LG Electronics Inc.

P/NO : AFN30721315

MAY,2006

SERVICE MANUAL

MODELS : RH1777/RH1888H

LG Electronics Inc.

LG

HDD/DVD RECORDER

SERVICE MANUAL

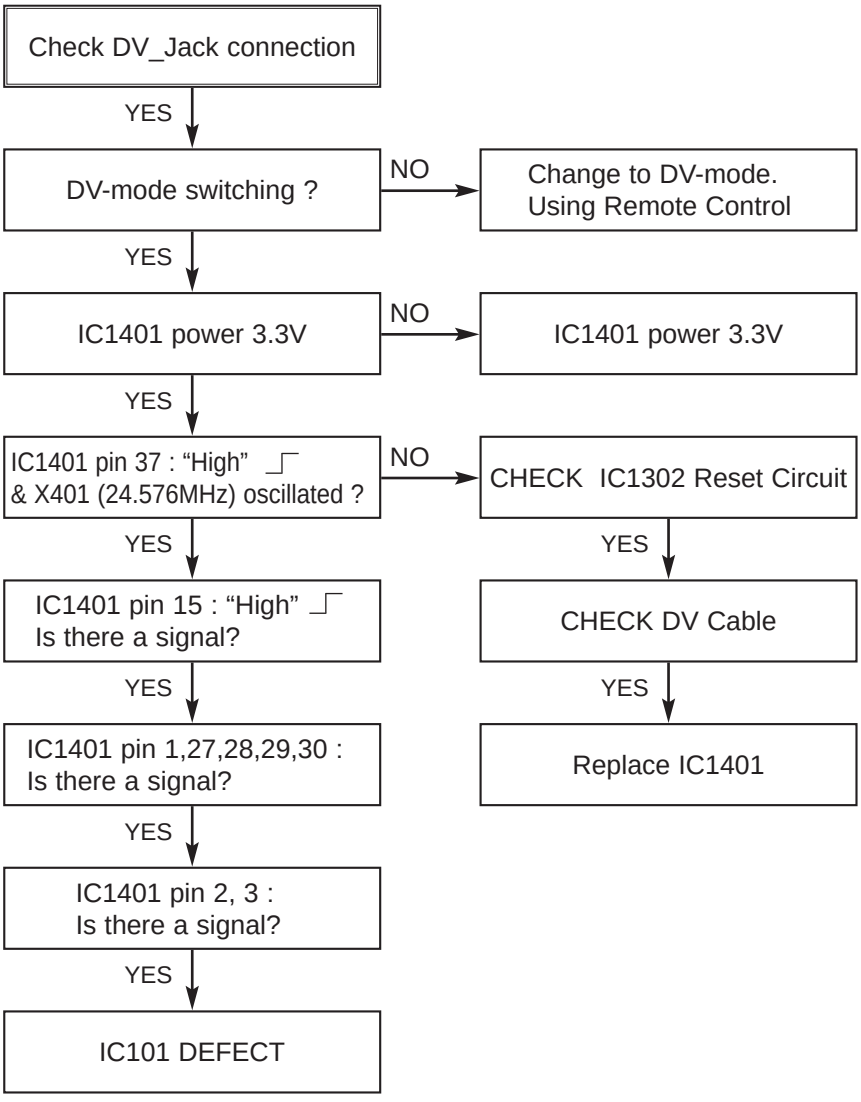
MODELS : RH1777/RH1888H

CAUTION

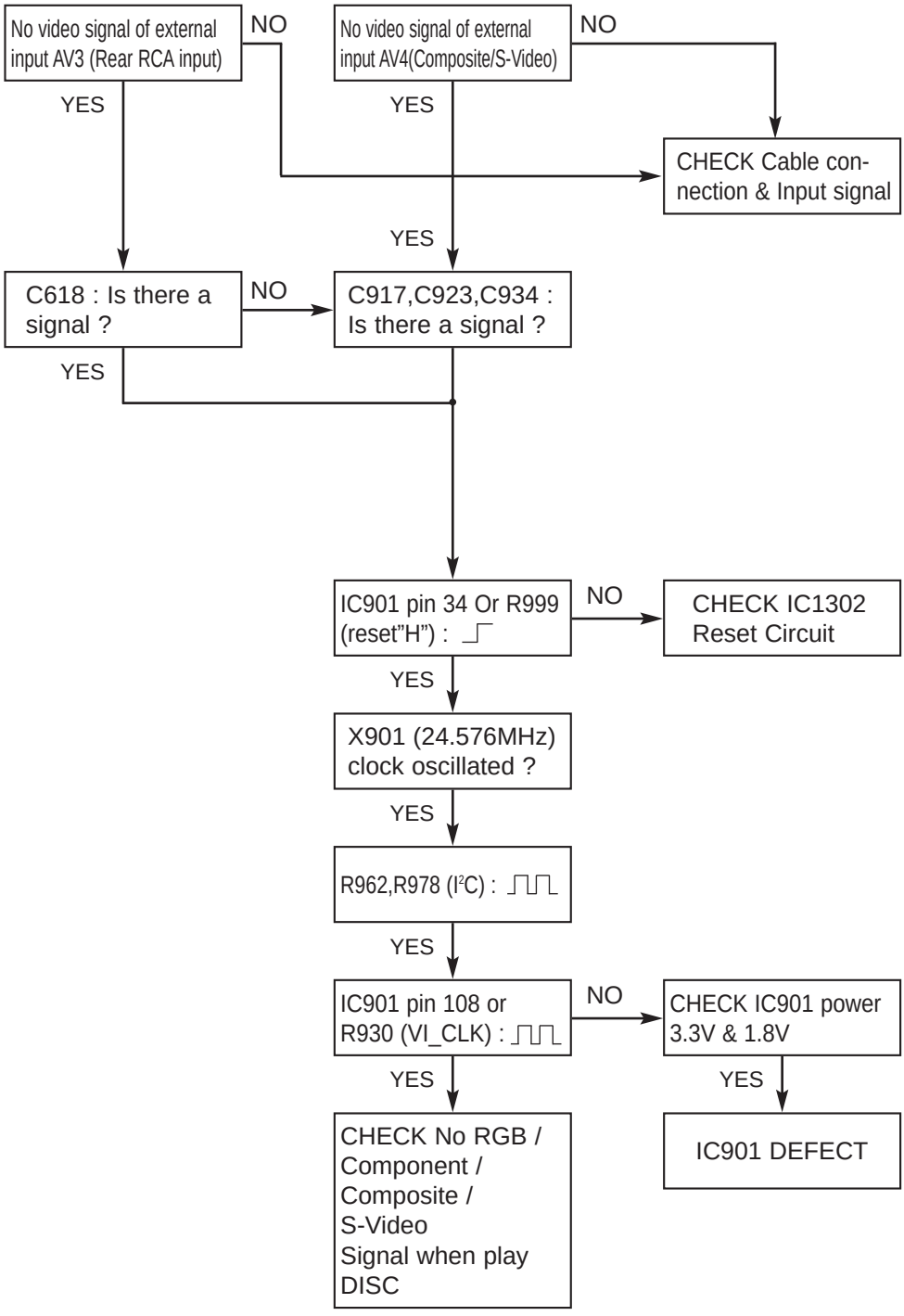
BEFORE SERVICING THE UNIT, READ THE “SAFETY PRECAUTIONS” IN THIS MANUAL.

MEMO

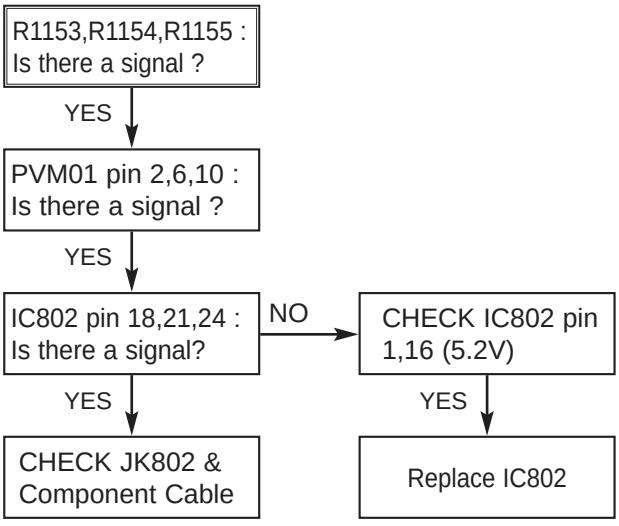
12. NO DV(IEEE 1394) INPUT (VIDEO/AUDIO) SIGNAL



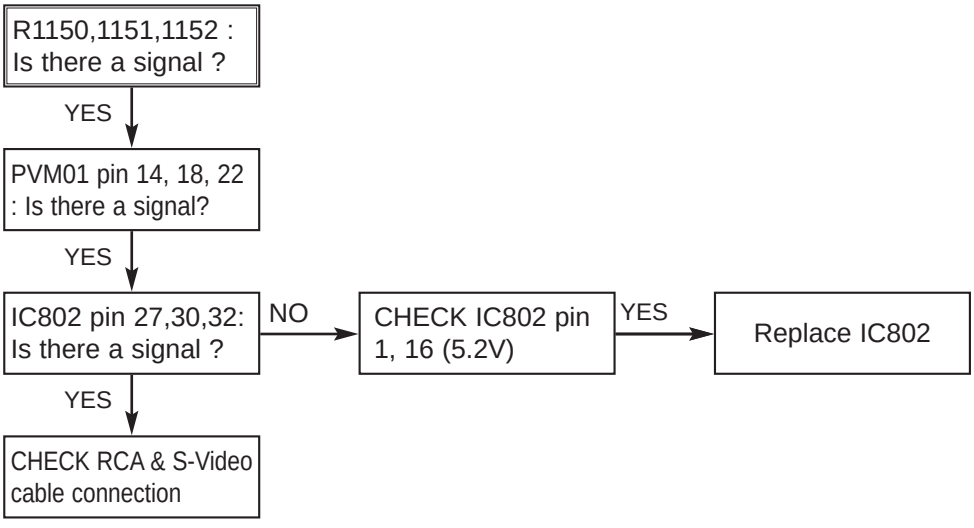
11. NO TV, EXTERNAL INPUT VIDEO SIGNAL



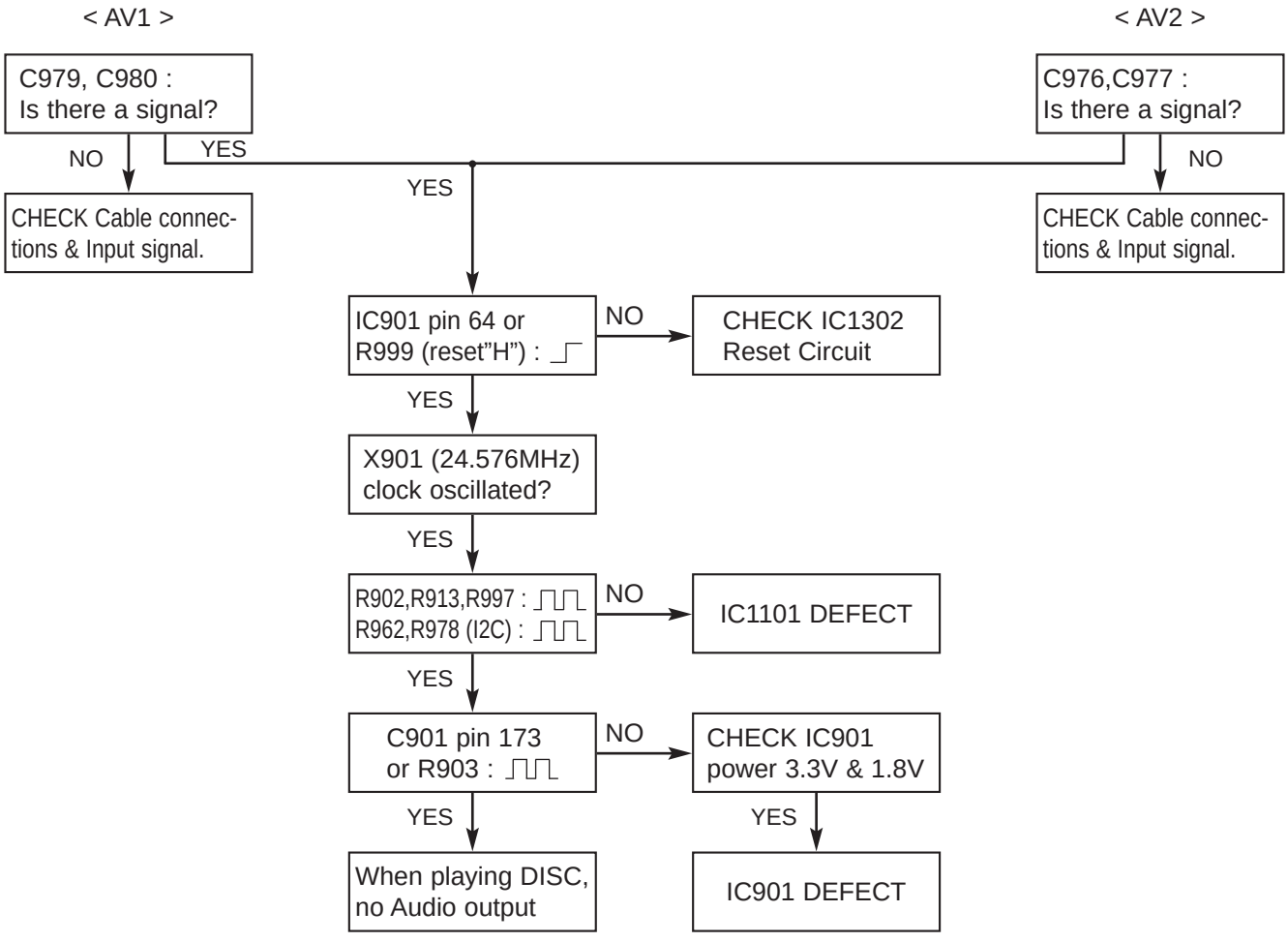
9. NO RGB/COMPONENT VIDEO SIGNAL WHEN PLAY DISC(W'S, NTSC'S "RGB WITHOUT)



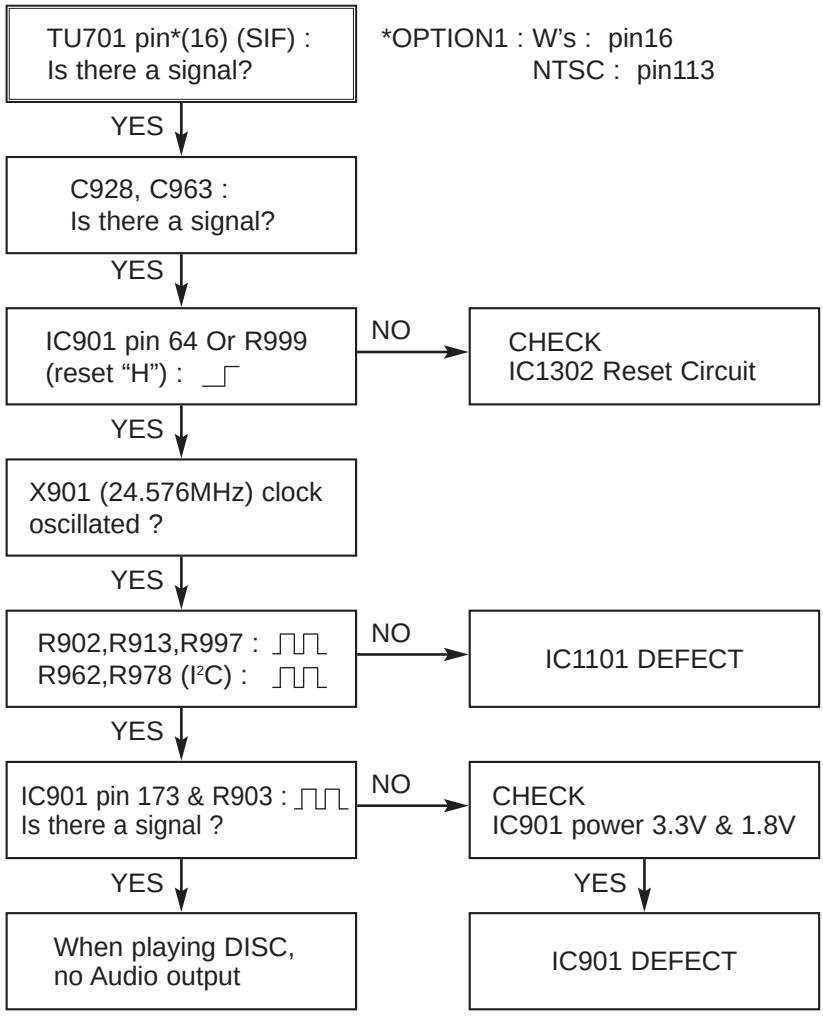
10. NO COMPOSITE / S-VIDEO SIGNAL WHEN PLAY DISC



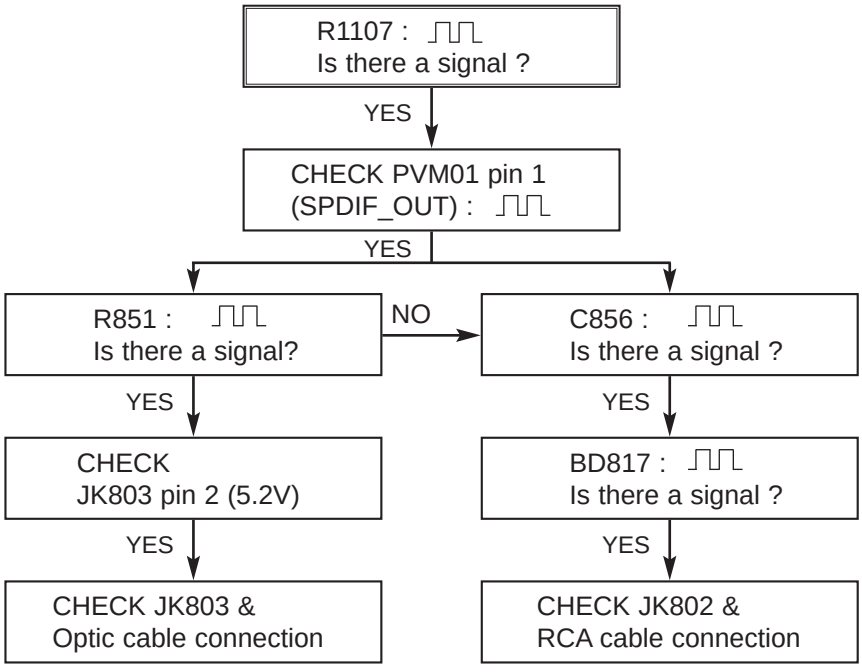
8. NO EXTERNAL INPUT AUDIO



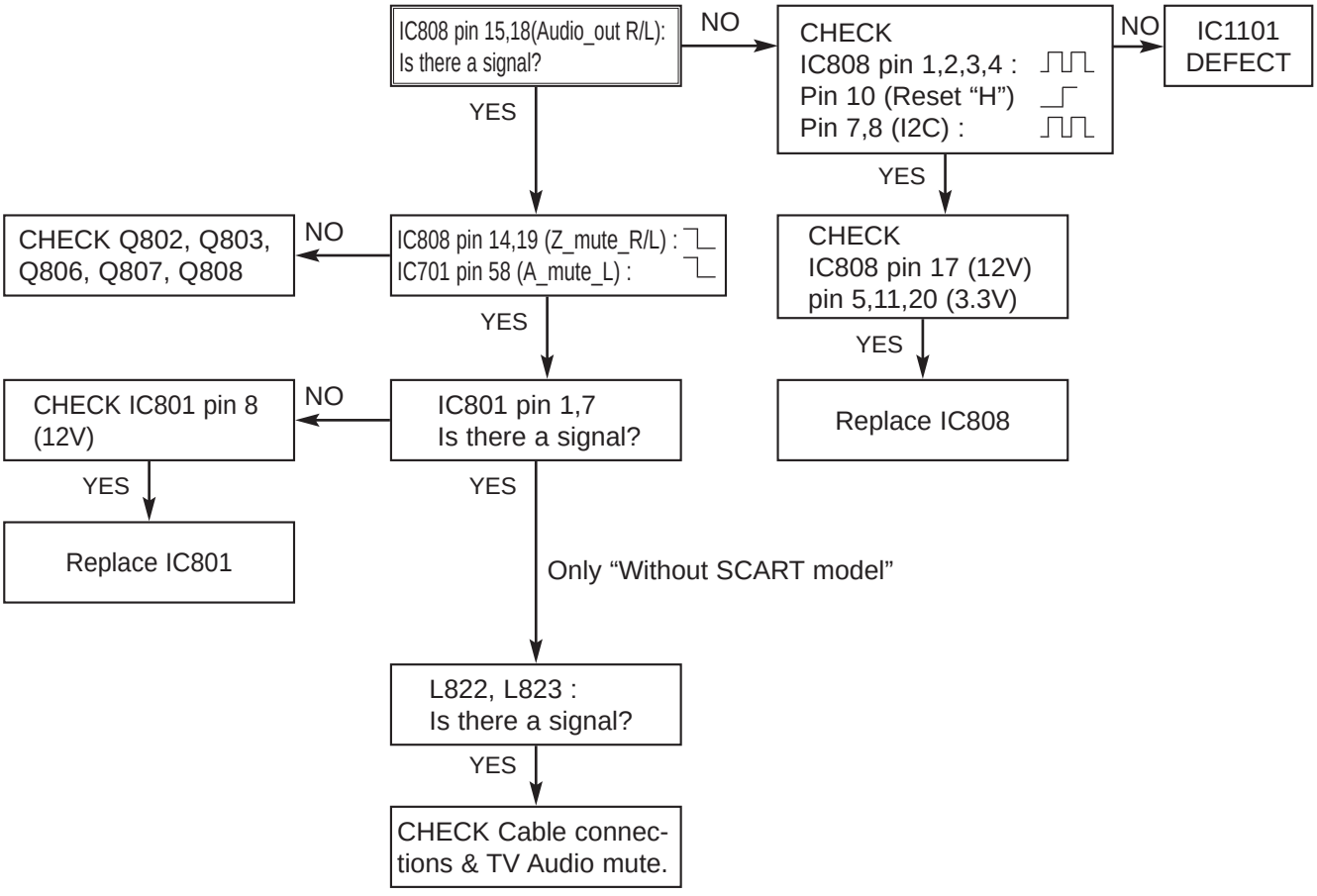
7. NO TUNER AUDIO OUTPUT



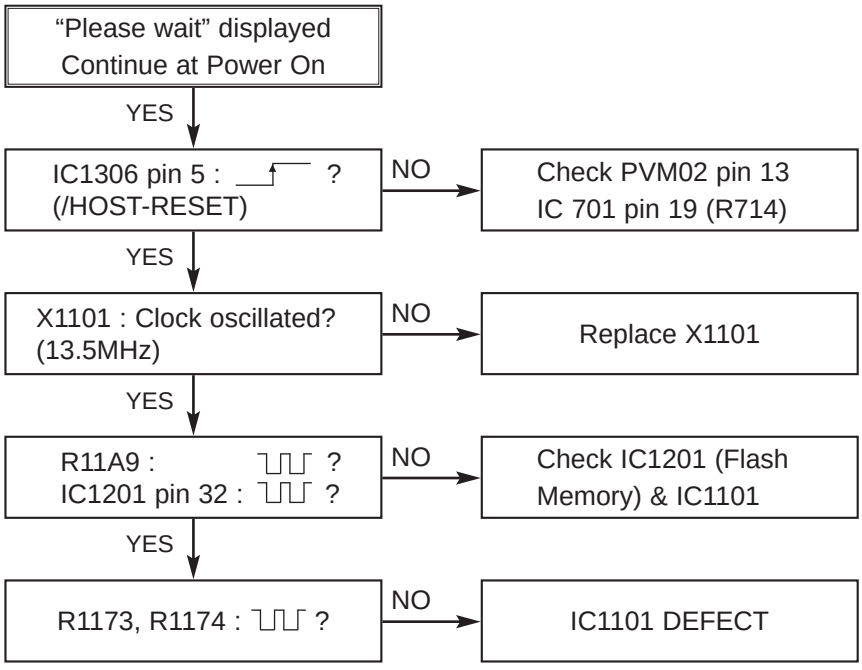
6. NO OPTICAL / DIGITAL OUTPUT



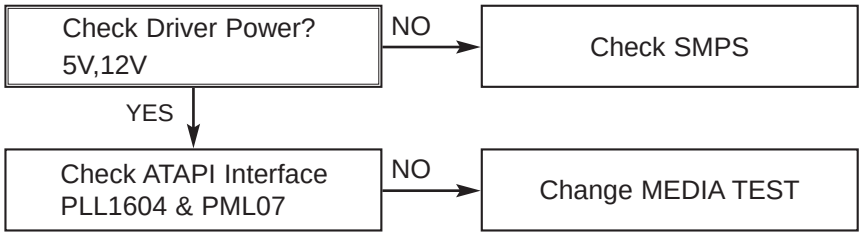
5. WHEN PLAYING DISC, NO AUDIO OUTPUT

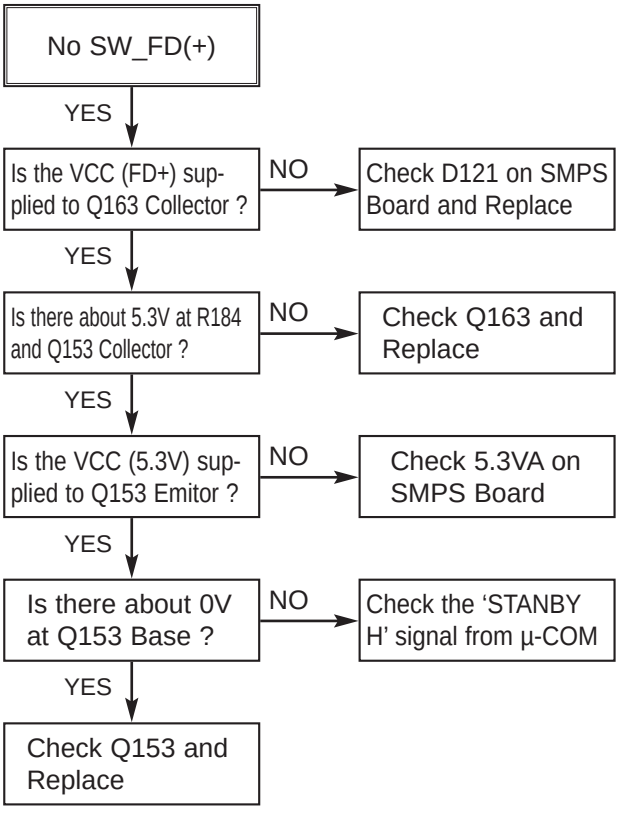


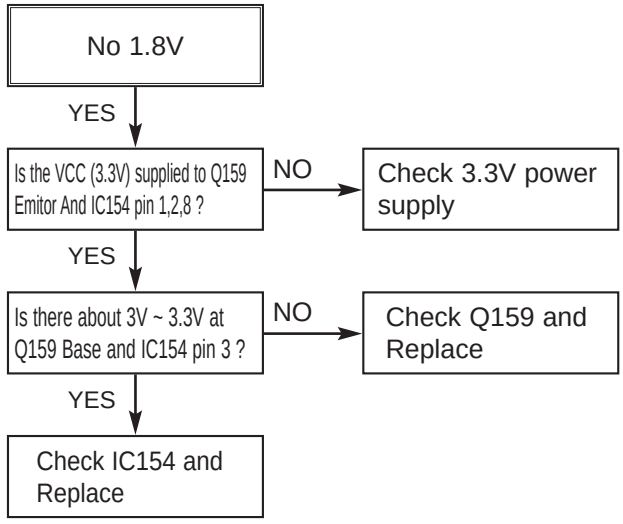
3. SYSTEM CIRCUIT PART

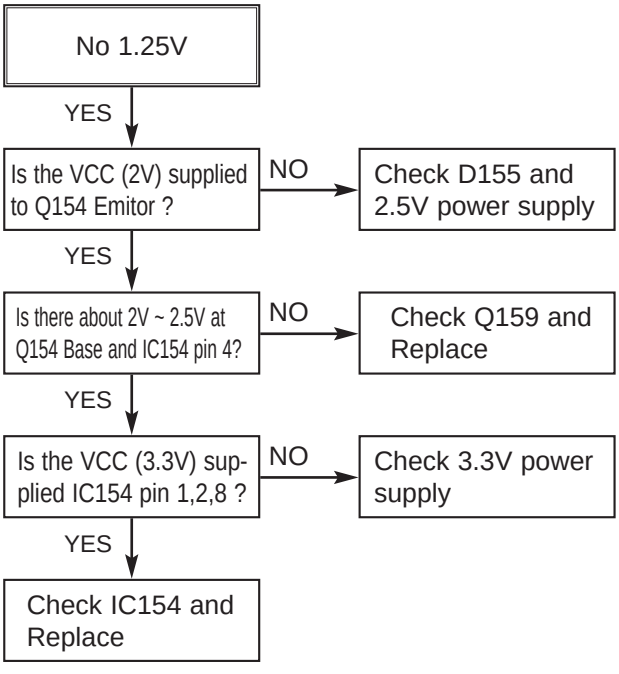


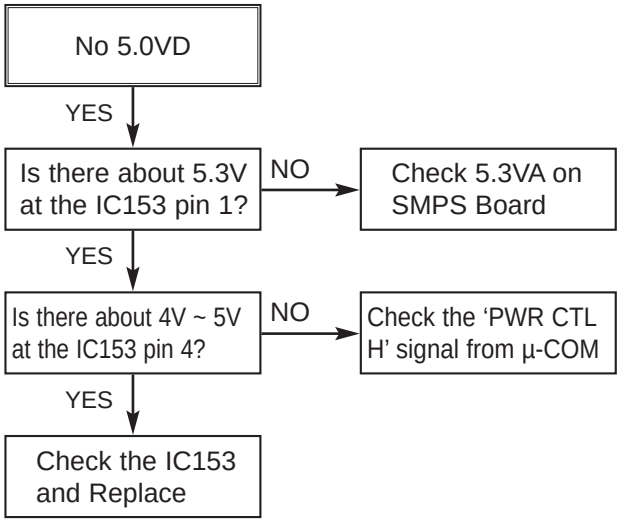
4. DISC NOT RECOGNIZED

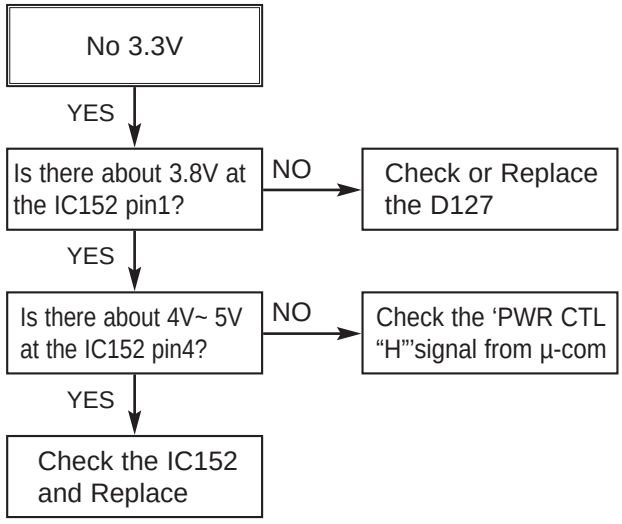


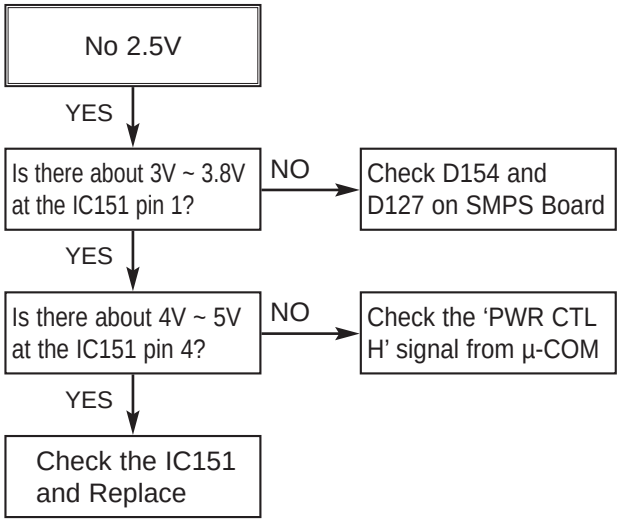

No SW_FD(+)
YES
Is the VCC (FD+) supplied to Q163 Collector ?
NO
Check D121 on SMPS Board and Replace
YES
Is there about 5.3V at R184 and Q153 Collector ?
NO
Check Q163 and Replace
YES
Is the VCC (5.3V) supplied to Q153 Emitor ?
NO
Check 5.3VA on SMPS Board
YES
Is there about 0V at Q153 Base ?
NO
Check the 'STANBY H' signal from µ-COM
YES
Check Q153 and Replace

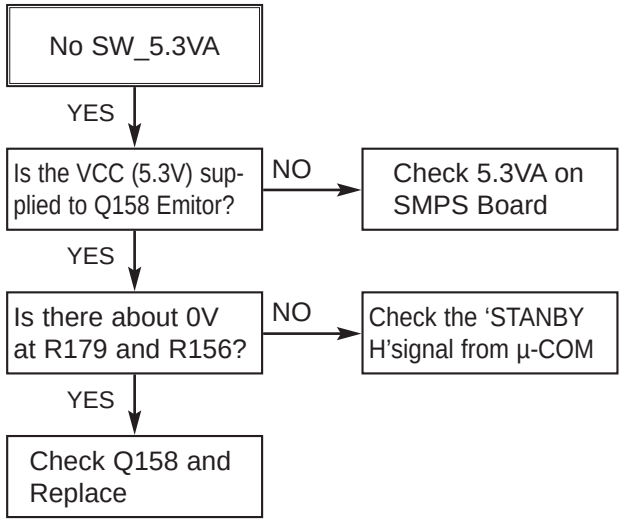

No 1.8V
YES
Is the VCC (3.3V) supplied to Q159 Emitor And IC154 pin 1,2,8 ?
NO
Check 3.3V power supply
YES
Is there about 3V ~ 3.3V at Q159 Base and IC154 pin 3 ?
NO
Check Q159 and Replace
YES
Check IC154 and Replace


No 1.25V
YES
Is the VCC (2V) supplied to Q154 Emitor ?
NO
Check D155 and 2.5V power supply
YES
Is there about 2V ~ 2.5V at Q154 Base and IC154 pin 4?
NO
Check Q159 and Replace
YES
Is the VCC (3.3V) supplied IC154 pin 1,2,8 ?
NO
Check 3.3V power supply
YES
Check IC154 and Replace

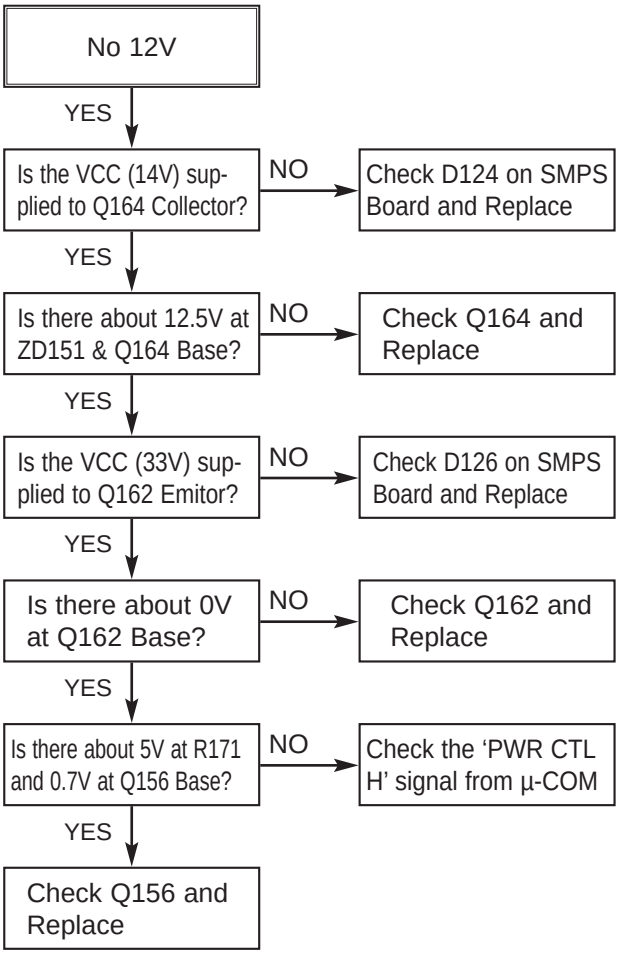

No 5.0VD
YES
Is there about 5.3V at the IC153 pin 1?
NO
Check 5.3VA on SMPS Board
YES
Is there about 4V ~ 5V at the IC153 pin 4?
NO
Check the 'PWR CTL H' signal from µ-COM
YES
Check the IC153 and Replace

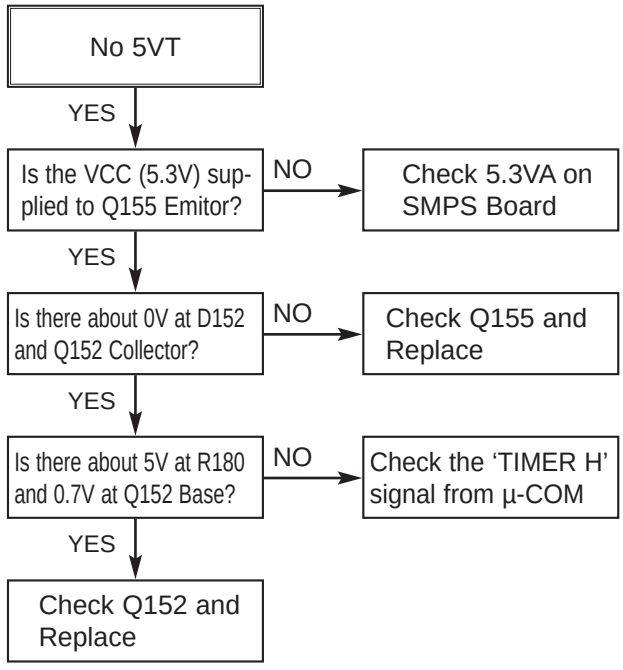

No 3.3V
YES
Is there about 3.8V at the IC152 pin1?
NO
Check or Replace the D127
YES
Is there about 4V~ 5V at the IC152 pin4?
NO
Check the 'PWR CTL "H"'signal from µ-com
YES
Check the IC152 and Replace

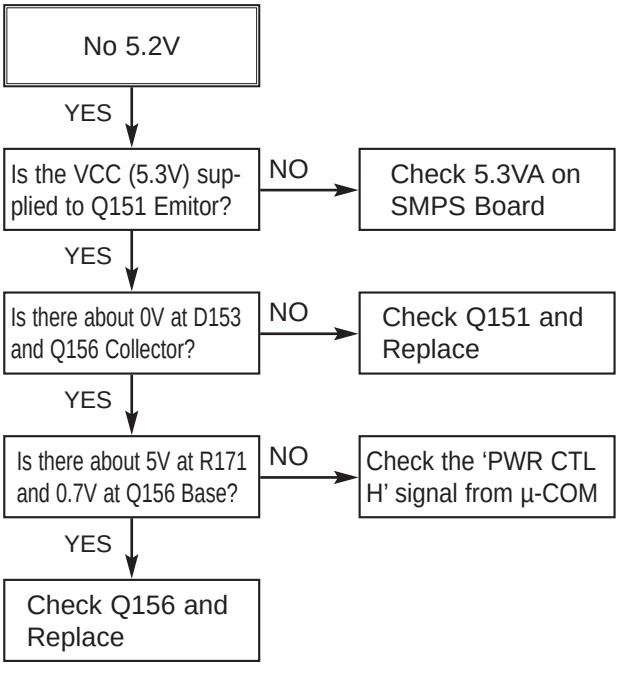

No 2.5V
YES
Is there about 3V ~ 3.8V at the IC151 pin 1?
NO
Check D154 and D127 on SMPS Board
YES
Is there about 4V ~ 5V at the IC151 pin 4?
NO
Check the 'PWR CTL H' signal from µ-COM
YES
Check the IC151 and Replace

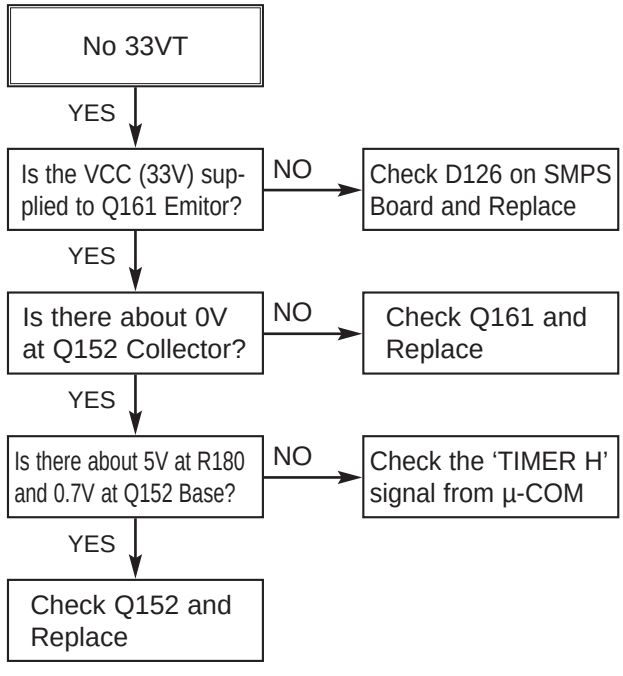

No SW_5.3VA
YES
Is the VCC (5.3V) supplied to Q158 Emitor?
NO
Check 5.3VA on SMPS Board
YES
Is there about 0V at R179 and R156?
NO
Check the 'STANBY H'signal from µ-COM
YES
Check Q158 and Replace

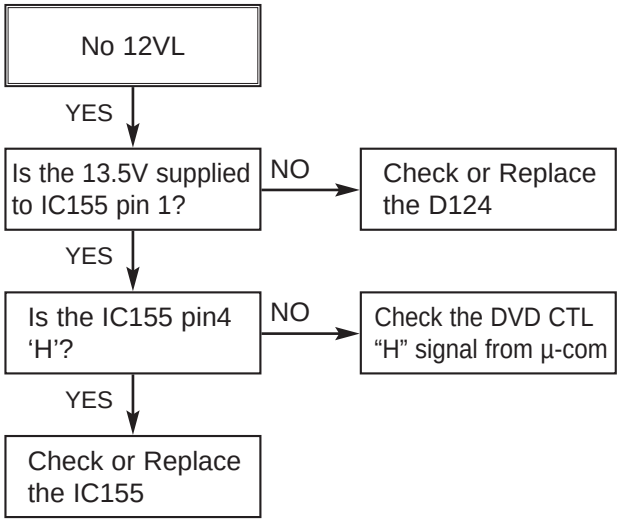
2. POWER SUPPLY ON I/O BOARD

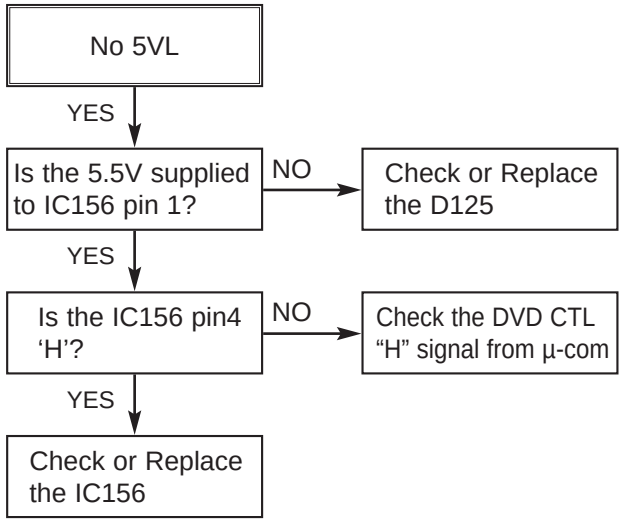








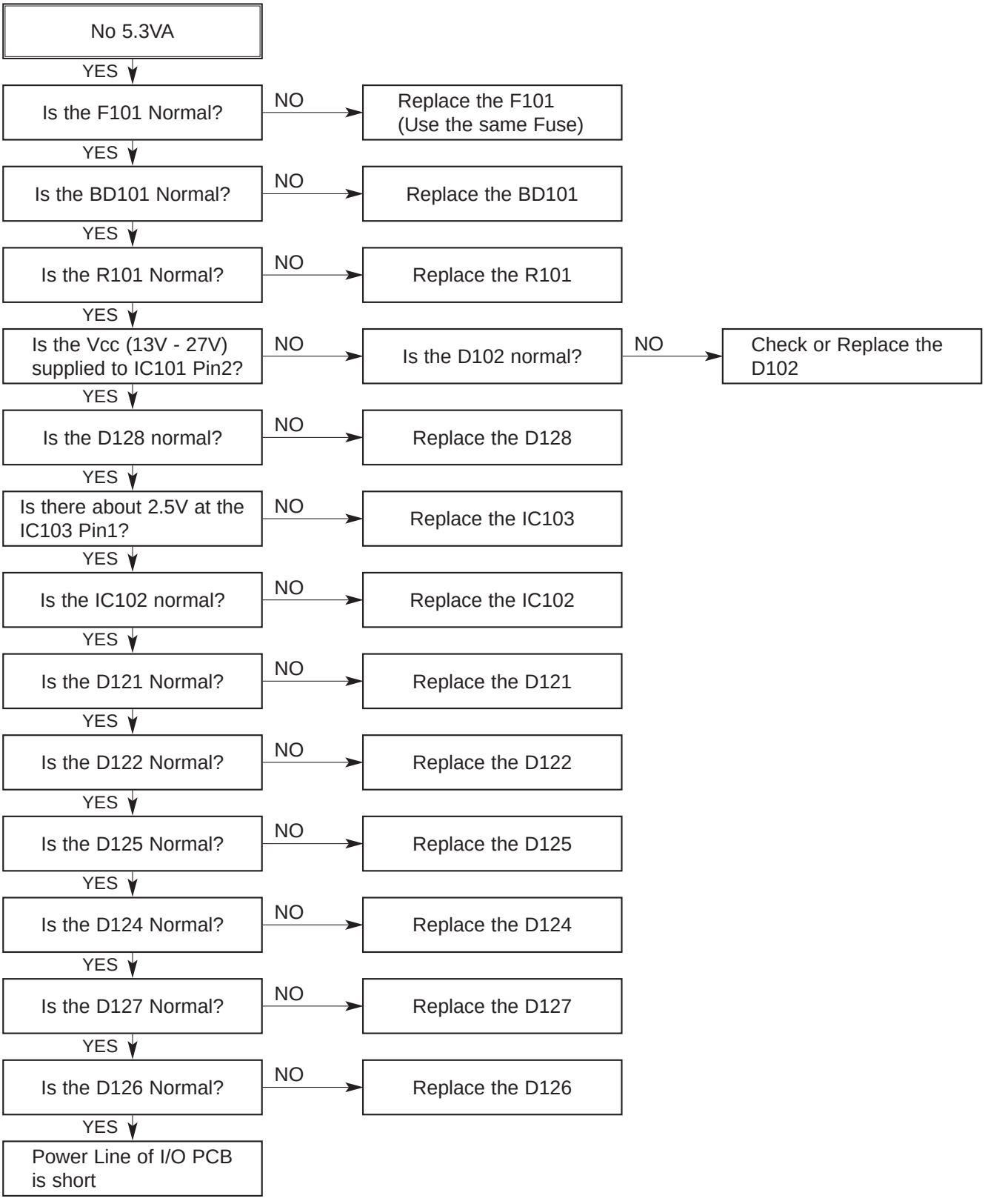

No 12VL
YES
Is the 13.5V supplied to IC155 pin 1?
NO
Check or Replace the D124
YES
Is the IC155 pin4 'H'?
NO
Check the DVD CTL "H" signal from µ-com
YES
Check or Replace the IC155


No 5VL
YES
Is the 5.5V supplied to IC156 pin 1?
NO
Check or Replace the D125
YES
Is the IC156 pin4 'H'?
NO
Check the DVD CTL "H" signal from µ-com
YES
Check or Replace the IC156

HDR PART

ELECTRICAL TROUBLESHOOTING GUIDE

1. POWER SUPPLY ON SMPS BOARD



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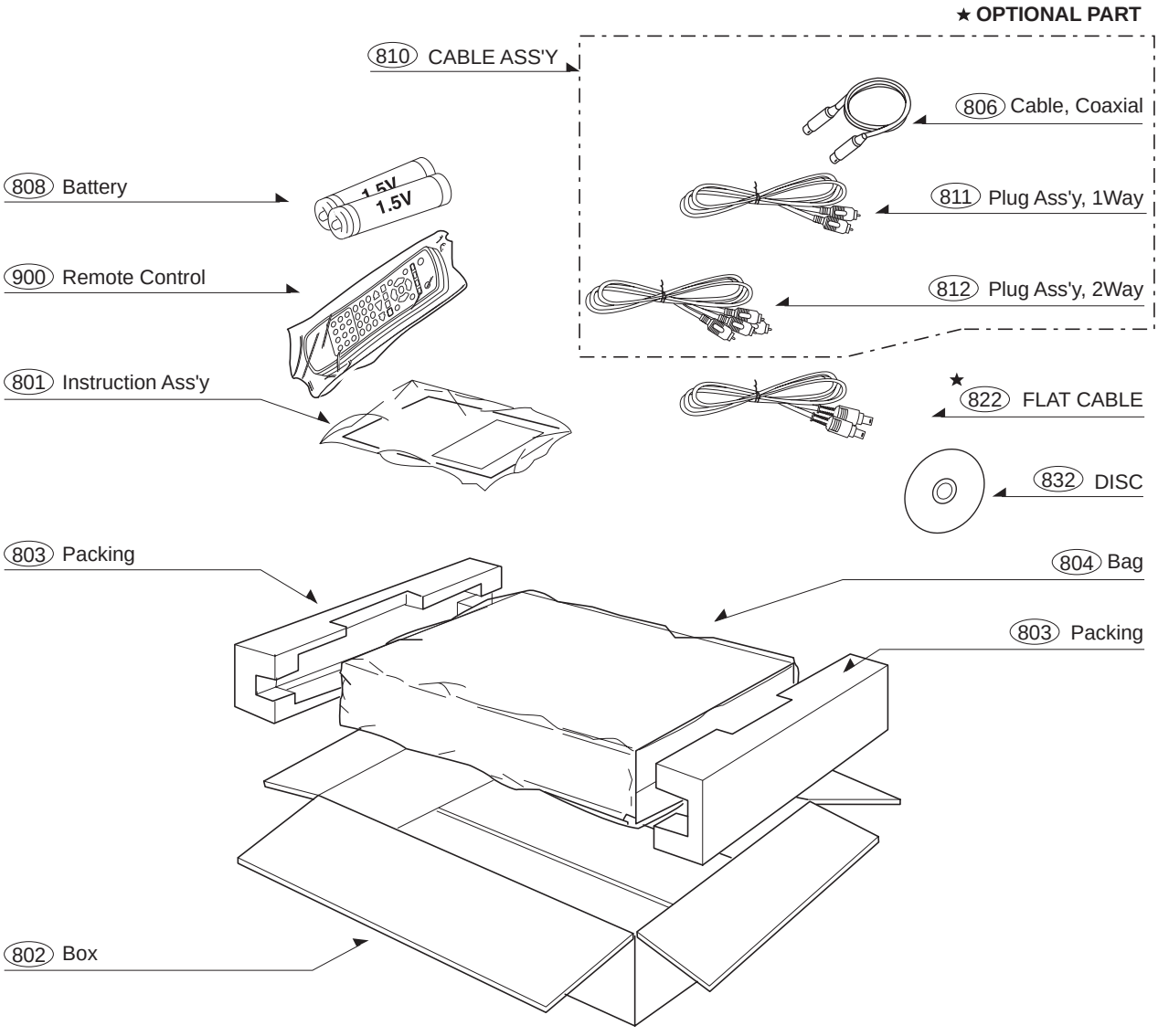
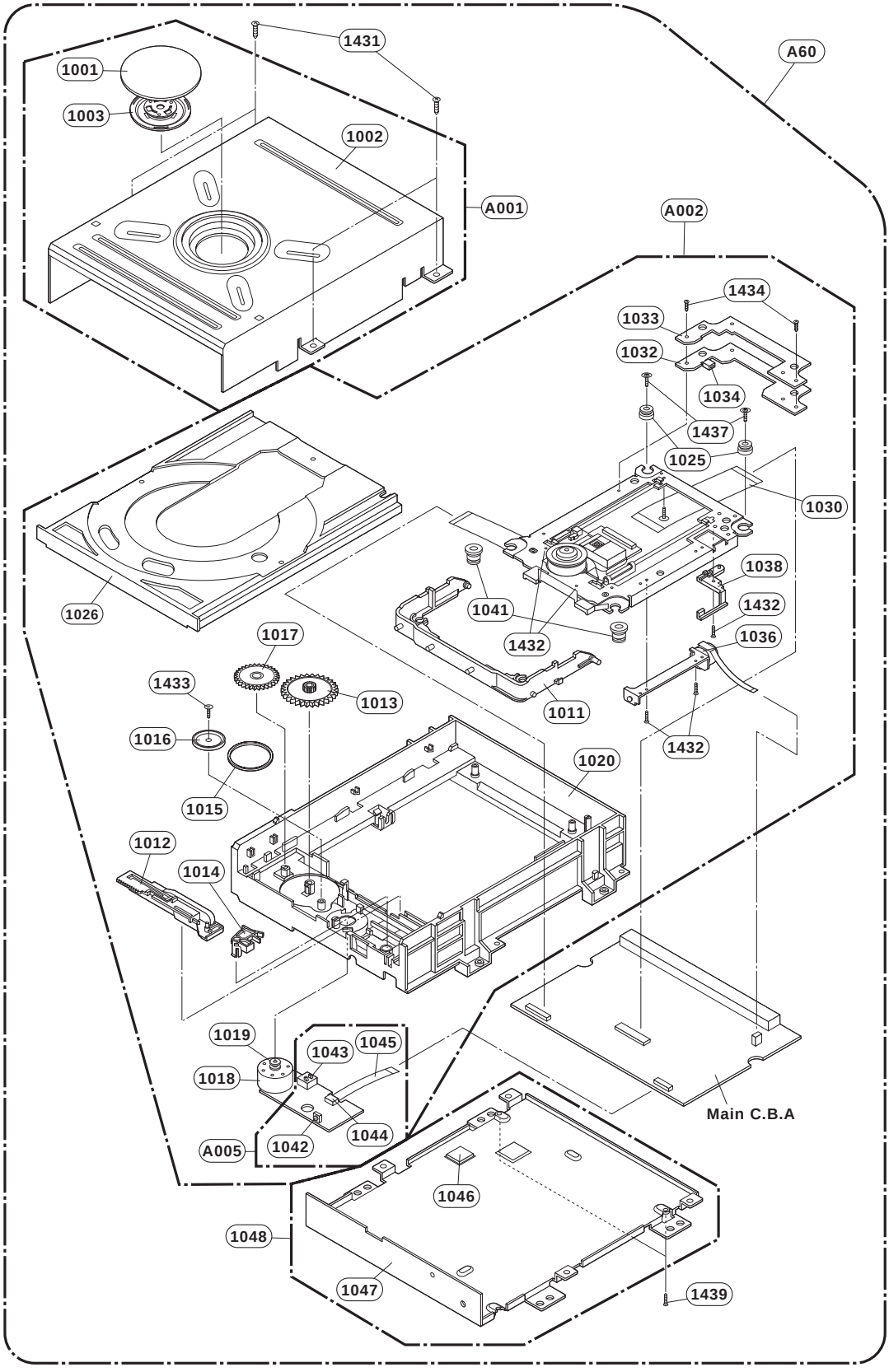
3. PACKING ACCESSORY SECTION

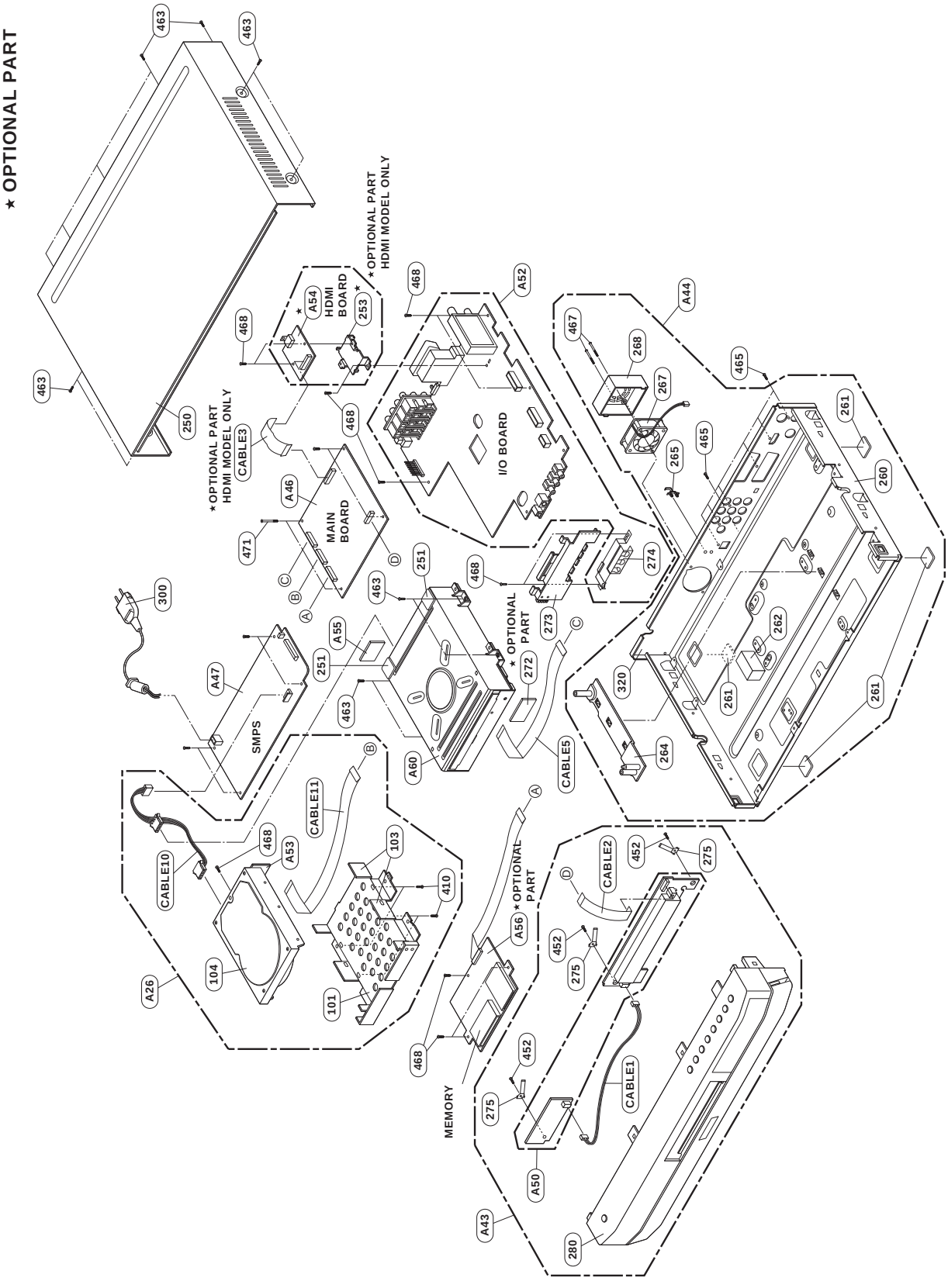


2. DECK MECHANISM SECTION(RS-01A)



EXPLODED VIEWS

1. CABINET AND MAIN FRAME SECTION



SECTION 2

CABINET & MAIN CHASSIS

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3. PACKING ACCESSORY SECTION 2-4

SPECIFICATIONS

• GENERAL

Power requirements	AC 110-240V, 50/60 Hz
Power consumption	35W
Dimensions (approx.)	430 X 54 X 275 mm (w x h x d) without foot
Mass (approx.)	4.1 kg
Operating temperature	5°C to 35°C
Operating humidity	5 % to 90 %
Television system	PAL B/G color system
Recording format	PAL

• RECORDING

Recording format	DVD Video Recording, DVD-VIDEO
Recordable media	HDD (80GB), DVD-ReWritable, DVD-Recordable, DVD+ReWritable, DVD+Recordable, DVD+Recordable (Double Layer)
Recordable time	DVD (4.7GB): Approx. 1 hour (XP mode), 2 hours (SP mode), 4 hours (LP mode), 6 hours (EP mode)
	DVD+R DL (8.5GB): Approx. 3 hour (XP mode), 3 hours 40 minutes (SP mode), 7 hours 10 minutes (LP mode), 10 hours 30 minutes (EP mode)
	HDD (80GB): Approx. 20 hours (XP mode), 40 hours (SP mode), 74 hours (LP mode), 111 hours (EP mode)

Video recording format

Sampling frequency	27MHz
Compression format	MPEG 2 (VBR support)

Audio recording format

Sampling frequency	48kHz
Compression format	Dolby Digital

• PLAYBACK

Frequency response	DVD (PCM 48 kHz): 8 Hz to 22 kHz, CD: 8 Hz to 20 kHz
	DVD (PCM 96 kHz): 8 Hz to 44 kHz
Signal-to-noise ratio	More than 100 dB (AUDIO OUT connector)
Harmonic distortion	Less than 0.008% (AUDIO OUT connector)
Dynamic range	More than 95 dB (AUDIO OUT connector)

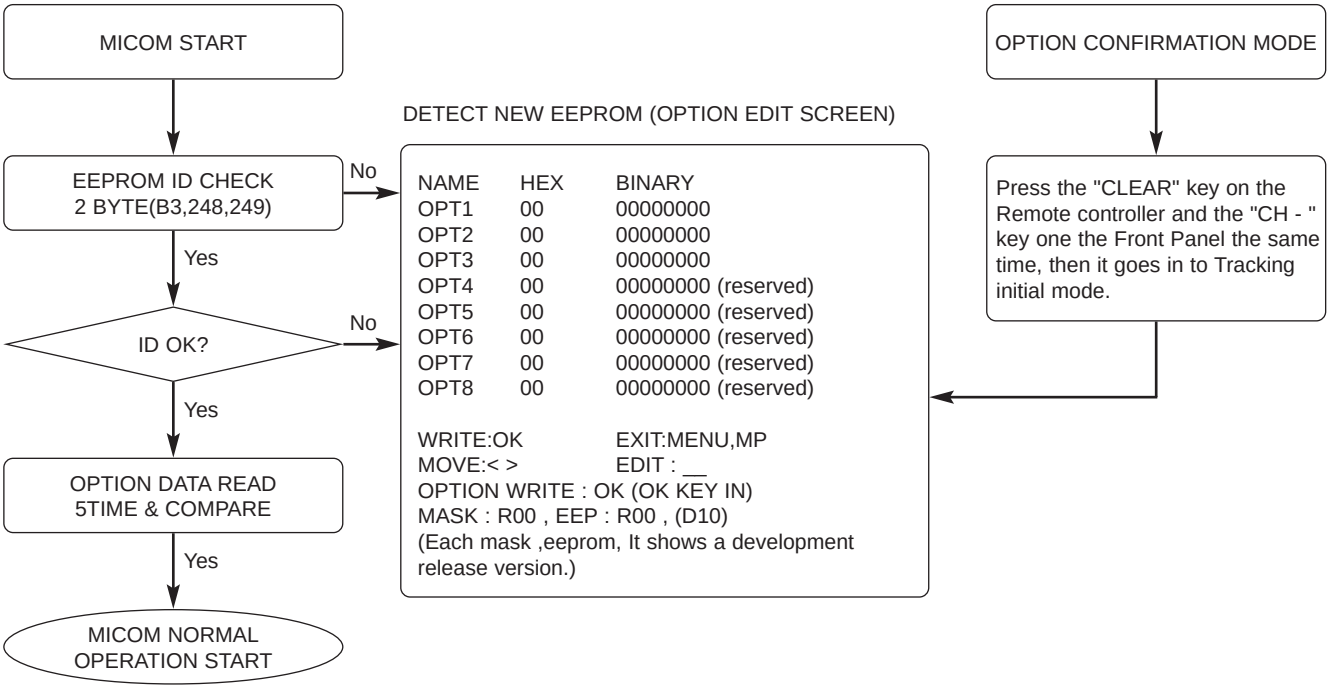
• INPUTS

AERIAL IN	Aerial input, 75 ohms
VIDEO IN	1.0 Vp-p 75 ohms, sync negative, RCA jack x 2
AUDIO IN	2.0 Vrms more than 47 kohms, RCA jack (L, R) x 2
S-VIDEO IN	(Y) 1.0 V (p-p), 75 Ω, sync negative, Mini DIN 4-pin x 1
	(C) 0.3 V (p-p) 75 Ω
DV IN	4 pin (IEEE 1394 standard)

• OUTPUTS

VIDEO OUT	1 Vp-p 75 Ω, sync negative, RCA jack x 1
S-VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, sync negative, Mini DIN 4-pin x 1
	(C) 0.3 V (p-p) 75 Ω
COMPONENT VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, sync negative, RCA jack x 1
	(Pb)/(Pr) 0.7 V (p-p), 75 Ω, RCA jack x 2
Audio output (digital audio)	0.5 V (p-p), 75 Ω, RCA jack x 1
Audio output (optical audio)	3 V (p-p), 75 Ω, Optical connector x 1
Audio output (analog audio)	2.0 Vrms (1 KHz, 0 dB), 600 Ω, RCA jack (L, R) x 1

SERVICE INFORMATION FOR EEPROM IC SETTING



*** EEPROM INITIAL ***

- SETUP is displayed in the field if pressing the Front ch- & ch+ Key with the Remocon number "clear" key pressed in the status of powering on.
- AUTO SEARCH is done since the initial screen of ACMS is serviced if powering on.

SERVICING PRECAUTIONS

CAUTION : Before servicing the HDD/DVD Recorder 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.
Remembers Safety First:

General Servicing Precautions

1. Always unplug the HDD/DVD Recorder AC power cord from the AC power source before:
   (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
   (2) Disconnection 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 HDD/DVD Recorder 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 HDD/DVD Recorder and/or any of its electrical assemblies unless all solid-state device heat sinks are cerrectly installed.

6. Always connect test instrument ground lead to the appropriate ground before connection 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 1M-ohm.
Note 1 : Accessible Conductive Parts including 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 grouned-tip soldering iron to solder or unsolder ES devices.

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

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

6. Do not remove a replacement ES device from its protec tive 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.)

PRODUCT SAFETY SERVICING GUIDELINES FOR VIDEO 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 Electronics 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 Electronics 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:

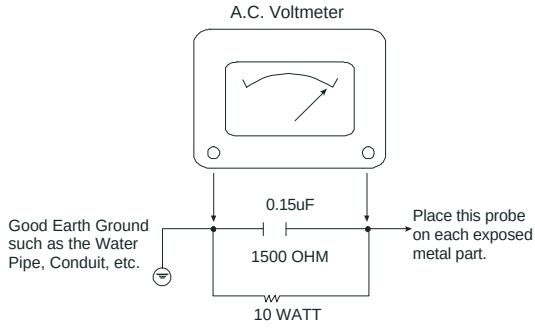
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

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.

NEW FUNCTIONS OF HDD/DVD-RECORDER

• HDMI

HDMI IS THE SPECIFICATION FOR THE HIGH-DEFINITION MULTIMEDIA INTERFACE. HDMI IS PROVIDED FOR TRANSMITTING DIGITAL TELEVISION AUDIOVISUAL SIGNALS FROM HDD-DVD RECORDER TO TELEVISION SETS, OTHER VIDEO DISPLAYS. HDMI CAN CARRY HIGH QUALITY MULTI-CHANNEL AUDIO DATA AND CAN CARRY ALL STANDARD AND HIGH DEFINITION CONSUMER ELECTRONICS VIDEO FORMATS. CONTENT PROTECTION TECHNOLOGY IS AVAILABLE. HDMI CAN ALSO CARRY CONTROL AND STATUS INFORMATION IN BOTH DIRECTIONS.

<< OPERATING >>

AUDIO, VIDEO AND AUXILIARY DATA IS TRANSMITTED ACROSS THE THREE TMDS DATA CHANNELS.

THE VIDEO PIXEL CLOCK IS TRANSMITTED ON THE TMDS CLOCK CHANNEL AND IS USED BY THE RECEIVER AS A FREQUENCY REFERENCE FOR DATA RECOVERY ON THE THREE TMDS DATA CHANNELS.

VIDEO DATA IS CARRIED AS A SERIES OF 24-BIT PIXELS ON THE THREE TMDS DATA CHANNELS.

TMDS ENCODING CONVERTS THE 8BIT PER CHANNEL INTO THE 10BIT DC–BALANCED.

VIDEO PIXEL RATES CAN RANGE FROM 25MHZ TO 165MHZ. THE VIDEO PIXELS CAN BE ENCODED IN EITHER RGB,YCBCR 4:4:4 OR YCBCR 4:2:2 FORMATS. IN ALL THREE CASES, UP TP 24 BITS PER PIXEL CAN BE TRANSFERRED.

FAST DUBBING

DUBBING MEANS A COPYING FUNCTION BETWEEN HDD TO DVD DISCS.

COPYING BETWEEN HDD TO DVD IS A COMPLETELY DIGITAL PROCESS AND THEREFORE INVOLVES NO LOSS OF QUALITY IN THE AUDIO OR VIDEO. SO THIS MEANS THAT COPYING CAN BE CARRIED OUT AT THE MAXIMUM SPEED POSSIBLE.

<< DUBBING SPEED RATE >>

NORMAL DUBBING : SPEED RATE MAX X1
FAST DUBBING : SPEED RATE MAX X4

WHEN FAST DUBBING FROM HDD TO DVD , THE SPEED OF COPYING DEPENDS ON THE RECORDING MODE AND THE KIND OF USING THE DVD DISC, AND THIS MODE IS NOT AVAILABLE FOR EDITED VIDEO TITLE IN HDD.

WHEN FAST DUBBING FROM DVD TO HDD , ONLY AVAILABLE WHEN COPYING VR MODE DISC(DVD-RW) TO HDD , AND ONLY NORMAL DUBBING AVAILABLE WHEN COPYING VIDEO MODE DISC (DVD+R/RW, DVD-R) TO HDD

SECTION 1

SUMMARY

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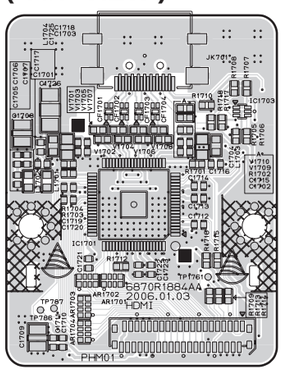
MEMO

MEMO

6. HDMI P.C.BOARD(OPTIONAL PARTS)

(TOP VIEW)



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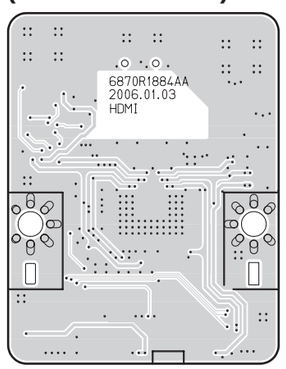
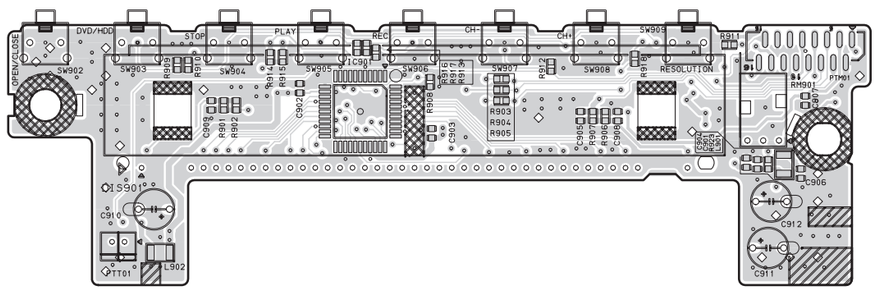


4. TIMER1 P.C.BOARD

(6, 7, 8 TOOL)

(TOP VIEW)



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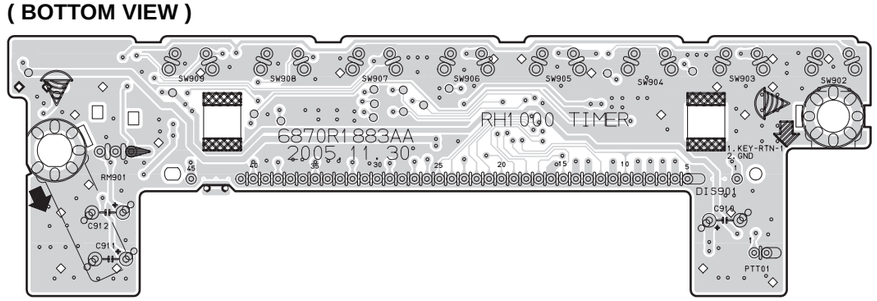
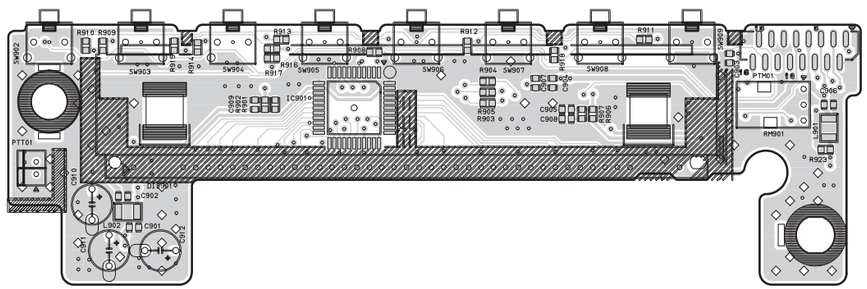


(9TOOL)

(TOP VIEW)



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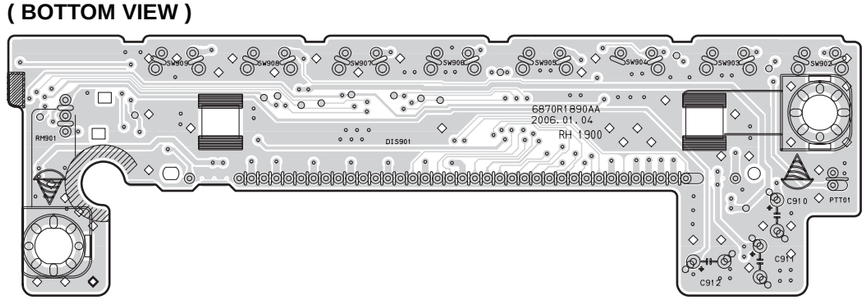
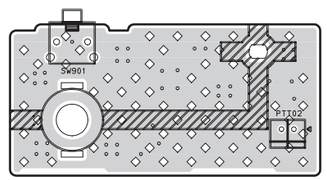


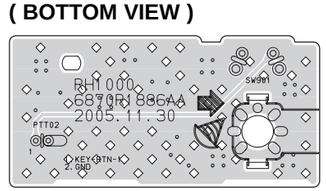
5. TIMER2 P.C.BOARD (6, 7, 8 TOOL)

(6, 7, 8 TOOL)

(TOP VIEW)



(BOTTOM VIEW)



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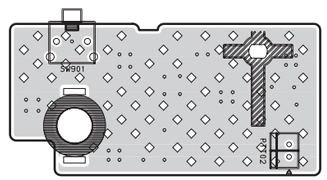
(TOP VIEW)



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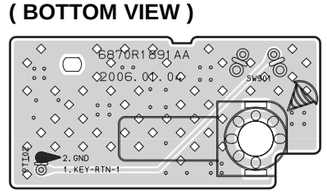
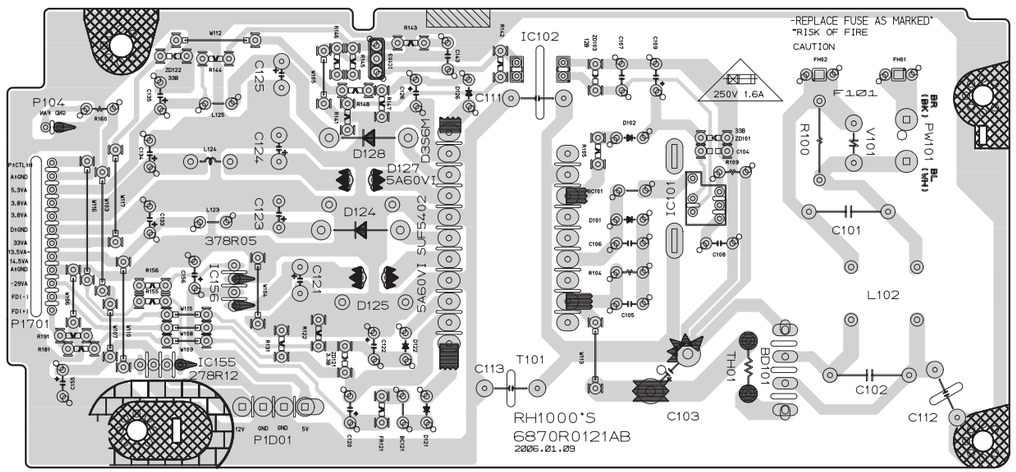
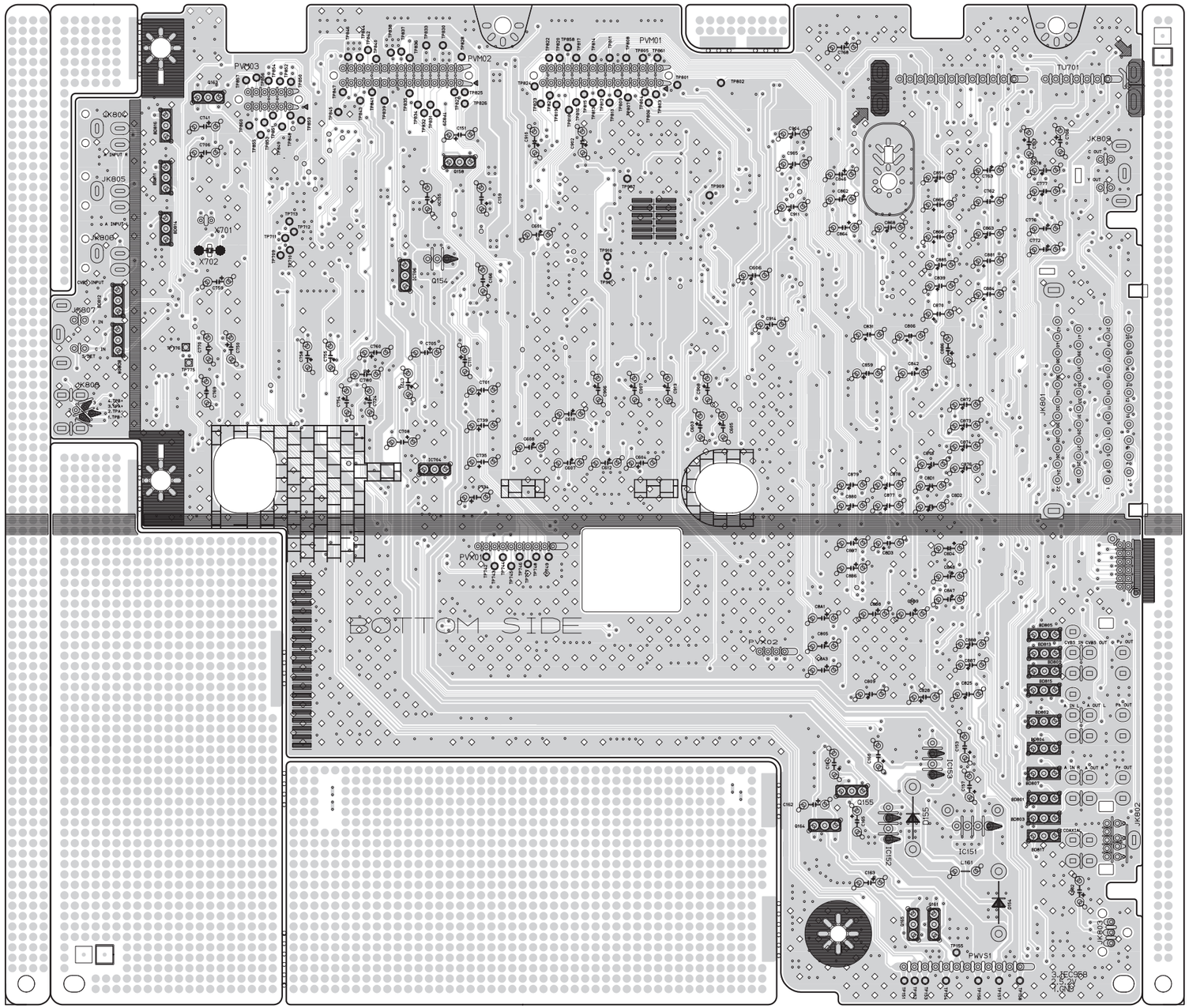


3. POWER P.C.BOARD



2. I/O P.C.BOARD

(BOTTOM VIEW)