SERVICE MANUAL

NAD

T567B T567BT T567C
3D Network
Blu-ray Disc™ PLAYER

T567B / T567BT / T567C

3D Network
Blu-ray Disc™ PLAYER

CONTENTS

SECTION 1

SUMMARY

CONTENTS

PRODUCT SAFETY SERVICING GUIDELINES FOR 3D NETWORK 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 NAD 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 NAD 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:

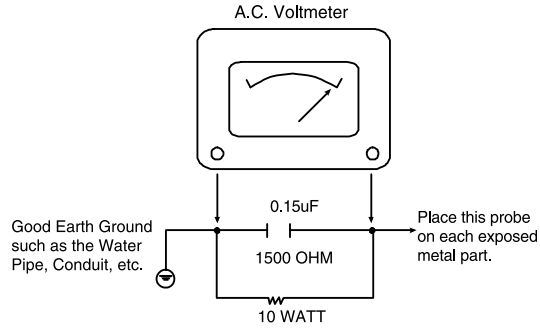
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

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 3D NETWORK 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 publication, always follow the safety precautions.
Remember Safety First :

General Servicing Precautions

1. Always unplug the 3D NETWORK 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 3D NETWORK 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 which instruments covered by this service manual might be equipped.

5. Do not apply AC power to this 3D NETWORK BLU-RAY / DISC PLAYER and / or any of its electrical assemblies unless all solid state 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

SPECIFICATIONS

• GENERAL

Power requirements:	AC 110 ~ 240 V, 50 / 60 Hz
Power consumption:	22 W
Dimensions (W x H x D):	Approx. 430 x 62 x 252 (mm)
Weight (Approx.):	2.5 kg (Net weight)
Operating temperature:	41 °F to 95 °F (5 °C to 35 °C)
Operating humidity:	5 % to 90 %

• OUTPUTS

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

• SYSTEM

Laser:	Semiconductor laser, wavelength: 405 nm / 650nm
Signal system:	Standard PAL Color TV system
Frequency response:	20 Hz to 20 kHz
Signal-to-noise ratio:	More than 100 dB (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

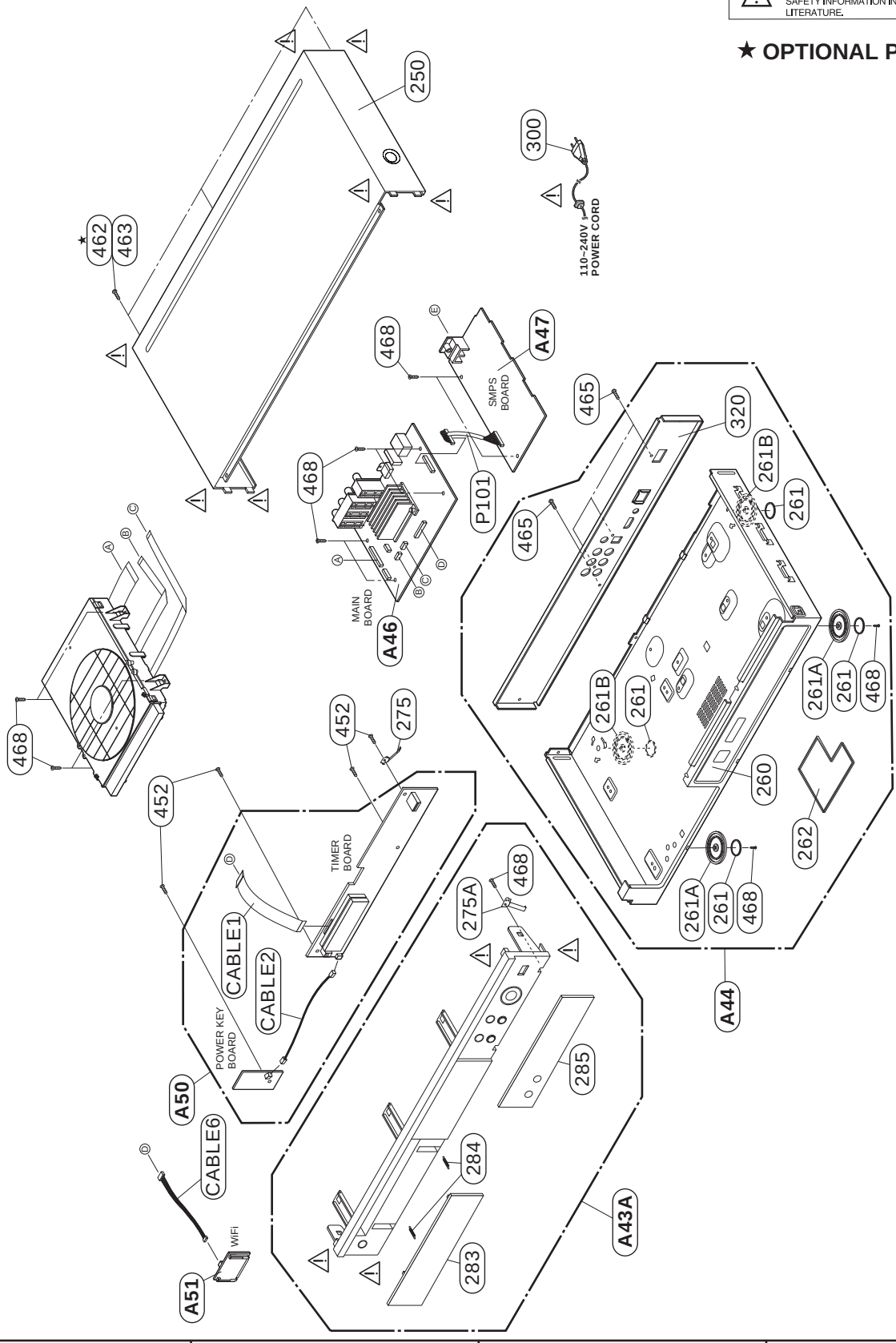
CONTENTS

EXPLODED VIEWS

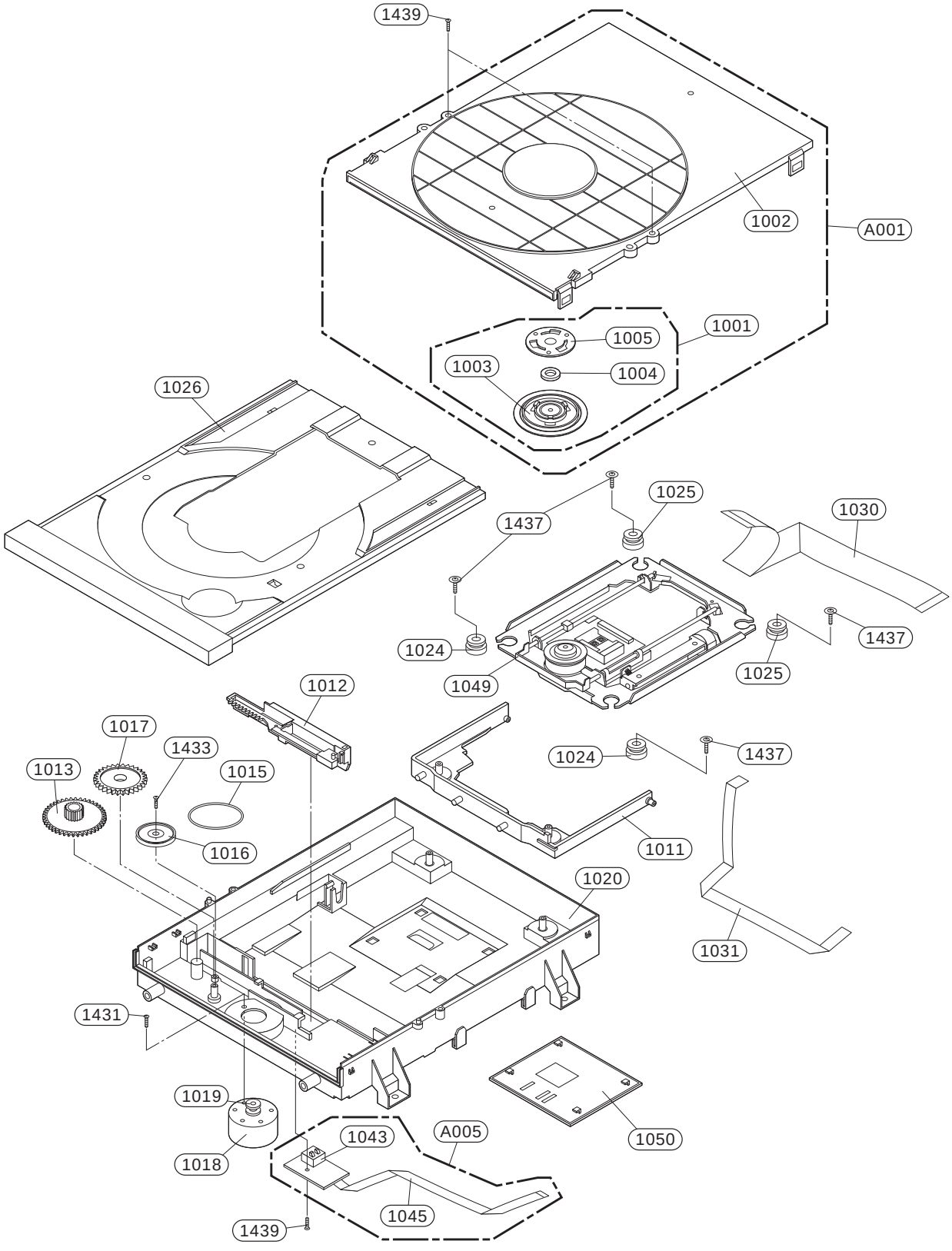
1. CABINET AND MAIN FRAME SECTION

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

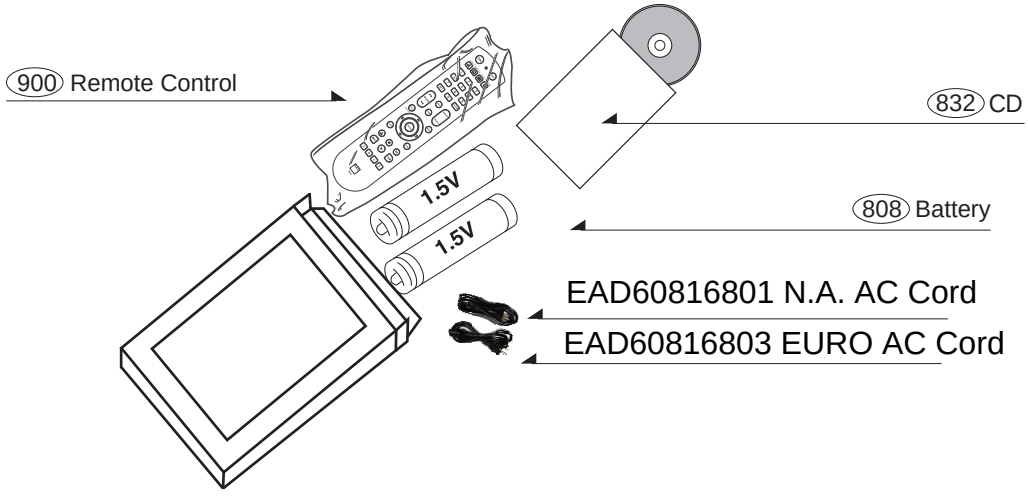
★ OPTIONAL PARTS

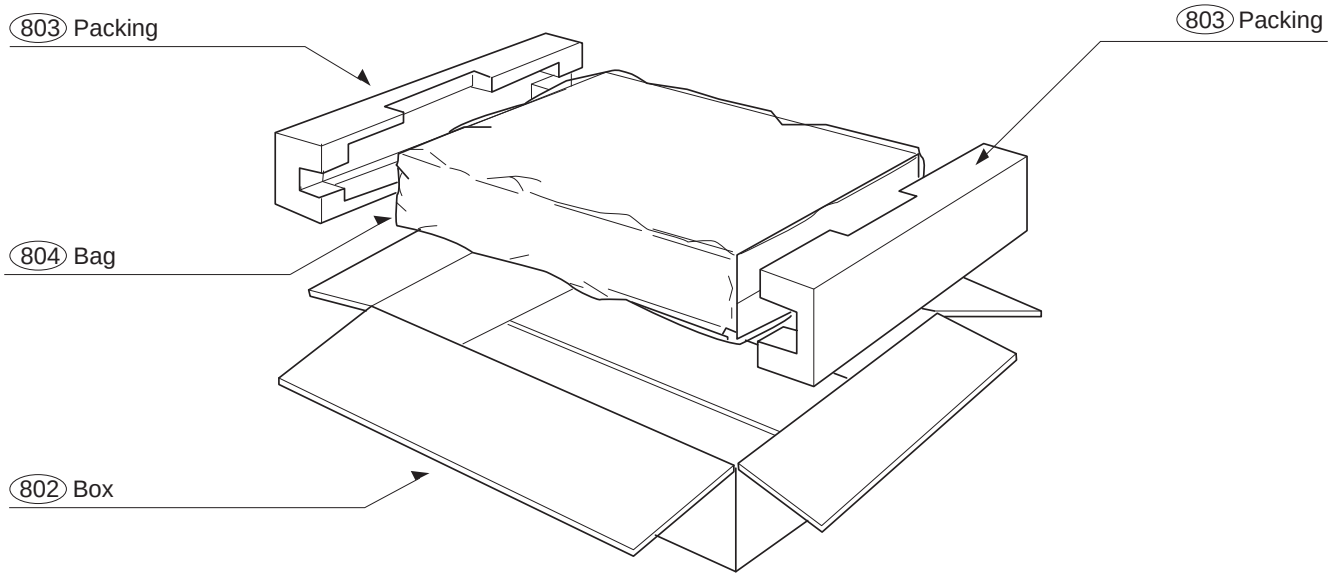


2. DECK MECHANISM SECTION, BM12H(LG08)



3. PACKING ACCESSORY SECTION





Parts List

1015 4400R-0010A T515 T517 & T567 Loading Belt
1018 4680R-E008A T567 BR loader motor RF-300EA-1D390 (80mm) 2V 90mA
A46 EBR73514924 T567 Servo & MPEG Decoder Assembly Region Code B option code Assy
A46 EBR73514926 T567 Servo & MPEG Decoder Assembly Region Code A option code Assy
284 4970R-0146E T587 T577 T557 T567 Door spring
A43A AGL73653102 T567 Fascia Complete Graphite
A43A AGL73653104 T567 Fascia Complete Titanium BT AKA AGL73653110
JK803 EAG62611202 T567 HDMI SOCKET FOR MPEG DECODER BOARD SMD mounting
IC704 EAN60732801 T567 R2A30209SP_W02Z 10.8V to 13.2V motor drive IC
1049 EAZ61122502 T567 BR 3D Traverse Assembly LGEIN LTH-A12 (Mech)
802 MAY65147122 T567 CARTON REGION B
802 MAY65147138 T567 CARTON REGION A
A47 EBR72102751 T567 Dual Voltage SMPS AH and C Version
261 MCQ58375801 T557 T567 T577 T587 Soft Sponge Ring for Foot.
1024 MCQ65785001 T567 BR Damper Front Grey BUTHYL IIR 40
1025 MCQ65785002 T567 BR Damper Rear Blue BUTHYL IIR 30
MDP58308301 T587 T577 T557 T567 Rubber Foot Extension
1026 MJS62172301 T567 BR Tray XR-401
1439 1SZZH-1007B T567 MACHINE SCREW 6MM SWRCH16A/ZNBK 4MM BLACK
1431 1SZZR-0011A T567 MACHINE SCREW for motor part #4680R-E008A
1433 1SZZR-0075A T567 1.7MM 10MM SWRCH FZW Pulley screw for MDT61842401
A001 ACQ84674501 T567 MECHA BM12 top Cover Assembly with clamper and magnet
A51 EAT61333201 T567 WN8522D WiFi Module
"CABLE 1" EAD30813107 T567 FFC AT10020220C04 220MM 1.00MM 20P
1030 EAD61048208 T567 FFC AT05045240C06 240MM 0.50MM 45P
1031 EAD61049004 T567 FFC AT10008240C01 240MM 1.00MM 8P
A50 EBR73761911 T567 Timer and Standby Switch assembly (keyboard with display)
1437 FAB30840501 T567 SCEW PWH (holds MCQ65785001 & MCQ65785002 on to loader)
1020 MAM62225801 T567 BASE ABS MOLD ABS XR-401 BM12 MAIN
1011 MAM62246401 T567 Base Up & Down MOLD ABS XR-401 BM11
1050 MCK66014301 T567 Cover holds in place FFC MOLD HIPS 60HR MECHA BM11
1016 MDT61842401 T567 Pulley MOLD POM LUCEL N109-LD DECK Deck pulley1
013 MDT62067301 T567 Gear MOLD POM (LUCEL N109-LD) DECK BIG
1017 MDT62067401 T567 Gear MOLD POM (LUCEL N109-LD) DECK SMALL
1012 MEA62411101 T567 Guide (slider) MOLD POM LUCEL N109-LD DECK
A005 MJS62172301 T567 Tray XR-401567 limit switches PCB includes FFC

SECTION 3 ELECTRICAL

CONTENTS

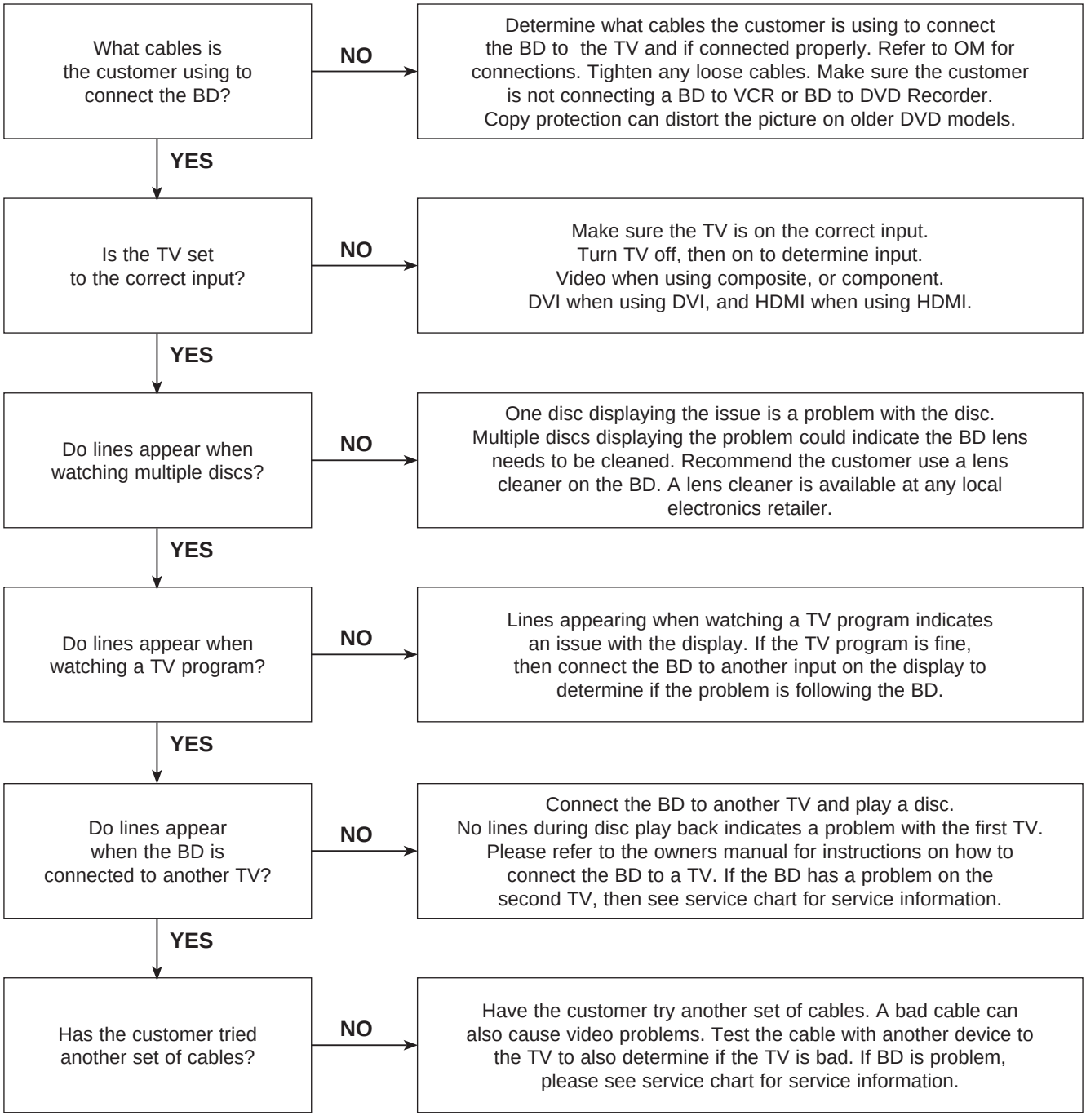
DIGITAL DISPLAY & MEDIA TRAINING MASTER

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

1. DISTORTED PICTURE

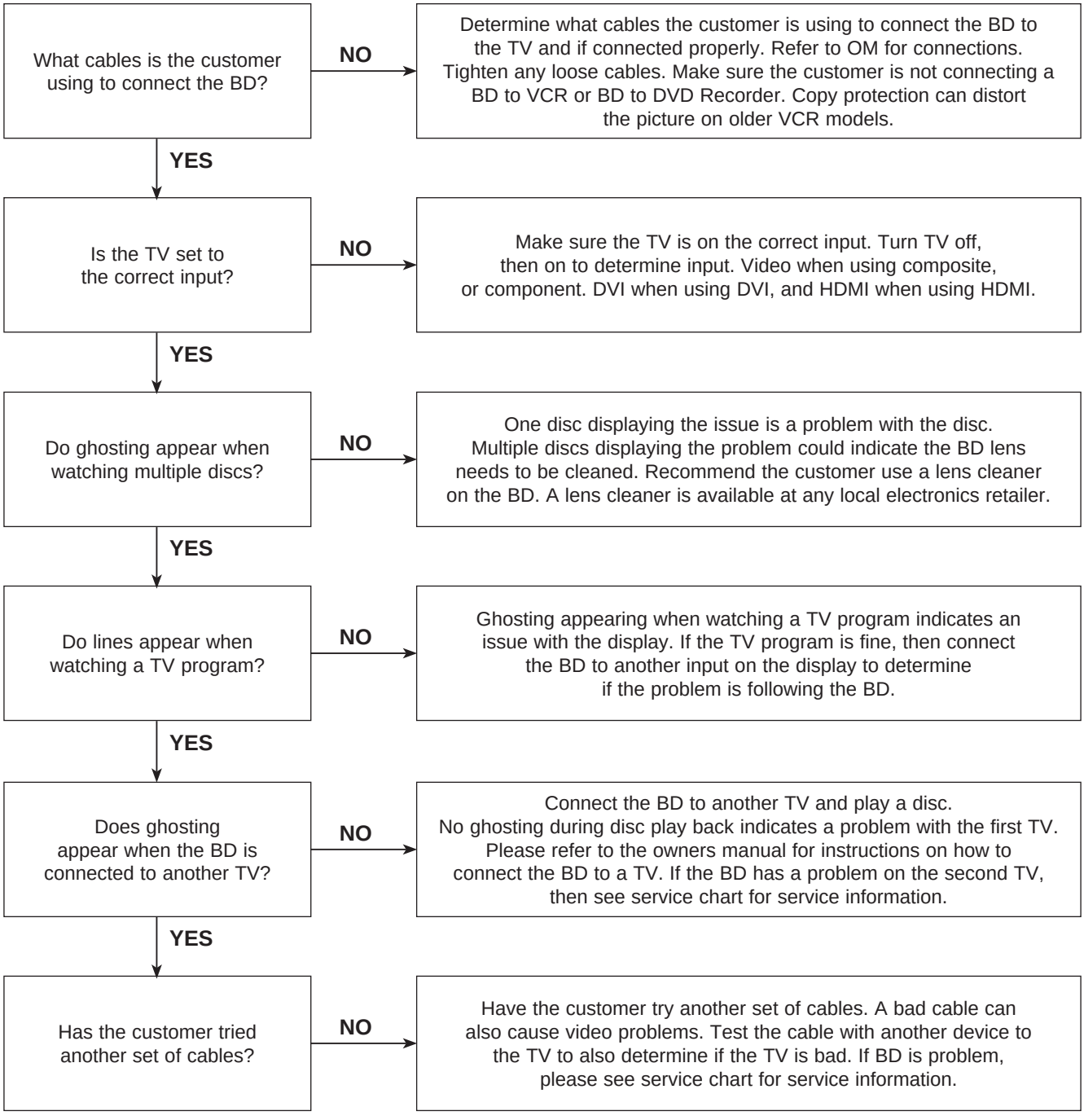
1-1. Lines on Picture

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



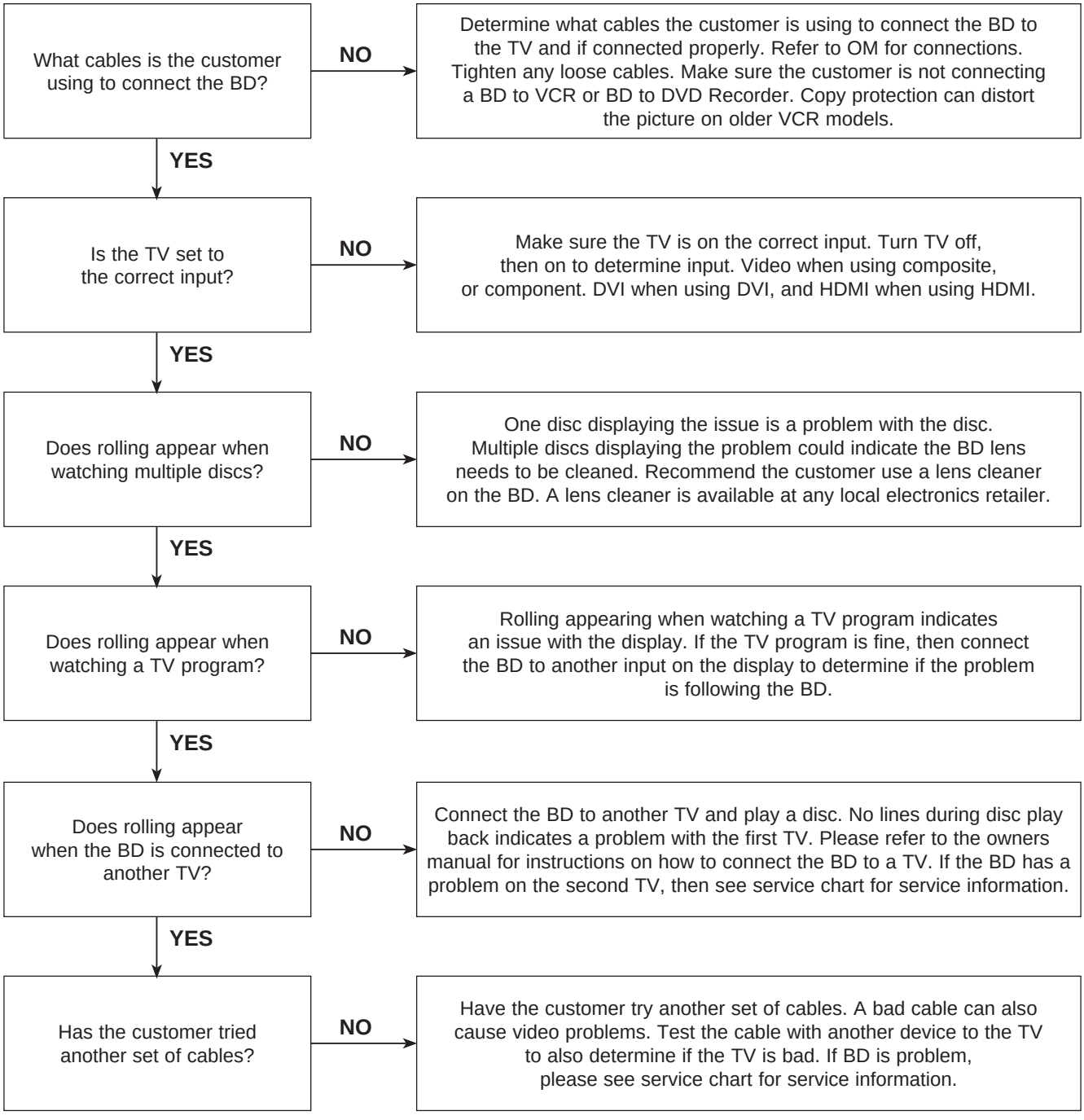
1-2. Ghost Picture

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



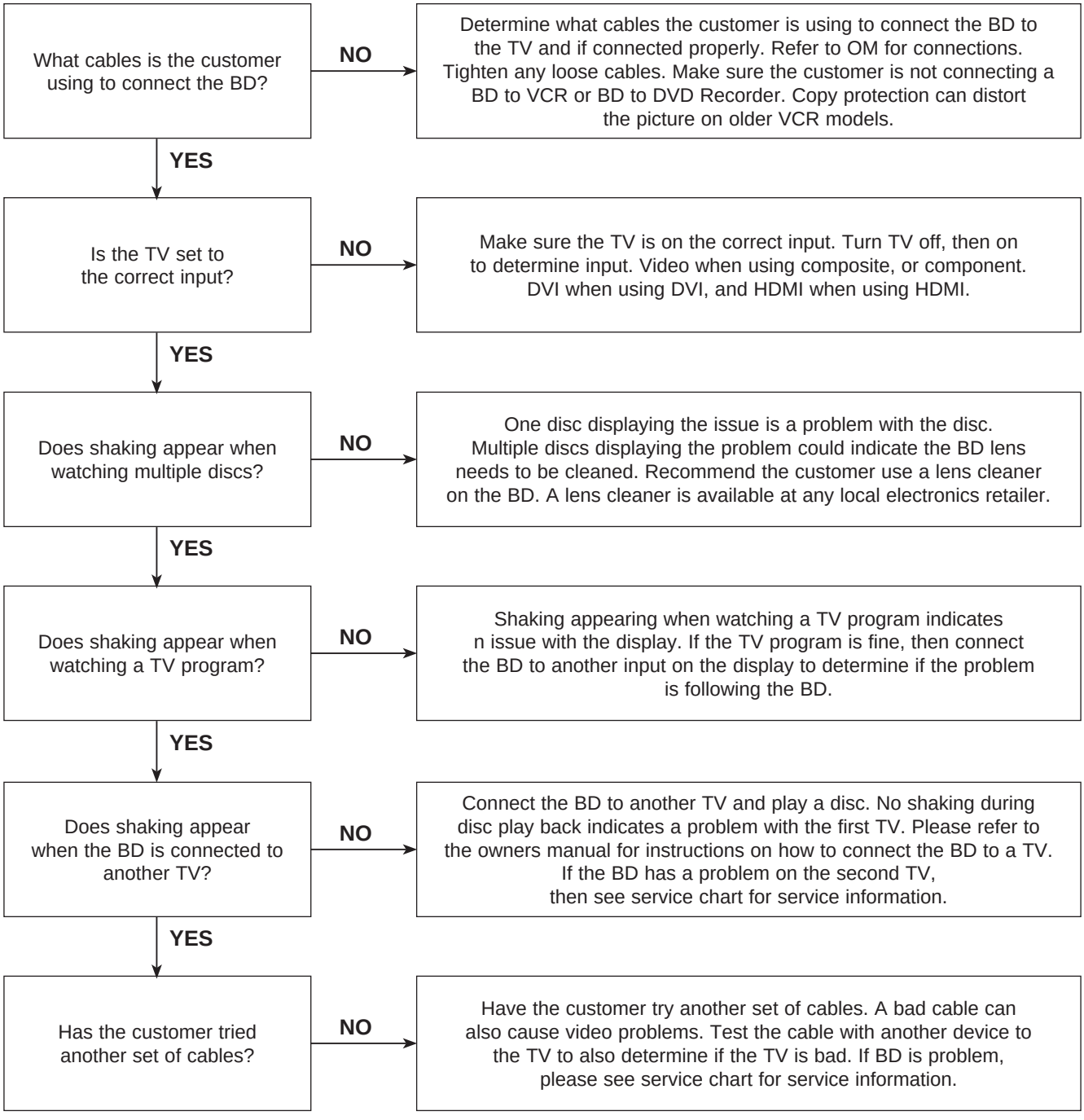
1-3. Rolling Picture

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



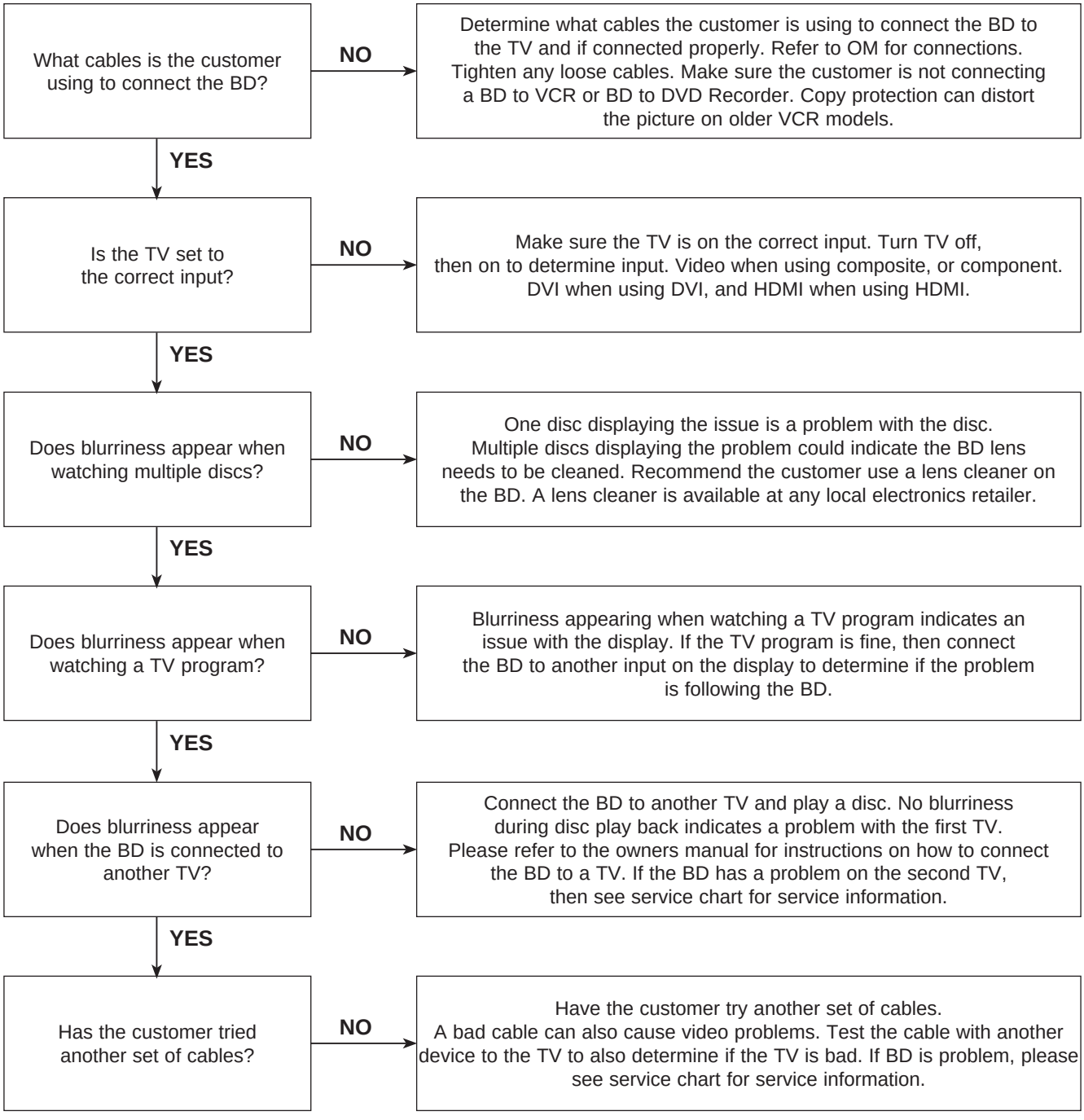
1-4. Shaky Picture

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



1-5. Blurry Picture

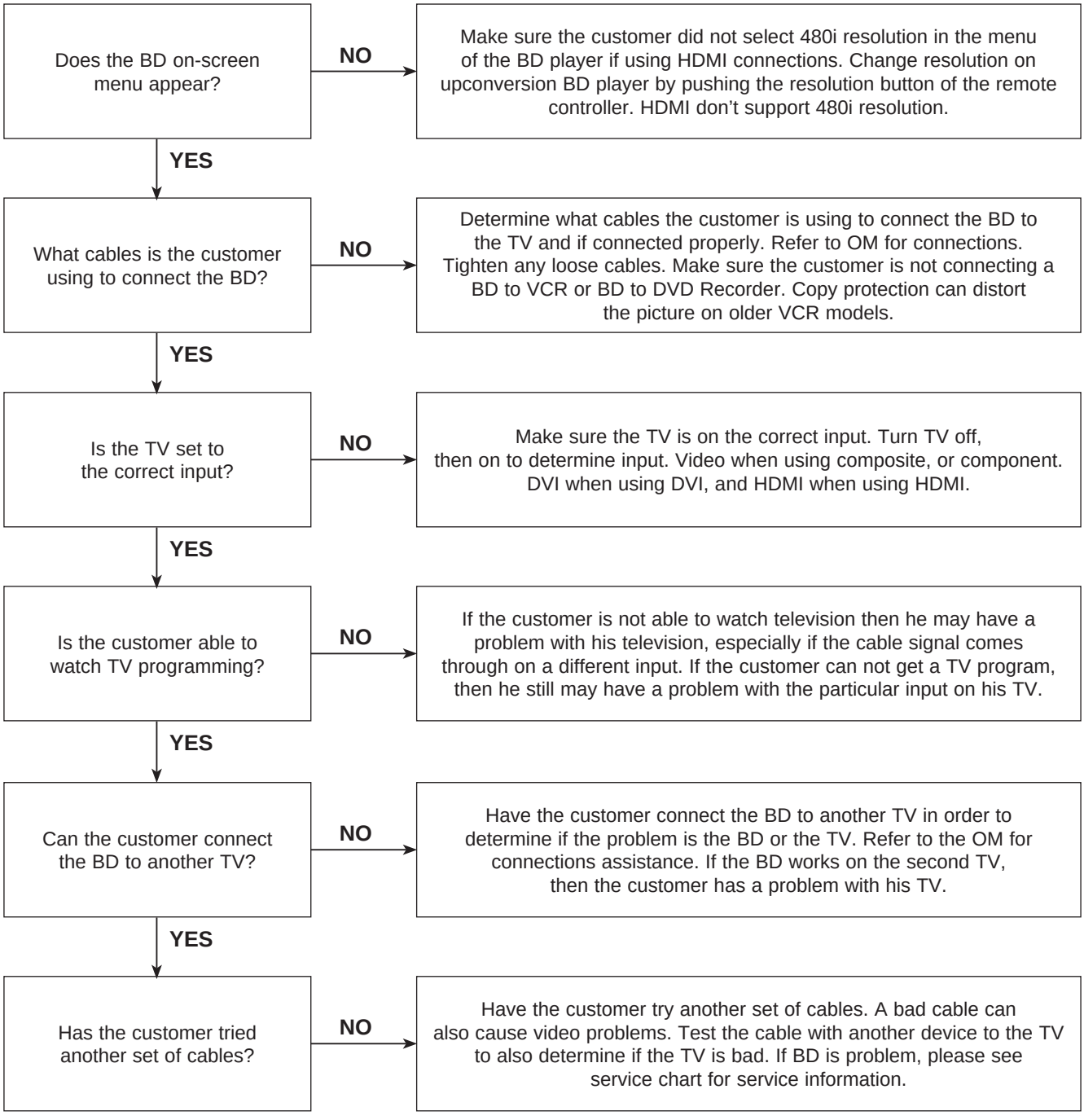
Distorted picture refers to the customer getting video, but there is a problem with the video.



2. NO PICTURE

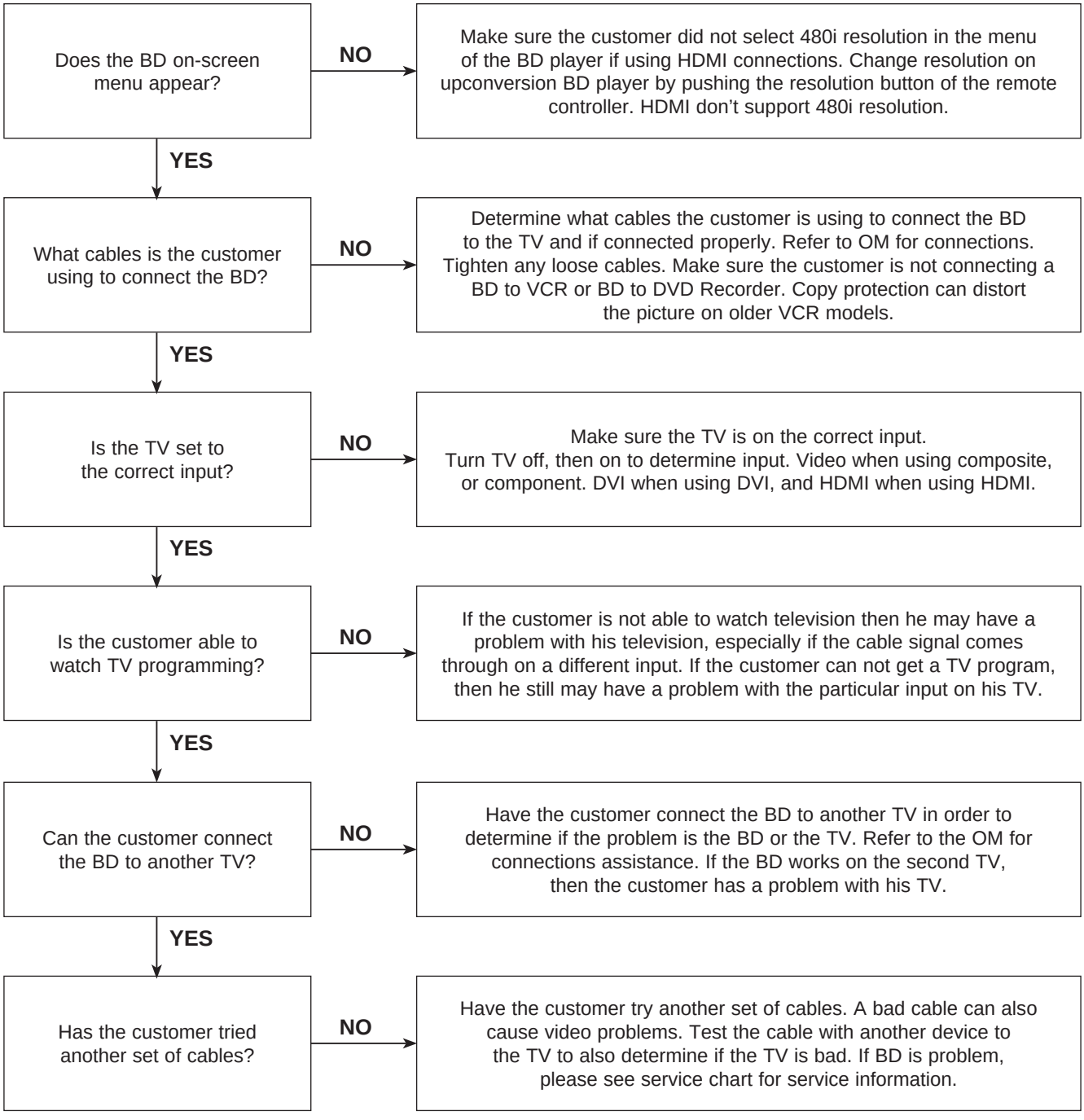
2-1. Black Screen

The entire screen is black.



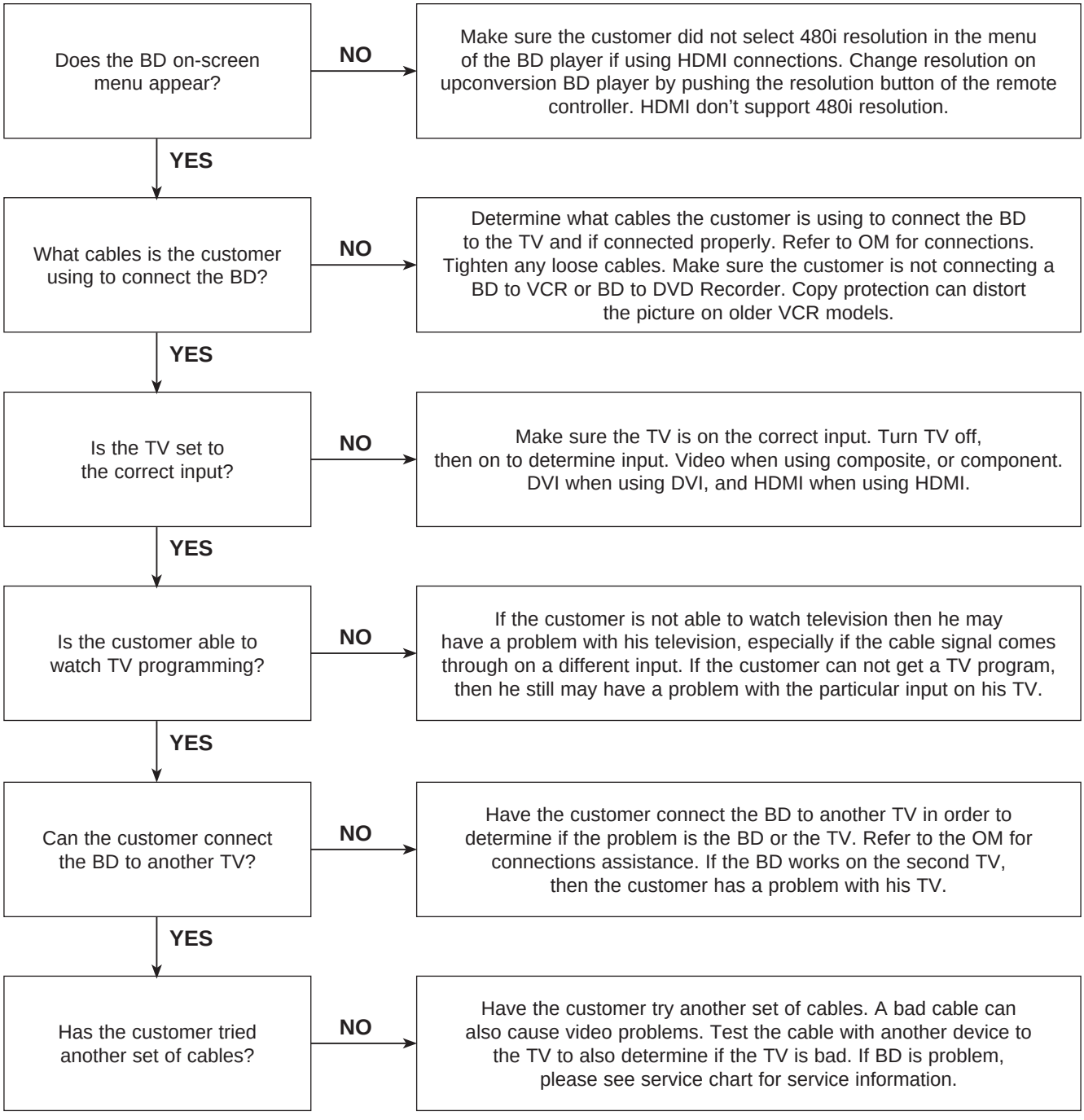
2-2. Blue Screen

The entire screen is a solid blue color.



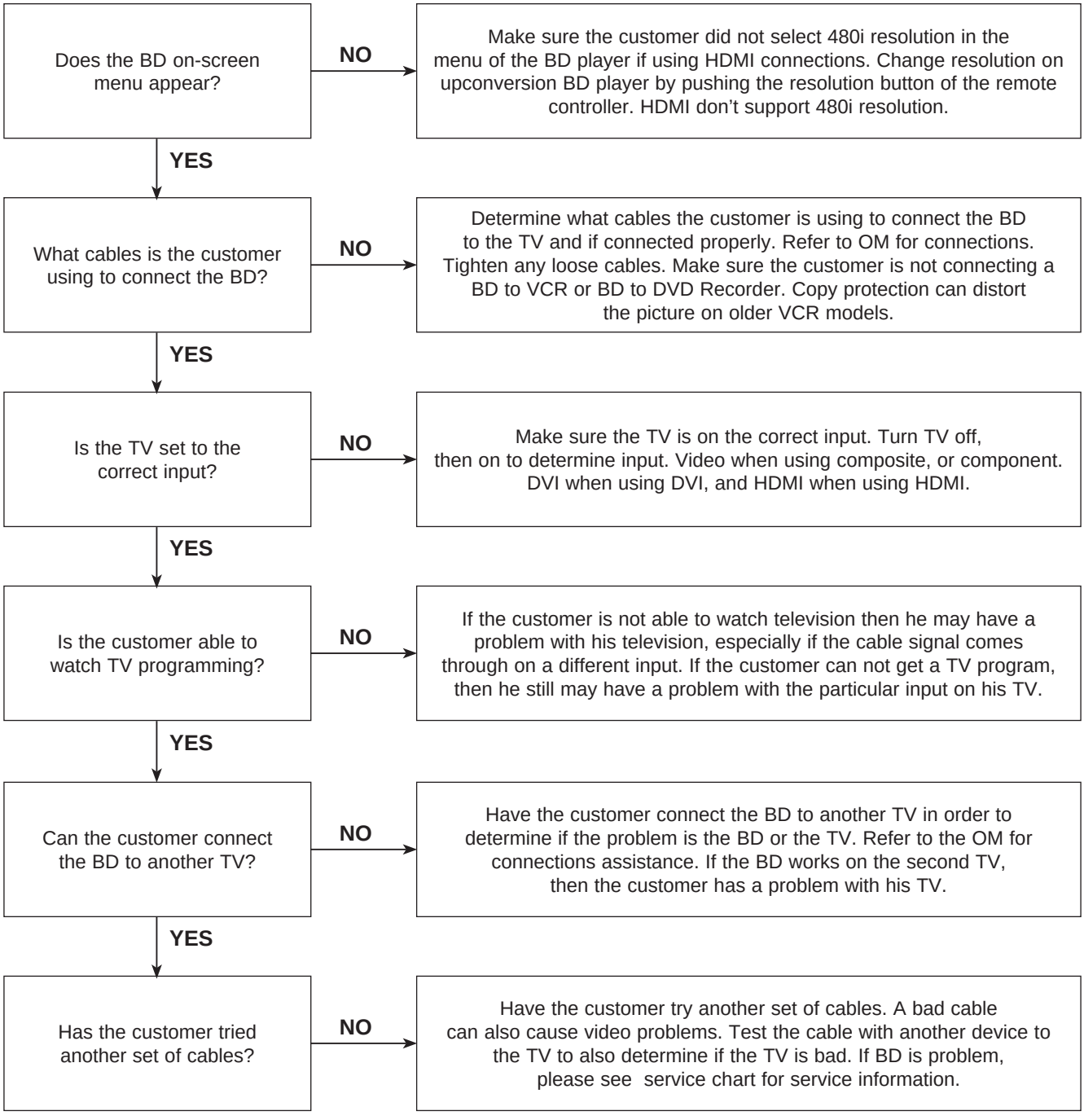
2-3. Snowy Screen

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

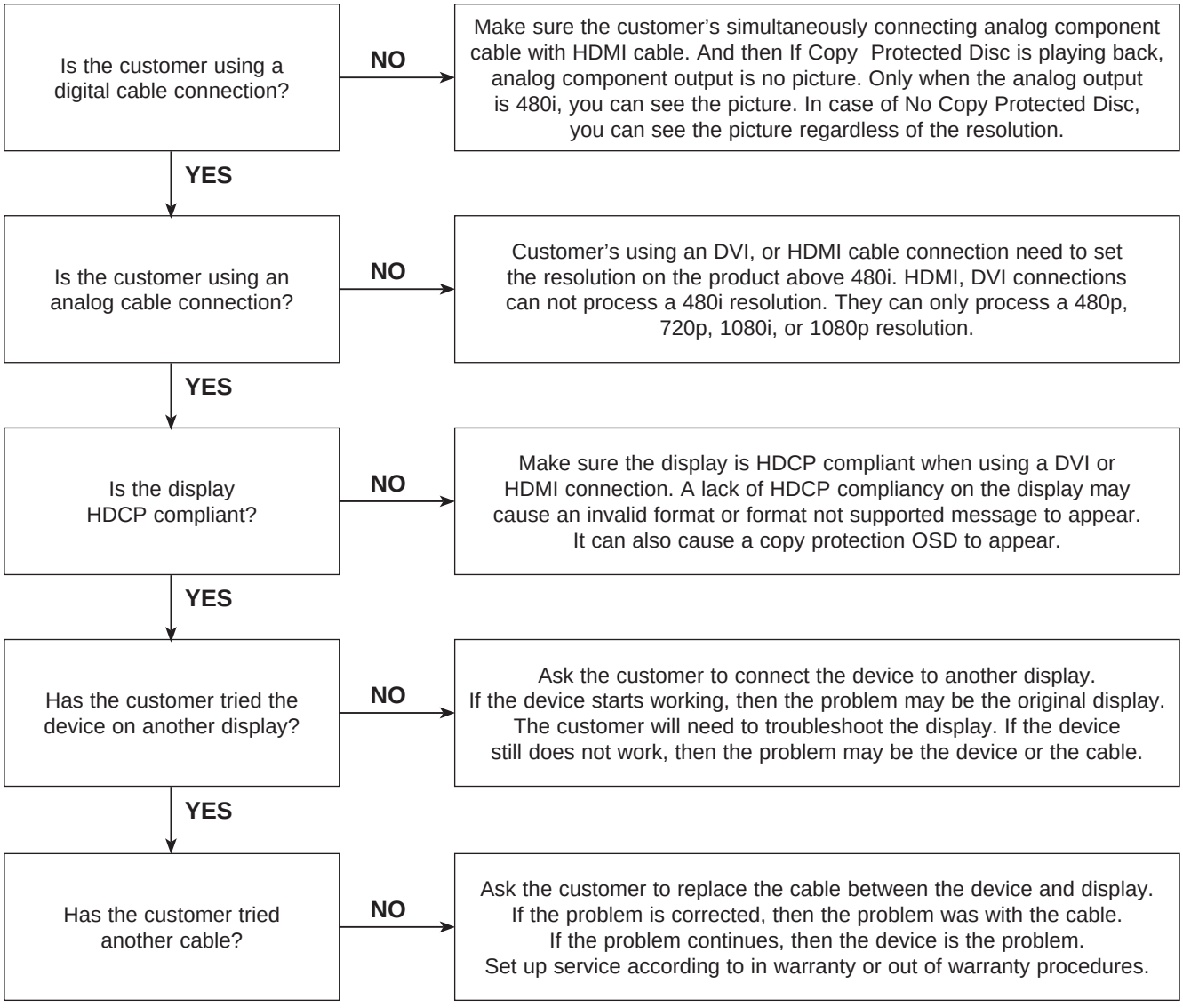


2-4. No Signal

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



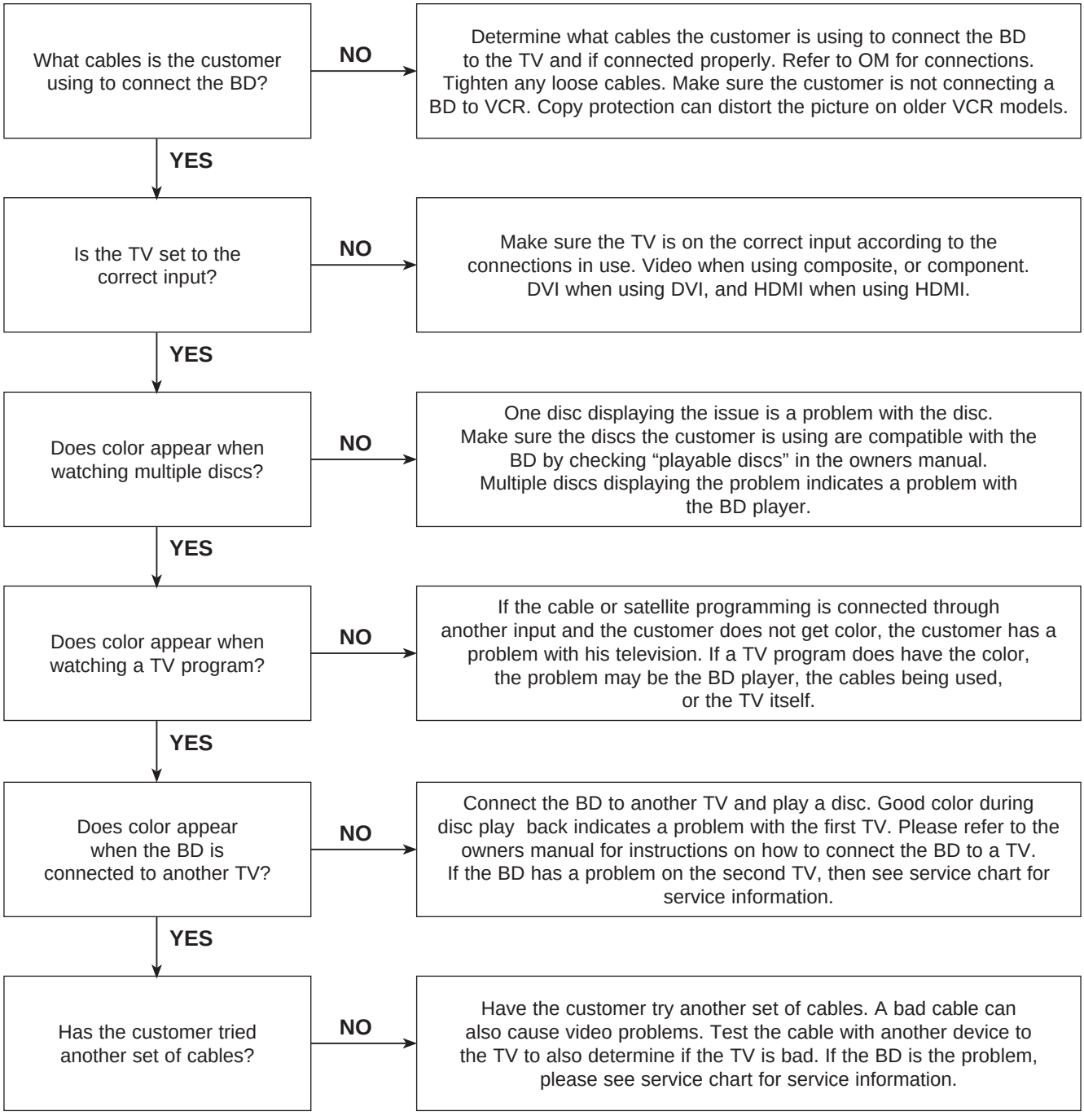
2-5. Invalid Format or Format Not Supported



3. PICTURE COLOR

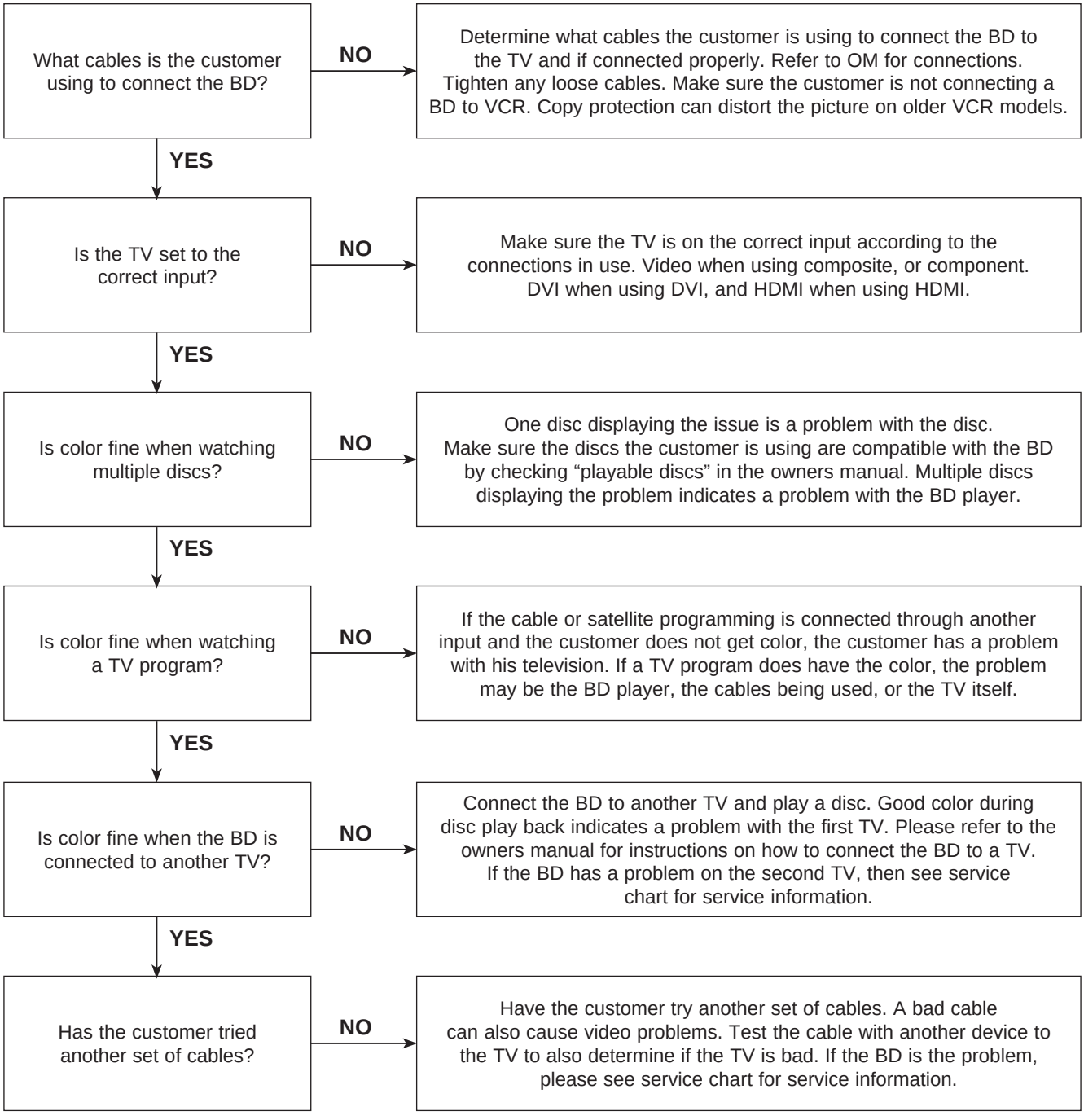
3-1. No Color

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



3-2. Poor Color

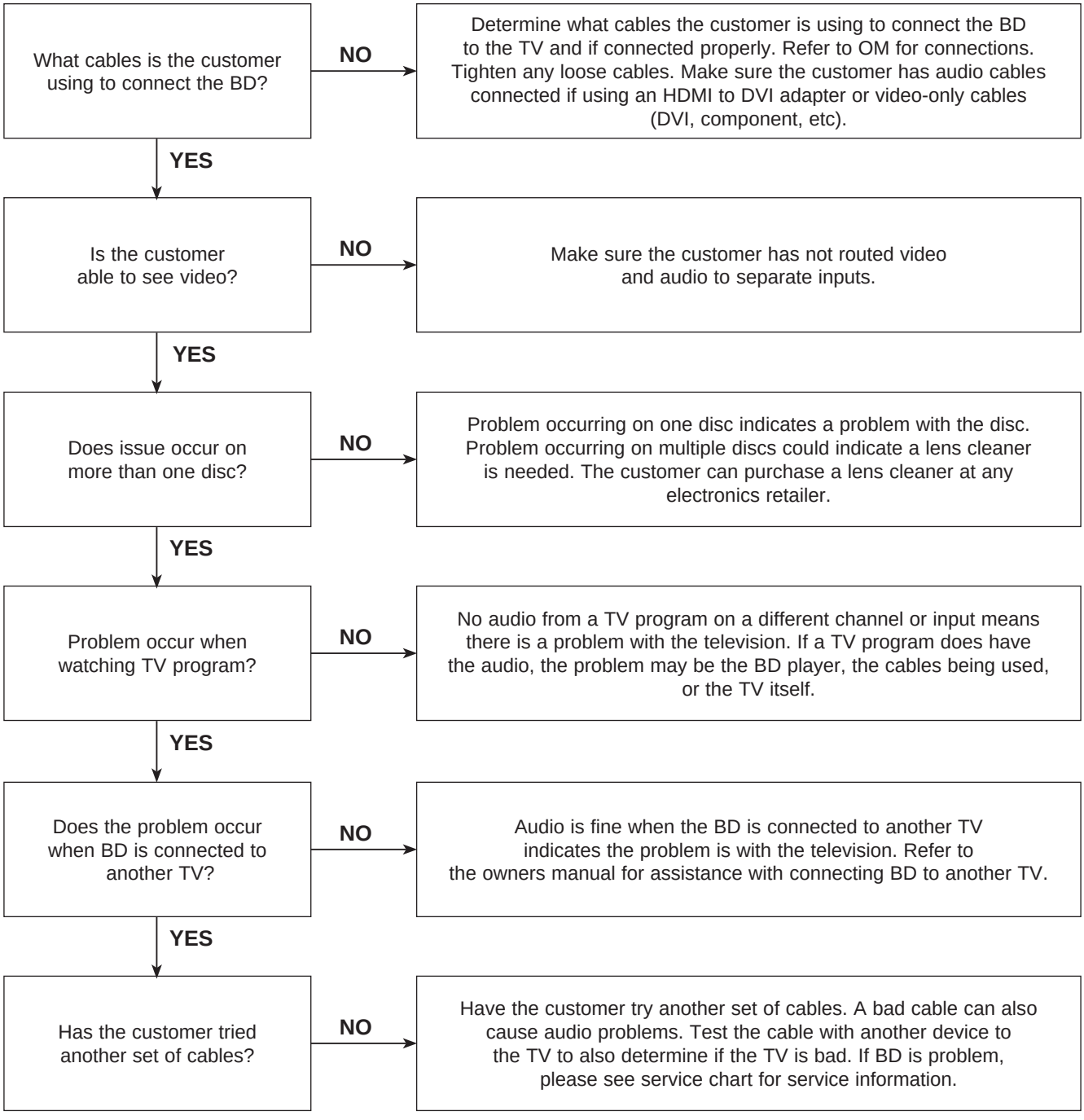
The color is poor. Examples would be washed out colors, colors bleeding into one another, or a solid tint to a screen.



4. NOISE/AUDIO PROBLEMS

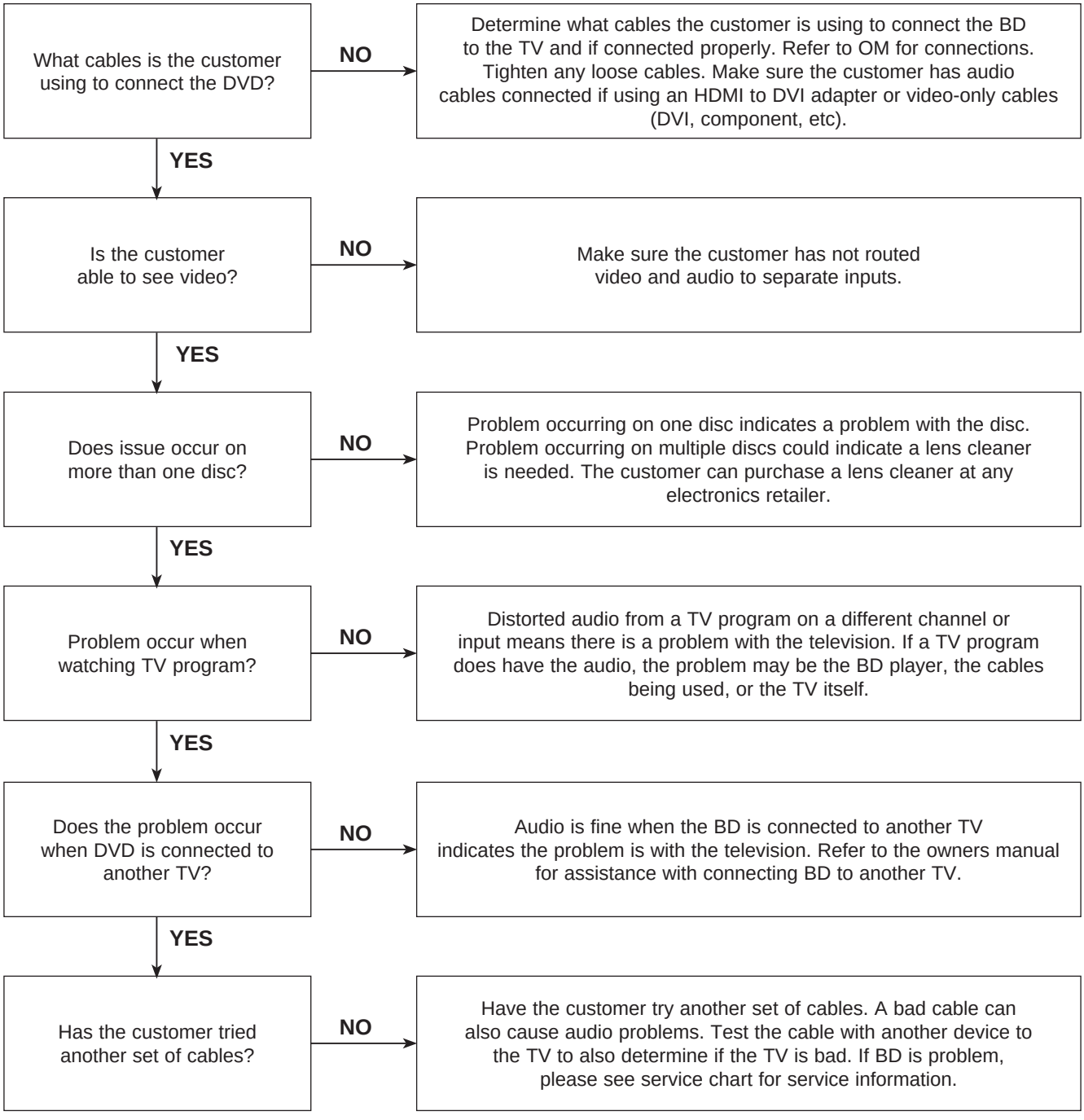
4-1. No Audio

The customer is not able to get audio.



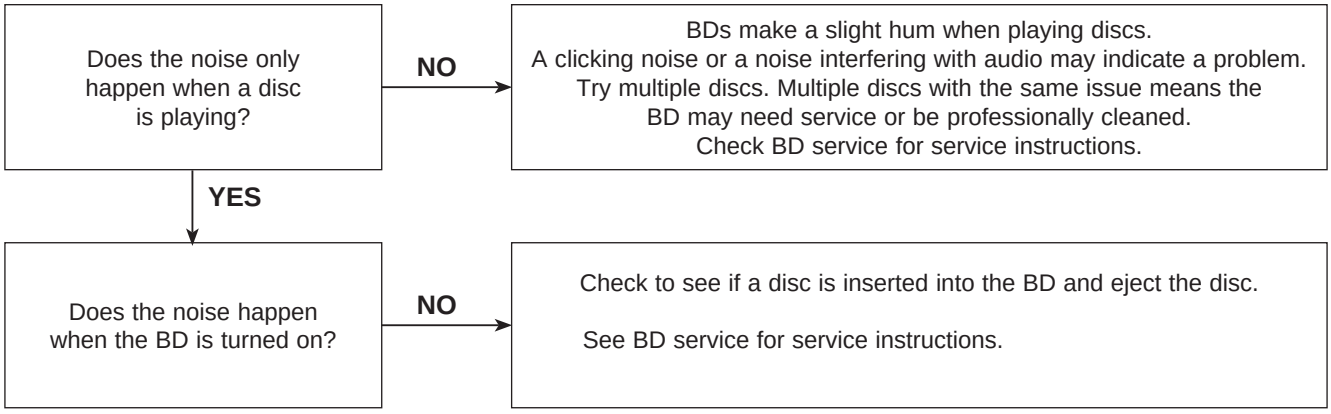
4-2. Distorted Audio

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



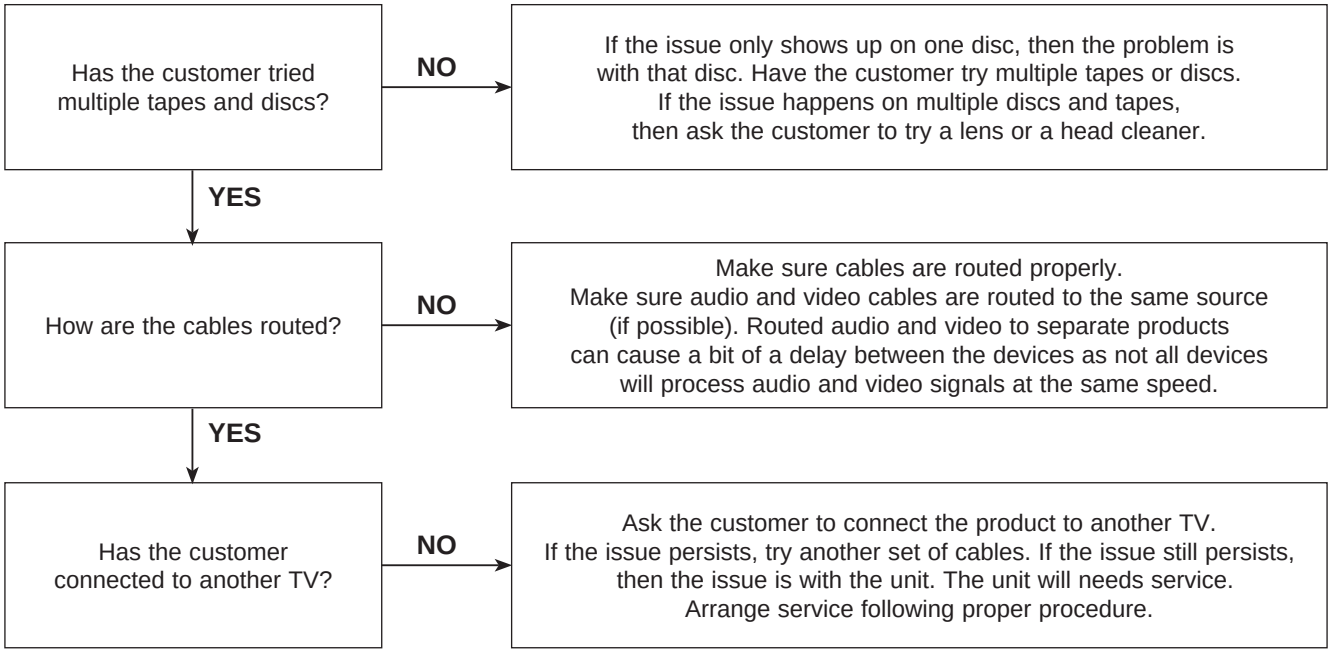
4-3. Humming/Clicking Noise

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



4-4. Audio/Video Out of Synch

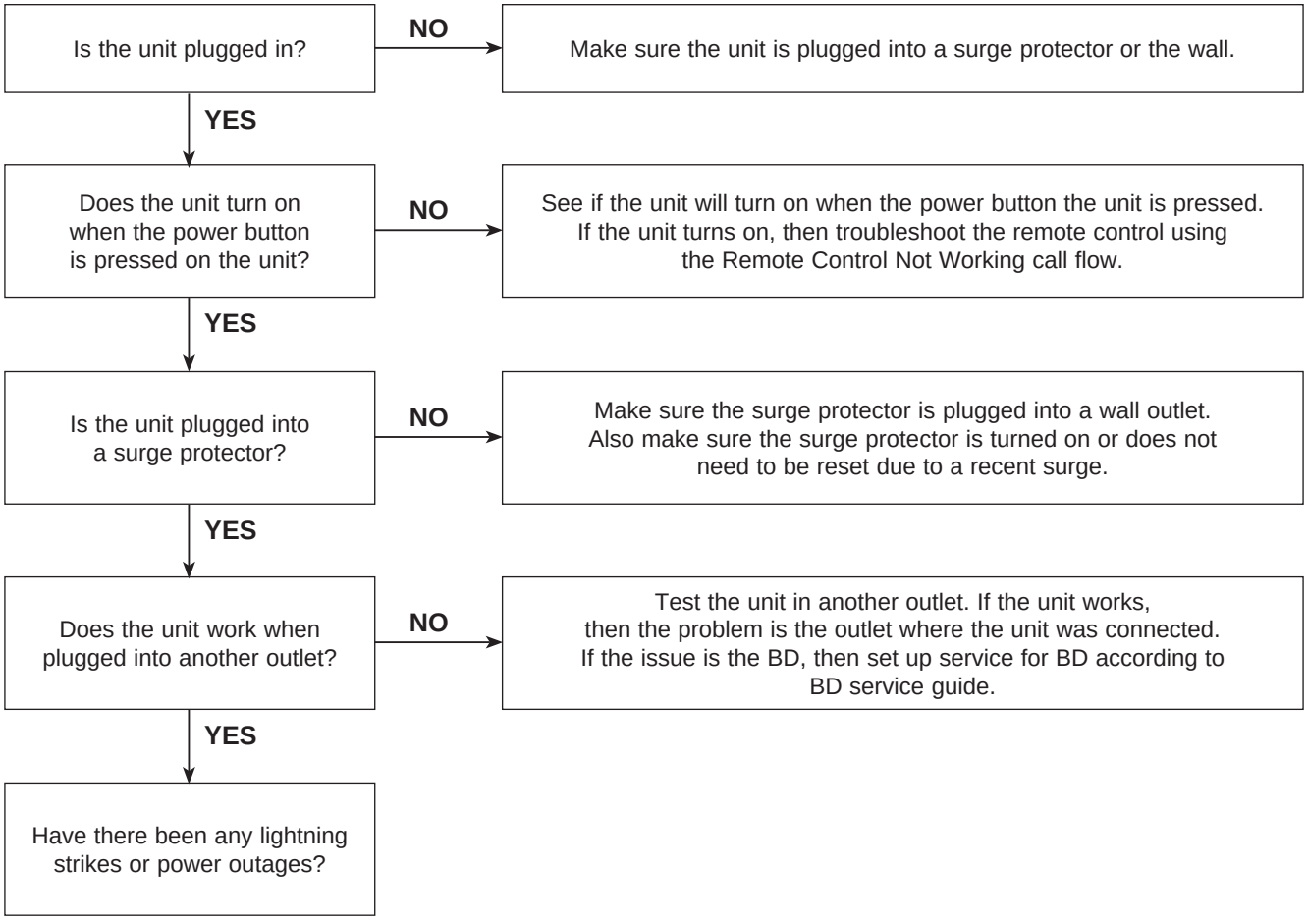
The audio and video do not match up. People look to be talking, but their voices are delayed by a few seconds.



5. MISCELLANEOUS

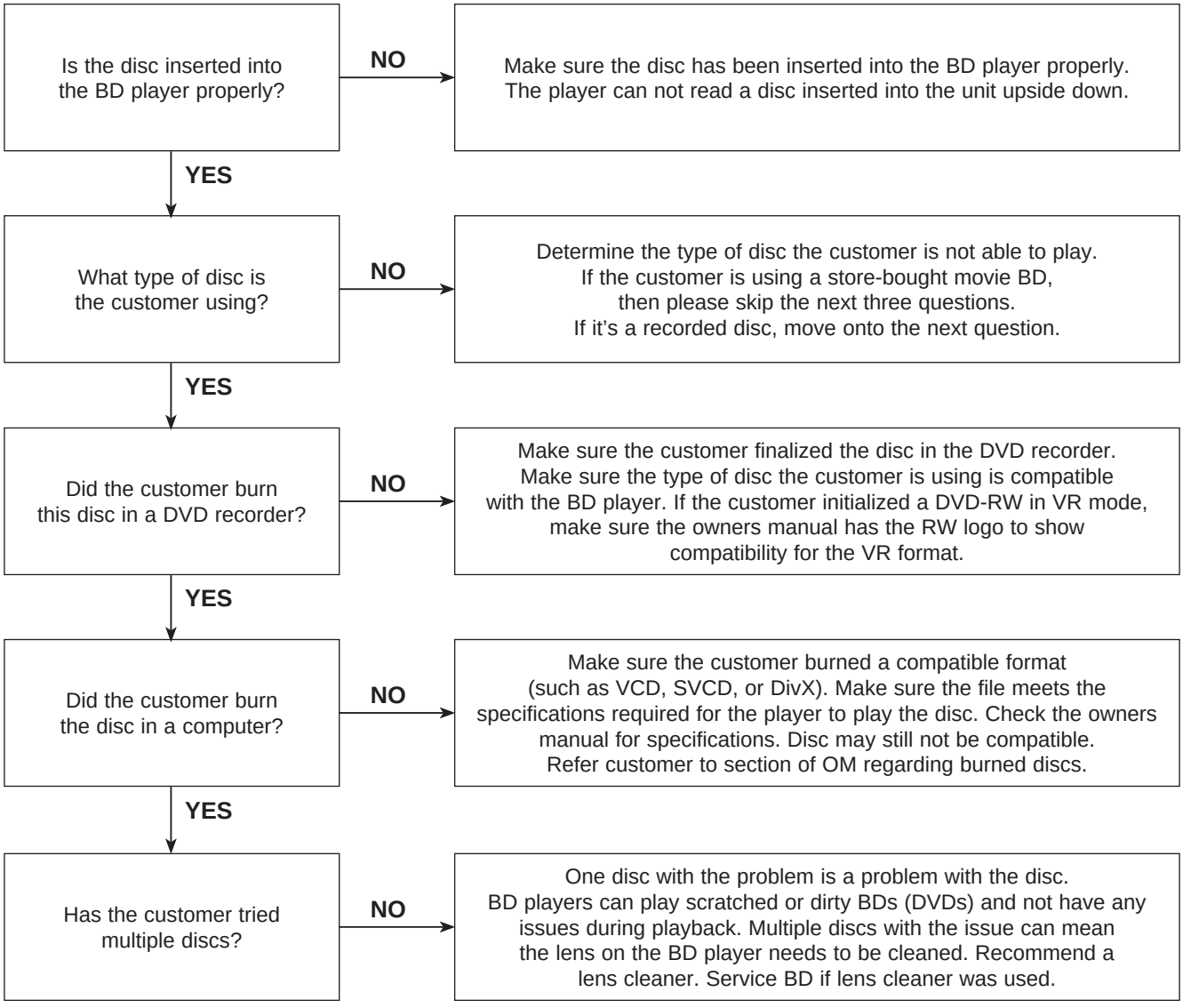
5-1. No Power

The unit will not turn on.

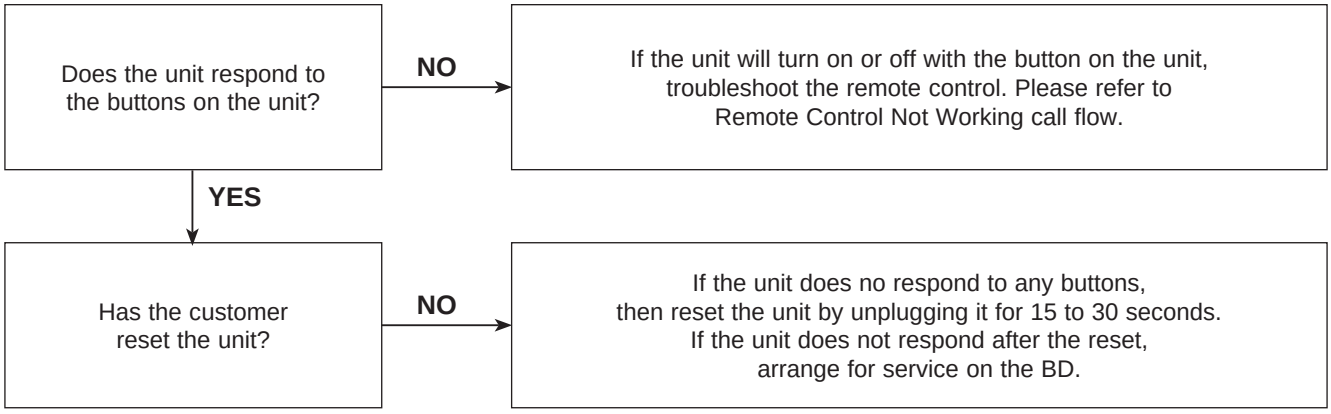


5-2. Disc Error

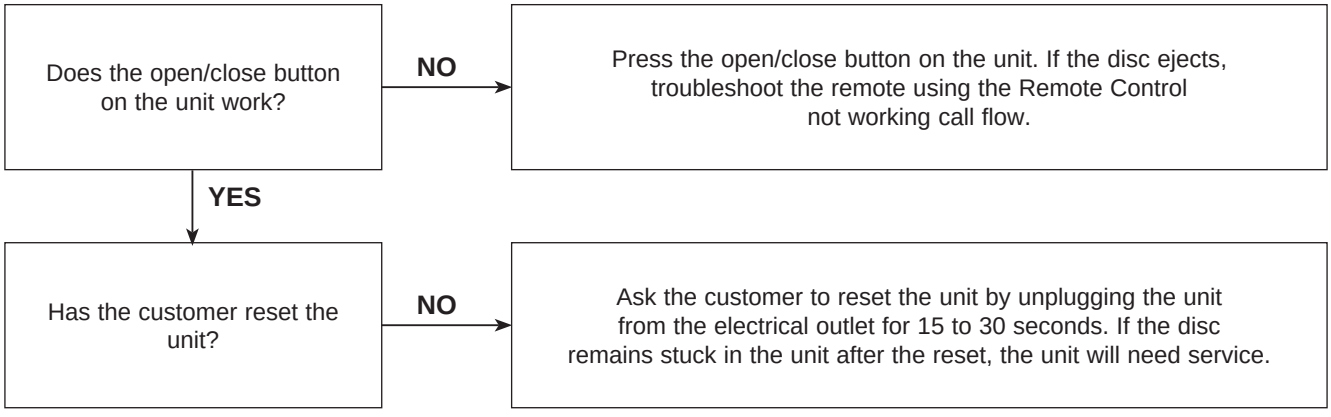
The unit displays “disc error” when a disc is inserted into the BD player.



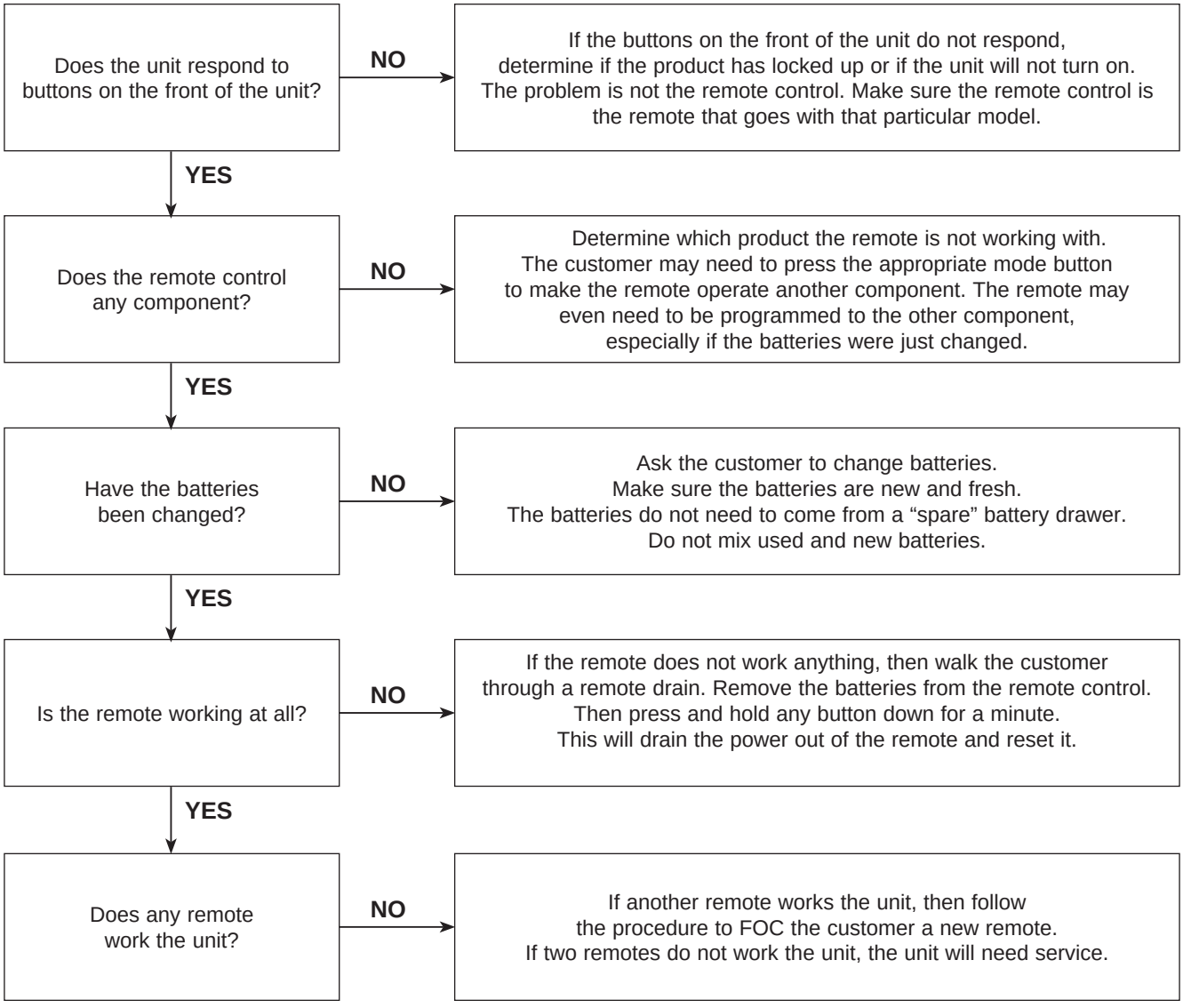
5-3. Unit Locks Up
Unit does not respond to any commands.



5-4. Disc Stuck
A BD disc is stuck in the unit.

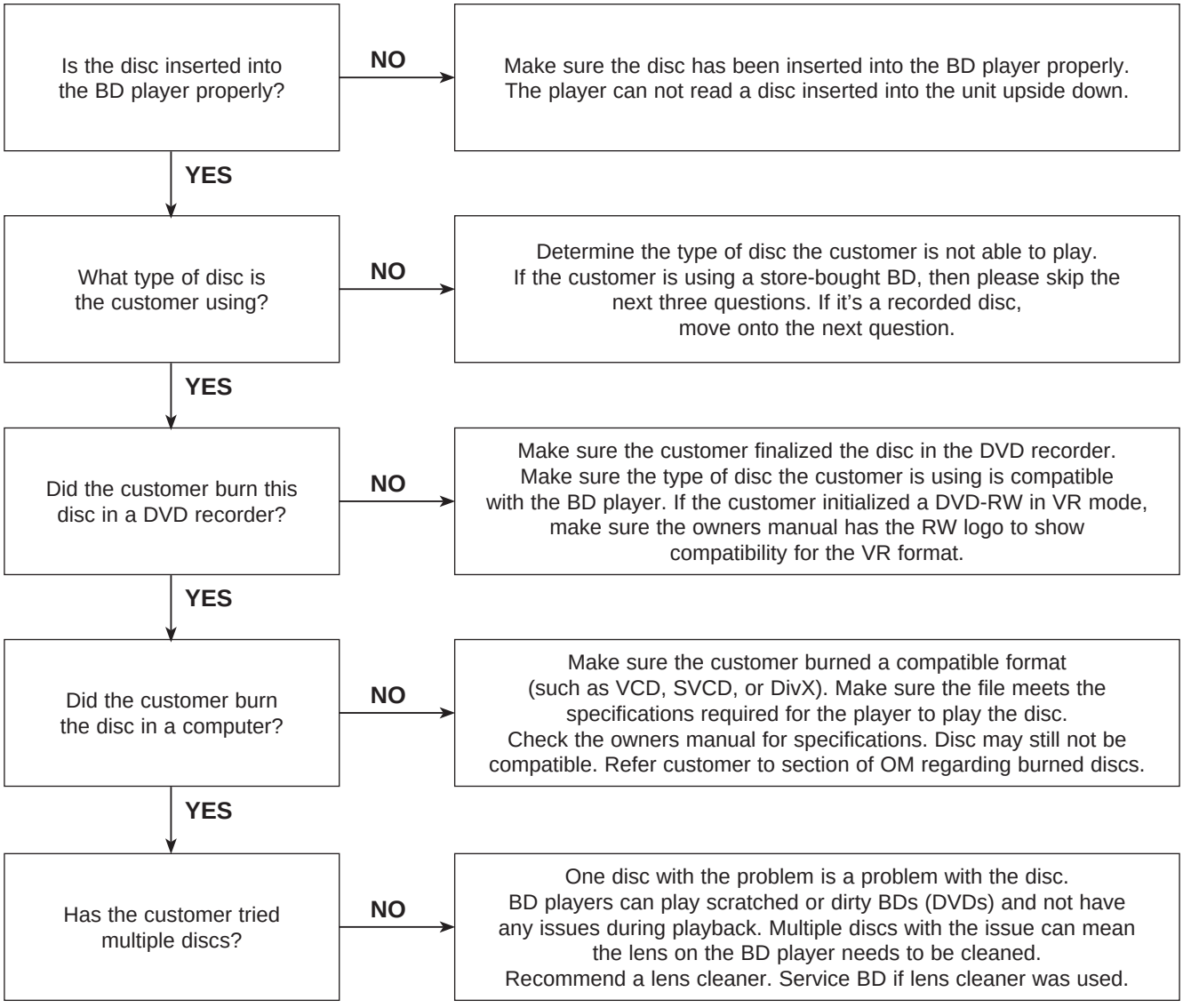


5-5. Remote Control Not Working



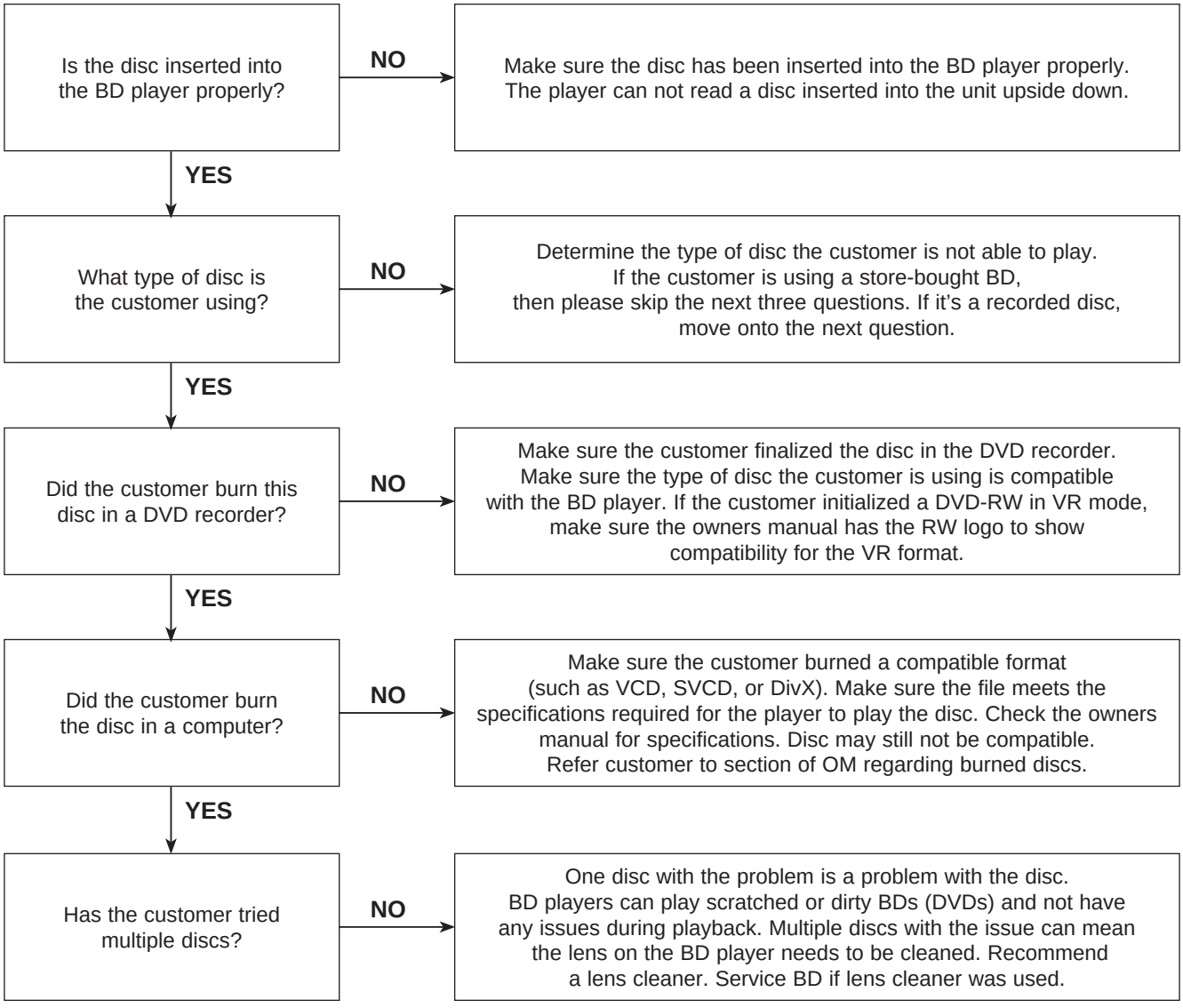
5-6. Will Not Play Disc

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

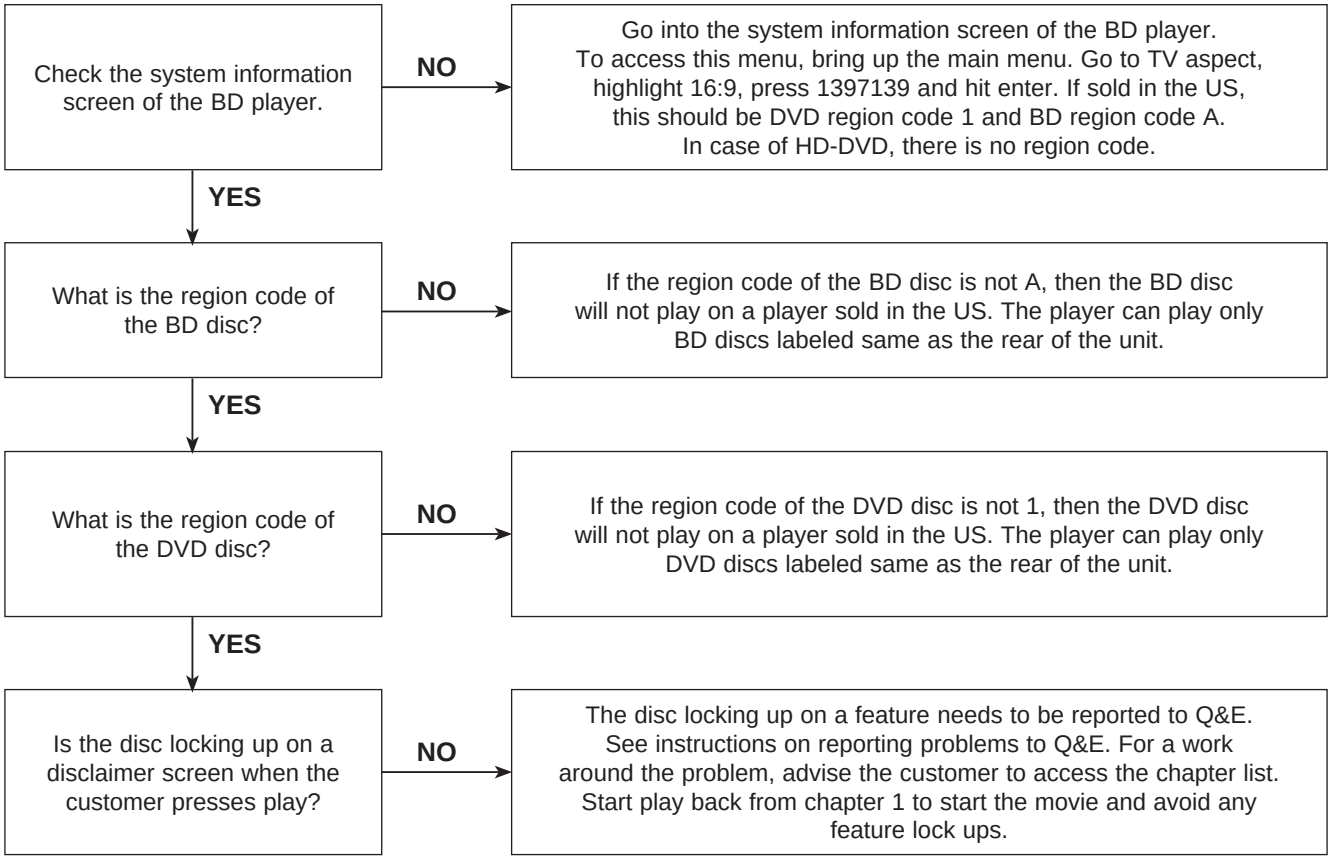


5-7. Disc Freezes or Skips

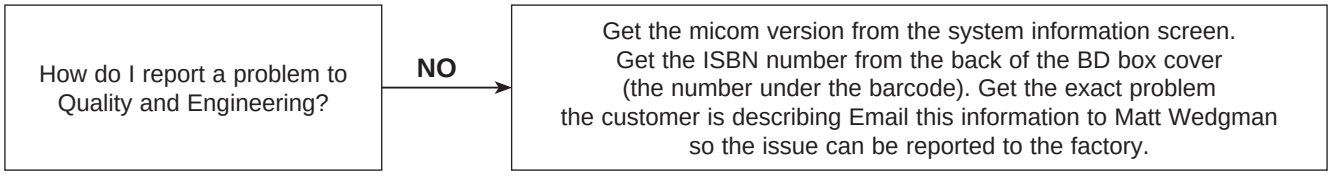
The audio and video freeze and skip during play back of a BD or DVD disc.



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

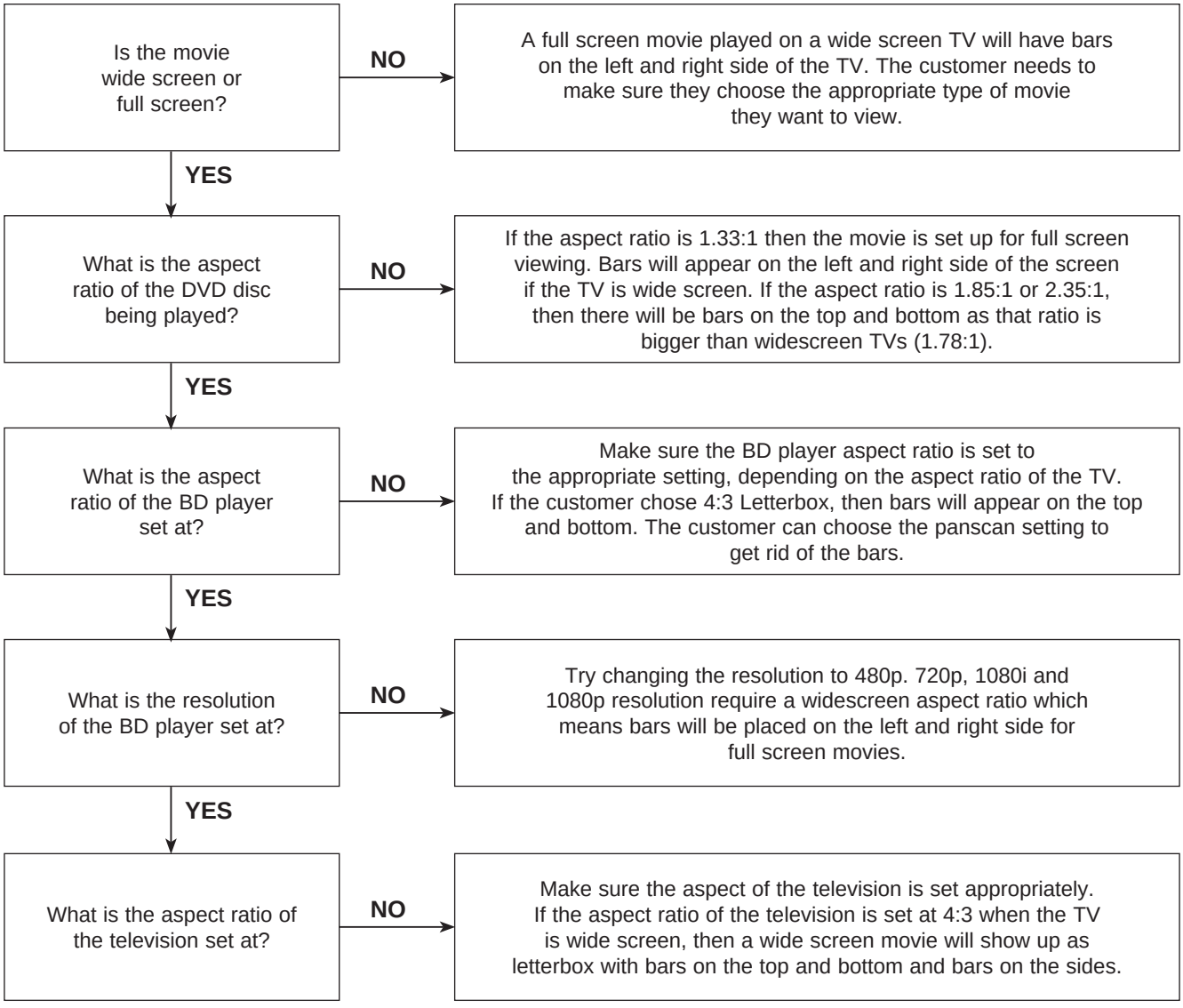


5-9. Reporting a problem to Quality & Engineering
Reporting a problem that may require a firmware update to fix.



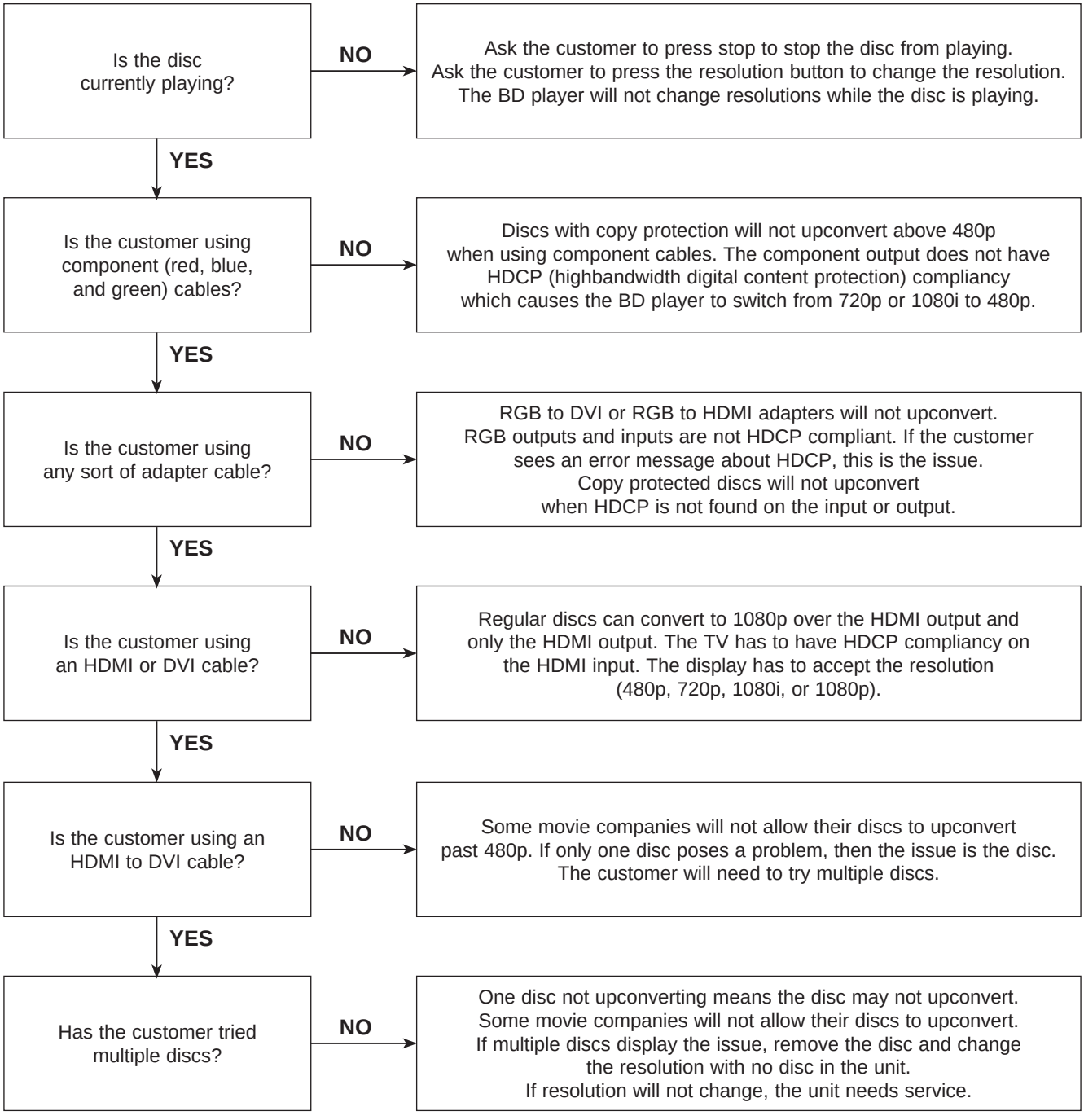
5-10. Aspect Ratio

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

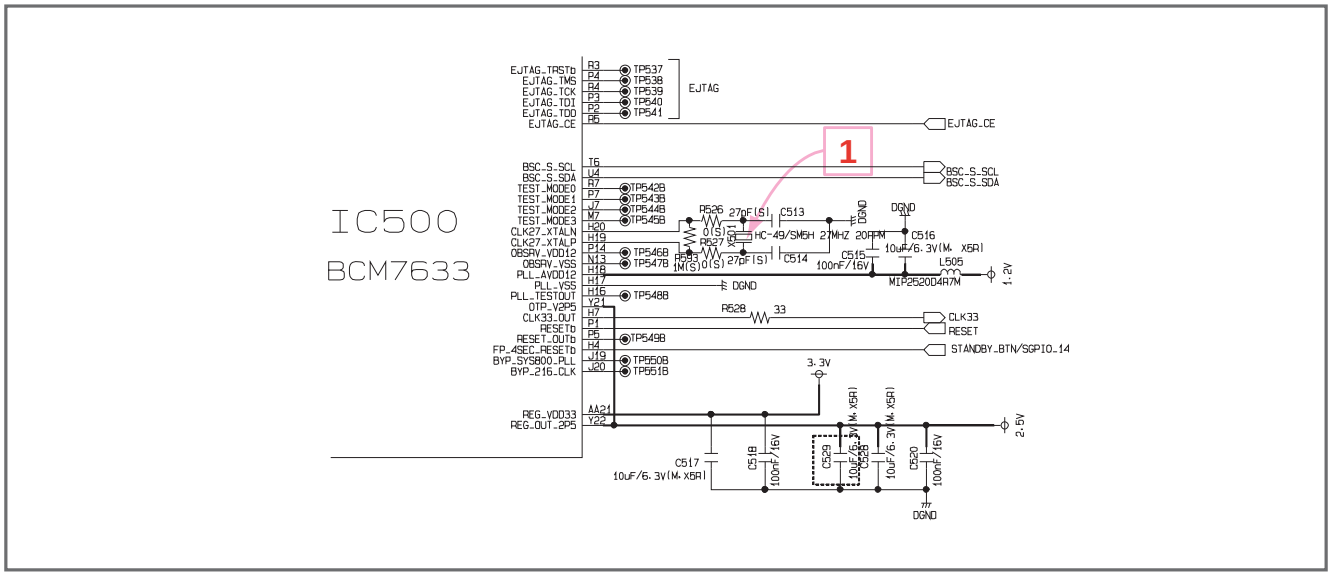
Why does it take so long to boot my BD?	NO →	The booting times for the BD is 20 seconds. When the set is booted, it takes a little long time to loading the OS program.

6-3. Ethernet Port

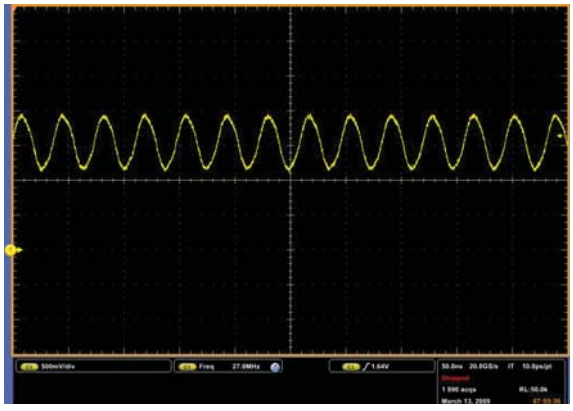
What is the purpose of the ethernet port on the BD Player?	NO →	This is used for the unit to access a network dealing with interactive BD movie menu. BD Player can support BD2.0 so that network function is active in the BD disc. Also, BD Player can support VOD service such as Netflix. (USA only)
Why 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.

WAVEFORMS

1. SYSTEM PART-1



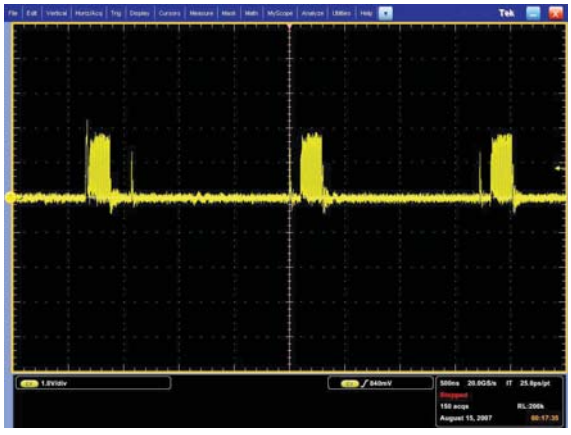
1



X-TAL (27 MHz)

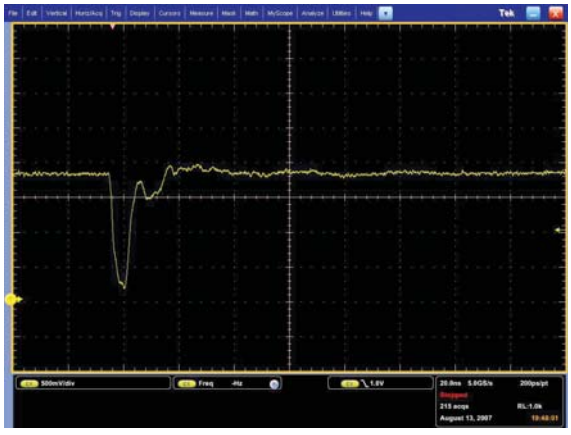
2. SYSTEM PART-2 (SYSTEM MEMORY)

2

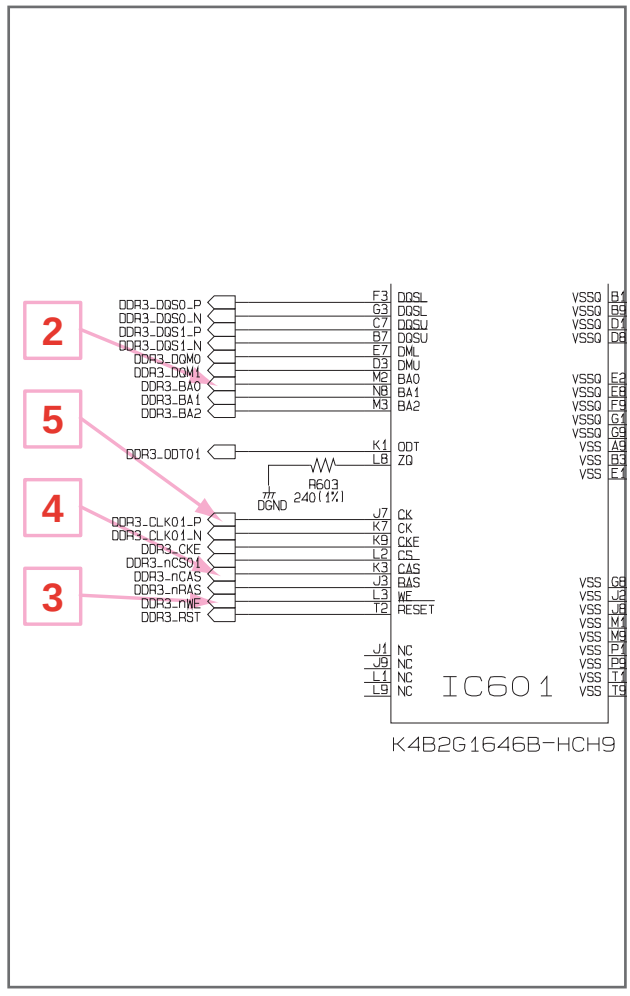


DDR3_BA0

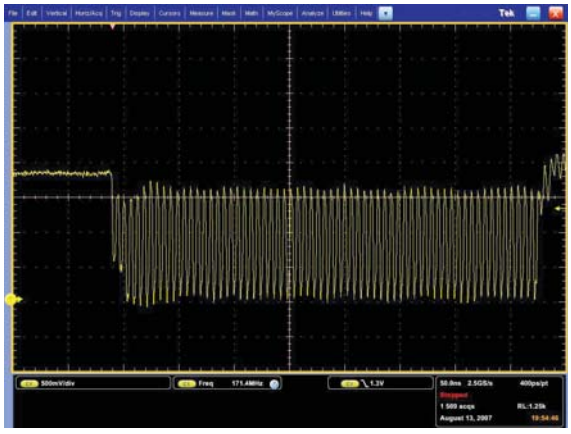
3



DDR3_nWE

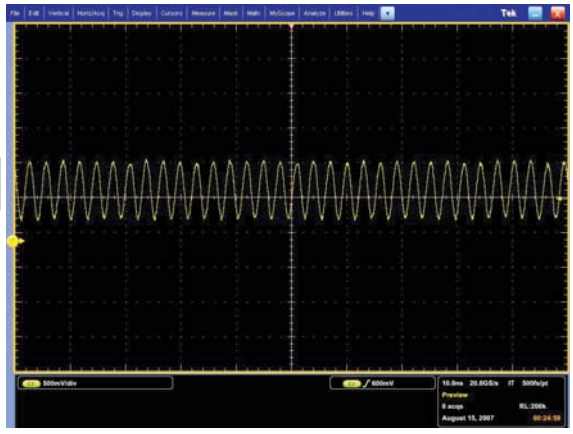


4



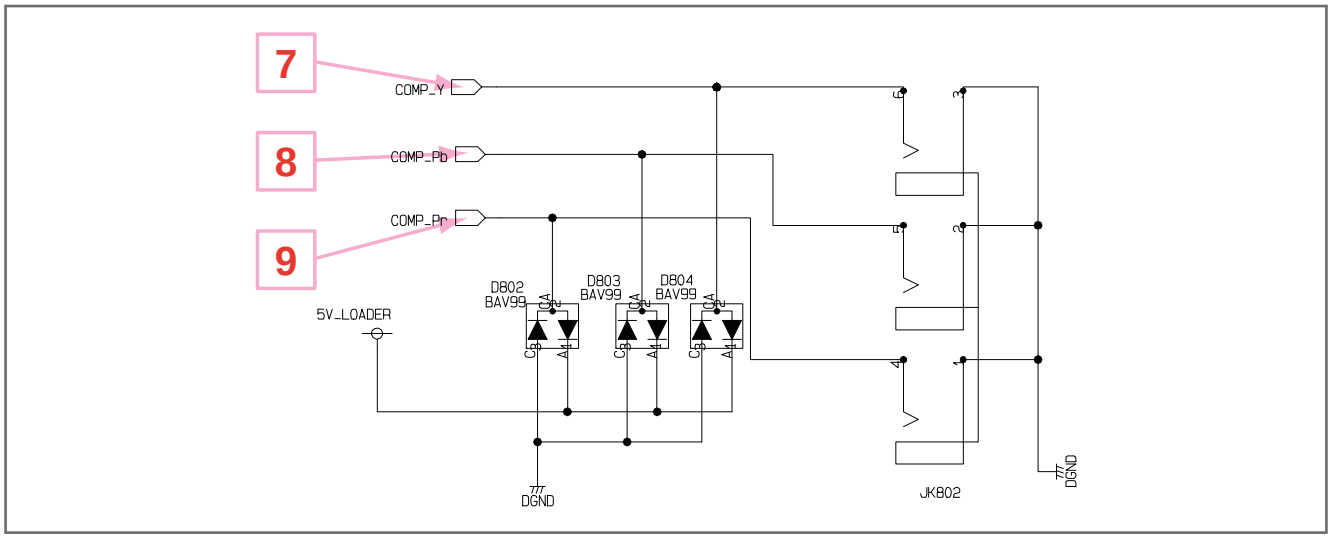
DDR3_nCAS

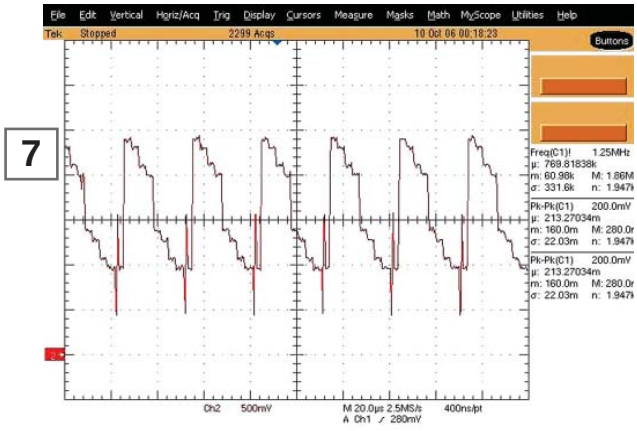
5



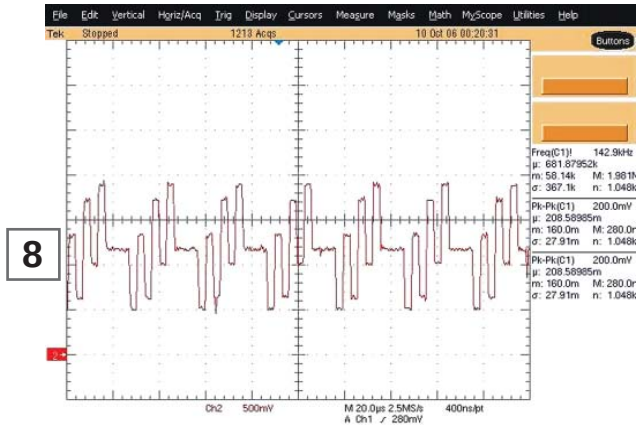
DDR3_CLK01_P

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

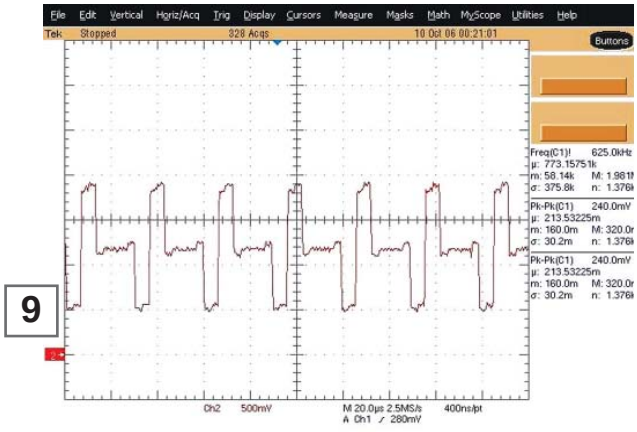




Y

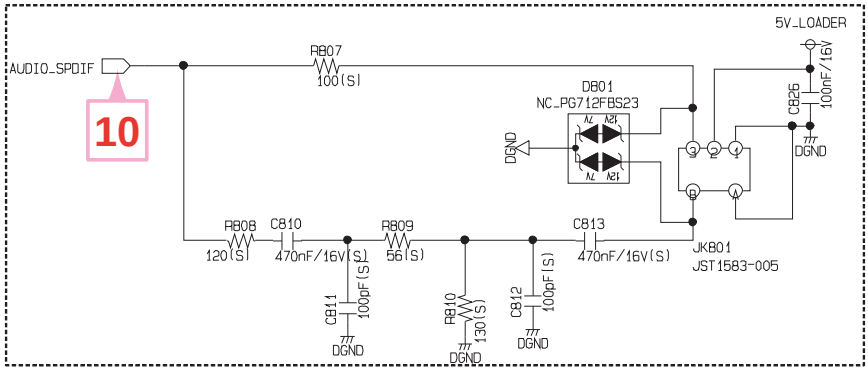


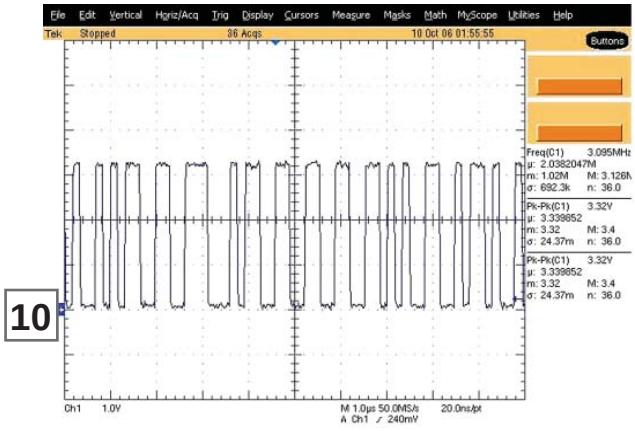
Pb



Pr

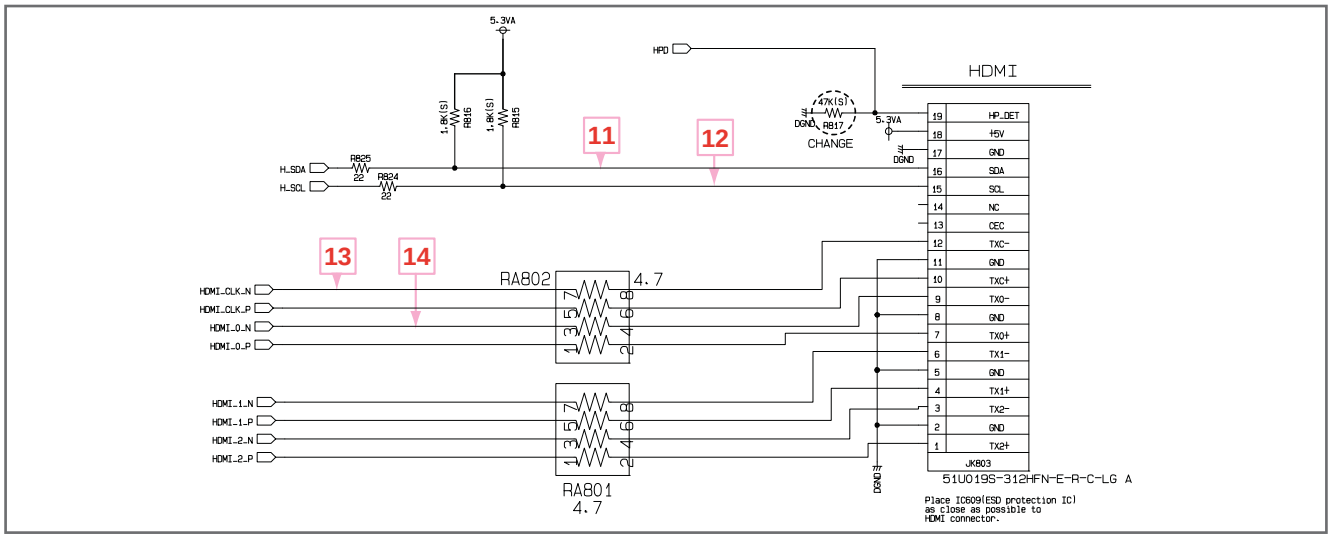
4. AUDIO PART (S/PDIF)

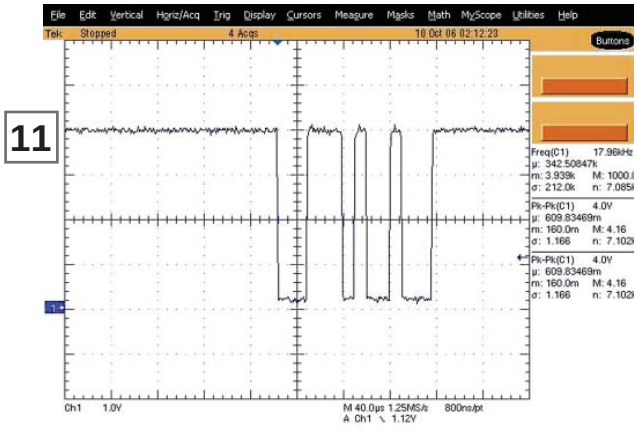




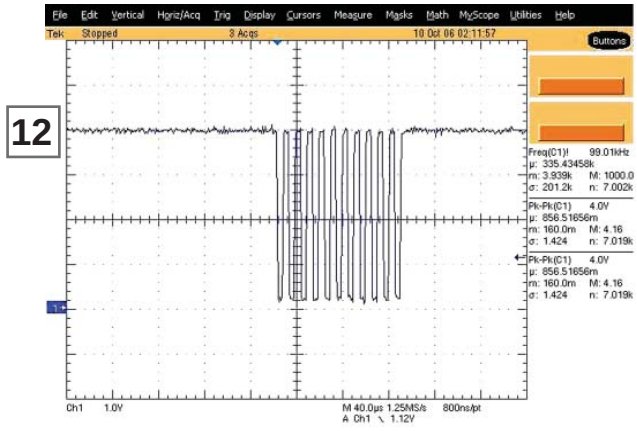
AUDIO_SPDIF

5. HDMI PART

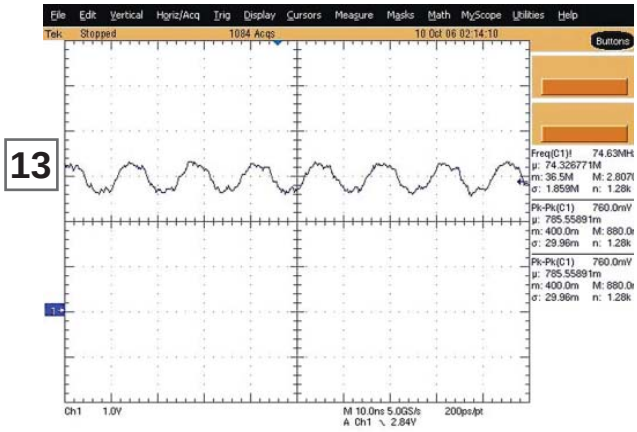




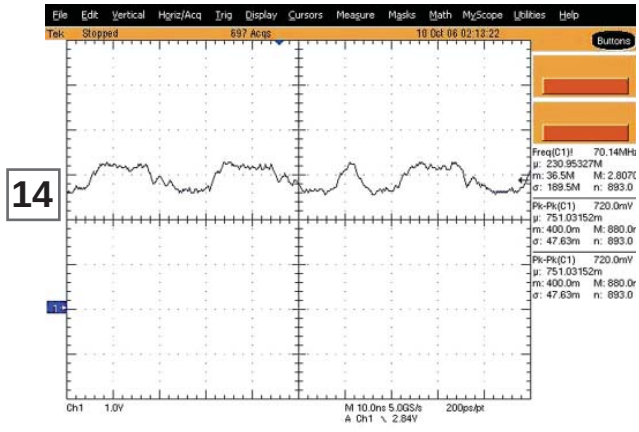
H_SDA



H_SCL

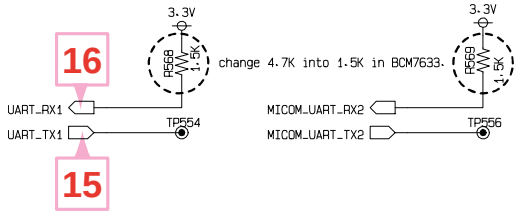


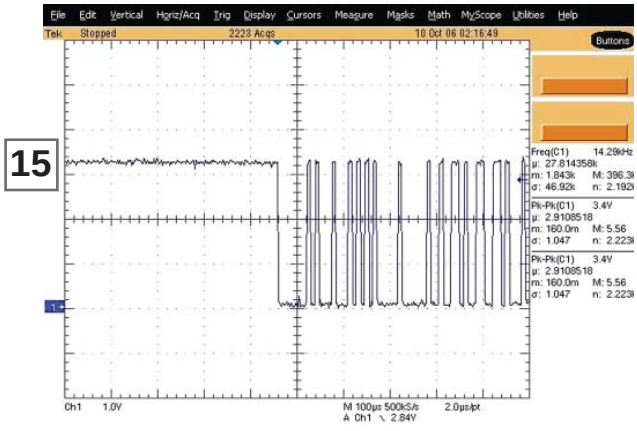
HDMI_CLK_N



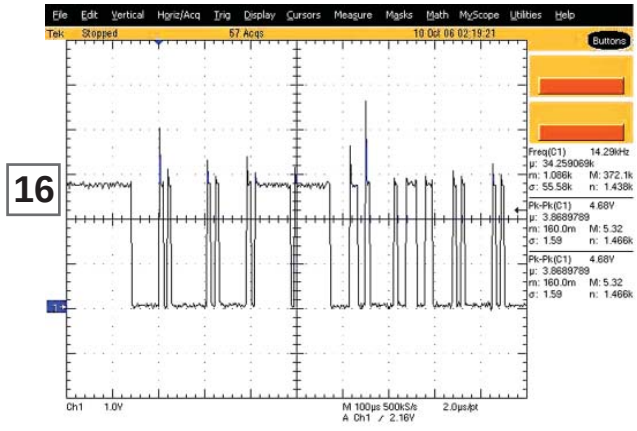
HDMI_0_N

6. MICOM I/F PART





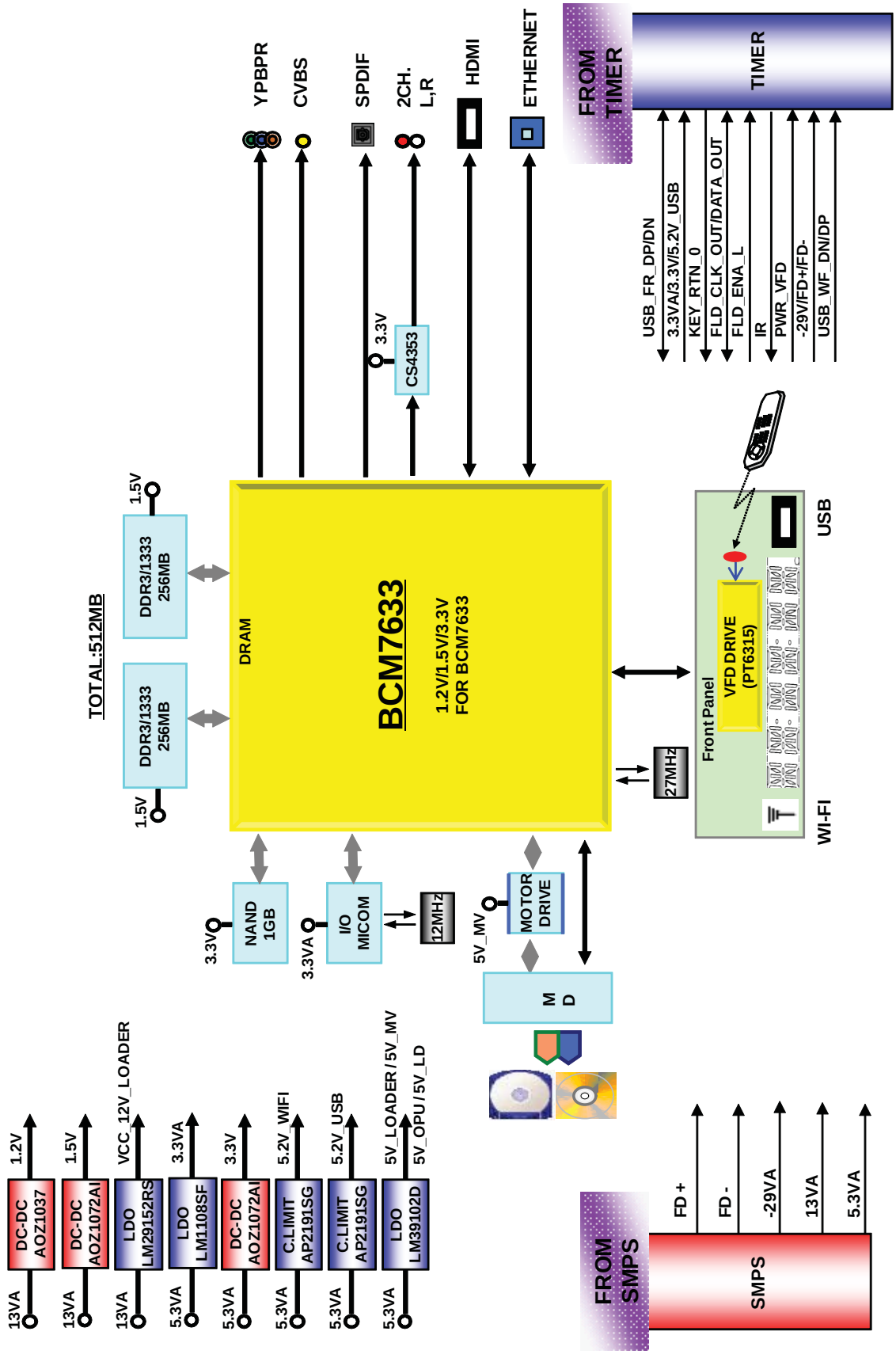
Tx1



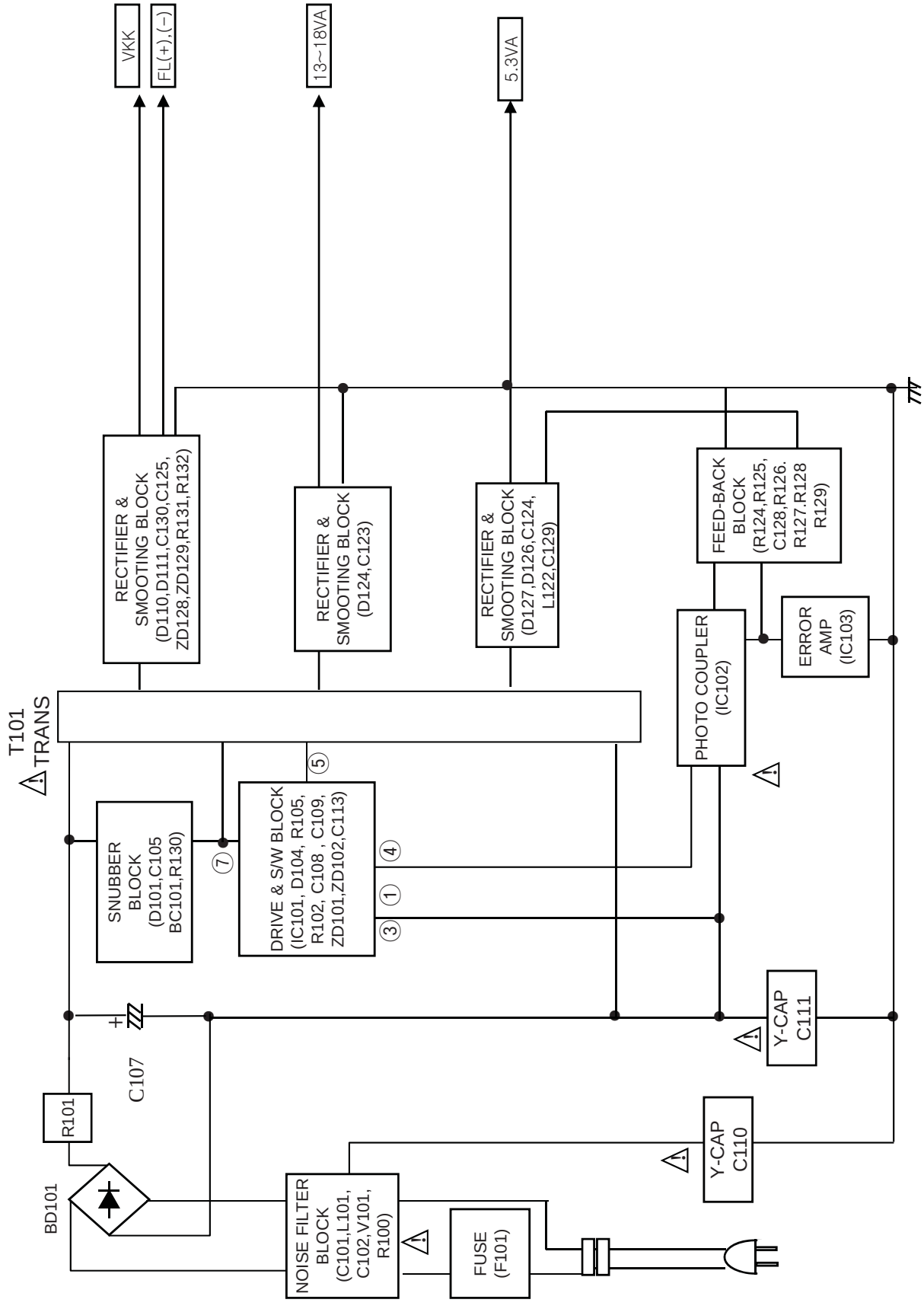
Rx1

BLOCK DIAGRAMS

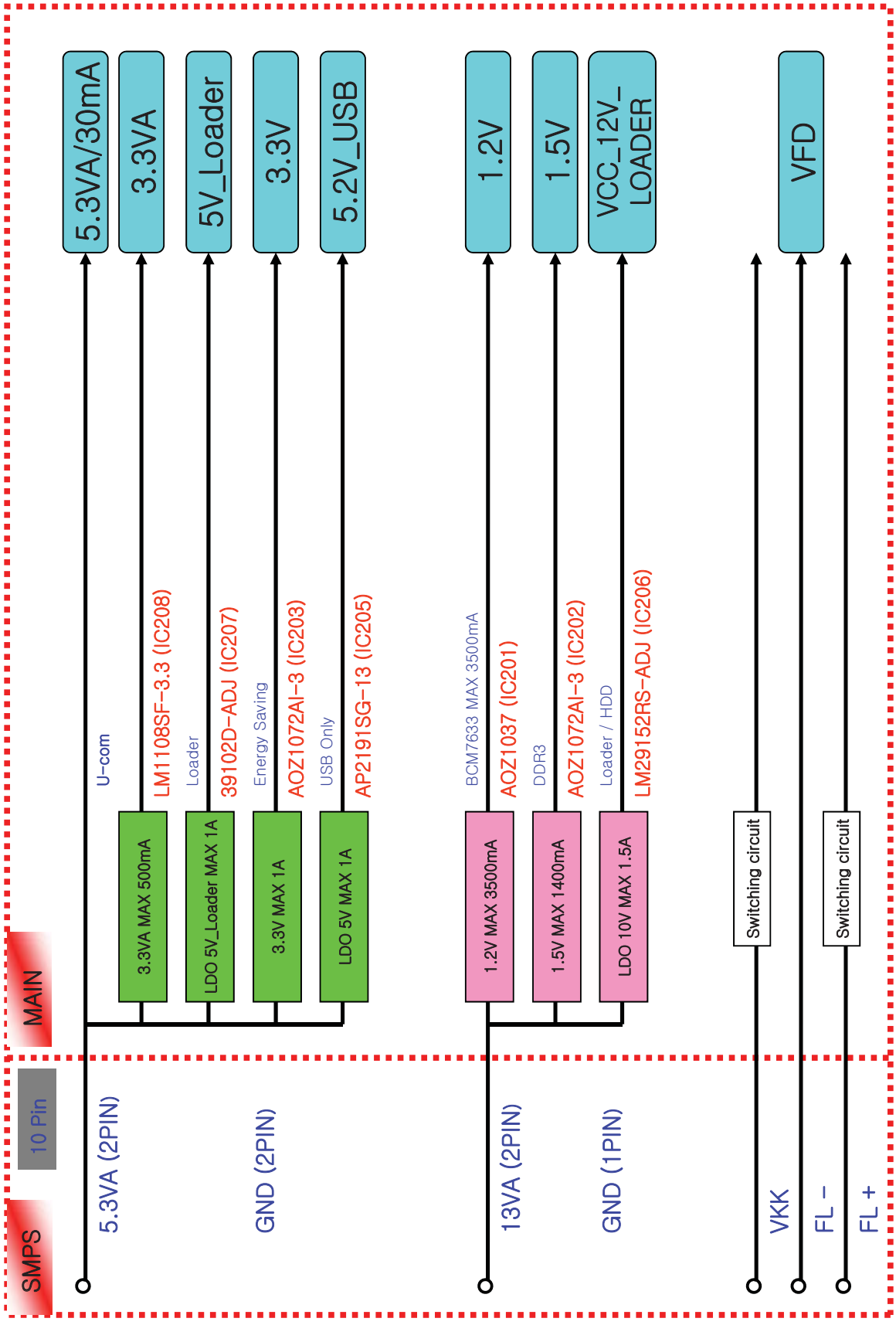
1. SYSTEM BLOCK DIAGRAM



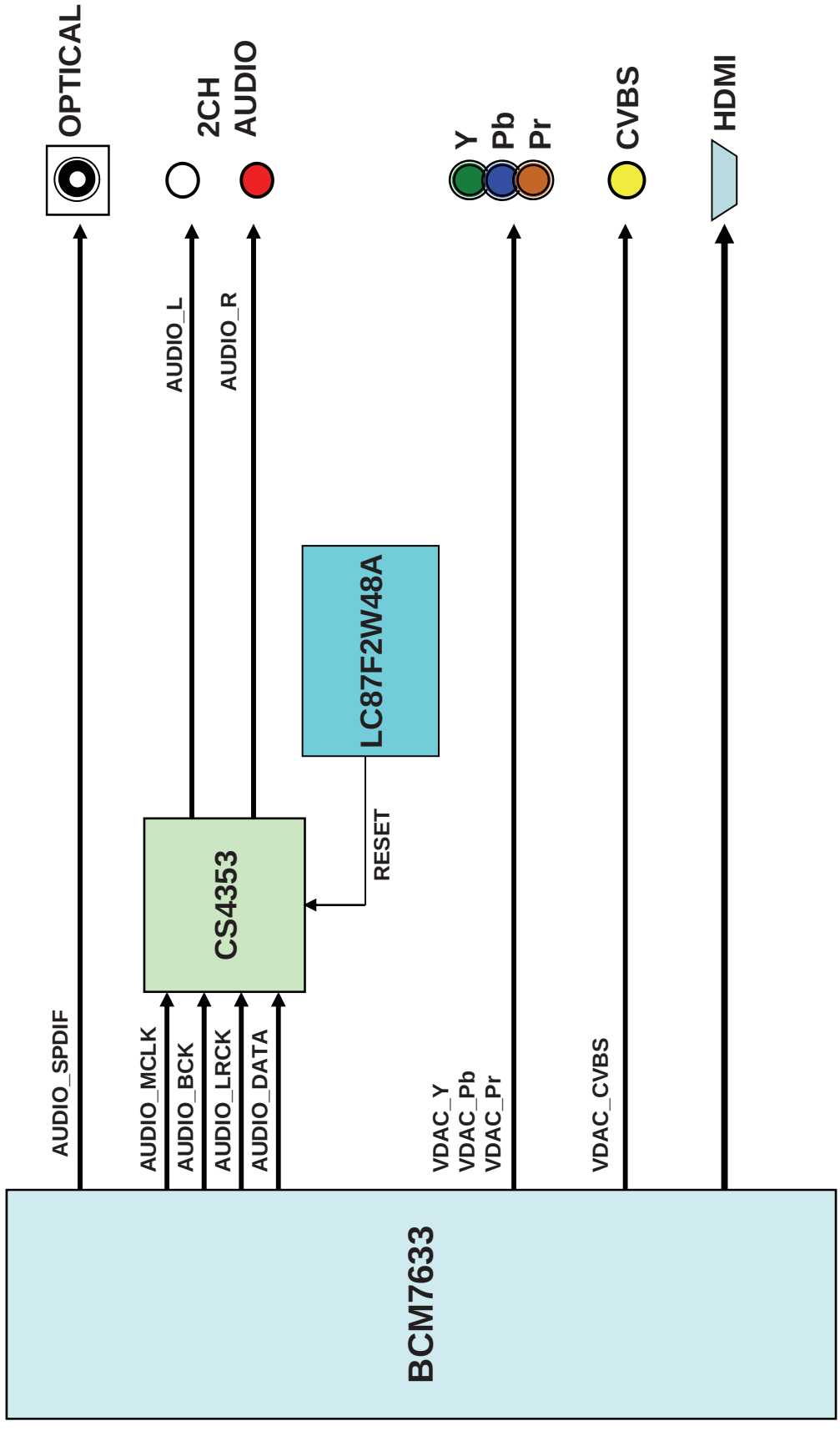
2. SMPS BLOCK DIAGRAM



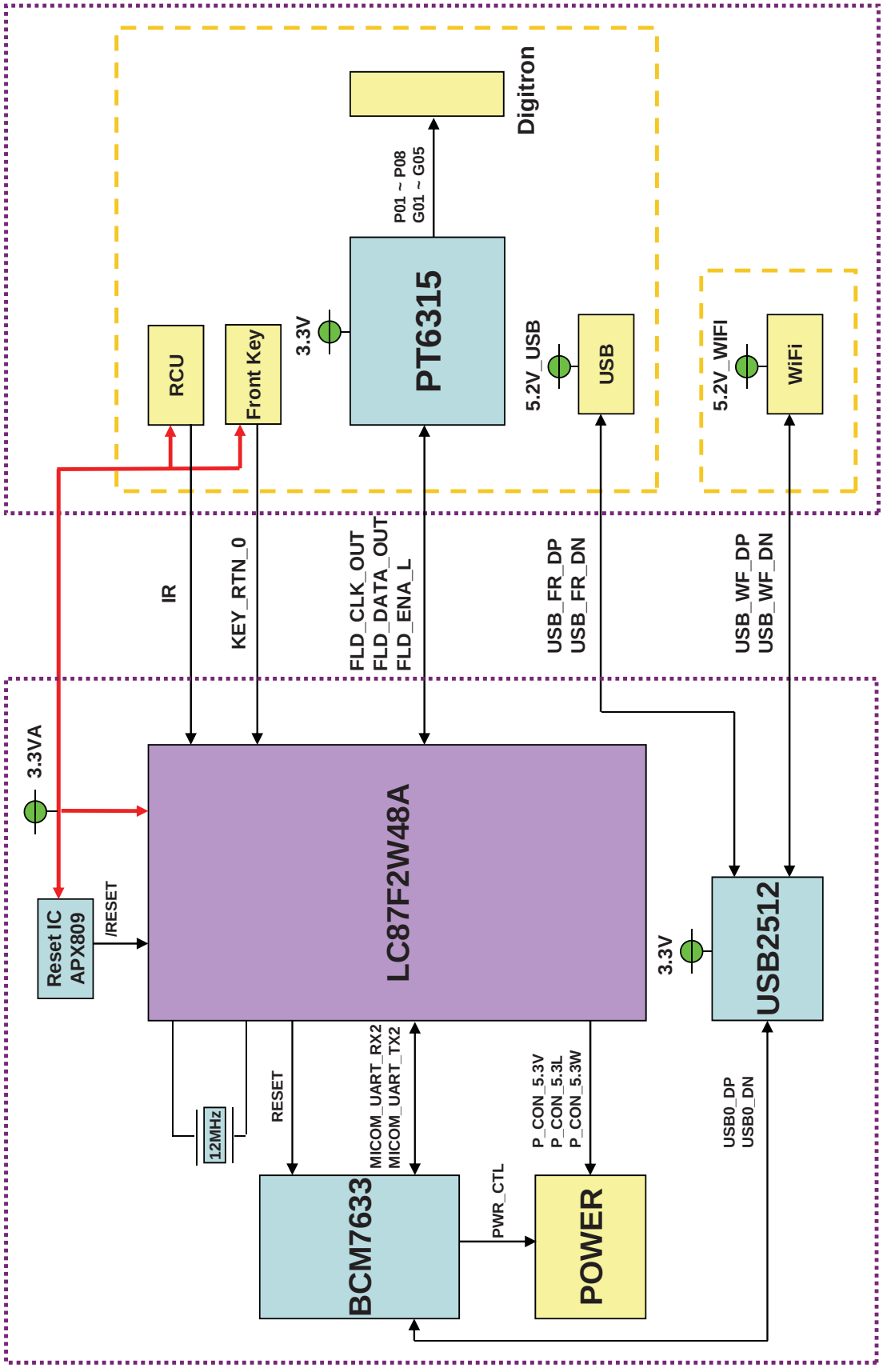
3. POWER BLOCK DIAGRAM



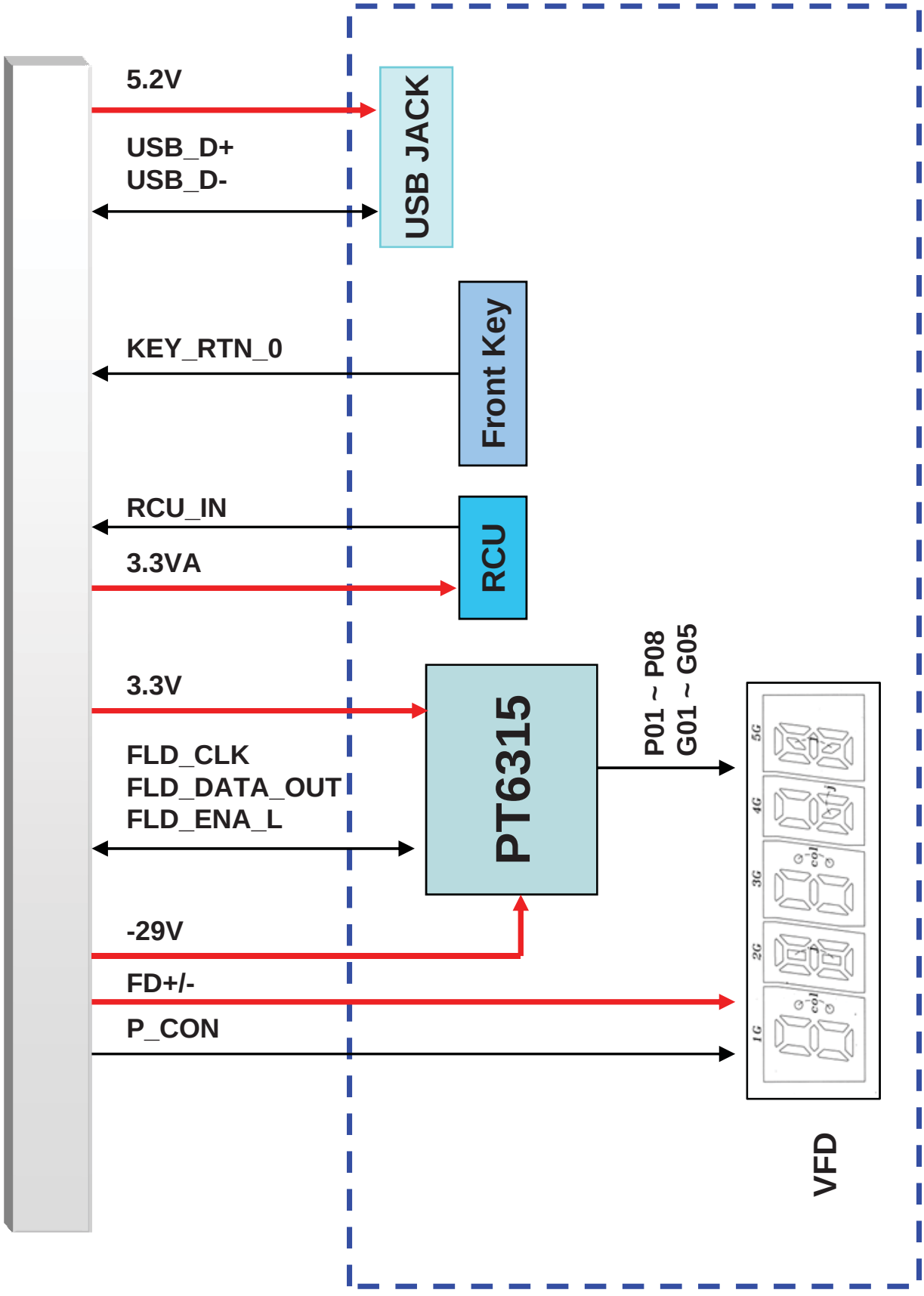
4. MAIN AUDIO / VIDEO BLOCK DIAGRAM



5. FRONT MICOM BLOCK DIAGRAM



6. FRONT TIMER BLOCK DIAGRAM



MEMO

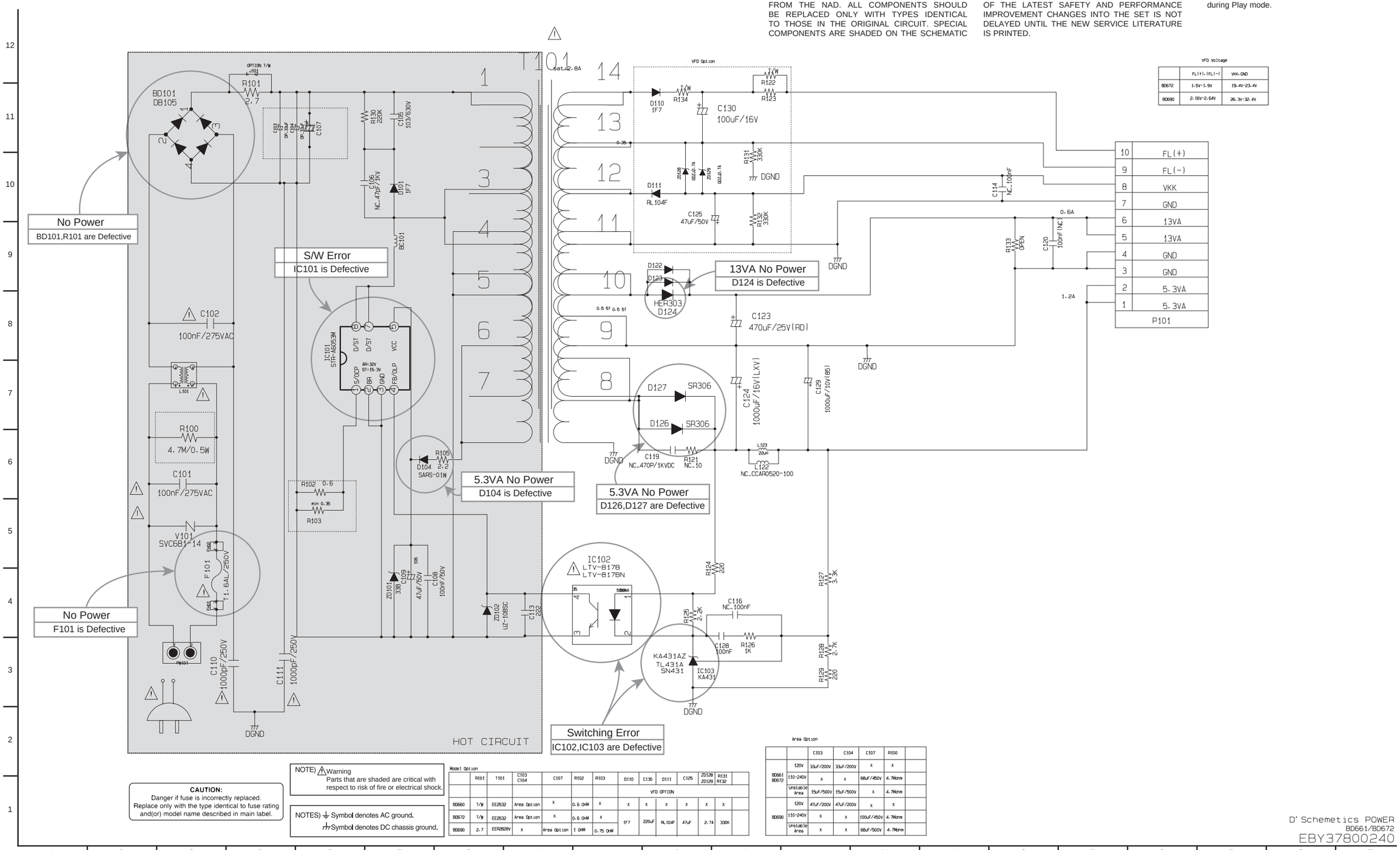
CIRCUIT DIAGRAMS
1. SMPS CIRCUIT DIAGRAM

IMPORTANT SAFETY

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE NAD. 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.



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

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

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

Model Option

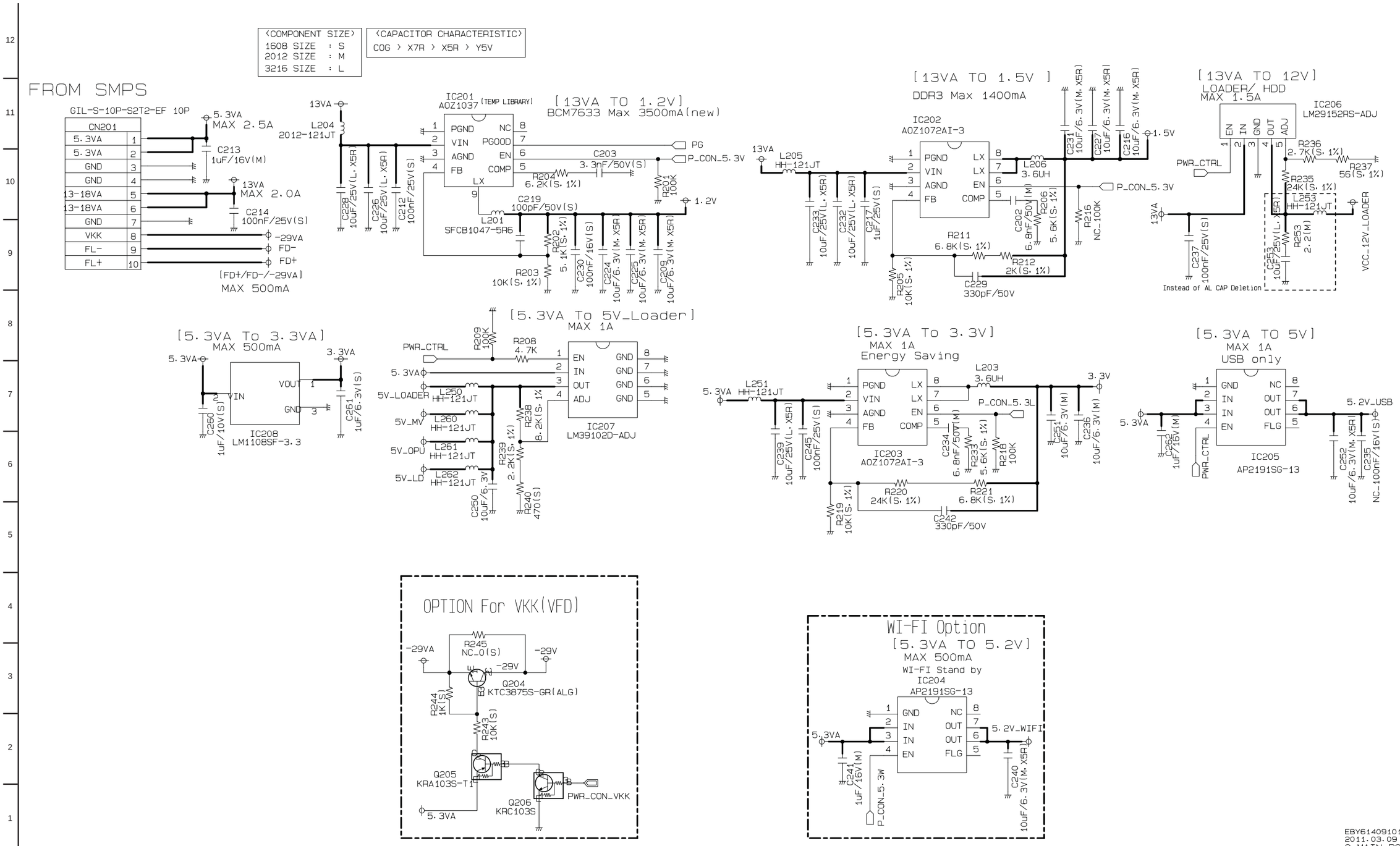
	R101	T101	C103 C104	C107	R102	R103	D110	C130	D111	C125	ZD128 ZD129	R131 R132
							VFD OPTION					
BD660	T/W	EE2532	Area Option	X	0.6 OHM	X	X	X	X	X	X	X
BD672	T/W	EE2532	Area Option	X	0.6 OHM	X	1F7	220uF	RL104F	47uF	2.7A	330K
BD690	2.7	EER2828V	X	Area Option	1 OHM	0.75 OHM						

Area Option

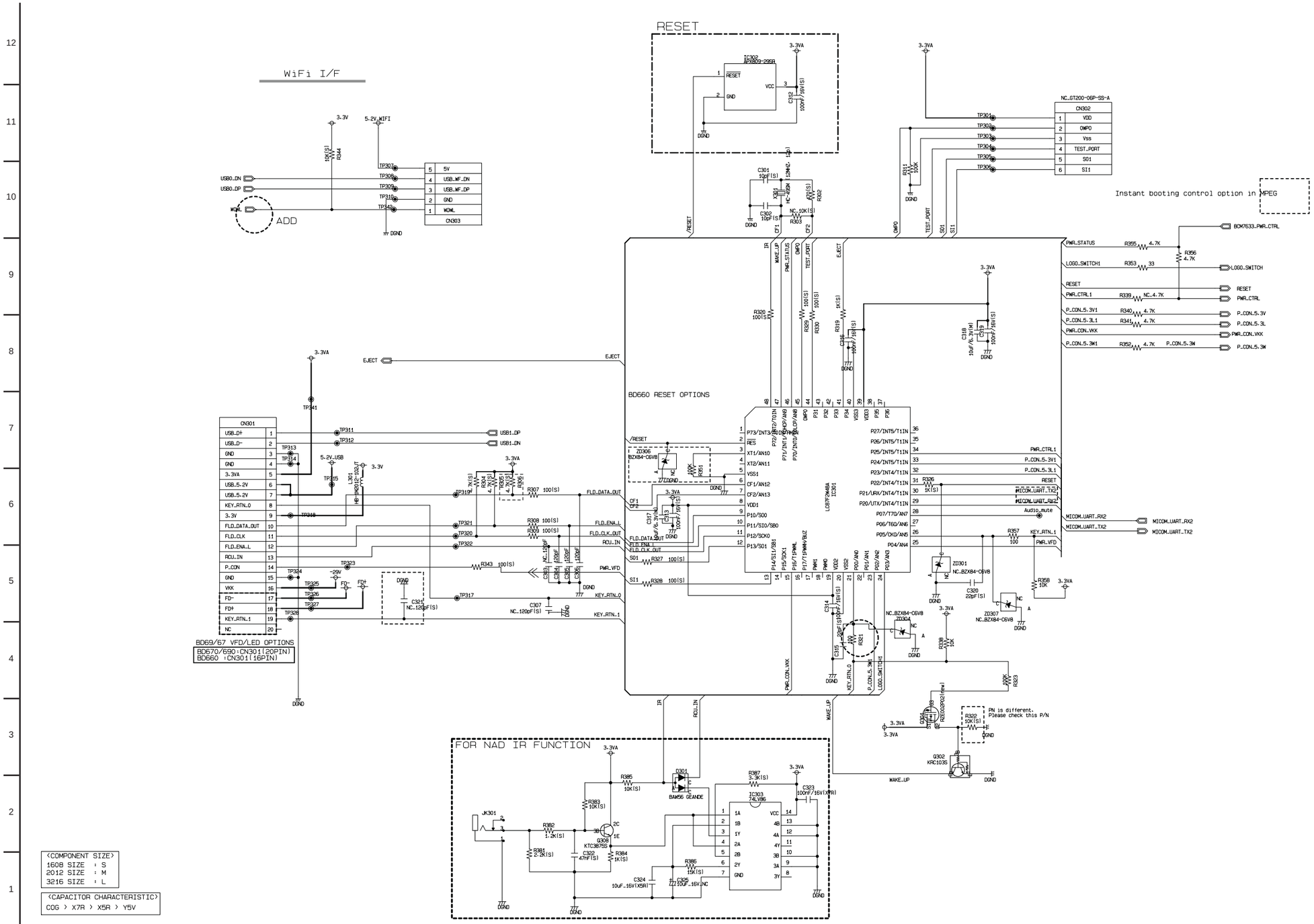
		C103	C104	C107	R100
BD661 BD672	120V	33uF/200V	33uF/200V	X	X
	110-240V	X	X	68uF/450V	4.7Mohm
	Unstable Area	15uF/500V	15uF/500V	X	4.7Mohm
BD690	120V	47uF/200V	47uF/200V	X	X
	110-240V	X	X	100uF/450V	4.7Mohm
	Unstable Area	X	X	68uF/500V	4.7Mohm

D' Schematics POWER
BD661/BD672
EBY37800240

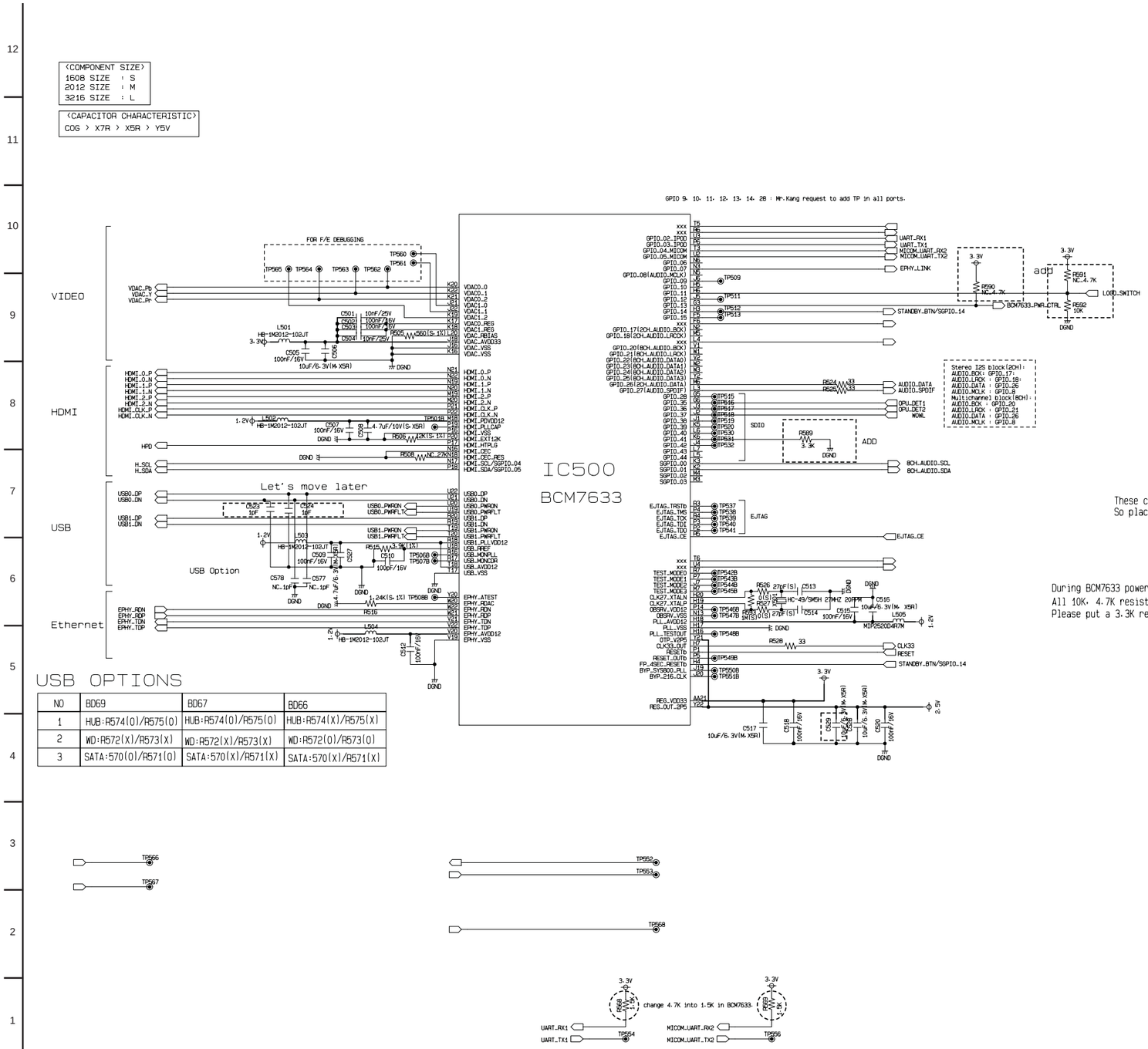
2. MAIN-POWER CIRCUIT DIAGRAM



3. MAIN-MICOM CIRCUIT DIAGRAM



4. MAIN-BCM7633 #1 CIRCUIT DIAGRAM



USB OPTIONS

NO	BD69	BD67	BD66
1	HUB:R574(0)/R575(0)	HUB:R574(0)/R575(0)	HUB:R574(X)/R575(X)
2	WD:R572(X)/R573(X)	WD:R572(X)/R573(X)	WD:R572(0)/R573(0)
3	SATA:570(0)/R571(0)	SATA:570(X)/R571(X)	SATA:570(X)/R571(X)

BCM7633 BOOT STRAP OPTIONS

NO.	SIGNAL NAME	FIELD NAME	Description	VALUE
1	EBI_nWE0	STRAP_FLASH_WIDTH	NAND: 0=Allow writes to block 0. 1=Ignore writes to block 0	0
2	EBI_nWE1	STRAP_NAND_FLASH	1=NAND	1
3	NAND_nRE	STRAP_EBI_ROM_SIZE1	0 = No ECC 1 = 1 BIT ECC 2 = 4 BIT ECC 3 = 8 BIT ECC	1
4	NAND_CLE	STRAP_EBI_ROM_SIZE0		0
5	NAND_ALE	Reserved	-	0
6	I2S_SDATA	STRAP_SYSTEM_BIG_ENDIAN	0 = Little endian. 1=Big endian	0
7	BCM_SPDIF_OUT	STRAP_RESET_EXT_MODE	1 = Extend initial Reset	0

DDR STRAP OPTIONS

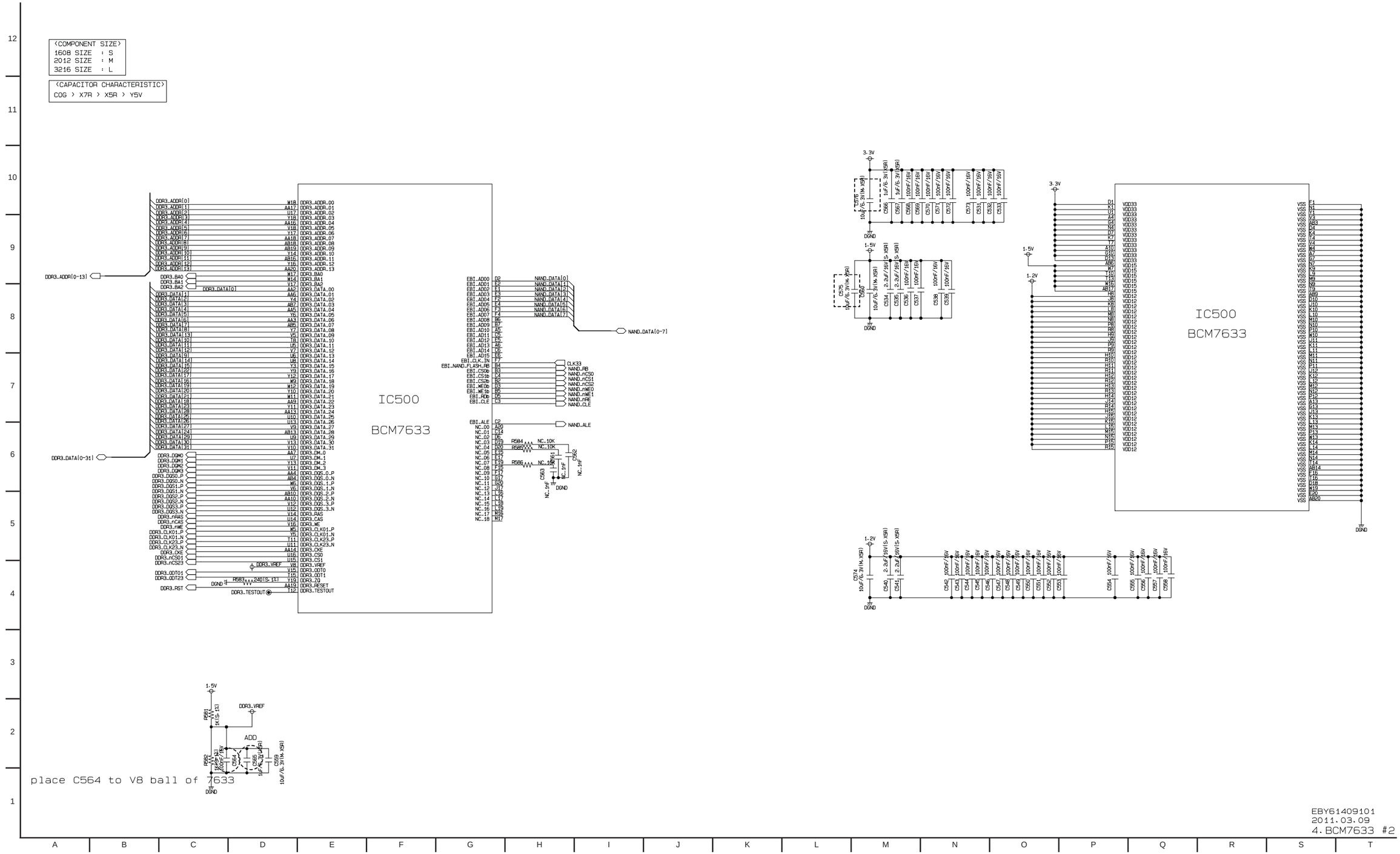
NO	SIGNAL NAME	384MB/512MBYTE
1	S_UART_TX0	0 / 1
2	IPOD_UART_TX1	0 / 0
3	UART_TX2	1 / 0
4	EPHY_LINK_GPIO07	1 / X

These configuration resistors do not need to be close to the BCM7633.
So place them at the destination of the trace.

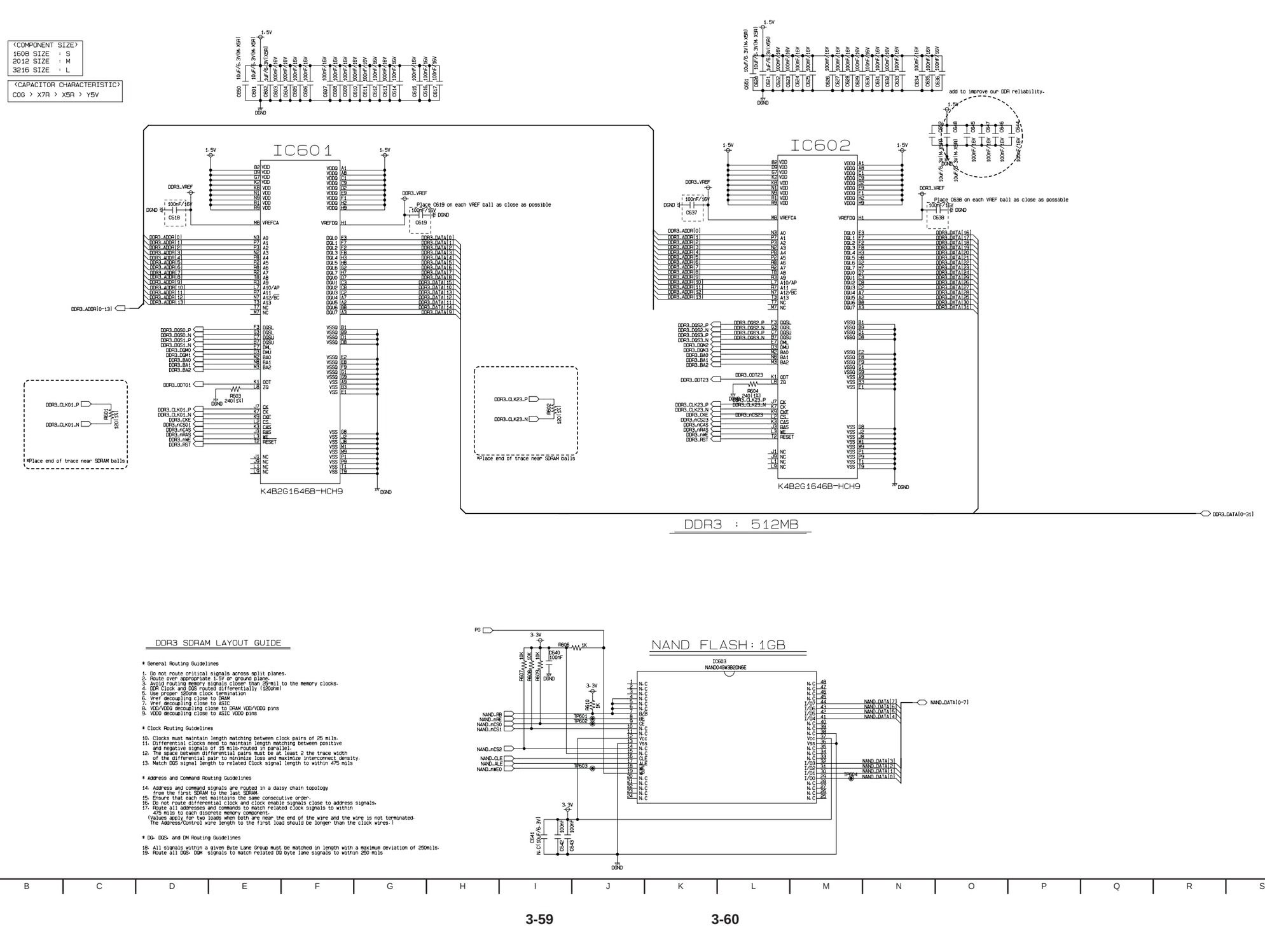
During BCM7633 power-up and initialization, all GPIOs have 15K pull-down resistors.
All 10K, 4.7K resistors, if any, pull-up resistors must be replaced by 1.5K to avoid conflict with internal BCM7633's 15K pull-donw.
Please put a 3.3K resistor pull-down on GPIO_41 to be able to use GPIOs(under SDIO group GPIO[36..44] as normal GPIO, in this case for GPIO36

EBY61409101
2011.03.09
3. BCM7633 #1

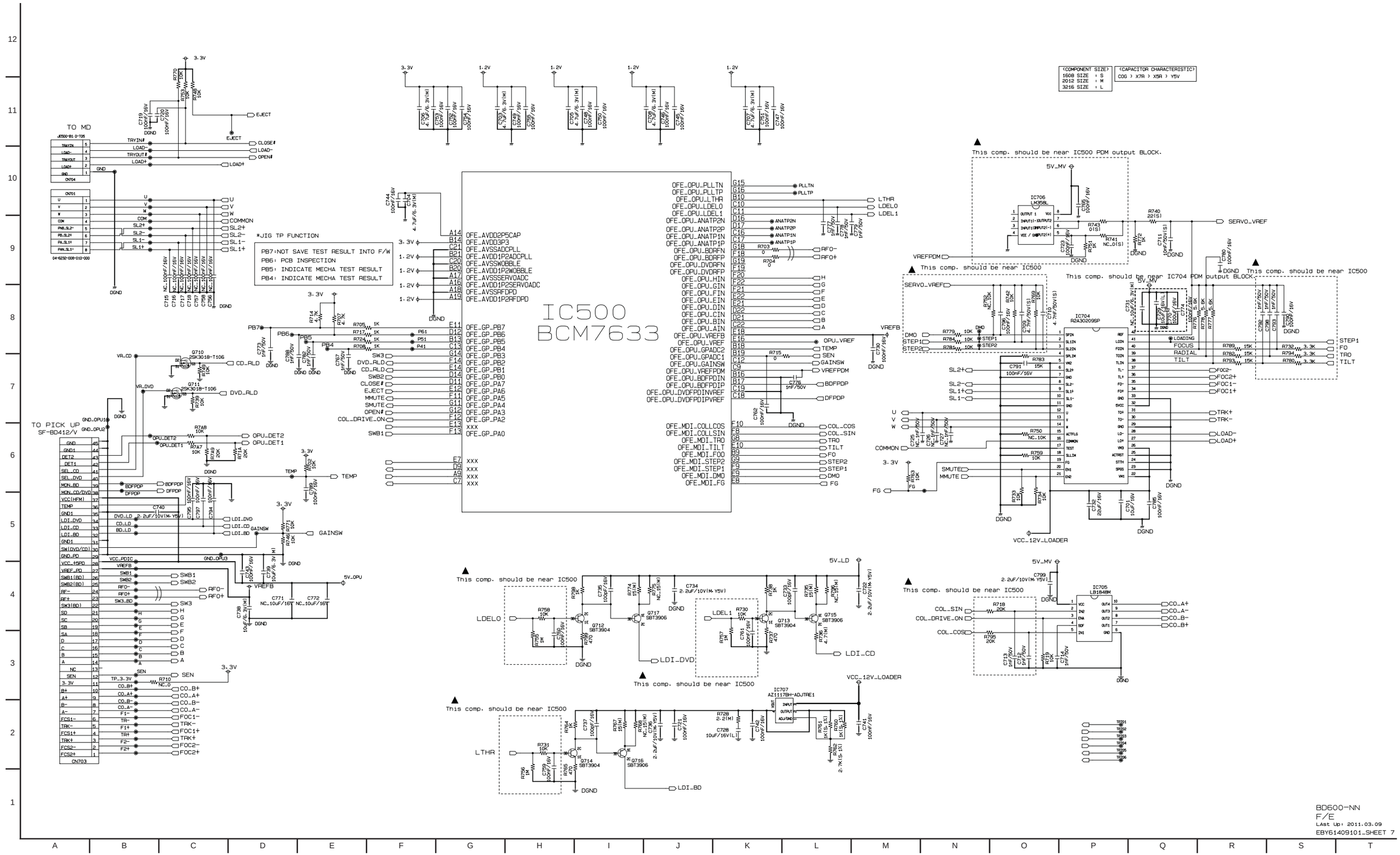
5. MAIN-BCM7633 #2 CIRCUIT DIAGRAM



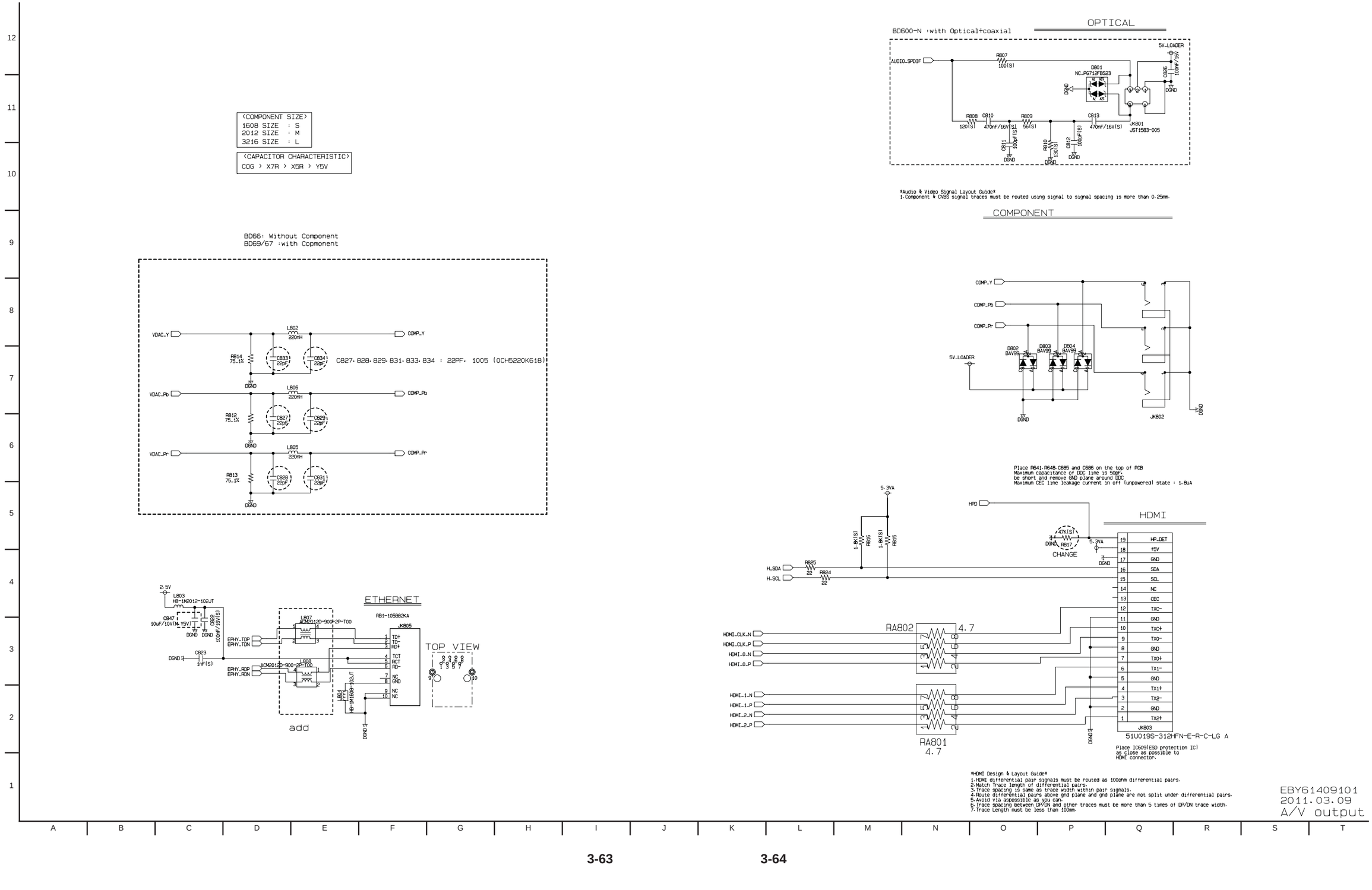
6. MAIN-DDR3/NAND CIRCUIT DIAGRAM



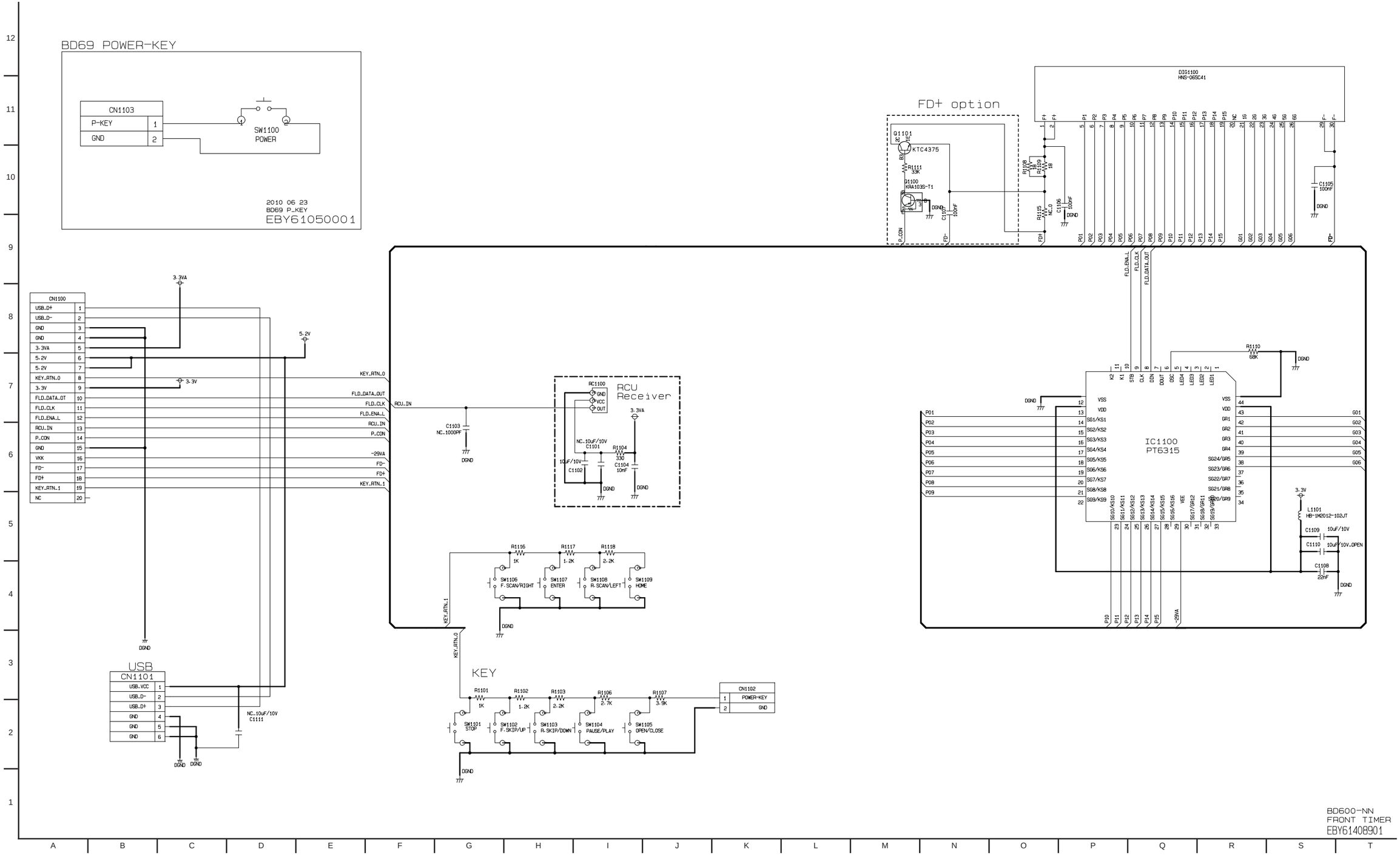
7. MAIN-FRONTEND CIRCUIT DIAGRAM



8. MAIN-A/V OUTPUT CIRCUIT DIAGRAM



9. POWER KEY AND TIMER CIRCUIT DIAGRAM



CIRCUIT VOLTAGE CHART

1. MAIN BOARD

Pin No.	Description	Voltage
IC201 AOZ1037PI		
2	Vin	13.24
9	Vout	1.28
IC202 AOZ1072AI		
2	Vin	13.24
7	Vout	1.51
8	Vout	1.51
IC203 AOZ1072AI		
2	Vin	5.25
7	Vout	3.23
8	Vout	3.23
IC204 AP2191SG		
2	Vin	5.25
3	Vin	5.25
6	Vout	5.23
7	Vout	5.23
IC205 AP2191SG		
2	Vin	5.26
3	Vin	5.26
6	Vout	5.2
7	Vout	5.2
IC206 LM29152RS		
2	Vin	13.2
4	Vout	12
IC207 LM39102D		
2	Vin	5.26
3	Vout	5
IC208 LM1108SF		
1	Vout	3.3
2	Vin	5.25
IC301 LC87F2W48A		
8	VDD	3.2
19	VDD	3.2
39	VDD	3.2
IC302 APX809		
1	RESET	3.25
3	VCC	3.3
IC704 R2A30209SP		
32	Vs	5.7
IC706 LM358L		
8	VCC	5.05
IC805 CS4353		
17	VDD	3.21
IC901 SPIF303		
44	VDD	5

Pin No.	Description	Voltage
IC902 USB2512A		
5	VDD	3.23
10	VDD	3.23
15	VDD	3.23
23	VDD	3.23
36	VDD	3.23
Pin		**Voltage**
Q204 KTC3875S		
Emiter		-27.8
Base		-27
Collector		-27.7
Q205 KRA103S		
Emiter		5.25
Base		0
Collector		5.19
Q206 KRC103S		
Emiter		0
Base		3.26
Collector		0
Q302 KRC103S		
Emiter		0
Base		3.2
Collector		3.15
Q306 KRC102S		
Emiter		0
Base		3.1
Collector		0
Q307 KTA1504S		
Emiter		0
Base		3.1
Collector		0

Reference	Capacity	Play Mode		No Play Mode	
		(+)	(-)	(+)	(-)
C770	100uF/16V	4.9	0	5	0

2. TIMER BOARD

Pin	Voltage
DIG1100 HFS-06SC41	
FD+	-16.24
FD-	-17.56

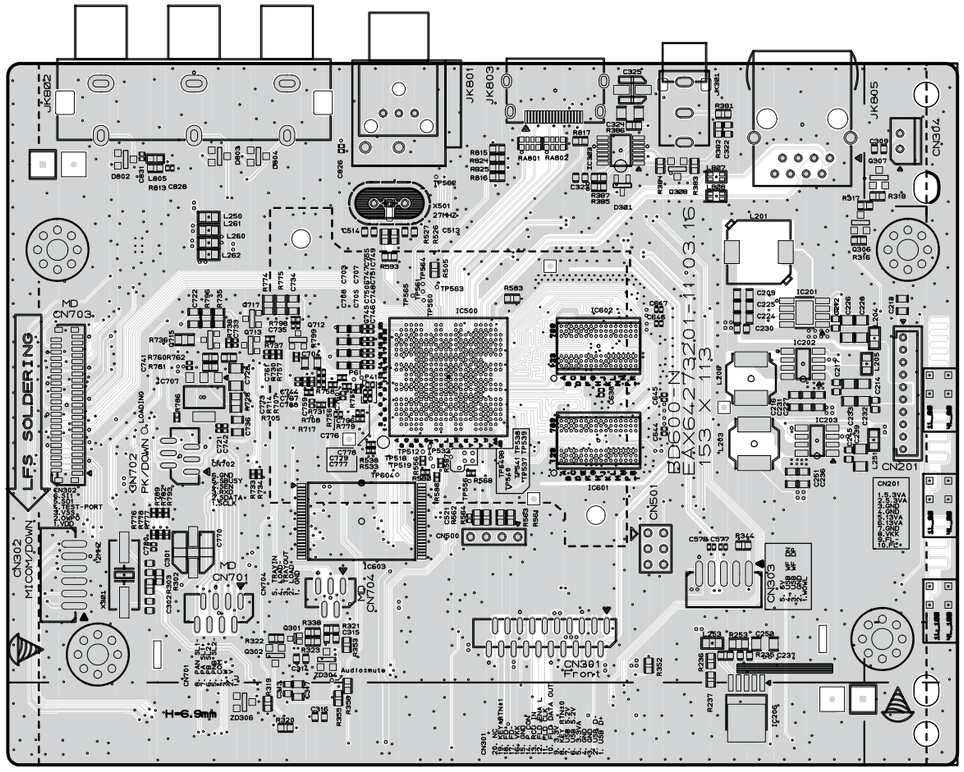
Pin No.	Description	Voltage
IC1100 PTC6315		
13	VDD	3.23
30	VKK	-19.7
43	VDD	3.23
Pin		**Voltage**
Q1101 KTC4375		
Emitter		-21.5
Base		-20.9
Collector		-21.4
Q1103 KRA103S		
Emitter		3
Base		0
Collector		3
Q1105 KRC103S		
Emitter		-14.7
Base		3.2
Collector		14.7

Pin No.	Description	Voltage
RC1100 RCU Receiver		
2	VCC	3

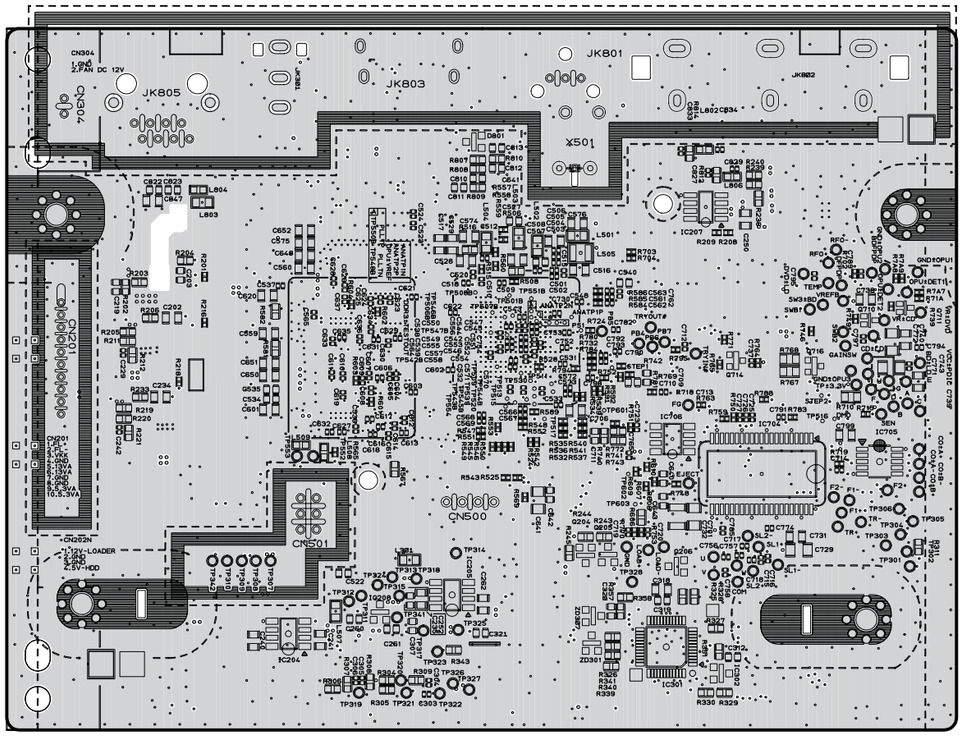
PRINTED CIRCUIT BOARD DIAGRAMS

1. MAIN P.C.BOARD

(TOP VIEW)

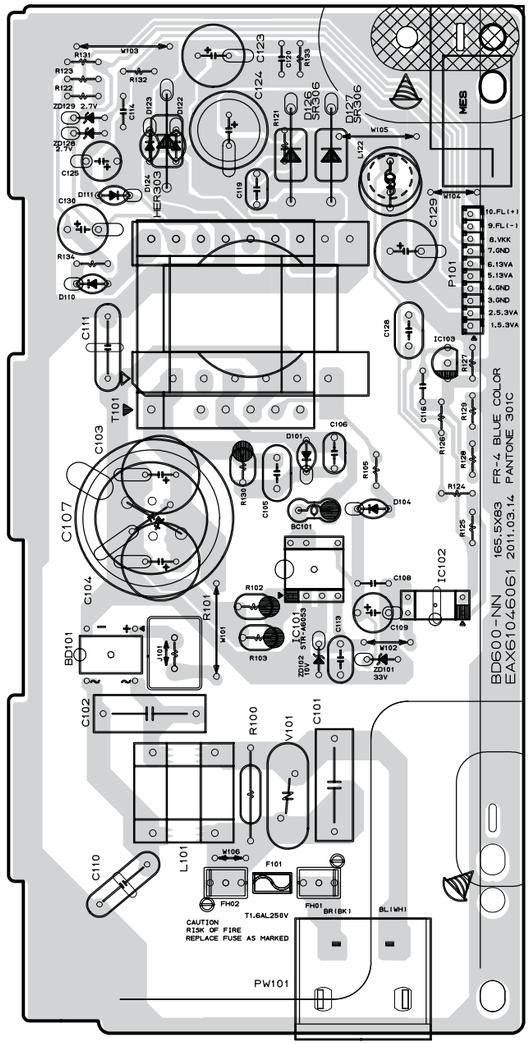


(BOTTOM VIEW)

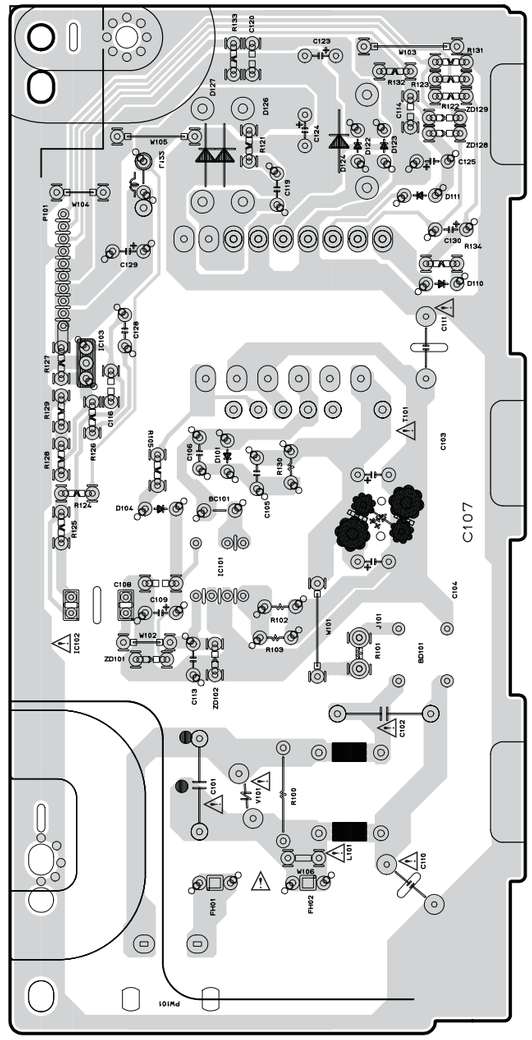


2. SMPS P.C.BOARD

(TOP VIEW)



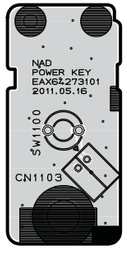
(BOTTOM VIEW)



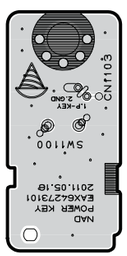
NOTE) Warning
⚠ Parts that are critical with respect to risk of fire or electrical shock.

3. POWER KEY P.C.BOARD

(TOP VIEW)

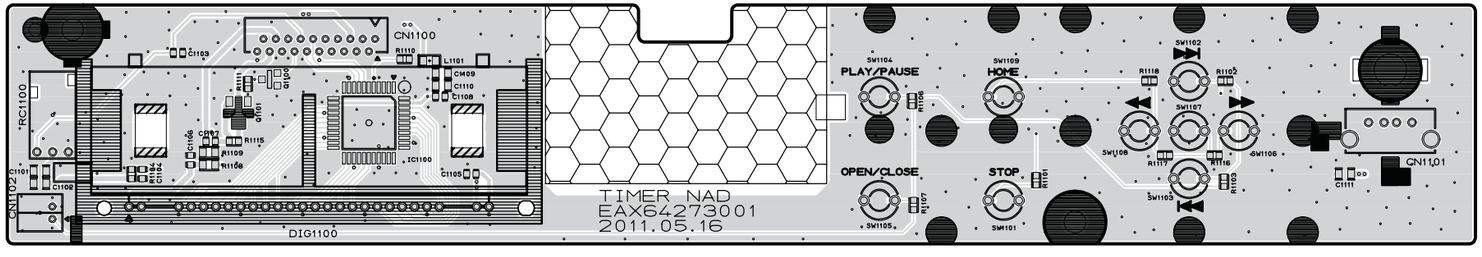


(BOTTOM VIEW)

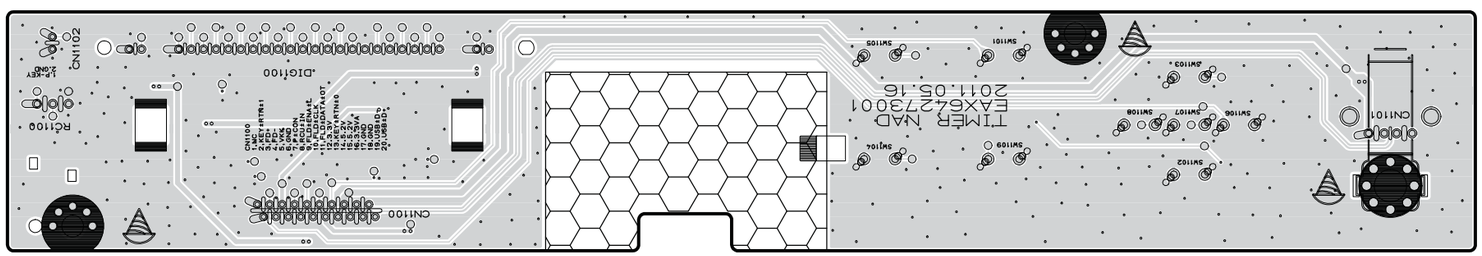


4. TIMER P.C.BOARD

(TOP VIEW)



(BOTTOM VIEW)



MEMO

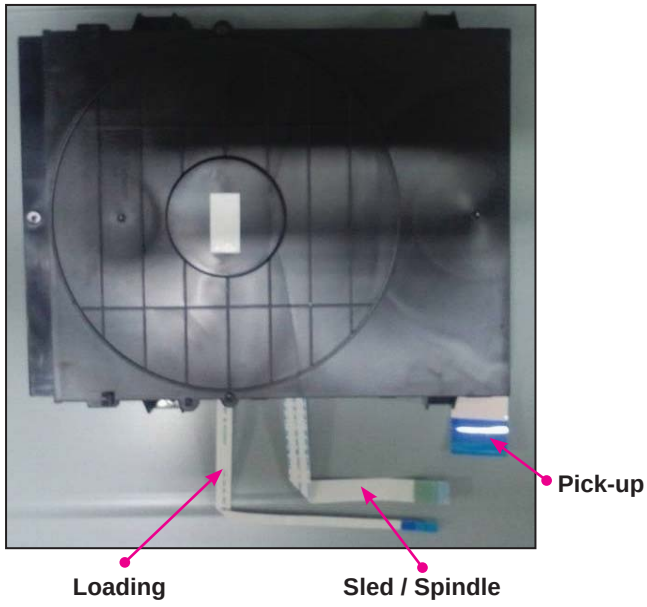
MEMO

SECTION 4

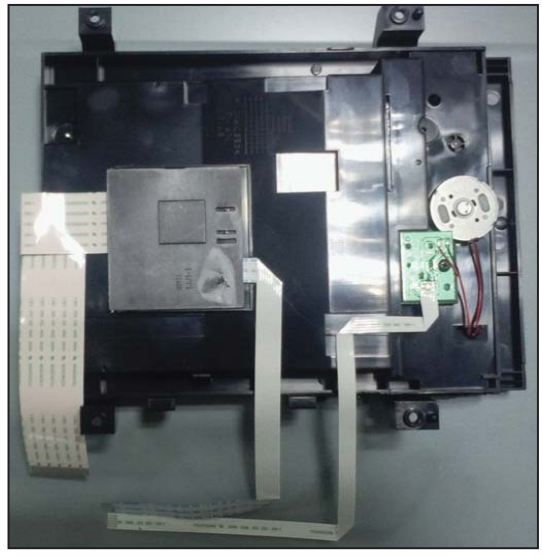
BCM7633 F/E LOADER PART

CONTENTS

MD APPEARANCE



< MD top view >



< MD bottom view >

COMPONENT 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 factory initialization.

COMPONENT 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.

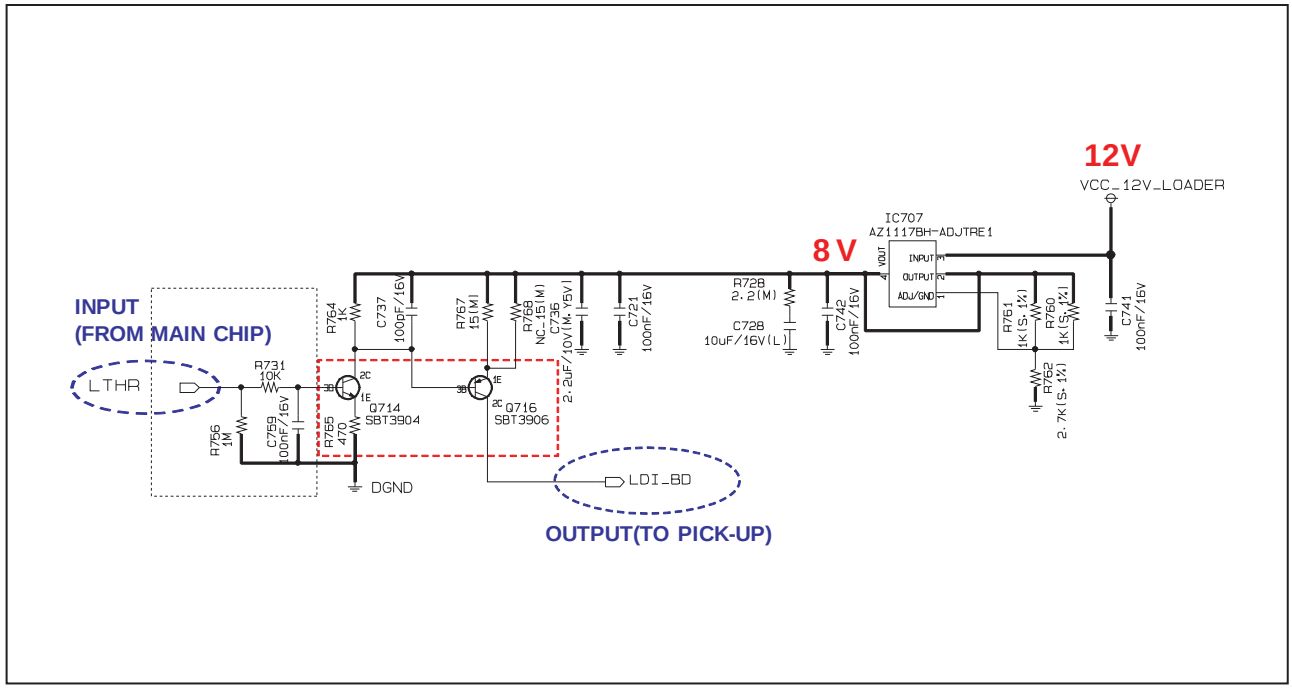
2-1. Component

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, Q716

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



COMPONENT 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

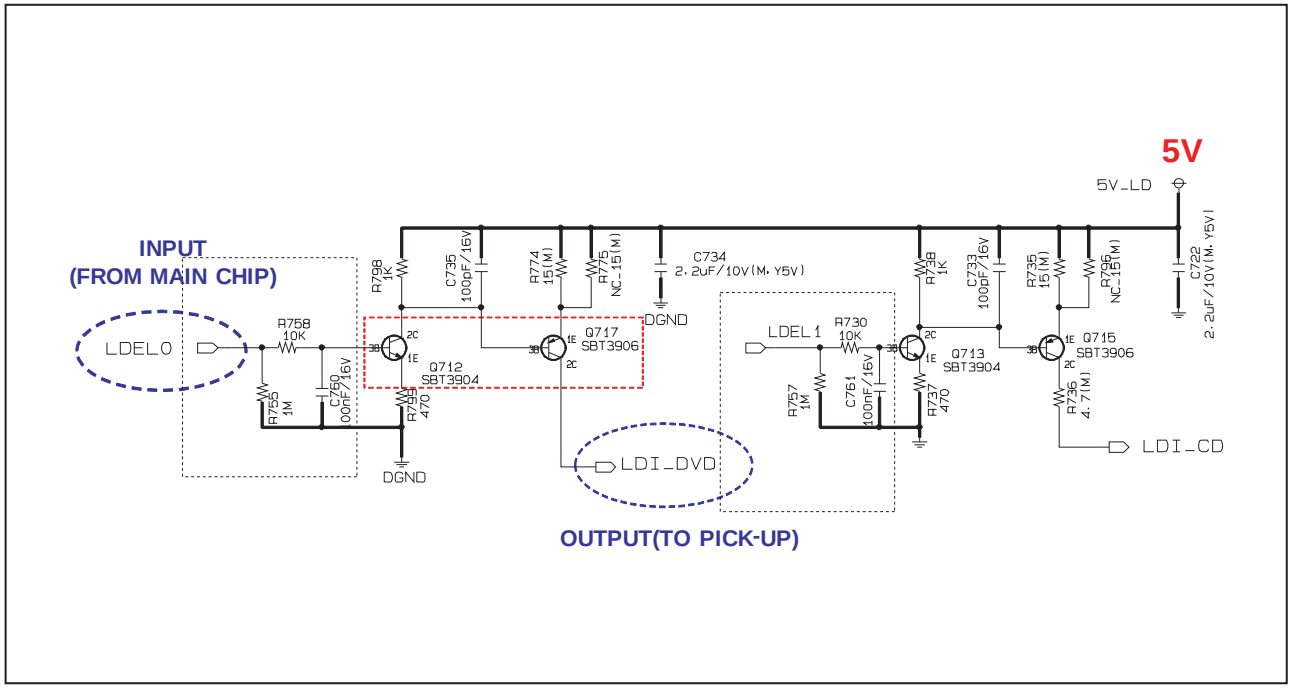
1) MD (Traverse Assembly)
2) Q712, Q717

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)



COMPONENT 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.

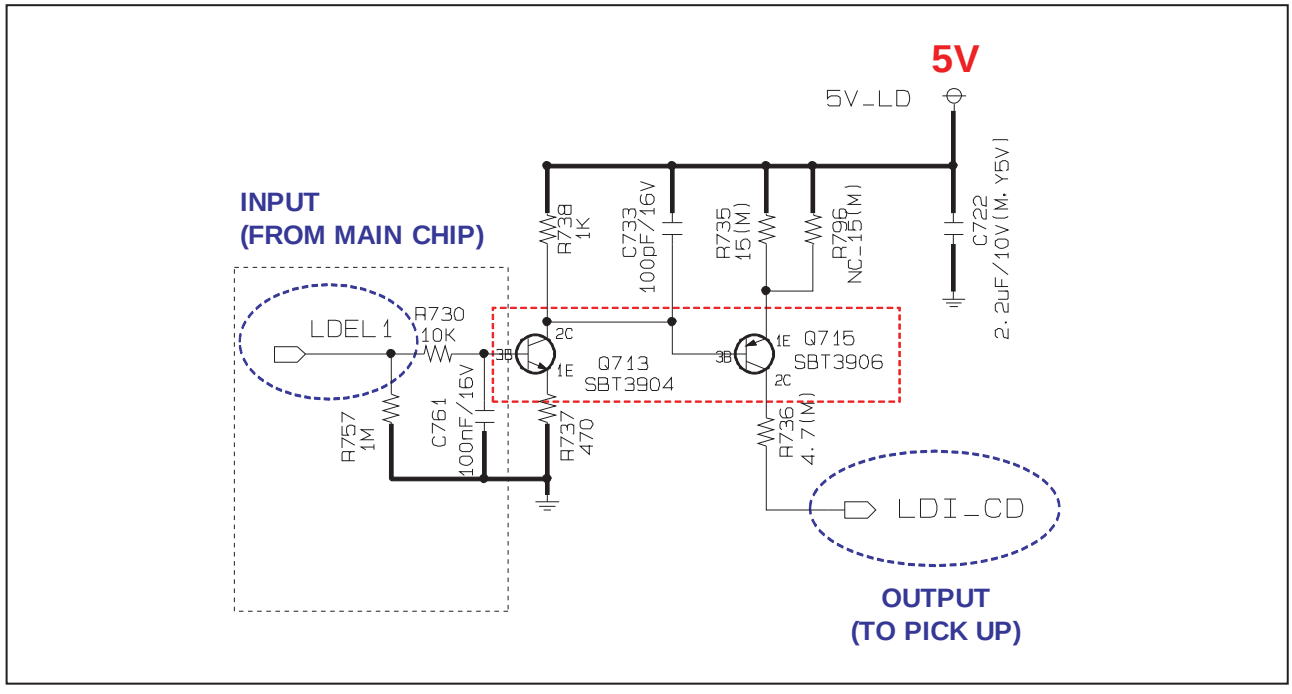
4-1. Component

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)



COMPONENT 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.

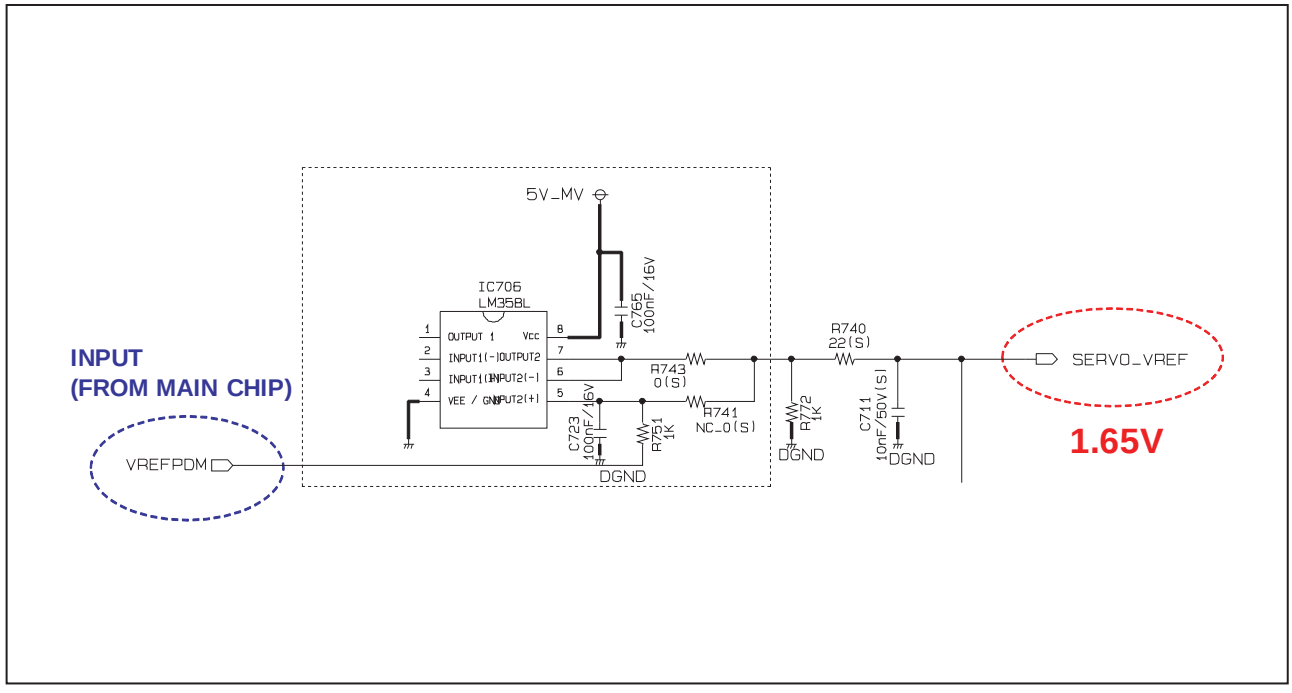
5-1. Component

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.

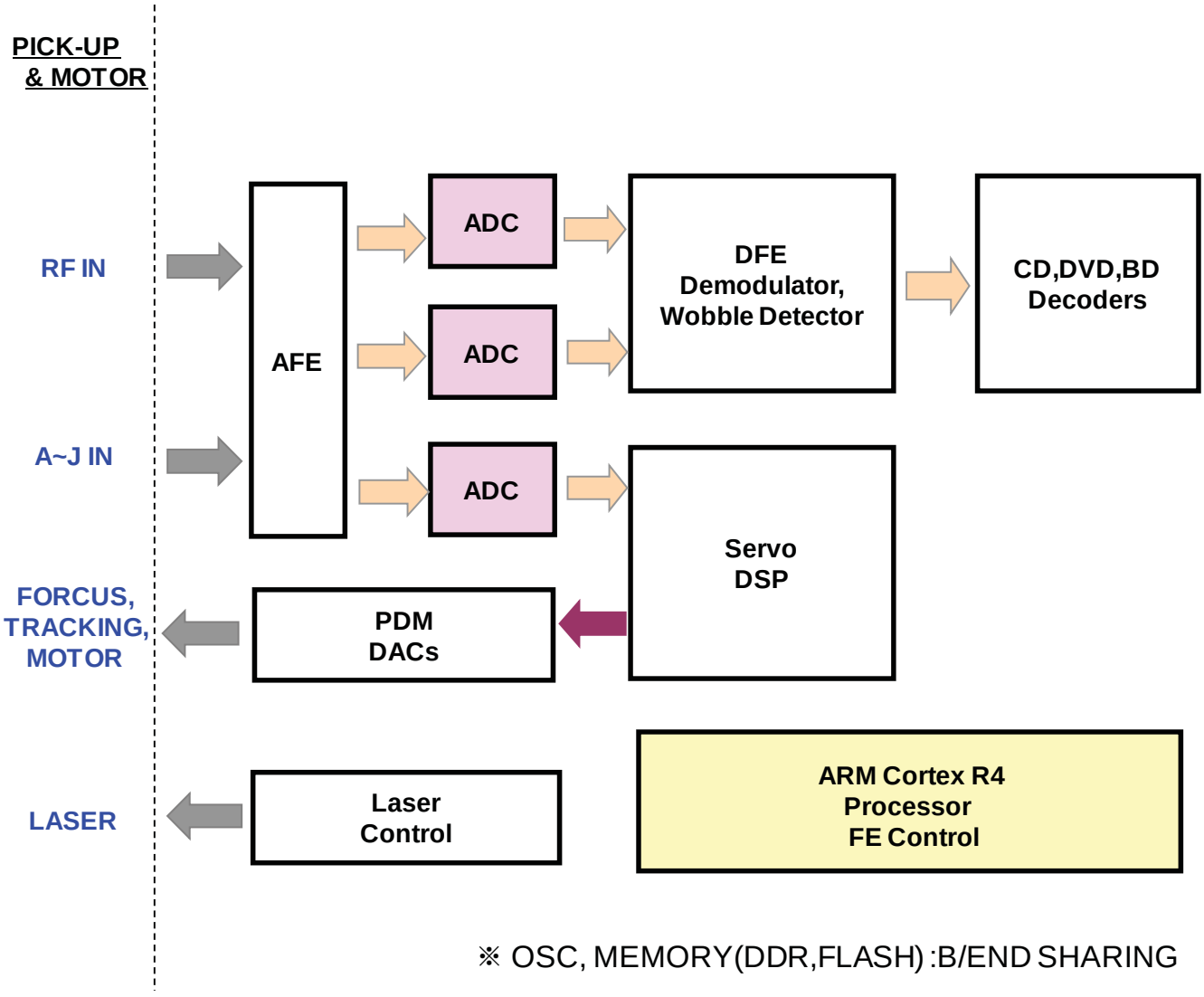
5-3. Service hint (Any picture / Remark)



MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

1. BCM7633

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

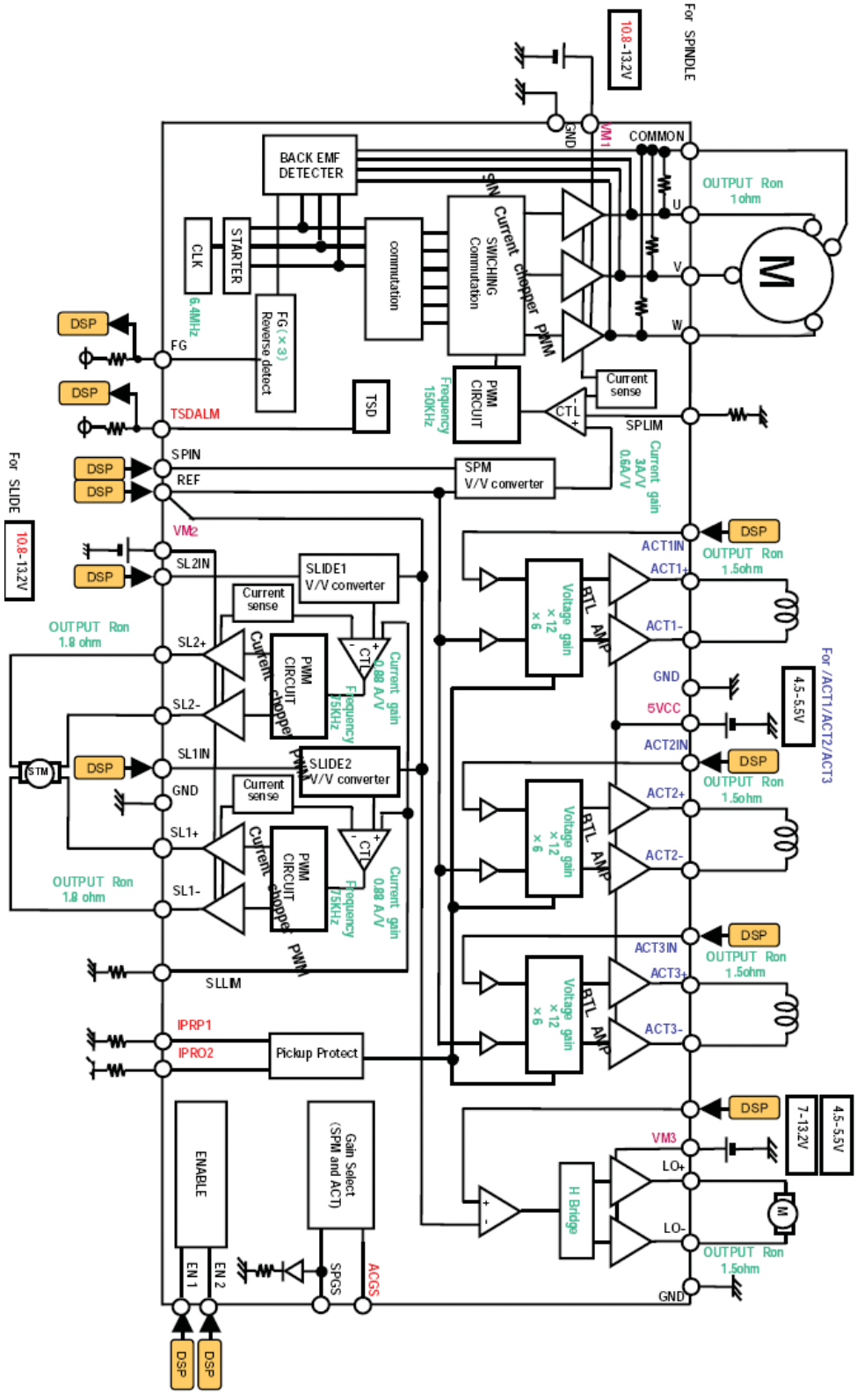
OFE – Optical Pickup Unit (OPU) Interface						
Label	**Function I/O**	**IO**	**PU/PD**	**Tol. (V)**	**Loc.**	**Description**
OFE_OPU_DVDFPDIPVREF	AIO	AIO	–	-	C18	DVD Fwd Photodiode and Ref Voltage
OFE_OPU_DVDFPDINVREF	AIO	AIO	–	-	C19	DVD Fwd Photodiode and Ref Voltage
OFE_OPU_BDFPDIP	AI	AI	–	–	B17	BD 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