

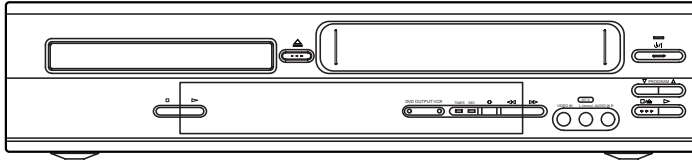
HITACHI

SERVICE MANUAL

TK

No. 9307E

DV-PF3A(S)



SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

DVD PLAYER & VIDEO CASSETTE RECORDER

June

2003

Digital Media Division, Tokai

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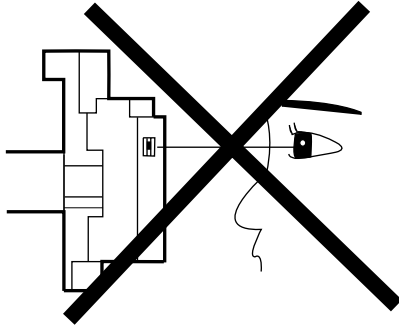
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CAUTIONS FOR SAFETY IN PERFORMING REPAIR

1-1 LASER BEAM SAFETY PRECAUTIONS

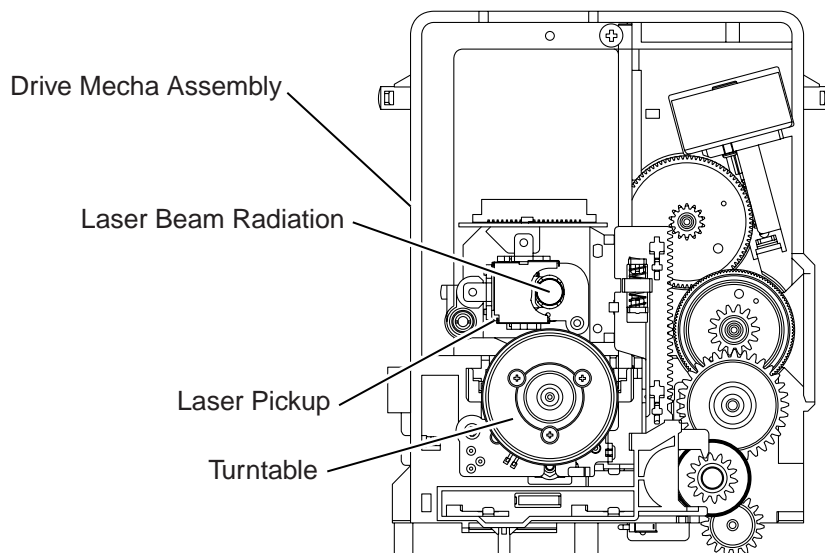
This DVD player uses a pickup that emits a laser beam.



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 30cm 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.



1-2 IMPORTANT SAFETY PRECAUTIONS

1-2-1 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 \triangle 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.

1-2-2 Precautions during Servicing

- A. Parts identified by the \triangle 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. Crimp type wire connector
The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.
Replacement procedure
 - 1) Remove the old connector by cutting the wires at a point close to the connector.
Important: Do not re-use a connector. (Discard it.)
 - 2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
 - 3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
 - 4) Use a crimping tool to crimp the metal sleeve at its center. Be sure to crimp fully to the complete closure of the tool.
- L. When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.

1-2-3 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. 1-2-1)

Table 1-2-1 : Ratings for selected area

AC Line Voltage	Clearance Distance (d) (d')
220 V 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.

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. 1-2-2 and the following table.

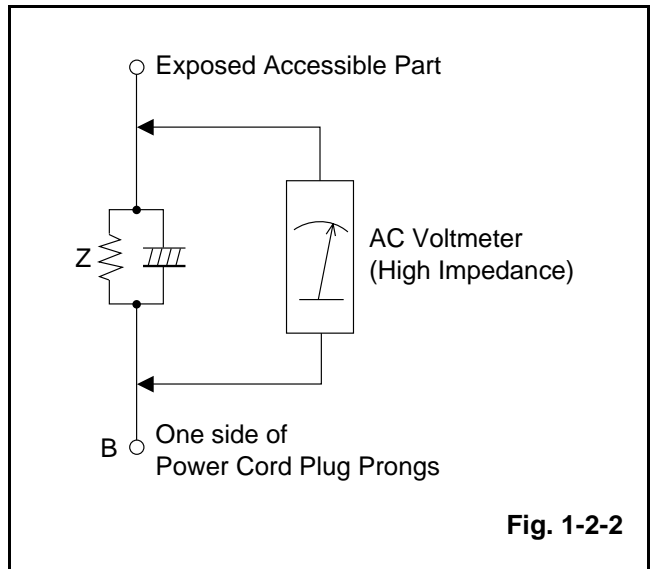
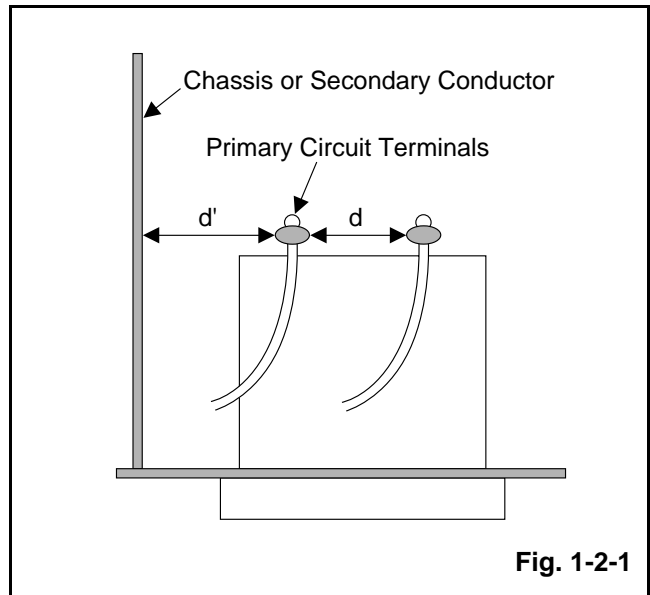


Table 1-2-2: Leakage current ratings for selected areas

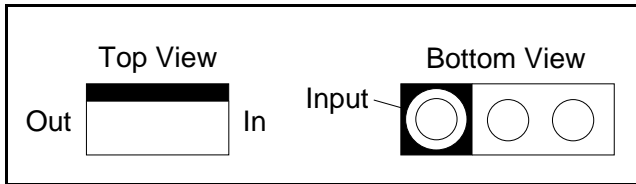
AC Line Voltage	Load Z	Leakage Current (i)	One side of power cord plug prongs (B) to:
220 V to 240 V	2k Ω RES. Connected in parallel	$i \leq 0.7$ mA AC Peak $i \leq 2$ mA DC	RF or Antenna terminals
	50k Ω RES. Connected in parallel	$i \leq 0.7$ mA AC Peak $i \leq 2$ mA DC	A/V Input, Output

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

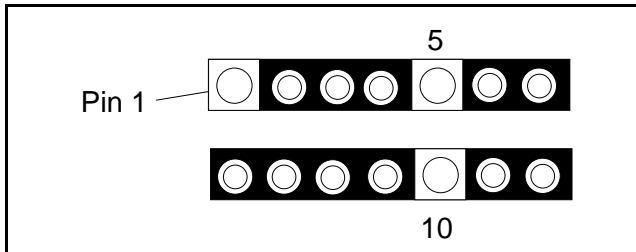
1-3 STANDARD NOTES FOR SERVICING

1-3-1 Circuit Board Indications

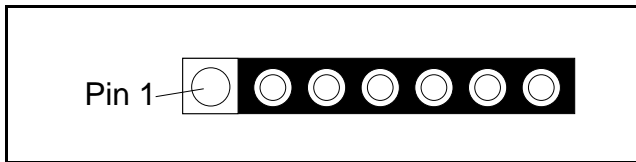
1. The output pin of the 3 pin Regulator ICs is indicated as shown.



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

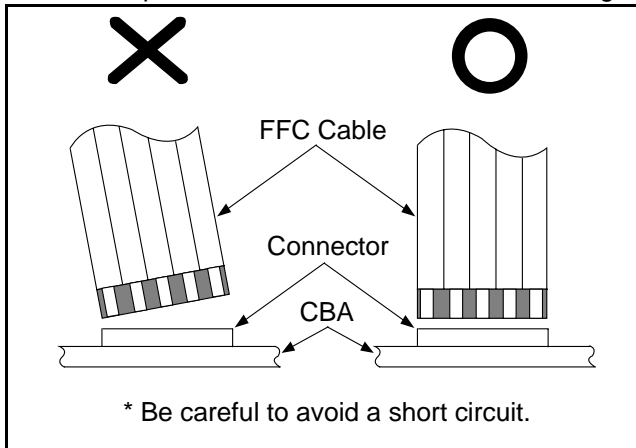


3. The 1st pin of every male connector is indicated as shown.



1-3-2 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.

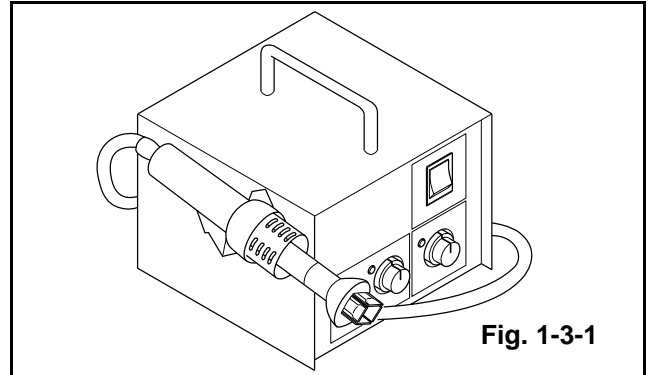


1-3-3 How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:

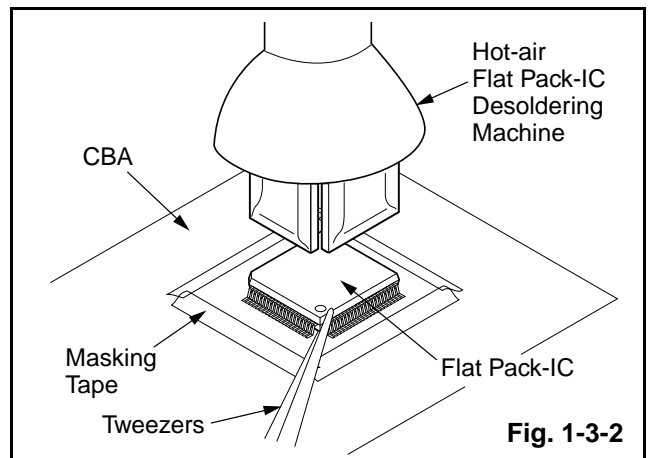
- (1) Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. 1-3-1)



- (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. 1-3-6)
- (4) Release the flat pack-IC from the CBA using tweezers. (Fig. 1-3-6)

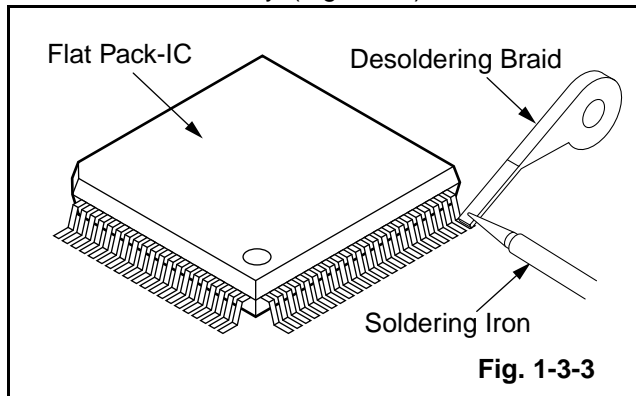
Caution:

1. 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. 1-3-2)
2. 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.

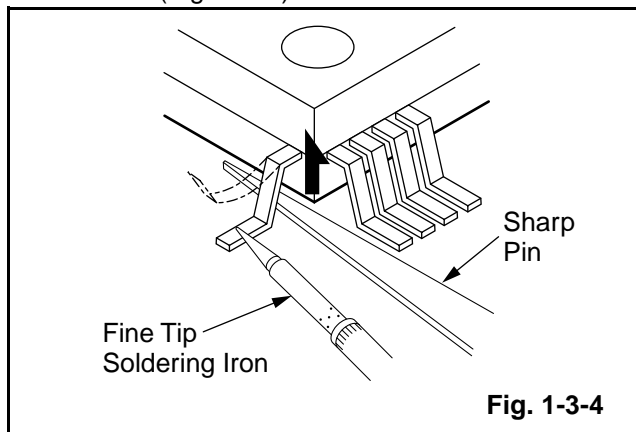


With Soldering Iron:

- (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. 1-3-3)



- (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. 1-3-4)



- (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. 1-3-6)

- (4) Release the flat pack-IC from the CBA using tweezers. (Fig. 1-3-6)

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. 1-3-3)

- (2) Affix the wire to a workbench or solid mounting point, as shown in Fig. 1-3-5.

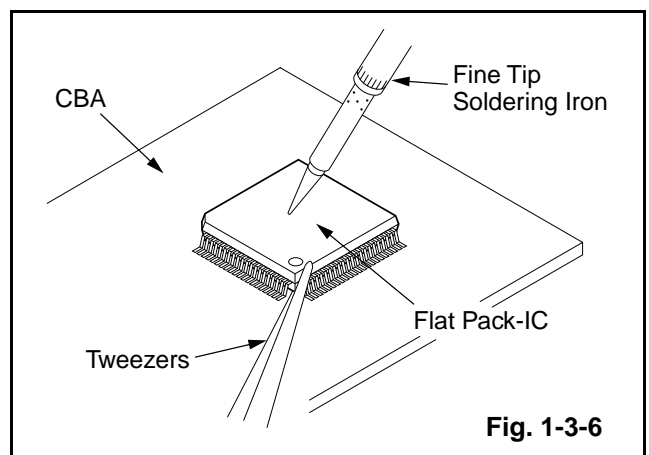
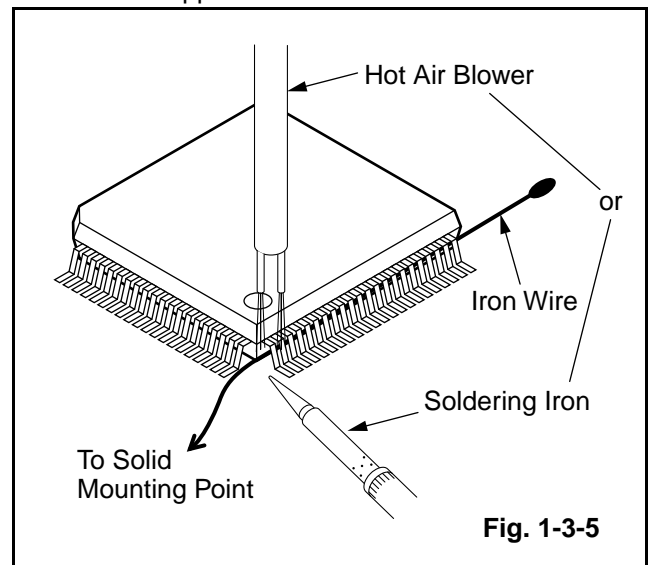
- (3) While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the CBA contact pads as shown in Fig. 1-3-5.

- (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. 1-3-6)

- (5) Release the flat pack-IC from the CBA using tweezers. (Fig. 1-3-6)

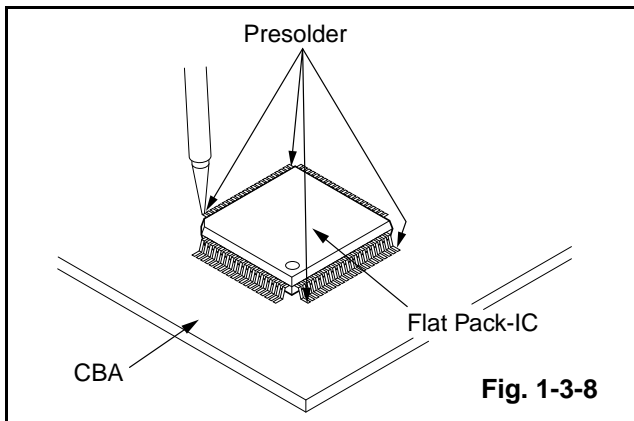
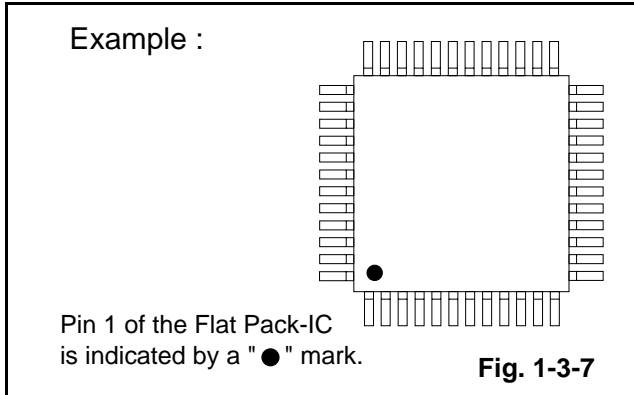
Note:

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.



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. 1-3-7.) Be sure this mark matches the 1 on the PCB when positioning for installation. Then presolder the four corners of the flat pack-IC. (See Fig. 1-3-8.)
- (3) Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.



1-3-4 Instructions for Handling Semi-conductors

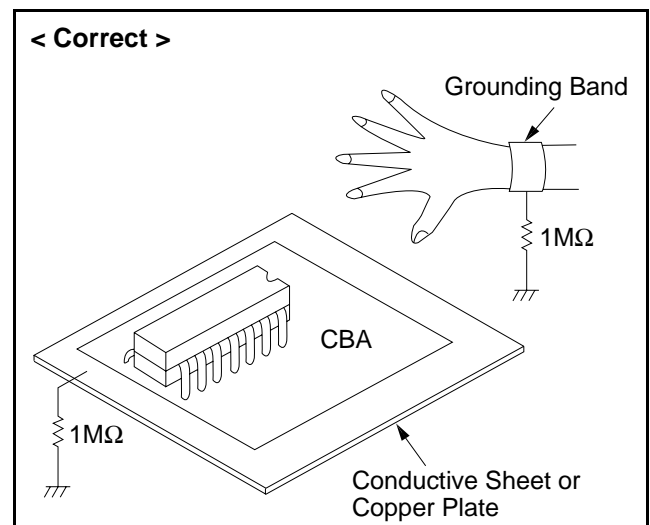
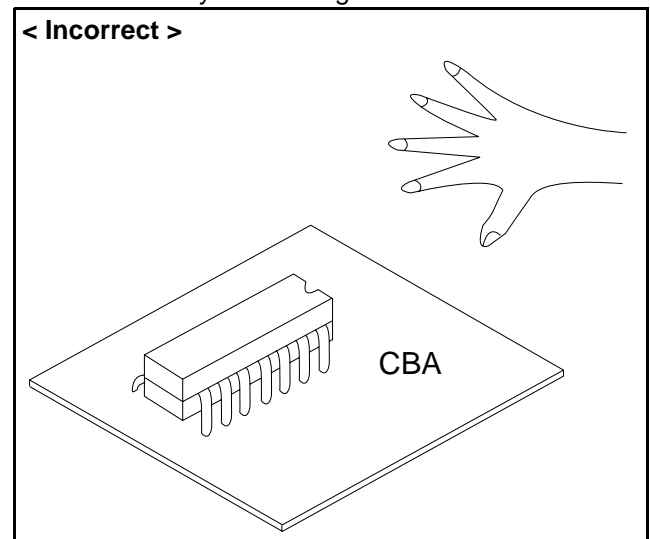
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

1. Ground for Human Body

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

2. Ground for Workbench

- (1) Be sure to place a conductive sheet or copper plate with proper grounding ($1M\Omega$) 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.



1-4 NOTES WHEN USING SERVICE MANUAL

The following shows the contents to be noted when using service manual:

Standard Notes

WARNING

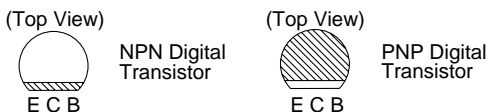
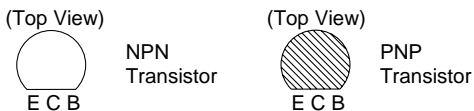
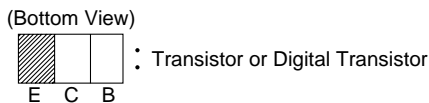
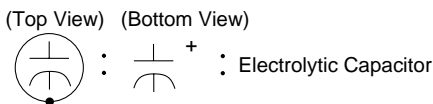
Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark " \triangle " 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.

Capacitor Temperature Markings

Mark	Capacity change rate	Standard temperature	Temperature range
(B)	$\pm 10\%$	20°C	-25~+85°C
(F)	+30 - 80%	20°C	-25~+85°C
(SR)	$\pm 15\%$	20°C	-25~+85°C
(Z)	+30 - 80%	20°C	-10~+70°C

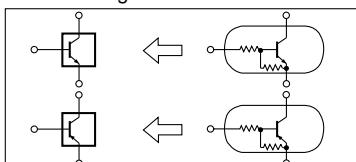
Capacitors and transistors are represented by the following symbols.

CBA Symbols



Schematic Diagram Symbols

Digital Transistor



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 voltages are DC voltages unless otherwise specified.

Values in schematic diagrams

The values, dielectric strength (power capacitance) and tolerances of the resistors (excluding variable resistors) and capacitors are indicated in the schematic diagrams using abbreviations.

[Resistors]

Item	Indication
Value	No indication..... Ω K.....k Ω M.....M Ω
Power capacitance	No indication.....1/4W,1/6W All capacitances other than the above are indicated in schematic diagrams.

[Capacitors]

Item	Indication
Value	No indication..... μ F P.....pF
Dielectric strength	No indication.....50V All dielectric strengths other than 50V are indicated in schematic diagrams.

[Coils]

Item	Indication
Value	μ μ H m.....mH

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.

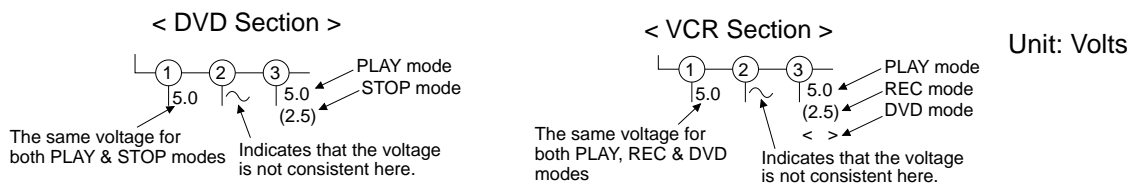
3. Note:

- (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.

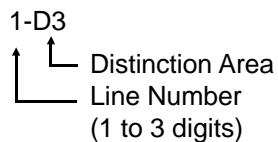
4. Wire Connectors

- (1) Prefix symbol "CN" means "connector" (can disconnect and reconnect).
- (2) Prefix symbol "CL" means "wire-solder holes of the PCB" (wire is soldered directly).

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

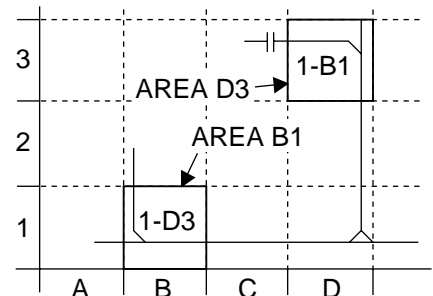


6. How to read converged lines



Examples:

1. "1-D3" means that line number "1" goes to area "D3".
2. "1-B1" means that line number "1" goes to area "B1".



7. 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.

2-1 SPECIFICATIONS

ITEM		DESCRIPTION		
Video section	TV system	PAL BG/DK, SECAM BG/DK		
	Video head	Rotating 4 heads		
	Recording system	Rotating 2 head helical scan brightness signal FM method VHS standard for methods to directly record color signal low frequency conversions		
	Audio track	Hi-Fi audio track: 2 channel Normal audio track: 1 channel		
	Tape	VHS-type videocassette		
	Tape speed	{SP}: 23.39 mm/s, {LP}: 11.70 mm/s		
	Maximum record and playback time	{SP}: 4 hours (with E-240 used) {LP}: 8 hours (with E-240 used)		
	Receiving channel	CH Indication	TV Channel	
		02-12	E2-E12	
		21-69	E21-E69	
		74-78	X,Y,Z,Z+1,Z+2	
		80-99, 100	S1-S20. GAP	
		121-141	S21-S41	
	142-153	R1-R12		
	Reception system	Up-heterodyne		
	RF converter	RF CONVERTER		
	Converter output	UHF 22 - 69 ch (K: 36 ch)		
	Timer display	24-hour system		
	Video output impedance	75 Ω		
	Video output level	1.0 V p-p		
	Audio output level	-6 dB 1 kΩ unbalance (high impedance)		
	Video input level	0.5-2.0 V p-p		
	Audio input level	-10 dBV		
Video S/N ratio	40 dB or more			
Audio S/N ratio	36 dB or more			
Hi-Fi audio	Frequency characteristic: 20-20,000 Hz Dynamic range: 70 dB or more			
DVD section	Disc used	DVD video disc, Music CD disc		
	Audio frequency characteristic	DVD (linear audio) 20 Hz - 22 kHz (48 kHz sampling frequency) 20 Hz - 44 kHz (96 kHz sampling frequency) Music CD 20 Hz - 20 kHz (JEITA)		
	Signal/Noise (S/N) ratio	CD: 70 dB (JEITA)		
	Dynamic range	DVD (linear audio): 70 dB, CD: 70 dB (JEITA)		
	Total distortion ratio	DVD: 0.1%, CD: 0.1%		
Terminal	Antenna input	DIN (input) terminal		
	Antenna output	DIN (output) terminal		
	Video input	SCART JACK (AV 1, 2) FRONT PIN JACK		
	Video output	SCART JACK (AV 1, 2)		
	Audio input	SCART JACK (AV 1, 2) FRONT PIN JACK		
	Audio output	SCART JACK (AV 1, 2) PIN JACK (REAR)		
	S Video output	MINI DIN 4PIN JACK (75 Ω)		
	Optical digital audio output	Optical connector		
Others	Coaxial digital audio output	PIN JACK		
	Power supply	AC 220-240 V - +/-10%, 50 Hz+/-0.5%		
	Power consumption	30 W (Standby: 9.0 W)		
	Retention at power failure	30 s		
	Temperature range for operation	5 °C - 40 °C		
Dimensions	435 mm x 99 mm x 218 mm			
Weight	3.8 kg			

2-2 COMPARISON OF MODELS

2-2-1 VCR Section

←: Same as on left

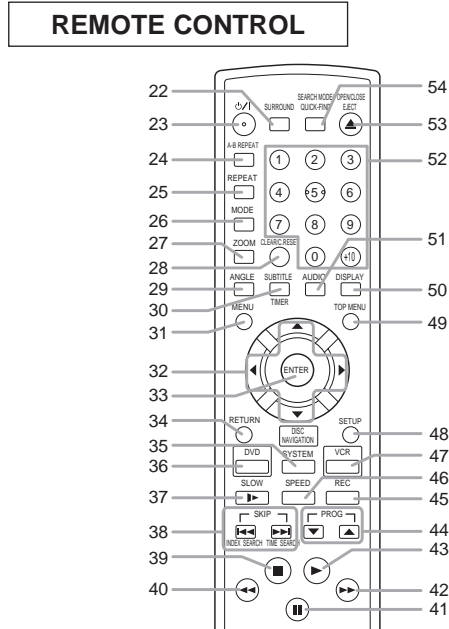
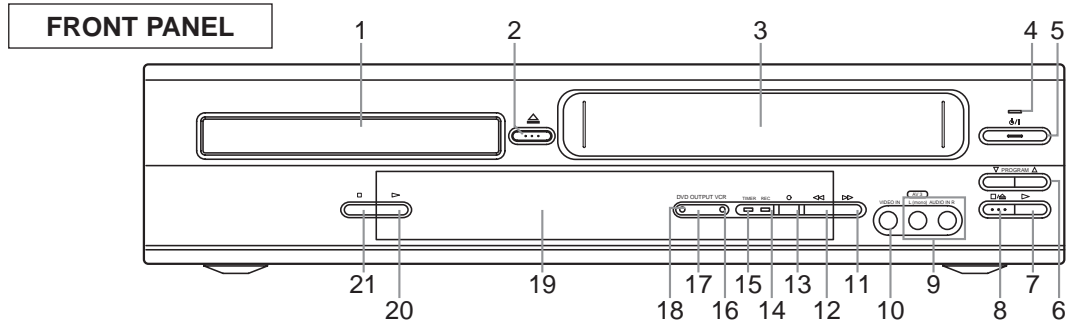
ITEM		DV-PF3A(S)	VT-FX695EGK
VIDEO	Video Format	VHS	←
	Y/C Separation	Comb Filter	←
	YNR (Luminance Noise Reduction) Circuit	O	←
	Picture Control	O	←
INPUT/ OUTPUT	Video/Audio Input (Rear)	O	1
	Video/Audio Input (Front)	1 (IN3)	O
	Video/Audio Output (Rear)	1 (with adopter)	O
OTHER	Power Supply	220 - 240V	110 - 240V
	OSD languages (VCR)	5(English, Russian, Polish, Hungarian, Czech)	1(English)
	Stereo CM Skip Feature	---	←
	Auto Clock Feature	---	←
	Number of Timer Programming	8 Program/year	7 Program/year
	Self Diagnosis Function	O (4 Modes)	---
	Back-up Time	30 s	60 s
	NTSC on PAL TV	O	←
	Surge Absorber	---	←
	Auto Power Off Feature	O	←
	Local Broadcast Setting	O	←
	Multi Search Feature	O (Index, Time Search, Quick Find)	O (Index, Time Search)
MECHANISM	Search Speed	SP: X5/X7 (NTSC X5) LP: X5/X11	←
	FF/REW Time (E-180 Tape)	FF: approx. 100 s, REW: approx. 100 s	←
	Head Composition	DA4+Hi-Fi SP: 2[49/49 μm] LP: 2[25/25 μm] Hi-Fi Audio: 2[28/28 μm]	←
	Head Material	SP: Ferrite LP: Ferrite Hi-Fi Audio: Ferrite	←

2-2-2 DVD Section

←: Same as on left

	ITEM	DV-PF3A(S)	DV-P388A(S)
GENERAL	Drive Speed	1x	←
	Laser	2	←
	DVD/CD/SVCD/CD-DA	O / O / --- / O	←
	CD-R/CD-RW/DVD-R (Video Format)	O / O / O	←
	DVD-RAM (VR Format)	---	←
	MP3	O	←
	OSD languages (DVD)	2 (English, Russian)	2 (English, Chinese)
	Jog Shuttle on Front	---	←
	Headphone Jack / Volume	---/---	←
VIDEO	PAL Disc NTSC Out	---	←
	Video Out Mode PAL/PAL60	O / O	←
	S-Video / Component / Composite	O / --- / O	O / O / O
	Video D/A Converter	10bit	←
	Black Level Select	---	O
	Picture Control	---	←
	Progressive Out	---	←
AUDIO	Audio D/A Converter	192kHz / 24bit	←
	Digital Audio Out Optical / Coaxial	O / O	←
	Dolby Digital 5.1 ch Decode	---	←
	DTS Digital Out	O	←
	Virtual Surround	O	←
	Dynamic Range Compression (Dolby Digital)	O	←
	DVD Audio	---	←
TRICK PLAY	Search Speed	2 to 100 (FORWARD/REWIND) (DVD: 2, 8, 50, 100/CD: 16)	2 to 60 (FORWARD/REWIND) (DVD: 2, 8, 30, 60/CD: 16)
	Slow Speed	1/16, 1/8, 1/2 (FORWARD/REWIND)	1/16, 1/8, 1/2 (FORWARD only)
	IP Search (Smooth 2x Play)	O	←
	2x Play with Audio	---	←
	Step Forward / Reverse	O / ---	←
	Still Picture Select (Frame/Field)	Auto Only	←
FEATURES	Disc Navigation	O	---
	DVD Zoom x2 / x4	O / O	←
	Program and Random Play of DVD	---	←
	A-B Repeat	O	←
	Repeat	O	←
	Resume Play	O (Resume is not effected after power off)	O
	Front Panel Display Dimmer	---	O
	Screen Saver	O	←
	Auto Power Off	O	←

2-3 OPERATING CONTROLS AND FUNCTIONS



1. **Disc loading tray**
2. **OPEN/CLOSE (▲) Button(DVD)**
Press to insert discs into or remove them from the tray.
3. **CASSETTE COMPARTMENT**
4. **POWER Light**
Lights up when the power is on.
5. **POWER/STANDBY (⓪/Ⓛ) Button**
Press to turn the power on and off.
(As to the indication of the Operate switch, “ I ” indicates ON and “ ⓪ ” indicates electrical power STANDBY.)
6. **PROGRAM (▲/▼) Buttons**
In VCR mode, press to change TV programmes on the VCR; press to adjust the tracking during normal or slow motion playback; press to remove vertical jitter in a Still picture.
7. **PLAY (▶) Button(VCR)**
Press to begin playback.
8. **STOP/EJECT (■/▲) Button (VCR) EJECT**
Press to remove the tape from the VCR.
9. **AUDIO In Jacks**
Connect audio cables coming from the audio out jacks of a camcorder, another VCR, or an audio source here.
10. **VIDEO In Jack**
Connect a video cable coming from the video out jack of a camcorder, another VCR, or a video source (laser disc player, camcorder, etc.) here.

11. **F.FWD (▶▶) Button (VCR)**
Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search).
12. **REW (◀◀) Button (VCR)**
Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode (Rewind Search).
13. **REC (●) Button (VCR)**
Press once to start a recording. Press repeatedly to start a One Touch Recording.
14. **REC Light**
Lights up during recording.
15. **TIMER Light**
This light glows when the DVD/VCR is in standby mode for a timer recording or during a One Touch Recording. It flashes if TIMER is pressed for a timer recording, but there is no tape in the DVD/VCR. It flashes when all timer recordings or One Touch Recording are finished.
16. **VCR OUTPUT Light (Green)**
This light appears when the VCR output mode is selected. You can only watch tapes when the green VCR OUTPUT light is on. To make the green VCR OUTPUT light come on, VCR on the remote control or OUTPUT on the front panel.
17. **OUTPUT Button**
Press to select DVD mode or VCR mode.
● You can switch the output mode either by pressing OUTPUT on the front panel, or by pressing DVD or VCR on the remote control. However, if you press OUTPUT on the front panel first, you need to re-select the corresponding mode by pressing DVD or VCR on the remote control.
18. **DVD OUTPUT Light (Green)**
This light appears when the DVD output mode is selected. You can only watch DVDs when the green DVD OUTPUT Light is on. To make the green DVD OUTPUT light come on, press DVD on the remote control or OUTPUT on the front panel.
19. **Display, Remote Sensor Window**
20. **PLAY (▶) Button (DVD)**
Press to begin playback.
21. **STOP (■) Button (DVD)**
Stops operation of the disc.
22. **SURROUND Button**
Press to activate the virtual surround.
23. **POWER/STANDBY (⓪/Ⓛ) Button**
Press to turn the power on and off.
(As to the indication of the Operate switch, “ I ” shows ON and “ ⓪/Ⓛ ” shows electrical power stand-by.)
24. **A-B REPEAT Button**
Repeats playback of a selected section.
25. **REPEAT Button**
Repeats playback of the current disc, title, chapter or track.
26. **MODE Button**
Activates programme playback or random playback mode when playing CDs or MP3. Sets virtual surround.

27. **ZOOM Button**
Enlarges part of a DVD-reproduced image.
28. **CLEAR/C.RESET Button**
 - **DVD mode**
Press to reset the setting.
 - **VCR mode**
Press to reset the counter.
29. **ANGLE Button**
Press to change the camera angle to see the sequence being played back from a different angle.
30. **SUBTITLE Button**
Press to select the desired subtitle language.
- TIMER Button**
Press to put the VCR into standby mode for a timer recording.
31. **MENU Button**
 - **DVD mode**
Press to display the menu of the Disc.
 - **VCR mode**
Press to access the VCR menu.
32. **Arrow Buttons**
 - **DVD mode**
▼ / ▲ / ► / ◀ **Buttons**
Move the cursor and determines its position.
 - **VCR mode**
▼ / ▲ **Buttons**
Press to enter digits when setting programme (For example: setting clock or timer programme). Press to select the setting modes from the on screen menu.
 - ▶ **Button**
When setting programme (For example: setting clock or timer programme), press to determine your selection and proceed to the next step you want to input. Press to determine the setting modes from the on screen menu.
 - ◀ **Button**
Press to cancel a setting of timer programme. Press to correct digits when setting programme (For example: setting clock or timer programme).
33. **ENTER Button (DVD)**
Press to accept a setting.
34. **RETURN Button (DVD)**
Returns to the previous operation.
35. **DISC NAVIGATION Button (DVD)**
Press to display the first scenes of each chapter of the title being played.
- SYSTEM Button (VCR)**
To change the VCR colour system during playback for matching recorded system (PAL or MESECAM)
36. **DVD Button**
Press to select DVD mode for the remote control.
 - You can switch the OUTPUT mode either by pressing OUTPUT on the front panel, or by pressing DVD or VCR on the remote control. However, **if you press OUTPUT on the front panel first, you need to re-select the corresponding mode by pressing DVD or VCR on the remote control.**
37. **SLOW Button**
During tape playback, press to view the video tape in slow motion. Press PLAY (▶) to resume normal playback. This button does not affect DVD playback.
38. **SKIP (◀◀ ▶▶) Buttons**
 - **DVD mode**
Press to skip Chapters or Tracks.
 - **INDEX SEARCH Button (VCR)**
Press to perform Index Search.
 - **TIME SEARCH Button (VCR)**
Press to perform Time Search.
39. **STOP (■) Button**
 - **DVD mode**
Press to stop the disc motion.
 - **VCR mode**
Press to stop the tape motion.
40. **◀◀ Button**
 - **DVD mode**
Press to view the DVD picture in fast reverse motion or to reverse playback of an Audio CD.
 - **VCR mode**
Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode (Rewind Search).
41. **PAUSE/STEP (⏸) Button**
 - **DVD mode**
Press to pause Disc playback. Press repeatedly to advance the DVD picture step by step (or one frame at a time).
 - **VCR mode**
While recording, press to temporarily stop the recording (pause). Press a second time to resume normal recording. You can not pause a One Touch Recording. Or, press during tape playback to freeze the picture. Press to advance the picture one frame at a time during still mode.
42. **▶▶ Button**
 - **DVD mode**
Press to fast forward the Disc. Press PAUSE/STEP, then press this button to begin slow motion playback. Press this button repeatedly to change the forward speed of slow motion.
 - **VCR mode**
Press to rapidly advance the tape, or view the picture rapidly in forward during playback (Forward Search).
43. **PLAY (▶) Button**
 - **DVD mode**
Press to begin playback.
 - **VCR mode**
Press to begin playback.
44. **PROG (▲/▼) Button (VCR)**
Press to change TV channels on the DVD/VCR. Press to adjust the tracking during normal or slow motion playback; press to remove vertical jitter in a still picture.
45. **REC Button (VCR)**
Press once to start a recording.
46. **SPEED Button (VCR)**
Press to select the VCR's recording speed (SP or LP)
47. **VCR Button**
Press to select VCR mode for the remote control.
 - You can switch the OUTPUT mode either by pressing OUTPUT on the front panel, or by pressing DVD or VCR on the remote control. However, **if you press OUTPUT on the front panel first, you need to re-select the corresponding mode by pressing DVD or VCR on the remote control.**
48. **SETUP Button (DVD)**
Press to enter the setup mode.
49. **TOP MENU Button (DVD)**
Press to bring up the Top Menu on a disc.
50. **DISPLAY Button**
 - **DVD mode**
Press to access or remove the display screen during DVD or Audio CD playback.
 - **VCR mode**
Press to access or remove the VCR's On screen status display.
51. **AUDIO Button**
 - **DVD mode**
Press to select a desired audio language or sound mode.
 - **VCR mode**
Press to select a desired sound mode.
52. **Number Buttons**
 - **DVD mode**
Press to directly select a Track (Audio CD) for playback.

+10 Button:

When searching a TITLE, a CHAPTER, or a TRACK, use this button to enter numbers 10 and above. For example when entering '15', press this button first, then '5'.

- **VCR mode**

Press to select TV channels on the VCR.

To select channels, enter channel numbers as a two-digit number for the quickest results. For example, to select channel 6, press 0 then 6.

53. OPEN/CLOSE (▲) Button (DVD)

Press to open or close the disc loading tray.

EJECT Button (VCR)

Press to eject the video cassette from the VCR.

54. SEARCH MODE/QUICK-FIND Button

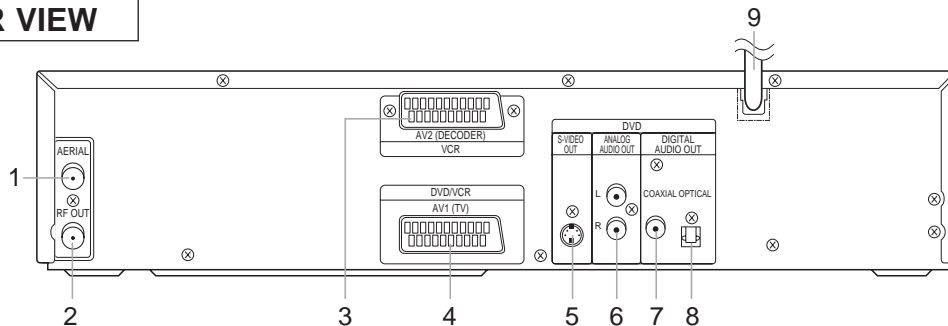
- **DVD mode**

Press to access or remove the Search display, which allows you to go directly to a specific Title/Chapter/Track/Time.

- **VCR mode**

Press to use Quick-Find mode.

Caution: Do not touch the inner pins of the jacks on the rear panel. Electrostatic discharge may cause permanent damage to the DVD/VCR.

REAR VIEW**1. AERIAL Jack**

Connect your antenna, Cable Box, or Direct Broadcast System.

2. RF OUT Jack

Use the supplied aerial cable to connect this jack to the ANTENNA IN Jack on your TV.

3. AV2 (DECODER) Socket

Connect 21-Pin scart cable here and to the 21-Pin scart jack of a decoder.

4. AV1 (TV) Socket

Connect 21-Pin scart cable here and to the 21-Pin scart jack of a TV.

If your TV has RCA type audio and video input jacks, you may connect to your DVD/VCR's AV1 (TV) scart socket through the 21pin/RCA adapter (supplied).

5. S-VIDEO OUT Jack (DVD only)

Connect an optional S-Video cable here and to the S-Video In jack of a television.

6. ANALOG AUDIO OUT Jacks (DVD only)

Connect the supplied audio cables here and to the Audio In jacks of a television or other audio equipment.

7. DIGITAL COAXIAL AUDIO OUT Jack (DVD only)

Connect an optional coaxial digital audio cable here and to the Coaxial Digital Audio In jack of a decoder or audio receiver.

8. DIGITAL OPTICAL AUDIO OUT Jack (DVD only)

Connect an optional optical digital audio cable here and to the Optical Digital Audio In jack of a decoder or audio receiver.

9. AC POWER CORD

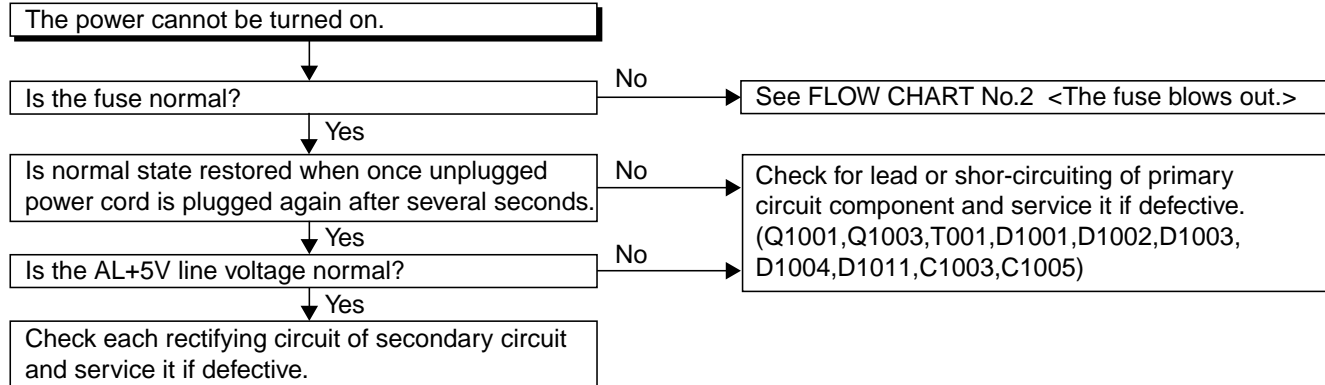
Connect to a standard AC outlet to supply power to the DVD/VCR.

3-1 TROUBLESHOOTING

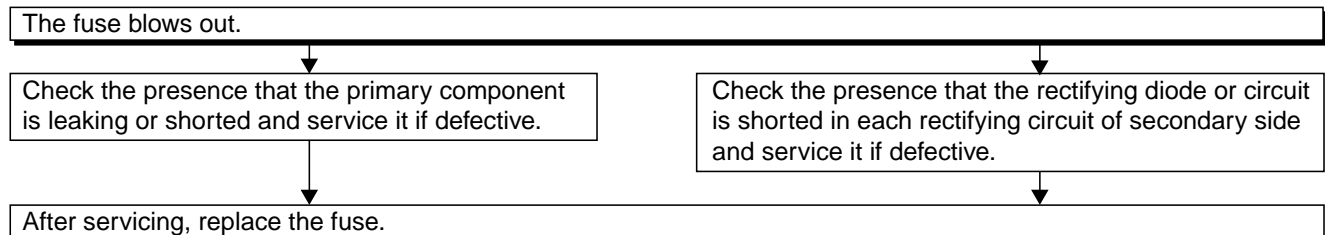
Troubleshooting is how to service for the specifying malfunction or poor parts. Detect malfunction or poor parts and service as the following charts.

3-1-1 Power Supply Section

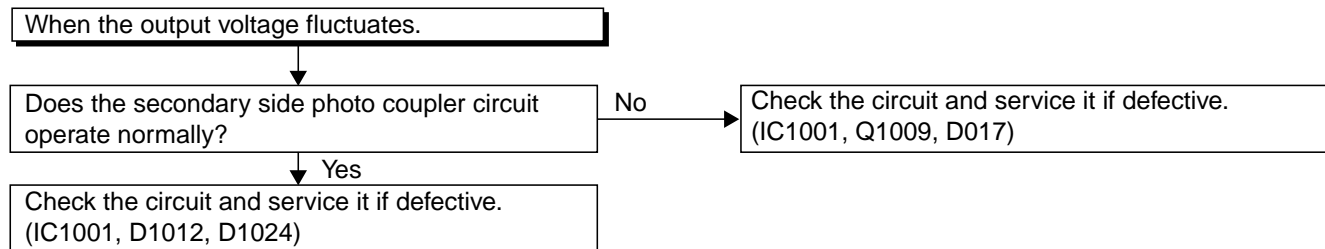
FLOW CHART NO.1



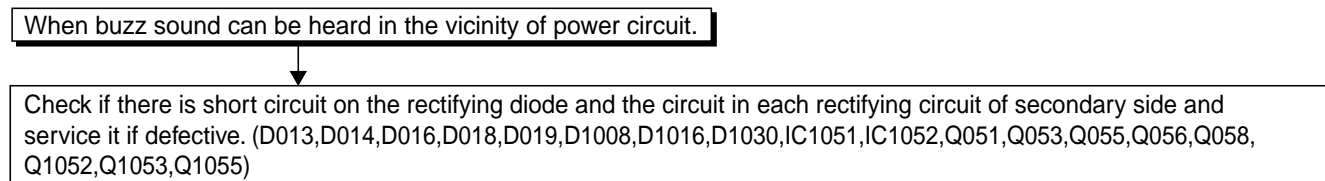
FLOW CHART NO.2



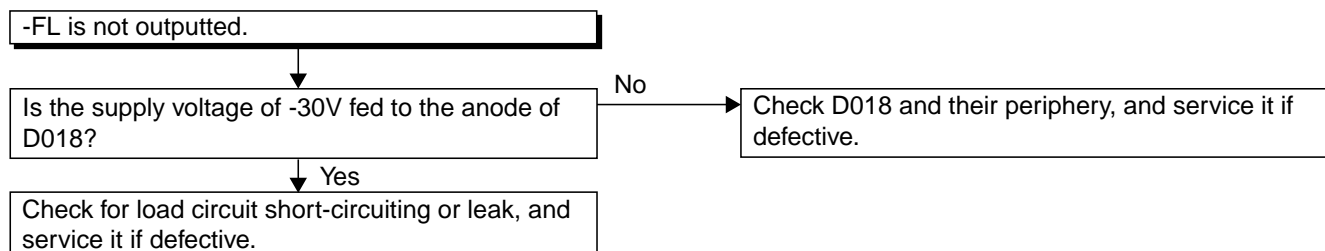
FLOW CHART NO.3



FLOW CHART NO.4



FLOW CHART NO.5



FLOW CHART NO.6

P-ON+5V is not outputted.

Is 5V voltage supplied to the collector of Q056?

No → Check D016, D017, C017, C018, and their periphery, and service it if defective.

Yes

Is the "H" pulse inputted into the base of Q056?

No → Check Q056, R058, R059, R060 and their periphery, and service it if defective.

Yes

Replace Q056.

FLOW CHART NO.7

EV+3.3V is not outputted.

Is 5V voltage supplied to Pin(1) of IC1052?

No → Check D1008, C1007, C1108 and their periphery, and service it if defective.

Yes

Replace IC1004.

FLOW CHART NO.8

P-ON+12V is not outputted.

Is 12V voltage supplied to the emitter of Q1053?

No → Check D014, C014, C1105 and their periphery, and service it if defective.

Yes

Is the "L" pulse (approximately 0V) outputted to the collector of Q1054?

No → Check Q1054 and PWRCON line, and service it if defective.

Yes

Replace Q1053.

FLOW CHART NO.9

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

Is the "H" pulse (approximately 5V) inputted into the base of Q1052?

No → See FLOW CHART NO.8. <P-ON+12V is not outputted. >

Yes

Replace Q1052.

FLOW CHART NO.10

EV 1.5V is not outputted.

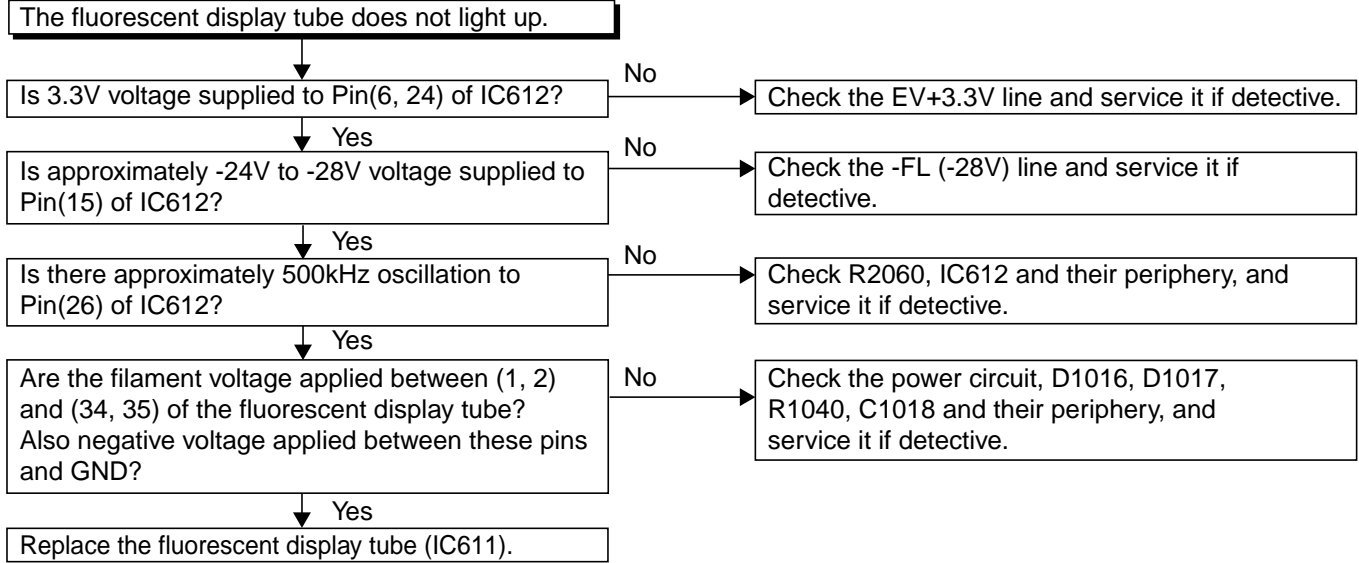
Is approximately 2.35V voltage supplied to Pin(1) of IC1051?

No → Check D1030, C1035, C1107, and their periphery, and service it if defective.

Yes

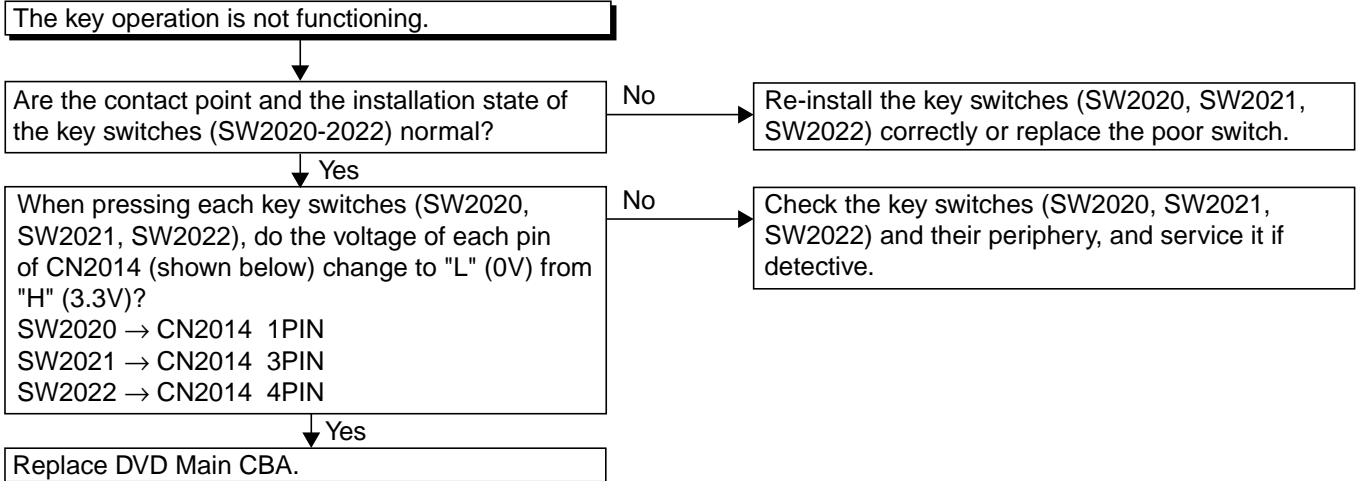
Replace IC1051.

FLOW CHART NO.11

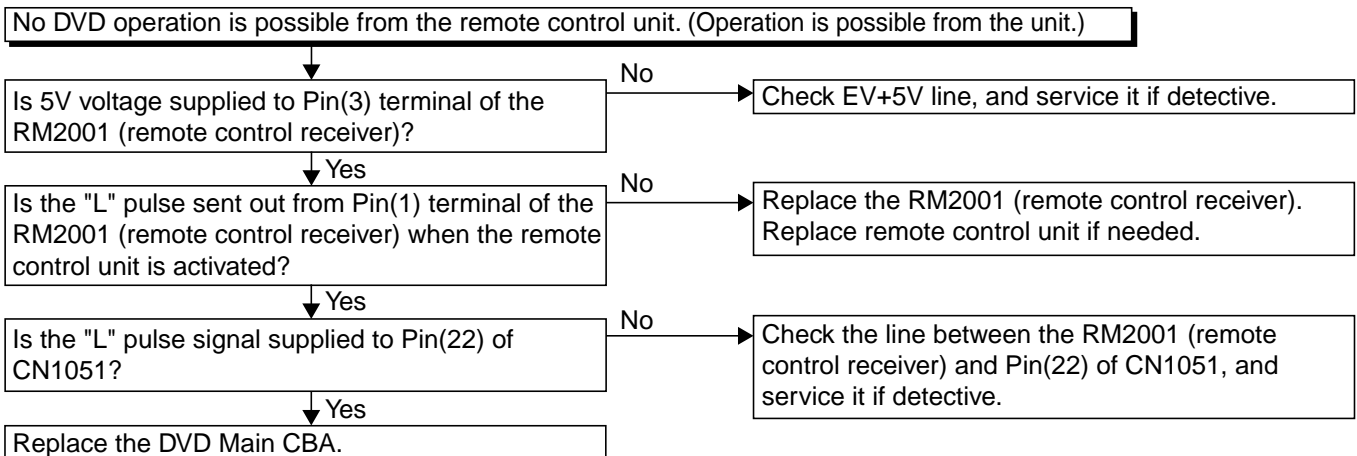


3-1-2 DVD Section

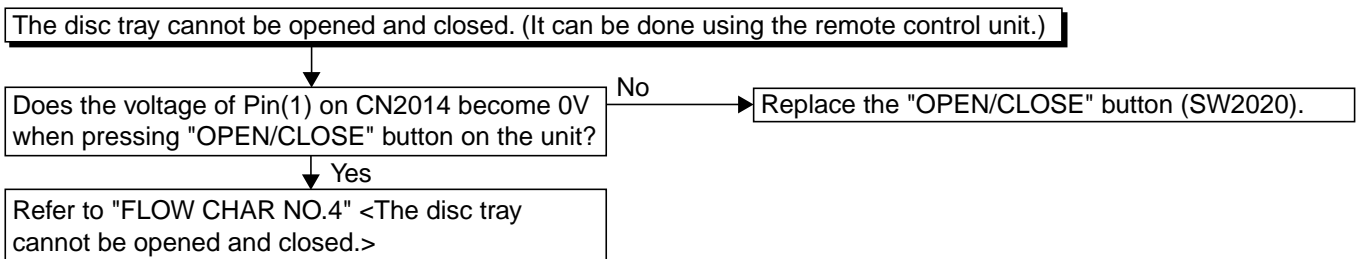
FLOW CHART NO.1



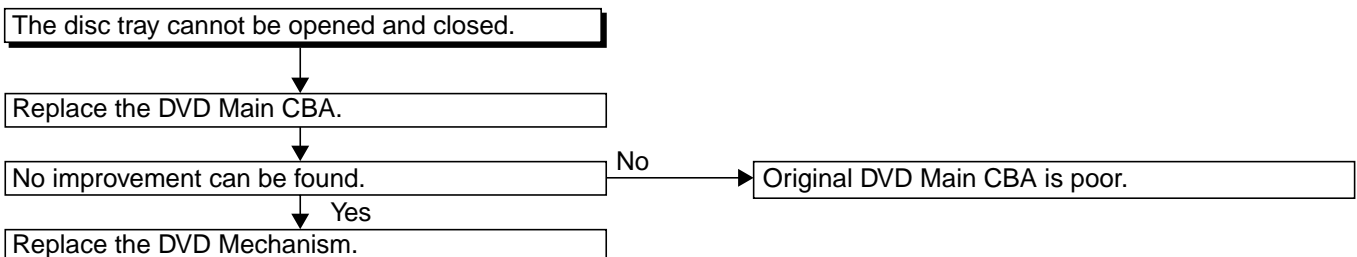
FLOW CHART NO.2



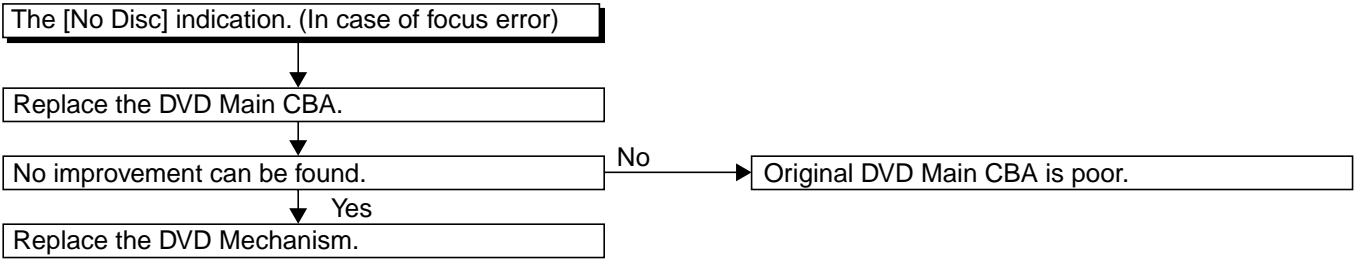
FLOW CHART NO.3



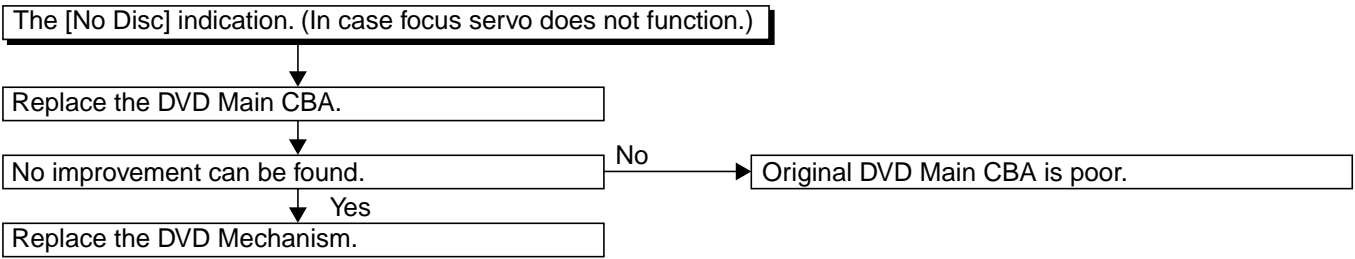
FLOW CHART NO.4



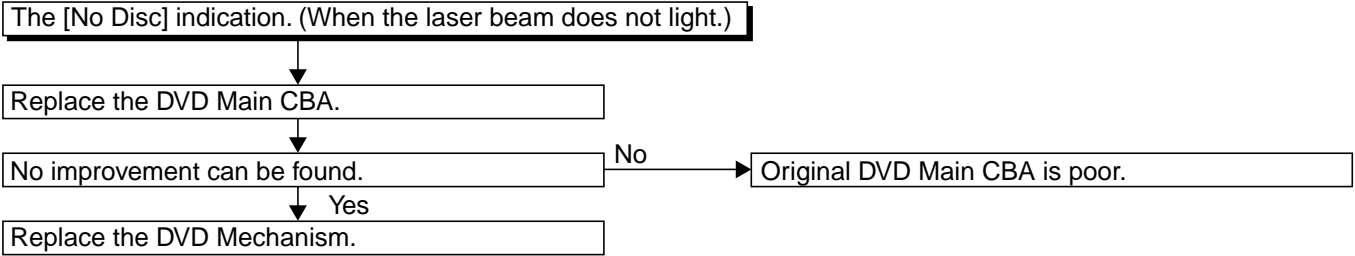
FLOW CHART NO.5



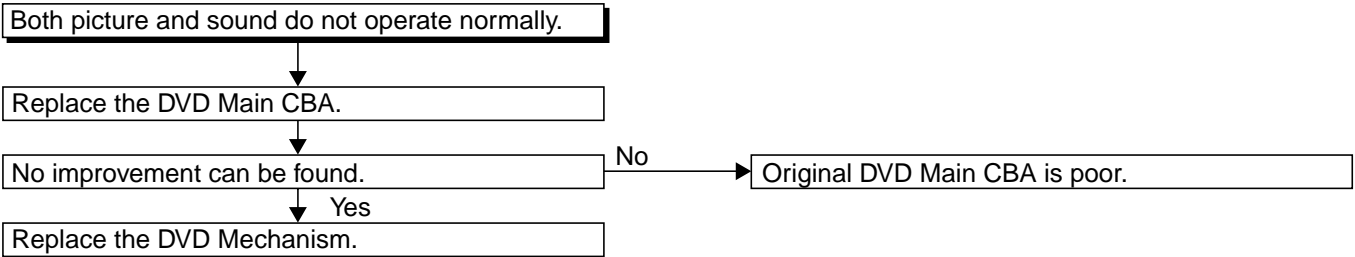
FLOW CHART NO.6



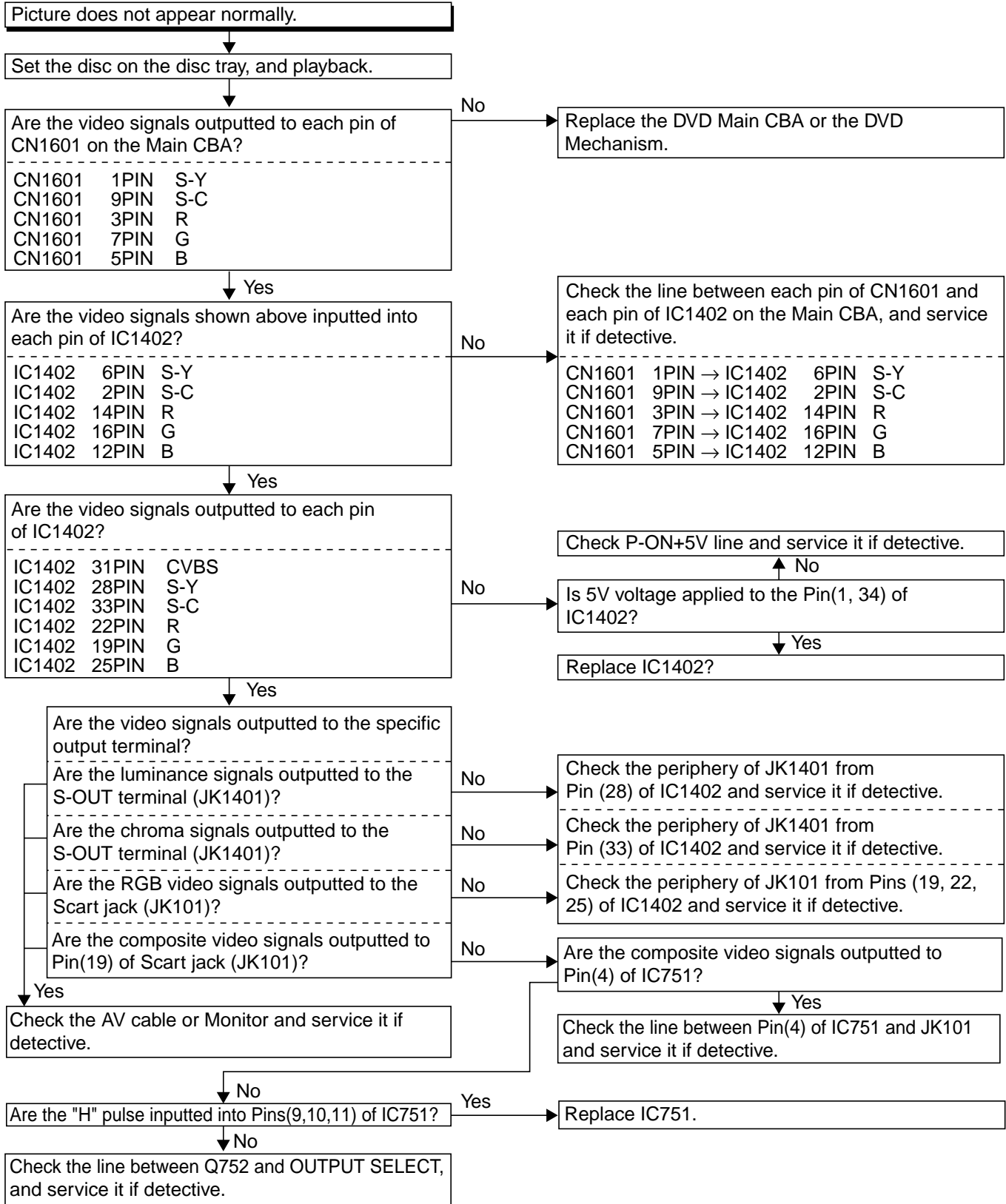
FLOW CHART NO.7



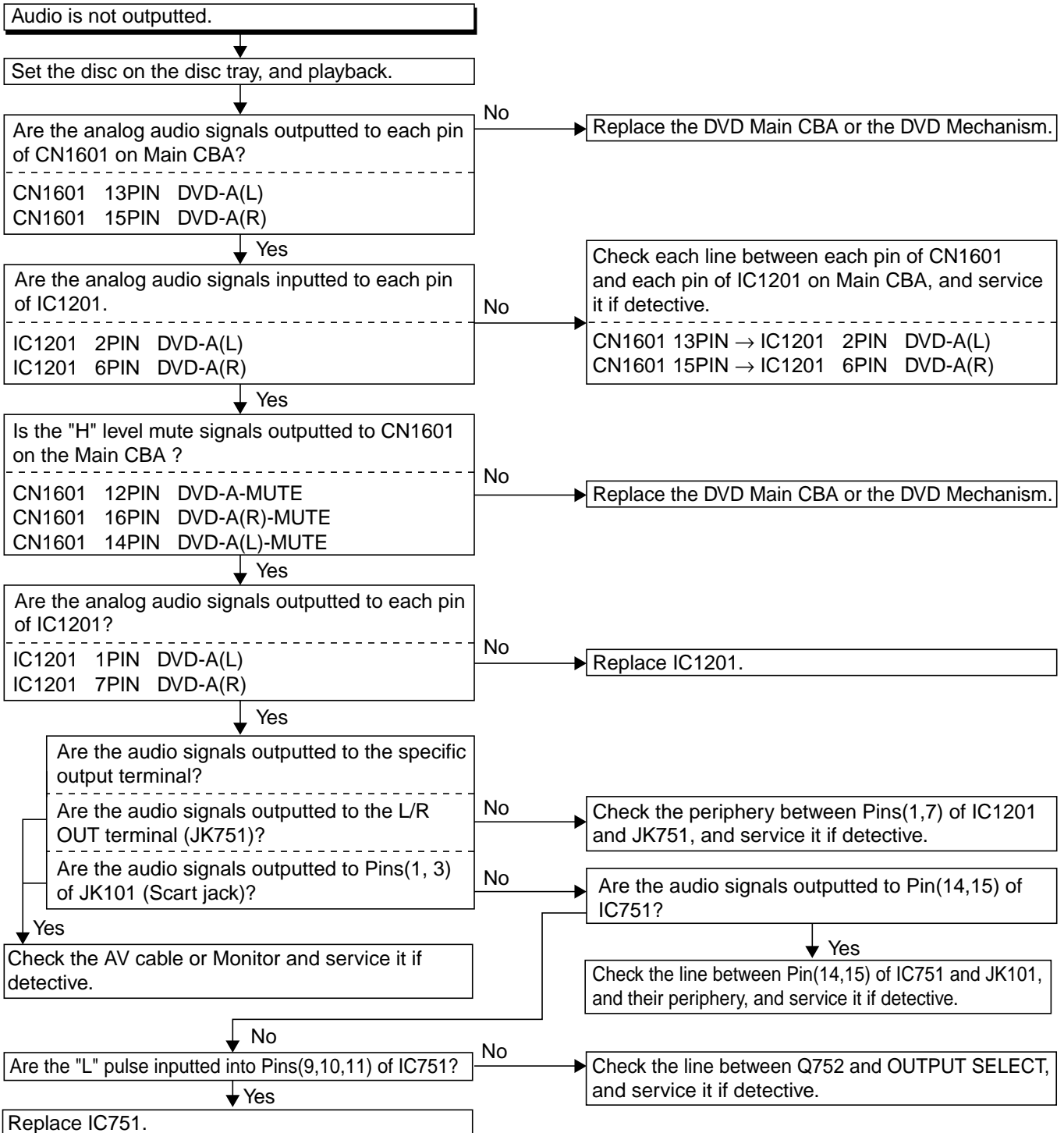
FLOW CHART NO.8



FLOW CHART NO.9

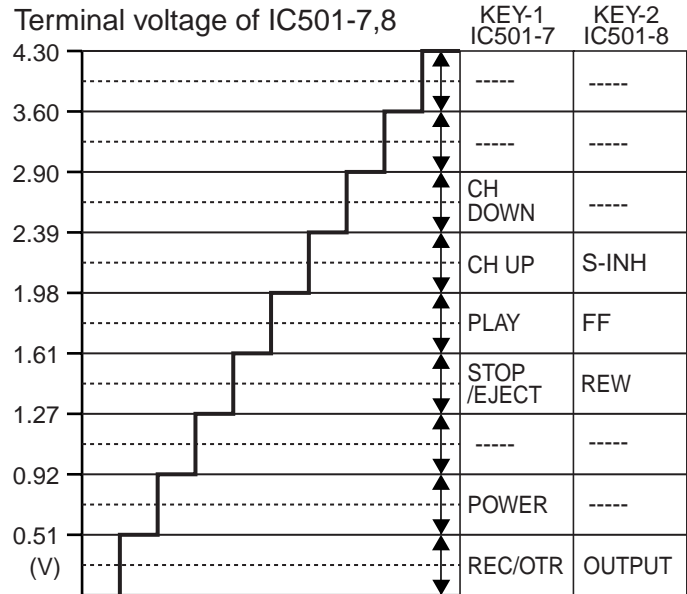
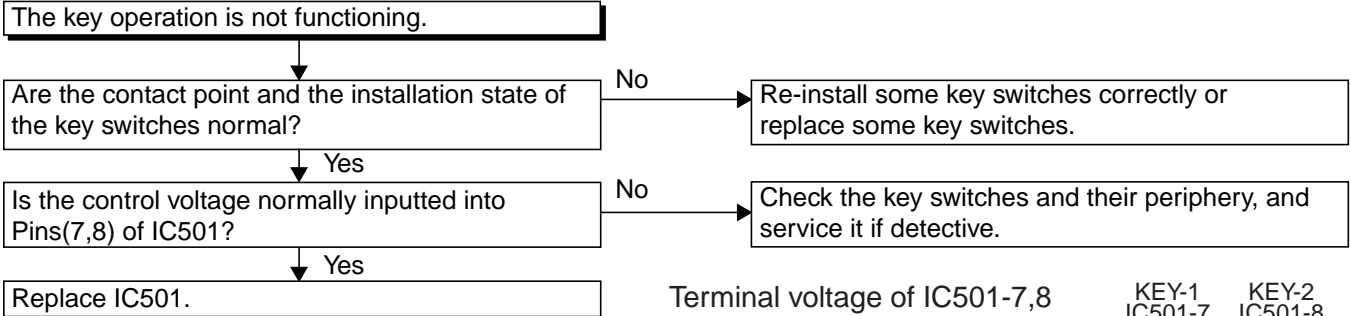


FLOW CHART NO.10

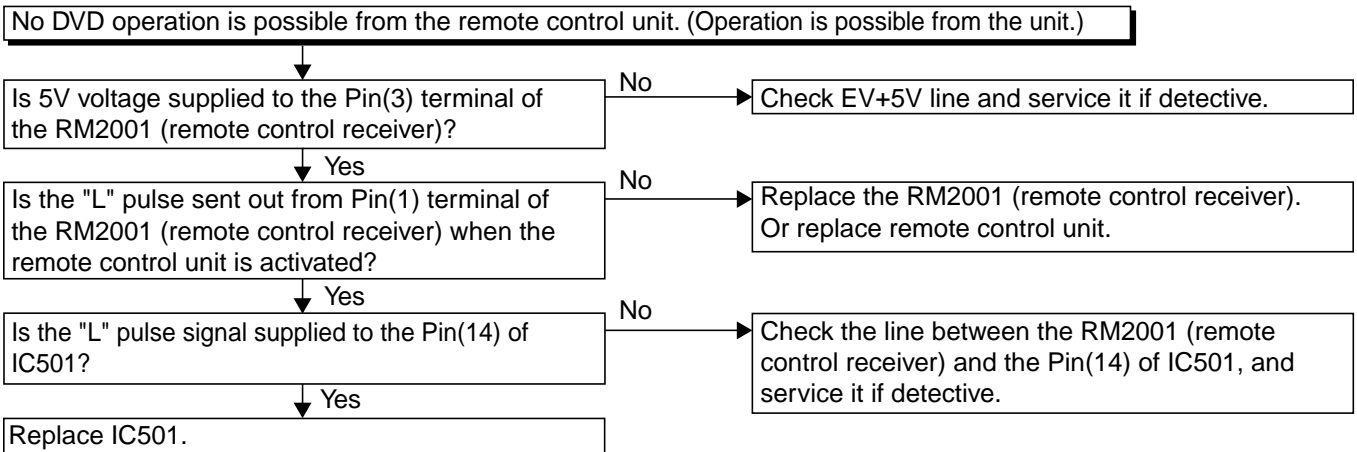


3-1-3 VCR Section

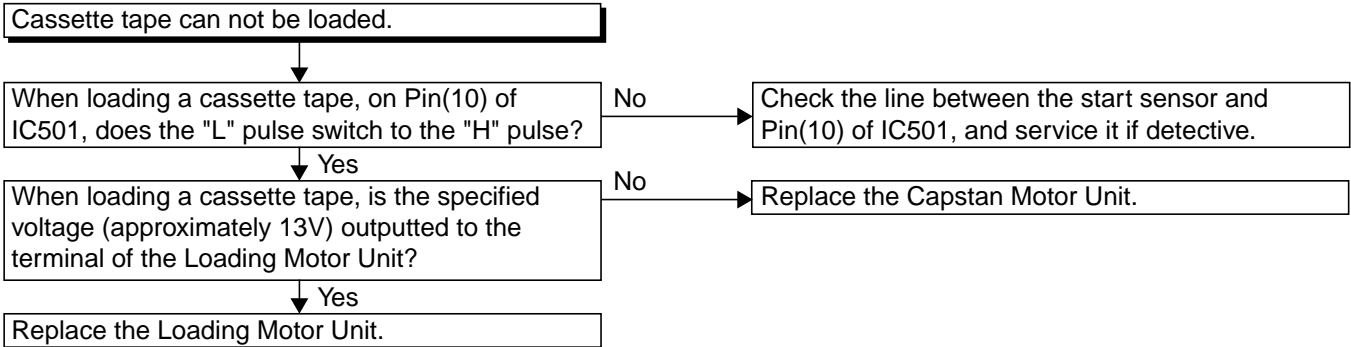
FLOW CHART NO.1



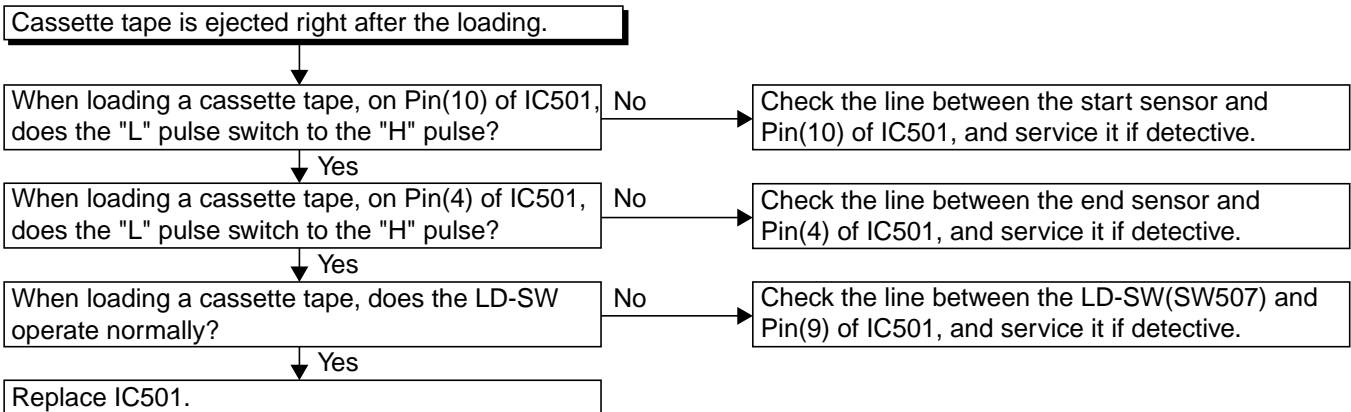
FLOW CHART NO.2



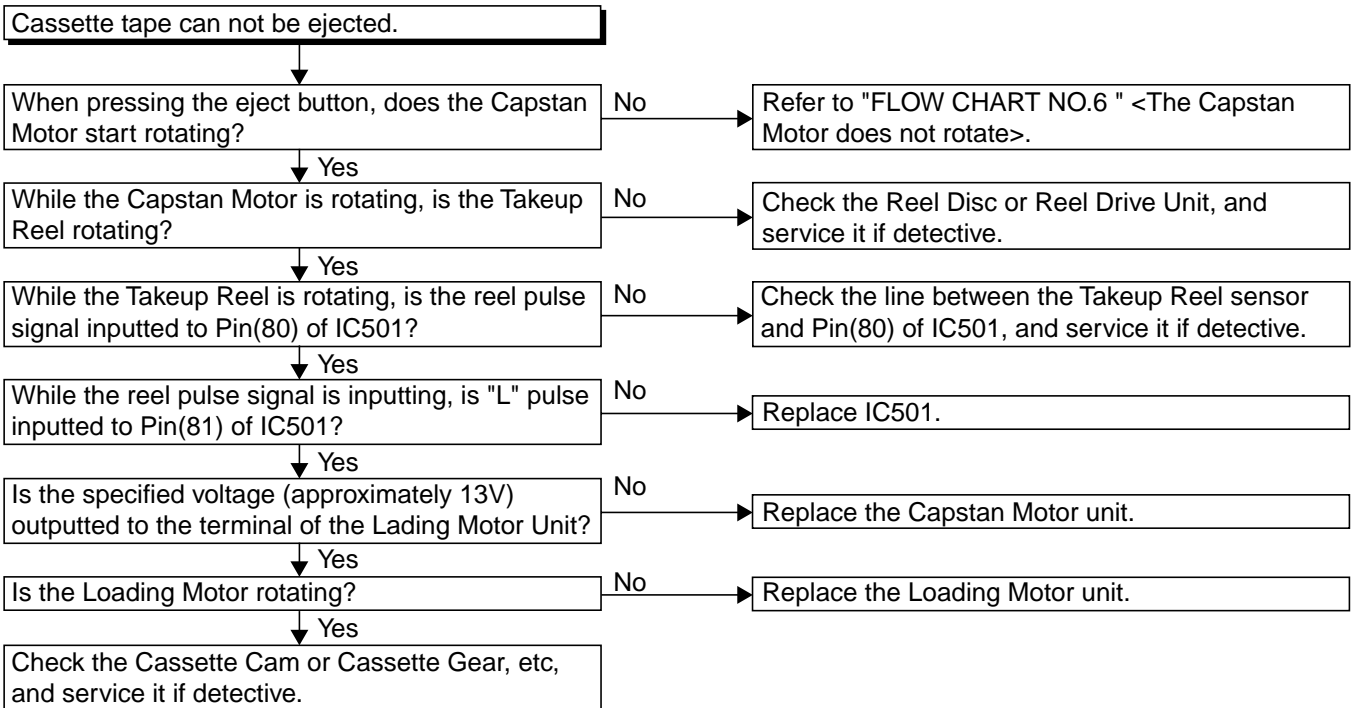
FLOW CHART NO.3



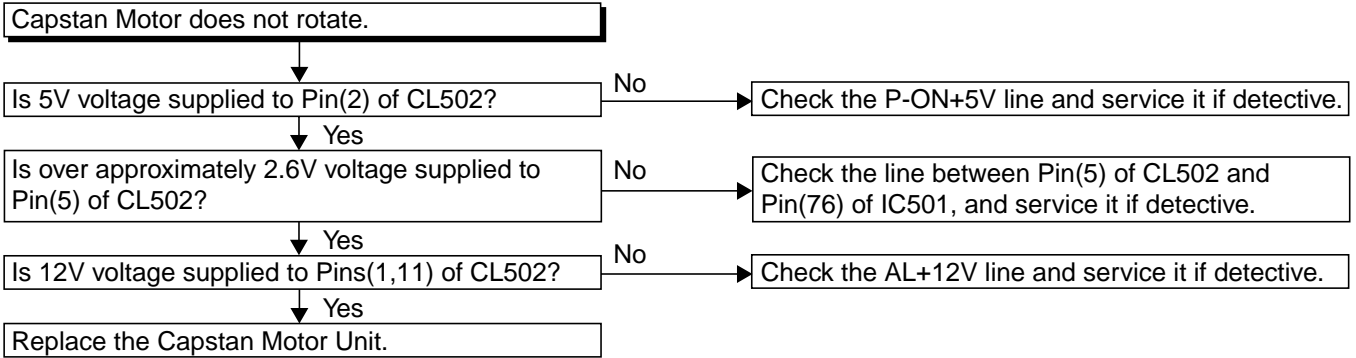
FLOW CHART NO.4



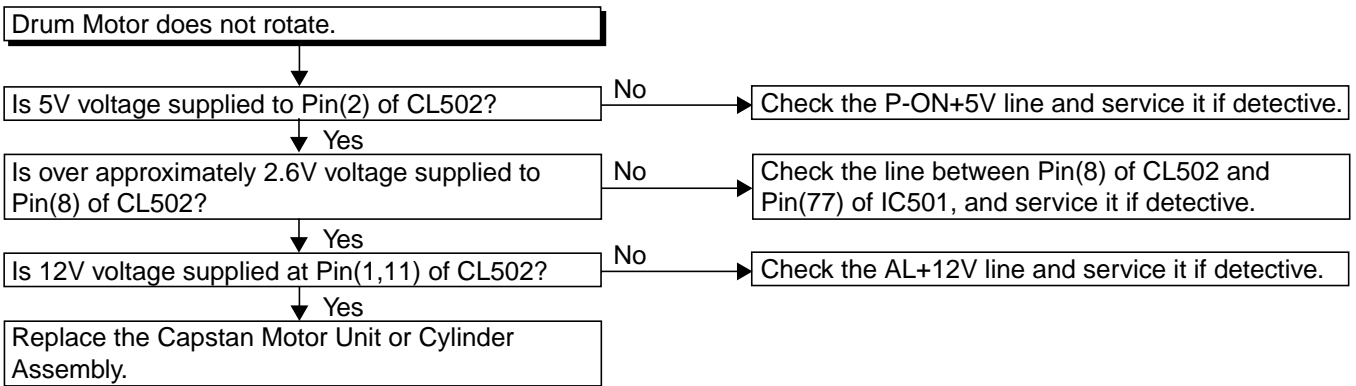
FLOW CHART NO.5



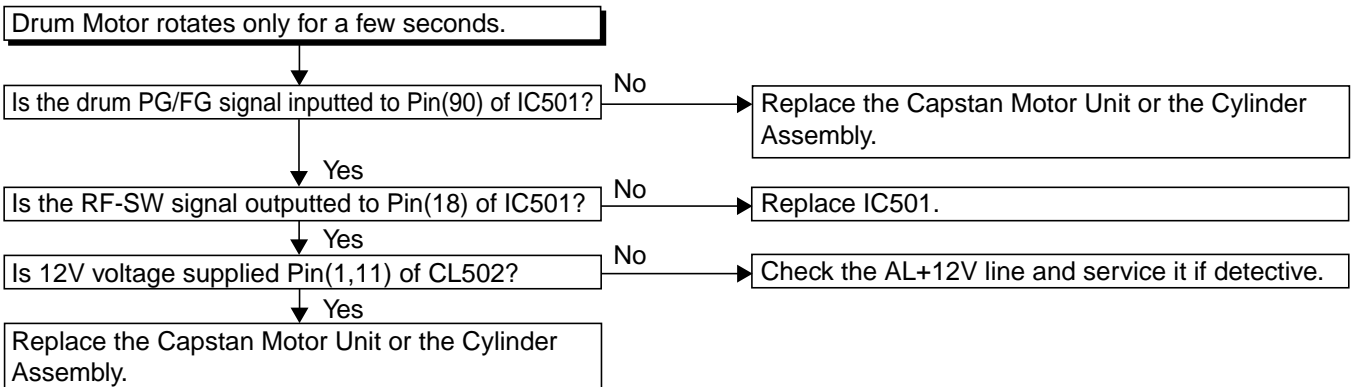
FLOW CHART NO.6



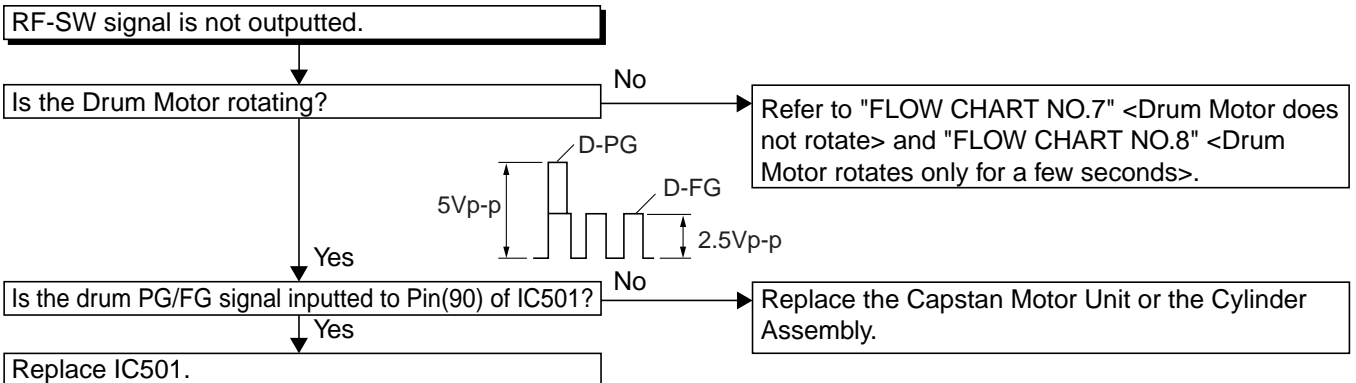
FLOW CHART NO.7



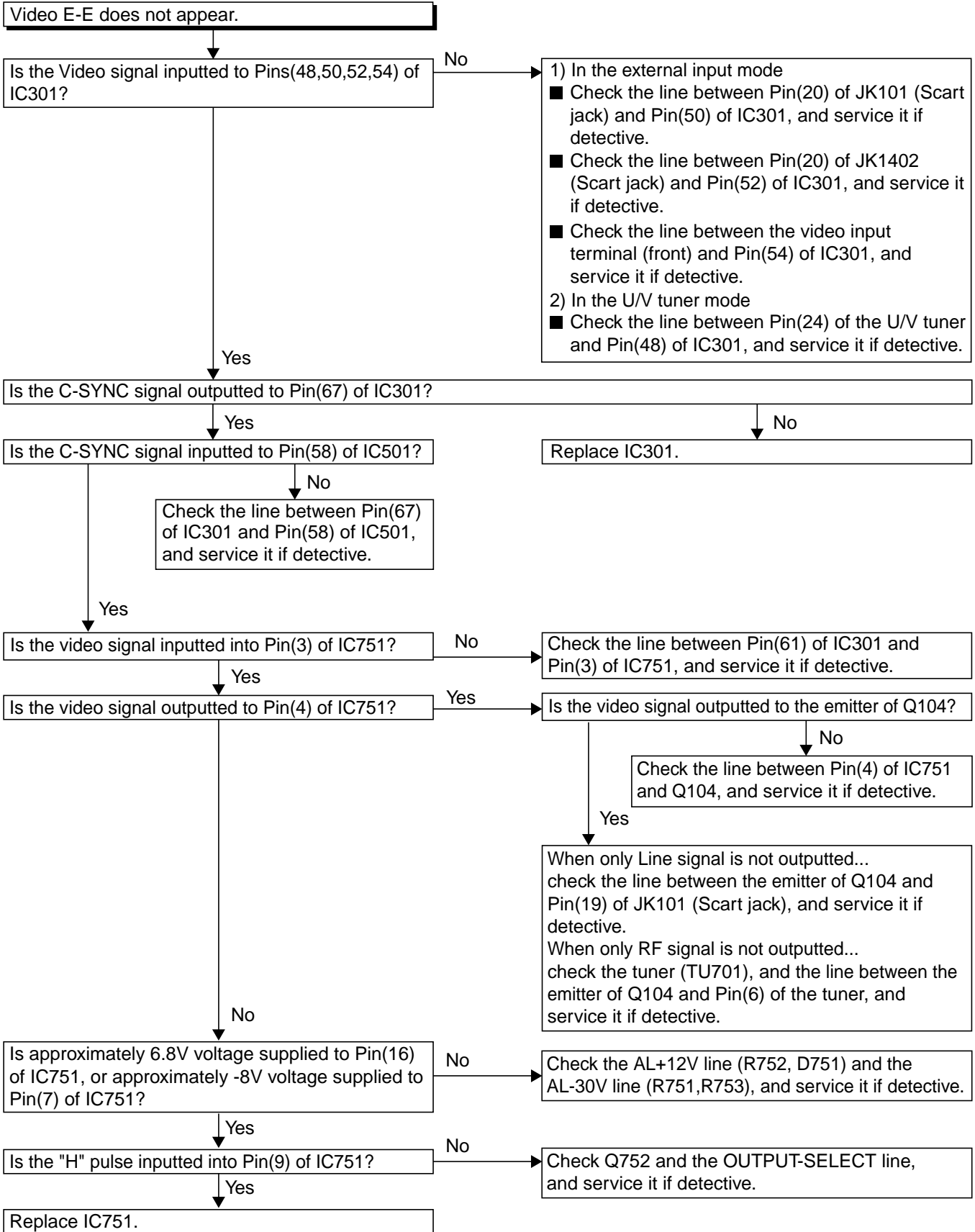
FLOW CHART NO.8



FLOW CHART NO.9



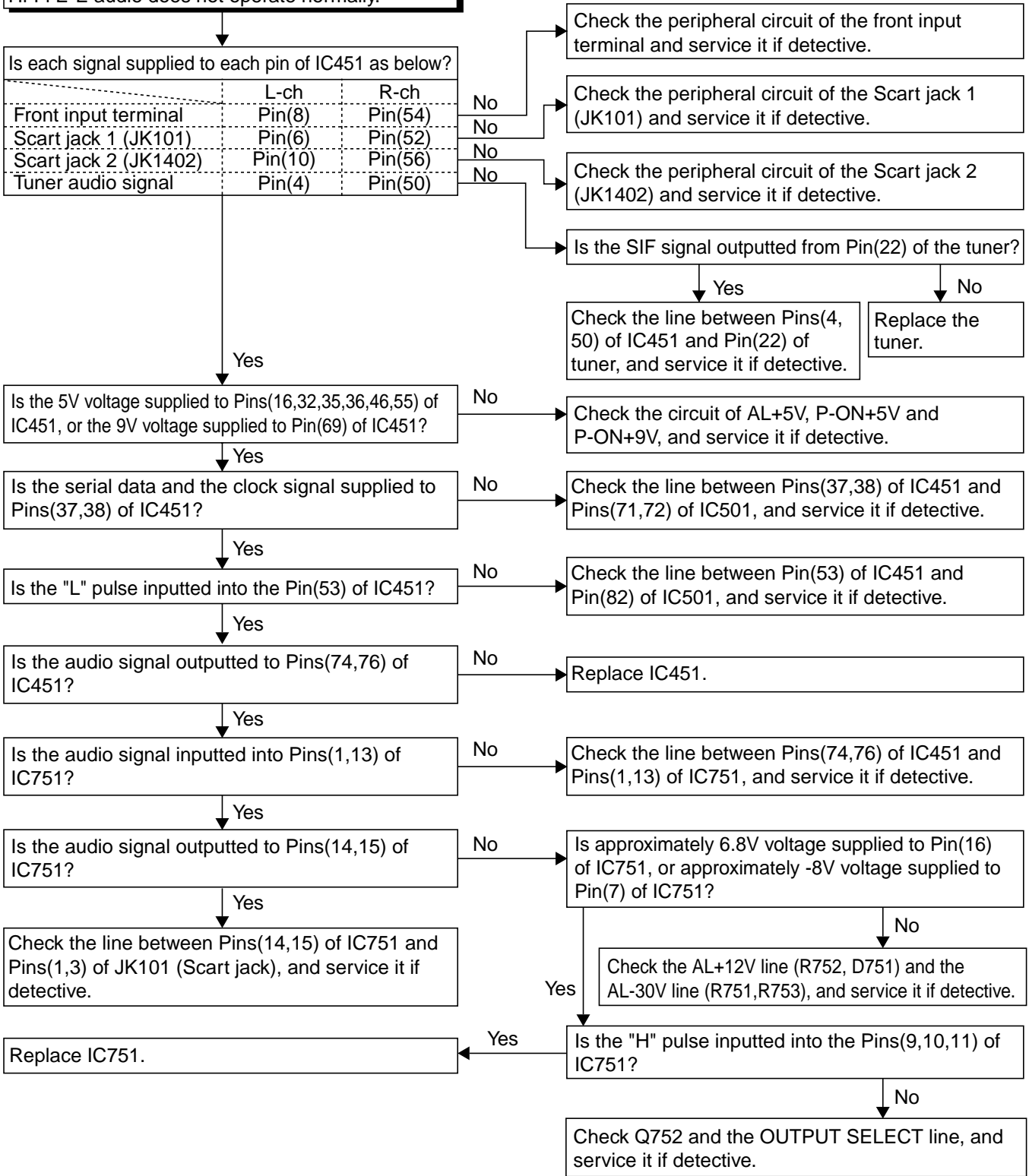
FLOW CHART NO.10



FLOW CHART NO.11

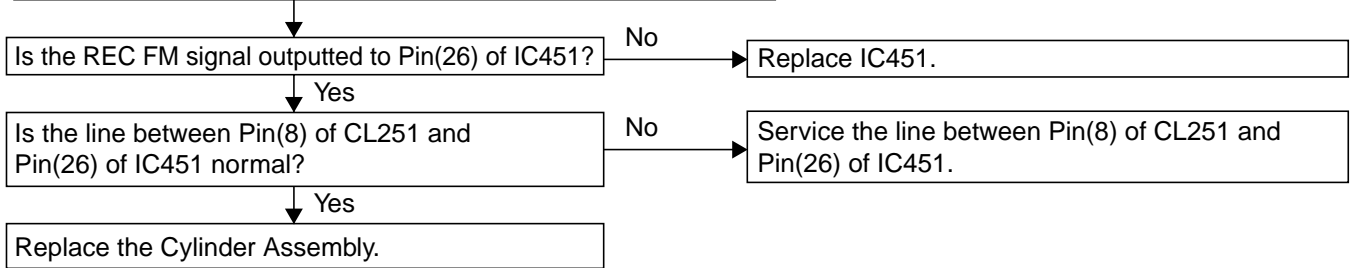
Hi-Fi E-E audio does not operate normally.

Is each signal supplied to each pin of IC451 as below?		
	L-ch	R-ch
Front input terminal	Pin(8)	Pin(54)
Scart jack 1 (JK101)	Pin(6)	Pin(52)
Scart jack 2 (JK1402)	Pin(10)	Pin(56)
Tuner audio signal	Pin(4)	Pin(50)



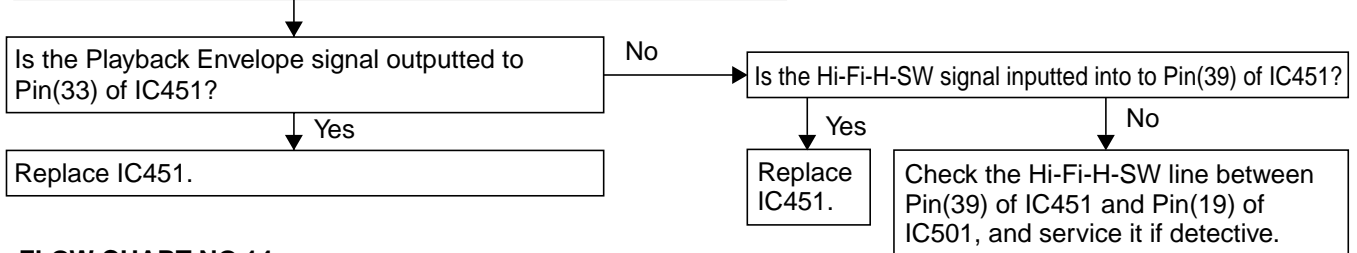
FLOW CHART NO.12

Hi-Fi audio can not be recorded normally. (E-E mode is normal.)



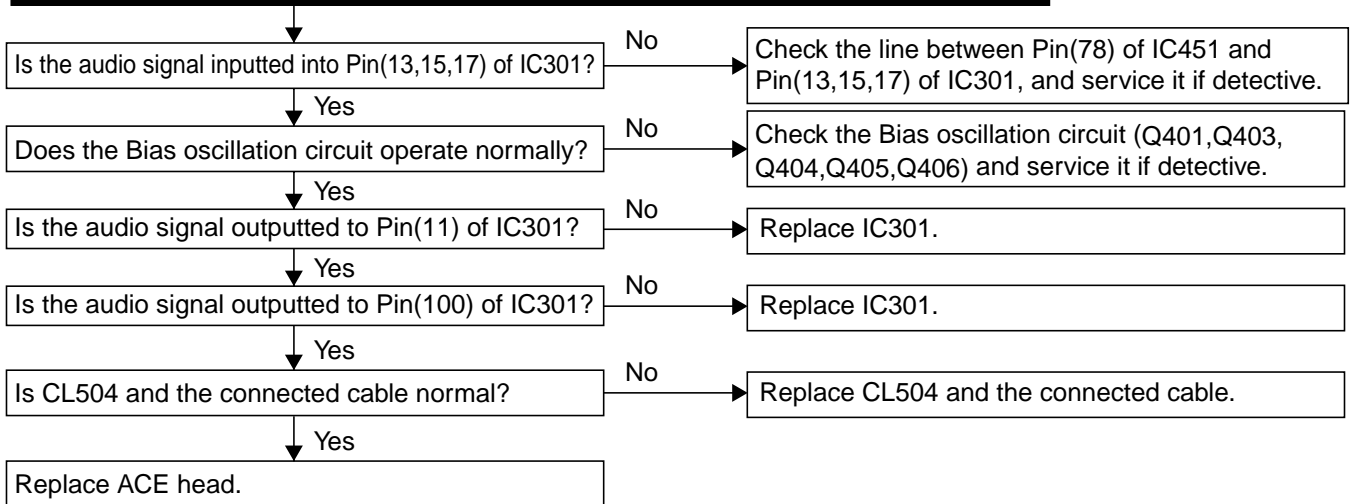
FLOW CHART NO.13

Hi-Fi audio can not be played back normally. (Hi-Fi E-E mode is normal.)



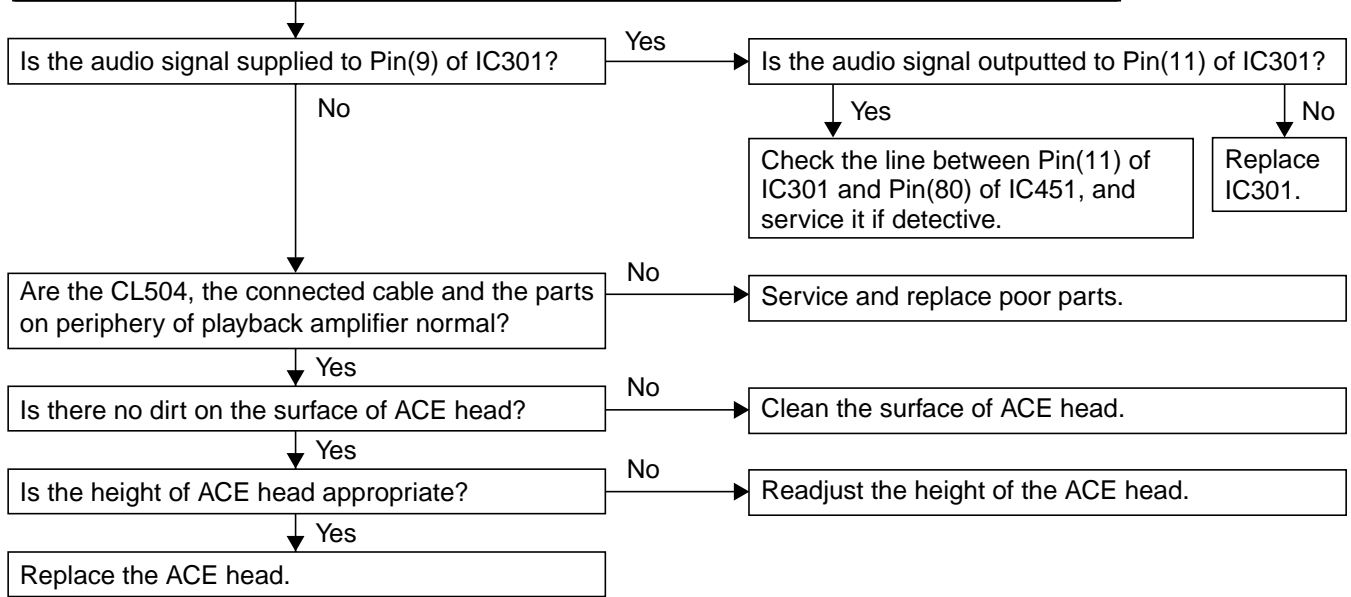
FLOW CHART NO.14

Hi-Fi audio can not be recorded normally in the linear audio mode. (E-E mode is normal.)



FLOW CHART NO.15

Hi-Fi audio can not be playbacked normally in the linear audio mode. (E-E mode is normal.)



3-2 FIRMWARE RENEWAL MODE

3-2-1 How to Update the Firmware Version

1. Turn the power on and remove the disc on the tray.
2. To put the DVD player into version up mode, press [9], [8], [7], [6], and [SEARCH MODE] buttons on the remote control unit in that order. The tray will open automatically.

Fig. 3-2-1 appears on the screen and Fig. 3-2-2 appears on the VFD.

The DVD player can also enter the version up mode with the tray open. In this case, Fig. 3-2-1 will be shown on the screen while the tray is open.

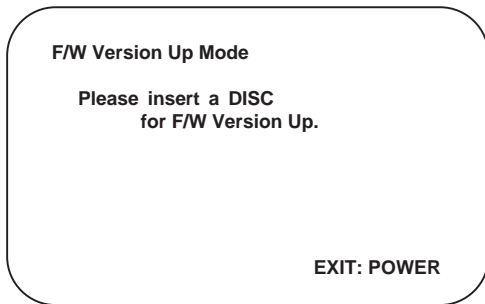


Fig. 3-2-1 Version Up Mode Screen

bE - UP

Fig. 3-2-2 VFD in Version Up Mode

3. Load the disc for version up.
4. The DVD player enters the F/W version up mode automatically. Fig. 3-2-3 appears on the screen and Fig. 3-2-4 appears on the VFD.

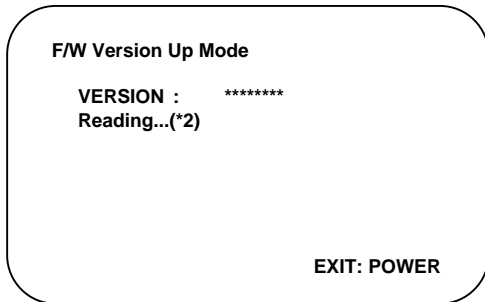


Fig. 3-2-3 Programming Mode Screen

1223

Fig. 3-2-4 VFD in Programming Mode (Example)

The appearance shown in (*2) of Fig. 3-2-3 is described as follows:

No.	Appearance	State
1	Reading...	Sending files into the memory
2	Erasing...	Erasing previous version data
3	Programming...	Writing new version data

5. After programming is finished, the tray opens automatically. Fig. 3-2-5 appears on the screen and the checksum in (*3) of Fig. 3-2-5 appears on the VFD. (Fig. 3-2-6)

At this time, no buttons are available.

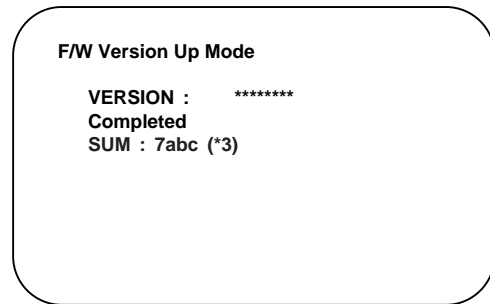


Fig. 3-2-5 Completed Program Mode Screen

7AbC

Fig. 3-2-6 VFD upon Finishing the Programming Mode (Example)

6. Unplug the AC cord from the AC outlet. Then plug it
7. To exit this mode, press [POWER] button.

3-2-2 How to Verify the Firmware Version

1. After making sure that no disc is in unit, turn the power on.
2. Press [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order. The B/E version appears on the VFD, and the F/E and B/E versions appear on TV screen.
3. Turn the power off to reset the unit.

Note:

If the firmware has been changed, etc., we will use Service News, etc. to report on how to obtain new firmware data and create an upgraded disc.

3-3 STANDARD MAINTENANCE

3-3-1 Service Schedule of Components

h: Hours ○: Check ●: Change

Deck		Periodic Service Schedule			
Ref.No.	Part Name	1,000 h	2,000 h	3,000 h	4,000 h
B2	Cylinder Assembly	○	●	○	●
B3	Loading Motor Assembly			●	
B8	Pulley Assembly (HI)		●		●
B587	Tension Lever Assembly		●		●
B31	AC Head Assembly			●	
B573, B574	Reel S, Reel T			●	
B37	Capstan Motor		●		●
B52	Cap Belt		●		●
B73	FE Head Assembly			●	
B86	F Brake Assembly (HI)		●		●
B133	Idler Assembly (HI)		●		●
B410	Pinch Arm Assembly		●		●
B414	M Brake (SP) Assembly (HI)		●		●
B416	M Brake (TU) Assembly (HI)		●		●
B525	LDG Belt		●		●

Notes:

1. Clean all parts for the tape transport (Upper Drum with Video Head / Pinch Roller / Audio Control Head / Full Erase Head) using 90% Isopropyl Alcohol.
2. After cleaning the parts, do all DECK ADJUSTMENTS.
3. For the reference numbers listed above, refer to Deck Exploded Views.

3-3-2 Cleaning

Cleaning of Video Head

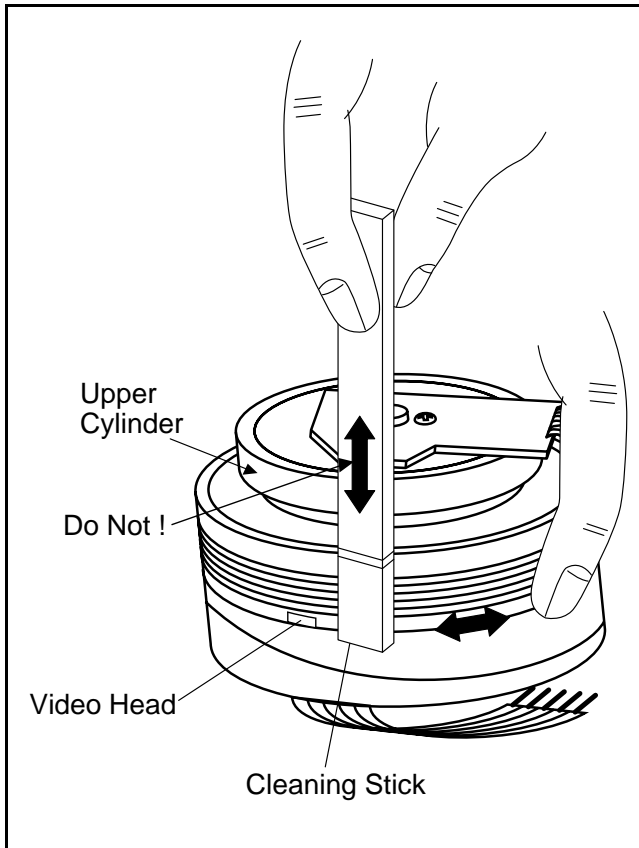
Clean the head with a head cleaning stick or chamois cloth.

Procedure

1. Remove the top cabinet.
2. Put on a glove (thin type) to avoid touching the upper and lower drum with your bare hand.
3. Put a few drops of 90% Isopropyl alcohol on the head cleaning stick or on the chamois cloth and, by slightly pressing it against the head tip, turn the upper drum to the right and to the left.

Notes:

1. The video head surface is made of very hard material, but since it is very thin, avoid cleaning it vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit.
3. Do not reuse a stained head cleaning stick or a stained chamois cloth.



Cleaning of ACE Head

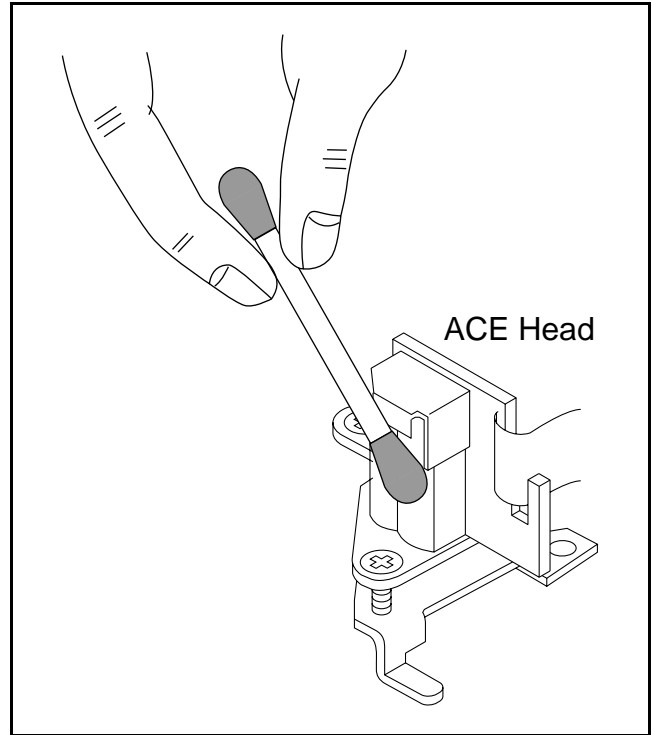
Clean the head with a cotton swab.

Procedure

1. Remove the top cabinet.
2. Dip the cotton swab in 90% Isopropyl alcohol and clean the ACE head. Be careful not to damage the upper drum and other tape running parts.

Notes:

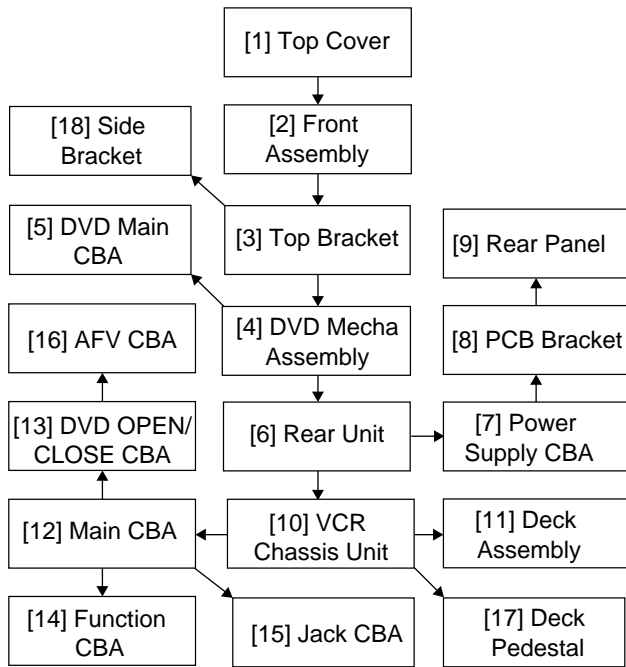
1. Avoid cleaning the ACE head vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit or damage may occur.



4-1 CABINET DISASSEMBLY INSTRUCTIONS

4-1-1 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.



4-1-2 Disassembly Method

ID/LOC. No.	PART	REMOVAL		
		Fig.No	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	Note
[1]	Top Cover	4-1-1	7(S-1)	-
[2]	Front Assembly	4-1-2	(S-2), *7(L-1)	1 1-1 1-2
[3]	Top Bracket	4-1-2	2(S-3), 2(S-3A)	-
[4]	DVD Mecha Assembly	4-1-3	3(S-4), *CN302, *CN401, *CN601	-
[5]	DVD Main CBA	4-1-4	2(S-5), *CN201, *CN301	2 2-1 2-2 2-3 3
[6]	Rear Unit	4-1-5	5(S-6), 4(S-7), CN003	-

ID/LOC. No.	PART	Fig.No	REMOVAL	
			REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	Note
[7]	Power Supply CBA	4-1-6	2(S-8), 2(S-8A)	-
[8]	PCB Bracket	4-1-6	3(S-9)	-
[9]	Rear Panel	4-1-6	-----	-
[10]	VCR Chassis Unit	4-1-7	5(S-10), 2(S-11), 2(S-11A)	-
[11]	Deck Assembly	4-1-8	Desolder, (S-12), (S-12A)	4,5
[12]	Main CBA	4-1-8	-----	-
[13]	DVD OPEN/CLOSE CBA	4-1-9	Desolder	-
[14]	Function CBA	4-1-9	Desolder	-
[15]	Jack CBA	4-1-9	Desolder	-
[16]	AFV CBA	4-1-9	Desolder	-
[17]	Deck Pedestal	4-1-10	7(S-13)	-
[18]	Side Bracket	4-1-10	(S-14)	-

- (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. 2(S-2) = two Screws (S-2),
2(L-2) = two Locking Tabs (L-2)
- (5): Refer to "Reference Notes."

Reference Notes

CAUTION 1: Locking Tabs (L-1) are fragile. Be careful not to break them.

1-1. Remove Screw (S-2).

1-2. Release seven Locking Tabs (L-1) (to do this, first release five Locking Tabs (A) at the side and top, and then release two Locking Tabs (B) at the bottom.)

CAUTION 2: Electrostatic breakdown of the laser diode in the optical system block may occur as a potential difference caused by electrostatic charge accumulated on cloth, human body etc., during unpacking or repair work.

To avoid damage of pickup follow next procedures.

2-1. Slide the pickup unit as shown in Fig. 4-1-4.

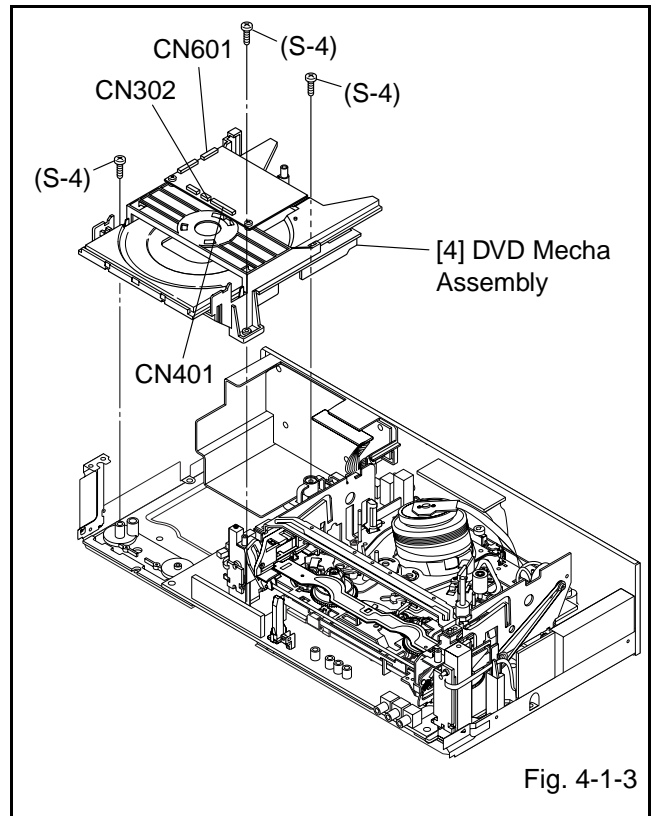
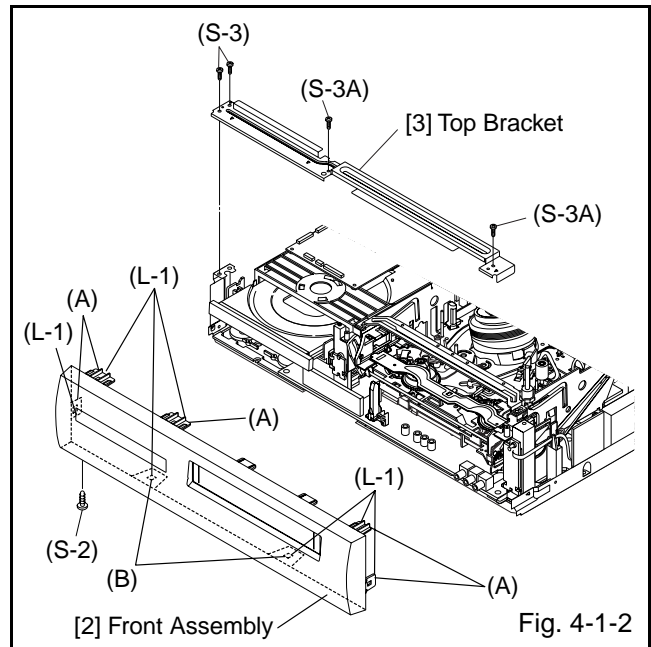
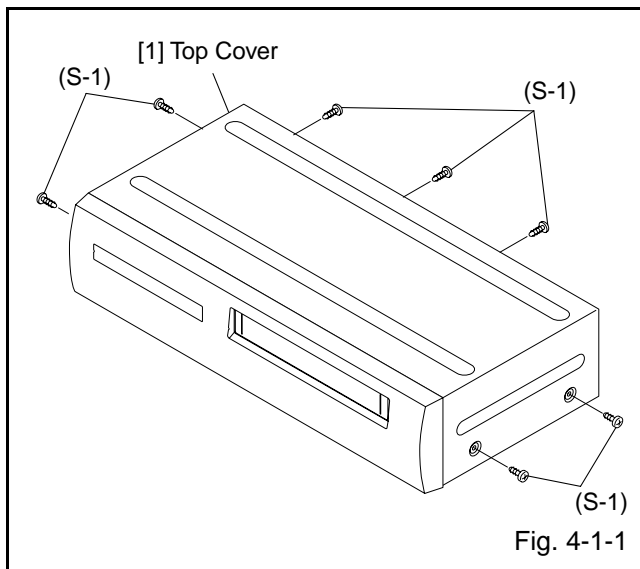
2-2. Short the three short lands of FPC cable with solder before removing the FFC cable (CN301) from it. If you disconnect the FFC cable (CN301), the laser diode of pickup will be destroyed. (Fig. 4-1-4)

2-3. Disconnect Connector (CN201). Remove two Screws (S-5) and lift the DVD Main CBA. (Fig. 4-1-4)

CAUTION 3: When reassembling, confirm the FFC cable (CN301) is connected completely. Then remove the solder from the three short lands of FPC cable. (Fig. 4-1-4)

CAUTION 4: When reassembling, solder wire jumpers as shown in Fig. 4-1-8.

CAUTION 5: Before installing the Deck Assembly, be sure to place the pin of LD-SW on Main CBA as shown in Fig. 4-1-8. Then, install the Deck Assembly while aligning the hole of Cam Gear with the pin of LD-SW, the shaft of Cam Gear with the hole of LD-SW as shown in Fig. 4-1-8.



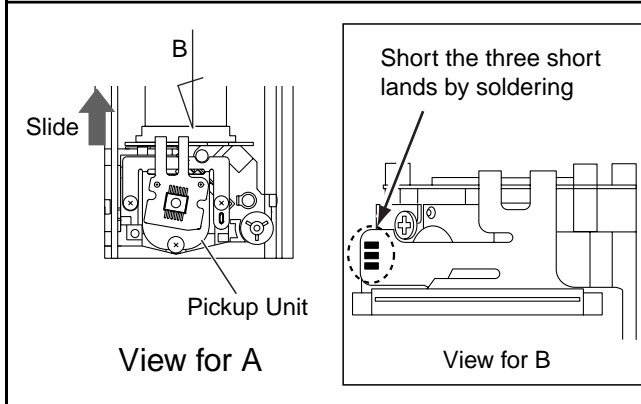
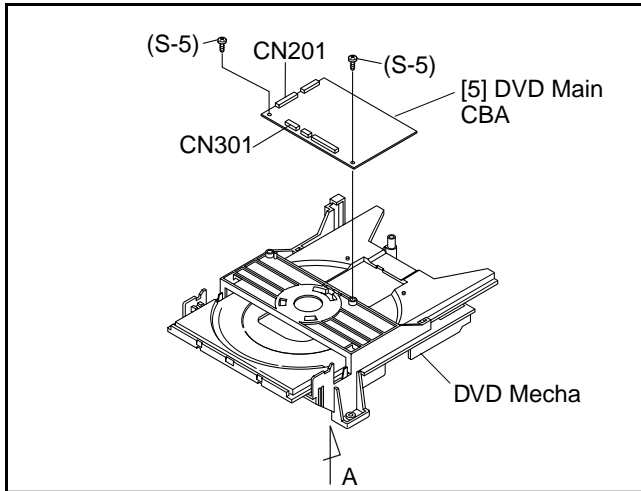


Fig. 4-1-4

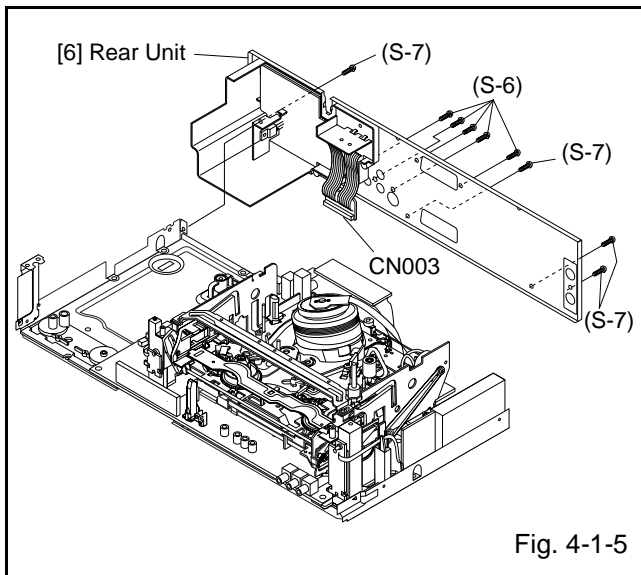


Fig. 4-1-5

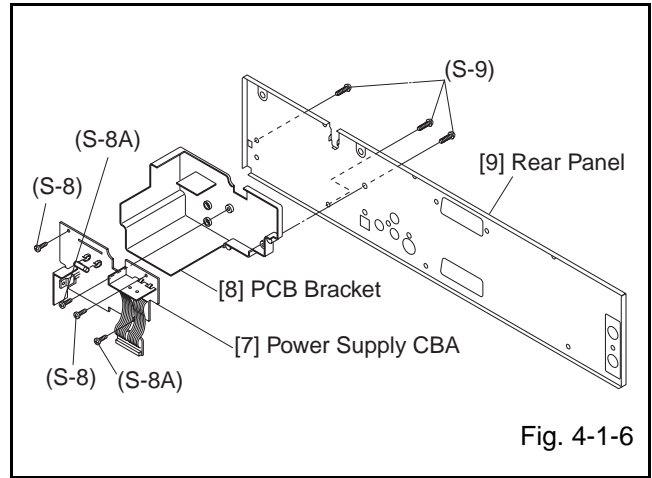


Fig. 4-1-6

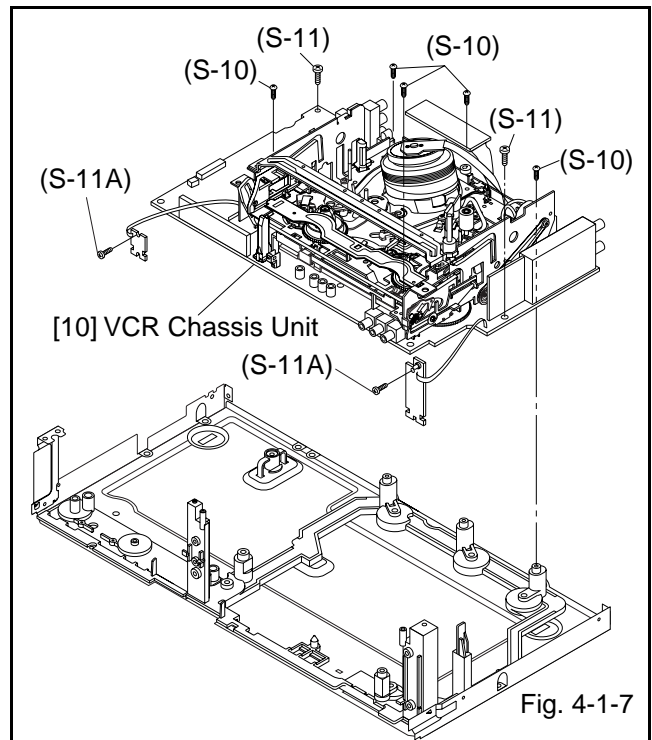


Fig. 4-1-7

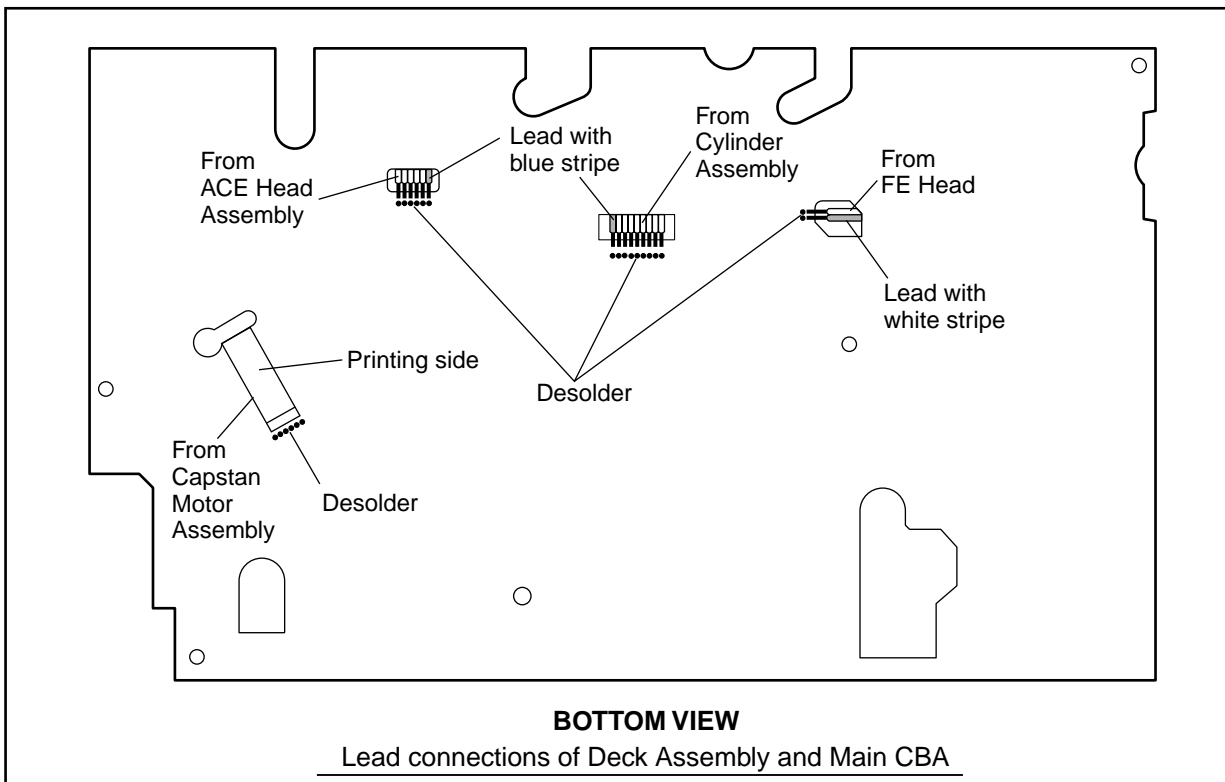
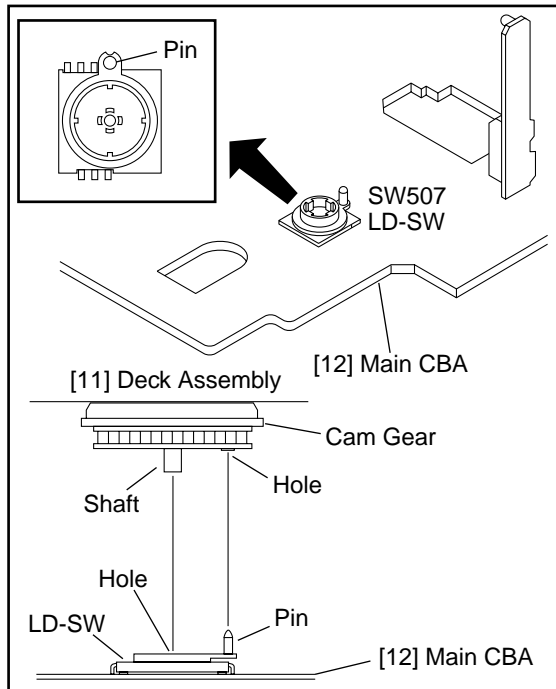
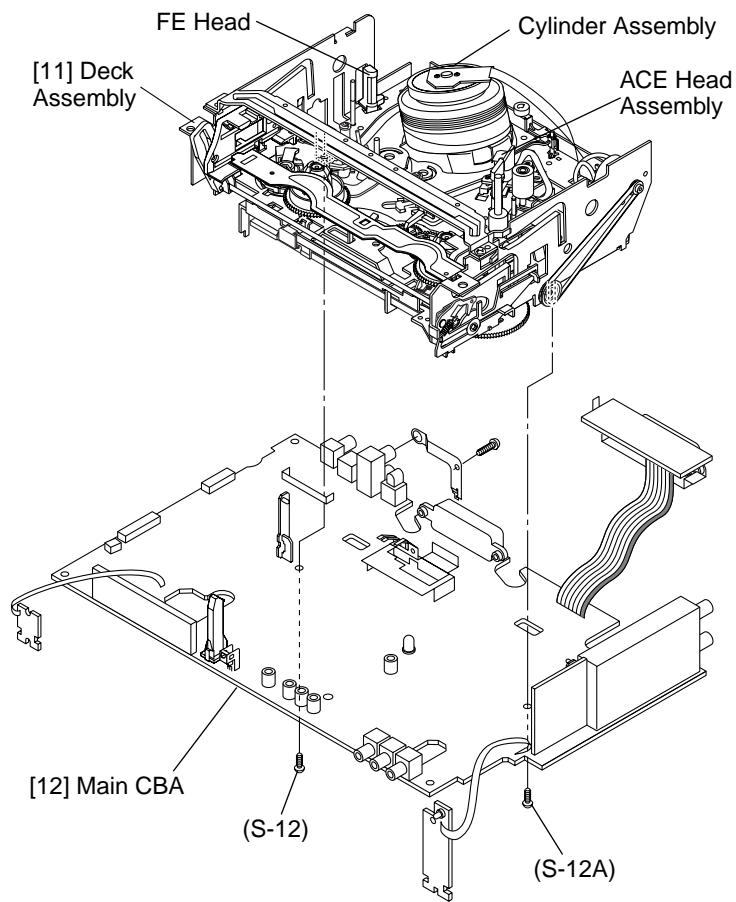
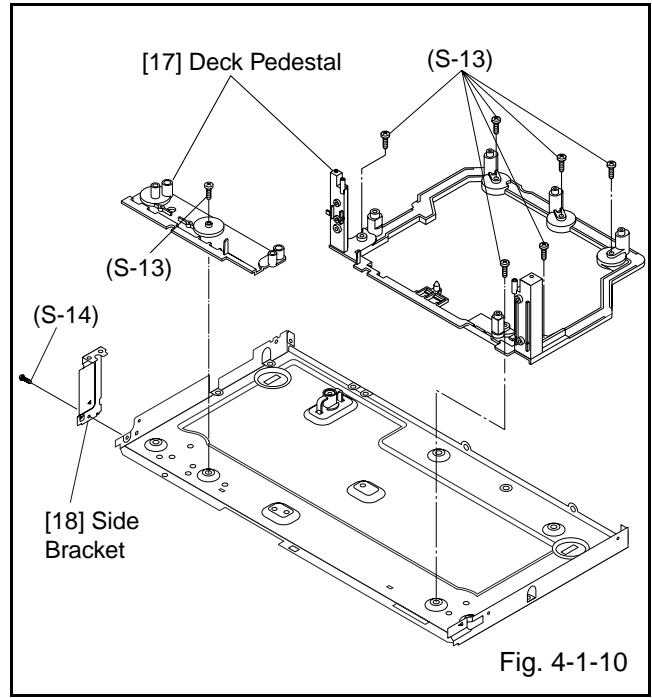
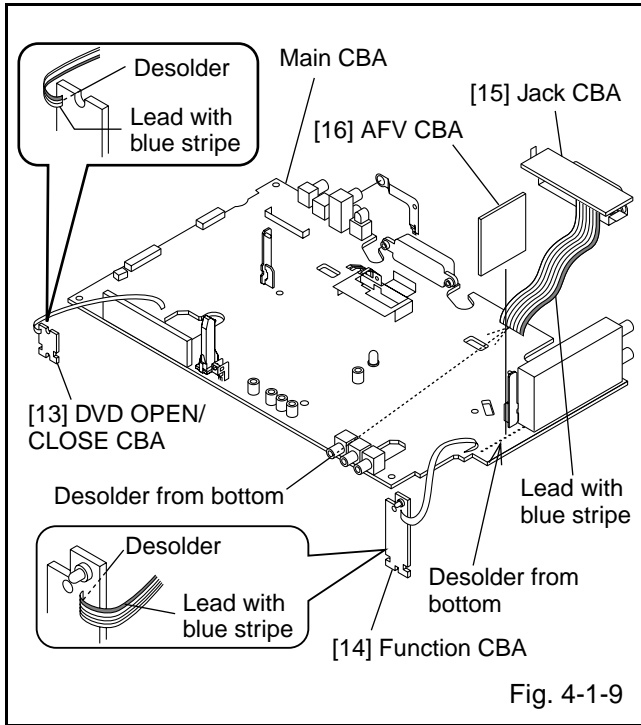
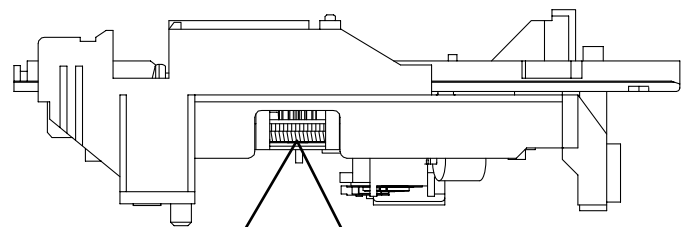
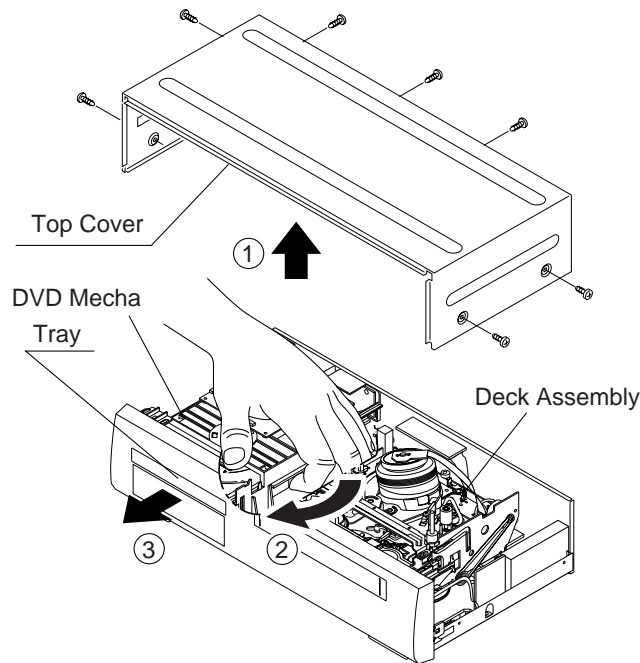


Fig. 4-1-8

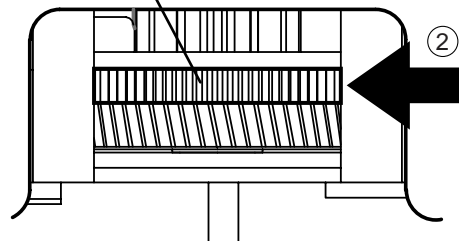


To Remove the Disc Manually

1. Remove the Top Cover.
2. Rotate this roulette in the direction of the arrow as shown below.



Rotate this roulette in the direction of the arrow



4-2 DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM

Before following the procedures described below, be sure to remove the deck assembly from the cabinet. (Refer to CABINET DISASSEMBLY INSTRUCTIONS on page 4-1.)

All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [44] and [45] in Fig. 4-2-1 on page 4-8. When reassembling, follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Guide Holder A	T	4-2-3	2(S-1)	
[2]	[1]	Cassette Holder Assembly	T	4-2-4		
[3]	[2]	Slider (SP)	T	4-2-5	*(L-1), (S-1A)	
[4]	[2]	Slider (TU)	T	4-2-5	*(L-2), (S-1B)	
[5]	[4]	Lock Lever	T	4-2-5	*(L-3), *(P-1)	
[6]	[2]	Cassette Plate	T	4-2-5		
[7]	[7]	Cylinder Assembly	T	4-2-1,4-2-6	Desolder, 3(S-2)	
[8]	[8]	Loading Motor Assembly	T	4-2-1,4-2-7	Desolder, LDG Belt, 2(S-3)	
[9]	[9]	AC Head Assembly	T	4-2-1,4-2-7	(S-4)	
[10]	[2]	Tape Guide Arm Assembly	T	4-2-1,4-2-8	*(P-2)	
[11]	[10]	C Door Opener	T	4-2-1,4-2-8	*(L-4)	
[12]	[11]	Pinch Arm (B)	T	4-2-1,4-2-8	*(P-3)	
[13]	[12]	Pinch Arm Assembly	T	4-2-1,4-2-8		
[14]	[14]	FE Head Assembly	T	4-2-1,4-2-9	(S-5)	
[15]	[15]	Prism	T	4-2-1,4-2-9	(S-6)	
[16]	[2]	Slider Shaft	T	4-2-10	*(L-5)	
[17]	[16]	C Drive Lever (SP)	T	4-2-10		
[18]	[16]	C Drive Lever (TU)	T	4-2-10	(S-7),*(P-4)	
[19]	[19]	Capstan Motor	B	4-2-2,4-2-11	3(S-8), Cap Belt	
[20]	[20]	Clutch Assembly (HI)	B	4-2-2,4-2-12	(C-1)	
[21]	[20]	Center Gear	B	4-2-12		
[22]	[22]	F Brake Assembly (HI)	B	4-2-2,4-2-12	*(L-6)	
[23]	[22]	Worm Holder	B	4-2-2,4-2-13	(S-9),*(L-7),*(L-8)	
[24]	[22]	Pulley Assembly (HI)	B	4-2-2,4-2-13		
[25]	[25]	Mode Gear	B	4-2-2,4-2-13	(C-2)	
[26]	[20],[25]	Mode Lever (HI)	B	4-2-2,4-2-13	(C-3)	
[27]	[22],[23], [26]	Cam Gear (A) (HI)	B	4-2-2,4-2-13	(C-4)	(+)Refer to Alignment Sec. Page 4-13
[28]	[26]	TR Gear C	B	4-2-2,4-2-13	(C-5)	
[29]	[28]	TR Gear Spring	B	4-2-13		
[30]	[29]	TR Gear A/B	B	4-2-13		
[31]	[31]	FF Arm (HI)	B	4-2-1,4-2-13		
[32]	[26]	Idler Assembly (HI)	B	4-2-1,4-2-14	*(L-9)	
[33]	[26]	BT Arm	B	4-2-2,4-2-14	*(P-5)	

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[34]	[26]	Loading Arm (SP) Assembly	B	4-2-2,4-2-14		(+)Refer to Alignment Sec.Page 4-13
[35]	[34]	Loading Arm (TU) Assembly	B	4-2-2,4-2-14		(+)Refer to Alignment Sec.Page 4-13
[36]	[16],[26]	M Brake (TU) Assembly (HI)	T	4-2-1,4-2-15		
[37]	[2],[26]	M Brake (SP) Assembly (HI)	T	4-2-1,4-2-15	*(P-6)	
[38]	[37]	Tension Lever Assembly	T	4-2-1,4-2-15		
[39]	[38]	T Lever Holder	T	4-2-15	*(L-10)	
[40]	[40]	M Gear (HI)	T	4-2-1,4-2-15	(C-6)	
[41]	[15],[40]	Sensor Gear (HI)	T	4-2-1,4-2-15	(C-7)	
[42]	[36],[40]	Reel T	T	4-2-1,4-2-15		
[43]	[38]	Reel S	T	4-2-1,4-2-15		
[44]	[34],[38]	Moving Guide S Preparation	T	4-2-1,4-2-16		
[45]	[35]	Moving Guide T Preparation	T	4-2-1,4-2-16		
[46]	[19]	TG Post Assembly	T	4-2-1,4-2-16	*(L-11)	
[47]	[27]	Rack Assembly	R	4-2-17		(+)Refer to Alignment Sec.Page 4-13
[48]	[47]	F Door Opener	R	4-2-17		
[49]	[49]	Cleaner Assembly	T	4-2-1,4-2-6		
[50]	[49]	CL Post	T	4-2-6	*(L-12)	

↓ ↓ ↓ ↓ ↓ ↓ ↓
 (1) (2) (3) (4) (5) (6) (7)

(1): Follow steps in sequence. When reassembling, follow the steps in reverse order.

These numbers are also used as identification (location) No. of parts in the figures.

(2): Indicates the part to start disassembling with in order to disassemble the part in column (1).

(3): Name of the part

(4): Location of the part: T=Top B=Bottom R=Right L=Left

(5): Figure Number

(6): Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.

P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder

e.g., 2(L-2) = two Locking Tabs (L-2).

(7): Adjustment Information for Installation

(+):Refer to Deck Exploded Views for lubrication.

Top View

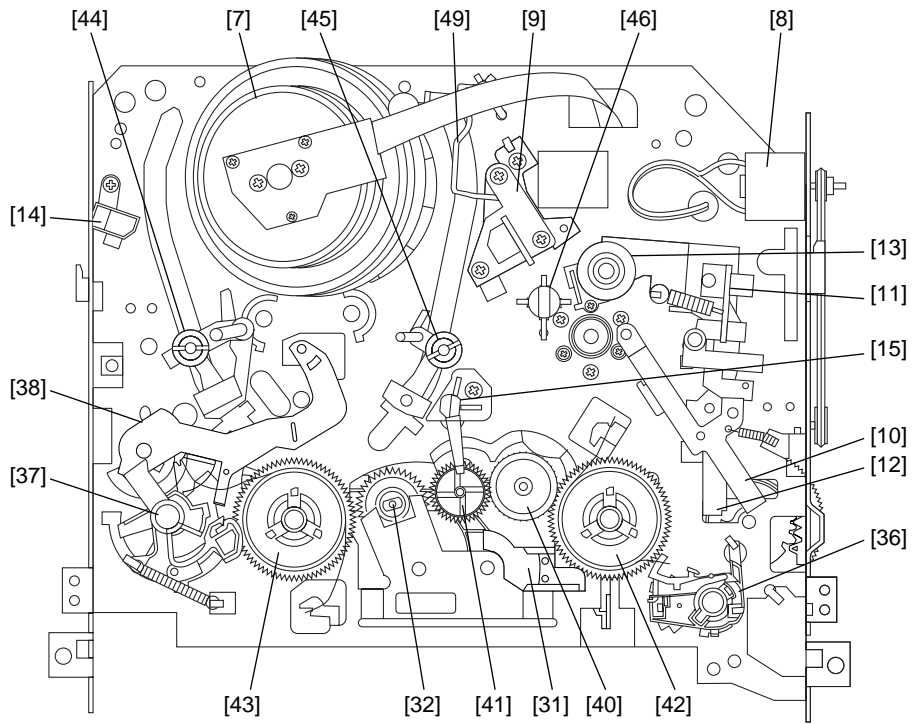


Fig. 4-2-1

Bottom View

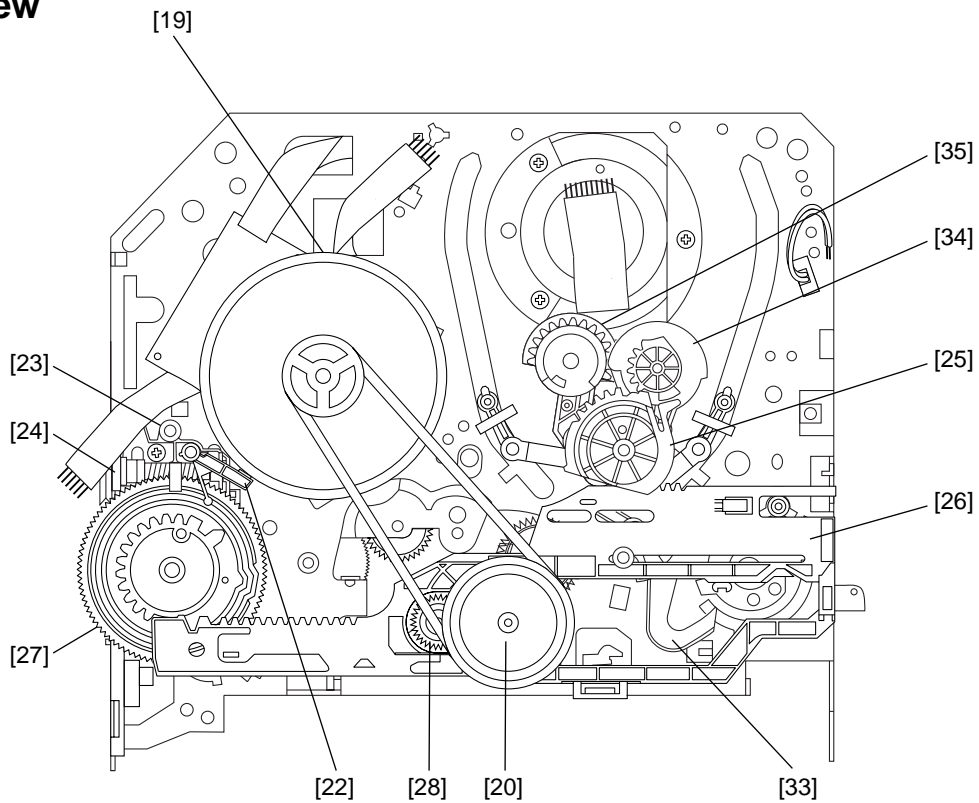


Fig. 4-2-2

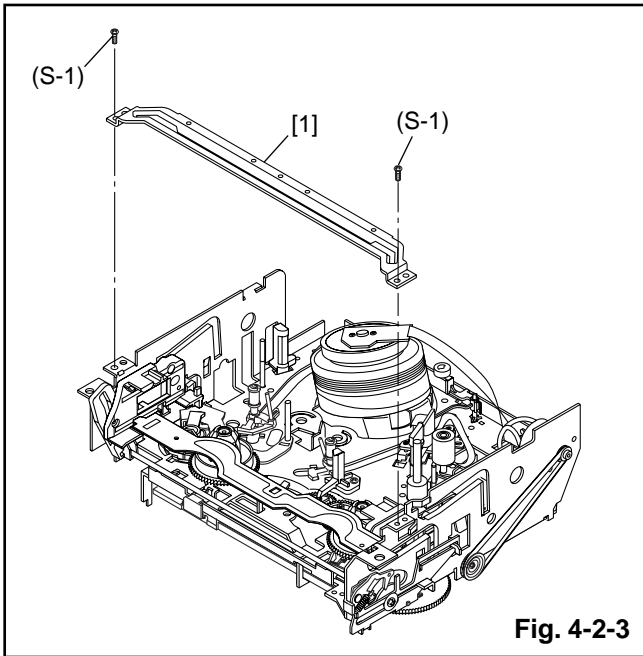


Fig. 4-2-3

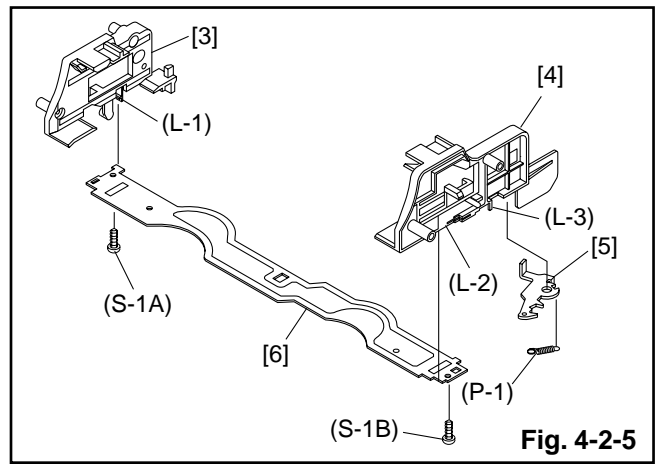


Fig. 4-2-5

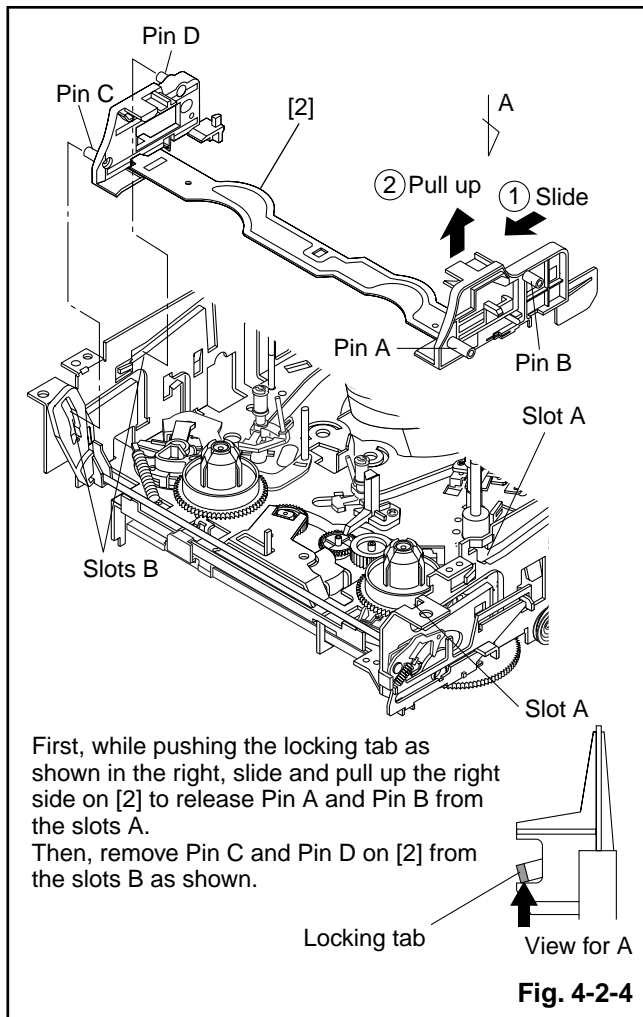


Fig. 4-2-4

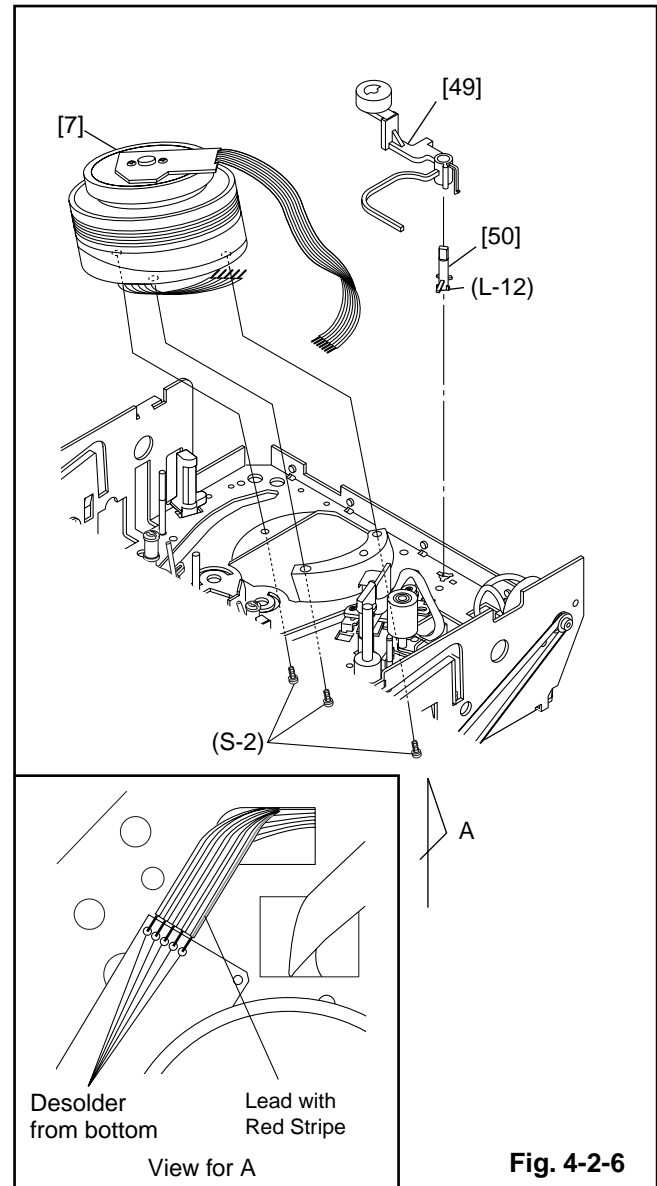


Fig. 4-2-6

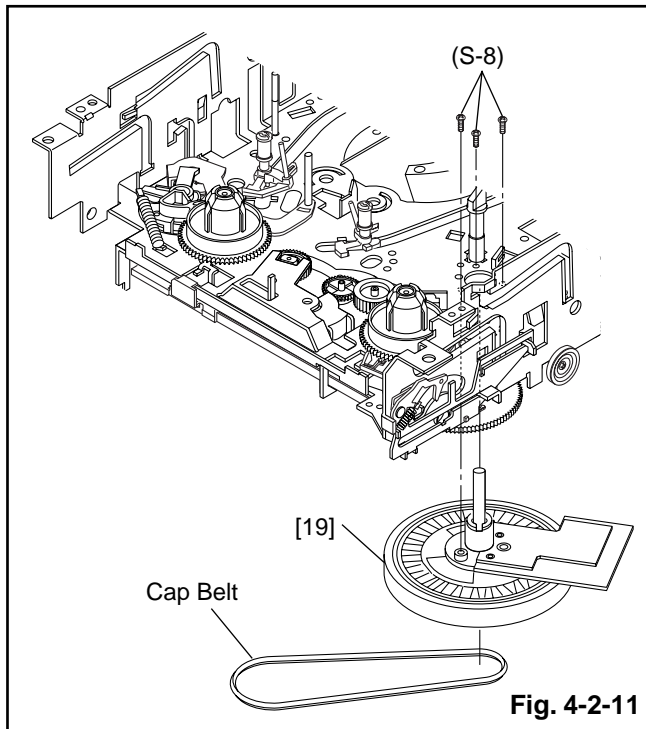


Fig. 4-2-11

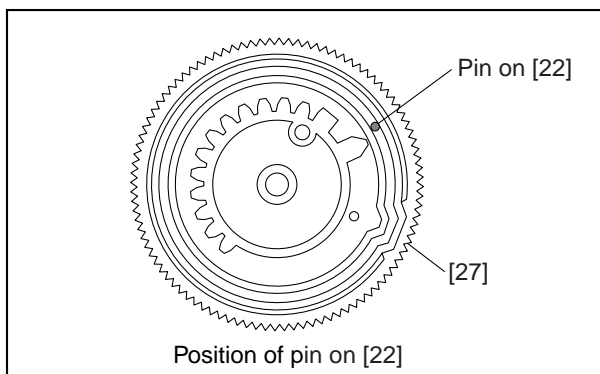
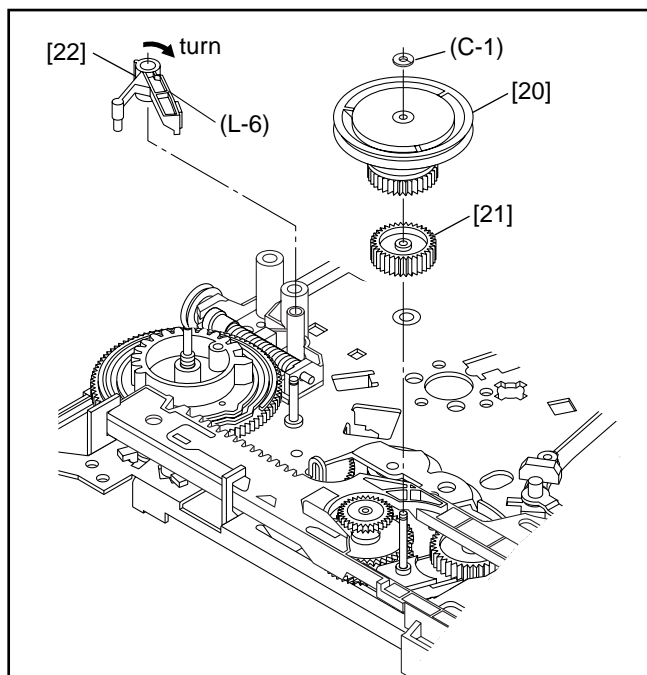


Fig. 4-2-12

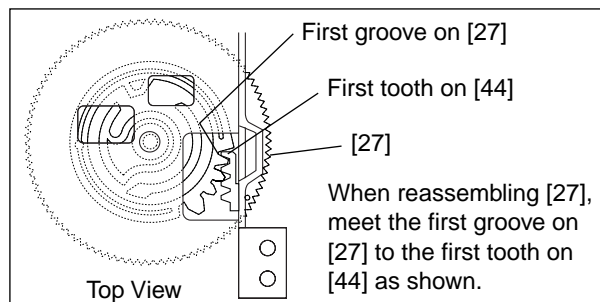
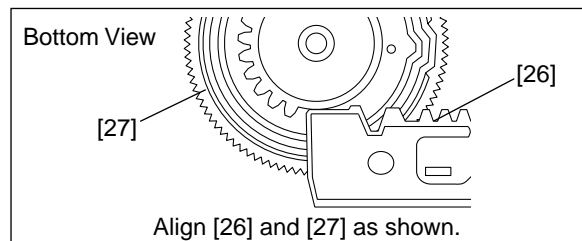
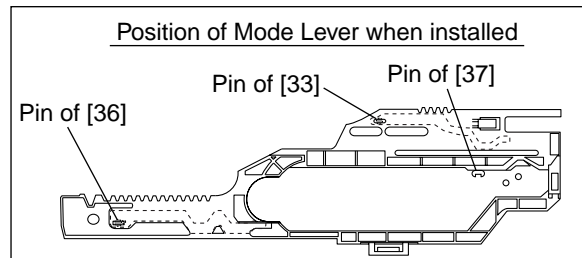
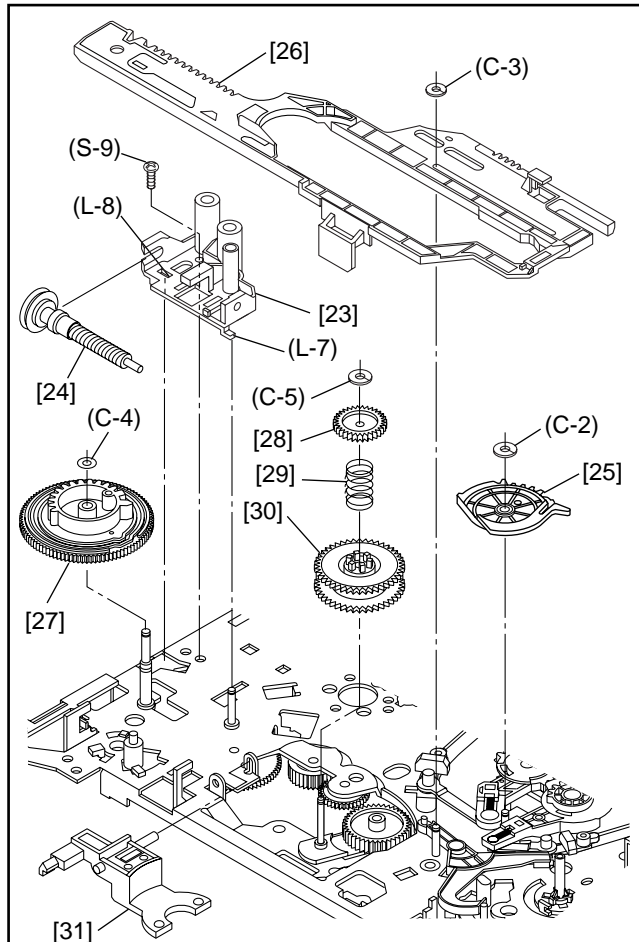
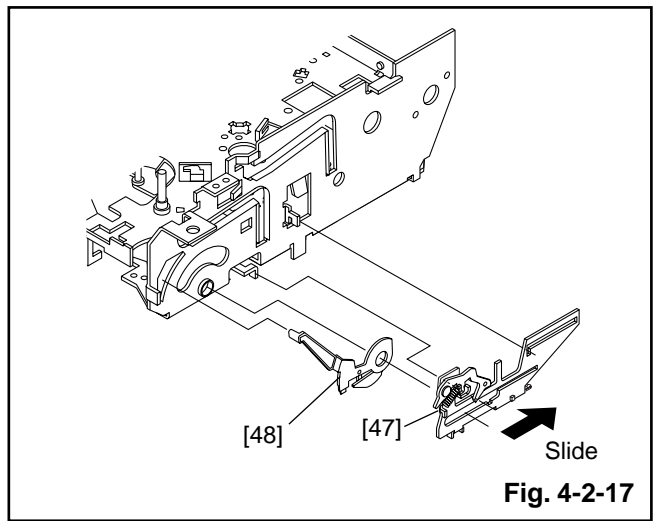
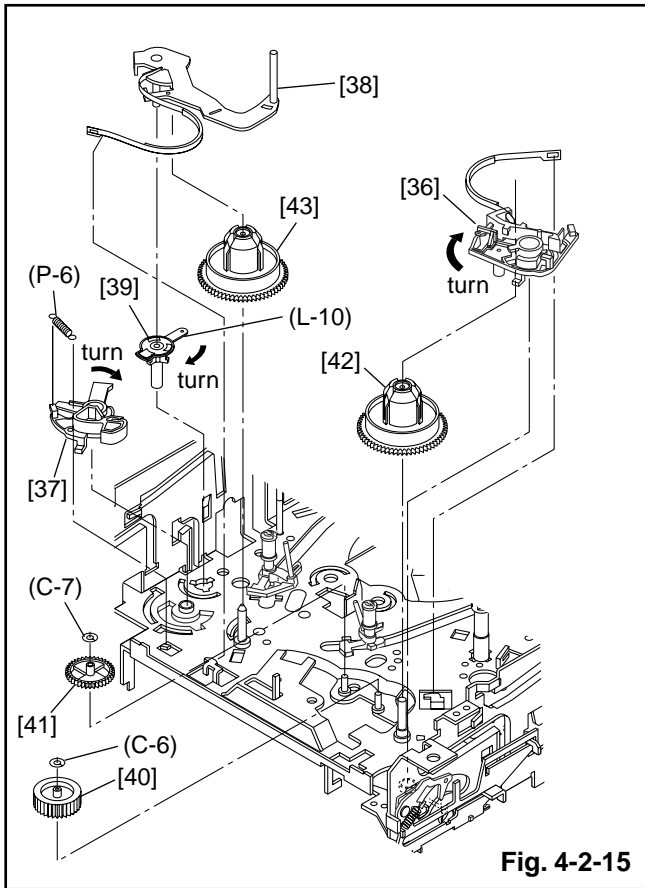
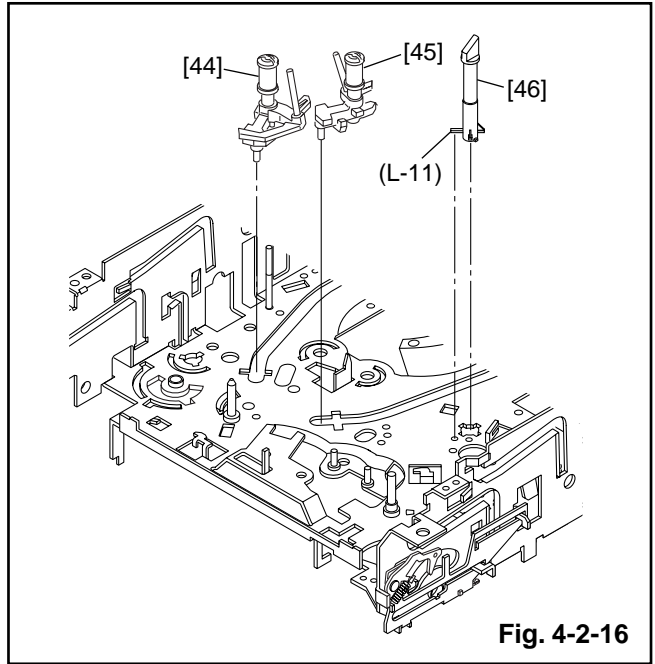
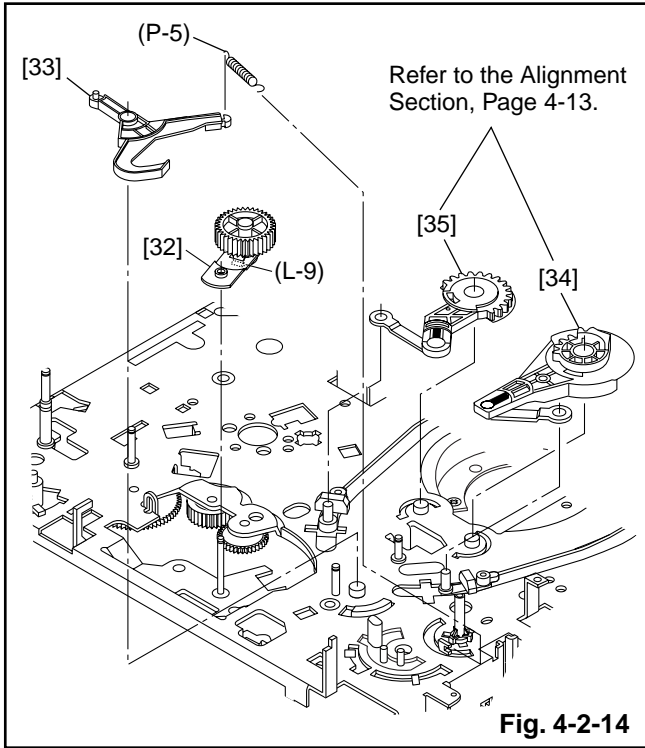


Fig. 4-2-13



4-3 ALIGNMENT PROCEDURES OF MECHANISM

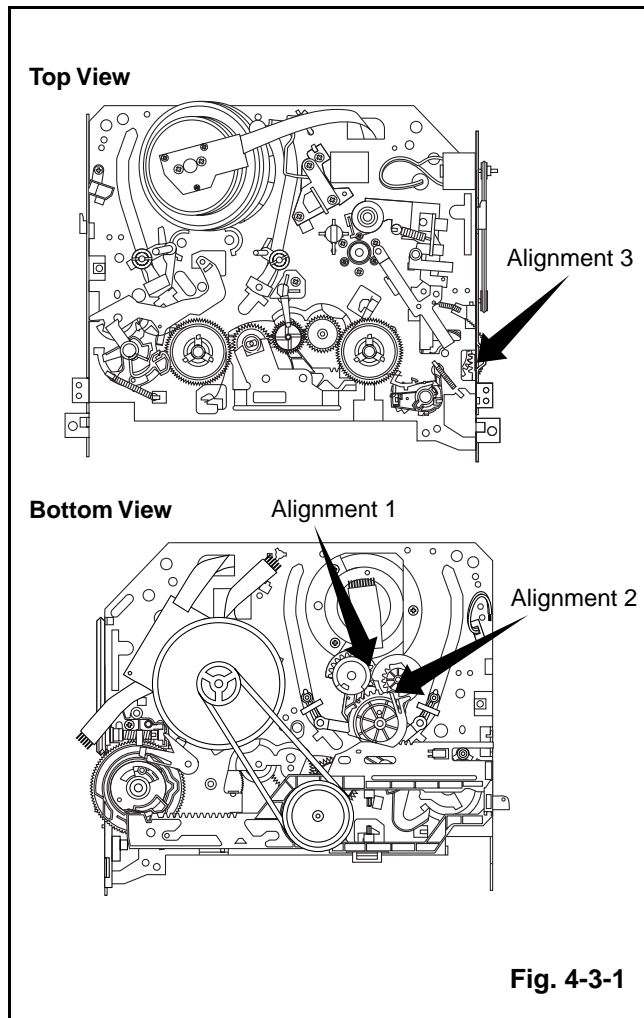
The following procedures describe how to align the individual gears and levers that make up the tape loading/unloading mechanism. Since information about the state of the mechanism is provided to the System Control Circuit only through the Mode Switch, it is essential that the correct relationship between individual gears and levers be maintained.

All alignments are to be performed with the mechanism in Eject mode, in the sequence given. Each procedure assumes that all previous procedures have been completed.

IMPORTANT:

If any one of these alignments is not performed properly, even if off by only one tooth, the unit will unload or stop and it may result in damage to the mechanical or electrical parts.

Alignment points in Eject Position



Alignment 1

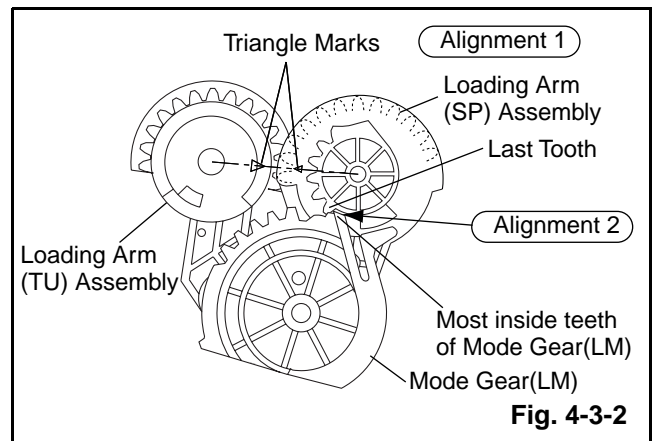
Loading Arm (SP) and (TU) Assembly

Install Loading Arm (SP) and (TU) Assembly so that their triangle marks point to each other as shown in Fig. 4-3-2.

Alignment 2

Mode Gear

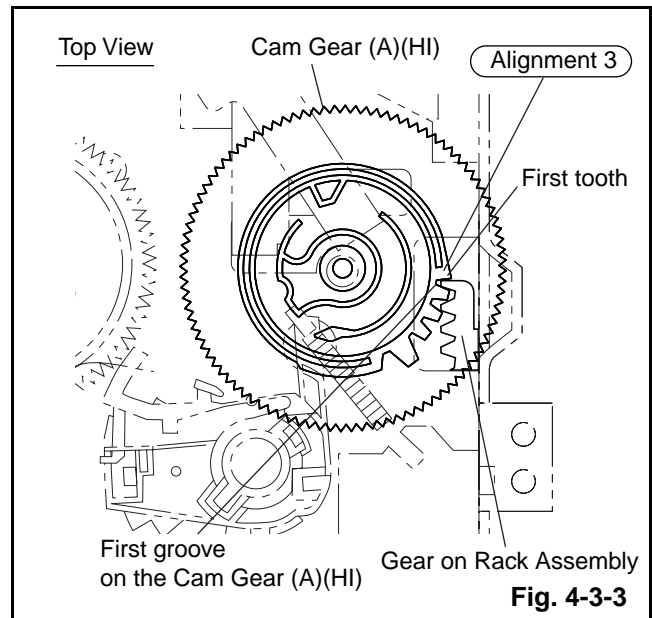
Keeping the two triangles pointing at each other, install the Loading Arm (TU) Assembly so that the last tooth of the gear meets the most inside teeth of the Mode Gear. See Fig. 4-3-2.



Alignment 3

Cam Gear (A)(HI), Rack Assembly

Install the Rack Assembly so that the first tooth on the gear of the Rack Assembly meets the first groove on the Cam Gear (A)(HI) as shown in Fig. 4-3-3.



5-1 PREPARATION FOR SERVICING

5-1-1 How to Enter the Service Mode

About Optical Sensors

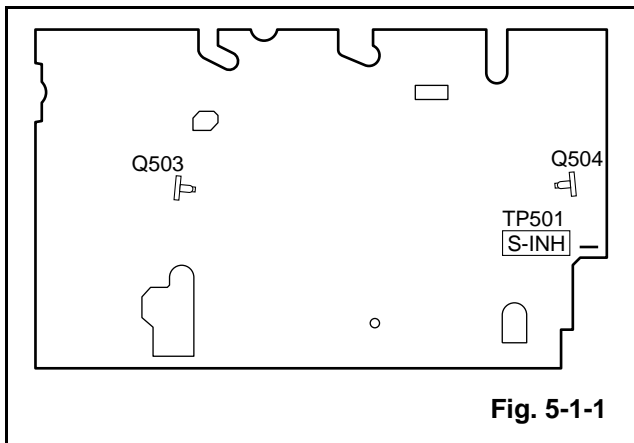
Caution:

An optical sensor system is used for the Tape Start and End Sensors on this equipment. Carefully read and follow the instructions below. Otherwise the unit may operate erratically.

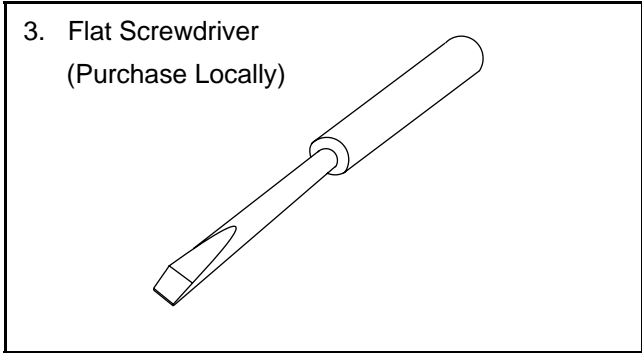
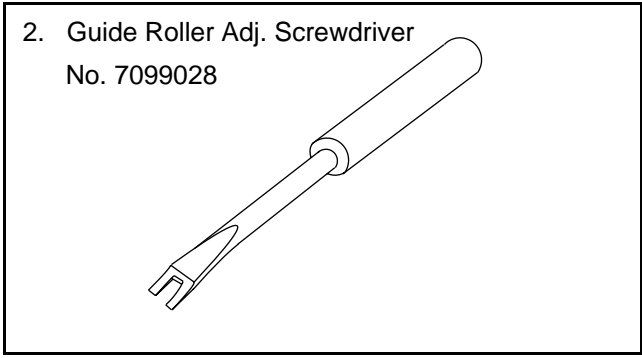
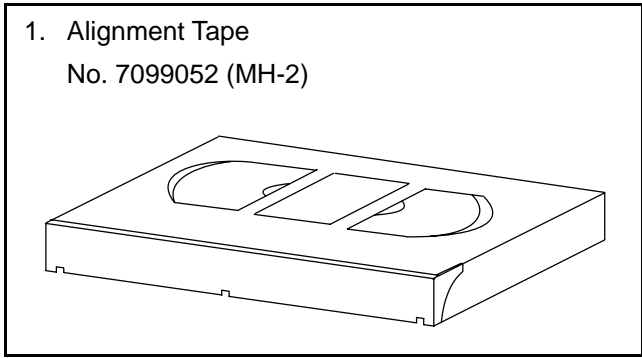
What to do for preparation

Insert a tape into the Deck Mechanism Assembly and press the PLAY button. The tape will be loaded into the Deck Mechanism Assembly. Make sure the power is on, connect TP501 (SENSOR INHIBITION) to GND. This will stop the function of Tape Start Sensor, Tape End Sensor and Reel Sensors. (If these TPs are connected before plugging in the unit, the function of the sensors will stay valid.) See Fig. 5-1-1.

Note: Because the Tape End Sensors are inactive, do not run a tape all the way to the start or the end of the tape to avoid tape damage.



5-2 FIXTURE AND TAPE FOR ADJUSTMENT



5-2-1 How To Use The Fixtures And Tape

Item No.	Name	Part No.	Adjustment
1	Alignment Tape	7099052	<ul style="list-style-type: none"> ● Head Switching Point ● Tape Interchangeability Alignment
2	Guide Roller Adj. Screwdriver	7099028	<ul style="list-style-type: none"> ● Guide Roller
3	Flat Screwdriver	Purchase Locally	<ul style="list-style-type: none"> ● X Value Alignment

5-3 ELECTRICAL ADJUSTMENT INSTRUCTIONS

General Note: "CBA" is an abbreviation for "Circuit Board Assembly."

NOTE:

1. Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to do these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.
2. To perform these alignment / confirmation procedures, make sure that the tracking control is set in the center position: Press either "CHANNEL ▼" or "CHANNEL ▲" button on the front panel first, then the "PLAY" button on the front panel.

5-3-1 Test Equipment Required

1. Oscilloscope: Dual-trace with 10:1 probe, V-Range: 0.001~50V/Div., F-Range: DC~AC-20MHz
2. Alignment Tape (MH-2)

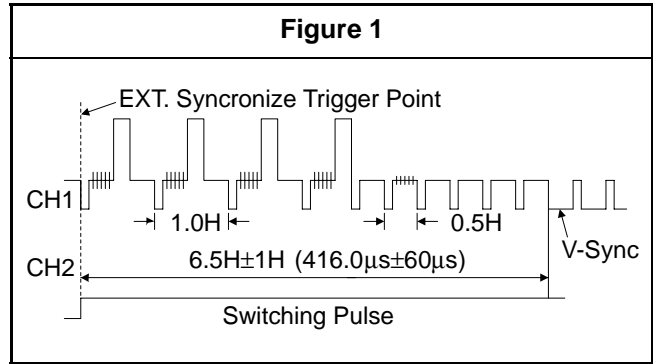
5-3-2 Head Switching Position Adjustment

Purpose:

To determine the Head Switching point during playback.

Symptom of Misadjustment:

May cause Head Switching noise or vertical jitter in the picture.

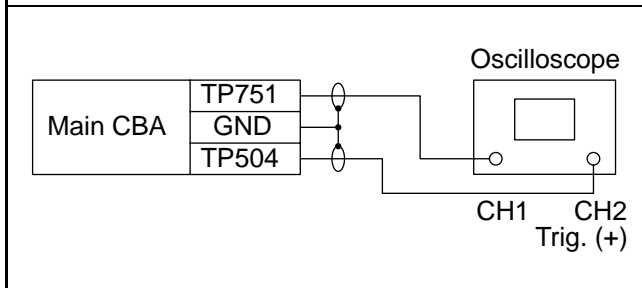


Reference Notes:

Playback the Alignment tape and adjust VR501 so that the V-sync front edge of the CH1 video output waveform is at the $6.5H \pm 1H (416.0\mu s \pm 60\mu s)$ delayed position from the rising edge of the CH2 head switching pulse waveform.

Test point	Adj. Point	Mode	Input
TP751(V-OUT) TP504(RF-SW) GND	VR501 (Switching Point) (MAIN CBA)	PLAY (SP)	----
Tape	Measurement Equipment	Spec.	
MH-2	Oscilloscope	$6.5H \pm 1H$ ($416.0\mu s \pm 60\mu s$)	

Connections of Measurement Equipment



5-4 MECHANICAL ALIGNMENT PROCEDURES

Explanation of alignment for the tape to correctly run starts on the next page. Refer to the information below on this page if a tape gets stuck, for example, in the mechanism due to some electrical trouble of the unit.

5-4-1 Service Information

A. Method for Manual Tape Loading/Unloading

To load a cassette tape manually:

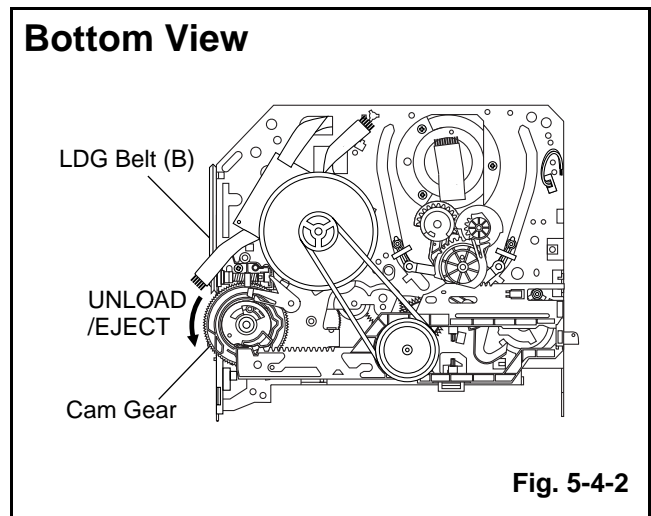
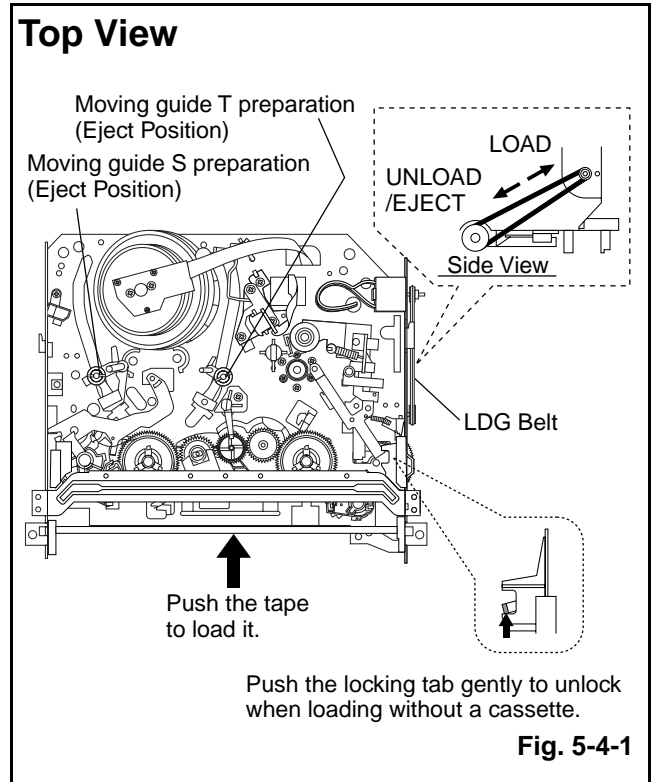
1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Insert a cassette tape. Though the tape will not be automatically loaded, make sure that the cassette tape is all the way in at the inlet of the Cassette Holder. To confirm this, lightly push the cassette tape further in and see if the tape comes back out, by a spring motion, just as much as you have pushed in.
4. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1 for a minute or two to complete this task.

To unload a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Make sure that the Moving guide preparations are in the Eject Position.
4. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1 until the Moving guide preparations come to the Eject Position. Stop turning when the preparations begin clicking or can not be moved further. However, the tape will be left wound around the cylinder.
5. Turn the LDG Belt in the appropriate direction continuously, and the cassette tape will be ejected. Allow a minute or two to complete this task.

B. Method to place the Cassette Holder in the tape-loaded position without a cassette tape

1. Disconnect the AC Plug.
2. Remove the Top Case and Front Assembly.
3. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1. Release the locking tabs shown in Fig. 5-4-1 and continue turning the LDG Belt until the Cassette Holder comes to the tape-loaded position. Allow a minute or two to complete this task.



5-4-2 Tape Interchangeability Alignment

Note:

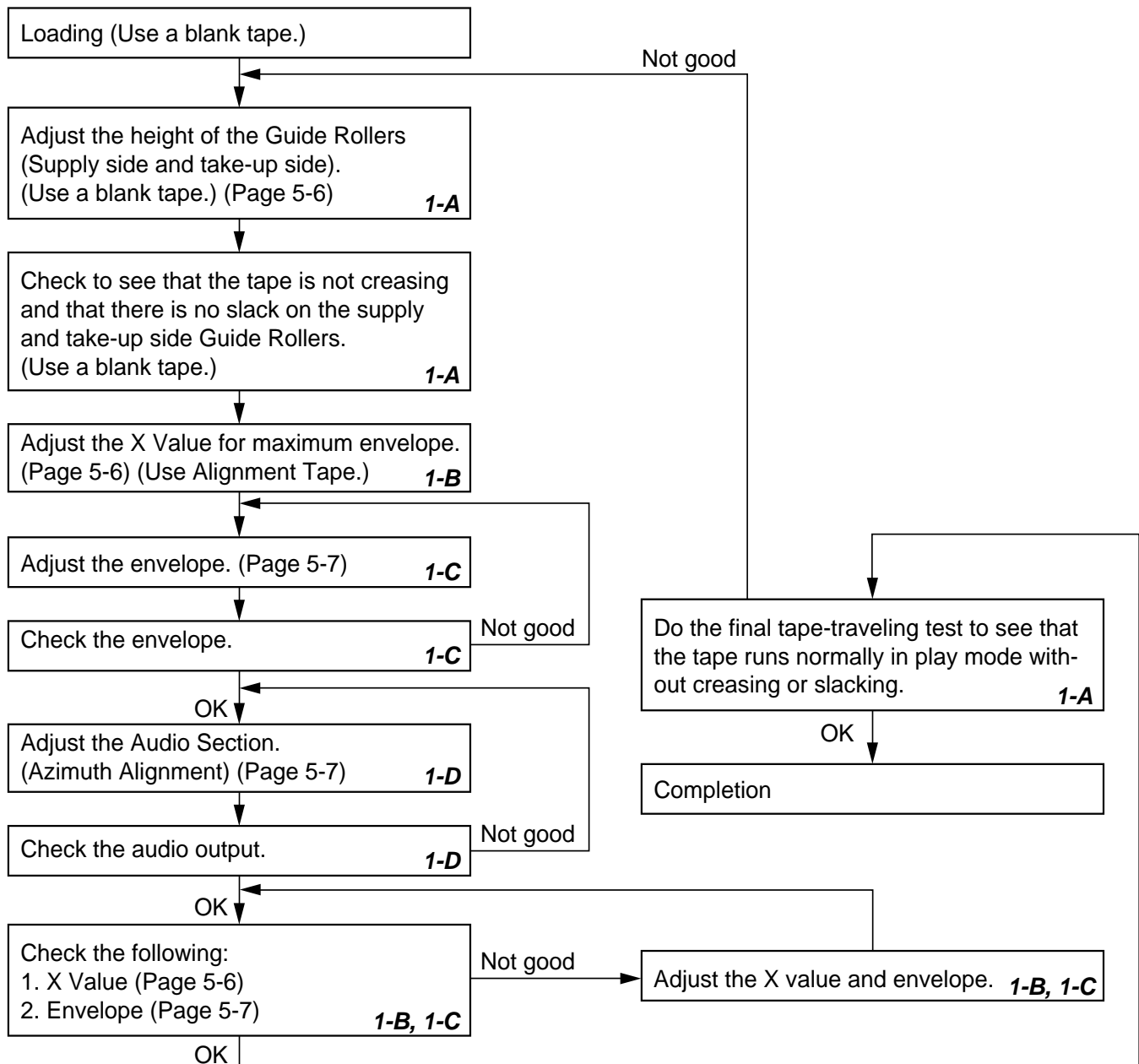
To do these alignment procedures, make sure that the Tracking Control Circuit is set to the center position every time a tape is loaded or unloaded. (Refer to page 5-7, procedure 1-C, step 2.)

Equipment required:

- Dual Trace Oscilloscope
- VHS Alignment Tape (MH-2)
- Guide Roller Adj. Screwdriver
- Flat Screwdriver (Purchase Locally)

Note: Before starting this Mechanical Alignment, do all Electrical Adjustment procedures.

Flowchart of Alignment for tape traveling



1-A. Preliminary/Final Checking and Alignment of Tape Path

Purpose:

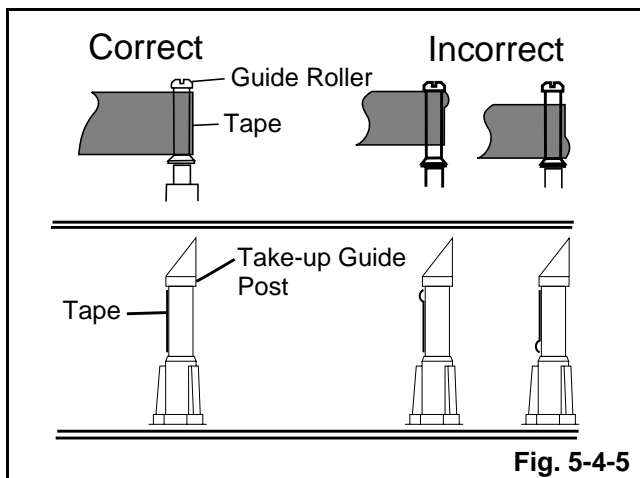
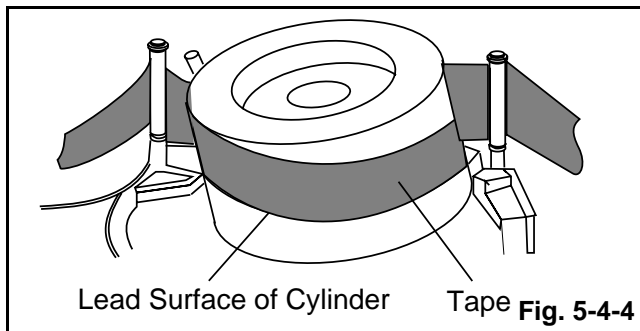
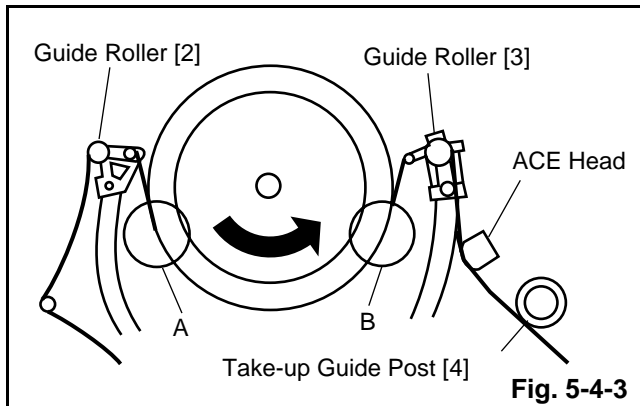
To make sure that the tape path is well stabilized.

Symptom of Misalignment:

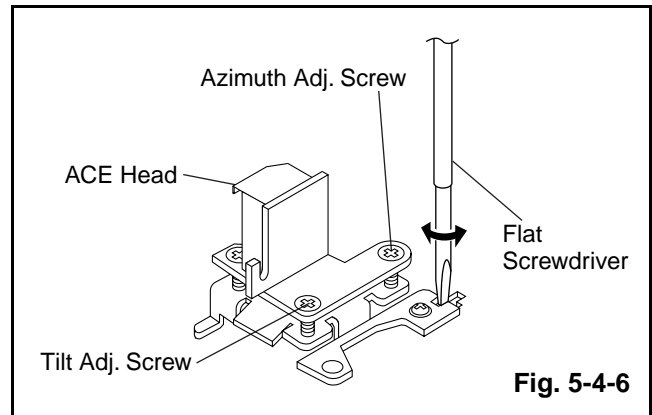
If the tape path is unstable, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Playback a blank cassette tape and check to see that the tape runs without creasing at Guide Rollers [2] and [3], and at points A and B on the lead surface. (Refer to Fig. 5-4-3 and 5-4-4.)
2. If creasing is apparent, align the height of the guide rollers by turning the top of Guide Rollers [2] and [3] with a Guide Roller Adj. Screwdriver. (Refer to Fig. 5-4-3 and 5-4-5.)



3. Check to see that the tape runs without creasing at Take-up Guide Post [4] or without snaking between Guide Roller [3] and ACE Head. (Fig. 5-4-3 and 5-4-5)
4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the ACE Head. (Fig. 5-4-6)



1-B. X Value Alignment

Purpose:

To align the Horizontal Position of the Audio/Control/ Erase Head.

Symptom of Misalignment:

If the Horizontal Position of the Audio/Control/Erase Head is not properly aligned, maximum envelope cannot be obtained at the Neutral position of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) and TP503 (CTL) on the Main CBA. Use TP504 (RF-SW) as a trigger.
2. Playback the Gray Scale of the Alignment Tape (MH-2) and confirm that the PB FM signal is present.
3. Set the Tracking Control Circuit to the center position by pressing CH UP button then "PLAY" button on the unit. (Refer to note on bottom of page 5-7.)
4. Use the Flat Screwdriver so that the PB FM signal at TP301 (C-PB) is maximum. (Fig. 5-4-6)
5. Press CH UP button on the unit until the CTL waveform has shifted by approx. +2ms. Make sure that the envelope is simply attenuated (shrinks in height) during this process so that you will know the envelope has been at its peak.

6. Press CH DOWN button on the unit until the CTL waveform has shifted from its original position (not the position achieved in step 5, but the position of CTL waveform in step 4) by approximately -2ms. Make sure that the envelope is simply attenuated (shrinks in height) once CTL waveform passes its original position and is further brought in the minus direction.
7. Set the Tracking Control Circuit to the center position by pressing CH UP button and then "PLAY" button.

1-C. Checking/Adjustment of Envelope Waveform

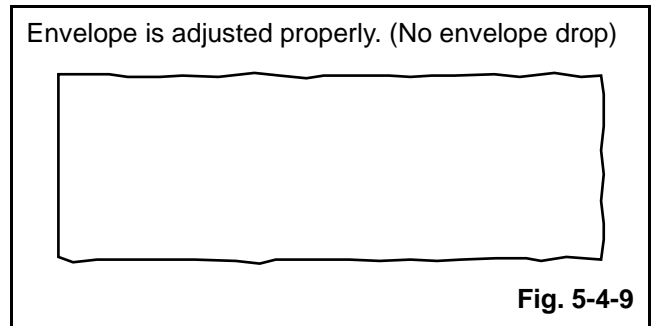
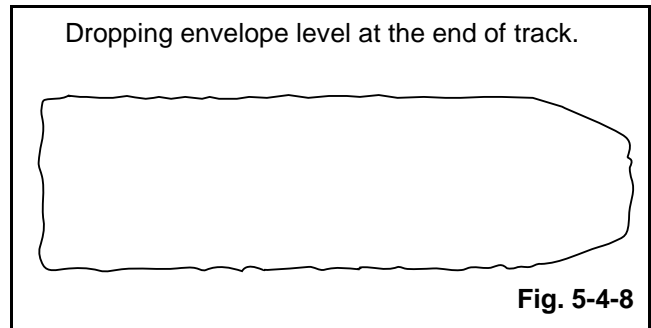
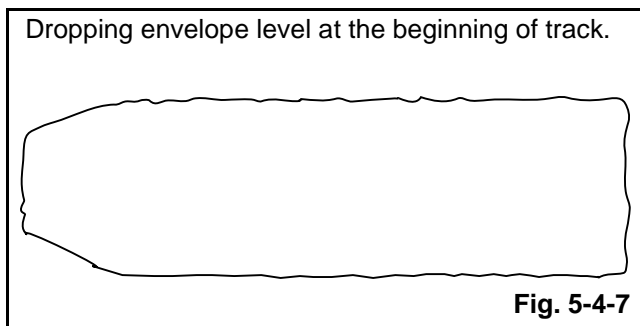
Purpose:

To achieve a satisfactory picture and precise tracking.

Symptom of Misalignment:

If the envelope output is poor, noise will appear in the picture. The tracking will then lose precision and the playback picture will be distorted by any slight variation of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) on the Main CBA. Use TP504 (RF-SW) as a trigger.
2. Playback the Gray Scale on the Alignment Tape (MH-2). Set the Tracking Control Circuit to the center position by pressing CH UP button and then "PLAY" button on the unit. Adjust the height of Guide Rollers [2] and [3] (Fig. 5-4-3, Page 5-6) watching the oscilloscope display so that the envelope becomes as flat as possible. To do this adjustment, turn the top of the Guide Roller with the Guide Roller Adj. Screwdriver.
3. If the envelope is as shown in Fig. 5-4-7, adjust the height of Guide Roller [2] (Refer to Fig. 5-4-3) so that the waveform looks like the one shown in Fig. 5-4-9.
4. If the envelope is as shown in Fig. 5-4-8, adjust the height of Guide Roller [3] (Refer to Fig. 5-4-3) so that the waveform looks like the one shown in Fig. 5-4-9.
5. When Guide Rollers [2] and [3] (Refer to Fig.5-4-3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. 5-4-9.



Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. 5-4-3), check the X Value by pushing the CH UP or DOWN buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure center position. The number of pushes CH UP button to achieve 1/2 level of envelope should match the number of pushes CH DOWN button from center. If required, redo the "X Value Alignment."

1-D. Azimuth Alignment of Audio/Control/ Erase Head

Purpose:

To correct the Azimuth alignment so that the Audio/Control/Erase Head meets tape tracks properly.

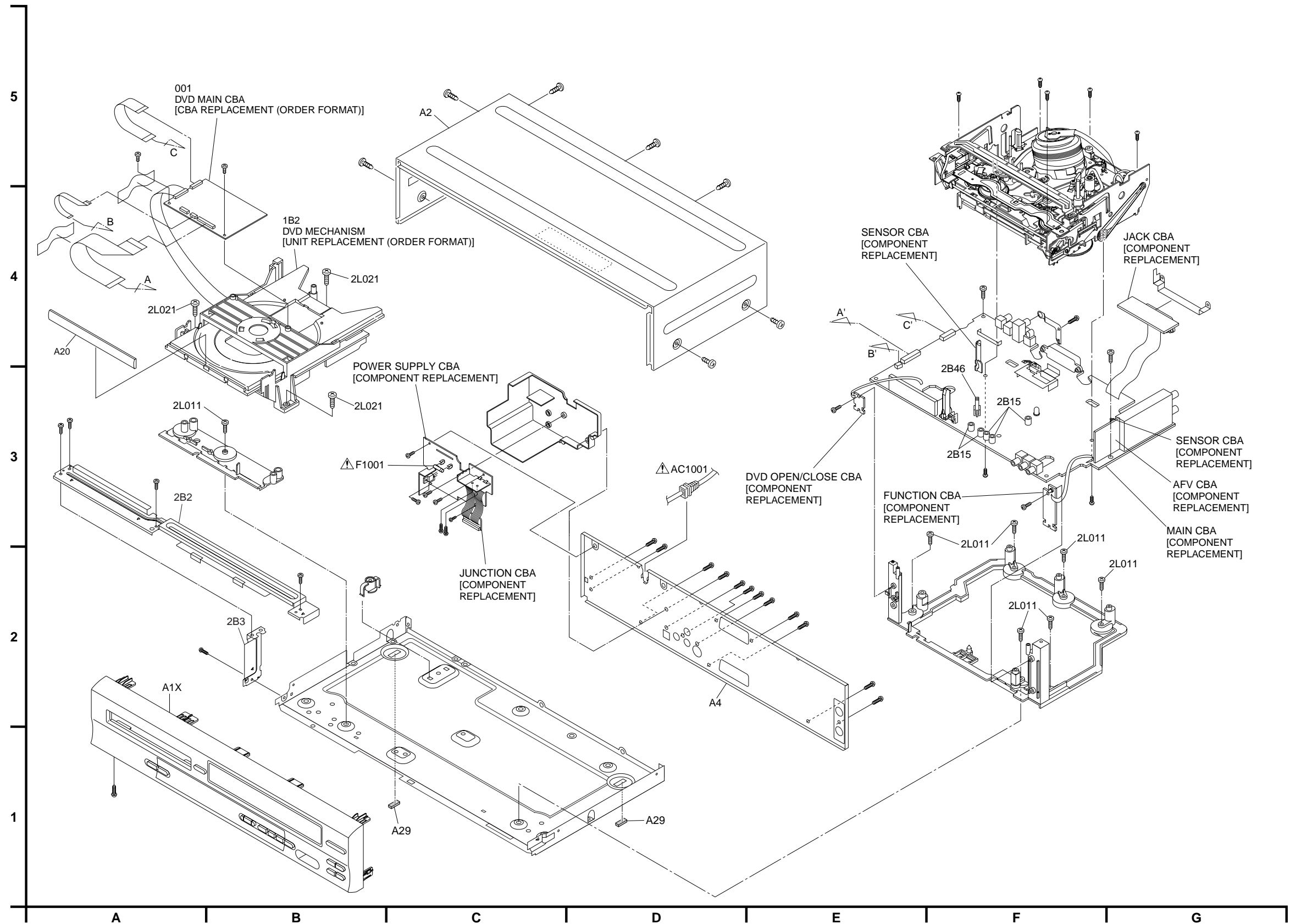
Symptom of Misalignment:

If the position of the Audio/Control/Erase Head is not properly aligned, the Audio S/N Ratio or Frequency Response will be poor.

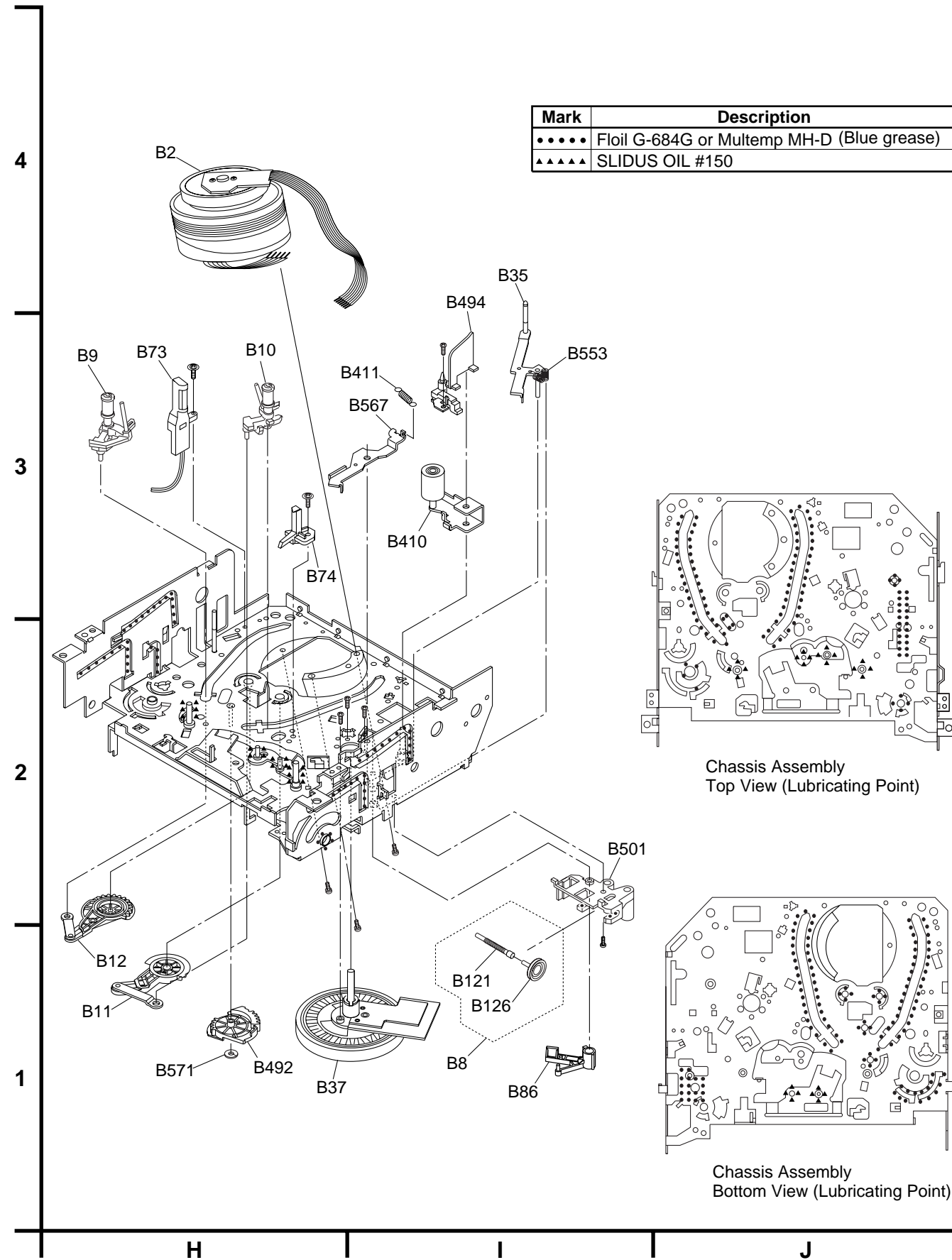
1. Connect the oscilloscope to the audio output jack on the rear side of the deck.
2. Playback the alignment tape (MH-2) and confirm that the audio signal output level is 8kHz.
3. Adjust Azimuth Adj. Screw so that the output level on the AC Voltmeter or the waveform on the oscilloscope is at maximum. (Fig. 5-4-6)

6-1 EXPLODED VIEWS

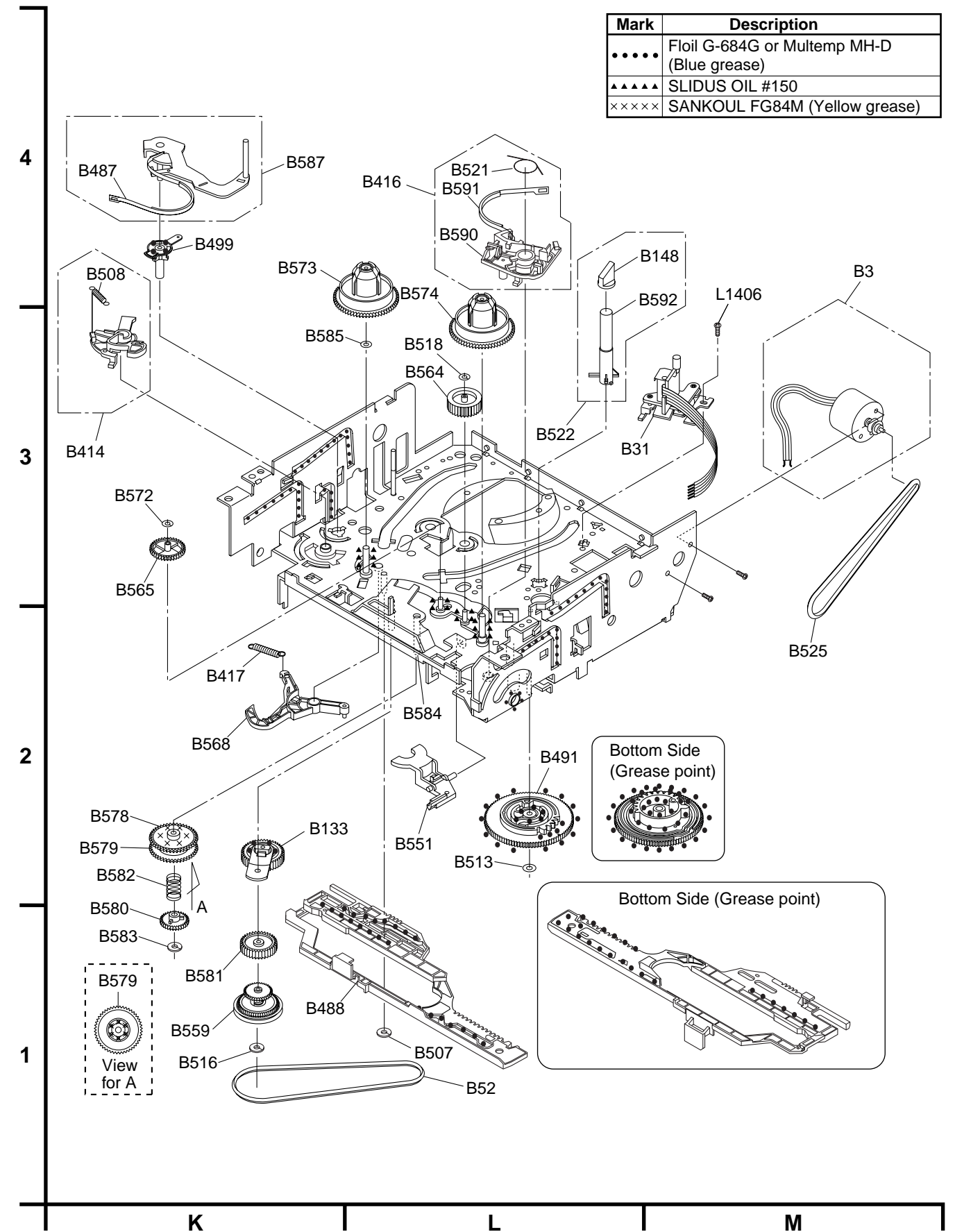
6-1-1 Cabinet Section



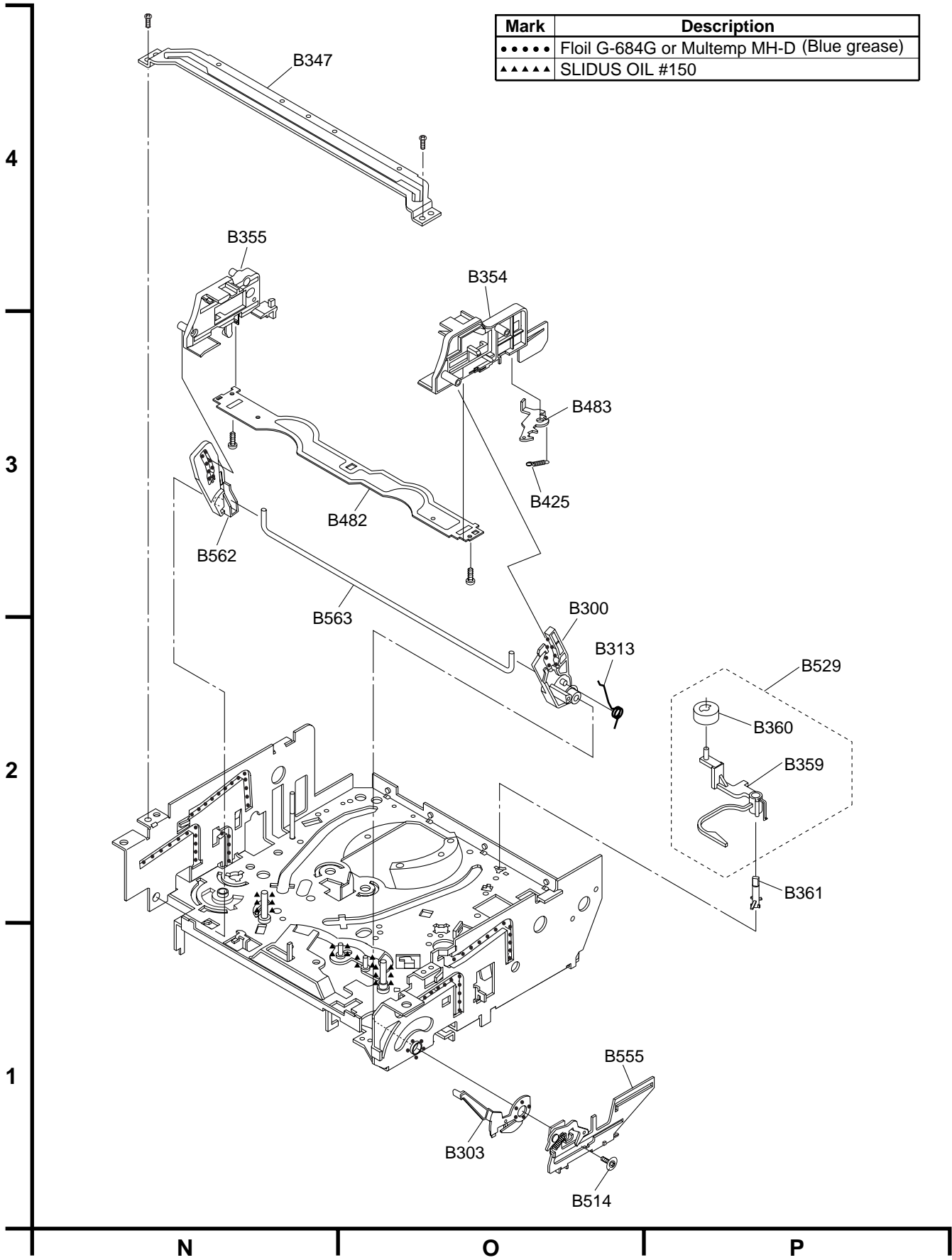
6-1-2 Deck Mechanism View 1 Section



6-1-3 Deck Mechanism View 2 Section



6-1-4 Deck Mechanism View 3 Section



6-2 REPLACEMENT PARTS LIST

6-2-1 Mechanical Parts List

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
MECHANISM SECTION			B487	TJ16911	BAND BRAKE(SP)
A1X	TJ17389	FRONT ASSEMBLY	B488	TJ17198	MODE LEVER
A2	TS18404	TOP COVER	B491	TJ16946	CAM GEAR(A)
A4	TJ17391	PANEL REAR	B492	TJ17199	MODE GEAR
			B494	TJ16915	CASSETTE DOOR OPENER
A20	TJ16942	PANEL TRAY	B499	TJ16916	T LEVER HOLDER
A29	TJ15943	FOOT	B501	TJ16917	WORM HOLDER
△ AC1001	TJ17382	AC CORD	B507	TJ14034	REEL WASHER
1B2	TS18405	DVD MECHA	B508	TJ16947	BRAKE SPRING(S)
2B2	TJ16877	TOP BRACKET	B513	TJ10229	CAM WASHER
2B3	TJ15946	SIDE BRACKET	B514	TJ15202	SCREW RACK
2B15	TJ15122	BUSH, LED(F)	B516	TJ14034	REEL WASHER
2B46	TJ15314	ROHM HOLDER	B518	TJ15203	WASHER
2L011	TJ15952	SCREW (3X8)	B521	TJ16948	REV BRAKE SPRING
2L021	TJ16882	SCREW (M3X26)	B522	TJ15206	TG POST ASSEMBLY
B2	TS18628	CYLINDER ASSEMBLY	B525	TJ16001	LDG BELT
B3	TS18445	LOADING MOTOR ASSEMBLY	B529	TJ15106	CLEANER ASSEMBLY
B8	TS18446	PULLEY ASSEMBLY	B551	TJ16949	FF ARM(HI)
B9	TJ16892	MOVING GUIDE (S) PREPARATION	B553	TJ16003	REV SPRING
B10	TJ16893	MOVING GUIDE (T) PREPARATION	B555	TS18422	RACK ASSEMBLY
B11	TJ16894	LOADING ARM(TU) ASSEMBLY	B559	TS18452	CLUTCH ASSEMBLY
B12	TJ16895	LOADING ARM(SP) ASSEMBLY	B562	TJ16924	CASSETTE DRIVE LEVER
B31	TS18415	AC HEAD ASSEMBLY	B563	TJ16925	SLIDER SHAFT
B35	TS18416	TAPE GUIDE ARM ASSEMBLY	B564	TJ16951	M GEAR
B37	TJ16956	CAPSTAN MOTOR	B565	TJ16952	SENSOR GEAR
B52	TJ15161	CAP BELT	B567	TJ16928	PINCH ARM(B)
B73	TS17449	FE HEAD ASSEMBLY	B568	TJ16929	BT ARM
B74	TJ15163	PRISM	B571	TJ15203	WASHER
B86	TS18447	F BRAKE ASSEMBLY	B572	TJ15203	WASHER
B121	TJ16896	WORM	B573	TJ16007	REEL (S)
B126	TJ17196	PULLEY	B574	TJ16008	REEL (T)
B133	TS18448	IDLER ASSEMBLY	B578	TJ15306	TR GEAR A
B148	TE12612	TG CAP	B579	TJ16953	TR GEAR B
B300	TJ16901	CASSETTE DRIVE LEVER(TU)	B580	TJ17388	TR GEAR C
B303	TJ16902	F DOOR OPENER	B581	TJ16172	CENTER GEAR
B313	TJ16903	CASSETTE DRIVE SPRING	B582	TJ15311	TR GEAR SPRING
B347	TJ15987	GUIDE HOLDER A	B583	TJ16919	CAM WASHER
B354	TJ17197	SLIDER(TU)	B584	TJ15312	TR GEAR SHAFT
B355	TJ17386	SLIDER(SP)	B585	TJ16039	WASHER
B359	TJ15103	CLEANER LEVER	B587	TS18424	TENSION LEVER ASSEMBLY
B360	TJ15104	CLEANER ROLLER	B590	TJ17202	BRAKE ARM(TU)
B361	TJ15105	CL POST	B591	TJ16935	BAND BRAKE(TU)
B410	TJ17387	PINCH ARM ASSEMBLY	B592	TJ16955	TG POST
B411	TJ16906	PINCH SPRING	L1406	TJ15238	AC HEAD SCREW
B414	TS18449	M BRAKE(SP) ASSEMBLY	001	TJ17394	DVD MAIN CBA UNIT
B416	TS18451	M BRAKE(TU) ASSEMBLY	ACCESSORIES		
B417	TJ16944	TENSION SPRING	X1	TS18356	REMOTE CONTROL UNIT
B425	TJ15185	LOCK LEVER SPRING	X3	TJ14683	RF CORD
B482	TJ16908	CASSETTE PLATE	X6	TJ15698	AV CORD
B483	TJ16909	LOCK LEVER			

6-2-2 Electrical Parts List

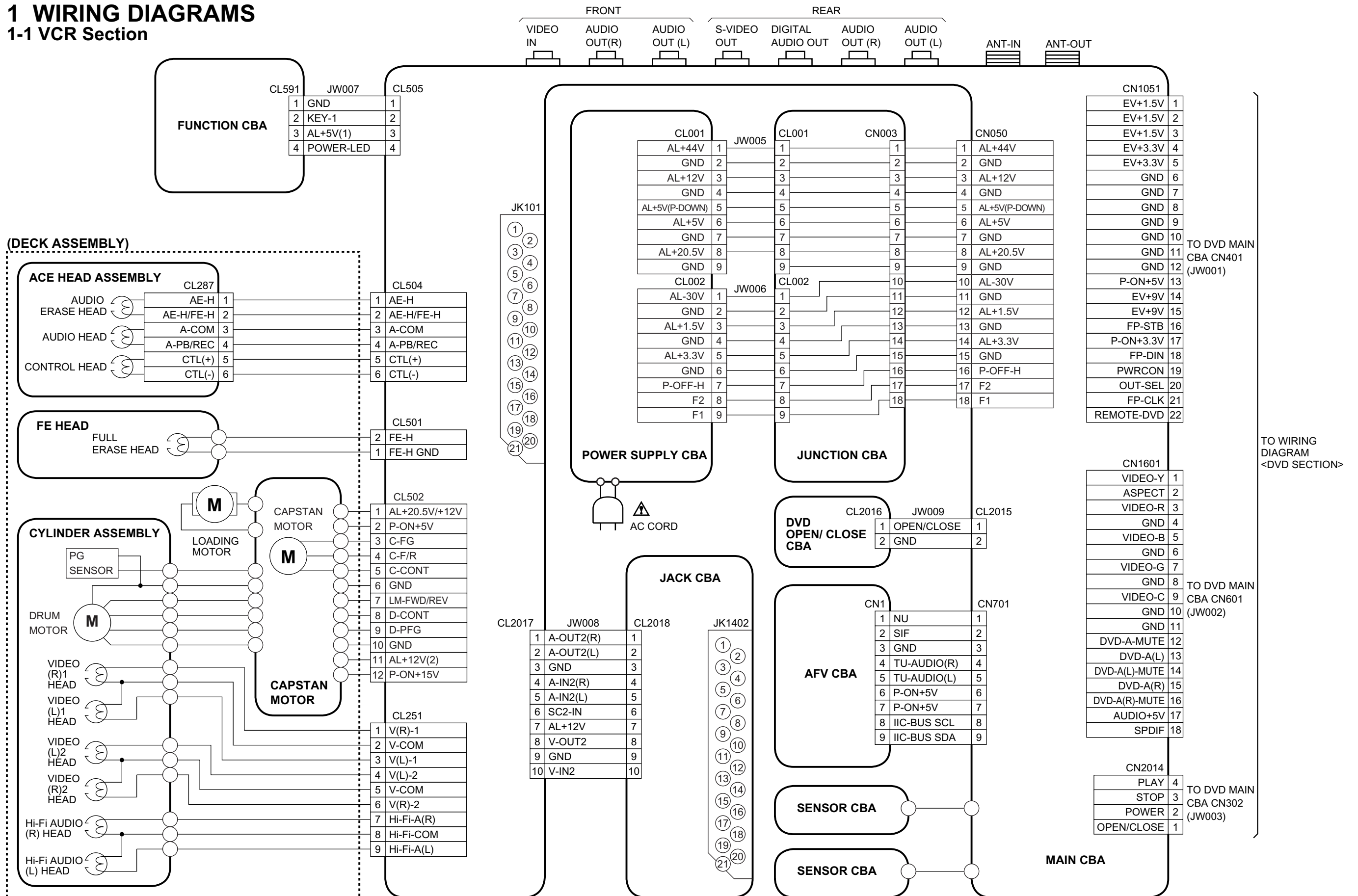
Note: Although some parts in the schematic diagrams have different names from those in the parts list, there is no problem in replacing parts.

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTOR			CN1	TE15287	ANGLE PIN HEADER 9P
			CN701	TS17736	AFV PCB ASSEMBLY
VR501	TA14561	CARBON P.O.T. 100K OHM B	CN1051	TE15481	FMN CONNECTOR 22P
SEMI-CONDUCTORS			CN1601	TE15111	FMN CONNECTOR 18P
D555	TJ13898	LED SIR-563ST3F Q	△ F1001	TJ14705	FUSE T1.6AL/250V
D501	TJ15414	LED(RED) 204HD/E	FH1001	TE11084	FUSE HOLDER
D502	TC12491	LED(GREEN) 204-10GD/S957	FH1002	TE11084	FUSE HOLDER
D503	TC12491	LED(GREEN) 204-10GD/S957	JK751	TE15133	RCA JACK
D504	TJ15414	LED(RED) 204HD/E	JK752	TJ15136	RCA JACK(YELLOW)
			JK1202	TE15134	RCA JACK(BLACK)
D592	TJ15414	LED(RED) 204HD/E	JK1401	TE14821	S TYPE JACK
D593	TJ15414	LED(RED) 204HD/E	JW009	TE15239	FLAT CABLE, 2P
IC1	TC12622	IC MSP3417G-QG-B8	SW501	TE11957	TACT SWITCH
IC301	TC12616	IC LA71750EM-MPB-E	SW506	TE15484	LEAF SWITCH
IC451	TC12731	IC LA72648M-MPB-E	SW507	TE15485	ROTARY MODE SWITCH
IC501	TJ17396	IC M37762MCA-AD0GP	SW591	TE11957	TACT SWITCH
IC502	TJ15338	IC BR24C02F-W	SW592	TE11957	TACT SWITCH
IC611	TE15471	IC 7-BT-292GN	SW593	TE11957	TACT SWITCH
IC612	TC12684	IC PT6313-S-TP	SW594	TE11957	TACT SWITCH
IC751	TC12531	IC TC4053BF(N)	SW595	TE11957	TACT SWITCH
△ IC1001	TC12221	PHOTOCOUPLER EL817B	SW601	TE11957	TACT SWITCH
IC1051	TC12682	VOLTAGE REGULATOR PQ070XF01SZ	SW602	TE11957	TACT SWITCH
IC1052	TC12682	VOLTAGE REGULATOR PQ070XF01SZ	SW603	TE11957	TACT SWITCH
IC1201	TC12251	IC KIA4558P	SW2020	TE11957	TACT SWITCH
IC1204	TC12261	TRANS.MODULE 0C-0805T*002	SW2021	TE11957	TACT SWITCH
IC1402	TC12661	IC MM1567AJBE	SW2022	TE11957	TACT SWITCH
Q1001	TJ17383	FET 2SK3566	TU701	TJ17397	TUNER UNIT TMDG2-731A
PS502	TJ15282	PHOTO INTERRUPTER RPI-302C70			
RM2001	TC12331	REMOTE RECEIVER PIC-37043LU			
TRANSFORMER					
△ T001	TJ17384	SWITCHING TRANSFORMER			
COILS					
L101	TA12575	BEAD CORE			
L102	TA12575	BEAD CORE			
L1001	TA12575	BEAD CORE			
L1002	TA12575	BEAD CORE			
△ L1003	TJ17398	LINE FILTER 56MH			
L1004	TA12575	BEAD CORE			
J9	TA12575	BEAD CORE			
J922	TA12575	BEAD CORE			
COILS					
X1	TC12623	X'TAL 18.432MHZ			
X301	TJ14708	X'TAL 4.433619MHZ			
X501	TE15284	X'TAL 12.000MHZ			
X502	TJ15148	X'TAL 32.768KHZ(20PPM)			
MISCELLANEOUS					

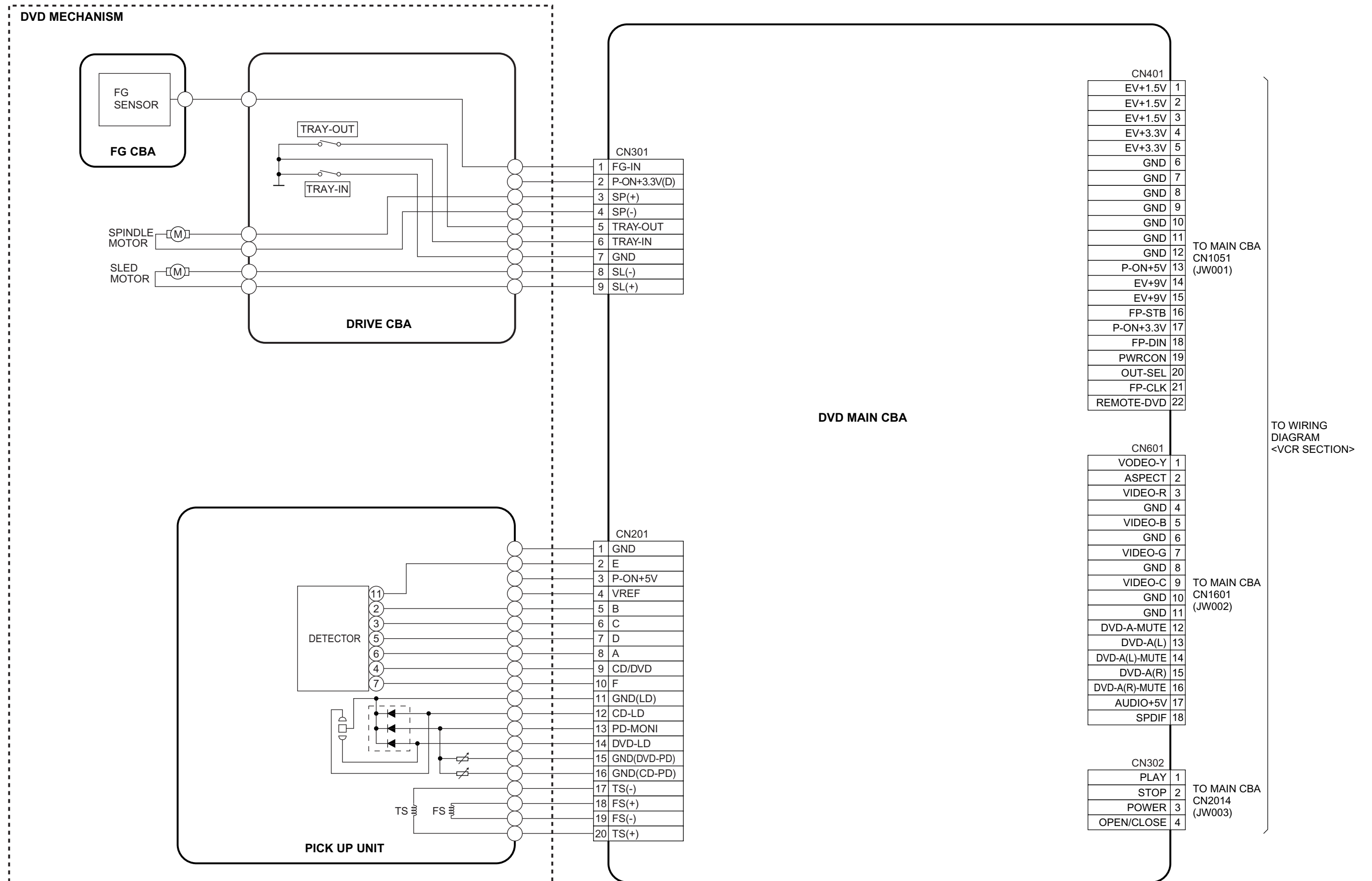
SCHEMATIC, CIRCUIT BOARD AND BLOCK DIAGRAMS

1 WIRING DIAGRAMS

1-1 VCR Section

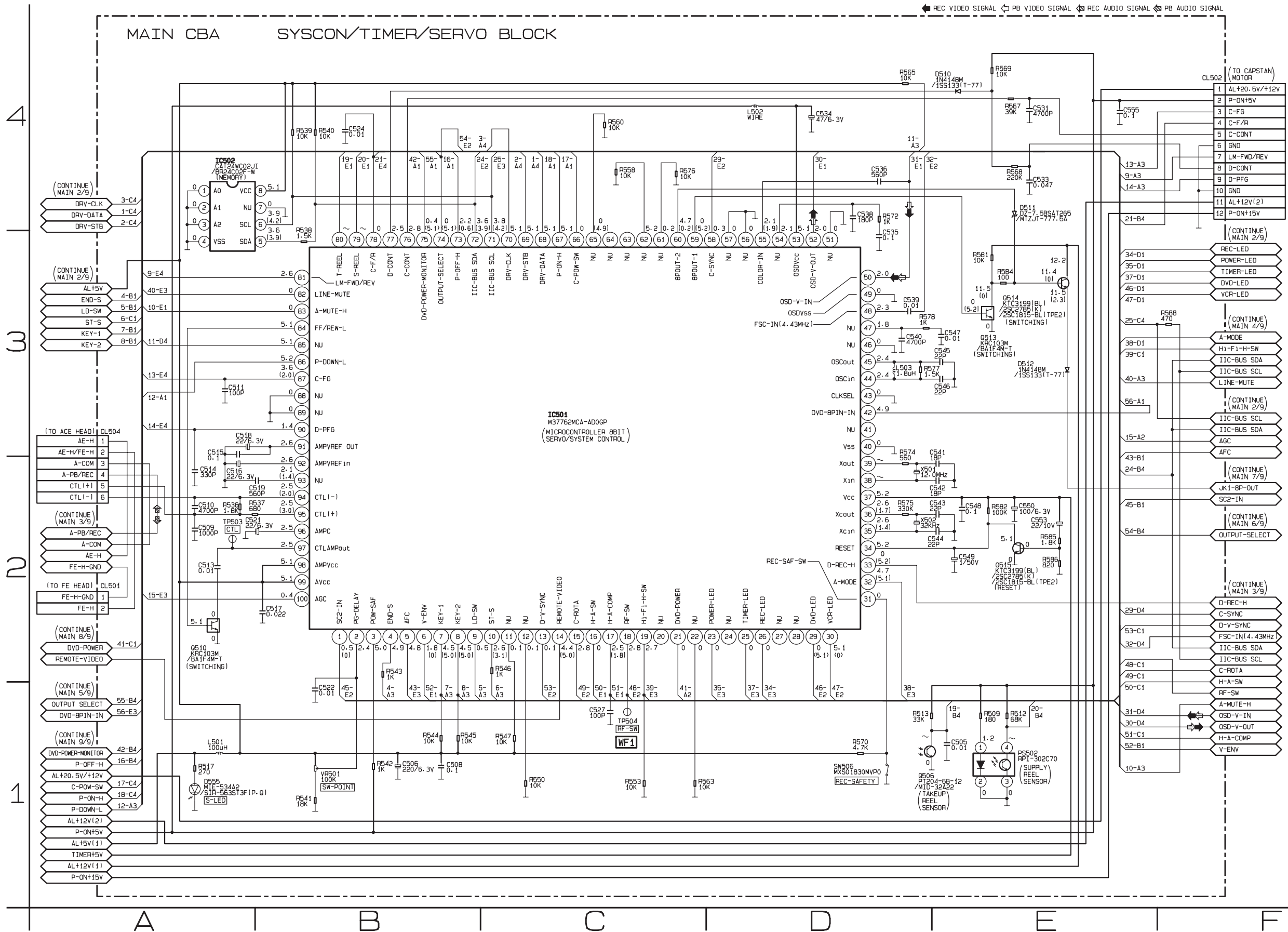


1-2 DVD Section



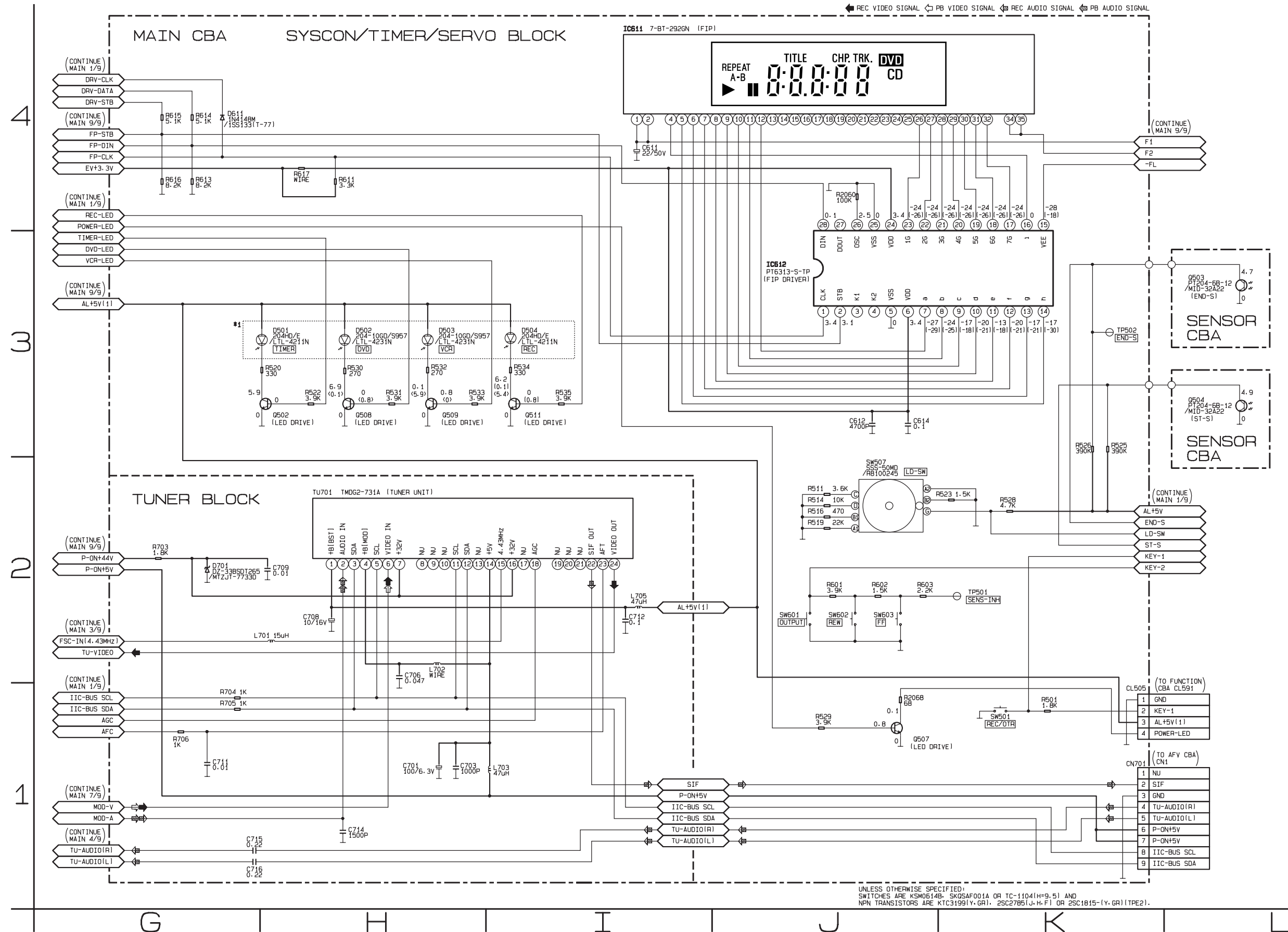
2 SCHEMATIC DIAGRAMS

2-1 Main 1/9 Schematic Diagram



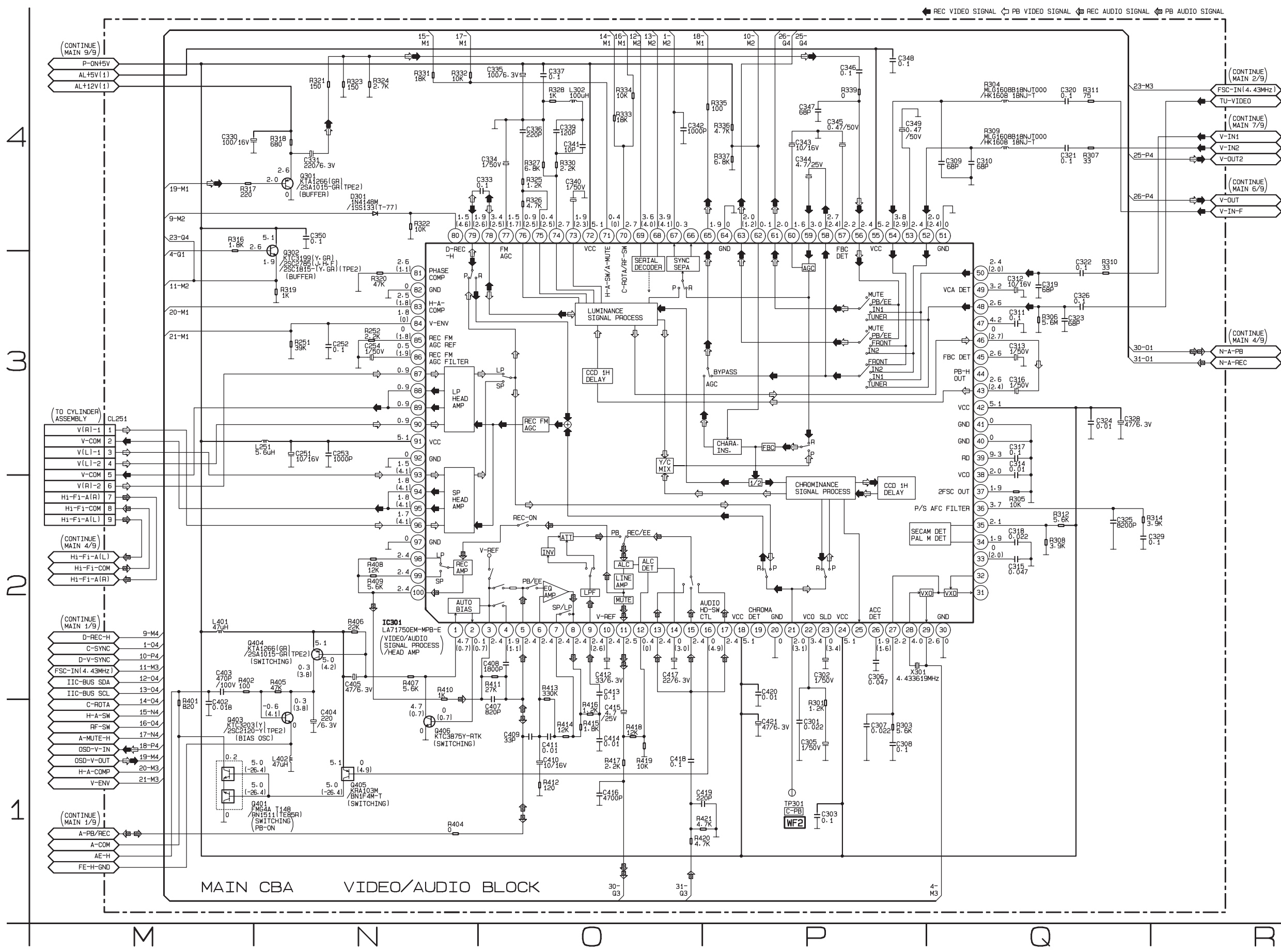
2-2 Main 2/9 & Sensor Schematic Diagrams

*** 1 Note:**
When it is necessary to replace one or more of the following Diodes,
all four should be replaced: D501, D502, D503, D504.

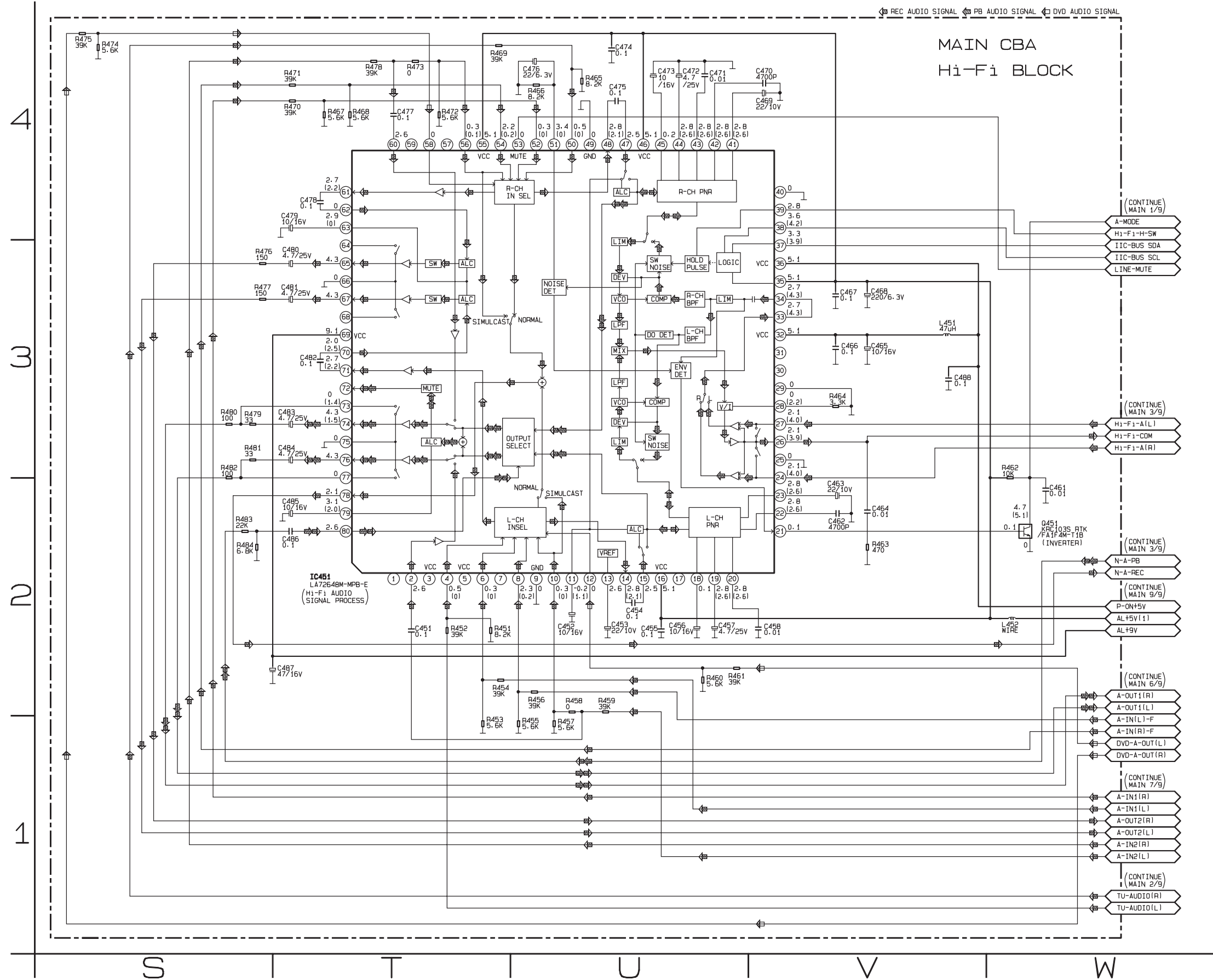


UNLESS OTHERWISE SPECIFIED:
SWITCHES ARE K5M0514B, SK05AF001A OR TC-1104(H=9.5) AND
NPN TRANSISTORS ARE KTC3199(Y,GR), 2SC2785(J,H,F) OR 2SC1815-(Y,GR)(1PE2).

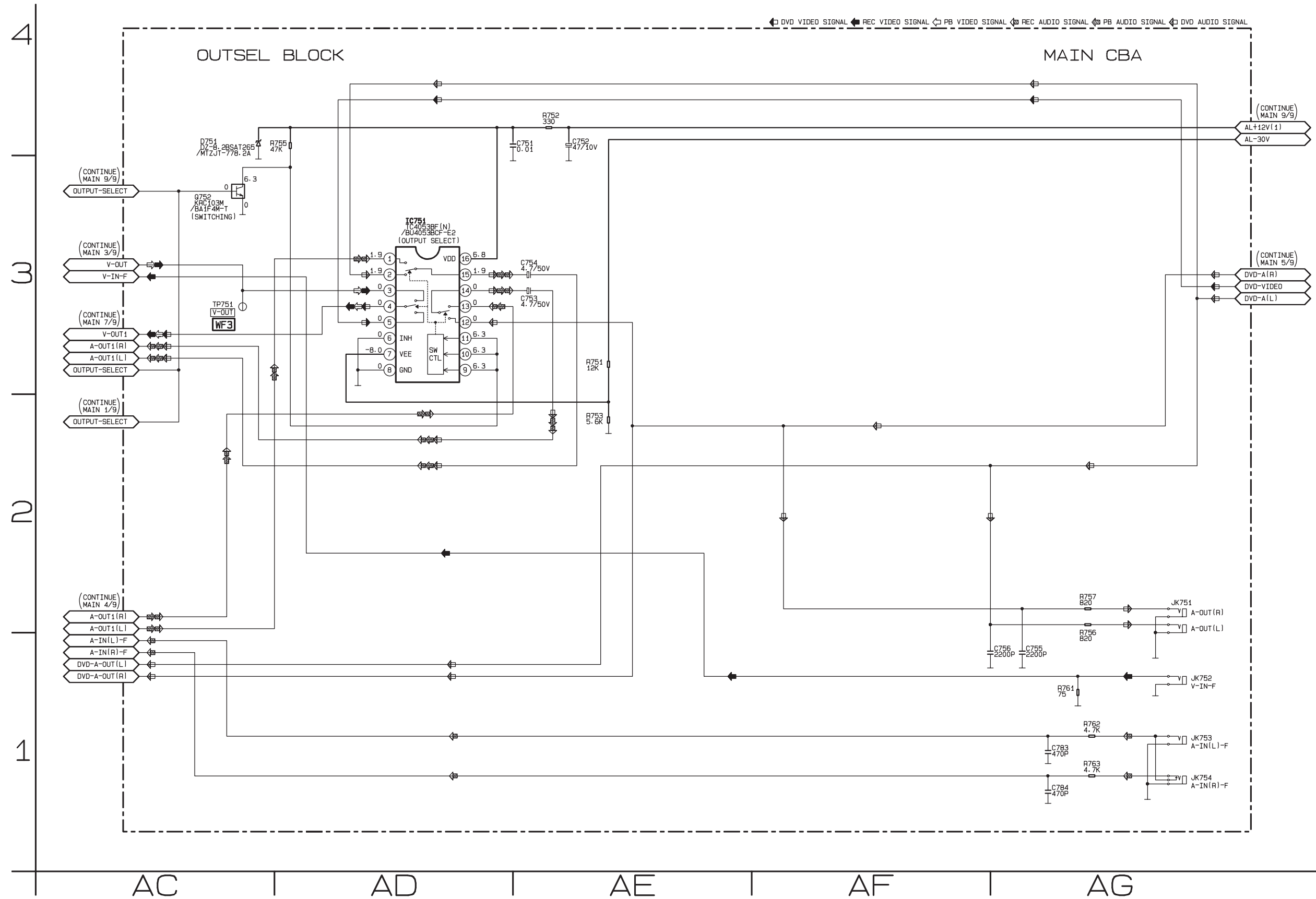
2-3 Main 3/9 Schematic Diagram



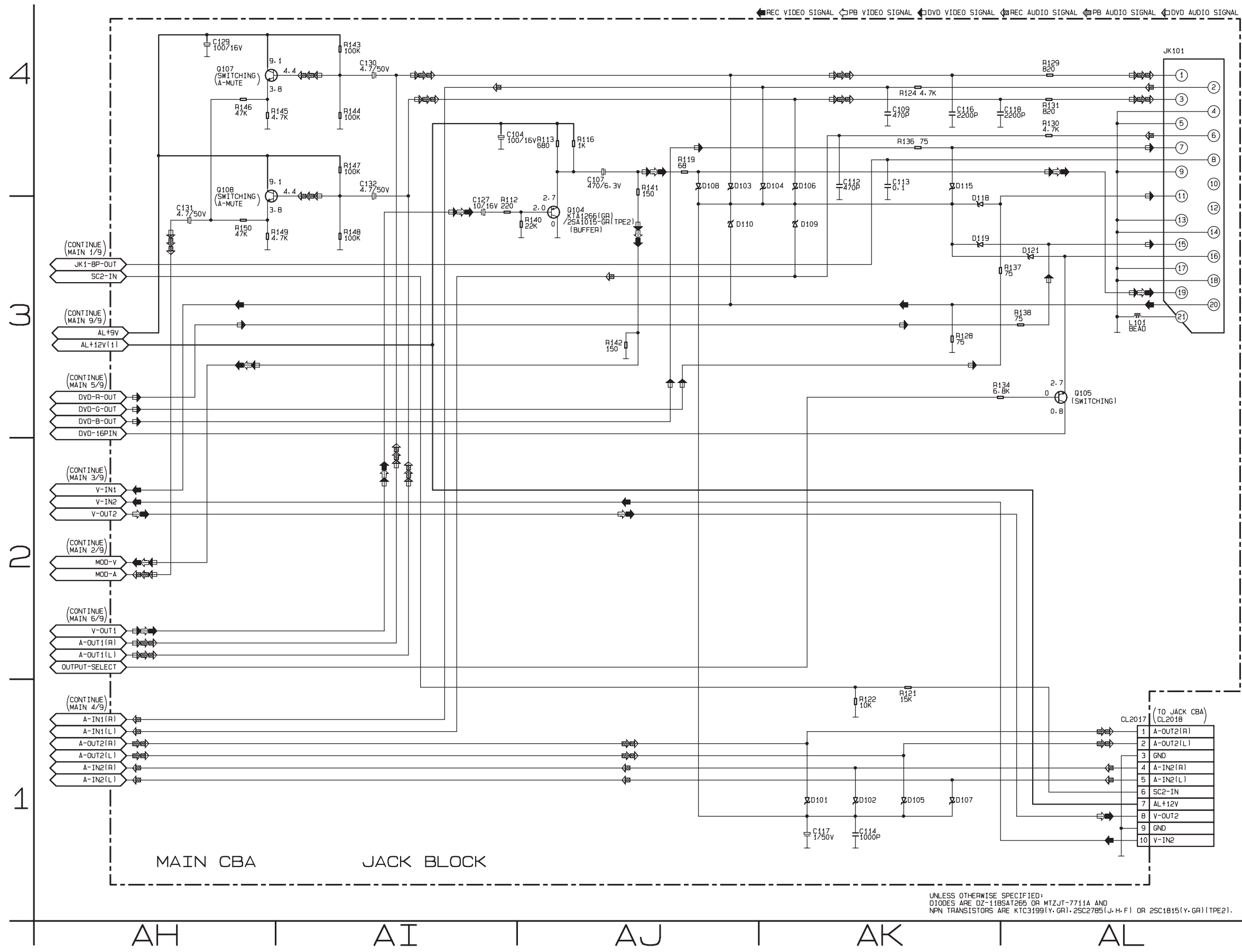
2-4 Main 4/9 Schematic Diagram



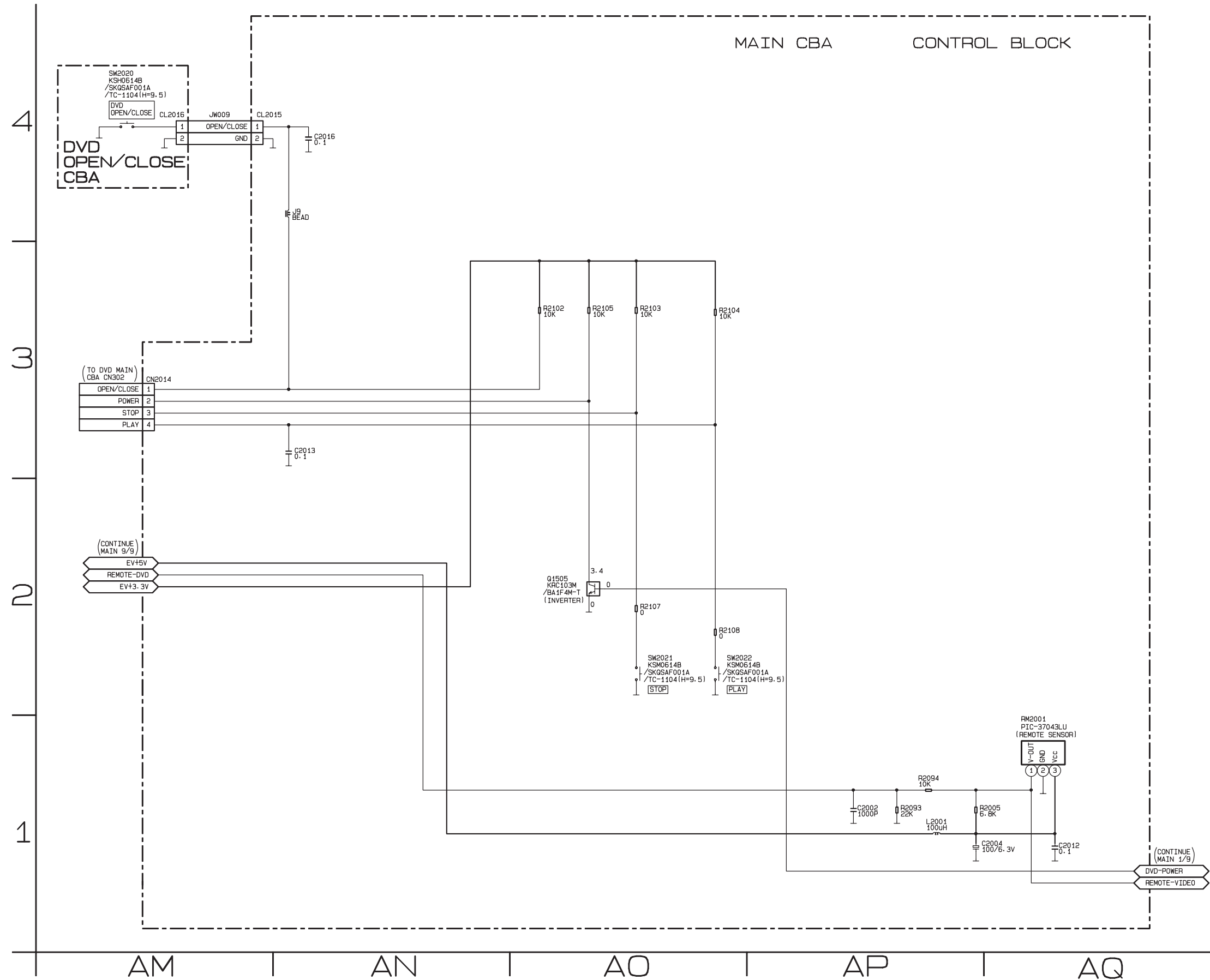
2-6 Main 6/9 Schematic Diagram



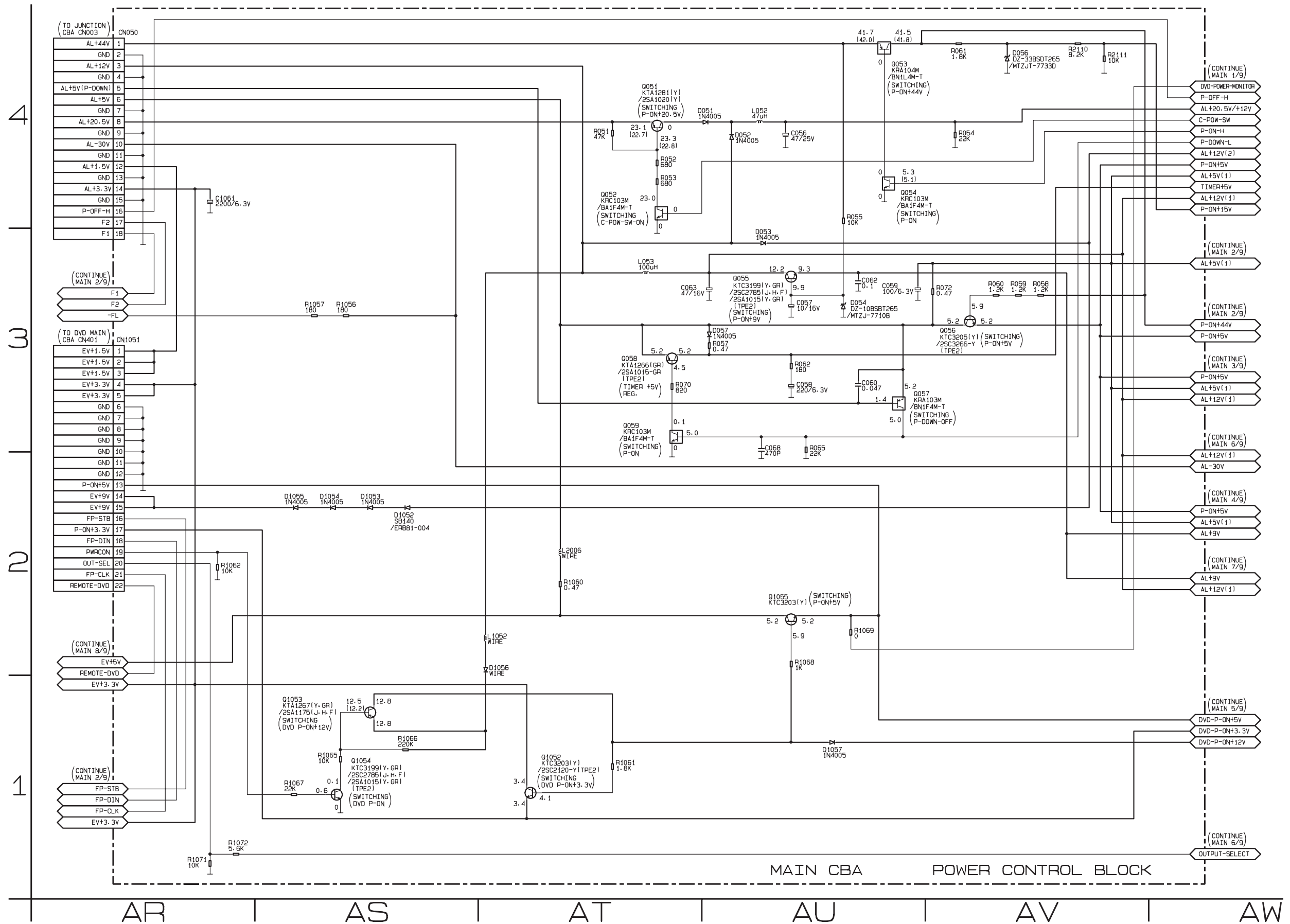
2-7 Main 7/9 Schematic Diagrams



2-8 Main 8/9 & DVD OPEN/ CLOSE Schematic Diagrams



2-9 Main 9/9 Schematic Diagrams



2-10 Power Supply & Junction Schematic Diagrams

CAUTION !

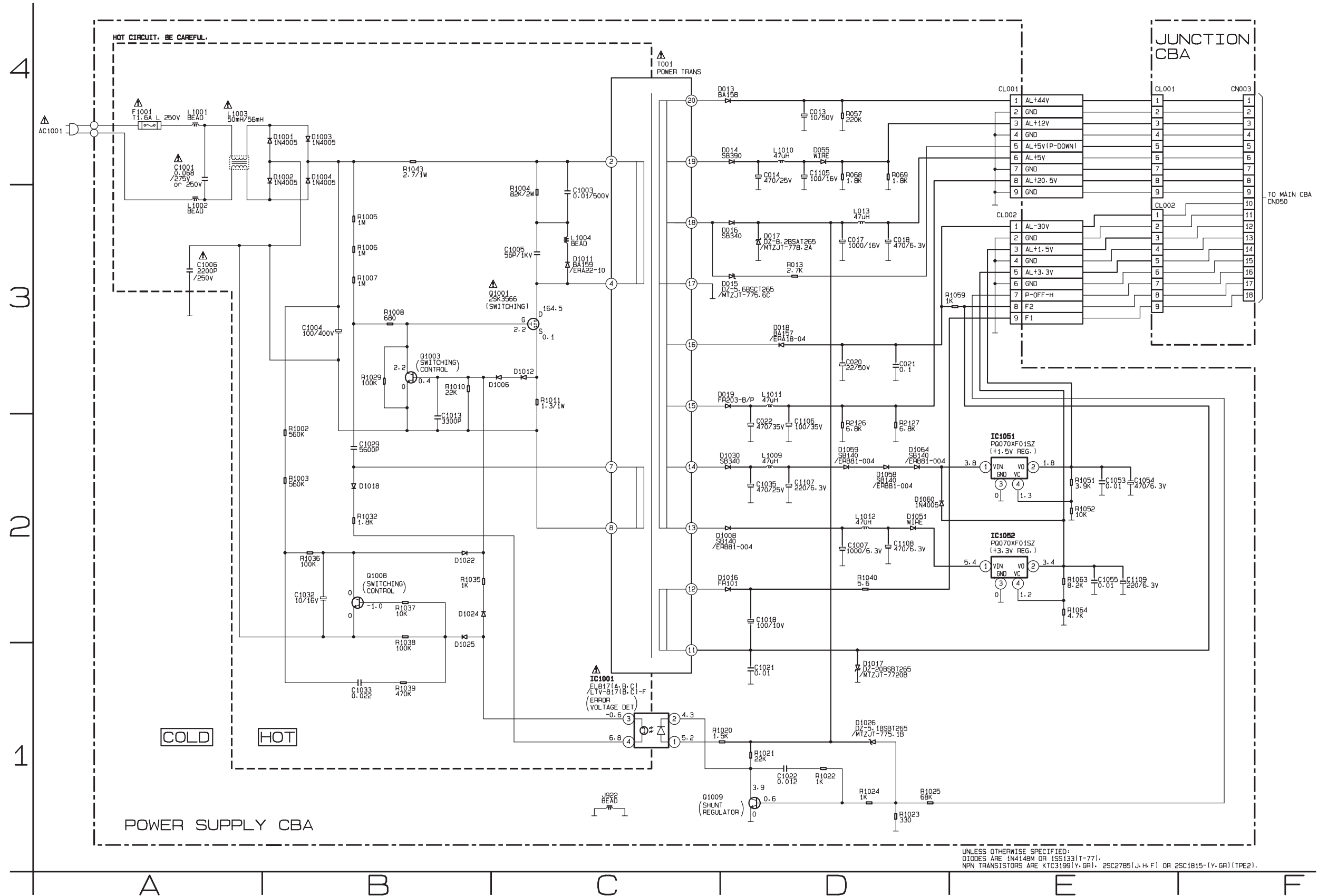
For continued protection against fire hazard, replace only with the same type fuse.

NOTE :

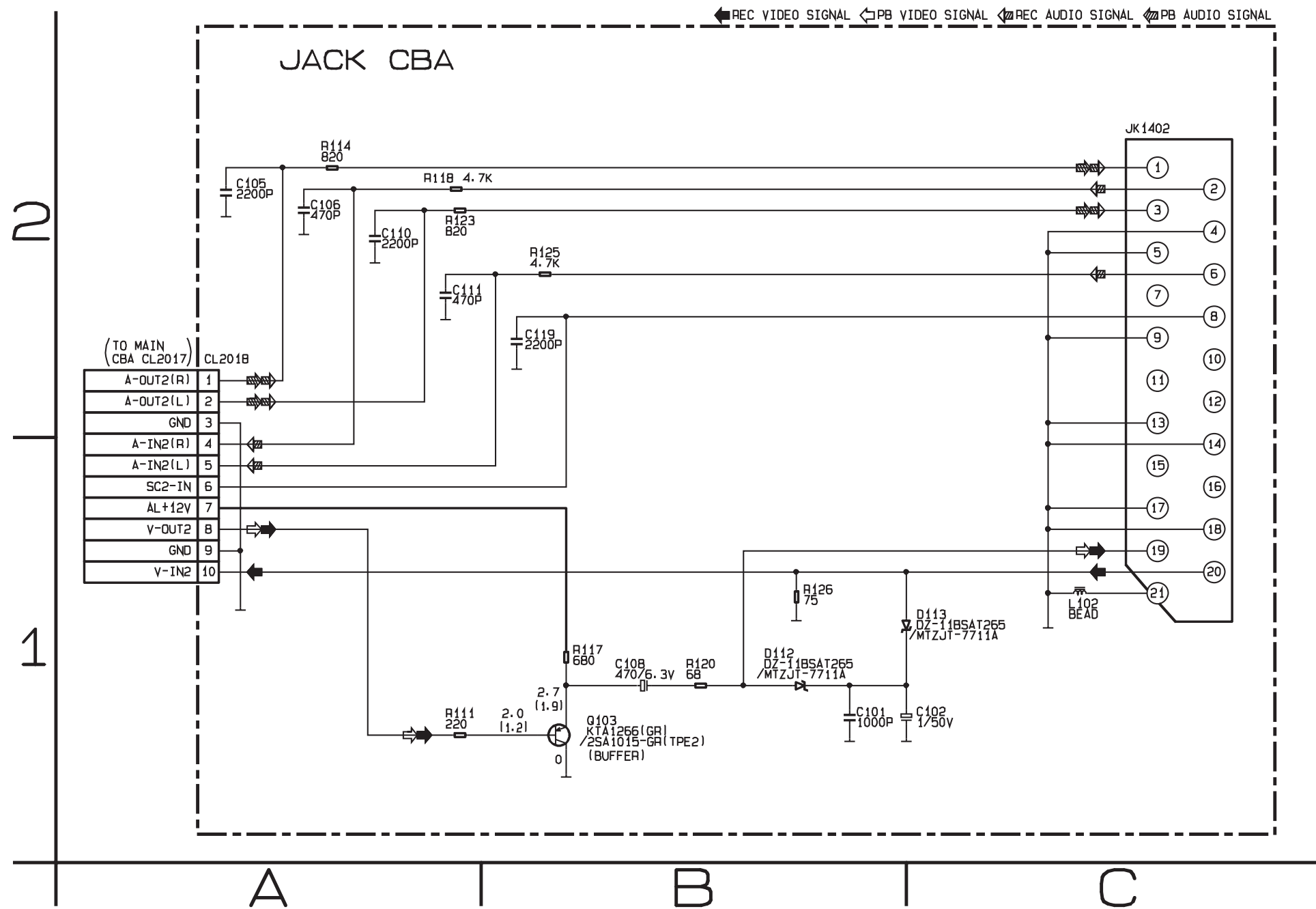
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION !

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

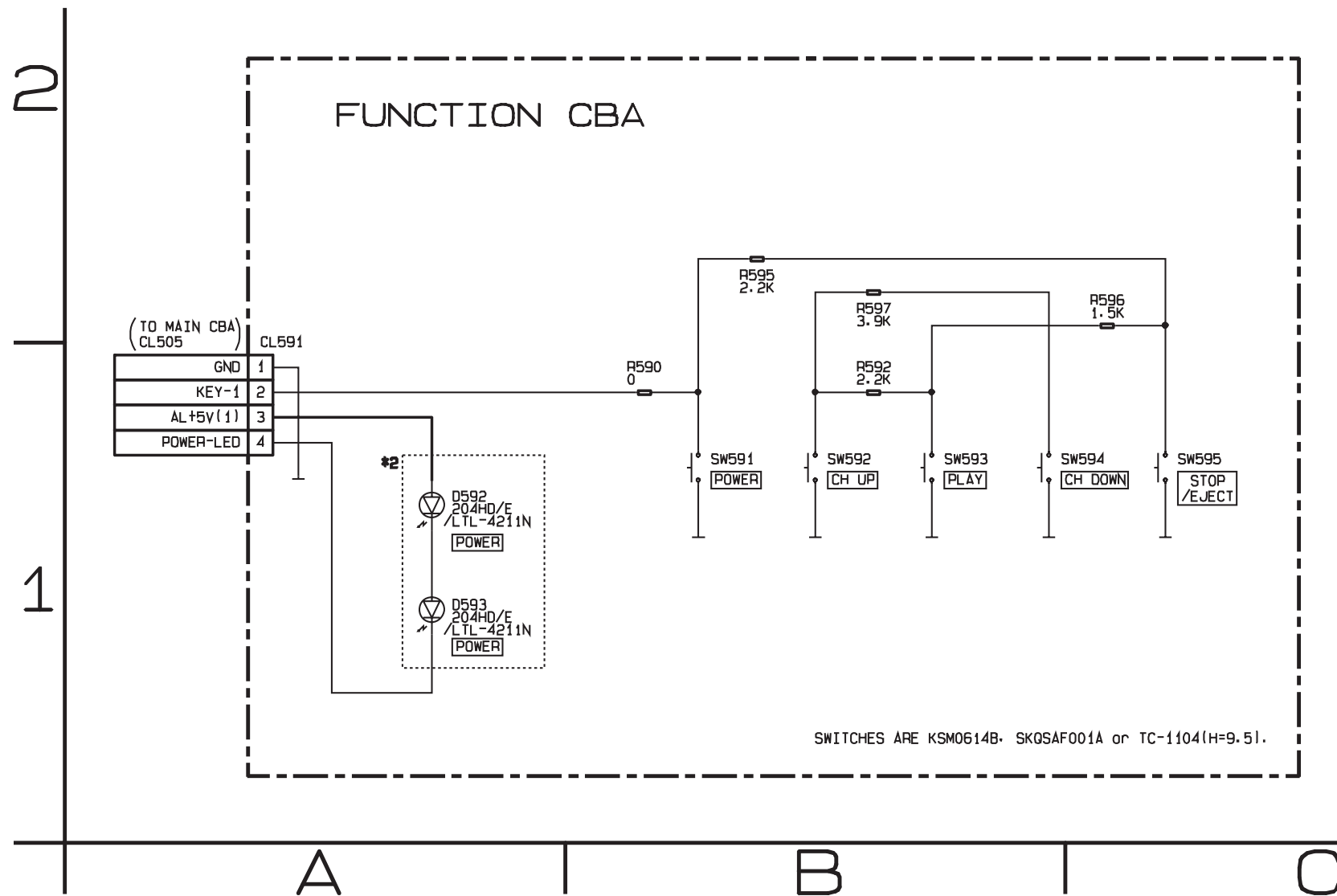


2-11 Jack Schematic Diagram

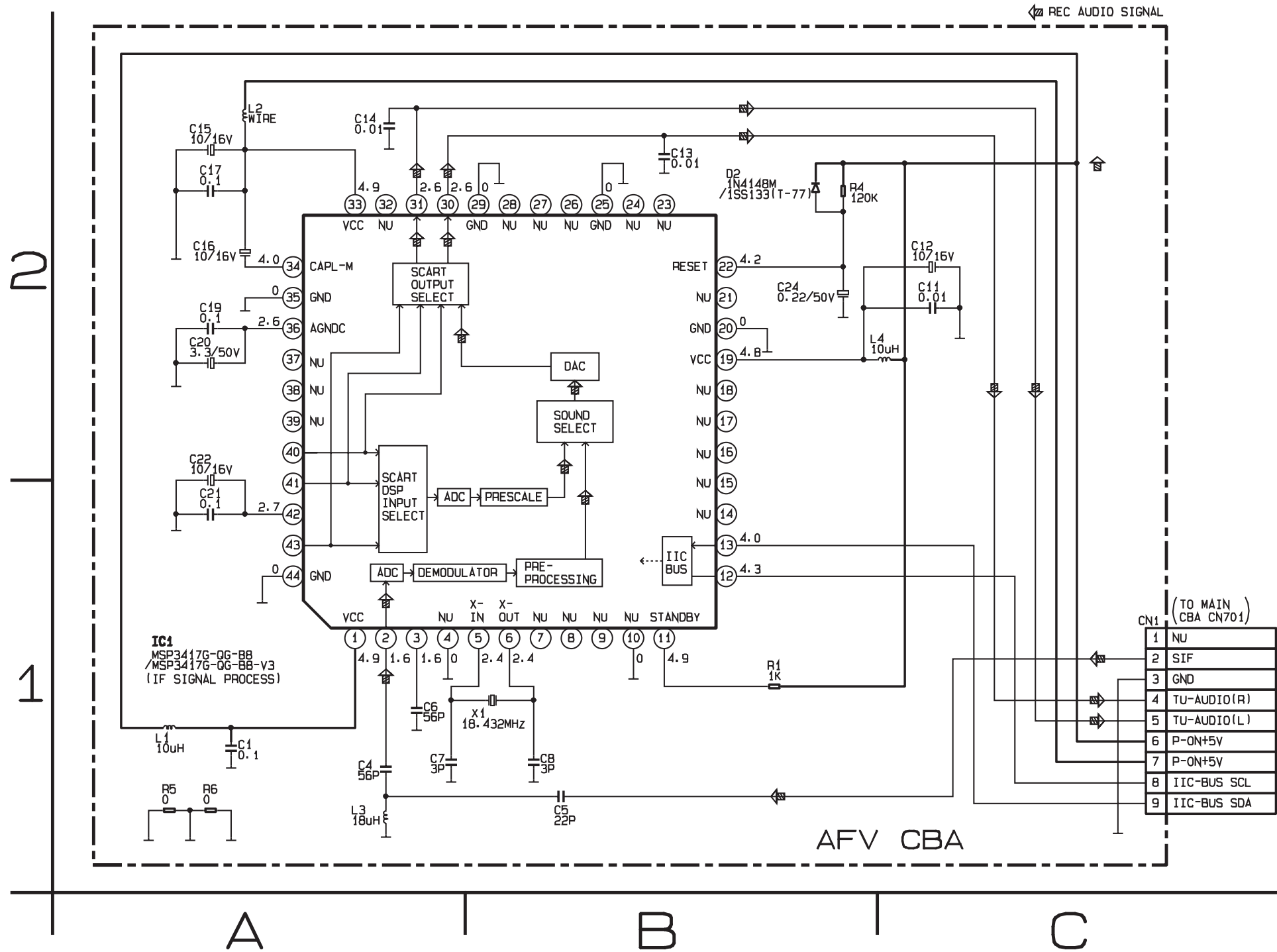


2-12 Function Schematic Diagrams

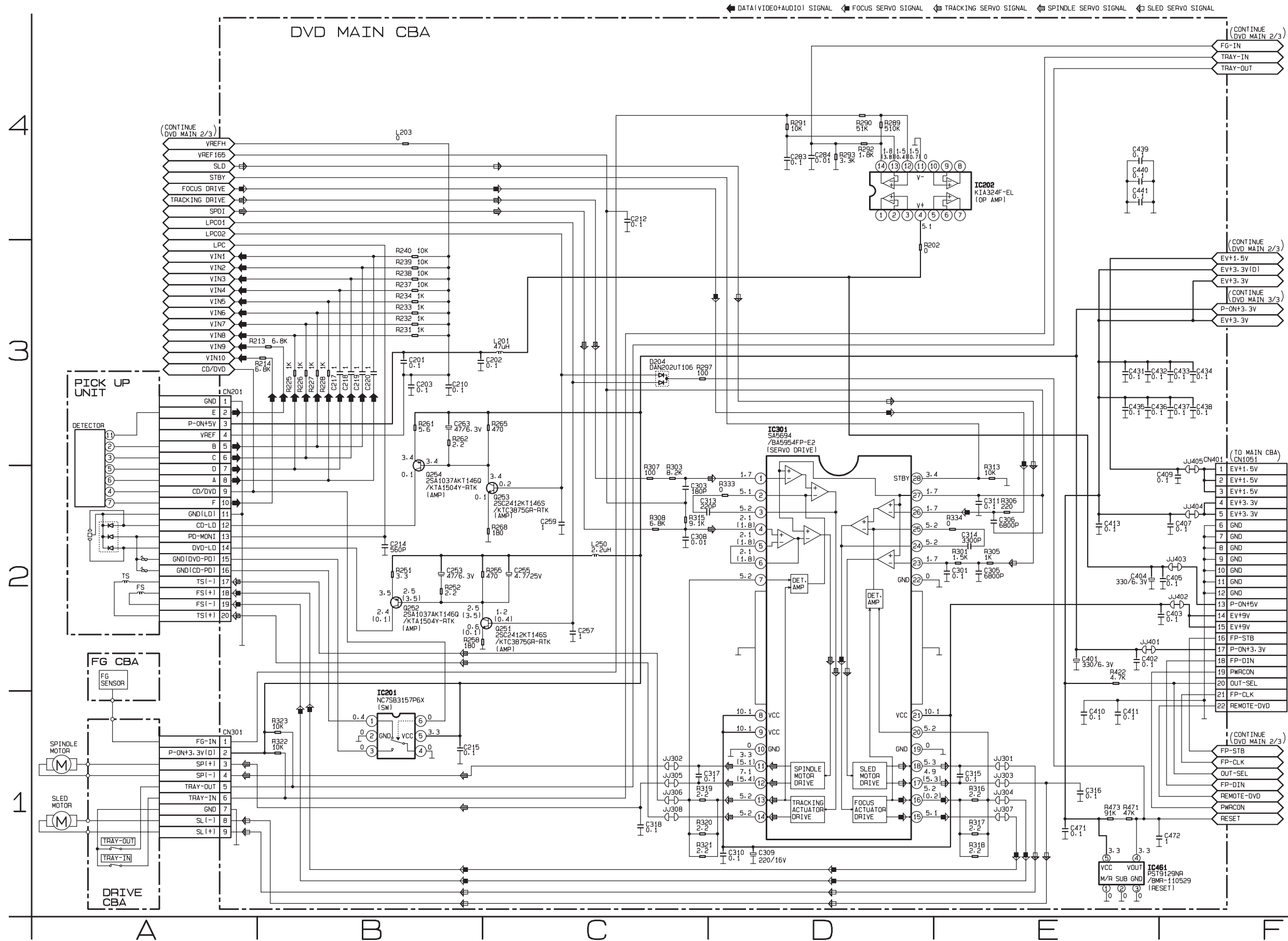
***2 Note:**
When it is necessary to replace one or more of the following Diodes,
all one should be replaced: D592, D593.



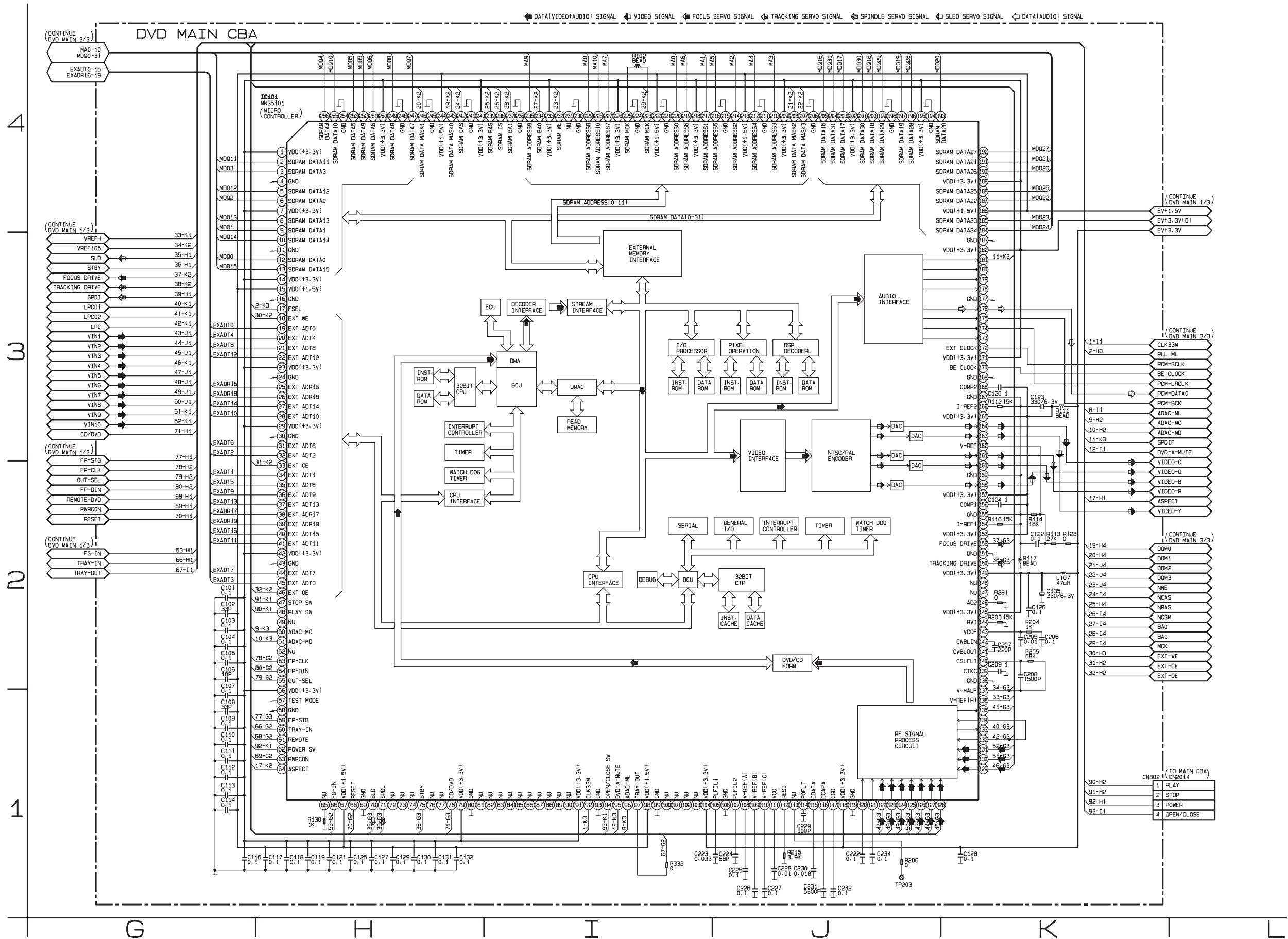
2-13 AFV Schematic Diagram



2-14 DVD Main 1/3 Schematic Diagram



2-15 DVD Main 2/3 Schematic Diagram



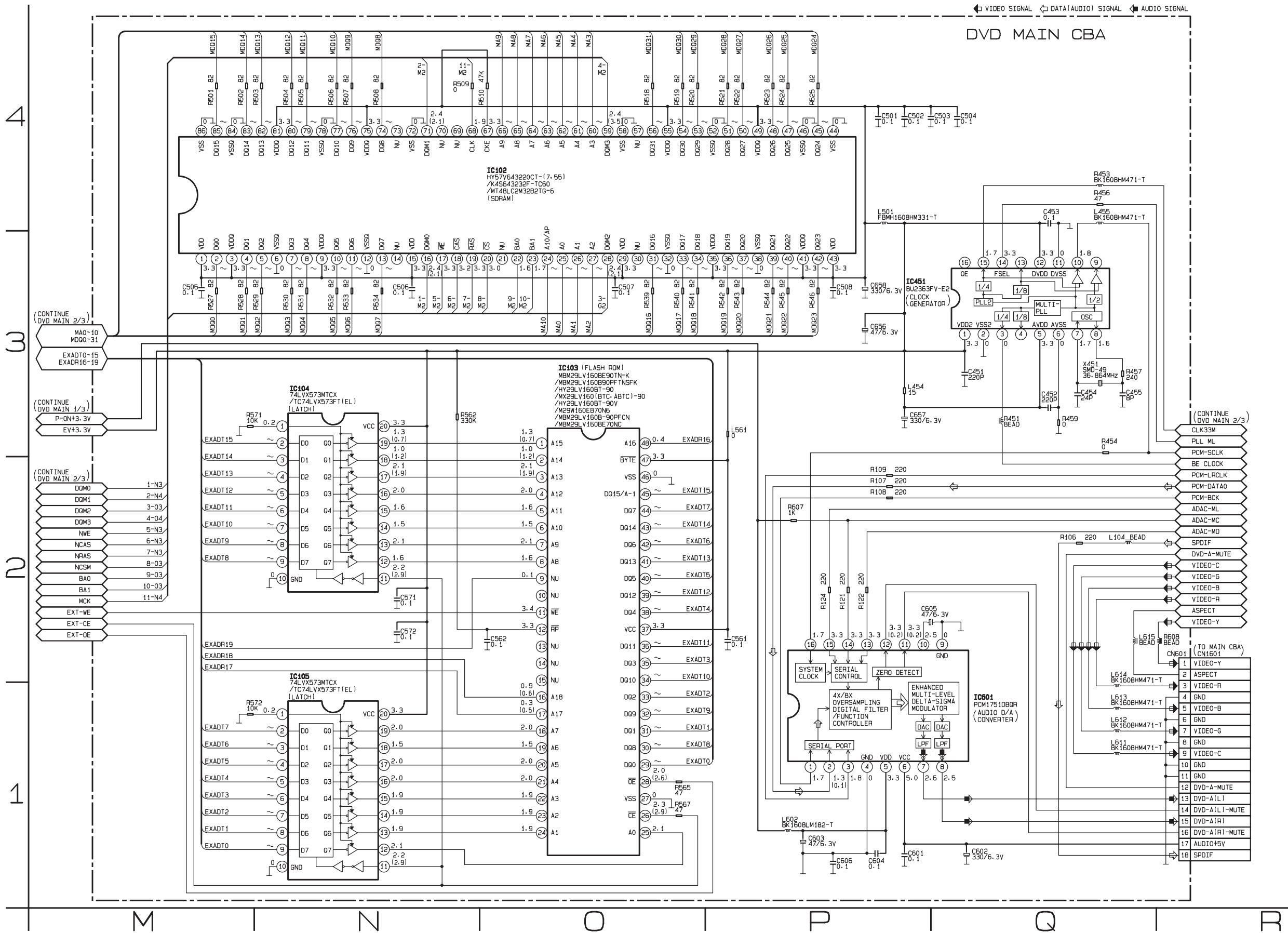
(TO MAIN CBA)
CN302 (CN2014)

90-H2	1	PLAY
91-H2	2	STOP
92-H1	3	POWER
93-I1	4	OPEN/CLOSE

IC101 VOLTAGE CHART

PIN.NO	PLAY	STOP	PIN.NO	PLAY	STOP	PIN.NO	PLAY	STOP	PIN.NO	PLAY	STOP	PIN.NO	PLAY	STOP	PIN.NO	PLAY	STOP	PIN.NO	PLAY	STOP	PIN.NO	PLAY	STOP
1	3.3	3.3	33	2.2	2.9	65	0.1	0.1	97	3.4	3.4	129	2.0	2.0	161	0.5	0.5	193	~	~	225	1.9	1.9
2	~	~	34	~	~	66	1.2	2.5	98	1.6	1.6	130	2.2	2.2	162	1.4	1.4	194	0	0	226	3.3	3.3
3	~	~	35	~	~	67	1.6	1.6	99	0	0	131	2.3	2.3	163	----	----	195	3.3	3.3	227	~	~
4	0	0	36	~	~	68	3.4	3.4	100	----	----	132	0.4	0.1	164	0.9	0.9	196	~	~	228	~	~
5	~	~	37	~	~	69	0	0	101	----	----	133	1.2	0.4	165	3.3	3.3	197	~	~	229	~	~
6	~	~	38	0.3	0.5	70	1.7	1.7	102	----	----	134	0.4	0.1	166	1.5	1.5	198	0	0	230	0	0
7	3.3	3.3	39	0.1	0.1	71	2.4	1.7	103	----	----	135	0.2	0.2	167	0	0	199	~	~	231	----	----
8	~	~	40	~	~	72	----	----	104	3.3	3.3	136	2.3	2.3	168	2.1	2.1	200	~	~	232	3.3	3.3
9	~	~	41	~	~	73	----	----	105	0.9	0.9	137	1.7	1.7	169	0	0	201	~	~	233	3.3	3.3
10	~	~	42	3.3	3.3	74	----	----	106	0	0	138	0	0	170	0.8	0.8	202	3.3	3.3	234	1.6	1.6
11	0	0	43	0	0	75	3.4	3.4	107	0.8	0.8	139	1.7	1.7	171	3.3	3.3	203	~	~	235	~	~
12	~	~	44	~	~	76	----	----	108	1.6	1.6	140	1.7	1.7	172	1.6	1.6	204	~	~	236	0	0
13	~	~	45	~	~	77	----	----	109	2.1	2.1	141	1.7	1.7	173	----	----	205	~	~	237	1.7	1.7
14	3.3	3.3	46	2.0	2.6	78	0.1	0.1	110	2.6	2.6	142	1.7	1.7	174	1.8	1.8	206	0	0	238	3.0	3.0
15	1.5	1.5	47	3.3	3.4	79	3.3	3.3	111	2.0	2.0	143	0.5	0.5	175	1.7	1.7	207	2.4	3.5	239	3.3	3.3
16	0	0	48	3.2	3.4	80	0	0	112	0.7	0.9	144	1.6	1.6	176	1.4	0.1	208	2.4	2.1	240	3.3	3.3
17	3.4	3.4	49	----	----	81	----	----	113	0	0	145	3.3	3.3	177	0	0	209	3.3	3.3	241	0	0
18	3.4	3.4	50	3.4	3.4	82	----	----	114	1.8	1.8	146	0	0	178	----	----	210	~	~	242	3.2	3.2
19	~	~	51	3.4	3.4	83	----	----	115	1.4	1.4	147	----	----	179	----	----	211	0	0	243	2.4	2.1
20	~	~	52	----	----	84	----	----	116	0.3	0.3	148	----	----	180	----	----	212	~	~	244	1.5	1.5
21	~	~	53	3.4	3.4	85	----	----	117	1.6	1.6	149	3.3	3.3	181	1.7	1.7	213	1.5	1.5	245	0	0
22	~	~	54	3.4	3.4	86	----	----	118	3.3	3.3	150	1.7	1.7	182	3.3	3.3	214	~	~	246	2.4	2.1
23	3.3	3.3	55	3.3	3.3	87	----	----	119	0	0	151	0	0	183	0	0	215	0	0	247	~	~
24	0	0	56	3.3	3.3	88	----	----	120	1.9	1.9	152	1.7	1.7	184	~	~	216	~	~	248	0	0
25	0.4	0.4	57	0	0	89	----	----	121	1.9	1.9	153	3.3	3.3	185	~	~	217	~	~	249	~	~
26	0.9	0.6	58	0	0	90	----	----	122	2.4	2.4	154	1.4	1.4	186	1.5	1.5	218	3.3	3.3	250	3.3	3.3
27	~	~	59	3.3	3.3	91	3.3	3.3	123	2.4	2.4	155	0	0	187	~	~	219	~	~	251	~	~
28	~	~	60	3.4	3.4	92	1.7	1.5	124	2.4	2.4	156	2.2	2.2	188	~	~	220	~	~	252	~	~
29	3.3	3.3	61	3.1	3.1	93	0	0	125	2.4	2.4	157	3.3	3.3	189	3.3	3.3	221	0	0	253	~	~
30	0	0	62	3.2	3.4	94	----	----	126	2.0	2.0	158	0.7	0.7	190	~	~	222	1.5	1.5	254	0	0
31	~	~	63	3.4	3.4	95	3.4	0.1	127	2.0	2.0	159	0	0	191	~	~	223	1.9	1.9	255	~	~
32	~	~	64	0.8	0.8	96	3.4	3.4	128	2.0	2.0	160	0.5	0.5	192	~	~	224	0	0	256	~	~

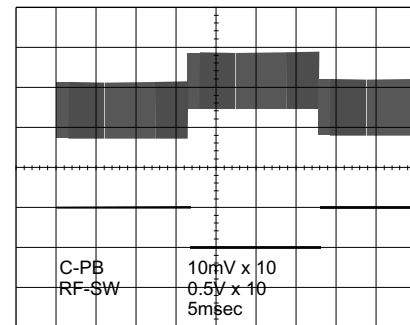
2-16 DVD Main 3/3 Schematic Diagram



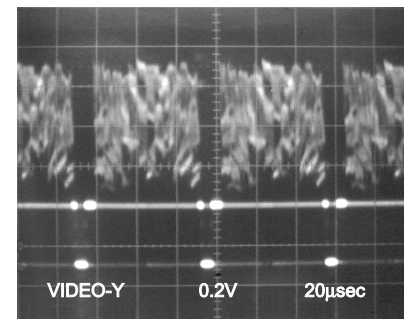
3 WAVEFORMS

WF2 UPPER (TP301 of Main CBA)

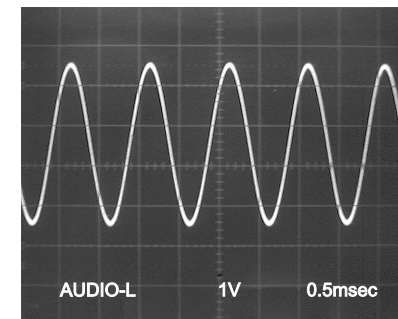
WF1 LOWER (TP504 of Main CBA)



WF4 Pin 1 of CN1601



WF7 Pin 13 of CN1601



NOTE:

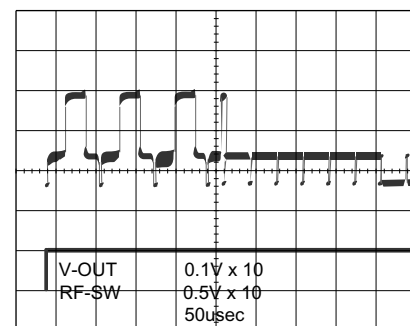
Input

CD: 1kHz PLAY
(WF7~WF9)

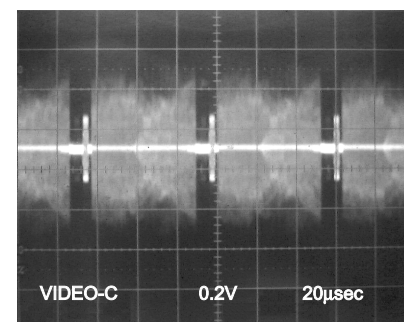
DVD: POWER ON (STOP) MODE
(WF4~WF6)

WF3 UPPER (TP751 of Main CBA)

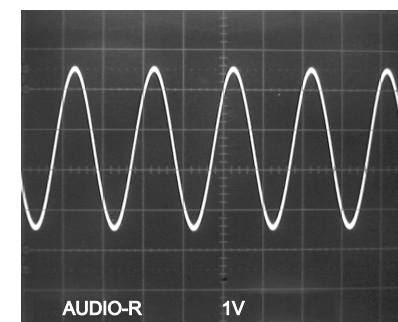
WF1 LOWER (TP504 of Main CBA)



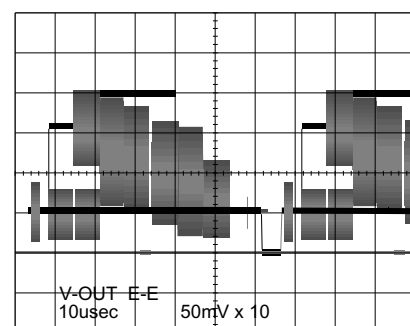
WF5 Pin 9 of CN1601



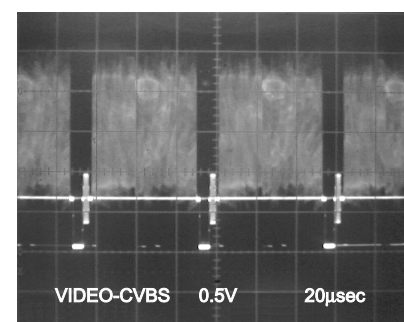
WF8 Pin 15 of CN1601



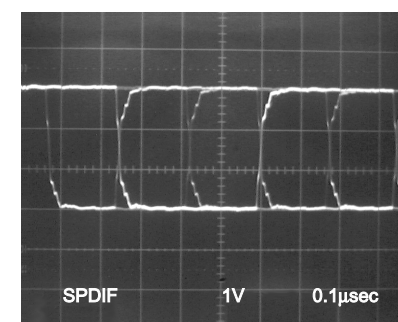
WF3 (TP751 of Main CBA)



WF6 Pin 31 of IC1402



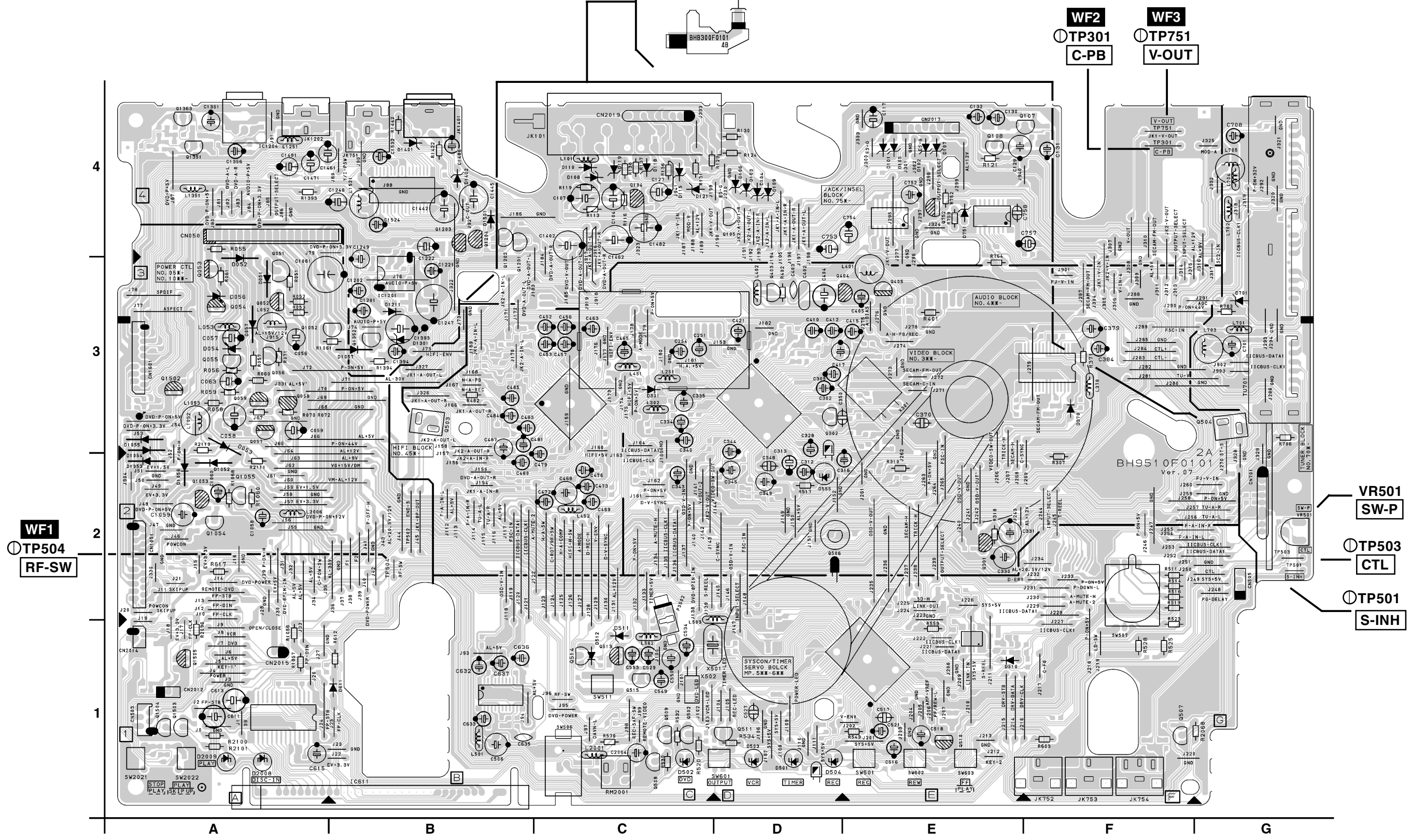
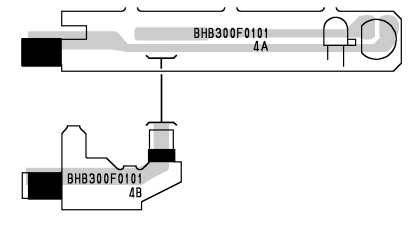
WF9 Pin 18 of CN1601



4 CIRCUIT BOARD DIAGRAMS

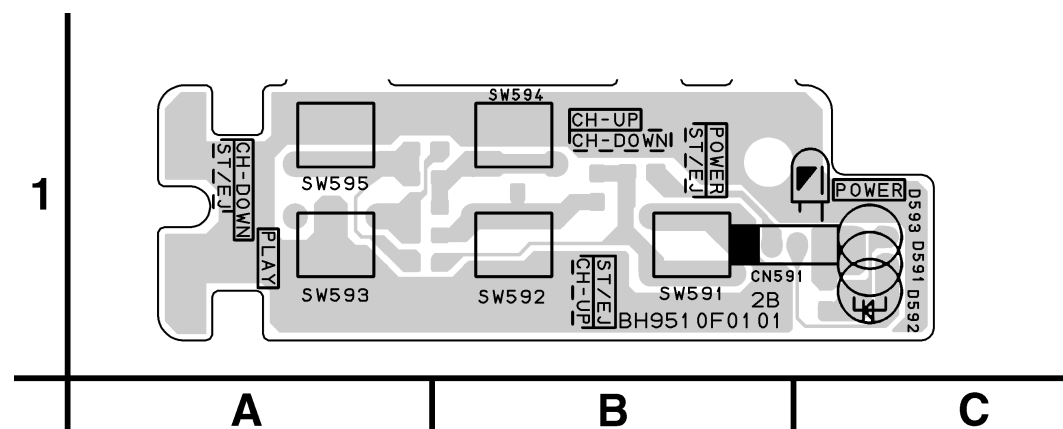
4-1 Main CBA Top View & Sensor CBA Top View

Sensor CBA Top View

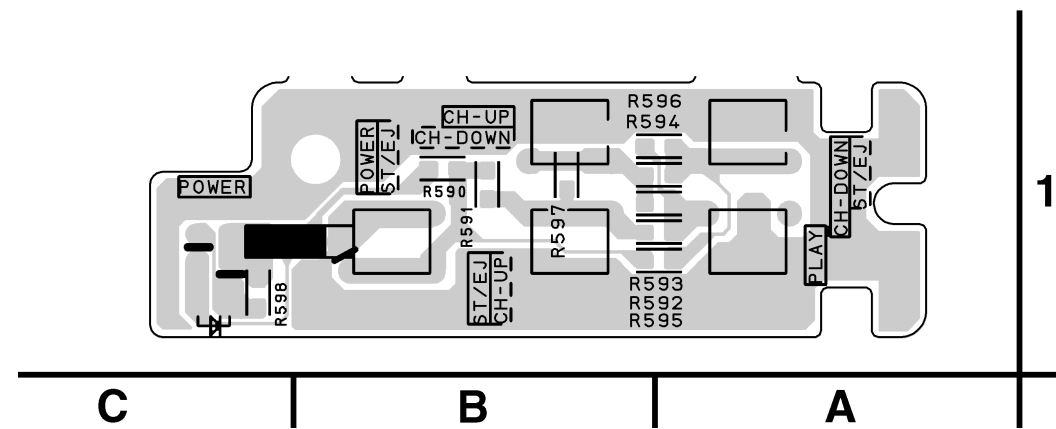


4-3 Function CBA Top/Bottom View & DVD OPEN/CLOSE CBA Top/Bottom View

Function CBA Top View

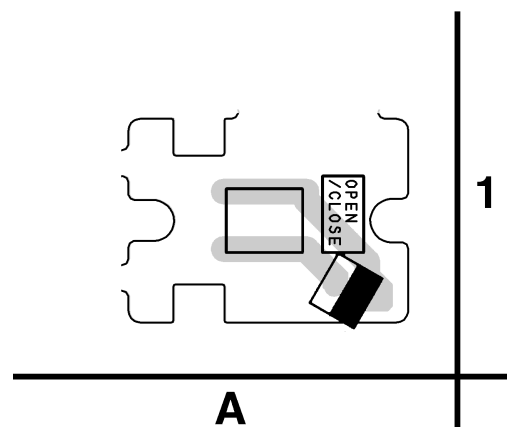
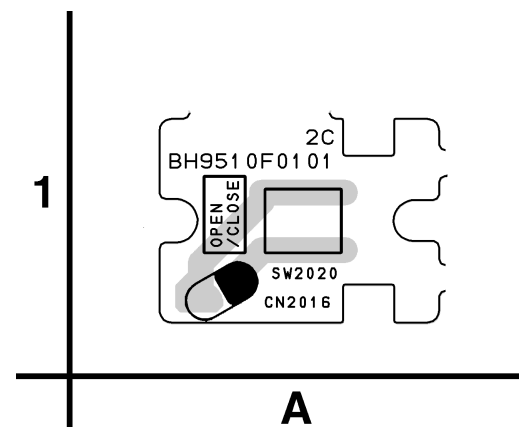


Function CBA Bottom View



DVD OPEN/CLOSE CBA Top View

DVD OPEN /CLOSE CBA Bottom View



4-4 Power Supply CBA Top/Bottom View & Junction CBA Top/Bottom View

Power Supply CBA Top View

CAUTION !

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

NOTE :

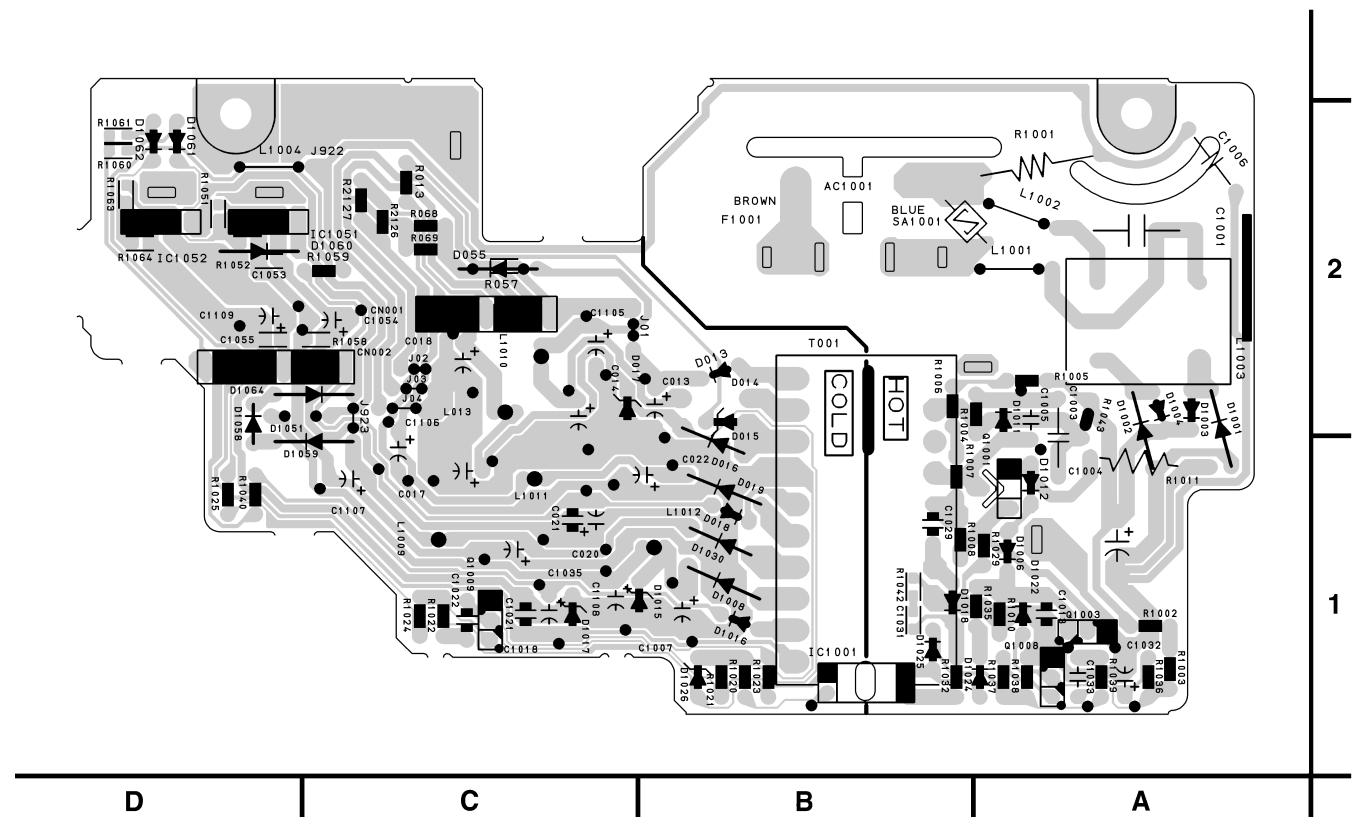
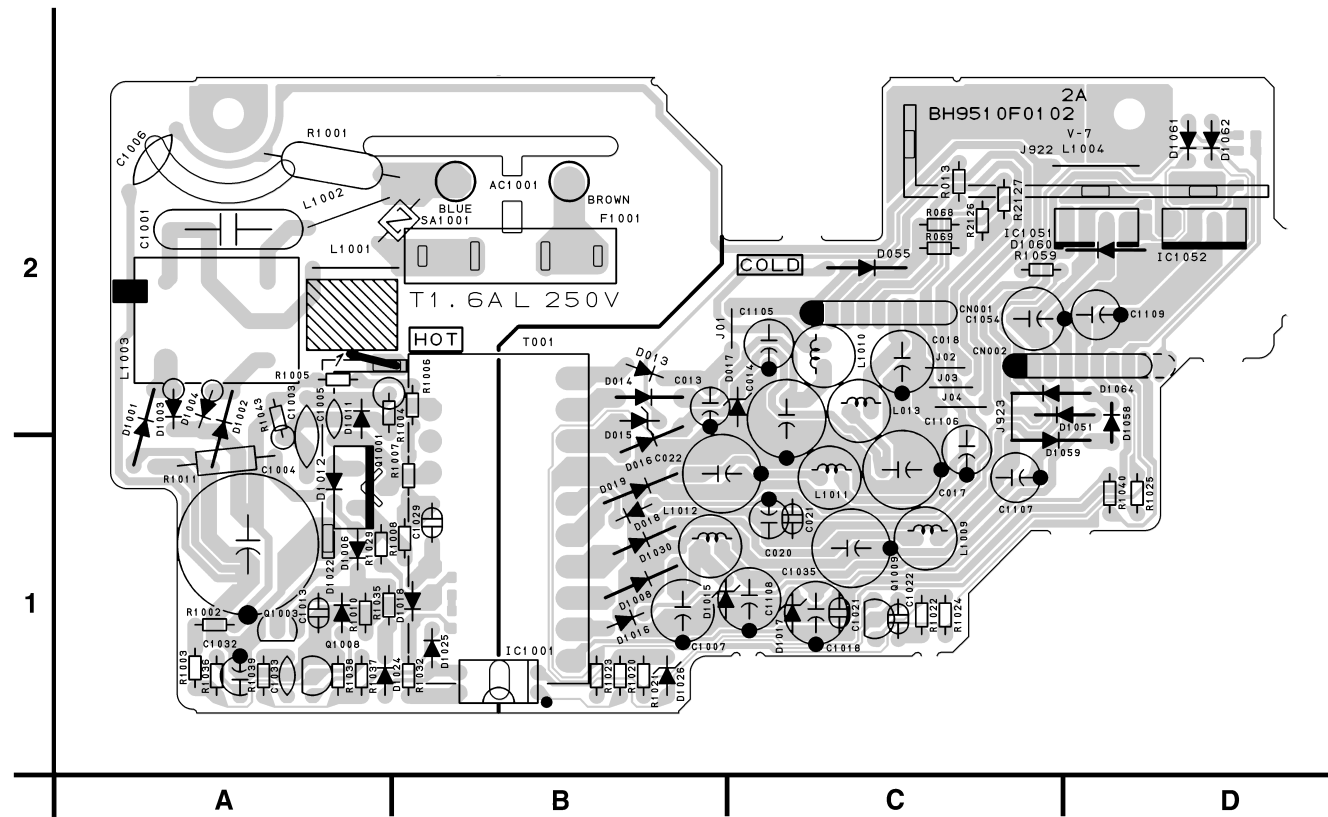
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION !

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

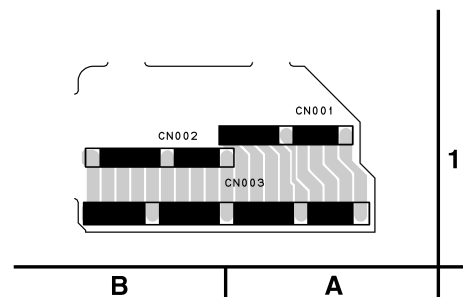
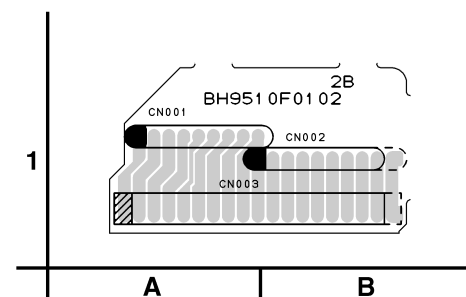
Power Supply CBA Bottom View

BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , 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.



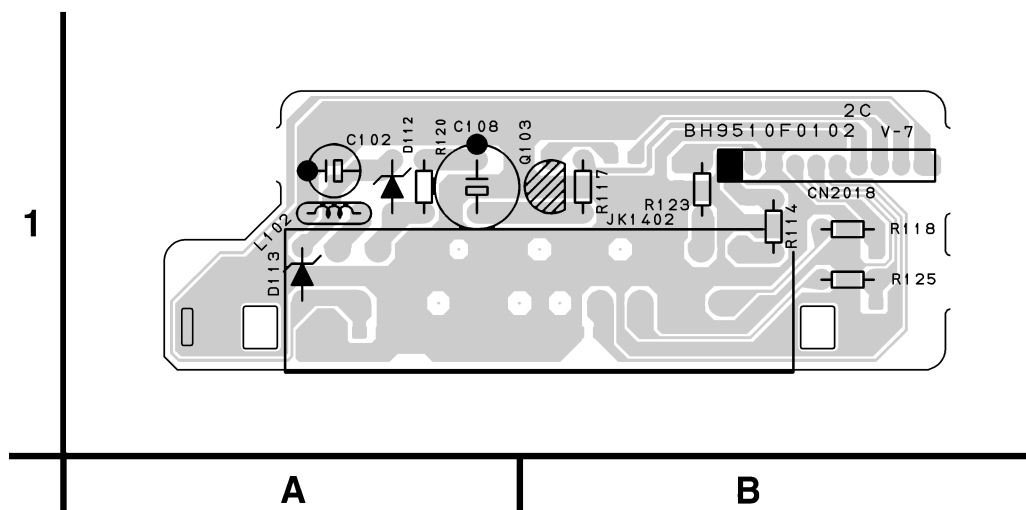
Junction CBA Top View

Junction CBA Bottom View

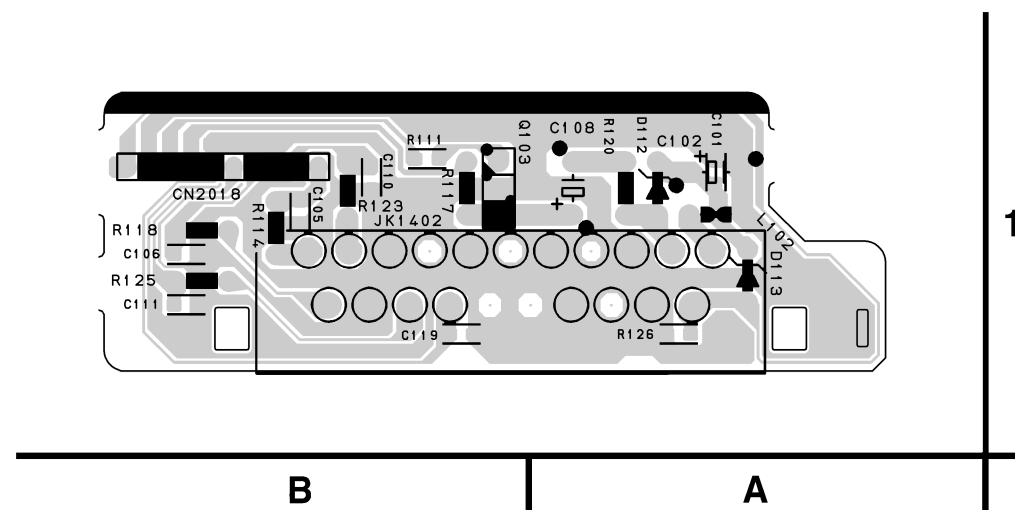


4-5 JACK CBA Top/Bottom View & AFV CBA Top/Bottom View

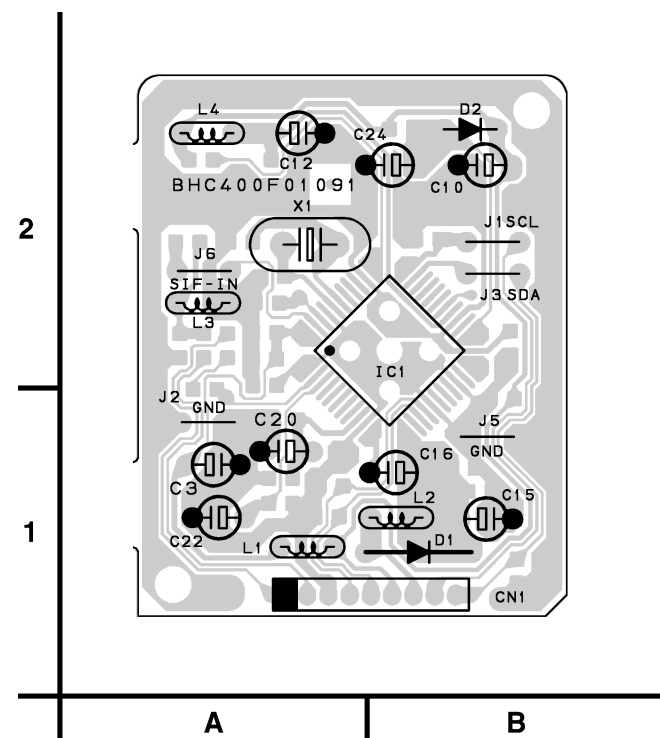
Jack CBA Top View



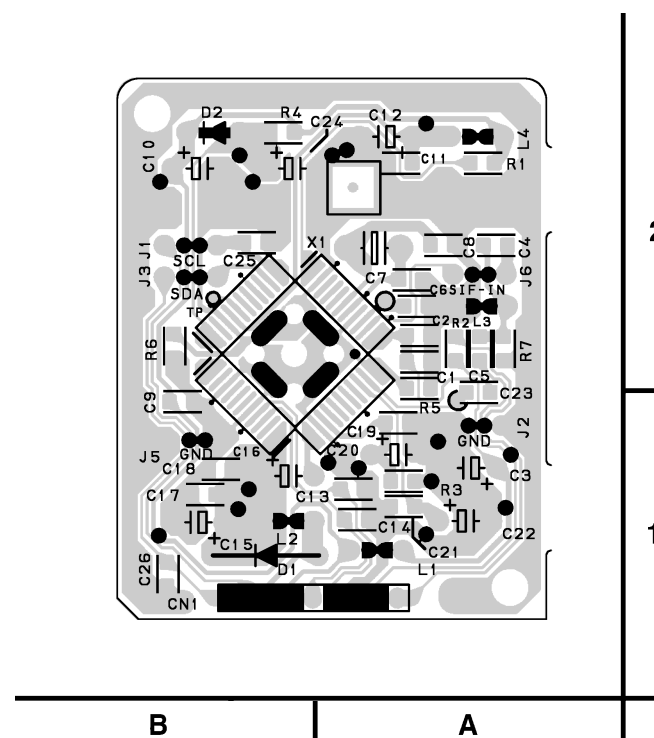
Jack CBA Bottom View



AFV CBA Top View



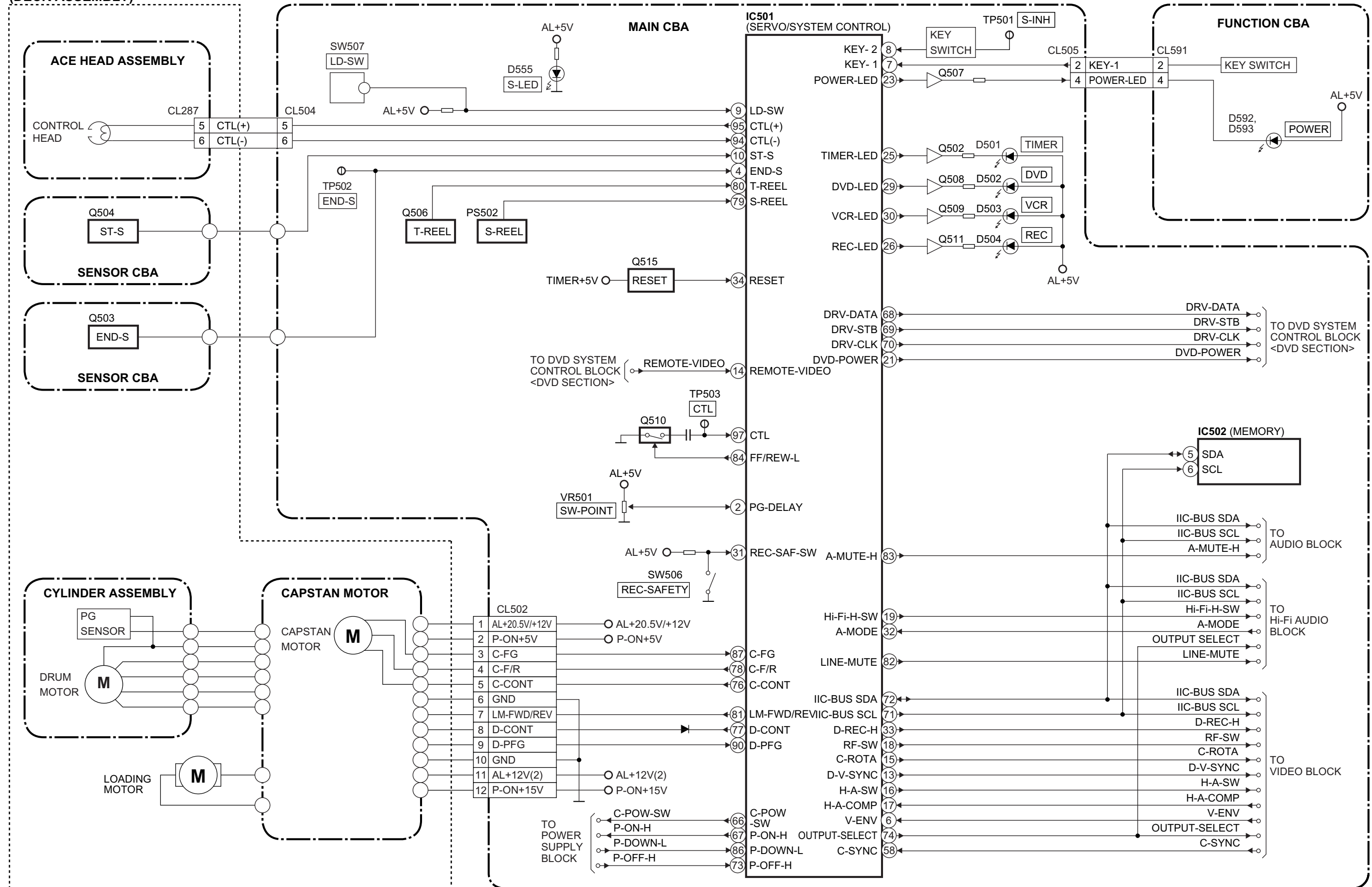
AFV CBA Bottom View



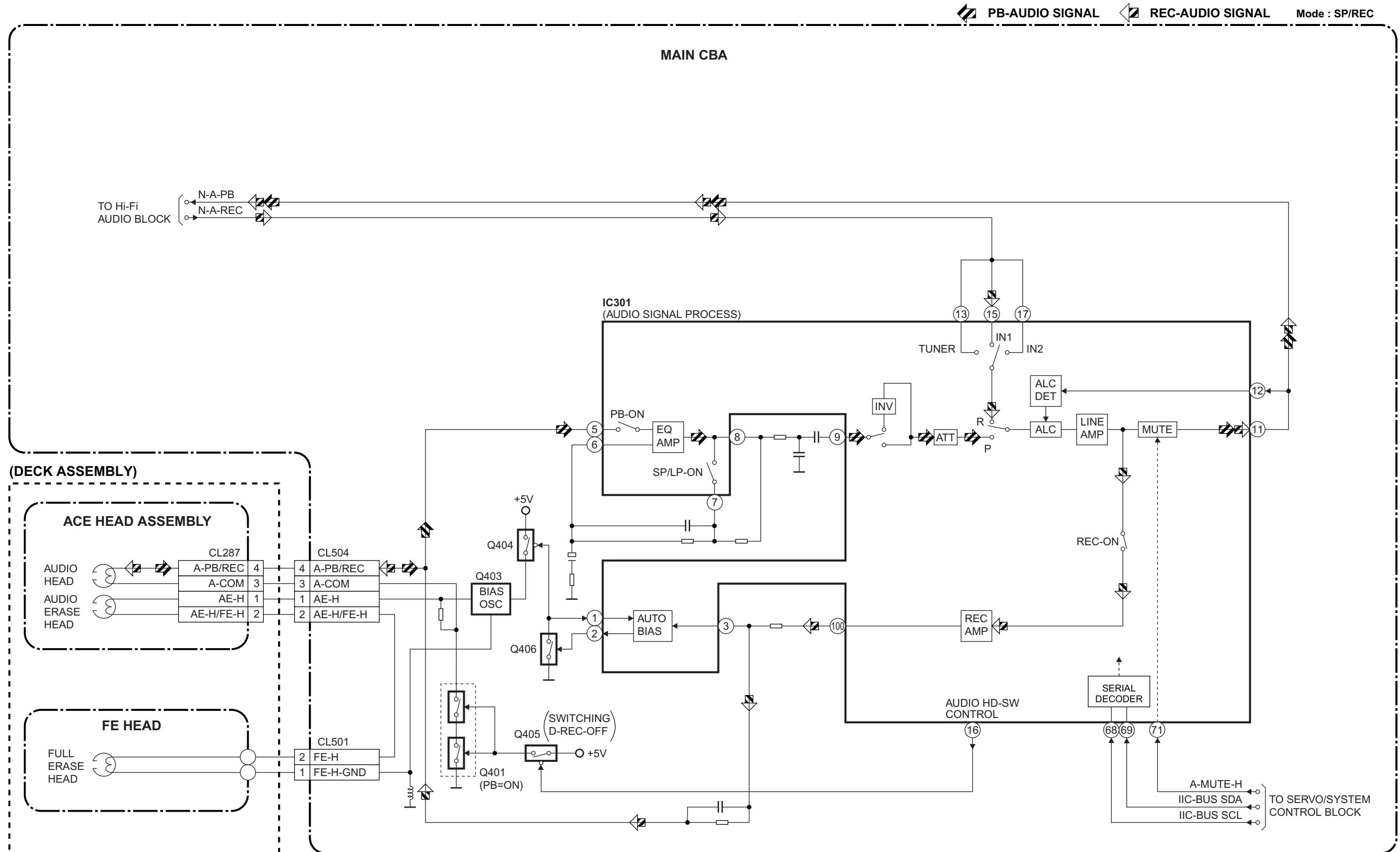
5 BLOCK DIAGRAMS

5-1 Servo/System Control Block Diagram

(DECK ASSEMBLY)

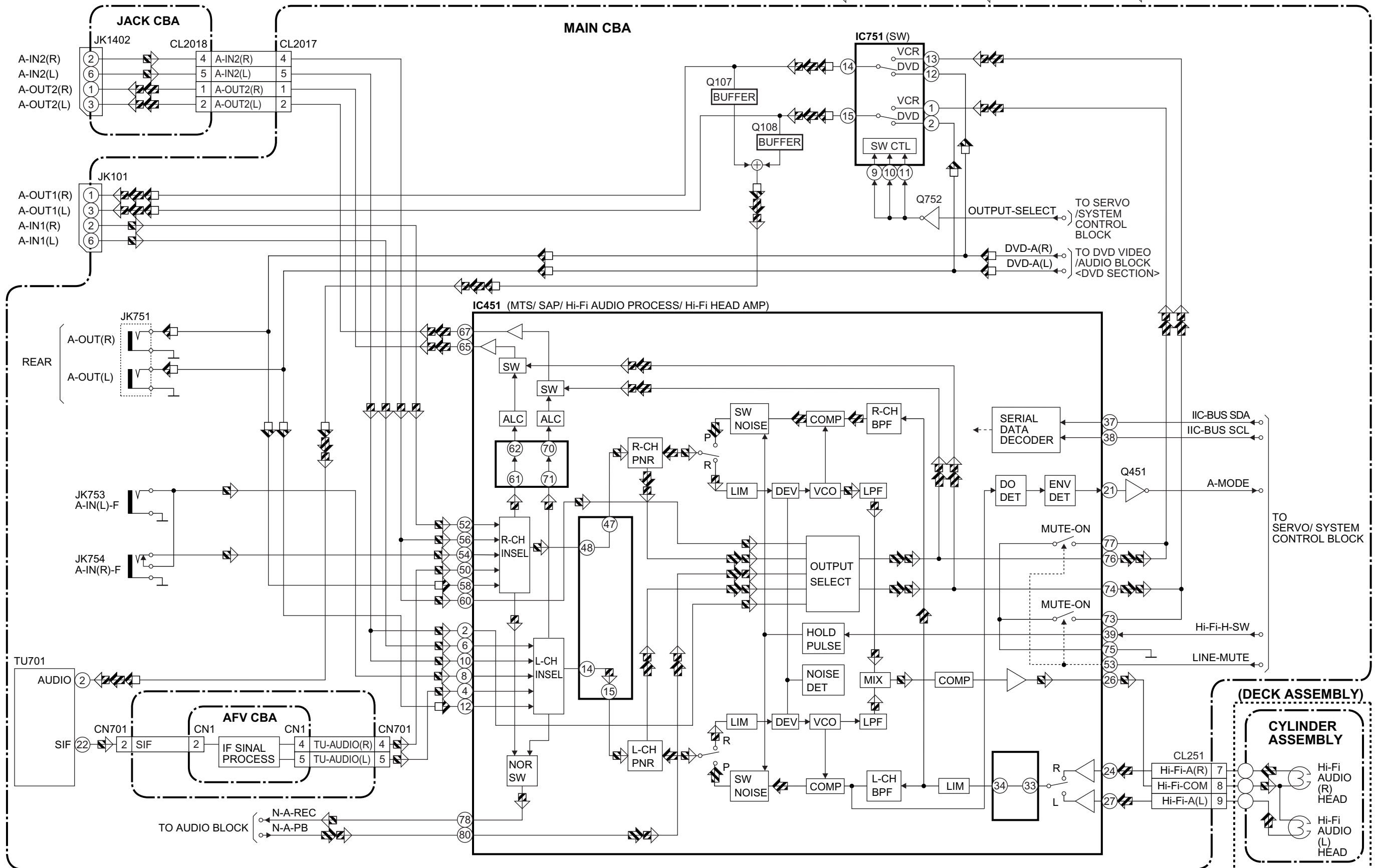


5-3 Audio Block Diagram



5-4 Hi-Fi Audio Block Diagram

PB-AUDIO SIGNAL
 REC-AUDIO SIGNAL
 DVD AUDIO SIGNAL
 Mode : SP/REC

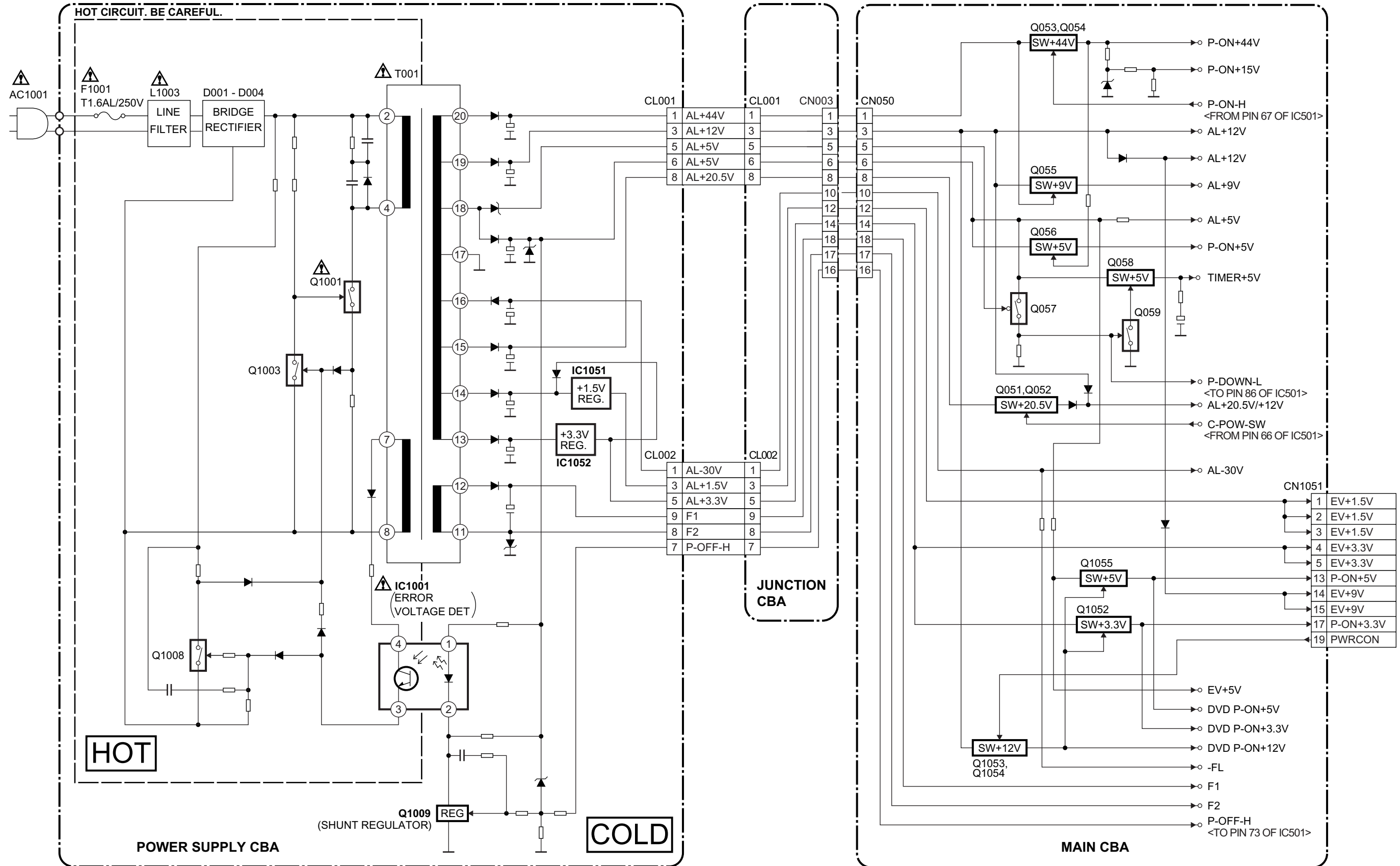


5-5 Power Supply Block Diagram

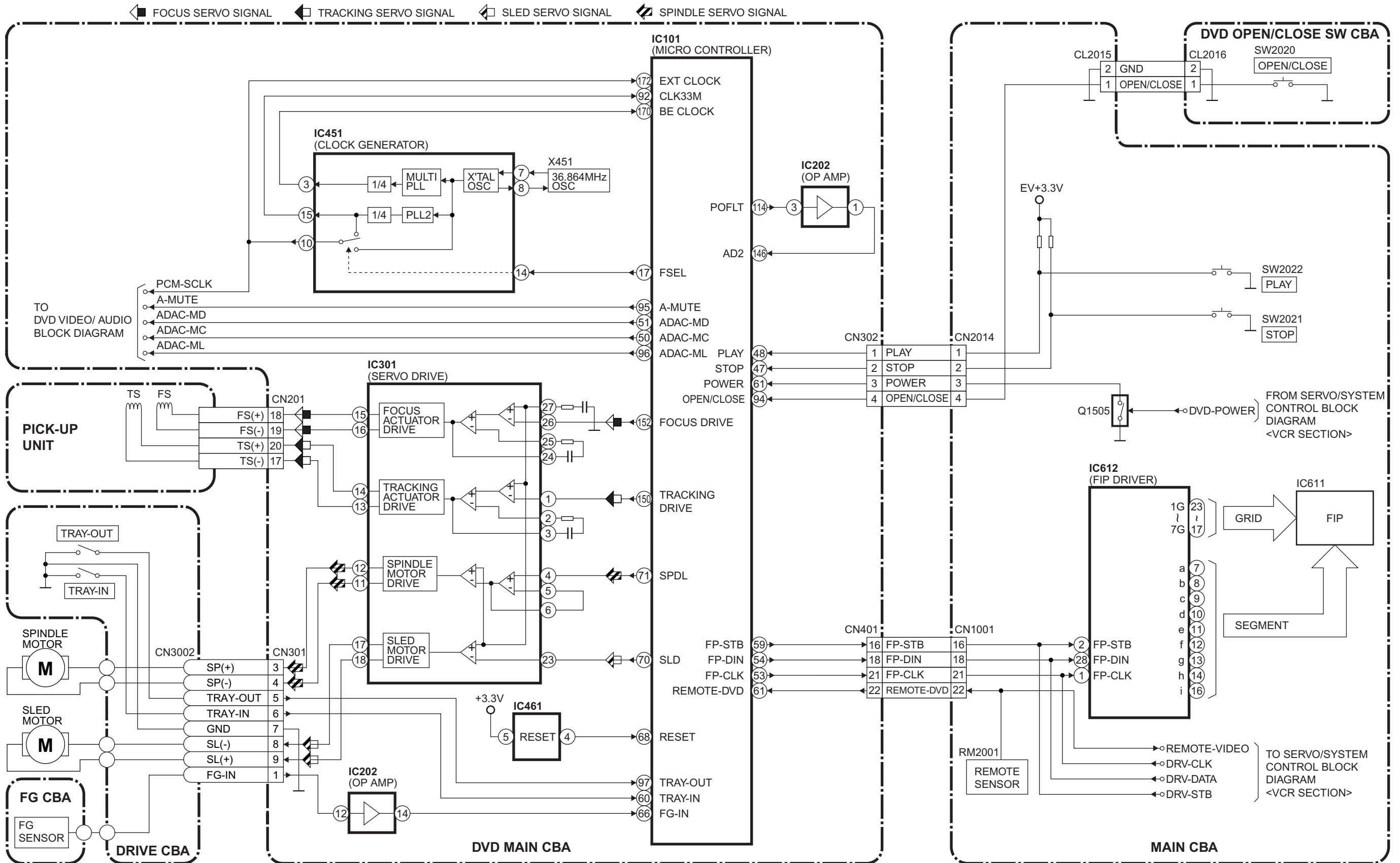
NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE T1.6AL/250V FUSE.

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F001) 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.

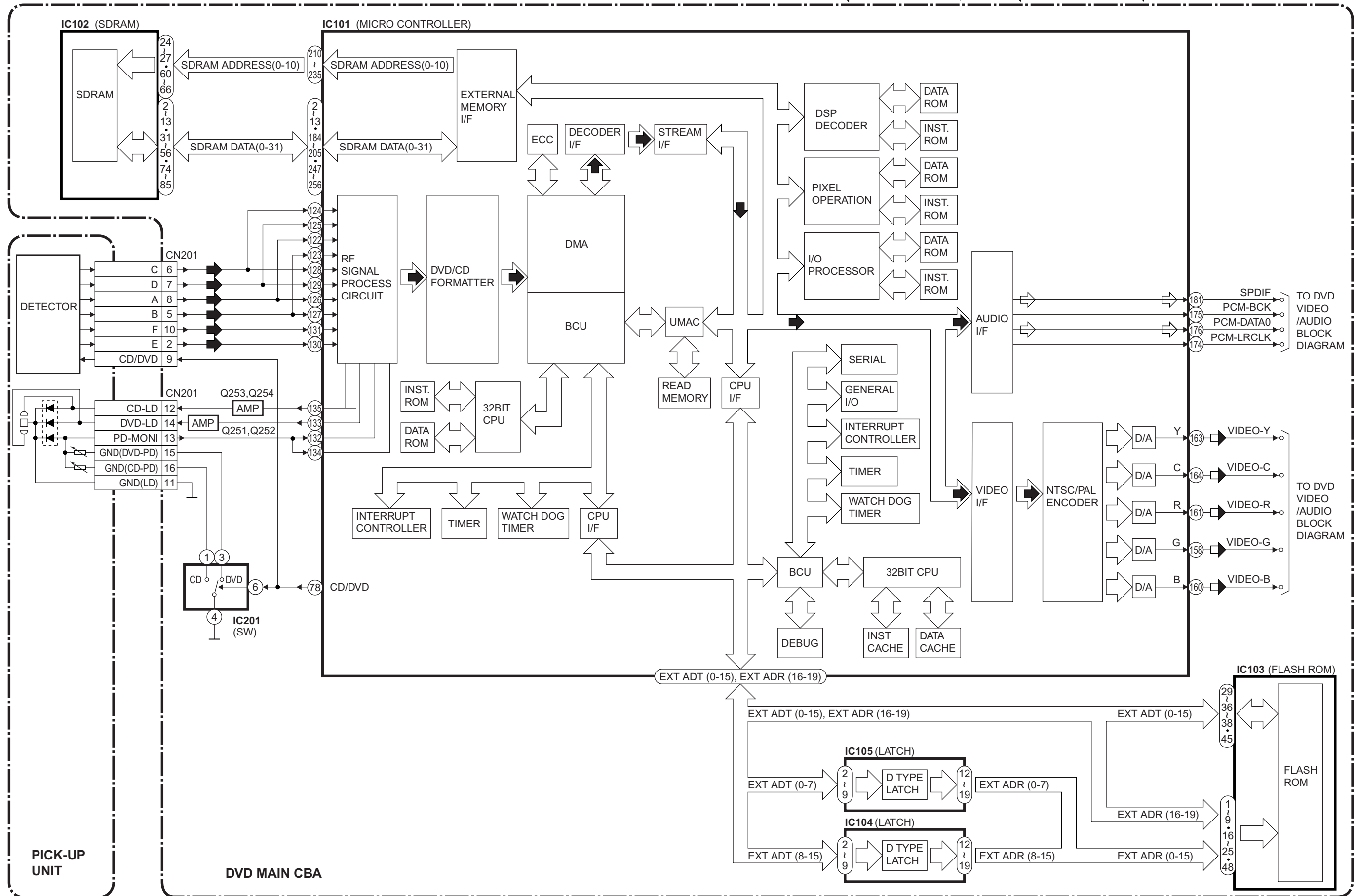


5-6 DVD System Control/Servo Block Diagram



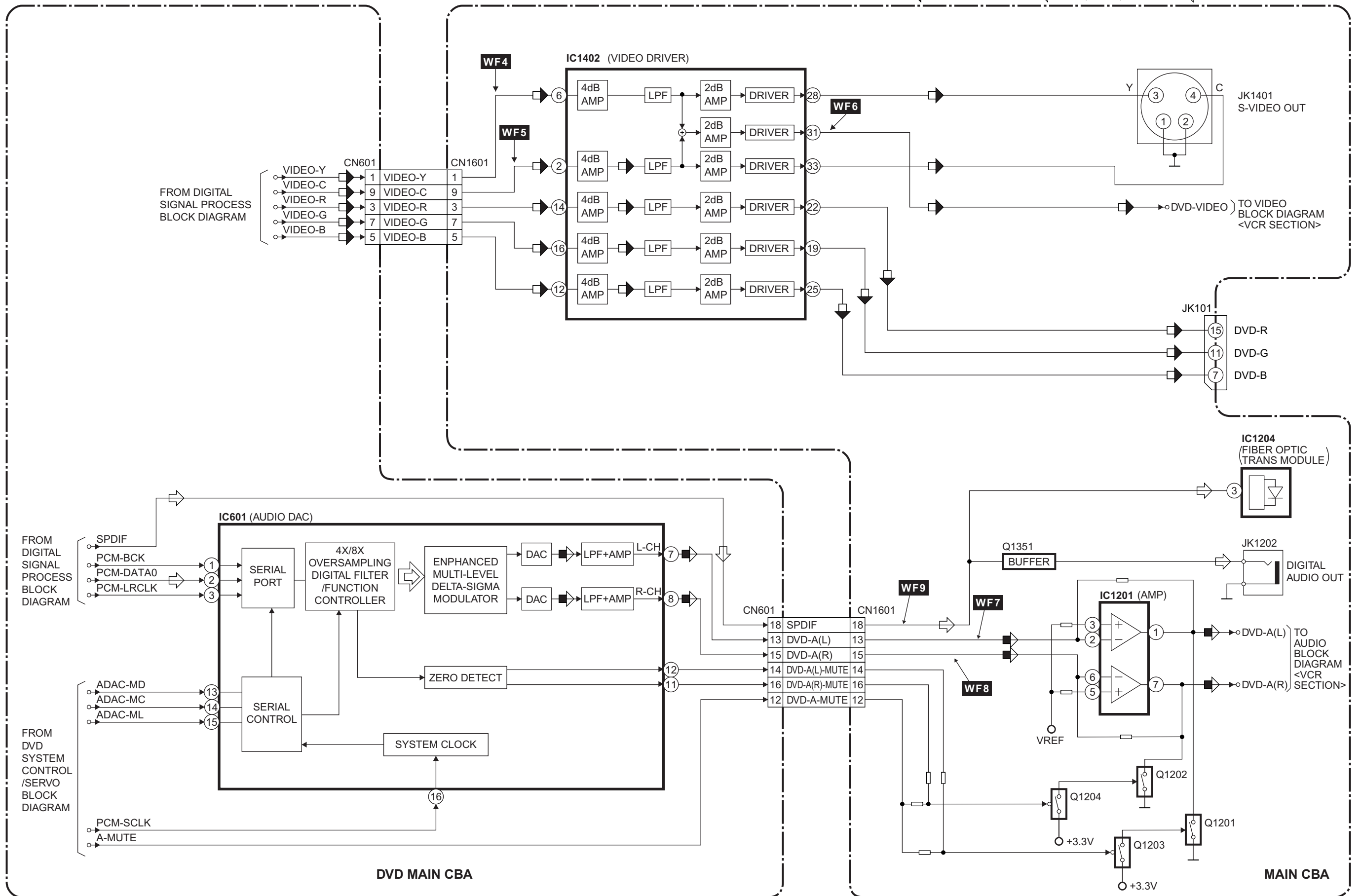
5-7 Digital Signal Process Block Diagram

← DATA(VIDEO/AUDIO) SIGNAL
 ◀ DVD VIDEO SIGNAL
 ⇐ DATA(AUDIO) SIGNAL



5-8 DVD Video / Audio Block Diagram

◻ DVD VIDEO SIGNAL ◻ DATA(AUDIO) SIGNAL ◼ DVD AUDIO SIGNAL



6 SYSTEM CONTROL TIMING CHARTS

[VCR Section]

Mode SW : LD-SW

LD-SW Position detection A/D Input voltage Limit (Calculated voltage)	Symbol
3.76V~4.50V (4.12V)	EJ
4.51V~5.00V (5.00V)	CL
0.00V~0.25V (0.00V)	SB
1.06V~1.50V (1.21V)	TL
0.66V~1.05V (0.91V)	FB
1.99V~2.60V (2.17V)	SF
1.51V~1.98V (1.80V)	SM
3.20V~3.75V (3.40V)	AU
0.26V~0.65V (0.44V)	AL
4.51V~5.00V (5.00V)	SS
2.61V~3.19V (2.97V)	RS

Note:

Note:

EJ → RS: Loading FWD (LM-FWD/REV "H")
 RS → EJ: Loading REV (LM-FWD/REV "L")
 Stop (A) = Loading
 Stop (B) = Unloading

Note:

Symbol	Loading Status
EJ	Eject
CL	Eject ~ REW Reel
SB	REW Reel ~ Stop(B)
TL	Stop(B) ~ Brake Cancel
FB	Brake Cancel ~ FF / REW
SF	FF / REW ~ Stop(M), (FF / REW)
SM	Stop(M), (FF / REW) ~ Stop(A)
AU	Stop(A) ~ Play / REC
AL	Play / REC ~ Still / Slow
SS	Still / Slow ~ RS (REW Search)
RS	RS (REW Search)

Still/Slow Control Frame Advance Timing Chart

1) SP Mode

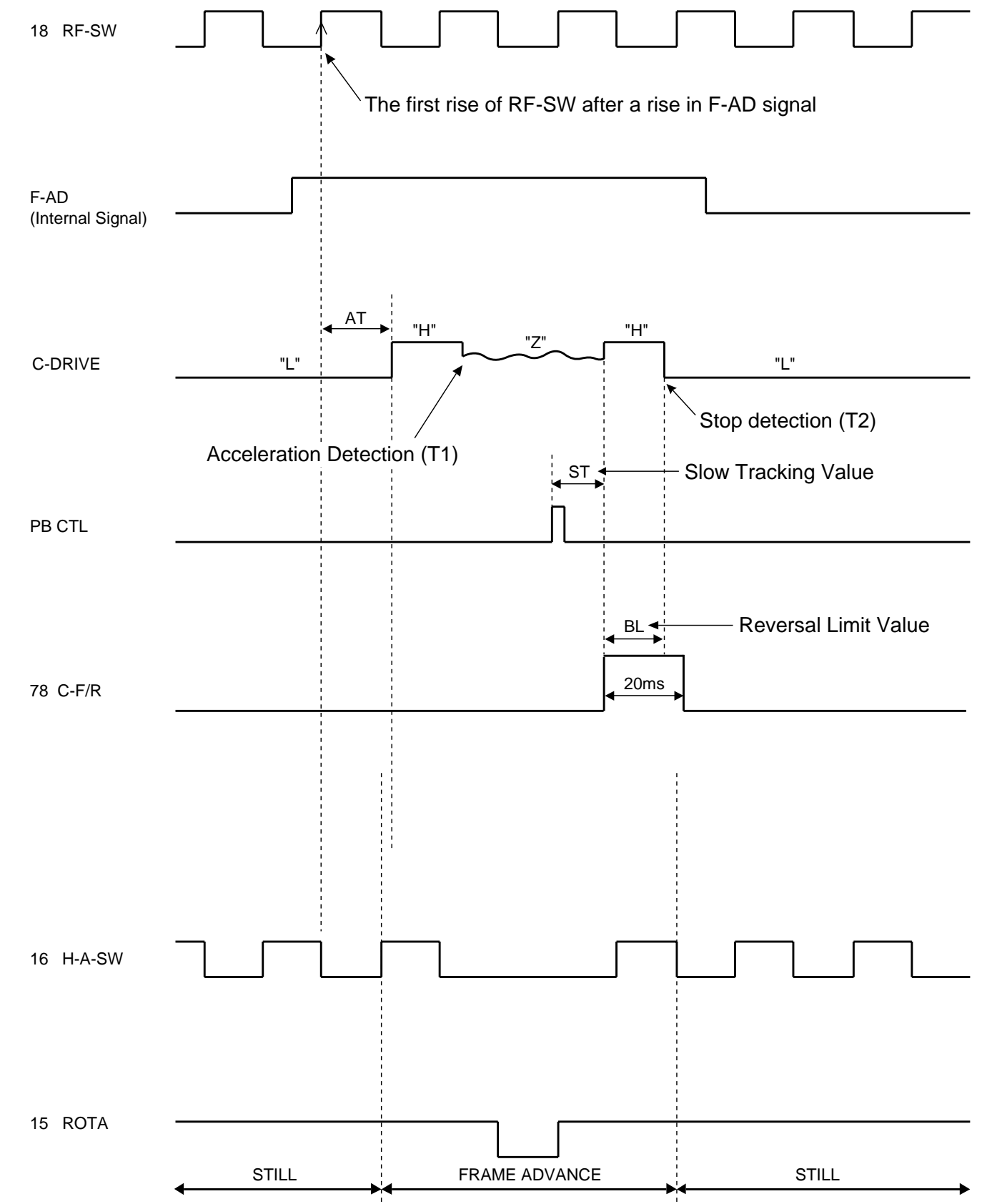


Fig. 1

2) LP Mode

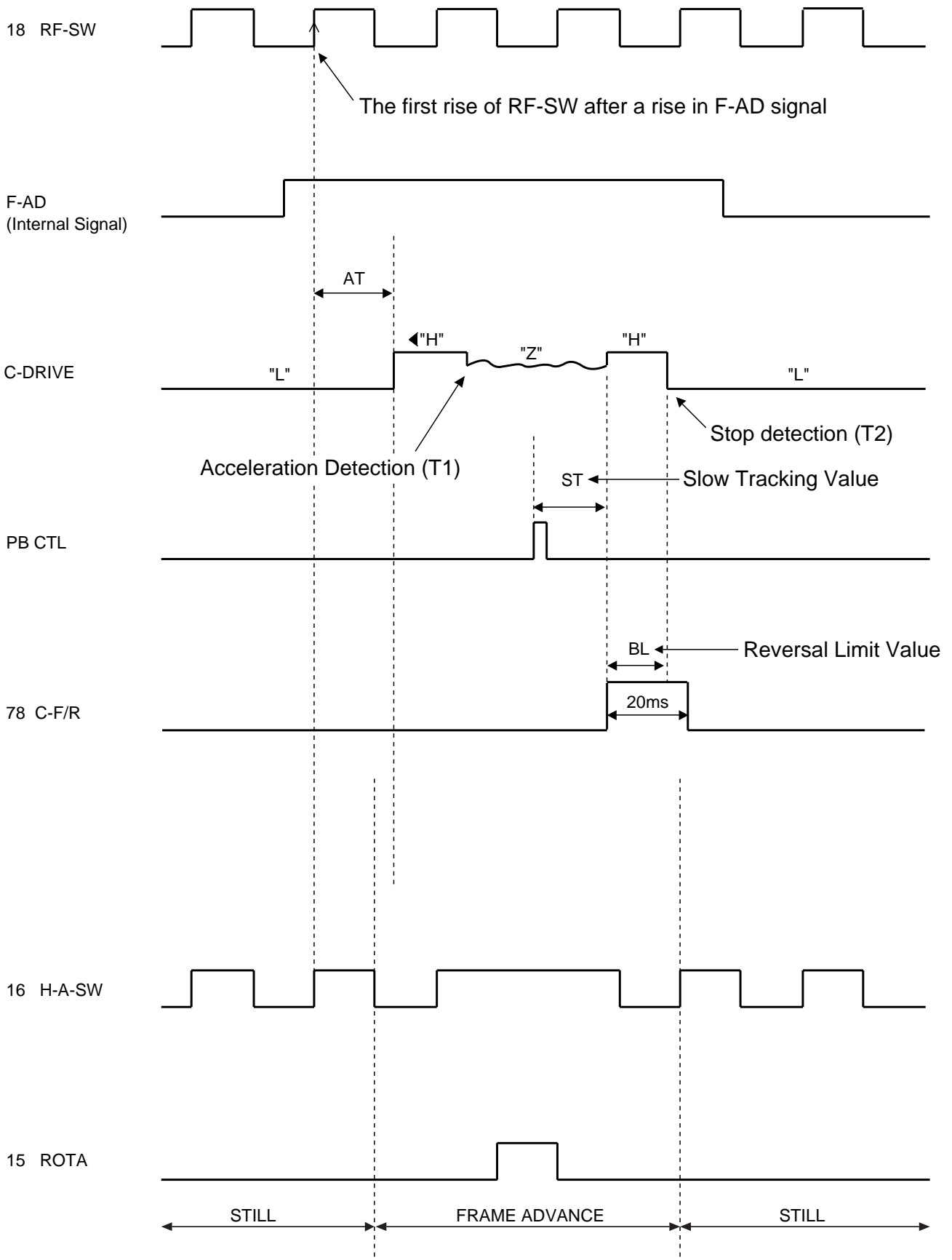


Fig. 2

2. STOP(A) -> FF -> STOP(A) -> REW -> STOP(A) -> REC -> PAUSE -> PAUSE or REC -> STOP(A) -> EJECT

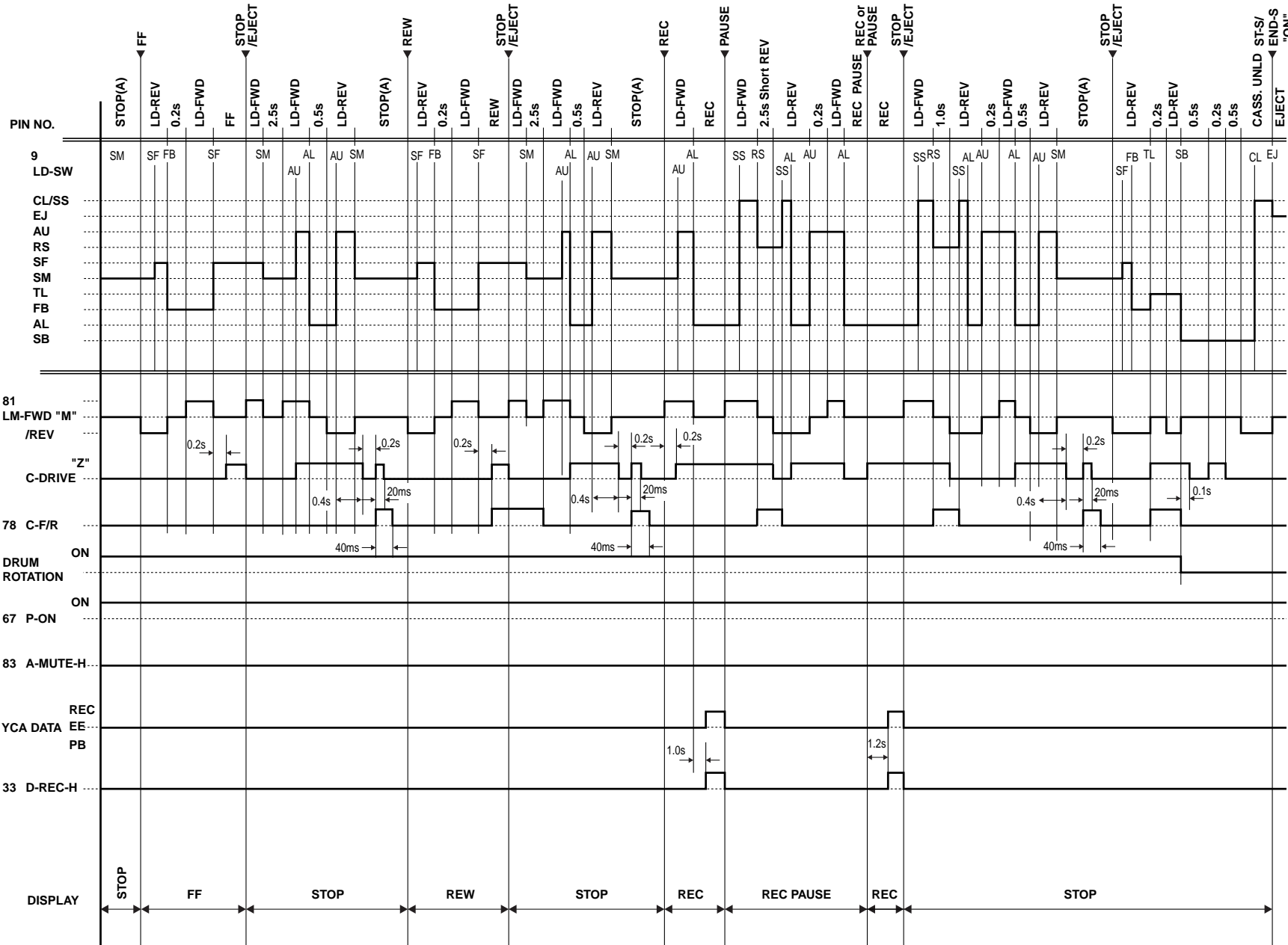
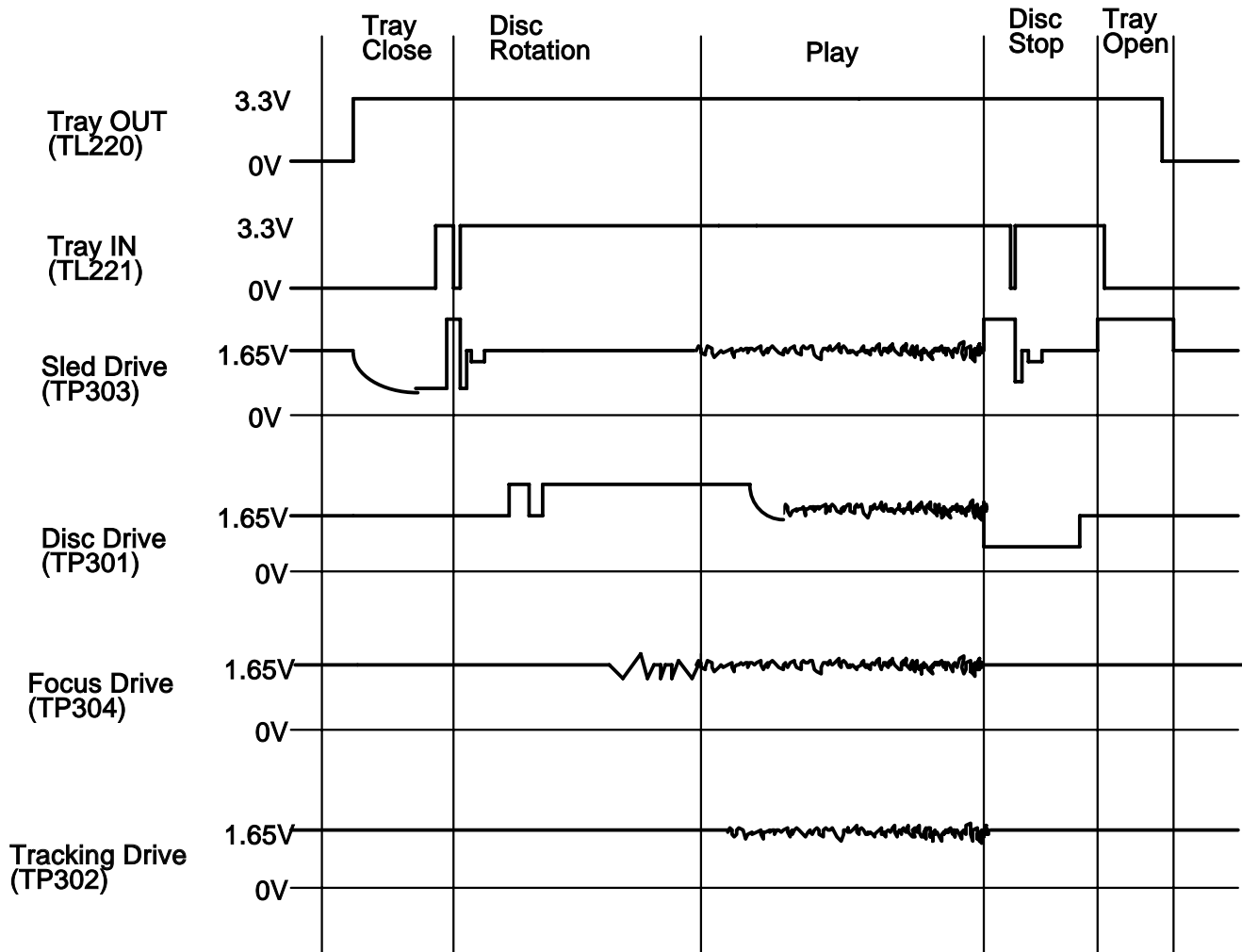


Fig. 4

[DVD Section]

Tray Close ~ Play / Play ~ Tray Open



7 IC PIN FUNCTION DESCRIPTIONS

[VCR Section]

IC501(SERVO / SYSTEM CONTROL IC)

“H” ≥ 4.5V, “L” ≤ 1.0V

Pin No.	IN/ OUT	Signal Name	Function	Active Level
1	IN	SC2-IN	Input Signal from Pin 8 of SCART2	A/D
2	IN	PG-DELAY	Video Head Switching Pulse Signal Adjusted Voltage	A/D
3	IN	POW-SAF	P-ON Power Detection Input Signal	A/D
4	IN	END-S	Tape End Position Detect Signal	A/D
5	IN	AFC	Automatic Frequency Control Signal	A/D
6	IN	V-ENV	Video Envelope Comparator Signal	A/D
7	IN	KEY-1	Key Scan Input Signal 1	A/D
8	IN	KEY-2	Key Scan Input Signal 2	A/D
9	IN	LD-SW	Deck Mode Position Detector Signal	A/D
10	IN	ST-S	Tape Start Position Detector Signal	A/D
11	-	NU	Not Used	-
12	-	NU	Not Used	-
13	OUT	D-V-SYNC	Dummy V-sync Output	H/Hi-z
14	IN	REMOTE-VIDEO	Remote Control Sensor	L
15	OUT	C-ROTA	Color Phase Rotary Changeover Signal	H/L
16	OUT	H-A-SW	Video Head Amp Switching Pulse	H/L
17	IN	H-A-COMP	Head Amp Comparator Signal	H/L
18	OUT	RF-SW	Video Head Switching Pulse	H/L
19	OUT	Hi-Fi-H-SW	HiFi Audio Head Switching Pulse	H/L
20	-	NU	Not Used	-
21	OUT	DVD-POWER	DVD Power Control Signal	H
22	-	NU	Not Used	-

Pin No.	IN/ OUT	Signal Name	Function	Active Level
23	OUT	POWER-LED	“POWER” LED Signal Output	H/L
24	-	NU	Not Used	-
25	OUT	TIMER-LED	“TIMER” LED Signal Output	H/L
26	OUT	REC-LED	“REC” LED Signal Output	H/L
27	-	NU	Not Used	-
28	-	NU	Not Used	-
29	OUT	DVD-LED	“DVD” LED Signal Output	H/L
30	OUT	VCR-LED	“VCR” LED Signal Output	H/L
31	IN	REC-SAF-SW	Recording Safety SW Detect (With Record tab="L"/ With out Record tab="H")	H/L
32	IN	A-MODE	Hi-Fi Tape Detection Signal	L
33	OUT	D-REC-H	Delayed Record Signal	H
34	IN	RESET	System Reset Signal (Reset="L")	L
35	IN	Xcin	Sub Clock	-
36	OUT	XcOUT	Sub Clock	-
37	-	Vcc	Vcc	-
38	IN	Xin	Main Clock Input	-
39	OUT	Xout	Main Clock Input	-
40	-	Vss	Vss(GND)	-
41	-	NU	Not Used	-
42	IN	DVD-8PIN-IN	SCART 8Pin DVD Input Control Signal	H/L
43	IN	CLKSEL	Clock Select (GND)	L
44	IN	OSCin	Clock Input for letter size	-
45	OUT	OSCut	Clock Output for letter size	-
46	-	NU	Not Used	-
47	-	NU	Not Used	-
48	IN	FSC-IN [4.43MHz]	4.43MHz Clock Input	-
49	-	OSDVss	OSDVss	-
50	IN	OSD-V-IN	OSD Video Signal Input	-
51	-	NU	Not Used	-
52	OUT	OSD-V-OUT	OSD Video Signal Output	-

Pin No.	IN/ OUT	Signal Name	Function	Active Level
53	-	OSDVcc	OSDVcc	-
54	-	NU	Not Used	-
55	IN	COLOR-IN	SECAM or MESECAM Chroma Video Input Signal at Super Impose	Z/L
56	-	NU	Not Used	-
57	-	NU	Not Used	-
58	IN	C-SYNC	Composite Synchronized Pulse	PULSE
59	OUT	8POUT-1	Control SCART 1 8Pin Level by using 8POUT-1 and 8POUT-2	H/L
60	OUT	8POUT-2	Control SCART 1 8Pin Level by using 8POUT-1 and 8POUT-2	H/L
61	-	NU	Not Used	-
62	-	NU	Not Used	-
63	-	NU	Not Used	-
64	-	NU	Not Used	-
65	-	NU	Not Used	-
66	OUT	C-POW-SW	Capstan Power Switching Signal	H/L
67	OUT	P-ON-H	Power On Signal at High	H
68	OUT	DRV-DATA	VFD Driver IC Control Data	H/L
69	OUT	DRV-STB	VFD Driver IC Chip Select Signal	H/L
70	OUT	DRV-CLK	VFD Driver IC Control Clock	H/L
71	OUT	IIC-BUS-SCL	IIC BUS Control Clock	H/L
72	IN/ OUT	IIC-BUS-SDA	IIC BUS Control Data	H/L
73	OUT	P-OFF-H	Power Off at High	H
74	OUT	OUTPUT-SELECT	Output Select	H/L
75	IN	DVD-POWER-MONITOR	DVD Power Monitor Signal (P-off="L", P-on="H")	H/L
76	OUT	C-CONT	Capstan Motor Control Signal	PWM
77	OUT	D-CONT	Drum Motor Control Signal	PWM
78	OUT	C-F/R	Capstan Motor FWD/REV Control Signal (FWD="L"/REV="H")	H/L

Pin No.	IN/ OUT	Signal Name	Function	Active Level
79	IN	S-REEL	Supply Reel Rotation Signal	PULSE
80	IN	T-REEL	Take Up Reel Rotation Signal	PULSE
81	OUT	LM-FWD/REV	Loading Motor Control Signal	H/L/ Hi-z
82	OUT	LINE-MUTE	Audio Mute Control Signal	H
83	OUT	A-MUTE-H	Audio Mute Control Signal (Mute = "H")	H
84	OUT	FF/REW-L	CTL Frequency Characteristics Switching Signal (FF/REW="L")	L
85	-	NU	Not Used	-
86	IN	P-DOWN-L	Power Voltage Down Detector Signal	L
87	IN	C-FG	Capstan Motor Rotation Detection Pulse	PULSE
88	-	NU	Not Used	-
89	-	NU	Not Used	-
90	IN	D-PFG	Drum Motor Phase/ Frequency Generator	PULSE
91	-	AMPVRE F OUT	V-Ref for CTL AMP	-
92	-	AMPVRE Fin	V-Ref for CTL AMP	-
93	-	NU	Not Used	-
94	IN/ OUT	CTL (-)	Playback/Record Control Signal (-)	H/L
95	IN/ OUT	CTL (+)	Playback/Record Control Signal (+)	H/L
96	-	AMPC	CTL AMP Connected Terminal	-
97	-	CTLAMP out	To Monitor for CTL AMP Output	PULSE
98	-	AMPVcc	AMPVcc	-
99	-	AVcc	A/D Converter Power Input/ Standard Voltage Input	-
100	IN	AGC	IF AGC Output Signal	A/D

Notes:

Abbreviation for Active Level:

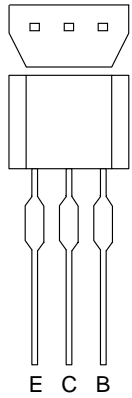
PWM -----Pulse Wide Modulation

A/D-----Analog - Digital Converter

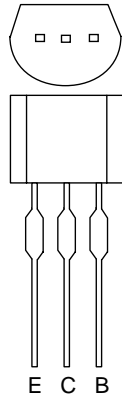
IC612 [PT6315-S(TP)]

Pin No.	In/Out	Signal Name	Name Function
1	In	CLK	Clock Input
2	In	STB	Serial Interface Strobe
3	In	K1	Key Data 1 Input
4	In	K2	Key Data 2 Input
5	-	VSS	GND
6	-	VDD	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	Power Supply
25	-	VSS	GND
26	In	OSC	Oscillator Input
27	Out	DOUT	Serial Data Output
28	In	DIN	Serial Data Input

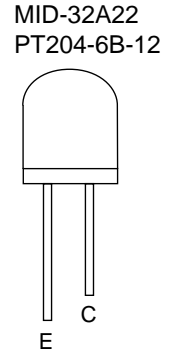
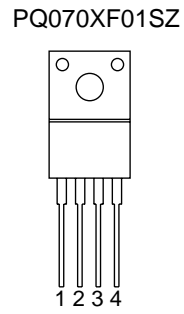
8 LEAD IDENTIFICATIONS



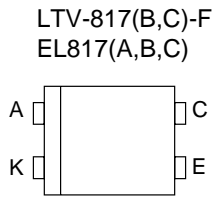
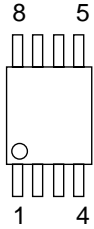
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 KRA104M



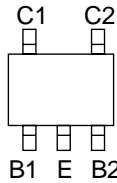
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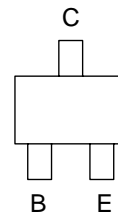
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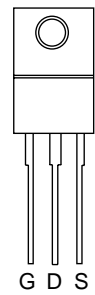
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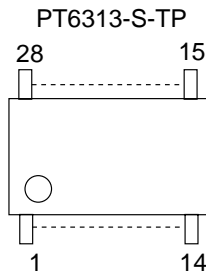
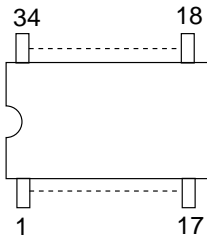
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2SK3566

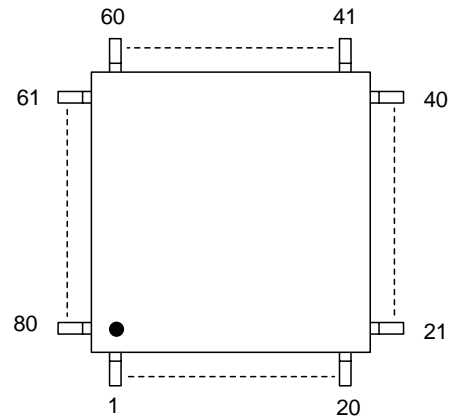


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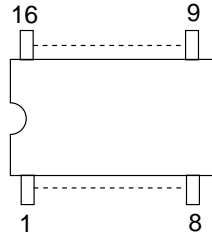


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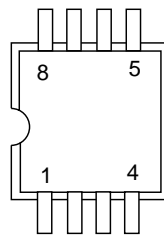
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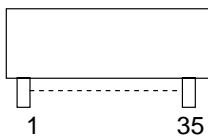
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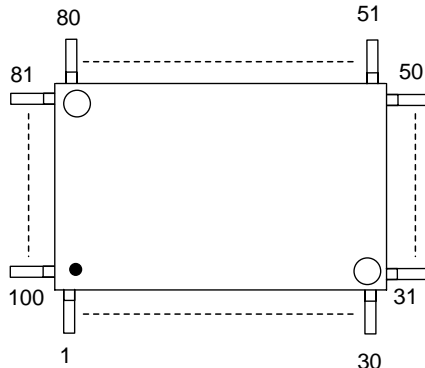
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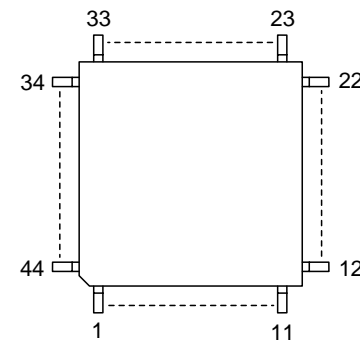
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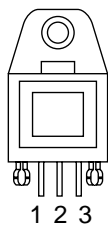
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MSP3417G-QG-B8
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0C-0805T*002
 GP1FA512TZV



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

HITACHI