV Symptom: AV1 No Video Out Problem
- 11/34
- 26~42LH2000
- 32~47LH3000/LH4000

**Copyright © 2009 LG Electronics, Inc. All right reserved. Only for training and service purposes**
Check Spec (Refer to User Manual)
Is it supported?

YES

Check the SCART Cable

YES

Check MAIN B’D C1122 Video Signal?

NO

Replace MAIN B’D IC 100

YES

MAIN B’D JK1101 Check

26~42LH2000
32~47LH3000/LH4000
**Component No Video/No Color Problem**

- **Check Signal format**
  - Is it supported?
    - **YES**
      - Check the Component Cable
        - **YES**
          - Check MAIN B'D R419 Video Signal?
            - **NO**
              - MAIN B'D JK400 Check
                - **NO**
                  - Replace MAIN B'D JK400
                - **YES**
                  - Replace MAIN B'D C209 or C214 or C215 or C216
            - **YES**
              - Replace MAIN B'D C209, C215 (Y) C216 (Pb) C214 (Pr) Video Signal?
                - **NO**
                  - Replace MAIN B'D C209 or C214 or C215 or C216
                - **YES**
                  - Replace MAIN B'D IC 100

- **Making**: 2009. 2 . 1
- **Revision**: 13/34

26~42LH2000
32~47LH3000/LH4000
LCD TV | Symptom | RGB No Video Problem

Check Signal format
Is it supported?

YES

Check the RGB Cable

YES

MAIN B’D P400 Pin #2
Video signal?
R437 has Vsync?
R440 has Hsync?

NO

MAIN B’D P400 Check

NO

Replace MAIN B’D P400

YES

Check MAIN B’D C208 (Video)
R246 (HSYNC)
R245 (VSYNC)

NO

Replace MAIN B’D C208 or R246 or R247

YES

Replace MAIN B’D IC 100

26~42LH2000
32~47LH3000/LH4000
Check Signal format Is it supported?

YES

Check the RGB Cable

YES

MAIN B’D P400
Pin #3 (BLUE)
Pin #2 (GREEN)
Pin #1 (RED)
Video signal ?

NO

MAIN B’D P400 Check

NO

Replace MAIN B’D P400

YES

Check MAIN B’D C212 (RED)
C207 (GREEN)
C213 (BLUE)
Video Signal ?

NO

Replace MAIN B’D C212 or C207 or C213

YES

Replace MAIN B’D IC 100

Copyright © 2009 LG Electronics, Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only
HDMI 1~3 All No Video Problem

**Symptom:**
- **HDMI1 – ALL MODELS**
- **HDMI2 – Except for 19/22LH20**
- **HDMI3 – Except for 19/22LU40**, 19/22LU50**, 19/22LH20**

**Check Signal format**
Is it supported?

- YES

**Check the HDMI Cable**

- YES

**Check the ADJUST MENU**
EDID OK?

- NO
  - Download EDID
    (Refer to Adjustment Spec)
  - YES

**Replace MAIN B’D IC107 (HDCP KEY)**

- NO
  - Replace MAIN B’D IC 100

Copyright © 2009 LG Electronics, Inc. All right reserved. Only for training and service purposes
### LCD TV Symptom: HDMI1 or 2 or 3 No Video Problem

<table>
<thead>
<tr>
<th>Check Signal format</th>
<th>Is it supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YES</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Check the HDMI Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAIN B’D JACK Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>JK600 -&gt; HDMI1</td>
</tr>
<tr>
<td>JK601 -&gt; HDMI2</td>
</tr>
<tr>
<td>JK602 -&gt; HDMI3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Replace MAIN B’D IC 100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

This case is that HDMI Video doesn’t display at the same HDMI input, not all.

HDMI1 – ALL MODELS
HDMI2 – Except for 19/22LH20**
HDMI3 – Except for 19/22LU40**, 19/22LU50**, 19/22LH20**
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Symptom</th>
<th>All Source no Audio Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Making 2009.2.1 Revision 18/34</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check The Speaker</td>
<td>Replace Speaker</td>
<td>NO</td>
</tr>
<tr>
<td>Check Speaker Cable</td>
<td>Replace Speaker Cable</td>
<td>NO</td>
</tr>
<tr>
<td>CHECK MAIN B'D JK700 or JK701</td>
<td>Replace MAIN B'D JK700 or JK701</td>
<td>NO</td>
</tr>
<tr>
<td>MAIN B'D L700 = 1.8V</td>
<td>Replace MAIN B'D IC803</td>
<td>NO</td>
</tr>
<tr>
<td>MAIN B'D Check R720, R721, R722 Signal</td>
<td>Replace MAIN B'D IC100</td>
<td>NO</td>
</tr>
<tr>
<td>MAIN B'D L705 Pin #1 L704 Pin #2 PWM Signal ?</td>
<td>Check P700 Cable</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Replace MAIN B'D IC701</td>
<td>NO</td>
</tr>
</tbody>
</table>

- If headphone is connected, Speaker sound doesn’t work.

26~42LH2000
32~47LH3000/LH4000
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Symptom</th>
<th>Digital TV No Audio Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Digital TV Video OK ?</td>
<td>YES Replace MAIN B'D IC 100</td>
</tr>
</tbody>
</table>

26~42LH2000
32~47LH3000/LH4000
Analog TV No Audio Problem

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Symptom</th>
<th>Analog TV Video OK?</th>
<th>Check MAIN B'D C231 Signal (SIF)</th>
<th>Replace MAIN B'D IC100</th>
<th>MAIN B'D TU1200 Pin #17 Signal (SIF)</th>
<th>Replace MAIN B'D TU1200</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Analog TV No Audio Problem</td>
<td></td>
<td>YES</td>
<td></td>
<td>NO</td>
<td>Replace MAIN B'D TU1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NO</td>
<td>Replace MAIN B'D IC100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26~42LH2000
32~47LH3000/LH4000
LCD TV       | Symptom | AV1 No Audio Problem | Making | Revision | 2009. 2 . 1 | 21/34

AV1 Video OK ?

YES

Check the SCART Cable

YES

Check MAIN B’D JK1100

NO

Replace MAIN B’D JK1100

YES

MAIN B’D
C229 (Right Sound) C230 (Left Sound)
signal ?

YES

Replace MAIN B’D IC 100

NO

Check MAIN B’D C229, C230

NO

YES

Replace MAIN B’D IC 100

Copyright © 2009 LG Electronics. Inc. All right reserved.
Only for training and service purposes

26~42LH2000
32~47LH3000/LH4000

LGE Internal Use Only
AV2 Video OK?

-> YES

Check the SCART Cable

-> YES

Check MAIN B’D JK1101

-> NO

Replace MAIN B’D JK1101

-> YES

MAIN B’D C2008 (Right Sound)
C2009 (Left Sound)
signal?

-> YES

Replace MAIN B’D IC 100

-> NO

Check MAIN B’D C2008, C2009

26~42LH2000
32~47LH3000/LH4000
AV3 No Audio Problem

AV3 Video OK?
- YES: Check the CVBS Cable
- NO: Check MAIN B'D JK402
  - YES: Replace MAIN B'D JK402
  - NO: MAIN B'D C2011 (Right Sound) C2012 (Left Sound) signal? (Check MAIN B'D C2011, C2012)

26~42LH2000
32~47LH3000/LH4000
**Component No Audio Problem**

1. **Component Video OK?**
   - **YES**
     - Check the CVBS Cable
       - **YES**
         - Check MAIN B'D JK400
           - **NO**
             - Replace MAIN B'D JK400
           - **YES**
             - Replace MAIN B'D IC 100
           - **NO**
             - Check MAIN B'D C2013, C2014
               - **YES**
                 - Replace MAIN B'D IC 100
               - **NO**
                 - Check MAIN B'D C2013, C2014

26~42LH2000
32~47LH3000/LH4000
Check the PC Audio Cable

YES

Check MAIN B'D JK401

NO -> Replace MAIN B'D JK401

YES -> MAIN B'D C2015 (Right Sound)
       C2016 (Left Sound)
       signal ?

NO -> Check MAIN B'D C2015, C2016

YES -> Replace MAIN B'D IC 100

NO -> RGB Video OK?
## LCD TV Symptom: HDMI-DTV No Audio Problem

<table>
<thead>
<tr>
<th>HDMI Video OK?</th>
<th>YES</th>
<th>Check the ADJUST MENU EDID OK?</th>
<th>NO</th>
<th>Download EDID (Refer to Adjustment Spec)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>YES</td>
<td></td>
<td>Replace MAIN B'D IC100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26~42LH2000
32~47LH3000/LH4000

Copyright © 2009 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only
**LCD TV**  | **Symptom**  | **AV1 No Audio Out Problem**  | **Making**  | **2009. 2. 1**
| --- | --- | --- | --- | ---
|  |  |  | **Revision**  | **27/34**

Check the SCART Cable

YES

Check MAIN B'D JK1100

YES

MAIN B'D R239 (Right Sound) R240 (Left Sound) signal ?

NO

Replace MAIN B'D IC 100

YES

Replace MAIN B'D IC1103

NO

Replace MAIN B'D JK1100

Check the Trouble Shooting Guide Analog TV No video

YES

Analog TV Audio OK

NO

Analog TV Audio OK

YES

Check the Trouble Shooting Guide Analog TV No video

NO

Replace MAIN B'D JK1100

YES

CHECK MAIN B'D JK1100

NO

Replace MAIN B'D IC 100

YES

Replace MAIN B'D IC1103

26~42LH2000

32~47LH3000/LH4000
Check the SCART Cable

YES

Check the Trouble Shooting Guide Related to Audio Problem

NO

YES

Check MAIN B’D JK1101

Replace MAIN B’D JK1101

NO

YES

MAIN B’D R250 (Right Sound)
R251 (Left Sound) signal ?

Replace MAIN B’D IC 100

NO

YES

Replace MAIN B’D IC1103
Check the Headphone Cable

YES

Check the Trouble Shooting Guide Related to Audio Problem

NO

Check the Headphone Cable

YES

Check MAIN B’D JK700 or JK701

NO

Replace MAIN B’D JK700 or JK701

YES

MAIN B’D
R237 (Right Sound)
R238 (Left Sound)
signal?

NO

Replace MAIN B’D IC 100

YES

Replace MAIN B’D IC700

Copyright © 2009 LG Electronics. Inc. All right reserved.
Only for training and service purposes

LGE Internal Use Only
**LCD TV** | **Symptom** | **SPDIF No Audio Problem**
---|---|---

**Making**: 2009. 2. 1  
**Revision**: 30/34

- **Speaker Audio OK**:  
  - **YES**  
  - **Check the SPDIF Cable**:  
    - **YES**  
    - **Check MAIN B'D JK403**:  
      - **YES**  
      - **Check MAIN B'D R230 PWM Signal**?  
        - **NO**  
        - **Replace MAIN B'D IC 100**  
      - **NO**  
      - **Replace MAIN B'D JK403**  
    - **NO**  
    - **Check the Trouble Shooting Guide Related to Audio Problem**

---

26~42LH2000  
32~47LH3000/LH4000
Check that the USB Memory & HDD are supported by Spec
(Refer to User Manual’s USB cautions)

- **YES**

- **NO**

  - Check MAIN B’D JK405 OK ?
    - **NO**
      - Replace MAIN B’D JK405
    - **YES**
      - Check MAIN B’D JK405 Pin #1 5V ?
        - **YES**
          - Replace MAIN B’D IC 100
        - **NO**
          - Check MAIN B’D R801 5V ?
            - **YES**
              - Replace MAIN B’D IC402
            - **NO**
              - Check MAIN B’D R848 12V ?
                - **YES**
                  - Replace MAIN B’D IC808
Remote Control Problem

Check MAIN B'D P1304 Wafer & Connector

- NO: Replace it
- YES: Check IR B'D P1 Wafer & Connector

- NO: Replace IR B'D
- YES: Replace it

26~42LH2000
32~47LH3000/LH4000
<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Symptom</th>
<th>Remote Control Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Check IR B'D P1 Wafer &amp; Connector</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Check MAIN B'D P1305 Wafer &amp; Connector</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Check MAIN B'D P1 Wafer &amp; Connector</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>IR B'D IC1 Pin #3 Voltage 4V ↑ ?</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Replace IR B'D IC1</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Replace MAIN B'D IC100</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Replace MAIN B'D IC100</strong></td>
</tr>
</tbody>
</table>

**Making:** 2009. 2. 1

**Revision:** 33/34

19~22LH2000

---

Copyright © 2009 LG Electronics. Inc. All right reserved.
Only for training and service purposes
LCD TV | Symptom | Intelligent Sensor Problem
---|---|---
Check MAIN B’D P1304 Wafer & Connector | NO | Replace it
YES | Replace IR B’D
Check IR B’D P1 Wafer & Connector | YES |