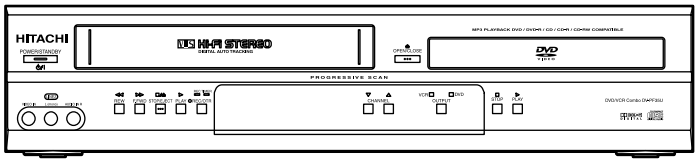
HITACHI

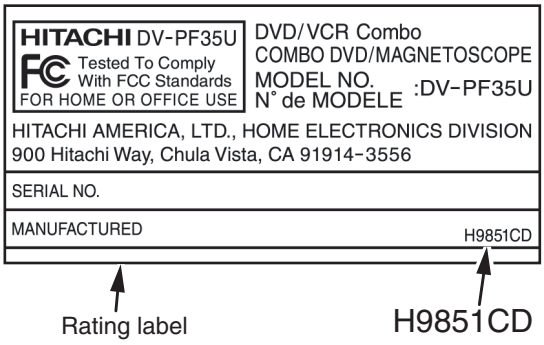
TK | No. 0508E

SERVICE MANUAL

DV-PF35U



This service manual is for DV-PF35U USA model and DV-PF35U Canada model.
For DV-PF35U Canada model, the letter (H9851CD) is printed on rating label in the rear.
When servicing, refer to the rating label illustration at right.



DO NOT RESELL OR DIVERT IMPROPERLY.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

DVD PLAYER & VIDEO CASSETTE RECORDER

April 2005 Digital Media Division, Yokohama

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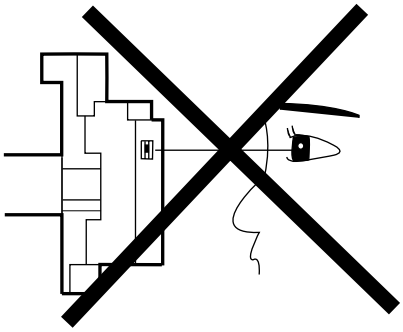
1 CAUTIONS FOR SAFETY IN PERFORMING REPAIR

1-1 LASER BEAM SAFETY PRECAUTIONS

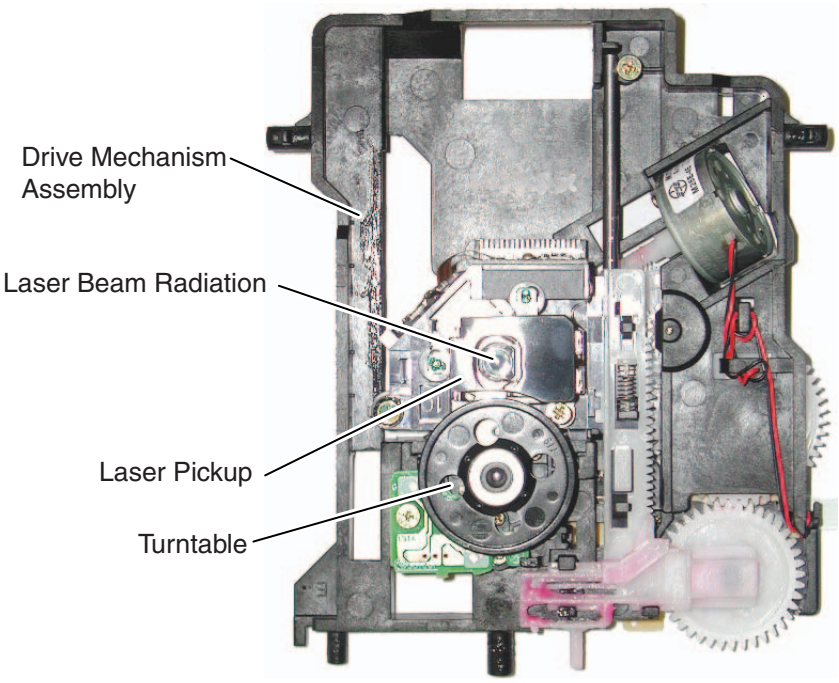
This DVD player uses a pickup that emits a laser beam.



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.

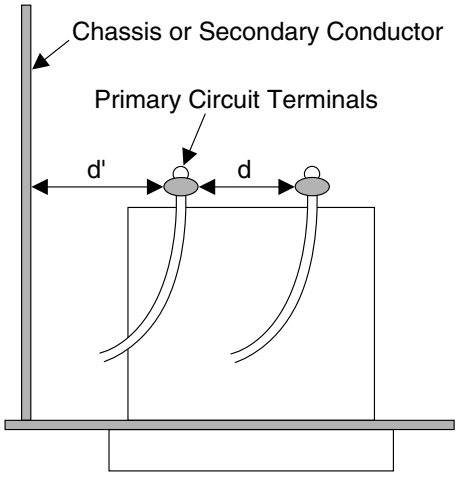


Fig. 1

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.

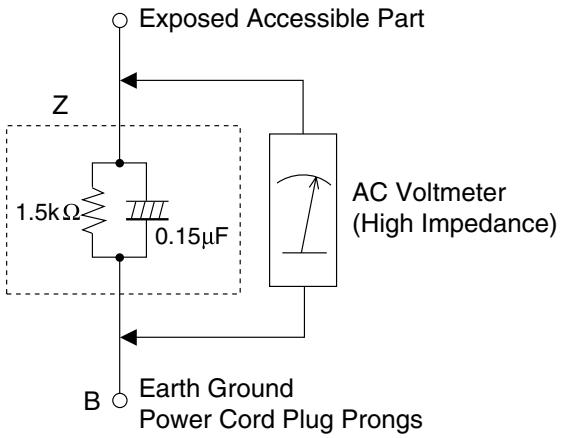


Fig. 2

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

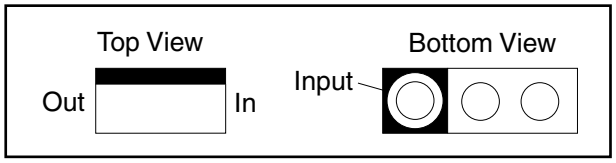
Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

1-3 STANDARD NOTES FOR SERVICING

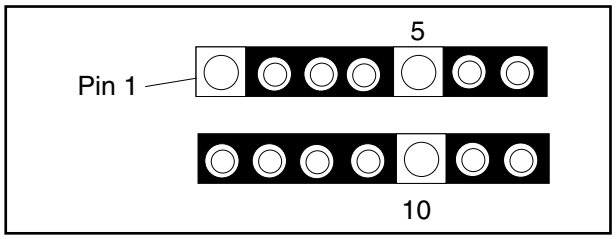
General Note: "CBA" is an abbreviation for "Circuit Board Assembly."

1-3-1 Circuit Board Indications

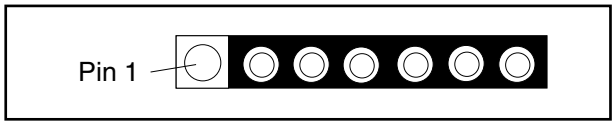
a. The output pin of the 3 pin Regulator ICs is indicated as shown.



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

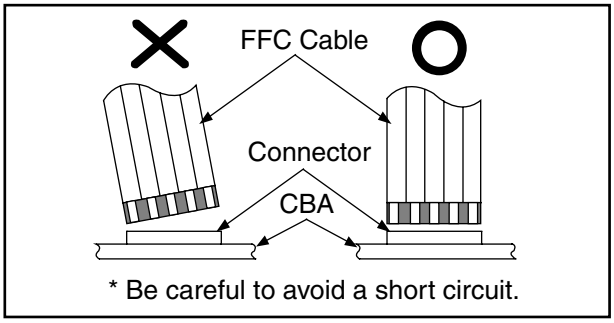


c. The 1st pin of every male connector is indicated as shown.



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 Instructions for Handling Semi-conductors

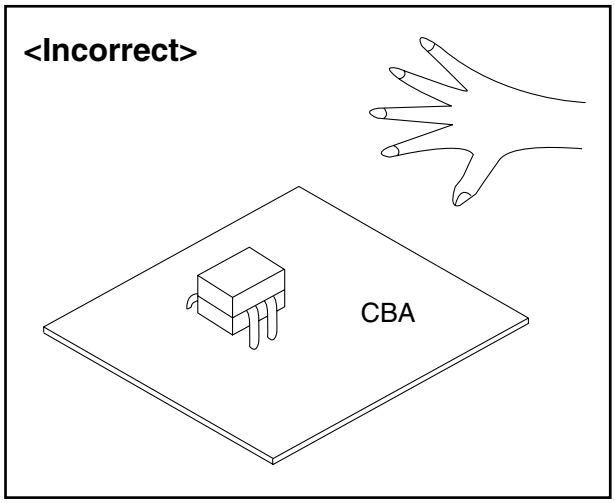
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

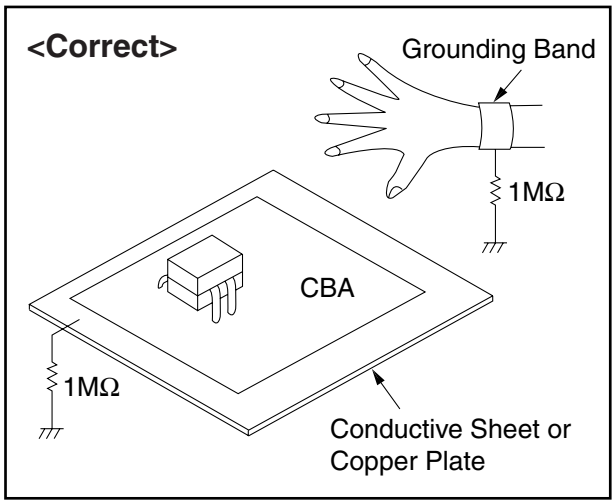
1. Ground for Human Body

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

(1) 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 Player with Video Cassette recorder

CONNECTIONS

Front panel:

Video input	One RCA connector
Audio input	Two RCA connectors (one left channel, one right channel)

Rear panel:

Audio input	Two RCA connectors (one left channel, one right channel)
Video input	One RCA connector
Audio output	Two RCA connectors (one left channel, one right channel)
Video output	One RCA connector
S-Video output	Mini DIN 4-pin jack (75 Ω)
Analog audio output	Two RCA connectors (one left channel, one right channel) 2 Vrms (47 kΩ)
Coaxial digital audio output	One pin jack, 500mVp-p (75 Ω)
Component output	Y output level: 1Vp-p (75Ω)
	C_B/P_B output level: 0.7Vp-p (75Ω)
	C_R/P_R output level: 0.7Vp-p (75Ω)
VHF/UHF antenna input/ output terminal	VHF/UHF set 75 Ω

[VCR section]

NUMBER OF VIDEO HEADS

4

VIDEO SIGNAL STANDARD

NTSC color system

AUDIO RECORDING SYSTEM

One stationary head for liner audio
Two rotary heads for Hi-Fi stereo

WOW AND FLUTTER

Below the measurement limitation (±0.001% W PEAK) (JEITA)

CHANNEL COVERAGE

VHF	2-13
UHF	14-69
CATV	1-125

TIMER BACKUP

30 seconds

[DVD section]

DISCS (PLAYBACK COMPATIBILITY)

DVD Video, Audio CD, CD-RW/R
DVD-RW/R

FREQUENCY RESPONSE

DVD (linear sound) :	20 Hz to 22 kHz (sample rate: 48 kHz)
	20 Hz to 44 kHz (sample rate: 96 kHz)
CD :	20 Hz to 20 kHz

SIGNAL-TO-NOISE RATIO (S/N RATIO)

CD : 100 dB (JEITA)

DYNAMIC RANGE

DVD (linear sound) :	90 dB
CD :	85 dB (JEITA)

TOTAL DISTORTION FACTOR

DVD :	1kHz	0.008% (JEITA)
CD :	1kHz	0.008% (JEITA)

POWER SOURCE

120V AC +/- 10%, 60Hz +/- 0.5%

POWER CONSUMPTION

21W (standby: 3.8W)

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

Approx. 6 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-PF35U	DV-PF74U
Dimensional	435(W) x 94(H) x 233(D)mm	←
Weight	2.7 kg	←
Tray Panel / FL Window	Clear	←
Color Front / Button	Silver / Silver	←
Remote Controller Model Name	DV-RMPF35U	DV-RMPF74U

2-2-2 VCR Section

O: Yes, ---: No, ← : Same as on left

ITEM		DV-PF35U	DV-PF74U
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-PF35U	DV-PF74U
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)	←
VIDEO	Video Out Mode NTSC/PAL/PAL60	O / --- / ---	←
	S-Video / Component / Composite	O / O / O	←
	Video D/A Converter	10bit	←
	Black Level Select	O	←
	Progressive Out	O	←
AUDIO	Audio D/A Converter	192kHz / 24bit	←
	Digital Audio Out Optical / Coaxial	--- / O	←
	DTS Digital Out	---	O
	Virtual Surround	O	←
	Dynamic Range Compression (Dolby Digital)	O	←
TRICK PLAY	Search Speed	2 to 100 (FORWARD/REWIND) (DVD: 2, 8, 20, 50, 100/CD: 2, 8, 30)	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	←
	x1.3, x0.8 Play with Audio	O	---
	Step Forward / Reverse	O / O	←
	Still Picture Select (Frame/Field)	Frame/Field/Auto	←
FEATURES	Disc Navigation	O	←
	DVD Zoom x2 / x4	O / O	←
	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)	←

2-3 COMPARISON OF MAIN CONTROL ICS

← : Same as on left

ITEM	DV-PF35U	DV-PF74U
MICRO CONTROLLER	MN35302 (IC101)	MN35202 (IC101)
FLASH ROM	MBM29LV160BE90TN-KE1 / ES29LV160DB-90TG / M29W160EB70N6E-PBF / MX29LV160BBTC-90G / M29W160EB70N6 (IC103)	MBM29LV160BM90TN (IC103)
SW	NC7SB3157P6X / SN74LVC1G3157DCKR (IC201)	←
OP AMP	LM324PWR / LM324PT (IC202)	←
SERVO DRIVE	BA5888FP-E2 / SA5694G / FAN8024CDTF-NL / SA5624G / SA5694 / FAN8024CDTF (IC301)	SA5694 / FAN8024CDTF / BA5954FP-E2 / BA5888FP-E2 (IC301)
RESET	PST3229NR (IC461)	←
	BMR-110529 (IC462)	←
SDRAM	K4S641632H-UC75 / P2V64S406TP-G6 (IC503)	K4S641632H-UC75 / VDS6616A4A-7G (IC503)
AUDIO D/A CONVERTER	PCM1782DBQR (IC601)	PCM1755DBQR (IC601)
VIDEO/AUDIO SIGNAL PROCESS/HEAD AMP	LA71205M-MPB-E (IC301)	←
MTS/SAP/Hi-Fi AUDIO PROCESS/Hi-Fi HEAD AMP	AN3663FBP-TV (IC451)	LA72670BM-MPB-E (IC451)
SERVO/SYSTEM CONTROL/ OSD	MN101D08DES (IC501)	MN101D08DFT (IC501)
FIP DRIVER	PT6313-S-TP / SC16313 / PT6313-S-TP(L) / SC16313G (IC571)	PT6313-S-TP (IC571)
OUTPUT SELECT	CD4053BNSR / CD4053BCSJX / TC4053BF(N) (IC751)	←
ERROR VOLTAGE DET	EL817A / EL817B / EL817C / PS2561A-1(Q) / PS2561A-1(W) / LTV-817B-F / LTV-817C-F (IC1001)	LTV-817B-F / LTV-817C-F / ELB817A / ELB817B / ELB817C / PS2561A-1(Q) / PS2561A-1(W) (IC1001)
1.2V REG	PQ1LAX95MSPQ (IC1002)	PQ070XZ5MZP (IC1002)
3.3V REG	PQ1LAX95MSPQ (IC1004)	BA3948FP-E2 (IC1004)
AMP	KIA4558P / RC4580IP / UTC4558 / KIA4558P/P (IC1201)	KIA4558P / NJM4558D (IC1201)
VIDEO DRIVER	MM1637XVBE (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.

Defective Cause	Indication
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

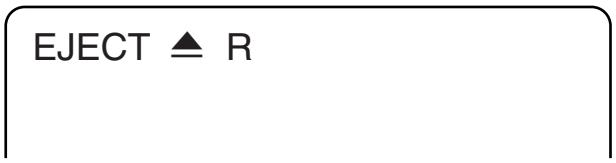


Fig. 1

When tape loading mechanism is not functioning correctly

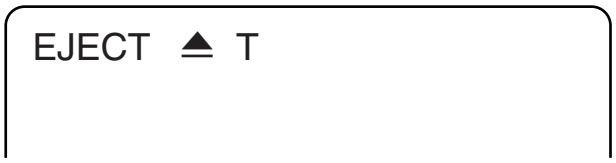


Fig. 2

When cassette loading mechanism is not functioning correctly

Fig. 3

When the drum is not working properly

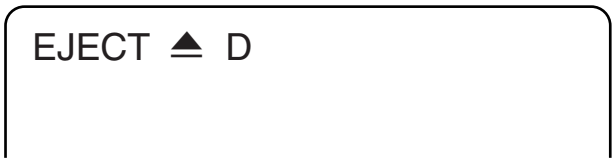
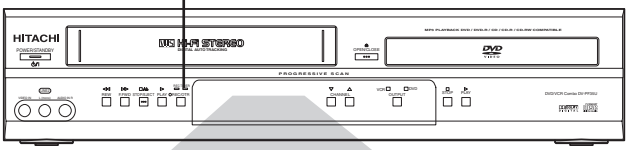


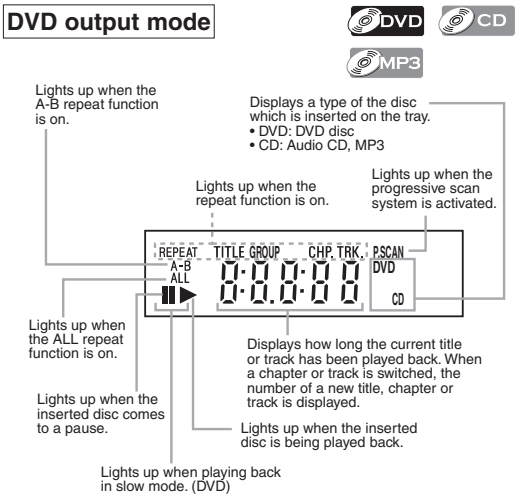
Fig. 4

2-6 OPERATING CONTROLS AND FUNCTIONS

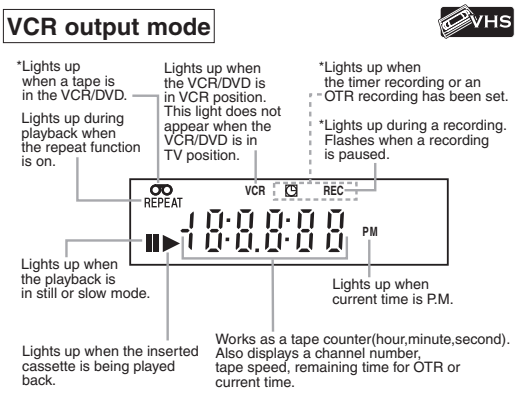


- - - - - -	No disc inserted / cannot read disc
OPEN	Opening the tray
CLOSE	Closing the tray
Load	Loading the disc
▶ 0:00:00 DVD	When a disc or tape is being played back

DVD output mode

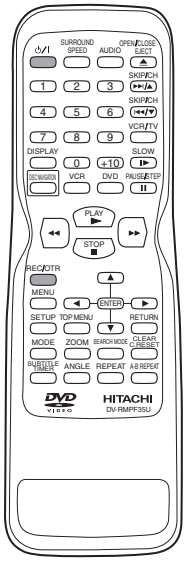


VCR output mode



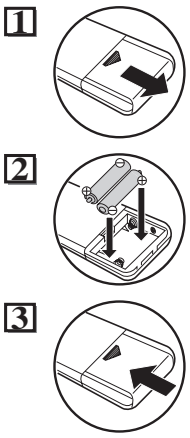
*** , and REC mark will disappear when you set VCR/DVD in DVD mode. However, the function indicated by each mark is still working.**

Remote Control



Installing the Batteries for the Remote Control

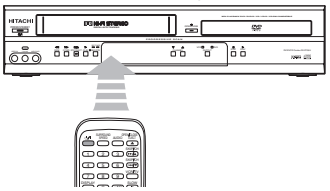
Install two AA batteries (supplied) matching the polarity indicated inside battery compartment of the remote control.



Keep in mind the following when using the remote control:

- Make sure that there is no obstacle between the remote control and the remote sensor on the unit.
- The maximum operable range as follows;

Beeline: approximately 23 feet (7m)
Either side of center: approximately 16 feet (5m) within 30 degrees
Above: approximately 16 feet (5m) within 15 degrees
Below: approximately 10 feet (3m) within 30 degrees



Button (Alphabetical order) / Disc/Tape	DVD mode		VCR mode
	DVD	CD MP3	VHS
1 2 3 / 4 5 6 / 7 8 9 / 0 +10	• To select a chapter or title directly	• To select a track directly	• To select a channel • The +10 button has no effect in VCR mode.
◀◀ ▶▶	• To search forward/backward through a disc • To begin slow forward/reverse playback during the pause mode	• To search forward/backward through a disc	• To forward/backward a tape
▲ ◀ ENTER ▶ ▼	• To move the cursor and determine its position	• To move the cursor and determine its position	• To select an item on the VCR Menu • To advance to the next VCR Menu • To go back one step during clock and timer setting
A-B REPEAT	• To repeat between your chosen point A and B	• To repeat between your chosen point A and B (CD)	—
ANGLE	• To select camera an angle on a disc (DVD-Video)	—	—
AUDIO	• To select an audio language on a disc	• To select STEREO, L-ch or R-ch (CD)	—
SKIP/CH ▶▶|/▲	• To skip chapters / titles	• To skip tracks	• To change channels • To adjust tracking manually during playback
SKIP/CH |◀◀/▼			
CLEAR C.RESET	• To clear the markers • To clear the numbers entered incorrectly • To cancel the point for A-B repeat.	• To clear the markers (CD) • To remove status number in program input • To clear the numbers entered incorrectly • To cancel the point for A-B repeat. (CD)	• To exit the VCR Menu • To reset the tape counter
DISC NAVIGATION	• To display the first scene of each chapter of the title	—	—
DISPLAY	• To display the current disc mode	• To display the current disc mode	• To display the current time, tape counter, and channel
DVD	• To select the DVD output mode • To activate the remote control in DVD mode	• To select the DVD output mode • To activate the remote control in DVD mode	—
MENU	• To call up the Menu on a disc	• To call up the file list (MP3)	• To call up the VCR Menu
MODE	• To set x1.3 and x0.8 Rapid Play with Voice off/x1.3/x0.8 • To set black level on/off	• To arrange the playback order or play back randomly	—
OPEN/CLOSE EJECT	• To open or close the disc tray	• To open or close the disc tray	• To eject the Video tape from the cassette compartment
PAUSE/STEP	• To pause disc playback • To advance playback frame by frame	• To pause disc playback	• To pause tape playback or recording • To advance playback frame by frame
PLAY	• To begin disc playback	• To begin disc playback	• To begin tape playback
⏻/I	• To turn on or off the unit	• To turn on or off the unit	• To turn on or off the unit
REC/OTR	—	—	• To start a recording or One Touch Recording
REPEAT	• To play back a chapter or title repeatedly	• To play back a track or disc repeatedly (CD) • To play a track, group or disc repeatedly (MP3)	—
RETURN	• To return to the previous operation on the DVD setup menu	• To return to the previous operation on the DVD setup menu	—
SEARCH MODE	• To search chapter / title / time / marker • To rapidly return to a location of disc	• To search track / time (CD) / marker (CD) • To rapidly return to a location of disc	• To call up the index or time search menu
SETUP	• To call up the DVD setup menu	• To call up the DVD setup menu	—
SLOW	—	—	• To view the tape in slow motion
SURROUND SPEED	• To set virtual surround on/off	• To set virtual surround on/off	• To select the recording speed
STOP	• To stop playback	• To stop playback	• To stop playback or recording
SUBTITLE TIMER	• To select a subtitle language on a disc	—	• To put the VCR into standby mode for a timer recording
TOP MENU	• To call up the Top Menu on a disc. (DVD-Video)	• To return to the top file of the highest hierarchy in the program and file list (MP3)	—
VCR	—	—	• To select the VCR output mode • To activate the remote control in VCR mode
VCR/TV	—	—	• To select VCR position or TV position
ZOOM	• To magnify the part of picture (x2/x4)	—	—

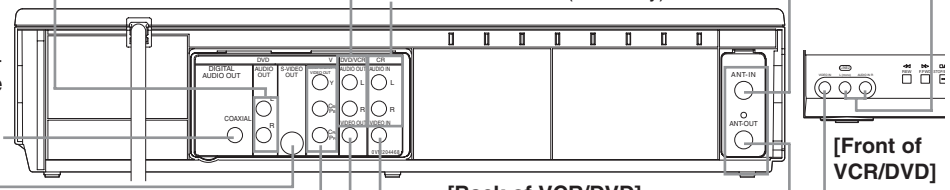
DVD ANALOG AUDIO OUT jacks
Connect the supplied Audio cables here through the Audio In jacks of a TV or other audio equipment. (DVD only)

DVD/VCR AUDIO OUT jacks
Connect the supplied Audio cable (red/white) here through the audio In jacks of a TV or other audio equipment.

AUDIO IN jacks
Connect Audio cables coming from the audio out jacks of a camcorder, another VCR, or an audio source here. (VCR only)

ANT IN jack
Connect your antenna or cable box here.

COAXIAL jack
Connect an optional coaxial digital Audio cable here through the coaxial digital audio in jack of a decoder or audio receiver. (DVD only)



[Back of VCR/DVD]

[Front of VCR/DVD]

S-VIDEO OUT jack
Connect an optional S-Video cable here through the S-Video in jack of a TV. (DVD only)

COMPONENT VIDEO OUT jacks
Connect optional component Video cable here through the component video in jacks of a TV. (DVD only)

DVD/VCR VIDEO OUT jack
Connect the supplied Video cable (yellow) here through the TV's video in jack.

VIDEO IN jack
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. (VCR only)

ANT OUT jack
Connect the supplied Round Coaxial cable to the antenna input jack on your TV.

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

The power cannot be turned on.

↓

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

↓ Yes

Is normal state restored when once unplugged power cord is plugged again after several seconds. — No → Check for lead or shor-circuiting of primary circuit component and service it if defective. (Q1001,Q1003,T001,D1001,D1002,D1003, D1004,D1011,C1003,C1005)

↓ Yes

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

↓ Yes

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

FLOW CHART NO.2

The fuse blows out.

↓

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

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

↓

After servicing, replace the fuse.

FLOW CHART NO.3

When the output voltage fluctuates.

↓

Does the secondary side photo coupler circuit operate normally? — No → Check the circuit and service it if defective. (IC1001, Q031, D031)

↓ Yes

Check the circuit and service it if defective. (IC1001, D1012, D1024)

FLOW CHART NO.4

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

↓

Check if there is short circuit on the rectifying diode and the circuit in each rectifying circuit of secondary side and service it if defective. (D013,D015,D016,D1008,D1010,D1016,D1020,IC1002,IC1004,Q055,Q056,Q063,Q1004,Q1006,Q1011)

FLOW CHART NO.5

-FL is not outputted.

↓

Is the supply voltage of -30V fed to the anode of D1010? — No → Check D1010 and their periphery, and service it if defective.

↓ Yes

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

FLOW CHART NO.6

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 Q063? — No → Check Q064, D062 and their periphery, and service it if defective.

↓ Yes

Replace Q063.

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(4) 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(4) 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. (It can not be done using the unit and the remote control unit.)

↓

Replace the DVD Main CBA.

↓

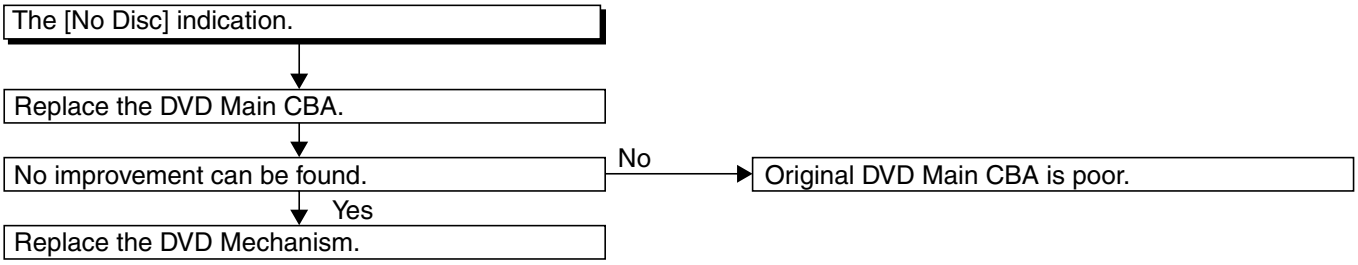
No improvement can be found.

No → Original DVD Main CBA is poor.

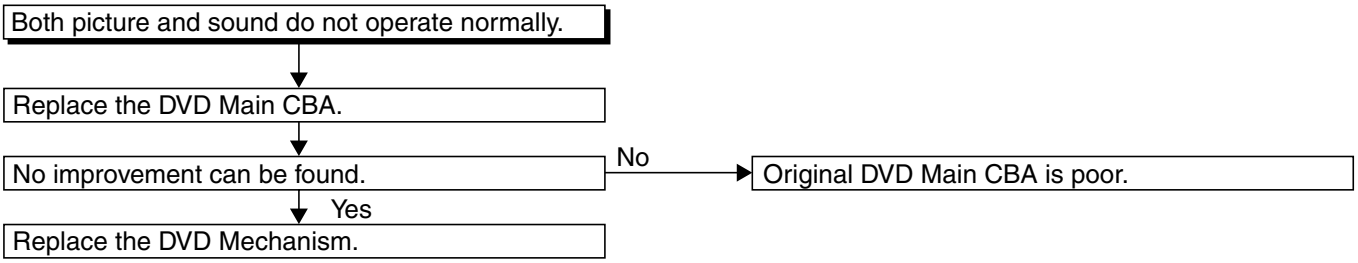
↓ Yes

Replace the DVD Mechanism.

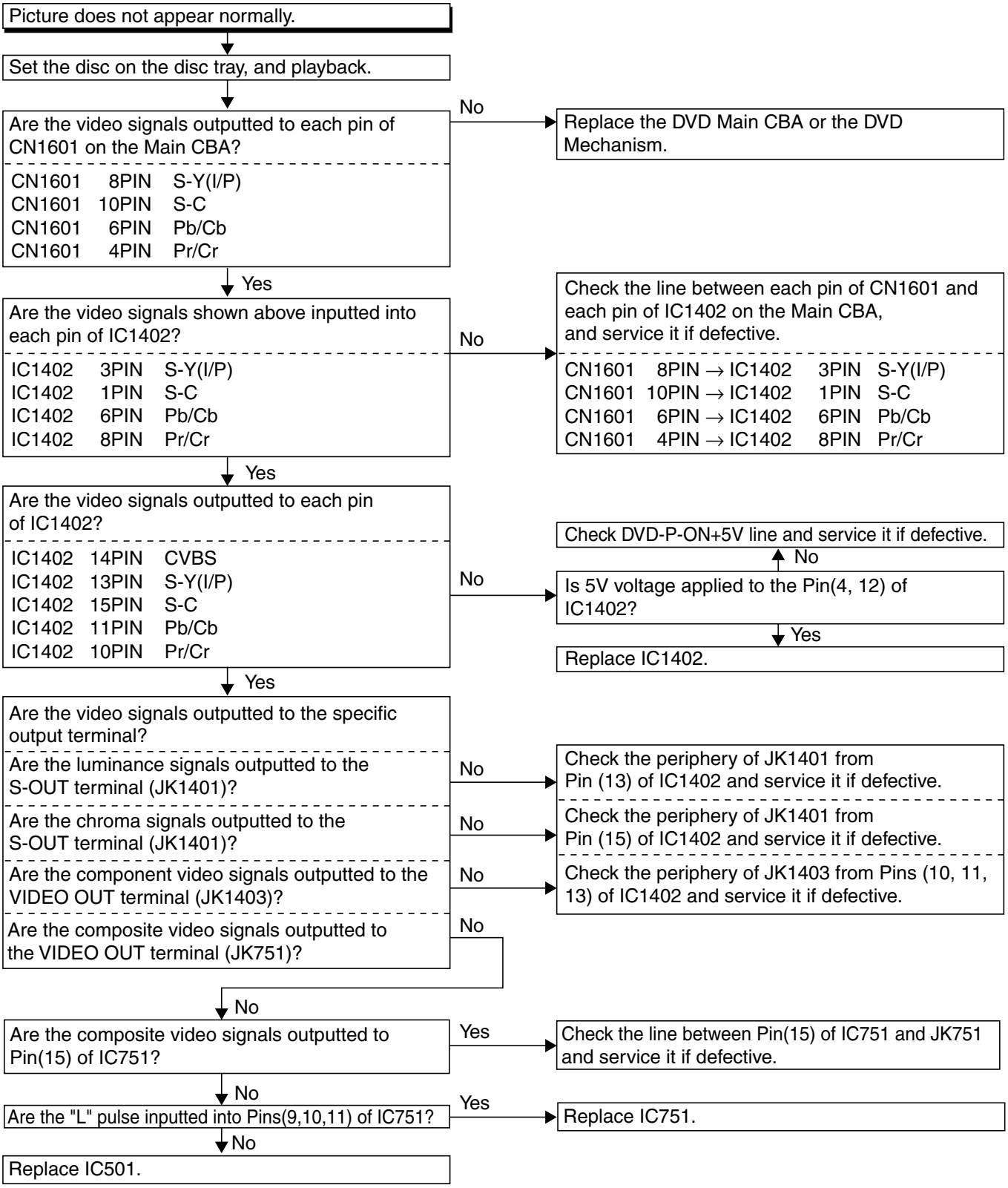
FLOW CHART NO.5



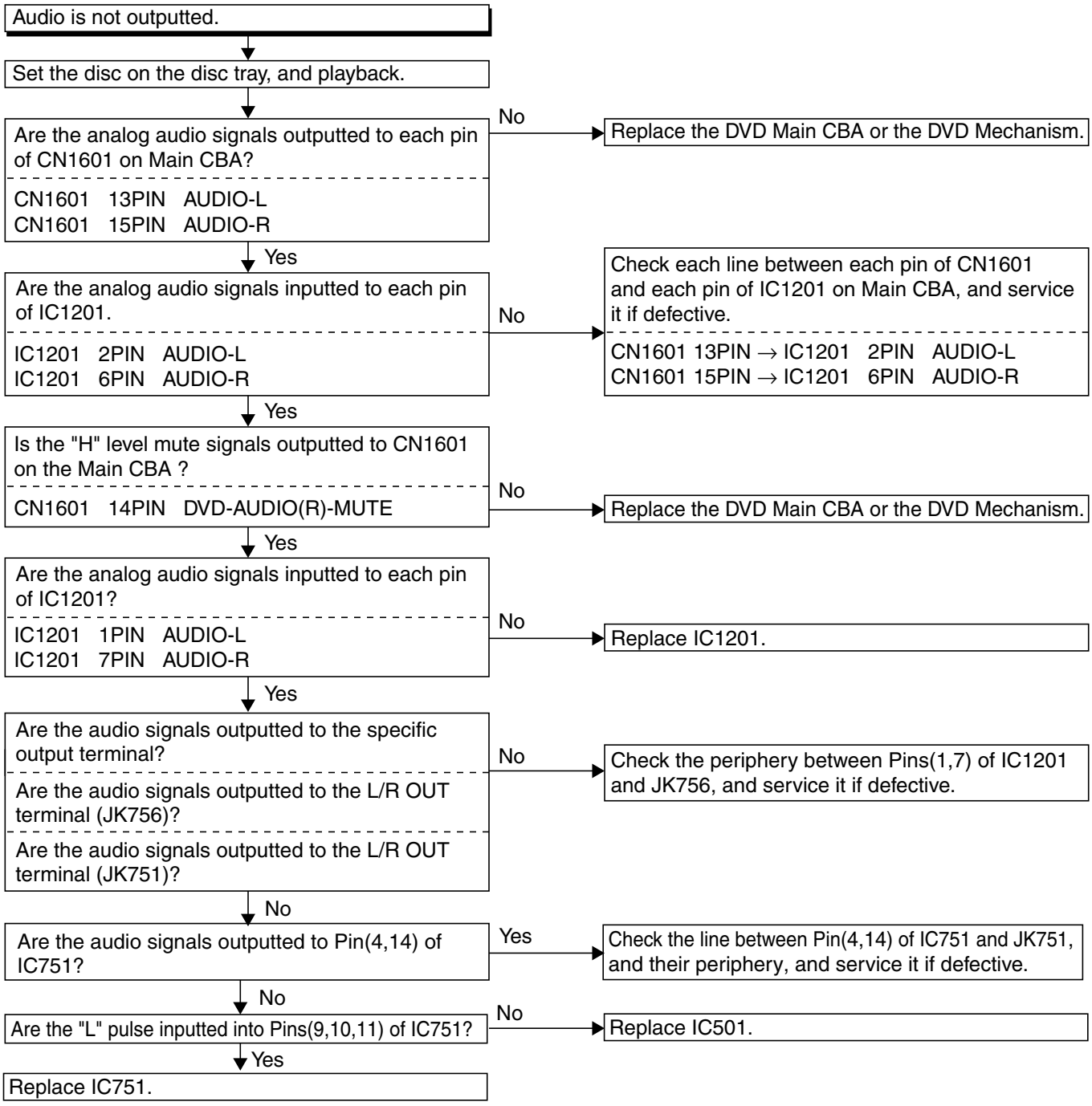
FLOW CHART NO.6



FLOW CHART NO.7



FLOW CHART NO.8



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.

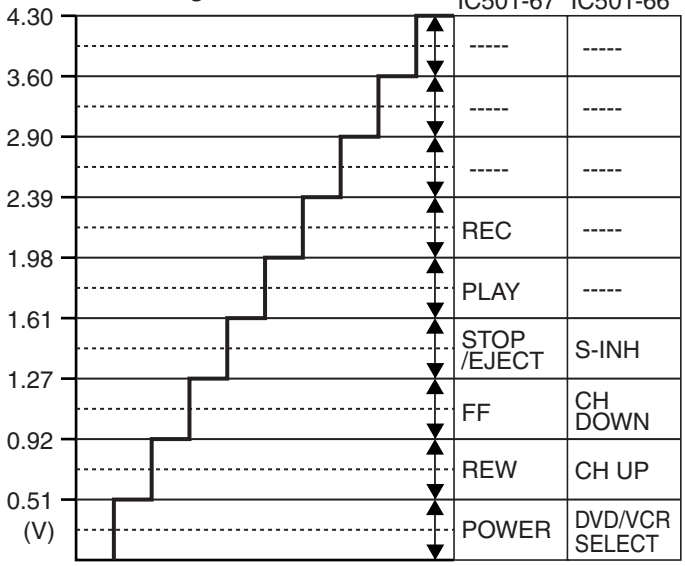
↓ Yes

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 Clutch Assembly, etc., 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?
- No → Replace the Capstan Motor.
- Yes ↓

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

Check the Cam Gear or Rack Assembly, 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.

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 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 or the Cylinder Assembly.

↓ Yes

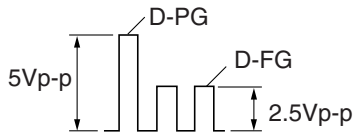
Is the RF-SW signal outputted to Pin(18) of IC501? — No → Replace IC501.

↓ 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 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>.

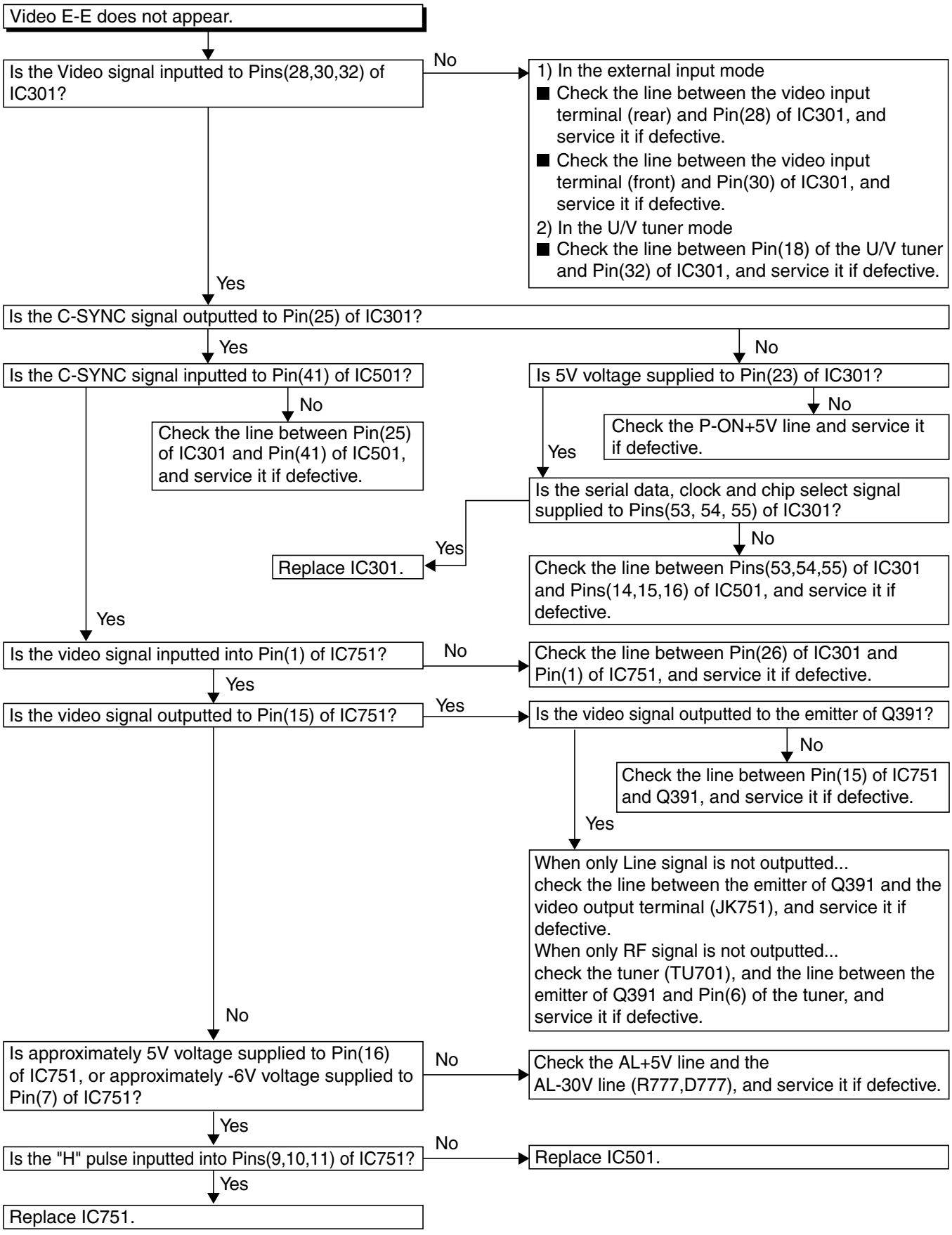
↓ Yes

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

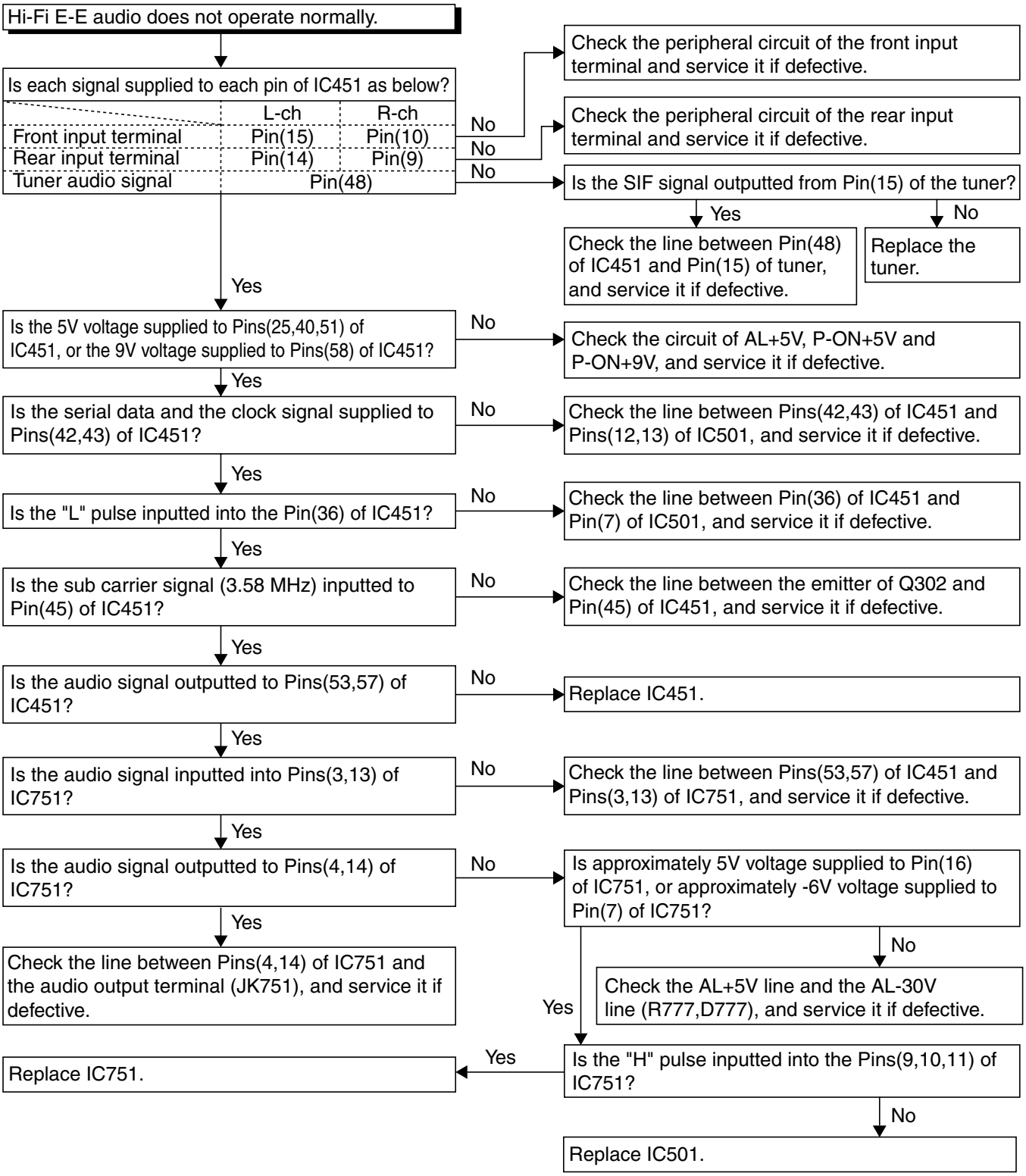
↓ Yes

Replace IC501.

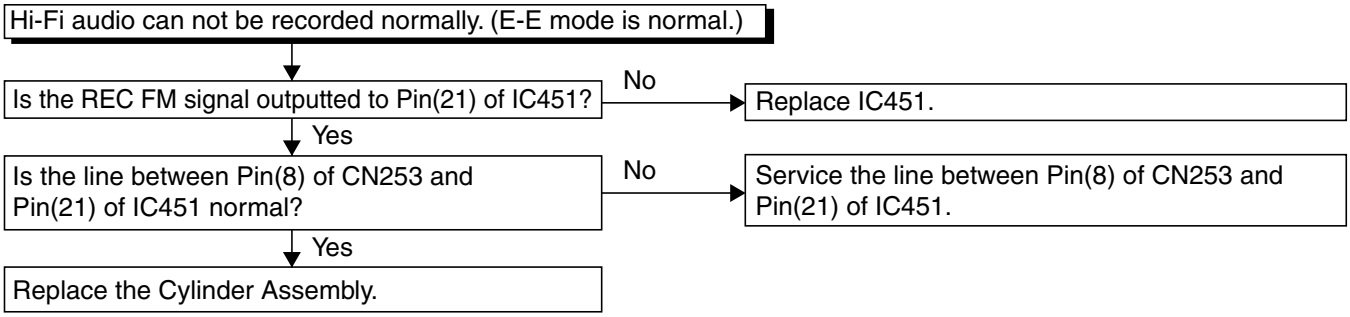
FLOW CHART NO.10



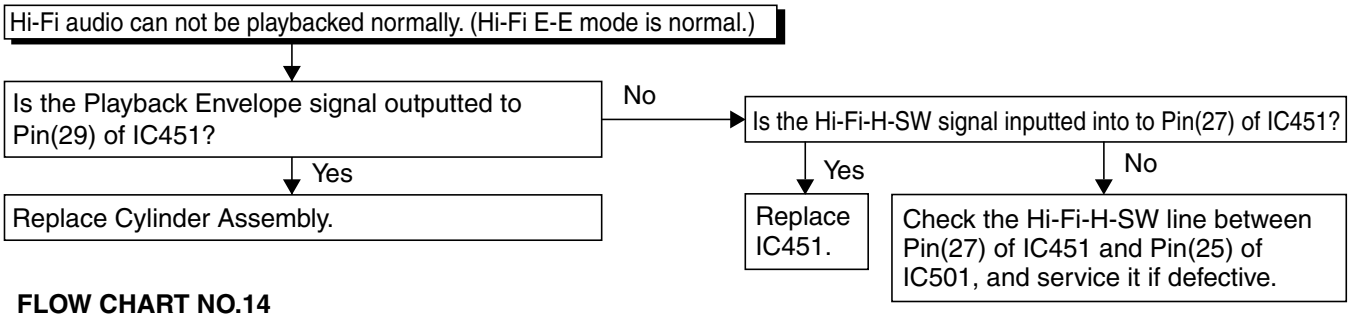
FLOW CHART NO.11



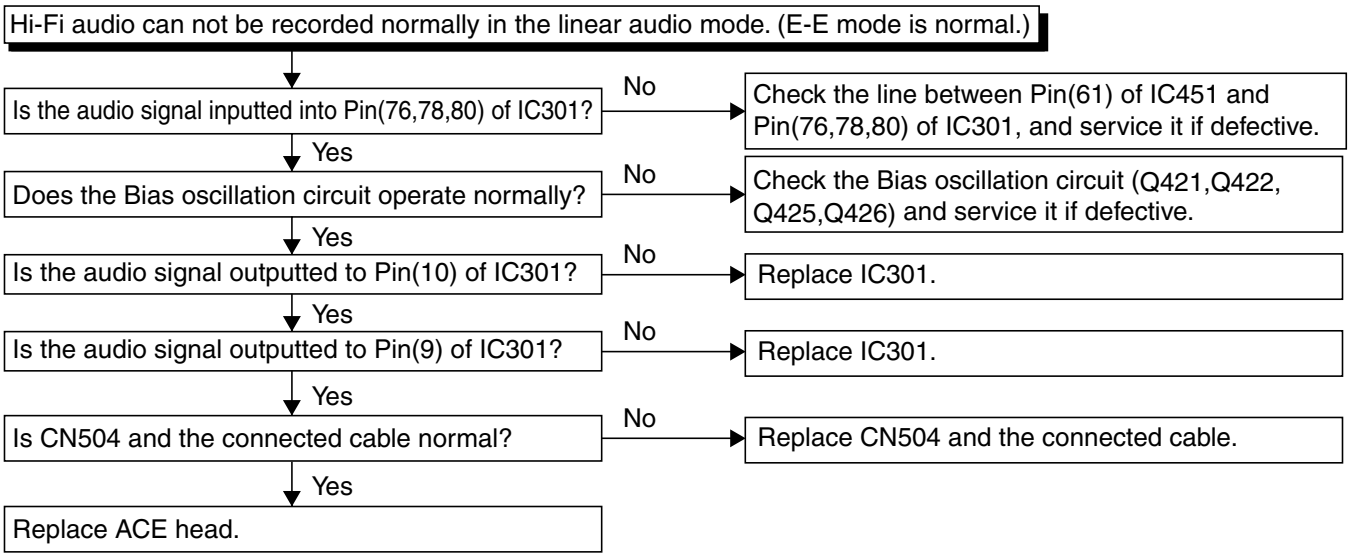
FLOW CHART NO.12



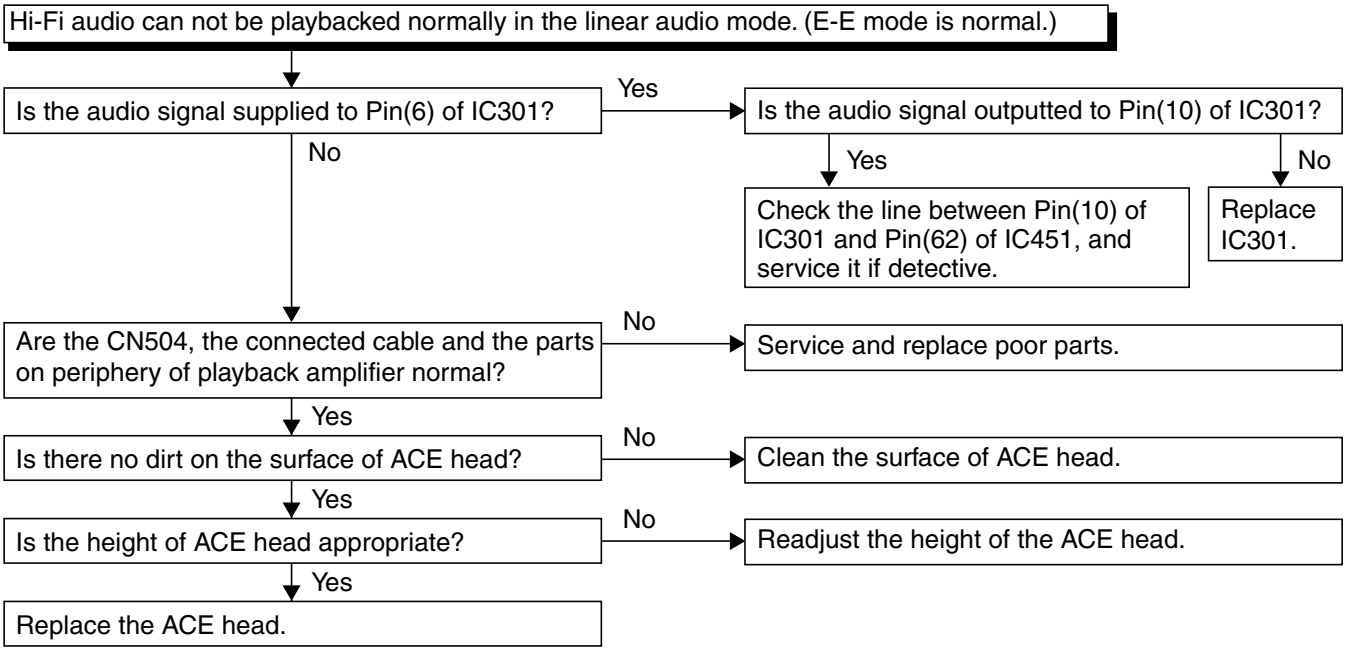
FLOW CHART NO.13



FLOW CHART NO.14



FLOW CHART NO.15



3-2 HOW TO INITIALIZE THE DVD PLAYER & VCR

To put the program back at the factory-default, initialize the DVD player & VCR as the following procedure.

< DVD Section >

1. Press [DVD], [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order.
   Fig. 1 appears on the screen.

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

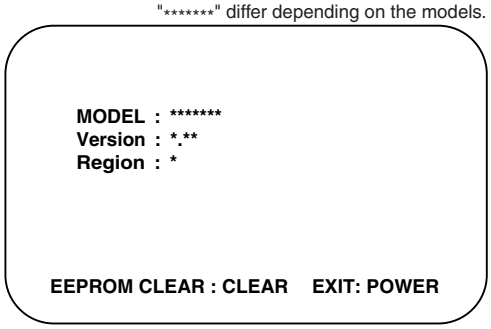


Fig. 1

2. Press [CLEAR C.RESET] button on the remote control unit.
   Fig. 2 appears on the screen.

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

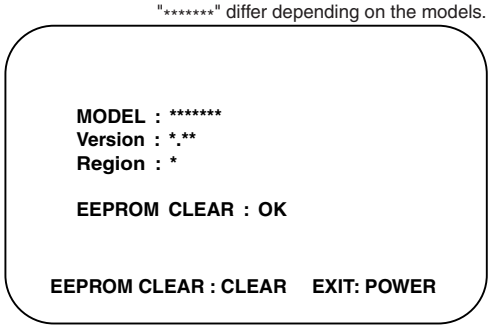


Fig. 2

   When “OK” appears on the screen, the factory default will be set.
3. To exit this mode, press [⏻/|] button.

3-3 FIRMWARE RENEWAL MODE

3-3-1 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 [DVD], [9], [8], [7], [6], and [SEARCH MODE] buttons on the remote control unit in that order. The tray will open automatically.
   Fig. 3 appears on the screen and Fig. 4 appears on the VFD.

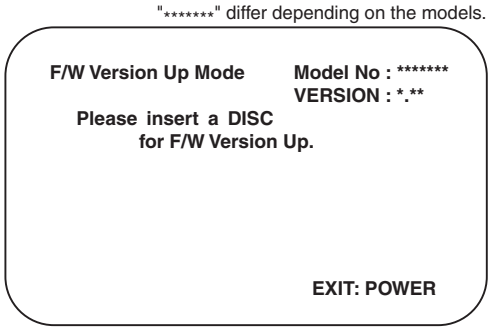


Fig. 3 Version Up Mode Screen

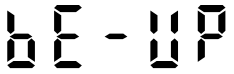


Fig. 4 VFD in Version Up Mode

   The DVD player can also enter the version up mode with the tray open. In this case, Fig. 3 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. 5 appears on the screen and Fig. 6 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.

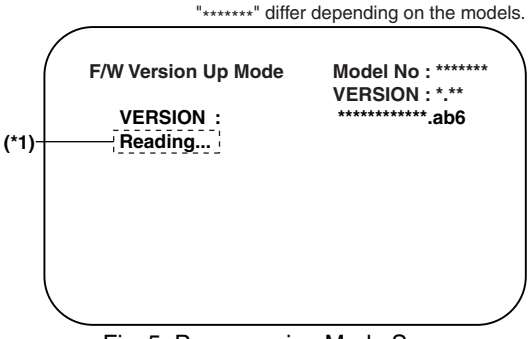


Fig. 5 Programming Mode Screen

Fig. 6 VFD in Programming Mode (Example)

The appearance shown in (*1) of Fig. 5 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. 7 appears on the screen and the checksum in (*2) of Fig. 7 appears on the VFD (Fig. 8).
   At this time, no button is available.

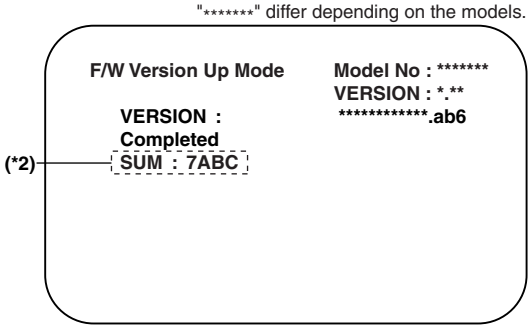


Fig. 7 Completed Program Mode Screen

Fig. 8 VFD upon Finishing the Programming Mode (Example)

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 [DVD], [1], [2], [3], [4], and [DISPLAY] buttons on the remote control unit in that order.
   Fig. 9 appears on the screen.

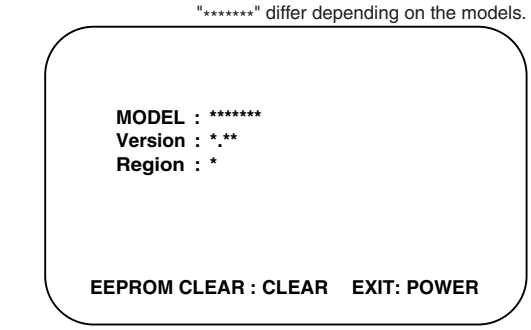


Fig. 9

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

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

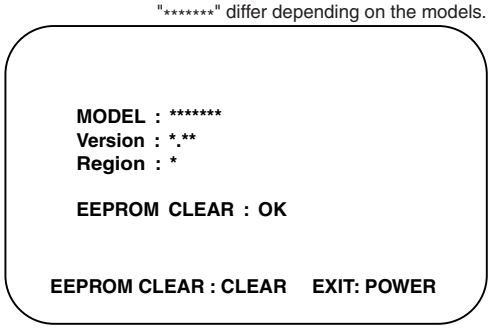


Fig. 10

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.

3-3-2 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.

3-4 STANDARD MAINTENANCE

3-4-1 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% ethyl 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

3-4-2 Cleaning

Cleaning of Video Head

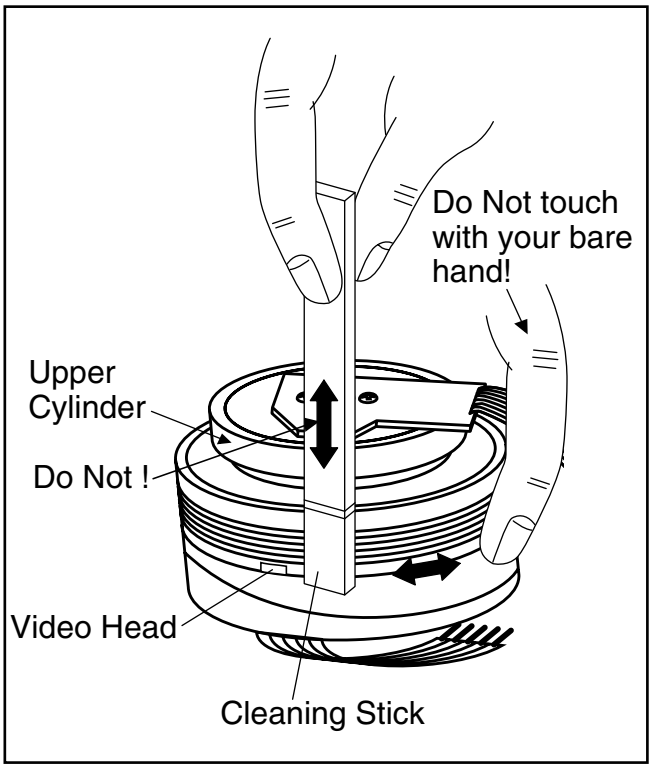
Clean the head with a head cleaning stick or chamois cloth.

Procedure

1. Remove the top case.
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% ethyl 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

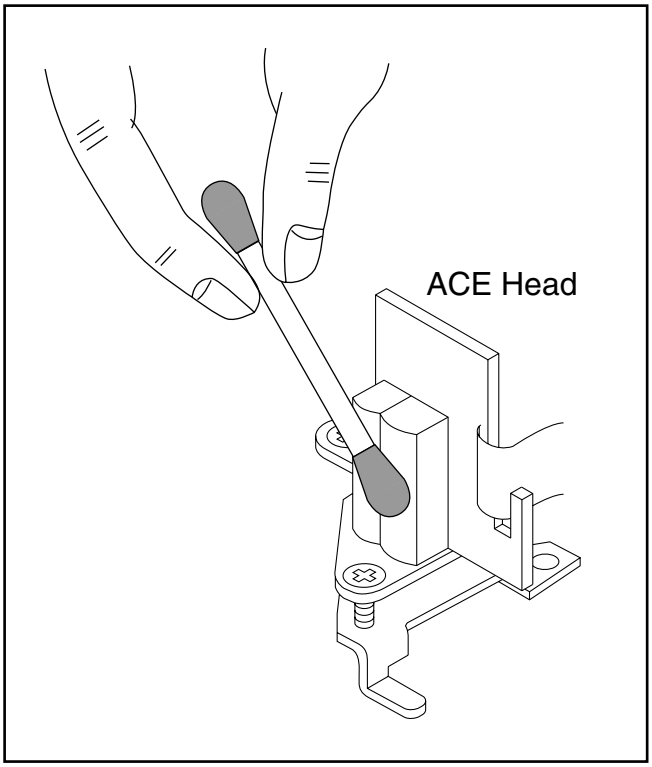
Clean the head with a cotton swab.

Procedure

1. Remove the top case.
2. Dip the cotton swab in 90% ethyl 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.

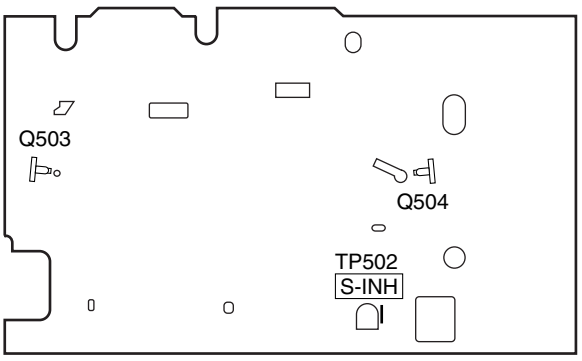
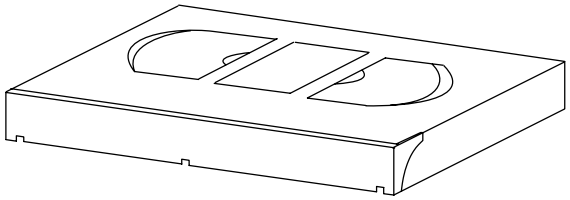


Fig. 1

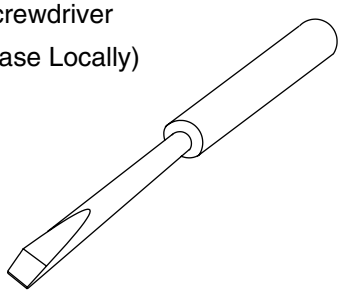
4-2 FIXTURE AND TAPE FOR ADJUSTMENT

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



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 (MH-1)	7099046	● Head Switching Position ● Tape Interchangeability Alignment
2	Guide Roller Adj. Screwdriver	7099028	● Guide Roller
3	Flat Screwdriver	Purchase Locally	● X Value Alignment

4-3 ELECTRICAL ADJUSTMENT INSTRUCTIONS

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 "VCR-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.**	
MH-1	Oscilloscope	6.5H±1H (412.7μs±63.5μs)	
Connections of Measurement Equipment			

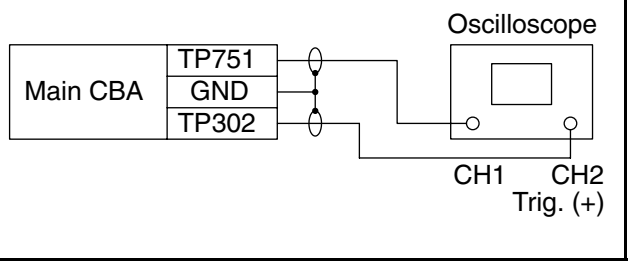
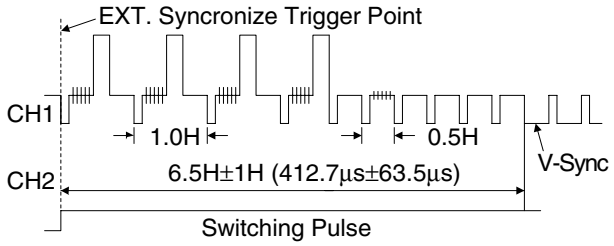


Figure 1



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. (The Cam Gear in Fig. M2 rotates.) 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.

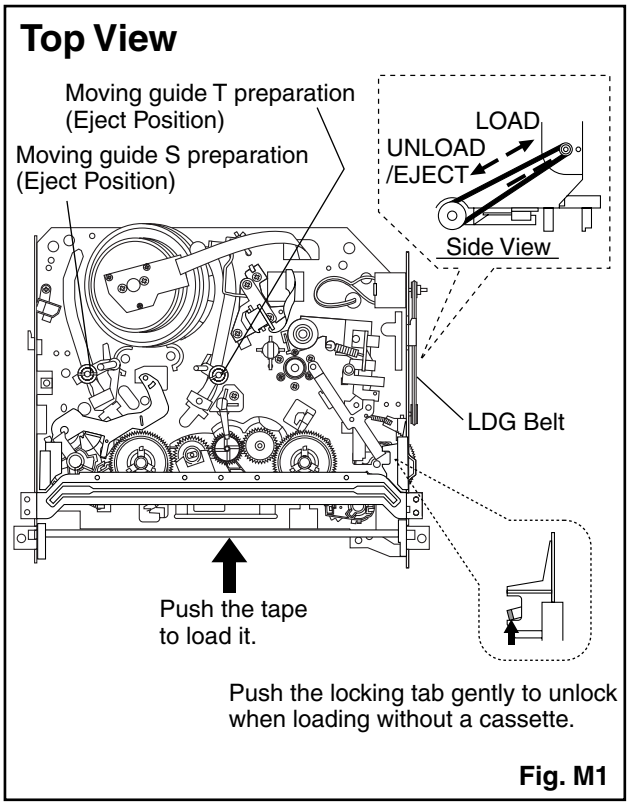


Fig. M1

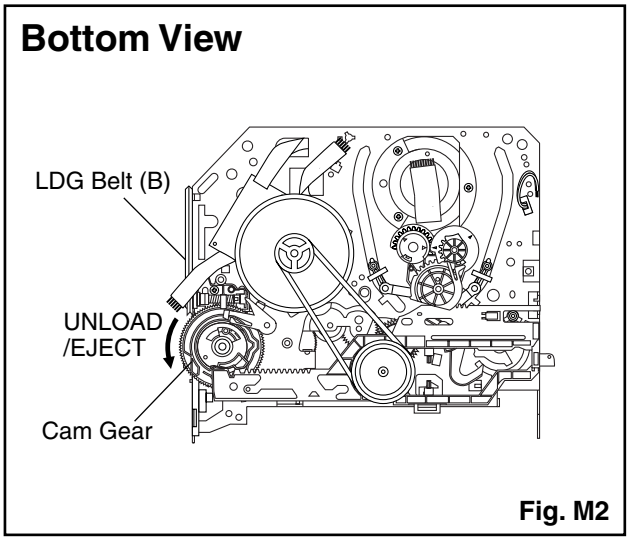


Fig. M2

4-4-2. Tape Interchangeability Alignment

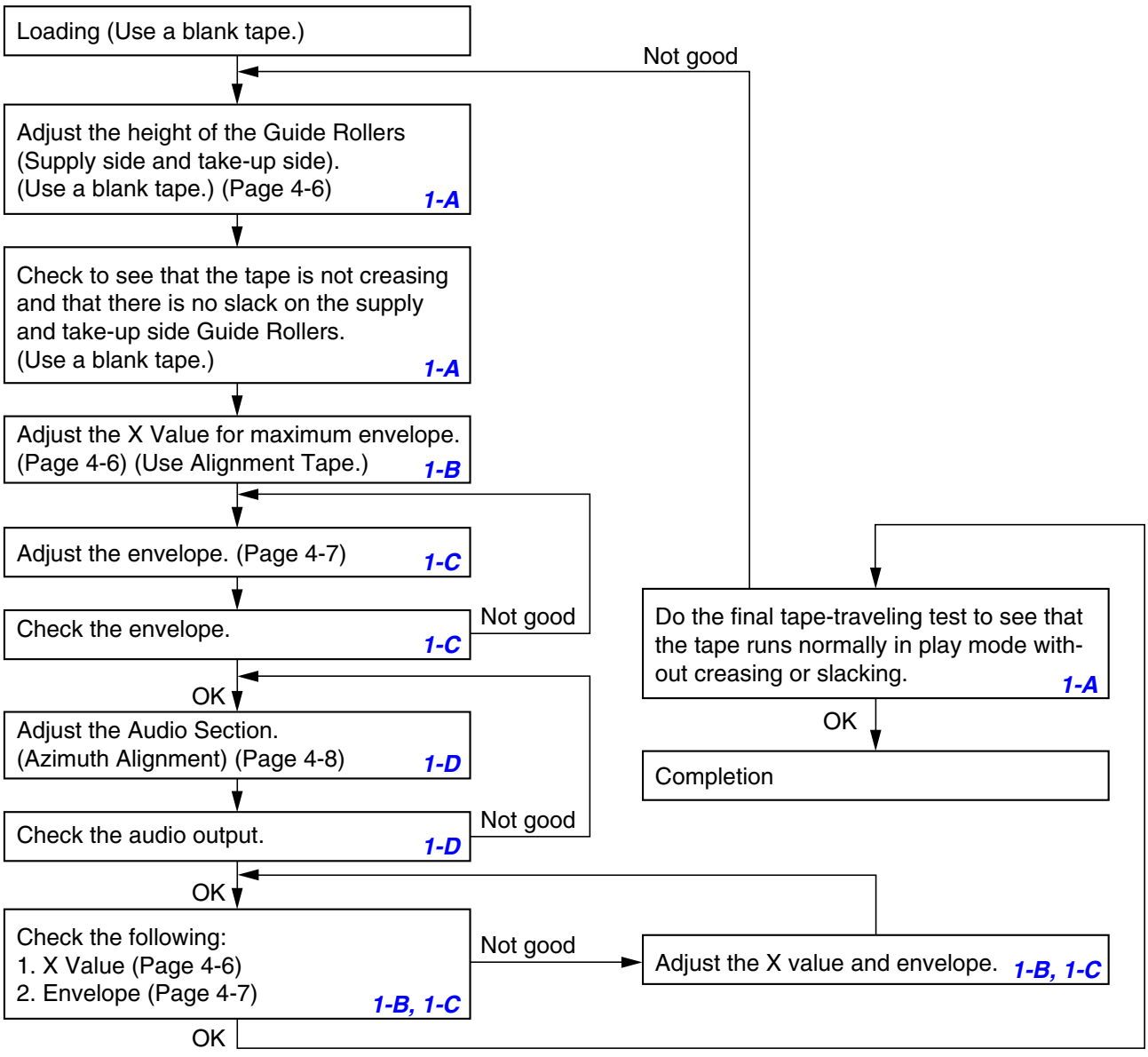
Note:
To do these alignment procedures, make sure that the Tracking Control Circuit is set to the preset position every time a tape is loaded or unloaded. (Refer to page 4-7, procedure 1-C, step 2.)

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.)

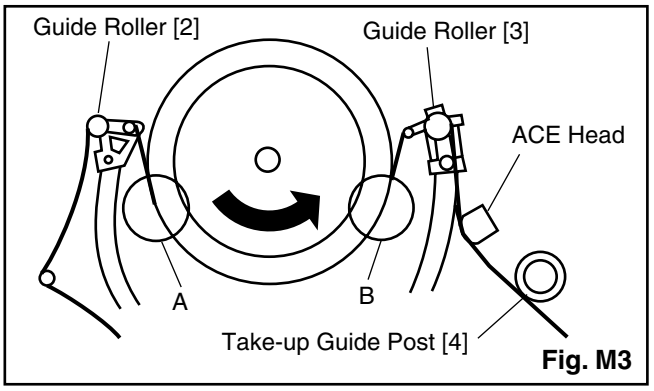


Fig. M3

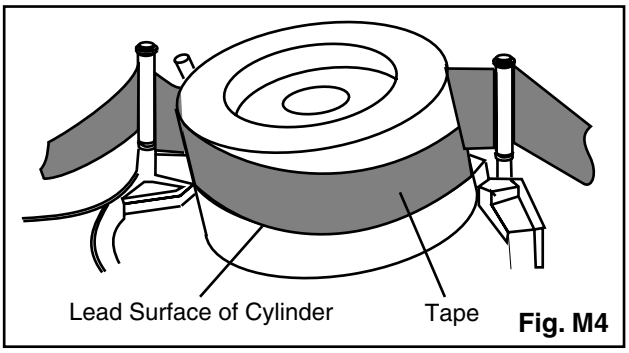


Fig. M4

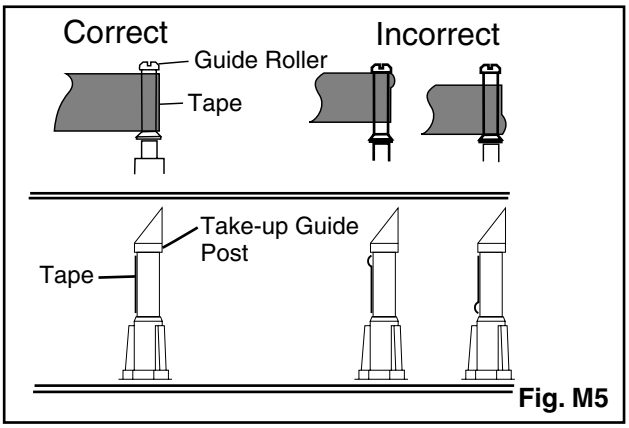


Fig. M5

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)

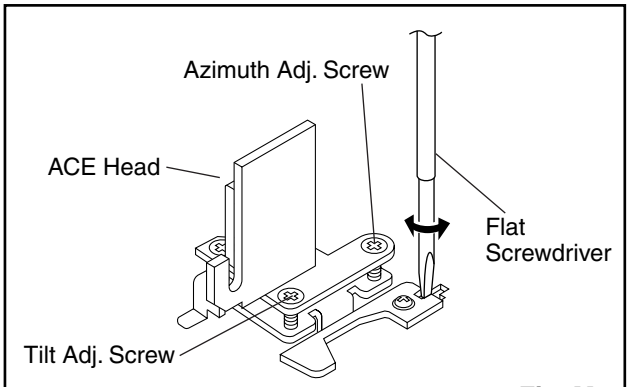


Fig. M6

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 ▲” button and then “VCR-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 ▲” or “CH ▼” 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.

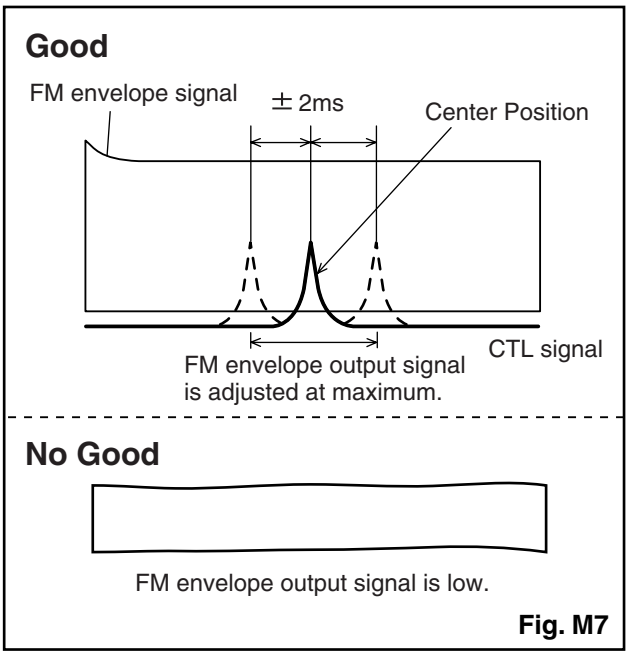


Fig. M7

6. Set the Tracking Control Circuit to the preset position by pressing “CH ▲” button and then “VCR-PLAY” button on the unit.

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 ▲” button and then “VCR-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.

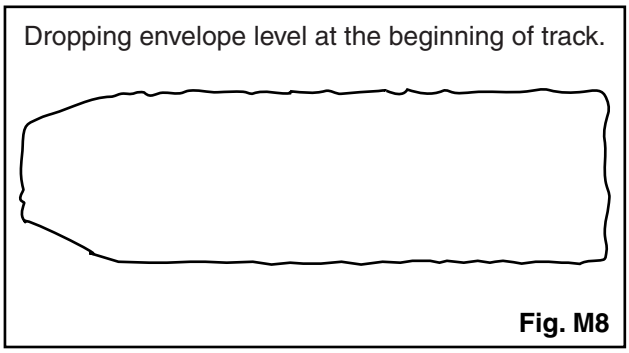


Fig. M8

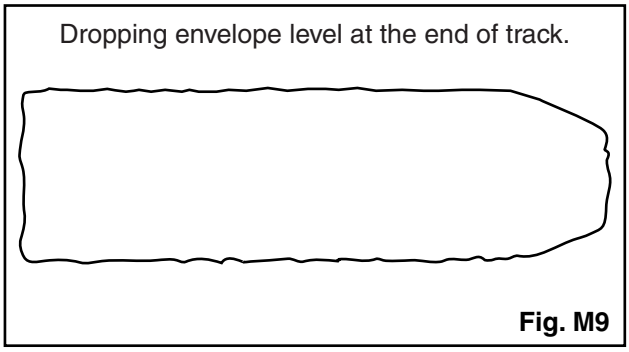


Fig. M9

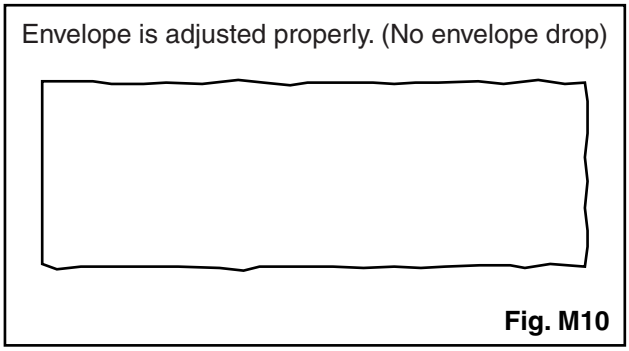


Fig. M10

Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. M3), check the X Value by pushing the “CH ▲” or “CH ▼” buttons on the unit alternately, to check the symmetry of the envelope. Check the number of pushes to ensure preset position. The number of pushes “CH ▲” button on the unit to achieve 1/2 level of envelope should match the number of pushes “CH ▼” button on the unit 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 ▲" or "CH ▼" buttons on the unit alternately, to check the symmetry of the envelope. Check the number of pushes to ensure preset position. The number of pushes "CH ▲" button on the unit to achieve 1/2 level of envelope should match the number of pushes "CH ▼" button on the unit from center. If required, redo the "X Value Alignment."

1-E. Checking and Alignment of Tape Path during reversing

Purpose: To make sure that the tape path is well stabilized during reversing.

Symptom of Misalignment: If the tape path is unstable during reversing, 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. Insert a blank cassette tape into the tray and set the unit to REV. Then confirm if the tape has been curled up or bent at the Take-up Guide Post[4] or REV Post[5]. (Refer to Fig. M11 and M12.)
2. When the tape has been curled up or bent, turn the alignment screw to adjust the height of REV Post. (Refer to Fig. M11 and M13.)

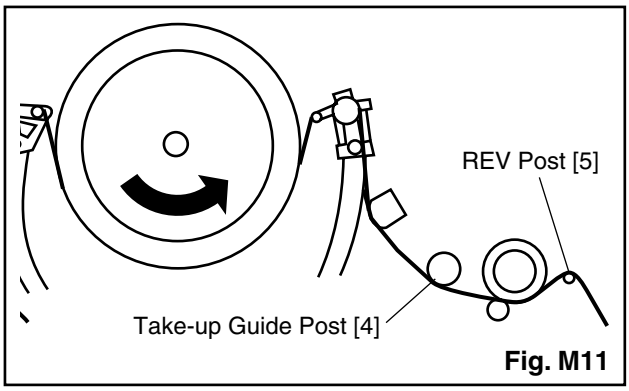


Fig. M11

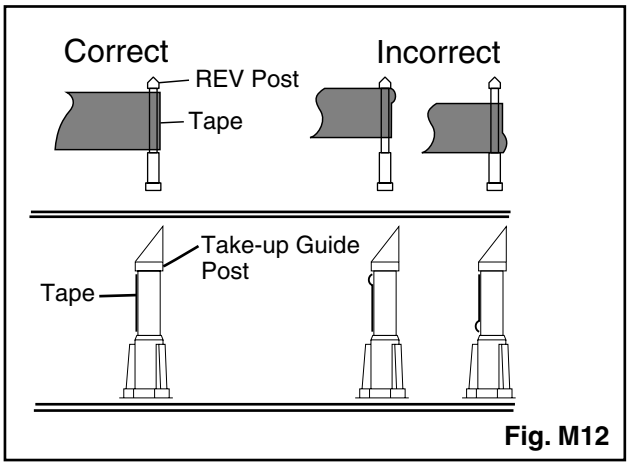


Fig. M12

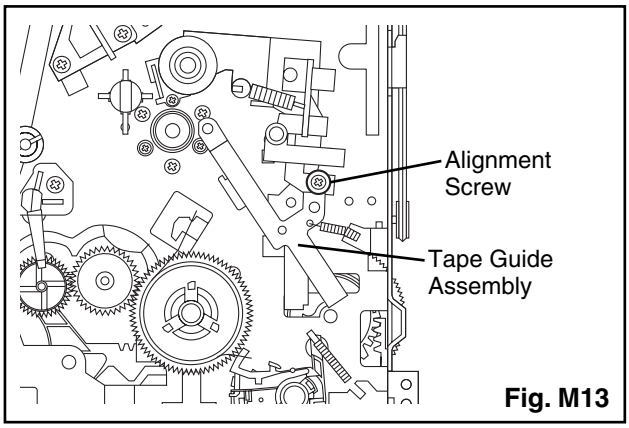


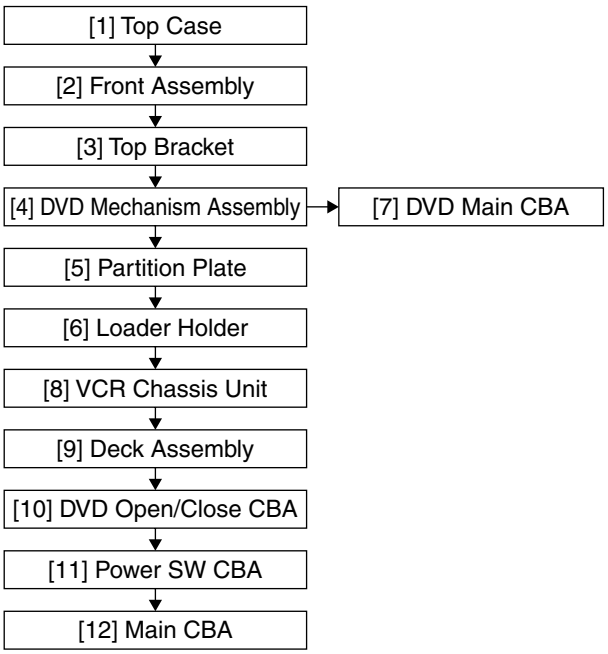
Fig. M13

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 Mechanism 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	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)

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. (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.

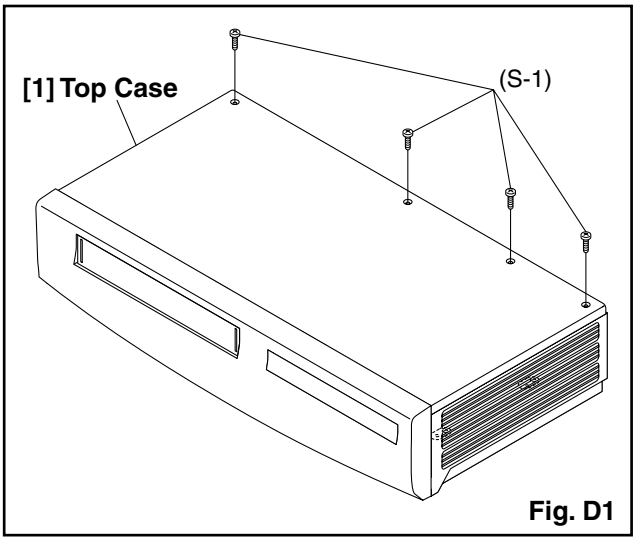


Fig. D1

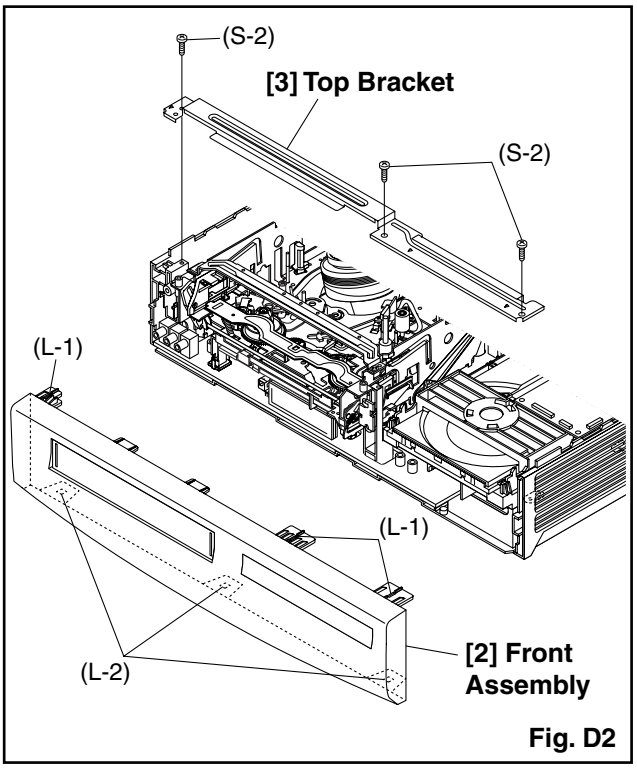


Fig. D2

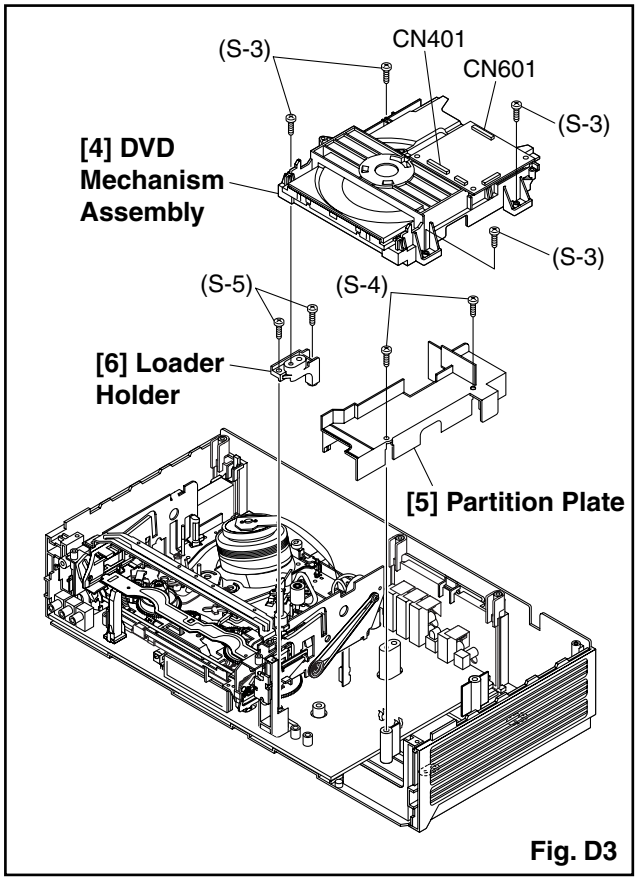


Fig. D3

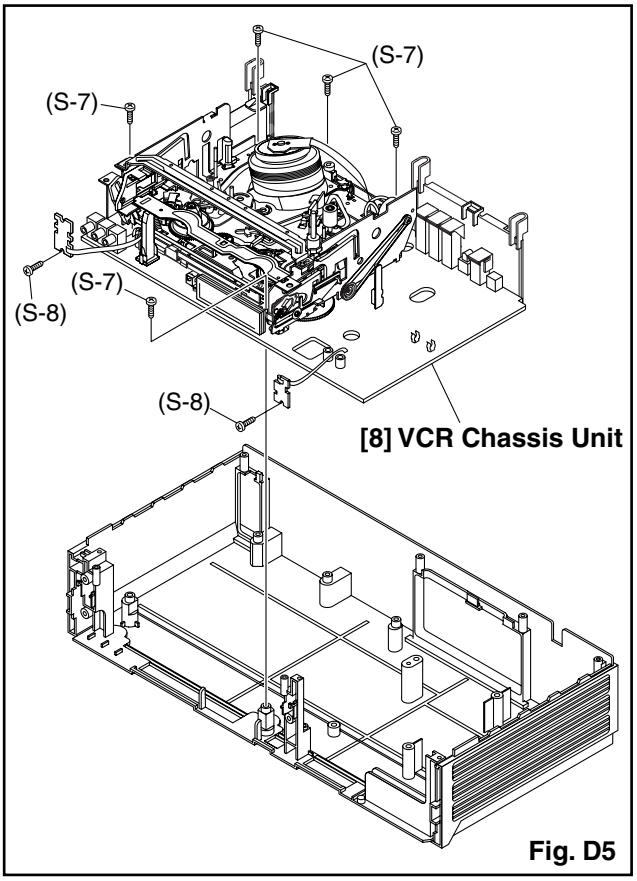


Fig. D5

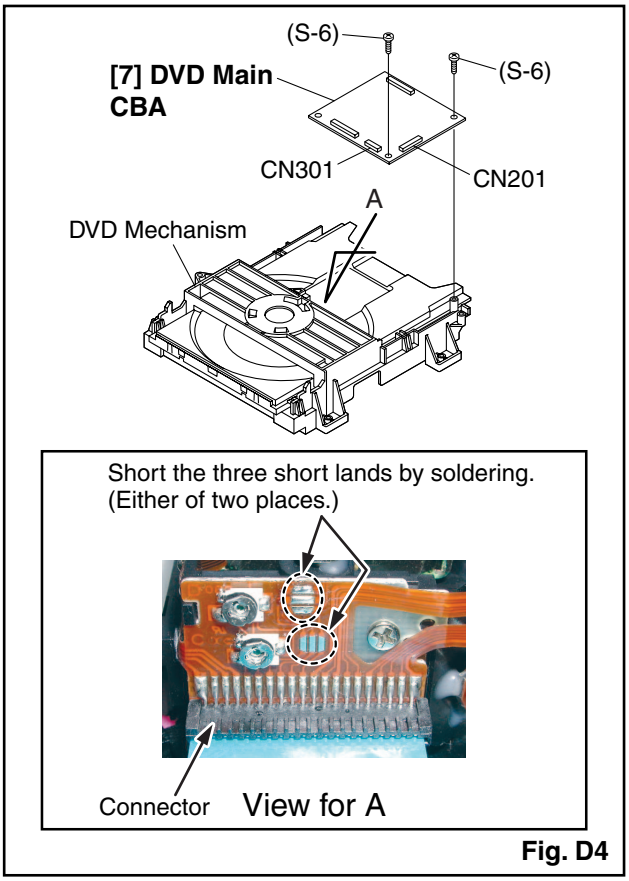
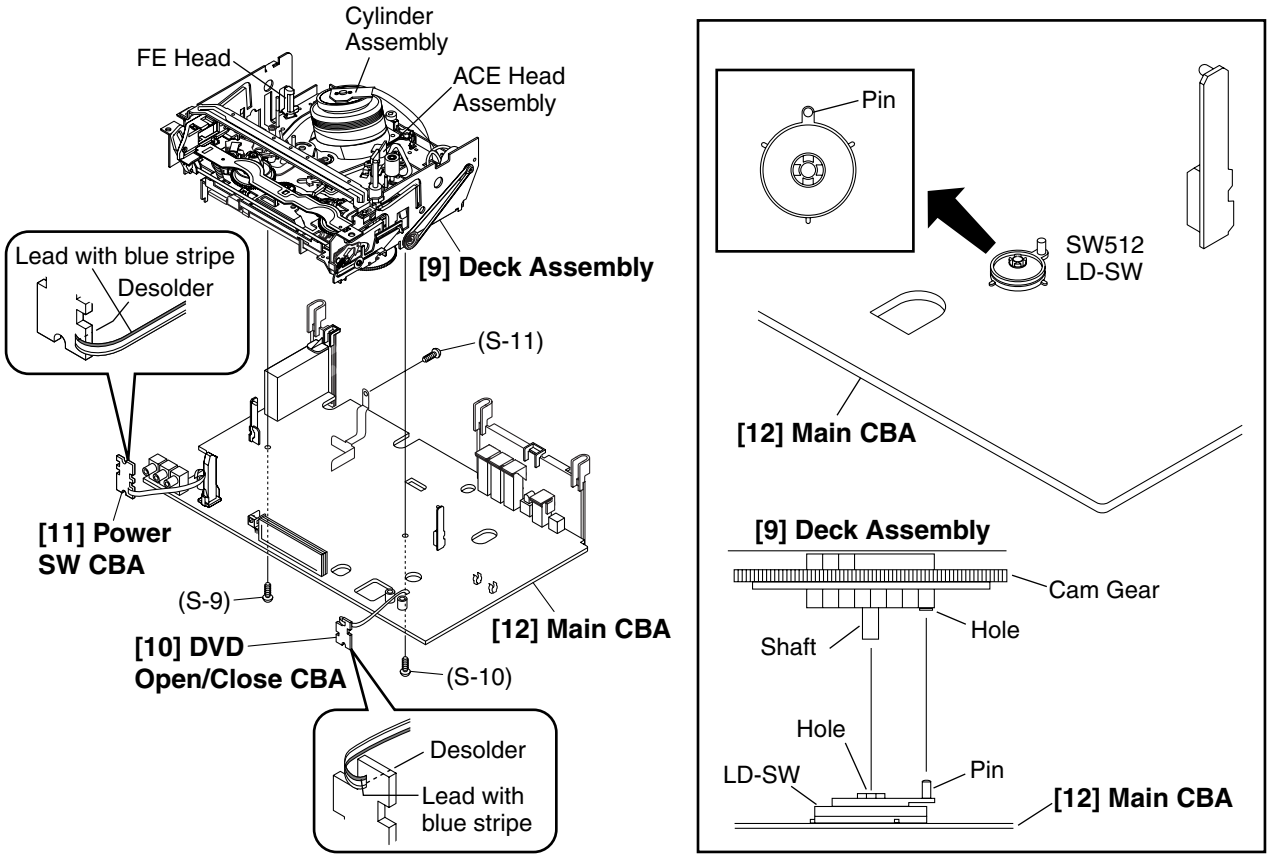
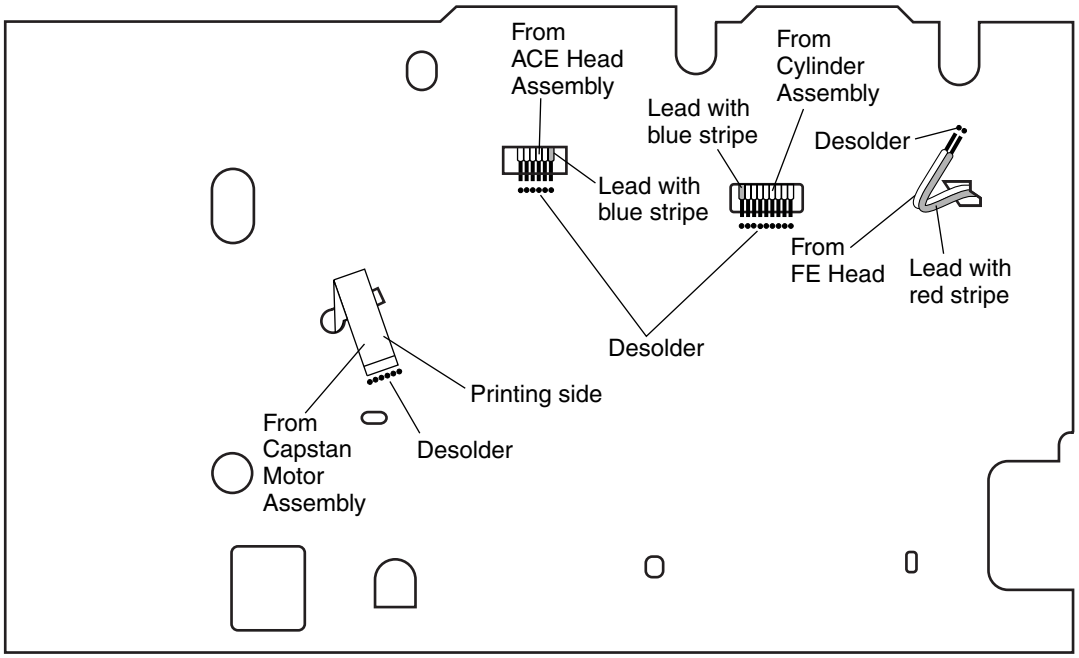


Fig. D4





BOTTOM VIEW

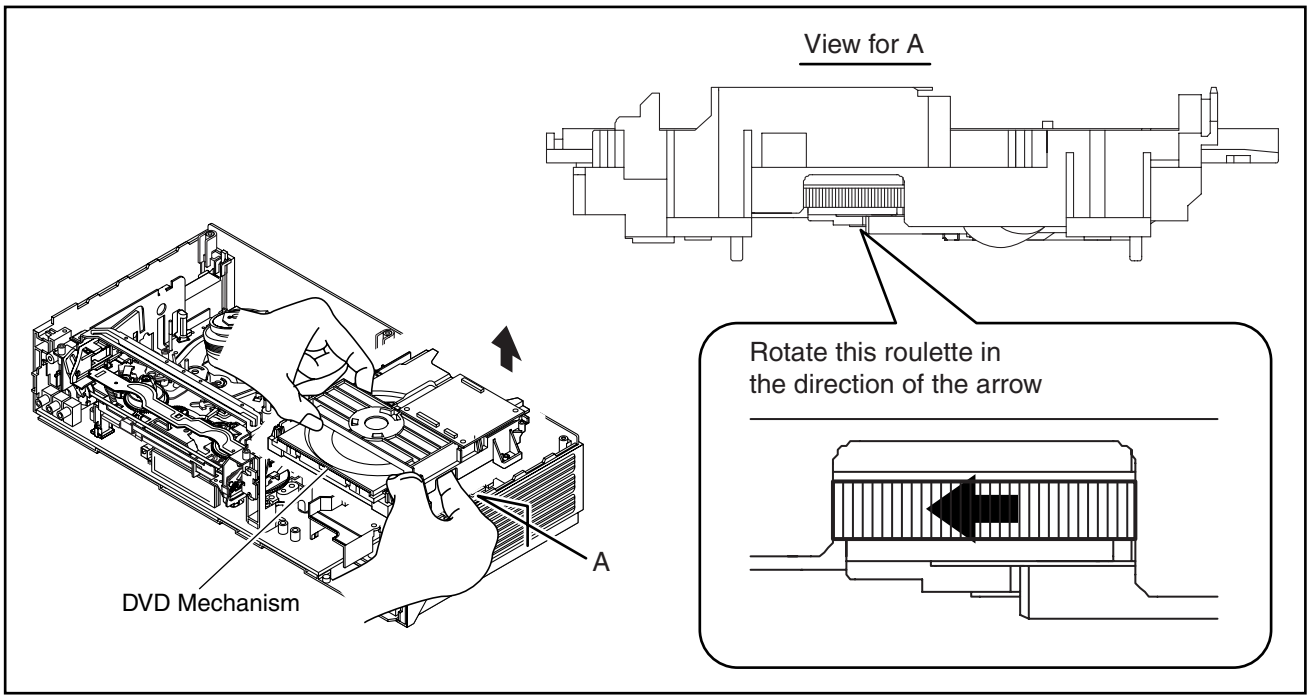
Lead connections of Deck Assembly and Main CBA

Fig. D6

5-1-3 How to Eject Manualy

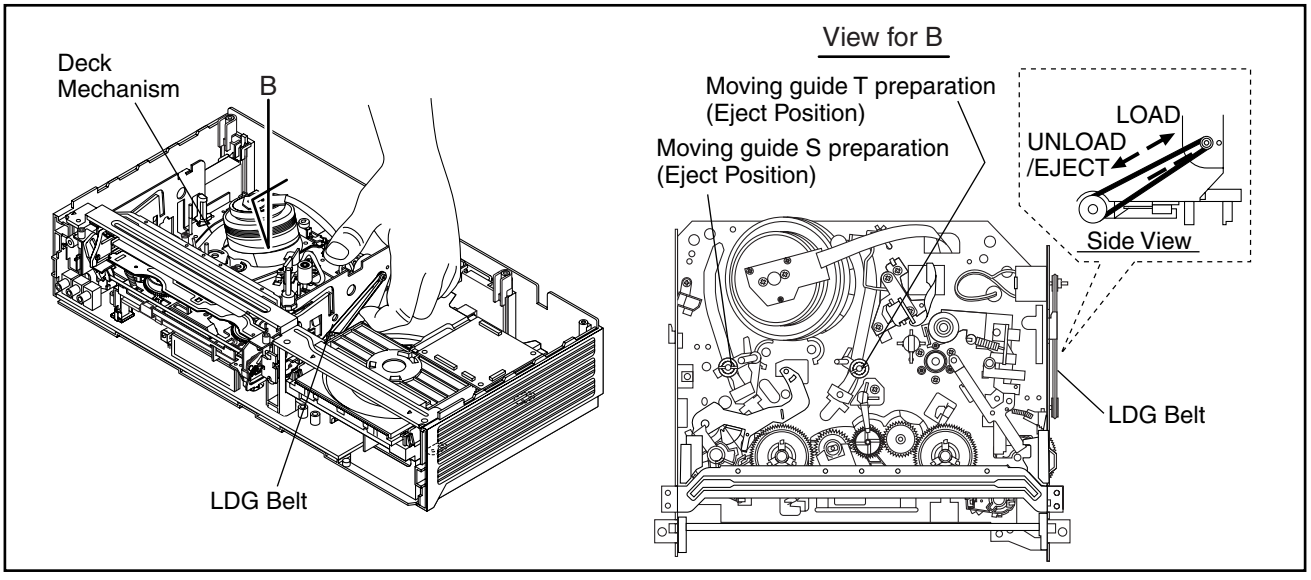
A. DVD

1. Remove the Top Case, Front Assembly and Top Bracket.
2. Remove four Screws (S-3) in Fig. D3. Do not disconnect connectors.
3. While lifting up the DVD Mechanism, rotate the roulette in the direction of the arrow as shown below.
4. Pull the tray slowly manually.



B. Cassette Tape

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 as shown below 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.



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

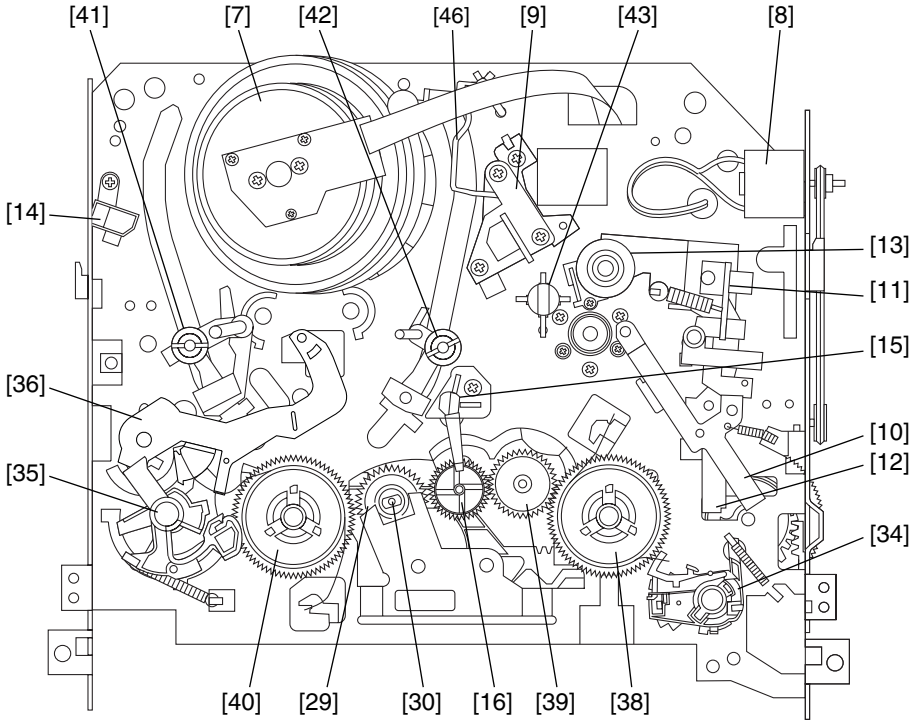


Fig. DM1

Bottom View

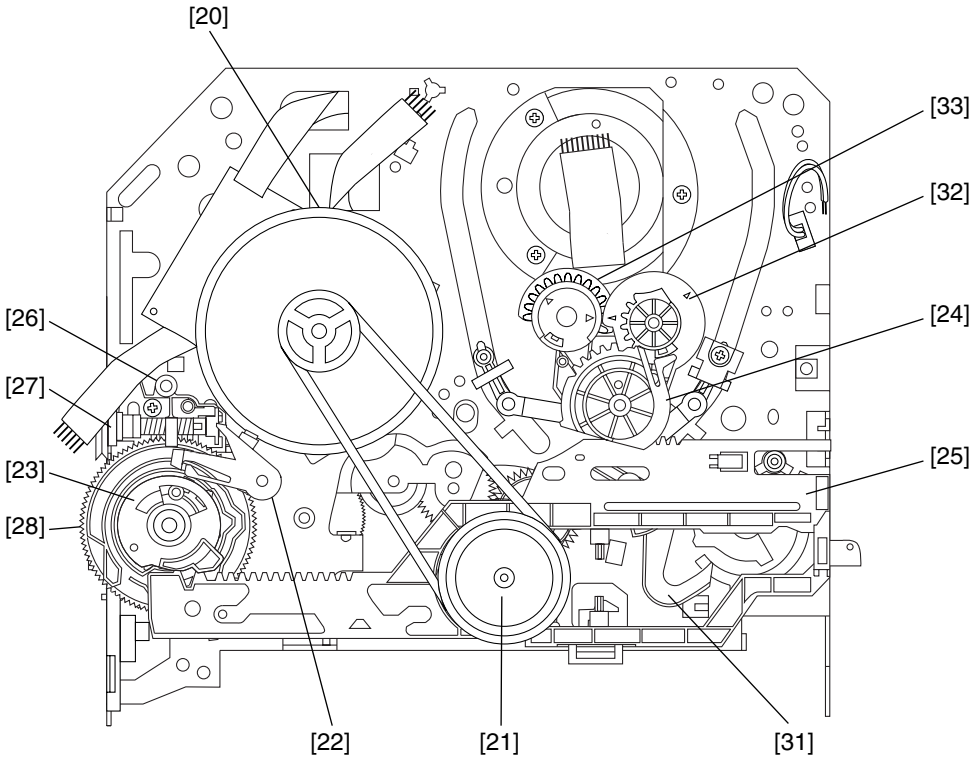


Fig. DM2

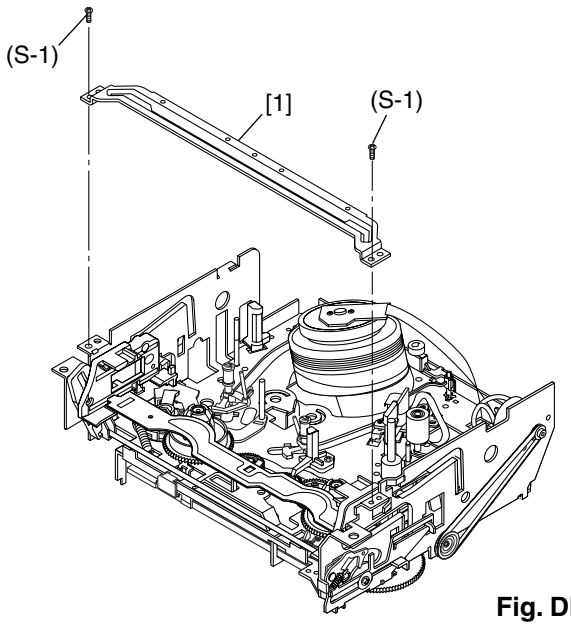
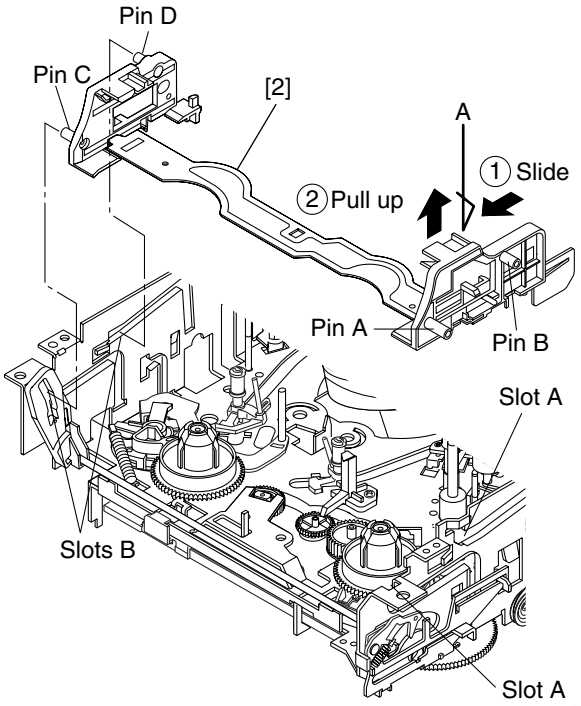


Fig. DM3



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.

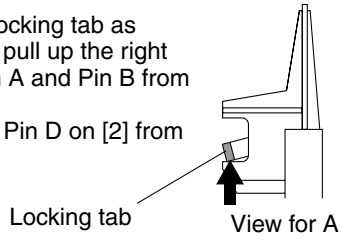
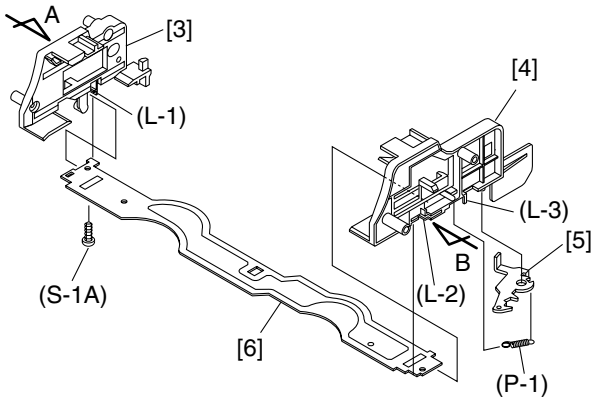
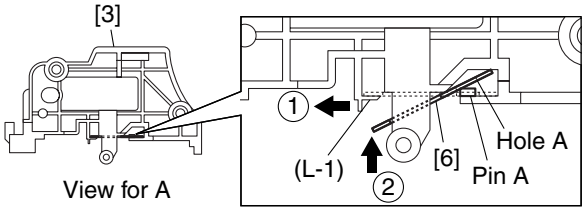


Fig. DM4



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.

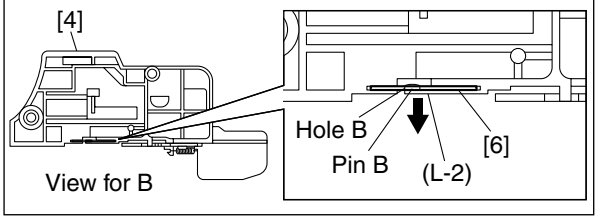


Fig. DM5

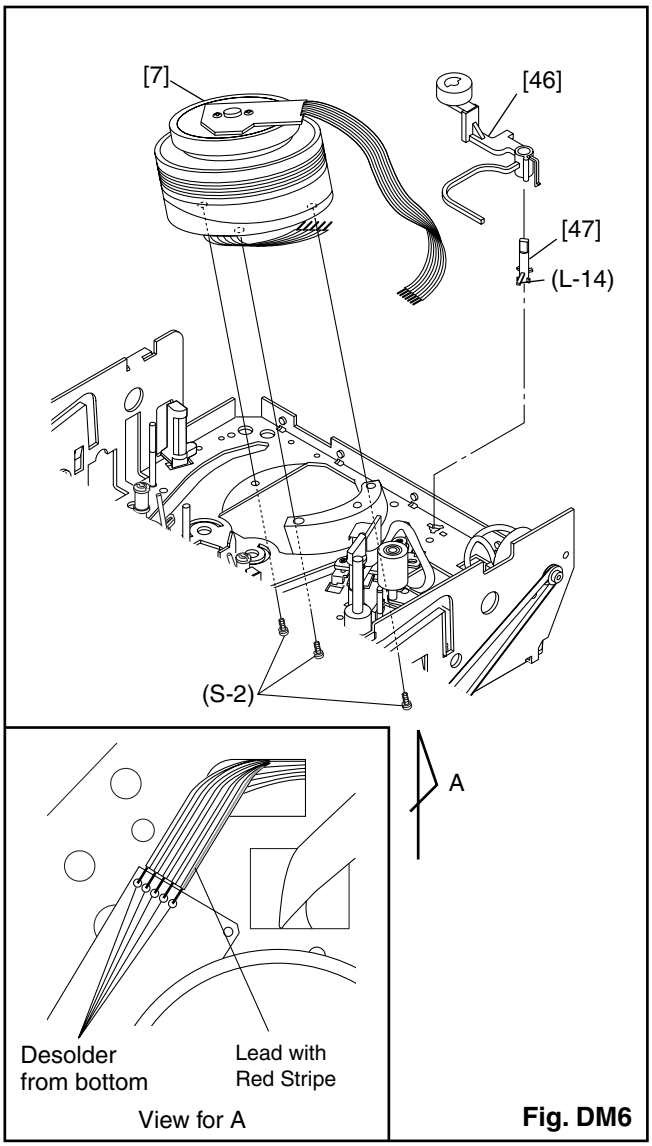


Fig. DM6

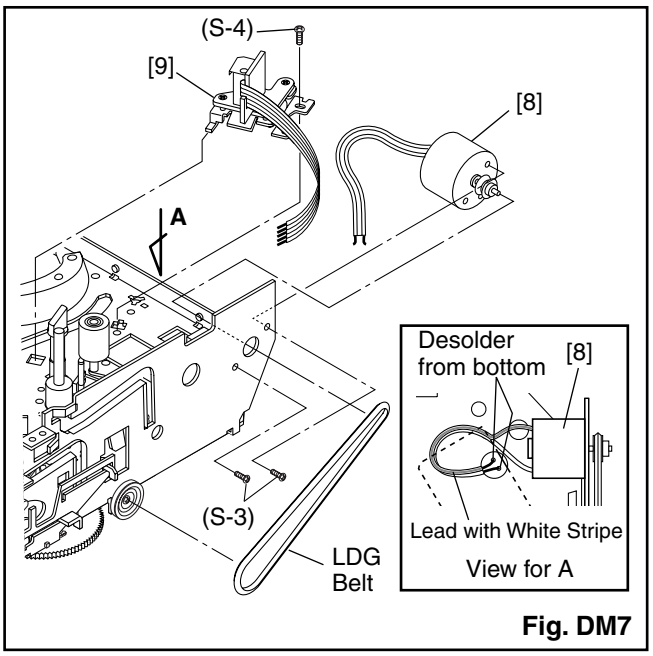


Fig. DM7

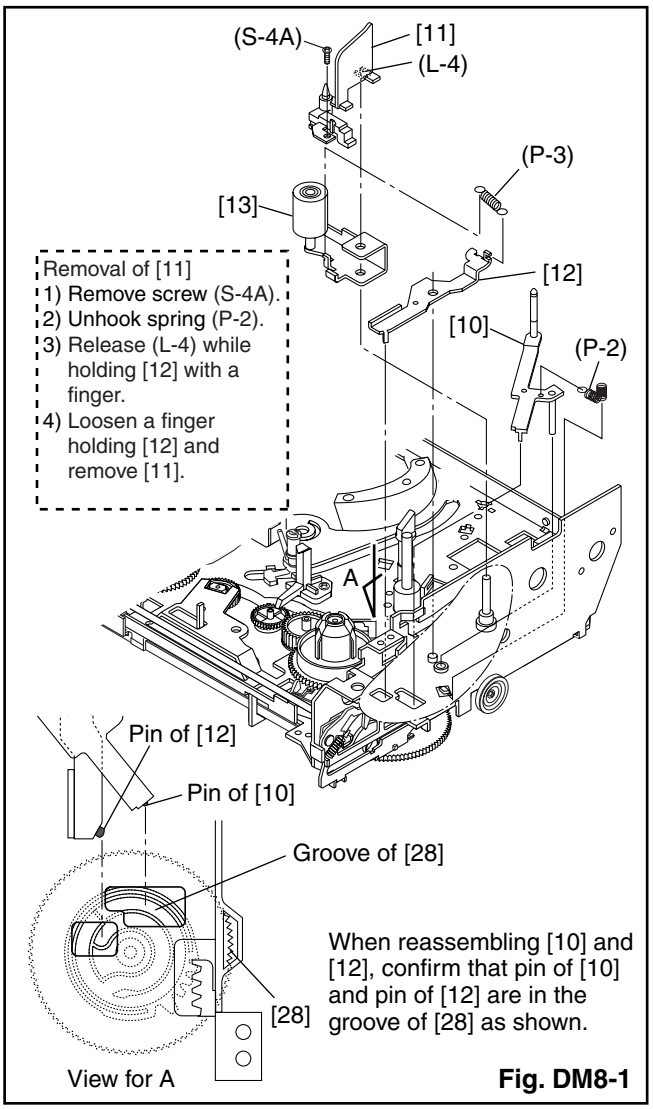


Fig. DM8-1

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.)

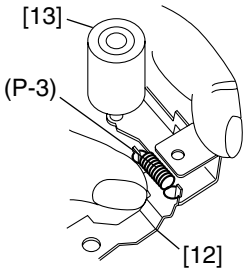


Fig. A

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

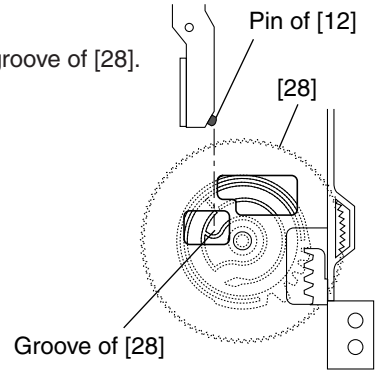


Fig. B (Top view)

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.)

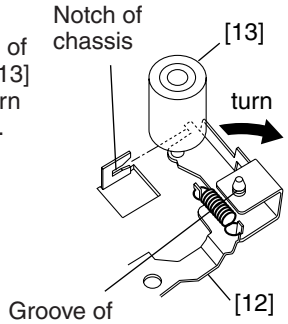


Fig. C

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

Fig. DM8-2

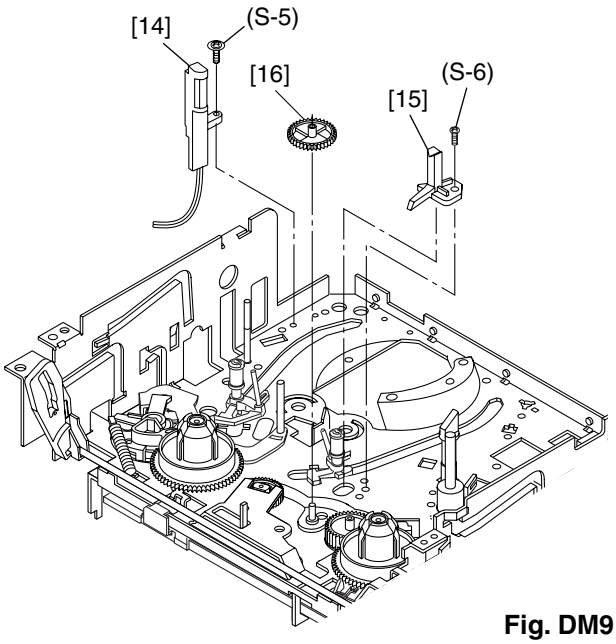


Fig. DM9

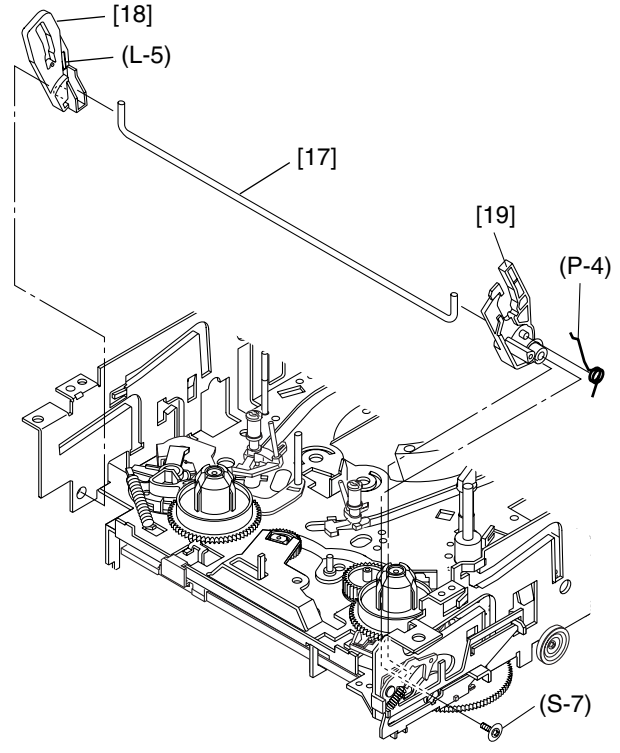
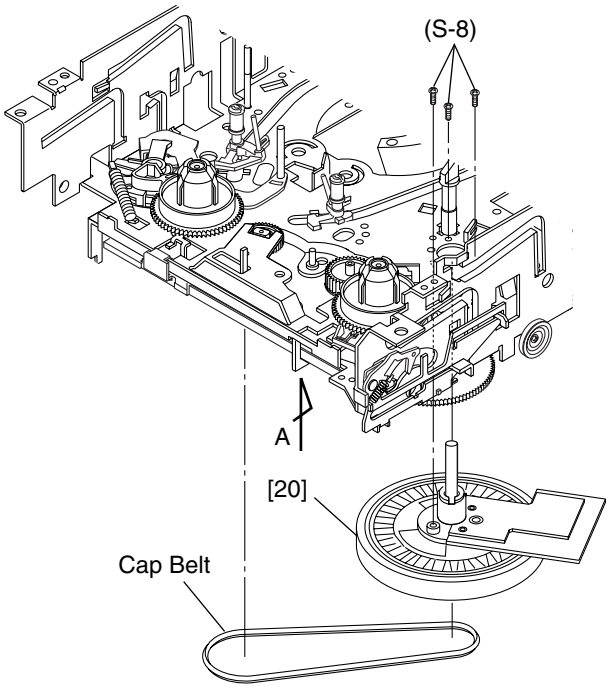
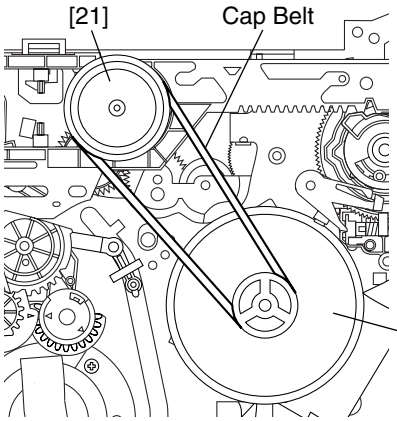


Fig. DM10

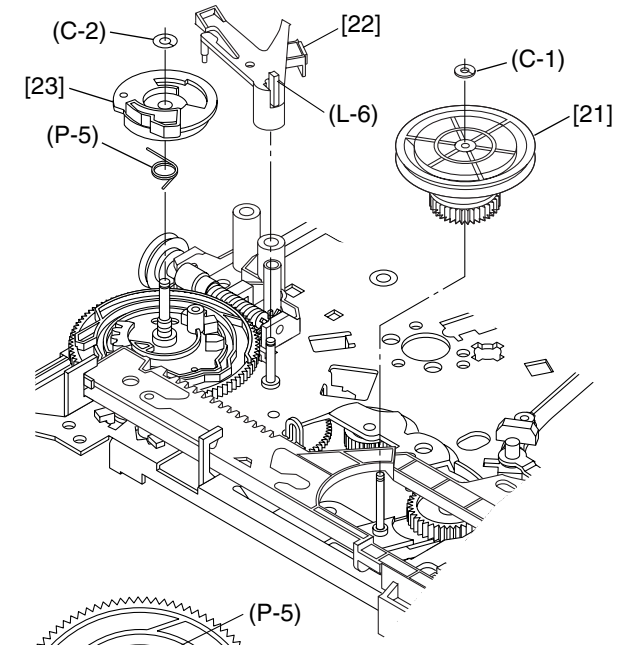


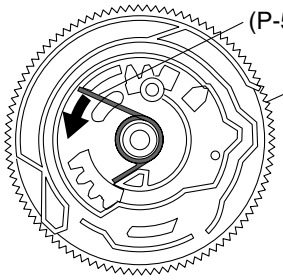
Installation position of Cap Belt



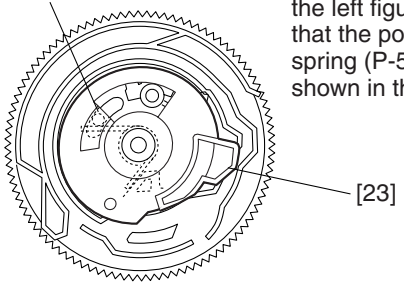
View for A

Fig. DM11



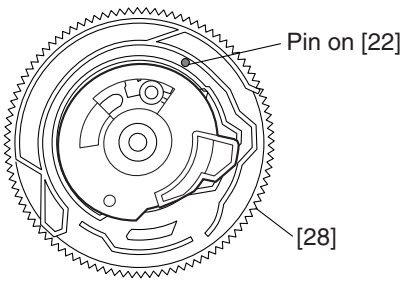


Pin on bottom of [23]



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

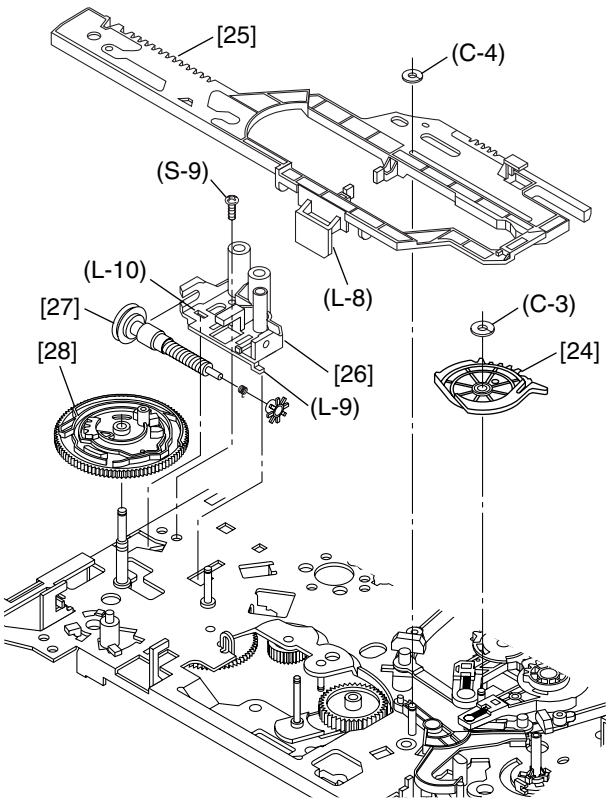
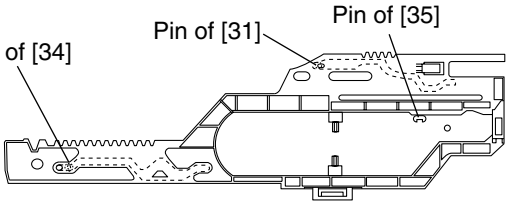
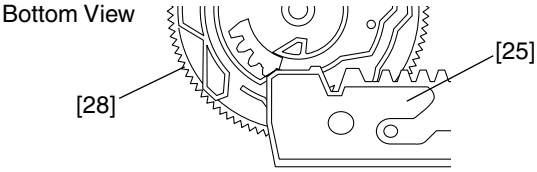


Fig. DM13-1

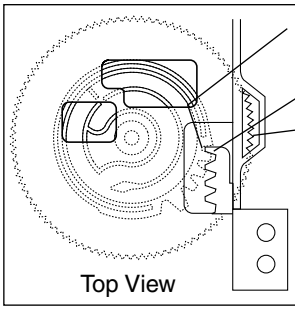
Installation of [25]

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

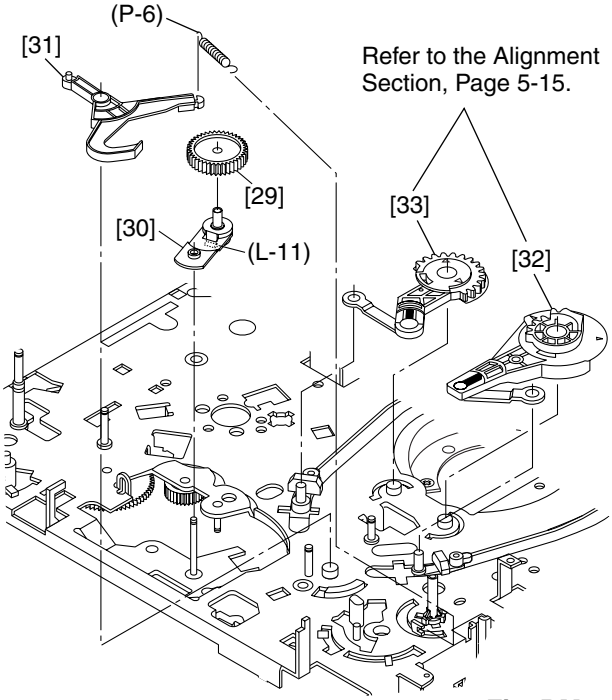


Fig. DM14

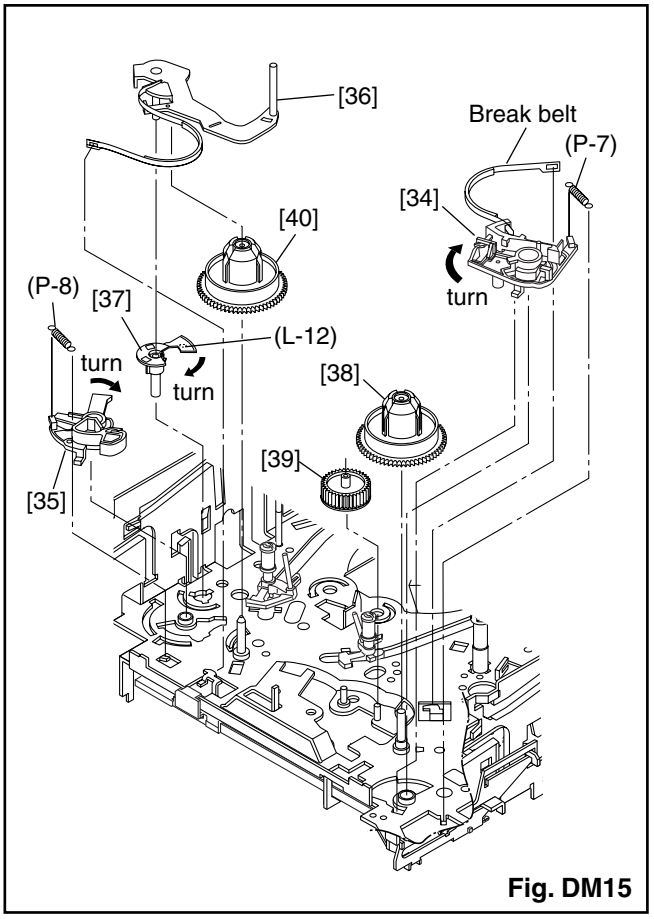


Fig. DM15

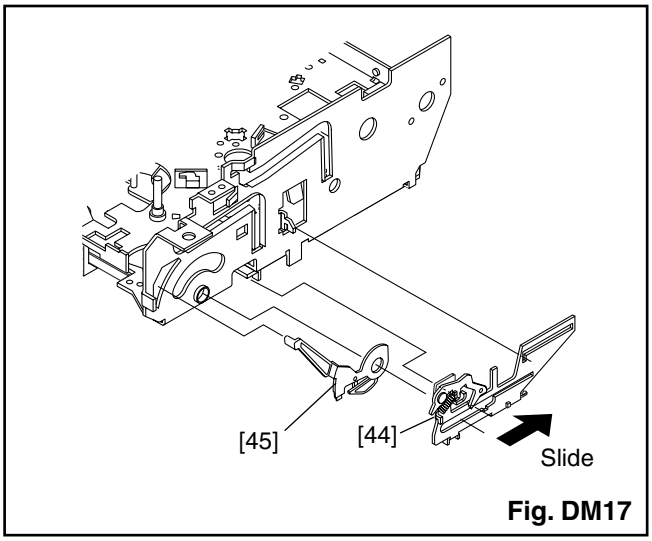


Fig. DM17

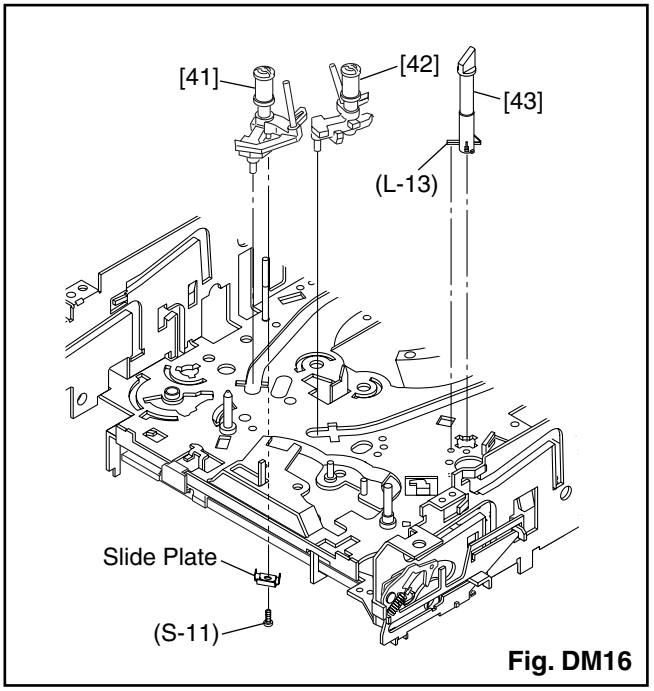


Fig. DM16

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

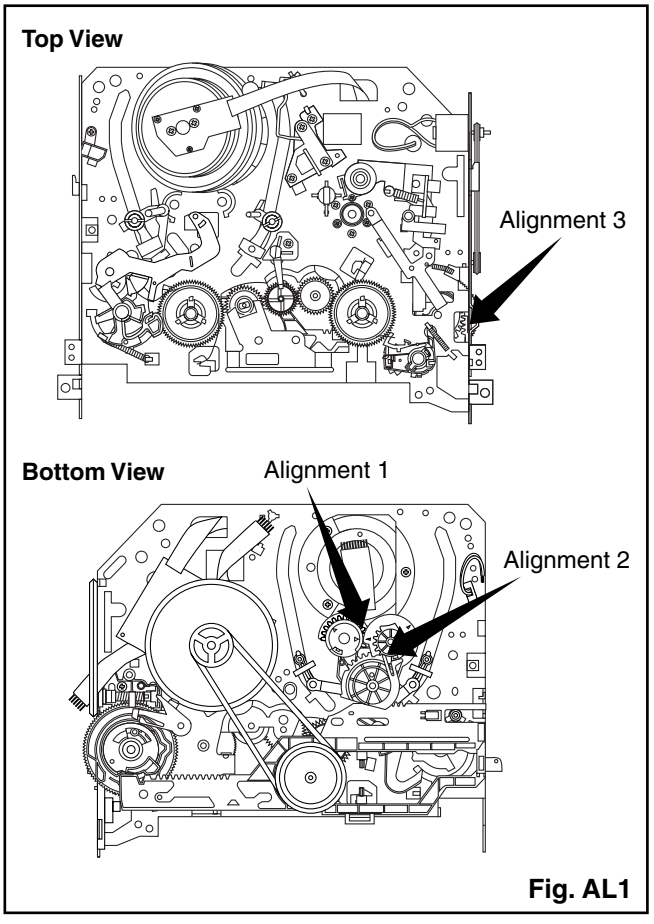


Fig. AL1

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.

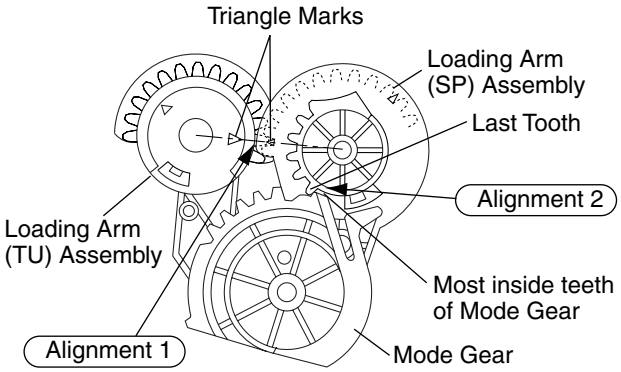


Fig. AL2

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.

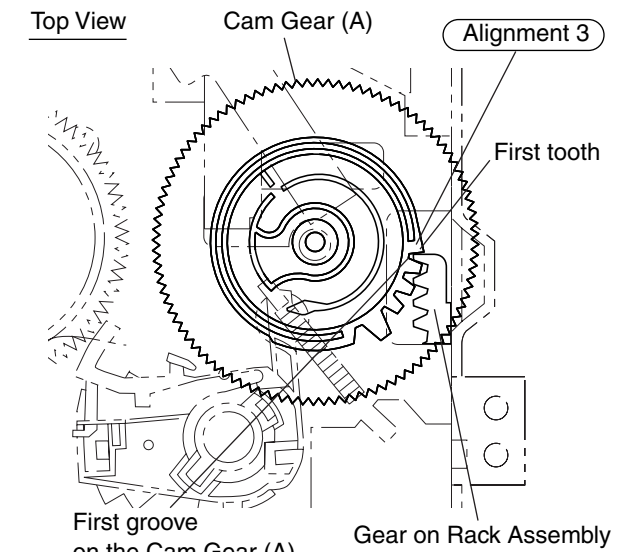
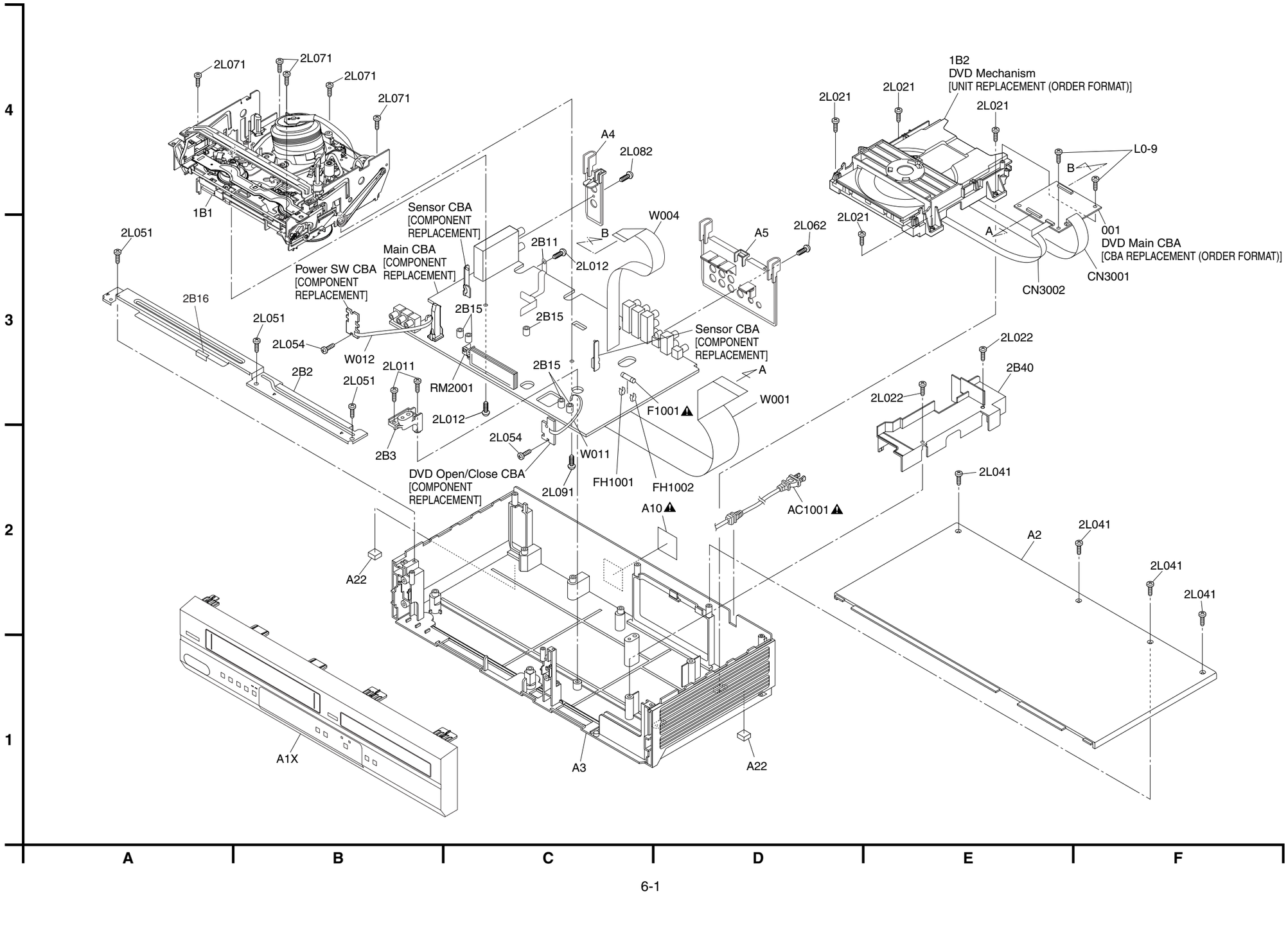


Fig. AL3

6 EXPLODED VIEWS AND PARTS LIST

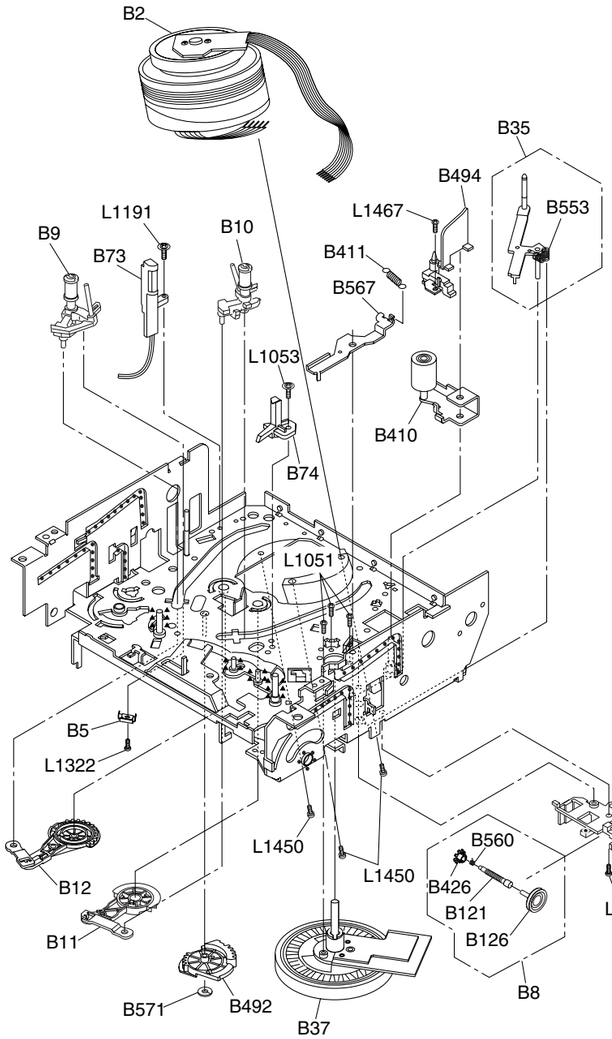
6-1 EXPLODED VIEWS

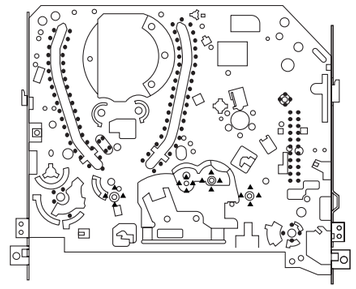
6-1-1 Cabinet Section



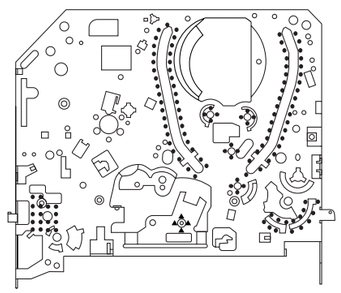
6-1-2 Deck Mechanism View 1 Section

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





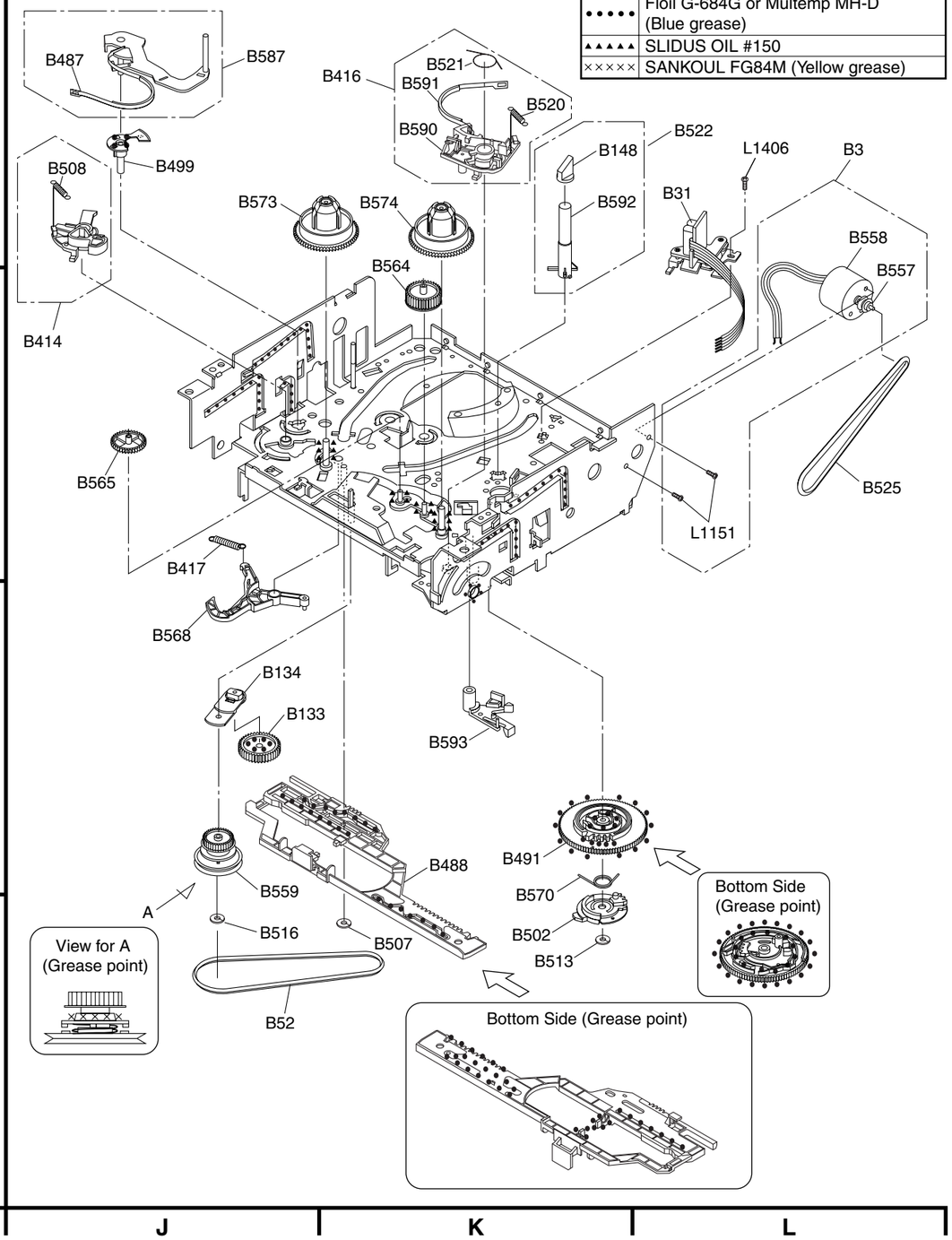
Chassis Assembly
Top View (Lubricating Point)



Chassis Assembly
Bottom View (Lubricating Point)

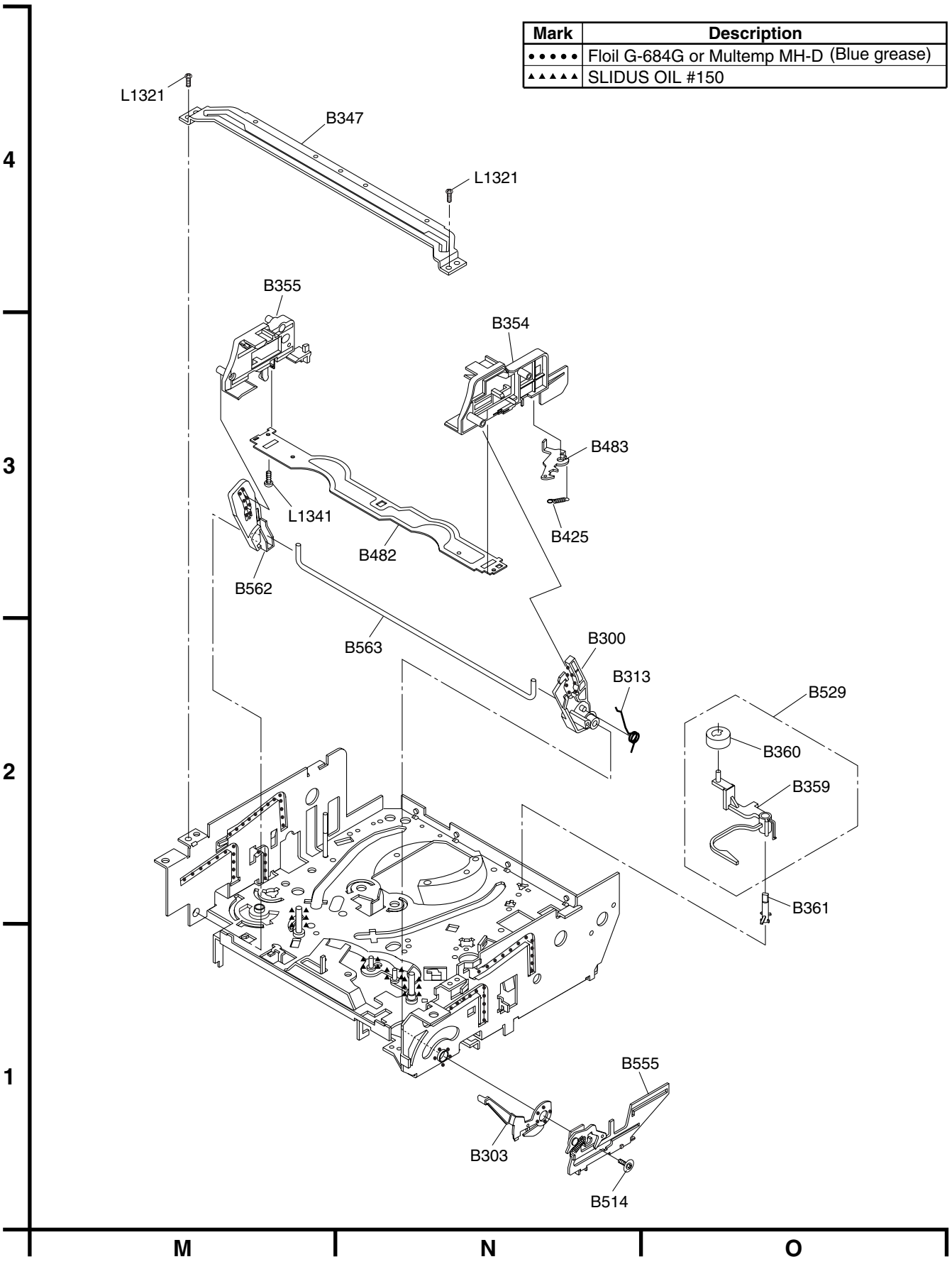
6-1-3 Deck Mechanism View 2 Section

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

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



6-2 REPLACEMENT PARTS LIST

6-2-1 Mechanical Parts List

SYMBOL-NO	P-NO	DESCRIPTION
		MECHANISM SECTION
A1X	TJ18631	FRONT ASSEMBLY H9850UD
A2	TJ18632	TOP CASE H9650UD
A4	TJ17701	JACK BOARD(TUNER) H9600UD
A5	TJ17702	JACK BOARD(RCA) H9600UD
A22	TJ17644	CHASSIS FOOT H79P9JD
1B1	TJ18655	DECK ASSEMBLY CZD014/VM2465
1B2	TJ18654	DVD MECHA E6160(FG LESS) N79F0JVM
2B2	TJ17646	TOP BRACKET H9600UD
2B3	TJ17647	RODER HOLDER H9600UD
2B11	TJ17657	HEAD SHIELD H9600UD
2B15	TJ15122	BUSH LED(F) H3700UD
2B40	TJ17648	PARTITION PLATE H9600UD
2L011	TJ10177	P-TIGHT SCREW 3X8 BIND +
2L012	TJ10176	SCREW S-TIGHT M3X6 BIND HEAD+
2L021	TJ18633	SCREW P-TIGHT 3X12 BIND HEAD+
2L022	TJ10177	P-TIGHT SCREW 3X8 BIND +
2L041	TE13193	SCREW P-TIGHT 3X10 BIND HEAD+
2L051	TJ14057	SCREW P-TIGHT M3X6 BIND HEAD+
2L054	TJ14057	SCREW P-TIGHT M3X6 BIND HEAD+
2L062	TJ15892	SCREW B-TIGHT M3X8 BIND HEAD +
2L071	TJ10119	SCREW P-TIGHT M3X10 WASHER HEAD+
2L082	TJ16883	SCREW S-TIGHT M3X5 BIND HEAD +
2L091	TJ15954	SCREW P-TIGHT M3X8 BIND HEAD+
L0-9	TJ10177	P-TIGHT SCREW 3X8 BIND +
B2	TJ18649	CYLINDER ASSEMBLY MK12.5 NTSC 6HD
B3	TJ17675	LOADING MOTOR ASSEMBLY MK12.5
B5	TJ17766	SLIDE PLATE MK12.5
B8	TS18414	PULLEY ASSEMBLY MK12
B9	TJ17676	MOVING GUIDE S P.P MK12.5
B10	TJ17677	MOVING GUIDE T P.P MK12.5
B11	TJ16894	LOADING ARM(TU) ASSEMBLY MK12
B12	TJ16895	LOADING ARM(SP) ASSEMBLY MK12
B31	TJ17678	AC HEAD ASSEMBLY MK12.5
B35	TJ17679	TAPE GUIDE ARM ASSEMBLY MK12.5
B37	TJ17681	CAPSTAN MOTOR 288/VCZC1300
B52	TJ15161	CAP BELT MK10
B73	TJ17682	FE HEAD(MK11) MH-131SF11
B74	TJ15163	PRISM MK10
B121	TJ16896	WORM MK12
B126	TJ17196	PULLEY MK12
B133	TJ16898	IDLER GEAR MK12
B134	TJ16899	IDLER ARM MK12
B148	TJ15984	TG CAP MK11
B300	TJ16901	C DRIVE LEVER(TU) MK12
B303	TJ17683	F DOOR OPENER MK12
B313	TJ16903	C DRIVE SPRING MK12
B347	TJ15987	GUIDE HOLDER A MK10
B354	TJ17197	SLIDER(TU) MK12
B355	TJ15103	SLIDER(SP) MK12
B359	TJ15103	CLEANER LEVER MK10
B360	TJ14676	CLEANER ROLLER MK9
B361	TJ15105	CL POST MK10
B410	TJ17685	PINCH ARM(A) ASSEMBLY(6) MK12.5
B411	TJ16906	PINCH SPRING MK12
B414	TJ17686	M BRAKE(SP) ASSEMBLY MK12.5
B416	TS18421	M BRAKE(TU) ASSEMBLY MK12
B417	TJ17687	TENSION SPG(3002645) MK12.5
B425	TJ15185	LOCK LEVER SPRING MK10
B426	TJ15186	KICK PULLEY MK10
B482	TJ18651	CASSETTE PLATE
B483	TJ16909	LOCK LEVER MK12
B487	TJ16911	BAND BRAKE(SP) MK12
B488	TJ17688	MODE LEVER MK12.5
B491	TJ16913	CAM GEAR(A) MK12
B492	TJ16914	MODE GEAR MK12
B494	TJ16915	C DOOR OPENER MK12
B499	TJ16916	T LEVER HOLDER MK12
B501	TJ16917	WORM HOLDER MK12
B502	TJ16918	CAM GEAR(B) MK12
B507	TJ14034	REEL WASHER MK9 5*2.1*0.5
B508	TJ15199	S BRAKE SPRING MK10
B513	TJ16919	CAM WASHER MK12
B514	TJ15202	SCREW RACK MK10
B516	TJ14034	REEL WASHER MK9 5*2.1*0.5
B520	TJ16921	TU BRAKE SPRING MK12
B521	TJ16922	REV BRAKE SPRING MK12
B522	TS17454	TG POST ASSEMBLY MK11
B525	TJ16001	LDG BELT MK11
B529	TJ15106	CLEANER ASSEMBLY MK10
B553	TJ16003	REV SPRING MK11
B555	TS18422	RACK ASSEMBLY MK12
B557	TJ15215	MOTER PULLEY U5
B558	TJ17689	LOADING MOTOR M31E-1 R-14 7401
B559	TS18423	CLUTCH ASSEMBLY MK12
B560	TJ15303	KICK SPRING MK10
B562	TJ16924	C DRIVE LEVER(SP) MK12
B563	TJ16925	SLIDER SHAFT MK12
B564	TJ16926	M GEAR MK12
B565	TJ16927	SENSOR GEAR MK12
B567	TJ16928	PINCH ARM(B) MK12
B568	TJ16929	BT ARM MK12
B570	TJ16035	CAM RACK SPRING(HI) MK11
B571	TJ14727	P.S.W CUT 1.6X4.0X0.5T
B573	TJ16931	REEL(SP)(D2) MK12
B574	TJ16932	REEL(TU)(D2) MK12
B587	TS18424	TENSION LEVER ASSEMBLY MK12
B590	TJ17202	BRAKE ARM(TU) MK12
B591	TJ16935	BAND BRAKE(TU) MK12

SYMBOL-NO	P-NO	DESCRIPTION
B592	TJ16936	TG POST MK11
B593	TJ17691	CAM HOLDER ASSEMBLY MK12.5
L1051	TJ14055	SCREW B-TIGHT M2.6X6 PAN HEAD+
L1053	TJ14283	SCREW S-TIGHT M2.6X8 WASHER HEAD+
L1151	TJ15236	SCREW SEMS M2.6X4 PAN HEAD+
L1191	TJ14283	SCREW S-TIGHT M2.6X8 WASHER HEAD+
L1321	TJ10176	SCREW S-TIGHT M3X6 BIND HEAD+
L1322	TJ15241	SCREW B-TIGHT M2.3X4 BIND HEAD+
L1341	TJ18652	SCREW P-TIGHT M2X6 PAN HEAD+
L1406	TJ14735	AC HEAD SCREW MK9
L1450	TE12971	SCREW SEMS M2.6X5 PAN HEAD+
L1466	TJ14066	SCREW S-TIGHT M2.6X6 BIND HEAD+
L1467	TJ18653	SCREW M2.6X5 WASHER HEAD+
		ACCESSORIES
X1	TS19223	REMOTE CONTROL UNIT NA233UD
X3	TE15081	RF CABLE 2.5C-2V
X5	TJ15698	AV CORD TSCKA-Y/RW100
⚠ X20	TJ18536	OWNERS MANUAL H9850UD
001	TJ18635	DVD MAIN CBA UNIT

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
		CAPACITOR
⚠ C1001	TJ18638	METALLIZED FILM CAP. 0.047UF/250V M
C1003	TE12005	CERAMIC CAP. B K 0.01UF/500V
C1005	TE12014	CERAMIC CAP. B K 120PF/500V
⚠ C1006	TJ18639	SAFTY CAP. 3300PF/250V
		SEMI-CONDUCTORS
D013	TE13211	RECTIFIER DIODE BA158
D015	TJ17658	SCHOTTKY BARRIER DIODE SB370
D016	TJ18641	SCHOTTKY BARRIER DIODE SB240-B/P
D031	TJ18642	ZENER DIODE DZ-16BSBT265
D040	TC12191	ZENER DIODE DZ-6.8BSBT265
D052	TJ13919	ZENER DIODE DZ-10BSBT265
D062	TJ18643	ZENER DIODE DZ-4.3BSCT265
D063	TC10752	RECTIFIER DIODE 1N4005
D080	TC10752	RECTIFIER DIODE 1N4005
D082	TC10752	RECTIFIER DIODE 1N4005
D100	TC10112	SWITCHING DIODE 1N4148M
D101	TC10112	SWITCHING DIODE 1N4148M
D451	TC10112	SWITCHING DIODE 1N4148M
D501	TC10112	SWITCHING DIODE 1N4148M
D504	TC10112	ZENER DIODE MTZJT-7718B
D555	TJ13898	LED SIR-563ST3F P
D564	TJ15414	LED(RED) 204HD/E
D565	TJ15414	LED(RED) 204HD/E
D566	TC12491	LED(GREEN) 204-10GD/S957
D567	TC12491	LED(GREEN) 204-10GD/S957
D701	TC10112	ZENER DIODE MTZJT-7733D
D777	TJ18644	ZENER DIODE DZ-5.6BSAT265
D1001	TC10752	RECTIFIER DIODE 1N4005
D1002	TC10752	RECTIFIER DIODE 1N4005
D1003	TC10752	RECTIFIER DIODE 1N4005
D1004	TC10752	RECTIFIER DIODE 1N4005
D1007	TC12471	ZENER DIODE DZ-39BSBT265
D1008	TC10877	SCHOTTKY BARRIER DIODE SB140
D1010	TE13211	RECTIFIER DIODE BA158
D1011	TE13211	RECTIFIER DIODE BA158
D1012	TC10112	SWITCHING DIODE 1N4148M
D1016	TJ15333	RECTIFIER DIODE FR101
D1017	TC10754	ZENER DIODE DZ-18BSBT265
D1017	TC10112	ZENER DIODE MTZJT-7718B
D1018	TC10112	SWITCHING DIODE 1N4148M
D1020	TC10877	SCHOTTKY BARRIER DIODE SB140
D1022	TC10112	SWITCHING DIODE 1N4148M
D1023	TC10774	CARBON RES. 1/4W J 1K OHM
D1024	TC10112	SWITCHING DIODE 1N4148M
D1025	TC10112	SWITCHING DIODE 1N4148M
D1036	TC10752	RECTIFIER DIODE 1N4005
D1037	TC10752	RECTIFIER DIODE 1N4005
D1038	TC10752	RECTIFIER DIODE 1N4005
D1058	TC10752	RECTIFIER DIODE 1N4005
D1301	TJ13895	ZENER DIODE DZ-5.6BSBT265
⚠ IC1001	TC12221	PHOTOCOUPLER EL817B
⚠ IC1001	TE13224	PHOTOCOUPLER LTV-817B-F
IC1002	TJ18647	VOLTAGE REGULATOR PQ1LAX95MSPQ
IC1004	TJ18647	VOLTAGE REGULATOR PQ1LAX95MSPQ
IC1201	TC12251	IC OP AMP KIA4558P
IC1402	TJ17591	DRIVER FOR DVD MM1637XVBE
IC301	TJ17659	IC Y/C/A LA71205M-MPB-E
IC451	TJ18645	IC HIFI AN3663FBP-TV
IC501	TJ18646	SYSCON IC MN101D08DES
IC571	TC12684	FL DRIVER IC PT6313-S-TP
IC751	TC12531	IC SWITCH TC4053BF(N)
Q031	TC10782	TRANSISTOR KTA1267(Y)
Q052	TC10779	RES. BUILT-IN TRANSISTOR KRC103M
Q055	TC12687	TRANSISTOR KTC3198(Y)
Q056	TJ15283	TRANSISTOR 2SC2001(K)
Q063	TC10782	TRANSISTOR KTA1267(Y)
Q064	TC10778	TRANSISTOR KTC3199(Y)
⚠ Q1001	TC12694	FET 2SK3543
Q1003	TC10778	TRANSISTOR 2SC1815-Y(TPE2)
Q1004	TJ15283	TRANSISTOR 2SC2001(K)
Q1005	TC10778	TRANSISTOR KTC3199(Y)
Q1006	TC10782	TRANSISTOR KTA1267(Y)
Q1008	TC10778	TRANSISTOR KTC3199(Y)
Q1011	TC10861	TRANSISTOR KTC3203(Y)
Q1201	TC10778	TRANSISTOR KTC3199(Y)
Q1202	TC10778	TRANSISTOR KTC3199(Y)
Q1204	TC10784	TRANSISTOR KTA1266(GR)
Q1351	TC10778	TRANSISTOR KTC3199(Y)
Q1385	TC10778	TRANSISTOR KTC3199(Y)
Q301	TC10784	TRANSISTOR KTA1266(GR)
Q302	TC10783	TRANSISTOR KTC3193(Y)
Q303	TC10783	TRANSISTOR KTC3193(Y)
Q391	TC10784	TRANSISTOR KTA1266(GR)
Q421	TC10784	TRANSISTOR KTA1266(GR)
Q422	TC10861	TRANSISTOR KTC3203(Y)
Q425	TC10779	RES. BUILT-IN TRANSISTOR KRA103M
Q426	TE15523	CHIP TRANSISTOR RN1511(TE85R)
Q428	TC10778	TRANSISTOR KTC3199(Y)
Q429	TC10778	TRANSISTOR KTC3199(Y)
Q430	TC10784	TRANSISTOR KTA1266(GR)
Q432	TC10779	RES. BUILT-IN TRANSISTOR KRC103M
Q501	TC10778	TRANSISTOR KTC3199(BL)
Q503	TC10782	PHOTO TRANSISTOR PT204-6B-12
Q504	TC10782	PHOTO TRANSISTOR PT204-6B-12
Q506	TC10782	PHOTO TRANSISTOR PT204-6B-12
Q563	TC10782	TRANSISTOR KTA1267(Y)

SYMBOL-NO	P-NO	DESCRIPTION
Q565	TC10782	TRANSISTOR KTA1267(Y)
Q566	TC10778	TRANSISTOR KTC3199(Y)
Q567	TC10778	TRANSISTOR KTC3199(Y)
TRANSFORMER		
⚠ T001	TJ18661	SWITCHING TRANSFOMER CGS-SW0085A
COILS		
L009	TJ13911	CHOKE COIL 47UH-K
⚠ L1001	TA14541	LINE FILTER 27MH TLF14CB2730R4
L1004	TA12575	BEAD CORE B16 RH 3.5X10X1.3
L1007	TJ13911	CHOKE COIL 47UH-K
L1020	TJ13911	CHOKE COIL 47UH-K
L1350	TA12561	INDUCTOR(100UH K) LAP02TA101K
L1351	TA14481	INDUCTOR(0.47UH K) LAP02TAR47K
L1522	TJ13915	INDUCTOR 47UH-K-5FT
L2001	TA12561	INDUCTOR(100UH K) LAP02TA101K
L303	TA12561	INDUCTOR(100UH K) LAP02TA101K
L304	TJ13911	CHOKE COIL 47UH-K
L421	TJ13915	INDUCTOR 47UH-K-5FT
L502	TJ13911	CHOKE COIL 47UH-K
L503	TA12562	INDUCTOR 12UH-K-26T
L701	TA12563	INDUCTOR 4.7UH-K-26T
CRYSTALS		
X301	TJ15146	XTAL 3.579545MHZ(20PPM)
X502	TJ15146	XTAL 32.768KHZ(20PPM)
MISCELLANEOUS		
⚠ AC1001	TJ17703	AC CORD PB8K9F9110A-05A
⚠ F1001	TJ18648	FUSE SIC 1A 250V U/C PSE
FH1001	TE11084	FUSE HOLDER MSF-015
FH1002	TE11084	FUSE HOLDER MSF-015
FIP502	TJ18594	V.F.D. 7-BT-298NYM
⚠ GP1001	TJ13894	GAP. FNR-G3.10D
JK1202	TE15134	RCA JACK(BLACK) MSP-281V2-B
JK1401	TE14821	S TYPE JACK MDC-050V-2.4
JK1403	TJ17664	RCA JACK MSP-283V-B-752 NI LF
JK751	TE15303	RCA JACK MSP-283V-B-324
JK752	TE15304	RCA JACK MSP-293V3-324
JK753	TJ15136	RCA JACK(YELLOW) MSP-281V4-B
JK754	TE15495	RCA JACK(WHITE) MSP-281V1-B
JK755	TE15496	RCA JACK(RED) MSP-281V3-A
JK756	TE15281	RCA JACK MSP-282V-12 PBSN
RM2001	TC12331	REMOTE RECEIVER PIC-37043LU
⚠ SA1001	TC10891	SURGE ABSORBER 470V+-10PER
SW2001	TE11957	TACT SWITCH KSM0614B
SW2002	TE11957	TACT SWITCH KSM0614B
SW2003	TE11957	TACT SWITCH KSM0614B
SW502	TE11957	TACT SWITCH KSM0614B

SYMBOL-NO	P-NO	DESCRIPTION
SW505	TE11957	TACT SWITCH KSM0614B
SW508	TE11957	TACT SWITCH KSM0614B
SW509	TE11957	TACT SWITCH KSM0614B
SW511	TE15484	LEAF SWITCH MXS01830MVP0
SW512	TJ17666	ROTARY MODE SWITCH SSS-53MD
SW513	TE11957	TACT SWITCH KSM0614B
SW514	TE11957	TACT SWITCH KSM0614B
SW515	TE11957	TACT SWITCH KSM0614B
SW516	TE11957	TACT SWITCH KSM0614B
SW518	TE11957	TACT SWITCH KSM0614B
TU701	TJ17668	TUNER UNIT VH025AFE
VR501	TA14561	CARBON P.O.T. VZ067TL1 B104 PB(F)
W001	TJ17669	FFC CABLE 27P FFC/P1.00/230
W004	TJ17762	FFC CABLE 17P FFC/P1.00/195
W011	TJ17673	PARALLEL WIRE 2P AWG26#2651/P2.0/125
W012	TJ17672	PARALLEL WIRE 3P AWG26#2651/P2.0/60

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

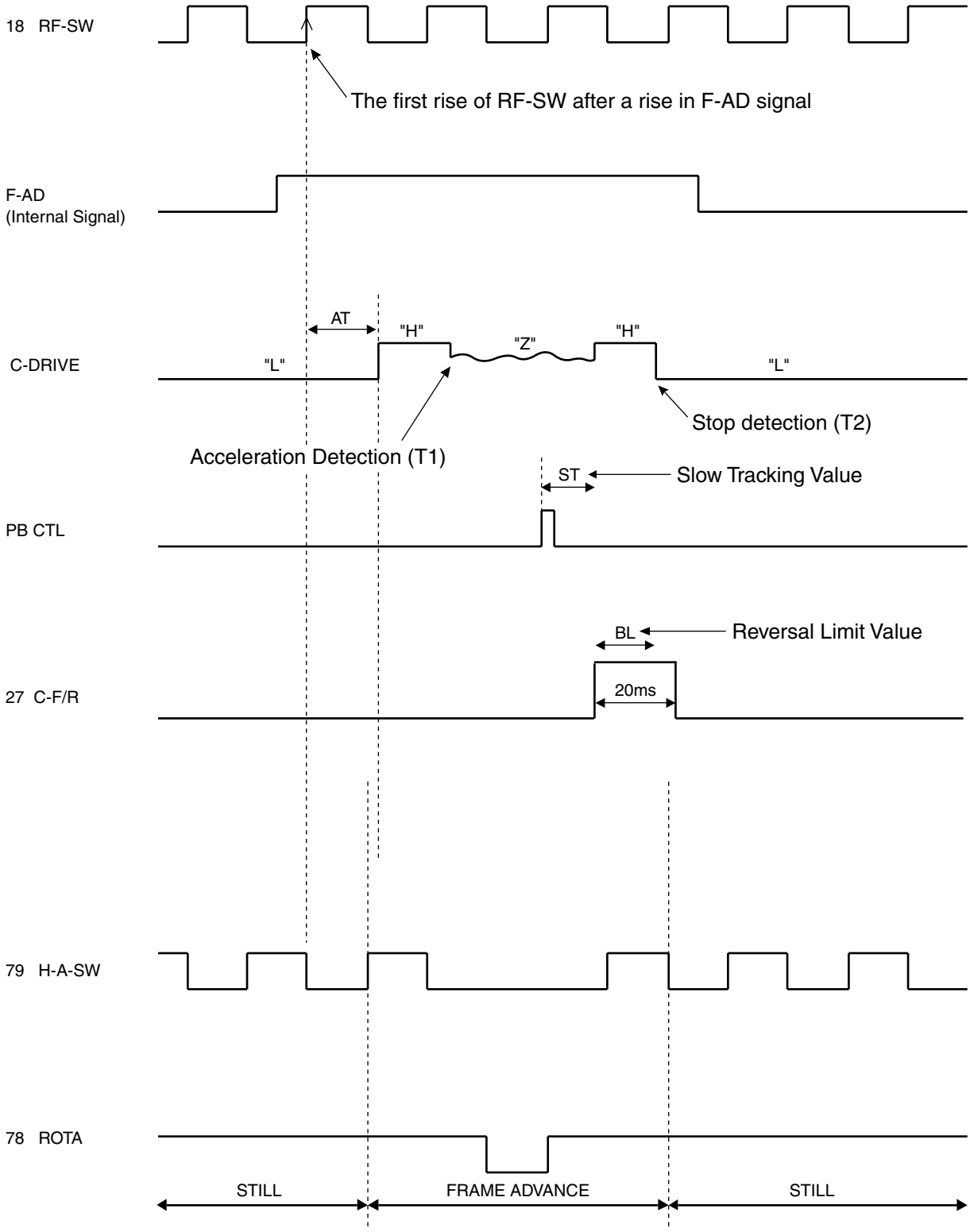


Fig. 1

2) LP/SLP Mode

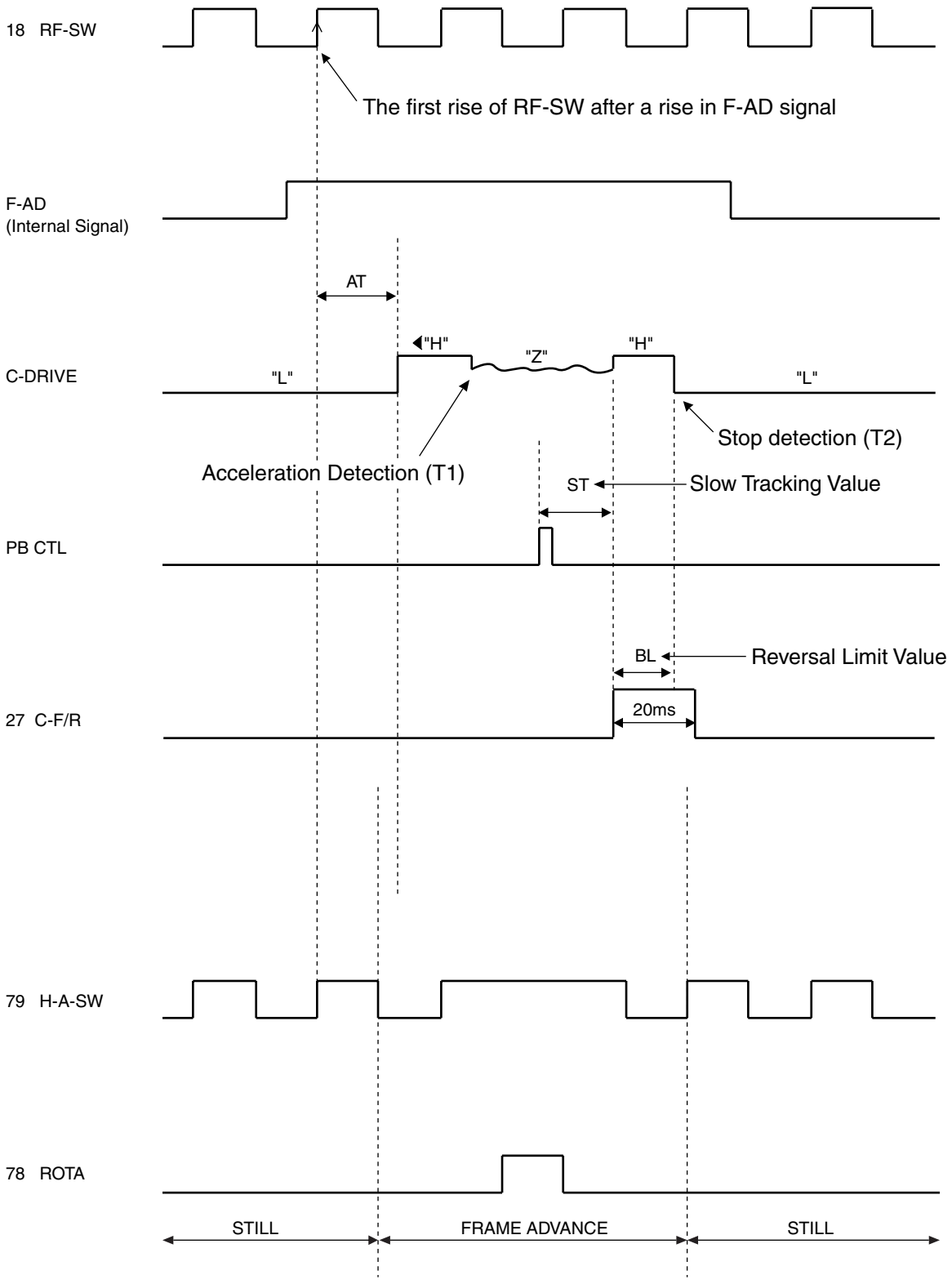


Fig. 2

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

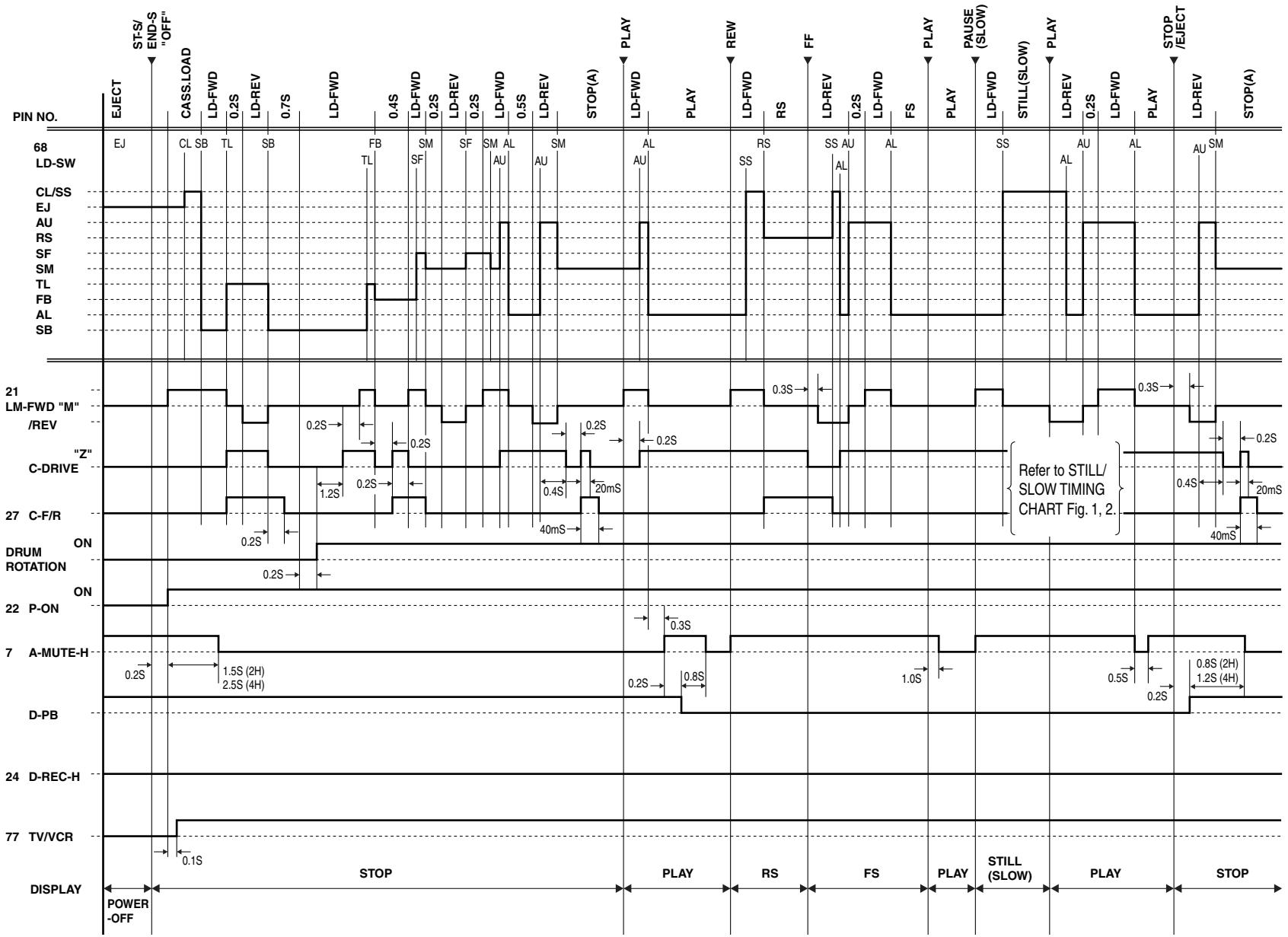


Fig. 3

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

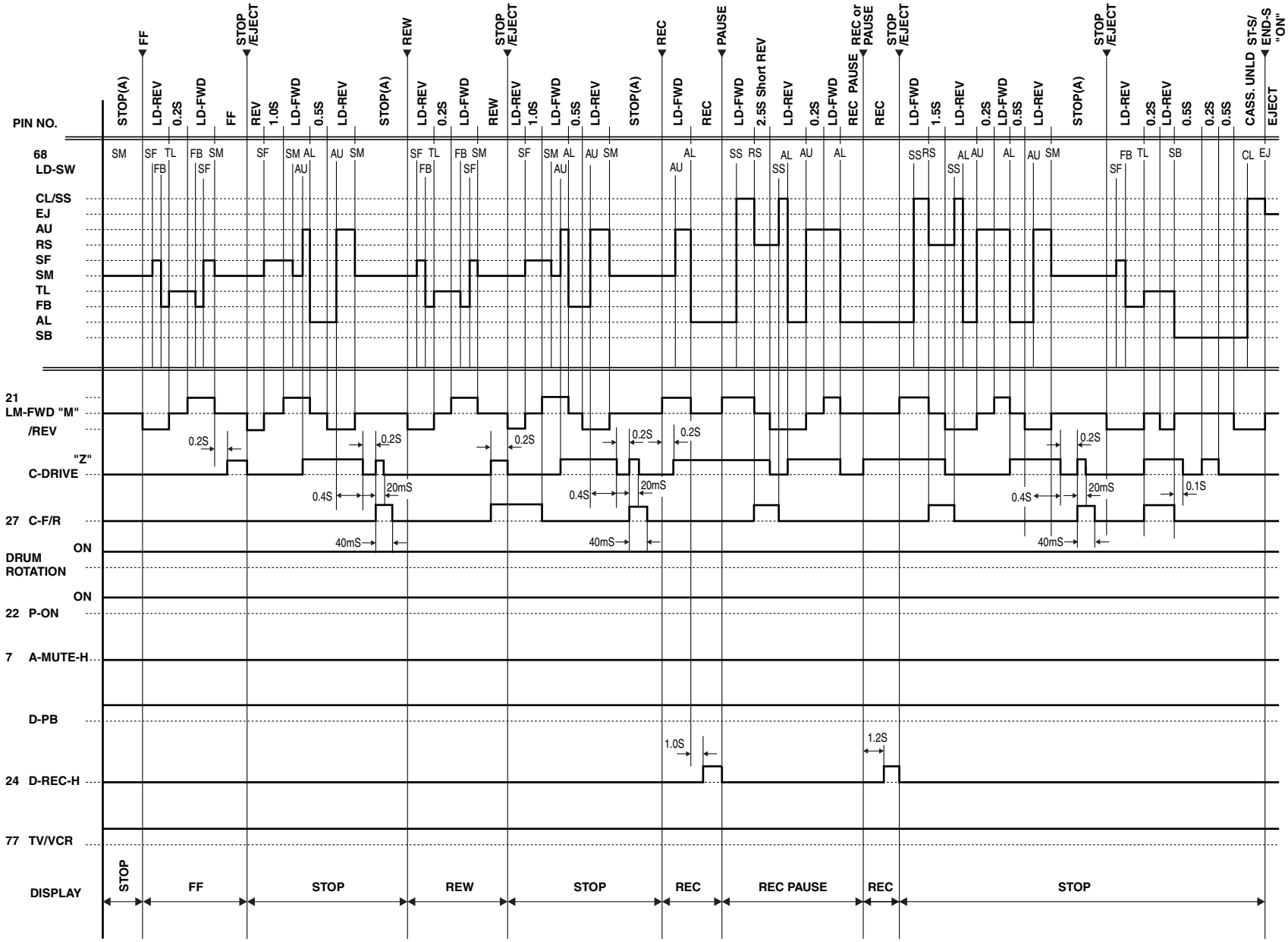
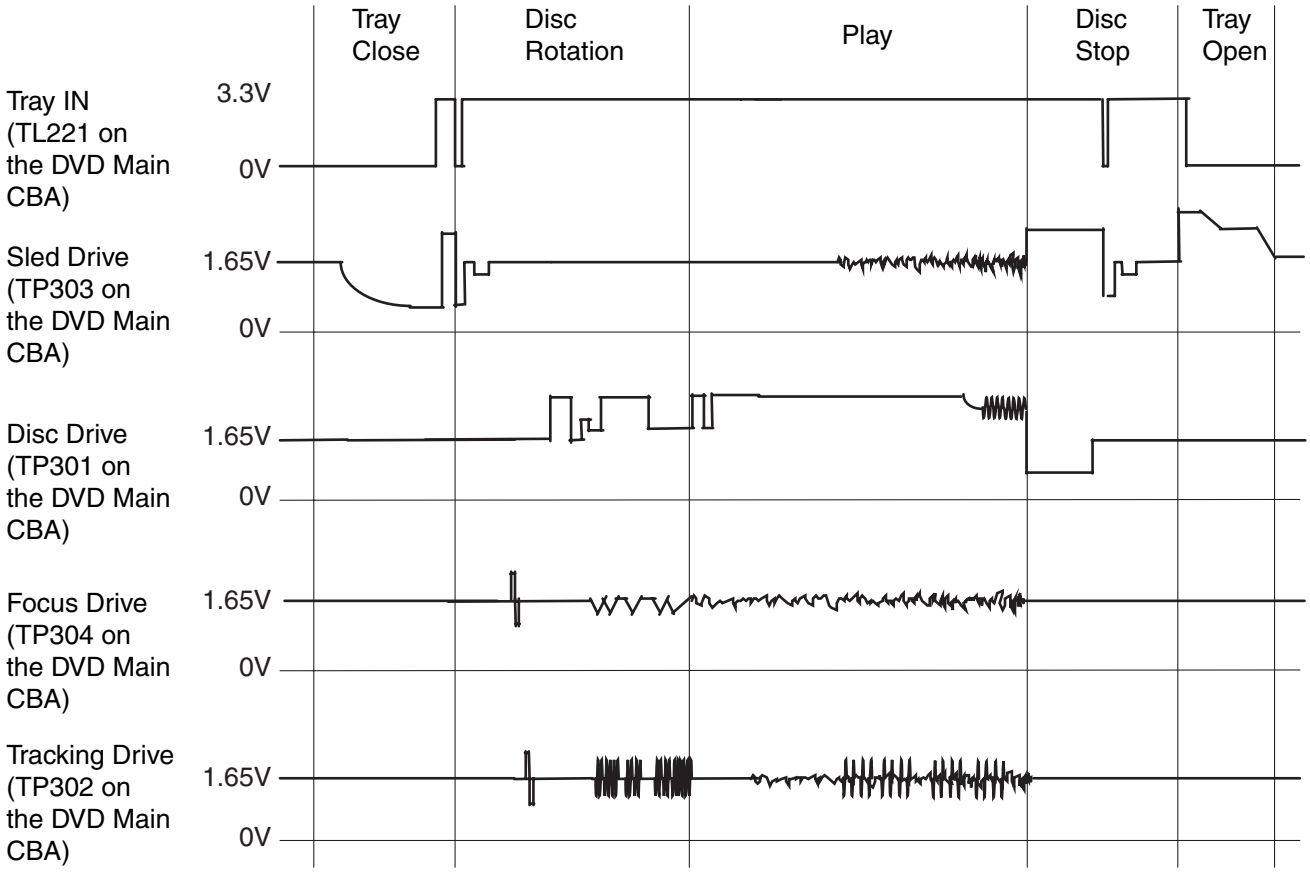


Fig. 4

[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-H	Power Voltage Down Detector Signal	H
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	AUDIO-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	IN	DVD-POW-MONITOR	DVD Power Monitor Signal (P-off="L", P-on="H")	H/L
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-IND	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:

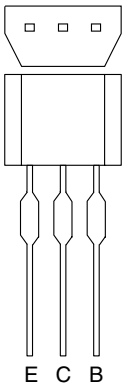
PWM -----Pulse Wide Modulation

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

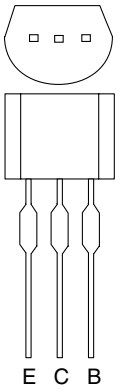
IC571 [PT6313-S-TP]

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

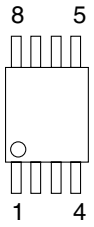


2SA1175(J,H,F)
2SC2785(J,H,F,K)
BA1F4M-T
BN1F4M-T
KRA103M
KRC103M
KTA1266(GR)
KTA1267(GR,Y)
KTC3193(Y)
KTC3199(Y,GR,BL)

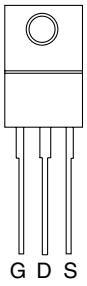


2SA1015-GR(TPE2)
2SC1815-BL(TPE2)
2SC1815-Y(TPE2)
2SC2120-Y(TPE2)
KTC3198(Y,GR)
KTC3203(Y)
2SC2001(K,L)

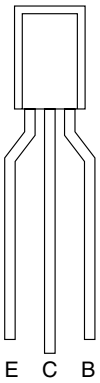
KIA4558P
RC4580IP
UTC4558
KIA4558P/P



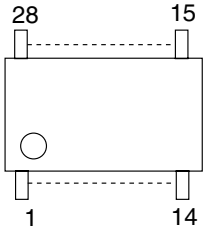
2SK3757(Q)
2SK3543



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

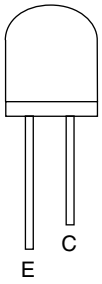


PT6313-S-TP
SC16313
PT6313-S-TP(L)
SC16313G

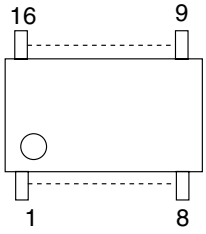


EL817A
EL817B
EL817C
LTV-817B-F
LTV-817C-F
PS2561A-1(Q,W)

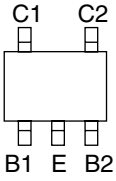
MID-32A22F
PT204-6B-12



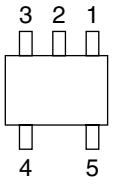
MM1637XVBE



FMG4A T148
RN1511(TE85R)

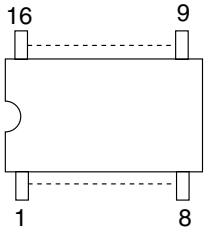


PQ1LAX95MSPQ

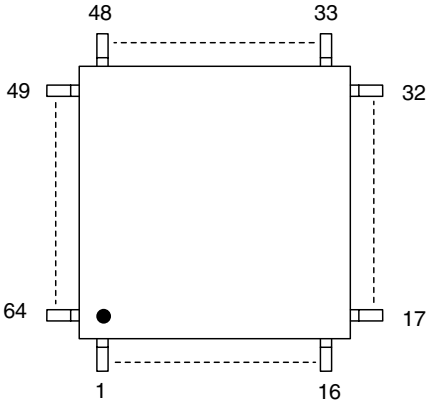


1: VREF
2: GND
3: VC
4: VIN
5: VOUT

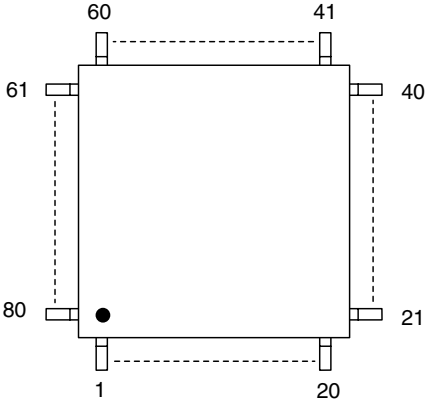
CD4053BCSJX
TC4053BF(N)



AN3663FBP-TV



LA71205M-MPB-E
MN101D08DES



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

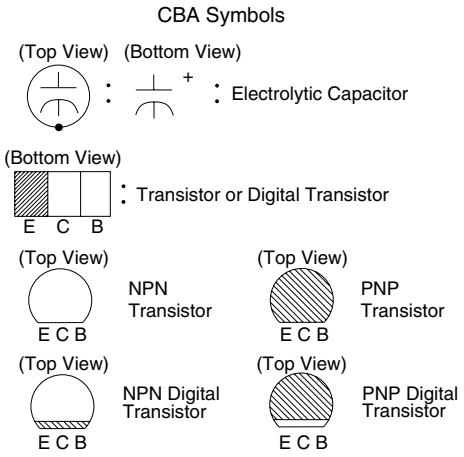
WARNING

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.

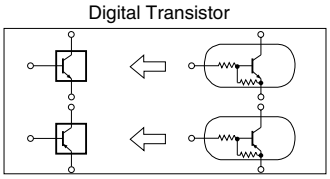
Capacitor Temperature Markings

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]

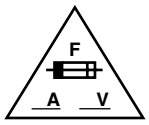
Item	Indication
Value	No indication.....μF P.....pF
Dielectric strength	No indication.....50V All dielectric strengths other than 50V are indicated in schematic diagrams.

[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.

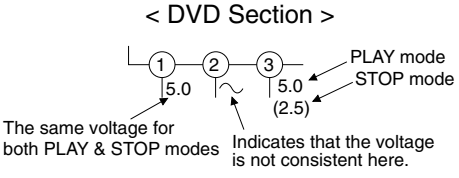
2. CAUTION:

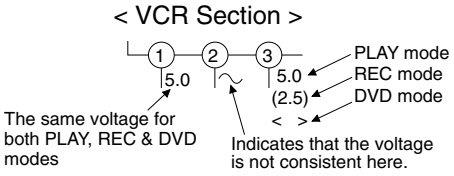
Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the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

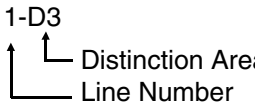
4. Voltage indications for PLAY and REC modes on the schematics are as shown below:



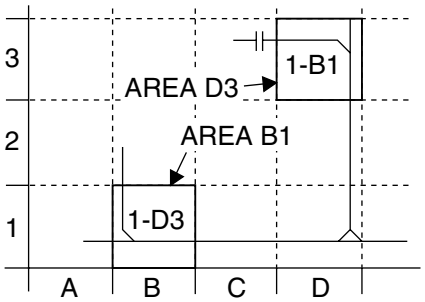


Unit: Volts

5. How to read converged lines



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



6. Test Point Information

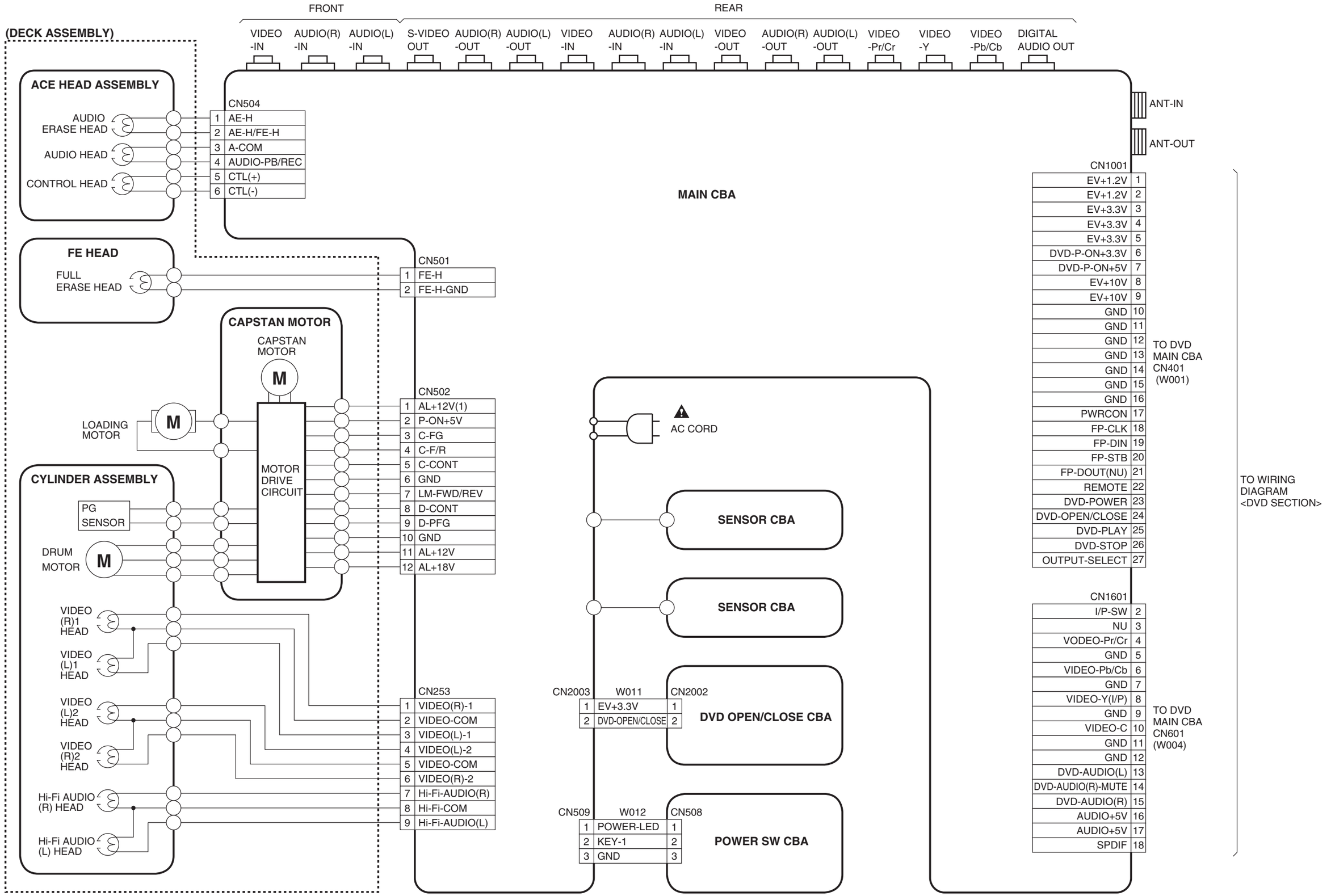
 : Indicates a test point with a jumper wire across a hole in the PCB.

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

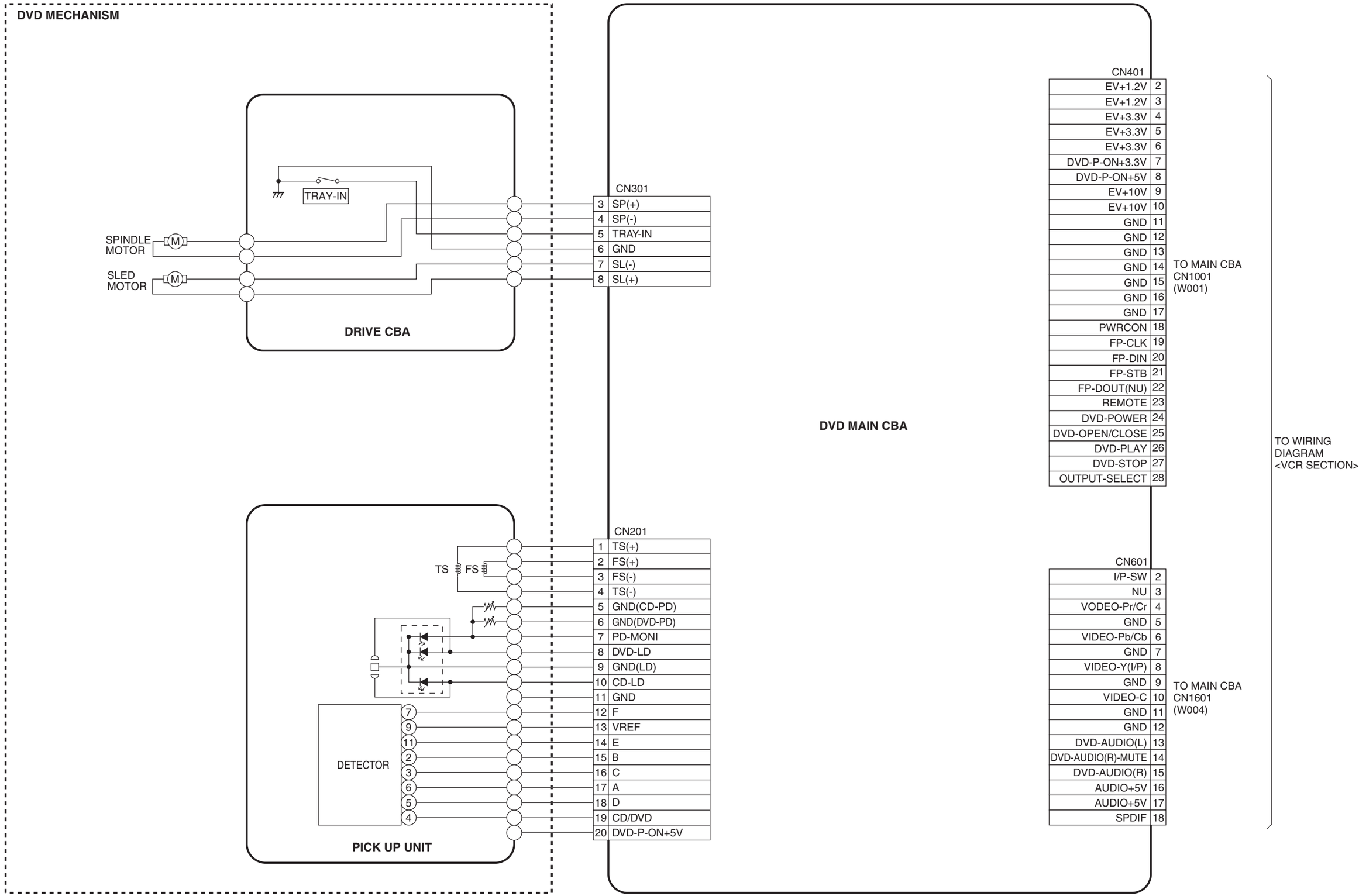
 : Used to indicate a test point with no test pin.

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

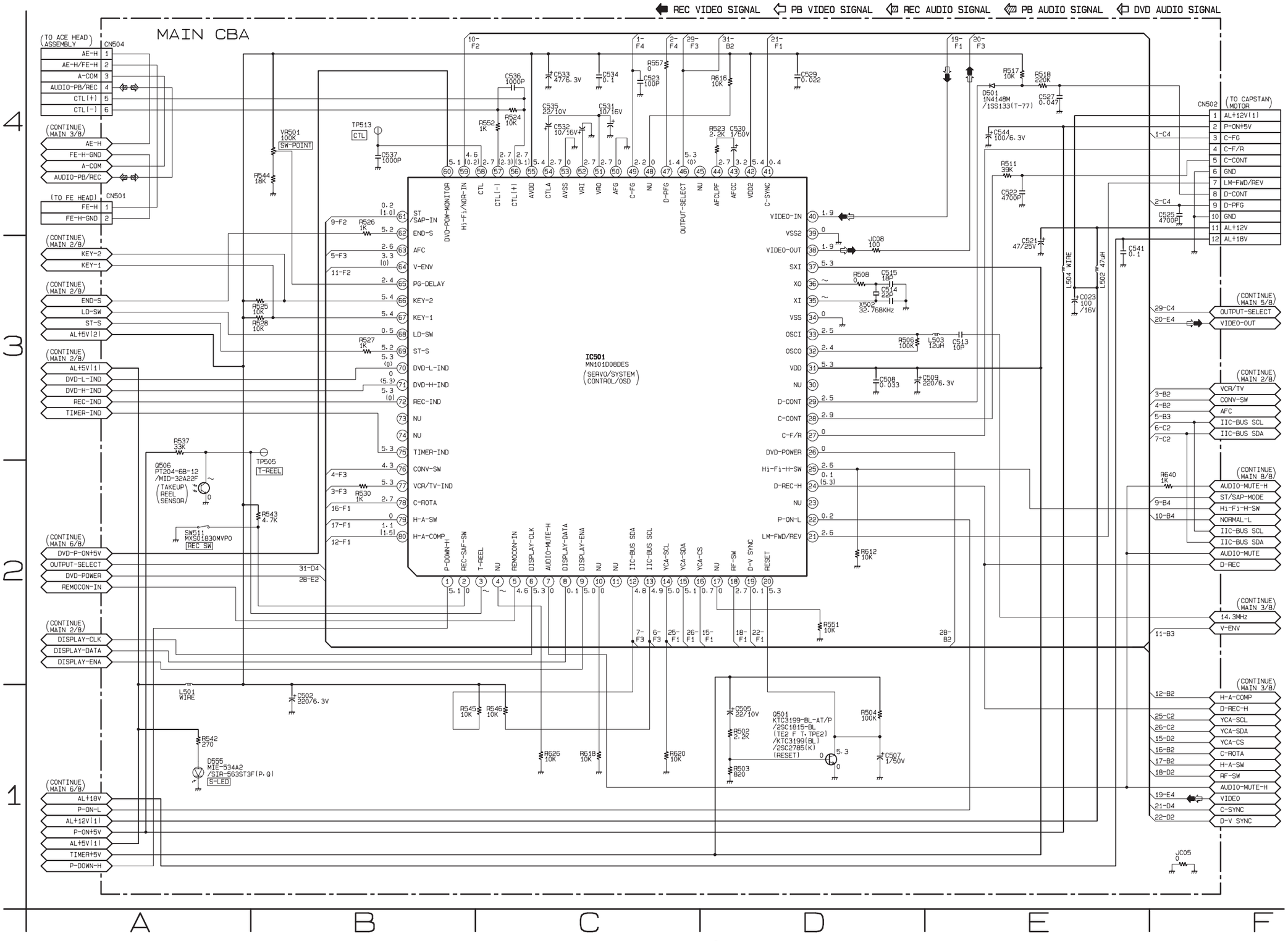
S-2 Wiring Diagrams < VCR SECTION >



S-3 Wiring Diagrams < DVD SECTION >



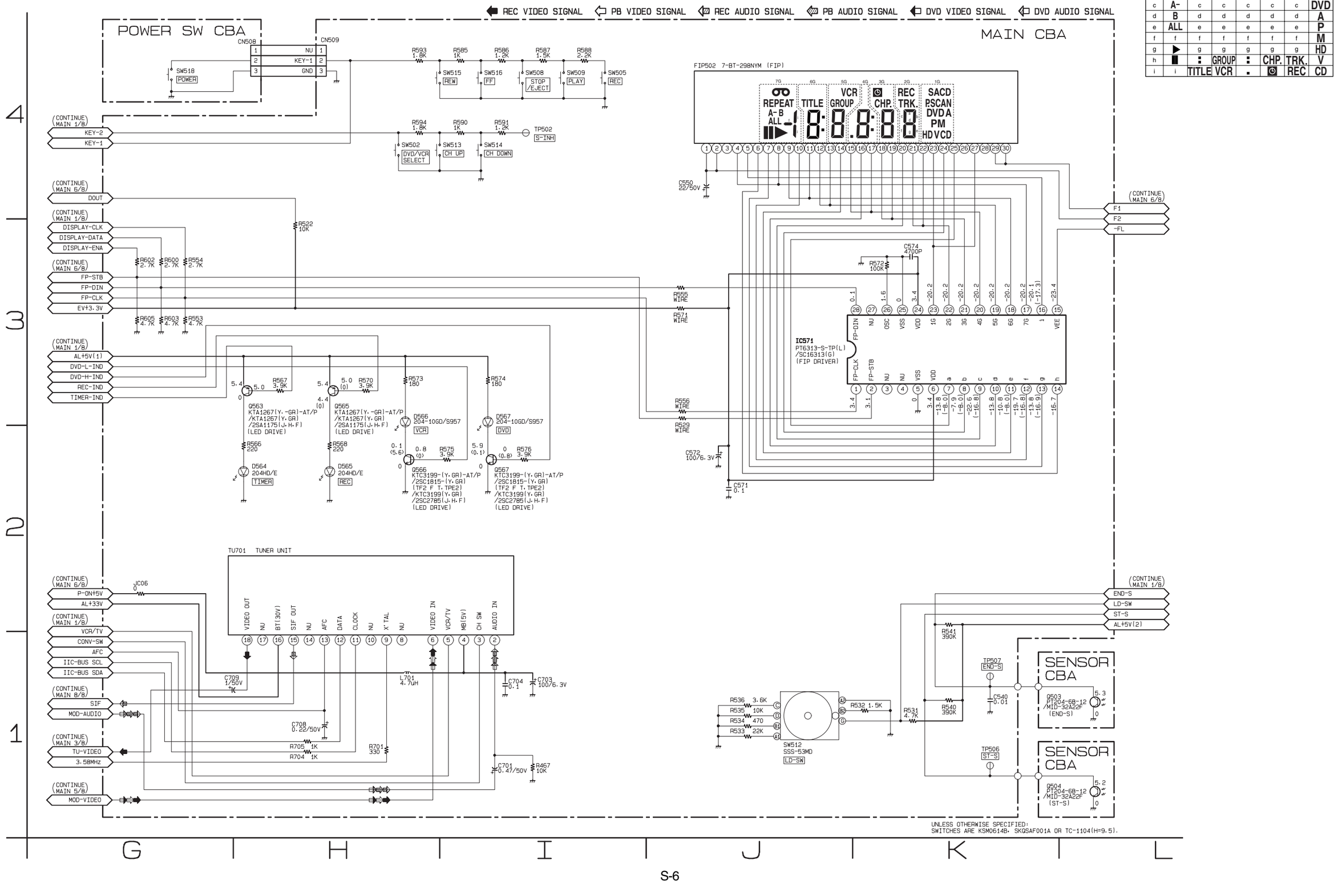
S-4 Main 1/8 Schematic Diagram



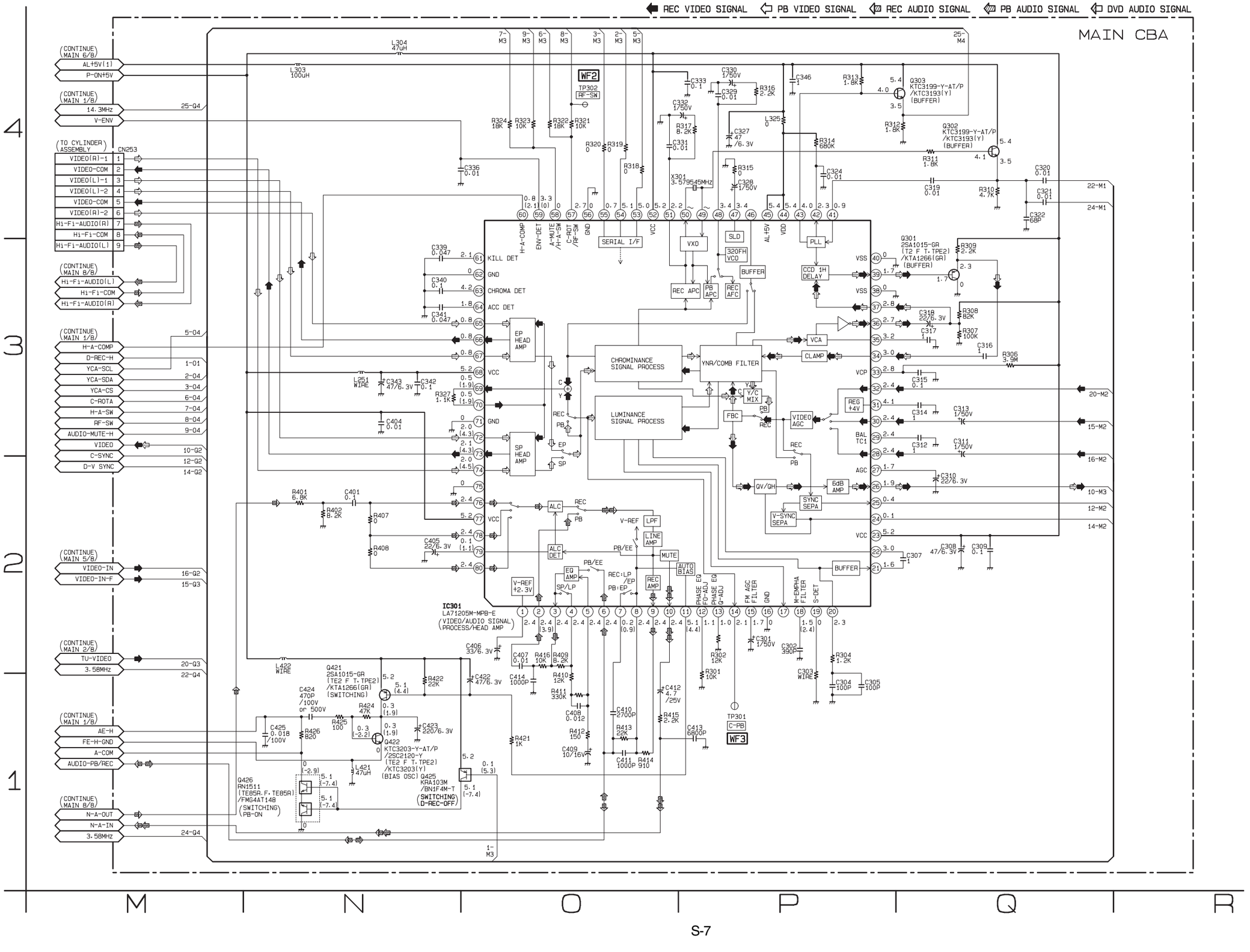
S-5 Main 2/8, Sensor & Power SW Schematic Diagram

FIP502 MATRIX CHART

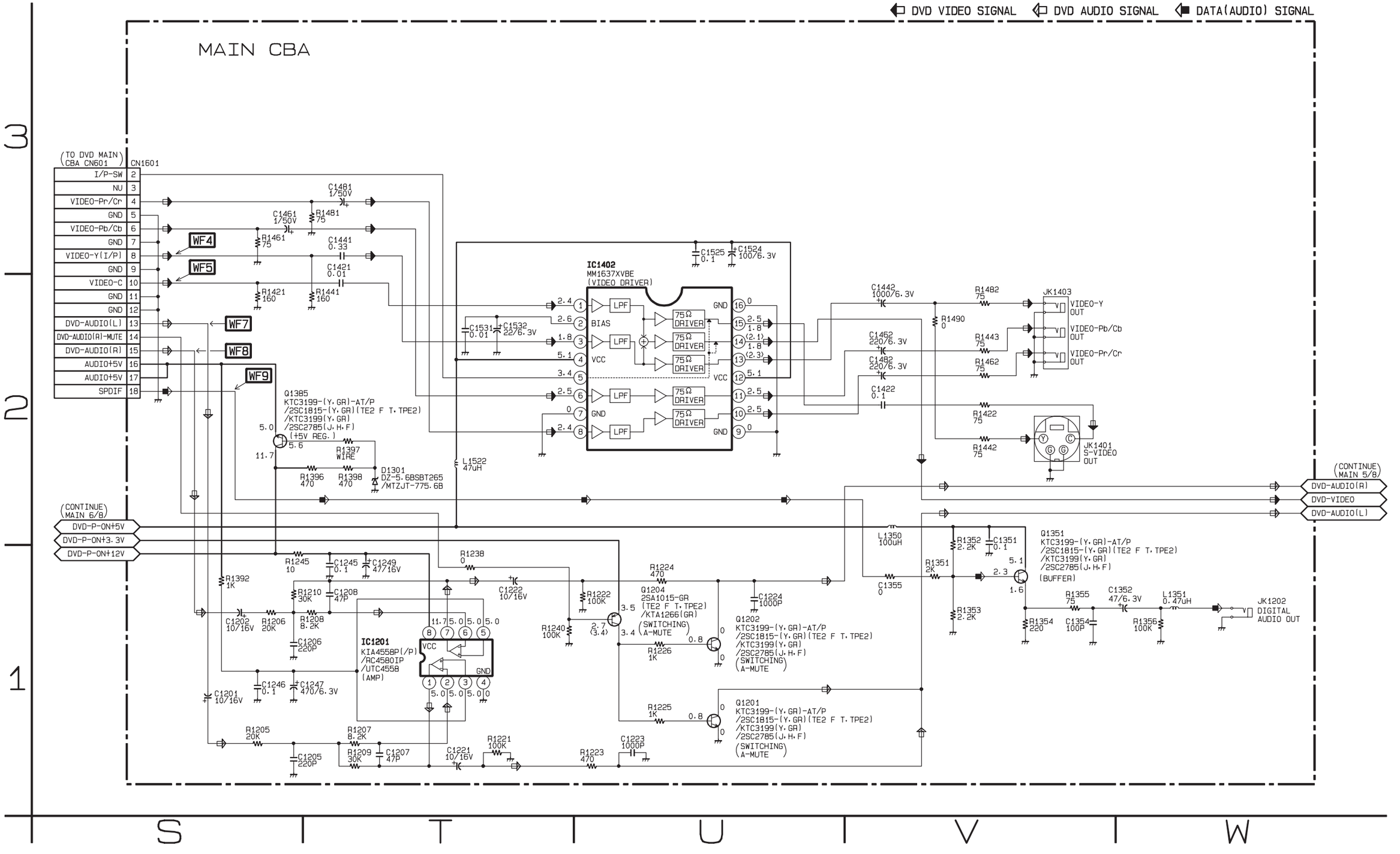
	7G	6G	5G	4G	3G	2G	1G
a	∞	a	a	a	a	a	SACD
b	REPEAT	b	b	b	b	b	PSCAN
c	A-	c	c	c	c	c	DVD
d	B	d	d	d	d	d	A
e	ALL	e	e	e	e	e	P
f	f	f	f	f	f	f	M
g	▶	g	g	g	g	g	HD
h	▮▮	:	GROUP	:	CHP.	TRK.	V
i	i	TITLE	VCR	.	⏲	REC	CD



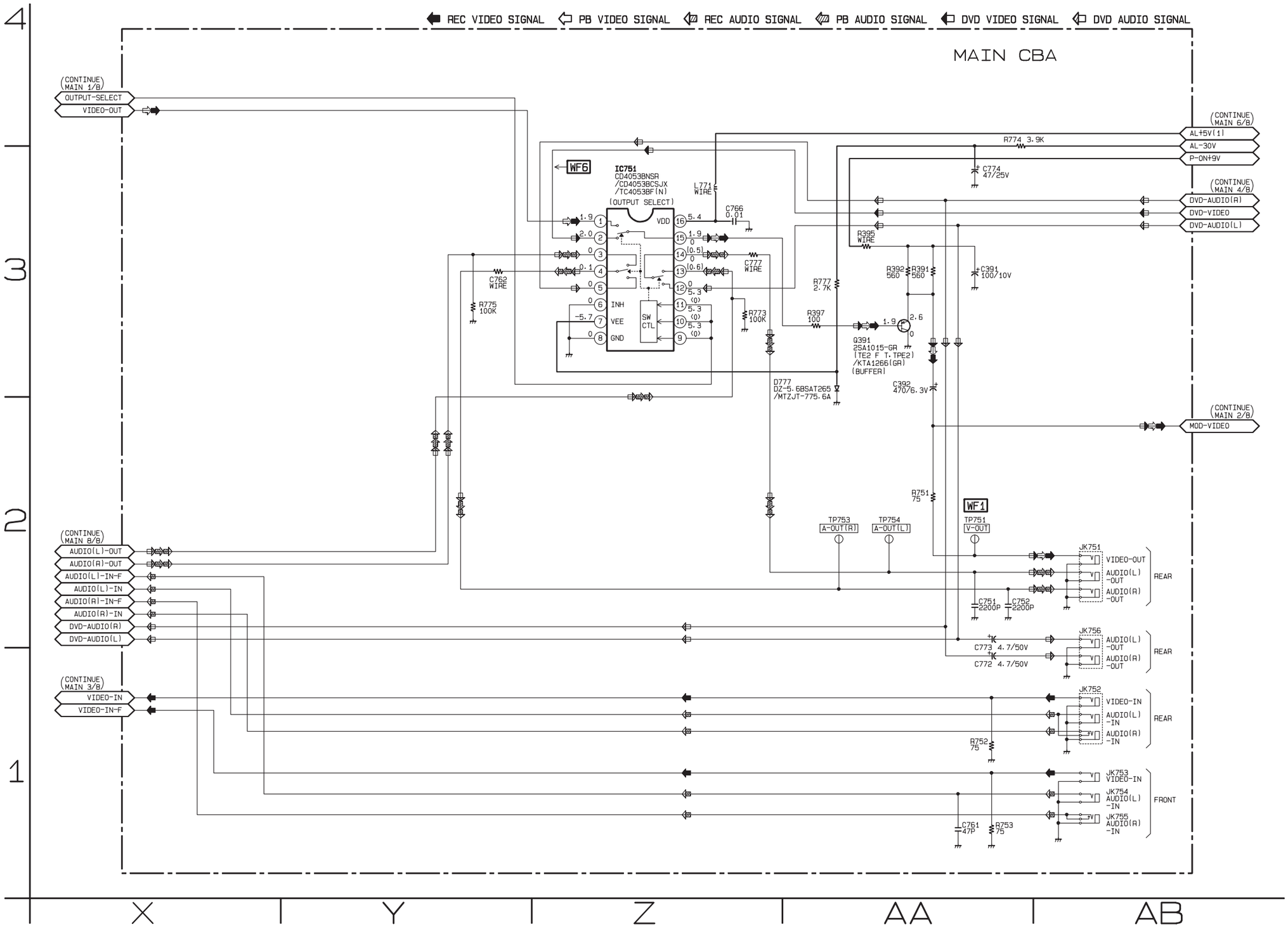
S-6 Main 3/8 Schematic Diagram



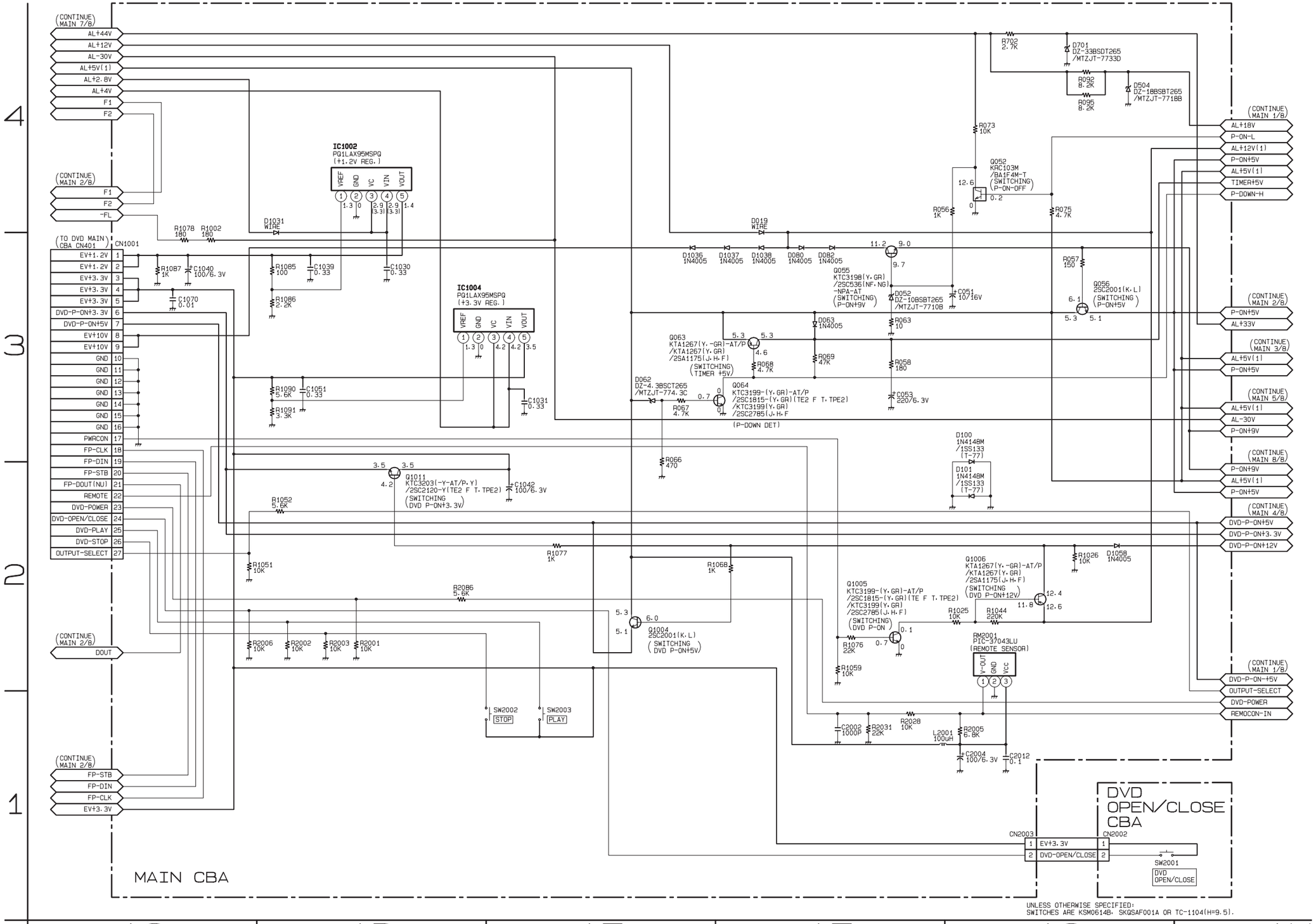
S-7 Main 4/8 Schematic Diagram



S-8 Main 5/8 Schematic Diagram



S-9 Main 6/8 & DVD Open/Close Schematic Diagram

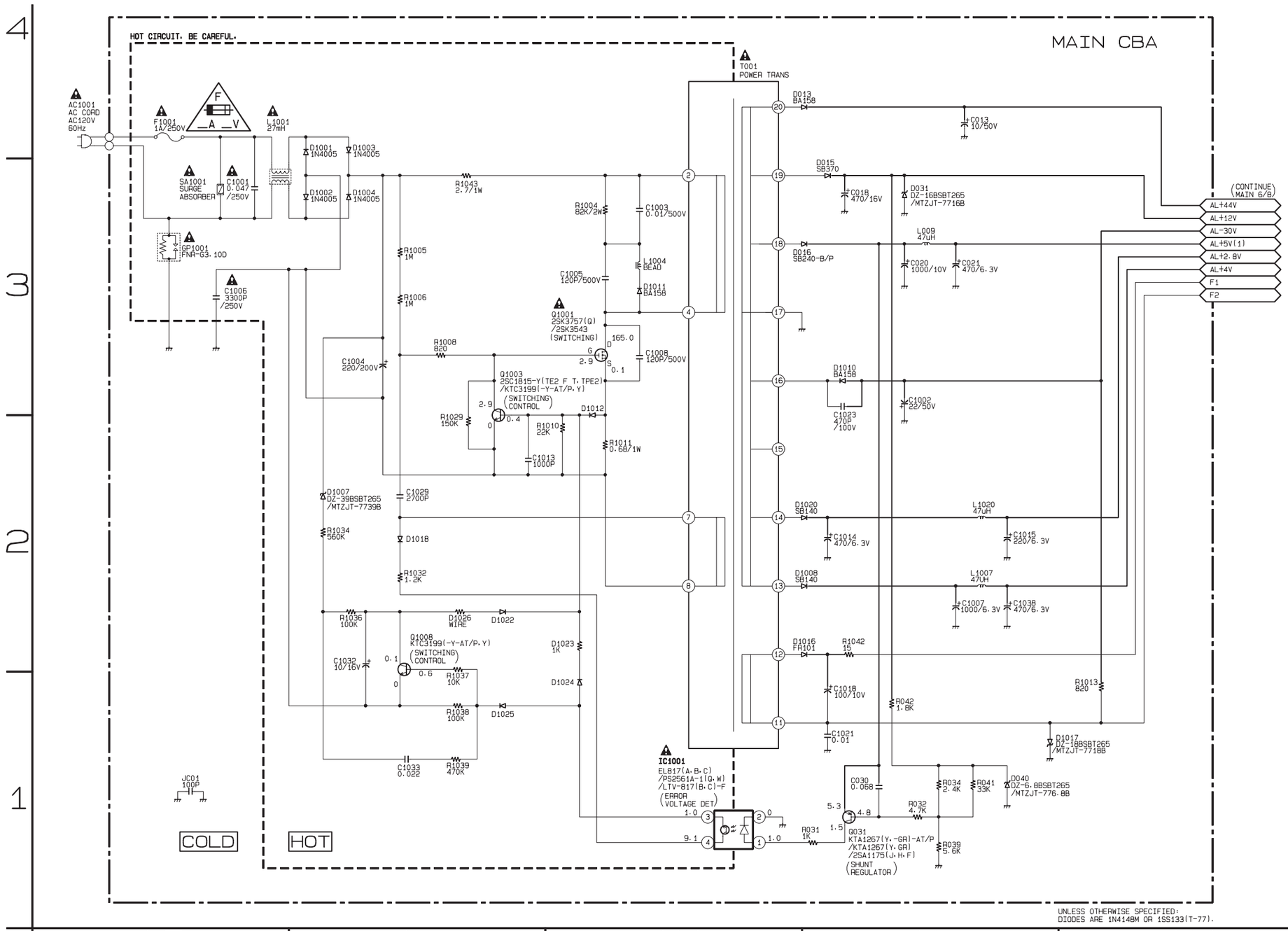


S-10 Main 7/8 Schematic Diagram

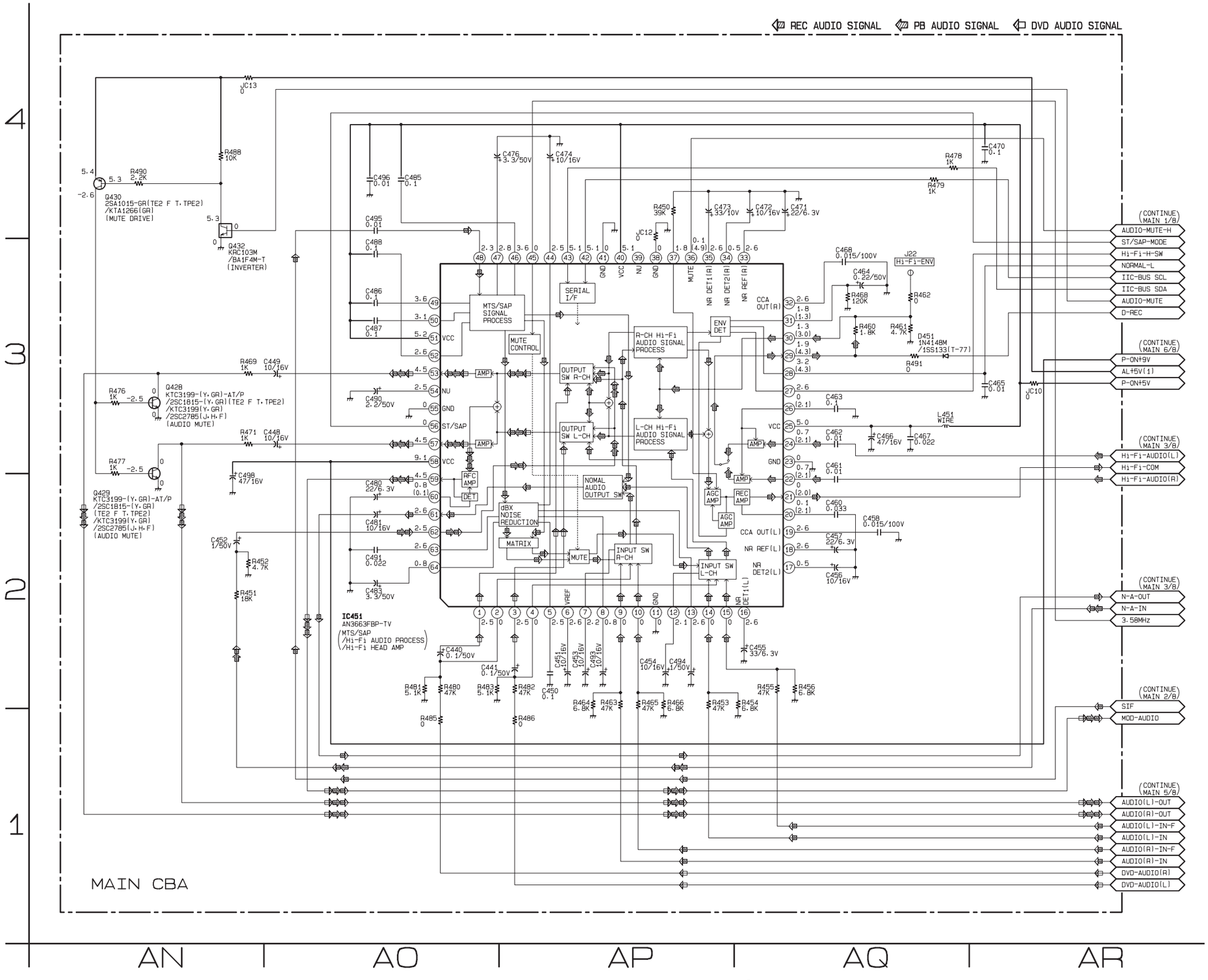
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components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

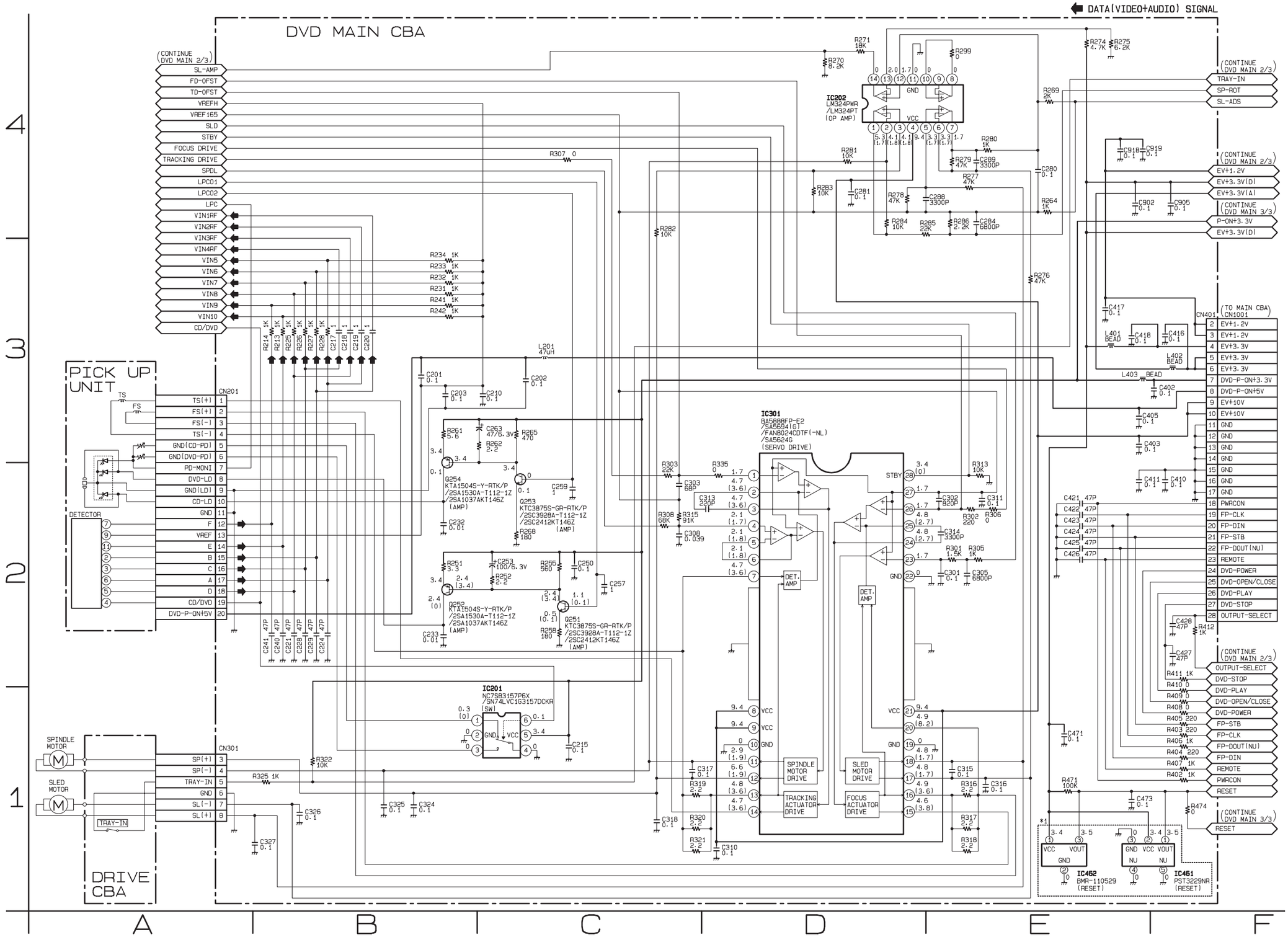


S-11 Main 8/8 Schematic Diagram

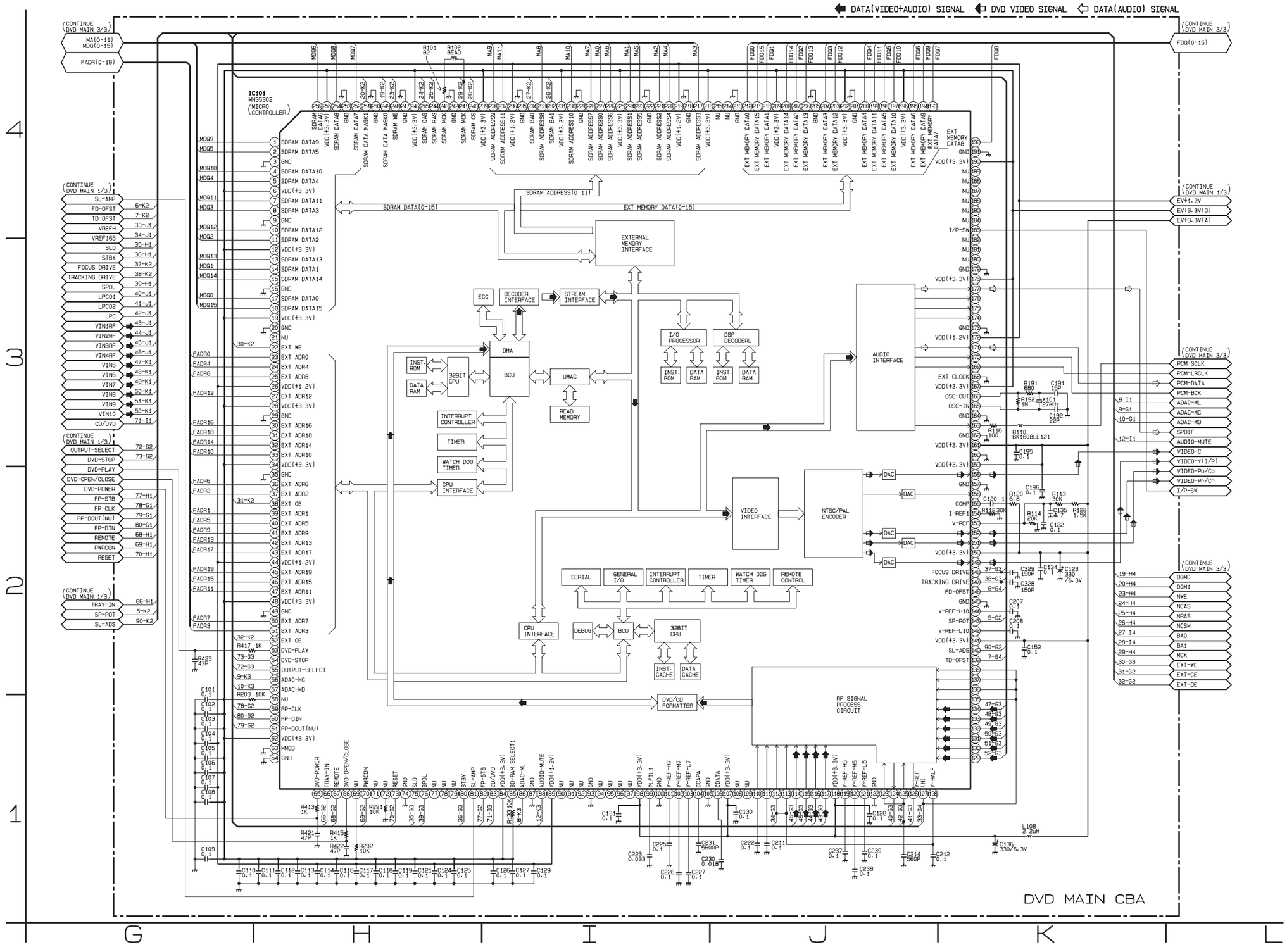


S-12 DVD Main 1/3 Schematic Diagram

***1 NOTE:**
Either IC461 or IC462 is used for DVD MAIN CBA.



S-13 DVD Main 2/3 Schematic Diagram

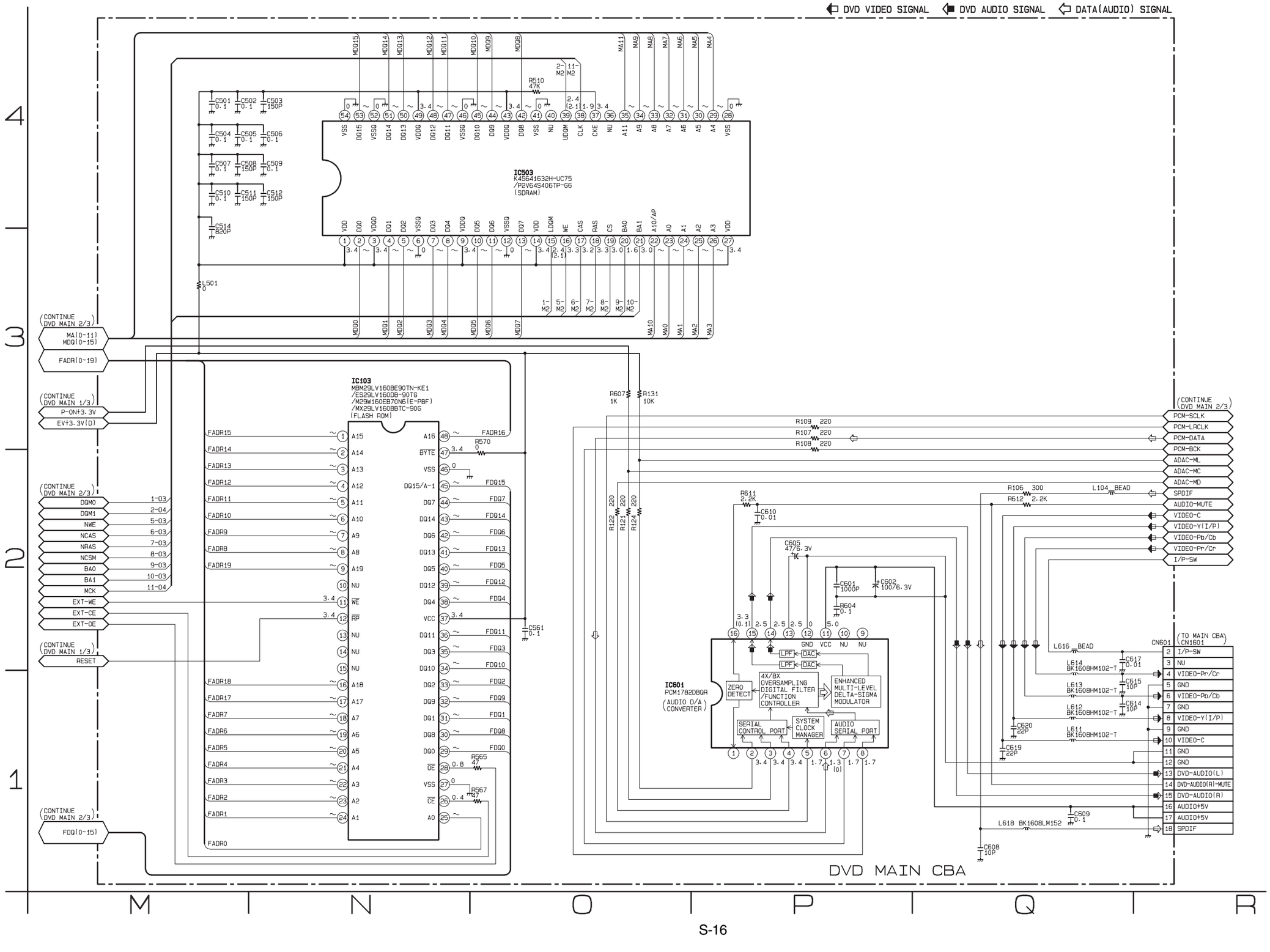


S-14 IC101 Voltage Chart

~ : Voltage is not consistent ----- : Not used Unit : Volts

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	3.4	3.4	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	1.4	2.7	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	1.7	1.7	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	3.4	3.4	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	-----	-----	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:

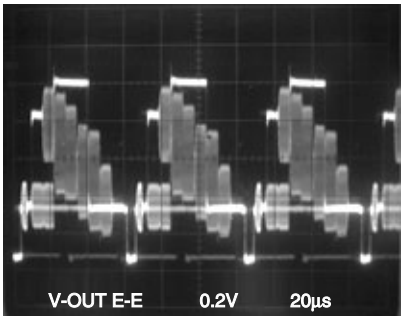
Input

VCR: COLOR BAR SIGNAL (WITH 1KHz AUDIO SIGNAL)
(WF1~WF3)

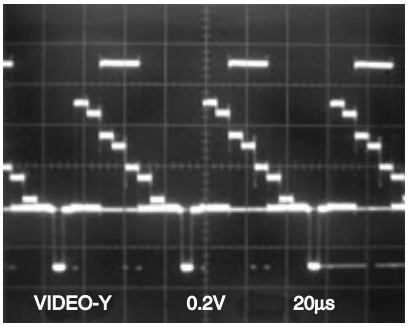
DVD: POWER ON (STOP) MODE
(WF4~WF6)

CD: 1kHz PLAY
(WF7~WF9)

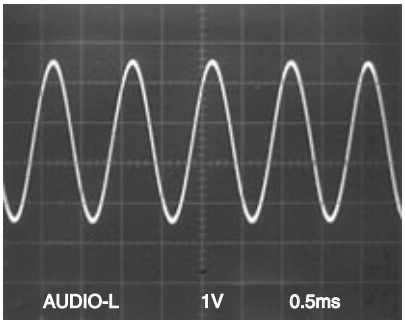
WF1 TP751



WF4 Pin 8 of CN1601

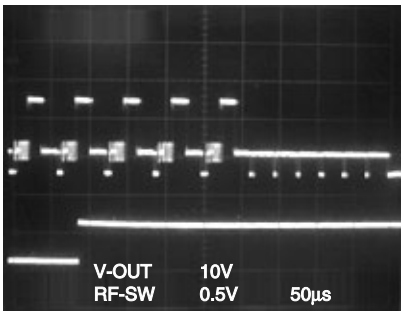


WF7 Pin 13 of CN1601

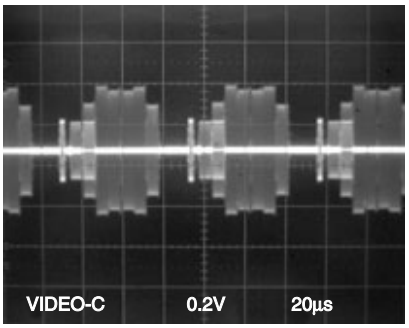


WF1 UPPER TP751

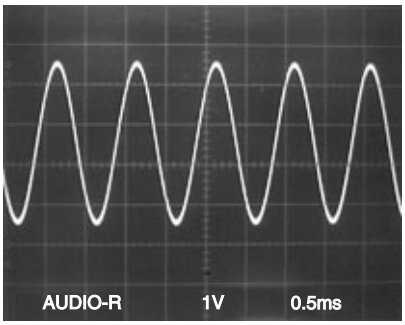
WF2 LOWER TP302



WF5 Pin 10 of CN1601

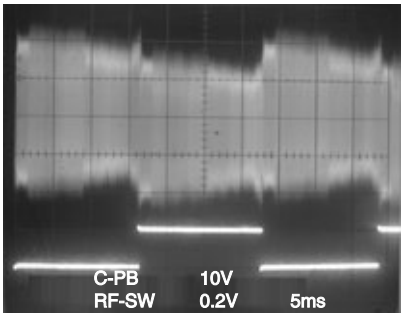


WF8 Pin 15 of CN1601

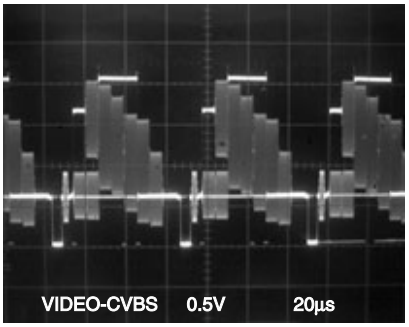


WF3 UPPER TP301

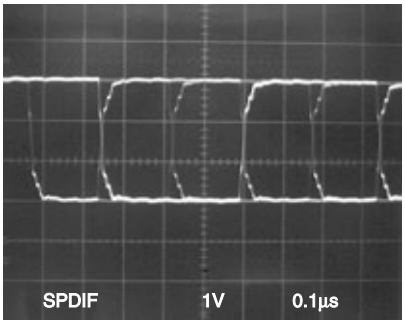
WF2 LOWER TP302



WF6 Pin 2 of IC751



WF9 Pin 18 of CN1601



C CIRCUIT BOARD DIAGRAMS

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

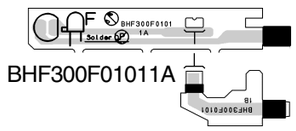
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components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

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."

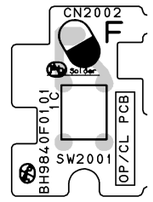
Because a hot chassis ground is present in the power supply circut, an isolation transformer must be used. Also, in order to have the ability to increase the input slowly, when troubleshooting this type power supply circuit, a variable isolation transformer is required.

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

Sensor CBA Top View

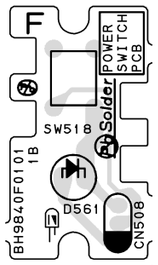


DVD Open/Close CBA Top View



BH9840F01011C

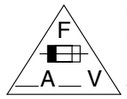
Power SW CBA Top View



BH9840F01011B

C-2 Main CBA Bottom View

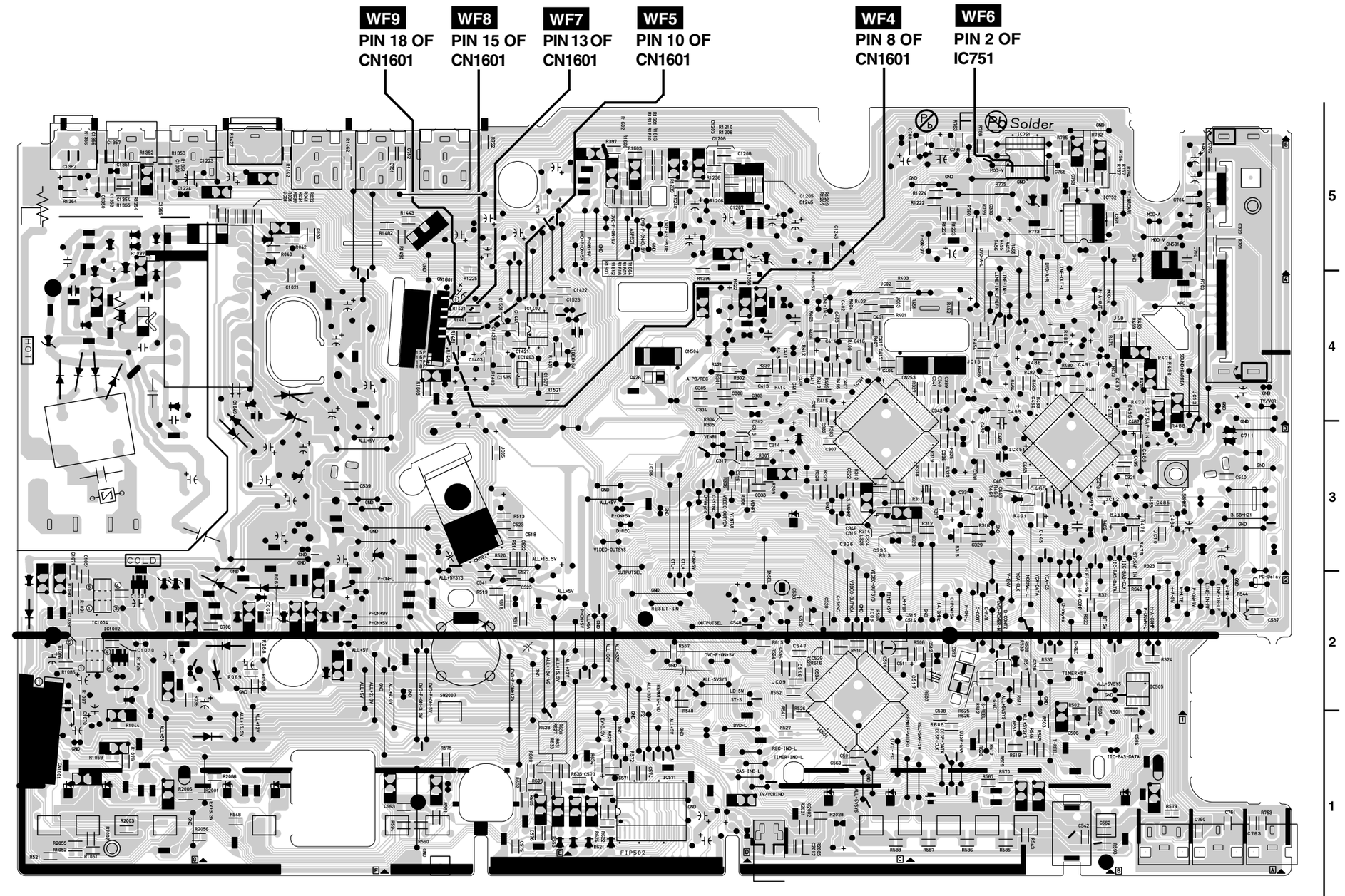
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown , check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components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



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."

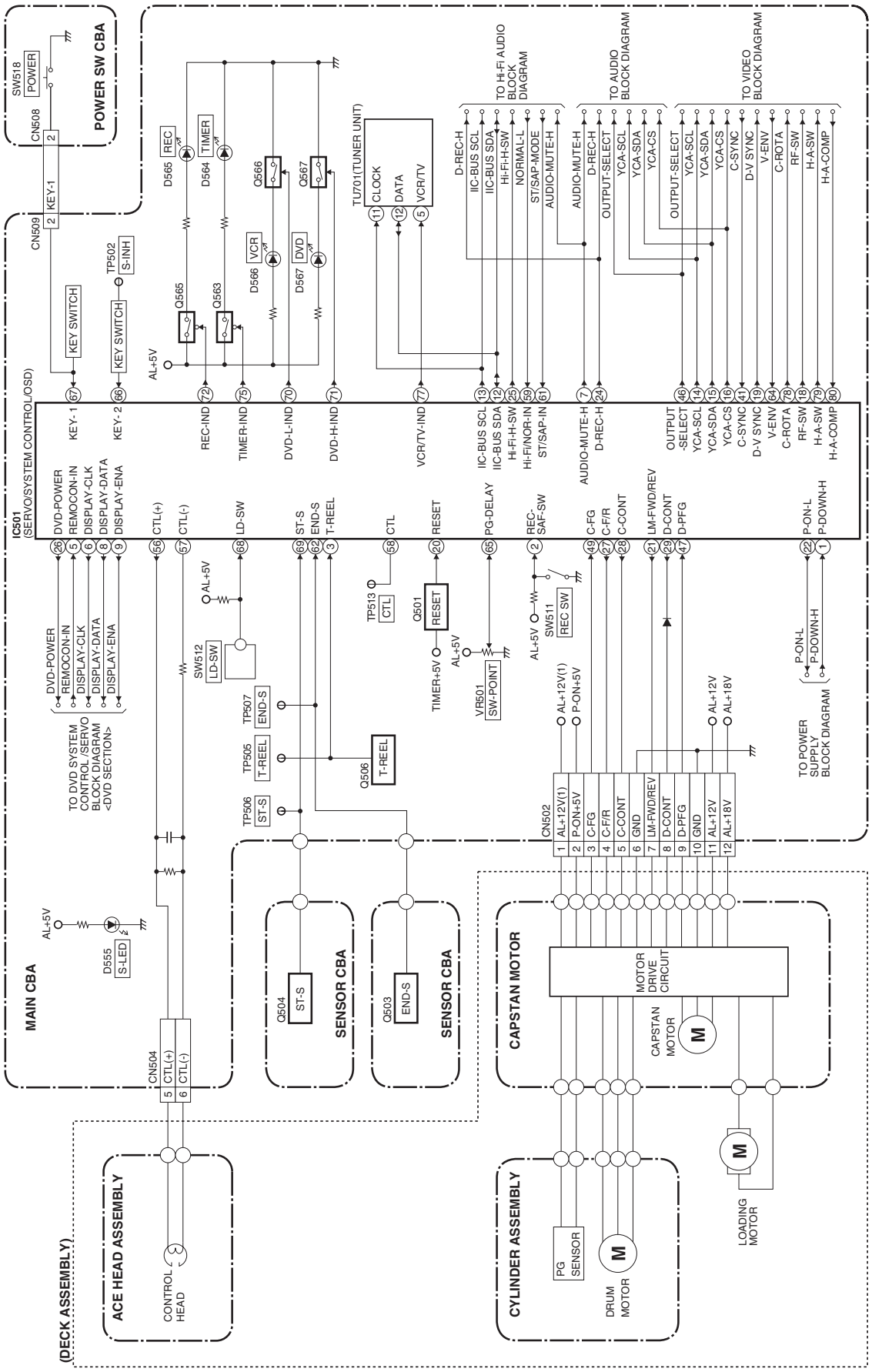
Because a hot chassis ground is present in the power supply circut, an isolation transformer must be used. Also, in order to have the ability to increase the input slowly, when troubleshooting this type power supply circuit, a variable isolation transformer is required.

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

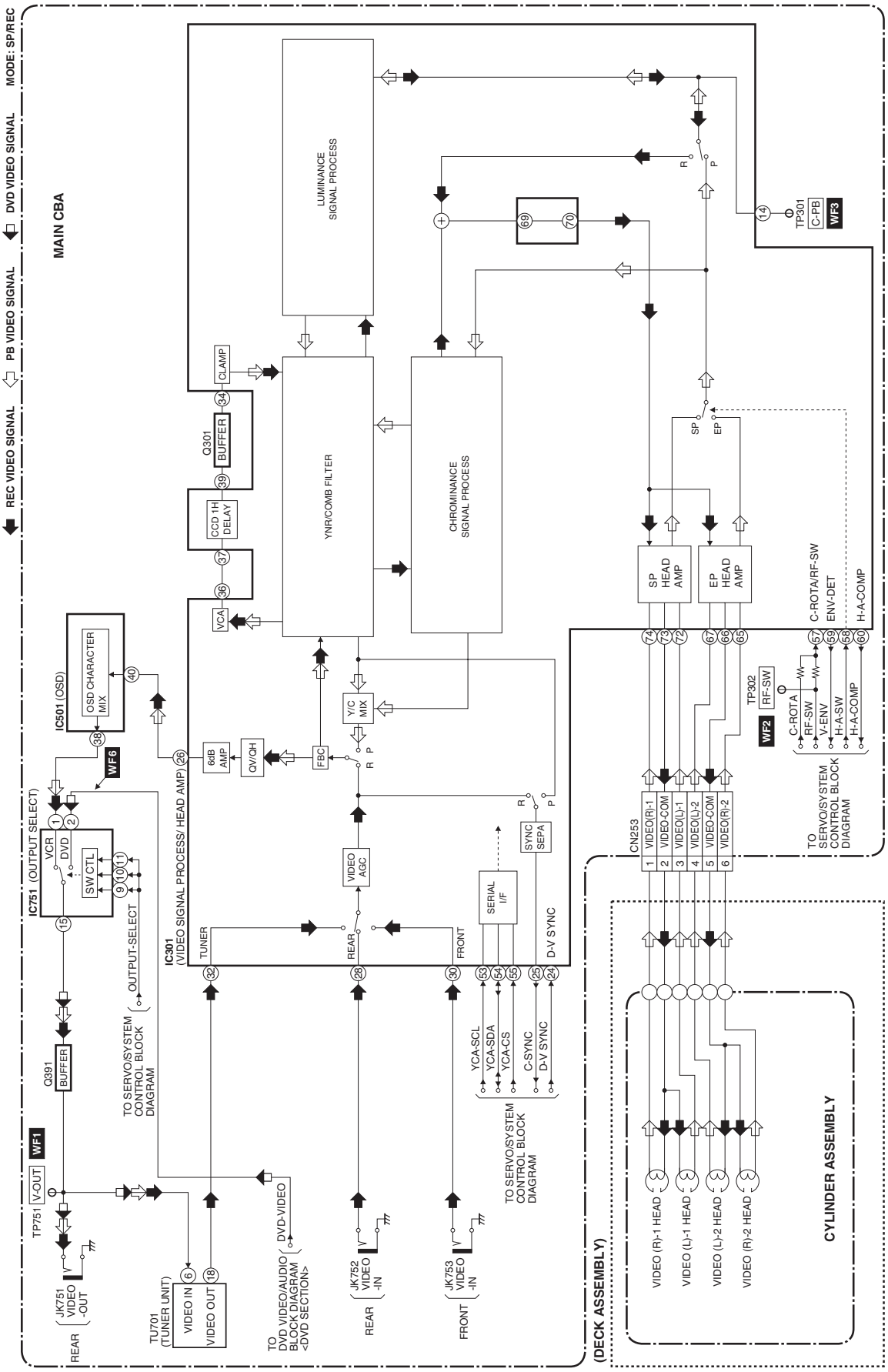


B BLOCK DIAGRAMS

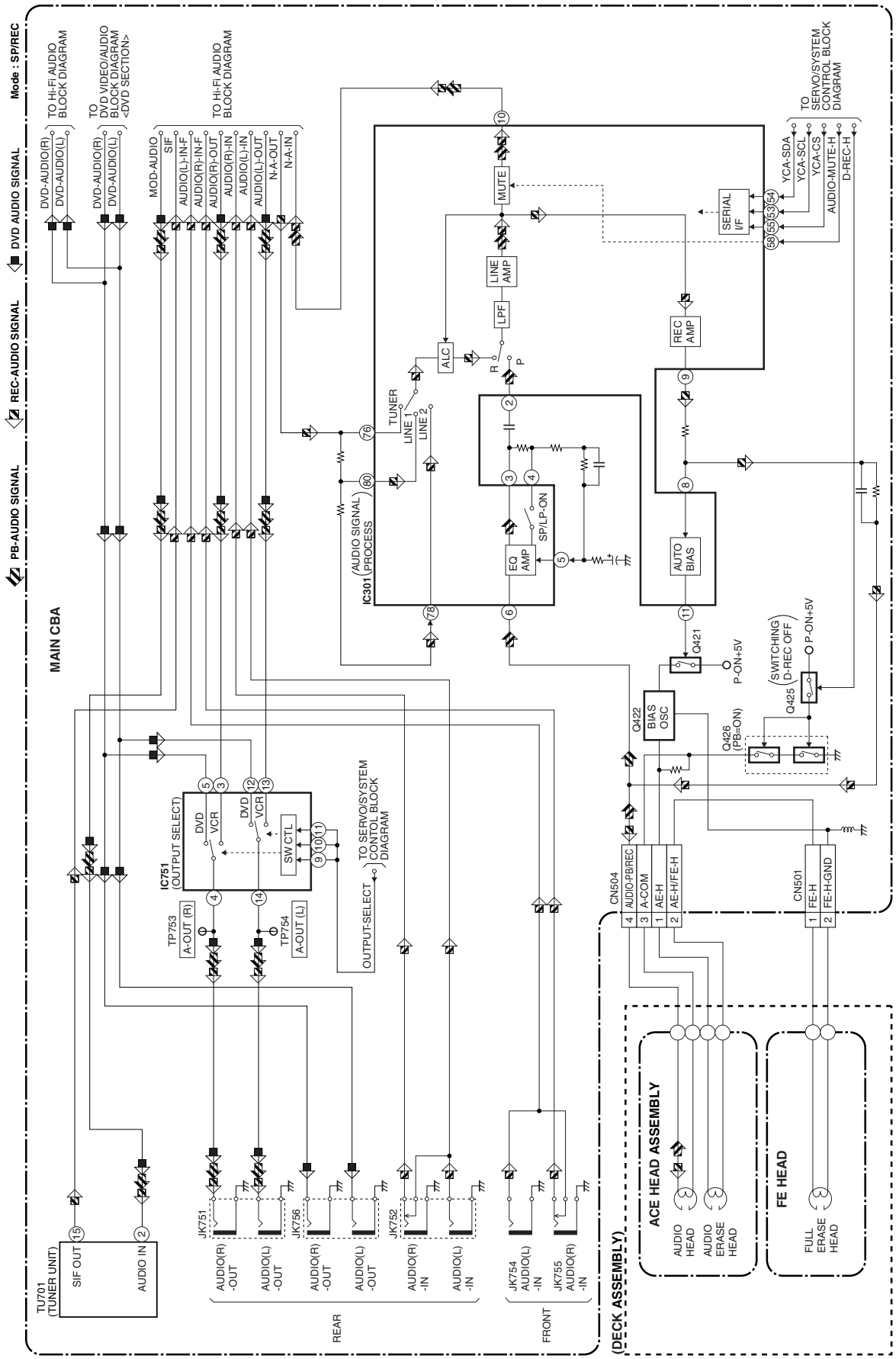
B-1 Servo / System Control Block Diagram



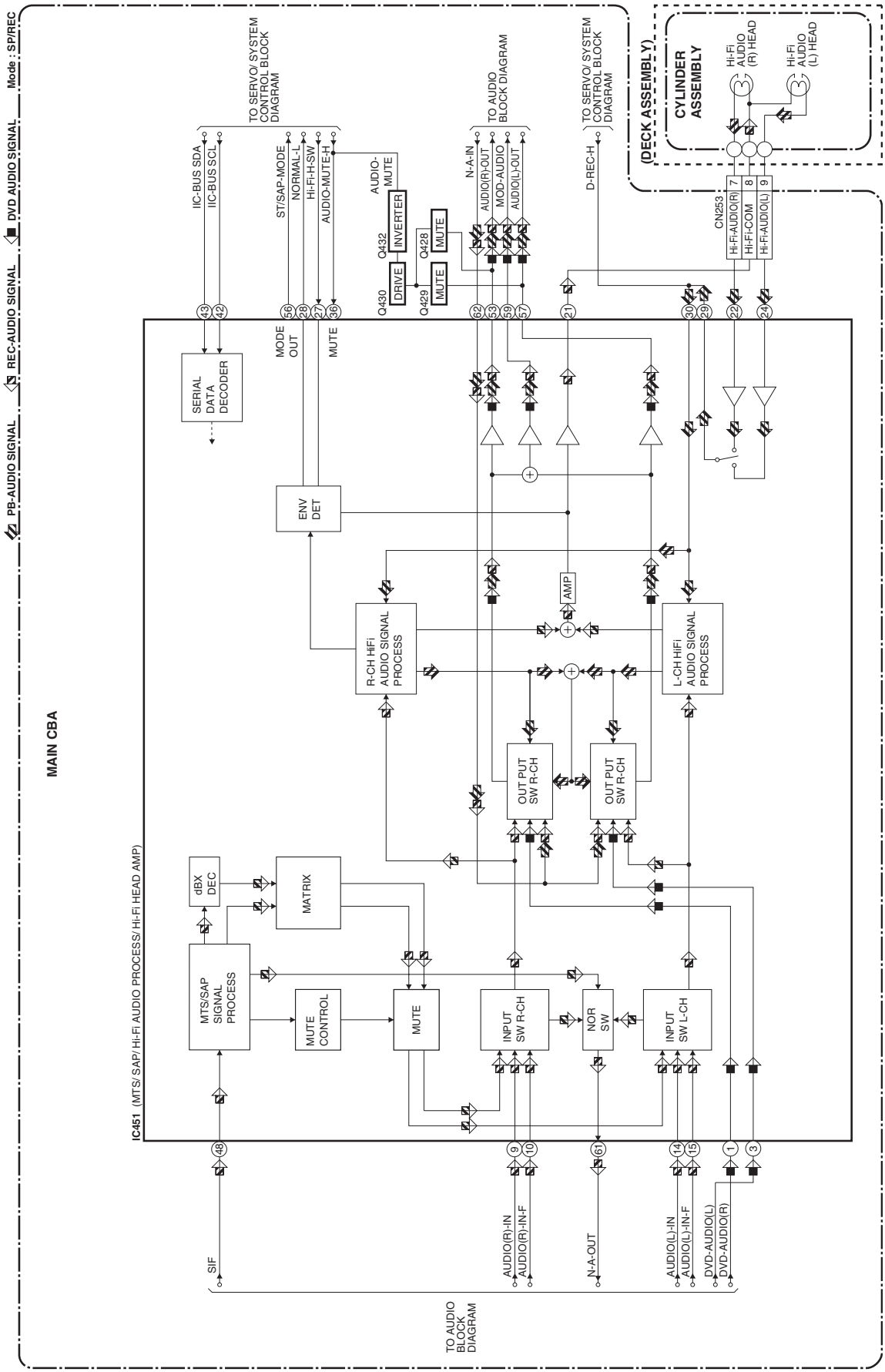
B-2 Video Block Diagram



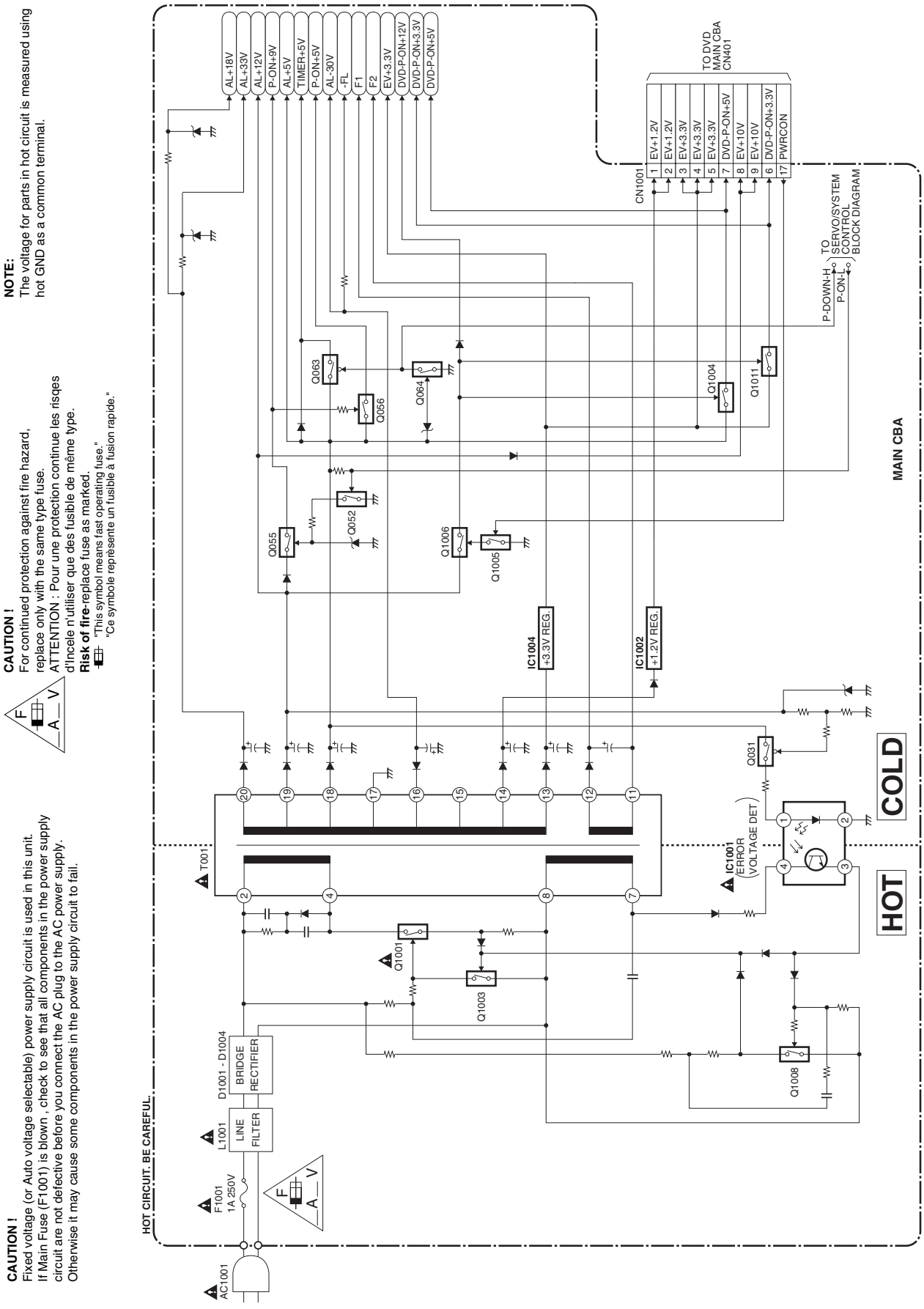
B-3 Audio Block Diagram



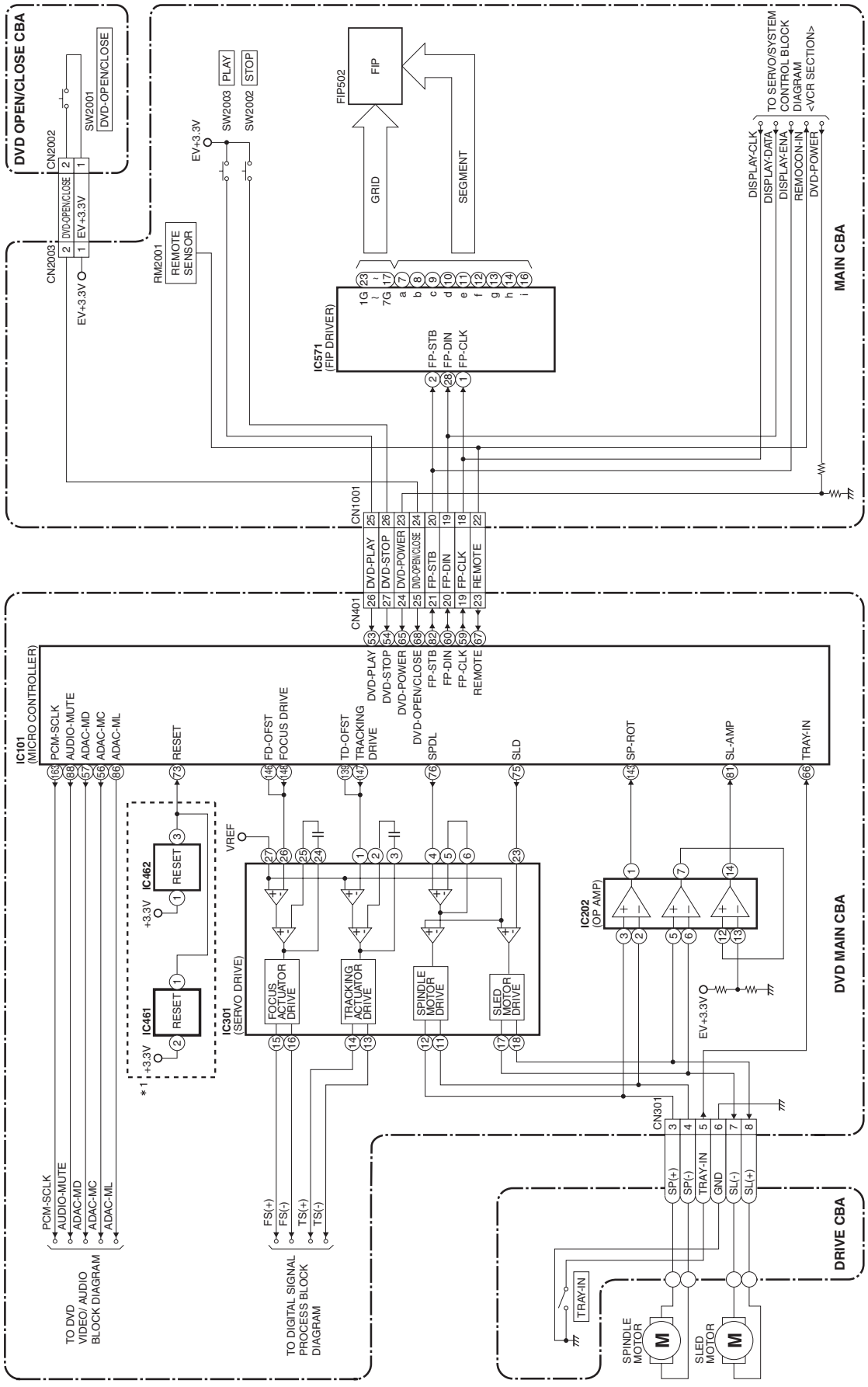
B-4 Hi-Fi Audio Block Diagram



B-5 Power Supply Block Diagram

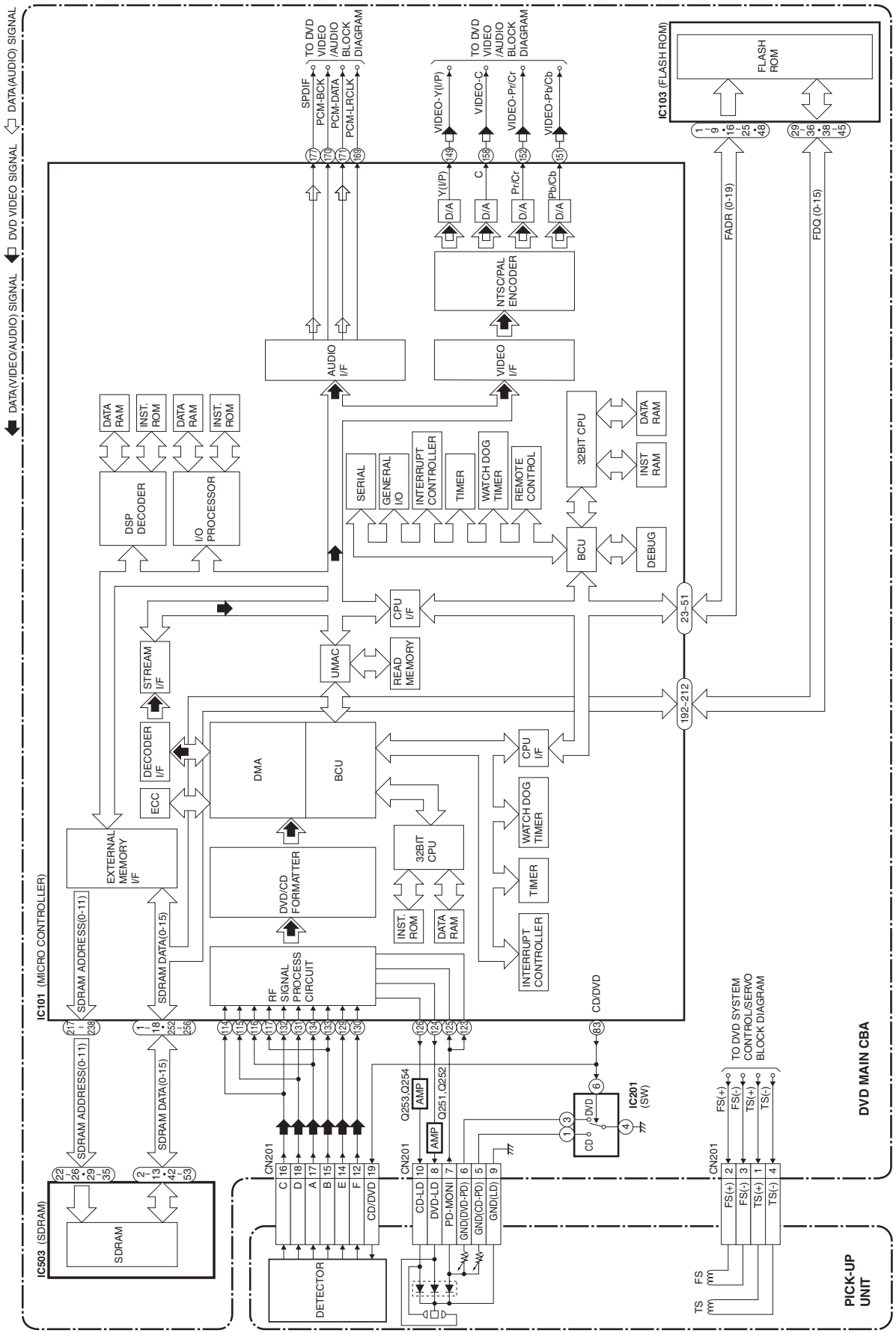


B-6 DVD System Control / Servo Block Diagram

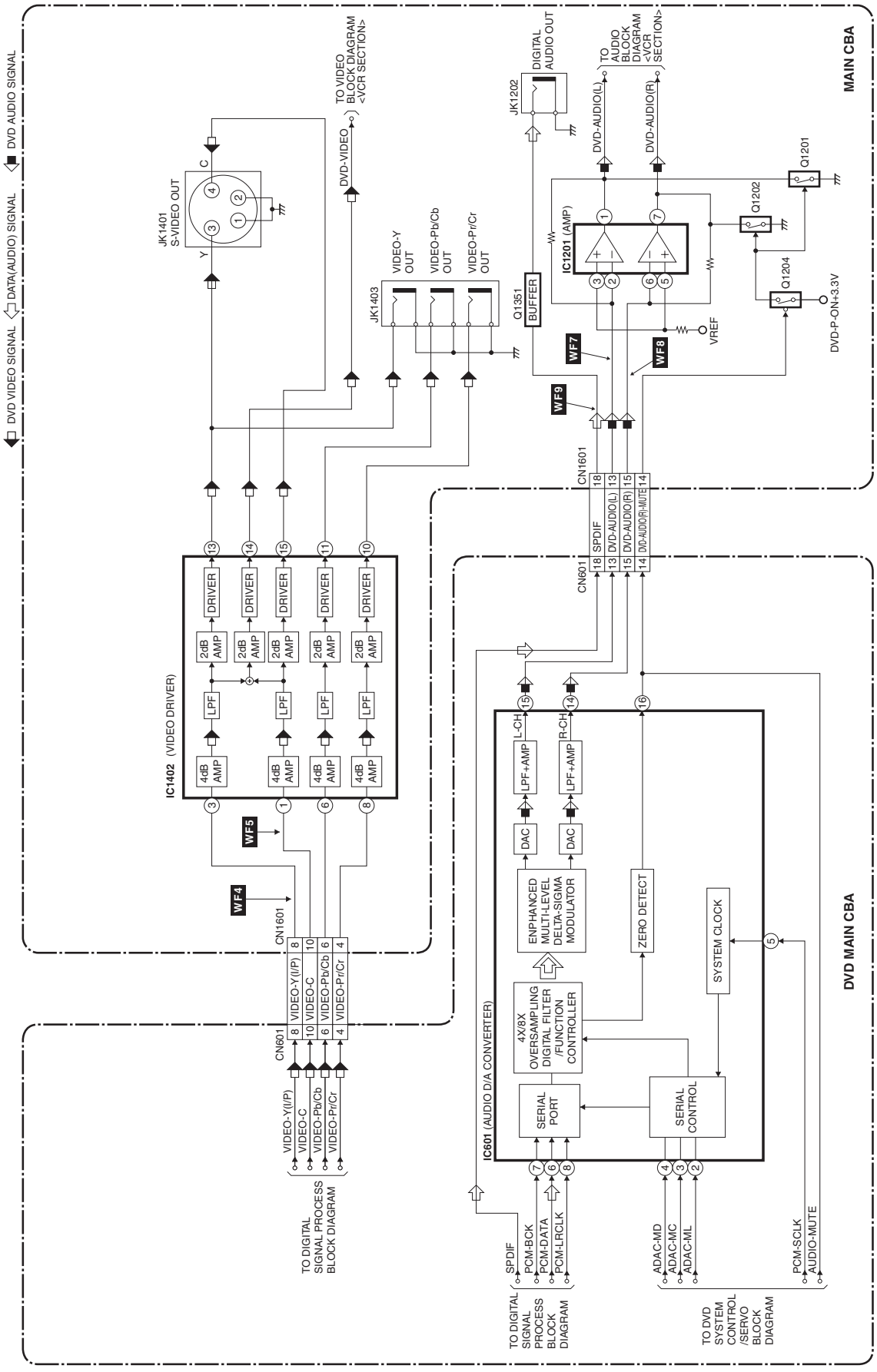


***1 NOTE:**
Either IC461 or IC462 is used for DVD MAIN CBA.

B-7 Digital Signal Process Block Diagram



B-8 DVD Video / Audio Block Diagram



HITACHI

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