LED LCD TV
SERVICE MANUAL

CHASSIS : LD01U
MODEL: 37LV3500  37LV3500-ZA
         37LV3550/355A/355C/355N/355U
         37LV3550/355A/355C/355N/355U-ZB

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

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by $\Delta$ 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 MO and 5.2 MO.

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

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

*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 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 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.

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

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 strands 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.

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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 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/LED LCD TV used LD01U 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 product 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: CE, IEC specification
   - EMC: CE, IEC

#### 4. Model General Specification

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 1   | Market                | EU(PAL Market-36Countries)                         | DTV-T/C & Analog
     |                        | (Germany, Netherlands, Switzerland, Hungary, Austria, Slovenia, Sweden, Denmark, Finland, Norway, Bulgaria) |
|     |                       |                                                    | DTV-T & Analog                                                        |
|     |                       |                                                    | UK, France, Spain, Italy, Belgium, Russia, Luxemburg, Greece, Czech, Croatia, Turkey, Morocco, Ireland, Latvia, Estonia, Lithuania, Poland, Portugal, Romania, Ukraine |
|     |                       |                                                    | Analog Only                                                           |
|     |                       |                                                    | Kazakhstan, Albania, Bosnia, Serbia, Slovakia                          |
| 2   | Broadcasting system   | 1) PAL-BG                                           |                                                                         |
|     |                       | 2) PAL-DK                                           |                                                                         |
|     |                       | 3) PAL-I/I’                                        |                                                                         |
|     |                       | 4) SECAM L/L’                                      |                                                                         |
|     |                       | 5) DVB-T/C/S (ID TV)                               |                                                                         |
| 3   | Receiving system      | Analog : Upper Heterodyne                          |                                                                         |
|     |                       | Digital : COFDM, QAM                               |                                                                         |
| 4   | Scart Jack (1EA)      | PAL, SECAM                                          |                                                                         |
|     |                       | Scart Jack is Full scart and support RF-OUT(analog & DTV) |
| 5   | Video Input RCA(1EA)  | PAL, SECAM, NTSC                                   |                                                                         |
|     |                       | System : PAL, SECAM, NTSC, PAL80                    |                                                                         |
| 6   | Component Input(1EA)  | Y/Cb/Cr, Y/Pb/Pr                                   |                                                                         |
| 7   | RGB Input             | RGB-PC                                             |                                                                         |
| 8   | HDMI Input (3EA)      | HDMI1-DTV (DVI)                                    |                                                                         |
|     |                       | HDMI2-DTV                                          |                                                                         |
|     |                       | HDMI3-DTV                                          |                                                                         |
|     |                       | Support HDCP                                        |                                                                         |
| 9   | Audio Input (3EA)     | RGB/DVI Audio, Component, AV                       |                                                                         |
|     |                       | L/R Input                                           |                                                                         |
| 10  | SPDIF out (1EA)       | SPDIF out                                          |                                                                         |
| 11  | Earphone out (1EA)    | Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, HDMI4 |                                                                         |
| 12  | USB (1EA)             | For Service (download)                             |                                                                         |
| 13  | DVB                   | DVB-T                                              |                                                                         |
|     |                       | DVB-C                                              |                                                                         |
|     |                       | DVB-S                                              |                                                                         |

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5. 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>
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<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>
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<tr>
<td>10.</td>
<td>1920x1080</td>
<td>31.25</td>
<td>50.00</td>
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<tr>
<td>11.</td>
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<td>HDTV 1080i</td>
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<tr>
<td>12.</td>
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<td>59.94</td>
<td>HDTV 1080i</td>
</tr>
<tr>
<td>13.</td>
<td>1920x1080</td>
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<td>50</td>
<td>HDTV 1080p</td>
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<tr>
<td>14.</td>
<td>1920x1080</td>
<td>67.5</td>
<td>60</td>
<td>HDTV 1080p</td>
</tr>
</tbody>
</table>

6. 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></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 60 Hz, 852</em>480 60 Hz -&gt; 640*480 60 Hz 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>FHD Model</td>
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<tr>
<td>7.</td>
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<tr>
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<td>10.</td>
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<td>WUXGA</td>
<td>FHD model</td>
</tr>
</tbody>
</table>
### 7. HDMI Input

#### (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>SDTV 480P</td>
<td></td>
</tr>
<tr>
<td>2.</td>
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<td>31.25</td>
<td>50</td>
<td>54</td>
<td>SDTV 576P</td>
<td></td>
</tr>
<tr>
<td>3.</td>
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<td>37.500</td>
<td>50</td>
<td>74.25</td>
<td></td>
<td>HDTV 720P</td>
</tr>
<tr>
<td>4.</td>
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<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>
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<td>23.97/24</td>
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<td>148.35/148.50</td>
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</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>
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<td>HDCP</td>
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<tr>
<td>2.</td>
<td>640*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*720</td>
<td>45</td>
<td>60</td>
<td>74.25</td>
<td></td>
<td>HDCP</td>
</tr>
<tr>
<td>8.</td>
<td>1280*1024</td>
<td>63.981</td>
<td>60.02</td>
<td>108.875</td>
<td>SXGA</td>
<td>HDCP/FHD model</td>
</tr>
<tr>
<td>9.</td>
<td>1920*1080</td>
<td>67.5</td>
<td>60</td>
<td>148.5</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/LED LCD TV with LD01U 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 °C ± 5 °C
   Relative humidity: 65 % ± 10 %
   Input voltage: 220 V, 60 Hz
6) Adjustment equipments: Color Analyzer(CA-210 or CA-110), DDC Adjustment Jig equipment, Service remote control.
7) Push the “IN STOP” key - For memory initialization.

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.

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 “in-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.

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”.

Please Check the Speed
To use speed between
from 200Hz to 400Hz

To use speed between
from 200Hz to 400Hz

filexxx.bin

Copying files from memory
Do not remove the memory card from the TV
Do not plug out!
4) Updating is starting.
5) Uploading 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)

<table>
<thead>
<tr>
<th>Module</th>
<th>Tool option1</th>
<th>Tool option2</th>
<th>Tool option3</th>
<th>Tool option4</th>
<th>Tool option5</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUO</td>
<td>22376</td>
<td>18986</td>
<td>55337</td>
<td>26904</td>
<td>352</td>
</tr>
<tr>
<td>LGD</td>
<td>22368</td>
<td>18986</td>
<td>55337</td>
<td>26904</td>
<td>288</td>
</tr>
</tbody>
</table>

3.1. ADC Process
(1) ADC
   - Enter Service Mode by pushing "ADJ" key,
   - Enter Internal ADC mode by pushing "I" key at "5. ADC Calibration"

  EZ ADJUT
   0. Tool Option1
   1. Tool Option2
   2. Tool Option3
   3. Tool Option4
   4. Country Group
   5. ADC Calibration
   6. White Balance
   7. Test Pattern
   8. EDID D/L
   9. Sub AV
   10. V-Com
   11. P-Gamma

   <Caution> Using ‘power on’ key of the Adjustment remote control, power on TV.
   * ADC Calibration Protocol (RS232)

   Adjust Sequence
   • aa 00 00 [Enter Adjust Mode]

<table>
<thead>
<tr>
<th>Item</th>
<th>CMD1</th>
<th>CMD2</th>
<th>Data0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjust Mode In</td>
<td>A</td>
<td>A</td>
<td>0</td>
</tr>
<tr>
<td>ADC Adjust</td>
<td>A</td>
<td>D</td>
<td>1</td>
</tr>
</tbody>
</table>

   When transfer the ‘Mode In’, Carry the command.
   Automatically adjustment (The use of a internal pattern)

   • xb 00 40 [Component1 Input (480i)]
   • ad 00 10 [Adjust 480i Comp1]
   • xb 00 60 [RGB Input (1024*768)]
   • ad 00 10 [Adjust 1024*768 RGB]
   • aa 00 90 End Adjust mode
   * Required equipment : Adjustment R/C.

3.2. Function Check
   * 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 @ 60 Hz)
       5) HDMI
       6) PC Audio In
   * Display and Sound check is executed by Remote control.
4. Total Assembly line process

4.1. Adjustment Preparation

- W/B Equipment condition
  
  **CA210**
  
  : CCFL/EEFL -> CH9, Test signal: Inner pattern (80IRE)
  
  LED -> CH14, Test signal: Inner pattern (80IRE)
  
  Above 5 minutes H/run in the inner pattern. ("power on" key of adjust remote control)
  
  * 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 10 lux).
    
    2) Adhere closely the Color Analyzer (CA210) to the module less than 10 cm 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 5 minutes.
      
      - Using 'no signal' or 'full white pattern' or the others, check the back light on.
    
  * Edge LED W/B Table is process of time (Only LGD Module)

  **CA210**: CH14, Test signal : Inner pattern (80IRE)
  
  - Cool 13,000 K
    
    X=0.269(±0.002)
    
    Y=0.273(±0.002)
    
    - Medium 9,300 K
      
      X=0.285(±0.002)
      
      Y=0.293(±0.002)
      
      (204 gray, 80 IRE)
      
      - Warm 6,500 K
        
        X=0.313(±0.002)
        
        Y=0.329(±0.002)
  
  - Aging Time
    
    Cool 13,000 K
    
    Medium 9,300 K
    
    Warm 6,500 K
  
  - RS-232C Command (Default)
    
    [CMD ID DATA]
    
    Wb 00 00 White Balance Start
    
    Wb 00 ff White Balance End
  
  * Auto adjustment Map (RS-232C)

  ```
  RS-232C COMMAND
  [CMD ID DATA]  
  Wb 00 00 White Balance Start  
  Wb 00 ff White Balance End
  ```

  **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)
  
    
    - After enter Service Mode by pushing "ADJ" key,
    
    - Enter White Balance by pushing "G" key at "6. White Balance".
  
  * After you finished all adjustments, Press “In-start” key 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.

  ** EZ ADJUST **

  EZ ADJUST
  
  0. Tool Option1
  
  1. Tool Option2
  
  2. Tool Option3
  
  3. Tool Option4
  
  4. Country Group
  
  5. ADC Calibration
  
  6. White Balance
  
  7. Test Pattern
  
  8. EDID/DL
  
  9. Sub R/C
  
  10. V-Com
  
  11. P-Gamma
  
  * After you finished all adjustments, Press “In-start” key 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. And Mechanical Power Switch must be set “ON”.

  ** 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 Service main Assembly, 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 Service main Assembly, 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

- Auto Download
  - After enter Service Mode by pushing “ADJ” key,
  - Enter EDID D/L mode.
  - Enter “START” by pushing “OK” key.

- Manual Download
  - Caution : Never connect HDMI & D-sub Cable when EDID download

* 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 'Mode In'</td>
<td>A</td>
<td>A</td>
<td>0 0</td>
</tr>
<tr>
<td>Automatically Download (The use of a internal pattern)</td>
<td>A</td>
<td>E</td>
<td>00 10</td>
</tr>
</tbody>
</table>

- Detail EDID Options are below

<table>
<thead>
<tr>
<th>Item CMD1 CMD2 Data0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer ID</td>
</tr>
<tr>
<td>Version</td>
</tr>
<tr>
<td>Revision</td>
</tr>
</tbody>
</table>

- EDID D/L

1) FHD RGB EDID data
2) FHD HDMI EDID data

* Caution
- Use the proper signal cable for EDID Download.
- Analog EDID : Pin3 exists
- Digital EDID : Pin3 exists
- Never connect HDMI & D-sub Cable at the same time.
- Download HDMI1, HDMI2, separately because HDMI1 is different from HDMI2.

* Edid data and Model option download (RS232)

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

* Serial No: Controlled on production line.
* Month, Year : Week : '01' -> '01'
  Year : '2011' -> '15' fix
* 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 4C 47 20 54 56 0A 20 20 20 20 20</td>
</tr>
</tbody>
</table>

* Checksum: Changeable by total EDID data.
* Vendor Specific(HDMI)

<table>
<thead>
<tr>
<th>INPUT</th>
<th>MODEL NAME(HEX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDMI1</td>
<td>67030C001000882D</td>
</tr>
<tr>
<td>HDMI2</td>
<td>67030C002000882D</td>
</tr>
<tr>
<td>HDMI3</td>
<td>67030C003000882D</td>
</tr>
<tr>
<td>HDMI4</td>
<td>67030C004000882D</td>
</tr>
</tbody>
</table>
4.5. V-COM Adjust (Only LGD (M+S) Module)

- 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
  - Press the PIP key of th ADJ remote control. (This PIP key is hot key to enter the VCOM adjusting mode)
  - (Or After enter Service Mode by pushing “ADJ” key, then Enter V-Com Adjust mode by pushing “G” key at “10. V-Com”).
  - As pushing the right or the left key on the remote control, and find the V-COM value which is no or minimized the Flicker. (If there is no flicker at default value, Press the exit key and finish the VCOM adjustment.)
  - Push the “OK” key to store value. Then the message “Saving OK” is pop.
  - Press the exit key to finish VCOM adjustment.

(Visual Adjust and control the Voltage level)

4.6. Outgoing condition Configuration

When pressing IN-STOP key by Service remote control, Red LED are blinked alternatively. And then Automatically turn off. (Must not AC power OFF during blinking)

4.7. Hi-pot Test

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

5. Model name & Serial number D/L

- Press “Power on” key of service remote control.
  - (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>

* Description
  - FOS Default write : <7mode data> write
  - Vtotal, V_Frequency, Sync_Polarity, Htotal, Hstart, Vstart, 0, Phase
  - Data write : Model Name and Serial No. write in EEPROM.

5.2. Command Set

<table>
<thead>
<tr>
<th>No.</th>
<th>Adjust mode</th>
<th>CMD(hex)</th>
<th>LENGTH(hex)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EEPROM WRITE</td>
<td>A0h</td>
<td>84h+n</td>
<td>n-bytes Write(n=1~16)</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.
**Manual Download (Model Name and Serial Number)**
If the TV set is downloaded by OTA or service man, Sometimes model name or serial number is initialized.(Not always)
There is impossible to download by bar code scan, so It need Manual download.
1) Press the ‘instart’ key of ADJ remote controller.
2) Go to the menu ‘5.Model Number D/L’ like below photo.
3) Input the Factory model name(ex 42LD450-ZA) or Serial number like photo.

4) Check the model name Instart menu -> Factory name displayed. (ex 42LD450-ZA)
5) Check the Diagnostics (DTV country only) -> Buyer model displayed. (ex 42LD450)

**6. CI+ Key Download method**
(1) Download Procedure
1) Press “Power on” key of a service remote control.
   (Baud rate : 115200 bps)
2) Connect RS232-C Signal Cable.
3) Write CI+ Key through RS-232-C.
4) Check whether the key was downloaded or not at ‘In Start’ menu. (Refer to below).

=> Check the Download to CI+ Key value in LGset.
1. check the method of CI+ Key value
   a. check the method on Instart menu
   b. check the method of RS232 Command
      1) into the main ass'y mode (RS232 : aa 00 00)

<table>
<thead>
<tr>
<th>CMD 1</th>
<th>CMD 2</th>
<th>Data 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>0</td>
</tr>
</tbody>
</table>

2) check the key download for transmitted command
   (RS232 : ci 00 10)

<table>
<thead>
<tr>
<th>CMD 1</th>
<th>CMD 2</th>
<th>Data 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>I</td>
<td>1</td>
</tr>
</tbody>
</table>

3) result value
   - normally status for download : Okx
   - abnormally status for download : Ngx

2. Check the method of CI+ Key value (RS232)
   1) into the main ass'y mode (RS232 : aa 00 00)

<table>
<thead>
<tr>
<th>CMD 1</th>
<th>CMD 2</th>
<th>Data 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>0</td>
</tr>
</tbody>
</table>

2) Check the method of CI+ key by command (RS232 : ci 00 20)

<table>
<thead>
<tr>
<th>CMD 1</th>
<th>CMD 2</th>
<th>Data 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>I</td>
<td>2</td>
</tr>
</tbody>
</table>

3) Result value
   i 01 Ok 1d1852d21c1ed5dcx

**7. Local Dimming Function Check**
Step 1) Turn on TV.
Step 2) Press “P-only” key, entrance to power only mode and Press “Exit” key.
Step 3) Press “Tilt” key, entrance to Local Dimming mode.
Step 4) At the Local Dimming mode, module Edge Backlight moving right to left Back light of module moving.
Step 5) Confirm the Local Dimming mode.
Step 6) Press “Exit” key
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-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING 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 RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS, 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, fire, 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 IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.
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+3.3V_Normal
IC1401-*1
W25Q80BVSSIG
S_FLASH_MAIN_WINBOND
3%WP[IO2]
2DO[IO1]
4GND
1CS
5 DI[IO0]
6 CLK
7 HOLD[IO3]
8 VCC
R1401
0OPT
SPI_SDI
R1405
33
SPI_SDO
R1404
4.7K
Q1401
KRC103S
OPTE
B
C
C1401
0.1uF
IC1401
MX25L8006EM2I-12G
S_FLASH_MAIN_MACRONIX
3WP#
2SO/SIO1
4GND
1CS#
5 SI/SIO0
6 SCLK
7 HOLD#
8 VCC

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 IT IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.
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TI solution RF-3D OPTION

ALL 3D-SG OPTION

FREQ  | INPUT_0 | INPUT_1 | INPUT_2
-----|---------|---------|---------
50Hz  | 0       | 0       | 0
59.94Hz | 0       | 1       | 0
60Hz  | 0       | 1       | 1
RESERVED | 1       | 0       | 1
RESERVED | 1       | 1       | 0
RESERVED | 1       | 1       | 1

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LCD TV Repair Guide
`11 years New Basic Models

Contents

1. Product Roadmap
2. Main PCB layout
3. Block Diagram
4. Interconnection
5. Standard Repair Process

LCD TV EU Group
LCD TV Research Department

JAN. 28th, 2011
Overview for ‘11 Year Model

LCD TV Repair Guide
‘11 years New Models

< Applicable Basic Model >
xxLK330, xxLK430, xxLK450, xxLK530, xxLK550
xxLV2300, xxLV2500, xxLV2540, xxLV3400
xxLV3500, xxLV3550, xxLV5500, xxLV4500
xxLW4500 (3D)
## Product Roadmap

### 2011

#### Lamp

<table>
<thead>
<tr>
<th>Tool</th>
<th>Pan EU</th>
<th>UK(U)</th>
<th>Nordic(N)</th>
<th>Italy(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22LK331-ZA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26LK331-ZA</td>
<td></td>
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#### Edge LED

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</tbody>
</table>

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LGE Internal Use Only
Main PCB

19/22/26LV2500 (50HZ)

- Main processor, DDR Memory
- Flash Memory
- Micom for Key/IR sensing
- Audio AMP (5W+5W)

* 19/22/26LV2500_S7 Reused (’11)
  Main IC : LGE101_Mstar
  Tuner Type : TDTJ-S001D (DVB-T/C)
  Display Type (Resolution) : LED TV (1366 x 768)
  Interface : HDMI 2EA, Component 1EA, AV 1EA, USB 1EA
  Difference : Without FRC, HDMI Position, Resolution, Interface, Wafer Position (Sub)
Main PCB

22/26LK330 (50HZ)

1. Main processor, DDR Memory
2. Flash Memory
3. Micom for Key/IR sensing
4. Audio AMP (5W+5W)

* 22/26LK330_S7 Reused ('11)
Main IC : LGE101_Mstar
Tuner Type : TDTJ-S001D (DVB-T/C)
Display Type (Resolution) : LCD TV (1366 x 768)
Interface : HDMI 2EA , Component 1EA, AV 1EA, USB 1EA
Difference : Without FRC, HDMI Position , Resolution , Interface, Wafer Position (Sub)
Main PCB

32/37/42/47LK450 (50HZ)

- Main processor, DDR Memory
- Flash Memory
- Micom for Key/IR sensing
- Audio AMP (10W+10W)

* 32/37/42/47LK450_S7 Reused ('11)
Main IC : LGE101_Mstar
Tuner Type : TDTJ-S001D (DVB-T/C)
Display Type (Resolution) : LCD TV (1920 x 1080)
Interface : HDMI 3EA , Component 1EA, AV 1EA, USB 1EA
Difference : Without FRC, HDMI Position , Resolution , Interface, Wafer Position (Sub)
Main PCB

32/37/42/47/55LW4500 (100HZ)

LVDS  Led Driver  Power

1. Main processor, DDR Memory
   Flash Memory
2. Micom for Key/IR sensing
3. Audio AMP (10W+10W)
4. LED Driver connection (with local dimming)

* 37LW4500_S7 Reused ('11)
Main IC : LGE107_Mstar
Tuner Type : TDTJ-S001D (DVB-T/C)
Display Type (Resolution) : 3D, LED TV (1920 x 1080)
Interface : HDMI 3EA, Component 1EA, AV 1EA, USB 1EA
Difference : HDMI Position, Interface, Wafer Position (LVDS, Power, Sub)
Interconnection - 1

19/22LV2500

[PCBs]
1 Main PCB
2 Soft Touch Key/IR PCB

[Cables]
1 Soft Touch key/IR cable
2 Main / Module LVDS cable
3 LED driver / Module cable
4 SPK cable

LCD Module
Interconnection - 2

19/22LV5500

[PCBs]
1. Main PCB
2. Soft Touch Key/IR PCB

[Cables]
1. Soft Touch key/IR cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable
Interconnection - 4

26LV5500

[PCBs]
1 Main PCB
2 Soft Touch Key/IR PCB

[Cables]
1 Soft Touch key/IR cable
2 Main / Module LVDS cable
3 LED driver / Module cable
4 SPK cable

LED driver

Main PCB

Soft Touch Key/IR PCB

Main / Module LVDS cable

LED driver / Module cable

SPK cable

LCD Module
Interconnection - 5

32LV2500

[PCBs]
1. Main PCB
2. PSU
3. Soft Touch Key/IR PCB
4. Timing controller
5. LED Driver

[Cables]
1. Main / PSU cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable
5. Soft Touch key/IR cable
6. LED driver / PSU cable 14P
Interconnection - 6

37LV3400

[PCBs]
1 Main PCB
2 PSU
3 Soft Touch Key/IR PCB
4 Timing controller
5 LED Driver

[Cables]
1 Main / PSU cable
2 Main / Module LVDS cable
3 LED driver / Module cable
4 SPK cable
5 Soft Touch key/IR cable
6 LED driver / PSU cable 14P

LCD Module
Interconnection - 7

37LV3550

[PCBs]
1 Main PCB
2 PSU
3 Soft Touch Key/IR PCB
4 Timing controller
5 LED Driver

[Cables]
1 Main / PSU cable
2 Main / Module LVDS cable
3 LED driver / Module cable
4 SPK cable
5 Soft Touch key/IR cable
6 LED driver / PSU cable 14P
Interconnection - 9

42LW4500

[PCBs]
1. Main PCB
2. PSU + LED driver
3. Soft Touch Key/IR PCB
4. Timing controller

[Cables]
1. Main / PSU cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable
5. Soft Touch key/IR cable
6. Local dimming signal cable (Main / LED driver 8pin)
Interconnection - 10

32LK530

[PCBs]
1. Main PCB
2. PSU (without inverter)
3. IR & Indicator PCB
4. Local Key PCB
5. Inverter
6. Timing controller

[Cables]
1. Main / PSU cable
2. Main / Module LVDS cable
3. SPK cable
4. IR/Local key cable
5. Inverter/PSU cable (14pin)
Interconnection - 11

37LK430

[PCBs]
1 Main PCB
2 PSU (without inverter)
3 IR & Indicator PCB
4 Local Key PCB
5 Timing controller

[Cables]
1 Main / PSU cable
2 Main / Module LVDS cable
3 SPK cable
4 IR/Local key cable

Main / PSU cable
Main / Module LVDS cable
SPK cable
IR/Local key cable

LCD Module
Interconnection - 12

42LK450

[PCBs]
1. Main PCB
2. PSU (without inverter)
3. Soft Touch Key/IR PCB
4. Inverter
5. Timing controller

[Cables]
1. Main / PSU cable
2. Main / Module LVDS cable
3. SPK cable
4. Soft Touch key/IR cable
5. Inverter/PSU cable (14pin)
Interconnection – sub PCB (LV**/LK450 Series)

- Soft Touch Key/IR PCB
- SPK unit
- 15pin Cable
- To Main
Interconnection – sub PCB (LK430/LK530 Series)

- Tact key
- IR/Sensor
- SPK unit
- 12pin Cable
- To Main
## 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>
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<tbody>
<tr>
<td>1</td>
<td>A. Video error</td>
<td>No video/Normal audio</td>
<td>1</td>
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<tr>
<td>2</td>
<td></td>
<td>No video/No audio</td>
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<td>3</td>
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<td>Video error, video lag/stop</td>
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<td>4</td>
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<td>Color error</td>
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<td>5</td>
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<td>Vertical/Horizontal bar, residual image, light spot, external device color error</td>
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<td>6</td>
<td>B. Power error</td>
<td>No power</td>
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<td>7</td>
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<td>Off when on, off while viewing, power auto on/off</td>
<td>7</td>
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<tr>
<td>8</td>
<td>C. Audio error</td>
<td>No audio/Normal video</td>
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<td>Wrecked audio/discontinuation/noise</td>
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<td>10</td>
<td>D. Function error</td>
<td>No response in remote controller, key error, recording error, memory error</td>
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<td>11</td>
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<td>External device recognition error</td>
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<td>12</td>
<td>E. Noise</td>
<td>Circuit noise, mechanical noise</td>
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<tr>
<td>13</td>
<td>F. Exterior error</td>
<td>Exterior defect</td>
<td>13</td>
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</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,..)

A. Video error

- No video/Normal audio

1. Normal audio → On with naked eye
   - On → Check Power Board 12V, 3.5V etc.
   - Off → Move to No video/No audio

2. Move to No video/No audio

3. Check Power Board 20V /12V or 24V output

- Normal voltage
  - On → Replace T-con Board or module
  - Off → Repair Power Board or parts

- Normal voltage
  - On → Replace Inverter or module
  - Off → Repair Power Board or parts

- Normal voltage
  - On → Replace Inverter or module
  - Off → Repair Power Board or parts

- Normal voltage
  - On → Replace Inverter or module
  - Off → Repair Power Board or parts

- Normal voltage
  - On → Replace Inverter or module
  - Off → Repair Power Board or parts

4. Replace Main Board

5. Re-enter White Balance value
Standard Repair Process

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>A. Video error</th>
</tr>
</thead>
<tbody>
<tr>
<td>No video/ No audio</td>
<td>Established date: 2010. 2.19</td>
</tr>
<tr>
<td></td>
<td>Revised date: 2/13</td>
</tr>
</tbody>
</table>

A. Video error

- No Video/ No audio
  - Check various voltages of Power Board (3.5V, 12V, 20V or 24V...)
  - Normal voltage?
    - Y: Check and replace MAIN B/D
    - N: Replace Power Board and repair parts
  - End
**A6**

**Check RF Signal level**

1. By using Digital signal level meter
2. By using Diagnostics menu on OSD (Menu → Red key → Signal test)
   - Signal strength (Normal: over 50%)
   - Signal Quality (Normal: over 50%)

**Check RF Signal level**

- Y: Normal Signal
- N: Check RF Cable Connection
  1. Reconnection
  2. Install Booster

**Normal Picture?**

- Y: Check W/S Version
  - SVC Bulletin?
    - N: Check Tuner soldering
    - Y: Close
  - S/W Upgrade?
    - N: Contact with signal distributor or broadcaster (Cable or Air)
    - Y: Close

- N: Close
A. Video error

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>A. Video error</th>
<th>Established date</th>
<th>2010. 2.19</th>
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<tbody>
<tr>
<td></td>
<td>Color error</td>
<td></td>
<td>Revised date</td>
<td>4/13</td>
</tr>
</tbody>
</table>

A8

- Check color by input
  - External Input
  - COMPONENT
  - RGB
  - HDMI/DVI

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

A10/A11

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

A12

- Check Test pattern
- External Input/Component error
- Check external device and cable
- External device/Cable normal
  - Y: Replace Main B/D
  - N: Request repair for external device/cable
- RGB/HDMI/DVI error
- Check external device and cable
- External device/Cable normal
  - Y: Replace Main B/D
  - N: Y
Vertical/HORIZONTAL BAR, RESIDUAL IMAGE, LIGHT SPOT

A8
Check color condition by input
-External Input
-Component
-RGB
-HDMI/DVI

Screen normal?
Y
N
Replace module

Check external device connection condition

Normal?
Y
N
Check and replace Link Cable

Screen normal?
Y
N
Replace Main B/D

End

A10/A11
Request repair for external device

Connect other external device and cable
(Connect normal operation of External Input, Component, RGB and HDMI/DVI by connecting Jig, pattern Generator, Set-top Box etc.)

Component error

RGB error

HDMI/DVI error

End

A12
Check Test pattern

EXTERNAL DEVICE SCREEN ERROR-COLOR ERROR

Check S/W Version

Check version
N
Y
S/W Upgrade

Normal screen?
N
Y
End

Check screen condition by input
-External Input
-Component
-RGB
-HDMI/DVI

External Input error

Component error

RGB error

HDMI/DVI error

End

Connect other external device and cable
(Connect normal operation of External Input, Component, RGB and HDMI/DVI by connecting Jig, pattern Generator, Set-top Box etc.)

Replace Main B/D

Request repair for external device
B. Power error

<table>
<thead>
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<th>Error symptom</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td>No power</td>
<td>2010. 2.19</td>
<td>6/13</td>
</tr>
</tbody>
</table>

**A17**
Check Power LED

- Power LED On?
  - Y: DC Power on by pressing Power Key On Remote control
  - N: Power LED On?
    - Y: Check Power cord was inserted properly
    - N: Normal?
      - Y: Close
      - N: Check ST-BY 5V

**A18**

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

**A19**
Check Power On "High"

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

- Measure voltage of each output of Power B/D

※ Stand-By: Red
  Operating: white
B. Power error

Off when on, off while viewing, power auto on/off

**Check Power Off Mode**

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

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

☞ A22

☞ A19

*(If Power Off mode is not displayed)* Check Power B/D voltage

- Fix A/C cord & Outlet and check each 3 phase power out

- Check outlet
- Check A/C cord
- Check for all 3-phase power out

---

**Established date** 2010. 2.19

**Status**

<table>
<thead>
<tr>
<th>Status</th>
<th>Power off List</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>Normal</td>
<td>&quot;POWEROFF_REMOTETKEY&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>
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<td></td>
<td>&quot;POWEROFF_INSTOP&quot;</td>
<td>Power off by INSTOP KEY</td>
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<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>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.
C. Audio 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>No audio/ Normal video</td>
<td>2010. 2.19</td>
<td>8/13</td>
<td></td>
</tr>
</tbody>
</table>

**Standard Repair Process**

- **A24**
  - No audio
  - Screen normal
  - Check user menu > Speaker off

- **A25**
  - Check audio B+ 20V or 24V of Power Board
  - Normal voltage
  - Replace Power Board and repair parts

- Check Speaker disconnection
  - Disconnection
  - Replace MAIN Board
  - End
  - Replace Speaker

Established date: 2010. 2.19
Revised date: 8/13
→ 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 Main B/D

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

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

Normal voltage?
Y
N

Replace Power B/D

Normal audio?
N
Y

Check and fix external device

Replace Main B/D

End

A25

Standard Repair Process

LCD TV

Error symptom
Wrecked audio/ discontinuation/noise

C. Audio error

Established date
2010. 2.19

Revised date
9/13

Established date

Revised date
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] → Close
  - Normal operating? [N] → Check & Replace Battery of R/C

- If R/C operate, explain the customer cause is interference from light in room.
  - Normal operating? [Y] → Close
  - Normal operating? [N] → Replace R/C

- Check 5v on Power B/D Replace Power B/D or Replace Main B/D (Power B/D don't have problem)
  - Normal Signal? [Y] → Repair/Replace IR B/D
  - Normal Signal? [N] → Replace Main B/D
**Standard Repair Process**

<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>2010. 2.19</td>
<td>11/13</td>
</tr>
</tbody>
</table>

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

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

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

- **Circuit noise, mechanical noise**

**Error symptom**

- **Check location of noise**
  - **Circuit noise**
    - Identify noise type
    - Replace PSU (with LED driver)
  - **Mechanical noise**
    - Check location of noise
    - Replace LED driver

- **OR**
  - 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)
  - Describe the basis of the description in “Part related to nose” in the Owner’s Manual.

**Established date**

- 2010. 2.19

**Revised date**

- 12/13
Standard Repair Process

<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>2010. 2.19</td>
<td>13/13</td>
</tr>
</tbody>
</table>

- Zoom part with exterior damage
  - Module 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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<th>Page</th>
<th>Remarks</th>
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<td></td>
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<td>LED driver B+ 24V measuring method</td>
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<td>3</td>
<td>Check White Balance value</td>
<td>A3</td>
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</tr>
<tr>
<td>4</td>
<td>Power Board voltage measuring method</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>A. Video error_ No video/Video lag/stop</td>
<td>TUNER input signal strength checking method</td>
<td>A6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>LCD-TV Version checking method</td>
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<td>9</td>
<td>A. Video error_Color error</td>
<td>LCD TV connection diagram</td>
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</tr>
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<td>10</td>
<td>Tuner Checking Part</td>
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<td></td>
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<td>A10</td>
<td>A11</td>
<td>A10 : Edge LED A11 : Lamp</td>
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<td></td>
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<tr>
<td>13</td>
<td>A. Video error_Vertical/Horizontal bar, residual image, light spot</td>
<td>LCD TV connection diagram</td>
<td>A8</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Check Link Cable (LVDS) reconnection condition</td>
<td>A10</td>
<td>A11</td>
<td>A10 : Edge LED A11 : Lamp</td>
</tr>
<tr>
<td>15</td>
<td>Adjustment Test pattern - ADJ Key</td>
<td>A12</td>
<td></td>
<td></td>
</tr>
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<td>Exchange T-Con Board (1)</td>
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<td></td>
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<tr>
<td>17</td>
<td>Exchange T-Con Board (2)</td>
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<td>18</td>
<td>Exchange LED driver Board (PSU)</td>
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<td></td>
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<td>19</td>
<td>Exchange Module itself (1)</td>
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<td></td>
<td></td>
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<tr>
<td>20</td>
<td>Exchange Module itself (2)</td>
<td>A-5/5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<Appendix>

Defected Type caused by T-Con/Inverter/Module

Continue to the next page
<table>
<thead>
<tr>
<th>No.</th>
<th>Error symptom</th>
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<th>Remarks</th>
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<td>Check front display LED</td>
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<td>22</td>
<td>B. Power error_No power</td>
<td>Check power input Voltage &amp; ST-BY 5V</td>
<td>A18</td>
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</tr>
<tr>
<td>23</td>
<td>B. Power error_No power</td>
<td>Checking method when power is ON</td>
<td>A19</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>B. Power error_No power</td>
<td>POWER BOARD voltage measuring method</td>
<td>A4</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>B. Power error_Off when on, off while viewing</td>
<td>POWER OFF MODE checking method</td>
<td>A22</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>B. Power error_Off when on, off while viewing</td>
<td>POWER BOARD PIN voltage checking method</td>
<td>A19</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>C. Audio error_No audio/Normal video</td>
<td>Checking method in menu when there is no audio</td>
<td>A24</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>C. Audio error_No audio/Normal video</td>
<td>Voltage and speaker checking method when there is no audio</td>
<td>A25</td>
<td></td>
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<tr>
<td>30</td>
<td>C. Audio error_Wrecked audio/discontinuation</td>
<td>Voltage and speaker checking method in case of audio error</td>
<td>A25</td>
<td></td>
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<tr>
<td>31</td>
<td>D. Function error_No response in remote controller, key error</td>
<td>Remote controller operation checking method</td>
<td>A27</td>
<td></td>
</tr>
</tbody>
</table>

Continued from previous page
<ALL MODELS>

After turning on the power and disassembling the case, check with the naked eye, whether you can see light from 4 locations.
A. Video error_No video/Normal audio

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED driver/lamp inverter</td>
<td>B+ 24V measuring method</td>
</tr>
</tbody>
</table>

Established date: 2011. 2. 07

Check the DC 24V, 12V, 3.5V and Inverter on

**LED driver/lamp inverter  B+ 24V measuring method**

**Check the DC 24V, 12V, 3.5V and Inverter on**

* ALEF/OS 42/47/55'/60”

<table>
<thead>
<tr>
<th>Power Board ↔ Drive Board – PSU</th>
<th>14 pin</th>
<th>14 pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ~ 5</td>
<td>24V</td>
<td>24V</td>
</tr>
<tr>
<td>6 ~ 10</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>11</td>
<td>Detect</td>
<td>Detect</td>
</tr>
<tr>
<td>12</td>
<td>Inverter On/Off</td>
<td>Inverter On/Off</td>
</tr>
<tr>
<td>13</td>
<td>Int. PWM</td>
<td>Int. PWM</td>
</tr>
<tr>
<td>14</td>
<td>Ext. PWM (PDIM)</td>
<td>Ext. PWM (PDIM)</td>
</tr>
</tbody>
</table>

* ALL 32”/37”

<table>
<thead>
<tr>
<th>Power Board ↔ Driver</th>
<th>PSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ~ 5</td>
<td>24V</td>
</tr>
<tr>
<td>6 ~ 10</td>
<td>GND</td>
</tr>
<tr>
<td>11</td>
<td>Detect</td>
</tr>
<tr>
<td>12</td>
<td>Inverter On/Off</td>
</tr>
<tr>
<td>13</td>
<td>Int. PWM</td>
</tr>
<tr>
<td>14</td>
<td>Ext. PWM (P DIM)</td>
</tr>
</tbody>
</table>

* 26” ~ 47” : ‘11 Pin map

<table>
<thead>
<tr>
<th>Lamp (Power Board ↔ Inverter)</th>
<th>PSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 Pin</td>
<td></td>
</tr>
<tr>
<td>1 ~ 5</td>
<td>24V</td>
</tr>
<tr>
<td>6 ~ 10</td>
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<td>12</td>
<td>Inverter On/Off</td>
</tr>
<tr>
<td>13</td>
<td>Int. PWM</td>
</tr>
<tr>
<td>14</td>
<td>Ext. PWM (P DIM)</td>
</tr>
<tr>
<td>LCD TV</td>
<td>Error symptom</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<ALL MODELS>

**Entry method**

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

2. Enter into White Balance of item 7.

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.
Check the DC 20V or 24V, 12V, 3.5V.

### 24 Pin (Power Board ↔ Main Board) - Checking

<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>20V (24V)</td>
</tr>
<tr>
<td>3</td>
<td>20V (24V)</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>3.5V</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>3.5V</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>GND</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>GND</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>12V</td>
<td>18</td>
</tr>
<tr>
<td>19</td>
<td>12V</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>12V</td>
<td>22</td>
</tr>
<tr>
<td>23</td>
<td>N.C</td>
<td>24</td>
</tr>
</tbody>
</table>

### 24 Pin (Power Board ↔ Main Board) - FW20020-24SB (FOOSUNG)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power on</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>20V (24V)</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>3.5V</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>3.5V</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>GND</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>GND</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>12V</td>
<td>18</td>
</tr>
<tr>
<td>19</td>
<td>12V</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>12V</td>
<td>22</td>
</tr>
<tr>
<td>23</td>
<td>N.C</td>
<td>24</td>
</tr>
</tbody>
</table>

Edge LED PSU without LED Driver

Lamp PSU without inverter
## Standard Repair Process Detail Technical Manual

<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>
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<tbody>
<tr>
<td>Content</td>
<td>TUNER input signal strength checking method</td>
<td>2011. 2.07</td>
<td>A6</td>
<td></td>
</tr>
</tbody>
</table>

### <ALL MODELS>

**MENU** - → red key(customer support) → signal test → select channel

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

---

**Established date**: 2011. 2.07

**Revised date**: A6

---

**Error symptom**: Video error_Video error, video lag/stop

**Content**: TUNER input signal strength checking method

---

**Established date**: 2011. 2.07

**Revised date**: A6
<ALL MODELS>

1. Checking method for remote controller for adjustment

Press the IN-START with the remote controller for adjustment
As the part connecting to the external input, check the screen condition by signal.
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.
### 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>Content</th>
<th>Revised date</th>
<th>A10</th>
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<tbody>
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<td></td>
<td></td>
<td>Check Link Cable (LVDS) reconnection condition</td>
<td>2011. 2.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<LV** : Edge LED Series Models>

---

![Image of a TV motherboard with components highlighted]

**Check the contact condition of the Link Cable, especially dust or mis insertion.**
## Check Link Cable (LVDS) reconnection condition

### Error symptom
- A. Video error _Color error_

### Established date
- 2011. 2.07

### Error symptom
- Check Link Cable (LVDS) reconnection condition

### Content
- *LK** : Lamp series Models>

---

Check the contact condition of the Link Cable
### 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>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Adjustment Test pattern - ADJ Key</td>
<td>2011. 2 .07</td>
<td>A12</td>
<td></td>
</tr>
</tbody>
</table>

#### 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!)

![Remote Control with ADJ Key highlighted](image1)

![Adjustment Test Patterns](image2)

![Remote Control with ADJ Key highlighted](image3)
Appendix : Exchange T-Con Board (1)

Solder defect, CNT Broken
Solder defect, CNT Broken
Solder defect, CNT Broken
Solder defect, CNT Broken
Solder defect, CNT Broken
Abnormal Power Section
Solder defect, CNT Broken
Solder defect, CNT Broken
Abnormal Power Section
Solder defect, Short/Crack
Abnormal Power Section
Solder defect, Short/Crack
Appendix : Exchange T-Con Board (2)

- Abnormal Power Section
- Abnormal Power Section
- Solder defect, Short/Crack
- Solder defect, Short/Crack
- Fuse Open, Abnormal power section
- Abnormal Display
- GRADATION
- Noise
- GRADATION
Appendix : Exchange PSU(LED driver)

No Light

Dim Light

Dim Light

No picture/Sound Ok
Appendix: Exchange the Module (1)

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.
## Standard Repair Process Detail Technical Manual

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>B. Power error <em>No power</em></th>
<th>Established date</th>
<th>Revised date</th>
<th>Content</th>
<th>Revised date</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Check front display LED</td>
<td>2010. 2.19</td>
<td>A17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Image shown may differ from your TV.


---

### Front LED control:
- Menu → Option → Power Indicator → Standby light ON

### ST-BY condition:
- Red

### Power ON condition:
- White

---

### Button Description

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Scrolls through the saved programmes</td>
</tr>
<tr>
<td>&lt;, &gt;</td>
<td>Adjusts the volume level</td>
</tr>
<tr>
<td>&lt;, &gt;</td>
<td>Selects the highlighted menu option or confirms an input</td>
</tr>
<tr>
<td>HDMI</td>
<td>Accesses the main menus, or saves your input and exits the menus</td>
</tr>
<tr>
<td>INPUT</td>
<td>Changes the input source</td>
</tr>
<tr>
<td>0, 1</td>
<td>Turns the power on or off</td>
</tr>
</tbody>
</table>

1. Intelligent sensor: Adjusts the image quality corresponding to the surrounding environment.
2. Touch Button: You can use the desired button functions by touching.

---

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Only for training and service purposes

A17 LGE Internal Use Only
Check power input voltage and ST-BY 3.5V

For '11 models, there is no voltage out for st-by purpose. When st-by, only 3.5V is normally on.

Check the 3.5V when st-by

<table>
<thead>
<tr>
<th>24 Pin (Power Board ↔ Main Board) - 상품</th>
<th>24 Pin (Power Board ↔ Main Board)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Power on 2 20V (24V) 3 20V (24V) 4 20V (24V) 5 GND 6 GND 7 GND 8 GND 9 3.5V 10 3.5V 11 3.5V 12 3.5V 13 GND 14 GND 15 GND 16 N.C 17 12V 18 Inverter On/off 19 12V 20 Lamp : A-Dim LED : N.C 21 12V 22 PWM Dim #1 23 N.C • Lamp SCANNING Model : PWM Dim #2 24 Error-out</td>
<td></td>
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</tr>
</tbody>
</table>
### Checking method when power is ON

#### B. Power error - No power

**Error symptom**: LCD TV

**Content**: Established date 2011. 2.07

- **Revised date**: A19

Check “power on” pin is high

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

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power on</td>
<td>20V (24V)</td>
</tr>
<tr>
<td>3</td>
<td>20V (24V)</td>
<td>20V (24V)</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>9</td>
<td>3.5V</td>
<td>3.5V</td>
</tr>
<tr>
<td>11</td>
<td>3.5V</td>
<td>3.5V</td>
</tr>
<tr>
<td>13</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>15</td>
<td>GND</td>
<td>N.C</td>
</tr>
<tr>
<td>17</td>
<td>12V</td>
<td>Inverter On/off</td>
</tr>
<tr>
<td>19</td>
<td>12V</td>
<td>Lamp : A-Dim</td>
</tr>
<tr>
<td>19</td>
<td>12V</td>
<td>LED : N.C</td>
</tr>
<tr>
<td>21</td>
<td>12V</td>
<td>PWM Dim #1</td>
</tr>
<tr>
<td>23</td>
<td>N.C</td>
<td>PWM Dim #2</td>
</tr>
</tbody>
</table>

#### 24 Pin (Power Board ↔ Main Board - Samsung)

<table>
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<tr>
<th>Pin</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>Power on</td>
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</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 MENU button on the remote controller
2. Select the AUDIO function of the Menu
3. Select TV Speaker from Off to On
Checking order when there is no audio

1. Check the contact condition of 20V 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.
### Remote controller operation checking method

#### Error symptom
- D. Function error: No response in remote controller, key error

#### Content
- Remote controller operation checking method

<table>
<thead>
<tr>
<th>LCD TV</th>
<th>Error symptom</th>
<th>D. Function error: No response in remote controller, key error</th>
<th>Established date</th>
<th>Revised date</th>
<th>A27</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Remote controller operation checking method</td>
<td>2011. 2.07</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<ALL MODELS>

**Checking order**

1. 2. Check IR cable condition between IR & Main board.
2. Check the st-by 3.3V on the terminal 6.
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.

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![Diagram](image-url)