FUNAI

HDD & BLU-RAY DISC RECORDER

BH2-M200

TABLE OF CONTENTS

SPECIFICATIONS

Specifications

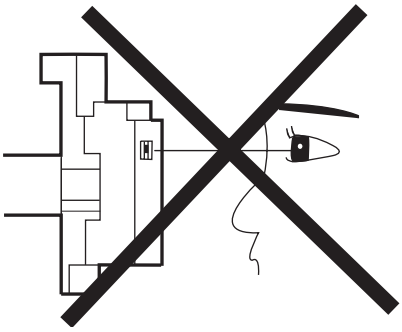
General	
HDD	Internal 3.5 inch HDD 500 GB
Power requirements	220–240 V~ ± 10 %, 50 Hz ± 0.5 %
Power consumption	34 W
Power consumption (standby)	0.7 W
Weight	4.0 kg
Dimensions (width x height x depth)	430 x 61 x 315 mm
Operating temperature	5°C to 40°C
Operating humidity	Less than 80% (no condensation)
TV system	PAL-B/G, SECAM-LL'
Recording	
Recording format	BDAV format (BD-RE, BD-R), Video Recording (VR) format (DVD-RW only), video format (DVD-RW, DVD-R), +VR format (DVD+RW, DVD+R)
Recordable discs	BD-RE, BD-R, 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 Linear PCM (XP mode) Dolby Digital Plus (TS mode) MPEG (TS mode)
Tuner	
DVB-T channels	
VHF	F5 - F10
UHF	E21 - E69
Input/Output	
Front Panel:	
SD card input	SD card slot
USB port TYPE A	USB 2.0
Rear Panel:	
VHF/UHF antenna input/output terminal	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
Audio output Output level	Two RCA connectors 2 Vrms (output impedance less than 1 kΩ)
Video output Output level	One RCA connector 1 Vp-p (75 Ω)
Digital audio output Output level	One Coaxial pin jack 500 mVp-p (75 Ω)
HDMI output	HDMI jack
LAN terminal	10 BASE-T / 100 BASE-TX

Note

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

LASER BEAM SAFETY PRECAUTIONS

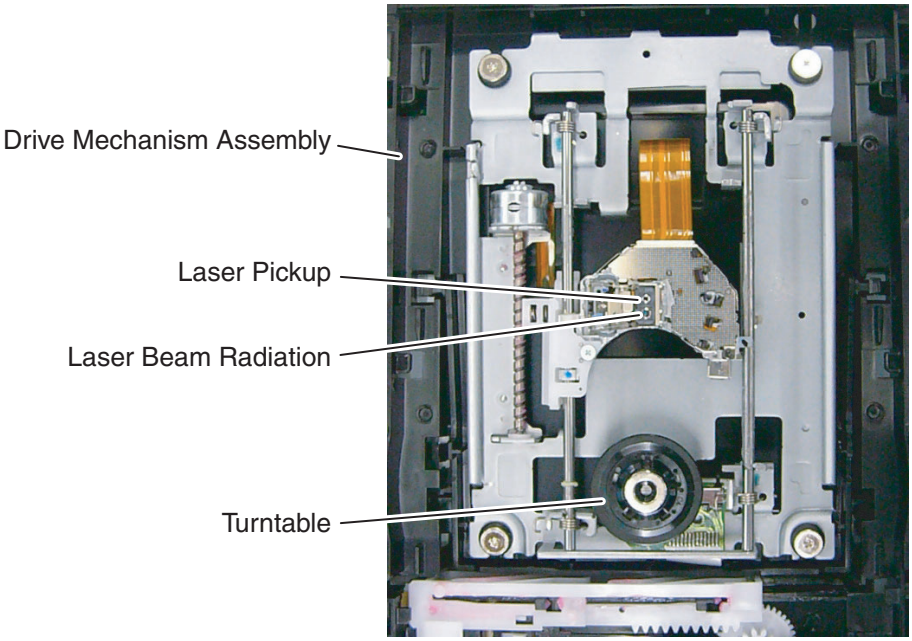
This BD player uses a pickup that emits a laser beam.



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 BD 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.

L. When reassembling, be sure to use the original screws or specified screws listed in the parts list.

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')
230 V	≥ 3.2 mm(d) ≥ 6.0 mm(d')

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

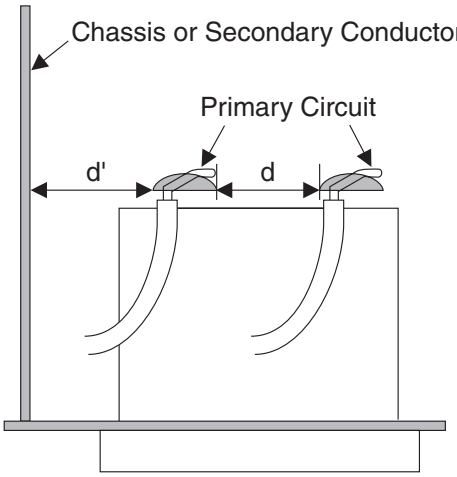


Fig. 1

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.

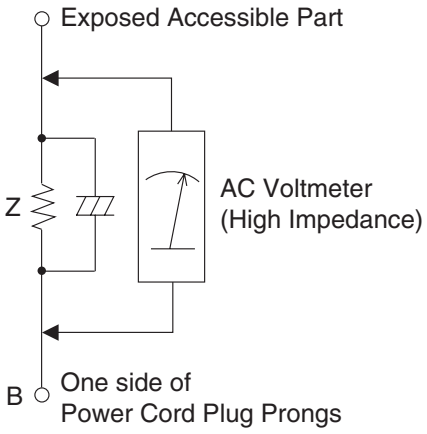


Fig. 2

Table 2: Leakage current ratings for selected areas

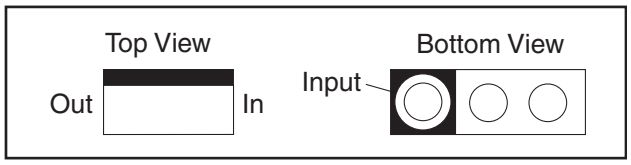
AC Line Voltage	Load Z	Leakage Current (i)	One side of power cord plug prongs (B) to:
230 V	2kΩ RES. Connected in parallel	i≤0.7mA AC Peak i≤2mA DC	RF or Antenna terminals
	50kΩ RES. Connected in parallel	i≤0.7mA AC Peak i≤2mA DC	A/V Input, Output

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

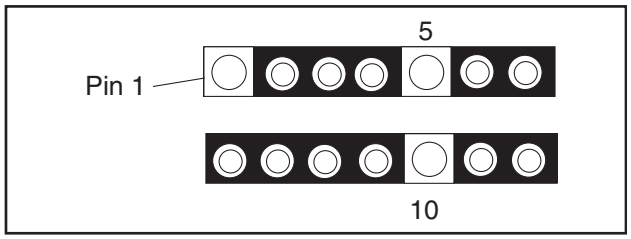
STANDARD NOTES FOR SERVICING

Circuit Board Indications

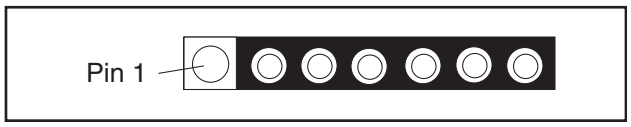
1. The output pin of the 3 pin Regulator ICs is indicated as shown.



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

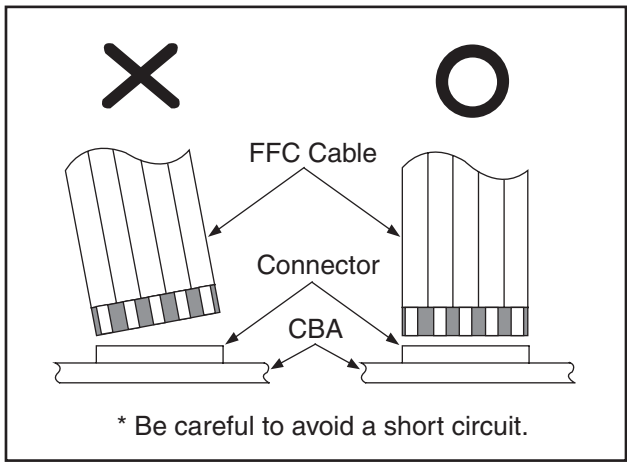


3. The 1st pin of every male connector is indicated as shown.



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)

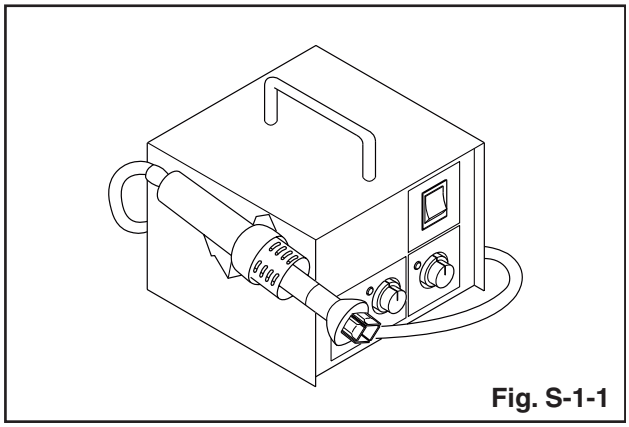


Fig. S-1-1

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 CBA; 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 CBA 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 CBA 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.

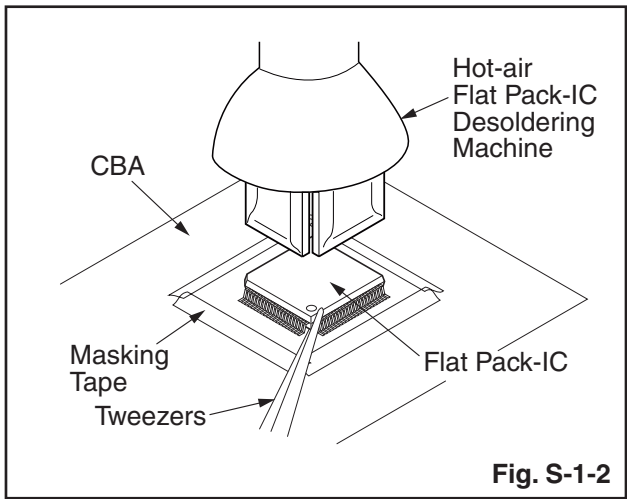


Fig. S-1-2

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)

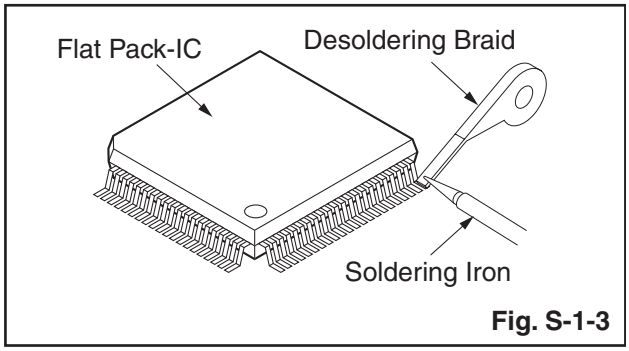


Fig. S-1-3

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)

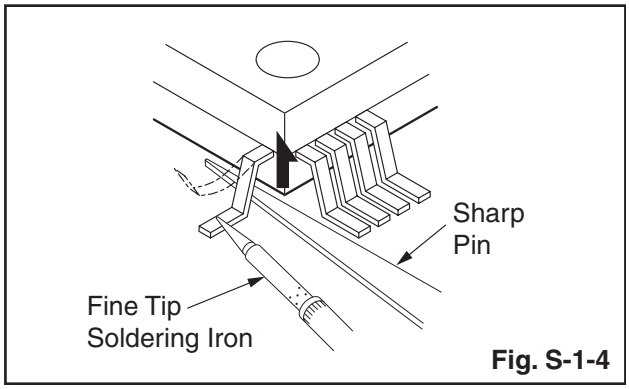


Fig. S-1-4

3. Bottom of the flat pack-IC is fixed with glue to the CBA; 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 CBA 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 CBA contact pads as shown in Fig. S-1-5.
4. Bottom of the flat pack-IC is fixed with glue to the CBA; 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 CBA 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 CBA, handle it gently because it may be damaged if force is applied.

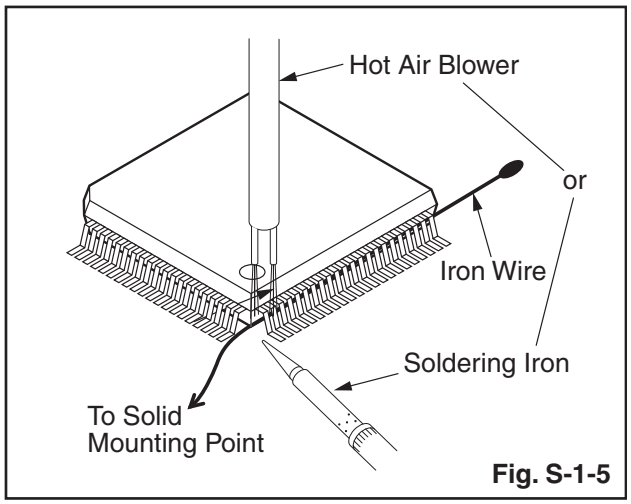


Fig. S-1-5

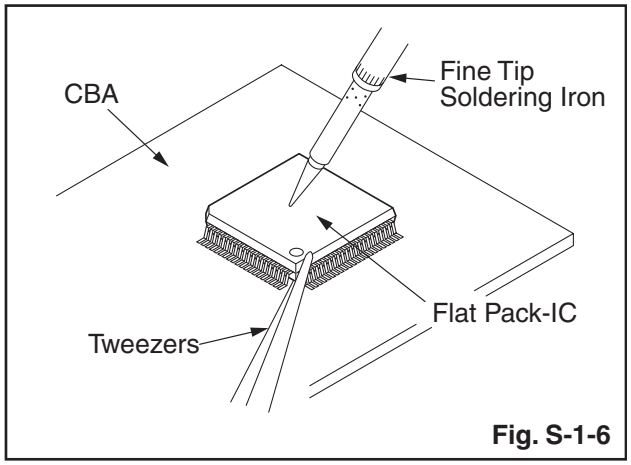


Fig. S-1-6

2. Installation

1. Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA 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 pin 1 on the PCB 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.

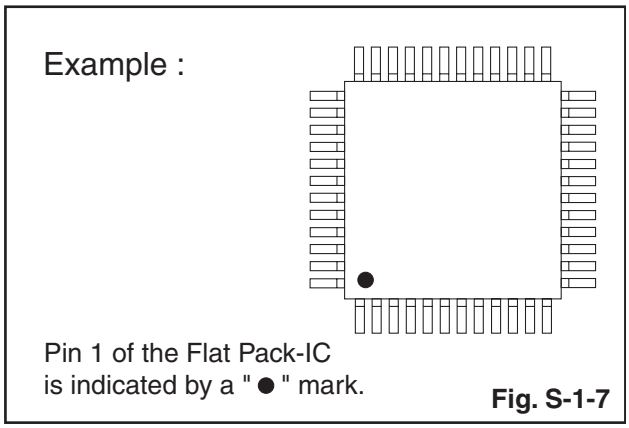


Fig. S-1-7

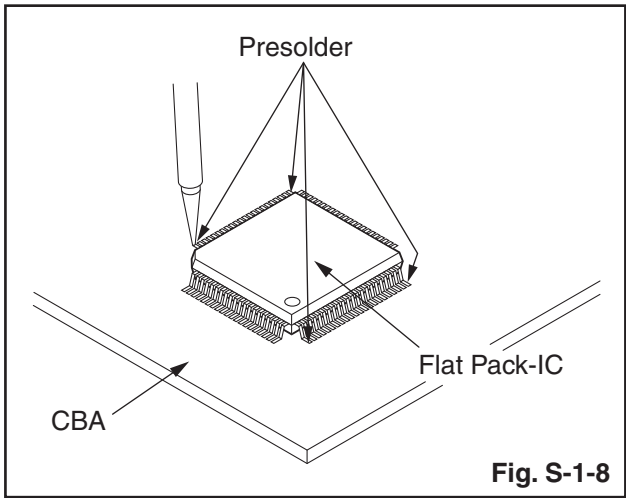


Fig. S-1-8

Instructions for Handling Semi-conductors

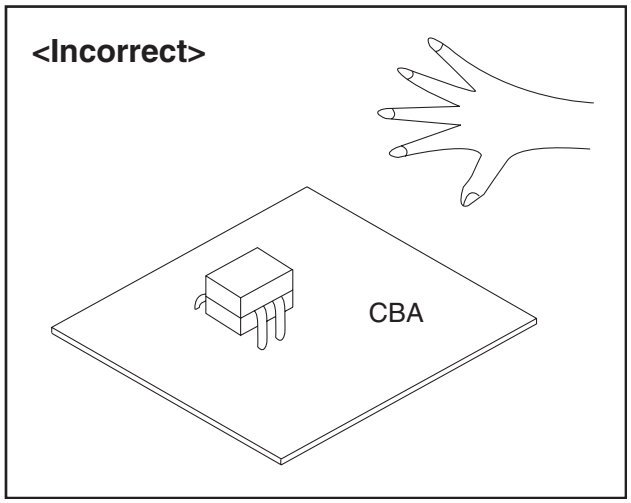
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

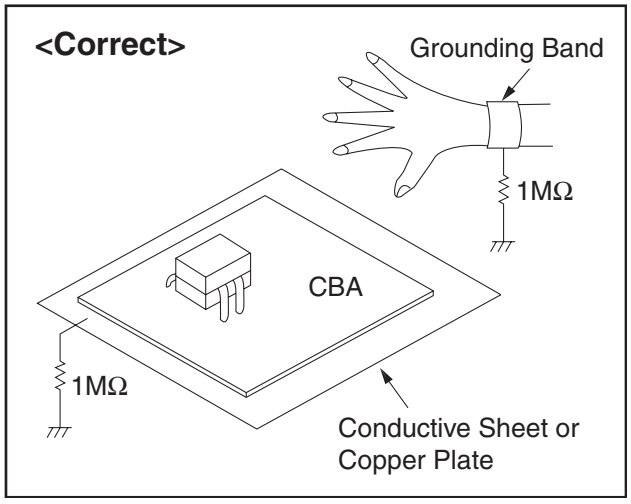
1. Ground for Human Body

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.)**

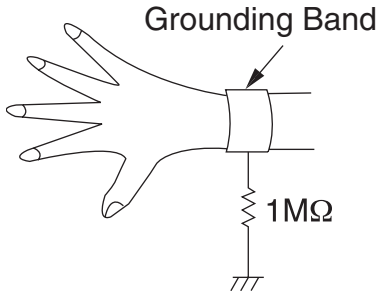
2. MOISTURE

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).

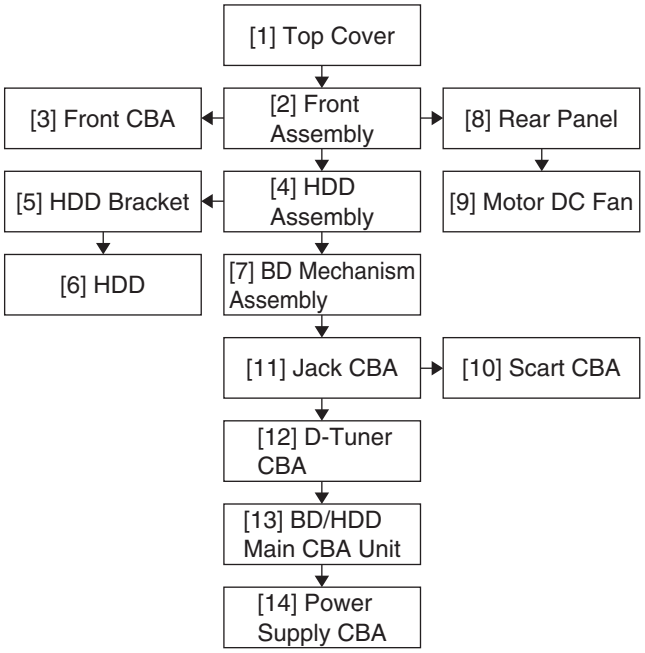
d. Do not stack HDDs.

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 items 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	Fig. No.	Removal	Note
[1]	Top Cover	D1	5(S-1)	---
[2]	Front Assembly	D2	4(L-1), 3(L-2), 4(S-2), CN2105	1
[3]	Front CBA	D2	----------	---
[4]	HDD Assembly	D3	4(S-3), Connector, SATA Cable	---
[5]	HDD Bracket	D4	4(S-4), HDD Damper, HDD Earth Plate	---
[6]	HDD	D4	----------	2
[7]	BD Mechanism Assembly	D5	4(S-5), CN502, CN6101	---
[8]	Rear Panel	D6	4(S-6), 2(S-7), (S-8), (S-9), 2(S-10), CN8002	3
[9]	Motor DC Fan	D6	Fan Folder	---
[10]	Scart CBA	D7	CN3501	---
[11]	Jack CBA	D7	3(S-11), CN3002, CN7400	---
[12]	D-Tuner CBA	D8	CN5900	---
[13]	BD/HDD Main CBA Unit	D8	3(S-12), CN2804, CN7401, CN7402, CN7100	4
[14]	Power Supply CBA	D9	3(S-13), Power Holder	---
↓ (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
e.g. 2(S-2) = two Screws of (S-2),
2(L-2) = two Locking Tabs of (L-2)

(5) Refer to “Reference Notes.”

Reference Notes

1. **CAUTION 1:** Locking Tabs (L-1) and (L-2) are fragile. Be careful not to break them.
2. **When replacing the HDD, HDD format is needed after replacing the HDD. Refer to “HOW TO FORMAT THE HDD AFTER REPLACEMENT.”**
3. **When reassembling, be sure to use the original screws or specified screws listed in the parts list.**
4. **When replacing the BD/HDD Main CBA Unit, the board and HDD will need to be recognized. Refer to “BD/HDD MAIN CBA UNIT REPLACEMENT.”**

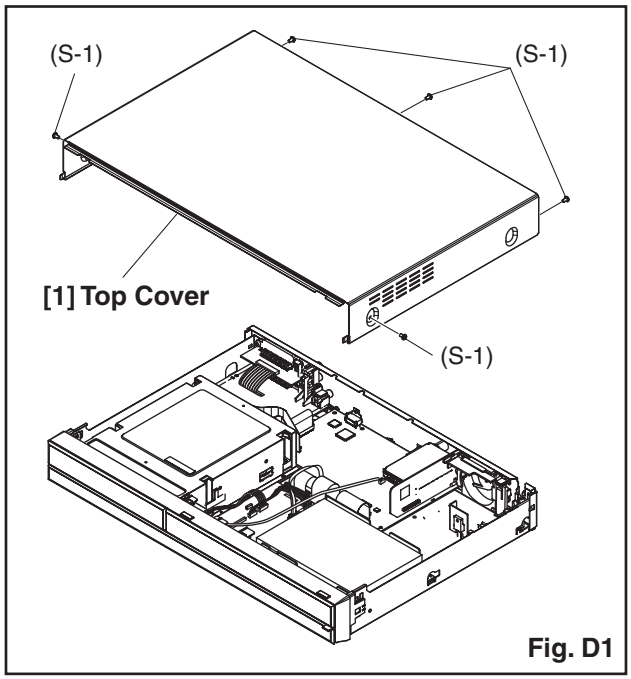


Fig. D1

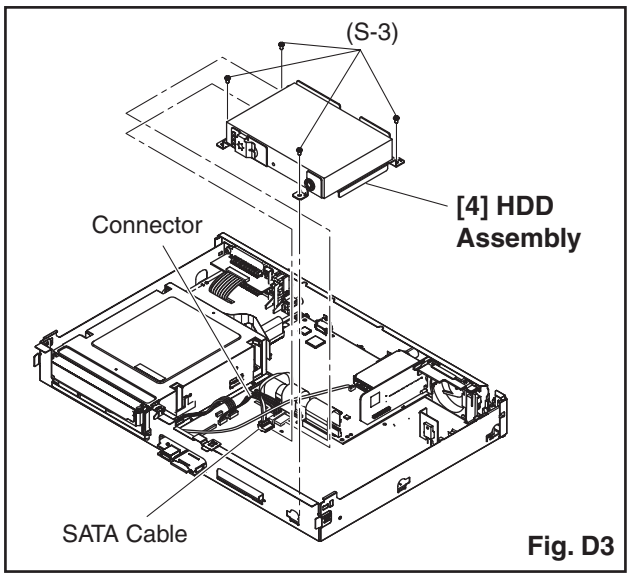


Fig. D3

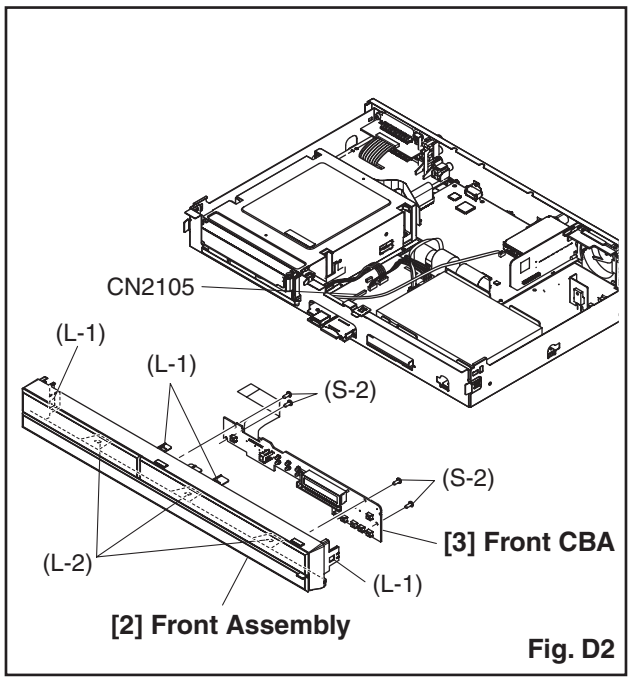
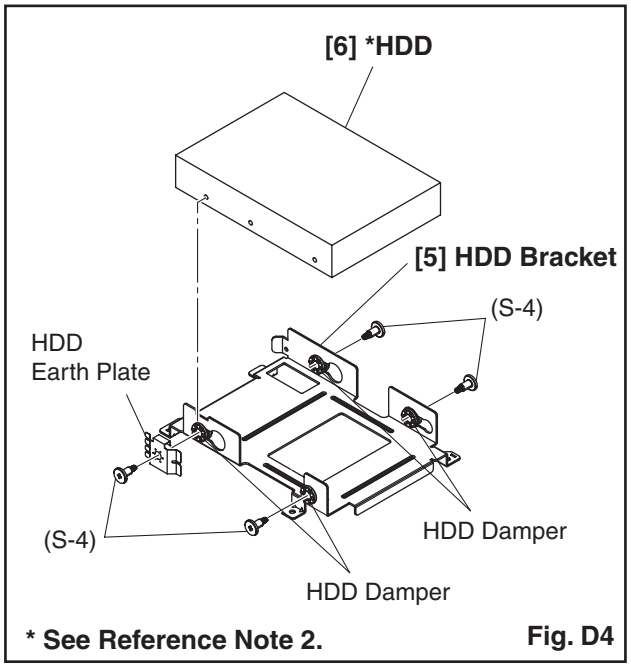


Fig. D2



*** See Reference Note 2.**

Fig. D4

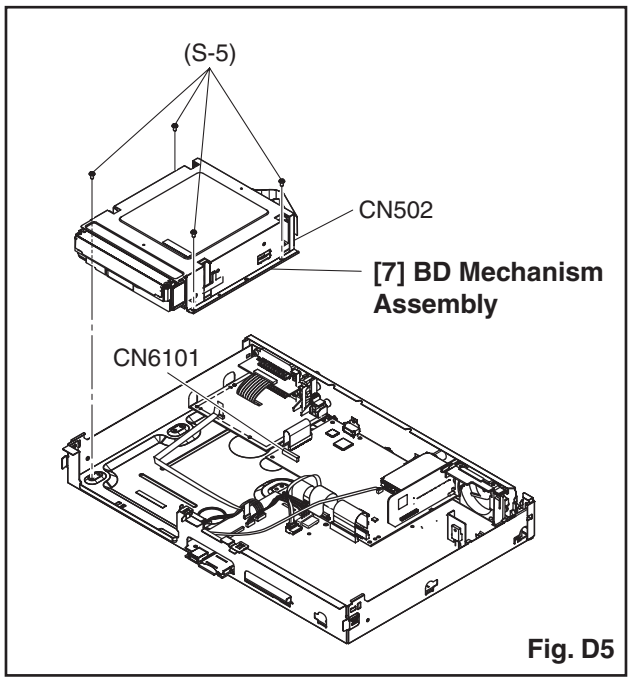
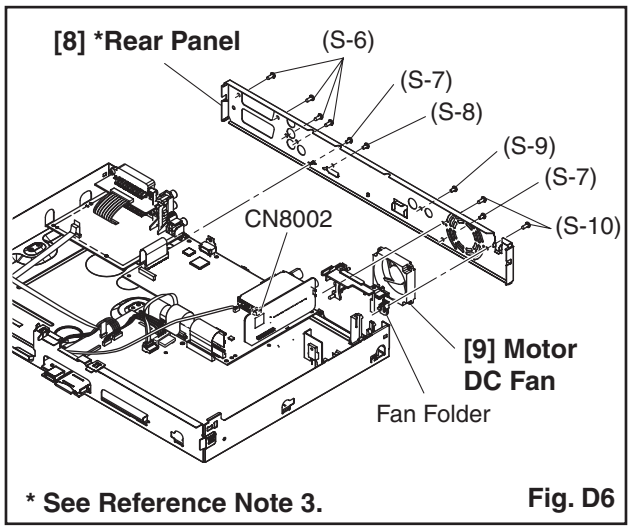


Fig. D5



* See Reference Note 3.

Fig. D6

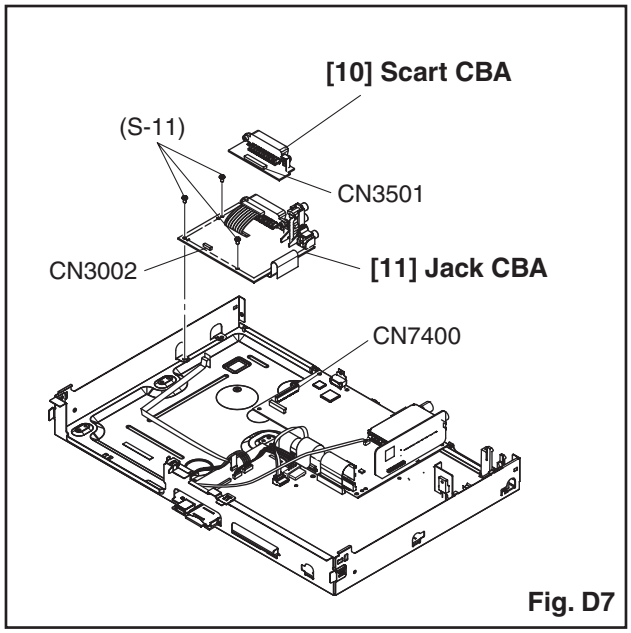
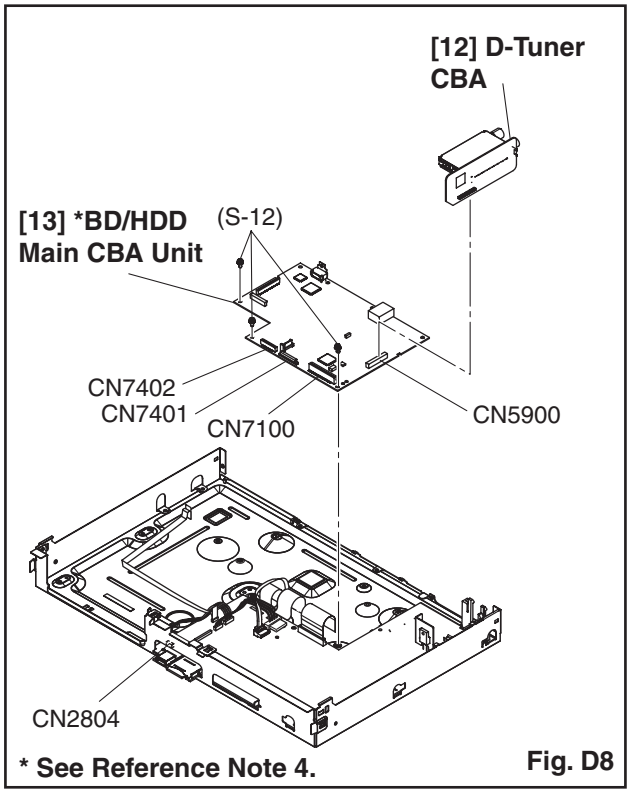


Fig. D7



* See Reference Note 4.

Fig. D8

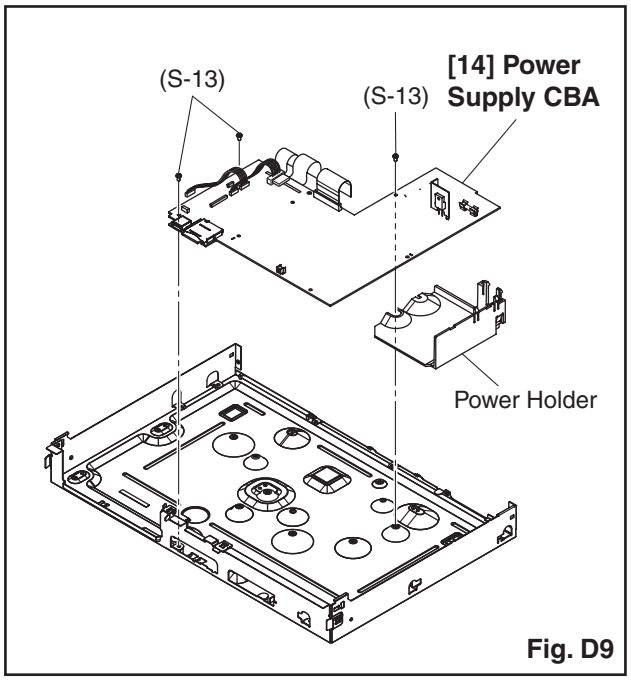


Fig. D9

3. How to Eject a Disc

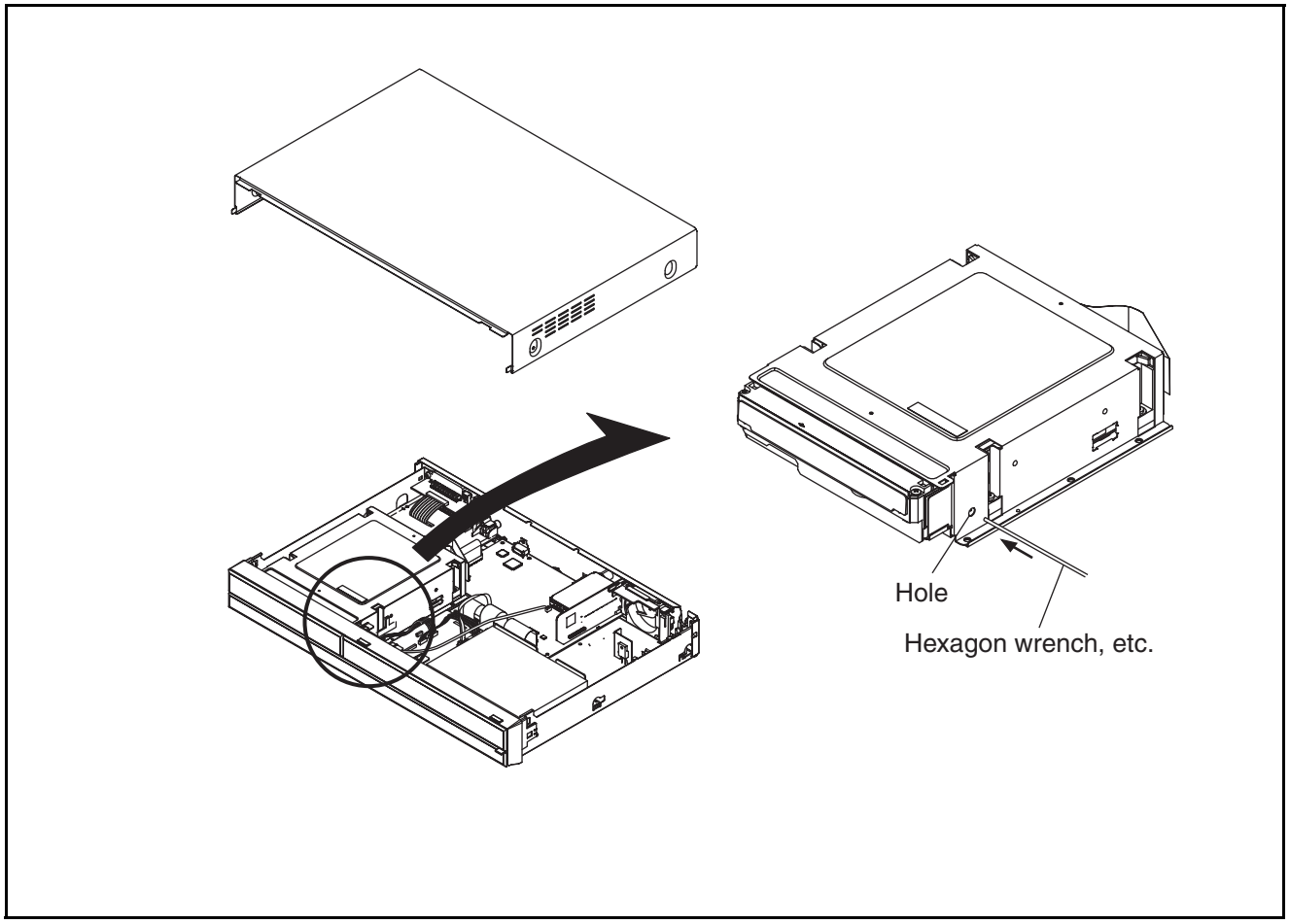
When a disc cannot be removed due to malfunction or when an unplayable disc is inserted, follow the procedure below to remove the disc.

Procedure A

1. Unplug the AC power cord and then plug it in.
2. Turn the power on by pressing the [⏏] button and the disc tray will open automatically.

Procedure B

1. Remove the Top Cover.
2. Insert a hexagon wrench, etc. into the hole (as shown below) straight and gently until the tray is ejected.
3. Pull the tray out manually and remove the disc.

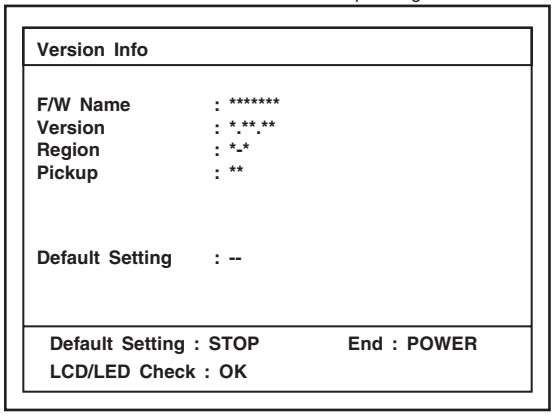


HOW TO INITIALIZE THE HDD & BLU-RAY DISC RECORDER

To put the program back to the factory-default, initialize the unit by following the procedure below.

1. Turn the power on.
2. Put the unit into HDD/DISC mode. Remove the disc on the tray and close the tray.
3. Press [►►I] (skip up), [1], [2], [3] buttons on the remote control in this order. The following screen will be displayed.

"⋆" differ depending on the models.



* All indicators on LCD light.

4. Press [STOP] button.
5. After the unit is initialized, the power will turn off automatically.

Note: The titles recorded on HDD will not be deleted.

FIRMWARE RENEWAL MODE

How to Prepare a Software Update Disc (BE F/W, FE F/W)

1. Copy the "*****.bin" file to a CD-R/RW or DVD-R/RW disc.

   Note:
   - Make sure to use a blank CD-R/RW or DVD-R/RW disc.
   - Copy one file per disc.

How to Update the Unit (BE F/W, FE F/W)

1. Make sure the unit is not recording or dubbing in HDD mode, or within 15 minutes a timer recording begins.
2. Insert the software update disc and close the tray.
3. When the disc is recognized, the unit enters Update mode. Fig. a appears on the screen and Fig. b appears on the LCD.

"⋆" differ depending on the models.

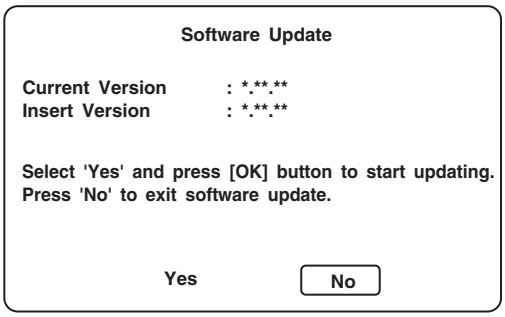


Fig. a Update Confirmation Screen

Fig. b LCD in Update Mode

4. Select "Yes" to start firmware loading. Fig. c appears on the screen and Fig. d appears on the LCD.

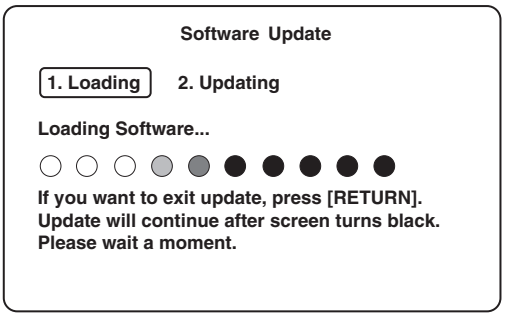


Fig. c Firmware Loading Screen

Fig. d LCD during Firmware Loading

5. The unit will restart automatically then begins updating. After the unit restarts and the display becomes available, Fig. e appears on the screen. The update progress is shown on the LCD.

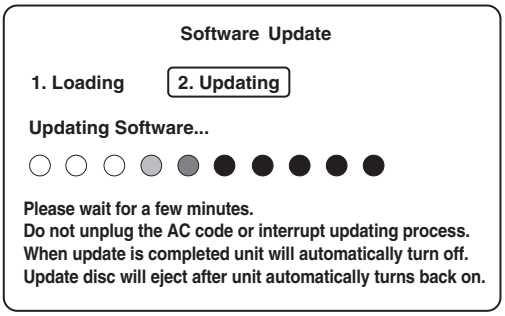


Fig. e Firmware Updating Screen

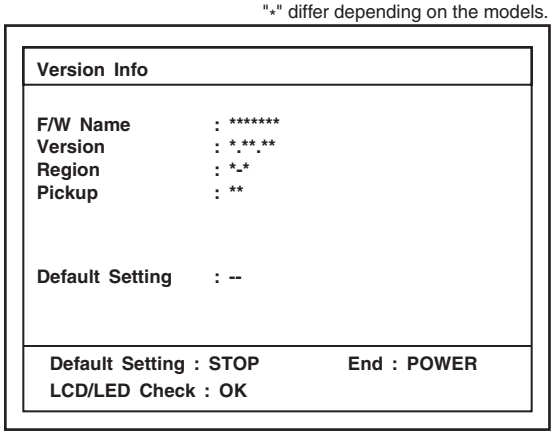
Fig. f LCD during Firmware Update

6. Upon completion of firmware update, the unit restarts and the tray will open automatically. Remove the disc from the unit.

How to Confirm the Firmware Version

1. Turn the power on.
2. Put the unit into HDD/DISC mode. Remove the disc on the tray and close the tray.
3. Press [►►I] (skip up), [1], [2], [3] buttons on the remote control in this order. The following screen will be diplayed.

"*" differ depending on the models.



* All indicators on LCD light.

4. To exit this mode, press [STANDBY/ON] button.

BD/HDD MAIN CBA UNIT REPLACEMENT

When replacing the BD/HDD Main CBA Unit, the board and HDD needs to be matched to one another. Follow the procedure below to complete the matching process.

1. Turn the power on.
2. Put the unit into HDD/DISC mode. Remove the disc on the tray and close the tray.
3. Press [►►I] (skip up), [3], [1], [0] buttons on the remote control in this order. The following screen will be diplayed.

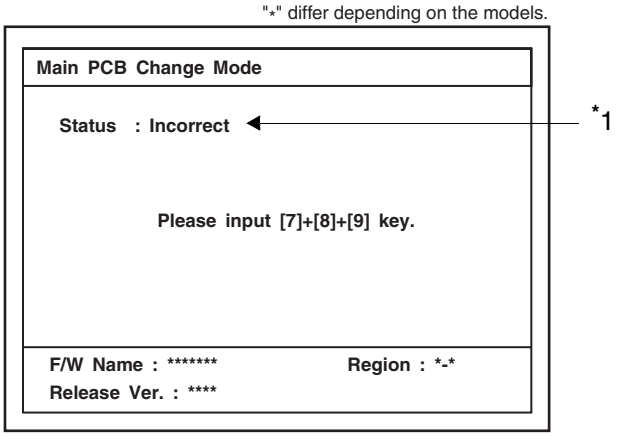


Fig. a Main PCB Change Mode Screen

Description of *1

Indication	State
Incorrect	Need to complete the matching process.
OK	Matching process is not necessary.
NG	HDD problem (not connected).

4. To perform the matching process, press [7], [8], [9] buttons on the remote control in this order within 3 seconds.
5. After the process completes, the result is displayed next to the “Status :” on the screen. (“SUCCESS” at success or “ERR24” at error.)

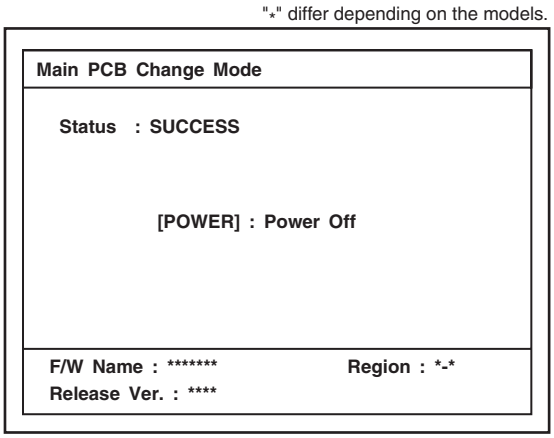


Fig. b “SUCCESS” Screen

6. Press [STANDBY/ON] button to turn the power off.
7. Unplug the AC cord.

HOW TO FORMAT THE HDD AFTER REPLACEMENT

Note: HDD format is needed after replacing the HDD. Enter the Self Check Mode and complete HDD format by following the procedure below.

1. Turn the power on.
2. Put the unit into HDD/DISC mode. Remove the disc on the tray and close the tray.
3. Press [►►I] (skip up), [0], [7], [9] buttons on the remote control in this order. The unit enters Self Check Mode and the following screen will be displayed.

"⋆" differ depending on the models.

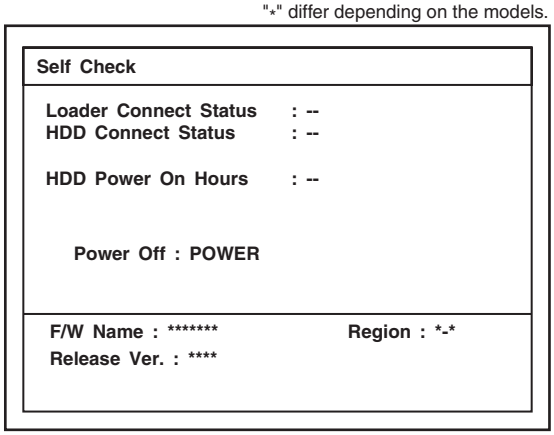


Fig. a Self Check Mode Screen

4. Connection check for loader and HDD starts automatically. After the self check is completed, the following screen appears.

"⋆" differ depending on the models.

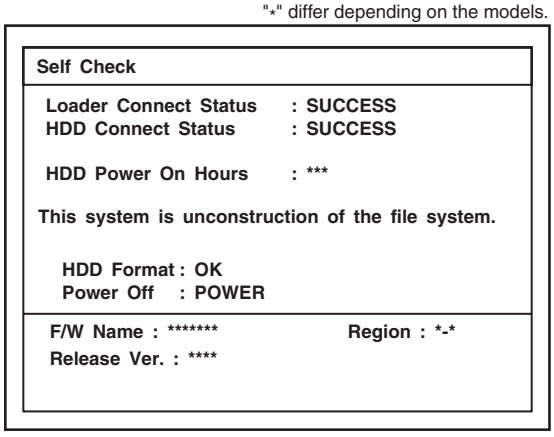


Fig. b Screen Display After the Self Check

5. Press [OK] button on the remote control. The power will turn off. On the LCD, “WAIT” message is displayed and HDD format begins.

Fig. c LCD during HDD format

Note: Because HDD format is performed in standby mode, the screen will be black.

6. When format is completed, clock display appears on the LCD.

Note:

- Make sure the “WAIT” message on LCD has disappeared before unplugging the AC cord.
- It may take up to 10 or more seconds to complete the HDD format.

HOW TO DISPLAY THE LD OPERATING TIME

1. Turn the power on.
2. Put the unit into HDD/DISC mode. Remove the disc on the tray and close the tray.
3. Press [►►I] (skip up), [3], [2], [1] buttons on the remote control in this order. The following screen will be displayed.

"⋆" differ depending on the models.

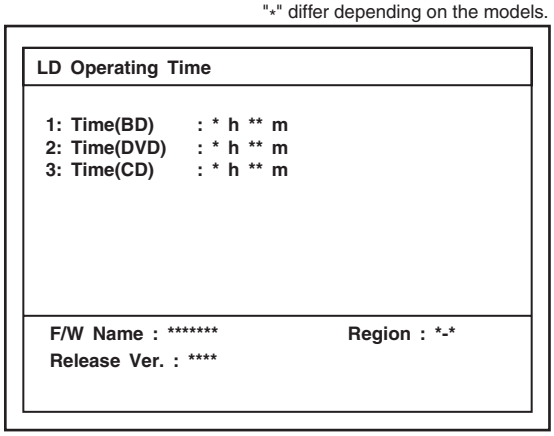


Fig. a LD Operating Time Screen

Description of Operating Time Screen

Display	Description
Time(BD)	The LD operating time is displayed. If the value exceeds 9999h59m, <Over!> appears at the right of the time display.
Time(DVD)	
Time(CD)	

4. To select a desired media, use the [UP]/[DOWN] buttons on the remote control. The operating time of the selected media will be displayed on the LCD with a “minute:second” value.

Fig. b Operating Time on LCD (Example of BD)

5. Press [STANDBY/ON] button to exit and to turn the power off.
6. Unplug the AC cord.

TROUBLESHOOTING

1 Power Supply Section

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. (IC1001, IC1100, Q1001, Q1002, T1001, D1006, D1007, D1008, D1009, D1010, C1010, R1013)

↓ Yes

Is the EV+16V 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. (IC1100, IC1113)

↓ Yes

Check the circuit and service it if defective. (IC1001, IC1100, D1001, D1003, D1004, D1005)

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. (D1101, D1116, D1117, IC1101, IC1102, IC1104, IC1105, Q2604, Q2651)

FLOW CHART NO.5

EV+16V is not outputted.

↓

Is approximatery +16V voltage supplied to the cathode of D1101(D1116, D1117)? — No → Check D1101, D1116, D1117, C1117 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

HDD+12V(FE+12V) is not outputted.

↓

Is approximately +16V voltage supplied to Pin(2) of IC1102? — No → Refer to "FLOW CHART NO.5"<EV+16V is not outputted>.

↓ Yes

Is approximately +5V voltage supplied to Pin(7) of IC1102? — No → Check D1124, DRIVE-SW line and their periphery, and service it if defective.

↓ Yes

Replace IC1102.

FLOW CHART NO.7

HDD+5V(FE+5V) is not outputted.

↓

Is approximately +16V voltage supplied to Pin(2) of IC1104? — No → Refer to "FLOW CHART NO.5"<EV+16V is not outputted>.

↓ Yes

Is approximately +5V voltage supplied to Pin(7) of IC1104? — No → Check D1124, DRIVE-SW line and their periphery, and service it if defective.

↓ Yes

Replace IC1104.

FLOW CHART NO.8

EV+5V(SYS+5V, LCD+5V) is not outputted.

↓

Is approximately +16V voltage supplied to Pin(2) of IC1105? — No → Refer to "FLOW CHART NO.5"<EV+16V is not outputted>.

↓ Yes

Replace IC1105.

FLOW CHART NO.9

P-ON+3.3V(SD+3.3V) is not outputted.

↓

Is approximately +16V voltage supplied to Pin(2) of IC1101? — No → Refer to "FLOW CHART NO.5"<EV+16V is not outputted>.

↓ Yes

Is approximately +5V voltage supplied to Pin(7) of IC1101? — No → Check D1123, 3V3CONT line and their periphery, and service it if defective.

↓ Yes

Replace IC1101.

FLOW CHART NO.10

P-ON+12V is not outputted.

↓

Is approximately 14V voltage supplied to the collector of Q2651? — No → Refer to "FLOW CHART NO.5"<EV+16V is not outputted>.

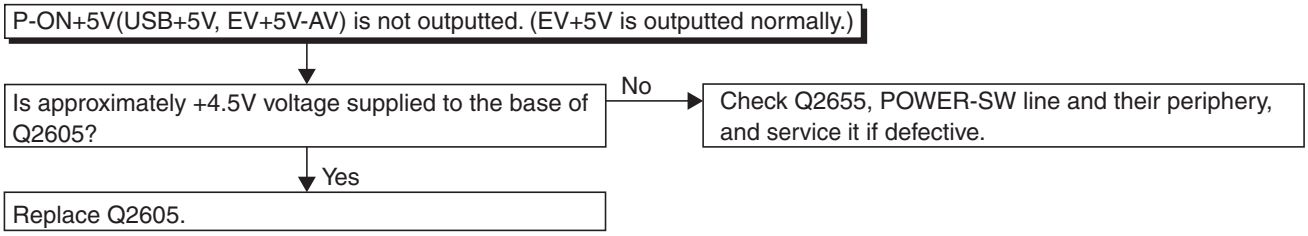
↓ Yes

Is approximately 13V voltage supplied to the base of Q2651? — No → Check D2652, Q2654, Q2658, 1V8CONT line and their periphery, and service it if defective.

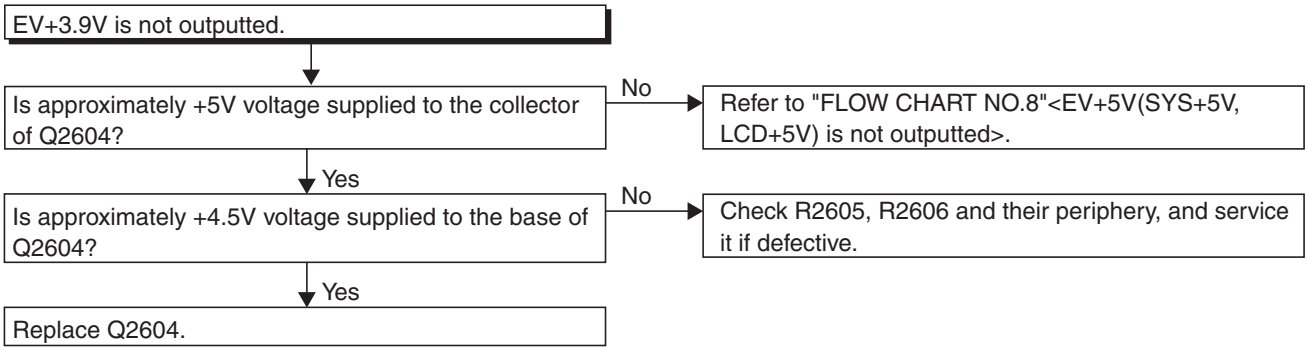
↓ Yes

Replace Q2651.

FLOW CHART NO.11



FLOW CHART NO.12



2 BD/HDD Section

FLOW CHART NO.1

The key operation is not functioning.

↓

Are the contact point and the installation state of the key switches (SW3701-SW3707) normal?

No → Re-install the switches (SW3701-SW3707) correctly or replace the poor switch.

↓ Yes

When pressing each switches (SW3701-SW3707), do the voltage of Pin(46, 47, 48, 55) of IC2701 decrease?

No → Check the switches (SW3701-SW3707) and their periphery, and service it if detective.

↓ Yes

Replace IC2701.

FLOW CHART NO.2

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

↓

Is approximately +5V voltage supplied to Pin(2) of RS3701 (remote control receiver) ?

No → Check LCD+5V line and service it if defective.

↓ Yes

Is the "L" pulse sent out Pin(1) of RS3701 (remote control receiver) when the remote control unit is activated?

No → Replace the RS3701 (remote control receiver) or remote control unit.

↓ Yes

Is the "L" pulse inputted to the Pin(41) of IC2701?

No → Check the line between the RS3701 (remote control receiver) and the Pin(41) of IC2701, and service it if detective.

↓ Yes

Replace IC2701.

FLOW CHART NO.3

The disc tray cannot be opened and closed.

↓

Is the normal control voltage inputted to Pin(47) of IC2701? Refer to "FLOW CHART NO.1" <The key operation is not functioning.>

No → Replace the "OPEN/CLOSE" switch (SW3707).

↓ Yes

Replace the BD Mechanism Assembly or BD/HDD Main CBA Unit.

FLOW CHART NO.4

There is [No Disc] indication.

Both picture and sound do not operate normally.

↓

Replace the BD Mechanism Assembly or BD/HDD Main CBA Unit.

FLOW CHART NO.5

VIDEO E-E does not appear normally.

Are the video signals inputted to each pin of IC3004?

IC3004	17PIN	VIDEO-IN 1 (AV1)
IC3004	19PIN	VIDEO-IN 2 (AV2)

No → Check the line between video input terminal and each pin of IC3004, and service it if defective.

IC3004	17PIN → JK3002	VIDEO-IN 1 (AV1)
IC3004	19PIN → JK3501	VIDEO-IN 2 (AV2)

Yes

Is the video signal outputted to Pin(35) of IC3004?

No → Is 5V voltage supplied to Pin(5, 9, 13, 24, 28, 30, 43) of IC3004?
Is 12V voltage supplied to Pin(29) of IC3004?

Yes → Replace IC3004.

No → Check the P-ON+5V, P-ON+12V line and service it if defective.

Yes

Are the video signals outputted to each pin of CN3001?

CN3001	4PIN	VIDEO-Y(I/P)
CN3001	6PIN	VIDEO-Pr/Cr
CN3001	2PIN	VIDEO-Pb/Cb
CN3001	15PIN	VIDEO-OUT

No → Replace the BD Mechanism Assembly or BD/HDD Main CBA Unit.

Yes

Are the video signals shown above inputted into each pin of IC3004?

IC3004	44PIN	VIDEO-Y(I/P)
IC3004	42PIN	VIDEO-Pr/Cr
IC3004	46PIN	VIDEO-Pb/Cb
IC3004	40PIN	VIDEO-OUT

No → Check the line between each pin of CN3001 and each pin of IC3004, and service it if defective.

CN3001	4PIN → IC3004	44PIN	VIDEO-Y(I/P)
CN3001	6PIN → IC3004	42PIN	VIDEO-Pr/Cr
CN3001	2PIN → IC3004	46PIN	VIDEO-Pb/Cb
CN3001	15PIN → IC3004	40PIN	VIDEO-OUT

Yes

Are the video signals outputted to each pin of IC3004?

IC3004	14PIN	VIDEO-OUT 1 (AV1)
IC3004	12PIN	VIDEO-OUT 2 (AV2)
IC3004	16PIN	VIDEO-OUT

No → Is 5V voltage supplied to Pin(5, 9, 13, 24, 28, 30, 43) of IC3004?
Is 12V voltage supplied to Pin(29) of IC3004?

Yes → Replace IC3004.

No → Check the P-ON+5V, P-ON+12V line and service it if defective.

Yes

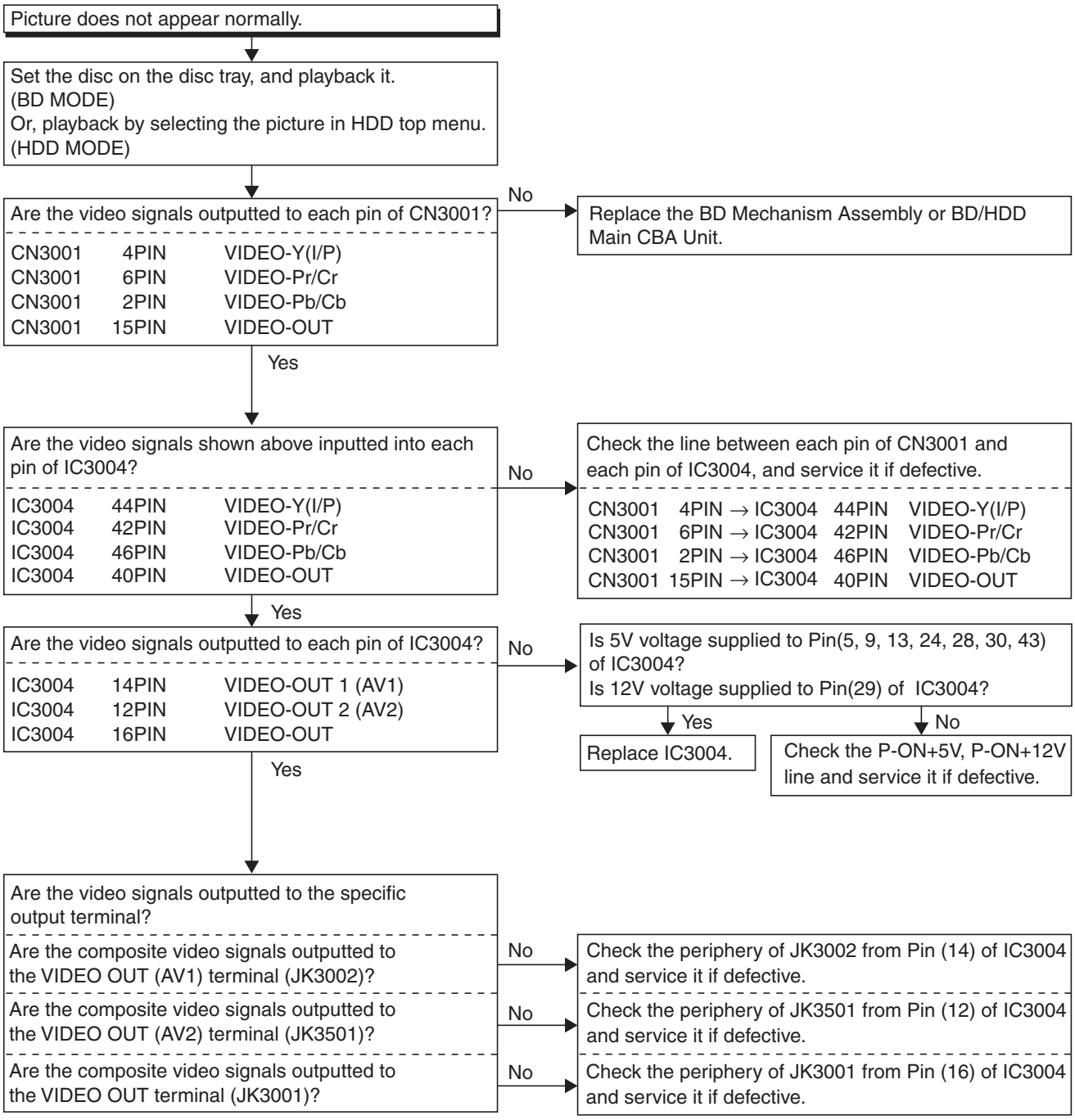
Are the video signals outputted to the specific output terminal?

Are the composite video signals outputted to the VIDEO OUT (AV1) terminal (JK3002)?
No → Check the periphery of JK3002 from Pin (14) of IC3004 and service it if defective.

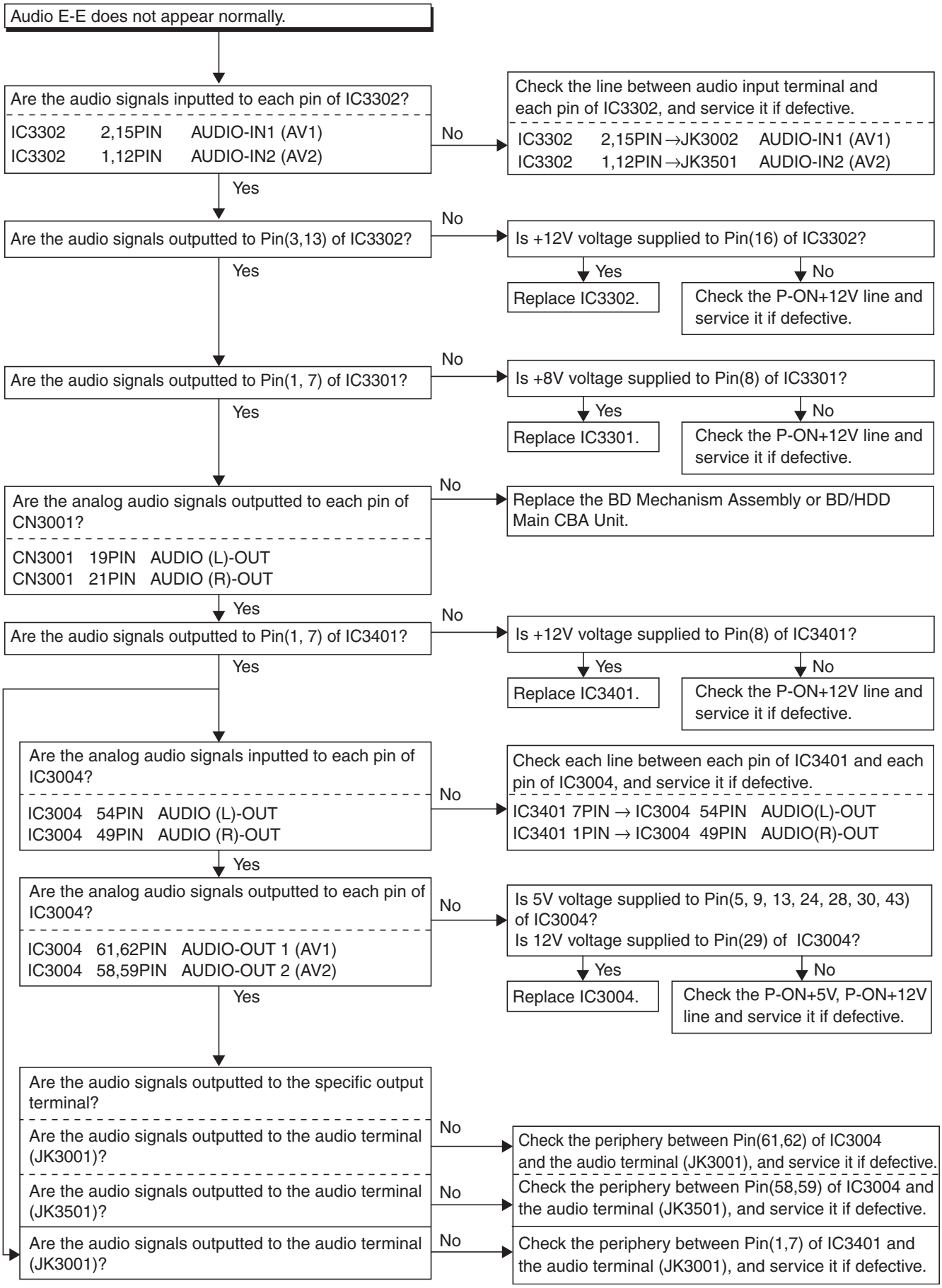
Are the composite video signals outputted to the VIDEO OUT (AV2) terminal (JK3501)?
No → Check the periphery of JK3501 from Pin (12) of IC3004 and service it if defective.

Are the composite video signals outputted to the VIDEO OUT terminal (JK3001)?
No → Check the periphery of JK3001 from Pin (16) of IC3004 and service it if defective.

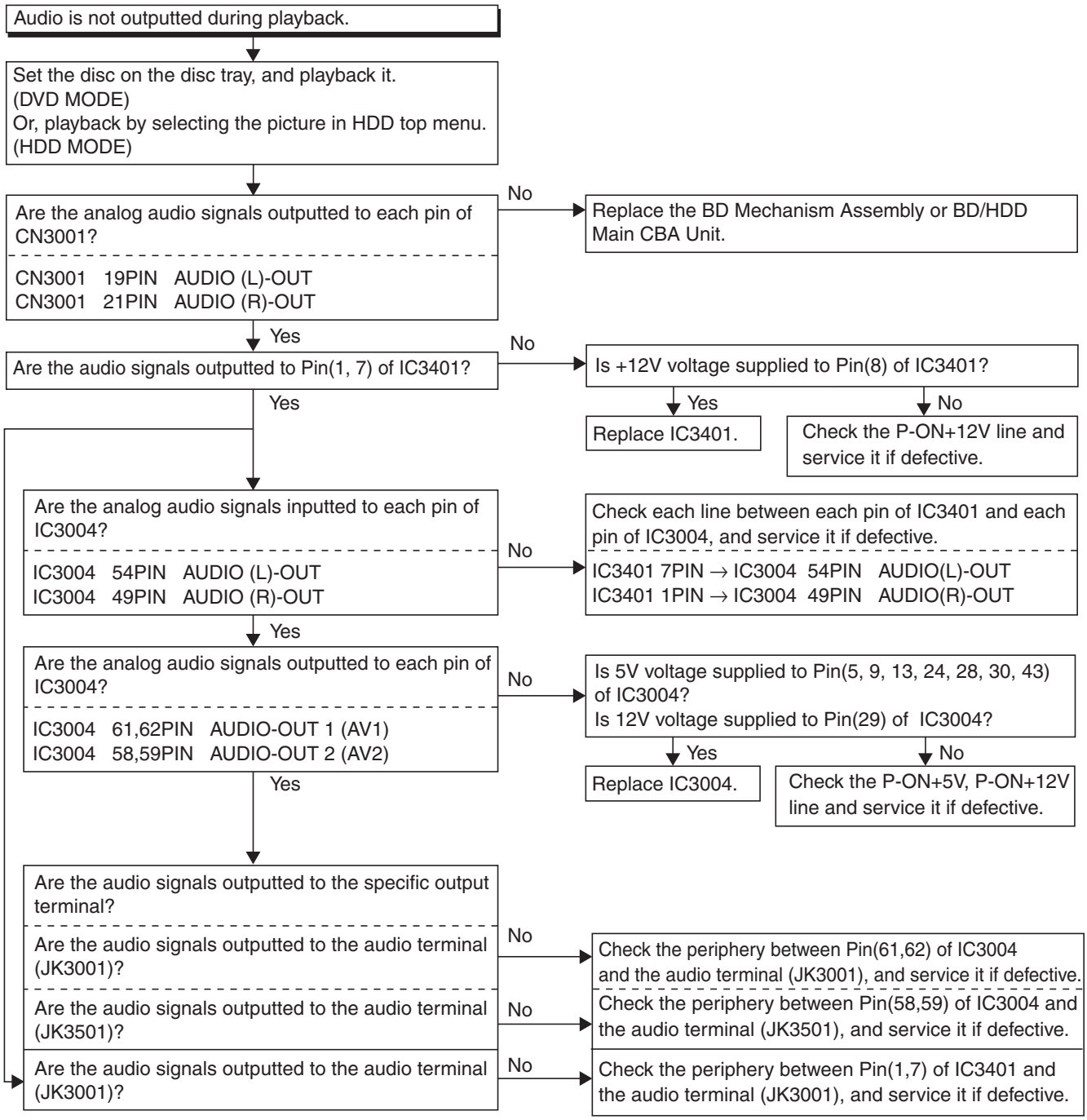
FLOW CHART NO.6



FLOW CHART NO.7



FLOW CHART NO.8



ERROR DISPLAY ON THE FRONT PANEL

If malfunction occurs in the power supply, safety detection (IC2701) on the Power Supply Board is activated the next time power is turned on, and error will be displayed on the front panel.
When an error is displayed, check whether the monitoring parts on the power line is defective. Replace the defective part(s) which is causing malfunction.

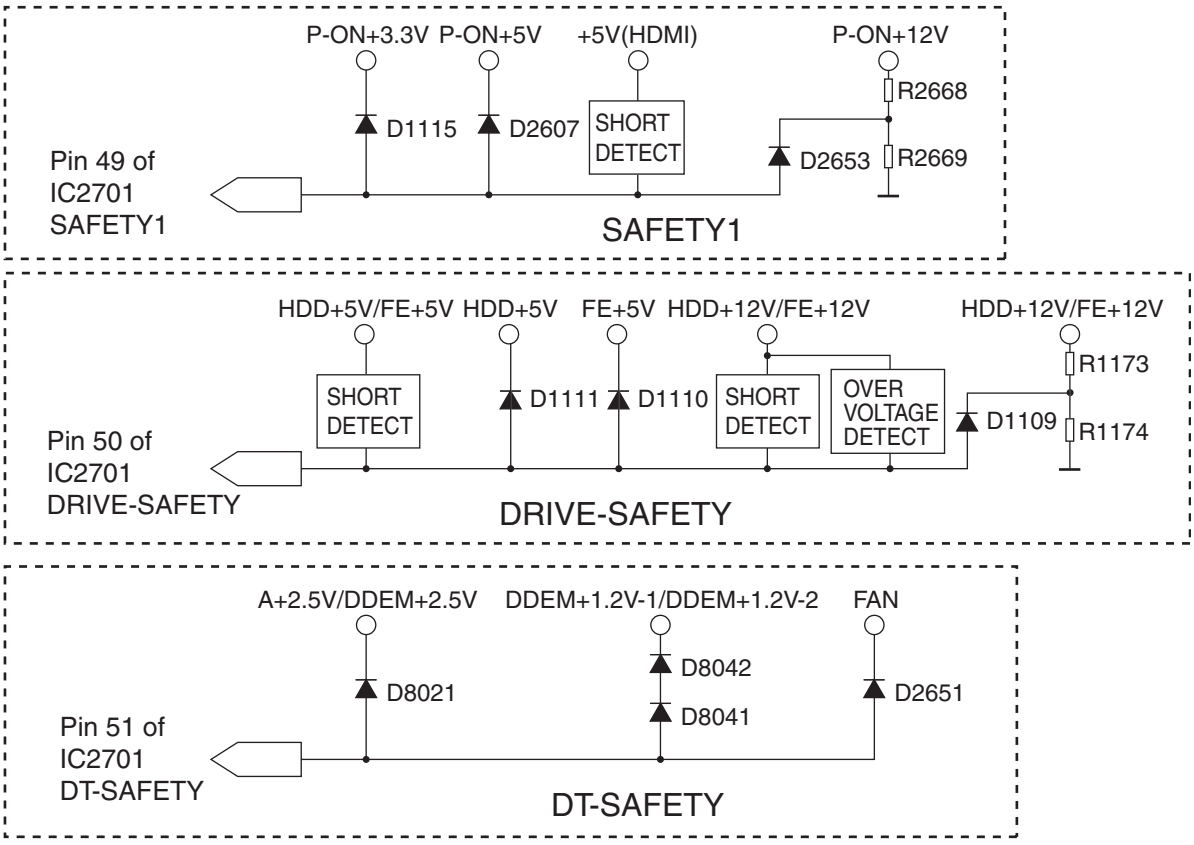
Front Panel Display	Detection Port	Power line being monitored
ERR P	SAFETY1	P-ON+3.3V, P-ON+5V, P-ON+12V, +5V(HDMI)
ERR D	DRIVE-SAFETY	HDD+5V,FE+5V, HDD+2V, FE+12V
ERR T	DT-SAFETY	DDEM+2.5V, A+2.5V, DDEM+1.2V-1, DDEM+1.2V-2, FAN

[Example]

ERR D (DRIVE-SAFETY) is displayed on the front panel.
Refer to the schematic diagram and determine HDD+5V, FE+5V, HDD+12V and FE+12V are generated on the Power Supply Board.

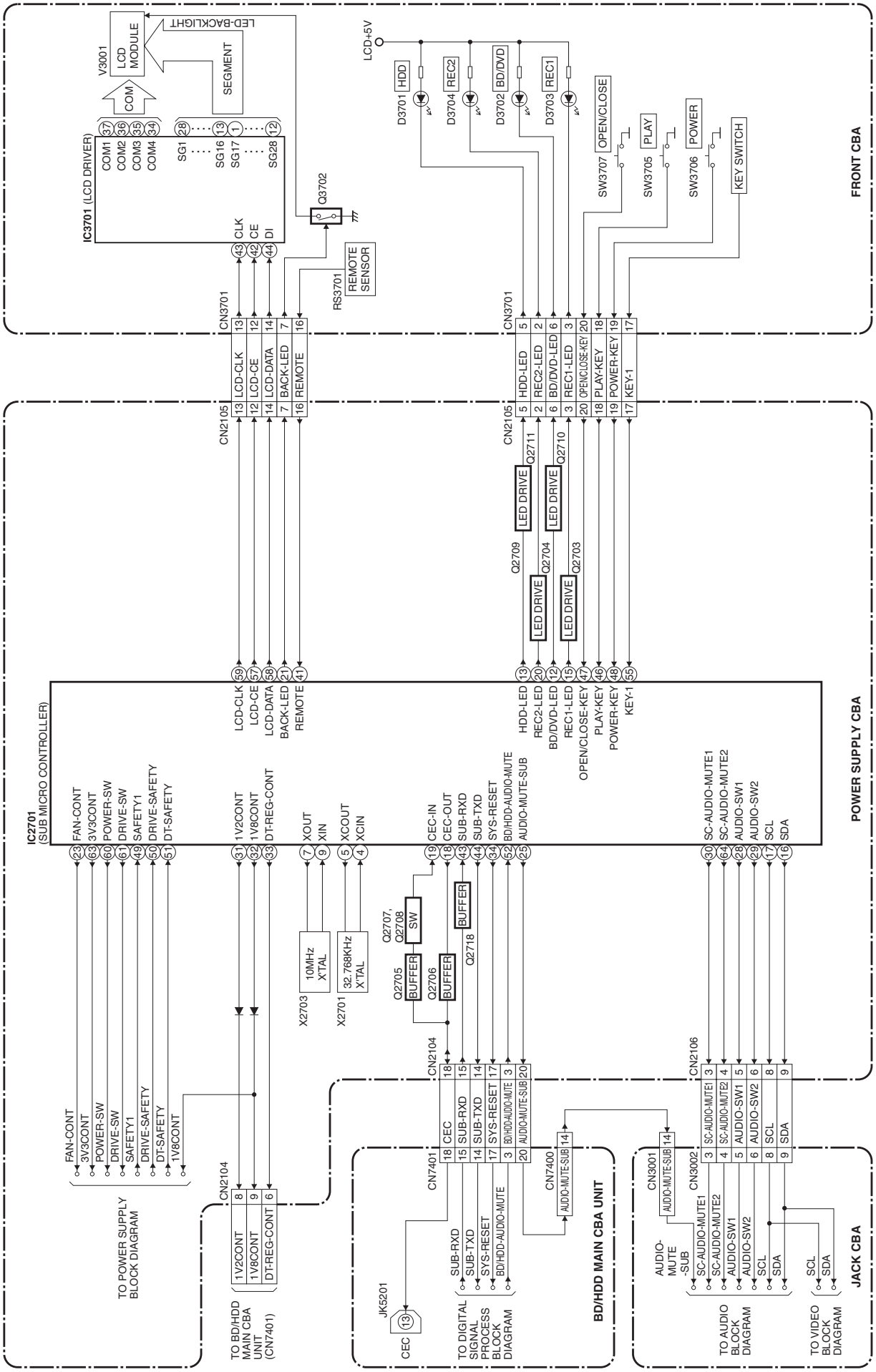
Check for abnormalities in the following area to identify the cause of malfunction:

- Parts that generate these power source (IC1102, IC1104) and their periphery
- Parts on the power line
- Parts that use these power source; HDD and Loader unit

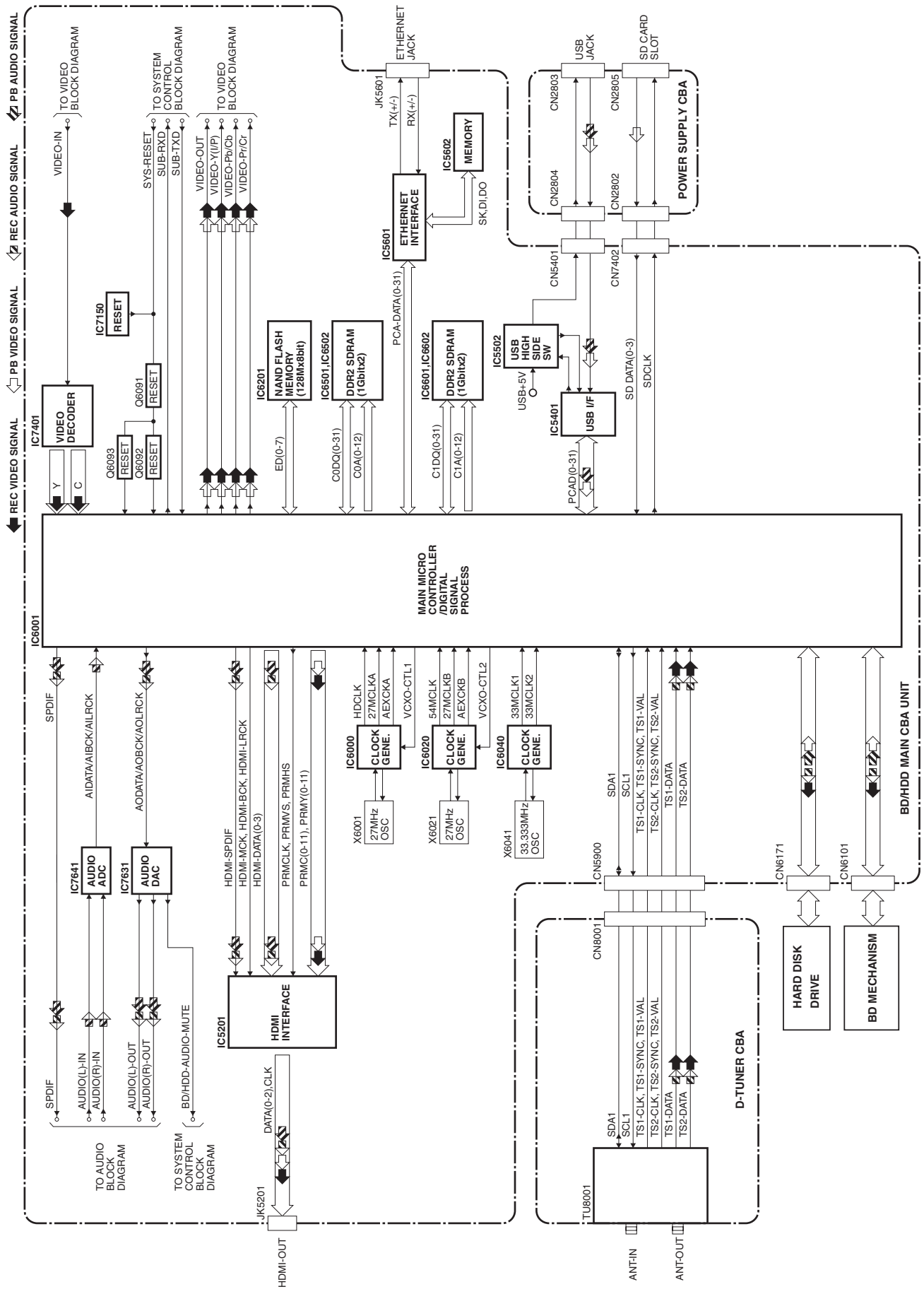


BLOCK DIAGRAMS

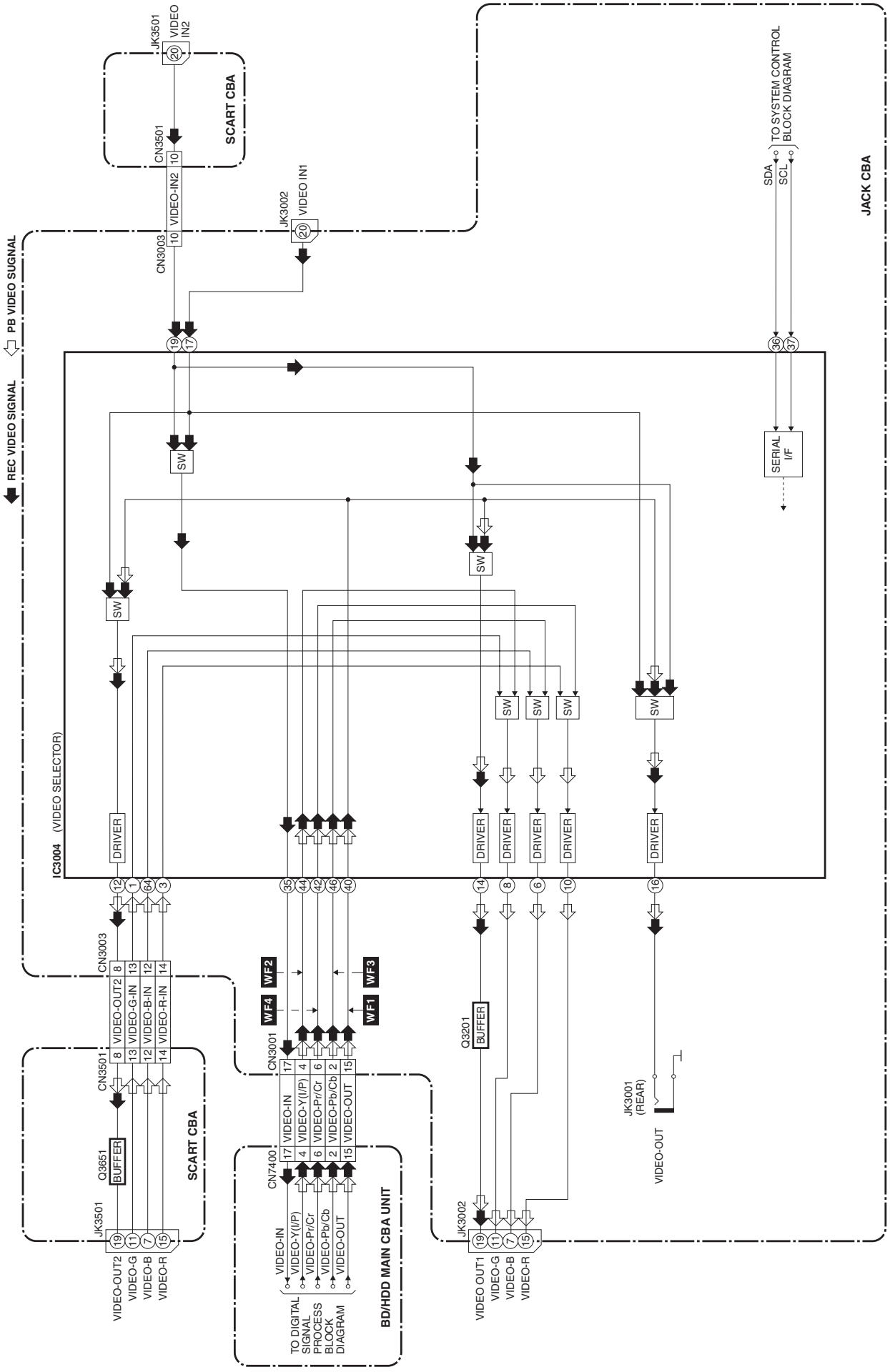
System Control Block Diagram



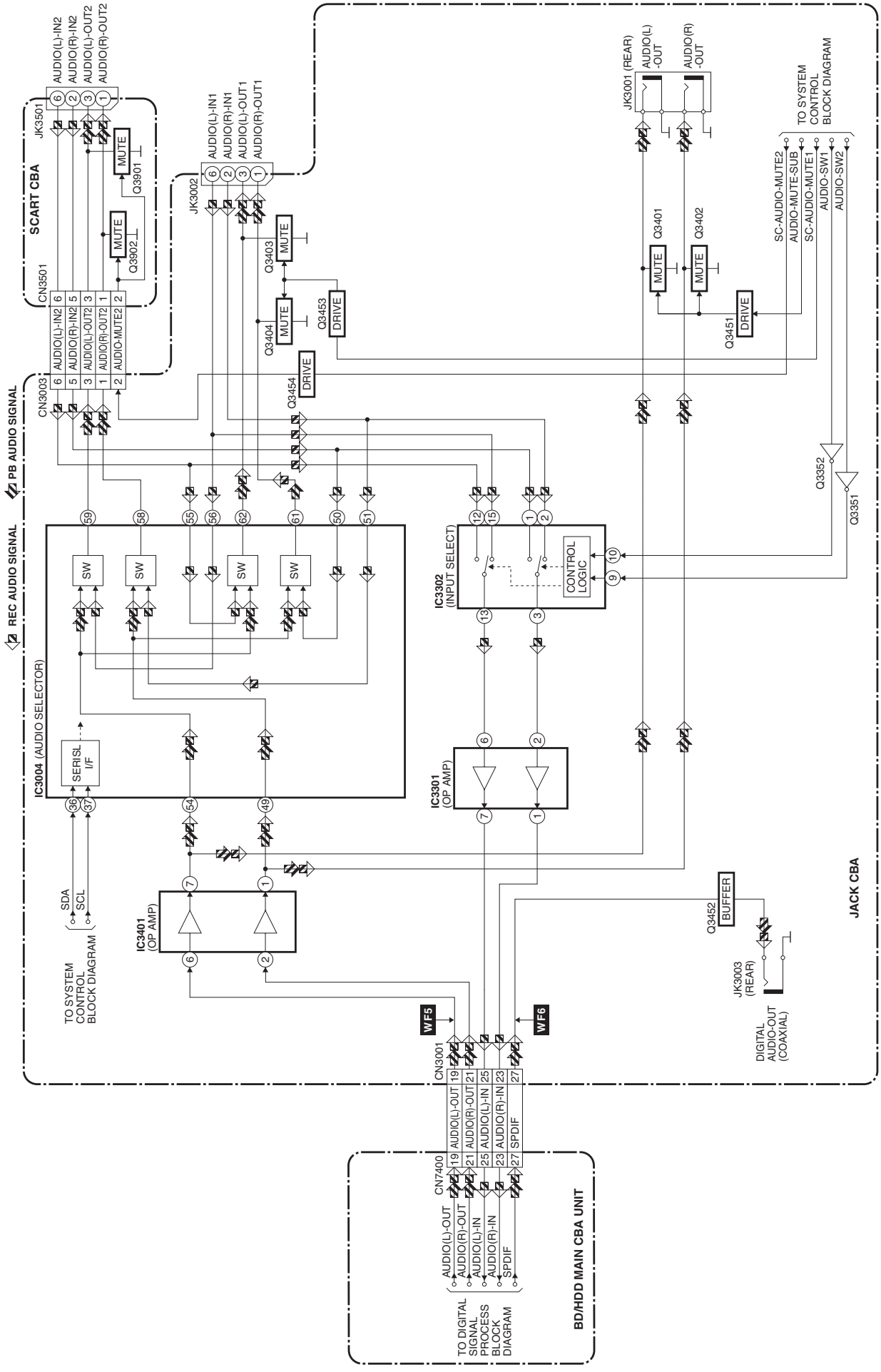
Digital Signal Process Block Diagram



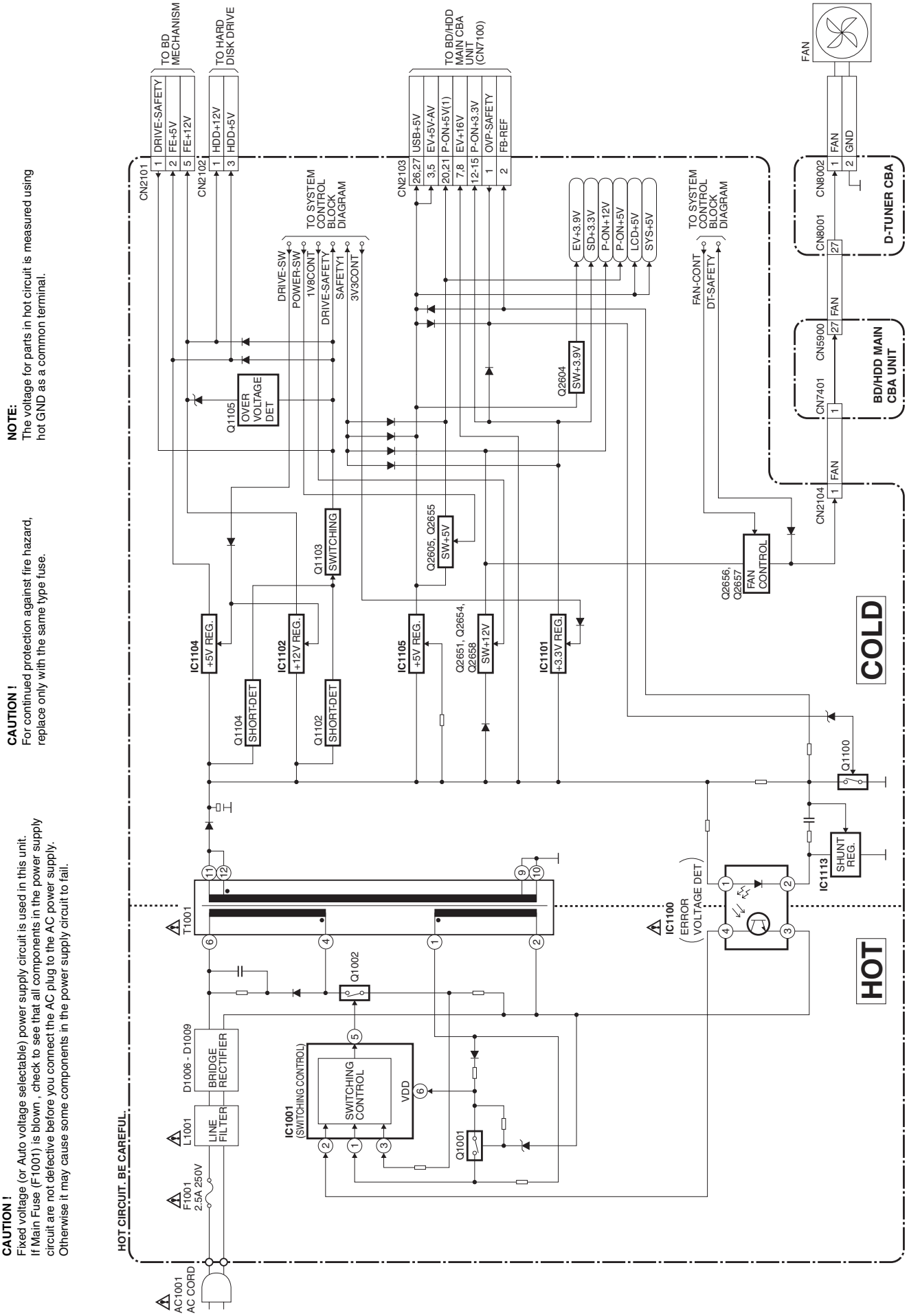
Video Block Diagram



Audio Block Diagram



Power Supply Block Diagram



CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F1001) 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 / CBA AND TEST POINTS

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.

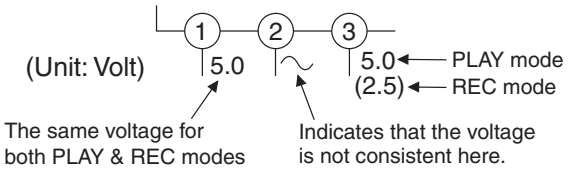
2. CAUTION:

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) 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.

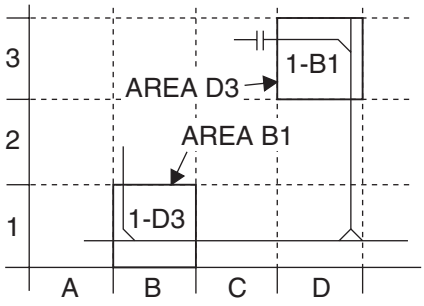
4. Voltage indications for PLAY and REC mode on the schematics are as shown below:



5. How to read converged lines

1-D3
Distinction Area
Line Number
(1 to 3 digits)

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.

The reference number of parts on Schematic Diagrams/CBA can be retrieved by application search function.

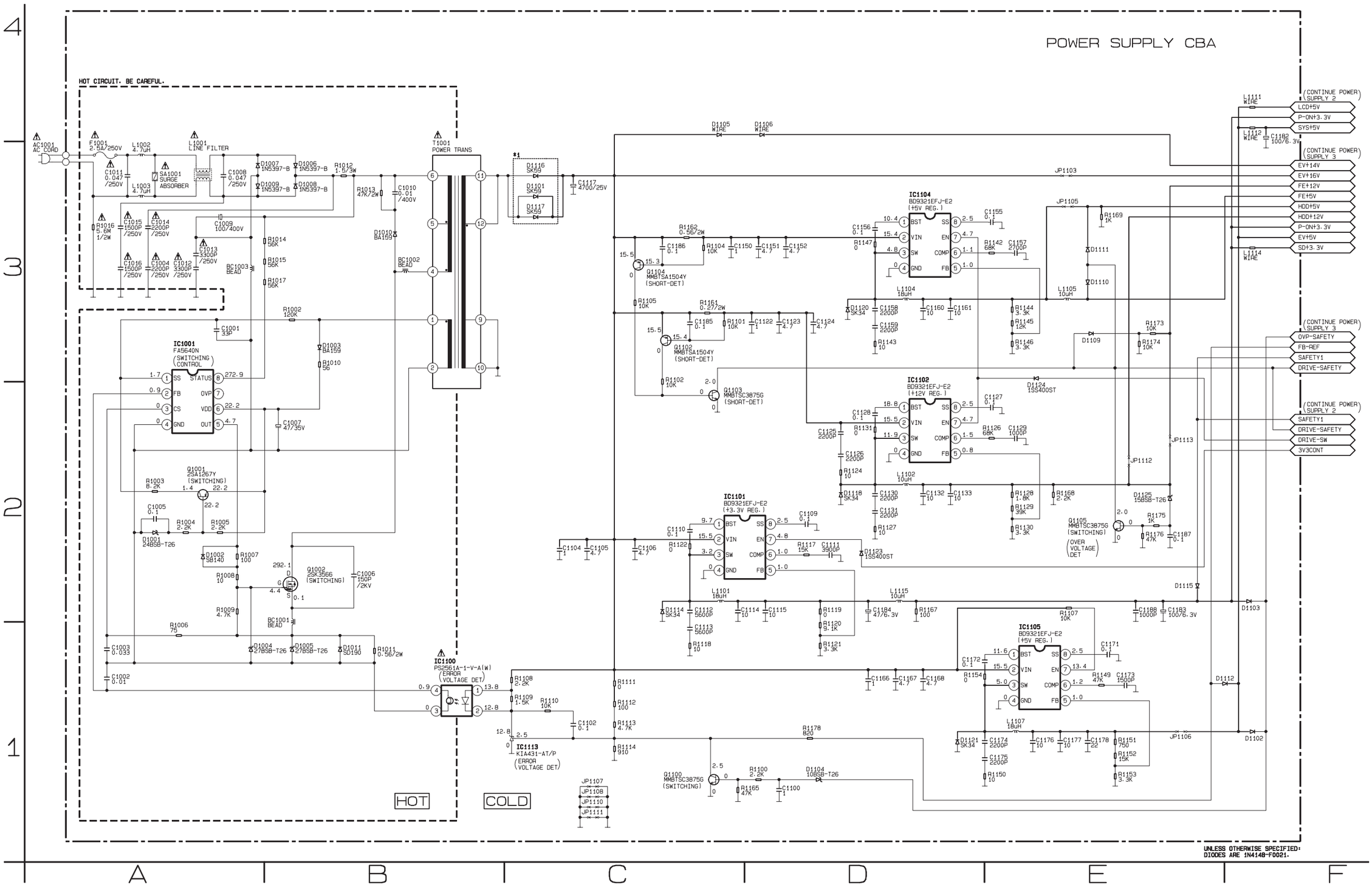
Power Supply 1 Schematic Diagram

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) 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.

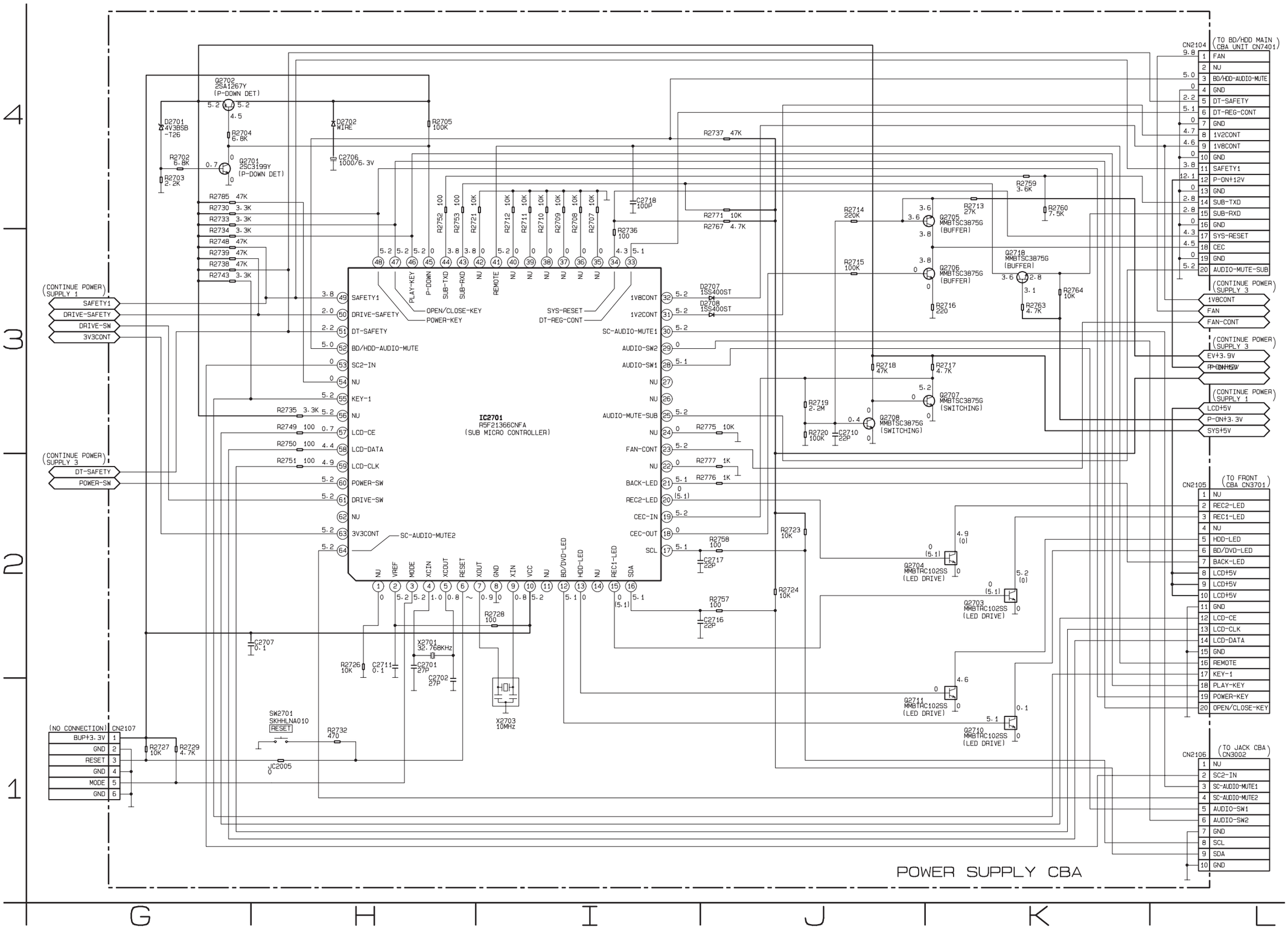
CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

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

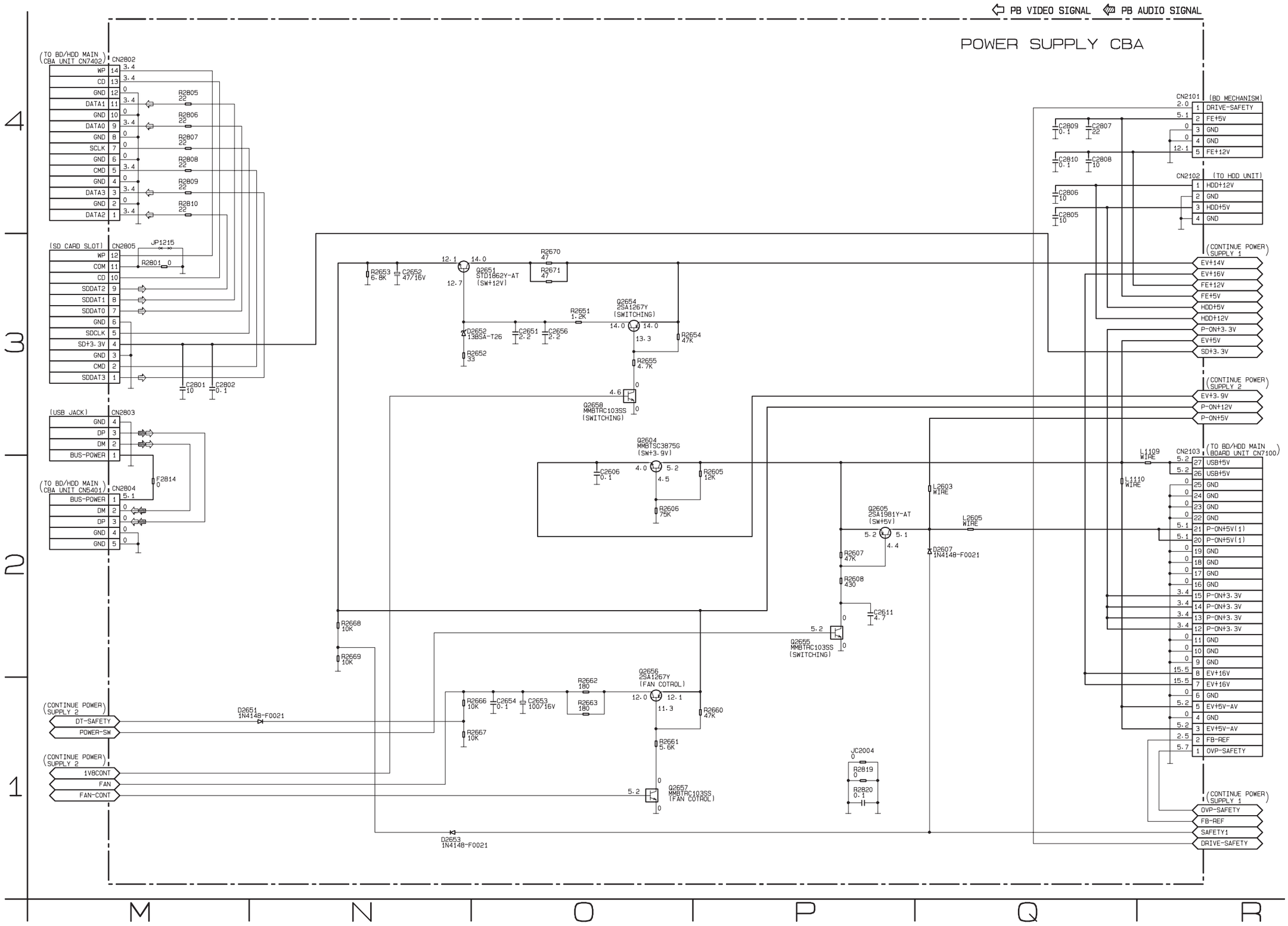
∗1 **NOTE:**
When you replace Diodes (D1101,D1116,D1117) on the Power Supply CBA, please replace with the one that has same parts number.
Do not mix different parts number's Diode. Refer to the Part List section.



Power Supply 2 Schematic Diagram



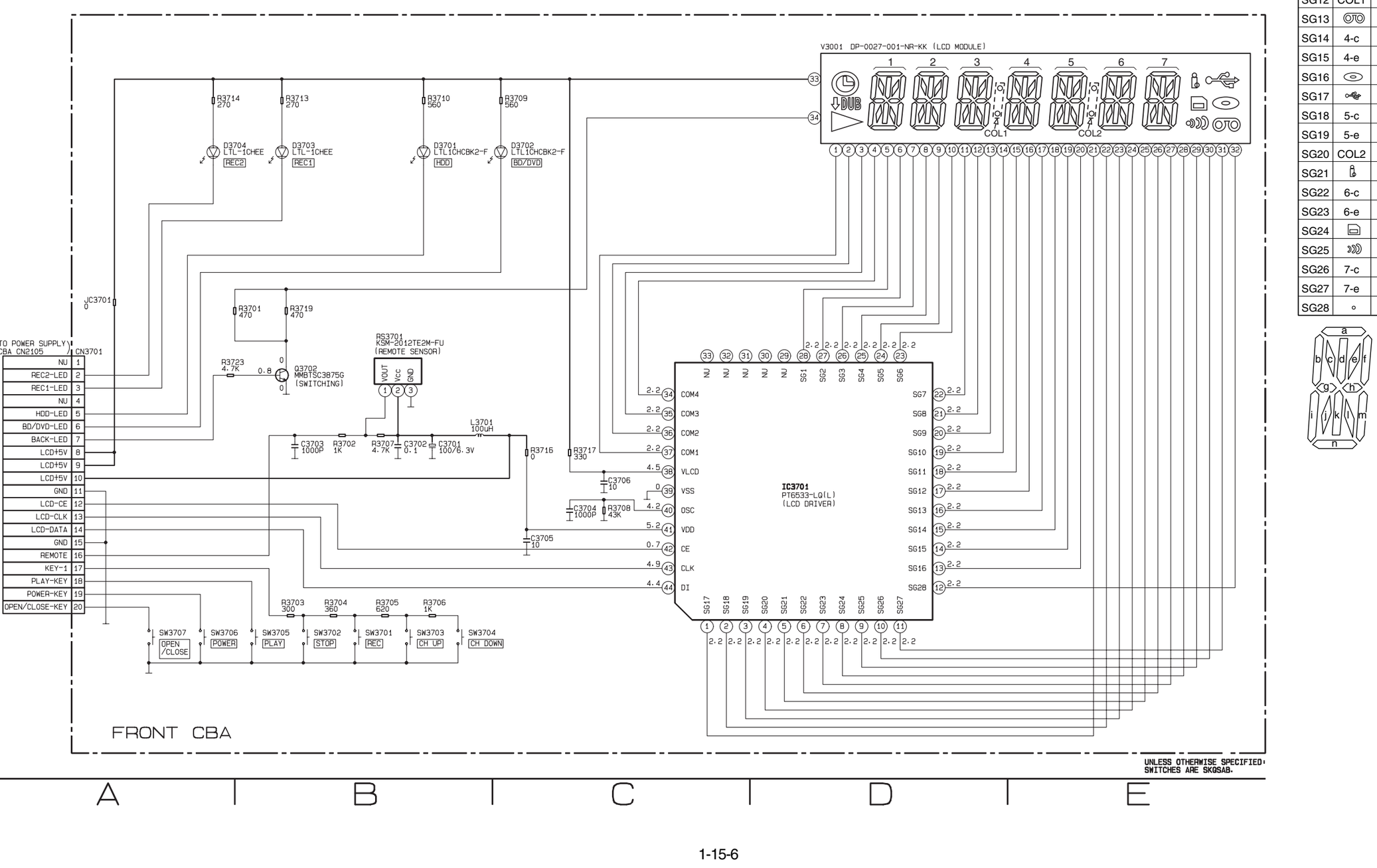
Power Supply 3 Schematic Diagram



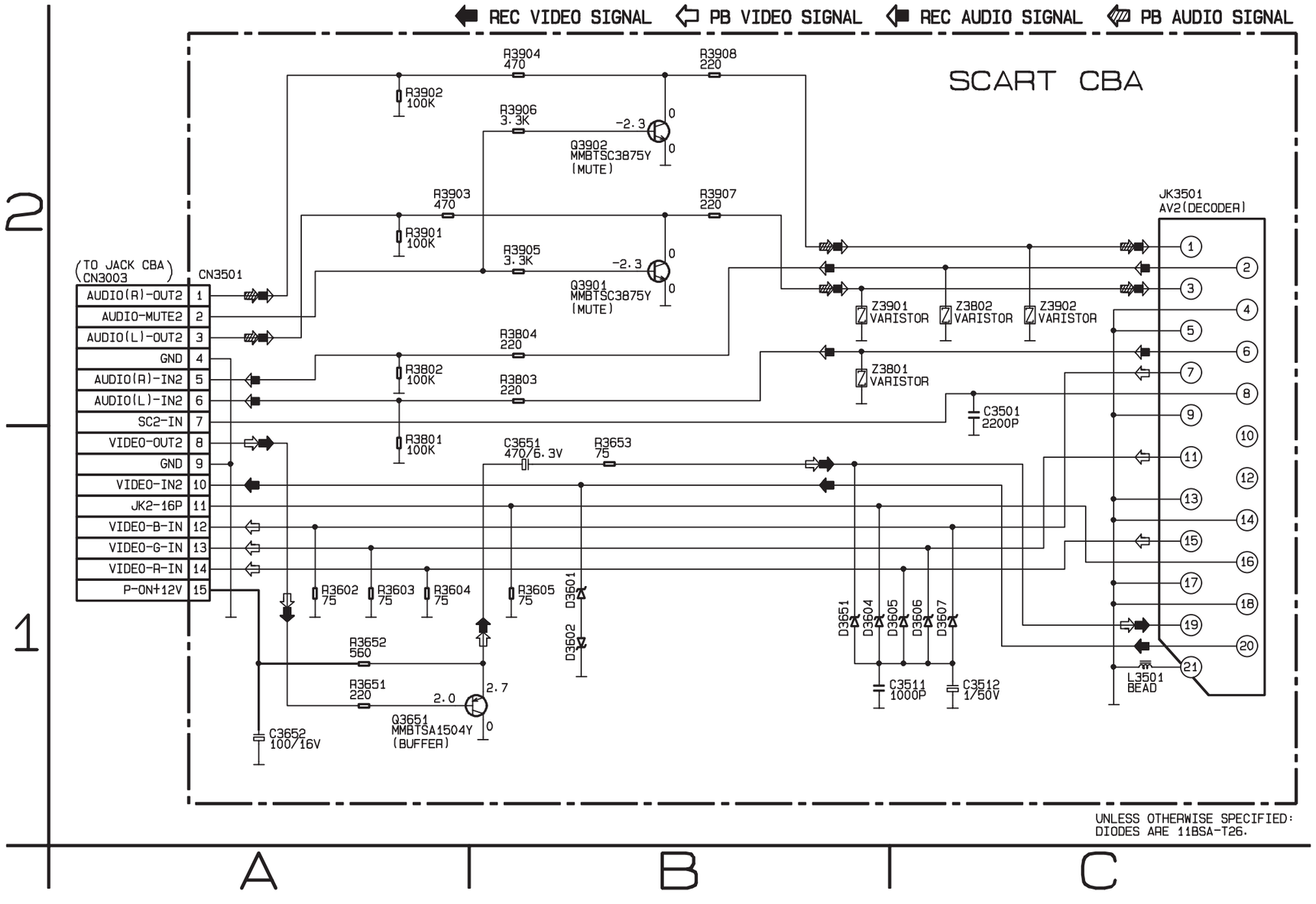
Front Schematic Diagram

V3001 MATRIX CHART

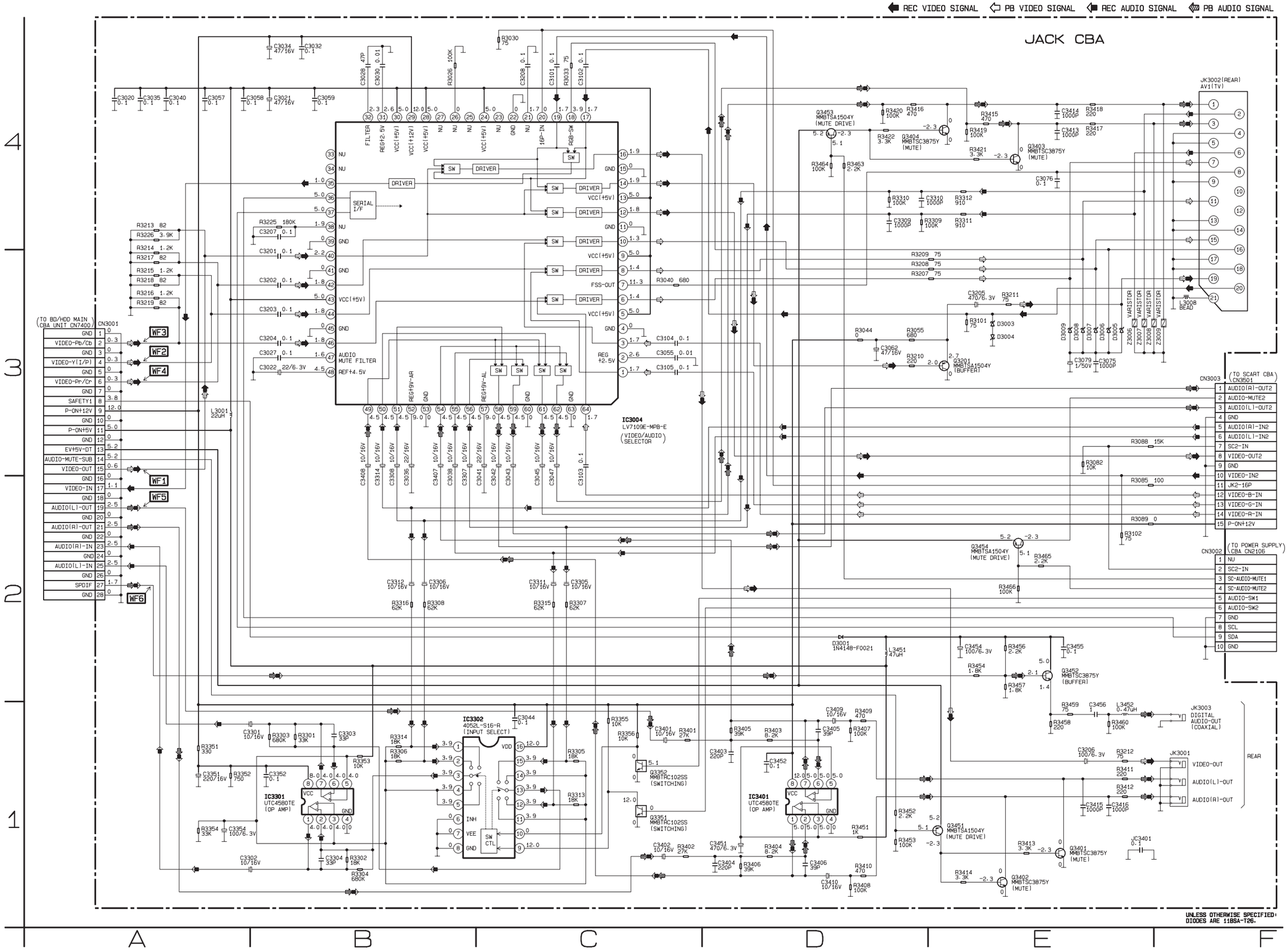
	COM1	COM2	COM3	COM4
SG1	UB	1-a	1-b	1-i
SG2	1-c	1-g	1-j	1-n
SG3	1-e	1-d	1-k	1-l
SG4	D	1-f	1-h	1-m
SG5	◷	2-a	2-b	2-l
SG6	2-c	2-g	2-j	2-n
SG7	2-e	2-d	2-k	2-l
SG8	⇩	2-f	2-h	2-m
SG9	▷	3-a	3-b	3-i
SG10	3-c	3-g	3-j	3-n
SG11	3-e	3-d	3-k	3-l
SG12	COL1	3-f	3-h	3-m
SG13	⊙⊙	4-a	4-b	4-i
SG14	4-c	4-g	4-j	4-n
SG15	4-e	4-d	4-k	4-l
SG16	⬭	4-f	4-h	4-m
SG17	⊶	5-a	5-b	5-i
SG18	5-c	5-g	5-j	5-n
SG19	5-e	5-d	5-k	5-l
SG20	COL2	5-f	5-h	5-m
SG21	⚷	6-a	6-b	6-i
SG22	6-c	6-g	6-j	6-n
SG23	6-e	6-d	6-k	6-l
SG24	▭	6-f	6-h	6-m
SG25	)))	7-a	7-b	7-i
SG26	7-c	7-g	7-j	7-n
SG27	7-e	7-d	7-k	7-l
SG28	∘	7-f	7-h	7-m



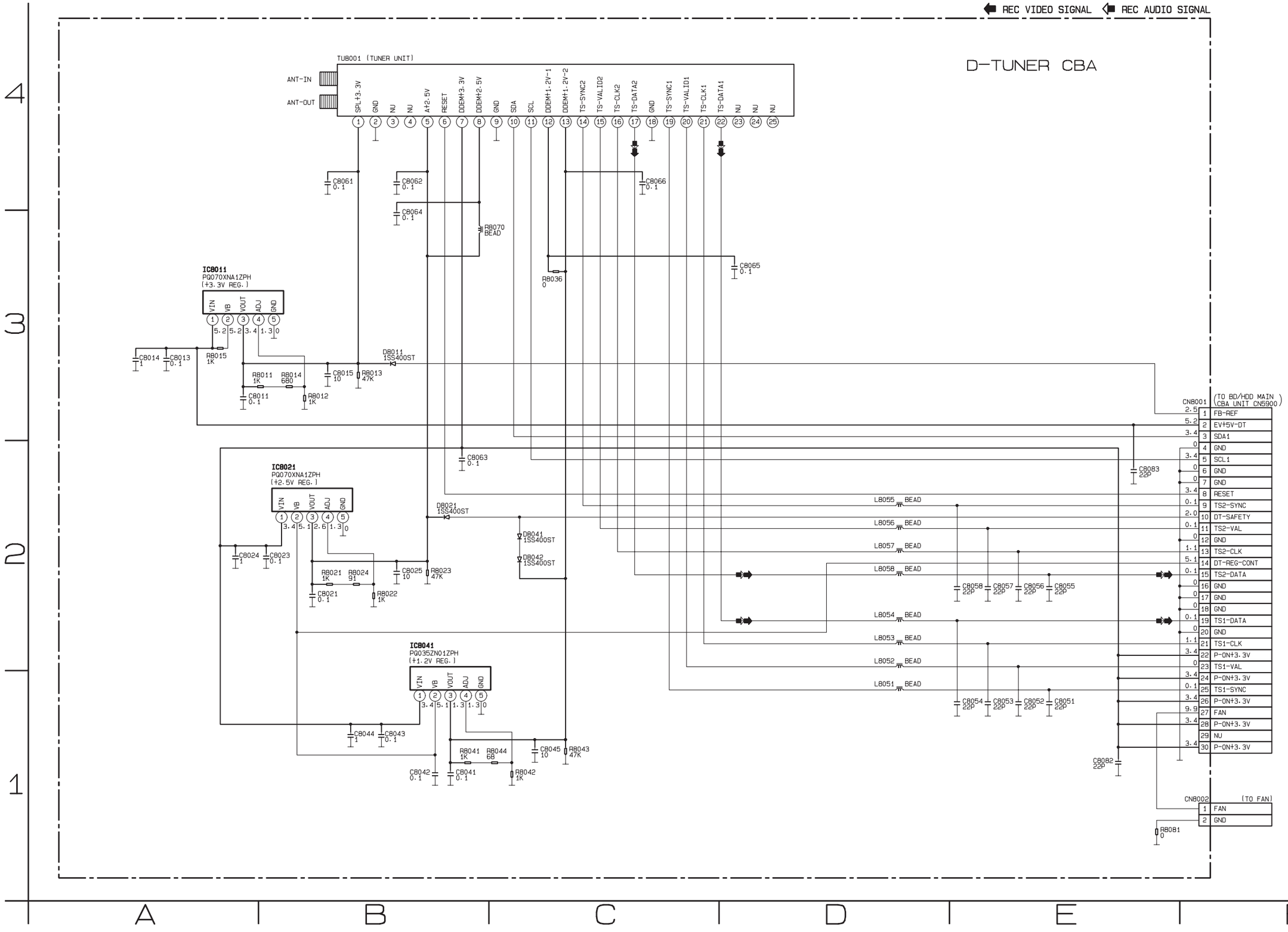
Scart Schematic Diagram



Jack Schematic Diagram

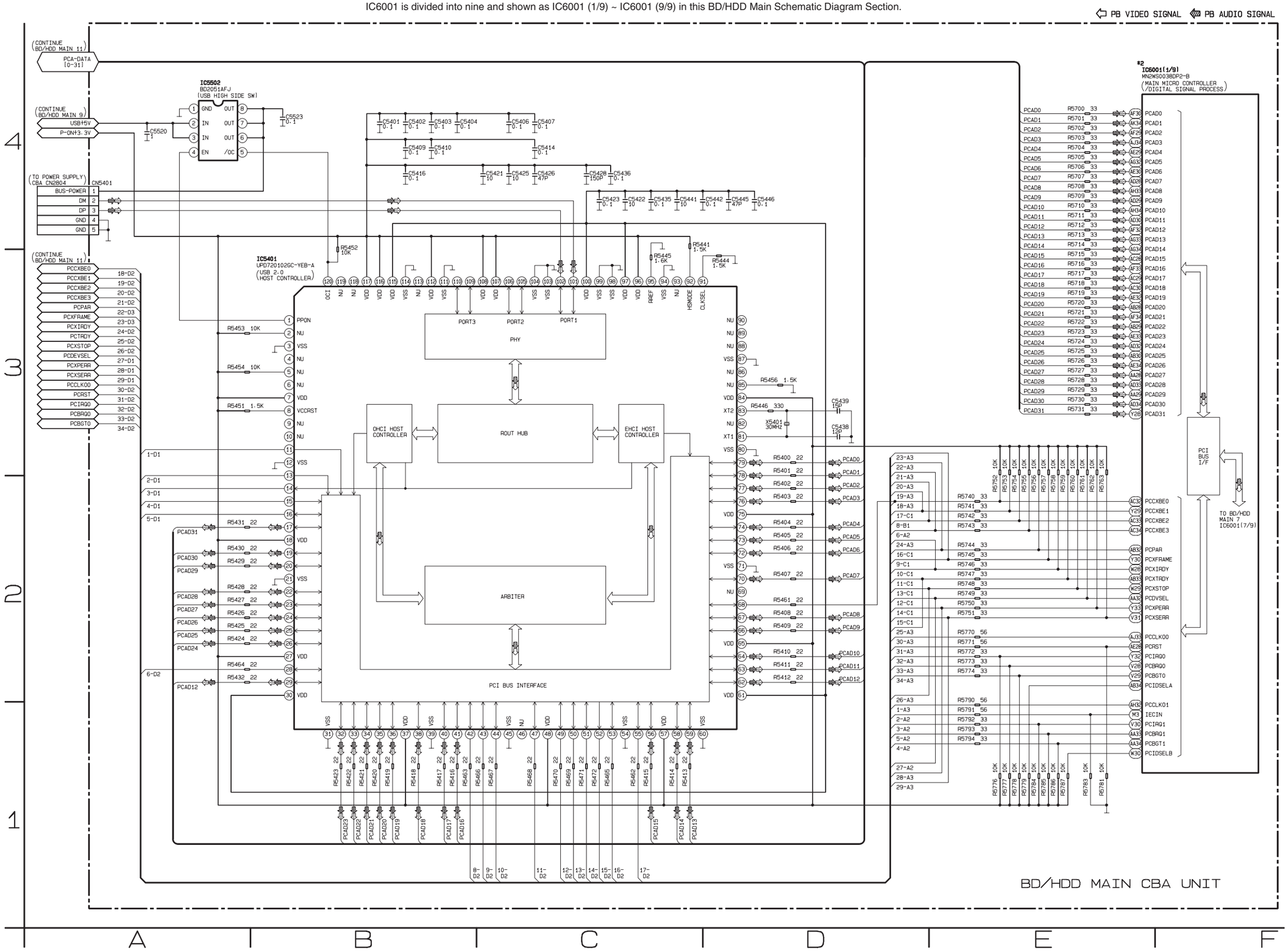


D-Tuner Schematic Diagram



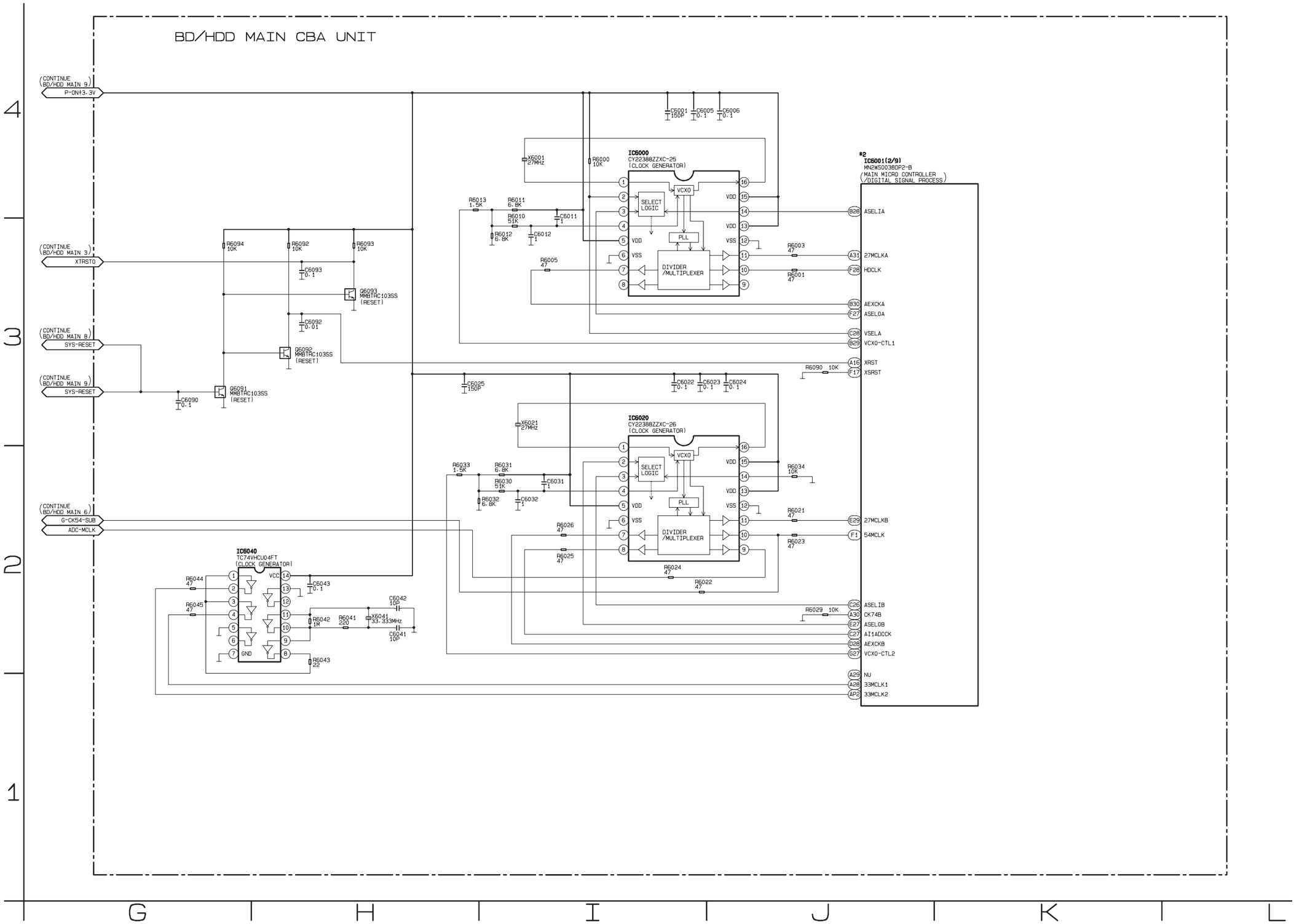
BD/HDD Main 1 Schematic Diagram

∗2 NOTE:
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.



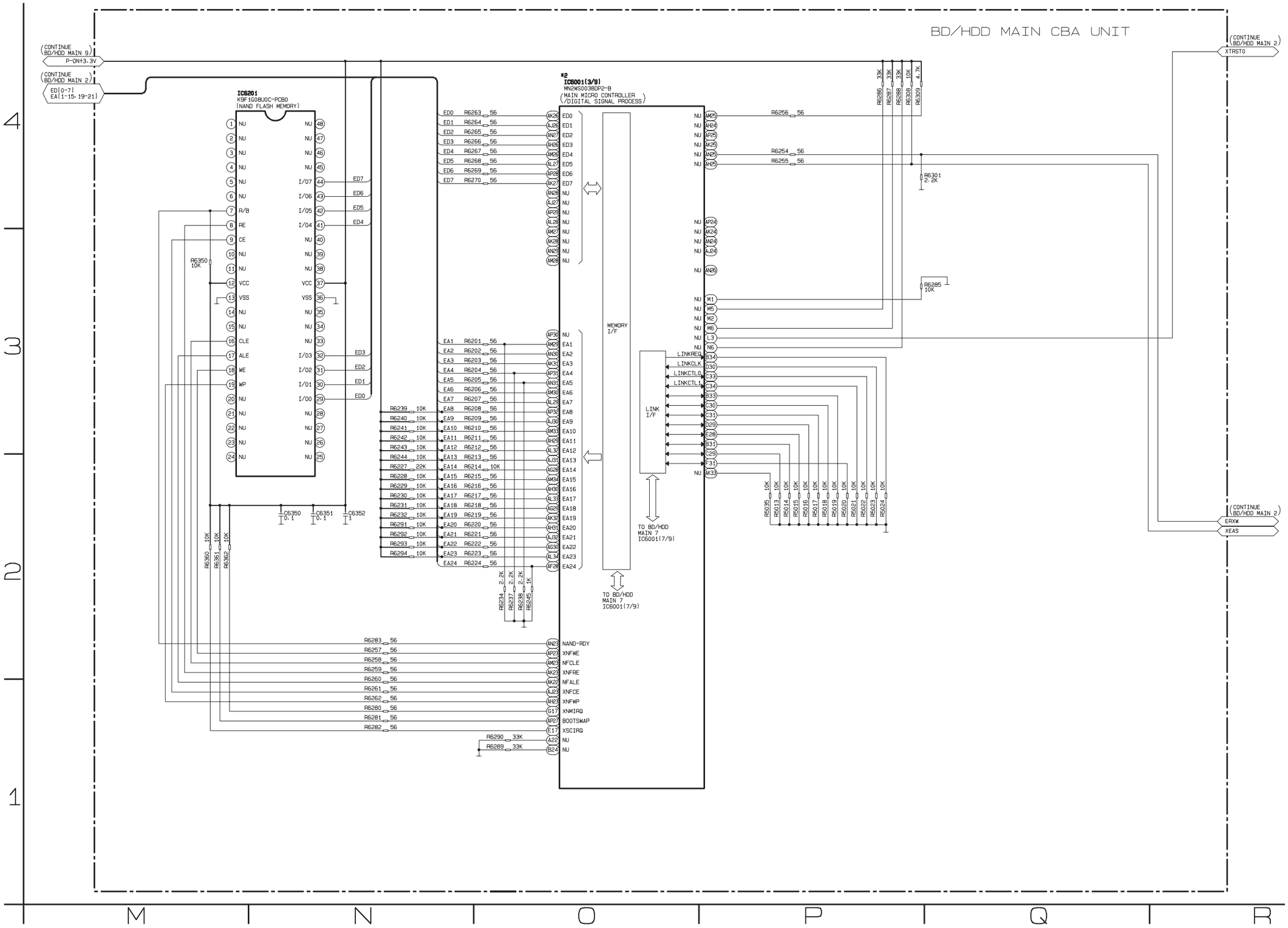
BD/HDD Main 2 Schematic Diagram

∗2 NOTE:
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.



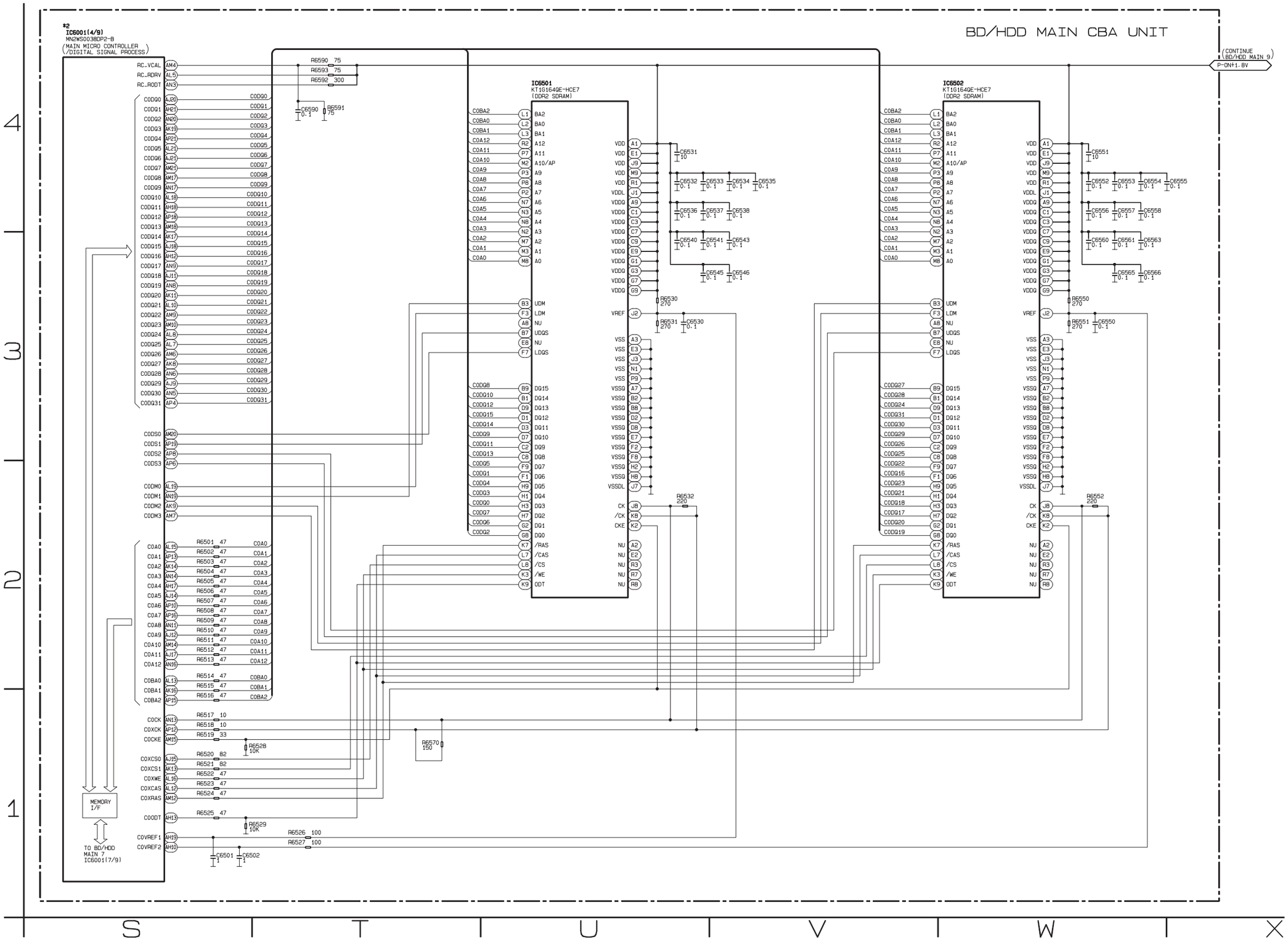
BD/HDD Main 3 Schematic Diagram

＊2 NOTE:
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.



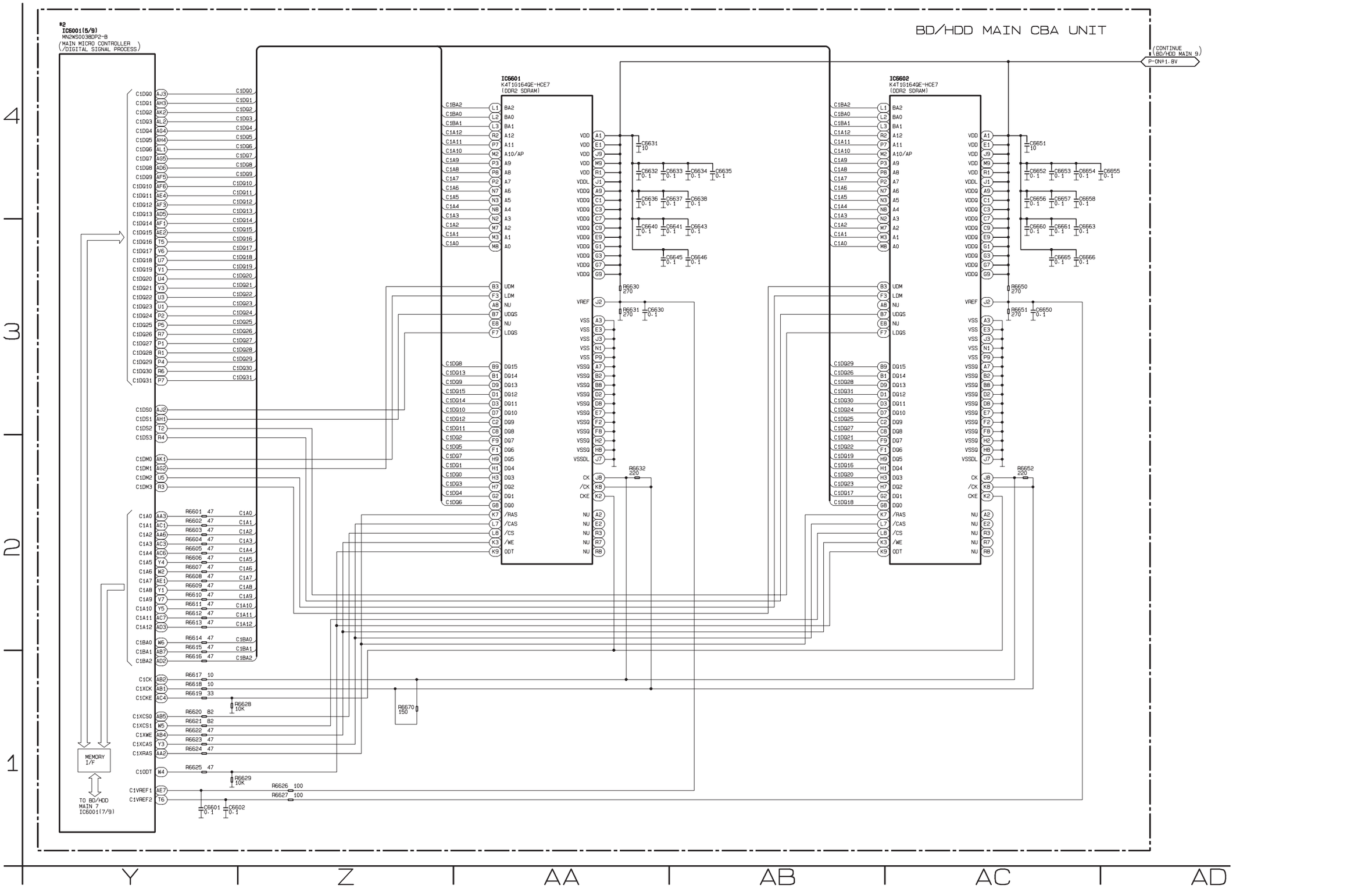
BD/HDD Main 4 Schematic Diagram

＊2 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.



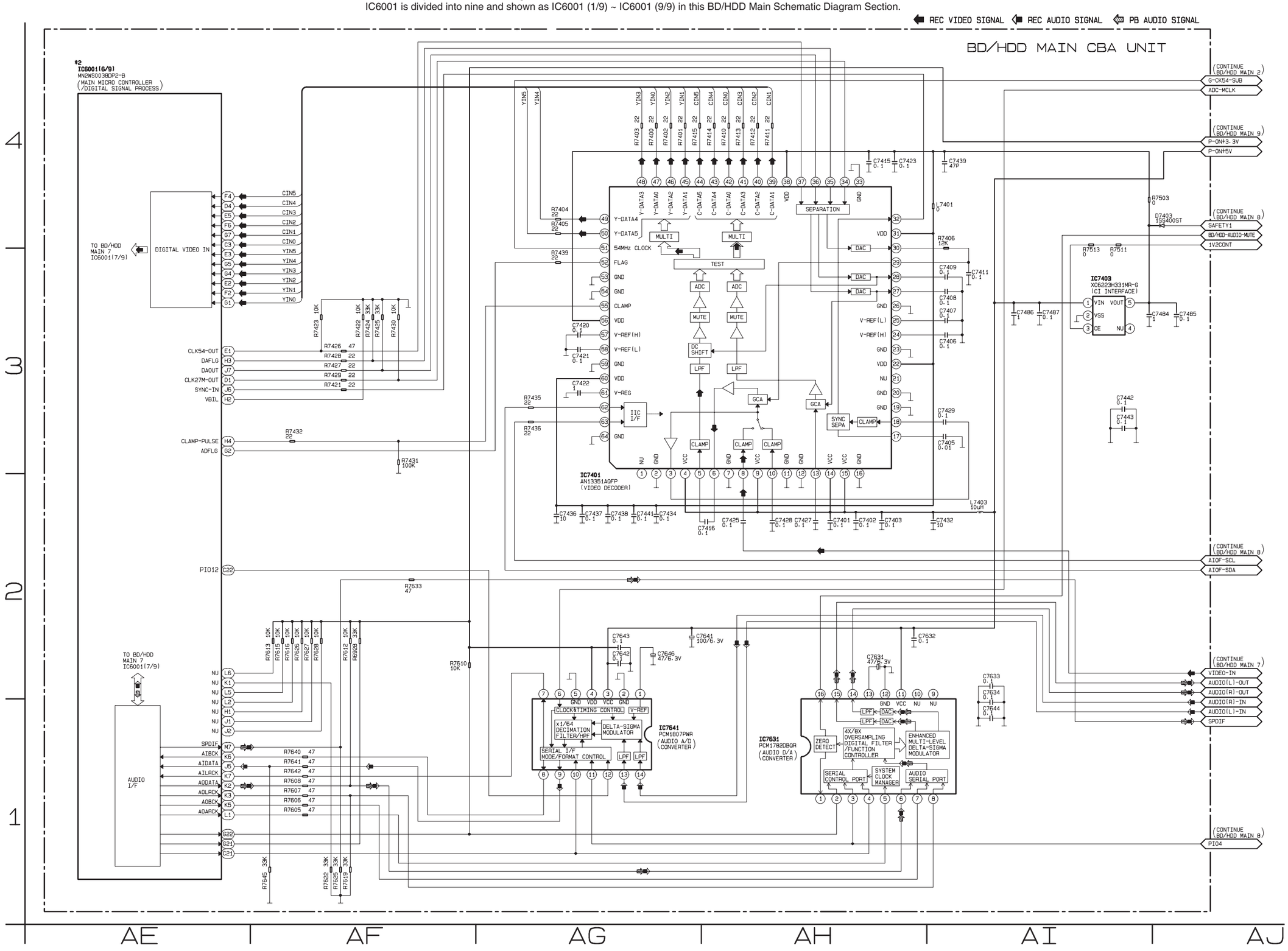
BD/HDD Main 5 Schematic Diagram

∗2 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.



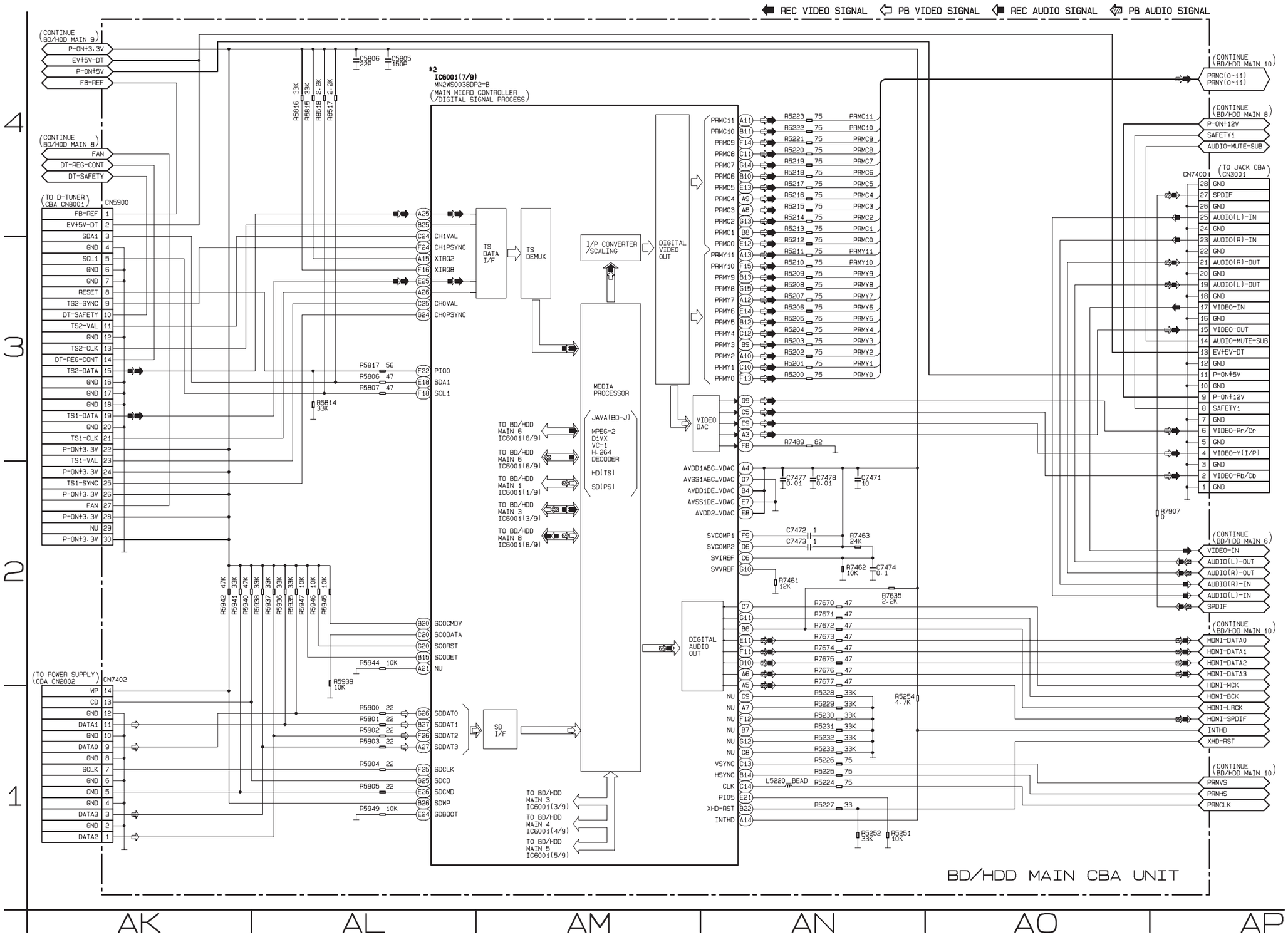
BD/HDD Main 6 Schematic Diagram

∗2 **NOTE:**
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.



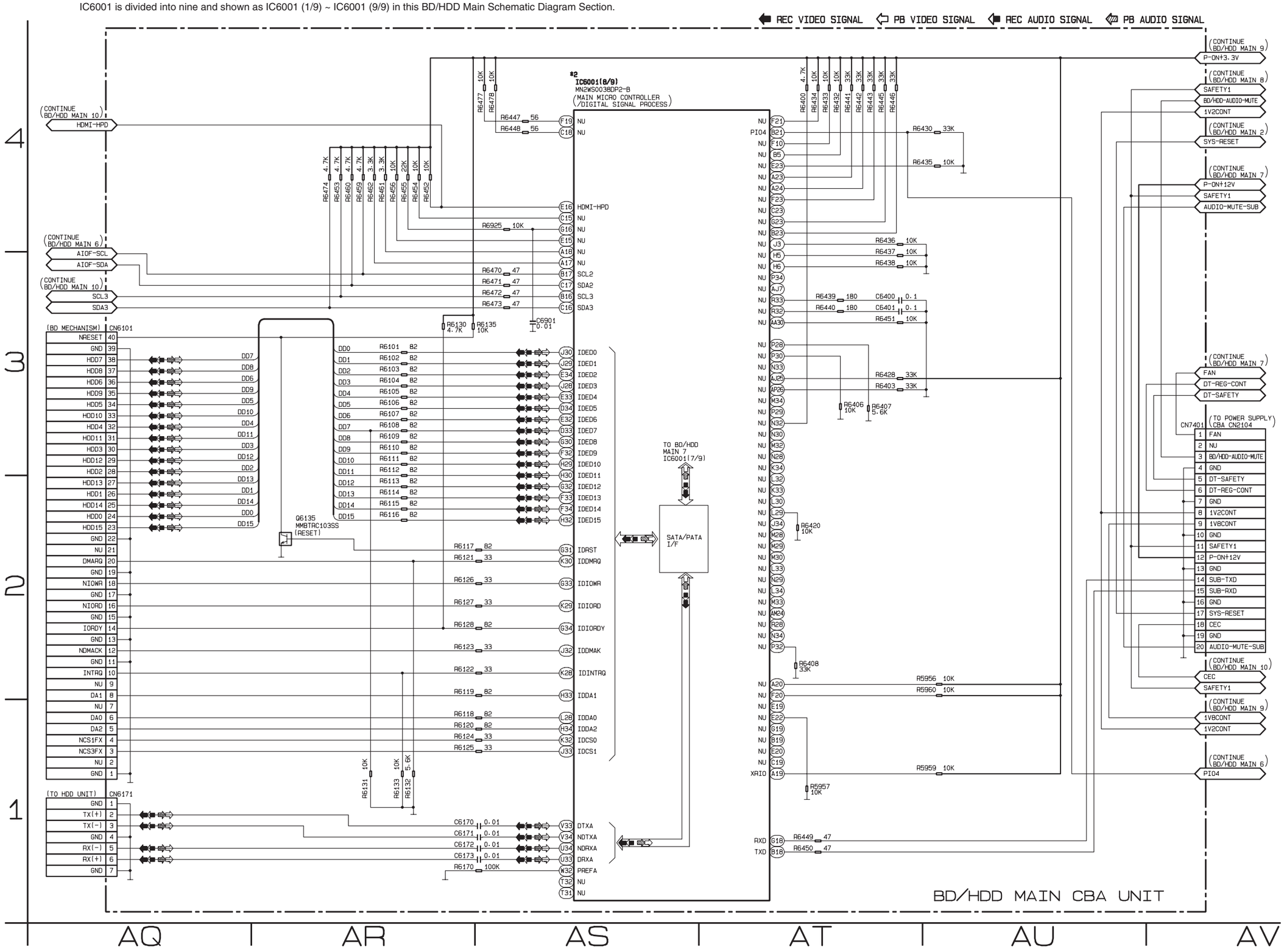
BD/HDD Main 7 Schematic Diagram

＊2 NOTE:
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.



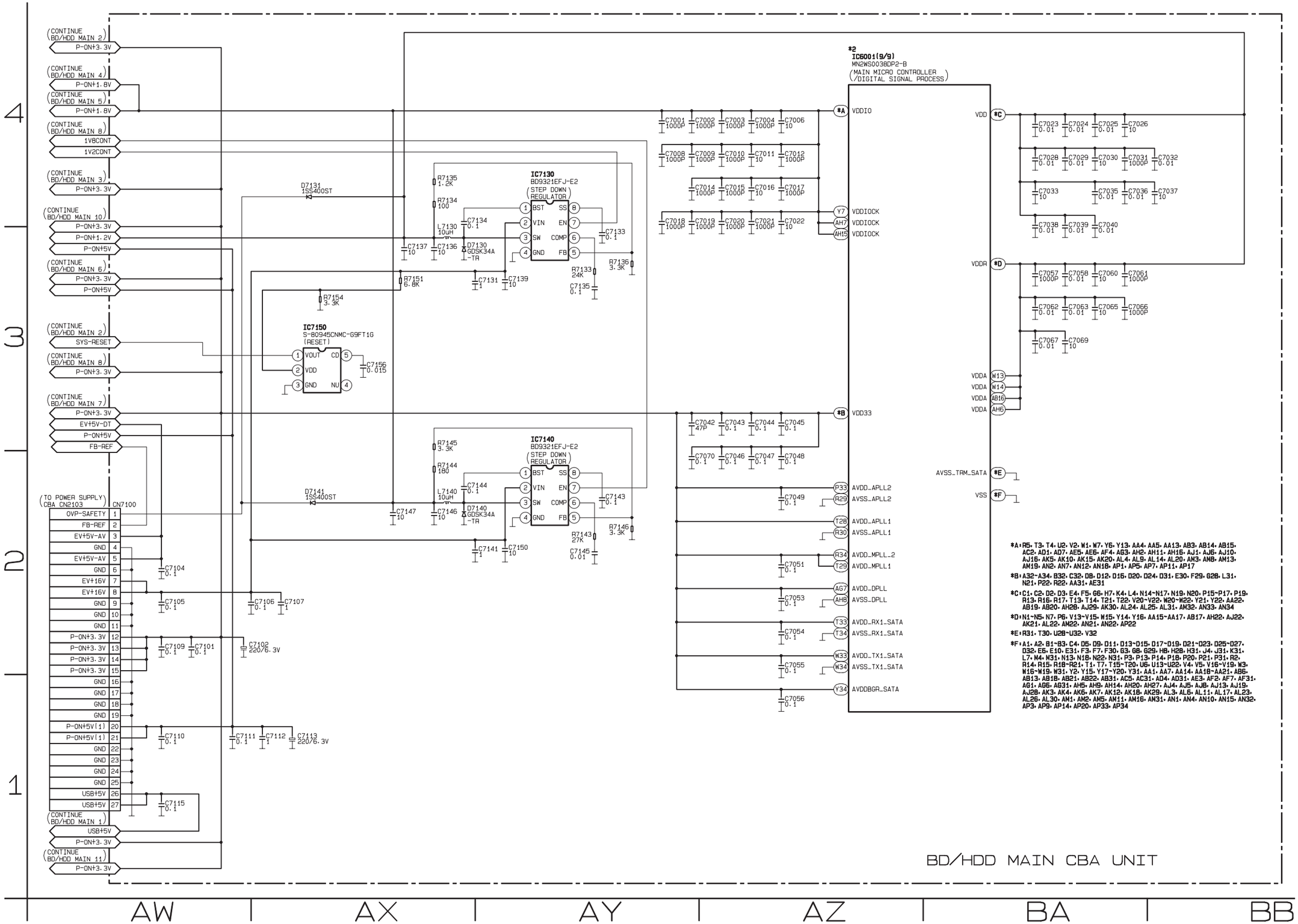
BD/HDD Main 8 Schematic Diagram

∗2 NOTE:
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.

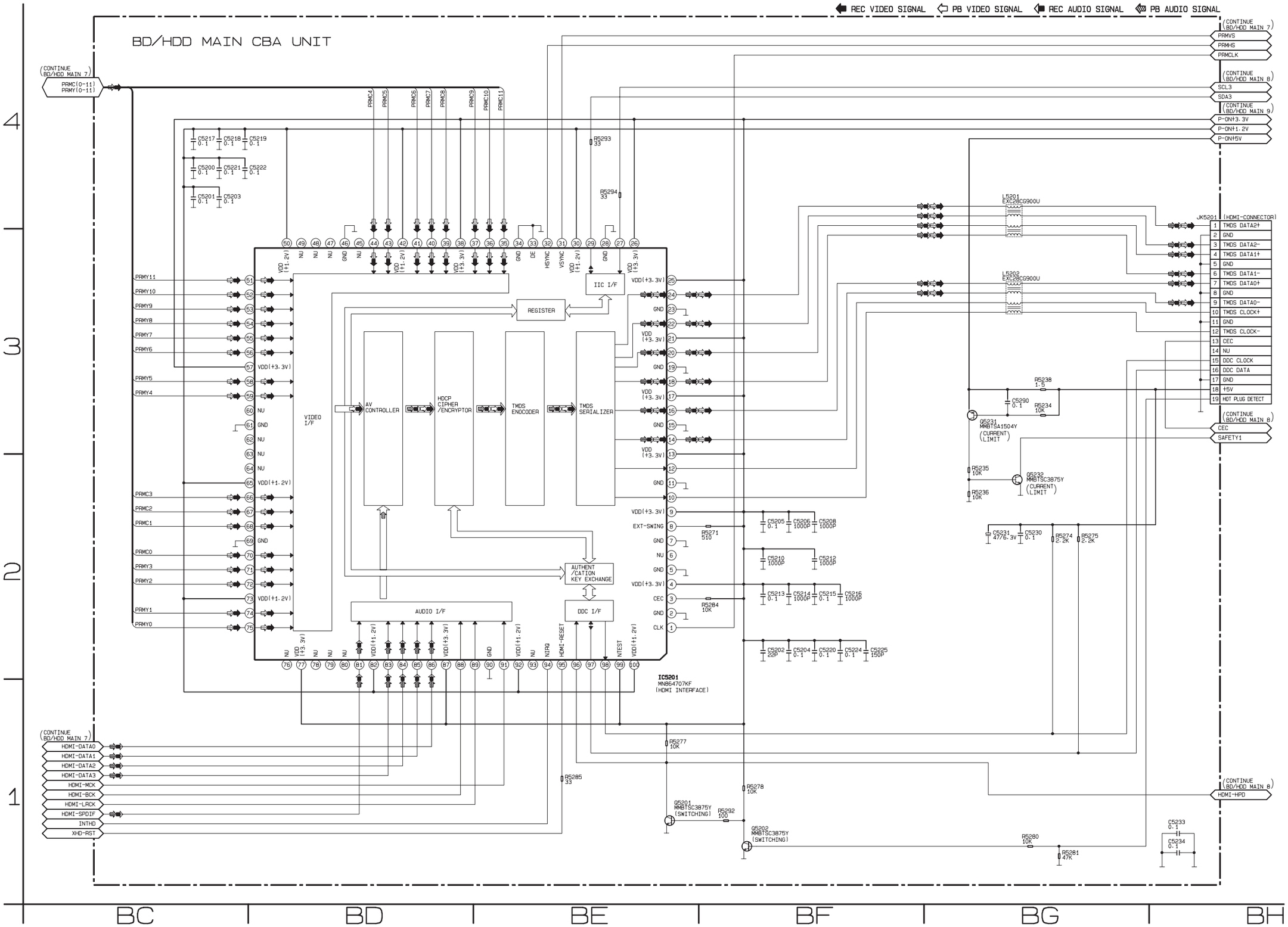


BD/HDD Main 9 Schematic Diagram

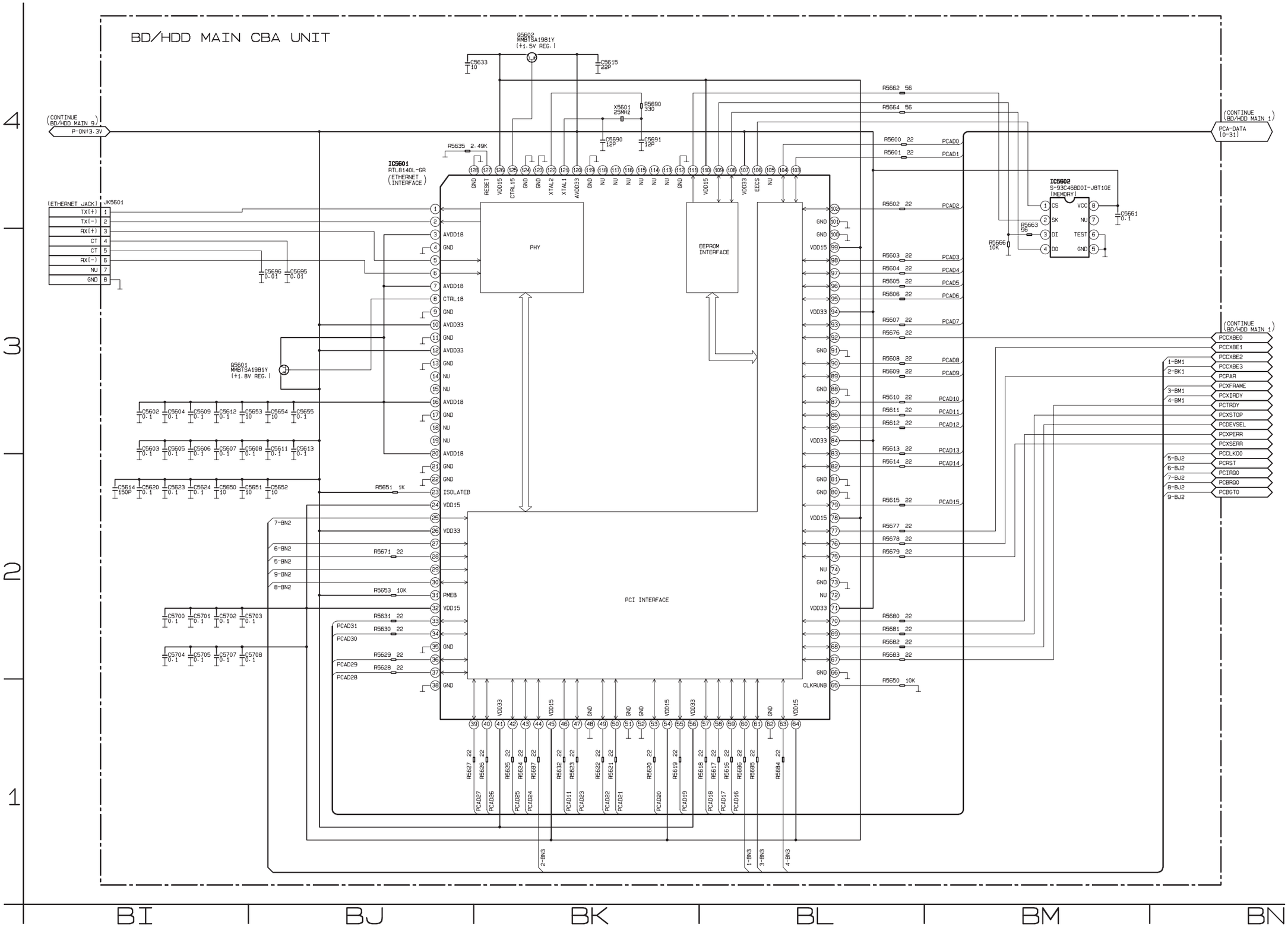
∗2 NOTE:
The order of pins shown in this diagram is different from that of actual IC6001.
IC6001 is divided into nine and shown as IC6001 (1/9) ~ IC6001 (9/9) in this BD/HDD Main Schematic Diagram Section.



BD/HDD Main 10 Schematic Diagram



BD/HDD Main 11 Schematic Diagram



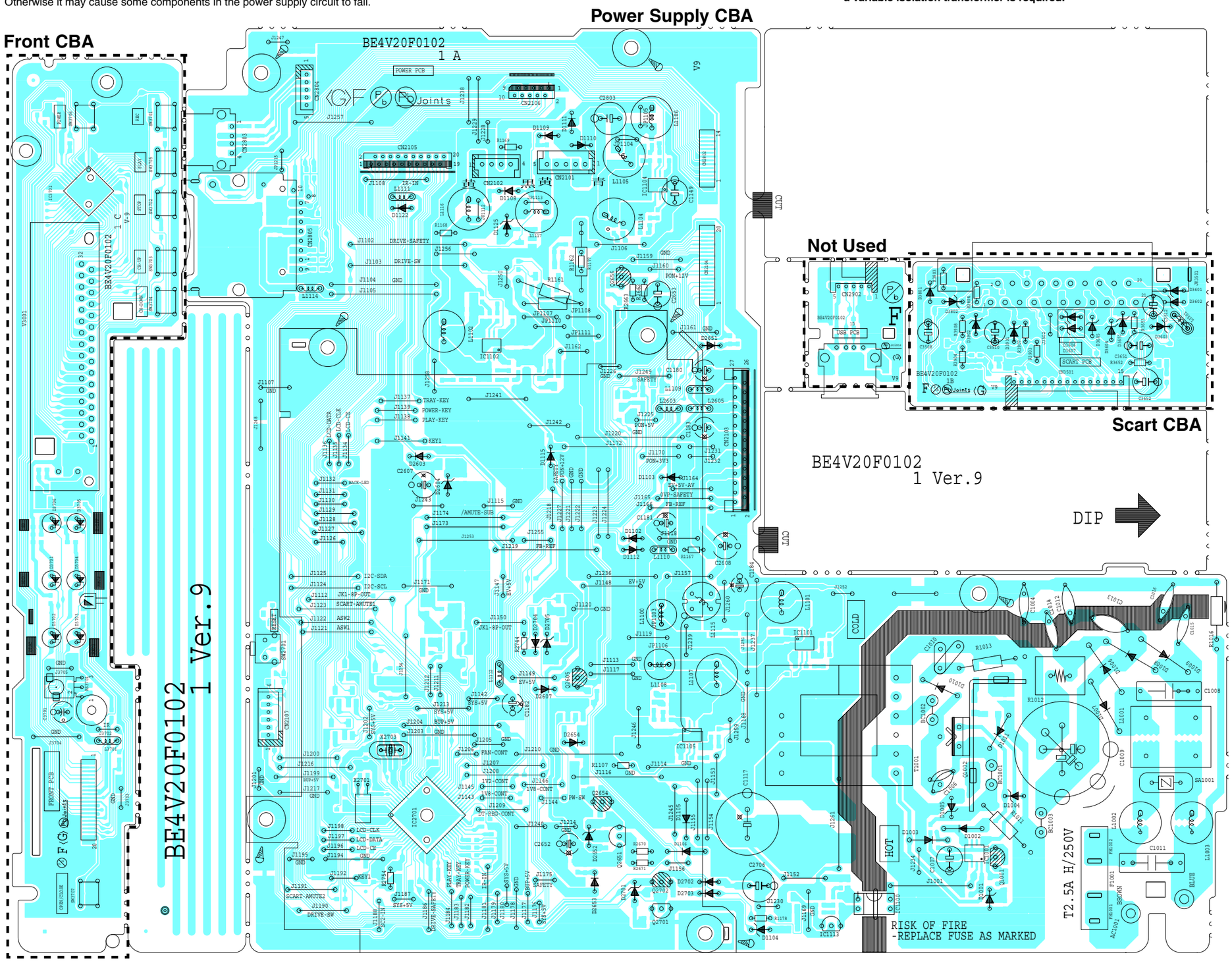
E4V21SCB11

Power Supply CBA, Front CBA & Scart CBA Top View

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) 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.

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

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

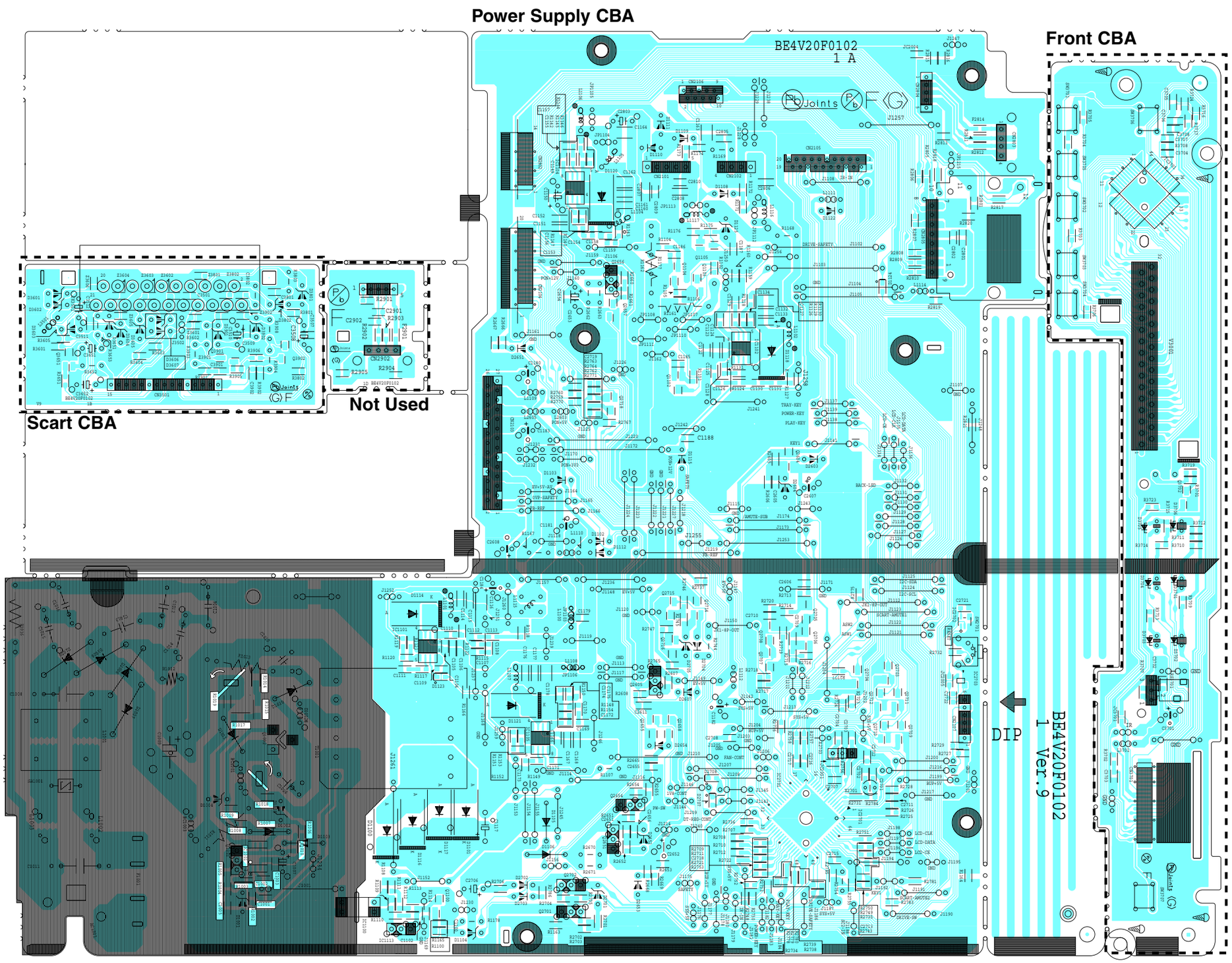


Power Supply CBA, Front CBA & Scart CBA Bottom View

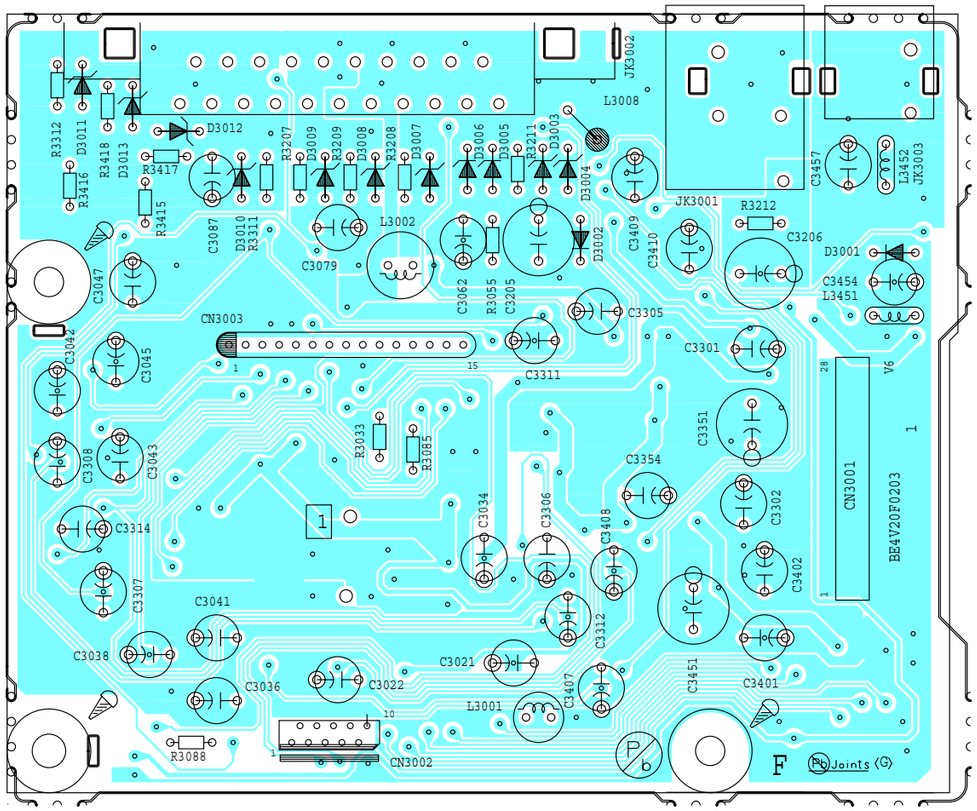
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

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

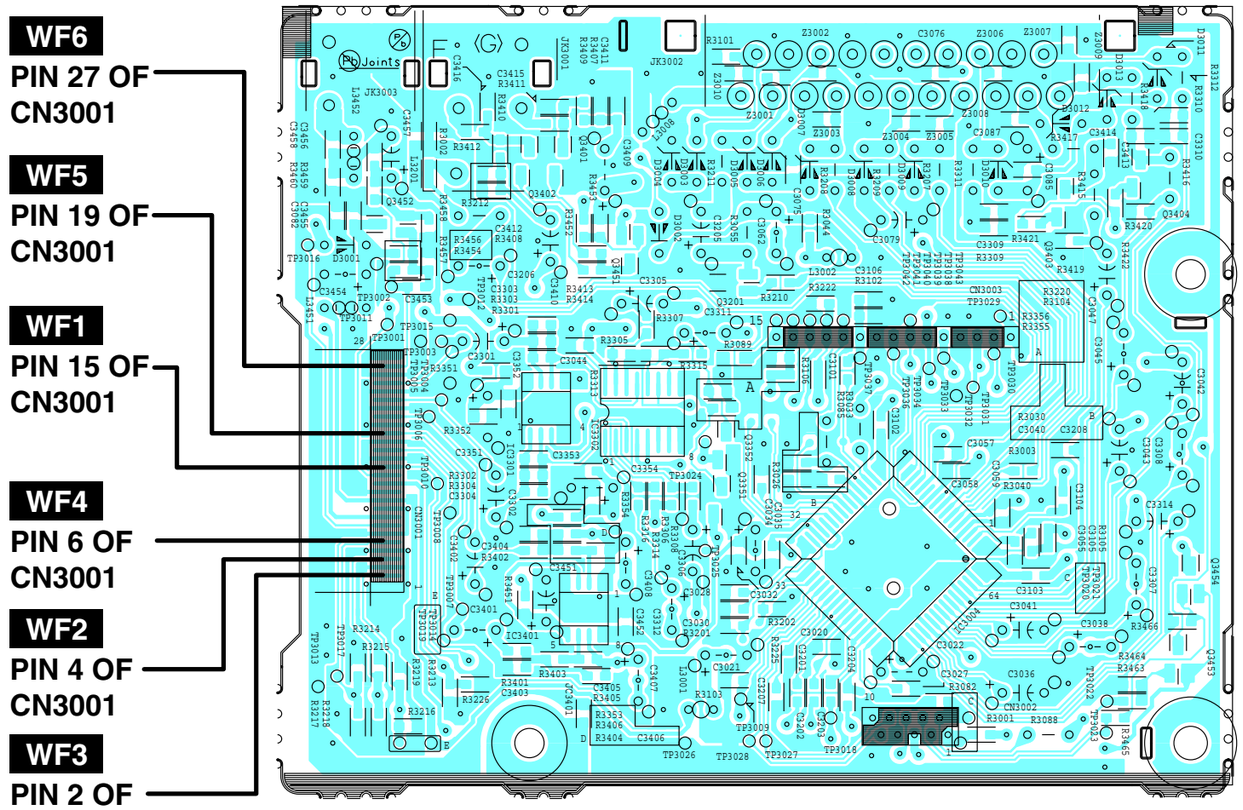
Because a hot chassis ground is present in the power supply circuit, an isolation transformer must be used when repairing. Also, in order to have the ability to increase the input slowly, when troubleshooting this type of power supply circuit, a variable isolation transformer is required.



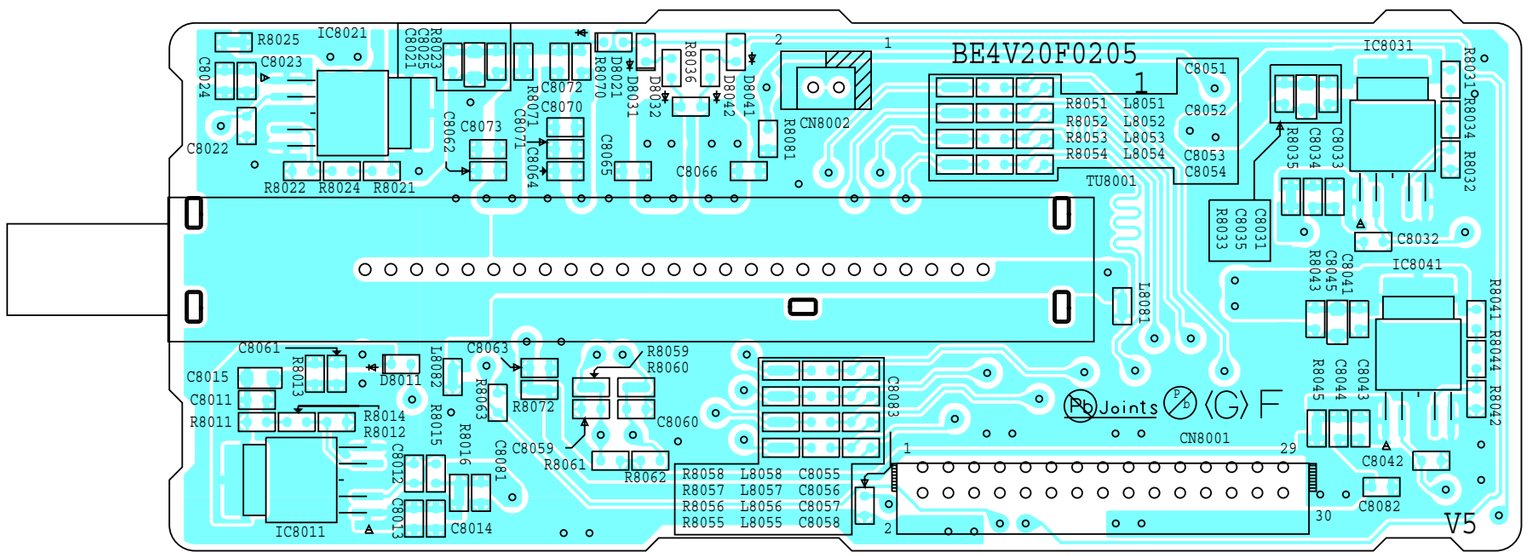
Jack CBA Top View



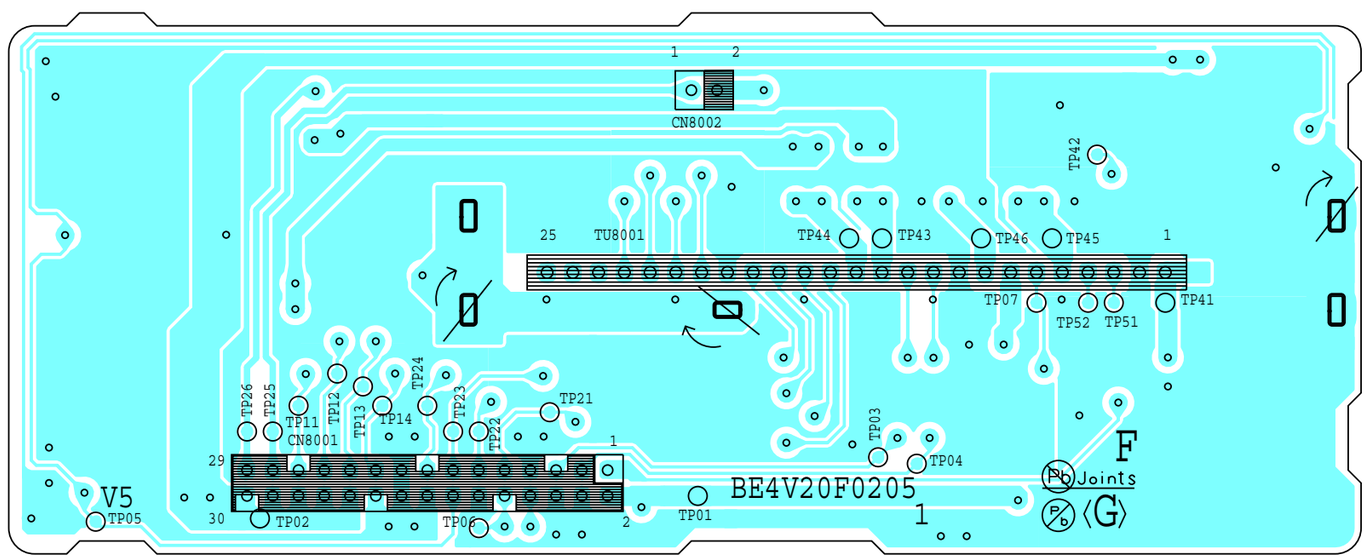
Jack CBA Bottom View



D- Tuner CBA Top View

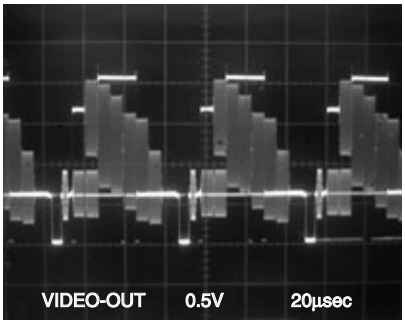


D- Tuner CBA Bottom View

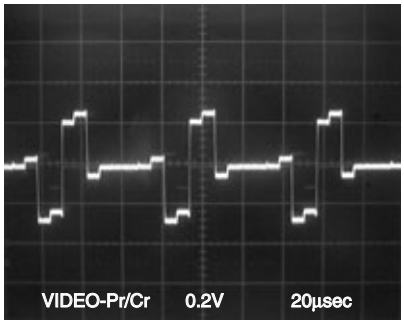


WAVEFORMS

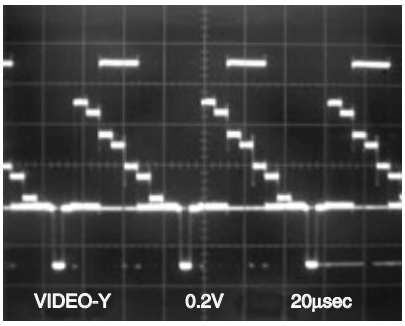
WF1 Pin 15 of CN3001



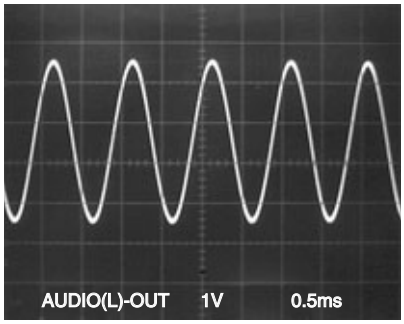
WF4 Pin 6 of CN3001



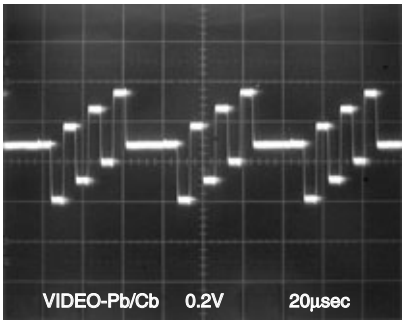
WF2 Pin 4 of CN3001



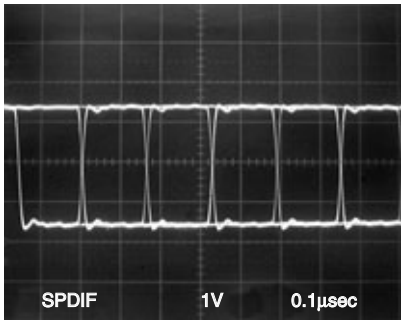
WF5 Pin 19 of CN3001



WF3 Pin 2 of CN3001

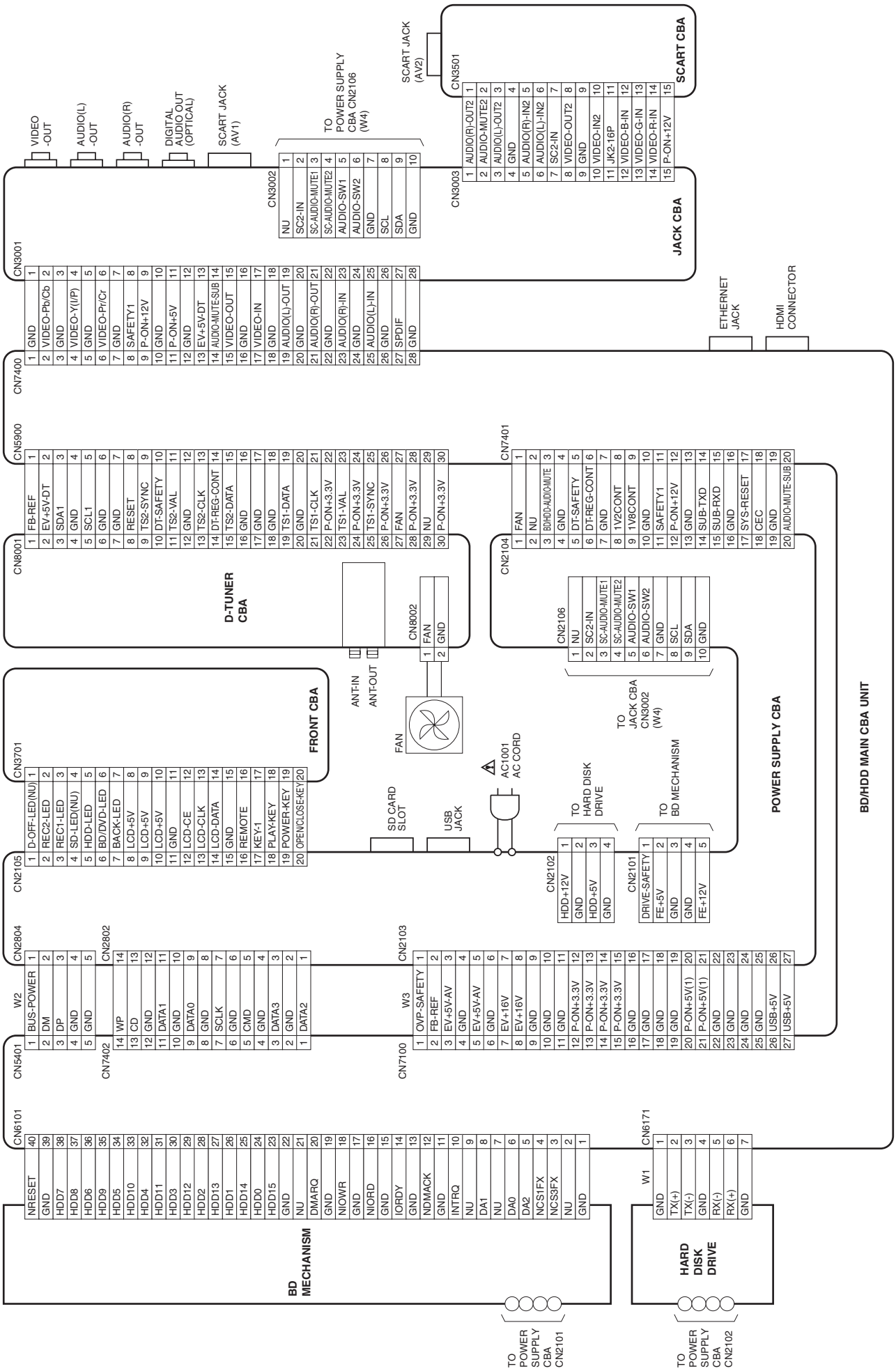


WF6 Pin 27 of CN3001



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

WIRING DIAGRAM



IC PIN FUNCTION DESCRIPTIONS

IC2701 (SUB MICRO CONTROLLER)

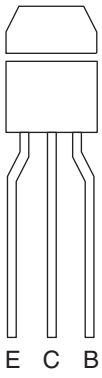
Pin No.	IN/ OUT	Signal Name	Function
1	-	NU	Ground
2	IN	VREF	+5V Power Supply
3	IN	MODE	Not Used
4	IN	XCIN	Sub Clock Input
5	OUT	XCOUT	Sub Clock Output
6	IN	RESET	Micro Controller Reset Signal
7	OUT	XOUT	Main Clock Output
8	-	GND	Ground
9	IN	XIN	Main Clock Input
10	IN	VCC	+5V Power Supply
11	-	NU	Not Used
12	OUT	BD/DVD-LED	BD/DVD LED Control Signal
13	OUT	HDD-LED	HDD LED Control Signal
14	-	NU	Not Used
15	OUT	REC1-LED	REC1 LED Control Signal
16	IN/ OUT	SDA	Serial Data
17	OUT	SCL	Serial Clock
18	OUT	CEC-OUT	HDMI Control Output Terminal
19	IN	CEC-IN	HDMI Control Intput Terminal
20	OUT	REC2-LED	REC2 LED Control Signal
21	OUT	BACK-LED	Backlight LED Control Signal
22	-	NU	Ground
23	OUT	FAN-CONT	Fan Motor Control Signal
24	-	NU	Ground
25	OUT	AUDIO-MUTE-SUB	Sub Audio Mute Control Signal (Mute="L")
26	-	NU	Not Used
27	-	NU	Not Used
28		AUDIO-SW1	Audio Input Select Signal 1
29		AUDIO-SW2	Audio Input Select Signal 2
30	OUT	SC-AUDIO-MUTE1	SCART (AV1) Jack Audio Mute Control Signal (Mute="L")
31	OUT	1V2CONT	1.2V Regulator Control Signal
32	OUT	1V8CONT	1.8V Regulator Control Signal
33	OUT	DT-REG-CONT	D-Tuner Power Regulator Control Signal
34	OUT	SYS-RESET	System Reset Signal
35	-	NU	Ground
36	-	NU	Not Used
37	-	NU	Not Used
38	-	NU	Not Used
39	-	NU	Not Used
40	-	NU	Not Used
41	IN	REMOTE	Remote Signal Input
42	-	NU	Not Used
43	IN	SUB-RXD	Reception Data from Main Micro Controller
44	OUT	SUB-TXD	Transmission Data to Main Micro Controller
45	IN	P-DOWN	Power Voltage Down Detector Signal
46	IN	PLAY-KEY	Play Control Signal
47	IN	OPEN/ CLOSE-KEY	Open/Close Control Signal
48	IN	POWER-KEY	Power Control Signal
49	IN	SAFETY1	Power Supply Failure Detection
50	IN	DRIVE-SAFETY	Power Supply Failure Detection (DRIVE)
51	IN	DT-SAFETY	Power Supply Failure Detection (D-TUNER)
52	IN	BD/HDD-AUDIO-MUTE	BD/HDD Audio Mute Control Signal (Mute="L")
53	IN	SC2-IN	Input Signal from Pin 8 of SCART(AV2)
54	-	NU	Not Used
55	IN	KEY-1	Key Data Input 1
56	-	NU	Not Used
57	OUT	LCD-CE	LCD Driver Selection Signal
58	OUT	LCD-DATA	LCD Serial Data
59	OUT	LCD-CLK	LCD Serial Clock
60	OUT	POWER-SW	Power Supply Control Signal
61	OUT	DRIVE-SW	Power Supply Control Signal
62	-	NU	Ground
63	OUT	3V3CONT	3.3V Regulator Control Signal
64	OUT	SC-AUDIO-MUTE2	SCART (AV2) Jack Audio Mute Control Signal (Mute="L")

IC3701 (LCD DRIVER)

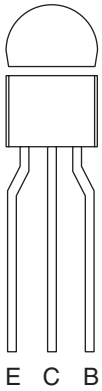
Pin No.	IN/ OUT	Signal Name	Function
1	OUT	SG17	Segment Output Serial Data Input
2		SG18	
3		SG19	
4		SG20	
5		SG21	
6		SG22	
7		SG23	
8		SG24	
9		SG25	
10		SG26	
11		SG27	
12		SG28	
13		SG16	
14		SG15	
15		SG14	
16		SG13	
17		SG12	
18		SG11	
19		SG10	
20		SG9	
21		SG8	
22		SG7	
23		SG6	
24		SG5	
25		SG4	
26		SG3	
27		SG2	
28		SG1	
29	-	NU	Not Used
30	-	NU	Not Used
31	-	NU	Not Used
32	-	NU	Not Used
33	-	NU	Not Used
34	OUT	COM4	Common Terminal 4
35	OUT	COM3	Common Terminal 3
36	OUT	COM2	Common Terminal 2
37	OUT	COM1	Common Terminal 1
38	-	VLCD	Power Supply
39	-	VSS	Ground
40	IN	OSC	Oscillator Input
41	-	VDD	Power Supply
42	IN	CE	Chip Select Signal
43	IN	CLK	System Clock
44	IN	DI	Serial Data Input

LEAD IDENTIFICATIONS

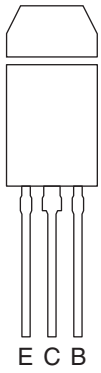
2SA1267Y
2SC3199Y



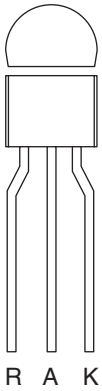
2SA1981Y-AT



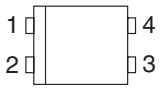
STD1862Y-AT



KIA431-AT/P

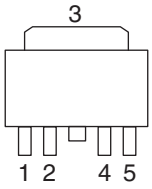


PS2561A-1-V-A(W)

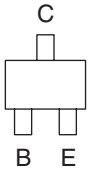


1: Anode
2: Cathode
3: Emitter
4: Collector

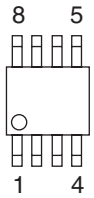
PQ035NZ01ZPH
PQ070XNA1ZPH



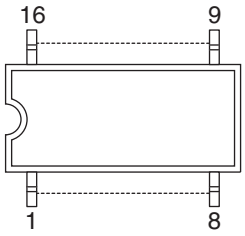
MMBTRC102SS
MMBTRC103SS
MMBTSC3875G
MMBTSC3875Y
MMBTSA1504Y



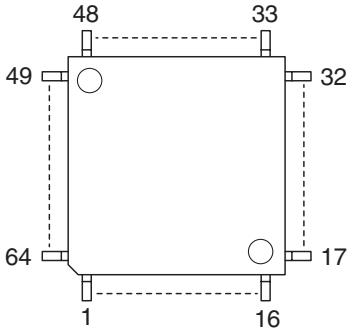
BD9321EFJ-E2
FA5640N
UTC4580TE



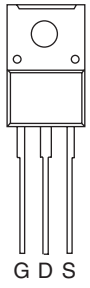
4052L-S16-R



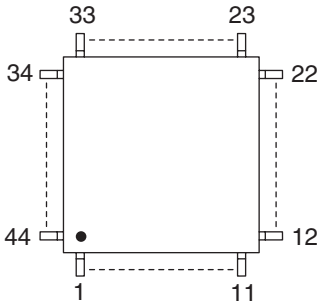
LV7109E-MPB-E



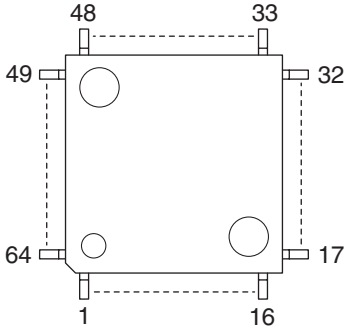
2SK3566(Q M)



PT6533-LQ(L)



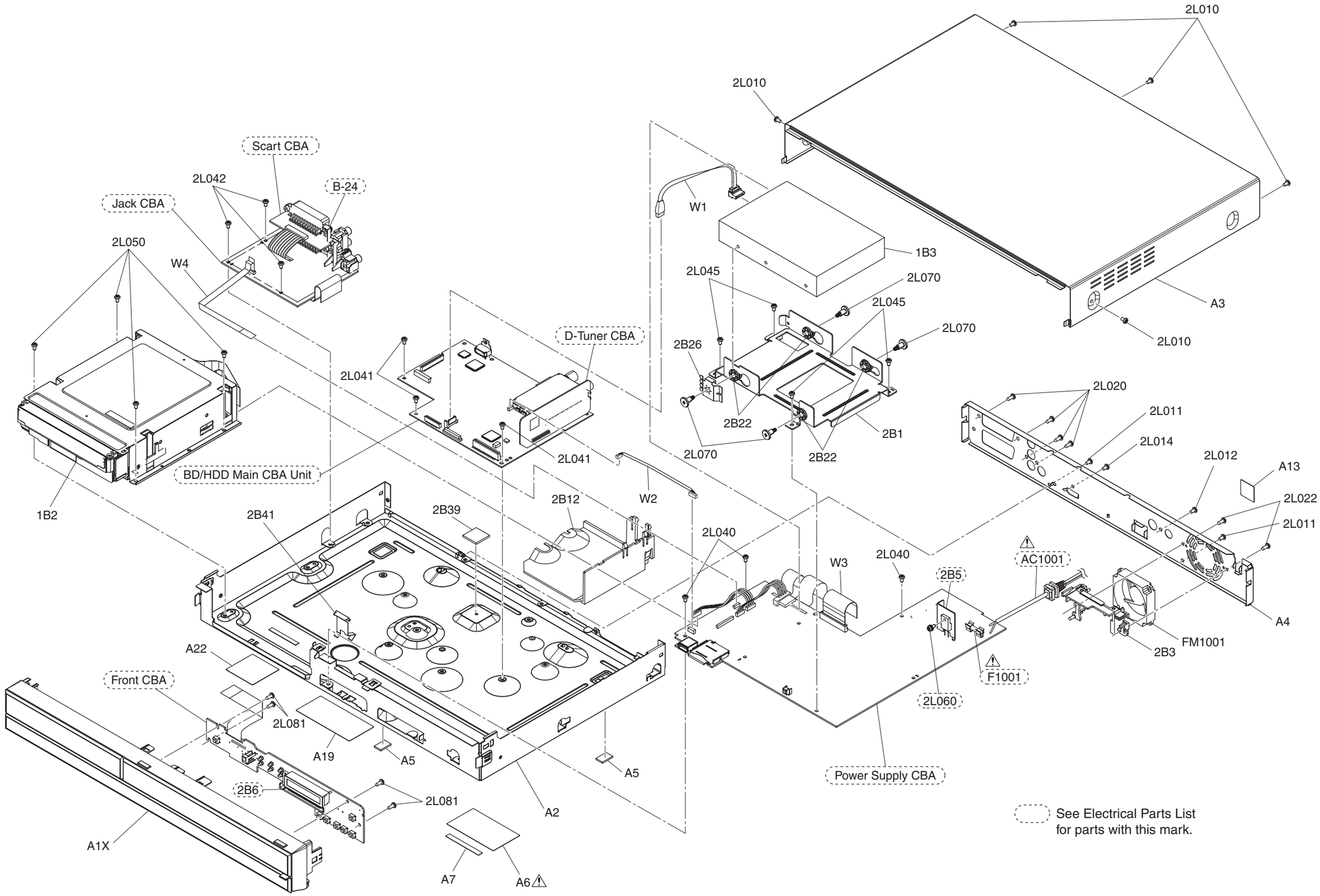
R5F21366CNFA



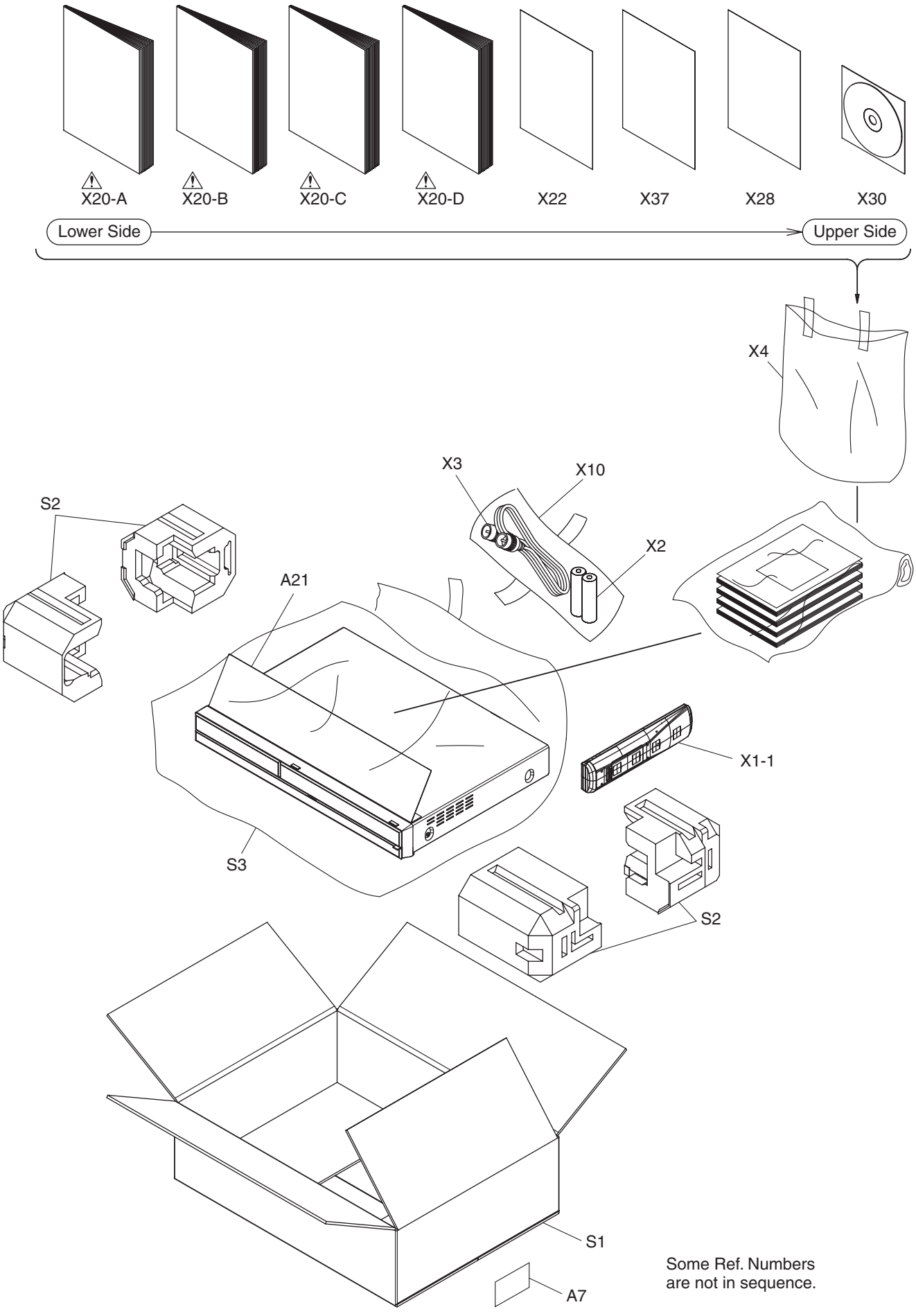
Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference
G: Gate
D: Drain
S: Source

EXPLODED VIEWS

Cabinet



Packing



Some Ref. Numbers
are not in sequence.