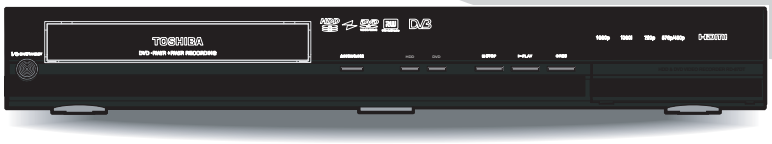
TOSHIBA

FILE NO. 810-200778GR

SERVICE MANUAL

HDD & DVD Video Recorder

RD-87DTKF



The above model is classified as a green product (*1), as indicated by the underlined serial number. This Service Manual describes replacement parts for the green product. When repairing this green product, use the part(s) described in this manual and lead-free solder (*2).

For (*1) and (*2), see the next page.

Published in Japan, Sep. 2007 GREEN

(*1) GREEN PRODUCT PROCUREMENT

The EC is actively promoting the WEEE & RoHS Directives that define standards for recycling and reuse of Waste Electrical and Electronic Equipment and for the Restriction of the use of certain Hazardous Substances. From July 1, 2006, the RoHS Directive will prohibit any marketing of new products containing the restricted substances.

Increasing attention is given to issues related to the global environmental. Toshiba Corporation recognizes environmental protection as a key management tasks, and is doing its utmost to enhance and improve the quality and scope of its environmental activities. In line with this, Toshiba proactively promotes Green Procurement, and seeks to purchase and use products, parts and materials that have low environmental impacts.

Green procurement of parts is not only confined to manufacture. The same green parts used in manufacture must also be used as replacement parts.

(*2) LEAD-FREE SOLDER

This product is manufactured using lead-free solder as a part of a movement within the consumer products industry at large to be environmentally responsible. Lead-free solder must be used in the servicing and repair of this product.

WARNING

This product is manufactured using lead free solder.

DO NOT USE LEAD BASED SOLDER TO REPAIR THIS PRODUCT !

The melting temperature of lead-free solder is higher than that of leaded solder by 86°F to 104°F (30°C to 40°C). Use of a soldering iron designed for lead-based solders to repair product made with lead-free solder may result in damage to the component and or BOARD being soldered. Great care should be made to ensure high-quality soldering when servicing this product — especially when soldering large components, through-hole pins, and on BOARDs — as the level of heat required to melt lead-free solder is high.

IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all TOSHIBA Equipment. The service procedures recommended by TOSHIBA and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.

It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. TOSHIBA could not possibly know, evaluate and advice the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, TOSHIBA has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by TOSHIBA must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

TABLE OF CONTENTS

SPECIFICATIONS

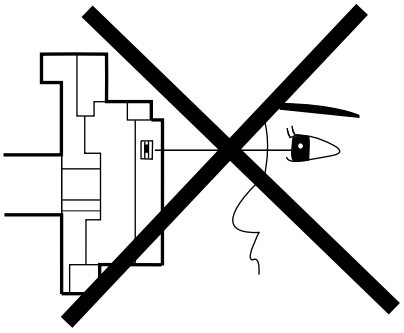
General	
System	HDD, DVD-Video, DVD-RW/-R, DVD+RW/+R, Video CD, CD-DA, CD-RW/-R
Power requirements	220–240 V~ ± 10%, 50 Hz ± 0.5%
Power consumption	37 W (standby: 7 W)
Weight	3.9 kg
Dimensions (width x height x depth)	420 x 59 x 315 mm
Operating temperature	5°C to 40°C
Operating humidity	Less than 80% (no condensation)
TV format	PAL-B/G, SECAM-LL'
Recording	
Recording format	Video Recording (VR) format (DVD-RW only), Video format (DVD-RW, DVD-R) +VR format (DVD+RW, DVD+R)
Recordable discs	DVD-ReWritable, DVD-Recordable, DVD+ReWritable, DVD+Recordable
Video recording format	
Sampling frequency	13.5 MHz
Compression format	MPEG
Audio recording format	
Sampling frequency	48 kHz
Compression format	Dolby Digital
Tuner	
Analogue channels	
L (SECAM L)	F1 - E69
BG (PAL B/G)	E2 - E69
DVB-T channels	
VHF	F5 - F10
UHF	E21 - E69
Input/Output	
Front Panel : (AV3)	
Video input Input level	One RCA connector 1 Vp-p (75 Ω)
S-Video input Input level	One Mini DIN 4-pin jack Y (luminance) 1 Vp-p (75 Ω) C (colour) 300 mVp-p (75 Ω)
Audio input Input level	Two RCA connectors 2 Vrms (input impedance: more than 10 kΩ)
DV input DV 4-pin jack	IEEE 1394
Rear Panel :	
ANALOG VHF/UHF antenna input/output terminal DVB-T UHF antenna input/output terminal	75 Ω 75 Ω
Audio input /output	Two 21-pin scart sockets (AV1, AV2)
Video input /output Input /output level	Two 21-pin scart sockets (AV1, AV2) 1 Vp-p (75 Ω) each
Component video output Output level	Three RCA connectors Y: 1.0 Vp-p (75 Ω) P_B/C_B, P_R/C_R: 0.7 Vp-p (75 Ω) each
Audio output Output level	Two RCA connectors 2 Vrms (output impedance: 680 Ω)
Digital audio output Output level	One Coaxial pin jack 500 mVp-p (75 Ω)
HDMI output	HDMI jack

Note

The specifications and design of this product are subject to change without notice.

LASER BEAM SAFETY PRECAUTIONS

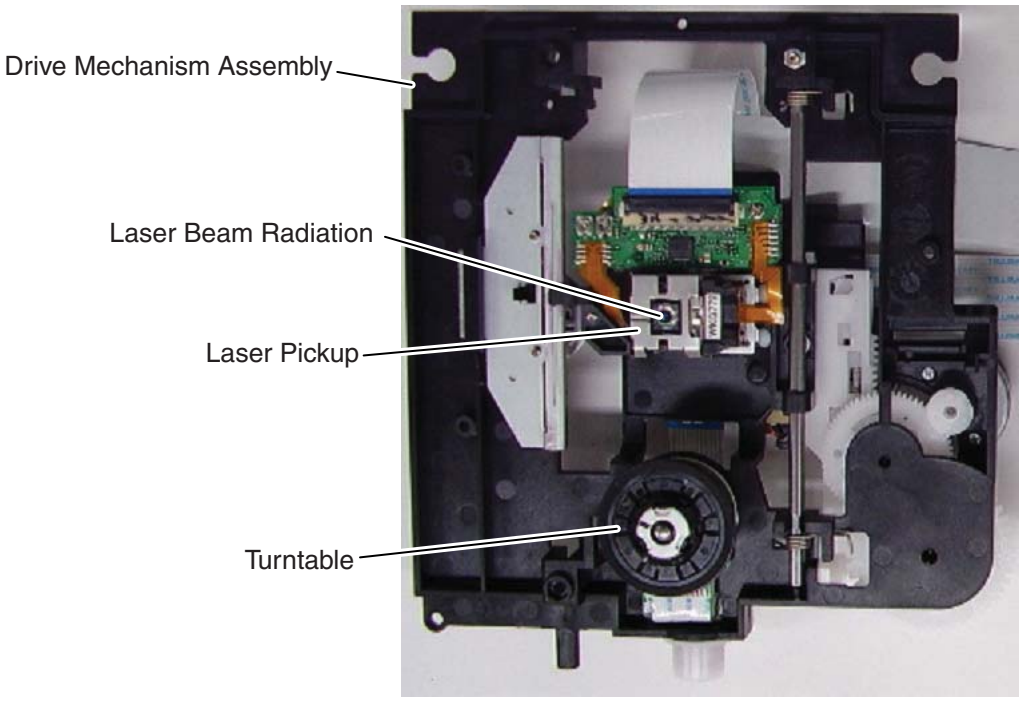
This DVD player uses a pickup that emits a laser beam.

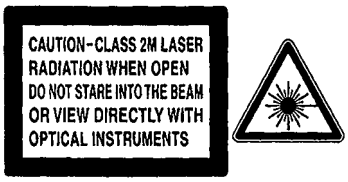


Do not look directly at the laser beam coming from the pickup or allow it to strike against your skin.

The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 30 cm away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.

CAUTION: Use of controls and adjustments, or doing procedures other than those specified herein, may result in hazardous radiation exposure.





Location: Inside Top of DVD mechanism.

IMPORTANT SAFETY PRECAUTIONS

Product Safety Notice

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a ⚠ on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are carefully inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Precautions during Servicing

A. Parts identified by the ⚠ symbol are critical for safety. Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:

1)Wires covered with PVC tubing

2)Double insulated wires

3)High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:

1)Insulation tape

2)PVC tubing

3)Spacers

4)Insulators for transistors

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).

G. Check that replaced wires do not contact sharp edges or pointed parts.

H. When a power cord has been replaced, check that 5 - 6 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Be careful that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

K. When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts, and wires have been returned to their original positions. Afterwards, do the following tests and confirm the specified values to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Clearance Distance (d), (d')
220 to 240 V	≥ 3 mm(d) ≥ 6 mm(d')

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

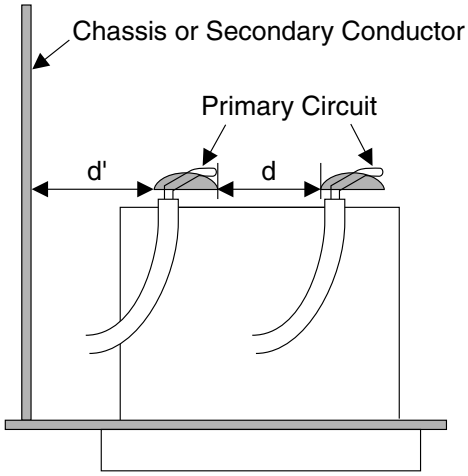


Fig. 1

2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

Measuring Method (Power ON) :

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across the terminals of load Z. See Fig. 2 and the following table.

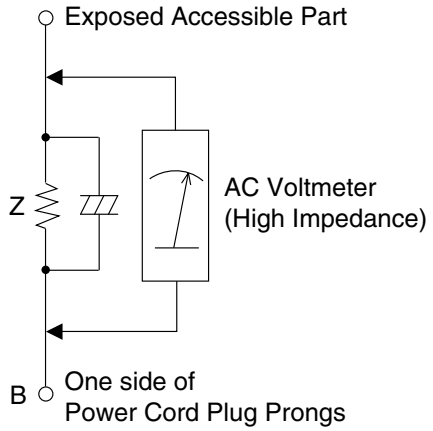


Fig. 2

Table 2: Leakage current ratings for selected areas

AC Line Voltage	Load Z	Leakage Current (i)	One side of power cord plug prongs (B) to:
220 to 240 V	2kΩ RES. Connected in parallel	i≤0.7mA AC Peak i≤2mA DC	RF or Antenna terminals
	50kΩ RES. Connected in parallel	i≤0.7mA AC Peak i≤2mA DC	A/V Input, Output

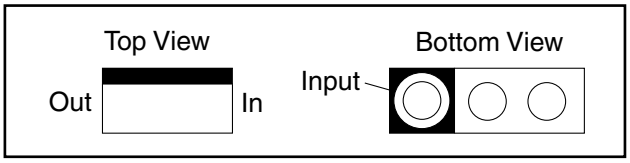
Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

STANDARD NOTES FOR SERVICING

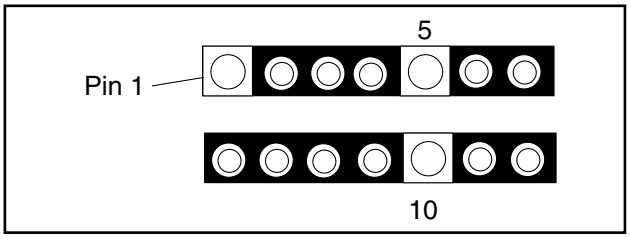
NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

Circuit Board Indications

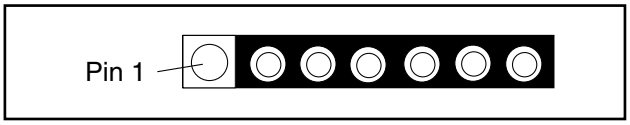
1. The output pin of the 3 pin Regulator ICs is indicated as shown.



2. For other ICs, pin 1 and every fifth pin are indicated as shown.

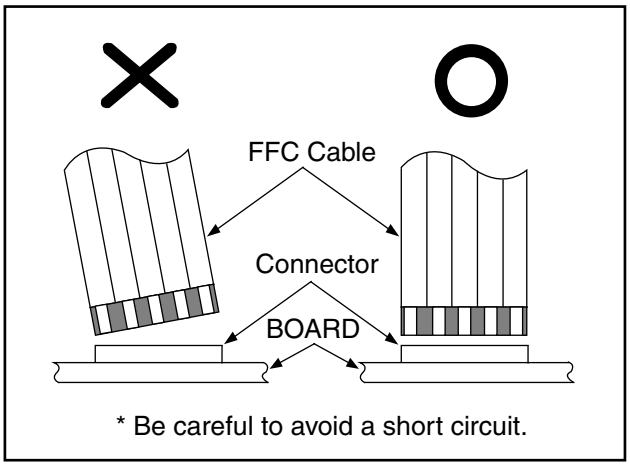


3. The 1st pin of every male connector is indicated as shown.



Instructions for Connectors

1. When you connect or disconnect the FFC (Flexible Foil Connector) cable, be sure to first disconnect the AC cord.
2. FFC (Flexible Foil Connector) cable should be inserted parallel into the connector, not at an angle.



Pb (Lead) Free Solder

When soldering, be sure to use the Pb free solder.

How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:

1. Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)

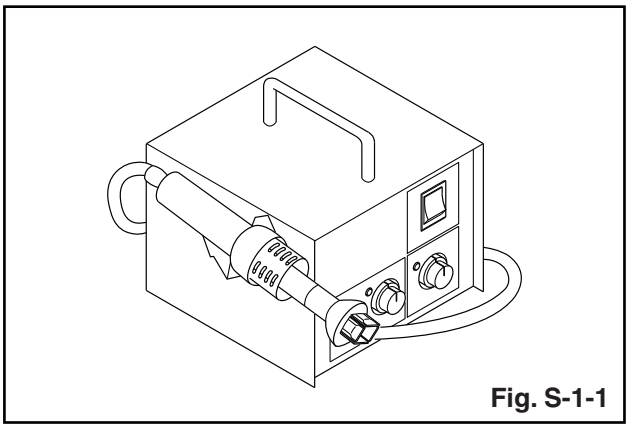


Fig. S-1-1

2. Remove the flat pack-IC with tweezers while applying the hot air.
3. Bottom of the flat pack-IC is fixed with glue to the BOARD; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
4. Release the flat pack-IC from the BOARD using tweezers. (Fig. S-1-6)

CAUTION:

1. The Flat Pack-IC shape may differ by models. Use an appropriate hot-air flat pack-IC desoldering machine, whose shape matches that of the Flat Pack-IC.
2. Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)

3. The flat pack-IC on the BOARD is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.

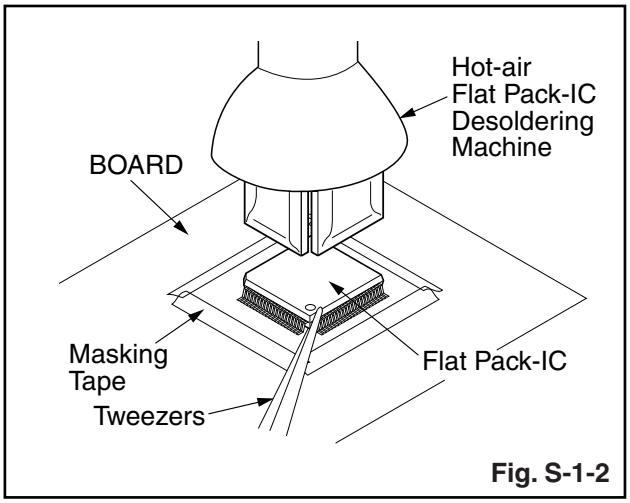


Fig. S-1-2

With Soldering Iron:

1. Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

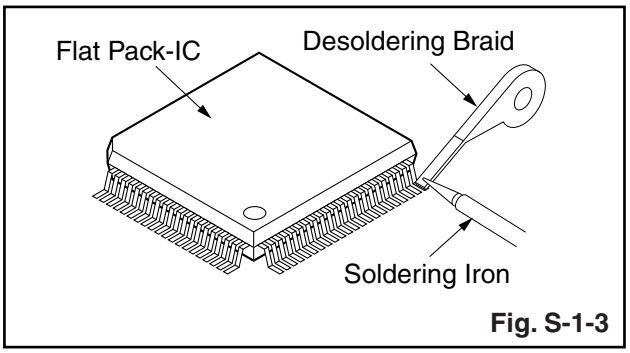


Fig. S-1-3

2. Lift each lead of the flat pack-IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air desoldering machine. (Fig. S-1-4)

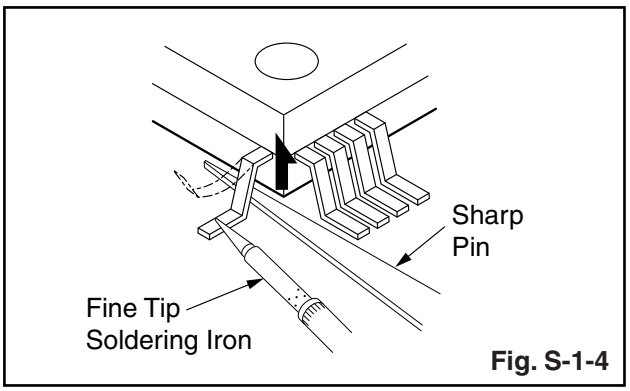


Fig. S-1-4

3. Bottom of the flat pack-IC is fixed with glue to the BOARD; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
4. Release the flat pack-IC from the BOARD using tweezers. (Fig. S-1-6)

With Iron Wire:

1. Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)
2. Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.
3. While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the BOARD contact pads as shown in Fig. S-1-5.
4. Bottom of the flat pack-IC is fixed with glue to the BOARD; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
5. Release the flat pack-IC from the BOARD using tweezers. (Fig. S-1-6)

Note: When using a soldering iron, care must be taken to ensure that the flat pack-IC is not being held by glue. When the flat pack-IC is removed from the BOARD, handle it gently because it may be damaged if force is applied.

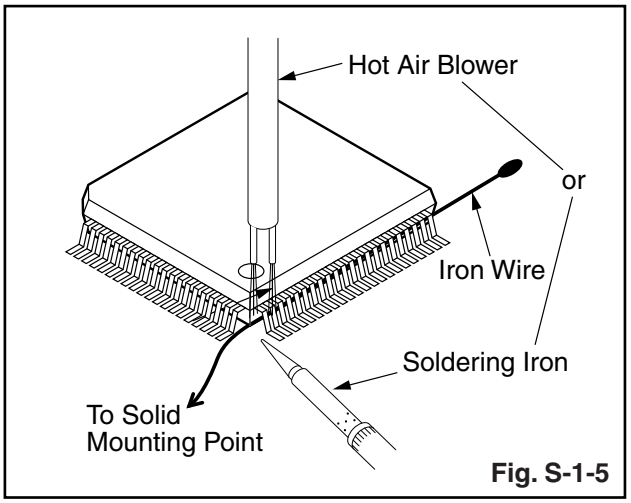


Fig. S-1-5

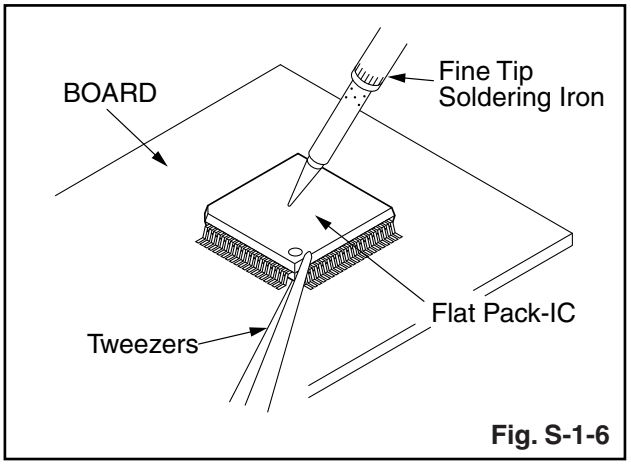


Fig. S-1-6

2. Installation

1. Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the BOARD so you can install a replacement flat pack-IC more easily.
2. The "●" mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the 1 on the BOARD when positioning for installation. Then presolder the four corners of the flat pack-IC. (See Fig. S-1-8.)
3. Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.

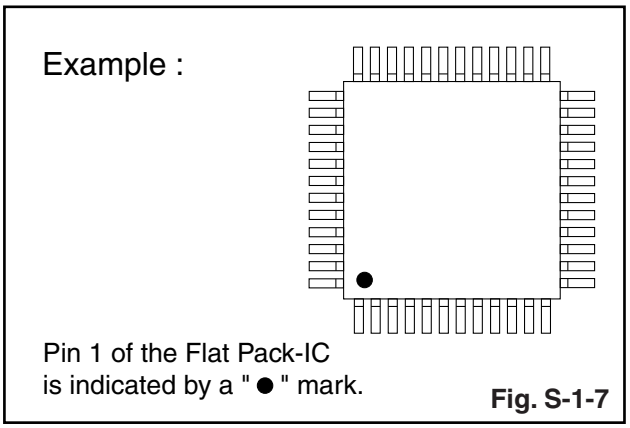


Fig. S-1-7

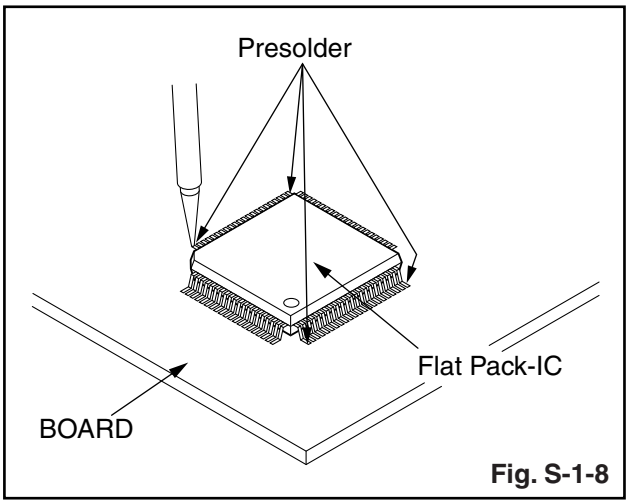


Fig. S-1-8

Instructions for Handling Semi-conductors

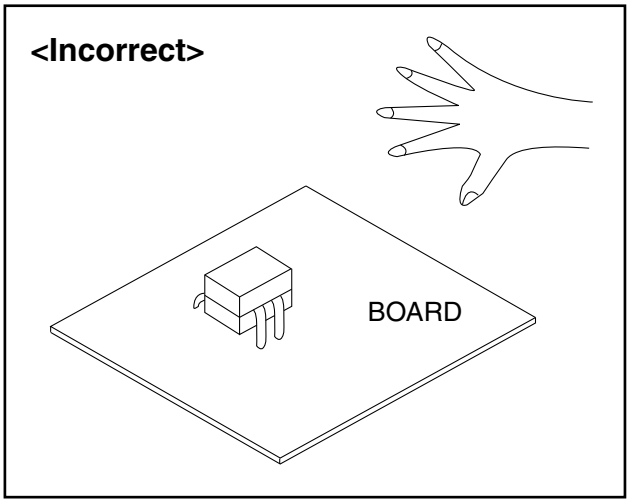
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

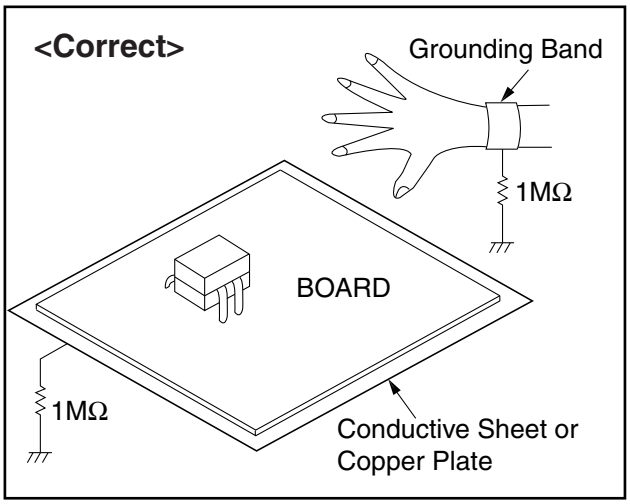
1. Ground for Human Body

Be sure to wear a grounding band (1 MΩ) that is properly grounded to remove any static electricity that may be charged on the body.

2. Ground for Workbench

Be sure to place a conductive sheet or copper plate with proper grounding (1 MΩ) on the workbench or other surface, where the semi-conductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semi-conductors with your clothing.





HANDLING PRECAUTIONS FOR HDD

CAUTION:

1. SHOCK

a. Exposing HDD to shock may be the biggest damaging factor. Please note that HDD is easily damaged even if dropped from any height. Be sure to place HDD on a shock-absorbent mat. Also, be careful when transporting HDD.

b. Be careful not to subject HDD to any shock when tightening screws for HDD replacement. **(Tighten screws manually, not with an electric driver.)**

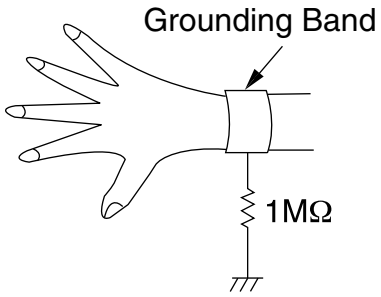
2. MOISTURE

a. Moisture may also be a damaging factor. HDD is semiclosed style. Sudden changes in ambient temperature may cause moisture to form. Monitor temperature and do not allow moisture to form on the media surface. Also, when opening HDD package, do so only after package is at ambient temperature.

b. After replacing HDD, leave it to reach room temperature (about 2 hours) for preventing dew internal condensation, and then work necessary task such as operation check.

3. STATIC ELECTRICITY

a. After removing HDD or taking replacement HDD out of the protective bag (the replacement HDD is packed in a protective bag), place HDD on a conductive surface. A grounding band should be worn when handling.



Both the conductive surface and grounding band should be grounded.

b. Make sure that HDD is placed on main unit completely and then let go of it, when assembling.

c. Do not put HDD on a packing bag. (for preventing electrostatic damage)

4. OTHERS

a. Be careful so as not to do the followings. Otherwise, HDD might be damaged.

- **DO NOT** disassemble HDD.
- When handling HDD, be sure to hold both sides securely.

b. HDD should be stored, packed in the protective bag, in suitable surroundings (i.e., no extreme changes in temperature to avoid condensation).

c. When transporting HDD, be sure to use the exclusive packing case (the replacement HDD carton).

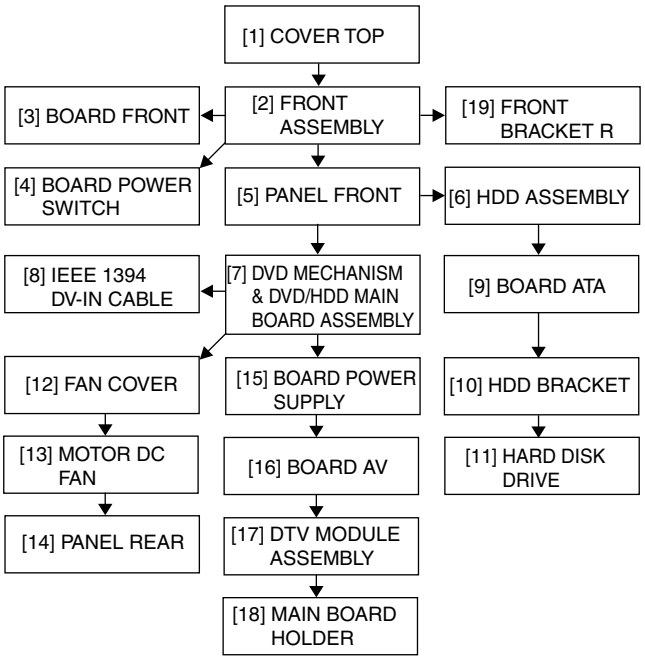
d. Do not stack HDDs.

e. Do not place vertically because HDD is unstable and easy to fall.

CABINET DISASSEMBLY INSTRUCTIONS

1. Disassembly Flowchart

This flowchart indicates the disassembly steps to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route, and dress the cables as they were originally.



2. Disassembly Method

ID/ LOC. No.	PART	REMOVAL		
		Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	Note
[1]	COVER TOP	D1	8(S-1)	---
[2]	FRONT ASSEMBLY	D2	*CN2204, *5(L-1), *3(L-2)	1
[3]	BOARD FRONT	D3	*CN3001-F, 4(S-2A)	---
[4]	BOARD POWER SWITCH	D3	(S-2B)	---
[5]	PANEL FRONT	D3	----------	---
[6]	HDD ASSEMBLY	D4	*CN1015, *CN651, 3(S-3)	---
[7]	DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY	D4	(S-4), 4(S-5), (S-6), *CN101, *CN503, *CN701, *CN901, BOARD SUPPORT/ BOARD SPACERS, M-BOARD PLATE EARTH	2
[8]	IEEE 1394 DV-IN CABLE	D4	2(S-7), DV PLATE EARTH	---
[9]	BOARD ATA	D5	*CN3001-A	---
[10]	HDD BRACKET	D5	4(S-8)	---
[11]	HARD DISK DRIVE	D5	(S-9), HDD PLATE EARTH	3
[12]	FAN COVER	D6	2(S-10)	---
[13]	MOTOR DC FAN	D6	FAN EARTH, *CN1601	---
[14]	PANEL REAR	D6	(S-11), 2(S-12), 2(S-13)	---
[15]	BOARD POWER SUPPLY	D7	*CN1152, 4(S-14), POWER HOLDER	---
[16]	BOARD AV	D7	5(S-15)	---
[17]	DTV MODULE ASSEMBLY	D7	DESOLDER, MODULE BOARD HOLDER	---
[18]	MAIN BOARD HOLDER	D7	(S-16)	---
[19]	FRONT BRACKET R	D7	(S-17)	---
↓ (1)	↓ (2)	↓ (3)	↓ (4)	↓ (5)

Note:

(1): Identification (location) No. of parts in the figures

(2): Name of the part

(3): Figure Number for reference

(4): Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, L=Locking Tab, S=Screw, CN=Connector
*=Unhook, Unlock, Release, Unplug, or Desolder
e.g. 7(S-1) = seven Screws (S-1),
5(L-1) = five Locking Tabs (L-1)

(5): Refer to “Reference Notes.”

Reference Notes

1. Locking Tabs (L-1) ,(L-2) are fragile. Be careful not to break them.
   1-1. Release five Locking Tabs (L-1).
   1-2. Release three Locking Tabs (L-2) and remove the PANEL FRONT.
2. **The DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY is adjusted as a unit at factory. Therefore, do not disassemble it. Replace the DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY as a unit.**
3. Whenever you have replaced the Hard Disk Drive, initialize the Hard Disk Drive. To initialize the Hard Disk Drive, perform the following.
   3-1. To put the HDD & DVD Video Recorder into the HDD mode, press the [HDD] button on the remote control unit.
   3-2. To put the HDD & DVD Video Recorder into the self-check mode, after pressing [VARIABLE SKIP] button, press the [0], [7], and [9] buttons on the remote control unit in that order within three seconds.
   3-3. Press [ENTER/OK] button. The HDD & DVD Video Recorder is initialized and the power is turned off automatically after two seconds.

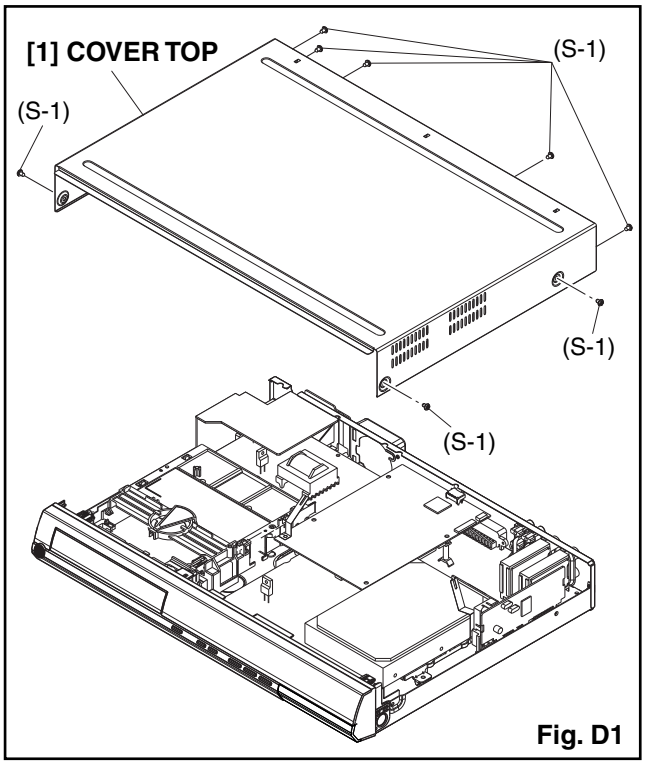


Fig. D1

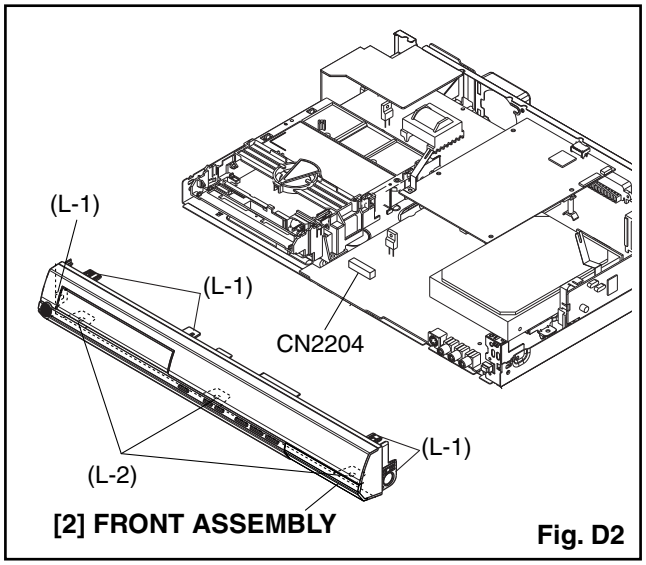


Fig. D2

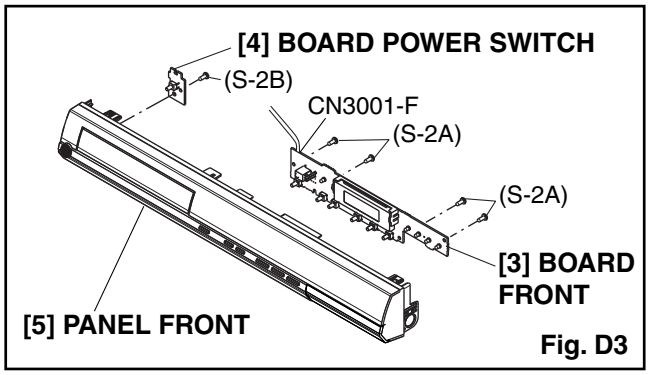


Fig. D3

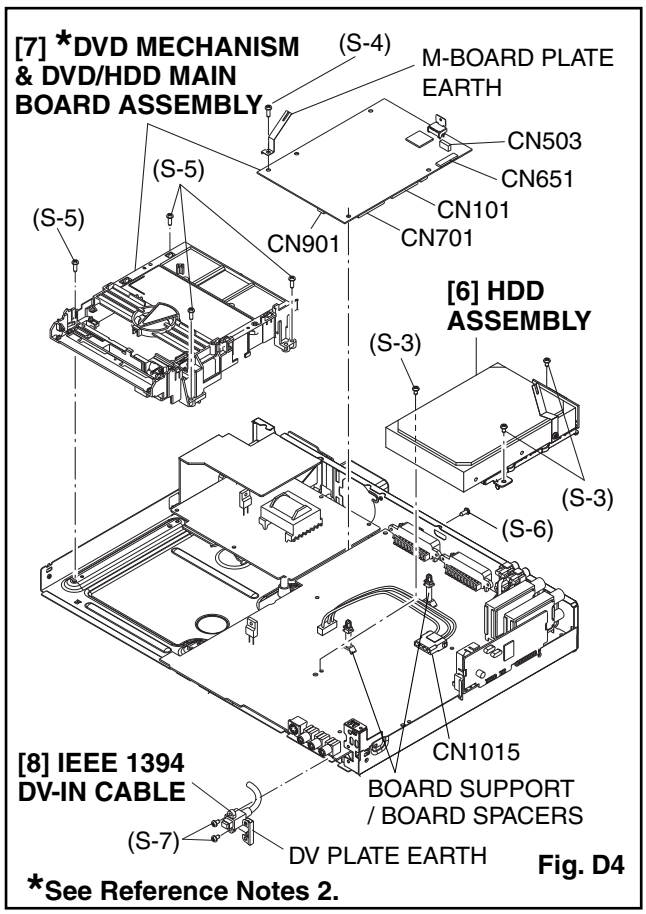


Fig. D4

*See Reference Notes 2.

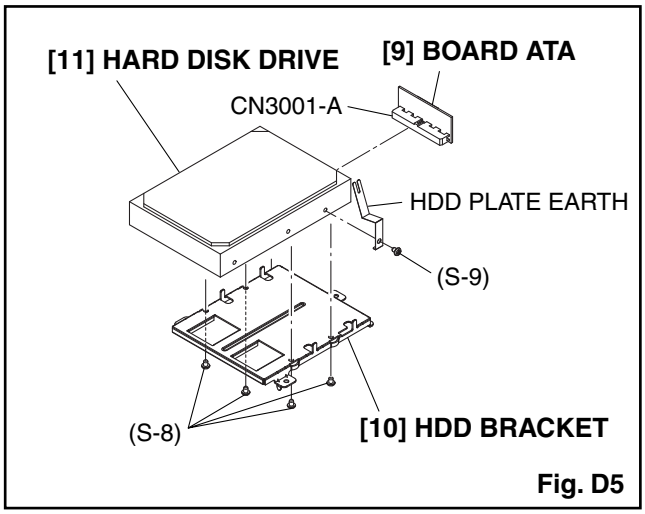


Fig. D5

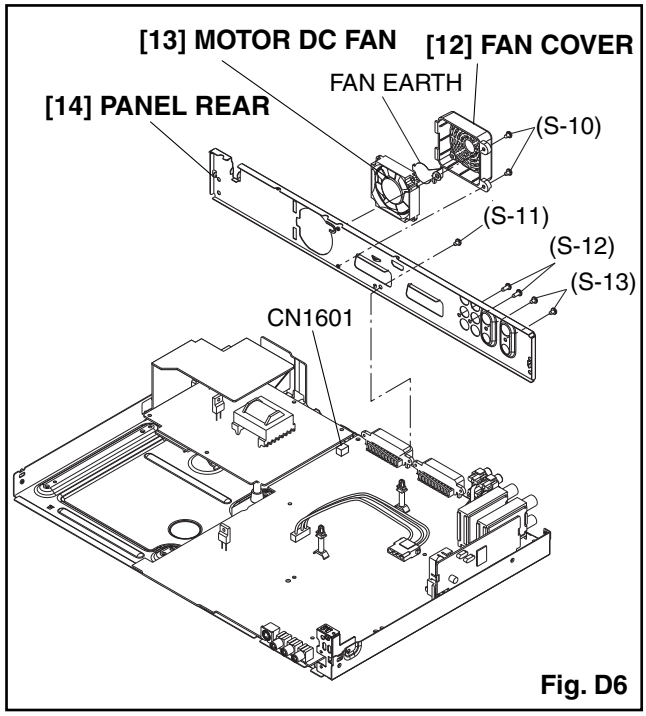


Fig. D6

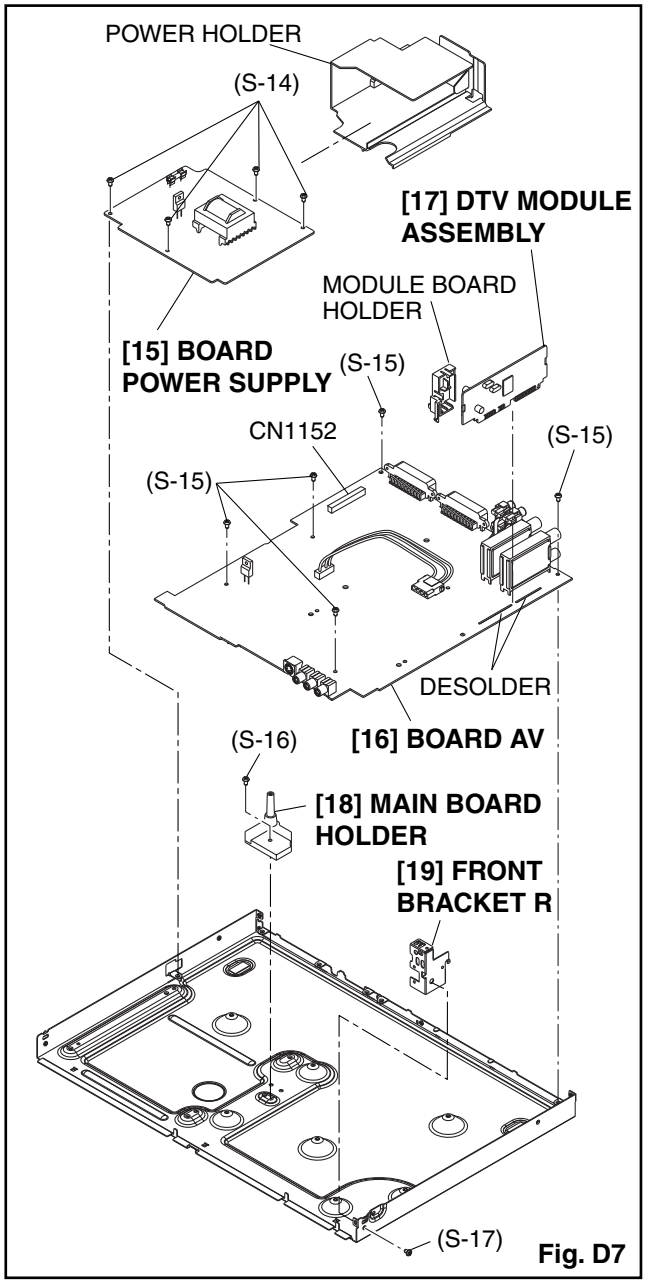
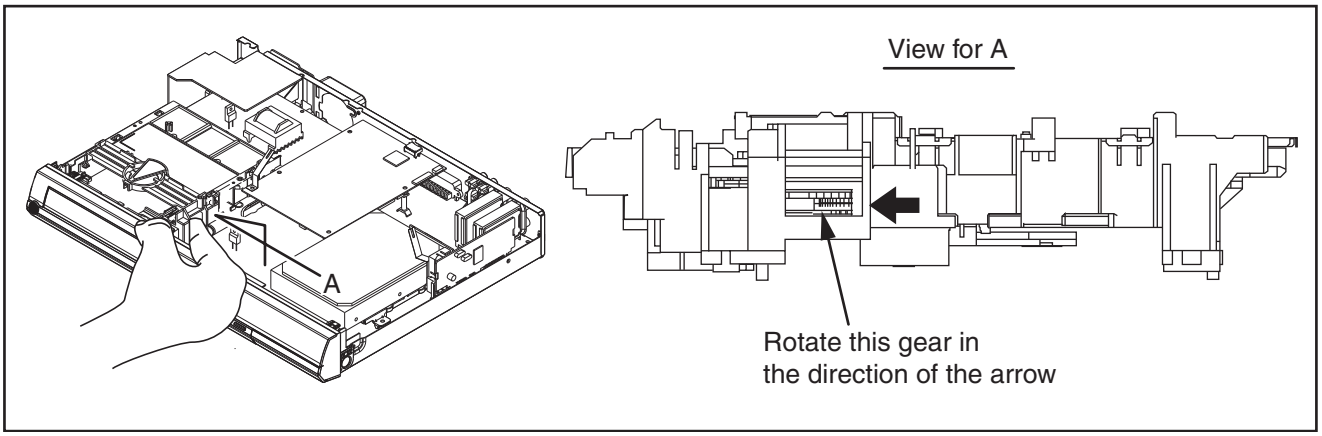


Fig. D7

3. How to Eject Manually

Note: When rotating the gear, be careful not to damage the gear.

1. Remove the COVER TOP.
2. Rotate the gear in the direction of the arrow manually as shown below until the tray descends.
3. Pull the tray out manually and remove a disc.



HOW TO SELF-CHECK AND INITIALIZE THE HDD & DVD VIDEO RECORDER

1. Turn on the HDD & DVD Video Recorder.
2. To put the HDD & DVD Video Recorder into the HDD mode, press [HDD] on the remote control unit.
3. To put the HDD & DVD Video Recorder into the self-check mode, after pressing [VARIABLE SKIP] button, press the [0], [7], and [9] buttons on the remote control unit in that order within three seconds.
   Fig. a appears on the screen and all LEDs light.

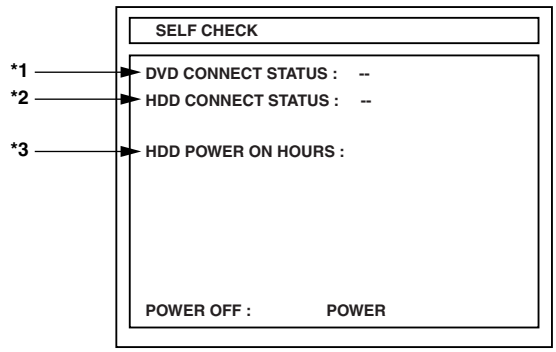


Fig. a: Self-Check Mode Screen

Table 1: Description of Fig. a

INDICATION	DESCRIPTION
DVD CONNECT STATUS (*1)	Connecting Condition of DVD(F/E)
HDD CONNECT STATUS (*2)	Connecting Condition of HDD
HDD POWER ON HOURS (*3)	Value of HDD power on hours obtained from S.M.A.R.T. command. (If not obtainable, value of HDD power on hours is “0”.) Value in parentheses is the factory setting value. (If no setting, the value is “0”.)

4. Upon the self-check completion, Fig. b appears on the screen.

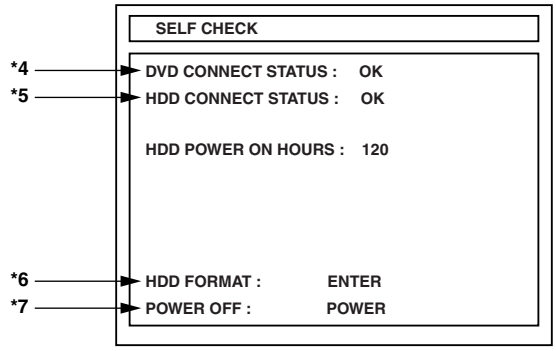


Fig. b: Screen of Finishing Self-Check Mode

Table 2: Indication of DVD self-check (*4)

INDICATION	DESCRIPTION
OK	Connection of DVD is normal.
NOT FOUND	DVD drive cannot be found.
CABLE ERROR	FFC cable (connecting to CN401) between the DVD drive and the DVD/HDD MAIN BOARD is not connected correctly.

Table 3: Indication of HDD self-check (*5)

INDICATION	DESCRIPTION
OK	Connection of HDD is normal.
NOT FOUND	HDD drive cannot be found.
CABLE ERROR	FFC cable between the BOARD ATA and the HDD drive is not connected correctly.

Table 4: Available button in self-check mode

BUTTON	DESCRIPTION
ENTER/OK (*6)	Initialize (only when the self-check mode is complete)
STANDBY-ON (*7)	Turn the power off (when the self-check mode is complete)
OTHER	Not available

5. When the self-check mode is complete, press [I/⏻] button to turn the power off.
   When initializing the HDD & DVD Video Recorder, press [ENTER/OK] button. After two seconds, the power is turned off automatically.

NOTE: When initializing, “Current Clock”, “Setup Changing Item”, “Channel Setup”, “Area Setup”, “Program” and “HDD Contents” are initialized.

FIRMWARE RENEWAL MODE

1. Turn the power on and remove the disc on the tray.
2. To put the HDD & DVD Video Recorder into version up mode, press [VARIABLE SKIP], [6], [5], and [4] buttons on the remote control unit in the order. Then the tray will open automatically.
   Fig. a appears on the screen and Fig. b appears on the VFD.

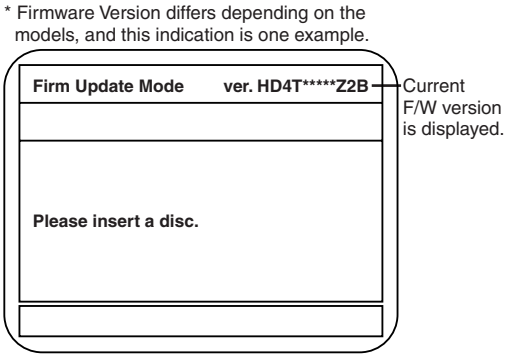


Fig. a Version Up Mode Screen

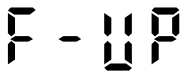


Fig. b VFD in Version Up Mode

3. Load the disc for version up.
   Fig. c appears on the screen. The file on the top is highlighted as the default.
   When there is only one file to exist, Step 4 will start automatically.

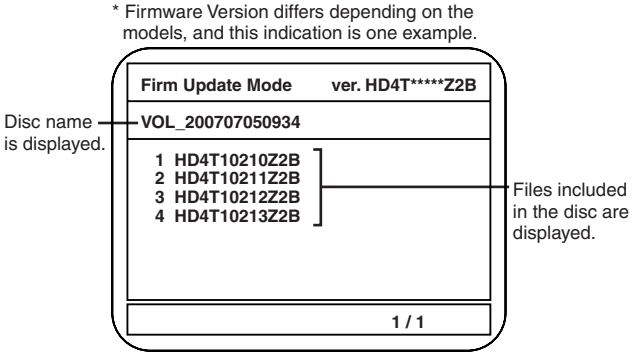


Fig. c Update Disc Screen

4. Select the firmware version pressing arrow buttons, then press [ENTER/OK].
   Fig. d appears on the screen and Fig. e appears on the VFD. The HDD & DVD Video Recorder starts updating.

   About VFD indication of Fig. e:

   1) When Fig. d is displayed on the screen, “F-UP” is displayed on the VFD.
   2) When “Firmware Updating... XX% Complete.” is displayed on the screen, “02110” is displayed on the VFD.

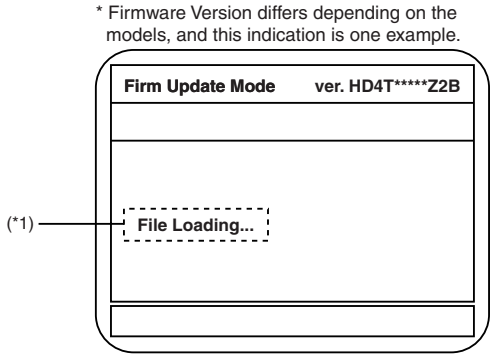


Fig. d Programming Mode Screen

Fig. e VFD in Programming Mode (Example)

The appearance shown in (*1) of Fig. d is described as follows.

No.	Appearance	State
1	File Loading...	Sending files into the memory
2	Firmware Updating... XX% Complete.	Writing new version data
---	Error	Failed in updating

5. After updating is finished, the tray opens automatically.
   At this time, no button is available.
6. Pull out the AC code once, then insert it again.

TROUBLESHOOTING

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

FLOW CHART NO.1

The power cannot be turned on.

↓

Is the fuse normal? — No → See FLOW CHART No.2 <The fuse blows out.>

↓ Yes

Is normal state restored when once unplugged power cord is plugged again after several seconds. — No → Check for lead or short-circuiting of primary circuit component and service it if defective. (Q2101, Q2102, T2001, D2001, D2002, D2003, D2004, R2101, R2102, R2103, R2104, R2105)

↓ Yes

Is the AL+5V(1) line voltage normal? — No → (same as above)

↓ Yes

Check each rectifying circuit of secondary circuit and service it if defective.

FLOW CHART NO.2

The fuse blows out.

↓

Check the presence that the primary component is leaking or shorted and service it if defective.

Check the presence that the rectifying diode or circuit is shorted in each rectifying circuit of secondary side and service it if defective.

↓

After servicing, replace the fuse.

FLOW CHART NO.3

When the output voltage fluctuates.

↓

Does the secondary side photo coupler circuit operate normally? — No → Check the circuit and service it if defective. (IC2101, IC2201, D2212, D2238, D2240)

↓ Yes

Check the circuit and service it if defective. (IC2101, D2111, D2112, D2113)

FLOW CHART NO.4

When buzz sound can be heard in the vicinity of power circuit.

↓

Check if there is short circuit on the rectifying diode and the circuit in each rectifying circuit of secondary side and service it if defective. (D2201, D2202, D2203, D2204, D2205, D2206, D2207, D2208, D2209, D2231, D2232, D2233, IC1025, IC1151, IC1152, Q1015, Q1154, Q1155, Q1156, Q1159, Q1160, Q1163, Q1508, Q1573, Q2203)

FLOW CHART NO.5

-FL is not outputted.

↓

Is the supply voltage of -30V fed to the anode of D2201? — No → Check D2201 and their periphery, and service it if defective.

↓ Yes

Check for load circuit short-circuiting or leak, and service it if defective.

FLOW CHART NO.6

AUDIO+10V is not outputted.

↓

Is 12V voltage supplied to the collector of Q1160? — Yes → Check Q1160, D1162 and their periphery, and service it if defective.

↓ No

Is 12V voltage supplied to the collector of Q2203? — No → Check D2204, D2205, D2212, C2204 and their periphery, and service it if defective.

↓ Yes

Check Q2203, IC2204 and their periphery, and service it if defective.

FLOW CHART NO.7

AL+9V is not outputted.

↓

Is 12V voltage supplied to the collector of Q1156? — No → Check D2204, D2205, D2212, C2204 TTand their periphery, and service it if defective.

↓ Yes

Check Q1156, D1156 and their periphery, and service it if defective.

FLOW CHART NO.8

P-ON+5V is not outputted.
(AUDIO+10V is outputted normally.)

↓

Is 5V voltage supplied to the collector of Q1154? — No → Check D2206, D2207, D2213, C2205, C2216 and their periphery, and service it if defective.

↓ Yes

Check Q1154 and their periphery, and service it if defective.

FLOW CHART NO.9

EV+32V is not outputted.

↓

Is the supply voltage 44V fed the cathode of D2202 — No → Check D2202, D2229, L2202 and their periphery, and service it if defective.

↓ Yes

Check D1701 and their periphery and service it if defective.

FLOW CHART NO.10

AUDIO +5V is not outputted. (AUDIO+10V is outputted normally.)

↓

Is 6V voltage supplied to the base of Q1163? — No → Check D1163, C1168 and their periphery, and service it if defective.

↓ Yes

Replace Q1163.

FLOW CHART NO.11

SYS+5V is not outputted.

↓

Is 12V voltage supplied to Pin(3) of IC1025? — No → Check D2204, D2205, D2212, C2204 and their periphery, and service it if defective.

↓ Yes

Replace IC1025.

FLOW CHART NO.12

EV+3.3V is not outputted.
(SYS+5V is outputted normally.)

↓

Is the voltage of approximately 4V supplied to the base of Q1159? — No → Check IC1153 and their periphery, and service it if defective.

↓ Yes

Replace Q1159.

FLOW CHART NO.13

P-ON+1.8V is not outputted.

↓

Is 2.8V voltage supplied to Pin(1) of IC1151? — No → Check D2203, D2232, D2233, C2203, C2239 and their periphery, and service it if defective.

↓ Yes

Replace IC1151.

FLOW CHART NO.14

P-ON+3.3V is not outputted.

↓

Is 5V voltage supplied to Pin(1) of IC1152? — No → Check D1181, D1185, D2209, C2217 and their periphery, and service it if defective.

↓ Yes

Replace IC1152.

FLOW CHART NO.15

TUNER+12V is not outputted.
(+32V is outputted normally.)

↓

Is 14V voltage supplied to the collector of Q1573? — No → Check D2204, D2205, D2212, C2204 and their periphery, and service it if defective.

↓ Yes

Is 13V voltage supplied to the base of Q1573? — No → Check Q1571, Q1572 and their periphery, and service it if defective.

↓ Yes

Replace Q1573.

FLOW CHART NO.16

AL+5V(2) is not outputted.
(AL+9V is outputted normally.)

↓

Is 6V voltage supplied to the base of Q1508? — No → Check D1508, C1526 and their periphery, and service it if defective.

↓ Yes

Replace Q1508.

FLOW CHART NO.17

The key operation is not functioning.

↓

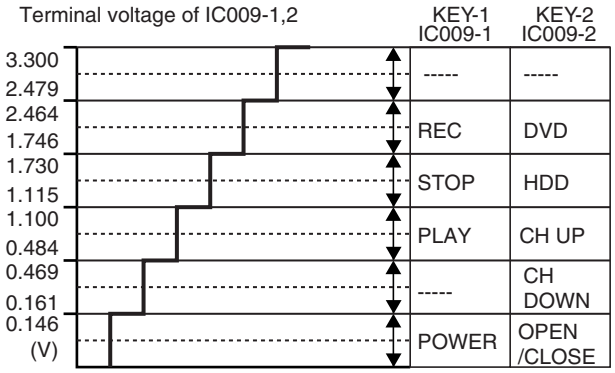
Are the contact point and the installation state of the key switches normal? — No → Re-install some key switches correctly or replace some key switches.

↓ Yes

Is the control voltage normally inputted into Pin(1, 2) of IC009? — No → Check the key switches and their periphery, and service it if defective.

↓ Yes

Replace IC009 or DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY.



FLOW CHART NO.18

No operation is possible from the remote control unit. (Operation is possible from the unit.)

↓

Is 5V voltage supplied to the Pin(3) terminal of the RS1501 (remote control receiver)? — No → Check AL+5V (1) line and service it if defective.

↓ Yes

Is the "L" pulse sent out from Pin(1) terminal of the RS1501 (remote control receiver) when the remote control unit is activated? — No → Replace the RS1501 (remote control receiver). Or replace remote control unit.

↓ Yes

Is the "L" pulse signal supplied to the Pin(27) of IC009? — No → Check the line between the RS1501 (remote control receiver) and the Pin(27) of IC009, and service it if defective.

↓ Yes

Replace IC009 or DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY.

FLOW CHART NO.19

The disc tray cannot be opened and closed. (It can be done using the remote control unit.)

↓

Is the normal control voltage inputted to Pin(2) of IC009? Refer to "FLOW CHART NO.17" <The key operation is not functioning.> — No → Replace the "OPEN/CLOSE" button (SW1643).

↓ Yes

Replace IC009 or DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY.

FLOW CHART NO.20

[No Disc] indicated.
Both functions of picture and sound do not operate normally.

↓

Replace the DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY.

FLOW CHART NO.21

VIDEO E-E does not appear normally.

↓

Are the video signals inputted to each pin of IC005?

IC005	16PIN	VIDEO-IN 1 (AV1)
IC005	14PIN	VIDEO-IN (FRONT)
IC005	7PIN	Y-IN 1 (FRONT)
IC005	9PIN	C-IN 1 (FRONT)
IC005	12PIN	VIDEO-IN 2 (AV2)
IC005	100PIN	DTV-Y-IN
IC005	1PIN	DTV-C-IN
IC005	20PIN	TUNER-VIDEO

No →

Check the line between video input terminal and each pin of IC005.

IC005	16PIN → JK1206		VIDEO-IN 1 (AV1)
IC005	14PIN → JK1201		VIDEO-IN (FRONT)
IC005	7PIN → JK1212		Y-IN 1 (FRONT)
IC005	9PIN → JK1212		C-IN 1 (FRONT)
IC005	12PIN → JK1207		VIDEO-IN 2 (AV2)
IC005	100PIN → CN1751	26PIN	DTV-Y
IC005	1PIN → CN1751	28PIN	DTV-C
IC005	20PIN → TU1701	17PIN	TUNER-VIDEO

↓ Yes

Are the video signals outputted to each pin of IC005?

IC005	61PIN	VIDEO-Y/CVBS-IN
IC005	59PIN	VIDEO-C-IN

No →

Is 5V voltage supplied to the Pin(27,29,47,63) of IC005?

↓ Yes

Replace IC005.

↓ No

Check AL+5V(2) line and service it if defective.

↓ Yes

Are the video signals outputted to each pin of CN1201?

CN1201	20PIN	VIDEO-Y/CVBS-IN
CN1201	22PIN	VIDEO-C-IN

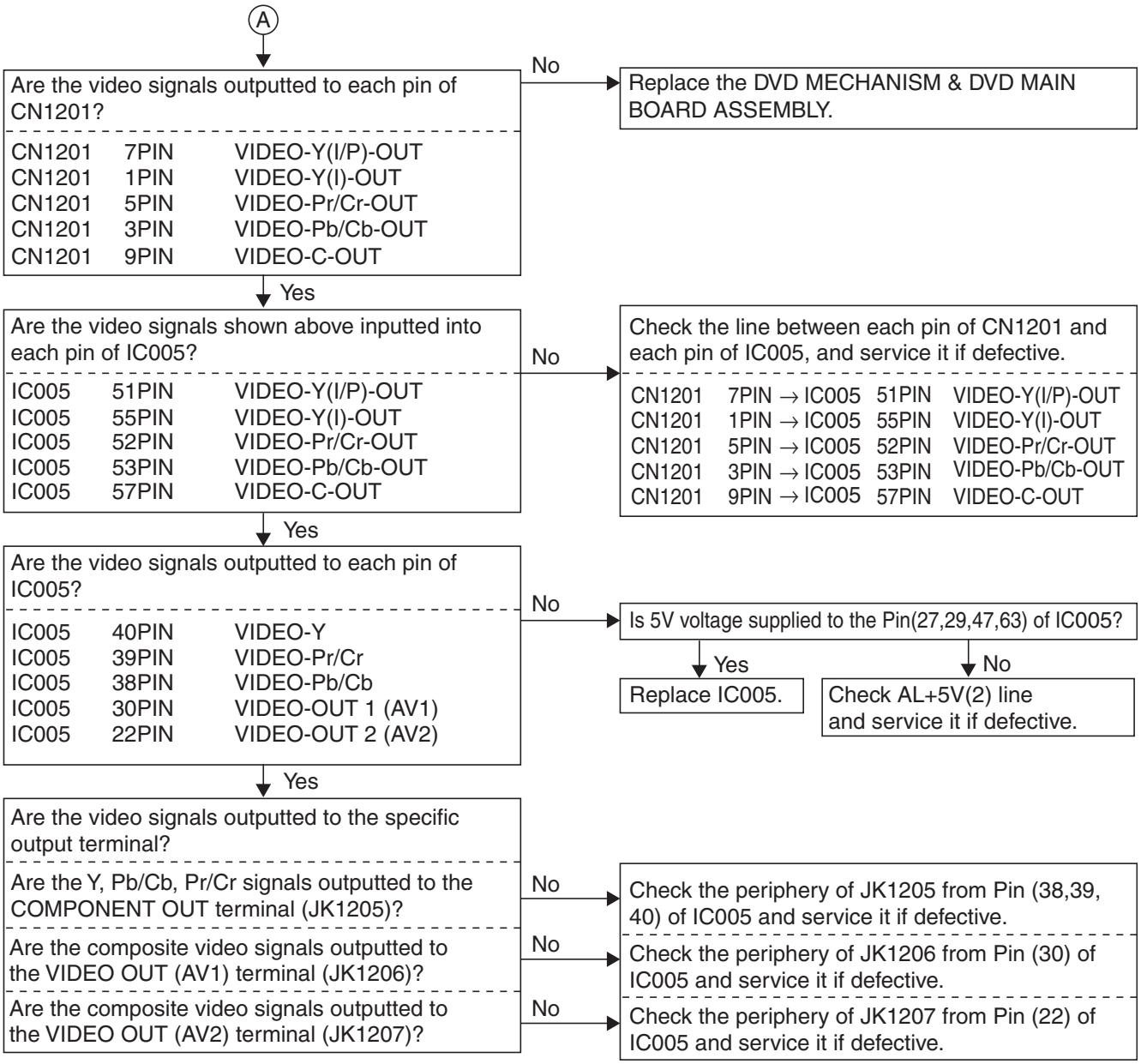
No →

Check the line between each pin of IC005 and each pin of CN1201 and service it if defective.

IC005	61PIN → CN1201	20PIN	VIDEO-Y/CVBS-IN
IC005	59PIN → CN1201	22PIN	VIDEO-C-IN

↓ Yes

Continued to (A) on the next page.


A
Are the video signals outputted to each pin of CN1201?
CN1201 7PIN VIDEO-Y(I/P)-OUT
CN1201 1PIN VIDEO-Y(I)-OUT
CN1201 5PIN VIDEO-Pr/Cr-OUT
CN1201 3PIN VIDEO-Pb/Cb-OUT
CN1201 9PIN VIDEO-C-OUT
No
Replace the DVD MECHANISM & DVD MAIN BOARD ASSEMBLY.
Yes
Are the video signals shown above inputted into each pin of IC005?
IC005 51PIN VIDEO-Y(I/P)-OUT
IC005 55PIN VIDEO-Y(I)-OUT
IC005 52PIN VIDEO-Pr/Cr-OUT
IC005 53PIN VIDEO-Pb/Cb-OUT
IC005 57PIN VIDEO-C-OUT
No
Check the line between each pin of CN1201 and each pin of IC005, and service it if defective.
CN1201 7PIN → IC005 51PIN VIDEO-Y(I/P)-OUT
CN1201 1PIN → IC005 55PIN VIDEO-Y(I)-OUT
CN1201 5PIN → IC005 52PIN VIDEO-Pr/Cr-OUT
CN1201 3PIN → IC005 53PIN VIDEO-Pb/Cb-OUT
CN1201 9PIN → IC005 57PIN VIDEO-C-OUT
Yes
Are the video signals outputted to each pin of IC005?
IC005 40PIN VIDEO-Y
IC005 39PIN VIDEO-Pr/Cr
IC005 38PIN VIDEO-Pb/Cb
IC005 30PIN VIDEO-OUT 1 (AV1)
IC005 22PIN VIDEO-OUT 2 (AV2)
No
Is 5V voltage supplied to the Pin(27,29,47,63) of IC005?
Yes
Replace IC005.
No
Check AL+5V(2) line and service it if defective.
Yes
Are the video signals outputted to the specific output terminal?
Are the Y, Pb/Cb, Pr/Cr signals outputted to the COMPONENT OUT terminal (JK1205)?
No
Check the periphery of JK1205 from Pin (38,39, 40) of IC005 and service it if defective.
Are the composite video signals outputted to the VIDEO OUT (AV1) terminal (JK1206)?
No
Check the periphery of JK1206 from Pin (30) of IC005 and service it if defective.
Are the composite video signals outputted to the VIDEO OUT (AV2) terminal (JK1207)?
No
Check the periphery of JK1207 from Pin (22) of IC005 and service it if defective.

FLOW CHART NO.22

Picture does not appear normally.

↓

Set the disc on the disc tray, and playback.

↓

Are the video signals outputted to each pin of CN1201?

CN1201	7PIN	VIDEO-Y(I/P)-OUT
CN1201	1PIN	VIDEO-Y(I)-OUT
CN1201	5PIN	VIDEO-Pr/Cr-OUT
CN1201	3PIN	VIDEO-Pb/Cb-OUT
CN1201	9PIN	VIDEO-C-OUT

No → Replace the DVD MECHANISM & DVD MAIN BOARD ASSEMBLY.

↓ Yes

Are the video signals shown above inputted into each pin of IC005?

IC005	51PIN	VIDEO-Y(I/P)-OUT
IC005	55PIN	VIDEO-Y(I)-OUT
IC005	52PIN	VIDEO-Pr/Cr-OUT
IC005	53PIN	VIDEO-Pb/Cb-OUT
IC005	57PIN	VIDEO-C-OUT

No → Check the line between each pin of CN1201 and each pin of IC005, and service it if defective.

CN1201	7PIN →	IC005	51PIN	VIDEO-Y(I/P)-OUT
CN1201	1PIN →	IC005	55PIN	VIDEO-Y(I)-OUT
CN1201	5PIN →	IC005	52PIN	VIDEO-Pr/Cr-OUT
CN1201	3PIN →	IC005	53PIN	VIDEO-Pb/Cb-OUT
CN1201	9PIN →	IC005	57PIN	VIDEO-C-OUT

↓ Yes

Are the video signals outputted to each pin of IC005?

IC005	40PIN	VIDEO-Y
IC005	39PIN	VIDEO-Pr/Cr
IC005	38PIN	VIDEO-Pb/Cb
IC005	30PIN	VIDEO-OUT 1 (AV1)
IC005	22PIN	VIDEO-OUT 2 (AV2)

No → Is 5V voltage supplied to the Pin(27,29,47,63) of IC005?

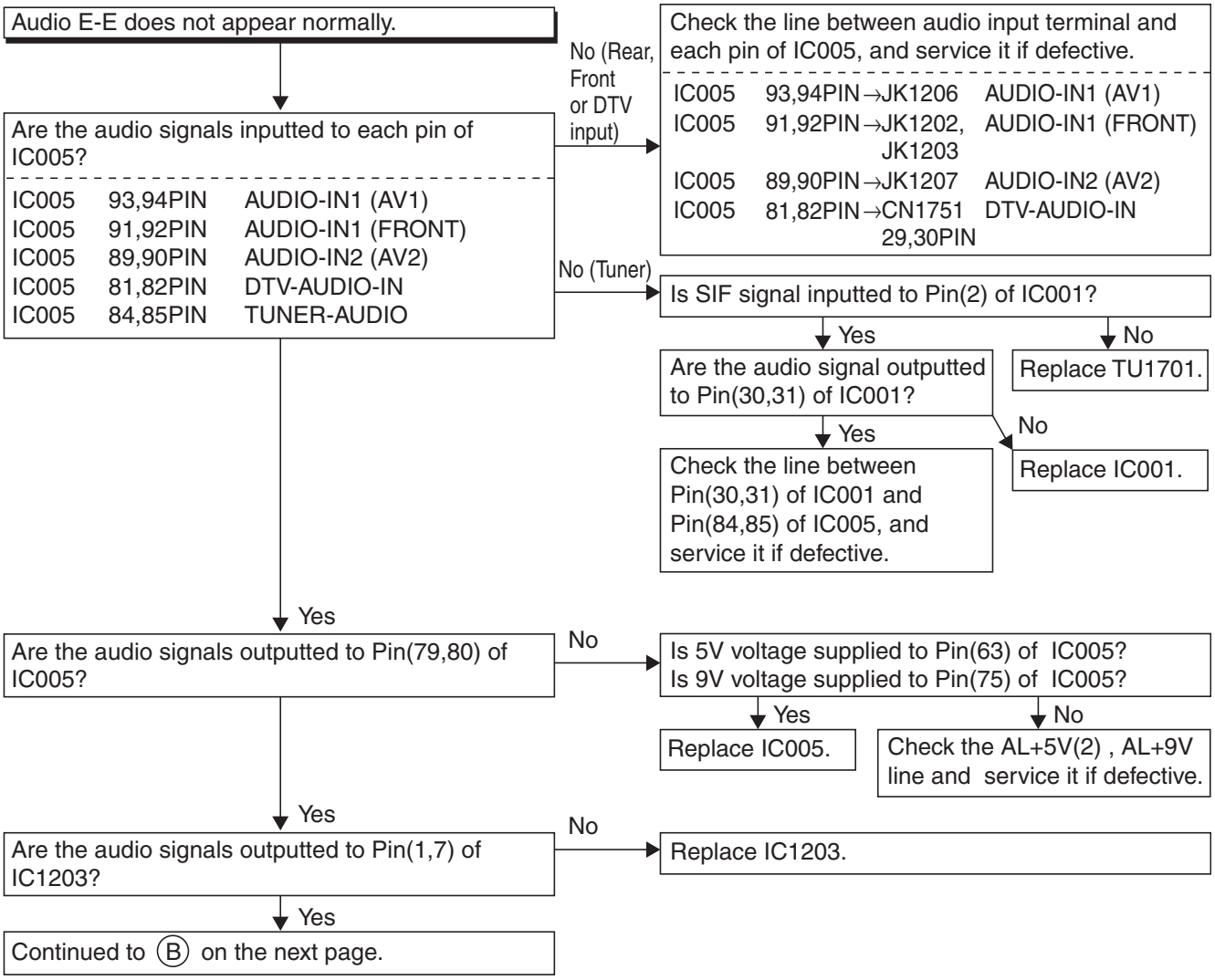
- Yes → Replace IC005.
- No → Check AL+5V(2) line and service it if defective.

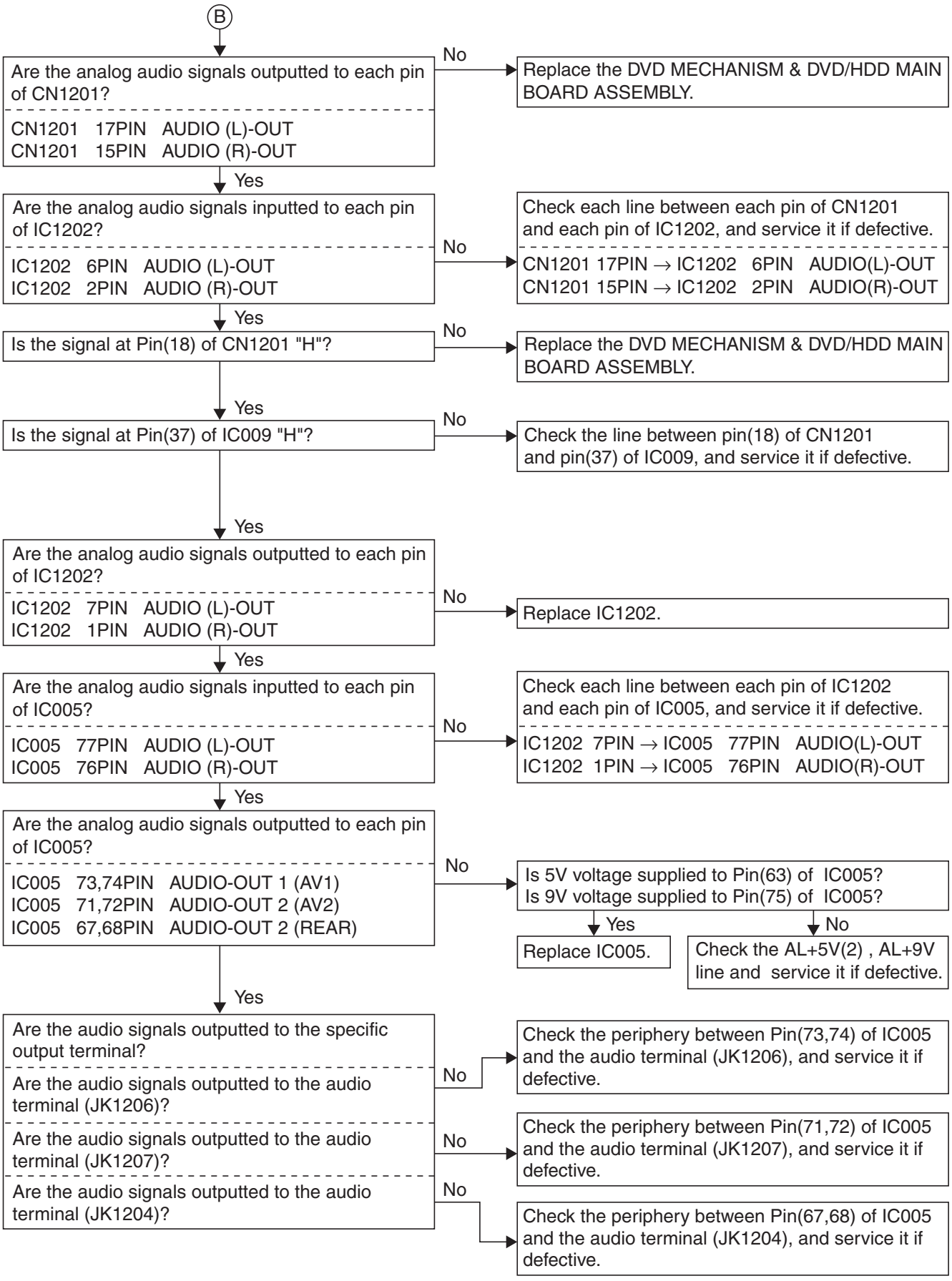
↓ Yes

Are the video signals outputted to the specific output terminal?

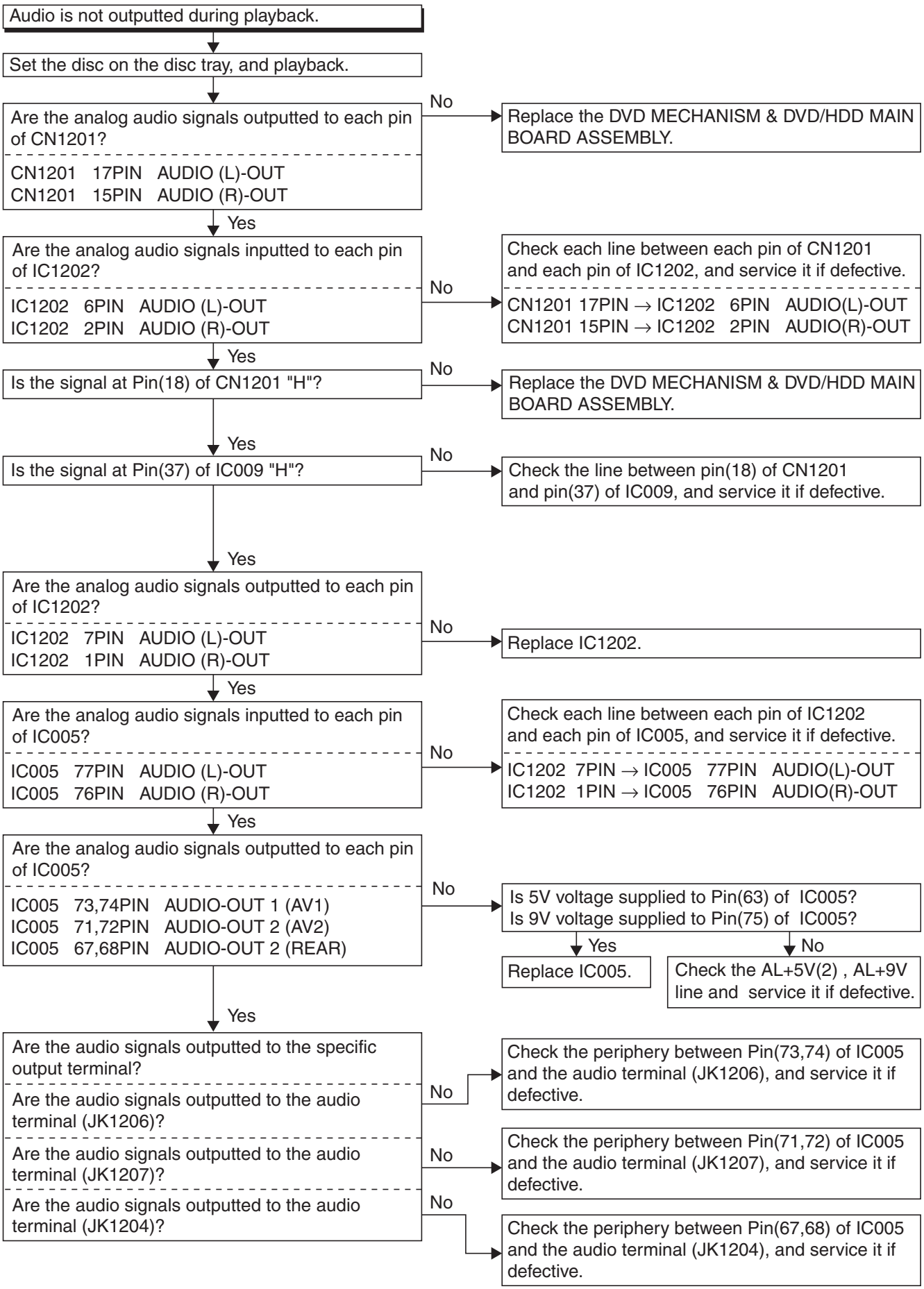
- Are the Y, Pb/Cb, Pr/Cr signals outputted to the COMPONENT OUT terminal (JK1205)? — No → Check the periphery of JK1205 from Pin (38,39, 40) of IC005 and service it if defective.
- Are the composite video signals outputted to the VIDEO OUT (AV1) terminal (JK1206)? — No → Check the periphery of JK1206 from Pin (30) of IC005 and service it if defective.
- Are the composite video signals outputted to the VIDEO OUT (AV2) terminal (JK1207)? — No → Check the periphery of JK1207 from Pin (22) of IC005 and service it if defective.

FLOW CHART NO.23



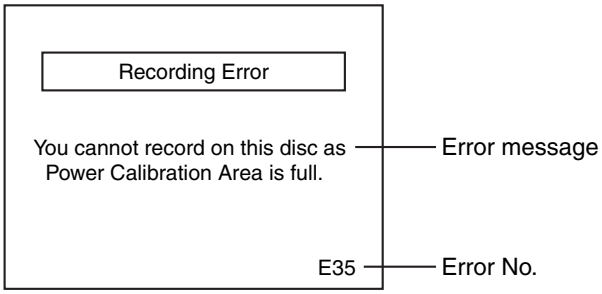

B
Are the analog audio signals outputted to each pin of CN1201?
CN1201 17PIN AUDIO (L)-OUT
CN1201 15PIN AUDIO (R)-OUT
No
Replace the DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY.
Yes
Are the analog audio signals inputted to each pin of IC1202?
IC1202 6PIN AUDIO (L)-OUT
IC1202 2PIN AUDIO (R)-OUT
No
Check each line between each pin of CN1201 and each pin of IC1202, and service it if defective.
CN1201 17PIN → IC1202 6PIN AUDIO(L)-OUT
CN1201 15PIN → IC1202 2PIN AUDIO(R)-OUT
Yes
Is the signal at Pin(18) of CN1201 "H"?
No
Replace the DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY.
Yes
Is the signal at Pin(37) of IC009 "H"?
No
Check the line between pin(18) of CN1201 and pin(37) of IC009, and service it if defective.
Yes
Are the analog audio signals outputted to each pin of IC1202?
IC1202 7PIN AUDIO (L)-OUT
IC1202 1PIN AUDIO (R)-OUT
No
Replace IC1202.
Yes
Are the analog audio signals inputted to each pin of IC005?
IC005 77PIN AUDIO (L)-OUT
IC005 76PIN AUDIO (R)-OUT
No
Check each line between each pin of IC1202 and each pin of IC005, and service it if defective.
IC1202 7PIN → IC005 77PIN AUDIO(L)-OUT
IC1202 1PIN → IC005 76PIN AUDIO(R)-OUT
Yes
Are the analog audio signals outputted to each pin of IC005?
IC005 73,74PIN AUDIO-OUT 1 (AV1)
IC005 71,72PIN AUDIO-OUT 2 (AV2)
IC005 67,68PIN AUDIO-OUT 2 (REAR)
No
Is 5V voltage supplied to Pin(63) of IC005?
Is 9V voltage supplied to Pin(75) of IC005?
Yes
Replace IC005.
No
Check the AL+5V(2) , AL+9V line and service it if defective.
Yes
Are the audio signals outputted to the specific output terminal?
Are the audio signals outputted to the audio terminal (JK1206)?
No
Check the periphery between Pin(73,74) of IC005 and the audio terminal (JK1206), and service it if defective.
Are the audio signals outputted to the audio terminal (JK1207)?
No
Check the periphery between Pin(71,72) of IC005 and the audio terminal (JK1207), and service it if defective.
Are the audio signals outputted to the audio terminal (JK1204)?
No
Check the periphery between Pin(67,68) of IC005 and the audio terminal (JK1204), and service it if defective.

FLOW CHART NO.24



FUNCTION INDICATOR SYMBOLS

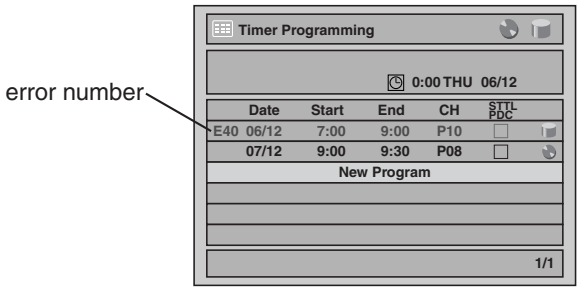
Note: If an error occurs, a message with the error number appears on the screen.



Message	Solution	Error No.	Error Description	Priority
Can not record on this disc.	Insert a recordable disc, and ensure the disc status satisfies the recording requirements.	1	An error occurs during data reading.	-
		2	There is no reply for 15 seconds in Test Unit Ready.	-
		3	Cannot write the data after trying three times.	-
		4	An error occurs with OPC.	-
		5	During recovery in a record.	-
		6	An error occurs even if recovery has been tried three times.	-
		7	An error occurs in a format.	-
		8	It cannot start an encode.	-
		9	NV_PCK/RDI_PCK is not in encoded data.	-
		10	Encode Pause condition continued for 10 minutes.	-
		11	Encode Pause condition continued in normal REC condition for 10 minutes.	-
		12	Difference in the address and cannot get Stream ID of RDI/VIDEO.	-
		13	It is a reply that “ATAPI is not readable.”	-
		14	Cannot write the data after recovering SMALL VMGI.	-
		15	Cannot write the data after DVD-R Reverse Track.	-
		16	An error occurs in Finalize Close.	-
		17	An error occurs in Rec Stop Close.	-
		18	An error occurs in PCA Full (DVD_R).	-
		19	Safety Stop occurs during editing.	-
		20	High Speed Disc.	2
		21	The disc is not formatted.	5
		22	Disc Error has occurred.	3
		24	The disc except DVD-R/RW or finalized DVD-R.	1
This program is not allowed to be recorded.	You cannot record copy-prohibited programs.	25	During the Macrovision picture input.	11
		26	During the CGMS picture input.	12
This program is not recordable in Video mode.	You cannot record copy-prohibited programs.	27	During the CGMS picture input. (Video Format Disc)	-
This program is not allowed to be recorded on this disc.	You cannot record cop-y prohibited programs.	28	During the CGMS picture input. (VR Format Disc)	-
This disc is protected and not recordable.	Release the disc protection setting in the Disc Setting menu.	29	Disc Protected Disc.	6

Message	Solution	Error No.	Error Description	Priority
Disc is full. (No area for new recording)	Insert a recordable disc with enough recording space.	30	No available recording space.	10
You cannot record more than 99 titles on one disc. (The maximum is 99.)	Delete unnecessary titles.	31	The 99 title limit has been reached. (Video Format Disc)	-
		32	The 99 title limit has been reached. (VR Format Disc)	-
You cannot record more than 999 chapters on one disc. (The maximum is 999.)	Delete unnecessary chapters.	33	999 chapter limit has been reached. (VR Format Disc)	-
You cannot record on this as Control Information is full.	Insert a new disc.	34	No available recording space for Control Information.	-
You cannot record on this disc as Power Calibration Area is full.	Insert a new disc.	35	PCA is Full. (in REC start)	4
This disc is already finalized.	Release the finalizing for this disc.	36	It is finalized. (Video Format Disc)	8
Can not record on this disc.	Repeat the same operation.	37	Access to outside of Memory Area.	-
		38	Sector Address is wrong.	-
		39	BUP writing error of chapter editing.	-
You cannot record more than 49 titles on the disc. (The maximum is 49.)	Delete unnecessary titles.	43	The 49 title limit has been reached. (+VR Format Disc)	9
You cannot record more than 254 chapters on the disc. (The maximum is 254.)	Delete unnecessary chapter marks.	44	The 254 chapter limit has been reached. (+VR Format Disc)	10
This program is not recordable in +VR mode.	You cannot record copy-prohibited programs.	45	During the CGMS picture input (+VR Format Disc).	12
The disc has no recording compatibility. Set “Make Recording Compatible” to “ON” to convert the disc.	Set “Make Recording Compatible” to “ON” to convert the disc.	46	Trying to record onto the +VR formatting disc that had been recorded by the other recorder when “Make Recording Compatible” setting is “OFF”,	7
You cannot record more than 600 titles on HDD. (The maximum is 600.)	Delete unnecessary titles.	47	The 600 title limit has been reached (HDD).	-
Can not record on this HDD.	Connect HDD.	48	Recording without HDD connected.	-
	Delete unnecessary programs.	49	HDD is Full.	-

If an error occurs during the timer recording, one of the following error numbers (40 to 42) or the above error messages (error number: 1 to 39 and 43 to 49) is displayed on the recording menu after timer recording.
(Once the screen of the program line is exited, the program line for the error will be cleared.)
(No Error Message is displayed for errors No. 40 ~ 42.)



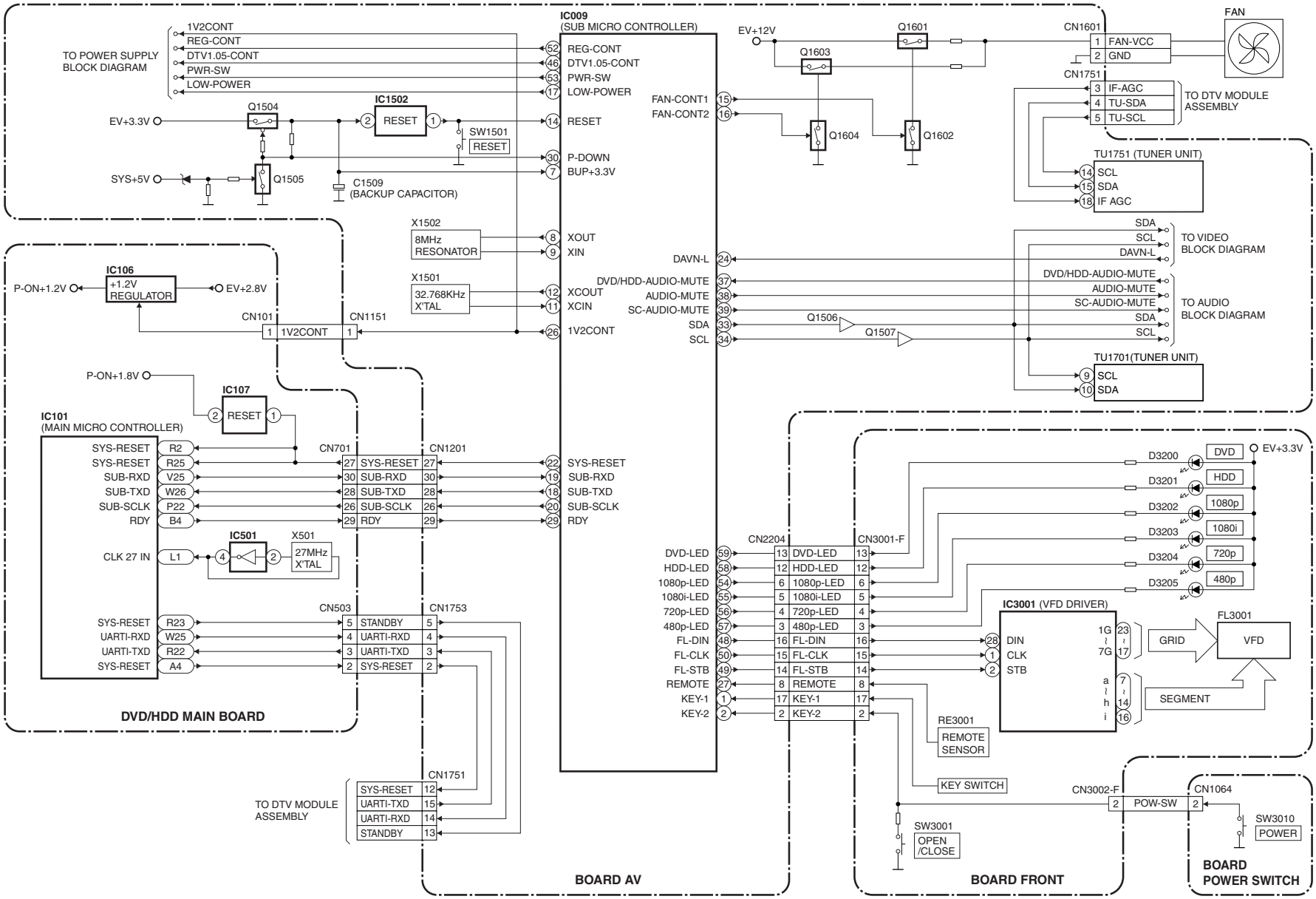
A program with the error number is grayed out on the timer programming list.

Message	Solution	Error No.	Error Description	Priority
Error message is not displayed.	- Set the timer programming correctly. - Set the timer programming before the start time.	40	- Some portion has not been recorded because of program overlapping. - Recording did not start at the start time.	-
	Turn the power on and set the clock correctly then set timer programming again.	41	Power failed	-
	Insert the recordable disc.	42	No disc when recording	-

BLOCK DIAGRAMS

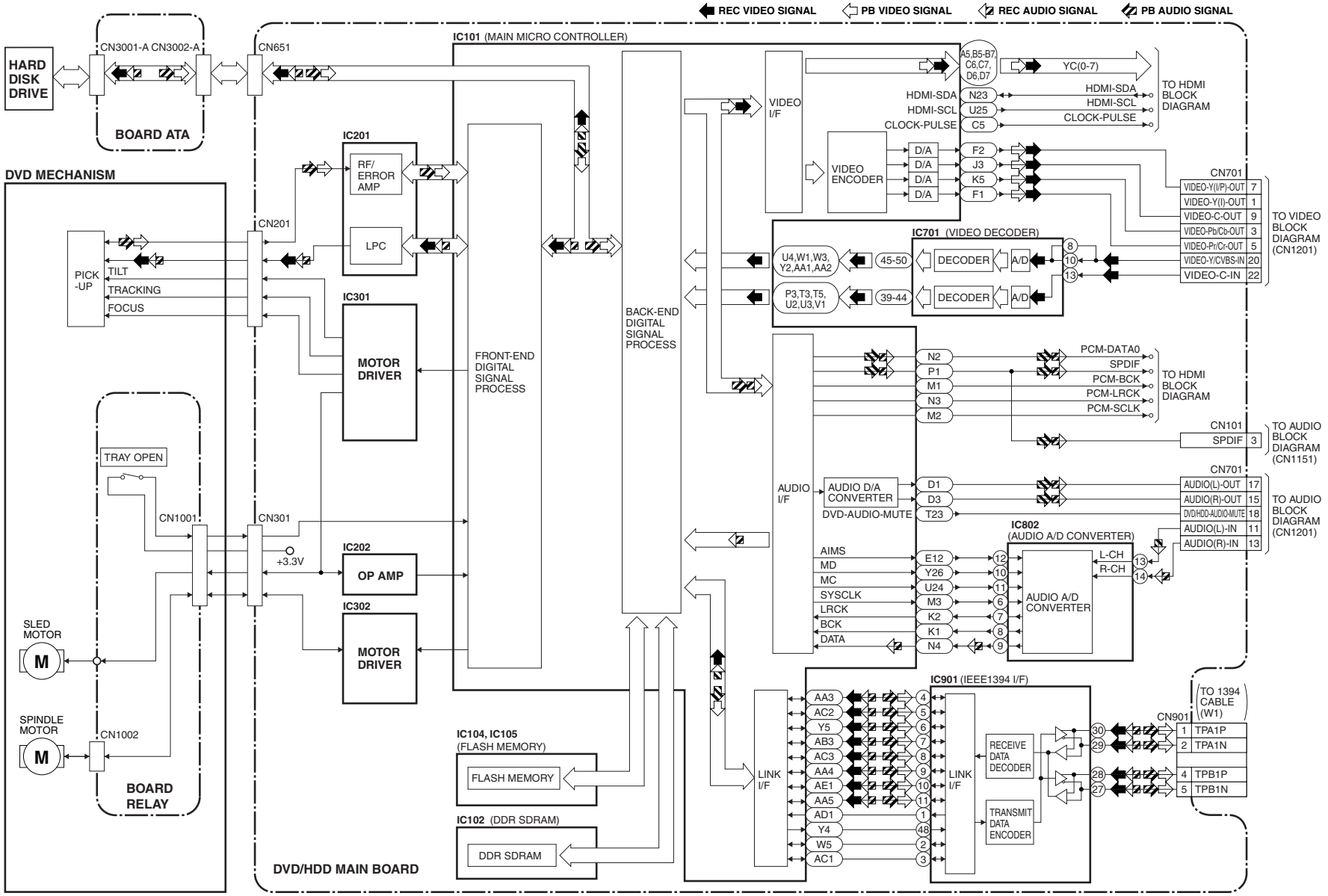
System Control Block Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



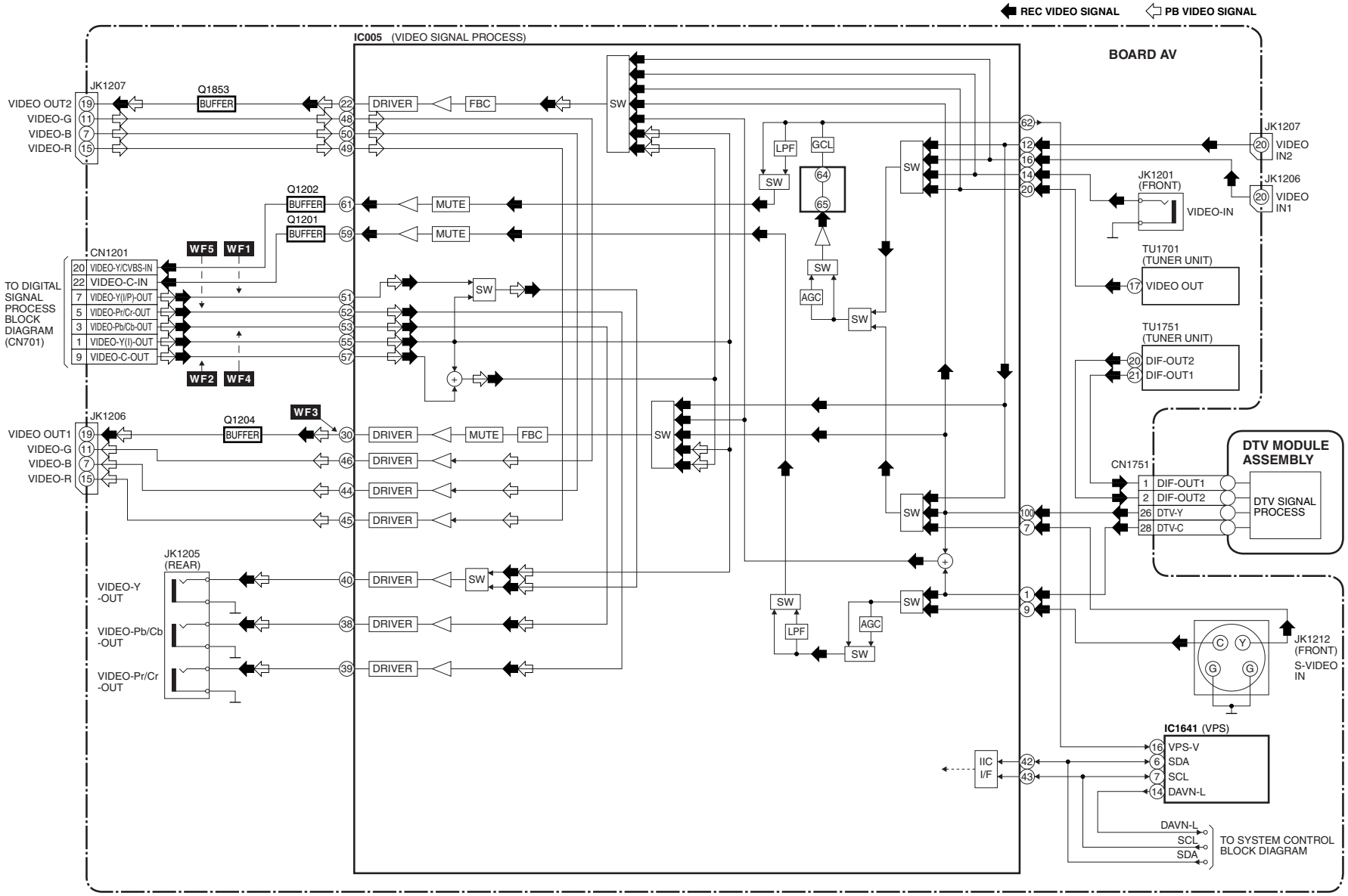
Digital Signal Process Block Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



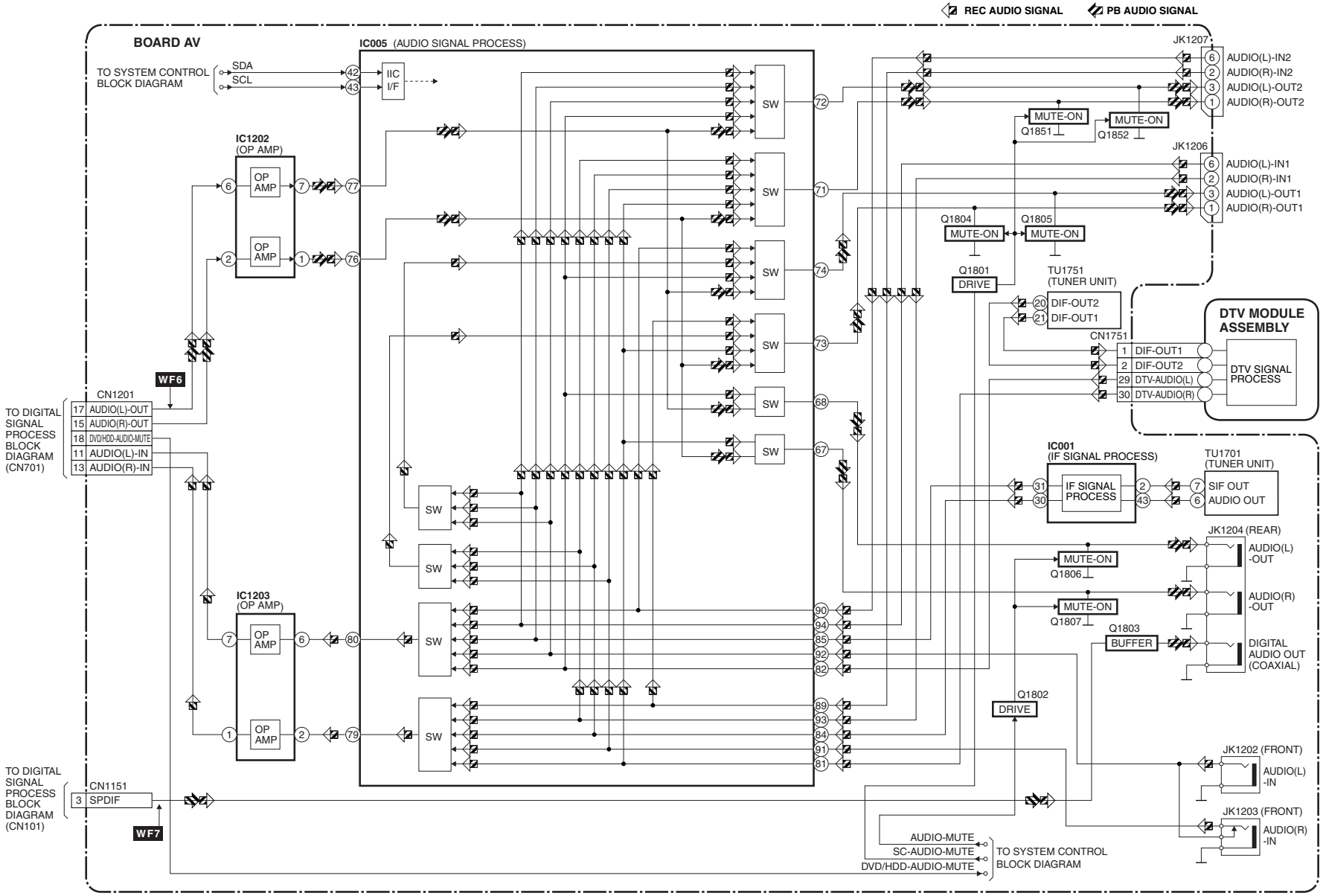
Video Block Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



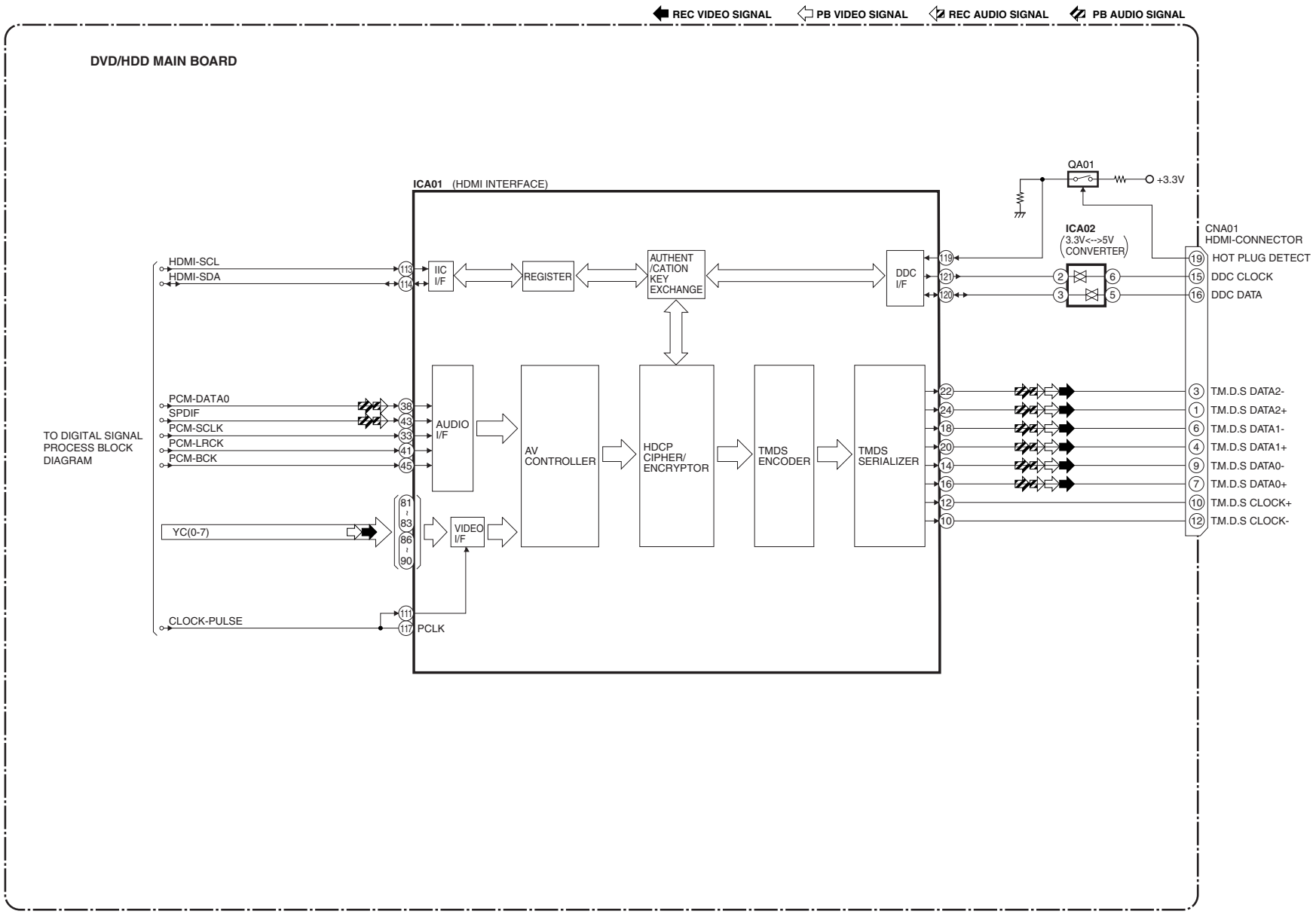
Audio Block Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



HDMI Block Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



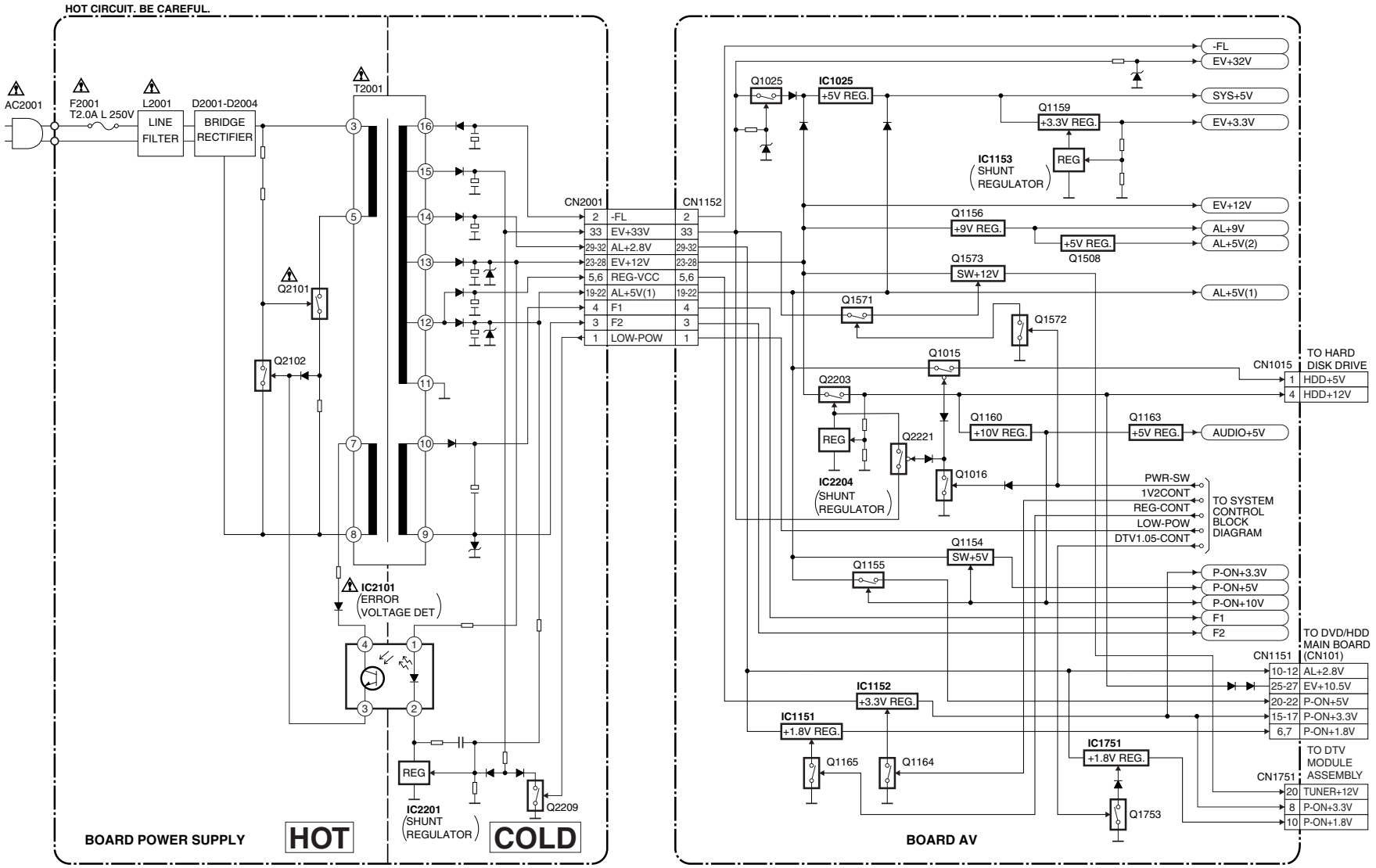
Power Supply Block Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F2001) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.



SCHEMATIC DIAGRAMS / BOARD'S AND TEST POINTS

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

Standard Notes

WARNING

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark " ⚠ " in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

Notes:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All resistance values are indicated in ohms ($K=10^3$, $M=10^6$).
3. Resistor wattages are 1/4W or 1/6W unless otherwise specified.
4. All capacitance values are indicated in μF ($P=10^{-6}$ μF).
5. All voltages are DC voltages unless otherwise specified.
6. Electrical parts such as capacitors, connectors, diodes, IC's, transistors, resistors, switches, and fuses are identified by four digits. The first two digits are not shown for each component. In each block of the diagram, there is a note such as shown below to indicate these abbreviated two digits.

LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

1. CAUTION:

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.

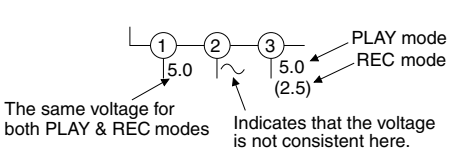
2. CAUTION:

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F2001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

3. Note:

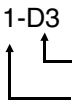
1. Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.
2. To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

4. Voltage indications for PLAY and REC modes on the schematics are as shown below:

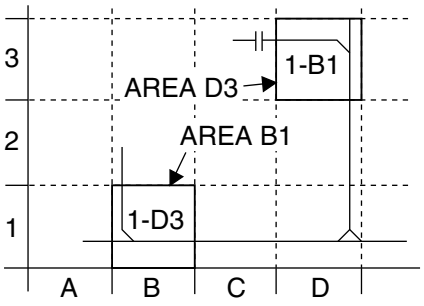


Unit: Volts

5. How to read converged lines



Examples:
1. "1-D3" means that line number "1" goes to the line number "1" of the area "D3".
2. "1-B1" means that line number "1" goes to the line number "1" of the area "B1".



6. Test Point Information

: Indicates a test point with a jumper wire across a hole in the PCB.

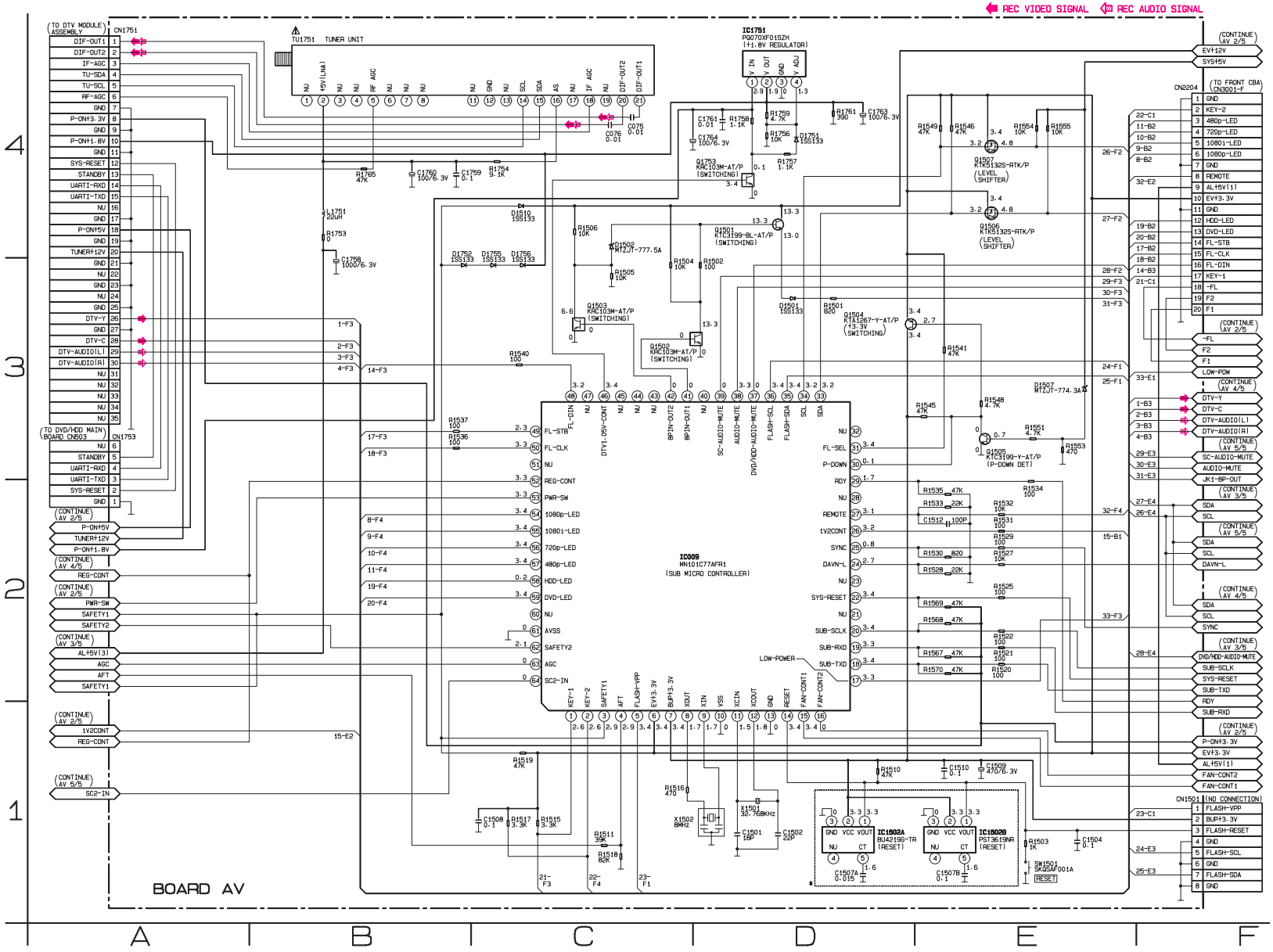
: Used to indicate a test point with a component lead on foil side.

: Used to indicate a test point with no test pin.

: Used to indicate a test point with a test pin.

AV 1/5 Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

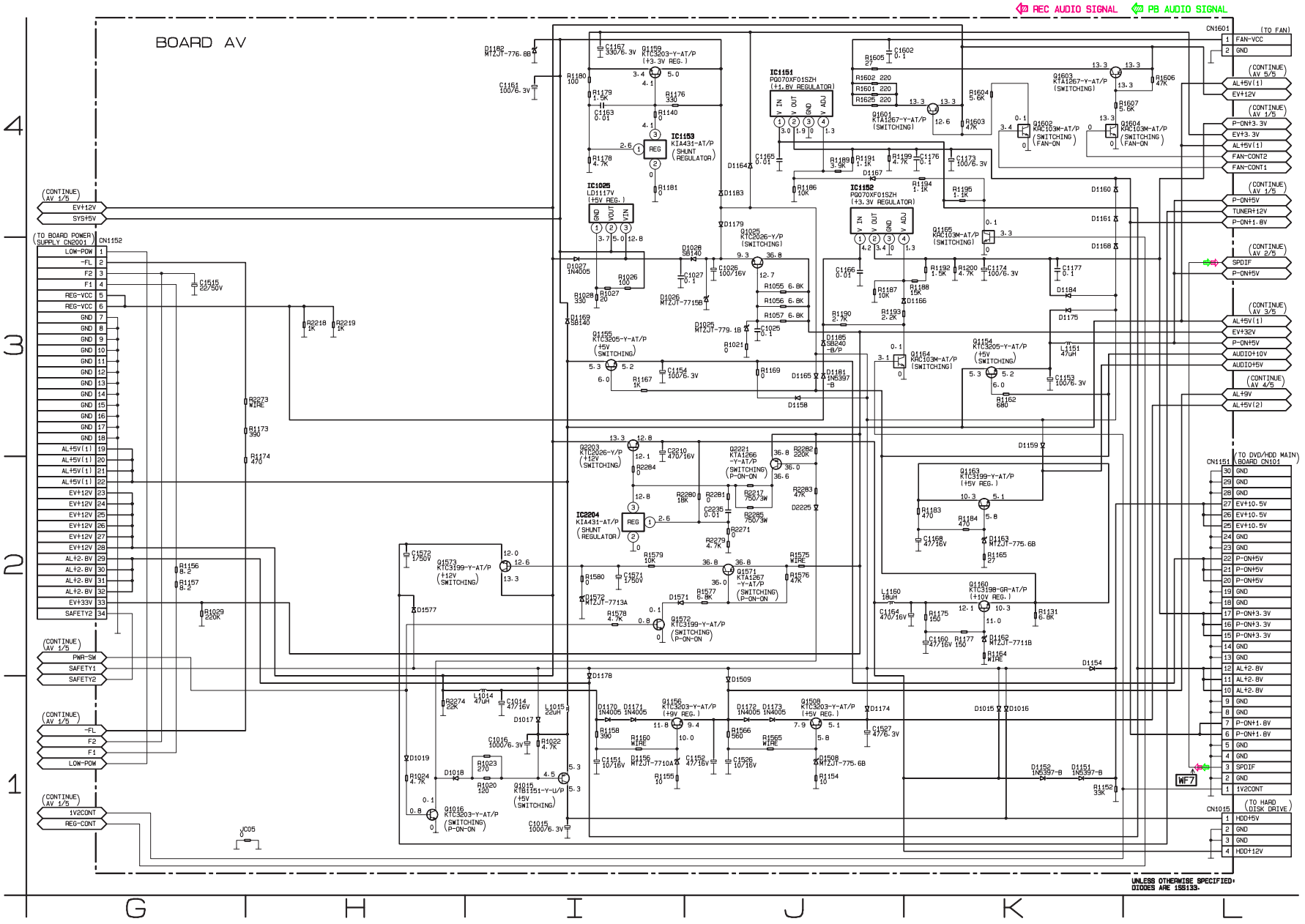


* NOTE
These components (IC1502A, C1507A, IC1502B, C1507B) can be used in any models.
However, you cannot mix components under Group A with the ones under Group B.
You can choose either Group. The difference between Group A and Group B is shown below.

	Group A	Group B
IC1502A	BU4219G-TR /R3112N191A-TR-FA /R3112N191A-TR-FB	----------
IC1502B	----------	PST3619NR
C1507A	0.015	----------
C1507B	----------	0.1

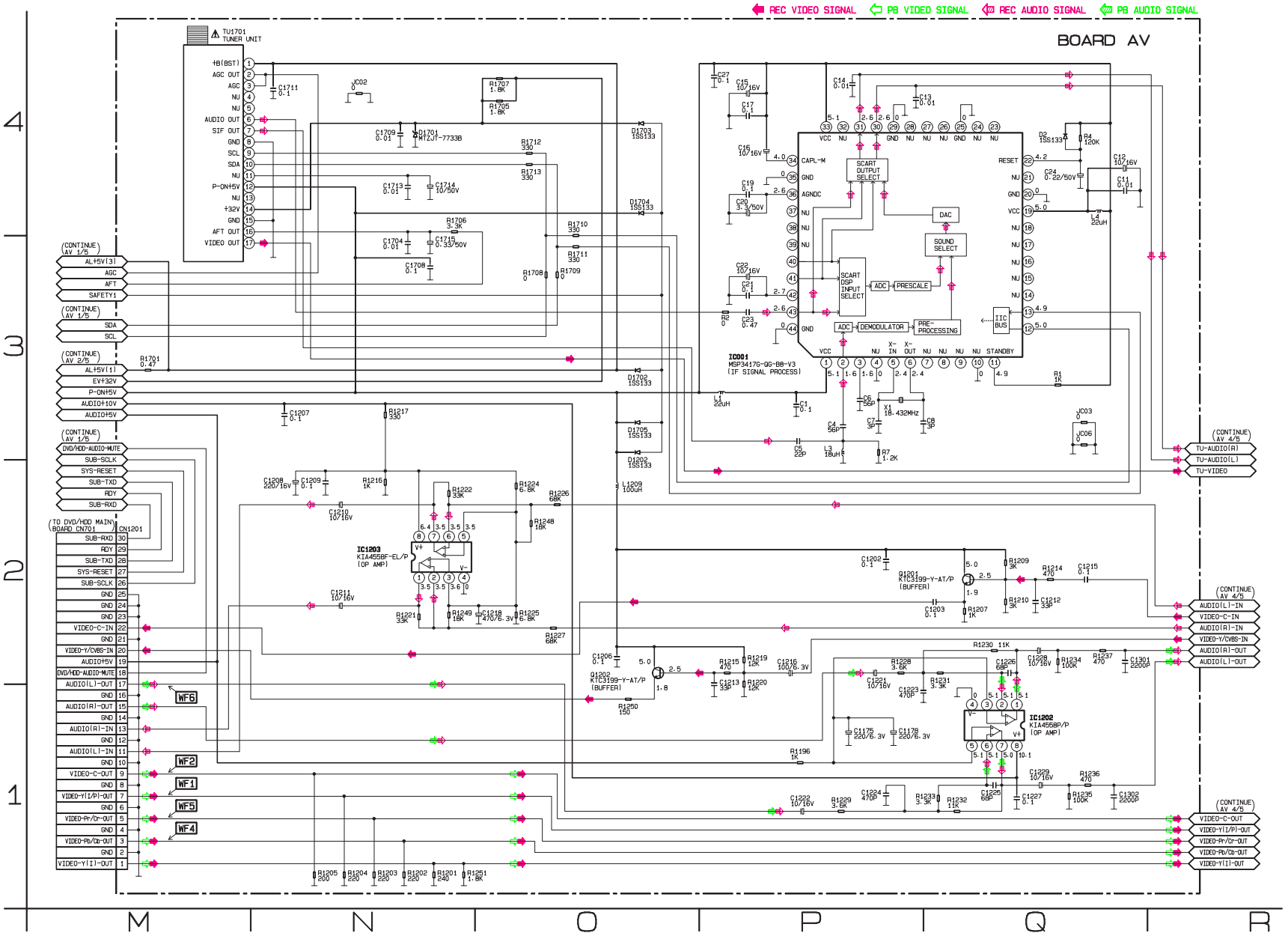
AV 2/5 Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



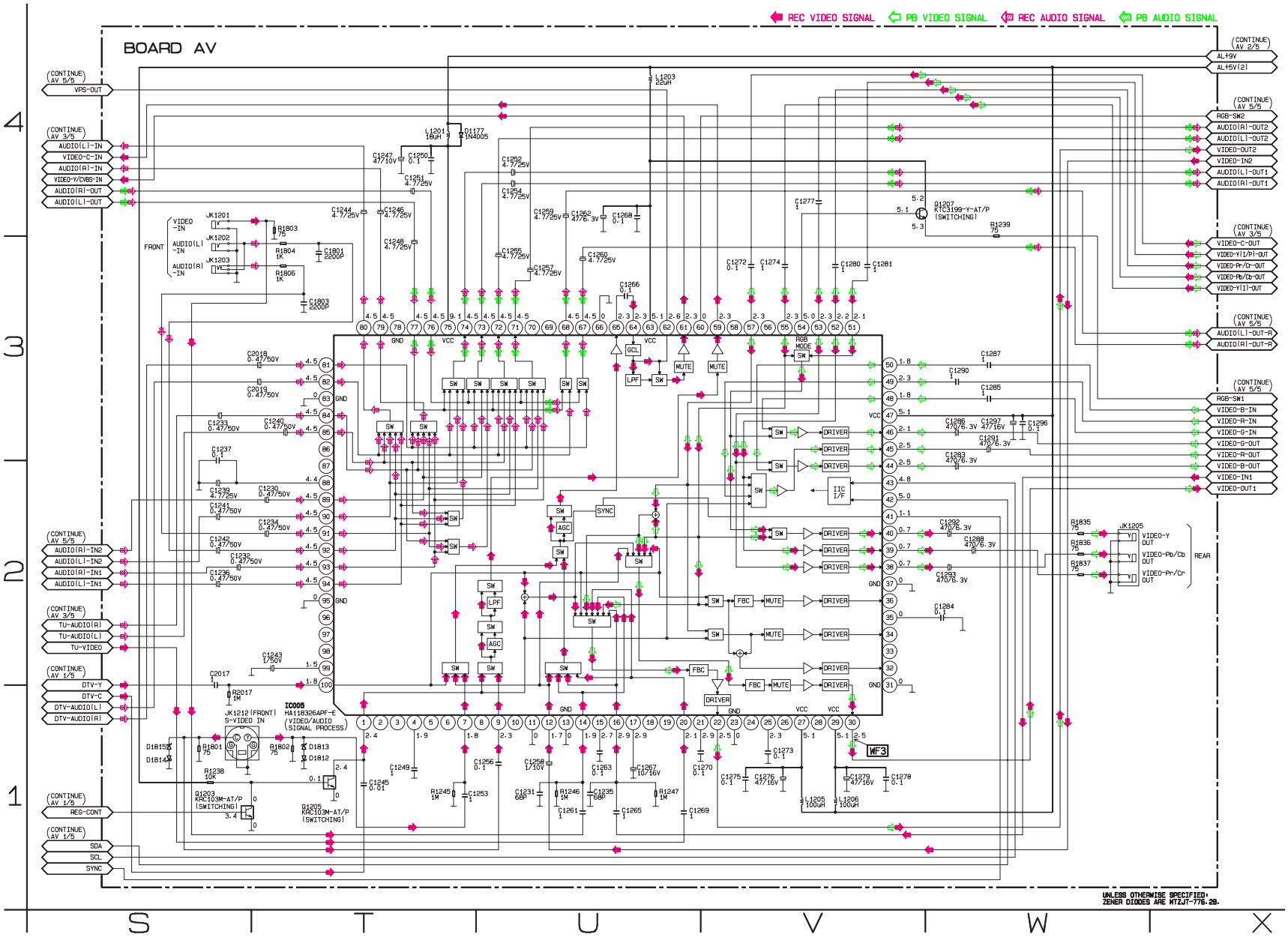
AV 3/5 Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



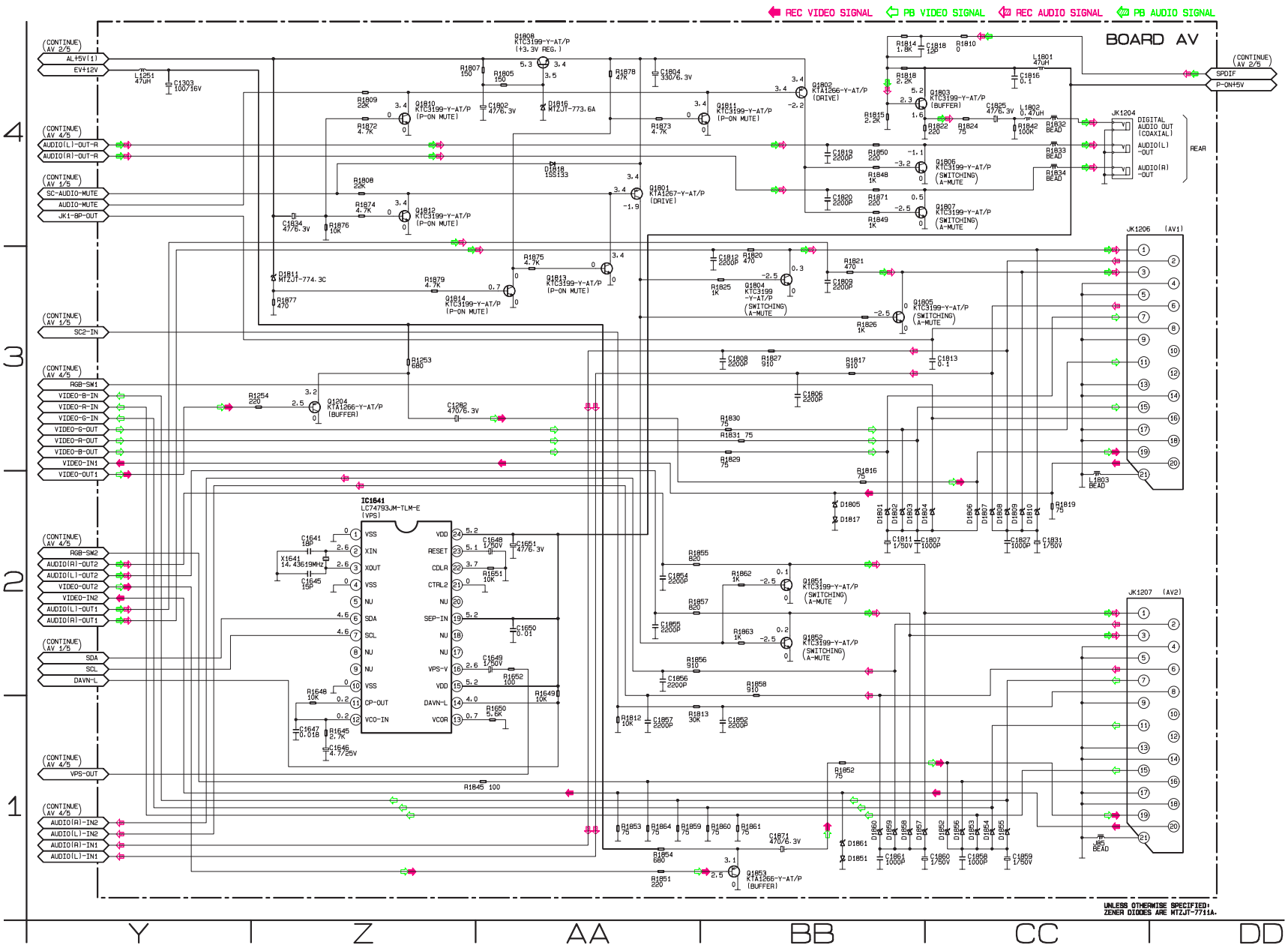
AV 4/5 Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



AV 5/5 Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



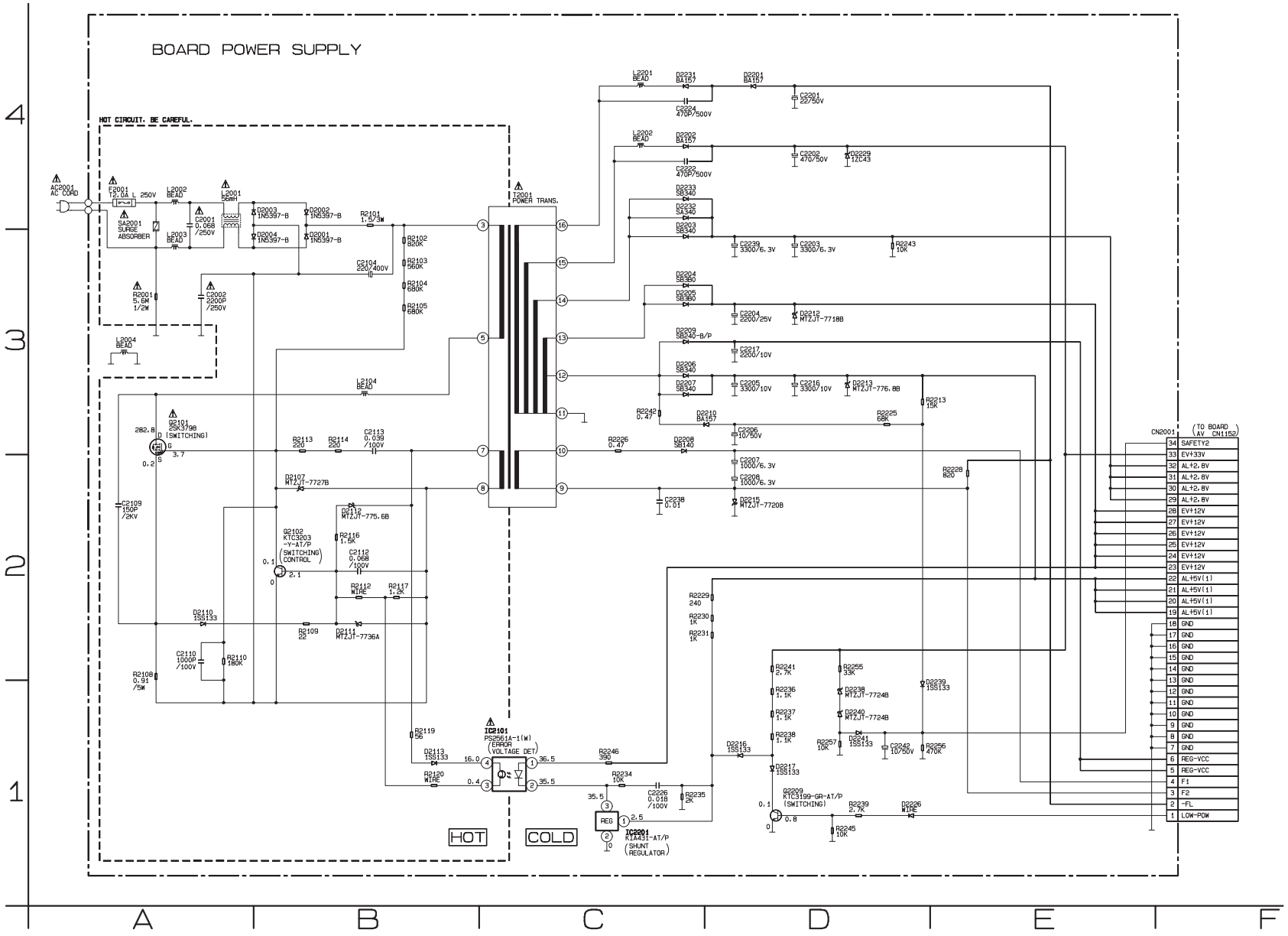
POWER SUPPLY Schematic Diagram

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F2001) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

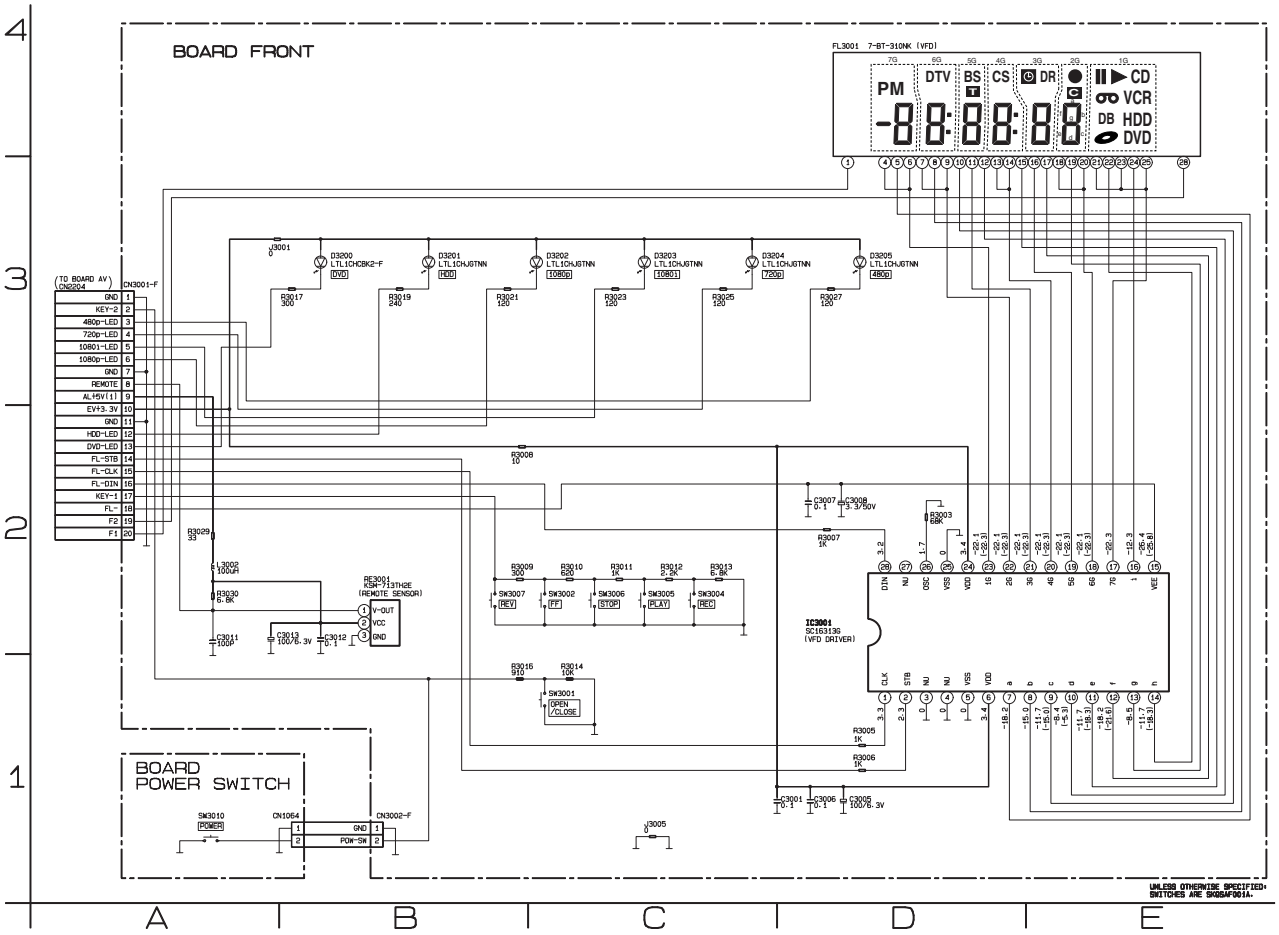


FRONT & POWER SWITCH Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

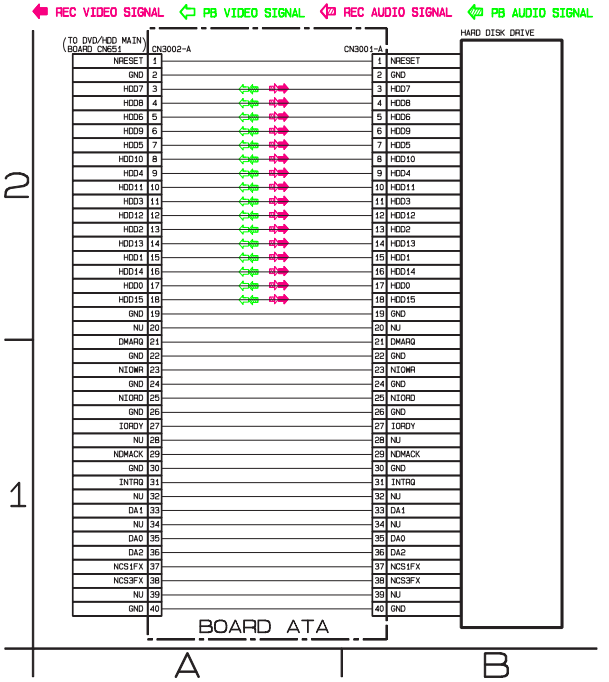
FL3001 MATRIX CHART

	7G	6G	5G	4G	3G	2G	1G
P1	a	a	a	a	a	a	CD
P2	b	b	b	b	b	b	
P3	f	f	f	f	f	f	VCR
P4	g	g	g	g	g	g	DB
P5	c	c	c	c	c	c	HDD
P6	e	e	e	e	e	e	
P7	d	d	d	d	d	d	DVD
P8	S1		T				
P9	PM	DTV	BS	CS	DR		



E2J71SCF

ATA Schematic Diagram

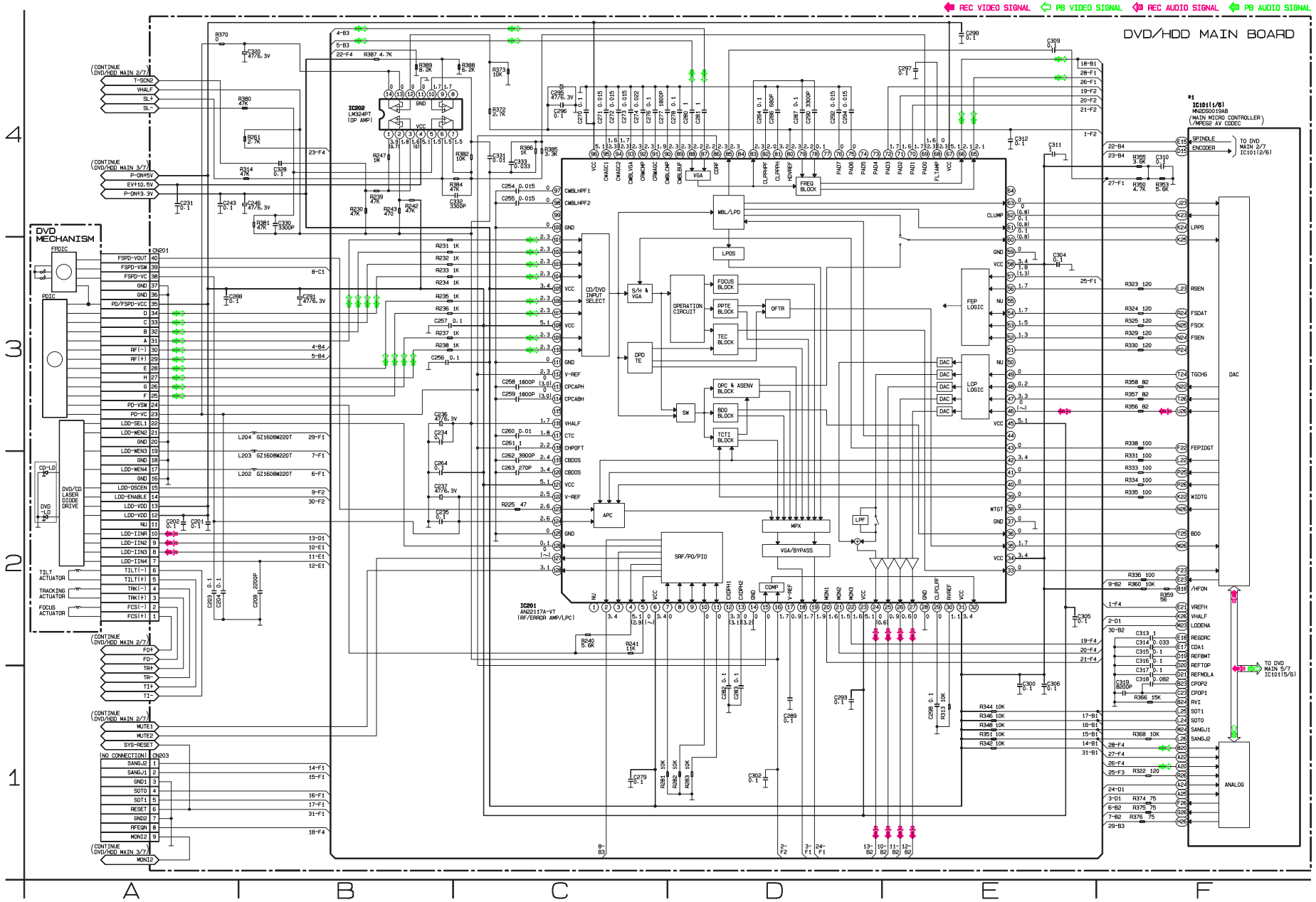


E2J71SCATA

DVD/HDD MAIN 1/7 Schematic Diagram

∗1 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC101.
IC101 is divided into six and shown as IC101 (1/6) ~ IC101 (6/6) in this DVD/HDD Main Schematic Diagram Section.

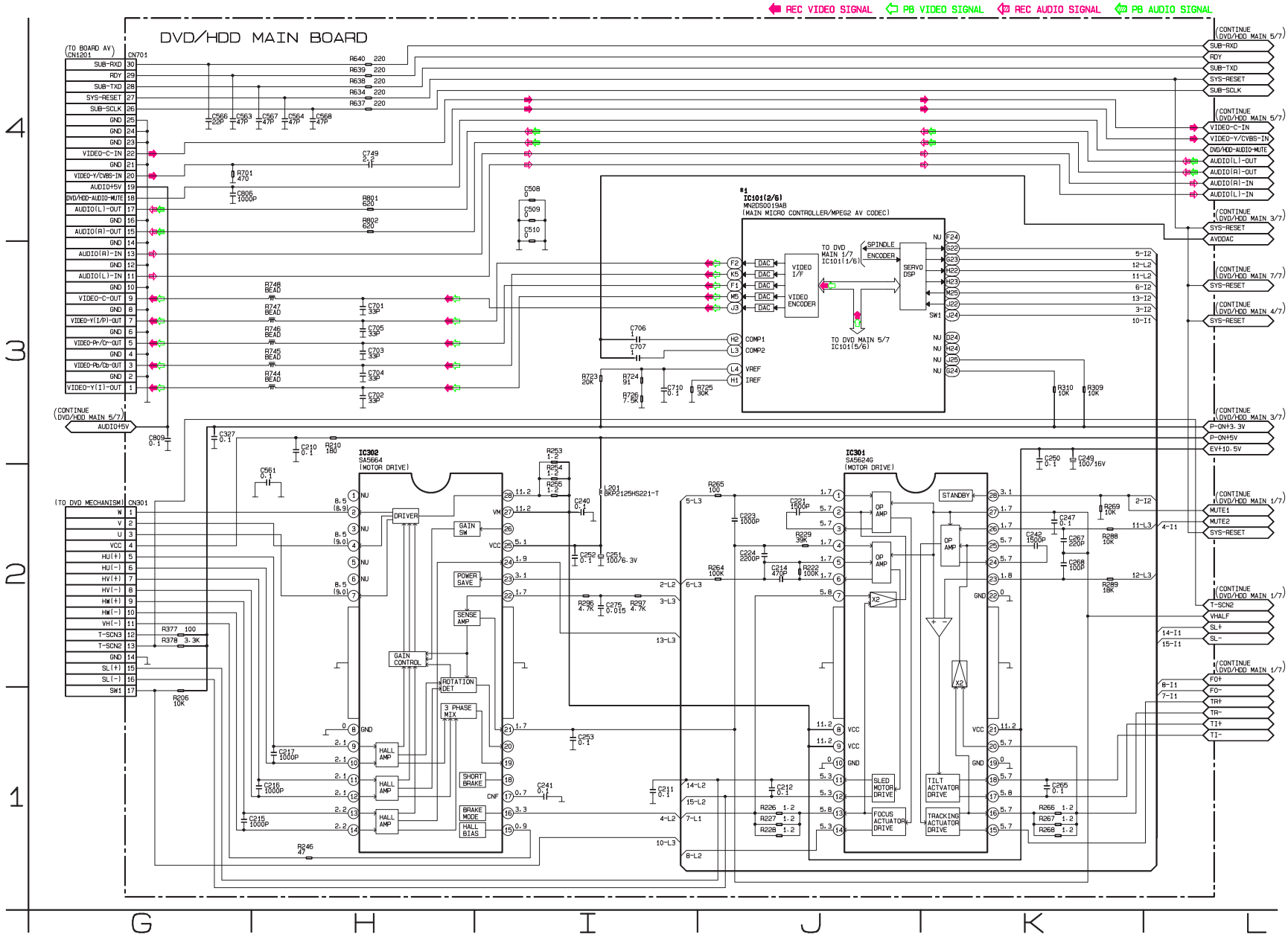
NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



DVD/HDD MAIN 2/7 Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

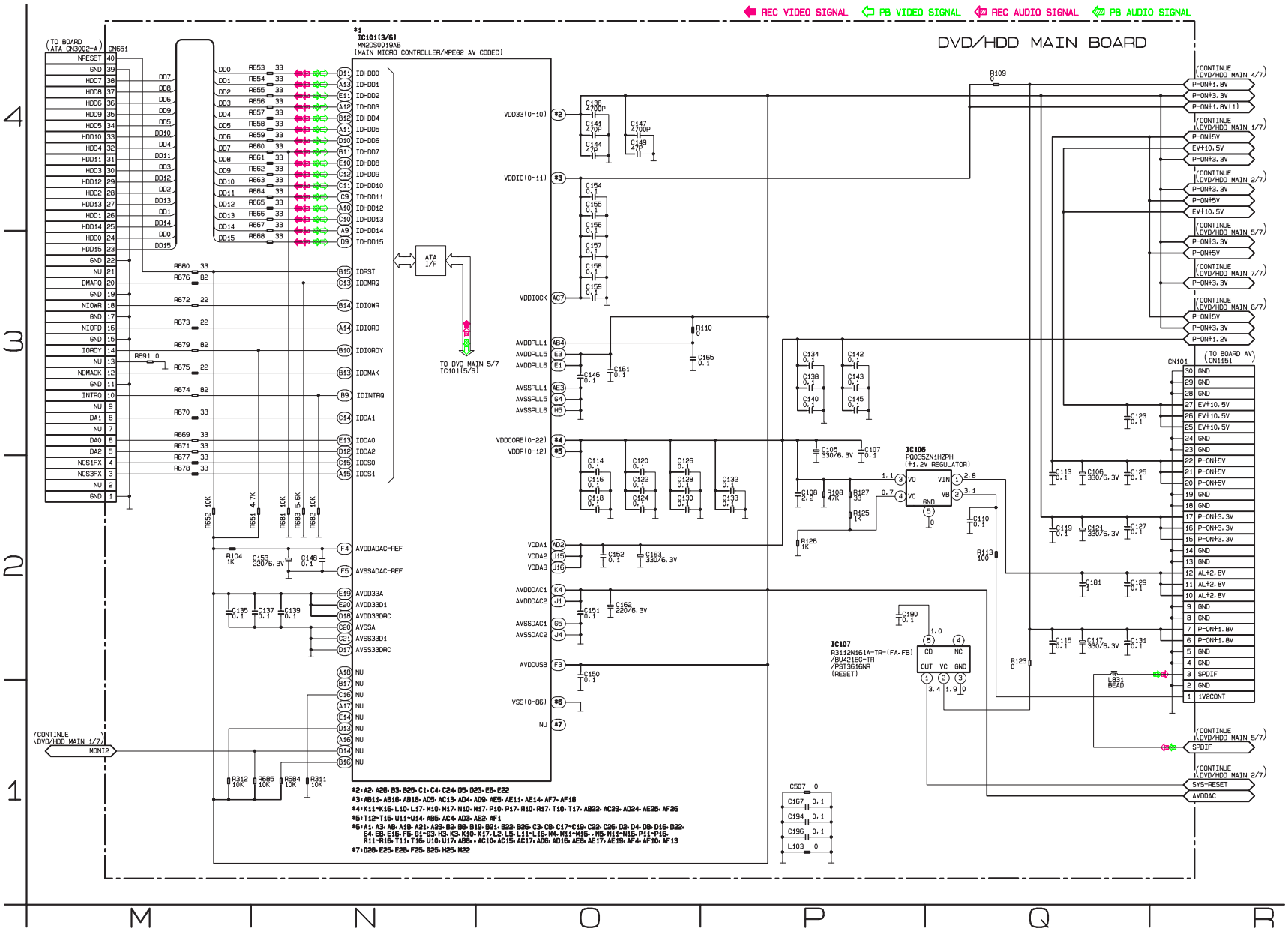
∗1 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC101.
IC101 is divided into six and shown as IC101 (1/6) ~ IC101 (6/6) in this DVD/HDD Main Schematic Diagram Section.



DVD/HDD MAIN 3/7 Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

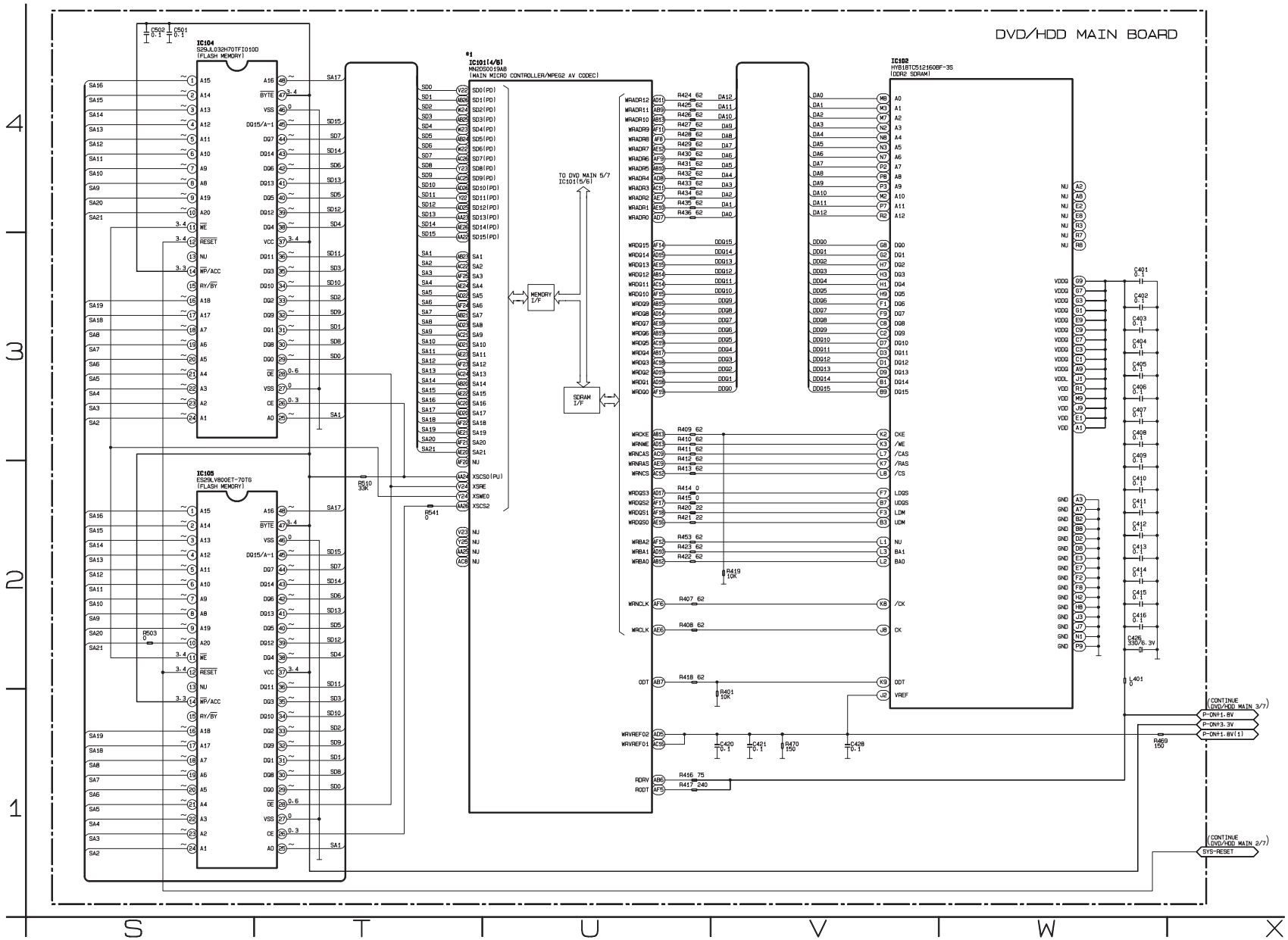
∗1 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC101.
IC101 is divided into six and shown as IC101 (1/6) ~ IC101 (6/6) in this DVD/HDD Main Schematic Diagram Section.



DVD/HDD MAIN 4/7 Schematic Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

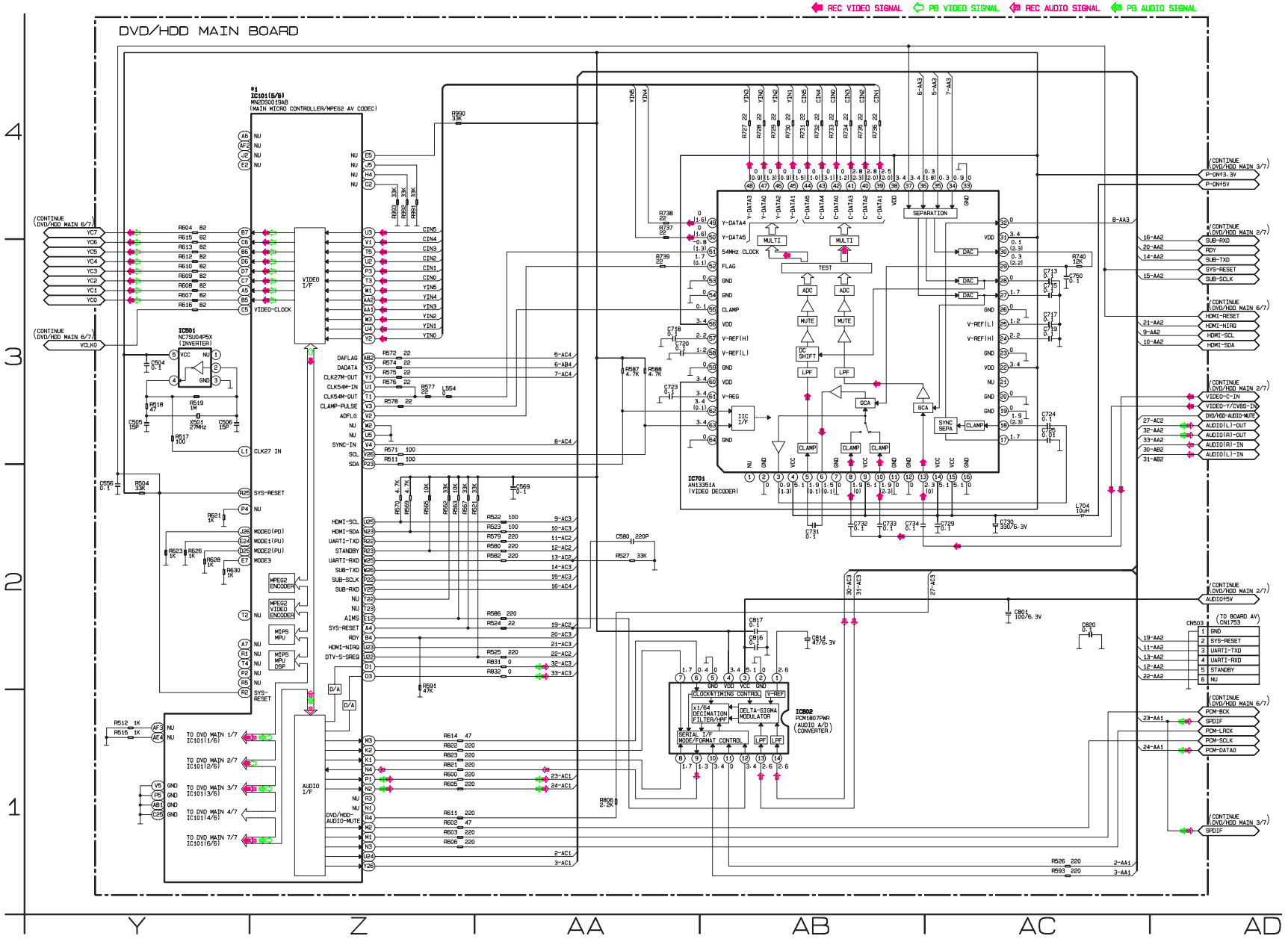
∗1 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC101.
IC101 is divided into six and shown as IC101 (1/6) ~ IC101 (6/6) in this DVD/HDD Main Schematic Diagram Section.



DVD/HDD MAIN 5/7 Schematic Diagram

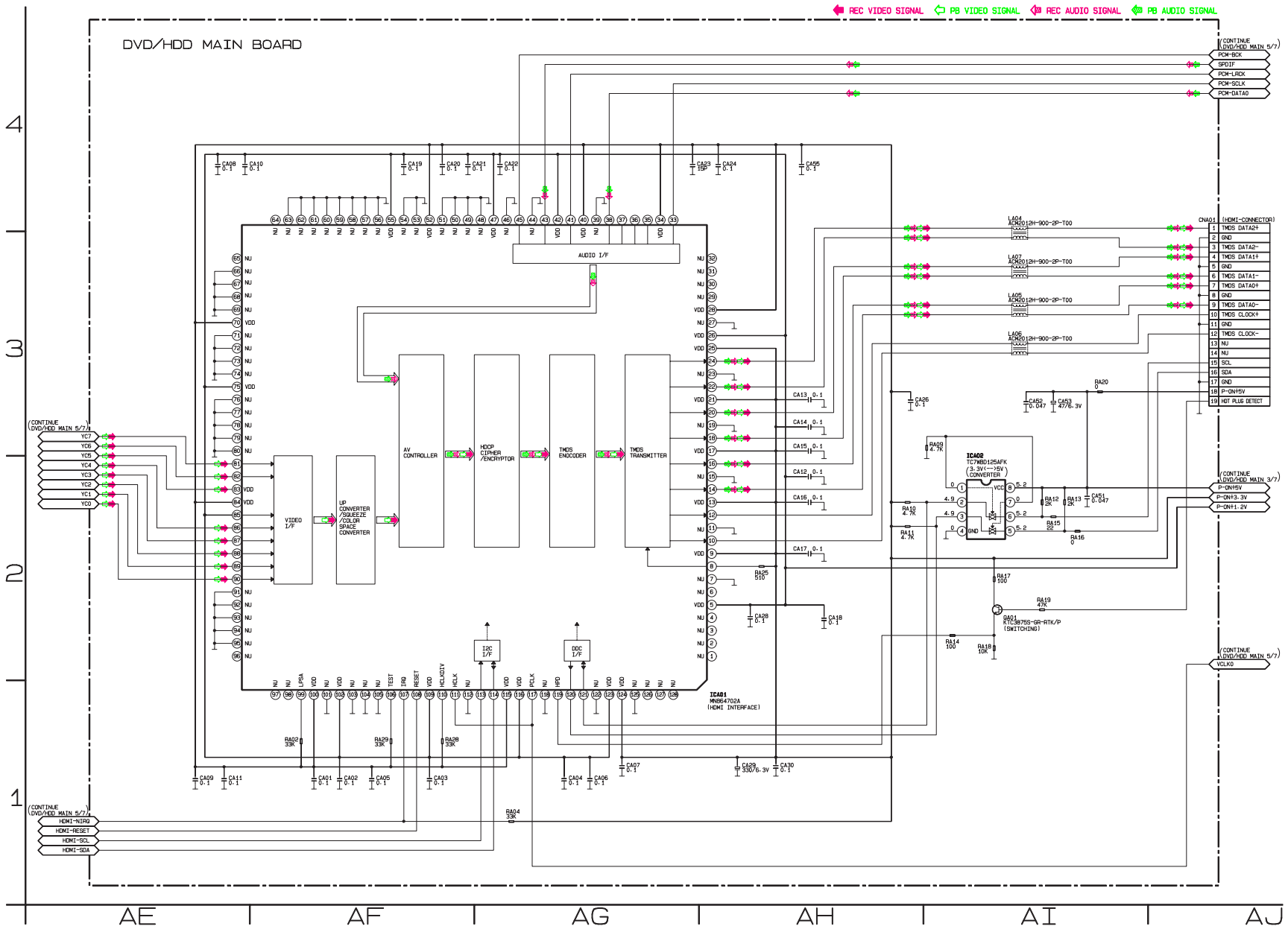
NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

∗1 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC101.
IC101 is divided into six and shown as IC101 (1/6) ~ IC101 (6/6) in this DVD/HDD Main Schematic Diagram Section.



DVD/HDD MAIN 6/7 Schematic Diagram

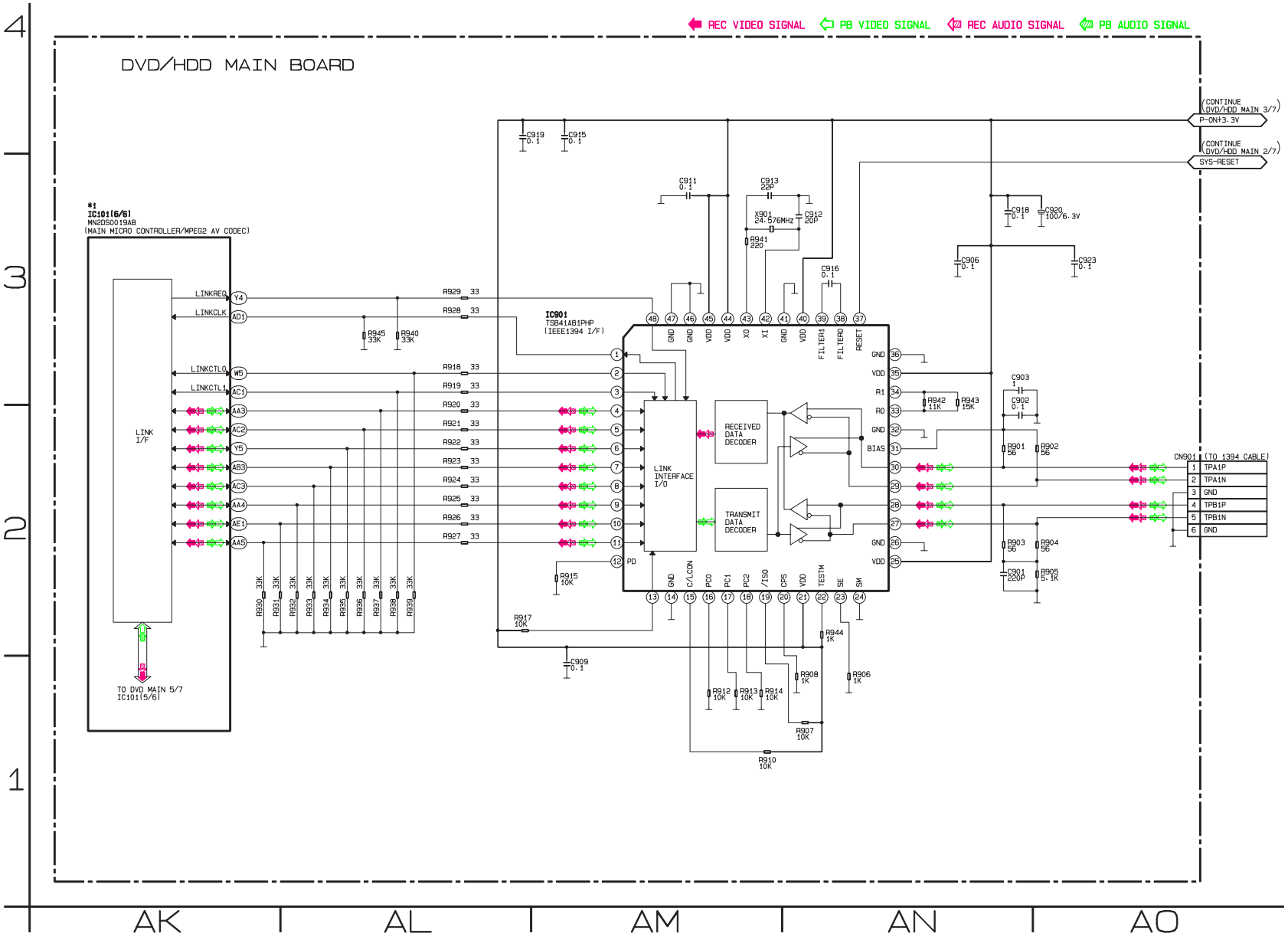
NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



DVD/HDD MAIN 7/7 Schematic Diagram

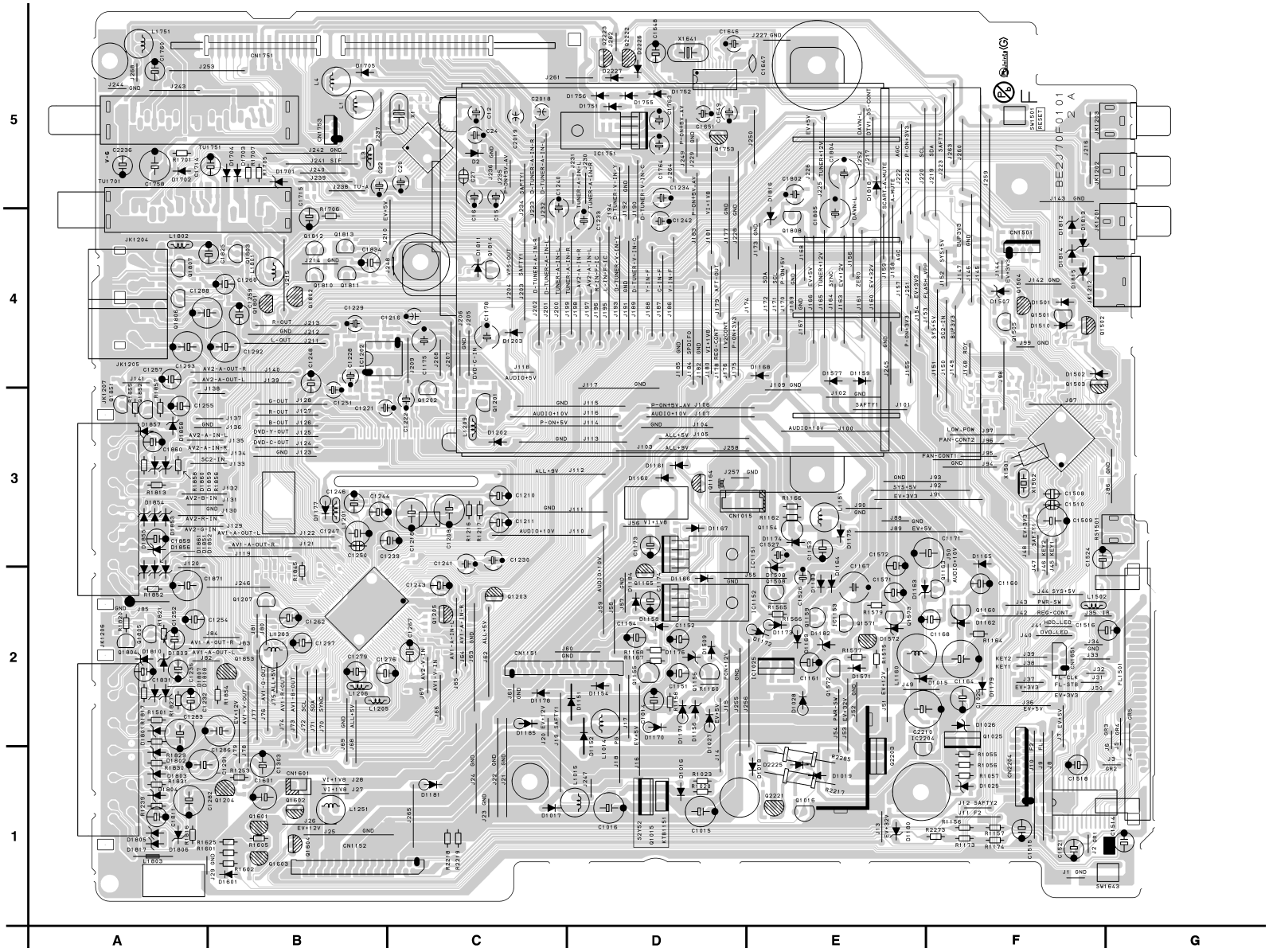
NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

∗1 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC101.
IC101 is divided into six and shown as IC101 (1/6) ~ IC101 (6/6) in this DVD/HDD Main Schematic Diagram Section.



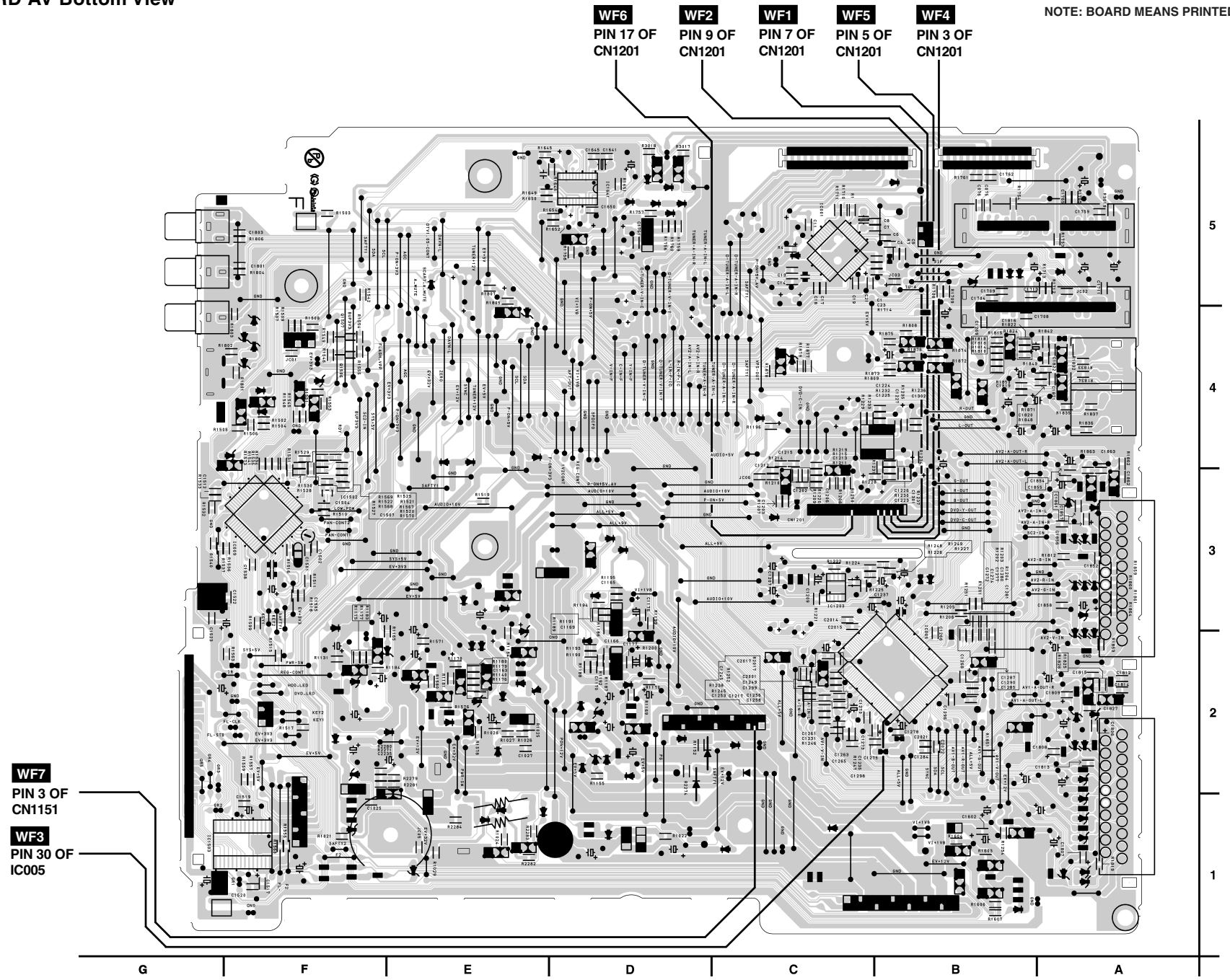
BOARD AV Top View

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



BOARD AV Bottom View

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



BOARD POWER SUPPLY Top View

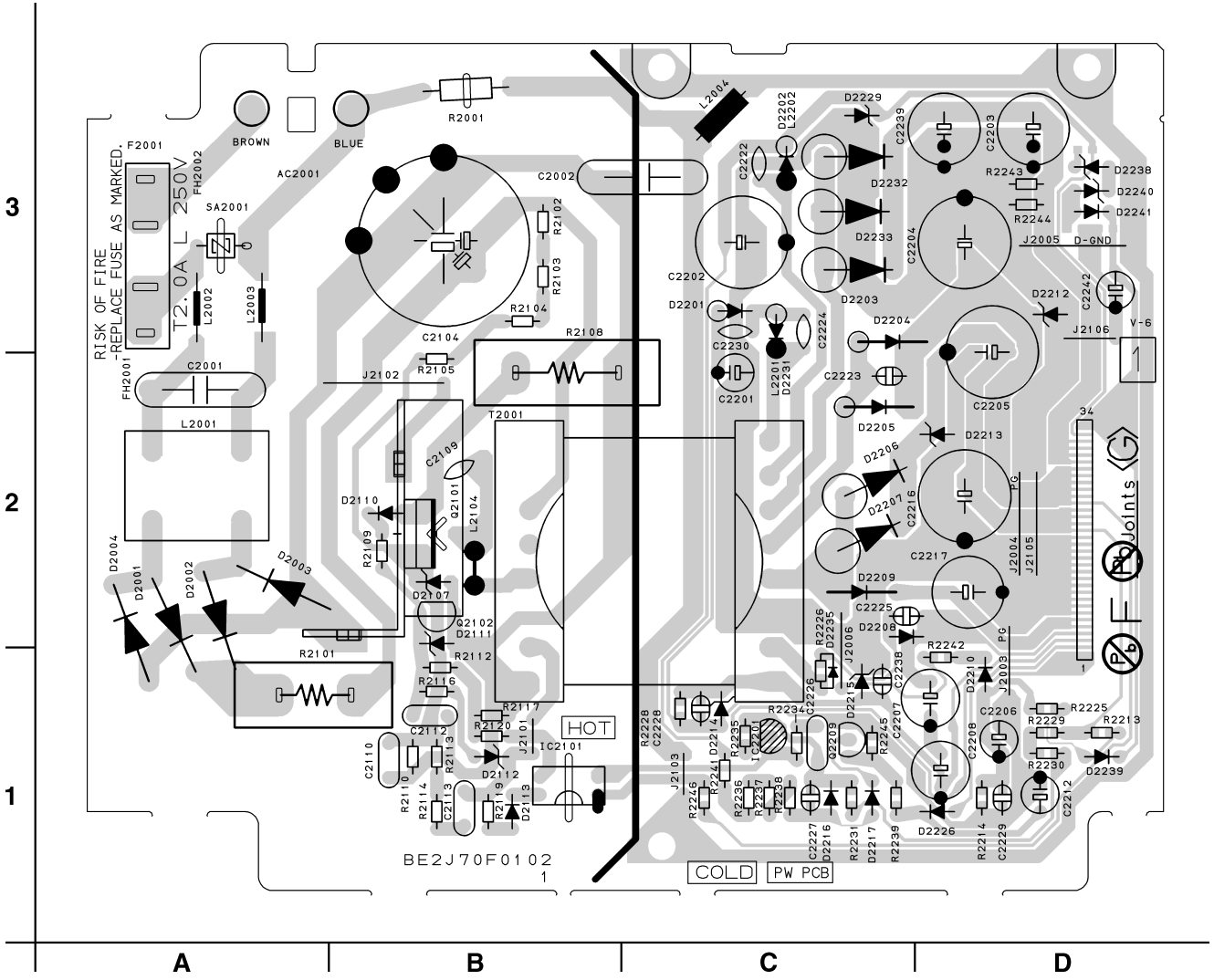
NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F2001) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

Because a hot chassis ground is present in the power supply circut, an isolation transformer must be used. Also, in order to have the ability to increase the input slowly, when troubleshooting this type power supply circuit, a variable isolation transformer is required.



BOARD POWER SUPPLY Bottom View

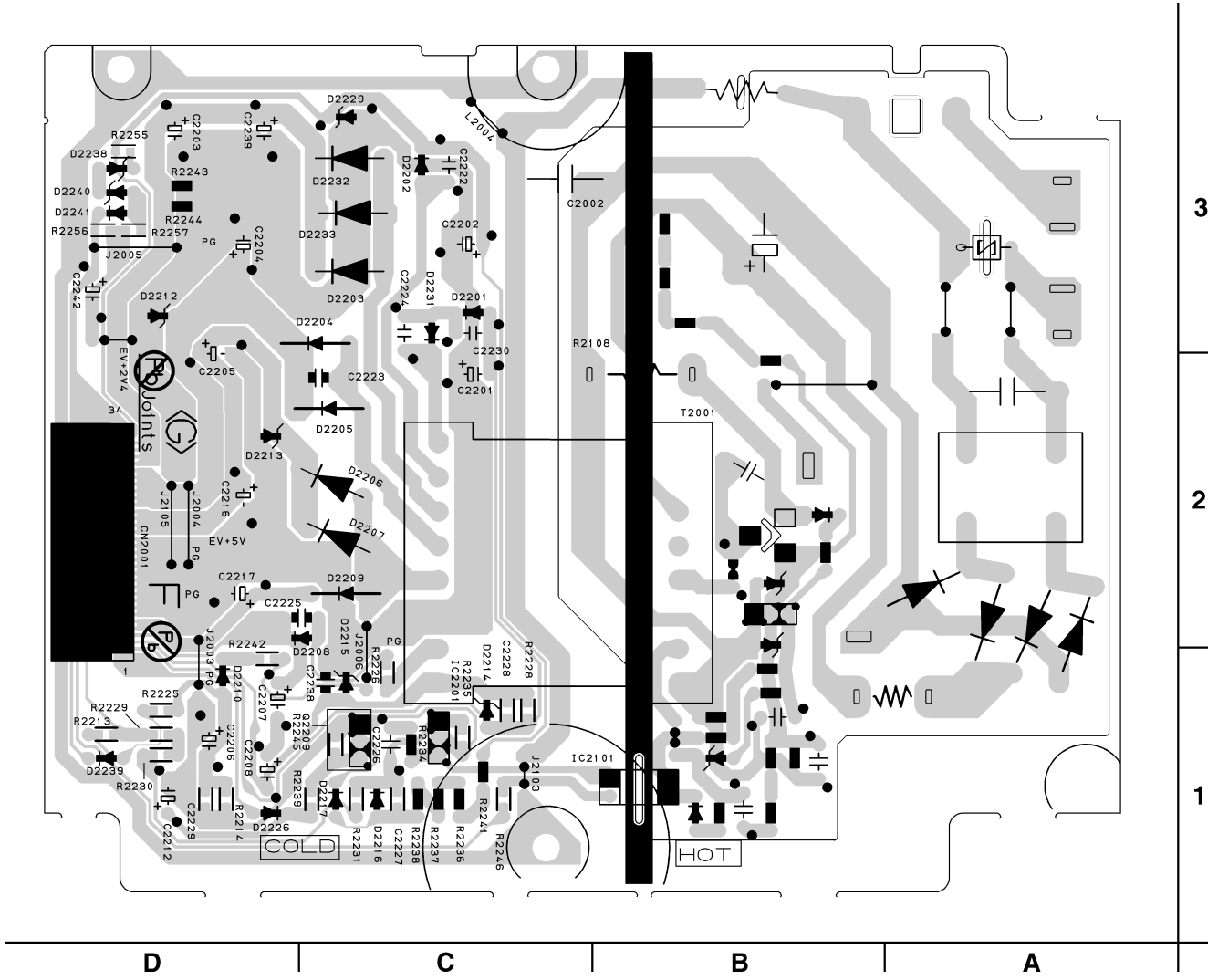
NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

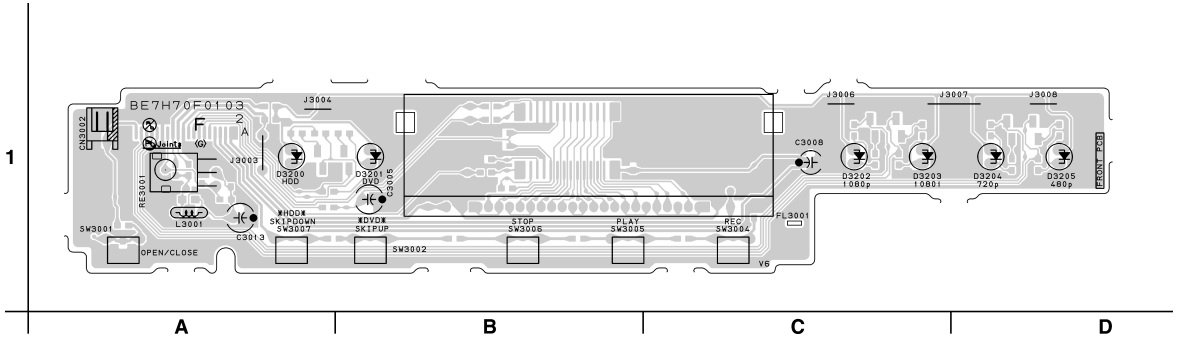
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F2001) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

Because a hot chassis ground is present in the power supply circut, an isolation transformer must be used. Also, in order to have the ability to increase the input slowly, when troubleshooting this type power supply circuit, a variable isolation transformer is required.

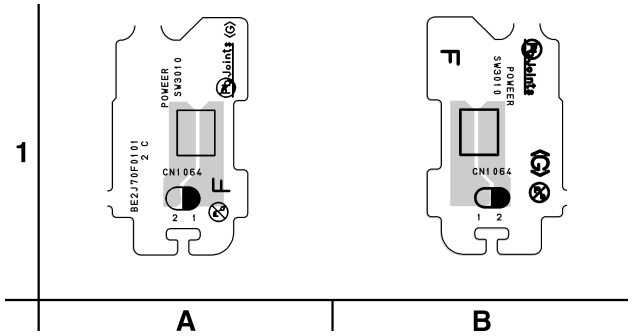


BOARD FRONT Top View

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



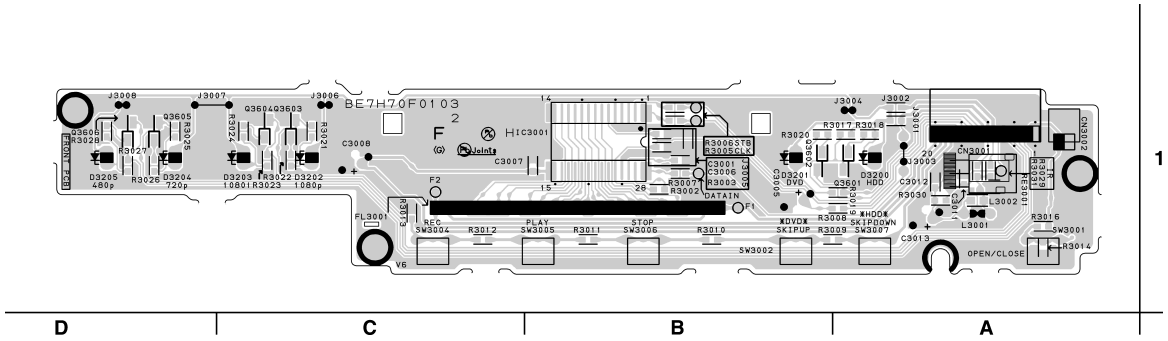
BOARD POWER SWITCH Top View



BOARD POWER SWITCH Bottom View

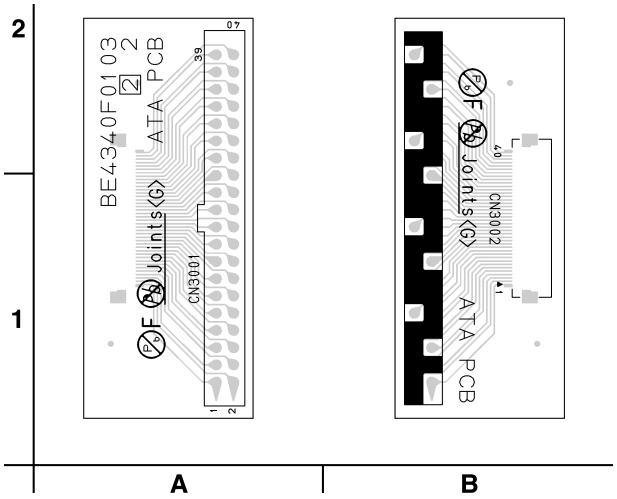
BE2J70F01012C

BOARD FRONT Bottom View



BE7H70F01032

BOARD ATA Top View

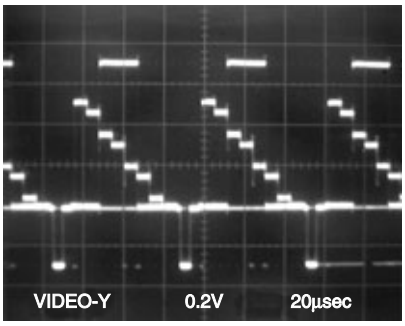


BOARD ATA Bottom View

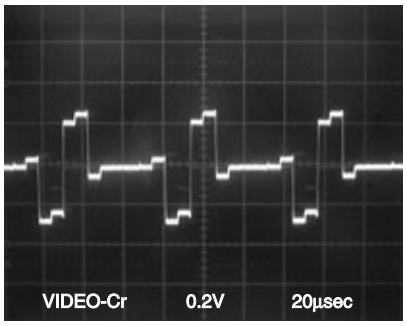
BE4340F01032

WAVEFORMS

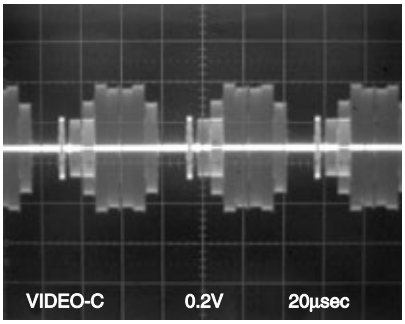
WF1 Pin 7 of CN1201



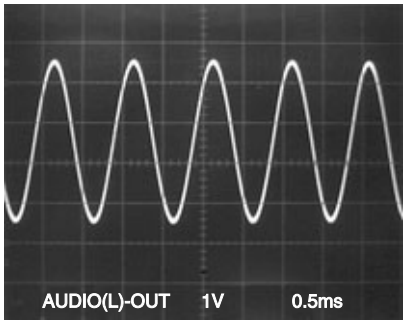
WF5 Pin 5 of CN1201



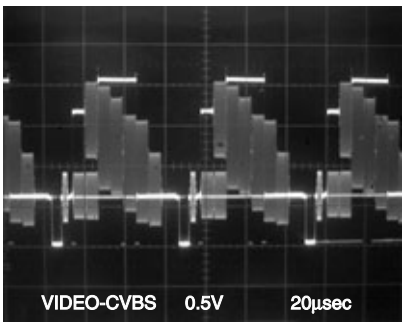
WF2 Pin 9 of CN1201



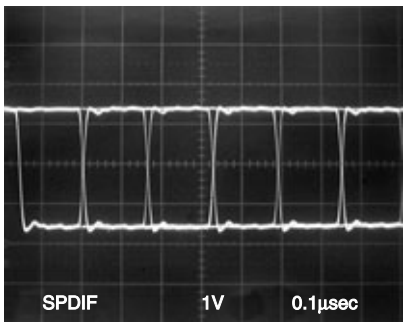
WF6 Pin 17 of CN1201



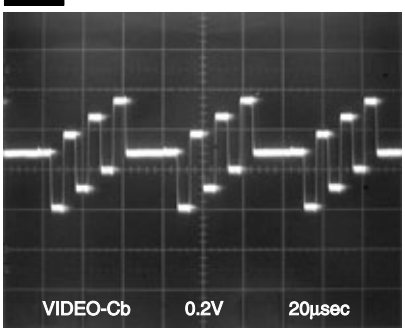
WF3 Pin 30 of IC005



WF7 Pin 3 of CN1151



WF4 Pin 3 of CN1201

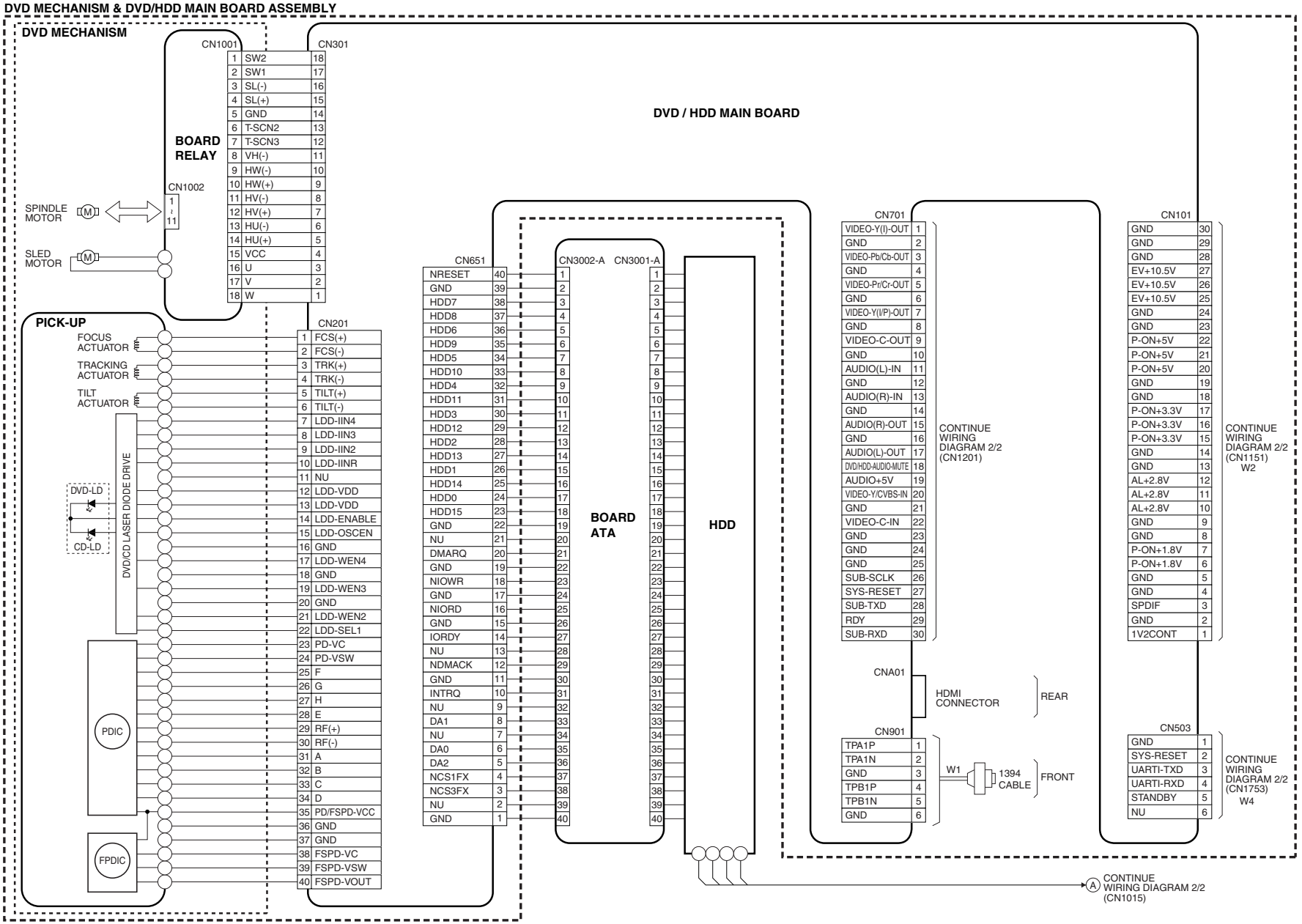


NOTE:
Input: COLOR BAR SIGNAL
(WITH 1KHz AUDIO SIGNAL)

WIRING DIAGRAM

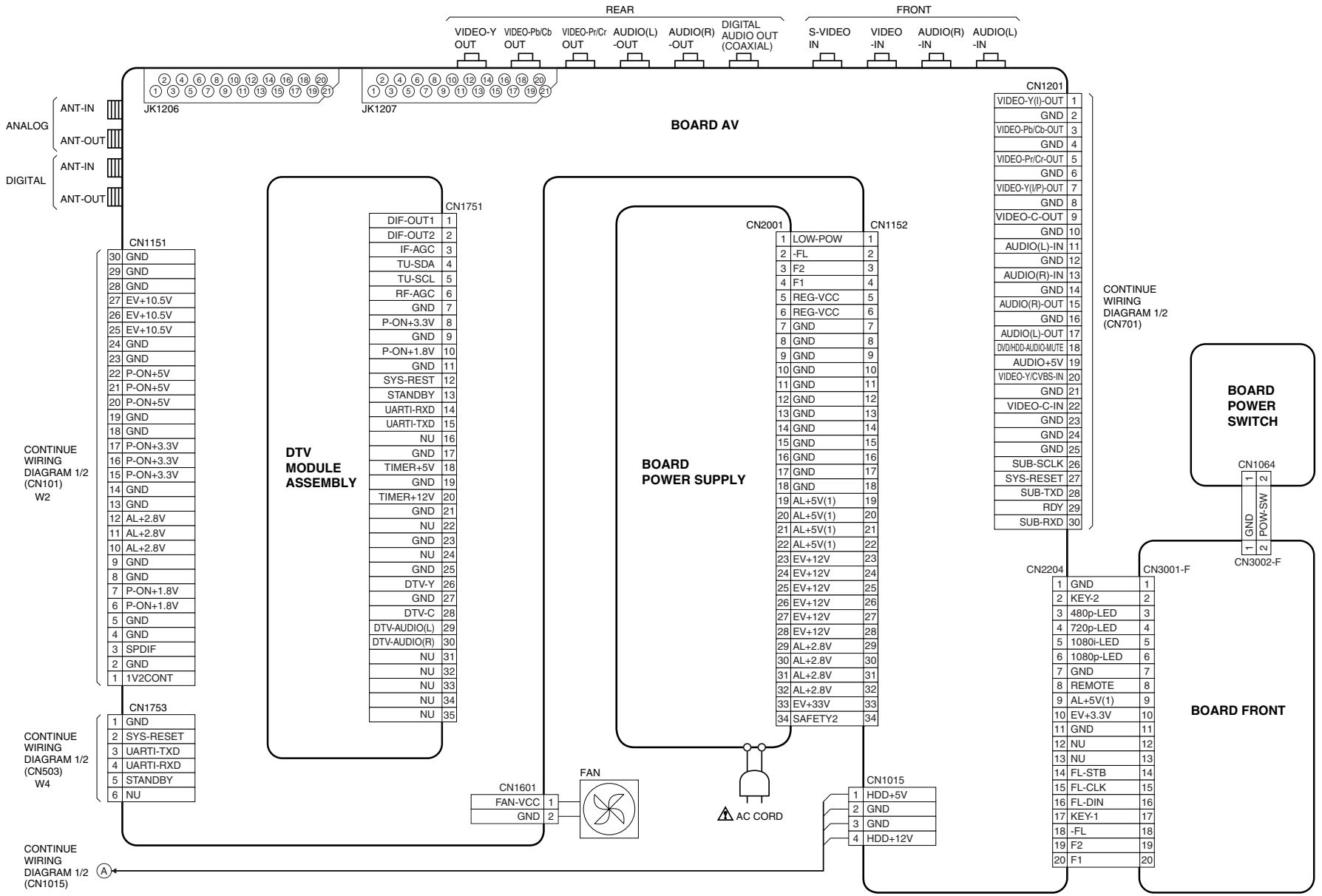
Wiring 1/2 Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.

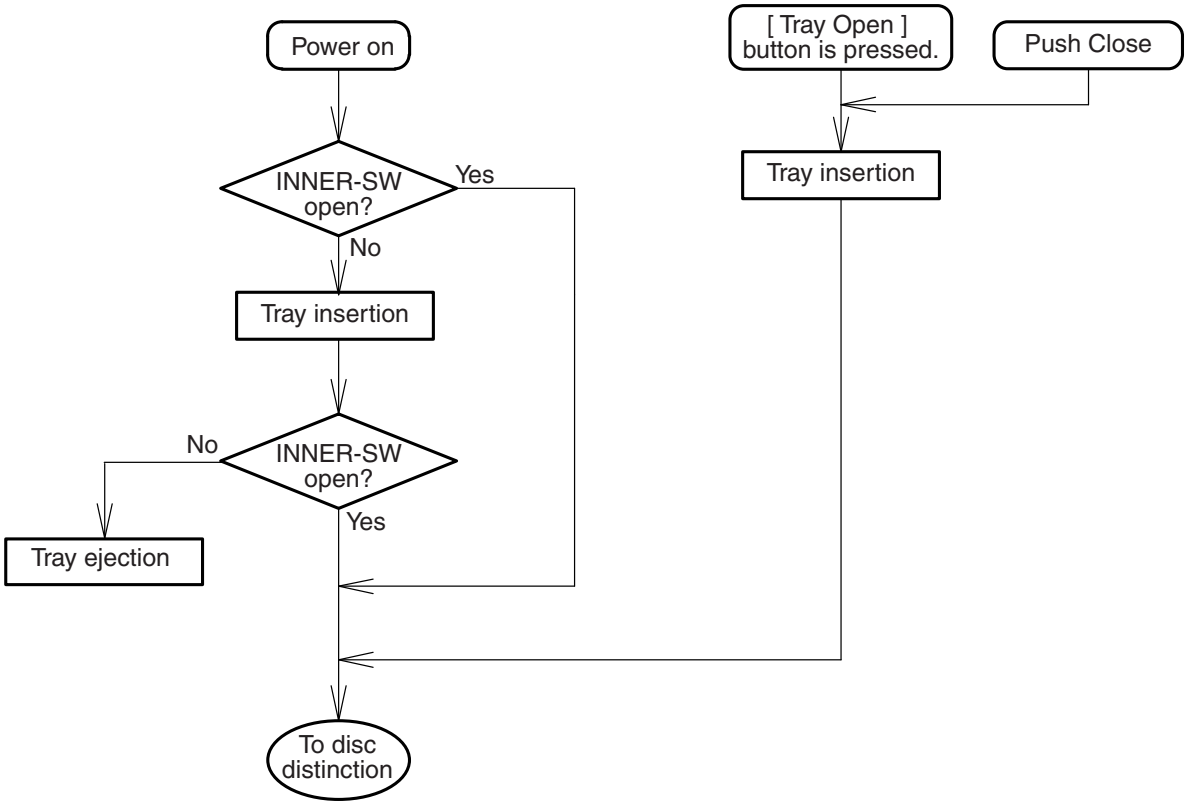


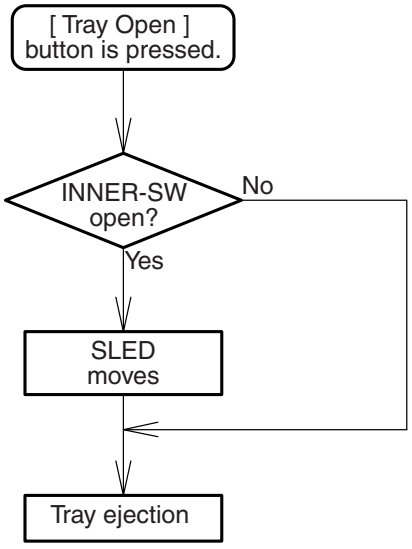
Wiring 2/2 Diagram

NOTE: BOARD MEANS PRINTED CIRCUIT BOARD.



SYSTEM CONTROL TIMING CHARTS

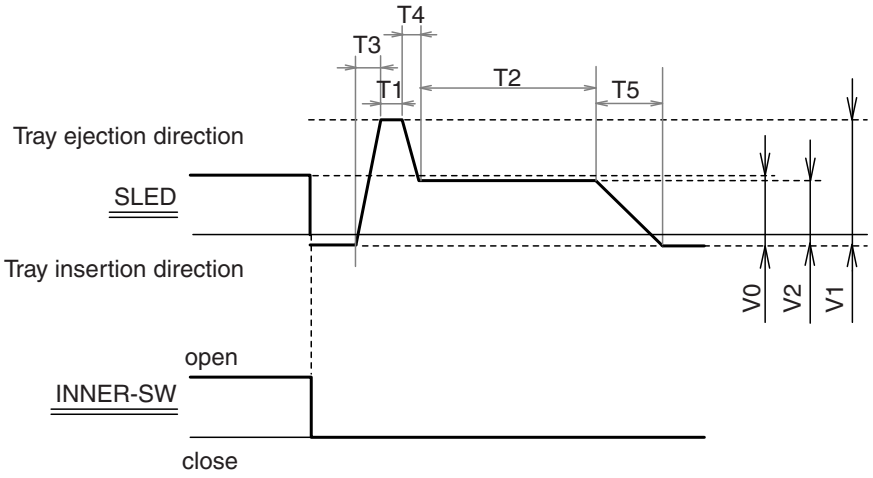




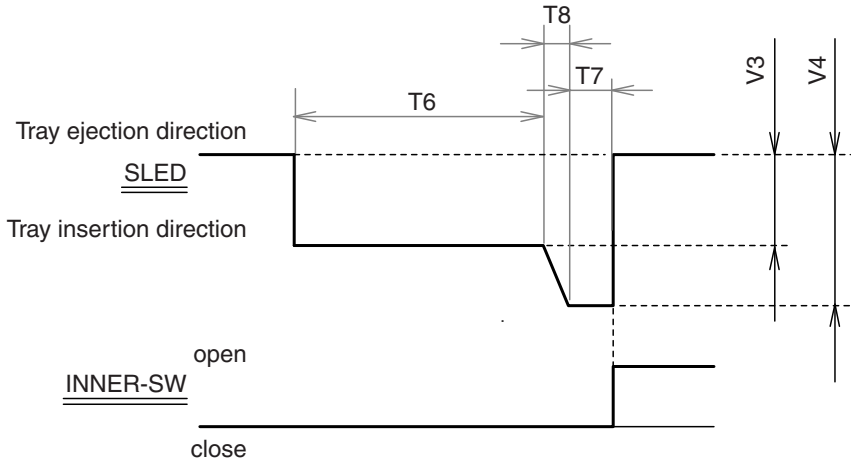
Parameter

V*: Voltage	T*: Event timer
V0: 2.40 V	T1: 0.050 s
V1: 4.25 V	T2: 2.000 s
V2: 2.00 V	T3: 0.008 s
V3: 2.36 V	T4: 0.006 s
V4: 4.26 V	T5: 0.066 s
	T6: 1.500 s
	T7: 0.800 s
	T8: 0.005 s

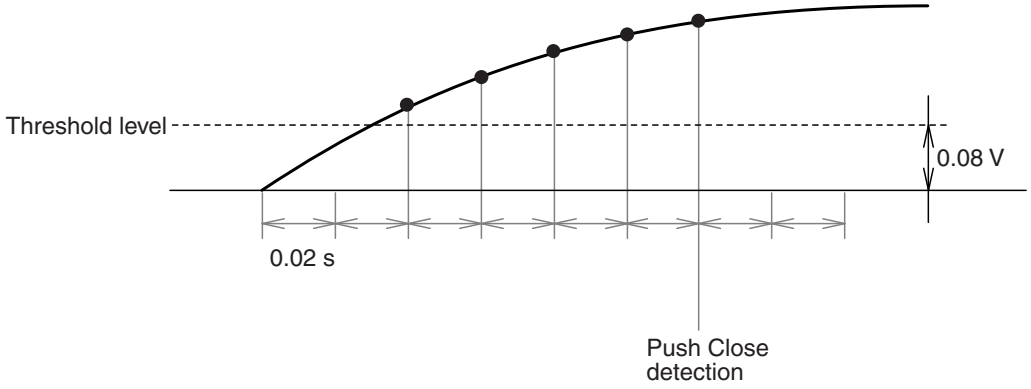
Tray open



Tray close



Push close



IC PIN FUNCTION DESCRIPTIONS

IC009 (SUB MICRO CONTROLLER)

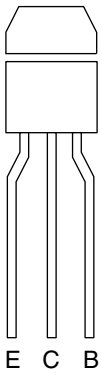
Pin No.	IN/ OUT	Signal Name	Function
1	IN	KEY-1	Key Data Input 1
2	IN	KEY-2	Key Data Input 2
3	IN	SAFETY1	Power Supply Protection1
4	IN	AFT	Tuner Voltage Input Signal
5	-	FLASH-VPP	Flash Writing Voltage
6	IN	EV+3.3V	+3.3V Power Supply
7	IN	BUP+3.3V	+3.3V Power Supply
8	OUT	XOUT	Main Clock Output
9	IN	XIN	Main Clock Input
10	-	VSS	Ground
11	IN	XCIN	Sub Clock Input
12	OUT	XCOUT	Sub Clock Output
13	-	GND	Ground
14	IN	RESET	Micro Controller Reset Signal
15	OUT	FAN-CONT1	Fan Motor Control Signal1
16	OUT	FAN-CONT2	Fan Motor Control Signal2
17	IN	LOW-POWER	Consumption Power Control
18	OUT	SUB-TXD	Transmission Data to Main Micro Controller
19	IN	SUB-RXD	Reception Data from Main Micro Controller
20	OUT	SUB-SCLK	Communication Clock with Main Micro Controller
21	-	NU	Not Used
22	OUT	SYS-RESET	System Reset Signal
23	-	NU	Not Used
24	IN	DAVN-L	VPS/PDC Data Receive = “L”
25	IN	SYNC	Video Sync Signal Input
26	OUT	1V2CONT	Power Regulator Control Signal
27	IN	REMOTE	Remote Signal Input
28	-	NU	Not Used
29	IN	RDY	Ready/Busy communication Control with Main Micro Controller
30	IN	P-DOWN	Power Voltage Down Detector Signal
31	OUT	FL-SEL	FL Select
32	-	NU	Not Used
33	IN/ OUT	SDA	Serial Data
34	OUT	SCL	Serial Clock
35	IN/ OUT	FLASH-SDA	Serial Data Signal for Flash
36	OUT	FLASH-SCL	Serial Clock Signal for Flash
37	IN	DVD/HDD-AUDIO-MUTE	DVD/HDD-Audio Mute Control Signal
38	OUT	AUDIO-MUTE	Audio Mute Control Signal
39	OUT	SC-AUDIO-MUTE	SCART Jack Audio Mute Control Signal
40	-	NU	Not Used
41	OUT	8PIN-OUT1	Control SCART1 8Pin Level by using 8POUT-1 and 8POUT-2
42	OUT	8PIN-OUT2	Control SCART1 8Pin Level by using 8POUT-1 and 8POUT-2
43	-	NU	Not Used
44	-	NU	Not Used
45	-	NU	Not Used
46	OUT	DTV1.05V-CONT	DTV1.05 Control Signal
47	-	NU	Not Used
48	OUT	FL-DIN	FL Serial Data Input
49	OUT	FL-STB	FL Serial Interface Strobe
50	OUT	FL-CLK	FL Serial Clock
51	-	NU	Not Used
52	OUT	REG-CONT	Power Regulator Control Signal
53	OUT	PWR-SW	DVD Power Supply Control Signal
54	OUT	1080p-LED	LED Control Signal
55	OUT	1080i-LED	LED Control Signal
56	OUT	720p-LED	LED Control Signal
57	OUT	480p-LED	LED Control Signal
58	OUT	HDD-LED	HDD LED Control Signal
59	OUT	DVD-LED	DVD LED Control Signal
60	-	NU	Not Used
61	-	AVSS	Ground
62	IN	SAFETY2	Power Supply Protection2
63	IN	AGC	IF AGC Comparator Signal
64	IN	SC2-IN	Input Signal from Pin 8 of SCART2

IC3001 (VFD DRIVER)

Pin No.	IN/ OUT	Signal Name	Function
1	IN	CLK	Serial Clock
2	IN	STB	Serial Interface Strobe
3	-	NU	Ground
4	-	NU	Ground
5	-	VSS	Ground
6	-	VDD	+3.3V Power Supply
7	OUT	a	Segment Output
8		b	
9		c	
10		d	
11		e	
12		f	
13		g	
14		h	
15	-	VEE	Pull Down Level
16	OUT	i	Segment Output
17	OUT	7G	Grid Output
18		6G	
19		5G	
20		4G	
21		3G	
22		2G	
23		1G	
24	-	VDD	+3.3V Power Supply
25	-	VSS	Ground
26	IN	OSC	Oscillator Input
27	-	NU	Not Used
28	IN	DIN	Serial Data Input

LEAD IDENTIFICATIONS

KRC103M-AT/P
KTC3199-(BL,GR,Y)-AT/P
KTA1267-Y-AT/P



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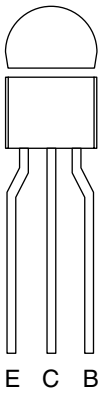
KTC3198-GR-AT/P
KTC3203-Y-AT/P



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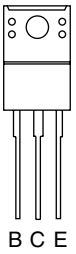

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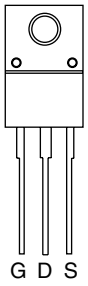

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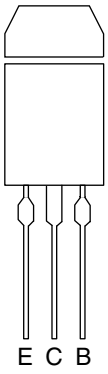

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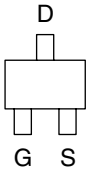

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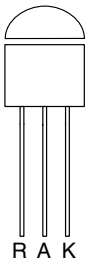

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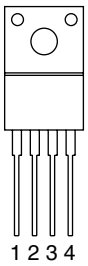

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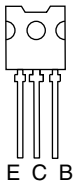

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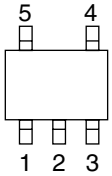

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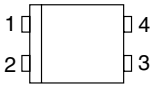
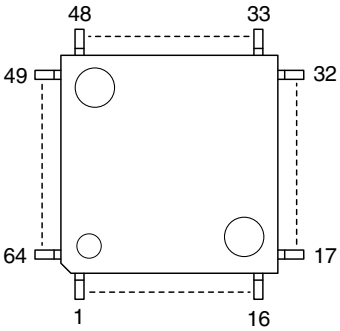


1: Anode
2: Cathode
3: Emitter
4: Collector

MN101C77AFR1



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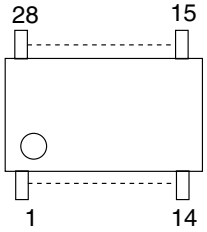

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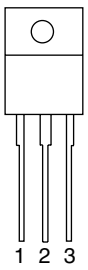

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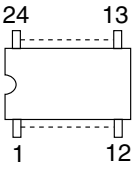

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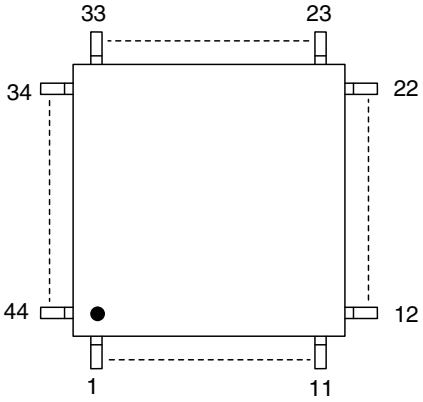

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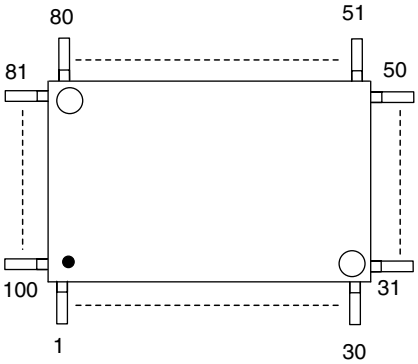
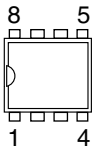


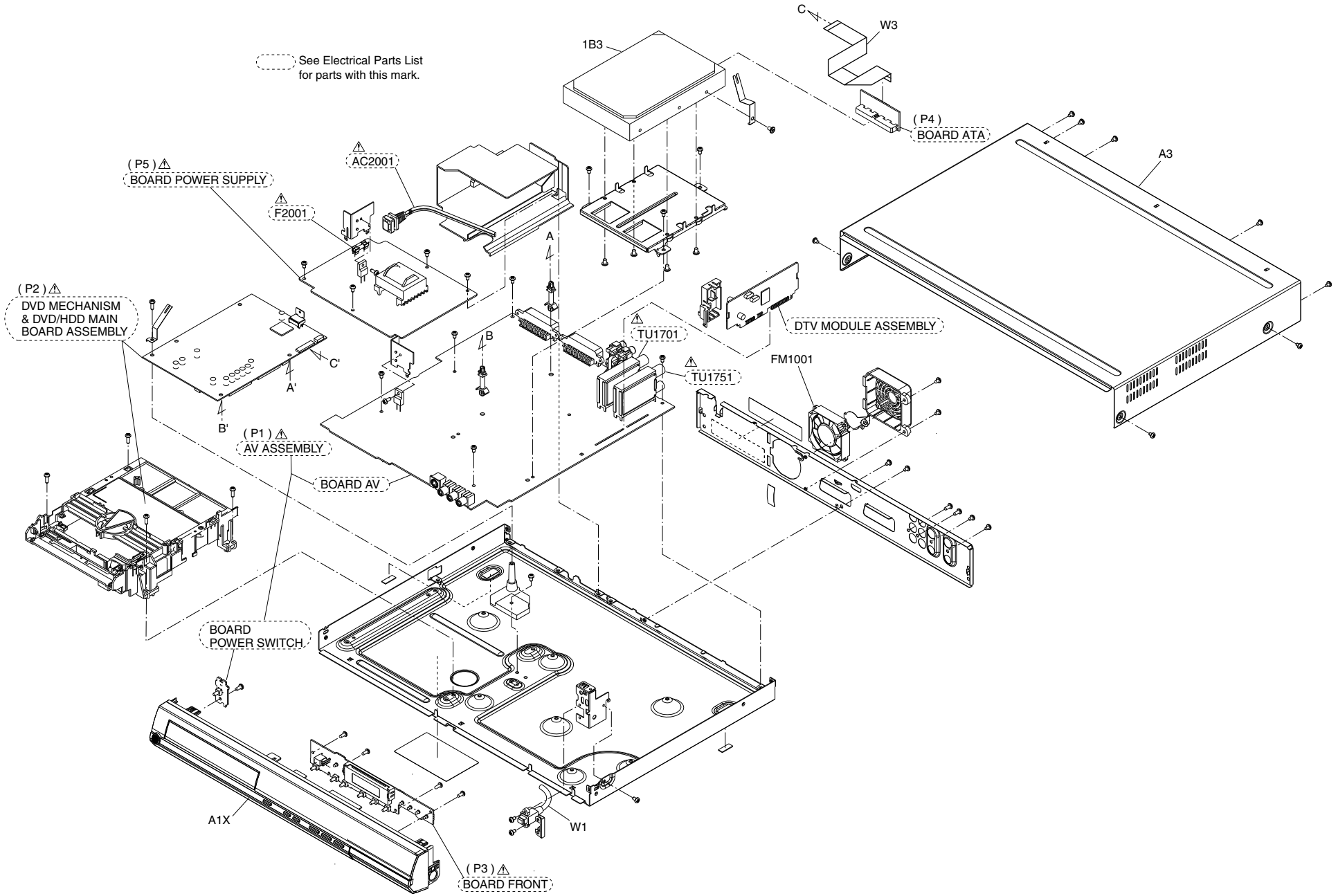
KIA4558F-EL/P
KIA4558P/P



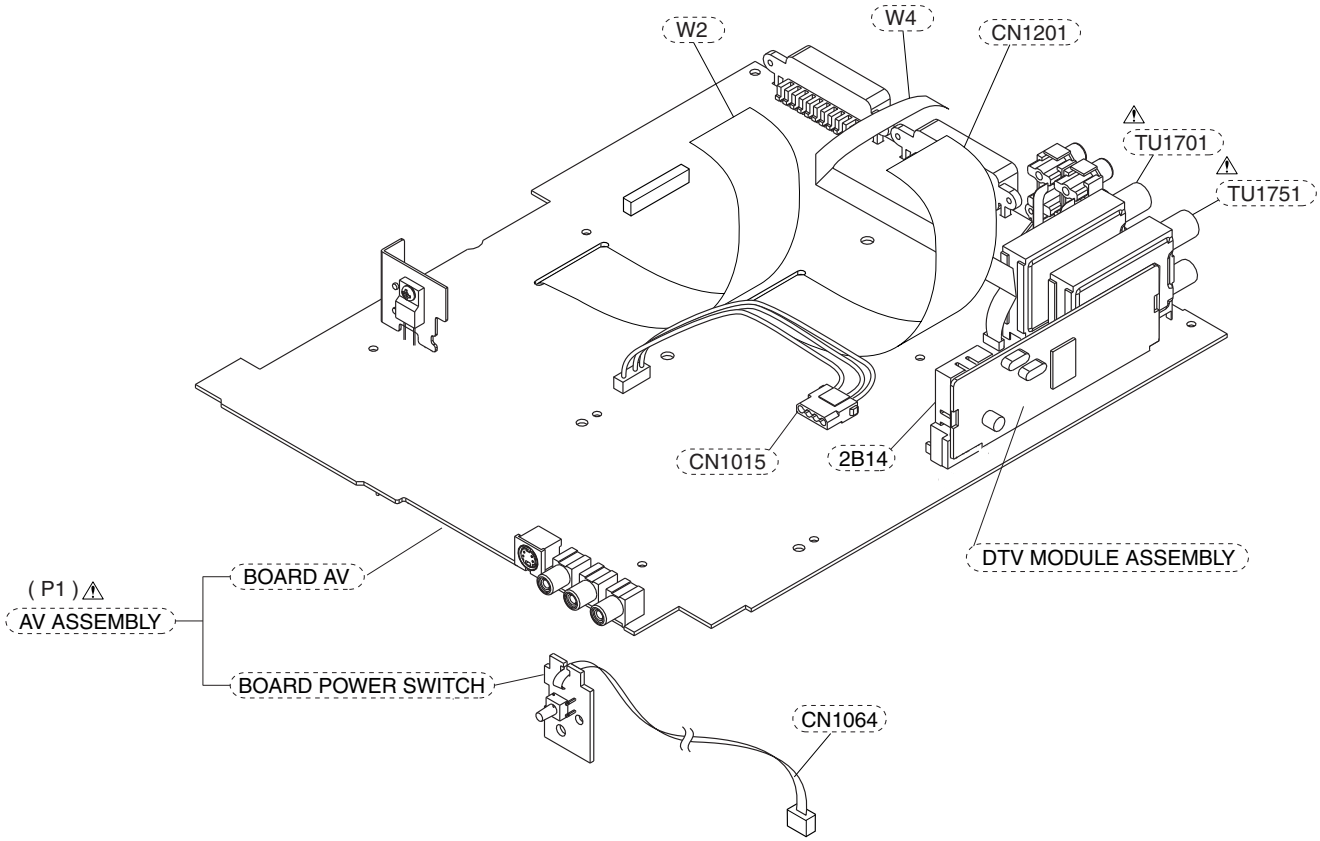
Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference
G: Gate
D: Drain
S: Source

EXPLODED VIEWS

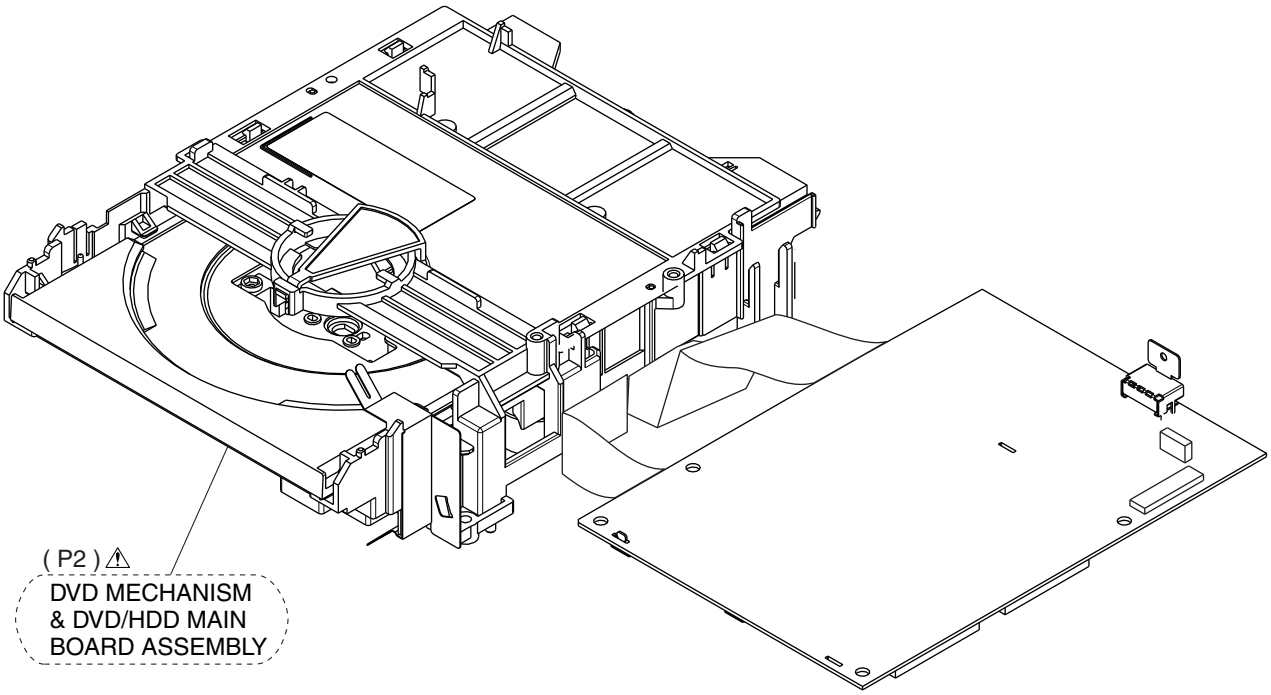
Cabinet



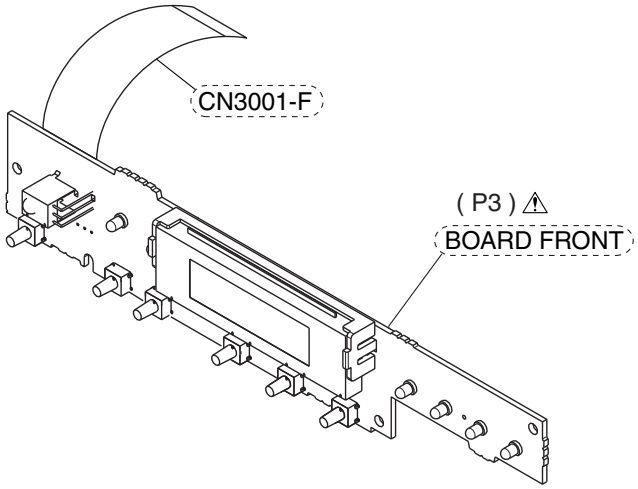
(P1) AV ASSEMBLY



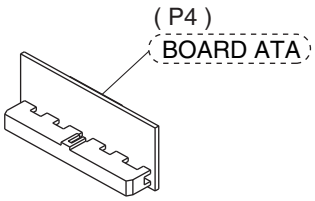
(P2) DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY



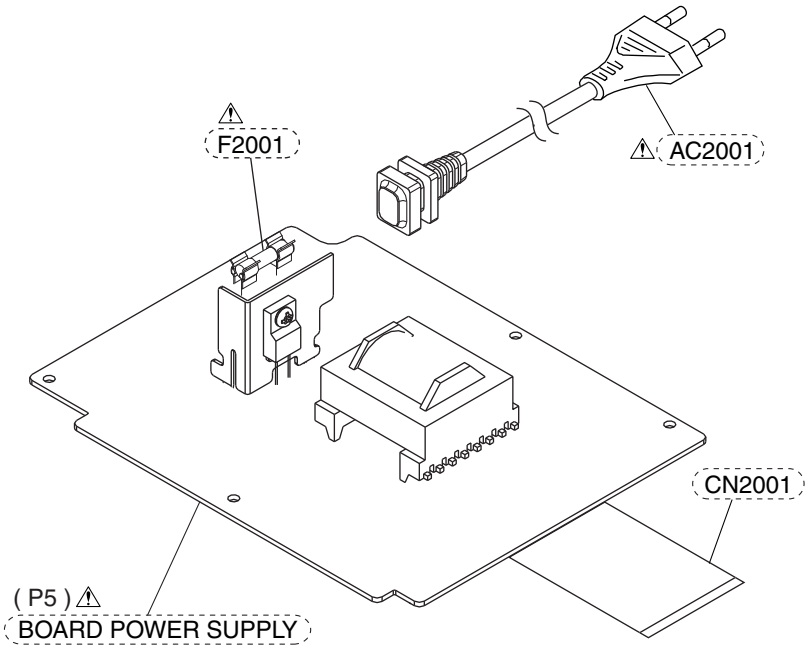
(P3) BOARD FRONT



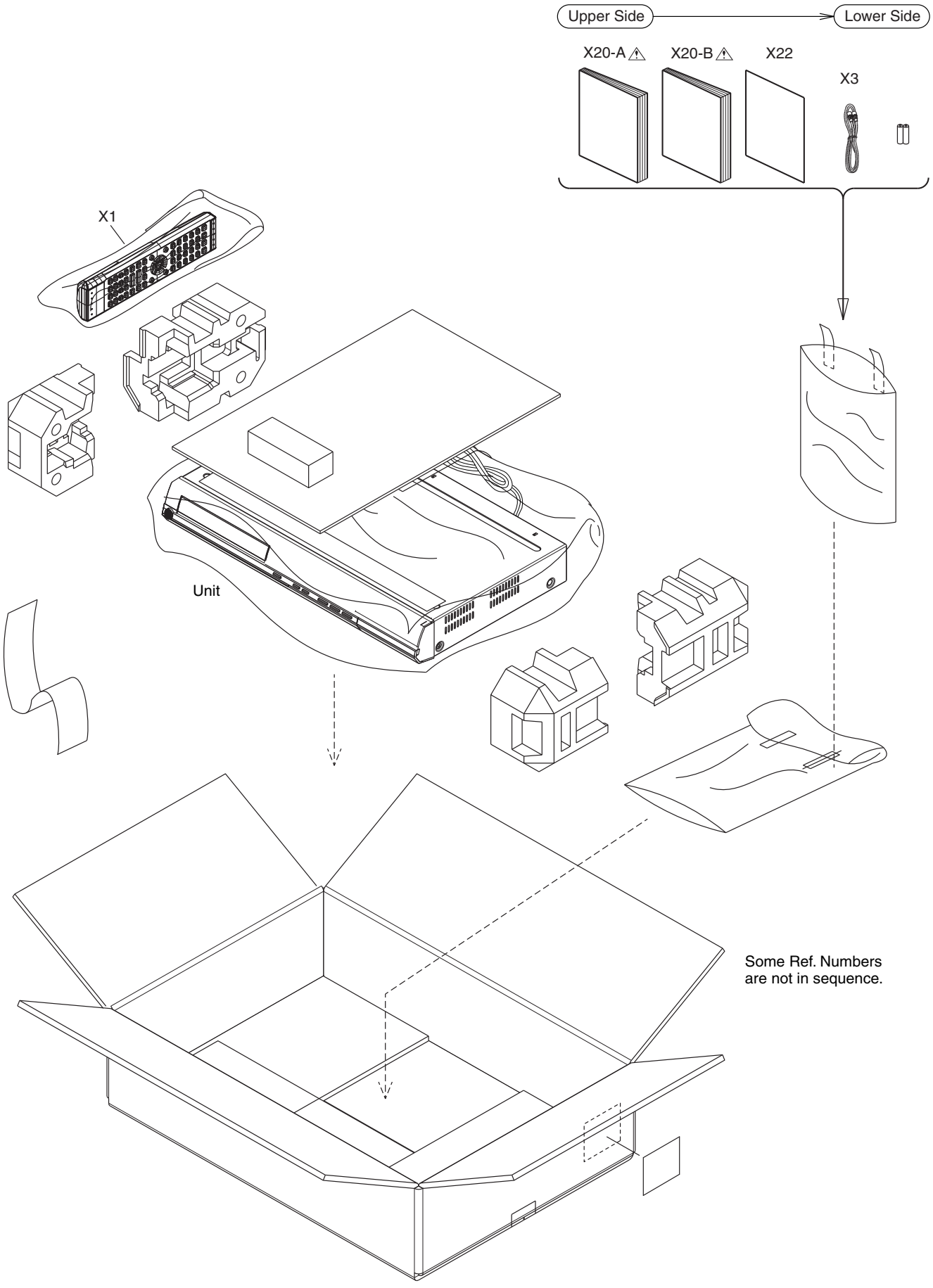
(P4) BOARD ATA



(P5) BOARD POWER SUPPLY



Packing


Upper Side
Lower Side
X20-A ⚠
X20-B ⚠
X22
X3
X1
Unit
Some Ref. Numbers
are not in sequence.

MECHANICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

⚠	Location No.	TSB P/N	Reference No.	Description
	A1X	P000493770	1VM223091	PANEL FRONT E2J71FD
	A3	P000493370	1VM121104	COVER TOP E2J70BD
	1B3	P000494100	UHDD160WG003	HARD DISK DRIVE 160GB WD1600AVBB-63SYA0
	FM1001	P000459880	MMEZL12NH008	MOTOR DC FAN D05U-12TS1 09(UX)
	W1	P000493530	WPZ0251JVE01	IEEE 1394 DV-IN CABLE 245MM BLACK
	W3	P000493540	WX1E2J70-009	WIRE ASSEMBLY MAIN TO HDD FFC 40P 194MM 40PIN
			ACCESSORIES	
	X1	P000493840	NB336ED	REMOTE CONTROL UNIT NB336ED
	X3	P000460030	WPZ0122LG001	RF CORD PAL 1.2M
⚠	X20-B	P000493790	1VMN23994	OWNERS MANUAL(ITA) E2J71FD
⚠	X20-A	P000493780	1VMN23993	OWNERS MANUAL(FR) E2J71FD
	X22	P000493800	1VMN23995	QUICK GUIDE E2J71FD

ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

NOTES:

1. Parts that are not assigned part numbers (---------) are not available.
2. Tolerance of Capacitors and Resistors are noted with the following symbols.

C.....±0.25%	D.....±0.5%	F.....±1%
G.....±2%	J.....±5%	K.....±10%
M.....±20%	N.....±30%	Z.....+80/-20%

DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY

⚠	Location No.	TSB P/N	Reference No.	Description
⚠	P2	P000493830	N78E7DFN	DVD MECHANISM & DVD/HDD MAIN BOARD ASSEMBLY

AV ASSEMBLY

⚠	Location No.	TSB P/N	Reference No.	Description
⚠	P1	P000493820	1VSA16364	AV ASSEMBLY

BOARD FRONT

⚠	Location No.	TSB P/N	Reference No.	Description
⚠	P3	P000493410	1VSA15874	BOARD FRONT

BOARD ATA

⚠	Location No.	TSB P/N	Reference No.	Description
	P4	P000493440	1VSA16180	BOARD ATA

BOARD POWER SUPPLY

⚠	Location No.	TSB P/N	Reference No.	Description
⚠	P5	P000493810	1VSA16346	BOARD POWER SUPPLY Consists of the following:
⚠	C2001	P000493460	CT2E683DC016	ACROSS THE LINE CAP. 0.068μF/250V
⚠	C2002	P000493450	CCN2EMA0E222	SAFTY CAP. 2200pF/250V
⚠	IC2101	P000483270	QPEWPS2561A1	PHOTOCOUPLER PS2561A-1(W)
⚠	L2001	P000483800	LLEG0Z0TU001	COIL LINE FILTER 56MH TLF24HB5630R3
⚠	Q2101	P000493500	QFWZ2SK3798Q	MOS FET 2SK3798(Q)
⚠	R2001	P000493510	RXX2565MGL01	GLASS GLAZE RES. 1/2W J 5.6M Ω
⚠	AC2001	P000468380	WAE0172LW011	POWER CORD PE8G2CG9G0AB05
⚠	F2001	P000483870	PEG20B0W3002	FUSE TIME RAG TSD2A250VSVDEUC3CPSE
⚠	SA2001	P000457210	NVQZ10D471KB	SURGE ABSORBER 470V+-10PER
⚠	T2001	P000493470	LTT3PE0KT031	TRANS POWER 7725

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