LCD TV
SERVICE MANUAL

CHASSIS : LD73A
MODEL : 32LC4D  32LC4D-ZA
       32LC45  32LC45-ZA
       32LC46  32LC46-ZC

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

GENERAL GUIDANCE

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

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

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

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

Keep wires away from high voltage or high temperature parts.

**Before returning the receiver to the customer,**

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

**Leakage Current Cold Check (Antenna Cold Check)**

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

If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1MΩ and 5.2MΩ.

When the exposed metal has no return path to the chassis the reading must be infinite.

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

**Leakage Current Hot Check** (See below Figure)

Plug the AC cord directly into the AC outlet.

**Do not use a line Isolation Transformer during this check.**

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

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

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

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

**Leakage Current Hot Check circuit**

![Leakage Current Hot Check circuit diagram](image-url)
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 of 600°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle.
   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 circuitboard 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.
### 1. General Specification (TV)

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<th>Remark</th>
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<td>3) PAL I/I</td>
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<td>4) SECAM L/L'</td>
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### 2. General Specification

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<td>V: 47 ~ 63Hz</td>
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<td>Power consumption</td>
<td>26inch ≤ 4.6 W</td>
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<td>32inch ≤ 5.54 W</td>
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<td>LCD Module- LPL (32inch)</td>
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<td>Pixel Pitch 32&quot; 170.25 x 510.75 x RGB (µm)</td>
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<td>Pixel Format 1366 horiz. By 768 vert. Pixels</td>
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<td>RGB strip arrangement</td>
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<td>Coating Hard coating (3H), Anti-glare treatment</td>
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<tr>
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<td>Back Light 32&quot; 18 EEFL</td>
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### 4. Component Video Input (Y, Pb, Pr)

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### 6. RGB PC Input Mode Table

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</table>
### 7. HDMI DTV Mode Table

<table>
<thead>
<tr>
<th>No</th>
<th>Resolution</th>
<th>H-freq(kHz)</th>
<th>V-freq.(Hz)</th>
<th>Pixel clock(MHz)</th>
<th>Remark</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>640X480</td>
<td>31.50</td>
<td>59.94</td>
<td>25.175</td>
<td>SDTV 480p 60Hz</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>640X480</td>
<td>31.50</td>
<td>60</td>
<td>25.20</td>
<td>SDTV 480p 60Hz</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>720X480</td>
<td>31.47</td>
<td>59.94</td>
<td>27.00</td>
<td>SDTV 480p 60Hz</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>720X480</td>
<td>31.47</td>
<td>60</td>
<td>27.027</td>
<td>SDTV 480p 60Hz</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>720X576</td>
<td>31.25</td>
<td>50.00</td>
<td>27.000</td>
<td>SDTV 576p 50Hz</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>1280X720</td>
<td>45.00</td>
<td>50.00</td>
<td>74.176</td>
<td>HDTV 720p 50Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>7.</td>
<td>1280X720</td>
<td>44.96</td>
<td>59.94</td>
<td>74.176</td>
<td>HDTV 720p 60Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>8.</td>
<td>1280X720</td>
<td>44.96</td>
<td>60</td>
<td>74.250</td>
<td>HDTV 720p 60Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>9.</td>
<td>1920X1080</td>
<td>28.13</td>
<td>50.00</td>
<td>74.250</td>
<td>HDTV 1080i 60Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>10.</td>
<td>1920X1080</td>
<td>33.72</td>
<td>59.94</td>
<td>74.176</td>
<td>HDTV 1080i 60Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>11.</td>
<td>1920X1080</td>
<td>33.75</td>
<td>60</td>
<td>74.250</td>
<td>HDTV 1080i 60Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>12.</td>
<td>1920X1080</td>
<td>27</td>
<td>24</td>
<td>74.250</td>
<td>HDTV 1080P 24Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>13.</td>
<td>1920X1080</td>
<td>56.25</td>
<td>50.00</td>
<td>148.500</td>
<td>HDTV 1080P 50Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>14.</td>
<td>1920X1080</td>
<td>67.43</td>
<td>59.94</td>
<td>148.352</td>
<td>HDTV 1080P 60Hz</td>
<td>HDCP</td>
</tr>
<tr>
<td>15.</td>
<td>1920X1080</td>
<td>67.50</td>
<td>60</td>
<td>148.500</td>
<td>HDTV 1080P 60Hz</td>
<td>HDCP</td>
</tr>
</tbody>
</table>

### 8. HDMI INPUT Mode Table

<table>
<thead>
<tr>
<th>No</th>
<th>Resolution</th>
<th>H-freq(kHz)</th>
<th>V-freq.(Hz)</th>
<th>Pixel clock(MHz)</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>720X400</td>
<td>31.468</td>
<td>70.08</td>
<td>28.321</td>
<td>VESA</td>
</tr>
<tr>
<td>2.</td>
<td>640X480</td>
<td>31.469</td>
<td>59.94</td>
<td>25.17</td>
<td>VESA</td>
</tr>
<tr>
<td></td>
<td>37.684</td>
<td>75.00</td>
<td>31.50</td>
<td>VESA(XGA)</td>
<td>VESA(WXGA)</td>
</tr>
<tr>
<td>3.</td>
<td>800X600</td>
<td>37.879</td>
<td>60.31</td>
<td>40.00</td>
<td>VESA</td>
</tr>
<tr>
<td></td>
<td>46.875</td>
<td>75.00</td>
<td>49.50</td>
<td>VESA(WXGA)</td>
<td>VESA(WXGA)</td>
</tr>
<tr>
<td>4.</td>
<td>832X624</td>
<td>49.725</td>
<td>74.55</td>
<td>57.283</td>
<td>Supported</td>
</tr>
<tr>
<td>5.</td>
<td>1024X768</td>
<td>48.363</td>
<td>60.00</td>
<td>65.00</td>
<td>VESA(XGA)</td>
</tr>
<tr>
<td></td>
<td>56.470</td>
<td>70.00</td>
<td>75.00</td>
<td>VESA(WXGA)</td>
<td>VESA(WXGA)</td>
</tr>
<tr>
<td></td>
<td>60.123</td>
<td>75.029</td>
<td>78.75</td>
<td>VESA(WXGA)</td>
<td>VESA(WXGA)</td>
</tr>
<tr>
<td>6.</td>
<td>1280X768</td>
<td>47.776</td>
<td>59.870</td>
<td>79.50</td>
<td>VESA(WXGA)</td>
</tr>
<tr>
<td>7.</td>
<td>1360X768</td>
<td>47.720</td>
<td>59.799</td>
<td>84.75</td>
<td>VESA(WXGA)</td>
</tr>
<tr>
<td>8.</td>
<td>1366X768</td>
<td>47.720</td>
<td>59.799</td>
<td>84.75</td>
<td>Supported</td>
</tr>
<tr>
<td>9.</td>
<td>1920X1080</td>
<td>67.50</td>
<td>60.00</td>
<td>148.50</td>
<td>HDCP</td>
</tr>
</tbody>
</table>
ADJUSTMENT INSTRUCTION

1. Application Range
   This spec. sheet is applied to all of the LD73A chassis manufactured at LG TV Plant all over the world.

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 to protect test instruments.
   2) Adjustment must be done in the correct sequence.
   3) The adjustment must be performed at 25±5°C temperature and 65±10% relative humidity if there is no specified designation.
   4) The input voltage of the receiver must be kept between 100-220V~, 50/60Hz.
   5) Before adjustment, execute Heat-Run for 30 minutes at RF no signal.

3. Channel Memory
   3.1. Setting up the LGIDS
      1) Install the LGIDS
      2) After installation, restart your PC.
      3) Extract [files.zip] to folder [c:\LGIDS\files]
      4) Start LGIDS.

   3.2 Channel memory method
      1) Press TILT key in Adjust remocon(Automatic setting).
      2) Setting up like bottom figure
         [Confirmation: Press ADJ Key in the Adjust remote control.
         Select “System Control2” by using ▲▼(CH+/-) key, and
         press ■(ENTER). RS-232 Host : Gprobe, Baud Rate : 115200bps, Download:Cortez]
      3) Connect RS232 cable .(Use the general RS-232C Twisted Serial Cable).
      4) Operate LGIDS
      5) Select “Hurricane” and “ALL” on Model dialog and check your connection in Communication dialog.
      (If your connection is ‘NG’, then set your PORT(COM1,2,3,….) correctly. If your connection has completed, you can see “Ready”)
      6) Select proper CH_memory file(*.nvm) for each model at [Channel Download] => [Write Batch].
      Next, select proper binary file(*.bin) including the CH information for each model at [Channel Download] => [NVRAM File].
      7) Click the [Download] button.
      It means the completion of the CH memory download if all items show ‘OK’ and Status is changed by ‘PASS’ at the lower right corner of the window.
4. EDID

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

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

=> Detail EDID Options are below (a, b, c, d, e-1, e-2, f-1, f-2)

### 4.1. EDID Data

<table>
<thead>
<tr>
<th>Item</th>
<th>Condition</th>
<th>Data (Hex)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer ID</td>
<td>GSM</td>
<td>1E6D</td>
</tr>
<tr>
<td>Version</td>
<td>Digital : 1</td>
<td>01</td>
</tr>
<tr>
<td>Revision</td>
<td>Digital : 3</td>
<td>03</td>
</tr>
</tbody>
</table>

### 4.2. Data

#### (1) ANALOG (128 bytes)

```
| 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 | 0x07 | 0x08 | 0x09 | 0x0A | 0x0B | 0x0C | 0x0D | 0x0E | 0x0F |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0x00 | FF   | FF   | FF   | FF   | FF   | 0   | 1E  | 0D  | 0E  | 0F   | 00   | 01   | 02   | 03   | 04   | 05   |
| 0x01 | 1    | 3    | 1    | 46   | 27   | 78  | EA  | 69  | B0  | A3   | 57   | 57   | 49   | 9C   | 25   |
| 0x02 | 11   | 49   | 4B   | A5   | 6E   | 0   | 31  | 40  | 40  | 40   | 40   | 40   | 40   | 40   | 40   |
| 0x03 | 0    | 1    | 1    | 1    | 1    | 1   | 18  | 21  | 50  | 50   | 50   | 50   | 50   | 50   | 50   |
| 0x04 | 35   | 0    | BC   | 86   | 21   | 0   | 0   | 1C  | 26  | 36  | 80   | 80   | 80   | 80   | 80   |
| 0x05 | 55   | 20   | 85   | 4    | BC   | 86  | 21   | 0   | 0   | 18   |       |       |       |       |       |
| 0x06 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 0x07 | 0    | 3C   | 4B   | 1D   | 43   | 0E   | 0   | 0A  | 20  | 20  | 20   | 20   | 20   | 20   | 0   | 0   |
```

#### (2) HDMI 1 (256 bytes)

```
| 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 | 0x07 | 0x08 | 0x09 | 0x0A | 0x0B | 0x0C | 0x0D | 0x0E | 0x0F |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0x00 | FF   | FF   | FF   | FF   | FF   | FF   | 0   | 1E  | 0D  | 0E  | 0F   | 00   | 01   | 02   | 03   | 04   |
| 0x01 | 1    | 3    | 1    | 46   | 27   | 78  | EA  | 69  | B0  | A3   | 57   | 57   | 49   | 9C   | 25   |
| 0x02 | 11   | 49   | 4B   | A5   | 6E   | 0   | 31  | 40  | 40  | 40   | 40   | 40   | 40   | 40   | 40   |
| 0x03 | 0    | 1    | 1    | 1    | 1    | 1   | 18  | 21  | 50  | 50   | 50   | 50   | 50   | 50   | 50   |
| 0x04 | 35   | 0    | BC   | 86   | 21   | 0   | 0   | 1C  | 26  | 36  | 80   | 80   | 80   | 80   | 80   |
| 0x05 | 55   | 20   | 85   | 4    | BC   | 86  | 21   | 0   | 0   | 18   |       |       |       |       |       |
| 0x06 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 0x07 | 0    | 32   | 4B   | 1C   | 43   | 0F   | 0   | 0A  | 20  | 20  | 20   | 20   | 20   | 20   | 20   |
| 0x08 | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    |
| 0x09 | 0    | 2    | 2    | 1D   | 43   | 0E   | 0   | 0A  | 20  | 20  | 20   | 20   | 20   | 20   | 20   |
| 0x0A | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    |
| 0x0B | 0    | 1    | 0    | 0    | 0    | 0    | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    |
| 0x0C | 0    | 1    | 0    | 0    | 0    | 0    | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    |
| 0x0D | 0    | 1    | 0    | 0    | 0    | 0    | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    |
| 0x0E | 0    | 1    | 0    | 0    | 0    | 0    | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    |
| 0x0F | 0    | 1    | 0    | 0    | 0    | 0    | 0   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    |
```

=> Detail EDID Options are below (a, b, c, d, e-1, e-2, f-1, f-2)
5. Select method of Tool option 1
   1) Press ADJ Key in the Adjust remote control.
   2) Select “Tool option 1” by using ▲▼ (CH+/-) key, and press ▼(ENTER).
   3) Select “Maker” by using ▲▼ (CH+/-) key, and change the module maker and applied module classification by using ◄► (VOL+/-).
   4) Select “Inch” by using ▲▼ (CH+/-) key, and change the module according to the inch of model.
   5) Select “Tool” by using ▲▼ (CH+/-) key, and change the tool name according to the model.

   (Inch of model : 26", 32", 37", 42", Applied module under the classification)

6. ADC Calibration

<table>
<thead>
<tr>
<th>ADC</th>
<th>RF/AV/S-VIDEO</th>
<th>Component</th>
<th>RGB-PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSPG925F</td>
<td>PAL</td>
<td>Model:215 (720P)</td>
<td>Model: 3</td>
</tr>
<tr>
<td>INPUT SELECT</td>
<td>AV3</td>
<td>Pattern:65</td>
<td>Pattern: 65</td>
</tr>
<tr>
<td>Model: 202 (PAL-BGDHI)</td>
<td>720P/50Hz</td>
<td>7 Color Bar</td>
<td></td>
</tr>
<tr>
<td>Pattern: 65</td>
<td>PAL 7 Color Bar</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   <Caution>
   - System control RS-232 Host should be "PC" for adjustment.
   - Before AV ADC Calibration, execute the “Module selection”.

6.1. Adjustment of RF/AV/S-VIDEO

(1) Required Equipments
   - Remote controller for adjustment
   - MSPG-925FS Pattern Generator (Which has Video Signal: 7 Color Bar Pattern shown in Fig. 1) => Model: 202 / Pattern: 65

   ![Fig. 1](image)

(2) Method of Auto RF/AV/S-VIDEO Color Balance.
   1) Input the Video Signal: 7 Color Bar signal into AV3.
   2) Set the PSM to Dynamic mode in the Picture menu.
   3) Press IN-START key on R/C for adjustment.
   4) Press the ◄►(Vol.+/-) key to operate the set, then it becomes automatically.
   5) Auto-RGB OK means the adjustment is completed.

6.2 Adjustment of Component.

(1) Required Equipments
   - Remote controller for adjustment
   - MSPG-925FS Pattern Generator (Which has 720p/60Hz YPbPr output Pattern shown in Fig. 1 ) => Model:215/Pattern: 65

(2) Method of Auto Component Color Balance
   1) Input the Component 720p/50Hz 7 Color Bar(MSPG-925FS model:215, pattern:65) signal into Component.
   2) Set the PSM to Dynamic mode in the Picture menu
   3) Press the IN-START key on R/C for adjustment.
   4) Press the ◄►(Vol.+/-) key to operate the set , then it becomes automatically.
   5) Auto-RGB OK means the adjustment is completed.
6.3 Adjustment of RGB

(1) Required Equipments
- Remote controller for adjustment
- MSPG-925F Pattern Generator
  (Which has XGA [1024*768] 60Hz 8 Color Bar pattern shown in Fig. 1)

(2) Method of Auto RGB Color Balance
1) Input the PC 1024x768@60Hz 100% Color Bar pattern
   (MSPG-925F model:37, pattern:33) into RGB.
   (Using D-sub to D-sub cable)
2) Set the PSM to Dynamic mode in Picture menu.
3) Press the IN-START key on R/C for adjustment
4) Press the ⚌(Vol.+ key to set , then it becomes automatically.
5) Auto-RGB OK means adjustment is completed.

* Before White-balance, the AV ADC should be done.

7. White Balance

* Test Equipment
  Color Analyzer (CA-210/CH.9)
  -> When you adjust LCD color temperature, on Color analyzer (CA-210), you should use Channel 9 which is Matrix compensated (White, Red, Green, Blue revised) by CS-1000 and adjust in accordance with White balance adjustment coordinate which is specified on the next.

* Color temperature standards according to CSM and Module
  Cool : 11,000k
  Medium : 9,300k
  Warm : 6,500k

* White balance adjustment coordinate and color temperature

<table>
<thead>
<tr>
<th></th>
<th>CS-1000</th>
<th>CA-210(CH.9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>y</td>
</tr>
<tr>
<td>Cool</td>
<td>0.276</td>
<td>0.283</td>
</tr>
<tr>
<td>x</td>
<td>0.276±0.002</td>
<td>0.283±0.002</td>
</tr>
<tr>
<td>y</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Δuv</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>CS-1000</td>
<td>CA-210(CH.9)</td>
</tr>
<tr>
<td>x</td>
<td>0.285</td>
<td>0.293</td>
</tr>
<tr>
<td>y</td>
<td>0.285±0.002</td>
<td>0.293±0.002</td>
</tr>
<tr>
<td>Δuv</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Warm</td>
<td>CS-1000</td>
<td>CA-210(CH.9)</td>
</tr>
<tr>
<td>x</td>
<td>0.313</td>
<td>0.329</td>
</tr>
<tr>
<td>y</td>
<td>0.313±0.002</td>
<td>0.329±0.002</td>
</tr>
<tr>
<td>Δuv</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Color Temperature: Cool, Medium, Warm
  1) When R GAIN is set to 80
    - Control G GAIN and B GAIN by lowering from 80.
  2) When B GAIN is set to 80
    - Control R GAIN and G GAIN by lowering from 80.
  3) When G GAIN is set to 80
    - Control R GAIN and B GAIN by lowering from 80.
    One of R Gain / G Gain / B Gain should be kept on 80, and adjust other two lower than 80.
    (When R/G/B GAIN are all 80, it is the FULL DYNAMIC Range of Module)

* Connecting picture of the measuring instrument (On Automatic control)
  Inside PATTERN is used when W/B is controlled. Connect to auto controller or push control R/C IN-START
  -> Enter the mode of White-Balance, the pattern will come out.
8. Set information (Serial No & Model name)

(1) Setting up like bottom figure (After setting white balance, this is set)

1) Press ADJ Key in the Adjust remocon.
2) Select “System Control 2” by using ▲▼(CH+/-) key, and press ■(ENTER).
3) Using Adjust remocon, RS-232 Host & Baud Rate & Download value change (RS-232 Host:Gprobe, Baud Rate:115200bps, Download:Cortez)

(2) Bar-code scanning

1) Push the menu button in DTV mode, Select the STATION -> Diagnostics -> To set

2) Check the Serial Number.
1. Power Board

1-1. The full flowchart for the voltage output

Start check

Does the whole screen appear?

Yes

Is it identical to when the power is off?

Yes

1. Check the Power Off status.

No

2. Check the Interface signal status.

Is the Interface signal operating?

Yes

Does the low pressure output appear?

Yes

Does the St-by 5V signal appear?

Yes

3. Check the St-by 5V signal circuit.

No

4. Check the 5V Monitor signal circuit.

Does the VSC signal RL-ON appear?

Yes

5. Check the VSC RL-ON signal.

No

Does the VSC low pressure output appear?

Yes

Does the VSC signal Vs-ON appear?

Yes

7. Check the VSC Vs-ON signal

No

6. Check the VSC low pressure output

Does the high tension output voltages occur?

Yes

11. Check the Y B/D Module output circuit

No

9. Check the Power Board Output high tension circuit

When removing the Y B/D Module input connector, does Power Board high tension output voltage drop?

Yes

When removing the Z B/D Module input connector, does output voltage drop?

No

10. Check the Z B/D Module output circuit

No

Does the high tension output voltage occur?

When removing the Z B/D Module input connector, does output voltage drop?

Yes

Manufacture’s model passage

No

Does the Vs, Va voltage output appear?

Yes

5. Check the VSC RL-ON signal.

No

Does the Vs, Va voltage output circuit.

8. Check the Vs, Va voltage output circuit.

No

When the Y, Z B/D Module input connector, does Power Board high tension output voltage drop?

Yes

When removing the Y B/D Module input connector, does output voltage drop?
2. No Power

(1) Symptom
1) Does not minute discharge at module.
2) Non does not come into the front LED.

(2) Procedure check

- Is the power cord plugged in?
  - Yes → Is the Line Filter and Power Board Cable connected?
    - Yes → Is the appropriate Fuse(F101) on the Power Board?
      - Yes → Is the Power Board and 13P of VSC Board Cable connected?
        - Yes → After removing the cables, connect them to the Power Board(except the SC101 connection cable), and change the AC voltage marking to manual. When ST-BY 5V does not operate, replace the Power Board.
      - No → Replace the Fuse.
    - No → Connect the Cable.
  - No → Plug in the power cord.

- Is the Line Filter and Power Board Cable connected?
  - Yes → Is the appropriate Fuse(F101) on the Power Board?
    - Yes → Is the Power Board and 13P of VSC Board Cable connected?
      - Yes → After removing the cables, connect them to the Power Board(except the SC101 connection cable), and change the AC voltage marking to manual. When ST-BY 5V does not operate, replace the Power Board.
      - No → Connect the Cable.
    - No → Replace the Fuse.
  - No → Connect the Cable.
3. Protect Mode

(1) Symptom
1) After lighting up once, it does not discharge minutely from module.
2) The relay falls. (there is an audible “click”)
3) The color of the front LED turns from green to red.

(2) Procedure check

- **Is the Power Board normal?**
  - Yes
  - No
  - **Is the output Low/High voltage normal except for Stand-by 5V?**
    - Yes
    - No
    - **Replace the Power Board.**

- **Is the each connector normal?**
  - Yes
  - No
  - **After connecting each connector do they operate normally?**
    - Yes
    - No
    - **Replace the connector.**

- **Is the Y-Board normal?**
  - Yes
  - No
  - **Is the appropriate Fuse (FS101, FS102) on the Y-B/D normal? (Replace if open)**
    - Yes
    - No
    - **Replace the Y-Board.**

- **Is the Z-Board normal?**
  - Yes
  - No
  - **Is the appropriate Fuse (FS1, FS2) on the Z-B/D? (replace if open)**
    - Yes
    - No
    - **Replace the Z-Board.**

- **Is the X-Board normal?**
  - Yes
  - No
  - **Is the output voltage normal after removing P1, 2, 3, 4, 5 connectors of the X-B/D?**
    - Yes
    - No
    - If the output voltage is normal after removing the P1, P2, P3: Replace the right X-B/D
    - If the output voltage is normal after removing the P4, P5: Replace the left X-B/D

- **Is the Ctrl Board normal?**
  - Yes
  - No
  - **Is the output voltage normal after removing P1, 2, 4, 9, 10 connectors of the Ctrl-B/D?**
    - Yes
    - No
    - **Replace the Ctrl Board.**

- **Is the VSC Board normal?**
  - Yes
  - No
  - **Is the output voltage normal after removing P900, P901 of VSC Board?**
    - Yes
    - No
    - If it operates normally after removing the P900, P901: Replace the VSC Board

- **Is the COF of X, Y, Z normal?**
  - Yes
  - No
  - **After a COF crisis for each board, check the normal operation. For normal operation, corresponding COF failure means the module should be relaced.**

- **Is the output voltage normal after removing P103 connector of Y-B/D?**
  - Yes
  - No
  - **Replace the Y-Board.**

- **Is the output voltage normal after removing P1 connector of Z-B/D?**
  - Yes
  - No
  - **Replace the Z-Board.**

- **Is the output voltage normal after removing P103 connector of Y-B/D?**
  - Yes
  - No
  - **Replace the Y-Board.**

- **Is the output voltage normal after removing P1 connector of Z-B/D?**
  - Yes
  - No
  - **Replace the Z-Board.**

- **Is the output voltage normal after removing the P1, P2, P3: Replace the right X-B/D**
- **If the output voltage is normal after removing the P4, P5: Replace the left X-B/D**

- **After a COF crisis for each board, check the normal operation. For normal operation, corresponding COF failure means the module should be relaced.**
4. No Raster

(1) Symptom
1) No OSD and image occur at screen.
2) It maintains the condition where the front LED is green.

(2) Procedure check

- Does minute discharge At Module?
  - Yes
  - No

  - Is the VAVS on?
    - Yes
    - NO

    - NO

  - NO

  - Is the LVDC cable normal?
    - Yes
    - NO

    - NO

    - Reconnect the LVDS cable in P800

  - NO

  - Is the IC700(FLI8548) Output normal?
    - Yes
    - NO

    - NO

    - Replace the VSC.

    - Replace the Power board
5. In case of strange screen display in specific modes

5-1. In case of no OSD display

(1) Symptom
1) LED is green.
2) The minute discharge is continuously accomplished from the module.

(2) Procedure check

- Is the LVDS cable normal? Yes/No
  - Yes → Re-insert the cable.
  - No → Is the LVDS cable connected? Yes/No
    - Yes → Replace the cable.
    - No → Does the FIL8548 IC (IC700) operate? Yes/No
      - Yes → Replace the VSC B/D.
      - No → Replace the FIL8548 IC (IC700)

- Is the VSC Board normal? Yes/No
  - Yes → Replace the Ctrl B/D.
  - No → Replace the Ctrl B/D.
5-2. In case there is no display on the screen in specific modes

(1) Symptom
1) There is no screen display from a specific input mode (RF, AV, Component, RGB, DVI).

(2) Procedure check
1) Check the all input modes have normal display.
2) Check the video(main)/ data(sub), video(main)/ video(sub) have normal displays from the PIP mode or DW mode(re-check it/ swap).

(3) In case of an unusual display in RF mode

<table>
<thead>
<tr>
<th>Is the Tuner normal?</th>
<th>Yes</th>
<th>Is the Tuner Cable connected?</th>
<th>No</th>
<th>Are the Input voltage, IIC Communication and CVBS output normal?</th>
<th>Yes</th>
<th>Re-insert the cable</th>
<th>No</th>
<th>Replace the Tuner.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the CXA2069Q normal?</td>
<td>No</td>
<td>Are the Input voltage, IIC Communication and HV sync normal?</td>
<td>No</td>
<td>Replace the IC.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the FIL8548 normal?</td>
<td>No</td>
<td>Are the Input voltage, IIC Communication and HV sync normal?</td>
<td>No</td>
<td>Replace the IC.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Block A

(4) In case of an unusual display in side S-video/ AV mode

<table>
<thead>
<tr>
<th>Is the Video input of the AV Jack(P1400) normal?</th>
<th>No</th>
<th>Check the input source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the CXA2069Q normal?</td>
<td>No</td>
<td>Are the Input voltage, IIC Communication and HV sync normal?</td>
</tr>
<tr>
<td>Yes</td>
<td>Same as Block A</td>
<td></td>
</tr>
</tbody>
</table>
(5) In case of an unusual display in Component, RGB mode

Are the R, G, B input and H, V Sync of the J1100 normal? No → Check the input source
Yes → Same as Block A

(6) In case of an unusual display in HDMI mode

Is the HDMI002(IC1004) normal? No → Are Input voltage, IIC Communication and HV sync normal? No → Replace the IC.
Yes → Same as Block A

(7) In case of an unusual display in SCART1 mode

Is the Video input of the A/V Jack(J1200) normal? No → Check the input source
Yes → Same as Block A

(8) In case of an unusual display in SCART2 mode

Is the Video input of the A/V Jack(J1201) normal? No → Check the input source
Yes → Same as Block A
6. In case of no sound

(1) Symptom
1) LED is Green.
2) Screen display appears but there is no sound.

(2) Procedure check

Is there no sound for All input(modes)?
  YES
  No

Is there no sound only for HDMI?
  YES
  No

Download the EDID data

Is there no sound only for RF?
  YES
  No

Check the Tuner IN/OUT

Is there no sound only for AV/component/PC input?
  YES
  No

Check the signal after CAX2069 refer to circuit diagram

Is there no sound only for specific input? (except HDMI,DTV,RF)
  YES
  No

Check the signal before CAX2069 refer to circuit diagram

Is the IC1300 operating normally?
  YES
  No

Replace the IC1300 (STA335BW)

Is the IC1301 operates normally?
  YES
  No

Replace the VSC B/D

Is the speaker on?
  YES
  No

Set on speaker on in menu.

Is the speaker Cable normal?
  YES
  No

Check the Speaker Cable.

Is the output of CXA2069 normal?
  YES
  No

Replace the CXA2069

Is there no sound for RF?