LED TV
SERVICE MANUAL
CHASSIS : UA64J
MODEL : 55UH7700  55UH7700-UB
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 △ in the Schematic Diagram and Exploded View. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.

General Guidance

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

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

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

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

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

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

Leakage Current Cold Check (Antenna Cold Check)

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

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

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

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit

![Leakage Current Hot Check circuit diagram]

When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω
*Base on Adjustment standard
SERVICING PRECAUTIONS

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

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

General Servicing Precautions
1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10 % (by volume) Acetone and 90 % (by volume) isopropyl alcohol (90 % - 99 % strength)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in 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 off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

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

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

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

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

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

Diode Removal/Replacement
1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular 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 spec sheet is applied to the LED TV used UA64J chassis

2. Test condition
   Each part is tested as below without special notice.

   (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 (100~240V@ 50/60Hz)
      Standard Voltage of each products is marked by models.
   (4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
   (5) The receiver must be operated for about 20 minutes prior to the adjustment.

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

4. General Specification

### 4.1. Model Specification

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## 5. External input format

### 5.1. 2D Mode

#### 5.1.1. Component input (Y, Cb/Pb, Cr/Pr)

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## 5.2. 3D Mode

### 5.2.1. HDMI Input 1.4b (3D supported mode automatically)

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<tr>
<td>1</td>
<td>Under 704x480</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2D to 3D</td>
</tr>
<tr>
<td>2</td>
<td>Over 704x480 interlaced</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2D to 3D, Side by Side(Half), Top &amp; Bottom</td>
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<tr>
<td>3</td>
<td>Over 704x480 progressive</td>
<td>-</td>
<td>50/60</td>
<td>-</td>
<td>2D to 3D, Side by Side(Half), Top &amp; Bottom</td>
</tr>
<tr>
<td>4</td>
<td>Over 704x480 Under 1080P</td>
<td>-</td>
<td>24/25/30</td>
<td>-</td>
<td>2D to 3D, Side by Side(Half), Top &amp; Bottom</td>
</tr>
<tr>
<td>5</td>
<td>others</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2D to 3D, Side by Side(Half), Top &amp; Bottom</td>
</tr>
</tbody>
</table>

## 5.2.6. USB, DLNA (Photo) Input (3D supported mode manually)

<table>
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<tr>
<th>No.</th>
<th>Resolution</th>
<th>H-freq(kHz)</th>
<th>V-freq.(Hz)</th>
<th>Pixel clock(MHz)</th>
<th>3D input proposed mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2D to 3D, Side by Side(Half), Top &amp; Bottom</td>
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</table>

## 5.2.7. USB, DNLA Input (3D supported mode automatically)

<table>
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<th>V-freq.(Hz)</th>
<th>Pixel clock(MHz)</th>
<th>3D input proposed mode</th>
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<tr>
<td>1</td>
<td>1080P</td>
<td>33.75</td>
<td>30</td>
<td>74.25</td>
<td>Side by Side(Half), Top &amp; Bottom, Side by Side(Full), Frame Sequential, MPO(Photo), JPS(Photo)</td>
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<tr>
<td>2</td>
<td>2160p</td>
<td>67.5</td>
<td>30</td>
<td>297</td>
<td>Frame Sequential, MPO(Photo), JPS(Photo)</td>
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5.2.8. Miracast, Widi (3D supported mode manually)

<table>
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<th>H-freq(kHz)</th>
<th>V-freq.(Hz)</th>
<th>Pixel clock(MHz)</th>
<th>3D input proposed mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1024*768p</td>
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<td>-</td>
<td>2D to 3D</td>
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<td>2</td>
<td>1280*720p</td>
<td>-</td>
<td>30 / 60</td>
<td>-</td>
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<td>3</td>
<td>1920*1080p</td>
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<td>30 / 60</td>
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<td></td>
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<td>4</td>
<td>Others</td>
<td>-</td>
<td></td>
<td></td>
<td>2D to 3D</td>
</tr>
</tbody>
</table>

**Remark: 3D Input mode**

<table>
<thead>
<tr>
<th>No.</th>
<th>Side by Side</th>
<th>Top &amp; Bottom</th>
<th>Single Frame Sequential</th>
<th>Frame Packing</th>
<th>2D to 3D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1" alt="Side by Side" /></td>
<td><img src="image2" alt="Top &amp; Bottom" /></td>
<td><img src="image3" alt="Single Frame Sequential" /></td>
<td><img src="image4" alt="Frame Packing" /></td>
<td><img src="image5" alt="2D to 3D" /></td>
</tr>
</tbody>
</table>
ADJUSTMENT INSTRUCTION

1. Application Range
This spec. sheet applies to UA64J Chassis applied LED TV all models manufactured in TV factory.

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

• In case of keeping module is in the circumstance of 0°C, it should be placed in the circumstance of above 15°C for 2 hours.
• In case of keeping module is in the circumstance of below -20°C, it should be placed in the circumstance of above 15°C for 3 hours.

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

3. Adjustment items
3.1. Main PCB check process
• MAC Address Download
• ADC adjustment : 480i Comp1, 1920*1080 Comp1
• EDID/DDC download
Above adjustment items can be also performed in Final Assembly if needed. Both Board-level and Final assembly adjustment items can be check using In-Start Menu 1.ADJUST CHECK.

3.2. Final assembly adjustment
• White Balance adjustment
• RS-232C functionality check
• PING Test
• Factory Option setting per destination
• Ship-out mode setting (In-Stop)

3.3. Etc.
• Ship-out mode
• Service Option Default
• USB Download(S/W Update, Option, Service only)
• ISP Download (Option)

4. Automatic Adjustment

4.1. ADC Adjustment
ADC adjustment is needed to find the optimum black level and gain in Analog-to-Digital device and to compensate RGB deviation.

4.1.1. Equipment & Condition
(1) USB to RS-232C Jig
(2) MSPG-925 Series Pattern Generator(MSPG-925FA, pattern -65)
- Resolution : 480i Comp1
  1080P Comp1
- Pattern : Horizontal 100% Color Bar Pattern
- Pattern level : 0.7±0.1 Vp-p
- Image

4.1.2. Adjustment method
• Using USB, adjust items listed in 3.1 in the other shown in “4.1.3.3”

4.1.3. Adj. protocol

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Command</th>
<th>Set ACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter adj. mode</td>
<td>aa 00 00</td>
<td>a 00 OK00x</td>
</tr>
<tr>
<td>Source change</td>
<td>xb 00 04</td>
<td>b 00 OK04x (Adjust 480i, 1080p Comp1 )</td>
</tr>
<tr>
<td></td>
<td>xb 00 06</td>
<td>b 00 OK06x (Adjust 1920*1080 RGB)</td>
</tr>
<tr>
<td>Begin adj.</td>
<td>ad 00 10</td>
<td></td>
</tr>
<tr>
<td>Return adj. result</td>
<td>OKx (Case of Success)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NGx (Case of Fail)</td>
<td></td>
</tr>
<tr>
<td>Read adj. data</td>
<td>(main) ad 00 20</td>
<td>(main) 000000000000000000000000007c007b006dx</td>
</tr>
<tr>
<td></td>
<td>(sub) ad 00 21</td>
<td>(Sub) 000000000000000000000000007c00830077x</td>
</tr>
<tr>
<td>Confirm adj.</td>
<td>ad 00 99</td>
<td>NG 03 00x (Fail)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NG 03 01x (Fail)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NG 03 02x (Fail)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OK 03 03x (Success)</td>
</tr>
<tr>
<td>End adj.</td>
<td>ad 00 90</td>
<td>a 00 OK90x</td>
</tr>
</tbody>
</table>

(Ref.) ADC Adj. RS232C Protocol_Ver1.0

Adj. order
• aa 00 00 [Enter ADC adj. mode]
• xb 00 04 [Change input source to Component1(480i&1080p)]
• ad 00 10 [Adjust 480i&1080p Comp1]
• xb 00 06 [Change input source to RGB(1024*768)]
• ad 00 10 [Adjust 1920*1080 RGB]
• aa 00 90 End adj.

[Ref.] ADC Adj. RS232C Protocol_Ver1.0
4.2. MAC address, ESN, Widevine, HDCP2.0 key D/L

4.2.1. Equipment & Condition
   (1) Play file: keydownload.exe

4.2.2. Communication Port connection
   (1) Key Write: Com 1,2,3,4 and 115200 (Baudrate)
   (2) Barcode: Com 1,2,3,4 and 9600 (Baudrate)

4.2.3. Download process
   (1) Select the download items.
   (2) Mode check: Online Only
   (3) Check the test process: DETECT -> MAC -> Widevine
   (4) Play: START
   (5) Check of result: Ready, Test, OK or NG

4.2.4. Communication Port connection
   (1) Connect: PCBA Jig -> RS-232C Port == PC -> RS-232C Port

4.2.5. Download
   (1) Models(MAC + Widevine + ESN)

4.3. LAN Inspection

4.3.1. Equipment & Condition
   • Each other connection to LAN Port of IP Hub and Jig

4.3.2. LAN inspection solution
   • LAN Port connection with PCB
   • Network setting at MENU Mode of TV
   • Setting automatic IP
   • Setting state confirmation
     - If automatic setting is finished, you confirm IP and MAC Address.

4.3.3. LAN PORT INSPECTION (PING TEST)
   Connect SET → LAN port == PC → LAN Port

   (1) Play the LAN Port Test PROGRAM.
   (2) Input IP set up for an inspection to Test Program.
     * IP Number : 12.12.2.2.
4.3.4. LAN PORT inspection (PING TEST)
(1) Play the LAN Port Test Program.
(2) Connect each other LAN Port Jack.
(3) Play Test (F9) button and confirm OK Message.
(4) Remove LAN CABLE

4.4. Model name & Serial number Download
4.4.1. Model name & Serial number D/L
- Press “Power on” key of service remocon (Baud rate : 115200 bps)
- Connect RS-232C Signal to USB Cable to USB.
- Write Serial number by use USB port.
- Must check the serial number at Instart menu.

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

4.5. WIFI MAC ADDRESS CHECK
4.5.1. Using RS232 Command

<table>
<thead>
<tr>
<th>Command</th>
<th>Set ACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission</td>
<td>[A][I][I][I][Set ID][][20][Cr]</td>
</tr>
</tbody>
</table>

Check the menu on in-start

* 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)
It is impossible to download by bar code scan, so it need Manual download.

a. Press the ‘INSTART’ key of ADJ remote controller.
b. Go to the menu ‘7. Model Number D/L’ like below photo.
c. Input the Factory model name or Serial number like below photo.
d. Check the model name INSTART menu -> Factory name displayed
e. Check the Diagnostics (DTV country only) -> Buyer model displayed
5. Manual Adjustment

5.1. ADC adjustment is not needed because of OTP (Auto ADC adjustment)

5.2. EDID

(The Extended Display Identification Data) / DDC (Display Data Channel) download

5.2.1. Overview

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

5.2.2. Equipment

- Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not needed.
- Adjust remocon

5.2.3. Download method

1. Press Adj. key on the Adjust remocon, then select “12. EDID D/L”.
   By pressing Enter key, enter EDID D/L menu
2. Select [Start] button by pressing Enter key, HDMI1 / HDMI2 / HDMI3 / HDMI4 are Writing and display OK or NG.

5.2.4. EDID DATA

- HDMI1
  - UHD DeepColor “OFF”
    - PCM (HDMI to HDMI or DVI-D to HDMI)

5.2.4.1. EDID

- Reference
  - HDMI1 ~ HDMI3
  - In the data of EDID, bellows may be different by input mode
  - Product ID
  - Serial No: Controlled on production line.
  - Month, Year: Controlled on production line: ex) Monthly : ‘01’ -> ‘01’
  - Year : ‘2016’ -> ‘1A’
  - Model Name (Hex): LGTV
  - Checksum (LG TV): Changeable by total EDID data.
  - Vendor Specific (HDMI)

For HDMI EDID

DVI-D to HDMI or HDMI to HDMI

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- HDMI2
  - PCM
  - PD (HDMI to HDMI)

- HDMI3
  - PCM
  - PD (HDMI to HDMI)
### (2) AC3

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### UHD DeepColor "ON"
#### (1) PCM - HDMI1

| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |
| **HD** | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 |

#### (2) AC3 - HDMI1

| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |
| **HD** | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 |

### HDMI2

| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |
| **HD** | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 |

### HDMI3

| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |
| **HD** | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 |

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Only for training and service purposes.
<table>
<thead>
<tr>
<th>HDMI 1</th>
<th>HDMI 2</th>
<th>HDMI 3</th>
<th>HDMI 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTS</td>
<td>DTS</td>
<td>DTS</td>
<td>DTS</td>
</tr>
<tr>
<td>HDMI1</td>
<td>HDMI2</td>
<td>HDMI3</td>
<td>HDMI4</td>
</tr>
<tr>
<td>DTS</td>
<td>DTS</td>
<td>DTS</td>
<td>DTS</td>
</tr>
<tr>
<td>HDMI1</td>
<td>HDMI2</td>
<td>HDMI3</td>
<td>HDMI4</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>HDMI</th>
<th>2D</th>
<th>DTS</th>
<th>DTHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDMI1</td>
<td>9F/11</td>
<td>9F/B6</td>
<td>9F/2E</td>
</tr>
<tr>
<td>HDMI2</td>
<td>9F/01</td>
<td>9F/A6</td>
<td>9F/1E</td>
</tr>
<tr>
<td>HDMI3</td>
<td>9F/F1</td>
<td>9F/96</td>
<td>9F/0E</td>
</tr>
</tbody>
</table>

- **2D**

<table>
<thead>
<tr>
<th>HDMI</th>
<th>2D</th>
<th>3G</th>
<th>6G</th>
<th>3G</th>
<th>6G</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDMI1</td>
<td>9F/11</td>
<td>9F/B6</td>
<td>9F/2E</td>
<td>9F/D3</td>
<td></td>
</tr>
<tr>
<td>HDMI2</td>
<td>9F/01</td>
<td>9F/A6</td>
<td>9F/1E</td>
<td>9F/C3</td>
<td></td>
</tr>
<tr>
<td>HDMI3</td>
<td>9F/F1</td>
<td>9F/96</td>
<td>9F/0E</td>
<td>9F/B3</td>
<td></td>
</tr>
</tbody>
</table>

- **AC3**

<table>
<thead>
<tr>
<th>HDMI</th>
<th>3G</th>
<th>6G</th>
<th>3G</th>
<th>6G</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDMI1</td>
<td>9F/1A</td>
<td>9F/BF</td>
<td>9F/8C</td>
<td>9F/31</td>
</tr>
<tr>
<td>HDMI2</td>
<td>9F/0A</td>
<td>9F/AF</td>
<td>9F/7C</td>
<td>9F/21</td>
</tr>
<tr>
<td>HDMI3</td>
<td>9F/FA</td>
<td>9F/9F</td>
<td>9F/6C</td>
<td>9F/11</td>
</tr>
</tbody>
</table>
5.3. Camera Port Inspection
(1) Objective: To check how it connects between Camera and PCBA normally, and their Function
(2) Test Method: This Inspection is available only Power-Only Status.
   1) Push Camera Up
   2) Camera’s Preview picture appears on TV Set
   3) Push Camera Down

5.4. V-COM Adjust
(ONLY FOR EPI model, 43/49/55UH6600, 43/49/55UH6500)

5.4.1. Overview
- V-COM adj. Objective & How-it-works
  - Objective: To reduce each Panel’s V-COM voltage deviation
  - How-it-works: When V-COM gain in the adjust-OSD of each SET is at default value, each SET can have flicker by each Panel’s V-COM voltage deviation. In order to prevent flicker of each SET, find the desired each Panel’s V-COM voltage value.
  - Adj. condition: normal temperature
    1) Surrounding Temperature: 25 °C ± 5 °C
    2) Warm-up time: About 5 Min
    3) Surrounding Humidity: 20% ~ 80%

5.4.2. Equipment
(1) Color Analyzer: CA-310 (LED Module : CH 14) or CM-H505
(2) Adj. Computer (During auto adj., RS-232C protocol is needed)
(3) Adjust Remocon
(4) Signal: internal flicker Pattern in SET
  • Color Analyzer Matrix should be calibrated using CS-100

5.4.3. Equipment connection MAP

5.4.4. Adj. Command (Protocol)
<Command Format>
CMD ID DATA CR RF

- CMD: Command
- ID : Command
- Data : Command
(Ex) [Send: va 00 00\r\n]

(1) RS-232C Command used during auto-adj.

<table>
<thead>
<tr>
<th>RS-232C COMMAND</th>
<th>CMD</th>
<th>DATA</th>
<th>ID</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>va 00 00</td>
<td></td>
<td></td>
<td></td>
<td>V-com pattern</td>
</tr>
<tr>
<td>vb 00 00 ~ FE</td>
<td></td>
<td></td>
<td></td>
<td>V-com adj.(internal Flicker pattern)</td>
</tr>
<tr>
<td>wb 00 FF</td>
<td></td>
<td></td>
<td></td>
<td>V-com adj. completed</td>
</tr>
</tbody>
</table>

5.4.5. Adjustment method
(1) Set TV in POWER-ONLY mode using POWER ONLY key
(2) Zero calibrate probe then place it on the center of the Display
(3) Connect Cable (RS-232C to USB)
(4) Select Model in “V-com adj. Program” and begin “V-com adj.”
(5) When V-com adj. is complete (OK)
(6) Remove probe and RS-232C to USB cable to complete adj.
  • V-com Adj. must begin as start command “va 00 00”, and finish as end command “wb 00 ff”

• V-com adjust data

<table>
<thead>
<tr>
<th>43” inch</th>
<th>49” inch</th>
<th>55” inch</th>
<th>65” inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-com Data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hex</td>
<td>dec</td>
<td>hex</td>
<td>dec</td>
</tr>
<tr>
<td>Max</td>
<td>B4</td>
<td>180</td>
<td>8B</td>
</tr>
<tr>
<td>Default</td>
<td>96</td>
<td>150</td>
<td>6D</td>
</tr>
<tr>
<td>Min</td>
<td>78</td>
<td>120</td>
<td>4F</td>
</tr>
</tbody>
</table>

5.4.5.1 Manual adj. method
TBD
5.5. White Balance Adjustment

5.5.1. Overview
5.5.1.1. W/B adj. Objective & How-it-works
(1) Objective: To reduce each Panel’s W/B deviation
(2) How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
(3) Adj. condition: normal temperature
- Surrounding Temperature: 25±5 °C
- Warm-up time: About 5 Min
- Surrounding Humidity: 20% ~ 80%

5.5.2. Equipment
(1) Color Analyzer: CA-210 (LED Module : CH 14)
(2) Adj. Computer (During auto adj., RS-232C protocol is needed)
(3) Adjust Remocon
(4) Video Signal Generator MSPG-925F 720p/204-Gray (Model: 217, Pattern: 49)
※ Color Analyzer Matrix should be calibrated using CS-1000

5.5.3. Equipment connection MAP

5.5.4. Adj. Command (Protocol)
<Command Format>
START 6E A 50 A LEN A 03 A CMD A 00 A VAL A CS A STOP
- LEN: Number of Data Byte to be sent
- CMD : Command
- VAL : FOS Data value
- CS : Checksum of sent data
- A : Acknowledge
(Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

(1) RS-232C Command used during auto-adj.

<table>
<thead>
<tr>
<th>Command</th>
<th>Data</th>
<th>ID</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>wb</td>
<td>00</td>
<td>00</td>
<td>Begin White Balance adj.</td>
</tr>
<tr>
<td>wb</td>
<td>00</td>
<td>10</td>
<td>Gain adj.(internal white pattern)</td>
</tr>
<tr>
<td>wb</td>
<td>00</td>
<td>1f</td>
<td>Gain adj. completed</td>
</tr>
<tr>
<td>wb</td>
<td>00</td>
<td>20</td>
<td>Offset adj.(internal white pattern)</td>
</tr>
<tr>
<td>wb</td>
<td>00</td>
<td>2f</td>
<td>Offset adj. completed</td>
</tr>
<tr>
<td>wb</td>
<td>00</td>
<td>ff</td>
<td>End White Balance adj. (internal pattern disappears )</td>
</tr>
</tbody>
</table>

(Ex) wb 00 00 -> Begin white balance auto-adj.
wb 00 10 -> Gain adj.
ja 00 ff -> Adj. data
jb 00 c0
...
wb 00 1f -> Gain adj. complete
*(wb 00 20(start), wb 00 2f(ende)) -> Off-set adj.
wb 00 ff -> End white balance auto adj.

(2) Adjustment Map
Applied Model : ALL MODELS

<table>
<thead>
<tr>
<th>Adj. item</th>
<th>Command (lower caseASCII)</th>
<th>Data Range (Hex.)</th>
<th>Default (Decimal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool</td>
<td>R Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>G Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>B Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>R Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>G Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>B Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Medium</td>
<td>R Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>G Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>B Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>R Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>G Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>B Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Warm</td>
<td>R Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>G Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>B Gain j</td>
<td>00</td>
<td>C0</td>
</tr>
<tr>
<td></td>
<td>R Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>G Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>B Cut</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

5.5.5. Adjustment method
5.5.5.1. Auto WB calibration
(1) Set TV in adj. mode using POWER ONNY key
(2) Zero calibrate probe then place it on the center of the Display
(3) Connect Cable (RS-232C to USB)
(4) Select mode in adj. Program and begin adj.
(5) When adj. is complete (OK Sign), check adj. status pre mode(Warm, Medium, Cool)
(6) Remove probe and RS-232C to USB cable to complete adj.
- W/B Adj. must begin as start command “wb 00 00”, and finish as end command “wb 00 ff”, and Adj. offset if need
### 5.5.5.2. Manual adj. method

1. Set TV in Adj. mode using POWER ON.
2. Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
3. Press ADJ key -> EZ adjust using adj. R/C -> 7. White-Balance then press the cursor to the right (KEY►).
4. One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
5. Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

**G-fix adjustment**
Adjust modes (Cool), Fix the G gain to 172 (default data) and change the others (G/B Gain).
Adjust two modes (Medium / Warm), Fix the one of R/G/B gain to 192 (default data) and decrease the others.

- If internal pattern is not available, use RF input. In EZ Adj. menu 7. White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

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

### 5.5.6. Reference (White Balance Adj. coordinate and color temperature)

- Luminance: 206 Gray
- Standard color coordinate and temperature using CS-1000 (over 26 inch)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Coordinate</th>
<th>Temp</th>
<th>△uv</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Cool</td>
<td>0.271</td>
<td>0.270</td>
<td>13,000K</td>
</tr>
<tr>
<td>Medium</td>
<td>0.283</td>
<td>0.289</td>
<td>9,300K</td>
</tr>
<tr>
<td>Warm</td>
<td>0.313</td>
<td>0.329</td>
<td>6,500K</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Mode</th>
<th>Coordinate</th>
<th>Temp</th>
<th>△uv</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Cool</td>
<td>0.271±0.002</td>
<td>0.270±0.002</td>
<td>13000K</td>
</tr>
<tr>
<td>Medium</td>
<td>0.286±0.002</td>
<td>0.289±0.002</td>
<td>9300K</td>
</tr>
<tr>
<td>Warm</td>
<td>0.313±0.002</td>
<td>0.329±0.002</td>
<td>6500K</td>
</tr>
</tbody>
</table>

### 5.5.7. EDGE & IOL LED White balance table

- Edge & ALEF LED module change color coordinate because of aging time
- apply under the color coordinate table, for compensated aging time
- Luminance: 204 Gray, 80IRE
** Except Gumi winter season(Jan~Feb) and except for winter season (Mar ~ Dec) & Global are same as the table below
- Standard color coordinate and temperature using CA-210(CH-14) – by aging time

<table>
<thead>
<tr>
<th>Aging time (Min)</th>
<th>Cool</th>
<th>Medium</th>
<th>Warm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>Y</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>271</td>
<td>270</td>
<td>286</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use only AUO, INX, Sharp, CSOT, BOE
(Cool temp Spec is 13000K)

### 5.6. Local Dimming Function Check

(Step 1) Turn on TV
(Step 2) At the Local Dimming mode, module Edge Backlight moving right to left
Back light of IOP module moving
(Step 3) confirm the Local Dimming mode
(Step 4) Press “exit” Key
5.7. Magic Motion Remocon test
- Equipment : RF Remocon for test, IR-KEY-Code Remocon for test
- You must confirm the battery power of RF-Remocon before test
  (recommend that change the battery per every lot)
- Sequence (test)
  a) if you select the ‘start key(OK)’ on the controller, you can pairing with the TV SET.
  b) You can check the cursor on the TV Screen, when select the ‘OK Key’ on the controller
  c) You must remove the pairing with the TV Set by select ‘Mute + OK Key’ on the controller

5.8. 3D function test
(Pattern Generator MSHG-600, MSPG-6100 [SUPPORT HDMI1.4])
* HDMI mode NO. 872 , pattern No.83

(1) Please input 3D test pattern like below (HDMI mode NO. 872 , pattern No.83)

(2) When 3D OSD appear automatically , then select green button

(3) Don’t wear a 3D Glasses, Check the picture like below

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

5.9.2. Test method
(1) Insert the HDMI Cable to the HDMI ARC port from the master equipment (HDMI2)
(2) Check the sound from the TV Set

(3) Check the Sound from the Speaker or using AV & Optic TEST program (It’s connected to MSHG-600)

5.10. EYE-Q Green Function Inspection
(Step 1) Turn on the TV.
(Step 2) Press ‘EYE button’ on the adjustment remote-controller.
(Step 3) Cover ‘Eye Q sensor’ on the front of set with your hands, hold it for 6 seconds.
(Step 4) Check "the Sensor Data" on the screen, make certain that Data is below 10. If Data isn’t below 10 in 6 seconds, Eye Q sensor would be bad. You should change Eye Q sensor.
(Step 5) Uncover your hands from Eye Q sensor, hold it for 6 seconds.
(Step 6) Check "Back Light(xxx)" on the screen, check data increase . You should change Eye Q sensor

5.11. Ship-out mode check (In-stop)
- After final inspection, press In-Stop key of the Adj. R/C and check that the unit goes to Stand-by mode.
6. GND and Internal Pressure check

6.1. Method
(1) GND & Internal Pressure auto-check preparation
   - Check that Power Cord is fully inserted to the SET. (If loose, re-insert)
(2) Perform GND & Internal Pressure auto-check
   - Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
   - Connect D-terminal to AV JACK TESTER
   - Auto CONTROLLER(GWS103-4) ON
   - Perform GND TEST
   - If NG, Buzzer will sound to inform the operator.
   - If OK, changeover to I/P check automatically.
   (Remove CORD, A/V form AV JACK BOX)
   - Perform I/P test
   - If NG, Buzzer will sound to inform the operator.
   - If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

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

7. AUDIO output check

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
</table>
| 1  | Audio practical max Output, L/R  
(Distortion=10% max output) | 10.0 | 8.10 | 12.0 | W Vrms | EQ Off  
AVL Off  
Clear Voice Off |
| 2  | Speaker  
(8Ω Impedance) | 10 | 12 | W | EQ On  
AVL On  
Clear Voice On |

*Measurement condition:
(1) RF input: Mono, 1kHz sine wave signal, 100% Modulation
(2) CVBS, Component: 1kHz sine wave signal (0.4Vrms)
(3) RGB PC: 1kHz sine wave signal (0.7Vrms)

8. USB S/W Download  
(optional, Service only)
(1) Put the USB Stick to the USB socket
(2) Automatically detecting update file in USB Stick
   - If your downloaded program version in USB Stick is lower than that of TV set, it didn't work. Otherwise USB data is automatically detected.
(3) Show the message "Copying files from memory"
(4) Updating is staring
(5) Updating Completed, The TV will restart automatically
(6) If your TV is turned on, check your updated version and Tool option.
   * 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, TOOL OPTION setting is needed 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.)
1. K2L Circuit Block Diagram
2. K2L I2C Block Diagram
3. K2L Power Block
4. Tuner/CI Block Diagram
5. Video/Audio In Block Diagram
6. Audio Out Block Diagram
7. HDMI

- HDMI1.4
- HDMI2.0
- HDMI 2.0
- HDMI2&ARC
- HDMI3&External EDID
- HDMI_ARC
- TMDS Link 8bits
- DDC_SCL_1
- DDC_SDA_1
- DDC_SCL_2
- DDC_SDA_2
- DDC_SCL_3
- DDC_SDA_3

- K2L

- ST_IO19_H0_SCL
- ST_IO19_H0_SDA
- ST_IO20_H1_SCL
- ST_IO20_H1_SDA
- ST_IO22_H1_SCL
- ST_IO22_H1_SDA
- ST_IO23_H1_SCL
- ST_IO23_H1_SDA
- ST_IO25_H2_SCL
- ST_IO25_H2_SDA
- ST_IO26_H2_SCL
- ST_IO26_H2_SDA

- X-Tal (X3000)
  - 32.768kHz

- * TMDS Link 8bits = TMDS DATA 6bits (DATA0,1,2) + TMDS CLK 2bits

- DDC_SCL
- DDC_SDA
- TMDS Link 8bits

- CEC_REMOTE
- HDMI_CEC_MICOM

- RENESAS MICOM (IC3000)

- Q3001

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8. USB / WIFI / M-REMOTE / UART
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.
ASSEMBLY / DISASSEMBLY

- Cover Disassemble Guide
  (1) Remove Screw

  (2) Disassemble the Bottom Bracket(Pull the upward.)

  (3) Rotate 180° and disassemble HARNESS

  (4) Latch Open Method
  (4-1) Latch Open at Side Latch 3 places(Upper Display)
  Push and Pull by hand as shown on the below picture.
  (Lower the first, and that the next.)

  (4-2) Latch Open at top Latch 8 places(Upper Display)
  Pull the Cover on right side to Left direction
• Cover assemble Guide

(1) Push Latches
- Top Side Latch
- Right Side Latch

(2) Assemble HARNESS
- 1) FFC 8P -> IR “A”
- 2) FFC 10P -> IR J1

(3) Insert Bottom bracket

(4) Joint Screw
- 1, 2, 3 Screw: 5 ~ 7Kgf.cm
- 4 Screw: 8 ~ 12Kgf.cm
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.
CI Region

* Option name of this page : CI_SLOT
(because of Hong Kong)
<table>
<thead>
<tr>
<th>MICOM MODEL OPTION</th>
<th>0.72V</th>
<th>1.53V</th>
<th>2.27V</th>
<th>3.0V</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODEL OPTION 0 (AM0)</td>
<td>0.72V</td>
<td>1.53V</td>
<td>2.27V</td>
<td>3.0V</td>
</tr>
<tr>
<td>MODEL OPTION 1 (AM1)</td>
<td>2.27V</td>
<td>3.0V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MODEL OPTION 2 (AM2)</td>
<td>1.53V</td>
<td>3.0V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MODEL OPTION 3 (AM3)</td>
<td>0.72V</td>
<td>1.53V</td>
<td>2.27V</td>
<td>3.0V</td>
</tr>
</tbody>
</table>
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF ESSENTIAL THAT ONLY MANUFACTURER SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.
The symbol mark of this schematic diagram incorporates special features important for protection from x-radiation, fire, and electrical shock hazards, when servicing if it is essential that only manufacturer-specified parts be used for the critical components in the symbol mark of the schematic. Copyright © 2016 LG Electronics Inc. All rights reserved.

SECRET
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MODEL UF71/7500
DATE 2014-05-19

BLOCK IR/KEY SHEET 12

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USB DOWN STREAM

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THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURE SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

USB3.0
MAX 1.5A

FOR 1.2T PCB
USB3.0_DIODE_NXP_MAIN
D4400
IP4294CZ10-TBR

FOR 1.6T PCB
USB3.0_DIODE_NXP_MAIN
D4401
IP4294CZ10-TBR

OCP USB3.0

value change
10K(2.63V) --> 4.7K(2.97V)
/USB_OCD3_0
USB_CTL3_0

10K(2.63V) --> 4.7K(2.97V)
/USB_OCD3_0
USB_CTL3_0

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LGElectronics

LG ELECTRONICS

MODEL
K2H
BLOCK
USB 2 & 3
DATE
2015.02.11
SHEET
15/26

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Ethernet Block
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING 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, IT IS ESSENTIAL TO USE ONLY MANUFACTURED PARTS SPECIFIED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.
LNB PART (DVB-S2)
OPTION ; LNB

**THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.**

**FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ® SYMBOL MARK OF THE SCHEMATIC.**

---

**SECRET**

**LGElectronics**

**LG ELECTRONICS**

**MODEL**

K2H

**BLOCK**

LNB

**DATE**

2014-08-25

**SHEET**

20

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[51P Vx1 output wafer]
[41P Vx1
output wafer]

[41P Vx1
output wafer]
eMMC I/F

3.3v power delete, 131120

Don’t Connect Power At VDDI
(Just Internal LDO Capacitor)
THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURER SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

RS-232C Control INTERFACE

LGE Internal Use Only
## Contents of 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>Picture broken/ Freezing</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, residual image, light spot, external device color error</td>
<td>5</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 viewing, power auto on/off</td>
<td>7</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></td>
<td>Remote control &amp; Local switch checking</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>D. Function error</td>
<td>MR15 operating checking</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Wifi operating checking</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Camera operating checking</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>External device recognition error</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>E. Noise</td>
<td>Circuit noise, mechanical noise</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>F. Exterior error</td>
<td>Exterior defect</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

First of all, Check whether there is SVC Bulletin in GSCS 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
  - Normal audio [Y]
  - Check Back Light On with naked eye [Y]
  - Normal voltage [Y]
  - Replace Inverter or module [N]
  - Repair Power Board or parts [N]
  - Replace T-con/Main Board or module And Adjust VCOM [N]

- Move to No video/No audio
  - Check Power Board 13V output [A18]
  - Replace Inverter or module [Y]
  - Repair Power Board or parts [N]
  - End

- A4 & A2
  - Always check & record S/W Version and White Balance value before replacing the Main Board
  - Replace Main Board [A18]
  - Re-enter White Balance value [A18]
### A. Video error

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>Establishment date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td>No video/ No audio</td>
<td></td>
<td>2/16</td>
</tr>
</tbody>
</table>

**Standard Repair Process**

1. **No Video/ No audio**
   - Check various voltages of Power Board (13V)
   - **Normal voltage?**
     - **Y**
       - Check and replace MAIN B/D
       - **N**
       - Replace Power Board and repair parts
   - **End**
A. Video error

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>A. Video error</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture broken/Freezing</td>
<td></td>
<td></td>
<td>3/16</td>
</tr>
</tbody>
</table>

**A3**

**Check RF Signal level**

- By using Digital signal level meter
- By using Diagnostics menu on OSD
  (Advanced→Channels→Channel Tuning→Manual Tuning→Check the Signal)
  - Signal strength (Normal: over 50%)
  - Signal Quality (Normal: over 50%)

**Normal Signal?**

- Y
- N

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

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

**Normal Picture?**

- Y
- N

**Check S/W Version**

- Y
- N

**Check SVC Bulletin?**

- Y
- N

**Check Tuner soldering**

- Y
- N

**S/W Upgrade**

- Y
- N

**Close**

**Contact with signal distributor or broadcaster (Cable or Air)**
### A. Video error

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color error</td>
<td></td>
<td>4/16</td>
</tr>
</tbody>
</table>

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

#### A7
* Check and replace Link Cable (V by one) and contact condition

---

#### A8
Check Test pattern

- External Input/Component error
- HDMI error
- External device/Cable normal

- Replace Main B/D
- Replace Main/T-con B/D
- Replace module

- Check error color input mode
- Check external device and cable

- End

- Request repair for external device/cable

- Replace Main/T-con B/D
### Vertical/Horizontal bar, residual image, light spot

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

**A8**
- Check Test pattern

**A7**
- Check and replace Link Cable

**Screen normal?**

**Normal?**
- Replace Main/T-con B/D (adjust VCOM)
  - For LGD panel
- Replace Main B/D
  - For other panel

**Screen normal?**

### External device screen error - Color error

**Check S/W Version**
- Check version
  - N
  - Y
  - S/W Upgrade

**Normal screen?**
- Y

**Check S/W Version**
- Check screen condition by input
  - External Input
  - Component
  - HDMI/DVI

**Screen normal?**
- Y

**External Input error**
- Component error

**Screen normal?**
- N
  - Replace Main/T-con B/D

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

**Screen normal?**
- N
  - Replace Main/T-con B/D

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

**Screen normal?**
- Y

**Screen normal?**
- N
  - Replace Main/T-con B/D
B. Power error

**Standard Repair Process**

<table>
<thead>
<tr>
<th>Error symptom</th>
<th></th>
<th>Est. date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td>No power</td>
<td></td>
<td></td>
<td>6/16</td>
</tr>
</tbody>
</table>

- **Check Logo LED**
  - Power LED On?
    - Y: Normal operation?
      - Y: Check Power On "High"
        - Y: OK?
          - Y: Replace Power B/D
          - N: Replace Main B/D
        - N: Check Power cord was inserted properly
        - Y: Close
      - N: Replace Power B/D
    - N: Normal?
      - Y: Replace Power B/D
      - N: Normal voltage?
        - Y: Replace Main B/D
        - N: Replace Power B/D
  - N: Check Power cord was inserted properly
    - Y: Normal?
      - Y: Replace Power B/D
      - N: Replace Power B/D
    - N: Normal voltage?
      - Y: Replace Main B/D
      - N: Replace Power B/D

- **A17**
- **A18**
**Standard Repair Process**

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>B. Power error</th>
<th>Established date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off when on, off while viewing, power auto on/off</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

- **Error?**
  - Y: Fix A/C cord & Outlet and check each 3-phase out
  - N: Check Power Off Mode

- **Check Power Off Mode**
  - CPU Abnormal: Replace Main B/D
  - Normal: Y End, N Replace Power B/D

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

- **A19** (If Power Off mode is not displayed)
  - Check Power B/D voltage

- **A18**
  - Caution: Check and fix exterior of Power B/D Part

---

**Standard Repair Process**

<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_SLEPTIMER&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 Reserved 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_UNKNOWN&quot;</td>
<td>Power off by unknown status except listed case</td>
</tr>
<tr>
<td></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>Error symptom</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td>No audio / Normal video</td>
<td></td>
<td>8/16</td>
</tr>
</tbody>
</table>

### Standard Repair Process

1. **No audio**
   - Screen normal
   - **A20**
     - Check user menu > Speaker off
     - Off
       - N
         - Cancel OFF
       - Y
         - **A21+A18**
           - Check audio B+ 13V of Power Board
           - Normal voltage
             - Y
               - Replace Power Board and repair parts
             - N
               - **Disconnection**
                 - Replace MAIN Board → End
           - N
             - Replace Speaker

---

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

- Check input signal:
  - RF
  - External Input signal

- Signal normal?
  - Y: Check and replace speaker and connector
  - N:
    - Wrecked audio/Discontinuation/Noise for all audio: Replace Main B/D
    - Wrecked audio/Discontinuation/Noise only for D-TV: Replace Power B/D
    - Wrecked audio/Discontinuation/Noise only for Analog: Replace Main B/D
    - 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
    - (When RF signal is not received) Normal audio?
      - Y: Normal voltage?
        - Y: Check audio B+ Voltage (13V)
          - N: Replace Main B/D
        - N: Replace Power B/D
      - N: Connect and check other external device
    - Normal audio? N: Check and fix external device

Established date
Revised date  9/16
1. Remote control (R/C) operating error

- **Check R/C itself Operation**
  - If R/C operate, explain the customer cause is interference from light in room.

- **Normal operating?**
  - **Y**
    - **Check & Repair**
      - Cable connection
      - Connector solder
    - **Normal operating?**
      - **Y**
        - **Check B+ 3.5V On Main B/D**
      - **N**
        - Close

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

- **Check IR Output signal**
  - **Normal Signal?**
    - **Y**
      - **Check 3.5v on Power B/D**
      - **Replace Power B/D or Replace Main B/D (Power B/D don’t have problem)**
    - **N**
      - **Replace Main B/D**

- **Repair/Replace IR B/D**
2. MR15R (Magic Remocon) operating error

- Check the INSTART menu
- Check MR15 itself Operation
- Normal operating?
- Press the wheel
- Is show ok message?
- Turn off/on the set and press the wheel

A4

- Check & Repair RF assy connection
- RF Receiver ver is “00.00”? [Y] Check & Replace Battery of MR15
- Normal operating? [Y] Close
- [N] Replace MR13

A4

- RF Receiver ver is “00.00”? [N] Close
- [Y] Down load the Firmware

* INSTART MENU → 14. RF Remocon Test → 3. Firmware download

* If you conduct the loop at 3 times, change the M4.
3. Wifi operating error

- Check the INSTART menu
  - Wi-Fi Mac value is “NG”? (N)
    - Check the Wifi wafer 1pin
      - Normal Voltage? (N)
        - Replace Main B/D
      - Normal Voltage? (Y)
        - Close
  - Wi-Fi Mac value is “NG”? (Y)
    - Change the Wifi assy
  - Wi-Fi Mac value is “NG”? (N)
    - Close
- Check & Repair Wifi cable connection
4. Camera operating error

Check the INSTART menu

Camera Ver. is “NULL”? Y

Change the Camera module

N

Reconnect the Camera module

Normal operation? Y

Close

N

Replace Main B/D

Established date

Revised date 13/16
Standard Repair Process

<table>
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<th>D. Function error</th>
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<tr>
<td>External device recognition error</td>
<td>Replace Main B/D</td>
<td></td>
<td>14/16</td>
</tr>
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</table>

- Check input signal
- Signal input?
  - Y: Check technical information
    - Fix information
    - S/W Version
  - N: Check and fix external device/cable
- External Input and Component Recognition error
  - Y: Fix in accordance with technical information
  - N: Replace Main B/D
- HDMI/DVI, Optical Recognition error
E. Noise

- Identify noise type
- Check location of noise
- Replace PSU

- 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)
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<th>F. Exterior defect</th>
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<td>Zoom part with</td>
<td>Replace module</td>
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<tr>
<td>exterior damage</td>
<td></td>
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</tr>
<tr>
<td>Module damage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replace cabinet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabinet damage</td>
<td></td>
<td></td>
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<tr>
<td>Replace remote control</td>
<td></td>
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<tr>
<td>damage</td>
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<td>Stand dent</td>
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<td>TUNER input signal strength checking method</td>
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<td>Version checking method</td>
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<td>Tuner Checking Part</td>
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<td></td>
<td>Exchange Module (2)</td>
<td>A-5/5</td>
<td></td>
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**<Appendix>**

Defected Type caused by T-Con/Inverter/Module

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## Contents of Standard Repair Process Detail Technical Manual

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<td>Check power input Voltage &amp; ST–BY 3.5V</td>
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<td>16</td>
<td>B. Power error_Off when on, off while viewing</td>
<td>POWER OFF MODE checking method</td>
<td>A19</td>
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<td>Checking method in menu when there is no audio</td>
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<td>18</td>
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<td>Voltage and speaker checking method when there is no audio</td>
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<td>D. Function error</td>
<td>Remote control operation checking method</td>
<td>A22</td>
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<td>Motion Remote operation checking method</td>
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<td>Camera operation checking method</td>
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<td>Not Used</td>
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<th>Error symptom</th>
<th>A. Video error_No video/Normal audio</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>Check LCD back light with naked eye</td>
<td></td>
<td>A1</td>
</tr>
</tbody>
</table>

After turning on the power and disassembling the case, check with the naked eye, whether you can see light from locations.
### Error symptom

**A. Video error_No video/Normal audio**

### Content

Check White Balance value

### Established date

- 

### Revised date

- A2

---

**Entry method**

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

2. Enter into White Balance of item 10.

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.

---

**<ALL MODELS>**
When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)
1. Checking method for remote control for adjustment

Press the IN-START with the remote control for adjustment
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.
3. If you can’t see the UHD live TV, please connect signal at left side of jack. (Korea model only)
<table>
<thead>
<tr>
<th>Error symptom</th>
<th>Content</th>
<th>Established date</th>
<th>Revised date</th>
<th>A6</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Video error <em>Vertical/Horizontal bar, residual image, light spot</em></td>
<td>connection diagram (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As the part connecting to the external input, check the screen condition by signal
<table>
<thead>
<tr>
<th>Error symptom</th>
<th>A. Video error_Color error</th>
<th>Established date</th>
<th>Revised date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>Check Link Cable(VX1) reconnection condition</td>
<td></td>
<td>A7</td>
</tr>
</tbody>
</table>

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

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

A8
Appendix : Exchange Main Board (1)

Solder defect, CNT Broken

Solder defect, CNT Broken

Solder defect, CNT Broken

Solder defect, CNT Broken

Abnormal Power Section

Solder defect, Short/Crack

Solder defect, CNT Broken

Solder defect, CNT Broken

Abnormal Power Section

Solder defect, Short/Crack
Appendix : Exchange Main Board (2)

Abnormal Power Section

Abnormal Power Section

Solder defect, Short/Crack

Fuse Open, Abnormal power section

Abnormal Display

GRADATION

Noise

GRADATION

A - 2/5
Appendix : Exchange Power Board (PSU)

No Light

Dim Light

Dim Light

Dim Light

No picture/Sound Ok

A - 3/5
Appendix : Exchange the Module (1)

Panel Mura, Light leakage

Press damage

Crosstalk

Press damage

Crosstalk

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

A - 4/5
Appendix : Exchange the Module (2)

Un-repairable Cases
In this case please exchange the module.
<table>
<thead>
<tr>
<th>Error symptom</th>
<th>B. Power error <em>No power</em></th>
<th>Established date</th>
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</thead>
<tbody>
<tr>
<td>Content</td>
<td>Check front Power Indicator</td>
<td></td>
<td>A17</td>
</tr>
</tbody>
</table>

ST-BY condition: On or Off
Power ON condition: Turn Off
### B. Power error _No power_

<table>
<thead>
<tr>
<th>Error symptom</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Check power input voltage and ST-BY 3.5V</td>
</tr>
</tbody>
</table>

Check the DC 13.2V.

---

**P201**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal</th>
<th>Pin No.</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>PWR_ON</td>
<td>4</td>
<td>P-DIM2</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>6</td>
<td>13.2V</td>
</tr>
<tr>
<td>7</td>
<td>13.2V</td>
<td>8</td>
<td>13.2V</td>
</tr>
<tr>
<td>9</td>
<td>13.2V</td>
<td>10</td>
<td>13.2V</td>
</tr>
<tr>
<td>11</td>
<td>GND</td>
<td>12</td>
<td>GND</td>
</tr>
<tr>
<td>13</td>
<td>DRV_ON</td>
<td>14</td>
<td>P-DIM</td>
</tr>
<tr>
<td>15</td>
<td>GND</td>
<td>16</td>
<td>SCLK</td>
</tr>
<tr>
<td>17</td>
<td>V-SYNC</td>
<td>18</td>
<td>SIN</td>
</tr>
</tbody>
</table>
Entry method

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

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

---

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

1. Check the contact condition of or 13.2V connector of Main Board

2. Measure the 13.2V input voltage supplied from Power Board (If there is no input voltage, remove and check the connector)

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

Checking order

1. Check IR cable condition between IR & Main board. (Check picture number ① and ②)
2. Check the standby 3.5V on the terminal 16 pin (③)
3. AS checking the Pre-Amp (IR LED light), the power is in ON condition, an Analog Tester needle should move slowly, otherwise, it’s defective.
Checking order to check motion remote/wifi

Checking order

1. Check BT/Wifi cable condition between BT/Wifi assy & Main board.
2. Check the 3.5V on the terminal 16