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# LED TV

# SERVICE MANUAL

CHASSIS : LD51A

MODEL : 22MT57V 22MT57V-PZS

## CAUTION

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



P/NO : MFL68127282 (1501-REV00)

Printed in Korea

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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  $\triangle$  in the Schematic Diagram and Exploded View.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

### General Guidance

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

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

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

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

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

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

### Leakage Current Cold Check(Antenna Cold Check)

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

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

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

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

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

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

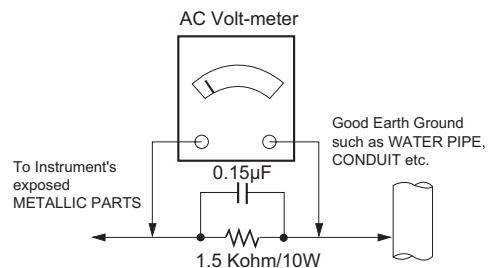
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

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

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

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

### Leakage Current Hot Check circuit



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

\*Base on Adjustment standard

# SERVICING PRECAUTIONS

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

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

## General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
  - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
  - b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
  - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.

**CAUTION:** A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)

**CAUTION:** This is a flammable mixture.

Unless specified otherwise in this service manual, lubrication of contacts is not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.

Always remove the test receiver ground lead last.
8. Use with this receiver only the test fixtures specified in this service manual.

**CAUTION:** Do not connect the test fixture ground strap to any heat sink in this receiver.

## Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain 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 1.25cm) 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 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 all of the TV used LD50A chassis.

## 3. Test method

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

## 2. Specification

Each part is tested as below without special appointment

- 1) Temperature :  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ( $77^{\circ}\text{F} \pm 9^{\circ}\text{F}$ ),  
CST :  $40^{\circ}\text{C} \pm 5^{\circ}\text{C}$
- 2) Relative Humidity :  $65\% \pm 10\%$
- 3) Power Voltage : Standard input voltage  
(100 V - 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.

## 4. General specification

### 4.1. TV

| No | Item   | Specification      | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|--------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Market | EU(PAL/DVB Market) | DTV & Analog (Total 37 countries)<br>DTV (MPEG2/4, DVB-T) : 37 countries<br>UK/Italy/Germany/France/Spain/Sweden/Finland/Netherlands/ Belgium/Luxemburg/ Greece/Denmark/Czech/ Austria /Hungary/Swiss/Croatia/Turkey<br>Norway/Slovenia/Poland/Ukraine/Portugal/Ireland/Morocco/ Latvia/Estonia/Lithania/Rumania/Bulgaria/Russia/Slovakia<br>Bosnia/Serbia/Albania/Kazakhstan/Belarus<br>*4 Country, Nordic option(EU model only)<br>- Denmark , Finland, Norway, Sweden<br>DTV (MPEG2/4, DVB-T2): 8 countries<br>UK/Denmark/Sweden/Finland/Norway/Ireland/Ukraine/ Kazakhstan<br>DTV (MPEG2/4, DVB-C): 37 countries<br>UK/Italy/Germany/France/Spain/Sweden/Finland/Netherlands/ Belgium/Luxemburg/ Greece/Denmark/Czech/ Austria /Hungary/Swiss/Croatia/Turkey<br>Norway/Slovenia/Poland/Ukraine/Portugal/Ireland/Morocco/ Latvia/Estonia/Lithania/Rumania/Bulgaria/Russia/Slovakia<br>Bosnia/Serbia/Albania/Kazakhstan/Belarus<br>DTV (MPEG2/4,DVB-S): 29 countries → MT57V model supported<br>Italy/Germany/France/Spain/Netherlands/ Belgium/ Luxemburg/ Greece/ Czech/Austria /Hungary/Swiss/Croatia/ Turkey/Slovenia/Poland/Portugal/ Morocco/Latvia/ Estonia/Lithuania/Rumania/Bulgaria/Russia/Slovakia<br>Bosnia/Serbia/Albania/ Belarus<br>Supported satellite : 22 satellites → MT57V model supported<br>HISPASAT 1C/1D, ATLANTIC BIRD 2, NILESAT 101/102, ATLANTIC BIRD 3, AMOS 2/3, THOR 5/6, IRIUS 4, EUTELSAT-W3A, EUROBIRD 9A, EUTELSAT-W2A, HOT-BIRD 6/8/9, EUTELSAT-SESAT, ASTRA 1L/H/M/KR, ASTRA 3A/3B, BADR 4/6, ASTRA 2D, EUROBIRD 3, EUTELSAT-W7, HELASSAT 2, EXPRESS AM1, TURKSAT 2A/3A, INTERSAT10 |

| No | Item                | Specification                                                                                                                                                                                                    | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2  | Broadcasting system | - Analogue TV<br>1) PAL-BG<br>2) PAL-DK<br>3) PAL-I/I'<br>4) SECAM-BG<br>5) SECAM-DK<br>6) SECAM L/L'<br><br>- Digital TV<br>1) DVB-T/C/T2<br><br>- Satellite Digital TV<br>1) DVB-T2/C/S/S2<br>(Only 57V model) | Analogue TV :<br>(RF) VHF: E2 to E12, UHF : E21 to E69<br>(CATV) S1 to S20, HYPER: S21 to S47<br>Digital TV : VHF, UHF<br>Satellite TV : VHF, UHF, C-Band, Ku-Band<br>* DVB-T2 ( T2 model only support )<br>*DVB-S/S2(Satellite model only support )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3  | Channel Storage     | ATV – 135EA, DTV – 1000EA                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 4  | Receiving system    | Analog : Upper Heterodyne<br>Digital : COFDM, QAM                                                                                                                                                                | ► DVB-T<br>- Guard Interval(Bitrate_Mbit/s)<br>1/4, 1/8, 1/16, 1/32<br>- Modulation : Code Rate<br>QPSK : 1/2, 2/3, 3/4, 5/6, 7/8<br>16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8<br>64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8<br>► DVB-T2<br>- Guard Interval(Bitrate_Mbit/s)<br>1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256,<br>- Modulation : Code Rate<br>QPSK : 1/2, 2/5, 2/3, 3/4, 5/6<br>16-QAM : 1/2, 2/5, 2/3, 3/4, 5/6<br>64-QAM : 1/2, 2/5, 2/3, 3/4, 5/6<br>256-QAM : 1/2, 2/5, 2/3, 3/4, 5/6<br>► DVB-C<br>- Symbolrate :<br>4.0Msymbols/s to 7.2Msymbols/s<br>- Modulation :<br>16QAM, 64-QAM, 128-QAM and 256-QAM<br>► DVB-S/S2<br>- symbolrate<br>DVB-S2 (8PSK / QPSK) : 2 ~ 45Msymbol/s<br>DVB-S (QPSK) : 2 ~ 45Msymbol/s<br>- viterbi<br>DVB-S mode : 1/2, 2/3, 3/4, 5/6, 7/8<br>DVB-S2 mode : 1/2, 2/3, 3/4, 3/5, 4/5, 5/6, 8/9, 9/10 |
| 5  | Interface           | RF / Composite / Component(CVBS) / HDMI / D-Sub / Scart /USB / Audio In / Headphone Out / LAN(option)                                                                                                            | Scart Jack is Full scart and support RF-OUT(analog)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 6  | DVB                 | DVB-T                                                                                                                                                                                                            | CI : UK, Finland, Denmark, Norway, Sweden, Russia, Spain, Ireland, Luxemburg, Belgium, Netherland<br>CI+ : France(Canal+), Italy(DGTVi)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                     | DVB-C                                                                                                                                                                                                            | CI : Switzerland, Austria, Slovenia, Hungary, Bulgaria<br>CI+ : Switzerland(UPC,Cablecom), Netherland(Ziggo), Germany(KDG,CWB), Finland(labwise)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|    |                     | DVB-S (Only 57V model)                                                                                                                                                                                           | CI + : Germany (Astra HD+)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## 5. External Input Support Format

### 5.1. RGB/ HDMI (PC)

| No. | Resolution | H-freq(kHz) | V-freq(Hz) | Pixel clock(MHz) | Remark        |
|-----|------------|-------------|------------|------------------|---------------|
| 1   | 720*400    | 31.468      | 70.080     | 28.321           |               |
| 2   | 640*480    | 31.469      | 59.940     | 25.175           |               |
| 3   | 640*480    | 37.500      | 75.000     | 31.500           |               |
| 4   | 800*600    | 37.879      | 60.317     | 40.000           |               |
| 5   | 800*600    | 46.875      | 75.000     | 49.500           |               |
| 6   | 1024*768   | 48.363      | 60.004     | 65.000           |               |
| 7   | 1024*768   | 56.476      | 70.069     | 75.000           | HDMI(PC) only |
| 8   | 1024*768   | 60.023      | 75.029     | 78.750           |               |
| 9   | 1152*864   | 67.500      | 75.000     | 108.000          |               |
| 10  | 1280*720   | 45.000      | 60.000     | 74.250           |               |
| 11  | 1280*800   | 49.702      | 59.810     | 83.500           |               |
| 12  | 1280*1024  | 63.981      | 60.020     | 108.000          |               |
| 13  | 1280*1024  | 79.976      | 75.025     | 135.000          |               |
| 14  | 1400*1050  | 65.317      | 59.978     | 121.750          |               |
| 15  | 1440*900   | 55.935      | 59.887     | 106.500          |               |
| 16  | 1600*900   | 60.000      | 60.000     | 108.000          |               |
| 17  | 1680*1050  | 64.674      | 59.883     | 119.000          |               |
| 18  | 1680*1050  | 65.290      | 59.954     | 146.250          |               |
| 19  | 1920*1080  | 67.500      | 60.000     | 148.500          |               |

### 5.2. HDMI (DTV)

| No. | Resolution | H-freq(kHz)   | V-freq(Hz) | Pixel clock(MHz) | Remark     |
|-----|------------|---------------|------------|------------------|------------|
| 1   | 720* 480   | 31.469 / 31.5 | 59.94 / 60 | 27.00/ 27.03     | SDTV 480P  |
| 2.  | 720*576    | 31.25         | 50.00      | 27.864           | SDTV 576P  |
| 3.  | 1280*720   | 37.50         | 50.00      | 74.250           | HDTV 720P  |
| 4   | 1280* 720  | 44.96 / 45    | 59.94 / 60 | 74.17/ 74.25     | HDTV 720P  |
| 5   | 1920* 1080 | 33.72 / 33.75 | 59.94 / 60 | 74.17/ 74.25     | HDTV 1080I |
| 6   | 1920* 1080 | 28.125        | 50.00      | 74.25            | HDTV 1080I |
| 7   | 1920* 1080 | 27.00         | 24         | 74.25            | HDTV 1080P |
| 8   | 1920* 1080 | 33.75         | 30.00      | 74.25            | HDTV 1080P |
| 9   | 1920* 1080 | 56.250        | 50         | 148.5            | HDTV 1080P |
| 10  | 1920* 1080 | 67.43 / 67.5  | 59.94 / 60 | 148.35/ 148.50   | HDTV 1080P |



### 5.3. Component

| No | Specification |             |            |                   | Remark                     |
|----|---------------|-------------|------------|-------------------|----------------------------|
|    | Resolution    | H-freq(kHz) | V-freq(Hz) | Pixel clock( MHz) |                            |
| 1  | 720* 480      | 15.73       | 59.94      | 13.500            | SDTV, DVD 480I( 525I)      |
| 2  | 720* 480      | 15.75       | 60.00      | 13.514            | SDTV, DVD 480I( 525I)      |
| 3  | 720* 576      | 15.625      | 50.00      | 13.500            | SDTV, DVD 576I( 625I) 50Hz |
| 4  | 720* 480      | 31.47       | 59.94      | 27.000            | SDTV 480P                  |
| 5  | 720* 480      | 31.50       | 60.00      | 27.027            | SDTV 480P                  |
| 6  | 720* 576      | 31.25       | 50.00      | 27.000            | SDTV 576P 50Hz             |
| 7  | 1280* 720     | 44.96       | 59.94      | 74.176            | HDTV 720P                  |
| 8  | 1280* 720     | 45.00       | 60.00      | 74.250            | HDTV 720P                  |
| 9  | 1280* 720     | 37.50       | 50.00      | 74.25             | HDTV 720P 50Hz             |
| 10 | 1920* 1080    | 33.72       | 59.94      | 74.176            | HDTV 1080I                 |
| 11 | 1920* 1080    | 33.75       | 60.00      | 74.250            | HDTV 1080I                 |
| 12 | 1920* 1080    | 28.125      | 50.00      | 74.250            | HDTV 1080I 50Hz            |
| 13 | 1920* 1080    | 56.25       | 50         | 148.5             | HDTV 1080P                 |
| 14 | 1920* 1080    | 67.432      | 59.94      | 148.350           | HDTV 1080P                 |
| 15 | 1920* 1080    | 67.5        | 60.00      | 148.5             | HDTV 1080P                 |

# ADJUSTMENT INSTRUCTION

## 1. Application Range

This document is applied to LD50A chassis TV which is manufactured in TV (or Monitor) Factory or is produced on the basis of this data.

## 2. Designation

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

### Case1 : Software version up

- 1) After downloading S/W by USB , Multi-vision set will reboot automatically
- 2) Push "In-stop" key
- 3) Push "Power on" key
- 4) Function inspection
- 5) After function inspection, Push "In-stop" key.

### Case2 : Function check at the assembly line

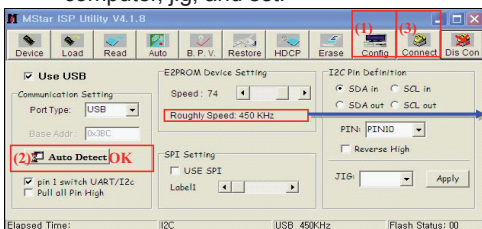
- 1) When TV set is entering on the assembly line, Push "In-stop" key at first.
- 2) Push "Power on" key for turning it on.  
→ If you push "Power on" key, TV set will recover channel information by itself.
- 3) After function inspection, Push "In-stop" key.

## 3. Main PCB check process

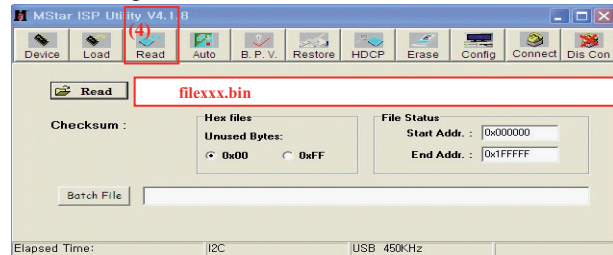
\* APC - After Manual-Insult, executing APC

### \* Boot file Download

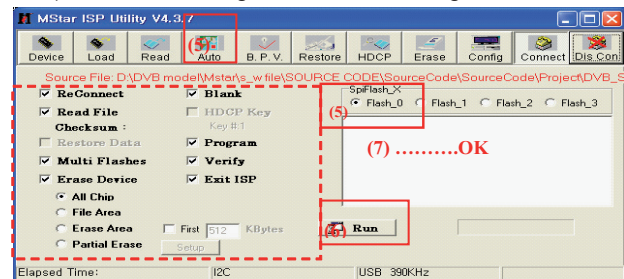
- 1) Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
- 2) Set as below, and then click "Auto Detect" and check "OK" message. If display "Error", Check connect computer, jig, and set.
- 3) Click "Connect" tab. If display "Can't ", Check connect computer, jig, and set.



- 4) Click "Read" tab, and then load download file(XXXX.bin) by clicking "Read"

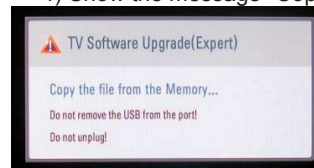


- 5) Click "Auto" tab and set as below
- 6) Click "Run".
- 7) After downloading, check "OK" message.

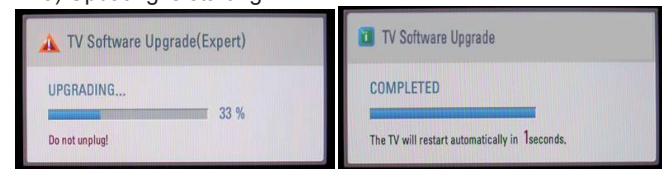


### \* USB DOWNLOAD(\*.epk file download)

- 1) Make New folder named "LG\_DTV" and put ISP file(\*.epk) in the folder.
- 2) Put the USB Stick to the USB socket.
- 3) 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.
- 4) Show the message "Copy the file from the Memory..."



- 5) Updating is starting.



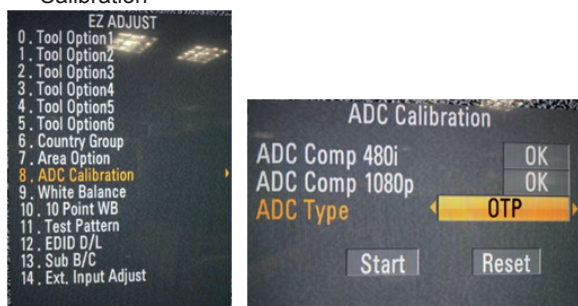
- 6) Updating Completed, The TV will restart automatically.
- 7) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)

\* If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

### 3.1. ADC Process (Optional) :

**If ADC processes as OTP, There is no need to proceed internal ADC.**

- 1) Enter Service Mode by pushing "ADJ" key.
- 2) Enter Internal ADC mode by pushing "▶" key at "ADC Calibration"



→ Caution: Using 'P-ONLY' button of the Adjustment R/C, power on TV.

#### \* ADC Calibration Protocol (RS232)

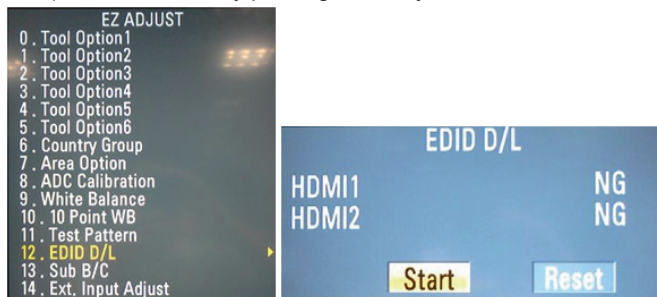
| NO                                  | Item               | CMD 1 | CMD 2 | Data 0 |                                                     |
|-------------------------------------|--------------------|-------|-------|--------|-----------------------------------------------------|
| Enter download MODE                 | Download 'Mode In' | A     | A     | 0 0    | When transfer the 'Mode In', Carry the command.     |
| EDID data and Model option download | Download           | A     | E     | 00 10  | Automatically download (The use of a internal Data) |

- aa 00 00 [Enter Adjust Mode]
- xb 00 40 [Component Input]
- ad 00 10 [Adjust 480i & 1080p Comp]
- aa 00 90 End Adjust mode

\* Required equipment : Adjustment R/C.

### 3.2. EDID Download

- 1) After enter Service Mode by pushing "ADJ" key.
- 2) Enter EDID D/L mode.
- 3) Enter "START" by pushing "OK" key.



→ Caution : Never connect RGB/HDMI cable when EDID downloaded.

#### \* Edid data and Model option download (RS232)

| NO                                  | Item               | CMD 1 | CMD 2 | Data 0 |  |
|-------------------------------------|--------------------|-------|-------|--------|--|
| Enter download MODE                 | Download 'Mode In' | A     | A     | 0 0    |  |
| EDID data and Model option download | Download           | A     | E     | 00 10  |  |

### 3.2.1. EDID Data Check Sum

| Input | Block(0) | Block(1) |
|-------|----------|----------|
| RGB   | BC       | -        |
| HDMI1 | 13       | 7E       |
| HDMI2 | 13       | 6E       |

#### - RGB

|      | 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 | 0x07 | 0x08 | 0x09 | 0x0A | 0x0B | 0x0C | 0x0D | 0x0E | 0x0F |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0x00 | 00   | FF   | FF   | FF   | FF   | FF   | FF   | 00   | 1E   | 6D   | C4   | 59   | 01   | 01   | 01   | 01   |
| 0x01 | 01   | 19   | 01   | 03   | 68   | 33   | 1D   | 78   | EA   | 62   | 75   | A3   | 55   | 4F   | A0   | 27   |
| 0x02 | 12   | 50   | 54   | A5   | 6B   | 80   | 71   | 4F   | 81   | C0   | 81   | 00   | 81   | 80   | 95   | 00   |
| 0x03 | 90   | 40   | A9   | C0   | B3   | 00   | 02   | 3A   | 80   | 18   | 71   | 38   | 2D   | 40   | 58   | 2C   |
| 0x04 | 45   | 00   | FD   | 1E   | 11   | 00   | 00   | 1A   | 00   | 00   | 00   | FD   | 00   | 38   | 4B   | 1E   |
| 0x05 | 53   | 0F   | 00   | 0A   | 20   | 20   | 20   | 20   | 20   | 20   | 00   | 00   | 00   | FC   | 00   | 32   |
| 0x06 | 44   | 20   | 46   | 48   | 44   | 20   | 4C   | 47   | 20   | 54   | 56   | 0A   | 00   | 00   | 00   | FF   |
| 0x07 | 00   | 0A   | 20   | 20   | 20   | 20   | 20   | 20   | 20   | 20   | 20   | 20   | 20   | 20   | 00   | BC   |

#### - HDMI1

|      | 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 | 0x07 | 0x08 | 0x09 | 0x0A | 0x0B | 0x0C | 0x0D | 0x0E | 0x0F |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0x00 | 00   | FF   | FF   | FF   | FF   | FF   | FF   | 00   | 1E   | 6D   | C6   | 59   | 01   | 01   | 01   | 01   |
| 0x01 | 01   | 19   | 01   | 03   | 80   | 33   | 1D   | 78   | EA   | 62   | 75   | A3   | 55   | 4F   | A0   | 27   |
| 0x02 | 12   | 50   | 54   | A5   | 6F   | 00   | 71   | 4F   | 81   | C0   | 81   | 00   | 81   | 80   | 95   | 00   |
| 0x03 | 90   | 40   | A9   | C0   | B3   | 00   | 02   | 3A   | 80   | 18   | 71   | 38   | 2D   | 40   | 58   | 2C   |
| 0x04 | 45   | 00   | FD   | 1E   | 11   | 00   | 00   | 1A   | 21   | 39   | 90   | 30   | 62   | 1A   | 27   | 40   |
| 0x05 | 68   | B0   | 36   | 00   | FD   | 1E   | 11   | 00   | 00   | 1C   | 00   | 00   | 00   | 00   | FD   | 00   |
| 0x06 | 4B   | 1E   | 53   | 0F   | 00   | 0A   | 20   | 20   | 20   | 20   | 20   | 20   | 00   | 00   | 00   | FC   |
| 0x07 | 00   | 32   | 44   | 20   | 46   | 48   | 44   | 20   | 4C   | 47   | 20   | 54   | 56   | 0A   | 01   | 13   |
| 0x08 | 02   | 03   | 21   | F1   | 4E   | 04   | 05   | 03   | 02   | 20   | 22   | 10   | 11   | 13   | 12   | 14   |
| 0x09 | 9F   | 07   | 16   | 26   | 15   | 07   | 50   | 09   | 57   | 07   | 66   | 03   | 0C   | 00   | 10   | 00   |
| 0x0A | 80   | 01   | 1D   | 00   | 72   | 51   | D0   | 1E   | 20   | 38   | 88   | 15   | 00   | 56   | 50   | 21   |
| 0x0B | 00   | 00   | 1E   | 01   | 1D   | 80   | 18   | 71   | 1C   | 16   | 20   | 58   | 2C   | 25   | 00   | 56   |
| 0x0C | 50   | 21   | 00   | 00   | 9E   | 01   | 1D   | 80   | D0   | 72   | 1C   | 16   | 20   | 10   | 2C   | 25   |
| 0x0D | 80   | C4   | 8E   | 21   | 00   | 00   | 9E   | 02   | 3A   | 80   | D0   | 72   | 38   | 2D   | 40   | 10   |
| 0x0E | 2C   | 45   | 20   | 06   | 44   | 21   | 00   | 00   | 1E   | 02   | 3A   | 80   | 18   | 71   | 38   | 2D   |
| 0x0F | 40   | 58   | 2C   | 45   | 00   | 56   | 50   | 21   | 00   | 00   | 1E   | 00   | 00   | 00   | 00   | 7E   |

#### - HDMI2

|      | 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 | 0x07 | 0x08 | 0x09 | 0x0A | 0x0B | 0x0C | 0x0D | 0x0E | 0x0F |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0x00 | 00   | FF   | FF   | FF   | FF   | FF   | FF   | 00   | 1E   | 6D   | C6   | 59   | 01   | 01   | 01   | 01   |
| 0x01 | 01   | 19   | 01   | 03   | 80   | 33   | 1D   | 78   | EA   | 62   | 75   | A3   | 55   | 4F   | A0   | 27   |
| 0x02 | 12   | 50   | 54   | A5   | 6F   | 00   | 71   | 4F   | 81   | C0   | 81   | 00   | 81   | 80   | 95   | 00   |
| 0x03 | 90   | 40   | A9   | C0   | B3   | 00   | 02   | 3A   | 80   | 18   | 71   | 38   | 2D   | 40   | 58   | 2C   |
| 0x04 | 45   | 00   | FD   | 1E   | 11   | 00   | 00   | 1A   | 21   | 39   | 90   | 30   | 62   | 1A   | 27   | 40   |
| 0x05 | 68   | B0   | 36   | 00   | FD   | 1E   | 11   | 00   | 00   | 1C   | 00   | 00   | 00   | 00   | FD   | 00   |
| 0x06 | 4B   | 1E   | 53   | 0F   | 00   | 0A   | 20   | 20   | 20   | 20   | 20   | 20   | 00   | 00   | 00   | FC   |
| 0x07 | 00   | 32   | 44   | 20   | 46   | 48   | 44   | 20   | 4C   | 47   | 20   | 54   | 56   | 0A   | 01   | 13   |
| 0x08 | 02   | 03   | 21   | F1   | 4E   | 04   | 05   | 03   | 02   | 20   | 22   | 10   | 11   | 13   | 12   | 14   |
| 0x09 | 9F   | 07   | 16   | 26   | 15   | 07   | 50   | 09   | 57   | 07   | 66   | 03   | 0C   | 00   | 10   | 00   |
| 0x0A | 80   | 01   | 1D   | 00   | 72   | 51   | D0   | 1E   | 20   | 38   | 88   | 15   | 00   | 56   | 50   | 21   |
| 0x0B | 00   | 00   | 1E   | 01   | 1D   | 80   | 18   | 71   | 1C   | 16   | 20   | 58   | 2C   | 25   | 00   | 56   |
| 0x0C | 50   | 21   | 00   | 00   | 9E   | 01   | 1D   | 80   | D0   | 72   | 1C   | 16   | 20   | 10   | 2C   | 25   |
| 0x0D | 80   | C4   | 8E   | 21   | 00   | 00   | 9E   | 02   | 3A   | 80   | D0   | 72   | 38   | 2D   | 40   | 10   |
| 0x0E | 2C   | 45   | 20   | 06   | 44   | 21   | 00   | 00   | 1E   | 02   | 3A   | 80   | 18   | 71   | 38   | 2D   |
| 0x0F | 40   | 58   | 2C   | 45   | 00   | 56   | 50   | 21   | 00   | 00   | 1E   | 00   | 00   | 00   | 00   | 6E   |

### 3.3. Function Check

#### 3.3.1. Check display and sound

\*Check Input and Signal items. (cf. work instructions)

- 1) TV(DTV, RF, Satellite(Satellite model))
- 2) AV (SCART/CVBS)
- 3) COMPONENT (480i)
- 4) HDMI1/2(PC : 1920 x 1080 @ 60Hz)
- 5) RGB(PC : 1920 x 1080 @ 60Hz)
- 6) PC Audio In
- 7) Headphone out
- 8) USB
- 9) LAN (2xMT55V model Only)

\* Display and Sound check is executed by Remote controller

\* Some models do not support RGB & PC audio in. It depends on model spec.

→ Caution : Not to push the INSTOP KEY after completion if the function inspection.

## 4. Total Assembly line process

### 4.1. White Balance adjustment

- 1) Color Analyzer: CA-210 (LED Module : CH 14)
- 2) Adj. Computer(During auto adj., RS-232C protocol is needed)
- 3) Service Remote Controller

\*RGB Gains are fixed data for each model.

Insert RS-232C Jack which is connected with PC for White Balance or equivalent device.

→ Total Assembly line should check whether the color coordinate(x,y) data refer to below table were meet or not. Color coordinate is differ from panel's characteristics of color temperature. Please check panel characteristics about color temperature.

-Warm Panel

|                   |        |          |    |                                    |                                                   |
|-------------------|--------|----------|----|------------------------------------|---------------------------------------------------|
| Color Temperature | Cool   | 9,300k   | °K | X=0.291 (±0.04)<br>Y=0.294 (±0.04) | <Test Signal><br>Inner pattern<br>(204gray,80IRE) |
|                   | Medium | 8,000k   | °K | X=0.300 (±0.04)<br>Y=0.310 (±0.04) |                                                   |
|                   | Warm   | 6,500k   | °K | X=0.318 (±0.04)<br>Y=0.334 (±0.04) |                                                   |
| Luminance (cd/m²) | Cool   | Min : 70 |    | Typ : 110                          | <Test Signal><br>Inner pattern<br>(204gray,80IRE) |
|                   | Medium | Min : 70 |    | Typ : 110                          |                                                   |
|                   | Warm   | Min : 70 |    | Typ : 110                          |                                                   |

#### ▪ White Balance Default value

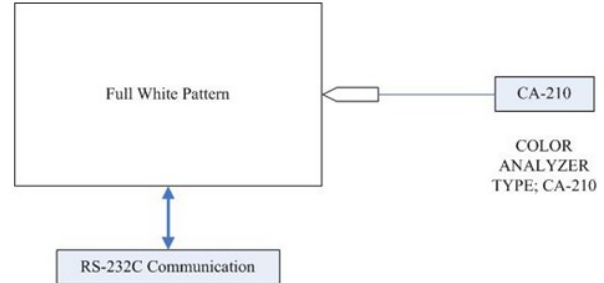
|      |        |              |        | Gain |     |     | Cut |    |    |
|------|--------|--------------|--------|------|-----|-----|-----|----|----|
|      |        |              |        | R    | G   | B   | R   | G  | B  |
| MT57 | 22MT57 | LGD (AH-IPS) | Cool   | 125  | 130 | 192 | 64  | 64 | 64 |
|      |        |              | Medium | 161  | 170 | 210 | 64  | 64 | 64 |
|      |        |              | Warm   | 185  | 185 | 192 | 64  | 64 | 64 |
|      | 24MT57 | LGD (AH-IPS) | Cool   | 120  | 110 | 192 | 64  | 64 | 64 |
|      |        |              | Medium | 170  | 172 | 220 | 64  | 64 | 64 |
|      |        |              | Warm   | 180  | 180 | 192 | 64  | 64 | 64 |
|      | 27MT57 | LGD (AH-IPS) | Cool   | 83   | 99  | 192 | 64  | 64 | 64 |
|      |        |              | Medium | 161  | 171 | 244 | 64  | 64 | 64 |
|      |        |              | Warm   | 187  | 174 | 192 | 64  | 64 | 64 |
|      | 27MT57 | HEESUNG      | Cool   | 110  | 119 | 192 | 64  | 64 | 64 |
|      |        |              | Medium | 159  | 172 | 221 | 64  | 64 | 64 |
|      |        |              | Warm   | 167  | 174 | 192 | 64  | 64 | 64 |
| MT77 | 23MT77 | LGD_B2D      | Cool   | 115  | 121 | 192 | 64  | 64 | 64 |
|      |        |              | Medium | 165  | 172 | 220 | 64  | 64 | 64 |
|      |        |              | Warm   | 183  | 180 | 192 | 64  | 64 | 64 |
|      | 24MT77 | LGD_B2D      | Cool   | 114  | 124 | 192 | 64  | 64 | 64 |
|      |        |              | Medium | 159  | 172 | 218 | 64  | 64 | 64 |
|      |        |              | Warm   | 184  | 184 | 192 | 64  | 64 | 64 |
|      | 27MT77 | LGD_B2D      | Cool   | 116  | 129 | 192 | 64  | 64 | 64 |
|      |        |              | Medium | 156  | 172 | 215 | 64  | 64 | 64 |
|      |        |              |        | 183  | 186 | 192 | 64  | 64 | 64 |

#### \* Connecting picture of the measuring instrument (On Automatic control)

Inside PATTERN is used when W/B is controlled. Connect to auto controller or push Adjustment R/C P-ONLY → Enter the mode of White-Balance, the pattern will come out.

### Auto-control interface and directions

- 1) Adjust in the place where the influx of light like floodlight around is blocked. (Illumination is less than 10ux).
- 2) Adhere closely the Color Analyzer ( CA210 ) to the module less than 10cm distance, keep it with the surface of the Module and Color Analyzer's Probe vertically.(90° +/- 2.5°).



#### 3) Aging time

- After aging start, keep the power on (no suspension of power supply) and heat-run over 5 minutes.
- Using 'no signal' or 'POWER ONLY' or the others, check the back light on.

\* Auto adjustment Map(using RS-232C to USB cable)

RS-232C COMMAND

[ CMD ID DATA ]

Wb 00 00 White Balance Start

Wb 00 ff White Balance End

|        | RS-232C<br>COMMAND<br>[CMD ID DATA] |     |      | M<br>I<br>N | CENTER<br>(DEFAULT) |     |      | M<br>A<br>X |
|--------|-------------------------------------|-----|------|-------------|---------------------|-----|------|-------------|
|        | Cool                                | Mid | Warm |             | Cool                | Mid | Warm |             |
| R Gain | jg                                  | Ja  | jd   | 00          | 172                 | 192 | 192  | 254         |
| G Gain | jh                                  | Jb  | je   | 00          | 172                 | 192 | 192  | 192         |
| B Gain | ji                                  | Jc  | jf   | 00          | 192                 | 192 | 172  | 254         |
| R Cut  |                                     |     |      |             | 64                  | 64  | 64   | 128         |
| G Cut  |                                     |     |      |             | 64                  | 64  | 64   | 128         |
| B Cut  |                                     |     |      |             | 64                  | 64  | 64   | 128         |

\*\* Caution \*\*

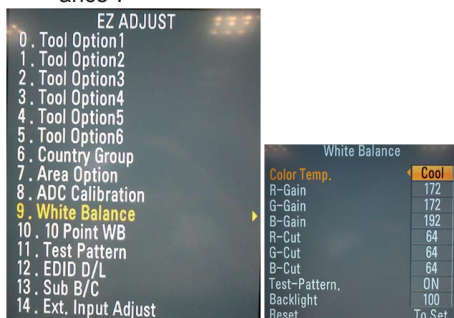
Color Temperature : Cool, Medium, Warm.

One of R Gain/G Gain/ B Gain should be kept on 0xC0, and adjust other two lower than C0. (when R/G/B Gain are all C0, it is the FULL Dynamic Range of Module)



### \* Manual W/B process using adjusts Remote control.

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



### \* CASE Medium Mode

First adjust the coordinate far away from the target value(x, y)B

- 1)  $x, y > \text{target}$
  - 2)  $x, y < \text{target}$
  - 3)  $x > \text{target}, y < \text{target}$
  - 4)  $x < \text{target}, y > \text{target}$
- Every 4 case have to fit y value by adjusting B Gain and then fit x value by adjusting R-Gain
  - In this case, increasing/decreasing of B Gain and R Gain can be adjusted.

How to adjust

- 1) If G gain more than 172, adjust R Gain and B Gain less than 192
- 2) If the G gain value be adjusted down to 172, one of the R/B Gain is 254
- 3) If G Gain is 172, more than one of R/B Gain is to be between 192~254.

### \* CASE Cool / Warm

First adjust the coordinate far away from the target value(x, y).

- 1)  $x, y > \text{target}$ 
  - a) Decrease the R, G.
- 2)  $x, y < \text{target}$ 
  - a) First decrease the B gain,
  - b) Decrease the one of the others.
- 3)  $x > \text{target}, y < \text{target}$ 
  - a) First decrease B, so make y a little more than the target.
  - b) Adjust x value by decreasing the R
- 4)  $x < \text{target}, y > \text{target}$ 
  - a) First decrease B, so make x a little more than the target.
  - b) Adjust x value by decreasing the G

\* After You finish all adjustments, Press "In-start" button and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable. If it is not same, then correct it same with BOM and unplug AC cable. For correct it to the model's module from factory JIG model.

\* Push The "IN STOP KEY" after completing the function inspection. And Mechanical Power Switch must be set "ON".

## 4.2. DPM test

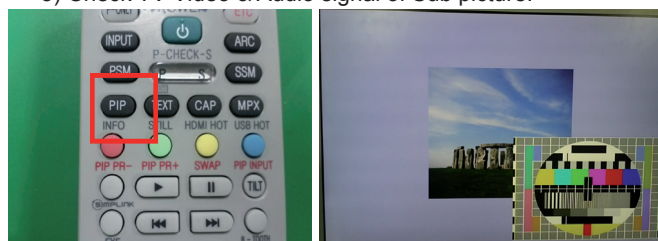
- Measurement Condition: 100 - 240V@ 50/60Hz

- 1) Set Input to RGB-PC and connect D-sub cable to set – RGB Mode. Set Input to HDMI (with Input Label set to PC) and connect HDMI cable to set – HDMI Mode
- 2) Cut off H sync or V sync of signal.
- 3) Check DPM operation refer to the below table.

| Operating Condition |                       | Sync (H/V) | Video | LED (SET) | Wattage (W) |
|---------------------|-----------------------|------------|-------|-----------|-------------|
| Power S/W On        | Sleep mode - RGB,HDMI | Off/Off    | Off   | Amber     | 1           |

## 4.3. PIP Check

- 1) Press "Power on" key of service remote control.
- 2) Input RGB & TV(ATV or DTV) signal.
- 3) Set Input mode to RGB.
- 4) Press 'PIP' key of ADJ remote controller
- 5) Check TV Video & Audio signal of Sub picture.



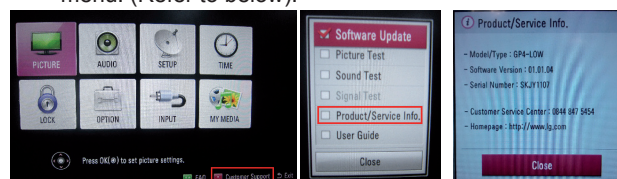
## 4.4. Outgoing condition Configuration

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

## 5. Model Name & Serial Number Download

### 5.1. Model name & Serial number

- Press "Power on" key of service remocon.(Baud rate : 115200 bps)
- Connect USB to RS232 Signal Cable to USB Jack.
- Write Serial number.
- Must check the serial number at the Diagnostics of SET UP menu. (Refer to below).



### 5.2. Signal TABLE

| CMD | LENGTH | ADH | ADL | DATA_1 | ... | Data_n | CS | DELAY |
|-----|--------|-----|-----|--------|-----|--------|----|-------|
|-----|--------|-----|-----|--------|-----|--------|----|-------|

CMD : A0h

LENGTH : 85~94h (1~16 bytes)

ADH : EEPROM Sub Address high (00~1F)

ADL : EEPROM Sub Address low (00~FF)

Data : Write data

CS: CMD + LENGTH + ADH + ADL + Data\_1 + ... + Data\_n

Delay : 20ms

### 5.3. Command Set

|             |                          |
|-------------|--------------------------|
| No.         | 1                        |
| Adjust mode | EEPROM WRITE             |
| CMD(hex)    | A0h                      |
| LENGTH(hex) | 84h+n                    |
| Description | n-bytes Write (n = 1~16) |

\* Description

FOS Default write : <7mode data> write  
Vtotal, V\_Frequency, Sync\_Polarity, Htotal, Hstart, Vstart, 0,  
Phase  
Data write : Model Name and Serial Number write in EE-  
PROM.

### 5.4. Method & notice

- 1) Serial number D/L is using of scan equipment.
- 2) Setting of scan equipment operated by Manufacturing Technology Group.
- 3) Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0

\* **Manual Download (Model Name and Serial Number)**

If the TV set is downloaded By OTA or Service man, Sometimes model name or serial number is initialized.( Not always)  
There is impossible to download by bar code scan, so It need Manual download.

- a. Press the 'In start' key of ADJ remote controller.
- b. Go to the menu '6.Model Number D/L' like below photo.
- c. Input the Factory model name(ex 32LV3400-ZG) or Serial number like photo.

## 6. MAC Address & CI+ Key Download

### 6.1. MAC Address

#### 6.1.1. Equipment & Condition

- Play file : Serial.exe
- MAC Address edit
- Input Start / End MAC address

#### 6.1.2. Download method

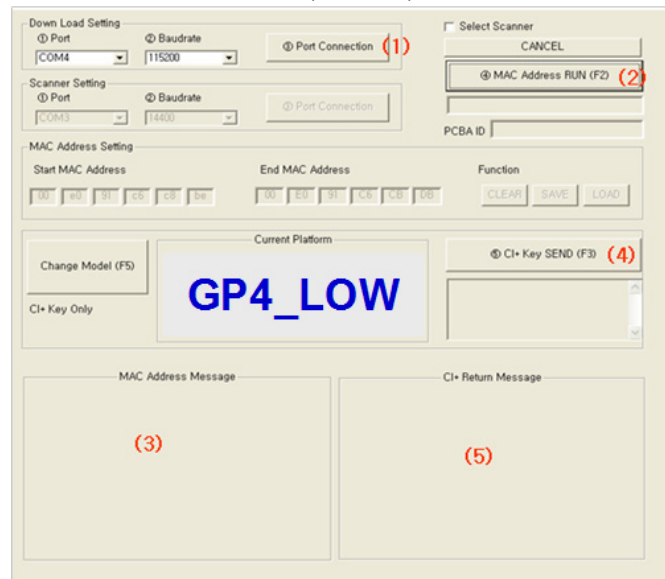
##### 6.1.2.1. Communication Prot connection

Connection : PCBA (USB Port) → USB to Serial Adapter (UC-232A) → RS-232C cable → PC(RS-232C port)



##### 6.1.2.2. MAC Address & CI+ Key Download

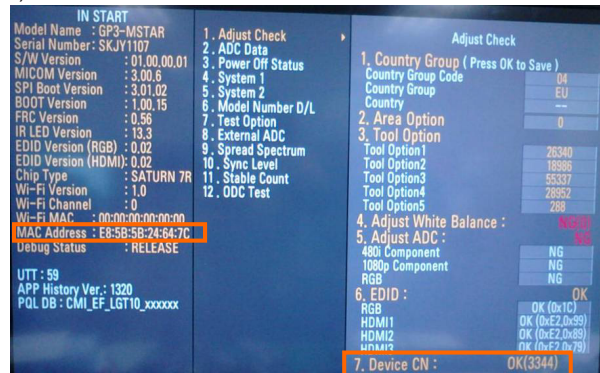
- Set CI+ Key path Directory at Start Mac & CI+ Download Programme
- Com 1,2,3,4 and 115200 (Baudrate)



- Port connection button click(1)
- Push the (2) MAC Address write.
- At success Download, check the OK (3)
- Start CI+ Key Download, Push the (4)
- Check the OK or NG

\* **Check the Download to CI+ Key value in LG set.**

- 1) Check the method of CI+ Key value
- a) check the method on Instart menu



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

| CMD 1 | CMD 2 | Data 0 |
|-------|-------|--------|
| A     | A     | 0 0    |

- b) check the method of CI+ key by command (RS232 : ci 00 10)

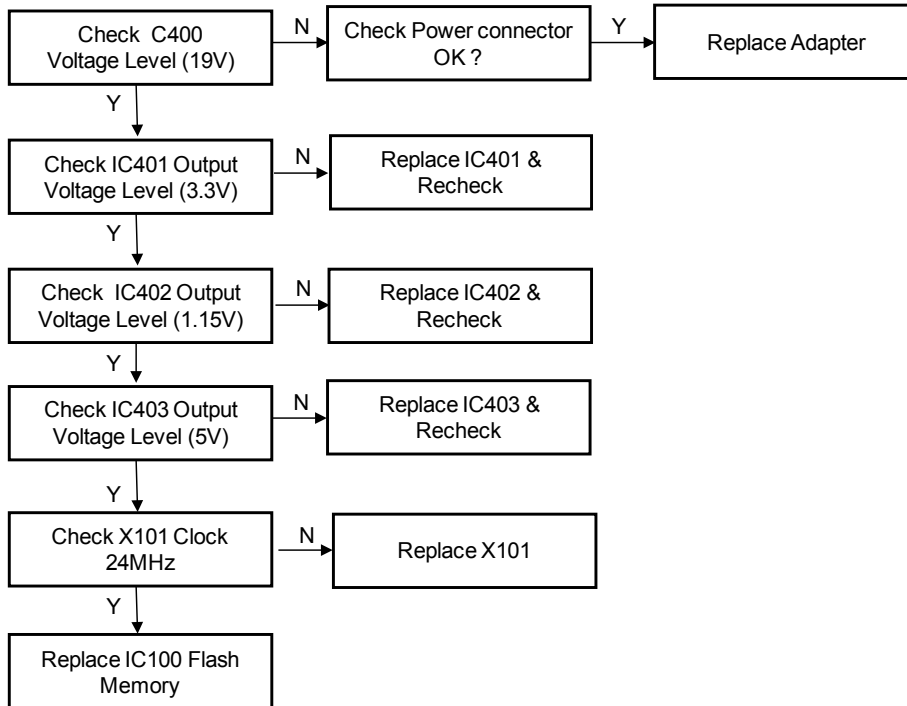
| CMD 1 | CMD 2 | Data 0 |
|-------|-------|--------|
| C     | I     | 1 0    |

c) result value

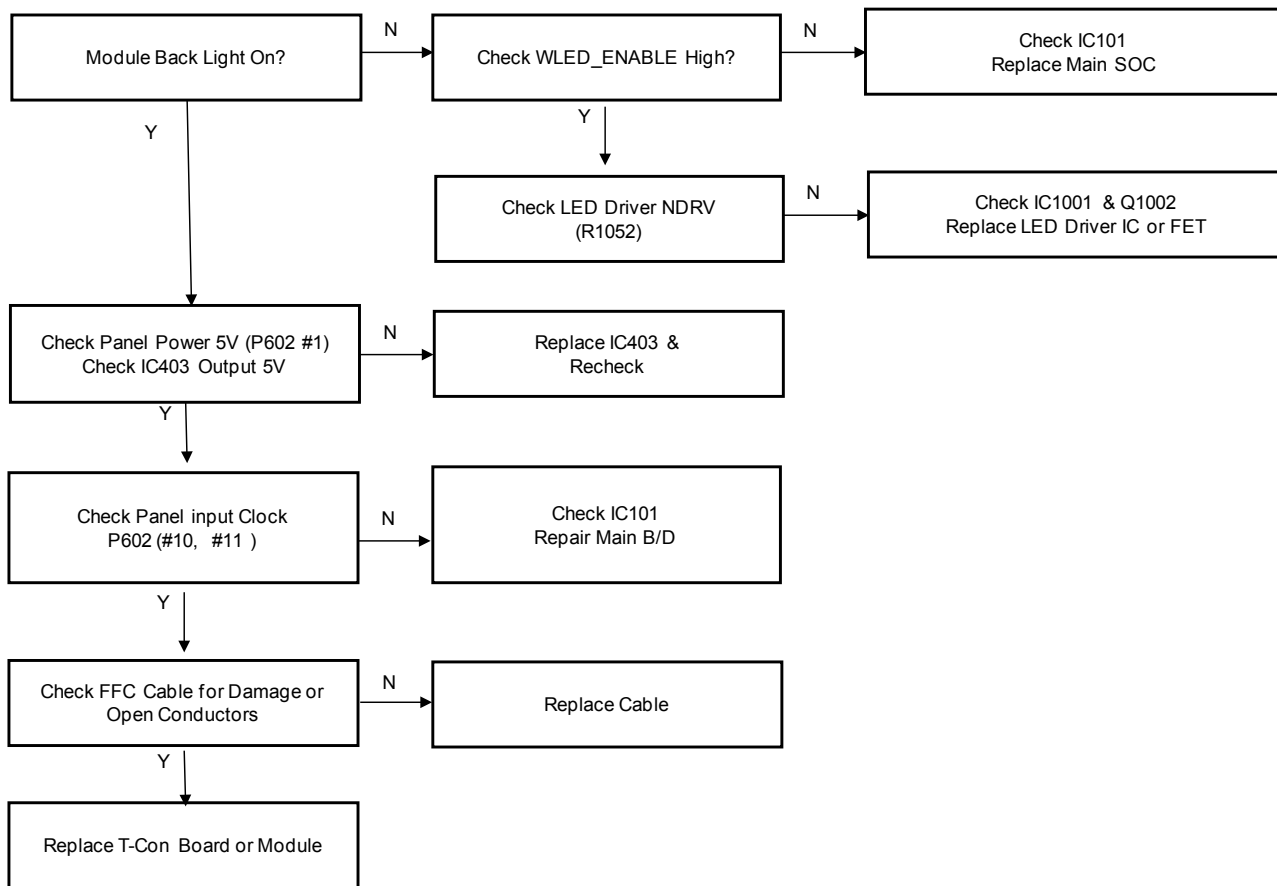
OKx : CI+ Key Download OK  
NGx : CI+ Key Download NG

# TROUBLE SHOOTING

## 1. No Power

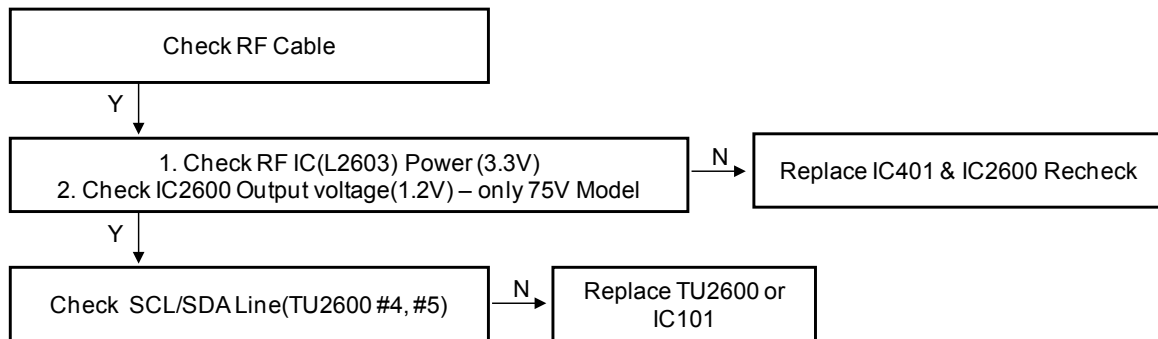


## 2. No Screen on

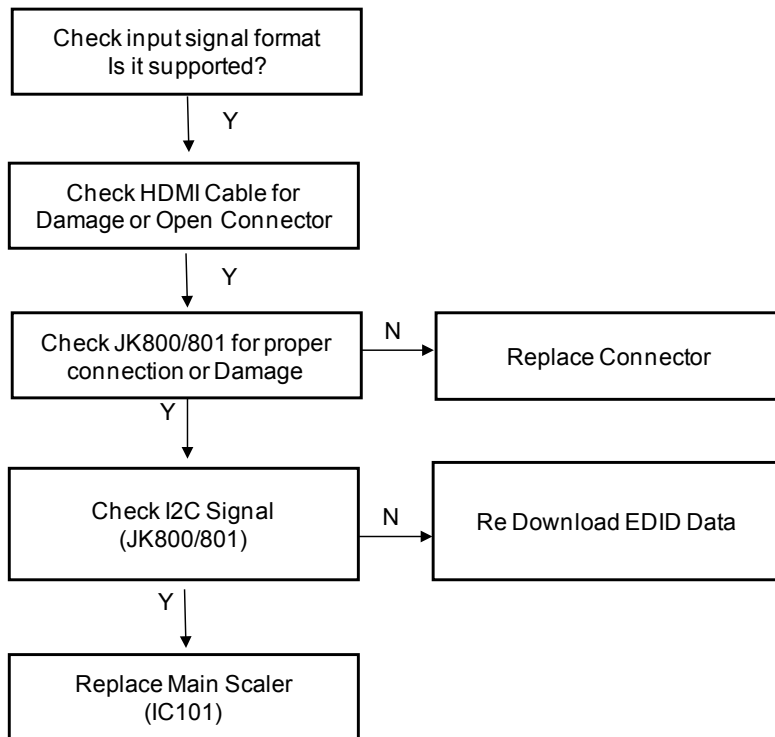




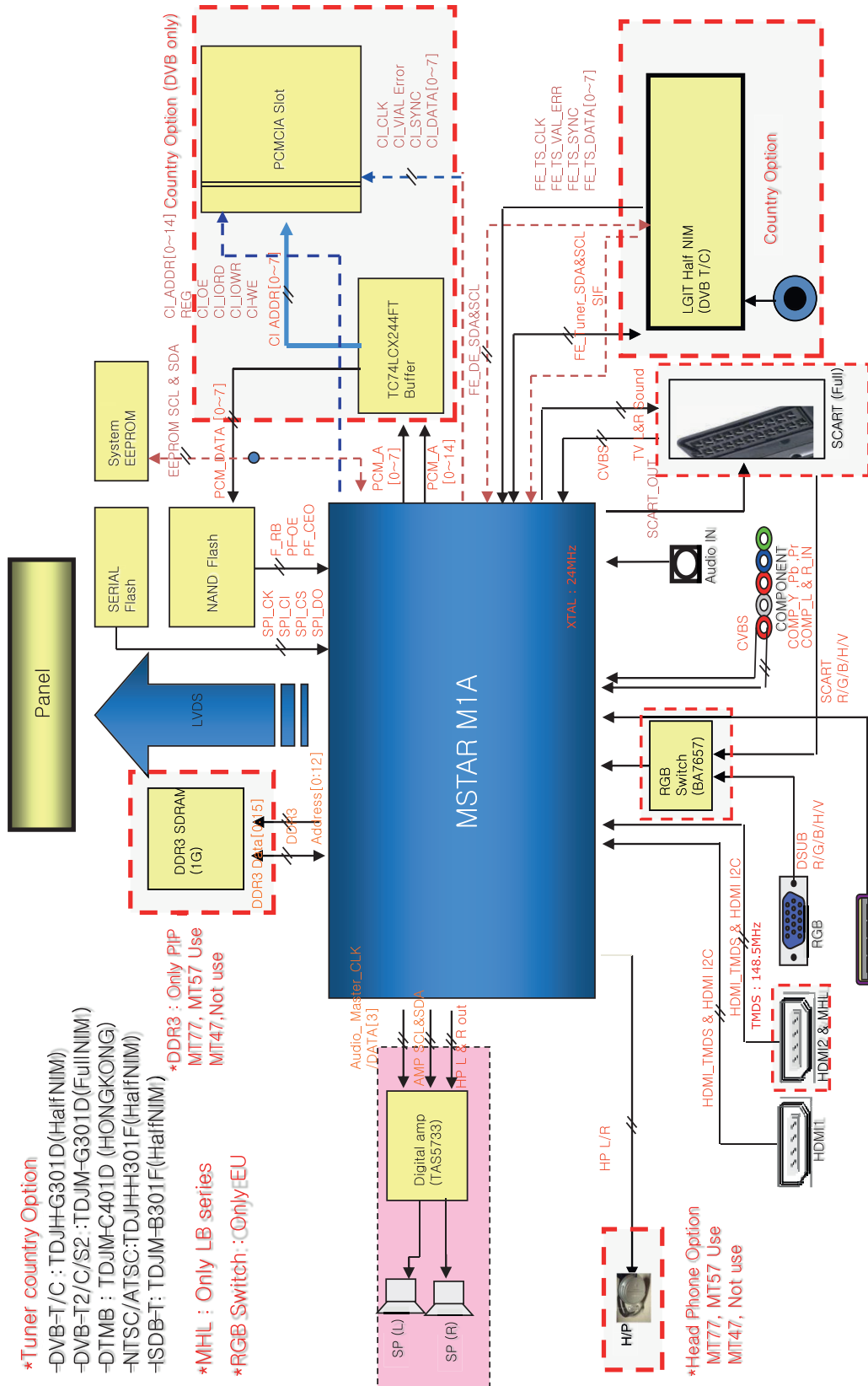
### 3. No Video - Digital TV



#### 4. No Video - HDMI



# BLOCK DIAGRAM



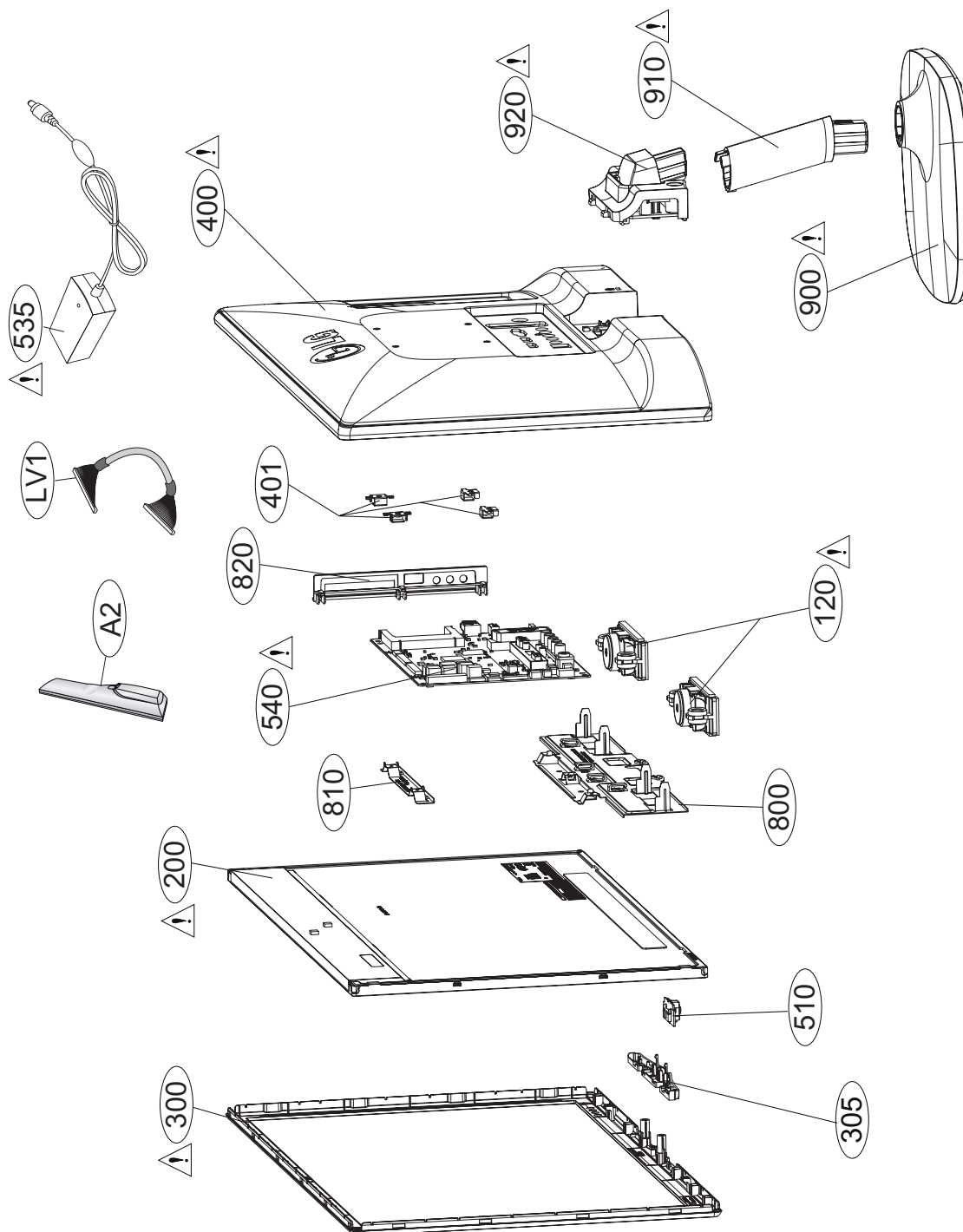
# EXPLODED VIEW

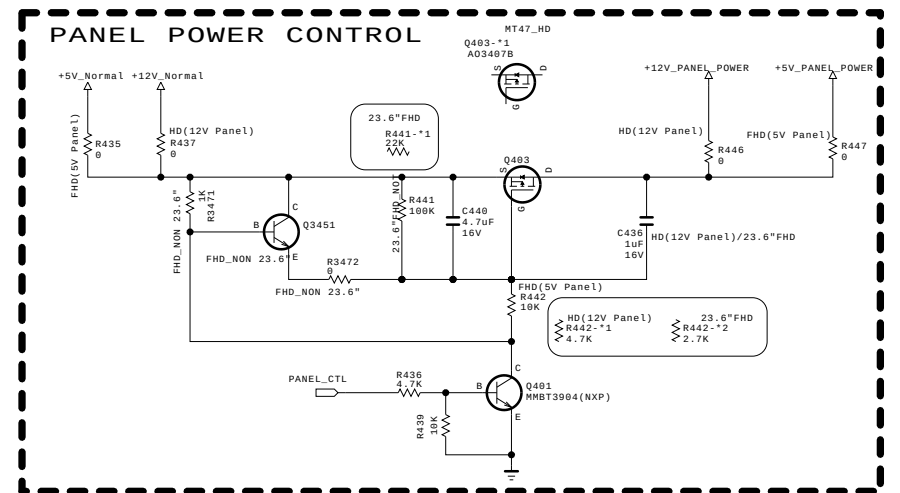
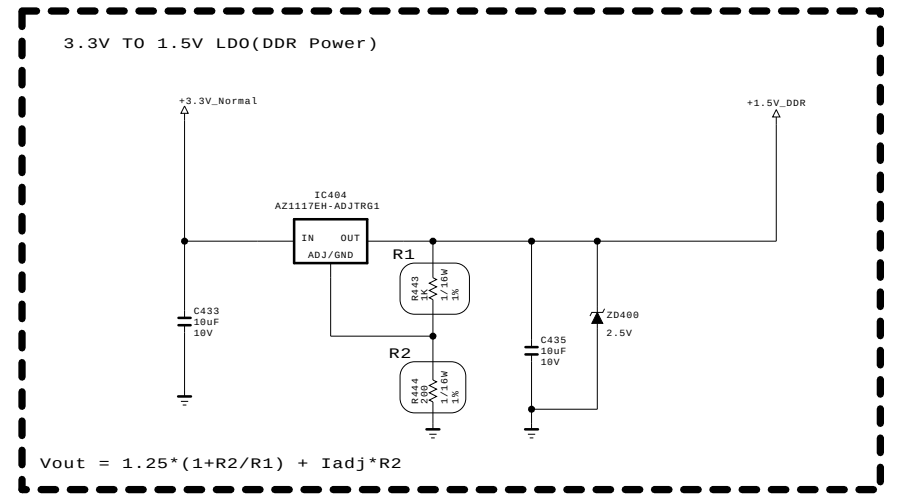
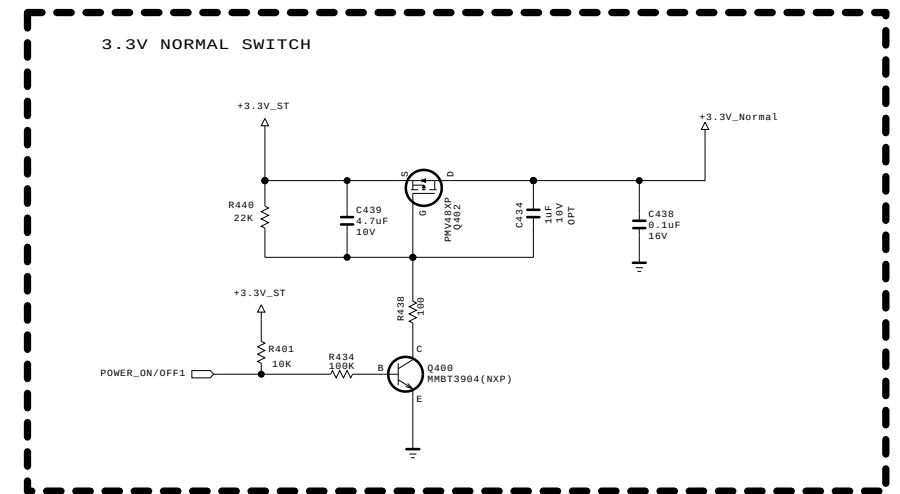
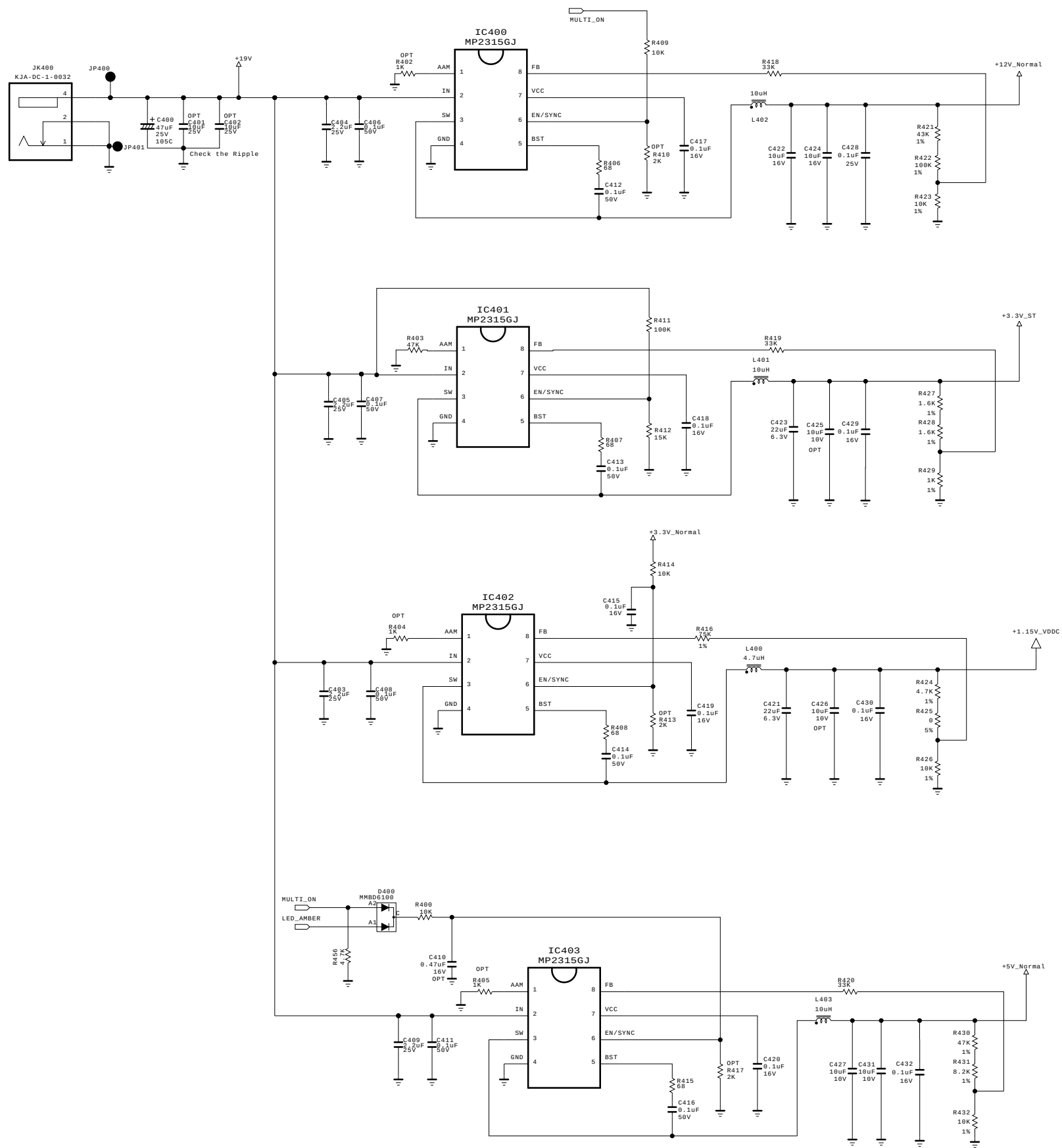
## IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent 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 IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

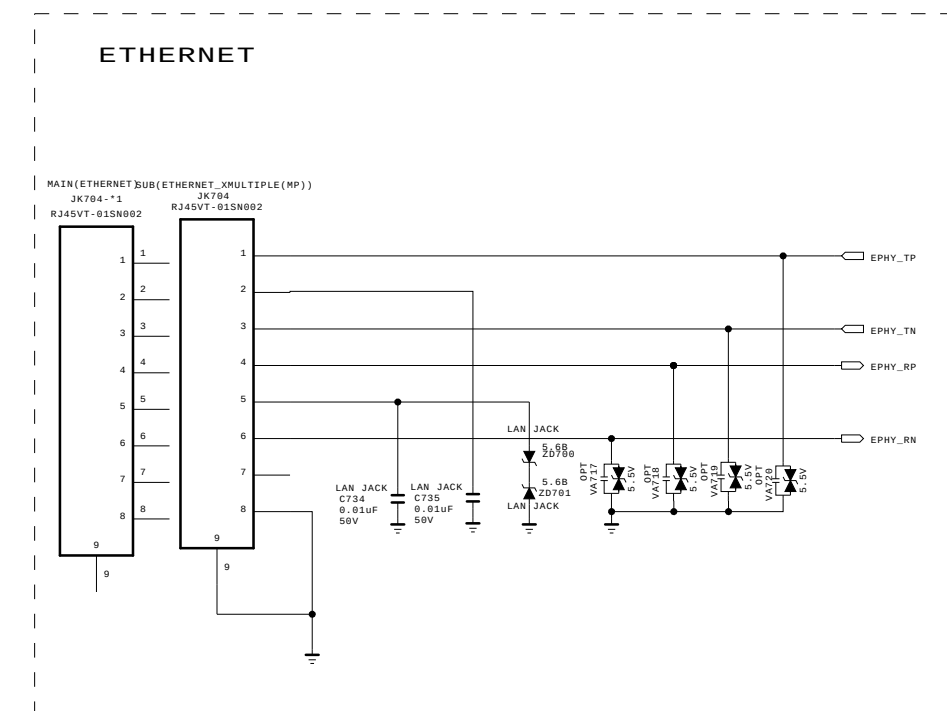
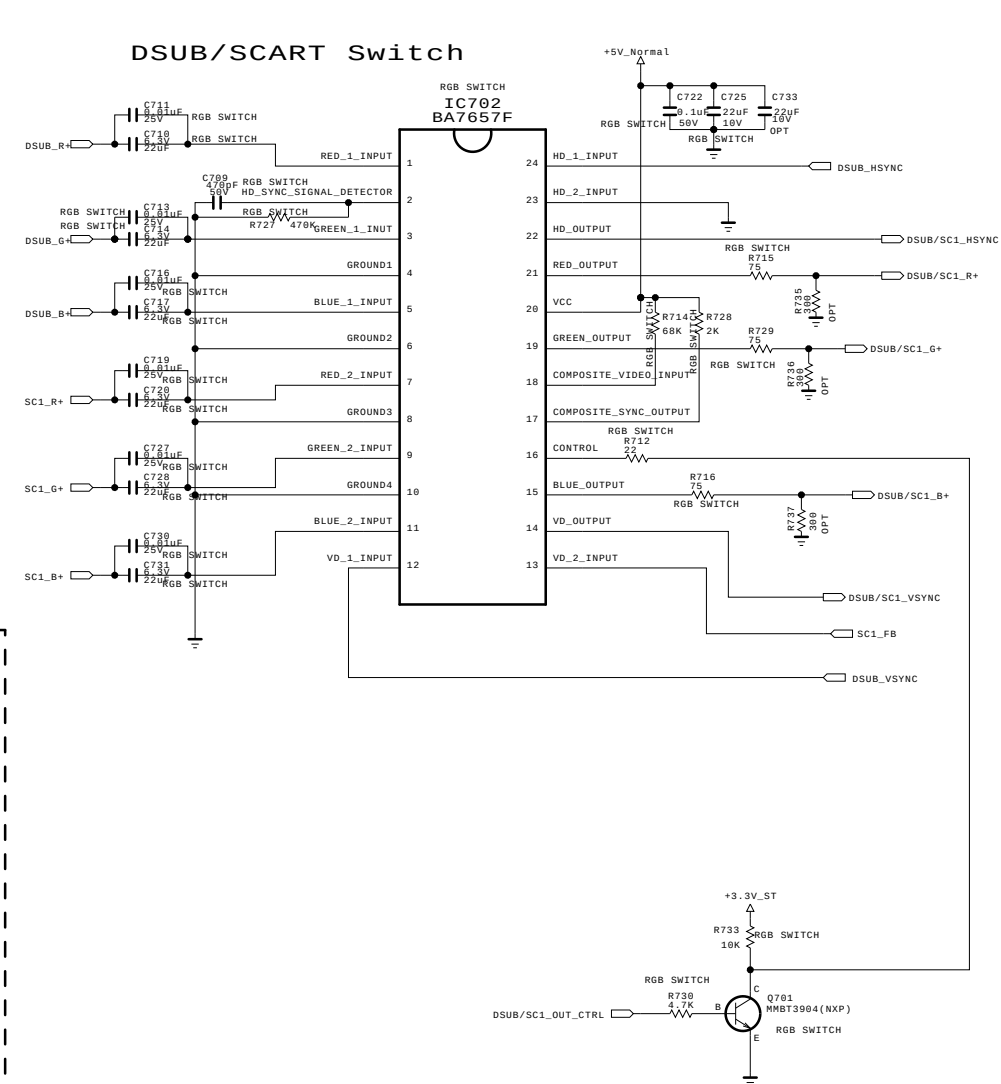
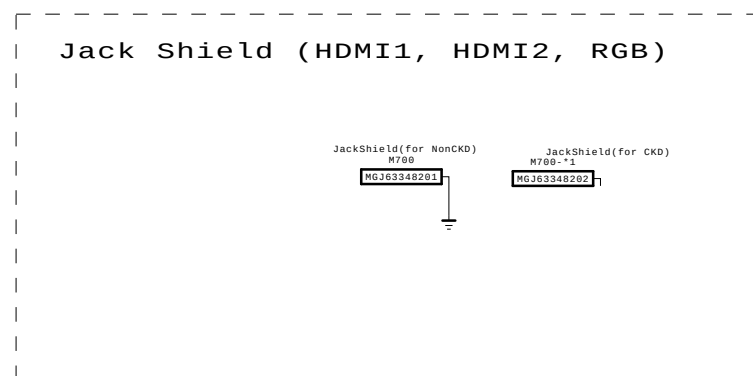
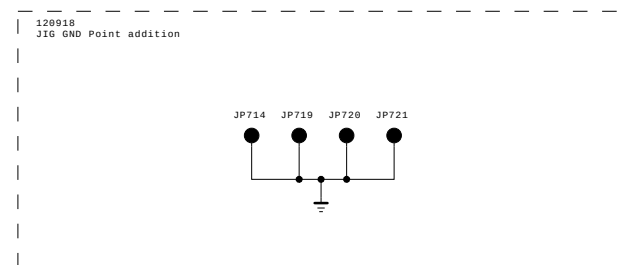
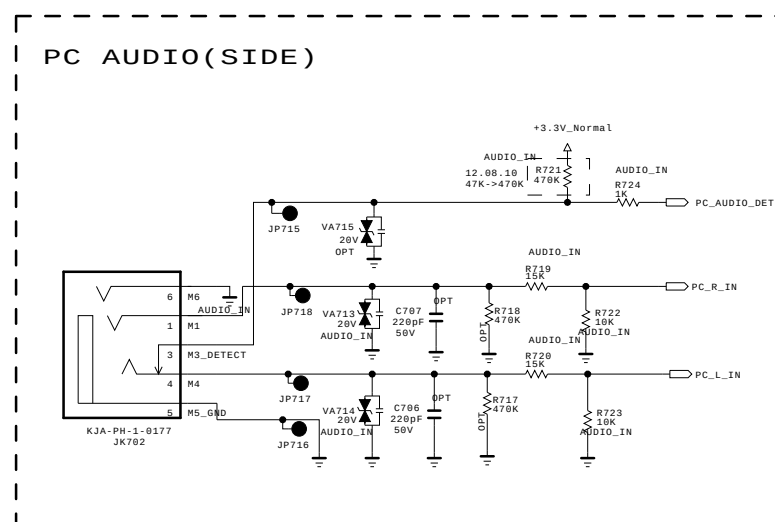
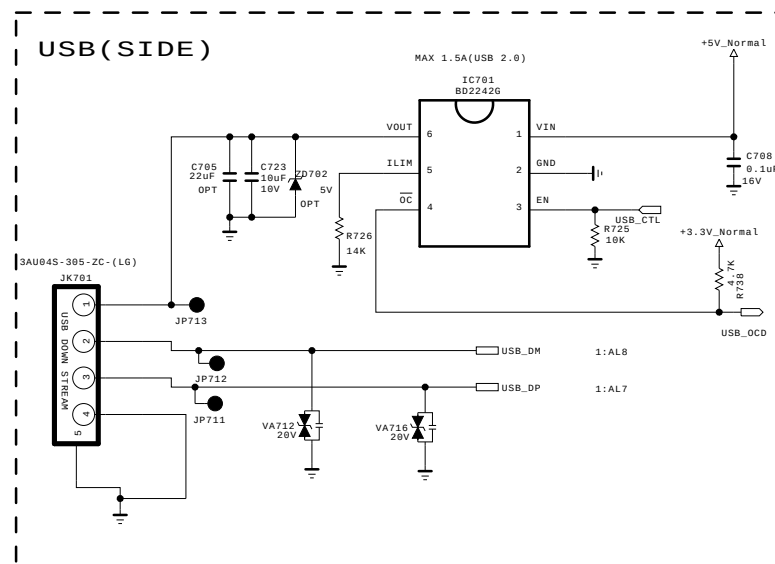
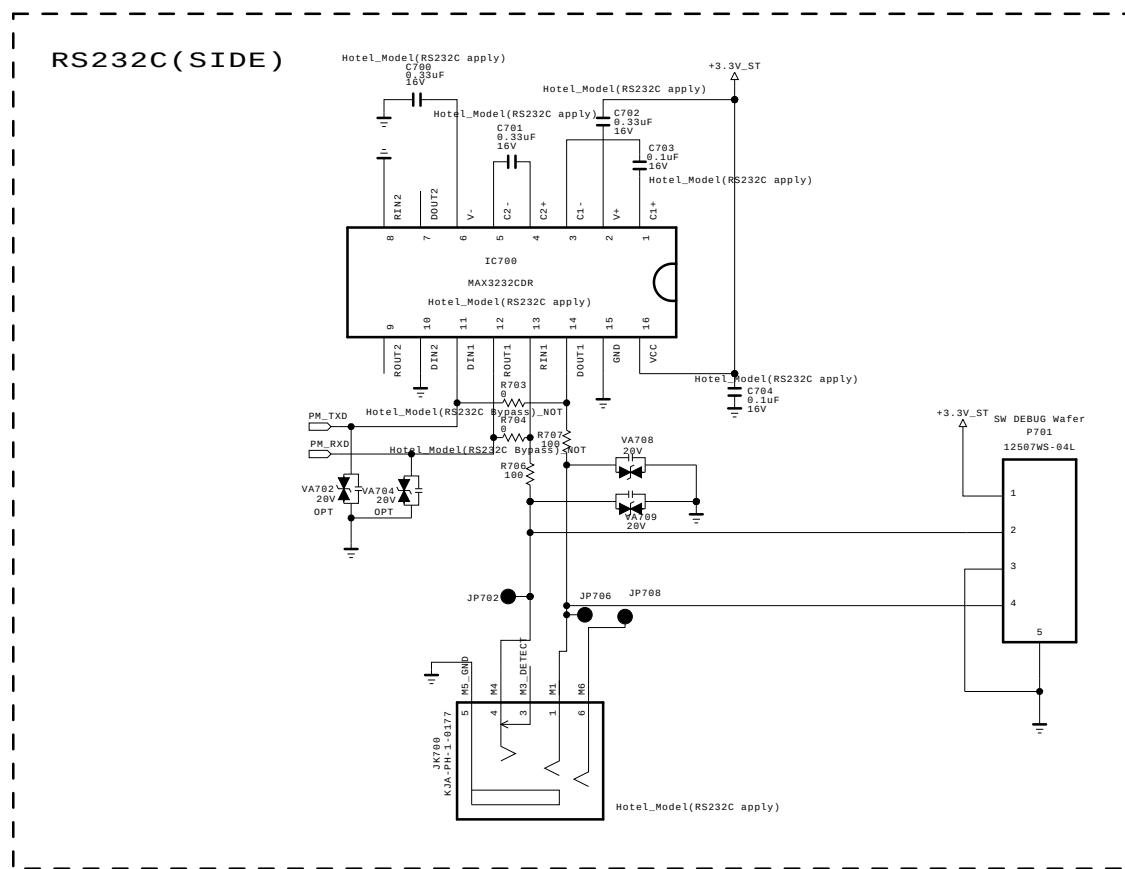
SECRET  
LGElectronics



|       |       |       |            |
|-------|-------|-------|------------|
| MODEL | MT57  | DATE  | 2014/08/14 |
| BLOCK | POWER | SHEET | 4 / 13     |







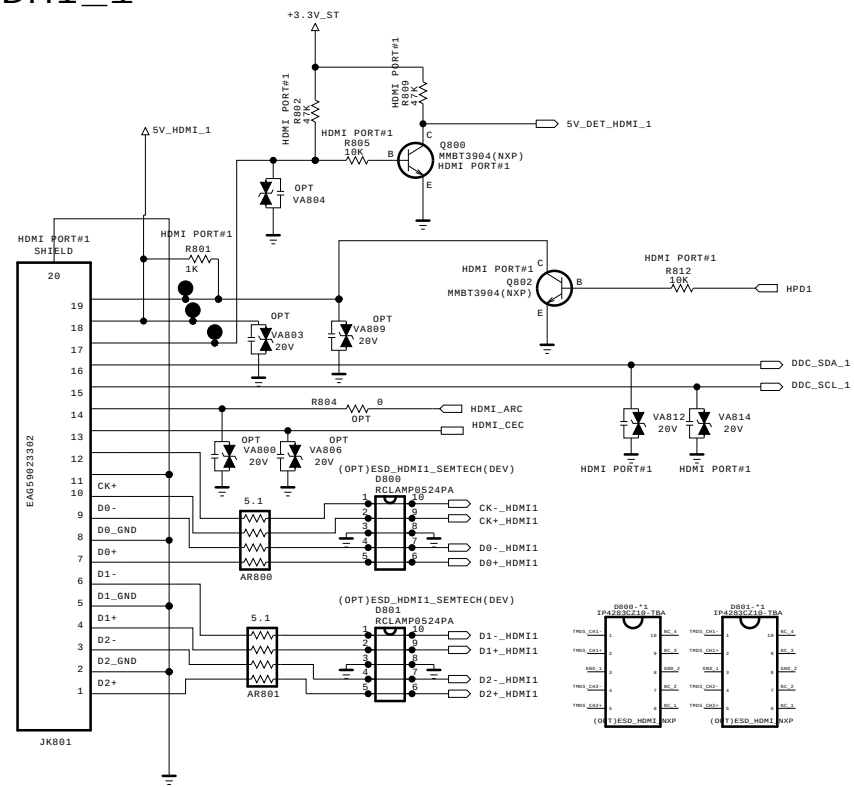
SECRET  
LGElectronics



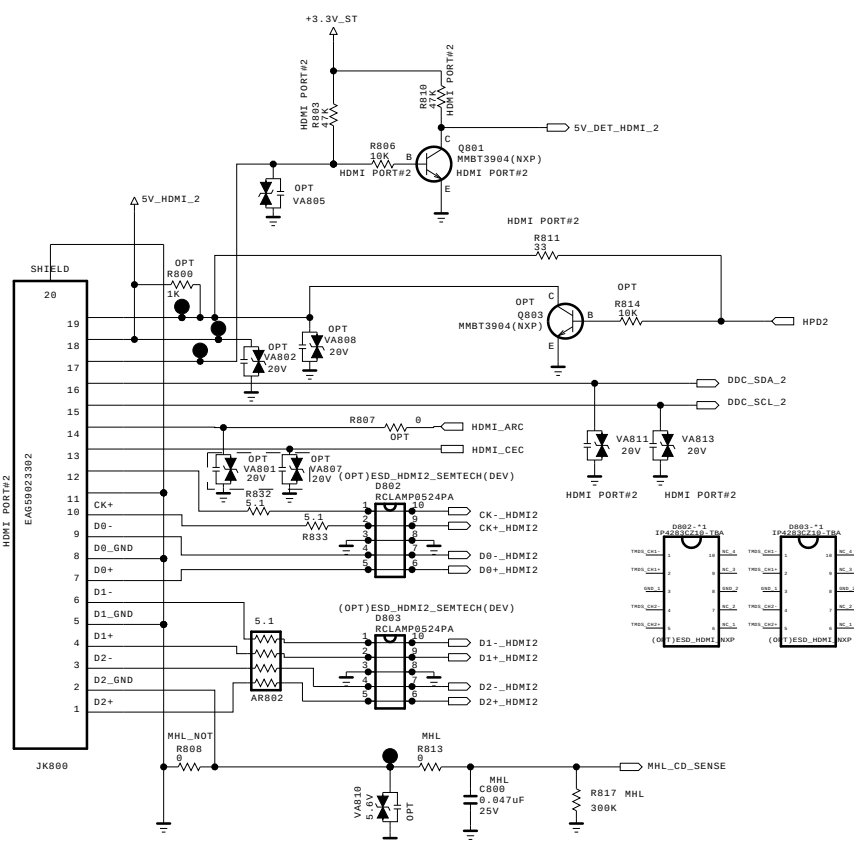
|       |           |       |            |
|-------|-----------|-------|------------|
| MODEL | MT57      | DATE  | 2014/08/14 |
| BLOCK | INTERFACE | SHEET | 7 /        |

# HDMI

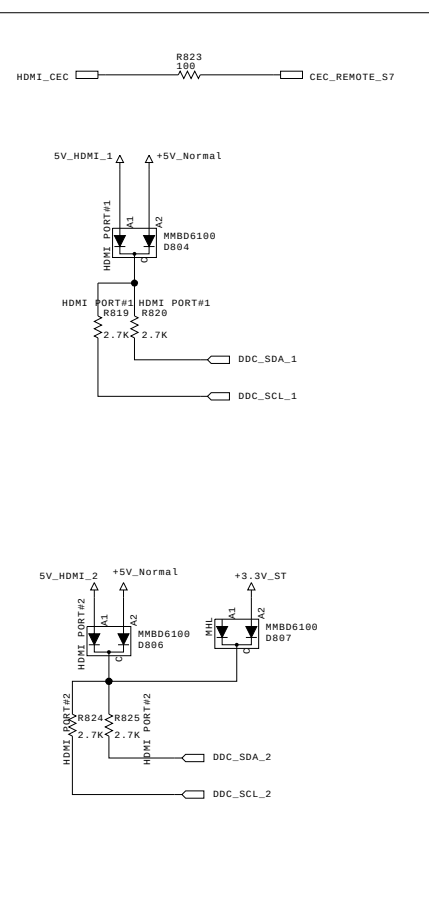
## HDMI\_1



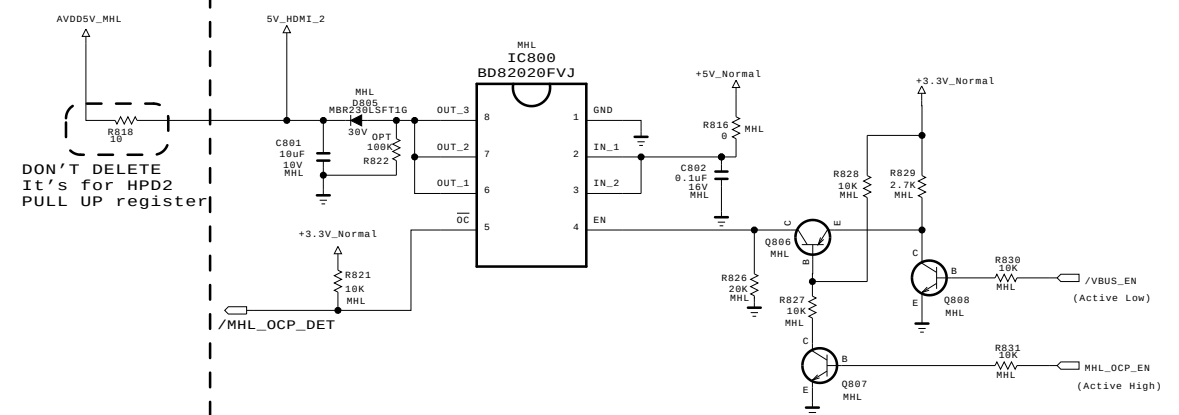
## HDMI\_2 With MHL



## CEC



MHL OCP



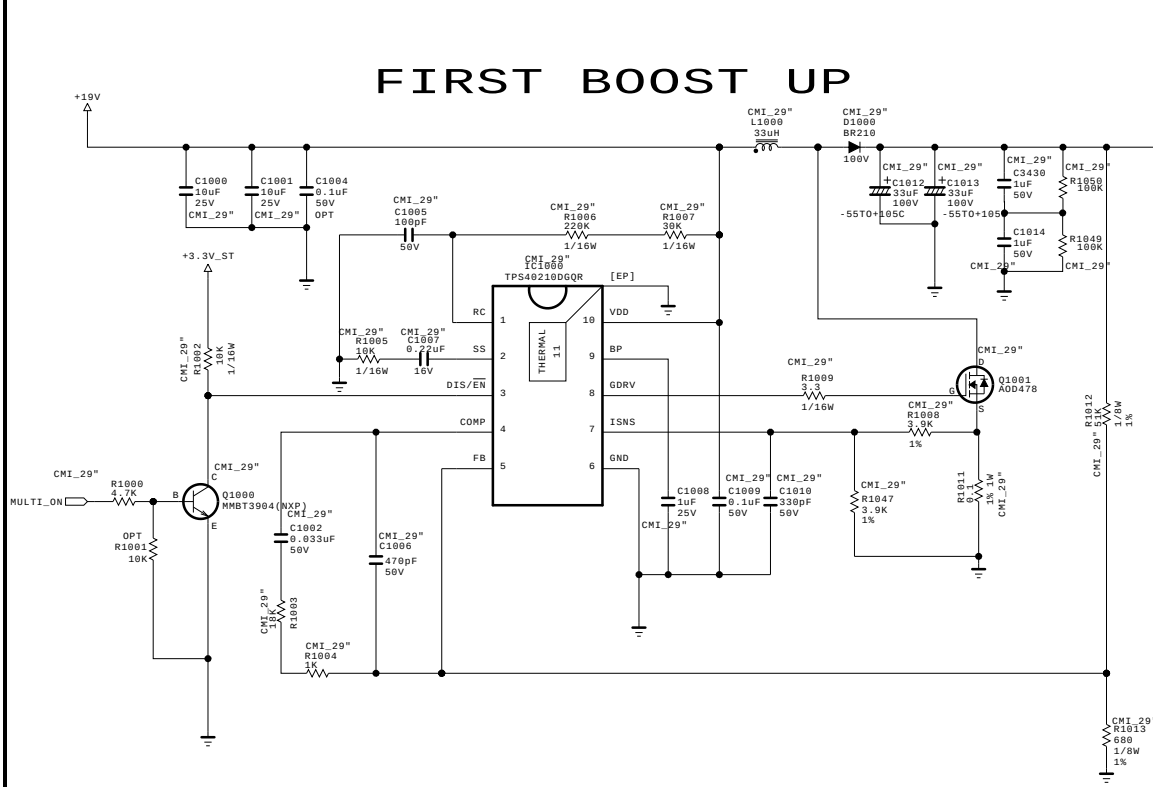
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

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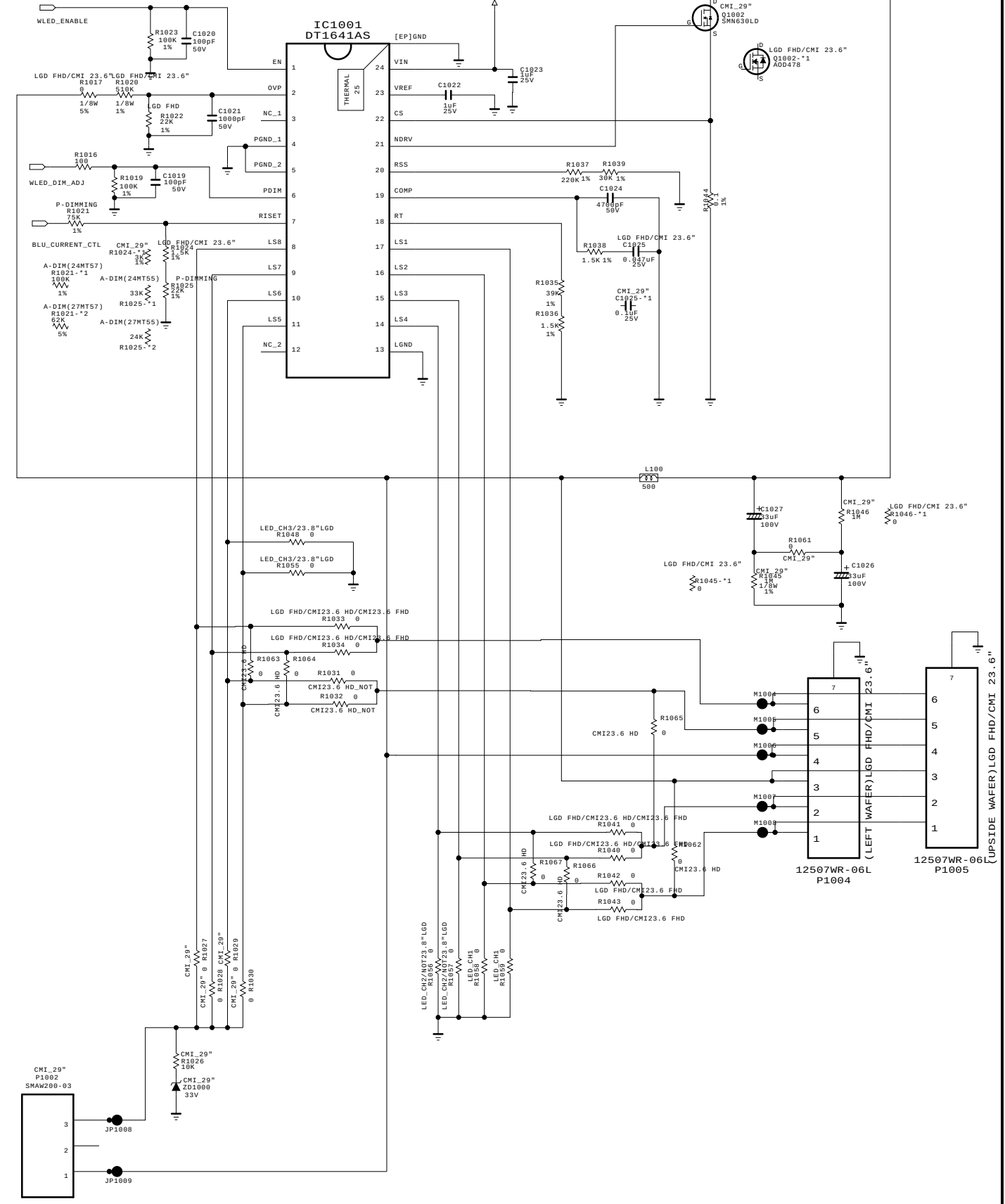
|       |      |       |            |
|-------|------|-------|------------|
| MODEL | MT57 | DATE  | 2014/08/14 |
| PORT  | HDMI | SHEET | 8 /        |

# FIRST BOOST UP



CMI\_29" CMI\_29"  
R1017-\*1 R1020-\*1  
120K 270K  
1/8W 1/8W  
1% 1%  
CMI\_29" CMI\_29"  
R1022-\*1 R1022-\*3  
5.6K 24K  
1% 1%  
CMI\_29"Panel OVP  
CMI23.6 HD CMI23.6 FHD  
R1022-\*2 R1022-\*3  
30K 24K  
1% 1%  
CMI\_23.6"Panel (24MT45D\_8CH)

# REDUCE INDUCTOR TEMP ISSUE

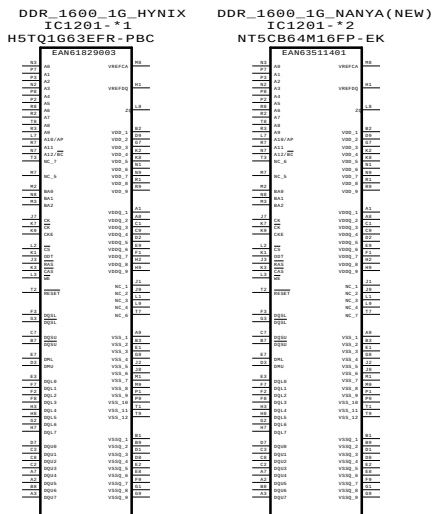
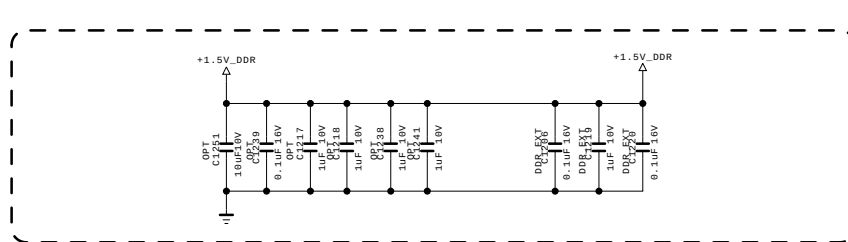


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|       |            |       |            |
|-------|------------|-------|------------|
| MODEL | MT57       | DATE  | 2014/05/23 |
| BLOCK | LED DRIVER | SHEET | 10         |



SECRET  
LGElectronics

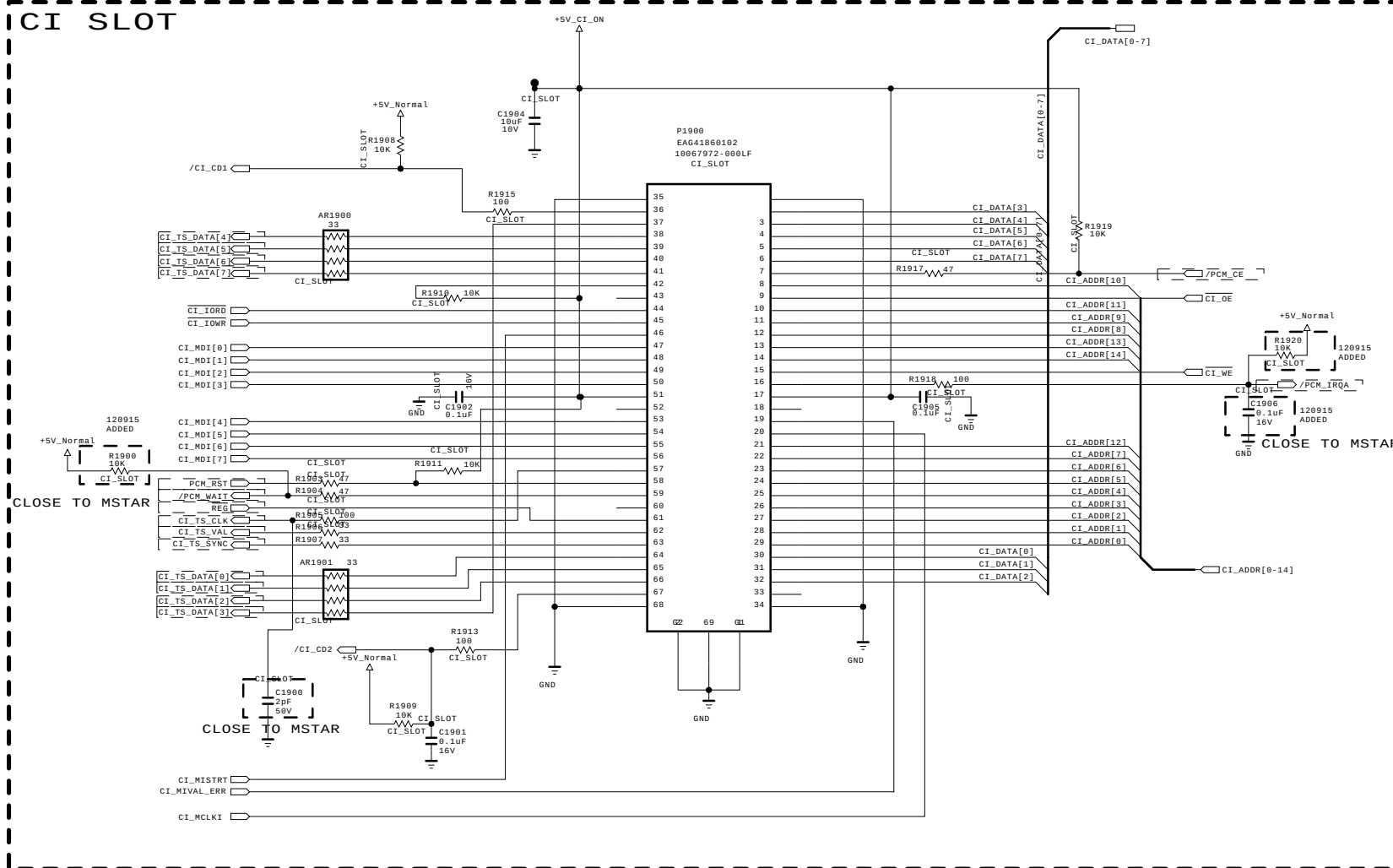


|       |               |       |            |
|-------|---------------|-------|------------|
| MODEL | MA55          | DATE  | 2013/05/23 |
| BLOCK | M1_DDR (2DDR) | SHEET | 12 /       |

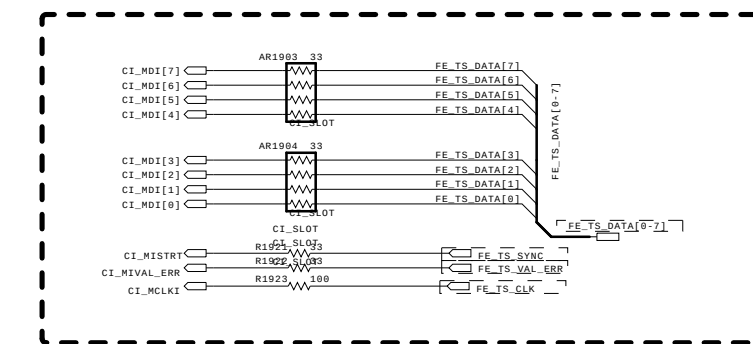
CI Region

```
* Option name of this page : CI_SLOT
(because of Hong Kong)
```

ICI SLOT



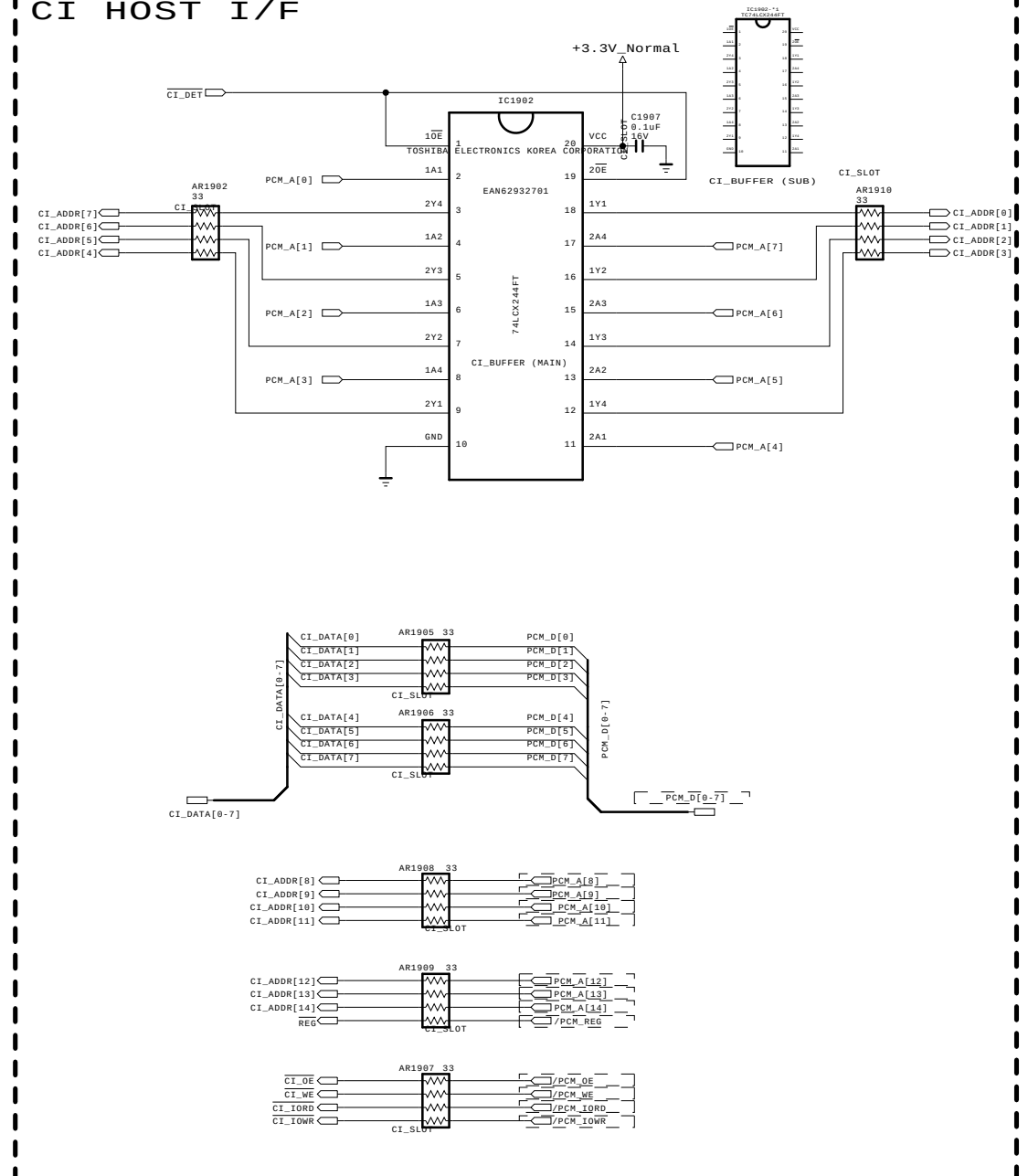
## CI TS INPUT



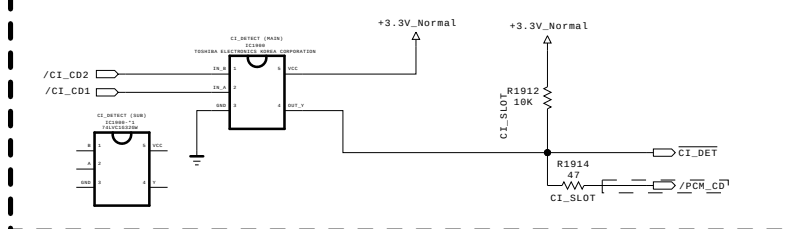
```

| CI  HOST  I/F
|

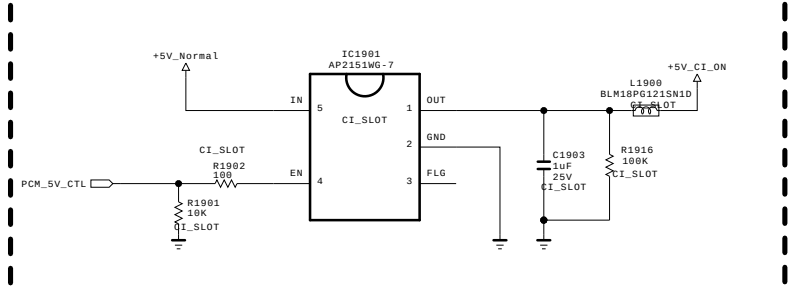
```



```
┌-----┐
| CI  DETECT
```



## | CI POWER ENABLE CONTROL



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|       |       |       |            |
|-------|-------|-------|------------|
| MODEL | MT57  | DATE  | 2014/07/24 |
| BOOK  | PCMCI | SHEET | 19 /       |

The schematic diagram illustrates the power supply section of the TDA1564Q. It features three input rails: +3.3V\_LNA, +3.3V\_TU, and +3.3V\_Normal. The LNA and TU rails are connected to a network of capacitors (C2619, C2620, C2622, C2623) and inductors (L2608, L2603) to filter noise. The Normal rail is connected to a capacitor (C2624). A DPT L2603 component is also shown in the circuit.

IC2600  
AP7361-Y-13

+3.3V<sub>TU</sub>

R2621  
3.3K

C2618  
10F  
10V

EN 1

2

3

GND

ADJ/WC

4

IN

5

OUT

R2623  
1K

R2624  
22K

R1

R2

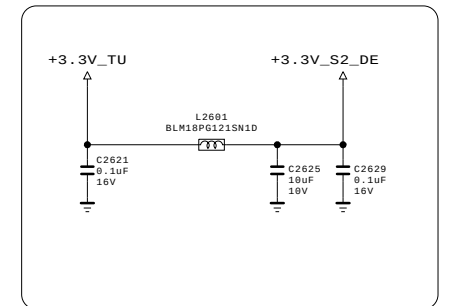
+1.2V<sub>DEMOD</sub>

C2627  
0.1uF  
10V

C2631  
10uF  
10V

R2631  
1K

$V_o = 0.8 * (1 + R_1/R_2)$



CHINA  
C2633  
100pF  
630V

TUNER LOUD A

CHINA\_LOUT7\_COLUMBIA\_NOT  
0 R2622  
0 R2625  
0 R2624  
0 R2627  
0 R2628  
0 R2638  
CHINA\_LOUT7\_COLUMBIA\_NOT

TUNER ISOLATOR CAP  
C2632  
1000pF  
630V

TUNER LOUD B

**ERROR & VALID PIN**

FE\_TS\_VAL  FE\_TS\_VAL\_ERR

R2629

GPIO must be added.

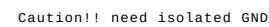


|       |               |       |            |
|-------|---------------|-------|------------|
| MODEL | MT57          | DATE  | 2014/08/14 |
| BLOCK | TUNER EU ERRC | SHEET | 26 /       |



(Option: LNB)

3A



SECRET

---

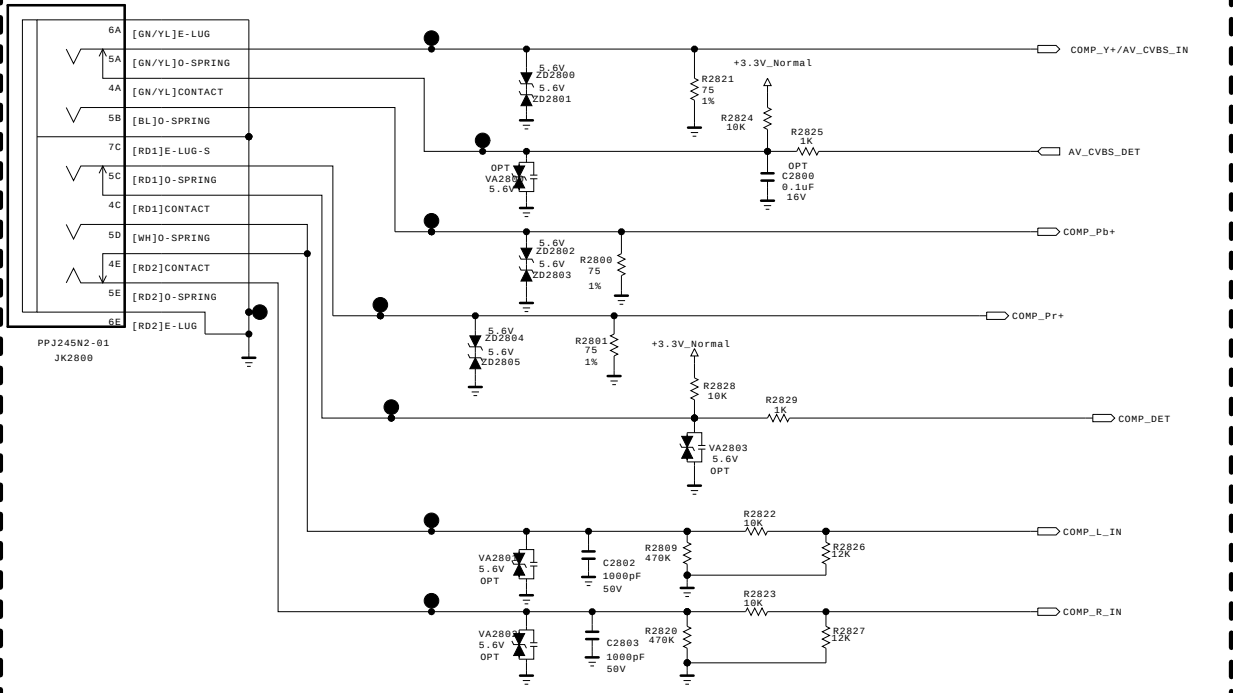
LG Electronics



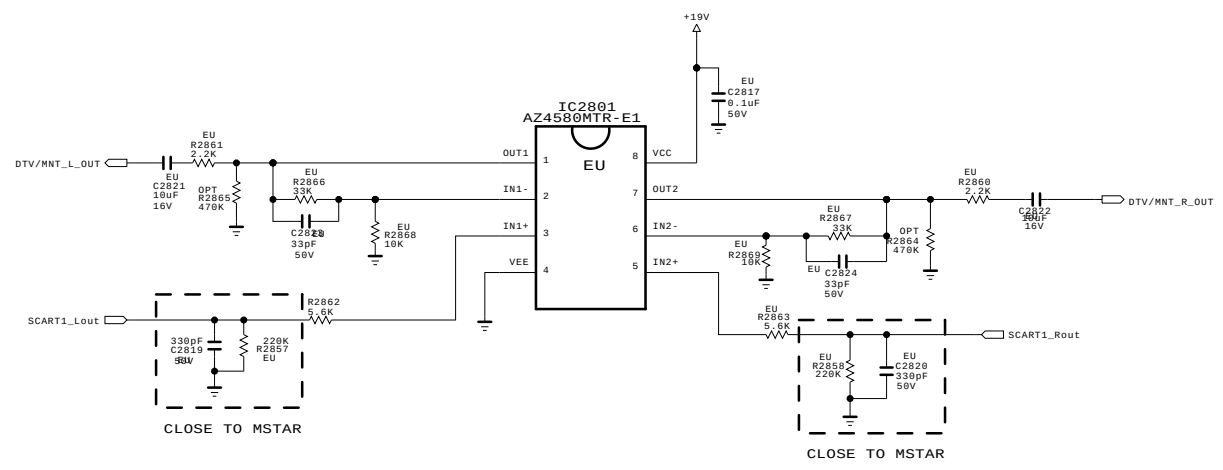


SCART / COMPONENT&COMPSIT

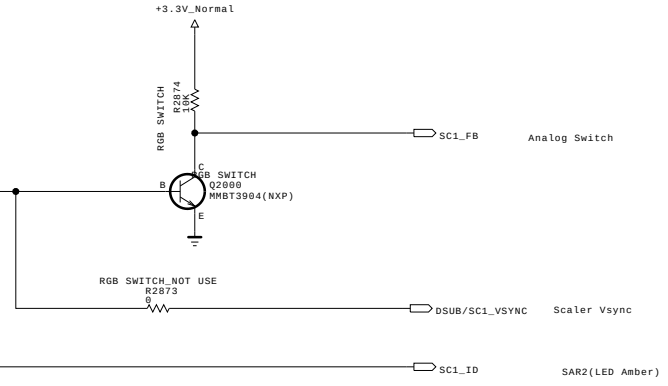
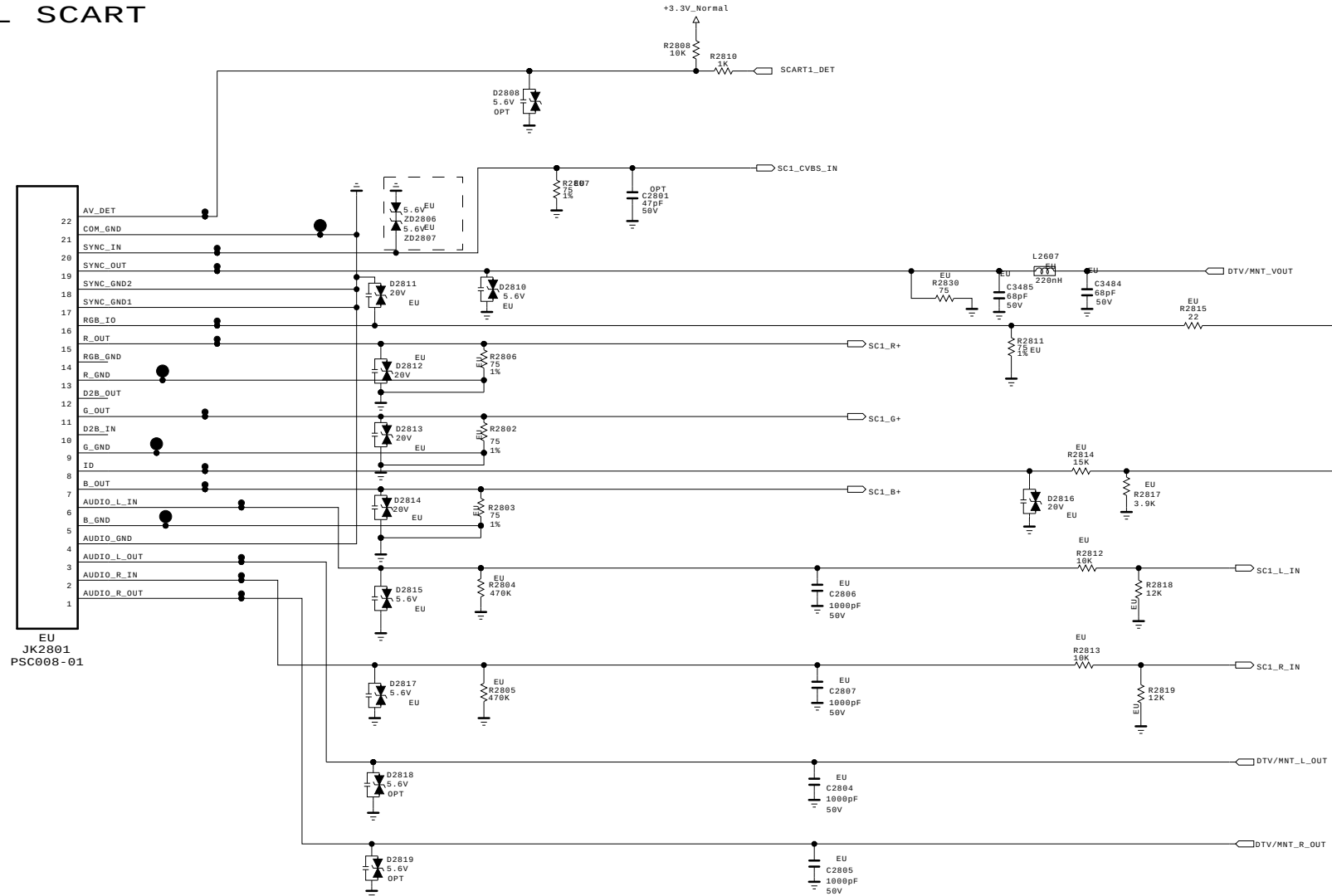
COMPONENT



SCART AMP



FULL SCART



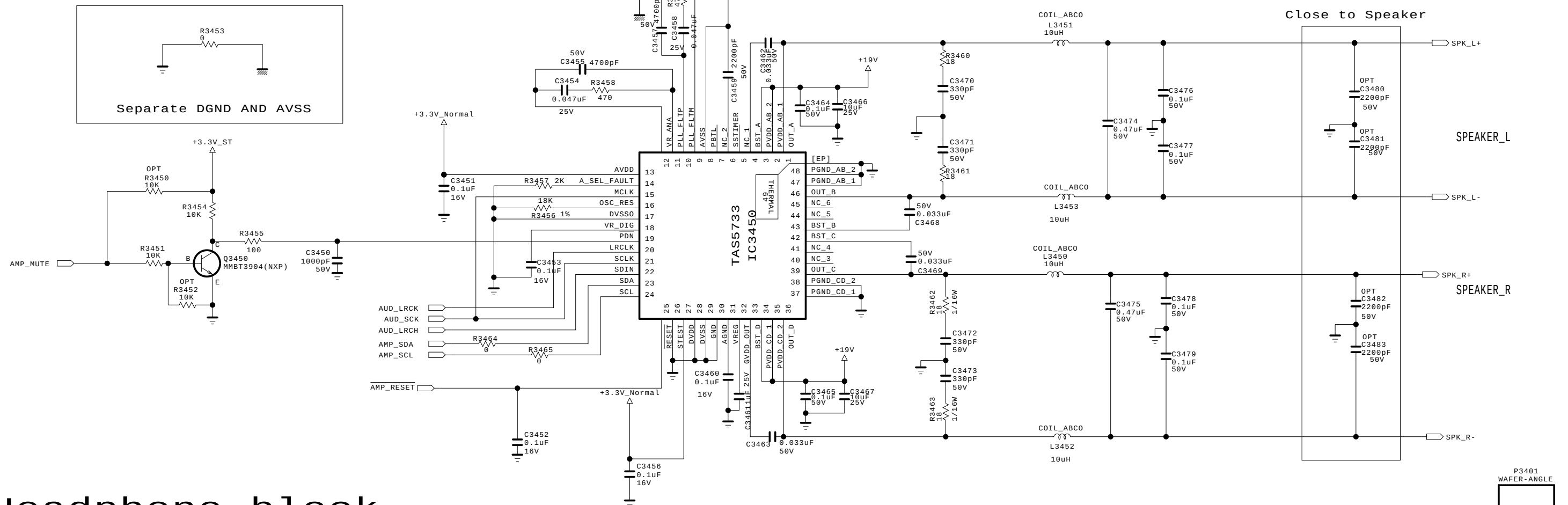
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SECRET  
LGElectronics

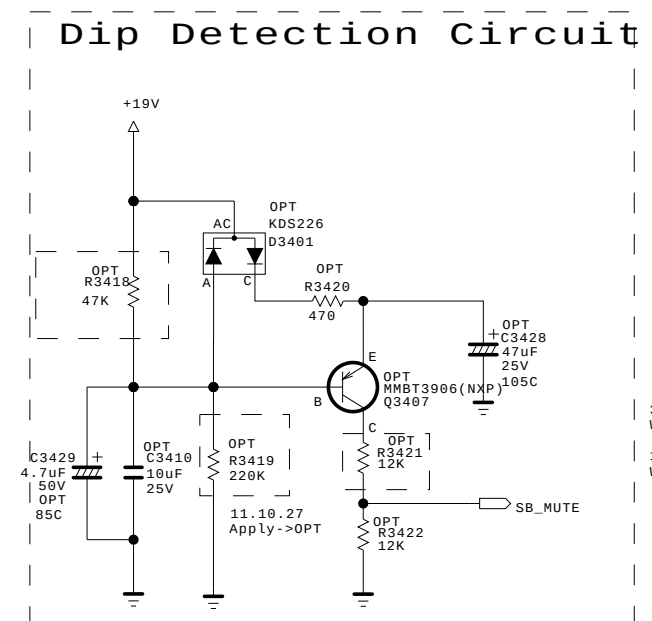
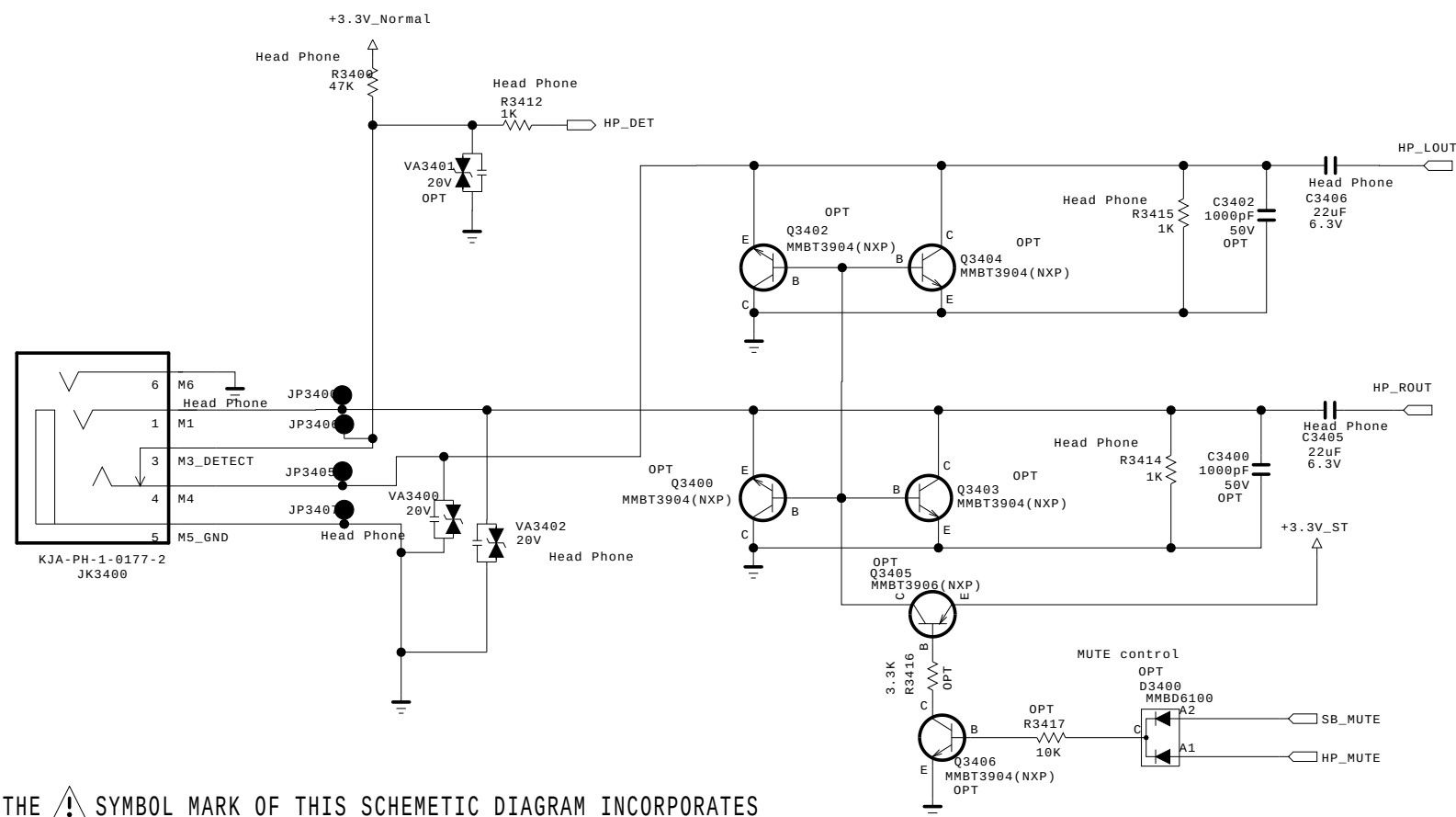


|       |                 |       |            |
|-------|-----------------|-------|------------|
| MODEL | MT57            | DATE  | 2014/08/14 |
| BLOCK | COMPONENT/SCART | SHEET | 28         |

# AUDIO AMP(TI)



## Headphone 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 IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

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|       |                |       |            |
|-------|----------------|-------|------------|
| MODEL | MT57           | DATE  | 2014/05/23 |
| BLOCK | AMP_TAS5733/HP | SHEET | 34 /       |

