PLASMA TV
SERVICE MANUAL

CHASSIS : PD43A

MODEL : 50PB690V  50PB690V-ZC

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

(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 Cold Check circuit

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

*Base on Adjustment standard
1. Application range 
This spec sheet is applied all of the PDP TV with PD43A chassis.

2. Requirement for Test 
Each part is tested as below without special appointment.
(1) Temperature: 25 °C ± 5 °C (77 °F ± 9 °F), CST: 40 °C ± 5 °C
(2) Relative Humidity: 65 % ± 10 %
(3) Power Voltage
   : Standard input voltage (AC 100-240 V~, 50/60 Hz)
   * Standard Voltage of each products is marked by models.
(4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
(5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method
(1) Performance: LGE TV test method followed
(2) Demanded other specification
   - Safety : CE, IEC specification
   - EMC : CE, IEC

4. Module General Specification
- 50" FHD

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Specification</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Display Screen Device</td>
<td>127 cm (50 inch) wide Color Display Module</td>
<td>PDP</td>
</tr>
<tr>
<td>2</td>
<td>Aspect Ratio</td>
<td>16:9</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PDP Module</td>
<td>PDP50R6####, RGB Closed (Well) Type, Glass Filter (43%) Pixel Format: 1920 horiz. By 1080 ver.</td>
<td></td>
</tr>
</tbody>
</table>
| 4  | Operating Environment | 1) Temp. : 0 ~ 40 deg  
   |                        | 2) Humidity : 20 ~ 80%                                                       | LGE SPEC   |
| 5  | Storage Environment   | 3) Temp. : -20 ~ 60 deg  
   |                        | 4) Humidity : 10 ~ 90 %                                                      |            |
| 6  | Input Voltage         | AC220 ~ 240V, 50/60Hz                                                        | Maker LG   |
## 5. Model General Specification

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Specification</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Market</td>
<td>Albania, Austria, Belgium, Bosnia, Bulgaria, Croatia, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Kazakhstan, Latvia, Lithuania, Luxembourg, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovenia, Spain, Sweden, Slovakia, Switzerland, Turkey, Ukraine, UK</td>
<td>36 Country</td>
</tr>
</tbody>
</table>
| 2  | Broadcasting system    | 1) PAL/SECAM BG  
2) PAL/SECAM DK  
3) PAL I / II  
4) SECAM L/L'  
5) DVB T / T2  
6) DVB C  
7) DVB S/S2  | EU (PAL Market) Support T2/C/S is for **PB***V                                   |
| 3  | Receiving system       | Analog : Upper Heterodyne  
Digital : COFDM  | ▶ DVB-T (T2 Need Update)  
- Guard Interval(Bitrate_Mbit/s)  
1/4, 1/8, 1/16, 1/32  
- Modulation : Code Rate  
QPSK : 1/2, 2/3, 3/4, 5/6, 7/8  
16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8  
64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8  
- DVB-C  
- Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s  
- Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM  
▶ DVB-S  
- Symbolrate  
DVB-S2 (8PSK / QPSK) : 2 ~ 45Msymbol/s  
DVB-S (QPSK) : 2 ~ 45Msymbol/s  
- viterbi  
DVB-S mode : 1/2, 2/3, 3/4, 5/6, 7/8  
DVB-S2 mode : 1/2, 2/3, 3/4, 3/5, 4/5, 5/6, 8/9, 9/10 |                                      |
| 4  | Scart Jack (1EA)       | PAL, SECAM  | Scart 1 Jack is Full scart and support RF-OUT(Analog), MNT-OUT               |
| 5  | Video Input (1EA)      | PAL, SECAM, NTSC  |                                                                 |
| 6  | Component Input (1EA)  | Y/Cb/Cr, Y/ Pb/Pr  |                                                                 |
| 7  | HDMI Input (3EA)       | HDMI-PC  
HDMI-DTV  
HDMI-MHL  | HDMI1(ARC), HDMI2(DVI) , Side HDMI3(MHL)                                      |
| 8  | Audio Input (1EA)      | Component + AV(Hybrid)  | L/R Input                                    |
| 9  | SPDIF Out (1 EA)       | SPDIF Out  |                                                                 |
| 10 | USB(3EA-FHD)           | For SVC, S/W Download, X-Studio, DivX-HD  |                                                                 |
| 11 | Ethernet LAN(1EA)      |                                                                 |                                                                 |
| 12 | PCMCIA(1EA)            | Common Interface  |                                                                 |
1. Application Range
This spec. sheet applies to PD43A chassis applied PDP 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 °C ± 5 °C of temperature and 65±10% of relative humidity if there is no specific designation.
(4) The input voltage of the receiver must keep 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 15 °C
- In case of keeping module is in the circumstance of 0°C, it should be placed in the circumstance of above 15°C for 2 hours.
- In case of keeping module is in the circumstance of below -20 °C, it should be placed in the circumstance of above 15 °C for 3 hours.

■ After RGB Full White in HEAT-RUN Mode, the receiver must be operated prior to the adjustment.
■ Enter into HEAT-RUN MODE
  1) Press the POWER ON KEY on R/C for adjustment.
  2) OSD display and screen display PATTERN MODE.
  ● Set is activated HEAT run without signal generator in this mode.
  ● Single color pattern ( WHITE ) of HEAT RUN MODE uses to check panel.
  ● Caution : If you turn on a still screen more than 20 minutes (Especially digital pattern, cross hatch pattern), an after image may be occur in the black level part of the screen.

3. PCB Assembly adjustment
* Caution : Using ‘power on’ button of the control R/C power on TV

3.1. MAC address D/L , CI+ key D/L , Widevine key D/L, ESN D/L, HDCP14/20 D/L, DTCP(optional)
Connect: USB port
Communication Prot connection
  • Com 1,2,3,4 and 115200(Baudrate)
Mode check: Online Only
  • check the test process
  ● DETECT -> MAC -> CI -> Widevine -> ESN -> HDCP14 -> HDCP20 -> DTCP(Optional)
  ● Play : Press Enter key
  ● Result: Ready, Test, OK or NG
  ● Printer Out (MAC Address Label)

3.2. DFT Process
* Depend on situation, Step can be changed.

3.3. Tool OPTION (MANUAL)
(1) Insert Access USB Memory Stick
(2) Press ADJ key on R/C to insert Tool OPTION
(3) On the “Tool Option”, Insert Tool Option by a number key
(4) Press the ENTER(■)
(5) Press ENTER(■) again.
(6) Select “OK to Download” by using ◀/▶(VOL +/-) and press ◀(VOL +)

<table>
<thead>
<tr>
<th>Tool option 1</th>
<th>Tool option 2</th>
<th>Tool option 3</th>
<th>Tool option 4</th>
<th>Tool option 5</th>
<th>Tool option 6</th>
<th>Tool option 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>32886</td>
<td>12306</td>
<td>161</td>
<td>64093</td>
<td>6295</td>
<td>1609</td>
<td>13455</td>
</tr>
</tbody>
</table>
3.4. EDID (The Extended Display Identification Data)

- HDMI [C/S: 96 71]: For 3D FHD (DTS) Models

* CheckSum & Physical Address Table.
  - Each HDMI Input has their own physical address(on Address:9E). So, each HDMI Input has different C/S value.

<table>
<thead>
<tr>
<th>Address</th>
<th>HDMI1</th>
<th>HDMI2</th>
<th>HDMI3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

- HDMI INPUT Physical Address Table

<table>
<thead>
<tr>
<th>Address</th>
<th>HDMI1</th>
<th>HDMI2</th>
<th>HDMI3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9671</td>
<td>9661</td>
<td>9651</td>
</tr>
</tbody>
</table>

4. SET assembly adjustment method

* Caution: Each PCB assembly must be checked by check JIG set. (Because power PCB Assembly damages to PDP Module, especially be careful)

4.1. POWER PCB Assembly Voltage adjustment

(Va, Vs voltage adjustment)

Test equipment: D.M.M 1EA

Connection Diagram for Measuring: refer to fig.4

Adjustment method

4.1.1. Va adjustment

1) Connect + terminal of D. M.M. to Va pin of P811, connect -terminal to GND pin of P811.
2) After turning VR502, voltage of D.M.M adjustment as same as Va voltage which on label of panel right/top (deviation: ±0.5V)

4.1.2. Vs adjustment

1) Connect + terminal of D. M..M. to Vs pin of P811, connect -terminal to GND pin of P811.
2) After turning VR901, voltage of D.M.M adjustment as same as Vs voltage which on label of panel right/top (deviation: ±0.5V)

4.2. Adjustment of White Balance

Required Equipment

- Remote controller for adjustment
- Color Analyzer (CS-1000, CA-210 or same product: CH 10 (PDP))
  - Please adjust CA-210 by CS-1000 before measuring
- Auto W/B adjustment instrument(only for Auto adjustment)
  - 9 Pin D-Sub Jack (RS232C) is connected to the AUTO W/B EQUIPMENT

Before Adjust of White Balance, Please press POWER ONLY key

- Adjust Process will start by execute RS232C Command.
  - Color temperature standards according to CSM and Module

<table>
<thead>
<tr>
<th>CSM</th>
<th>PLASMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool</td>
<td>11000K</td>
</tr>
<tr>
<td>Medium</td>
<td>9300K</td>
</tr>
<tr>
<td>Warm</td>
<td>6500K</td>
</tr>
</tbody>
</table>

- CS-1000/CA-100+/CA-210(CH 10) White balance adjustment coordinates and color temperature.

<table>
<thead>
<tr>
<th>CSM</th>
<th>Color Coordination</th>
<th>Temp</th>
<th>± Color Coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td>COOL</td>
<td>0.276</td>
<td>0.283</td>
<td>11000K</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>0.285</td>
<td>0.293</td>
<td>9300K</td>
</tr>
<tr>
<td>WARM</td>
<td>0.313</td>
<td>0.329</td>
<td>6500K</td>
</tr>
</tbody>
</table>
● Change target luminance and range of the Auto adjustment W/B equipment
  - 50/60R5

<table>
<thead>
<tr>
<th>Target luminance</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>±23</td>
</tr>
</tbody>
</table>

* Manual W/B process (using adjusts Remote control)
  - Please Adjust in AV 1 MODE, Turn off Energy Saving Mode.
  1) Enter 'PICTURE RESET' on Picture Mode, and then turn off Fresh Contrast and Fresh colour in Advanced Control
  2) After enter Service Mode by pushing "ADJ" key,
  3) Enter White Pattern off of service mode, and change off -> on.
  4) Enter "W/B ADJUST" by pushing "►" key at "3. W/B ADJUST".

* Gain Max Value is 192. So, Never make any Gain Value over 192 and please fix one Value on 192, between R, G and B.

<table>
<thead>
<tr>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-GAIN</td>
<td>0</td>
<td>192</td>
</tr>
<tr>
<td>G-GAIN</td>
<td>0</td>
<td>192</td>
</tr>
<tr>
<td>B-GAIN</td>
<td>0</td>
<td>192</td>
</tr>
</tbody>
</table>

* Auto-control interface and directions
  (1) Adjust in the place where the influx of light like floodlight around is blocked. (Illumination is less than 10lux).
  (2) Measure and adjust after sticking the Color Analyzer (CA-100+, CA210) to the side of the module.
  (3) Aging time
    - After aging start, keep the Power on (no suspension of power supply) and heat-run over 5 minutes

* Auto adjustment Map (RS232C)

<table>
<thead>
<tr>
<th>No</th>
<th>Index</th>
<th>CMD1</th>
<th>CMD2</th>
<th>Set ID</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Start</td>
<td>w</td>
<td>b</td>
<td>0</td>
<td>00</td>
</tr>
<tr>
<td>2</td>
<td>Gain Start</td>
<td>w</td>
<td>b</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Gain End</td>
<td>w</td>
<td>b</td>
<td>0</td>
<td>1F</td>
</tr>
<tr>
<td>4</td>
<td>Offset Start</td>
<td>w</td>
<td>b</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Offset End</td>
<td>w</td>
<td>b</td>
<td>0</td>
<td>2F</td>
</tr>
<tr>
<td>6</td>
<td>End</td>
<td>w</td>
<td>b</td>
<td>0</td>
<td>FF</td>
</tr>
<tr>
<td>7</td>
<td>Medium R</td>
<td>j</td>
<td>a</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>8</td>
<td>Medium G</td>
<td>j</td>
<td>b</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>9</td>
<td>Medium B</td>
<td>j</td>
<td>c</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>10</td>
<td>Warm R</td>
<td>j</td>
<td>d</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>11</td>
<td>Warm G</td>
<td>j</td>
<td>e</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>12</td>
<td>Warm B</td>
<td>j</td>
<td>f</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>13</td>
<td>Cool R</td>
<td>j</td>
<td>g</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>14</td>
<td>Cool G</td>
<td>j</td>
<td>h</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>15</td>
<td>Cool B</td>
<td>j</td>
<td>i</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>16</td>
<td>Cool R,G,B</td>
<td>j</td>
<td>j</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>17</td>
<td>Medium</td>
<td>j</td>
<td>k</td>
<td>0</td>
<td>00~FF</td>
</tr>
<tr>
<td>18</td>
<td>Warm</td>
<td>j</td>
<td>l</td>
<td>0</td>
<td>00~FF</td>
</tr>
</tbody>
</table>

4.3. Serial number download & Model name D/L.
(1) Press "Power on" button of a service R/C.(Baud rate : 115200 bps)
(2) Connect RS232-C Signal Cable and start ‘Option Check Program Ver3.8’
(3) Scan serial Number and press 'F5' button.
(4) Check ‘OK’ on program 1) program.
(5) Press ‘in start’ button on SVC R/C, check Serial Number and Model Name.

4.4. Check Tool Option and write Country Group & Area Code(Option) D/L
  - Refer to Table 3.3 insert tool option.

4.5. PING TEST
  * In this case Network setting is on Manual Setting.
  Connect : SET->LAN Port == PC->LAN Port

4.5.1. Equipment Setting
(1) Play the LAN Port Test PROGRAM.
(2) Input IP set up for an inspection to Test
  * IP Number : 12.12.2.2

4.5.2. LAN PORT inspection (PING TEST)
  * In this case Network setting is on Manual Setting.
  (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
4.6. Magic Motion Remote Controller test
(1) Equipment: RF R/C for test,
(2) You must confirm the battery power of RF-R/C before test
(Recommend that change the battery per every lot)
(3) Sequence (test)
1) if you select the 'start key(Wheel Key)' on the controller,
you can pairing with the TV SET.
2) You can check the cursor on the TV Screen, when select
the 'Wheel Key' on the controller.
3) You must remove the pairing with the TV Set by select
'Mute Key' on the controller.

4.7. Wi-Fi Test
Step 1) Turn on TV
Step 2) Select ‘Network Connection’ option in Network Menu.
Step 3) Select ‘Start Connection’ Button in ‘Network
Connection’.
Step 4) If the system finds any AP like blow PIC, it is working
well.

4.8. 3D function test
- Required Equipment
  ● Pattern Generator :
    MSHG-600, MSPG-6100 [SUPPORT HDMI1.4])
    MODE : HDMI mode NO. 872
    Pattern No.83
(1) Please input 3D test pattern like below (HDMI mode NO.
872 , pattern No.83)

4.9 LNB voltage and 22KHz tone check
(1) Test method
1) Press "Power on" button of a service R/C.(Baud rate :
115200 bps)
2) Connect cable between satellite ANT and test JIG.
3) Connect RS232-C Signal Cable.
4) Write LNB ON control command through RS-232-C.
5) check LED light ‘ON’ at 18V menu.
6) check LED light ‘ON’ at 22KHz tone menu.
7) Write LNB OFF control command through RS-232-C.
8) check LED light ‘OFF’ at 18V menu.
9) check LED light ‘OFF’ at 22KHz tone menu.
(2) RS-232 command for test LNB

<table>
<thead>
<tr>
<th>Command</th>
<th>Set ACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNB On</td>
<td>[A][I][ ][Set ID][ ][30][Cr]</td>
</tr>
<tr>
<td>LNB Off</td>
<td>[A][I][ ][Set ID][ ][40][Cr]</td>
</tr>
</tbody>
</table>
(3) Test result
- After send LNB On command, ‘18V LED’ and ‘22KHz tone
LED’ should be ON.
- After send LNB Off command, ‘18V LED’ and ‘22KHz tone
LED’ should be OFF.

<Remark>
After the measurement conditions witnessed in the last state.
5. Set Information  (Serial No & Model name)

5.1. Check the serial number & Model Name
(1) Push the menu button and press red button on R/C to enter 'Customer Support' menu.
(2) Move to 'signal test' menu. And check Serial No & Model Name Select the STATION -> Diagnostics -> To set

6. SW Download Guide.
* Before put a *.epk to USB Stick make 'LG_DTV' folder in USB. Then, put *.epk file to 'LG_DTV' folder and Turn on TV

(1) Put the USB Stick to the USB socket
(2) Automatically detecting update file in USB Stick
   * If your downloaded program version in USB Stick is Low, it didn’t work.
   But your downloaded version is High, USB data is automatically detecting.
(3) Show the message "Copying files from memory"
(4) Updating is staring.
(5) Updating Completed, The TV will restart automatically.
   After turn on TV, Please press 'IN-STOP' button on ADJ Remote-control.
   * IF you don’t have ADJ R/C, enter 'Factory Reset' in OPTION MENU.
(6) When TV turns on, check the Updated version on Product/Service Info. MENU.
   * After downloading, have to adjust TOOL OPTION again.
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 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 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 IF ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

IR / KEY

EYE Sensor For US

10PIN IR/KEY Harness
For 6600
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.
TAS5733

The symbol mark of this schematic diagram incorporates special features important for protection from X-radiation. Fire and electrical shock hazards, when servicing IP, is essential that only manufactures specified parts be used for the critical components in the symbol mark of the schematic.
T/C/S & H/NIM & T2/C TUNER (EU & CHINA)

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.

Vout = 0.6*(1+R1/R2)

[Diagram of T/C/S & H/NIM & T2/C TUNER (EU & CHINA)]

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LG Electronics
THERMAL
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 MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

PCB_GND and A_GND are connected
DCDC_GND and A_GND are connected in pin#27
PCB_GND and A_GND are connected

Input trace widths should be sized to conduct at least 3A
Output trace widths should be sized to conduct at least 2A

---

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Don’t Connect Power At VDDI
(Just Internal LDO Capacitor)
# NetCast4.5 Service Guide

## Contents

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3. TV Video Trouble Shooting
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8. Component / RGB / AV Audio Trouble Shooting
9. HDMI Audio Trouble Shooting
10. USB Trouble Shooting
11. DVR Recording Fail Trouble Shooting
12. OPTIC Audio Out Trouble Shooting
13. WIFI/BT COMBO Trouble shooting
1. Power-Up Boot Fail Trouble Shooting

- **Check P1100 All Voltage Level (17V, 5V, 5V_ST)**
  - **Y**
  - **N**

- **Check All Voltage Level at Bead**
  - **Y**
  - **N**

- **Check Voltage Level 3.3V at C1151, C1152**
  - **Y**
  - **N**

- **Check Voltage Level 1.5V at C1125, C1126**
  - **Y**
  - **N**

- **Check Voltage Level 1.2V at C1128, C1130**
  - **Y**
  - **N**

- **Replace one of IC1101 & Recheck**
  - **Y**
  - **N**

- **Replace one of IC1105 & Recheck**
  - **Y**
  - **N**

- **Replace one of IC1102 & Recheck**
  - **Y**
  - **N**

- **Replace one of Bead & Recheck**
  - **Y**
  - **N**

- **Check Power connector**
  - **Y**
  - **N**

- **Replace Power board**

- **Check Micom Redownload or replace**
  - **Y**
  - **N**

- **Replace IC8100 EMMC Memory**
  - **Y**
  - **N**

- **Replace one of IC701 ~ 703 & Recheck**
  - **Y**
  - **N**

- **Replace IC105 & Recheck**
  - **Y**
  - **N**
## Power check

### 1. PSU voltage check

<table>
<thead>
<tr>
<th>P1100</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17V</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5V_ST</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>5V</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>GND</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>5V_ST</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>RL_ON</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>M_ON</td>
<td>18</td>
</tr>
</tbody>
</table>

- **Q1102**: 5V
- **C1157**
- **L1101**: 5V_ST
- **L1112**: 17V
- **L1111**: 5V_ST

Measure point

Measure point
DC-DC Check

- DC-DC Check

- Typ. 1.5V
- Typ. 3.3V
- Typ. 12V

- IC1101
- IC1105
- IC1106

Measure point

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2. No OSD Trouble Shooting

- Check P1100 5V_ON
- Check 5V Voltage Level at P1100
- Check 5V Voltage Level at L1101
- Check all multi voltage (17v, 3.3v, 1.2v, 5V)
- Check LVDS Cable
- Check PDP Module

- Check GPIO Path of Micom
- Check Power connector
- Replace one of L1101 & Recheck
- Check power up boot sequence
- Replace Cable

- Replace Power board
3. TV Video Trouble shooting

- **Air/Cable**
  - **DVB-S**
  - **EU: T2/C/S2 Without ATV**
    - **TUNER (T2/C/A)**
    - **TUNER (S2)**
    - **DEMOD (S2)**
  - **US: ATSC H/NIM (W/o AD)**
- **BRAZIL: F/NiM (SBTVD) Silicon Tuner**
  - Demodulator:
    - **SBTVD Only**
- **Serial TS (SBTVD)**
- **USB1**
- **USB2**
- **USB3**
- **Wi-Fi / BT Combo**
- **OPTIC**
- **LAN**
- **CVBS/COMP _LR**
- **AV / COMP HYBRID**
- **CVBS/COMP _LR**
- **NVRAM (256KB)**
- **X-TAL (27MHz)**
- **NVRAM (256KB)**
- **eMMC (4GB)**
- **SYSTEM**
  - A: DDR3x16_512 X 2
  - B: DDR3x16_256 X 1
  - = 1.25GB
- **MTK A2**
  - **LVDS**
  - **HDMI RX**
  - **HDMI 1**
  - **HDMI 2**
  - **HDMI 3**
  - **HDMI RX MHL Bridge**
  - **SIL1292**
- **SUB MICOM (Renesas)**
- **SUB MICOM (Renesas)**
- **Audio AMP**
- **Sub Micom (Renesas)**
- **X-TAL (32.768kHz)**
- **RS-232C**
- **Ethernet**
- **I2C**
- **I2S Out**
- **CVBS**
- **SPDIF OUT**
- **LAN**
- **Ethernet**

**Cable**
- **Air/Cable**
- **LAN**
- **LAN**
- **LAN**
- **LAN**
- **LAN**
- **LAN**

**DVB-S**
- **EU: T2/C/S2 Without ATV**
  - **TUNER (T2/C/A)**
  - **TUNER (S2)**
  - **DEMOD (S2)**
- **US: ATSC H/NIM (W/o AD)**

**BRAZIL: F/NiM (SBTVD) Silicon Tuner**
- Demodulator:
  - **SBTVD Only**
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- **X-TAL (27MHz)**
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  - **HDMI RX MHL Bridge**
  - **SIL1292**
- **SUB MICOM (Renesas)**
- **SUB MICOM (Renesas)**
- **Audio AMP**
- **Sub Micom (Renesas)**
- **X-TAL (32.768kHz)**
- **RS-232C**
- **Ethernet**
- **I2C**
- **I2S Out**
- **CVBS**
- **SPDIF OUT**
- **LAN**
- **Ethernet**

**Cable**
- **Air/Cable**
- **LAN**
- **LAN**
- **LAN**
- **LAN**
- **LAN**
- **LAN**
3-1. TV Video Trouble Shooting

Check RF Cable

- Y
  - Check Tuner Power (3.3V, 1.1 or 1.2V)
    - Y
      - Check IF Signal pin #6,7
        - N
          - Maybe Tuner has problems
        - Y
          - Maybe LGE2122 (IC105) has problems
    - N
      - Replace one of Bead & Recheck

Checking order

1. Check Tuner power (Pin #1, #11, #26)
2. Check Tuner I2C level (Pin #4, #5, #27, #30)
3. Check IF AGC level (Pin #3)
4. Check IF Signal (Pin #6, #7)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.3V</td>
</tr>
<tr>
<td>2</td>
<td>RF_SWITCH_CTL</td>
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<tr>
<td>3</td>
<td>IF_AGCG</td>
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<tr>
<td>4</td>
<td>I2C_SCL6</td>
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<tr>
<td>5</td>
<td>I2C_SDA6</td>
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<tr>
<td>6</td>
<td>IF_P</td>
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<tr>
<td>7</td>
<td>IF_N</td>
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<tr>
<td>8</td>
<td>NC</td>
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<td>NC</td>
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<td>10</td>
<td>NC</td>
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<td>11</td>
<td>3.3V</td>
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<td>DEMOD1_TS_ERROR</td>
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<td>13</td>
<td>GND</td>
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<td>FE_TS_CLK</td>
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<td>FE_TS_VAL</td>
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<td>FE_TS_DATA[0]</td>
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<td>18</td>
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<td>FE_TS_DATA[2]</td>
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<td>FE_TS_DATA[5]</td>
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<tr>
<td>23</td>
<td>FE_TS_DATA[6]</td>
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<td>24</td>
<td>FE_TS_DATA[7]</td>
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<tr>
<td>25</td>
<td>RESET</td>
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<td>3.3V</td>
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<td>I2C_SCL4</td>
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<td>Demod_Core</td>
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<td>29</td>
<td>LNB_TX</td>
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<tr>
<td>30</td>
<td>I2C_SDA4</td>
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<td>57</td>
<td>LNA_CTRL_1</td>
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<tr>
<td>58</td>
<td>LNA_CTRL_2</td>
</tr>
</tbody>
</table>
4. AV/COMPONENT Video Trouble shooting

**System:**
- **MTK A2**
- **eMMC (4GB)**
- **NVRAM (256KB)**

**Connections:**
- **USB1**, **USB2**, **USB3**
- **USB0**
- **Ethernet**
- **LVDS**
- **Audio AMP**
- **Sub Micom (Renesas)**
- **X-TAL (27MHz)**
- **X-TAL (32.768kHz)**
- **RS-232C**

**Inputs:**
- **DVB-S**
- **Air/Cable**
- **TUNER (T2/C/A)**
- **TUNER (S2)**
- **DEMOD (S2)**
- **LNB**

**US:**
- **ATSC H/NIM (W/o AD)**

**BRAZIL:**
- **F/Nim(SBTVD) Silicon Tuner Demodulator SBTVD Only**
- **Serial TS(SBTVD)**

**AV/COMPONENT Video:**
- **CVBS**, **COMP**, **CVBS/COMP _LR**
- **MHL Bridge SIL1292**
- **SPDIF OUT**
- **Ethernet**
- **Serial TS**

**EU:**
- **T2/C/S2 Without ATV**
- **LAN**

**LAN:**
- **Ethernet**

**LAN:**
- **Ethernet**

**OPTIC:**
- **OPTIC**

**LAN:**
- **LAN**

---

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4-1. AV/Component Video Trouble Shooting

Check Signal Format
Is it supported signal?

Y → Check Component Cable

Y → Check AV/Component JK3608

N → Replace Jack

Y → Replace one of R3609/R3612/R1618 & Recheck

N → Replace it

Y → Check Component Signal and resistance R3609/R3612/R1618

Y → Check Component Signal C372/C373/C374

N → Replace it

Maybe LGE2122 (IC105) has problems
4-2. AV/Component Video Trouble Shooting
5. HDMI Video Trouble shooting

EU : T2/C/S2 Without ATV
- TUNER (T2/C/A)
- DEMOD (S2)

DVB-S
- TUNER (S2)
- LNB

BRAZIL : F/Nim (SBTVD) Silicon Tuner
- Cable
- Demodulator
- Serial TS (SBTVD)

US : ATSC H/NIM (W/o AD)
- Digital Tuner
- Demodulator

Air/Cable
- Digital Tuner
- Demodulator

MTK A2
- MHL Bridge
- HDMI RX
- HDMI1
- HDMI2
- HDMI3
- CVBS
- COMP
- COMP/ _LR
- SPI
- I2C
- I2S Out
- RS-232C
- Audio Amp
- Sub Micom (Renesas)
- X-TAL (32.768kHz)
- NVRAM (256KB)
- eMMC (4GB)
- USB0
- USB1
- USB2
- USB3

SYSTEM
- A:DDR3x16_512 X 2
- B:DDR3x16_256 X 1
- = 1.25GB

SBTVD Only
- HDMI RX
- HDMI1
- HDMI2
- HDMI3
- CVBS
- COMP
- COMP/ _LR
- SPI
- I2C
- I2S Out
- RS-232C
- Audio Amp
- Sub Micom (Renesas)
- X-TAL (32.768kHz)
- NVRAM (256KB)
- eMMC (4GB)
- USB0
- USB1
- USB2
- USB3

EU : T2/C/S2 Without ATV
- Cable
- Digital Tuner
- Demodulator

DVB-S
- TUNER (S2)
- LNB

BRAZIL : F/Nim (SBTVD) Silicon Tuner
- Cable
- Demodulator
- Serial TS (SBTVD)

US : ATSC H/NIM (W/o AD)
- Digital Tuner
- Demodulator

Air/Cable
- Digital Tuner
- Demodulator
5-1. HDMI Video Trouble Shooting

Check Signal Format
Is it supported signal?

Y

Check HDMI Cable

Y

Check EDID D/L

N

Re-Download EDID

Y

Check HDMI Jack
JK3301, JK3302, JK3303

N

Replace Jack

Y

Maybe LGE:2122 (IC105) has problems

N

Re-Download EDID
6. Audio AMP Trouble shooting

EU: T2/C/S2 Without ATV
- TUNER (T2/C/A)
- DEMOD (S2)

US: ATSC H/NIM (W/o AD)
- LNB

BRAZIL: F/Nim(SBTVD) Silicon Tuner
- Serial TS(SBTVD)
- Optic (LAN)
- Sub Micom (Renesas)

MTK A2
- USB0
- USB1
- USB2
- USB3
- HDMI RX
- HDMI1
- HDMI2
- HDMI3
- MHL Bridge (SIL1292)
- CVBS/COMP
- COM/MIC
- COMP/ _LR
- CVBS OUT
- Ethernet
- UART
- X-TAL (27MHZ)
- NVRAM (256KB)

Air/Cable
- DVB-S
- DVB-S
- TUNER (S2)
- DEMOD (S2)

Serial TS(720)

OPTIC

LAN

Audio AMP

Export

System
A: DDR3x16_512 X 2
B: DDR3x16_256 X 1 = 1.25GB

eMMC (4GB)

CPU

Sub Micom (Reneses)

Audio AMP

X-TAL (32.768Khz)

RS-232C

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6-1. All Source Audio Trouble Shooting

Make sure you can’t hear any audio

Y → Check Speaker
No audio?

N → Replace Speaker

Y → Check Connector P5601
No audio?

N → Replace Connector

Y → Check Signal at Coil
L5605, L5606, L5604, L5603
Is there any pulse signal?

N → Replace one of Resistor / Capacitor & Recheck signal
ok?

Resistor: R5611, R5612, R5613, R5614
Capacitor: C5626~C5629, C5630~C3839

N → Replace one of Coil
L5608, L5609, L5610, L5611
& Recheck signal
ok?

Y → Replace It & Recheck

N → Replace Speaker

Check IC5600 Power
OK
(17V: C5620, C5621
3.3V: C5610, C5604)

Y → Check IC5600 Power
OK
17V: C5620, C5621
3.3V: C5610, C5604

N → Follow Power UP_Boot Fail
trouble shooting guide

Y → Replace It & Recheck

N → Maybe MTK IC LGE2122 (IC105)
has problems
Replace it

Check Main IC I2C / I2S
signal out put with user
menu volume up/down test

Y → Maybe Audio Digital AMP has
problems. (IC5600, TAS5733)
Replace It

N → Replace It
7. Tuner Audio Trouble shooting
7-1. Tuner Audio Trouble Shooting

Check video output

Follow procedure All source audio trouble shooting

Follow procedure digital TV video trouble shooting

Maybe LGE2122(MTK IC) internal audio DSP has problems. Replace It

Y

N
7-2. Tuner Audio Trouble Shooting

Check video output
N → Follow procedure analog TV video trouble shooting

Check Tuner Power
3.3V, Demod core : 1.1V or 1.2V
N → Replace one of L6508/L6507/L6505 & Recheck
Y → Check IF Level
At Tuner (#6, #7 Pin)
N → Maybe Tuner has problems
Replace it
Y → Replace one of
R346, R331, R380, R334, R335
C336, C337, C312, C310
& Recheck the signal
N → Maybe LGE2122 (MTK Main IC, IC105) audio block has problems.
Replace It
Y → Replace it
8. COMP/AV Audio Trouble shooting
8-1. Component / AV Audio Trouble Shooting

- **Check Video Output**
  - Y: Follow procedure external input video trouble shooting
  - N: Check Jack JK3608

- **Check Jack JK3608**
  - Y: Check equipment / Replace Jack
  - N: Follow procedure All source audio trouble shooting

- **Check Signal R3620, R3621**
  - Y: Replace one of R3607, R3613, R3620, R3621, C3605, C3606, C3607, C3608, & Recheck
  - N: Maybe LGE2122 (MTK Main IC, IC105) audio block has problems. Replace It
9. HDMI Audio Trouble shooting

- System:
  - A: DDR3x16_512 x 2
  - B: DDR3x16_256 x 1 = 1.25GB

- eMMC (4GB)

- NVRAM (256KB)

- X-TAL (32.768kHz)

- X-TAL (27MHz)

- MTK A2

- HD: 51P

- Audio AMP

- HDMI RX

- HDMI1
  - HDMI2
  - HDMI3

- MHL Bridge SIL1292

- CVBS

- COMP/
  - I2S Out

- I2C

- Sub Micom (Renesas)

- X-TAL

- UART

- HDMI Audio Trouble shooting

- Air/Cable

- DVB-S

- TUNER (T2/C/A)

- DEMOD (S2)

- LNB

- Cable

- USB1

- USB2

- USB3

- Wi-Fi/Bluetooth Combo

- AV/Hybrid

- CVBS/COMP_LRR

- OPTIC

- LAN

- LAN

- Ethernet

- HDMI Audio Trouble shooting

- Air/Cable

- DVB-S

- TUNER (T2/C/A)

- DEMOD (S2)

- LNB

- Cable

- USB1

- USB2

- USB3

- Wi-Fi/Bluetooth Combo

- AV/Hybrid

- CVBS/COMP_LRR

- OPTIC

- LAN

- Ethernet

- HDMI Audio Trouble shooting

- Air/Cable

- DVB-S

- TUNER (T2/C/A)

- DEMOD (S2)

- LNB

- Cable

- USB1

- USB2

- USB3

- Wi-Fi/Bluetooth Combo

- AV/Hybrid

- CVBS/COMP_LRR

- OPTIC

- LAN

- Ethernet
9-1. HDMI Audio Trouble Shooting

- Check video output
  - Y: Follow procedure HDMI video trouble shooting
  - N: Check DDC Line
    - Y: Replace one R3302, R3303, R3312, R3313, R3320, R3321 & Recheck
    - N: Check EDID Pull-Up Voltage
      - Y: Replace one R3330, R3374, R3315, R3316, R3311, R3314 & Recheck
      - N: Follow procedure All source audio trouble shooting
        - Y: Maybe LGE2122 (MTK Main IC, IC105) audio block has problems. Replace it
        - N: Follow procedure HDMI video trouble shooting
10. USB Trouble shooting
10-1. USB Trouble Shooting

- Exception
  - USB power could be disabled by inrushing current
  - In this case, remove the device and try to reboot the TV (AC power off/on)
11-1. Recording Fail Trouble Shooting

Check video/audio FE output → Y → Follow procedure video/audio trouble shooting

Check HDD → N → Replace HDD

Check USB block → Y → Use USB Trouble shooting guide

Maybe Mainchip USB block has problems. Replace It.
12. Optic Audio Out Trouble shooting

- BRAZIL: F/Nim(SBTVD) Silicon Tuner
- OPTIC: SPDIF OUT
- Audio AMP
- HDMI RX
- Ethernet
- UART
- Sub Micom (Renesas)
- X-TAL (32.768kHz)
- RS-232C

- USB1
- USB2
- USB3
- X-TAL (27MHz)
- NVRAM (256KB)
- eMMC (4GB)
- MTK A2
- HDMI RX
- LVDS
- MHL Bridge S1292
- HDMI1
- HDMI2
- HDMI3
- HDMI RX
- OPTIC
- LAN
- CVBS/COMP /LR
- I2S Out
- Audio AMP
- Sub Micom (Renesas)
- X-TAL (32.768kHz)
- RS-232C

- EU: T2/C/S2 Without ATV
- DVB-S
- TUNER (S2) / DEMOD (S2)
- TUNER (T2/C/A)
- LNB

- US: ATSC H/NIM (W/o AD)
- Wi-Fi / BT Combo

- AIR/Cable
- DVB-S

- AV / COMP HYBRID
- CVBS/COMP /LR

- HDMI / COMP
- HDMI / COMP

- OPTIC

- SUB MICOM

- Cable
- Serial TS(SBTVD)
- Serial TS IF

- S2

- EU: T2/C/S2 Without ATV
- DVB-S
- TUNER (S2) / DEMOD (S2)
- TUNER (T2/C/A)
- LNB

- US: ATSC H/NIM (W/o AD)
- Wi-Fi / BT Combo

- AIR/Cable
- DVB-S
12-1. OPTIC Audio Out Trouble Shooting

Check SPDIF signal (R3662)

- Y: Replace JK3606
- N: Replace LGE2122 (MTK Main IC, IC105)

Check Signal (JK3606, #3 pin)

- Y: Maybe LGE2122 (MTK Main IC, IC105) has problems. Replace it.
- N: Replace JK3606
13-1. WiFi/Bluetooth Combo

- Check Wifi/BT Combo Cable
  - Y
    - Check 3.3V voltage level at L4100
      - N
        - Replace one of L4100 & Recheck
      - Y
        - Check Signal 3D Sync and RF&M_REMOT_RST at P4306’s No 6 Pin (Pulse wave when 3D enable) & No.7 Pin (default “High”)
          - N
            - Replace one of Main Chip (IC105) & Recheck
          - Y
            - Check USB interface DP/DM
              - N
                - Replace one of Main Chip (IC105) & Recheck
              - Y
                - Maybe WiFi/BT Combo module has problems. Replace It.