



# 3D Blu-ray™ / DVD Home Theater System **SERVICE MANUAL**

**MODEL: LHB655**  
(LHB655, S65T1-S/C/W)

**CAUTION**

BEFORE SERVICING THE UNIT, READ THE "SAFETY PRECAUTIONS"  
IN THIS MANUAL.



SERVICE MANUAL

MODEL: LHB655 (LHB655, S65T1-S/C/W)

LG

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# SECTION 1

## SUMMARY

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# PRODUCT SAFETY SERVICING GUIDELINES FOR BD-HTS PRODUCTS

## IMPORTANT SAFETY NOTICE

This manual was prepared for use only by properly trained audio-video service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent x-radiation, shock and fire hazard. These components are indicated by the letter "X" included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by LG Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

**CAUTION :** Do not attempt to modify this product in any way. Never perform customized installations without manufacturer's approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury.

Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

## GRAPHIC SYMBOLS



The exclamation point within an equilateral triangle is intended to alert the service personnel to important safety information in the service literature.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the service personnel to the presence of noninsulated "dangerous voltage" that may be of sufficient magnitude to constitute a risk of electric shock.



The pictorial representation of a fuse and its rating within an equilateral triangle is intended to convey to the service personnel the following fuse replacement caution notice:

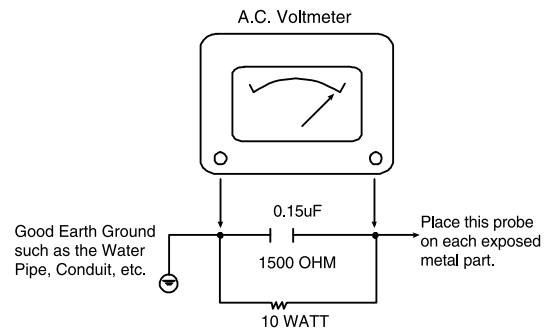
**CAUTION :** FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

## SERVICE INFORMATION

While servicing, use an isolation transformer for protection from AC line shock. After the original service problem has been corrected, make a check of the following:

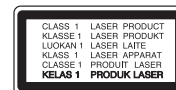
### FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items transported to and from the repair shop.
2. Verify that all protective devices such as insulators, barriers, covers, shields, strain reliefs, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a high current device or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After reassembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. **DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST.** Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



## TIPS ON PROPER INSTALLATION

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall- and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a tilted position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.



**CAUTION :** CLASS 1M VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN. DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS

Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

# SERVICING PRECAUTIONS

**CAUTION:** Before servicing the BD-HTS covered by this service data and its supplements and addends, read and follow the SAFETY PRECAUTIONS.

**NOTE:** if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publications, always follow the safety precautions.

Remember Safety First :

## General Servicing Precautions

1. Always unplug the BD-HTS AC power cord from the AC power source before:

- (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
- (2) Disconnecting or reconnecting any internal electrical plug or other electrical connection.
- (3) Connecting a test substitute in parallel with an electrolytic capacitor.

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

2. Do not spray chemicals on or near this BD-HTS or any of its assemblies.

3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton-tipped swab, or comparable soft applicator.

Unless specified otherwise in this service data, lubrication of contacts is not required.

4. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.

5. Do not apply AC power to this BD-HTS and / or any of its electrical assemblies unless all solidstate device heat sinks are correctly installed.

6. Always connect the test instrument ground lead to an appropriate ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

## Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1Mohm.

**Note 1 :** Accessible Conductive Parts include Metal panels, Input terminals, Earphone jacks, etc.

## 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 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 for 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 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 an electrical charge 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. (Normally 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.)

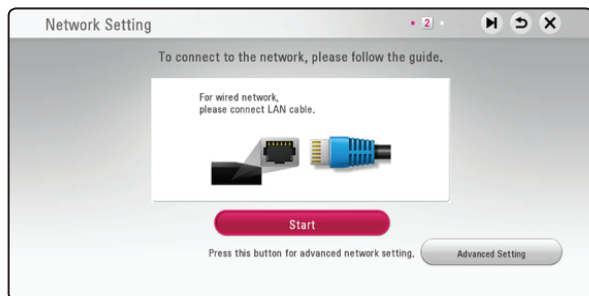
# INITIAL SYSTEM SETUP

When you turn on the unit for the first time, the initial setup wizard appears on the screen. Set the display language and network settings on the initial setup wizard.

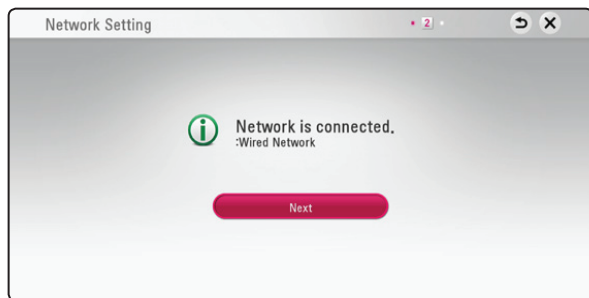
1. Press **⏻** (POWER).  
The initial setup wizard appears on the screen.
2. Use **▲/▼/◀/▶** to select a display language and press **ENTER** (⊙).



3. After checking the Terms of Service, select **[Agree]** to use the Premium Service and SW Updates. Read and prepare the preparations for the network settings and then press **ENTER** (⊙) while **[Start]** is highlighted.



If wired network is connected, the network connection setting will automatically be finished.



4. Select **[Next]** and press **ENTER** (⊙).

5. Press **ENTER** (⊙) to verify the test tone signals of the speakers.



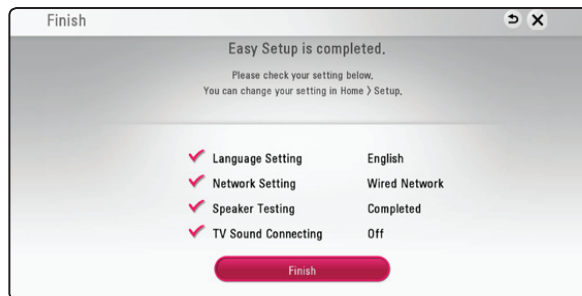
After verifying the test tone signals, press **ENTER** (⊙) while **[Stop]** is highlighted. Select **[Next]** and press **ENTER** (⊙).

6. You can listen to TV sound through HTS Speaker automatically when TV is turned on.



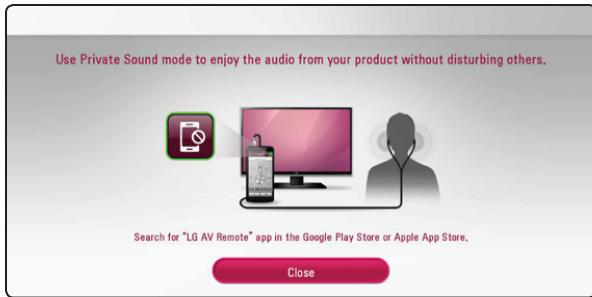
Press **▲** to move and press **◀/▶** to select **[On]** or **[Off]**. Select **[Next]** and press **ENTER** (⊙).

7. Check all the settings that you have set in the previous steps.



Press **ENTER** (⊙) while **[Finish]** is highlighted to finish the initial setup settings. If there is any settings to be changed, use **▲/▼/◀/▶** to select and press **ENTER** (⊙).

8. Displays private sound mode guide. Press ENTER (⊙).



9. Displays the guide to enjoy online contents using LG AV Remote. Press ENTER (⊙).



# HIDDEN KEY MODE

## 1. MPEG HIDDEN KEY

HIDDEN MODE	AVAILABLE STATUS	ENTRANCE KEY	EXIT KEY	DISPLAY	RESULT
DISPLAY SYSTEM INFORMATION	(NO DISC  OPEN)&& (Highlight on 16:9 Full)	1+3+9+7 +1+3+9 +ENTER or MP2	Pause    MP2	SYSTEM INFORMATION	FACTORY RESET(All of data have to be Initialized as Factory Mode except SPDATA)
DISPLAY SYSTEM INFORMATION	(NO DISC  OPEN)&& (Highlight on 16:9 Full)	1+3+9+7 +1+3+9 +0+ENTER or MP11	Pause    MP11	SYSTEM INFORMATION	1.FACTORY RESET(All of data have to be Initialized as Factory Mode) 2.Clear SDPDATA and copy SPDR0 to SPDATA 3. Auto power off after Clear SDPDATA and copy SPDR0 to SPDATA
DISPLAY SYSTEM INFORMATION for Develoep	(NO DISC or Tray OPEN State) and Setup-DISPLAY-TV Aspect Ratio-16:9 Full	4+5+6+2 +5+8+0 +ENTER	PAUSE	Debug Information	
CLEAR PASSWORD	(NO DISC  STOP) && (SETUP LOCK MENU ON)	2+1+0+4 +9+9	X	PASSWORD CLR(VFD)	LOCK PASSWORD Cleared.
ENTER DEMO LOCK MODE	(DISC && CLOSE)	pause+1 +7+3+9	pause+1 +7+3+9	display "LOC", "UNLOC" (VFD) for 3 sec.	Enter, leave Front Lock mode by toggle. See the Demo Lock sheet
System Log Save to Flash	ALWAYS AVAILABLE	Clear key (RCU) 3 seconds Hold simultaneously	X	OK(VFD)	Save Log Data to Flash
Change Resolution	ALWAYS AVAILABLE	Push Stop key 5 sec	X	480P or 576P on VFD	Change the Resolution to 480P or 576P
Chage Video System	Open and Home Menu OFF. (Video system option is PAL only)	push pause key for 5 sec	X	AUTO->PAL->NTSC(VFD)	Video system is changed as AUTO->PAL->NTSC->AUTO...
BE/FE DEBUG MESSAGE	ALWAYS AVAILABLE	1+2+3+6 +9+Enter	X	CPUSB, OK (VFD) or NOUSB	Write BE/FE Debug Message
BE DEBUG MESSAGE	ALWAYS AVAILABLE	1+2+3+6 +8+Enter	X	CPUSB, OK (VFD) or NOUSB	Write BE Debug Message
FE DEBUG MESSAGE	ALWAYS AVAILABLE	1+2+3+6 +7+Enter	X	CPUSB, OK (VFD) or NOUSB	Write FE Debug Message
DRM Key Download	ALWAYS AVAILABLE	pause+1+4 +7+3+5+9	X	key download	Option, DRM, MAC burn into the set.
Upgrade sdpro.bin	Highlight on "Setup->OTHERS->DivX@ VOD"	1+2+3+4	X	sdpro upgrade	sdpro burn into the set.



## 2. MICOM HIDDEN KEY

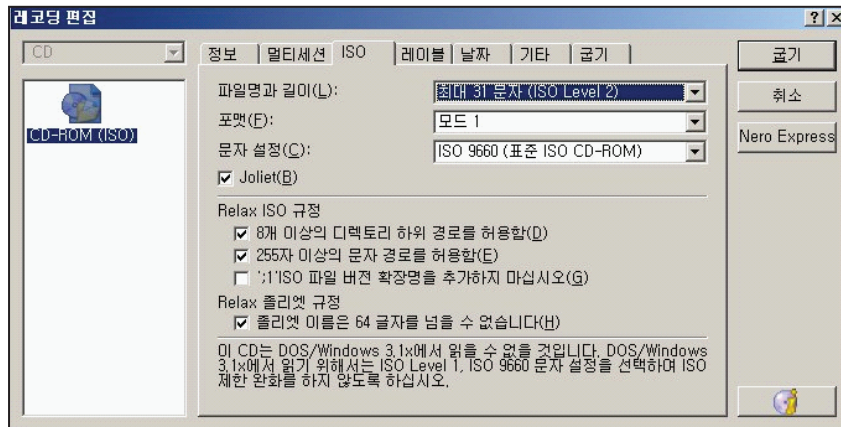
HIDDEN MODE	AVAILABLE STATUS	ENTRANCE KEY	EXIT KEY	DISPLAY	RESULT
<b>Door Lock</b>	DVD FUNCTION and POWER ON STATUS	Front Stop + RMC Stop for 5s	Toggling	"D-LOCK" display for 3s	
<b>Door Unlock</b>	DVD FUNCTION and POWER ON STATUS	Front Stop + RMC Stop for 5s	Toggling	"D-UNLOCK" display for 3s	
<b>Version Check</b>	POWER ON STATUS	Front Stop + RMC Play for 5s	POWER OFF	M-0807031	Display MICOM Ver, OPTION CODE, Touch Key Ver
<b>EEPROM INITIAL</b>	POWER ON STATUS	Front Stop + RMC '0' for 5s	auto exit	"E2P CLEAR"	
<b>EEPROM EDIT</b>	POWER ON STATUS	Front Stop + RMC '2' for 5s	Toggling	OP0-10	
<b>Wireless spk remate</b>	POWER ON STATUS	Front Stop + RMC mute		"REIMATE:"	

# FIRMWARE UPDATE GUIDE

## 1. COPY AN UPDATE FILE TO A MEDIA (USB OR CD-ROM)

Update File Name: LG\_HB\_A100M63.ROM

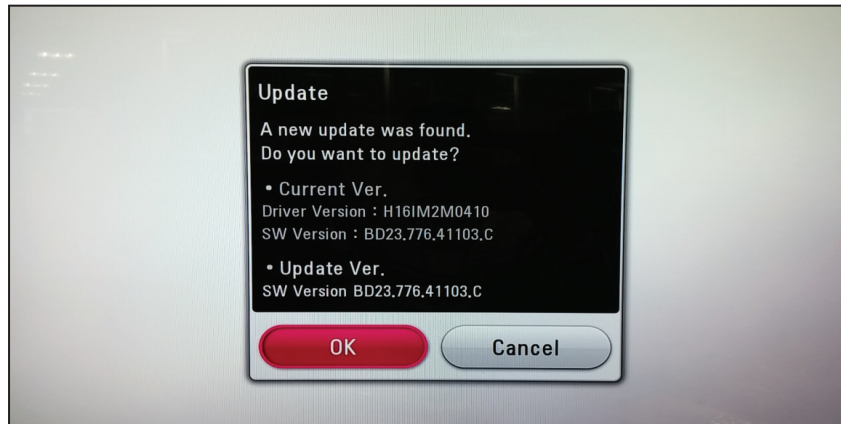
- 1) An update file have to be copied onto the root of file system.
- 2) USB and CD-ROM are able to use firmware update.



< Example: Nero Burning Rom >

## 2. UPDATE FIRMWARE

- 1) Insert USB or CD-ROM which has an update file.
- 2) OSD responds to the insertion event.
- 3) OSD is shown as below.



### Caution:

Do not turn off the power during the software update.

### Note:

If the software includes the driver update, disc tray may open during the process.

## 3. AFTER UPDATE COMPLETE

- 1) When update is completed, the power will be turned off automatically in a few seconds.
- 2) Turn the power back on. The system now operates with the new version.

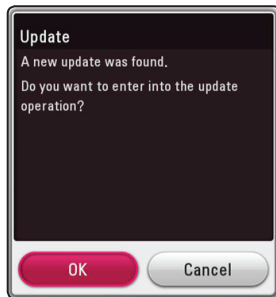
# NETWORK SOFTWARE UPDATE

## Network update notification

From time to time, performance improvements and/or additional features or services may be made available to units that are connected to a broadband home network. If there is new software available and the unit is connected to a broadband home network, the player will inform you about the update as follows.

### Option 1:

1. The update menu will appear on the screen when you turn on the player.
2. Use ◀/▶ to select a desired option and then press ENTER (⊙).



[OK]	Starts the software update.
[Cancel]	Exits the update menu and the home appears.

### Option 2:

If the software update is available from the update server, the "Update" icon appears in the Home menu. Press blue (B) colored button to start the update procedure.

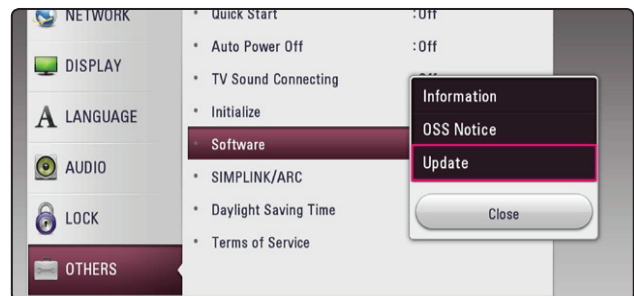
## Software update

You can update the player using the latest software to enhance the products operation and/or add new features. You can update the software by connecting the unit directly to the software update server.

### Note:

- Before updating the software in your player, remove any disc and USB Device from the player.
- Before updating the software in your player, turn the player off and then turn it back on.
- **During the software update procedure, do not turn off the player or disconnect AC power, or do not press any button.**
- If you cancel the update, turn off the power and turn it on for stable performance.
- This unit cannot be updated to previous software version.

1. Check the network connection and settings.
2. Select [Software] option in the [Settings] menu then press ENTER (⊙).
3. Select [Update] option, and press ENTER (⊙).



The player will check for the newest update.

### Note:

- Pressing ENTER (⊙) while checking for the update will end the process.
- If there is no update available, the Message, "No update is found." appears. Press ENTER (⊙) to return to the [Home Menu].

4. If newer version exists, the message "A new update was found. The update takes a few minutes. Do you want to update?" appears.
5. Select [OK] to start update. (Selecting [Cancel] will end the update.)
6. The player starts downloading the newest update from the server. (Downloading will takes several minutes depending on your home network condition)

7. To update software the next time, the software update procedure has to be started from the beginning again.

**Caution:**

Do not turn off the power during the software update.

**Note:**

If the software includes the driver update, disc tray may open during the process.

8. When update is completed, the power will be turned off automatically in a few seconds.
9. Turn the power back on. The system now operates with the new version.

**Note:**

The Software Update function may not work properly depending on your internet environment. In this case, you can obtain the latest software from the authorized LG Electronics Service Center then update your player. Refer to "Customer Support".

# SPECIFICATIONS

## • GENERAL

Power requirements	120 V ~ 60 Hz
Power consumption	135 W
	Networked standby : 0.5 W (If all network ports are activated.)
Dimensions (W x H x D)	Approx. 360 mm x 60.5 mm x 299 mm (14.1 inches x 2.3 inches x 11.7 inches)
Net Weight (Approx.)	2.7 kg (5.9 lbs)
Operating temperature	5 °C to 35 °C (41 °F to 95 °F)
Operating humidity	5 % to 90 %

## • INPUTS/OUTPUTS

HDMI OUT (video/audio)	19 pin (Type A, HDMI™ Connector) x 1
ANALOG AUDIO IN	2.0 Vrms (1 kHz, 0 dB), 600 Ω, RCA jack (L, R) x 1
DIGITAL IN (OPTICAL)	3 V (p-p), Optical jack x 1

## • TUNER

FM Tuning Range	87.5 to 108.0 MHz or 87.50 to 108.00 MHz
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## • AMPLIFIER

Power output (3 Ω), (RMS), THD 10 %	
Total	1000 W
Front	167 W x 2
Center	167 W
Rear	167 W x 2
Sub-Woofer	167 W (Passive)

## • SYSTEM

Laser	Semiconductor laser
Wavelength	405 nm / 650 nm
Signal system	Standard NTSC color TV system
Frequency response	20 Hz to 18 kHz (48 kHz, 96 kHz, 192 kHz sampling)
Harmonic distortion	Less than 0.05 %
Dynamic range	More than 80 dB
LAN port	Ethernet jack x 1, 10BASE-T / 100BASE-TX
Bus Power Supply (USB)	5 V ⎓ 500 mA

• **SPEAKERS**

**Front speaker**

Type	1 Way 1 speaker
Impedance	3 Ω
Rated Input Power	167 W
Max. Input power	334 W
Net Dimensions (W x H x D)	290 mm x 1100 mm x 290 mm (11.4 inches x 43.3 inches x 11.4 inches)
Net Weight	3.5 kg (7.7 lbs)

**Rear speaker**

Type	1 Way 1 speaker
Impedance	3 Ω
Rated Input Power	167 W
Max. Input power	334 W
Net Dimensions (W x H x D)	290 mm x 1100 mm x 290 mm (11.4 inches x 43.3 inches x 11.4 inches)
Net Weight	3.5 kg (7.7 lbs)

**Center speaker**

Type	1 Way 1 speaker
Impedance	3 Ω
Rated Input Power	167 W
Max. Input power	334 W
Net Dimensions (W x H x D)	220 mm x 98.5 mm x 104 mm (8.6 inches x 3.8 inches x 4.0 inches)
Net Weight	0.5 kg (1.1 lbs)

**Subwoofer**

Type	1 Way 1 speaker
Impedance	3 Ω
Rated Input Power	167 W
Max. Input power	334 W
Net Dimensions (W x H x D)	172 mm x 391 mm x 261 mm (6.7 inches x 15.3 inches x 10.2 inches)
Net Weight	5.2 kg (11.4 lbs)

- Design and specifications are subject to change without notice.



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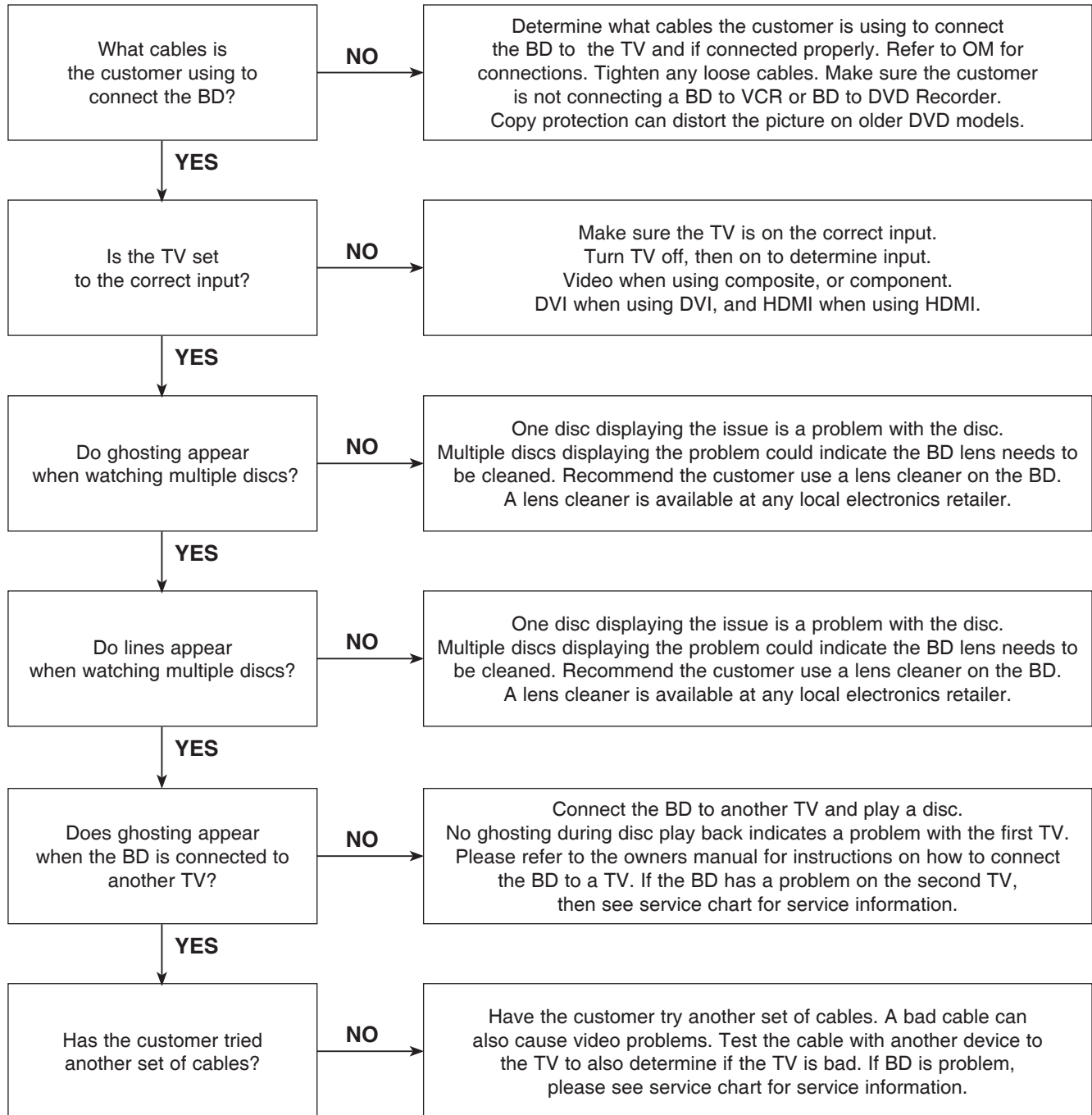
# DIGITAL DISPLAY & MEDIA TRAINING MASTER

**Objective:** To provide clear and concise guidelines for customer service agents to handle calls on box goods calls.

## 1. DISTORTED PICTURE

### 1-1. Lines on Picture

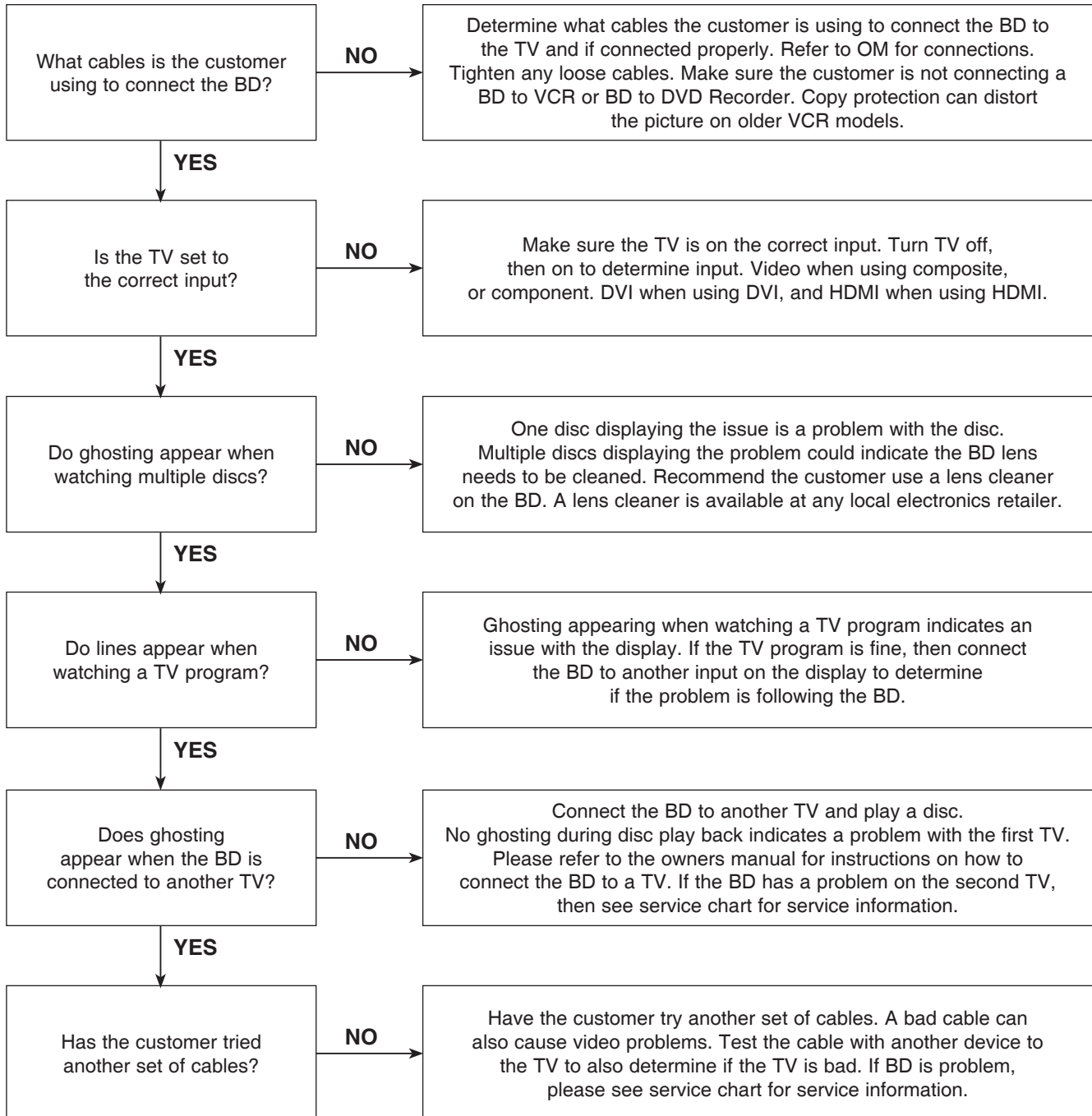
Distorted picture refers to the customer getting video, but there is a problem with the video.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 1-2. Ghost Picture

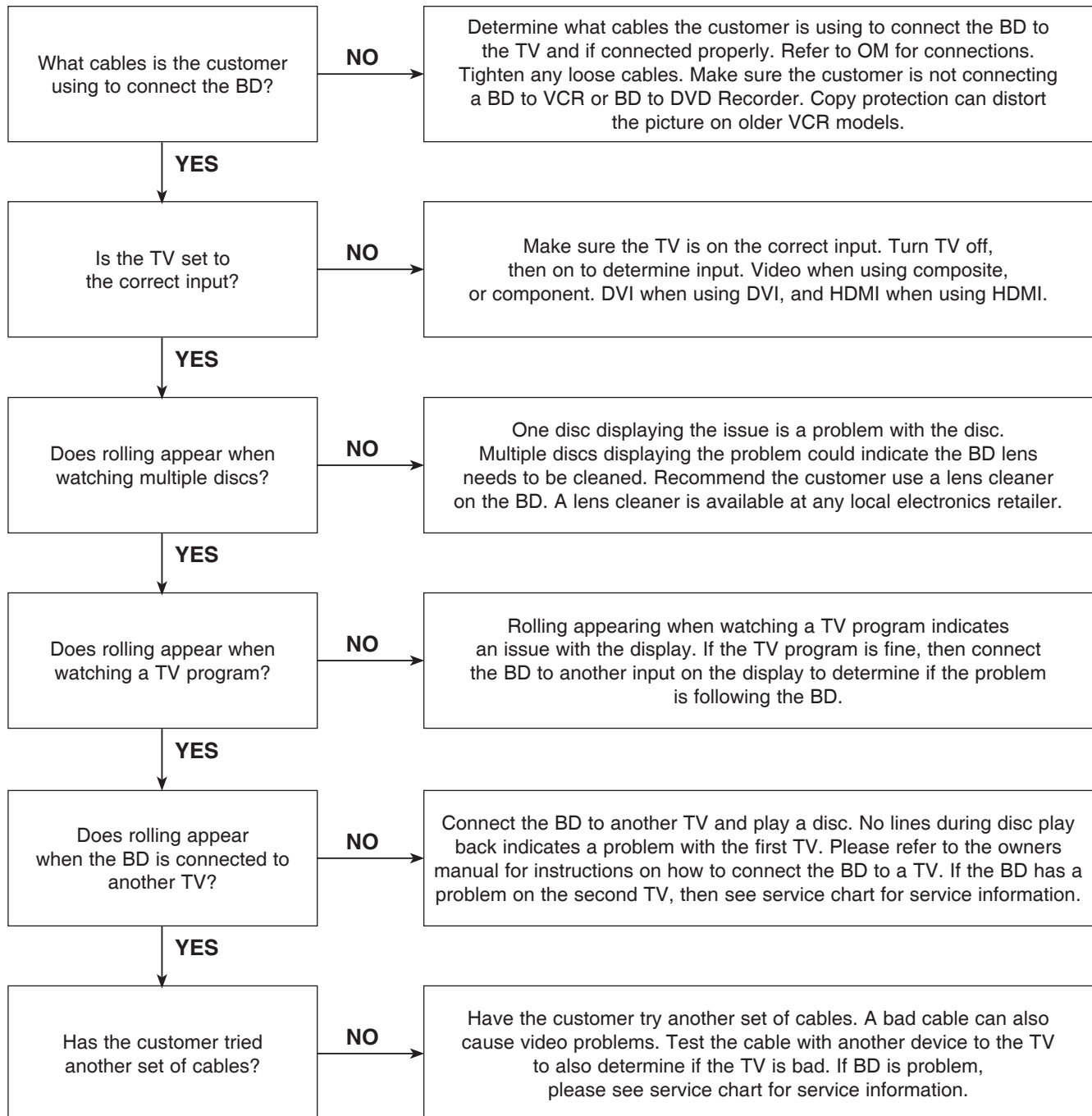
Distorted picture refers to the customer getting video, but there is a problem with the video.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 1-3. Rolling Picture

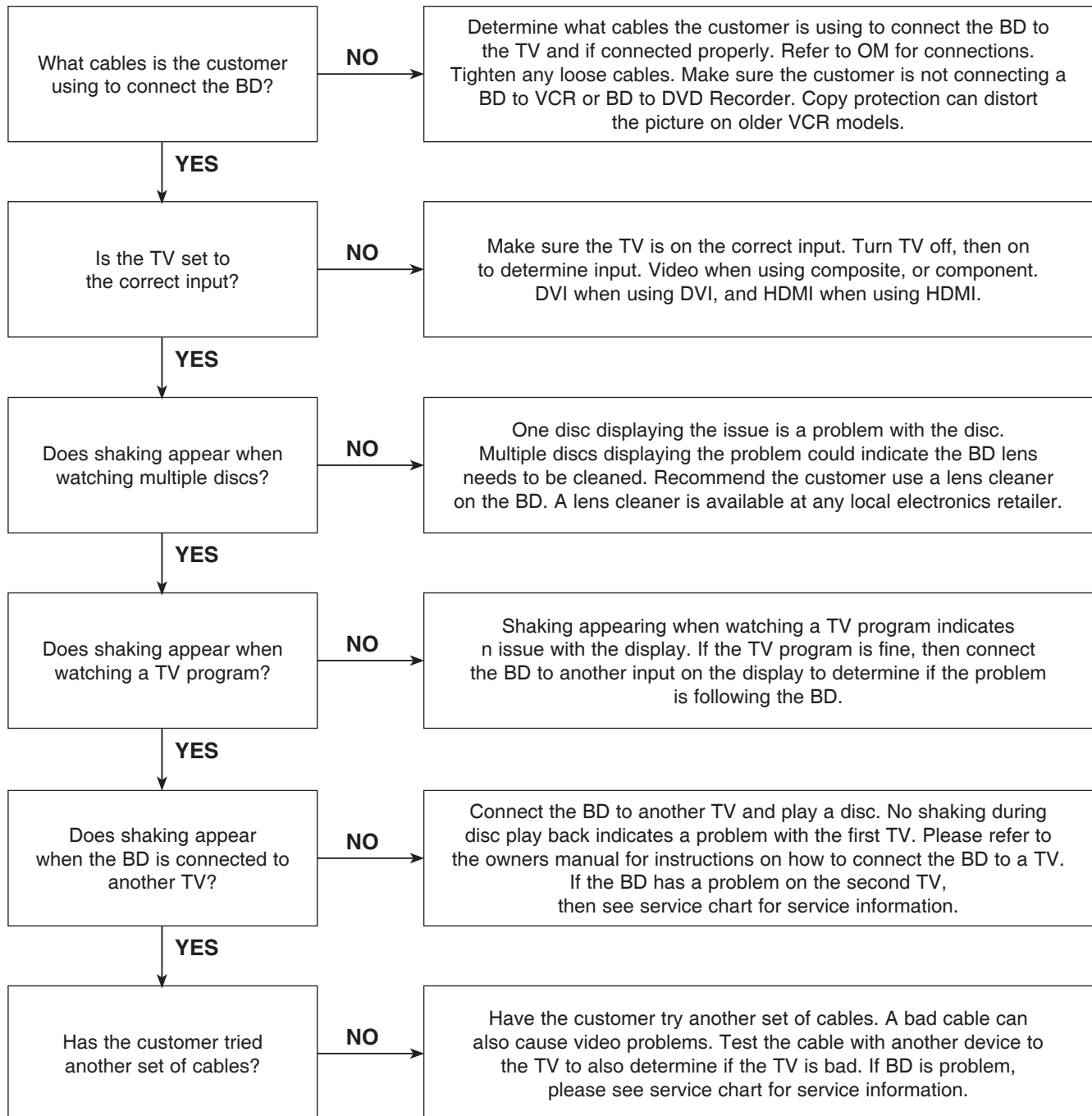
Distorted picture refers to the customer getting video, but there is a problem with the video.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 1-4. Shaky Picture

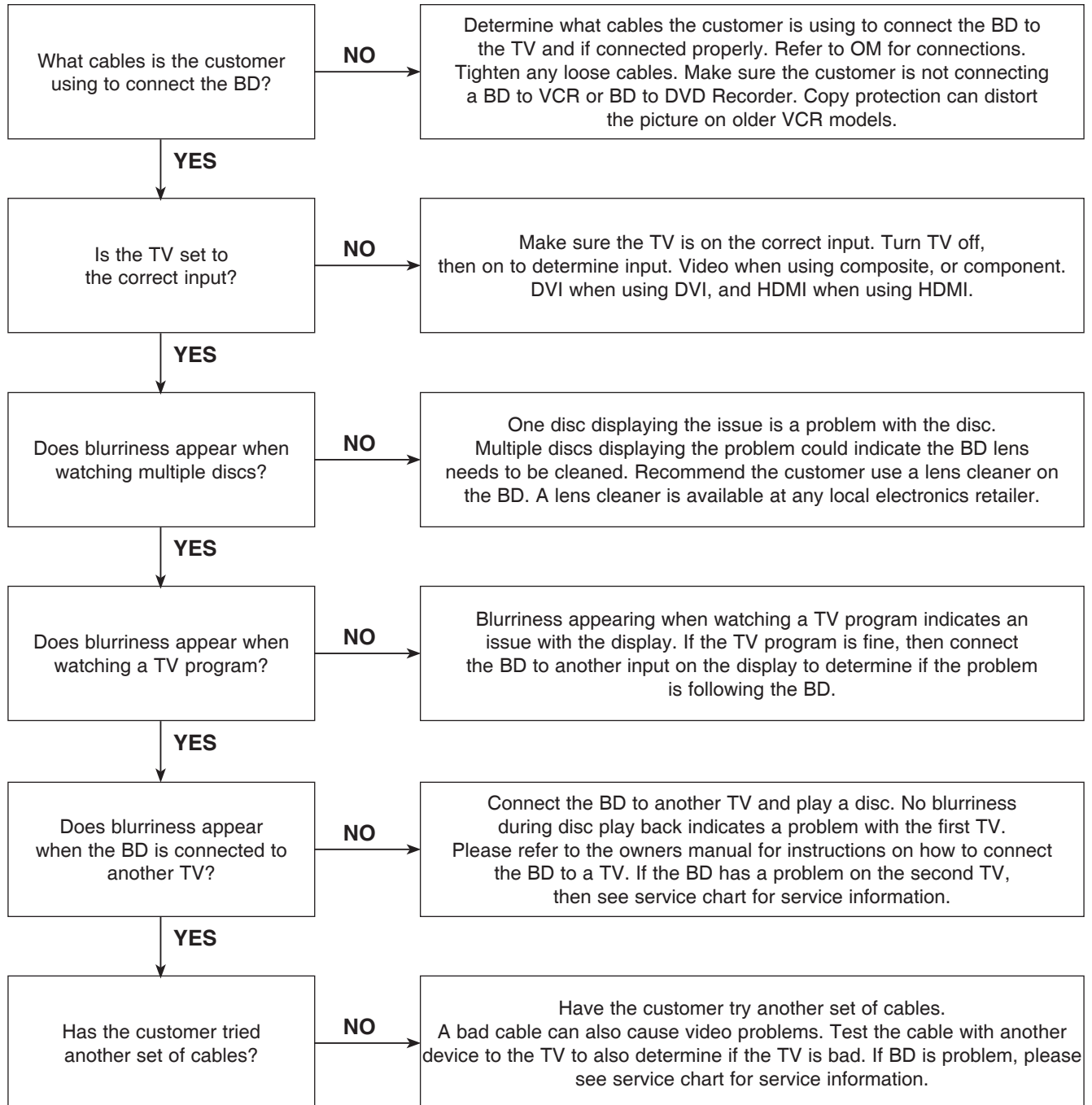
Distorted picture refers to the customer getting video, but there is a problem with the video.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 1-5. Blurry Picture

Distorted picture refers to the customer getting video, but there is a problem with the video.

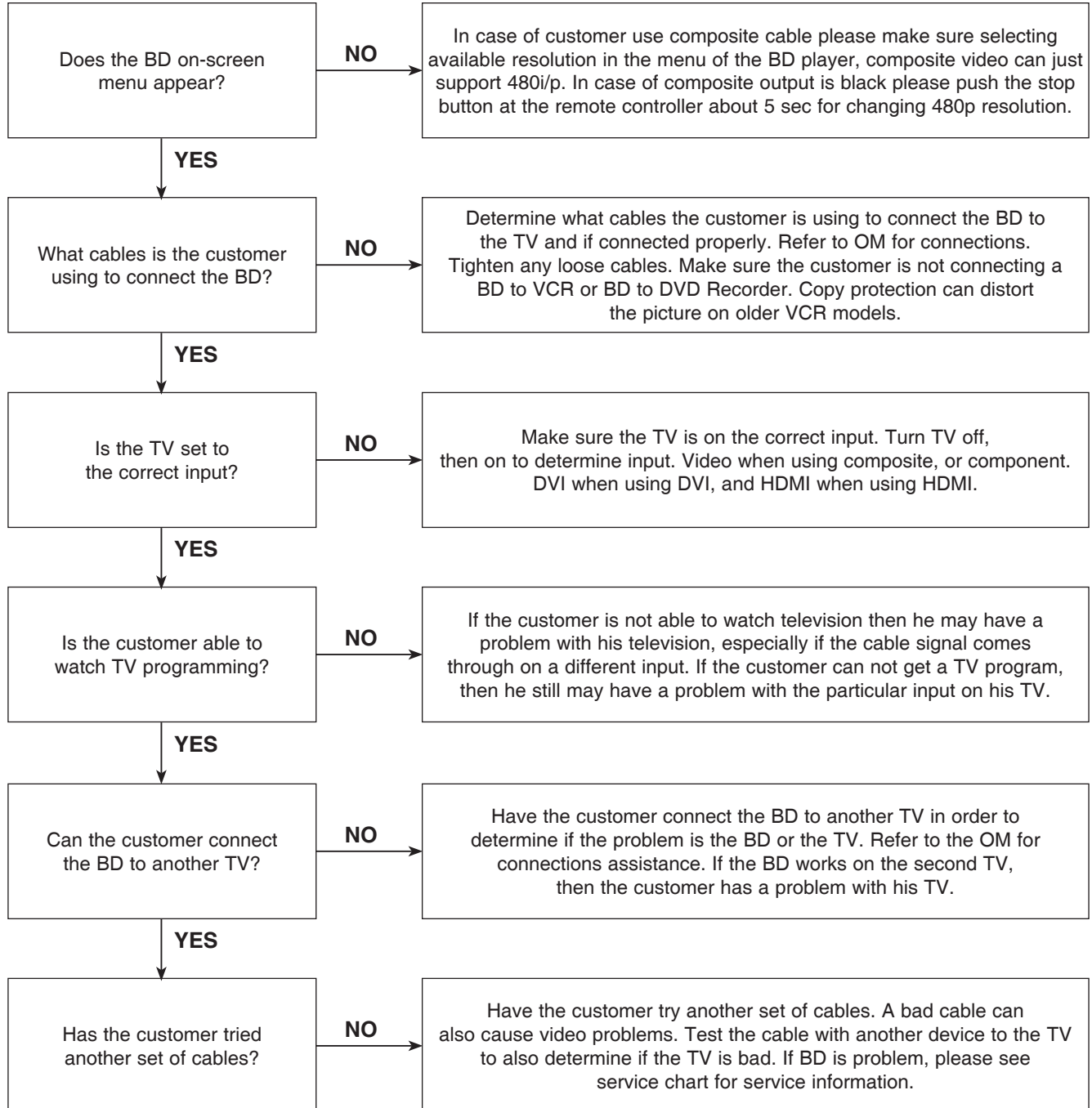


# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 2. NO PICTURE

### 2-1. Black Screen

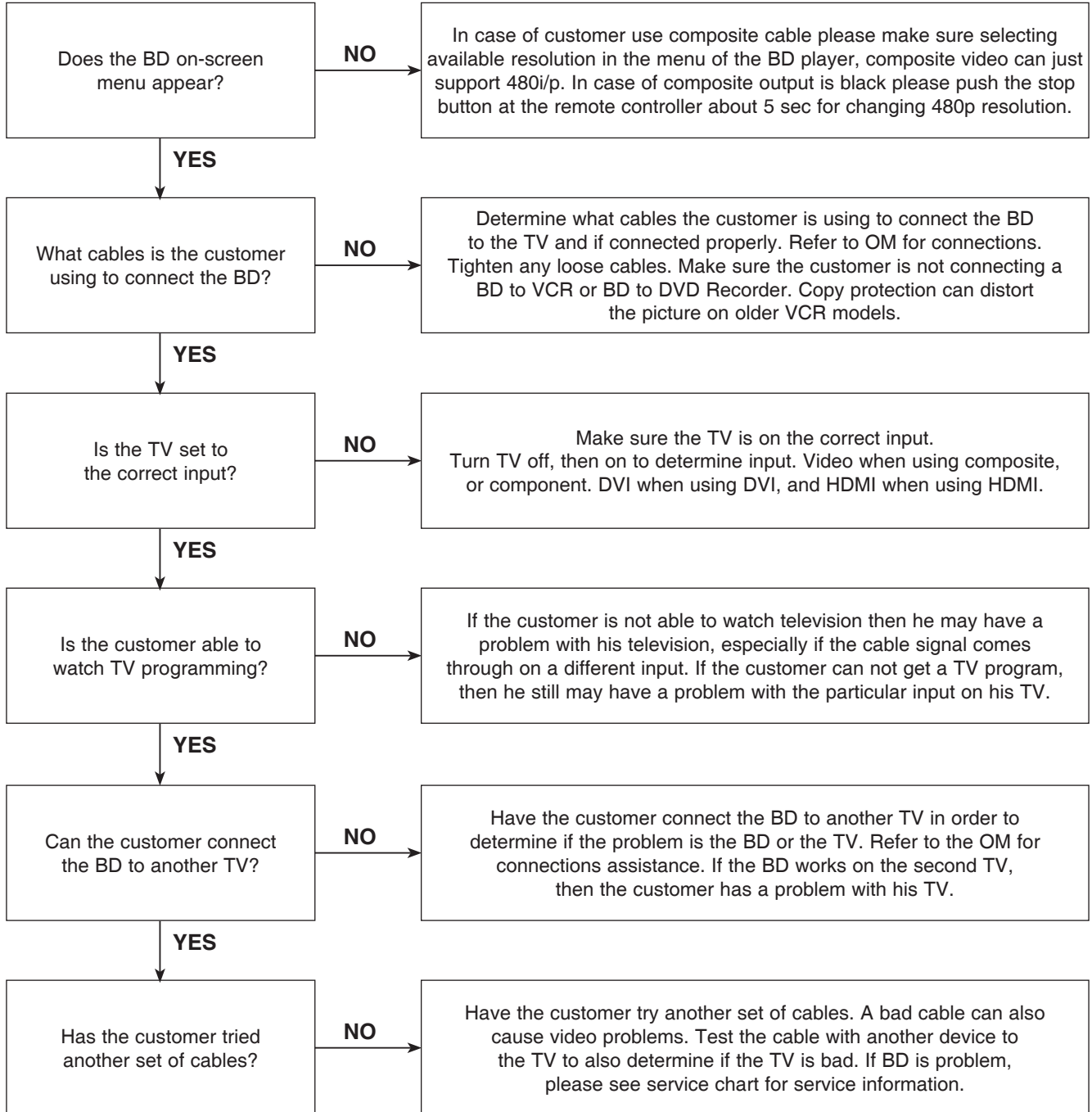
The entire screen is black.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 2-2. Blue Screen

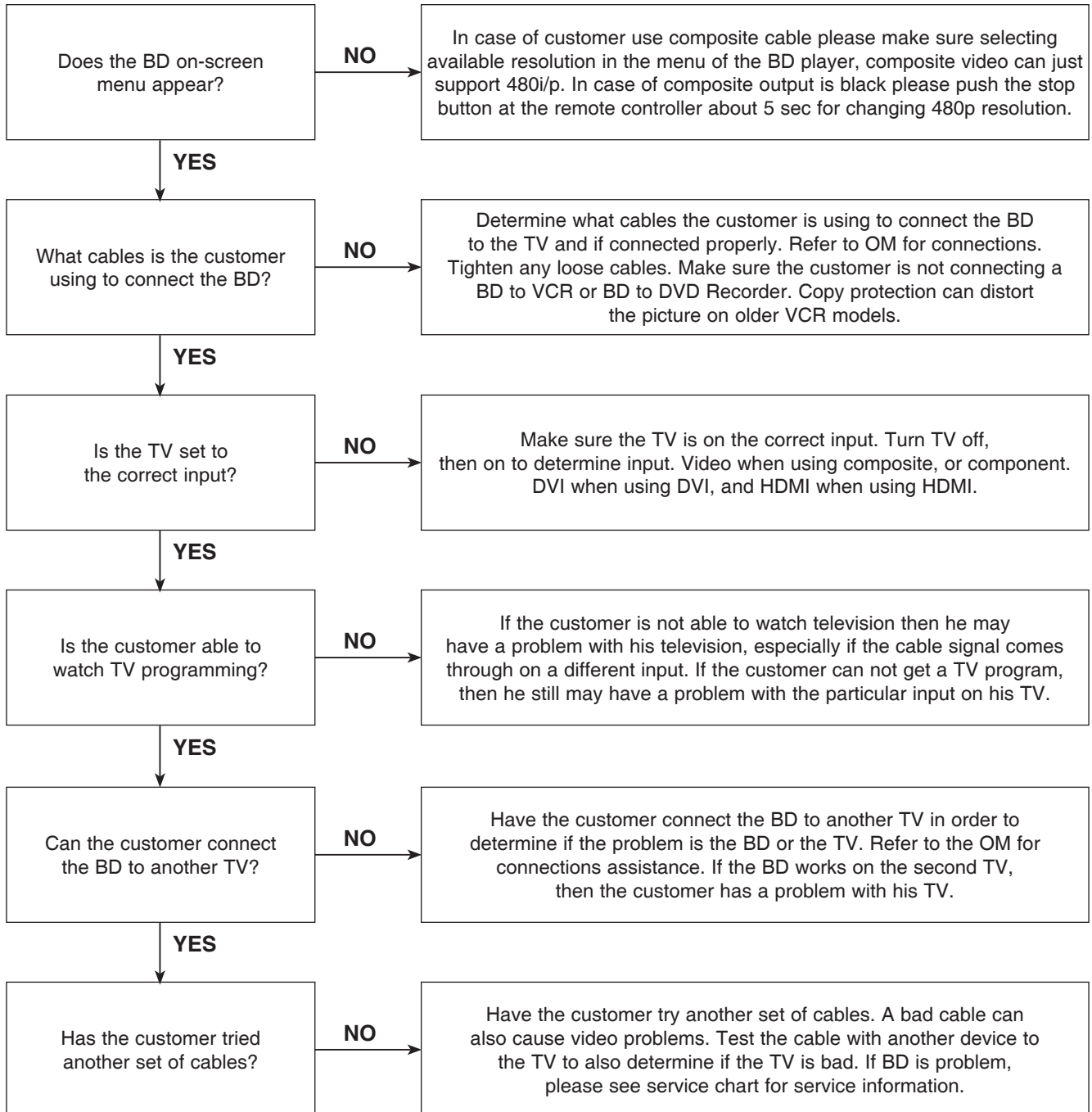
The entire screen is a solid blue color.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 2-3. Snowy Screen

A snowy picture is when black and white dots are all over the screen.

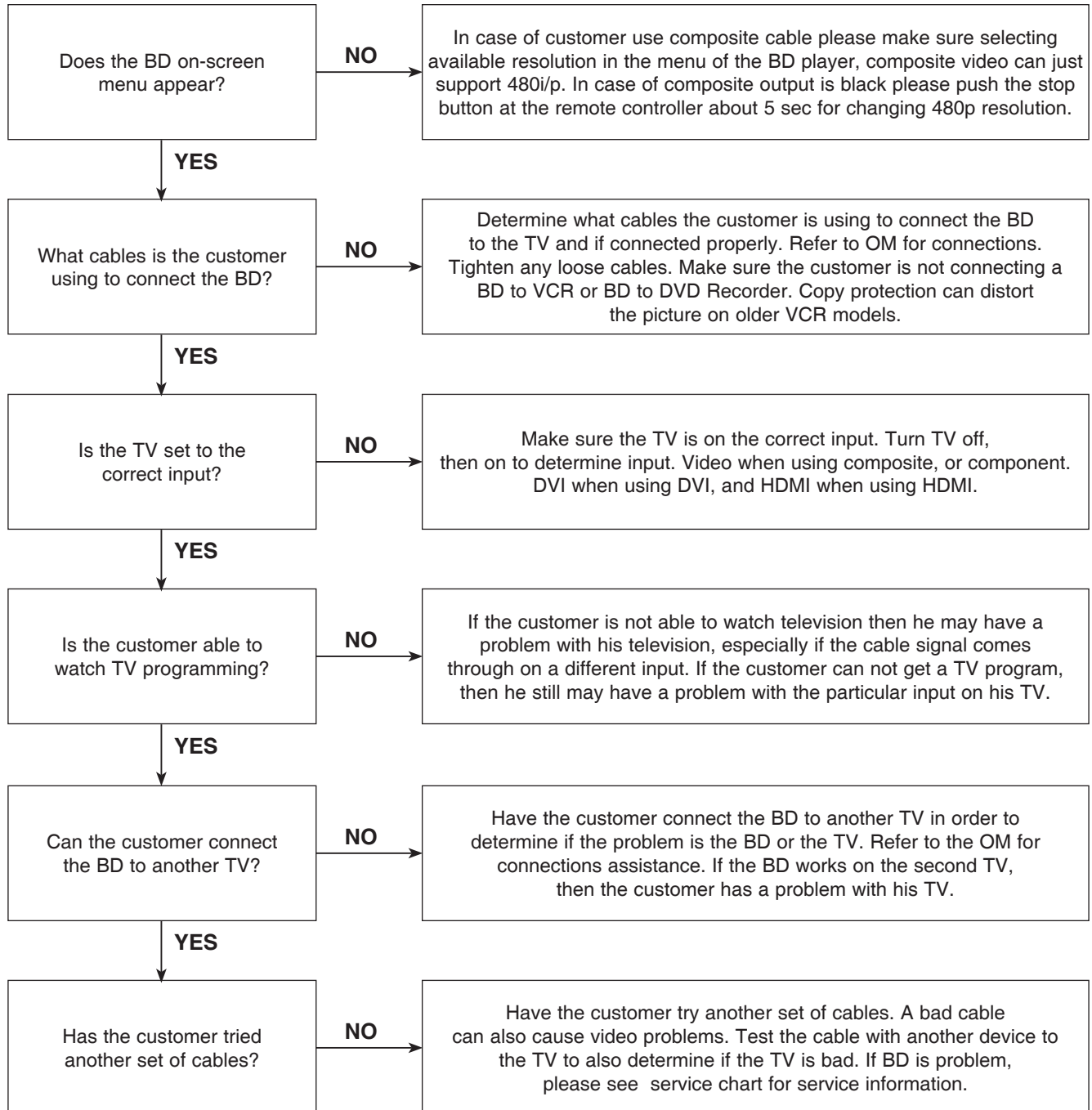




# DIGITAL DISPLAY & MEDIA TRAINING MASTER

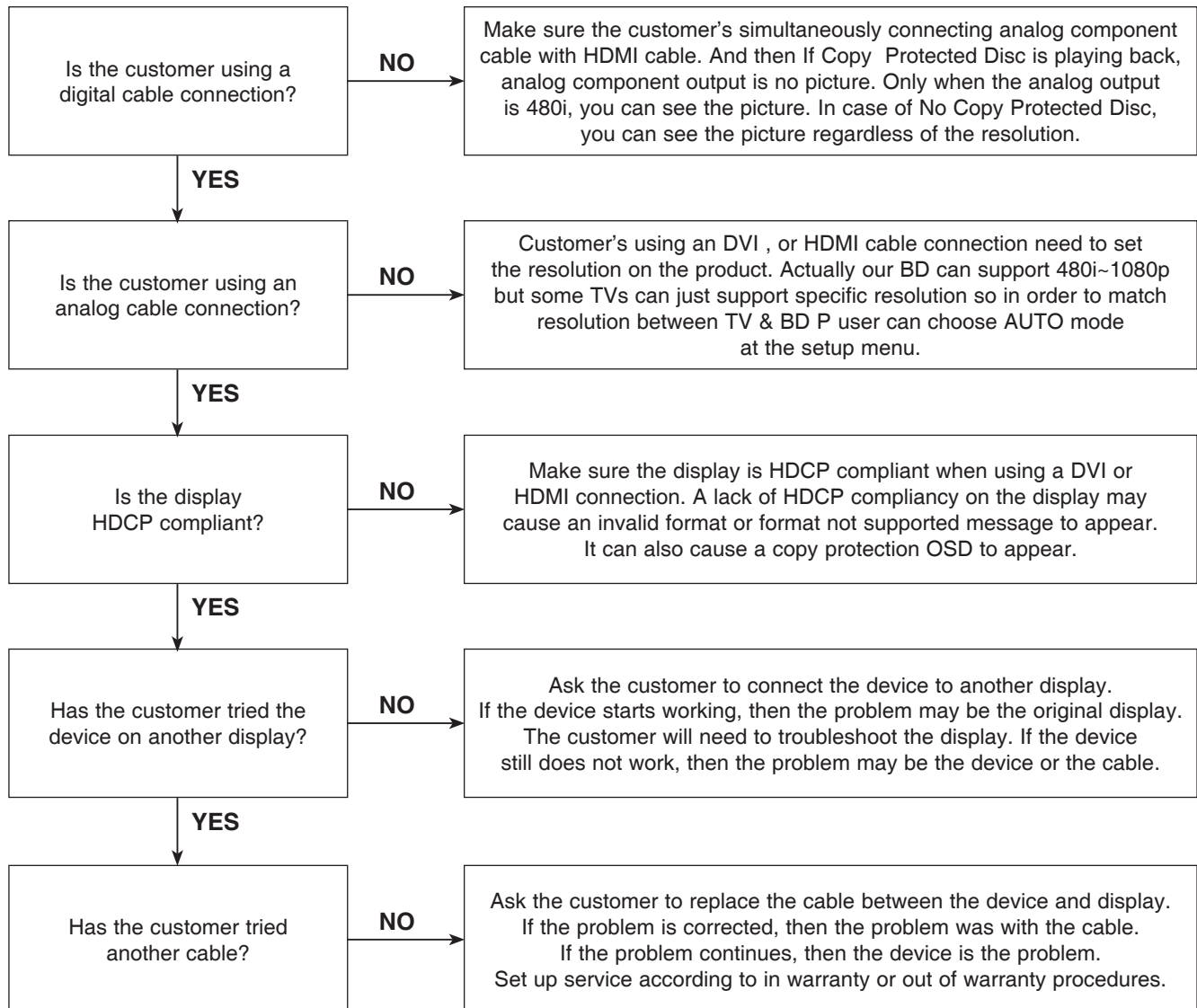
## 2-4. No Signal

A “no signal” message appears on the screen of the display.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 2-5. Invalid Format or Format Not Supported

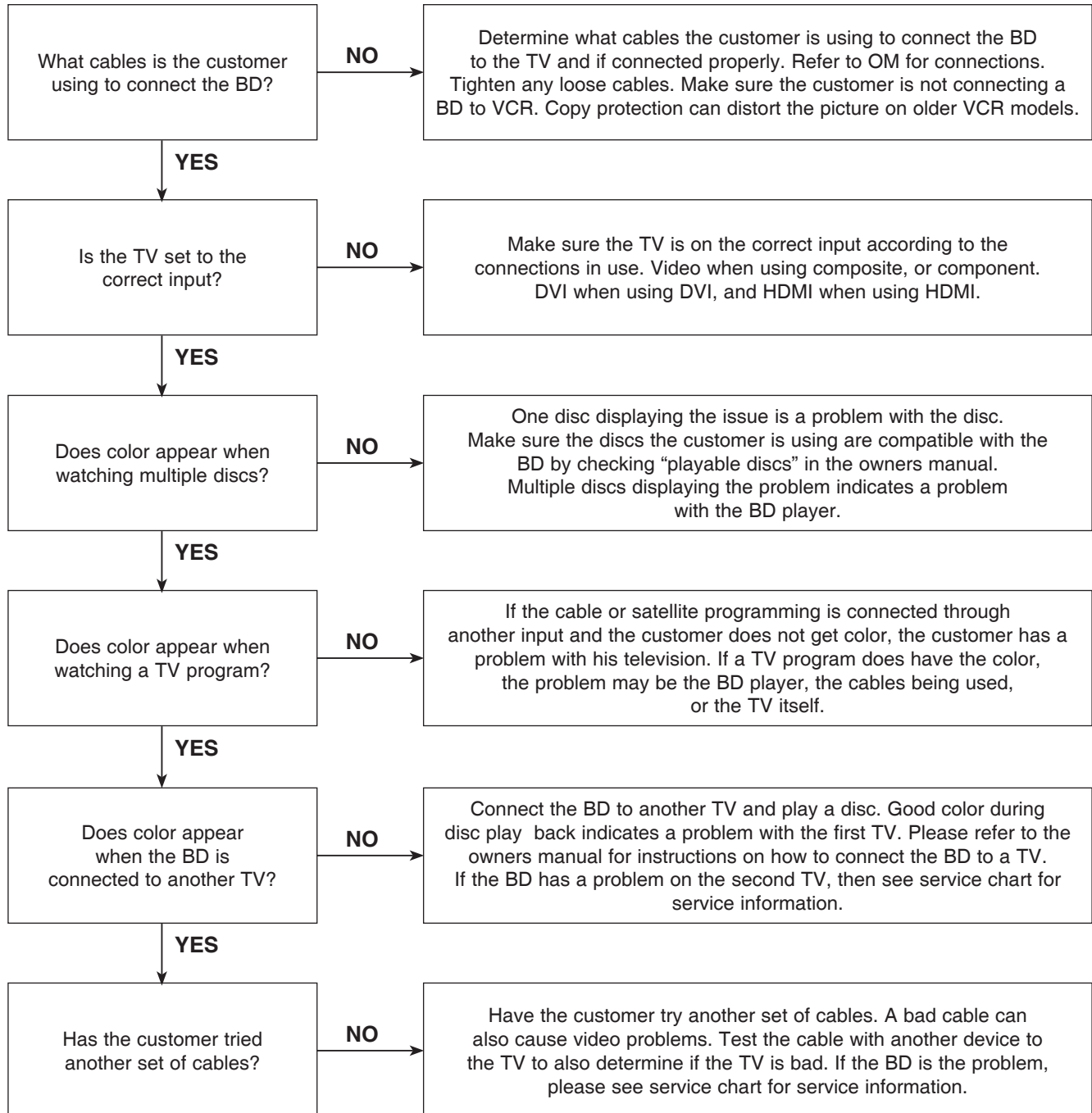


# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 3. PICTURE COLOR

### 3-1. No Color

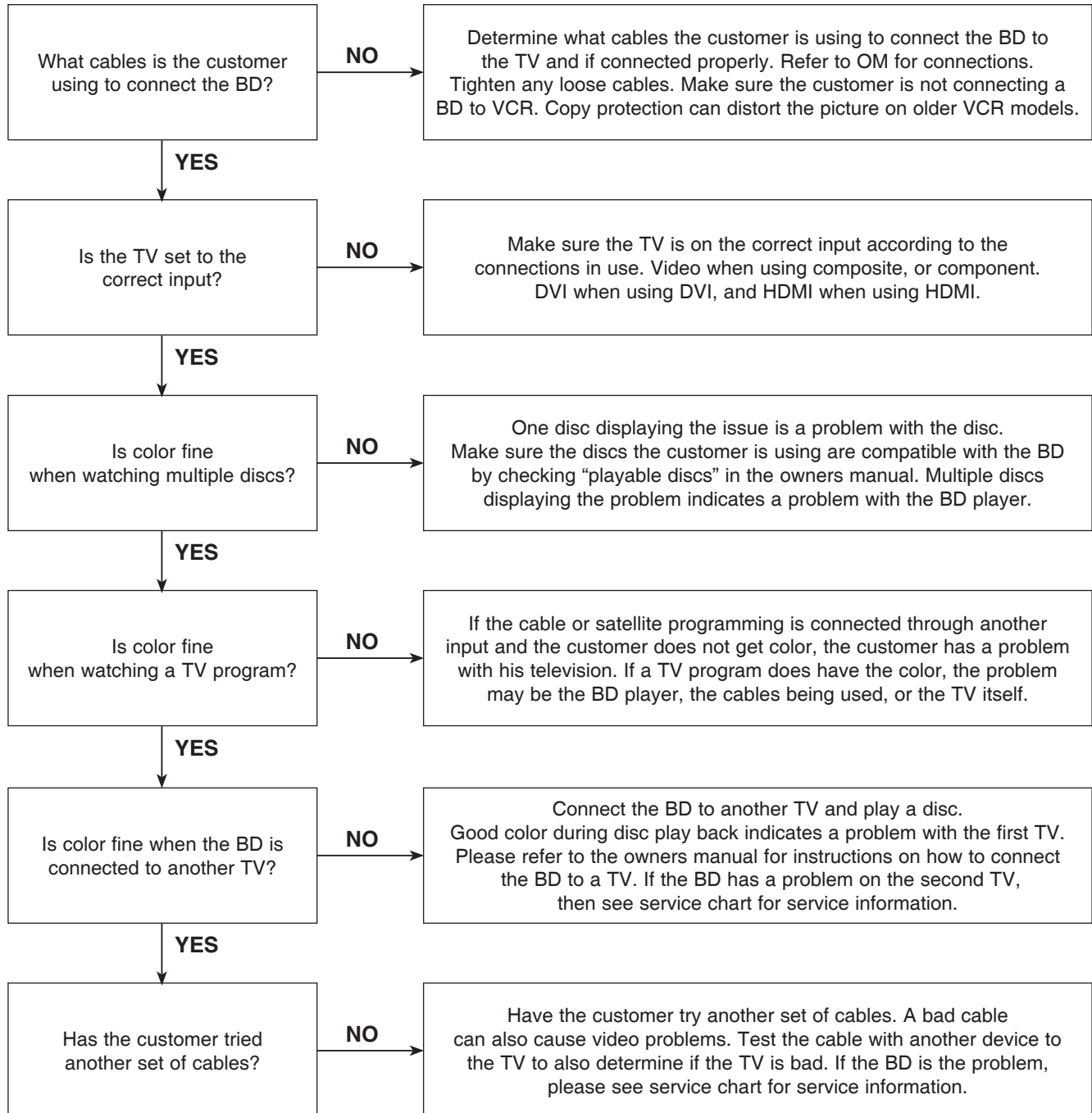
The video displays no color and only shows in black and white.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 3-2. Poor Color

The color is poor. Examples would be washed out colors, colors bleeding into one another, or a solid tint to a screen.

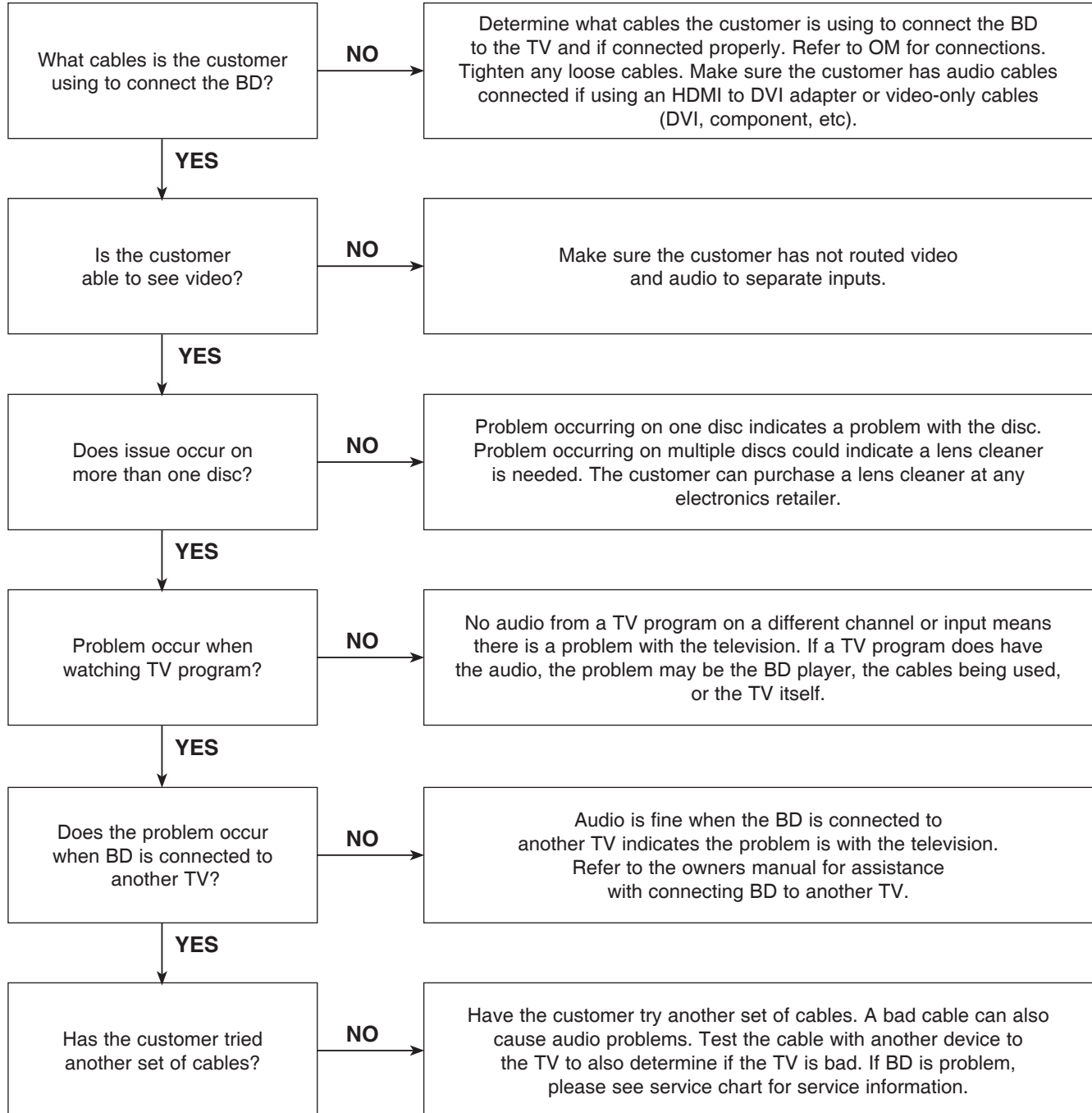


# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 4. NOISE/AUDIO PROBLEMS

### 4-1. No Audio

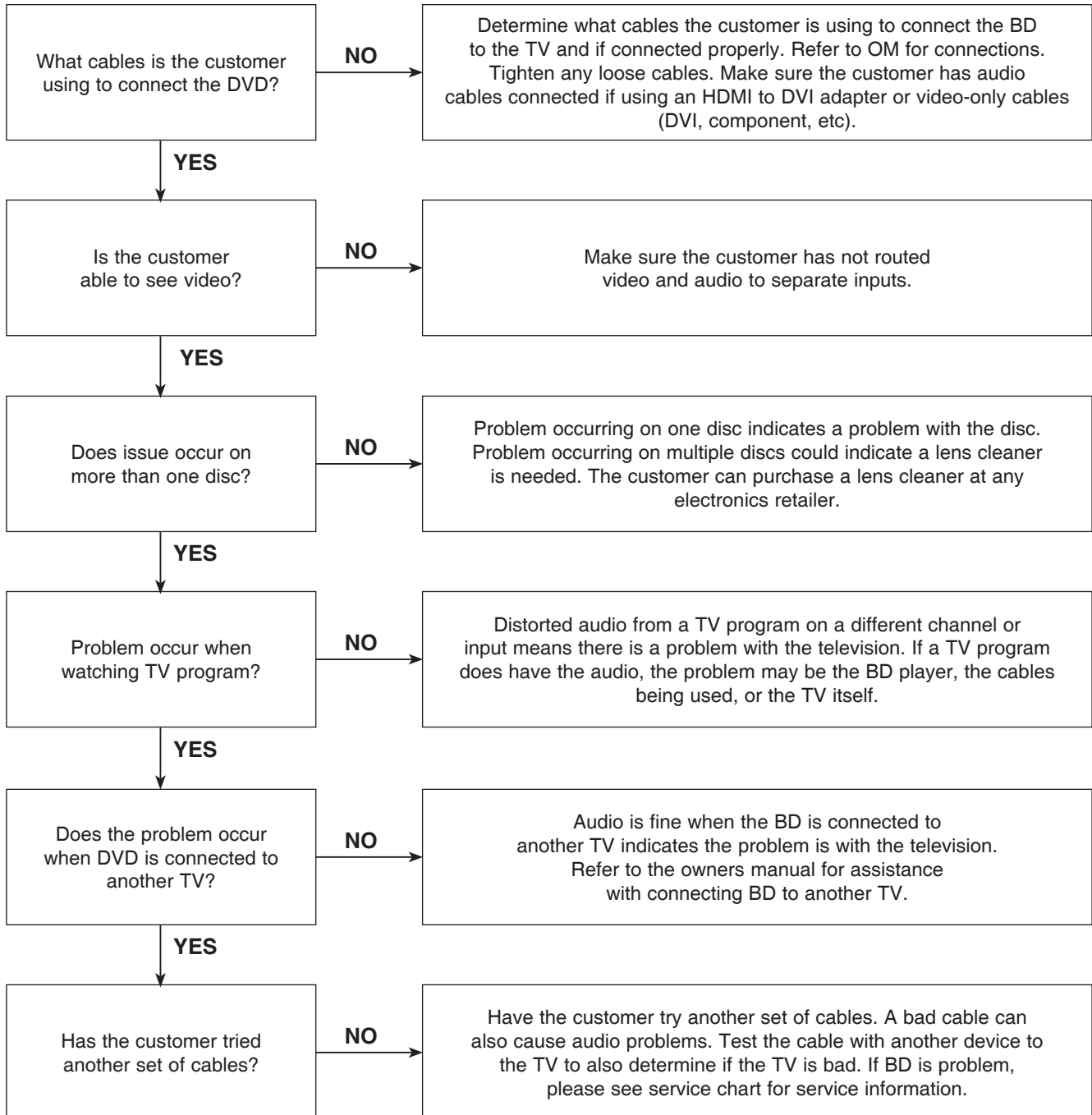
The customer is not able to get audio.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 4-2. Distorted Audio

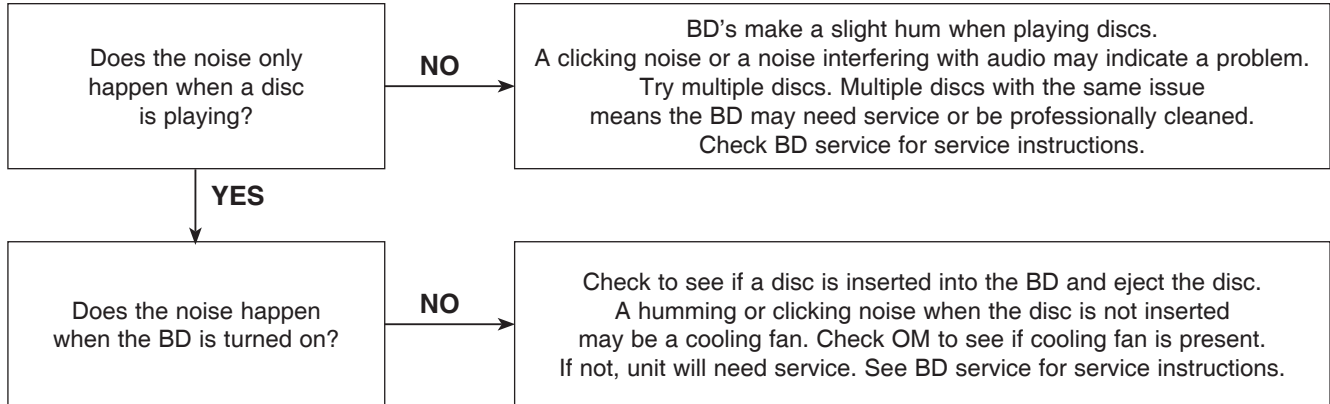
The audio sounds muffled, scratchy, or the audio skips.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

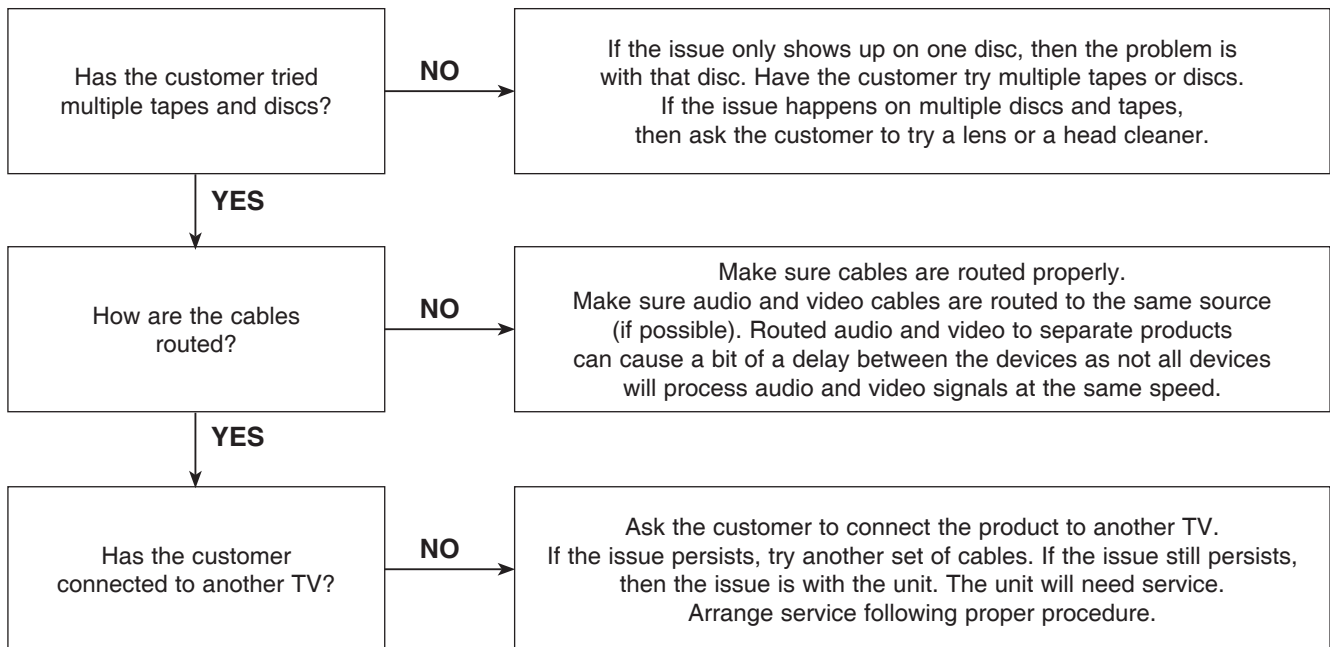
## 4-3. Humming/Clicking Noise

The unit is making a humming noise or a clicking noise.



## 4-4. Audio/Video Out of Synch

The audio and video do not match up. People look to be talking, but their voices are delayed by a few seconds.

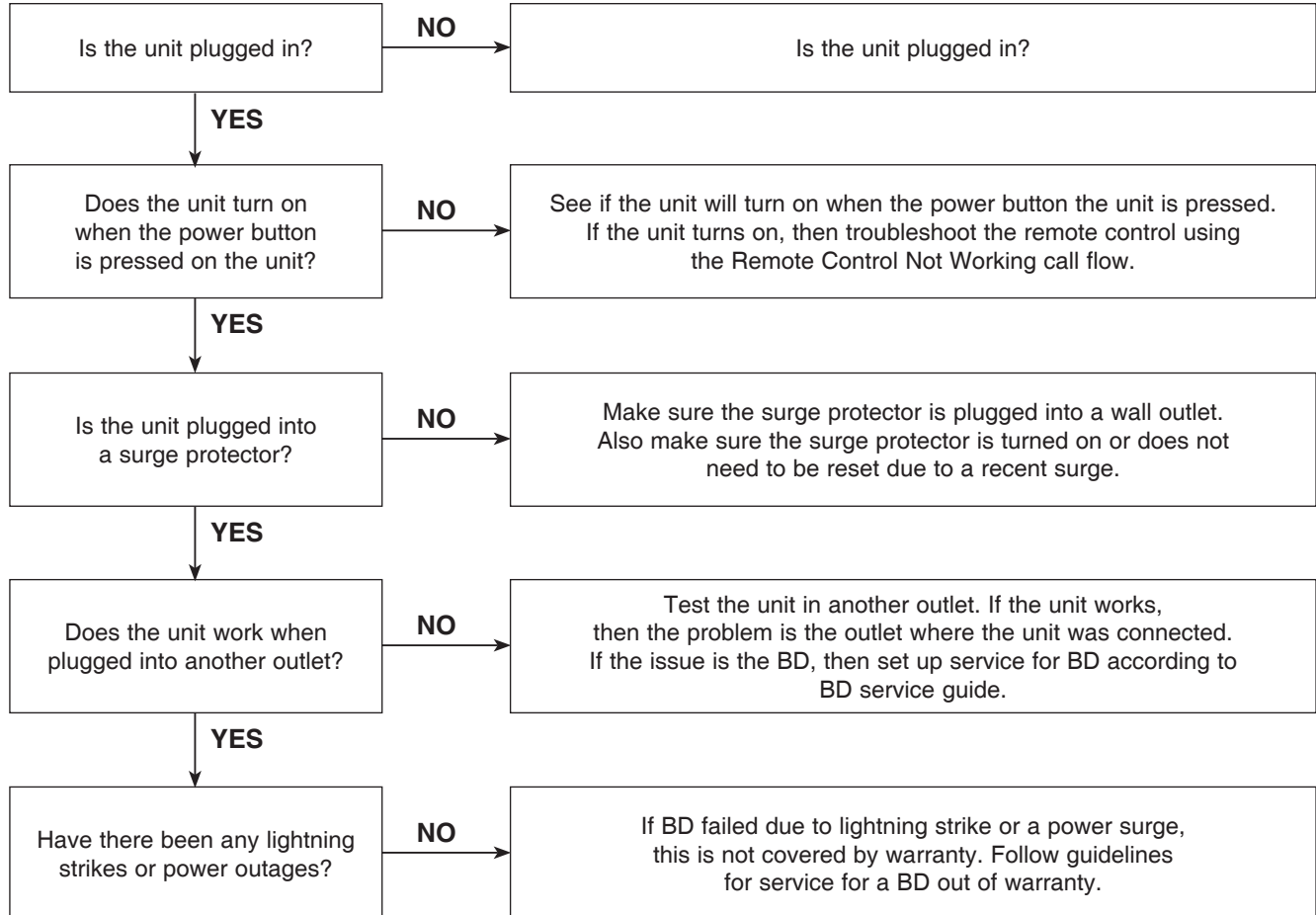


# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 5. MISCELLANEOUS

### 5-1. No Power

The unit will not turn on.

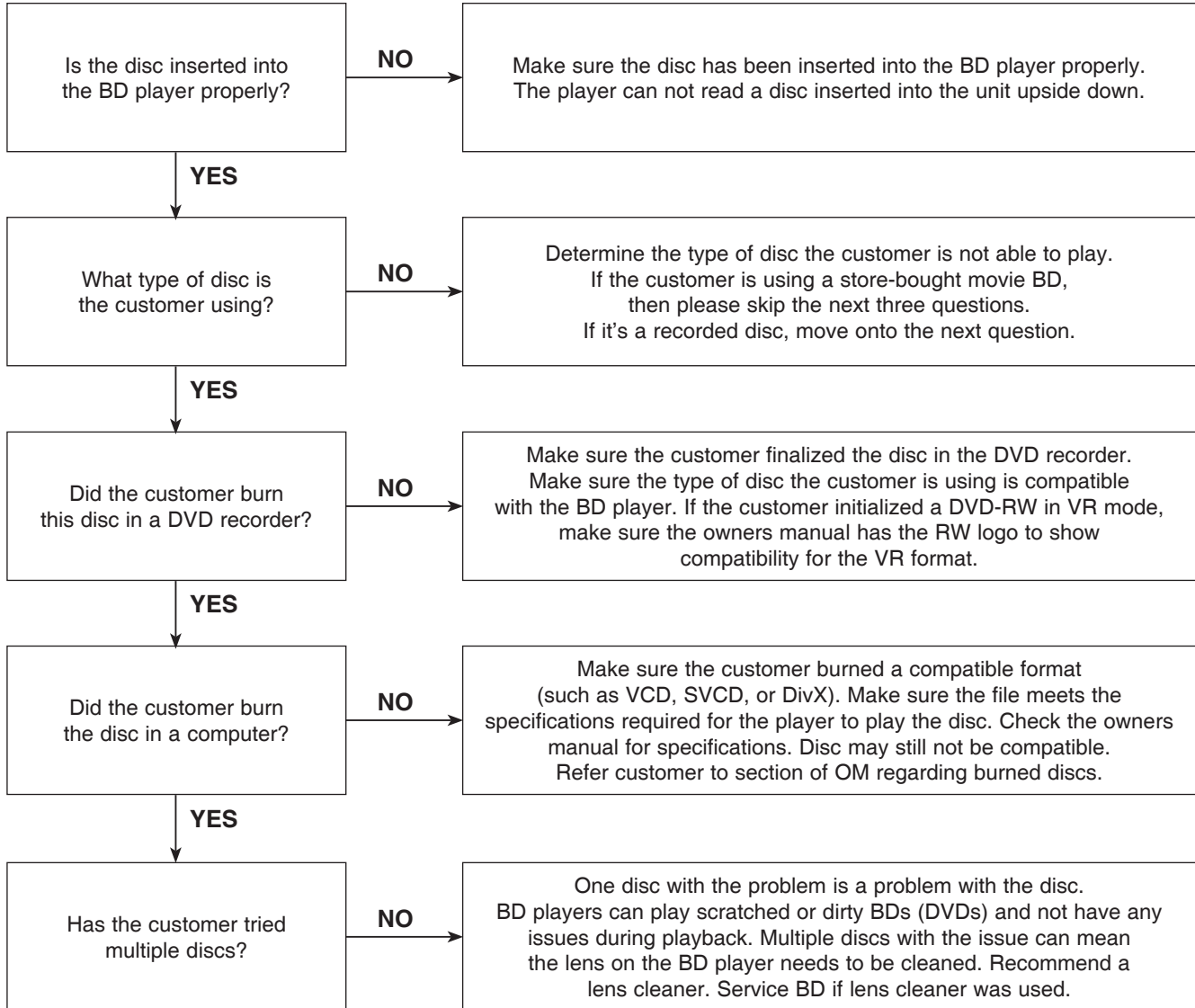




# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 5-2. Disc Error

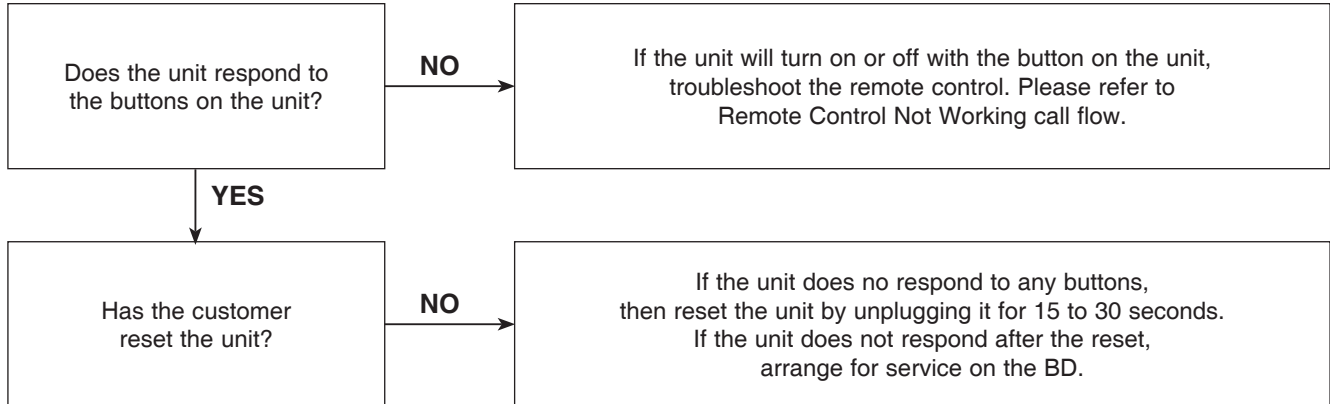
The unit displays “disc error” when a disc is inserted into the BD player.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

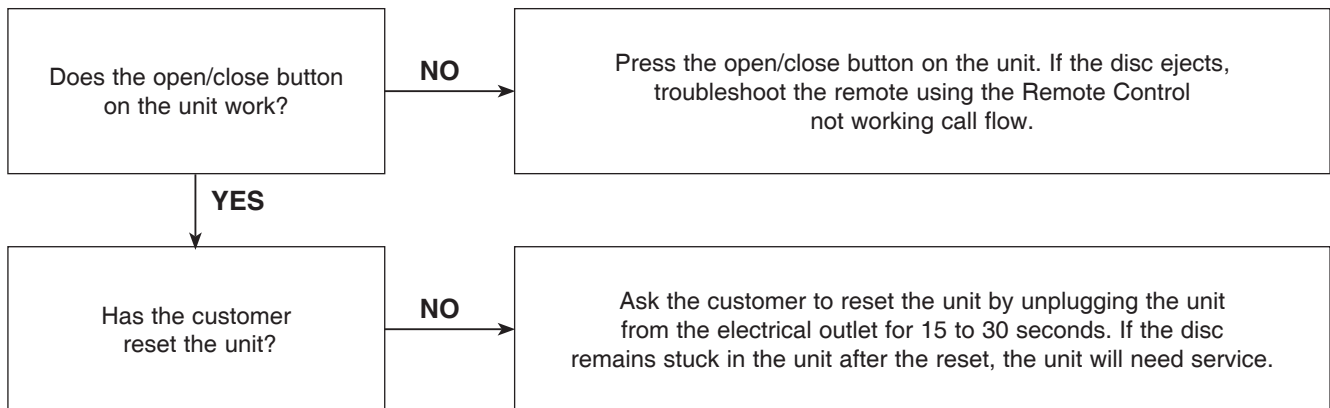
## 5-3. Unit Locks Up

Unit does not respond to any commands.



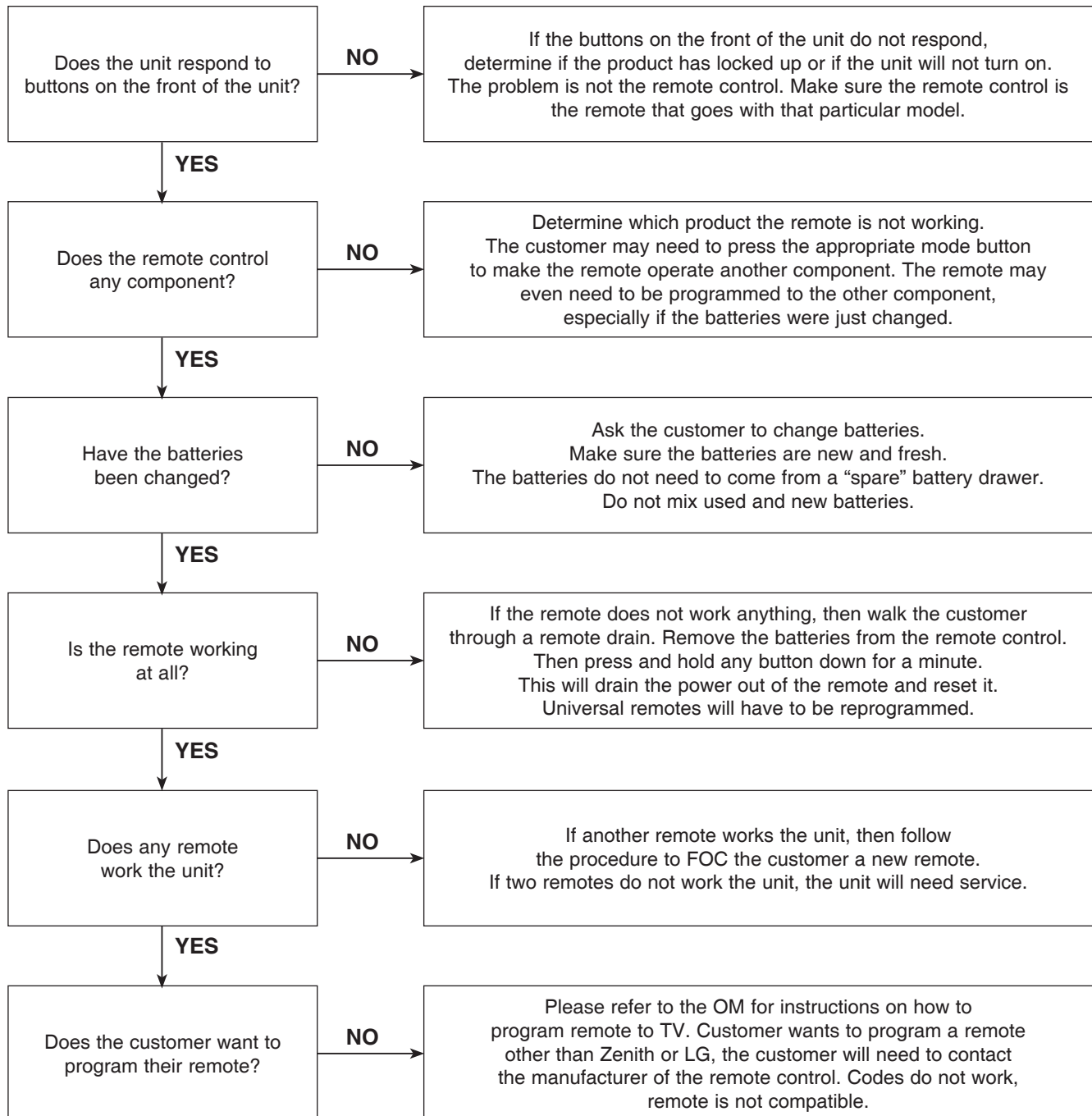
## 5-4. Disc Stuck

A BD disc is stuck in the unit.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

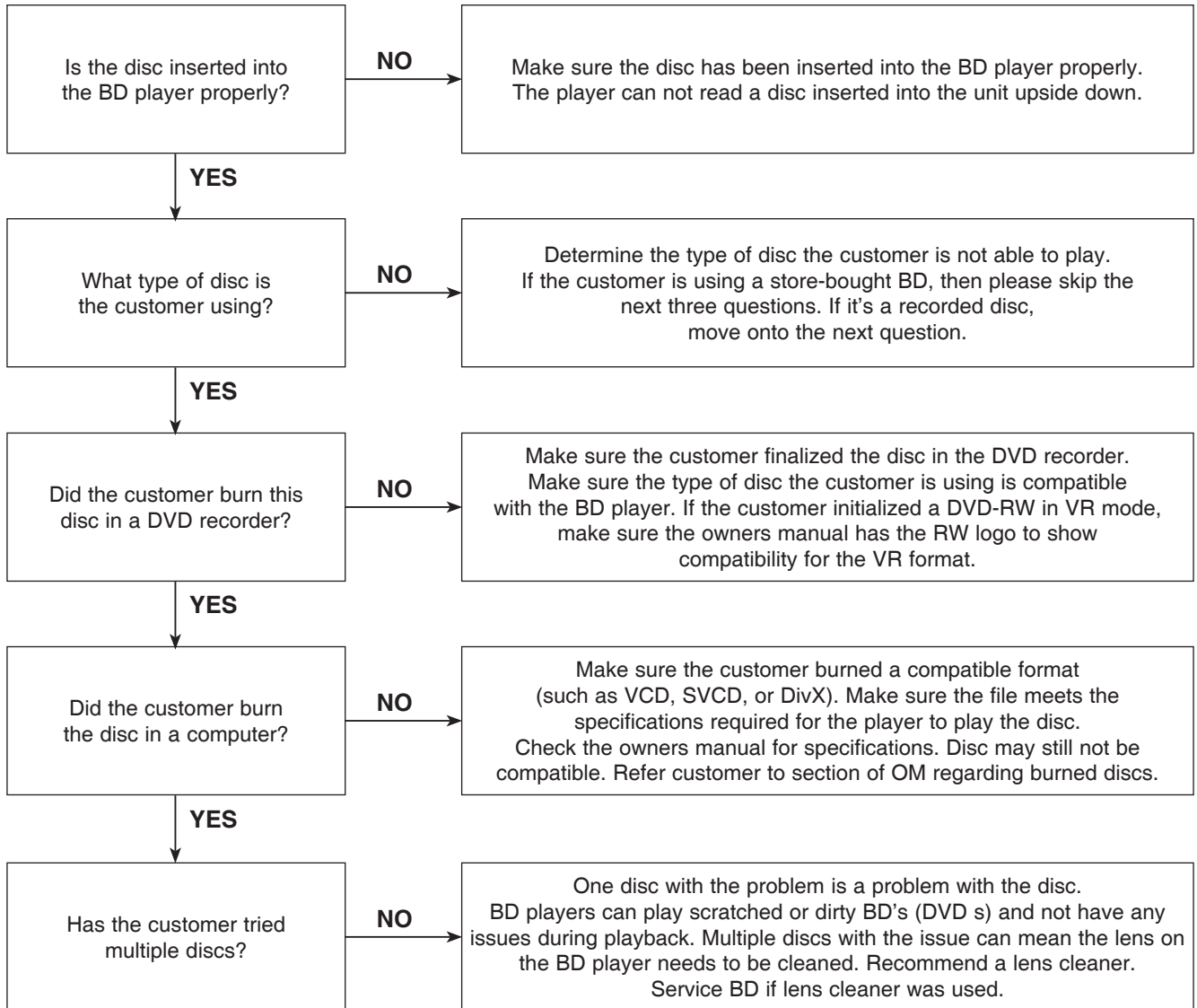
## 5-5. Remote Control Not Working



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 5-6. Will Not Play Disc

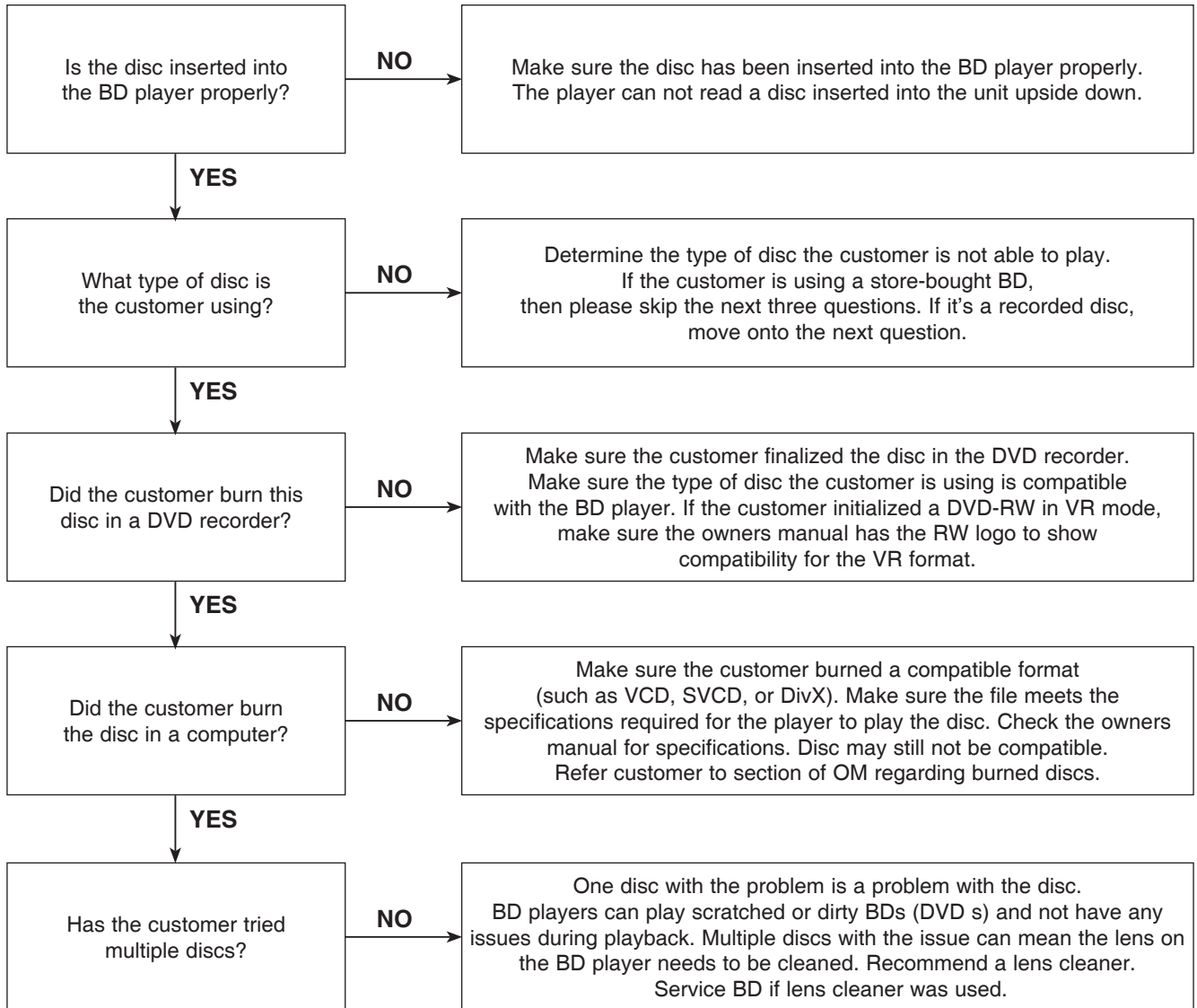
The unit will not play a disc when a disc is inserted into the player.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 5-7. Disc Freezes or Skips

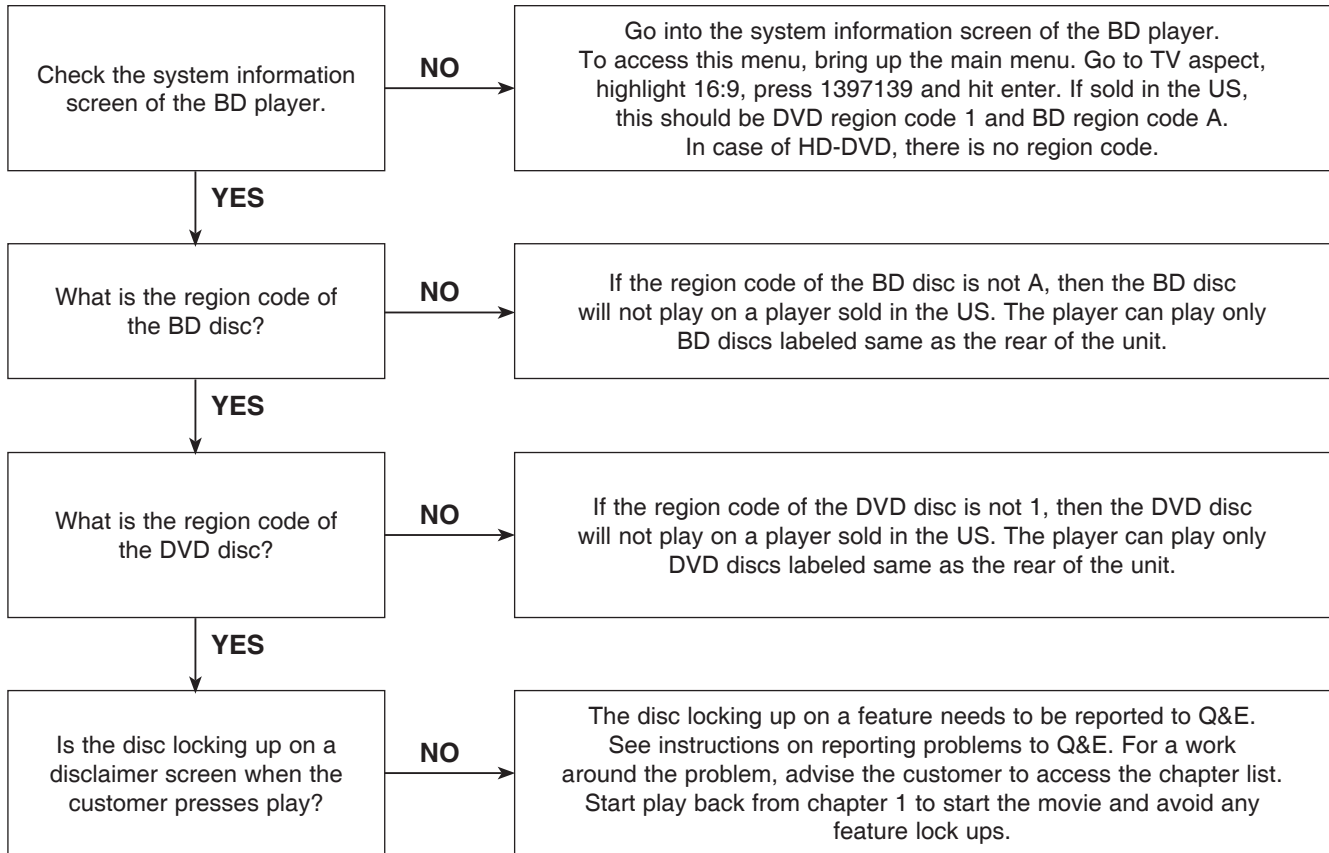
The audio and video freeze and skip during play back of a BD or DVD disc.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

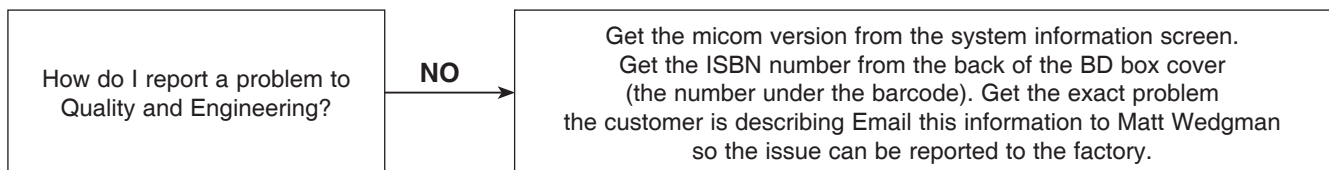
## 5-8. Can Access Menu, but Not Play a Movie

The disc menu is displayed but the disc will not play.



## 5-9. Reporting a problem to Quality & Engineering

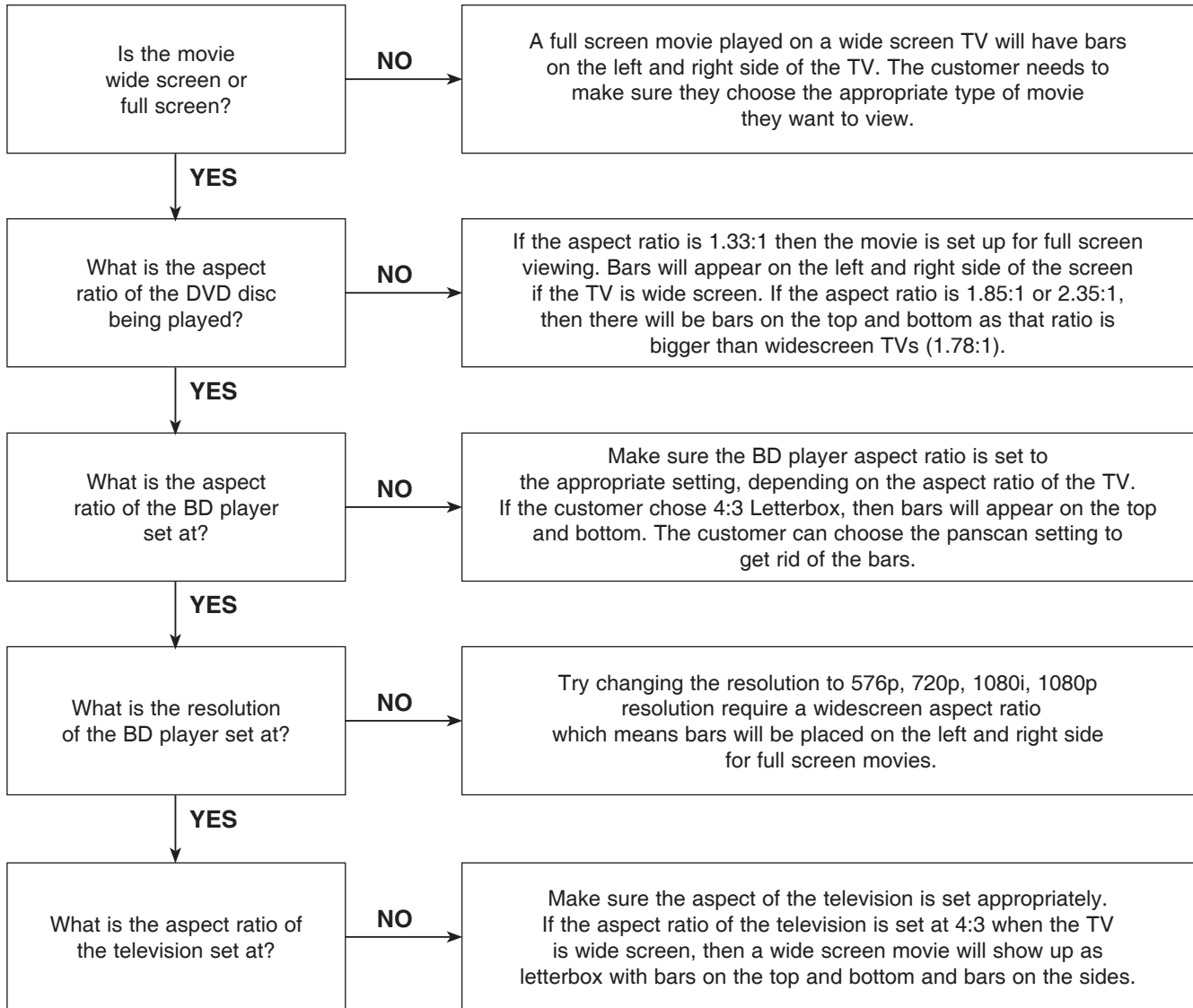
Reporting a problem that may require a firmware update to fix.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 5-10. Aspect Ratio

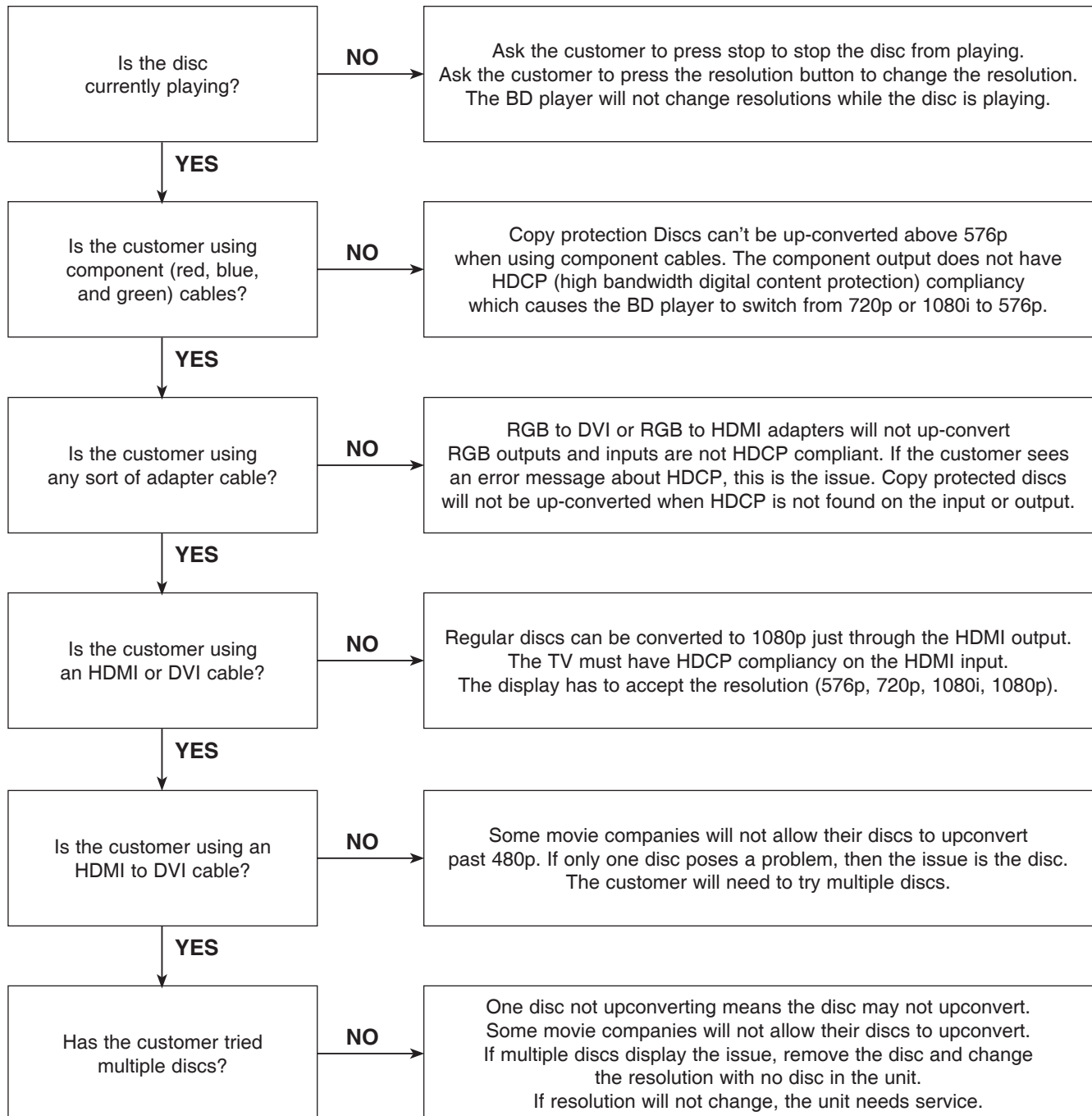
The customer has bars on the top and bottom of the screen, the left and right of the screen, or both.



# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 5-11. My Unit Won't be up-converted

The customer has a problem with getting the unit to change resolutions to 576p, 720p, 1080i, 1080p.

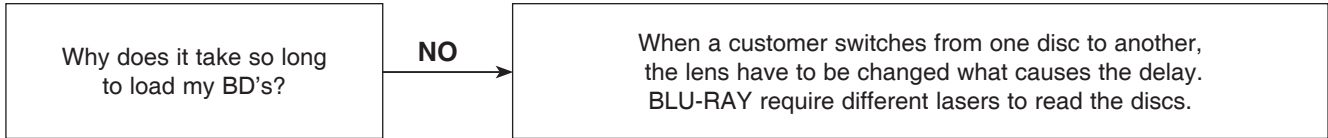




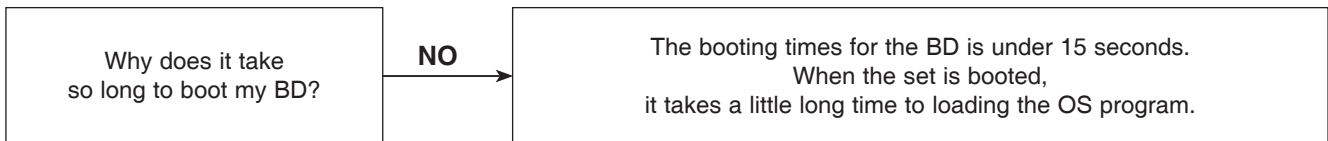
# DIGITAL DISPLAY & MEDIA TRAINING MASTER

## 6. BLU-RAY PLAYER

### 6-1. Slow Loading Times for BD's



### 6-2. Booting Times



# ONE POINT REPAIR GUIDE

## 1. NO POWER PROBLEM

No power problem occurs when you power on the unit.

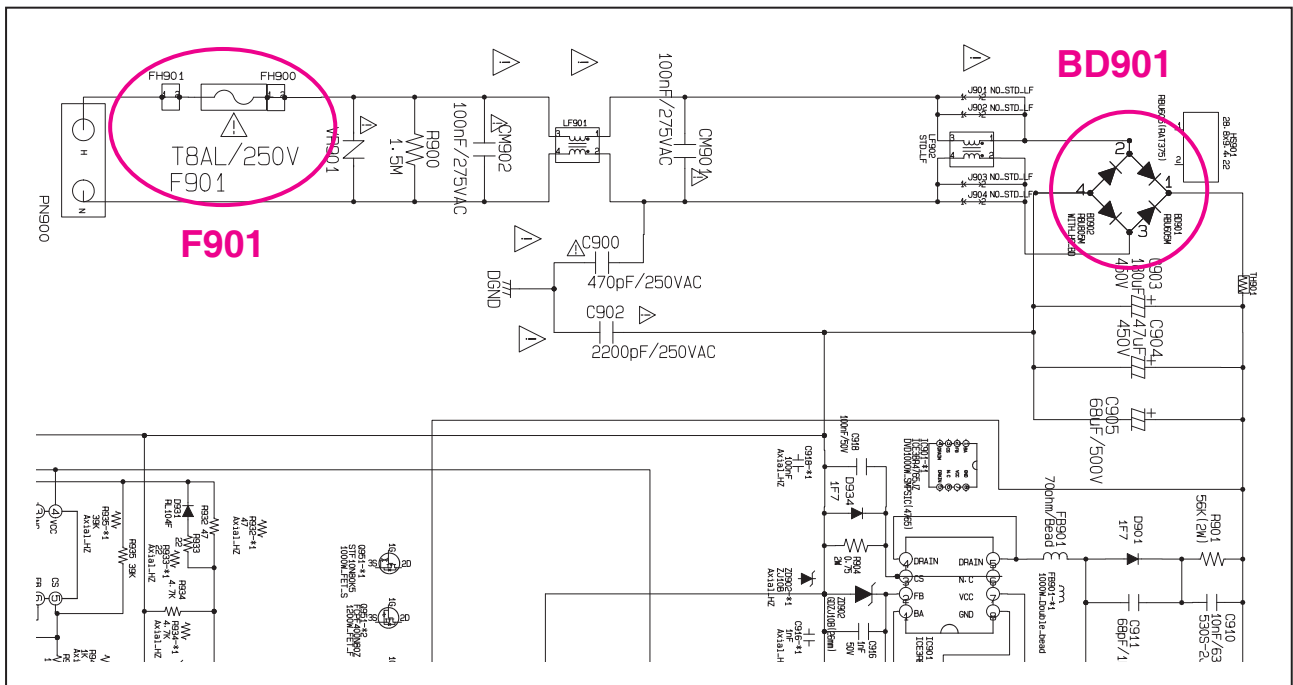
### 1-1. Fuse & Bridge diode

#### 1-1-1. Solution

Replace F901, BD901 on SMPS board.

#### 1-1-2. How to troubleshoot (Countermeasure)

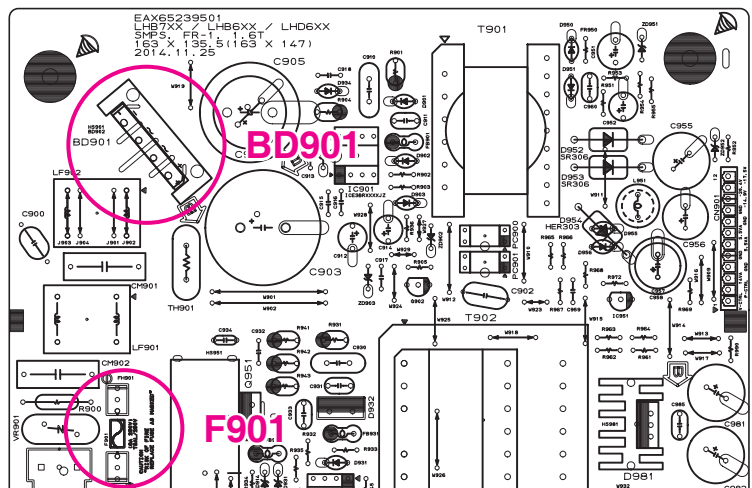
- 1) Look at the physical of fuse F901.
- 2) Check the bridge diode BD901.



#### 1-1-3. Service hint (Any picture / Remark)



< Fuse, F901 >  
Can look at physical condition.



< SMPS board top view >

# ONE POINT REPAIR GUIDE

No power problem occurs when you power on the unit.

## 1-2. VFD, 14 VA, 5.5 VA

### 1-2-1. Solution

Replace D922, D923, D924, D925, D926, D927, IC901.

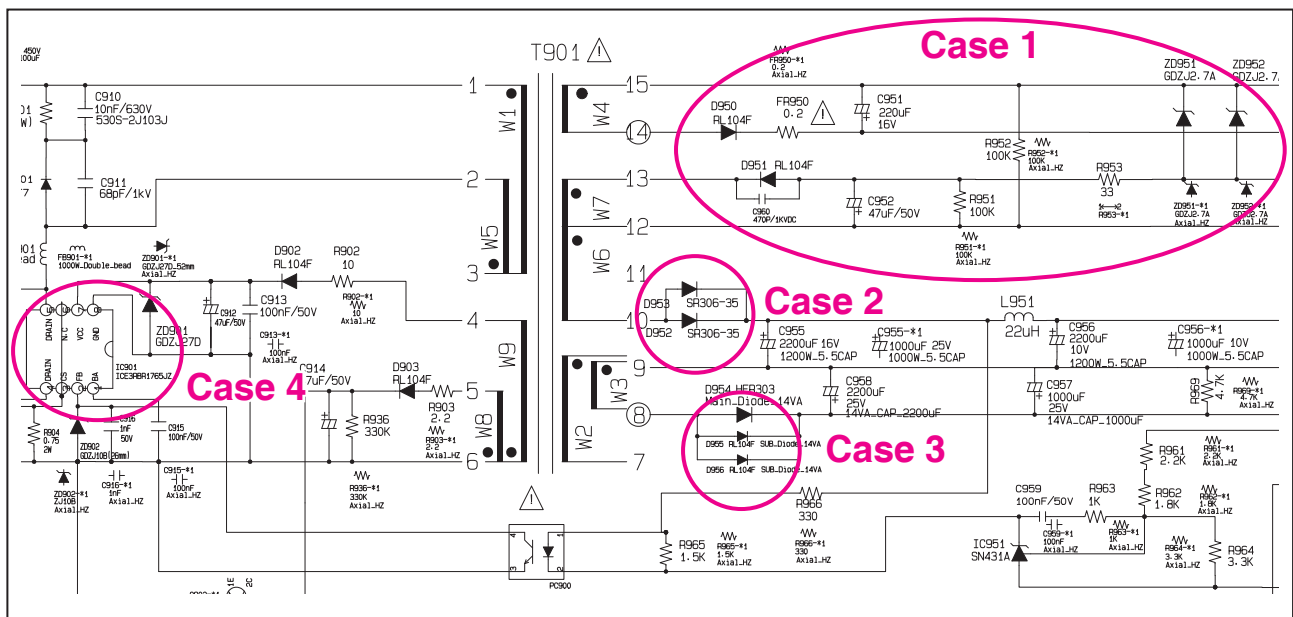
### 1-2-2. How to troubleshoot (Countermeasure)

Case 1) FLD abnormal: Check D950, D951, ZD951, ZD952, FR950 and replace it.

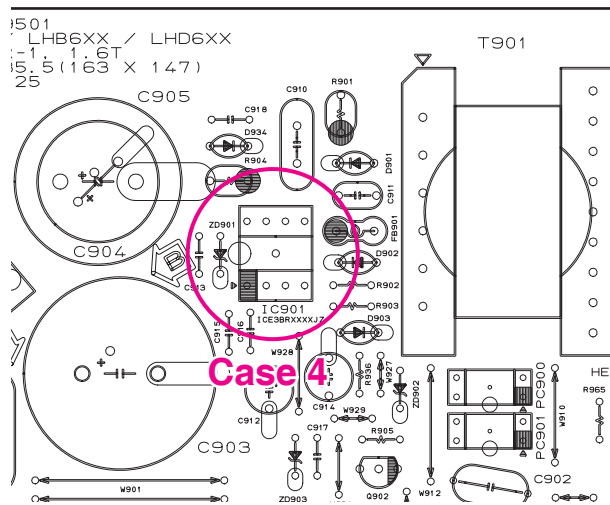
Case 2) 5.5 VA abnormal: Check D952, D953 and replace it.

Case 3) 14 VA abnormal: Check D955, D956 and replace it.

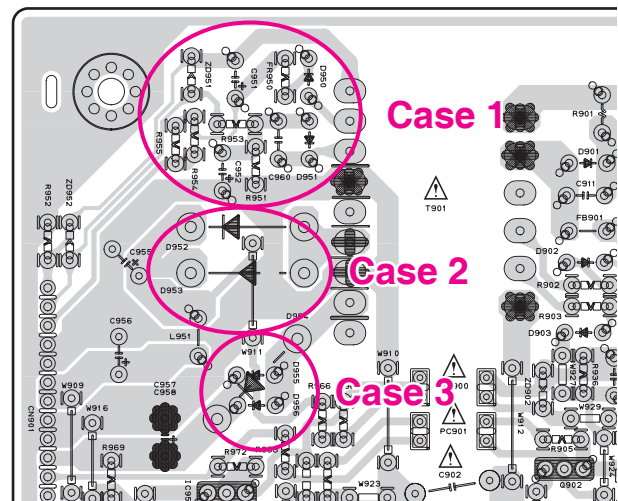
Case 4) All voltage abnormal: Check IC901 and replace it.



### 1-2-3. Service hint (Any picture / Remark)



< SMPS board top view >



< SMPS board bottom view >



# ONE POINT REPAIR GUIDE

When you turn on your set, it will blank / no message or Welcome on front panel, and it will not boot-up.

## 2-2. IC156 System 3.3 V (No System 3.3 V)

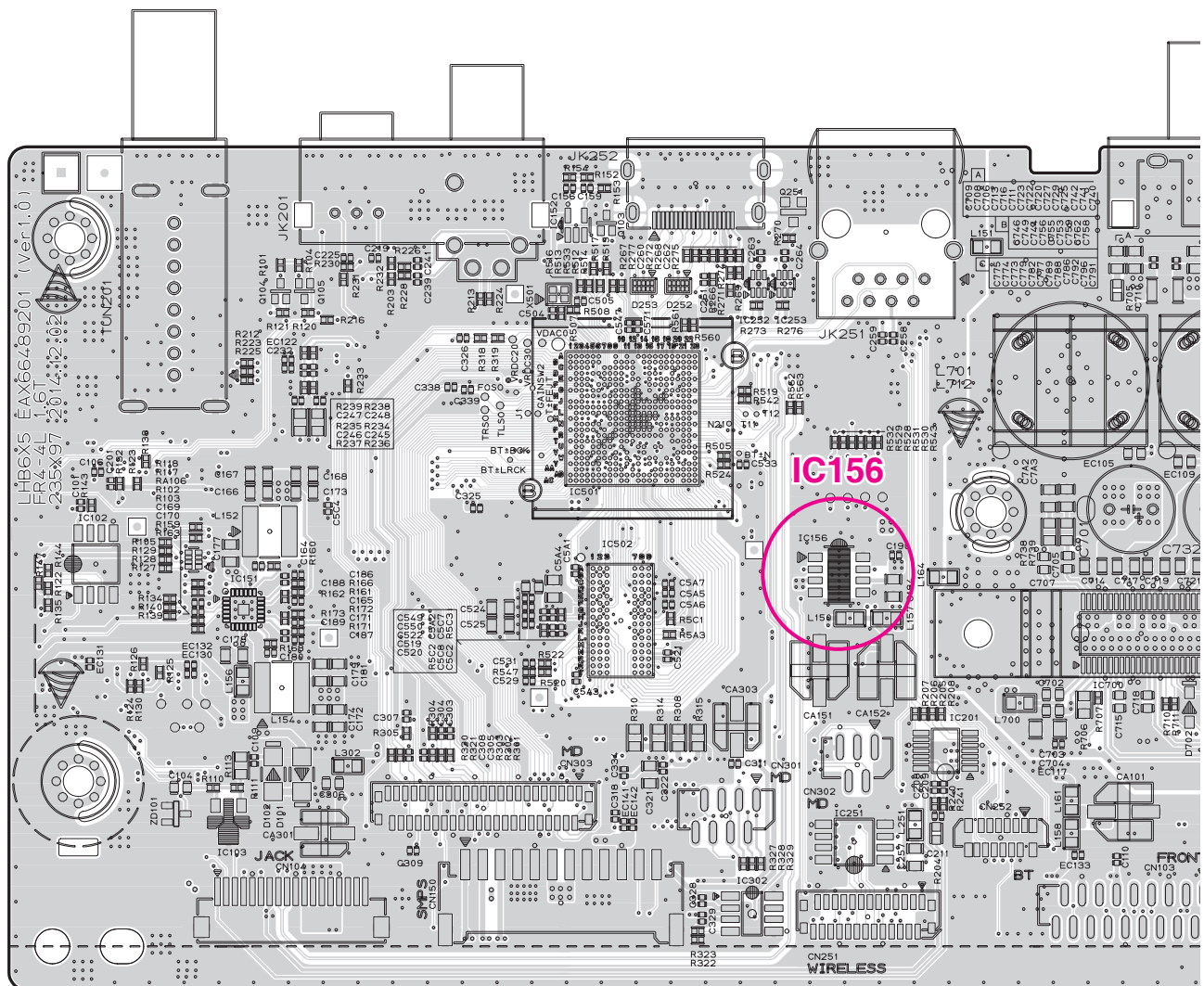
### 2-2-1. Solution

Replace IC156 on MAIN board.

### 2-2-2. How to troubleshoot (Countermeasure)

- 1) Please check 5.5 VA of IC156 pin3 (VIN).
- 2) If 5.5 VA is abnormal, please check SMPS 5.5 VA.
- 3) If 5.5 VA is OK, but 3.3 V is abnormal at the IC156 pin6 (VOUT), replace IC156.

### 2-2-3. Service hint (Any picture / Remark)



< MAIN board top view >

# ONE POINT REPAIR GUIDE

When you turn on your set, it will blank / no message or Welcome on front panel, and it will not boot-up.

## 2-3. IC151 (No 1.2 V & 1.5 V)

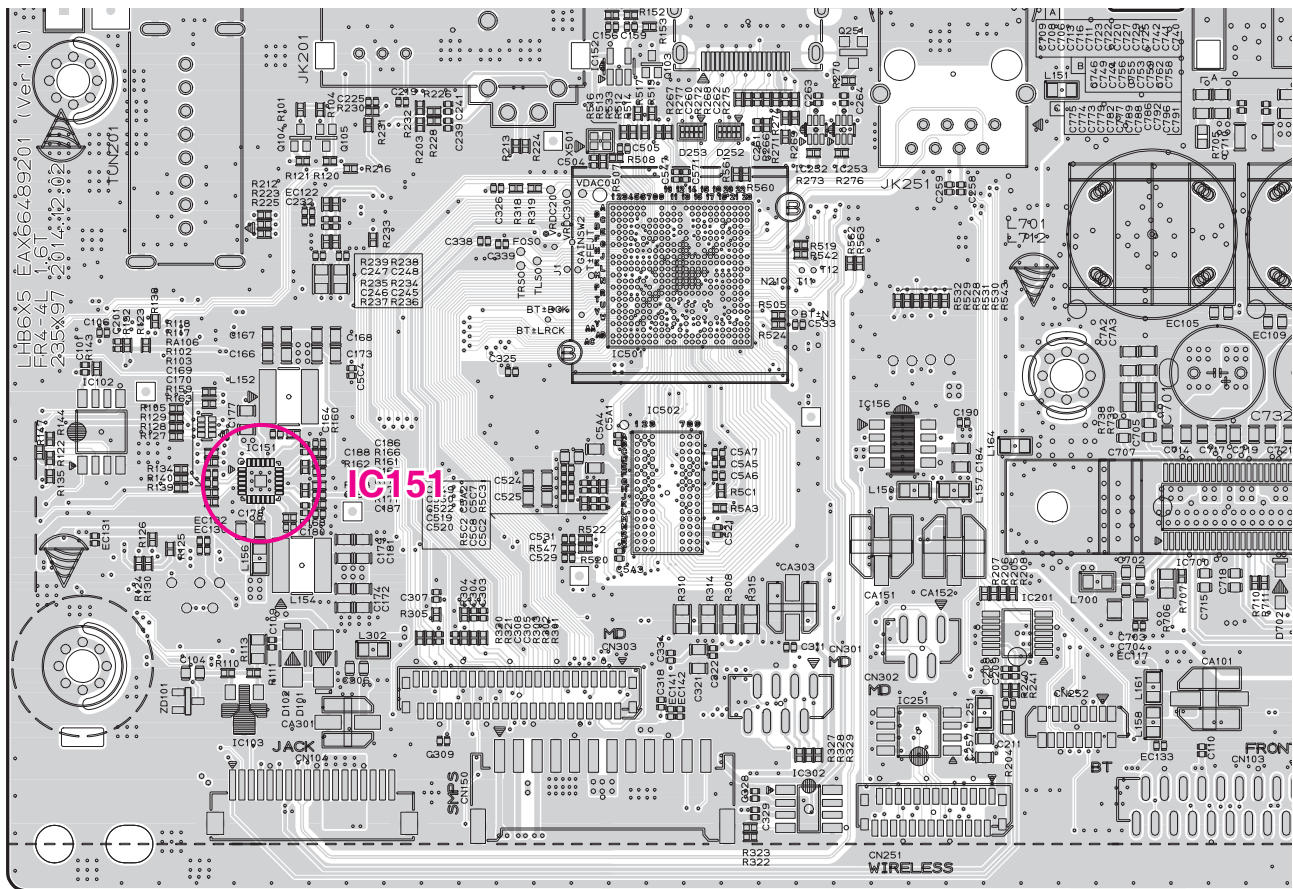
### 2-3-1. Solution

Replace IC151 on MAIN board.

### 2-3-2. How to troubleshoot (Countermeasure)

- 1) Please check 1.2 V & 1.5 V of IC151 on MAIN board.
- 2) If 1.2 V voltage doesn't come out, check IC151 pin22 (VCC 5.5 VA).  
If 1.5 V voltage doesn't come out, check IC151 pin9 (VCC 5.5 VA).  
If there is no 5.5 V, please check 5.5 VA from SMPS.
- 3) If 5.5 VA input is normal, first of all check DC15\_12\_CTRL is high (IC101 pin24).  
If DC15\_12\_CTRL is high, check R159 and if there's no defective component then please replace IC151.
- 4) After changing it, if the set is still not booting :
  - Check 1.2 V, 1.5 V, 3.3 V is normal. (please refer to other sections of this guide)
  - Check Crystal X501 refer to item 2-4.
  - Check NAND Flash IC (IC503) refer to item 2-5.
  - Check DDR IC (IC502) refer to item 2-6.
  - Check MT8563 IC (IC501) refer to item 2-7.

### 2-3-3. Service hint (Any picture / Remark)



< MAIN board top view >

# ONE POINT REPAIR GUIDE

When you turn on your set, it will display “WELCOME” on front panel, and it will not boot-up normally.

## 2-4. X501

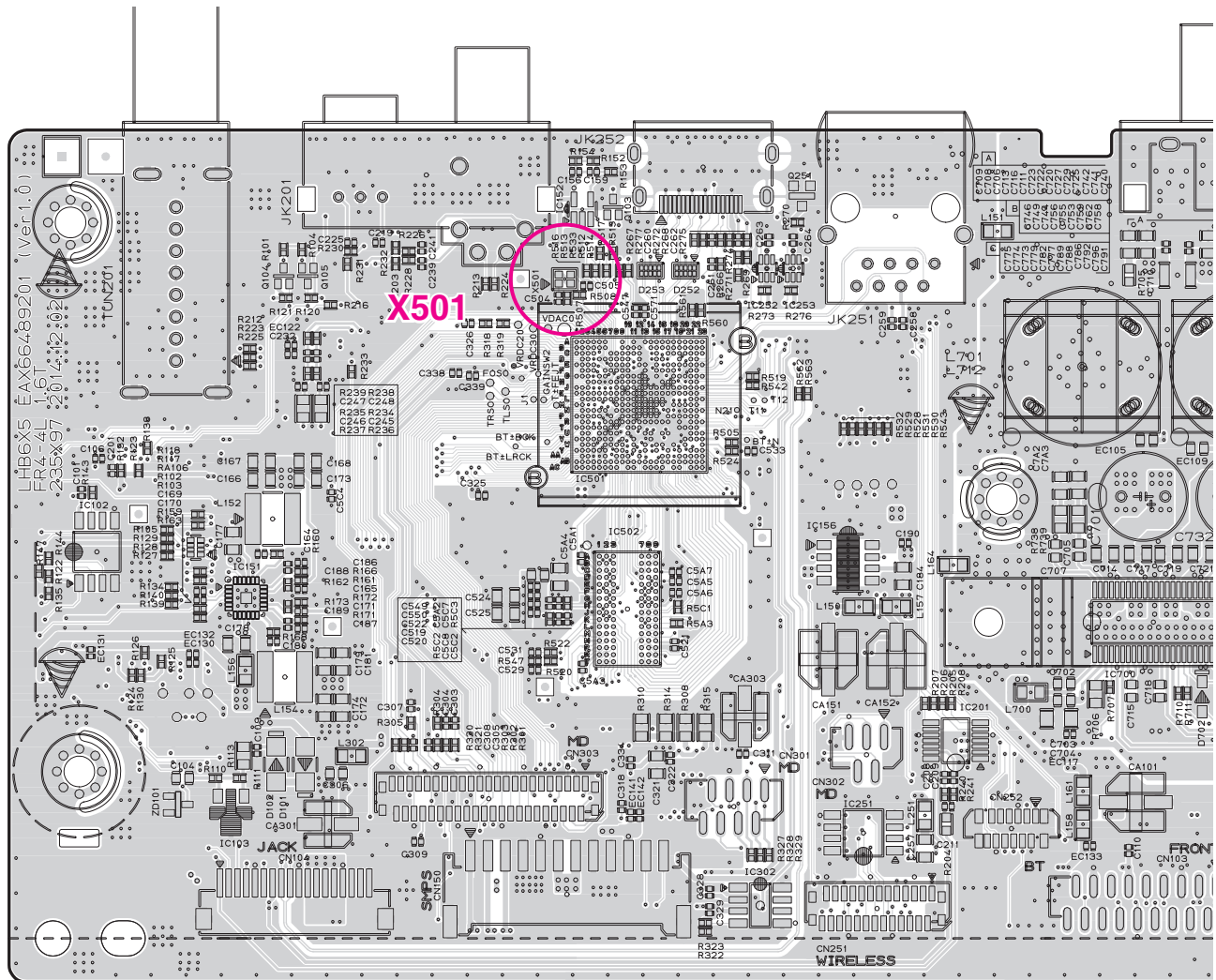
### 2-4-1. Solution

Replace X501 on MAIN board.

### 2-4-2. How to troubleshoot (Countermeasure)

- 1) Please check the soldering status of 27 MHz crystal (X501).
- 2) Please check the frequency of 27 MHz crystal (X501).
- 3) If the crystal doesn't oscillate, replace X501.
- 4) After changing it, if the set is still not booting :
  - Check NAND Flash IC (IC503) refer to item 2-5.
  - Check DDR IC (IC502) refer to item 2-6.
  - Check MT8563 IC (IC501) refer to item 2-7.

### 2-4-3. Service hint (Any picture / Remark)



< MAIN board top view >

# ONE POINT REPAIR GUIDE

When you turn on your set, it will display “WELCOME” on front panel, and it will not boot-up normally.

## 2-5. IC503 (NAND FLASH MEMORY)

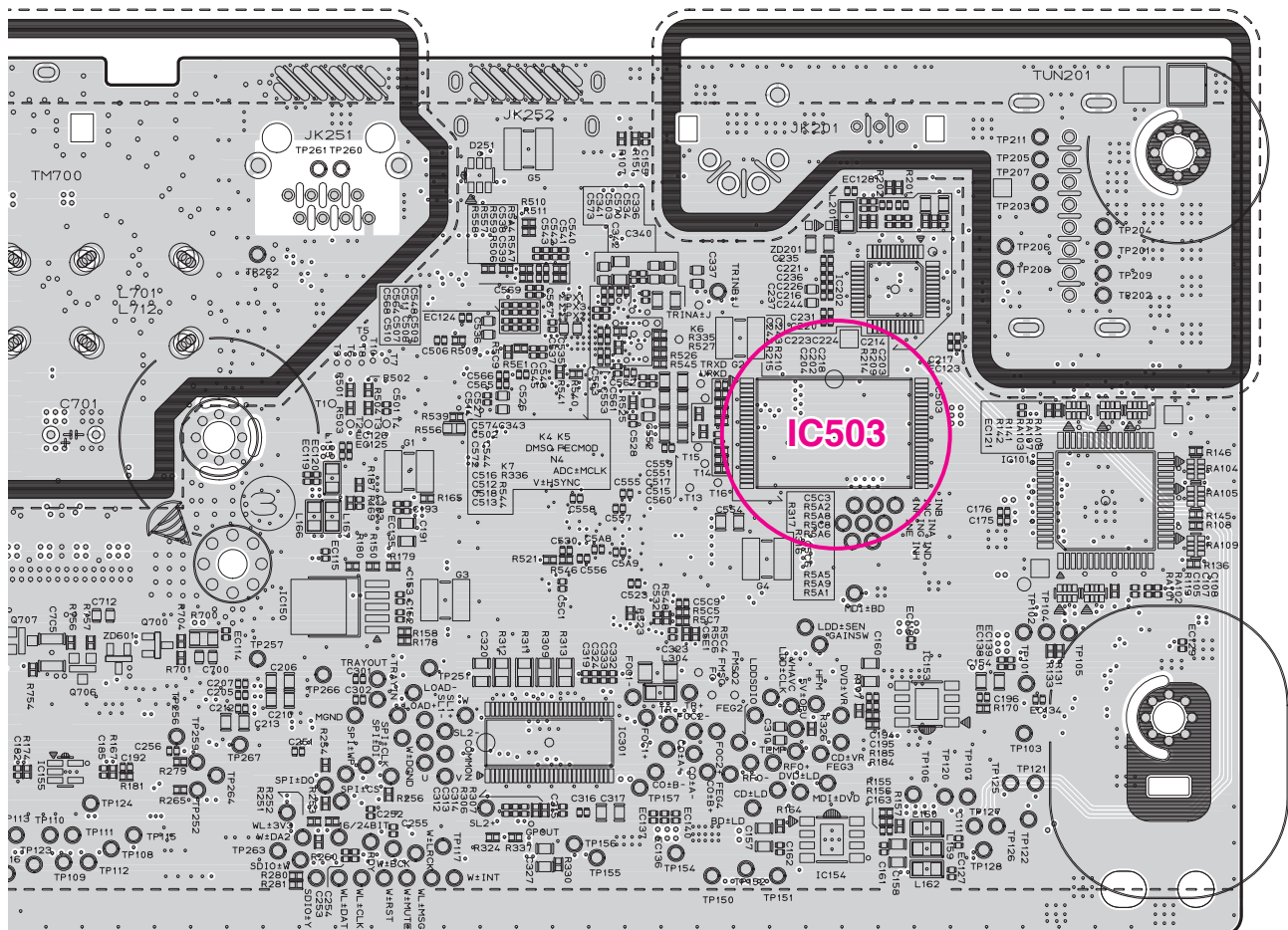
### 2-5-1. Solution

Replace IC503 on MAIN board.

### 2-5-2. How to troubleshoot (Countermeasure)

- 1) Please check physical status of IC503 on your eyes.
- 2) Check the VCC (3.3 V) of IC503 and if it's normal, please replace IC503.  
(Please make sure IC503 has proper program.)
- 3) After changing it, if the set is still not booting :
  - Check DDR IC (IC502) refer to item 2-6.
  - Check MT8563 IC (IC501) refer to item 2-7.

### 2-5-3. Service hint (Any picture / Remark)



< MAIN board bottom view >



# ONE POINT REPAIR GUIDE

When you turn on your set, it will display “WELCOME” on front panel, and it will not boot-up normally.

## 2-6. IC502 (DDR3 MEMORY)

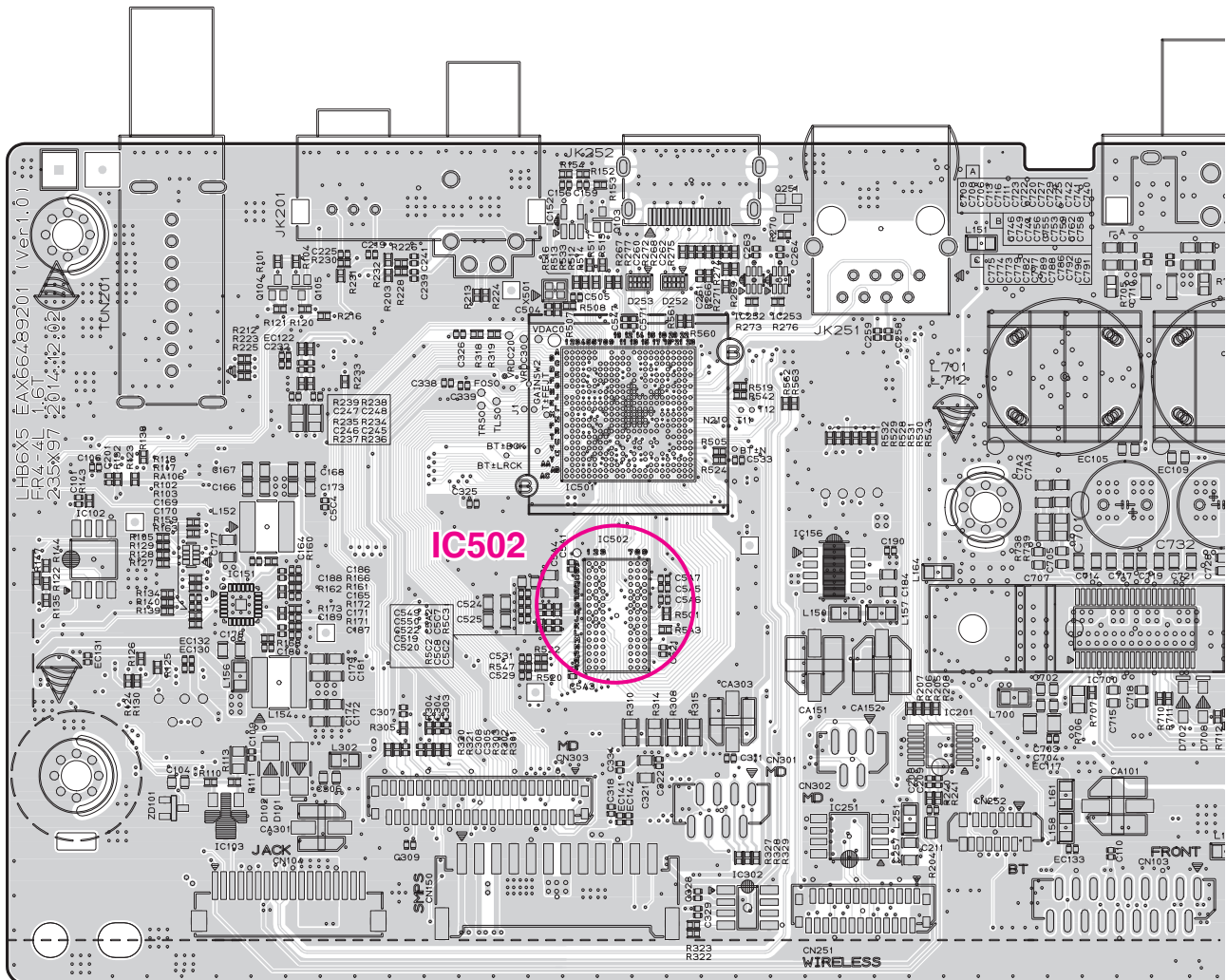
### 2-6-1. Solution

Replace IC502 on MAIN board.

### 2-6-2. How to troubleshoot (Countermeasure)

- 1) Please check 0.75 V of DDR3\_VREF. (between C5C2 and R5C3)  
Please check 1.5 V of IC502.
- 2) If it doesn't work even though IC151, IC156 are no problem,  
IC502 (DDR memory) could have problem.
- 3) After changing it, if the set is still not booting :  
- Check MT8563 IC (IC501) refer to item 2-7.

### 2-6-3. Service hint (Any picture / Remark)



< MAIN board top view >

# ONE POINT REPAIR GUIDE

When you turn on your set, it will display “WELCOME” on front panel, and it will not boot-up normally.

## 2-7. IC501 (MPEG IC)

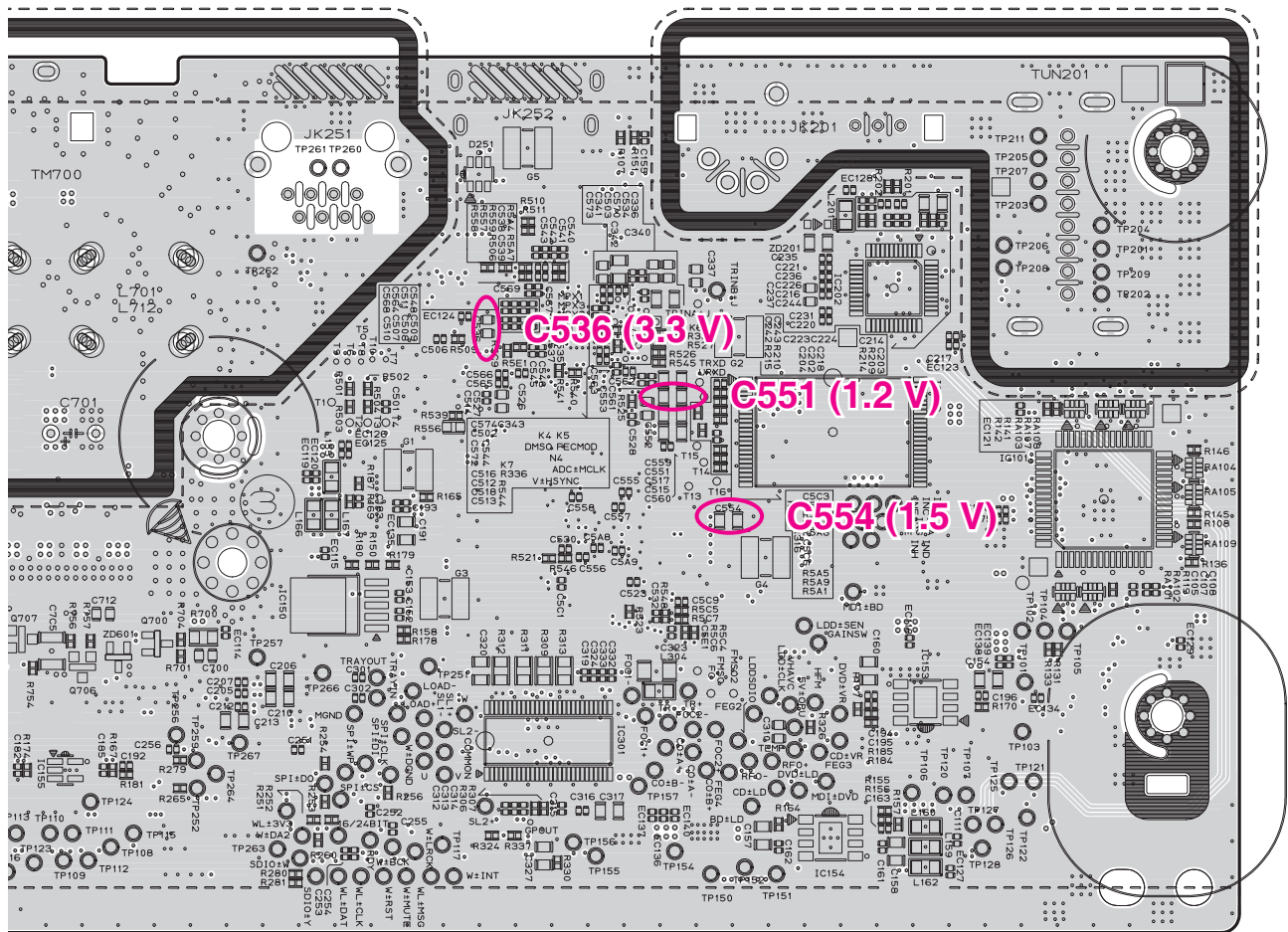
### 2-7-1. Solution

Replace IC501 on MAIN board.

### 2-7-2. How to troubleshoot (Countermeasure)

- 1) Please Check 1.2 V of C551 on MAIN board.  
Please Check 3.3 V of C536 on MAIN board.  
Please Check 1.5 V of C554 on MAIN board.
- 2) If it doesn't work even though IC151, IC156 are no problem,  
IC501 MT8563 could have problem.

### 2-7-3. Service hint (Any picture / Remark)



< MAIN board bottom view >

# ONE POINT REPAIR GUIDE

## 3. WIRED NETWORK CONNECTION ERROR

When you connect online service (like You-tube or Netflix2.1) through the wired LAN, the “no connection“ message appears.

### 3-1. JK251 (ETHERNET JACK)

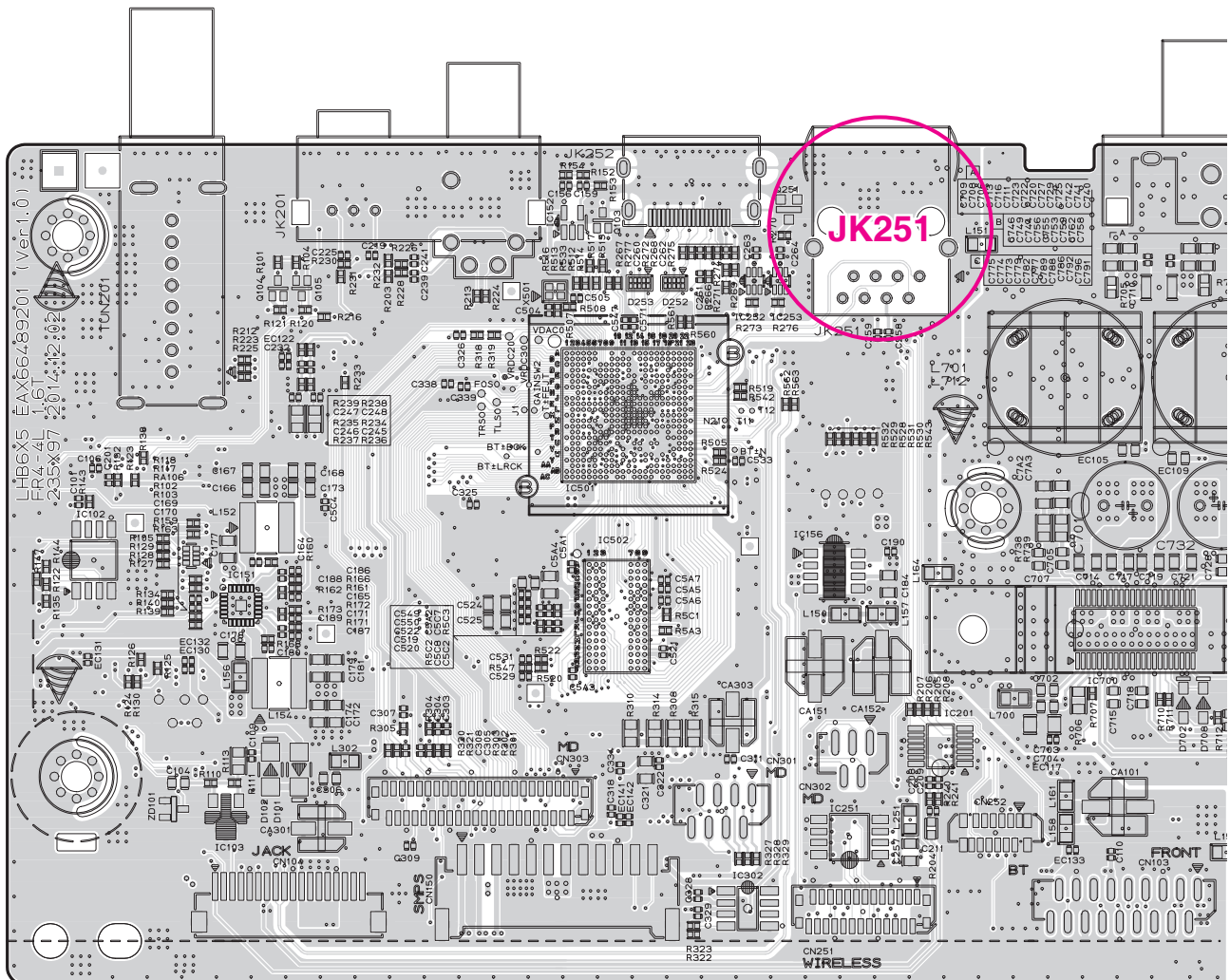
#### 3-1-1. Solution

Replace JK251 on MAIN board.

#### 3-1-2. How to troubleshoot (Countermeasure)

- 1) Check you internet connection. Make sure it connect properly to modem or router.
- 2) If internet connection OK, please check the Ethernet Jack (JK251).
- 3) If there is soldering problem, please re-soldering pin JK251.
- 4) If after re-soldering problem still occurs, replace JK251.
- 5) If problem still occurs after change JK251, check MT8563 IC (IC501). Refer to item 2-7.

#### 3-1-3. Service hint (Any picture / Remark)



< MAIN board top view >

# ONE POINT REPAIR GUIDE

## 4. BAD HDMI VIDEO / AUDIO OUTPUT

When unit is connected to HDMI TV using HDMI cable, picture shows bad color, no output or mixed color on the screen. But component output is OK.

### 4-1. JK252 (HDMI JACK)

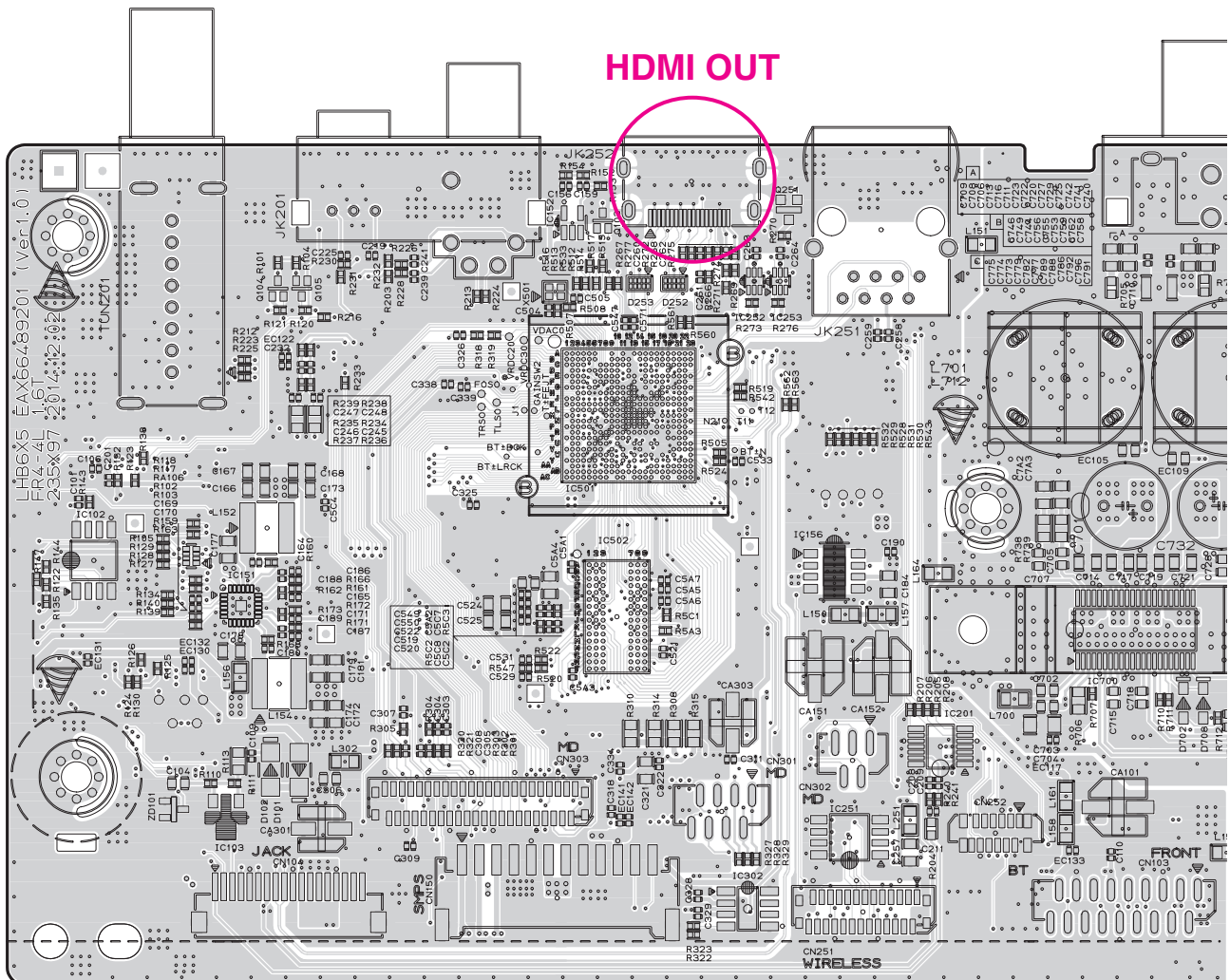
#### 4-1-1. Solution

Replace JK252 (HDMI Jack).

#### 4-1-2. How to troubleshoot (Countermeasure)

- 1) Check JK252 pin soldering.
- 2) If there is short soldering on pin JK252, re-soldering pin JK252.
- 3) If problem still occurs, check HDMI data.
  - If all data OK, replace JK252.
  - If data NG, check set on BD mode :  
Replace IC501.

#### 4-1-3. Service hint (Any picture / Remark)



< MAIN board top view >

# ONE POINT REPAIR GUIDE

## 5. NO AUDIO FROM SPEAKER

When unit is connected to speaker, no audio from speaker.

### 5-1. IC601 (PWM IC)

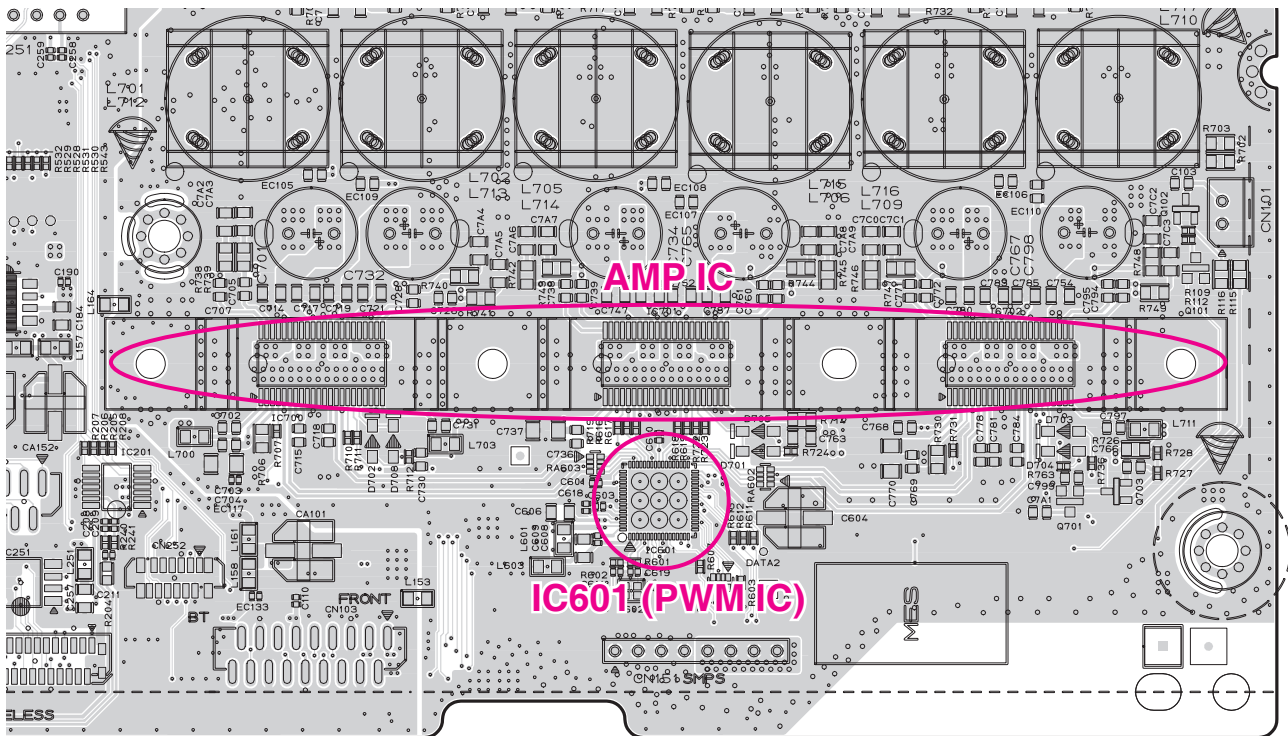
#### 5-1-1. Solution

Replace IC601 (PWM IC).

#### 5-1-2. How to troubleshoot (Countermeasure)

- 1) Check IC601 pin soldering.
- 2) If there is short soldering on pin IC601, re-soldering pin IC601.
- 3) If problem still occurs, check AMP IC (IC700, IC701, IC702).
  - Check IC700, IC701, IC702 pin soldering.
  - If soldering ok, check the AMP heat sink :  
Replace IC700, IC701, IC702.

#### 5-1-3. Service hint (Any picture / Remark)



< MAIN board top view >



< AMP heat sink view >

# ONE POINT REPAIR GUIDE

## 6. NO USB

When unit is connected to USB, no audio and video from SET.

### 6-1. IC501 (MT8563)

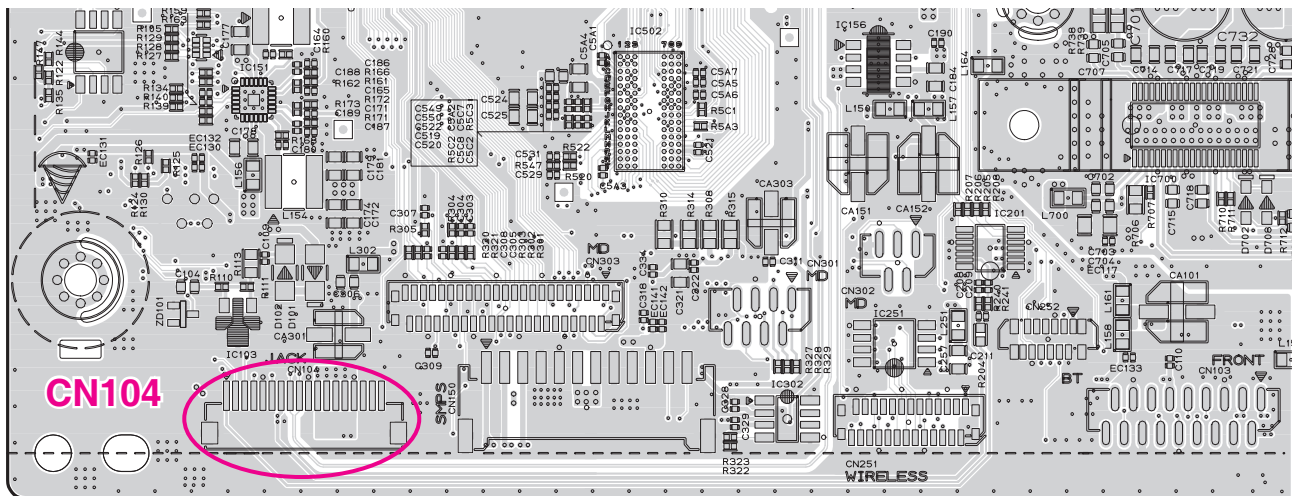
#### 6-1-1. Solution

Change IC501 (MT8563).

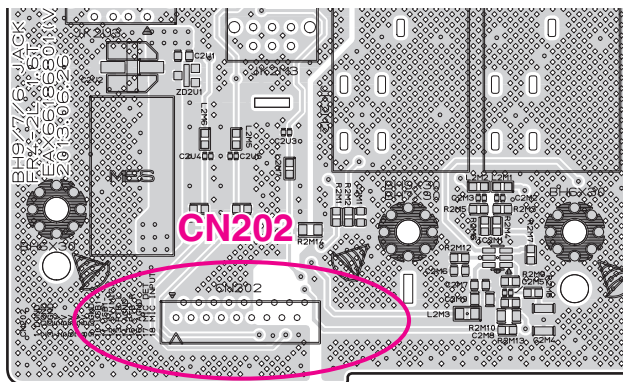
#### 6-1-2. How to troubleshoot (Countermeasure)

- 1) MAIN board : Check CN104 connector and FFC cable.  
JACK board : Check CN202 connector.
- 2) If there is short soldering on CN104, re-soldering CN104.  
If there is short soldering on CN202, re-soldering CN202.
- 3) If problem still occurs, check 5 V (CN104 pin11 ~ pin15).
  - If no output, check MAIN board IC154.
  - If OK, check D+, D- signal.
  - If there is no signal, replace IC501.

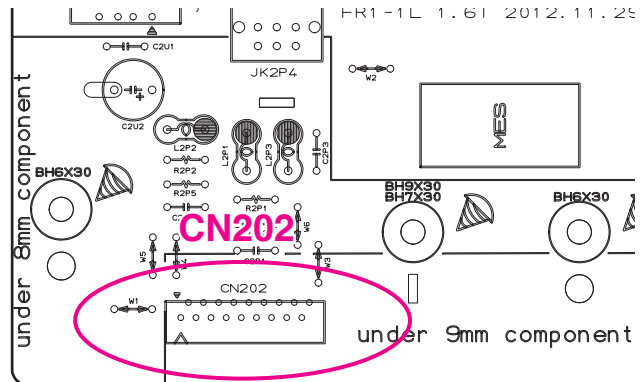
#### 6-1-3. Service hint (Any picture / Remark)



< MAIN board top view >



< USB/ PORTABLE/ MIC board top view >

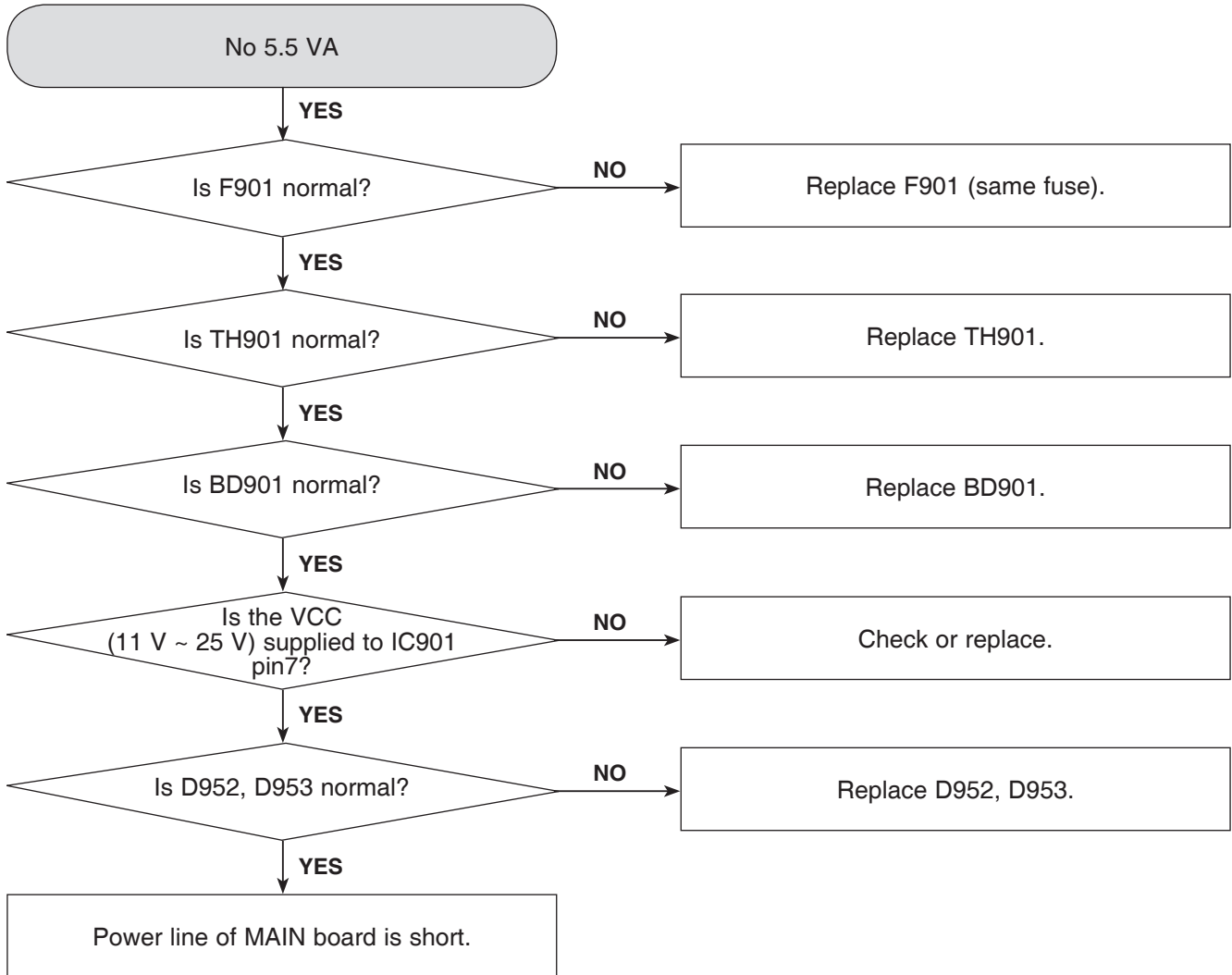


< USB/ PORTABLE board top view >



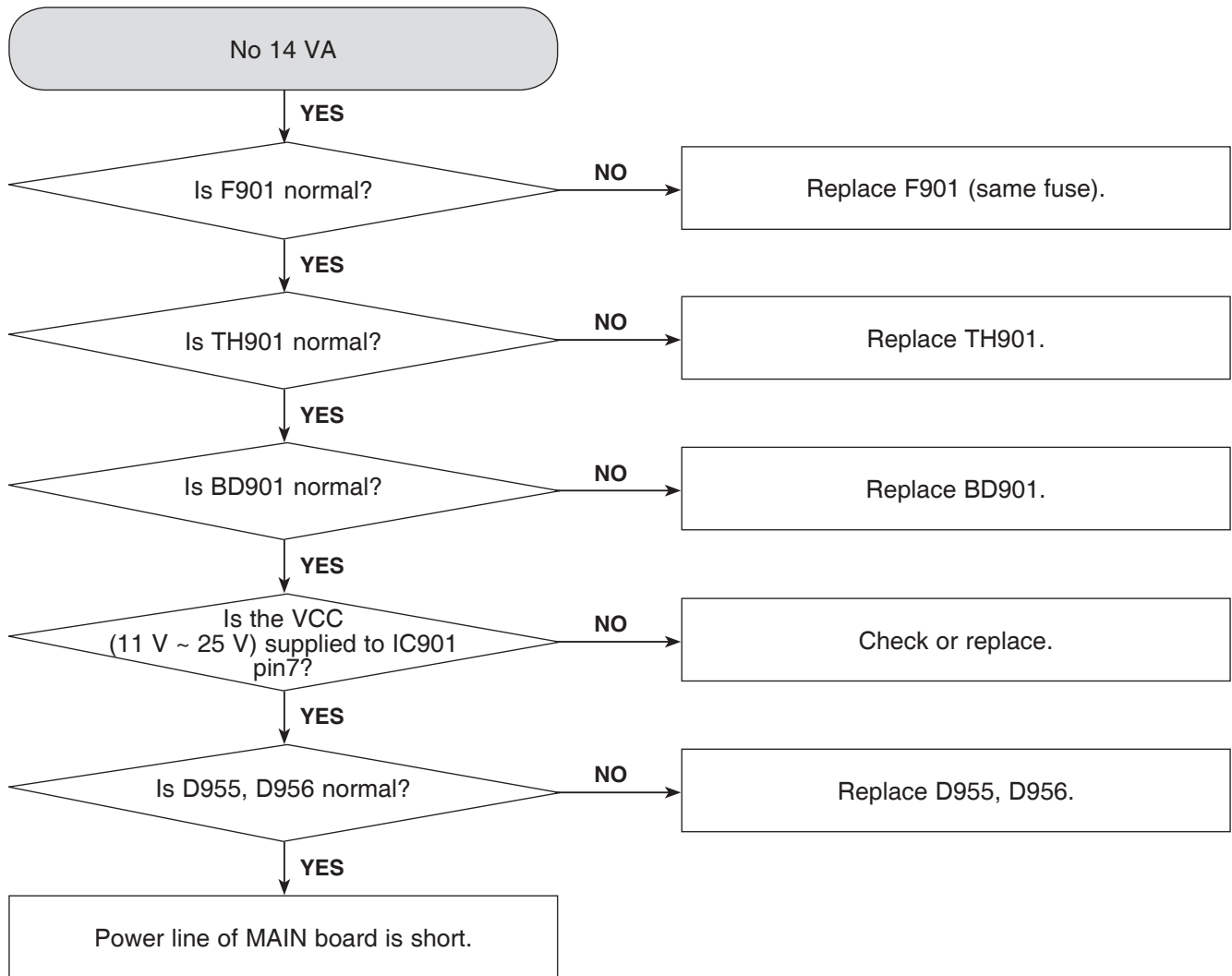
# ELECTRICAL TROUBLESHOOTING GUIDE

## 1. SYSTEM POWER SUPPLY ON SMPS BOARD

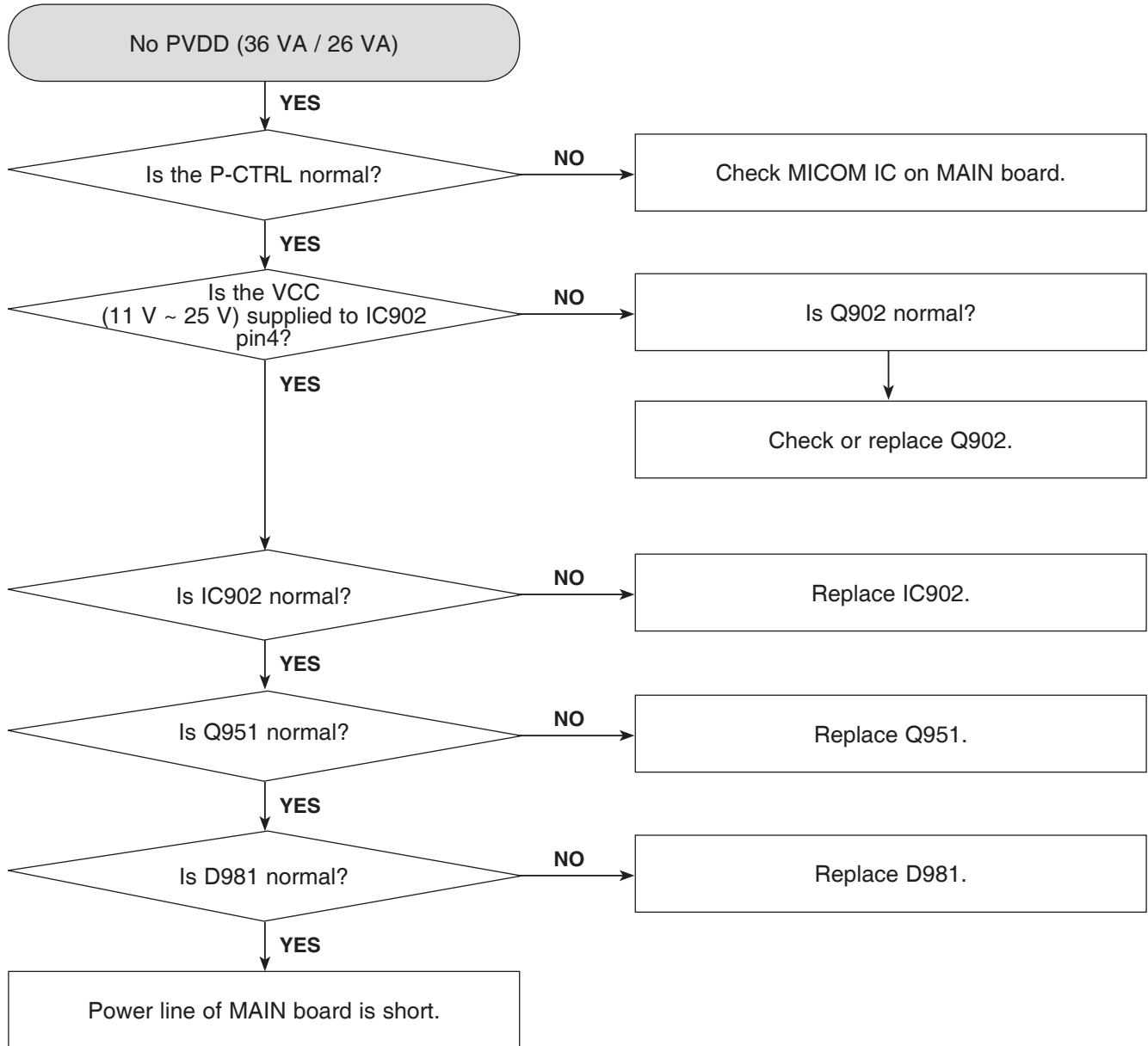




# ELECTRICAL TROUBLESHOOTING GUIDE

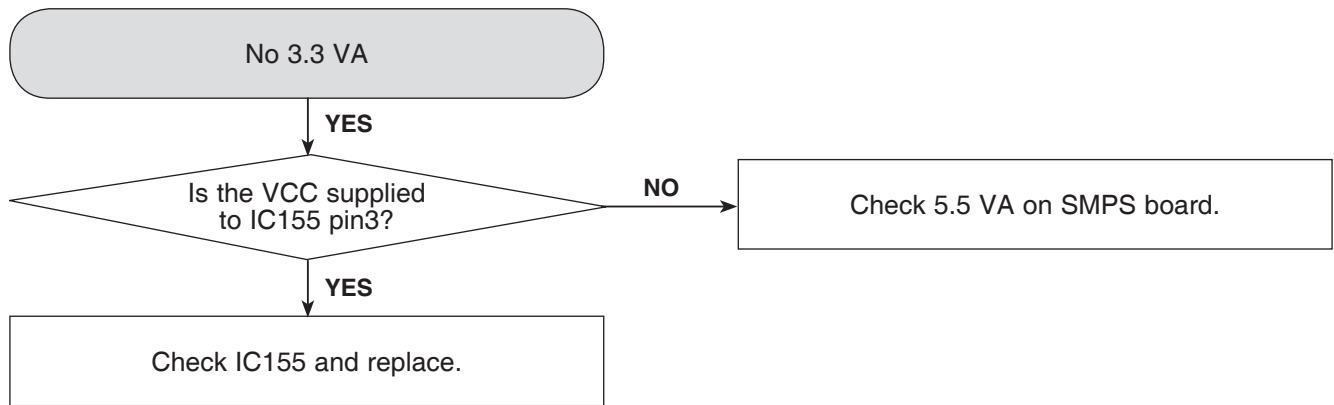
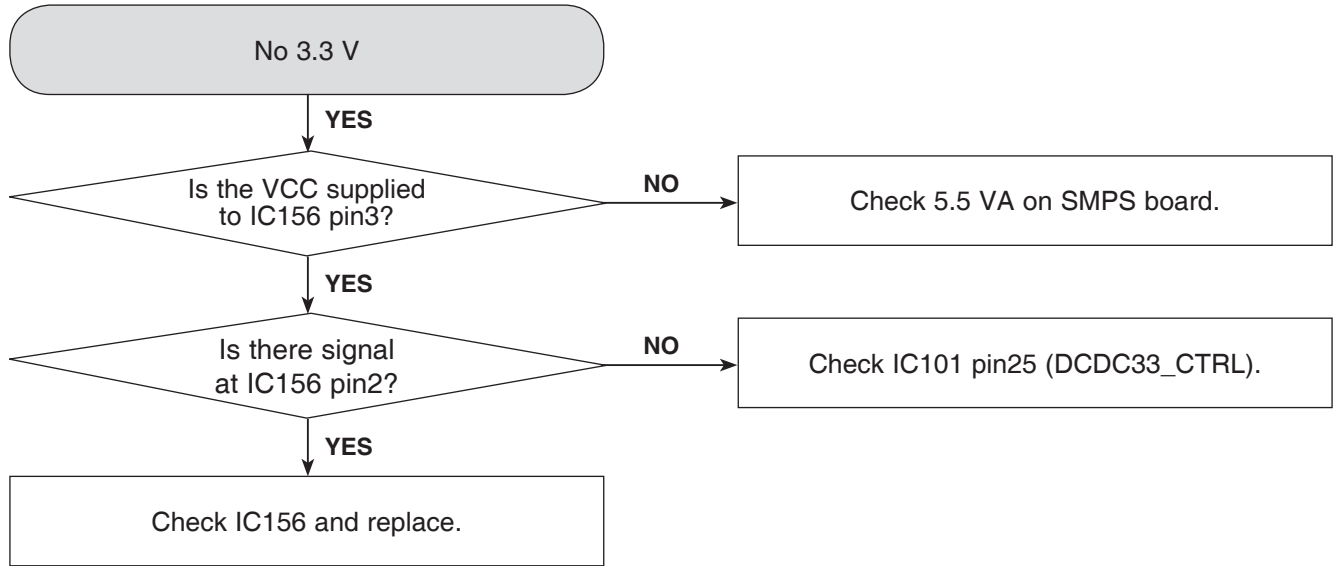


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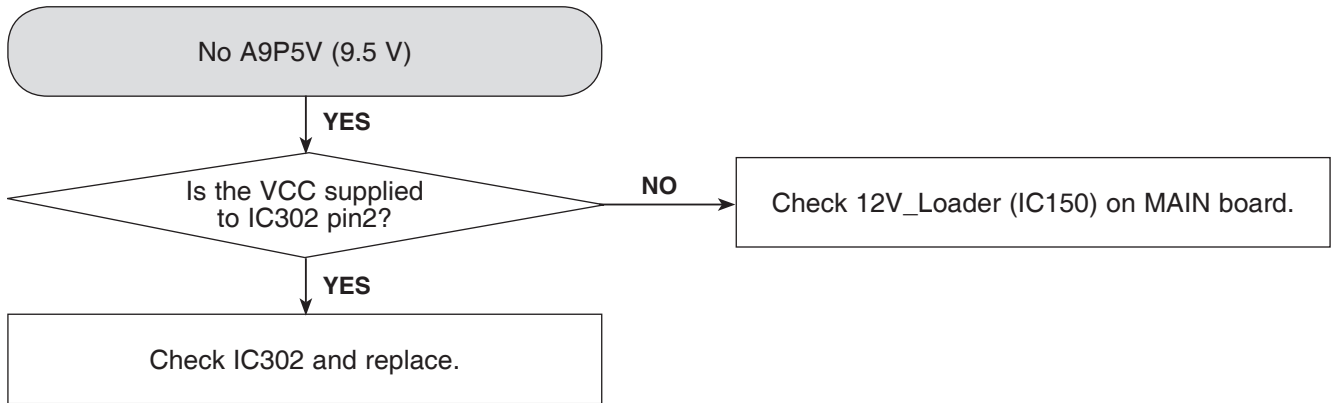
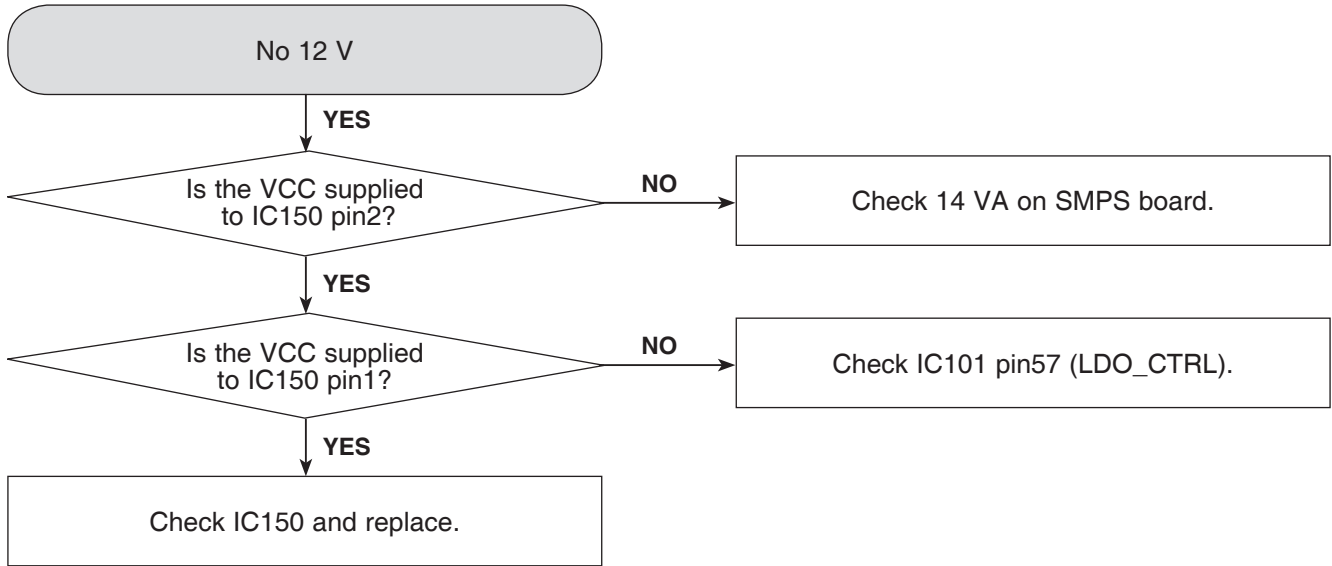


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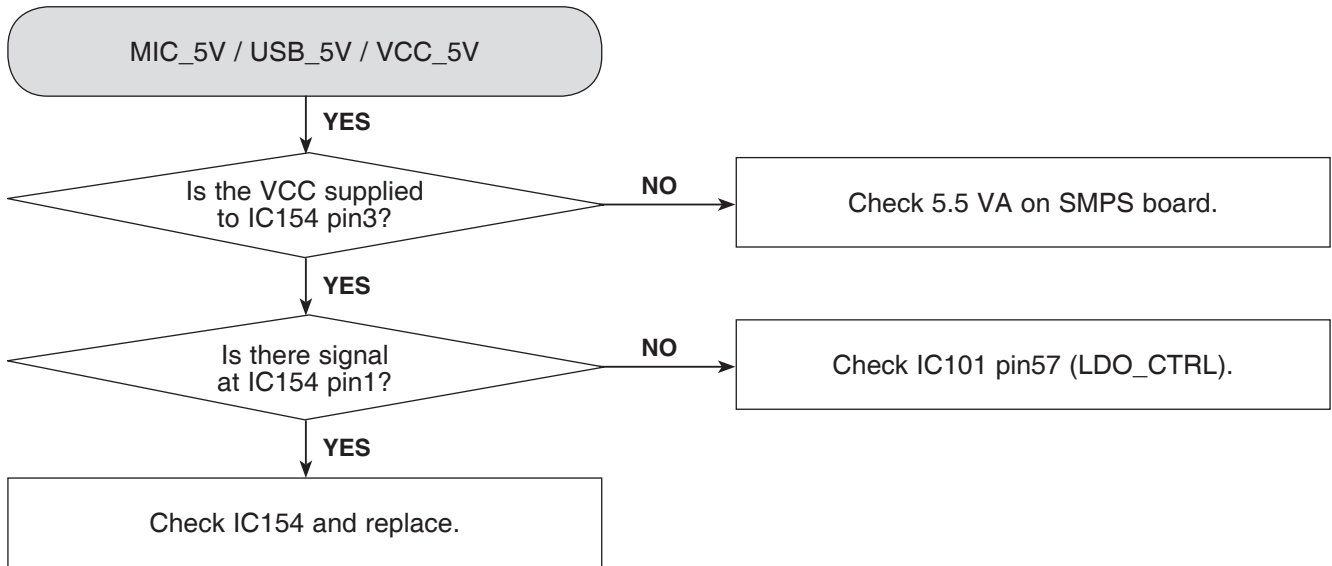
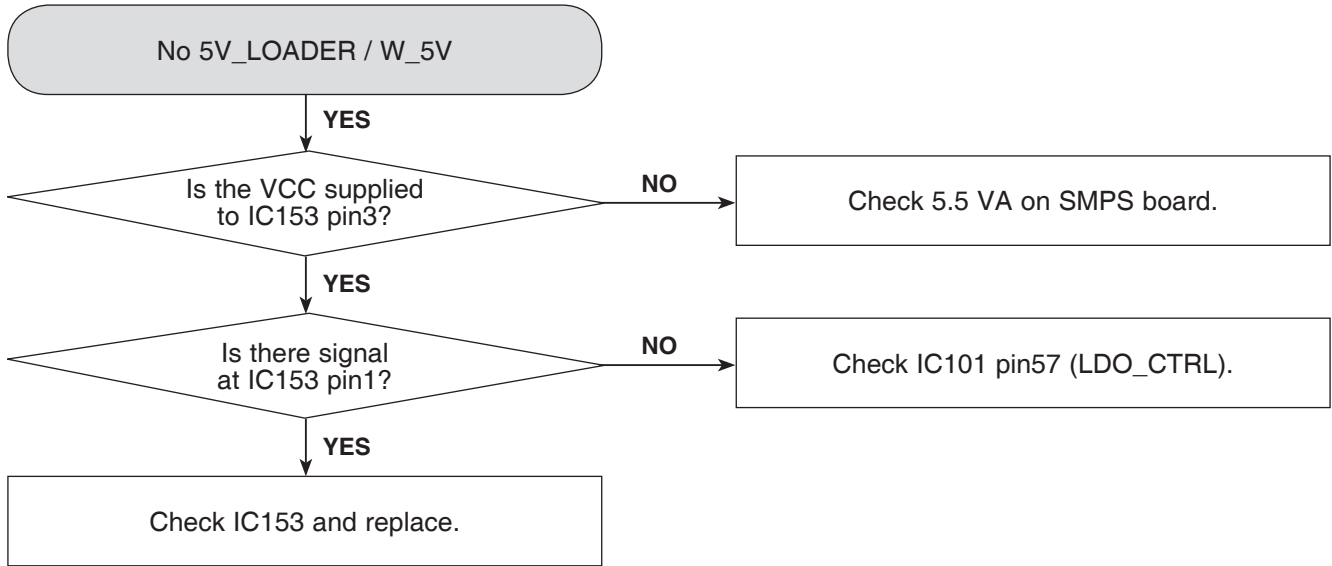
## 2. POWER SUPPLY ON MAIN BOARD



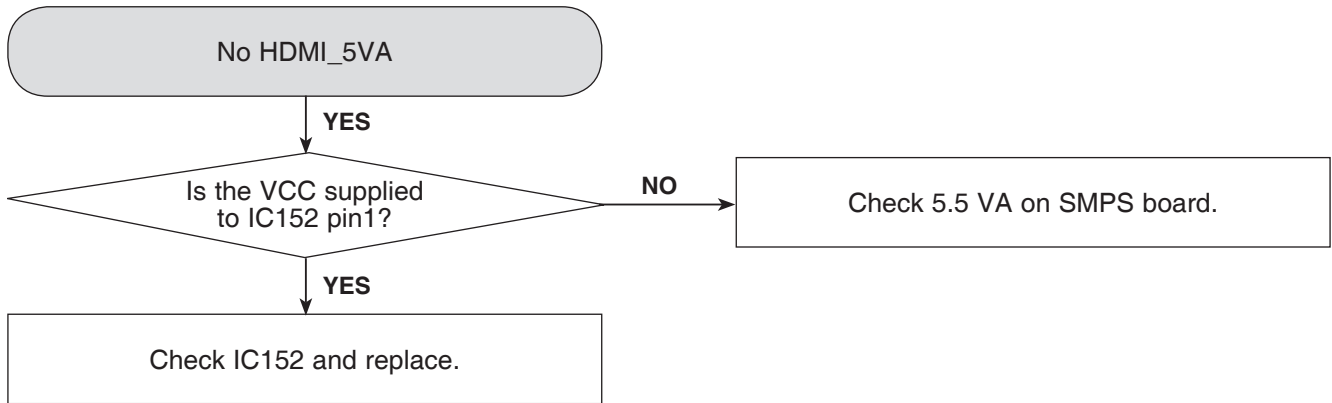
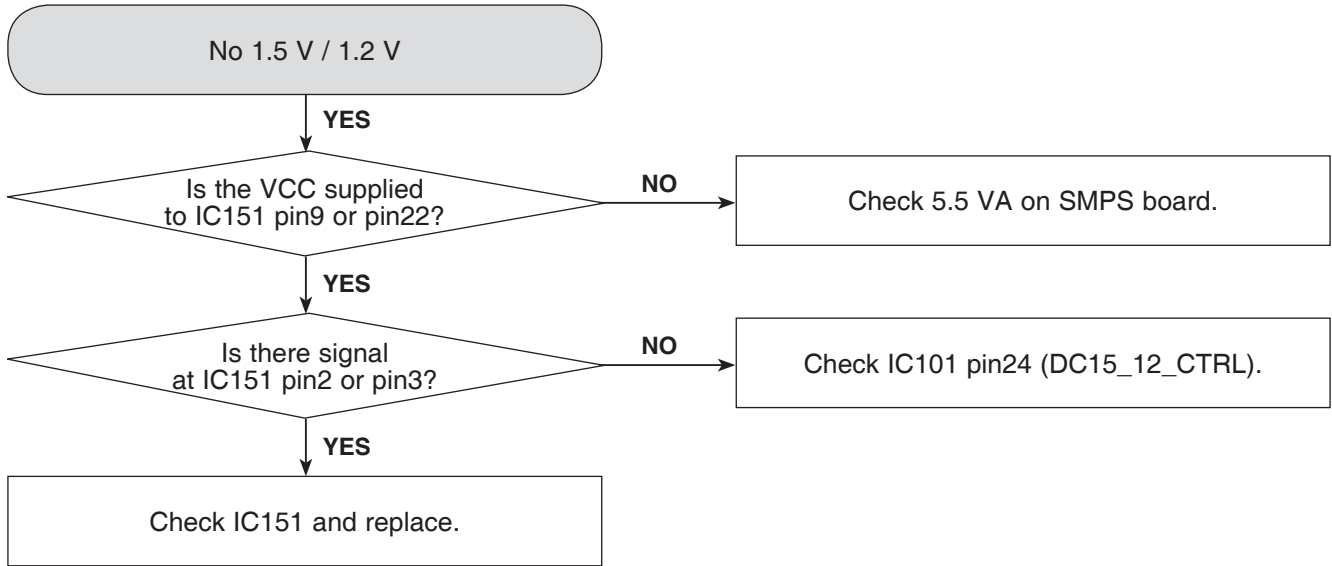
# ELECTRICAL TROUBLESHOOTING GUIDE



# ELECTRICAL TROUBLESHOOTING GUIDE

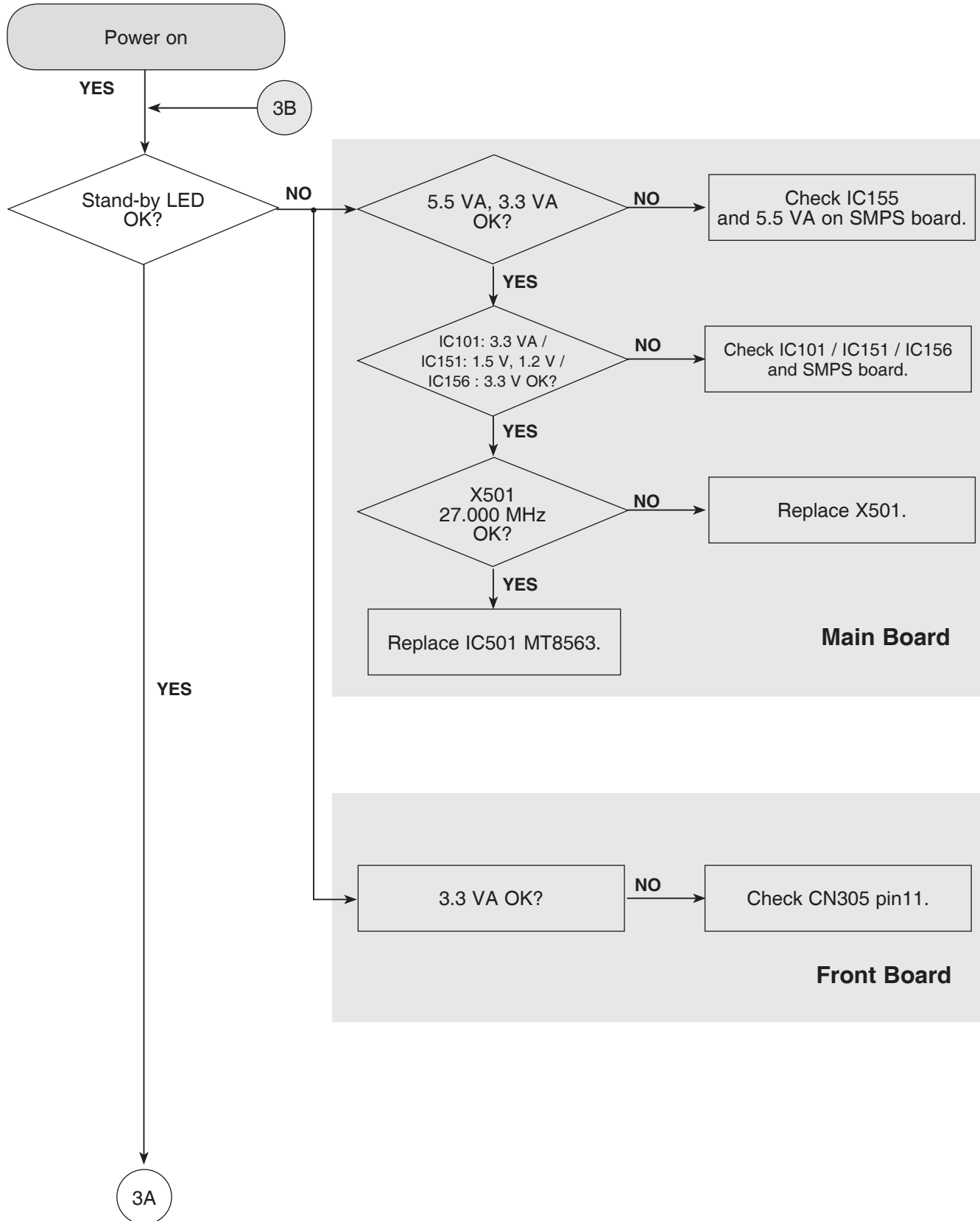


# ELECTRICAL TROUBLESHOOTING GUIDE

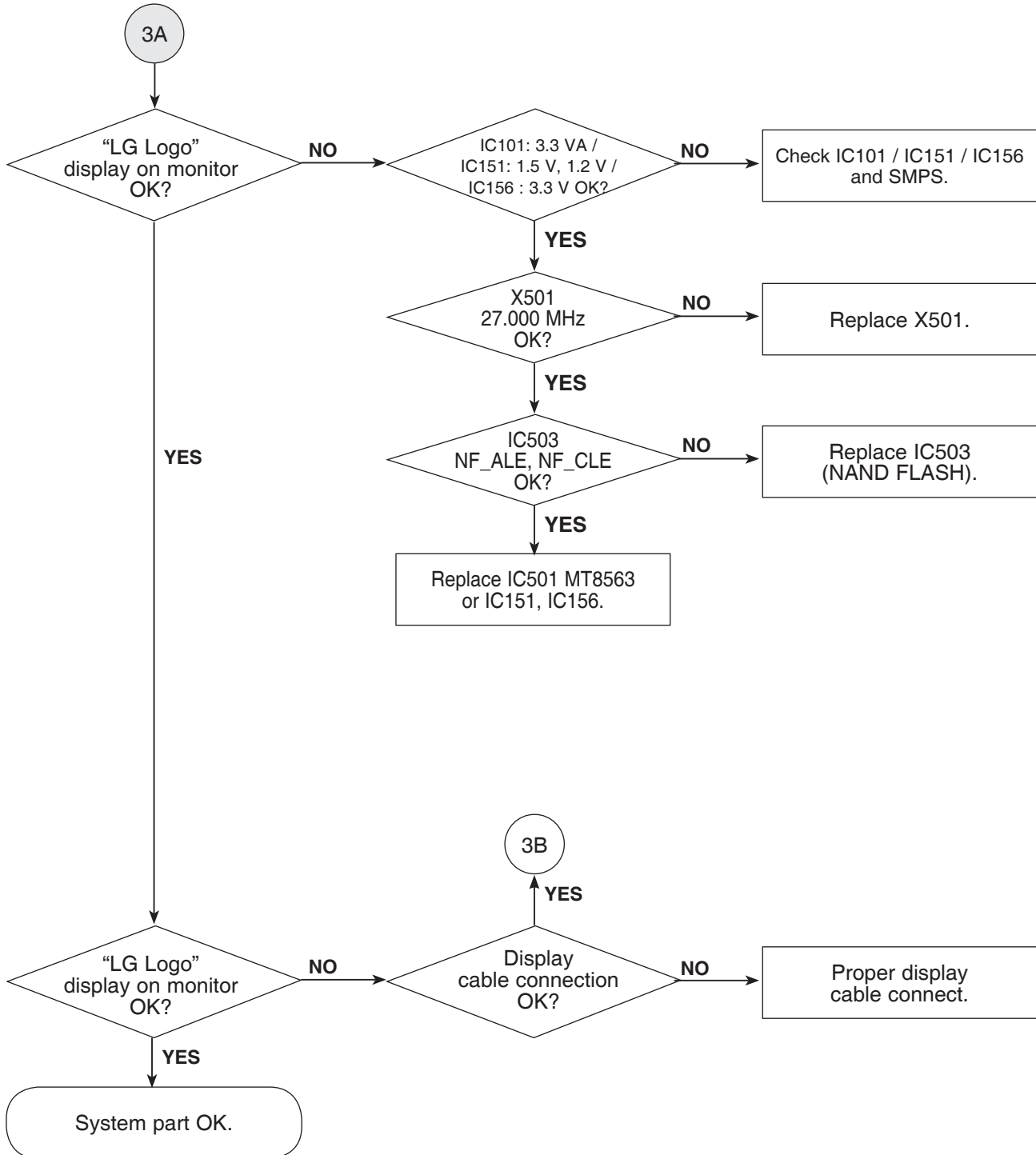


# ELECTRICAL TROUBLESHOOTING GUIDE

## 3. SYSTEM PART



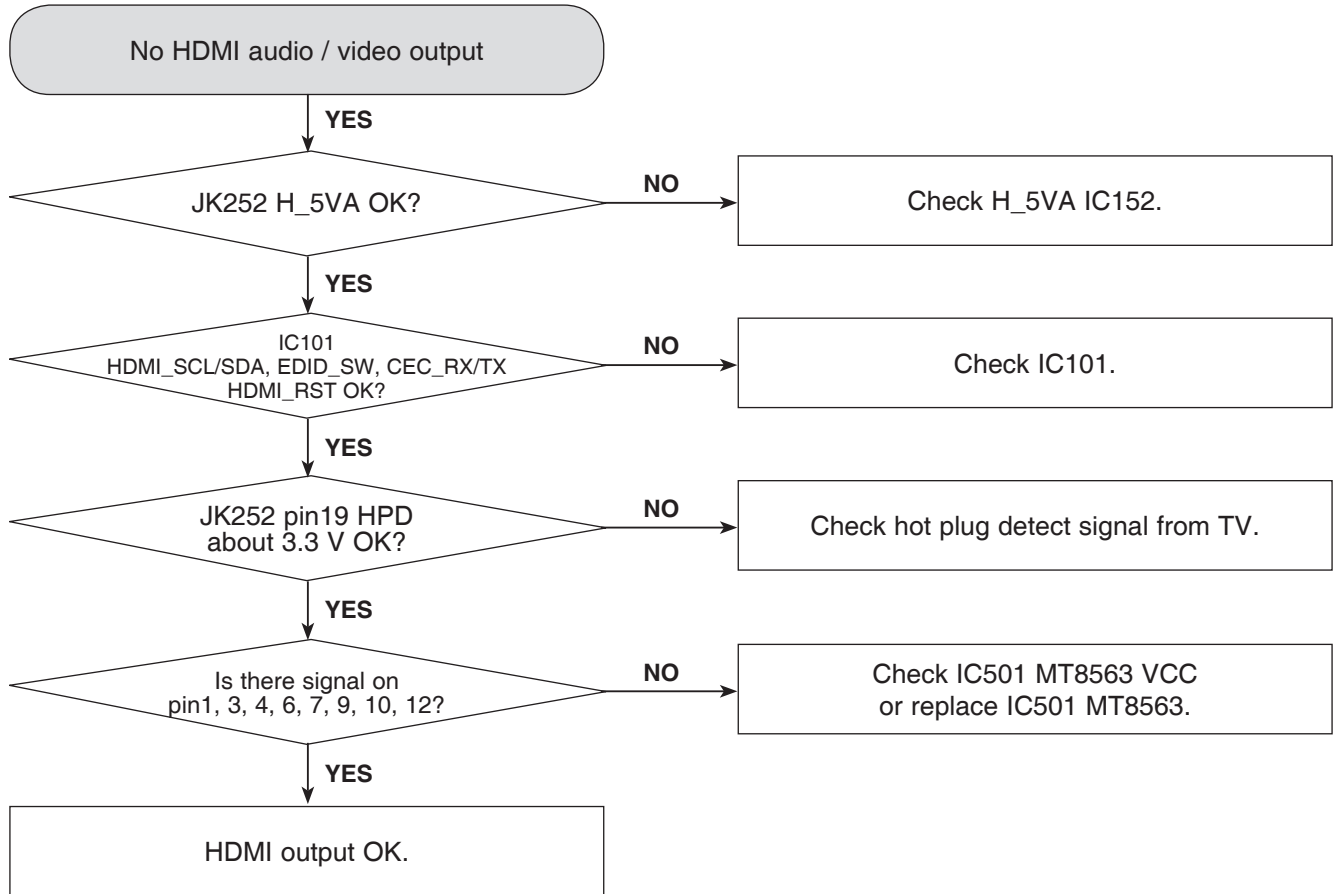
# ELECTRICAL TROUBLESHOOTING GUIDE





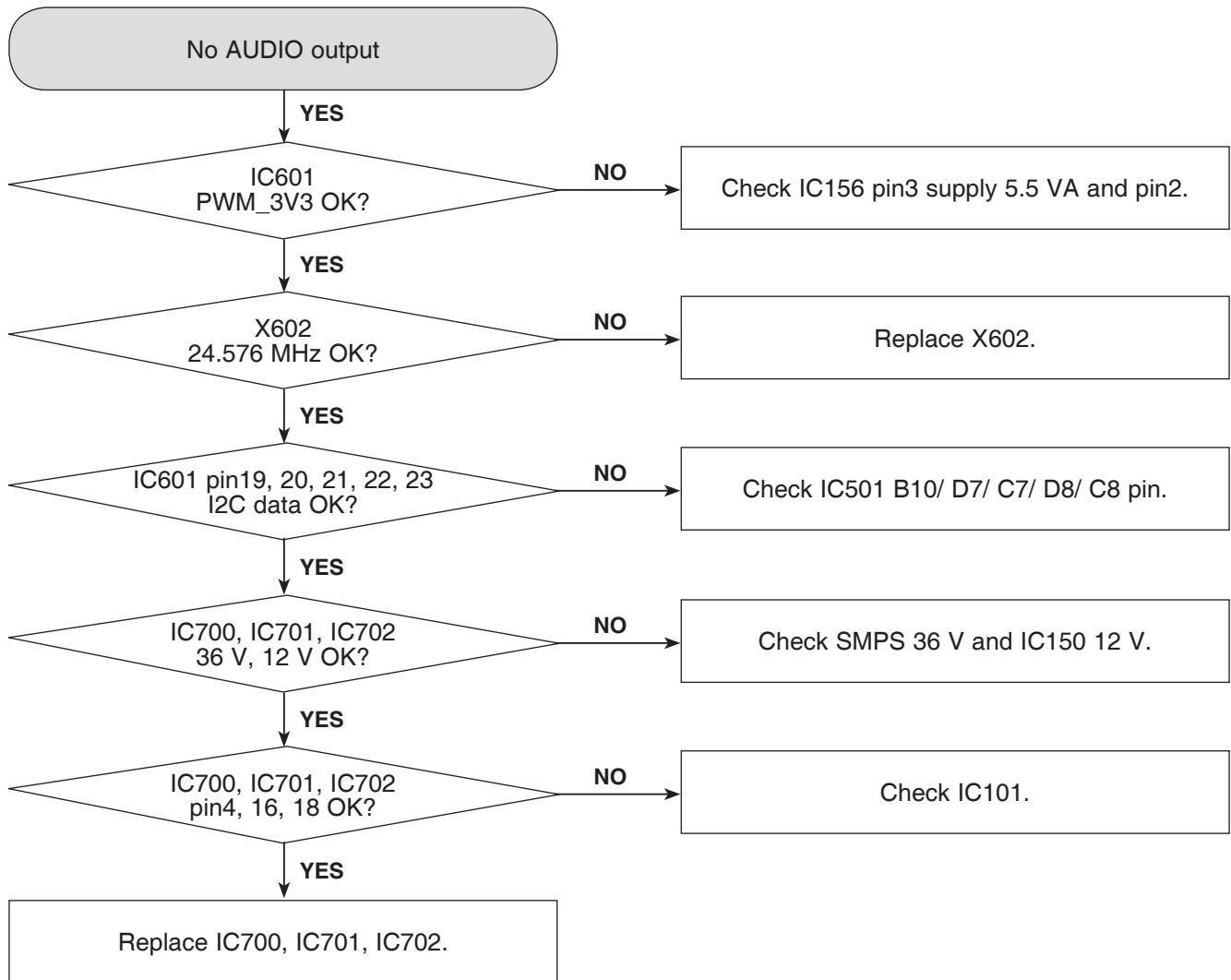
# ELECTRICAL TROUBLESHOOTING GUIDE

## 4. NO HDMI OUTPUT



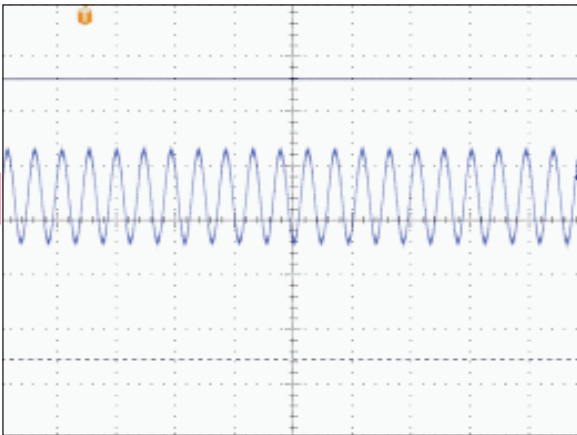
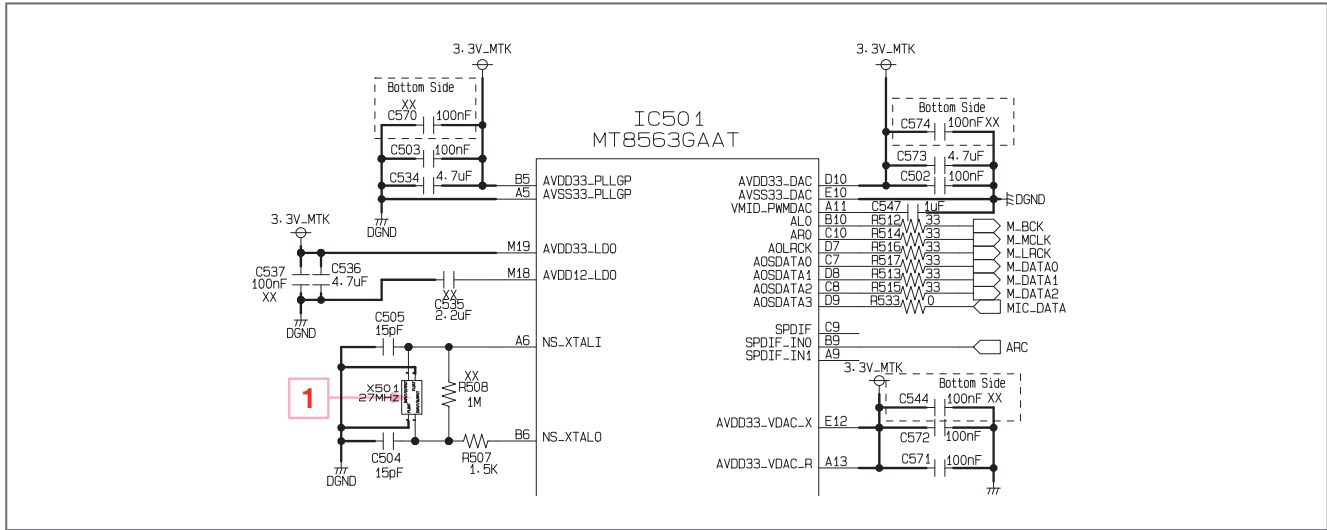
# ELECTRICAL TROUBLESHOOTING GUIDE

## 5. NO AUDIO OUTPUT



# WAVEFORMS

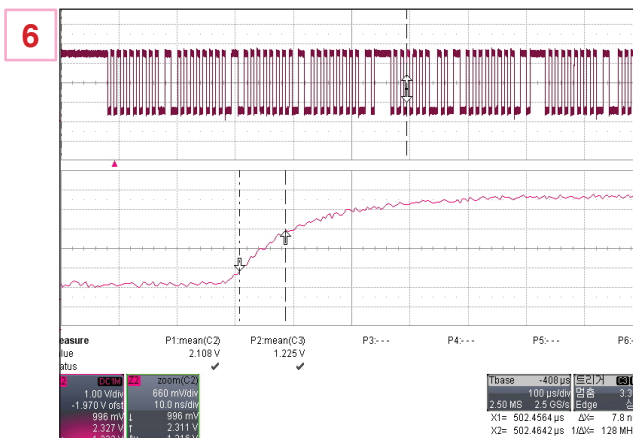
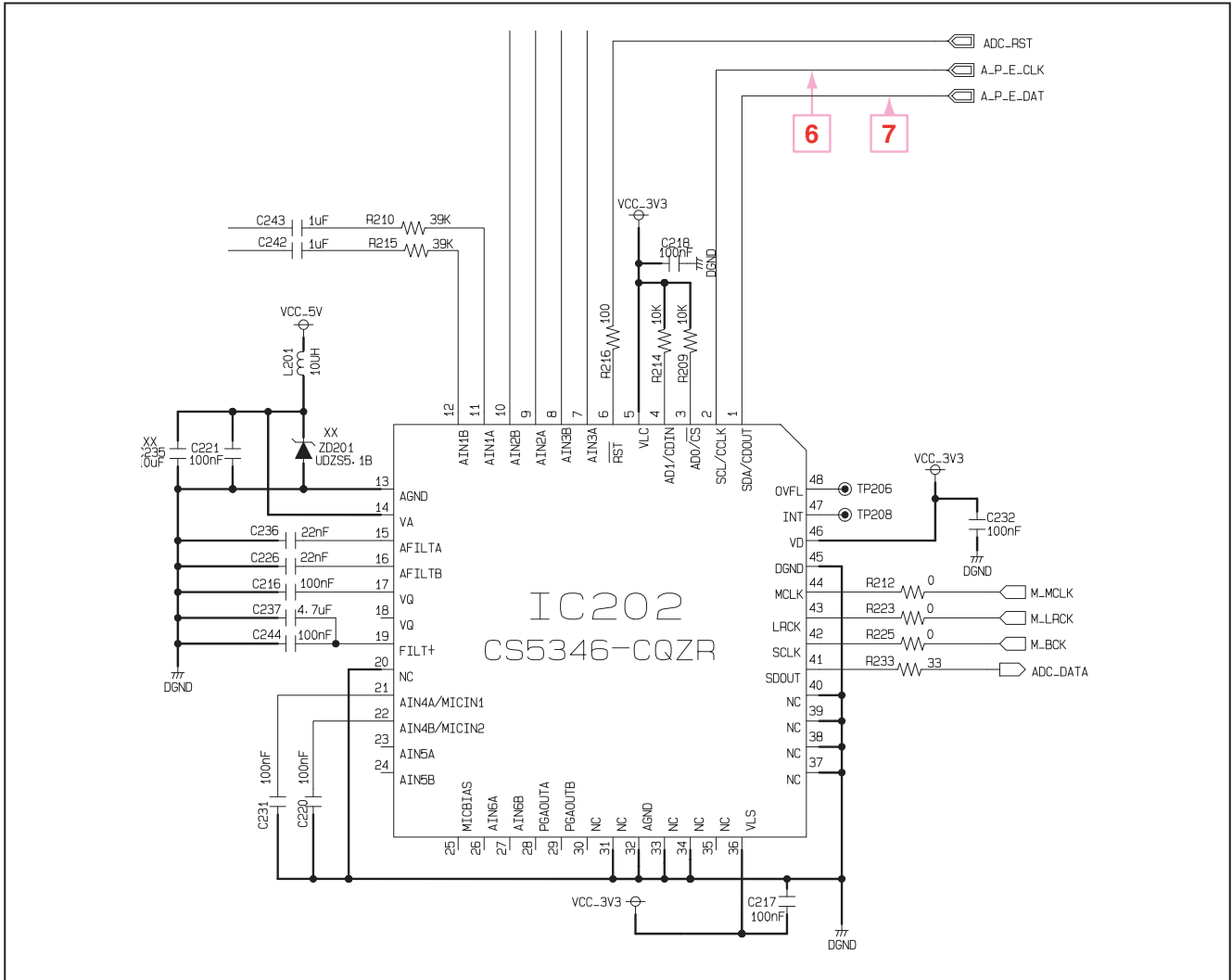
## 1. SYSTEM PART - 1 (MPEG CRYSTAL 27 MHz)



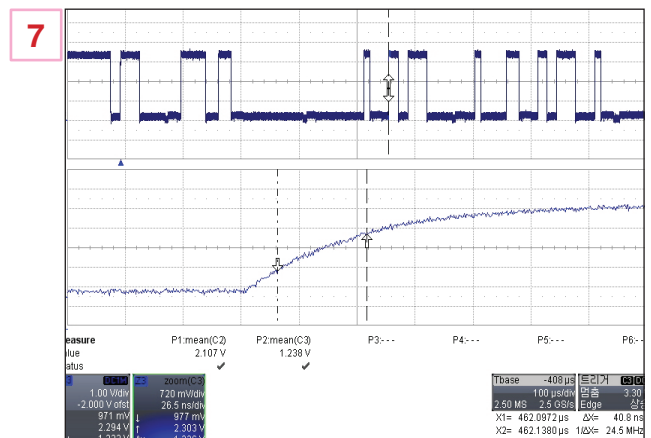
IC501 MT8563 X-TAL 27 MHz



### 3. AUDIO PART - 1 (ADC I2C)

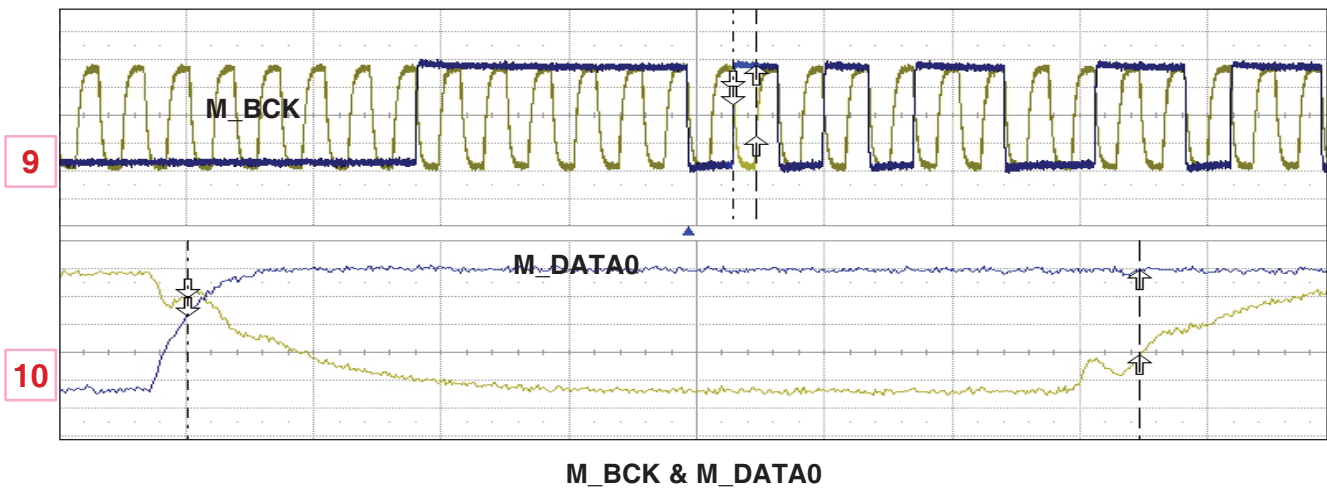
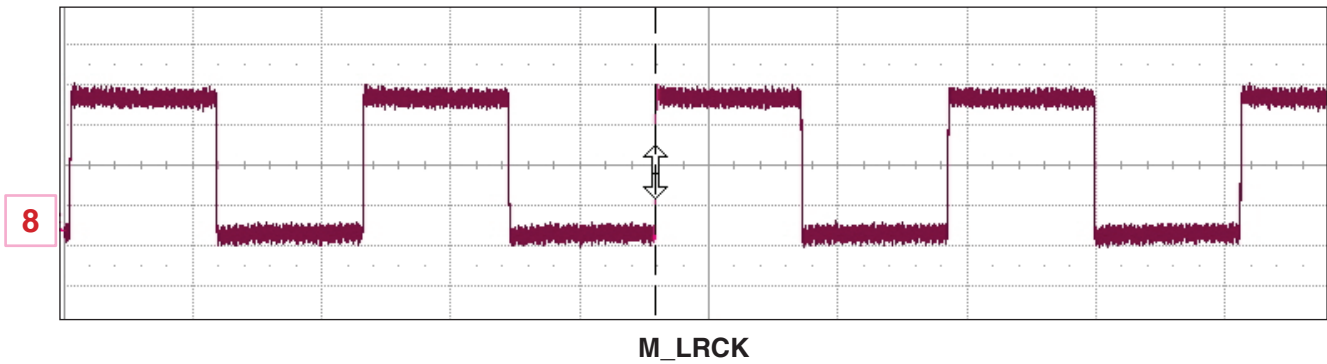
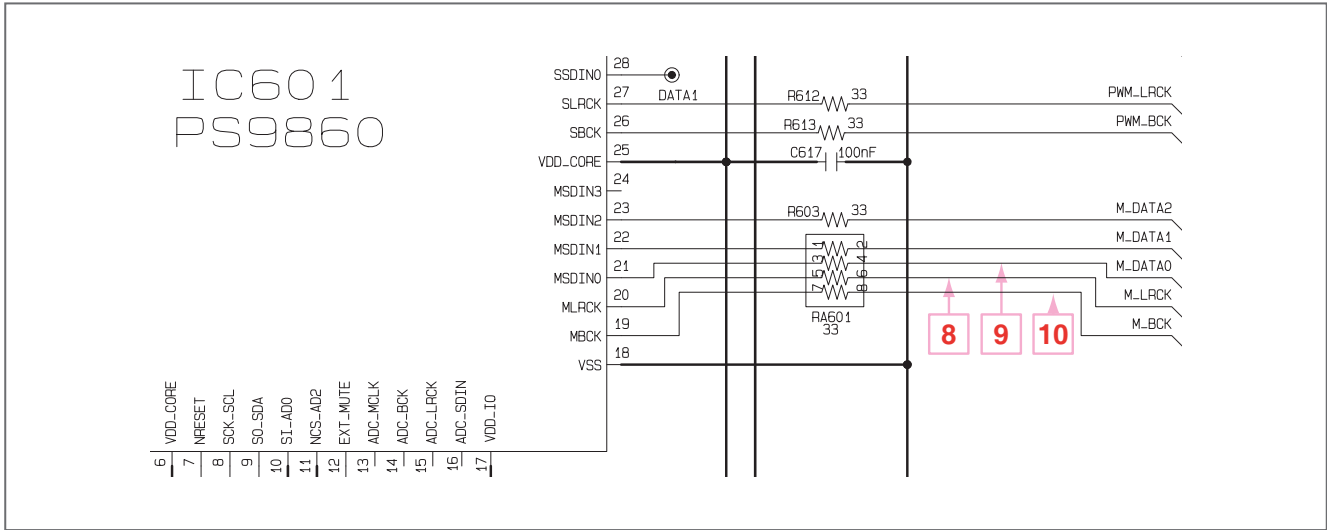


IC202 SCL

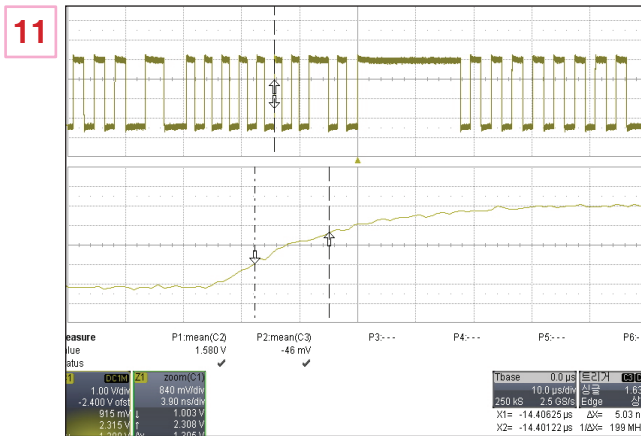
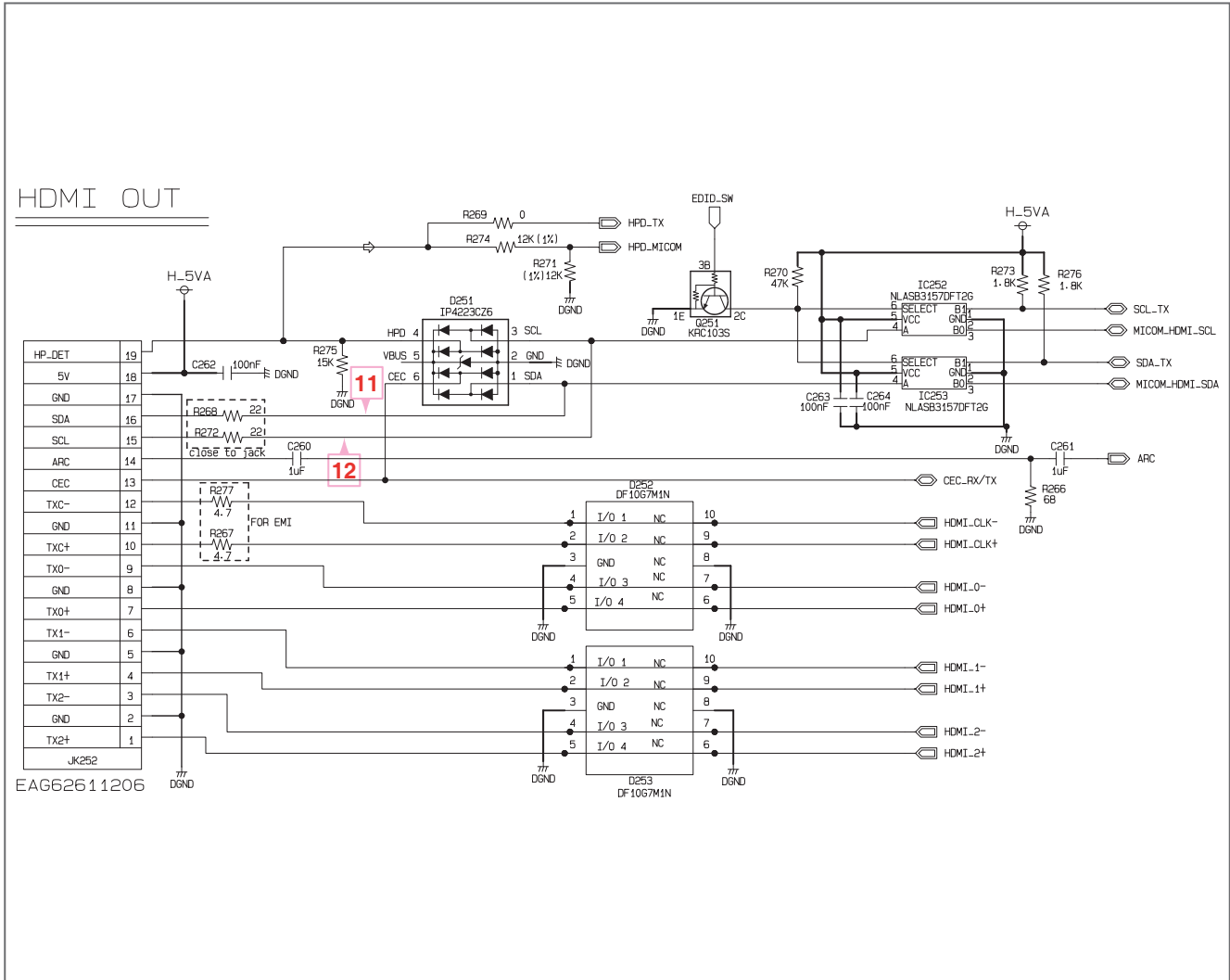


IC202 SDA

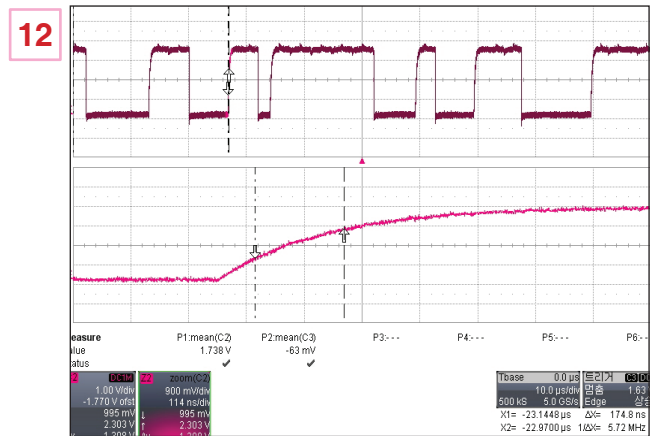
## 4. AUDIO PART - 2 (PWM I2S / I2C)



# 5. HDMI PART

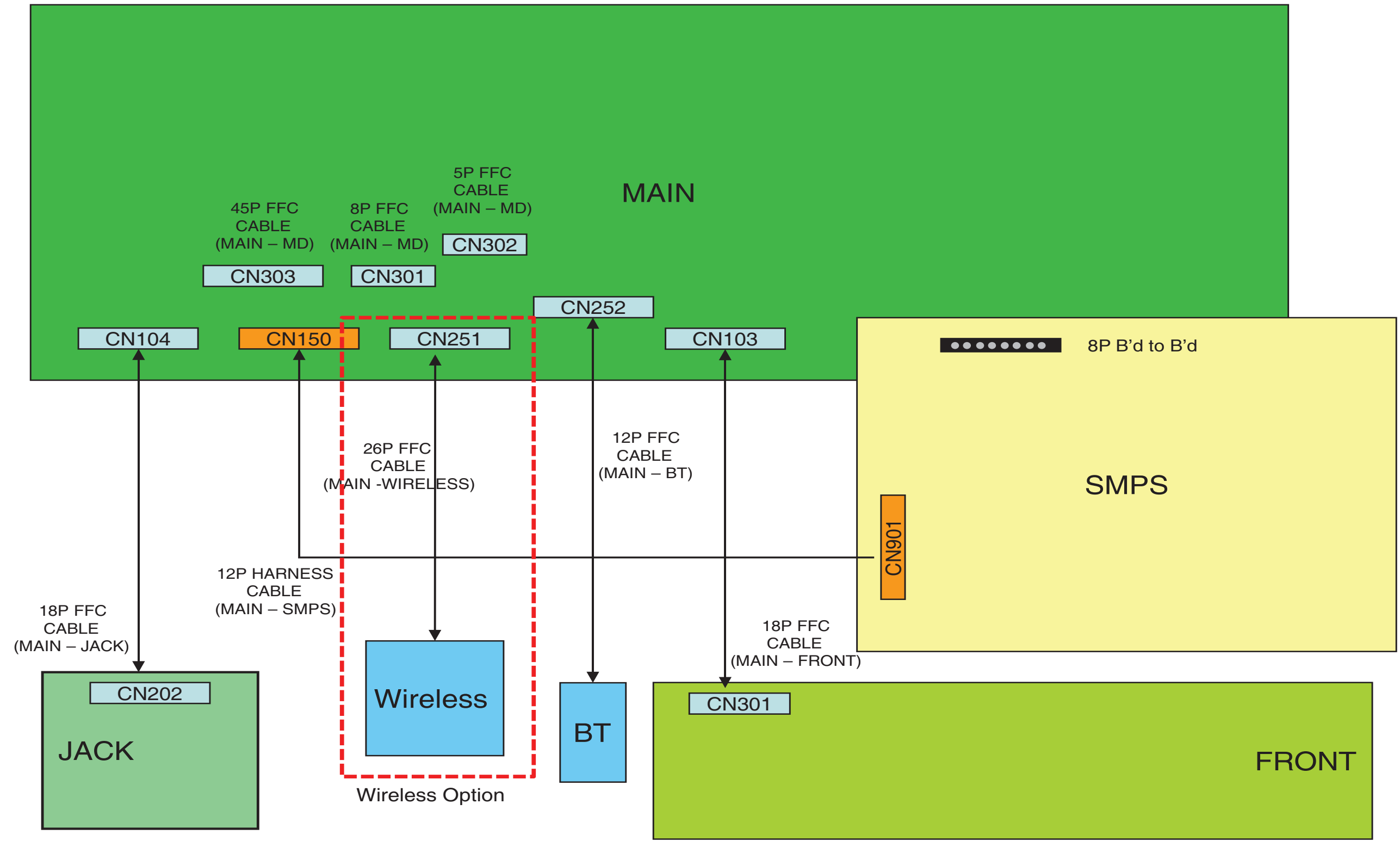
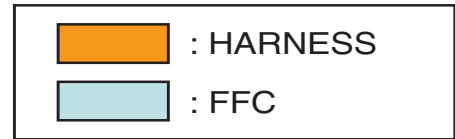


H\_SDA



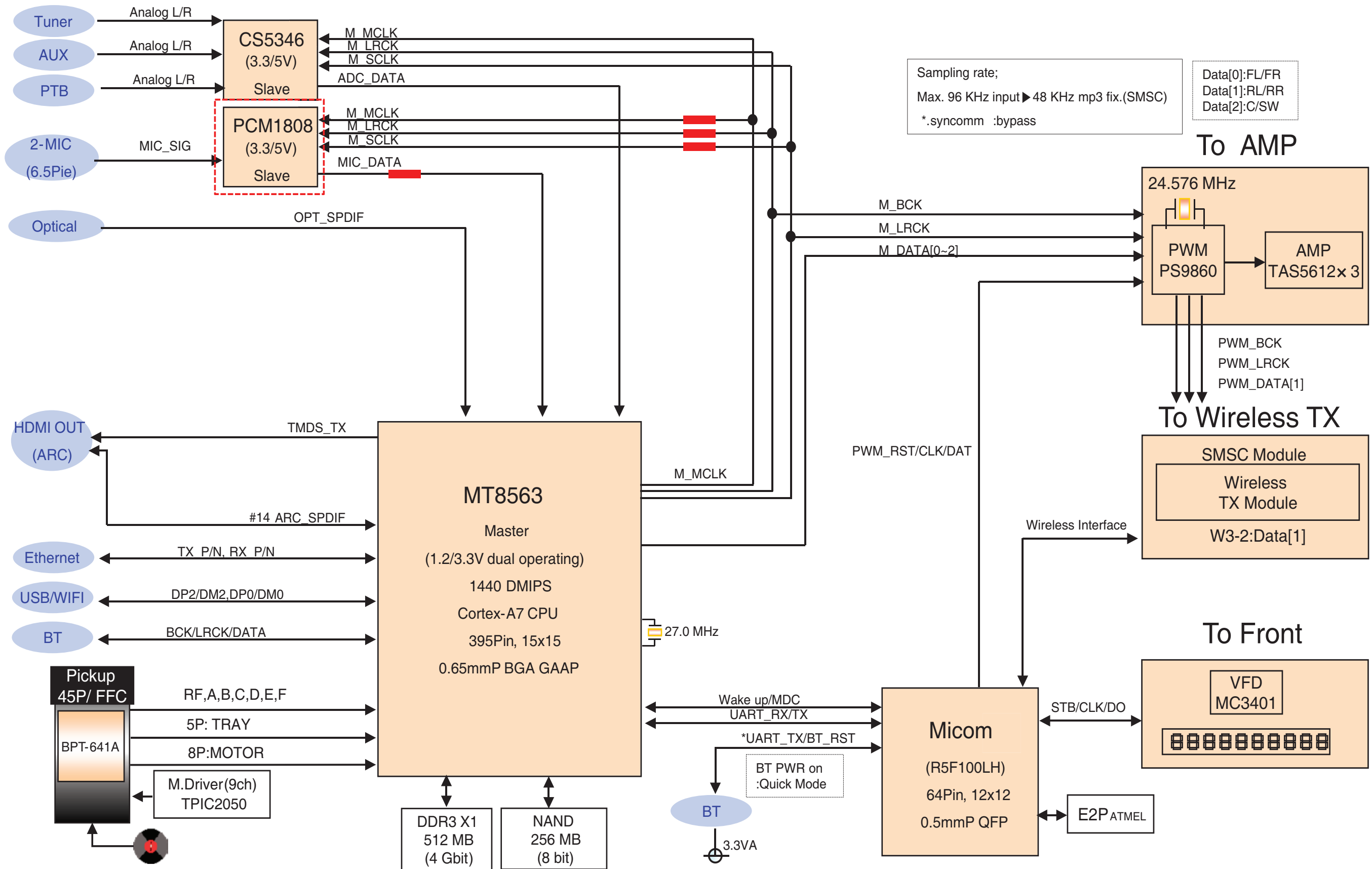
H\_SCL

# WIRING DIAGRAM





# BLOCK DIAGRAM



# CIRCUIT DIAGRAMS

## 1. SMPS CIRCUIT DIAGRAM

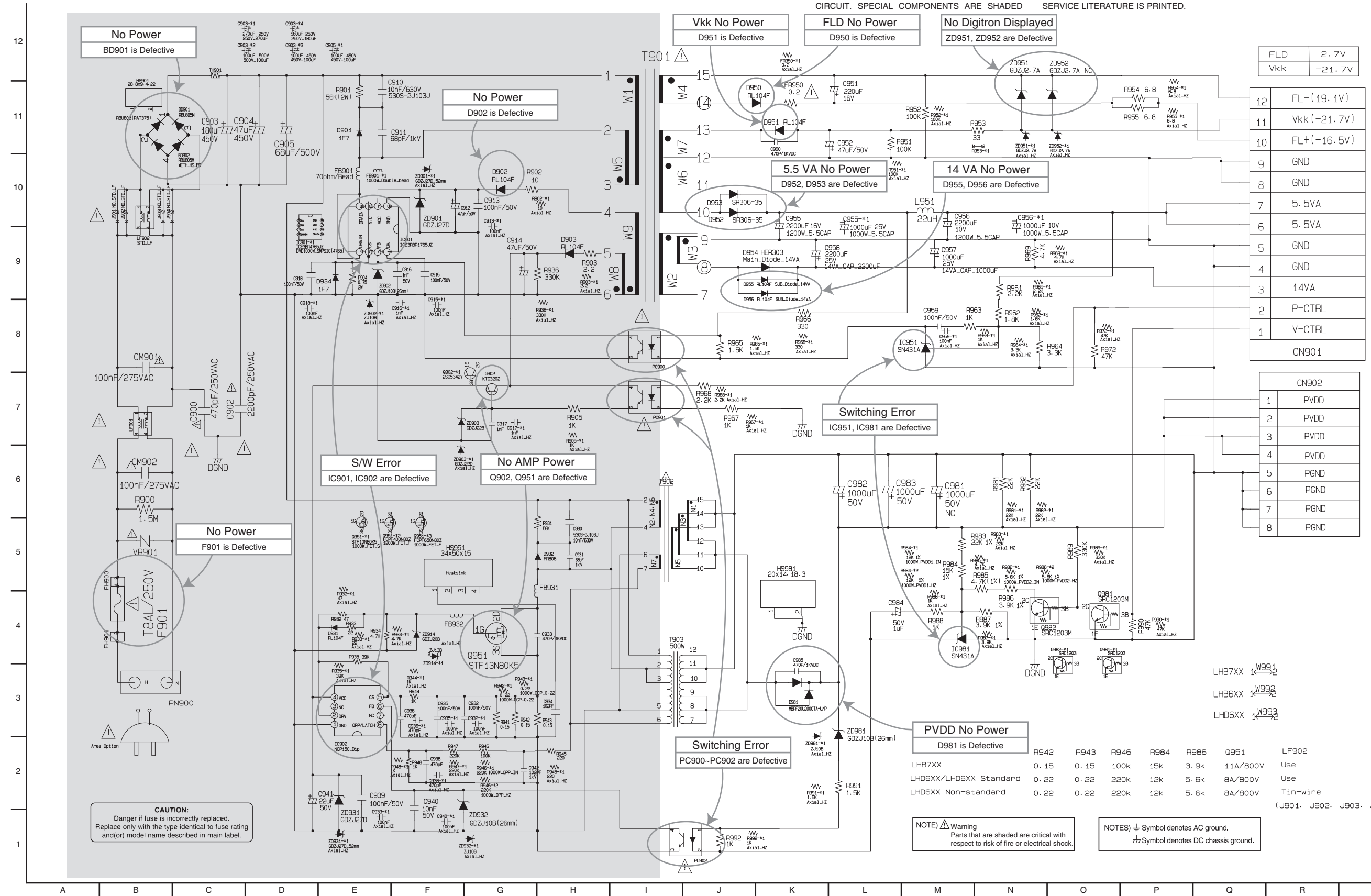
### IMPORTANT SAFETY

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE LG CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT. SPECIAL COMPONENTS ARE SHADED

ON THE SCHEMATIC FOR EASY IDENTIFICATION. THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

### NOTE :

1. Shaded(■) parts are critical for safety. Replace only with specified part number.
2. Voltages are DC-measured with a digital voltmeter during Play mode.



FLD	2.7V
VKK	-21.7V

12	FL-(-19.1V)
11	VKK(-21.7V)
10	FL+(-16.5V)
9	GND
8	GND
7	5.5VA
6	5.5VA
5	GND
4	GND
3	14VA
2	P-CTRL
1	V-CTRL

CN902	
1	PVDD
2	PVDD
3	PVDD
4	PVDD
5	PGND
6	PGND
7	PGND
8	PGND

LHB7XX	W991
LHB6XX	W992
LHD6XX	W993

R942	R943	R946	R984	R986	Q951	LF902
0.15	0.15	100k	15k	3.9k	11A/800V	Use
LHD6XX/LHD6XX Standard	0.22	220k	12k	5.6k	8A/800V	Use
LHD6XX Non-standard	0.22	220k	12k	5.6k	8A/800V	Tin-wire

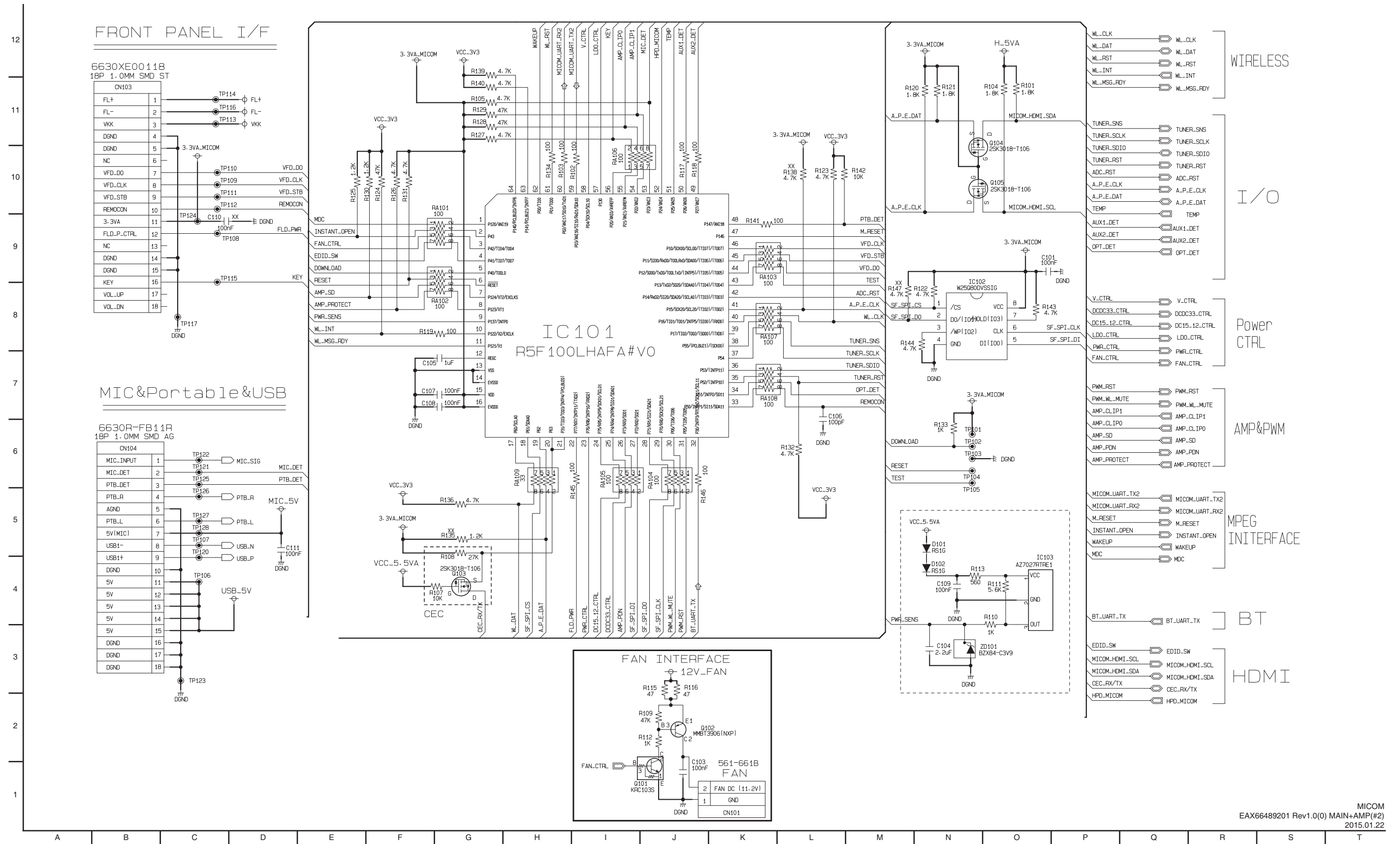
(J901, J902, J903, J904)

(NOTE) ⚠ Warning Parts that are shaded are critical with respect to risk of fire or electrical shock.

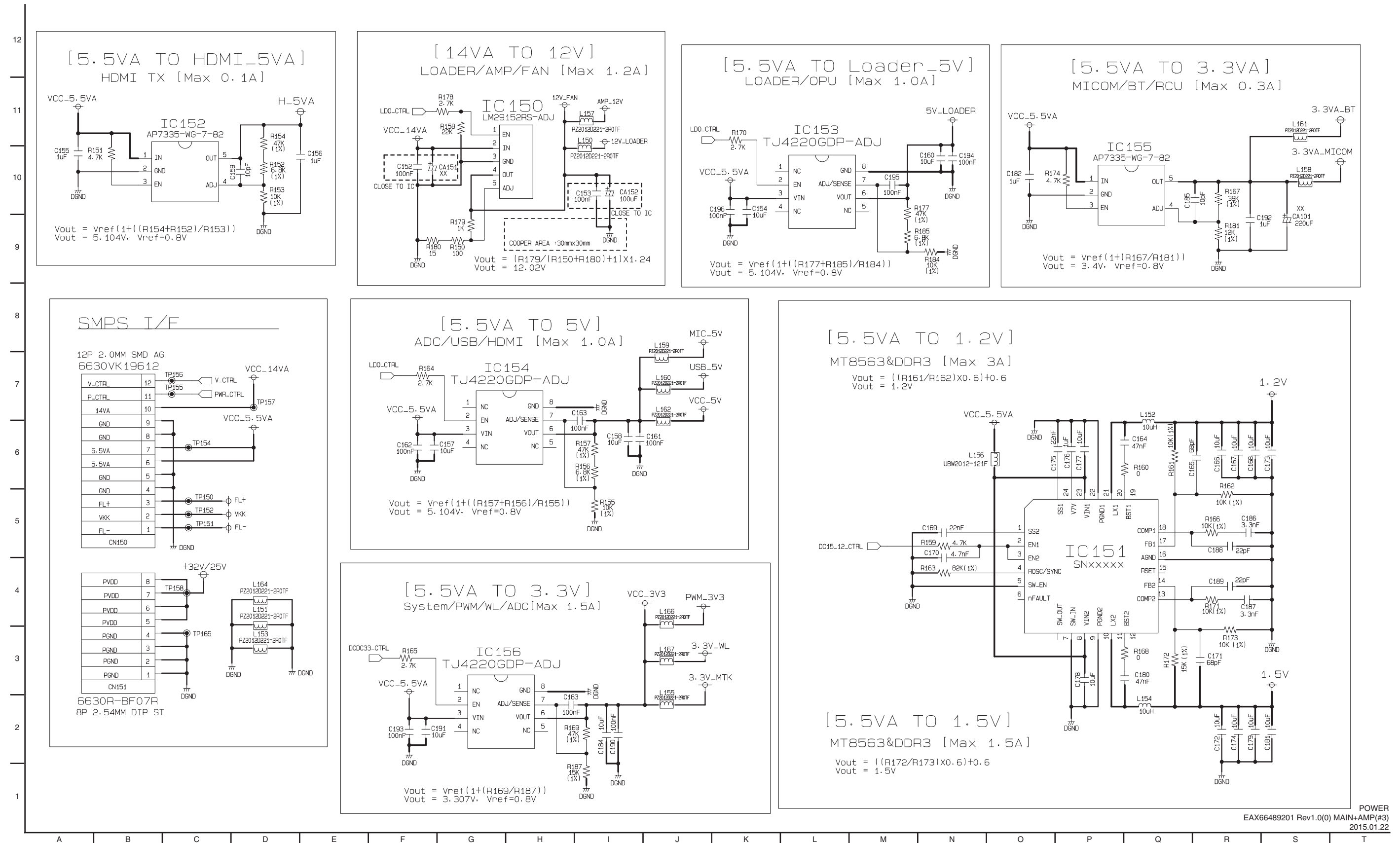
(NOTES) ⊕ Symbol denotes AC ground. ⚡ Symbol denotes DC chassis ground.

**CAUTION:**  
Danger if fuse is incorrectly replaced. Replace only with the type identical to fuse rating and/or model name described in main label.

## 2. MAIN & AMP - MICOM CIRCUIT DIAGRAM

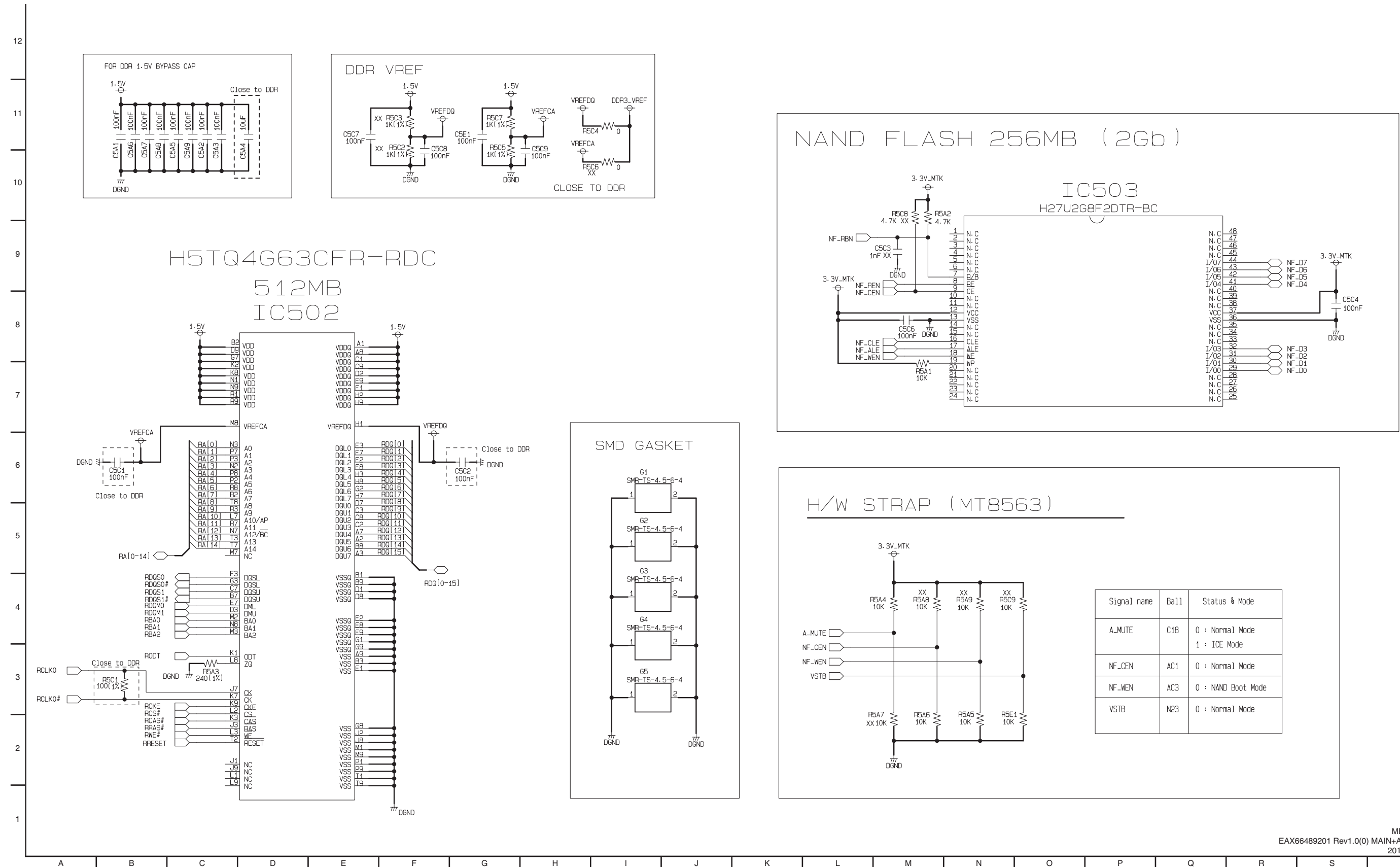


### 3. MAIN & AMP - POWER CIRCUIT DIAGRAM

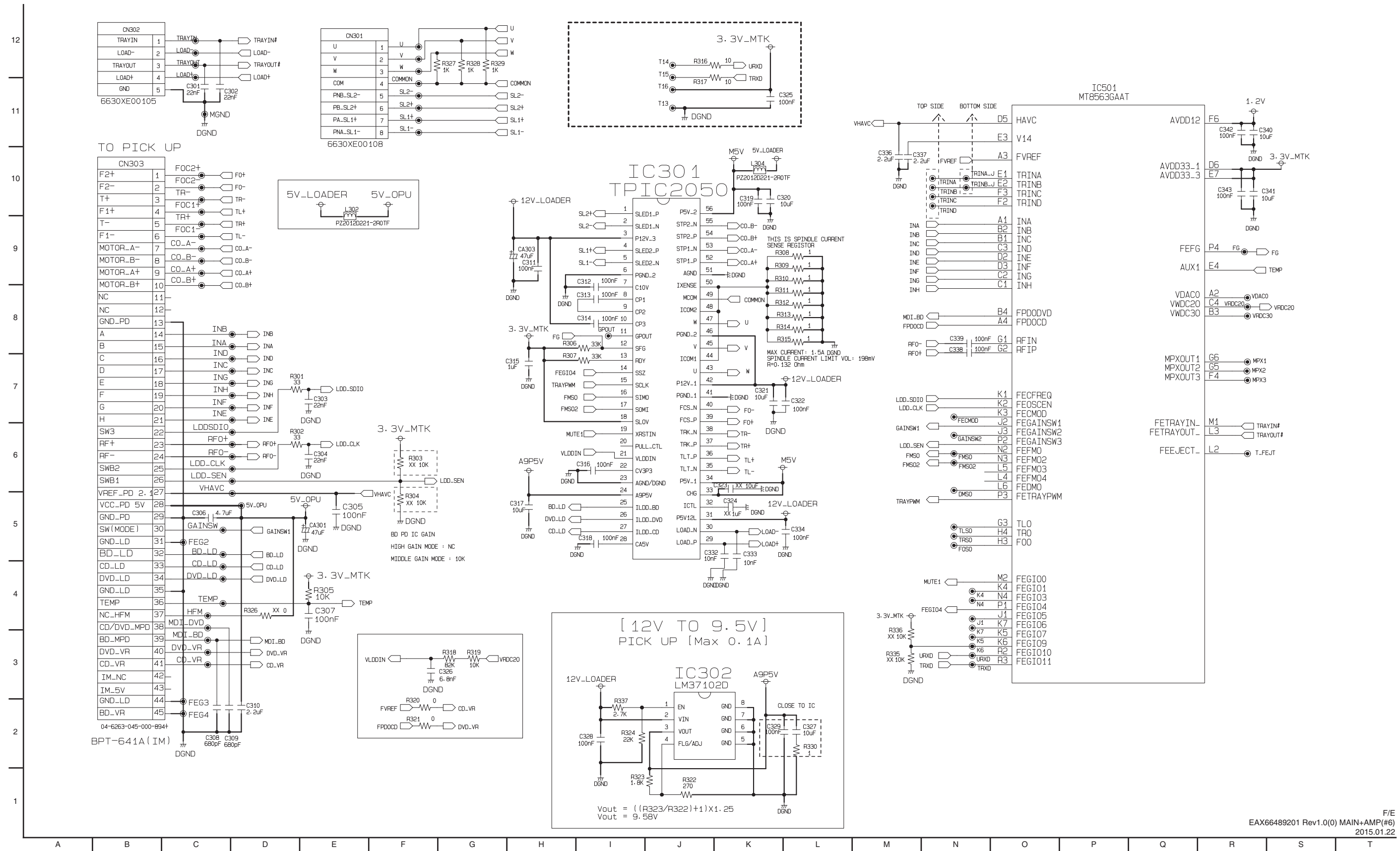




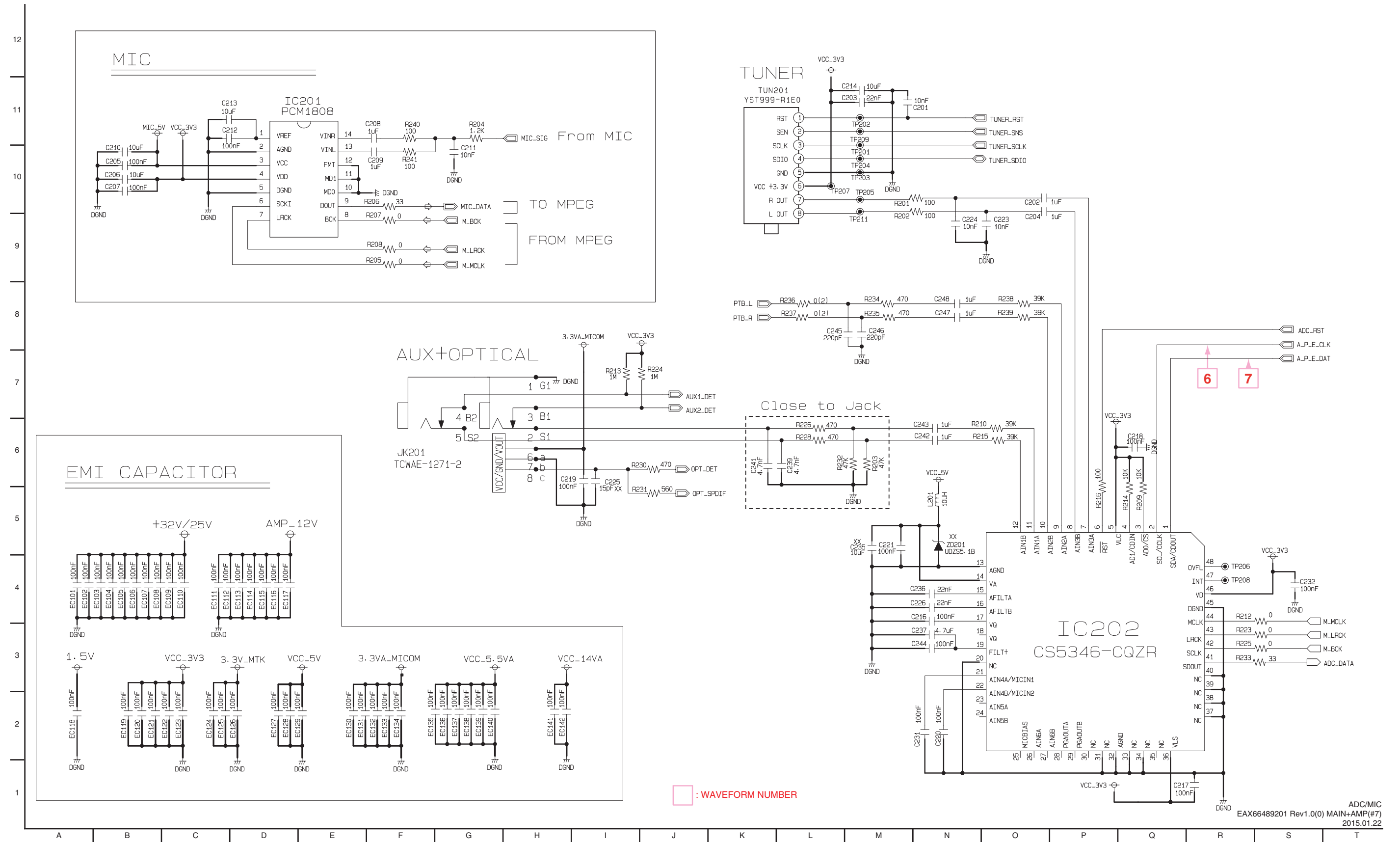
# 5. MAIN & AMP - MEMORY CIRCUIT DIAGRAM



# 6. MAIN & AMP - F/E CIRCUIT DIAGRAM

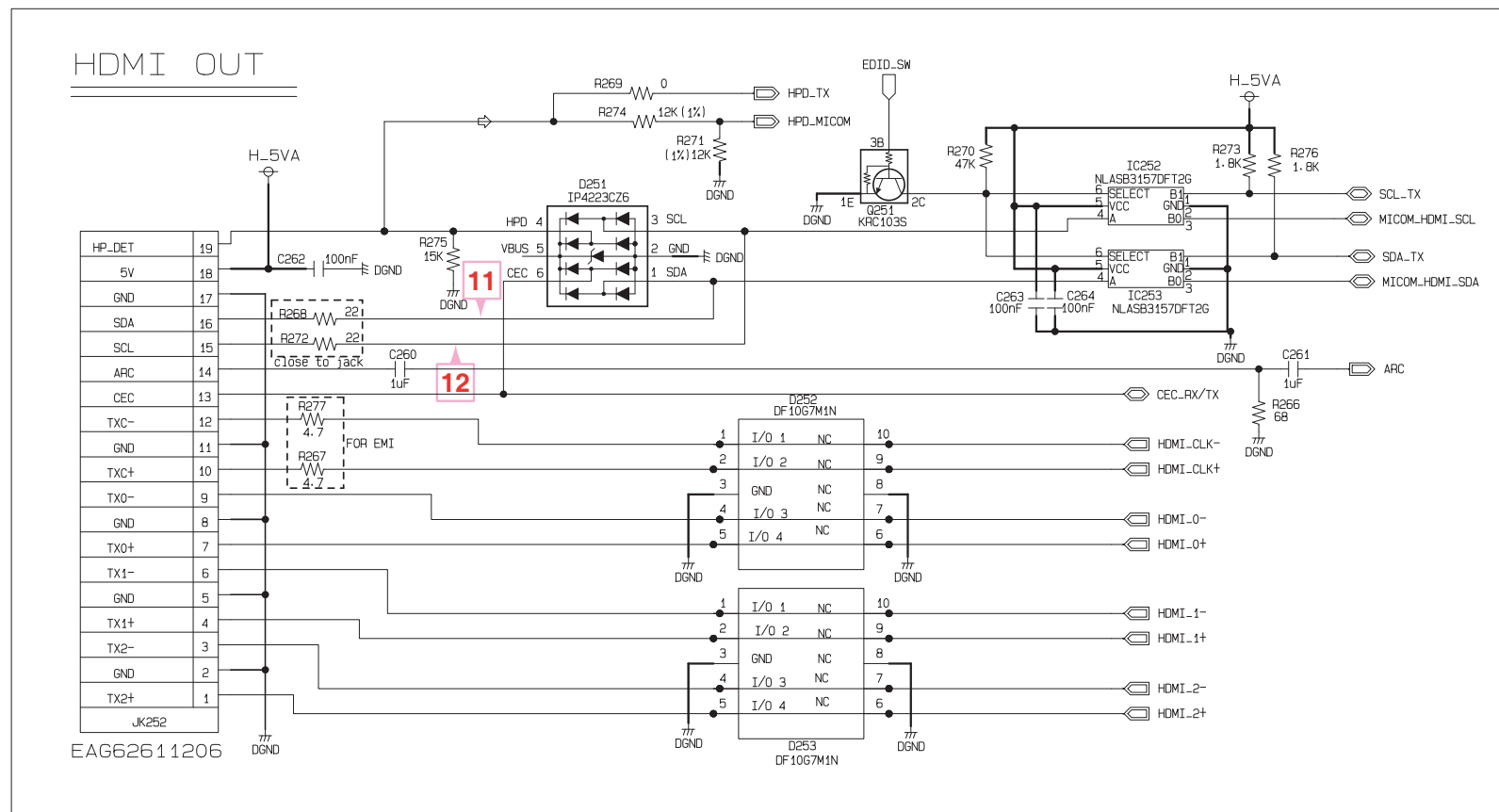
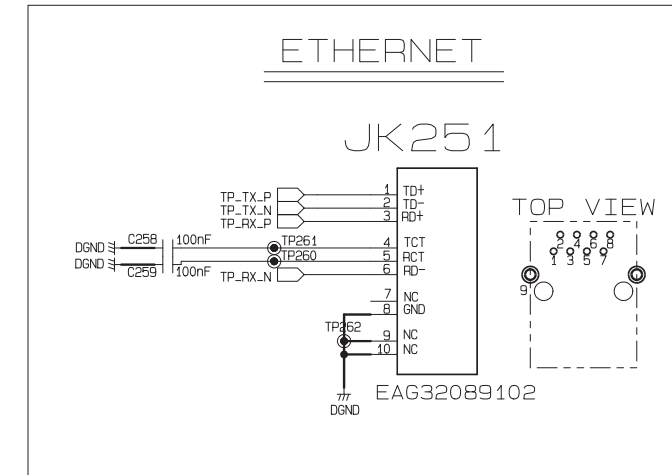
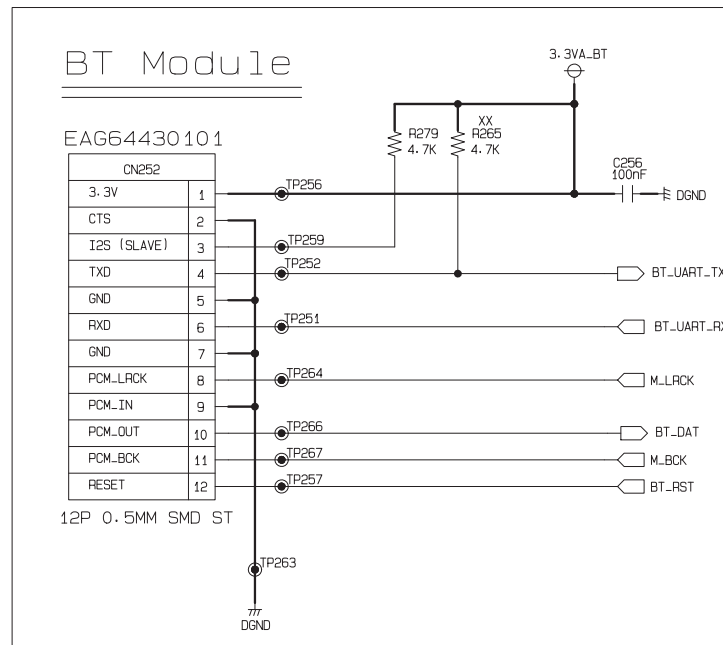
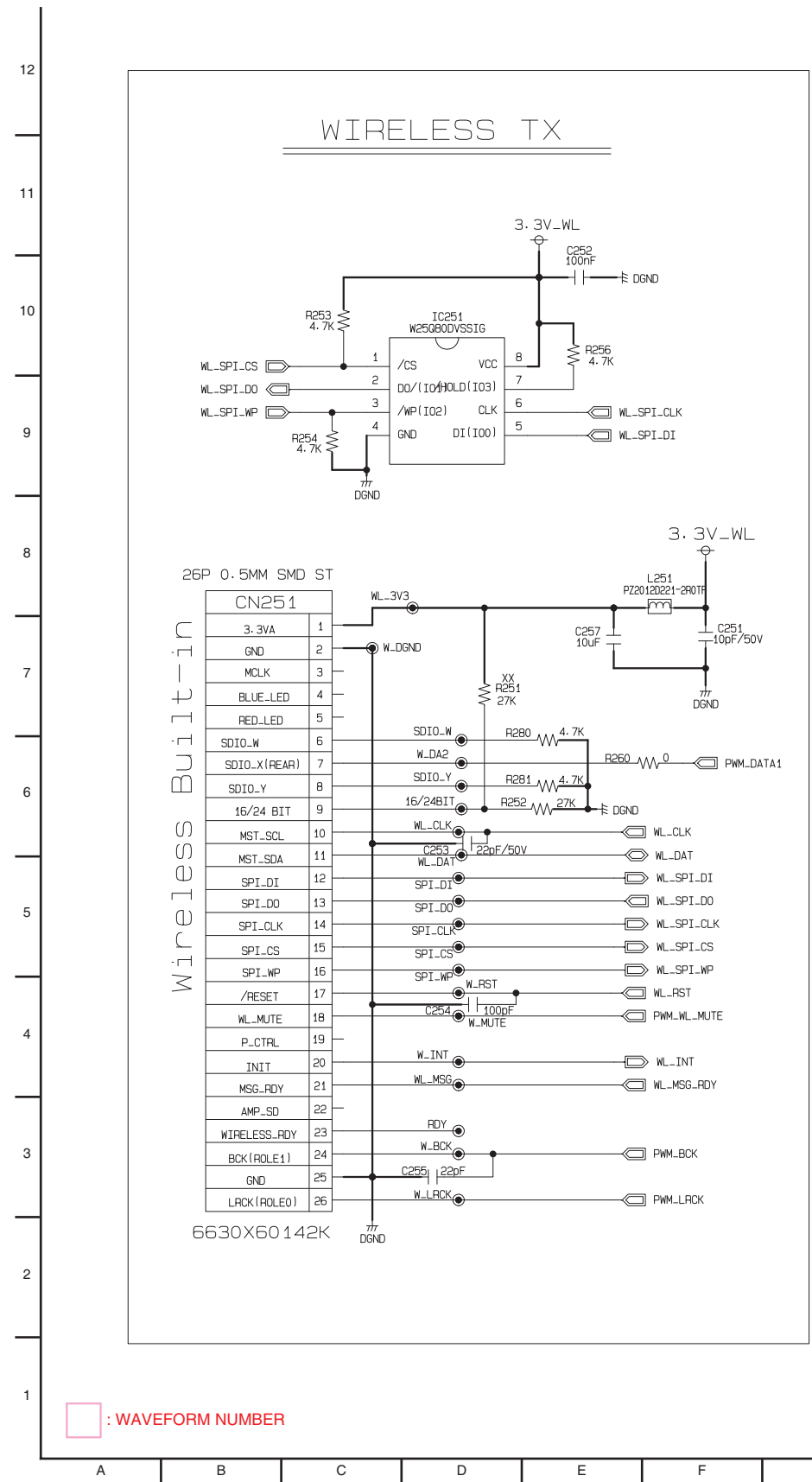


# 7. MAIN & AMP - ADC / MIC CIRCUIT DIAGRAM



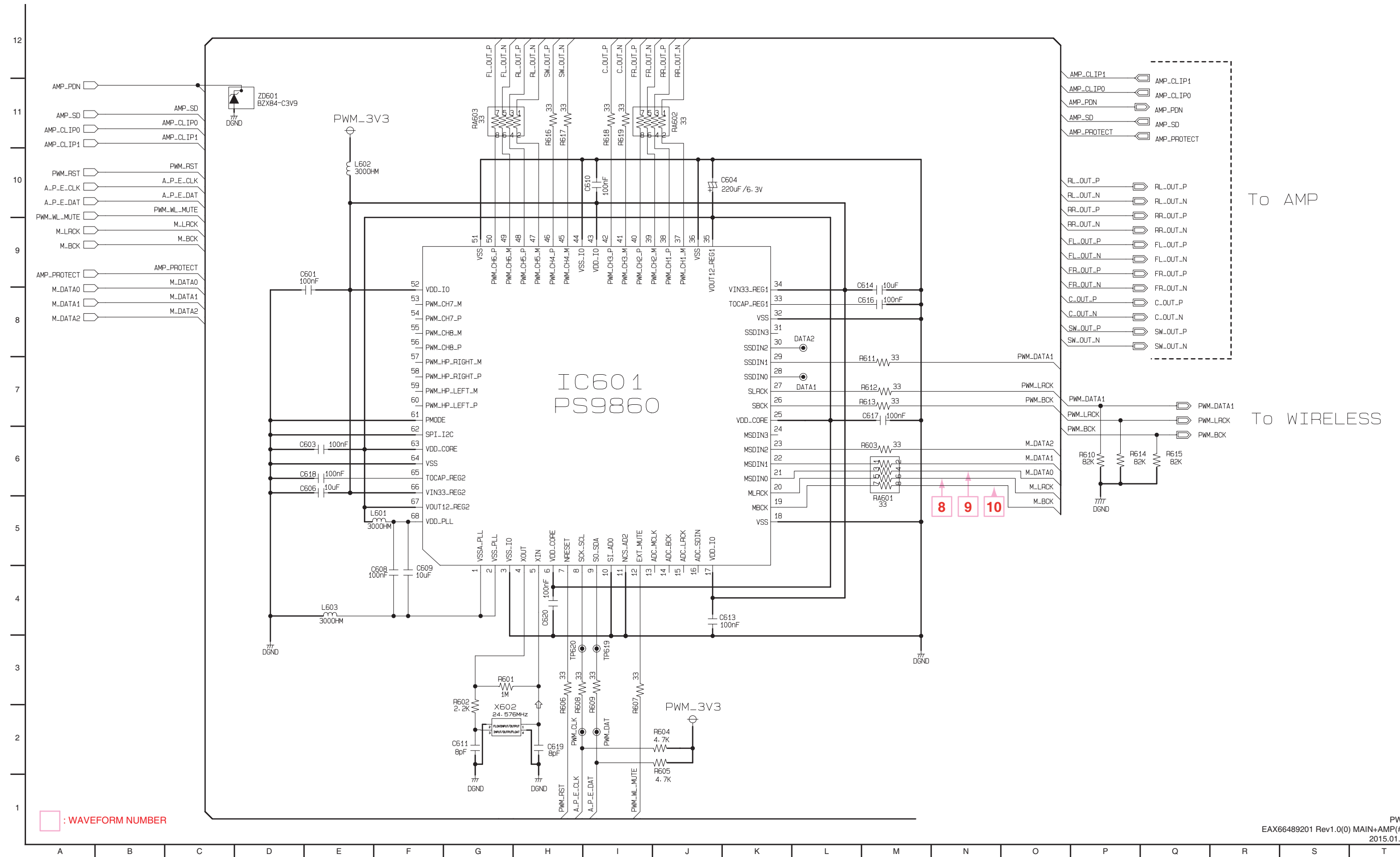


# 8. MAIN & AMP - I/O CIRCUIT DIAGRAM

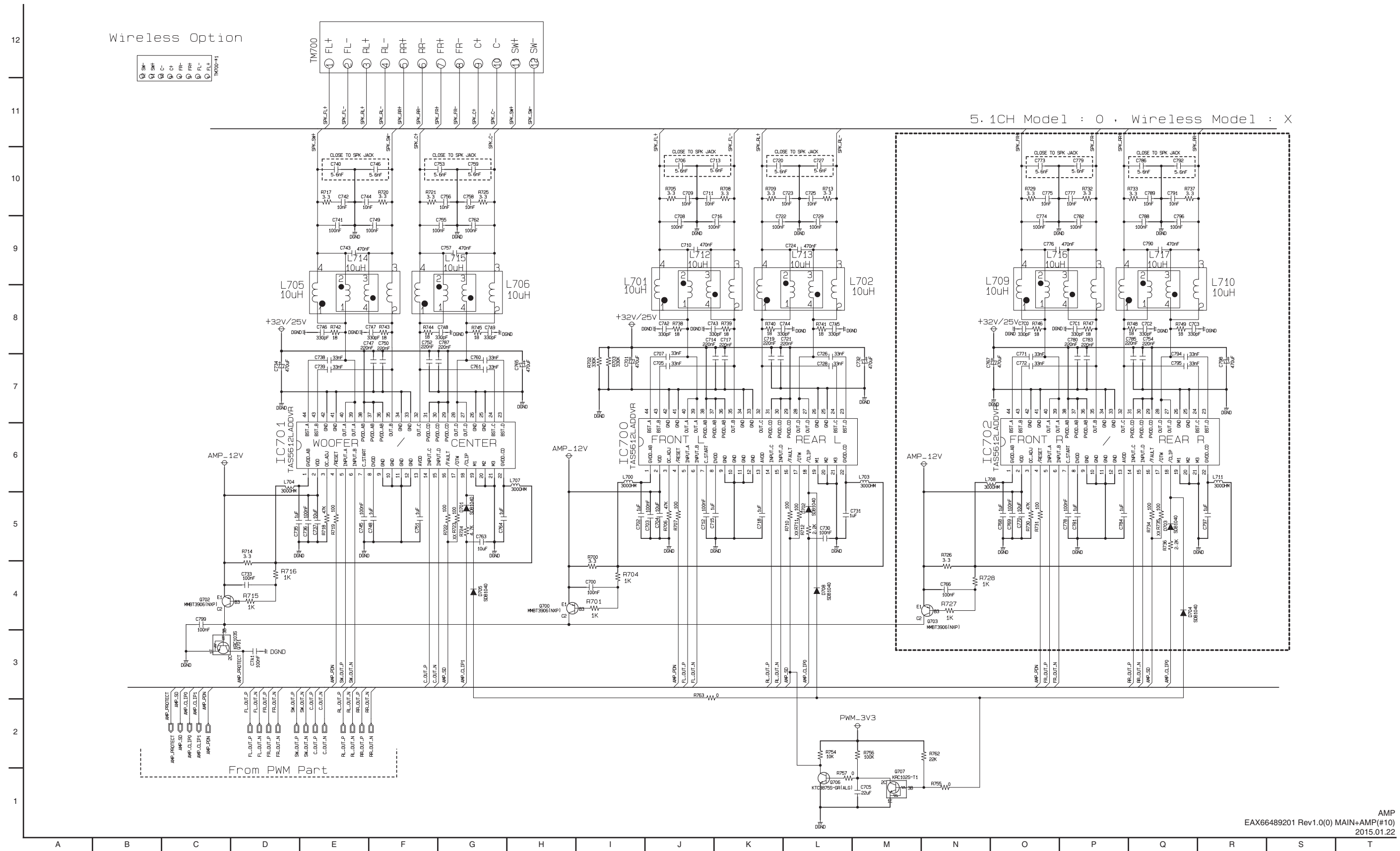


□ : WAVEFORM NUMBER

# 9. MAIN & AMP - PWM CIRCUIT DIAGRAM



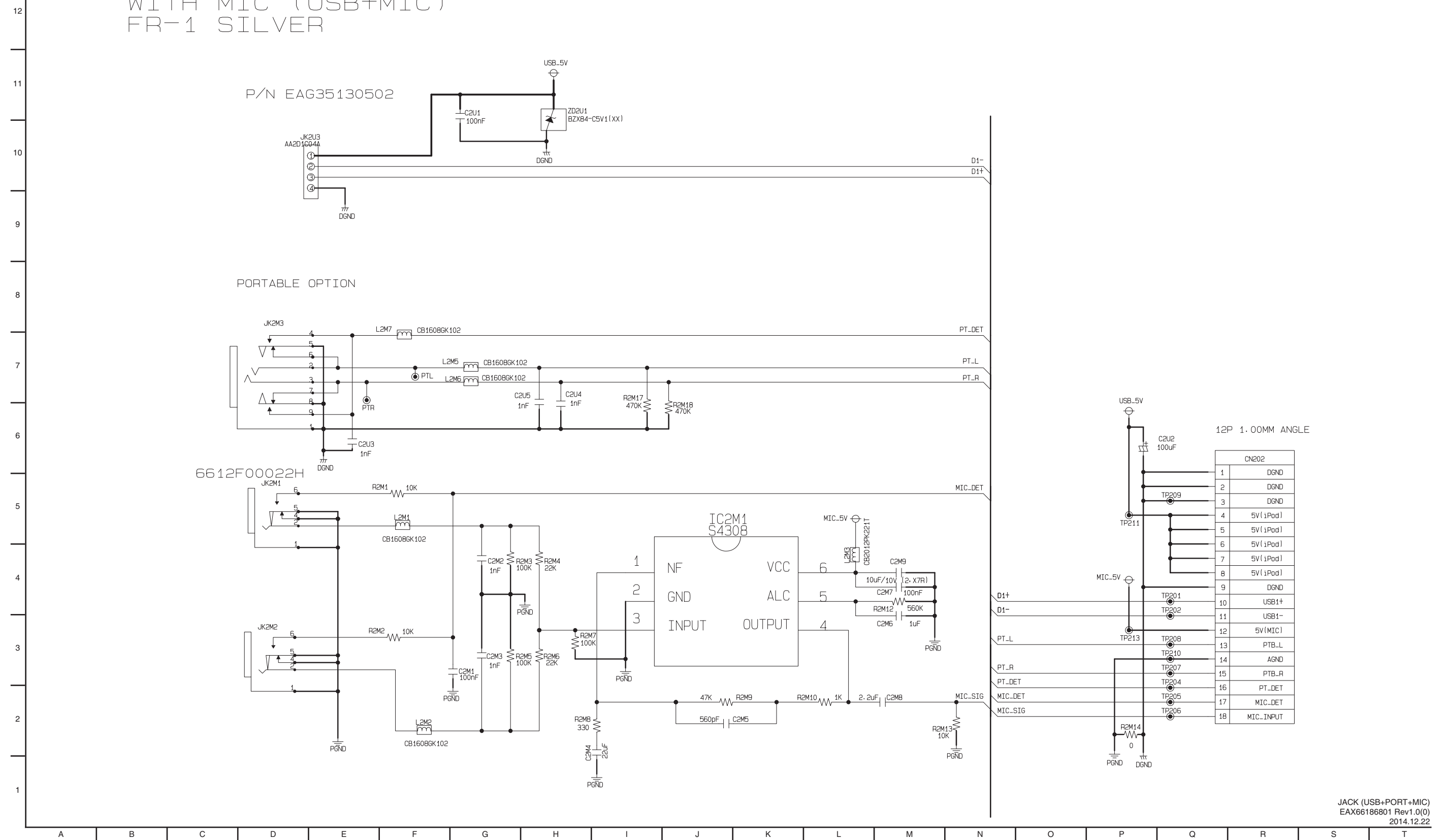
# 10. MAIN & AMP - AMP CIRCUIT DIAGRAM



# 11. JACK CIRCUIT DIAGRAM (OPTIONAL PART)

## 11-1. USB / PORTABLE / MIC CIRCUIT DIAGRAM

WITH MIC (USB+MIC)  
FR-1 SILVER



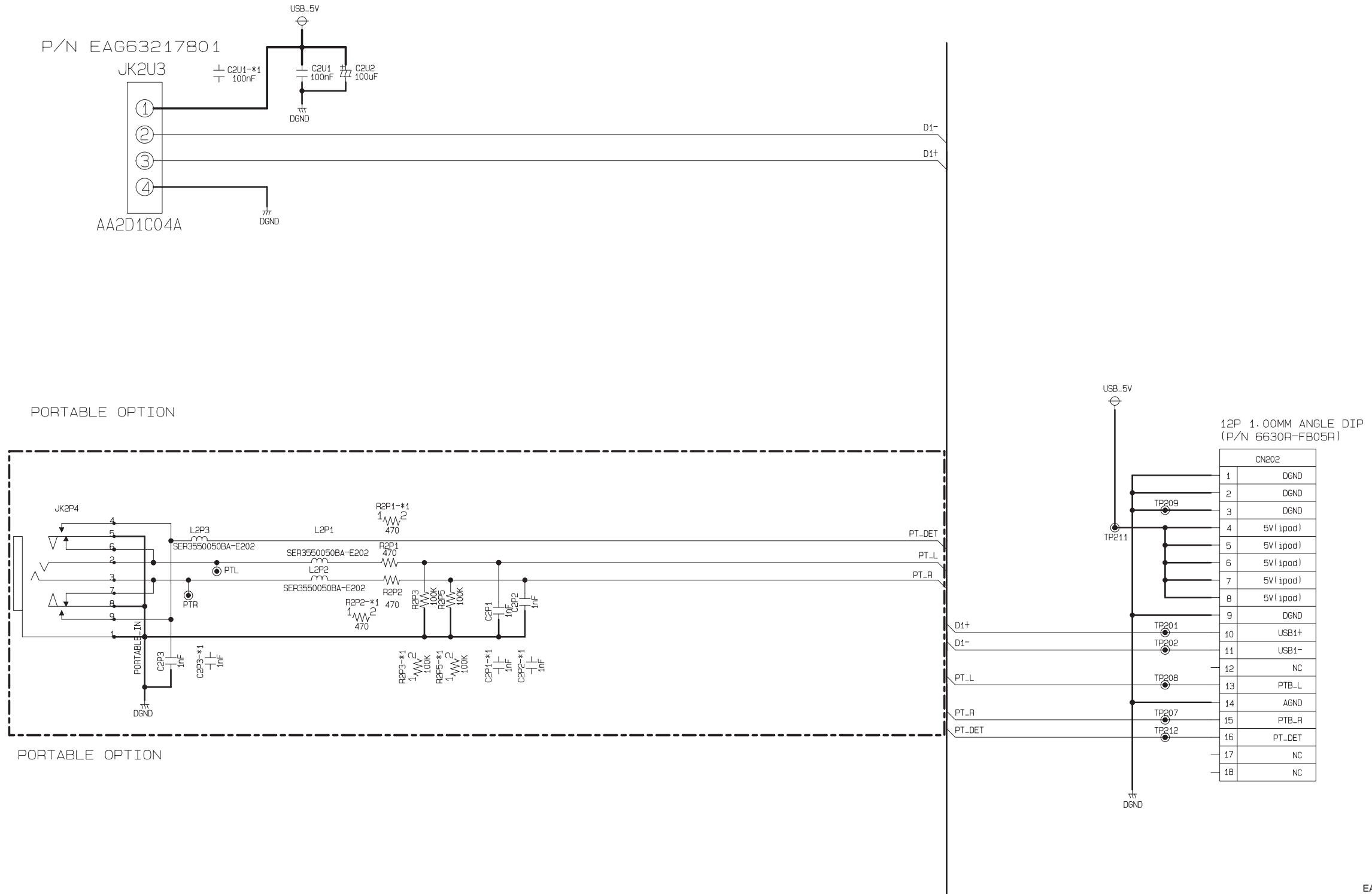
JACK (USB+PORT+MIC)  
EAX66186801 Rev1.0(0)  
2014.12.22

# JACK CIRCUIT DIAGRAM (OPTIONAL PART)

## 11-2. USB / PORTABLE CIRCUIT DIAGRAM

WITHOUT MIC  
FR-1 PHENOL

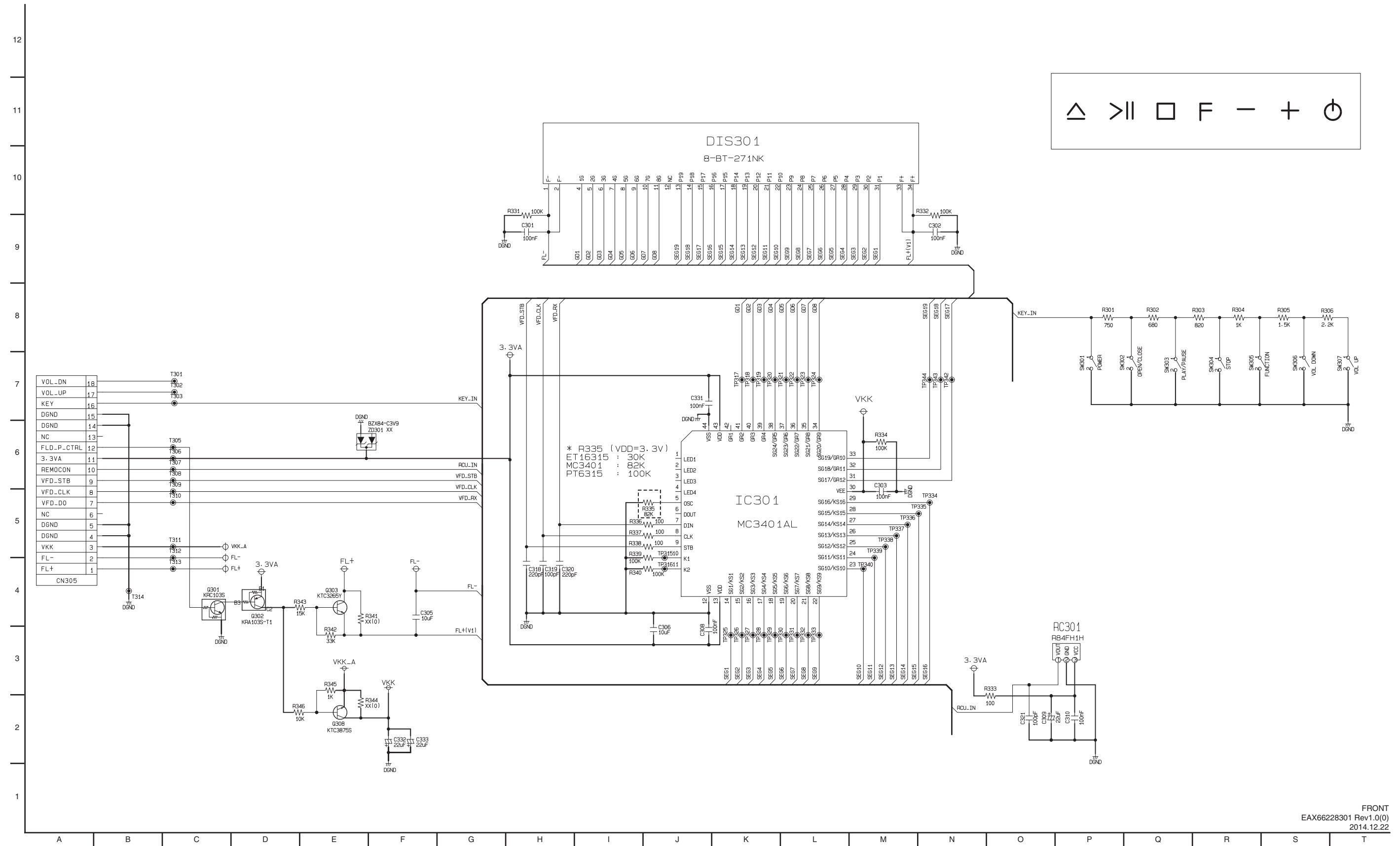
12  
11  
10  
9  
8  
7  
6  
5  
4  
3  
2  
1



A B C D E F G H I J K L M N O P Q R S T

JACK (W/O MIC)  
EAX65038701 Rev1.5(7)  
2014.12.22

# 12. FRONT CIRCUIT DIAGRAM



# CIRCUIT VOLTAGE CHART

## 1. ICs

Pin No.	Pin Description	Spec (V)	Power-On Mode
<b>IC101 (R5F100LH)</b>			
15	VDD	3.4	3.403
16	VDD	3.4	3.403
<b>IC102 (W25Q80DVSSIG)</b>			
8	VCC	3.4	3.403
<b>IC150 (LM29152RS)</b>			
2	INPUT	14	12.54
4	OUTPUT	12	12.03
<b>IC151 (SN1406035RGER)</b>			
9	VIN2	5.5	5.51
22	VIN1	5.5	5.51
20	LX1	1.2	1.199
11	LX2	1.5	1.497
<b>IC152 (AP7335)</b>			
1	INPUT	5.5	5.49
5	OUTPUT	5	5.1
<b>IC153 (TJ5220GDP)</b>			
3	VIN	5.5	5.51
6	VOUT	5	5.13
<b>IC154 (TJ4220GDP)</b>			
3	VIN	5.5	5.51
6	VOUT	5	5.14
<b>IC155 (AP7335)</b>			
1	INPUT	5.5	5.51
5	OUTPUT	3.4	3.406
<b>IC156 (TJ4220GDP)</b>			
3	VIN	5.5	5.51
6	VOUT	3.3	3.35
<b>IC202 (CS5346)</b>			
14	VA	5	5.1
46	VDD	3.3	3.35
36	VLS	3.3	3.35
5	VLC	3.3	3.35
<b>IC301 (TPIC2050)</b>			
34	P5V	5	5.1
56	P5V	5	5.1
31	P12V	12	12.03
42	P12V	12	12.03
24	A9P5V	9.5	9.47
<b>IC302 (LM37102D)</b>			
2	VIN	12	12.02
3	VOUT	9.5	9.47

Pin No.	Pin Description	Spec (V)	Power-On Mode
<b>IC501 (MT8563)</b>			
	DVCC33_IO	3.3	3.35
	DVCC12_K	1.2	1.199
	DDRVCIO	1.5	1.497
	AVDD33	3.3	3.35
	AVDD12	1.2	1.199
	AVDD12_LDO	1.2	1.199
<b>IC503 (H27U2G8F2DTR)</b>			
12	VCC	3.3	3.35
36	VCC	3.3	3.35
<b>IC601 (PS9860)</b>			
17	VDD_IO	3.3	3.35
43	VDD_IO	3.3	3.35
52	VDD_IO	3.3	3.35
<b>IC700/701/702 (TAS5612)</b>			
2	VDD	12	12.03
22	VDD	12	12.03
29	PVDD	36/26	36.65/26.09
30	PVDD	36/26	36.65/26.09
31	PVDD	36/26	36.65/26.09
36	PVDD	36/26	36.65/26.09
37	PVDD	36/26	36.65/26.09
38	PVDD	36/26	36.65/26.09

## 2. CAPACITORS

Location	Value & Spec	Voltage_Spec	Power-On Mode	
			(+)	(-)
CA152	100uF	16V	12.04	0
CA301	47uF	16V	5.13	0
CA303	47uF	16V	12.03	0

## 3. CONNECTORS

Pin No.	Pin Description	Spec (V)	Power-On Mode
<b>CN103 (MAIN -&gt; FRONT)</b>			
11	3.3VA	3.4	3.403
<b>CN104 (MAIN -&gt; JACK)</b>			
	USB_5V	5	5.14
<b>CN150 (MAIN -&gt; SMPS)</b>			
1	FL-	-17.5	-17.14
2	VKK	-20	-19.77
3	FL+	-14.85	-14.26
6	VCC_5.5VA	5.5	5.52
7	VCC_5.5VA	5.5	5.52
10	VCC_14VA	13	12.54
<b>CN151 (MAIN -&gt; SMPS)</b>			
6	36V/25V	36V/25V	36.65/26.09
7	36V/25V	36V/25V	36.65/26.09
8	36V/25V	36V/25V	36.65/26.09
<b>CN252 (MAIN -&gt; BT)</b>			
12	3.3VA_BT	3.3	3.403



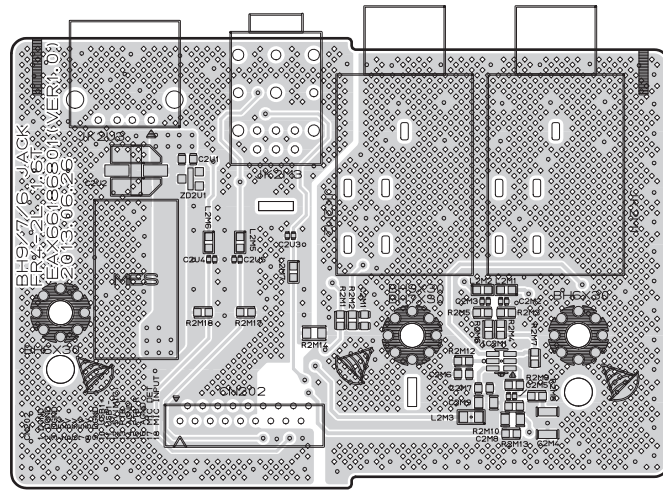




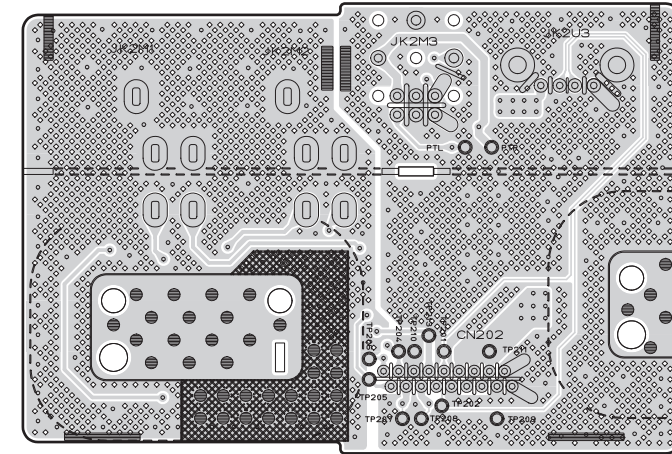
### 3. JACK P. C. BOARD (OPTIONAL PART)

#### 3-1. USB / PORTABLE / MIC P. C. BOARD

(TOP VIEW)

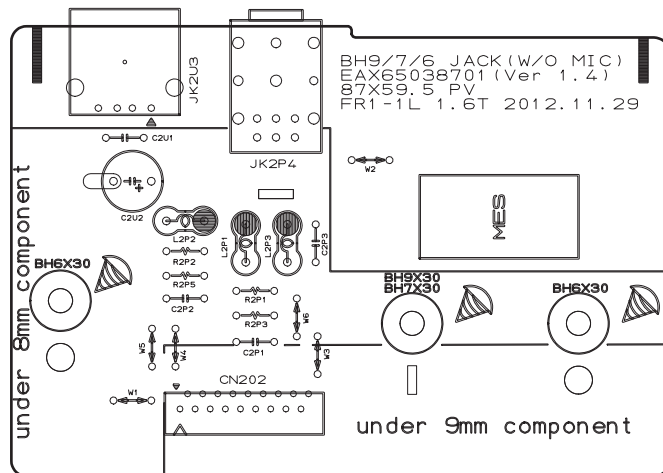


(BOTTOM VIEW)

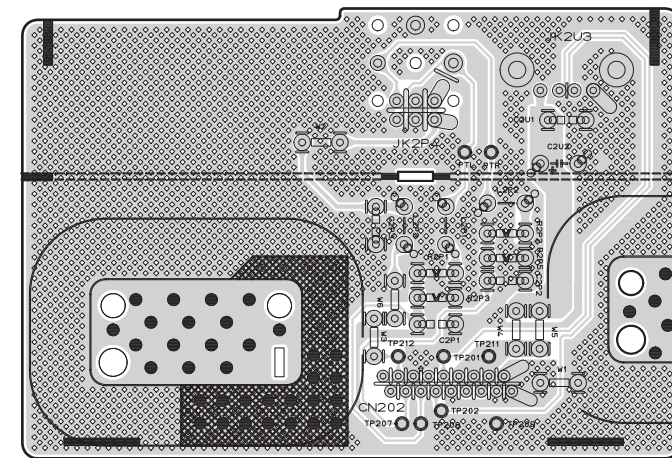


#### 3-2. USB / PORTABLE P. C. BOARD

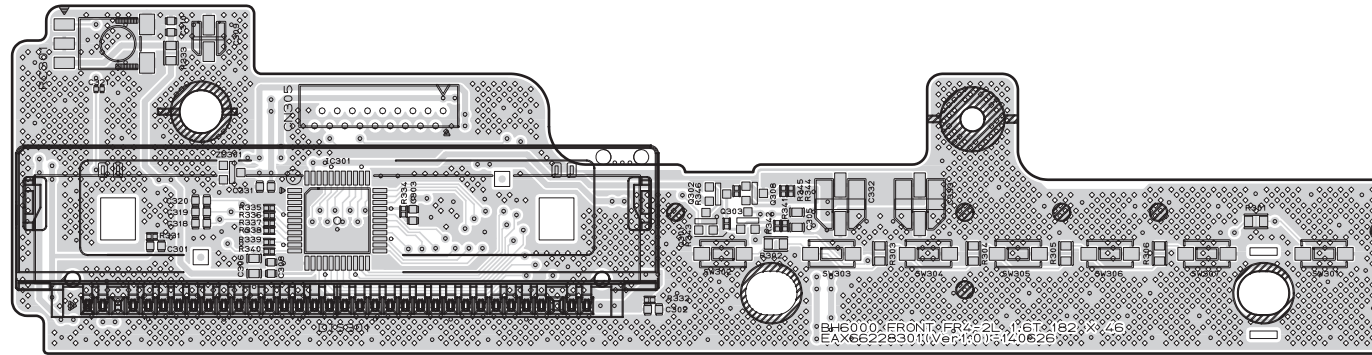
(TOP VIEW)



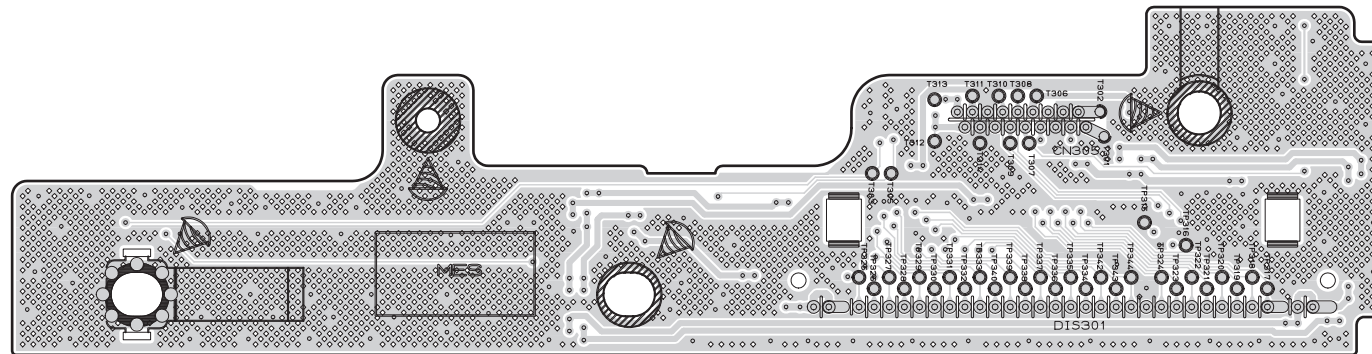
(BOTTOM VIEW)



**4. FRONT P. C. BOARD  
(TOP VIEW)**



**(BOTTOM VIEW)**



**SECTION 3**  
**CABINET & MAIN CHASSIS**

**CONTENTS**

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- 2. DECK MECHANISM SECTION ..... 3-5
- 3. PACKING ACCESSORY SECTION ..... 3-7
- 4. SPEAKER SECTION ..... 3-8
  - 4-1. CENTER SPEAKER ..... 3-8
  - 4-2. FRONT / REAR SPEAKER ..... 3-9
  - 4-3. PASSIVE SUBWOOFER..... 3-10

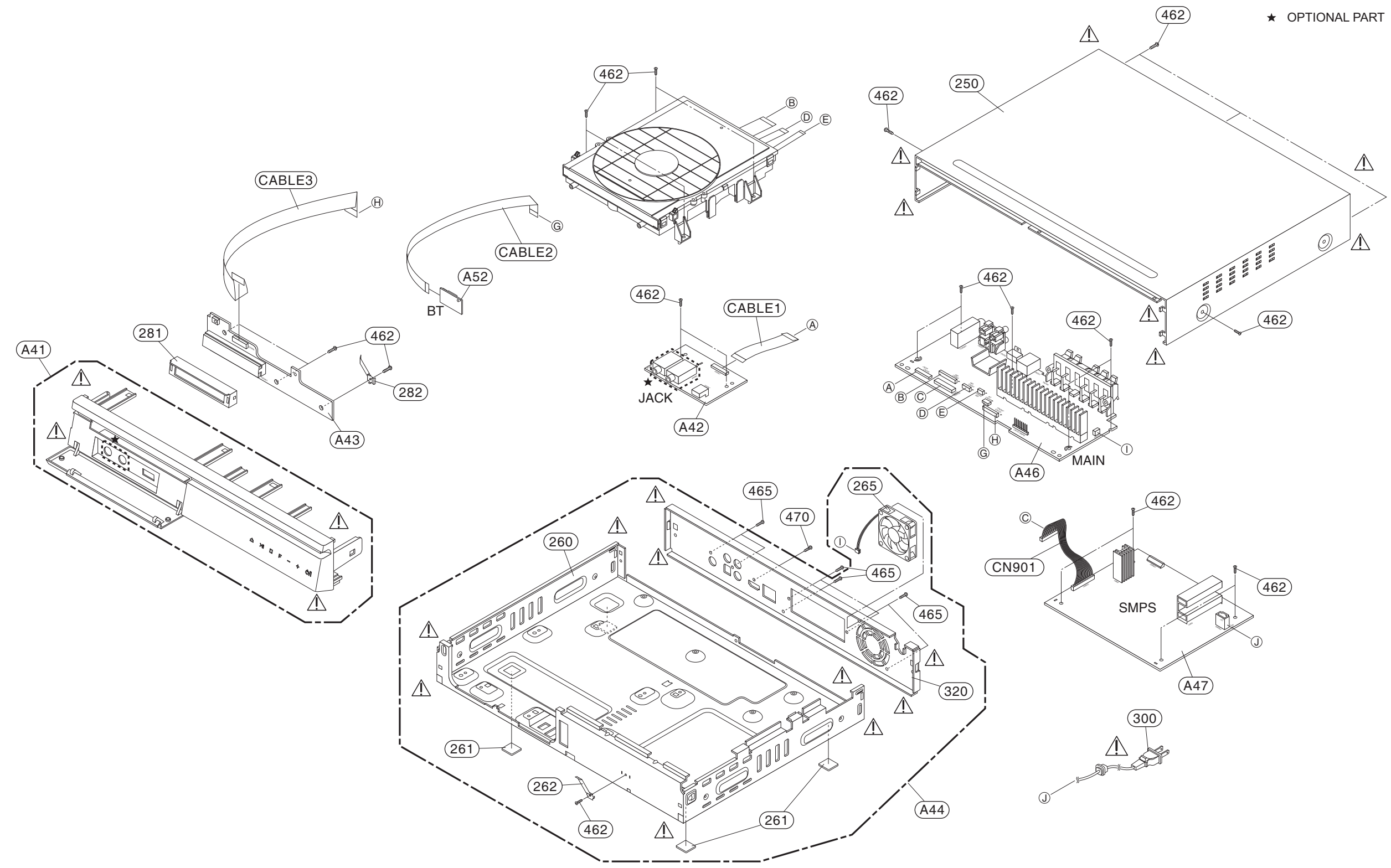


# EXPLODED VIEWS

## 1. CABINET AND MAIN FRAME SECTION

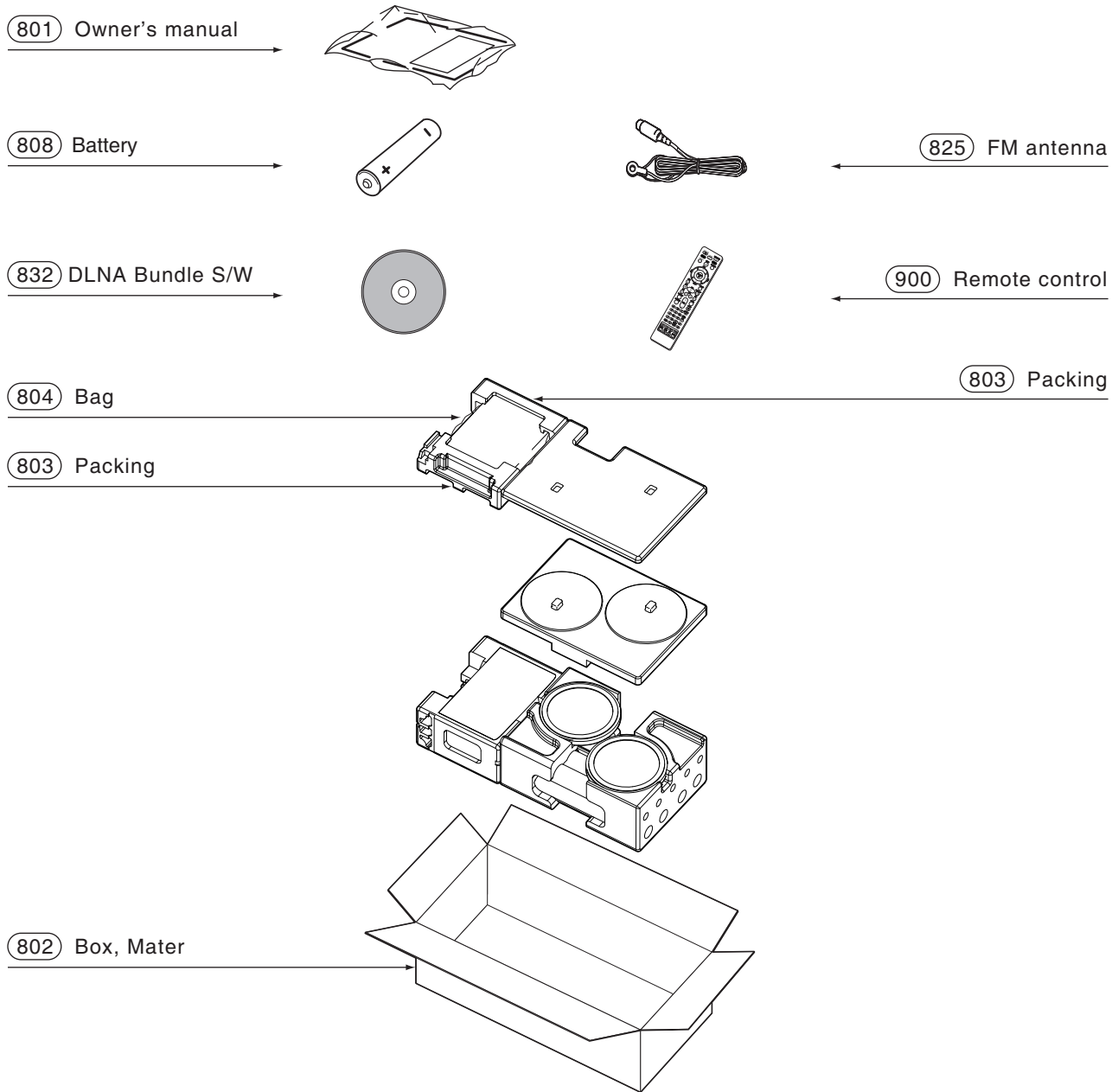
**NOTES)** THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

★ OPTIONAL PART



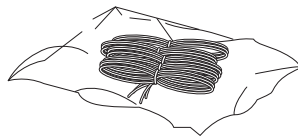


### 3. PACKING ACCESSORY SECTION



#### Speaker cables

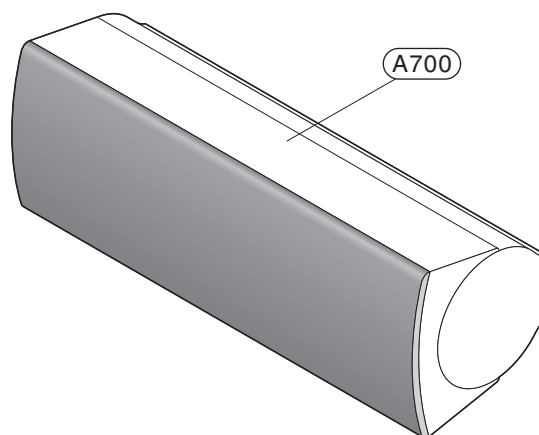
- WIRE80 Front Left
- WIRE81 Front Right
- WIRE70 Center
- WIRE60 Rear Left
- WIRE61 Rear Right



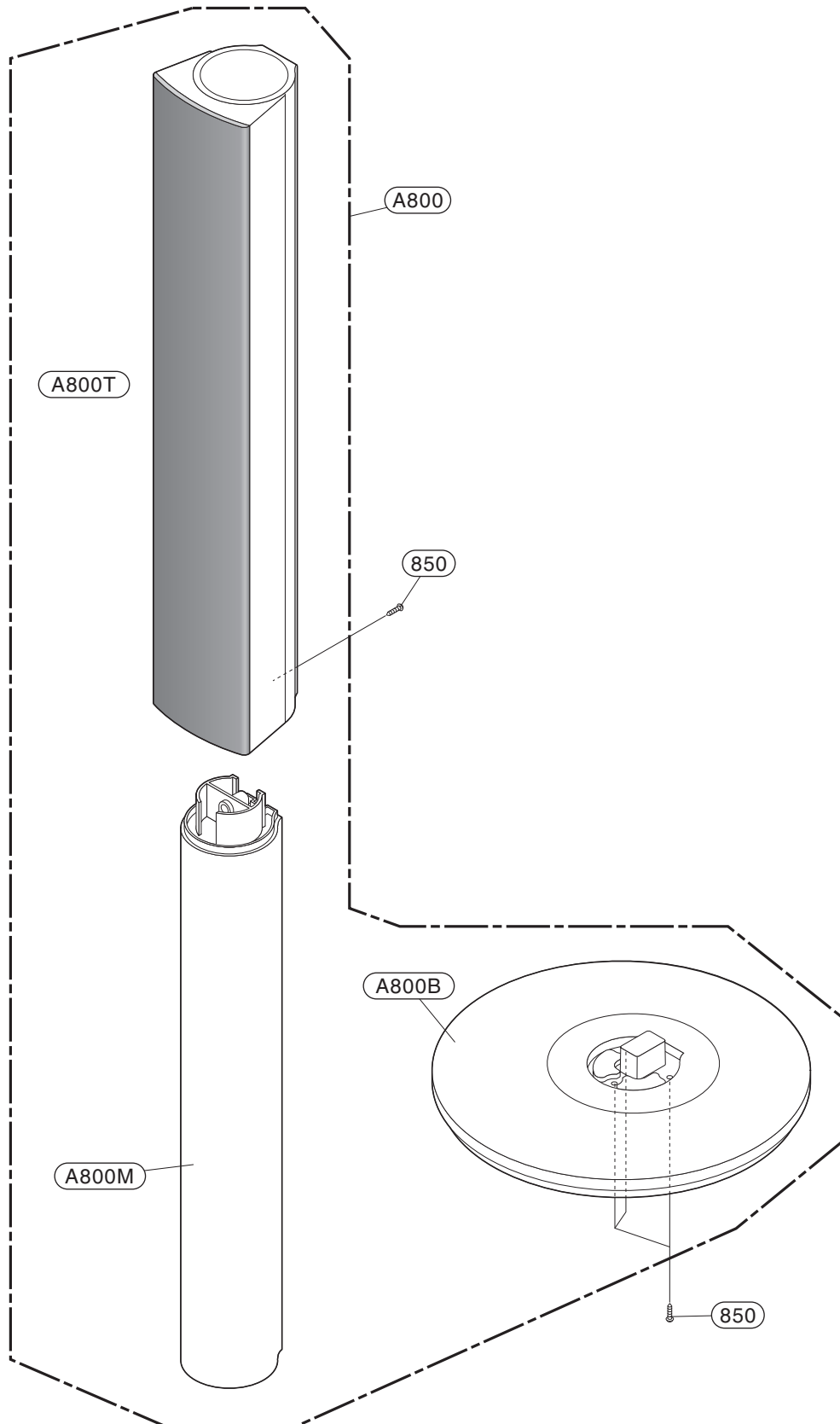


## 4. SPEAKER SECTION

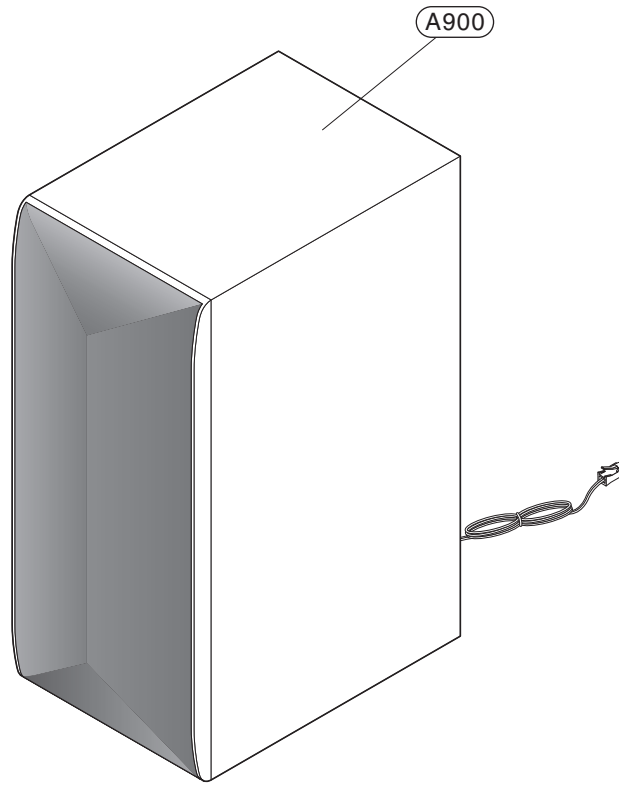
### 4-1. CENTER SPEAKER



## 4-2. FRONT / REAR SPEAKER



### 4-3. PASSIVE SUBWOOFER



# SECTION 4

## MT8563 F/E LOADER PART

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3. SA RESET PROCEDURE .....	4-3
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2. IC701 (TPIC2050): 9CH MOTOR DRIVE WITH 3 BEAM LASER DIODE DRIVER .....	4-8
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<b>BLOCK DIAGRAM</b> .....	4-11

# LD CHECK GUIDE

## 1. PURPOSE

If LD (Laser Diode) have problem, disc reading problem can happen.  
So it is needed to check LD status.

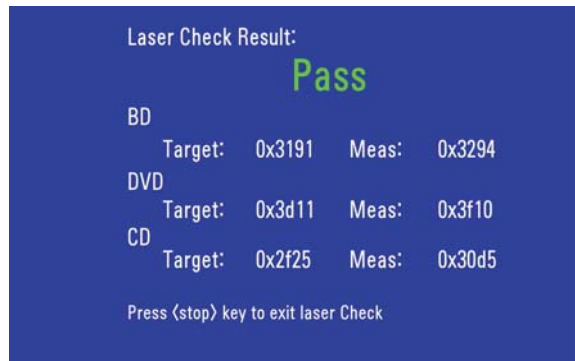
## 2. LD CHECK PROCEDURE

1) Power on the set (then, mode is in home menu).

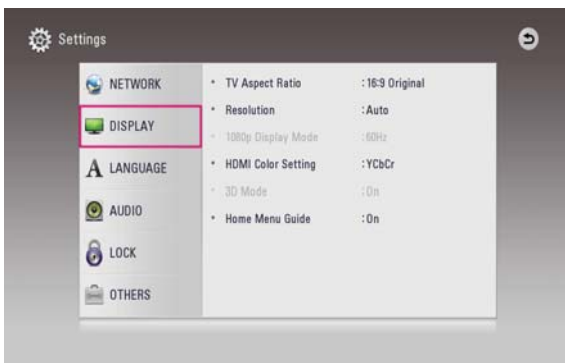


4) Check result is shown automatically.

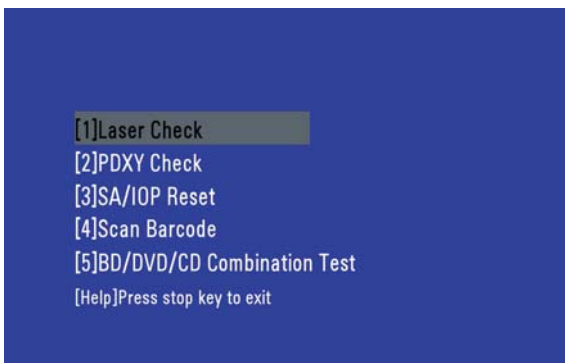
If you will see **"PASS"**, BD/DVD/CD LD status is OK.



2) Press Settings.



3) Under DISPLAY highlighted condition, press '5' -> '1' -> '7' -> '7' -> '7' -> '7' -> '7' -> **Enter** on the remote controller to display special mode. Move to the [1]Laser Check and click.



# HOW TO USE THE SA RESET FUNCTION

## 1. PURPOSE

In order to insert the new SA adjustment values, it needs clearing SA initial values of the flash memory.

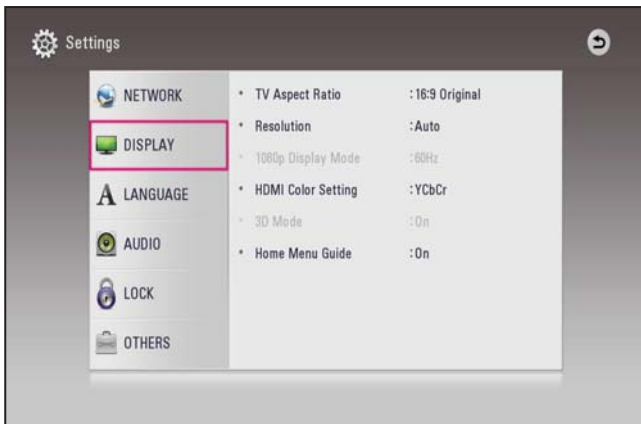
## 2. REQUIRED SA RESET

- After changing traverse.
- After changing main board assembly.
- After changing main board flash IC.

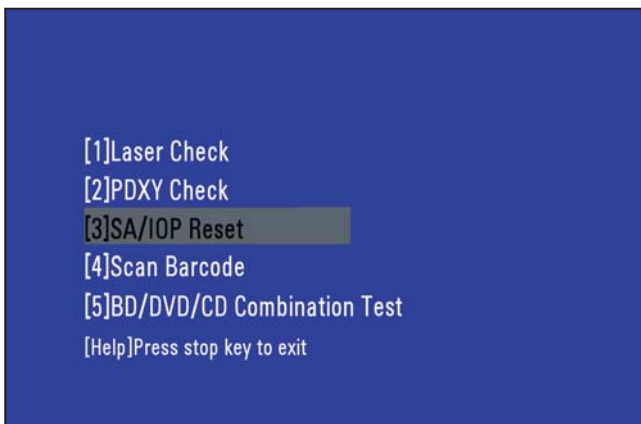
## 3. SA RESET PROCEDURE



1) Power on the set (then, mode is in home menu).



2) Press Settings.



3) Under DISPLAY highlighted condition, **press '5' -> '1' -> '7' -> '7' -> '7' -> '7' -> '7' -> '7' -> 'Enter'** on the remote controller to display special mode. Move to [3]SA/IOP Reset and click.



4) Insert BD-ROM SL disc.  
(Tray is opened automatically.)



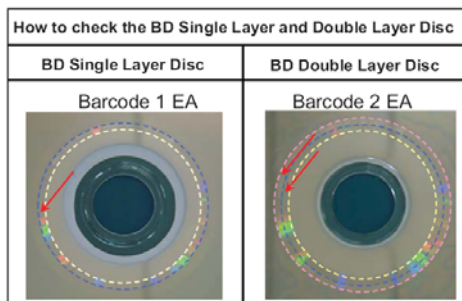
5) If the disc is inserted, you will see "Wait...".



6) If SA Adjustment is finished, you will see "PASS" and tray is opened automatically.

7) Press stop key twice to escape this special mode.

**Reference:**



# MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

## 1. IC501 (MT8563) PIN DESCRIPTION

### 1-1. Pin Function

PIN NO.	SYMBOL	TYPE	DESCRIPTION
SERVO			
E4	AUX1	Analog I/O	Auxiliary Input. Alternate Function : Signal Monitoring
F6	AVDD12	Analog Power(1.2V)	Power Pin
D6	AVDD33_1	Analog Power(3.3V)	Power Pin
E7	AVDD33_3	Analog Power(3.3V)	Power Pin

K1	FECFREQ	3.3V LVTTTL I/O, 5V-tolerance, Slow slew, 2, 4, 6, 8 mA PDR, 75K pull-up (3.3 V)	Frequency selection signal output, or LDD serial interface data or 12C SDA. The pin is spike-free at power-on stage.
K3	FECMOD	3.3V LVTTTL I/O, 5V-tolerance, Slow slew, 2, 4, 6, 8 mA PDR, 75K pull-up (0 V)	High frequency modulation mode selection signal output, or LDO serial interface command enable. The pin is spike-free at power-on stage.  Multifunction: Line-in input data
L6	FEDMO	Analog Output	Disk motor control output. DAC output.
L2	FEEJECT_	3.3V LVTTTL I/O, 5V-tolerance, 6 mA driving, 75K pull-up (3.3 V)	Eject/stop key input, active low. The pin is spike-free at power-on stage. Alternate function : General IO.
P4	FEFG	3.3V LVTTTL I/O, 5V-tolerance, 6 mA PDR, 75K pull-up (3.3 V)	Motor Hall sensor input. The pin is spike-free at power-on stage.
N2	FEFMO	Analog Output	Feed motor 1 control. DAC output.
N3	FEFMO2	Analog Output	Feed motor 2 control. DAC output.
L5	FEFMO3	Analog I/O	Feed motor 3 control. DAC output. Alternative Function : Auxiliary servo input.
L4	FEFMO4	Analog I/O	Feed motor 4 control. DAC output. Alternative Function : Auxiliary servo input.
H3	FOO	Analog Output	Focus servo output. PDM output of focus servo compensator.
A4	FPDOCD	Analog Input	Laser Power Monitor Input for CD APC / Differential negative input
B4	FPDODVD	Analog Input	Laser Power Monitor Input for DVD APC / Differential positive input
J2	FEGAINSW1	Analog Output	Read gain switch 1.
J3	FEGAINSW2	Analog Output	Read gain switch 2.
P2	FEGAINSW3	Analog Output	Read gain switch 3.
M2	FEGIO0	3.3V LVTTTL I/O, 5V-tolerance, 2, 4, 6, 8 mA PDR, 75K pull-down (0 V)	LDD serial interface data. The pin is spike-free at power-on stage. The pin is not allowed to pull-up in circuit layout. Alternate function : 1. Internal monitored signal output 2. General IO
K4	FEGIO1	3.3V LVTTTL I/O, 5V-tolerance, 2, 4, 6, 8 mA PDR, 75K pull-down (0 V)	LDD serial interface CLK. The pin is spike-free at power-on stage. The pin is not allowed to pull-up in circuit layout. Alternate function : 1. Internal monitored signal output 2. General IO



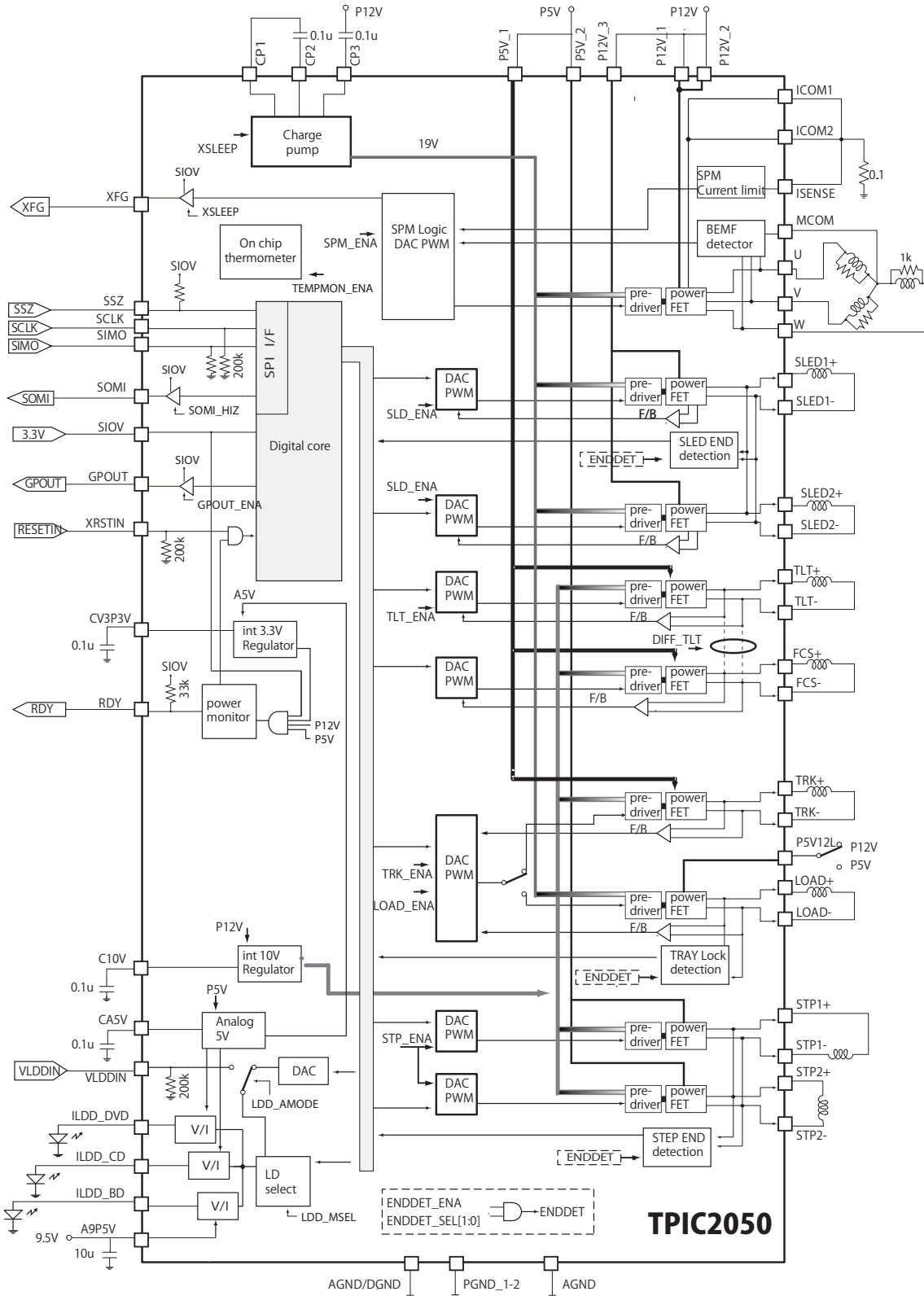
PIN NO.	SYMBOL	TYPE	DESCRIPTION
R2	FEGIO10	3.3V LVTTTL I/O, 5V-tolerance, 2, 4, 6, 8 mA PDR, 75K pull-down (3.3 V)	PC RS232 serial receive data. The pin is spike-free at power-on stage. Alternate function : 1. High speed serial output port. (CLOCK) 2. Internal monitored signal output 3. LED Control Output. Initial "0" Output 4. Line-in input master clock 5. Serial interface control line 6. Slave I2C clock 7. General IO
R3	FEGIO11	3.3V LVTTTL I/O, 5V-tolerance, 2, 4, 6, 8 mA PDR, 75K pull-down (3.3 V)	PC RS232 serial transmit data. The pin is spike-free at power-on stage. Alternate function : 1. High speed serial output port. (Data) 2. Internal monitored signal output 3. Line-in input bit clock 4. Serial interface control line 5. Slave I2C clock 6. General IO
N4	FEGIO3	3.3V LVTTTL I/O, 5V-tolerance, 2, 4, 6, 8 mA PDR, 75K pull-down (0 V)	LED Control Output. Initial 0 Output. The pin is spike-free at power-on stage. Alternate function : 1. Internal monitored signal output 2. General IO
P1	FEGIO4	Analog Output	Read gain switch 4 Alternate function : 1. LCD serial interface command enable. 2. LCD_DRV: Square wave output for LCD control. 3. Internal monitored signal output 4. Line-in input left-right clock 5. General IO.
J1	FEGIO5	Analog Output	Read gain switch 6 Alternate function : 1. SIDM 2. LCD serial interface command enable. 3. Internal monitored signal output 4. Line-in input data 5. General IO.
K7	FEGIO6	Analog Output	Read gain switch 6. The pin is not allowed to pull-up in circuit layout Alternate function : 1. SIDM 2. LCD serial interface command enable. 3. Internal monitored signal output 4. General IO.
K5	FEGIO7	3.3V LVTTTL I/O, 5V-tolerance, 2, 4, 6, 8 mA PDR, 75K pull-down (0 V)	General IO. The pin is spike-free at power-on stage. The pin is not allowed to pull-up in circuit layout.
K6	FEGIO9	3.3V LVTTTL I/O, 5V-tolerance, 2, 4, 6, 8 mA PDR, 75K pull-down (0 V)	General IO. The pin is spike-free at power-on stage. Alternate function : 1. Internal monitored signal output 2. Spoke input 3. Power on reset input, high active. 4. General IO.
D5	HAVC	Analog Output	Decoupling Pin for Reference Voltage of Main and Sub Beams
A1	INA	Analog Input	Input of Main Beam Signal (A)
B2	INB	Analog Input	Input of Main Beam Signal (B)
B1	INC	Analog Input	Input of Main Beam Signal (C)

PIN NO.	SYMBOL	TYPE	DESCRIPTION
C3	IND	Analog Input	Input of Main Beam Signal (D)
D2	INE	Analog Input	Input of Sub-Beam Signal (E)
D3	INF	Analog Input	Input of Sub-Beam Signal (F)
C2	ING	Analog Input	Input of Sub-Beam Signal (G)
C1	INH	Analog Input	Input of Sub-Beam Signal (H)
G6	MPXOUT1	Analog Output	Multiplexer Output 1 for Signal Monitoring. The pin is not allowed to pull-up in circuit layout. Alternate function : Internal monitored signal output / General output.
G5	MPXOUT2	Analog Output	Multiplexer Output 2 for Signal Monitoring. The pin is not allowed to pull-up in circuit layout. Alternate function : Internal monitored signal output / General output.
F4	MPXOUT3	Analog Output	Multiplexer Output 3 for Signal Monitoring. The pin is not allowed to pull-up in circuit layout. Alternate function : Internal monitored signal output / General output.
K2	FEOSCEN	3.3V LVTTTL I/O, 5V-tolerance, Slow slew, 2, 4, 6, 8 mA PDR, 75K pull-up (3.3 V)	High frequency modulation enable signal output, or LDD serial interface CLK or 12C SCL. The pin is spike-free at power-on stage.
G1	RFIN	Analog Input	Differential Input of AC Coupling RF SUM Signal (Negative)
G2	RFIP	Analog Input	Differential Input of AC Coupling RF SUM Signal (Positive)
G3	TLO	Analog Output	Tilt servo output
M1	FETRAYIN_	3.3V LVTTTL I/O, 5V-tolerance, 6 mA, 75K pull-up (3.3 V)	Tray_is_in Input. A Logical Low Indicates the Tray is IN. Feedback Flag is from Tray Connector. The pin is spike-free at power-on stage. Alternate function : General IO.
L3	FETRAYOUT_	3.3V LVTTTL I/O, 5V-tolerance, 6 mA, 75K pull-up (3.3 V)	Tray_is_out Input. A Logical Low Indicates the Tray is OUT. Feedback Flag is from Tray Connector. The pin is spike-free at power-on stage. Alternate function : General IO.
P3	FETRAYPWM	Analog Output	Tray DAC / PWM control output. Controlled by microP
E1	TRINA	Analog Input	Input of Tracking Signal (A)
E2	TRINB	Analog Input	Input of Tracking Signal (B)
F3	TRINC	Analog Input	Input of Tracking Signal (C)
F2	TRIND	Analog Input	Input of Tracking Signal (D)
H4	TRO	Analog Output	Tracking servo output. PDM output of tracking servo compensator.
E3	V14	Analog Output	Output of voltage eference (1.4V)
A2	VDAC0	Analog Output	Output of General DAC
A3	FVREF	Analog Output	Output of Voltage Reference
C4	VWDC2O	Analog Output	Output Voltage 2 of Laser Diode Control in APC
B3	VWDC3O	Analog Output	Output Voltage 3 of Laser Diode Control in APC

## 2. IC701 (TPIC2050)

### : 9ch motor drive with 3 beam laser diode driver

#### 2-1. Block Diagram



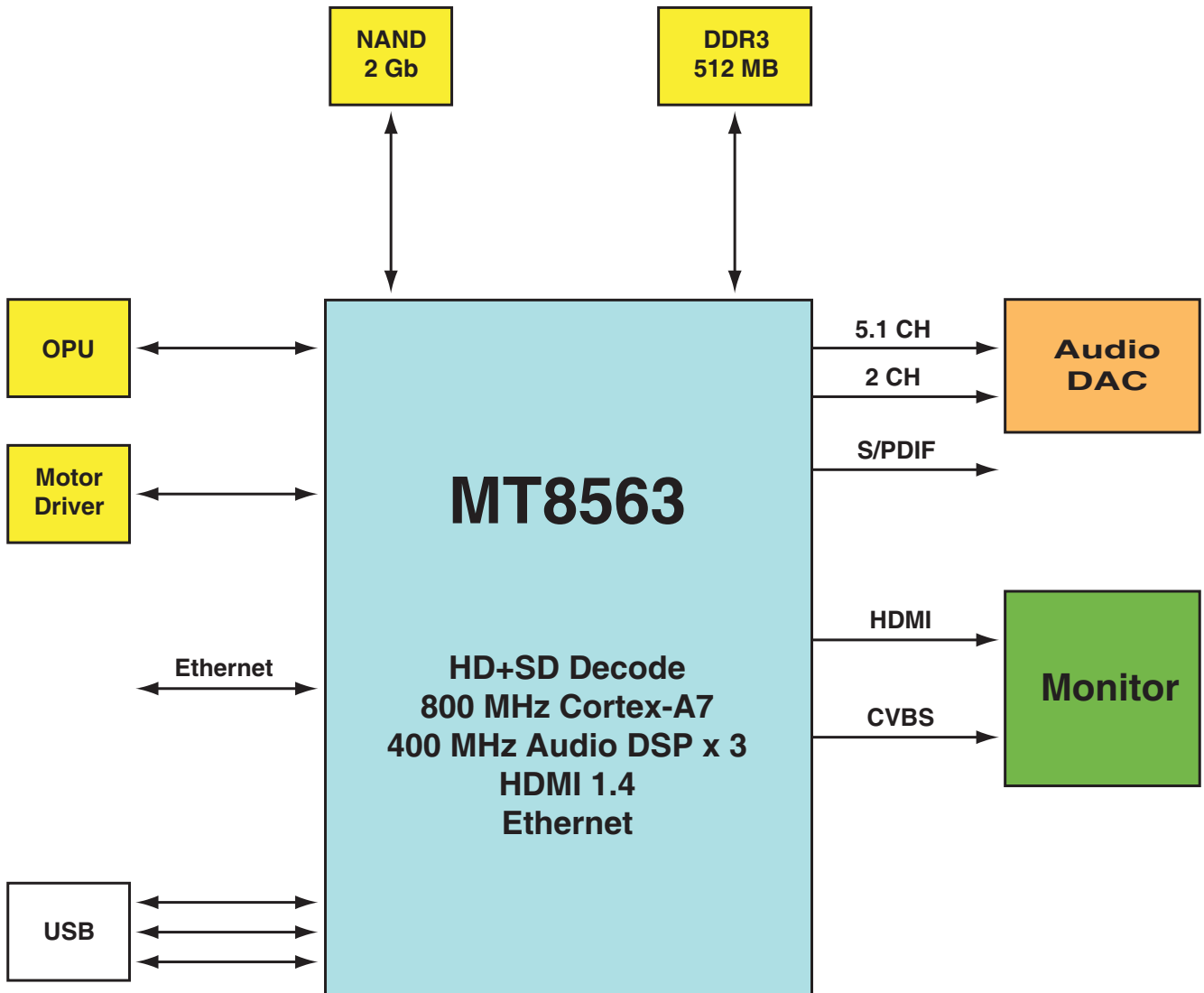
## 2-2. Pin Function

No.	Name	I/O	Description
1	SLED1_P	OUT	Sled1 positive output terminal
2	SLED1_N	OUT	Sled1 negative output terminal
3	P12V_3	PS	Power supply terminal for 12V drivers output
4	SLED2_P	OUT	Sled2 positive output terminal
5	SLED2_N	OUT	Sled2 negative output terminal
6	PGND_2	PS	GND terminal for 12V drivers
7	C10V	MISC	The capacitance connection terminal for internal regulator
8	CP1	MISC	Capacitance connection for Charge Pump
9	CP2	MISC	Capacitance connection for Charge Pump
10	CP3	MISC	Capacitance connection for Charge Pump
11	GPOUT	OUT	General Purpose Output (Test monitor)
12	XFG	OUT	Motor speed signal output
13	RDY	OUT	Device ready signal Internally pulled up to SIOV
14	SSZ	IN	SIO Slave Select Low active input terminal
15	SCLK	IN	SIO Serial clock input terminal
16	SIMO	IN	SIO Slave Input Master Output terminal
17	SOMI	OUT	SIO Slave Input Master Input terminal
18	SIOV	PS	Power supply terminal for Serial Port 3.3V typical
19	XRSTIN	IN	RESET input terminal to disable the driver IC
20	TEST1	MISC	Test pin. Should be open.
21	VLDDIN	IN	Laser diode control analog signal input 0 to 3V terminal. Required to set register when use VLDDIN input. Open in case of non use analog input.
22	CV3P3	MISC	Capacitance terminal for internal 3.3V core (typ 0.1uF)
23	AGND/DGND	PS	Ground terminal for digital and analog
24	A9P5V	PS	Power supply terminal 9.5V Laser diode for BD
25	ILDD_BD	OUT	Laser diode for BD output terminal
26	ILDD_DVD	OUT	Laser diode for DVD output terminal
27	ILDD_CD	OUT	Laser diode for CD output terminal
28	CP5V	MISC	The capacitance connection terminal for control system power supply 0.1uF or larger decoupling capacitor should be connected.
29	LOAD_P	OUT	Load positive output terminal
30	LOAD_N	OUT	Load negative output terminal
31	P5V12L	PS	The power supply terminal (5V or 12V) for Load driver output stages.
32	TEST2	MISC	Test pin. Should be open.
33	TEST3	MISC	Test pin. Should be connected to P5V.
34	P5V_1	PS	Power supply terminal for Tilt/Fcs/Trk drivers
35	TLT_N	OUT	Tilt negative output terminal
36	TLT_P	OUT	Tilt positive output terminal
37	TRK_P	OUT	Tracking positive output terminal
38	TRK_N	OUT	Tracking negative output terminal
39	FCS_P	OUT	Focus positive output terminal
40	FCS_N	OUT	Focus negative output terminal
41	PGND_1	PS	GND terminal for Tilt/Fcs/Trk channel drivers
42	P12V_1	PS	Power supply terminal for 12V driver output stage
43	U	OUT	U phase output terminal for spindle motor
44	ICOM1	MISC	Current sense resistor terminal for spindle driver
45	V	OUT	V Phase output terminal for spindle motor
46	P12V_2	PS	Power supply terminal for 12V driver output stage
47	W	OUT	W phase output terminal for spindle motor
48	ICOM2	MISC	Current sense resistor terminal for spindle driver
49	MICOM	IN	Motor center tap connection
50	ISENCE	IN	Current sense input terminal for spindle drivers
51	AGND	PS	Ground terminal for internal analog
52	STIP1_P	OUT	STP1 positive output terminal for collimator
53	STIP1_N	OUT	STP1 negative output terminal for collimator
54	STP2_P	OUT	STP2 positive output terminal for collimator
55	STP2_N	OUT	STP2 negative output terminal for collimator
56	P5V_2	PS	Power supply terminal for 5V driver output

### 3. PICK-UP CONNECTOR TERMINAL PIN ASSIGNMENTS

PIN NO.	PIN NAME	FUNCTION	BLOCK
1	F2+	Outer Focus (+)	Actuator
2	F2-	Outer Focus (-)	
3	T+	Tracking (+)	
4	F1+	Inner Focus (+)	
5	T-	Tracking (-)	
6	F1-	Inner Focus (-)	
7	MOTOR_A-	Step Motor A-	CLD Motor
8	MOTOR_B-	Step Motor B-	
9	MOTOR_A+	Step Motor A+	
10	MOTOR_B+	Step Motor B+	
11	NC	NC	NC
12	NC	NC	
13	GND_PD	PDIC Ground	PDIC Part (BD/ DVD/ CD)
14	A	Servo Signal Part	
15	B		
16	C		
17	D		
18	E		
19	F		
20	G		
21	H		
22	SW3 (Sub PD Mode)	Sub PD Mode Change	
23	RF+	BD/DVD/CD RF+	
24	RF-	BD/DVD/CD RF-	
25	NC	NC	
26	SW1 (Mode)	BD/DVD/CD Mode Change	
27	VREF_PD(2.1V)	PDIC Reference 2.1V	
28	VCC_PD(5V)	PDIC Power 5V	
29	GND_PD	PDIC GND	
30	SW (Gain)	BD/DVD/CD Gain Change	
31	GND_LD	LD Ground	LD/Monitor Part
32	BD_LD	LD Control BD	
33	CD_LD	LD Control CD	
34	DVD_LD	LD Control DVD	
35	GND_LD	LD Ground	
36	TEMP	Thermistor	
37	NC	NC	
38	CD/DVD_MPD	Monitor output DVD/CD	
39	BD_MPD	Monitor output BD	
40	DVD_VR	DVD Level adjust	
41	CD_VR	CD Level adjust	
42	NC	NC	
43	NC	NC	
44	GND_LD	LD Ground	
45	GND_LD	LD Ground	

# BLOCK DIAGRAM



# MEMO

A series of horizontal dotted lines for writing.