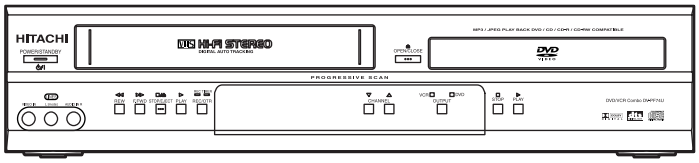
HITACHI

TK | No. 0406E

SERVICE MANUAL

DV-PF74U
DV-PF74U(C)



DO NOT RESELL OR DIVERT IMPROPERLY.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

DVD PLAYER & VIDEO CASSETTE RECORDER

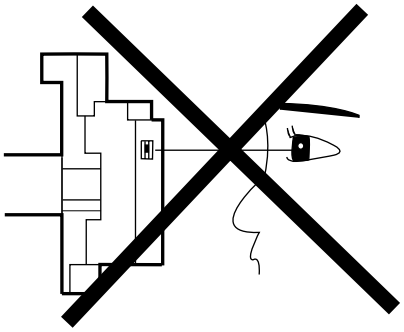
March 2004 Digital Media Division, Tokai

CONTENTS

1 CAUTIONS FOR SAFETY IN PERFORMING REPAIR

1-1 LASER BEAM SAFETY PRECAUTIONS

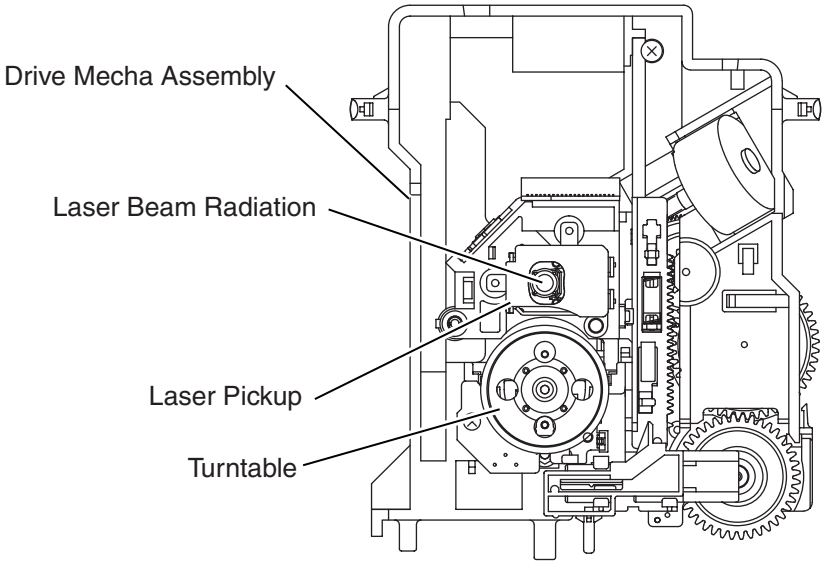
This DVD player uses a pickup that emits a laser beam.



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.



Location: Top of DVD mechanism.

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 ⚠ 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 ⚠ 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)

Table 1 : Ratings for selected area

AC Line Voltage	Clearance Distance (d) (d')
120 V	≥ 3.2mm (0.126 inches)

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

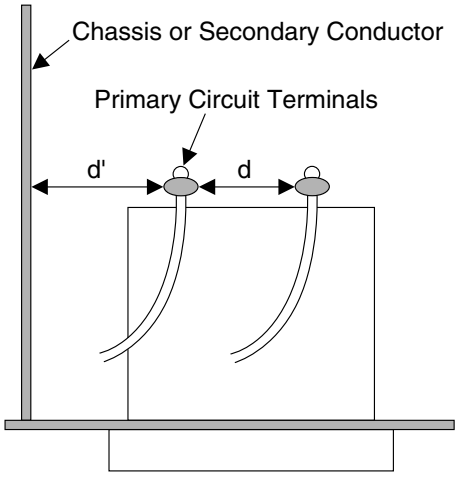


Fig. 1

2. Leakage Current Test

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

Measuring Method (Power ON) :

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

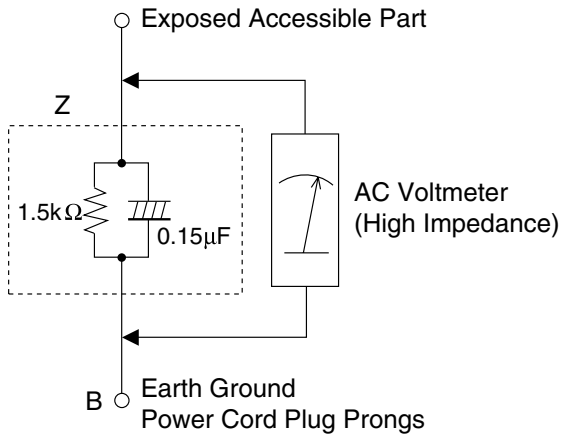


Fig. 2

Table 2: Leakage current ratings for selected areas

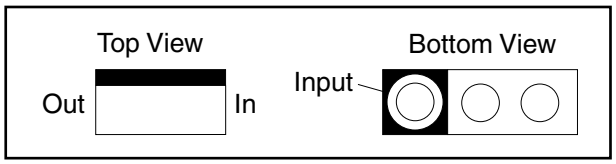
AC Line Voltage	Load Z	Leakage Current (i)	Earth Ground (B) to:
120 V	0.15μF CAP. & 1.5kΩ RES. Connected in parallel	i≤0.5mA Peak	Exposed accessible parts

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

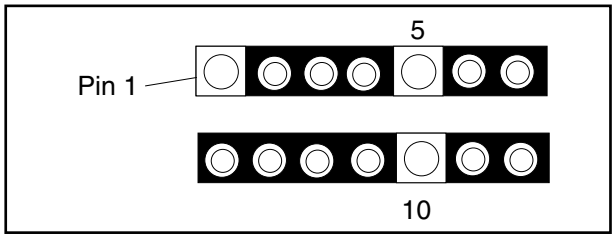
1-3 STANDARD NOTES FOR SERVICING

1-3-1 Circuit Board Indications

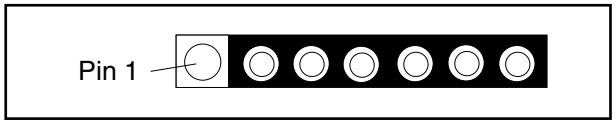
a. The output pin of the 3 pin Regulator ICs is indicated as shown.



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

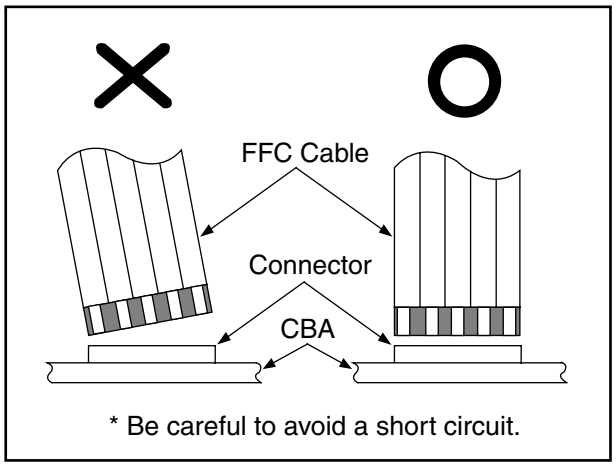


c. The 1st pin of every male connector is indicated as shown.



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 Pb (Lead) Free Solder

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

1-3-4 How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:.

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

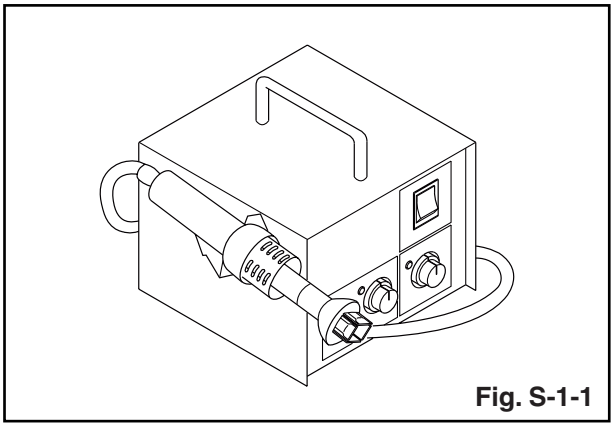


Fig. S-1-1

(2) Remove the flat pack-IC with tweezers while applying the hot air.

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

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

Caution:

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

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

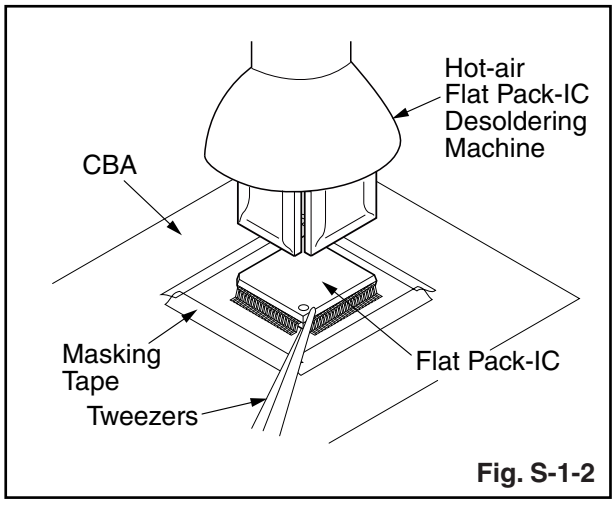


Fig. S-1-2

With Soldering Iron:

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

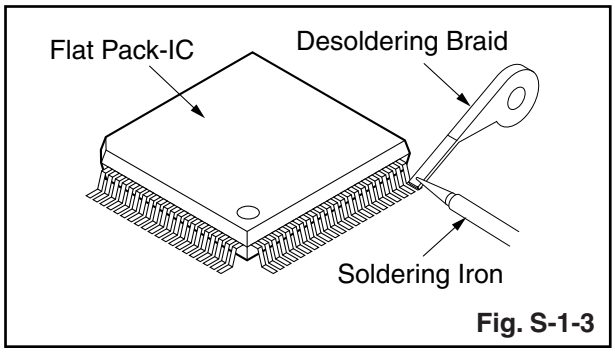


Fig. S-1-3

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

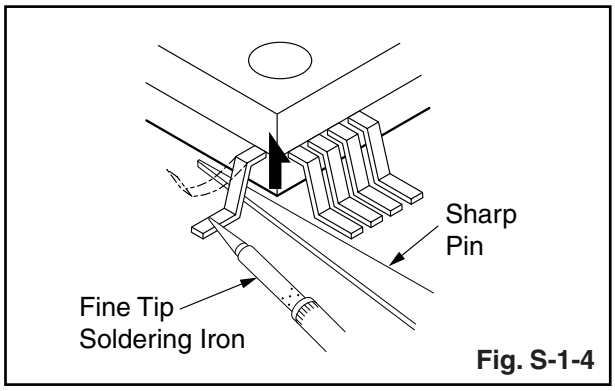


Fig. S-1-4

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

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

With Iron Wire:

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

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

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

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

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

Note:

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

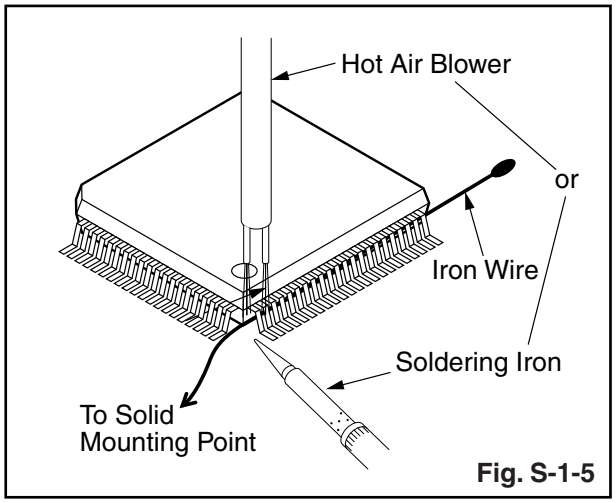


Fig. S-1-5

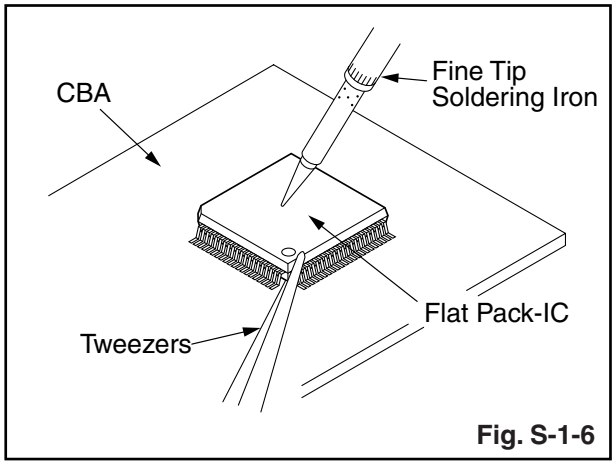


Fig. S-1-6

2. Installation

(1) Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA so you can install a replacement flat pack-IC more easily.

(2) The "●" mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the 1 on the PCB when positioning for installation. Then presolder the four corners of the flat pack-IC. (See Fig. S-1-8.)

(3) Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.

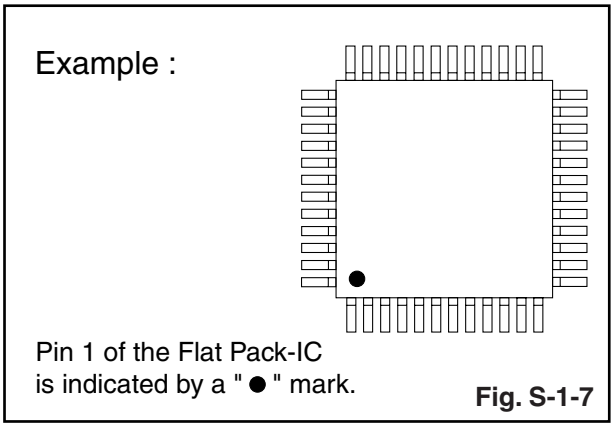


Fig. S-1-7

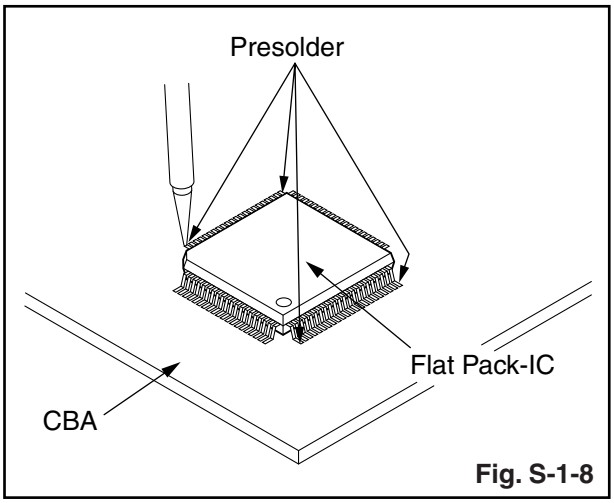


Fig. S-1-8

1-3-5 Instructions for Handling Semi-conductors

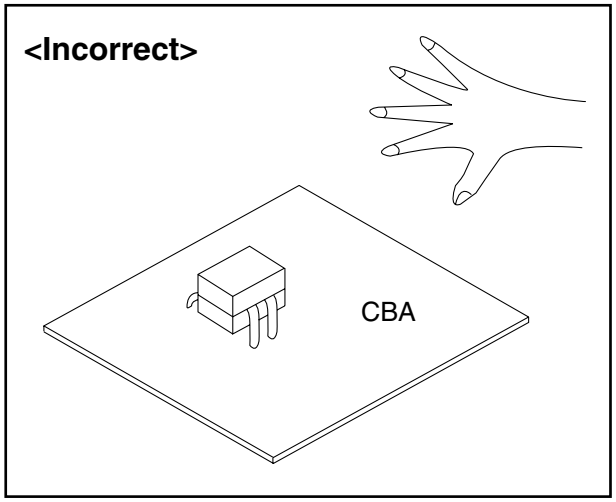
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

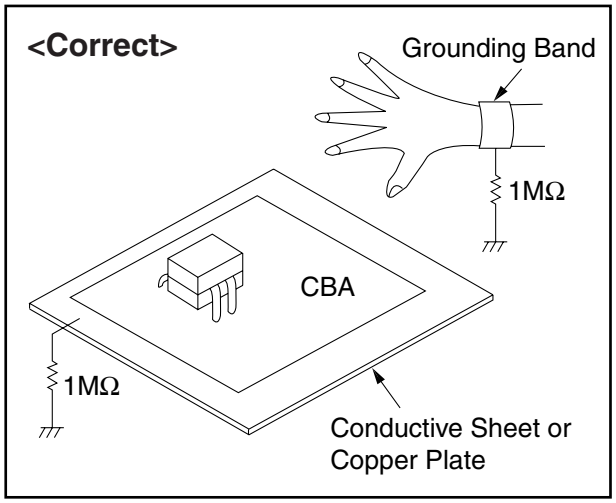
1. Ground for Human Body

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

2. Ground for Workbench

(4) Be sure to place a conductive sheet or copper plate with proper grounding (1MΩ) 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.





2 GENERAL INFORMATION

2-1 SPECIFICATIONS

Product type:	DVD/VCR Combo (DVD player with Video Cassette Recorder)
Discs:	DVD video Audio CD Video Cassette tape (VHS)
Converter output:	VHF Channel 3 or 4.
Power source:	120 V AC +/- 10%, 60 Hz +/- 0.5%
Power consumption:	21 W (standby: 3.6 W)
Operating temperature:	41 F (5 C) to 104 F (40 C)
Dimensions:	W 17-3/16” (435 mm) H 3-3/4” (94 mm) D 9-3/16” (233 mm)
Weight:	6.0 lbs (2.7 kg)

- **Designs and specifications are subject to change without notice.**
- **If there is a discrepancy between languages, the default language will be English.**

2-2 COMPARISON OF MODELS

2-2-1 General

O: Yes, ---: No, ← : Same as on left

ITEM		DV-PF74U/PF74U(C)	DV-PF73U/PF73U(C)/PF33U
APPEARANCE	Dimensional	435(W) x 94(H) x 233(D)mm	435(W) x 99(H) x 218(D)mm
	Weight	2.7 kg	3.6 kg
	Tray Panel / FL Window	Clear / Clear	Silver / Clear
	Color Front / Button	Silver / Silver	Silver / Silver (DV-PF73U/PF73U(C))
REMOTE CONTROLLER	Remote Controller Model Name	DV-RMPF74U	DV-RMPF73U (DV-PF73U/PF73U(C)) DV-RMPF33U (DV-PF33U)
	Jog Shuttle on Remote	---	←
	TV Control	---	O

2-2-2 VCR Section

O: Yes, ---: No, ← : Same as on left

ITEM		DV-PF74U/PF74U(C)	DV-PF73U/PF73U(C)/PF33U
VIDEO	Video Format	VHS	←
	Y/C Separation	Comb Filter	←
	YNR (Luminance Noise Reduction) Circuit	O	←
	New Synchronize Circuit	---	←
	Picture Control	---	←
INPUT/ OUTPUT	Video/Audio Input (Rear)	1/1 (IN1)	←
	Video/Audio Input (Front)	1/1 (IN2)	←
	Video/Audio Output (Rear)	1/1 (OUT1)	←
OTHER	Stereo CM Skip Feature	---	←
	Auto Clock Feature	---	←
	Number of Timer Programming	8 Program/year	←
	Self Diagnosis Function	O (4 Modes)	←
	Back-up Time	30 s	←
	SQPB	---	←
	Surge Absorber	O	←
	Auto Power Off Feature	O	←
	Local Broadcast Setting	O	←
	Multi Search Feature	O (Index, Time Search)	←
MECHANISM	Search Speed	SP: X5 LP: X5/X9 EP: X5/X15	←
	FF/REW Time (T-120 Tape)	FF: approx. 4 min, REW: approx. 4 min	←
	Head Composition	DA4+Hi-Fi SP: 2[49/58 µm] EP: 2[21/21 µm] Hi-Fi Audio: 2[28/28 µm]	←
	Video Head Material	SP: Ferrite EP: Ferrite Hi-Fi Audio: Ferrite	←
	VISS	O (Index Search)	←

2-2-3 DVD Section

O: Yes, ---: No (← : Same as on left)

ITEM		DV-PF74U/PF74U(C)	DV-PF73U/PF73U(C)/PF33U
GENERAL	Drive Speed	1x	←
	Laser	2	←
	DVD/VCD/SVCD/CD-DA	O / --- / --- / O	←
	CD-R/CD-RW/DVD-R (Video Format)	O / O / O	←
	DVD-RAM/DVD-RW (Video Format)	--- / O	--- / ---
	JPEG Play back	O	---
	MP3	O	←
	OSD languages	3 (English, French, Spanish)	←
	Jog Shuttle on Front	---	←
	Headphone Jack / Volume	--- / ---	←
VIDEO	PAL Disc NTSC Out	---	←
	Video Out Mode NTSC/PAL/PAL60	O / --- / ---	←
	S-Video / Component / Composite	O / O / O	←
	Video D/A Converter	10bit	←
	Black Level Select	O	←
	Picture Control	---	←
	Progressive Out	O	←
AUDIO	Audio D/A Converter	192kHz / 24bit	←
	Digital Audio Out Optical / Coaxial	--- / O	←
	Dolby Digital 5.1 ch Decode	---	←
	DTS Digital Out	O	---
	Virtual Surround	O	←
	Dynamic Range Compression (Dolby Digital)	O	←
	DVD Audio	---	←
	Power on sound	---	←
TRICK PLAY	Search Speed	2 to 100 (FORWARD/REWIND) (DVD: 2, 8, 50, 100/CD: 16)	←
	Slow Speed	1/16, 1/8, 1/2 (FORWARD/REWIND)	←
	IP Search (Smooth 2x Play)	O	←
	2x Play with Audio	---	←
	Step Forward / Reverse	O / O	←
	Still Picture Select (Frame/Field)	Frame/Field/Auto	Auto Only
FEATURES	Disc Navigation	O	O (DV-PF73U/PF73U(C)) --- (DV-PF33U)
	DVD Zoom x2 / x4	O / O	←
	Program and Random Play of DVD / VCD	---	←
	A-B Repeat	O	←
	Repeat	O	←
	Last Play	O	---
	Closed Caption for NTSC DVD	O	←
	Front Panel Display Dimmer	O	←
	Screen Saver	O	←
	Auto Power Off	O (always ON)	O

2-3 COMPARISON OF MAIN CONTROL ICS

← : Same as on left

ITEM	DV-PF74U/PF74U(C)	DV-PF73U/PF73U(C)/PF33U
MICRO CONTROLLER	MN35202 (IC101)	MN35102 (IC101)
FLASH ROM	MBM29LV160BM90TN (IC103)	MBM29LV160BE90TN-K / MBM29LV1661390PFTNSFK / HY29LV160BT-90 / MX29LV160BTC-90 / M29W166DB70N6 (IC103)
LATCH	----------	74LVX573MTCX / TC74LVX573FT(EL) (IC104, IC105)
SW	NC7SB3157P6X / SN74LVC1G3157DCKR (IC201)	NC7SB3157P6X (IC201)
OP AMP	LM324PWR / LM324PT (IC202)	KIA324F-EL (IC202)
SERVO DRIVE	SA5694 / FAN8024CDTF / BA5954FP-E2 / BA5888FP-E2 (IC301)	SA5694 / BA5954FP-E2 (IC301)
CLOCK GENERATOR	----------	BU2363FV-E2 (IC451)
RESET	PST3229NR (IC461)	PST9127NR / BMR-110527 (IC461)
	BMR-110529 (IC462)	
SDRAM	K4S641632H-UC75 / VDS6616A4A-7G (IC503)	K4S643232F-TC60 / HY57V643220CT-(7,55) (IC102)
AUDIO D/A CONVERTER	PCM1755DBQR (IC601)	PCM1751DBQR (IC601)
VIDEO/AUDIO SIGNAL PROCESS/HEAD AMP	LA71205M-MPB-E (IC301)	LA71091M (IC301)
MTS/SAP/Hi-Fi AUDIO PROCESS/Hi-Fi HEAD AMP	LA726708M-MPB-E (IC451)	LA72670M (IC451)
SERVO/SYSTEM CONTROL	MN101D08DFT (IC501)	----------
SYSTEM CONTROL MICROPROCESSOR	----------	MN101D08EFD1/QSZACORMS006 (IC501)
FIP DRIVER	PT6313-S-TP (IC571)	←
OUTPUT SELECT	TC4053BF(N) / BU4053BCF / CD4053BCSJX (IC751)	TC4053BF(N) / BU4053BCF (IC751)
ERROR VOLTAGE DET	LTV-817B-F / LTV-817C-F / ELB817A / ELB817B / ELB817C / PS2561A-1(Q) / PS2561A-1(W) (IC1001)	LTV-817B-F (IC1001)
1.2V REG	PQ070XZ5MZP (IC1002)	----------
1.5V REG	----------	PQ070XF01SZ (IC1002)
3.3V REG	BA3948FP-E2 (IC1004)	PQ070XF01SZ (IC1004)
SHUNT REGULATOR	----------	KIA431-AT / TL431A-TA / KIA431A-AT (IC1006)
AMP	KIA4558P / NJM4558D (IC1201)	←
VIDEO DRIVER	MM1637XVBE (IC1402)	MM1622XJBE (IC1402)
	MM1636XWRE (IC1403)	

2-4 LIST OF ABBREVIATIONS AND TERMS FOR DVD PLAYER

Index	Abbreviation/Term	Explanation
A	AC3	See Dolby AC3.
C	CD-R	One type of DVD standard disc, to which writing once is possible (recordable type)
	CD-RW	One type of CD standard disc, to which writing up to 1000 times is possible
	Component video output terminals	Used for outputs of HDTV video signal format. Since signals for brightness and colors are independently handled for components signals (Y: luminance signal; PR/PB: chrominance signals), degrading of image will be reduced.
D	Dolby AC3	Audio coding format developed by Dolby Laboratories in U.S, also simply referred to as AC3 format: Supports 5-channel full-range sound and one channel for sub-woofer sound playback.
	D terminal	This terminal, specified by EIAJ (currently JEITA), can automatically switch "digital hi-vision" programs of BS digital broadcast, and "digital standard broadcast" of current image quality. A tuner and TV can easily be connected to the D terminal. There are 5 types of D terminal, depending on the different format of video signal passing thorough the D terminal.
	DTS	Digital Theater System: Sound system as for movie theaters developed by US Digital Theater Systems, Inc. The number of channels provided by DTS is the same for Dolby AC3.
	DVD	Digital Versatile Disc. A huge amount of digital data for video (movie) and audio can be recorded on this disc, whose size is the same as CD.
	DVD-Audio	One type of DVD standard disc, on which high-quality audio can be recorded
	DVD-R	One type of DVD standard disc, to which writing once is possible (recordable type)
	DVD-RAM	One type of DVD standard disc, to which writing up to 100,000 times is possible
	DVD-ROM	One type of DVD standard disc, to which data for computer can be recorded
	DVD-RW	One type of DVD standard disc, to which writing up to 1000 times is possible
	DVD-Video	One type of DVD standard disc, on which high-quality video and audio can be recorded
	DVD Video Format	Video recording/playback standard that applies to DVD-Video, DVD-R and DVD-RW
	DVD Video Recording Format	Video recording/playback standard that applies to DVD-RAM and DVD-RW: This allows versatile editing functions, differing from the DVD Video Format.
	DVD Forum	International organization that formulates the technical standards of DVD
E	EIAJ	Electronic Industries Association of Japan: An organization of manufacturers of consumer electronic devices, industrial electronic devices and electronic components, established in April 1948. EIAJ merged with JEIDA (Japan Electronic Industry Development Association) in November 2000 to become JEITA (Japan Electronics and Information Technology Industries Association).
J	JPEG	Joint Photographic Expert Group: International standard format for compressing still images.
L	Linear PCM	Linear Pulse Code Modulation: LPCM is a format that digitizes analog audio signal during recording and converts it back to analog signal during playback.
M	MPEG	Moving Picture Experts Group: Standard related to compression of digital video and audio. MPEG2 is a higher standard of MPEG and is applied to video (movie) requiring higher quality.
	MPEG Audio Layer 2	One of three audio compression standards (layers 1-3) defined by MPEG
	MP3	MPEG1 Audio Layer-3: Audio data digital compression technology.
P	Progressive playback function	This function converts interlaced images to non-interlaced images and displays them. It can play back 24-frame/second images included in DVD movie software, etc.
S	SDMI	Secure Digital Music Initiative: This conference was established by hardware makers, the Recording Industry Association of America (RIAA) and music industry companies, to protect copyrights of musical compositions.
V	Virtual surround	This technology localizes sound at any position using only two front speakers, by subjecting the L and R signals to matrix operation. It uses the four transfer functions from L/R speakers located at specified positions to both ears of listener located in a specified position, taking into account the shape of head and the effect of earlobes, and the two transfer functions from any position to both ears.

2-5 FUNCTION INDICATOR SYMBOLS

Note:

The following symbols will appear on the indicator panel to indicate the current mode or operation of the VCR. On-screen modes will also be momentarily displayed on the tv screen when you press the operation buttons.

Led Mode	Indicator Active
When reel and capstan mechanism is not functioning correctly	“EJECT R” is displayed on a TV screen. (Refer to Fig. 1.)
When tape loading mechanism is not functioning correctly	“EJECT T” is displayed on a TV screen. (Refer to Fig. 2.)
When cassette loading mechanism is not functioning correctly	“EJECT C” is displayed on a TV screen. (Refer to Fig. 3.)
When the drum is not working properly	“EJECT D” is displayed on a TV screen. (Refer to Fig. 4.)

TV screen

Note:

OSD for mechanical error will be displayed for 5 sec. after the mechanical error occurs.

When reel and capstan mechanism is not functioning correctly

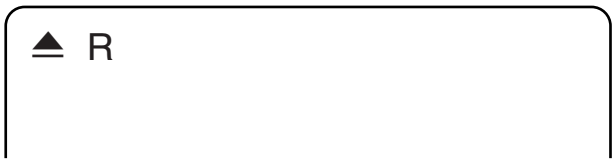


Fig. 1

When tape loading mechanism is not functioning correctly

Fig. 2

When cassette loading mechanism is not functioning correctly

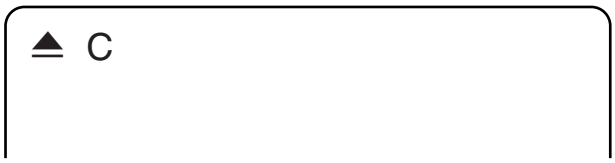


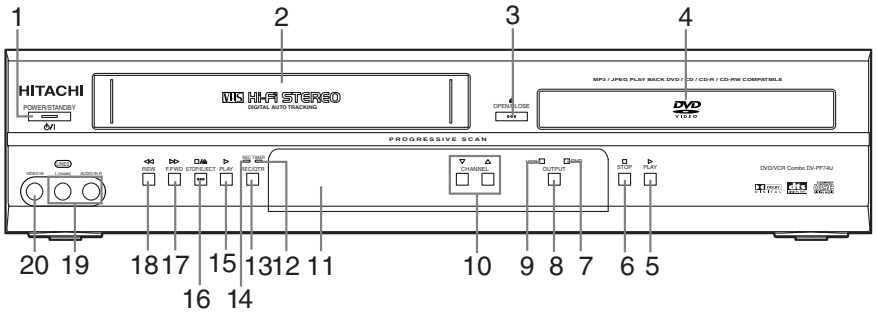
Fig. 3

When the drum is not working properly

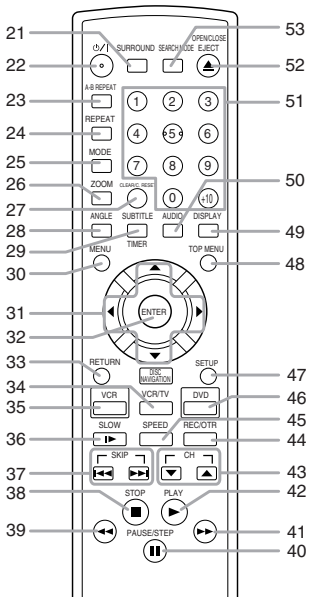
Fig. 4

2-6 OPERATING CONTROLS AND FUNCTIONS

FRONT PANEL



REMOTE CONTROL



1. **POWER/STANDBY Button**
   Press to turn the power on and off.
2. **CASSETTE COMPARTMENT**
3. **OPEN/CLOSE Button**
   Press to insert discs into or remove them from the tray.
4. **Disc loading tray**
5. **PLAY Button (DVD)**
   Press to begin playback.
   Press to switch between progressive mode and interlace modes.
6. **STOP Button (DVD)**
   Stops operation of the disc.
7. **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.
8. **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.**
9. **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, select VCR on the remote control or OUTPUT on the front panel.
10. **CHANNEL Buttons**
    In VCR mode, 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.
11. **Display, Remote Sensor Window**
12. **TIMER Light**
    This light glows when the DVD/VCR is in standby mode or off for a timer recording or during an 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 Recordings are finished.
13. **REC/OTR Button**
    Press once to start a recording. Press repeatedly to start an One Touch Recording.
14. **REC Light**
    Lights up during recording.
15. **PLAY Button(VCR)**
    Press to begin playback.
16. **STOP/EJECT Button (VCR)**
    EJECT Button
    Press to remove the tape from the DVD/VCR.
    STOP Button
    Press to stop the tape motion.
17. **F.FWD Button (VCR)**
    Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search).
18. **REW Button (VCR)**
    Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode (Rewind Search).
19. **AUDIO In Jacks**
    Connect audio cables coming from the audio out jacks of a camcorder, another VCR, or an audio source here.
20. **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.
21. **SURROUND Button**
    Press to activate the 3D sound.
22. **⏻/I(POWER/STANDBY) Button**
    Press to turn the power on and off.
    (As to the indication of the Operate switch, "I" shows ON and "⏻/I" shows electrical power stand-by.)
23. **A-B REPEAT Button**
    Repeats playback of a selected section.
24. **REPEAT Button**
    Repeats playback of the current disc, title, chapter or track.
25. **MODE Button**
    Activates program playback or random playback mode when playing Audio CD, MP3 or JPEG on discs. Sets Black level and Slide Show Mode.

26. ZOOM Button
Enlarges a part of the DVD-reproduced image.

27. CLEAR/C.RESET Button
- **DVD mode**
  Press to reset the setting.
- **VCR mode**
  Press to reset the counter. Press to exit from the MENU screen.

28. ANGLE Button
Press to change the camera angle to see the sequence being played back from a different angle.

29. SUBTITLE Button
Press to select the desired subtitle language.

TIMER Button
Press to put the VCR into standby mode for a timer recording.

30. MENU Button
- **DVD mode**
  Press to display the menu of the Disc.
- **VCR mode**
  Press to access the VCR menu.

31. Arrow Buttons
- **DVD mode**

▼ / ▲ / ▶ / ◀ Buttons
Move the cursor and determines its position.
- **VCR mode**

▼ / ▲ Buttons
Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu.

▶ Button
When setting program (For example: setting clock or timer program), 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. Press to add or delete channel numbers during channel preset.

◀ Button
Press to cancel a setting of timer program. Press to correct digits when setting program (For example: setting clock or timer program). Press to add or delete channel numbers during channel preset.

32. ENTER Button
Press to accept a setting.

33. RETURN Button
Returns to the previous operation.

34. VCR/TV Button
Use to select VCR or TV position.
This DVD/VCR does not have VCR/TV light. If noise appears on your TV when you turn on DVD/VCR(VCR mode), press this button.
- **VCR Position**
  To view playback, to monitor video recordings or to watch TV using the VCR tuner.
- **TV Position**
  To watch TV or to view one program while recording another.

DISC NAVIGATION Button
Press to display the first scene of each chapter of the title being played.

35. 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.**

36. 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.

37. SKIP Buttons
- **DVD mode**
  Press to skip Chapters or Tracks.

38. STOP Button
- **DVD mode**
  Press to stop the disc motion.
- **VCR mode**
  Press to stop the tape motion.

39. ◀◀ Button
- **DVD mode**
  Press to view the DVD picture in fast reverse motion or to reverse playback of an Audio CD, MP3 or JPEG on discs. For DVD, press PAUSE/STEP, then press this button to begin slow reverse motion playback. Press this button repeatedly to change the reverse speed of slow reverse motion.
- **VCR mode**
  Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode (Rewind Search).

40. 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 again to resume normal recording. You cannot pause an One Touch Recording. Press during tape playback to freeze the picture. Press to advance the picture one frame at a time during still mode.

41. ▶▶ 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).

42. PLAY Button
- **DVD mode**
  Press to begin playback.
- **VCR mode**
  Press to begin playback.

43. CH Button
- **VCR mode**

Press to change TV channels on the DVD/VCR.

44. REC/OTR Button
Press once to start a recording.
Press repeatedly to start an One Touch Recording.

45. SPEED Button
Press to select the VCR's recording speed (SP or SLP)

46. 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.**

47. SETUP Button
Press to enter the setup mode.

48. TOP MENU Button
Press to call up the title menu.

49. DISPLAY Button
- **DVD mode**
  Press to access or remove the display screen during DVD, Audio CD, MP3 or JPEG playback.
- **VCR mode**
  Press to access or remove the VCR's on-screen status display.

50. AUDIO Button
Press to select a desired audio language or sound mode.

51. Number Buttons
- **DVD mode**
  Press to directly select a Chapter or a Title for playback. (DVD)
  Press to directly select a Track for playback. (Audio CD, MP3 or JPEG on discs)

● **VCR mode**

Press to select TV channels on the DVD/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.

52. OPEN/CLOSE Button

Press to open or close the disc loading tray.

EJECT Button

Press to eject the video cassette from the DVD/VCR.

53. SEARCH MODE Button

● **DVD mode**

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

● **VCR mode**

Press to perform a Time Search or an Index Search.

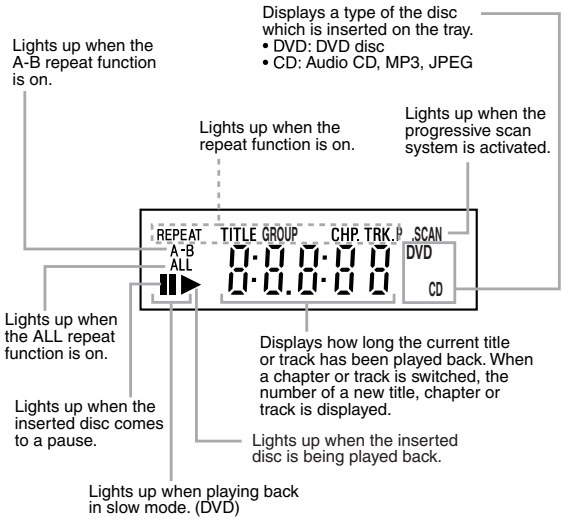
Caution: Do not touch the inner pins of the jacks on the rear panel. Electrostatic discharge may cause permanent damage to the DVD/VCR.

Notes

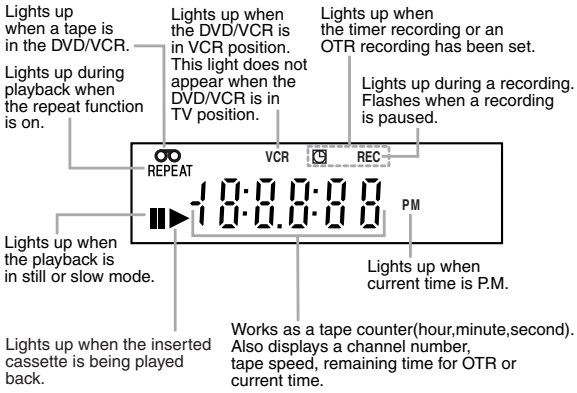
- To use the remote control to operate the DVD/VCR and its features, press DVD on the remote control before pressing other DVD's operation buttons. Verify that the green DVD OUTPUT Light is on.
- To use the remote control to operate the VCR and its features, press VCR on the remote control before pressing other VCR's operation buttons. Verify that the green VCR OUTPUT Light is on.

FROM PANEL DISPLAY

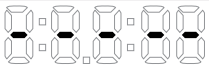
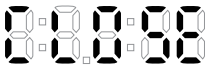
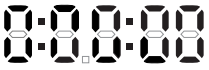
DVD



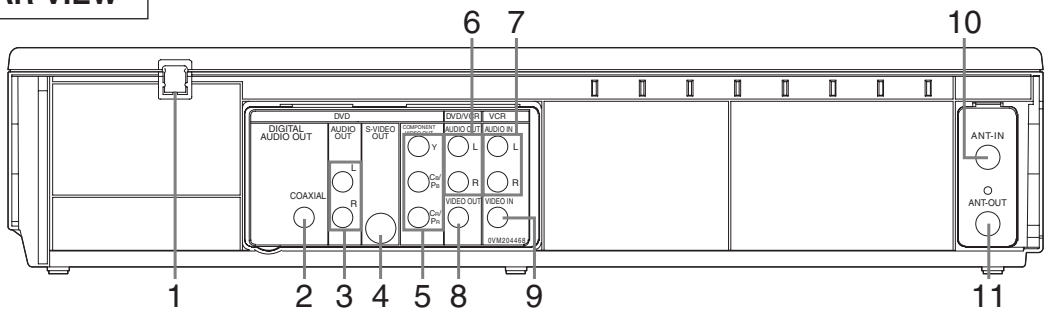
VCR



DISPLAYS DURING OPERATION

	No disc inserted or cannot read the disc
	Tray open
	Tray closed
	Loading the Disc
	When a disc is being Play back

REAR VIEW



1. **AC Power Cord**
   Connect to a standard AC outlet to supply power to the DVD/VCR.
2. **COAXIAL Jack (DVD only)**
   Use coaxial digital audio out to connect to a compatible Dolby Digital receiver. Use to connect to a Dolby Digital decoder or DTS decoder.
3. **DVD AUDIO OUT Jacks (DVD only)**
   Connect the supplied audio cables here and to the Audio In jacks of a television or other audio equipment (DVD only).
4. **S-VIDEO OUT Jack (DVD only)**
   Connect an optional S-Video cable here and to the S-Video In jack of a television.
5. **COMPONENT VIDEO OUT Jacks (DVD only)**
   Connect optional component video cables here and to the component Video In jacks of a television.
6. **DVD/VCR AUDIO OUT Jacks**
   Connect the supplied audio cables here and to the Audio In jacks of a television or other audio equipment.
7. **AUDIO IN Jacks (VCR only)**
   Connect audio cables coming from the audio out jacks of a camcorder, another VCR, or an audio source here.
8. **DVD/VCR VIDEO OUT Jack**
   Connect the yellow video cable (supplied) here and to the TV's Video In jack.
9. **VIDEO IN Jack (VCR only)**
   Connect a cable coming from the video out jack of a camcorder, another VCR, or an audio-visual source (laser disc player, video disc player, etc.) here.
10. **ANT-IN (Antenna In) Jack**
    Connect your antenna, RF INPUT Cable Box, or Direct Broadcast System.
11. **ANT-OUT (Antenna Out) Jack**
    Use the supplied RF coaxial cable to connect this jack to the ANTENNA IN Jack on your TV.

Notes

- The S-VIDEO OUT jack, COAXIAL jack and COMPONENT VIDEO OUT jack are only useful in DVD mode.

CAUTION:

- Be sure to turn off the DVD/VCR and equipment to be connected before connecting.
- Read through the operation manual for the equipment to be connected.
- Be sure that the colors of the jacks and plugs match up when using VIDEO/AUDIO cables.
- Be sure to keep the DVD/VCR connection cables separate from the TV antenna cable when you install the DVD/VCR, because it may cause electrical interference when you are watching television programs.
- DTS audio cannot be produced with an analogue connection.

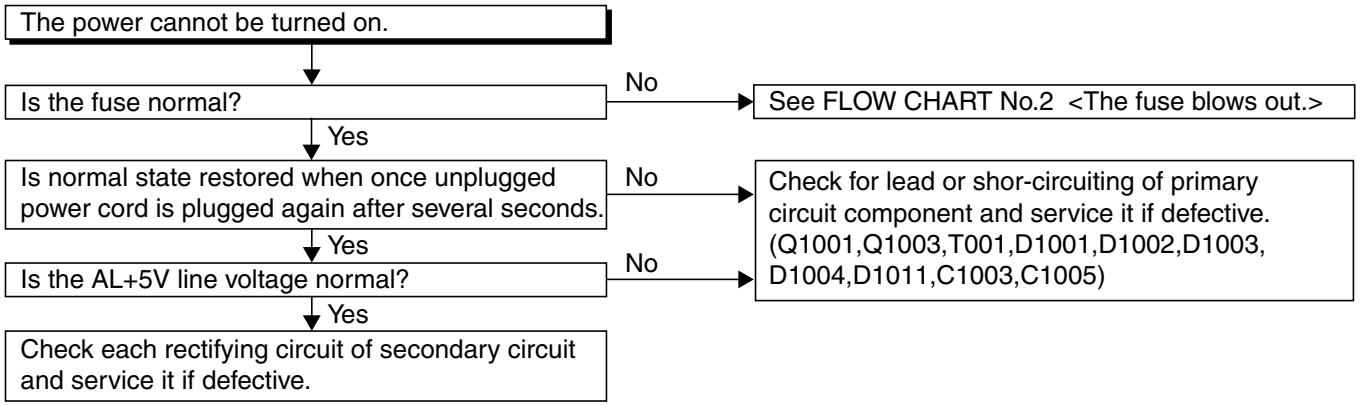
3 MAINTENANCE AND INSPECTION

3-1 TROUBLESHOOTING

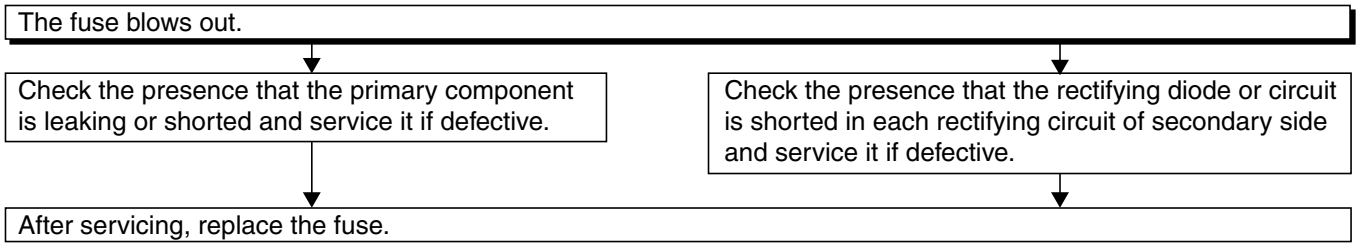
Troubleshooting is how to service for the specifying malfunction or poor parts.
Detect malfunction or poor parts and service as the following charts.

3-1-1 Power Supply Section

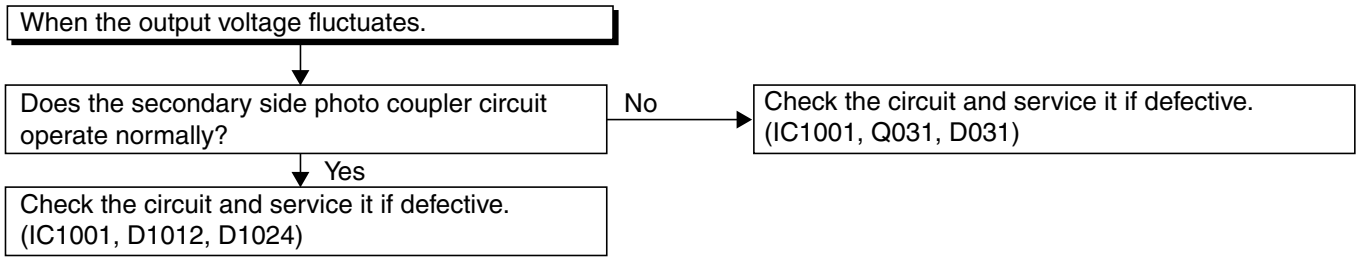
FLOW CHART NO.1



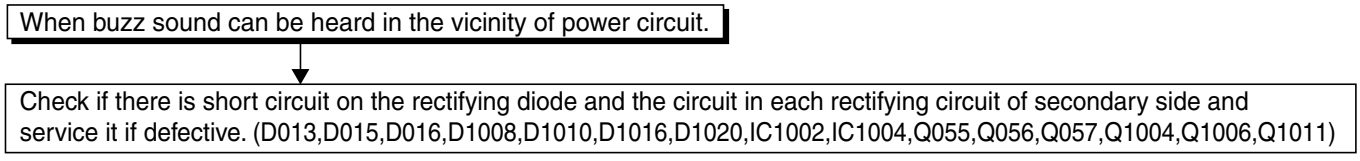
FLOW CHART NO.2



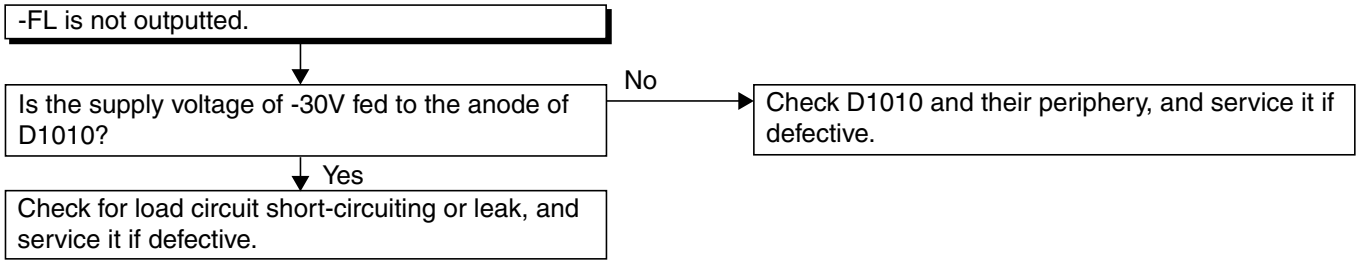
FLOW CHART NO.3



FLOW CHART NO.4



FLOW CHART NO.5



FLOW CHART NO.6

P-ON+9V is not outputted. (AL+5V is outputted normally.)

↓

Is 12V voltage supplied to the collector of Q055? — No → Check D015, D031, C018, and their periphery, and service it if defective.

↓ Yes

Is the "L" pulse inputted to the base of Q052? — No → Replace IC501.

↓ Yes

Check Q052, D052 and their periphery, and service it if defective.

FLOW CHART NO.7

P-ON+5V is not outputted. (P-ON+9V is outputted normally.)

↓

Is 5V voltage supplied to the collector of Q056? — No → Check D016, L009, C020, C021, and their periphery, and service it if defective.

↓ Yes

Is the "H" pulse inputted into the base of Q056? — No → Check Q056, R057 and their periphery, and service it if defective.

↓ Yes

Replace Q056.

FLOW CHART NO.8

TIMER+5V is not outputted. (AL+5V is outputted normally.)

↓

Is the "H" pulse inputted to the base of Q057? — No → Check D030, C017 and their periphery, and service it if defective.

↓ Yes

Replace Q057.

FLOW CHART NO.9

AL+33V is not outputted.

↓

Is the supply voltage 44V fed the cathode of D013? — No → Check D013, C013 and their periphery, and service it if defective.

↓ Yes

Check D701, R702, and service it if defective.

FLOW CHART NO.10

AL+18V is not outputted.

↓

Is the supply voltage 44V fed the cathode of D013? — No → Check D013, C013 and their periphery, and service it if defective.

↓ Yes

Check D504, R092, R095, and service it if defective.

FLOW CHART NO.11

DVD-P-ON+12V is not outputted.

↓

Is 12V voltage supplied to the emitter of Q1006? — No → Check D015, D031, C018 and their periphery, and service it if defective.

↓ Yes

Is the "L" pulse (approximately 0V) outputted to the collector of Q1005? — No → Check Q1005 and PWRCON line, and service it if defective.

↓ Yes

Replace Q1006.

FLOW CHART NO.12

DVD-P-ON+3.3V is not outputted. (DVD-P-ON+12V is outputted normally.)

↓

Is the "H" pulse (approximately 5V) inputted into the base of Q1011? — No → Check R1077 and their periphery, and service it if defective.

↓ Yes

Replace Q1011.

FLOW CHART NO.13

DVD-P-ON+5V is not outputted. (DVD-P-ON+12V is outputted normally.)

↓

Is the "H" pulse inputted to the base of Q1004? — No → Check R1068 and their periphery, and service it if defective.

↓ Yes

Replace Q1004.

FLOW CHART NO.14

EV+1.2V is not outputted.

↓

Is 2.8V voltage supplied to Pin(1) of IC1002? — No → Check D1020,C1014,L1020, C1015, and their periphery, and service it if defective.

↓ Yes

Replace IC1002.

FLOW CHART NO.15

EV+3.3V is not outputted.

↓

Is 4V voltage supplied to Pin(1) of IC1004? — No → Check D1008, C1007, L1007, C1038 and their periphery, and service it if defective.

↓ Yes

Replace IC1004.

FLOW CHART NO.16

The fluorescent display tube does not light up.

↓

Is 3.3V voltage supplied to Pin(6, 24) of IC571? — No → Check the EV+3.3V line and service it if defective.

↓ Yes

Is approximately -24V to -28V voltage supplied to Pin(15) of IC571? — No → Check the -FL line and service it if defective.

↓ Yes

Is there approximately 500kHz oscillation to Pin(26) of IC571? — No → Check R572, IC571 and their periphery, and service it if defective.

↓ Yes

Are the filament voltage applied between (1, 2) and (29, 30) of the fluorescent display tube? Also negative voltage applied between these pins and GND? — No → Check the power circuit, D1016, D1017, R1042, C1018 and their periphery, and service it if defective.

↓ Yes

Replace the fluorescent display tube.

3-1-2 DVD Section

FLOW CHART NO.1

The key operation is not functioning.

↓

Are the contact point and the installation state of the key switches (SW2001-2003) normal?

No → Re-install the key switches (SW2001, SW2002, SW2003) correctly or replace the poor switch.

↓ Yes

When pressing each key switches (SW2001, SW2002, SW2003), do the voltage of each pin of CN1001 (shown below) change to "H" (3.3V) from "L" (0V)?
SW2001 → CN1001 24PIN
SW2002 → CN1001 26PIN
SW2003 → CN1001 25PIN

No → Check the key switches (SW2001, SW2002, SW2003) and their periphery, and service it if defective.

↓ Yes

Replace DVD Main CBA.

FLOW CHART NO.2

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

↓

Is 5V voltage supplied to Pin(3) terminal of the RM2001 (remote control receiver)?

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

↓ Yes

Is the "L" pulse sent out from Pin(1) terminal of the RM2001 (remote control receiver) when the remote control unit is activated?

No → Replace the RM2001 (remote control receiver). Replace remote control unit if needed.

↓ Yes

Is the "L" pulse signal supplied to Pin(22) of CN1001?

No → Check the line between the RM2001 (remote control receiver) and Pin(22) of CN1001, and service it if defective.

↓ Yes

Replace the DVD Main CBA.

FLOW CHART NO.3

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

↓

Does the voltage of Pin(24) on CN1001 become to 3.3V from 0V when pressing "OPEN/CLOSE" button on the unit?

No → Replace the "OPEN/CLOSE" button (SW2001).

↓ Yes

Refer to "FLOW CHAR NO.4" <The disc tray cannot be opened and closed.>

FLOW CHART NO.4

The disc tray cannot be opened and closed.

↓

Replace the DVD Main CBA.

↓

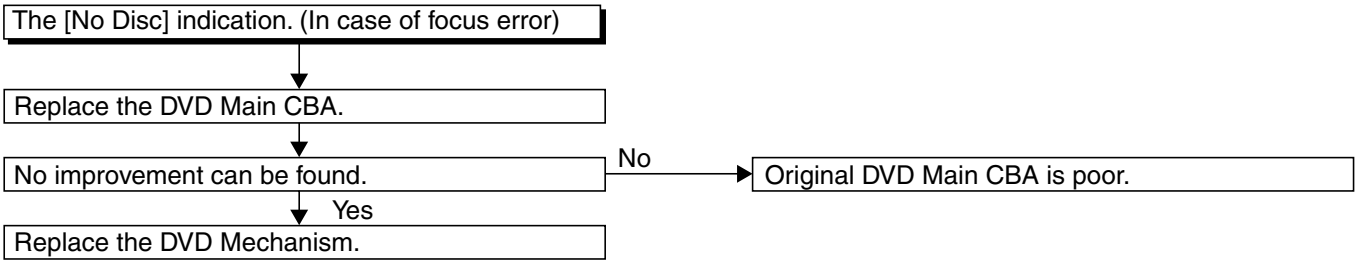
No improvement can be found.

No → Original DVD Main CBA is poor.

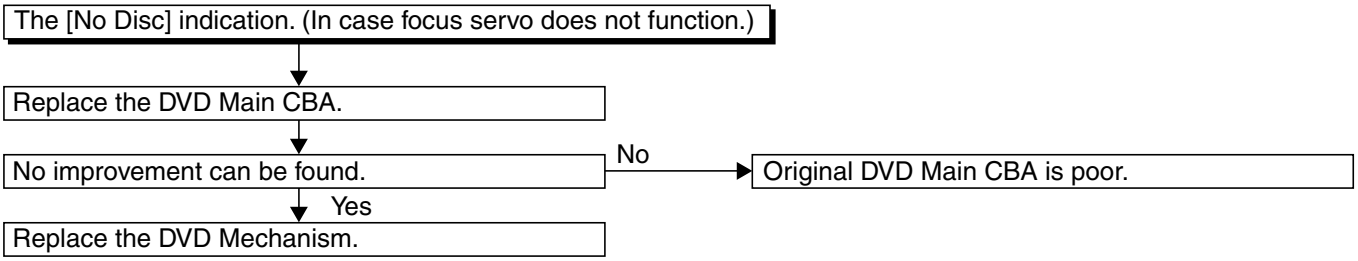
↓ Yes

Replace the DVD Mechanism.

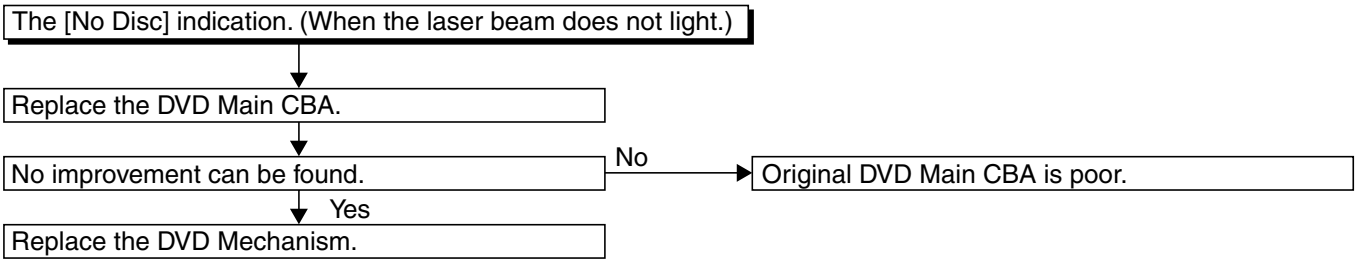
FLOW CHART NO.5



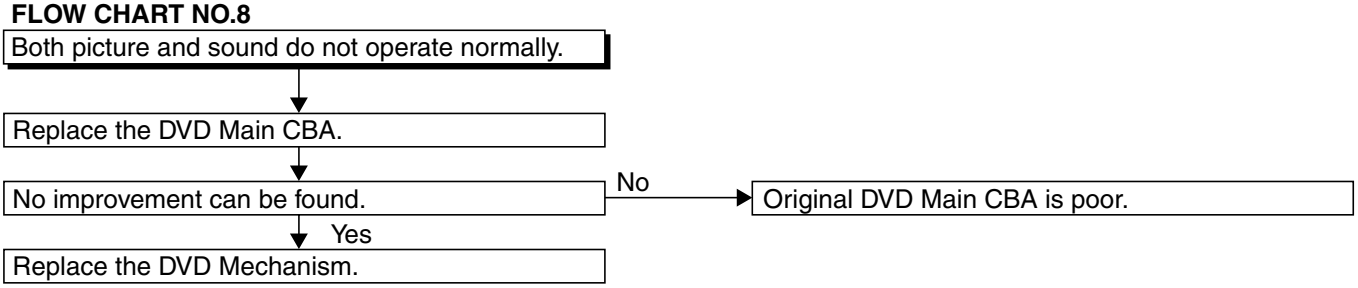
FLOW CHART NO.6



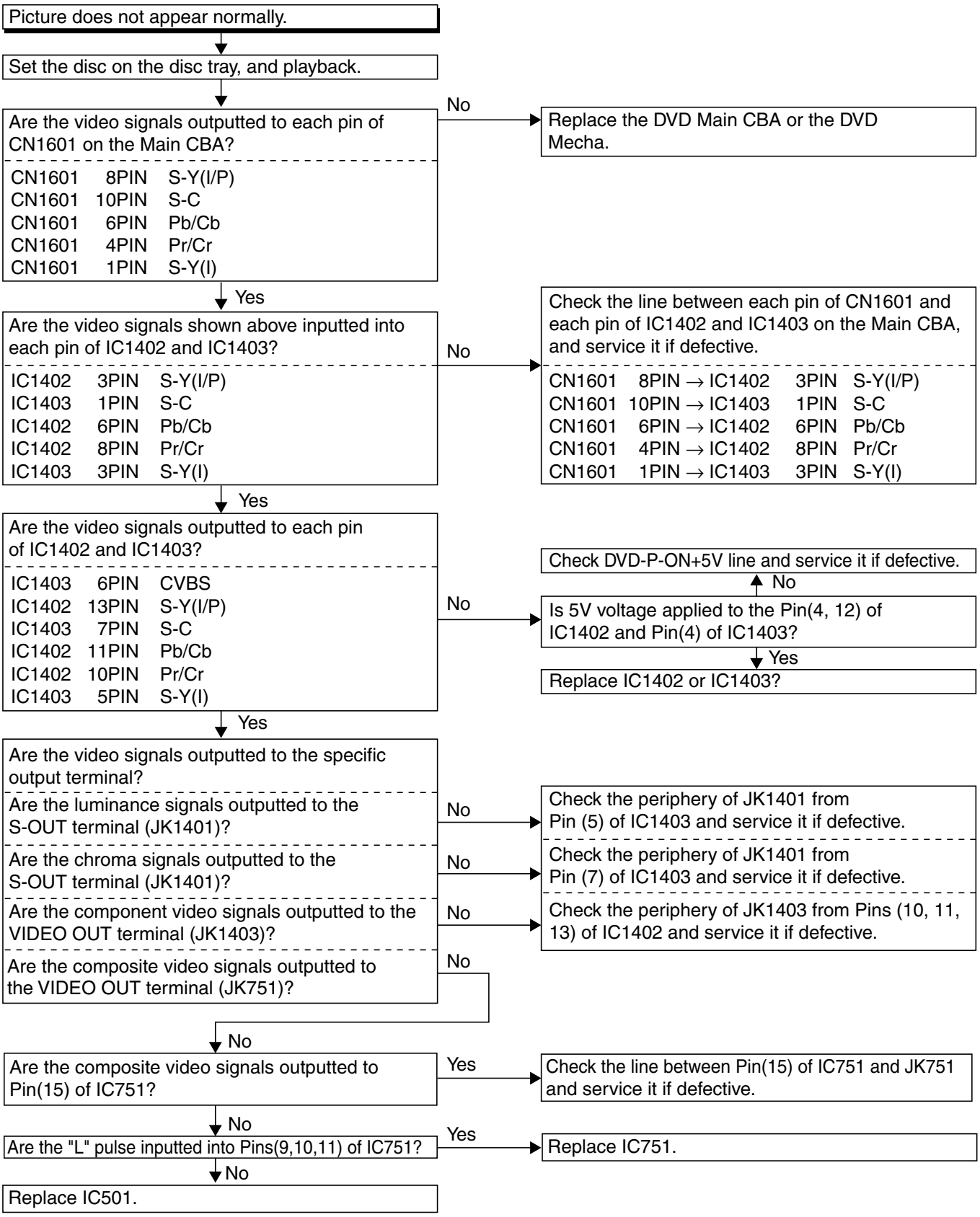
FLOW CHART NO.7



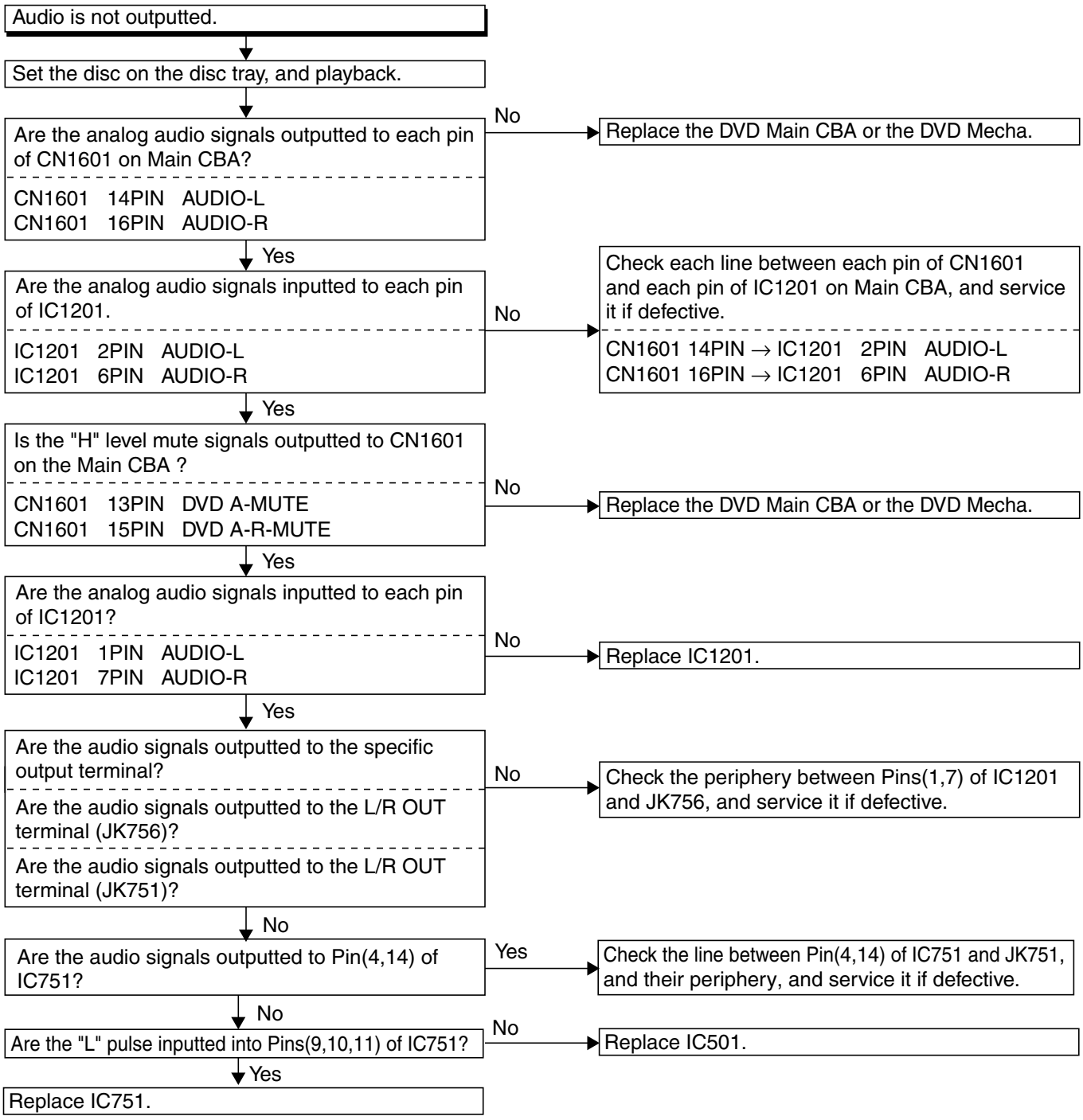
FLOW CHART NO.8



FLOW CHART NO.9



FLOW CHART NO.10



3-1-3 VCR Section

FLOW CHART NO.1

The key operation is not functioning.

↓

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

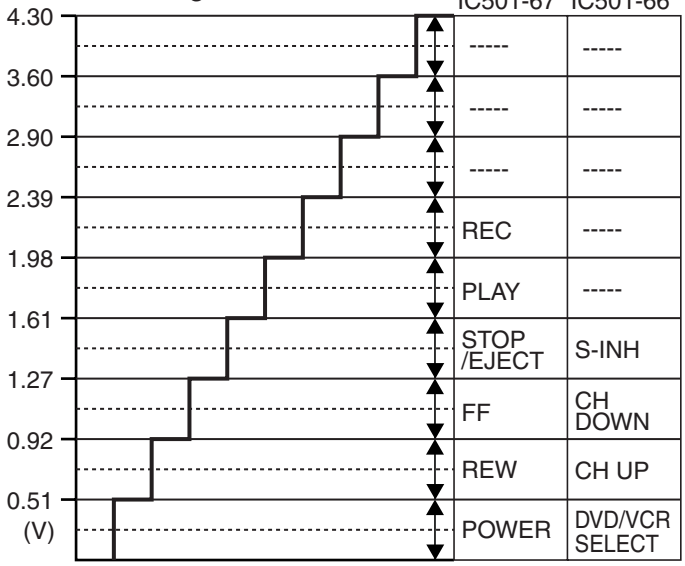
↓ Yes

Is the control voltage normally inputted into Pins(66,67) of IC501? — No → Check the key switches and their periphery, and service it if defective.

↓ Yes

Replace IC501.

Terminal voltage of IC501-66,67



FLOW CHART NO.2

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

↓

Is 5V voltage supplied to the Pin(3) terminal of the RM2001 (remote control receiver)? — No → Check AL+5V line and service it if defective.

↓ Yes

Is the "L" pulse sent out from Pin(1) terminal of the RM2001 (remote control receiver) when the remote control unit is activated? — No → Replace the RM2001 (remote control receiver). Or replace remote control unit.

↓ Yes

Is the "L" pulse signal supplied to the Pin(5) of IC501? — No → Check the line between the RM2001 (remote control receiver) and the Pin(5) of IC501, and service it if defective.

↓ Yes

Replace IC501.

FLOW CHART NO.3

Cassette tape can not be loaded.

When loading a cassette tape, on Pin(69) of IC501, does the "L" pulse switch to the "H" pulse?
- No → Check the line between the start sensor and Pin(69) of IC501, and service it if defective.
- Yes ↓

When loading a cassette tape, is the specified voltage (approximately 13V) outputted to the terminal of the Loading Motor Unit?
- No → Replace the Capstan Motor Unit.
- Yes ↓

Replace the Loading Motor Unit.

FLOW CHART NO.4

Cassette tape is ejected right after the loading.

When loading a cassette tape, on Pin(69) of IC501, does the "L" pulse switch to the "H" pulse?
- No → Check the line between the start sensor and Pin(69) of IC501, and service it if defective.
- Yes ↓

When loading a cassette tape, on Pin(62) of IC501, does the "L" pulse switch to the "H" pulse?
- No → Check the line between the end sensor and Pin(62) of IC501, and service it if defective.
- Yes ↓

When loading a cassette tape, does the LD-SW operate normally?
- No → Check the line between the LD-SW(SW512) and Pin(68) of IC501, and service it if defective.
- Yes ↓

Replace IC501.

FLOW CHART NO.5

Cassette tape can not be ejected.

When pressing the eject button, does the Capstan Motor start rotating?
- No → Refer to "FLOW CHART NO.6 " <The Capstan Motor does not rotate>.
- Yes ↓

While the Capstan Motor is rotating, is the Takeup Reel rotating?
- No → Check the Reel Disc or Reel Drive Unit, and service it if defective.
- Yes ↓

While the Takeup Reel is rotating, is the reel pulse signal inputted to Pin(3) of IC501?
- No → Check the line between the Takeup Reel sensor and Pin(3) of IC501, and service it if defective.
- Yes ↓

While the reel pulse signal is inputting, is "L" pulse inputted to Pin(21) of IC501?
- No → Replace IC501.
- Yes ↓

Is the specified voltage (approximately 13V) outputted to the terminal of the Lading Motor Unit?
- No → Replace the Capstan Motor unit.
- Yes ↓

Is the Loading Motor rotating?
- No → Replace the Loading Motor unit.
- Yes ↓

Check the Cassette Cam or Cassette Gear, etc, and service it if defective.

FLOW CHART NO.6

Capstan Motor does not rotate.

↓

Is 5V voltage supplied to Pin(2) of CN502? — No → Check the P-ON+5V line and service it if detective.

↓ Yes

Is over approximately 2.6V voltage supplied to Pin(5) of CN502? — No → Check the line between Pin(5) of CN502 and Pin(28) of IC501, and service it if detective.

↓ Yes

Is 12V voltage supplied to Pins(1,11) of CN502? — No → Check the AL+12V line and service it if detective.

↓ Yes

Replace the Capstan Motor Unit.

FLOW CHART NO.7

Drum Motor does not rotate.

↓

Is 5V voltage supplied to Pin(2) of CN502? — No → Check the P-ON+5V line and service it if detective.

↓ Yes

Is over approximately 2.6V voltage supplied to Pin(8) of CN502? — No → Check the line between Pin(8) of CN502 and Pin(29) of IC501, and service it if detective.

↓ Yes

Is 12V voltage supplied at Pin(1,11) of CN502? — No → Check the AL+12V line and service it if detective.

↓ Yes

Replace the Capstan Motor Unit or Cylinder Assembly.

FLOW CHART NO.8

Drum Motor rotates only for a few seconds.

↓

Is the drum PG/FG signal inputted to Pin(47) of IC501? — No → Replace the Capstan Motor Unit or the Cylinder Assembly.

↓ Yes

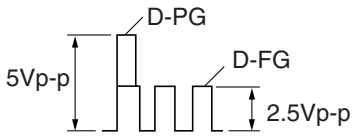
Is the RF-SW signal outputted to Pin(18) of IC501? — No → Replace IC501.

↓ Yes

Is 12V voltage supplied Pin(1,11) of CN502? — No → Check the AL+12V line and service it if detective.

↓ Yes

Replace the Capstan Motor Unit or the Cylinder Assembly.



DRUM PG/FG SIGNAL WAVEFORM

FLOW CHART NO.9

RF-SW signal is not outputted.

↓

Is the Drum Motor rotating? — No → Refer to "FLOW CHART NO.7" <Drum Motor does not rotate> and "FLOW CHART NO.8" <Drum Motor rotates only for a few seconds>.

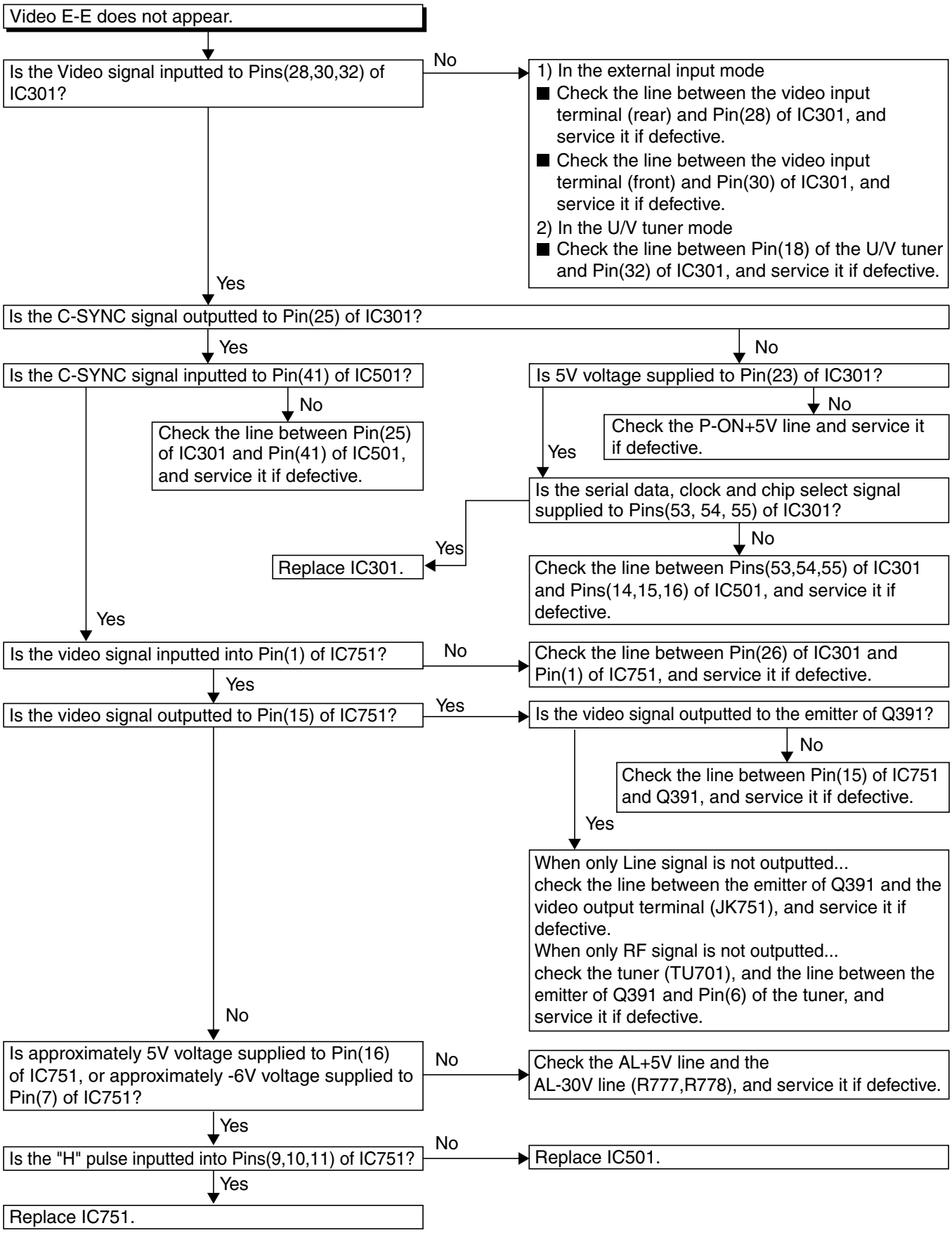
↓ Yes

Is the drum PG/FG signal inputted to Pin(47) of IC501? — No → Replace the Capstan Motor Unit or the Cylinder Assembly.

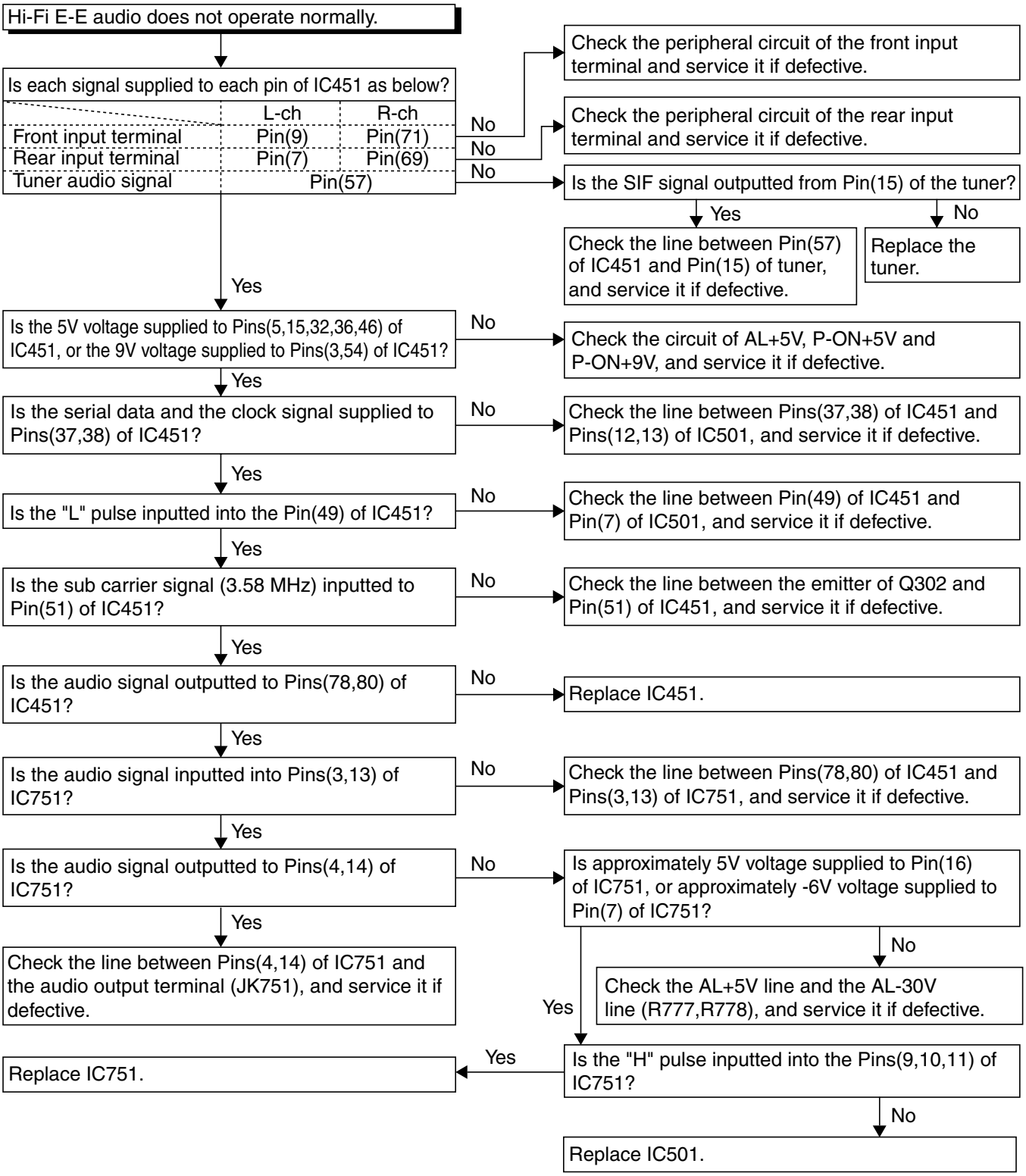
↓ Yes

Replace IC501.

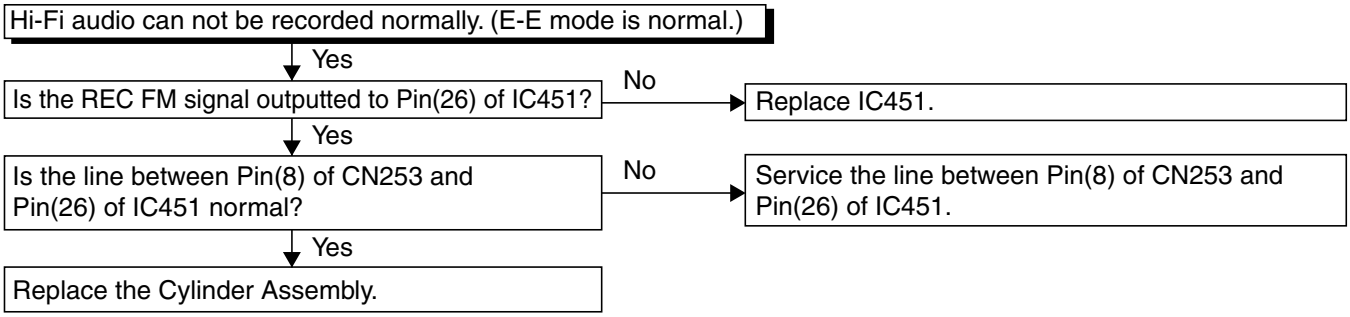
FLOW CHART NO.10



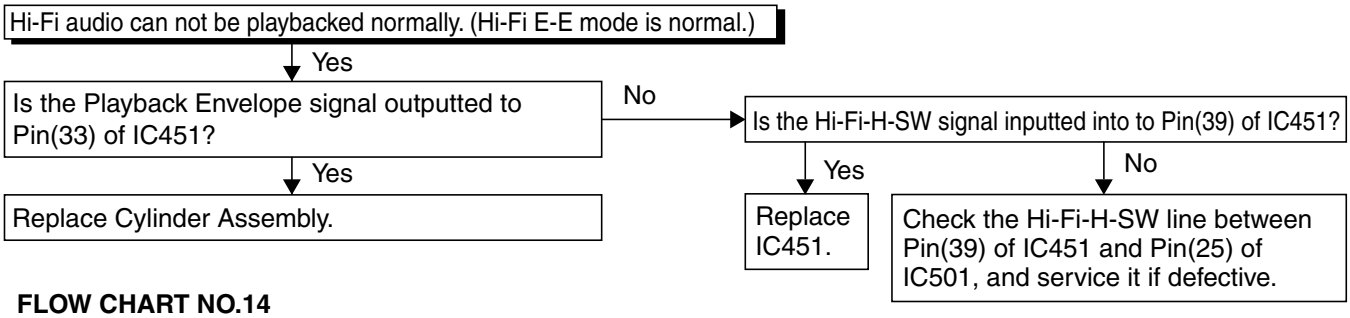
FLOW CHART NO.11



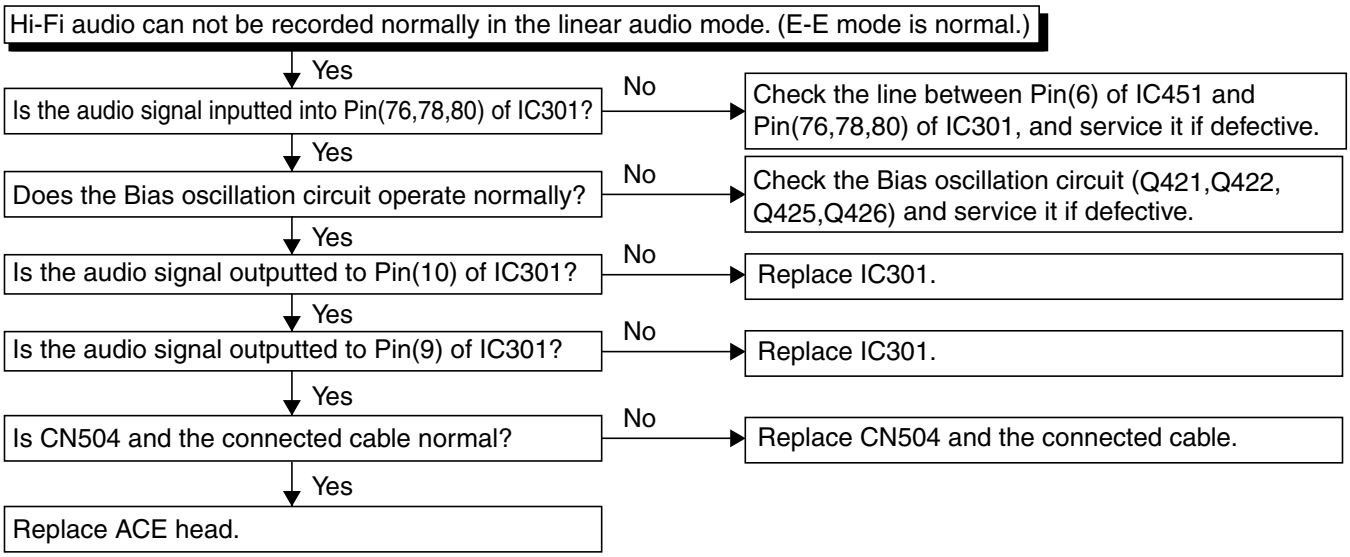
FLOW CHART NO.12



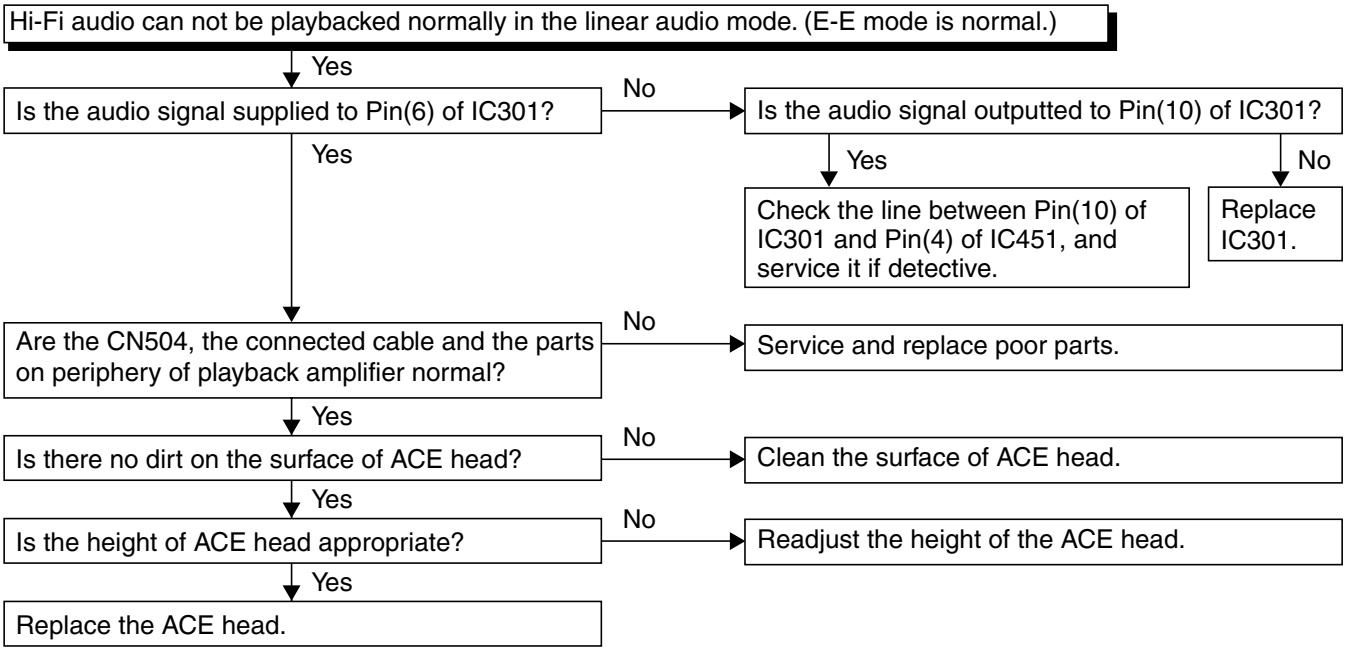
FLOW CHART NO.13



FLOW CHART NO.14



FLOW CHART NO.15



3-2 FIRMWARE RENEWAL MODE

3-2-1 How to Update the Firmware Version

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.

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. a appears on the screen and Fig. b appears on the VFD.

"*******" differ depending on the models.

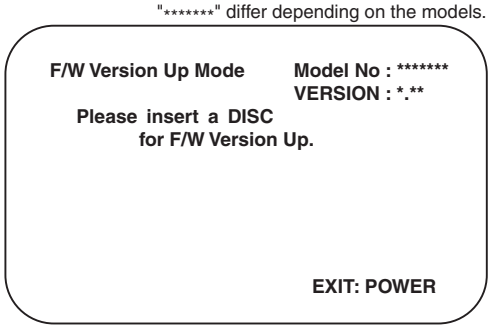


Fig. a Version Up Mode Screen

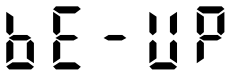


Fig. b VFD in Version Up Mode

   The DVD player can also enter the version up mode with the tray open. In this case, Fig. a will be shown on the screen while the tray is open.
3. Load the disc for version up.
4. The DVD player enters the F/W version up mode automatically. Fig. c appears on the screen and Fig. d appears on the VFD. If you enter the F/W for different models, “Disc Error” will appear on the screen, then the tray will open automatically.

"*******" differ depending on the models.

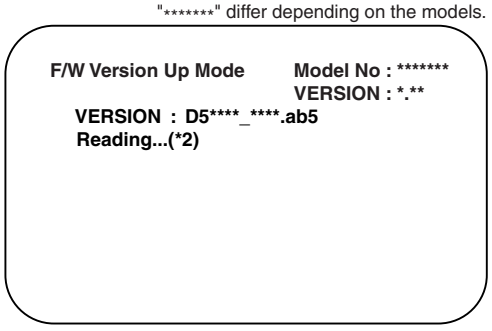


Fig. c Programming Mode Screen

Fig. d VFD in Programming Mode (Example)

The appearance shown in (*2) of Fig. c 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. e appears on the screen and the checksum in (*3) of Fig. e appears on the VFD. (Fig. f)

"*******" differ depending on the models.

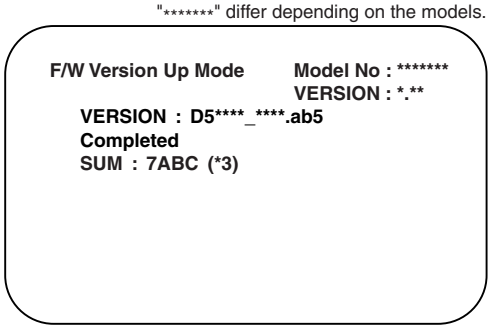


Fig. e Completed Program Mode Screen

Fig. f VFD upon Finishing the Programming Mode (Example)

   At this time, no buttons are available.
6. Remove the disc on the tray.
7. Unplug the AC cord from the AC outlet. Then plug it again.
8. Turn the power on by pressing the [POWER] button and the tray will close.
9. Press [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order.
   Fig. g appears on the screen.

"*******" differ depending on the models.

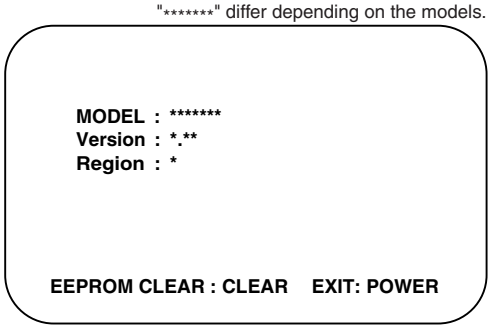


Fig. g

10. Press [CLEAR] button on the remote control unit.
    Fig. h appears on the screen.

"*******" differ depending on the models.

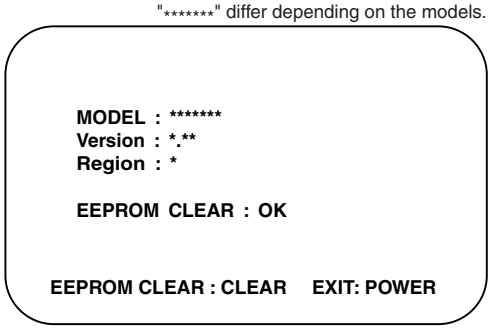


Fig. h

When “OK” appears on the screen, the factory default will be set. Then the firmware renewal mode is complete.

11. 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 Firmware version appears on the VFD and TV screen.
3. Turn the power off to reset the unit.

3-3 STANDARD MAINTENANCE

3-3-1 Service Schedule of Components

This maintenance chart shows you the standard of replacement and cleaning time for each part.
Because those may replace depending on environment and purpose for use, use the chart for reference.

h: Hours ○: Cleaning ●: Replace

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		●		●
B587	Tension Lever Assembly		●		●
B31	ACE Head Assembly			●	
B573, B574	Reel (SP)(D2), Reel (TU)(D2)			●	
B37	Capstan Motor		●		●
B52	Cap Belt		●		●
*B73	FE Head			●	
B133, B134	Idler Gear, Idler Arm		●		●
B410	Pinch Arm Assembly		●		●
B414	M Brake (SP) Assembly		●		●
B416	M Brake (TU) Assembly		●		●
B525	LDG Belt		●		●
B569 (2 head only)	Cam Holder (F)		●		●
B593 (4 head, 4 head HiFi only)	Cam Holder (F) Assembly		●		●

Notes:

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

   * B73 ------ Recording Model only

3-3-2 Cleaning

Cleaning of Video Head

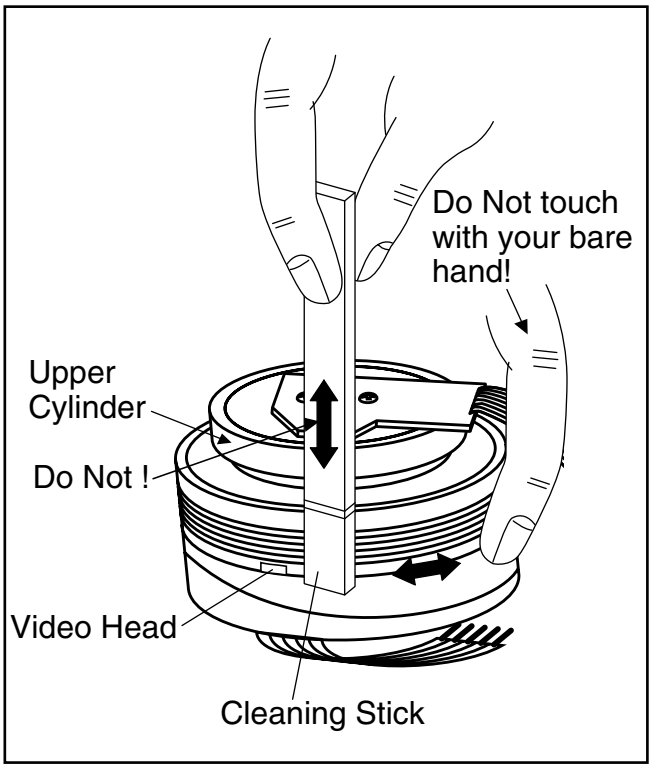
Clean the head with a head cleaning stick or chamois cloth.

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

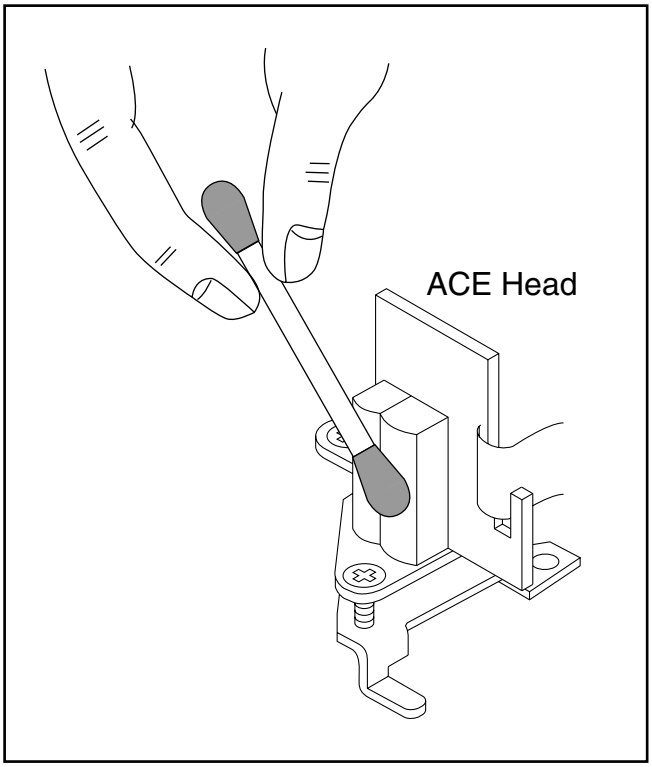
Clean the head with a cotton swab.

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 ADJUSTMENT

4-1 PREPARATION FOR SERVICING

4-1-1 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 TP502 (S-INH) 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. 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.

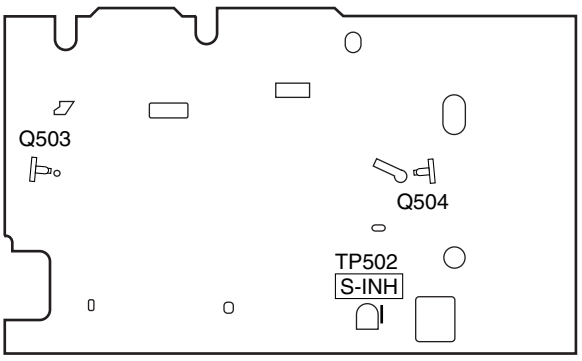
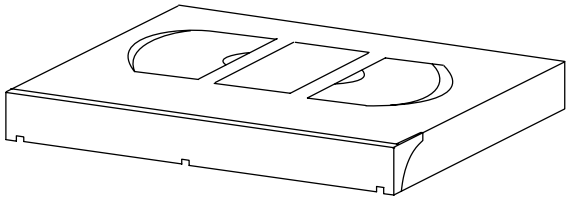


Fig. 1

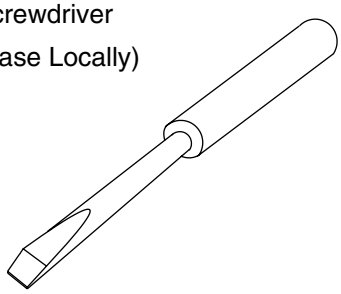
4-2 FIXTURE AND TAPE FOR ADJUSTMENT

1. Alignment Tape
   No. 7099046 (MH-1)



2. Guide Roller Adj. Screwdriver
   No. 7099028

3. Flat Screwdriver
   (Purchase Locally)



4-2-1 How To Use The Fixtures And Tape

Item No.	Name	Part No.	Adjustment
1	Alignment Tape	7099046	● Head Switching Point ● Tape Interchangeability Alignment
2	Guide Roller Adj. Screwdriver	7099028	● Guide Roller
3	Flat Screwdriver	Purchase Locally	● X Value Alignment

4-3 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.

4-3-1 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-1)

4-3-2 Head Switching Position Adjustment

Purpose:

To determine the Head Switching position during playback.

Symptom of Misadjustment:

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

Test point	Adj.Point	Mode	Input
TP751(V-OUT) TP302(RF-SW) GND	VR501 (Switching Point) (MAIN CBA)	PLAY (SP)	-----
Tape	**Measurement Equipment**	**Spec.**	
FL8A	Oscilloscope	6.5H±1H (412.7μs±63.5μs)	
Connections of Measurement Equipment			

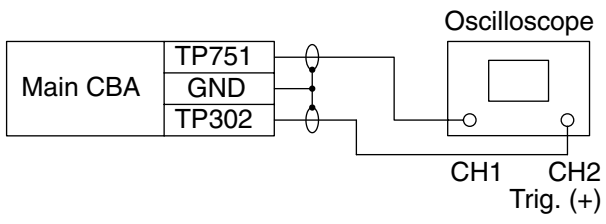
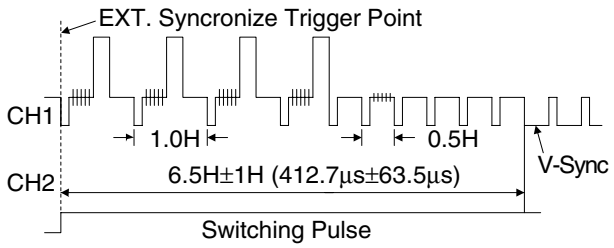


Figure 1



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±1H(412.7μs±63.5μs) delayed position from the rising edge of the CH2 head switching pulse waveform.

4-4 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.

4-4-1 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. M1 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. M1 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. M1. Release the locking tabs shown in Fig. M1 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.

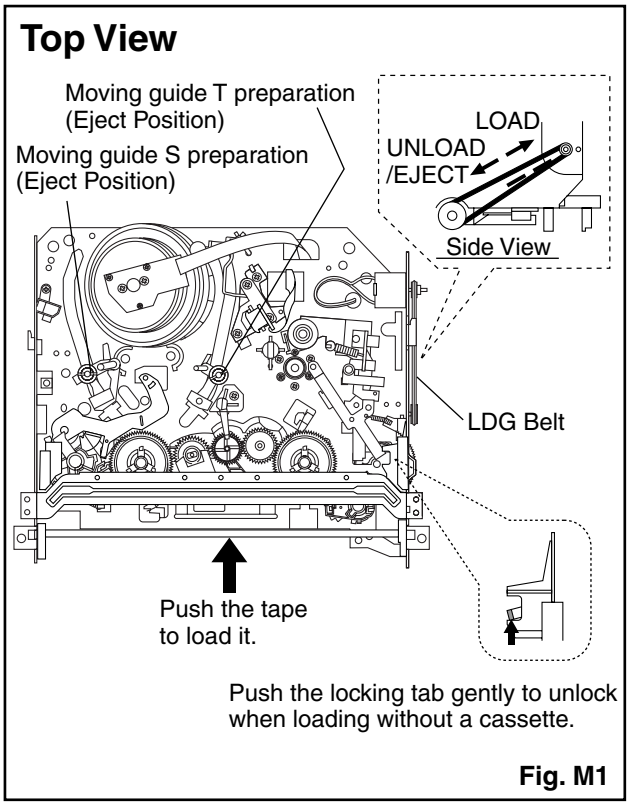


Fig. M1

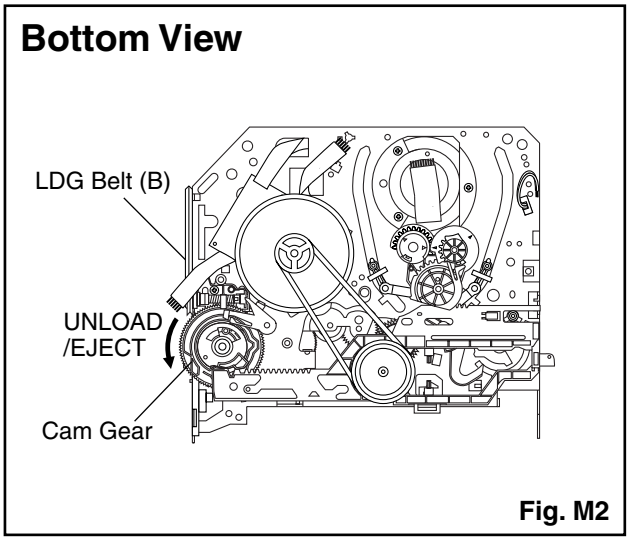


Fig. M2

4-4-2. Tape Interchangeability Alignment

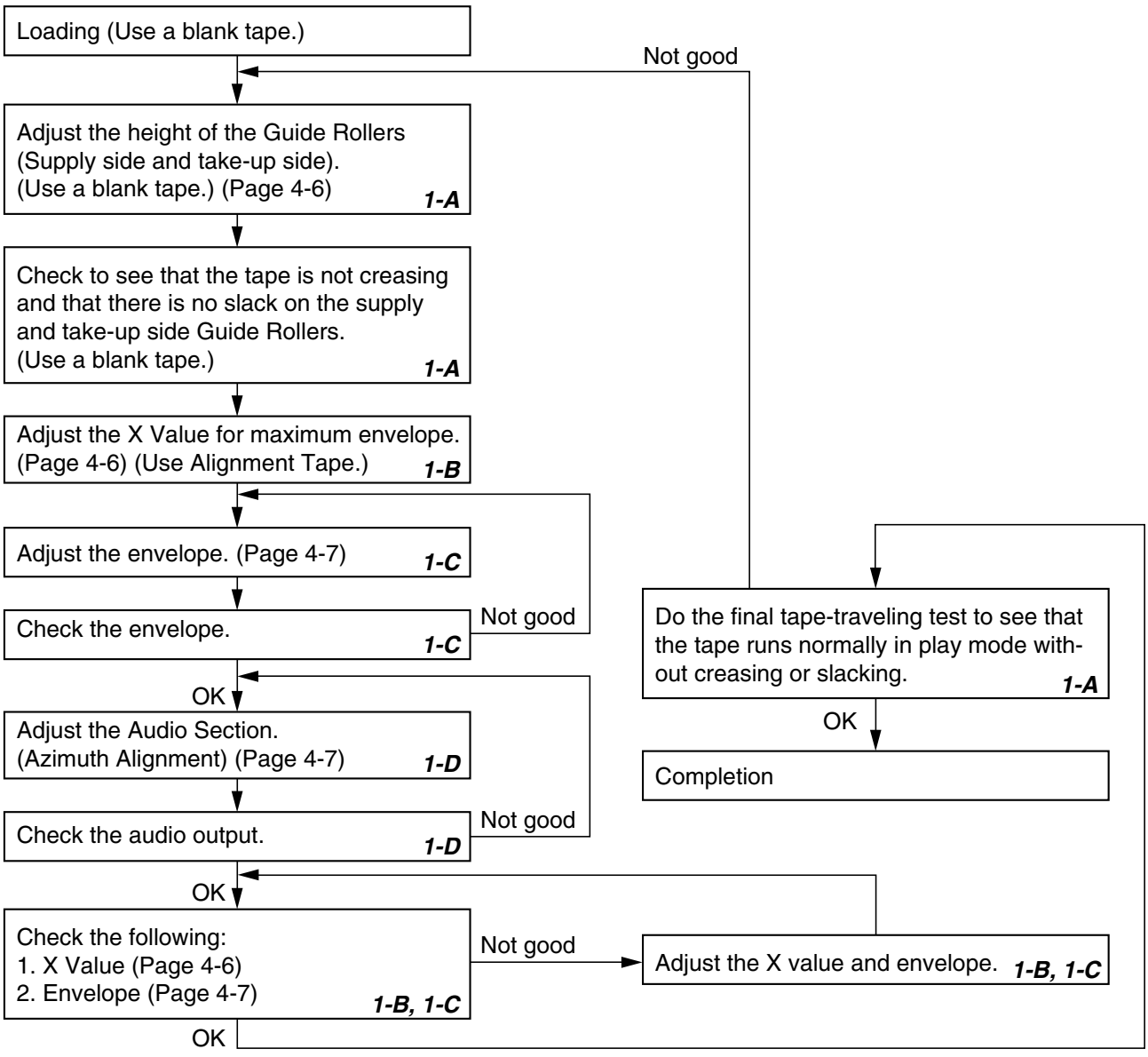
Note:
To do these alignment procedures, make sure that the Tracking Control Circuit is set to the preset position every time a tape is loaded or unloaded. (Refer to page 4-7, procedure 1-C, step 2.)

Equipment required:

Dual Trace Oscilloscope
VHS Alignment Tape (MH-1)
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. M3 and M4.)
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. M3 and M5.)

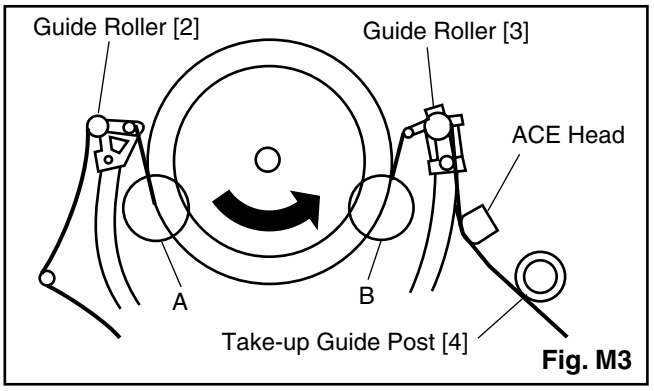


Fig. M3

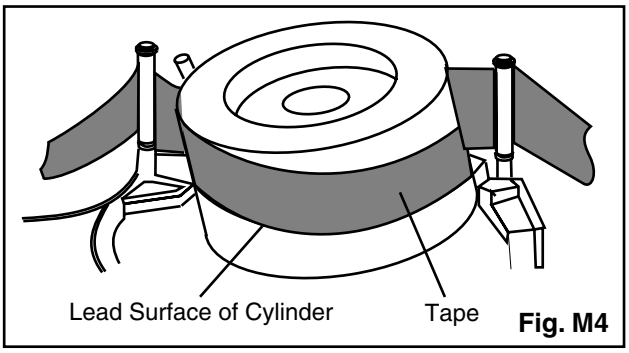


Fig. M4

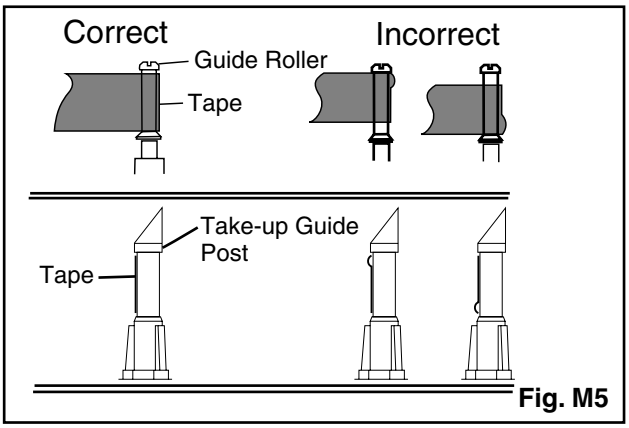


Fig. M5

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. M3 and M5)
4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the ACE Head. (Fig. M6)

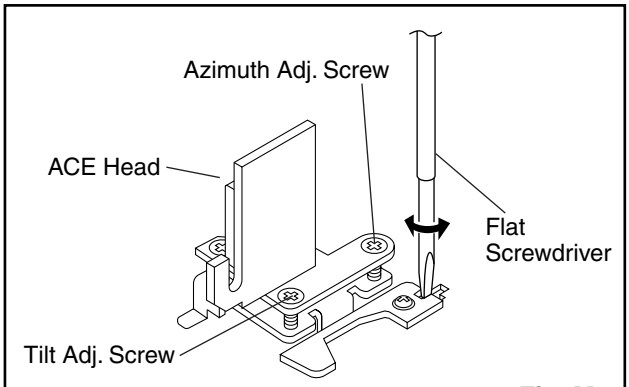


Fig. M6

1-B. X Value Alignment

Purpose:

To obtain maximum PB FM envelope signal at the preset position of the Tracking Control Circuit, align the Horizontal Position of the ACE Head.

Symptom of Misalignment:

If the Horizontal Position of the ACE Head is not properly aligned, maximum PB FM envelope cannot be obtained at the preset position of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) and TP513 (CTL) on the Main CBA. Use TP302 (RF-SW) as a trigger.
2. Playback the Gray Scale of the Alignment Tape (MH-1) and confirm that the PB FM signal is present.
3. Set the Tracking Control Circuit to the preset position by pressing CH UP button on the remote control unit then “PLAY” button on the unit. (Refer to note on bottom of page 4-7.)
4. Use the Flat Screwdriver so that the PB FM signal at TP301 (C-PB) is maximum. (Fig. M6)

5. To shift the CTL waveform, press CH UP or CH DOWN button on the remote control unit. Then make sure that the maximum output position of PB FM envelope signal become within ±2ms from preset position.

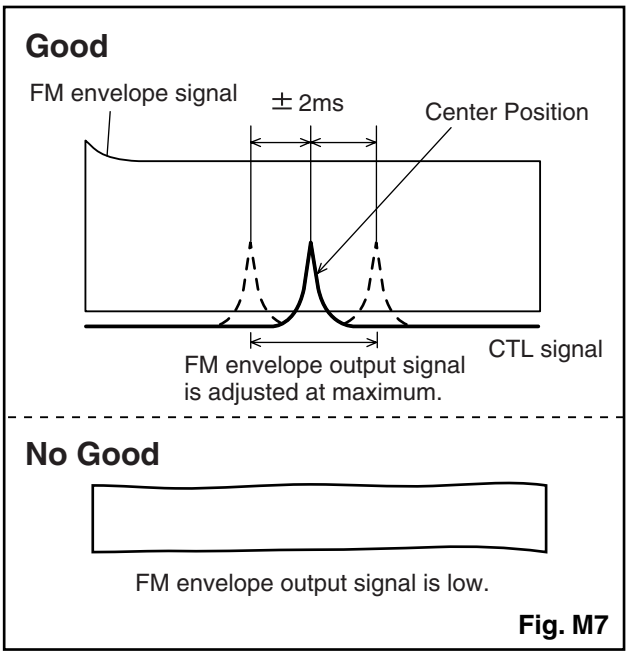


Fig. M7

6. Set the Tracking Control Circuit to the preset position by pressing CH UP button on the remote control unit. and then “PLAY” button.

1-C. Checking/Adjustment of Envelope Waveform

Purpose:

To achieve a satisfactory picture, adjust the PB FM envelope becomes as flat as possible.

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 TP302 (RF-SW) as a trigger.
2. Playback the Gray Scale on the Alignment Tape (MH-1). Set the Tracking Control Circuit to the preset position by pressing CH UP button and then “PLAY” button on the unit. Adjust the height of Guide Rollers [2] and [3] (Fig. M3, page 4-6) 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. M7, adjust the height of Guide Roller [2] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
4. If the envelope is as shown in Fig. M8, adjust the height of Guide Roller [3] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
5. When Guide Rollers [2] and [3] (Refer to Fig. M3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. M9.

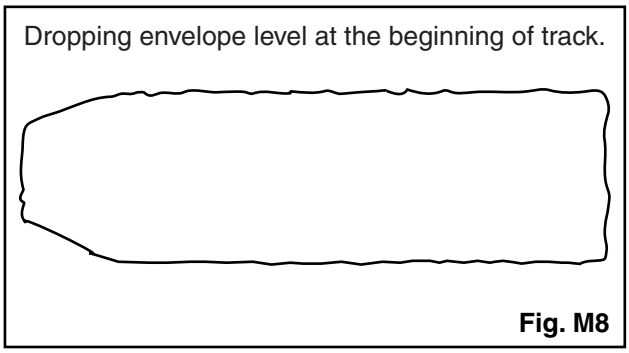


Fig. M8

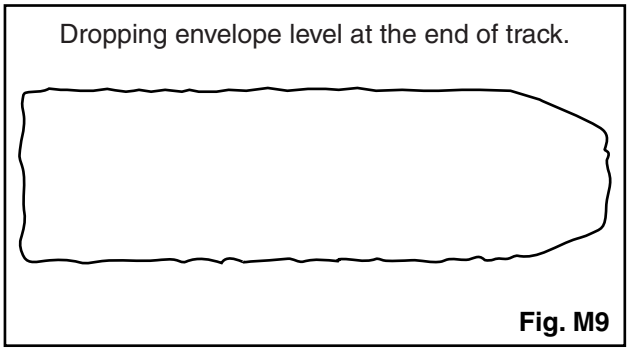


Fig. M9

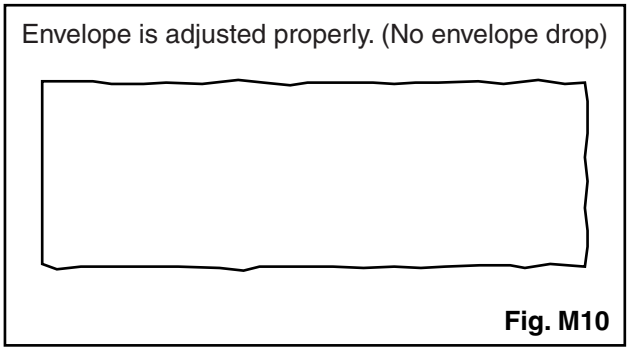


Fig. M10

Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. M3), 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 preset 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-1) 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. M6)

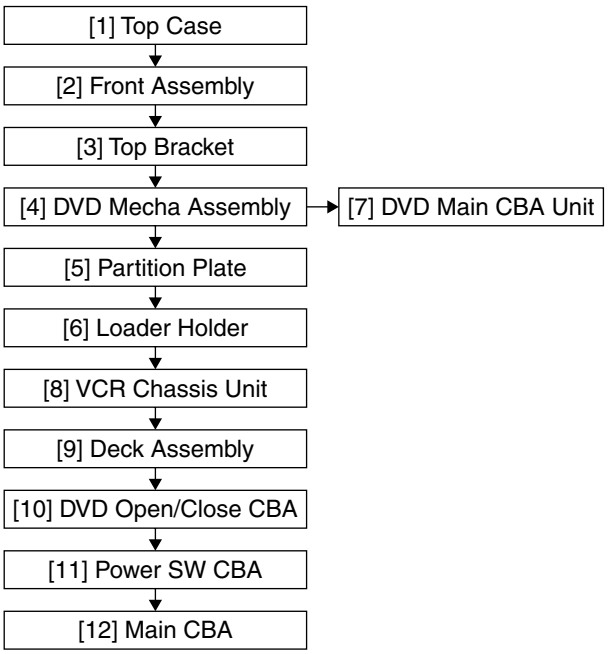
Note: Upon completion of the adjustment of Azimuth Adj. Screw, check the X Value by pushing the CH UP or DOWN buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure preset position. The number of pushes CH UP button to achieve 1/2 level of envelope should match the number of pushes CH DOWN button from center. If required, redo the “X Value Alignment.”

5 DISASSEMBLY

5-1 CABINET DISASSEMBLY INSTRUCTIONS

5-1-1 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.



5-1-2 Disassembly Method

ID/ LOC. No.	PART	REMOVAL		
		Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	Note
[1]	Top Case	D1	4(S-1)	-
[2]	Front Assembly	D2	*3(L-1), *3(L-2)	1 1-1 1-2
[3]	Top Bracket	D2	3(S-2)	-
[4]	DVD Mecha Assembly	D3	4(S-3), *CN401, *CN601	-
[5]	Partition Plate	D3	2(S-4)	-
[6]	Loader Holder	D3	2(S-5)	-
[7]	DVD Main CBA Unit	D4	(S-6), *CN201, *CN301	2 2-1 2-2 3
[8]	VCR Chassis Unit	D5	5(S-7), 2(S-8)	-
[9]	Deck Assembly	D6	Desolder, (S-9), (S-10), (S-11)	4,5
[10]	DVD Open/ Close CBA	D6	Desolder	-
[11]	Power SW CBA	D6	Desolder	-
[12]	Main CBA	D6	----------	-
		↓ (3)	↓ (4)	↓ (5)
		(1)	(2)	

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) and (L-2) are fragile. Be careful not to break them.

1-1. Release three Locking Tabs (L-1).

1-2. Release three Locking Tabs (L-2), then remove the Front Assembly.

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. Disconnect Connector (CN301). Remove a Screw (S-6) and lift the DVD Main CBA Unit. (Fig. D4)

2-2. Short the three short lands of FPC cable with solder before removing the FFC cable (CN201) from it. If you disconnect the FFC cable (CN201), the laser diode of pickup will be destroyed. (Fig. D4)

CAUTION 3: When reassembling, confirm the FFC cable (CN201) is connected completely. Then remove the solder from the three short lands of FPC cable. (Fig. D4)

4. When reassembling, solder wire jumpers as shown in Fig. D6.

5. Before installing the Deck Assembly, be sure to place the pin of LD-SW on Main CBA as shown in Fig. D6. 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. D6.

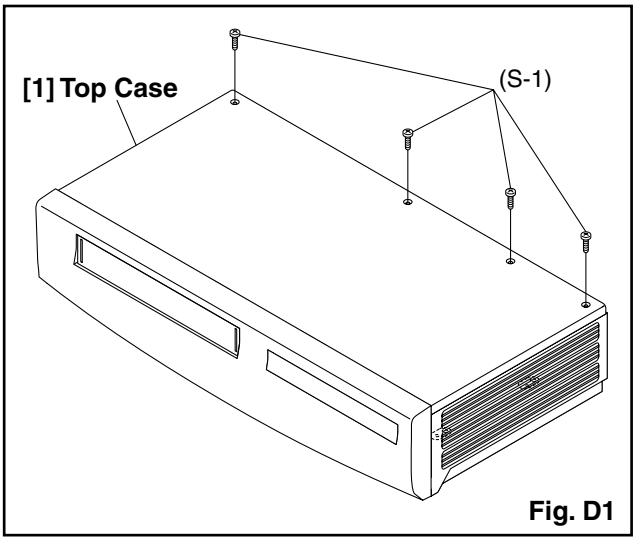


Fig. D1

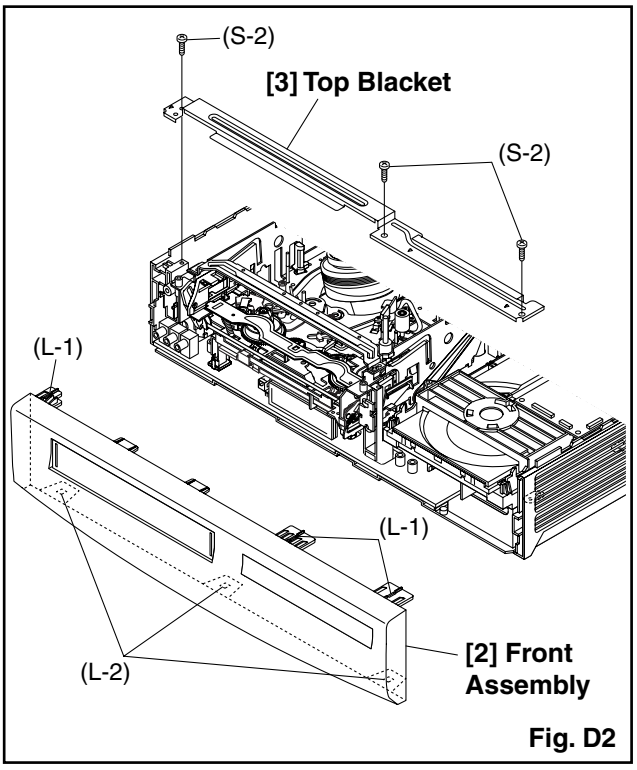


Fig. D2

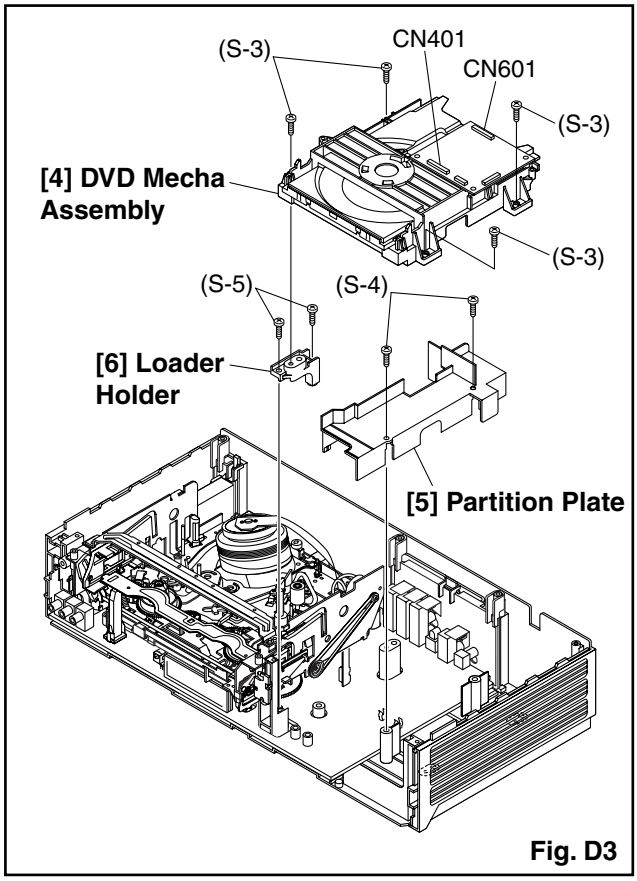


Fig. D3

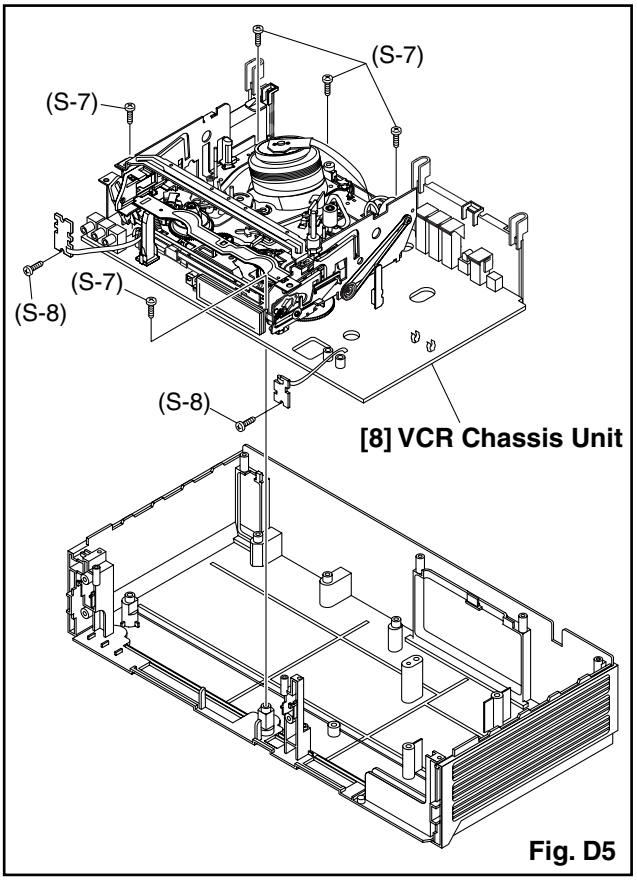


Fig. D5

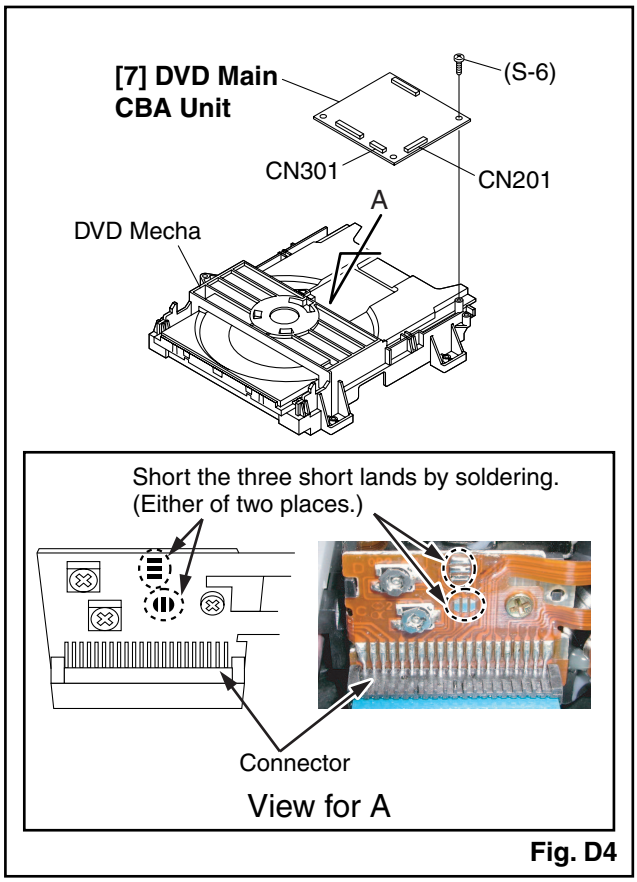
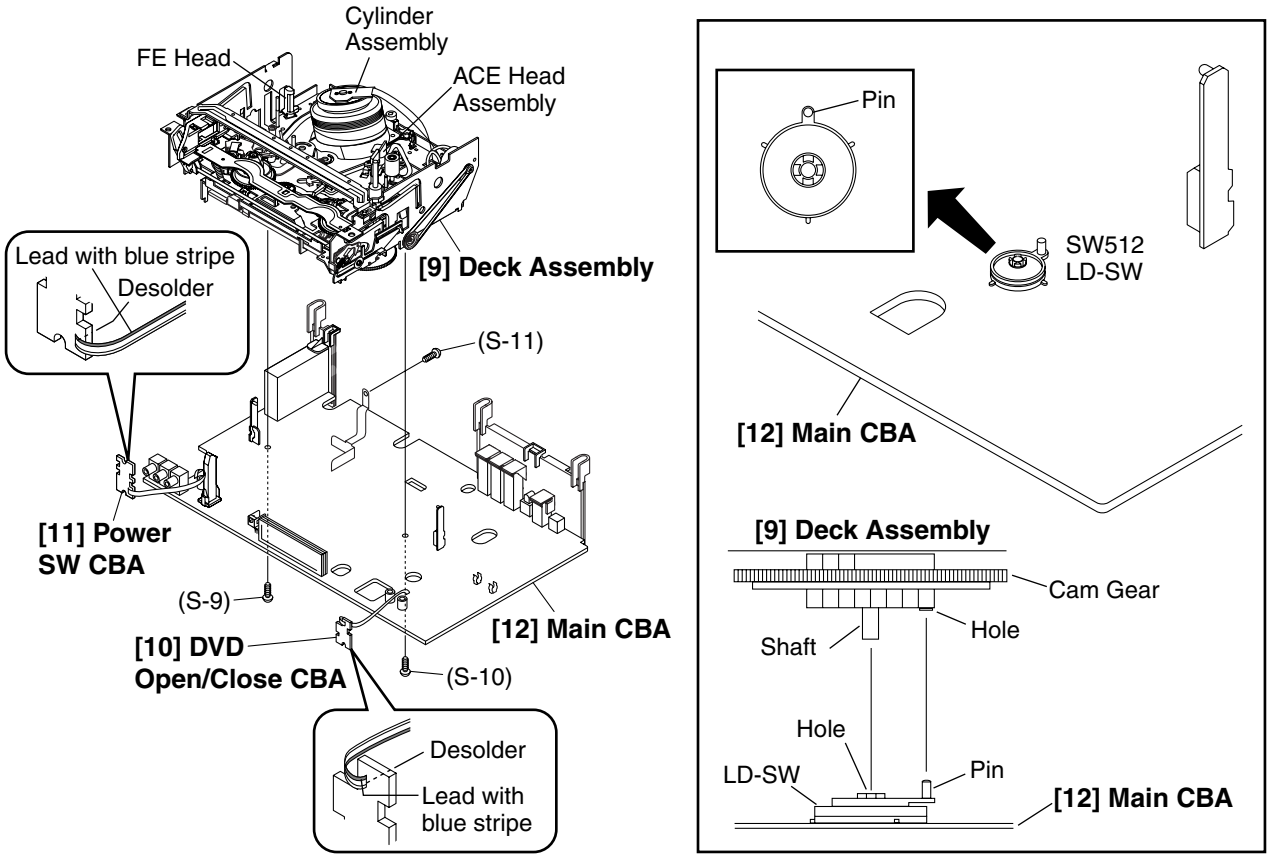
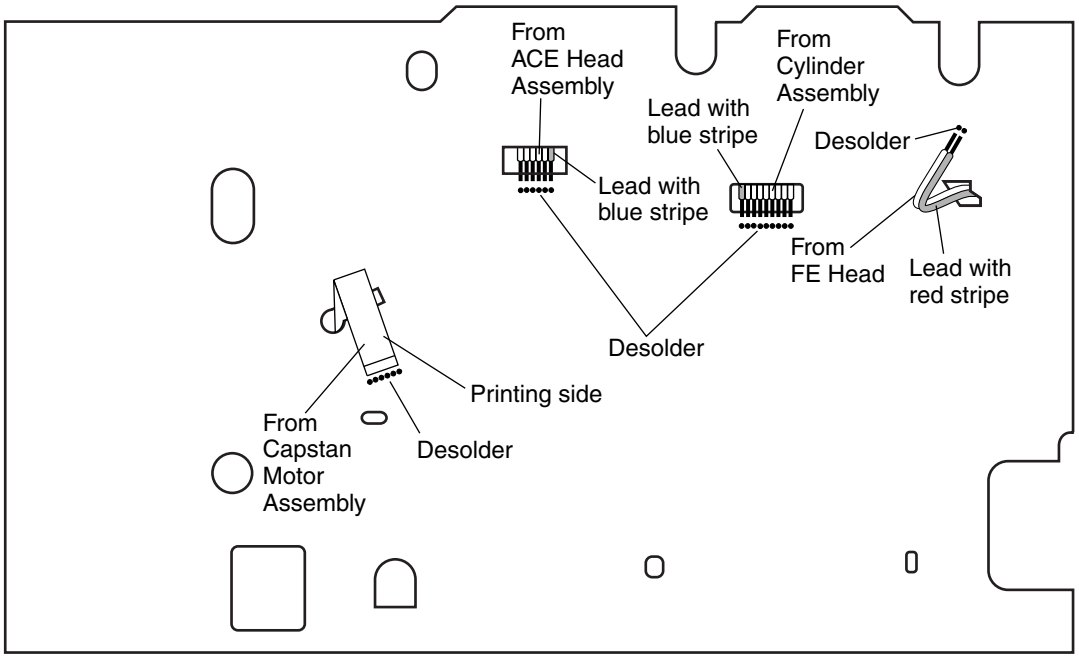


Fig. D4





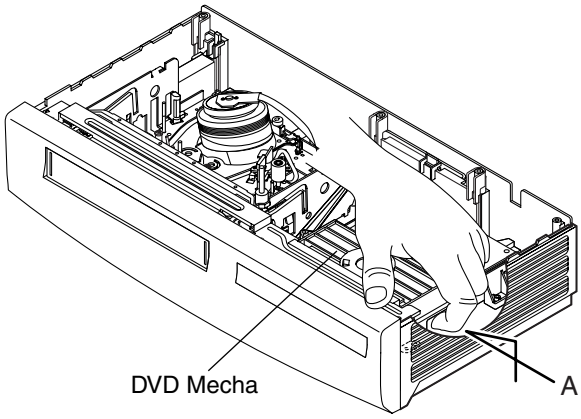
BOTTOM VIEW

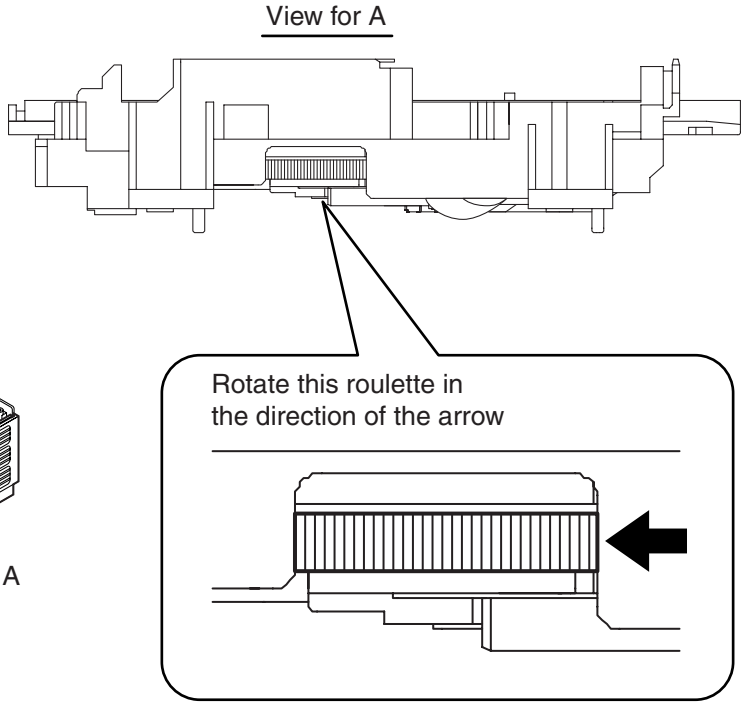
Lead connections of Deck Assembly and Main CBA

Fig. D6

HOW TO EJECT MANUALLY

1. Remove the Top Case.
2. Rotate the roulette in the direction of the arrow as shown below.
3. Pull the tray slowly with a hand.





5-2 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 5-1.)
All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [41] and [42] in Fig. DM1 on page 5-8. 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	DM3	2(S-1)	
[2]	[1]	Cassette Holder Assembly	T	DM4		
[3]	[2]	Slider (SP)	T	DM5	(S-1A), *(L-1)	
[4]	[2]	Slider (TU)	T	DM5	*(L-2)	
[5]	[4]	Lock Lever	T	DM5	*(L-3), *(P-1)	
[6]	[2]	Cassette Plate	T	DM5		
[7]	[7]	Cylinder Assembly	T	DM1, DM6	Desolder, 3(S-2)	
[8]	[8]	Loading Motor Assembly	T	DM1, DM7	Desolder, LDG Belt, 2(S-3)	
[9]	[9]	ACE Head Assembly	T	DM1, DM7	(S-4)	
[10]	[2]	Tape Guide Arm Assembly	T	DM1, DM8-1	*(P-2)	
[11]	[10]	C Door Opener	T	DM1, DM8-1	(S-4A), *(L-4)	
[12]	[11]	Pinch Arm (B)	T	DM1, DM8-1, DM8-2	*(P-3)	
[13]	[12]	Pinch Arm (A) Assembly	T	DM1, DM8-1, DM8-2		
[14]	[14]	FE Head	T	DM1, DM9	(S-5)	
[15]	[15]	Prism	T	DM1, DM9	(S-6)	
[16]	[2],[15]	Sensor Gear	T	DM1, DM9		
[17]	[2]	Slider Shaft	T	DM10	*(L-5)	
[18]	[17]	C Drive Lever (SP)	T	DM10		
[19]	[17]	C Drive Lever (TU)	T	DM10	(S-7), *(P-4)	
[20]	[7],[8], [10]	Capstan Motor	B	DM2, DM11	3(S-8), Cap Belt	
[21]	[21]	Clutch Assembly	B	DM2, DM12	(C-1)	
[22]	[22]	Cam Holder Assembly	B	DM2, DM12	*(L-6)	
[23]	[23]	Cam Gear (B)	B	DM2, DM12	(C-2), *(P-5)	
[24]	[24]	Mode Gear	B	DM2, DM13-1	(C-3)	
[25]	[21],[23], [24]	Mode Lever	B	DM2, DM13-1, DM13-2	(C-4), *(L-8)	
[26]	[22]	Worm Holder	B	DM2, DM13-1	(S-9), *(L-9), *(L-10)	
[27]	[26]	Pulley Assembly	B	DM2, DM13-1		
[28]	[25],[26]	Cam Gear (A)	B	DM2, DM13-1, DM13-2		

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[29]	[25]	Idler Gear	B	DM1, DM14		
[30]	[29]	Idler Arm	B	DM1, DM14	*(L-11)	
[31]	[25]	BT Arm	B	DM2, DM14	*(P-6)	
[32]	[25]	Loading Arm (SP) Assembly	B	DM2, DM14		(+)Refer to Alignment Sec. Page 5-15
[33]	[32]	Loading Arm (TU) Assembly	B	DM2, DM14		(+)Refer to Alignment Sec. Page 5-15
[34]	[2],[25]	M Brake (TU) Assembly	T	DM1, DM15	*(P-7), Brake Belt	
[35]	[2],[25]	M Brake (SP) Assembly	T	DM1, DM15	*(P-8)	
[36]	[35]	Tension Lever Assembly	T	DM1, DM15		
[37]	[36]	T Lever Holder	T	DM15	*(L-12)	
[38]	[34]	Reel (TU)(D2)	T	DM1, DM15		
[39]	[38]	M Gear	T	DM1, DM15		
[40]	[36]	Reel (SP)(D2)	T	DM1, DM15		
[41]	[32],[36]	Moving Guide S Preparation	T	DM1, DM16	(S-11), Slide Plate	
[42]	[33]	Moving Guide T Preparation	T	DM1, DM16		
[43]	[19]	TG Post Assembly	T	DM1, DM16	*(L-13)	
[44]	[28]	Rack Assembly	R	DM17		(+)Refer to Alignment Sec. Page 5-15
[45]	[44]	F Door Opener	R	DM17		
[46]	[46]	Cleaner Assembly	T	DM1, DM6		
[47]	[46]	CL Post	T	DM6	*(L-14)	
↓ (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

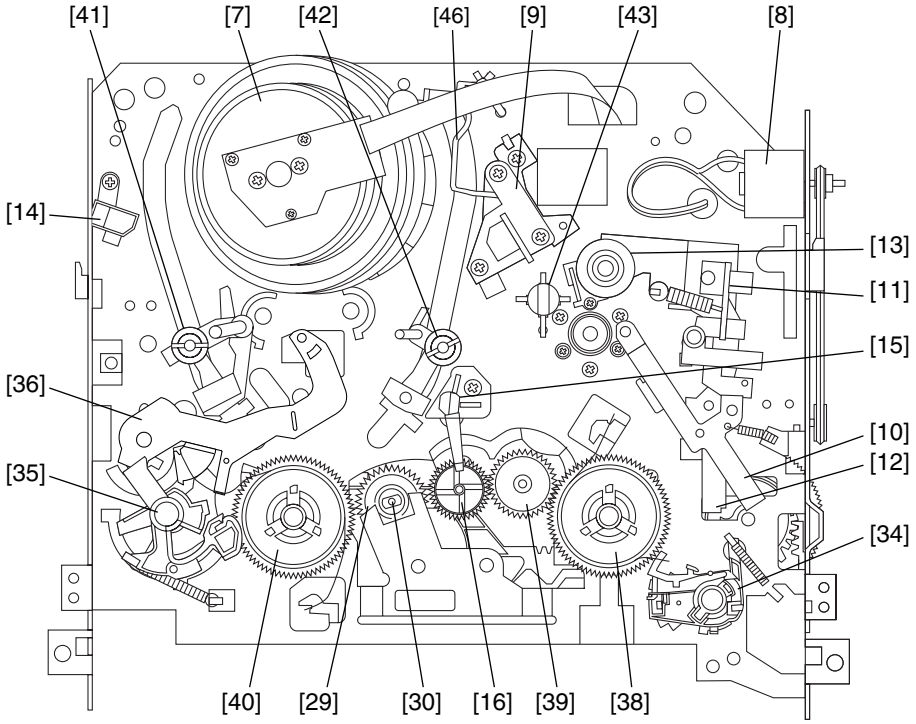


Fig. DM1

Bottom View

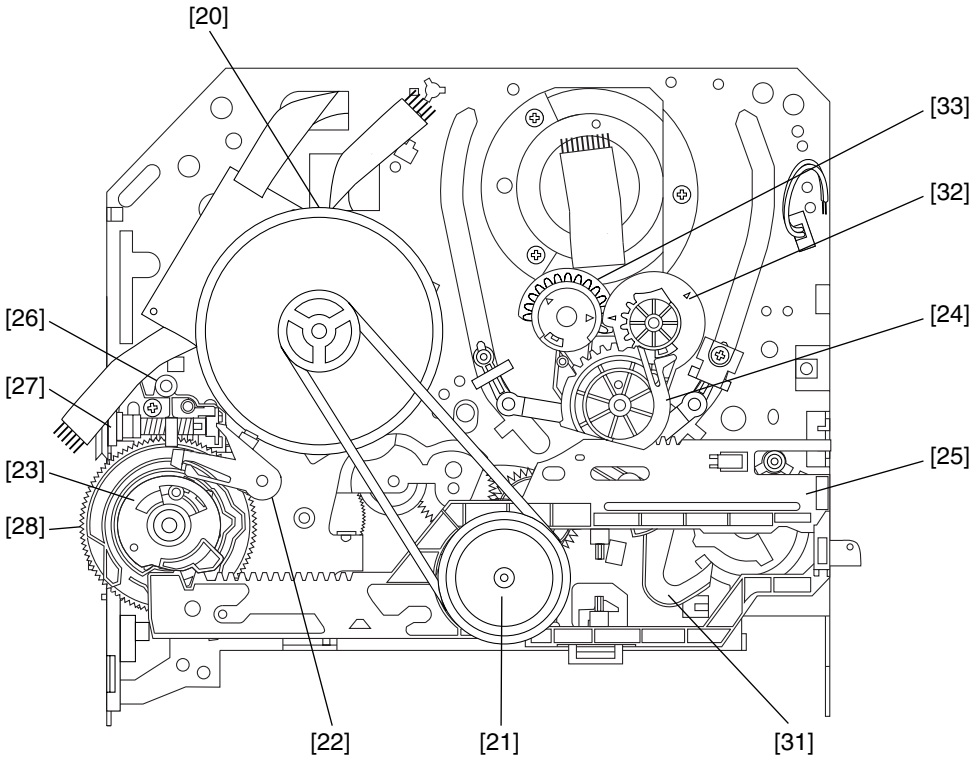


Fig. DM2

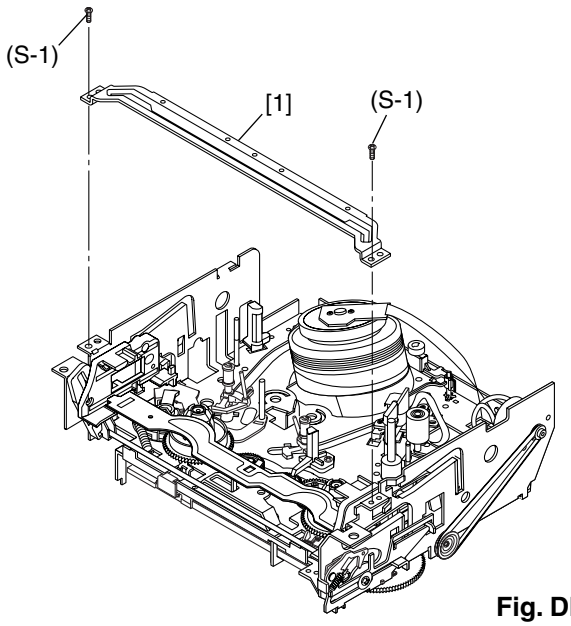
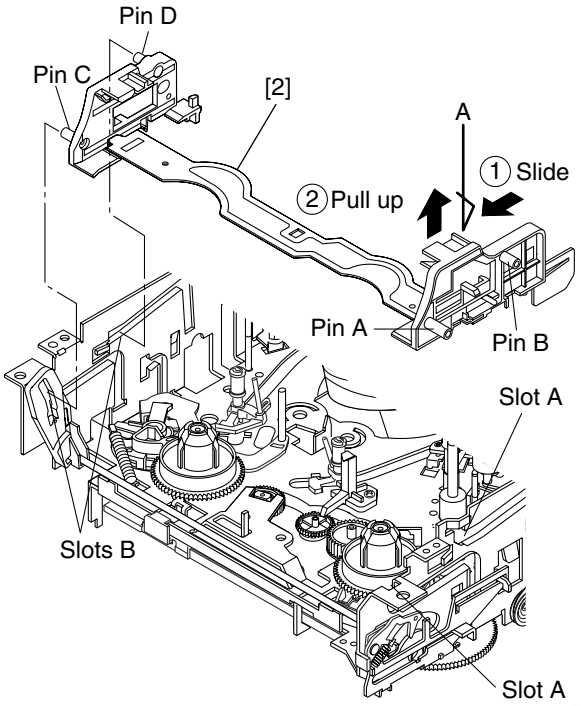


Fig. DM3



First, while pushing the locking tab as shown at right, slide and pull up the right side on [2] to release Pin A and Pin B from the slots A.
Then, remove Pin C and Pin D on [2] from the slots B as shown.

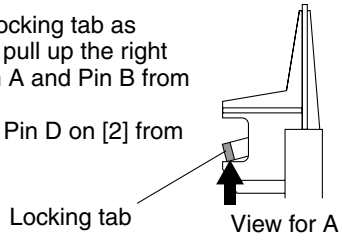
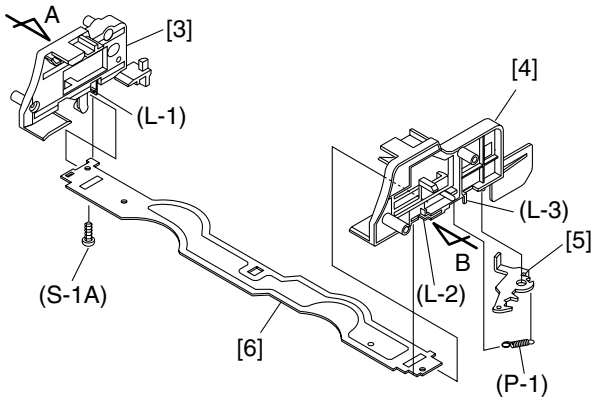
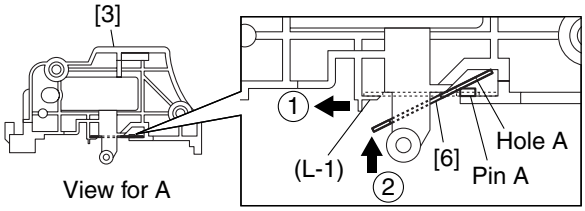


Fig. DM4



Installation of [3] and [6]

First, insert [6] diagonally in [3] as shown below. Then, install [6] in [3] while pushing (L-1) in a direction of arrow. After installing [6] in [3], confirm that pin A of [3] enters hole A of [6] properly.



Installation of [4] and [6]

Install [6] in [4] while pulling (L-2) in a direction of arrow. After installing [6] in [4], confirm that pin B of [4] enters hole B of [6] properly.

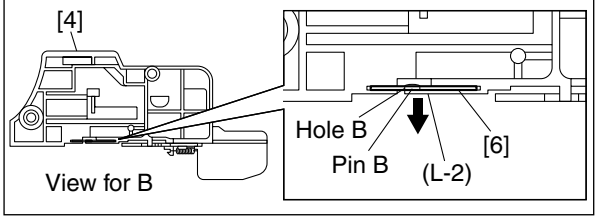


Fig. DM5

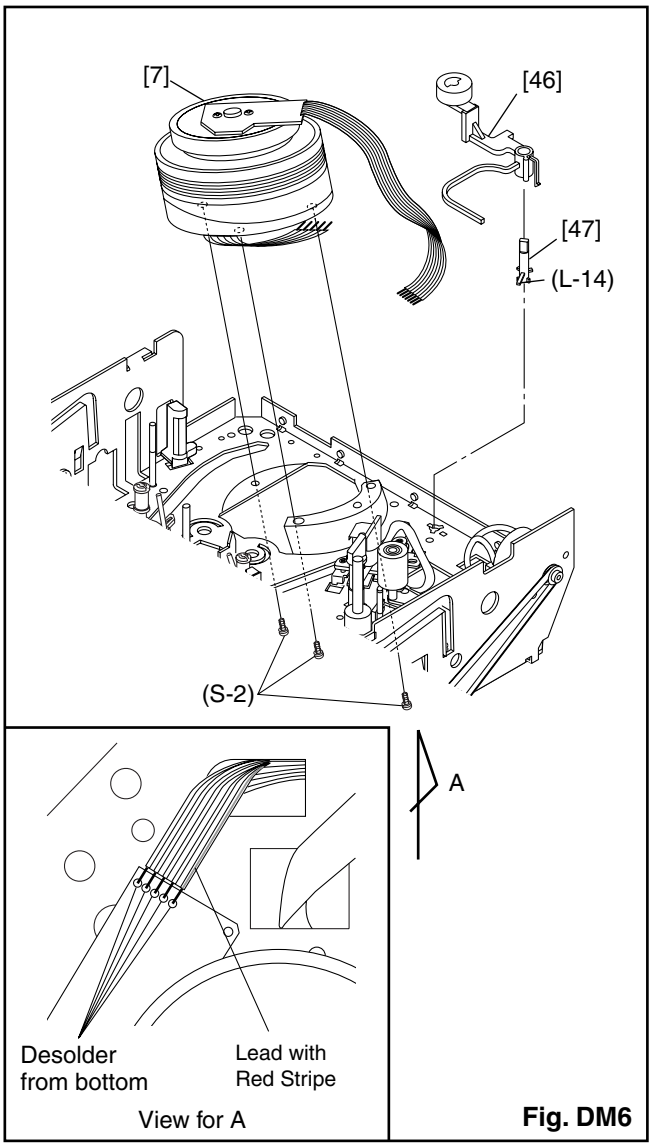


Fig. DM6

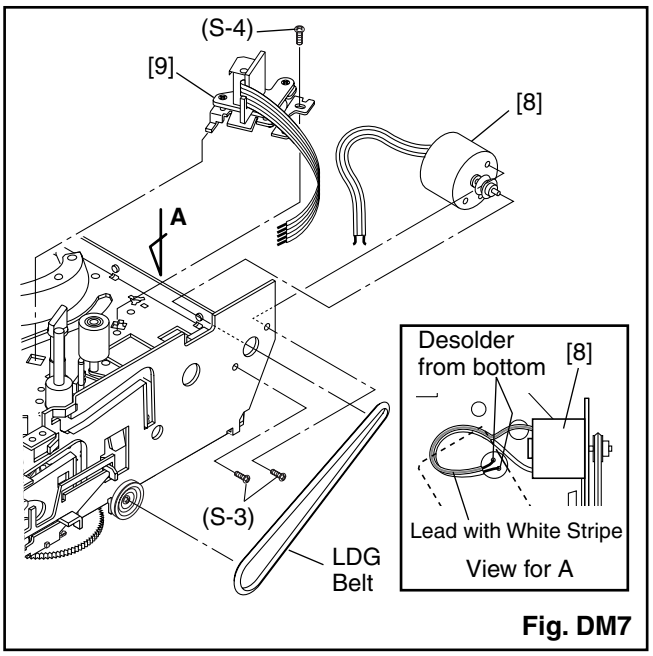


Fig. DM7

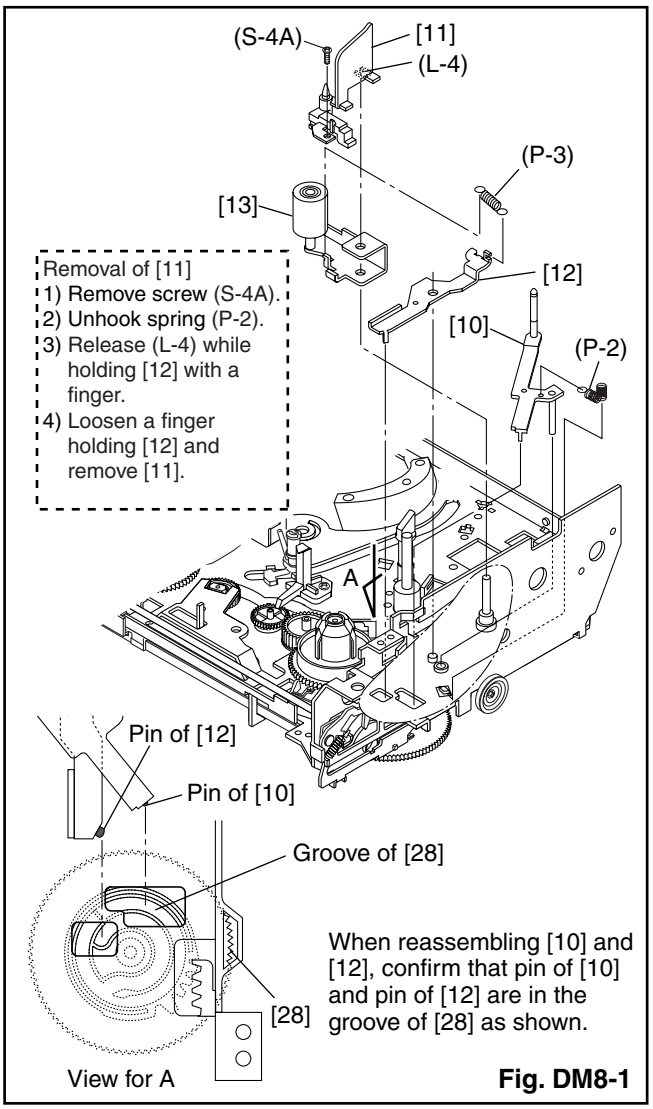


Fig. DM8-1

Installation of [13] and [12]

Hook spring (P-3) up to [12] and [13], then install then to the specified position so that [12] will be floated slightly while holding [12] and [13]. (Refer to Fig. A.)

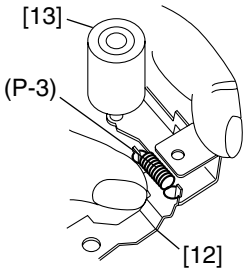


Fig. A

Install pin of [12] in groove of [28]. (Refer to Fig. B.)

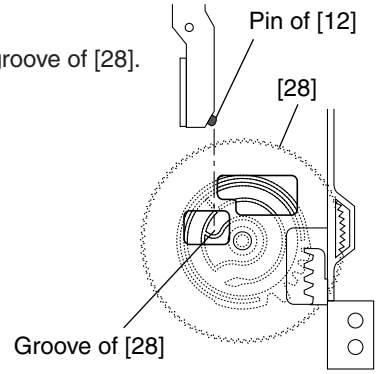


Fig. B (Top view)

Hold [12] and [13] till groove of pin of chassis looks and fit [13] in notch of chassis. Then, turn a few [13] while holding [12]. (Refer to Fig. C.)

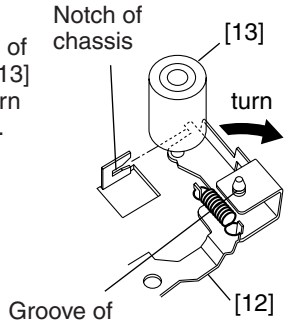


Fig. C

Install [11] and [10] while holding [12]. (Refer to Fig. DM8-1.)

Fig. DM8-2

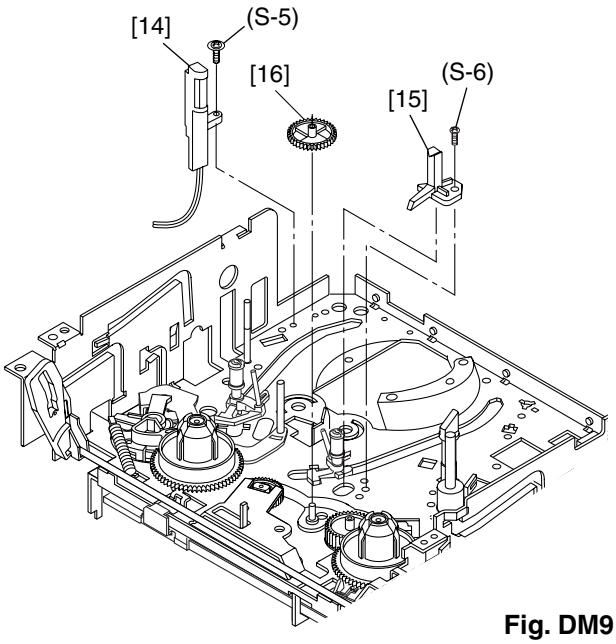


Fig. DM9

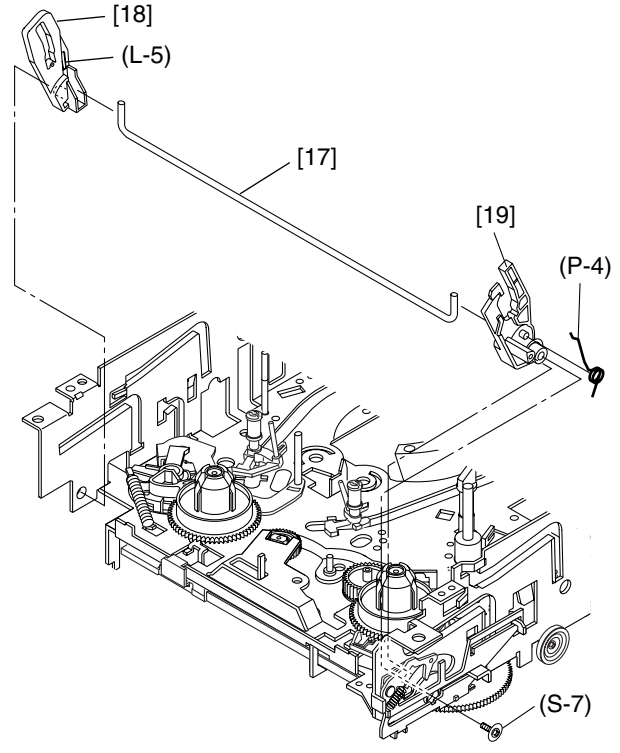
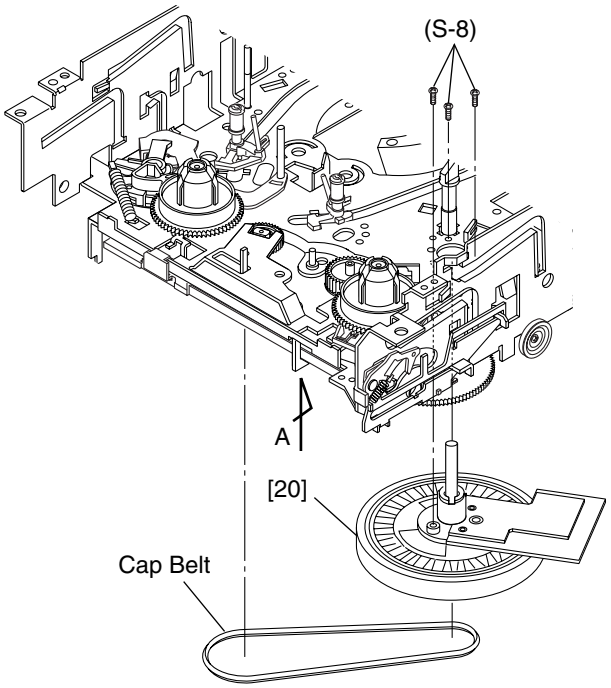
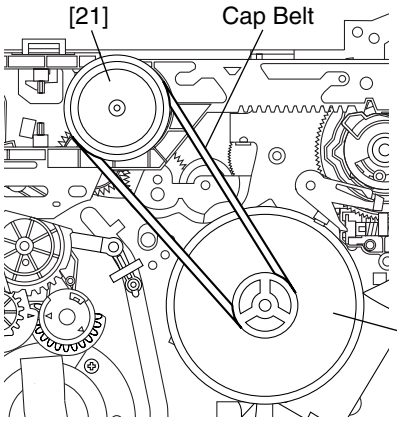


Fig. DM10

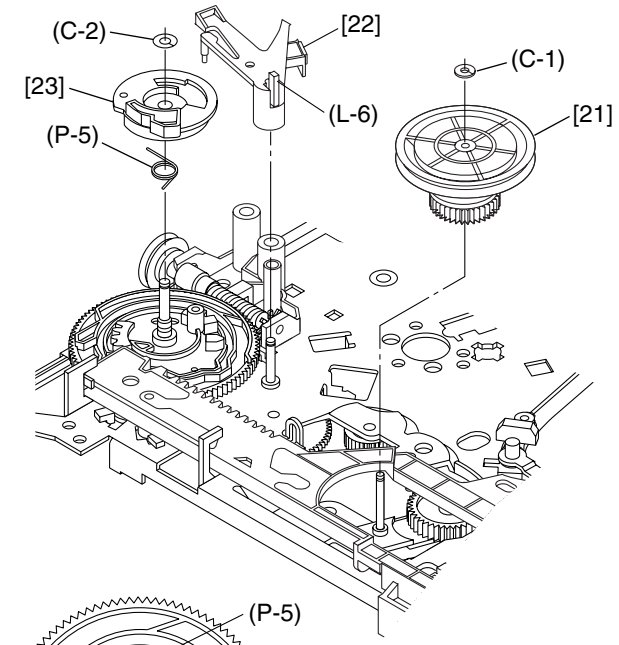


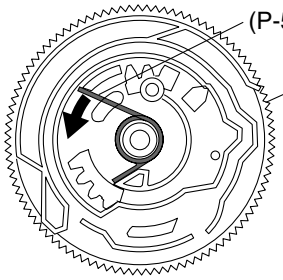
Installation position of Cap Belt



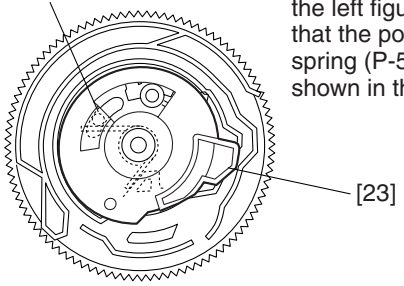
View for A

Fig. DM11



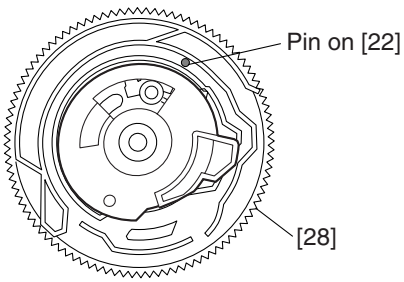


Pin on bottom of [23]



Top View

When installing [23], install the spring (P-5) to [28] as shown in the left figure, and then install [23] while pressing the spring (P-5) to the direction of the arrow in the left figure and confirming that the position of the spring (P-5) is placed as shown in the left figure.



Position of pin on [22]

Fig. DM12

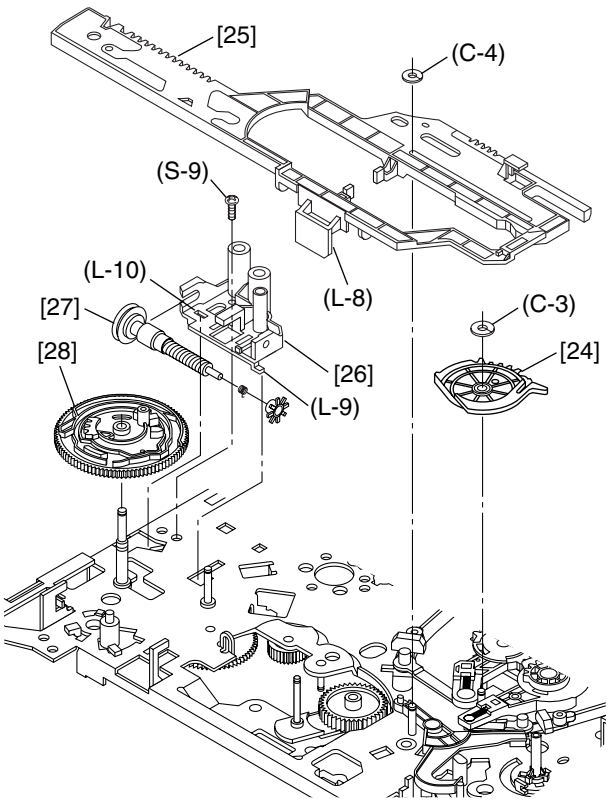
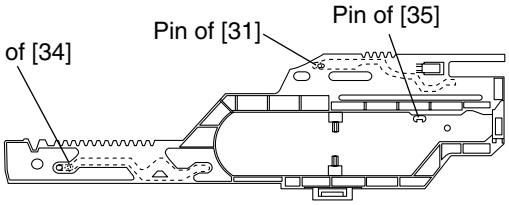
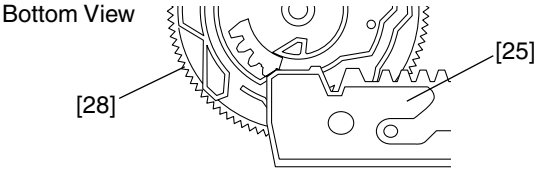


Fig. DM13-1

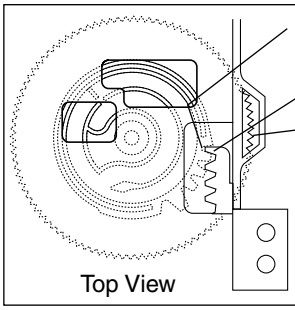
Installation of [25]

Position of Mode Lever when installed





Align [25] and [28] as shown.



When reassembling [28], align the first groove on [28] to the first tooth on [44] as shown.

Fig. DM13-2

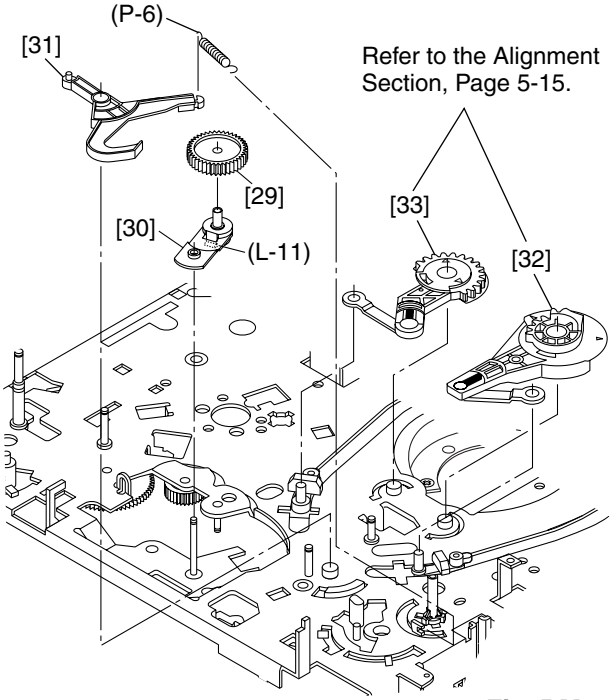


Fig. DM14

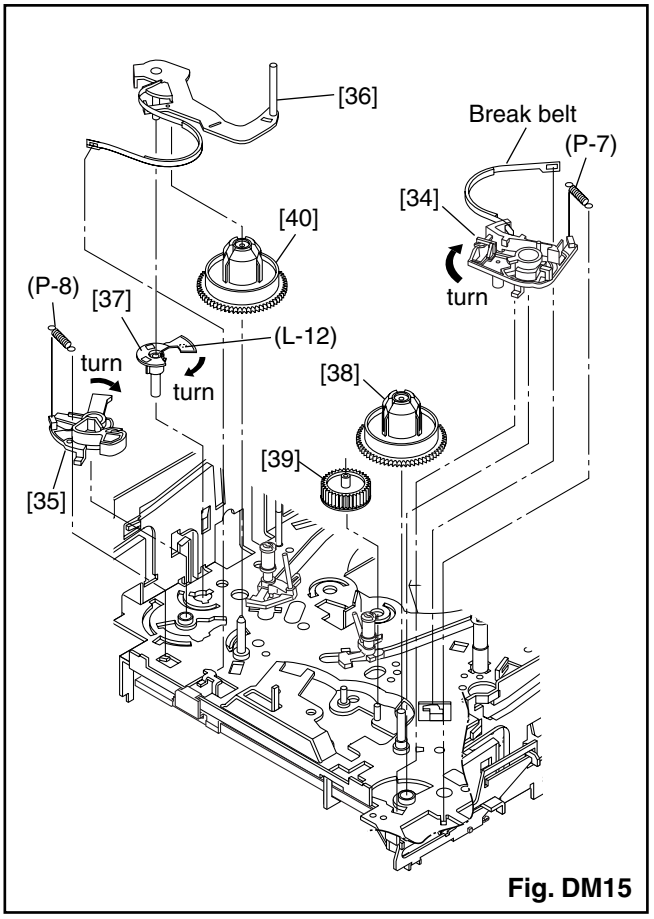


Fig. DM15

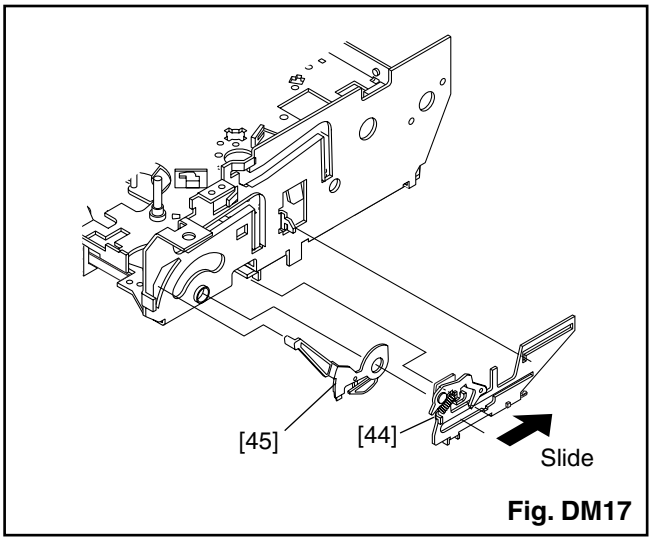


Fig. DM17

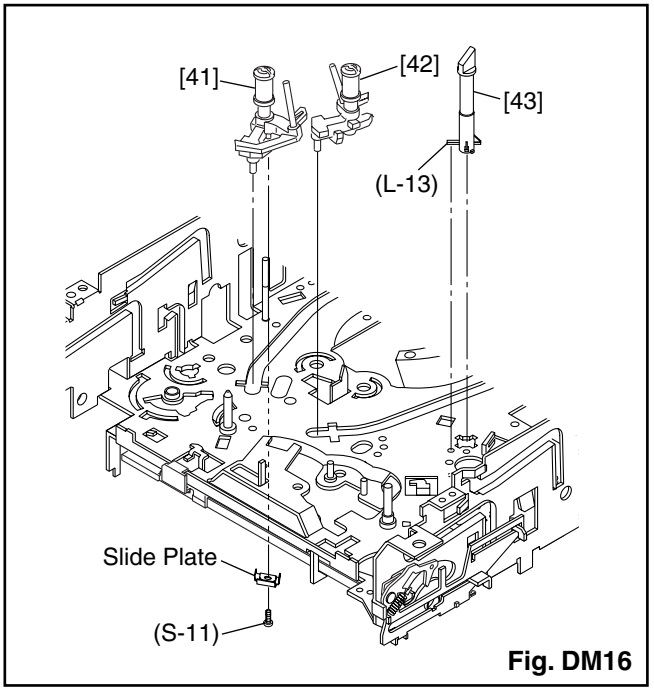


Fig. DM16

5-3 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

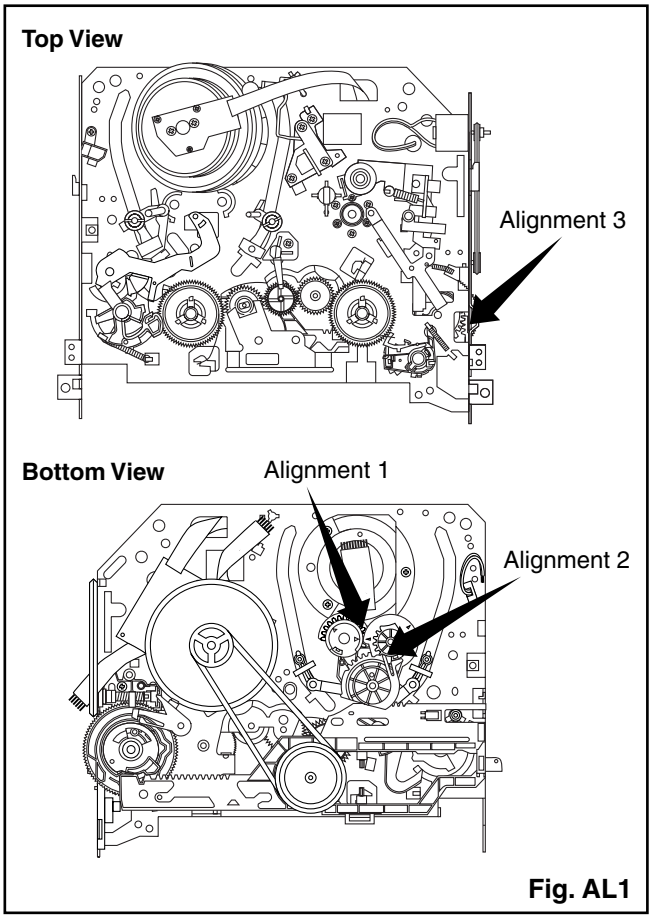


Fig. AL1

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. AL2.

Alignment 2

Mode Gear

Keeping the two triangles pointing at each other, install the Loading Arm (SP) Assembly so that the last tooth of the gear meets the most inside teeth of the Mode Gear. See Fig. AL2.

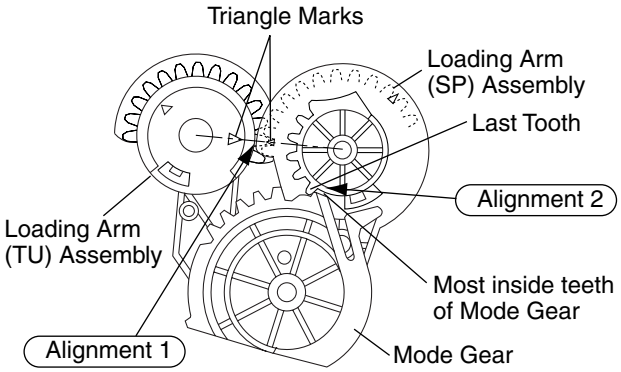


Fig. AL2

Alignment 3

Cam Gear (A), 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) as shown in Fig. AL3.

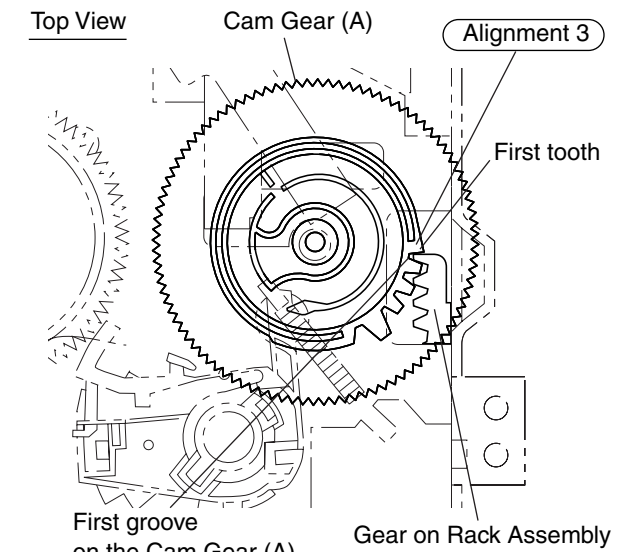
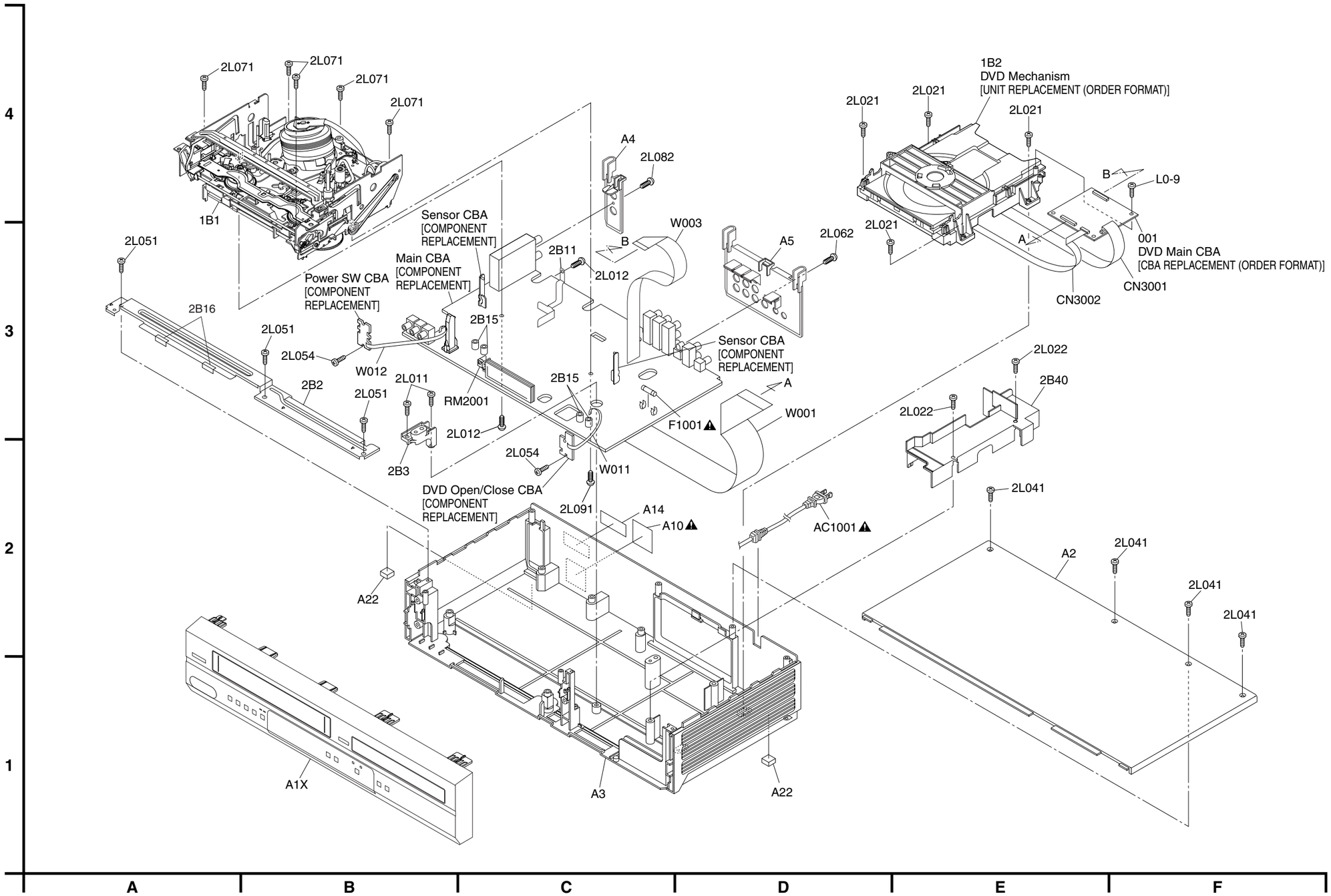


Fig. AL3

6 EXPLODED VIEWS AND PARTS LIST

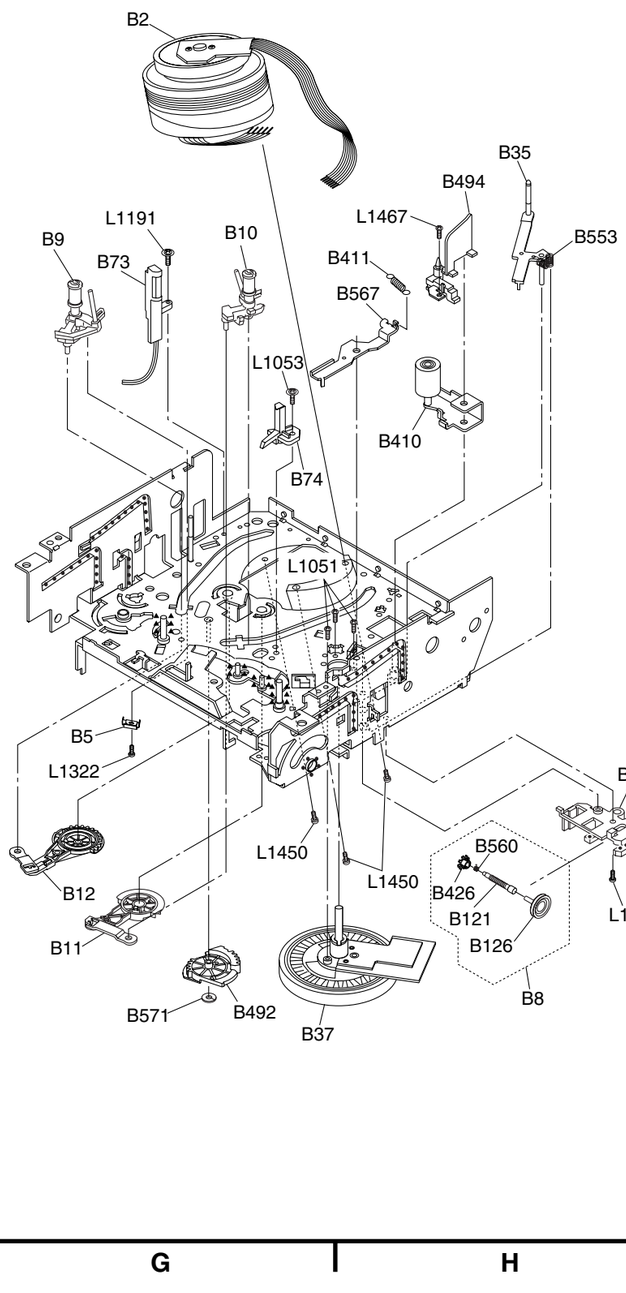
6-1 EXPLODED VIEWS

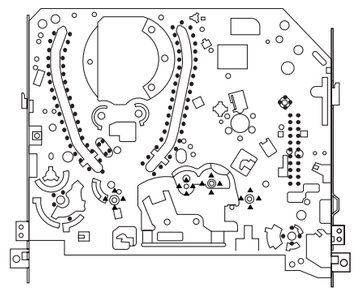
6-1-1 Cabinet Section



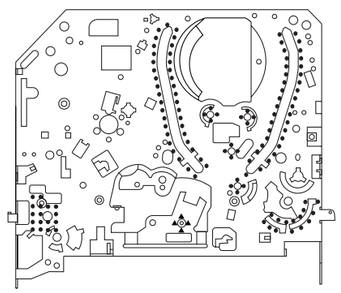
6-1-2 Deck Mechanism View 1 Section

Mark	Description
●●●●●	Floil G-684G or Multemp MH-D (Blue grease)
▲▲▲▲▲	SLIDUS OIL #150





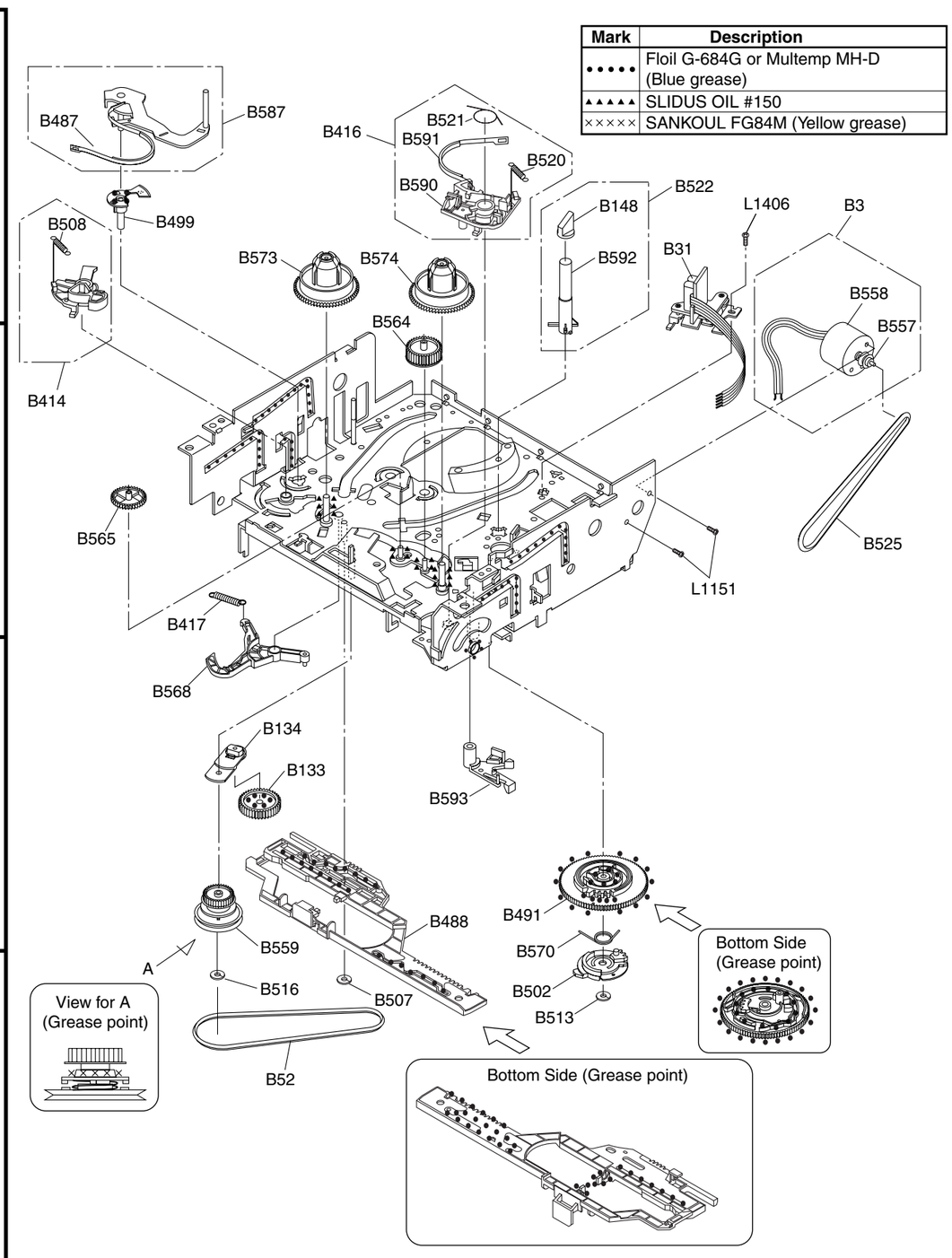
Chassis Assembly
Top View (Lubricating Point)



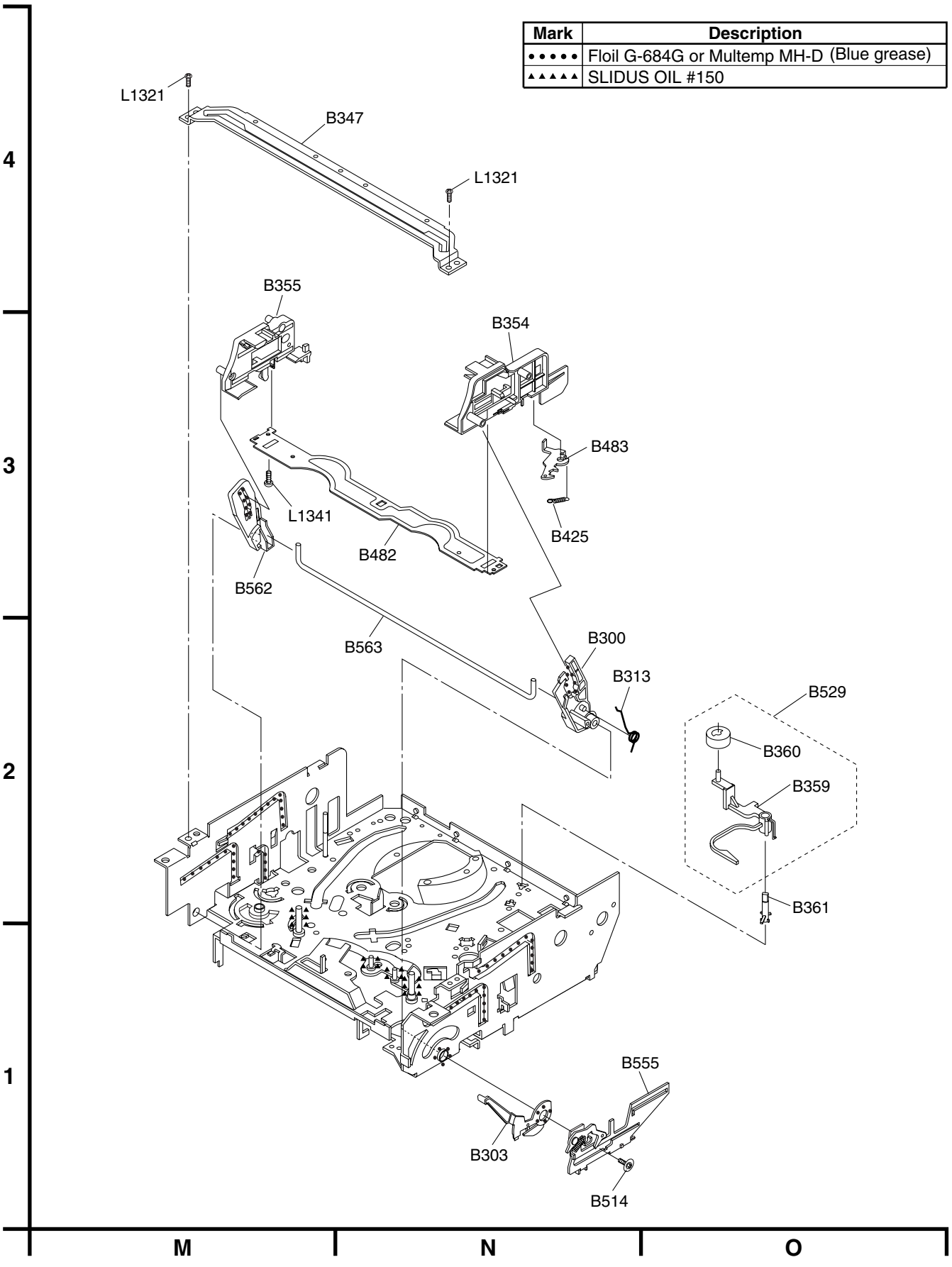
Chassis Assembly
Bottom View (Lubricating Point)

6-1-3 Deck Mechanism View 2 Section

Mark	Description
●●●●●	Floil G-684G or Multemp MH-D (Blue grease)
▲▲▲▲▲	SLIDUS OIL #150
×××××	SANKOUL FG84M (Yellow grease)



6-1-4 Deck Mechanism View 3 Section



6-2 REPLACEMENT PARTS LIST

6-2-1 Mechanical Parts List

SYMBOL-NO	P-NO	DESCRIPTION
		MECHANISM SECTION
A1X	TJ17642	PANEL,FRONT
A2	TJ17643	CASE,TOP
A4	TJ17701	JACK
A5	TJ17702	JACK
A22	TJ17644	FOOT,CHASSIS
⚠ AC1001	TJ17703	CORD,AC
1B2	TJ17573	DVD DRIVE MECHA
2B2	TJ17646	BRACKET,TOP
2B3	TJ17647	HOLDER,RODER
2B11	TJ17657	SHIELD,HEAD
2B15	TJ15122	BUSH,LED
2B40	TJ17648	PLATE,PARTITION
B2	TJ17674	CYLINDER ASSY
B3	TJ17675	MOTOR,LOADING ASSY
B8	TS18414	PILLEY ASSY
B9	TJ17676	GUIDE,MOVING(S)
B10	TJ17677	GUIDE,MOVING(T)
B11	TJ16894	ARM,LOADING(TU)
B12	TJ16895	ARM,LOADING(SP)
B31	TJ17678	HEAD,AC
B35	TJ17679	ARM,GUIDE TAPE
B37	TJ17681	MOTOR,CAPSTAN
B52	TJ15161	BELT,CAP
B73	TJ17682	HEAD,FE
B74	TJ15163	PRISM
B121	TJ16896	WORM
B126	TJ17196	PULLEY
B133	TJ16898	GEAR,IDLER
B134	TJ16899	ARM,IDLER
B148	TJ15984	CAP
B300	TJ16901	LEVER,DRIVE(C)
B303	TJ17683	DOOR OPENER(F)
B313	TJ16903	SPRING,DRIVE(C)
B347	TJ15987	HOLDER,GUIDE
B354	TJ17197	SLIDER(TU)
B355	TJ17684	SLIDER(SP)
B359	TJ15103	LEVER,CLEANER
B360	TJ15104	ROLLER,CLEANER
B361	TJ15105	POST
B410	TJ17685	ARM,PINCH(A)
B411	TJ16906	SPRING,PINCH
B414	TJ17686	BRAKE ASSY
B416	TS18421	BRAKE(TU)
B417	TJ17687	SPRING,TENSION
B425	TJ15185	SPRING,LOCK LEVER
B426	TJ15186	PULLEY KICK
B482	TJ16908	PLATE,CASSETTE
B483	TJ16909	LEVER,LOCK
B487	TJ16911	BRAKE,BAND
B488	TJ17688	LEVER,MODE
B491	TJ16913	GEAR,CAM
B492	TJ16914	GEAR,MODE
B494	TJ16915	OPENER,DOOR(C)
B499	TJ16916	HOLDER,LEVER(T)
B501	TJ16917	HOLDER,WORM
B502	TJ16918	GEAR,CAM(B)
B507	TJ14034	WASHER
B508	TJ15199	SPRING,BRAKE(S)
B513	TJ16919	WASHER,CAM
B514	TJ15202	SCREW,RACK
B516	TJ14034	WASHER
B520	TJ16921	BRAKE,SPRING
B521	TJ16922	BRAKE,SPRING
B522	TS17454	POST AS
B525	TJ16001	BELT
B529	TJ15106	CLEANER ASSY
B553	TJ16003	SPRING
B555	TS18422	RACK ASSY
B557	TJ15215	PULLEY,MOTOR
B558	TJ17689	MOTOR,LOADING
B559	TS18423	CLUTCH ASSY
B560	TJ15303	SPRING,KICK
B562	TJ16924	LEVER,DRIVE(C)
B563	TJ16925	SHAFT,SLIDER
B564	TJ16926	GEAR(M)
B565	TJ16927	GEAR,SENSOR
B567	TJ16928	ARM,PINCH
B568	TJ16929	ARM,BT
B570	TJ16035	SPRING,RACK
B571	TJ15203	WASHER
B573	TJ16931	REEL(SP)
B574	TJ16932	REEL(TU)
B587	TS18424	LEVER,TENSION
B590	TJ17202	ARM,BRAKE
B591	TJ16935	BRAKE,BAND
B592	TJ16936	POST
B593	TJ17691	CAM HOLDER ASSY
X502	TJ15148	CYLINDER ASSY
L1406	TJ15238	HEAD,AC
L1450	TE12971	SCREW M2.6X5
L1466	TJ14066	SCREW(M2.6X6)
2L011	TJ10177	SCREW (3X8)
2L012	TJ10176	SCREW (3X6)
2L022	TJ10177	SCREW (3X8)
2L041	TE13193	SCREW (3X10)
2L051	TJ14057	SCREW(M3X6)
2L054	TJ14057	SCREW(M3X6)
2L062	TJ15892	SCREW(M3X10)

SYMBOL-NO	P-NO	DESCRIPTION
2L071	TJ10119	SCREW(3X10)
2L082	TJ16883	SCREW(M3X5)
2L091	TJ15954	SCREW(M3X8)
001	TJ17654	PWB ASSY DVD MAIN
		ACCESSPRIES
X1	TS18856	REMOTE HAND SET
X3	TE15081	CABLE,RF
X5	TJ15698	CORD,AV

SYMBOL-NO	P-NO	DESCRIPTION

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
		RESISTOR
VR501	TA14561	RESISTOR 100KOHM
		SEMI-CONDUCTORS
D013	TE13211	DIODE BA158
D015	TJ17658	DIODE SB370
D016	TJ14082	DIODE SB340
D030	TE13211	DIODE BA158
D031	TJ17613	ZENER DIODE DZ-18BSBT2
D040	TC12191	ZENER DIODE 6.8BSBT265
D052	TJ13919	ZENER DIODE NTZJT-771.B
D080	TC10752	DIODE 1A5
D081	TC10752	DIODE 1A5
D082	TC10752	DIODE 1A5
D100	TC10112	DIODE 1N4148M
D101	TC10112	DIODE 1N4148M
D501	TC10112	DIODE 1N4148M
D502	TC10112	DIODE 1N4148M
D504	TJ17613	ZENER DIODE DZ-18BSBT2
D510	TC10112	DIODE 1N4148M
D555	TJ13898	LED
D564	TJ15414	LED
D565	TJ15414	LED
D566	TC12491	LED
D567	TC12491	LED
D701	TC10607	ZENER DIODE UZ-33BSD
D1001	TC10752	DIODE 1A5
D1002	TC10752	DIODE 1A5
D1003	TC10752	DIODE 1A5
D1004	TC10752	DIODE 1A5
D1007	TC12471	ZENER DIODE DZ-39BSBT265
D1008	TC10877	DIODE SB140
D1010	TE13211	DIODE BA158
D1011	TE13211	DIODE BA158
D1012	TC10112	DIODE 1N4148M
D1016	TJ15333	DIODE FR101
D1017	TJ17613	ZENER DIODE DZ-18BSBT2
D1018	TC10112	DIODE 1N4148M
D1020	TC10877	DIODE SB140
D1022	TC10112	DIODE 1N4148M
D1024	TC10112	DIODE 1N4148M
D1025	TC10112	DIODE 1N4148M
D1025	TC10754	SWITCHING DIODE 1N4148M
D1036	TC10752	DIODE 1A5
D1037	TC10752	DIODE 1A5
D1038	TC10752	DIODE 1A5
D1058	TC10752	DIODE 1A5
D1301	TJ13895	ZENER DIODE MTZJT-775.6B
IC301	TJ17659	IC LA71205M-MPE-E
IC451	TJ17661	IC LA72670BM-MPB-E
IC501	TJ17662	IC MN101D08DFT(QSZAA0RMS017)
IC571	TC12684	IC PT6313-S-TP
IC751	TC12531	IC TC4053BF(N)
⚠ IC1001	TE13224	IC LTV-817B-F
IC1002	TJ17589	IC PQ070XZ5MZP
IC1004	TJ17663	IC BA3948FP-E2
IC1201	TC12251	IC KIA4558P
IC1402	TJ17591	IC MM1637XVBE
IC1403	TJ17592	IC MM1636XWRE
Q031	TC10782	TRANSISTOR KTA1267
Q052	TC12591	TRANSISTOR KRC103M
Q055	TJ13924	TRANSISTOR 2SC536NF
Q056	TJ15283	TRANSISTOR 2SC2001(K)
Q057	TE13243	TRANSISTOR KTC3199(BL)
Q301	TC10784	TRANSISTOR KTA1266
Q302	TC10783	TRANSISTOR KTC3193
Q303	TC10783	TRANSISTOR KTC3193
Q391	TC10784	TRANSISTOR KTA1266
Q421	TC10784	TRANSISTOR KTA1266
Q422	TE13235	TRANSISTOR KTC3203(Y)
Q425	TJ13923	TRANSISTOR BN1F4M
Q426	TJ17665	TRANSISTOR RN1511
Q501	TE13243	TRANSISTOR KTC3199(BL)
Q503	TJ15141	TRANSISTOR PT204-6B-12
Q504	TJ15141	TRANSISTOR PT204-6B-12
Q506	TJ15141	TRANSISTOR PT204-6B-12
Q563	TC10782	TRANSISTOR KTA1267
Q565	TC10782	TRANSISTOR KTA1267
Q566	TC10778	TRANSISTOR KTC3199
Q567	TC10778	TRANSISTOR KTC3199
⚠ Q1001	TC12694	TRANSISTOR 2SK3543
Q1003	TC10778	TRANSISTOR KTC3199
Q1004	TE13235	TRANSISTOR KTC3203(Y)
Q1005	TC10778	TRANSISTOR KTC3199
Q1006	TC10782	TRANSISTOR KTA1267
Q1008	TC10778	TRANSISTOR KTC3199
Q1011	TE13235	TRANSISTOR KTC3203(Y)
Q1201	TC10778	TRANSISTOR KTC3199
Q1202	TC10778	TRANSISTOR KTC3199
Q1204	TC10784	TRANSISTOR KTA1266
Q1351	TC10778	TRANSISTOR KTC3199
Q1385	TC10778	TRANSISTOR KTC3199
		TRANSFORMER
⚠ T001	TJ17667	TRANSFOMER,SWITCHING
		COILS
L009	TJ13909	COIL

SYMBOL-NO	P-NO	DESCRIPTION
L303	TA12561	COIL 100UH
L304	TJ13909	COIL
L421	TJ13915	COIL
L502	TJ13909	COIL
L503	TA12562	COIL 12UH
L701	TA12563	COIL 4.7UH
L1001	TA14541	FILTER,LINE
L1004	TA12575	CORE
L1007	TJ13909	COIL
L1020	TJ13909	COIL
L1350	TA12561	COIL 100UH
L1351	TA14481	COIL
L1522	TJ13915	COIL
L2001	TA12561	COIL 100UH
		CRYSTALS
X301	TJ15145	CRYSTAL
X301	TJ15146	CRYSTAL
		MISCELLANEOUS
RM2001	TC12331	SENSOR UNIT
SW502	TE11957	SWITCH
SW505	TE11957	SWITCH
SW508	TE11957	SWITCH
SW509	TE11957	SWITCH
SW511	TE15484	SWITCH
SW512	TJ17666	SWITCH,MODE
SW513	TE11957	SWITCH
SW514	TE11957	SWITCH
SW515	TE11957	SWITCH
SW516	TE11957	SWITCH
SW518	TE11957	SWITCH
SW2001	TE11957	SWITCH
SW2002	TE11957	SWITCH
SW2003	TE11957	SWITCH
⚠ F1001	TE13223	FUSE 1A/250V
FH1001	TE11084	HOLDER
FH1002	TE11084	HOLDER
FIP502	TJ17588	DISPLAY
⚠ GP1001	TJ13894	GAP
JK1202	TE15134	JACK
JK1401	TE14821	JACK
JK1403	TJ17664	JACK
JK751	TE15303	JACK
JK752	TE15304	JACK
JK753	TJ15136	JACK
JK754	TE15495	JACK
JK755	TE15496	JACK
JK756	TE15281	JACK
⚠ SA1001	TC10891	SURGE ABSORBER ENC471D-10AC

SYMBOL-NO	P-NO	DESCRIPTION
TU701	TJ17668	TUNER UNIT
W001	TJ17669	CABLE(27P)
W003	TJ17671	CABLE(19P)
W011	TJ17673	WIRE(2P)
W012	TJ17672	WIRE(3P)

7 APPENDIX

7-1 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

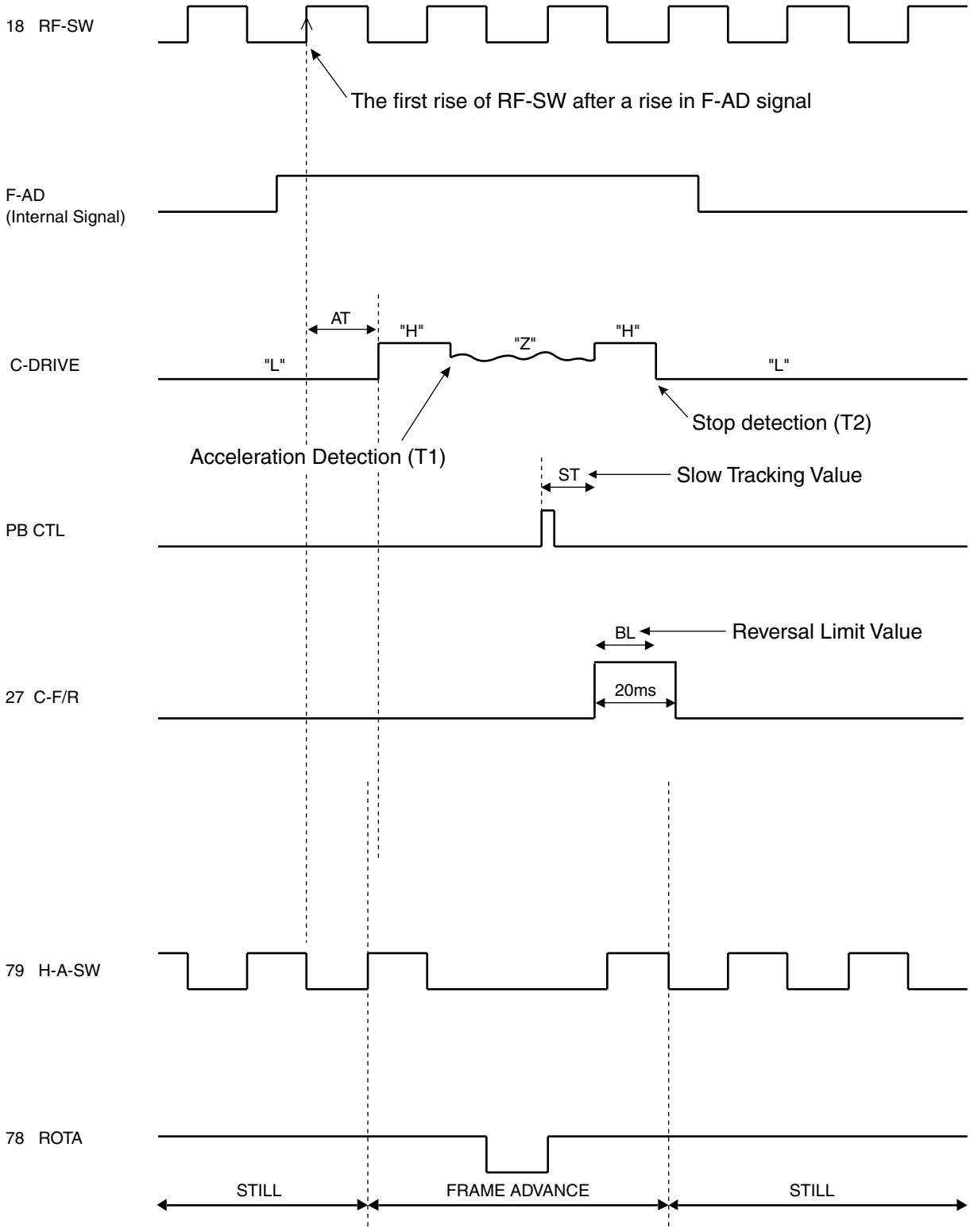


Fig. 1

2) LP/SLP Mode

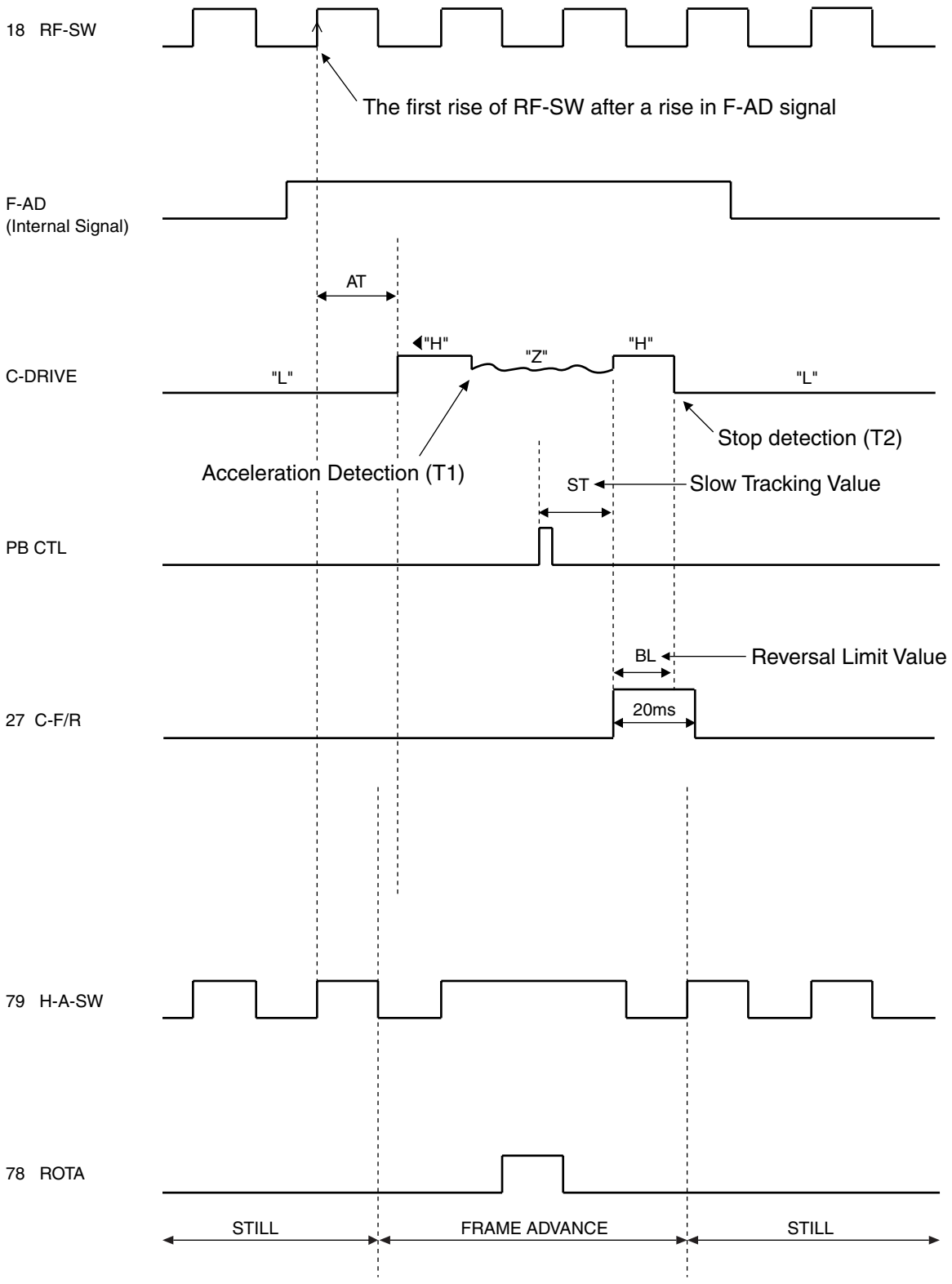


Fig. 2

1. EJECT (POWER OFF) -> CASSETTE IN (POWER ON) -> STOP(B) -> STOP(A) -> PLAY -> RS -> FS -> PLAY -> STILL -> PLAY -> STOP(A)

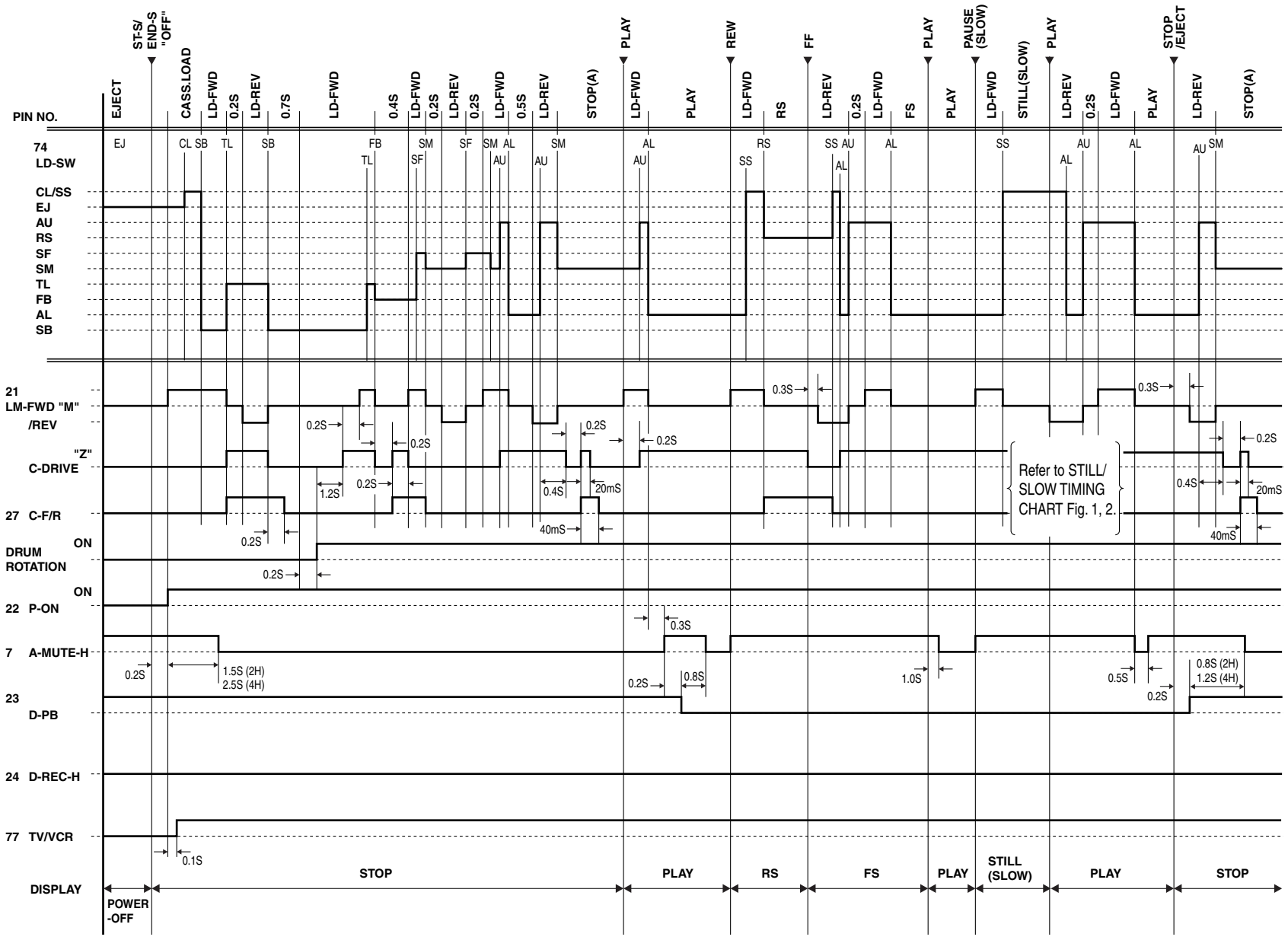


Fig. 3

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

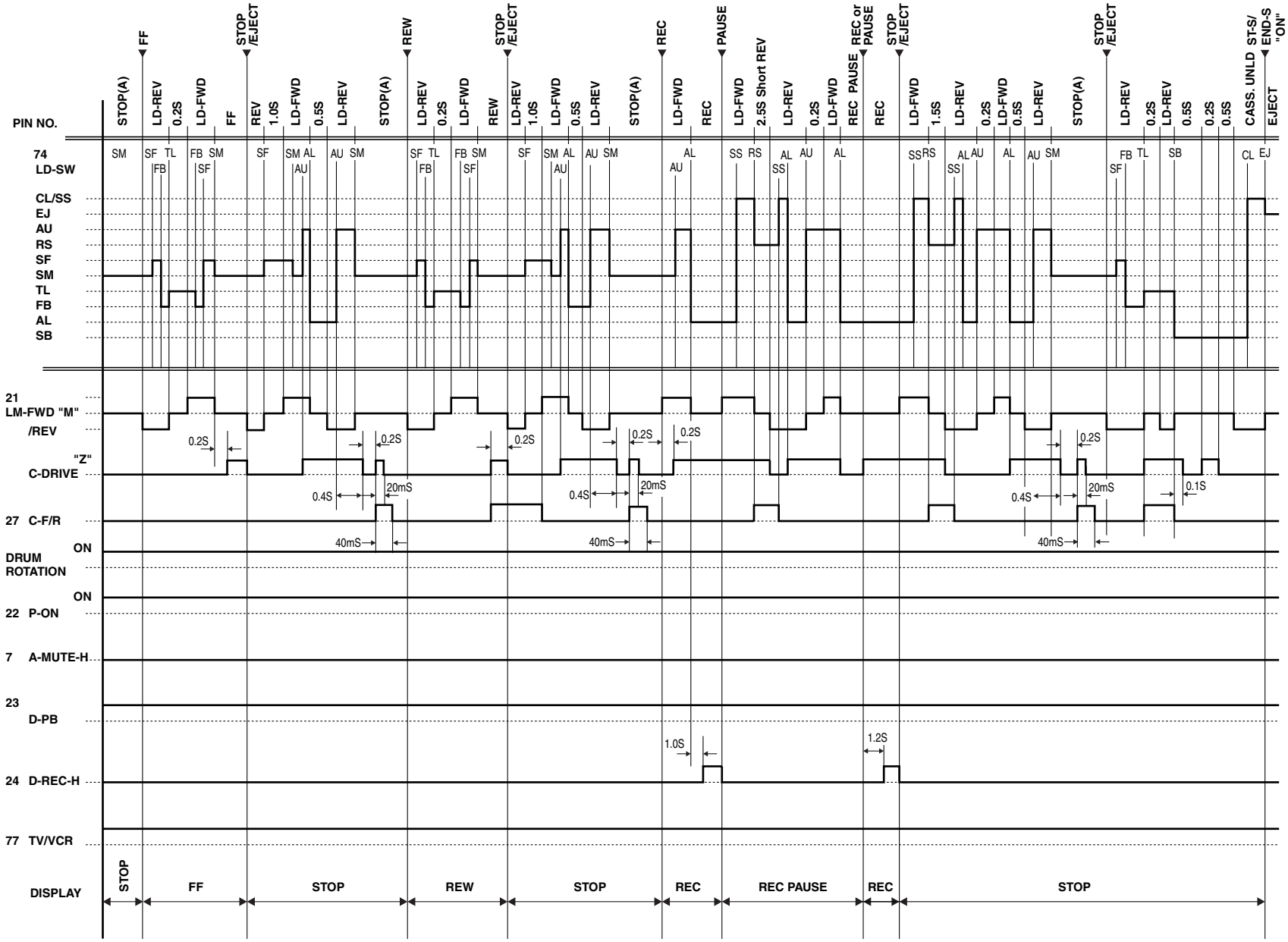
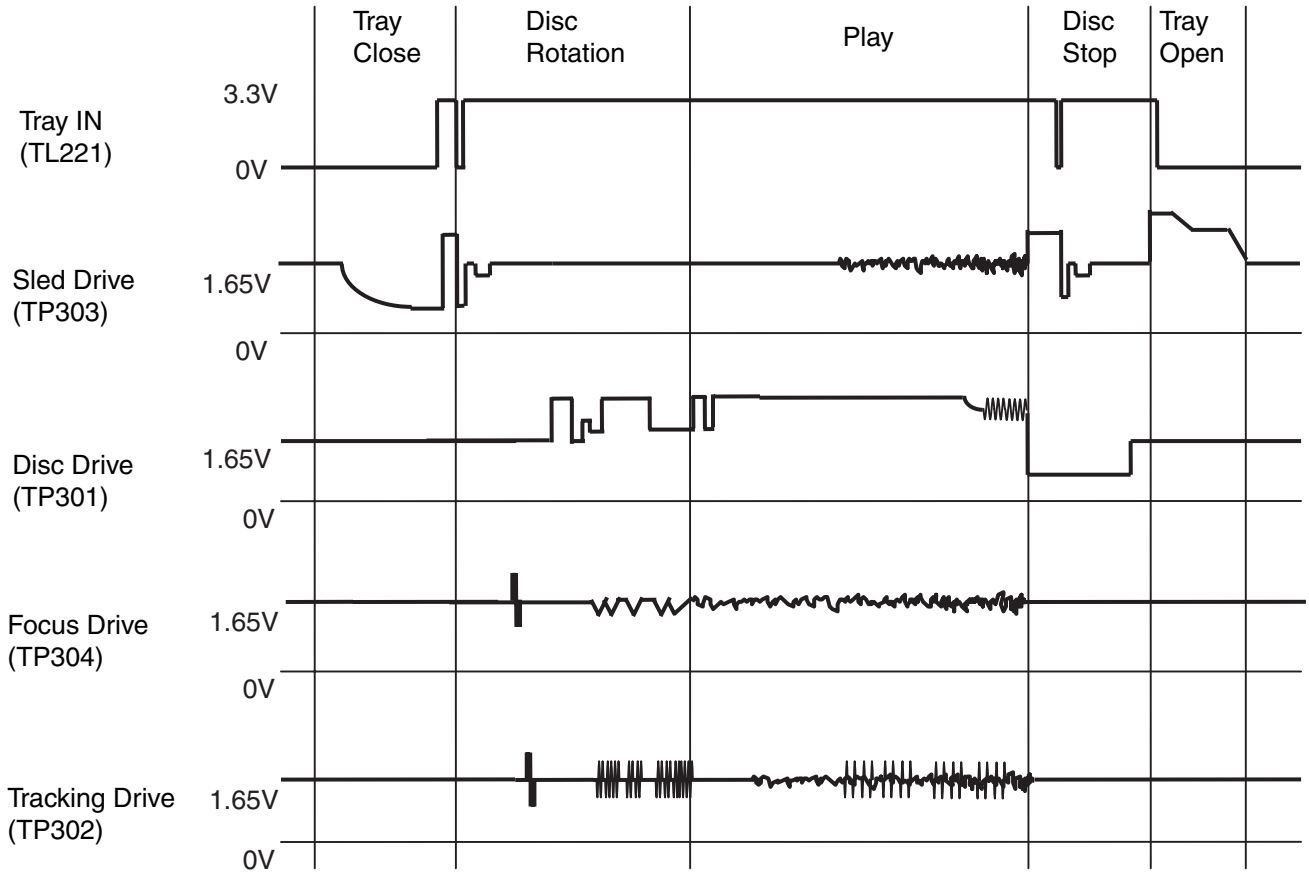


Fig. 4

[DVD Section]

Tray Close ~ Play / Play ~ Tray Open



7-2 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	P-DOWN -L	Power Voltage Down Detector Signal	L
2	IN	REC-SAF-SW	Recording Safety SW Detect (With Record tab = "L"/ With out Record tab = "H")	H/L
3	IN	T-REEL	Take Up Reel Rotation Signal	PULSE
4	-	N.U.	Not Used	-
5	IN	REMOTE-VIDEO	Remote Control Sensor	L
6	OUT	DISPLAY-CLK	7seg. Driver IC Clock Control Output Signal	H/L
7	OUT	A-MUTE-H	Audio Mute Control Signal (Mute = "H")	H
8	OUT	DISPLAY-DATA	7seg. Driver IC Data Control Output Signal	H/L
9	OUT	DISPLAY-ENA	7seg. Driver IC Enable Control Output Signal	L
10	-	N.U.	Not Used	-
11	-	N.U.	Not Used	-
12	IN/ OUT	IIC-BUS-SDA	IIC BUS Control Data	H/L
13	OUT	IIC-BUS-SCL	IIC BUS Control Clock	H/L
14	OUT	YCA-SCL	YCA IC Control Clock	H/L
15	OUT	YCA-SDA	YCA IC Control Data	H/L
16	OUT	YCA-CS	YCA IC Control Chip Select	H/L
17	-	N.U.	Not Used	-
18	OUT	RF-SW	Video Head Switching Pulse	H/L
19	OUT	D-V SYNC	Dummy V-sync Output	H/Hi-z
20	IN	RESET	System Reset Signal (Reset="L")	L
21	OUT	LM-FWD/ REV	Loading Motor FWD/ REV Output	H/Z/L
22	OUT	P-ON-L	Power On Signal to Low	L
23	-	N.U.	Not Used	-
24	OUT	D-REC-H	Delayed Record Signal	H
25	OUT	HiFi-H-SW	HiFi Audio Head Switching Pulse	H/L
26	OUT	DVD-POWER	DVD Power Control Signal	H
27	OUT	C-F/R	Capstan Motor FWD/REV Control Signal (FWD="L"/ REV="H")	H/L
28	OUT	C-CONT	Capstan Motor Control Signal	PWM
29	OUT	D-CONT	Drum Motor Control Signal	PWM
30	-	N.U.	Not Used	-
31	-	VDD	VDD	-
32	OUT	OSCO	Main Clock Output 14.31818MHz	-
33	IN	OSCI	Main Clock Input 14.31818MHz	-
34	-	VSS	VSS	
35	IN	XI	Sub Clock Input 32.768 MHz	-
36	OUT	XO	Sub Clock Output 32.768 MHz	-
37	IN	SXI	Operation Mode Selecting Input Signal	-
38	OUT	VIDEO-OUT	Composite Video Signal Output	-
39	-	Vss2	Vss2	-
40	IN	VIDEO-IN	Composite Video Signal Input	-
41	IN	C-SYNC	Composite Synchronized Pulse	PULSE
42	-	VDD2	VDD2	-
43	IN	AFCC	Low Path Filter Input Signal For AFC	-
44	OUT	AFCLPF	Low Path Filter Output Signal For AFC	-

Pin No.	IN/ OUT	Signal Name	Function	Active Level
45	-	N.U.	Not Used	-
46	OUT	OUTPUT-SELECT	Output Select	H/L
47	IN	D-PFG	Drum PG/FG Input Signal	PULSE
48	-	N.U.	Not Used	-
49	IN	C-FG	Capstan Motor Rotation Detection Pulse	PULSE
50	-	AFG	GND	-
51	OUT	VRO	Servo Standard Voltage Output	-
52	IN	VRI	Servo Standard Voltage Input	-
53	-	AVss	AVSS	-
54	IN	CTLA	CTL Amp. AC GND	-
55	-	AVDD	AVDD	-
56	IN/ OUT	CTL (+)	Playback/Record Control Signal (+)	-
57	IN/ OUT	CTL (-)	Playback/Record Control Signal (-)	-
58	OUT	CTL	Amp. Output Control Signal for Test Point	-
59	IN	HiFi/NOR-IN	Audio Mode Input HiFi=”L”/ Normal=”H”	A/D
60	-	NU	Not Used	-
61	IN	ST/SAP-IN	Tuner Stereo/Sap Detector Signal Input	A/D
62	IN	END-S	Tape End Position Detect Signal	A/D
63	IN	AFC	Automatic Frequency Control Signal	A/D
64	IN	V-ENV	Video Envelope Comparator Signal	A/D
65	IN	PG-DELAY	Video Head Switching Pulse Signal Adjusted Voltage	A/D
66	IN	KEY-2	A/D Key Data Signal 2	A/D
67	IN	KEY-1	A/D Key Data Signal 1	A/D
68	IN	LD-SW	Deck Mode Position Detector Signal	A/D
69	IN	ST-S	Tape Start Position Detector Signal	A/D
70	OUT	DVD-L-IND	VCR Mode LED Signal Output	H/L
71	OUT	DVD-H-IND	DVD Mode LED Signal Output	H/L
72	OUT	REC-IND	REC Mode LED Signal Output	H/L
73	-	N.U.	Not Used	-
74	-	N.U.	Not Used	-
75	OUT	TIMER-IND	TIMER LED Signal Output	H/L
76	OUT	CONV-SW	RF Conv. Output Channel Switching Signal 3ch=”Hi-z”, 4ch=”L”	Hi-z/L
77	OUT	VCR/TV	RF Conv. ON/OFF Signal (TV="L"/ VCR="H")	H/L
78	OUT	C-ROTA	Color Phase Rotary Changeover Signal	H/L
79	OUT	H-A-SW	Video Head Amp Switching Pulse	H/L
80	IN	H-A-COMP	Head Amp Comparator Signal	H/L

Notes:

Abbreviation for Active Level:

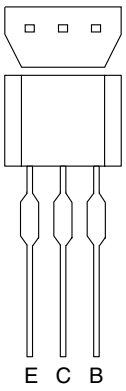
PWM -----Pulse Wide Modulation

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

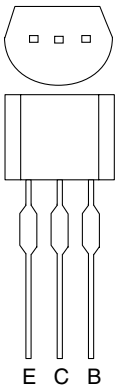
IC571 [PT6313-S-TP]

Pin No.	In/Out	Signal Name	Name Function
1	In	FP-CLK	Clock Input
2	In	FP-STB	Serial Interface Strobe
3	-	N.U.	Not Used
4	-	N.U.	Not Used
5	-	VSS	GND
6	-	VDD	Power Supply
7	Out	a	Segment Output
8	Out	b	
9	Out	c	
10	Out	d	
11	Out	e	
12	In	f	
13	In	g	
14	Out	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	-	N.U.	Not Used
28	In	FP-DIN	Serial Data Input

7-3 LEAD IDENTIFICATIONS

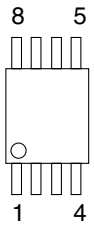


2SA1175(J,H,F)
2SC2785(J,H,F,K)
BA1F4M-T
BN1F4M-T
KRA103M
KRC103M
KTA1266(GR)
KTA1267(GR,Y)
KTC3193(Y)
KTC3199(Y,GR,BL)

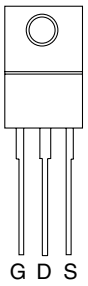


2SA1015-GR(TPE2)
2SC1815-BL(TPE2)
2SC1815-GR(TPE2)
2SC1815-Y(TPE2)
2SC2120-Y(TPE2)
KTC3198(Y,GR)
KTC3203(Y)

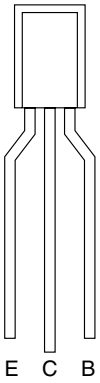
KIA4558P
NJM4558D



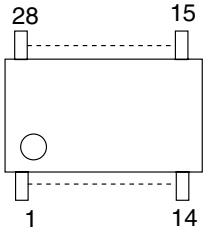
2SK3543



2SC536NF-NPA-AT
2SC536NG-NPA-AT

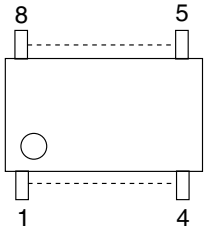


PT6313-S-TP

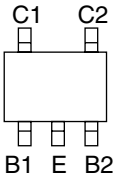


EL817A
EL817B
EL817C
LTV-817B-F
LTV-817C-F
PS2561A-1(Q,W)

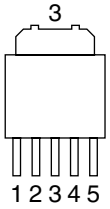
MM1636XWRE



FMG4A T148
RN1511(TE85R)

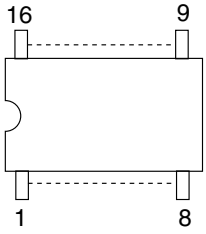


PQ070XZ5MZP

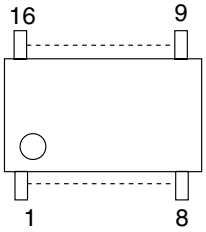


1: Vin
2: Vc
3: Vo
4: Vadj
5: GND

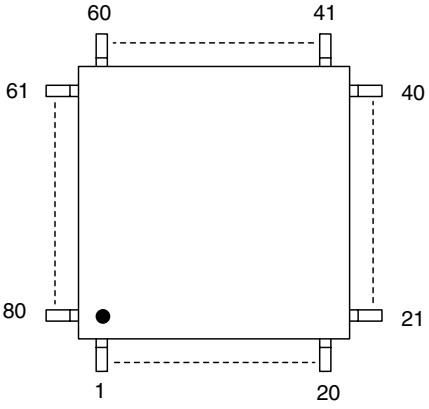
BU4053BCF
CD4053BCSJX
TC4053BF(N)



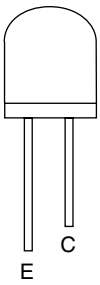
MM1637XVBE



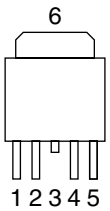
LA71205M-MPB-E
LA72670BM-MPB-E
QSZAA0RMS017



MID-32A22F
PT204-6B-12



BA3948FP-E2



1: CTL
2: Vcc
3: N.C.
4: OUT
5: C
6: GND

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

S SCHEMATIC, WIRING DIAGRAMS

S-1 Schematic Diagrams / CBA's and Test Points

Standard Notes

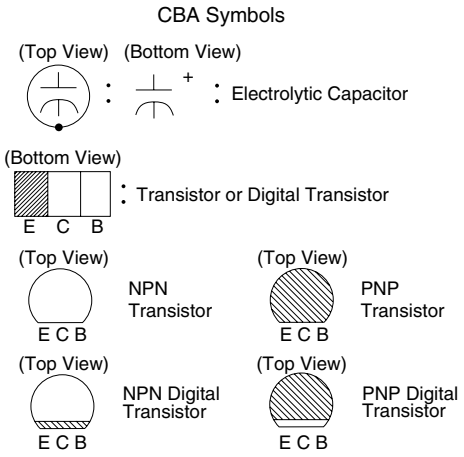
WARNING

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

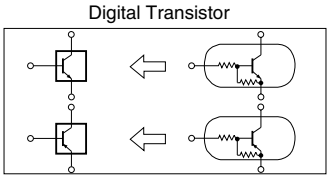
Capacitor Temperature Markings

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

Capacitors and transistors are represented by the following symbols.



Schematic Diagram Symbols



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.....kΩ M.....MΩ
Power capacitance	No indication.....1/4W,1/6W All capacitances other than the above are indicated in schematic diagrams.

[Capacitors]

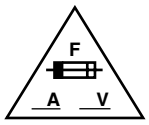
Item	Indication
Value	No indication.....μF P.....pF
Dielectric strength	No indication.....50V All dielectric strengths other than 50V are indicated in schematic diagrams.

[Coils]

Item	Indication
Value	μ.....μH 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.
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

This symbol means fast operating fuse.
Ce symbole reprèsente un fusible à fusion rapide.

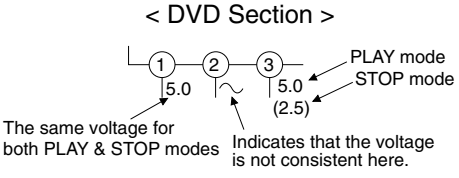
2. CAUTION:

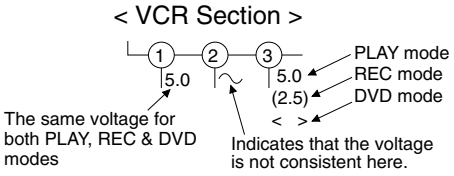
Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the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

3. Note:

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

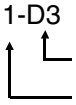
4. Voltage indications for PLAY and REC modes on the schematics are as shown below:





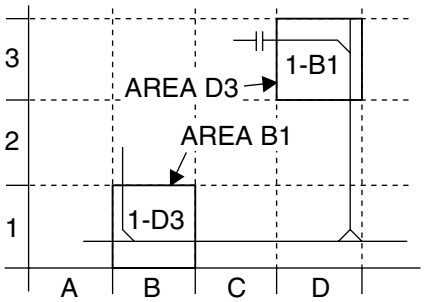
Unit: Volts

5. How to read converged lines



Examples:

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



6. Test Point Information

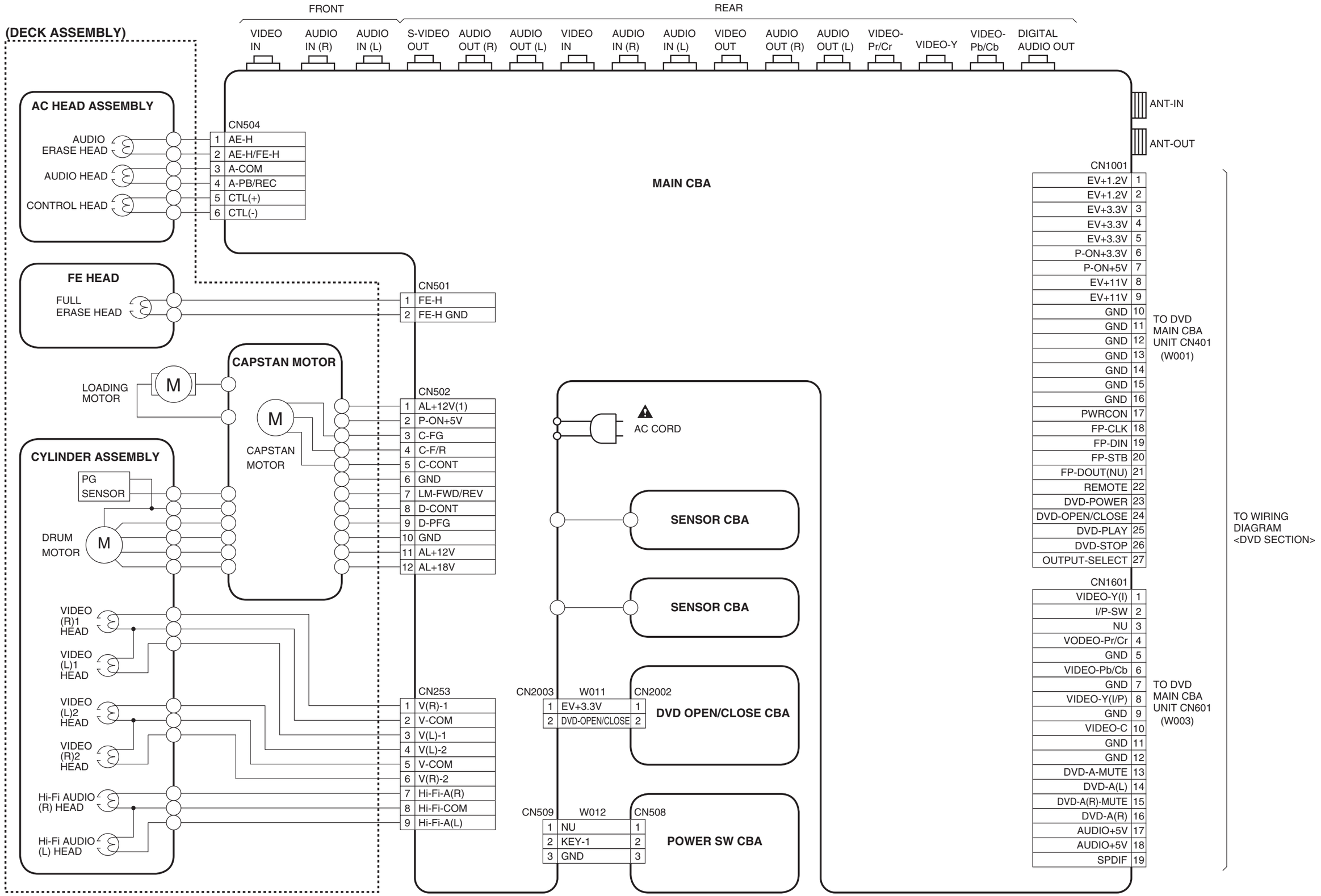
 : Indicates a test point with a jumper wire across a hole in the PCB.

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

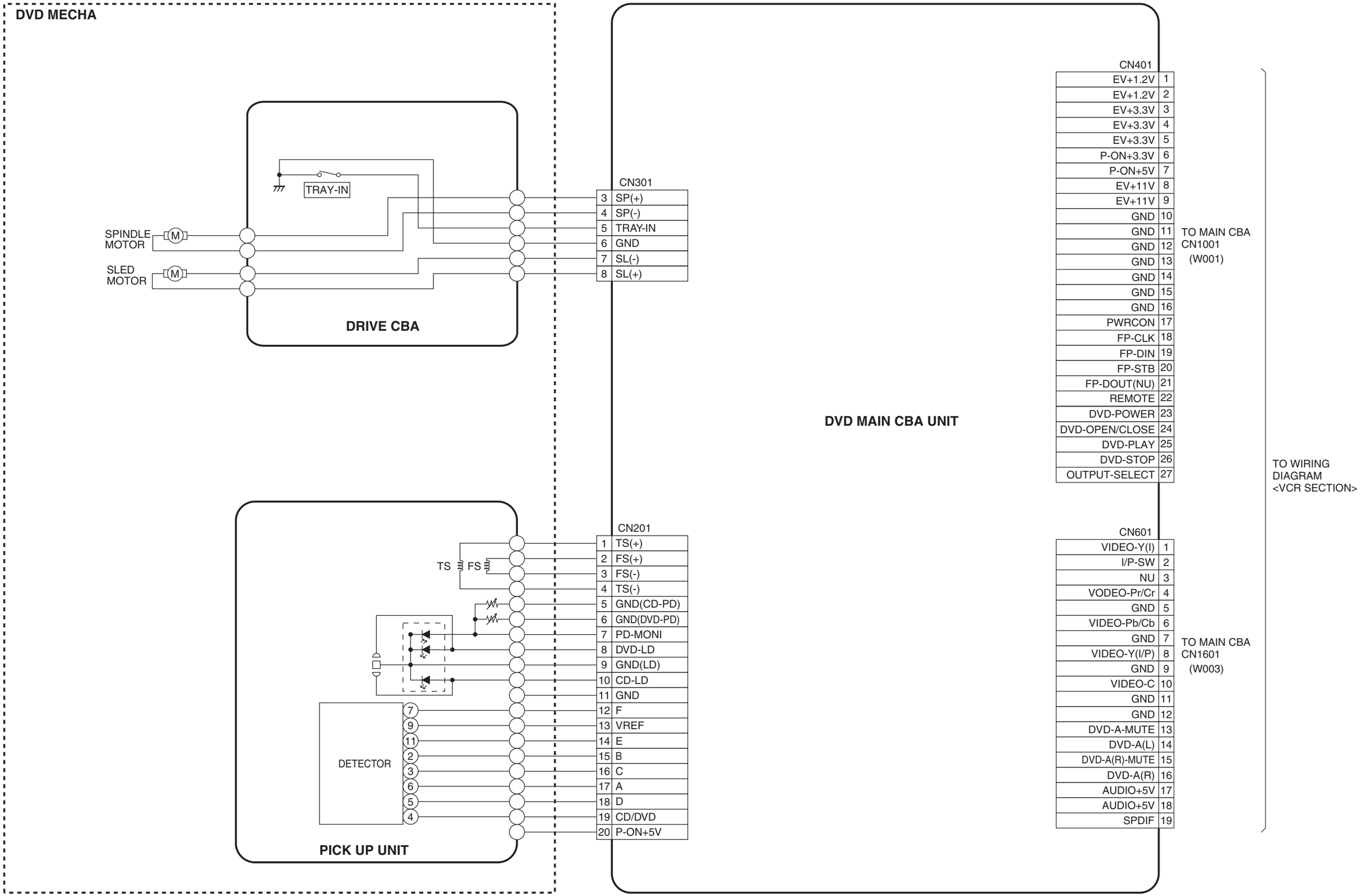
 : Used to indicate a test point with no test pin.

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

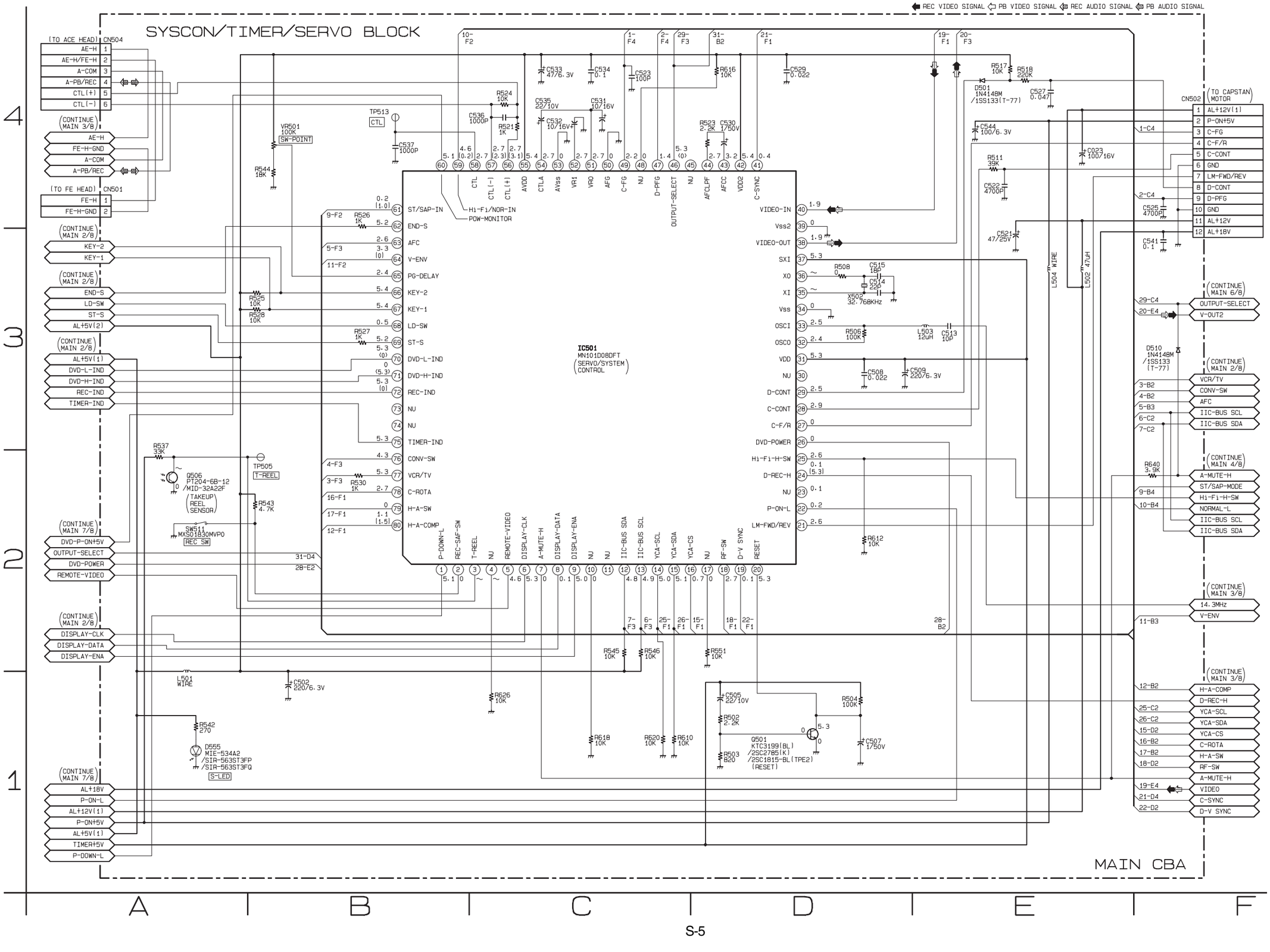
S-2 Wiring Diagrams < VCR SECTION >



S-3 Wiring Diagrams < DVD SECTION >



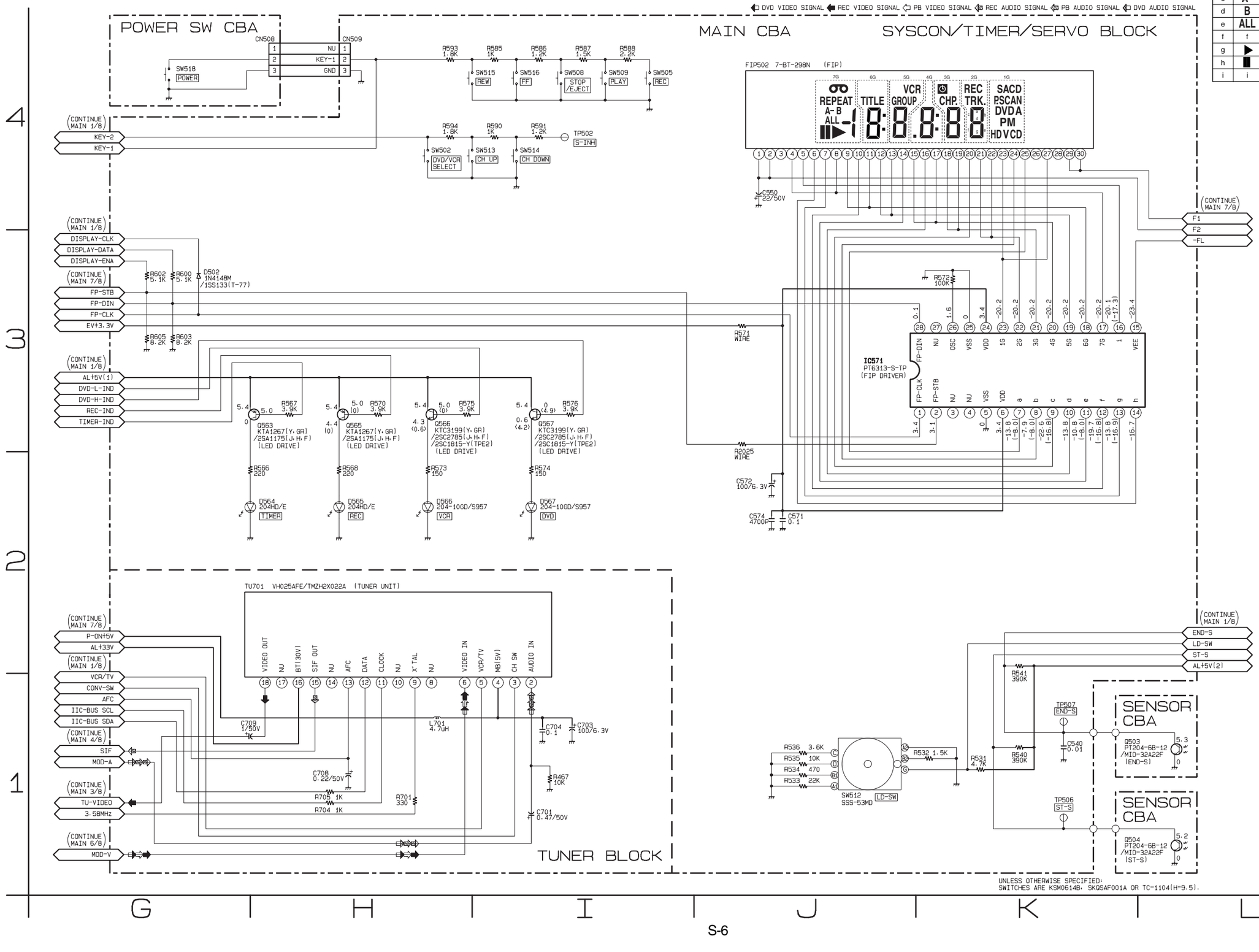
S-4 Main 1/8 Schematic Diagram



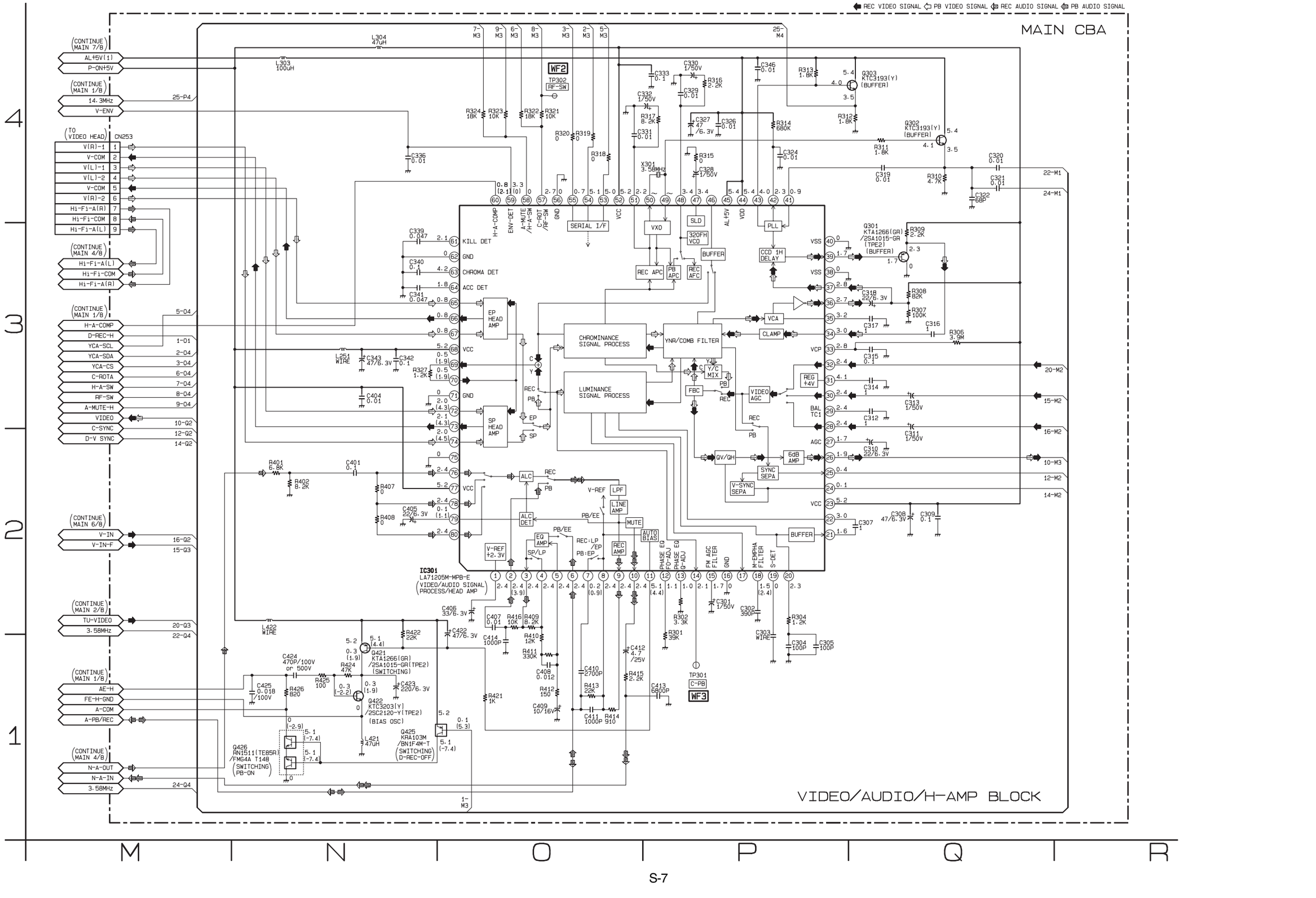
S-5 Main 2/8, Sensor & Power SW Schematic Diagram

FIP502 MATRIX CHART

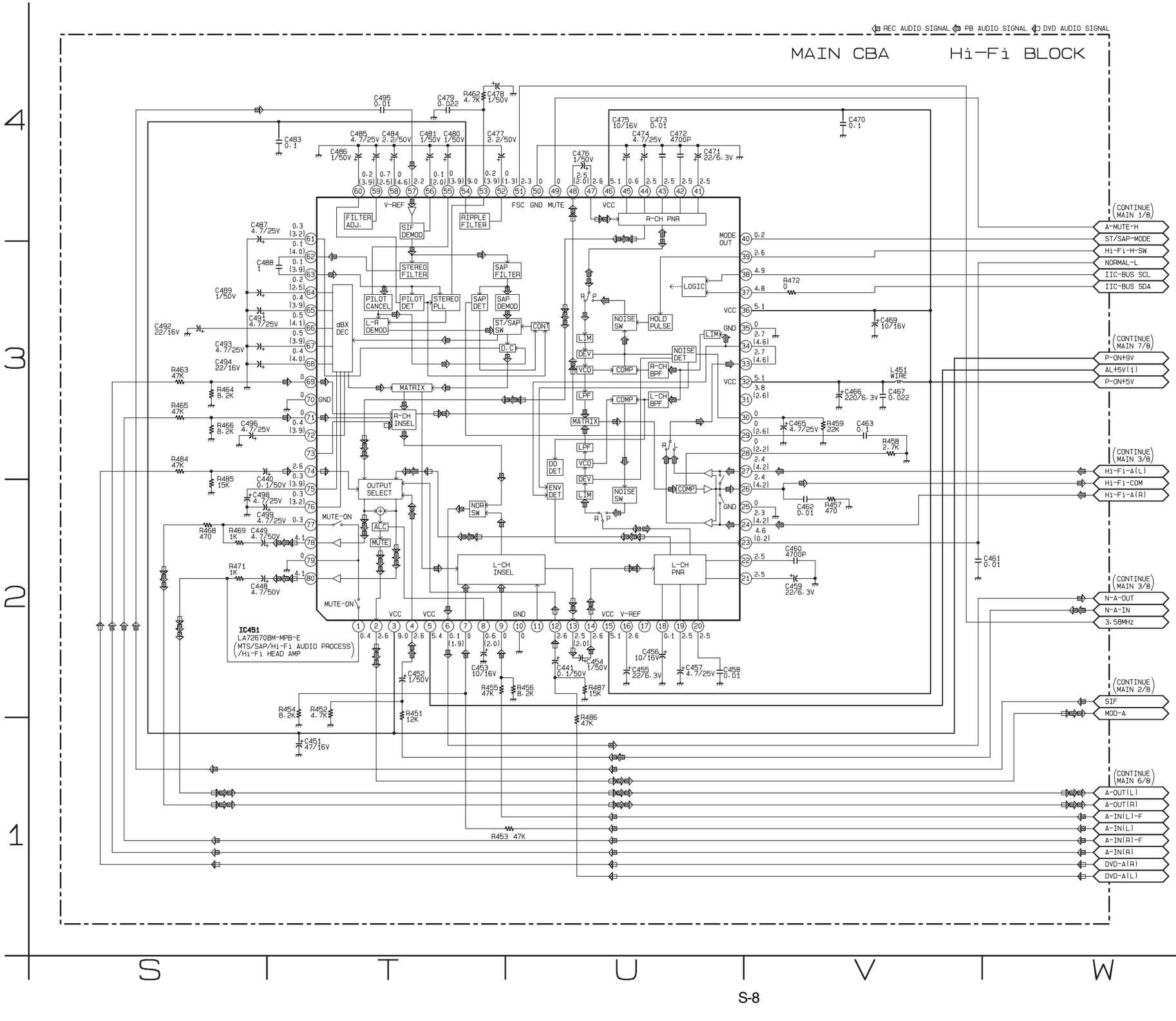
	7G	6G	5G	4G	3G	2G	1G
a	OO	a	a	a	a	a	SACD
b	REPEAT	b	b	b	b	b	PSCAN
c	A-	c	c	c	c	c	DVD
d	B	d	d	d	d	d	A
e	ALL	e	e	e	e	e	P
f	f	f	f	f	f	f	M
g	▶	g	g	g	g	g	HD
h	▮	:	GROUP	:	CHP	TRK.	V
i	i	TITLE	VCR	.	⏲	REC	CD



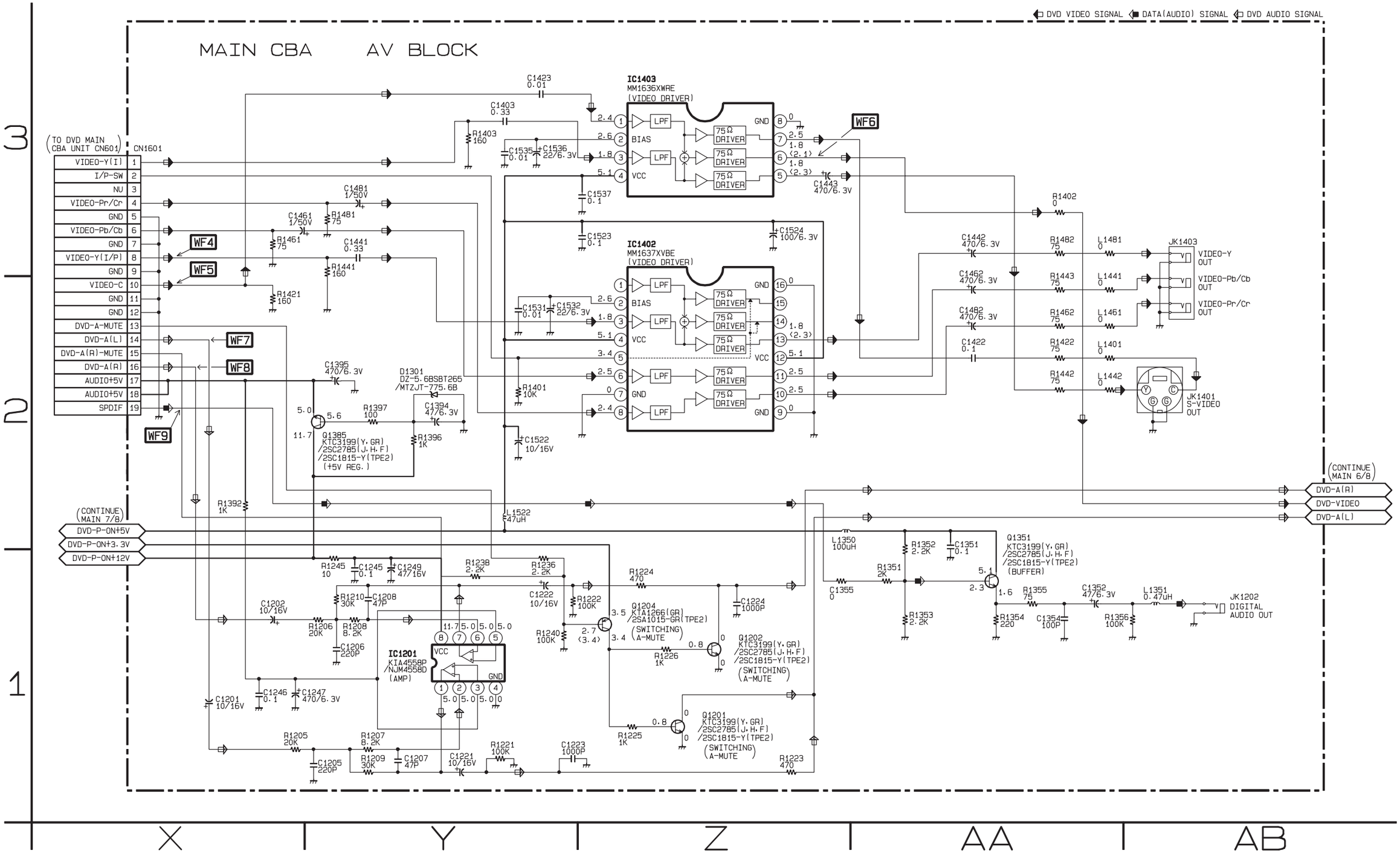
S-6 Main 3/8 Schematic Diagram



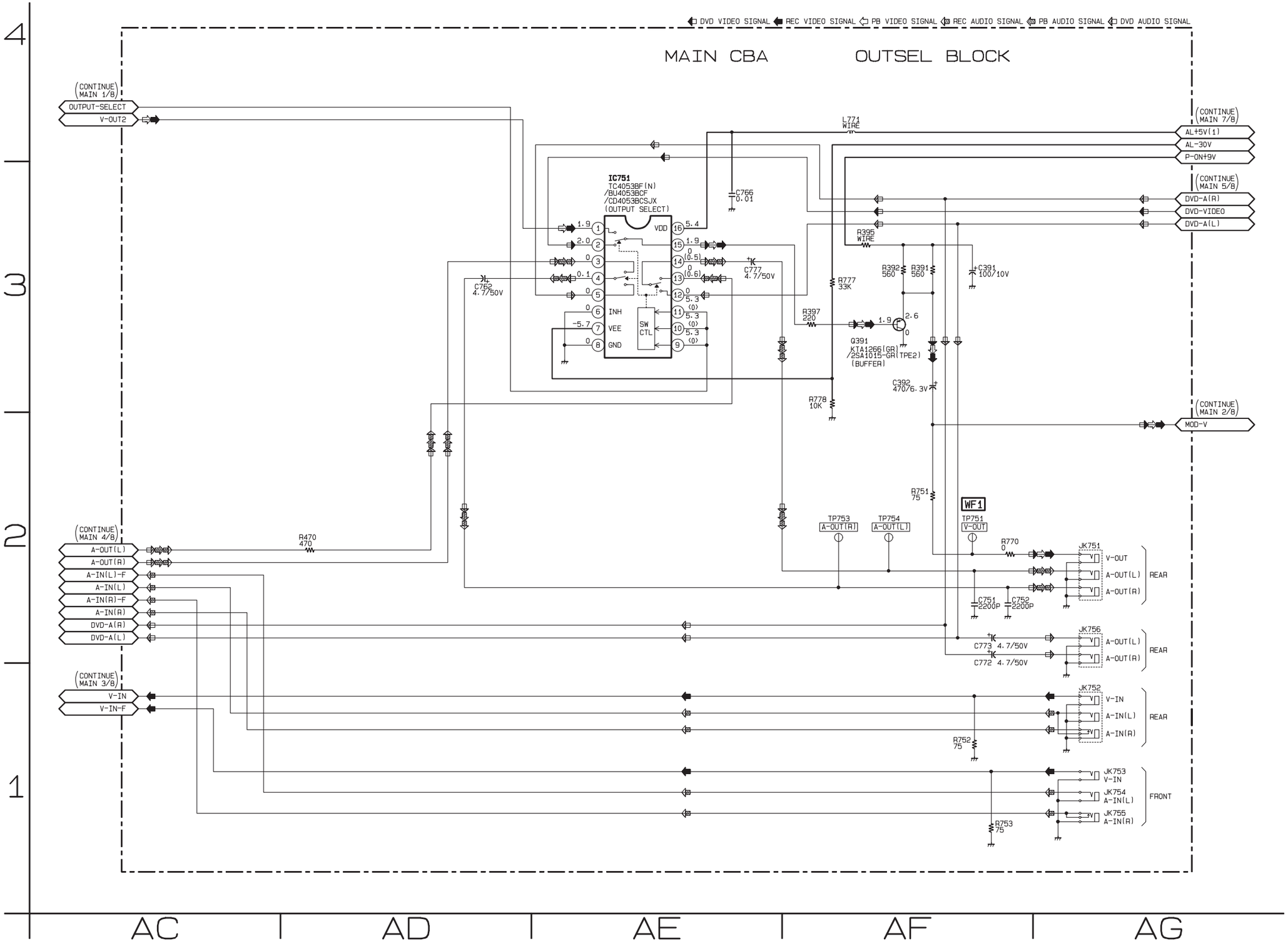
S-7 Main 4/8 Schematic Diagram



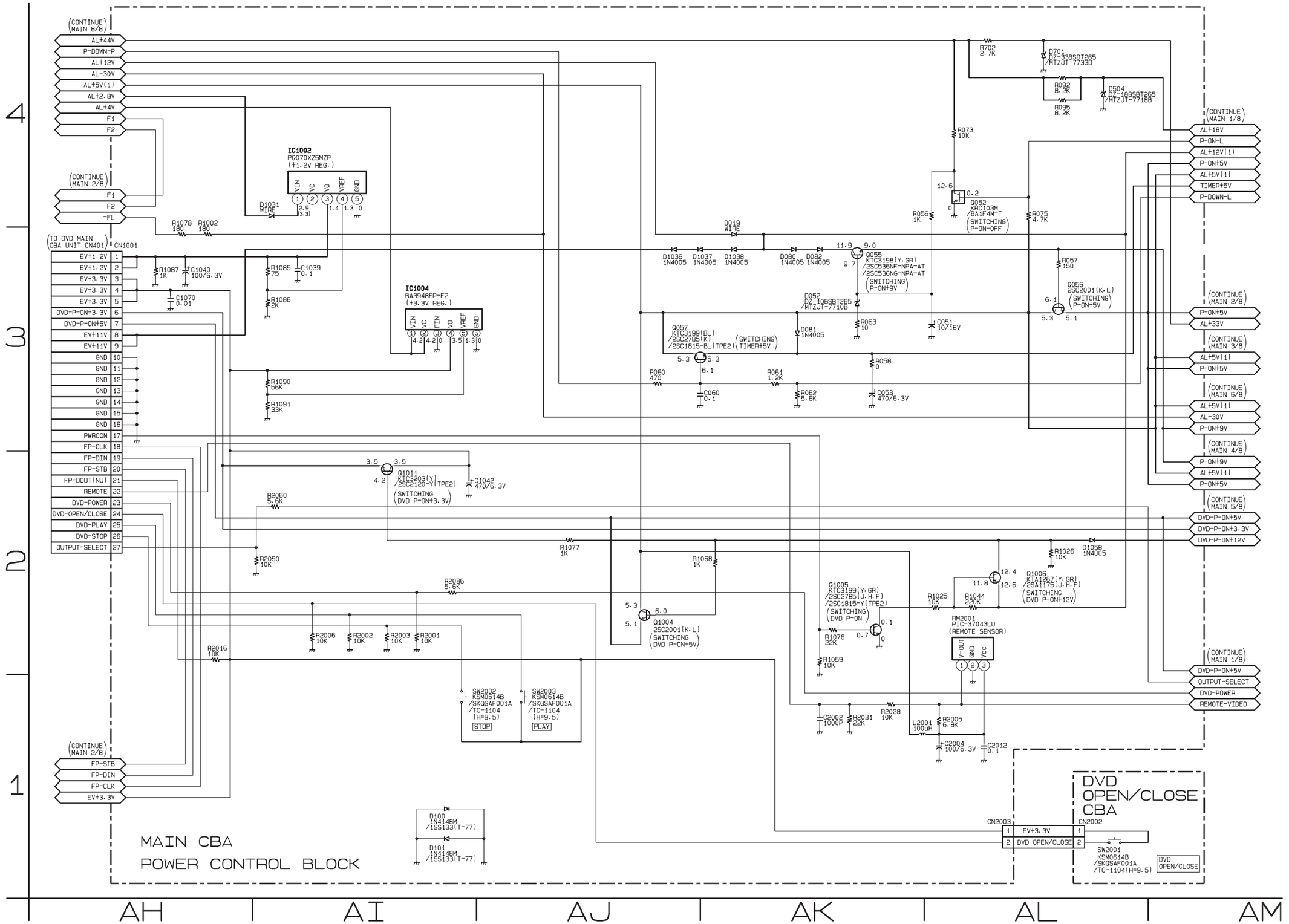
S-8 Main 5/8 Schematic Diagram



S-9 Main 6/8 Schematic Diagram



S-10 Main 7/8 & DVD Open/Close Schematic Diagram

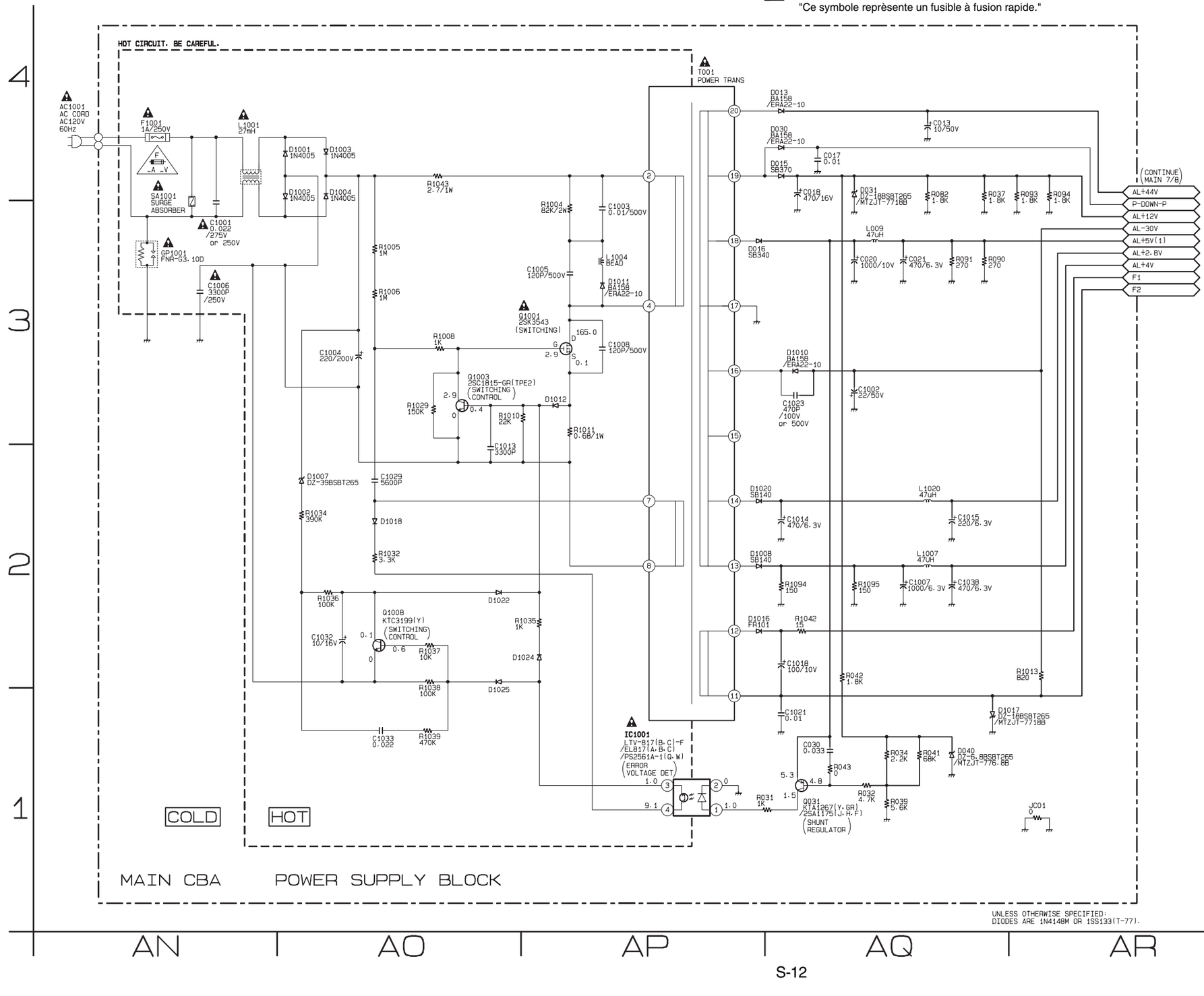


S-11 Main 8/8 Schematic Diagram

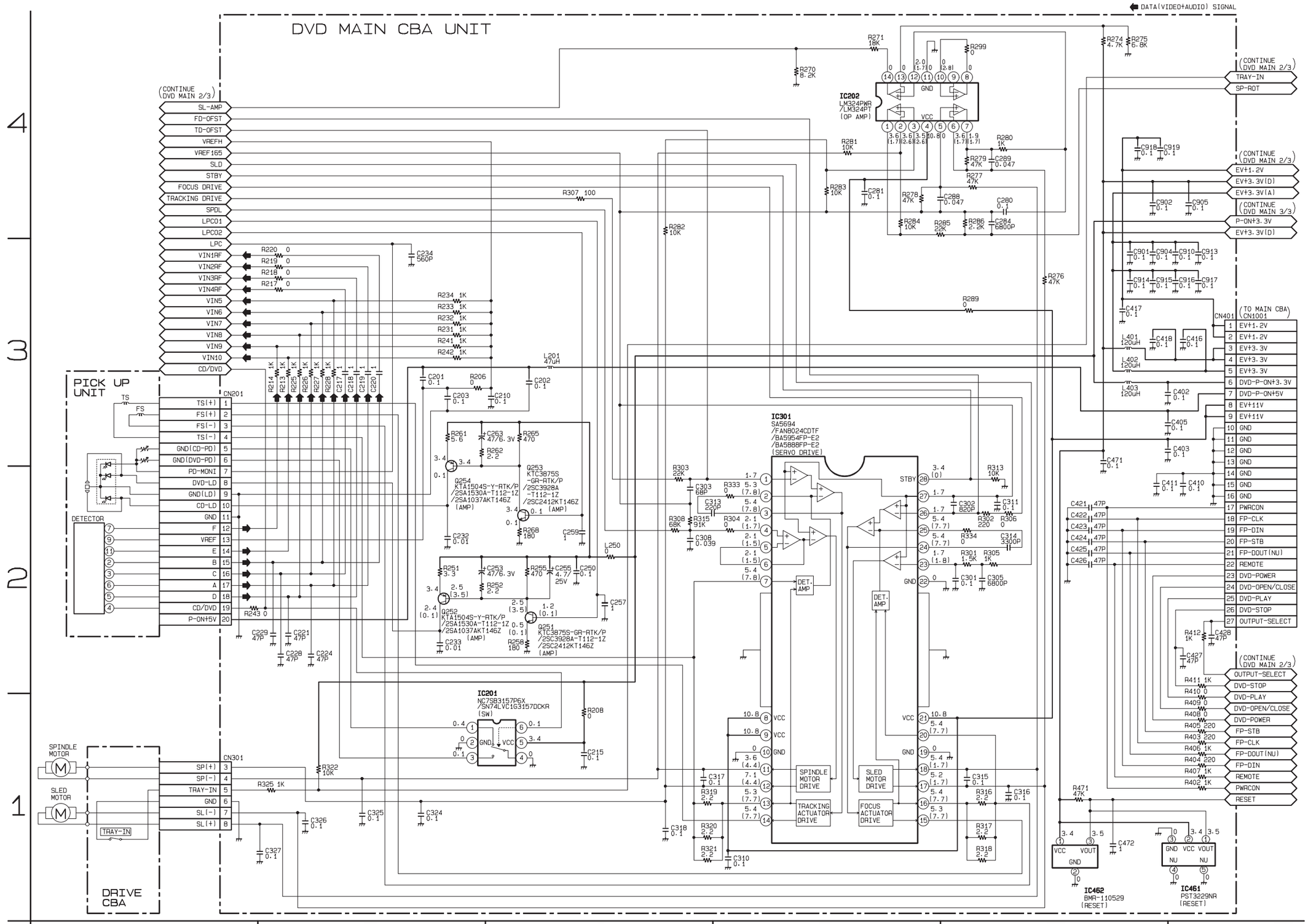
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in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

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MÊME TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

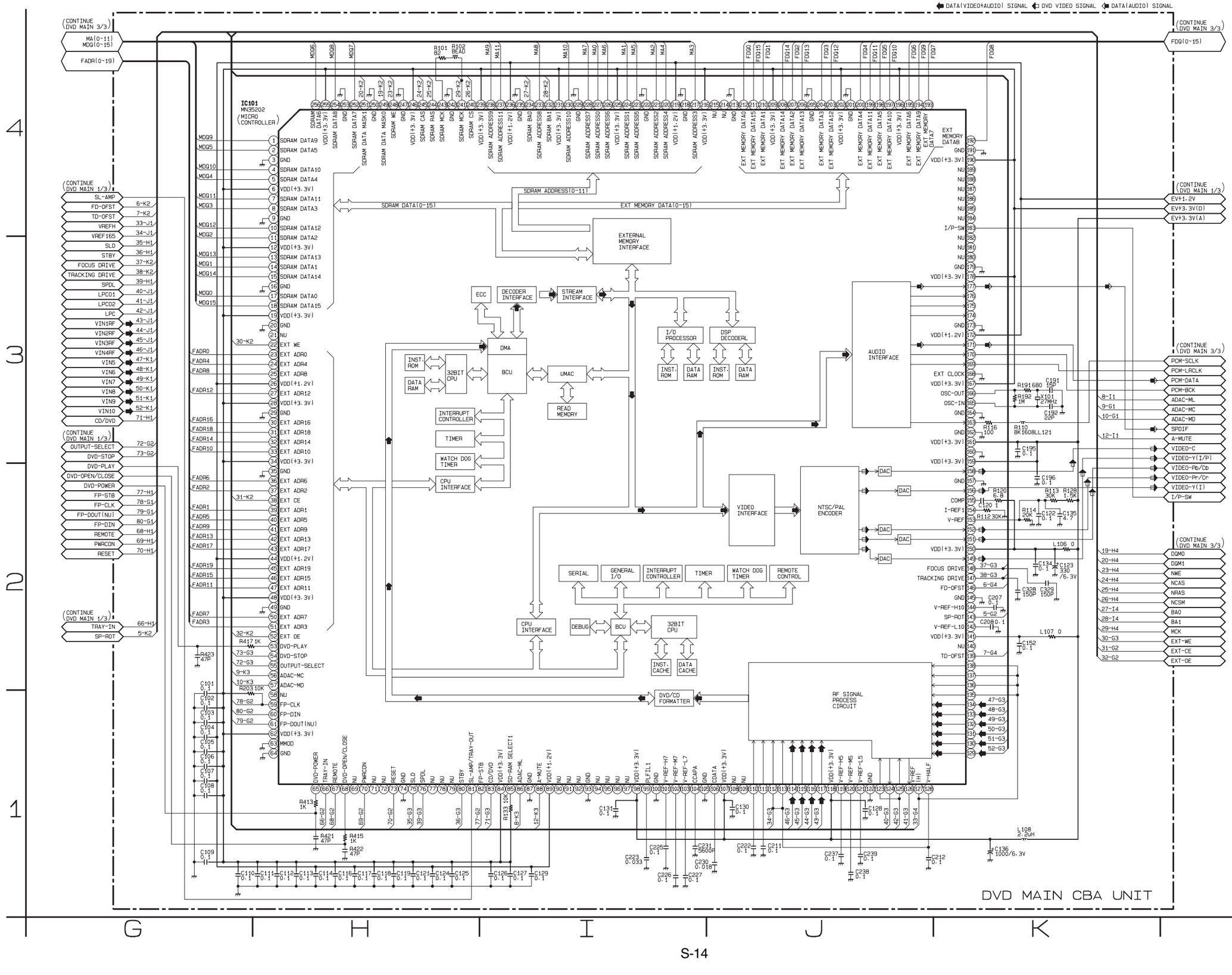
NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.



S-12 DVD Main 1/3 Schematic Diagram



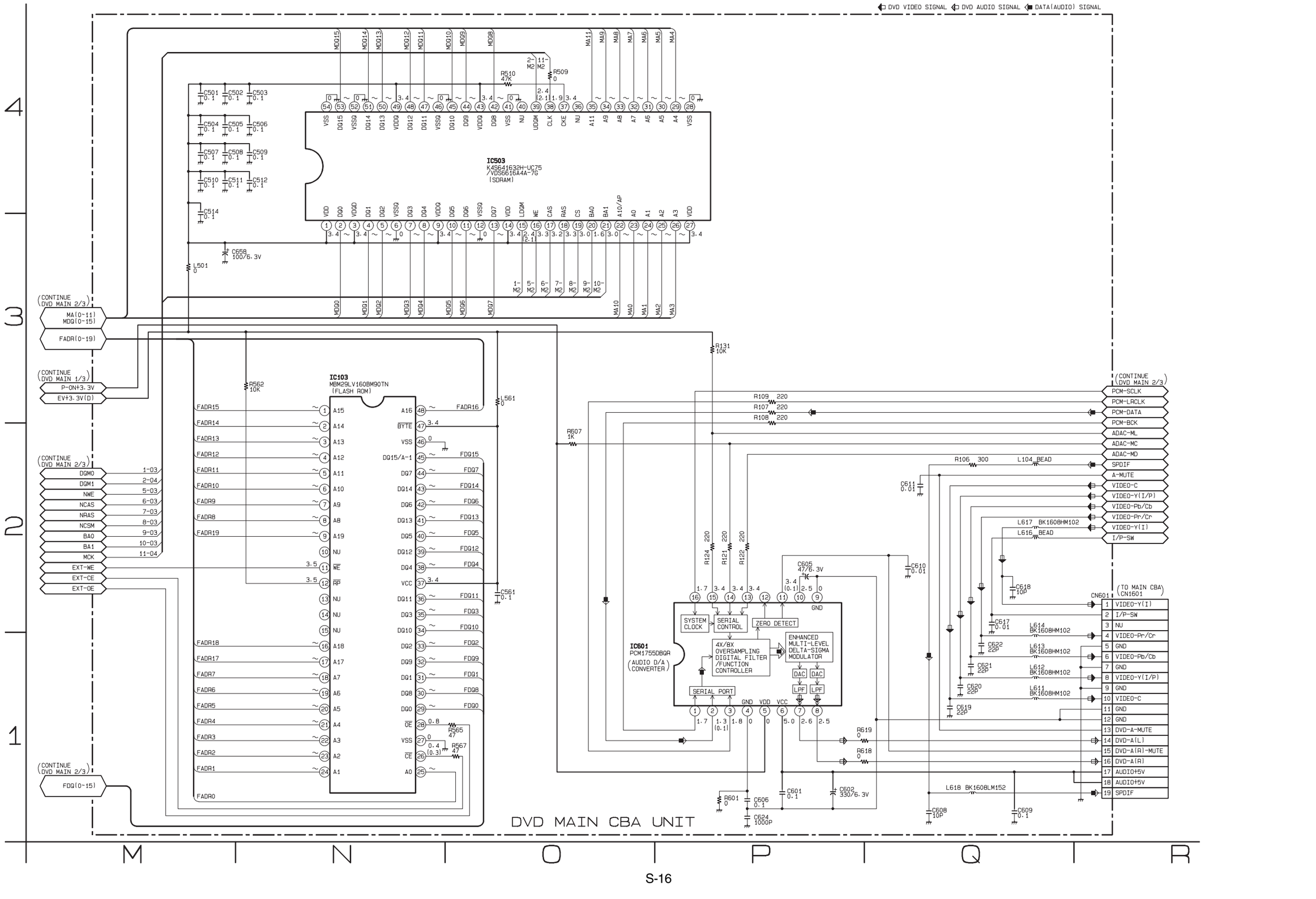
S-13 DVD Main 2/3 Schematic Diagram



S-14 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	~	~	33	~	~	65	0	0	97	-----	-----	129	2.3	2.3	161	3.4	3.4	193	~	~	225	3.4	3.4
2	~	~	34	3.4	3.4	66	3.4	3.5	98	3.4	3.4	130	2.3	2.3	162	0	0	194	~	~	226	~	~
3	0	0	35	0	0	67	3.2	3.2	99	0.9	0.8	131	2.3	2.3	163	1.8	1.8	195	~	~	227	~	~
4	~	~	36	~	~	68	0	0	100	0	0	132	2.4	2.3	164	0	0	196	3.4	3.4	228	~	~
5	~	~	37	~	~	69	-----	-----	101	2.4	2.4	133	2.4	2.4	165	1.7	1.8	197	~	~	229	0	0
6	3.4	3.4	38	0.4	0.3	70	3.4	3.4	102	2.2	2.2	134	2.4	2.4	166	1.7	1.7	198	~	~	230	~	~
7	~	~	39	~	~	71	-----	-----	103	1.9	1.9	135	2.3	2.3	167	3.4	3.4	199	~	~	231	3.4	3.4
8	~	~	40	~	~	72	-----	-----	104	0.4	0.3	136	2.3	2.3	168	0	0	200	~	~	232	1.3	1.6
9	0	0	41	~	~	73	3.4	3.4	105	0	0	137	2.3	2.3	169	1.8	1.8	201	0	0	233	~	~
10	~	~	42	~	~	74	0	0	106	1.7	1.7	138	2.3	2.3	170	1.7	1.7	202	3.4	3.4	234	1.9	2.3
11	~	~	43	~	~	75	1.7	1.8	107	3.4	3.4	139	1.7	1.7	171	1.3	0.1	203	~	~	235	0	0
12	3.4	3.4	44	1.3	1.3	76	2.3	1.8	108	-----	-----	140	-----	-----	172	1.3	1.3	204	~	~	236	1.3	1.3
13	~	~	45	~	~	77	-----	-----	109	-----	-----	141	3.4	3.4	173	0	0	205	0	0	237	~	~
14	~	~	46	~	~	78	-----	-----	110	1.9	1.9	142	1.3	1.3	174	-----	-----	206	~	~	238	~	~
15	~	~	47	~	~	79	-----	-----	111	1.9	1.9	143	2.1	1.7	175	-----	-----	207	~	~	239	3.4	3.4
16	0	0	48	3.4	3.4	80	3.4	0.1	112	1.7	1.7	144	2.2	2.2	176	-----	-----	208	~	~	240	3.4	3.3
17	~	~	49	0	0	81	0.1	0.1	113	1.7	1.7	145	0	0	177	1.8	1.7	209	3.4	3.4	241	1.9	1.9
18	~	~	50	~	~	82	2.8	2.8	114	1.7	1.7	146	1.7	1.7	178	3.4	3.5	210	~	~	242	0	0
19	3.4	3.4	51	~	~	83	0.1	0.1	115	1.7	1.7	147	1.8	1.7	179	0	0	211	~	~	243	1.9	1.9
20	0	0	52	0.8	0.8	84	3.4	3.4	116	1.7	1.7	148	1.7	1.7	180	-----	-----	212	~	~	244	3.4	3.3
21	-----	-----	53	0	0	85	0.1	0.1	117	1.7	1.7	149	0.6	0.5	181	-----	-----	213	0	0	245	3.4	3.4
22	3.5	3.5	54	0	0	86	3.6	3.4	118	3.4	3.4	150	3.4	3.4	182	-----	-----	214	-----	-----	246	3.4	3.4
23	~	~	55	1.4	1.4	87	0	0	119	2.0	2.0	151	0.5	0.6	183	3.5	3.5	215	-----	-----	247	0	0
24	~	~	56	3.4	3.4	88	3.5	0.1	120	1.7	1.7	152	0.5	0.4	184	-----	-----	216	3.4	3.4	248	3.3	3.4
25	~	~	57	3.5	3.5	89	1.3	1.3	121	1.5	1.5	153	1.4	1.3	185	-----	-----	217	~	~	249	3.2	3
26	1.3	1.3	58	-----	-----	90	-----	-----	122	0	0	154	1.4	1.3	186	-----	-----	218	0	0	250	0	0
27	~	~	59	3.4	3.4	91	-----	-----	123	0.3	0.1	155	2.4	2.4	187	-----	-----	219	1.3	1.3	251	3.2	3.0
28	3.4	3.4	60	3.4	3.4	92	-----	-----	124	1.2	0.1	156	3.4	3.4	188	-----	-----	220	~	~	252	~	~
29	0	0	61	3.5	3.5	93	0	0	125	0.3	0.1	157	0	0	189	-----	-----	221	~	~	253	0	0
30	~	~	62	3.4	3.4	94	-----	-----	126	0.1	0.1	158	0.9	0.9	190	3.4	3.5	222	0	0	254	~	~
31	~	~	63	0	0	95	-----	-----	127	2.3	2.3	159	3.4	3.4	191	0	0	223	~	~	255	3.4	3.4
32	~	~	64	0	0	96	-----	-----	128	1.7	1.7	160	0	0	192	~	~	224	~	~	256	~	~

S-15 DVD Main 3/3 Schematic Diagram



S-16 Waveforms

NOTE:

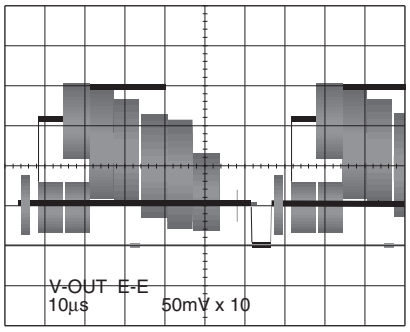
Input

VCR: COLOR BAR SIGNAL
(WF1~WF3)

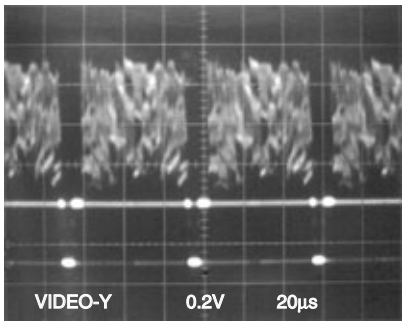
DVD: POWER ON (STOP) MODE
(WF4~WF6)

CD: 1kHz PLAY
(WF7~WF9)

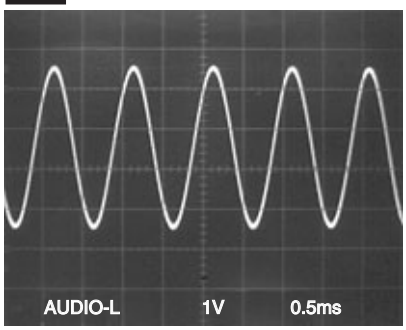
WF 1 TP751



WF4 Pin 8 of CN1601

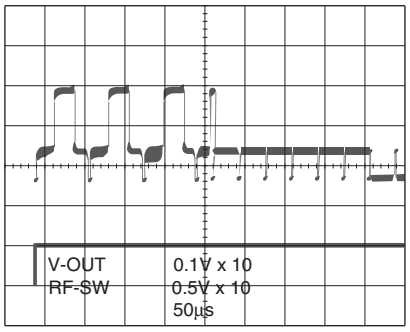


WF7 Pin 14 of CN1601

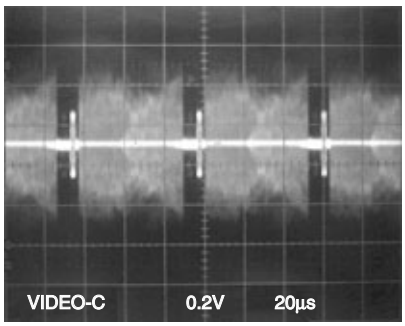


WF1 UPPER TP751

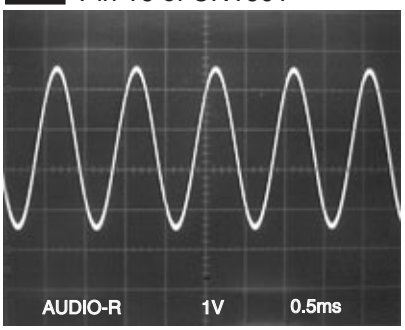
WF2 LOWER TP302



WF5 Pin 10 of CN1601

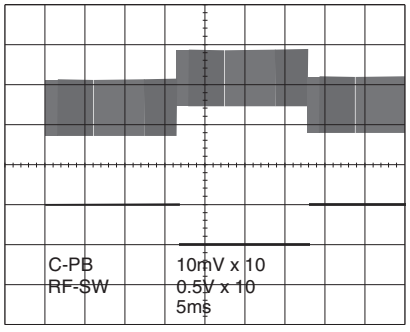


WF8 Pin 16 of CN1601

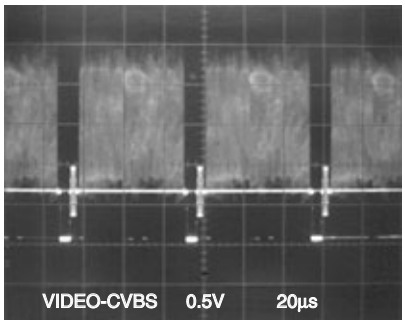


WF3 UPPER TP301

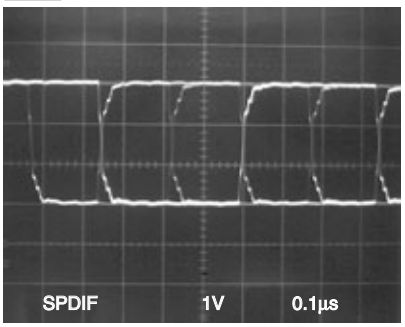
WF2 LOWER TP302



WF6 Pin 6 of IC1403



WF9 Pin 19 of CN1601



C CIRCUIT BOARD DIAGRAMS

C-1 Main CBA, Sensor CBA, DVD Open/Close CBA, Power SW CBA Top View

CAUTION

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MÊME TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

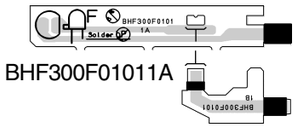
CAUTION !

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.

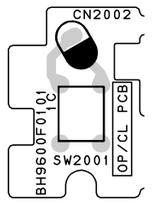
BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.

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

Sensor CBA Top View

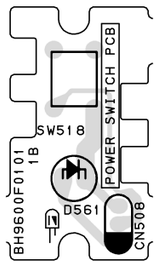


DVD Open/Close CBA Top View

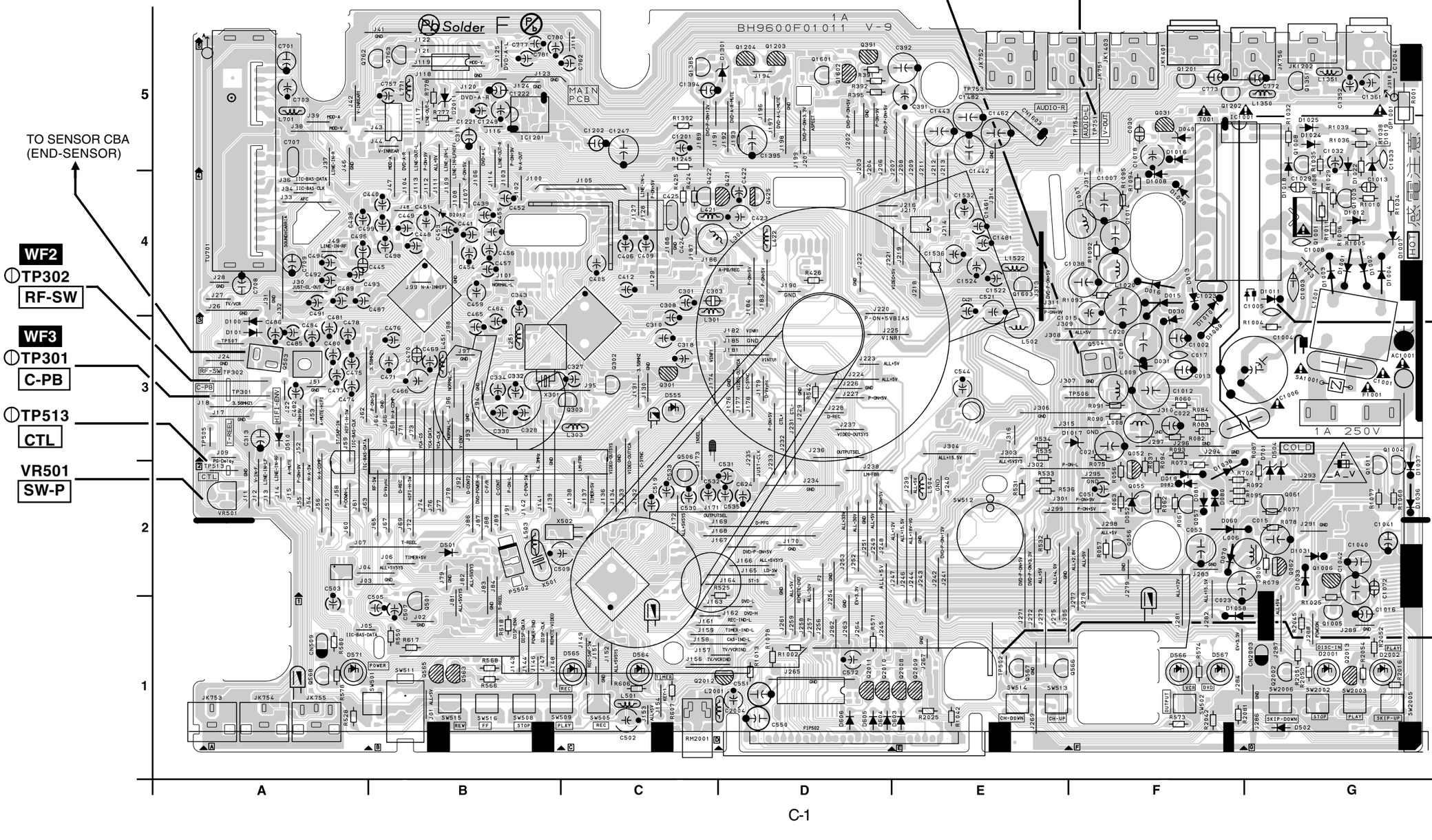


BH9600F01011C

Power SW CBA Top View



BH9600F01011B



C-2 Main CBA Bottom View

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MÊME TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

"This symbol means fast operating fuse."
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CAUTION !
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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.
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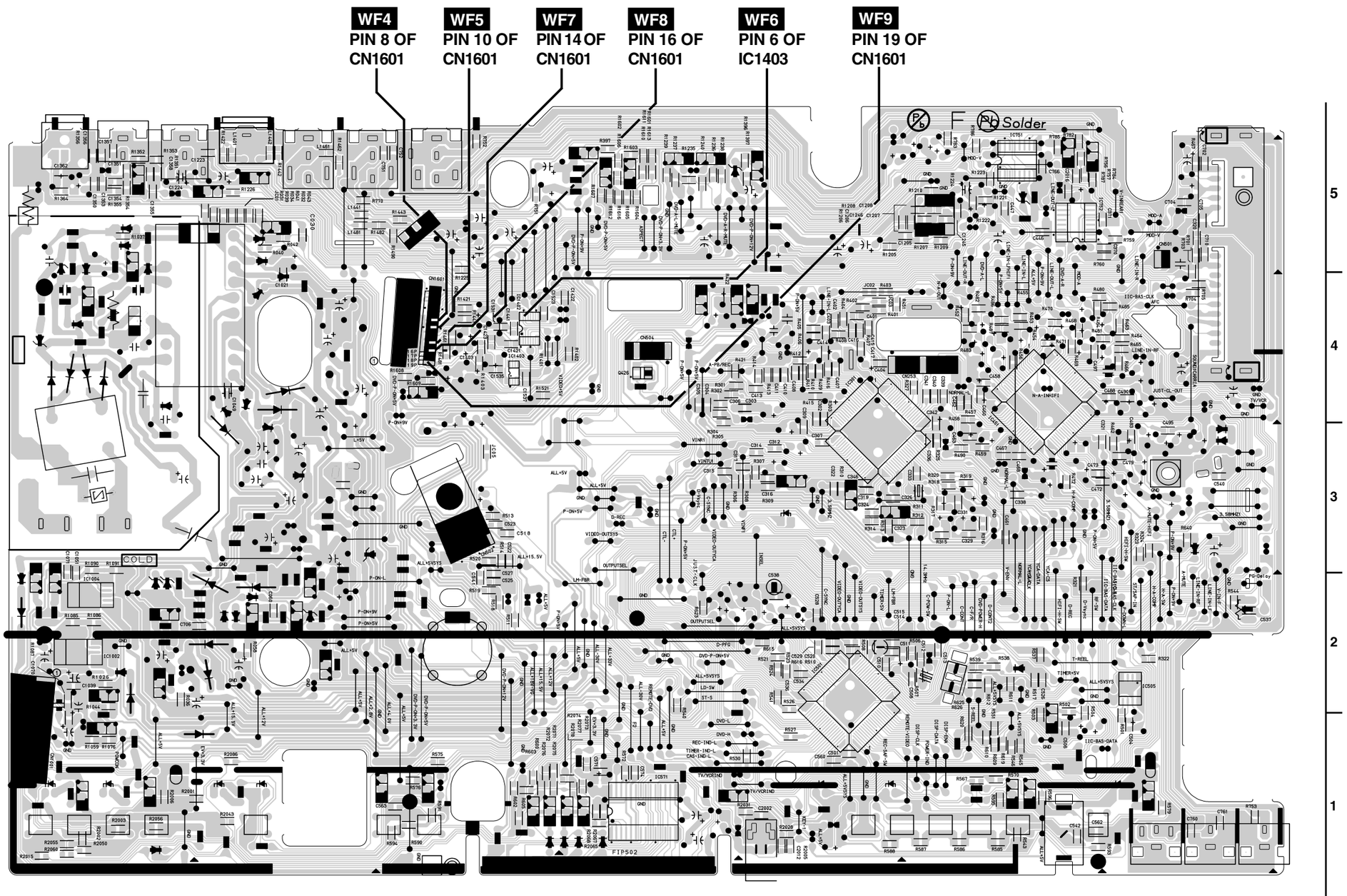
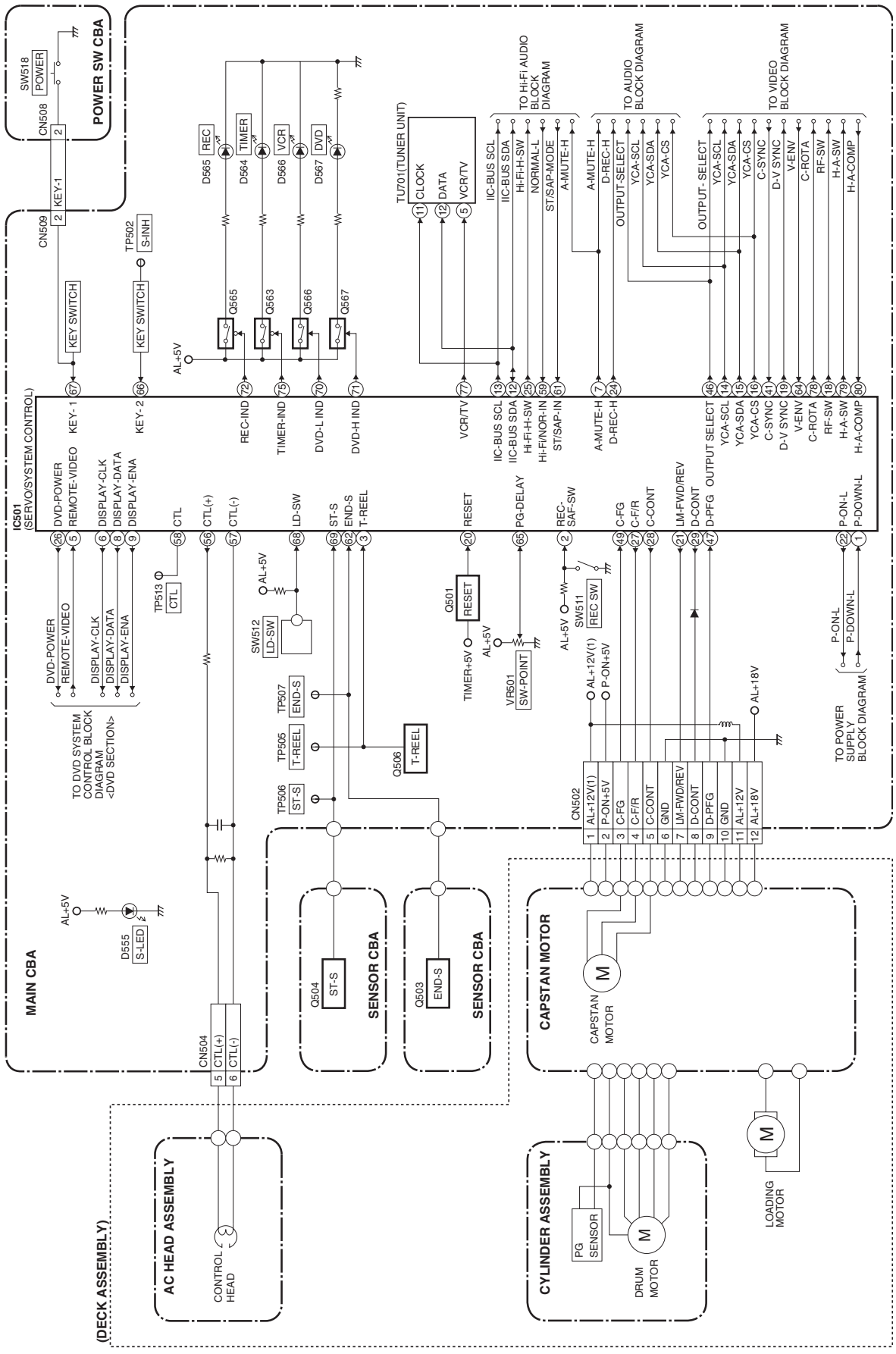
BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.

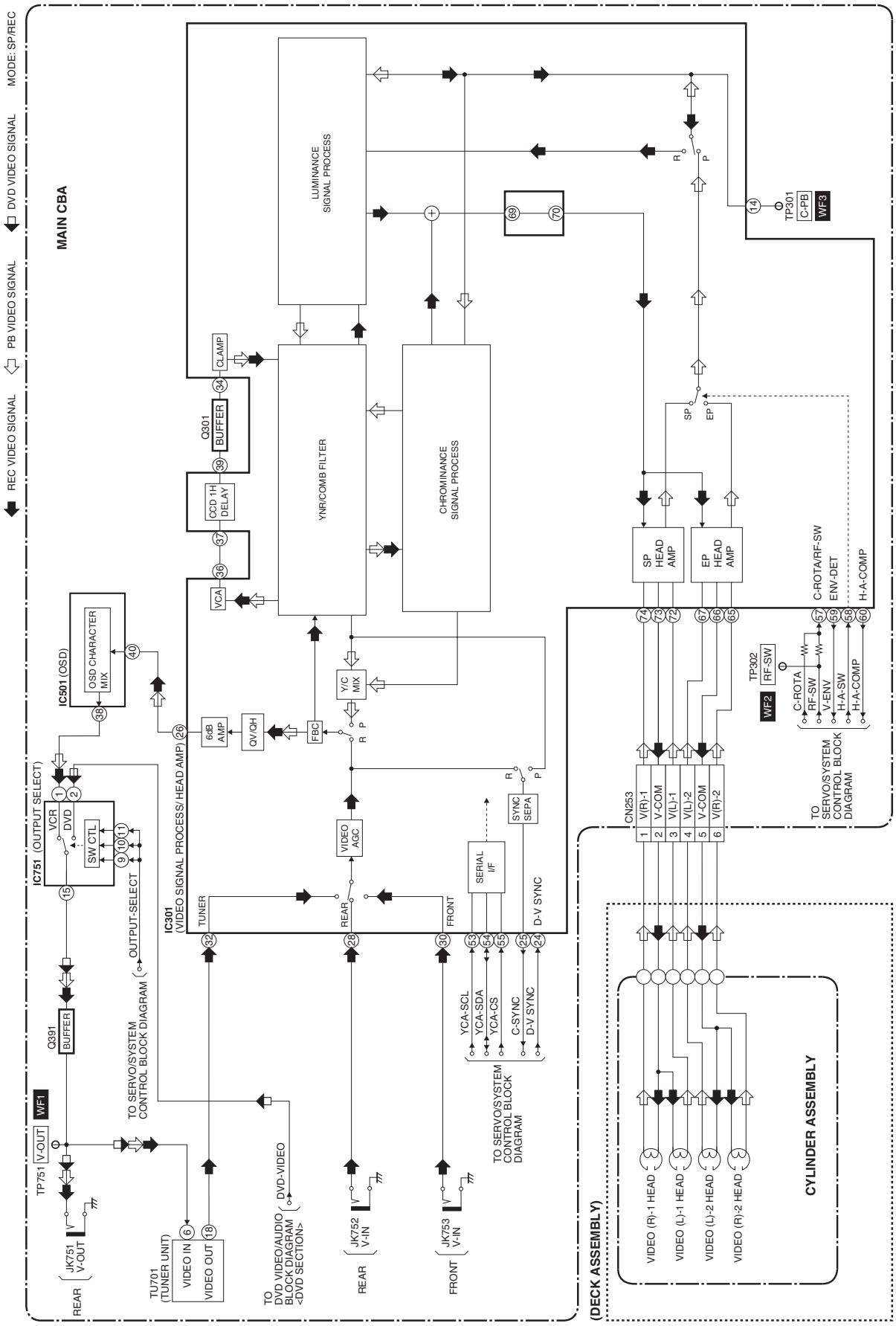
NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.



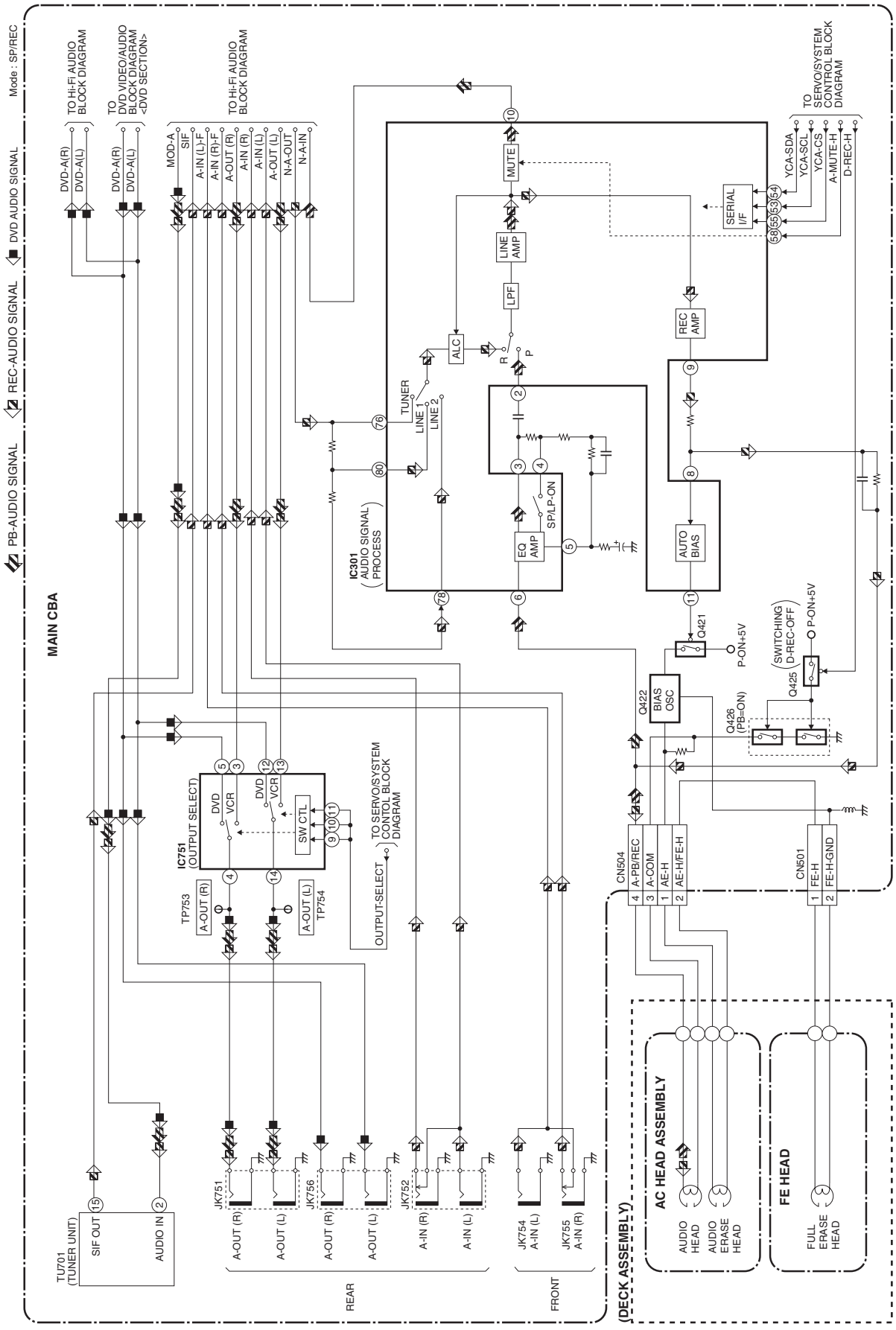
B BLOCK DIAGRAMS
B-1 Servo / System Control Block Diagram



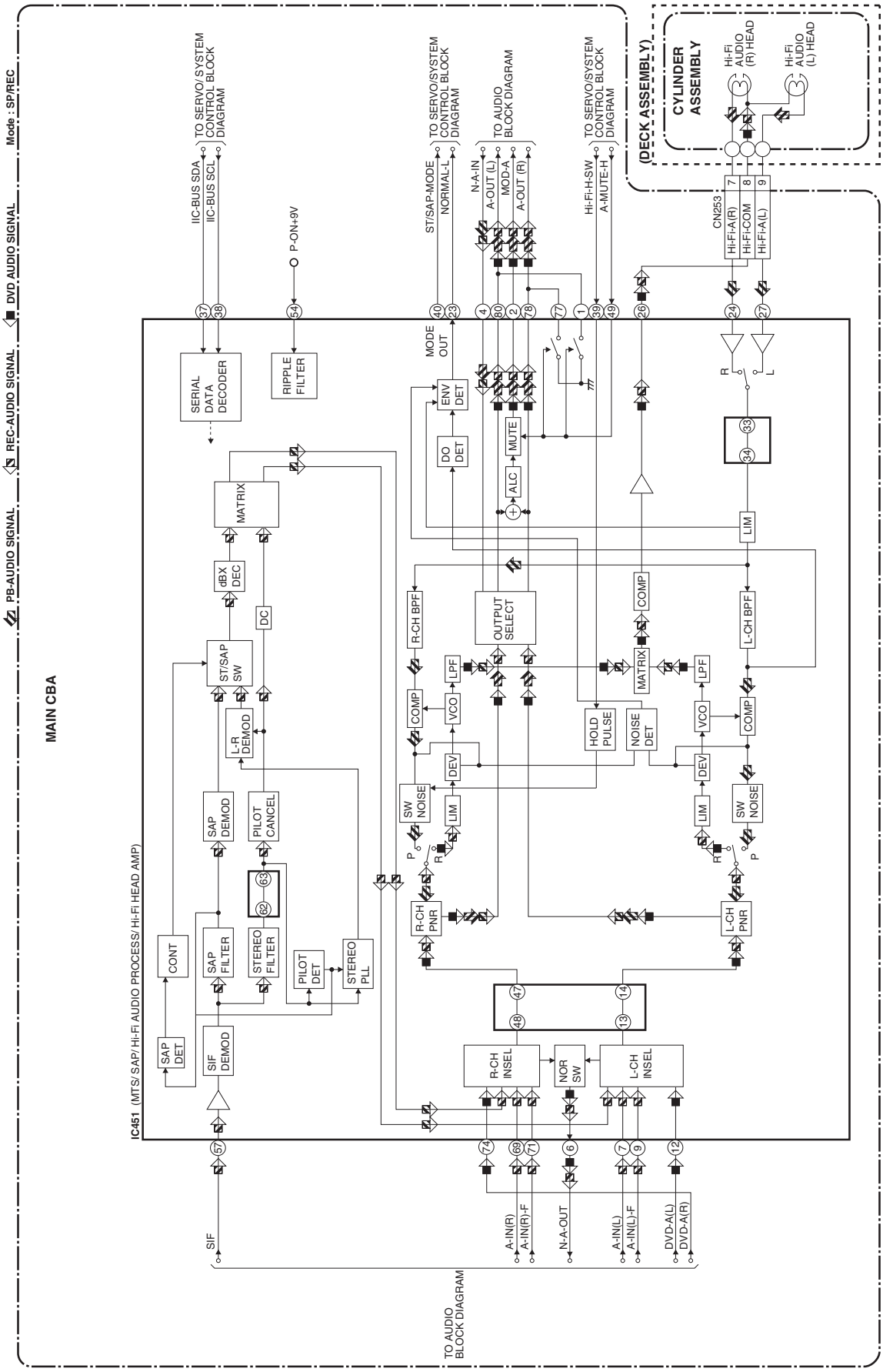
B-2 Video Block Diagram



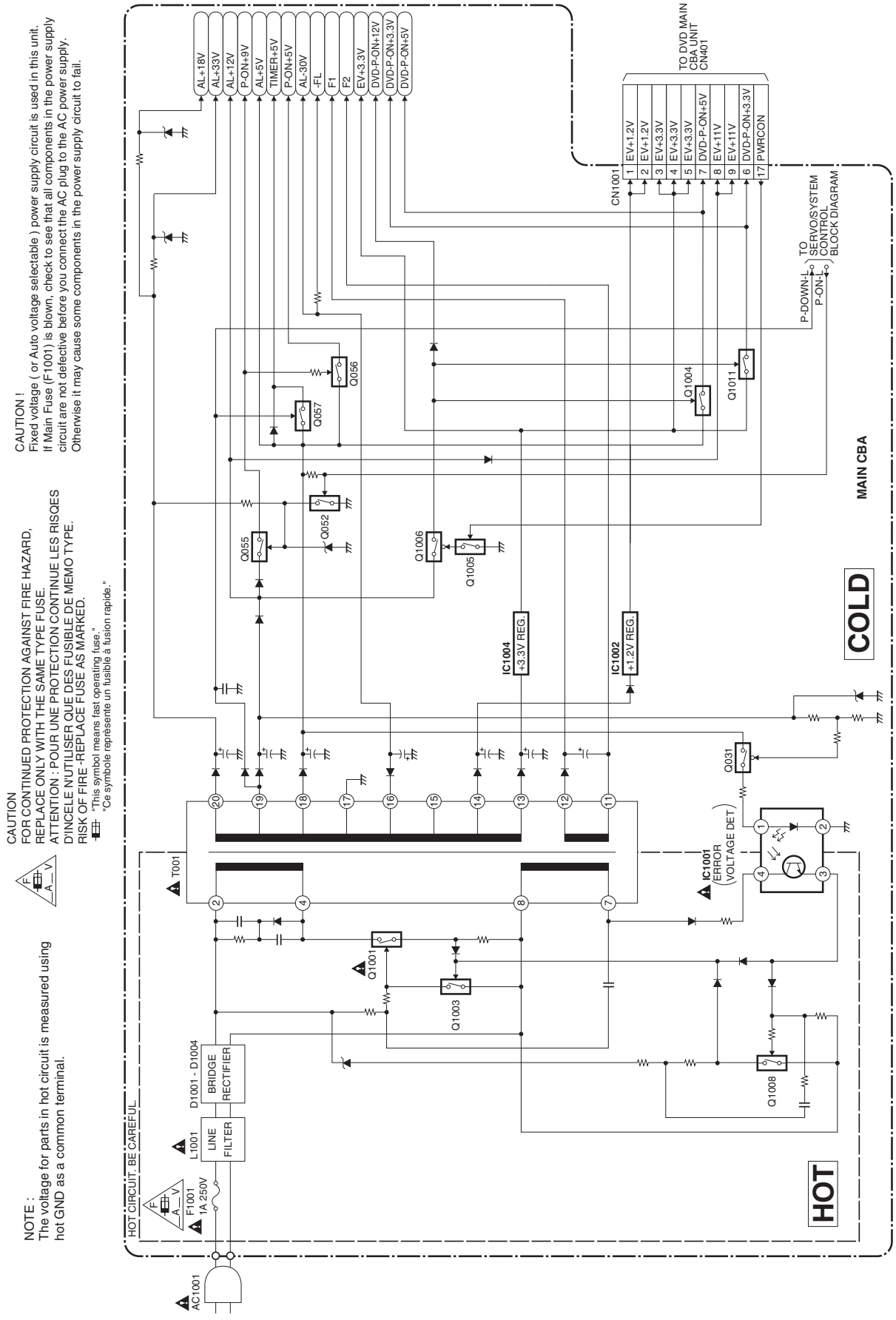
B-3 Audio Block Diagram



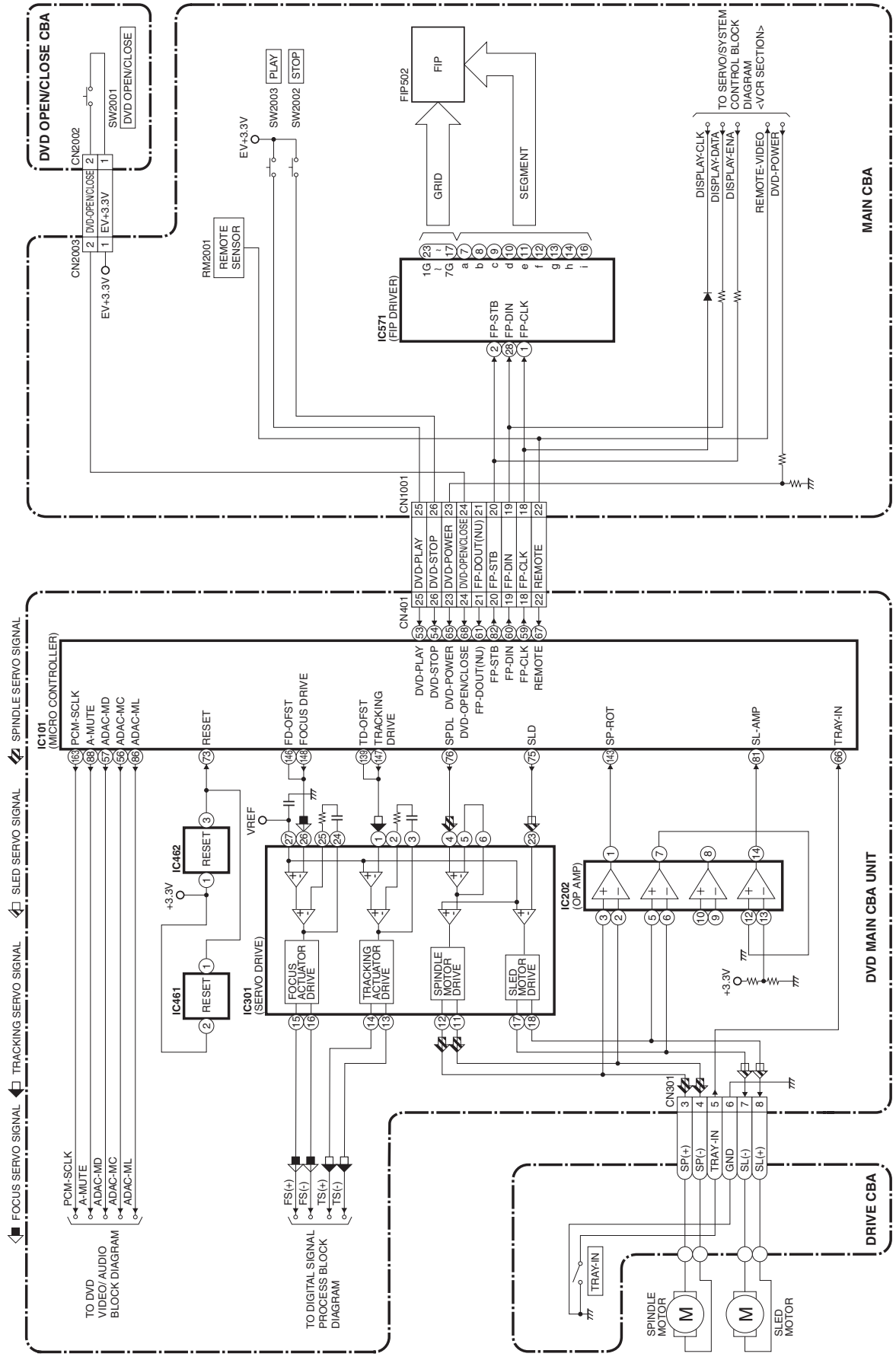
B-4 Hi-Fi Audio Block Diagram



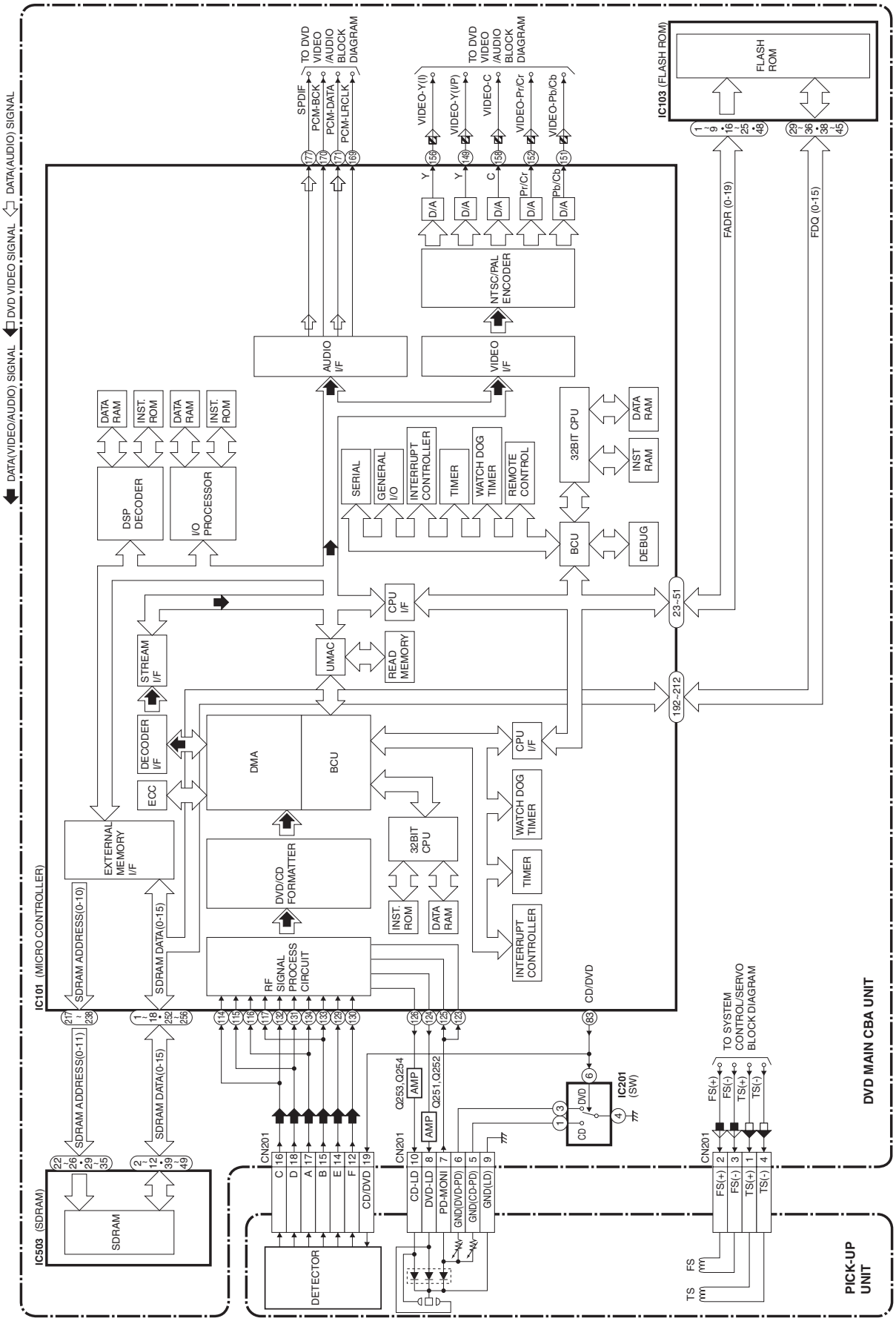
B-5 Power Supply Block Diagram



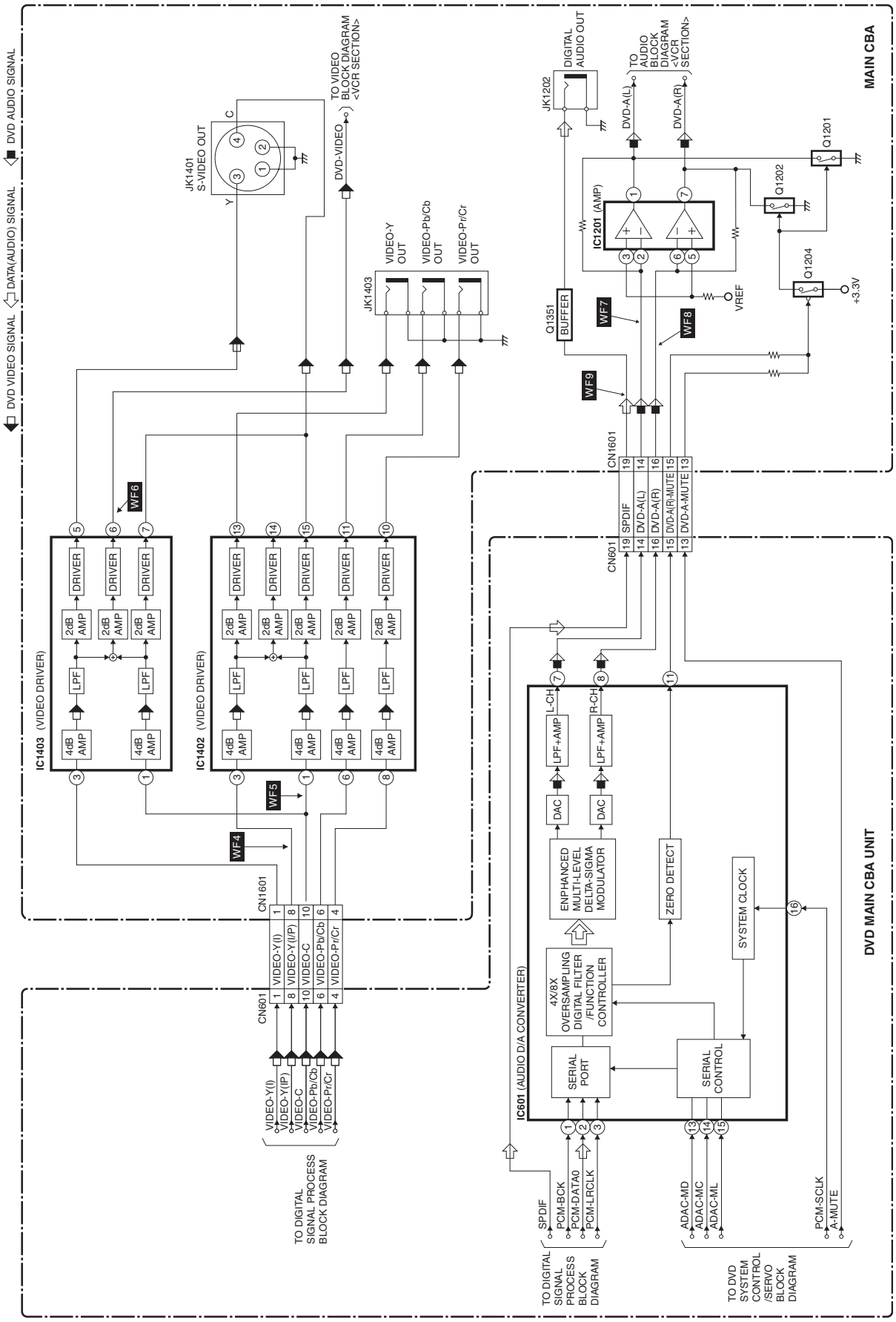
B-6 DVD System Control / Servo Block Diagram



B-7 Digital Signal Process Block Diagram



B-8 DVD Video / Audio Block Diagram



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