LG

BLU-RAY DISC PLAYER
with BUILT-IN HDD & HD TUNER

SERVICE MANUAL

MODEL: HR832T/HR835T

CAUTION
BEFORE SERVICING THE UNIT, READ THE “SAFETY PRECAUTIONS” IN THIS MANUAL.

P/NO : AFN75494625

SEPTEMBER, 2012

SERVICE MANUAL

MODEL: HR832T/HR835T

LG

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SECTION 1

SUMMARY

CONTENTS

PRODUCT SAFETY SERVICING GUIDELINES FOR HD RECORDER / BLU-RAY COMBO 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 non-insulated "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:

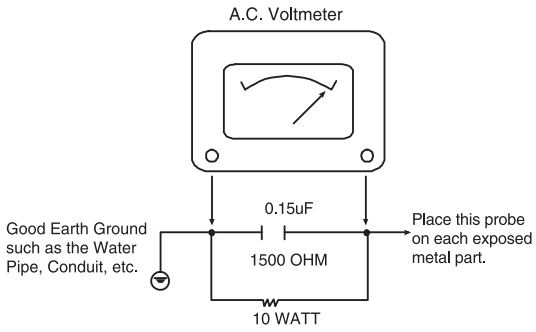
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

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 trans-ported 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.

SERVICING PRECAUTIONS

CAUTION: Before servicing the HD RECORDER / BLU-RAY COMBO 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 HD RECORDER / BLU-RAY COMBO 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 HD RECORDER / BLU-RAY COMBO 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 whitch instruments covered by this service manual might be equipped.

5. Do not apply AC power to this HD RECORDER / BLU-RAY COMBO 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 surf ace 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.)

PROGRAM UPDATE GUIDE

1. MAKING SOFTWARE UPGRADE TO USB OR DISC

1-1. Software Upgrade to Disc

1) Do Physical format as ISO9660 or JOLIET file system

2) Don't care about the CD Volume label

3) Write Main SW file and Back up SW file on Root
   a) Main SW : **LG_BR_7000B32.ROM-00**
   b) Back up SW : **LG_BR_7000B32.ROM-01**

1-2. Software Upgrade to USB

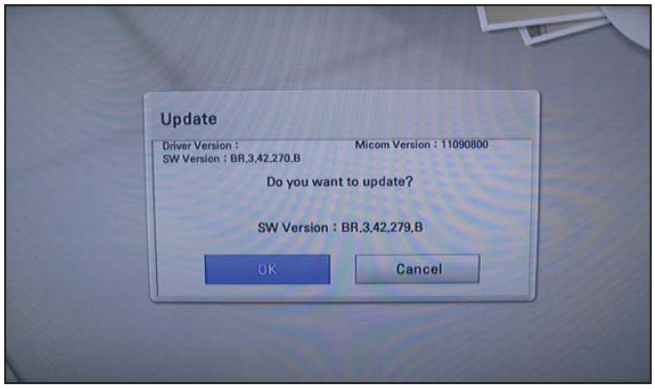
1) Write Main SW file and Back up SW file :
   a) Main SW : **LG_BR_7000B32.ROM-00**
   b) Back up SW : **LG_BR_7000B32.ROM-01**

2) Copy this file to root fold in USB.

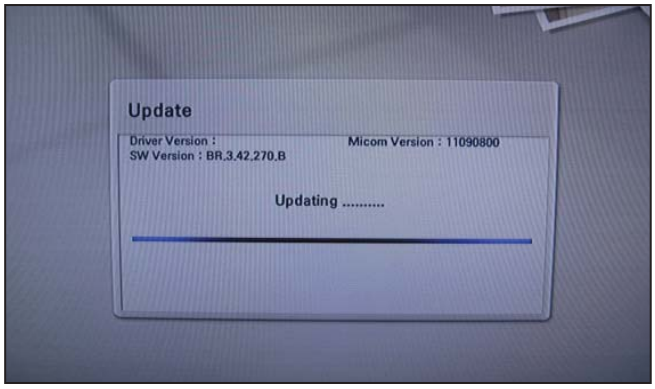
PROGRAM UPDATE GUIDE

2. SOFTWARE UPGRADE

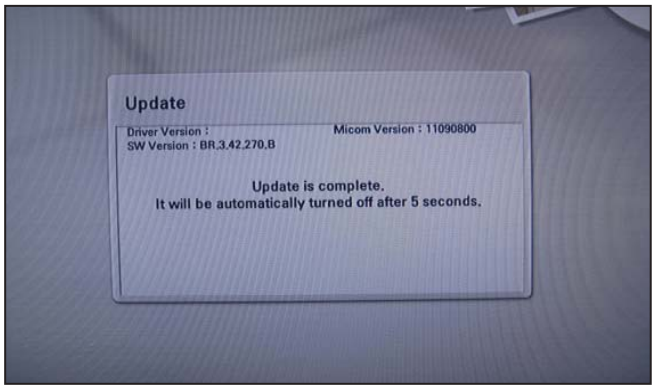
1) Select "**Home**" button in Remocon.



2) Insert upgrading USB or Disc to set.
3) After about 10 seconds, system display a pop-up for program upgrade.



4) Move cursor to "**OK**" in pop-up and press "**ENTER**" key.
It will show progress information.



5) If the upgrade process is complete, the set will be automatically turned off.

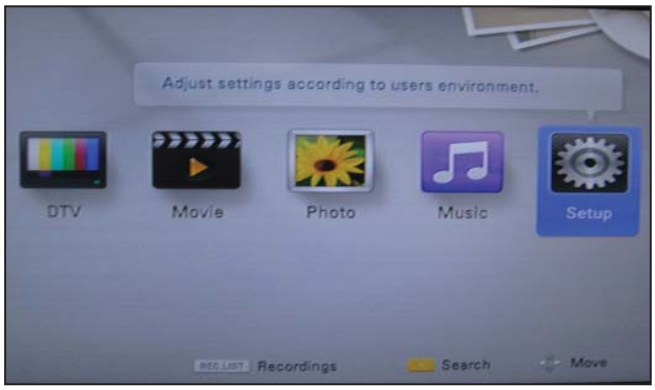
PROGRAM UPDATE GUIDE

3. NETWORK UPDATE

You can update the firmware by connecting your unit device directly to the S/W update server.

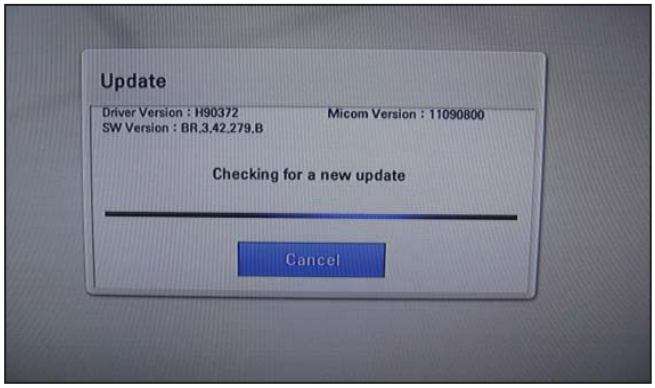
Configuring Network Settings

To update the firmware by connecting your player directly to the S/W update server, your player must be connected to network. If your player is not connected to network, make a physical connection.



1) Select "**Home**" button in Remocon, and select the **Setup** mode.

2) Select **Others --> Software Update**

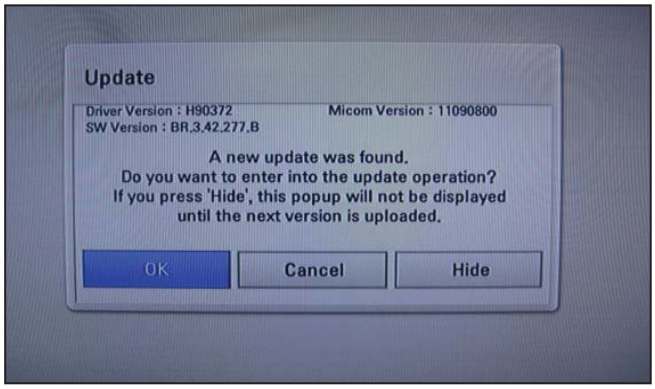


3) On the UPDATE window, press or ENTER to check for the newest update.
(Checking will takes about one minute.)

Caution:
Pressing Enter while checking for the update will end process.

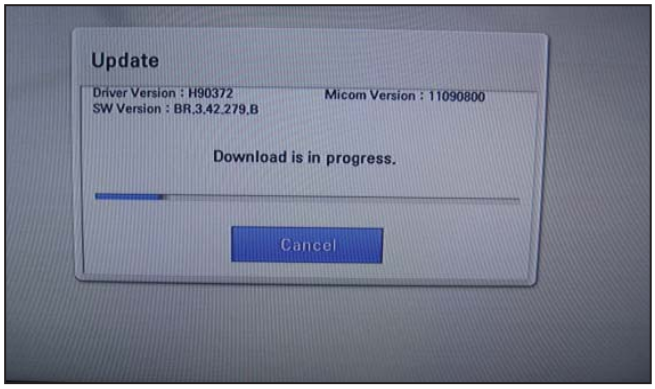
PROGRAM UPDATE GUIDE

NETWORK UPDATE

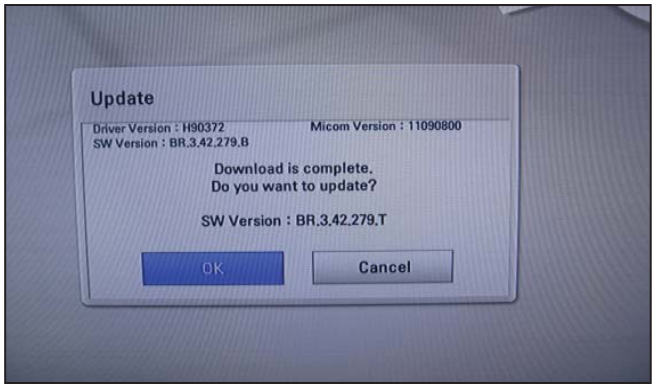


If newer version exists,

4) If newer version exists, the message "**A new update was found. Do you want to download it ?**" appears. Select OK to download the update. (Selecting **CANCEL** will end the update.)

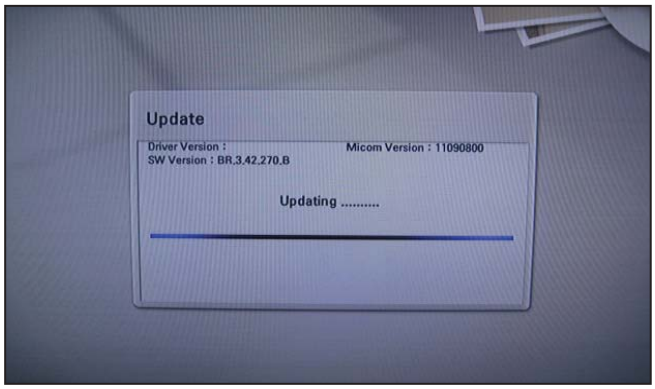


5) The player starts downloading the newest update from the SBP server.



6) When downloading is completed, the message, "**Download is complete. Do you want to update?**" appears.

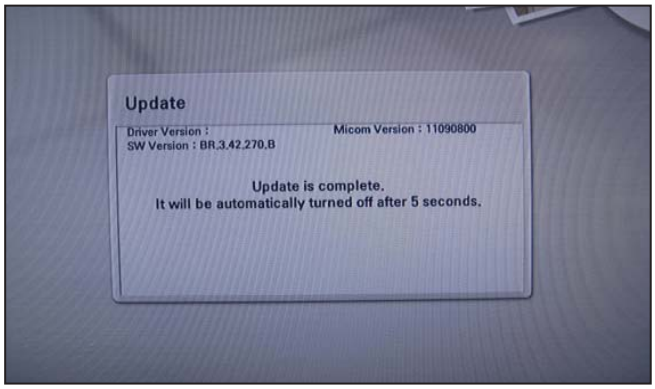
7) Select **OK** to start updating.



8) Update will be processed.

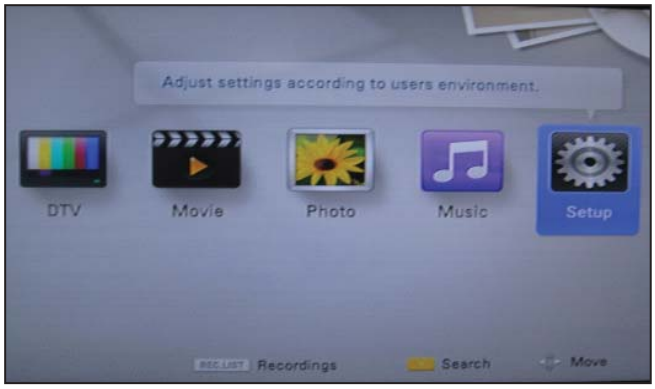
Caution:
Do not turn off the power during firmware update.

PROGRAM UPDATE GUIDE

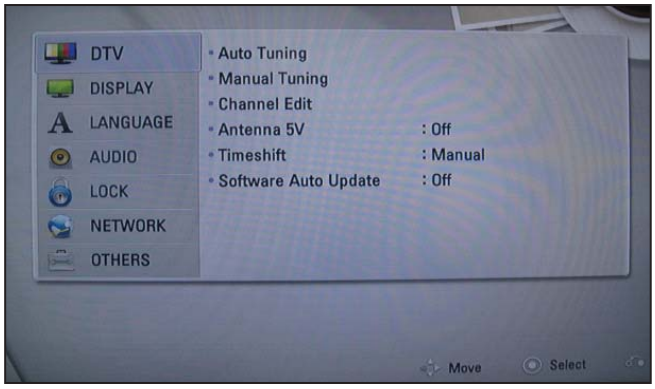


9) When update is completed, the message, "**Update is complete.**" will appear, and the power will turn off automatically after 5 seconds.
10) Turn the power back on.
The system now operates with the new version.

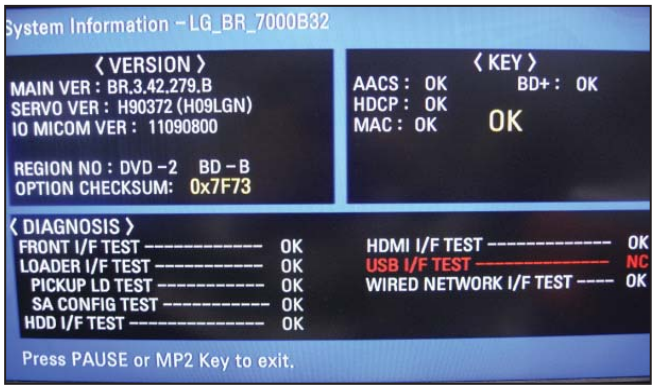
4. SYSTEM INFORMATION



1) Press "**Home**" button in Remocon.



2) Select "**Setup**" in Home Menu



3) Press button number **1 –> 3 –> 9 –> 7 –> 1 –> 3 –> 9** in Remocon.
The picture on TV screen appears like left picture:
4) Press "**Pause**" button in Remocon to exit.

SPECIFICATIONS

• GENERAL

Power requirements:	AC 200 ~ 240 V, 50 / 60 Hz
Power consumption:	30 W
Dimensions (approx.) :	430 X 58 X 299 mm (W x H x D) without foot
Net weight (approx.) :	3.33 kg
Operating temperature :	5 °C to 35 °C
Operating humidity :	5 % to 90 %
Television system :	DVB-T Standard Compliant

• TV RECORDING

Recording format:	TS (Transport Stream format)
Recordable media:	Hard Disc Drive (250 GB), USB 2.0 HDD
Audio recording format:	Dolby Digital (2 CH)

• CONNECTORS

VIDEO OUT:	1.0 V (p-p), 75 Ω, sync negative, RCA jack x 1
HDMI OUT (video/audio):	19 pin (HDMI standard, Type A)
DIGITAL OUT (COAXIAL):	0.5 V (p-p), 75 Ω, RCA jack x 1
USB Port:	4 pin (USB 2.0 standard)
ANTENNA IN:	Antenna input, 75 Ω

• SYSTEM

Laser:	Semiconductor laser
Wavelength:	405 nm / 650 nm
Frequency response:	20 Hz to 20 kHz (48 kHz, 96 kHz, 192 kHz sampling)
Signal-to-noise ratio:	More than 100 dB (Analog OUT connectors only)
Harmonic distortion:	Less than 0.008 %
Dynamic range:	More than 95 dB
LAN port:	Ethernet jack x 1, 10BASE-T / 1—BASE-TX
Bus Power Supply (USB):	DC 5 V ⎓ 500 mA

Note : Design and specifications are subject to change prior notice.

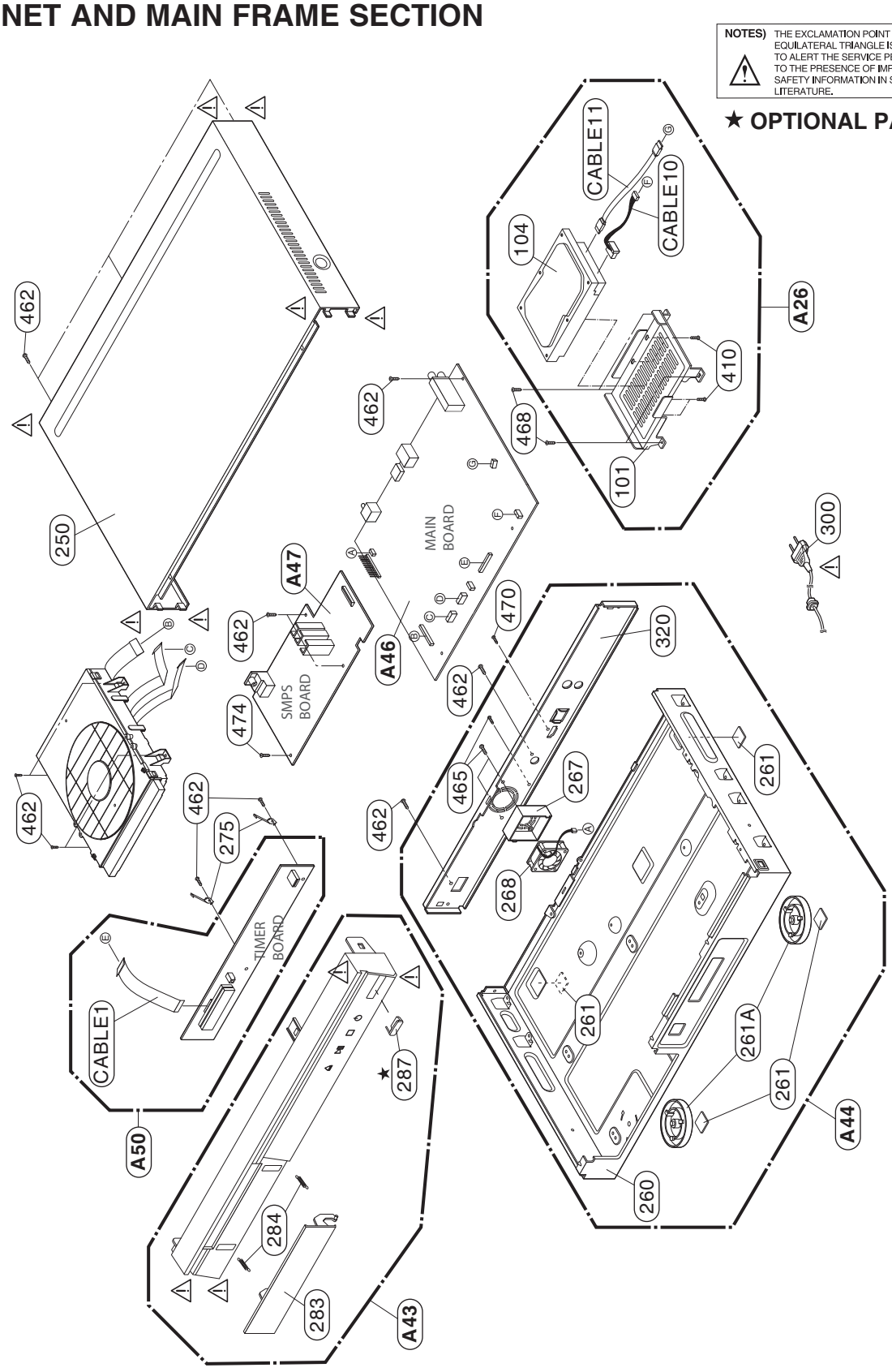
SECTION 2

CABINET & MAIN CHASSIS

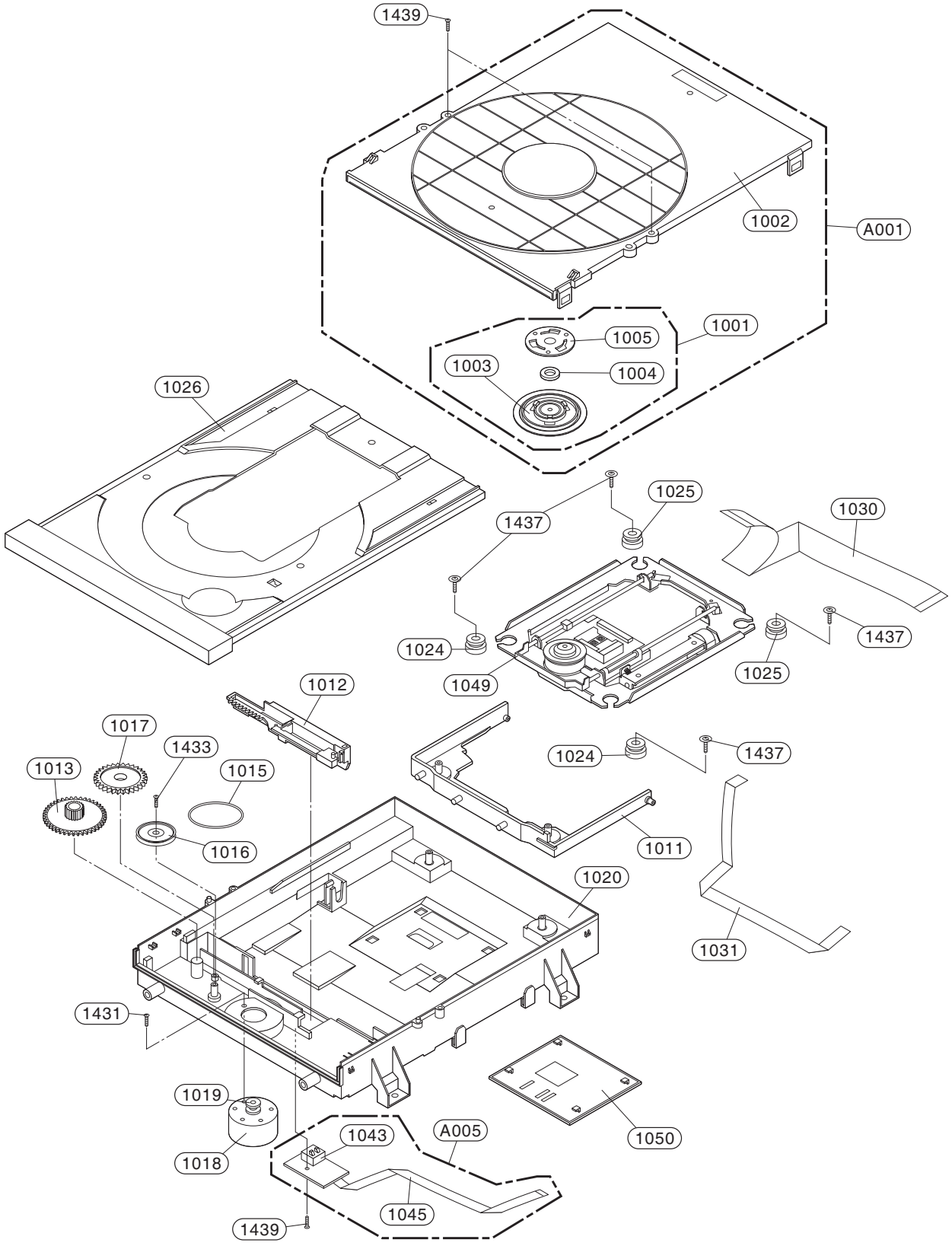
CONTENTS

EXPLODED VIEWS

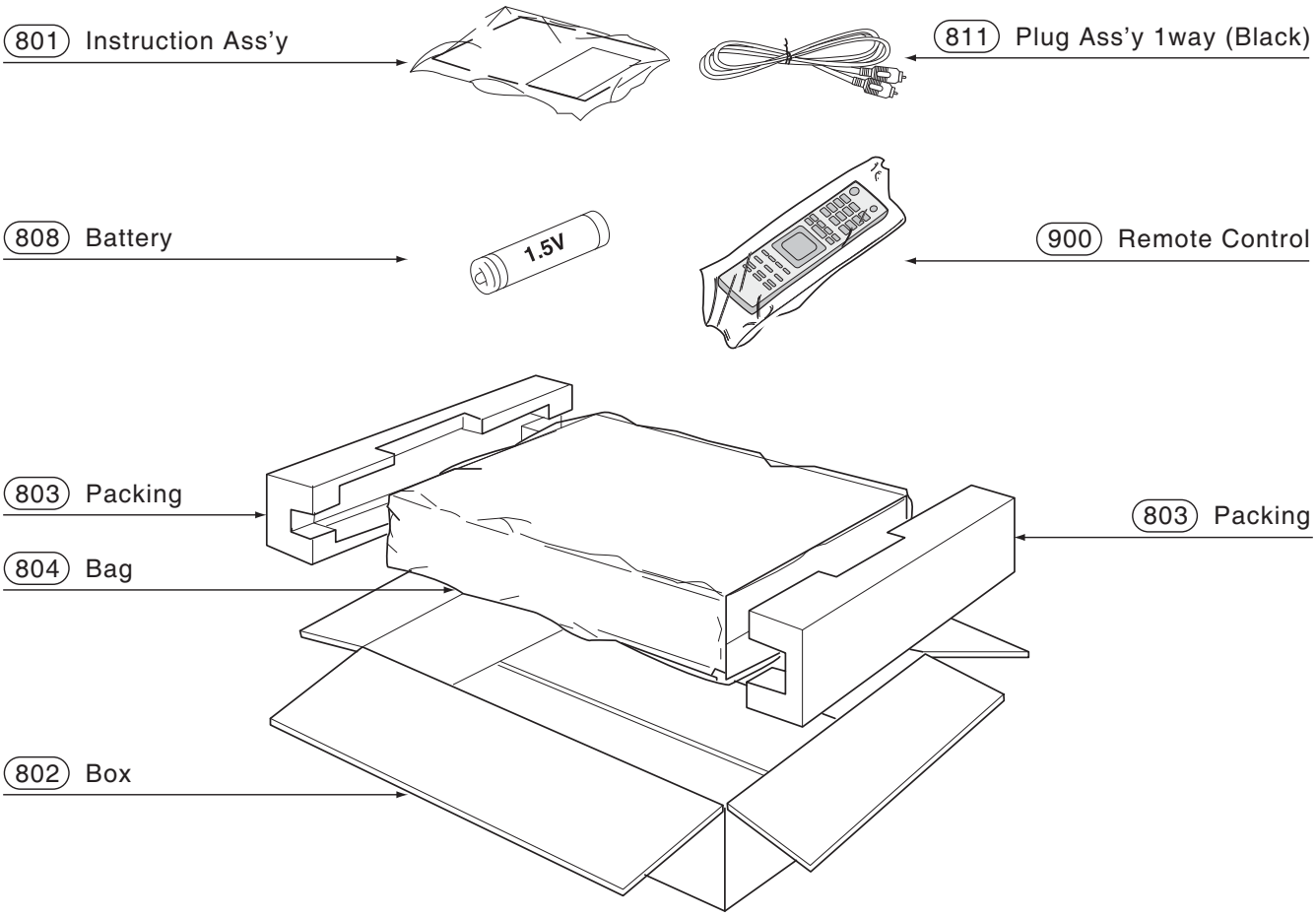
1. CABINET AND MAIN FRAME SECTION



2. DECK MECHANISM SECTION, BM12H3 (IM11)



3. PACKING ACCESSORY SECTION



SECTION 3 ELECTRICAL

CONTENTS

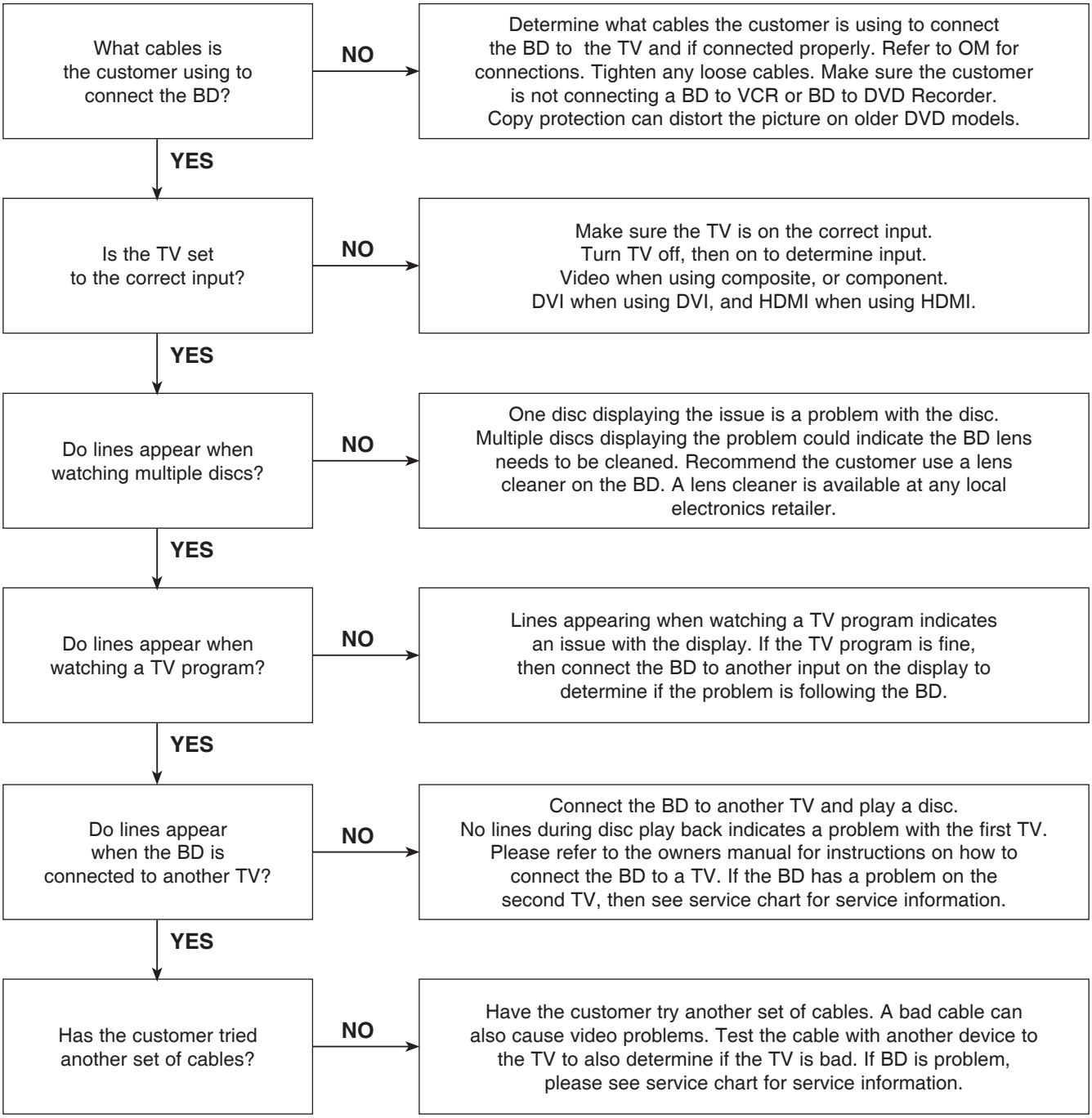
DIGITAL DISPLAY & MEDIA TRAINING MASTER

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

1. DISTORTED PICTURE

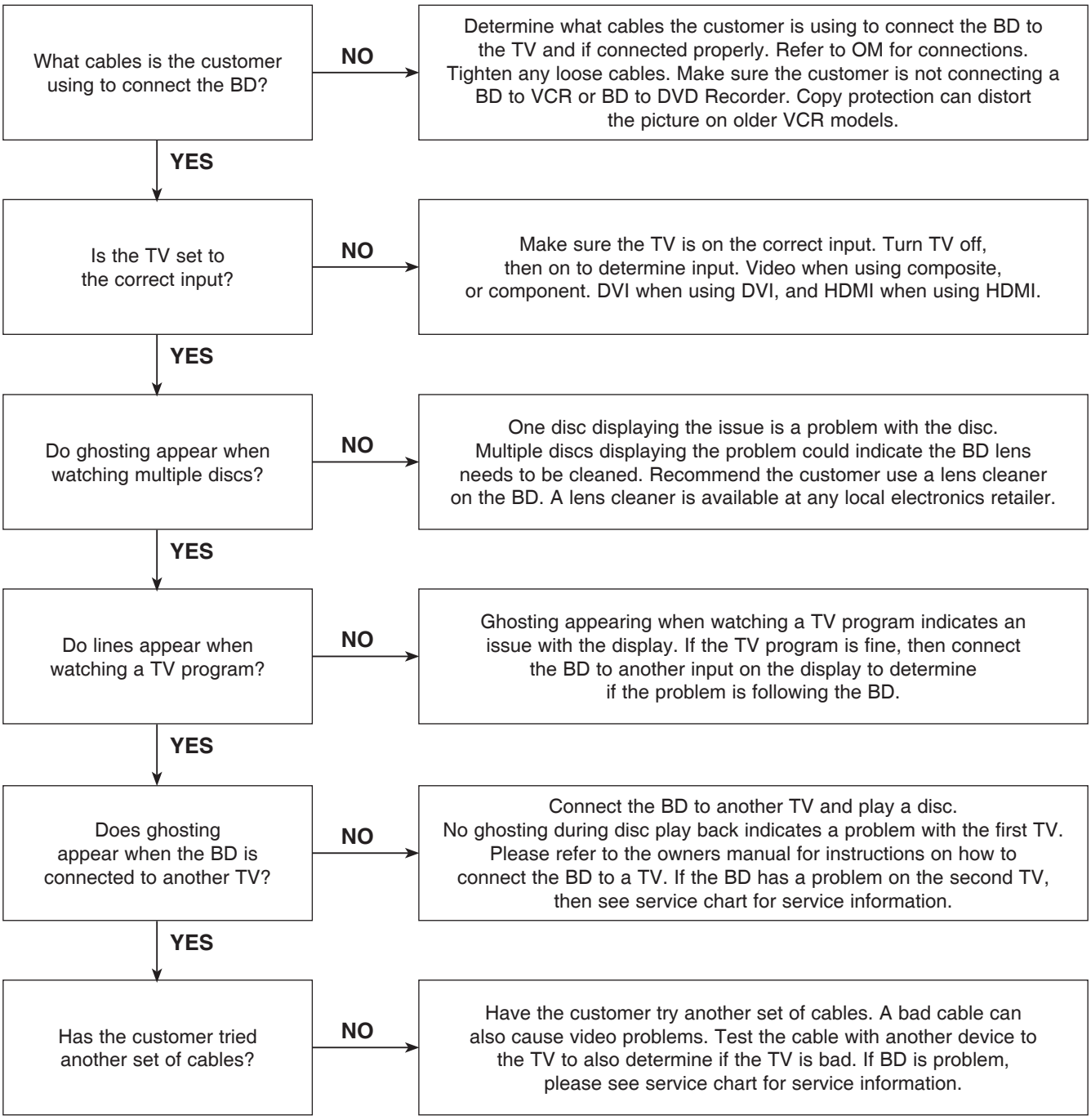
1-1. Lines on Picture

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



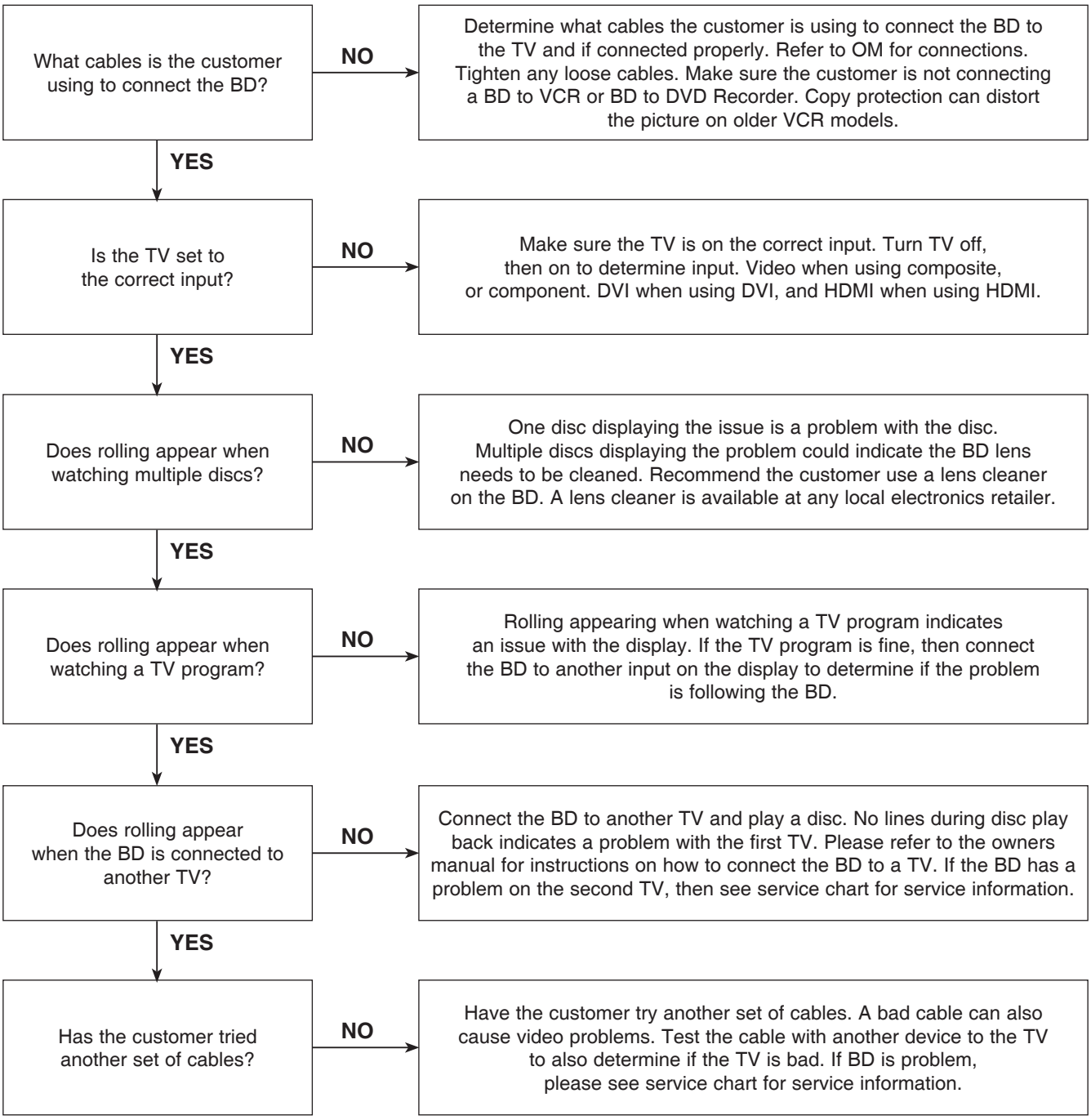
1-2. Ghost Picture

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



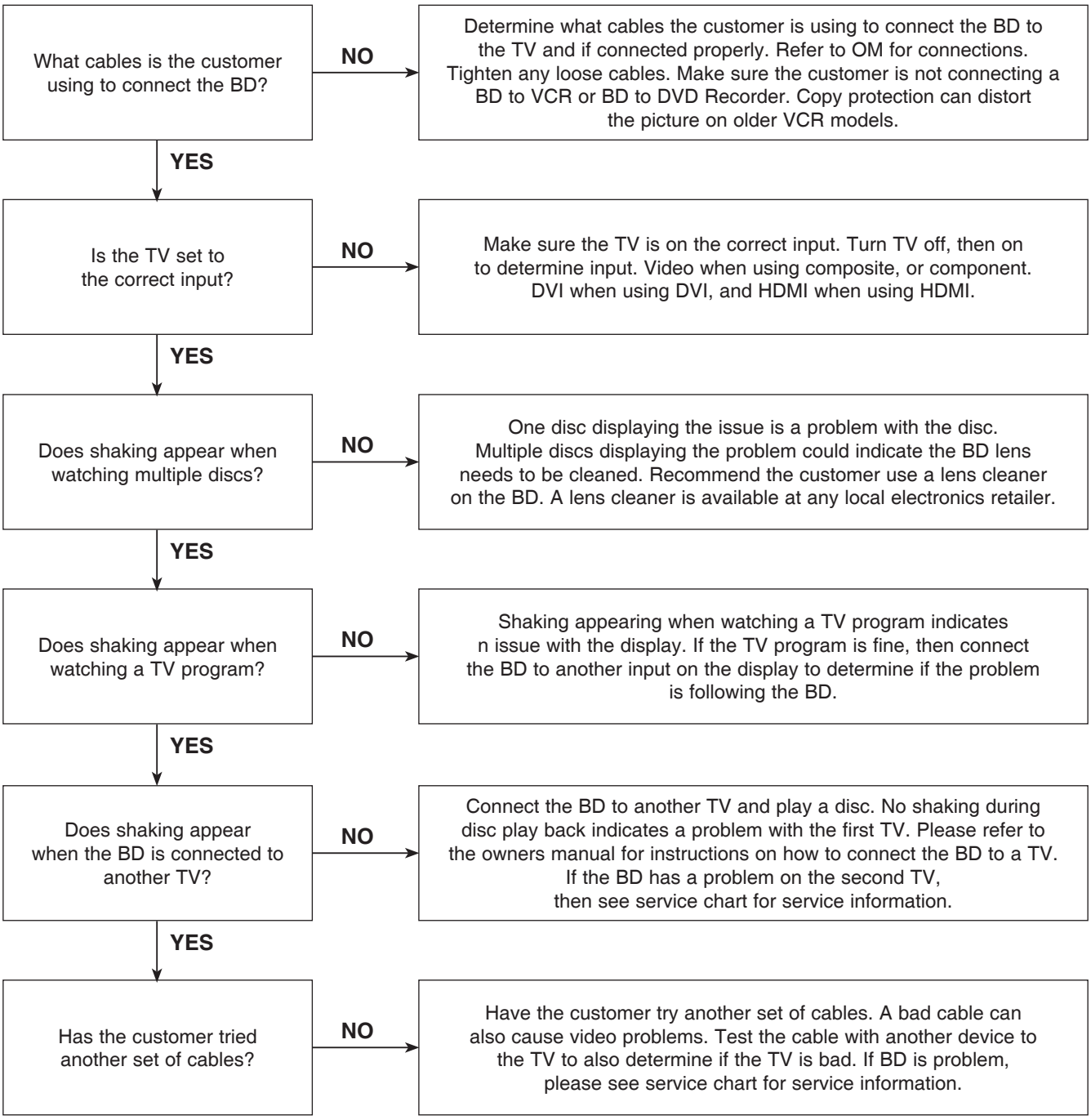
1-3. Rolling Picture

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



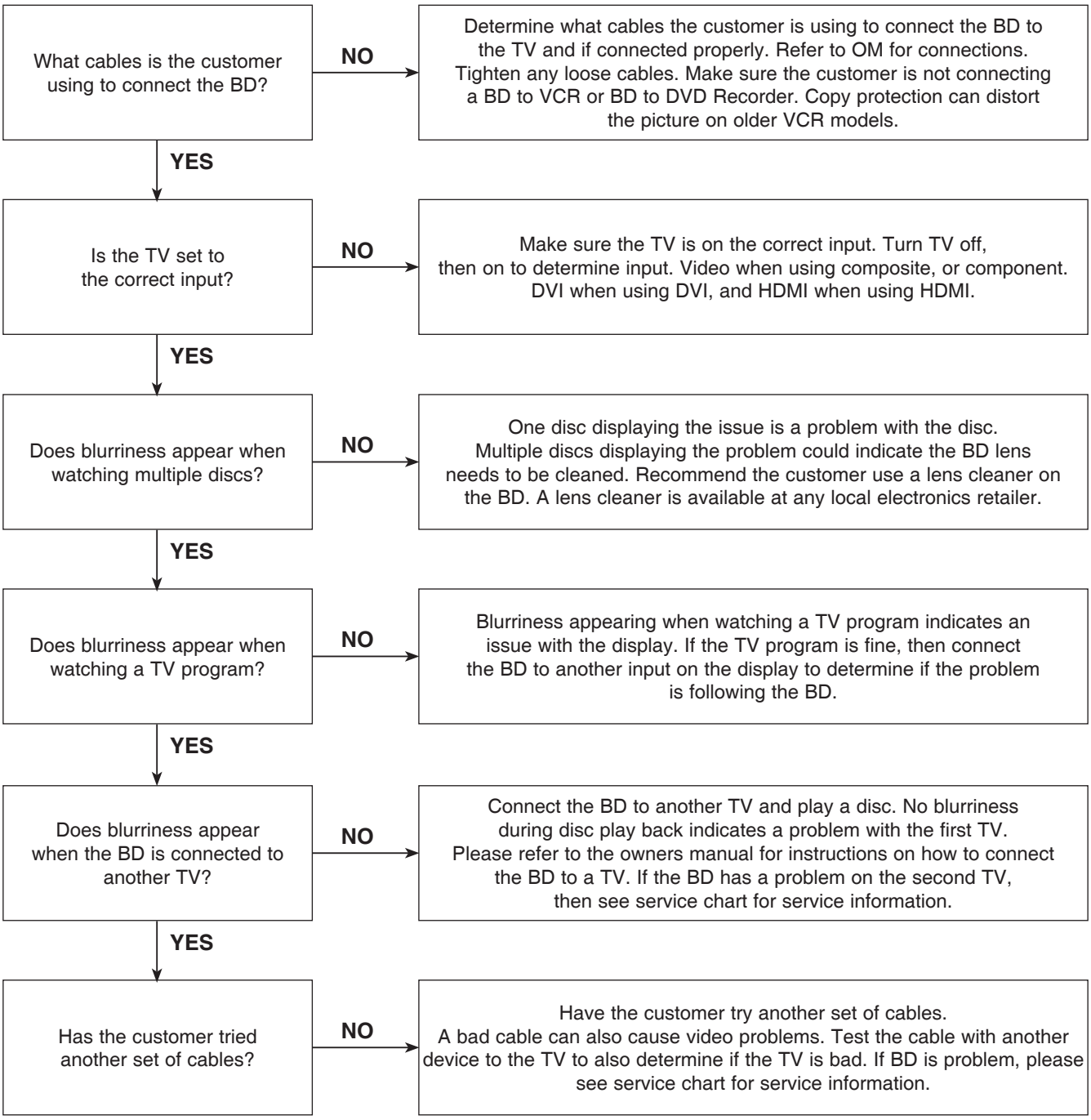
1-4. Shaky Picture

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



1-5. Blurry Picture

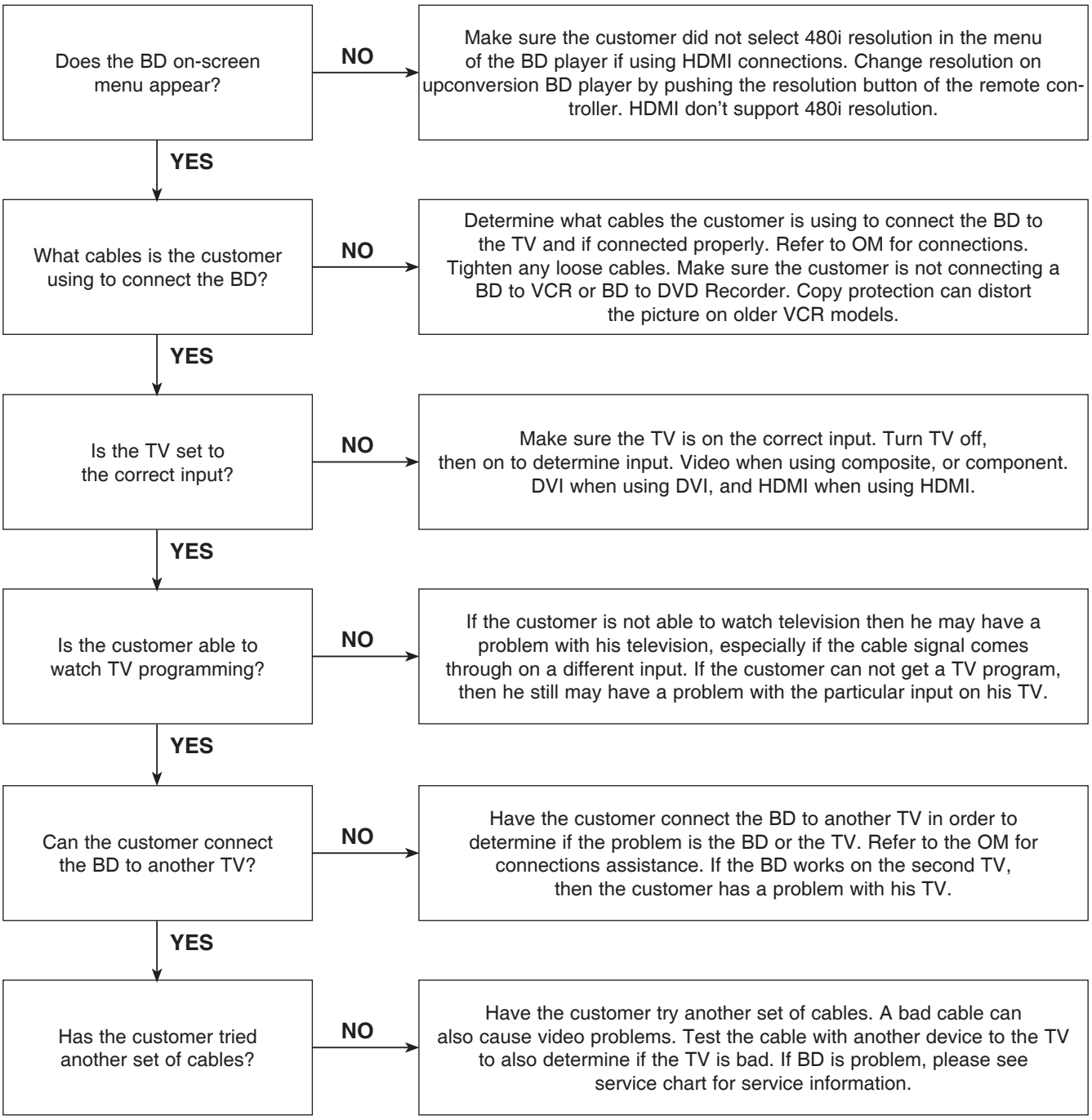
Distorted picture refers to the customer getting video, but there is a problem with the video.



2. NO PICTURE

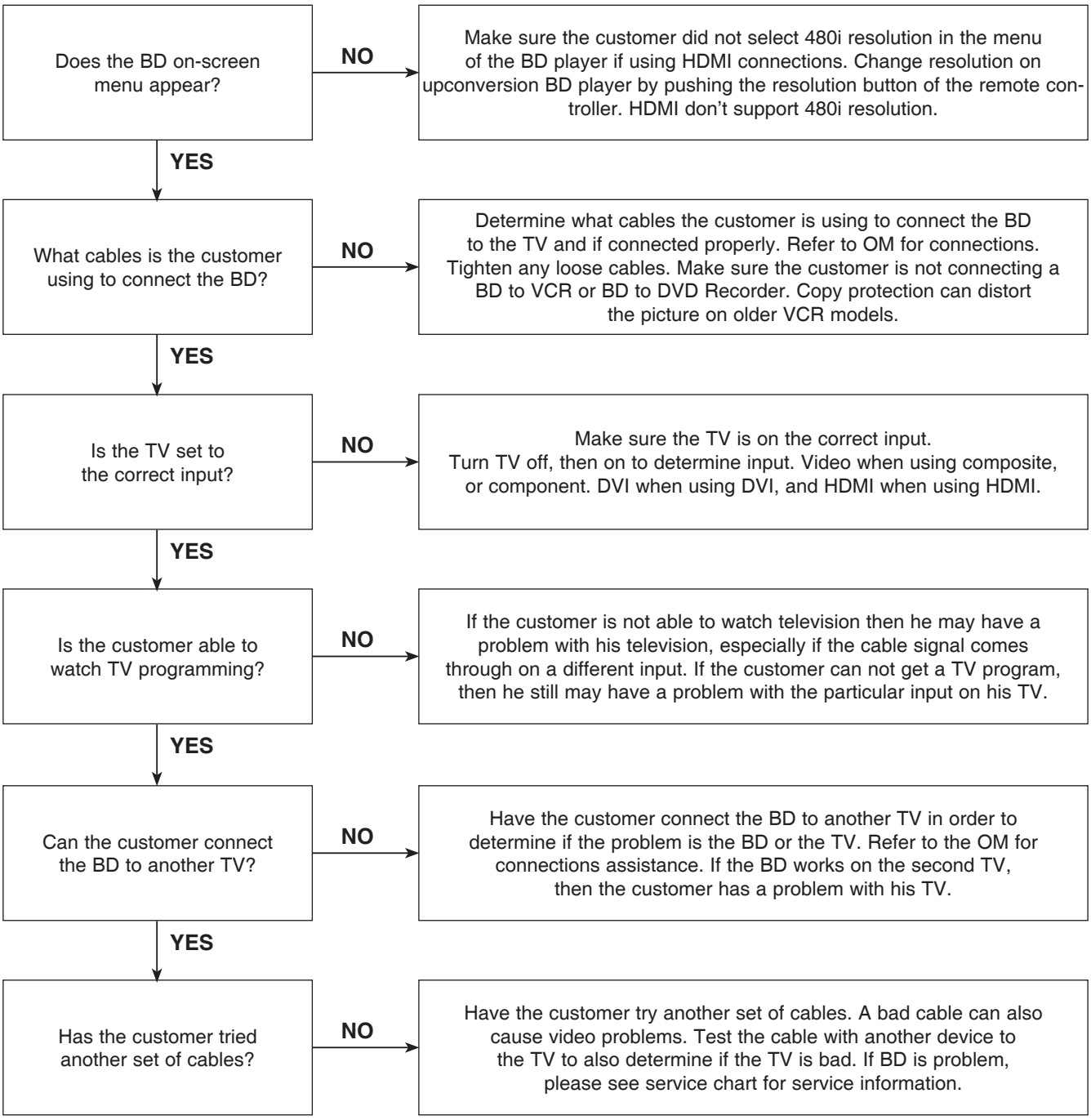
2-1. Black Screen

The entire screen is black.



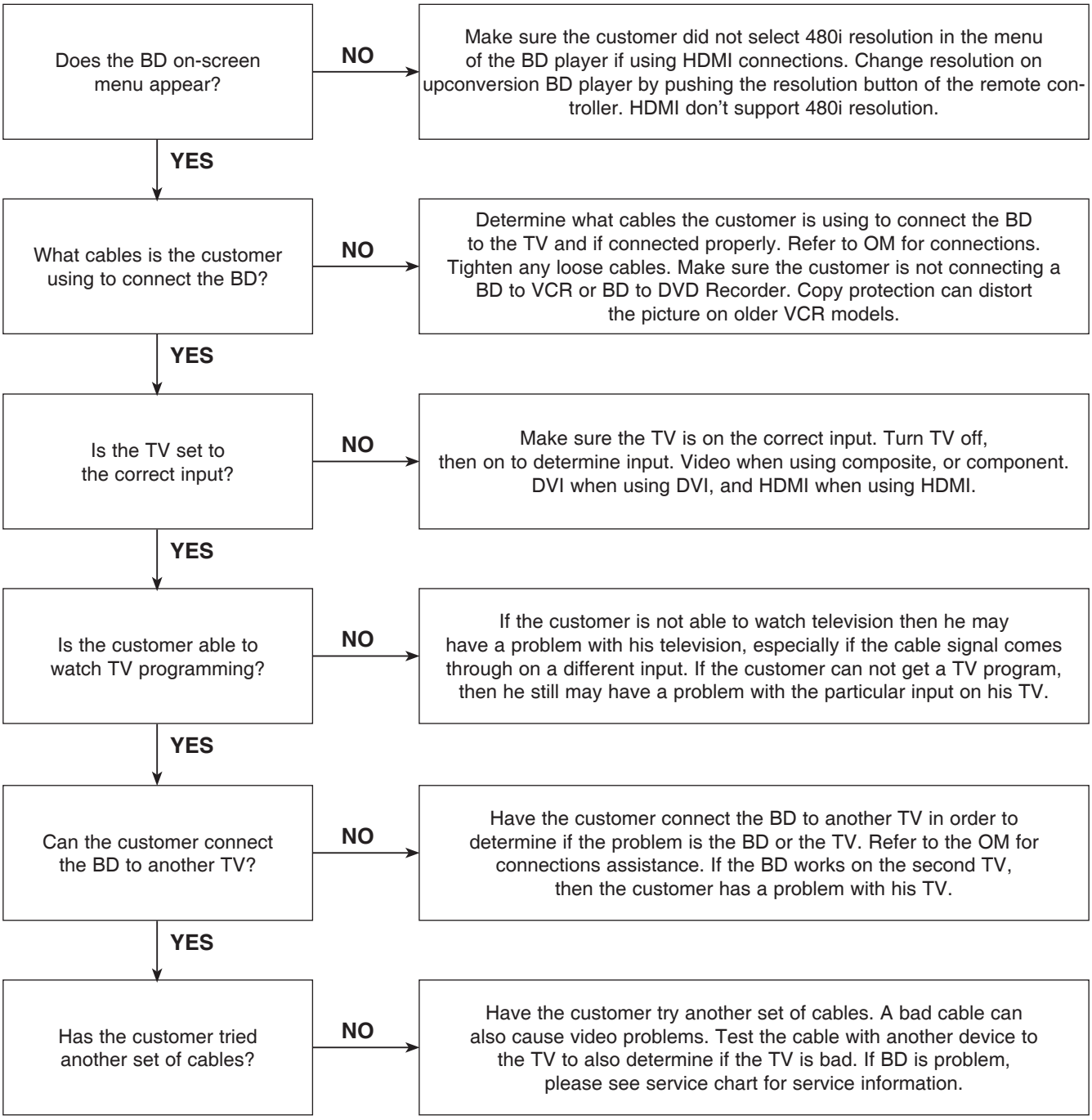
2-2. Blue Screen

The entire screen is a solid blue color.



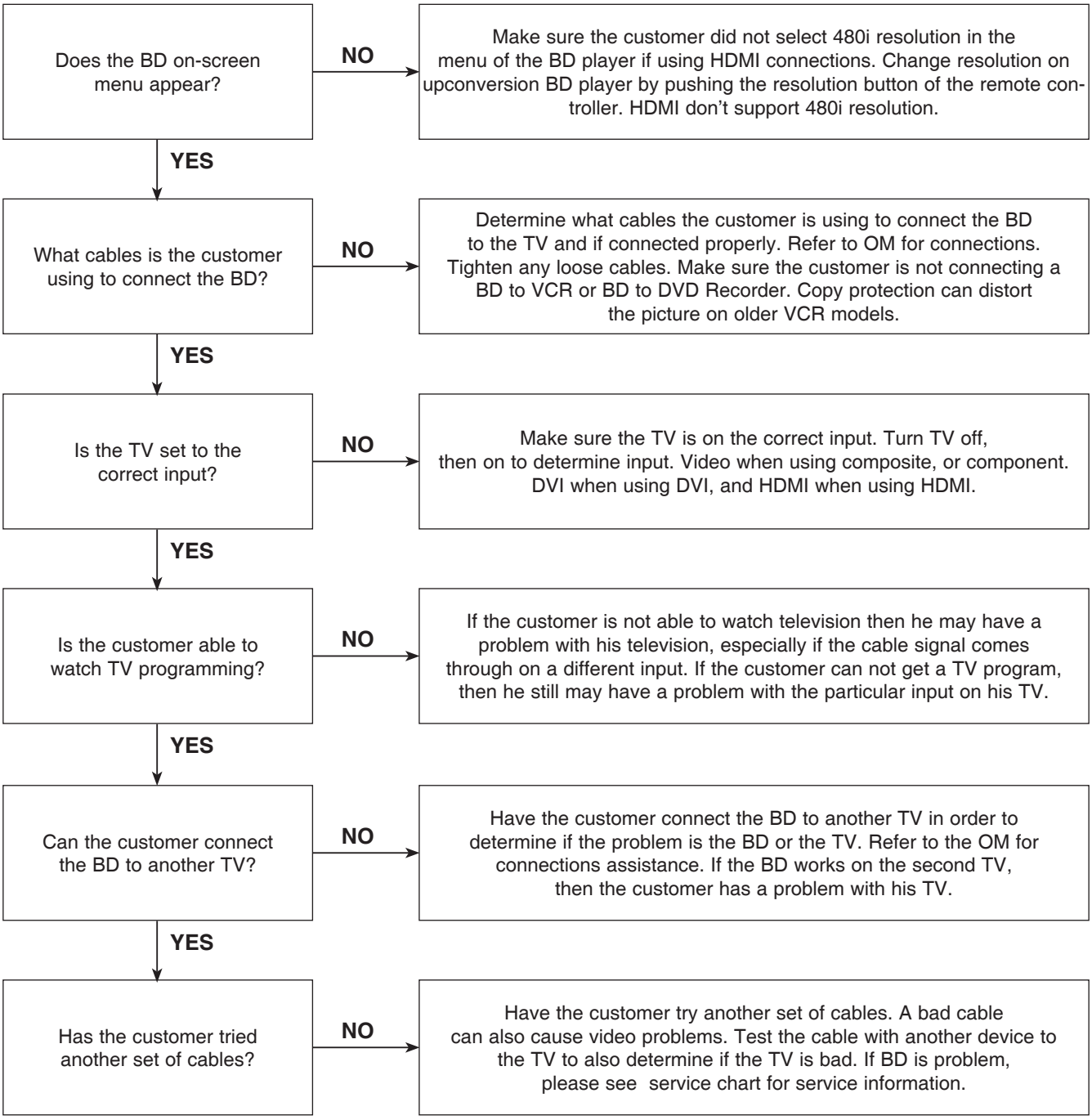
2-3. Snowy Screen

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

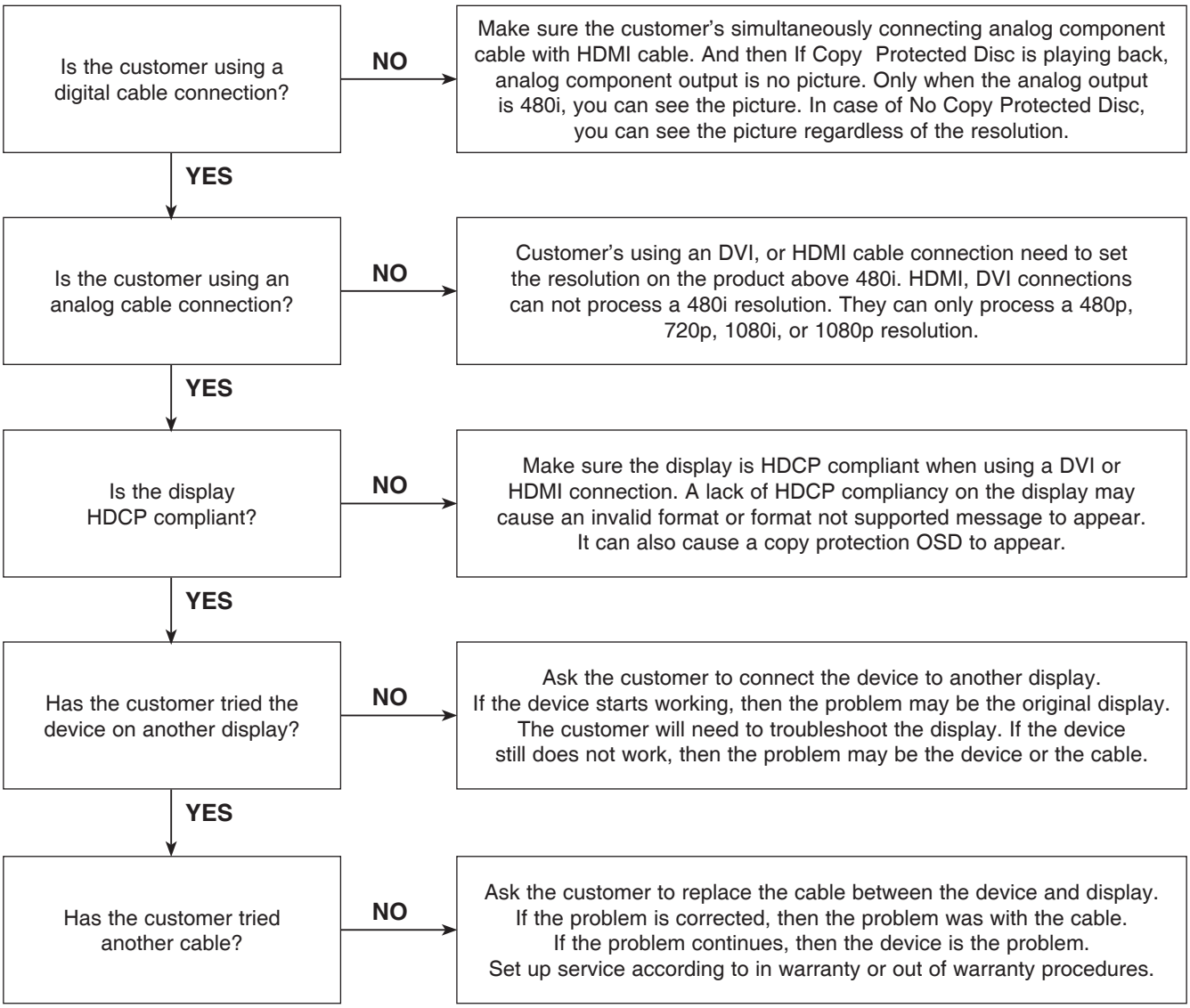


2-4. No Signal

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



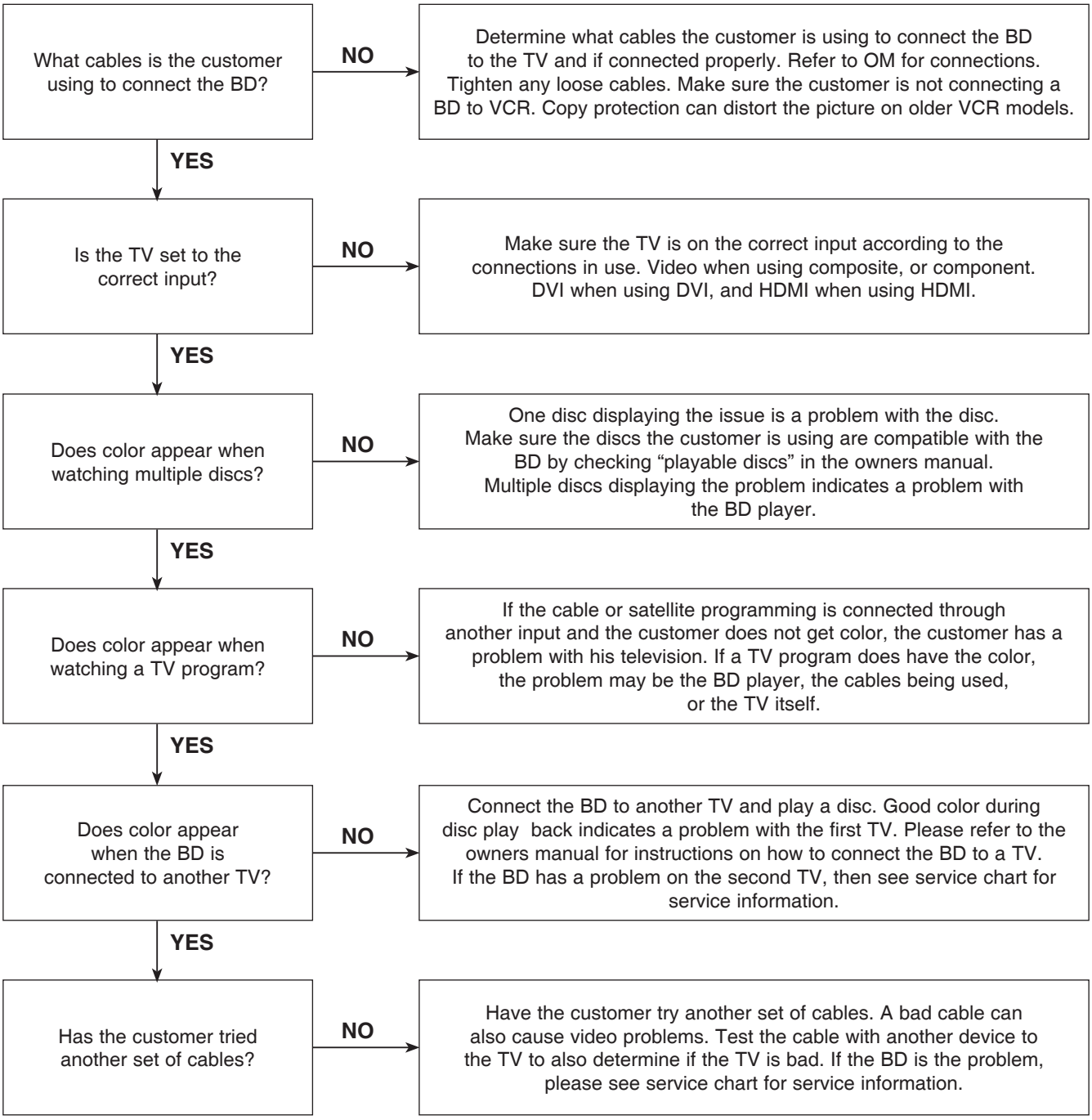
2-5. Invalid Format or Format Not Supported



3. PICTURE COLOR

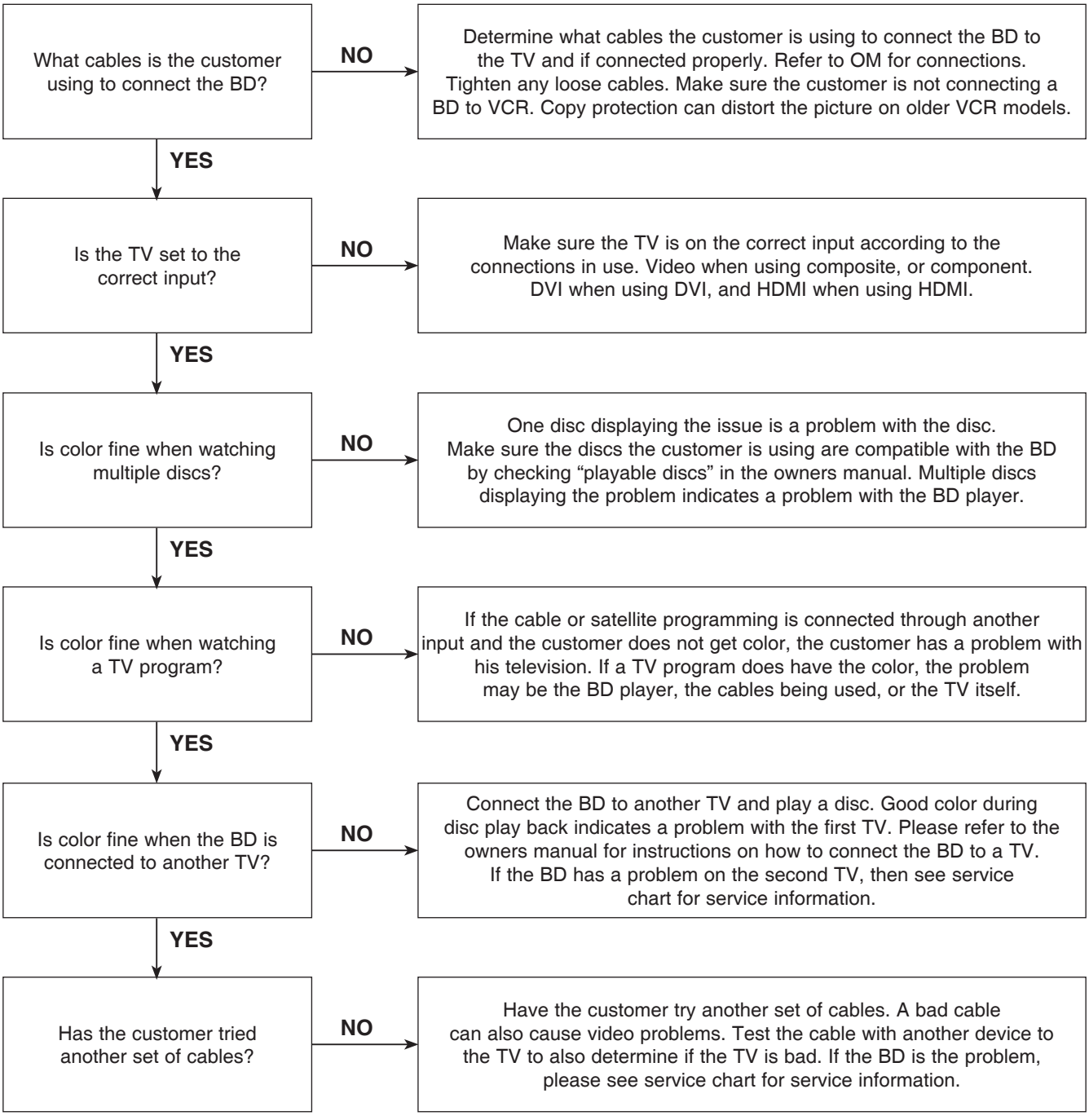
3-1. No Color

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



3-2. Poor Color

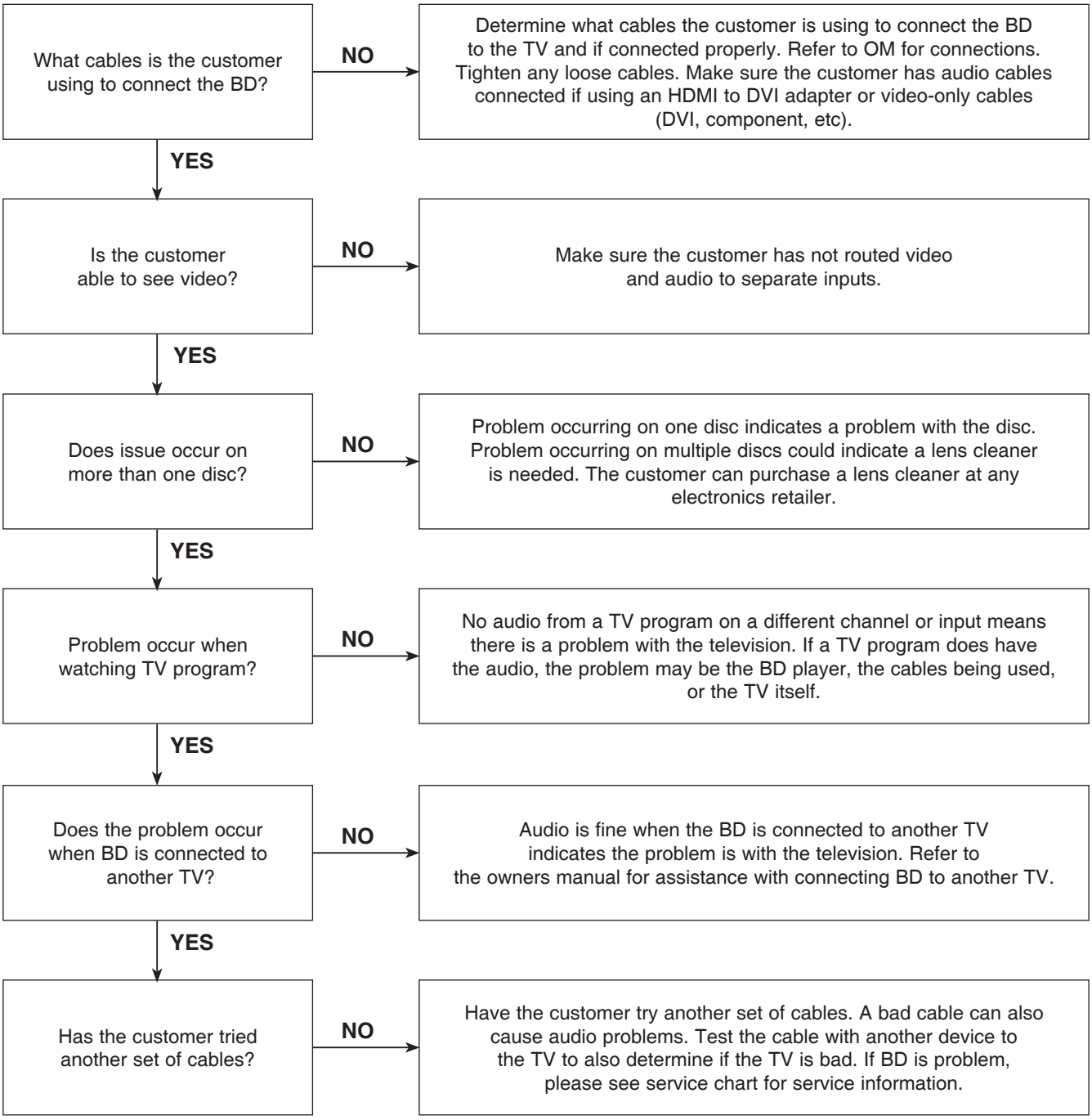
The color is poor. Examples would be washed out colors, colors bleeding into one another, or a solid tint to a screen.



4. NOISE/AUDIO PROBLEMS

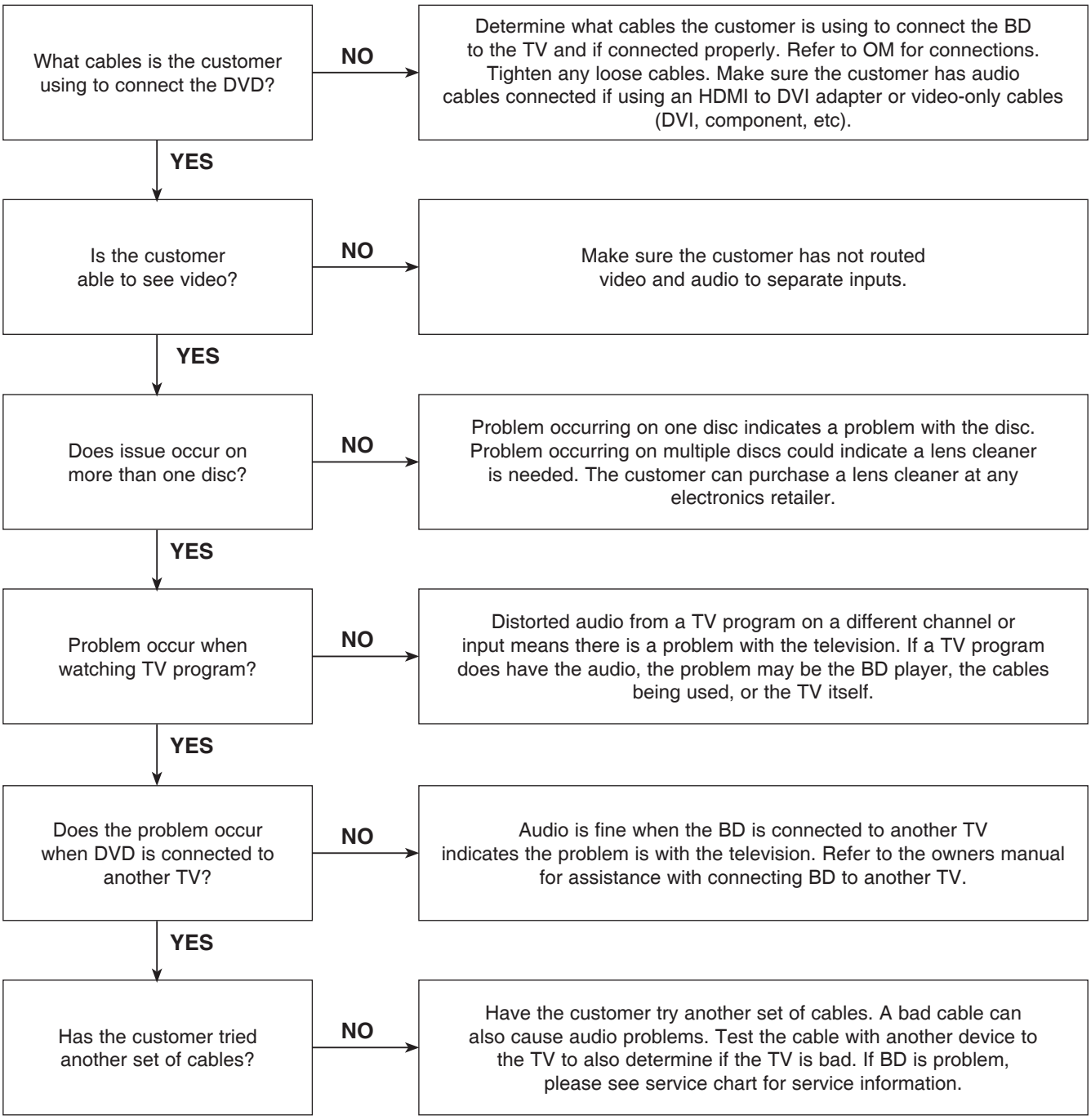
4-1. No Audio

The customer is not able to get audio.



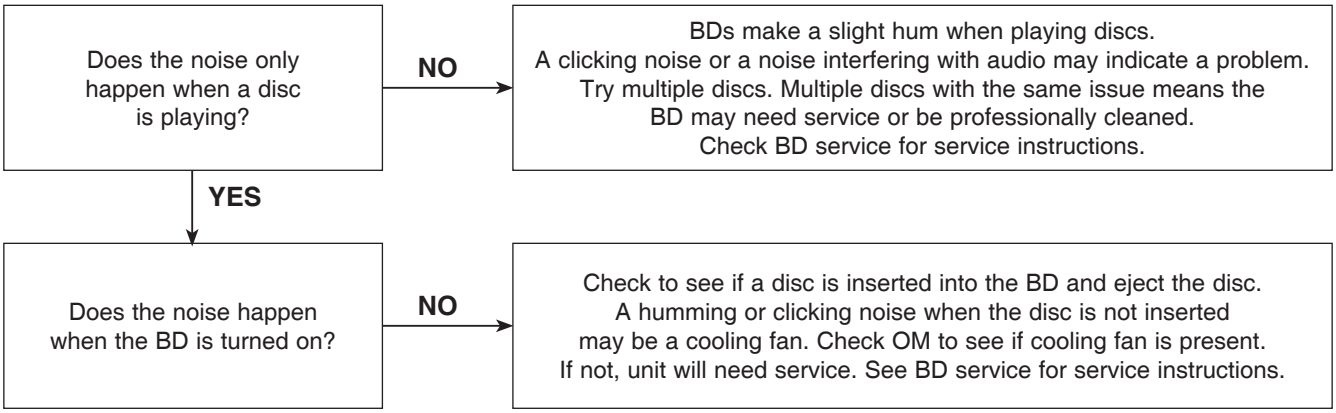
4-2. Distorted Audio

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



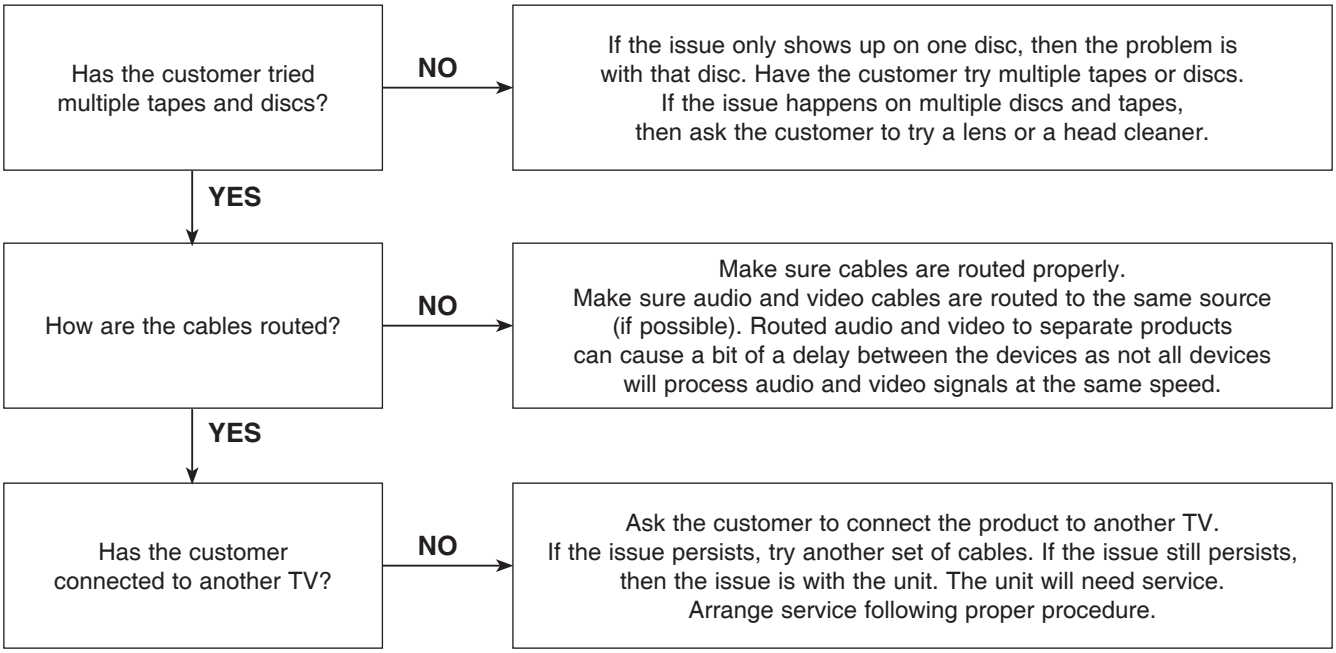
4-3. Humming/Clicking Noise

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



4-4. Audio/Video Out of Synch

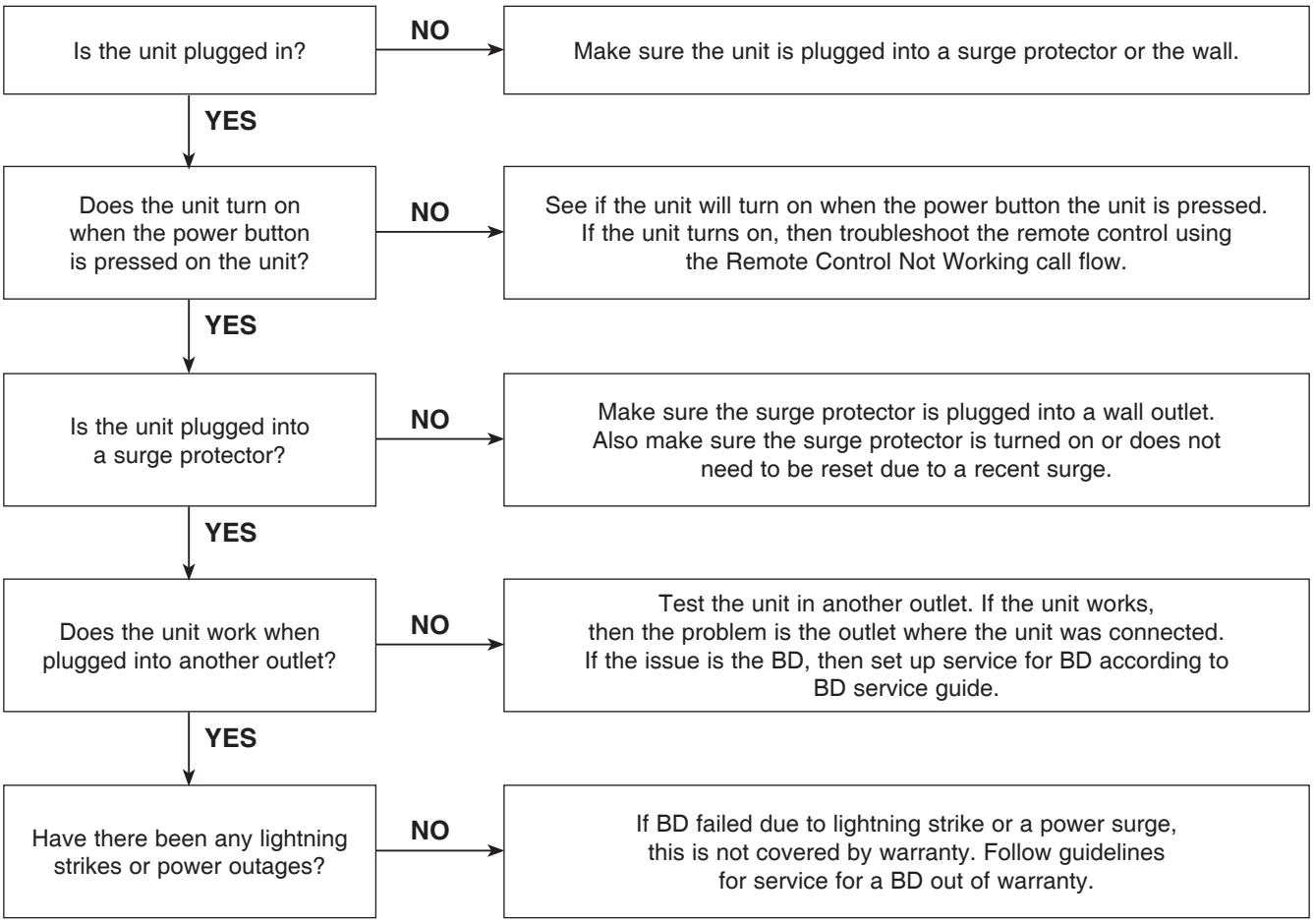
The audio and video do not match up. People look to be talking, but their voices are delayed by a few seconds.



5. MISCELLANEOUS

5-1. No Power

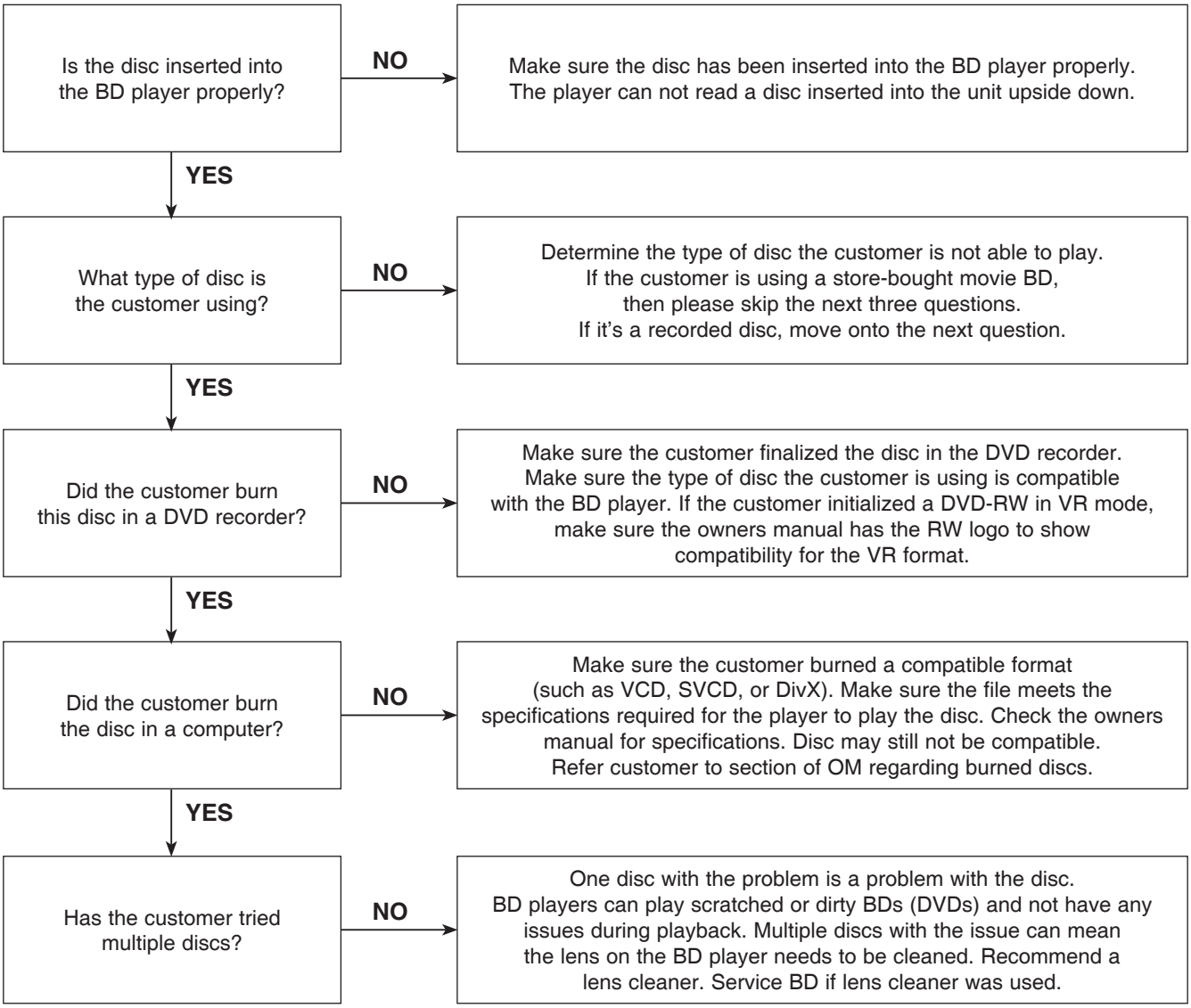
The unit will not turn on.



LGE Internal Use Only

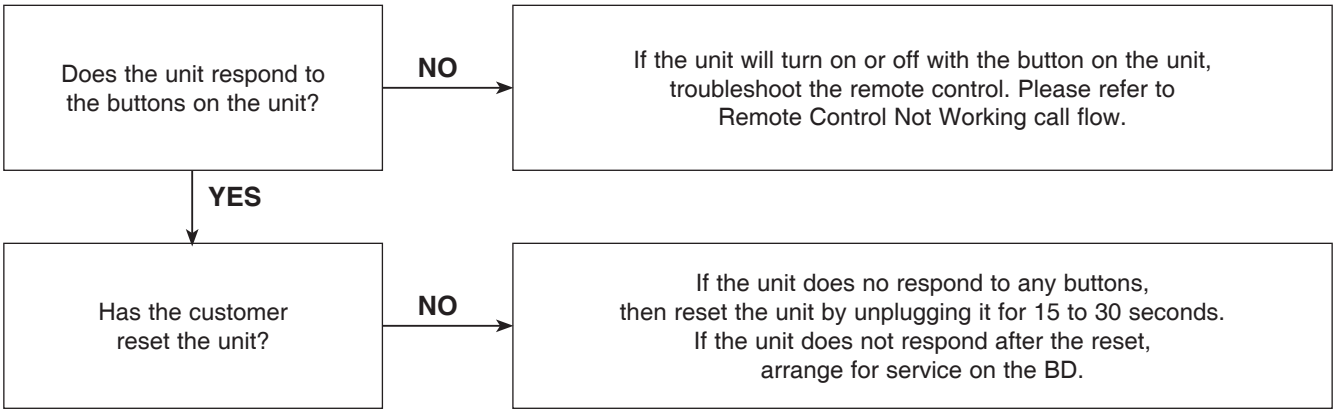
5-2. Disc Error

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



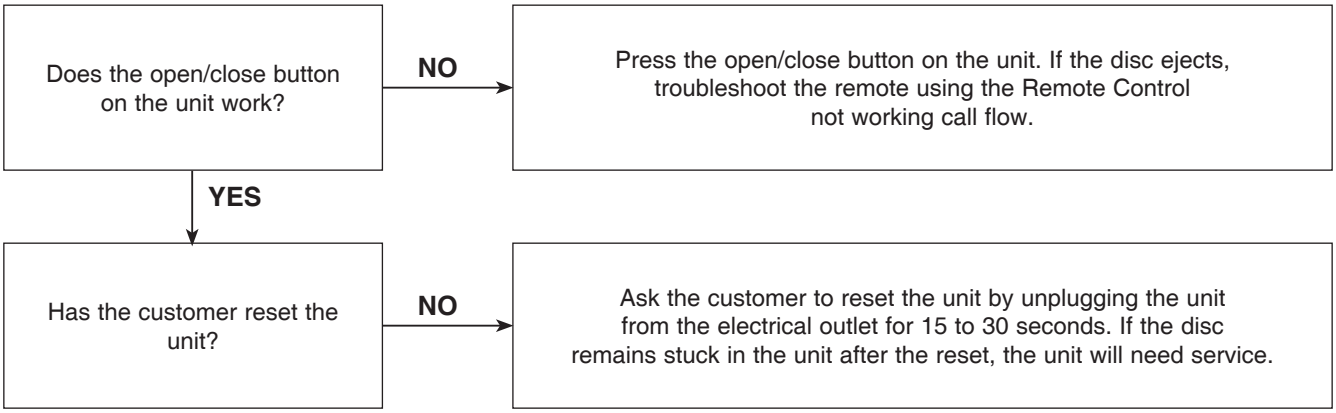
5-3. Unit Locks Up

Unit does not respond to any commands.

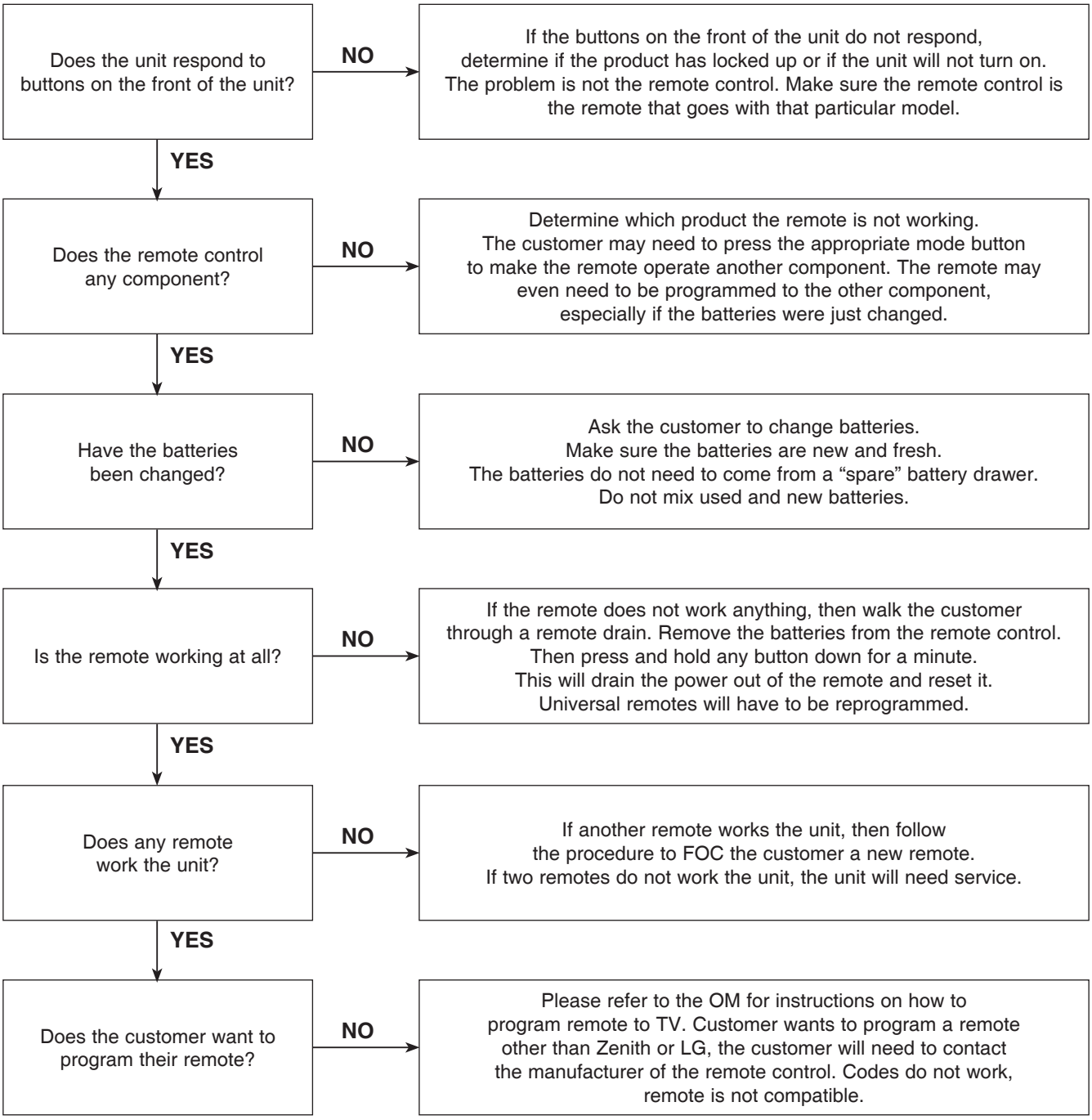


5-4. Disc Stuck

A BD disc is stuck in the unit.

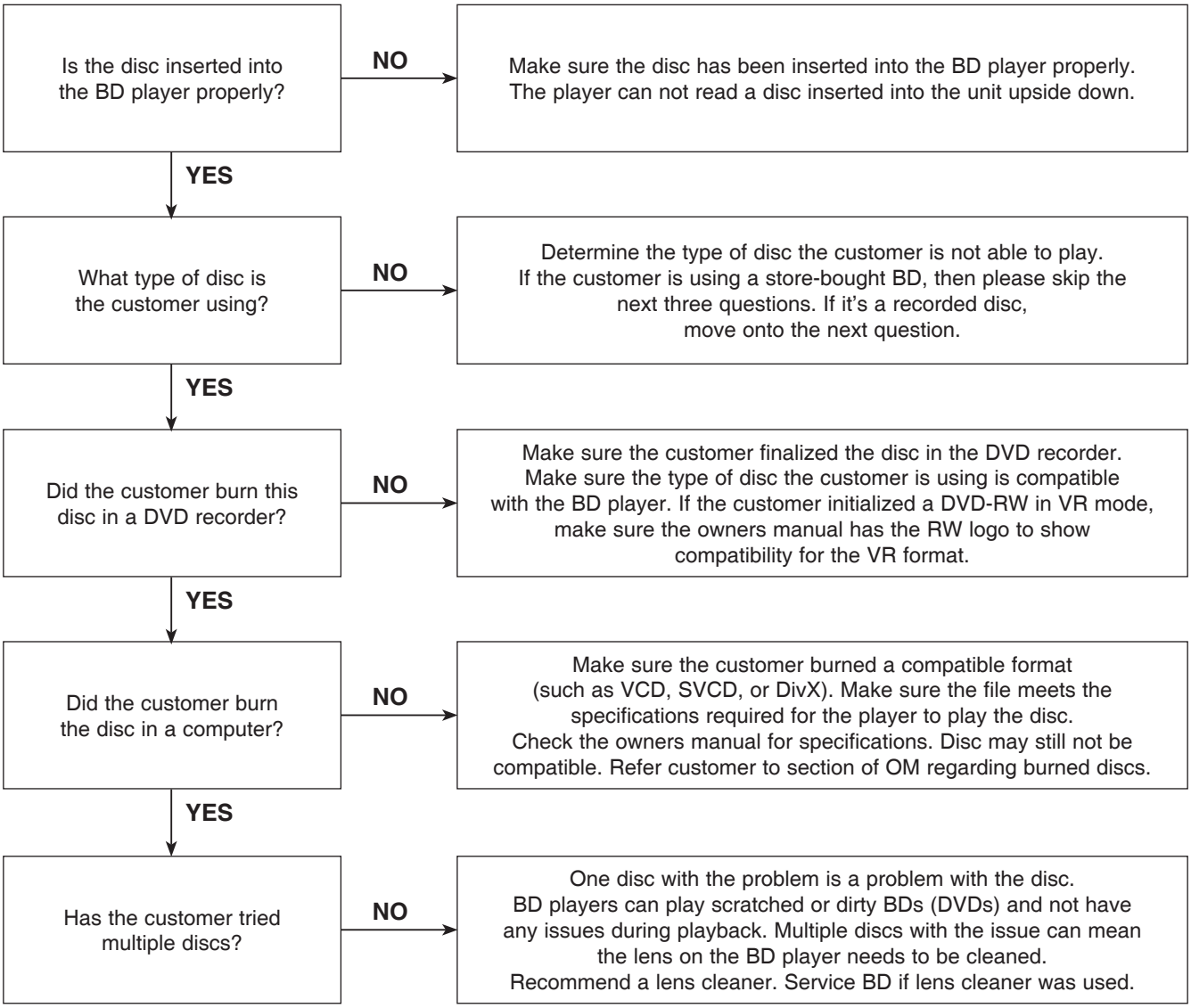


5-5. Remote Control Not Working



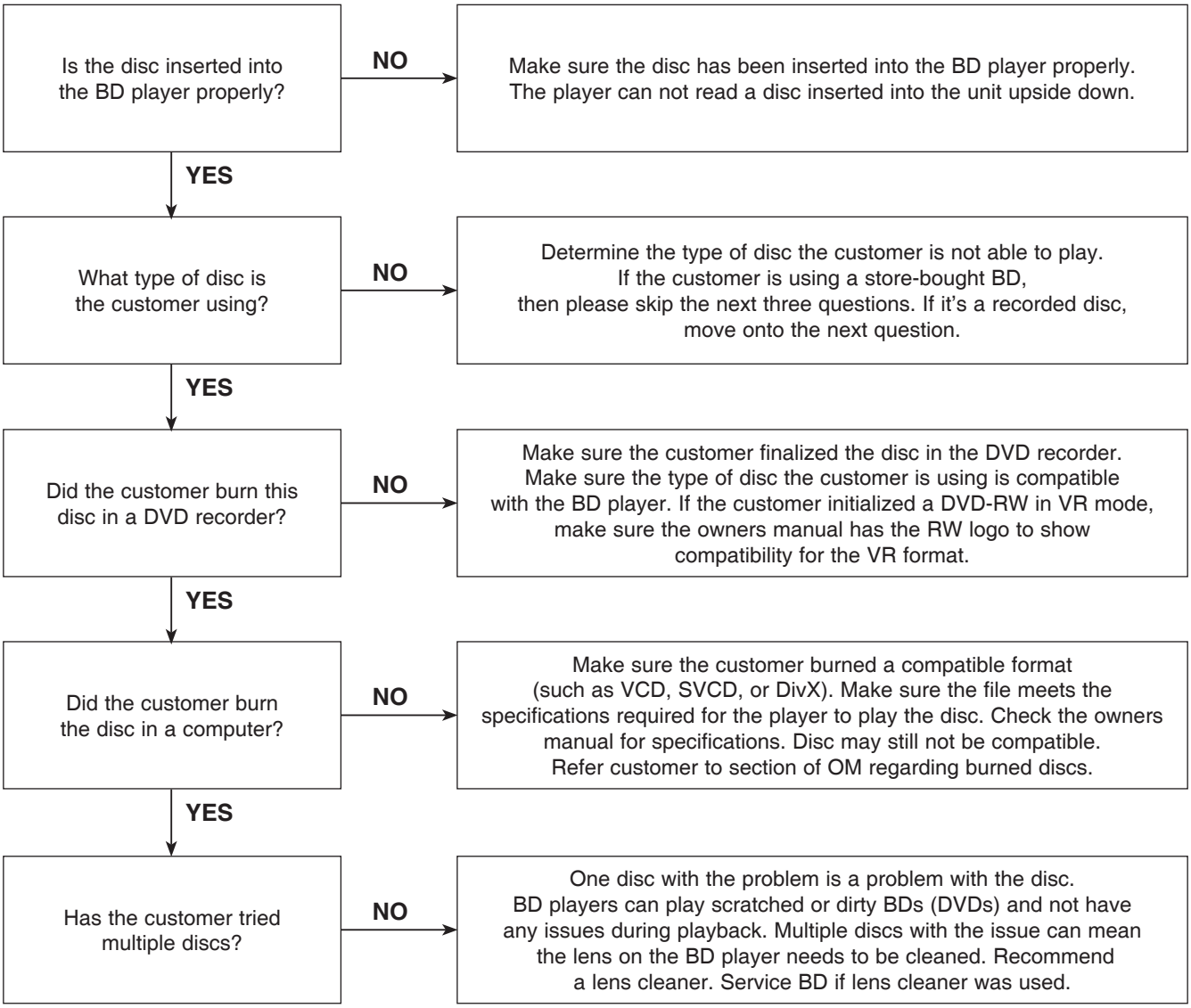
5-6. Will Not Play Disc

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



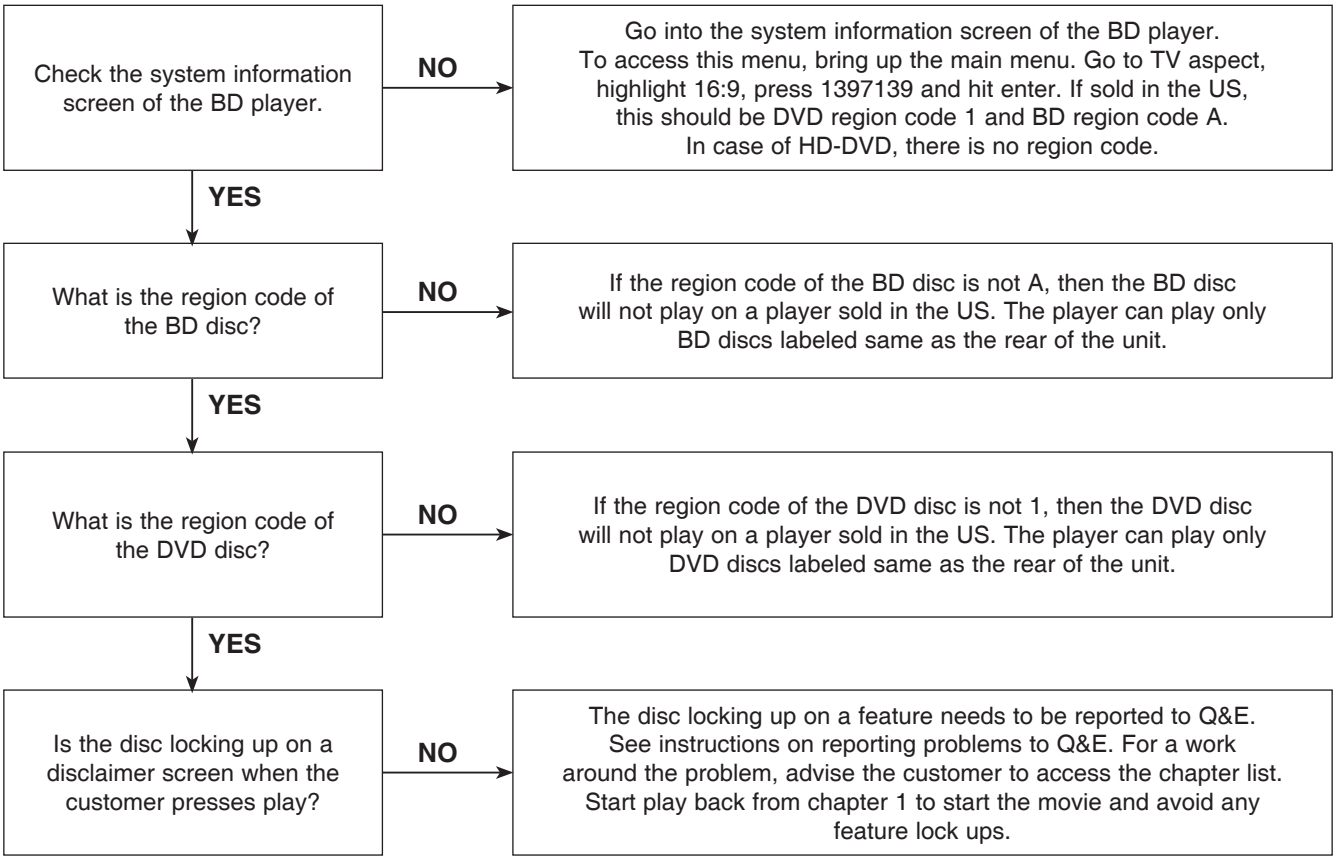
5-7. Disc Freezes or Skips

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



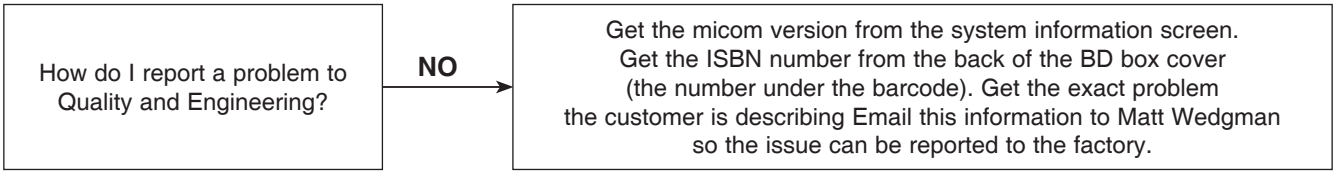
5-8. Can Access Menu, but Not Play a Movie

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



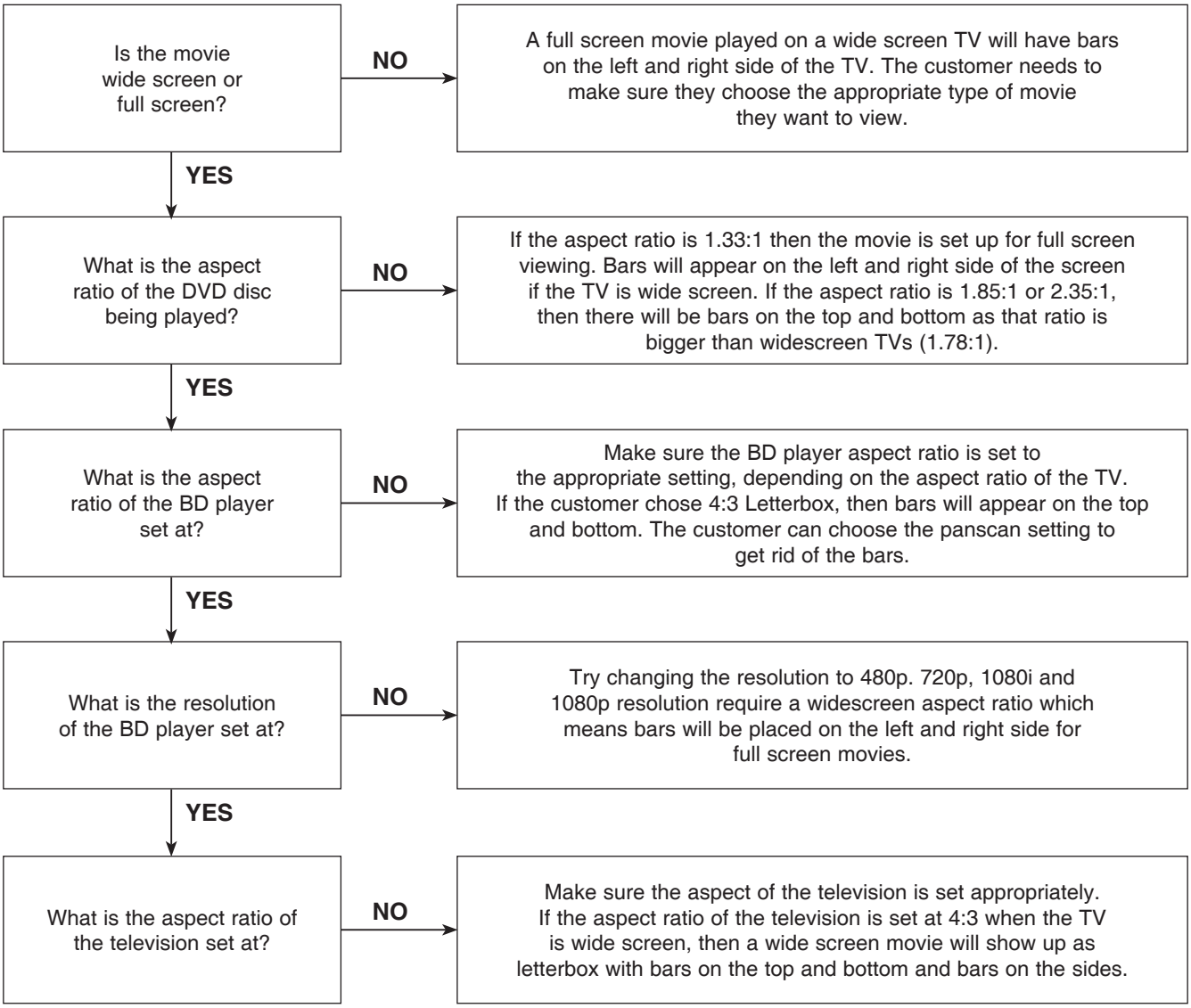
5-9. Reporting a problem to Quality & Engineering

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



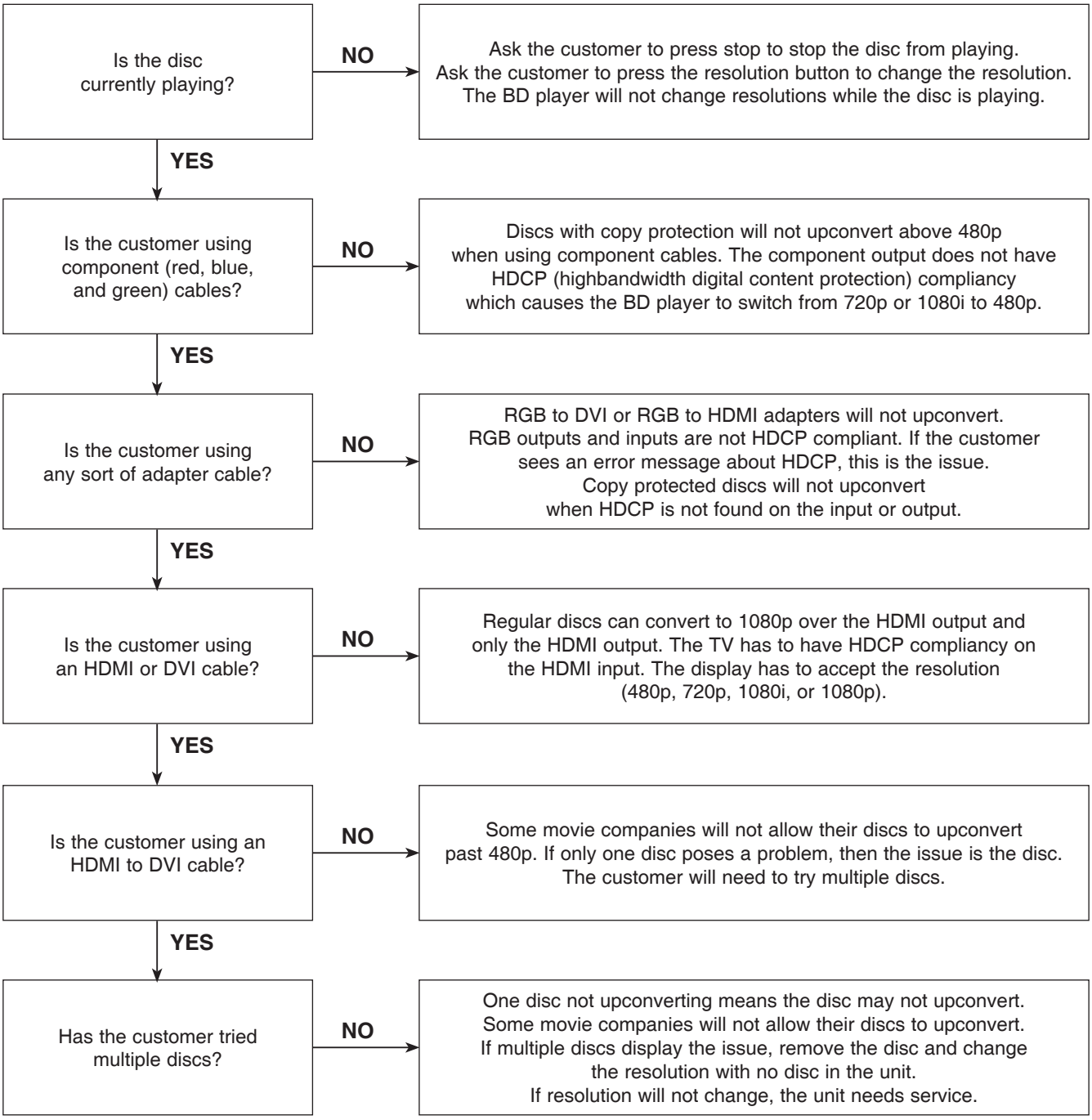
5-10. Aspect Ratio

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



5-11. My Unit Won't Upconvert

The customer has a problem with getting the unit to change resolutions to 480p, 720p, 1080i, or 1080p.



6. BLU-RAY PLAYER

6-1. Slow Loading Times for BDs

Why does it take so long to load my BDs?	NO →	The loading times for a blu-ray disc is 30 seconds. When a customer switches from one disc to another, the lens will change which is what causes the delay. Blu Ray require different lasers to read the discs.

6-2. Booting Times

Why does it take so long to boot my BD?	NO →	The booting times for the BD is 20 seconds. When the set is booted, it takes a little long time to loading the OS program.

6-3. Ethernet Port

What is the purpose of the ethernet port on the BD Player?	NO →	This is used for the unit to access a network dealing with interactive BD movie menu. BD Player can support BD2.0 so that network function is active in the BD disc. Also, BD Player can support VOD service such as Netflix. (USA only)
Why is not the item downloaded through the network?	NO →	Make sure the customer insert the LAN cable into the Ethernet jack. Make sure the network is active. If it is active, the disc may have a problem. If not active, see the network section of OM.

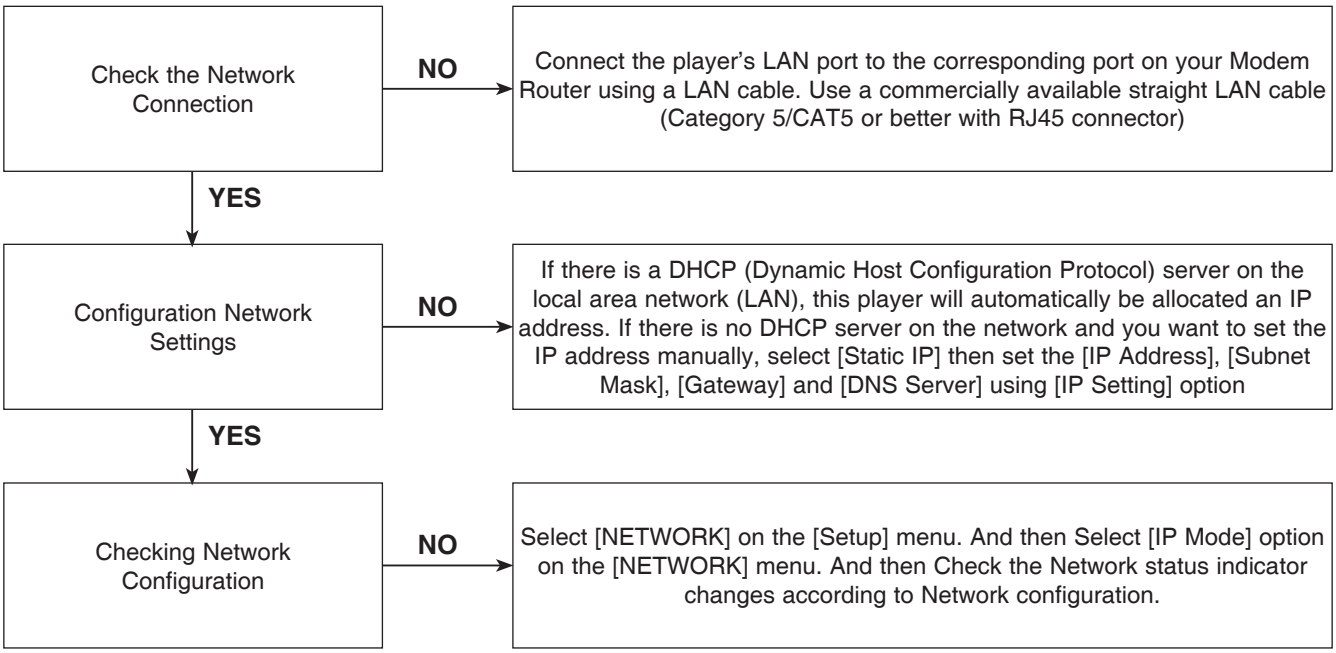
6-4. Firmware Update Availability

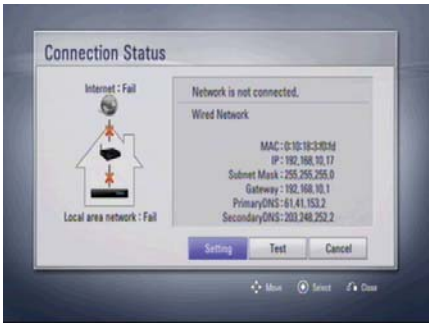
Is there a firmware update available for the BD Player?	NO →	Yes, firmware updates are available at http://us.lgservice.com that address some playback issues with movies. Go to device drivers and click on DVD&VIDEO&SET-TOP. The firmware updates are available there. Advise the customer to download the firmware and unzip the file. Also, firmware updates are done by network. Select Home Menu -> Setup -> Others -> Software update menu.

7. NETFLIX

7-1. Network Setup

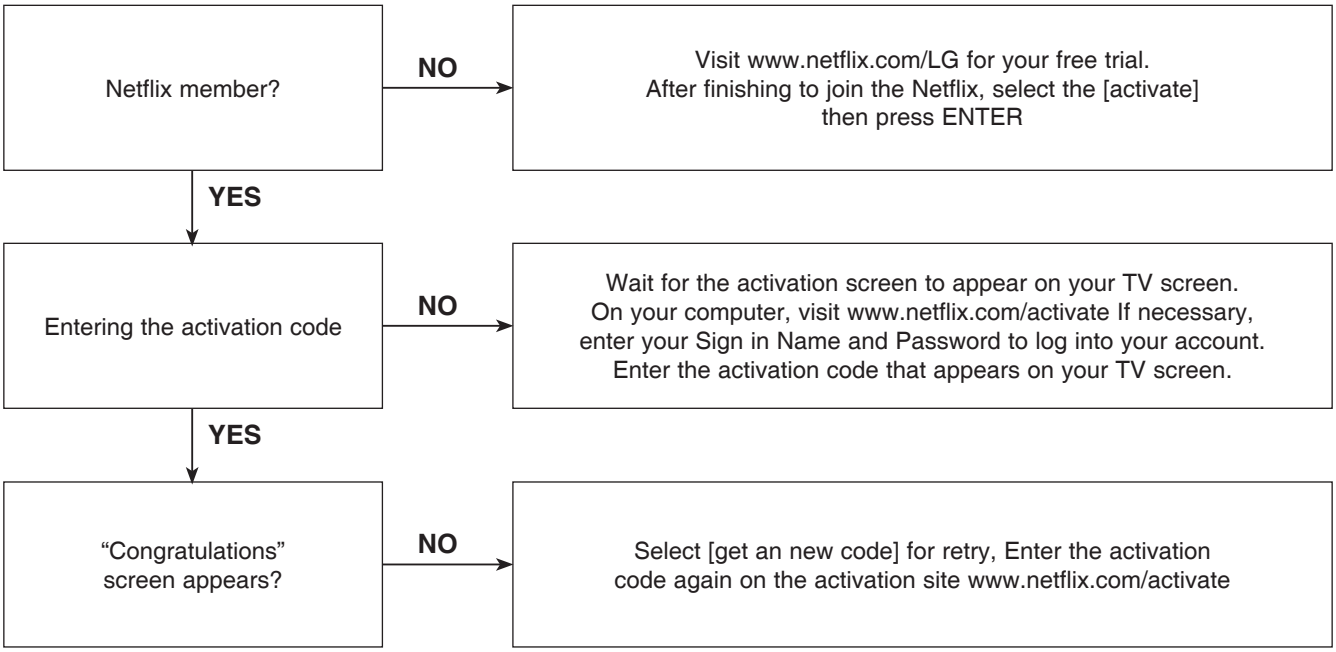
(By connecting the unit to broadband Internet, you can use Netflix function)



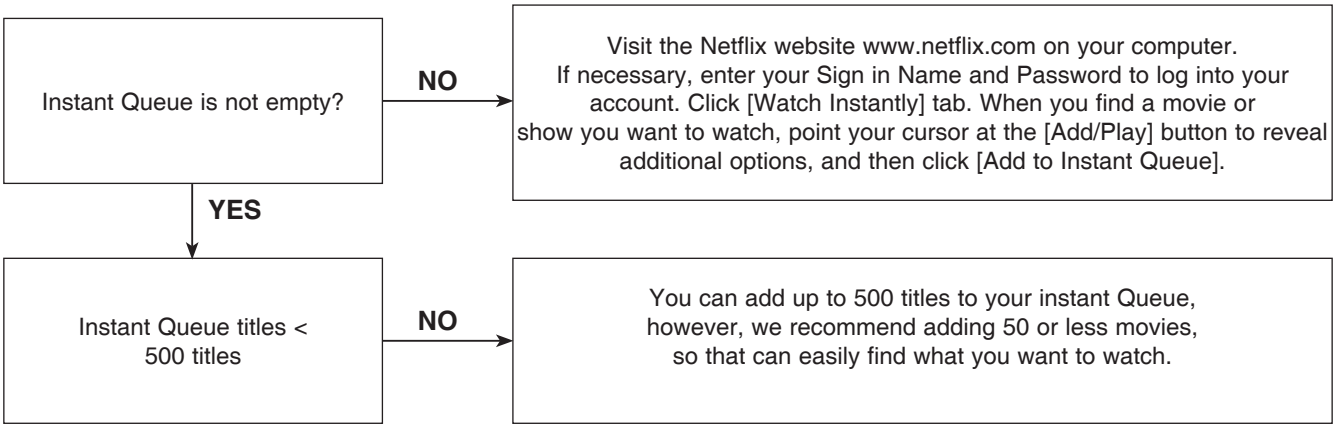


7-2. Activation

Activating the unit establishes a connection between the unit and Netflix account



7-3. Adding Movie to your player



7-4. ESN (Electronic Serial Number) Validation

(Select [OTHERS] on the [Setup] menu.
And then Select [Netflix] on the [OTHERS] menu.
And then Check [Netflix ESN].)

Does it begin with "**LGE-XXXXX-**" followed by "8-digit" ?

Example)
BD572 : LGE-BD572-
BD592 : LGE-BD592-
BD561 : LGE-BD561-
HB905 : LGE-HB905-
HB965 : LGE-HB965-

NO → If not, the set has a bad ESN (It should not happen) -> replace the player

YES

Select [Streaming] on the [Home] menu.

Is it activated successfully?

NO → This means that ESN is valid.

YES

Is Netflix server ok?

NO → If Netflix Server is dead, activation fails even if the ESN is valid.

YES

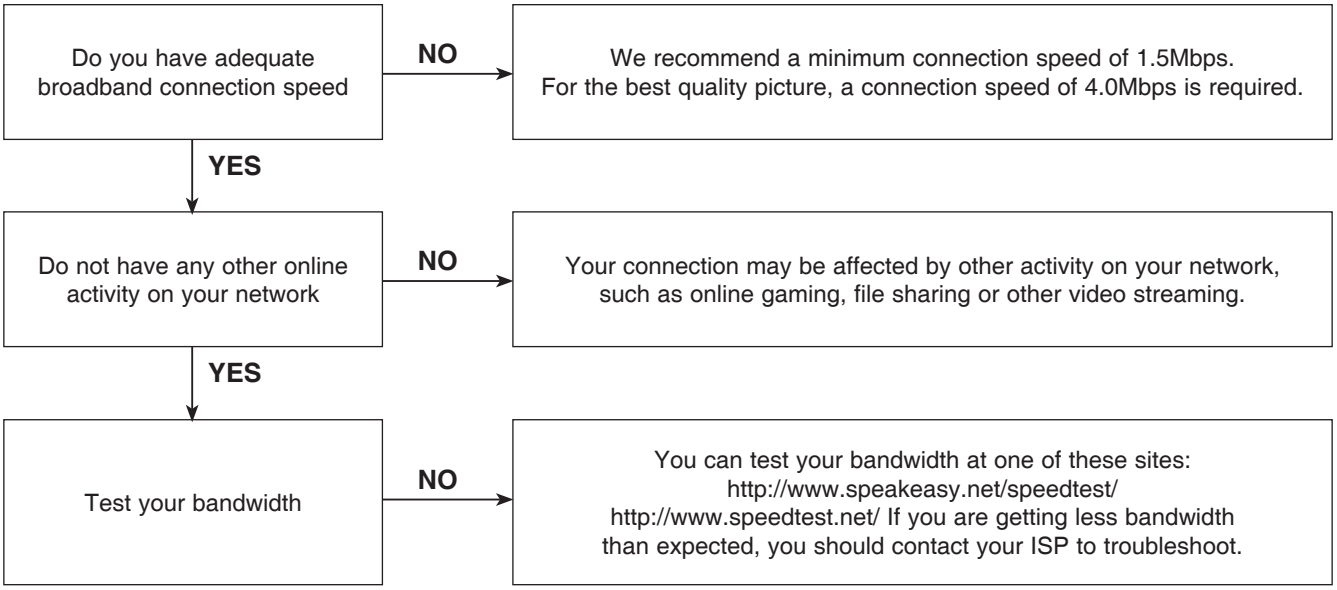
Netflix server is ok, but fails in activation.

NO → Call Netflix Customer Support and check that this ESN added to the Netflix DB

7-5. Less Bandwidth and less resolution movie than expected

The Quality indicator during movie retrieval corresponds to the following bandwidth requirements:

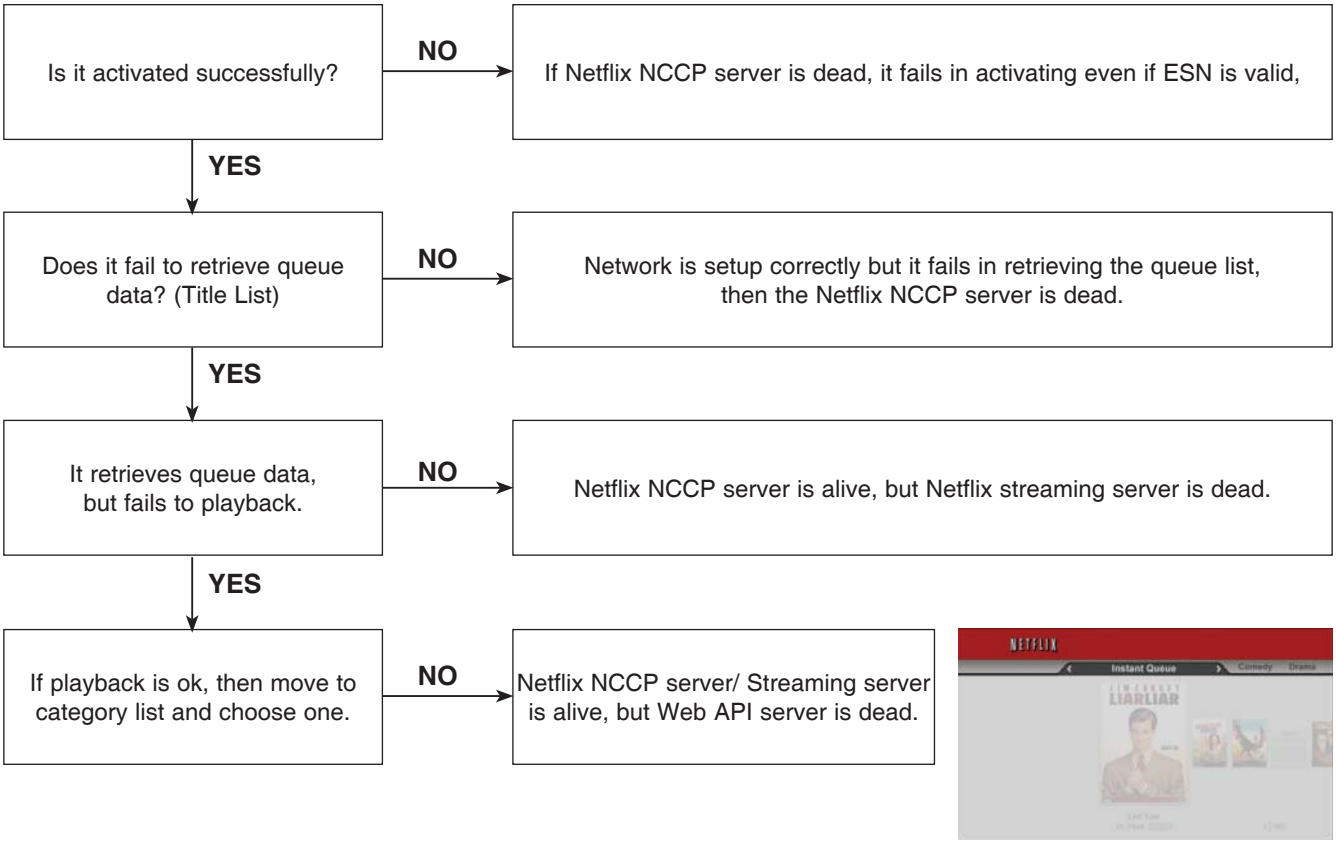
- 1.0 Mbps
- 1.5 Mbps
- 2.6 Mbps
- Best quality is 3.8 Mbps



7-6. Errors from Netflix server

Following operations could be abnormal if Netflix server is dead

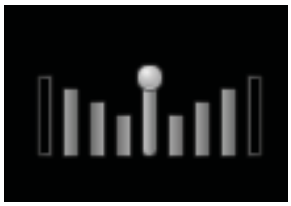
- Activation
- Queue retrieving
- Movie playback
- Category list



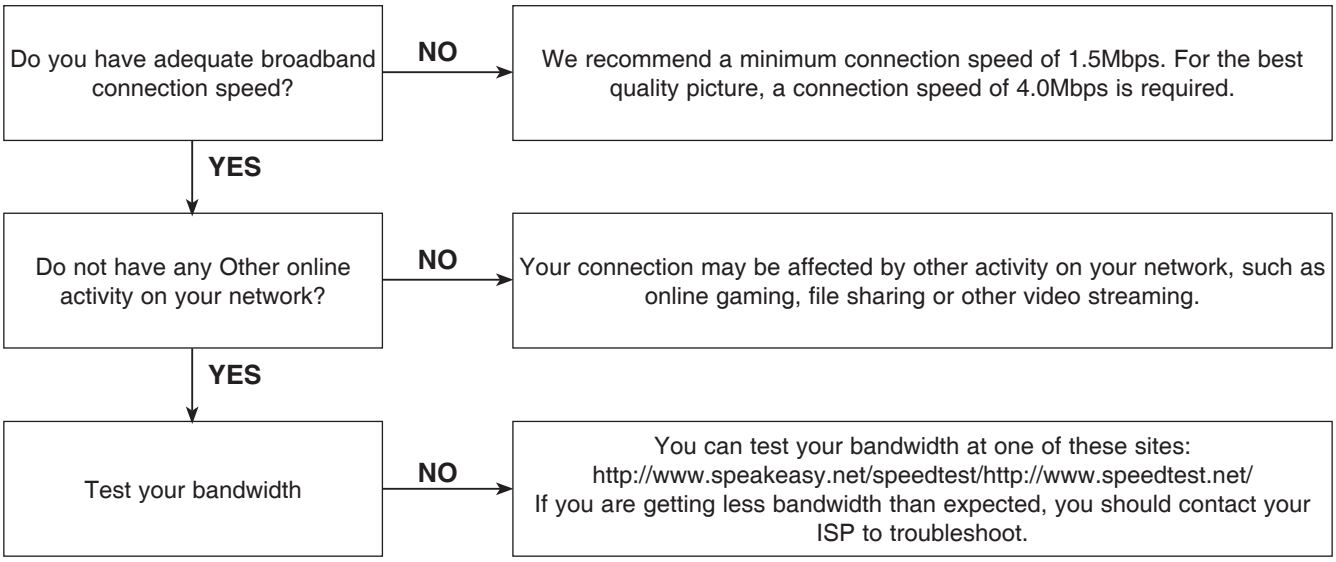
8. YouTube

8-1.Frequent buffering happens while playing videos.

Network Condition Meter indicate current network speed between BD Player and YouTube stream server.
To play videos without buffering, Network Condition Meter should have more than 3 Bars.



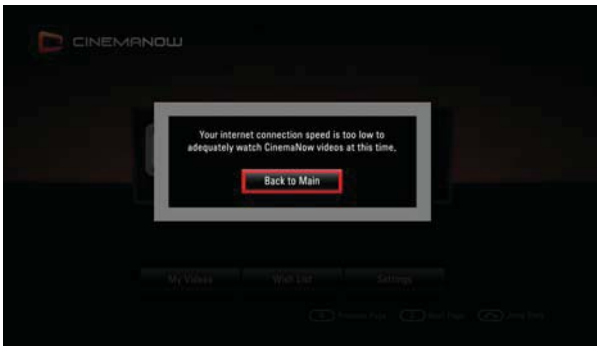
Bitrate in Kbps		Bars
min	max	to display
0	200	0
200	400	1
400	600	2
600	800	3
800	~	4



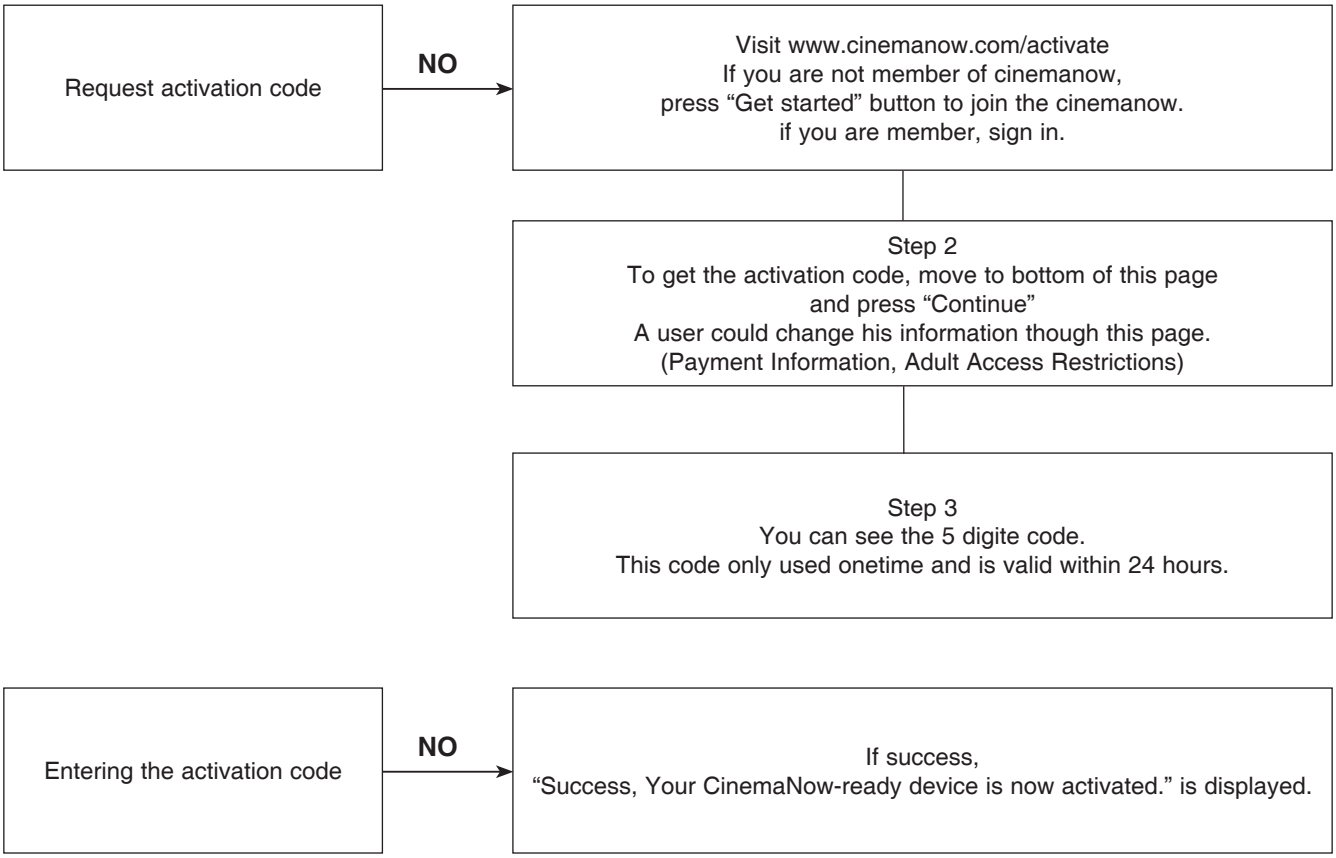
9. CINEMANOW

9-1. Entering the Cienmanow Function.
(Before using the Cinemanow function, it guides a user network status)

Does It connect to internet?	NO →	To enter cinemanow mode, it try to check internet connection. If failed, it displays the popup message to the user. User can move to [Home] menu or [Network setting] menu as our guideline.
Check the network speed?	NO →	If success, it check the network speed from cinemanow server. We recommend a minimum connection speed of 700kbps for playing titles. If the result of speed check is lower than 700kbps, it displays the warning message to user.

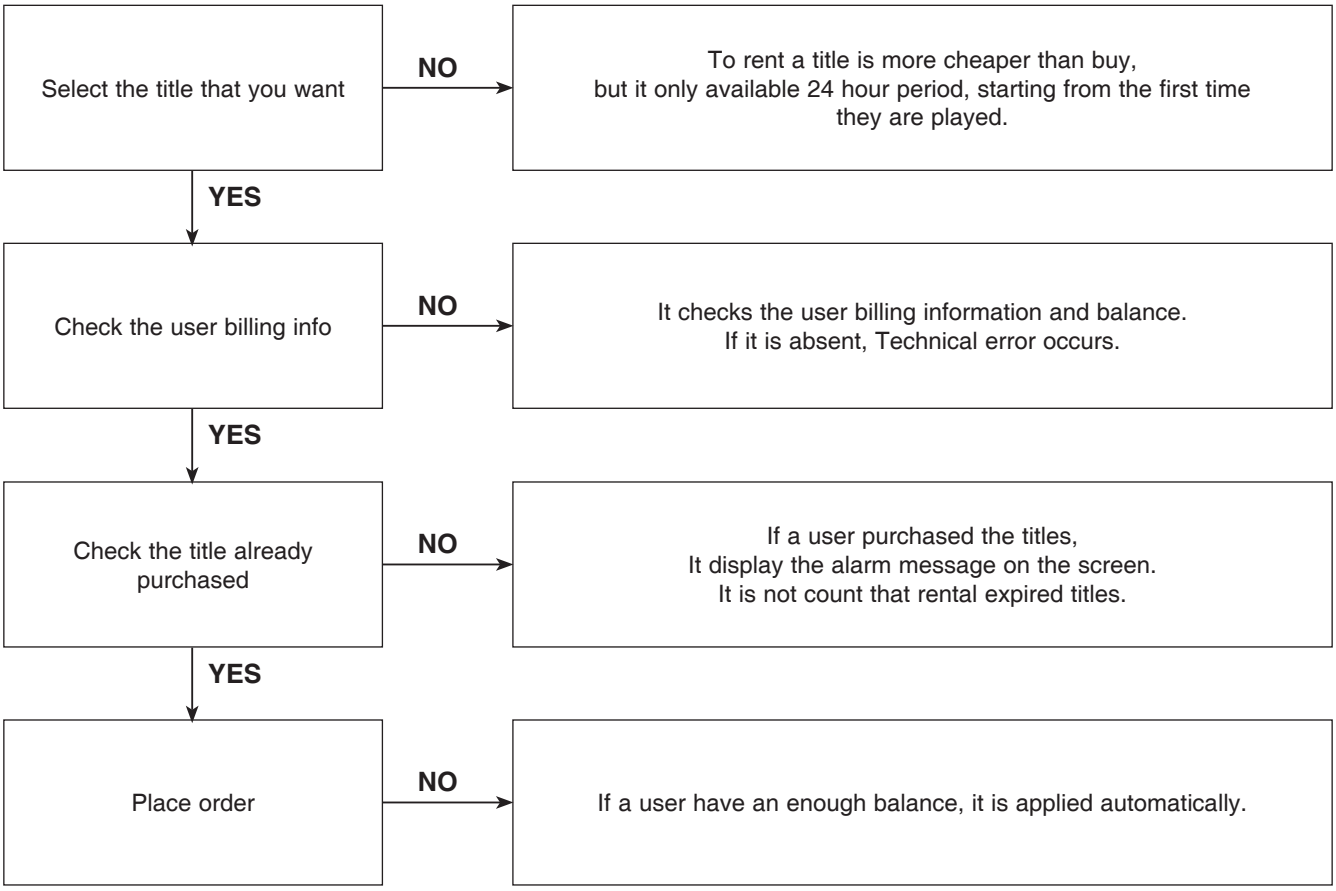


9-2. Activation
(To rent or buy titles, a user must activate the player, Activating the unit establishes a connection between the unit and Cinemanow account)



9-3. Purchase titles

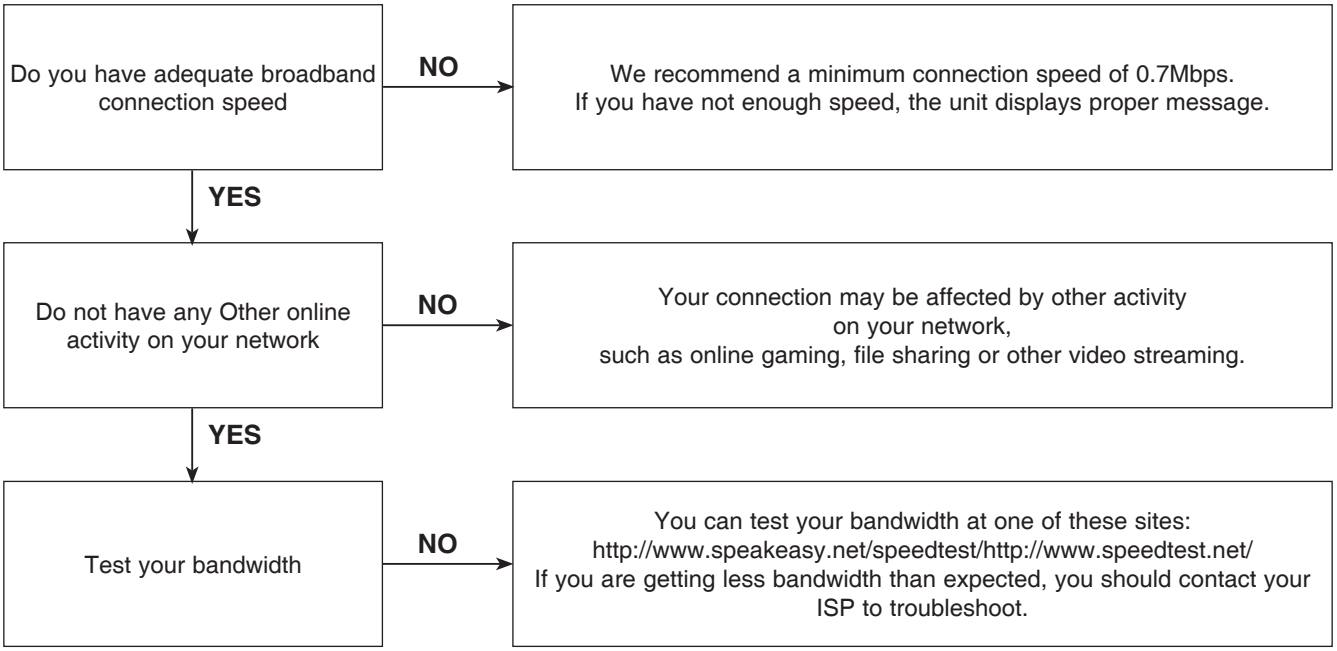
(To watch the stream video, you should browse and buy titles at the player.)



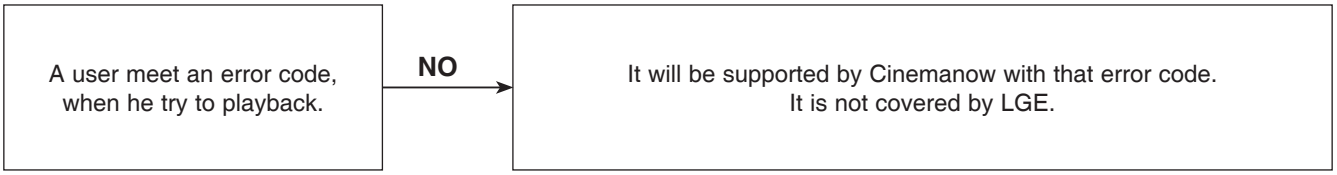
9-4. Less Bandwidth and less resolution movie than expected

The Quality indicator during movie retrieval corresponds to the following bandwidth requirements:

- 1 box is 0.7 Mbps
- 2 boxs is 1.0 Mbps
- 3 boxs is 1.5 Mbps
- 4 boxs is 2.0 Mbps



9-5. Play title restriction.



9-6. Check your internet connection

Before starting cinemanow service,
it is checked whether internet is connected or not,
but during the network communication,
it is detected that internet connection is closed.

A user make it sure that internet connection is working.

 # Check Internet Access

Cannot connect to the internet.
Please make sure your internet connection is working properly,
and that your device is setup properly

9-7. Cannot connect to CinemaNow Server.

Even though there is no problem at our internet connection,
but we still fail to connect Cinemanow Server.

It will be solved by Cinemanow.

 # Cinemanow Support

CinemaNow has encountered a Technical problem.
Please retry. If the problem persists, please contact CinemaNow customer support at www.cinemanow.com/support

(Cannot connect to CinemaNow Server)

9-8. TimeOut

It happens that server response does not finished within 30 seconds. However there is no error at internet connection and cinemanow server. It is due to network congestion, so a user can retry it just a few minute later.
Still a user have problem,
Check internet speed with this url
http://www.speakeasy.net/speedtest/
http://www.speedtest.net/
Andmore, to improvement, contact your ISP.

 # Network Congestion

Cannot connect to CinemaNow service at this time.
Please try again in a few moments.

9-9. CinemaNow Support

It occurs all our application runs well,
but it received unexpected result from
cinemanow server.

In this case,we print error code from
cinemanow server,
a user can serve from cinemanow
support pages,
www.cinemanow.com/help.
This can not be handled by LGE.

 # Cinemanow Support

CinemaNow has encountered a Technical problem.
Please retry. If the problem persists, please contact CinemaNow
customer support at www.cinemanow.com/support

(code [insert error code # here])

9-10. Other Network Error

If your internet environment is not enough
to serve Cinemanow feature,
Our application uses TCP/IP network
connection, with these port 80(HTTP),
443(SSL) and NTP(123).
One of these service is blocked, we can't
support our service.
A user can consult ISP or IT manager.
Still you have a problem,
LG examine it for the detail reason.

 # Connectivity Problem

There is a problem with your connection.
Please make sure your internet connection is working properly.

10. HOME LINK

10-1. What is Home link?

Home link is a Media File Sharing Function. User can play most of media files in my PC or my NAS (Network Attached Storage). General **DLNA compatible server** shares Media Files on local network.
To connect DLNA server, user must have PC with DLNA server program or NAS with DLNA server certified.
LG gives Home link bundle SW disc(PC DLNA Program for Windows).

Another way is to use just file sharing method, this is based on the standard of **CIFS (Common Internet File System)**.
User don't need any program, just set folder sharing on your PC.
Home link server search menu can search user-shared folders.

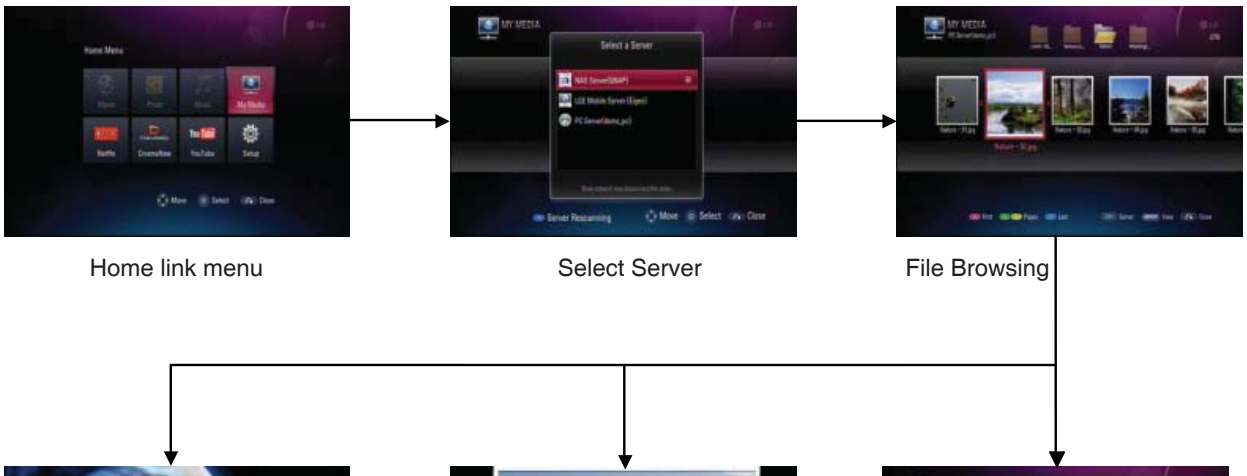
Home link support this media:
JPG,PNG,MP3,WMA,PCM,MPEG1,2,DivX(subtitle support),XviD,**MKV,MP4**

Other DLNA Servers:
Nero Media home, Cyberlink server, Twonky, Window Media Player11, QNAP NAS etc.

Restrictions:
1. PC and BD Player must be connected in one access point.
2. Anti-Virus program may block media sharing. Before installing SW, stop the Anti-Virus program.
3. LG bundle disc program is Essential program supported by Nero.Inc.
4. Media types support is variable by each DLNA server.
5. DivX subtitle is supported by LG bundle disc only.

10-2. What is Home link Feature?

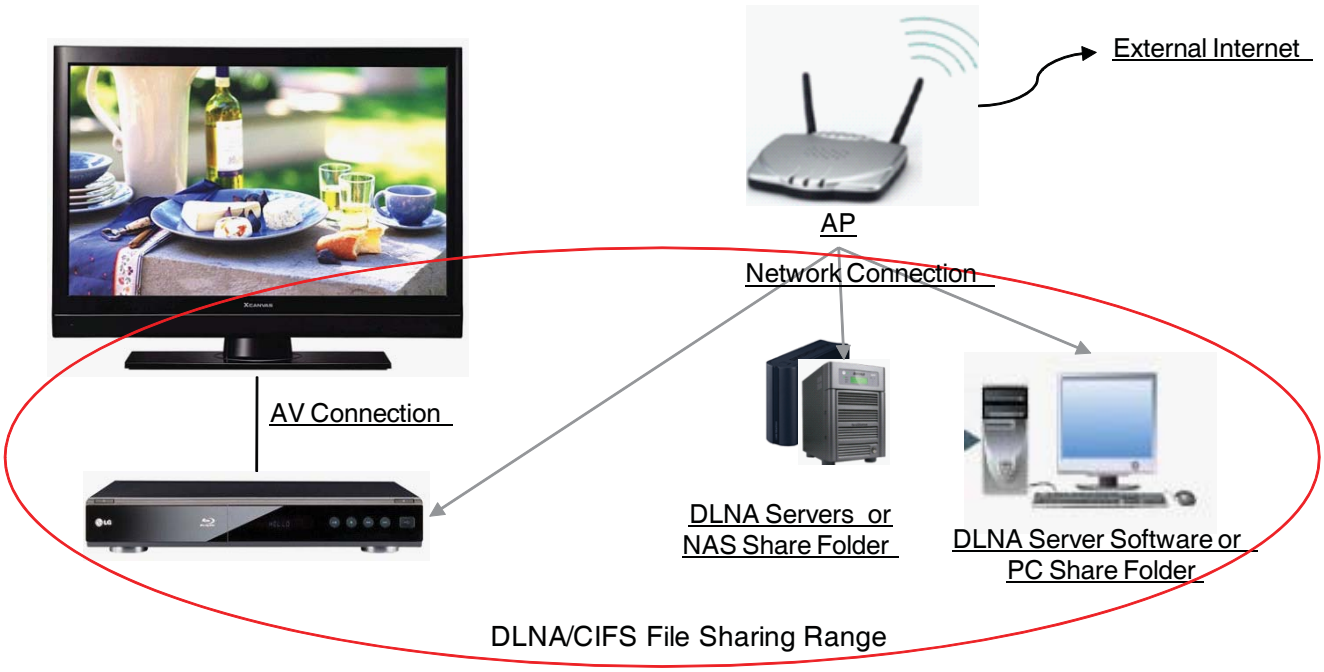
Home link is composed of the screens of selecting server, browsing files, playing video, playing audio, playing photo.
You can move up, down, left, right and select in file browser.



Home link menu | Select Server | File Browsing

Video Playing | Photo slide show | Music Playing

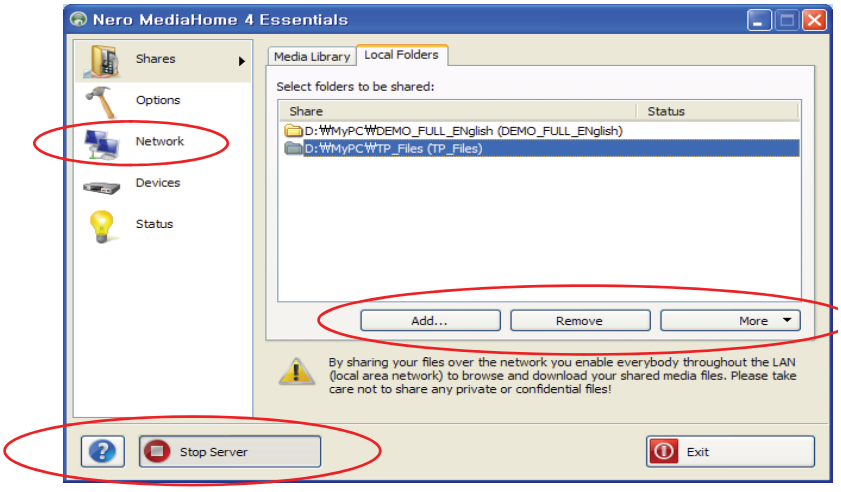
10-3. How can I connect network?



In home network, Access Point is connected to PC, NAS, BD player, etc.
Home link operation is guaranteed within only one Access Point.
Only in this case you can play your media normally.

10-4. How can I Install PC bundle program for DLNA?

Check your network	PC and BD Player are connected to one access point. Check Setup -> Network Status, is it connected normally?
Install PC Bundle SW	Insert bundle CD in your PC and install program. PC Server adds Firewall Exception of nero mdeia server automatically.
Share your media files	Add/Remove PC media folder in share item.
Check “Network Item”	You can check wired or wireless network.
Check “Start Server”	Check “Start Server” button.



10-5. How can I Share new files and folders using DLNA?

Add new files and folders

1. Double-click the “Nero MediaHome 4 Essentials” icon on the desktop tray.
2. Click [Network] icon on the left and define your network name in the [Network name] field.
   The Network name you enter will be recognized by your player.
3. Click [Shares] icon on the left.
4. Click [Local Folders] tab on the [Shared] screen.
5. Click [Add] icon to open the [Browse Folder] window.
6. Select the folder containing the files you want to share.
   The selected folder is added to the list of shared folders.
7. Click [Start Server] icon to start the server.

Shared folders or files are not displayed on the player

1.Click the folder on the [Local Folders] tab and click [Rescan Folder] at the [More] button.
2.If you want more information, see Help menu.
Visit the www.nero.comfor more information and software tools.

10-6. How many DivX subtitle is supported?

Cannot display subtitle

1. Check the subtitle file name.
   The subtitle file name must match the video file name. For example, the following files will be accepted as subtiles for a given movie.
   “Time_Machine.avi” --------video
   “Time_Machine.srt” --------subtitle
   “Time_Machine.sub” -------subtitle
   “Time_Machine.smi” -------subtitle

2. Check the subtitle file size. The file size is limited 2Mbytes.

3. Check the subtitle format. Supported subtitle format is as below.
   SubRip(.srt/.txt), SAMI(.smi), Substation Alpha (.ssa/.txt), MicroDVD (.sub/.txt), Subtitle System(.txt), Vobsub(.sub/.idx)

one more subtitle files

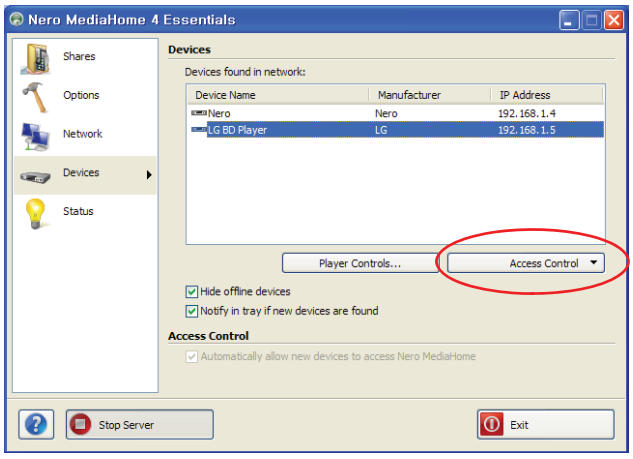
1. Display priority
: If there are several subtitle files in a folder, display priority is this.

Priority	High ← → Low					
File extension	“.smi”	“.idx”	“.sub”	“.srt”	“.txt”	“.ssa”

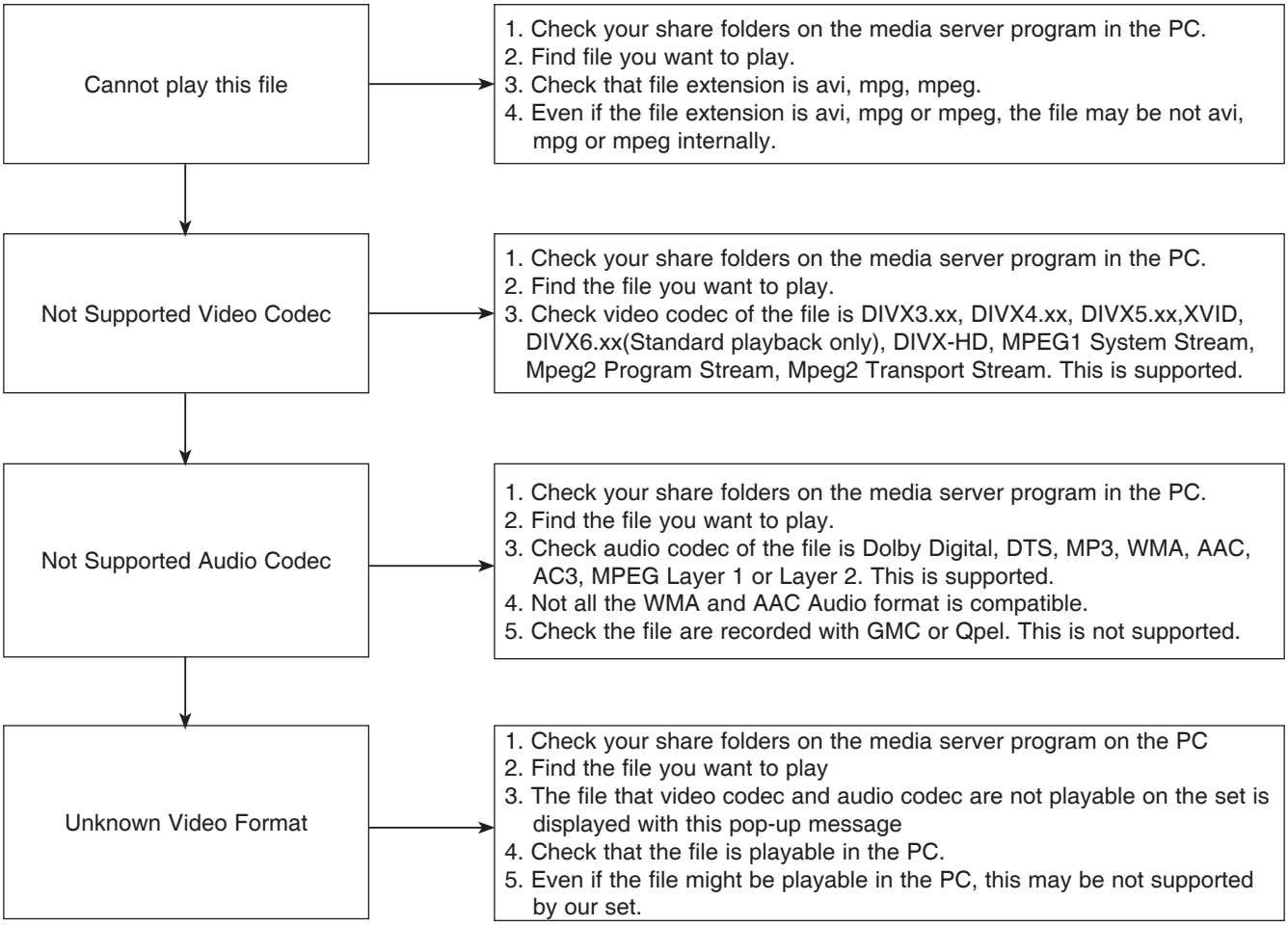
For example, if there are “Time_Machine.smi” and “Time_Machine.srt” in a folder, “Time_Machine.smi” will be displayed.

10-7. Network Error case

No Server Found	1. Check Unit Network Status 2. Check the server and BD Player are connected to same access pointer. 3. Check server turn on.
Network Error, Congestion Error Network Busy Error	1.Check Server status 2.if Server is ok, retry to conect server 3.if server has no response, restart server 4.if Computer has no response, restart computer. 5.If congestion error or network busy error is occurred repeatedly, 5.1 Turn off other devices that is connected to access point. 5.2 Restart Router
Access Deny	1.Check if Nero is set with access deny. Nero Server -> device (left menu) -> select devices -> change Access Control -> set Access Allow



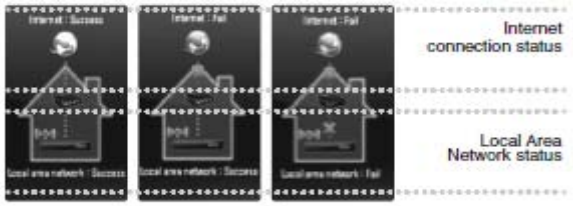
10-8. Video Media Error case



10-9. I can not find Nero media server

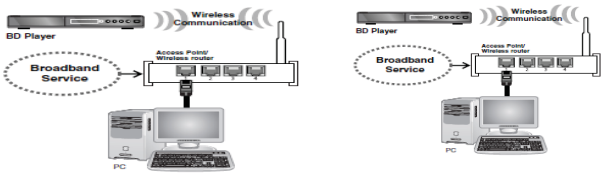
Check Unit Network Statu

1.Local Area Network Should be connected



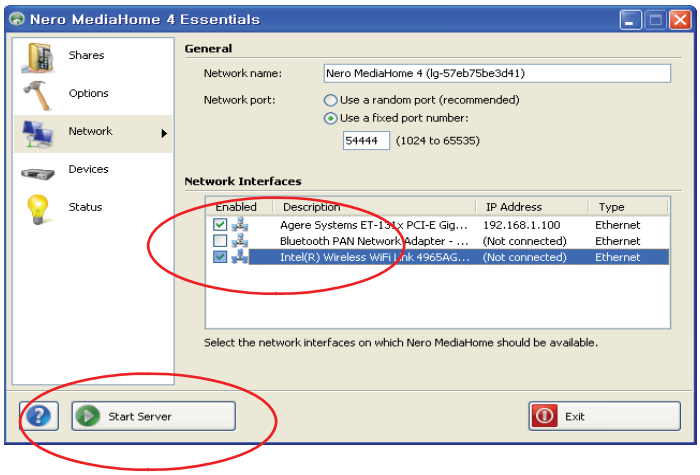
Check PC Network status

1.Check that computer's IP Address subset is same with player's.
(ex, Unit 192.168.1.15, computer 192.168.1.xxx)

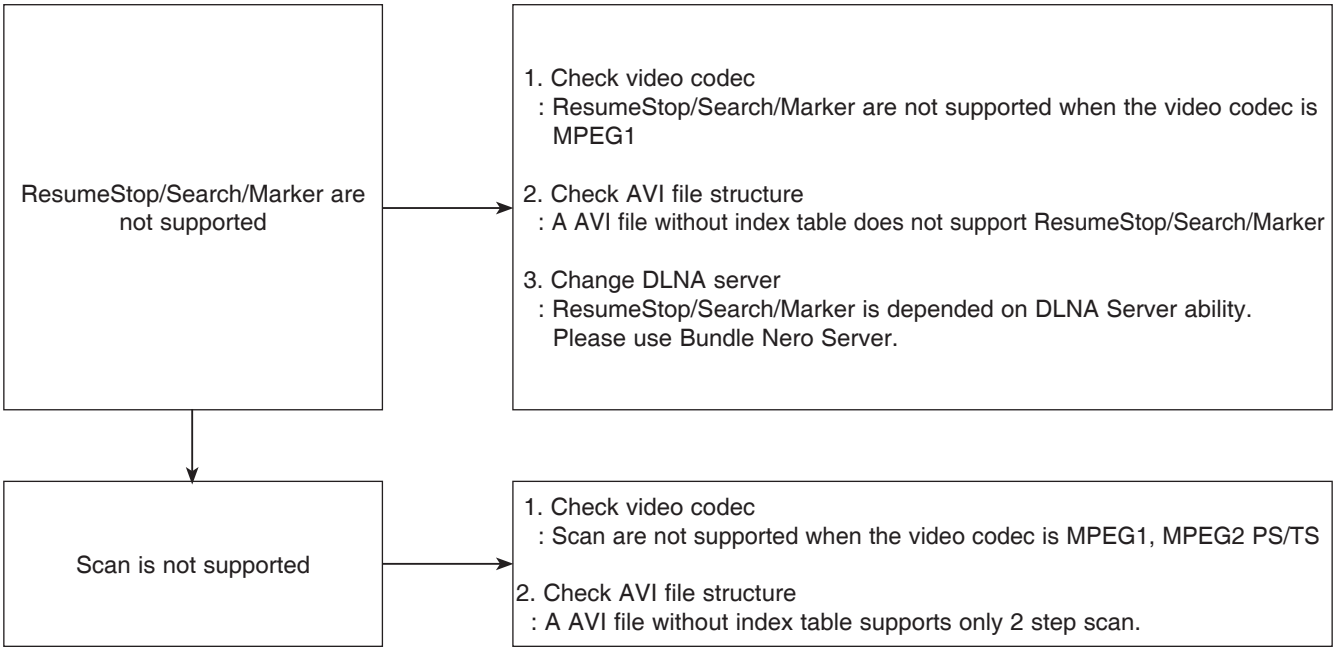


Check Nero SW

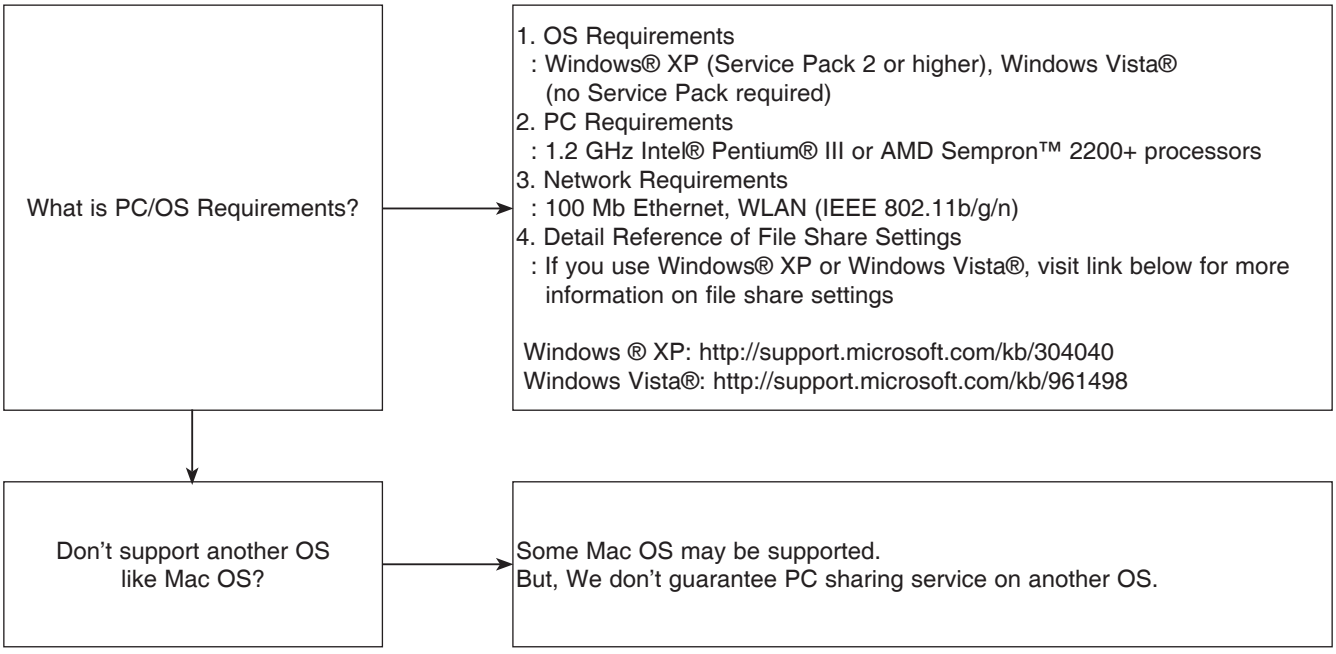
1.Check Network Interface.
Network -> Network Interface
2. If it is wired connected, check wired network interface
if it is wireless connected, check wireless network interface.
3. Start Server



10-10. Movie Playability Error Case



10-11. PC Requirements

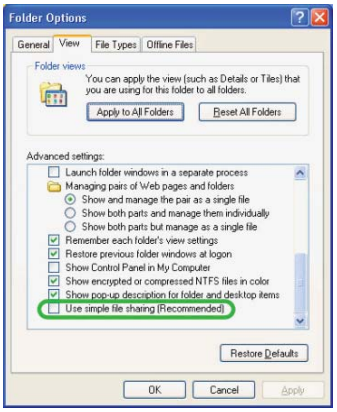


10-12. Folder Sharing in Windows XP

1. Right-click the appropriate folder > Click Sharing and Security... > As shown below [picture 1] and [picture 2], Properties window is shown. Properties window is changed as shown below [Picture 1] and [Picture 2] with check [Use simple file sharing] in [Tools]-[Folder options]-[View] but available to set sharing with check or not.

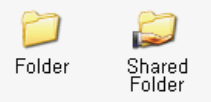
[Picture 1]

[Picture 2]



[Picture 3]

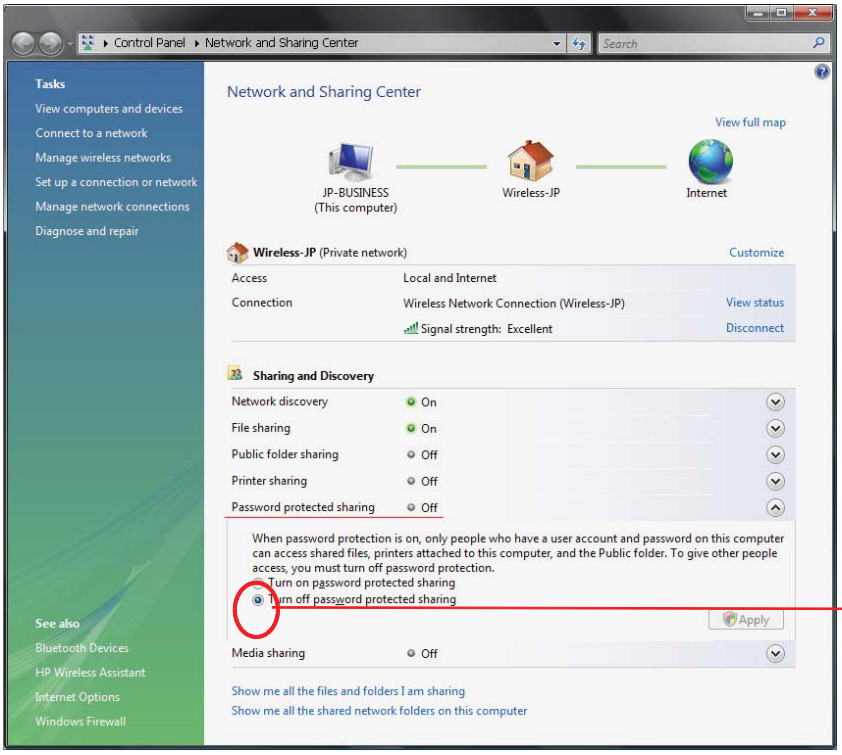
2. After Check and set sharing as shown above [Picture 1] and [Picture 2], there is an icon of a hand holding the shared folder.



3. PC with shared folder and Unit are connected to same router.
   If user select Home link, user can use CIFS Feature. (After selecting folder, usage is same as DLNA's)

10-13. Folder Sharing in Windows Vista

1. By default, folder sharing process is same as Windows XP.
2. The other things is the menu as shown below picture and Remember to release **"Password-protected sharing"** option.

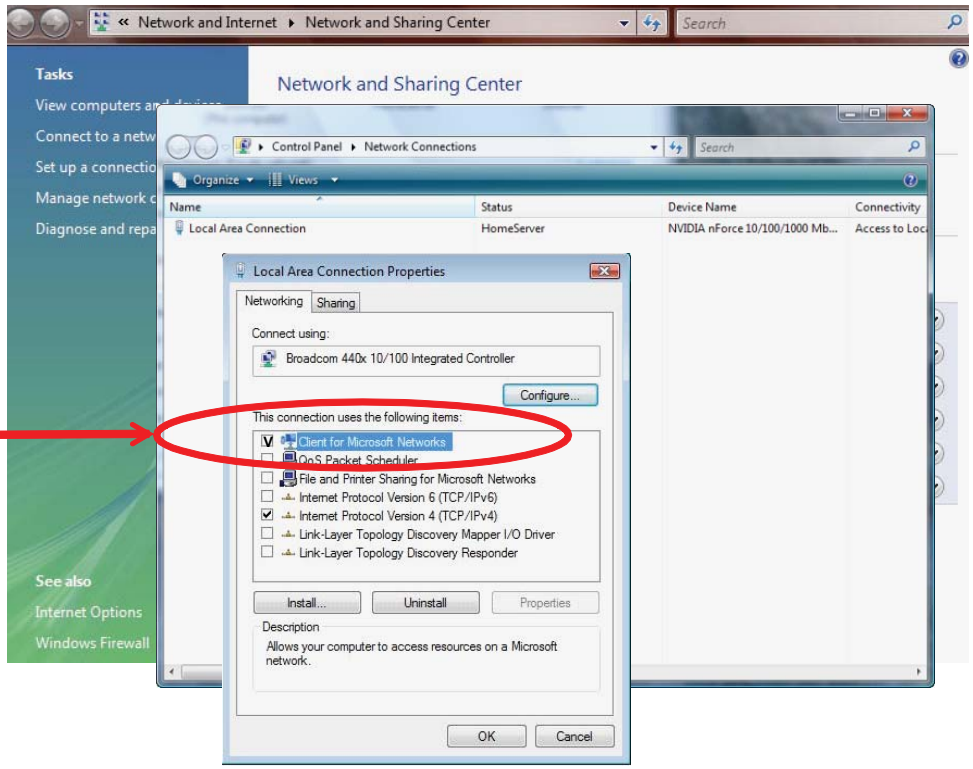


In control panel
> Network and Sharing Center
> Password-protected sharing
> Release Password-protected sharing

10-14. No Server Found

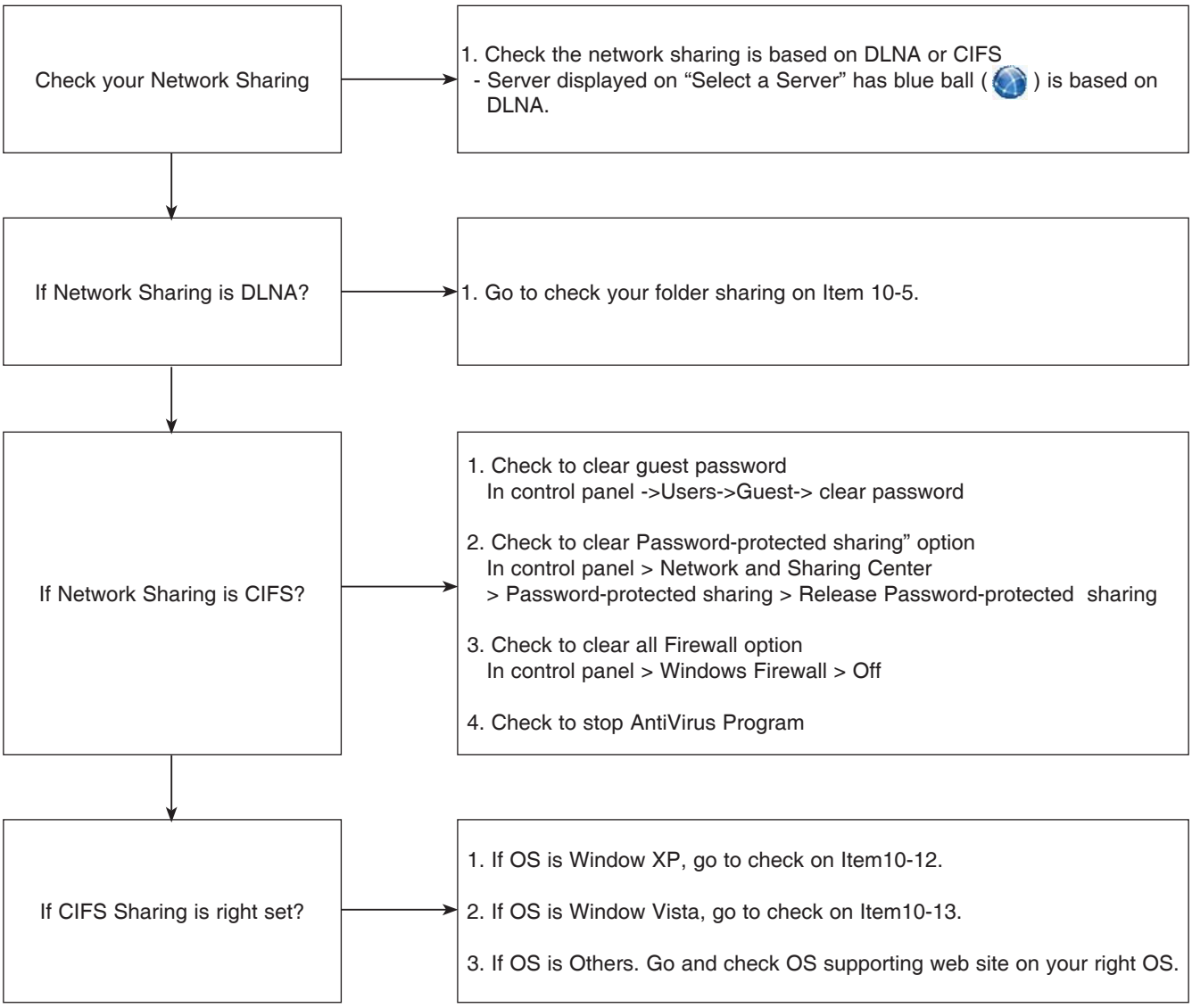
No Server Found (No Server icon At server Menu)	1. Check Computer Turn On 2. Check Computer is same network router. 3. Try Rescanning Button (Blue Button) 4. Then if Server is not found at Server Menu, Check Network property. Start -> Network Environment (right click)->Property -> Local Area Network (right click) -> Property 5. Check Microsoft Network Client is Checked 6. Disable Anti virus SW.

Must be Checked at
“Microsoft Network Client”



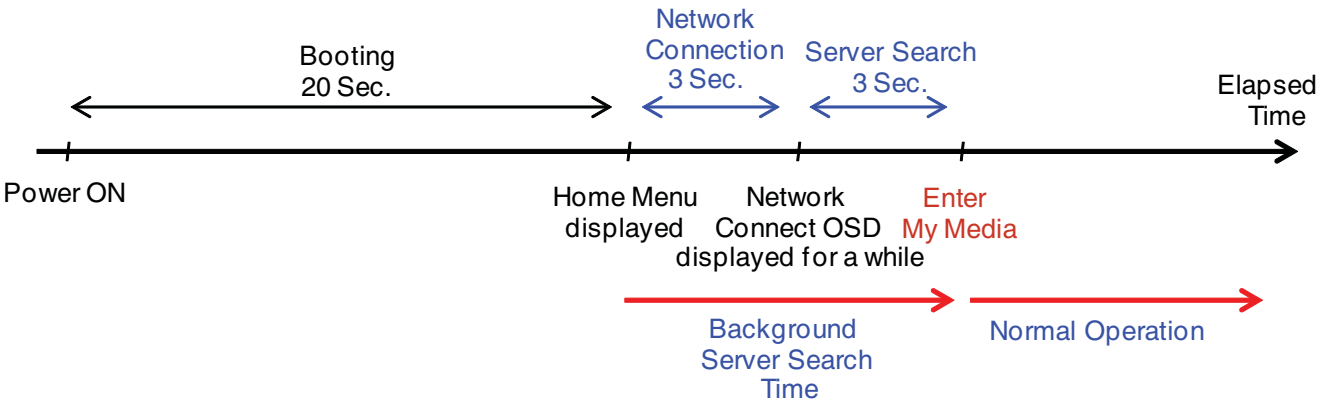
DIGITAL DISPLAY & MEDIA TRAINING MASTER

10-15. I can not find shared folder on the Select a Server window



10-16. User can go directly last used folder after power up.
But it may happen not to go directly last used folder.

Can't find the used folder when you enter the Home link after Power On	• Wait 5 or 6 second after displaying the Home Menu, then enter the My Media Menu (See the following figure) : If you enter the Home link during the background server search time, Unit can't find the used folder. • Check the Server IP : If Server IP was changed (by DHCP or by Manually), Unit can't find the used folder

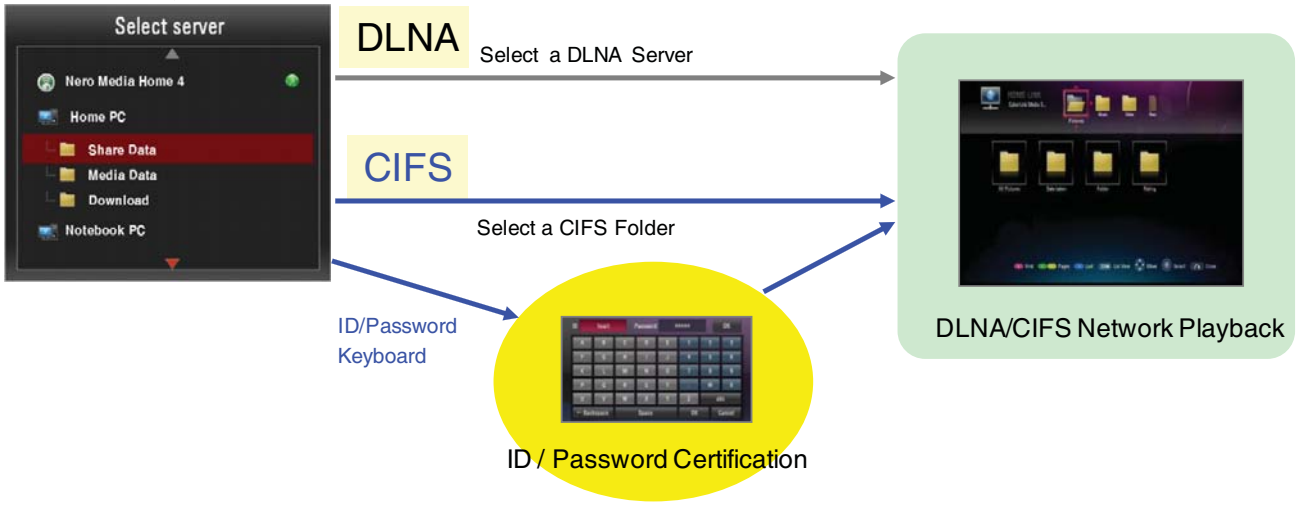


10-17. What do I input for requiring ID and Password?

When you share folder on your PC, you may share folder with user ID and Password.
If it's needed ID/Password for using the shared folder, you can enter ID/Password by using Keyboard menu.
If you can not see folder' contents, please check your PC folder sharing setup. Unit can remember 50 ID/Password.

Home Menu

DLNA and CIFS features are together in Home Link menu.
DLNA and CIFS action's Look & Feel are same.



11. WIRELESS NETWORK SETUP

11-1. Basic Guidance for wireless network troubles.

■ Expectable Causes

1. BD-Player maybe do not receive the radio frequency signal interrupted by different obstacle. The obstacle can be walls, objects, and the other wireless device. Or the distance between AP and BD-Player can be the interrupting.

2. Just after change the AP configuration, the changed configuration (SSID, channel..) does not be applied in AP. It can be also cause of wireless network malfunctions.

3. The wireless part in BD-Player is located on front panel of the product. If, therefore, BD-Player is placed in narrow space, something like a TV cabinet it maybe not receive the radio frequency signal normally.

4. The wrong configuration of AP.

■ Possible Solutions

1. It is good that BD-Player is placed around AP as close as possible. If the signal strength bar of AP like picture, move the AP close to BD-Player around.

2. Clear away the obstacles around BD-Player.

3. If AP's location is far from BD-Player, make move the AP's height of location. For instance, above shelf.

4. Check that AP's configurations are set normally. (Please refer to the next sheet for various troubles)

11-2. When no Access Points or SSID after access point searching

■ Possible Solutions (By router configuration change)

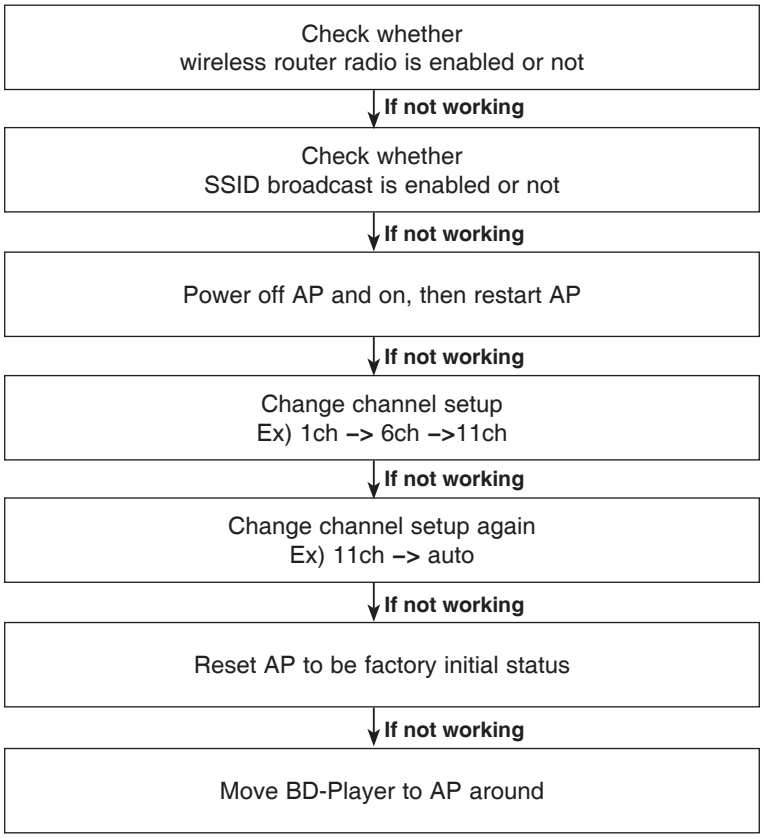
1. Check that country setup of AP. The country setup should be set in each country.

2. Check frequency band using now. The BD-Player can operate in 2.4GHz band not 5GHz.

3. Check channel of band frequency. Available channel is different in each country.
   For example,
   - U.S , Canada : 1ch~11ch
   - Korea, Europe : 1ch~13ch
   - Japan : 1ch~14ch

4. Check the broadcasting SSID function of AP, make it enable.

5. If the result of the above check items is not valid, try the below process.



11-3. When access point connection failed.

■ Expectable Causes

1. A wrong security key.

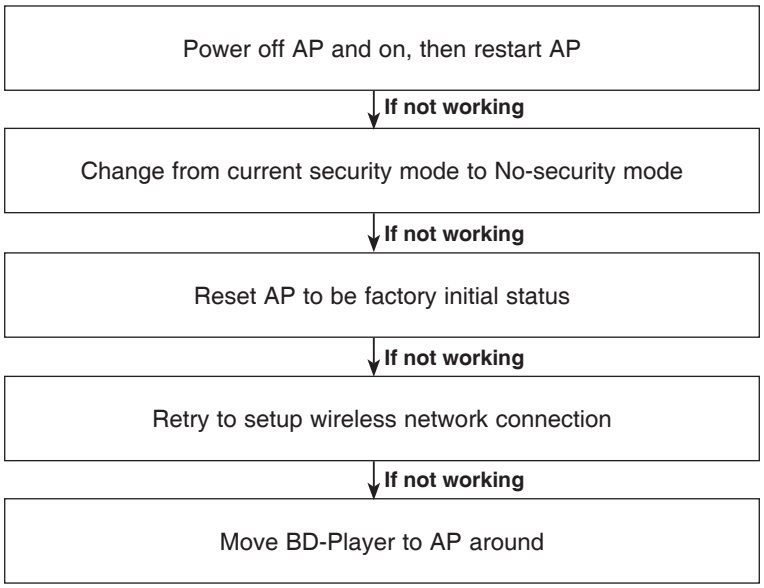
2. Interference between BD-Player and router.

3. Some obstacles like walls, long distance or another wireless device.

■ Possible Solutions

1. Follow the basic guidance of previous page.

2. If not effect, try the below process



11-4. When wireless dynamic IP is not set.

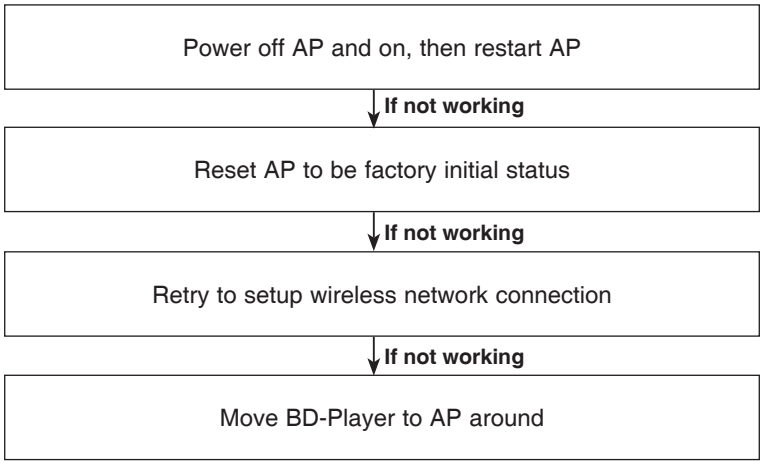
■ Expectable Causes

1. Interference between BD-Player and router.

2. Wrong configuration of IP address of AP.

■ Possible Solutions

1. AP should be used as DHCP server.
   Check whether DHCP server of AP is activated or not.



11-5. When only the WAN is not connected

■ Expectable Causes

1. Some problems between AP(router) and ISP(Internet Service Provider)

2. Simple Data Packet Error by Interference between BD-Player and router.

■ Possible Solutions

1. Confirm if there are no troubles home local internet line by PC.

2. Some ISP need their own unique DNS address. If it is, the DNS address should be set in AP.

3. If not effect, try the below process

Confirm WAN of AP is set as dynamic host configuration protocol, DHCP

↓ **If not working**

Power off AP and on, then restart AP

↓ **If not working**

Reset AP to be factory initial status

↓ **If not working**

Retry to setup wireless network connection at the beginning

↓ **If not working**

Move BD-Player to AP around

↓ **If not working**

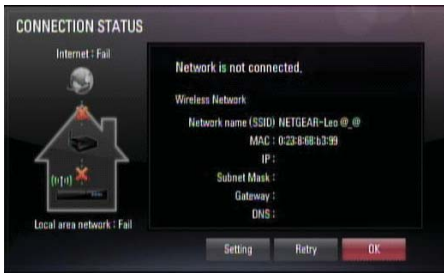
Make AP's MAC same with PC's.
It's possible by using MAC-Clone function of AP

11-6. When both WAN and LAN are not connected in the connection status

Retry wireless network setup at the beginning

If not working

Reset AP to be factory initial status



Retry wireless network setup at the beginning

If not working

Confirm if there are no troubles home local internet line by PC.

If not working

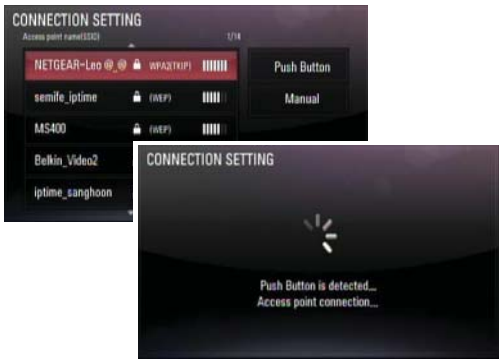
Reset AP to be factory initial status

11-7. When Push Button is not working

■ Expectable Causes & Solutions of Push-Button is not detected

1. This BD-Player's push button is same meaning of AP's WPS-Button. To connect with push button function, user must push button of AP and push button of BD-Player. The inverse sequence is also ok.

2. In some AP(router), user must enable the WPS function in setup-menu. Then WPS-Push-Button function of AP is available.



■ Expectable Causes of WPS Time-Out

1. Each Push button of AP and BD-Player must be pushed in 120 seconds.

2. During 120 seconds just after AP's push button is pushed, other device also can be connected with the AP by the device's push button.

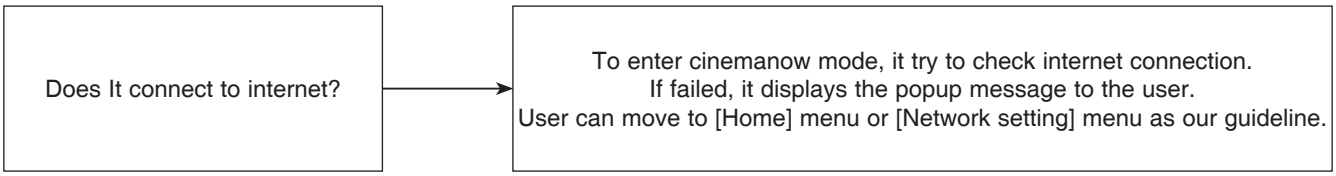
■ Possible Solution

1. Try one more time from at the beginning of network connection.

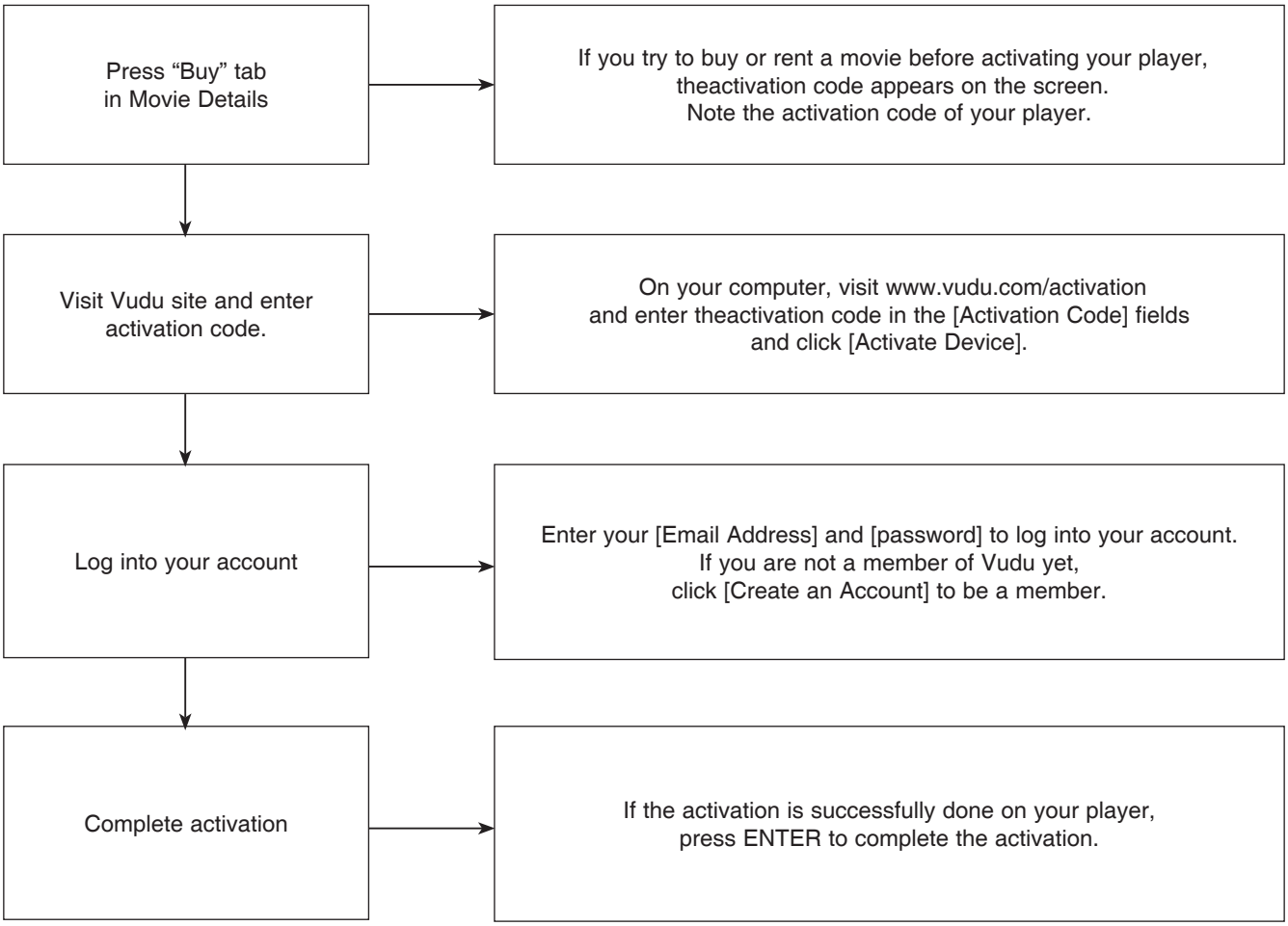
2. Some AP does not support WPS Push Button function.

12. VUDU

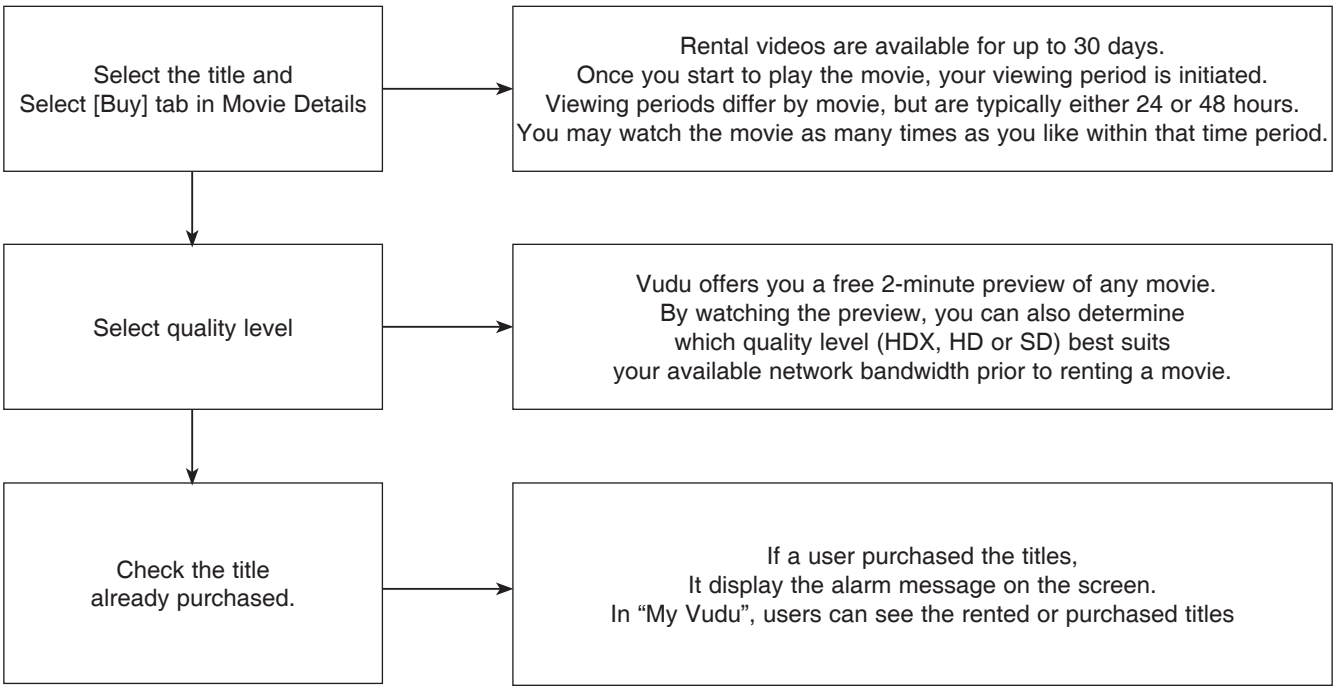
12-1. Entering the Vudu.
(Before using the Vudu function, it guides a user network status)



12-2. Activation
(To rent or buy titles, a user must activate the player, Activating the unit establishes a connection between the unit and Vudu account)



12-3. Purchasing titles
(To watch the stream video, you should browse and buy titles at the player.)



12-4. Less Bandwidth and less resolution movie than expected

Switching movie quality level	While playing a movie, press ENTER or DISPLAY to show the movie info bar, and then use b B to select a movie quality level (HDX, HD or SD) and press ENTER to confirm.
Switching Quality level dialog	This dialog will show up the 4th time playback needs to be paused because of buffering. Users can select a lower quality level and fewer buffering would occur.

12-5. Check your internet connection

Before starting Vudu service, it is checked whether internet is connected or not, but during the network communication, it is detected that internet connection is closed. A user make it sure that internet connection is working.	**# Check Internet Access** Cannot connect to the internet. Please make sure your internet connection is working properly, and that your device is setup properly

13. PICASA

13-1. Create Picasa Web Albums Account

Don't have a Picasa Web Albums account?	Visit "piccasaweb.google.com" and click the "Create an Account >>" button. You can get 1GB of free storage which can store about 4,000 pictures.

13-2. No Image Icon

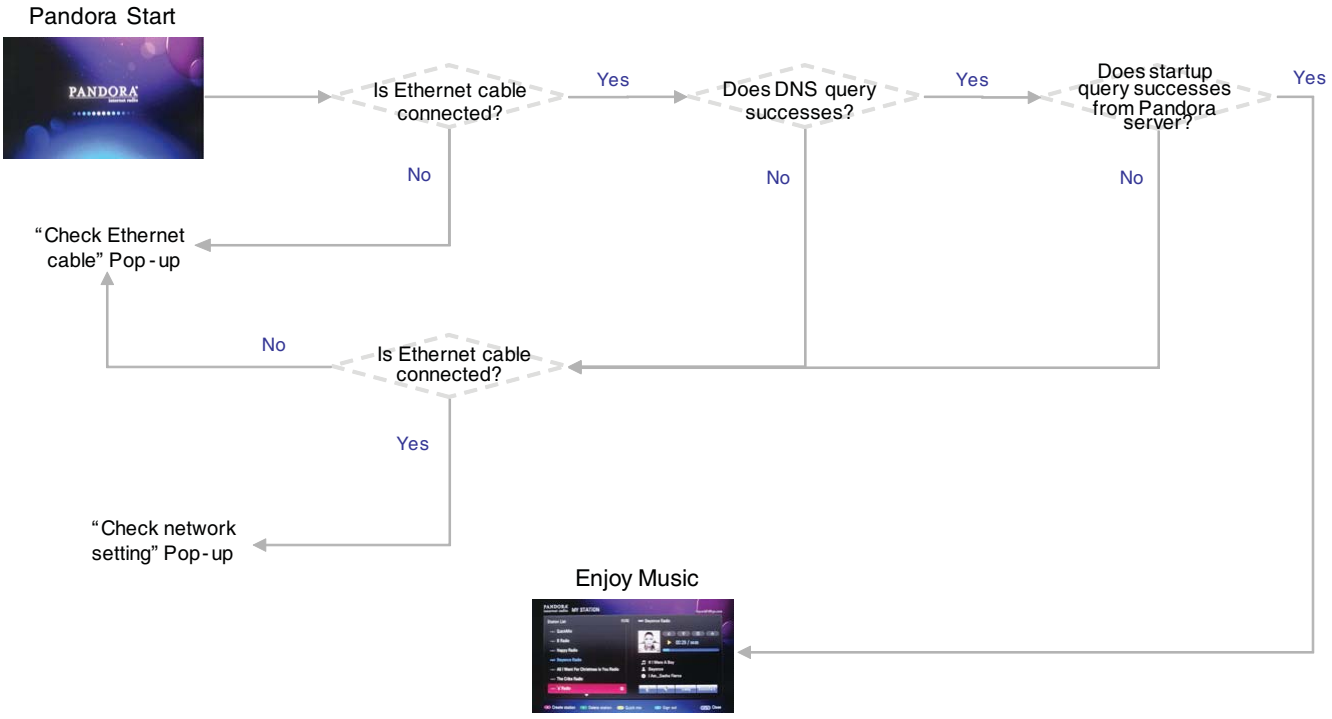
What is "No Image"?	"No Image" icon can appear on thumbnail list or full picture screen. "No Image" means that the meta data of the image is still at the database server but the content has been removed because it violates Google's Terms of Service.

13-3. Network Congestion

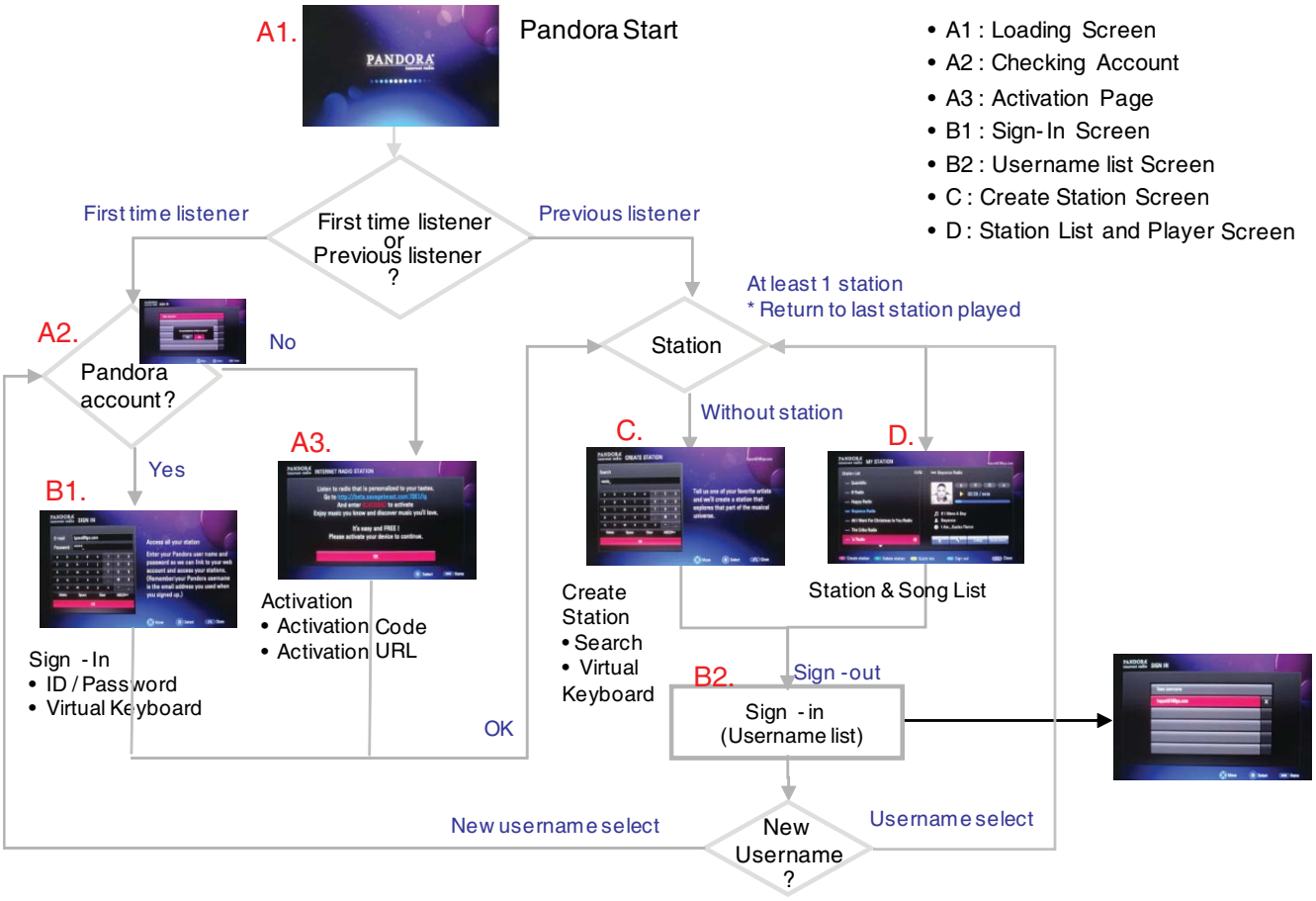
When does the "There may be network congestion" pop-up appears?	"There may be network congestion" pop-up appears when the network is too slow to service the Picasa Web Albums. We try the service API and image request until it successes but if every request fails for 1 minutes then we show the pop-up and return to the Netcast home menu.

14. PANDORA

14-1. Pandora Initial Network Error Policy



14-2. Pandora Initial Network Error Policy



14-3. Player Buffering Policy

■ When does the "Buffering" pop-up appears?

If there is no more data to play at the buffer. The buffer can store about 90 seconds of music data.

■ How much data is buffered?

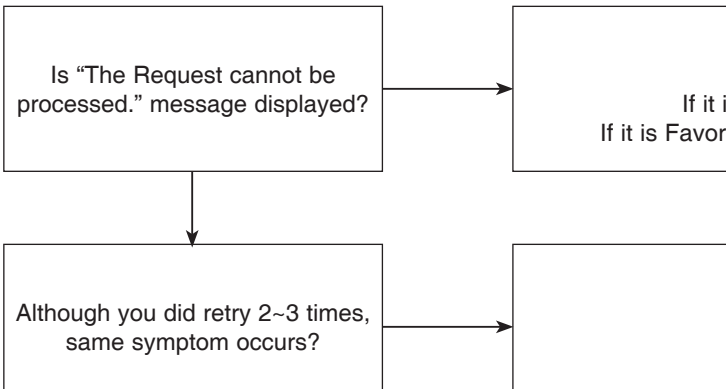
- At the begging of music,
  1) If the network is faster than 128Kbps, buffers 16Kbytes of music data and start playing.
  2) If the network is slower than 128Kbps, buffers 96Kbytes of music data and start playing.
- After playing music,
  1) Until the buffer is full.
  2) When the buffer goes empty, buffers 15 seconds of music data and then restart playing.

■ When does the "There may be network congestion" pop-up appears?

1) If the buffering continues for 1 minutes.
2) If the buffering pop-up appears more than 5 times in the same music.

15. ACCUWEATHER

15-1. The Request cannot be processed



ONE POINT REPAIR GUIDE

1. NO POWER PROBLEM

No power problem occurs when you power on the unit.

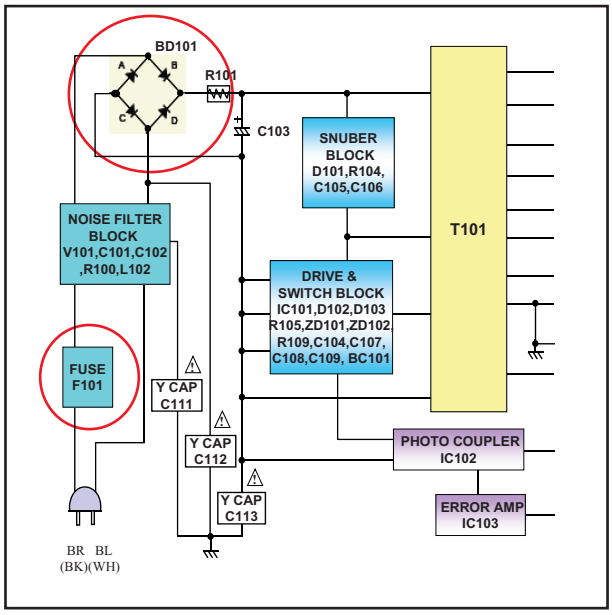
1-1. F101, BD101

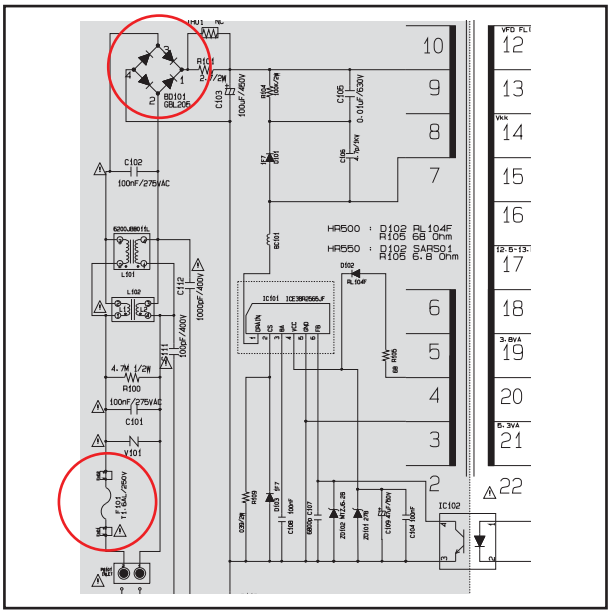
1-1-1. Solution

Replace F101, BD101 on SMPS board.

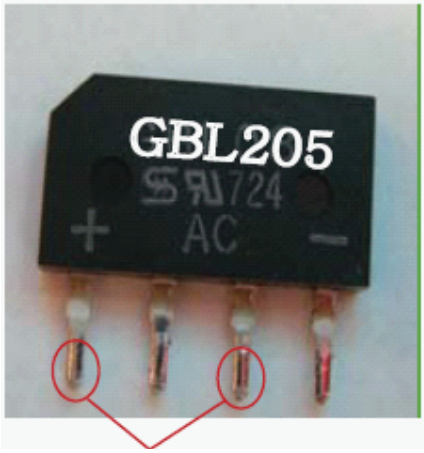
1-1-2. How to troubleshoot (Countermeasure)

1) Look at the physical of fuse F101.
2) Check the bridge diode BD101.

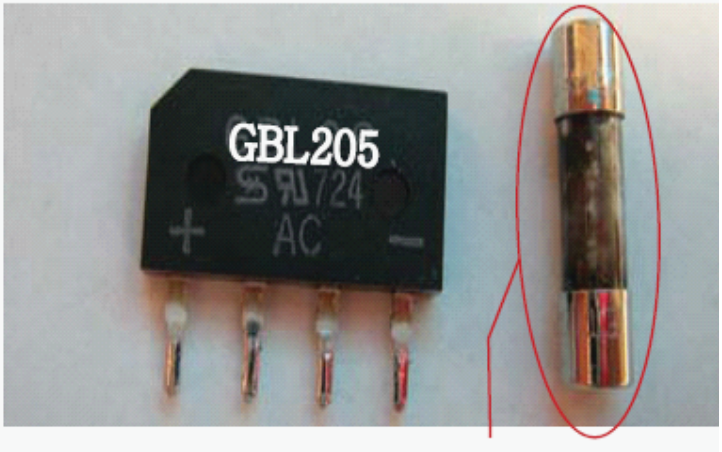




1-1-3. Service hint (Any picture / Remark)



Check with ohm meter is short



Can look at the physical condition

ONE POINT REPAIR GUIDE

2. VFD DOESN'T DISLPAY

Timer board doesn't work. (abnormal display)

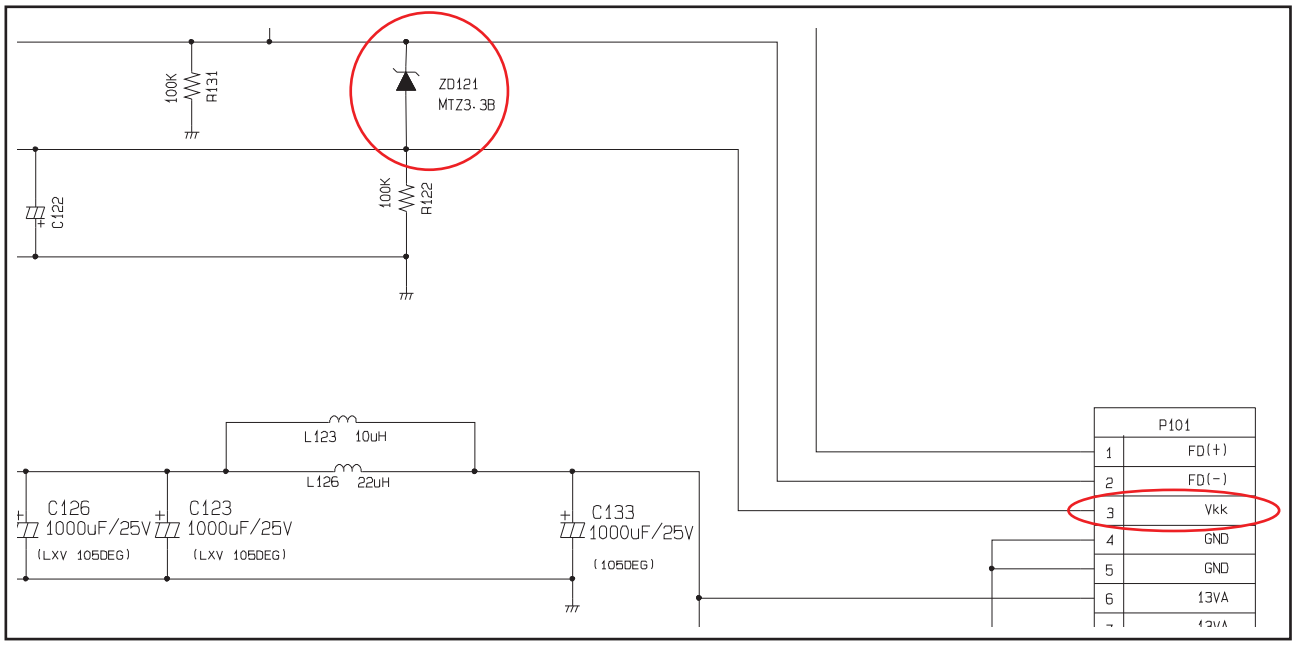
2-1. ZD121

2-1-1. Solution

Replace ZD121 on SMPS board.

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

1) Check P101 in pin3 --> VKK -29 VA at power.



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

ONE POINT REPAIR GUIDE

3. NO BOOTING WHEN YOU TURN THE UNIT ON, “HELLO” OR “WAIT” ON FRONT PANEL

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

3-1. IC209, IC302

3-1-1. Solution

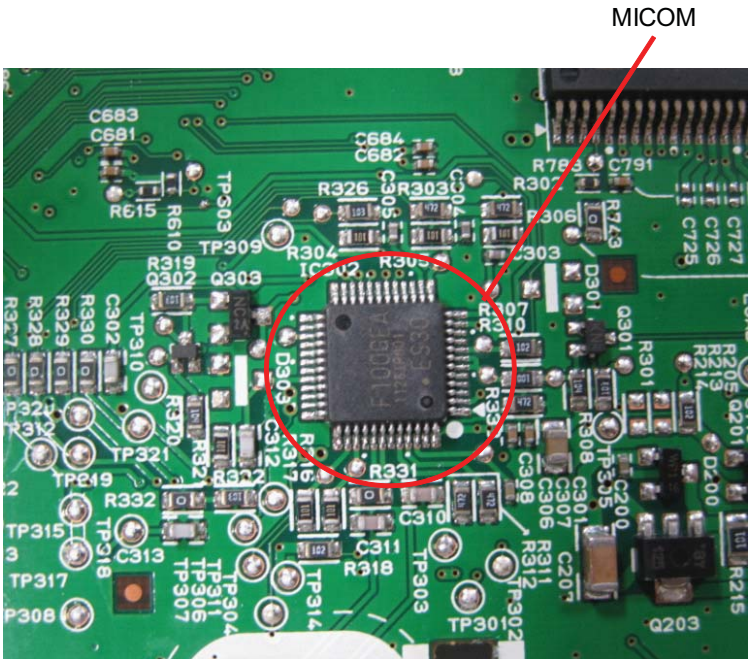
Replace IC209 or IC302 on main board.

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

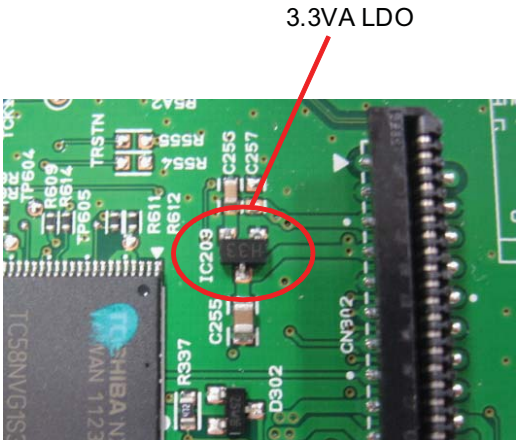
1) Please check VCC MICOM_3.3 VA of IC302 pin48.
   If it doesn’t work, check 3.3 VA from IC209 pin1.
   If it doesn’t work, check 5.3 VA input voltage from IC209 pin2.
   If 5.3 VA is working, change the IC209.
2) If 3.3 VA is working, check the MPEG reset of micom pin8, power control pin 9, 10, 11.
   If it doesn’t work, change the IC302.

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

There was a micom pin not good soldering because micom pin is not flat.
So it is needed to check the Micom soldering state.



< MAIN board bottom view >



< MAIN board top view >

ONE POINT REPAIR GUIDE

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

3-2. IC605

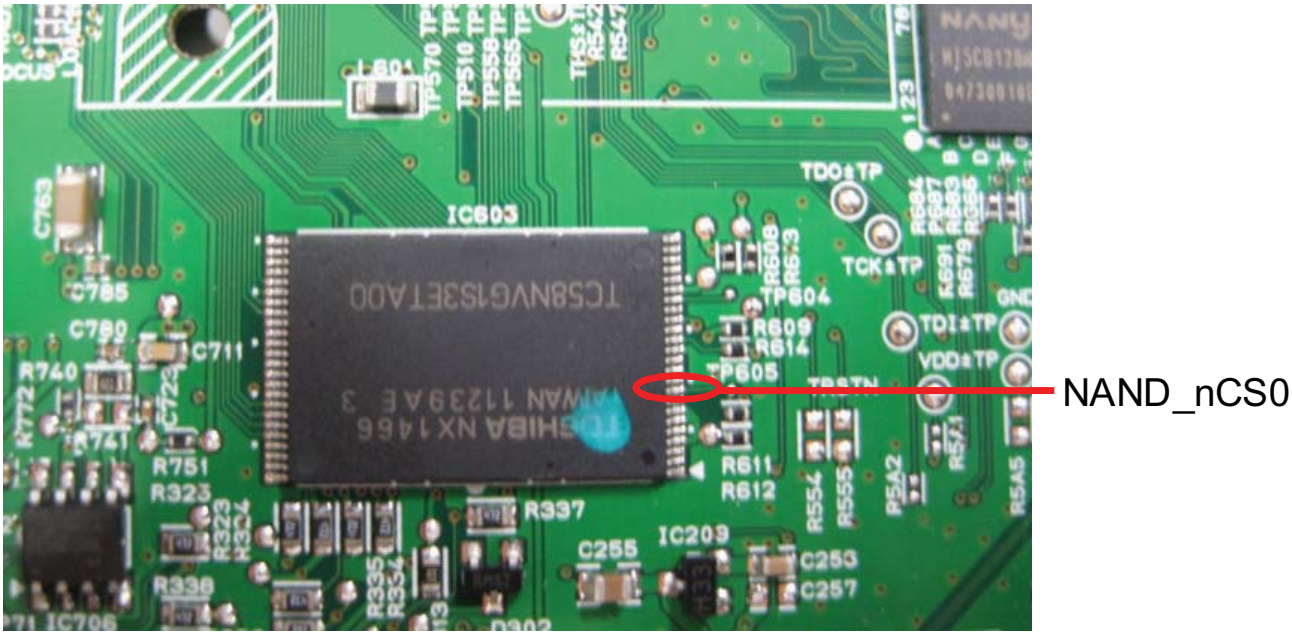
3-2-1. Solution

Replace IC605 on main board.

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

1) Please check the IC605 on your eyes.
2) Check the /CE signal of IC605 pin9.
   First, If the /CE signal is not operating normally during booting, try to change IC605.
3) After changing it, if the set is still not booting :
   - Check DDR IC (IC600 ~ IC603) refer to item 3-3.
   - Check BCM7632 IC (IC500) refer to item 3-4.

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



< MAIN board top view >

ONE POINT REPAIR GUIDE

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

3-3. IC600 ~ IC603

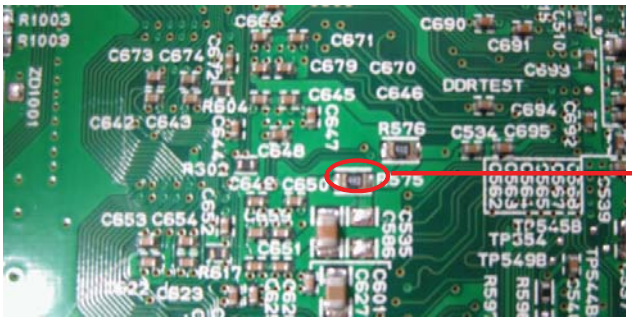
3-3-1. Solution

Replace IC600~IC603 on main board.

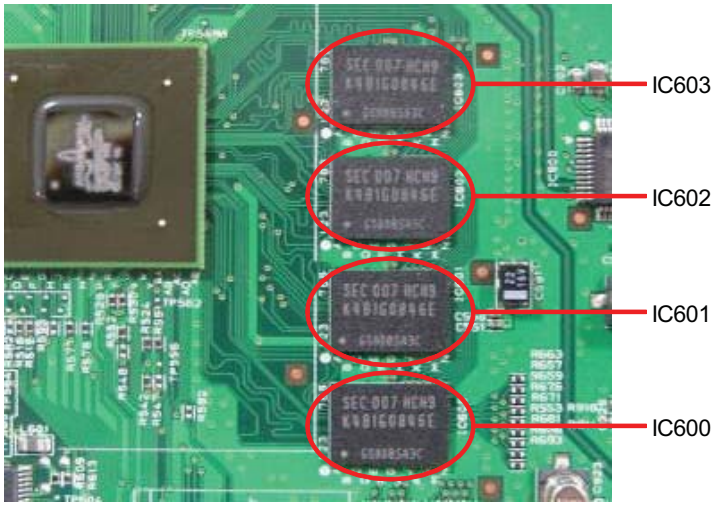
3-3-2. How to troubleshoot (Countermeasure)

1) Please check 1.5 V of C591.
2) Check DDR3_VREF of C619, C639, C659, C679, DDR3_VREF must be 0.75 V.
   If DDR3_VREF is not 0.75 V, check the R575 and R576.
2) If it doesn’t work even only one and IC201, IC202, IC203 are no problem,
   IC600, IC601, IC602, IC603 (DDR memory) must be changed.
3) After changing it, if the set is still not booting :
   - Check BCM7632 IC (IC500) refer to item 3-4.

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



< MAIN board bottom view >



< MAIN board top view >

ONE POINT REPAIR GUIDE

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

3-4. IC500

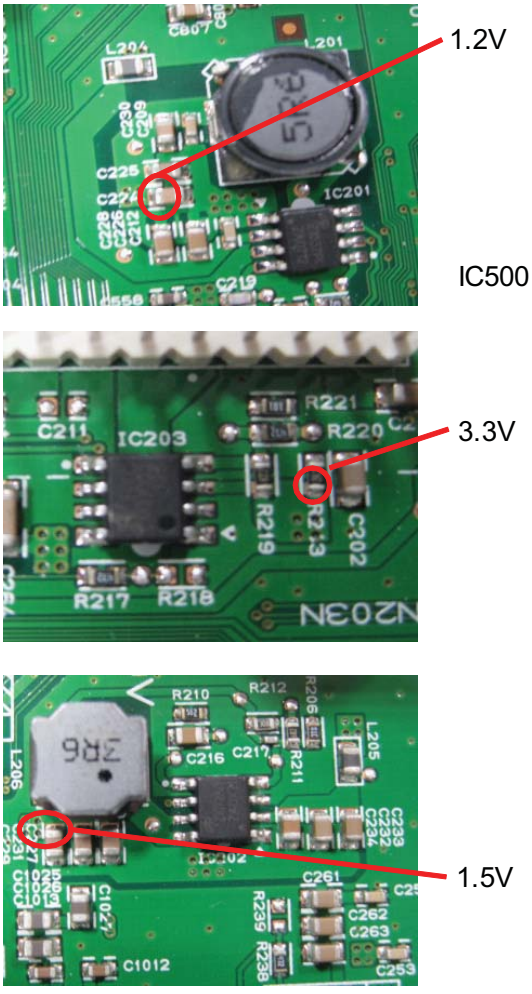
3-4-1. Solution

Replace IC500 on main board.

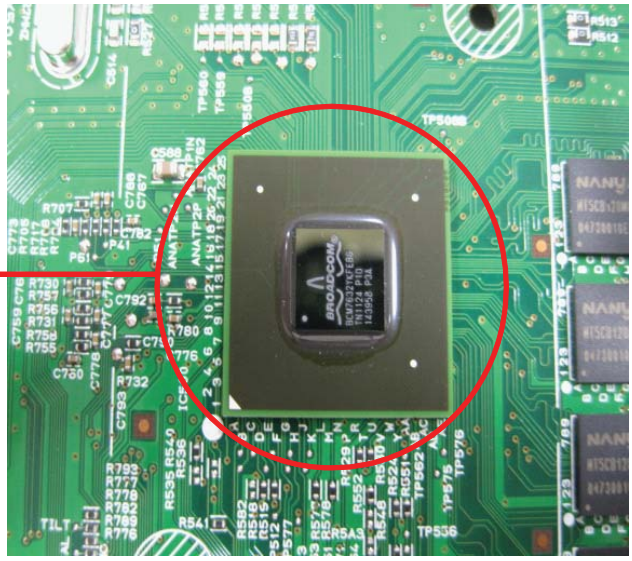
3-4-2. How to troubleshoot (Countermeasure)

1) Please check 1.2 V of C224 on main board.
   Please check 3.3 V of R243 on main board.
   Please check 1.5 V of C231 on main board.
2) Please check the frequency of 27 MHz crystal (X501).
3) If it doesn’t work even only one and IC201, IC202, IC203 and X501 are no problem, IC500 BCM7632 must be changed.

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



< MAIN board top view >



< MAIN board bottom view >

ONE POINT REPAIR GUIDE

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

3-5. COIL USING IN DCDC IC(L201, L206)

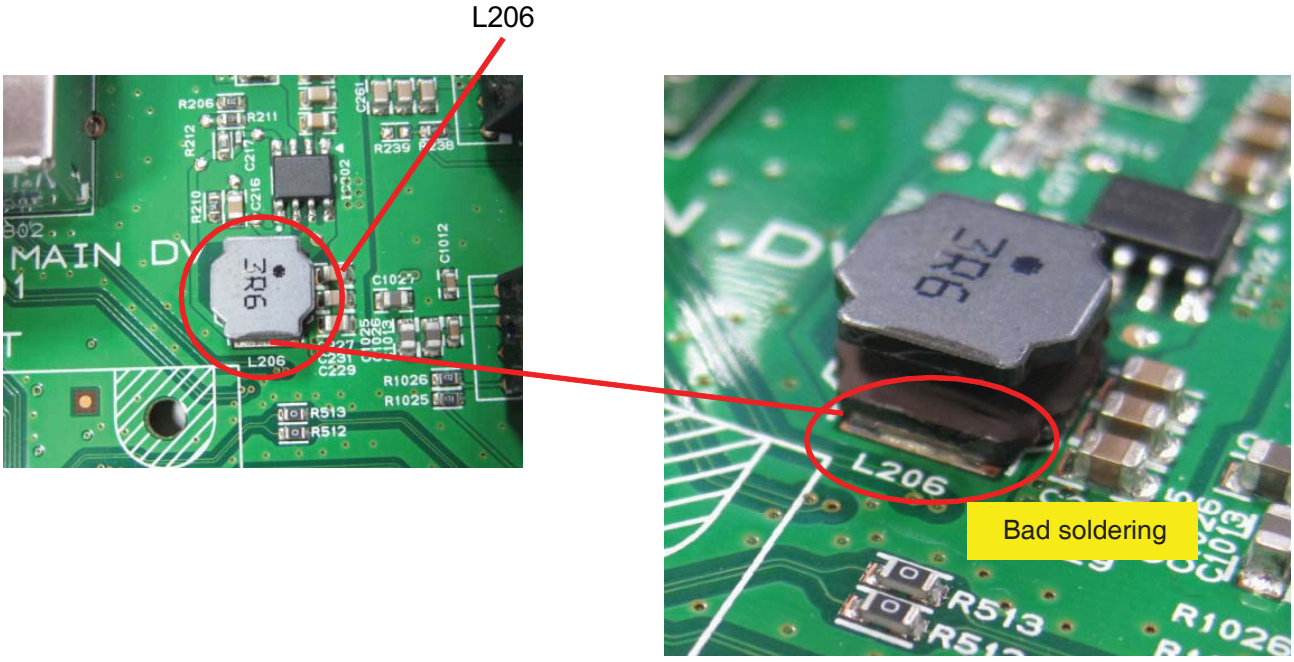
3-5-1. Solution

Re-soldering the Coil.

3-5-2. How to troubleshoot (Countermeasure)

1) Please check 1.2 V of IC201, 1.5V of IC202.
2) If there is problem of input voltage, check the input voltage 5.3 VA.
3) If there is no problem, check the L201, L206 like below picture.

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



< MAIN board top view >

ONE POINT REPAIR GUIDE

4. NO HDD DETECTED

When you access the internal HDD, it will display “No HDD detected” on the screen.

4-1. 5 V DCDC COIL AND HDD CABLE

4-1-1. Solution

Re-soldering L292N, change the IC900.

4-1-2. L292N How to troubleshoot (Countermeasure)

Refer to the previous page.

4-1-3. IC900 How to troubleshoot (Countermeasure)

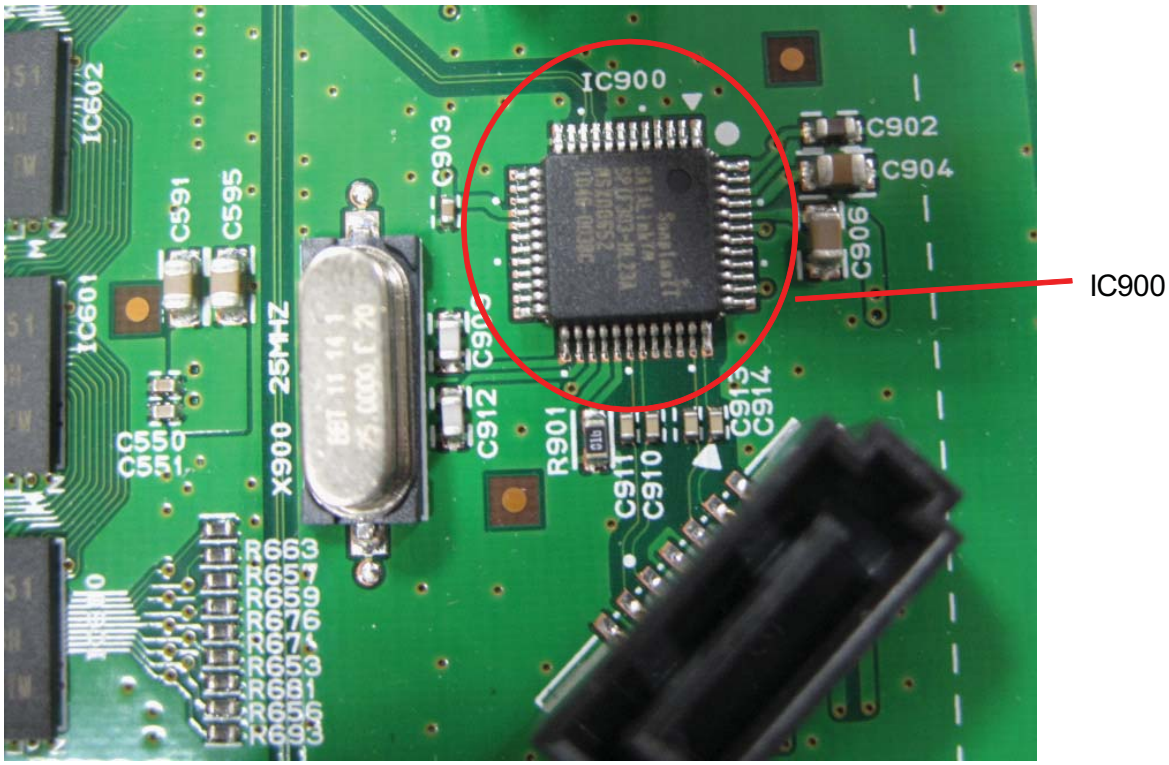
1) Please check VCC 5V of IC900 pin44.
If it doesn’t work, check the IC290N.

If VCC 5 V is working, check the 1.8 V of IC900 pin3, 3.3 V of IC900 pin2 and X900.
If it doesn’t work, change the IC900.

If 1.8 V and 3.3 V is working, check the IC900 pin30, 31, 35, 36.
If there is no signal, check the SATA and HDD power cable connection.

If signal is coming to IC, check the IC900 pin9, 10.
If there is no signal, change the IC900.

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



< MAIN board top view >

ONE POINT REPAIR GUIDE

5. DISC TRAY CAN NOT OPEN, CLOSE/ DISC READING PROBLEM

When you want to play the BD Disc, you can not open, read disc.

5-1. IC202

5-1-1. Solution

Check the CN701, CN705, CN707 around.

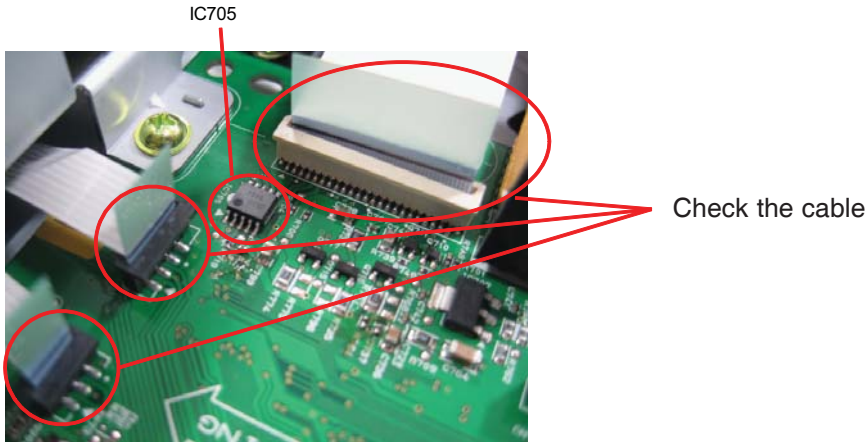
5-1-2. How to troubleshoot (Countermeasure)

1) Check the FFC cable of CN701, CN705, CN707.
Change the MD. If the problem is same, you can try this.

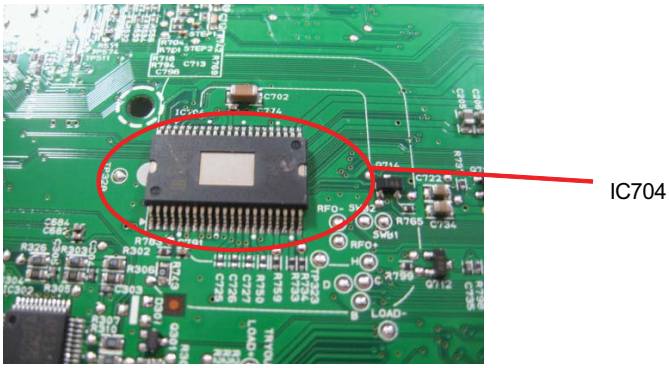
If you can not open, close, check the CN707 pin5, 6, 7, 8.
If there is no signal, check the IC704.

If there is disc reading problem, check the CN707 pin23, 24.
If the signal is unstable eye pattern, check the IC704, IC705.

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



< MAIN board top view >



< MAIN board bottom view >

ONE POINT REPAIR GUIDE

6. NO FLD DISPLAY/ NO REMOTE CONTROL

When you turn on your set, there is no FLD Display and no RMC control.

6-1. FRONT FFC CABLE, MICOM IC

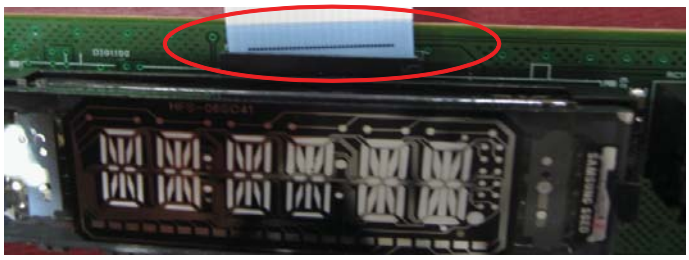
6-1-1. Solution

Check the Front FFC cable.
Check MICOM.
Check FLD power.

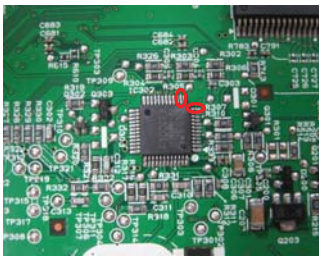
6-1-2. How to troubleshoot (Countermeasure)

1) Please check the FFC cable connection.
   If there is no problem, check the MICOM pin12, 13, 14.
   If there is no problem, check the FD+, FD-, Vkk power.

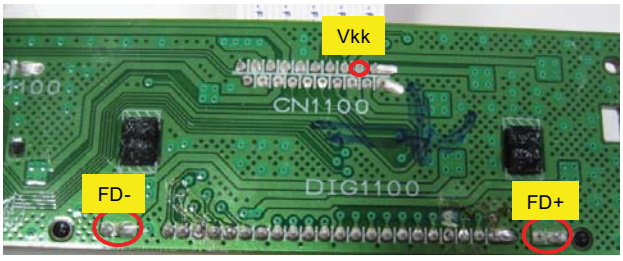
6-1-3. Service hint (Any picture / Remark)



< MAIN board top view >



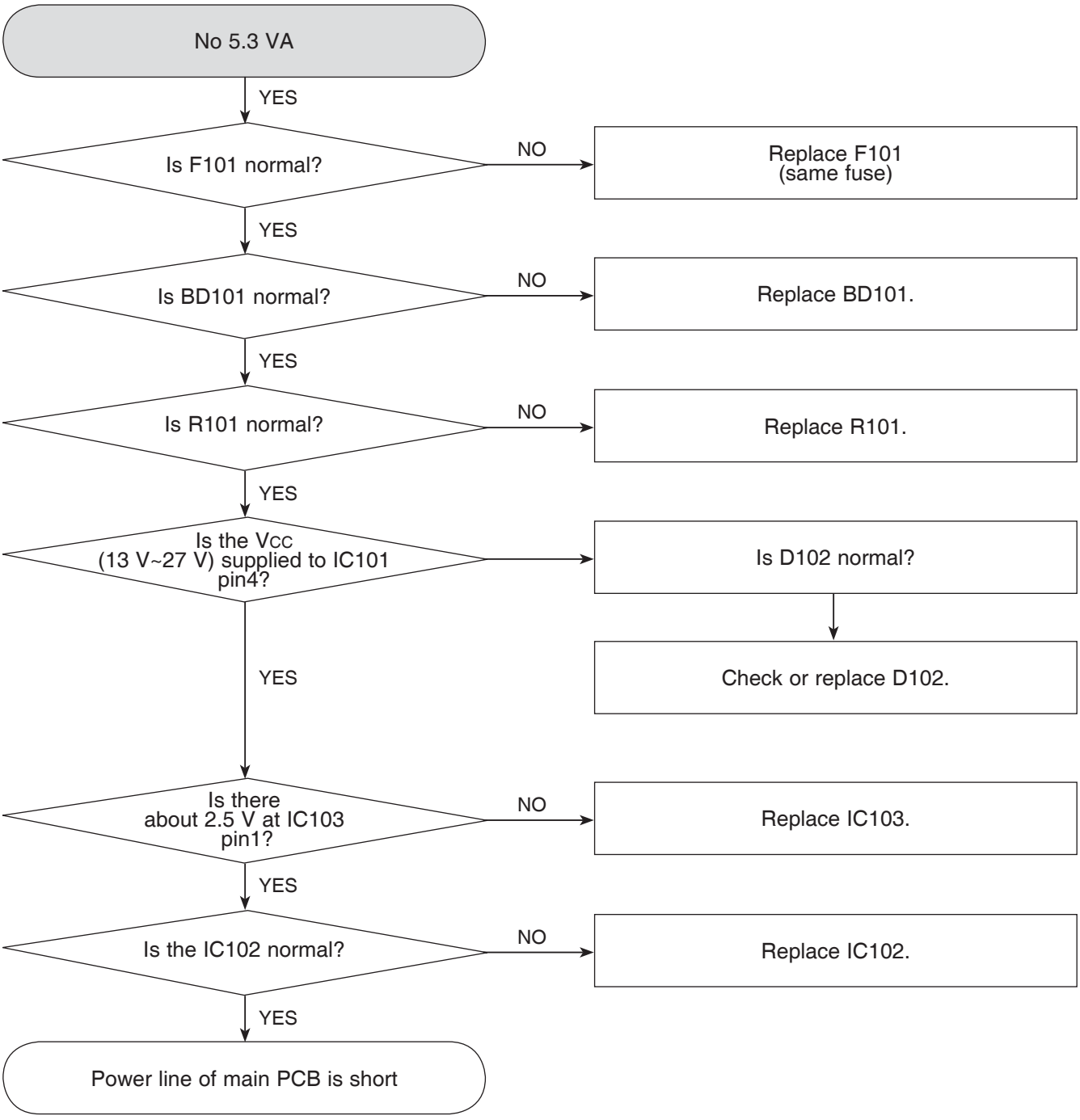
< MAIN board bottom view >



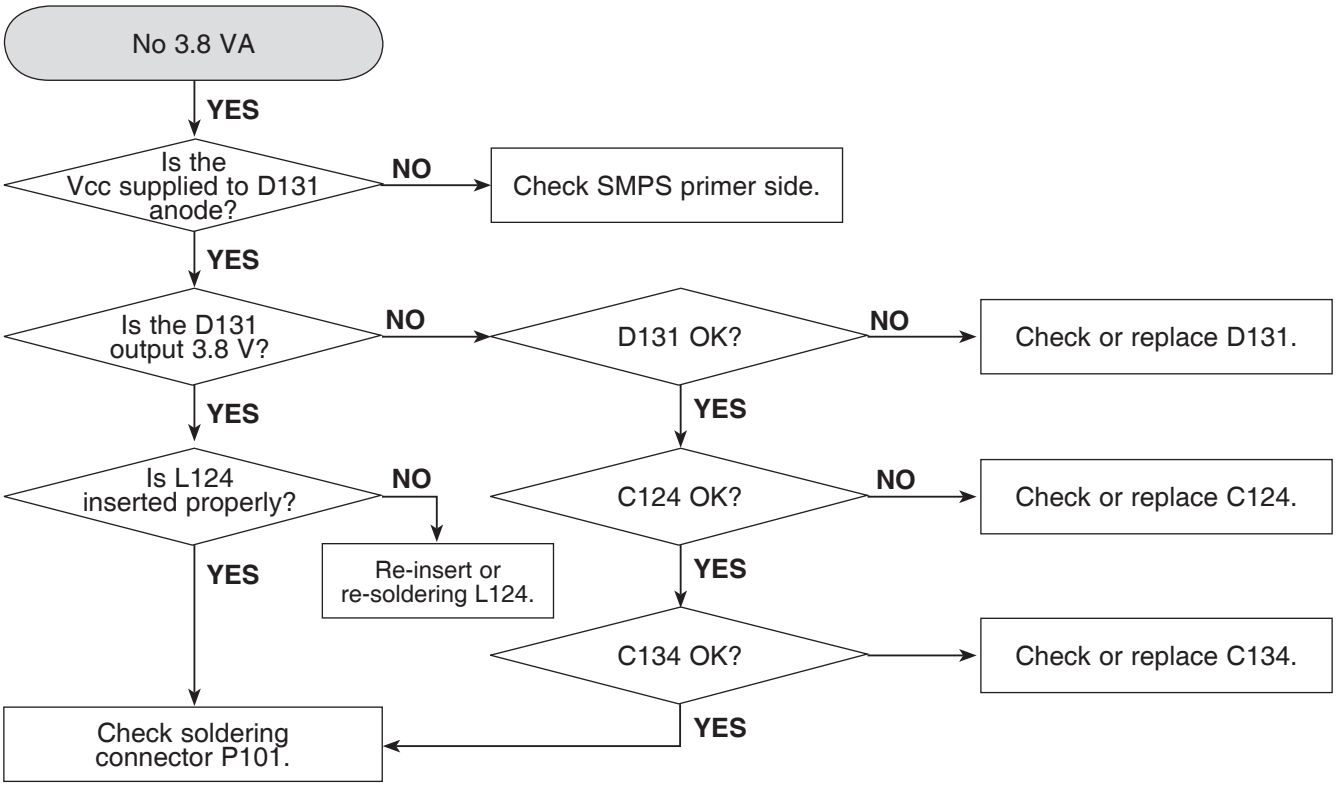
< MAIN board bottom view >

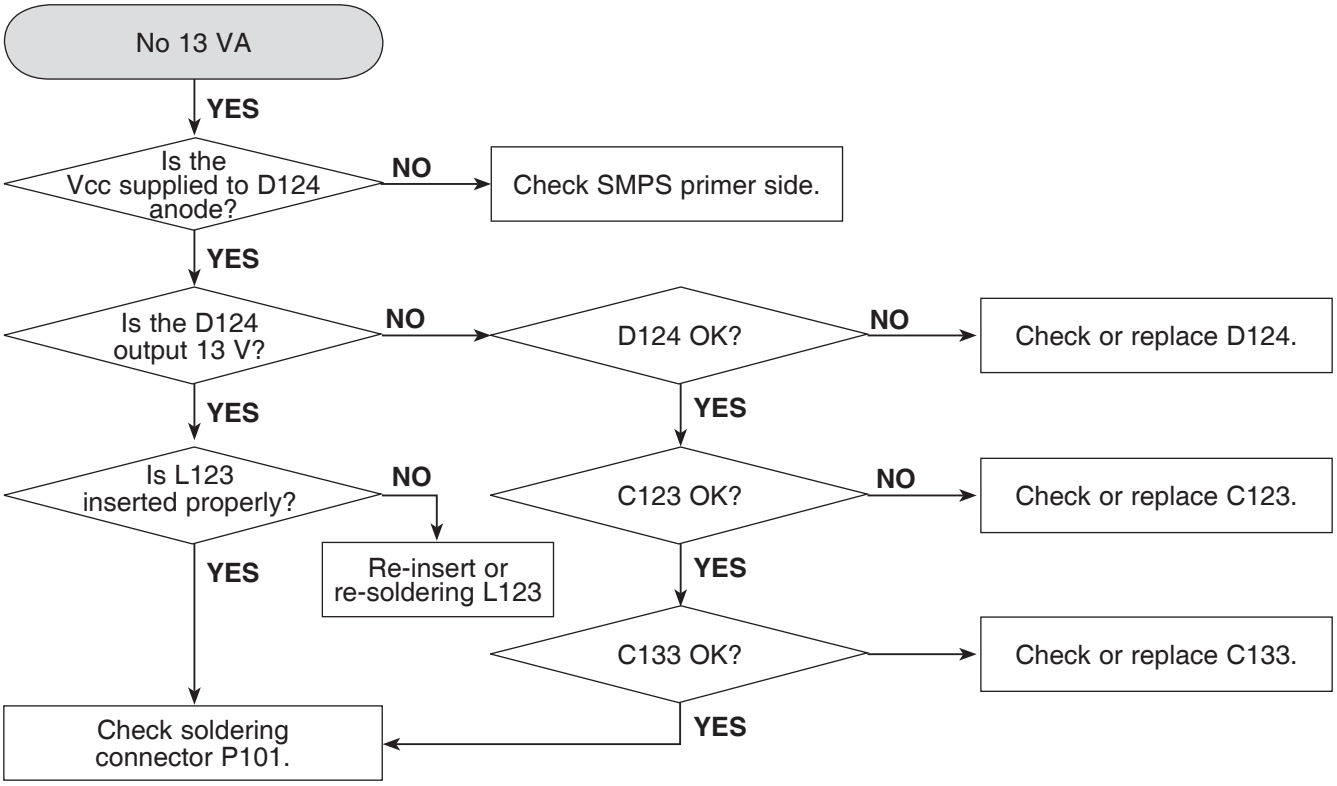
ELECTRICAL TROUBLESHOOTING GUIDE

1. POWER SUPPLY ON SMPS BOARD

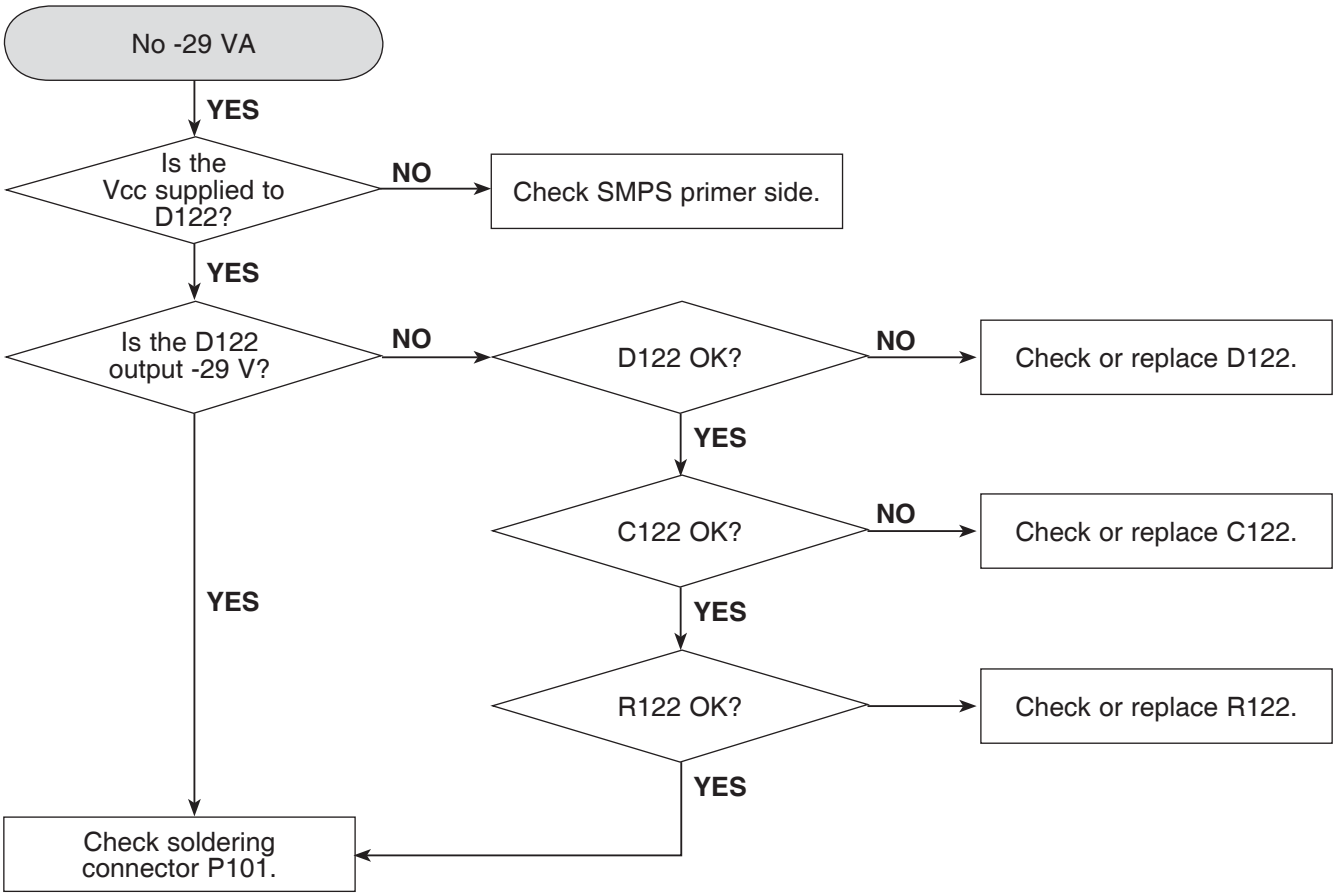


ELECTRICAL TROUBLESHOOTING GUIDE

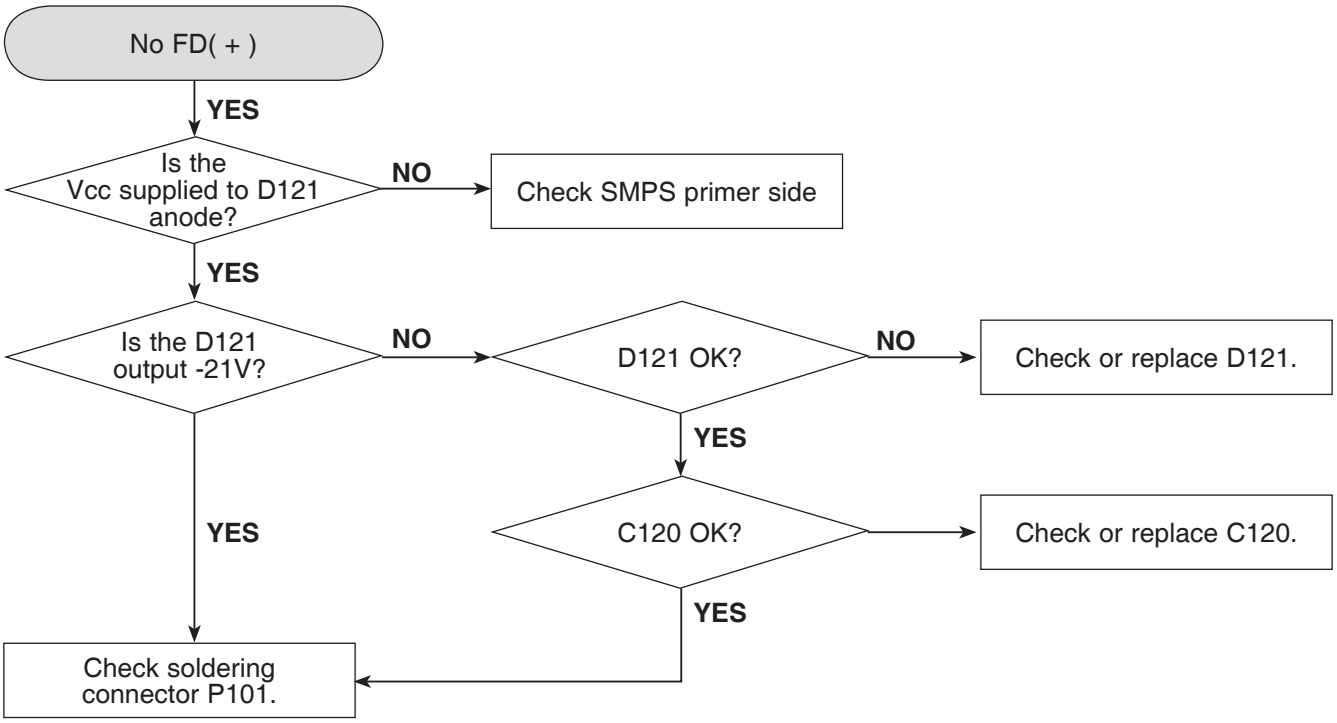


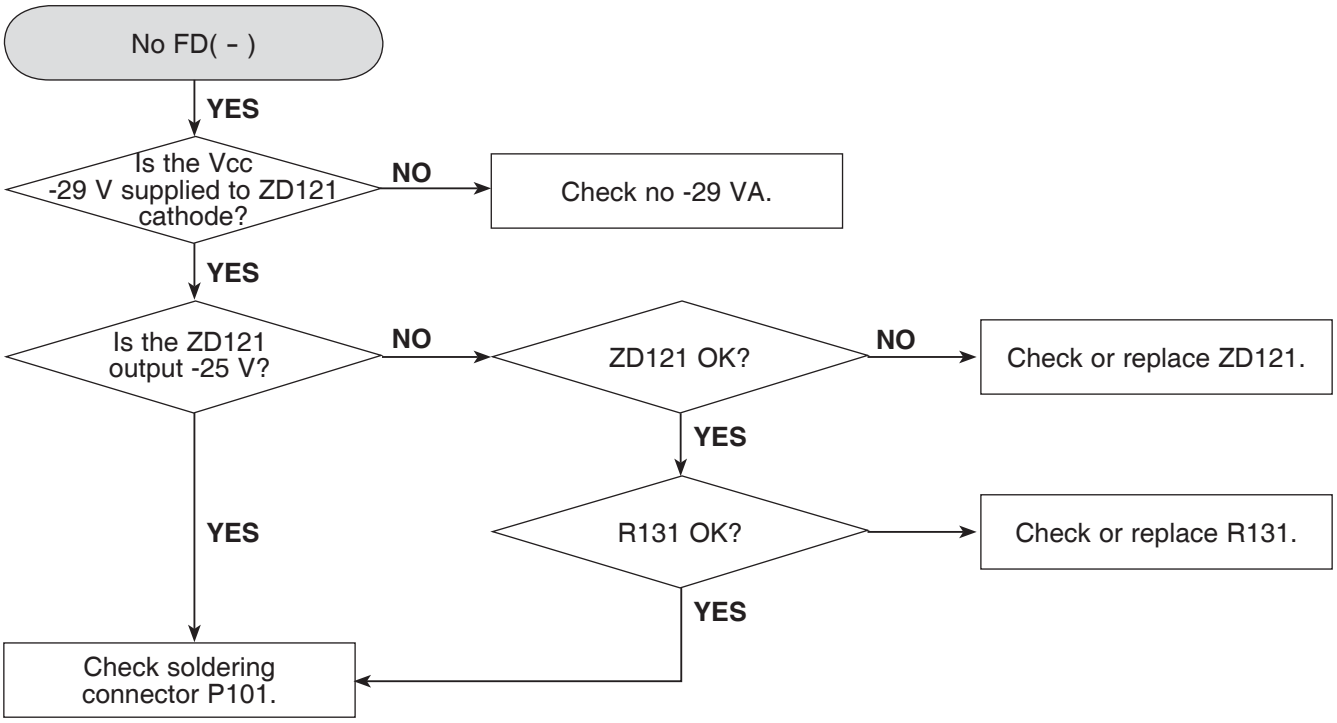


ELECTRICAL TROUBLESHOOTING GUIDE



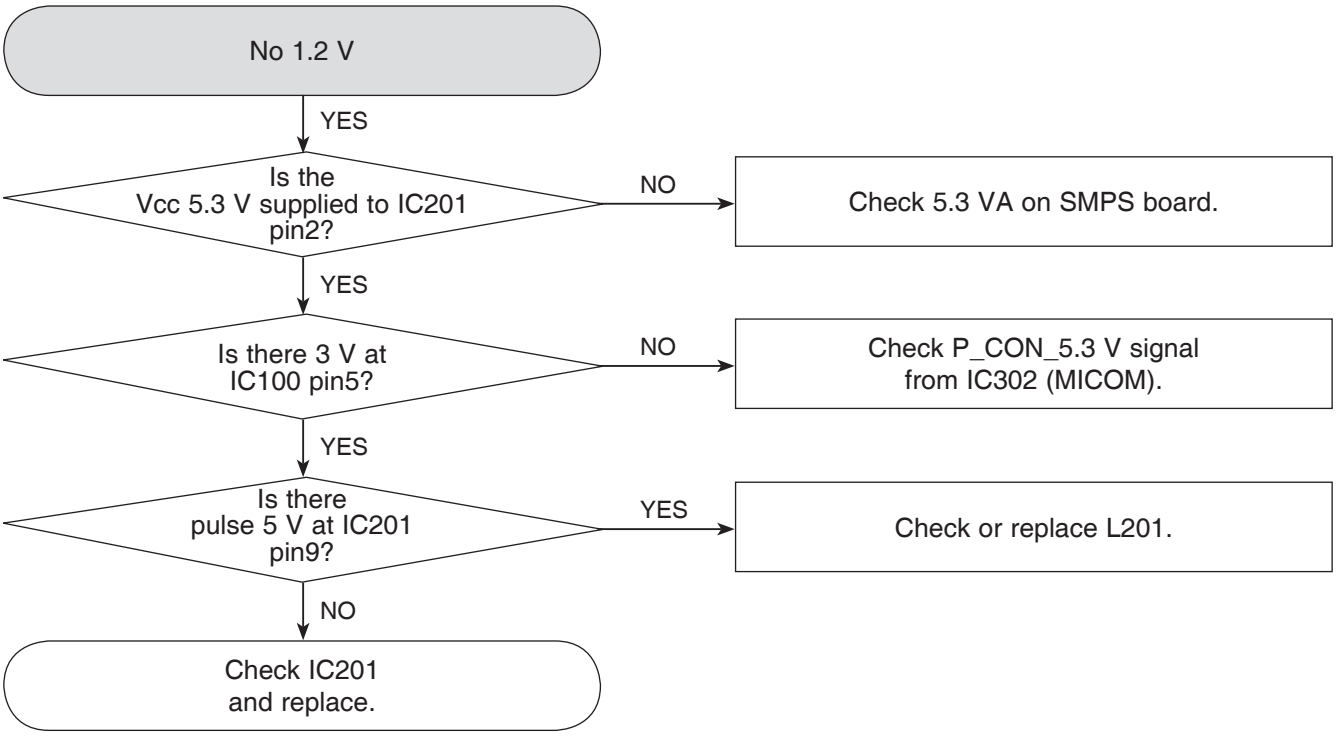
ELECTRICAL TROUBLESHOOTING GUIDE

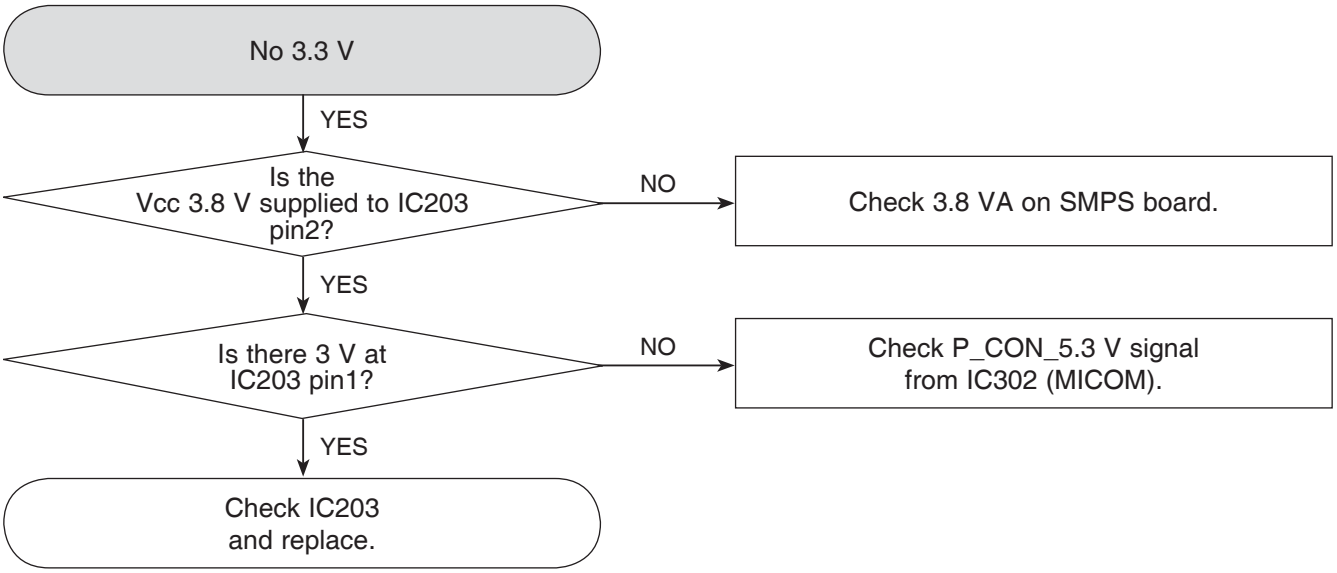




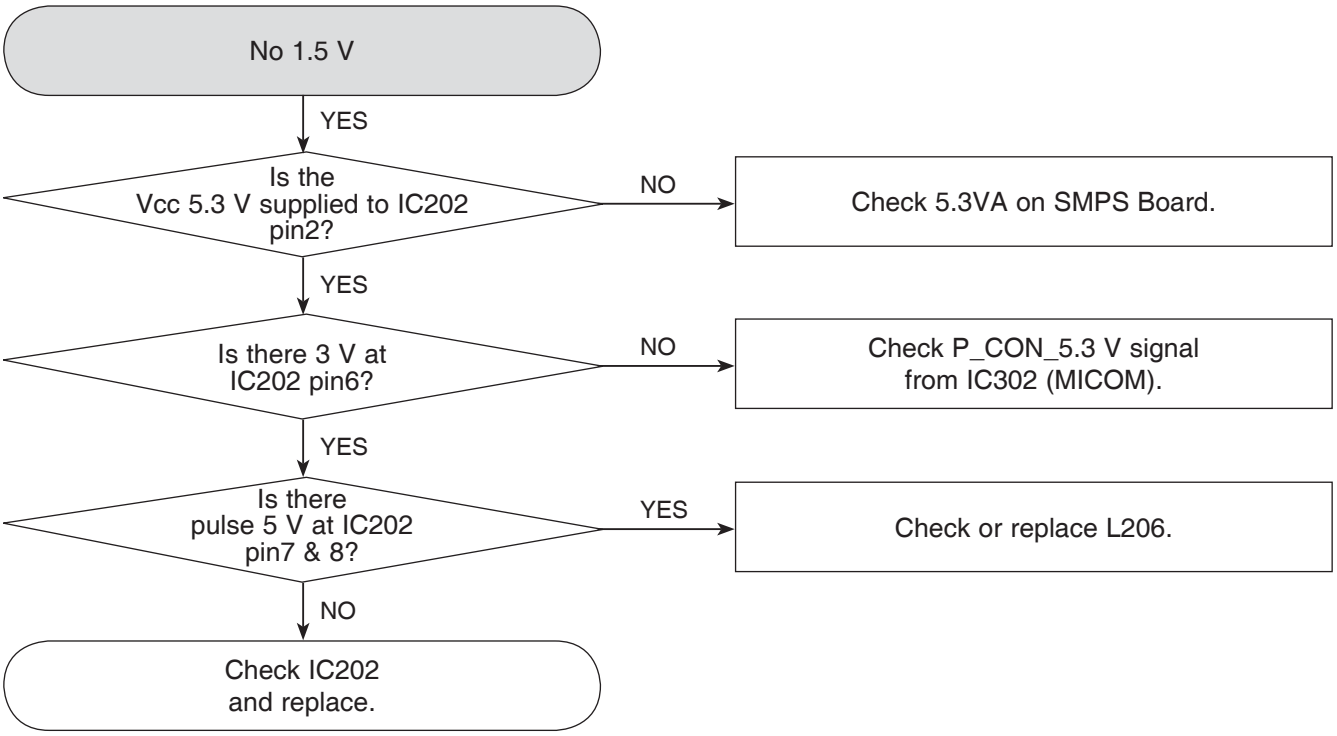
ELECTRICAL TROUBLESHOOTING GUIDE

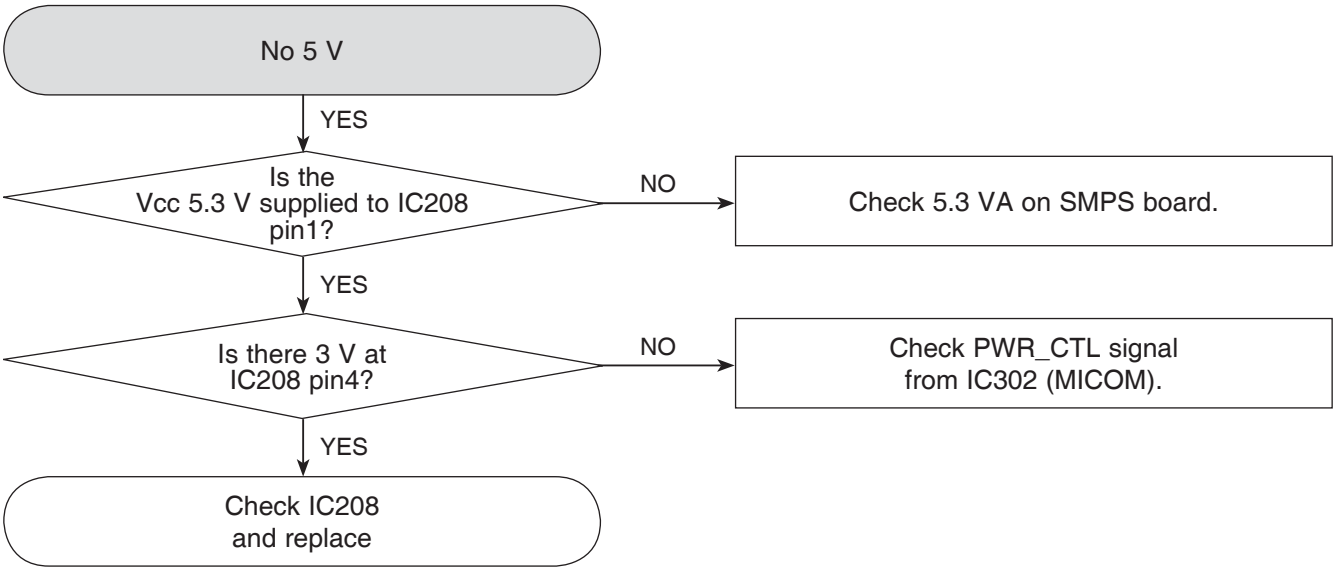
2. POWER SUPPLY ON MAIN BOARD



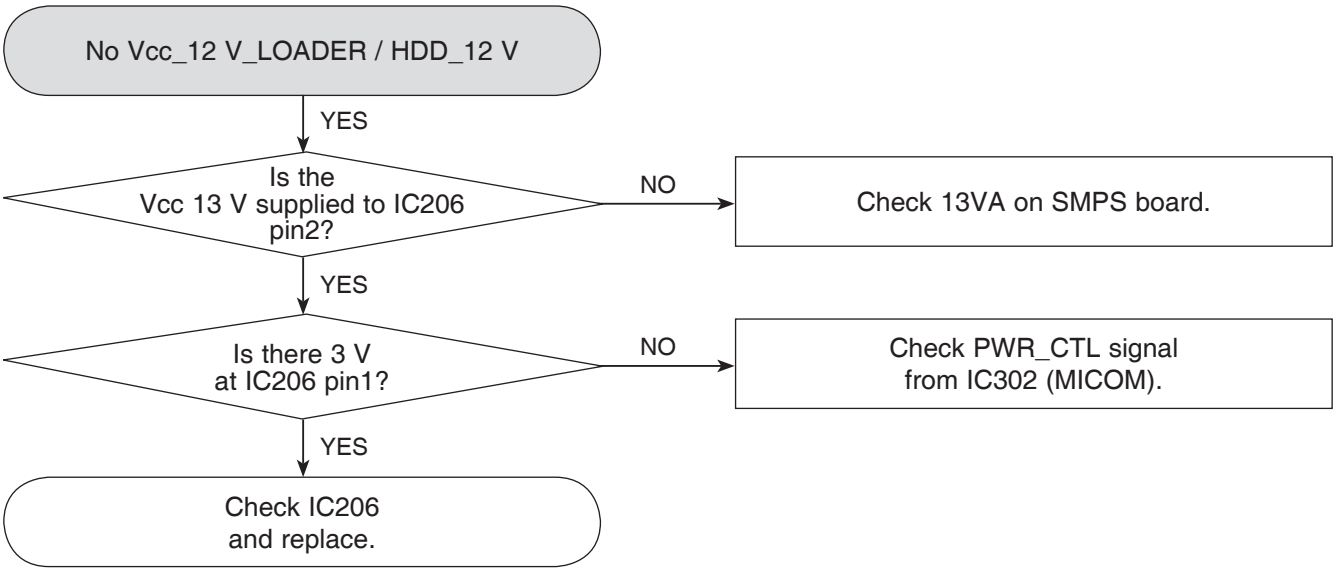


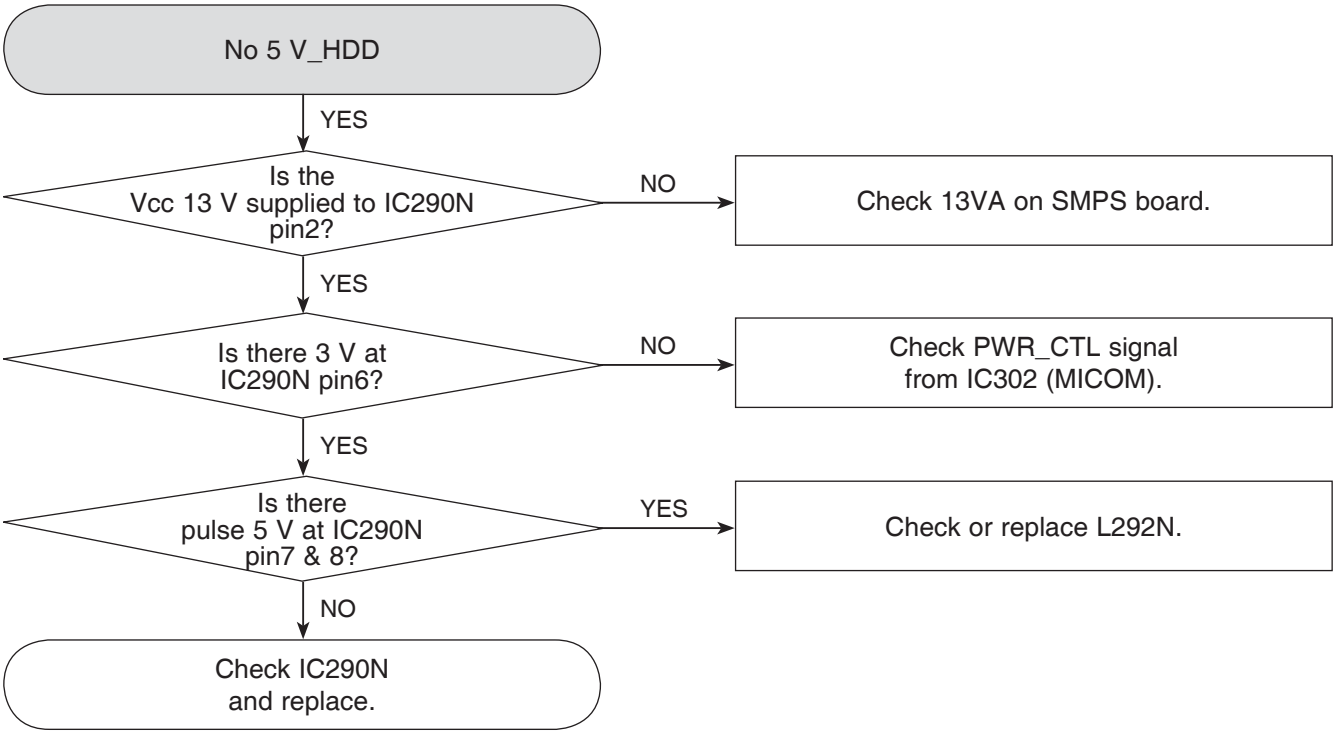
ELECTRICAL TROUBLESHOOTING GUIDE



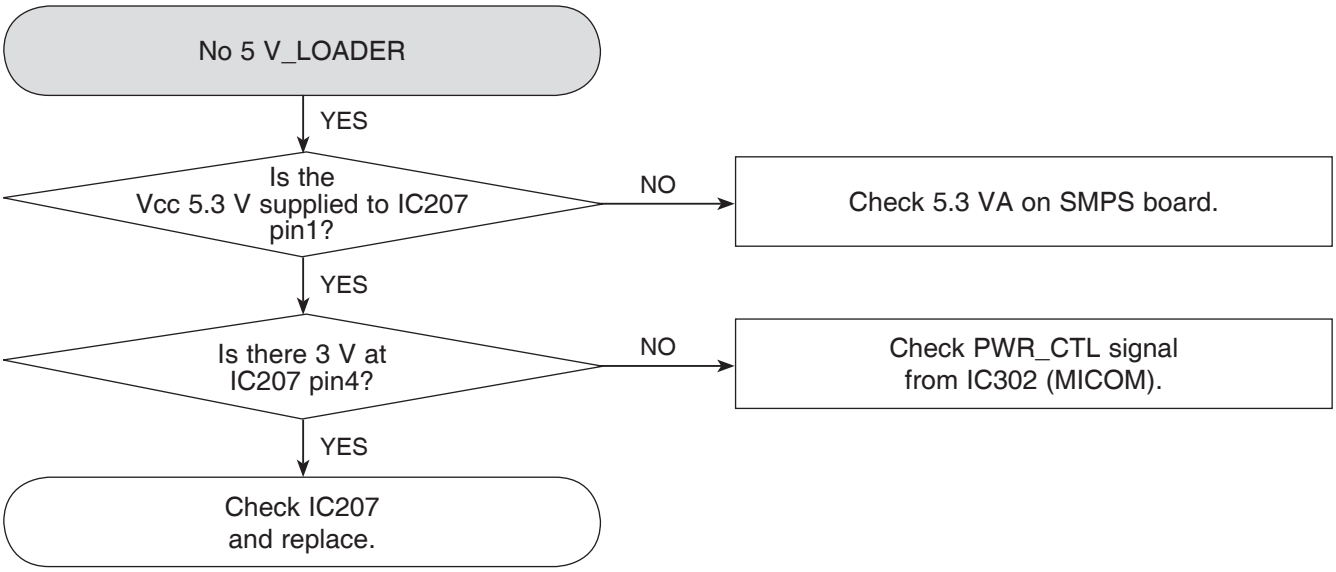


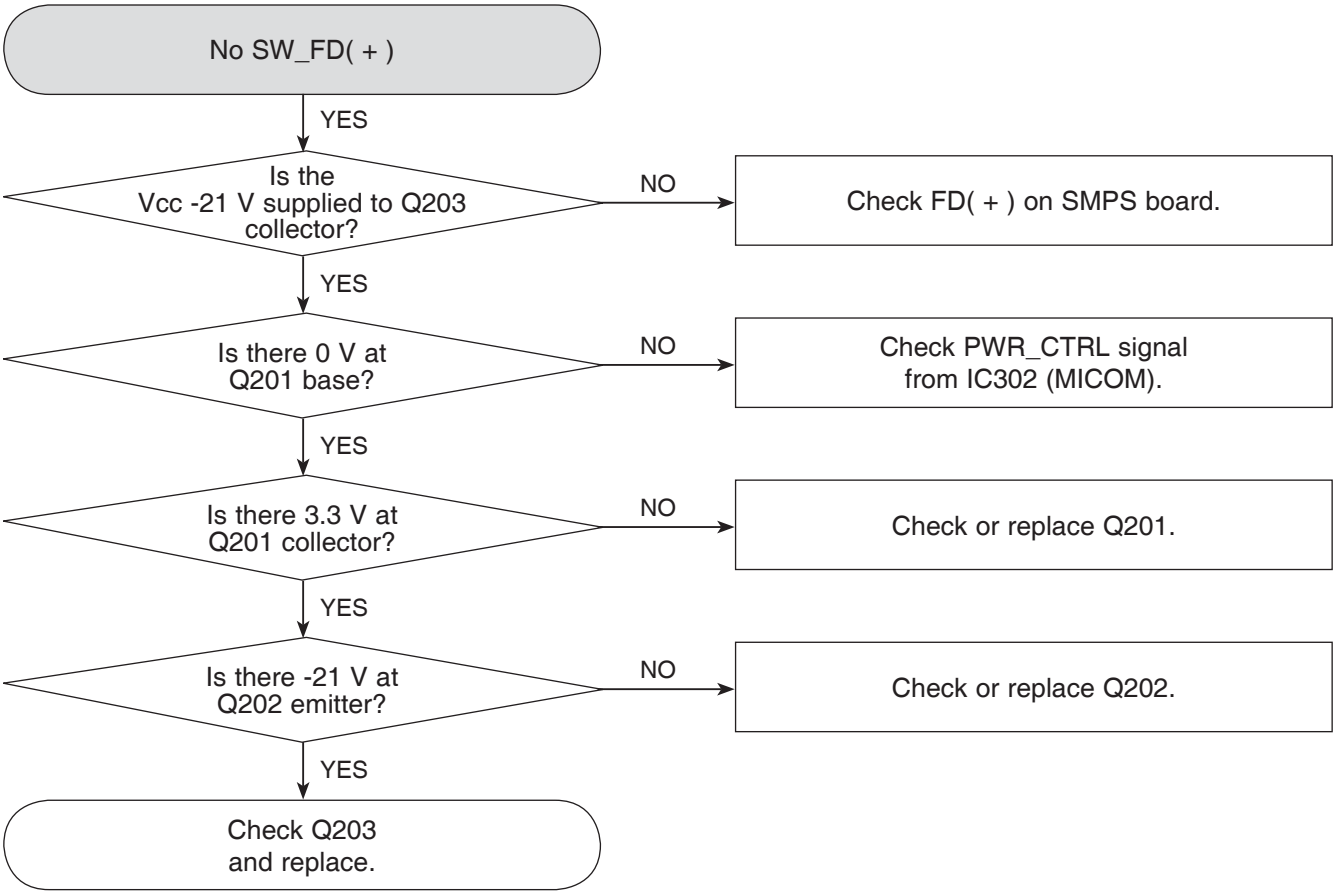
ELECTRICAL TROUBLESHOOTING GUIDE





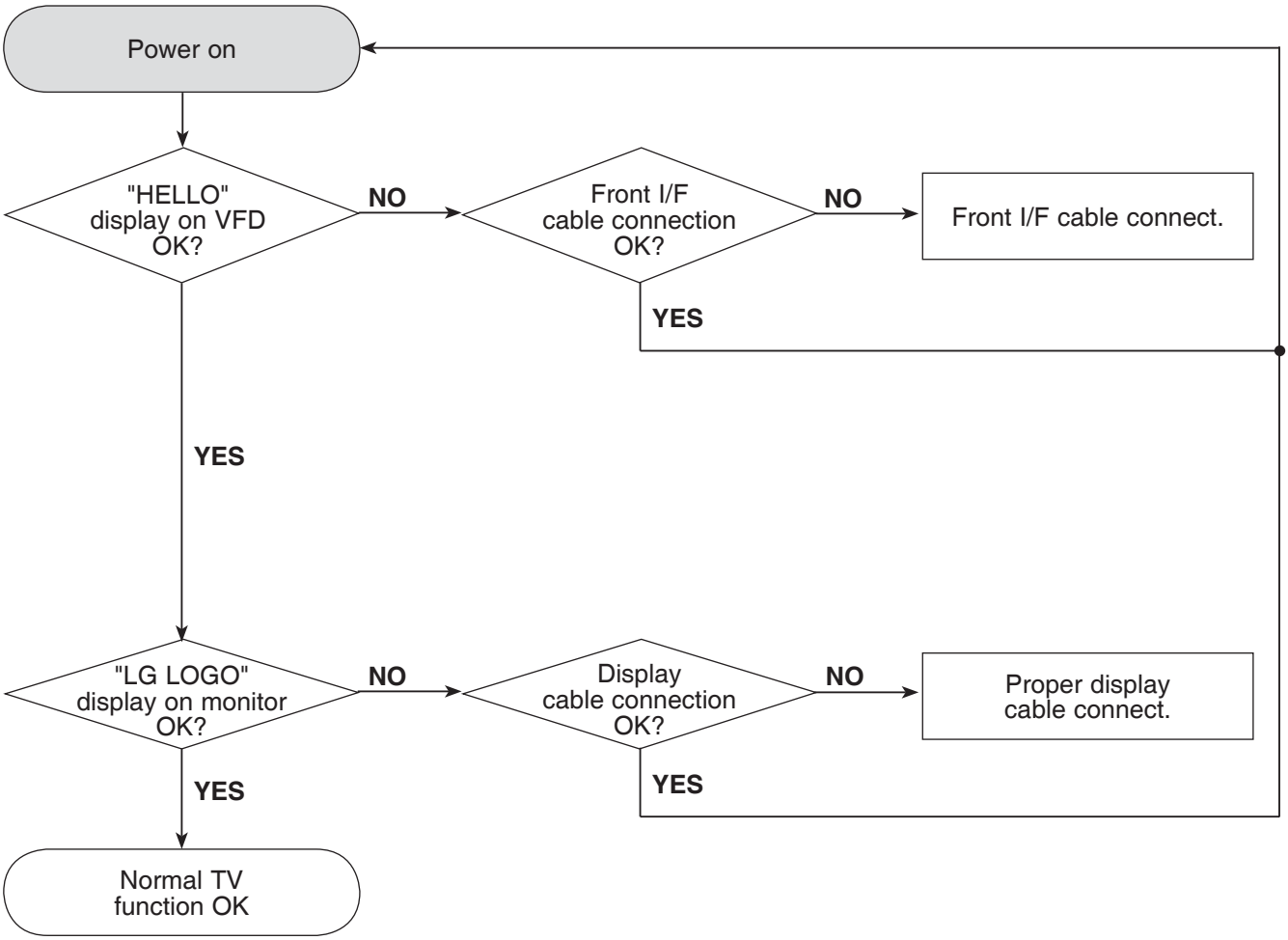
ELECTRICAL TROUBLESHOOTING GUIDE





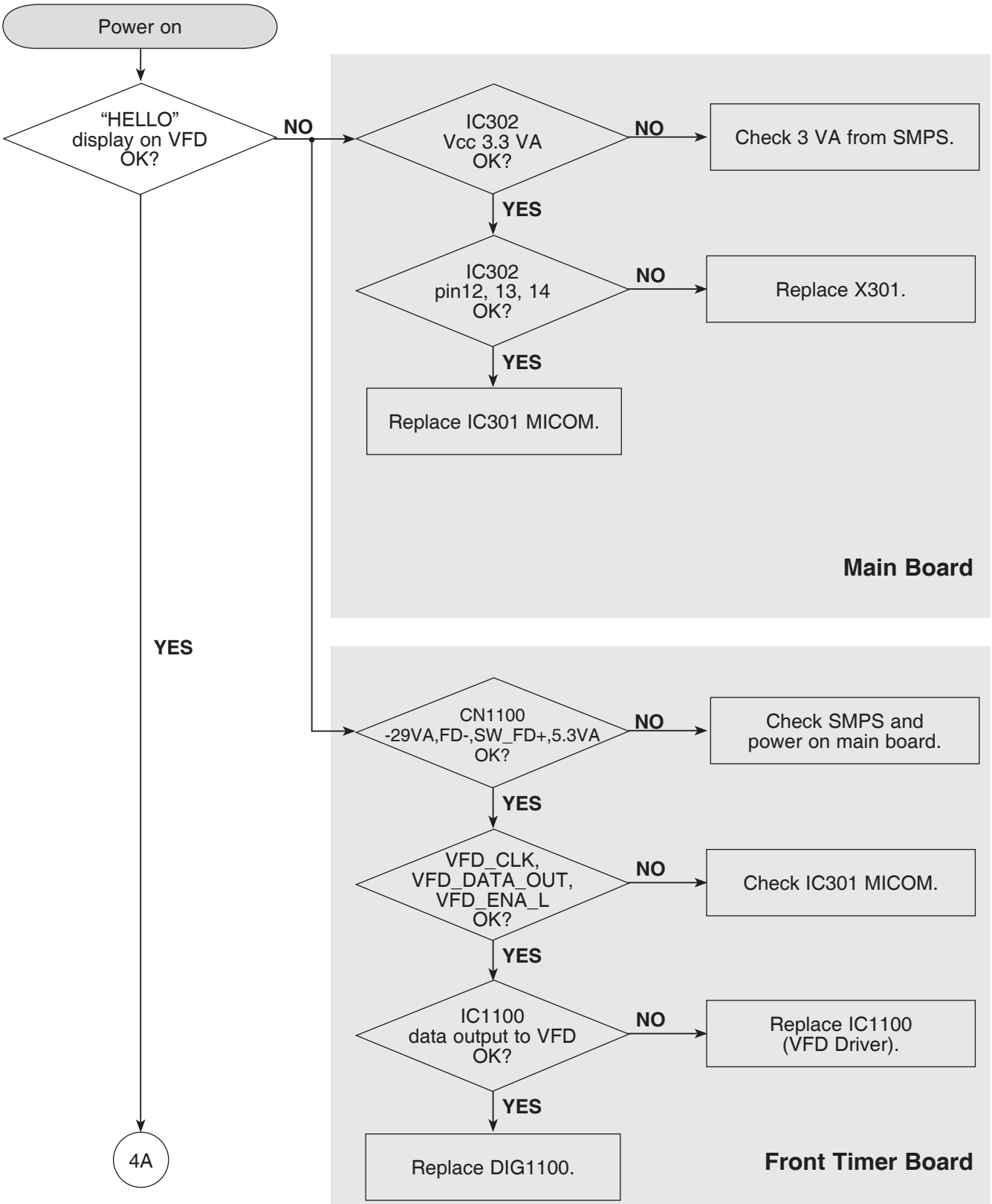
ELECTRICAL TROUBLESHOOTING GUIDE

3. POWER ON

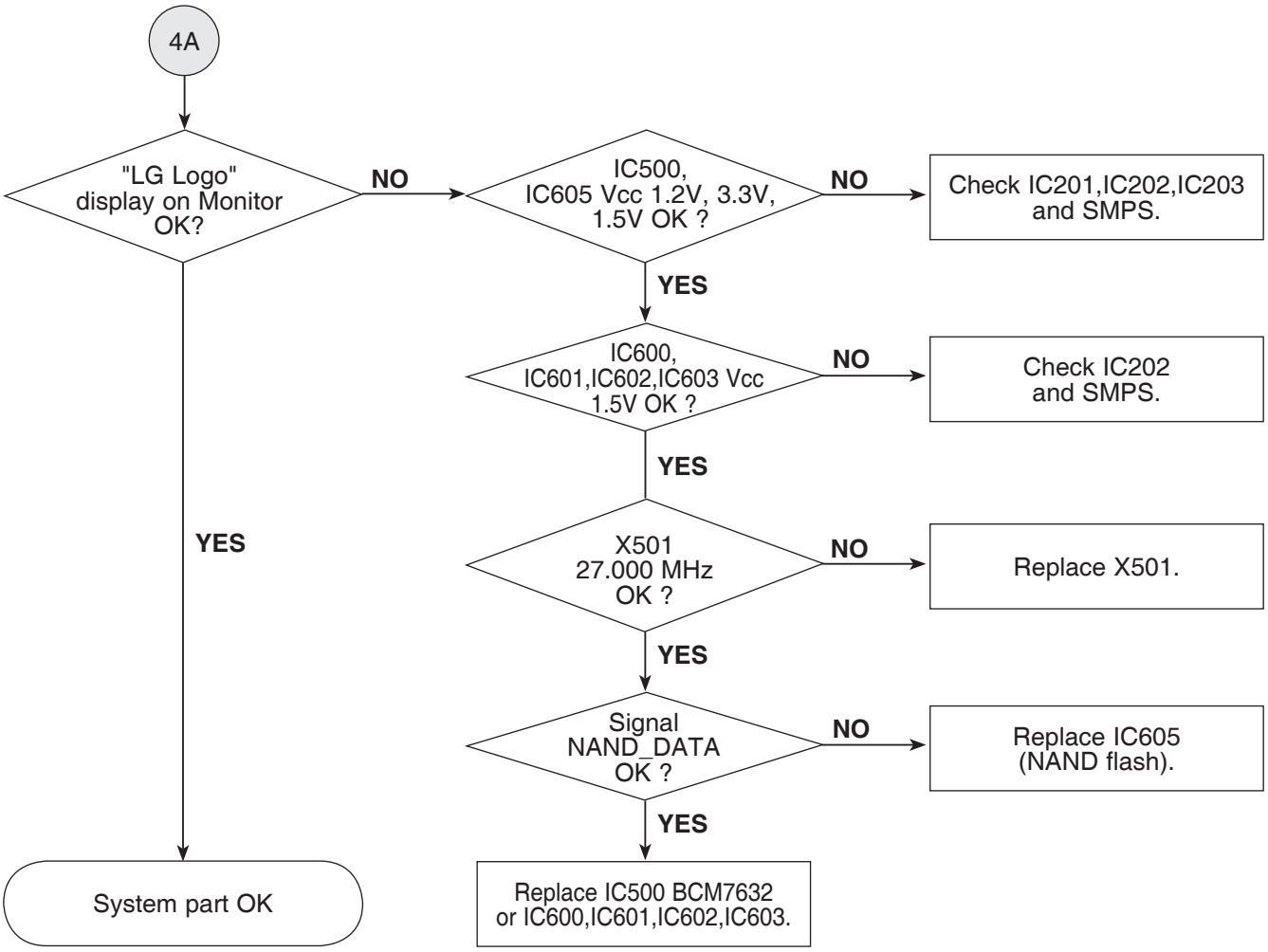


ELECTRICAL TROUBLESHOOTING GUIDE

4. SYSTEM PART

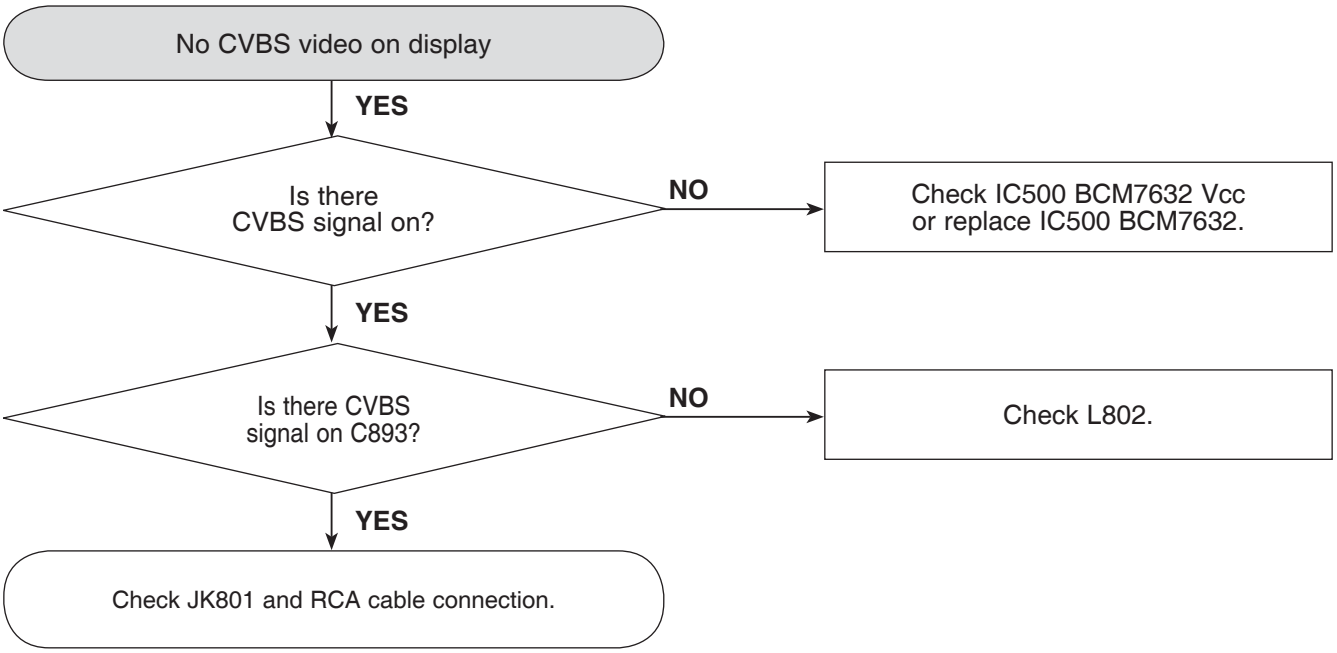


ELECTRICAL TROUBLESHOOTING GUIDE



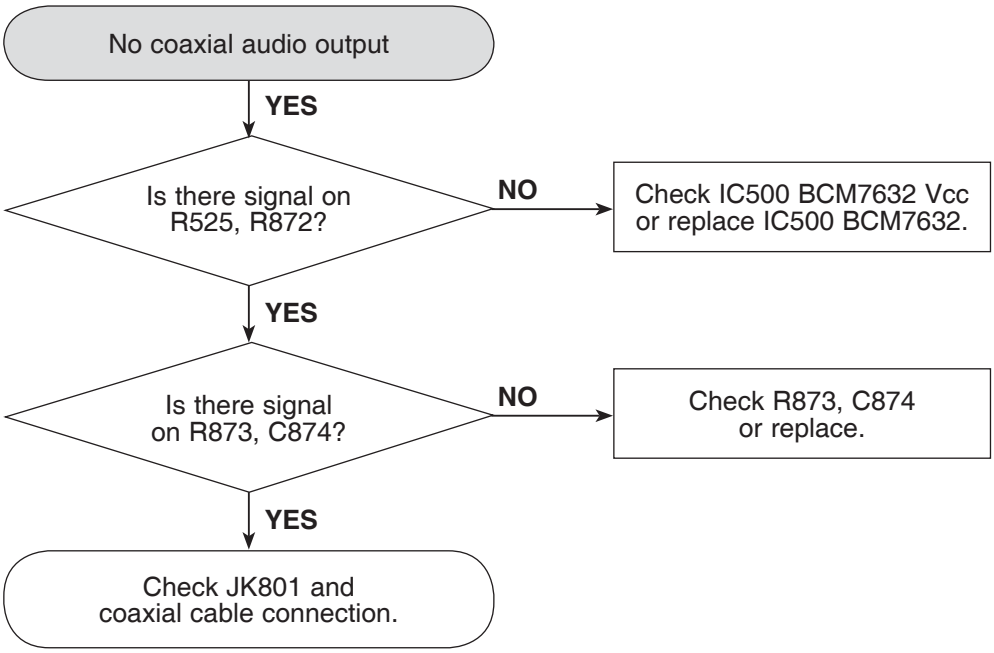
ELECTRICAL TROUBLESHOOTING GUIDE

5. NO CVBS VIDEO OUTPUT WHEN PLAY DISC



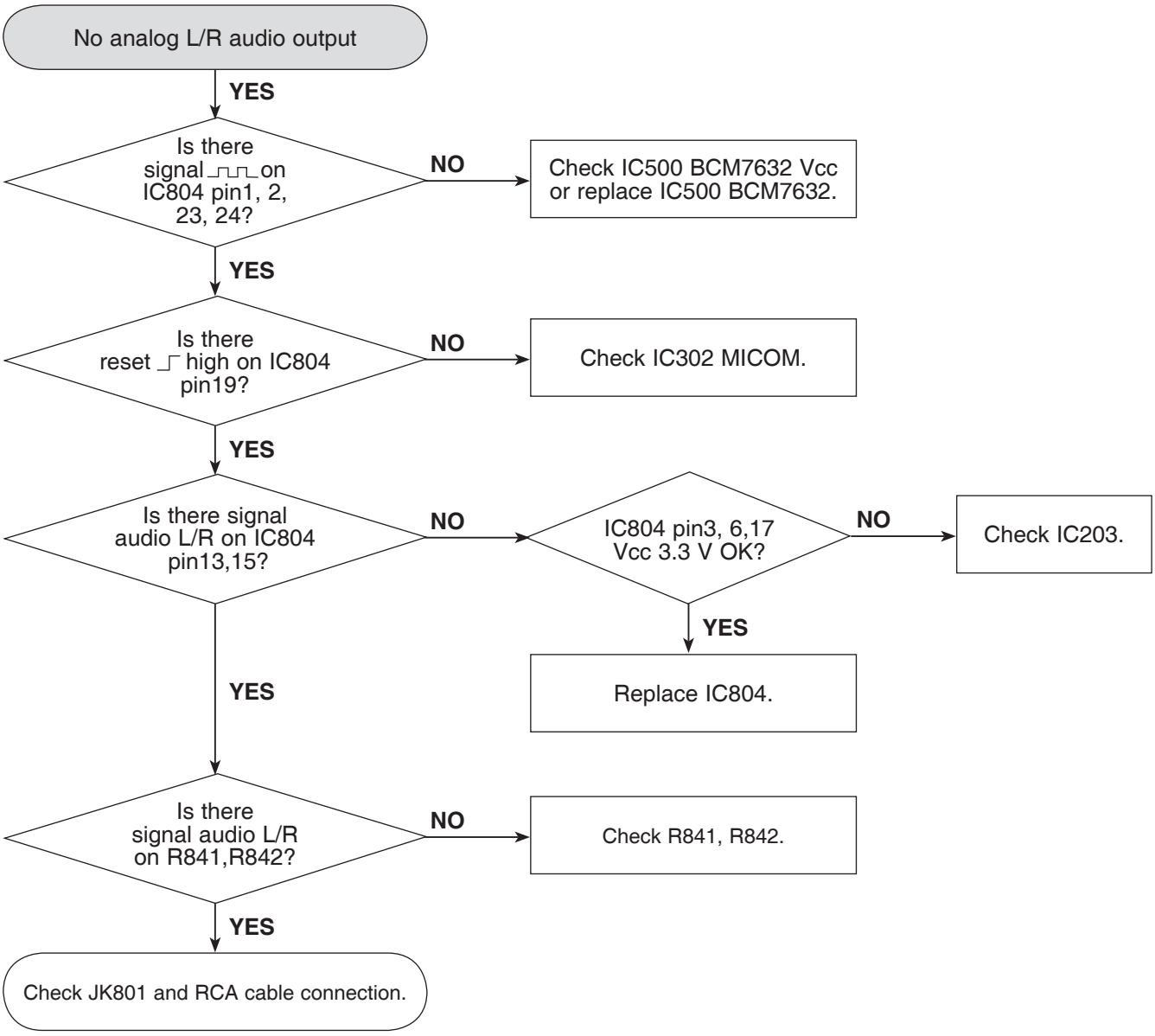
ELECTRICAL TROUBLESHOOTING GUIDE

6. NO COAXIAL OUTPUT WHEN PLAY DISC



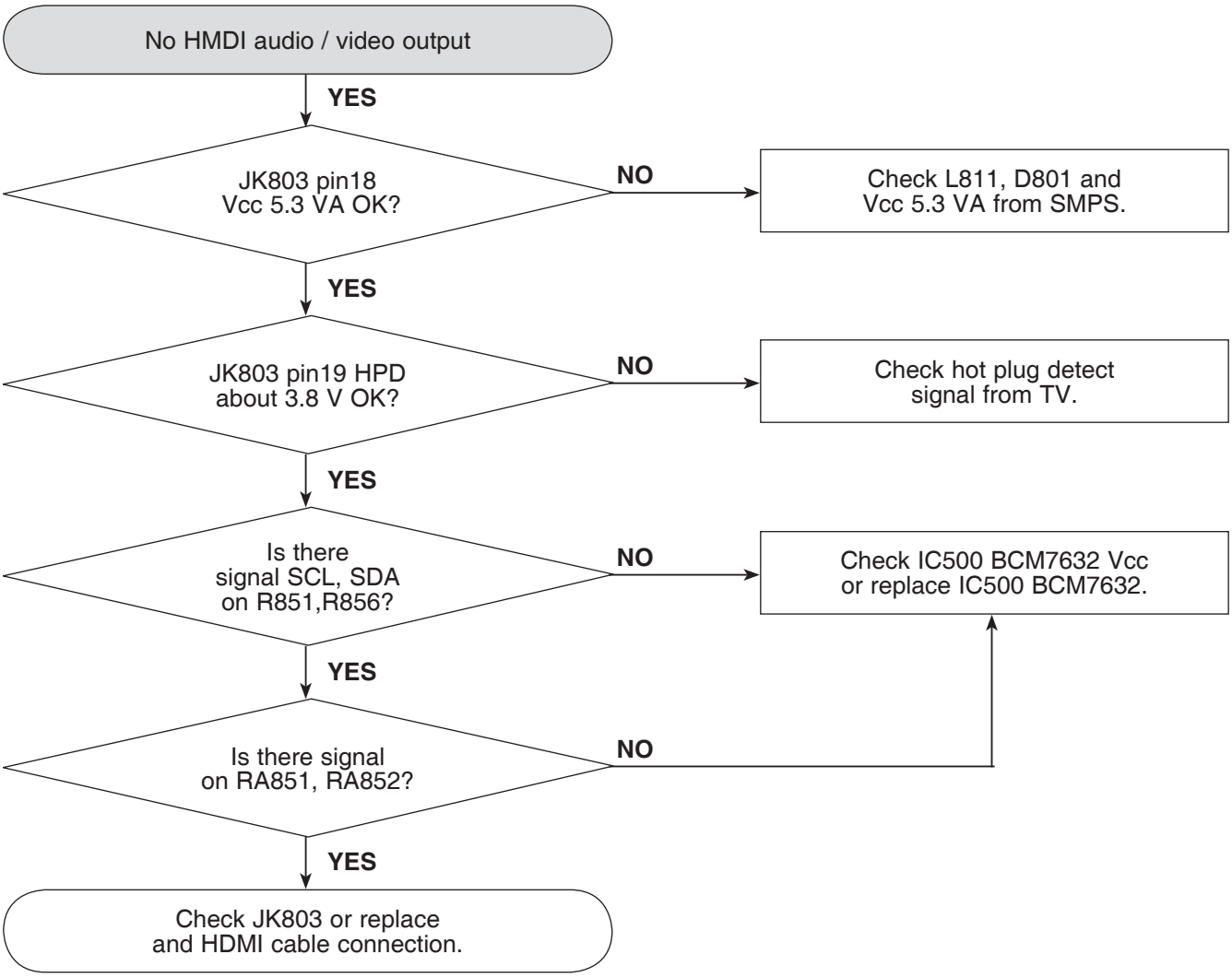
ELECTRICAL TROUBLESHOOTING GUIDE

7. NO ANALOG AUDIO L/R OUTPUT WHEN PLAY DISC



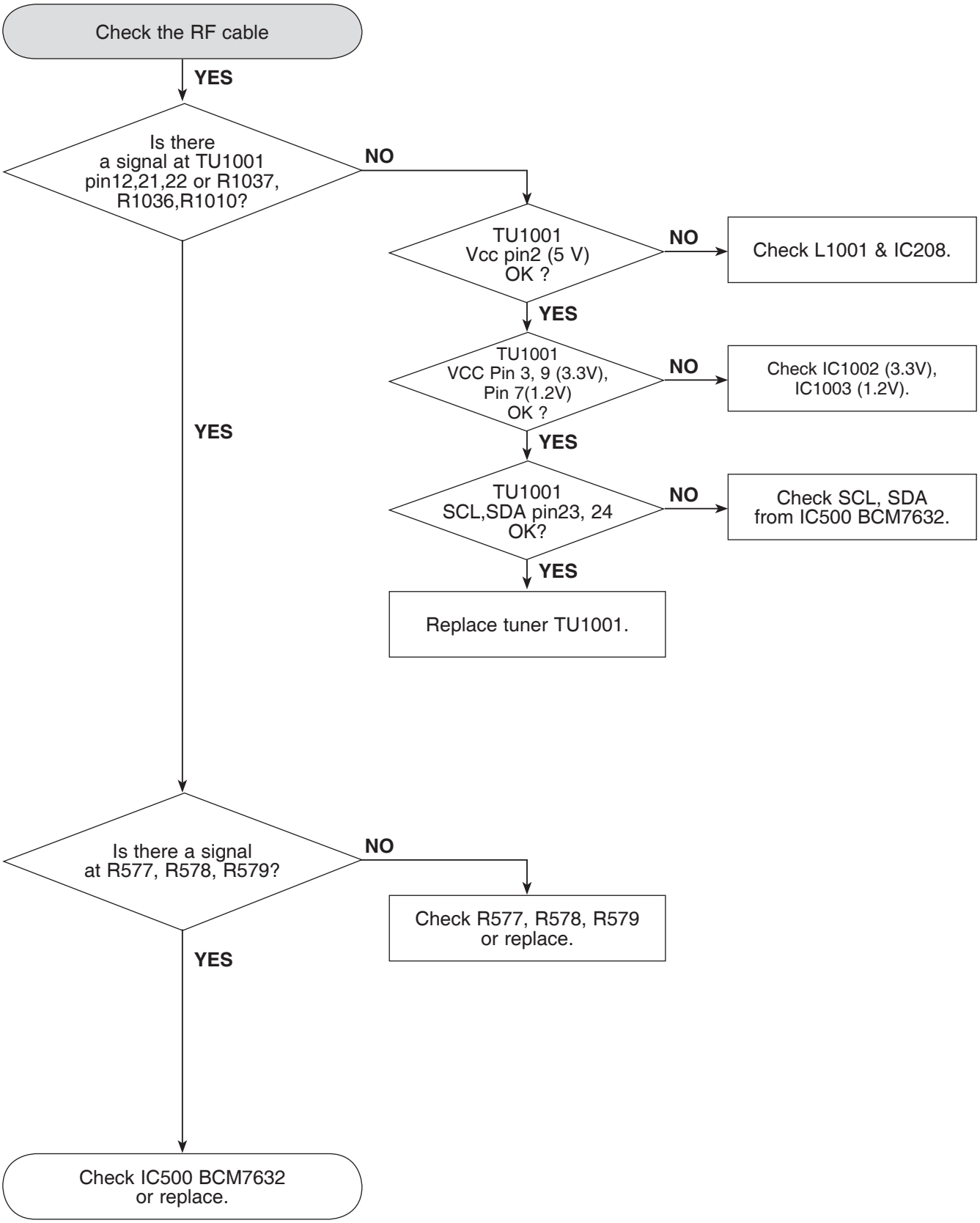
ELECTRICAL TROUBLESHOOTING GUIDE

8. NO HDMI OUTPUT WHEN PLAY DISC



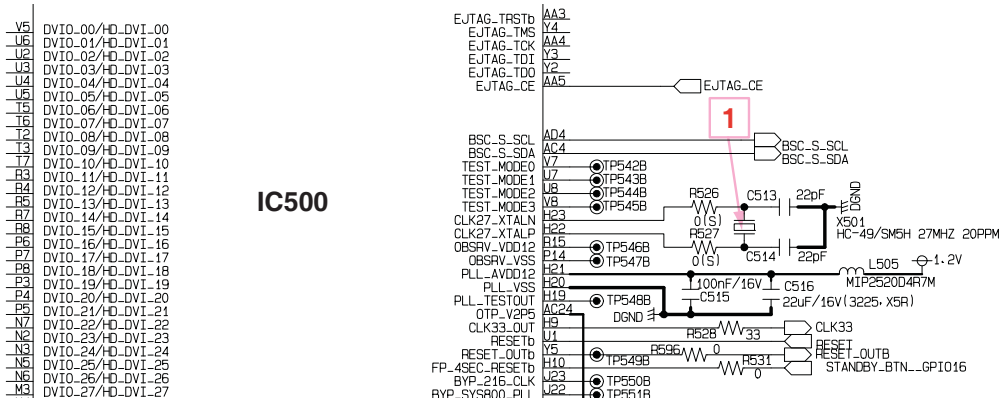
ELECTRICAL TROUBLESHOOTING GUIDE

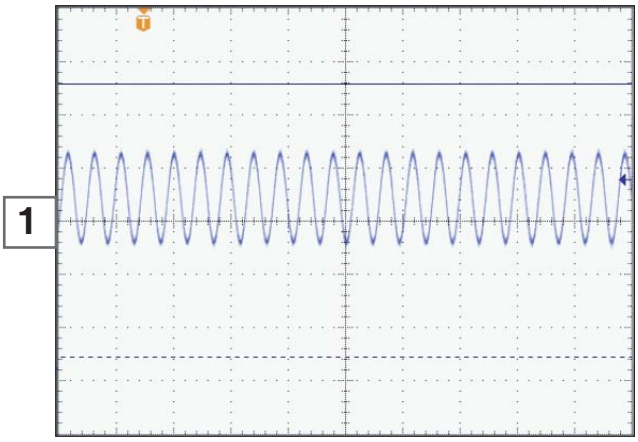
9. NO DVB-T TUNER OUTPUT



WAVEFORMS

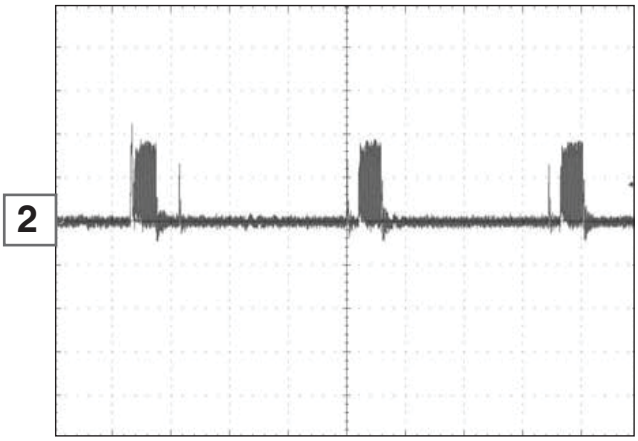
1. SYSTEM PART



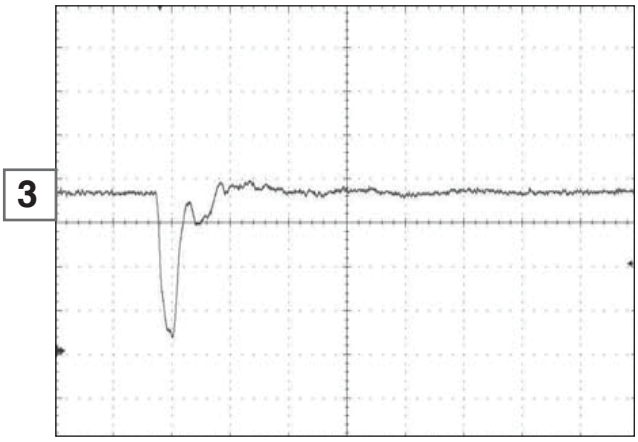


IC500 BCM7632 XTAL 27 MHz

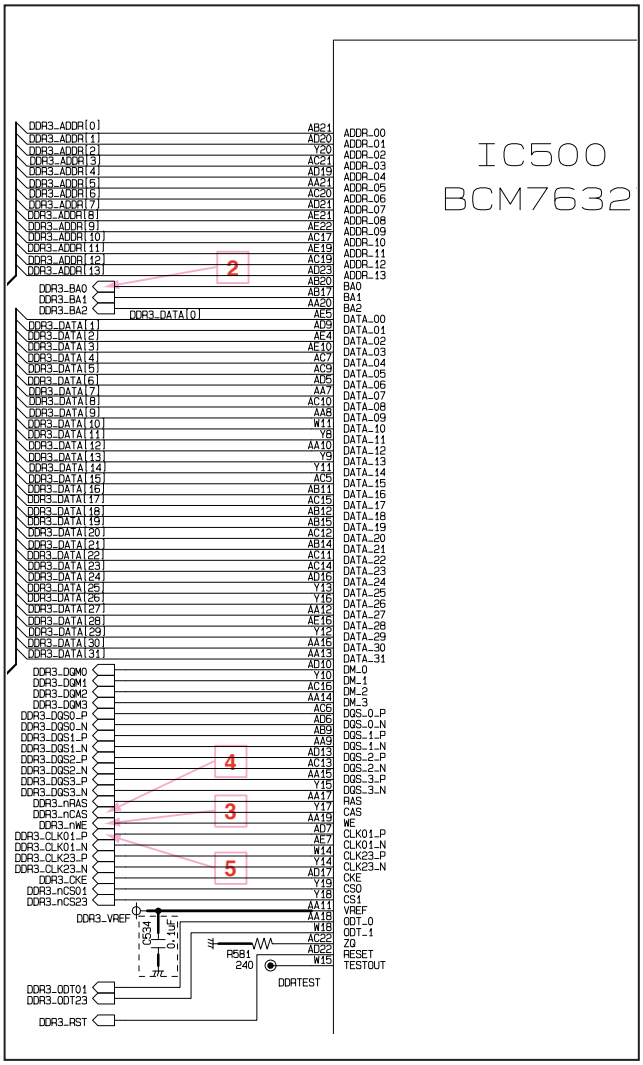
2. SYSTEM PART - MEMORY

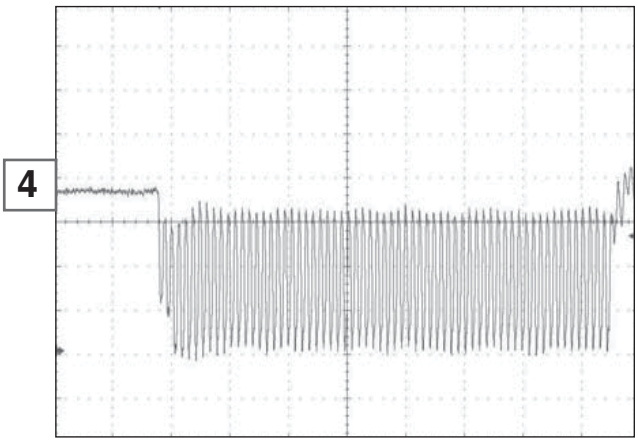


IC500 BCM7632 DDR3_BA0

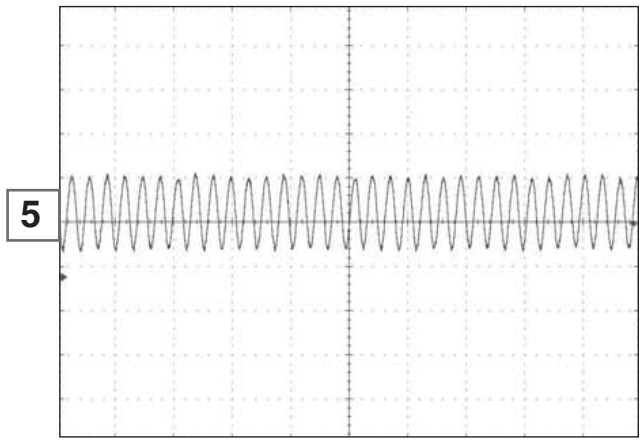


IC500 BCM7632 DDR3_nWE



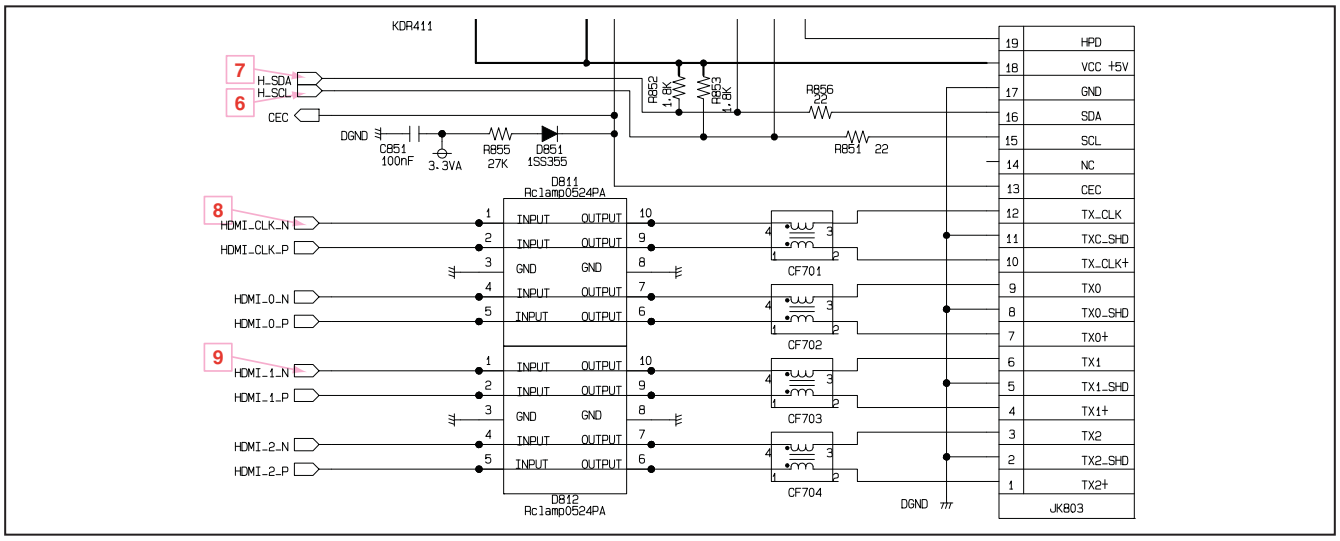


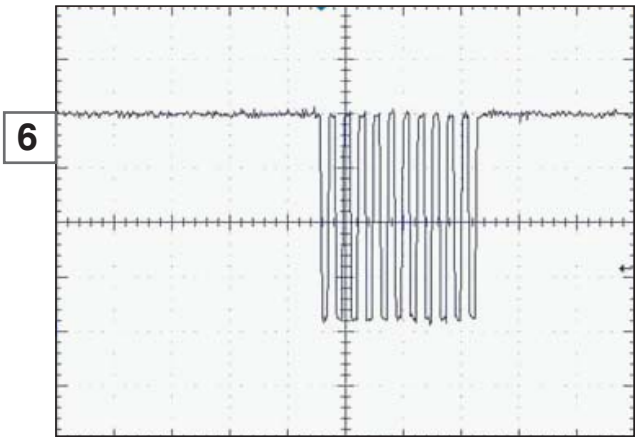
IC500 BCM7632 DDR3_nCAS



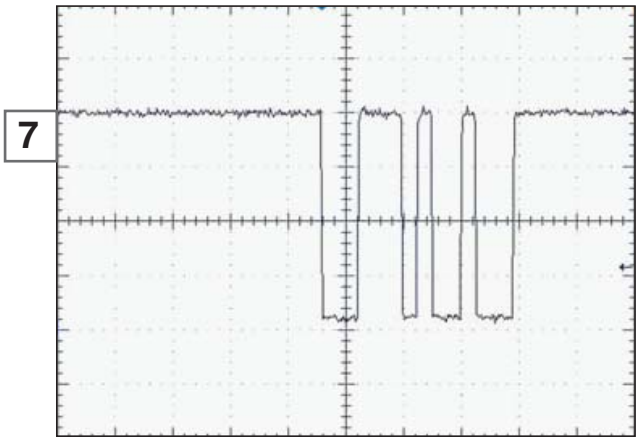
IC500 BCM7632 DDR3_CLK01

3. HDMI PART

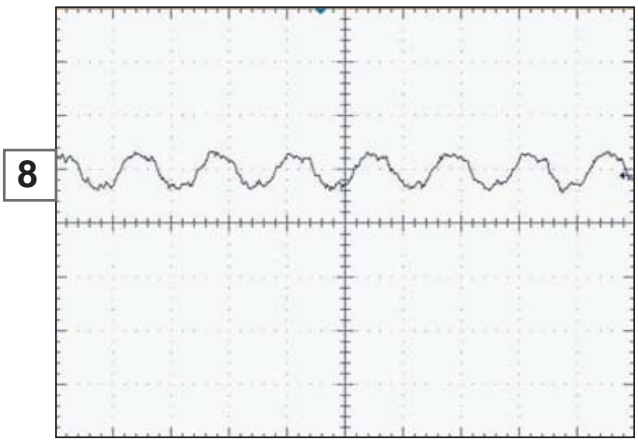




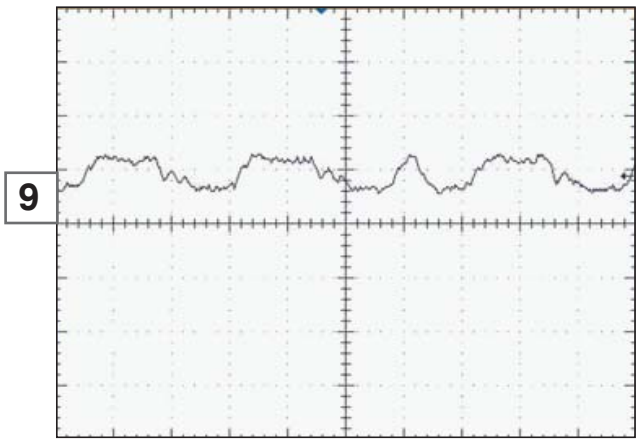
H_SCL



H_SDA

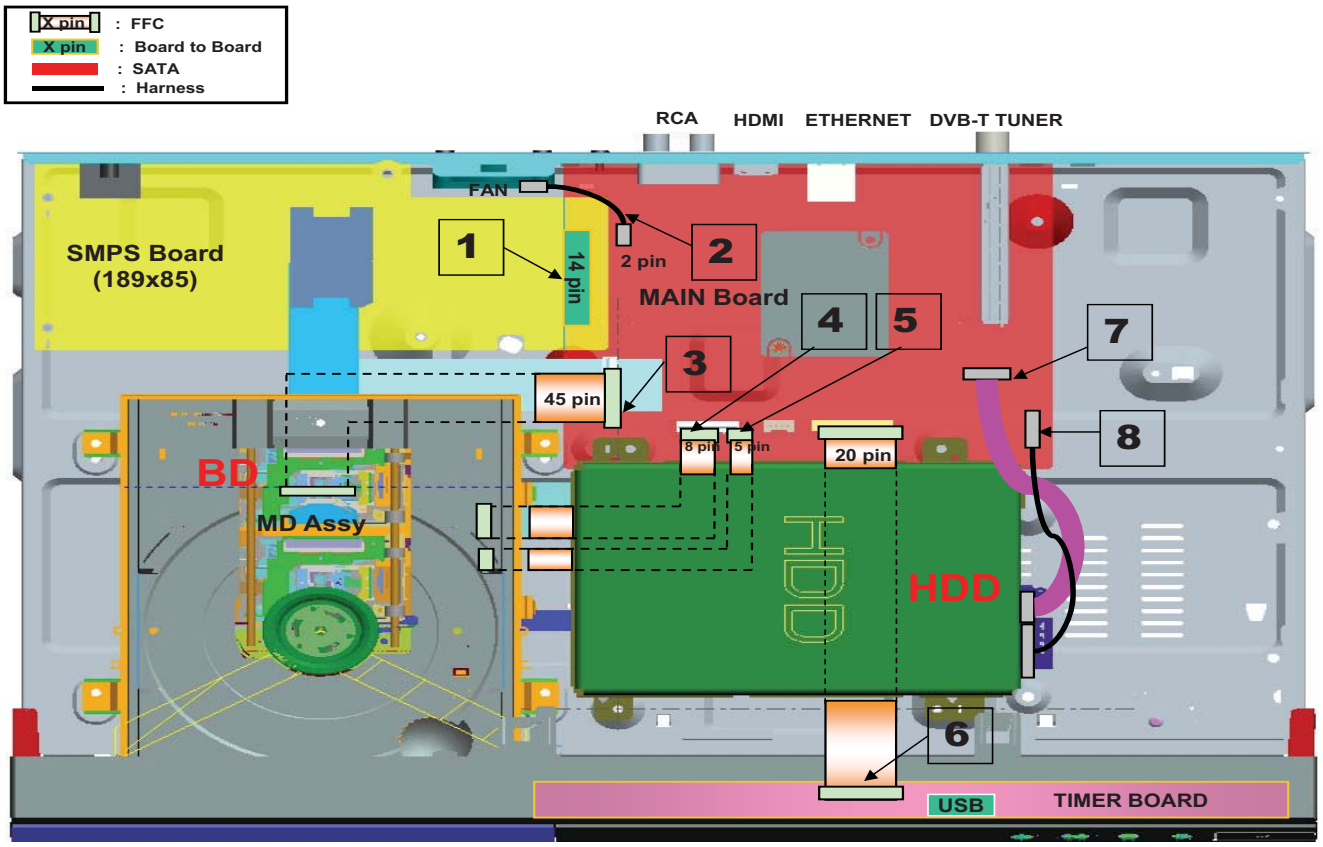


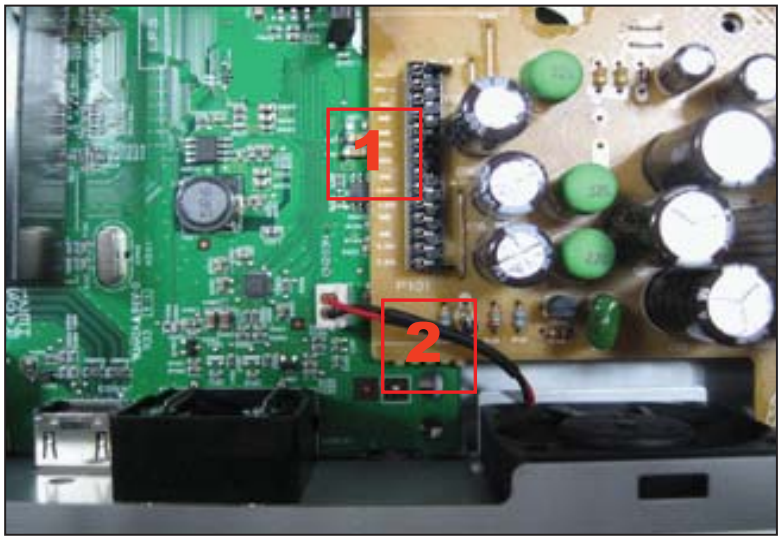
HDMI_CLK_n



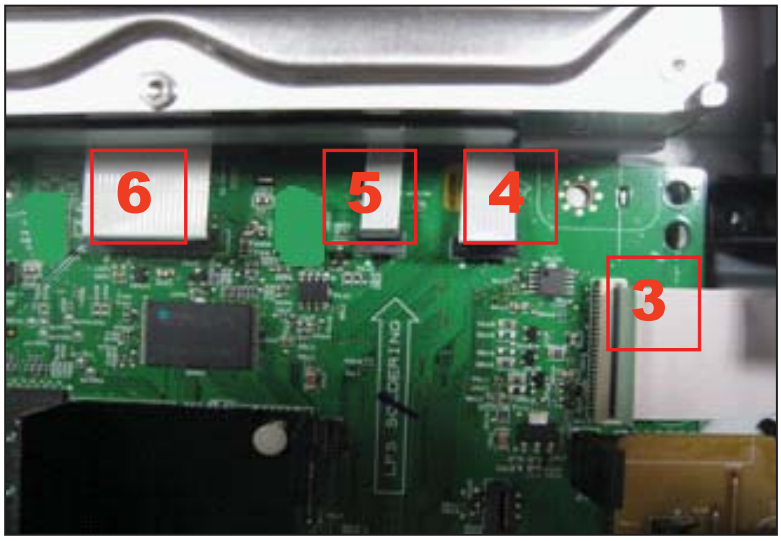
HDMI_1_N

WIRING DIAGRAM

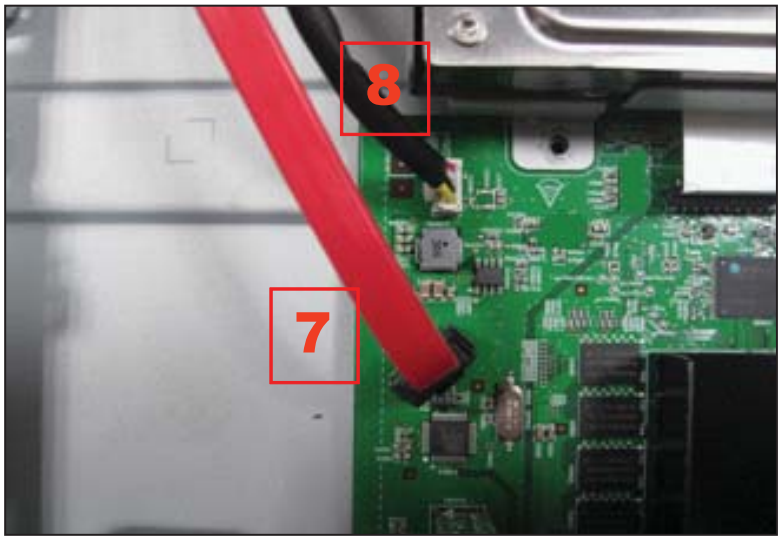




1. B to B Connector, SMPS to Main
2. Harness Cable, Fan to Main Board



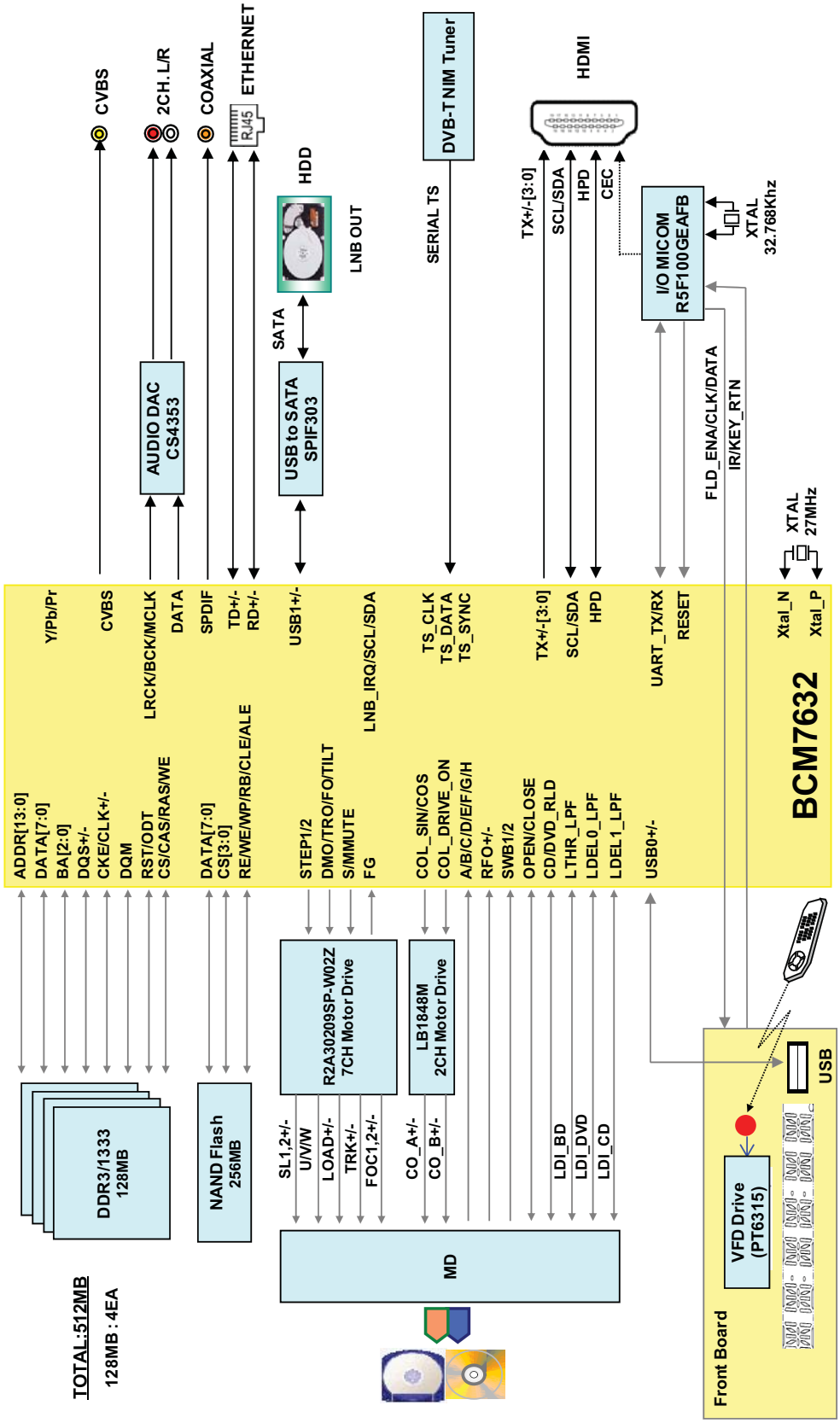
3. FFC, MD Assy to Main Board
4. FFC, MD Assy to Main Board
5. FFC, MD Assy to Main Board
6. FFC, Timer Board to Main Board



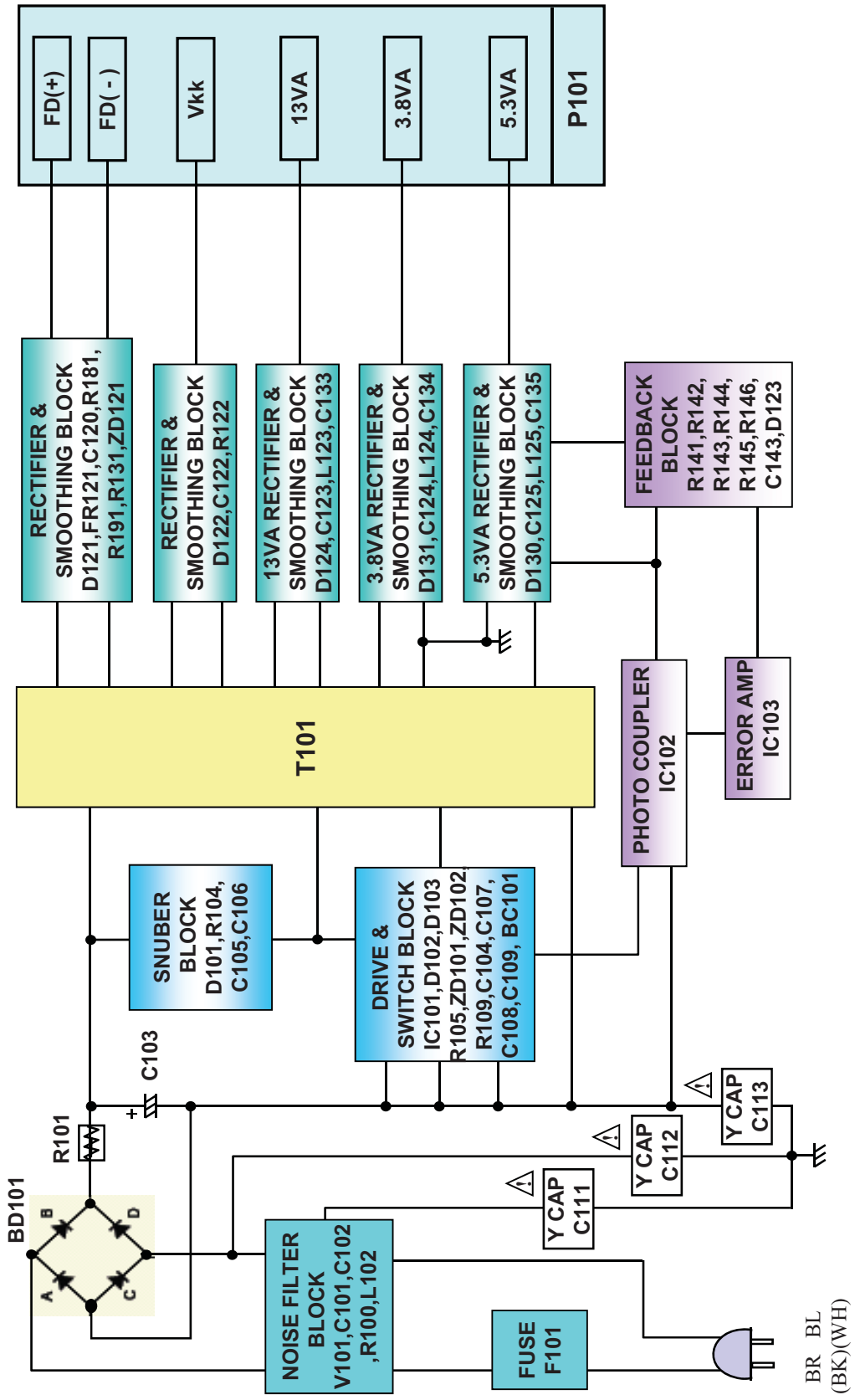
7. SATA Cable, HDD to Main Board
8. Harness Cable, HDD to Main Board

BLOCK DIAGRAMS

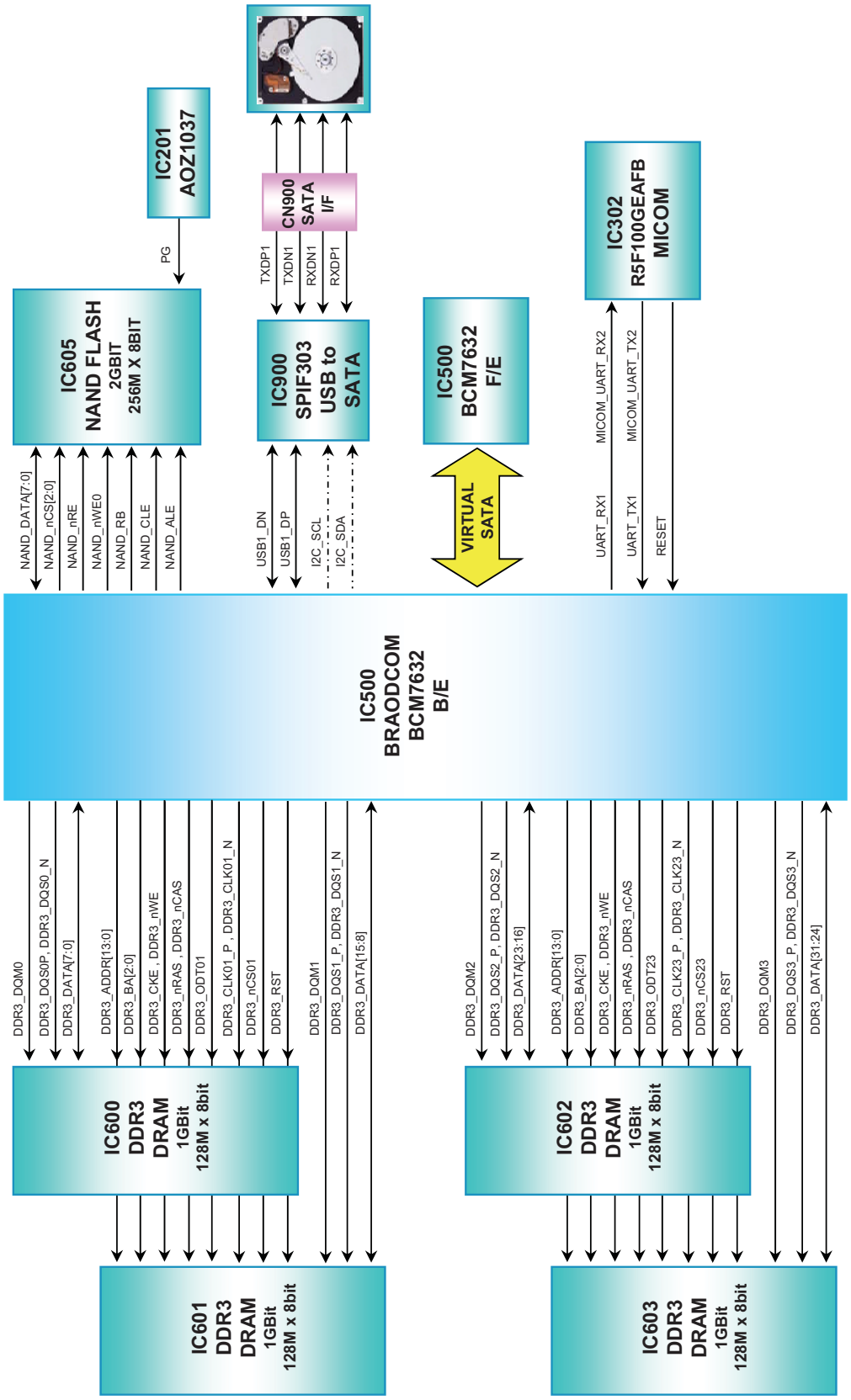
1. OVERALL BLOCK DIAGRAM



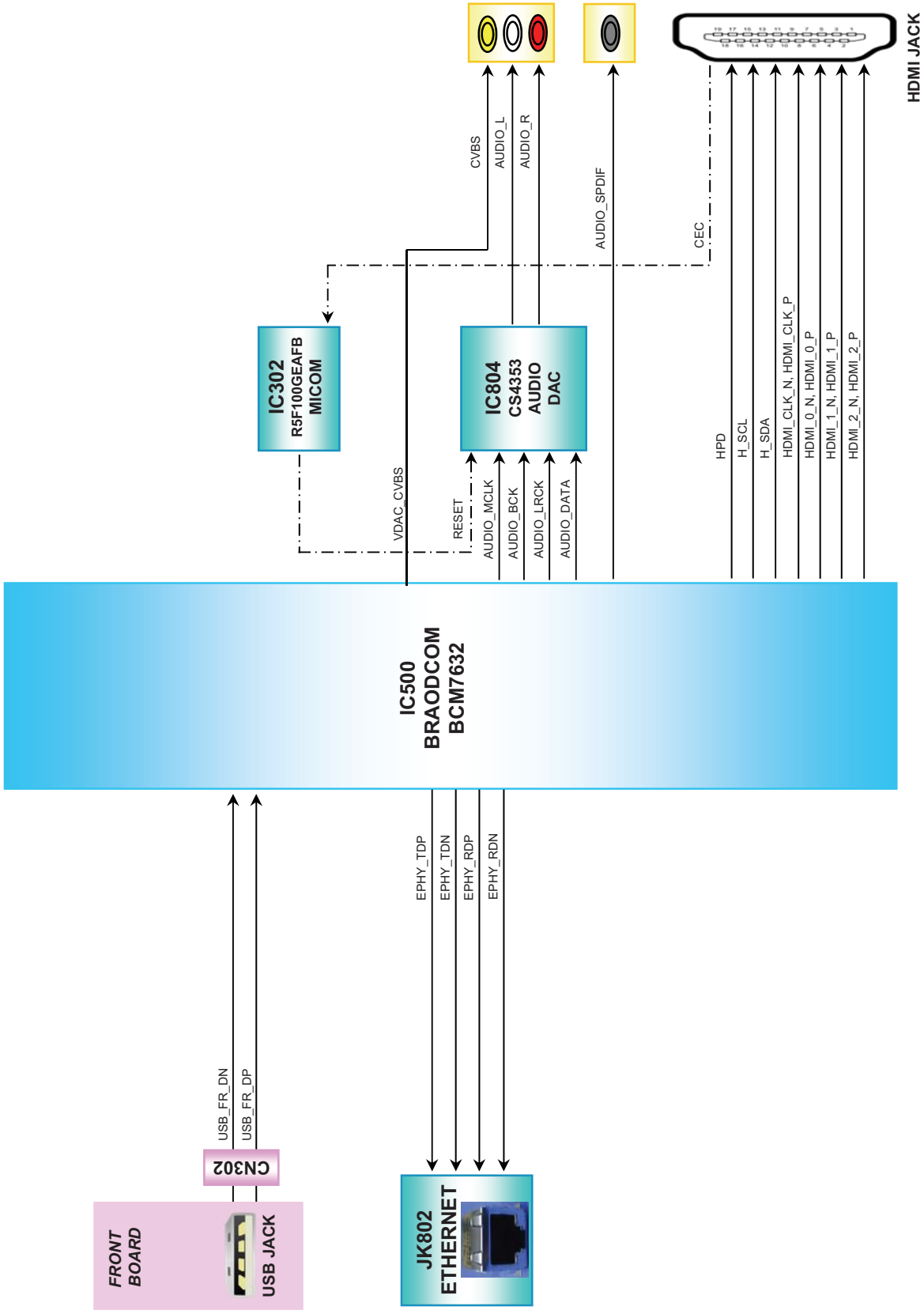
2. SMPS BOARD BLOCK DIAGRAM



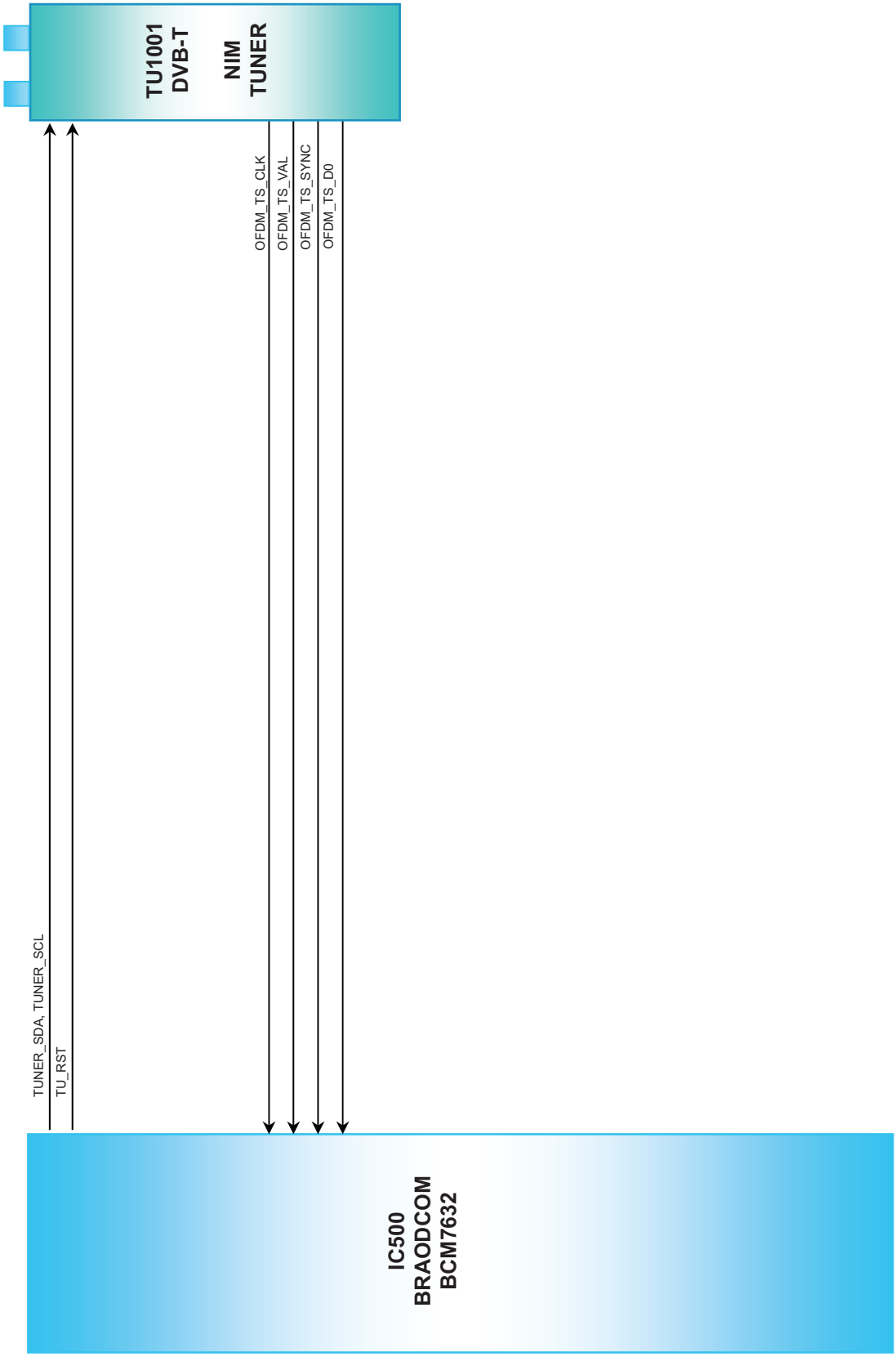
3. MAIN BOARD - SYSTEM BLOCK DIAGRAM



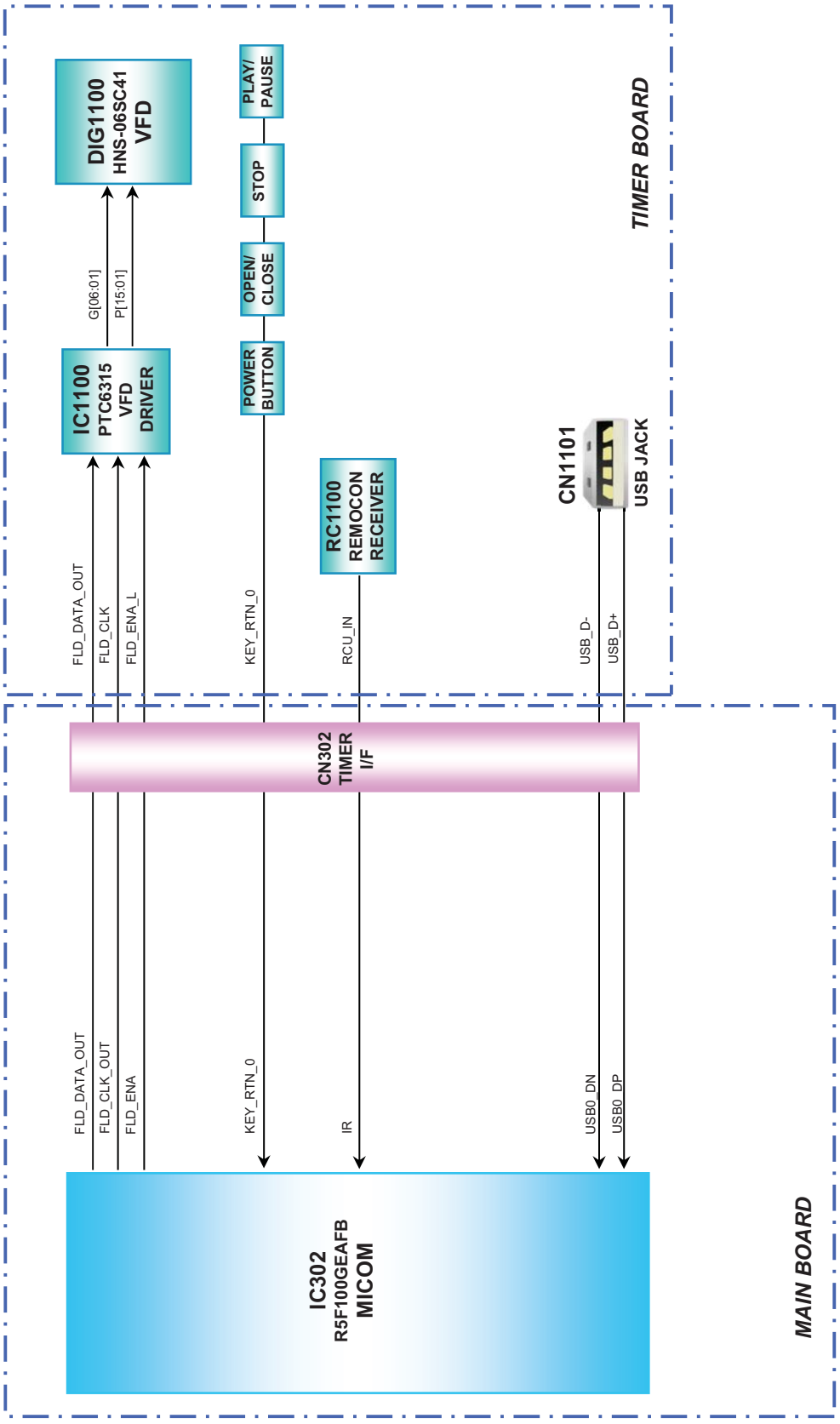
4. MAIN BOARD - INPUT/ OUTPUT BLOCK DIAGRAM



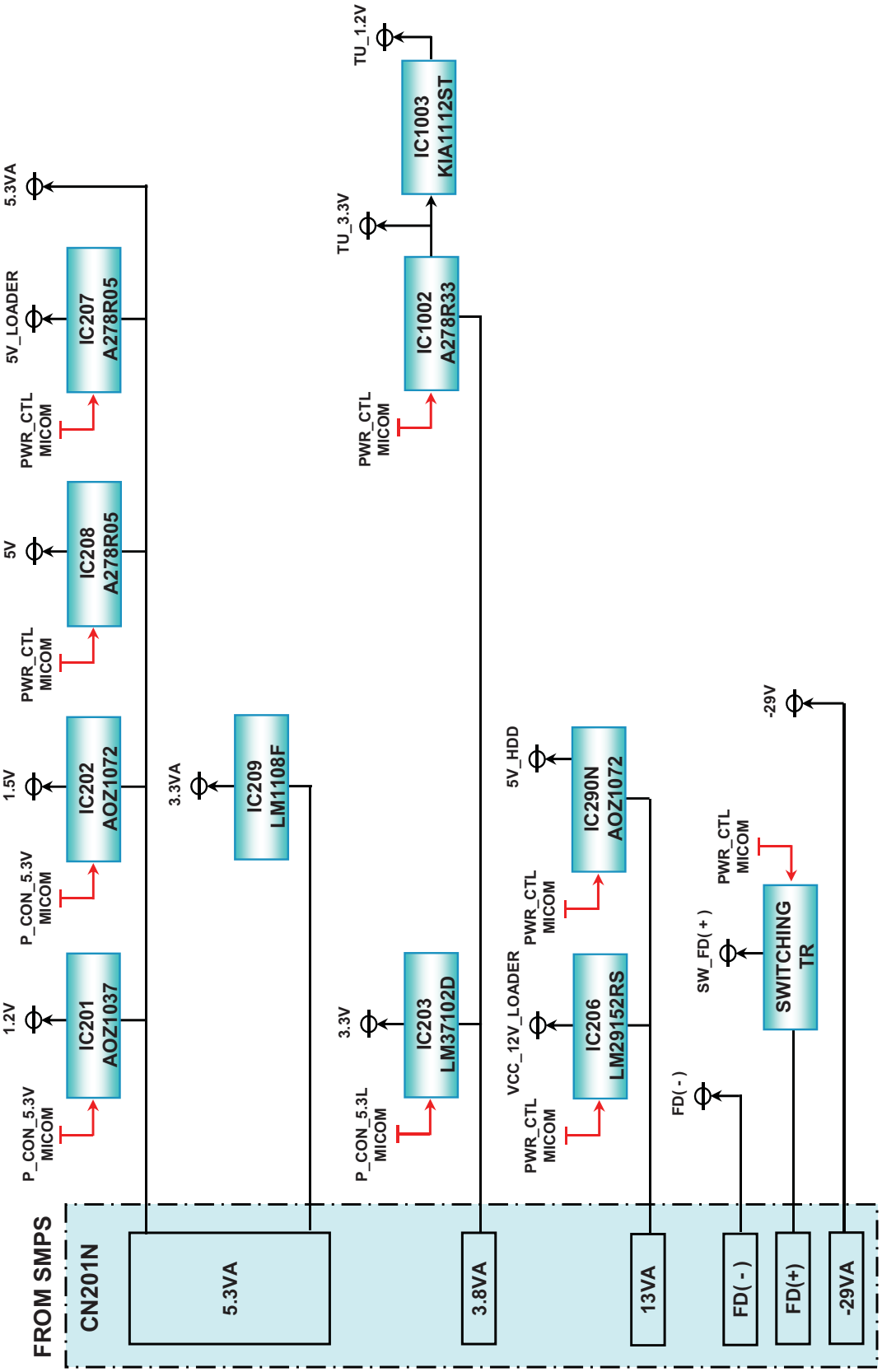
5. MAIN BOARD - TUNER BLOCK DIAGRAM



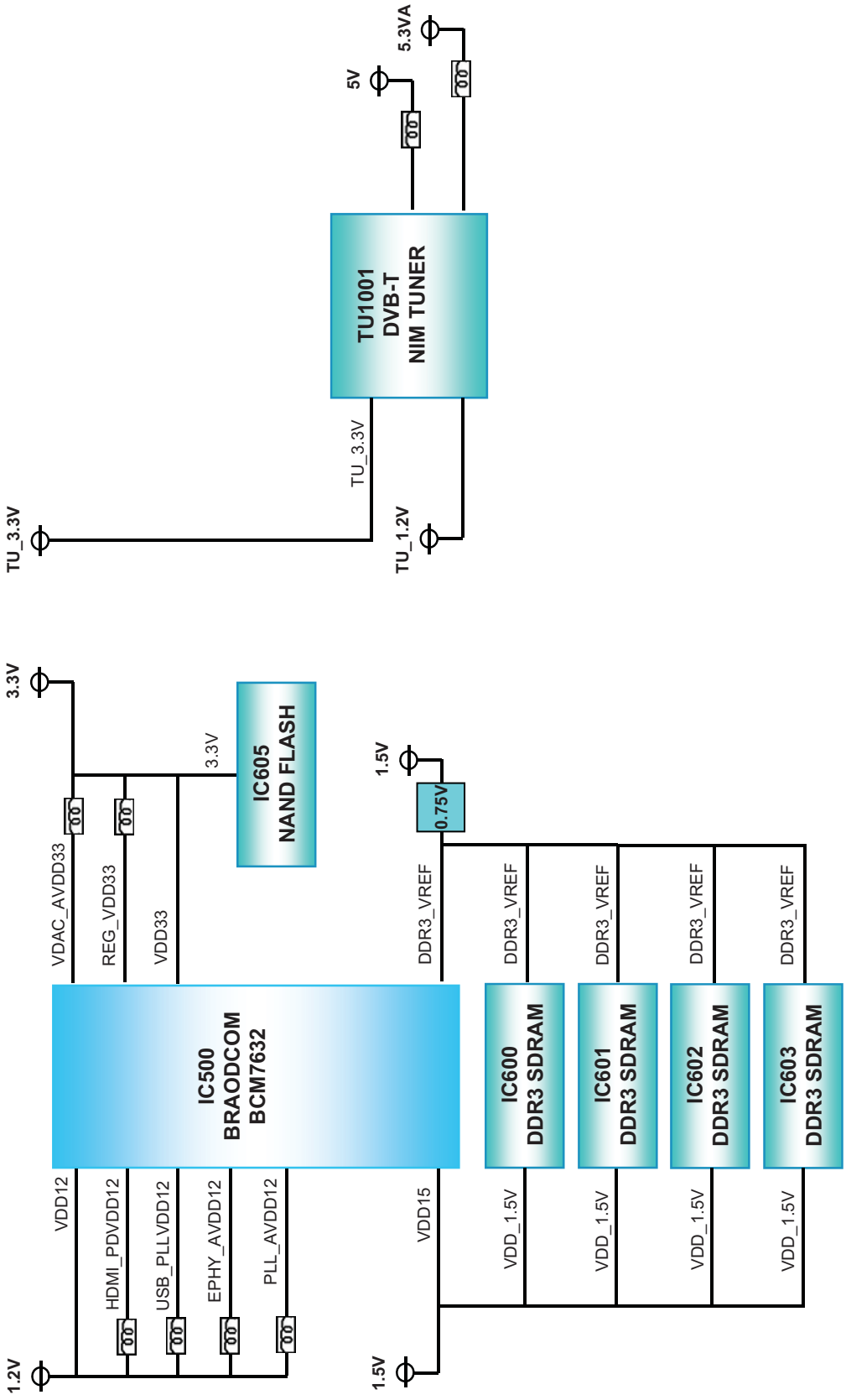
6. FRONT TIMER BOARD BLOCK DIAGRAM



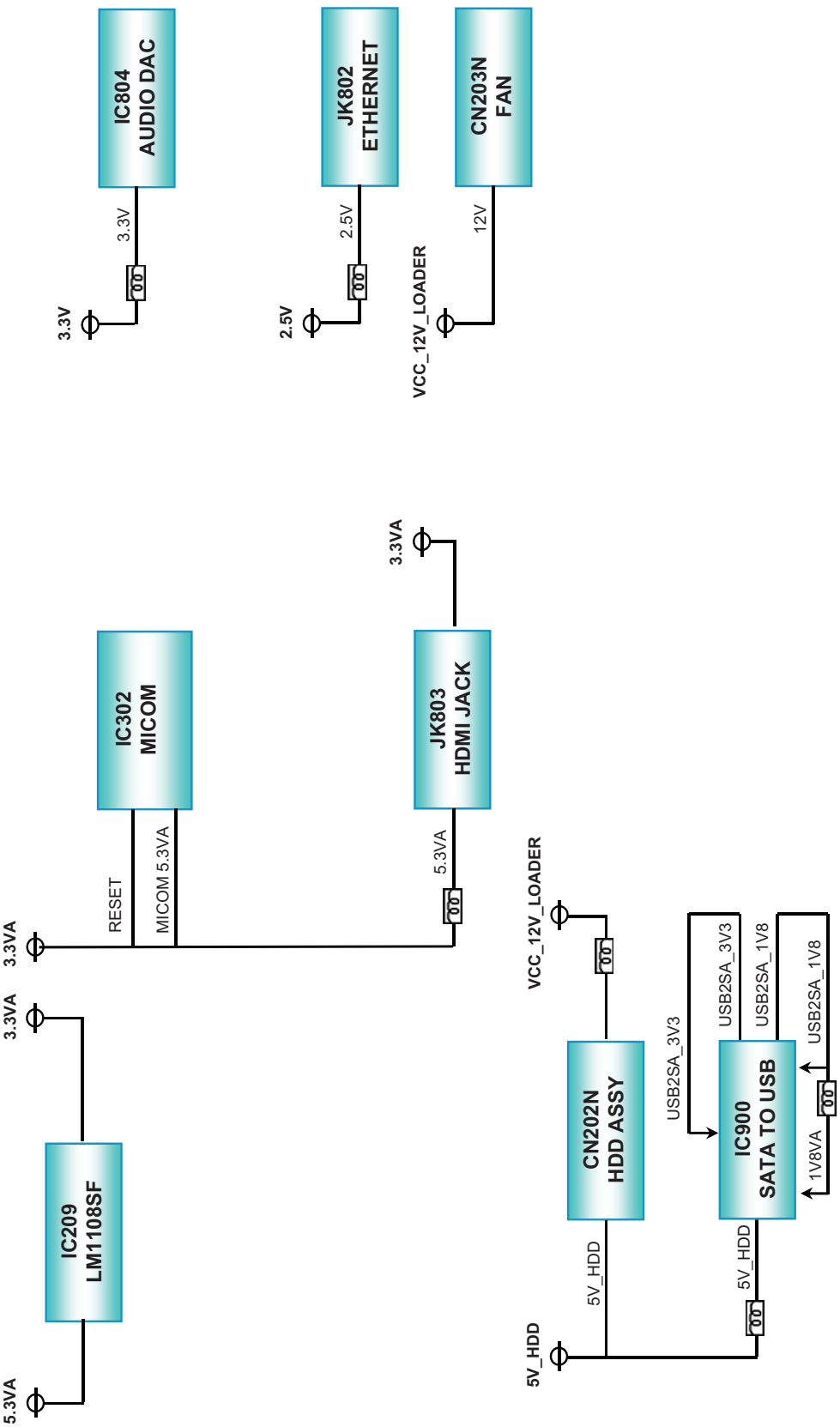
7. MAIN BOARD POWER SIGNAL



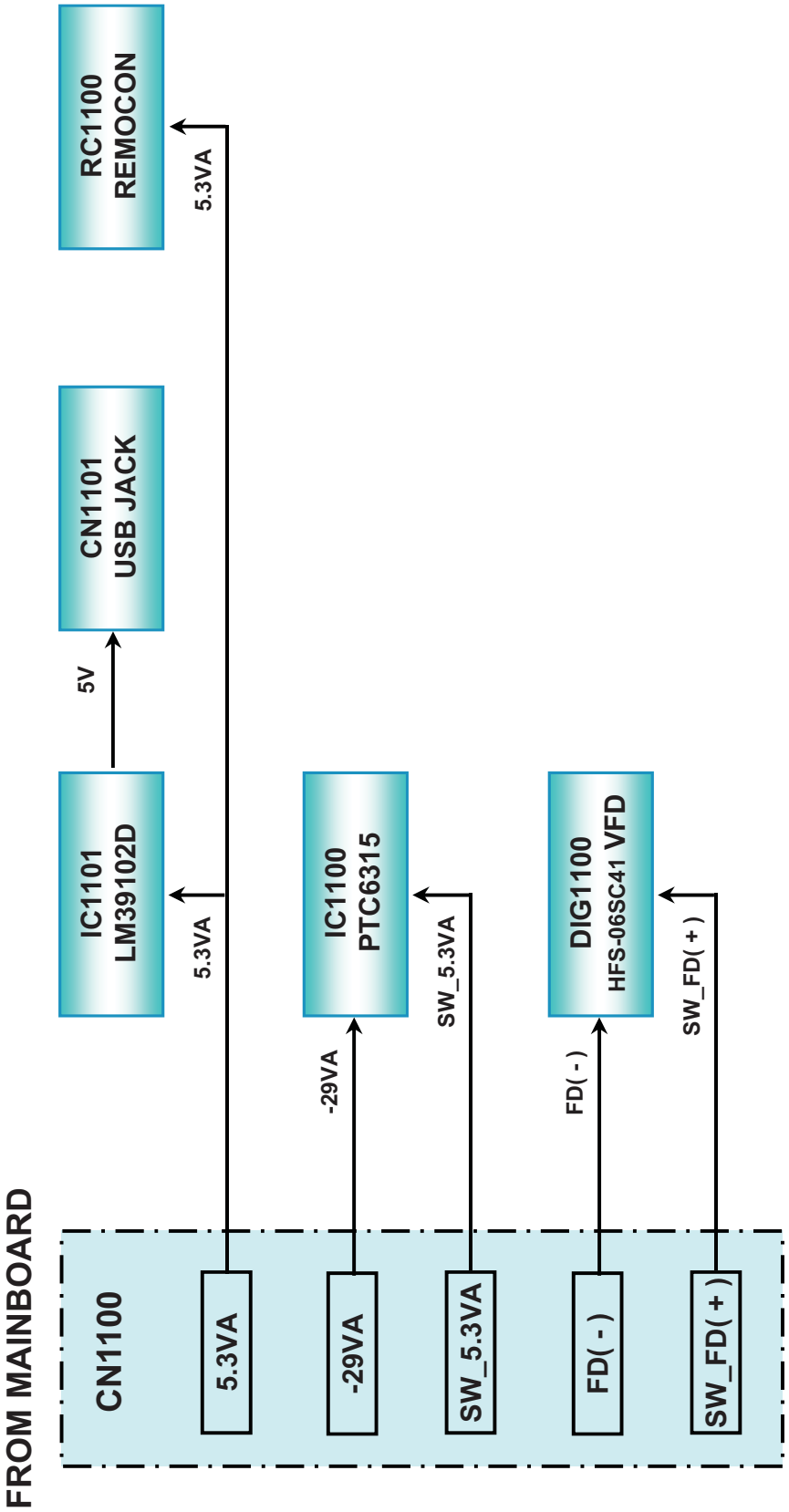
8. MAIN BOARD - SYSTEM & TUNER POWER SIGNAL



9. MAIN BOARD - INPUT/ OUTPUT POWER SIGNAL



10. FRONT TIMER BOARD POWER SIGNAL



CIRCUIT DIAGRAMS

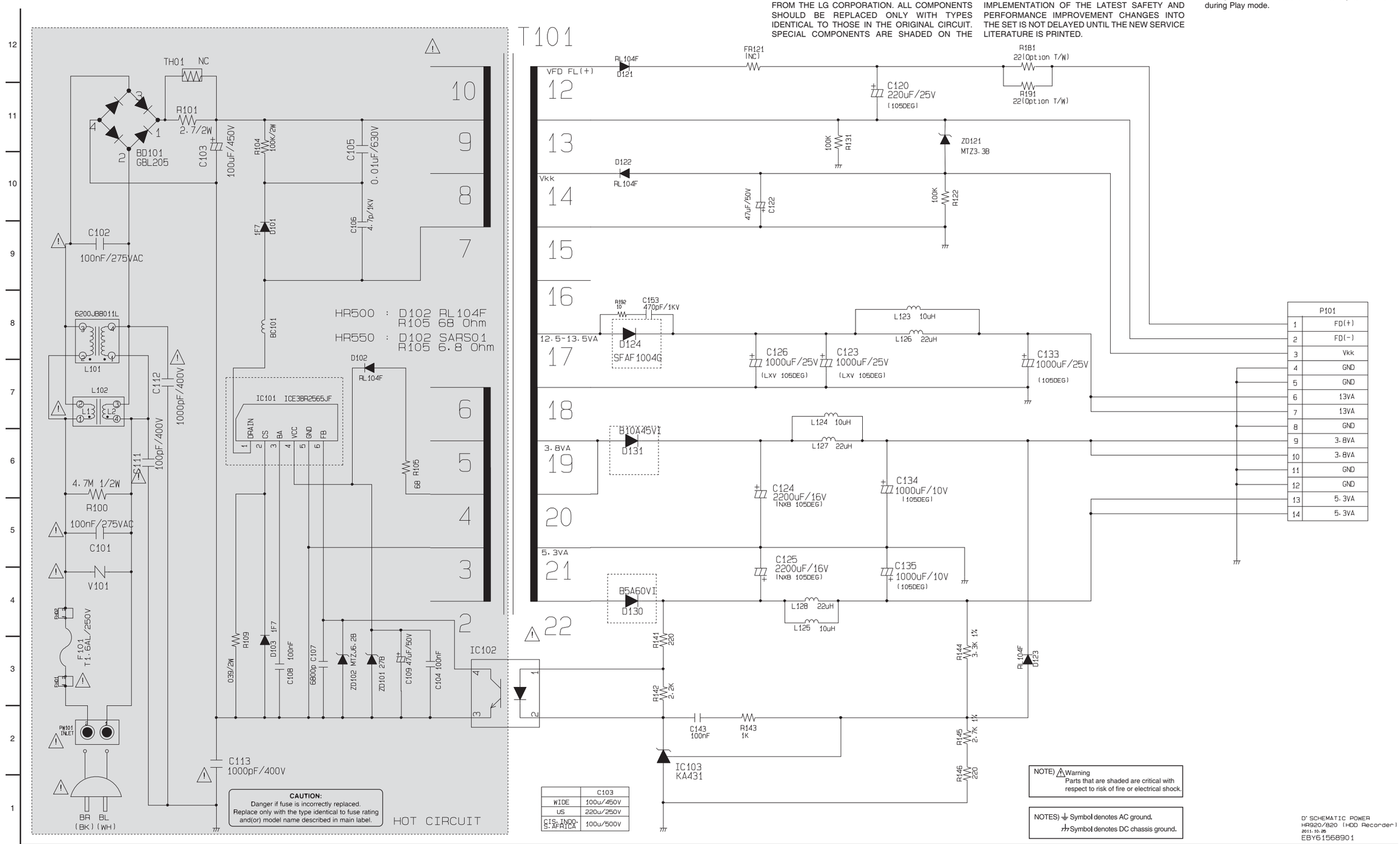
1. SMPS CIRCUIT DIAGRAM

IMPORTANT SAFETY

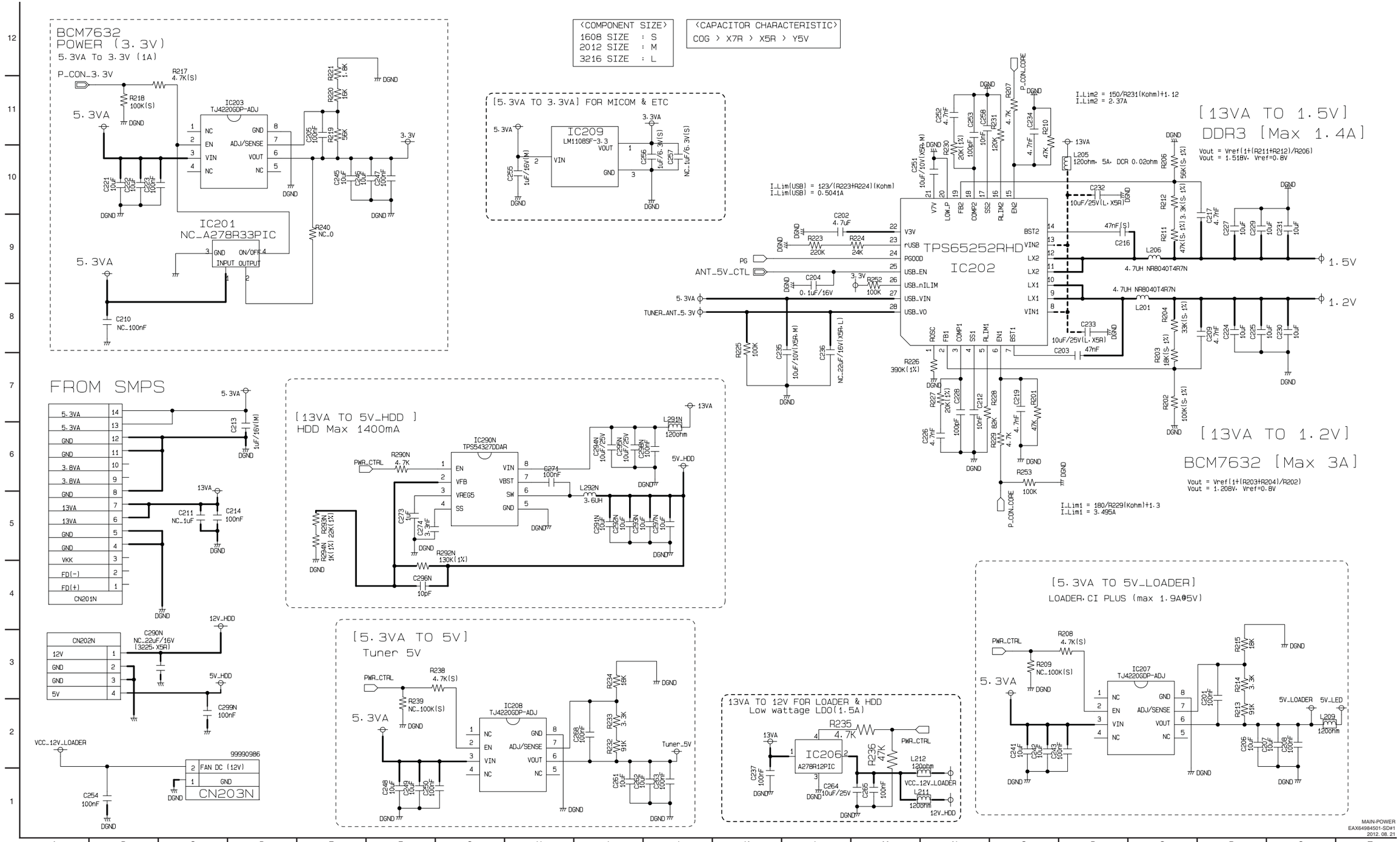
WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE LG CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT. SPECIAL COMPONENTS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION.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

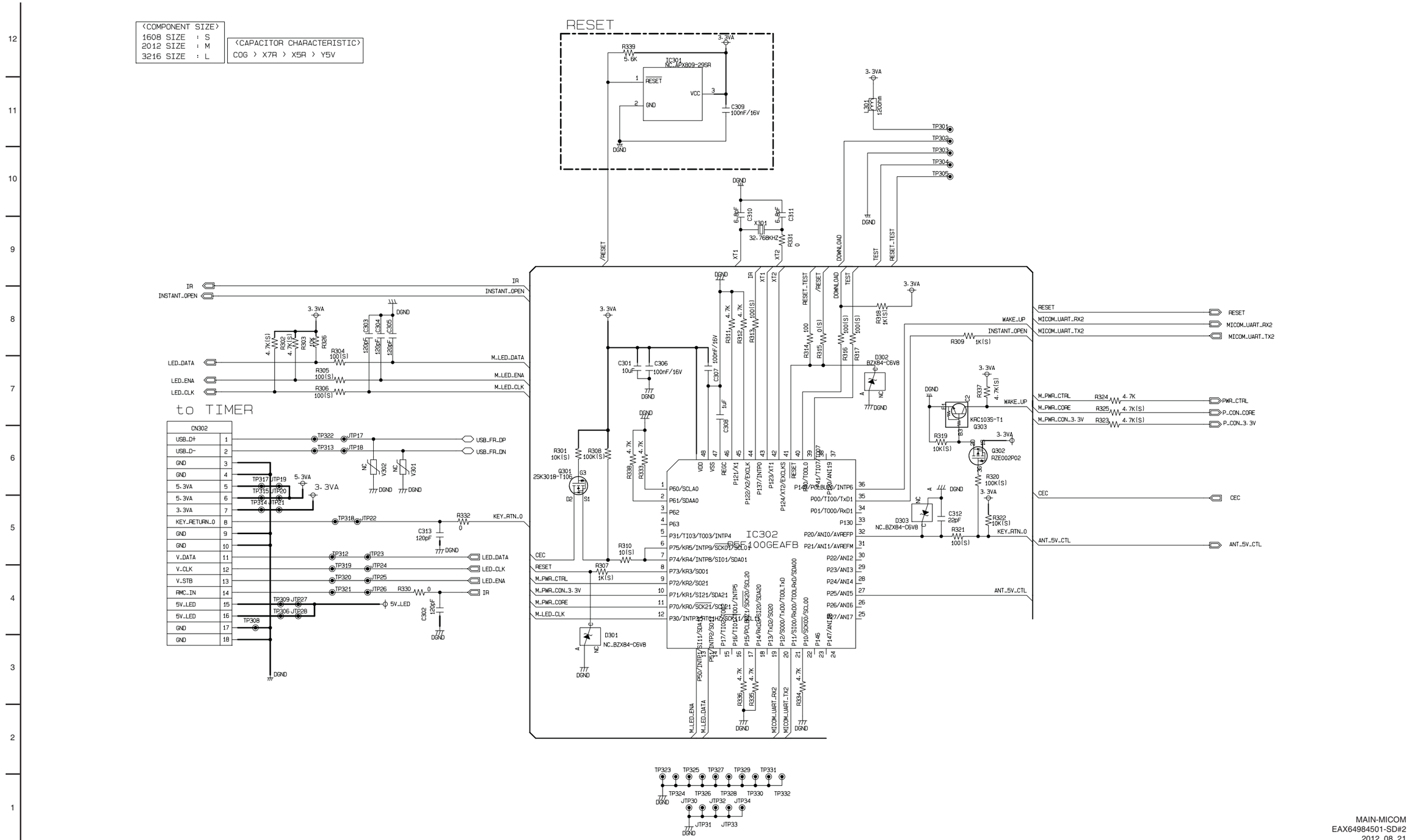
1. Shaded(▩) parts are critical for safety. Replace only with specified part number.
2. Voltages are DC-measured with a digital voltmeter during Play mode.



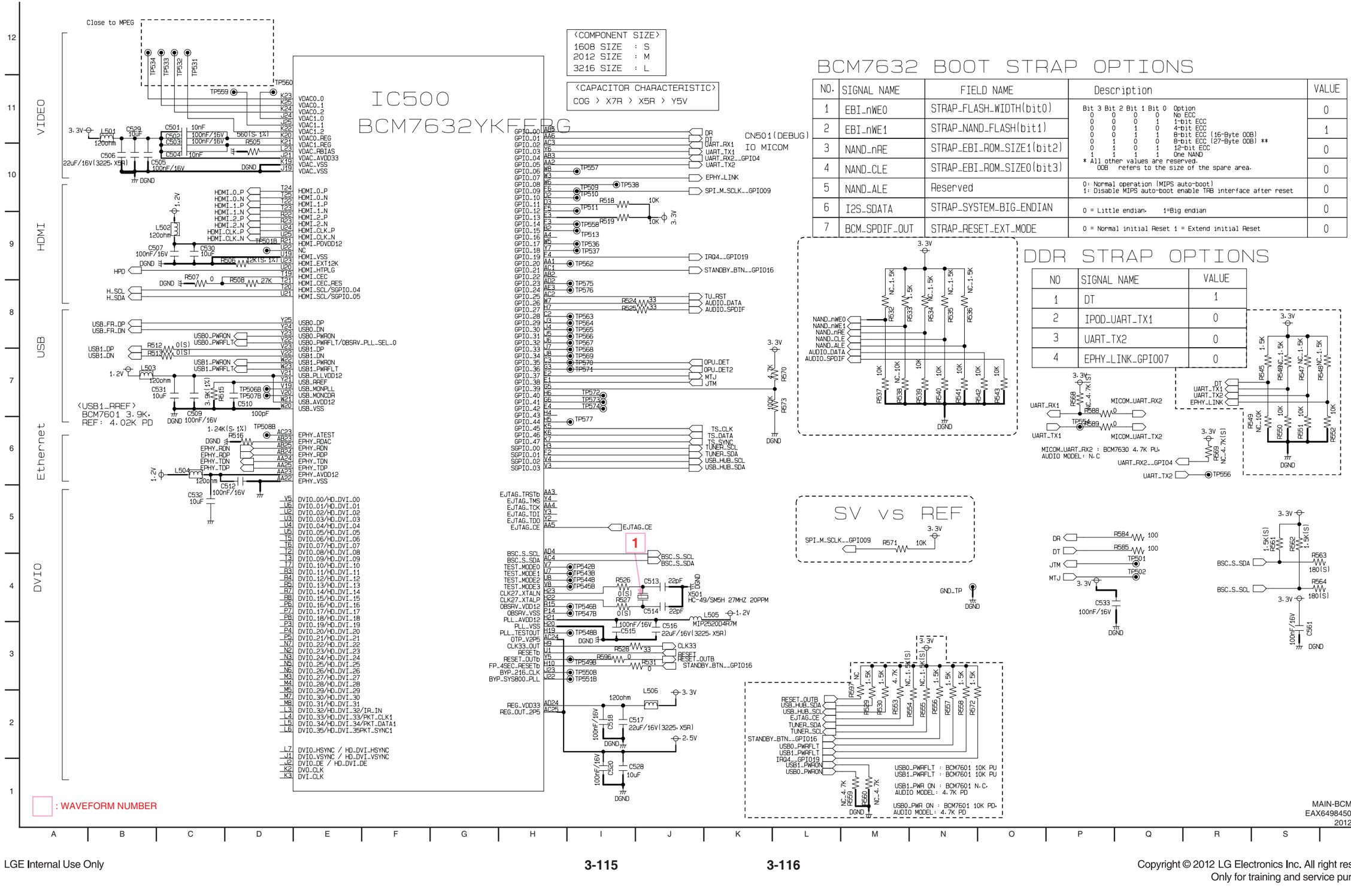
2. MAIN - POWER CIRCUIT DIAGRAM



3. MAIN - MICOM CIRCUIT DIAGRAM



4. MAIN - BCM7632 #1 CIRCUIT DIAGRAM



BCM7632 BOOT STRAP OPTIONS

NO.	SIGNAL NAME	FIELD NAME	Description	VALUE
1	EBI_nWE0	STRAP_FLASH_WIDTH(bit0)	Bit 3 Bit 2 Bit 1 Bit 0 Option 0 0 0 0 No ECC 0 0 0 1 1-bit ECC 0 0 1 0 4-bit ECC 0 0 1 1 8-bit ECC (16-Byte OOB) 0 1 0 0 8-bit ECC (27-Byte OOB) ** 0 1 0 1 12-bit ECC 1 1 1 1 One NAND * All other values are reserved. OOB refers to the size of the spare area.	0
2	EBI_nWE1	STRAP_NAND_FLASH(bit1)		1
3	NAND_nRE	STRAP_EBI_ROM_SIZE1(bit2)		0
4	NAND_CLE	STRAP_EBI_ROM_SIZE0(bit3)		0
5	NAND_ALE	Reserved	0: Normal operation (MIPS auto-boot) 1: Disable MIPS auto-boot enable TRB interface after reset	0
6	I2S_SDATA	STRAP_SYSTEM_BIG_ENDIAN	0 = Little endian. 1=Big endian	0
7	BCM_SPDIF_OUT	STRAP_RESET_EXT_MODE	0 = Normal initial Reset 1 = Extend initial Reset	0

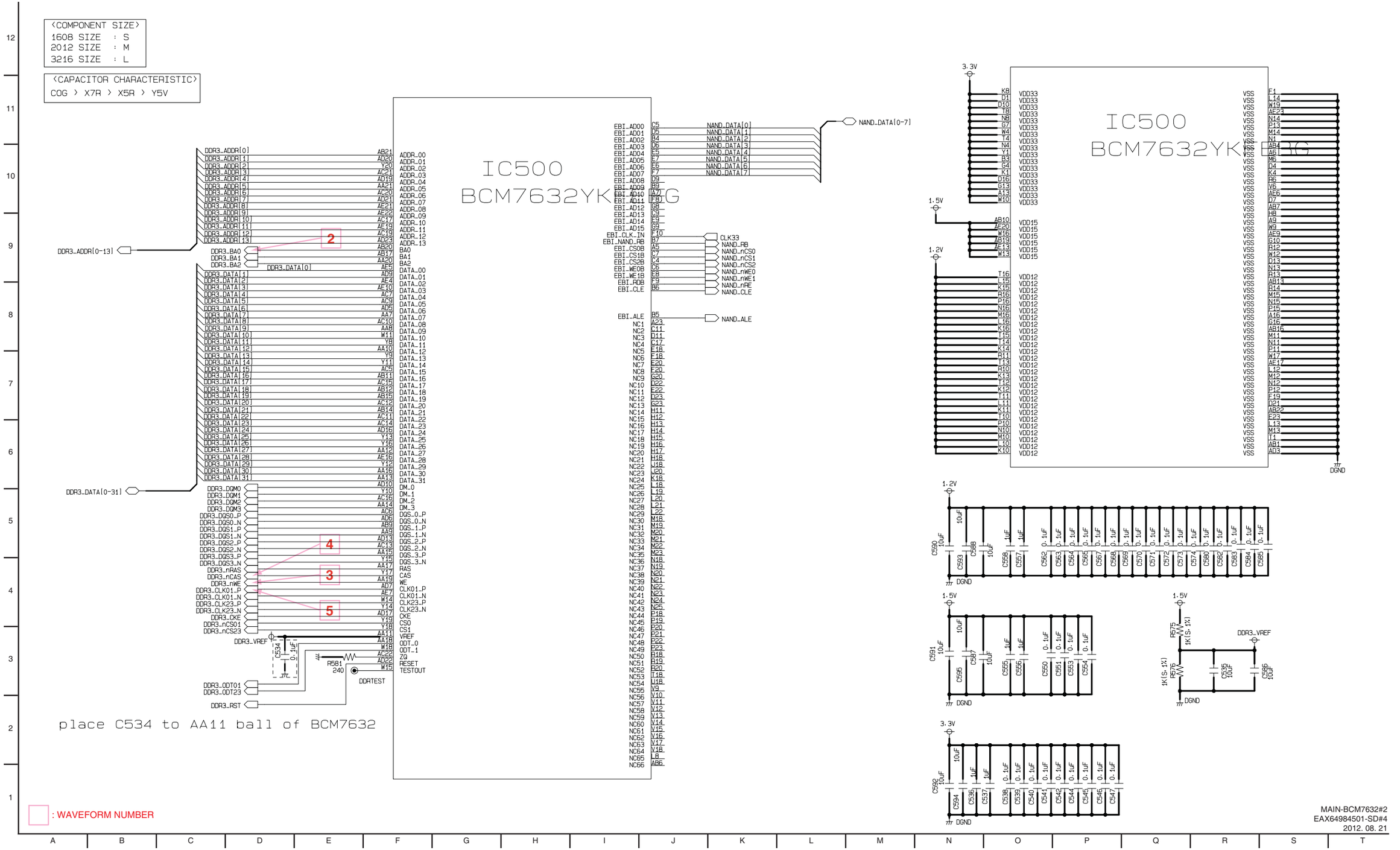
DDR STRAP OPTIONS

NO	SIGNAL NAME	VALUE
1	DT	1
2	IPOD_UART_TX1	0
3	UART_TX2	0
4	EPHY_LINK_GPIO07	0

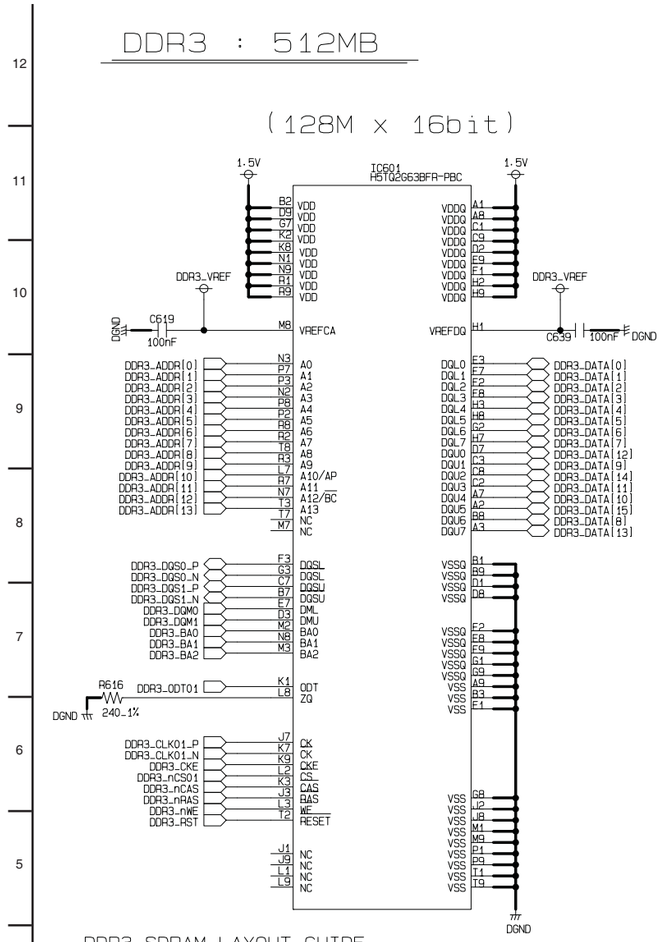
SV vs REF

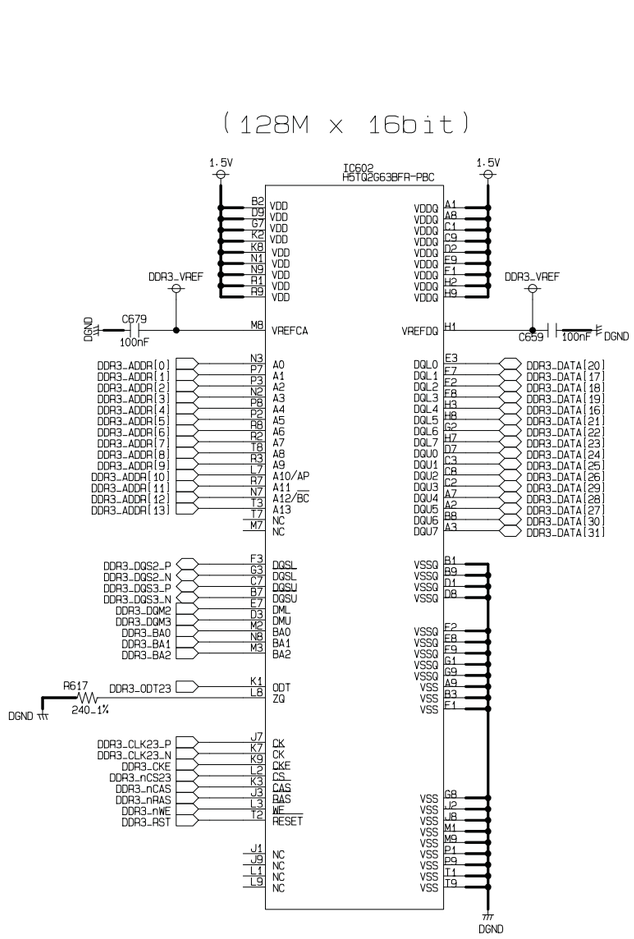
MAIN-BCM7632#1
EAX64984501-SD#3
2012. 08. 21

5. MAIN - BCM7632 #2 CIRCUIT DIAGRAM

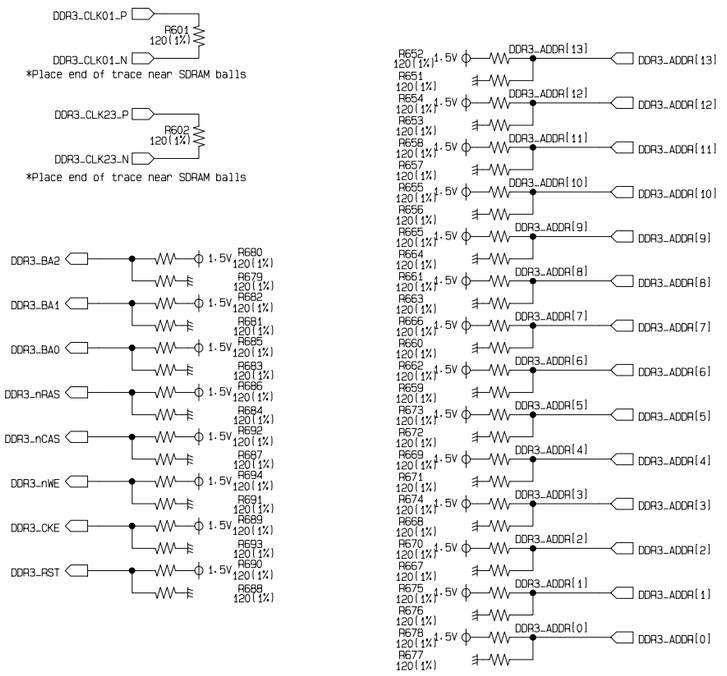


6. MAIN - DDR3 NAND CIRCUIT DIAGRAM





DDR Termination



DDR3 SDRAM LAYOUT GUIDE

* General Routing Guidelines

1. Do not route critical signals across split planes.
2. Route over appropriate 1.5V or ground plane.
3. Avoid routing memory signals closer than 25-mil to the memory clocks.
4. DDR Clock and DQS routed differentially (120ohm)
5. Use proper 120ohm clock termination
6. Vref decoupling close to DRAM
7. Vref decoupling close to ASIC
8. VDD/VDDQ decoupling close to DRAM VDD/VDDQ pins
9. VDDQ decoupling close to ASIC VDDQ pins

* Clock Routing Guidelines

10. Clocks must maintain length matching between clock pairs of 25 mils.
11. Differential clocks need to maintain length matching between positive and negative signals of 15 mils routed in parallel.
12. The space between differential pairs must be at least 2 the trace width of the differential pair to minimize loss and maximize interconnect density.
13. Match DQS signal length to related Clock signal length to within 475 mils

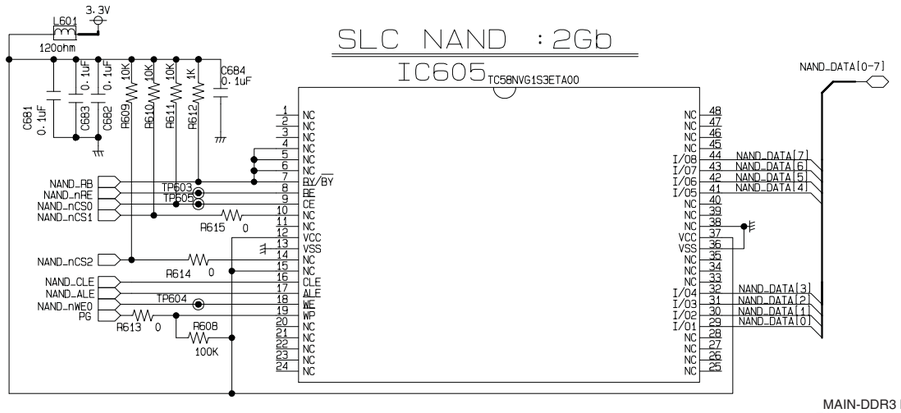
* Address and Command Routing Guidelines

14. Address and command signals are routed in a daisy chain topology from the first SDRAM to the last SDRAM.
15. Ensure that each net maintains the same consecutive order.
16. Do not route differential clock and clock enable signals close to address signals.
17. Route all addresses and commands to match related clock signals to within 475 mils to each discrete memory component.
    (Values apply for two loads when both are near the end of the wire and the wire is not terminated. The Address/Control wire length to the first load should be longer than the clock wires.)

* DQ, DQS, and DM Routing Guidelines

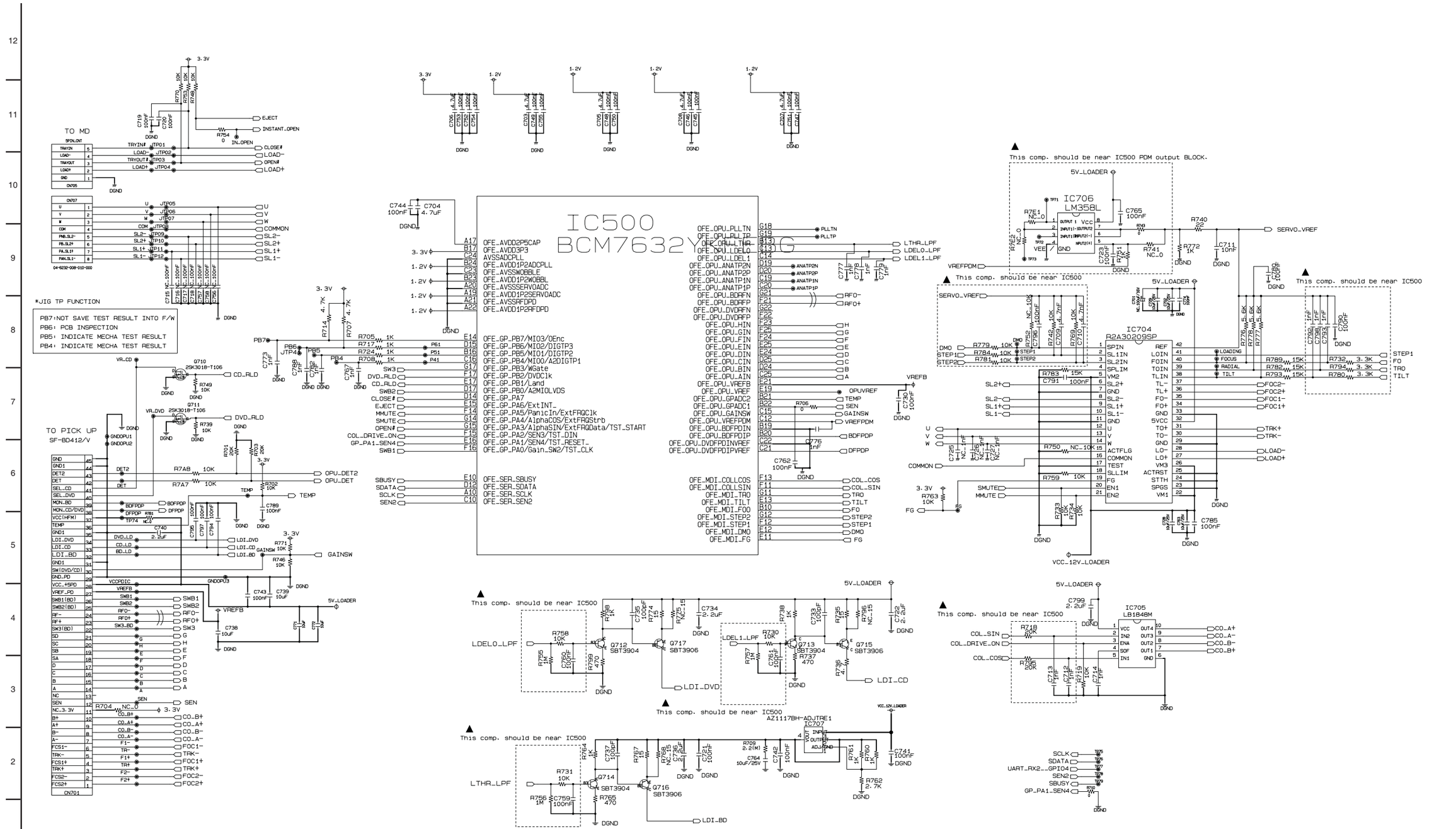
18. All signals within a given Byte Lane Group must be matched in length with a maximum deviation of 250mils.
19. Route all DQS, DQM signals to match related DQ byte lane signals to within 250 mils

SLC NAND : 2Gb

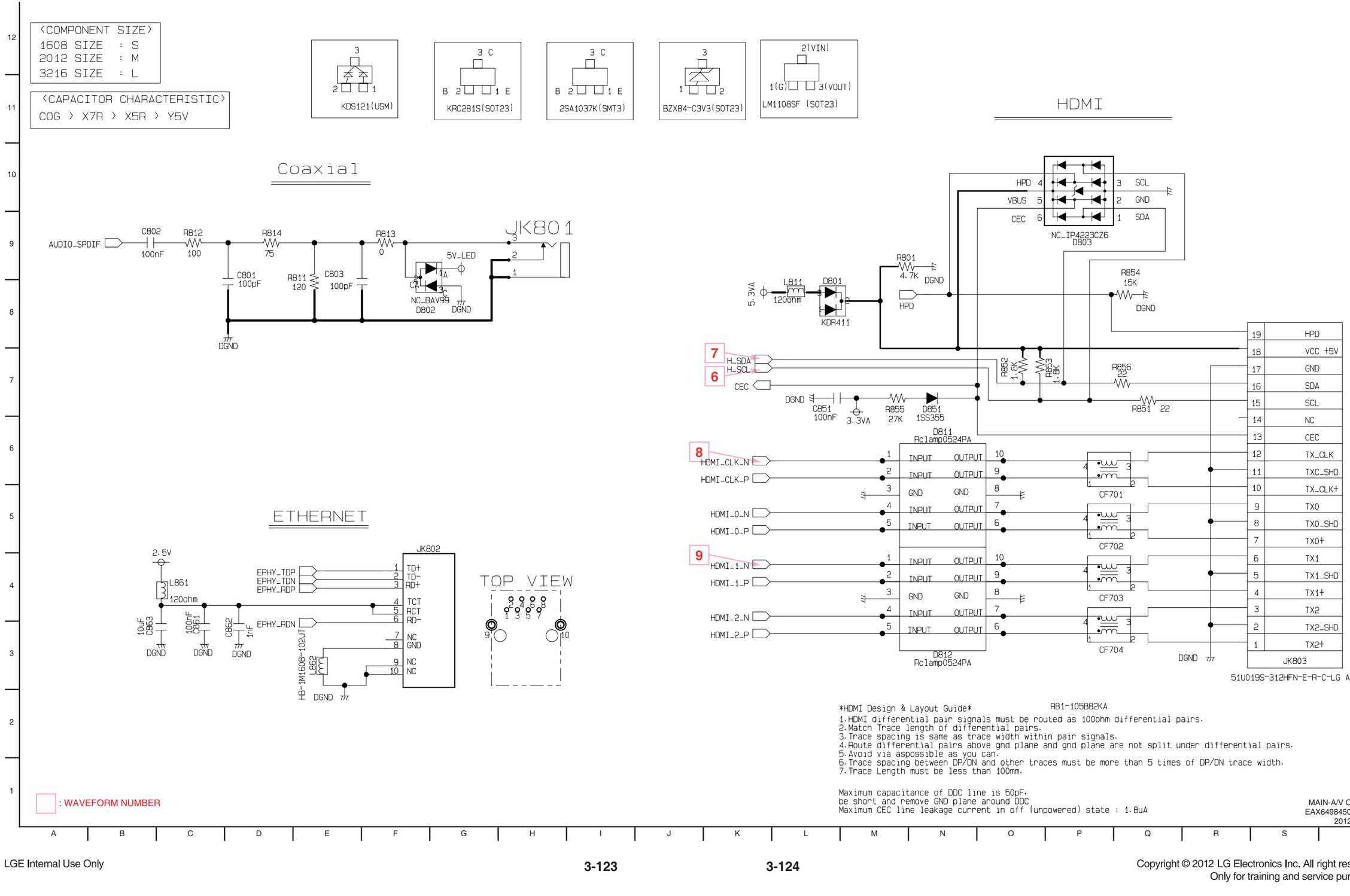


MAIN-DDR3 NAND
EAX64984501-SD#5
2012. 08. 21

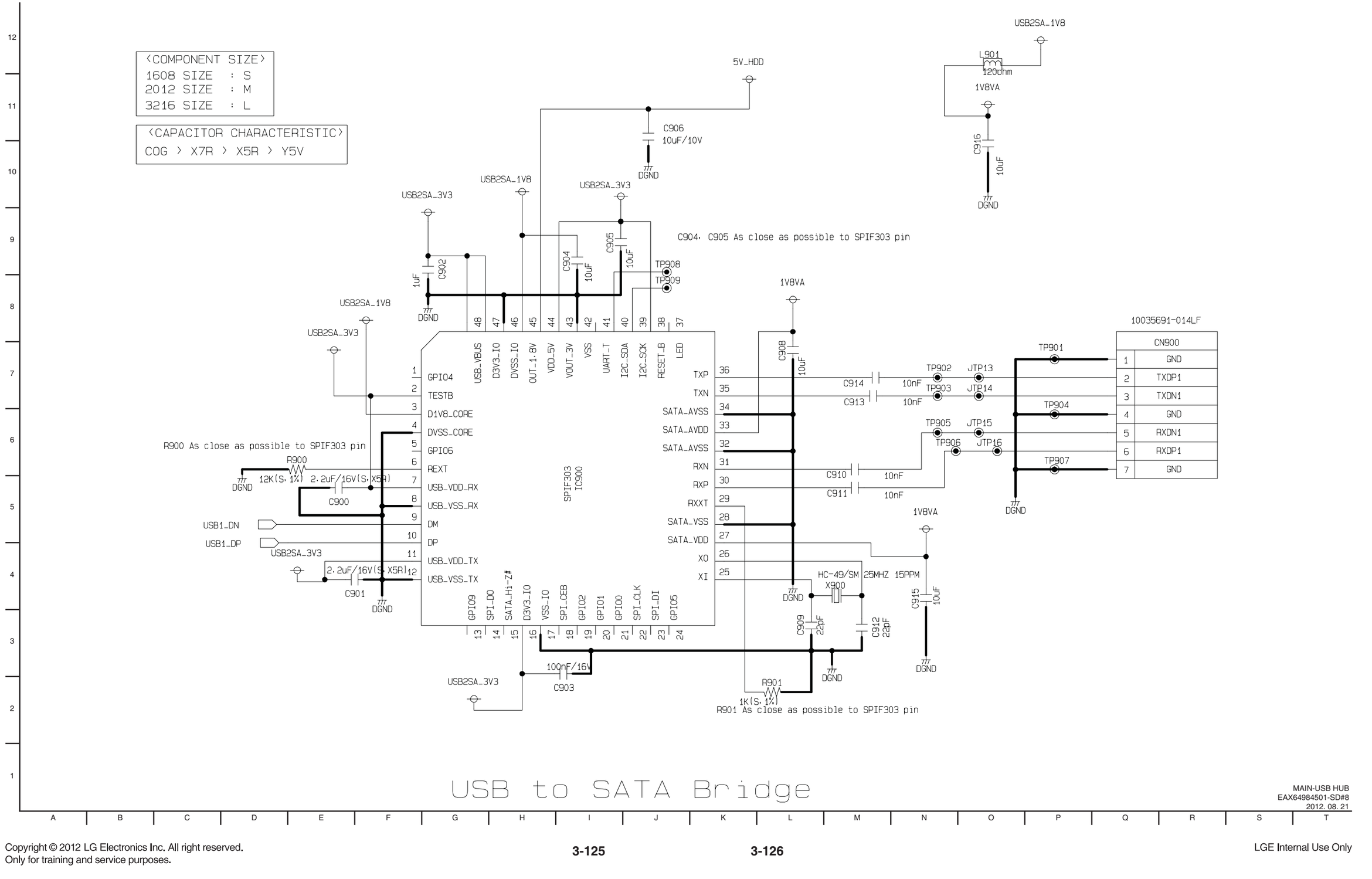
7. MAIN - FRONT END CIRCUIT DIAGRAM



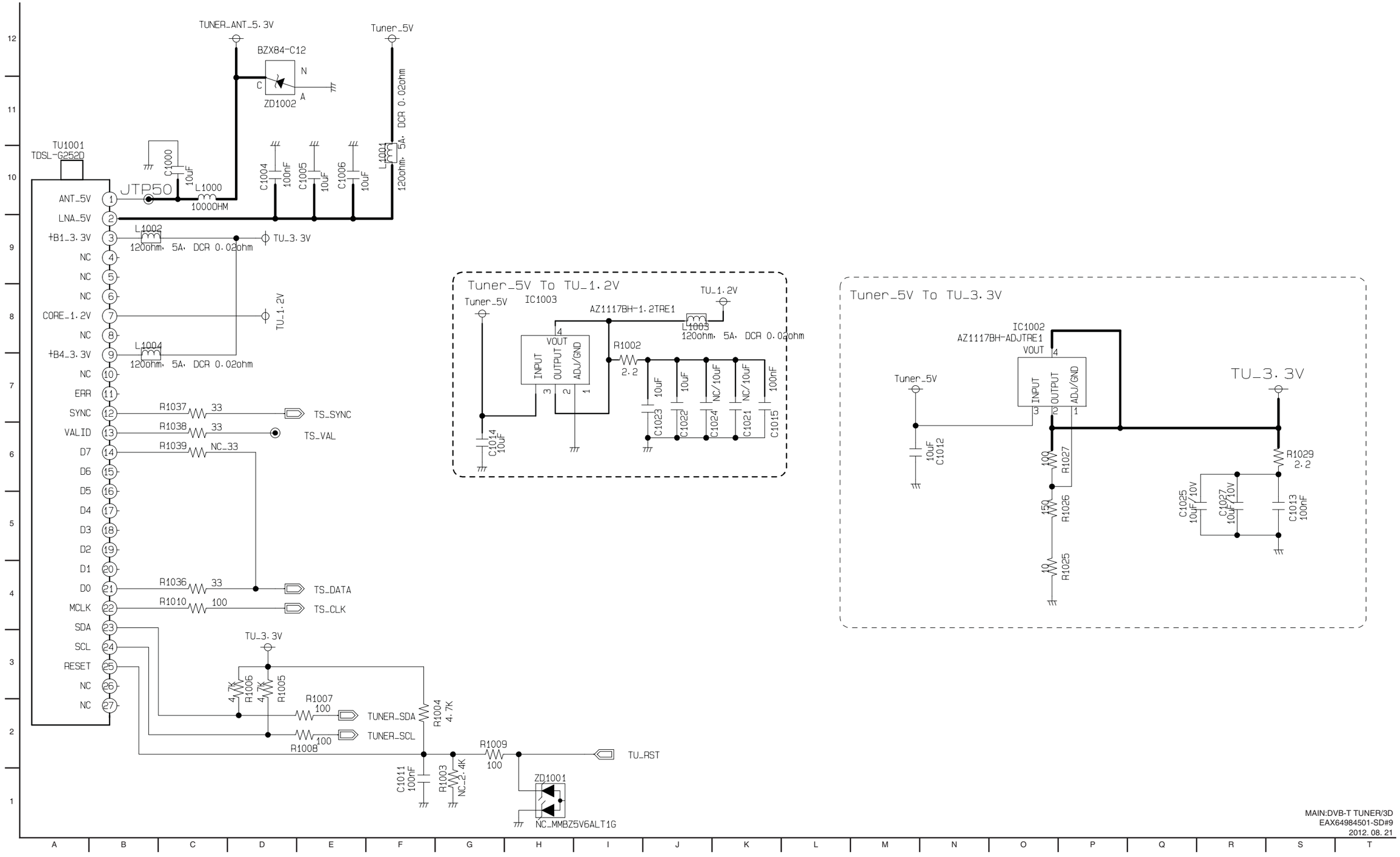
8. MAIN - A/V OUTPUT CIRCUIT DIAGRAM



9. MAIN - USB HUB CIRCUIT DIAGRAM

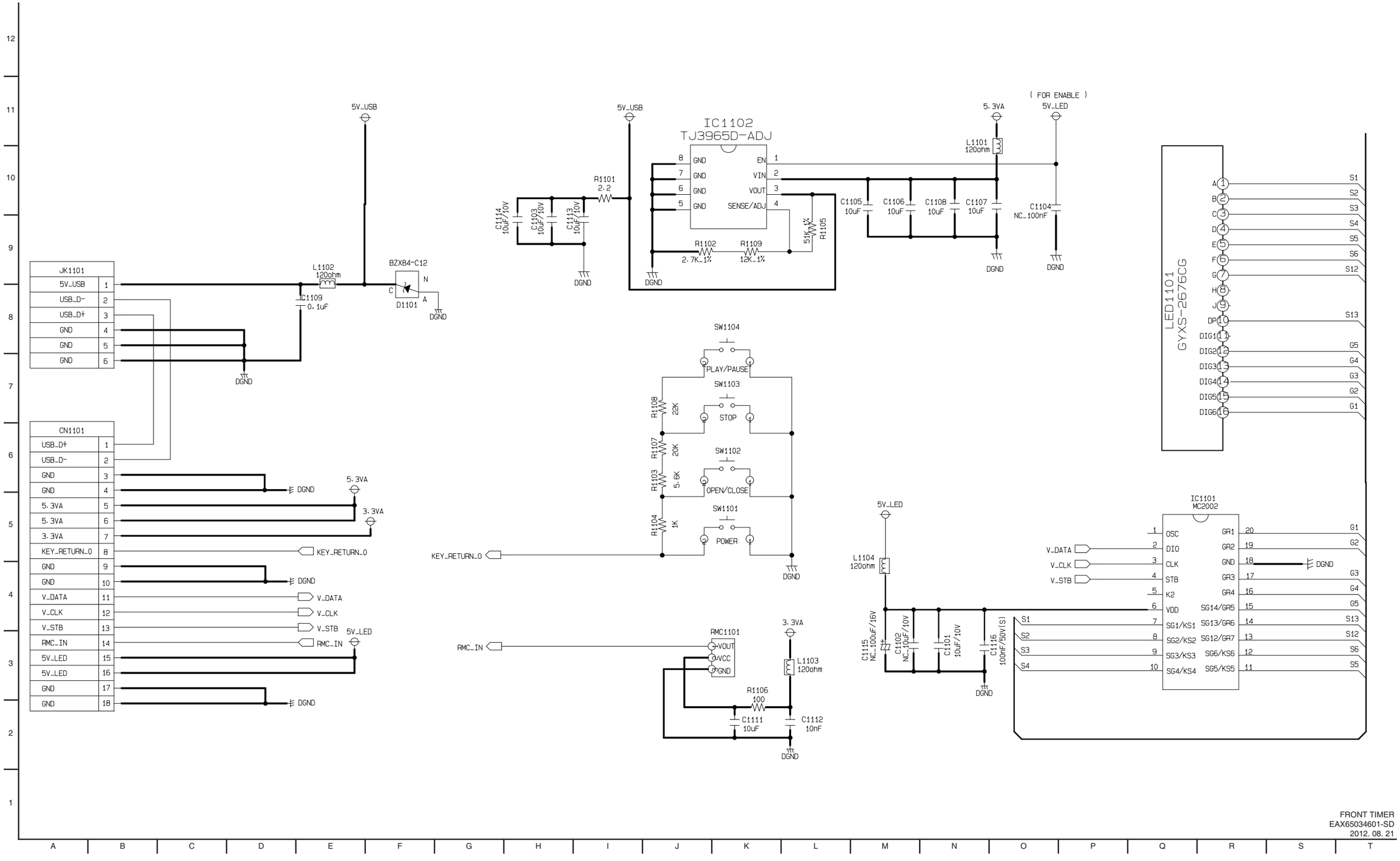


10. MAIN - DVB-T TUNER/ 3D CIRCUIT DIAGRAM



MAIN:DVB-T TUNER/3D
EAX64984501-SD#9
2012. 08. 21

11. FRONT TIMER CIRCUIT DIAGRAM



CIRCUIT VOLTAGE CHART

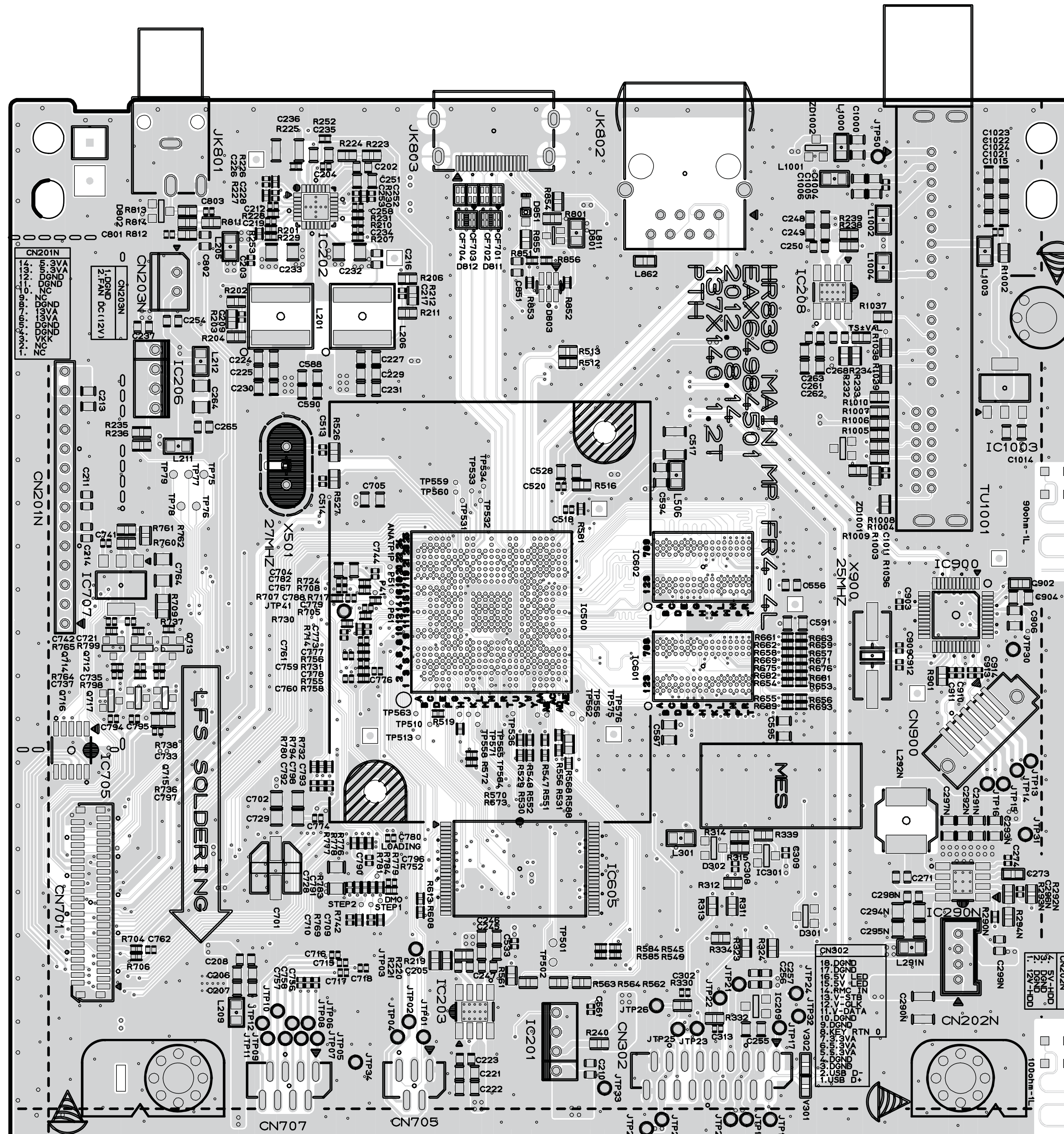
PIN NO.	DESCRIPTION	VOLTAGE	
		EE MODE	PLAY with TUNER REC.
IC201 (AOZ1037)			
8	VIN	5.33	5.32
1	VOUT	1.23	1.23
IC202 (AOZ1072)			
1	VIN	5.34	5.33
3	VOUT	1.50	1.50
IC203 (LM37102D)			
2	VIN	3.95	3.98
3	VOUT	3.31	3.31
IC208 (A278R05)			
2	VIN	5.38	5.38
4	VOUT	5.02	5.02
IC206 (LM29152RS)			
2	VIN	13.23	13.23
4	VOUT	12.14	12.13
IC207 (KIA278R05)			
1	VIN	5.38	5.38
2	VOUT	5.01	5.00
IC209 (LM1108)			
1	VIN	5.35	5.32
3	VOUT	3.31	3.31
IC290N (AOZ1072)			
1	VIN	13.23	13.10
3	VOUT	5.09	5.09
IC302 (MICOM)			
48	VDD2	3.31	3.31
40	RESET	3.31	3.31
IC500 (BCM7632)			
-	1.2V	1.22	1.22
-	3.3V	3.30	3.30
-	1.5V	1.50	1.49
IC600, IC601, IC602, IC603 (DDR3 DRAM)			
-	1.5V	1.50	1.49
-	DDR3_VREF	0.75	0.75
IC605 (NAND FLASH)			
-	3.3V	3.30	3.30

PIN NO.	DESCRIPTION	VOLTAGE	
		EE MODE	PLAY with TUNER REC.
IC804 (CS4353)			
3	VL	3.30	3.30
6	VCP	3.30	3.30
17	VA	3.30	3.30
18	VBIAS	1.22	1.21
IC900 (SPIF303)			
2	TESTB	3.30	3.30
3	D1V8_CORE	1.83	1.83
11	USB_VDD_TX	3.30	3.30
16	D3V3_IO	3.30	3.30
27	SATA_VDD	1.80	1.80
33	SATA_AVDD	1.80	1.80
44	VDD_5V	5.05	5.05
45	OUT_1.8V	1.82	1.82
47	D3V3_IO	3.30	3.30
48	USB_VBUS	3.30	3.30
IC1002 (A278R33)			
1	VIN	3.93	3.96
2	VOUT	3.30	3.30
IC1003 (AZ1117)			
3	VIN	3.30	3.30
2	VOUT	1.21	1.21
IC1101 (TJ3965D)			
2	VIN	5.38	5.38
3	VOUT	5.03	5.03
IC1100 (PTC6315)			
13, 43	VDD	3.31	3.31
30	VEE	-27.36	-27.36
RC1100 (REMOCON RECEIVER)			
2	VIN	3.31	3.31
DIG1100 (VFD)			
1, 2	F+	-20.92	-20.92
29, 30	F-	-23.85	-23.85

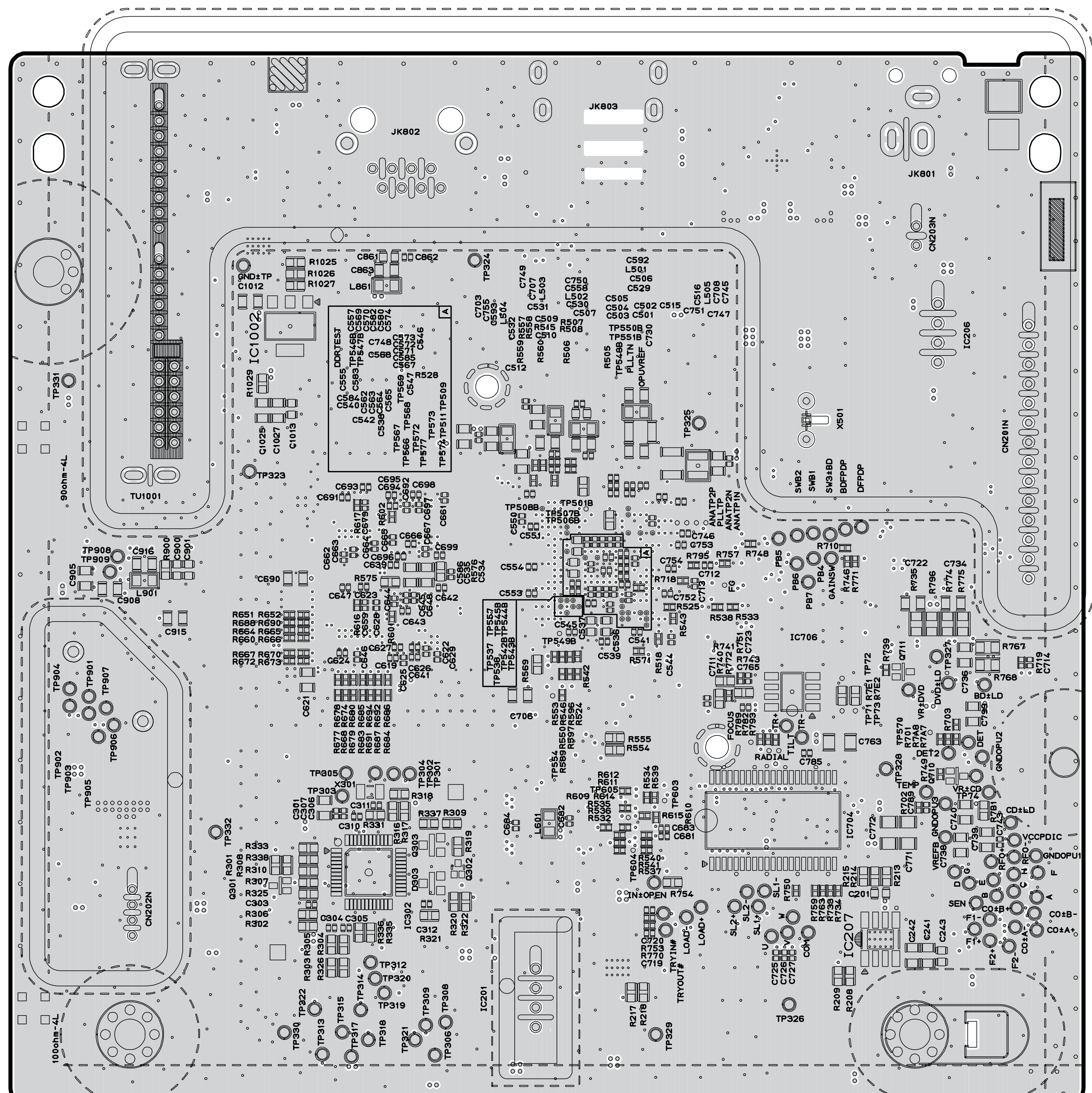
PRINTED CIRCUIT BOARD DIAGRAMS

1. MAIN P.C. BOARD

(TOP VIEW)

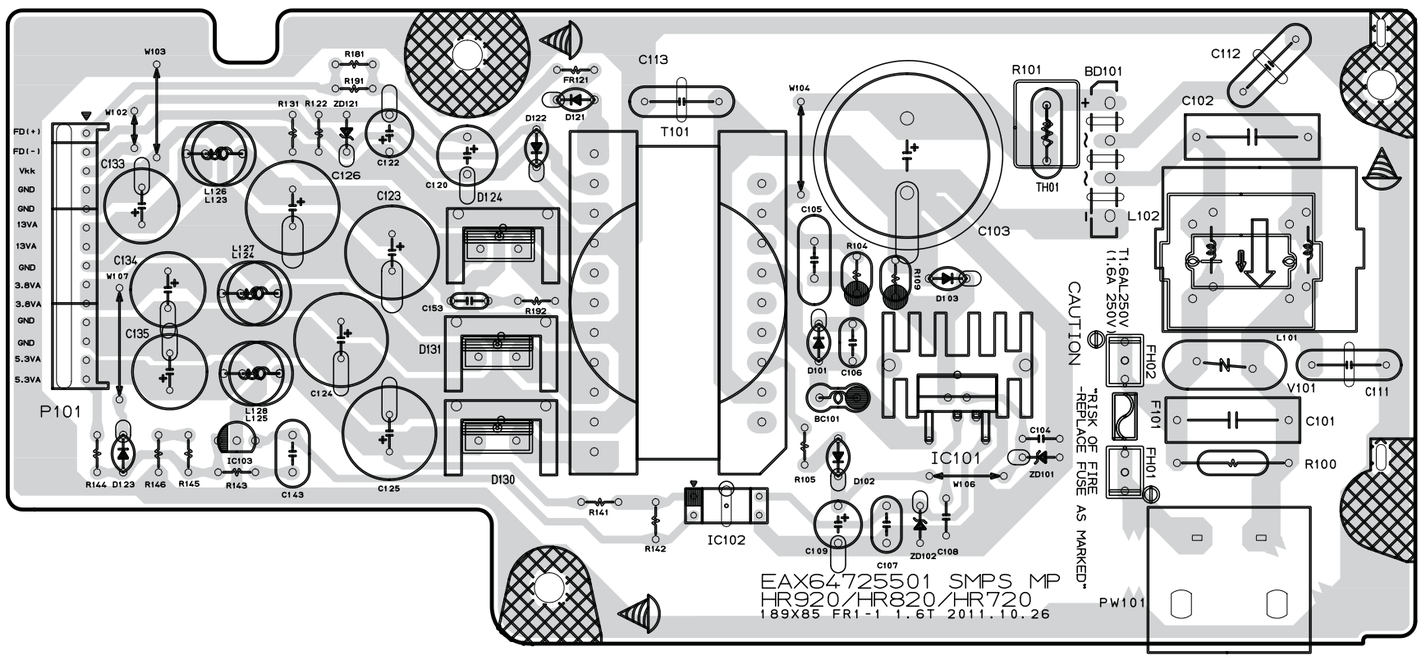


MAIN P.C. BOARD
(BOTTOM VIEW)

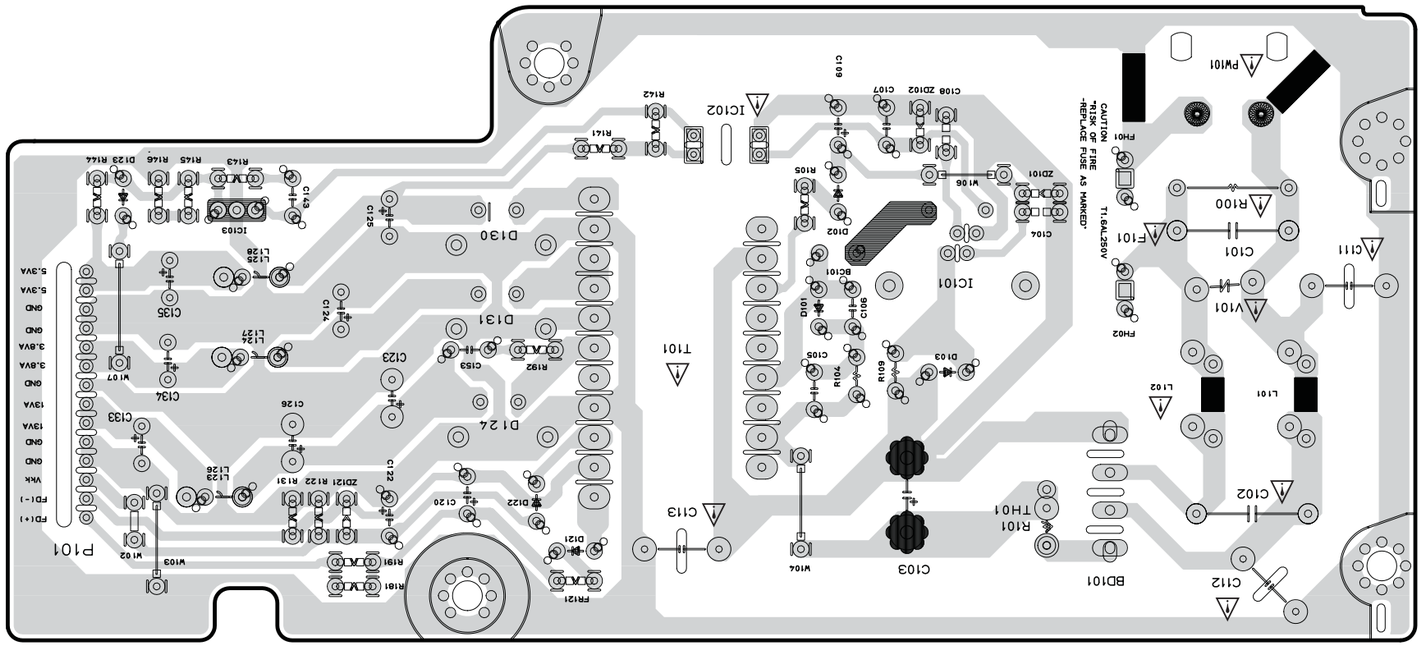


2. SMPS P.C. BOARD

(TOP VIEW)



(BOTTOM VIEW)

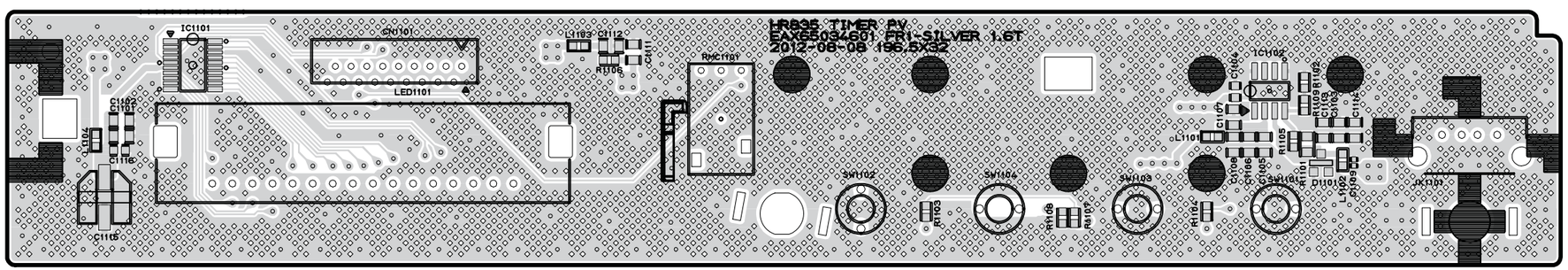


NOTE) Warning

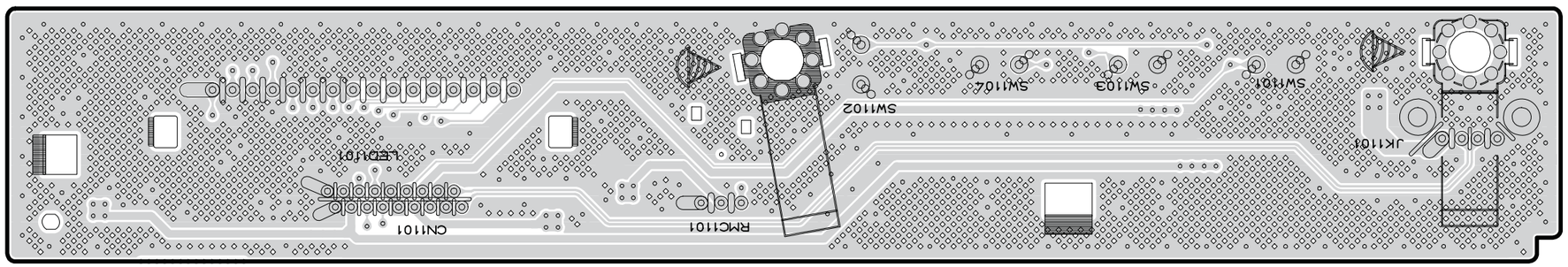
⚠ Parts that are critical with respect to risk of fire or electrical shock.

3. FRONT TIMER P.C. BOARD

(TOP VIEW)



(BOTTOM VIEW)



SECTION 4

BCM7632 F/E LOADER PART

CONTENTS

ONE POINT REPAIR GUIDE

1. ABNORMAL MD OPERATION

Abnormal disc reading or abnormal tray open/close.

⇨ Replace new MD and test if it is operated normally.

1-1. Component

1) Traverse assembly
2) FFC cable from MAIN board to MD

1-2. How to troubleshoot (Countermeasure)

1) Check the connection between main board and FFC cable,
2) Confirm the connection point.
3) If all the cable connections are normal, replace the traverse assembly.

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

◊ After changing MD(Traverse assembly), you must perform "SA Reset".
Refer to the next chapter "How to use the SA reset function".

ONE POINT REPAIR GUIDE

2. "ALL BD DISC" READING ERROR

- All the Blu-ray disc is not operated, but DVD and CD are operated normally.
- If the LDO for APC of BD laser diode is abnormal, BD doesn't work.
- If the LD current control is abnormal, BD doesn't work.

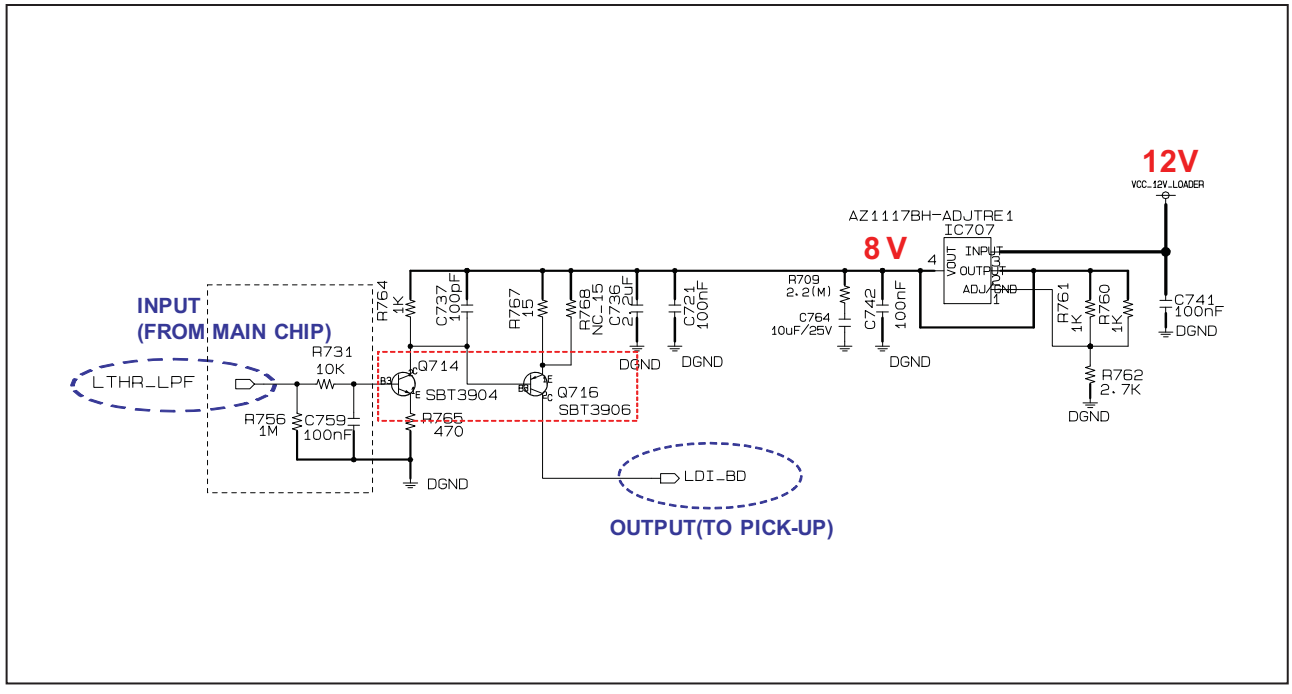
2-1. Component

1) MD (Traverse Assembly)
2) IC707 – Adjustable LDO

2-2. How to troubleshoot (Countermeasure)

1) Check MD (Traverse, pick-up) first of all
2) Check input/output voltage of LDO IC707 – (12 V, 8.1 V)
3) If output voltage is abnormal, check the periphery of IC707 and replace it.
4) Check the BD LD Control input/output.
   If input signal (LTHR) is ok, but no output (LDI_BD), check the TR Q714,716

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



ONE POINT REPAIR GUIDE

3. "ALL DVD DISC" READING ERROR

- All the DVD disc is not operated, but BD and CD are operated normally.
- If the LD current control is abnormal, DVD doesn't work.

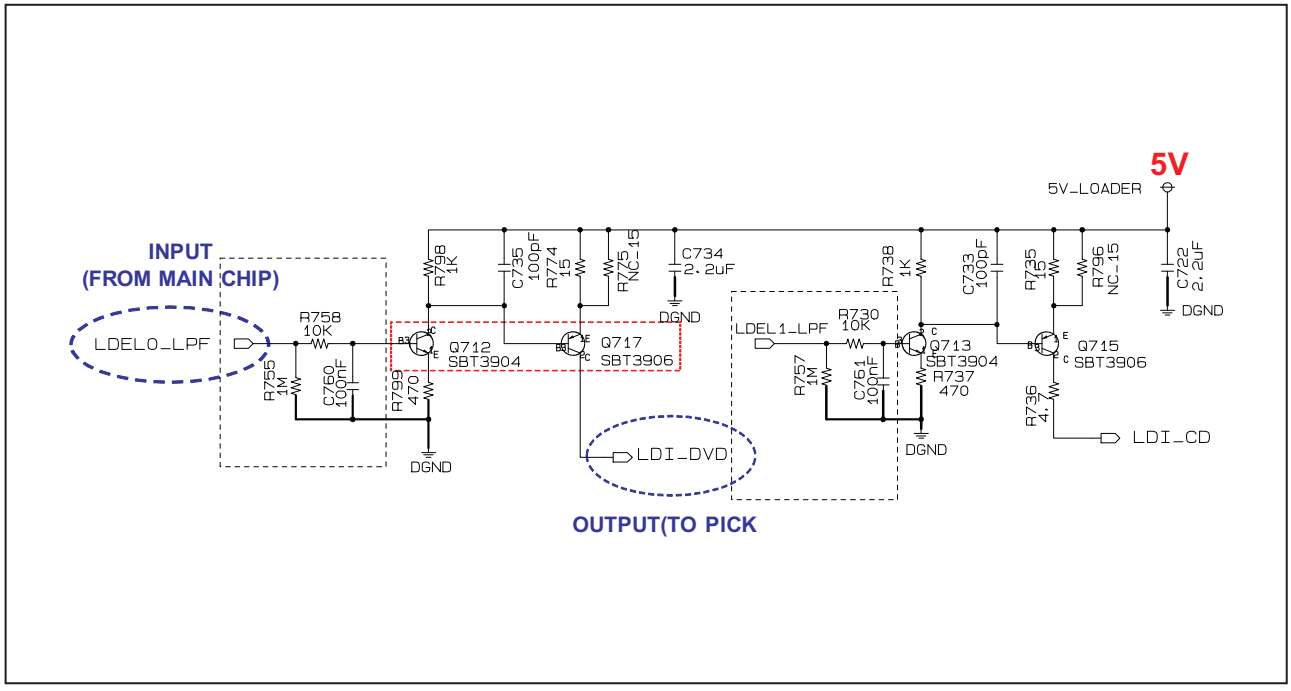
3-1. Component

1) MD (Traverse Assembly)
2) Q712, Q717

3-2. How to troubleshoot (Countermeasure)

1) Check MD (Traverse, pick-up) first of all.
2) Check the DVD LD Control input/output.
   If input signal (LDELO) is ok, but no output (LDI_DVD), check the TR Q712, Q717.

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



ONE POINT REPAIR GUIDE

4. "ALL CD DISC" READING ERROR

- All the CD disc is not operated, but BD and DVD are operated normally.
- If the LD current control is abnormal, CD doesn't work.

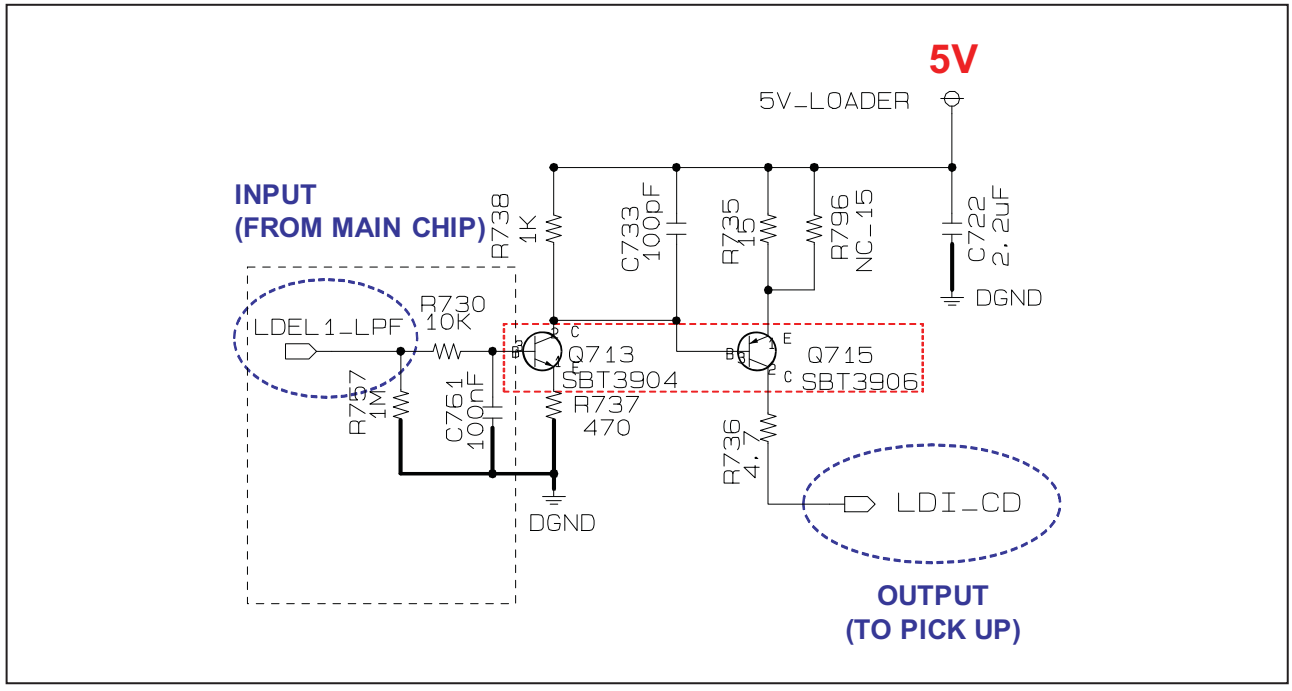
4-1. Component

1) MD (Traverse Assembly)
2) Q713, Q715

4-2. How to troubleshoot (Countermeasure)

1) Check MD (Traverse, pick-up) first of all.
2) Check the CD LD Control input/output.
   If input signal (LDEL1) is ok, but no output (LDI_CD), check the TR Q713, Q715.

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



ONE POINT REPAIR GUIDE

5. ABNORMAL SERVO OPERATION

- The actuator, spindle and sled operation of pick-up are abnormal.
- After changing MD, the motors are abnormal operations.
- After changing Motor Drive IC, the motors are abnormal operations.

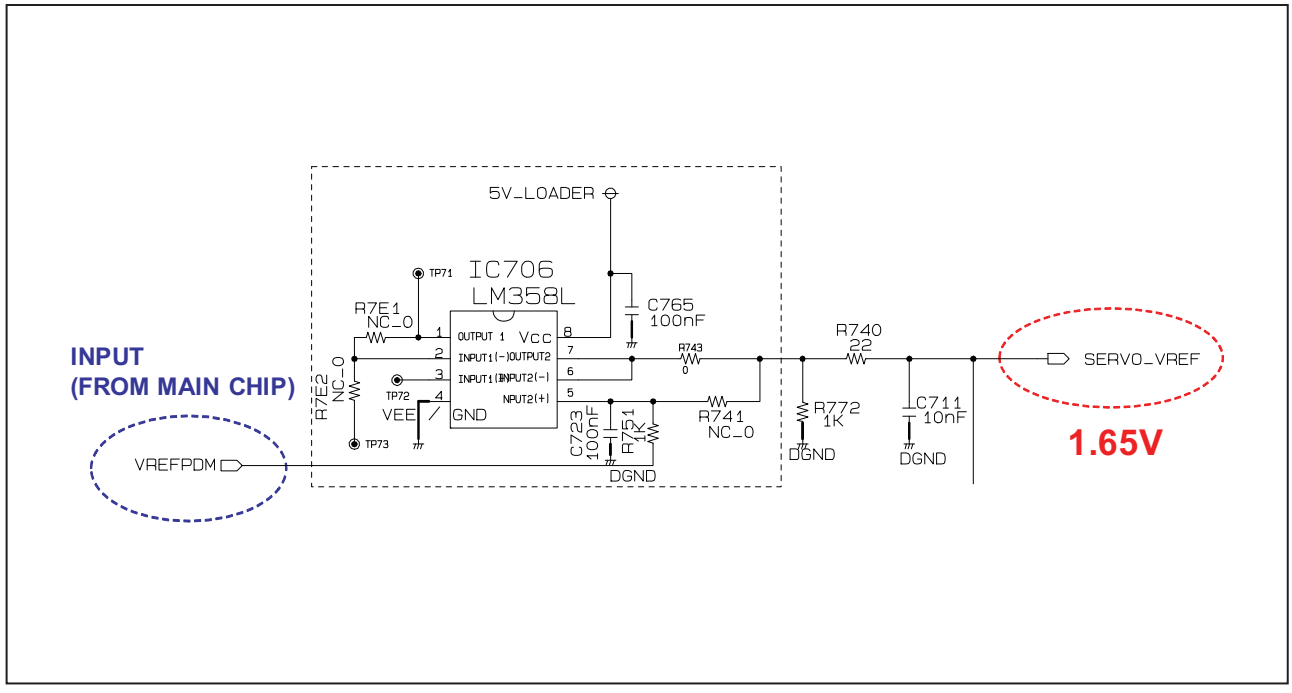
5-1. Component

1) MD (Traverse Assembly)
2) IC706 – LM358L

5-2. How to troubleshoot (Countermeasure)

1) Check if the input/output voltage of IC706 (pin5 and pin7) is 1.65 V.

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



HOW TO USE THE SA RESET FUNCTION

1. SA RESET PURPOSE

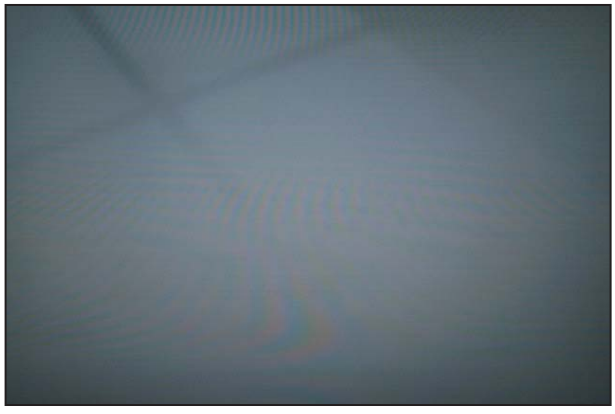
1) If we change system, we should do SA adjustment to get better performance of BD disc.
2) This is the operation to locate collimator lens of pick-up at the exact point.
3) We use this value to playback the BD disc after we store into the flash memory.

2. REQUIRED SA RESET

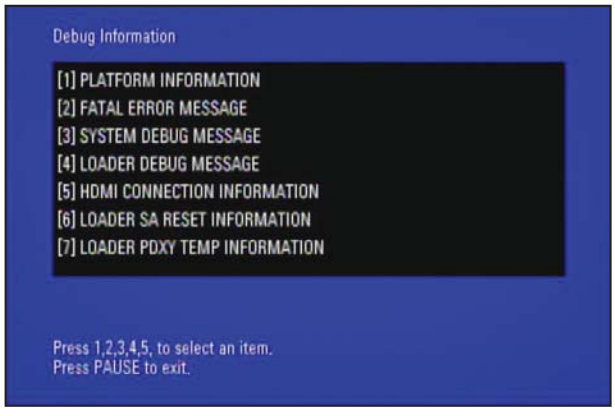
1) After changing Traverse.
2) After changing Main Board Assembly.
3) After changing Main Board Flash IC.

3. SA RESET PROCEDURE

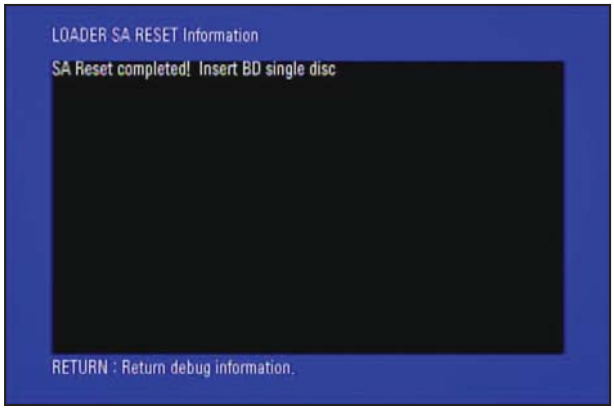
1) After the set turn on.
(then, mode is the home menu)



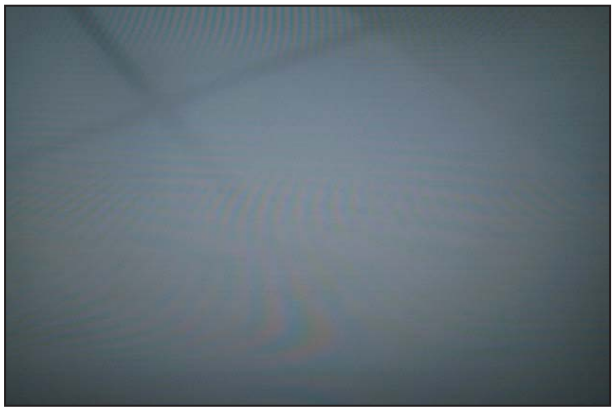
2) Press HOME key to escape from home menu.



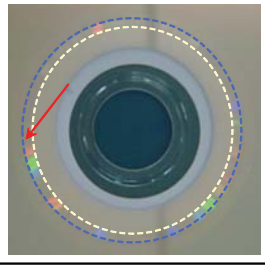
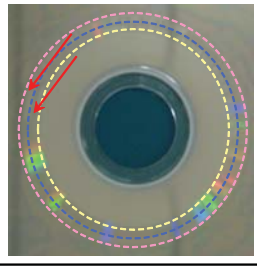
3) Press the 4 –> 5 –> 6 –> 2 –> 5 –> 8 –> 0(numerical button) on the remote controller to display debug window.



4) Select 6 on debug window to perform SA Reset.



5) Press Return key or Pause key to finish debug mode.

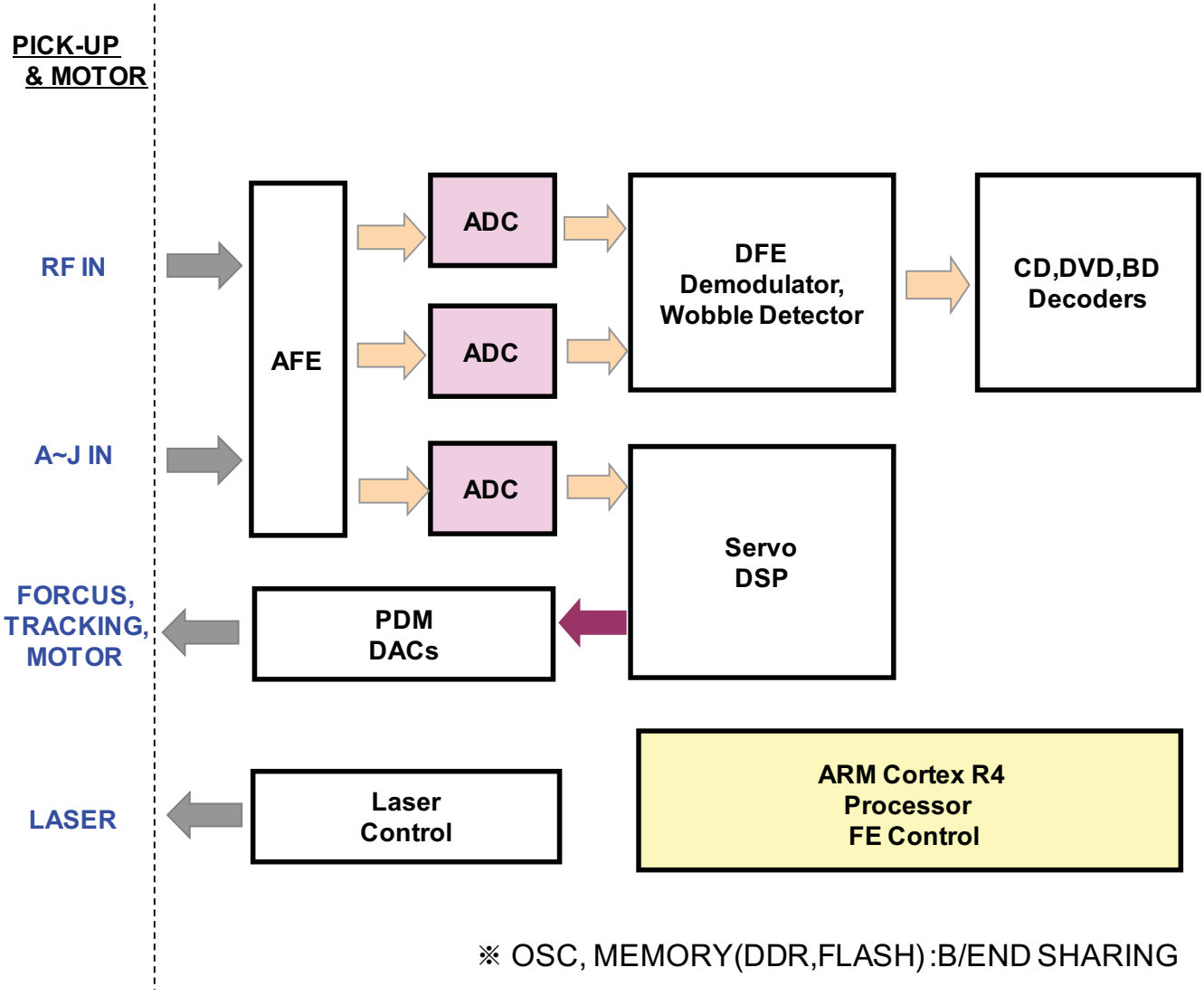
How to check the BD Single Layer and Double Layer Disc	
BD Single Layer Disc	**BD Double Layer Disc**
Barcode 1 EA	Barcode 2 EA
	

6) Playback once BD disc more than 3 seconds.
(At this time, you must use BD ROM single layer and BDR single layer disc.)
- Check the disc reverse side of printed label and then you can see the Bar code in the near of center hole.
- You should use BD disc which has 1 Barcode like left picture.
- If you use Double Layer Disc, we don't perform the SA adjustment, it might be not able to read BD disc.

MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

1. BCM7632

1-1. Front-end Block Diagram



※ OSC, MEMORY(DDR,FLASH) :B/END SHARING

1-2. Pin Function

OFE – Motor Driver Interface						
Label	**Function I/O**	**IO**	**PU/PD**	**Tol. (V)**	**Loc.**	**Description**
OFE_MDI_FG	I	I/O	PU	3.3	E8	Spindle Motor Feedback
OFE_MDI_DMO	O	O	–	3.3	E9	Spindle Motor Output
OFE_MDI_STEP1	O	O	–	3.3	F9	Sled Step Motor PDM DAC
OFE_MDI_STEP2	O	O	–	3.3	G9	Sled Step Motor PDM DAC
OFE_MDI_FOO	O	O	–	3.3	B9	Focus PDM Output/Focus Tilt PDM Output
OFE_MDI_TILT	O	O	–	3.3	E10	Tilt PDM Output/Focus Tilt PDM Output
OFE_MDI_TRO	O	O	–	3.3	G8	Tracking PDM Output
OFE_MDI_COLLSIN	O	O	–	3.3	F8	Collimator Sine PDM Output
OFE_MDI_COLLCOS	O	O	–	3.3	F10	Collimator Cosine PDM Output
OFE_OPU_VREFPDM	O	I/O	–	3.3	C9	Reference Voltage PDM Output

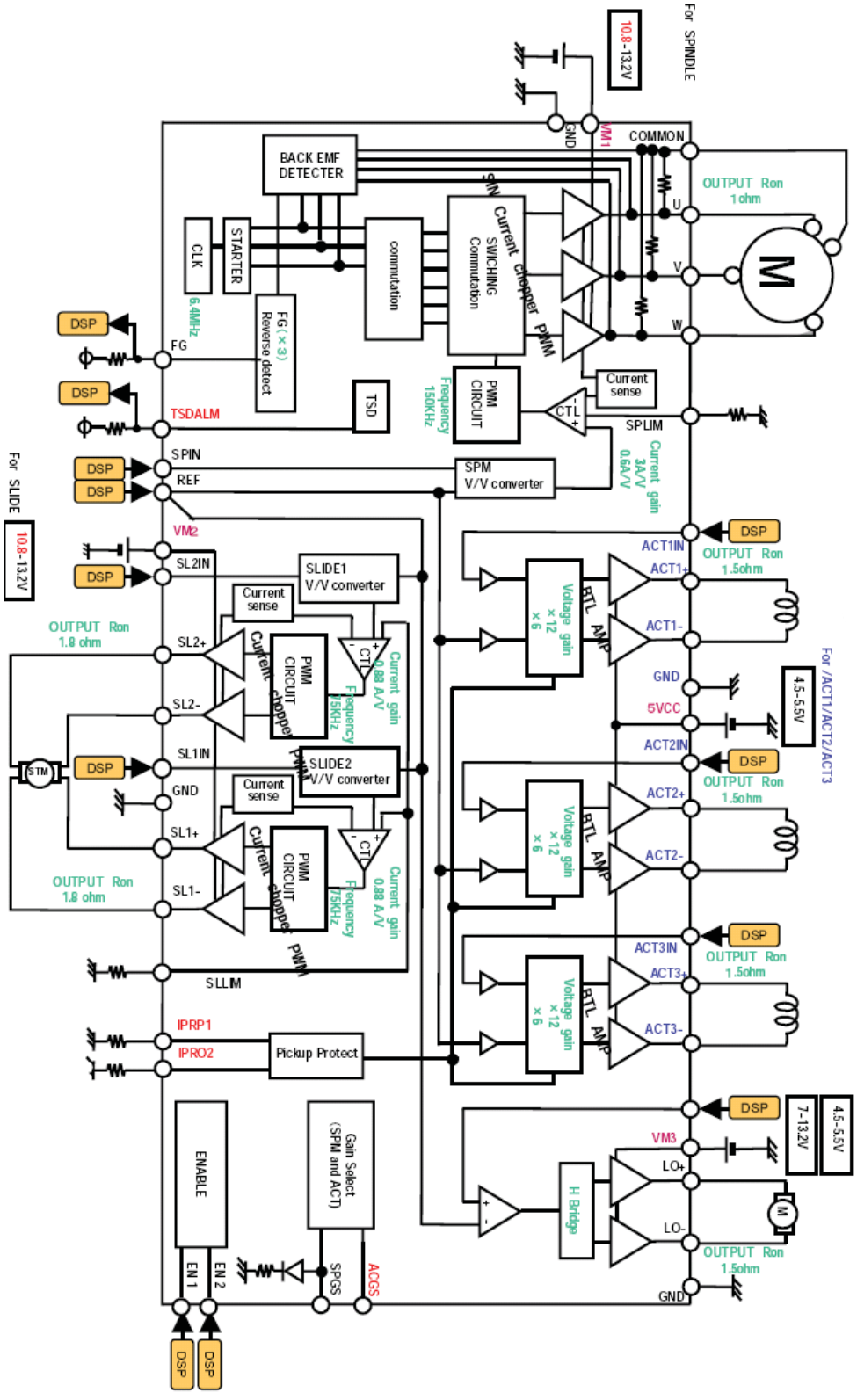
OFE – Optical Pickup Unit (OPU) Interface						
Label	**Function I/O**	**IO**	**PU/PD**	**Tol. (V)**	**Loc.**	**Description**
OFE_OPU_DVDFPDIPVREF	AIO	AIO	–	-	C18	DVD Fwd Photodiode and Ref Voltage
OFE_OPU_DVDFPDINVREF	AIO	AIO	–	-	C19	DVD Fwd Photodiode and Ref Voltage
OFE_OPU_BDFPDIP	AI	AI	–	–	B17	BD Fwd Photodiode In
OFE_OPU_BDFPDIN	AI	AI	–	–	B16	BD Fwd Photodiode In
OFE_OPU_GAINSW	O	I/O	–	3.3	C12	OPU Gain Switch
OFE_OPU_GPADC1	AI	AI	–	–	B19	General Purpose ADC Channel Input
OFE_OPU_GPADC2	AI	AI	–	–	B18	General Purpose ADC Channel Input
OFE_OPU_VREF	AO	AO	–	–	E16	Reference Voltage
OFE_OPU_VREFB	AO	AO	–	–	E18	Reference Voltage for OEIC (1.5 to 2.55V)
OFE_OPU_AIN	AI	AI	–	–	C22	Photodiode Input A
OFE_OPU_BIN	AI	AI	–	–	D21	Photodiode Input B
OFE_OPU_CIN	AI	AI	–	–	D22	Photodiode Input C
OFE_OPU_DIN	AI	AI	–	–	E21	Photodiode Input D
OFE_OPU_EIN	AI	AI	–	–	E22	Photodiode Input E
OFE_OPU_FIN	AI	AI	–	–	F21	Photodiode Input F
OFE_OPU_GIN	AI	AI	–	–	F22	Photodiode Input G
OFE_OPU_HIN	AI	AI	–	–	F20	Photodiode Input H
OFE_OPU_DVDRFP	AI	AI	–	–	F19	Summed RF Input Port
OFE_OPU_DVDRFN	AI	AI	–	–	G19	Summed RF Input Port
OFE_OPU_BDRFP	AI	AI	–	–	F18	2nd Summed RF Input Port
OFE_OPU_BDRFN	AI	AI	–	–	G18	2nd Summed RF Input Port
OFE_OPU_ANATP1P	AIO	AIO	–	–	C17	Differential high-speed output debug port 1
OFE_OPU_ANATP1N	AIO	AIO	–	–	C16	Differential high-speed output debug port 1
OFE_OPU_ANATP2P	AIO	AIO	–	–	D17	Differential high-speed output debug port 2
OFE_OPU_ANATP2N	AIO	AIO	–	–	D16	Differential high-speed output debug port 2
OFE_OPU_LDEL1	O	T/O	–	3.3	C11	Laser Control PDM Output
OFE_OPU_LDEL0	O	T/O	–	3.3	C10	Laser Control PDM Output
OFE_OPU_LTHR	O	T/O	–	3.3	B10	Laser Control PDM Output
OFE_OPU_PLLTP	AO	AO	–	–	G16	OPU PLL test pin–Do not connect
OFE_OPU_PLLTN	AO	AO	–	–	G15	Test pin–Do not connect

OFE–Serial Interface						
Label	**Function I/O**	**IO**	**PU/PD**	**Tol. (V)**	**Loc.**	**Description**
OFE_SER_SEN2	I/O	STI/O	PU	3.3	C7	SSI Enable Out
OFE_SER_SCLK	I/O	I/O	PU	3.3	A9	SSI Clock Out
OFE_SER_SDATA	I/O	I/O	PU	3.3	D9	SSI Data In/out
OFE_SER_SBUSY	I/O	I/O	PD	3.3	E7	SSI Busy In/SEN4

OFE–General Purpose						
Label	**Function I/O**	**IO**	**PU/PD**	**Tol. (V)**	**Loc.**	**Description**
OFE_GP_PA0	I/O	I/O	–	3.3	F13	OFE_GP_PA0/Gain SW2
OFE_GP_PA1	I/O	I/O	–	3.3	E13	OFE_GP_PA1/SEN4
OFE_GP_PA2	I/O	I/O	–	3.3	F12	OFE_GP_PA2/SEN3
OFE_GP_PA3	I/O	I/O	–	3.3	G12	OFE_GP_PA3/AlphaSIN
OFE_GP_PA4	I/O	I/O	–	3.3	G11	OFE_GP_PA4/AlphaCOS
OFE_GP_PA5	I/O	I/O	–	3.3	F11	OFE_GP_PA5/PanicIn
OFE_GP_PA6	I/O	I/O	–	3.3	E12	OFE_GP_PA6/ExtINT_
OFE_GP_PA7	I/O	I/O	–	3.3	D11	OFE_GP_PA7
OFE_GP_PB0	I/O	I/O	–	3.3	D14	OFE_GP_PB0/MIOCLK
OFE_GP_PB1	I/O	I/O	–	3.3	E14	OFE_GP_PB1/Land
OFE_GP_PB2	I/O	I/O	–	3.3	F14	OFE_GP_PB2
OFE_GP_PB3	I/O	I/O	–	3.3	G14	OFE_GP_PB3
OFE_GP_PB4	I/O	I/O	–	3.3	C13	OFE_GP_PB4/MIO0/DIGTP1
OFE_GP_PB5	I/O	I/O	–	3.3	B13	OFE_GP_PB5/MIO1/DIGTP2
OFE_GP_PB6	I/O	I/O	–	3.3	D12	OFE_GP_PB6/MIO2/DIGTP3
OFE_GP_PB7	I/O	I/O	–	3.3	E11	OFE_GP_PB7/MIO3

OFE–Analog Supply						
Label	**Function I/O**	**IO**	**PU/PD**	**Tol. (V)**	**Loc.**	**Description**
OFE_AVDD1P2RFDPD	APWR	APWR	–	1.2	A19	Analog Power for RF and DPD (1.2 V)
OFE_AVSSRFDPD	AGND	AGND	–		A18	Analog Ground for RF and DPD
OFE_AVDD1P2SERVOADC	APWR	APWR	–	1.2	A16	Analog Power for Servo ADC (1.2 V)
OFE_AVSSSERVOADC	AGND	AGND	–		A17	Analog Ground for Servo ADC
OFE_AVDD1P2WOBBLE	APWR	APWR	–	1.2	B20	Analog Power for Wobble (1.2 V)
OFE_AVSSWOBBLE	AGND	AGND	–		C20	Analog Ground for Wobble
OFE_AVDD1P2ADCPLL	APWR	APWR	–	1.2	B21	Analog Power for ADC PLL (1.2 V)
OFE_AVSSADCPLL	AGND	AGND	–		C21	Analog Ground for ADC PLL
OFE_AVDD3P3	APWR	APWR	–	3.3	B14	Analog Power for 2.5V Regulator (3.3 V)
OFE_AVDD2P5CAP	AGND	AGND	–		A14	Output cap for 2.5V regulator

2. DRIVE IC (R2A30209SP)
: SPINDLE MOTOR AND 6CH ACTUATOR DRIVER
2-1. Block Diagram



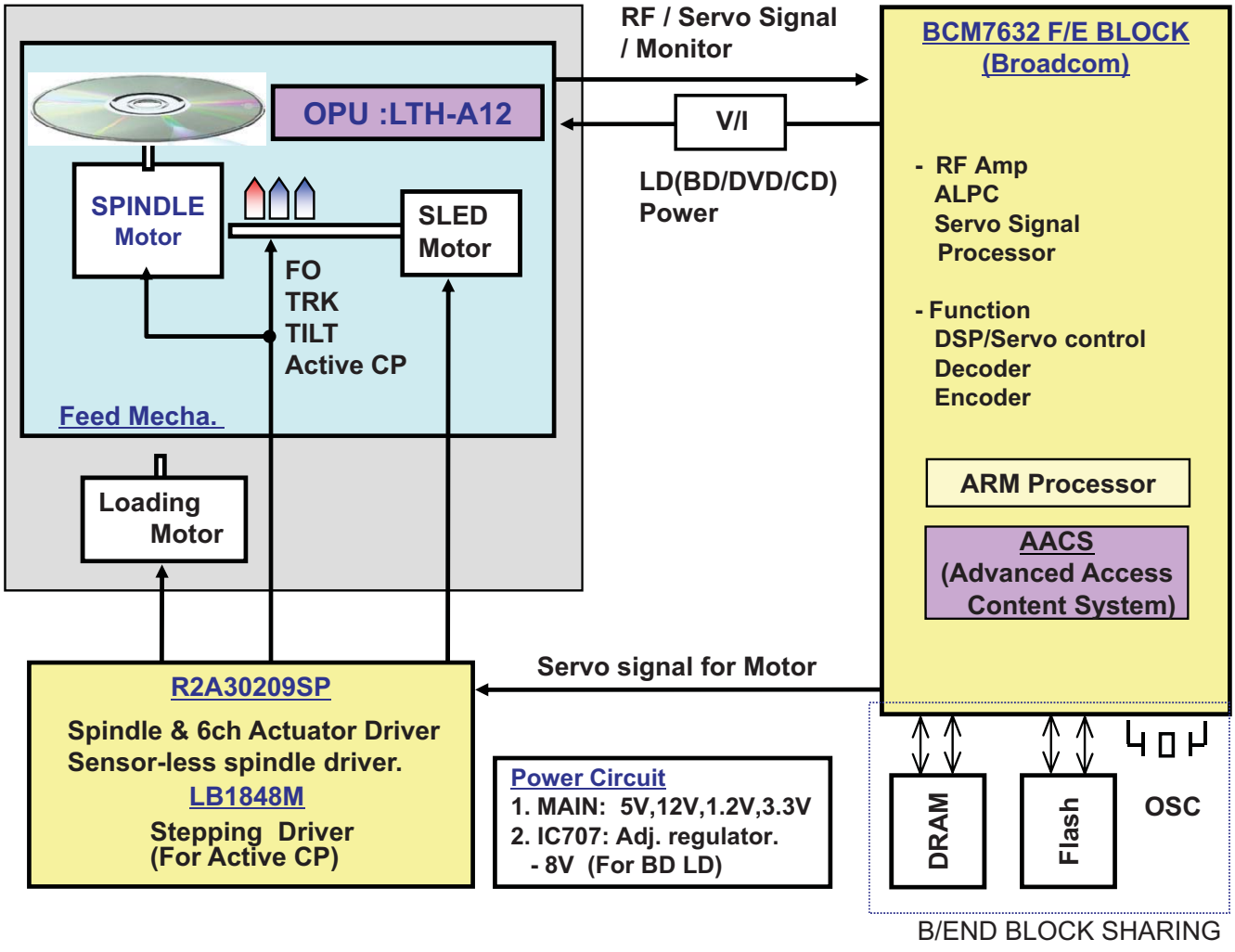
2-2. Pin Function

PIN NO	SYMBOL	FUNCTION
1	SPIN	Spindle control voltage input
2	SL1IN	Slide control voltage input 1
3	SL2IN	Slide control voltage input 2
4	SPLIM	Input terminal for spindle current limit
5	VM2	Motor Power Supply 2(for Slide)
6	SL2+	Slide non-inverted output 2
7	GND	GND
8	SL2-	Slide inverted output 2
9	SL1+	Slide non-inverted output 1
10	SL1-	Slide inverted output 1
11	GND	GND
12	U	Motor drive output U
13	V	Motor drive output V
14	W	Motor drive output W
15	TSDFLG	TSD flag output
16	COMMON	Motor common
17	IPRO2	Input terminal for ACT2 current protect
18	SLLIM	Input terminal for slide current limit
19	FG	Frequency generator output
20	EN1	Input terminal for enable 1
21	EN2	Input terminal for enable 2
22	VM1	Motor Power Supply 1(for Spindle)
23	SPGS	Input terminal for gain select SPM
24	IPRO1	Input terminal for ACT13 current protect
25	ACGS	Input terminal for gain select ACT
26	VM3	Power Supply3(for Loading)
27	LO+	Loading non-inverted output
28	LO-	Loading inverted output
29	GND	GND
30	ACT2-	ACT2+ inverted output
31	ACT2+	ACT2+ non-inverted output
32	5VCC	5V Power Supply (for FS,TS,TL)
33	GND	GND
34	ACT1+	ACT1 non-inverted output
35	ACT1-	ACT1 inverted output
36	ACT3+	ACT3 non-inverted output
37	ACT3-	ACT3 inverted output
38	ACT3IN	ACT3 control voltage input
39	ACT2IN	ACT2 control voltage input
40	ACT1IN	ACT1 control voltage input
41	LOIN	Loading control input
42	REF	Reference voltage input

3. PICK-UP CONNECTOR TERMINAL PIN ASSIGNMENTS (LTH-A12)

PIN NO.	PIN NAME	DESCRIPTION	FUNCTION
1	FCS2+	ACT	FOCUSING2+
2	FCS2-		FOCUSING2-
3	TRK+		TRACKING+
4	FCS1+		FOCUSING1+
5	TRK-		TRACKING-
6	FCS1-		FOCUSING1-
7	A-	CMU SHIFTER	Stepping Motor A-Terminal
8	B-		Stepping Motor B-Terminal
9	A+		Stepping Motor A+Terminal
10	B+		Stepping Motor B+Terminal
11	PGND(NC)	PDIC	GND for PDIC(NC)
12	NC		NC
13	NC(VCC)		NC(Terminal for LG pick-up recognation)
14	A		A output
15	B		B output
16	C		C output
17	D		D output
18	SA		SA output
19	SB		SB output
20	SC		SC output
21	SD		SD output
22	NC		NC
23	RF+		RF+output for BD and DVD, CD
24	RF-		RF-output for BD and DVD, CD
25	SWB2		PDIC BD Output Switch Port
26	SWB1		PDIC BD Output Switch Port
27	VREF_PD		PDIC Reference Supply Terminal 2.1 V
28	VCC_+5PD		PDIC Power Terminal 5 V
29	PGND		GND for PDIC
30	SW		2-Wavelength PDIC DVD/CD/Sleep(L/H/M) Changeover SW
31	GND1	LD HFM IC Monitor	GND for LD and HFM IC
32	LDI BD		LD control for LD,BD
33	LDI CD		LD control for LD,CD
34	LDI DVD		LD control for LD,DVD
35	LGND		GND for LD and HFM IC
36	TEMP		Thermister
37	VCC		Vcc for HFM IC 5 V
38	MON_CD/DVD		Monitor Output for DVD & CD
39	MON_BD		Monitor Output for BD
40	SEL_DVD		Select Input for DVD Monitor(L:Enable)
41	SEL_CD		Select Input for CD Monitor(L:Enable)
42	LGND(NC)		GND for LD and HFM IC(NC)
43	NC		GND for LD and HFM IC(NC)
44	LGND		GND for LD and HFM IC
45	GND_BDPD		GND for Back monitor PD,BD

BLOCK DIAGRAM



MEMO