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FEB, 2009

SERVICE MANUAL

MODEL : BD370

LG

BLU-RAY DISC PLAYER

SERVICE MANUAL

MODEL : BD370

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

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SECTION 1

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PRODUCT SAFETY SERVICING GUIDELINES FOR BLU-RAY DISC PLAYER PRODUCTS

IMPORTANT SAFETY NOTICE

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

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

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

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

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

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

GRAPHIC SYMBOLS

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

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

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

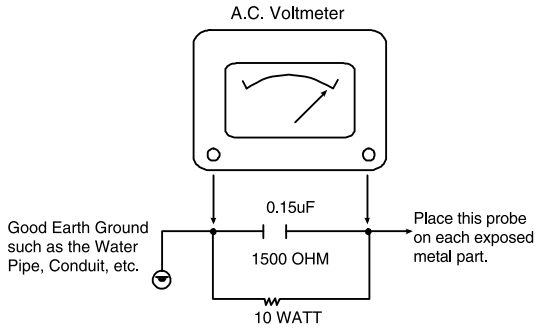
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

SERVICE INFORMATION

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

FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items 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 BLU-RAY DISC PLAYER 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 BLU-RAY DISC PLAYER 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 BLU-RAY DISC PLAYER 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 BLU-RAY DISC PLAYER and / or any of its electrical assemblies unless all solidstate device heat sinks are correctly installed.

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

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1Mohm.
Note 1 : Accessible Conductive Parts include Metal panels, Input terminals, Earphone jacks,etc.

Electrostatically Sensitive (ES) Devices

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

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.

3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.

4. Use only an anti-static solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ES devices.

5. Do not use freon-propelled chemicals. These can generate an electrical charge sufficient to damage ES devices.

6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil,or comparable conductive material).

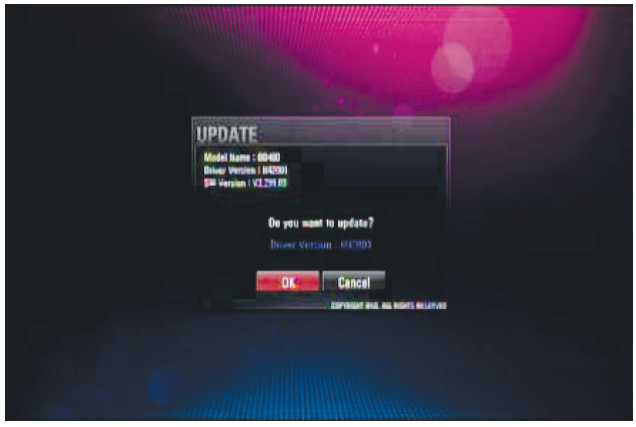
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

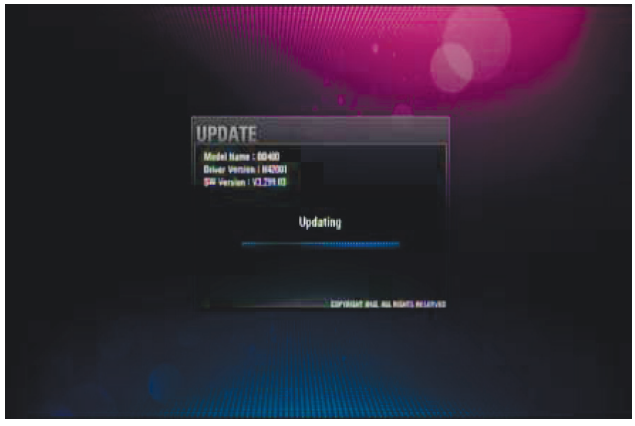
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Normally harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

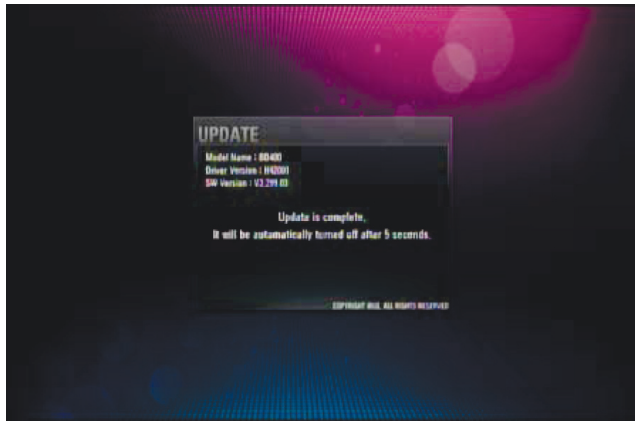
SOFTWARE UPGRADE

- Burn a DVD recordable disc or USB with a file that is named to “LG_BD_LV400M.ROM(BD370)”.
- Insert a upgrading disc or USB.
- Show help message for disc upgrade as follows.
  < in the case of Back End program & Front End program >



Press play key to upgrade and it will show progress information





After completing upgrade then power is off.

SPECIFICATIONS

• GENERAL

Power requirements:	AC 100~240V, 50/60Hz
Power consumption:	18W
Dimensions (W x H x D):	Approx. 430 x 54 x 245mm without foot
Weight (Approx.):	2.7kg
Operating temperature:	5°C to 35°
Operating humidity:	5% to 90%

• OUTPUTS

VIDEO OUT:	1.0V (p-p), 75Ω, sync negative, RCA jack x 1
COMPONENT VIDEO OUT:	(Y) 1.0V (p-p), 75Ω, sync negative, RCA jack x 1 (Pb)/(Pr) 0.7V (p-p), 75Ω, RCA jack x 2
HDMI OUT (video/audio):	19pin (HDMI standard, Type A)
ANALOG AUDIO OUT:	2.0Vrms (1kHz, 0dB), 600Ω, RCA jack (L, R) x 1
DIGITAL OUT (COAXIAL):	0.5V (p-p), 75Ω, RCA jack x 1
DIGITAL OUT (OPTICAL):	3V (p-p), Optical jack x 1

• SYSTEM

Laser:	Semiconductor laser, wavelength: 405nm / 650nm
Signal system:	Standard PAL/NTSC Color TV system
Frequency response:	20Hz to 20kHz (48kHz, 96kHz, 192kHz sampling)
Signal-to-noise ratio:	More than 100dB (ANALOG OUT connectors only)
Harmonic distortion:	Less than 0.008%
Dynamic range:	More than 95dB
LAN port:	Ethernet jack x 1, 10BASE-T/100BASE-TX

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

SECTION 2

CABINET & MAIN CHASSIS

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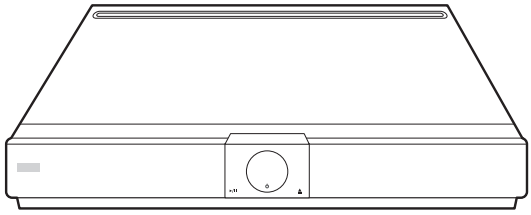
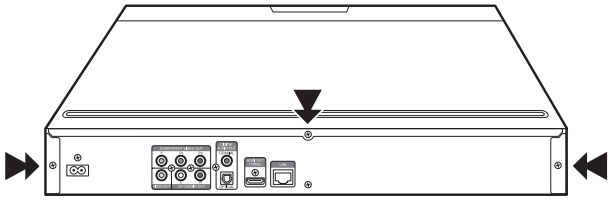
DISASSEMBLY INSTRUCTIONS

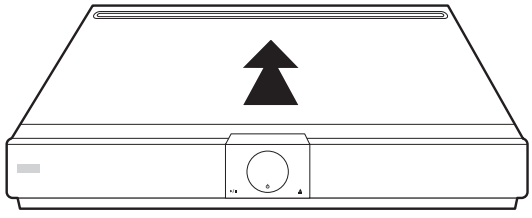
1. It is the product appearance.



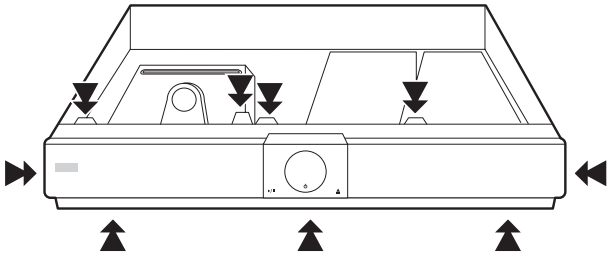
2. Remove the three screws on the back panel to seperate the top cover.



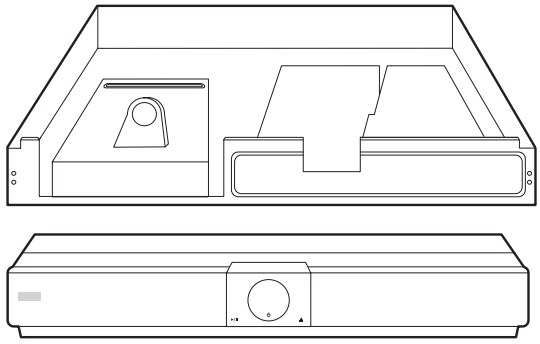
3. Push the top cover backward to seperate the top cover completely.



4. Remove the nine front panel hooks (four hooks on the top, two hooks on the both side and three hooks on the bottom) to seperate the front panel.



5. It is the feature that the top and front panel are seperated.



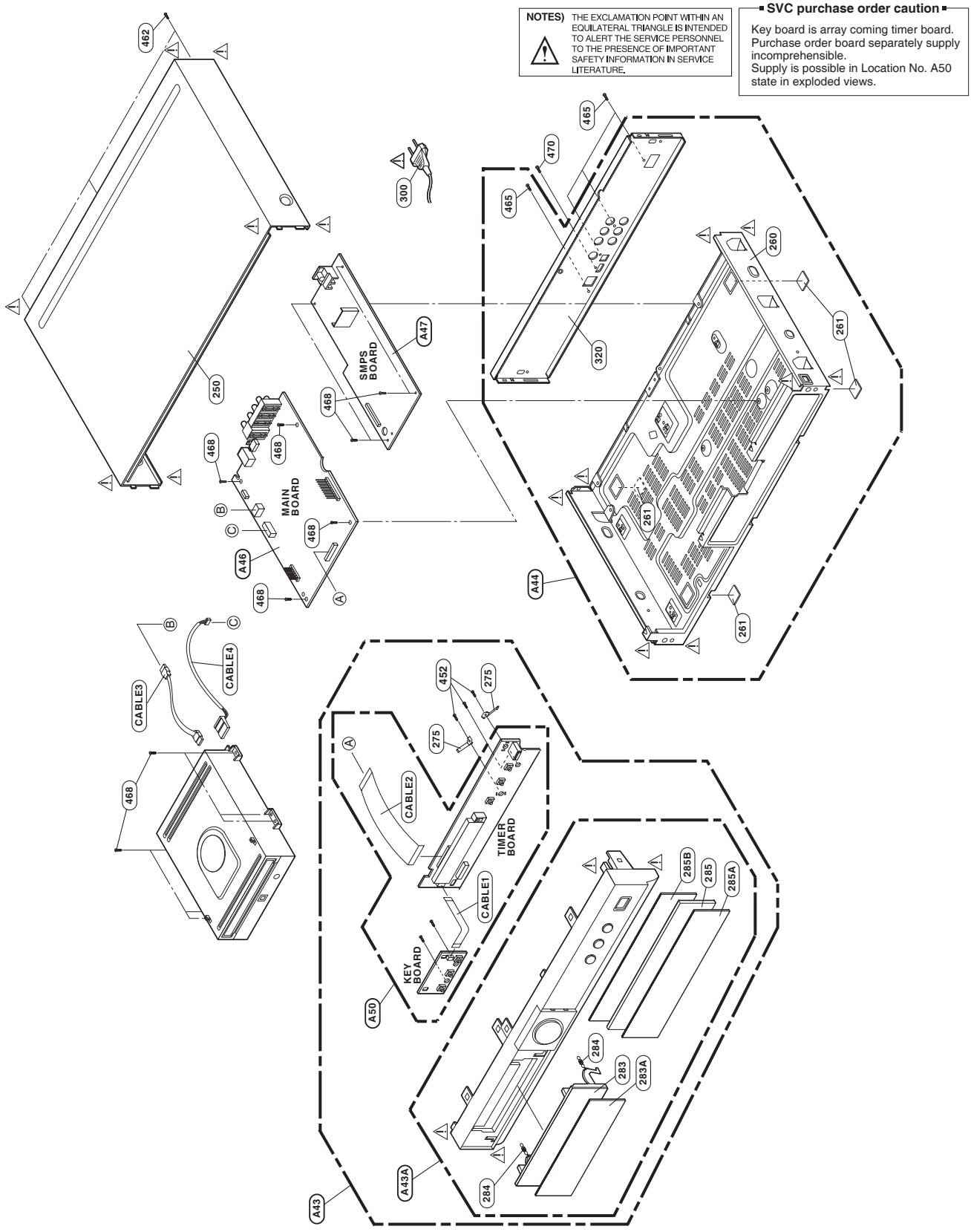
EXPLODED VIEWS

1. CABINET AND MAIN FRAME SECTION

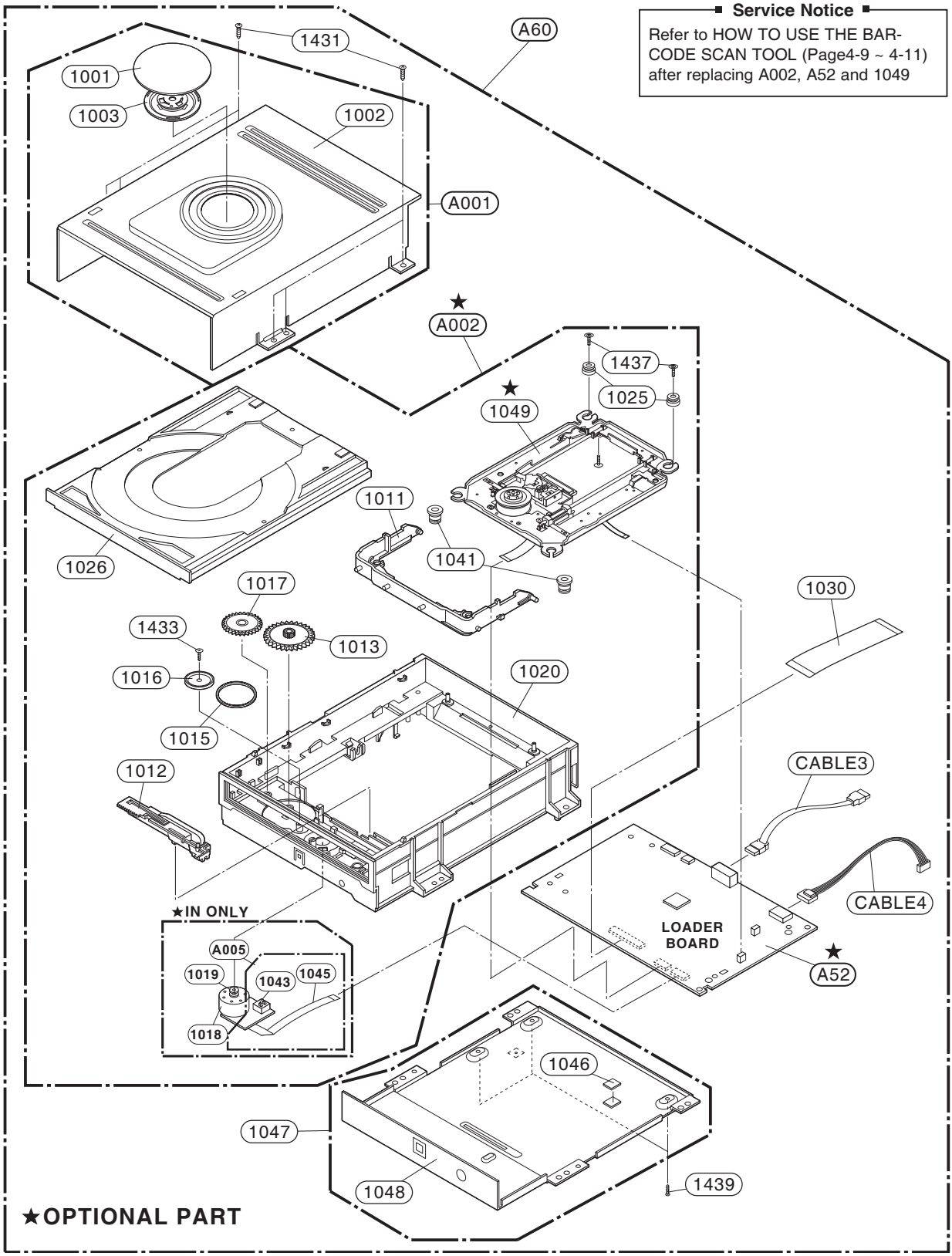
NOTES) THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

SVC purchase order caution

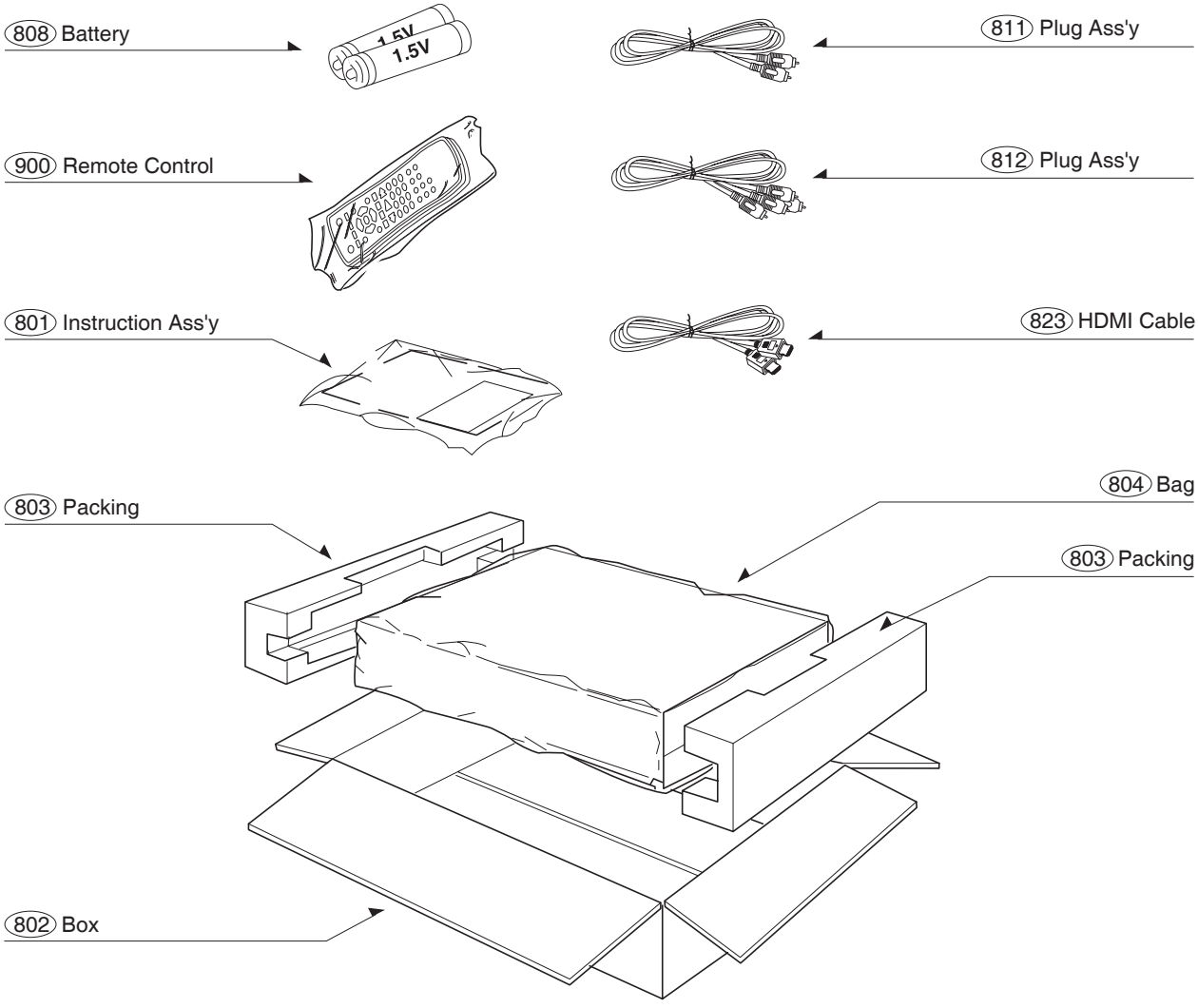
Key board is array coming timer board.
Purchase order board separately supply incomprehensible.
Supply is possible in Location No. A50 state in exploded views.



2. DECK MECHANISM SECTION (HL-04P)



3. PACKING ACCESSORY SECTION



MEMO

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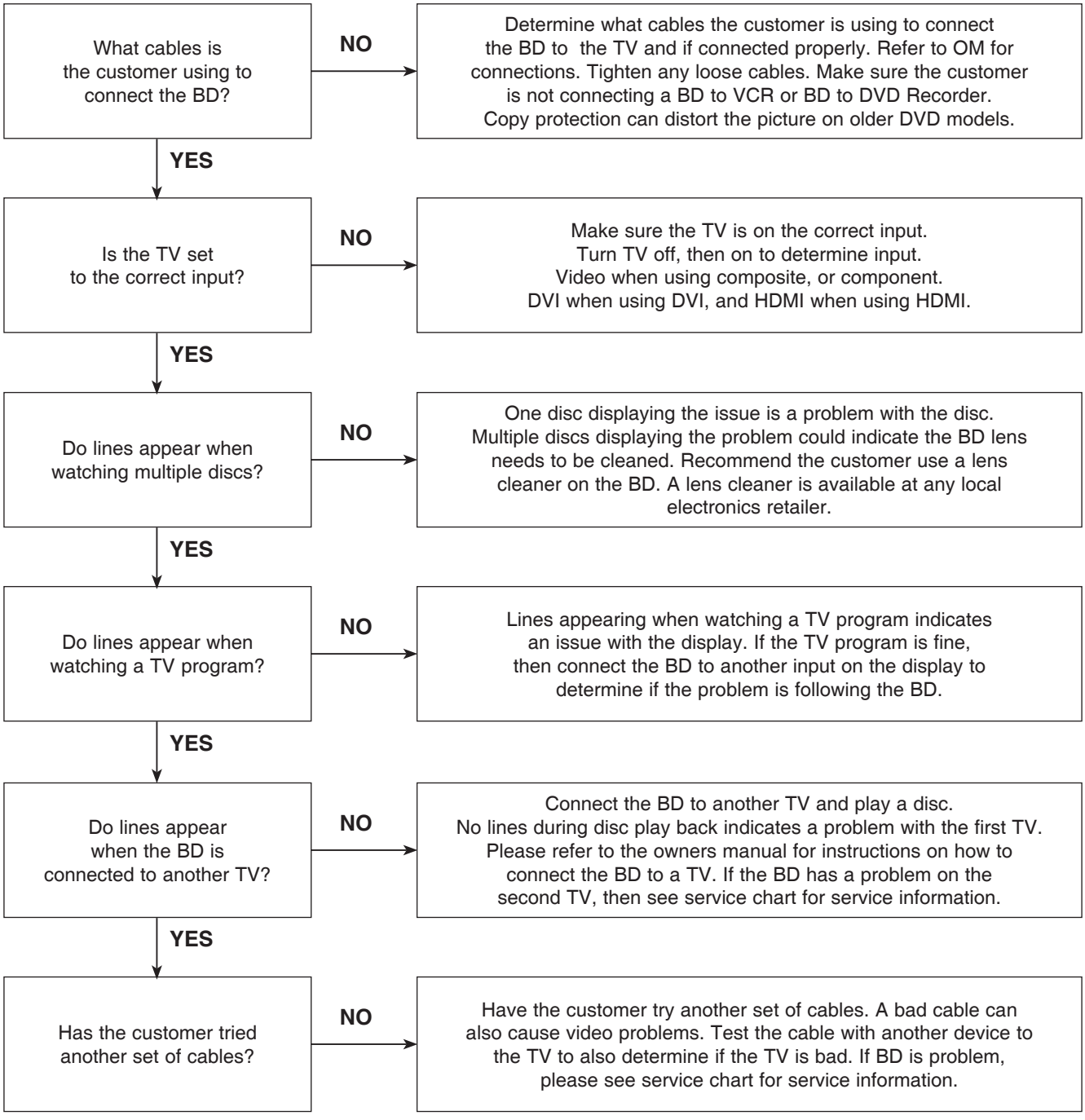
TRAINING MASTER FOR BLU-RAY (BD)

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

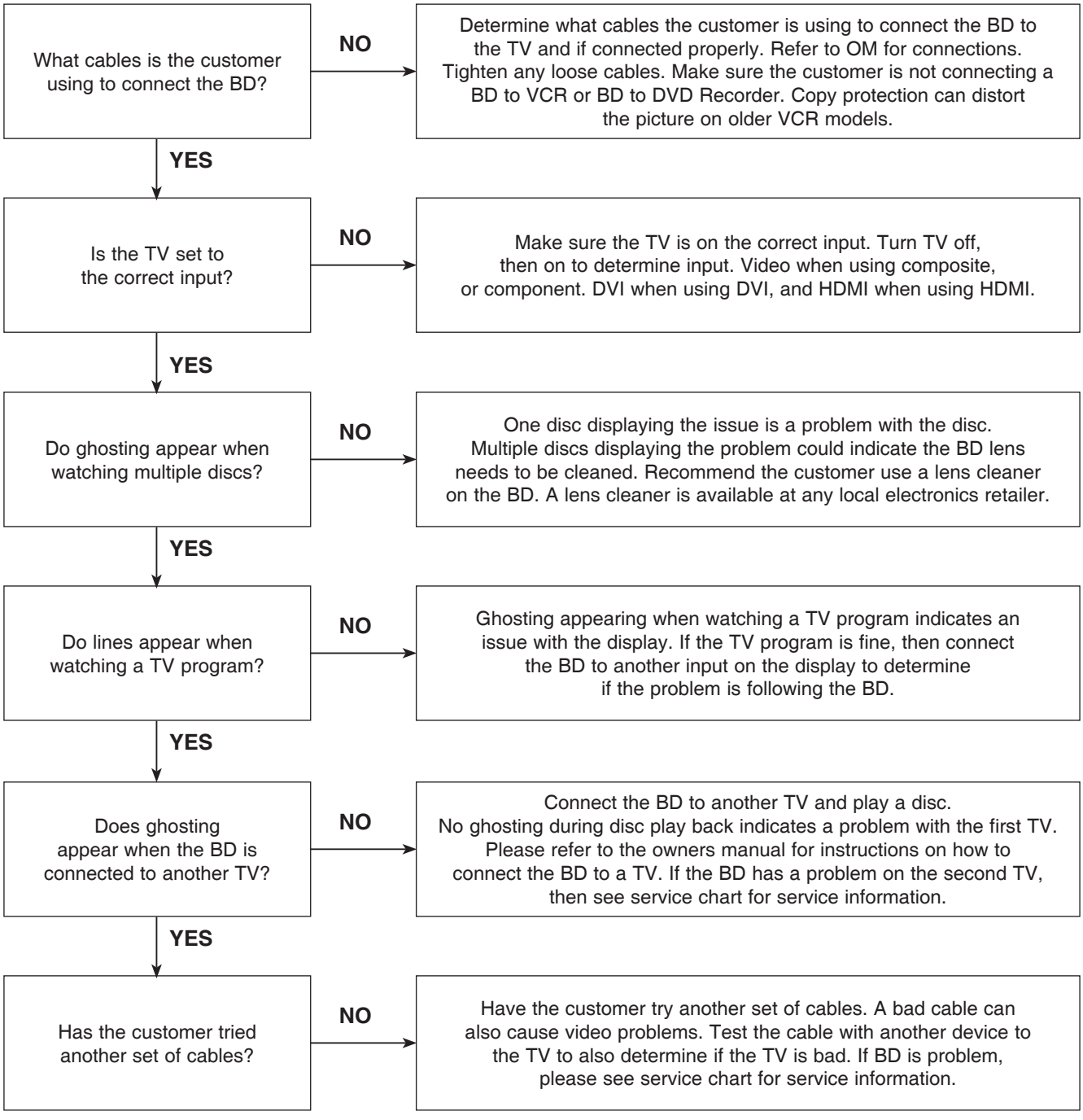
Distorted picture refers to the customer getting video, but there is a problem with the video.



TRAINING MASTER FOR BLU-RAY (BD)

1-2. Ghost Picture

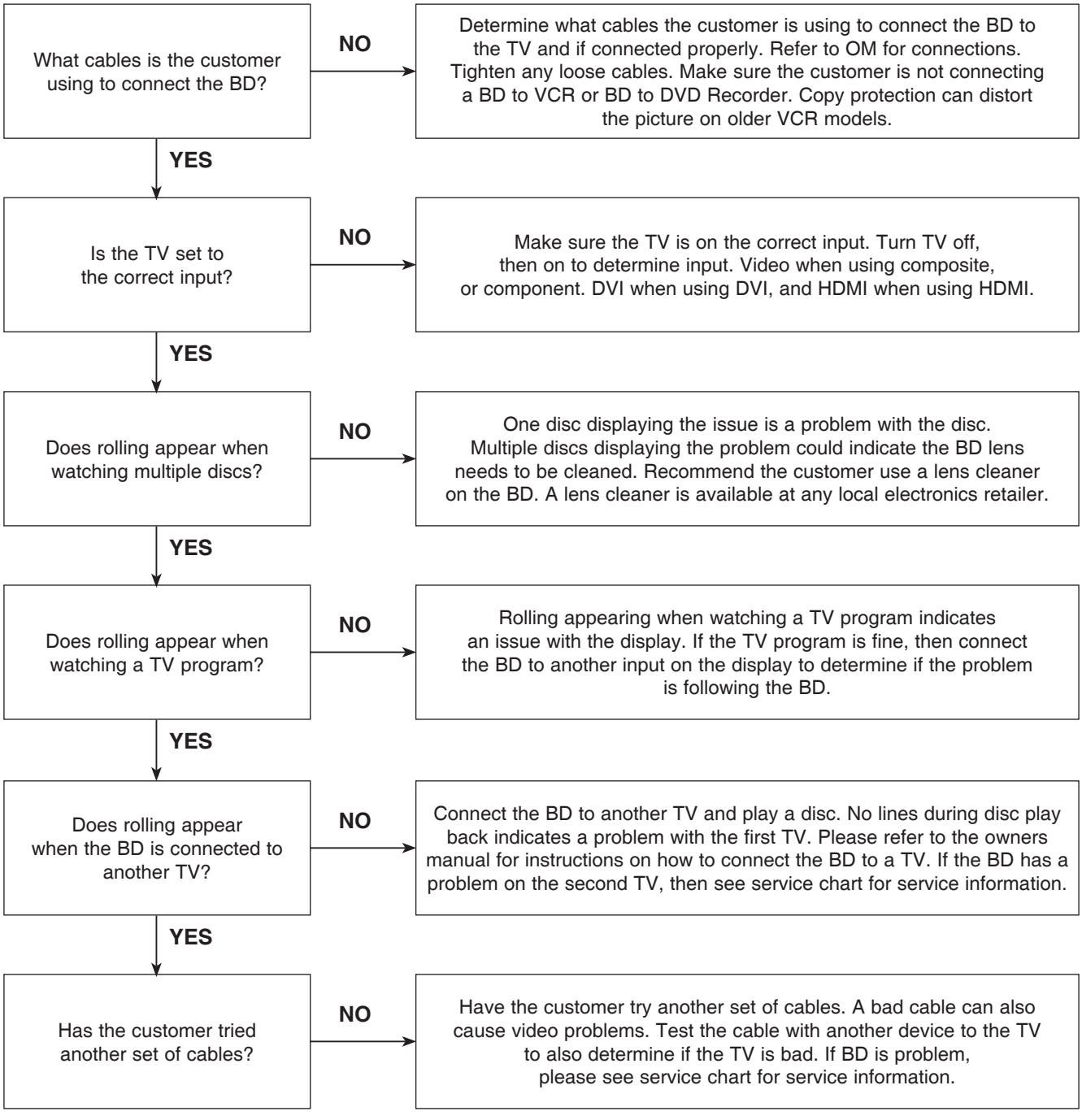
Distorted picture refers to the customer getting video, but there is a problem with the video.



TRAINING MASTER FOR BLU-RAY (BD)

1-3. Rolling Picture

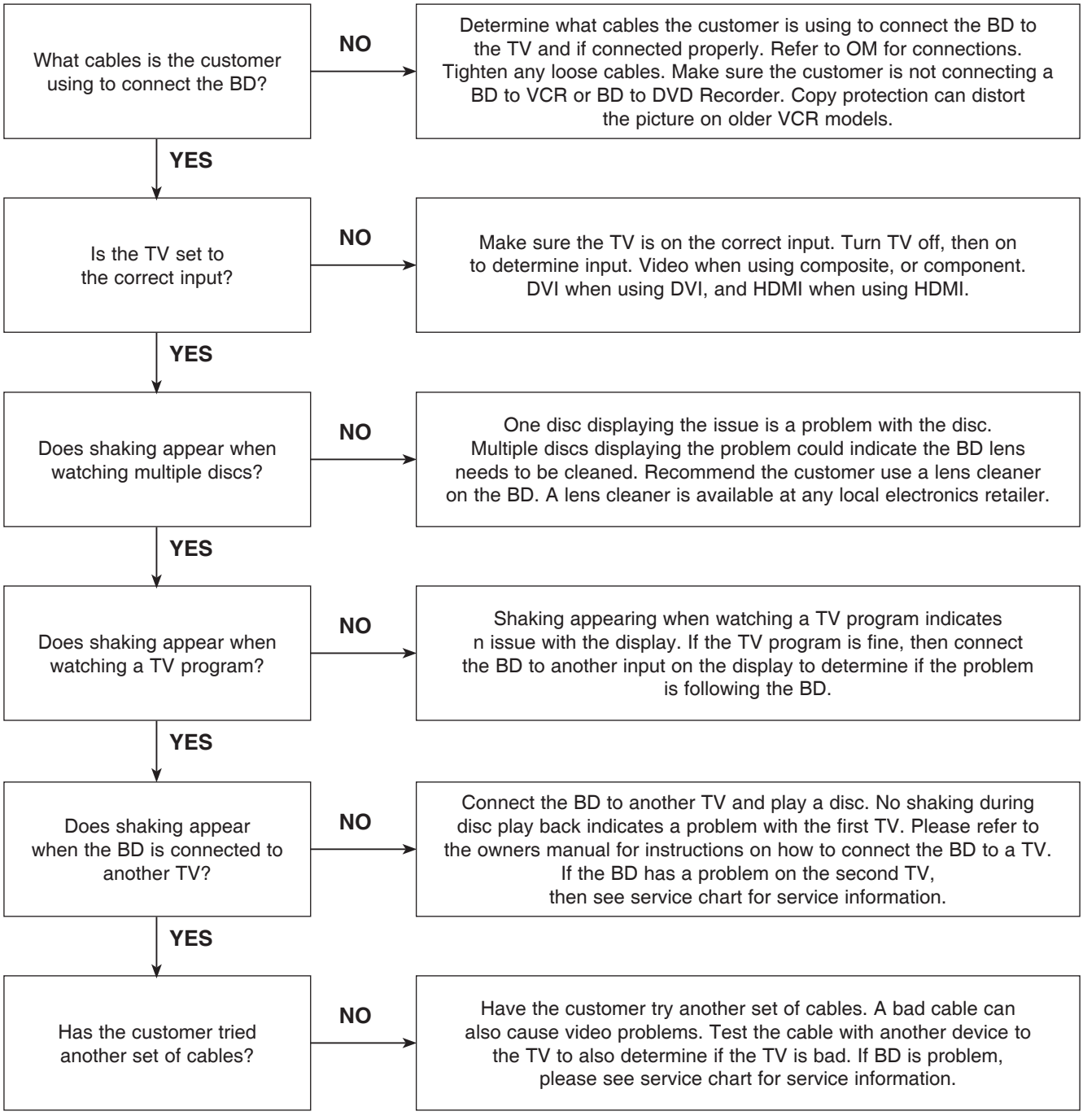
Distorted picture refers to the customer getting video, but there is a problem with the video.



TRAINING MASTER FOR BLU-RAY (BD)

1-4. Shaky Picture

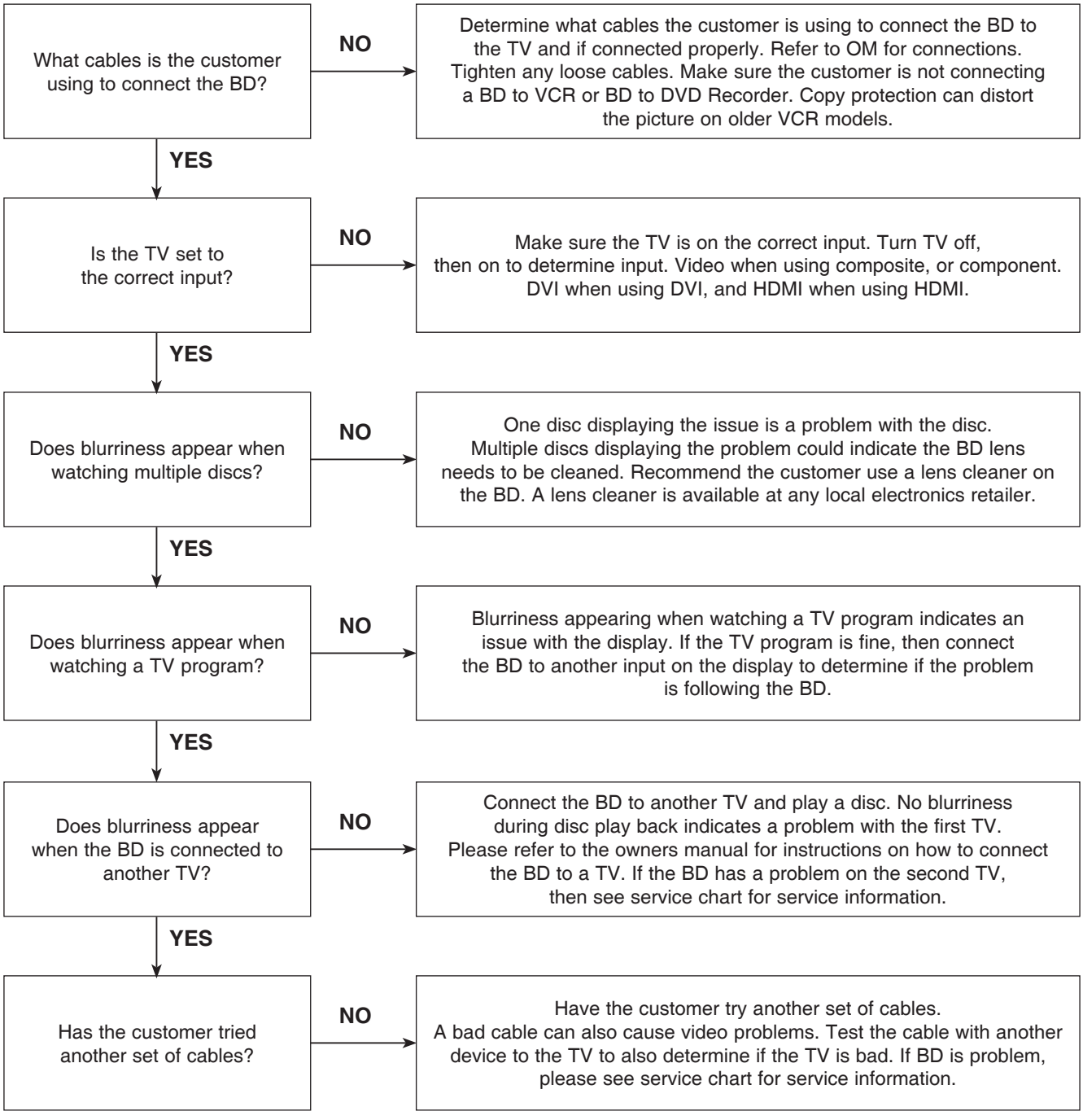
Distorted picture refers to the customer getting video, but there is a problem with the video.



TRAINING MASTER FOR BLU-RAY (BD)

1-5. Blurry Picture

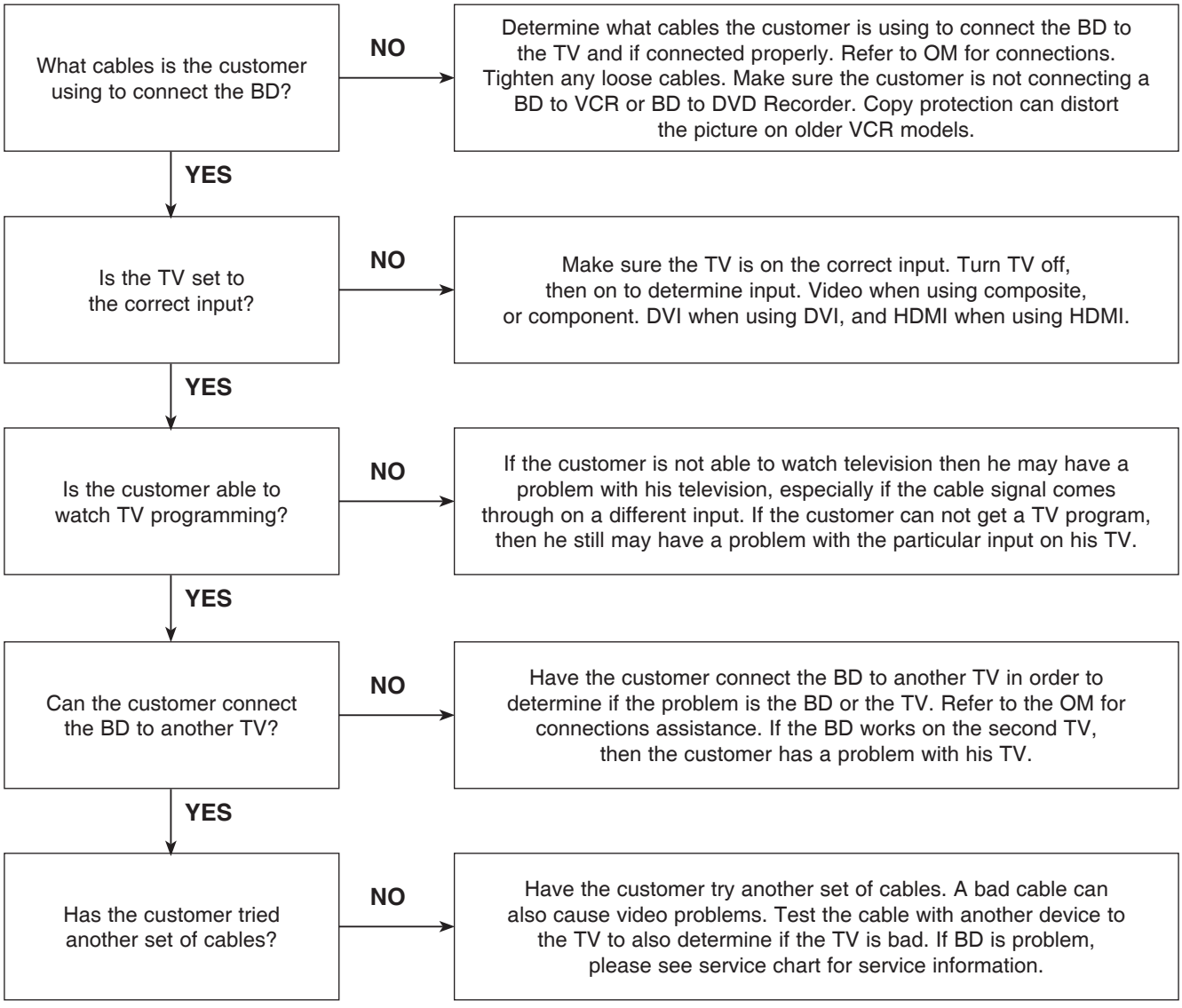
Distorted picture refers to the customer getting video, but there is a problem with the video.



2. NO PICTURE

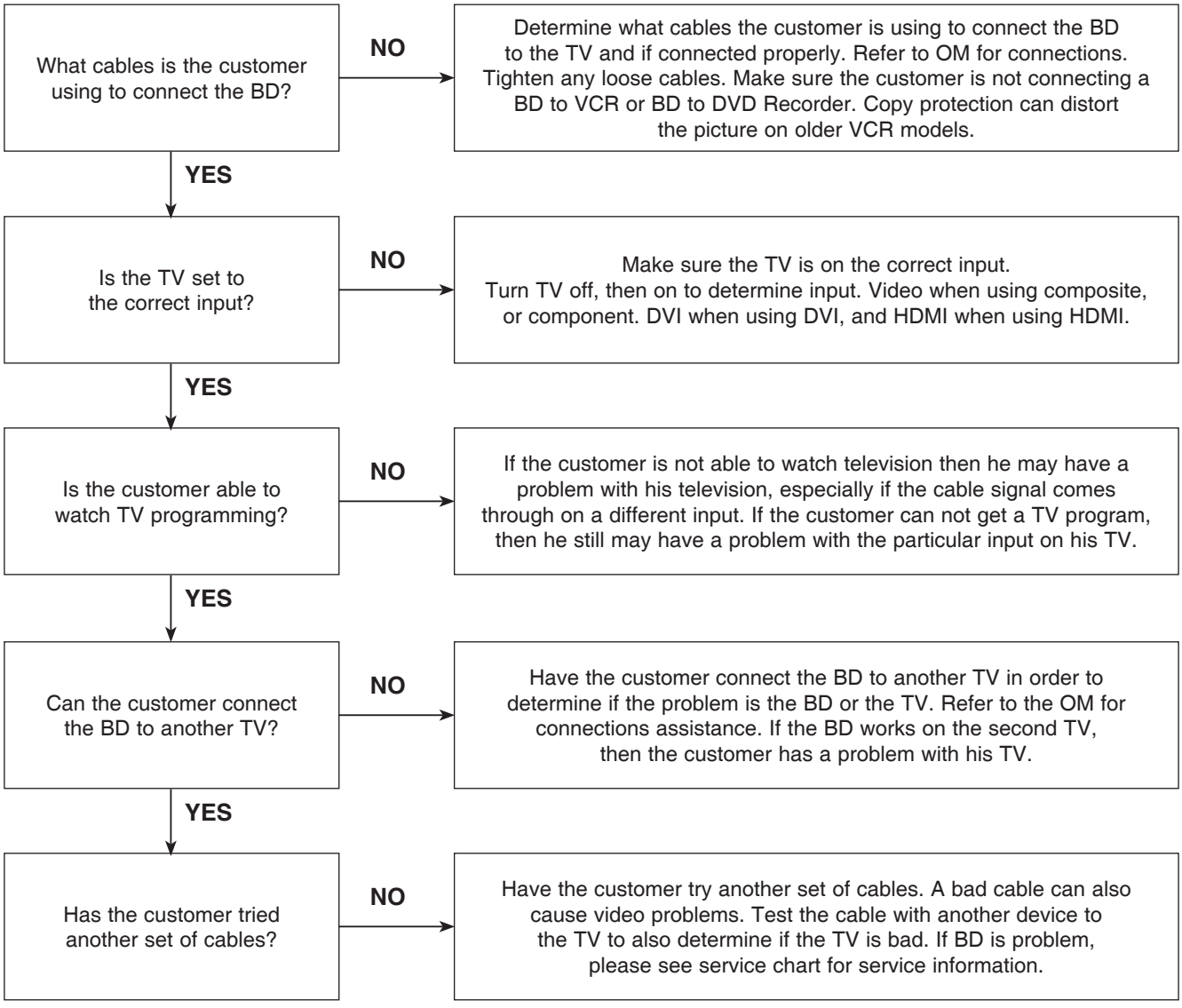
2-1. Black Screen

The entire screen is black.



2-2. Blue Screen

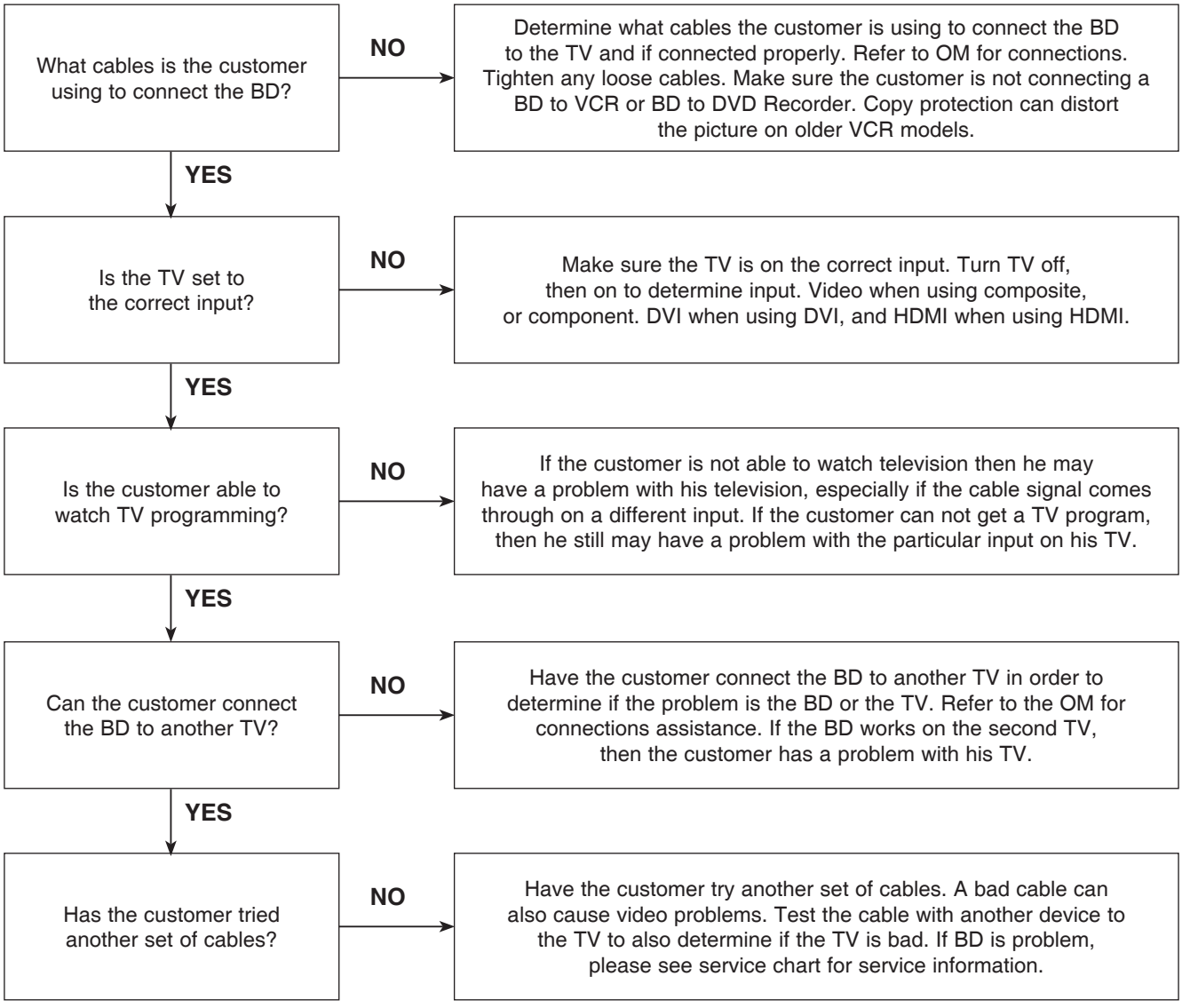
The entire screen is a solid blue color.



TRAINING MASTER FOR BLU-RAY (BD)

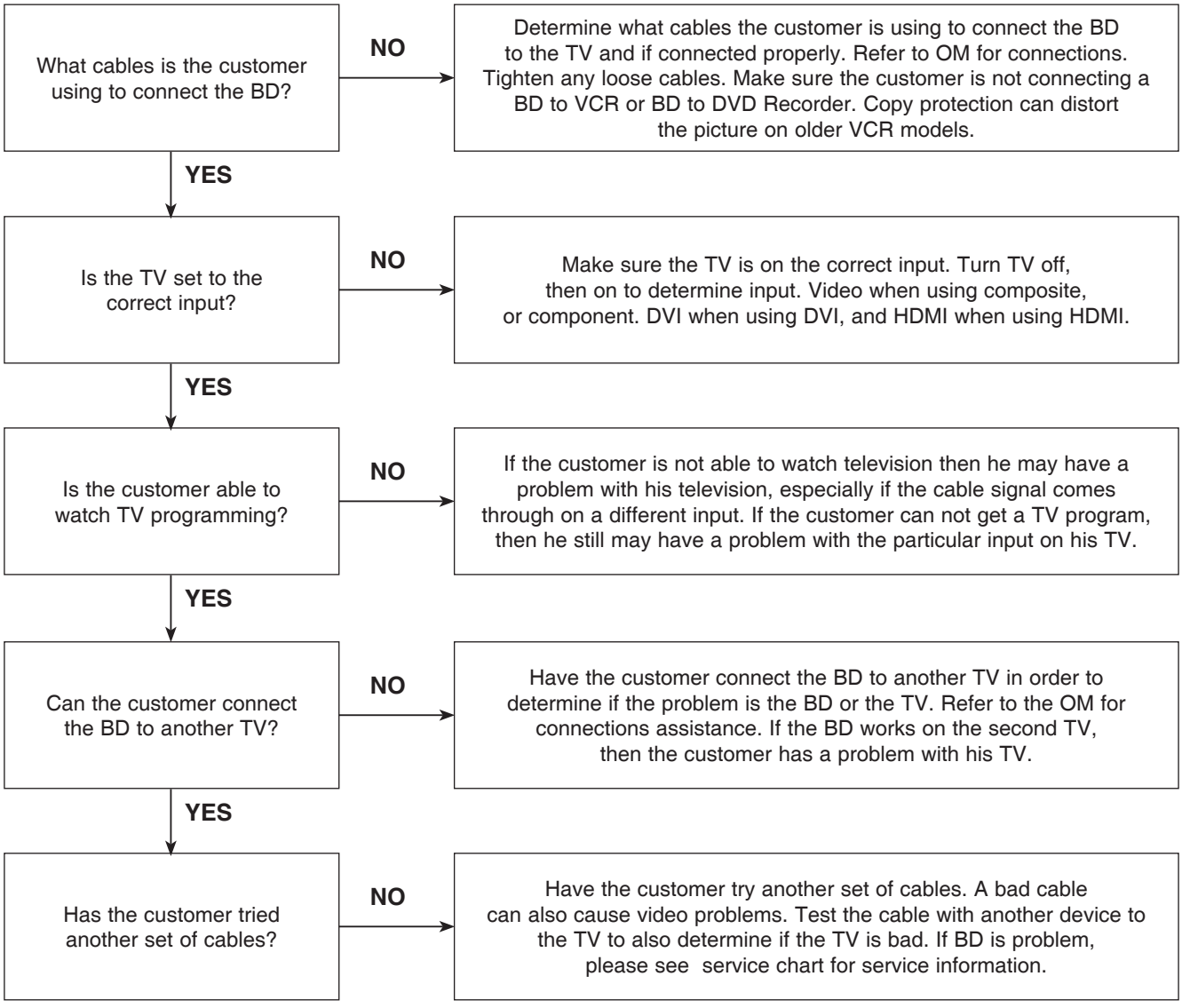
2-3. Snowy Screen

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



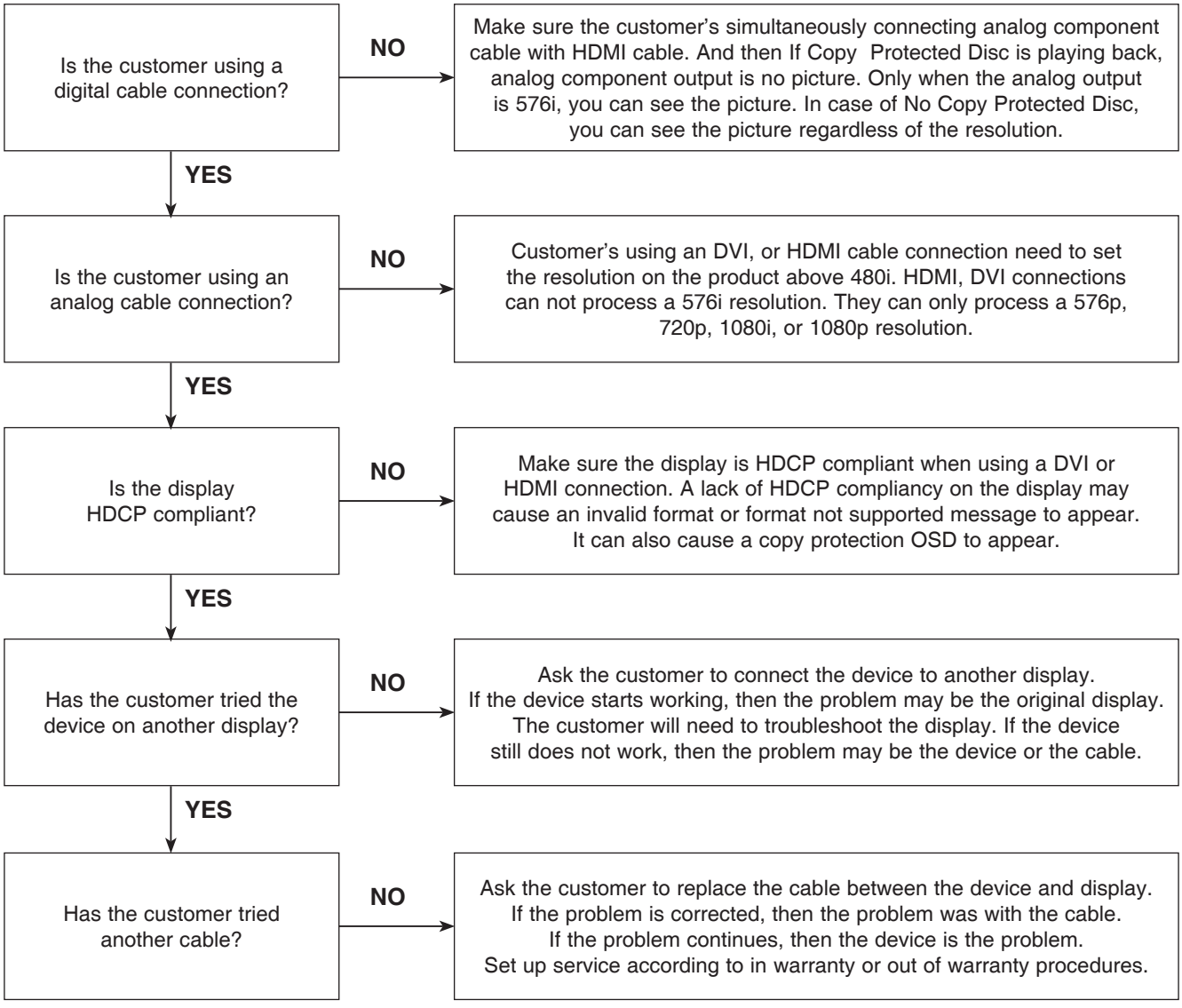
2-4. No Signal

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



TRAINING MASTER FOR BLU-RAY (BD)

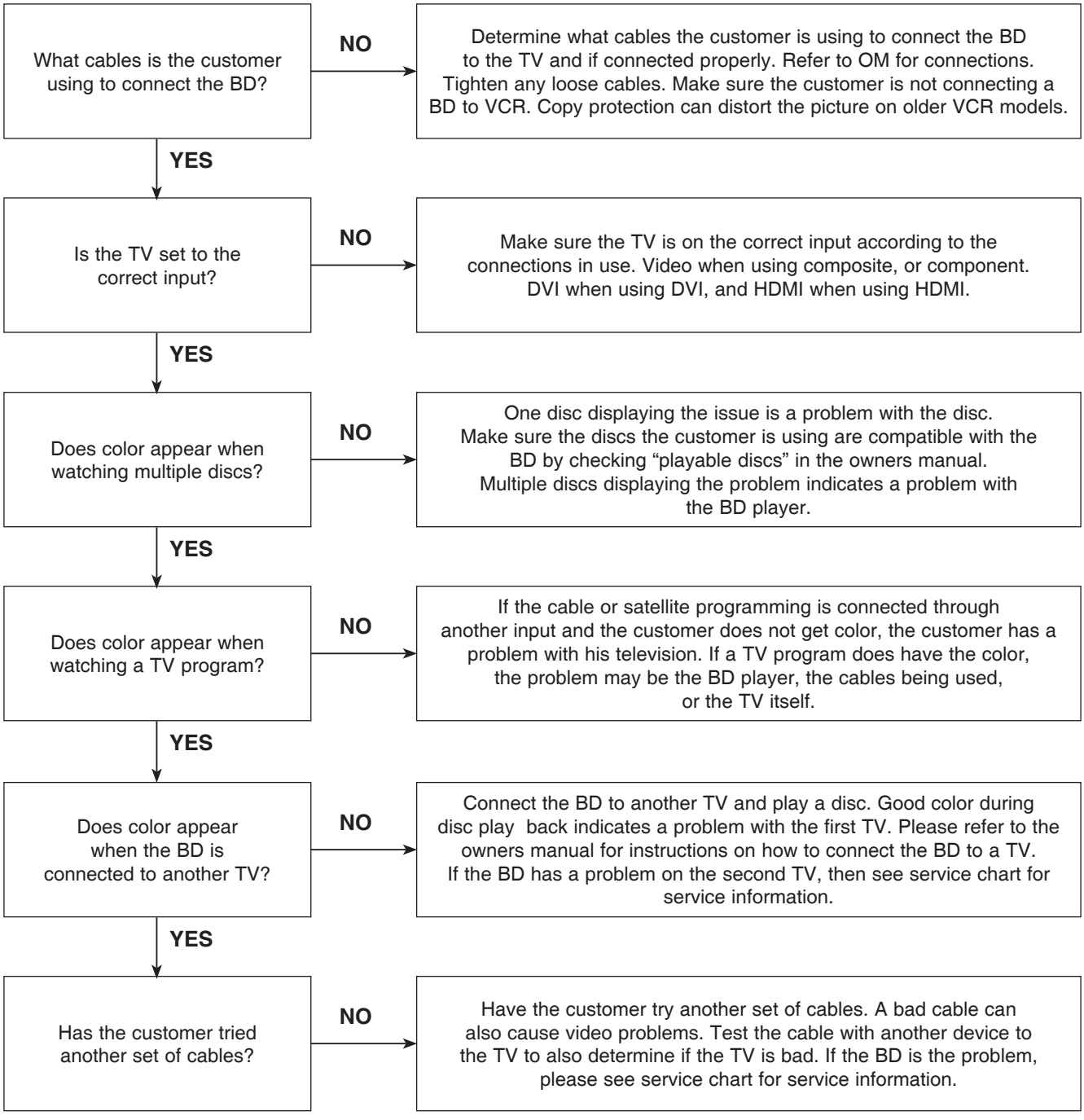
2-5. Invalid Format or Format Not Supported



3. PICTURE COLOR

3-1. No Color

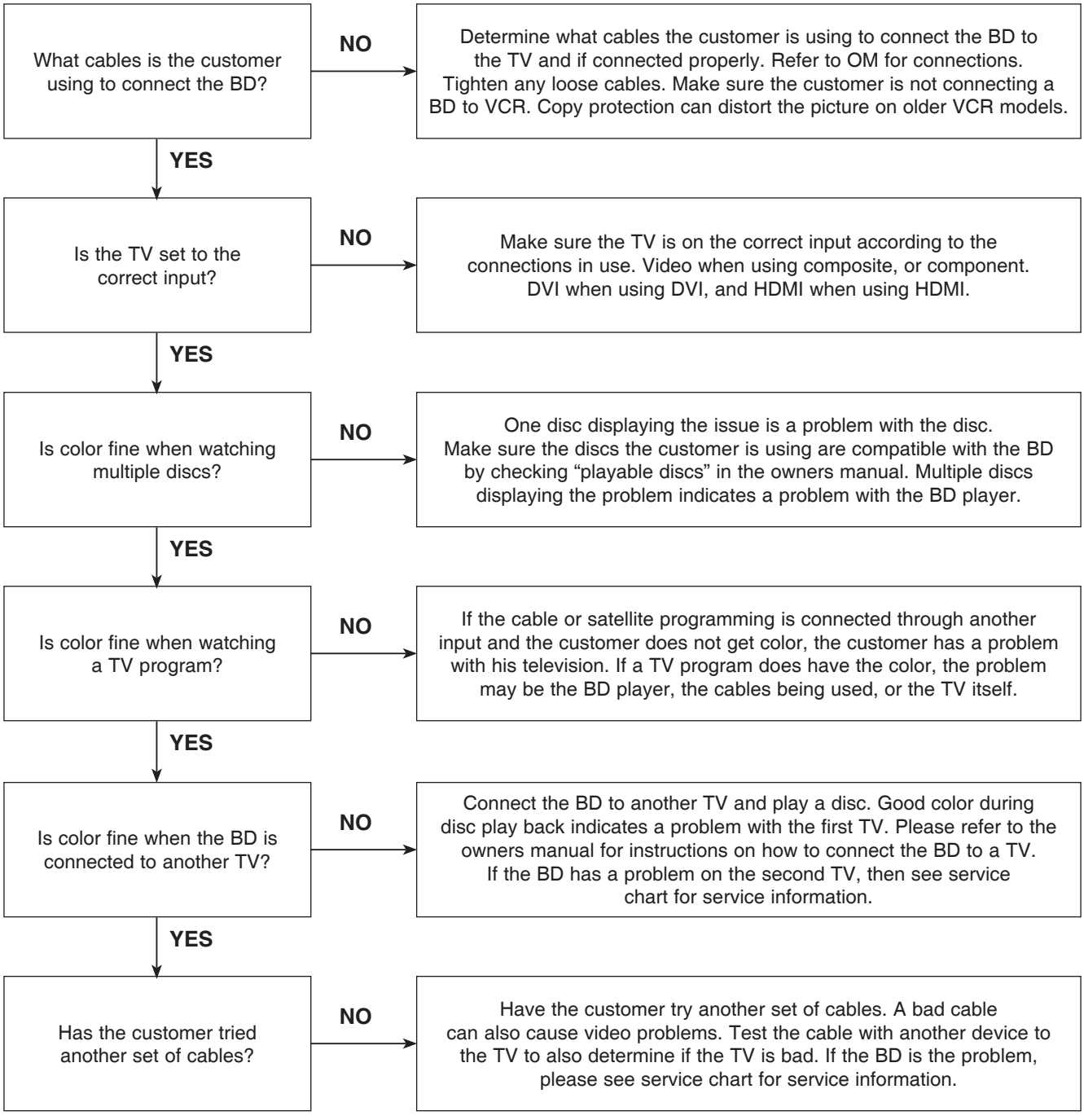
The video displays no color and only shows in black and white.



TRAINING MASTER FOR BLU-RAY (BD)

3-2. Poor Color

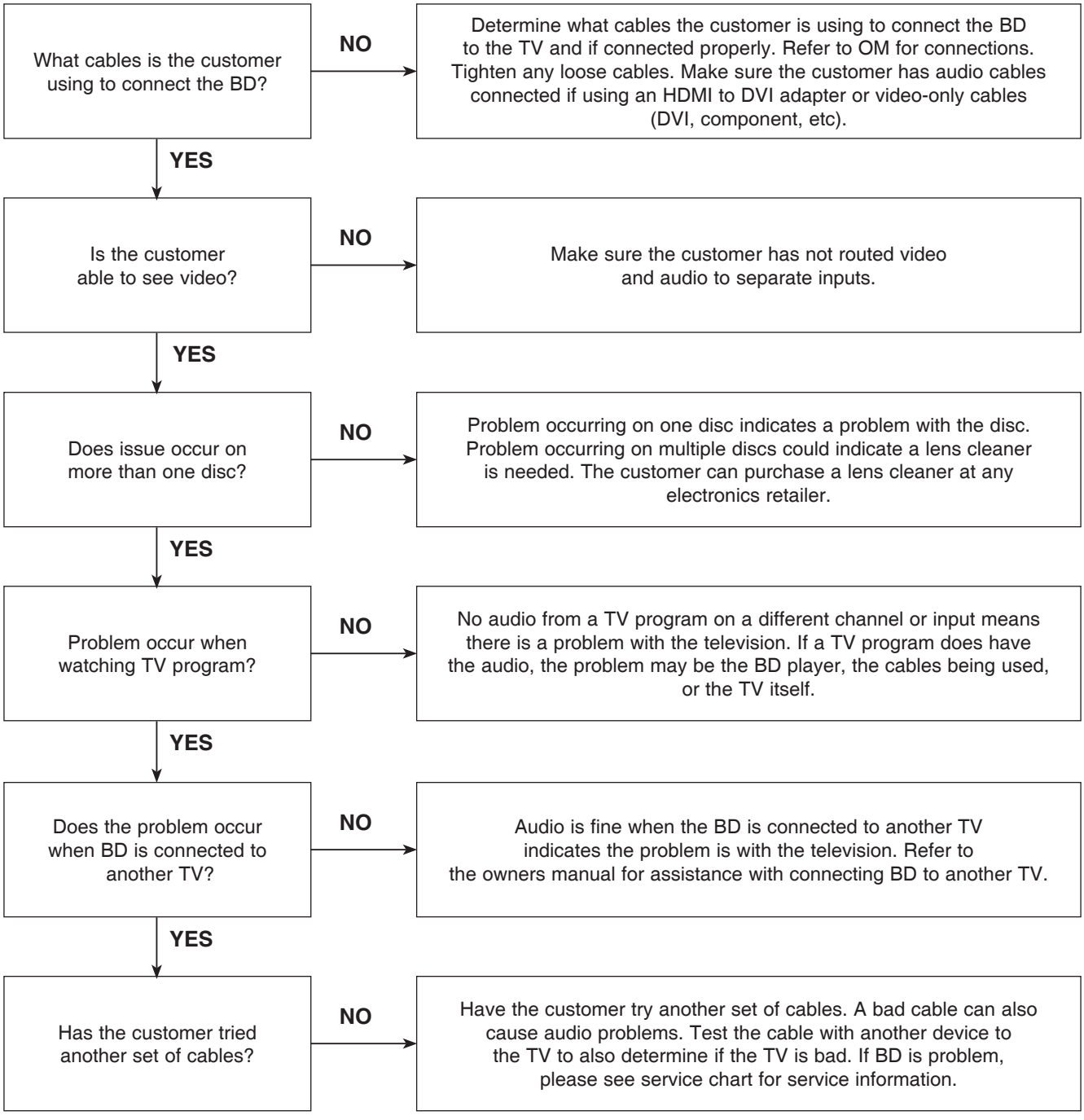
The color is poor. Examples would be washed out colors, colors bleeding into one another, or a solid tint to a screen.



4. NOISE/AUDIO PROBLEMS

4-1. No Audio

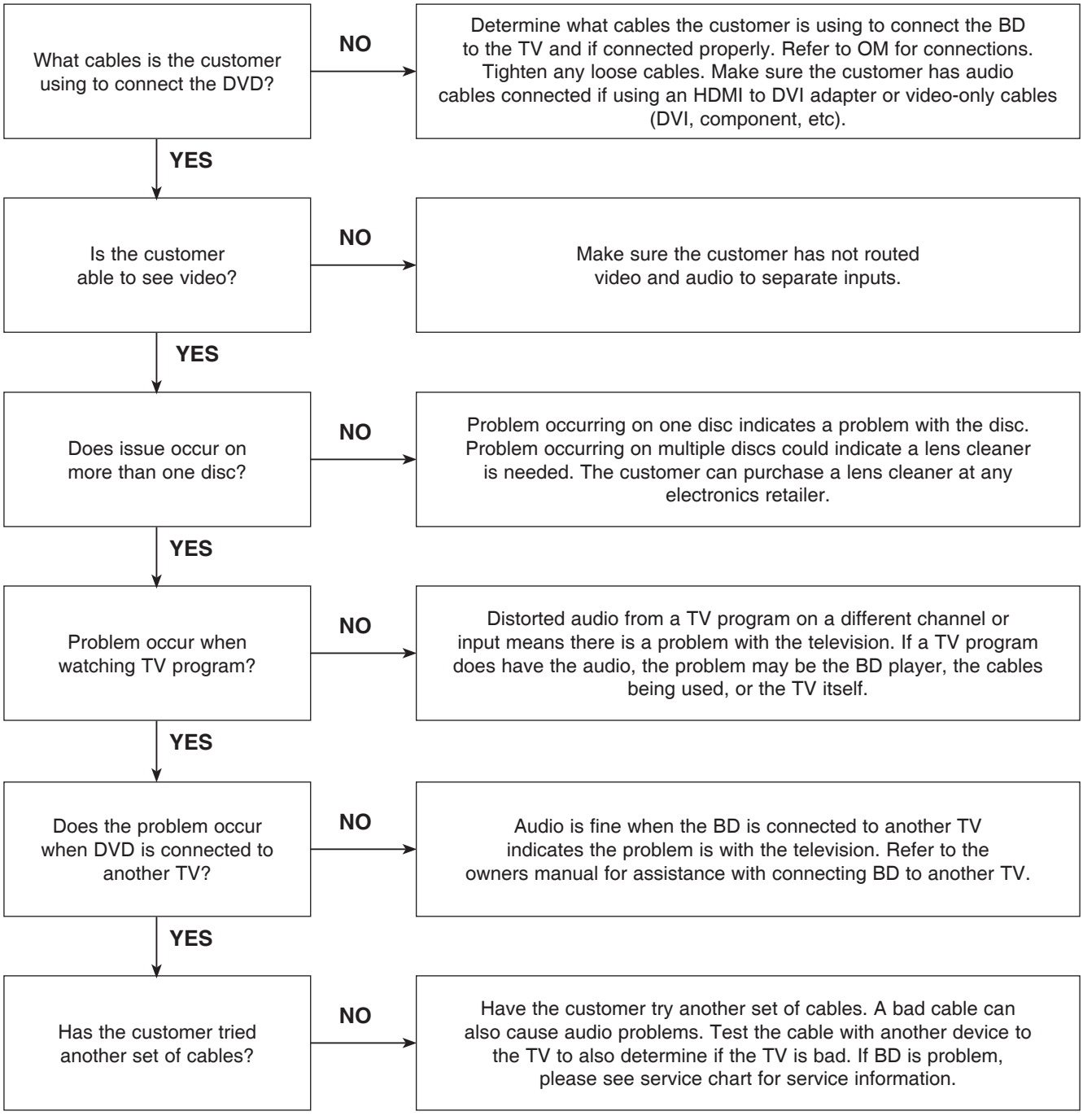
The customer is not able to get audio.



TRAINING MASTER FOR BLU-RAY (BD)

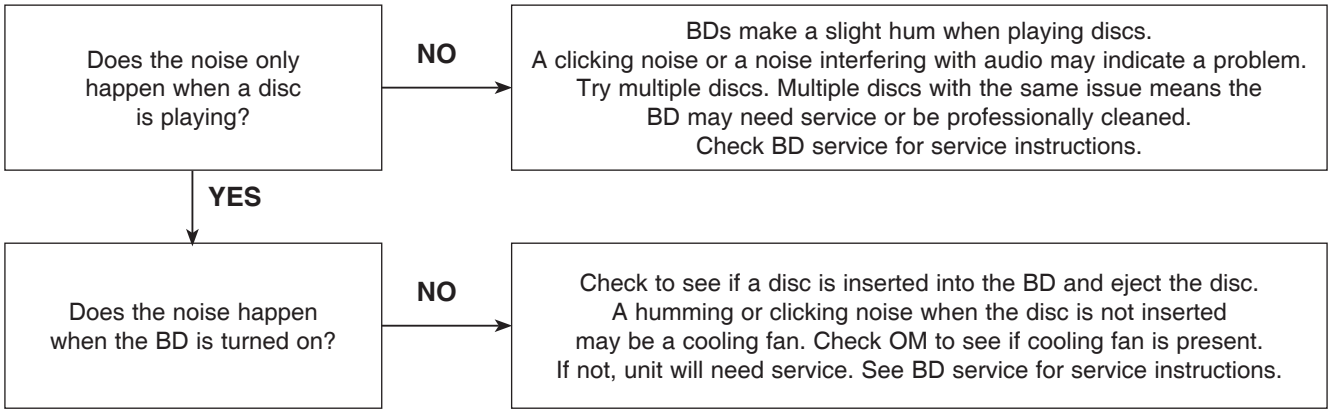
4-2. Distorted Audio

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



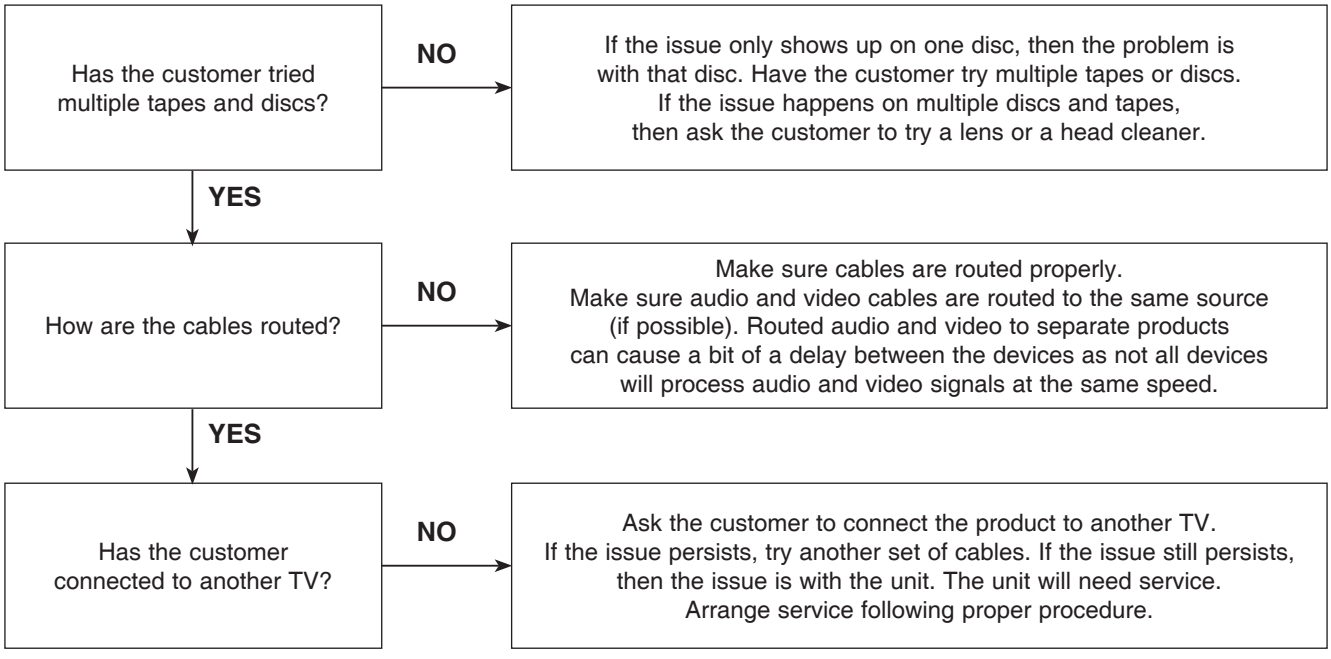
4-3. Humming/Clicking Noise

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.

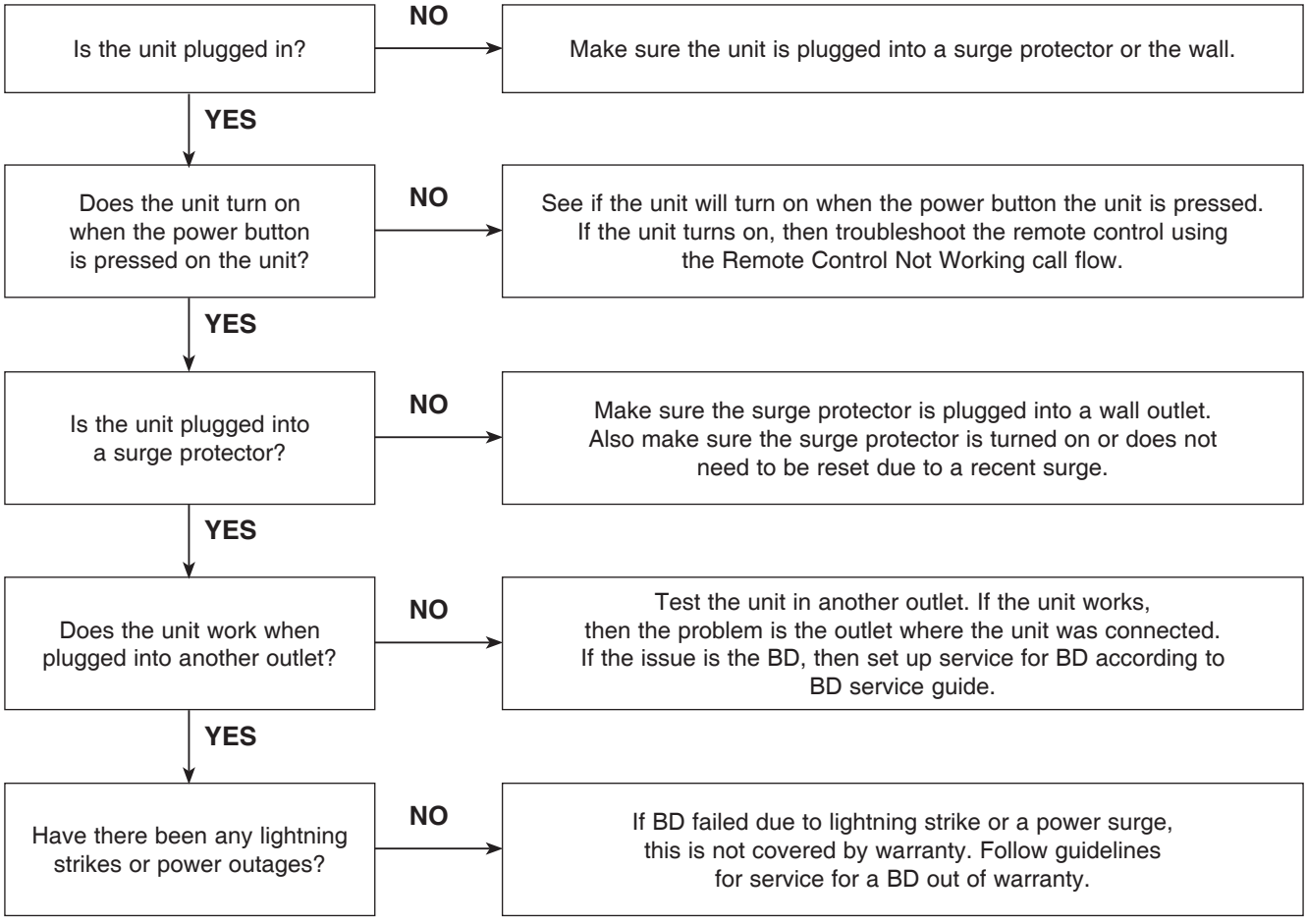


TRAINING MASTER FOR BLU-RAY (BD)

5. MISCELLANEOUS

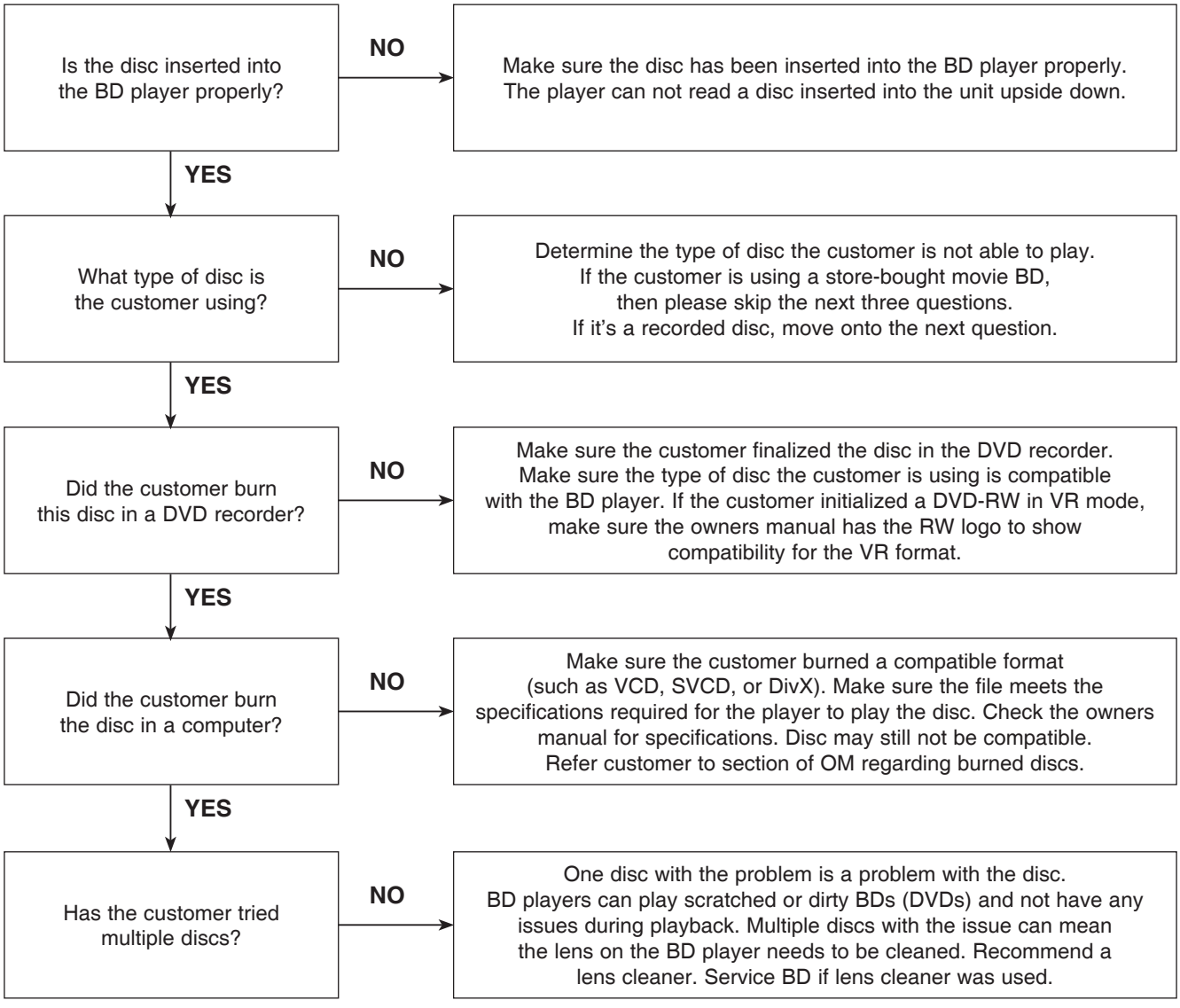
5-1. No Power

The unit will not turn on.



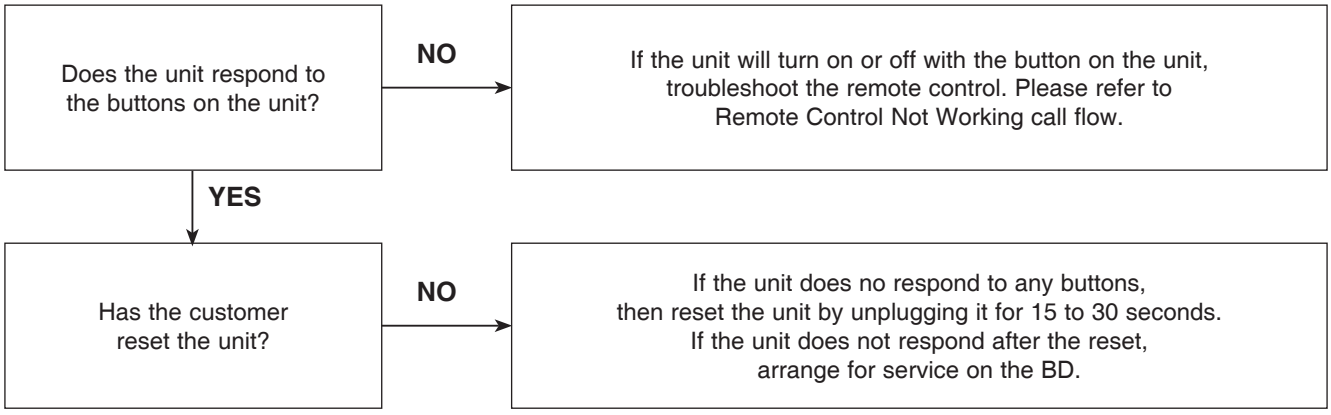
5-2. Disc Error

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



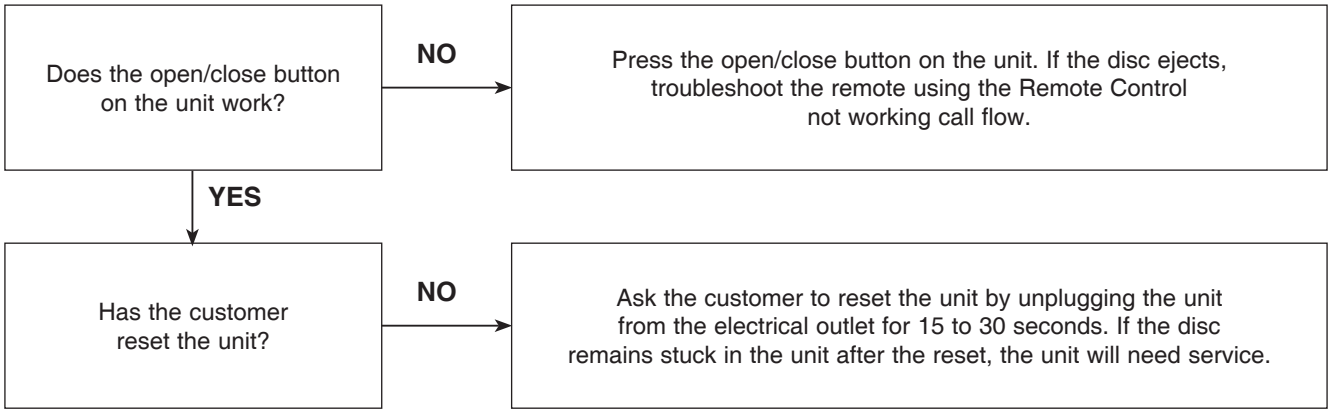
5-3. Unit Locks Up

Unit does not respond to any commands.

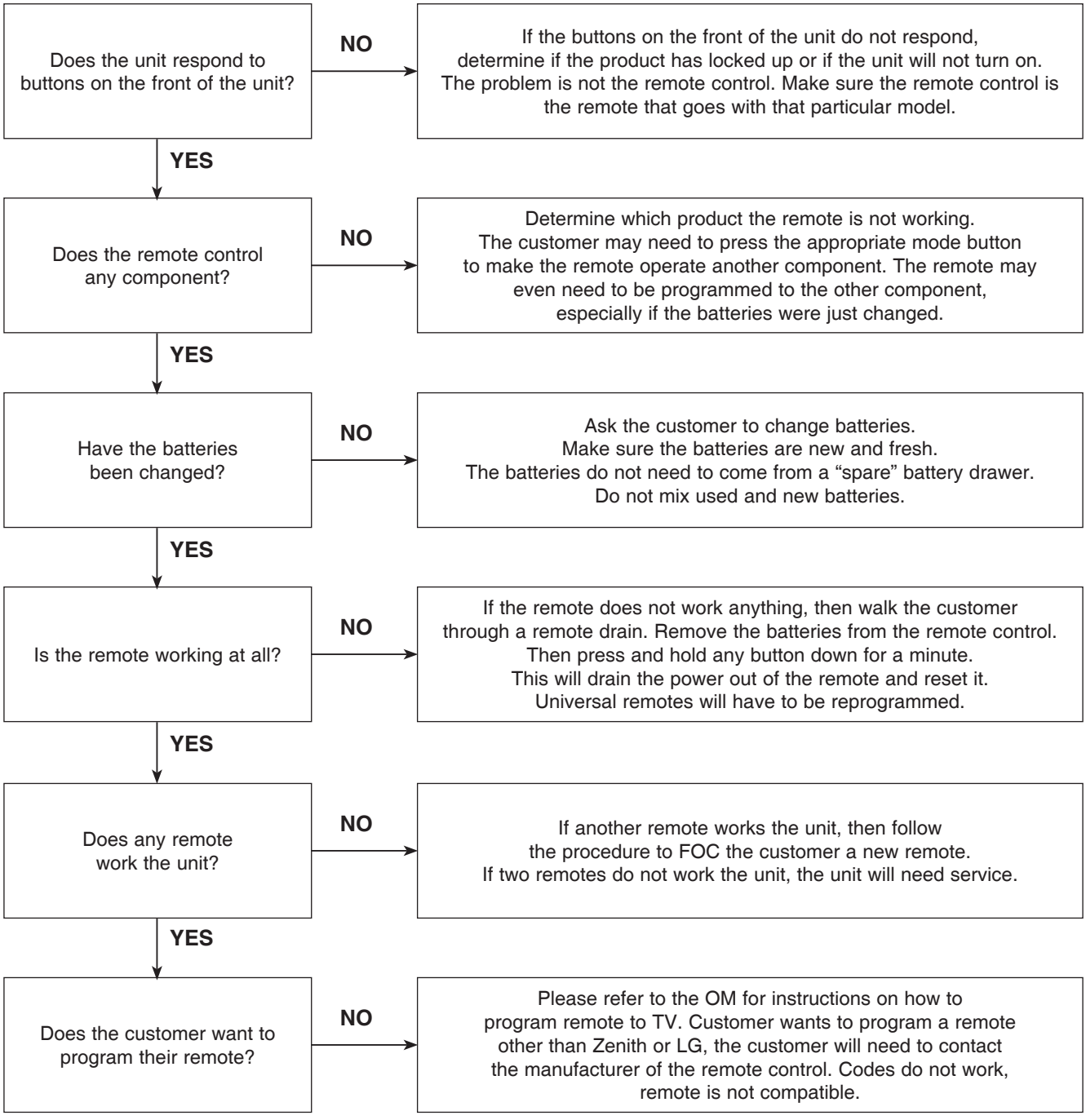


5-4. Disc Stuck

A BD disc is stuck in the unit.



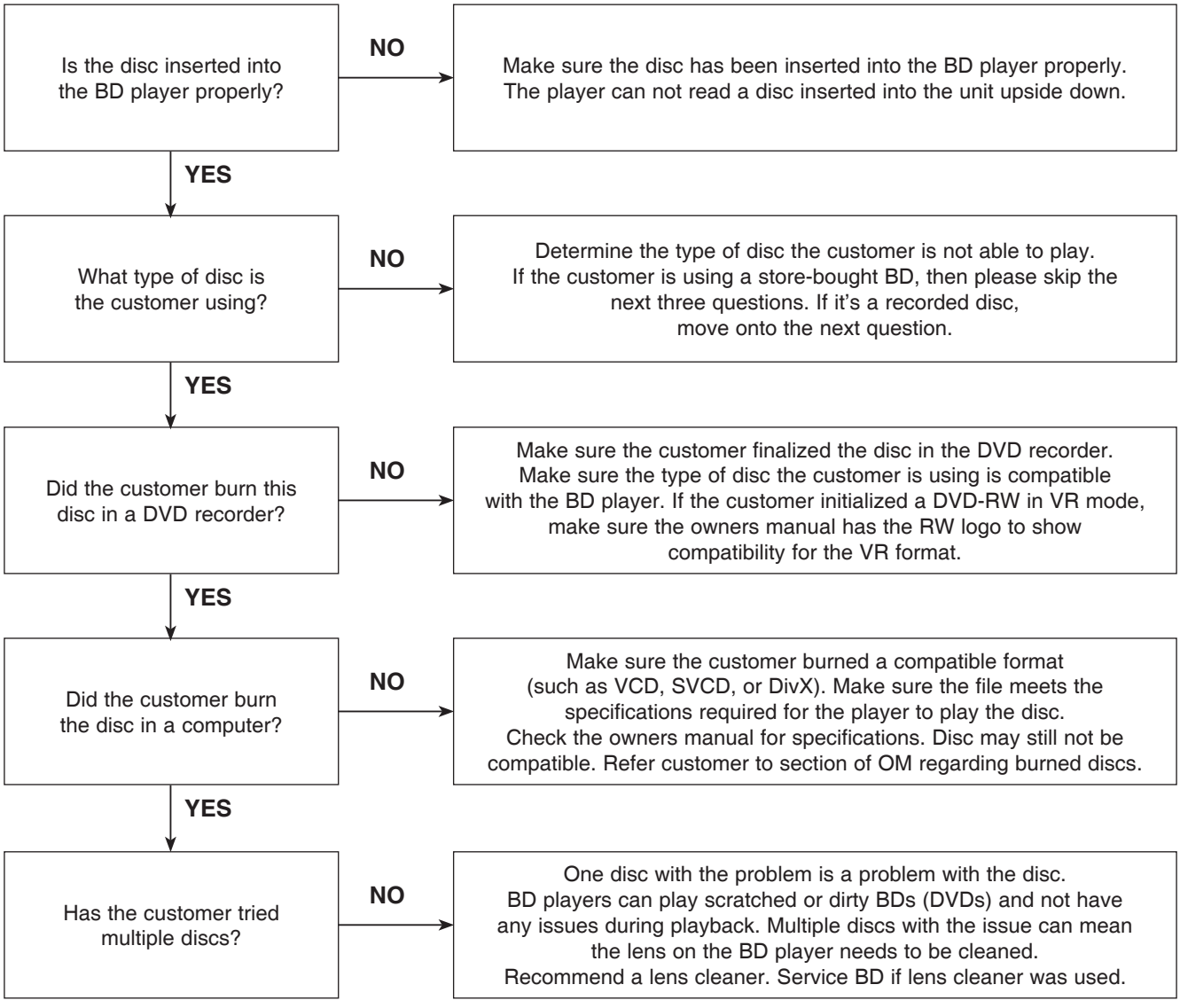
5-5. Remote Control Not Working



TRAINING MASTER FOR BLU-RAY (BD)

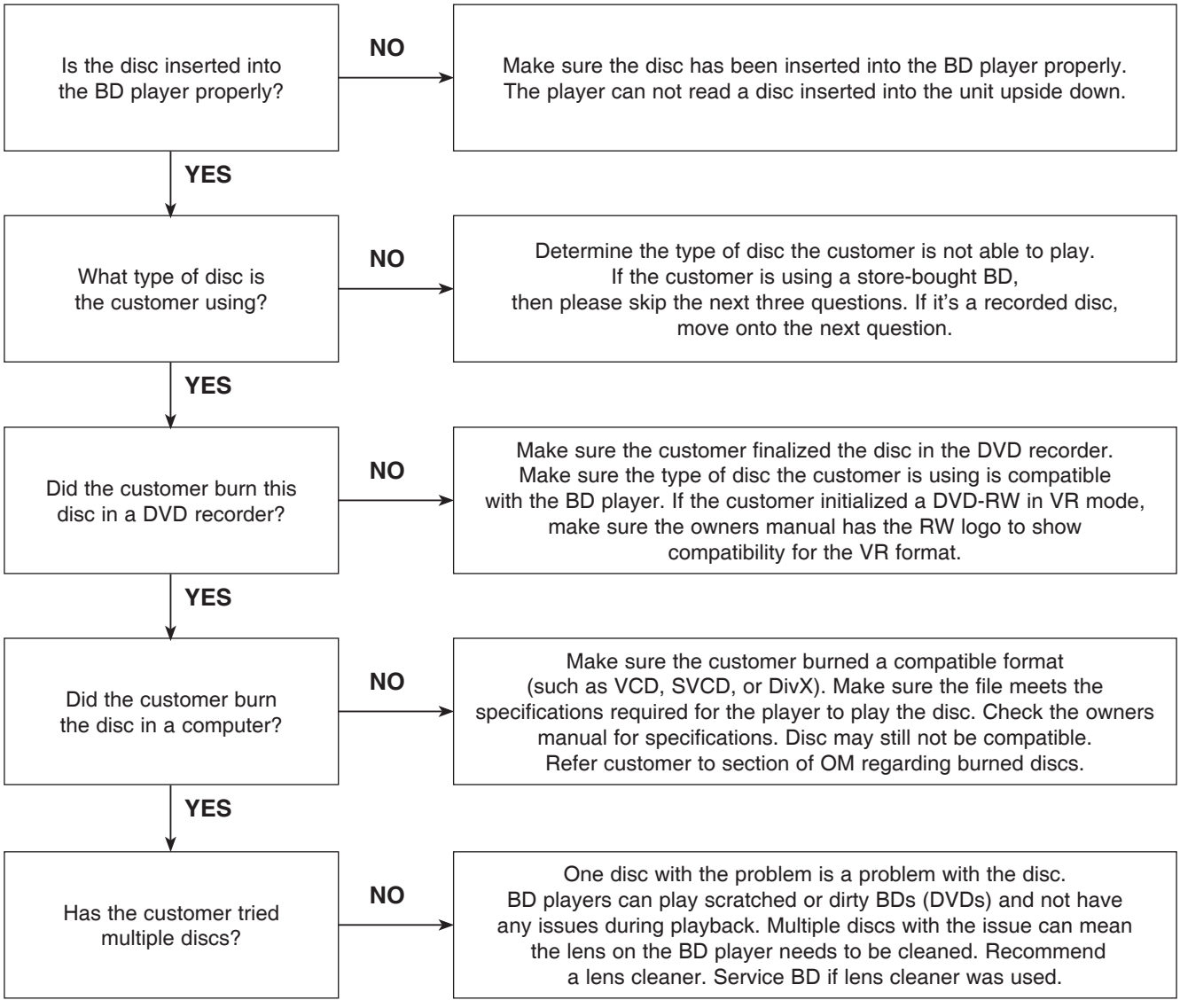
5-6. Will Not Play Disc

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



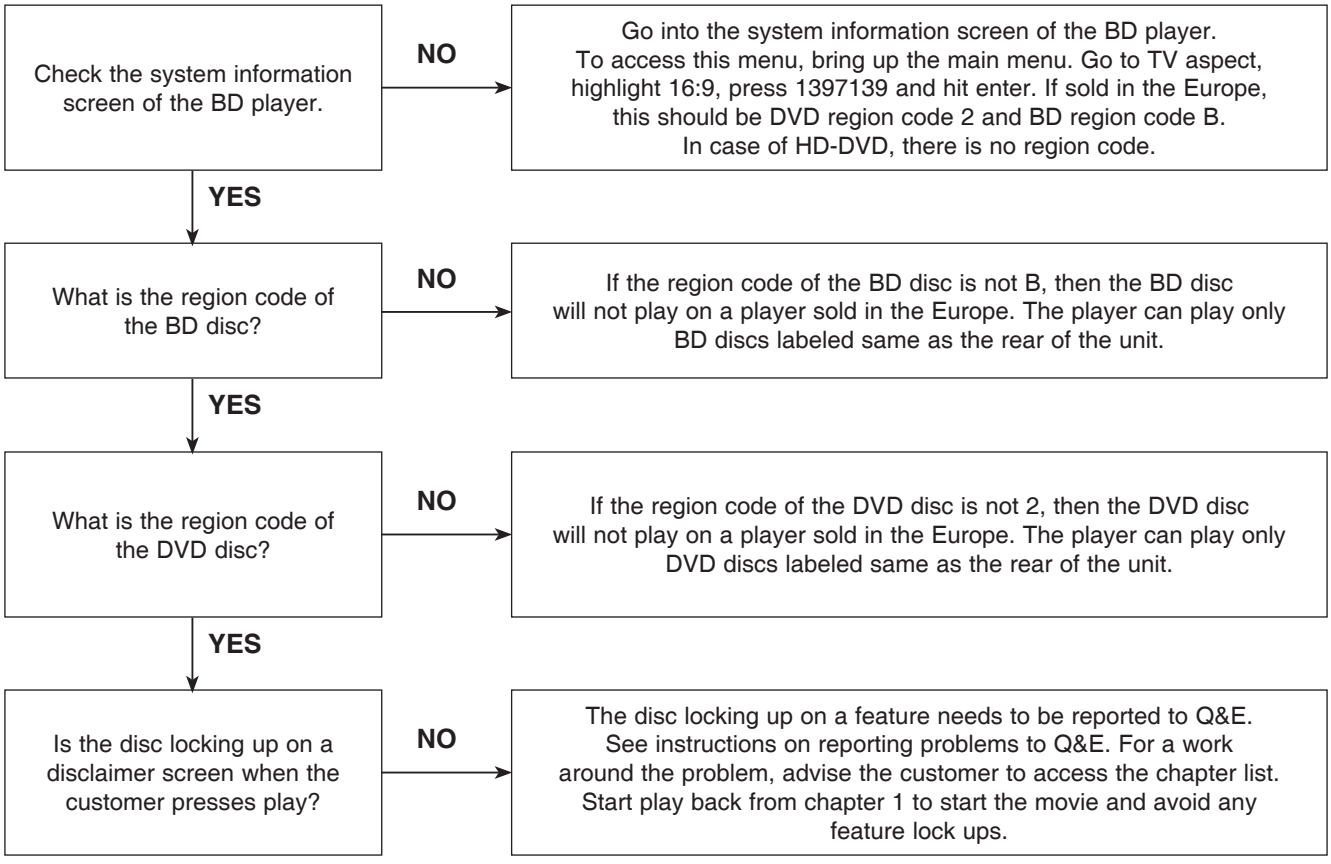
5-7. Disc Freezes or Skips

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

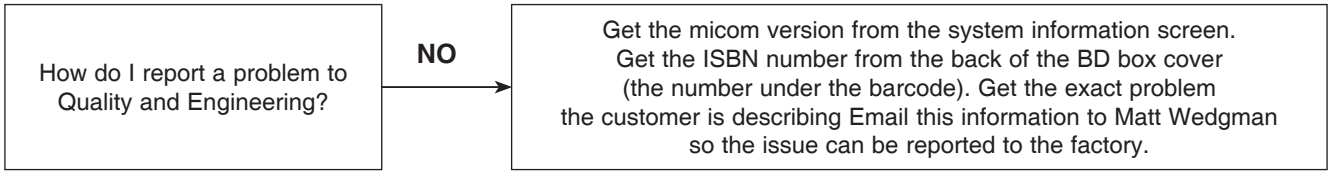


TRAINING MASTER FOR BLU-RAY (BD)

5-8. Can Access Menu, but Not Play a Movie
The disc menu is displayed but the disc will not play.

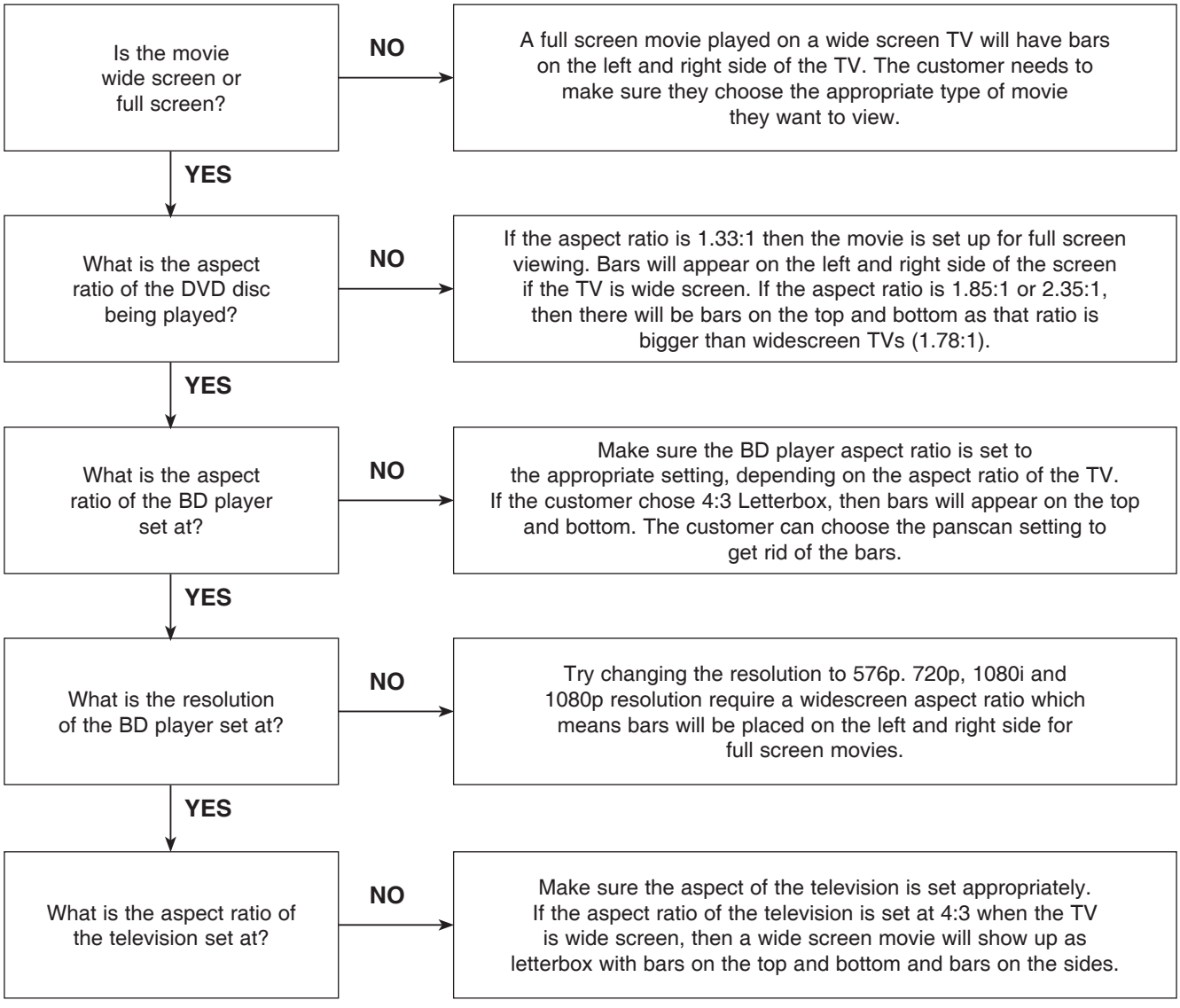


5-9. Reporting a problem to Quality & Engineering
Reporting a problem that may require a firmware update to fix.



5-10. Aspect Ratio

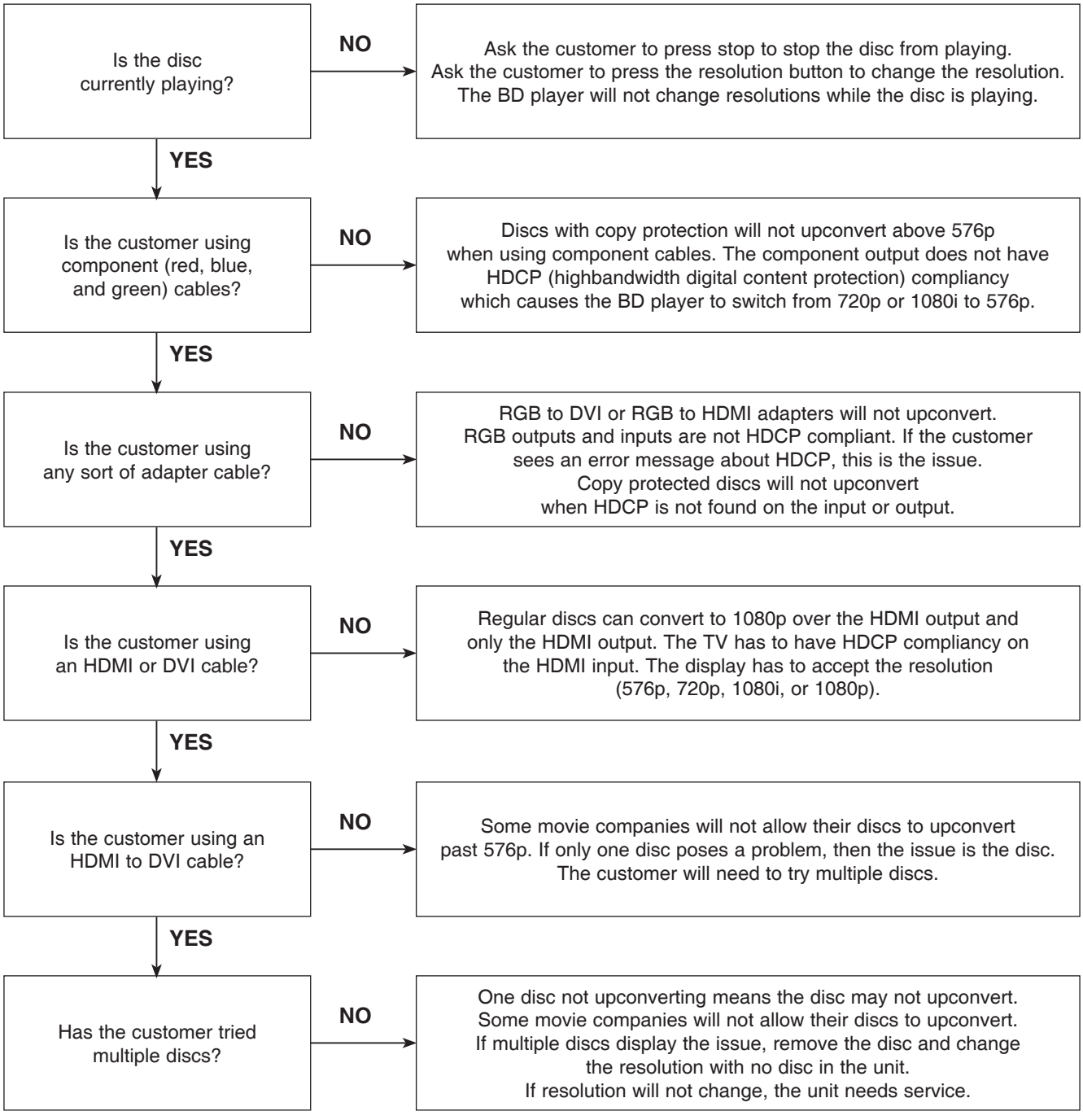
The customer has bars on the top and bottom of the screen, the left and right of the screen, or both.



TRAINING MASTER FOR BLU-RAY (BD)

5-11. My Unit Won't Upconvert

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



TRAINING MASTER FOR BLU-RAY (BD)

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. YouTube Service

Check network cable?	NO →	Make sure the customer doesn't connect the LAN cable. If they don't ,The monitor is displaying "Check network cable" expression.
How do I operate the YouTube?	NO →	First, you have to check the configuration of the Network. Second, you must activate the YouTube. It is necessary to refer to Owner's Manual. This Service is not for free.

6-4. Ethernet Port

The purpose of the ethernet port on the unit.

What is the purpose of the ethernet port on the unit?	NO →	This is used for the unit to access a network dealing with interactive BD movie menu. Unit can support BD2.0 so that network function is active in the BD disc. Also, unit can support UCC service such as YouTube.
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.

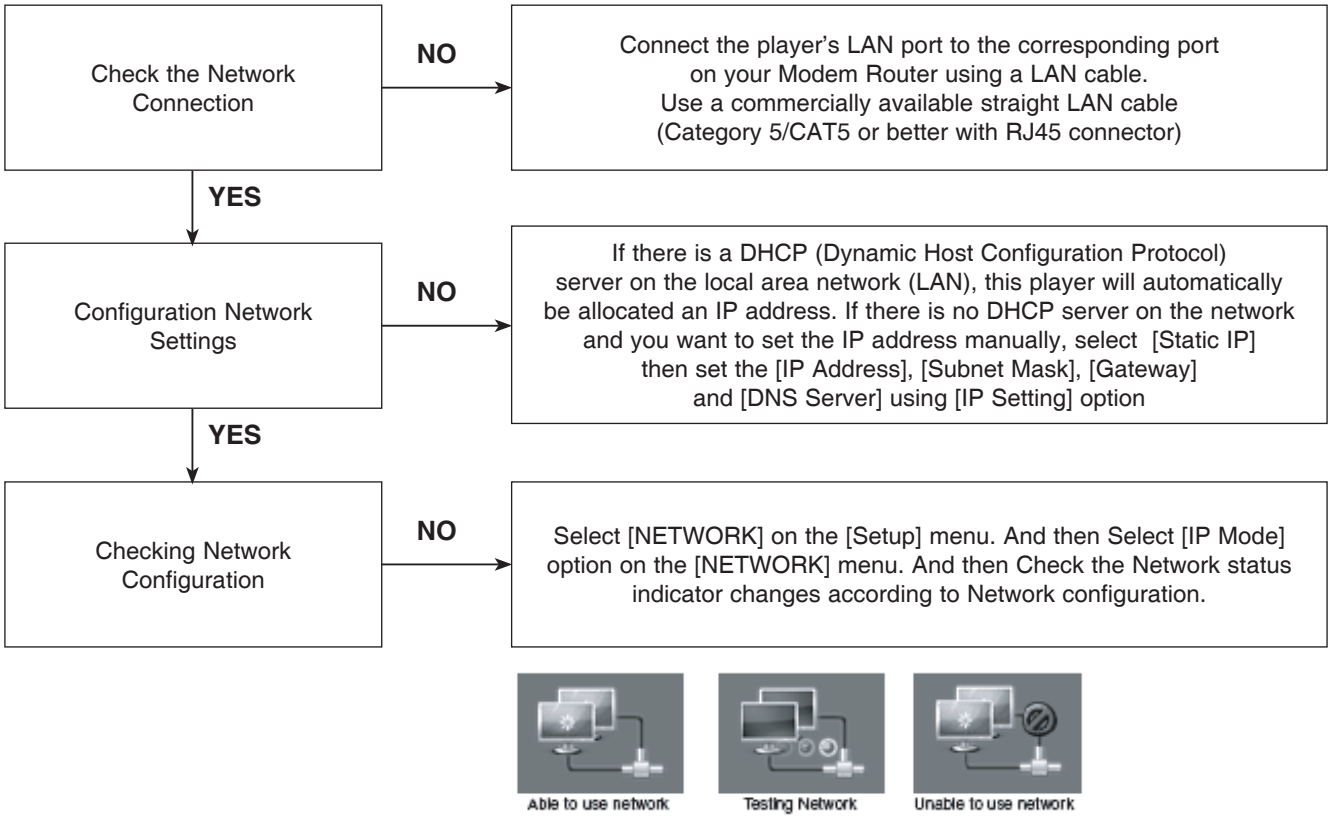
6-5. Firmware Update Availability

Is there a firmware update available for the unit?	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 unit 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. YouTube

7-1. Network Setup

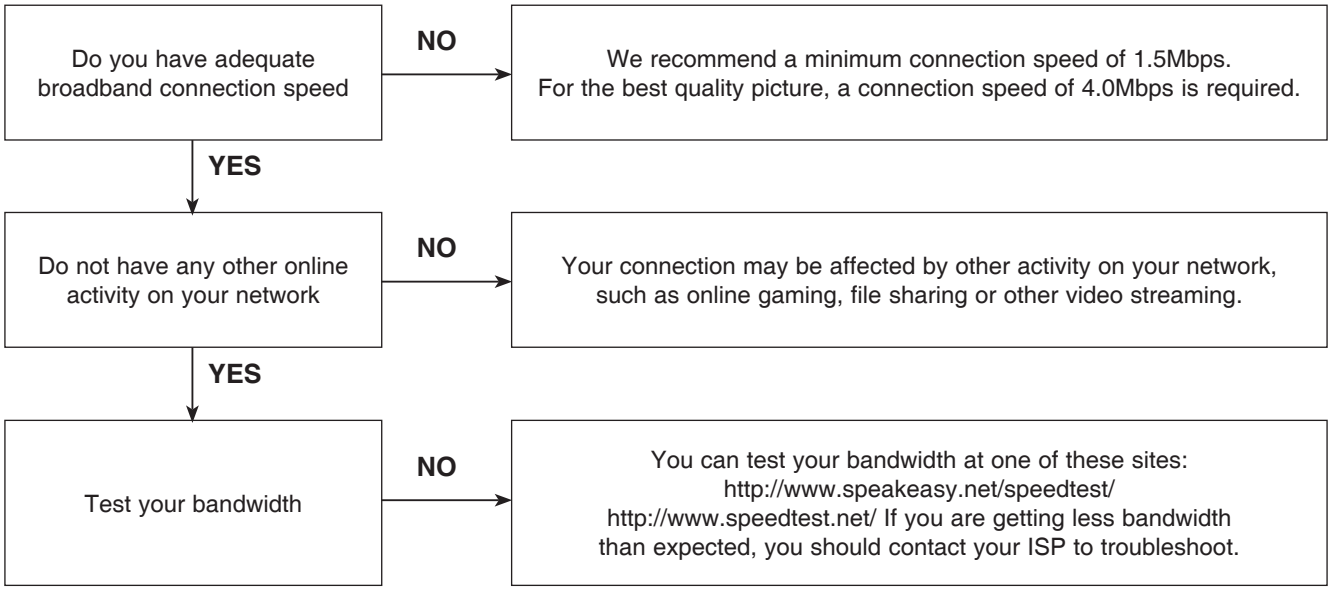
By connecting the unit to broadband Internet, you can use YouTube function



7-2. Less Bandwidth and less resolution movie than expected

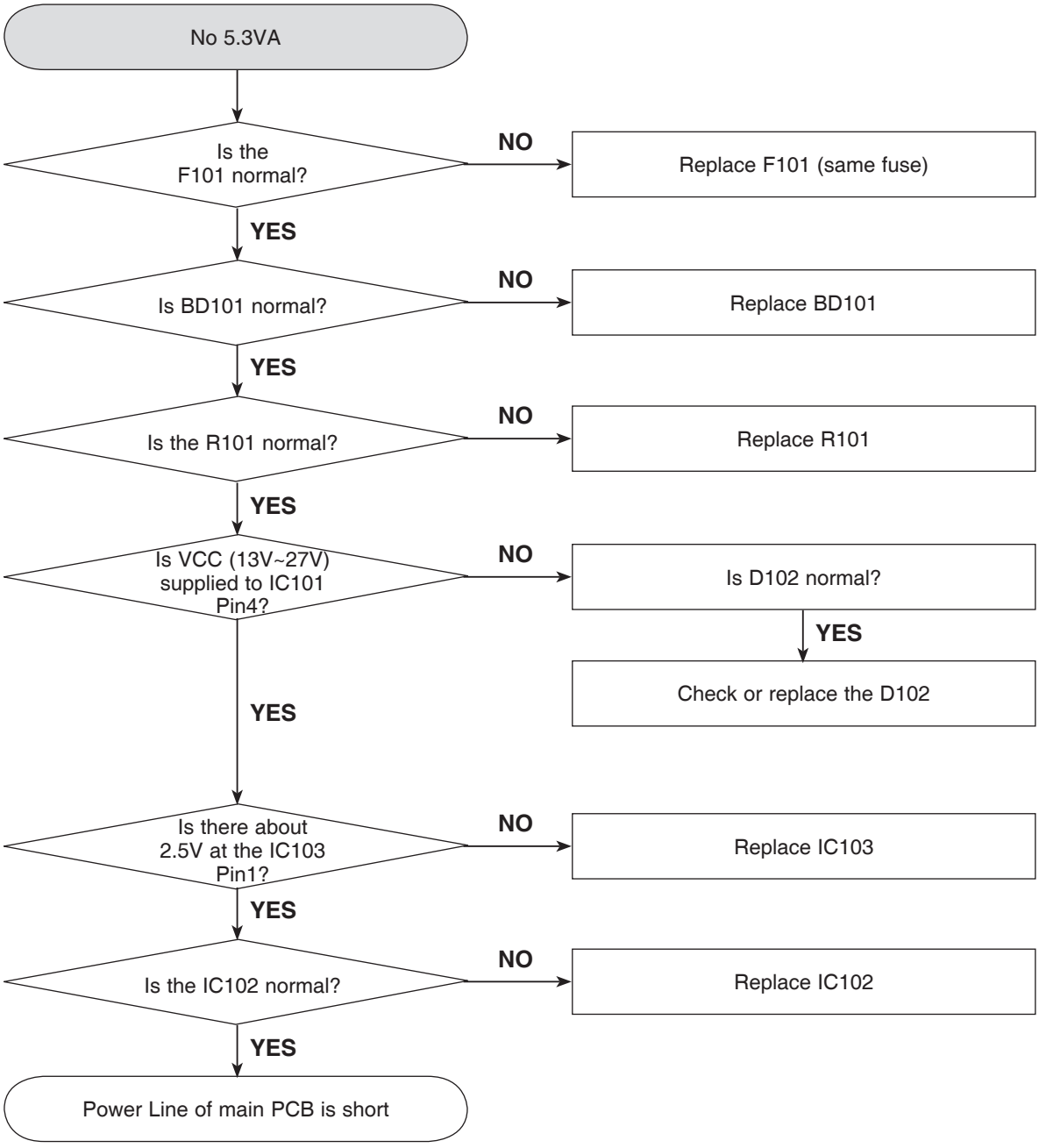
The Quality indicator during movie retrieval corresponds to the following bandwidth requirements:

- 1 dot is 0.5 Mbps
- 2 dots is 1.0 Mbps
- 3 dots is 1.6 Mbps
- 4 dots is 2.2 Mbps

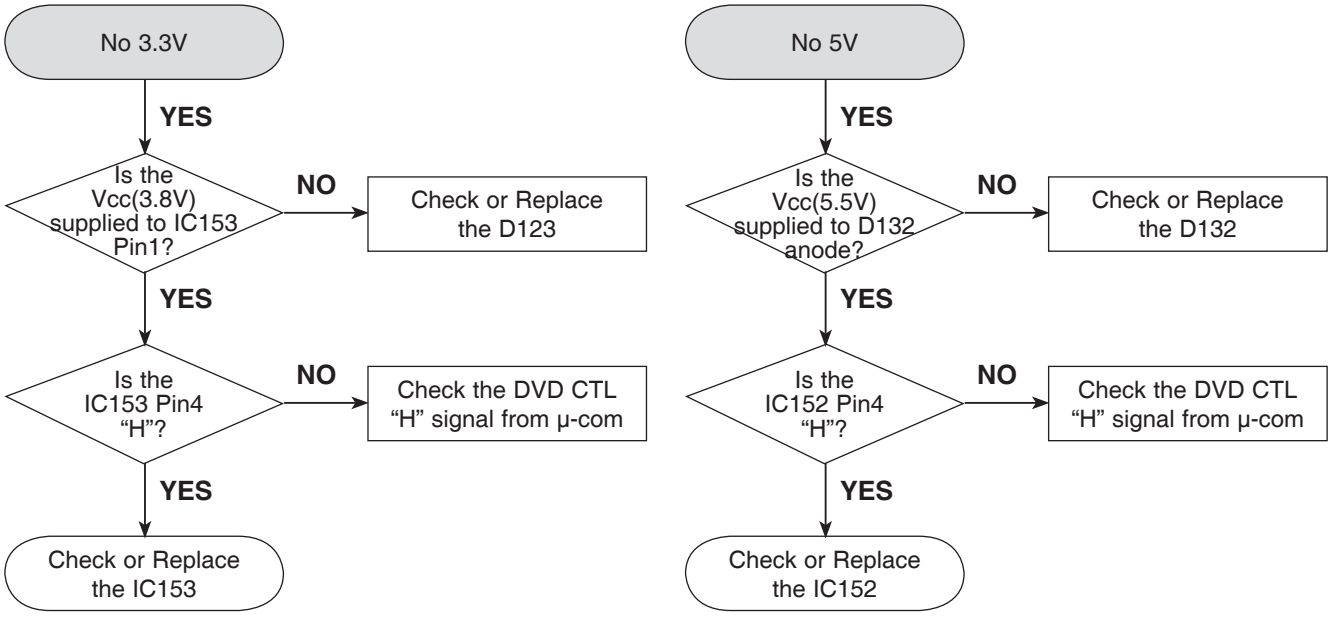


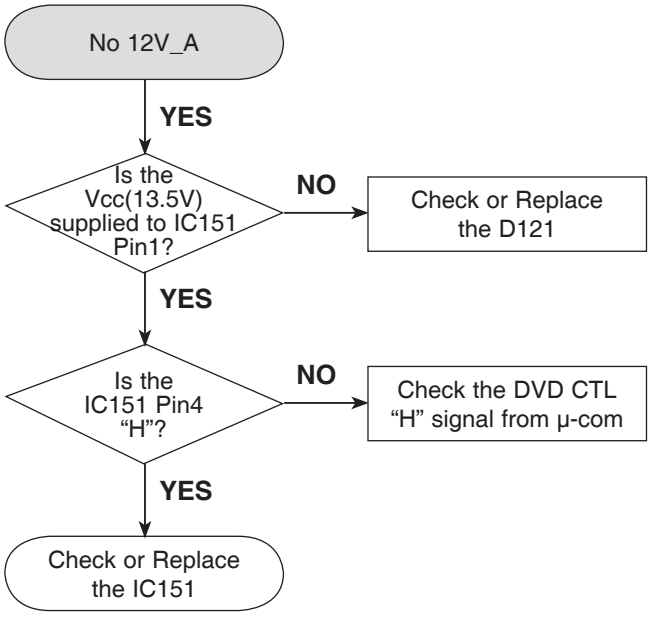
ELECTRICAL TROUBLESHOOTING GUIDE

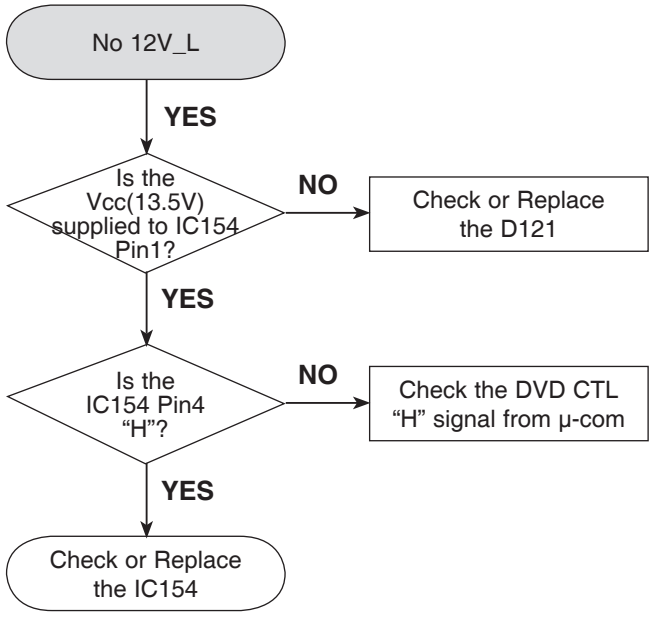
1. POWER SUPPLY (SMPS)



ELECTRICAL TROUBLESHOOTING GUIDE

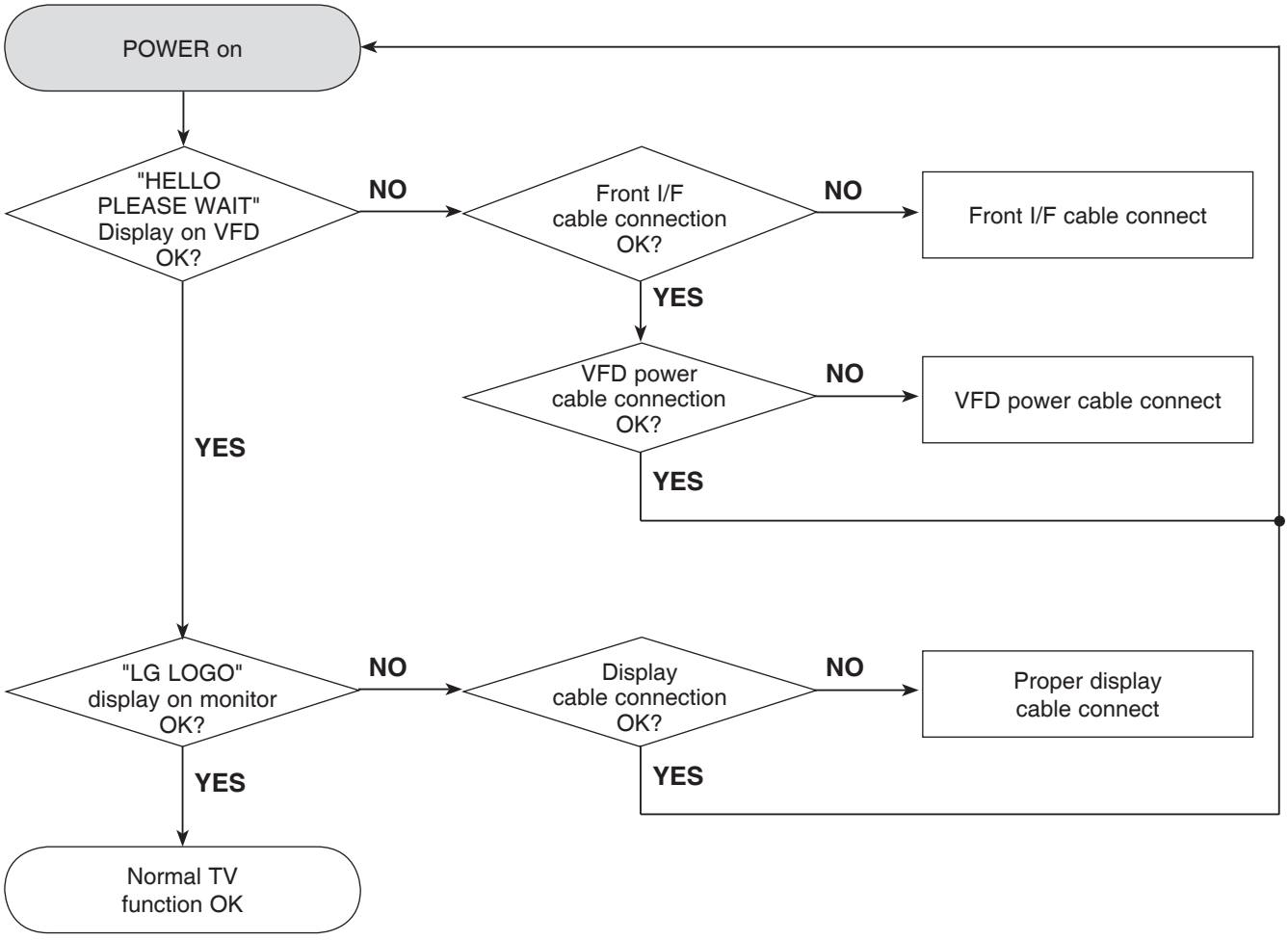






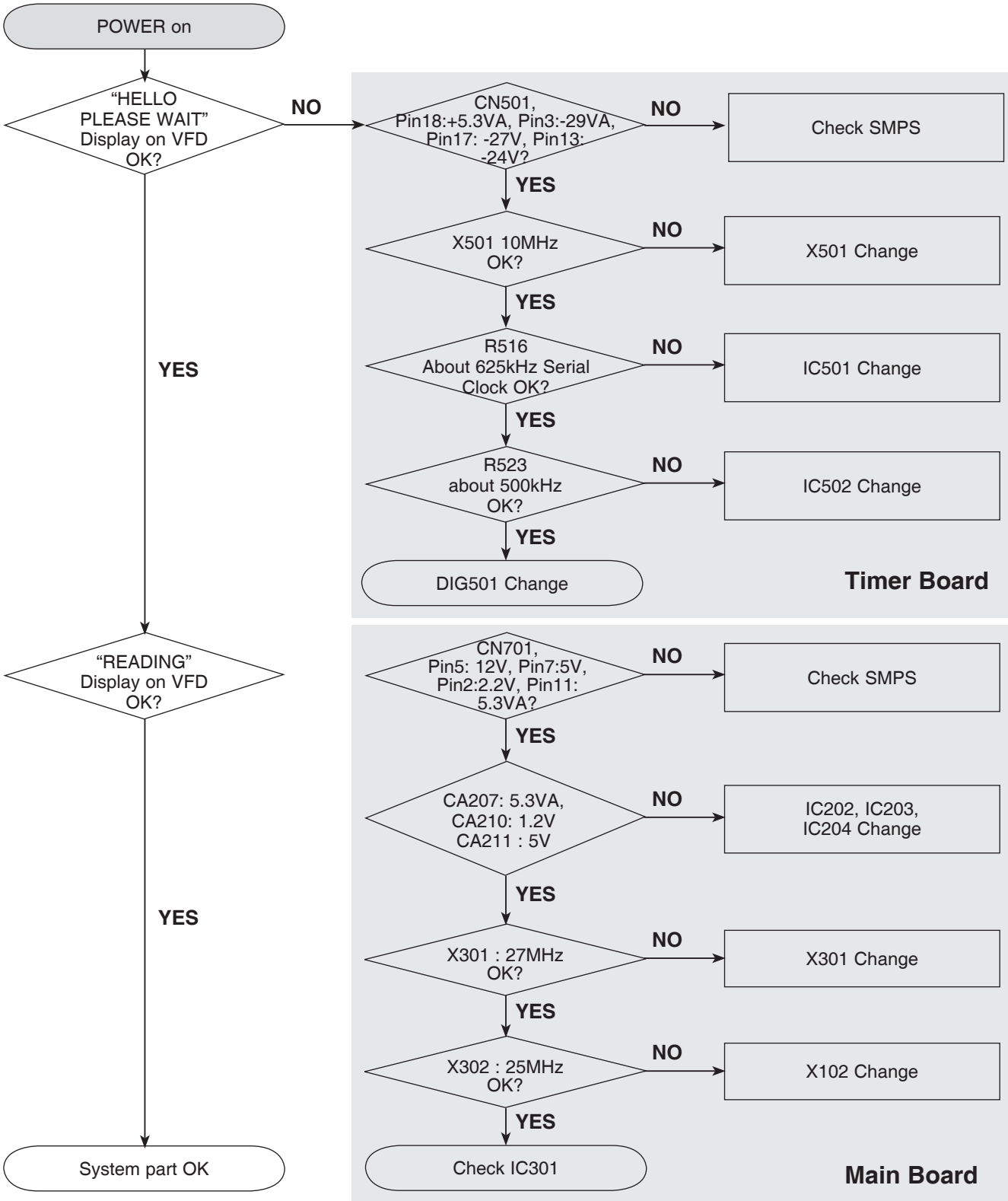
ELECTRICAL TROUBLESHOOTING GUIDE

2. POWER ON



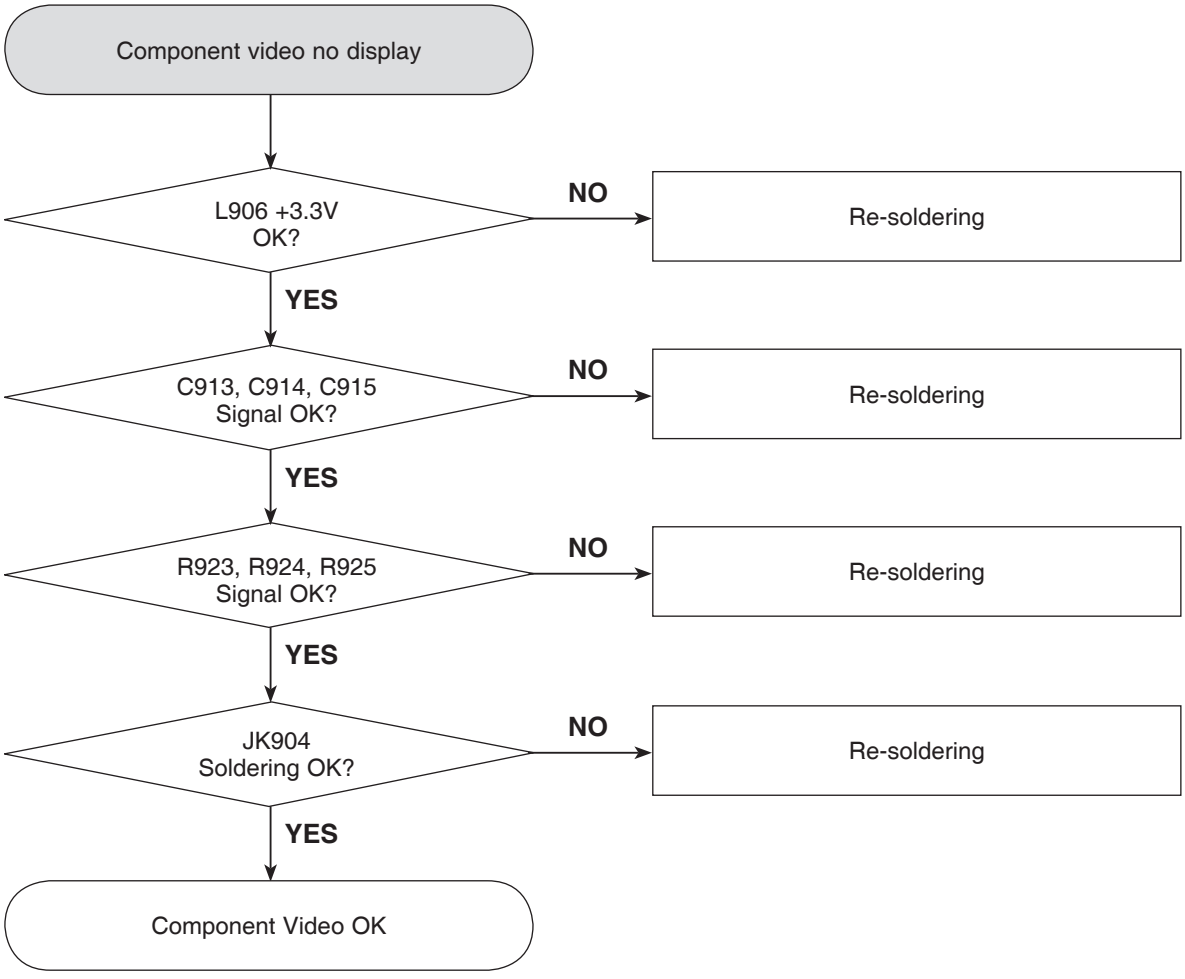
ELECTRICAL TROUBLESHOOTING GUIDE

3. SYSTEM PART



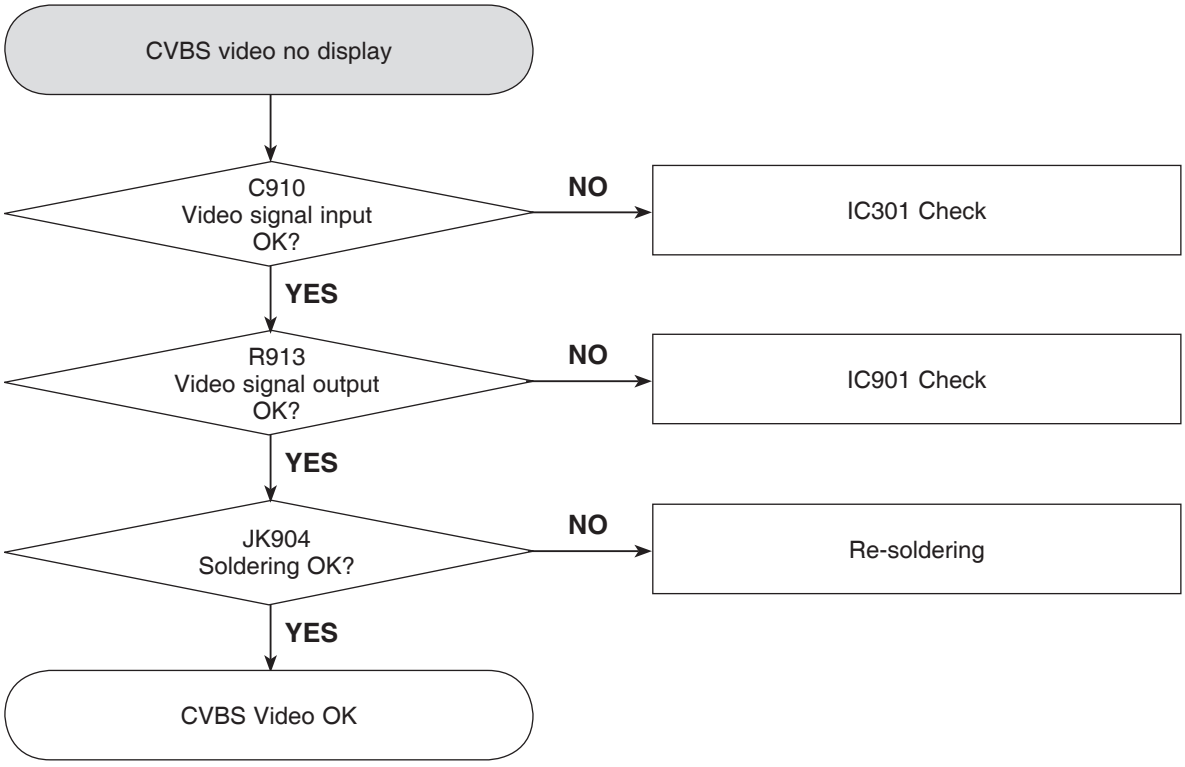
ELECTRICAL TROUBLESHOOTING GUIDE

4. COMPONENT (YPbPr) VIDEO OUT



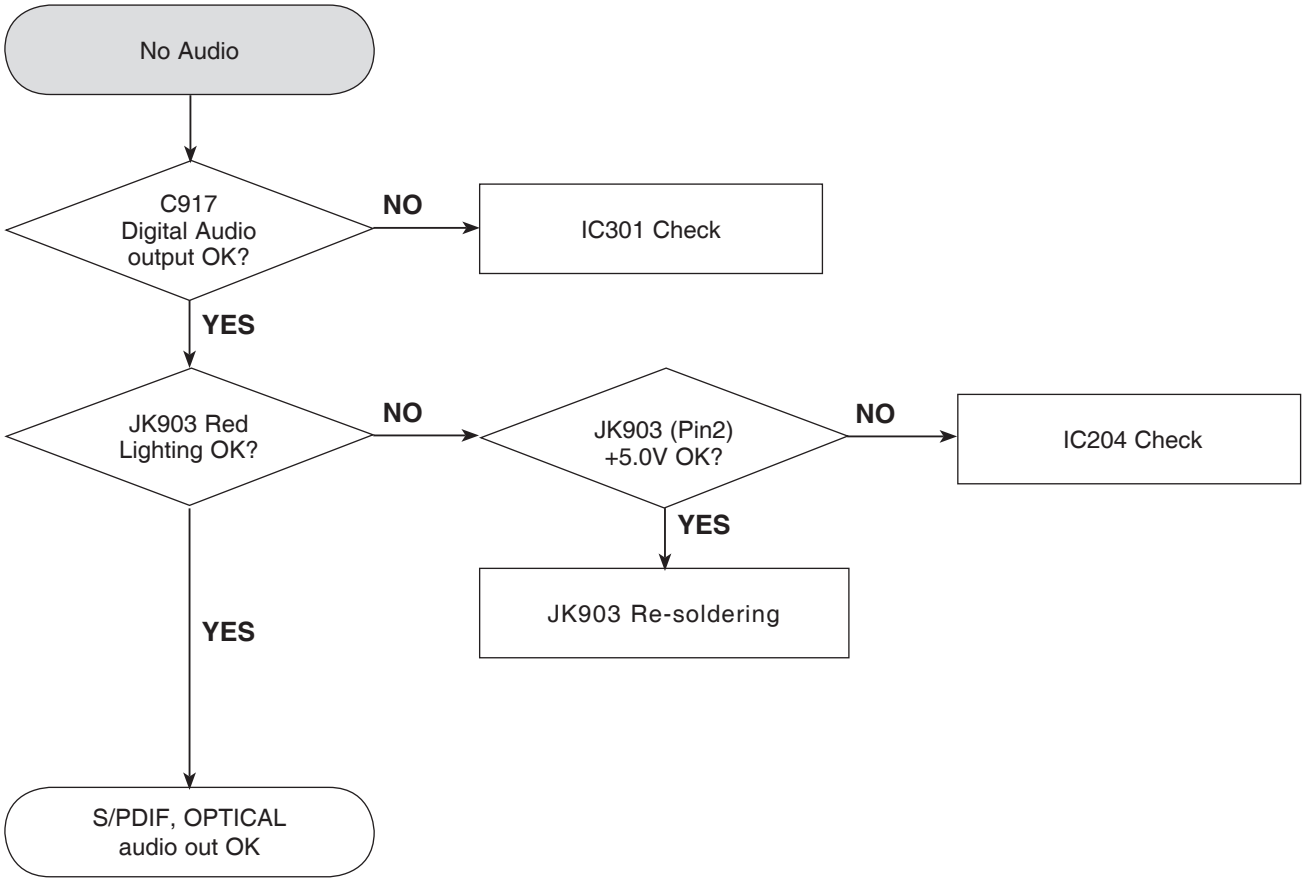
ELECTRICAL TROUBLESHOOTING GUIDE

5. CVBS VIDEO OUT



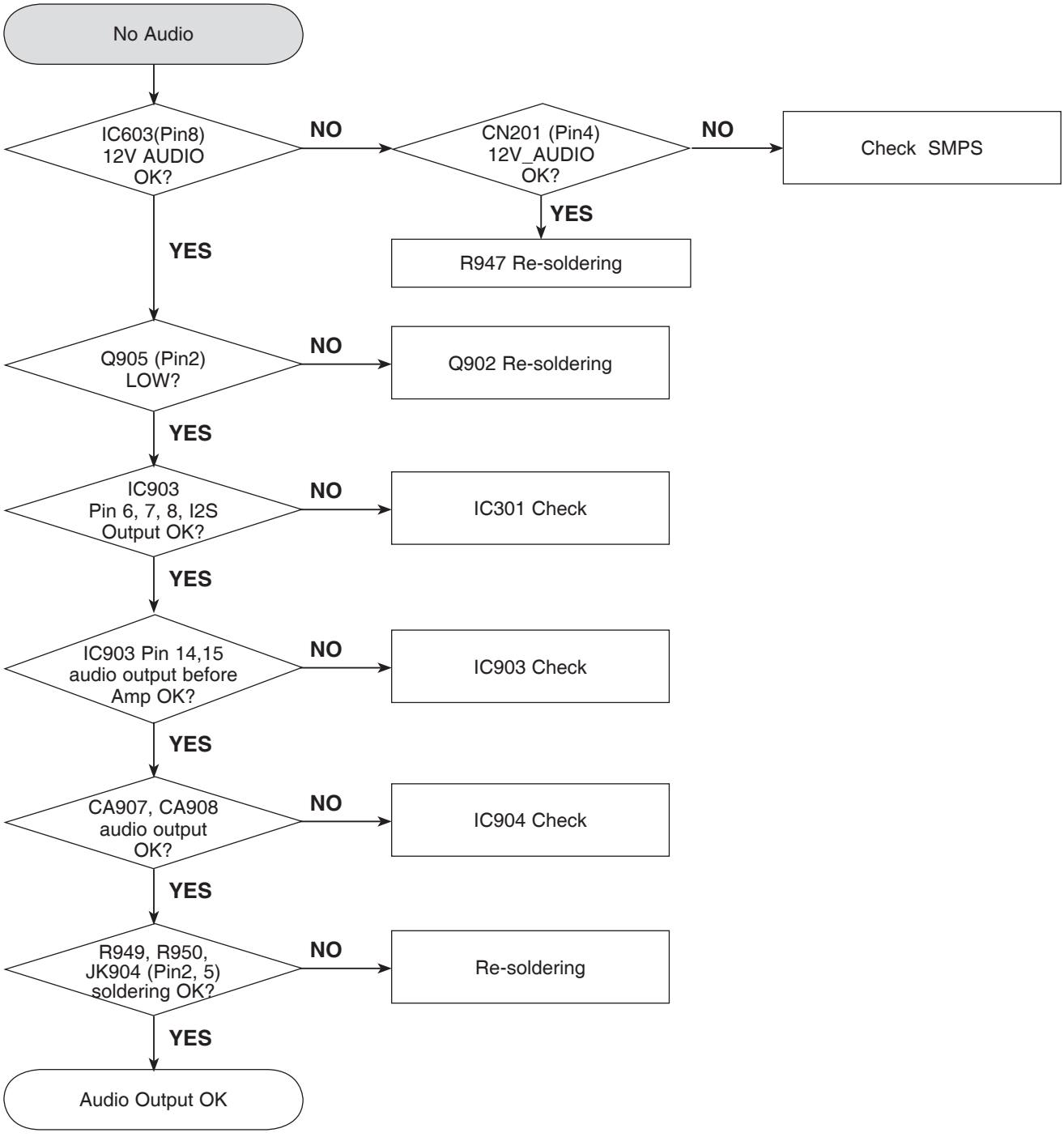
ELECTRICAL TROUBLESHOOTING GUIDE

6. AUDIO (S/PDIF, OPTICAL)



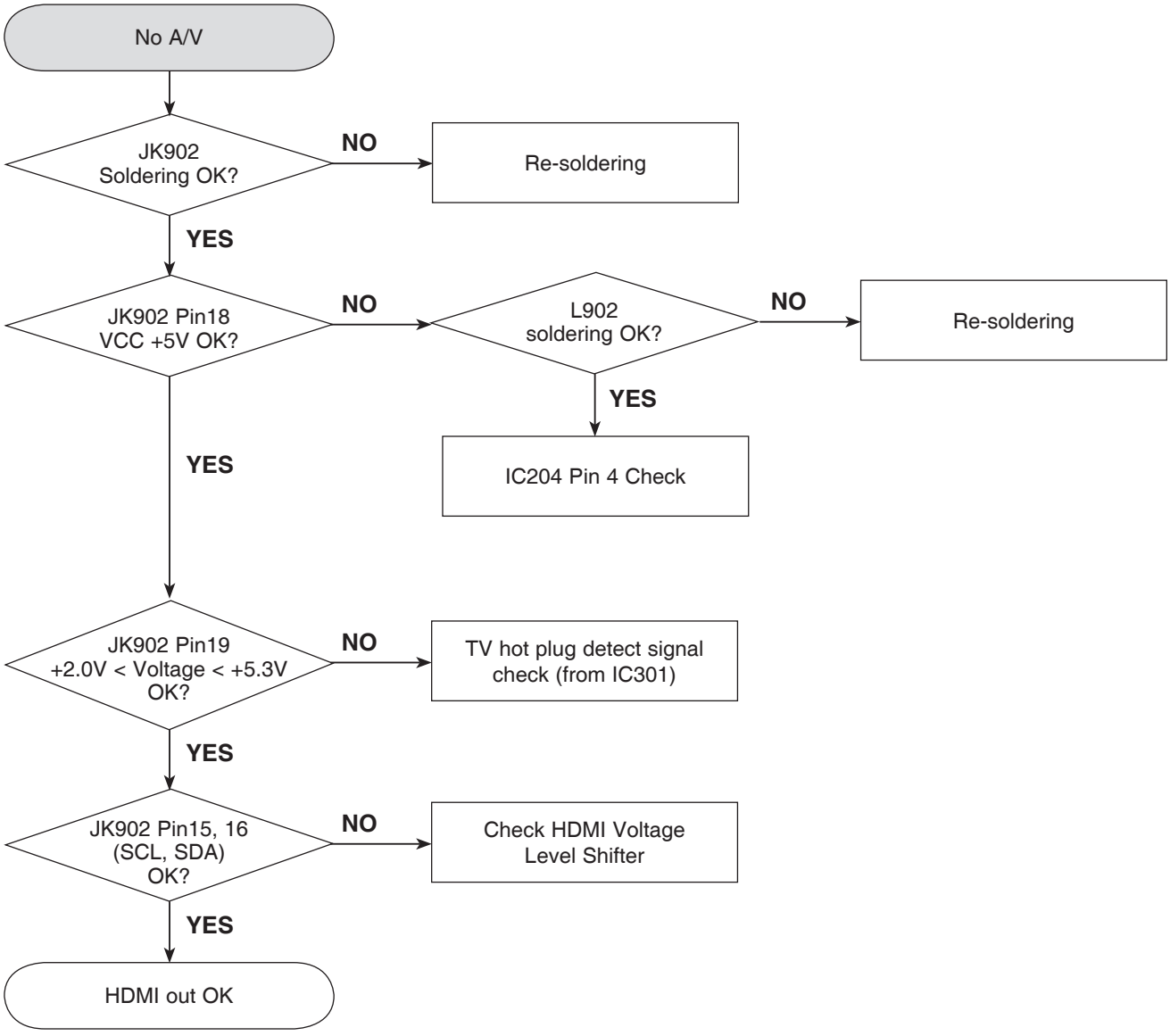
ELECTRICAL TROUBLESHOOTING GUIDE

7. AUDIO (ANALOG)



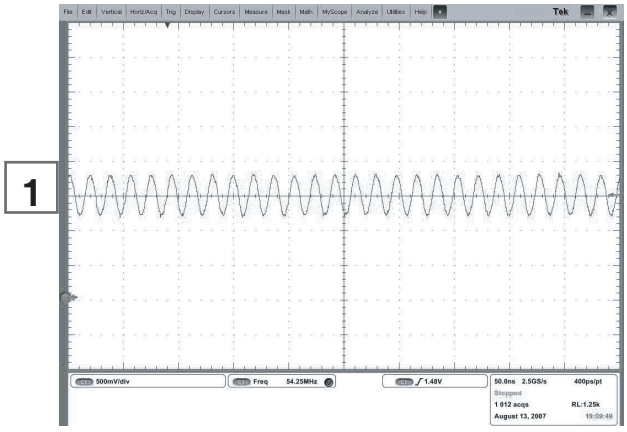
ELECTRICAL TROUBLESHOOTING GUIDE

8. HDMI

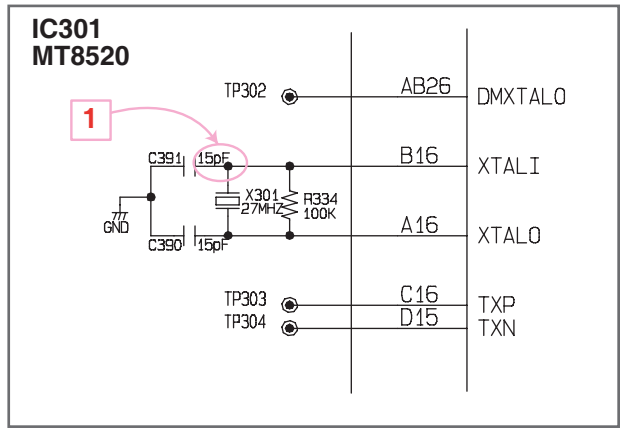


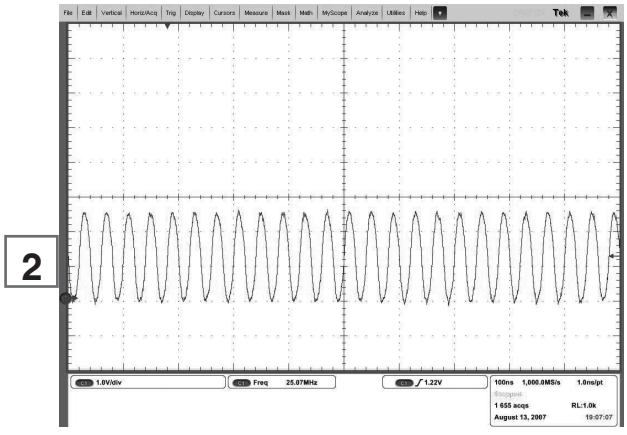
WAVEFORMS

1. SYSTEM PART-1

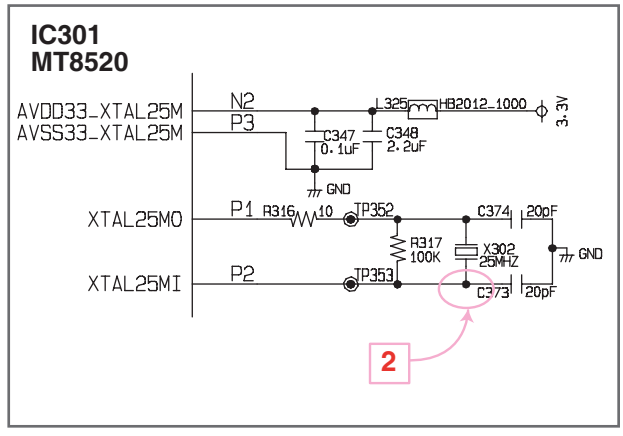


MT8520 XTAL 27MHz

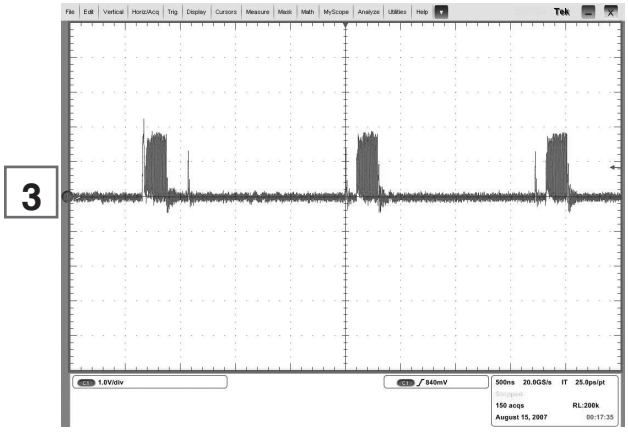




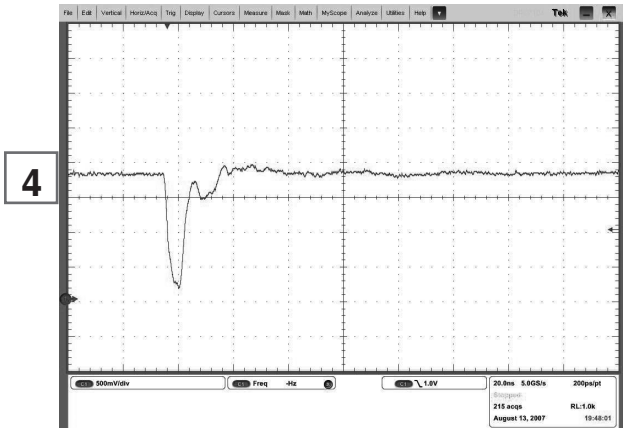
MT8520 XTAL 25MHz for
SATA Loader



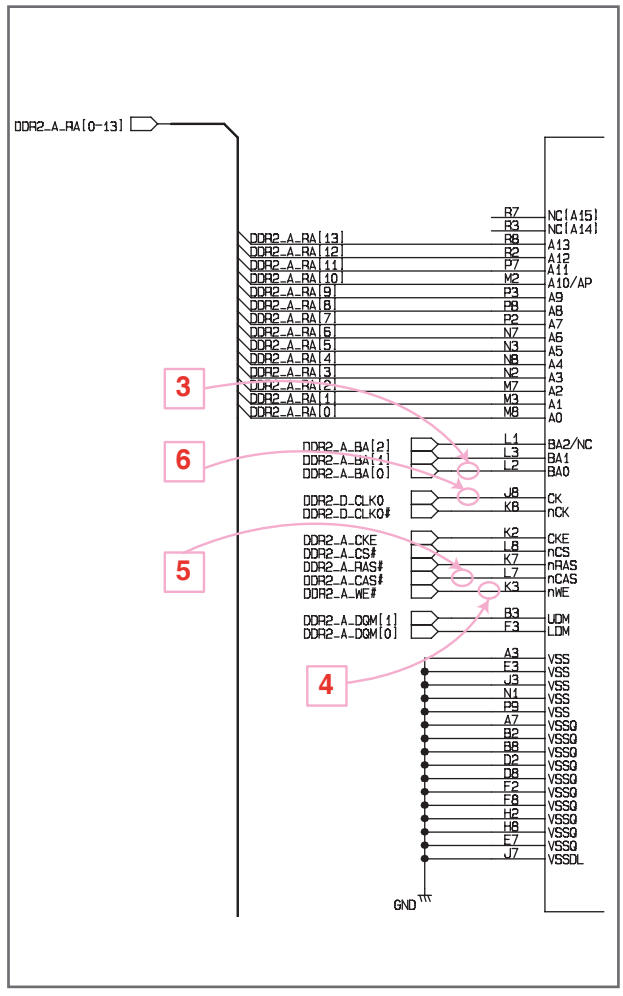
2. SYSTEM PART-2 (SYSTEM MEMORY)

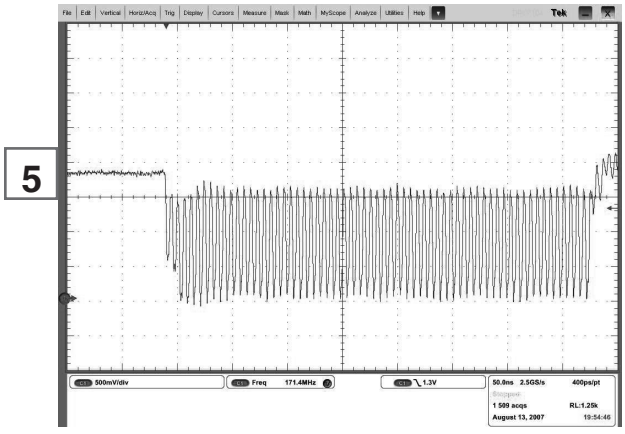


MT8520 DDR2_A_BA[0]

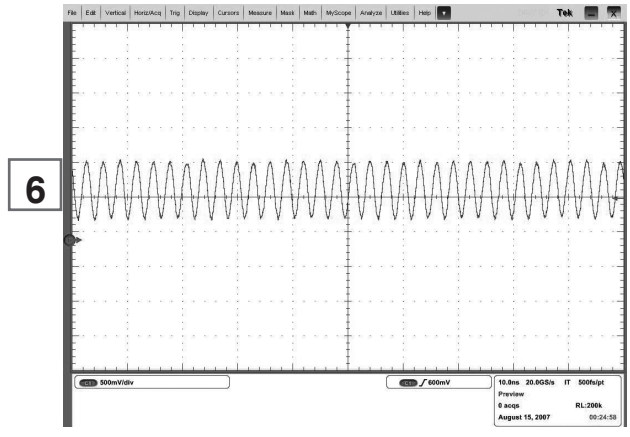


MT8520 DDR2_A_WE#



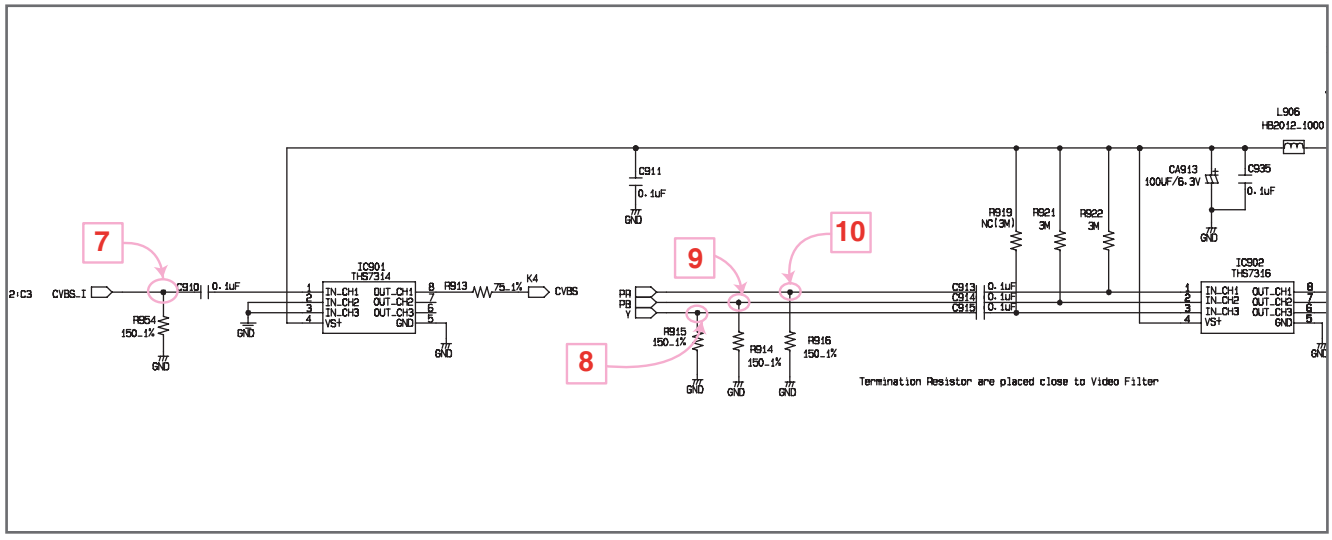


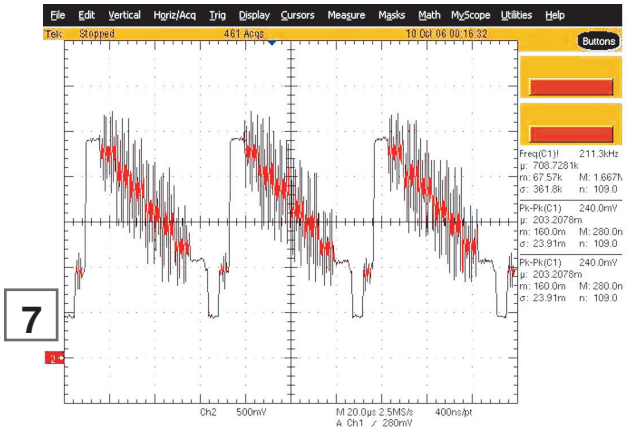
MT8520 DDR2_A_CAS#



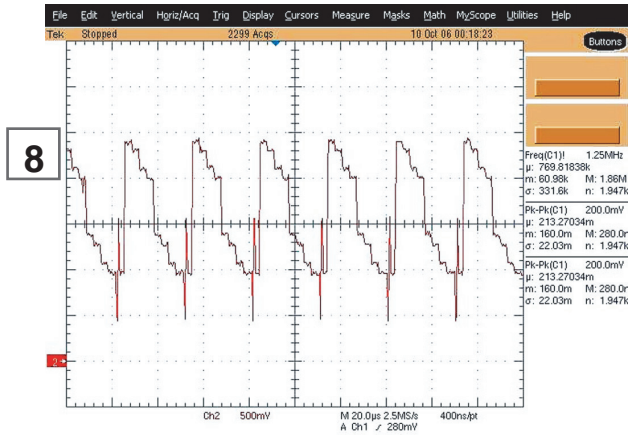
MT8520 DDR2_A_CLK0

3. VIDEO PART-1 (100% FULL COLOR-BAR)

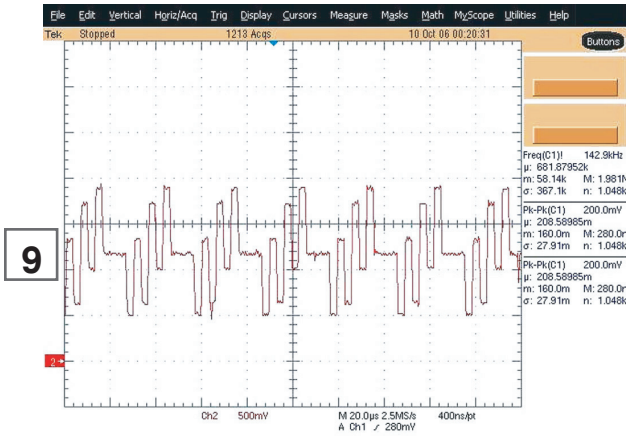




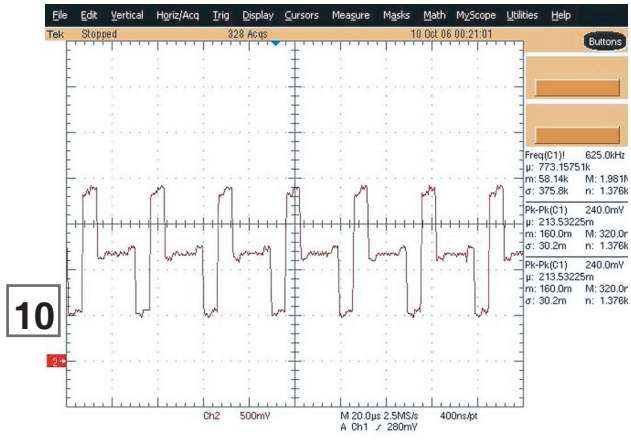
CVBS_I



Y

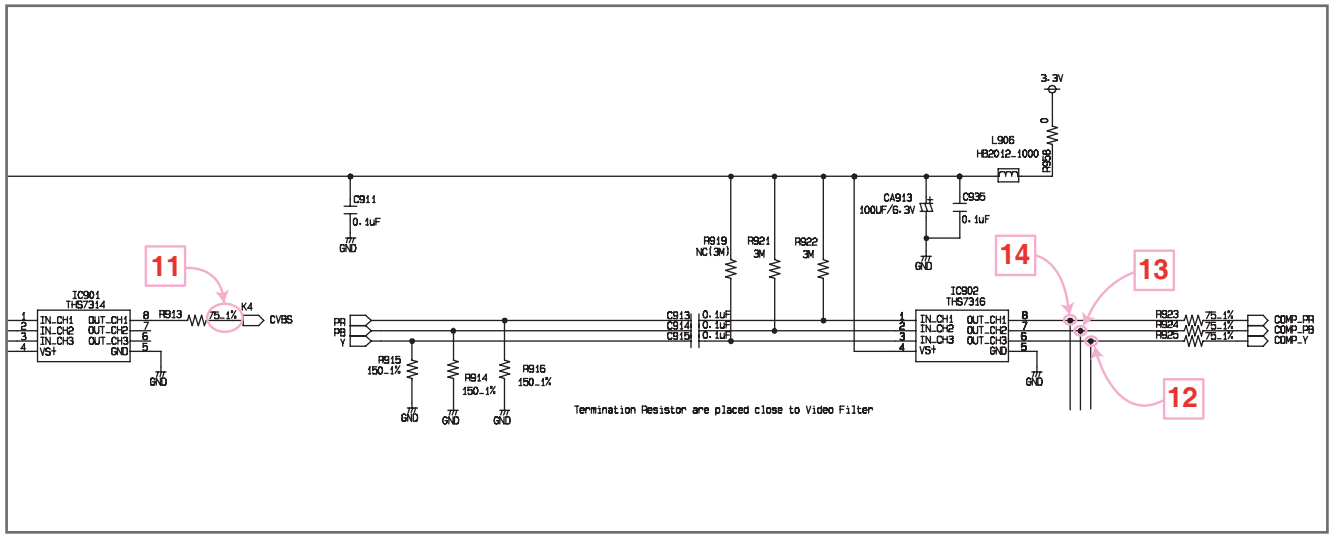


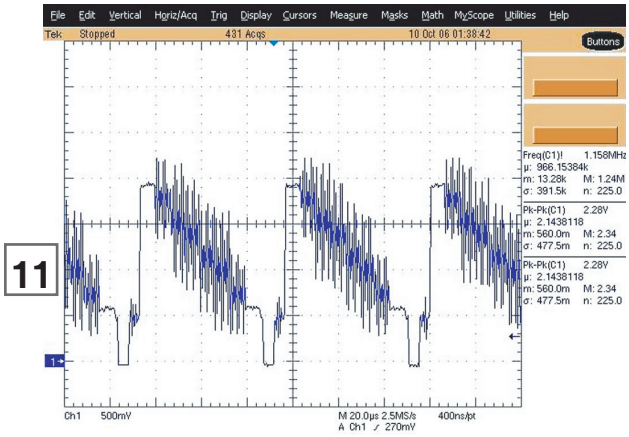
Pb



Pr

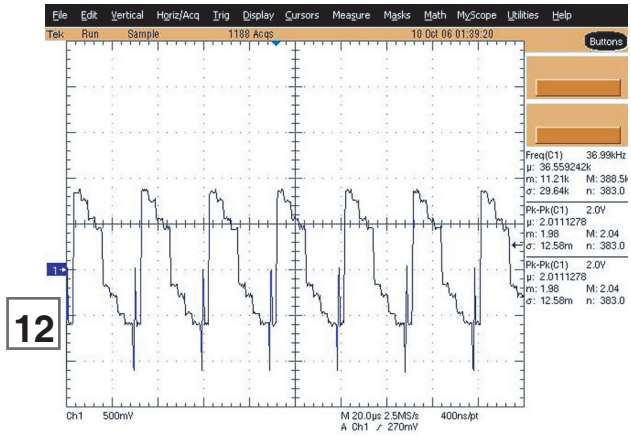
4. VIDEO PART-2 (100% FULL COLOR-BAR)





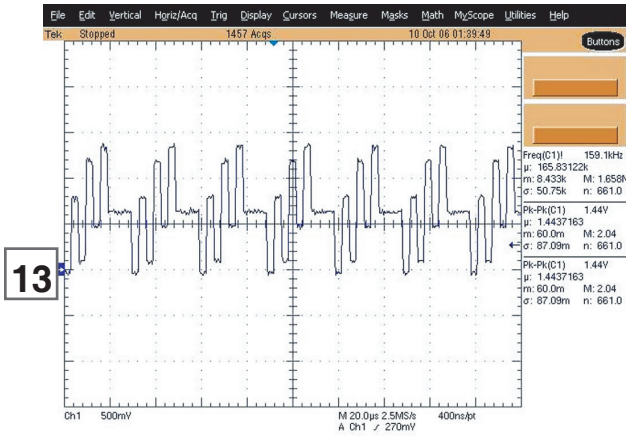
11

CVBS



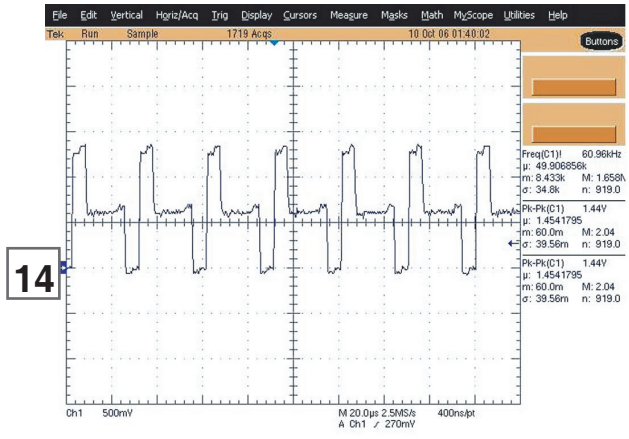
12

COMP_Y



13

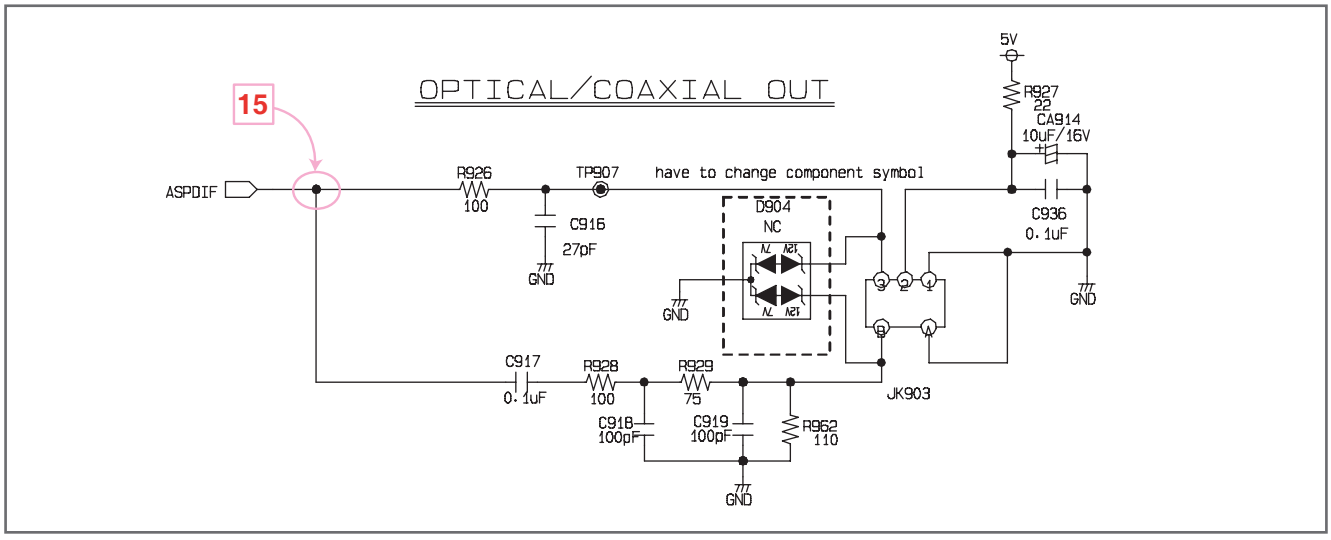
COMP_Pb

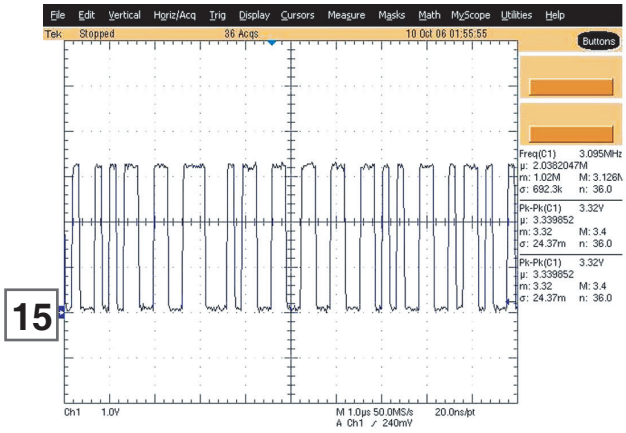


14

COMP_Pr

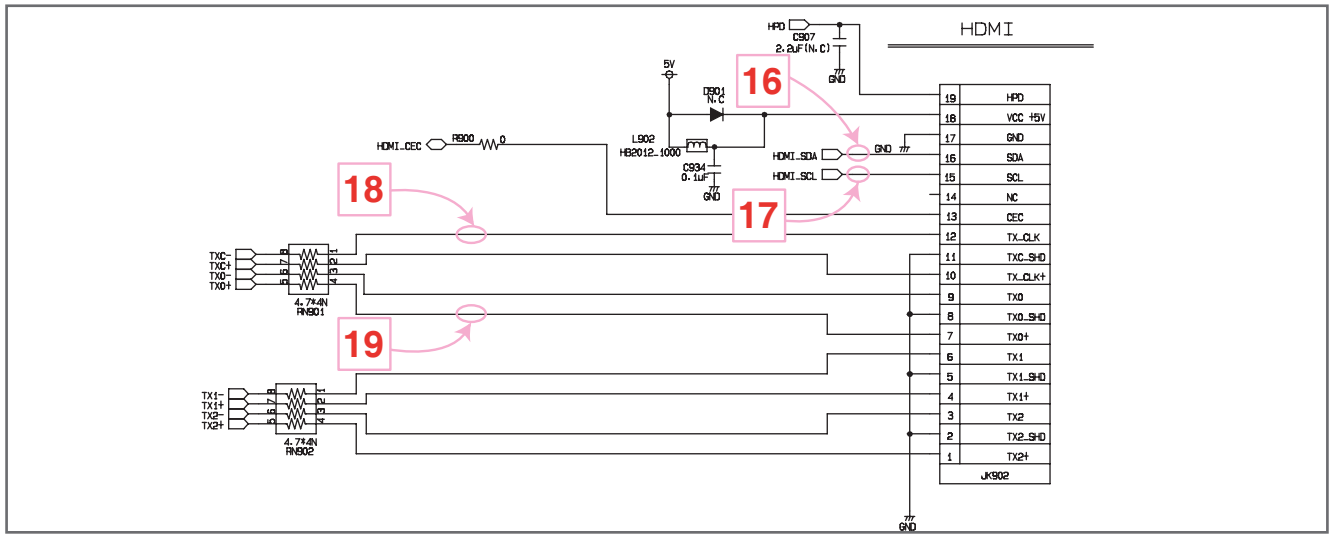
5. AUDIO PART (S/PDIF)

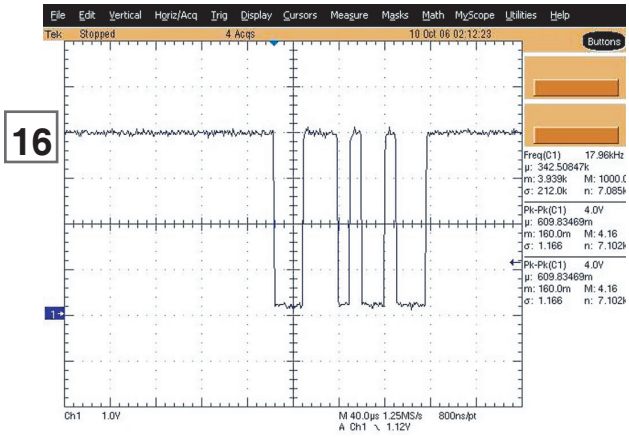




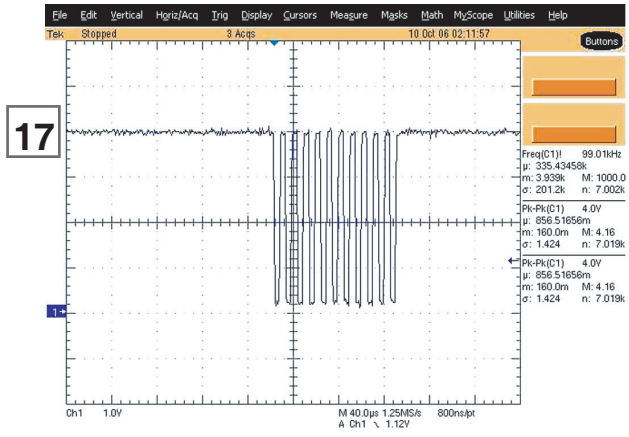
ASPDIF

6. HDMI PART

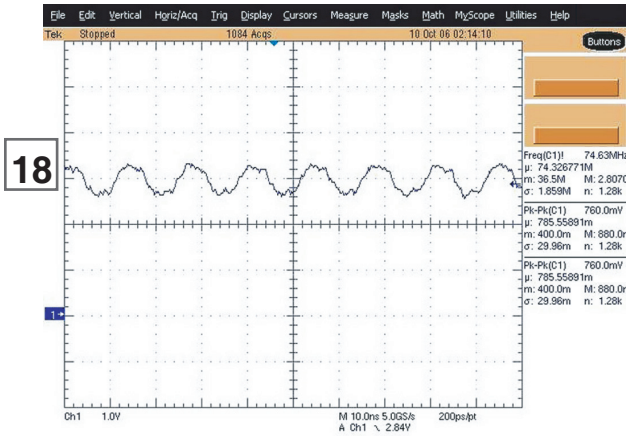




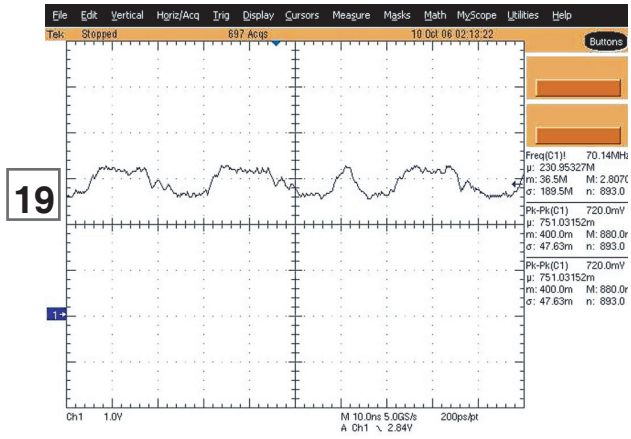
HDMI_SDA



HDMI_SCL

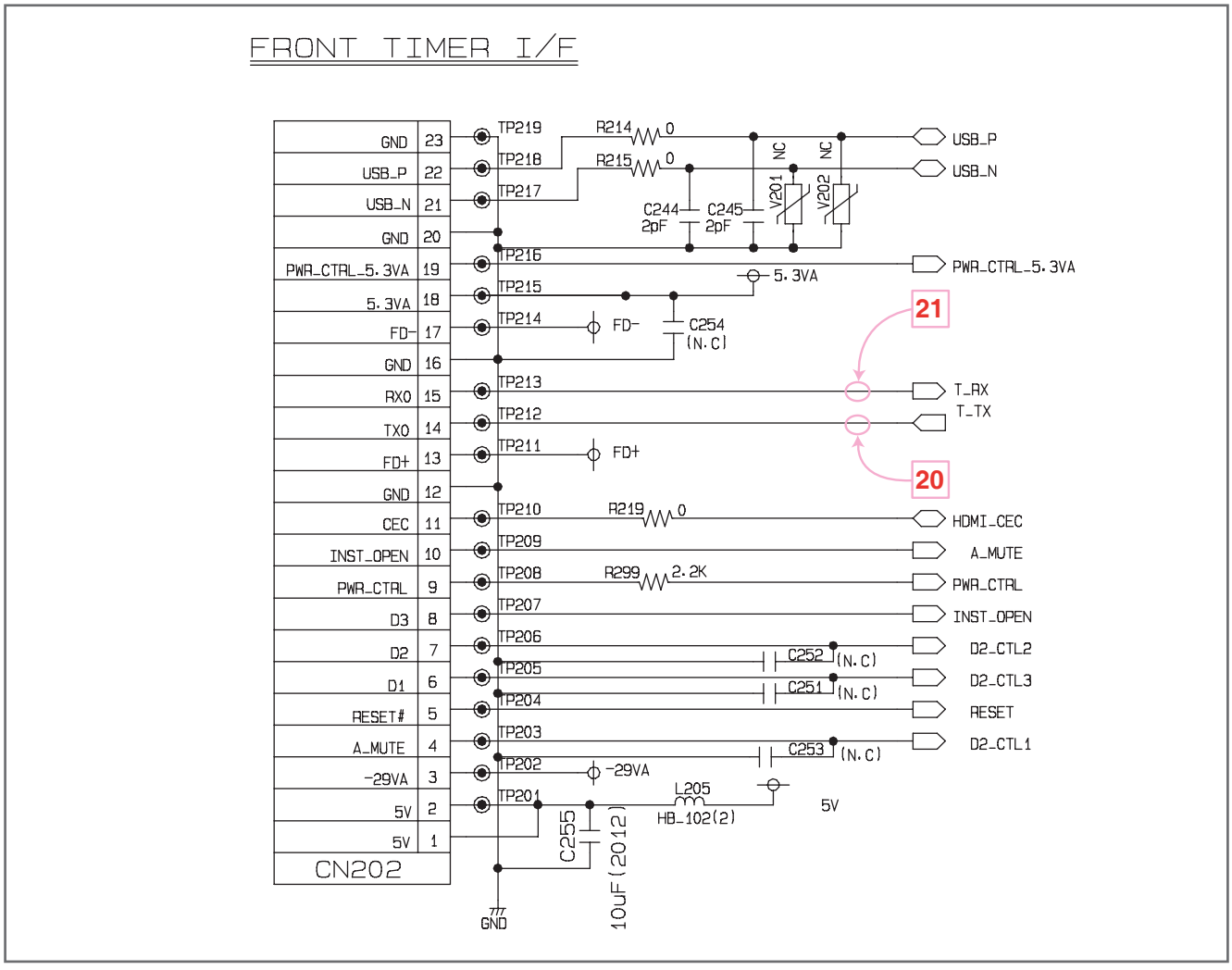


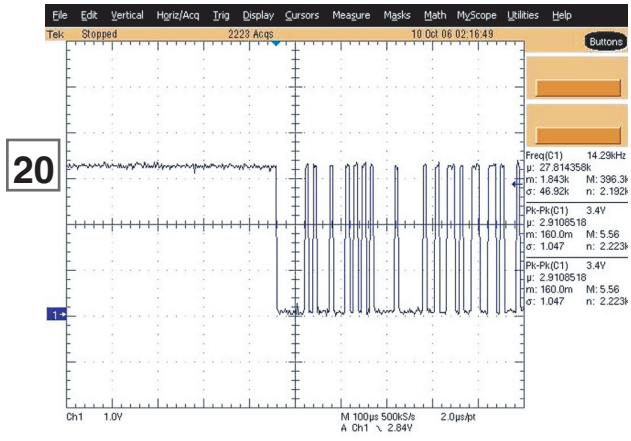
HDMI_CLK



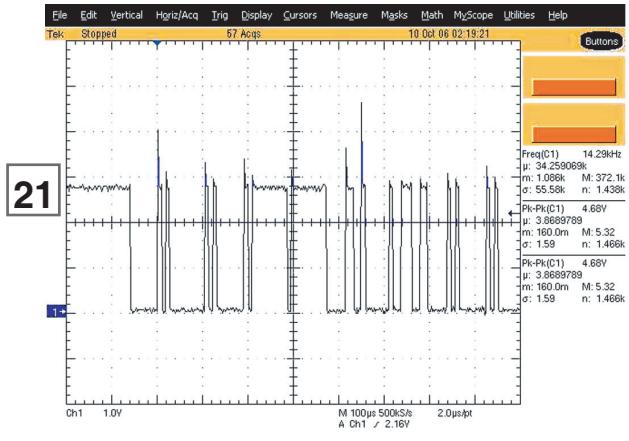
HDMI_DATA

7. FRONT I/F PART





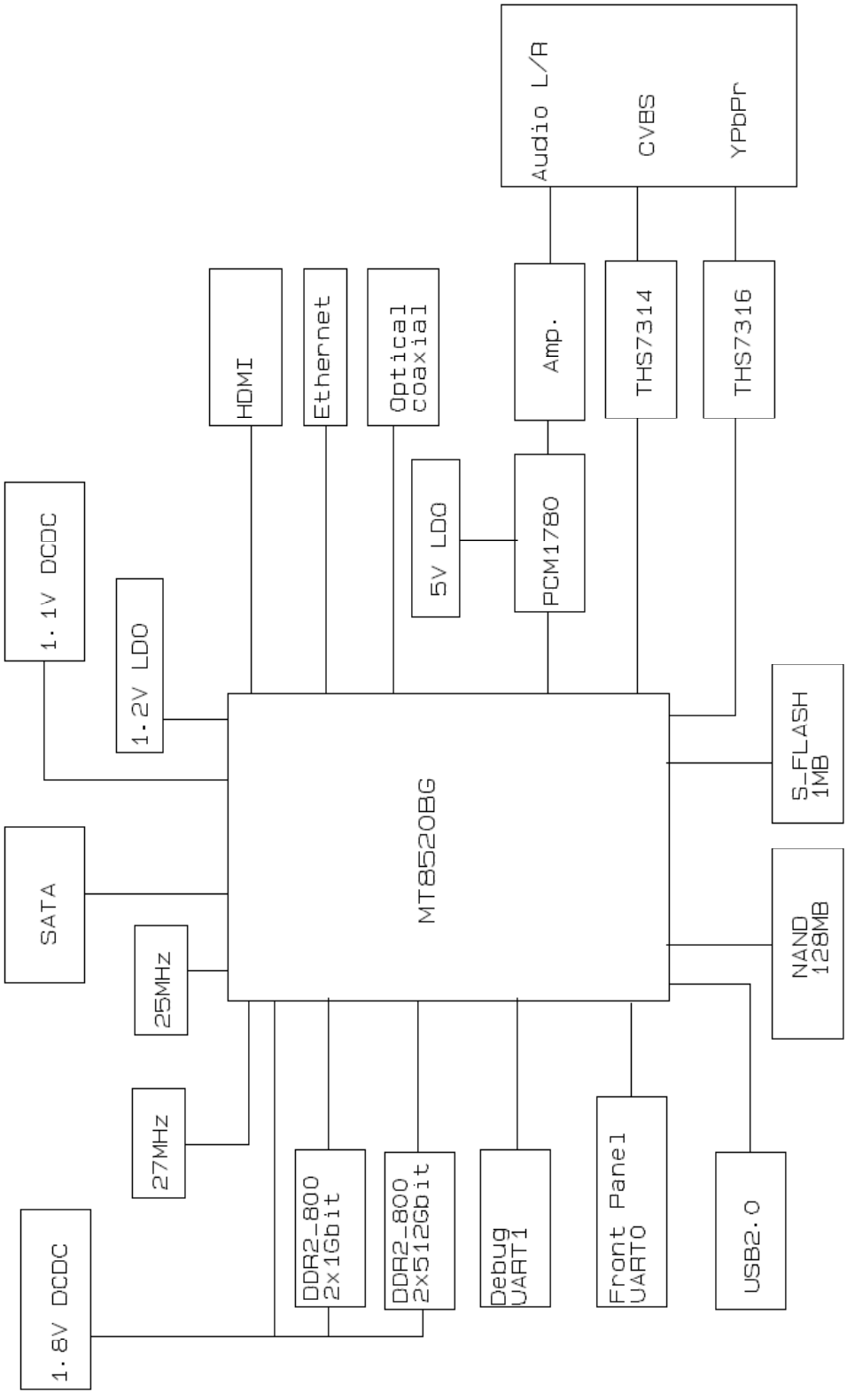
T_TX



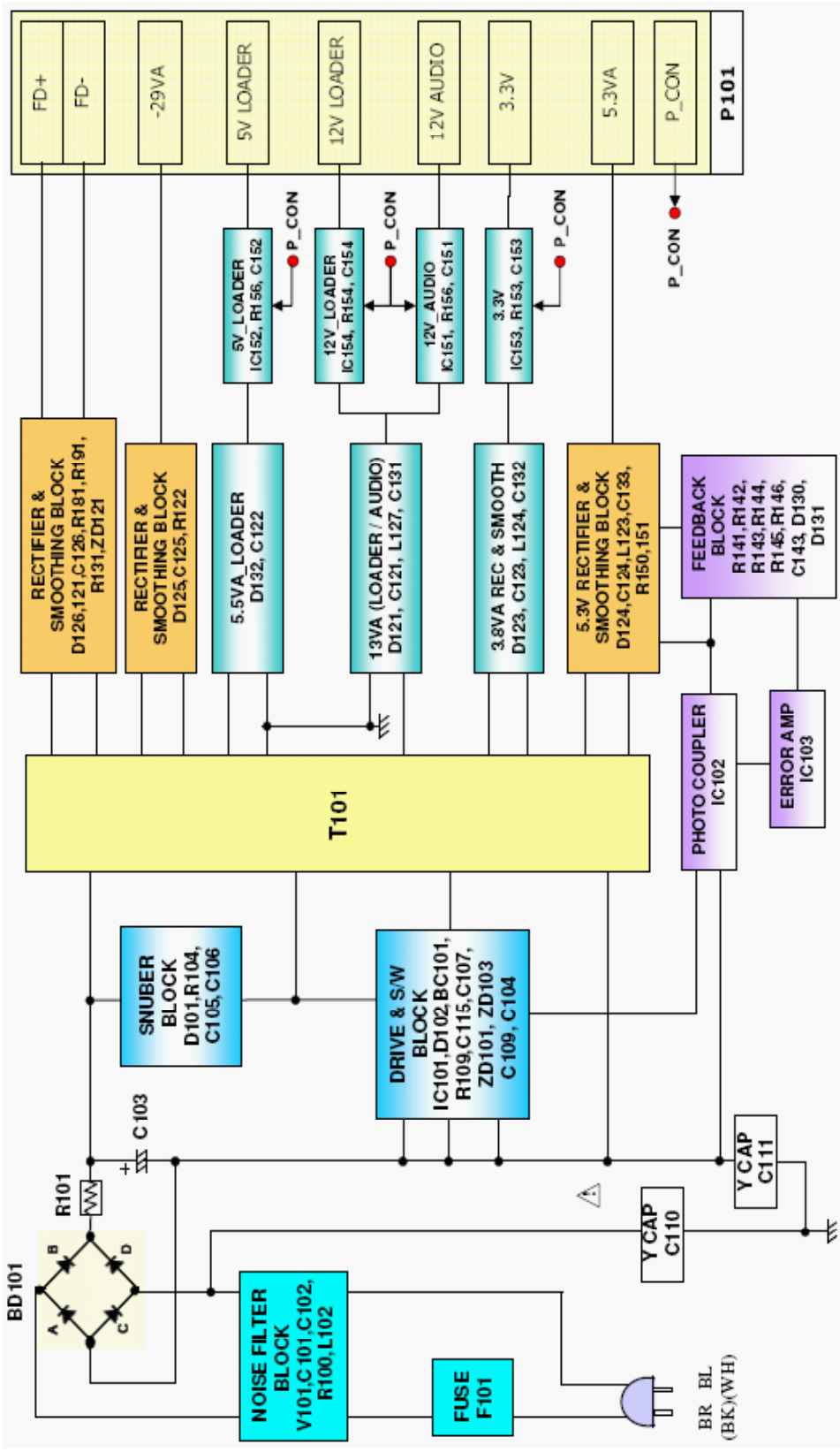
R_RX

BLOCK DIAGRAMS

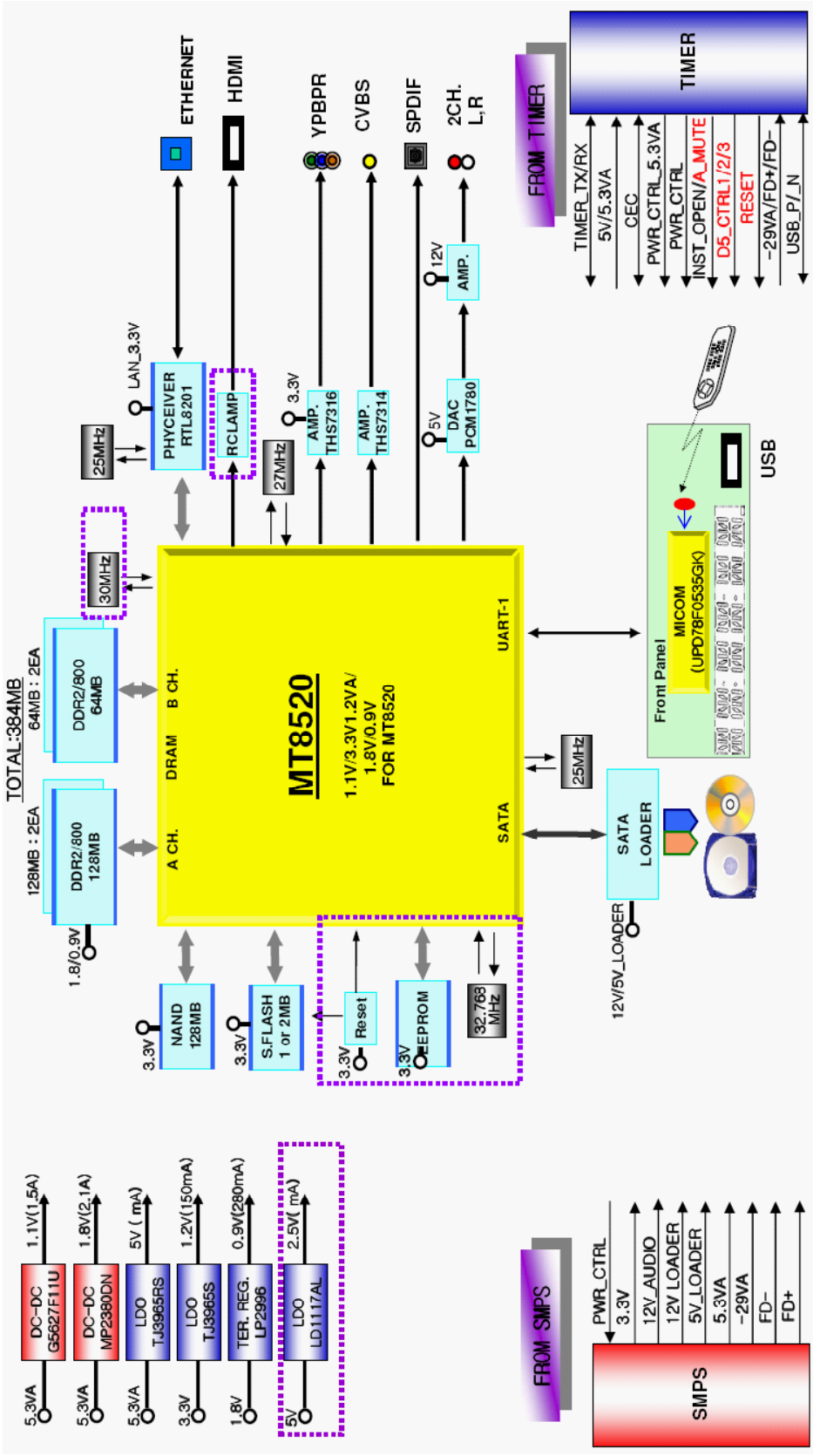
1. OVERALL BLOCK DIAGRAM



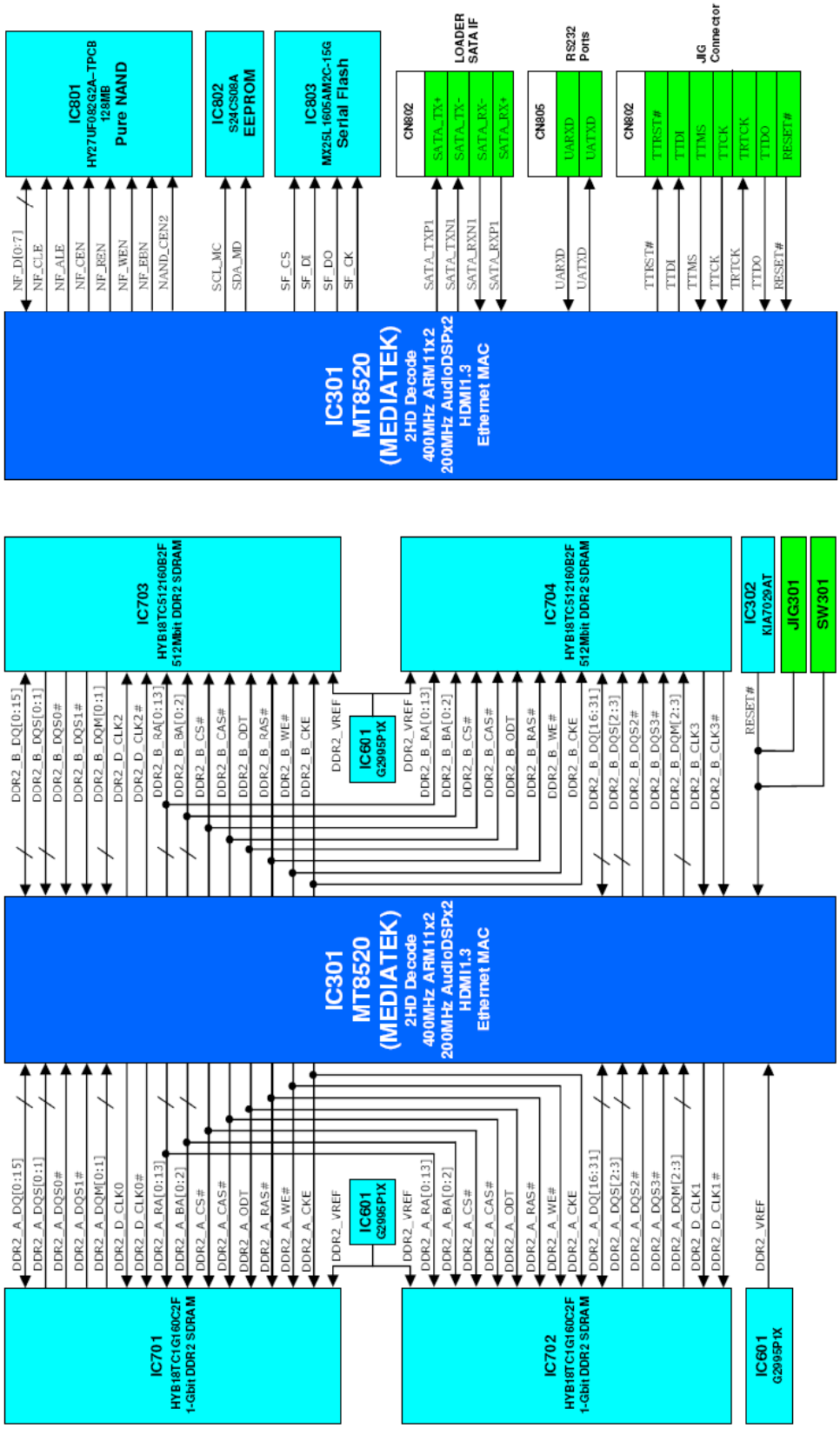
2. SMPS BLOCK DIAGRAM



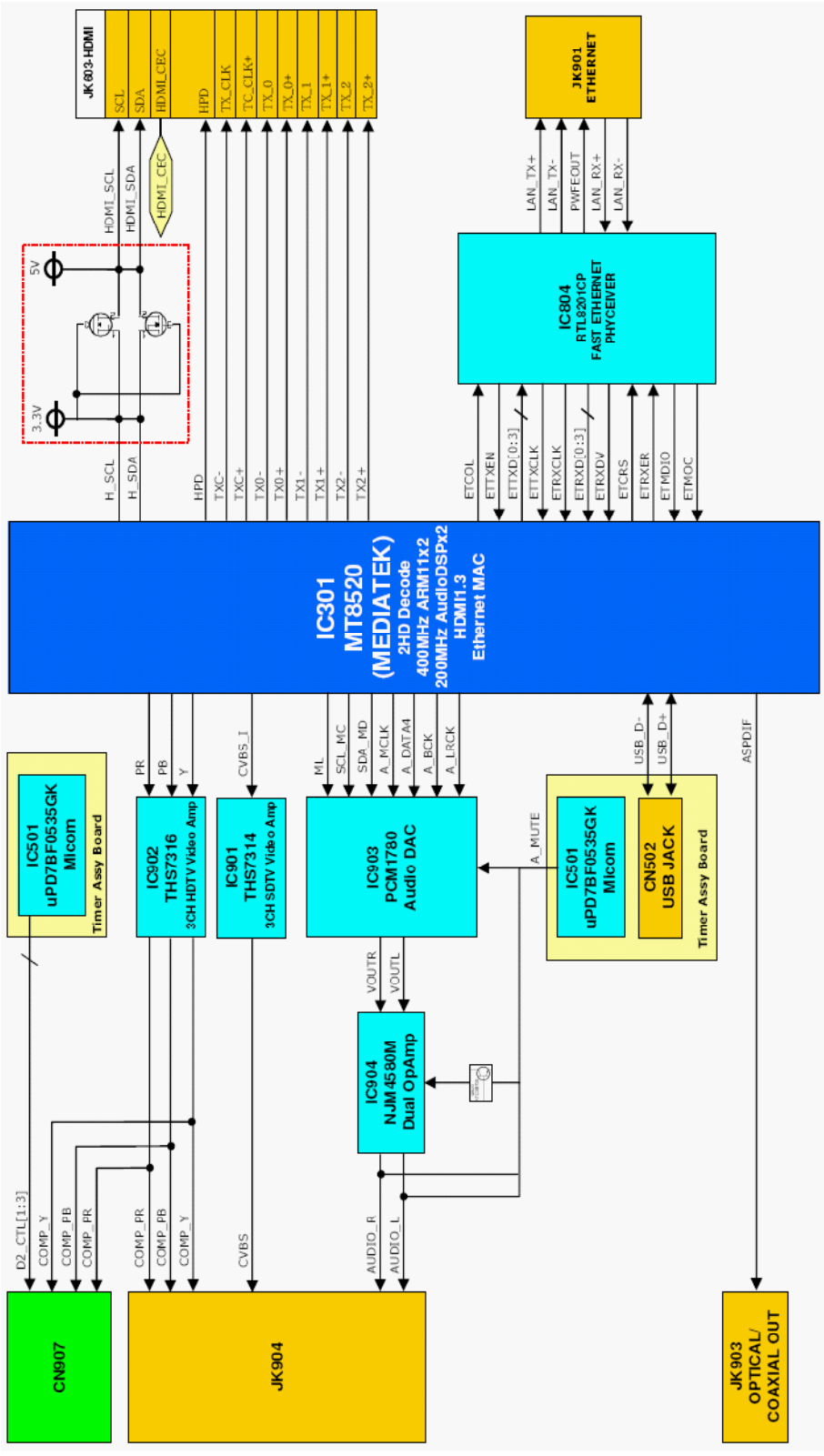
3. SYSTEM BLOCK DIAGRAM



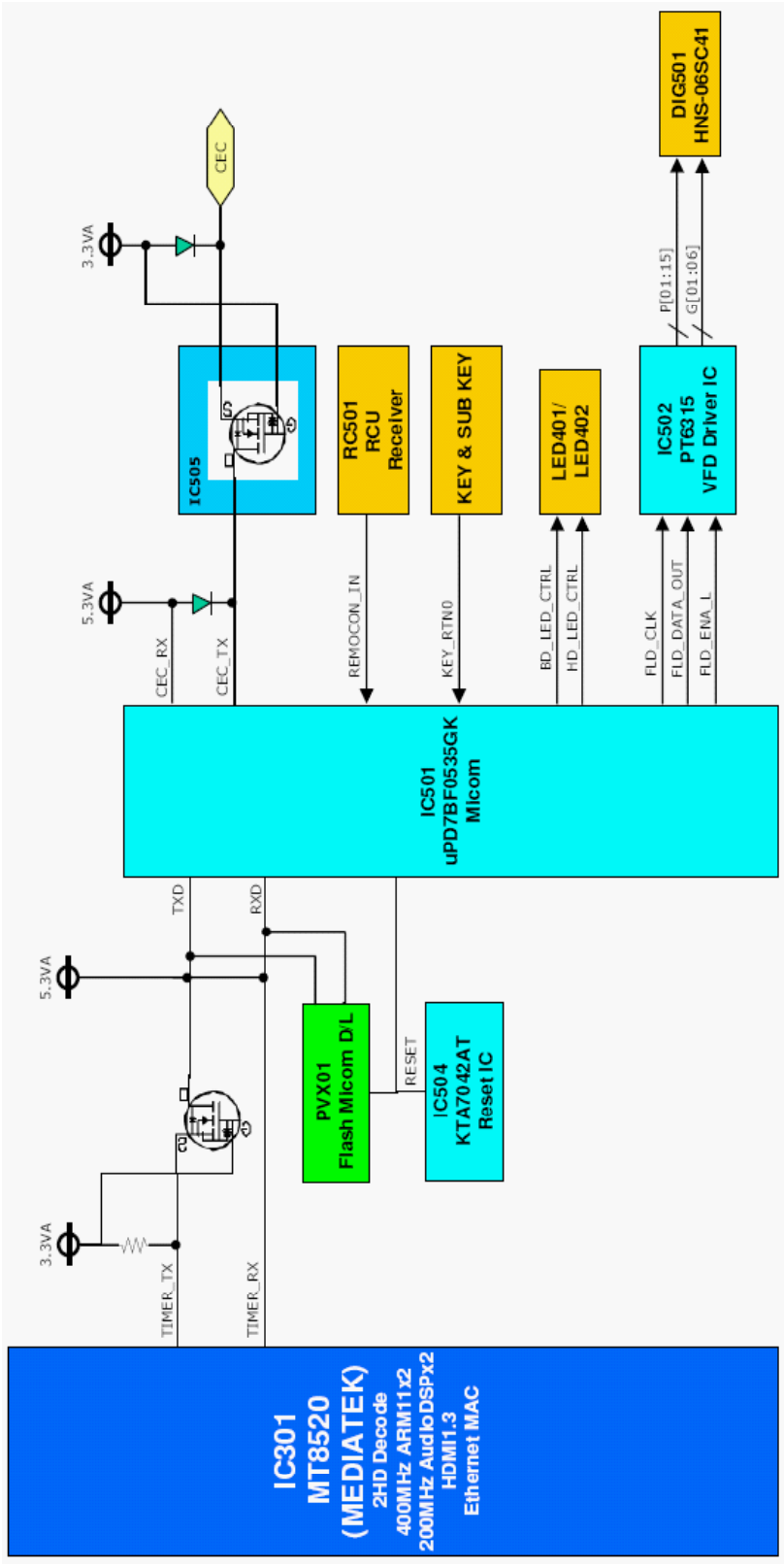
4. MT8520/DDR2-SDRAM/NAND/FLASH/EEPROM BLOCK DIAGRAM



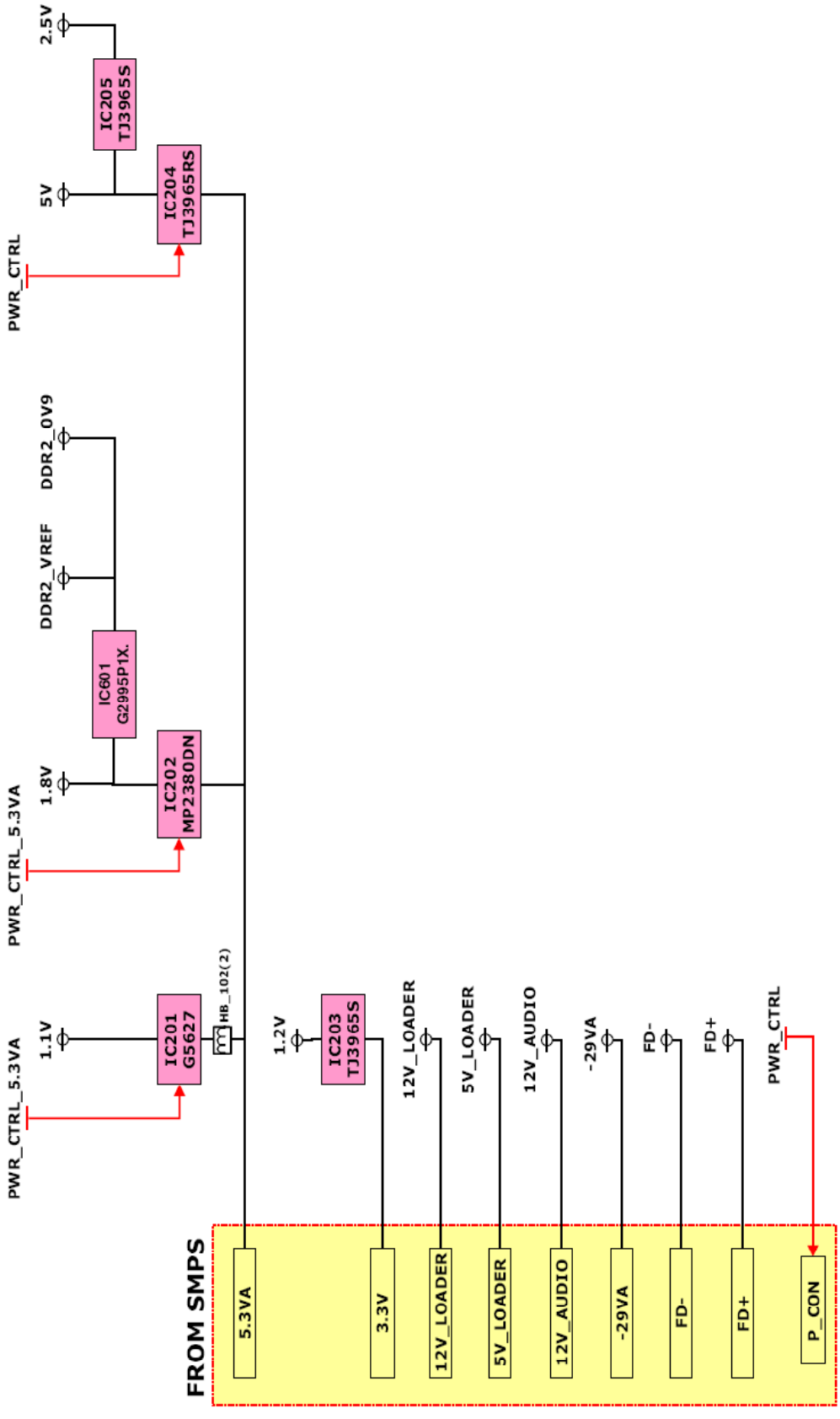
5. MT8520/HDMI/ETHERNET/USB/AV BLOCK DIAGRAM



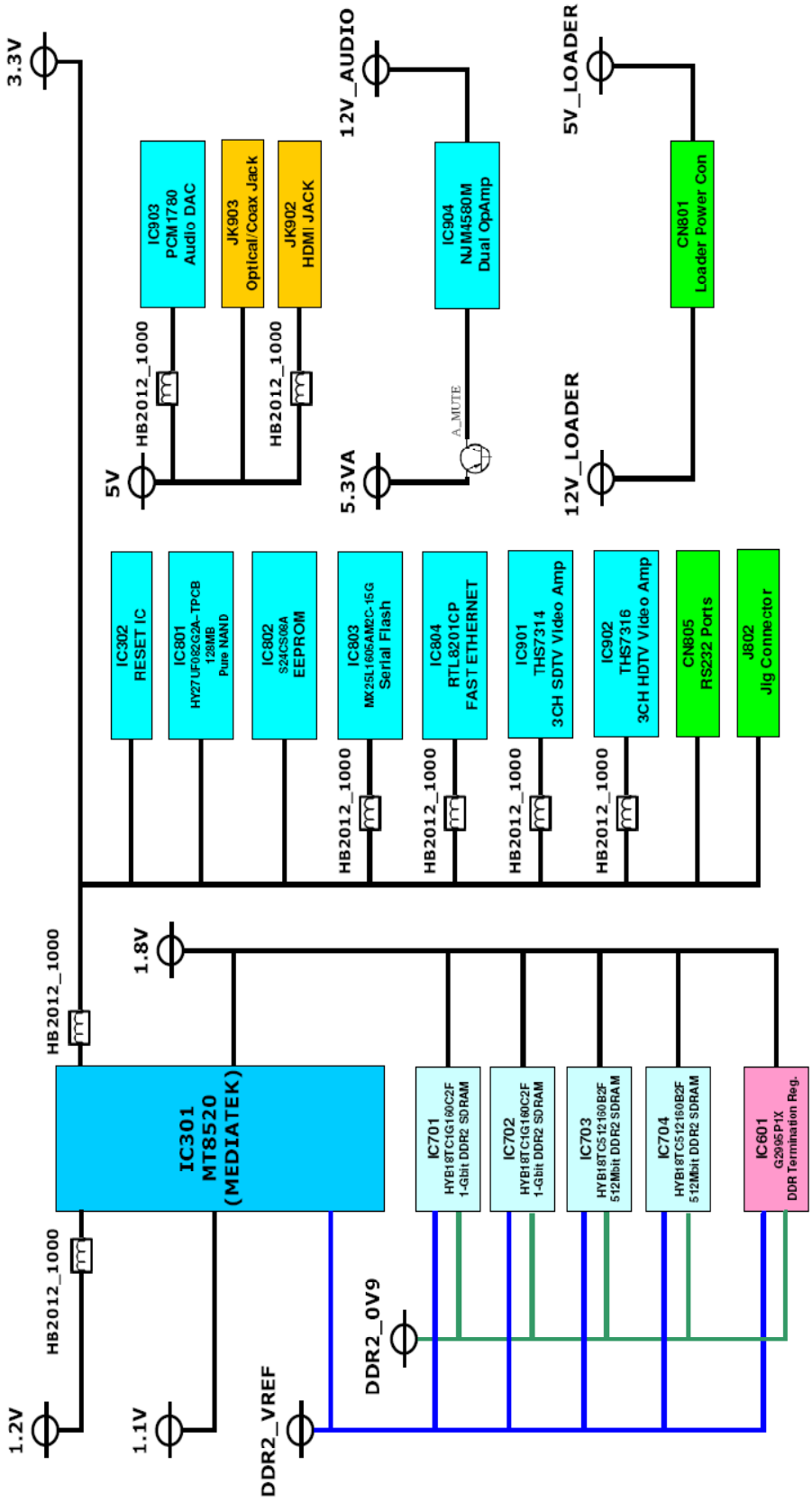
6. MICOM AND TIMER BLOCK DIAGRAM



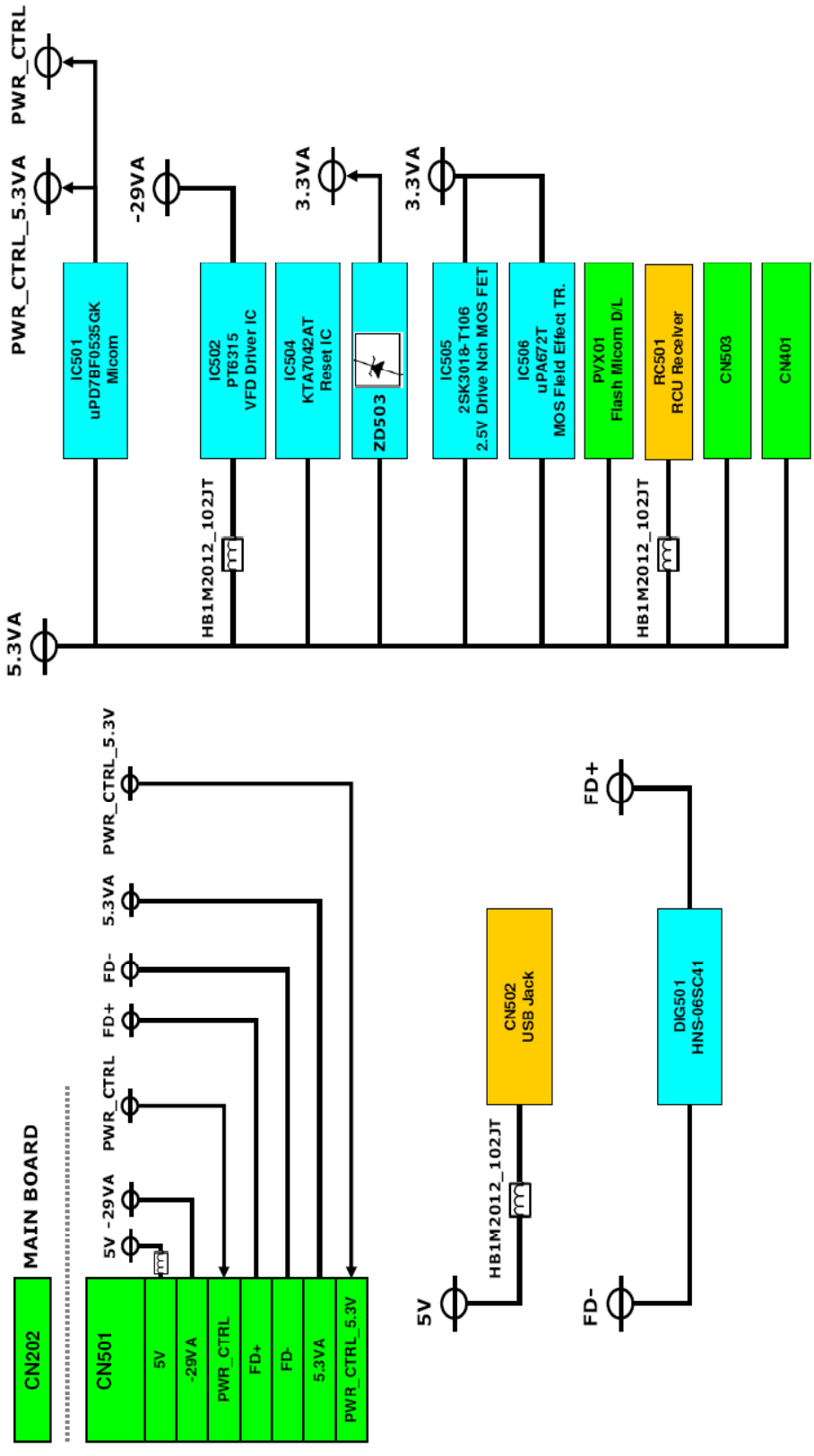
7. SMPS POWER SIGNAL BLOCK DIAGRAM



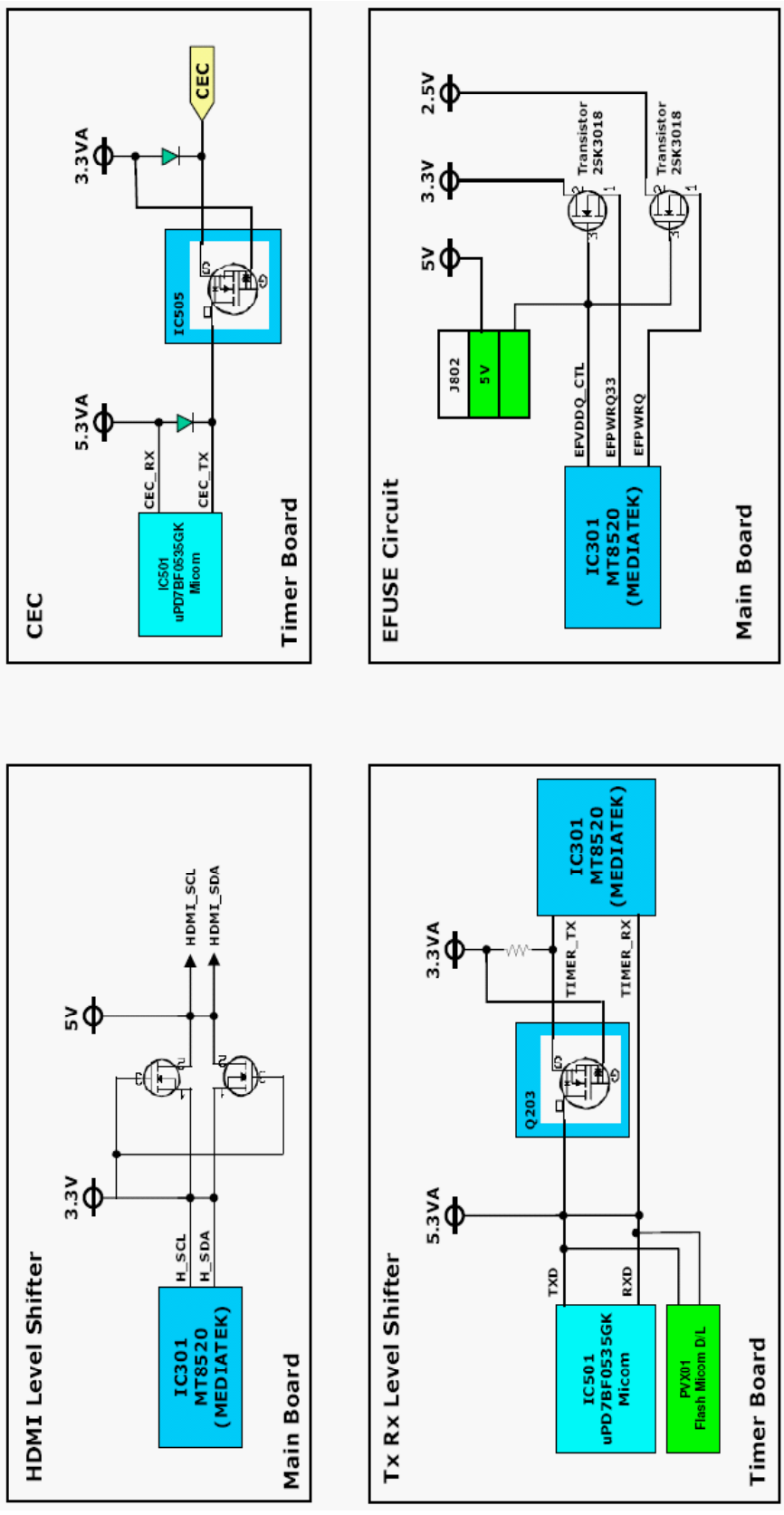
8. MAIN BOARD POWER SIGNAL BLOCK DIAGRAM



9. TIMER/LED/MICOM POWER SIGNAL BLOCK DIAGRAM



10. LEVEL SHIFTER/CEC/EFUSE BLOCK DIAGRAM



MEMO

CIRCUIT DIAGRAMS

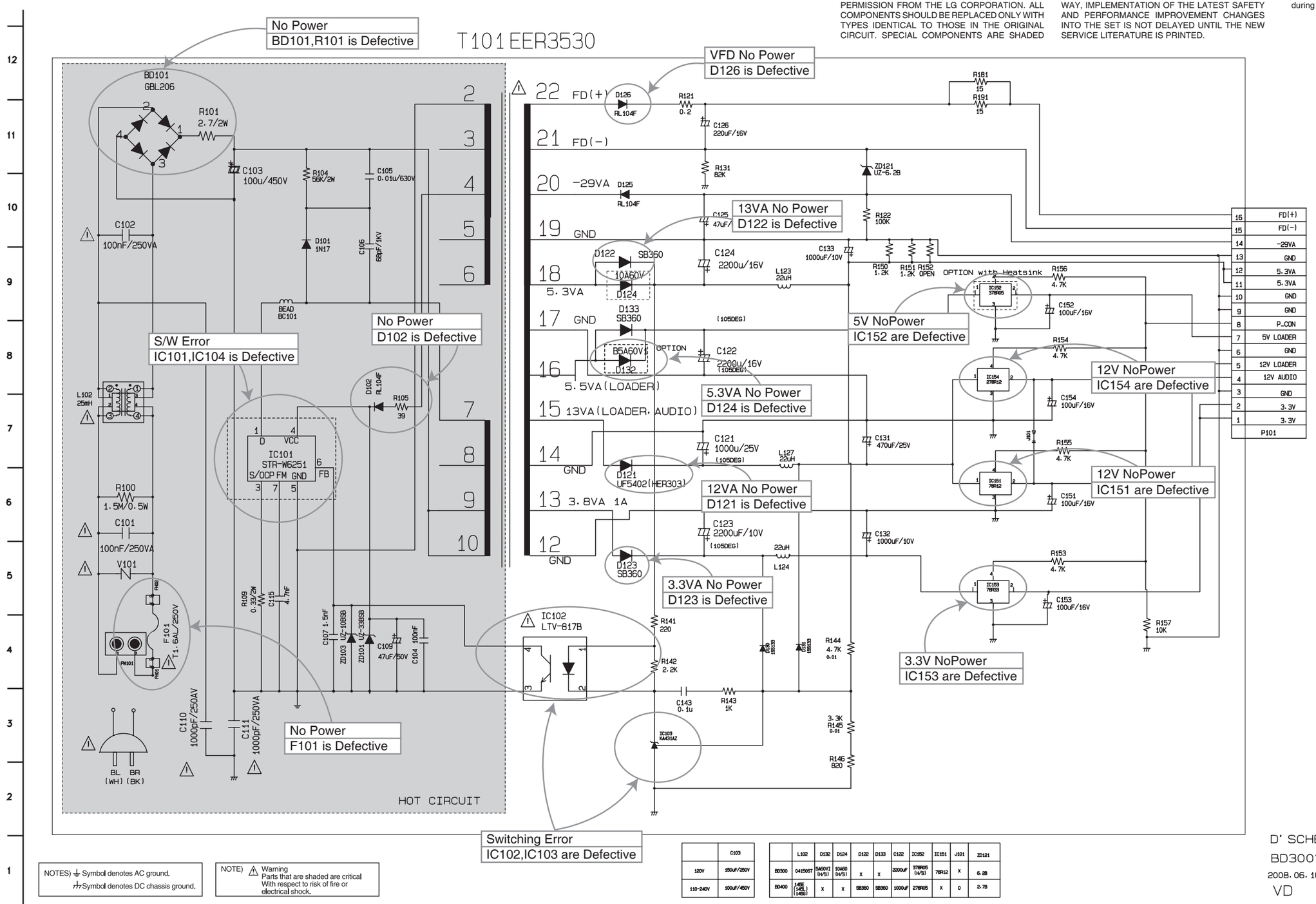
1. SMPS CIRCUIT DIAGRAM

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.



NOTES) ⏚ Symbol denotes AC ground.
⏚ Symbol denotes DC chassis ground.

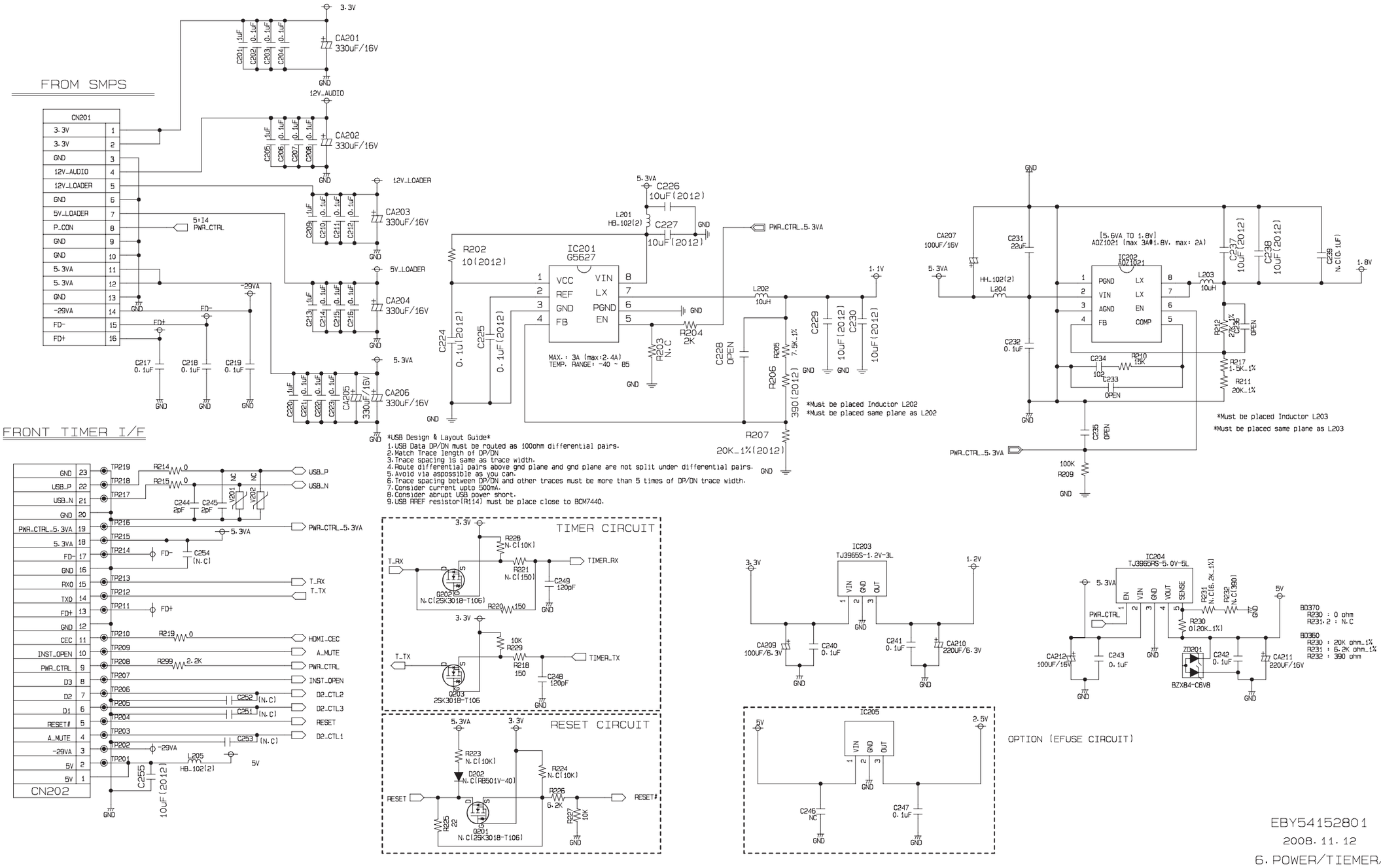
NOTE) ⚠ Warning
Parts that are shaded are critical
With respect to risk of fire or
electrical shock.

	C103
120V	150uF/250V
110-240V	100uF/450V

	L102	D132	D124	D122	D133	C122	IC152	IC151	J101	ZD121
BD300	04150ST	5A60V1 (HV5)	10A60 (HV5)	x	x	2200uF	378R05 (HV5)	78R12	X	6.2B
BD400	14SE (1456) (1456)	X	X	SB360	SB360	1000uF	278R05	X	0	2.7B

D' SCHEMATIC POWER
BD300' S /BD400
2008. 06. 16
VD EBY37800211

2. POWER/TIMER/USB CIRCUIT DIAGRAM

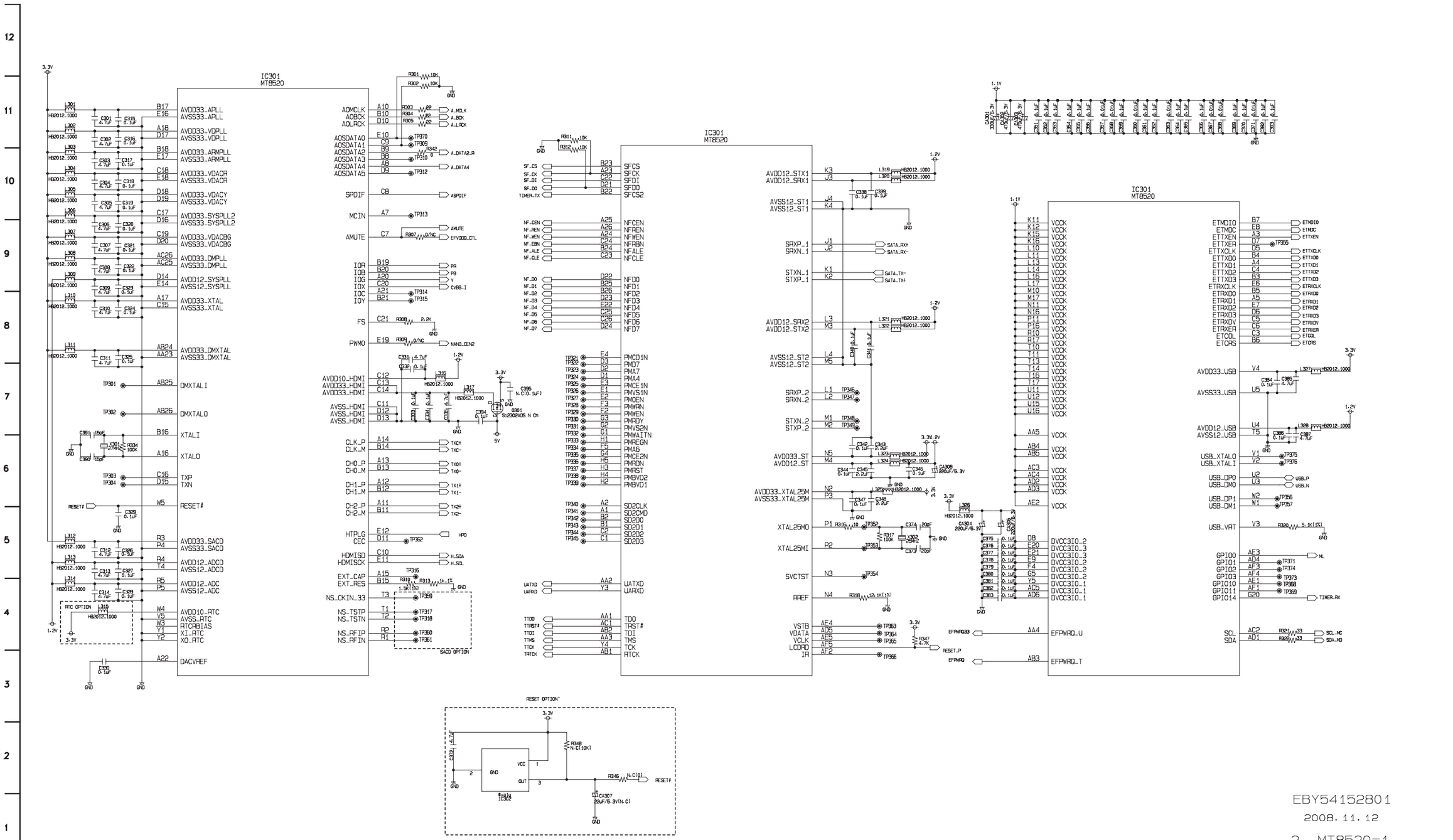


EBY54152801

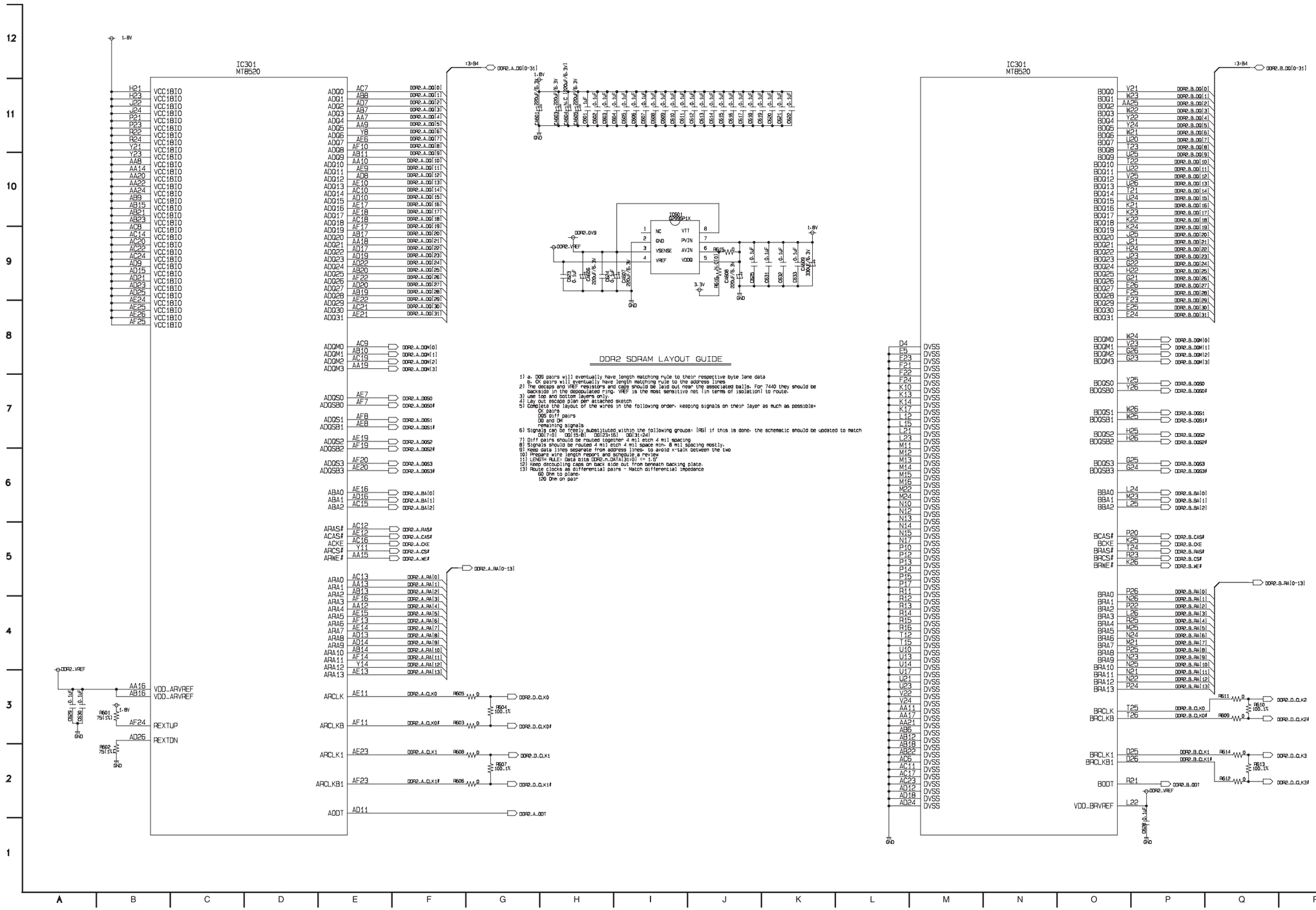
2008.11.12

6. POWER/TIEMER/USB

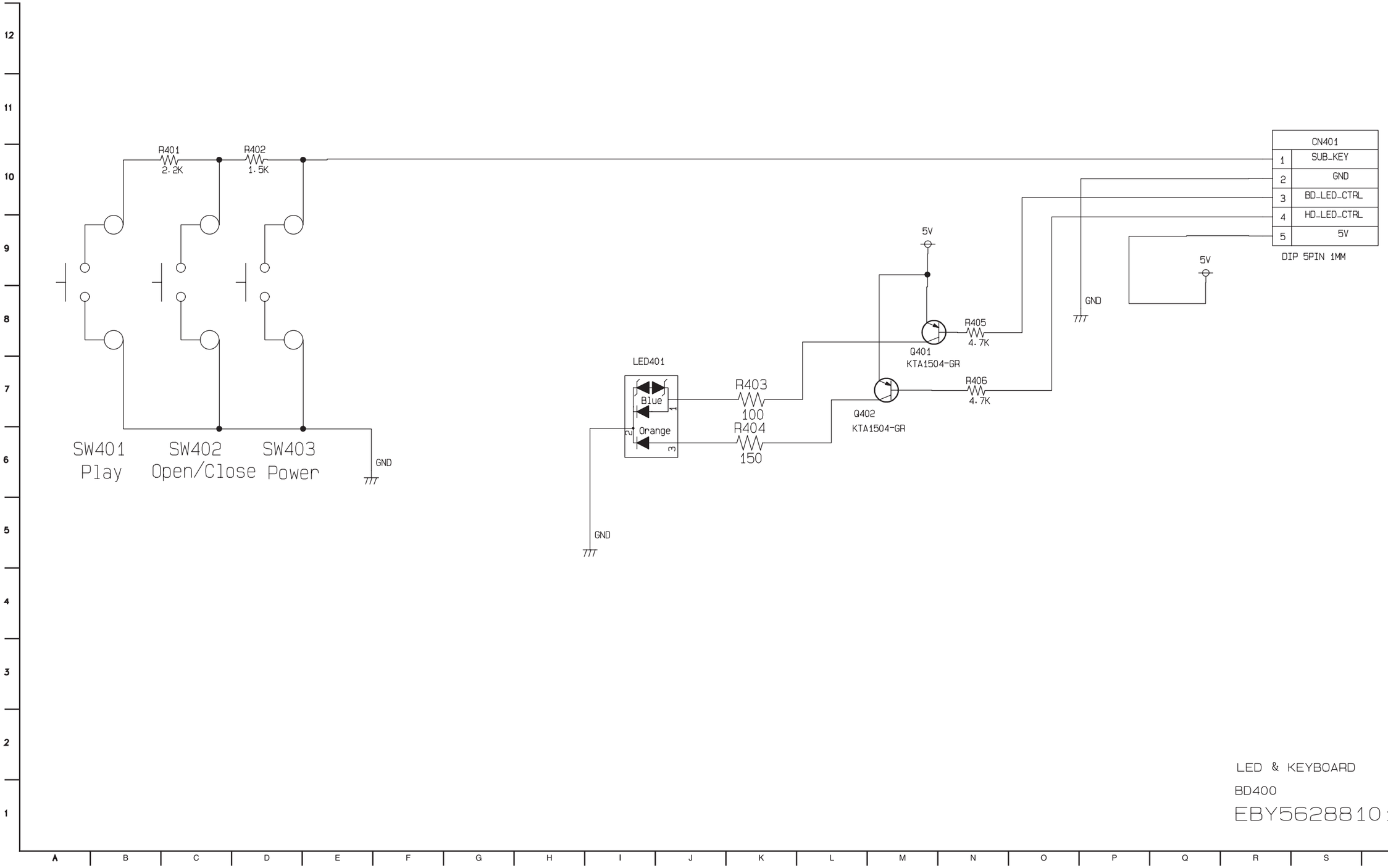
3. MT8520-1 CIRCUIT DIAGRAM



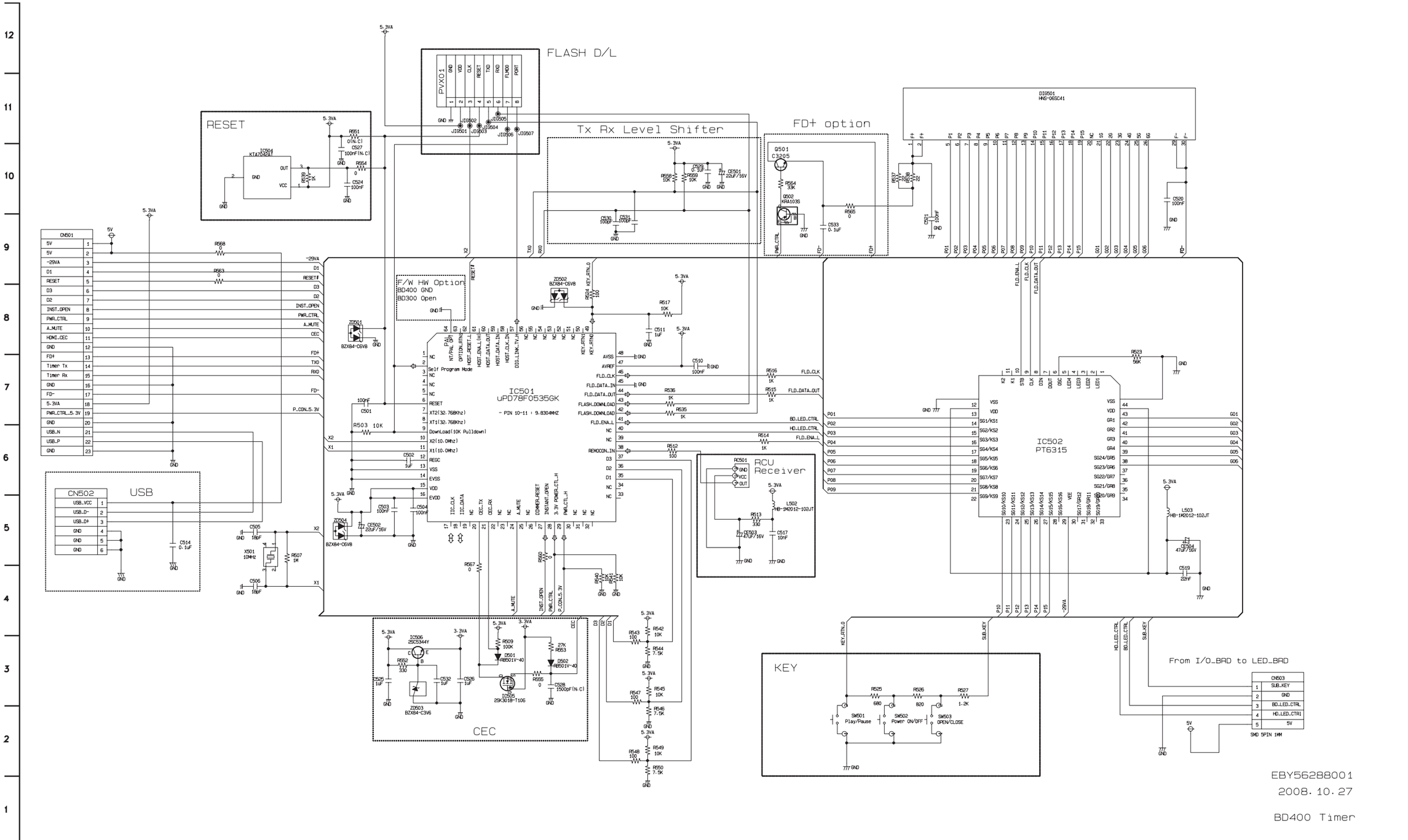
4. MT8520-2 CIRCUIT DIAGRAM



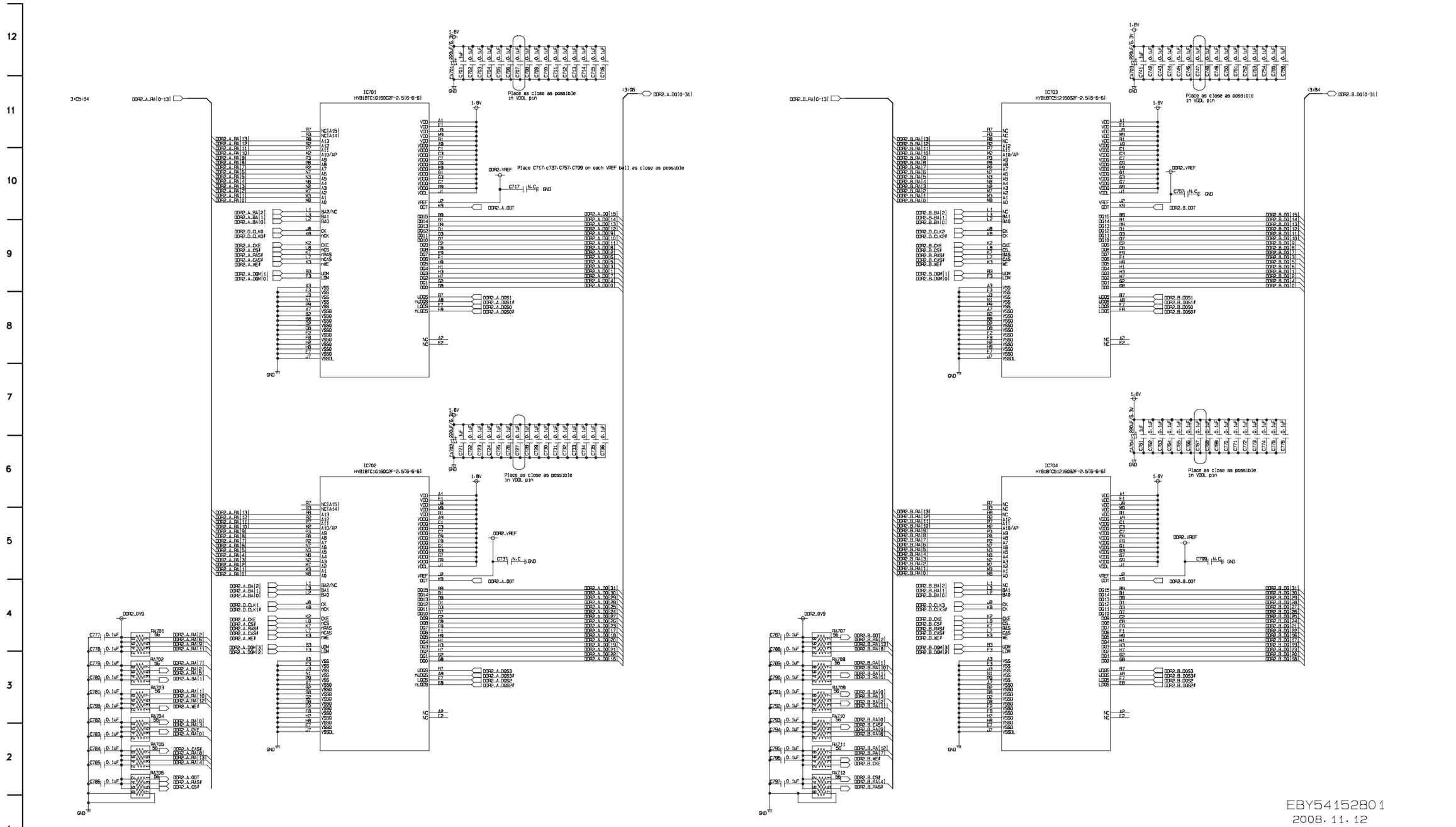
5. LED & KEY CIRCUIT DIAGRAM



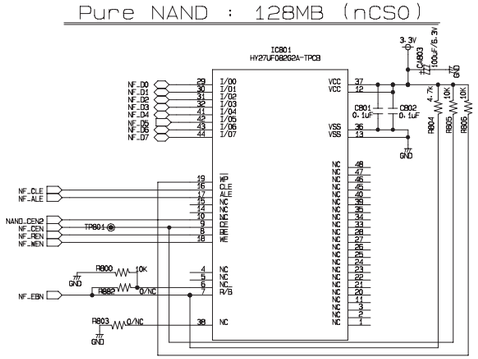
6. TIMER CIRCUIT DIAGRAM

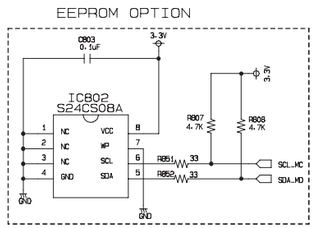


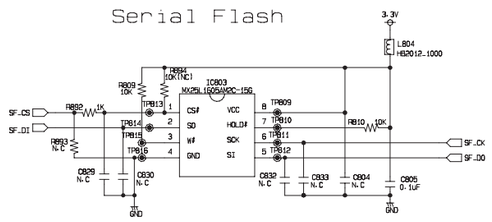
7. DDR2-SDRAM CIRCUIT DIAGRAM

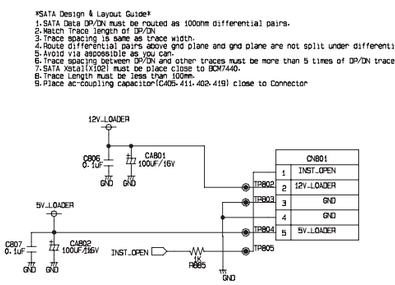


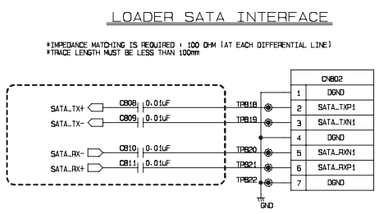
8. NAND/FLASH/ETHERNET CIRCUIT DIAGRAM

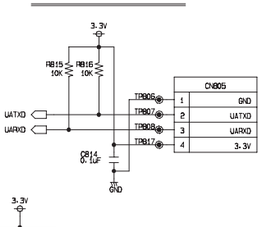


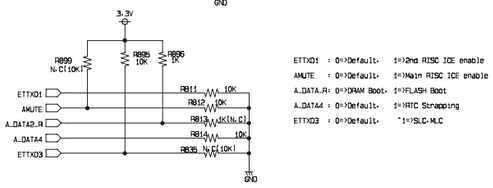


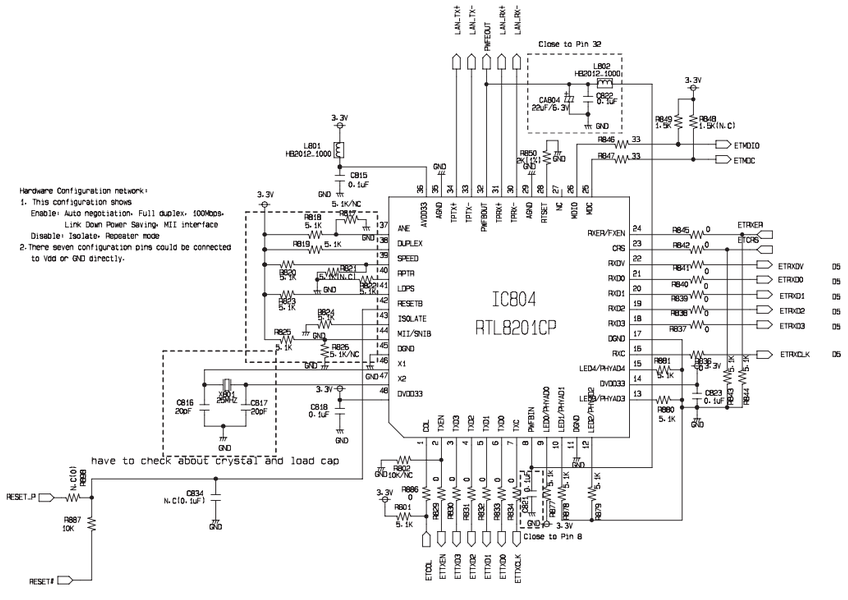


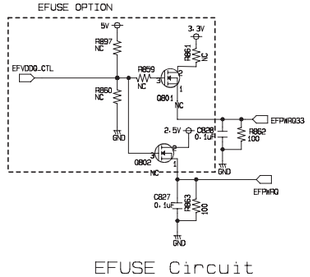




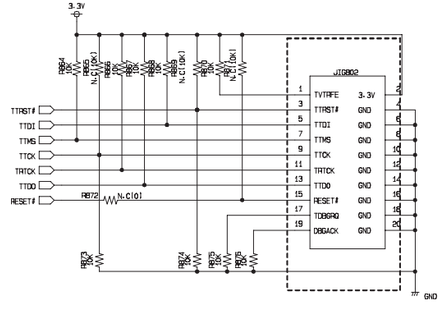








EFUSE Circuit

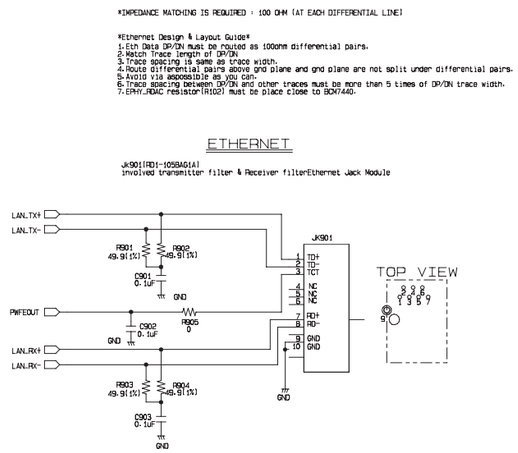


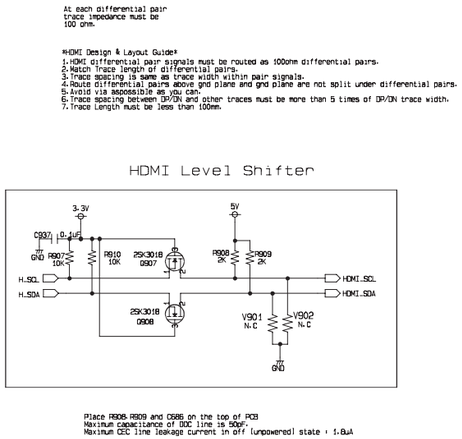
Have to find this connector.

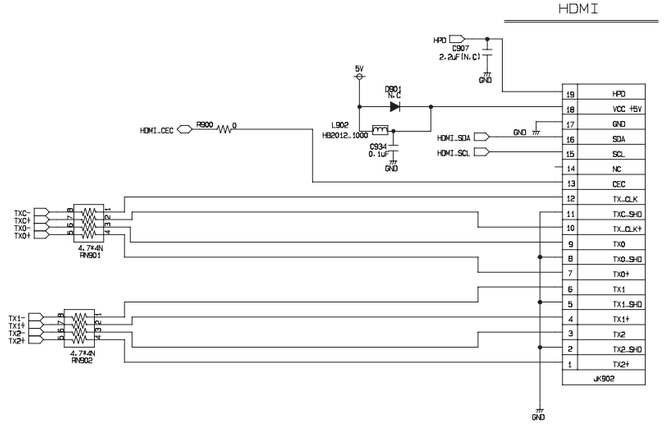
EBY54152801
2008. 11. 12

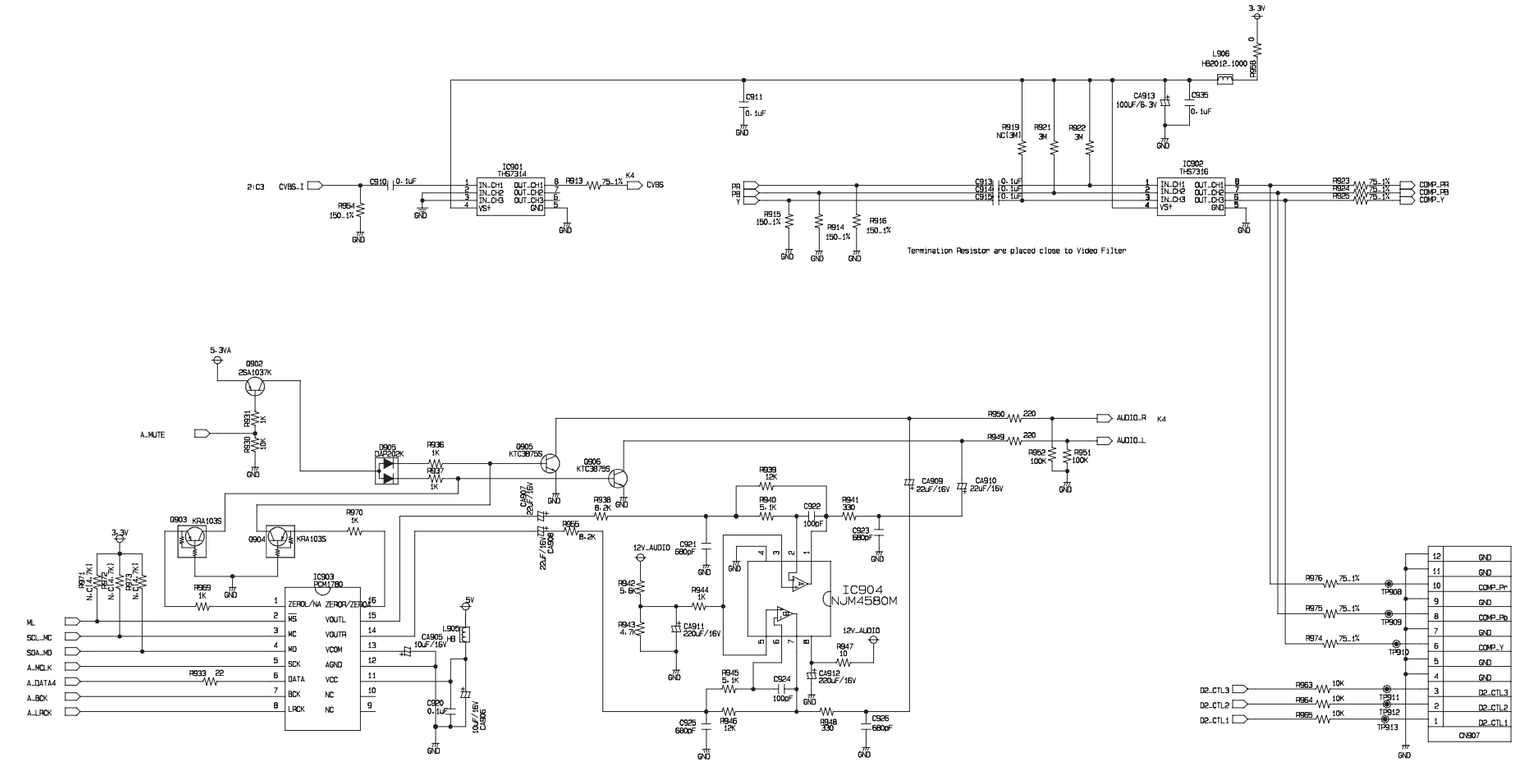
NAND, Flash, ethernet

9. AV/HDMI CIRCUIT DIAGRAM





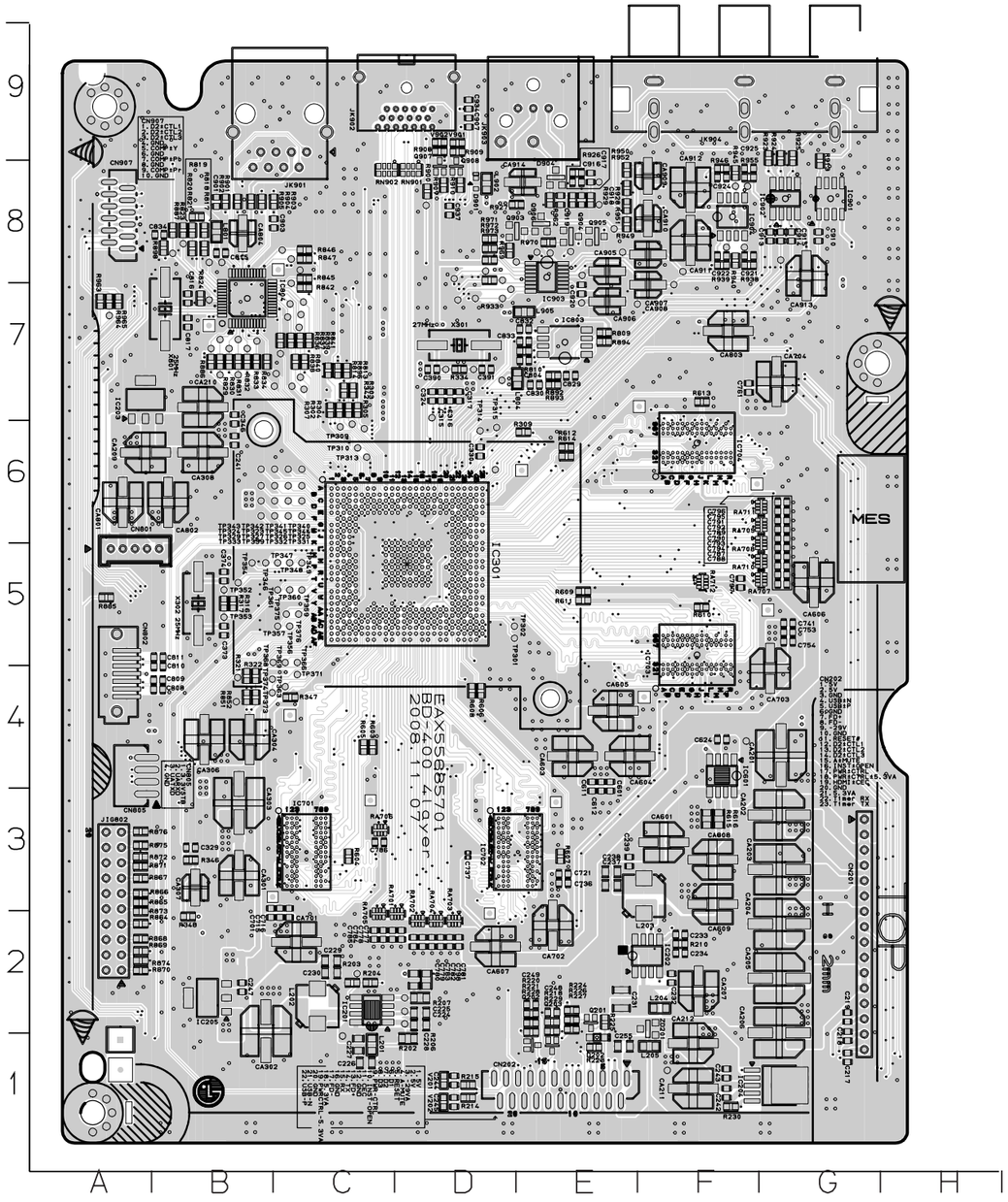




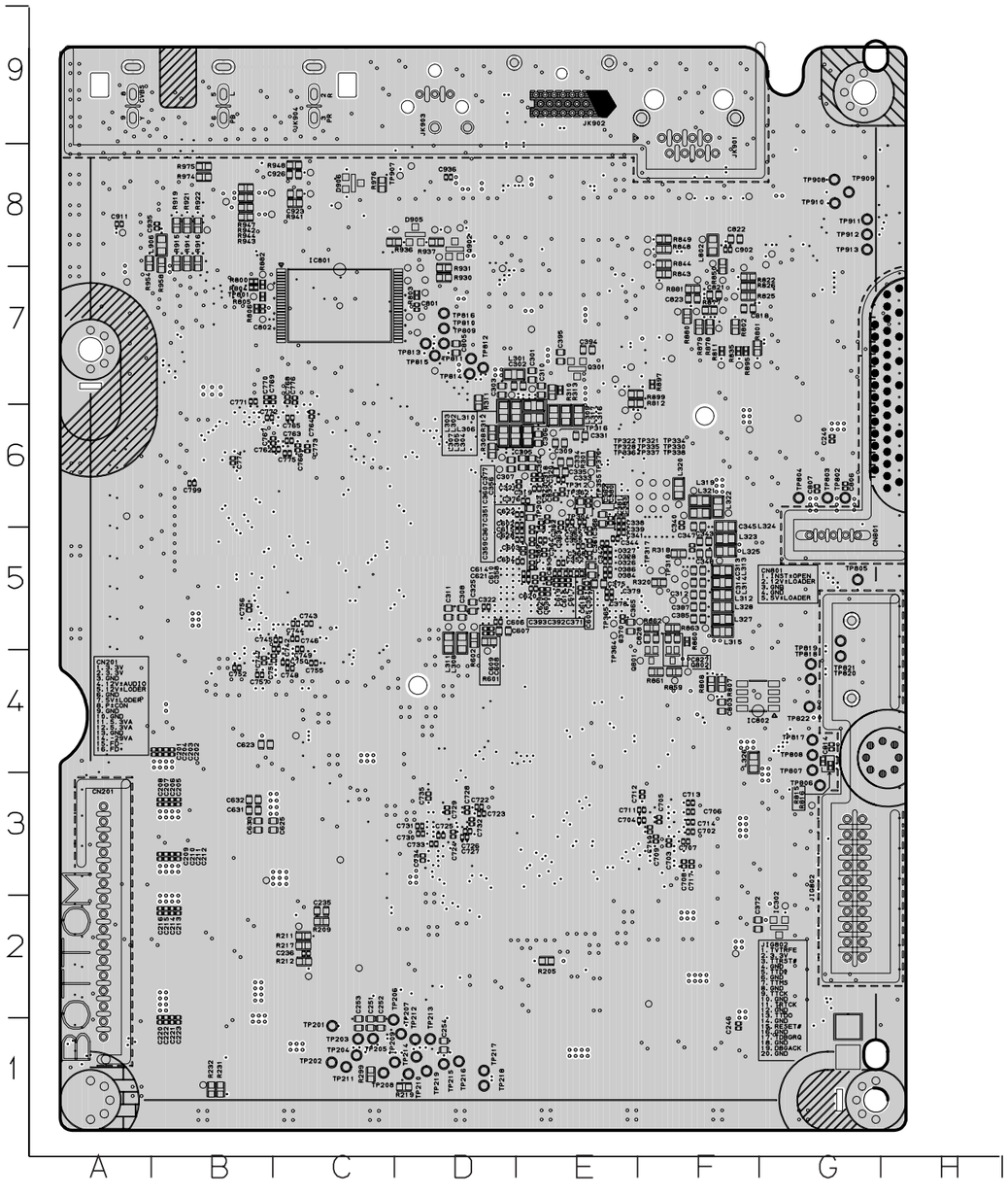
PRINTED CIRCUIT BOARD DIAGRAMS

1. MAIN P.C.BOARD

(TOP VIEW)

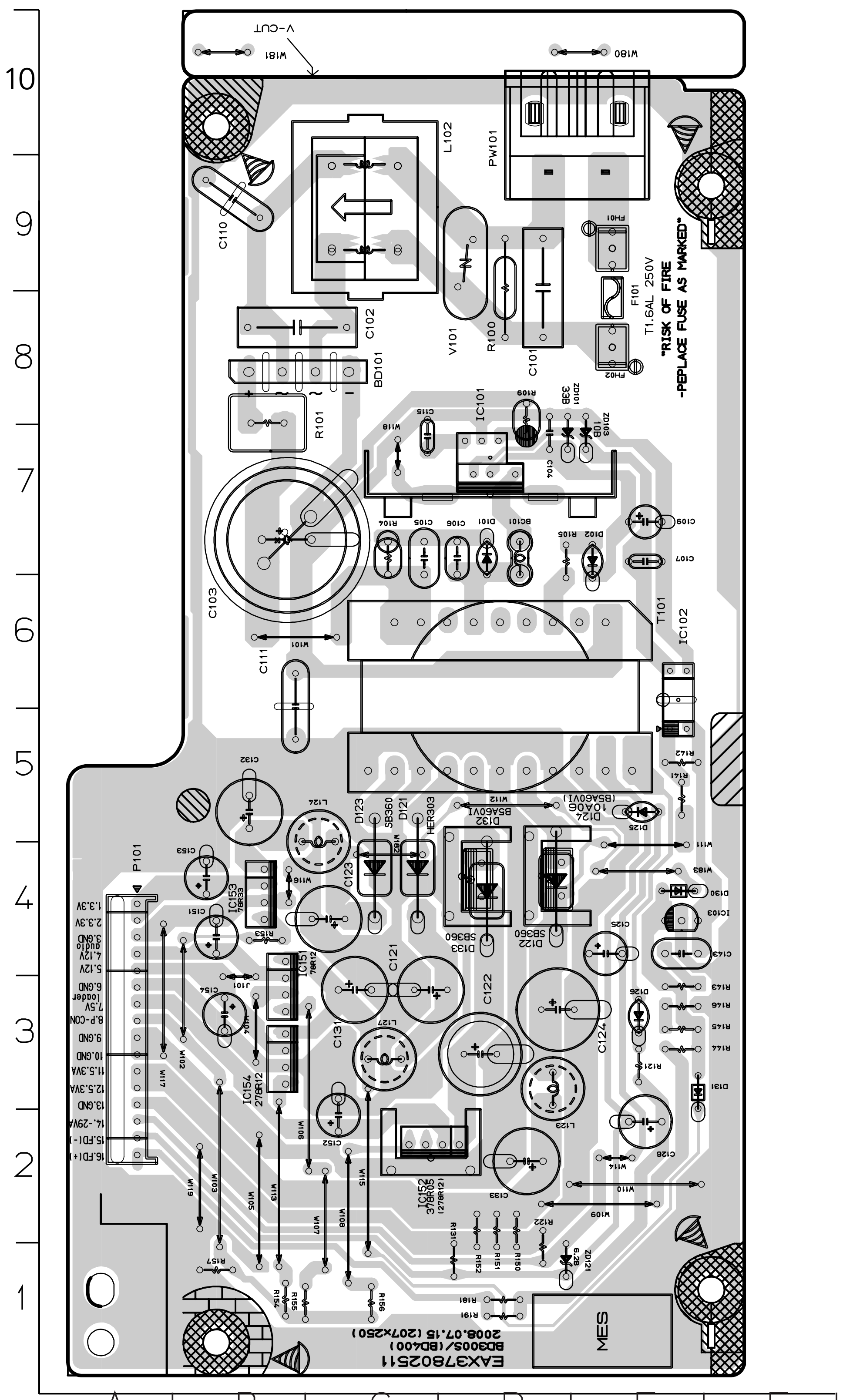


(BOTTOM VIEW)

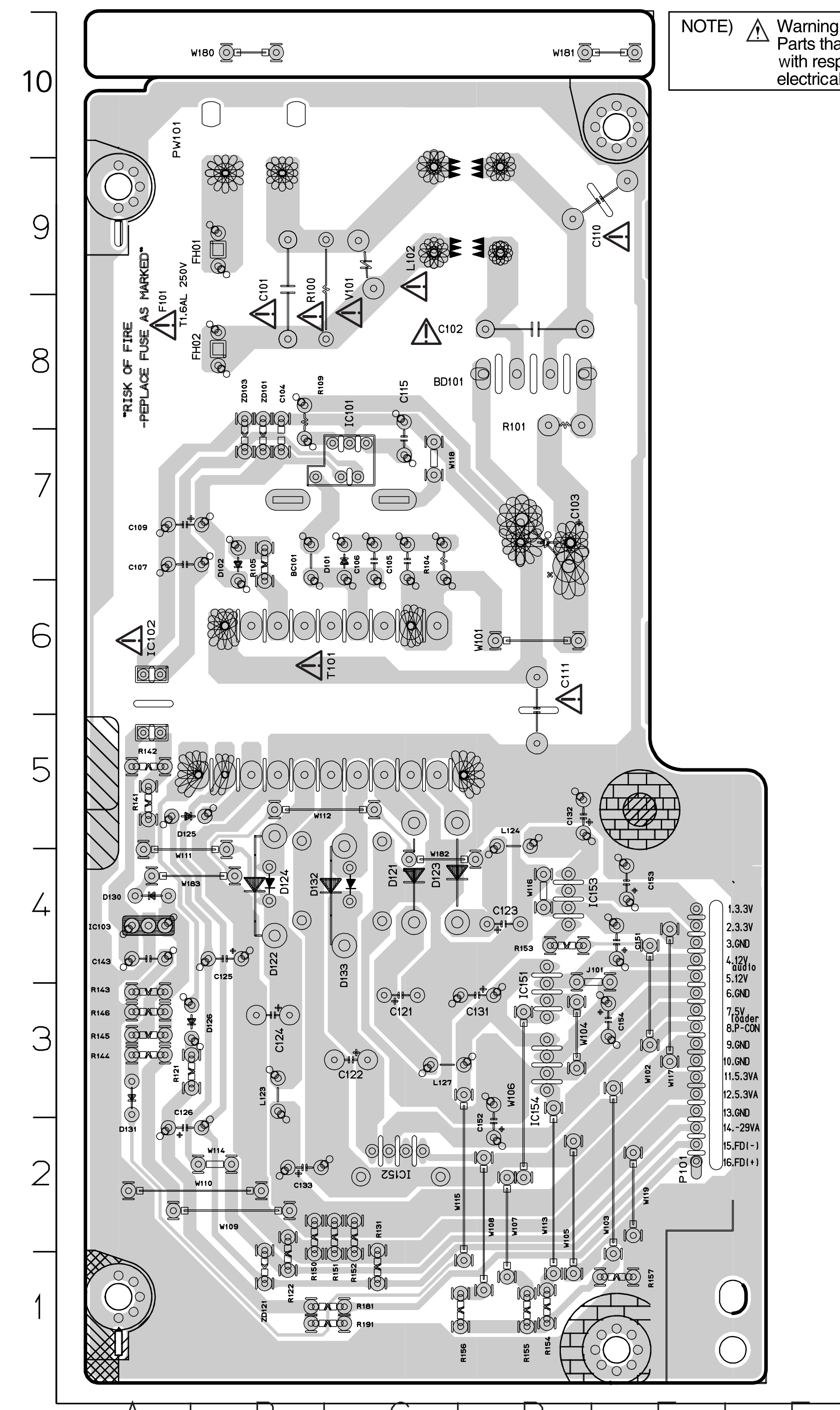


2. SMPS P.C.BOARD

(TOP VIEW)

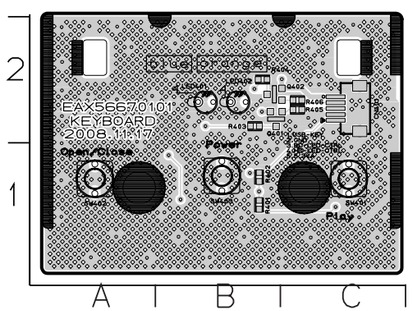


(BOTTOM VIEW)

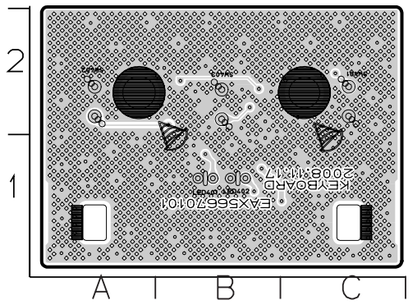


NOTE) ⚠ Warning
Parts that are shaded are critical with respect to risk of fire or electrical shock.

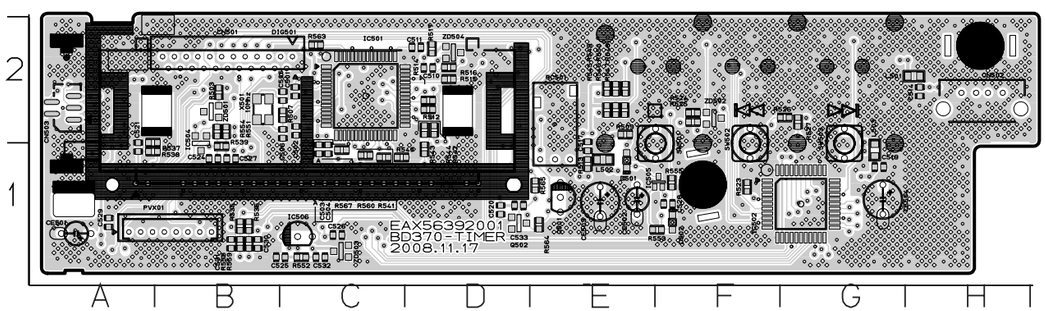
3. LED & KEY P.C.BOARD
(TOP VIEW)



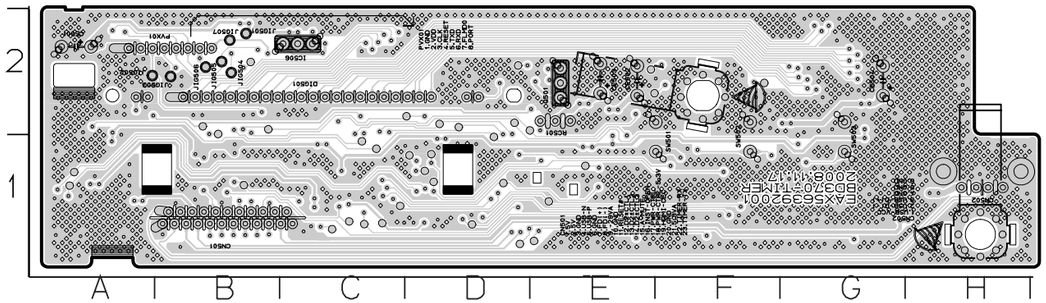
(BOTTOM VIEW)



4. TIMER P.C.BOARD
(TOP VIEW)



(BOTTOM VIEW)



SECTION 4

HL-04P LOADER PART

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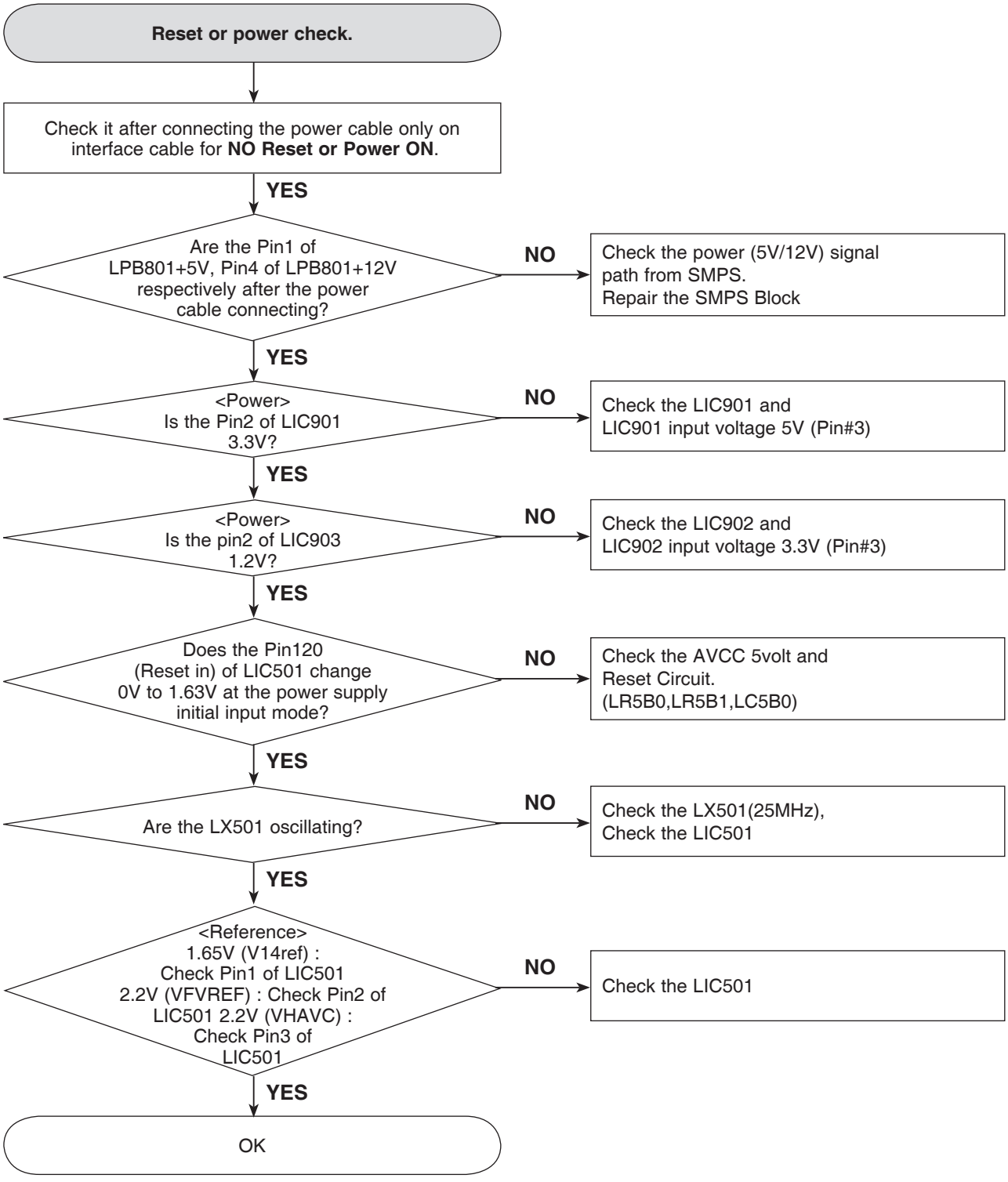
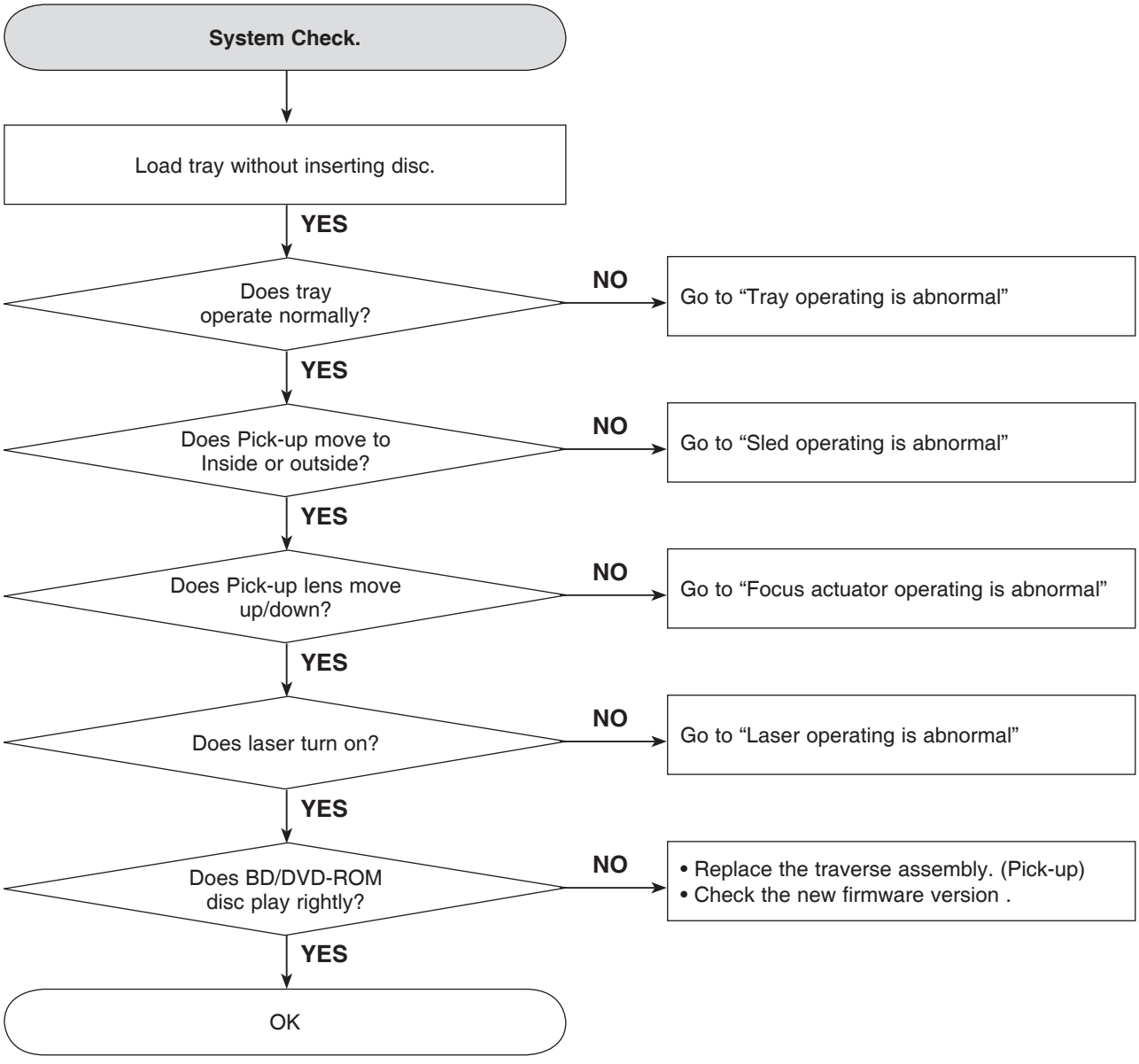
ELECTRICAL TROUBLESHOOTING GUIDE

1. RESET OR POWER CHECK



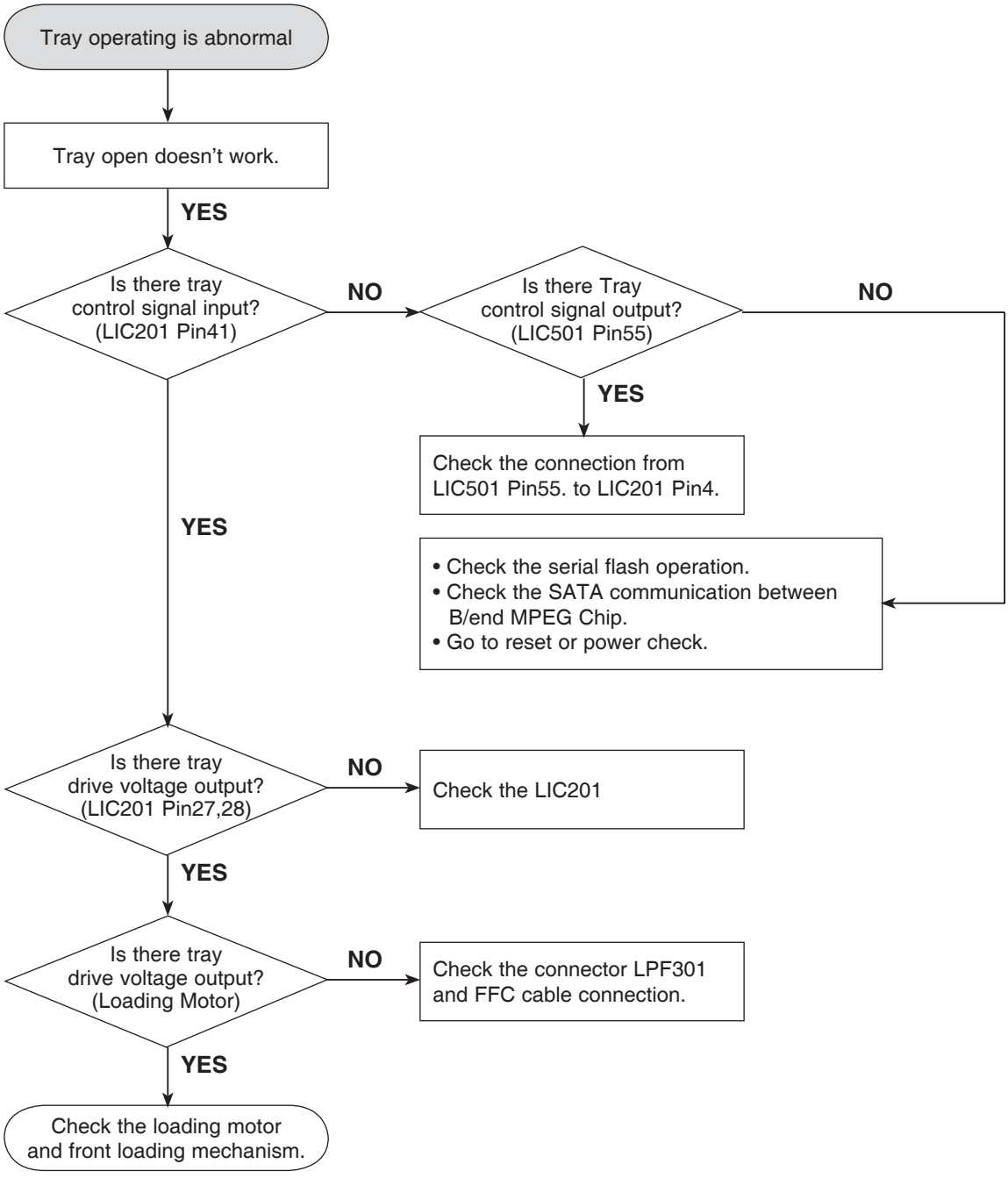
ELECTRICAL TROUBLESHOOTING GUIDE

2. SYSTEM CHECK



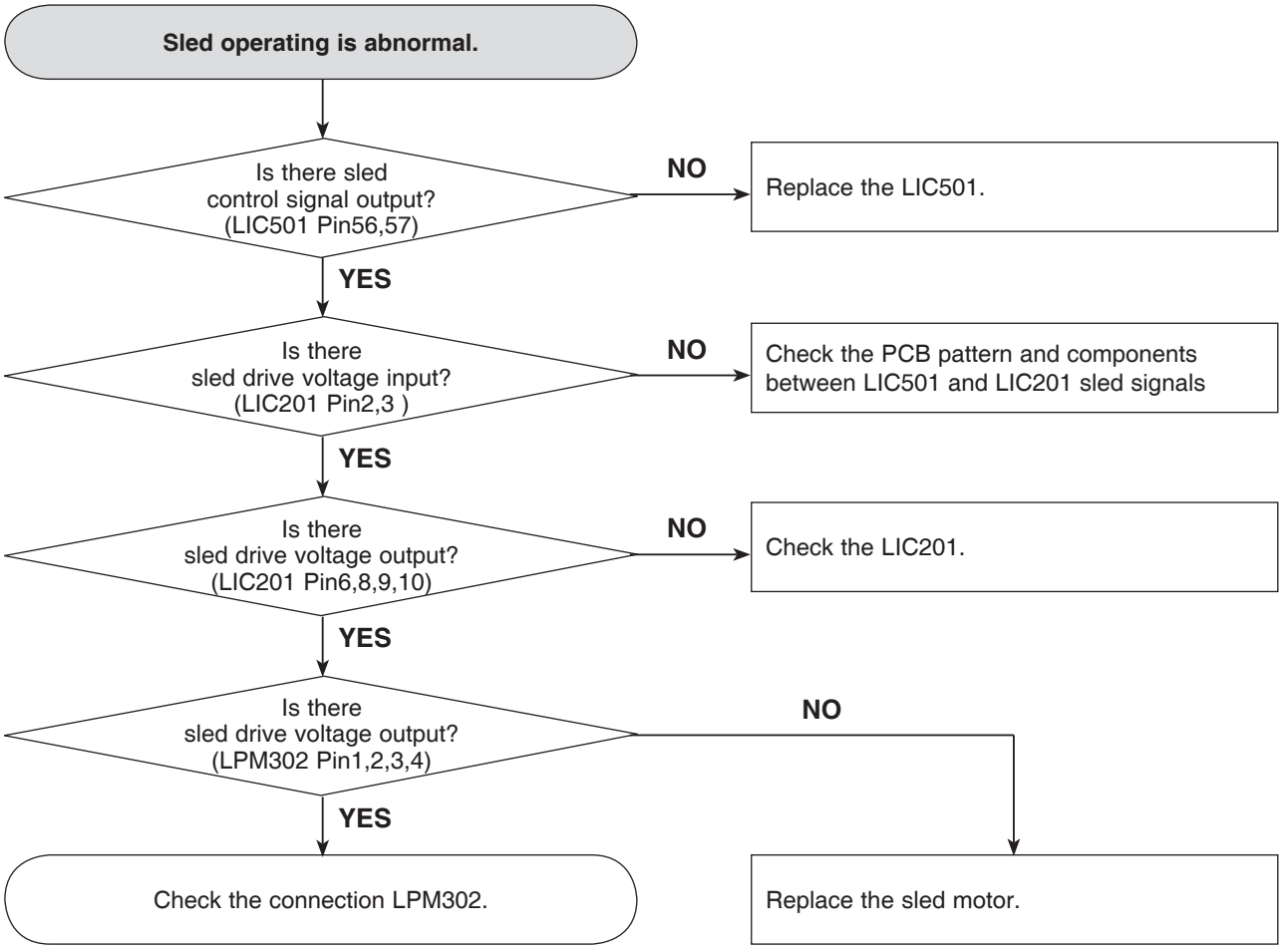
ELECTRICAL TROUBLESHOOTING GUIDE

3. TRAY OPERATING IS ABNORMAL



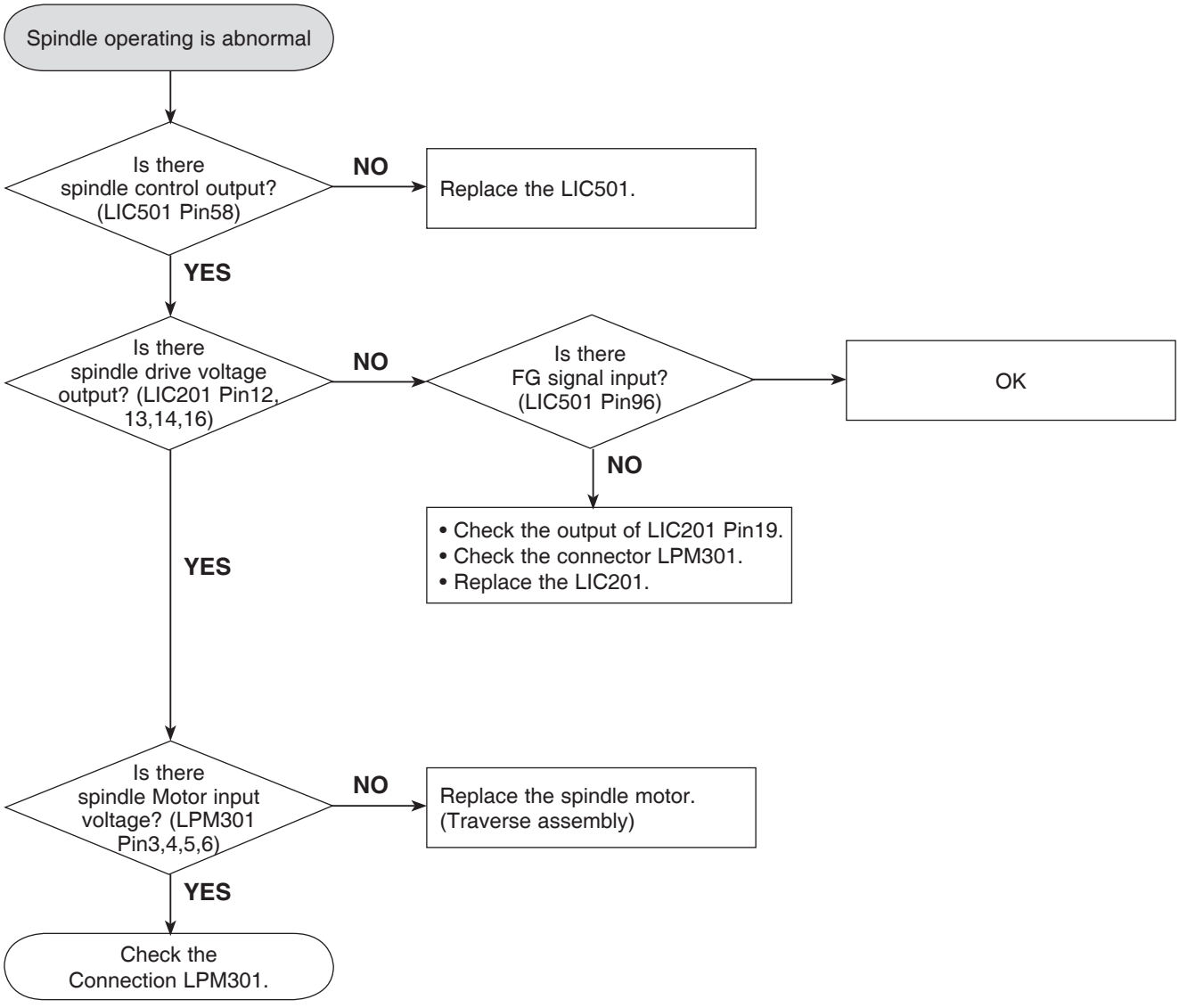
ELECTRICAL TROUBLESHOOTING GUIDE

4. SLED OPERATING IS ABNORMAL



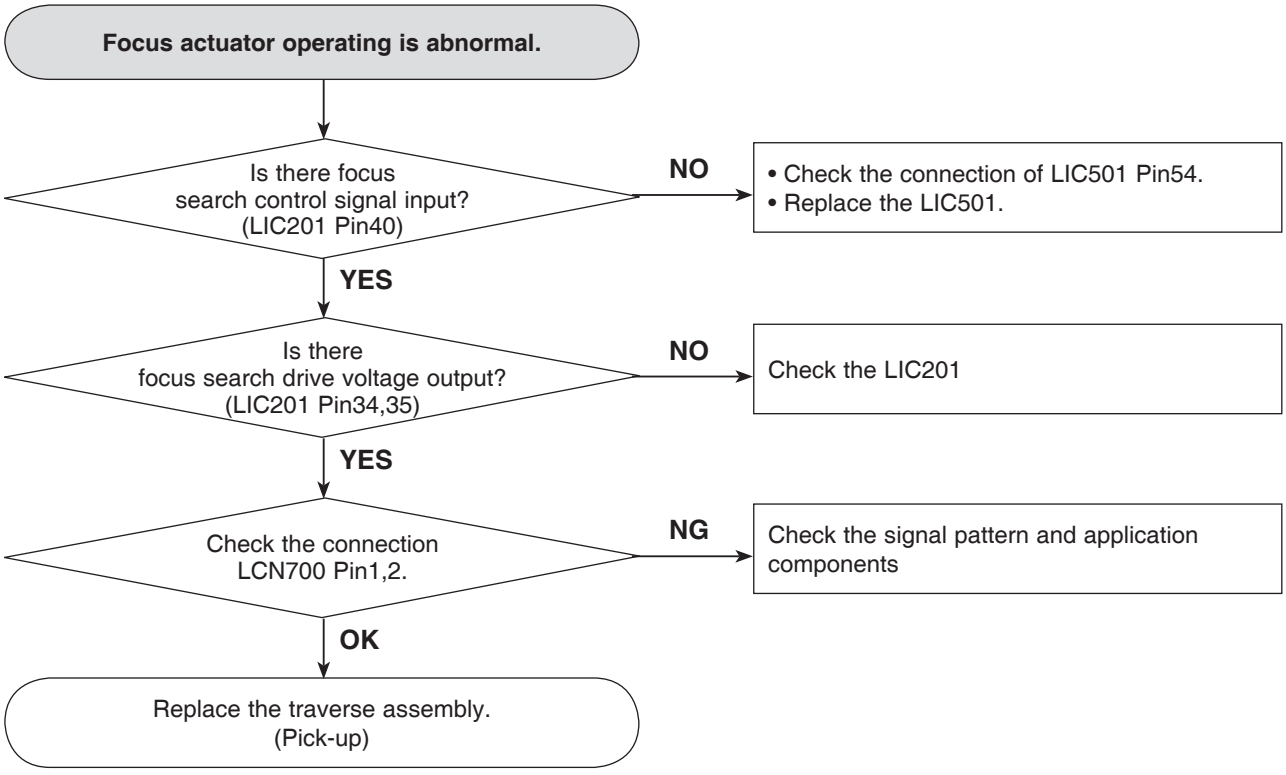
ELECTRICAL TROUBLESHOOTING GUIDE

5. SPINDLE OPERATING IS ABNORMAL



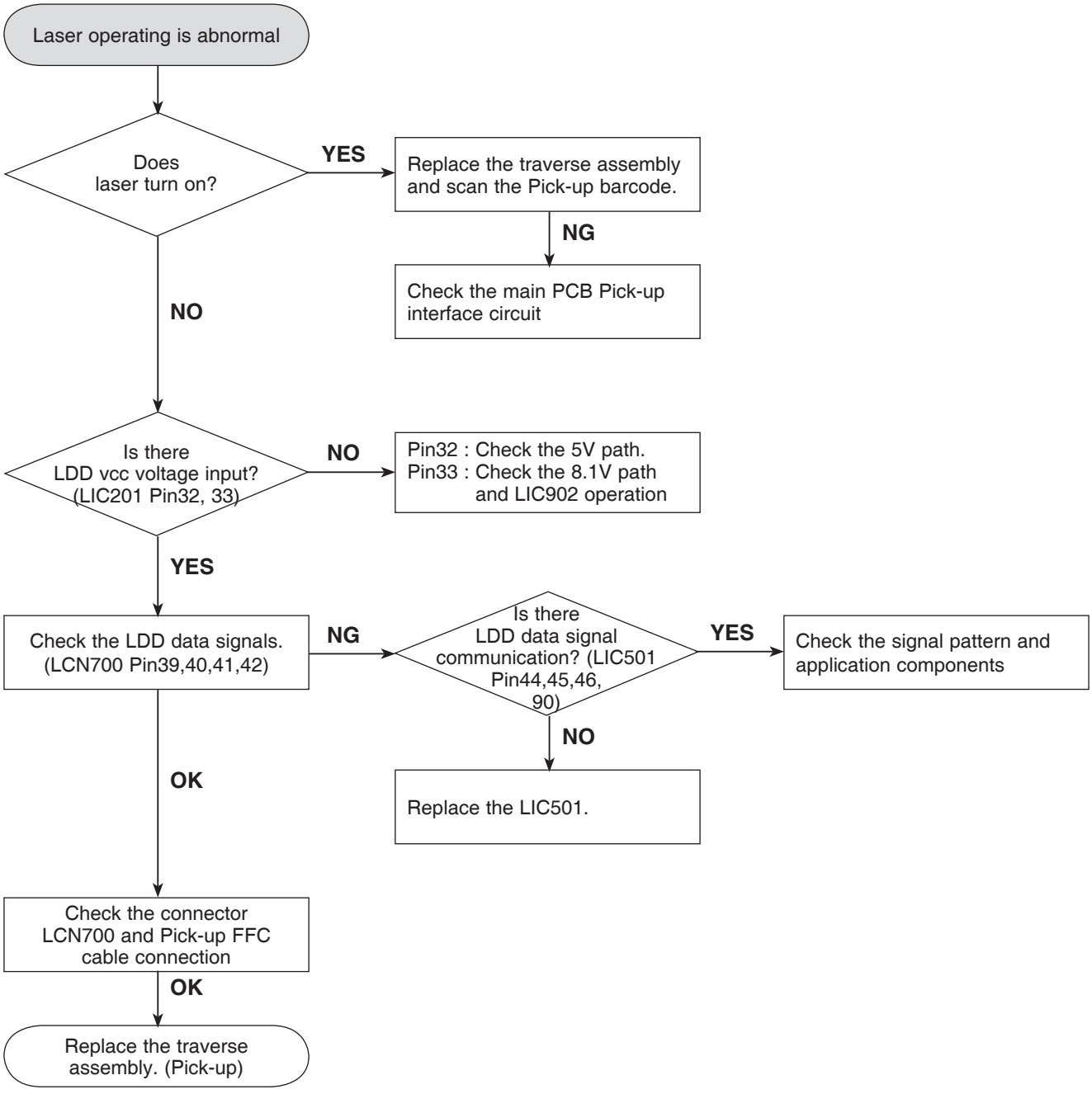
ELECTRICAL TROUBLESHOOTING GUIDE

6. FOCUS ACTUATOR OPERATING IS ABNORMAL



ELECTRICAL TROUBLESHOOTING GUIDE

7. LASER OPERATING IS ABNORMAL



HOW TO USE THE BAR-CODE SCAN TOOL

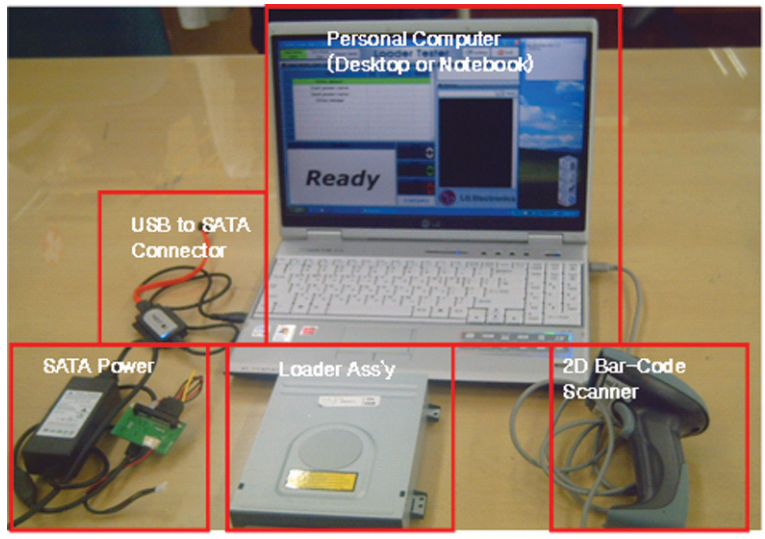
Bar-Code Scan Tool inserts the Bar-code values (including Skew, Read power, HFM, LD power and so on) to the Flash-ROM in the Loader Main Board. So, In case of changing the Traverse assembly or Loader main board, It is required to pick-up Bar-code scan procedure.

1. BAR-CODE SCAN SYSTEM CONFIGURATION

In order to insert Bar-code values (including Skew, Read power, HFM, LD power and so on), the following equipments are needed.

Compulsory equipments

1) Personal Computer
2) Bar-Code Scan Tool (Loader Tester)
3) 2D Bar-Code Scanner
4) Target Loader Ass'y
5) USB to SATA Connector
6) Power Supply



2. PICK-UP BAR-CODE SCAN TOOL CONFIGURATION.

The Loader Tester is the Application Tool for FA Test and also Bar-Code Scan.

The Bar-Code Scan is the one of functions in the Loader Tester.
Therefore the Bar-Code scan Users should check "only Bar Code" up in the Loader Tester.
Loader Tester Program consists of total 2 files.

Setup.exe
Setup.exe.txt

Setup.exe file is the installation file.
After you install the Loader Tester program, the **LoaderTest.exe** file will appear in the wallpaper(background) of Windows.
LoaderTester.exe is a program execution file.
Setup.exe.txt is the install Report file.

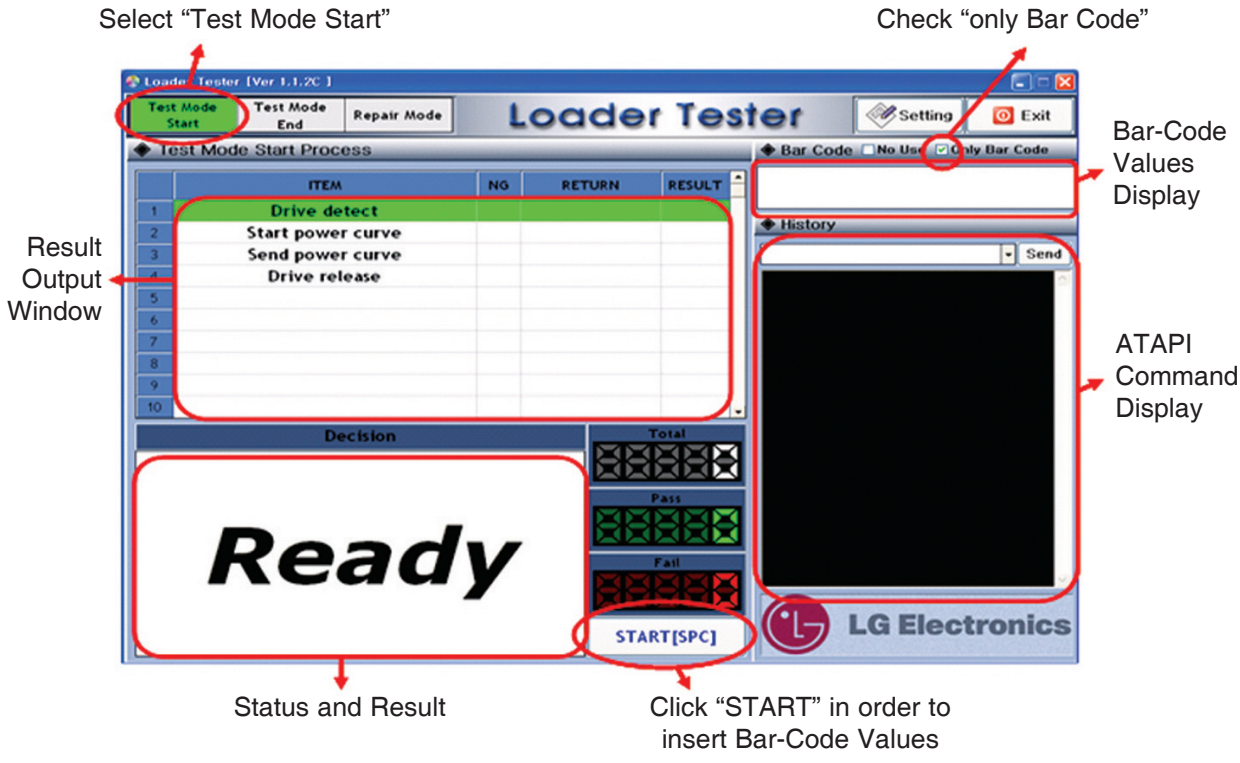
3. RUNNING BAR-CODE SCAN TOOL

When running “LoaderTester.exe” file in the wallpaper(background) of Windows, the following screen appears.
Before you start to click “Start” button, remind these.

1) “Test Mode Start” should be selected.

2) Check “only Bar Code”

3) Click “START” START[SPC]

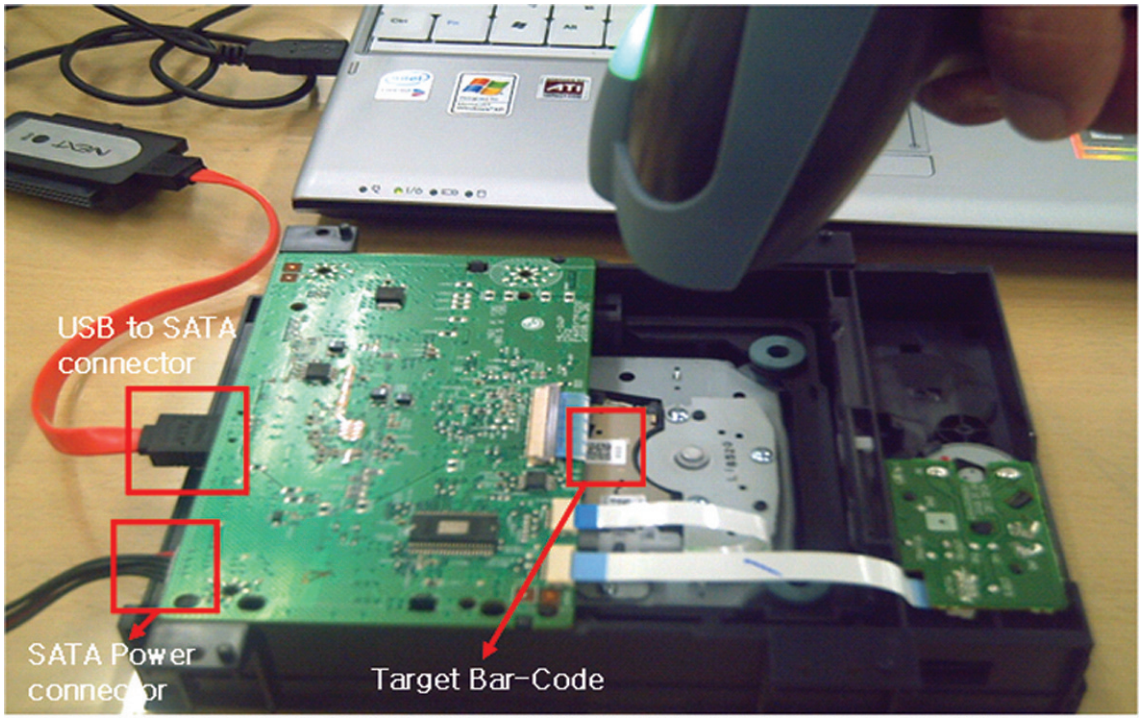


4. BAR-CODE SCAN PROCEDURE

1) Untie the screw of Loader.
2) Connect the “USB to SATA connector” and “SATA Power” to the Loader.
3) Connect the “USB to SATA connector” to the PC.
4) Connect the “Bar-Code Scanner” to the PC.
5) Run the Bar-Code Scan Tool (Loader Tester).
6) Click “Start” Button START[SPC]

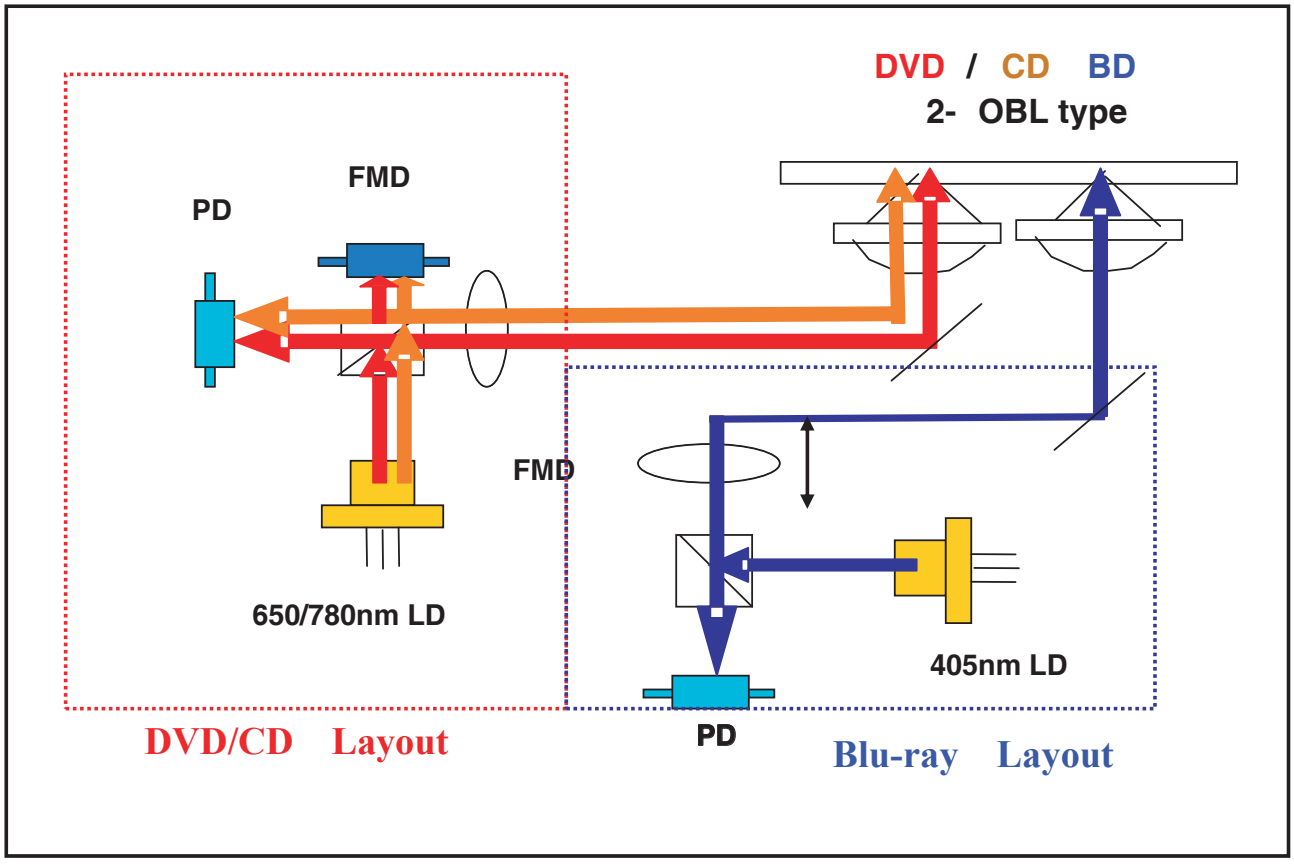
   (Tip. If Drive can not be detected, please plug off and on again the “USB to SATA connector” to the PC and wait for 15 seconds.)

7) Sled will move the innermost.
8) Focus on the target of Bar-Code and Pull the trigger of Bar-Code scanner until Bar-Code can be scanned to the Bar-Code scan Tool (Loader Tester)
9) If Bar-Code scan succeeds, “ OK” will display in the result windows.
   However, Bar-Code scan fails, “NG” will display in the result windows.
   In case you got “ NG” result, please check procedure up from 2 to 8. then try it again.

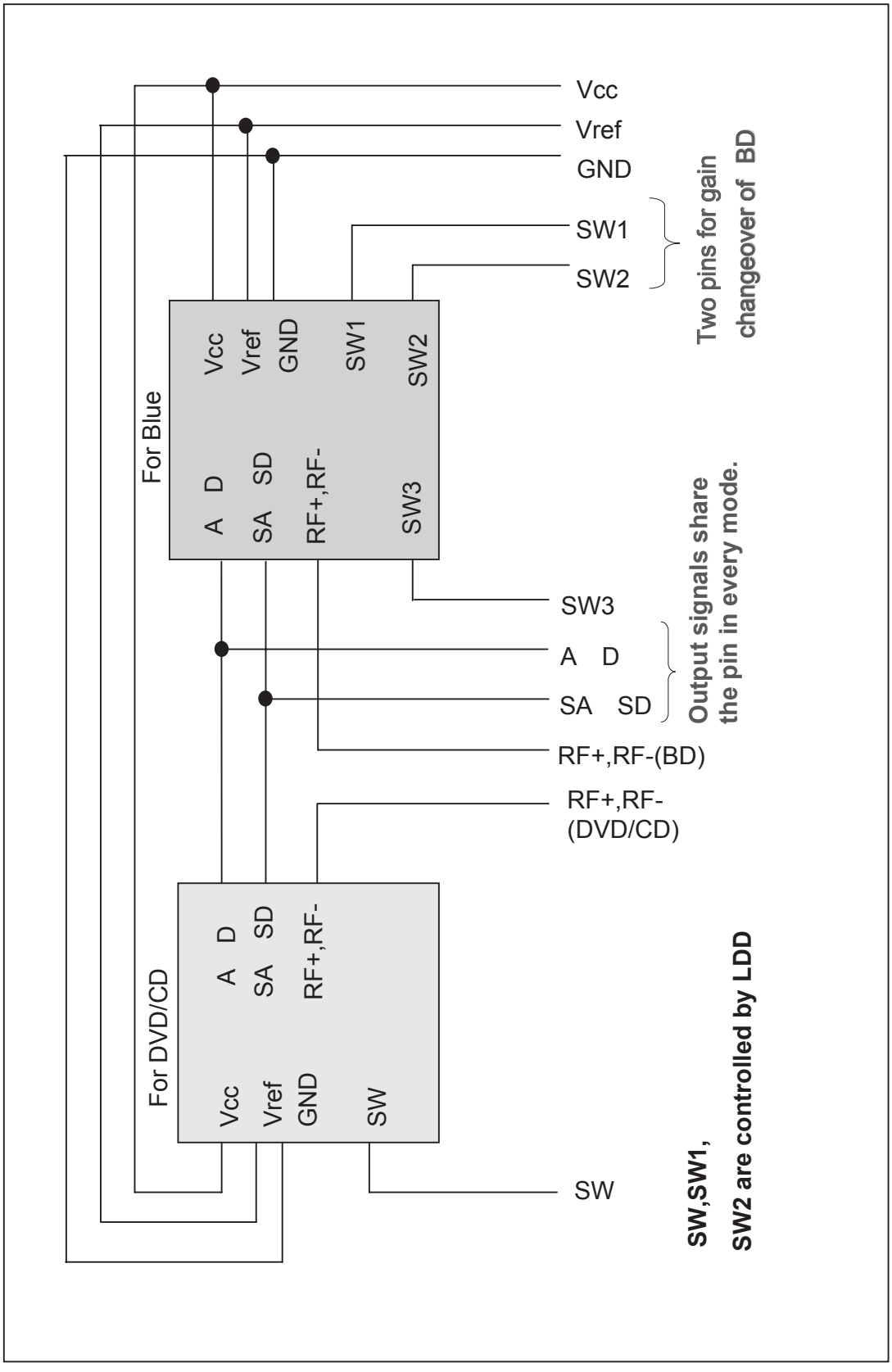


INTERNAL STRUCTURE OF THE PICK-UP

1. OPTICAL LAYOUT



2. SF-BD411 PDIC COMPOSITION



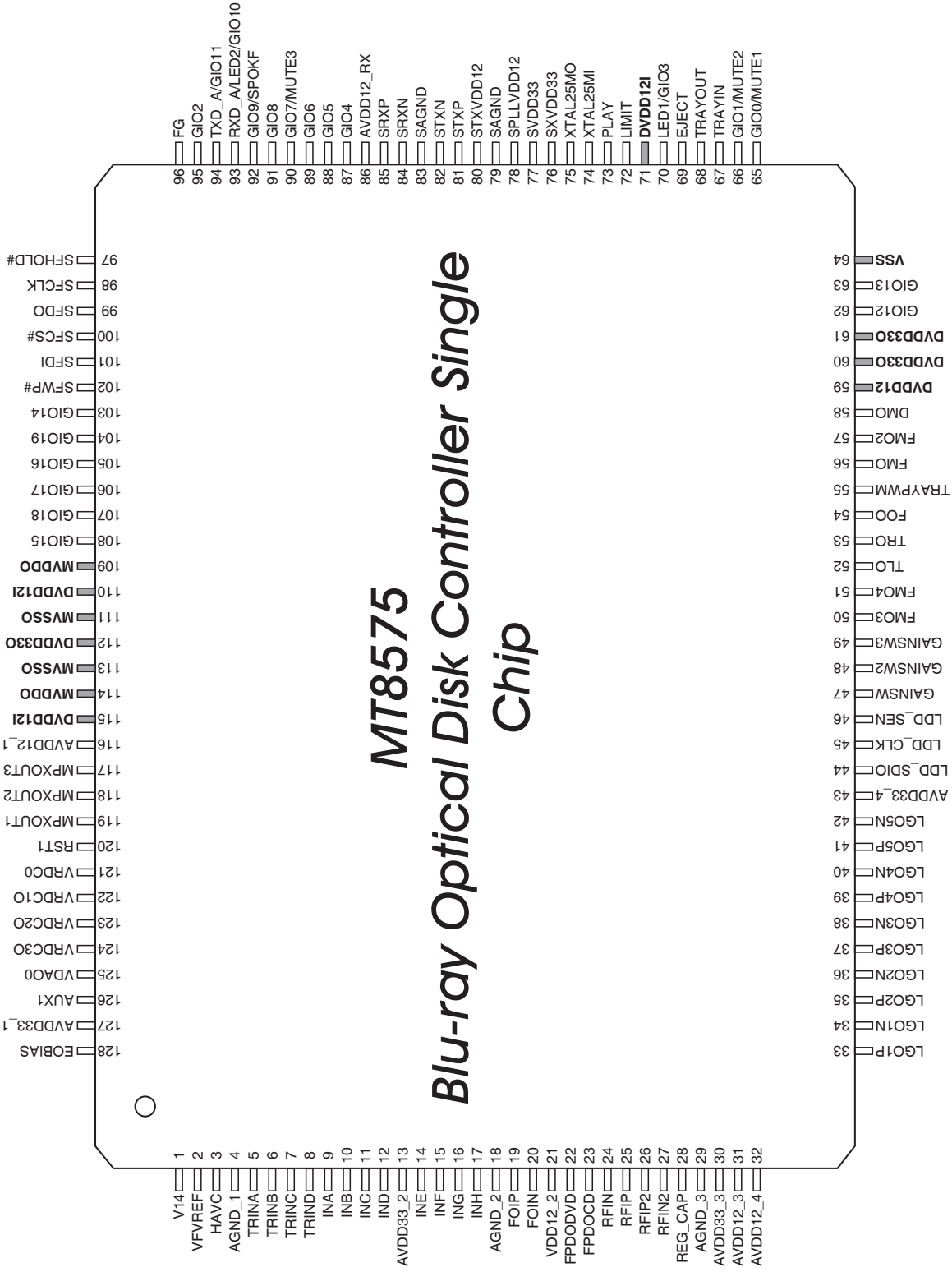
3. PICK-UP CONNECTOR TERMINAL PIN ASSIGNMENTS

PIN NO	PIN NAME		DESCRIPTION
1	FCS2+	ACT	FOCUSING2+
2	FCS2-		FOCUSING2-
3	TRK+		TRACKING+
4	FCS1+		FOCUSING1+
5	TRK-		TRACKING-
6	FCS1-		FOCUSING1-
7	A-	CL SHIFTER	Stepping Motor A- Terminal
8	B-		Stepping Motor B- Terminal
9	A+		Stepping Motor A+ Terminal
10	B+		Stepping Motor B+ Terminal
11	VCC_CLSFT		Sensor Power Supply 3.3V
12	SIG_PO		Output signal from the reference position sensor of BD COL SHIFTER
13	GND_CLSFT		GND for CL SHIFTER
14	A	PDIC	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	SW3		PDIC BD Sub Output Switch Port
23	RF+(BD)		RF(+) output for BD
24	RF-(BD)		RF(-) output for BD
25	RF+(DVDCD)		RF(+) output for DVDCD
26	RF-(DVDCD)		RF(-) output for DVDCD
27	VREF_PD		PDIC Reference Supply Terminal 2.1V
28	VCC_+5PD		PDIC Power Terminal 5V
29	NC		NC
30	GND_PD		GND for PDIC
31	NC(SW)		2-Wavelength PDIC DVD/CD/Sleep Changeover SW
32	VCC_LDR	LDD	LDD 5V-Power Supply for LD,DVD and CD
33	VCC_LDB		LDD 9V-Power Supply for LD,BD
34	NC		NC
35	GND1_LDD		LDD GND Terminal
36	GND1_LDD		LDD GND Terminal
37	VMON		Monitor Voltage Output Terminal
38	VCC		LDD 5V-Power Supply for Logic
39	LDEN		LD Enable Input Terminal
40	SEN		Serial Resistor Chip Select Input Terminal
41	SCLK		Serial Clock Input Terminal
42	SDIO		Serial Resistor Data Input/Output Terminal
43	XRST		Serial Resistor RESET Input Terminal
44	GND1_LDD		LDD GND Terminal
45	TEMP		Thermistor

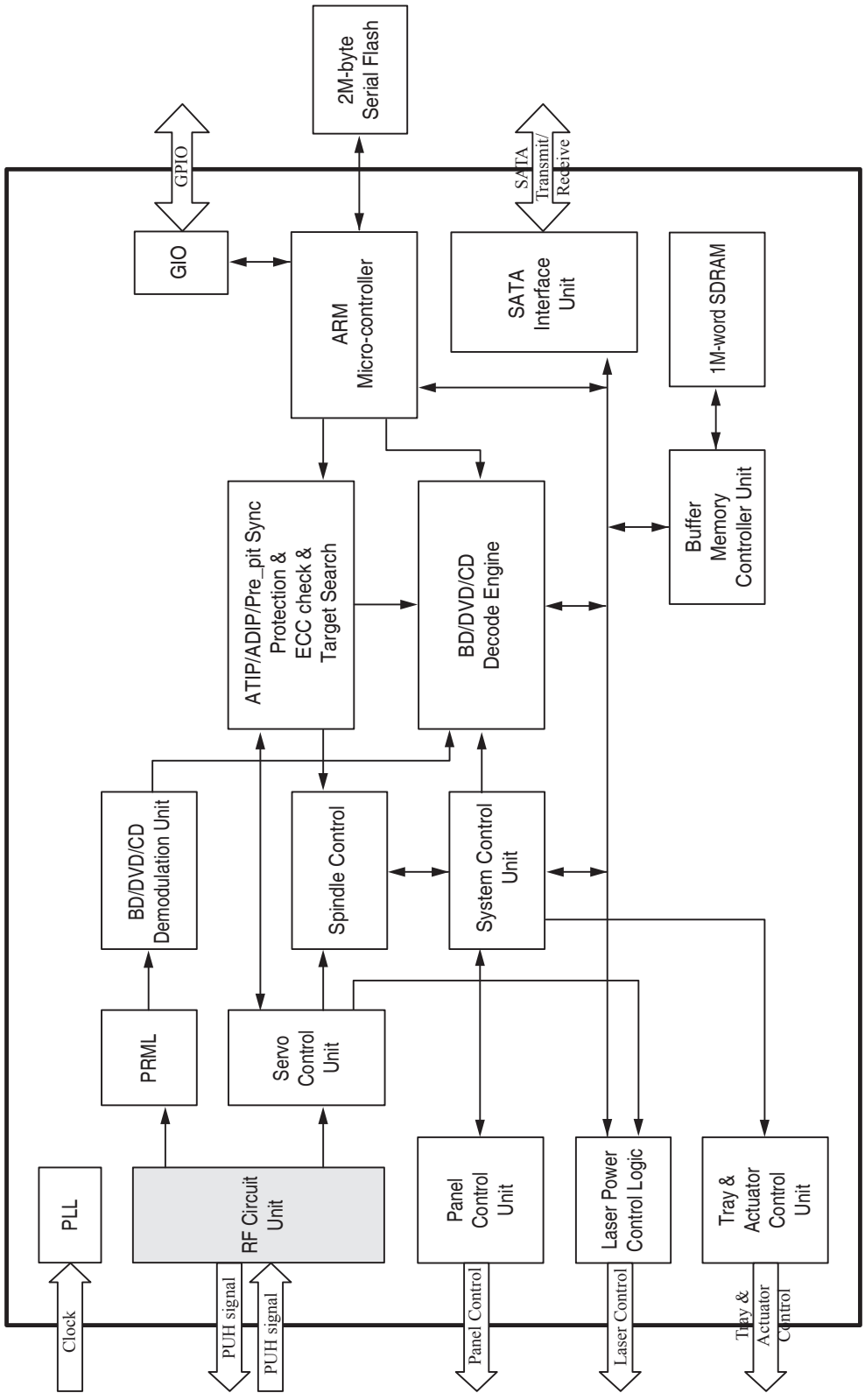
MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

1. LIC501 (MT8575) : Blu-ray SIGNAL PROCESSOR SINGLE CHIP

1-1. Pin Assignment



1-2. Block Diagram



1-3. Pin Function

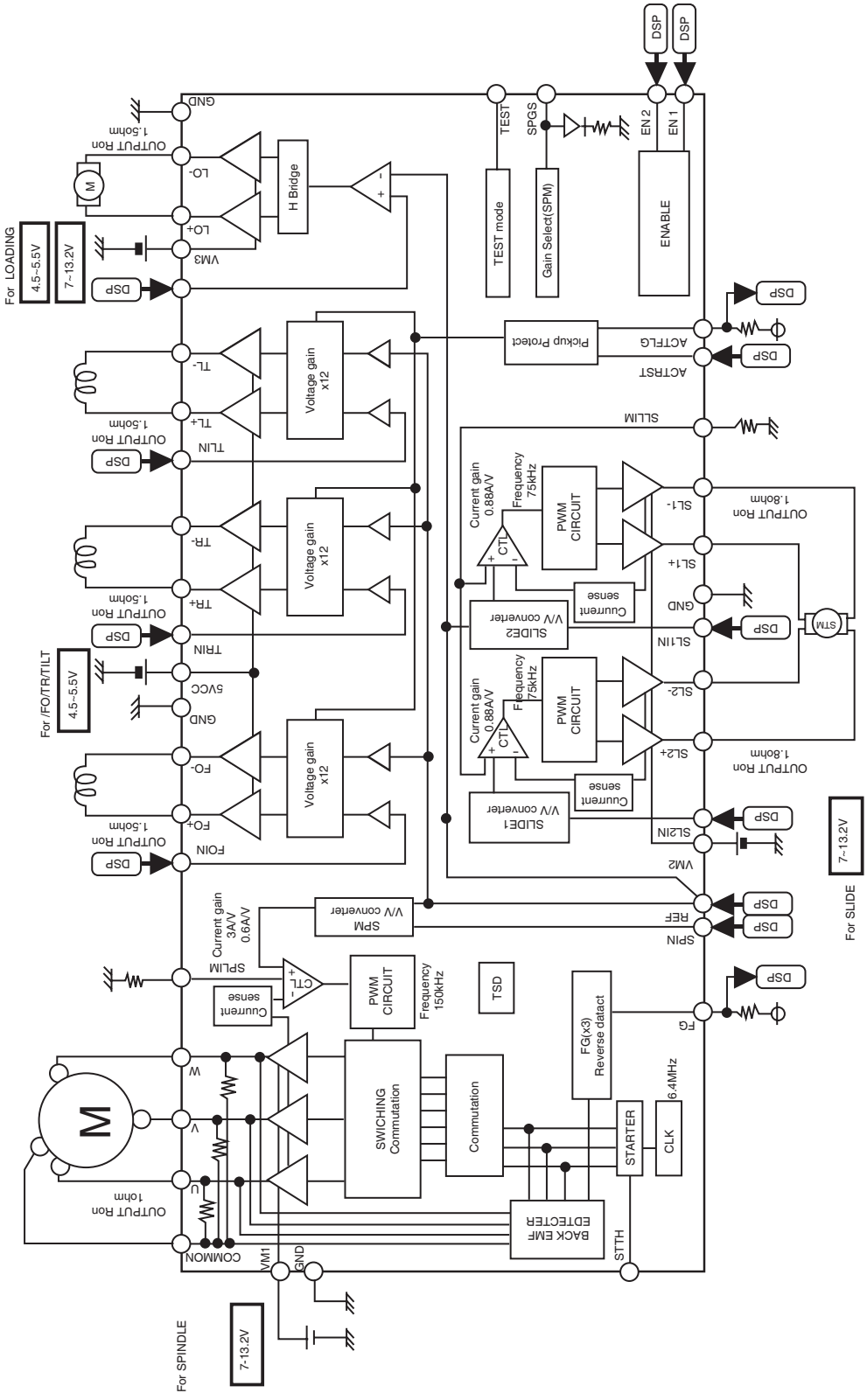
PIN NO	PIN NAME	TYPE	DESCRIPTION
RF Signals & S/H Control Pulses (21)			
5	TRINA	Analog Input	Input of Tracking Signal (A)
6	TRINB	Analog Input	Input of Tracking Signal (B)
7	TRINC	Analog Input	Input of Tracking Signal (C)
8	TRIND	Analog Input	Input of Tracking Signal (D)
9	INA	Analog Input	Input of Main Beam Signal (A)
10	INB	Analog Input	Input of Main Beam Signal (B)
11	INC	Analog Input	Input of Main Beam Signal (C)
12	IND	Analog Input	Input of Main Beam Signal (D)
14	INE	Analog Input	Input of Sub-Beam Signal (E)
15	INF	Analog Input	Input of Sub-Beam Signal (F)
16	ING	Analog Input	Input of Sub-Beam Signal (G)
17	INH	Analog Input	Input of Sub-Beam Signal (H)
19	FOIP/RRFSUM	Analog Input	Input of Focusing Signal (Positive) Alternative Function : Read RF sum
20	FOIN	Analog Input	Input of Focusing Signal (Negative)
24	RFIN	Analog Input	Differential Input of AC Coupling RF SUM Signal (Negative)
25	RFIP	Analog Input	Differential Input of AC Coupling RF SUM Signal (Positive)
26	RFIP2	Analog Input	Differential Input of AC Coupling RF SUM Signal (Positive)
27	RFIN2	Analog Input	Differential Input of AC Coupling RF SUM Signal (Negative)
47	GAINSW	Analog Output	Read gain switch. 1
48	GAINSW2	Analog Output	Read gain switch 2.
49	GAINSW3	Analog Output	Read gain switch 3.
EQRF Circuits (1)			
128	EQBIAS	Analog Output	External Bias Connection for Circuits in EQRF Block & SATA Block. The external resistor need meet the precision for SATA requirement. (23.1K, 1%)
APC (Auto Power Control for Laser) (6)			
22	FPDODVD	Analog Input	Laser Power Monitor Input for DVD APC / Differential positive input
23	FPDOCD	Analog Input	Laser Power Monitor Input for CD APC / Differential negative input
121	VRDCO	Analog Output	Output Voltage of Laser Diode Control in Read APC
122	VRDC1O	Analog Output	Output Voltage 1 of Laser Diode Control in Read APC
123	VRDC2O	Analog Output	Output Voltage 2 of Laser Diode Control in Read APC
124	VRDC3O	Analog Output	Output Voltage 3 of Laser Diode Control in Read APC
Reference Voltages & DACs (5)			
1	V14	Analog Output	Output of Voltage Reference (1.4V)
2	VFVREF	Analog Output	Output of Voltage Reference
3	HAVC	Analog Output	Decoupling Pin for Reference Voltage of Main and Sub Beams
28	REG_CAP	Analog Output	Output of Voltage Reference
125	VDAC0	Analog Output	Output of General DAC
MPXOUT (Multiplexer Circuit for Various Signals) and Testing Interface (4)			
117	MPXOUT3/MON/GO	Analog Output	Multiplexer Output 3 for Signal Monitoring. Alternate function : Internal monitored signal output / General output.
118	MPXOUT2/MON/GO	Analog Output	Multiplexer Output 2 for Signal Monitoring. Alternate function : Internal monitored signal output / General output.
119	MPXOUT1/MON/GO	Analog Output	Multiplexer Output 1 for Signal Monitoring. Alternate function : Internal monitored signal output / General output
126	AUX1	Analog I/O	Auxiliary Input.Alternative Function : Signal Monitoring
RF Power Supplies (11)			
4	AGND_1	Analog Ground	Ground Pin
13	AVDD33_2	Analog Power(3.3V)	Power Pin
18	AGND_2	Analog Ground	Ground Pin
21	AVDD12_2	Analog Power(1.2V)	Power Pin
29	AGND_3	Analog Ground	Ground Pin
30	AVDD33_3	Analog Power(3.3V)	Power Pin

PIN NO	PIN NAME	TYPE	DESCRIPTION
31	AVDD12_3	Analog Power(1.2V)	Power Pin
32	AVDD12_4	Analog Power(1.2V)	Power Pin
43	AVDD33_4	Analog Power(3.3V)	Power Pin
116	AVDD12_1	Analog Power(1.2V)	Power Pin
127	AVDD33_1	Analog Power(3.3V)	Power Pin
Low-Speed General Output (10)			
33	LGO1P	Analog Output	Lowspeed General Output 1P
34	LGO1N	Analog Output	Lowspeed General Output 1N
35	LGO2P	Analog Output	Lowspeed General Output 2P
36	LGO2N	Analog Output	Lowspeed General Output 2N
37	LGO3P	Analog Output	Lowspeed General Output 3P
38	LGO3N	Analog Output	Lowspeed General Output 3N
39	LGO4P	Analog Output	Lowspeed General Output 4P
40	LGO4N	Analog Output	Lowspeed General Output 4N
41	LGO5P	Analog Output	Lowspeed General Output 5P Alternative Function : Read gain switch 4
42	LGO5N	Analog Output	Lowspeed General Output 5N Alternative Function : Read gain switch 5
MOTOR (10)			
50	FMO3	Analog I/O	Feed motor 3 control. PWM output. Alternative Function : Auxiliary servo input
51	FMO4	Analog I/O	Feed motor 4 control. PWM output. Alternative Function : Auxiliary servo input
52	TLO	Analog Output	Tilt servo output
53	TRO	Analog Output	Tracking servo output. PDM output of tracking servo compensator.
54	FOO	Analog Output	Focus servo output. PDM output of focus servo compensator.
55	TRAYPWM	Analog Output	Tray PWM control output. Controlled by µ P.
56	FMO	Analog Output	Feed motor control. PWM output.
57	FMO2	Analog Output	Feed motor 2 control. PWM output.
58	DMO	Analog Output	Disk motor control output. PWM output.
96	FG	3.3V LVTTL I/O, 5V-tolerance,1 2mA PDR, 75K pull-up.	Motor Hall sensor input. The pin is spike-free at power-on stage.
SATA Interface (10)			
77	SVDD33	Analog Power(3.3V)	Power supply for SATA 3.3V circuitry
78	SPLLVDD12	Analog Power(1.2V)	Power supply for SATA circuitry
79	SAGND	Analog Ground	Ground Pin for SATA circuitry
80	STXVDD12	Analog Power(1.2V)	Power supply for SATA transmit circuitry
81	STXP	Analog Output	Differential serial output transmit signal of SATA
82	STXN	Analog Output	Differential serial output transmit signal of SATA
83	SAGND	Analog Ground	Ground Pin for SATA circuitry
84	SRXN	Analog Input	Differential input receive signal of SATA
85	SRXP	Analog Input	Differential input receive signal of SATA
86	AVDD12_RX	Analog Power(1.2V)	Power supply for SATA circuitry
Crystal Interface (3)			
74	XTAL25MI	Input	X`tal input. The working frequency is 25MHz.
75	XTAL25MO	Output	X`tal output.
76	SXVDD33	Analog Power(3.3V)	Power supply for X`ftal circuitry
Serial Flash (6)			
97	SFHOLD#	3.3V LVTTL I/O, 5V-tolerance, 4,8,12,16mA PDR, 75K pull-up	Hold in normal serial flash mode but in quad I/O, as serial data input/data output
98	SFCLK		serial flashÅfs clock output
99	SFDO		serial data outputrial
100	SFCS#		chip select output
101	SFDI		serial data input
102	SFWP#		Write protection in normal serial flash mode but in quad I/O, as serial data input/data output

PIN NO	PIN NAME	TYPE	DESCRIPTION
LDD serial interface (3)			
44	LDD_SDIO	3.3V LVTTL I/O, 5V-tolerance, 2,4,6,8mA PDR, 75K pull-up	LDD serial interface data. The pin is spike-free at power-on stage.
45	LDD_CLK		LDD serial interface CLK. The pin is spike-free at power-on stage.
46	LDD_SEN		LDD serial interface command enable. The pin is spike-free at power-on stage.
Panel & sense key (5)			
67	TRAYIN	3.3V LVTTL I/O, 5V-tolerance, 12mA,75K pull-up	Tray_is_in Input, A Logical Low Indicates the Tray is IN. Feedback Flag is from Tray Connector. The pin is spike-free at power-on stage.
68	TRAYOUT		Tray_is_out Input. A Logical Low Indicates the Tray is OUT. Feedback Flag is from Tray Connector. The pin is spike-free at power-on stage.
69	EJECT		Eject/stop key input, active low. The pin is spike-free at power-on stage.
72	LIMIT		Sledge Inner Limit Input, Active Low. The pin is spike-free at power-on stage. Alternate function : 1. Internal monitored signal output
73	PLAY		Play/pause key input, active low. The pin is spike-free at power-on stage.
MISC & GIO function (21)			
120	RSTI	Analog Input	Internal power on reset detection input.
62	GIO12	3.3V LVTTL I/O, 5V-tolerance, 4,8,12,16mA PDR, 75K pull-up	General IO
63	GIO13		General IO.
65	GIO0/MUTE1		General IO
66	GIO1/MUTE2	3.3V LVTTL I/O, 5V-tolerance, 4,8,12,16mA PDR, 75K pull-down	General IO
70	LED1/GIO3		LED Control Output. Initial 0 Output. The pin is spike-free at power-on stage. Alternate function : General I/O
87	GIO4	3.3V LVTTL I/O	General IO.
88	GIO5	3.3V LVTTL I/O	General IO.
89	GIO6	3.3V LVTTL I/O	General IO.
90	GIO7/MUTE3	3.3V LVTTL I/O, 5V-tolerance, 4,8,12,16mA PDR, 75K pull-down	General IO. The pin is spike-free at power-on stage.
91	GIO8		General IO.
92	GIO9/SPOKE		General IO.The pin is spike-free at power-on stage. The pin is not allowed to pull-up in circuit layout. Alternate function : Spoke input.
93	RXD_A/ LED2/GIO10		PC RS232 serial receive data. The pin is spike-free at power-on stage. Alternate function : 1. LED Control Output. Initial “0” Output 2. General IO.
94	TXD_A/GIO11		PC RS232 serial transmit data. The pin is spike-free at power-on stage. Alternate function : 1. LED Control Output. Initial “0” Output 2. General IO.
95	GIO2		General IO
103	GIO14		General IO
104	GIO19		General IO
105	GIO16		General IO
106	GIO17		General IO
107	GIO18		General IO
108	GIO15		General IO The pin is not allowed to pull-up in circuit layout.
Digital Power Pins (11)			
60,61,112	DVDD33O	Digital Power (3.3V)	VDD for digital pad.
109,114	MVDDQ	DRAM Power (3.3V)	VDD for pad output buffer of DRAM die.
111,113	MVSSQ	DRAM Ground	VSS for pad output buffer of DRAM die.
59,71, 110,115	DVDD12I	Digital Power (1.2V)	VDD for internal circuit.
64	VSS	Digital Ground	VSS for digital pad

2. LIC301 (R2A30232SP) : SPINDLE MOTOR AND 6CH ACTUATOR DRIVER

2-1. Block Diagram

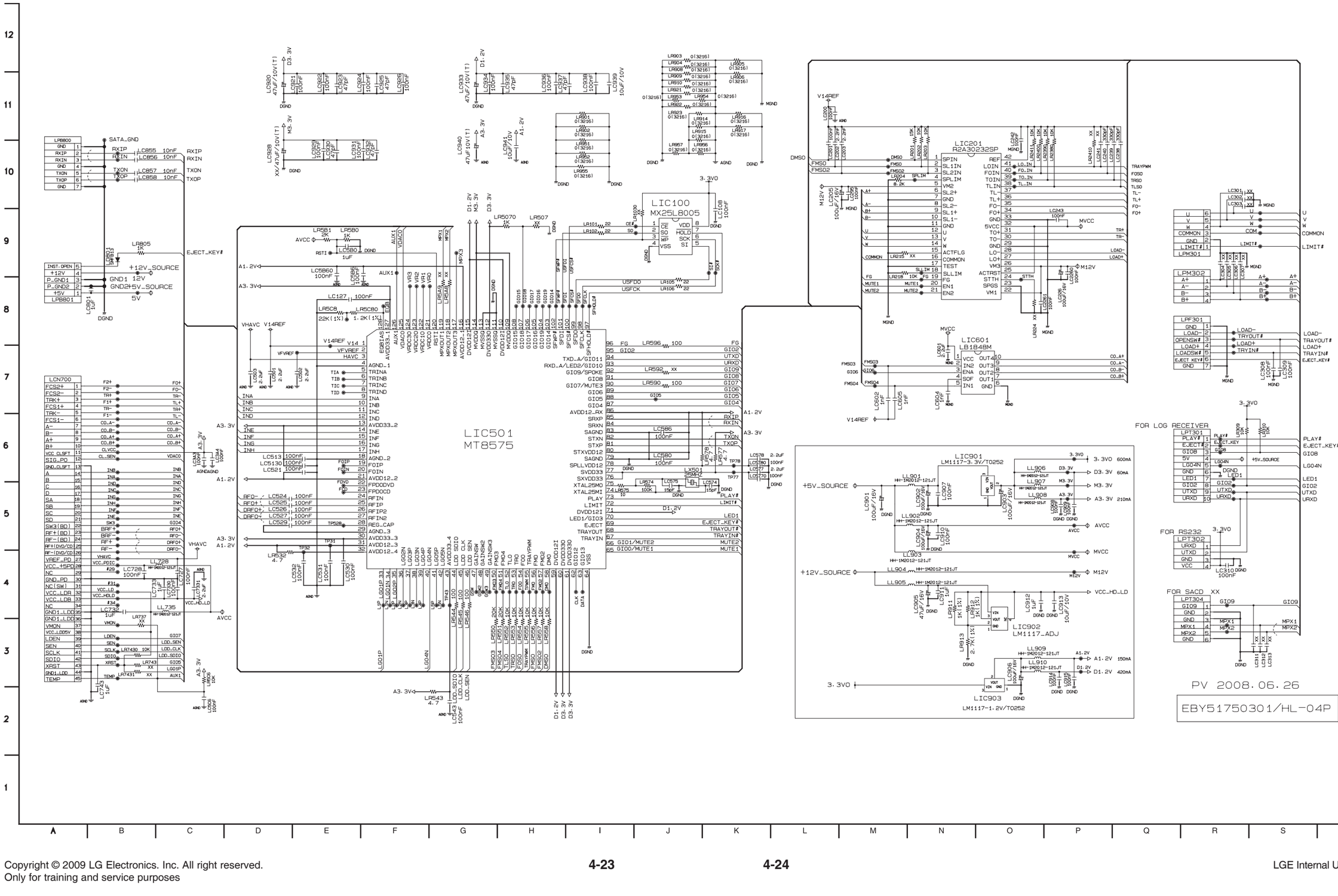


2-2. Pin Function

PIN NO	SYMBOL	FUNCTION
1	SPIN	Spindle control voltage input
2	SL1IN	Slide control voltage input 1
3	SL2IN	Slide control voltage input ÇQ
4	SPLIM	Input terminal for spindle current limit
5	VM2	Motor Power Supply ÇQ(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	ACTFLG	Pickup protect flag output
16	COMMON	Motor common
17	TEST	Test
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	STTH	Reference voltage for spindle start up
25	ACTRST	Pickup protect Reset
26	VM3	Power Supply3(for Loading)
27	LO+	Loading non-inverted output
28	LO-	Loading inverted output
29	GND	GND
30	TO-	Tracking inverted output
31	TO+	Tracking non-inverted output
32	5VCC	5V Power Supply (for FS,TS,TL)
33	GND	GND
34	FO+	Focus non-inverted output
35	FO-	Focus inverted output
36	TL+	Tilt non-inverted output
37	TL-	Tilt inverted output
38	TLIN	Tilt control voltage input
39	TOIN	Tracking control voltage input
40	FOIN	Focus control voltage input
41	LOIN	Loading control input
42	REF	Reference voltage input

MEMO

CIRCUIT DIAGRAM



CIRCUIT VOLTAGE CHART

PIN NO.	VOLTAGE
LIC100	
1	0.00
2	PULSE
3	3.30
4	0.00
5	0.00
6	0.00
7	3.30
8	3.30
LIC201	
1	1.41
2	1.41
3	1.41
4	0.00
5	12.19
6	PULSE
7	0.00
8	PULSE
9	PULSE
10	PULSE
11	0.00
12	5.80
13	5.80
14	5.80
15	0.90
16	3.29
17	0.00
18	0.00
19	3.59
20	0.00
21	0.00
22	12.19
23	0.00
24	0.00
25	5.06
26	12.19
27	1.07
28	1.07
29	0.00
30	1.23
31	1.23
32	5.06
33	0.00
34	1.25
35	1.25
36	0.98
37	0.98
38	1.41
39	1.41
40	1.41
41	1.41
42	1.41

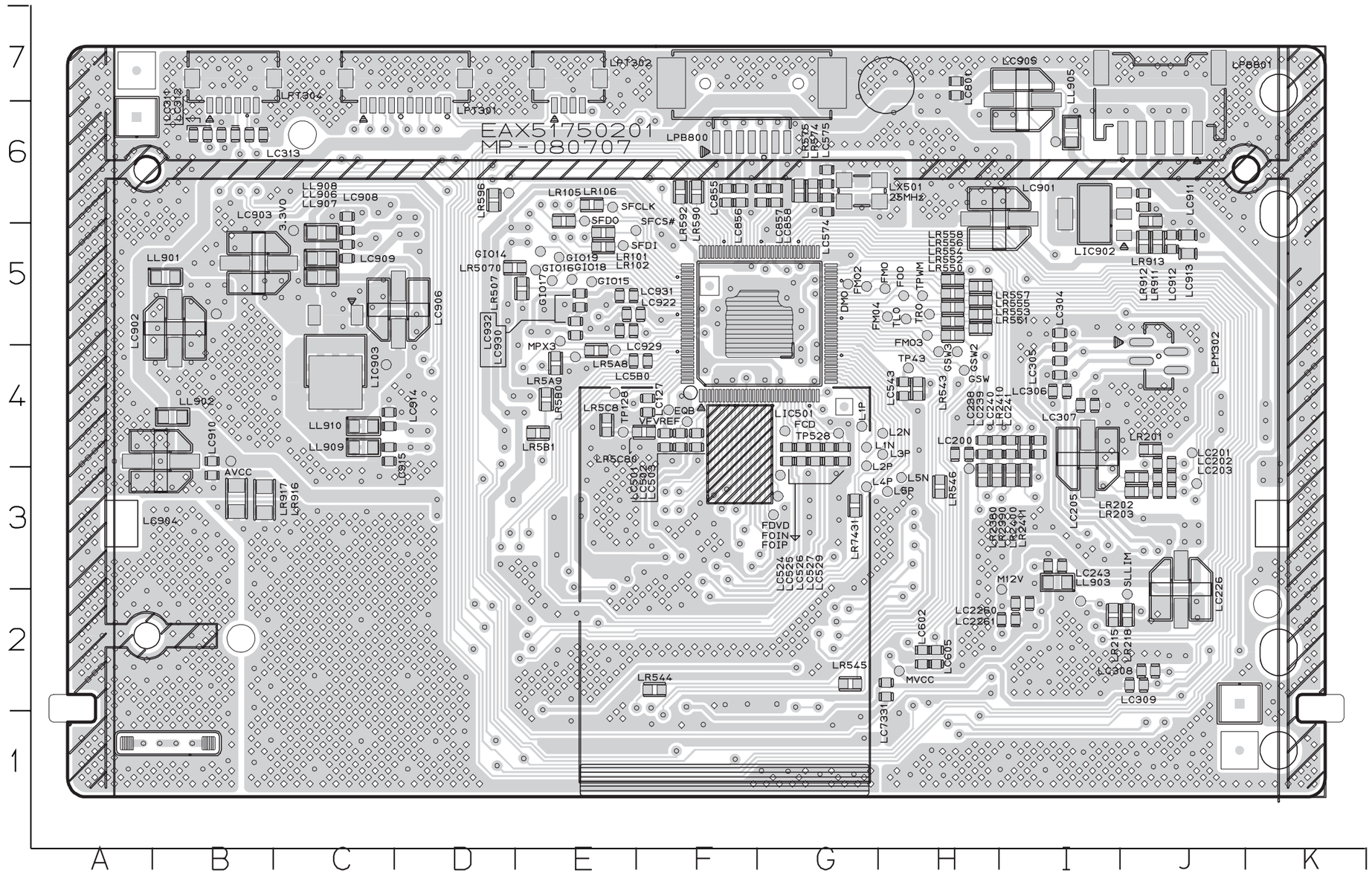
PIN NO.	VOLTAGE
LIC501	
1	1.41
2	1.01
3	2.10
4	0.00
5	1.05
6	1.15
7	0.92
8	1.70
9	2.49
10	2.48
11	2.40
12	2.50
13	3.28
14	2.30
15	2.40
16	2.32
17	2.38
18	0.00
19	1.19
20	0.00
21	0.00
22	0.00
23	0.00
24	0.00
25	0.00
26	0.00
27	0.00
28	0.00
29	0.00
30	3.28
31	1.19
32	1.16
33	0.00
34	0.00
35	0.00
36	0.00
37	0.00
38	0.00
39	0.00
40	0.00
41	0.00
42	0.00
43	0.00
44	3.29
45	0.00
46	0.00
47	0.00
48	0.00
49	0.00
50	1.39
51	1.32

PIN NO.	VOLTAGE
52	1.34
53	1.34
54	1.35
55	2.57
56	1.33
57	1.33
58	1.33
59	1.19
60	3.28
61	3.28
62	0.00
63	0.00
64	0.00
65	0.00
66	0.00
67	3.30
68	3.30
69	3.30
70	0.00
71	1.19
72	3.30
73	3.30
74	3.22
75	3.24
76	3.24
77	1.17
78	0.00
79	1.19
80	1.20
81	1.19
82	1.19
83	0.00
84	1.19
85	1.19
86	1.19
87	0.00
88	0.00
89	0.00
90	0.00
91	0.00
92	0.00
93	3.30
94	3.30
95	0.00
96	3.29
97	3.30
98	0.00
99	0.00
100	0.00
101	PULSE
102	3.30
103	3.30

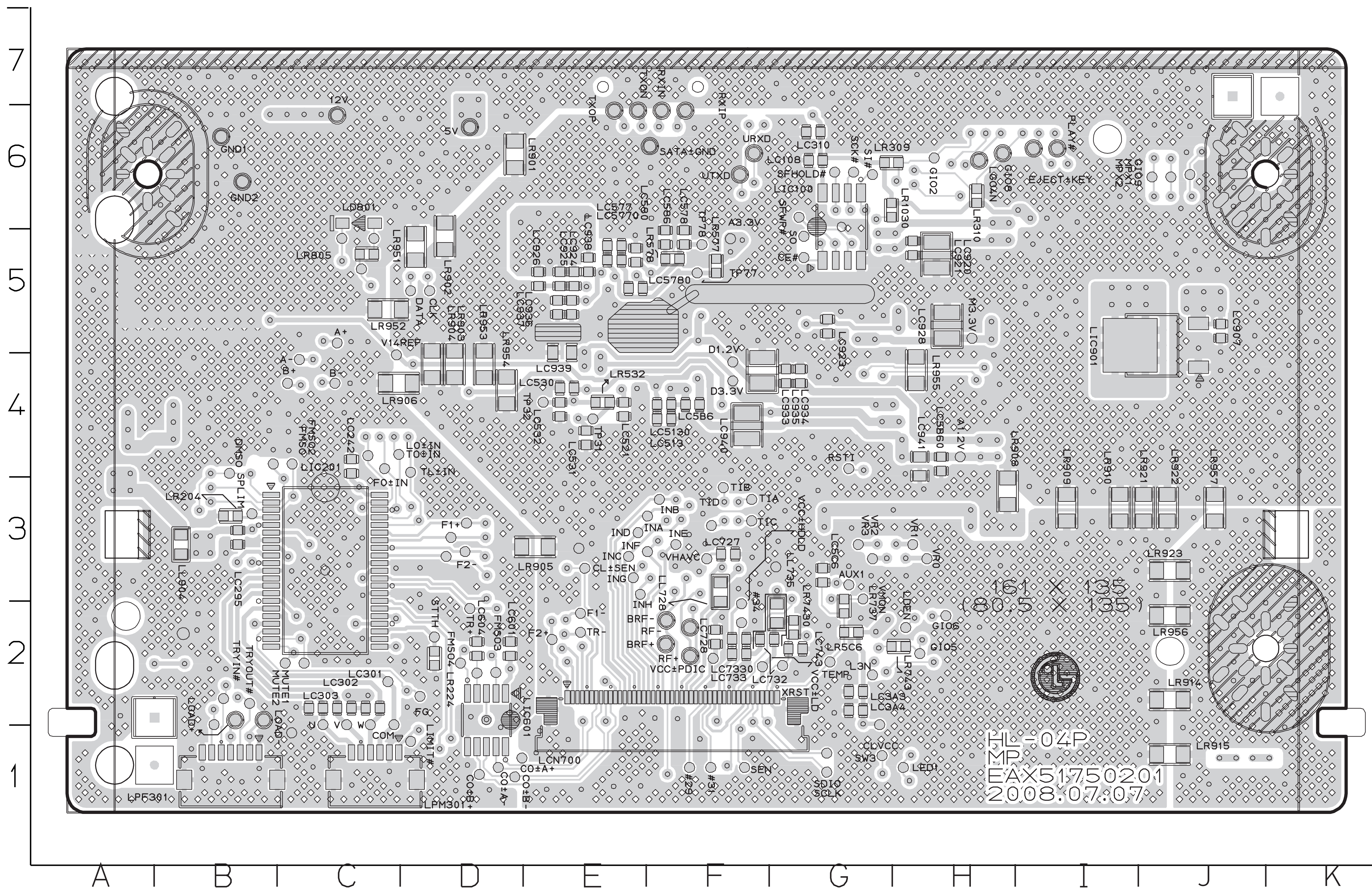
PIN NO.	VOLTAGE
104	3.30
105	3.30
106	3.30
107	3.30
108	3.30
109	3.30
110	1.19
111	0.00
112	3.30
113	0.00
114	3.30
115	1.19
116	1.19
117	1.12
118	1.12
119	3.29
120	1.67
121	0.00
122	0.00
123	0.00
124	1.67
125	1.67
126	1.16
127	3.30
128	1.39
LIC601	
1	5.07
2	1.19
3	0.00
4	4.50
5	1.19
6	0.00
7	PULSE
8	PULSE
9	PULSE
10	PULSE
LIC901	
1	0.00
2	3.30
3	5.05
LIC902	
1	6.93
2	8.18
3	12.19
LIC903	
1	0.00
2	1.20
3	3.30

PRINTED CIRCUIT BOARD DIAGRAMS

(TOP VIEW)



(BOTTOM VIEW)



7
6
5
4
3
2
1
A
B
C
D
E
F
G
H
I
J
K
12V
5V
GND1
GND2
LD801
LR805
LR951
LR902
LR952
CLK
DATA
LR903
LR904
LR953
LR954
V14REF
A+
A-
B+
B-
LR906
LR901
TXOP
TXON
RXIN
RXIP
SATA+GND
URXD
UTXD
LC310
LC108
SFHOLD#
LIC100
SCK#
SI#
LR309
LR1030
GIO2
LR310
LGO4N
GIO8
PLAY#
EJECT+KEY
GIO9
MPX1
MPX2
LC577
LC5770
LC580
LC586
LC578
TP78
LR577
LR578
A3.3V
SFWP#
SO
CE#
TP77
LC5780
LC926
LC938
LC924
LC925
LC936
LC937
LC939
LC920
LC921
LC928
M3.3V
LC923
LIC901
LC907
D1.2V
D3.3V
LR532
LC530
TP32
LC532
TP31
LC521
LC531
LC5B6
LC5130
LC513
LC940
LC933
LC935
LC934
LR955
LC941
LC5B60
A1.2V
RSTI
LR908
LR909
LR910
LR921
LR922
LR957
DMSO
FMSO
FMSO2
LC242
LIC201
LO+IN
TO+IN
TL+IN
FO+IN
LR204
SPLIM
LL904
LC295
F1+
F2-
LR905
STTH
TR+
LC604
FMS03
LC601
FMS04
LR224
F2+
F1-
TR-
TRYIN#
TRYOUT#
MUTE1
MUTE2
LOAD+
LOAD-
LC301
LC302
LC303
U
V
W
FG
COM
LIMIT#
LIC601
LCN700
CO+A+
CO+A-
CO+B+
CO+B-
LPF301
LPM301
TIB
TIA
TID
TIC
INB
INA
INE
IND
INF
INC
ING
INH
VHAVC
CL+SEN
LC727
LL728
LC728
BRF-
RF-
BRF+
RF+
VCC+PDIC
LC7330
LC733
LC732
VCC+HDD
LL735
#34
LR7430
LC743
VCC+LD
XRST
#29
#31
SEN
SDIO
SCLK
LC5C6
AUX1
VR2
VR3
VR1
VR0
VMON
LR737
LDEN
GIO6
GIO5
LR5C6
L3N
TEMP
LR743
LC3A3
LC3A4
CLVCC
SW3
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LR923
LR956
LR914
LR915
161 X 135
(80.5 X 135)
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MP
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