

Service Manual

Portable Stereo Component System

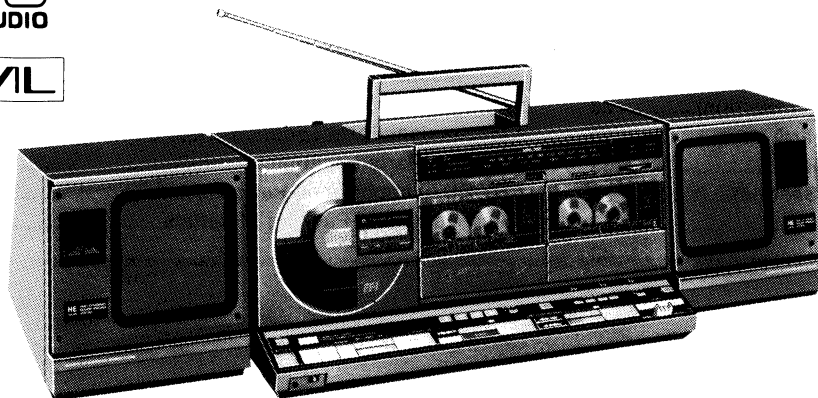
Radio Cassette

RX-CD70

(Black)

COMPACT
disc
DIGITAL AUDIO

DIGITAL



This is the Service Manual
for the following area.

M ... For U.S.A.

■ SPECIFICATIONS

General:

Power Requirement: AC; 120V, 60Hz
Battery; 15V (Ten "D" Size
Flashlight Batteries)
(Panasonic UM-1 or equivalent)

Power Consumption: 40W (AC only)

Power Output: 22W (11W×2)...RMS (max.)

Speaker: Woofer; 4" (10cm) PM Dynamic
Speaker (2.7Ω)
Tweeter; 3/4"×1 1/2" (2×4cm)
Ceramic Speaker (1.4kΩ)

Input: MIC; sensitivity 0.25mV/
applicable microphone
impedance 200~600Ω
AUX; sensitivity 200mV/47kΩ
over

Output: Line out; sensitivity 420mV/4kΩ
under
Ext SP; 2.7~8Ω
Headphones; 32Ω

Dimensions: 30 1/16" (W)×6 13/16" (H)×9 3/8" (D)
(764×173×237mm)
Main unit;
16 1/2" (W)×6 13/16" (H)×9 3/8" (D)
(419×173×237mm)
Speaker box;
7" (W)×6 13/16" (H)×7 5/16" (D)
(177×173×186mm)

Weight: 15lbs. 7 oz (7.0kg)
without batteries

Disc Player Section:

Sampling Frequency: 44.1kHz

D-A Conversion: 16-bit linear

Pickup: FF-1 (Fine focus· 1 beam)

Light Source: Semiconductor laser
(wavelength 765nm)

No. of Channels: 2 channels, stereo

Frequency Response: 20~20,000Hz (±3dB)

Dynamic Range: 90dB (1kHz)

S/N Ratio: 90dB (1kHz)

Wow and Flutter: below measurable limit

Radio Section:

Radio Frequency Range: FM; 88~108MHz
AM; 525~1610kHz

Intermediate Frequency: FM; 10.7MHz
AM; 525kHz

Sensitivity: FM; 1.8μV/50mW output
(-3dB limit sens.)
AM; 100μV/m/50mW output

Tape Deck Section:

Frequency Response: 40~15,000Hz (with normal tape)
40~16,000Hz (with CrO₂ tape)
40~17,000Hz (with Metal tape)

Recording System: AC bias, AC erase

Tape Speed: 1 7/8 ips (4.8cm/s)

Track System: 4-track 2 channel stereo recording
and playback

Weights and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic®

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SAFETY PRECAUTIONS (For U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

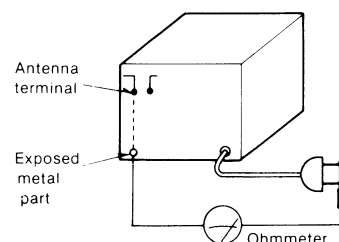


Fig. 1

Resistance = $3\text{M}\Omega$ — $5.2\text{M}\Omega$

INSULATION RESISTANCE TEST (For U.S.A.)

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads, antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between $3\text{M}\Omega$ and $5.2\text{M}\Omega$ to all exposed parts*. (Fig. 1) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. 2)
 * **Note:** Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

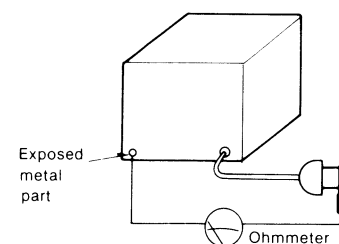


Fig. 2

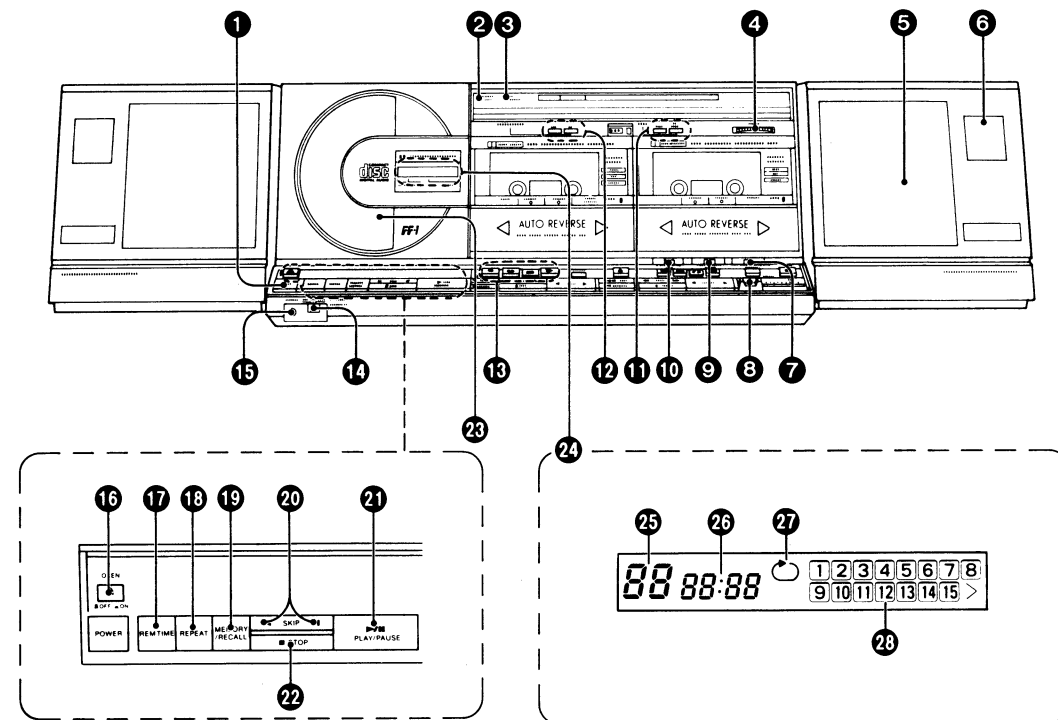
Resistance = Approx ∞

CAUTION:

THIS PRODUCT UTILIZES A LASER.

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

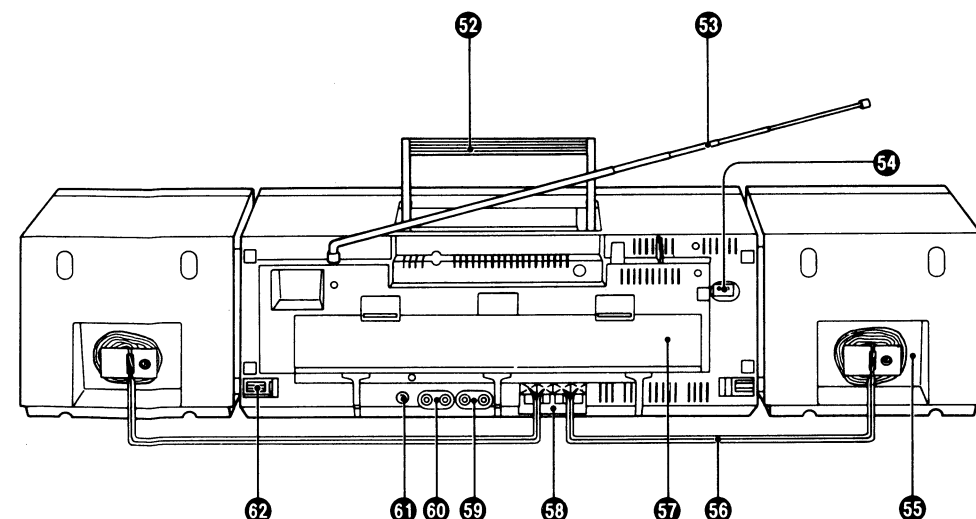
LOCATION OF CONTROLS AND COMPONENTS



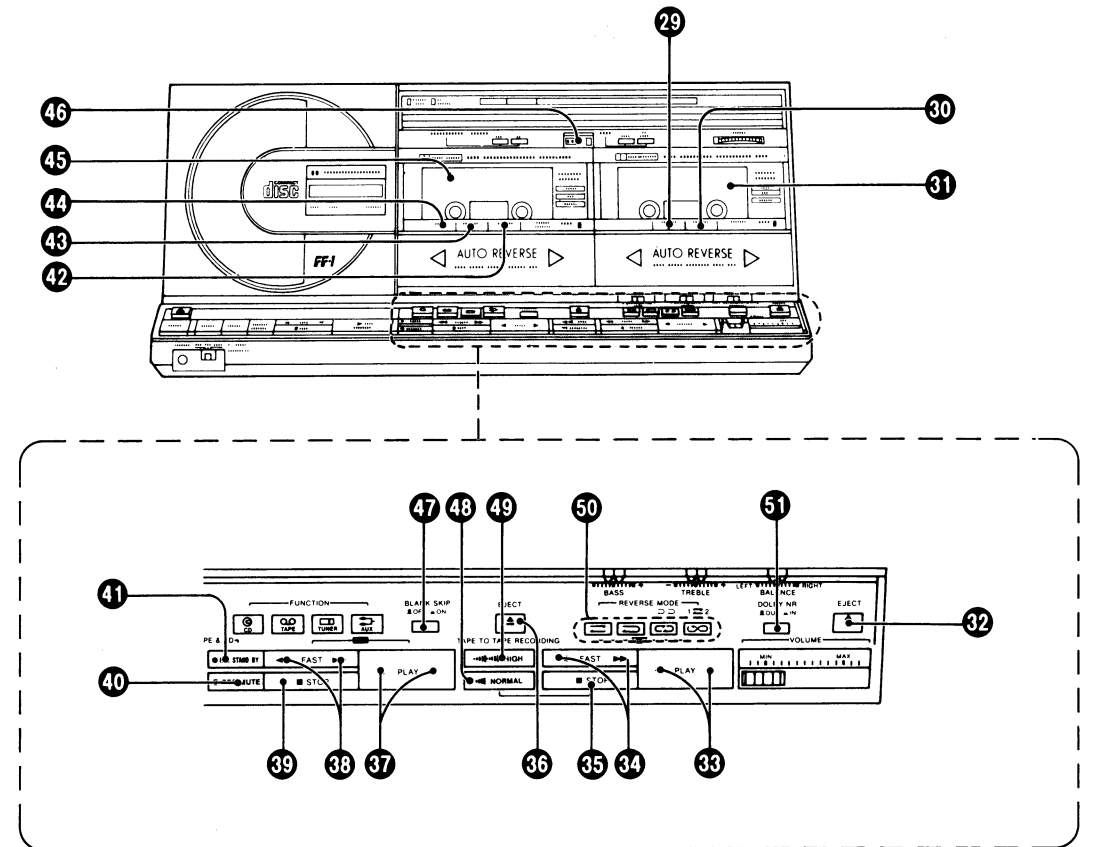
- 1 Power Switch (POWER)
- 2 Power/Battery Check Indicator (POWER/BATT)
- 3 FM Stereo Indicator (FM STEREO)
- 4 Tuning Control (TUNING)
- 5 Speakers (Woofer) [10 cm/2.7 Ω]
- 6 Speakers (Tweeter) [2 cm/1.4 kΩ]
- 7 Balance Control (BALANCE)
- 8 Volume Control (VOLUME)
- 9 Treble Control (TREBLE)
- 10 Bass Control (BASS)
- 11 Band Selector (BAND)
- 12 FM Mode Selector/Beat Proof Switch (FM MODE/B.P)
- 13 Function Selector (FUNCTION)
- 14 Timer Stand By Selector (TIMER STAND BY)
- 15 Headphones Jack (PHONES) [32 Ω/φ3.5]

CD CONTROLS

- 16 Open Button (OPEN)
- 17 Remaining Time Button (REM TIME)
- 18 Repeat Button (REPEAT)
- 19 Memory/Recall Button (MEMORY/RECALL)
- 20 Skip Button (◀ ▶ SKIP)
- 21 Play/Pause Button (▶/II PLAY/PAUSE)
- 22 Stop Button (■ STOP)
- 23 Disc Holder
- 24 Display Panel
- 25 Track Display (TRACK)
- 26 Time Display (TIME)
- 27 Repeat Indicator
- 28 Program Display (PROGRAM)



- 52 Handle
- 53 Telescopic Antenna
- 54 AC Socket (AC IN ~) [120 V/60 Hz]
- 55 Speaker Cable Compartments
- 56 Speaker Cables
- 57 Battery Compartment
- 58 Speaker Terminals (SPEAKER IMP 3-8 Ω)
- 59 Line Output Jacks (LINE OUT)
- 60 Auxiliary Input Jacks (AUX IN)
- 61 External Microphone Jack (EXT MIC) [0.25 mV/φ3.5]
- 62 Speaker Release Levers (RELEASE)



TAPE 2 CONTROLS

- 29 Reverse Indicator (REVERSE)
 - 30 Forward Indicator (FORWARD)
 - 31 Cassette Compartment
 - 32 Eject Button (EJECT)
 - 33 Playback Button (◀ ▶ PLAY)
 - 34 Fast Button (◀ ◀ ▶ ▶ FAST)
 - 35 Stop Button (■ STOP)
- Press to stop One Touch Tape to Tape Recording.

TAPE 1 CONTROLS

- 36 Eject Button (EJECT)
- 37 Playback Button (◀ ▶ PLAY)
- 38 Fast Button (◀ ◀ ▶ ▶ FAST)
- 39 Stop Button (■ STOP)
- 40 Record Muting Button (○ REC MUTE)
- 41 Record Stand By Button (● REC STAND BY)
- 42 Forward Indicator (FORWARD)
- 43 Reverse Indicator (REVERSE)
- 44 Recording Indicator (RECORD)
- 45 Cassette Compartment
- 46 Tape Counter and Reset Button

GENERAL TAPE CONTROLS

- 47 Blank Skip Switch (BLANK SKIP)
- 48 Normal Speed Button (NORMAL)
- 49 High Speed Button (HIGH)
- 50 Reverse Mode Selector (REVERSE MODE)
- 51 Dolby Noise Reduction Switch (DOLBY NR)

“Dolby” and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.

Note:

When pressing the Skip Button, Playback Buttons or the Fast Buttons, always press near the operating mark position. As for the other operation buttons, press the center of the buttons.

BATTERY SERVICE LIFE

UM-1 (D-size) Batteries
Approx. 7 hours of recording (EIAJ).
Approx. 4.3 hours playback (EIAJ) with volume set at “8” position.
The above battery service life is measured according to the conditions set forth by EIAJ (Electronic Industries Association of Japan). As the battery service life varies with the method of operation and environmental conditions, use these values as reference.

CONCERNING COMPACT DISCS

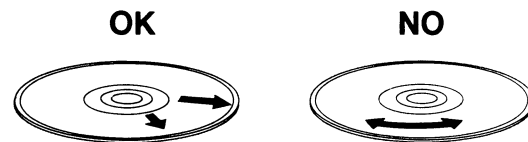
Observe the following precautions to enjoy the same outstanding sonic performance from your compact discs for many years.

■ Handling precautions

Only compact discs having this mark can be used with this player.



- Hold compact discs by the edges so the surface is not soiled with fingerprints.
- Be careful not to scratch the surface with fingernails or other sharp objects, particularly when inserting and removing discs from their cases.
- Do not bend the disc.
- Do not use record cleaning sprays or static electricity prevention liquids.
- Do not wipe with benzine, thinner or any other solvent. If the surface is soiled, wipe gently with a soft, damp (water only) cloth.
- When wiping discs, always move the cloth directly outward from the center of the disc, not in a circular motion as with standard photograph records.



(In Compact Discs, circular scratches along a line of pits are more likely to cause errors than straight scratches across many lines of pits.)

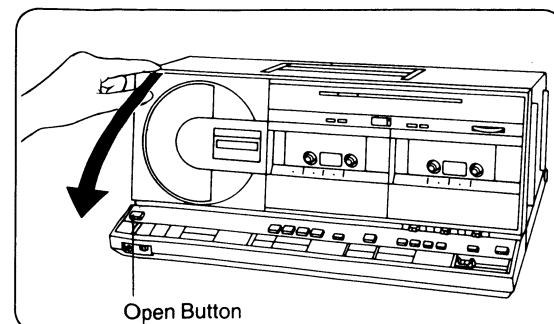
- If the disc is brought from a cold environment into a warm room, dew may form on the disc. Wipe this off with a soft, dry cloth before using the disc.
- Do not try to dry discs with a hair dryer.
- Do not write on the label side with a ball-point pen, hard pencil or other writing utensil.

■ Storage precautions

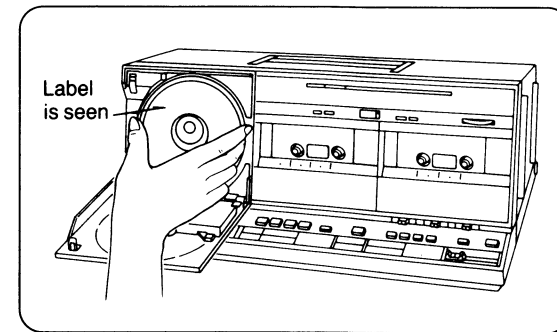
- Be sure to store discs in their cases to protect them from dust, scratches and warping.
- Do not place or store discs in the following places:
 1. Locations exposed to direct sunlight.
 2. Locations with high humidity or a lot of dust.
 3. Locations directly exposed to a heat outlet or heating appliance.
 4. In the glove compartment or rear ledge of an automobile.

DISC INSERTION

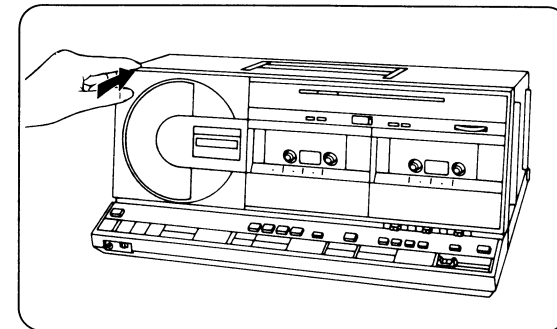
1. Press the Open Button to release the Disc Holder cover and open it as shown.



2. Insert a disc in to the Disc Holder.



3. Close the cover and push in firmly as shown.

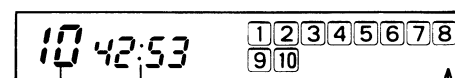


PLAYING A DISC

The following explanation is for a disc containing 10 tracks having a total playing time of 42 minutes and 53 seconds.

■ To Play A Disc from Beginning to End (Auto-play)

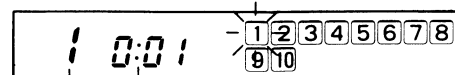
1. Turn the Power Switch to "ON".
 - The Power/Battery Check Indicator will light.
2. Press the CD Button (Function).
3. Press the Open Button and insert a disc.
 - When the Disc Holder cover is closed, the disc will rotate and the total number of tracks and the total playing time will appear on the Display Panel.



- Total playing time
- Total number of tracks

• When there are more than 15 tracks on the disc, the ">" mark will be displayed.

4. Press the Play/Pause Button.
 - The disc will be played from the first track.
 - The number or the track being played will flash, and go out at the end of play.

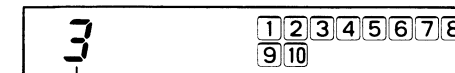


- Playing time per track
- Track number

5. Adjust the Volume Control.
6. Adjust the Bass, Treble, and Balance Controls.
7. To stop disc play, press the Stop Button.
 - The disc will stop rotating, and the total number of tracks and the total playing time will be displayed once again on the Display Panel.
 - When all tracks have been played, the disc will automatically stop.
8. Turn the Power Switch to "OFF" to turn the unit off.

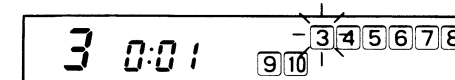
■ To Play A Disc from A Specific Track (Direct-Play)

1. Follow the procedure described in steps 1-3 of "To Play A Disc from Beginning to End (Auto-Play)".
2. Press the ► Button (SKIP) to locate the desired track.
 - Each time you press this button, the pickup will advance by one track. If you go past the desired track, return the pickup using the ◀ Button.



- For example, to play a disc from the track 3, press the ► Button 3 times.

3. When you press the Play/Pause Button, disc play will start from the track 3.

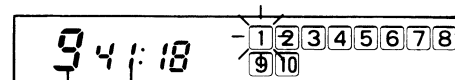


- This means that the track 3 is being played and that disc play will continue to the last track.

4. Follow the procedure described in steps 5-8 of "To Play A Disc from Beginning to End (Auto-play)".

■ Remaining Time Display (REM TIME)

If the Remaining Time Button is pressed during Auto-play or Direct-play, the number of remaining tracks and also the remaining time on the disc will be displayed. Press the button again to restore the initial display.



- Time remaining on disc
- Number of remaining tracks

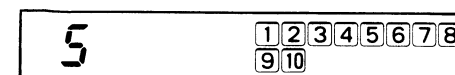
Note:
The Remaining Time Button will not function during Program-play.

■ To Play Several Tracks out of Order (Program-play)

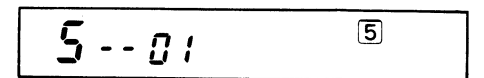
1. Follow the procedure described in steps 1-3 of "To Play A Disc from Beginning to End (Auto-play)" on page 5.
2. Program several tracks out of order. (A maximum of 15 tracks can be programmed).

For example, to play track 5, track 2, track 9 in that order...

- ① Press the Skip Button (◀ or ▶) and specify the desired track.

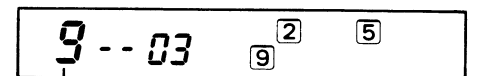


- ② Press the Memory/Recall Button.



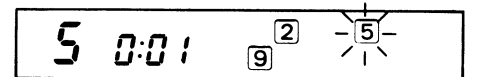
- If the Memory/Recall Button is pressed repeatedly, the same track is programmed repeatedly.

- ③ Repeat procedure ① and ② according to your program.

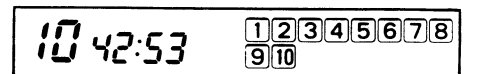


- If the program time is over 15 times, "F" indication will appear.

3. Press the Play/Pause Button.
 - The disc played from the first Program track.

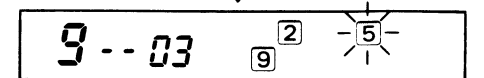
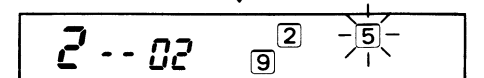
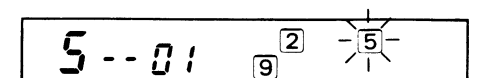


4. Adjust the Volume Control.
5. Adjust the Bass, Treble, Balance Controls.
6. To stop disc play, press the Stop Button.
 - When all programmed tracks have been played, the disc will automatically stop.
 - When the Stop Button is pressed (or the disc is stopped automatically), the program will be cleared.



• To confirm the program (RECALL)

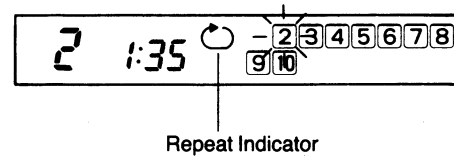
By pressing the Memory/Recall Button during Program-play or when the Program-play is paused, you can easily recall the program.



restored initial display

■ Repeat Play

If the Repeat Button is pressed before or during disc play, the Repeat Indicator will appear, and the disc will be played repeatedly. Pressing this button again will cancel the repeat function.



- During Auto-play or Direct-play, at the end of the last track the pickup will return to the first track and all tracks will be played again.
- During Program-play, only the memorized tracks will be played again in the memorized sequence.

■ Search Function

If the ►| Button (or ◀| Button) is pressed continuously during disc play, sound from the disc can be heard as the pickup moves at high speed in the forward (reverse) direction (the output level at this time is 1/4 of the level during normal play). Release the button when the pickup reaches the desired portion of the disc.

Notes:

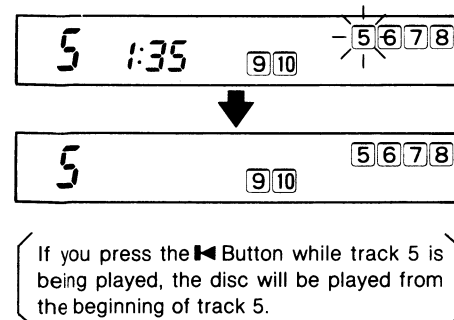
- During Program-play, you can only search the track being played.
- If you release the button immediately, the unit will go into the Skip Play.

■ Skip Play

By pressing the Skip Button (◀| or ►|) during disc play or when disc play is paused, you can easily move the pickup to the beginning of the track being played or a track before or after it.

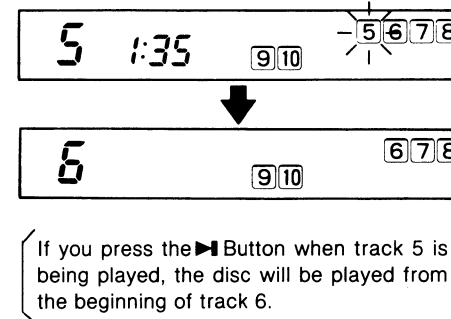
- When you wish to listen from the beginning of the track being played...

Press the ◀| Button once.



- When you wish to skip the track being played and listen to the next track...

Press the ►| Button once.



- When you wish to skip several tracks in either the forward or backward direction...

Press and press the ◀| Button or the ►| Button continuously, and you can skip to the beginning of the desired track. (Verify the track number by observing the Track Display on the Display Panel.)

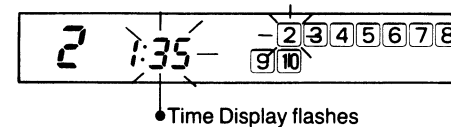
• During Program-play...

If the ►| Button is pressed during Program-play, the disc will be played from the beginning of the next memorized track. Press this button to step through to a desired memorized track.

If the ◀| Button is pressed once during disc play, the program will be played once again from the beginning track which was being played. Press this button to step back to a desired memorized track.

■ Pause Function

If the Play/Pause Button is pressed while a disc is being played, disc play will stop.



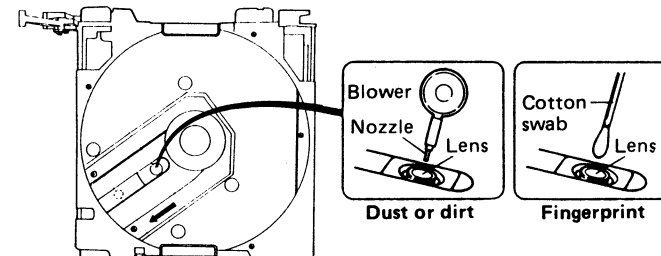
- When this button is pressed once again, disc play will continue from where it stopped.

■ CLEANING OF LENS

If the lens is stained causing sound skip or operation failure, open the top cover by pressing the open button, and clean the lens.

• To remove dust or dirt

Blow the lens with the blower provided in the cleaning kit to remove dust or dirt.



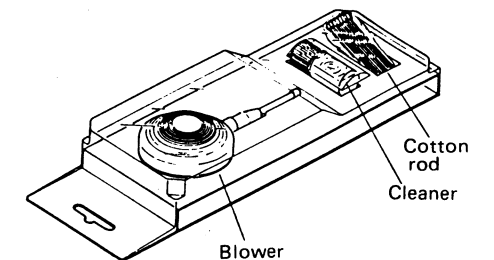
• To remove fingerprint

If the blower is not enough, moisten the cotton swab with the lens cleaner solution and wipe the lens with it from center of the lens to outside.

Cautions:

- Do not directly apply the cleaner solution to the lens.
- Do not apply too much solution to the cotton swab or otherwise the solution will flow into the player.
- Wipe the lens carefully. Do not put too much stress on the lens otherwise it may scratch the lens or cause optical pickup trouble.
- If too much solution is applied, wipe the lens with a dry cotton swab.

Lens cleaning kit (Part No. : SZZP1038C)



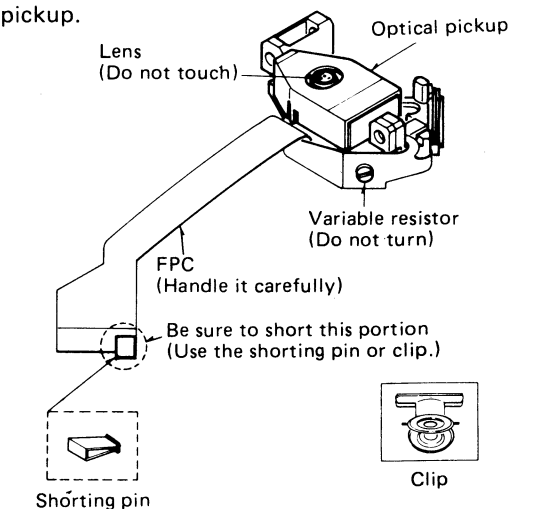
■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the optical pickup may break down due to potential difference caused by static electricity of clothes or human body.

So, be careful of electrostatic breakdown during repair of the optical pickup.

• Handling of optical pickup

1. Do not give excessive shock to the optical pickup because it is of extremely high precision construction.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the FPC. When removing or connecting the short pin, finish the job in a short time.
3. Take care not to give excessive stress to the FPC.
4. Do not turn the variable resistor (laser power adjustment). (It has been already adjusted.)

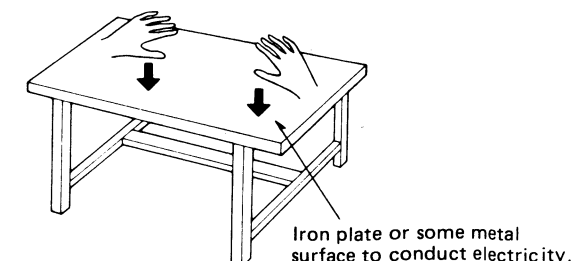
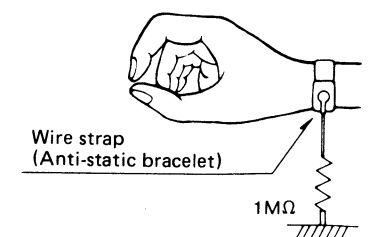


• Grounding for electrostatic breakdown prevention

1. Human body grounding
Use the anti-static wrist strap to relieve the static electricity from your body.
2. Work table grounding
Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

Caution:

The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the optical pickup.



DISASSEMBLY INSTRUCTIONS

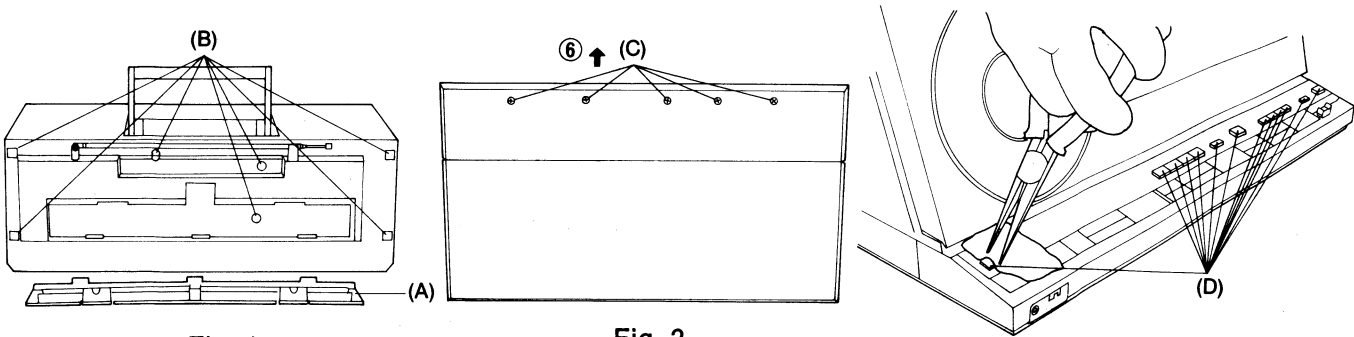


Fig. 1

Fig. 2

Fig. 3

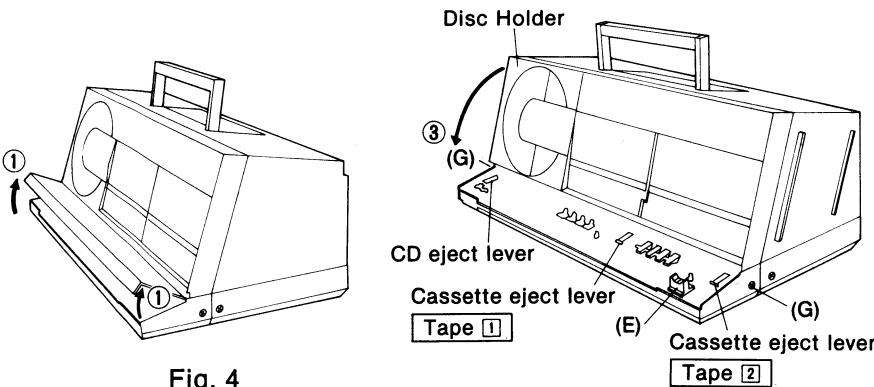


Fig. 4

Fig. 5

Fig. 6

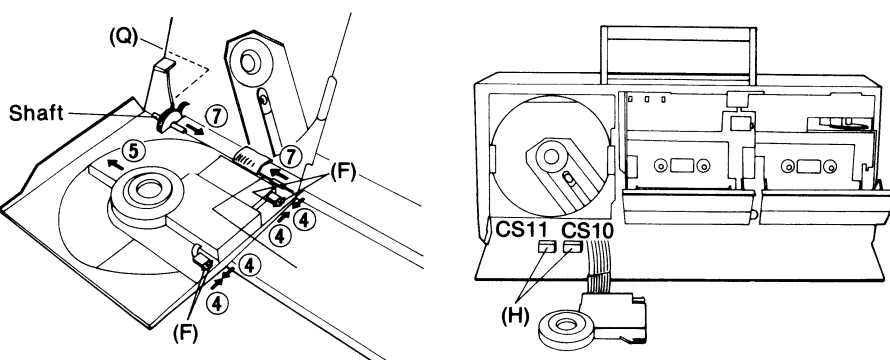


Fig. 7

Fig. 8

Fig. 9

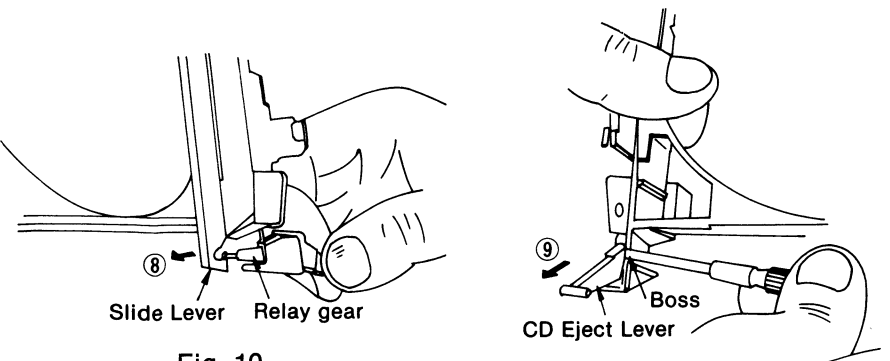


Fig. 10

Fig. 11

Fig. 12

Ref. No.	Shown in Fig. —	To remove —	Remove —
1	1	Front Cabinet (*1)	Battery cover (A)×1
2	1		Screw (3×60)mm (B)×7
3	2		Screw (3×16)mm (C)×5
4	3		Pull out the operating buttons with a cloth so as not to scratch them. (D)×13
5	4		Lift up the operating panel in the direction of arrow ①.
6	5		Knob (E)×1
7	5		Press the cassette eject buttons for tape 1 and tape 2.
8	6		Remove the cassette Lid in the direction of arrow ②. (repeat for tape 1)
9	5		Press the CD eject button and open the cover.
10	7		Push in the 4 disc magnet holder tabs in the direction of arrow ③ and pull out in the direction of arrow ④. (F)×4
11	5		Screw (3×6)mm (G)×2
12	2		Tilt the set toward the back and remove the front cabinet in the direction of arrow ⑥.
13	8	CD Player Unit	Socket (CN10, 11)..... (H)×2
14	7	Dumper Gear	Screw (3×10)mm (I)×1
15	7	Disc Holder	Pull out the shaft in the direction of arrow ⑦.
16	10	Open Lever	Pull the slide Lever in the direction of arrow ⑧ and disengage.
17	11	Slide Lever	Detach the boss of the open lever and pull out in the direction of arrow ⑨.
18	12		Detach the tab of the slide lever and remove in the direction of arrow ⑩.

Note
* 1. Once the front cabinet is removed, the CD player can be removed.
(The CD player is fastened by interlocking with the cabinet.)

(CD Player Unit)

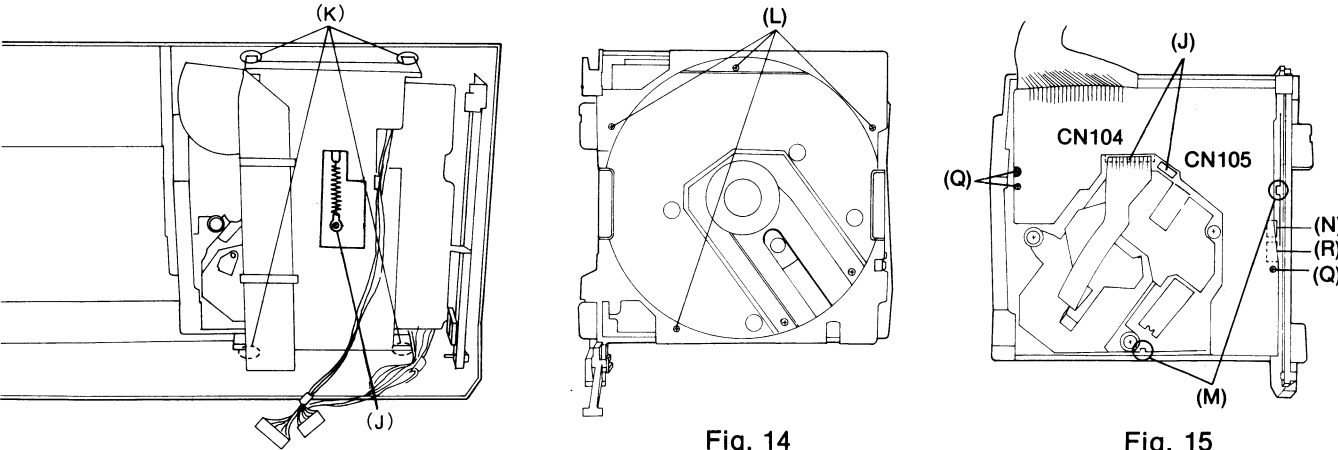


Fig. 13

Fig. 14

Fig. 15

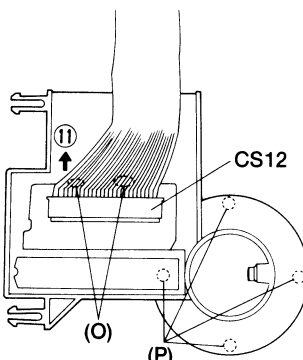


Fig. 16

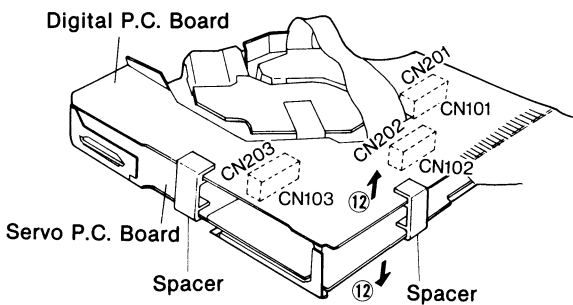


Fig. 17



• CD Player Unit

Ref. No.	Shown in Fig. —	To remove —	Remove —
19	13	Flexible board and Holder	Screw (1.7×3)mm (J)×1
20	13		Remove the four ribs..... (K)×4
21	14	Chassis	Screw (1.7×4)mm (L)×4
22	15		Remove the two ribs (M)×2
23	15		Socket (CN107)..... (N)×1
24	16	LCD P.C.B	Push the socket of CS12 in the direction of arrow ⑪ and remove the flexible board.
25	16		Remove the two ribs (O)×2
26	16	Disc Magnet	Screw (2×4)mm (P)×4
27	15	PC Boards (Digital and Servo P.C. Board)	Screw (1.7×3)mm (Q)×3
28	15		Socket (CN104, 105, 106) (R)×3
29	17		Disconnect the connectors (CN201, 202, 203). Then take out the PC board in the direction of arrow ⑫.

(Mechanism and Chassis Unit)

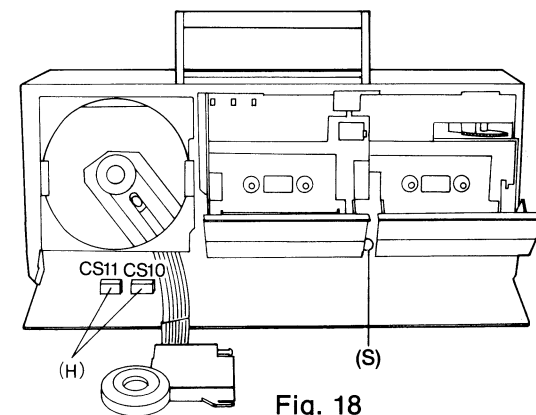


Fig. 18

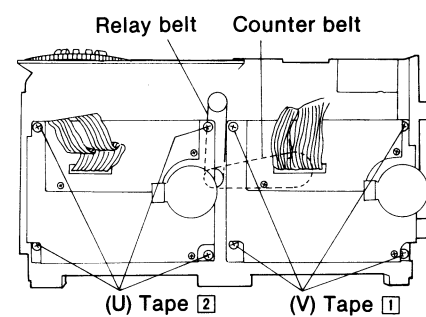


Fig. 20

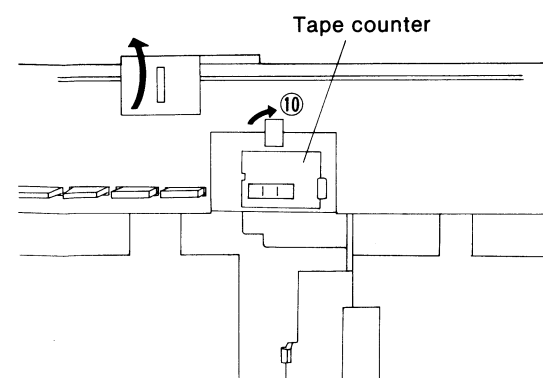


Fig. 22

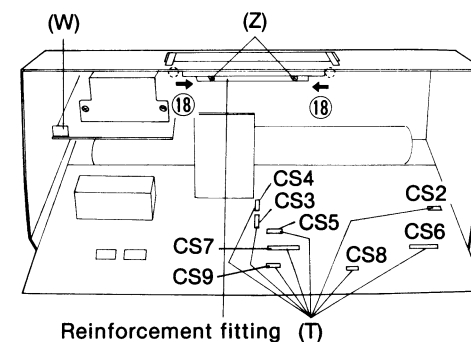


Fig. 19

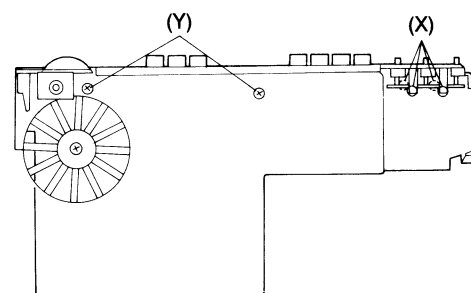


Fig. 21

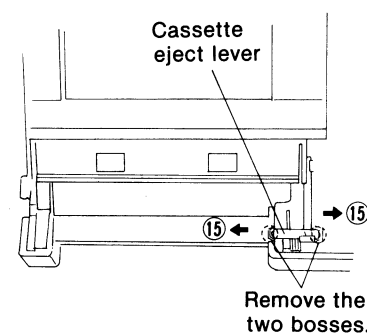


Fig. 23

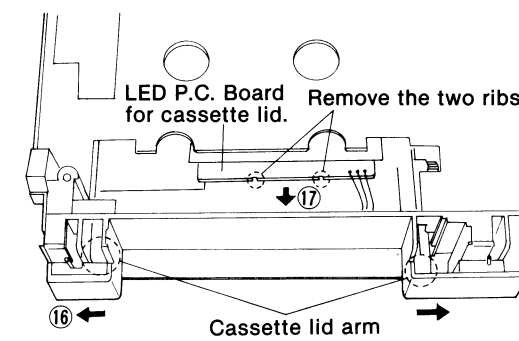


Fig. 24

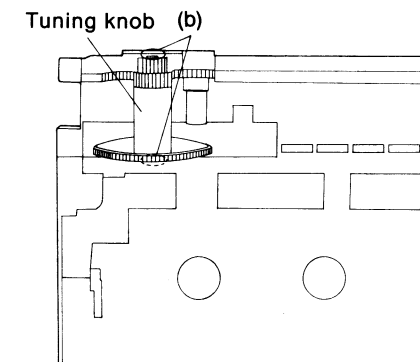


Fig. 26

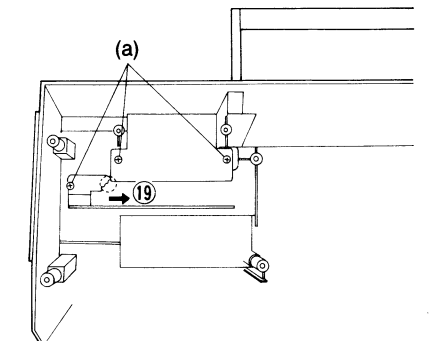


Fig. 25

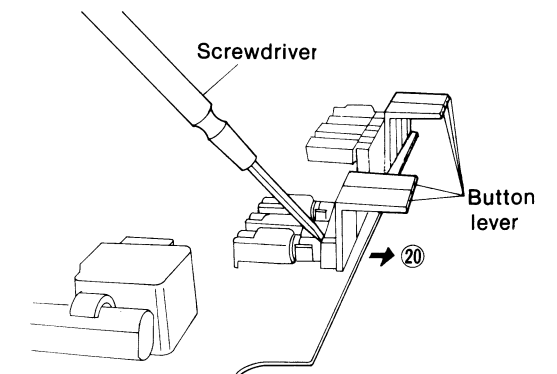


Fig. 27

Ref. No.	Shown in Fig. —	To remove —	Remove —
29	18	Mechanism Unit	Screw (3×10)mm (S)×1
30	19		Socket (CN2, 3, 4, 5, 6, 7, 8, 9) (T)×8
31	20		Screw (3×10)mm [Tape 2]..... (U)×4
32	20		Screw (3×10)mm [Tape 1]..... (V)×4
33	19	Main PC Board	Socket (CN1)..... (W)×1
34	20	LED PC Board	Remove the four ribs..... (X)×4
35	20	Tuner PC Board	Screw (3×10)mm (Y)×2
36	21	Dial Pointer	Detach in the direction of arrow ⑬.
37	21	Tape Counter	Rotate in the direction of arrow ⑭ and pull out.
38	22	Cassette Eject Lever	Press the 2 tabs in the direction of arrow ⑮ and take out the lever.
39	23	Cassette Lid	Push the cassette lid arm in the direction of arrow ⑯ and remove it with the cassette lid spring still attached.
40	23	Cassette Lid and LED P.C. Board	Pull out in the direction of arrow ⑰ by detaching the 2 tabs.
41	18	Handle	Screw (3×10)mm (Z)×2
42	18		Take out the reinforcement fitting.
43	18		Detach the 2 tabs in the direction of arrow ⑱ and pull out the handle.
44	24	Power Supply P.C. Board	Screw (3×10)mm (a)×3
45	24		Detach the tab in the direction of arrow ⑲.
46	25	Tuning Knob	Remove the two ribs (b)×2
47	26	Button Lever	Insert a slotted screwdriver between the button lever and switch and push in the direction of arrow ⑳.

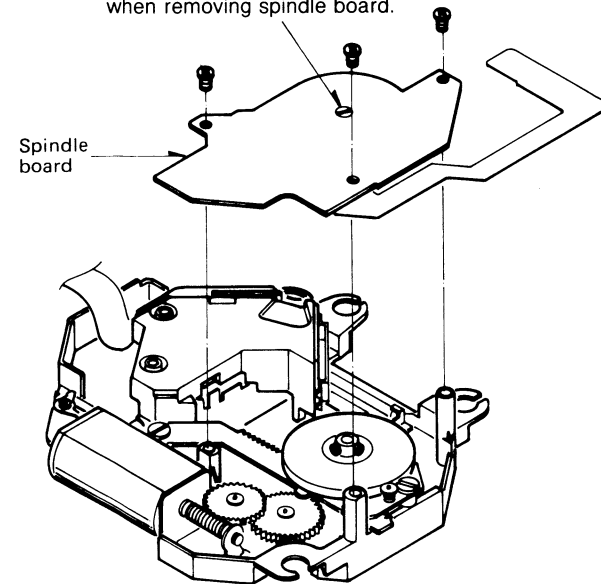
• Servicing Note

- (1) Even during operation, the laser diode will not emit light if the disc holder cover is not closed and the S101 (laser power switch) and S103 (close switch) safety switches are not on.
- (2) When closing the disc holder cover to turn on the S101 and S103 safety switches, do not look at the laser pickup lens.

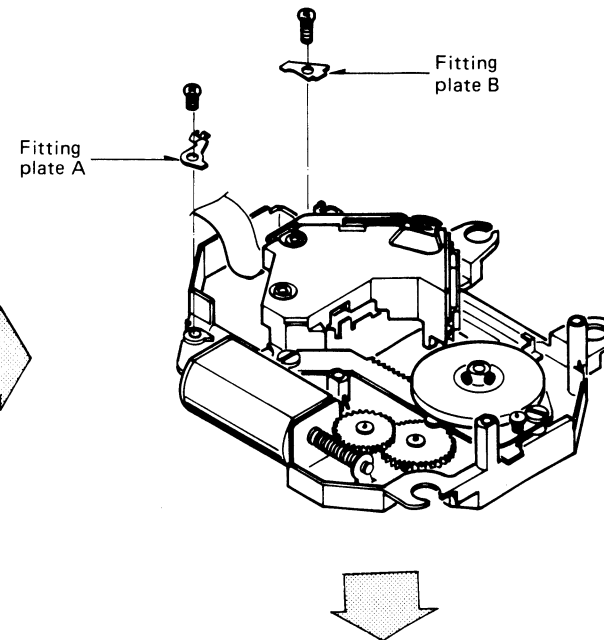
How to remove the optical pickup

1. Remove the 3 setscrews of the spindle board.

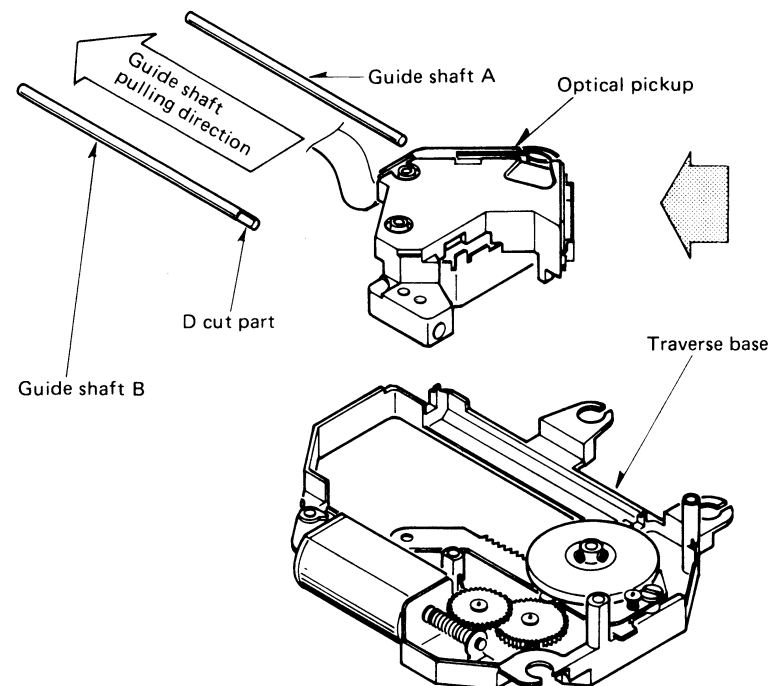
<Caution>
Don't touch this screw
when removing spindle board.



2. Remove the 2 setscrews of the guide shaft fitting plate A and B.

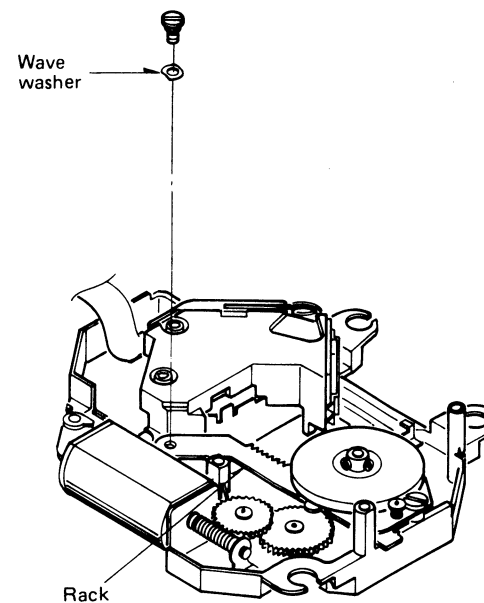


4. Pull out the guide axes A and B in the direction of the arrow.



3. Remove the rack setscrew.

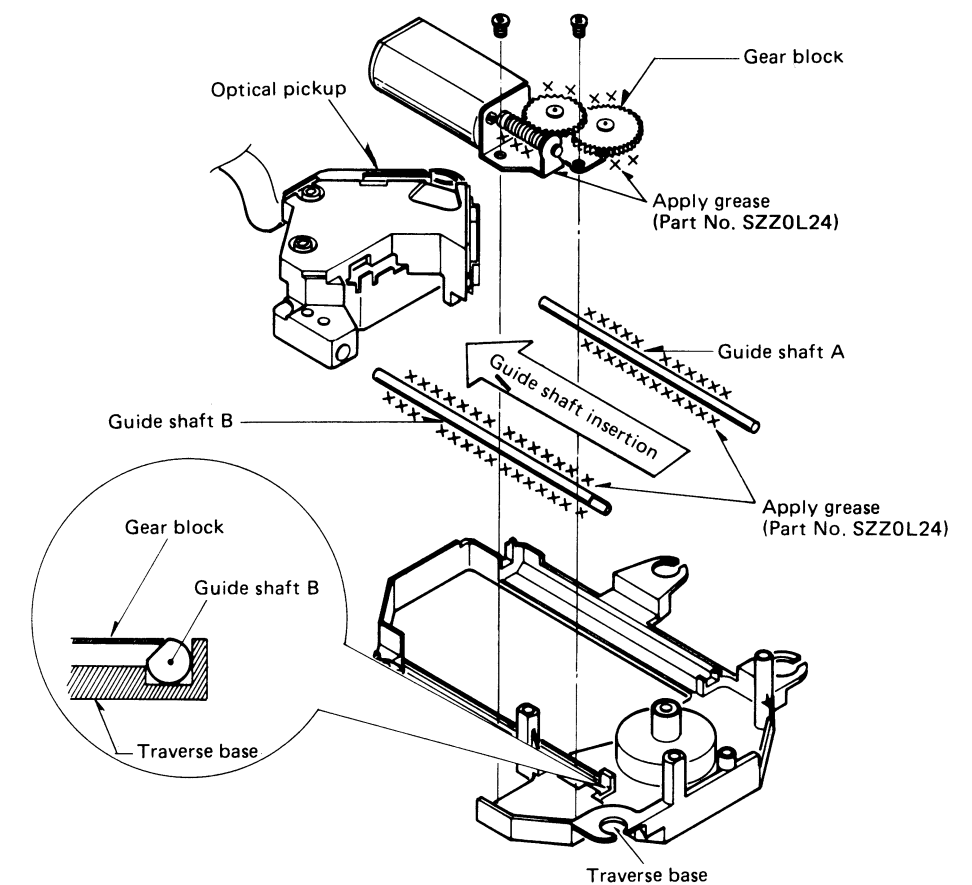
Note: Take care not to lose the wave washer.



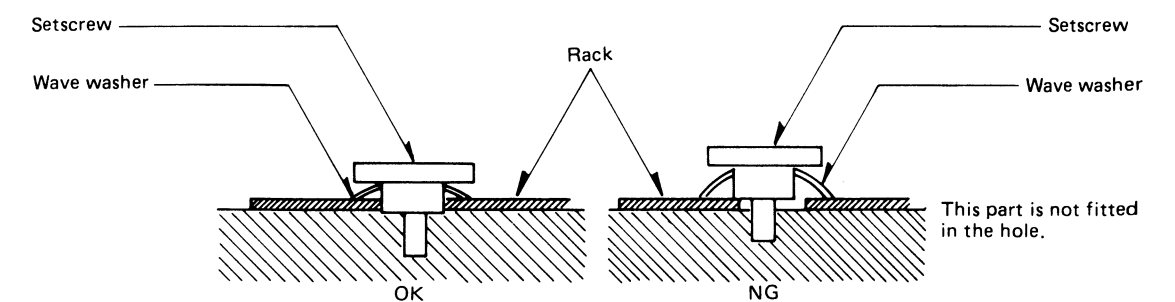
Cautions for assembly

The assembly work can be done by reversing the disassembly procedure. Keep the following points in mind.

1. Be sure to insert the guide shaft in the direction of the arrow.
If it is inserted in the wrong direction, the interval plate spring may be damaged.
2. Make sure that the D cut off guide shaft B is fitted in the position as shown.



3. Tighten the rack setscrew as shown.

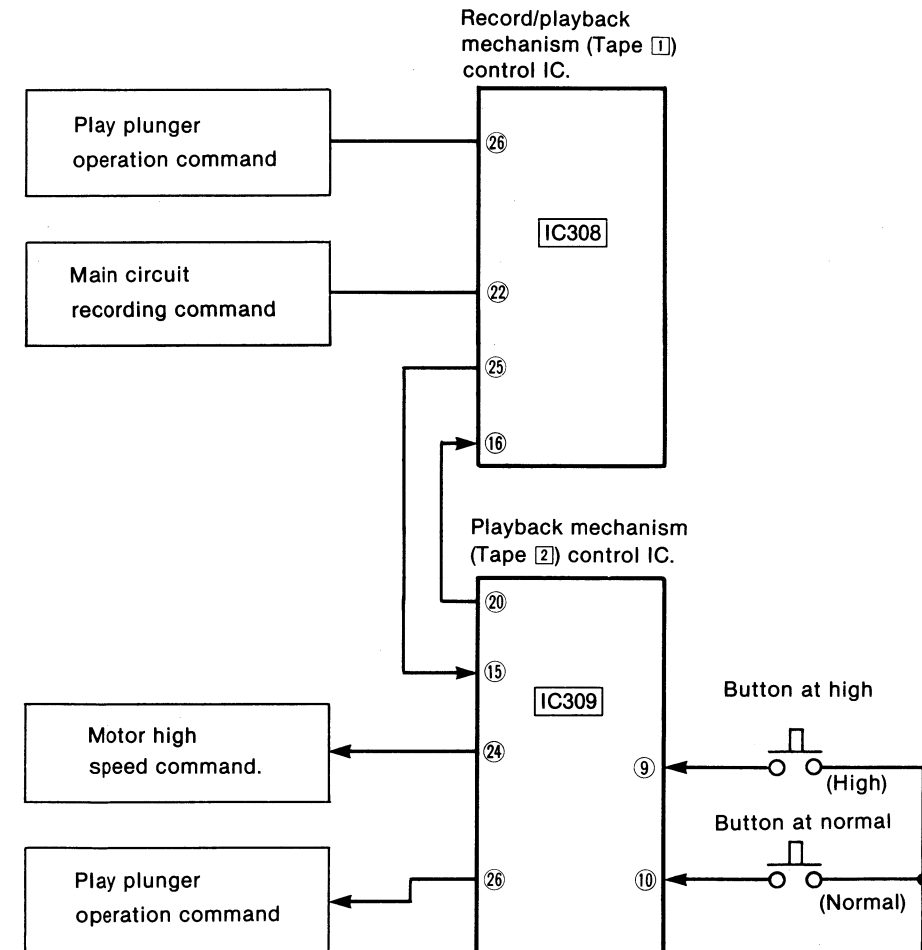


INTRODUCTION TO NEW FUNCTIONS

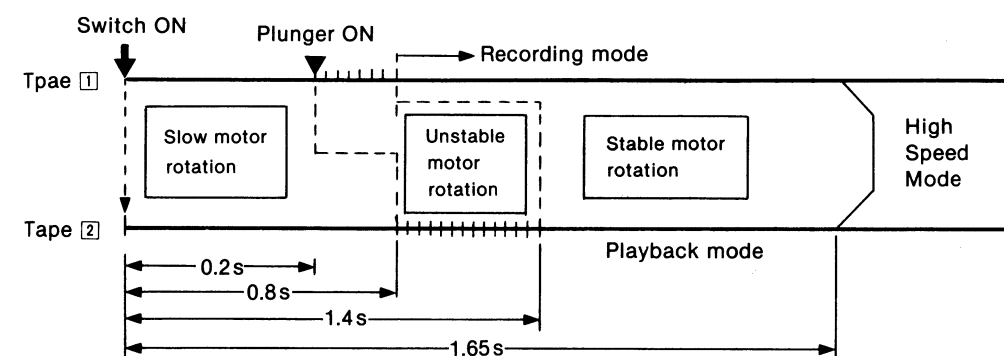
1. One-Touch Tape Editing Operation

The RX-CD70 is equipped with a function that can be dubbing (from thape ② to tape ①) at normal or high speed with a signal touch of a button. In this operation, tape ① is in the recording mode and tape ② is in the play mode. This minimizes the consumption of the batteries when the mechanism starts operating.

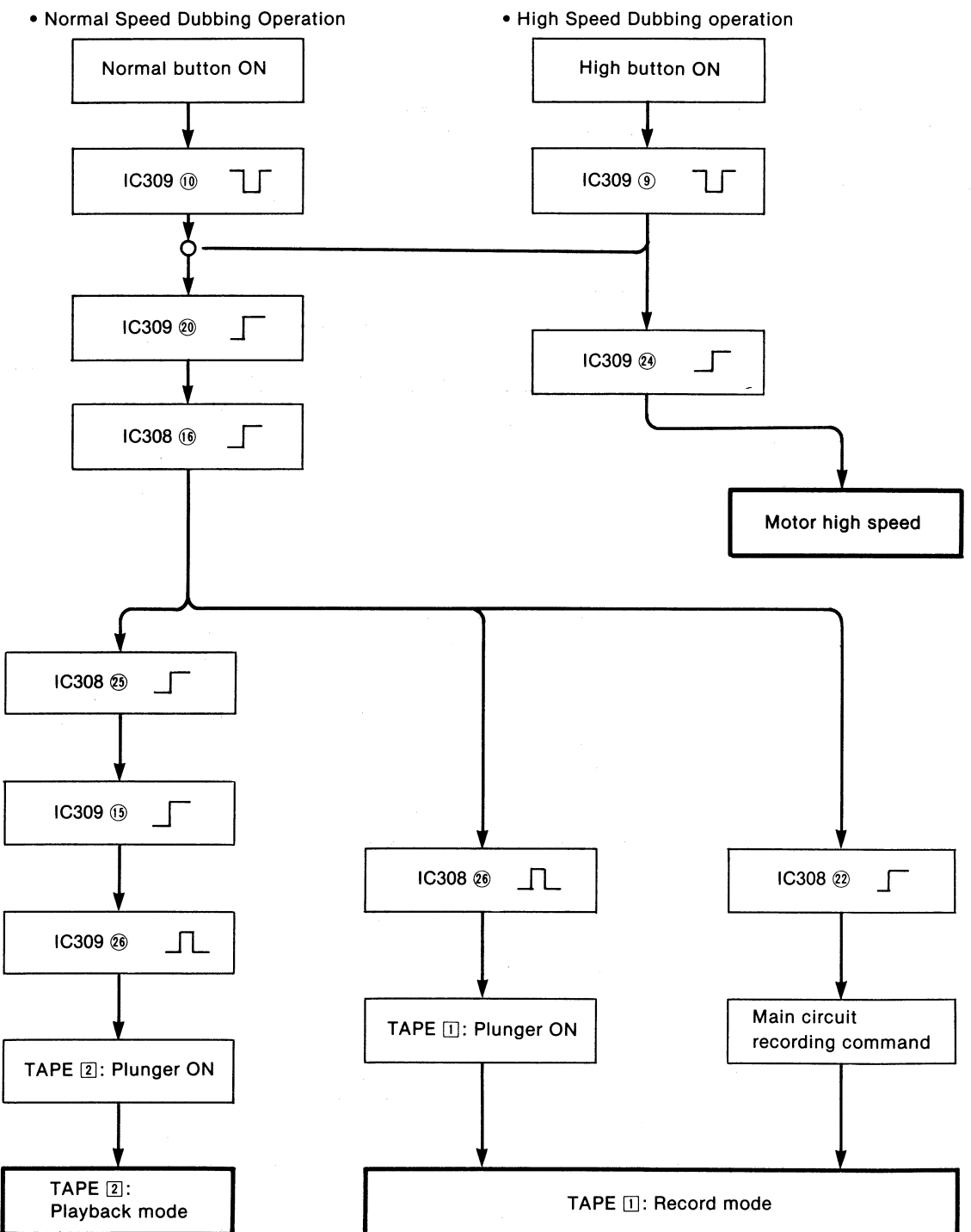
〈Basic Operation〉



〈Timing Chart〉



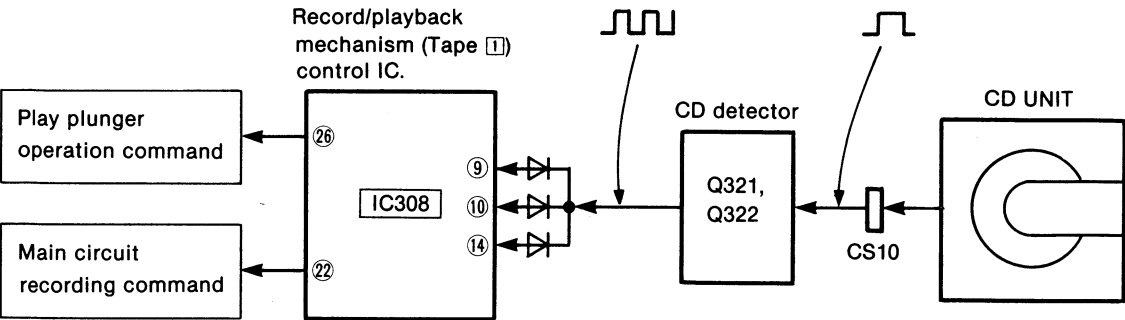
〈FlowChat〉



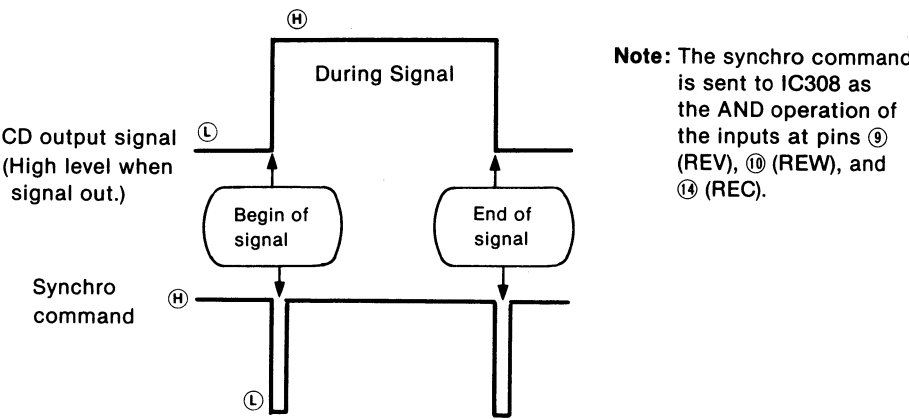
2. CD Synchro-Recording Operation

The RX-CD70 provides a synchro-recording function that starts recording tape 1 when the CD is played and stops recording tape 1 when the CD is stopped.

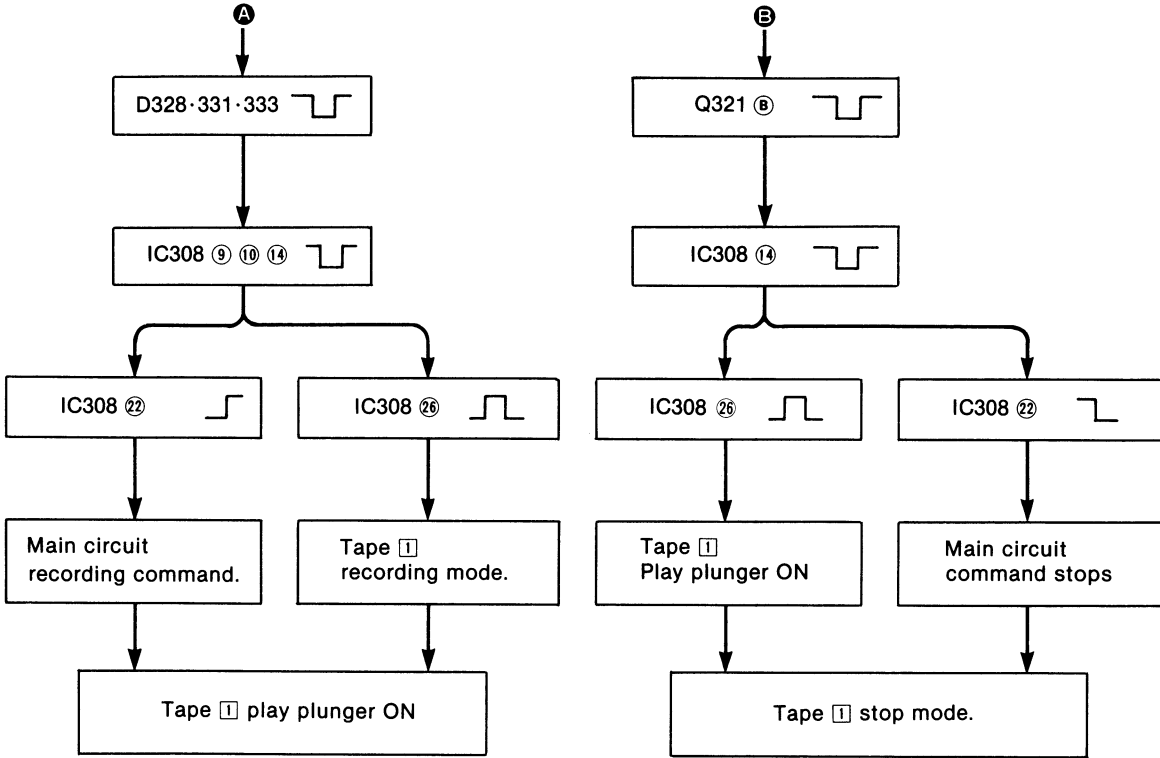
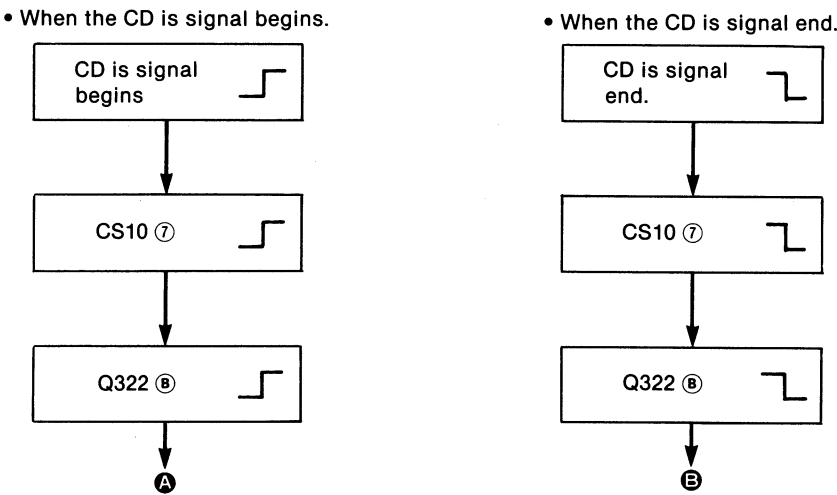
Basic Operation



Timing Chart



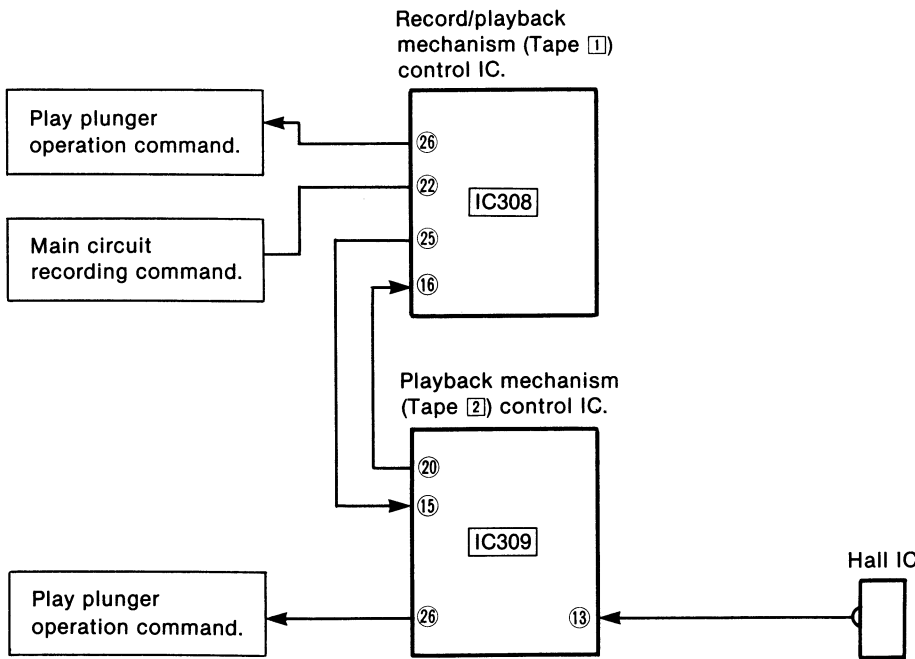
Flowchat



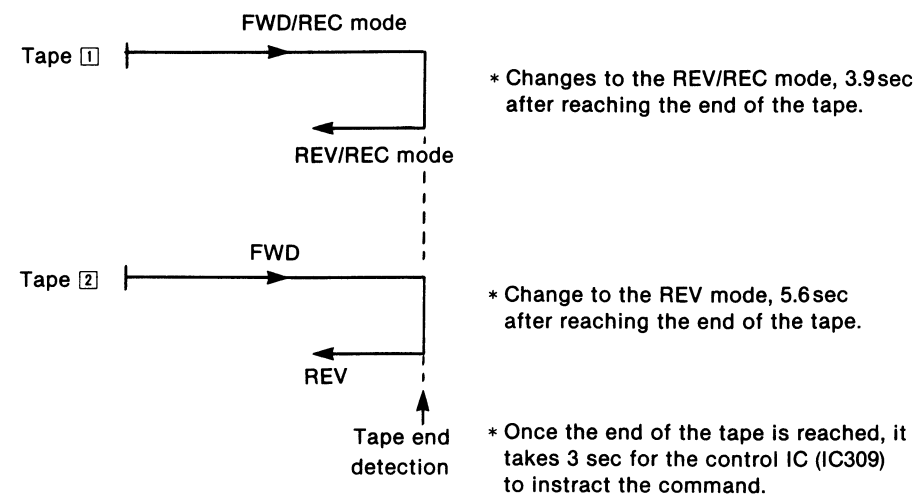
3. Synchro-Reverse Operation

Once the button is turned on for one-touch dubbing, the end of the 2 (Playback) is detected. Then, tape 1 (record/playback) and tape 2 are switch to reverse mode in the dubbing condition.

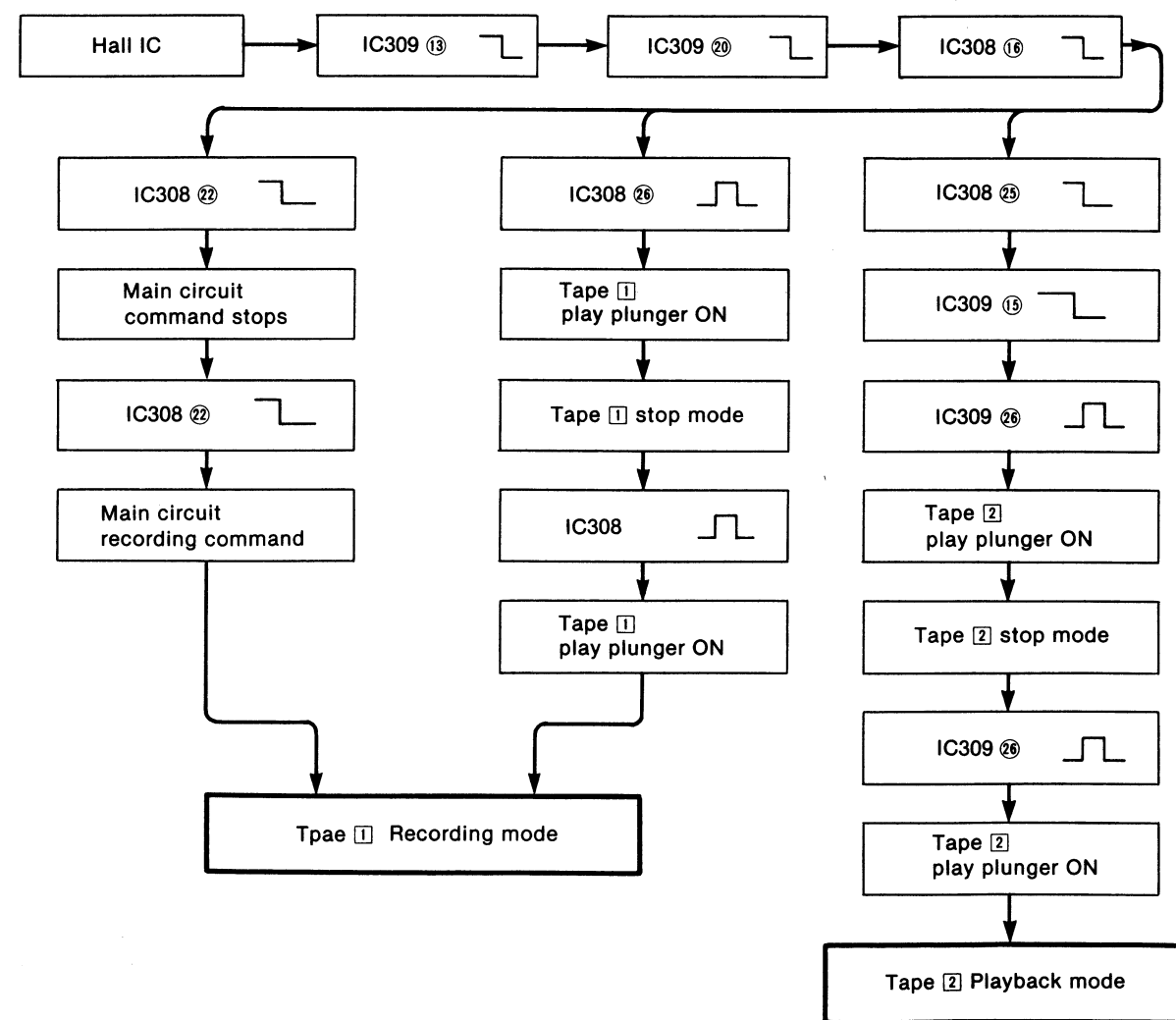
Basic Operation



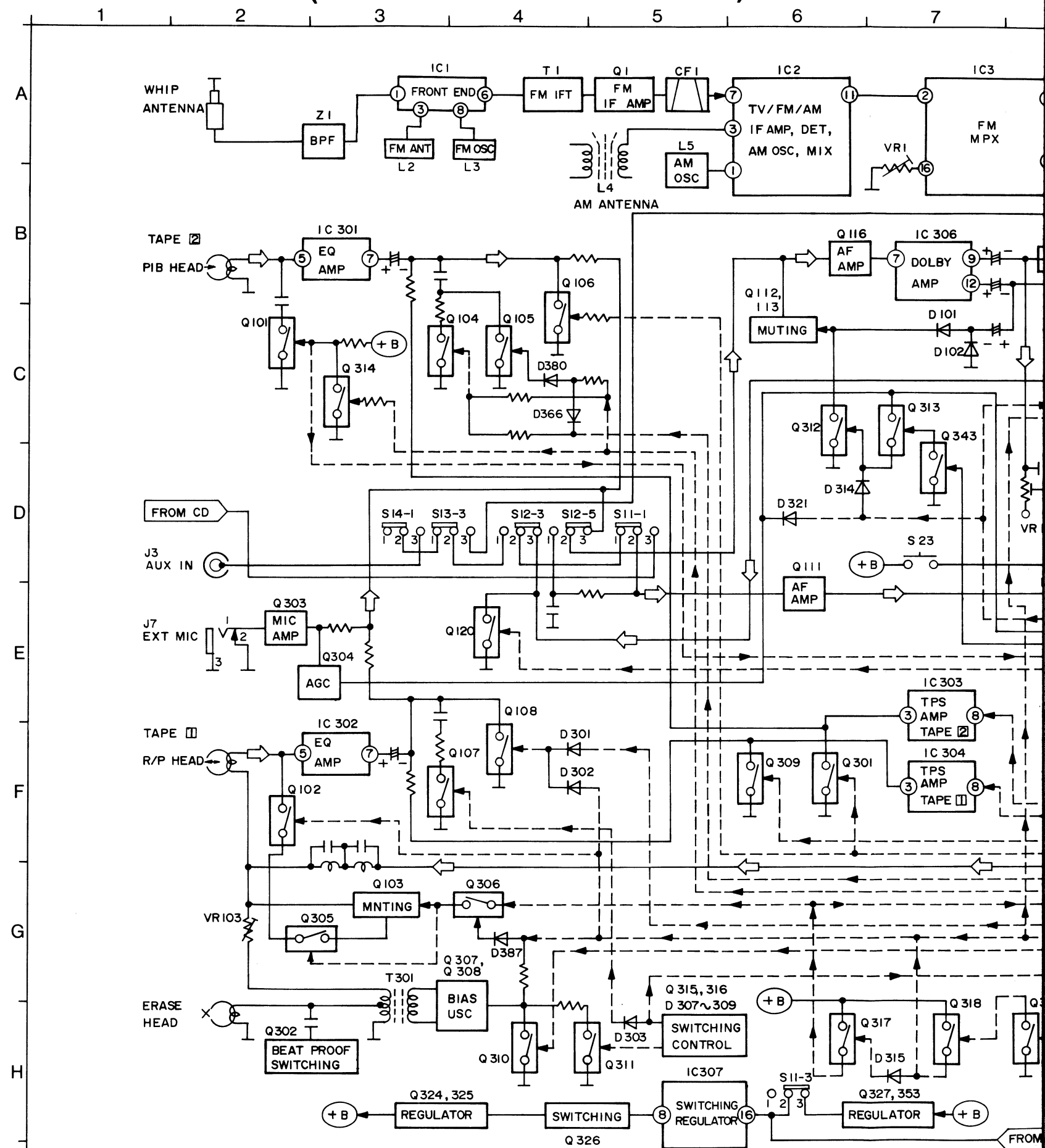
〈Timing Chart〉

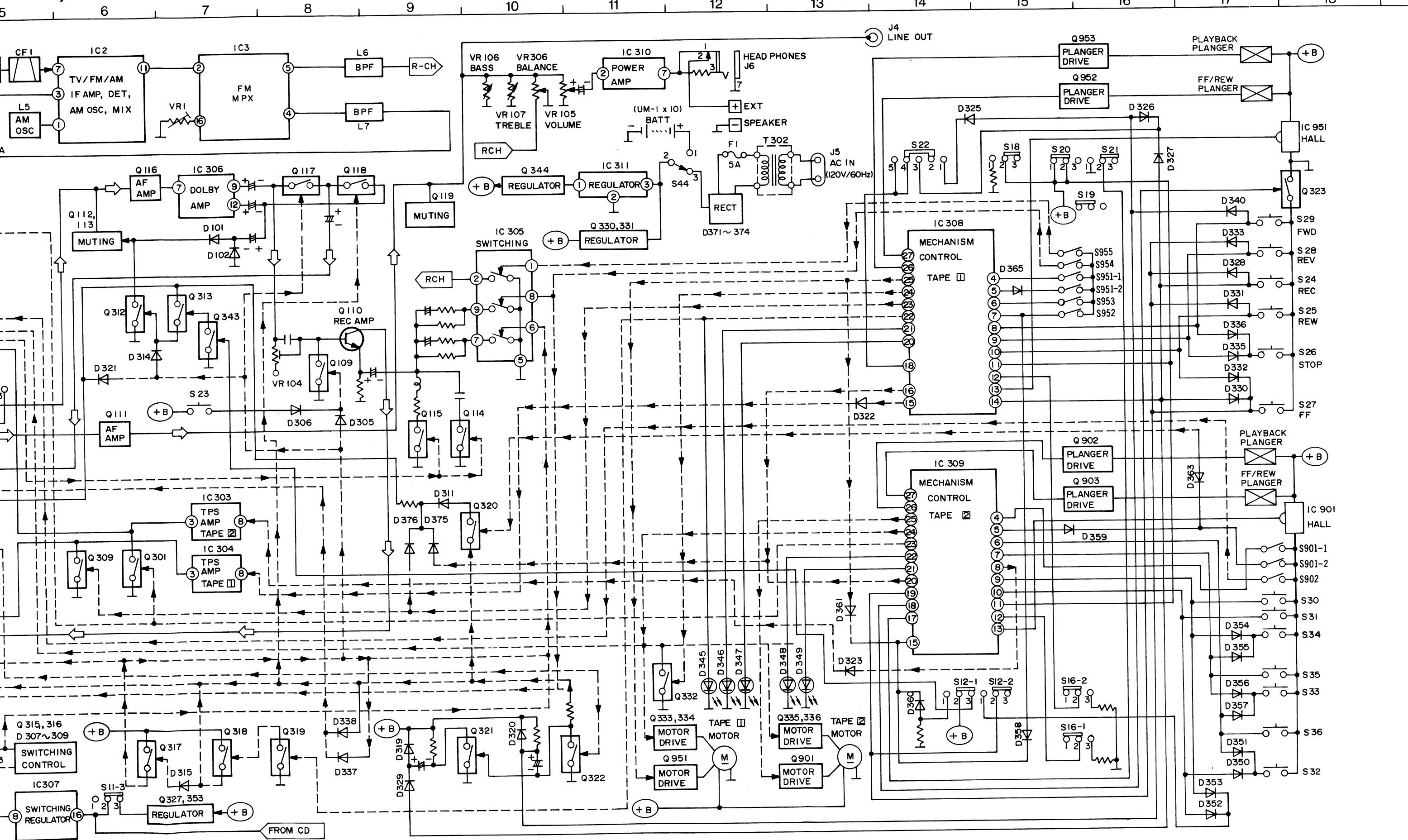


〈Flowchart〉

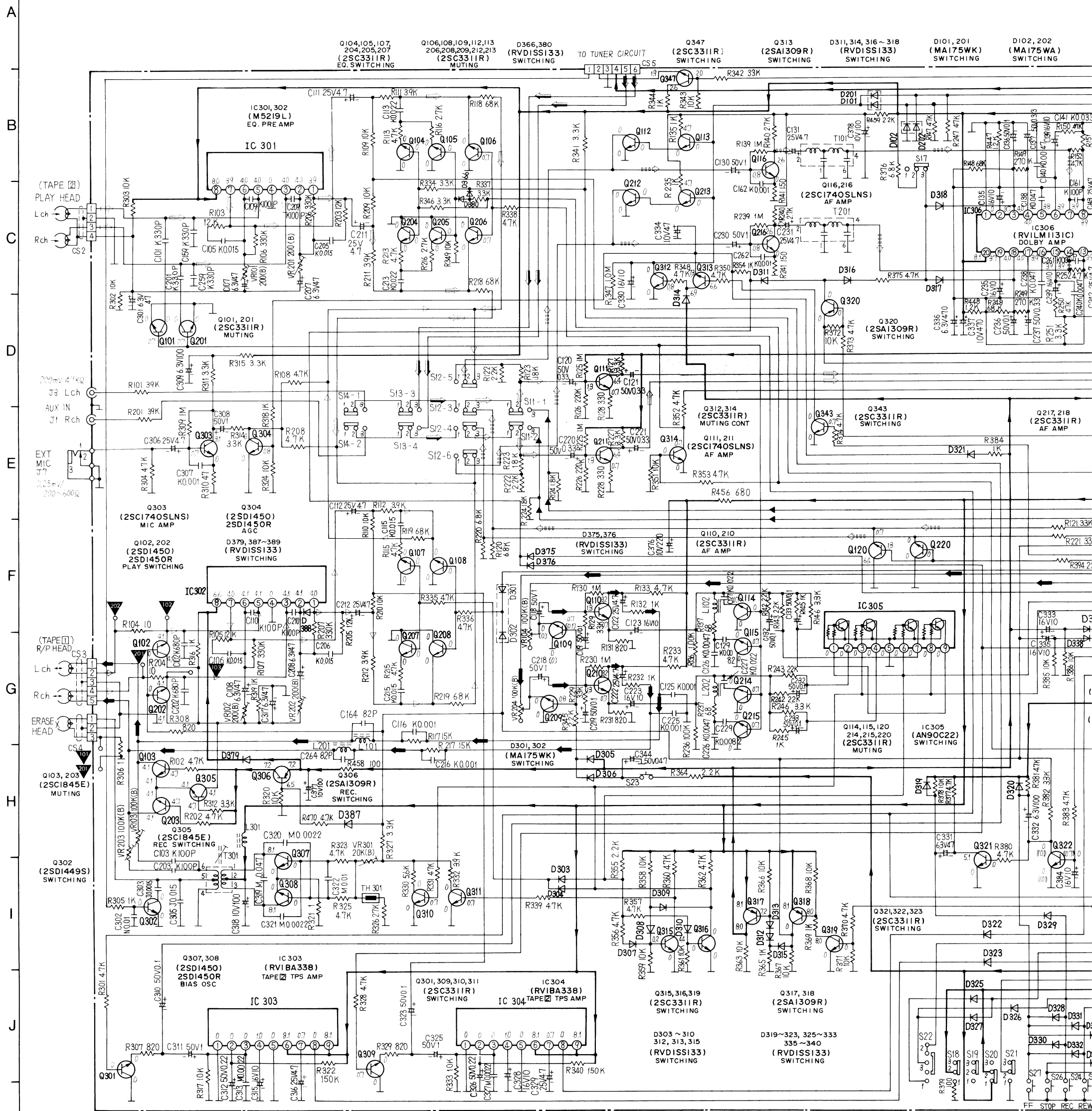


BLOCK DIAGRAM (for MAIN & TUNER SECTION)





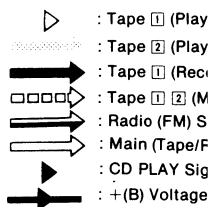
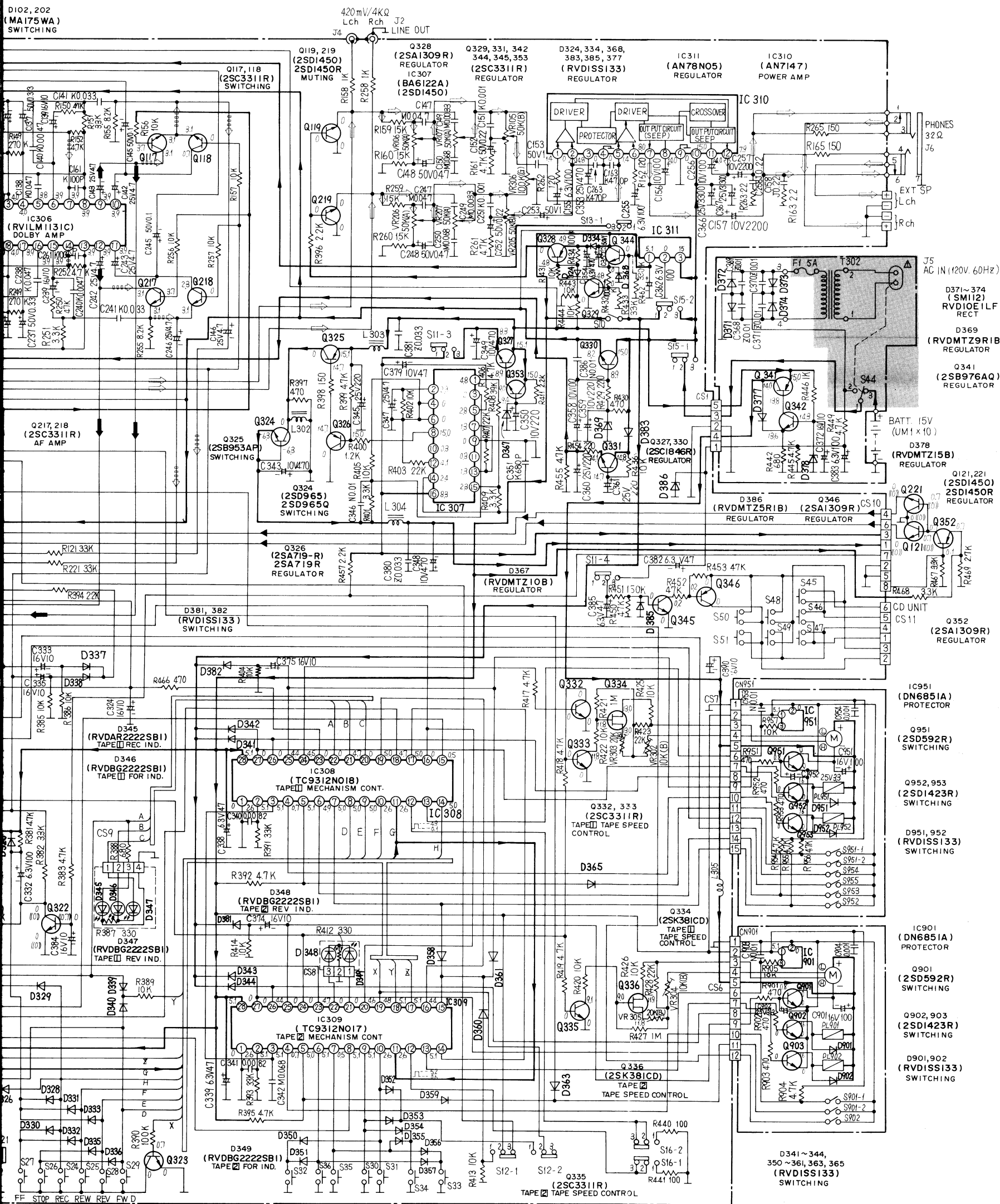
MAIN CIRCUIT



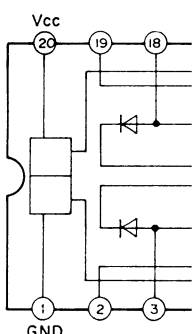
Notes:

- | | | | | | | | |
|------------------|---|----------|------------------------------|-----------------|--------------------------------|------------------|--|
| 1. S10: | Function selector muting switch. | 15. S30: | High speed dubbing switch. | 30. S901-1: | FF/REW mode switch. | 41. VR103, 203: | Bias current adjustment. |
| 2. S11~S14: | Function select switch. | 16. S31: | Normal speed dubbing switch. | 31. S901-2: | Playback mode switch. | 42. VR104, 204: | Overall gain adjustment. |
| 3. S15-1, S15-2: | Power ON/OFF switch. | 17. S32: | Rewind switch. | 32. S902: | Auto tape select switch. | 43. VR105, 205: | Volume control. |
| 4. S16-1, S16-2: | Blank skip switch. | 18. S33: | Stop switch. | 33. S951-1: | FF/REW mode switch. | 44. VR106, 206: | Bass control. |
| 5. S17: | Dolby NR switch. | 19. S34: | Fast forward switch. | 34. S951-2: | Playback mode switch. | 45. VR107, 207: | Treble control. |
| 6. S18~S21: | Reverse mode select switch. | 20. S35: | Reverse switch. | 35. S952: | Forward record inhibit switch. | 46. VR301: | Erase current adjustment. |
| 7. S22: | Timer stand by select switch in "OFF" position. | 21. S36: | Forward switch. | 36. S953: | Reverse record inhibit switch. | 47. VR302: | High speed dubbing (for Tape I Deck). |
| 8. S23: | REC mute switch. | 22. S44: | AC/DC changing switch. | 37. S954: | Auto tape select switch. | 48. VR303: | Normal speed dubbing (for Tape I Deck). |
| 9. S24: | REC stand-by switch. | 23. S45: | Memory/recall switch. | 38. S955: | Auto tape select switch. | 49. VR304: | High speed dubbing (for Tape II Deck). |
| 10. S25: | Rewind switch. | 24. S46: | Remain time switch. | 39. VR101, 201: | Playback gain adjustment VR. | 50. VR305: | Normal speed dubbing (for Tape II Deck). |
| 11. S26: | Stop switch. | 25. S47: | Repeat switch. | 40. VR102, 202: | Playback gain adjustment VR. | 51. VR306: | Balance control. |
| 12. S27: | Fast forward switch. | 26. S48: | Forward skip switch. | | | 52. The mark () | shows test point. |
| 13. S28: | Reverse switch. | 27. S49: | Reverse skip switch. | | | | |
| 14. S29: | Forward switch. | 28. S50: | Play/pause switch. | | | | |
| | | 29. S51: | Stop switch. | | | | |

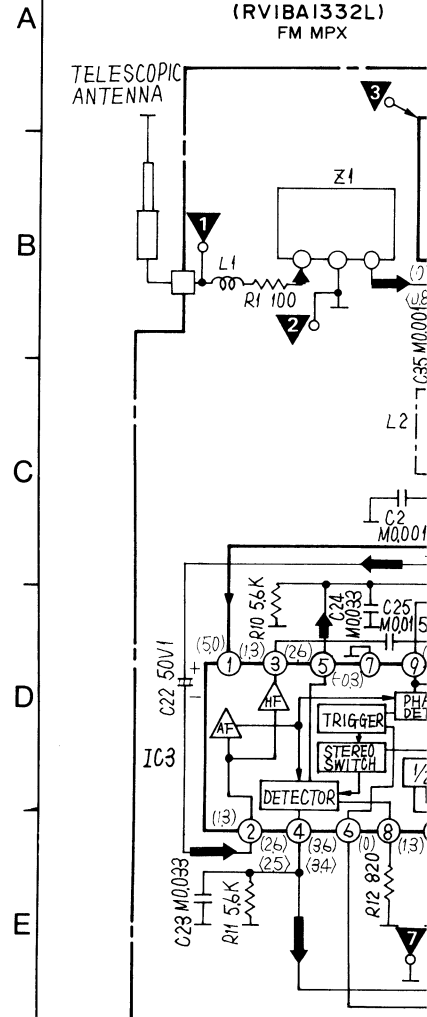
D102, 202
(MA175WA)
SWITCHING



IC306 RVILM



TUNER CIRCUIT



Bias current adjustment VR. (for Tape □ Deck)
 Overall gain adjustment VR. (for Tape □ Deck)
 Volume control.
 Bass control.
 Treble control.
 Erase current adjustment VR.
 High speed dubbing adjustment VR.
 (for Tape □ Deck)
 Normal speed dubbing adjustment VR.
 (for Tape □ Deck)
 High speed dubbing adjustment VR.
 (for Tape □ Deck)
 Normal speed dubbing adjustment VR.
 (for Tape □ Deck)
 Balance control.
) shows test point e.g. ▽ = test point 1.

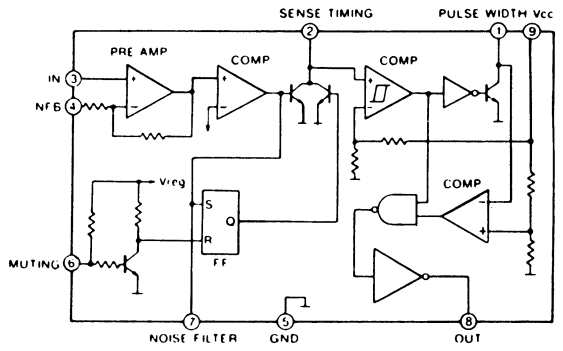
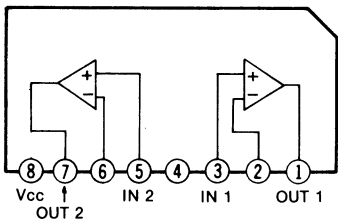
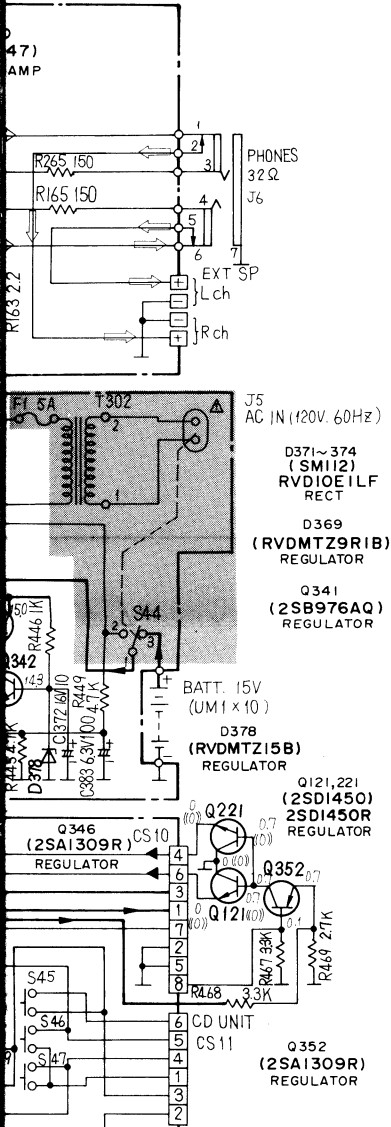
- Important safety notice**
 The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.
- DC voltage measurement are taken with electronics voltmeter from negative terminal of battery.
 [] ...Recording position, No mark...Playback position.
- Battery current: No signal 190 mA
 Maximum output:
 Radio..... 860 mA
 Tape/Playback..... 1.2 A
 Tape/Recording 400 mA (VR min, AUX IN)
 Normal Speed Dubbing 520 mA
 High Speed Dubbing..... 550 mA

- Described in schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type number is used for supply parts number and production parts number which they are identical.
 e.g. Q1
 2SC2412NRTB, LNSTB ← Production parts number
 [2SC2412] ← Supply parts number
- The supply parts number is described alone in the replacement parts list.
- This schematic diagram may be modified at any time with the development of new technology.

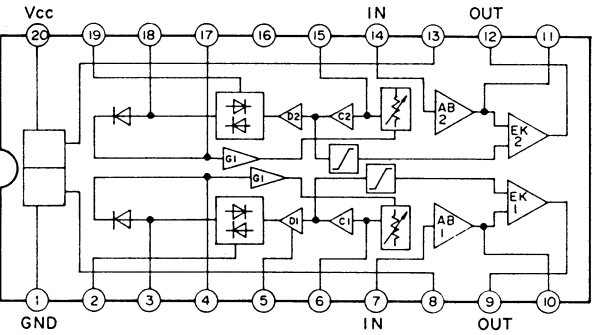
• EQUIVALENT CIRCUIT

IC301, 302 M5219L

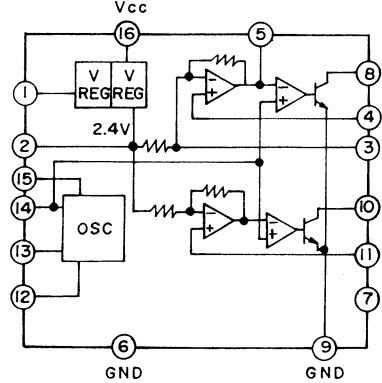
IC303, 304 RVIBA338



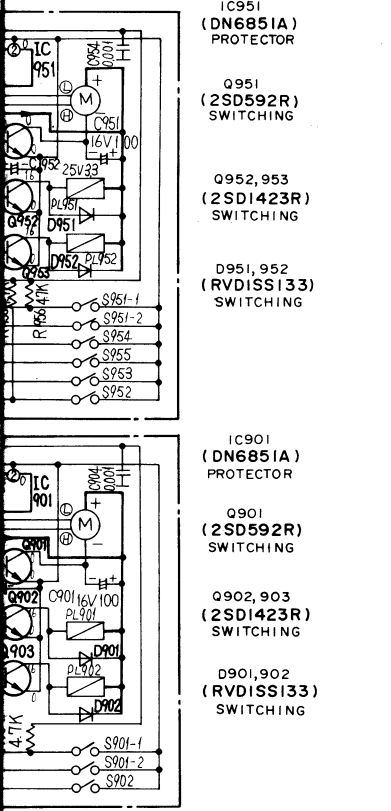
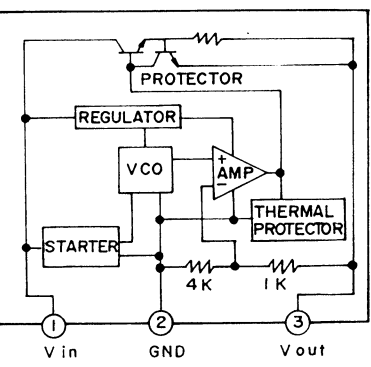
IC306 RVILM1131C



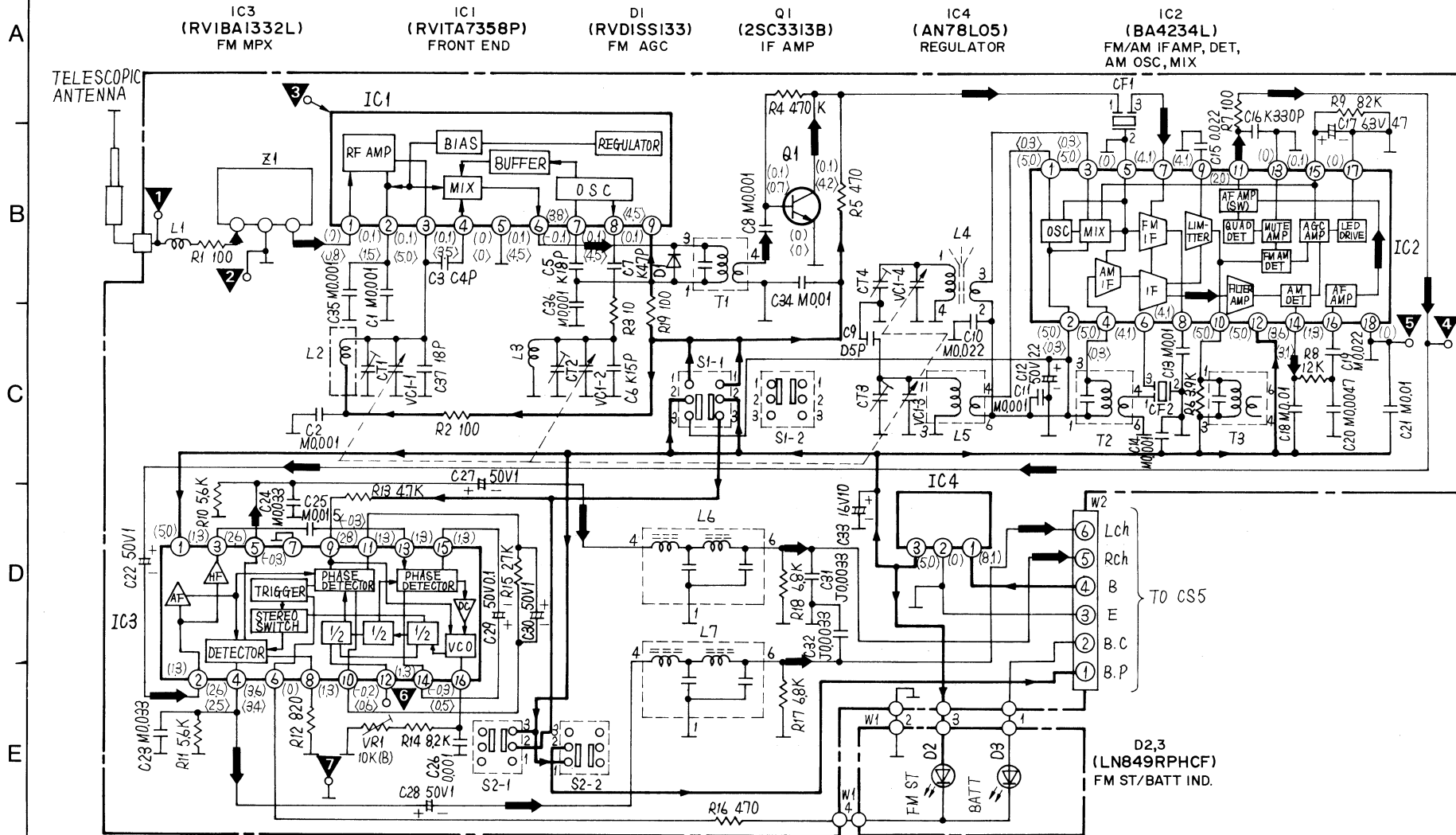
IC307 BA6122A



IC4, 311 AN78N05



TUNER CIRCUIT



- Notes:
- S1-1, S1-2: Band select switch in "AM" position. (A...AM, F...FM)
 - S2-1, S2-2: FM mode/select switch in "MONO/II" position. (M...MONO/II, S...Stereo/II)
 - VR1: FM VCO adjustment VR.
 - DC voltage measurement are taken with electronics voltmeter from negative terminal of battery. < ...FM position, ()...AM position.

- Described in schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type number is used for supply parts number and production parts number which they are identical. e.g. Q1 2SC2412NRTB, LNSTB ← Production parts number [2SC2412] ← Supply parts number
- The supply parts number is described alone in the replacement parts list.
- This schematic diagram may be modified at any time with the development of new technology.



am are two types of numbers; the supply parts number for transistors and diodes. supply parts number and production parts number which they are identical.

Production parts number Supply parts number Described alone in the replacement parts

may be modified at any time with the development of new technology.

ELECTRICAL PARTS LIST (Main & Tuner Section)

REPLACEMENT PARTS LIST

Important safety notice:

Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS			D 101, 301	MA175WK	Diode	VR 103, 104, 203, 204		
IC 1	RV1TA7358P	IC (Front End)	D 102	MA175WA	Diode	EVND4AA00B15		Bias Current, Overall Gain Adj. VR (150k Ω /B)
IC 2	BA4234L	IC (MIX/IF/DET)	D 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 363, 365, 366, 368, 375, 376, 377, 379, 380, 381, 382, 383, 385, 387, 388, 389			VR 105, 205		
IC 3	RV1BA1332L	IC (FM MPX)				EWANA4X05B54		Volume Control
IC 4	AN78L05	IC (Regulator)				VR 106, 107, 206, 207		
IC 301, 302						EWAKA2X05A54		Bass, Treble Control
	M5219L	IC (EQ AMP)				VR 301, 303, 305		
IC 303, 304						EVND4AA00B24		Erase Current, Tape Speed Adj. VR (Nor. Speed/20k Ω , B)
	RV1BA338	IC (TPS)				VR 302, 304		
IC 305	AN90C22	IC (Switching)				EVND4AA00B14		Tape Speed Adj. VR (High Speed/140k Ω , B)
IC 306	RV1LM1131C	IC (Dolby)				VR 306		EWAKF1X05G15 Balance Control
IC 307	BA6122A	IC (Switching Regulator)				CERAMIC FILTERS		
IC 308	TC9312N018	IC (Tape [1] Mechanism Cont.)				CF 1	RVF107WAZ	Ceramic Filter (10.7MHz)
IC 309	TC9312N017	IC (Tape [2] Mechanism Cont.)				CF 2	RVFPFA455A	Ceramic Filter (455kHz)
IC 310	AN7147	IC (Power AMP)	D 345	RVDAR2222SB1	LED	THERMISTOR		
IC 311	AN78N05	IC (Regulator)	D 346, 347, 348, 349			TH 301	RRT202	Thermistor
IC 901, 951			D 367	RVDMTZ10B	Diode	FILTER		
	DN6851A	IC (Hall IC)	D 369	RVDMTZ9R1B	Diode	Z 1	RXABPM86A	B.P.F
TRANSISTORS			D 371, 372, 373, 374			FUSE		
Q 1	2SC3313B	Transistor		SM112	Rectifier	F 1	XBA1C50NU100	Fuse (5A) Δ
Q 101, 104, 105, 106, 107, 108, 109, 110, 112, 113, 114, 115, 117, 118, 120, 201, 204, 205, 206, 207, 208, 209, 210, 212, 213, 214, 215, 217, 218, 220, 301, 309, 310, 311, 312, 314, 315, 316, 319, 321, 322, 323, 329, 331, 332, 333, 335, 342, 343, 344, 345, 347, 353			D 378	RVDMTZ15B	Diode	SWITCHES		
	2SC3311R	Transistor	D 386	RVDMTZ5R1B	Diode	S 1, 2	ESB621589	Switch, Band, FM Mode
Q 102, 119, 121, 202, 219, 221, 304, 307, 308			D 901, 902, 951, 952			S 11, 12, 13, 14	ESB621562	Slide Switch (CD, Tape, Radio, AUX)
Q 103, 203, 305				RVD1SS133	Diode	S 15	RSH2B38Z	Push Switch (Power ON/OFF)
	2SD1450R	Transistor	COILS			S 16, 17	ESB6488	Slide Switch (Blank Skip, Dolby)
Q 111, 116, 211, 216, 303			L 1	RLQY30S1	Coil, Choke	S 18, 19, 20, 21	ESB68508	Slide Switch (   )
	2SC1740SLNS	Transistor	L 3	RLD4Y44	Coil, FM OSC	S 22	RSS3A12Z	Slide Switch (Timer Standby)
Q 302	2SD1449S	Transistor	L 4	RLF2V83	Coil, AM ANT	S 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 45, 46, 47, 48, 49, 50, 51		
Q 306, 313, 317, 318, 320, 328, 346, 352			L 5	RLQ2B105	Coil, AM OSC	EVQQS405K		Slide Switch (REC Mute, REC Standby, REW, Stop, FF, Reverse, Forward, Normal/High Speed)
Q 324	2SA1309R	Transistor	L 6, 7	RLE5031	Filter	S 901, 951	RSH1B12Z	Push Switch
Q 325	2SD965Q	Transistor	L 101, 201	RLQZM473J	Choke Coil	S 902, 952, 953, 954, 955	RSH1A46Z	Push Switch
Q 326	2SB953AP	Transistor	L 102, 202	RLQZB822K	Choke Coil	JACKS		
Q 327, 330	2SC1846R	Transistor	L 301	RLQZB470K	Choke Coil	J 1, 2	RJF1094Y	AUX IN/LINE OUT (R-CH)
Q 334, 336	2SK381CD	Transistor	L 302	RLQV201K	Choke Coil	J 3, 4	RJF1094Z	AUX IN/LINE OUT (L-CH)
Q 341	2SB976AQ	Transistor	L 303, 304	RLQW500K	Choke Coil	J 5	RJJ1A3Y	Jack, AC IN
Q 901, 951	2SD592R	Transistor	L 305	RLQZB8R2K	Choke Coil	J 6	RJJD9S1Z	Jack, Headphones
Q 902, 903, 952, 953			TRANSFORMERS			J 7	RJJ1D20Y	Jack, EXT. MIC
	2SD1423R	Transistor	T 1, 3	RLI4B153	IFT, FM 1st, 2nd			
DIODES & RECTIFIERS			T 2	RLI2B458	IFT, AM			
D 1	RVD1SS133	Diode	T 101, 201	RLE9B2	B.P.F			
D 2, 3	LN849RPHCF	LED	T 301	RL08C4	Bias Oscillation			
			T 302	RLT5L5M1A	Power Transformer Δ			
			VARIABLE CAPACITOR					
			VC 1	RCV4LC2V1K	Variable Capacitor/with CT1-4			
			VARIABLE RESISTORS					
			VR 1	QVNB3A00B103	FM VCO Adj. VR (10k Ω /B)			
			VR 101, 102, 201, 202					
				EVND4AA00B22	Playback Gain Adj. VR (22 Ω /B)			

RESISTORS AND CAPACITORS (Main & Tuner Section)

Numbering System of Resistor

Example ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value (100Ω) 2R2
ERX	2	AN	J	
Type	Wattage	Shape	Tolerance	Value (2.2Ω)

Resistor Type	Wattage Tolerance
ERD: Carbon	10 : 1/8 W J : $\pm 5\%$
ERG: Metal Film	12 : 1/2 W
ERX: Metal Film	25 : 1/4 W
ERQ: Fuse Type Metal	1 : 1 W
RRD: Carbon (Chip Type)	18 : 1/8 W

Numbering System of Capacitor

Example	1H	102	Z	F
ECKD				
Type	Voltage	Value (1000 pF)	Tolerance	Peculiarity
ECEA	50	M	R47	
Type	Voltage	Peculiarity	Value (0.47 uF)	

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA: Electrolytic	0J : 6.3 V	2H : 500 V DC	C : ± 0.25 pF
ECCD: Ceramic	1A : 10 V	1 : 100 V	J : $\pm 5\%$
ECKD: Ceramic	1C : 16 V	DKC : 400 V AC	K : $\pm 10\%$
EQQM: Polyester	1E : 25 V		Z : $+80\%$, -20%
ECQP: Polypropylene	1H : 50 V		P : $+100\%$, -0%
	1V : 35 V		
	50 : 50 V		
ECET: Electrolytic			
ECEA□□□N: Non Polar Electrolytic	25 : 25 V		
	16 : 16 V		
QCU □: Ceramic (Chip Type)			
ECUX: Ceramic (Chip Type)			

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.
CAPACITORS		C 118, 130, 153, 218, 230, 253, 308, 311, 325, 357	ECEA1HU010	C 336, 354, 337, 348, 349, 339, 340, 341, 343	ECEA0JU471 ECEA1AU471 ECEA0JU470 ECQP2A822JZ ECEA1AFS471	R 103, 105, 203, 205, 104, 204, 106, 107, 206, 207, 462	ERDS2TJ123 ERDS2TJ100 ERDS2TJ334	R 128, 142, 228, 242, 387, 412, 130, 230, 131, 231, 307, 308, 329, 132, 135, 143, 158, 160, 232, 235, 243, 258, 260, 305, 316, 318, 319, 344, 354, 365, 369, 384, 446	ERDS2TJ331 ERDS2TJ684 ERDS2TJ821
C 1, 2, 8, 11, 14, 35, 36, C 3, C 5, 37, C 6, C 7, C 9, C 10, 15, 19, C 12	ECKD1H102MD ECCD1H040C ECCD1H180KC ECCD1H150KC ECCD1H470KC ECCD1H050DC ECFT1E223MD ECEA1H2R2	C 119, 136, 145, 219, 236, 245, 310, 323	ECEA1HU0R1	C 345, 360, 361, C 350, 359, 376, C 353, C 366, 367, C 368, 369, 370, 371, C 380, 381, C 901, 951, C 902, 952, C 903, 953, C 904, 954	ECEA1EU221 ECEA1AU221 ECEA1EU471 ECEA1ESS332 ECKD1H103ZF ECKD1H333ZF ECEA1CU101 ECEA1EU3R3 RCBS1C103NY RCBS1H102KB	R 109, 110, 156, 157, 159, 209, 210, 256, 257, 259, 302, 303, 317, 320, 324, 333, 343, 349, 351, 358, 359, 361, 363, 366, 367, 368, 371, 372, 378, 385, 386, 389, 402, 404, 405, 413, 414, 420, 422, 425, 426, 431, 436, 443, 444	ERDS2TJ102	R 136, 236, 390, 432, 434, 137, 237, 141, 162, 165, 241, 262, 265, 398	ERDS2TJ104 ERDS2TJ680 ERDS2TJ151
C 13, 18, 21, C 16, C 17, C 20, C 22, 27, 28, 30, C 23, 24, C 25, C 26, C 29, C 31, 32, C 33	ECFT1E103MD ECCD1H331K ECEA0JU470 ECKD1H472MD ECEA1HU010 ECFT1E333MD ECFT1E153MD ECQP2A102JZ ECEA1HU0R1 ECQP2A332JZ ECEA1CU100	C 123, 135, 139, 223, 235, 239, 315, 324, 328, 330, 333, 335, 372, 374, 375, 384	ECEA1CU100		RESISTORS				
C 34, C 101, 159, 201, 259, C 102, 351, C 103, 110, 209, 210, C 105, 106, 205, 206, C 107, 108, 207, 208, 301, 317, 331, 338, 382, 385	ECKD1H103MD RCBS1H331KB ECKD1H681KB ECCD1H101K ECQG1H103KZ ECEA0JU470	C 126, 140, 226, 240, C 129, 229, C 133, 152, 233, 252, 312, 326, C 138, 238, C 141, 241, C 147, 247, 319, C 148, 248, 344, C 149, 249, C 150, 250, 342, C 155, 255, 309, 332, 362, 383, C 156, 256, 318, 358, 377, 378, C 157, 257, C 158, 258, C 160, 260, C 162, 262, 307, C 163, C 164, 264, C 202, C 302, 346, 386, C 303	RCBS1C472KX ECQG1H822KZ ECEA1HUR22 ECQG1H473KZ ECQG1H333KZ ECFT1C473MD ECEA1HUR47 RCBS1C682MXY ECFT1C683MD ECEA0JU101 ECEA1AU101 ECEA1AU222 ECQV1H224JZ RCBS1H221KB ECKD1H102KB ECKD1H471KB ECCD1H820K RCBS1H681KB RCBS1C103NY ECQP2A152JZ	R 1, 2, 7, 19, R 3, R 4, R 5, 16, R 6, R 8, R 9, R 10, 11, R 12, R 13, R 14, R 15, R 17, 18, R 101, 201, 408, R 102, 108, 113, 115, 133, 152, 161, 202, 208, 213, 215, 233, 252, 261, 301, 304, 312, 323, 325, 328, 331, 335, 336, 338, 339, 348, 350, 352, 353, 356, 357, 360, 362, 370, 373, 374, 375, 377, 380, 381, 382, 383, 392, 395, 399, 406, 417, 418, 419, 445, 449, 455	ERDS2TJ101 ERDS2TJ100 ERDS2TJ474 ERDS2TJ471 ERDS2TJ392 ERDS2TJ123 ERDS2TJ823 ERDS2TJ562 ERDS2TJ821 ERDS2TJ472 ERDS2TJ822 ERDS2TJ273 ERDS2TJ682 ERDS2TJ393 ERDS2TJ822 ERDS2TJ273 ERDS2TJ682 ERDS2TJ333 ERDS2TJ222 ERDS2TJ222 ERDS2TJ183 ERDS2TJ182 ERDS2TJ105 ERDS2TJ224 ERDS2TJ332	R 111, 112, 211, 212, 330, R 116, 140, 145, 216, 240, 246, 326, 469, R 117, 217, R 118, 119, 148, 218, 219, 248, R 120, 220, 376, R 121, 129, 221, 229, 342, 391, 393, 433, R 122, 222, 332, 345, 355, 364, 394, 396, 411, 457, 459, R 123, 223, R 124, 224, R 125, 139, 225, 239, 309, 421, 427, R 126, 226, R 127, 151, 227, 251, 311, 314, 315, 327, 334, 337, 341, 346, 401, 409, 467, 468	ERDS2TJ471 ERDS2TJ474 ERDS2TJ473 ERDS2TJ274 ERDS2TJ822 ERDS2TJ2R2 ERDS2TJ1R0 ERDS2TJ470 ERDS2TJ154 ERD25VJ106 ERDS2TJ101 ERDS2TJ681 ERDS2TJ122 ERDS2TJ223 ERDS2TJ221 ERDS2TJ474 ERDS2TJ471 ERDS2TJ472 ERDS2TJ103		
C 113, 127, 213, 227, C 115, 215, C 116, 125, 151, 216, 225, 251	ECFT1C223KD ECFT1C153KD RCBS1H102KB	C 305, C 313, 327, C 320, 321, C 322, C 334, 379	ECQP2A153JZ ECKD1H222MD RCBS1C222MX ECFT1C103MD ECEA1AU470		ERDS2TJ472				

CIRCUIT BOARD

MAIN CIRCUIT BOARD

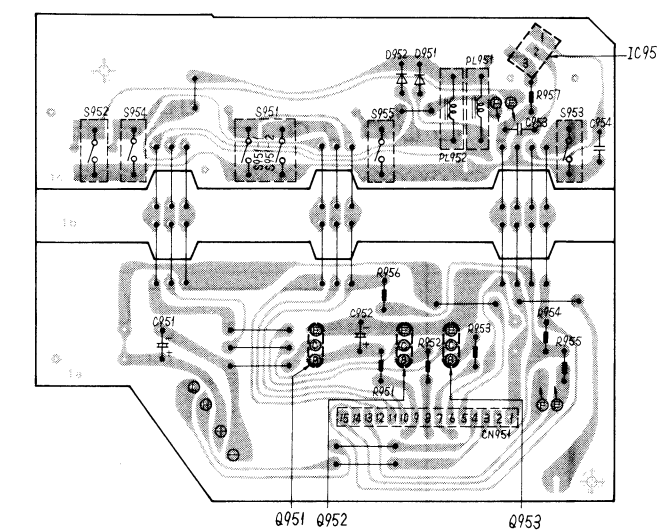
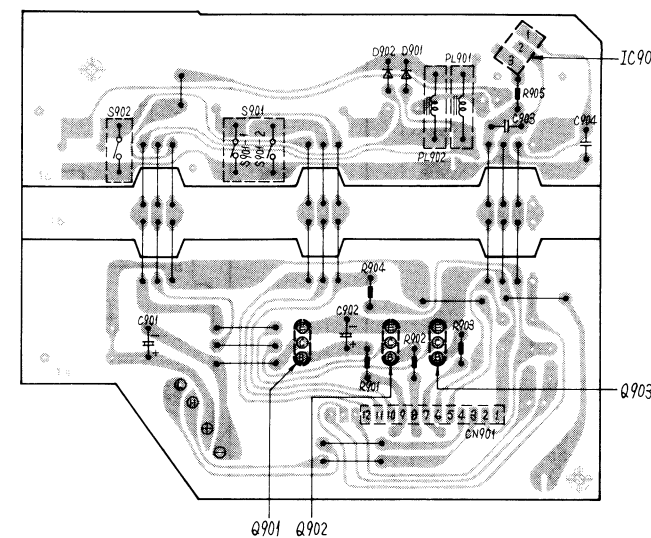
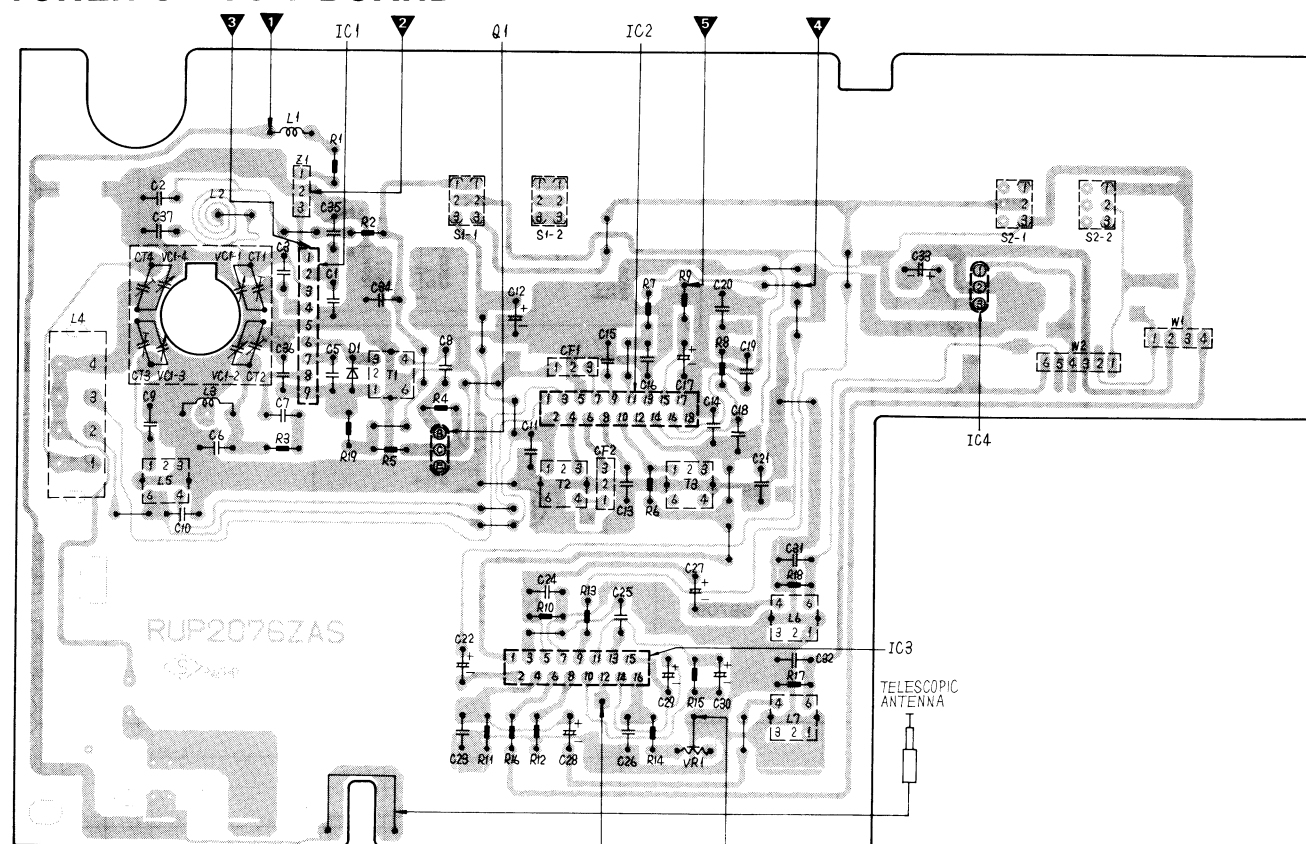
TUNER C

POWER SUPPLY
CIRCUIT BOARD

CASSETTE

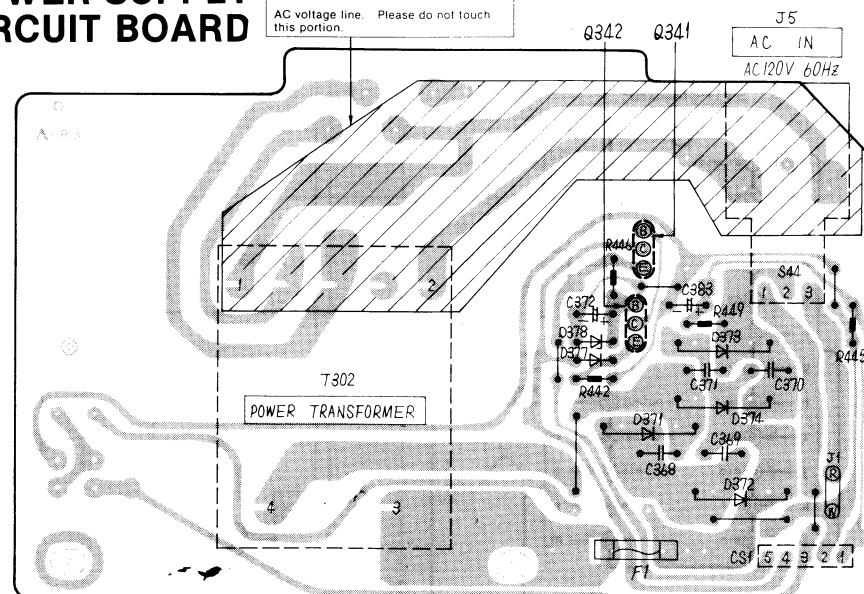
MECHANISM CIRCUIT BOARD (TAPE 2)

MECHANISM CIRCUIT BOARD (TAPE 1)

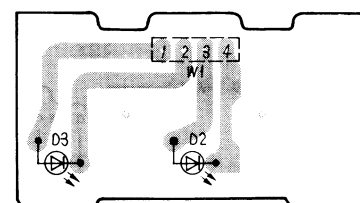


POWER SUPPLY CIRCUIT BOARD

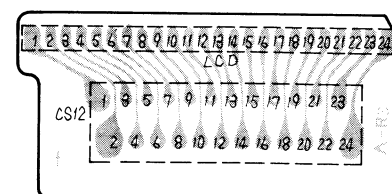
CAUTION
RISK OF ELECTRIC SHOCK
AC voltage line. Please do not touch
this portion.



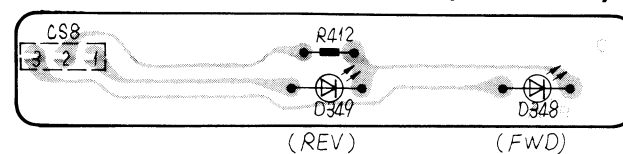
LED CIRCUIT BOARD



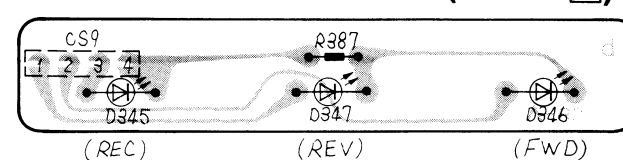
LCD CIRCUIT BOARD



CASSETTE LID CIRCUIT BOARD (TAPE 2)



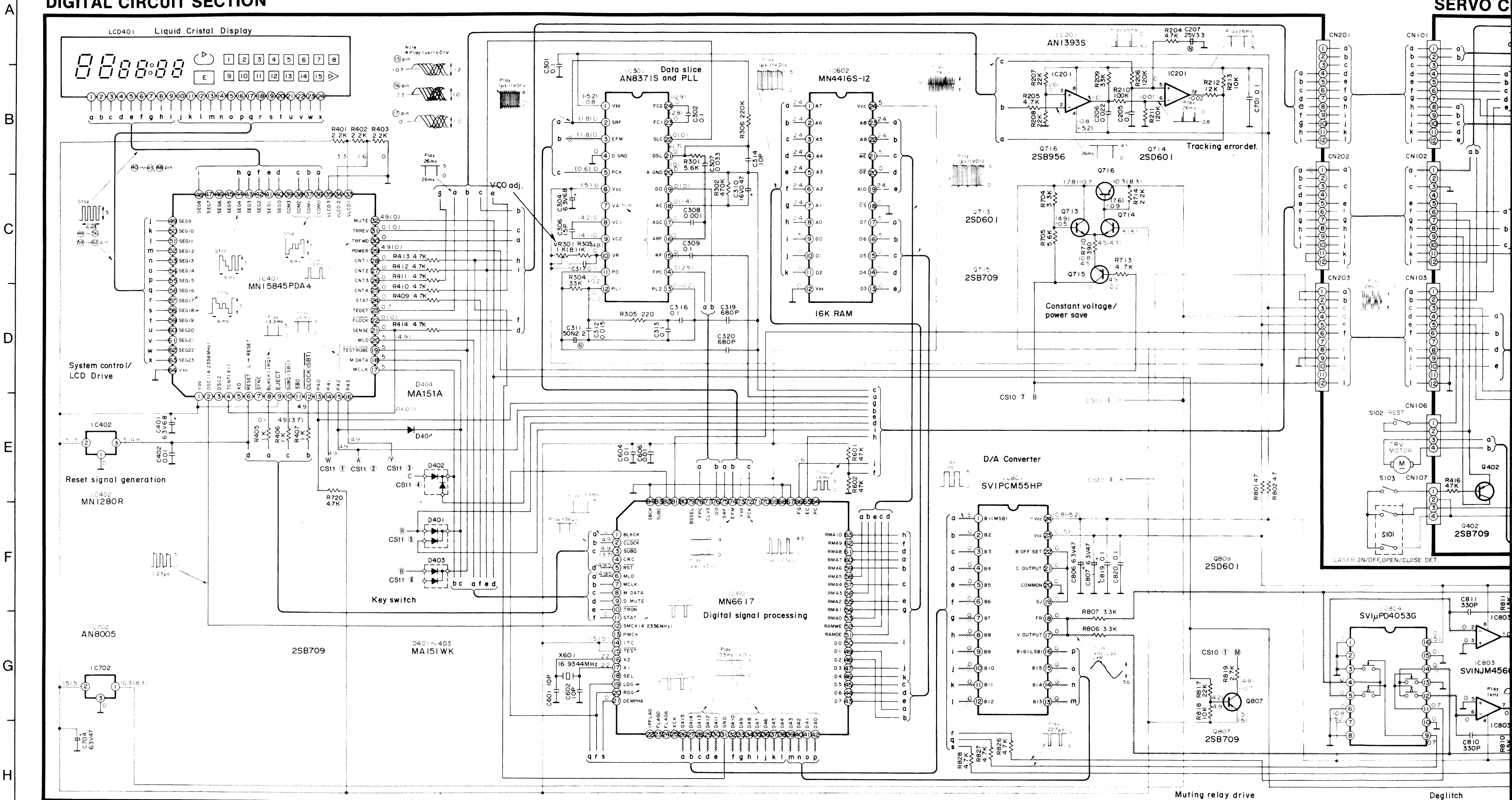
CASSETTE LID CIRCUIT BOARD (TAPE 1)



 IC1, 3	 IC2, 307	 IC4, 311	 IC301, 302	 IC303, 304	 IC305	 IC306
 IC308, 309	 IC310	 IC901, 951	 Q1, 103, 111, 116, 203, 211, 216, 303, 305, 324, 326, 341, 901, 951			
Q101, 102, 104~110, 112~115, 117~121, 201, 202, 204~210, 212~215, 217~221, 301, 302, 304, 306~323, 328, 329, 331~333, 335, 342~347, 352, 353, 902, 903, 952, 953			 Q325	 Q327, 330	 Q334, 336	
D1, 303~344, 350~361, 363, 365, 366~369, 375~383, 385~389, 901, 902, 951, 952			 D2, 3	 D101, 201, 301, 302		
 D102			 D345~349	 D371~374		

SCHEMATIC DIAGRAM (This schematic diagram may be modified at any time with the development of new technology.)

DIGITAL CIRCUIT SECTION



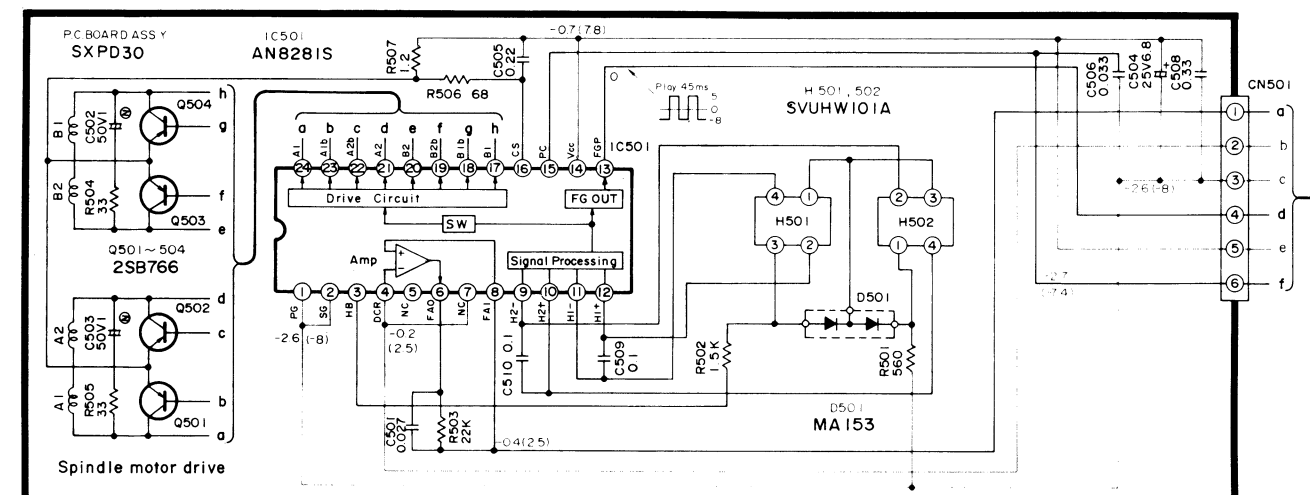
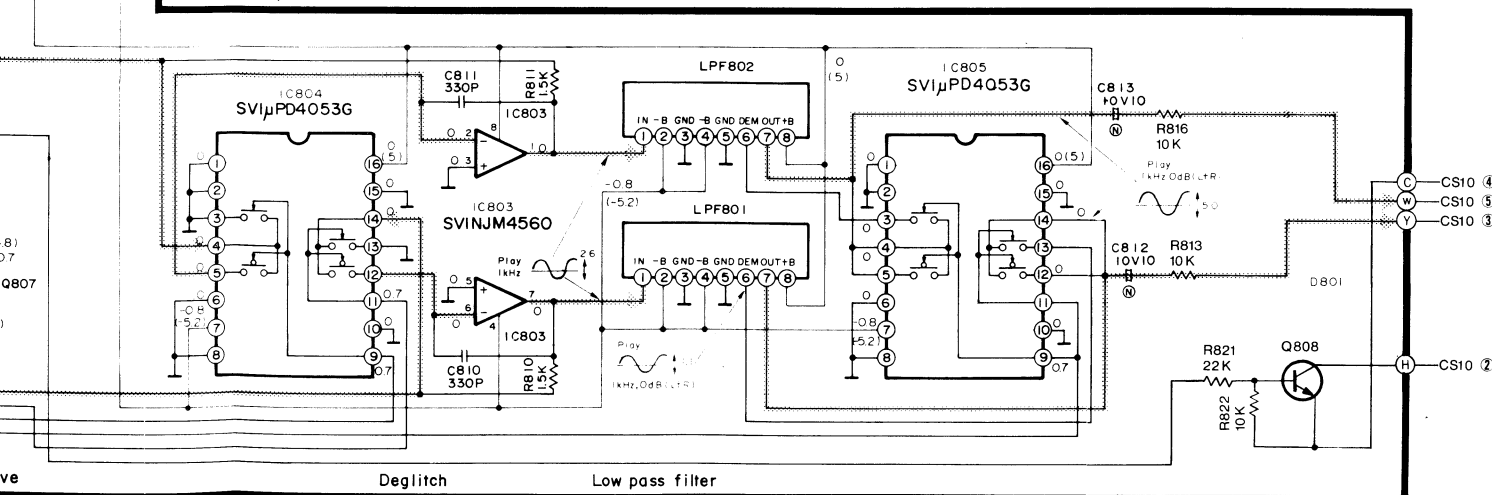
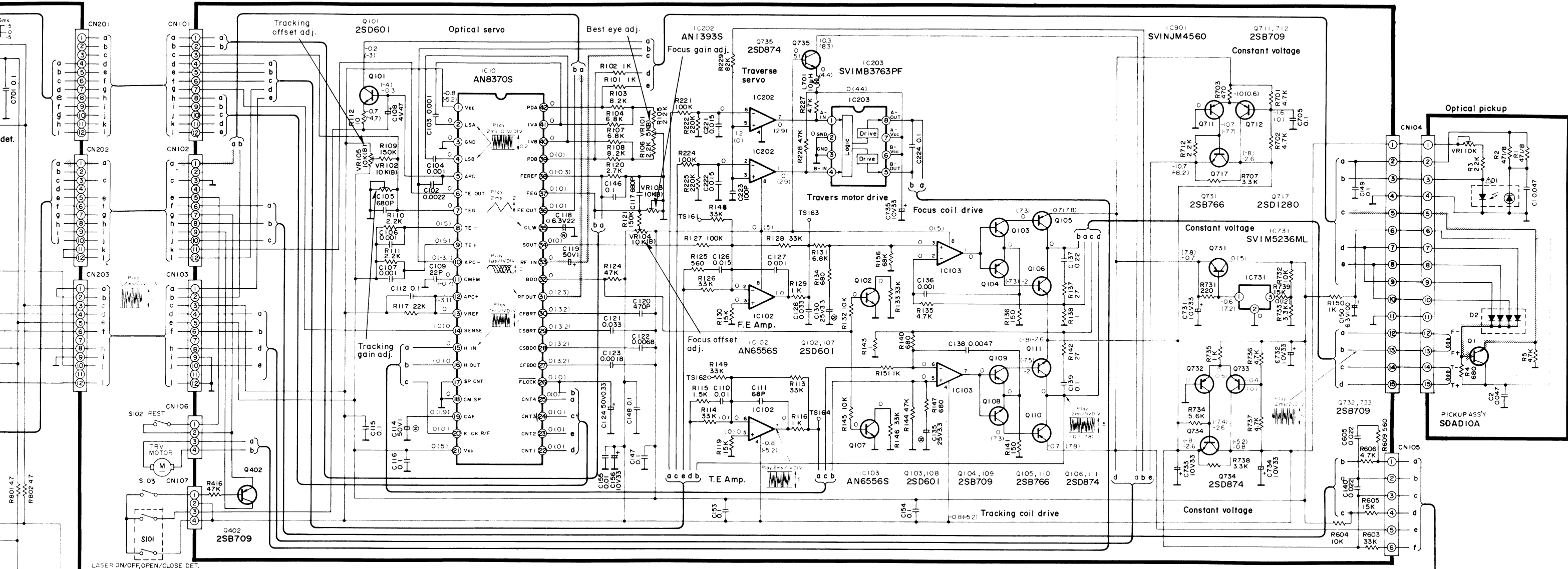
SERVO C

Notes:

1. ——— : Positive voltage lines and negative voltage lines.
2. ——— : Audio signal lines

2. Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

SERVO CIRCUIT SECTION



Notes: (for Schematic Diagram)

1. **S101** : Laser ON/OFF switch in "off" position.
(It turns "on" with disc holder closed.)
2. **S102** : Rest switch in "off" position.
(It turns "on" when optical pickup comes to innermost periphery.)
3. **S401** : Play/pause switch.
4. **S402** : Memory/recall switch.
5. **S403** : Skip/search (Forward) switch.
6. **S404** : Skip/search (Backward) switch.
7. **S405** : Stop/clear switch.
8. **S406** : Remain time switch.
9. **S407** : Repeat switch.
10. **S701** : Power switch in "on" position.
11. **S901** : High filter switch in "on" position.
12. The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of GND terminal.
Accordingly, there may arise some error in the voltage values and waveforms depending upon the internal impedance of the tester or measuring unit.
* The parenthesized is the voltage for test disc (1 kHz, L + R, 0 dB) in play mode, and the other, for no disc in stop mode.

*** Caution !**

IC and LSI are sensitive to static electricity.

Secondary trouble can be prevented by taking care during repair.

* Cover the parts boxes made of plastics with aluminum foil.

* Ground the soldering iron.

* Put a conductive mat on the work table.

* Do not touch the legs of IC or LSI with the fingers directly.

RESISTORS AND CAPACITORS

- Notes:**
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 2. Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

3. The "S" mark is service standard parts and may differ from production parts.
4. Unless otherwise specified.
All resistors are in OHMS (Ω) K = 1000 Ω , M = 1000k Ω
All capacitors are in MICORFARADS (μ F) P = 10⁻⁶ μ F.

Numbering System of Resistor

Example

ERJ	6	GMY	J	102	$\square$
Type	Wattage (1/16W)	Sharpe	Tolerance ($\pm 5\%$)	Value (1k Ω)	Special use

Type	Wattage	Tolerance
ERJ : Chip Type Carbon	6 : 1/16W 8 : 1/8W	J : $\pm 5\%$ K : $\pm 10\%$

Numbering System of Capacitor

Example

ECUV	1H	102	K	C
Type	Voltage (50V)	Value (0.001 μ F)	Tolerance ($\pm 10\%$)	Peculiarity

ECEA	0G	KS	470	L
Type	Voltage (4V DC)	Peculiarity use	Value (47 μ F)	Special use

GR426	B	273	K	25
Type	Peculiarity	Value (0.027 μ F)	Tolerance ($\pm 10\%$)	Voltage (25V)

- Indication of RCBS type capacitor (Axial type)
- Rated voltage

The rated voltages are indicated by insulating paint colors.

Rated voltage (DC)	Paint color
16V	Pink
50V	Light-green

Type	Voltage	Tolerance
ECEA : Electrolytic ECEA...N : Non-Polar Electrolytic ECEV...N : Chip type Non- Polar Electrolytic ECSE : Chip Type Tontal	ECEA, ECSE, ECEV Types 0G : 4V 0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1V : 35V 1H : 50V	F : $\pm 1\text{pF}$ J : $\pm 5\%$ K : $\pm 10\%$ M : $\pm 20\%$ Z : $\pm 80\%$ - 20%
ECUV ECUX RCUX REUV GR426 GR40 RCBS : Ceramic (Axial Type)	Others 1E : 25V DC 1H : 50V DC 50 : 50V DC	

- Electrostatic capacity and characteristics

The nominal electrostatic capacities (PF), tolerances and temperature characteristics are indicated by color codes.

Color band	Brown	Red	Orange	Yellow	Green	Blue	Purple	Gray	White	Black	Gold	Silver
1st, 2nd color bands (Effective number of nominal electrostatic capacity)	1	2	3	4	5	6	7	8	9	0	—	—
3rd color band (Multiplier of nominal electrostatic capacity)	10 ¹	10 ²	10 ³	10 ⁴	—	—	—	—	—	10 ⁰	10 ⁻¹	10 ⁻²
4th color band (Tolerances)	—	—	—	—	—	—	—	N	Z	M	J	K
5th color band (Temperature characteristic)												



• CAPACITORS

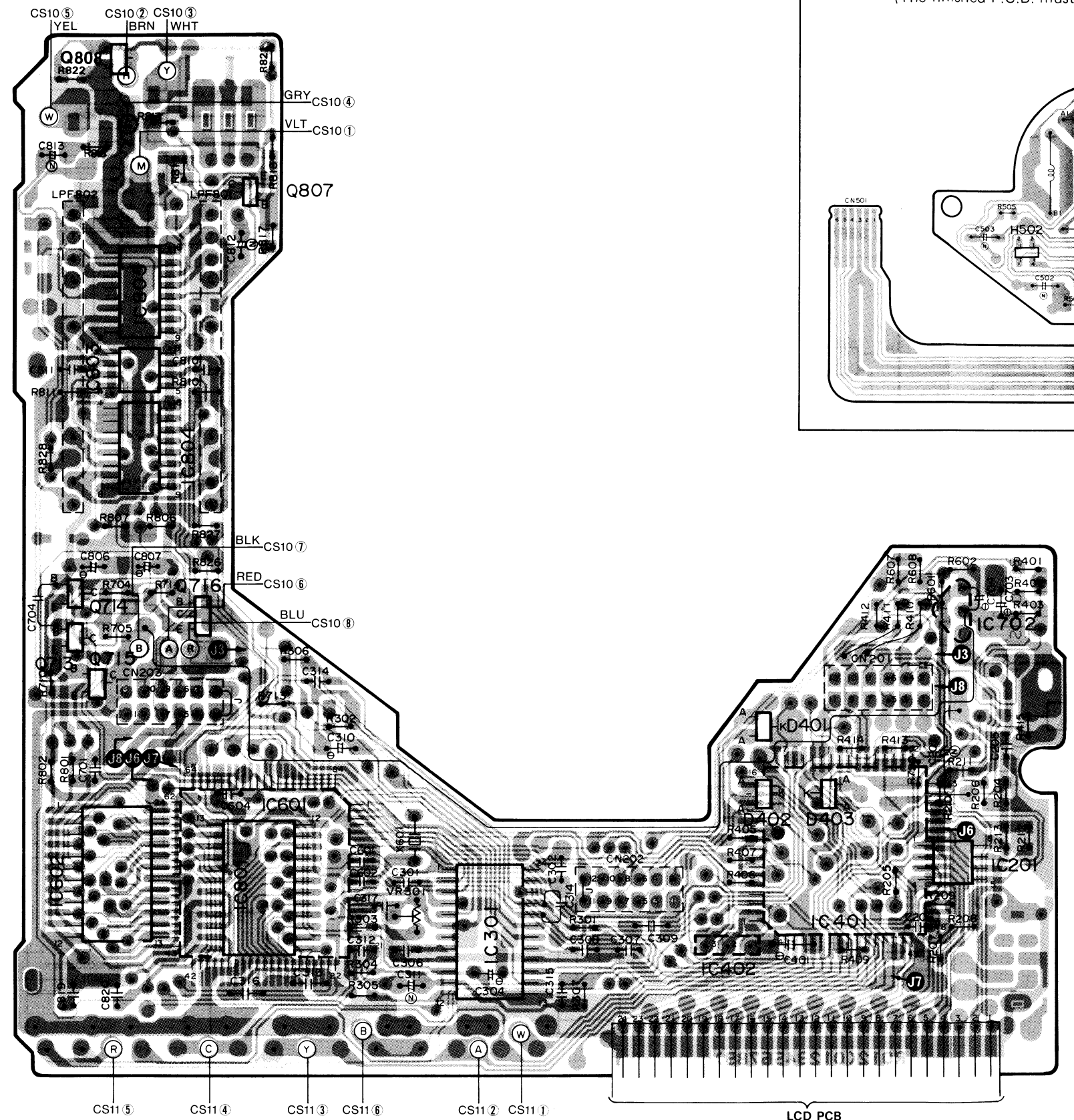
Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
C102	ECKF1H222KB	0.0022	C140	ECUX1E223MB	0.022	C319, 320	ECKF1H681KB	680P
C103, 104	ECUV1H102KC	0.001				C401	ECSE0JT685SM	6.8
C105	ECUX1H681KC	680P				C402	RCUX1H103ZF	0.01
C106, 107	ECUV1H102KC	0.001	C146, 147	RCUV1E104ZF	0.1			
C108	ECSF1AZ476	47	C148	RCUV1E104ZF	0.1			
C109	RCUX1H220KC	22P	C150	ECEA0JKS101	100	C501	GR426B273K25	0.027
C110	ECUX1H103KB	0.01	C153, 154	ECFF1H104ZF	0.1	C502, 503	ECEV1HN010R	1
C111	RCUX1H680KC	68P	C155	RCBC1C103NYY	0.01	C504	ECEV1EV6R8R	6.8
C112	RCUV1E104ZF	0.1	C156	RCBC1C103NYY	0.01	C505	GR426F224Z25	0.22
C114	ECEA1HSN010L	1	C205	RCUV1E104ZF	0.1	C506	GR426B333M25	0.033
			C206	ECUX1E223MB	0.022	C508	GR426F334Z25	0.33
C115, 116	RCUV1E104ZF	0.1	C207	ECEA1SKN3R3	3.3	C509, 510	GR40F104Z25P	0.1
C117	ECUX1H681KC	680P	C221, 222	ECUX1H153MB	0.015	C601, 602	RCUX1H100FC	10P
C118	ECEA0JSN220I	22				C604	RCUX1H103ZF	0.01
C119	ECEA1HKS010L	1				C605	ECUX1E223MB	0.022
C120	RCUV1H471KC	470P	C223	RCUX1H101KC	100P			
C121	ECUX1E333KB	0.033	C224	RCUV1E104ZF	0.1	C606	RCBC1C103NYY	0.01
C122	RCUV1H682KB	0.0068	C301	RCUV1E104ZF	0.1	C701	RCUV1E104ZF	0.1
C123	RCUX1H182KB	0.0018	C302	ECUX1E104MD	0.1	C703	ECSE0JT685SM	6.8
C124	ECEA1HKS33L	0.33	C304	ECSE0JT685SM	6.8	C704	ECEA0JKS470	0.1
C126	RCUV1E153KB	0.015	C306	RCUX1H150JT	15P	C705	ECKF1E104ZV	0.1
			C307	ECUX1E333KB	0.033	C731, 732	ECEA1AKS330I	33
C127	RCUX1H102KB	0.001	C308	RCUX1H102MB	0.001	C733, 734	ECEA1AKS330I	33
C128	RCUV1E333KB	0.033	C309	ECUV1E104MD	0.1	C735	ECEA1AKS330I	33
C129	ECEA1ASN330I	33	C310	ECSE1CT4740R	0.47	C806, 807	ECEA0JKS470	47
C130	ECEA1ESN3R3I	3.3				C810, 811	RCUV1H331KC	330P
C134	ECEA1ASN330I	33	C311	ECEA1HSN2R2I	2.2			
C135	ECEA1ASN100L	10	C312	ECUX1H153KB	0.015			
C136	RCUX1H102MB	0.001	C313	ECUV1E104MD	0.1	C812, 813	ECEA1ASN100L	10
C137	ECUV1E224ZF	0.22	C314	RCUX1H100FC	10P	C819, 820	RCUV1E104ZF	0.1
C139	RCUV1E104ZF	0.1	C315, 318	RCUX1H472MB	0.0047			
			C316	ECUV1E104MD	0.1			
			C317	RCUV1E104ZF	0.1			

• RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R101, 102	ERJ6GMYJ102M	1K	R148, 149	ERJ6GMYJ333M	33K	R605	ERJ6GMYJ153M	15K
R103	ERJ6GMYJ822M	8.2K				R606	ERJ6GMYJ472M	4.7K
R104	ERJ6GMYJ682M	6.8K	R150, 151	ERJ6GMYJ102M	1K	R607	ERJ6GMYJ224M	220K
R105, 106	ERJ6GMYJ222M	2.2K	R156	ERJ6GMYJ683M	68K			
R107	ERJ6GMYJ682M	6.8K	R204, 205	ERJ6GMYJ472M	4.7K	R608	ERJ6GMYJ154M	150K
R108	ERJ6GMYJ822M	8.2K	R206	ERJ6GMYJ124M	120K	R609	ERJ6GMYJ561M	560
R109	ERJ6GMYJ154M	150K	R207, 208	ERJ6GMYJ223M	22K	R701, 702	ERJ6GMYJ472M	4.7K
R110, 111	ERJ6GMYJ222M	2.2K	R209	ERJ6GMYJ333M	33K	R703	ERJ8GCYJ471M	470
R112	ERJ8GCYJ100M	10	R210	ERJ6GMYJ104M	100K	R704	ERJ6GMYJ332M	3.3K
R113, 114	ERJ6GMYJ333M	33K	R211	ERJ6GMYJ124M	120K	R705	ERJ6GMYJ562M	5.6K
			R212	ERJ6GMYJ123M	12K	R707	ERJ6GMYJ332M	3.3K
R115	ERJ6GMYJ152M	1.5K	R213	ERJ6GMYJ103M	10K	R710	ERJ6GMYJ391M	390
R116	ERJ6GMYJ102M	1K				R712	ERJ6GMYJ222M	2.2K
R117	ERJ6GMYJ223M	22K	R221	ERJ6GMYJ104M	100K	R713	ERJ6GMYJ472M	4.7K
R119	ERJ6GMYJ153M	15K	R222	ERJ6GMYJ224M	220K			
R120	ERJ6GMYJ272M	2.7K	R224	ERJ6GMYJ104M	100K	R714	ERJ6GMYJ222M	2.2K
R121	ERJ6GMYJ154M	150K	R225	ERJ6GMYJ224M	220K	R720	ERJ6GMYJ472M	4.7K
R124	ERJ6GMYJ473M	47K	R227, 228	ERJ6GMYJ472M	4.7K	R731	ERJ6GMYJ221M	220
R125	ERJ6GMYJ561M	560	R229	ERJ6GMYJ823M	82K	R732	ERJ6GMYJ103M	10K
R126	ERJ6GMYJ333M	33K	R301	ERJ6GMYJ562M	5.6K	R733	ERJ6GMYJ332M	3.3K
R127	ERJ6GMYJ104M	100K	R302	ERJ6GMYJ474M	470K	R734	ERJ6GMYJ562M	5.6K
			R303	ERJ6GMYJ102M	1K	R735	ERJ6GMYJ102M	1K
R128	ERJ6GMYJ333M	33K	R304	ERJ6GMYJ333M	33K	R736, 737	ERJ6GMYJ472M	4.7K
R129	ERJ6GMYJ102M	1K				R738	ERJ6GMYJ332M	3.3K
R130	ERJ6GMYJ153M	15K	R305	ERJ6GMYJ221M	220	R739	ERJ6GMYJ153M	15K
R131	ERJ6GMYJ682M	6.8K	R306	ERJ6GMYJ224M	220K			
R132	ERJ6GMYJ103M	10K	R307	ERJ6GMYJ824M	820K	R801, 802	ERJ6GMYJ4R7M	4.7
R133	ERJ6GMYJ333M	33K	R401, 402	ERJ6GMYJ222M	2.2K	R806, 807	ERJ6GMYJ332M	3.3K
R134	ERJ6GMYJ681M	680	R403	ERJ6GMYJ222M	2.2K	R810, 811	ERJ6GMYJ152M	1.5K
R135	ERJ6GMYJ472M	4.7K	R405, 406	ERJ6GMYJ102M	1K	R813	ERJ6GMYJ103M	10K
R136	ERJ6GMYJ151M	150	R407	ERJ6GMYJ102M	1K	R816	ERJ6GMYJ103M	10K
R137	ERJ8GCYJ270M	27	R409, 410	ERJ6GMYJ472M	4.7K	R817, 821	ERJ6GMYJ223M	22K
			R411, 412	ERJ6GMYJ472M	4.7K	R818, 822	ERJ6GMYJ103M	10K
R138	ERJ8GCPK1R0M	1	R413, 414	ERJ6GMYJ472M	4.7K	R819	ERJ6GMYJ272M	2.7K
R140	ERJ6GMYJ681M	680				R826, 827	ERJ6GMYJ472M	4.7K
R141	ERJ6GMYJ151M	150	R416	ERJ6GMYJ473M	47K	R828	ERJ6GMYJ472M	4.7K
R142	ERJ8GCYJ270M	27	R501	ERJ6GEYJ561V	560			
R143	ERJ8GCPK1R0M	1	R502	ERJ6GEYJ152V	1.5K			
R144	ERJ6GMYJ473M	47K	R503	ERJ6GEYJ223V	2.2K			
R145	ERJ6GMYJ103M	10K	R601, 602	ERJ6GMYJ473M	47K			
R146	ERJ6GMYJ333M	33K	R603	ERJ6GMYJ333M	33K			
R147	ERJ6GMYJ681M	680	R604	ERJ6GMYJ103M	10K			

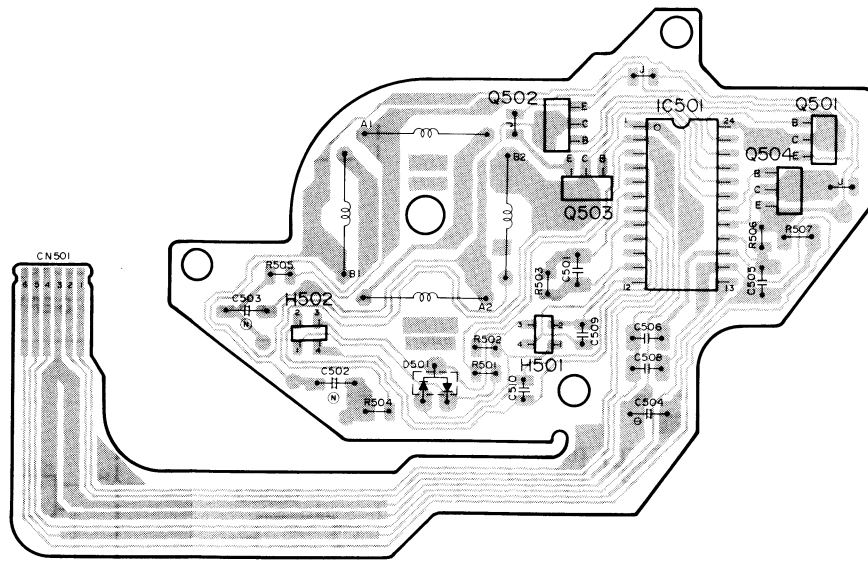
■ CIRCUIT BOARDS

• Digital circuit

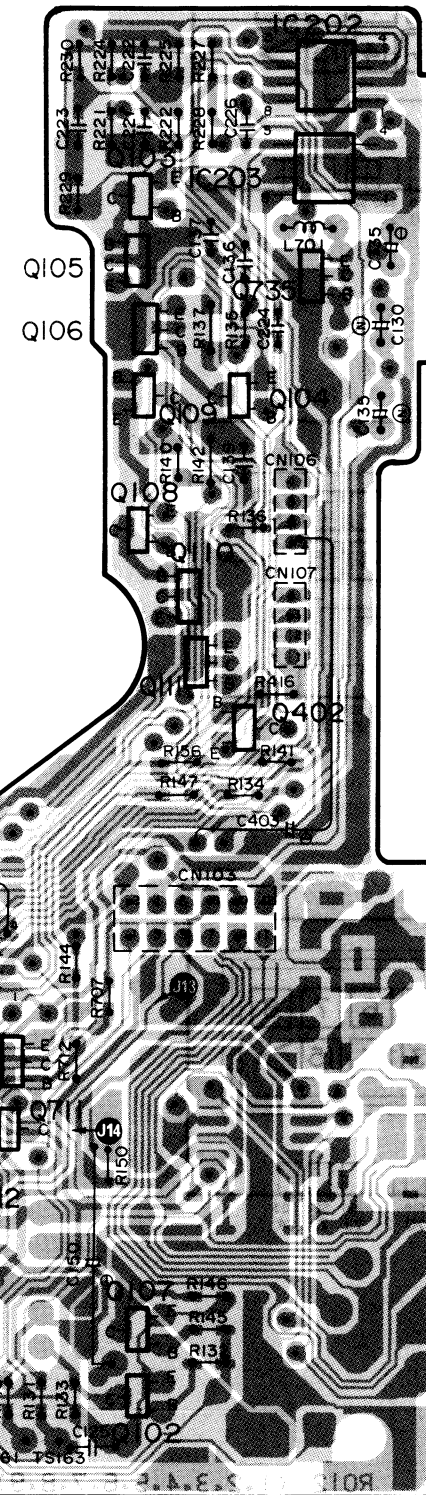


• Spindle motor drive circuit

- Note:** 1. The spindle motor drive circuit board is made by laminating iron sheet and FPC. It is very difficult to replace the parts on the circuit board. So, the repair parts are supplied in the form of finished P.C.B.
2. Do not cut the FPC fitted to the circuit board.
(The finished P.C.B. must be otherwise replaced.)



• Servo circuit



* Caution !

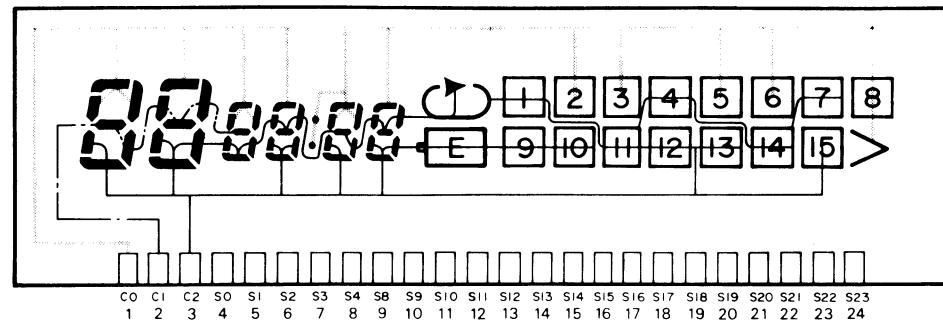
- IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
- * Cover the parts boxes made of plastics with aluminum foil.
 - * Ground the soldering iron.
 - * Put a conductive mat on the work table.
 - * Do not touch the legs of IC or LSI with the fingers directly.

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

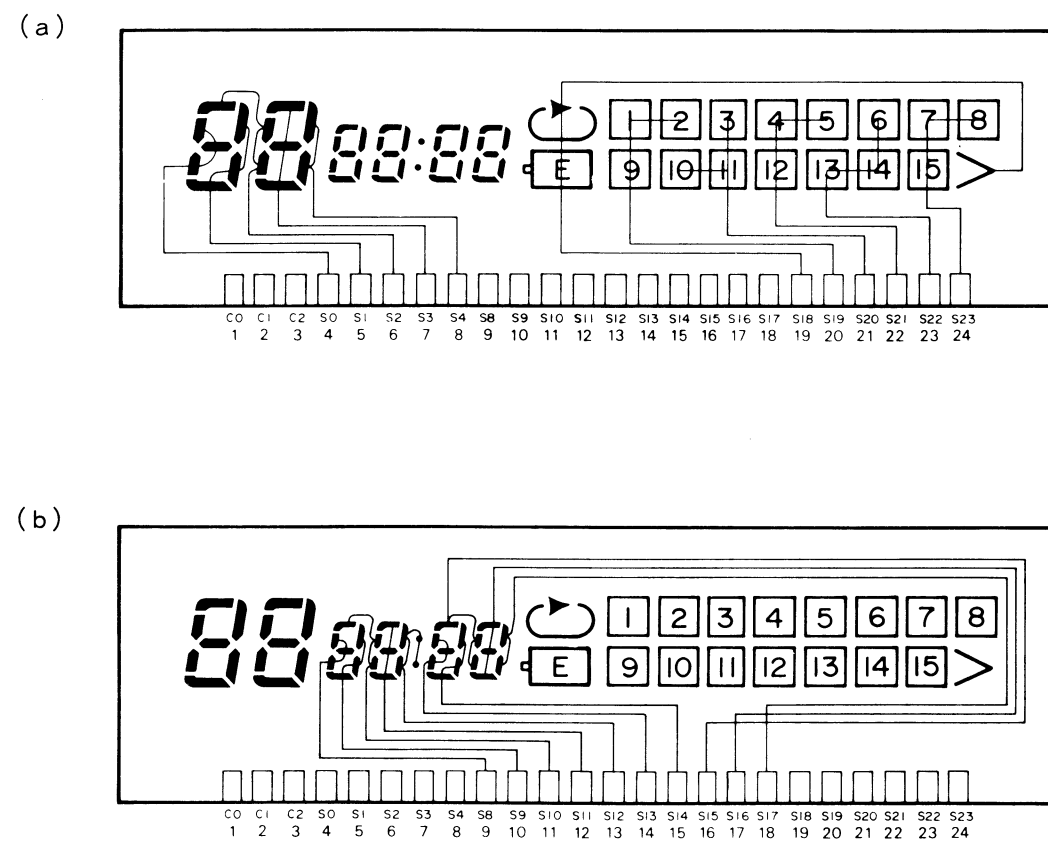
SVINJM4560 SVIMB3763PF AN6556S AN1393S SVIUPD4053G SVIPCM55HP MN4416S AN8281S AN8371S AN8370S	2SB709, 2SD601 Part name symbol hFE rank 1. Collector 2. Emitter 3. Base Part name : A (2SB709) symbol : Y (2SD601)	MN15845PDA 64 Pin MN6617 84 Pin
AN8005	2SB766, 2SB956 2SD874, 2SD1280 Part name symbol hFE rank 1. Base 2. Collector 3. Emitter Part name : A (2SB766) symbol : Z (2SD874) H (2SB956) R (2SD1280)	MN1280R
MA153	MA151WK	SVIM5236ML

INTERNAL CONNECTIONS OF LCD (Liquid Crystal Display)

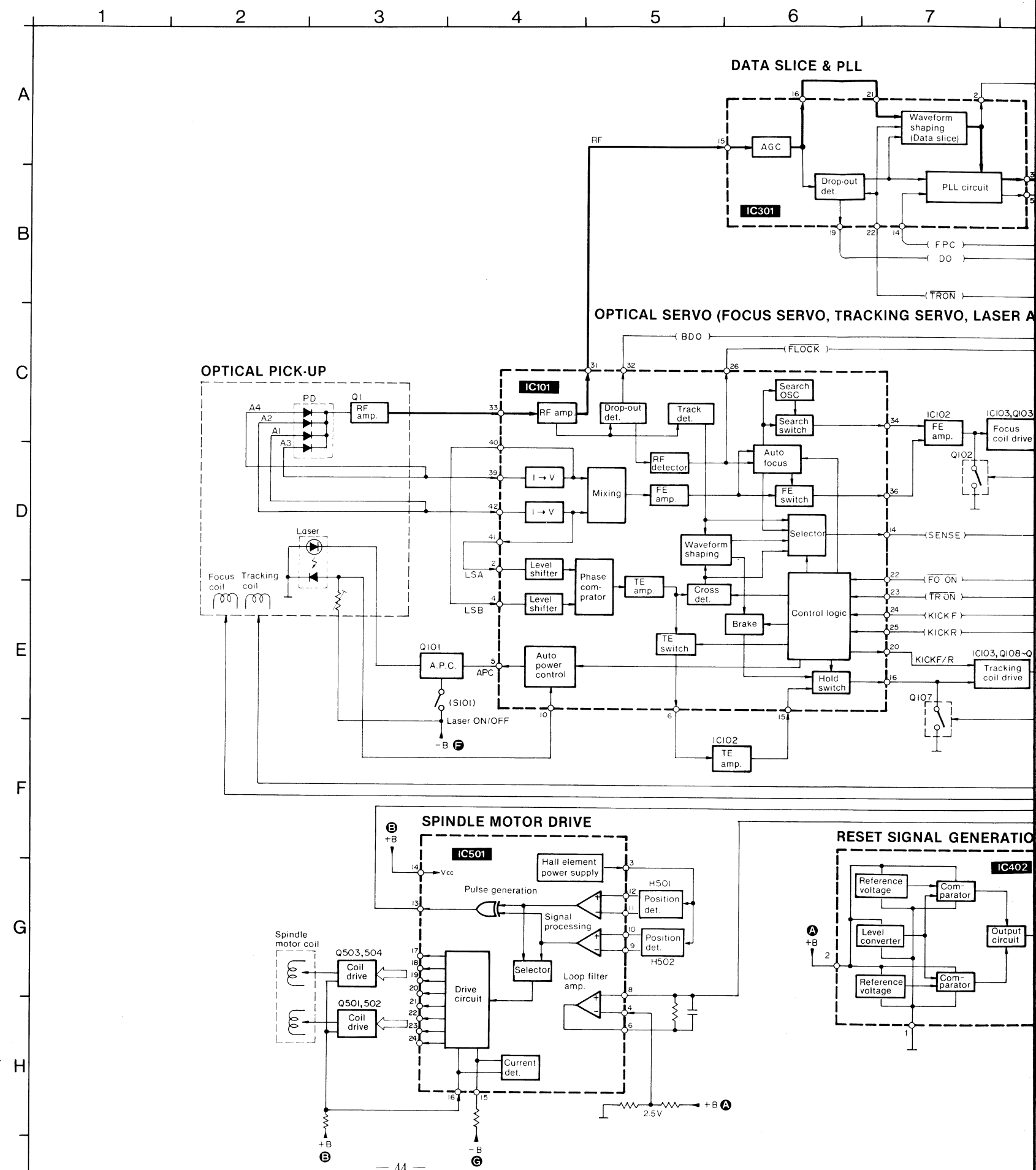
Common connection diagram

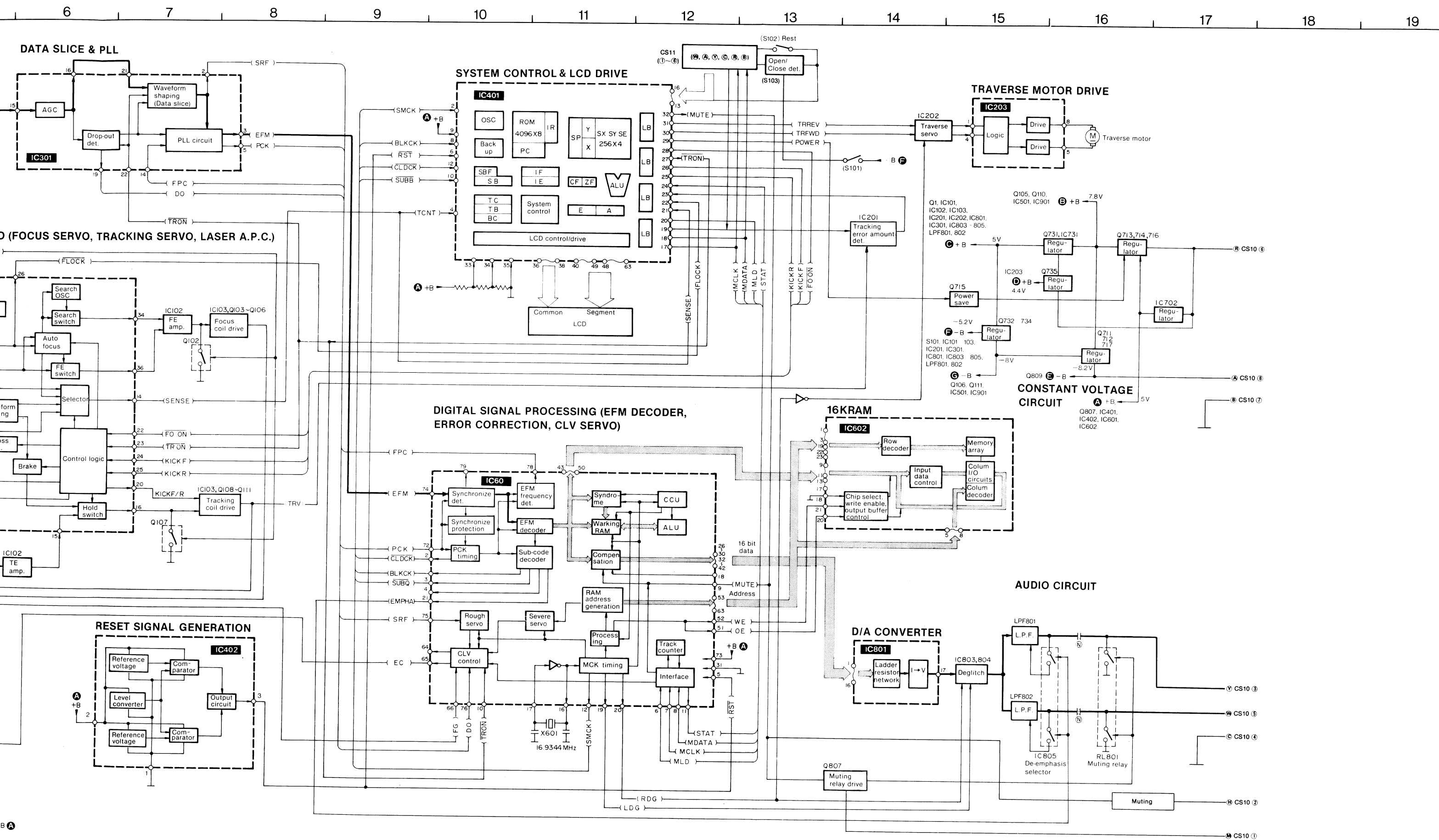


Segment connection diagram

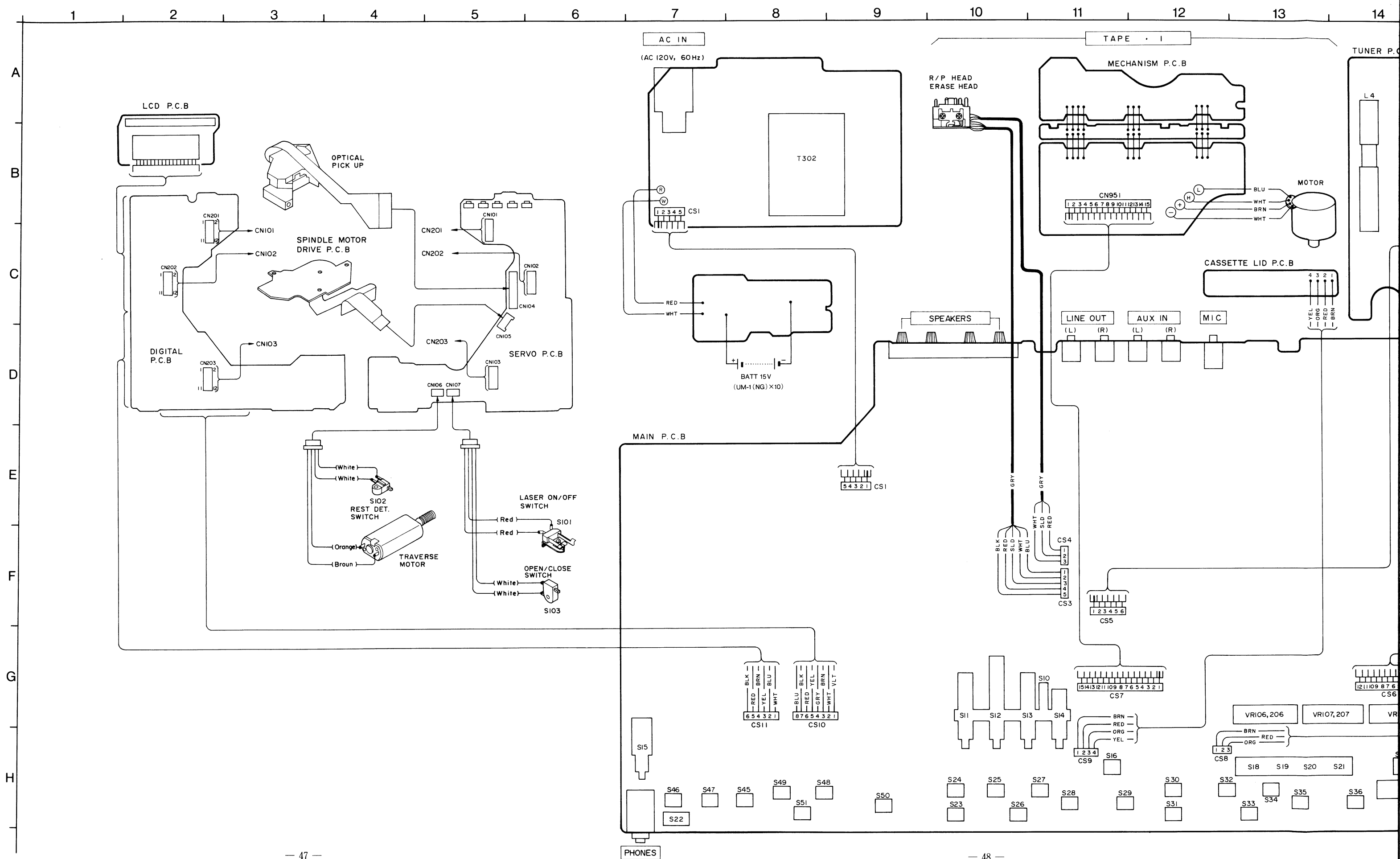


BLOCK DIAGRAM (CD PLAYER SECTION)

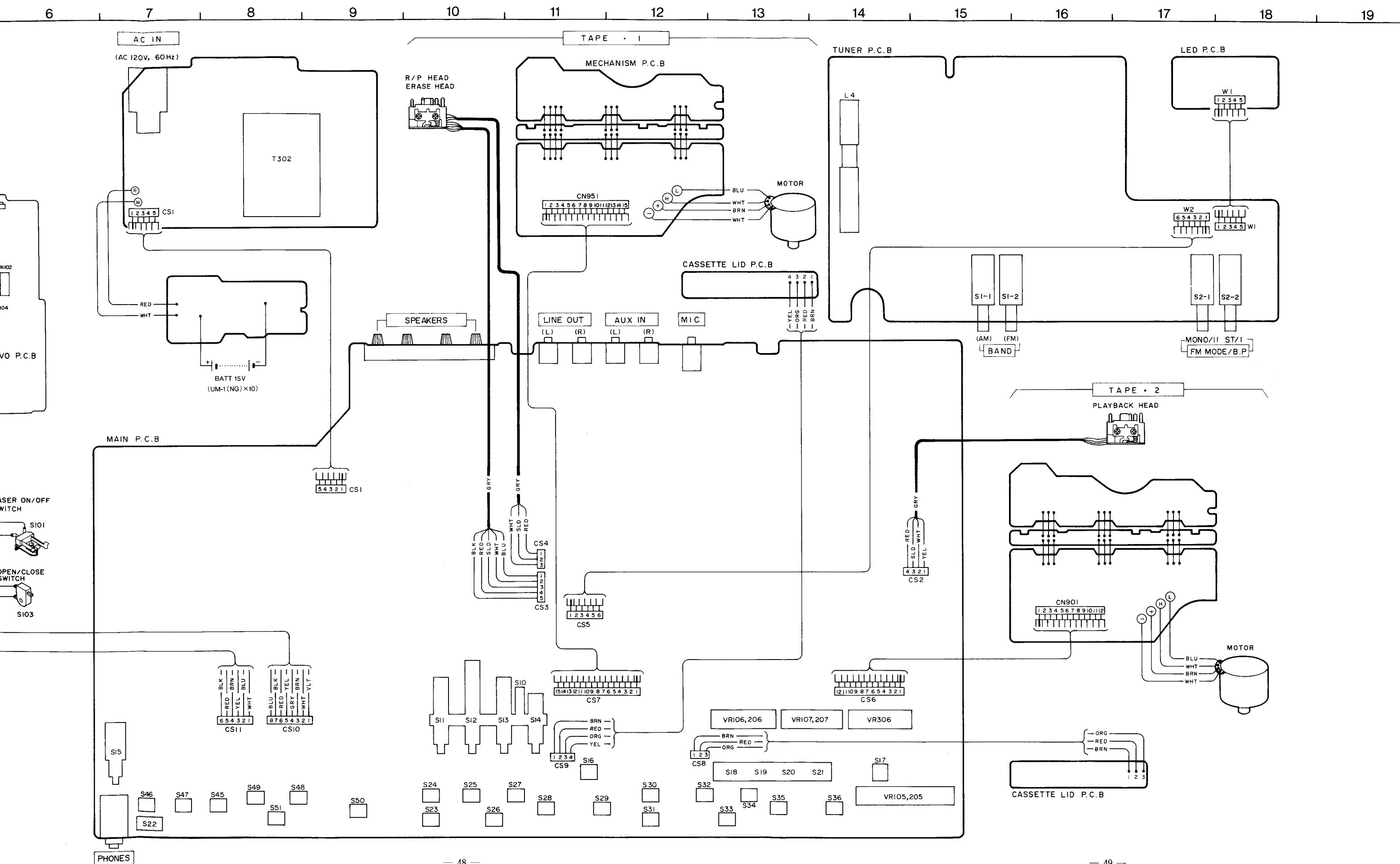




WIRING CONNECTION DIAGRAM



WIRING CONNECTION DIAGRAM



■ TERMINAL FUNCTION OF LSI

● MN6617 (Digital Signal Processing : EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O Devision	Function	Pin No.	Mark	I/O Devision	Function
1	BLKCK	O	Sub-code block (Q data) clock (75 Hz)	32	DA10	O	16-bit data output (DA0 : LSB)
2	CLDCK	O	Sub-code frame (Q data) clock (7.35 kHz)	42	DA 0		
3	SUBQ	O	Sub-code (Q data) output	43	D7	I/O	16 K RAM data output
4	CRC	O	Sub-code (Q data) CRC check (not used, open)	50	D0		
5	RST	I	Reset signal input (reset at "L")	51	RAMOE	O	16 K RAM OE signal
6	MLD	I	Data input (Command load)	52	RAMWE	O	16 K RAM WE signal
7	MCLK	I	Data clock input (Command clock)	53	RAMA 0	O	16 K RAM address signal (RAMA0 : LSB, RAMA10 : MSB)
8	MDATA	I	Data input (Command data)	63	RAMA10		
9	DMUTE	I	Muting control (muting ON at "H")	64	PC	O	Spindle motor ON signal (ON at "L")
10	TRON	I	Tracking servo ON signal (tracking servo ON at "L")	65	EC	O	Spindle motor drive signal
11	STAT	O	Processing condition (CRC, OTC, CLVOK, TT STOP) output	66	FG	I	Spindle motor FG signal input
12	SMCK	O	Clock output (4.2336 MHz)	67	—	—	—
13	PMCK	O	Pitch control clock output (not used, open)	68	—	—	—
14	ITC	I	Track counter input signal (not used, connected to +5V)	69	—	—	—
15	TEST	I	Test mode selection (not used, connected to +5V)	70	—	—	—
16	X2	O	Clock output (16.9334 MHz)	71	—	—	—
17	X1	I	Clock input (16.9344 MHz)	72	PCK	I	PLL extract clock input (4.2336 MHz)
18	SEL	I	DA output parallel/serial selection (parallel at "H")	73	VDD	I	Power supply (connected to +5V)
19	LDG	O	L channel deglitch signal	74	EFM	I	EFM signal input (PLL)
20	RDG	O	R channel deglitch signal	75	SRF	I	EFM signal input (DSL)
21	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")	76	DO	I	Drop-out signal (Drop-out at "H")
22	IPFLAG	O	Interpolation flag (interpolation at "H")	77	CLVS	O	11T stereo OK signal (OK at "H")
23	FLAG0	O	Error flag (error at "H")	78	FPC	O	PLL frequency comparison signal
24	FLAG6	O	16 K RAM address reset signal (reset at "H")	79	BSSEL	O	PLL frequency in take operation signal
25	XCK	O	Clock (16.9334 MHz) output (not used, open)	80	—	—	—
26	DA15	O	16-bit data output (DA15 : MSB)	81	—	—	—
30	DA11			82	—	—	—
31	GND	I	GND terminal	83	SUBC	O	Sub-code serial output data (not used, open)
				84	SBCK	I	Clock for sub-code serial output (not used, connected to GND)

● AN8370S (Optical Servo Control)

Pin No.	Mark	I/O Devision	Function
1	VEE	I	Power supply (connected to -5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE-	I	Phase difference-voltage conversion (-)
9	TE+	I	Phase difference-voltage conversion (+)
10	APC-	O	Laser power inversion input
11	C-MEM	I	Capacitor connection for phase difference memory
12	APC+	I	Laser power non-inversion input
13	VREF	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Track-cross speed control output (not used, grounded)
18	C-MSP	I	Track-cross reference speed setting capacitor connection (not used, grounded)
19	C-AF	I	Auto focus timer capacitor connection
20	KICK R/F	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)
22	CNT1	I	Control input (FOON : Focus servo ON signal)

● AN8371S (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function
1	VEE	I	Power supply (connected to -5V)
2	SRF	O	RF signal output data-sliced into digital value
3	EFM	O	EFM signal output synchronized with PCK
4	D-GND	I	GND terminal (digital system)
5	PCK	O	Clock output extracted from SRF
6	VCC	I	Power supply (connected to +5V)
7	VA	I	VCO free ran frequency adjusting current input
8	VC1	I	Capacitor connection for VCO oscillation frequency
9	VC2	I	Capacitor connection for VCO oscillation frequency
10	VR	I	Resistor connection for VCO oscillation frequency
11	PD	I	Capacitor connection for PLL DO protection

Pin No.	Mark	I/O Devision	Function
23	CNT2	I	Control input (TRON : Tracking servo ON signal)
24	CNT3	I	Control input (KICKF : Kick direction [forward] command)
25	CNT4	I	Control input (KICKR : Kick direction [reverse] command)
26	F-LOCK	O	Focus lock signal output
27	C-FBDO	O	Capacitor connection for inversion RF high speed detection
28	C-SBDO	O	Capacitor connection for inversion RF low speed detection
29	C-SBRT	O	Capacitor connection for non-inversion RF low speed detection
30	C-FBRT	O	Capacitor connection for non-inversion RF high speed detection
31	RF OUT	O	RF signal output
32	BDO	O	Drop-out detection output
33	RFIN	I	RF signal input
34	S-OUT	O	Focus search signal output
35	C-LW	I	Capacitor connection for triangular wave generation
36	FE-OUT	O	Focus error signal output
37	FEG	I	Focus error gain adjusting input
38	FE-REF	I	Focus error comparison voltage generation
39	PDB	I	Photo detector current input (B)
40	IVB	O	Current/voltage conversion output (B)
41	IVA	O	Current/voltage conversion output (A)
42	PDA	I	Photo detector current input (A)

● MN15845PDA

Pin No.	Mark	Function
1	VDD	V
2	OSC1	O
3	OSC 2	O
4	X1	T
5	X0	T
6	RST	R
7	SYNC	T
8	IRQ	B
9	SIRQ	T
10	SBI	S
11	SBO	T
12	SBT	O
13	P40	P
16	P43	
17	P00	M
18	P01	M
19	P02	T
20	P03	M
21	P10	S
22	P11	R
23	P12	T

● AN8281S (Spi

Pin No.	Mark	Function
1	PG	
2	SG	
3	HB	
4	DCR	
5	NC	
6	FAO	
7	NC	
8	FAI	
9	H2 -	
10	H2 +	
11	H1 -	

● AN8370S (Optical Servo Control)

Pin No.	Mark	I/O Devision	Function	Pin No.	Mark	I/O Devision	Function
1	VEE	I	Power supply (connected to -5V)	23	CNT2	I	Control input (TRON : Tracking servo ON signal)
2	LSA	I	Phase difference input (A)	24	CNT3	I	Control input (KICKF : Kick direction [forward] command)
3	GND	I	GND terminal	25	CNT4	I	Control input (KICKR : Kick direction [reverse] command)
4	LSB	I	Phase difference input (B)	26	F·LOCK	O	Focus lock signal output
5	APC	O	Auto laser power control output	27	C·FBDO	O	Capacitor connection for inversion RF high speed detection
6	TEOUT	O	Tracking error signal output	28	C·SBDO	O	Capacitor connection for inversion RF low speed detection
7	TEG	I	Tracking error gain adjusting input	29	C·SBRT	O	Capacitor connection for non-inversion RF low speed detection
8	TE-	I	Phase difference-voltage conversion (-)	30	C·FBRT	O	Capacitor connection for non-inversion RF high speed detection
9	TE+	I	Phase difference-voltage conversion (+)	31	RF OUT	O	RF signal output
10	APC-	O	Laser power inversion input	32	BDO	O	Drop-out detection output
11	C·MEM	I	Capacitor connection for phase difference memory	33	RFIN	I	RF signal input
12	APC+	I	Laser power non-inversion input	34	S·OUT	O	Focus search signal output
13	VREF	O	Reference current generation	35	C·LW	I	Capacitor connection for triangular wave generation
14	SENSE	O	Selector output (track-crossed)	36	FE·OUT	O	Focus error signal output
15	HIN	I	Tracking hold circuit input	37	FEG	I	Focus error gain adjusting input
16	HOUT	O	Tracking hold circuit output	38	FE·REF	I	Focus error comparison voltage generation
17	SPCNT	O	Track-cross speed control output (not used, grounded)	39	PDB	I	Photo detector current input (B)
18	C·MSP	I	Track-cross reference speed setting capacitor connection (not used, grounded)	40	IVB	O	Current/voltage conversion output (B)
19	C·AF	I	Auto focus timer capacitor connection	41	IVA	O	Current/voltage conversion output (A)
20	KICK R/F	O	Track kick signal output	42	PDA	I	Photo detector current input (A)
21	VCC	I	Power supply (connected to +5V)				
22	CNT1	I	Control input (FOON : Focus servo ON signal)				

● AN8371S (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function	Pin No.	Mark	I/O Devision	Function
1	VEE	I	Power supply (connected to -5V)	12	PL1	I	PLL loop filter constant connection
2	SRF	O	RF signal output data-sliced into digital value	13	PL2	I	PLL loop filter constant connection
3	EFM	O	EFM signal output synchronized with PCK	14	FPC	I	Frequency comparison error signal input
4	D·GND	I	GND terminal (digital system)	15	RF	I	RF signal input
5	PCK	O	Clock output extracted from SRF	16	ARF	O	RF signal output with AGC applied
6	VCC	I	Power supply (connected to +5V)	17	AGC	I	ARF signal input for AGF drop-out detection
7	VA	I	VCO free ran frequency adjusting current input	18	AC	I	AGC loop filter constant connection
8	VC1	I	Capacitor connection for VCO oscillation frequency	19	DO	O	Drop-out detection pulse output
9	VC2	I	Capacitor connection for VCO oscillation frequency	20	A·GND	I	GND terminal (analog system)
10	VR	I	Resistor connection for VCO oscillation frequency	21	DSL	I	RF signal input for data slicer
11	PD	I	Capacitor connection for PLL DO protection	22	SLC	I	Slice level control signal input
				23	FC1	I	Data slicer filter capacitor connection
				24	FC2	I	Data slicer filter capacitor connection

● MN15845PDA (System Control)

Pin No.	Mark	Signal	I/O Devision	Function	Pin No.	Mark	Signal	I/O Devision	Function
1	VDD	VDD	I	Power supply (connected to +5V)	24	P13	STAT	I	Processing status input from signal processing LSI
2	OSC1	OSC	I	Clock input (4.2336 MHz)	25	P20	CNT4	O	Optical servo IC control signal (KICKR : Kick direction [revers] command)
3	OSC 2	—	O	Not used (open)	26	P21	CNT3	O	Optical servo IC control signal (KICKF : Kick direction [forward] command)
4	X1	TCNT	I	Track count input (track-cross input in rough search)	27	P22	CNT2	O	Optical servo IC control signal (TRON : Track servo)
5	X0	—	O	Not used (open)	28	P23	CNT1	O	Optical servo IC control signal (FOON : Focus servo)
6	RST	RESET	I	Reset signal input (reset at "L")	29	P30	POWER	O	Power save control (power save at "H")
7	SYNC	—	O	Not used (open)	30	P31	TRFWD	O	Traverse motor forward command signal
8	IRQ	BLKCK	I	Q data read-in timing strobe signal input (sub-code block clock : 75 Hz)	31	P32	TRREV	O	Traverse motor revers command signal
9	SIRQ	—	I	Not used. (connected to VDD)	32	P33	MUTE	O	Muting control (muting ON at "H")
10	SBI	SUBQ	I	Q data read-in input (sub-code Q code)	33	VLCD 1	—	I	LCD drive power supply (3.33V)
11	SBO	—	O	Not used (open)	34	VLCD2	—	I	LCD drive power supply (1.67V)
12	SBT	CLDCK	I	Q data read-in data strobe signal input (sub-code block clock : 7.35 kHz)	35	VLCD3	—	I	LCD drive power supply (0V)
13 16	P40 P43	—	I	Key input	36 38	COM0 COM2	—	O	LCD common line output
17	P00	MCLK	I/O	Key input strobe and data clock output	39	COM3	—	O	Not used (open)
18	P01	MDATA	I/O	Key input strobe and data output	40 44	SEG0 SEG4	—	O	LCD segment line output
19	P02	TEST	I/O	Key input strobe and tracking error read-in strobe output	45 47	SEG5 SEG7	—	O	Not used (open)
20	P03	MLD	O	Data strobe signal output (signal processing LSI command load output)	48 63	SEG8 SEG23	—	O	LCD segment line output
21	P10	SENSE	I	Optical servo status (track-cross) input	64	VSS	GND	I	GND terminal.
22	P11	FLOCK	I	Optical servo status (focus) input.					
23	P12	TEDET	I	Traverse tracking error detection signal input					

● AN8281S (Spindle Motor Drive)

Pin No.	Mark	I/O Devision	Function	Pin No.	Mark	I/O Devision	Function
1	PG	I	GND terminal (for power supply)	12	H1 +	I	Hall element's Hall voltage input (non-inversion)
2	SG	I	GND terminal (for signal)	13	FGP	O	FG pulse output.
3	HB	O	Hall element bias voltage output (7.5V)	14	VCC	I	Power supply (connected to +7.5V)
4	DCR	I	Reference voltage input (2.5V)	15	PC	I	Capacitor connection for phase compensation and motor drive command input.
5	NC	—	Not used.	16	CS	O	Current detection
6	FAO	O	Loop filter constant connection	17	B1	O	Spindle motor drive output
7	NC	—	Not used.	18	B1b		
8	FAI	I	Loop filter constant connection and control signal input	19	B2b		
9	H2 -	I	Hall element's Hall voltage input (inversion)	20	B2		
10	H2 +	I	Hall element's Hall voltage input (non-inversion)	21	A2		
				22	A2b		
11	H1 -	I	Hall element's Hall voltage input (inversion)	23	A1b		
				24	A1		

• TC9312N017, TC9312N018 (Mechanism Control)

1) Termination

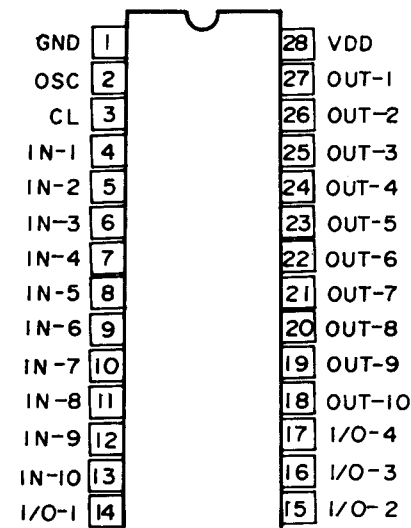


Fig. 1

M: 2.5V

Level	Blank Skip	TPS
L	○	○
M	×	○
H	×	×

Fig. 2

2) Block Diagram

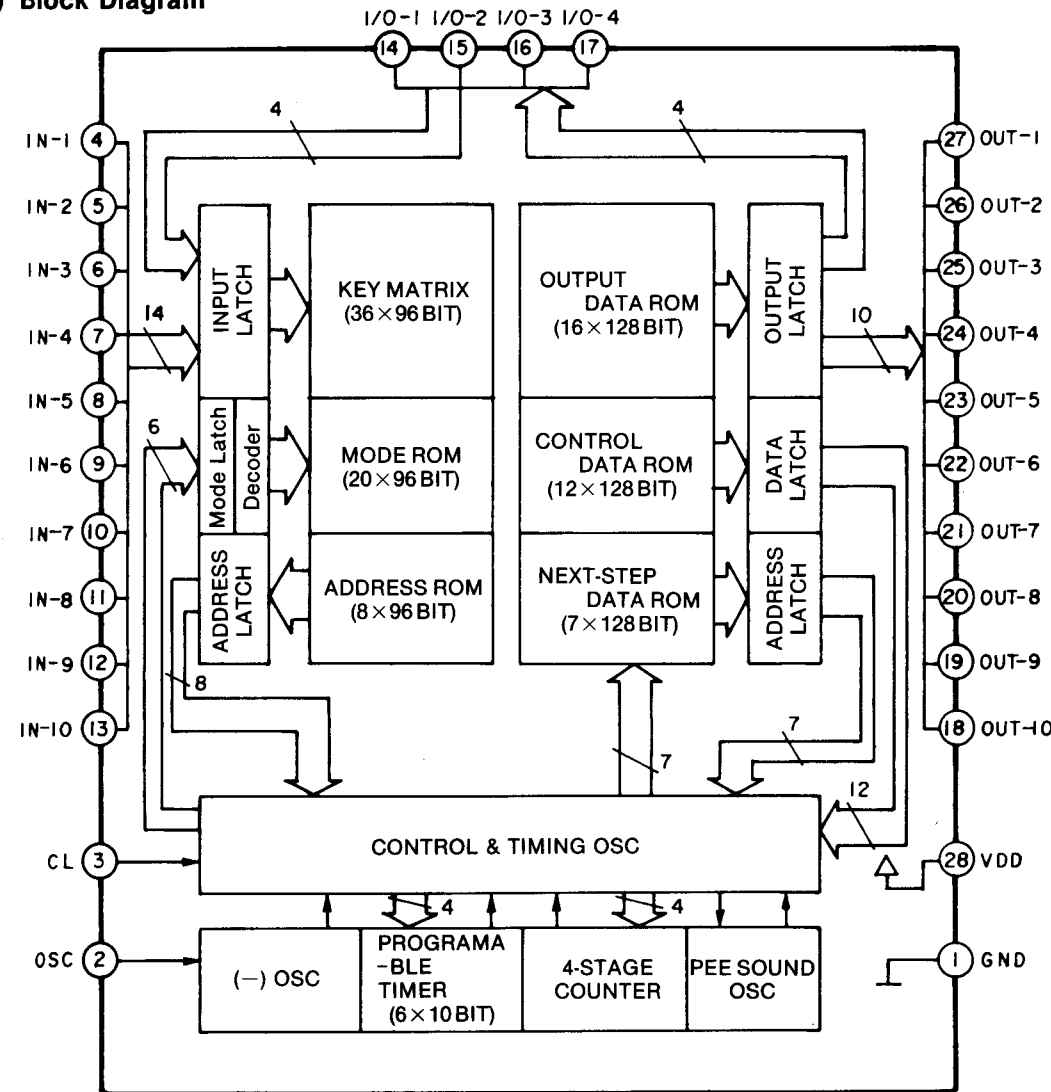


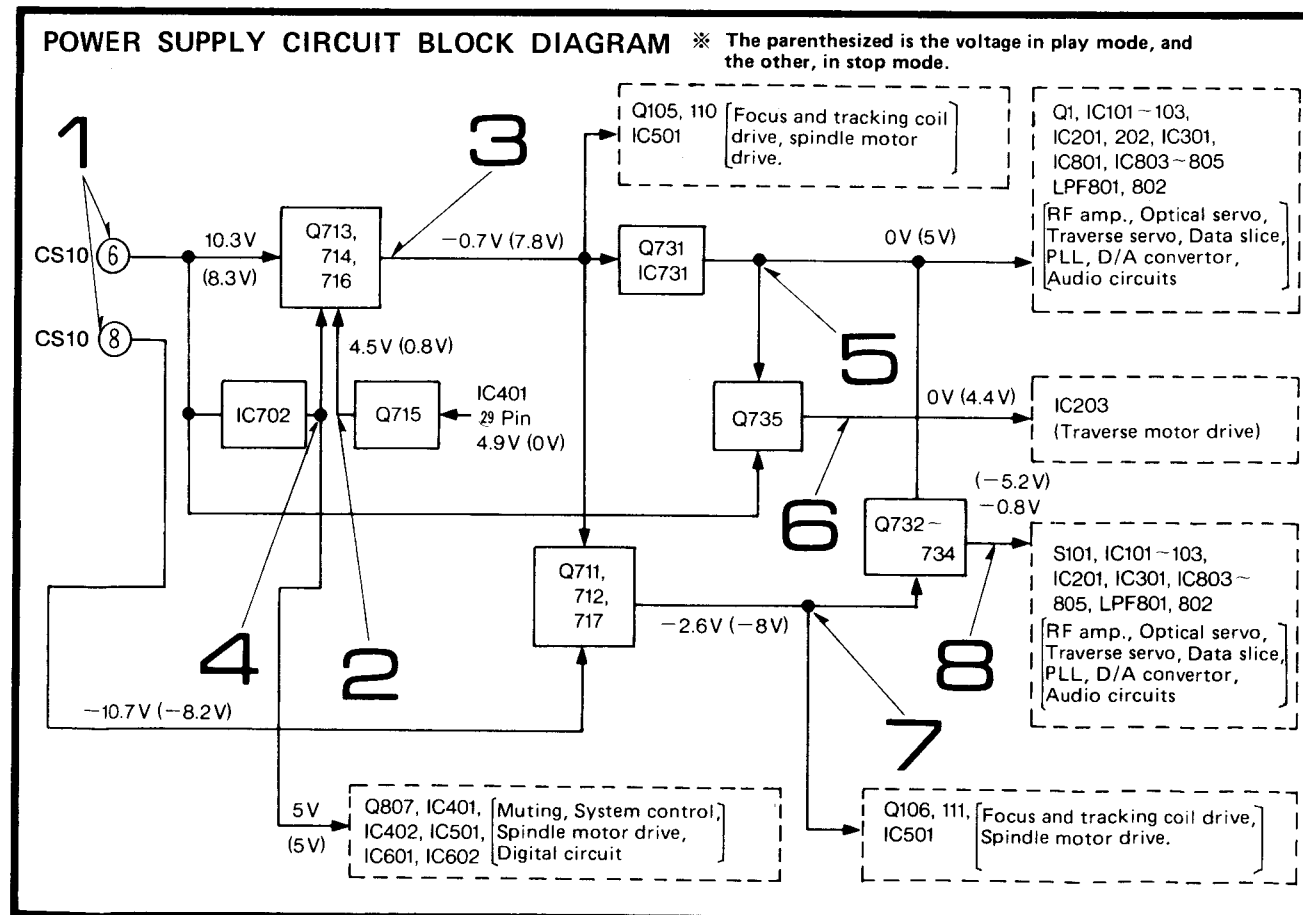
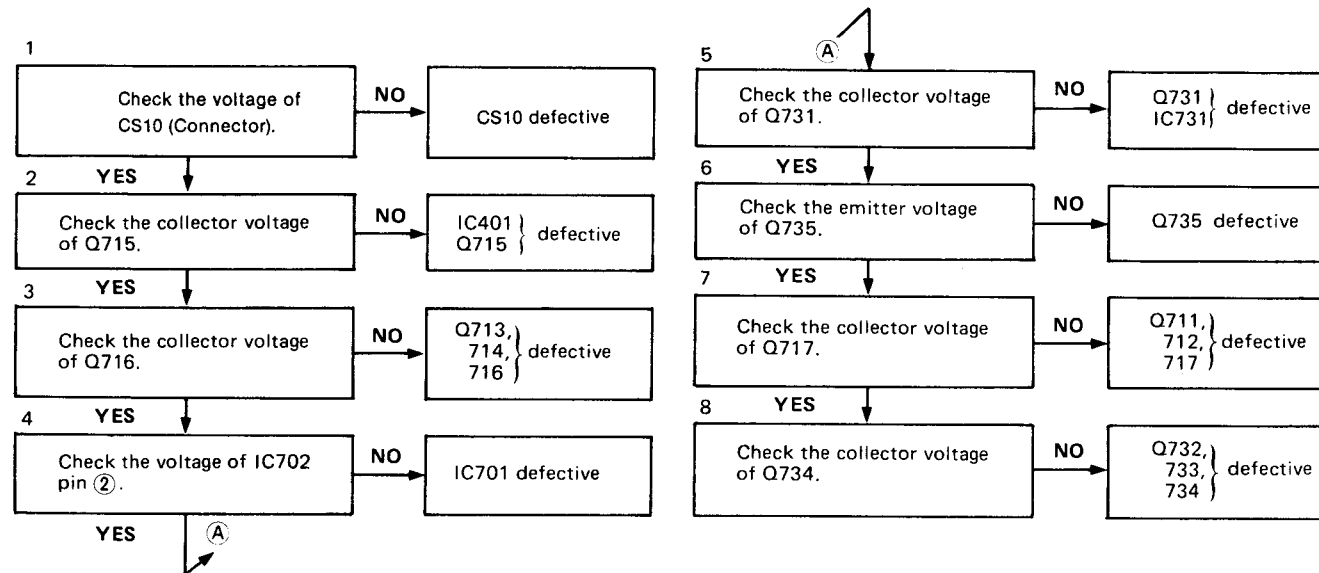
Fig. 3

Pin No.	Pin Name	Function		Description	
		IC308 (TC9312N018)	IC309 (TC9312N017)	IC308 (TC9312N018)	IC309 (TC9312N017)
1	GND	GND		Ground	
2	OSC	Clock oscillator		Approx. 64 kHz	
3	CL	Clear		Resets the operation when the power supply voltage drops (3.5V).	
4	IN-1	FF/REW		FF/REW mode switch detection: "L" during FF/REW mode.	
5	IN-2	PLAY SW		PLAY mode switch detection: "L" during PLAY and REC mode.	
6	IN-3	REV REC	Key input	REV REC mode detection: "H" during REV REC mode.	Input for FWD PLAY and REW.
7	IN-4	FWD REC	Key input	FWD REC mode detection: "H" during FWD REC mode.	Input for REV PLAY, FF and STOP.
8	IN-5	Key input	TPS input	Input for FWD PLAY and STOP.	"L" during use signal and "H" during no signal.
9	IN-6	Key input		Input for REV PLAY and STOP.	Input for High Dubbing, FF, STOP.
10	IN-7	Key input		Input for REW and FF.	Input for Dubbing, REW and Dubbing STOP.
11	IN-8	REV mode		Z: "H", D: "M", S: "H", ∞: "M", Syncro Reverse: "H" "M": 2.5V	
12	IN-9	Mode		Blank skip/TPS (refer to Fig. 2.)	
13	IN-10	Auto-Stop		Rotation of the reel table (with ring magnets) is detected with the Hall IC (DN6851A) to determine the end of tape. Square wave output in PLAY, FF, REW, TPS.	
14	I/O-1	Key input	Key OK	Input for REC-Standby and FF.	Key INH input: Key inputs are accepted when "H".
15	I/O-2	TPS input	Dubbing OK	"L" during use signal and "H" during no signal.	Dubbing starts when "L".
16	I/O-3	Dubbing S/S	Relay	"H" when dubbing starts; "L" (momentary) during synchro-reverse.	Tape 1 starts when the relay play input is "L".
17	I/O-4	Key-INH.	Relay SW	Inhibits the key input for tape 1. "L" when tape 2 starts operating.	Relay play switch. Relay play when "L".
18	OUT-10	Timer	Relay	Mode setting for the timer standby.	"L" when relay play from tape 1 to tape 2.
19	OUT-9	Relay	Key-INH.	"L" when relay play from tape 2 to tape 1.	Inhibits the key input for tape 2. ("L" when tape 1 starts operating)
20	OUT-8	REV LED	Dubbing S/S	"L" during FWD PLAY; "H" during REV PLAY. Alternates rapidly between "L" and "H" during TPS.	"H" when dubbing starts; "L" (momentary) during synchroreverse.
21	OUT-7	FWD LED		"H" during FWD PLAY; "L" during REV PLAY. Alternates rapidly between "H" and "L" during TPS.	
22		REC LED	REV LED	"H" during REC mode.	"L" during FWD PLAY; "H" during REV PLAY. Alternates rapidly between "H" and "L" during TPS.
23	OUT-5	DMT		"L" during audio muting PLAY/REC STANDBY.	
24	OUT-4	Compulsory normal	High speed	"H" during synchro-reverse or start of high speed dubbing.	"H" during high speed dubbing.
25	OUT-3	CAP Motor		"L" during STOP; otherwise "H".	
26	OUT-2	PLAY PL		Play plunger drive. Momentary "H" when switching the PLAY, REC, and TPS operations.	
27	OUT-1	FF/REW PL		FF/REW plunger drive. Momentary "H" when switching the FF, REW, and TPS operations.	
28	VDD	Power supply		Approx. 5V.	

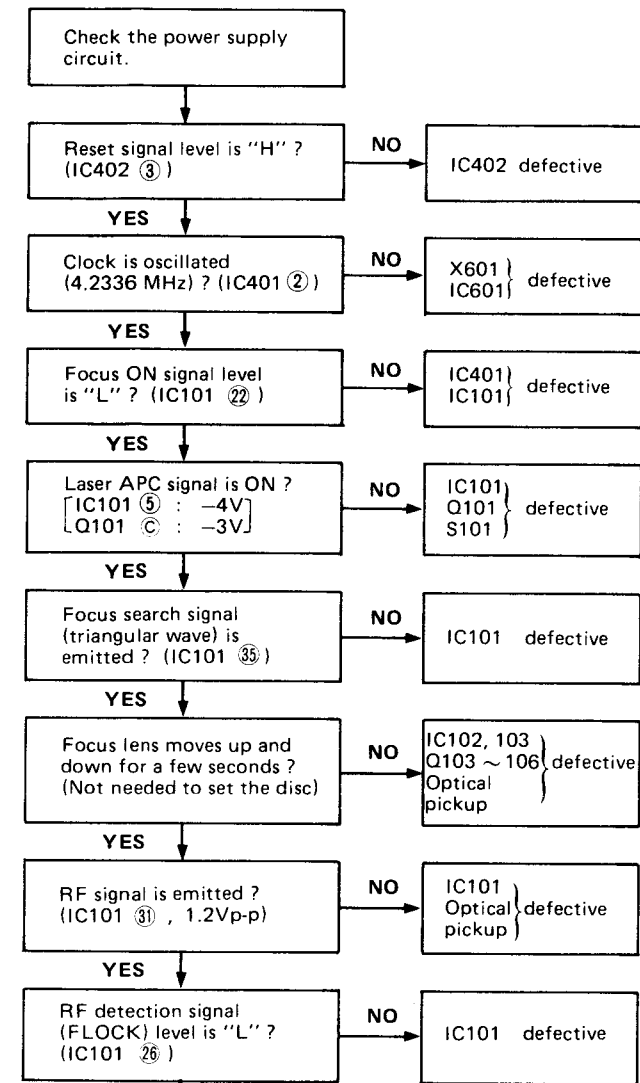
■ TROUBLESHOOTING (for CD Player Section)

- Note:** 1. Carefully handle the compact disc because stains, dust or warping may cause generation of noise.
 2. If the optical pickup lens is stained, it may cause skipping.
Refer to "CLEANNING OF LENS (page 8)".
 3. For the voltage value and waveform, refer to the schematic diagram.
 (The voltage value and waveform slightly varies depending on the measuring set and power supply.)
 4. Possible defects are mainly shown by the name of semi-conductor. The adjacent electronic circuits (such as C and R) are omitted.

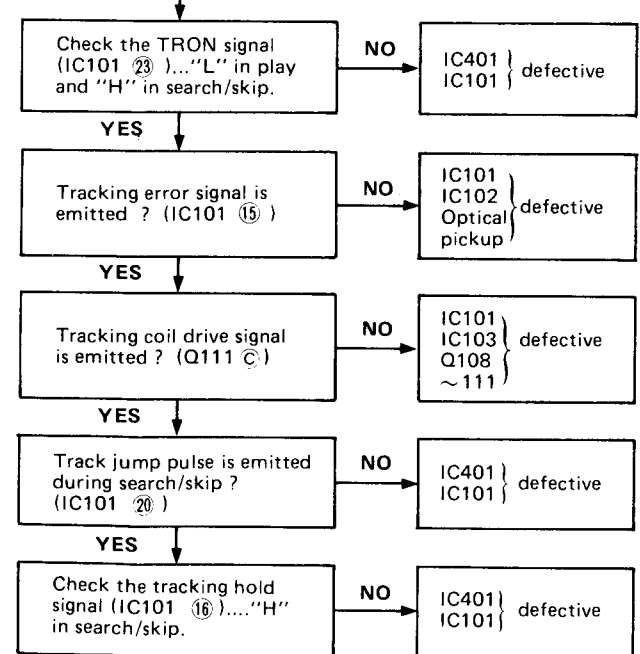
• Check the power supply circuit



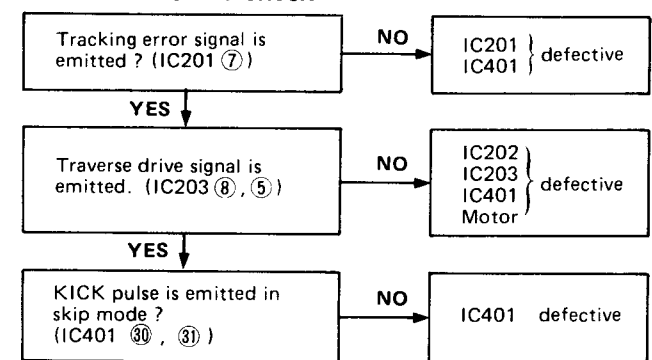
• Focus servo check



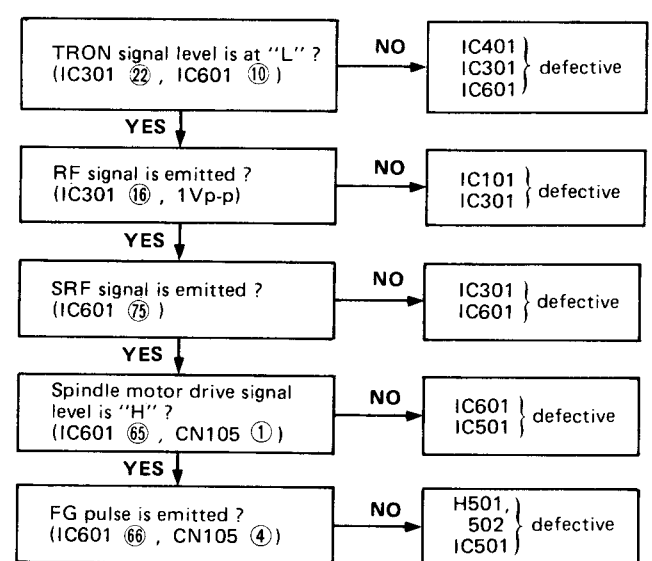
• Tracking servo check



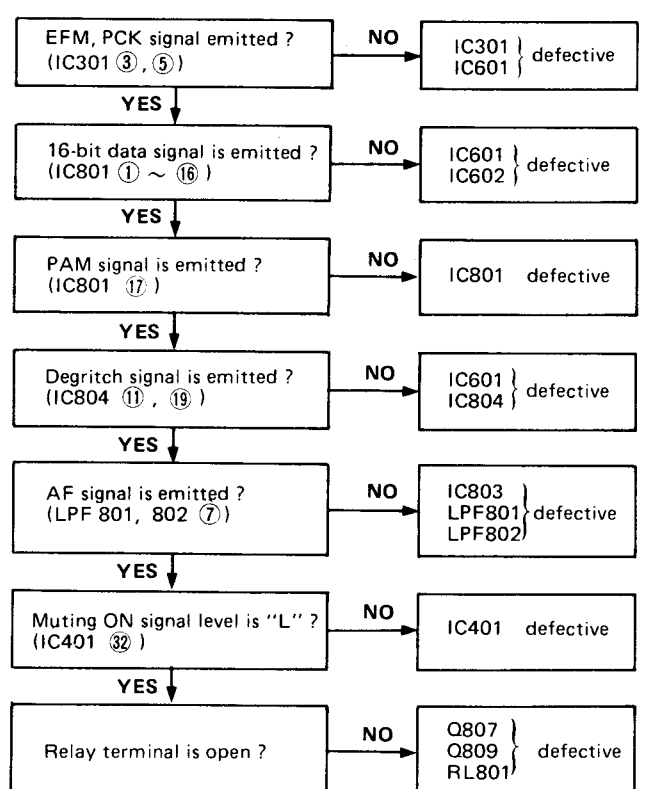
• Traverse servo check



• CLV servo check



• Audio circuit check



MEASUREMENTS AND ADJUSTMENTS

■ On Adjusting the CD Player Unit

Please follow the procedure below for continuity checks, adjustment, or measurement of the CD player.

Notes:

- (1) Even if during operation, the laser diode does not emit laser if the disc holder cover is not closed and safety interlock switches S101 (laser power switch) and S103 (close switch) are not on.
- (2) When the disc holder cover is closed and safety interlock switches S101 and S103 are on, never look at the lens of laser pickup.

1. SPECIAL TOOLS

- | | | |
|----------------------|------------------------|------------------------|
| ① FPC relay board | ③ PCB connection cord | ⑤ 6 pin extension cord |
| ② FPC extension cord | ④ 8 pin extension cord | |

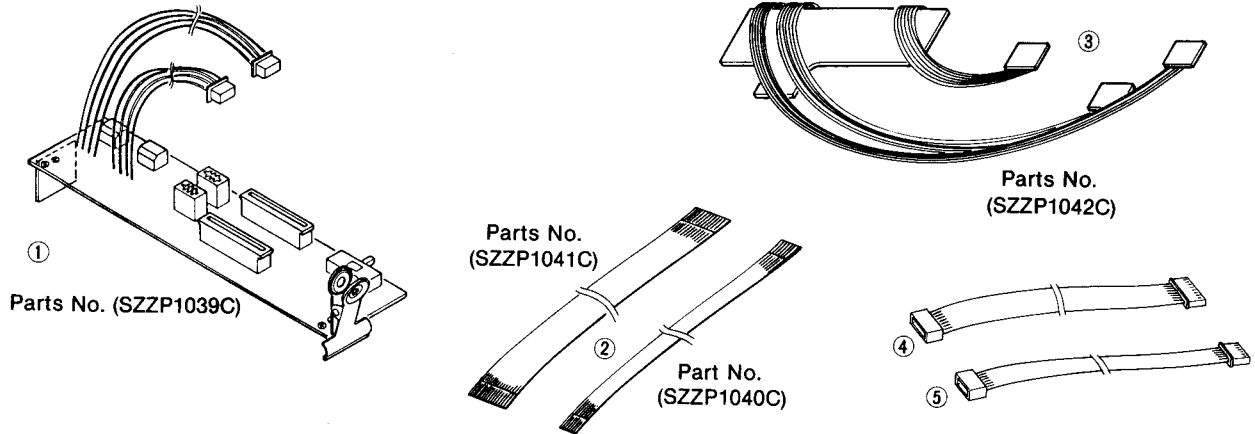


Fig. 1

2. DISASSEMBLY PROCEDURES

Before beginning disassembly, you must use the following procedure to remove the laser pickup from the center. (When removing the servo board, the rack gear might touch the servo board causing damage if the laser pickup is at the inner side.)

< Procedure >

- ① Insert a compact disc (CD).
 - ② Turn the power switch on and set the unit to the play mode.
 - ③ Skip to the end of the program. When it reaches the end, the laser pickup moves to the outer side automatically.
 - ④ Turn the power switch off and remove the CD.
- (1) Remove the front cabinet and CD player unit by following the disassembly instructions on page 9.

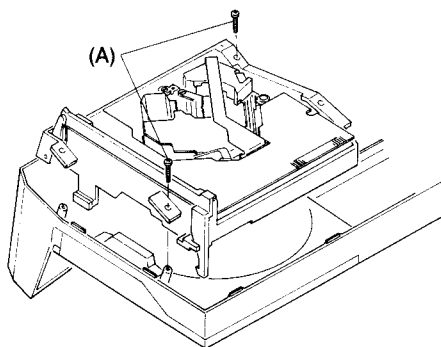


Fig. 2

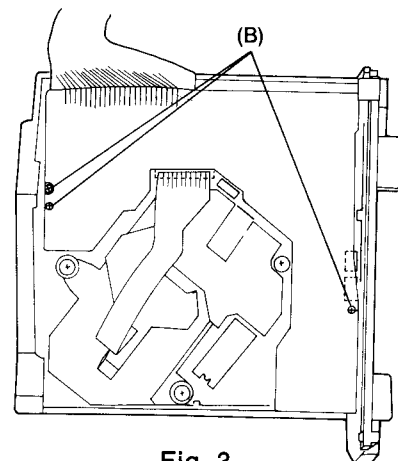


Fig. 3

- (2) Mount the CD player unit to the inside of the front cabinet and fasten part (A) with 2 screws (3×6mm).

- (3) Remove the 3 screws (B) (3×6mm).

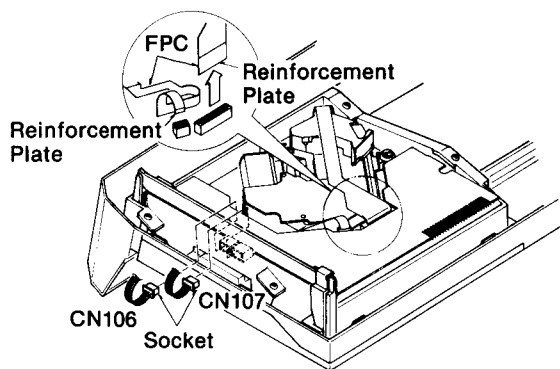


Fig. 4

- (4) Pull out the 2 FPC (15-conductor) cords.
(Be sure not to tear the flexible board.)

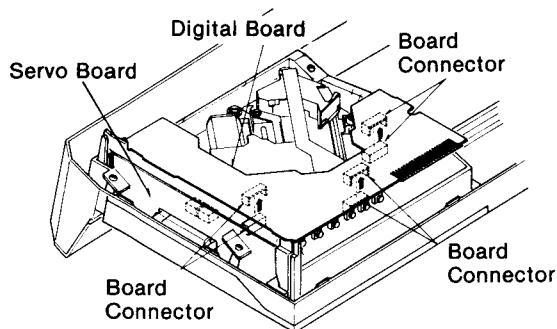


Fig. 6

- (5) Remove the digital board.

Note: The 2 boards (digital board and servo board) are connected by 3 board connectors. When removing, be sure to hold the board near the board connector so as not to crack the board.

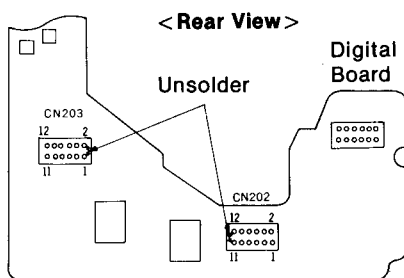


Fig. 8

3. SETTING UP THE SPECIAL TOOLS

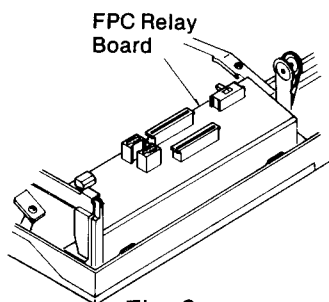


Fig. 9

- (1) Attach the FPC relay board.

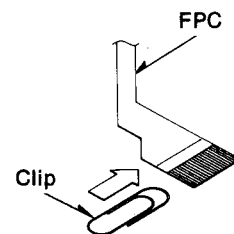


Fig. 5

Note: To prevent damage to the removed FPC cord due to static electricity, clip it as shown in above to short it.

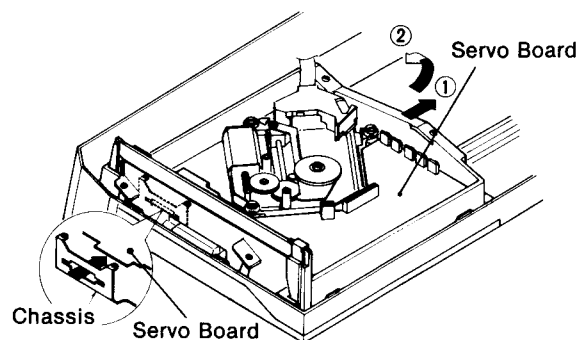


Fig. 7

- (6) Move the servo board in the direction of arrows ① and ②, and remove.

- (7) Remove the solder on the digital board between pins ⑪ and ⑫ connector CN202 and between pins ① and ② of CN203.

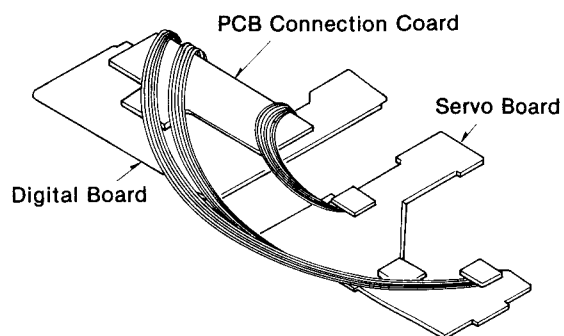
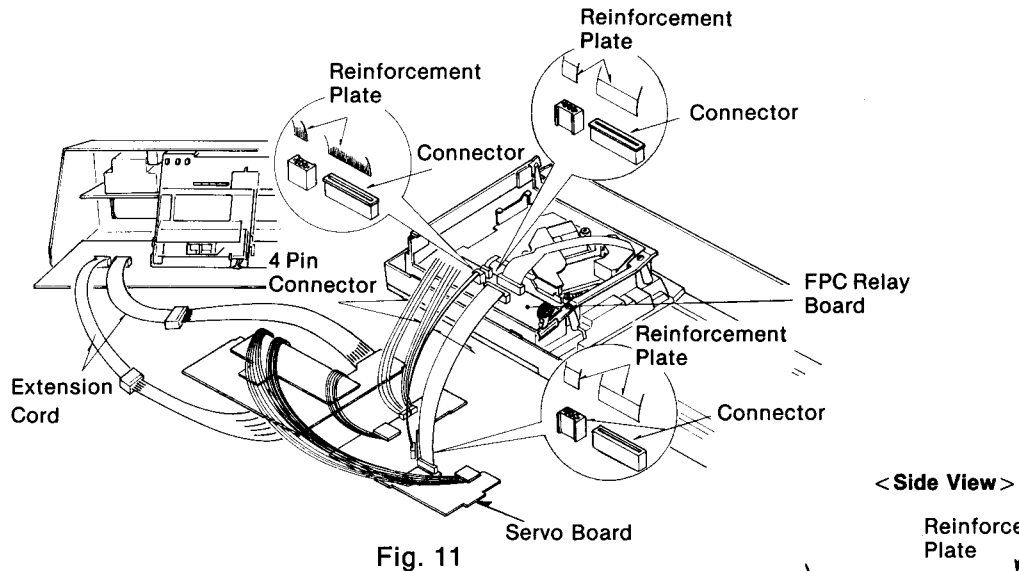


Fig. 10

- (2) Connect the digital board and the servo board with the PCB connection cord.

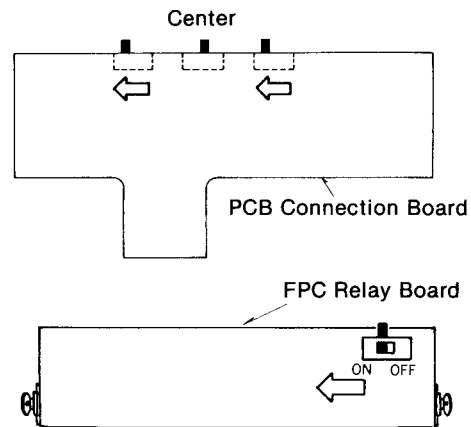
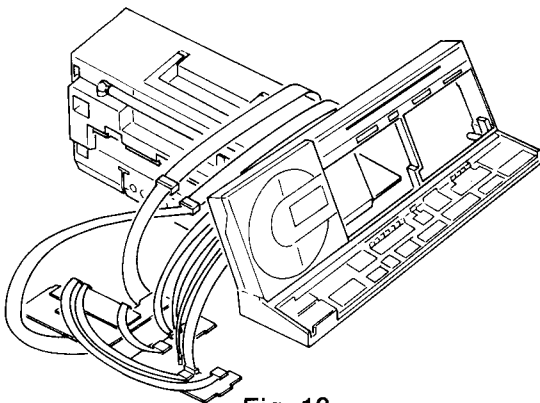


- (3) Next, connect the FPC extension cord between FPC relay board and servo board.

Note: Be sure to correctly orient the reinforcement plate and conductor side when connecting the FPC extension cord.

- (4) Connect the two 4-pin sockets (extension wires from CN106 and CN107) to the respective plugs (CN106 and CN107) on the servo board.
- (5) Connect the set's FPC cord and the 4-pin connector to the relay board.

Note: When connecting, be sure to properly align the FPC.



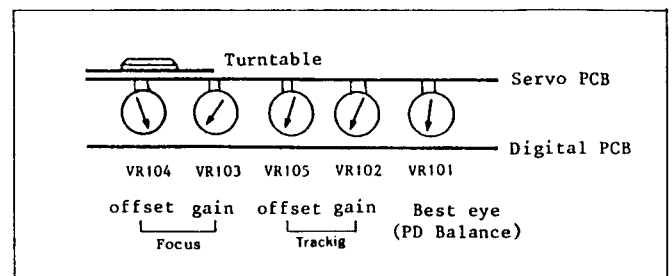
- (6) After completing the connections above, lean the front cabinet against the set as shown in the figure.

(This CD player is assembled at a 72° angle. If it is adjusted in any other angle or when laying flat, the laser pickup will be displaced, preventing normal operation.)

- (7) Set the switches on the PCB connection board and FPC relay board as shown by the arrows.
- (8) Check to see that the power switch is at its OFF position. Then connect the AC power cord.
- (9) Load a disc and turn on the power switch.

4. INITIAL SETTING POINTS OF ADJUSTING VARIABLE RESISTORS

The player operates but not optimum at the above settings of the adjusting variable resistors. Adjust them according to the adjusting procedure. Must conduct the electrical adjustment when any electrical part is replaced. Perform ① optical pick-up adjustment and ② electric adjustment in the stated order when the optical pick-up is replaced.



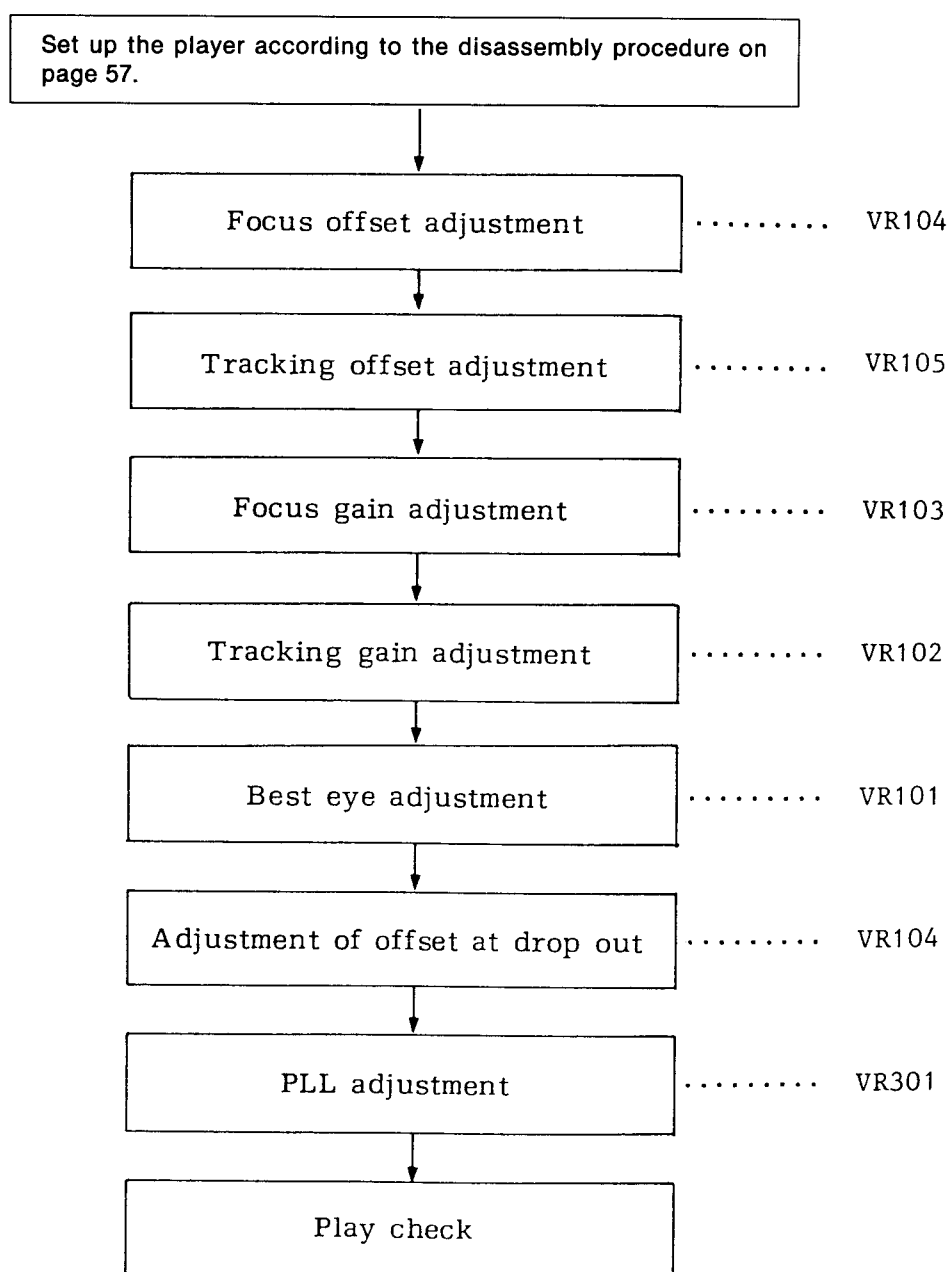
5. ADJUSTMENT PROCEDURE

5-1. Electrical Adjustment

(1) Measuring Instruments and Tools

- ① 2-channel oscilloscope (with external trigger, 30 MHz or over).
- ② Low frequency oscillator (Audio used).
- ③ Screwdriver for watch (Hozan tool No.D22 ⊕ No.0 ⊖ 2mm)
- ④ Allen wrench (Hozan tool No. W91 · 1.5mm)
- ⑤ Other common tools

(2) Adjusting Sequence and Locations



(3) Location of Adjusting Variable Resistors of each PCB.

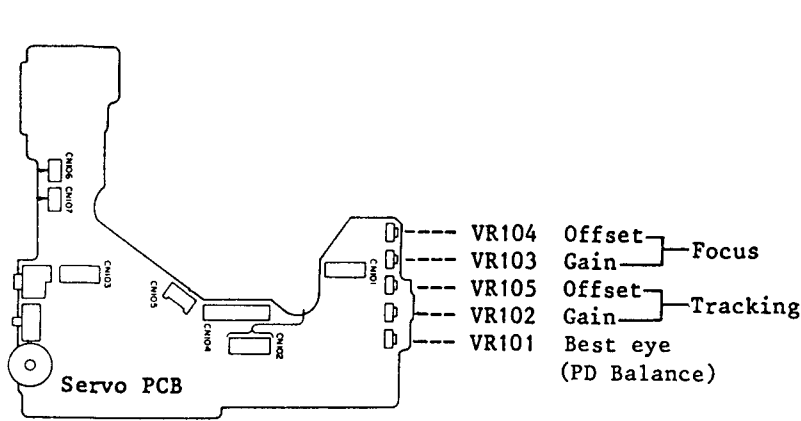


Fig. 2-1

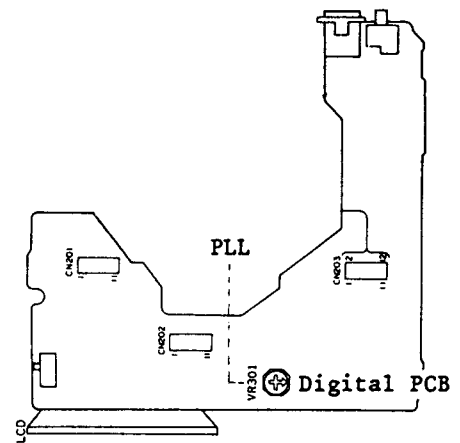


Fig. 2-2

(4) Electrical Adjustment

A. Focus Offset Adjustment

- ① Position the switches of the PCB connection cord as illustrated in Fig. 2-3.

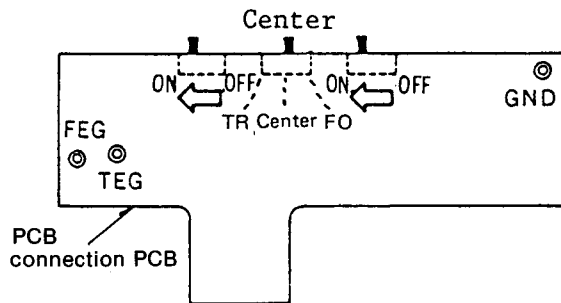


Fig. 2-3

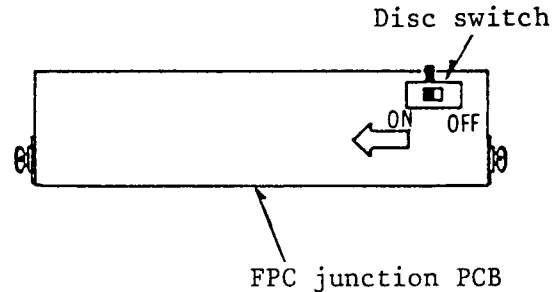


Fig. 2-4

- ② Set the input selector switch of the oscilloscope to the GROUND position for zero balancing.
- ③ Connect the oscilloscope to the FEG and GND terminals of the PCB connection cord.

Oscilloscope setting

VOLT		100mV
SWEEP		1msec.
Input selector		D.C

- ④ Place the test disc (SZZP1014F), switch on the power supply to set the player to the playing status.
- ⑤ Set the disc switch of the FPC junction PCB to the OFF position.
- ⑥ Adjust VR104 so that the DC voltage indicated on the oscilloscope shall be 0 V.
- ⑦ On completion of adjustment, set the disc switch to the ON position.
- ⑧ Set the power supply switch to the OFF position.

B. Tracking Offset Adjustment

- ① Set the switches of the PCB connection cord in the same positions as in the focus offset adjustment.
- ② Connect the oscilloscope to the terminals TEG and GND of the PCB connection cord. (The oscilloscope must have been zero-balance adjusted.)

Oscilloscope setting {

VOLT	100mV
SWEEP	1 msec.
Input selector	D.C

- ③ Turn on the power supply switch.
- ④ Place the test disc (SZZP1014F) and play the outermost track.
- ⑤ If the player starts play, hold the magnet rotor of the spindle motor (shown in Fig. 2-5) with the hand to stop the rotation.
- ⑥ Adjust VR105 so that the center of the DC waveforms displayed on the oscilloscope shall be 0 V.
- ⑦ Set the power supply switch to the OFF position.

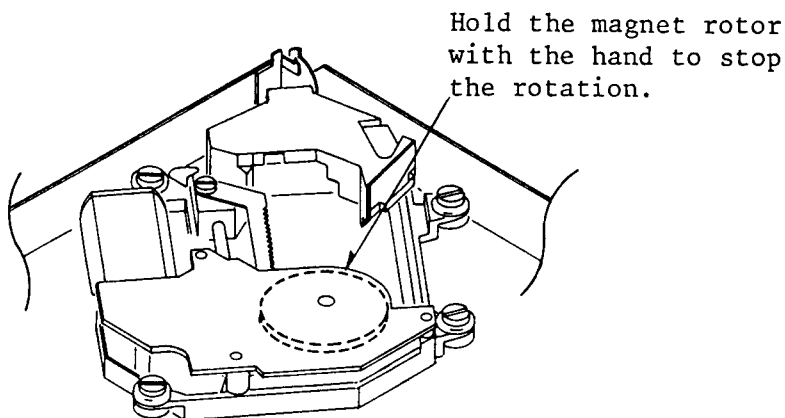


Fig. 2-5



Fig. 2-6

Adjust so that this portion shall be about 0 V.

C. Focus Gain Adjustment

- ① Set the switches of the PCB connection cord as illustrated in Fig. 2-7.

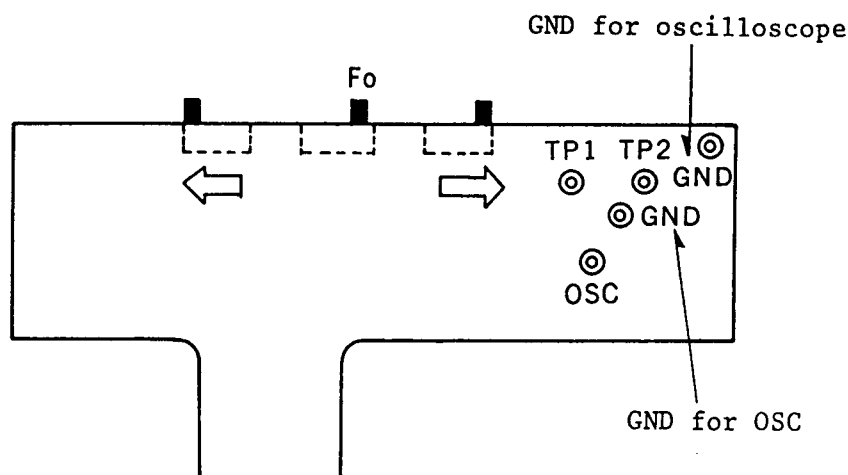


Fig. 2-7

- ② Connect CH1 and CH2 of the oscilloscope to the terminals TP1, TP2, and GND of the PCB connection cord.

Oscilloscope setting	VOLT	100 mV
	SWEEP	5 msec.
	Input selector	A.C

- ③ Connect the low frequency oscillator set to 1 kHz and 150 mV_{p-p} to the terminals OSC and GND of the PCB connection cord.
- ④ Turn on the power supply switch.
- ⑤ Place the test disc (SZZP1014F) and set the player to the playing condition.
- ⑥ 1 kHz signal will be displayed on the oscilloscope. Adjust VR103 so that the amplitudes of two channels shall be equal.
- ⑦ Turn off the power supply switch.

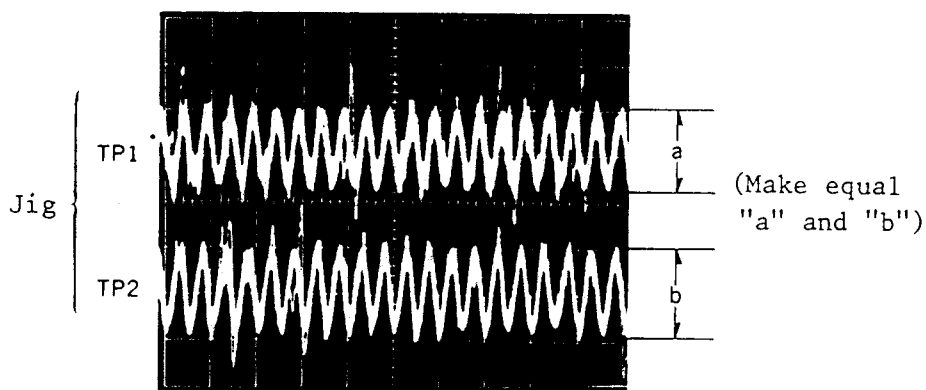


Fig. 2-8

D. Tracking Gain Adjustment

- ① Set the switches of the PCB connection cord as shown in Fig. 2-9.

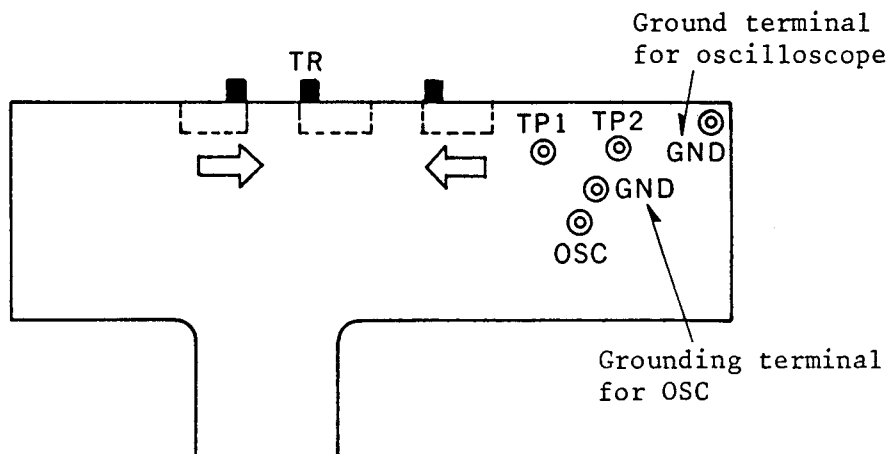


Fig. 2-9

- ② Connect CH1 and CH2 of the oscilloscope to the terminals TP1 and TP2 of the PCB connection cord.

Oscilloscope setting

VOLT	100 mV
SWEEP	5 msec.
Input selector	A.C

- ③ Connect the low frequency oscillator set to 1.5 kHz and 150 mV_{p-p} to the terminals OSC and GND.
- ④ Turn on the power supply switch.
- ⑤ Place the test disc (SZZP1014F) and set the player to the playing condition.
- ⑥ 1.5 kHz signals are displayed on the oscilloscope. Adjust VR102 so that the amplitudes of waveforms of the two channels shall be equal as shown in Fig. 2-10.
- ⑦ Turn off the power supply switch.

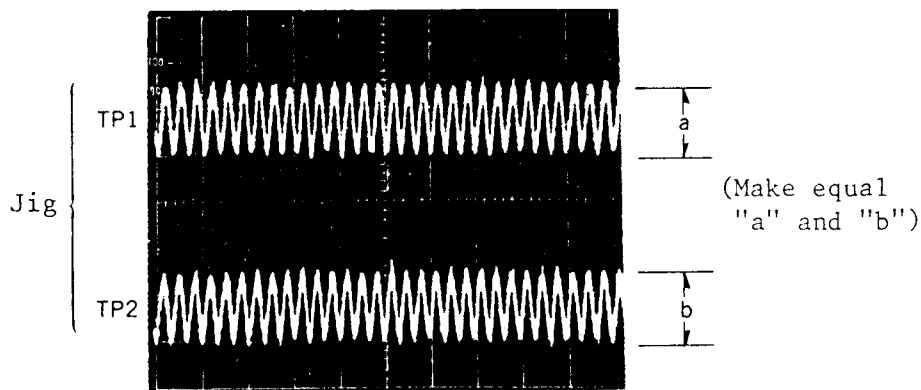


Fig. 2-10

E. Best Eye Adjustment (PD Balance)

- ① Position the switches of the PCB connection cord as illustrated in Fig. 2-11.

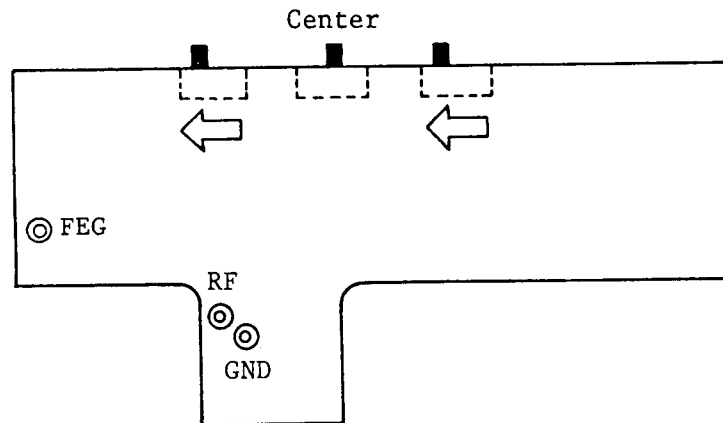


Fig. 2-11

- ② Connect the oscilloscope to the terminals RF and GND of the PCB connection cord.

Oscilloscope setting

VOLT	200mV
SWEEP.....	0.5 μ sec.
Input selector	A.C

- ③ Turn on the power supply switch.
- ④ Place the test disc (SZZP1014F) and set the player to the playing condition.
- ⑤ The RF signal is indicated on the oscilloscope. Adjust VR101 so that the eye pattern shall be stretched most as illustrated in Fig. 2-12.
- ⑥ Turn off the power supply switch.

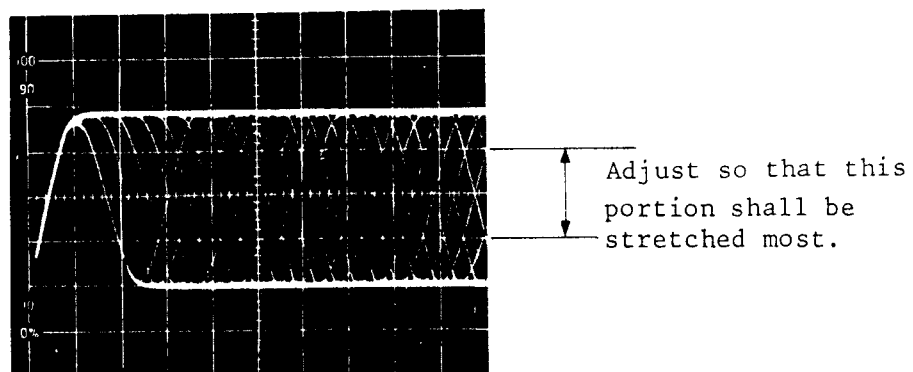


Fig. 2-12

F. Adjustment of Offset at Drop Out

- ① Position the switches of the PCB connection cord to the same positions as in best eye adjustment. (Refer to Fig. 2-11.)
- ② Connect CH1 of the oscilloscope to RF of the PCB connection cord and CH2 to FEG.

Oscilloscope setting	{	VOLT.....	0.5V
		SWEEP	0.5msec.
		Input selector	A.C
		Trigger	CH1, NORM.

- ③ Turn on the power supply switch.
- ④ Play back the band 8 or 13 (0.5 mm black spot) of the test disc (SZZP1014F).
- ⑤ Trigger so that the waveform shown in Fig. 2-13 is displayed on the oscilloscope and adjust VR104 so that the hollow of RF and the waveform amplitude of FE shall be minimum.
- ⑥ Turn off the power supply switch.

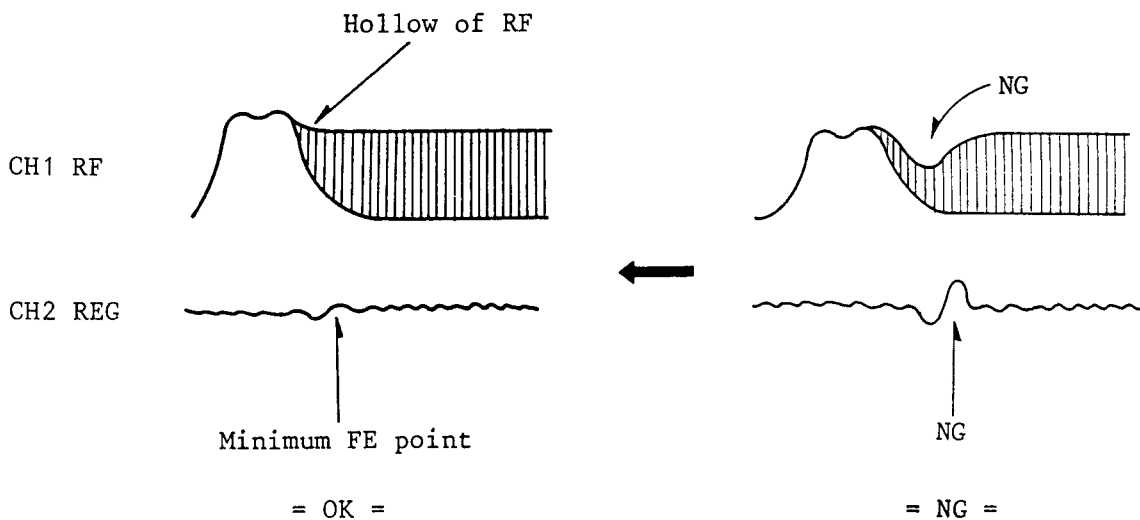


Fig. 2-13

G. PLL Adjustment

- ① Set the switches of the PCB connection cord to the same positions as in the adjustment of best eye. (Refer to Fig. 2-11.)
- ② Check the voltage at the pin ② ($\overline{\text{CLDCK}}$) of LSI/IC-601 (MN6617) with the oscilloscope.

Oscilloscope setting

VOLT	2V
SWEEP	1msec.

- ③ Set the power supply switch to the ON position.
- ④ Play back the band 8 or 13 (0.5 mm black spot) of the test disc (SZZP1014F).
- ⑤ Adjust VR301 so that the shaking of waveform is eliminated or minimized as shown in Fig. 2-14.
- ⑥ Turn off the power supply switch.

MN6617
②Pin($\overline{\text{CLDCK}}$)

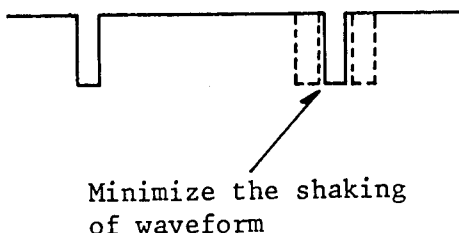


Fig. 2-14

H. Check of play operation after adjustment

Check of skip search

- ① Play an ordinary disc.
- ② Press the skip button and check to see that skip search is given. (Forward and reverse)

Check of manual search

- ① Play an ordinary disc
- ② Press the manual search button and check to see that smooth manual search can be done at low and high speeds. (Forward and reverse)

Check for defects

- ① Play the band 8 or 13 of test disc, (SZZP1014) and check to see that there is no sound skip or noise. (Black spot --- 0.5)
- ② Play the band 10 or 14 of test disc (SZZP1014F), and check to see that there is no sound skip or noise. (Fingle print)

6. REPLACEMENT AND ADJUSTMENT OF OPTICAL PICK-UP

6-1. Replacement of Optical Pick-Up

<Removing Method >

- ① Disassemble the player to take out the traverse unit as in Fig.3-1.
(Refer to the service manual.)

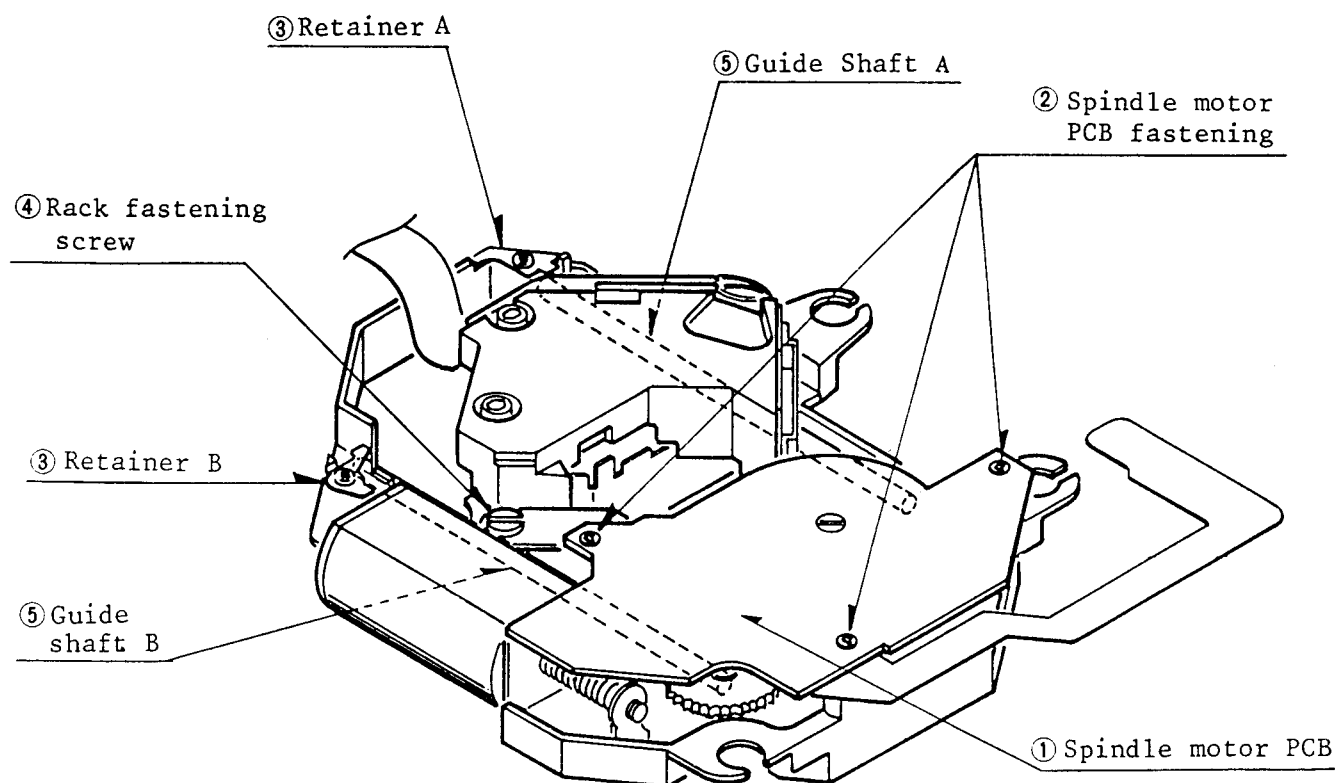


Fig. 3-1

- ② Remove the spindle motor by unscrewing three fastening screws as shown in Fig. 3-2.
 [(Note) Exercise care not to loose three nylon washers of the PCB fastening screws.]
- ③ Remove the retainer A and B by unscrewing the fastening screws as shown in Fig.3-3.
- ④ Unscrew the rack fastening screw as shown in Fig. 3-4.
 [(Note) Exercise care not to loose a wave washer.]
- ⑤ Take out the guide shafts A and B in the direction of an arrow shown in Fig. 3-5. The optical pick-up is removable.

Spindle motor PCB
fastening screws

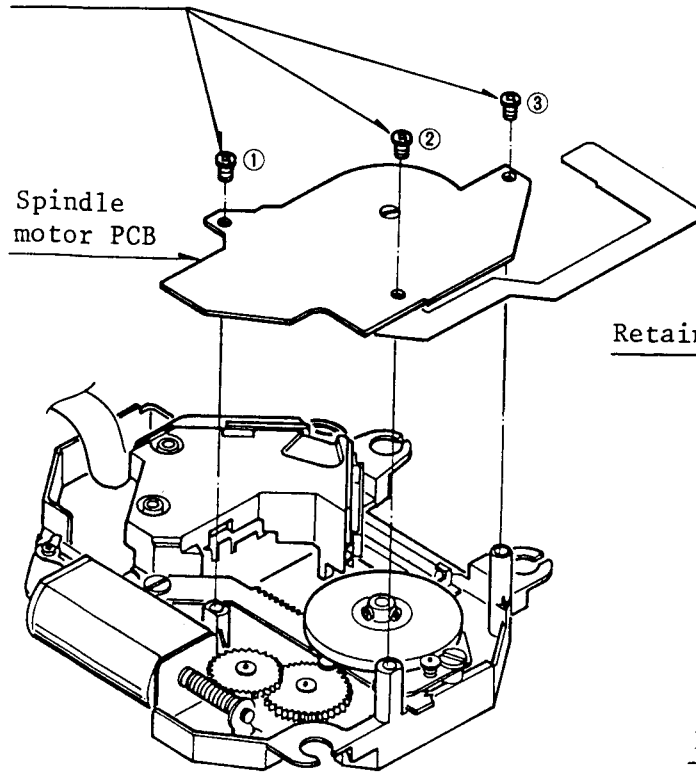


Fig. 3-2

Retainer fastening screw

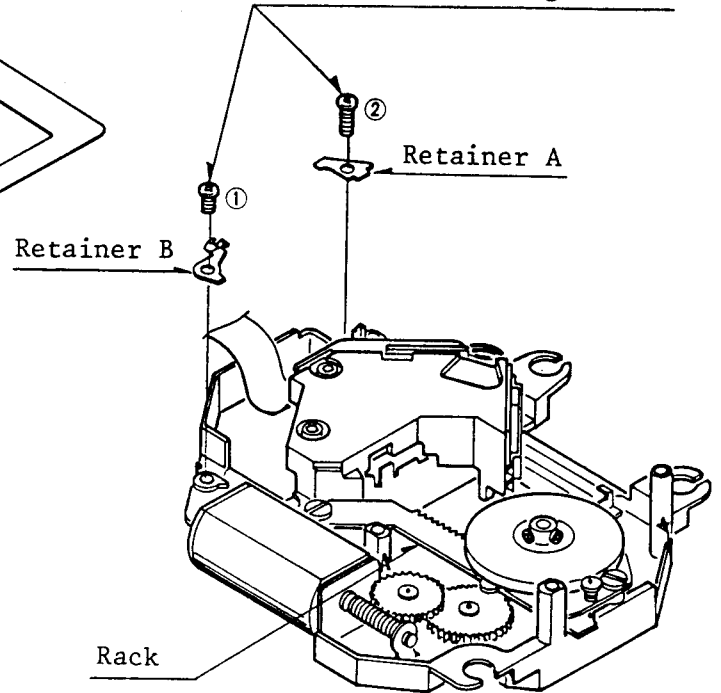


Fig. 3-3

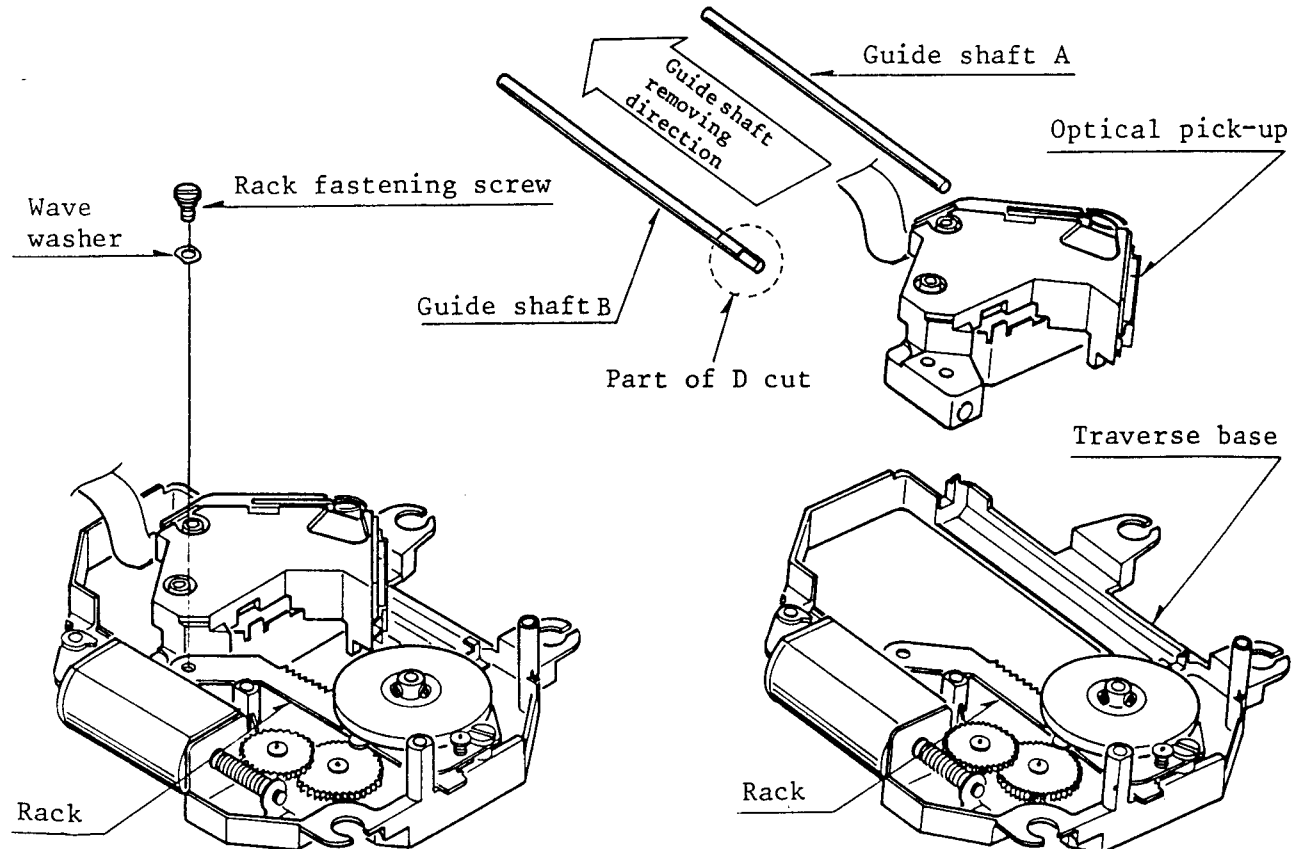


Fig. 3-4

Fig. 3-5

<Installation Procedure >

Assemble the removed parts in the reversed order of the disassembling steps, by paying attention to the following points.

- ① Must install the guide shifts to the pick-up in the direction shown by an arrow in Fig. 3-6, and install them to the traverse base.

(Note) If the guide shifts are installed in the reversed direction, the leaf spring in the optical pick-up may be bent.

The guide shafts A and B are not identical. Install them carefully without confusing them.

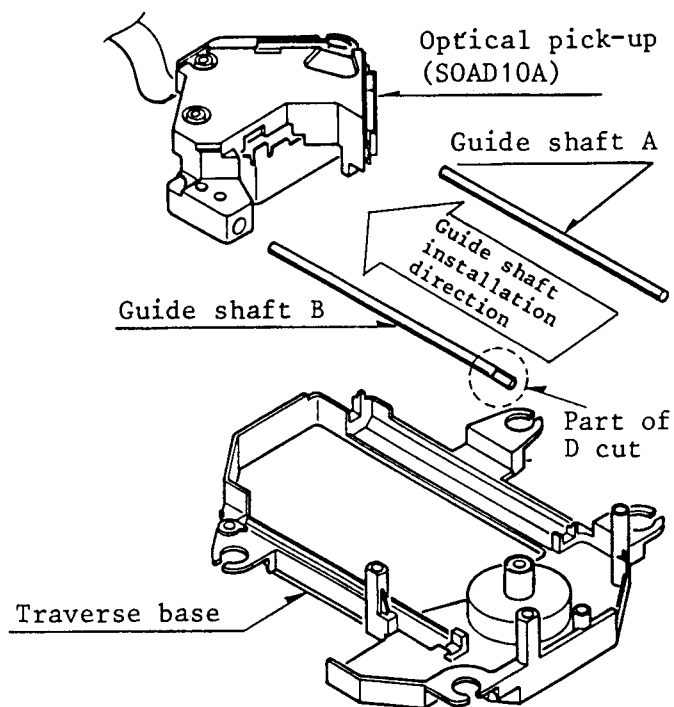


Fig. 3-6

- ② Ensure that the D cut of the guide shaft B is installed as illustrated in Fig. 3-7.

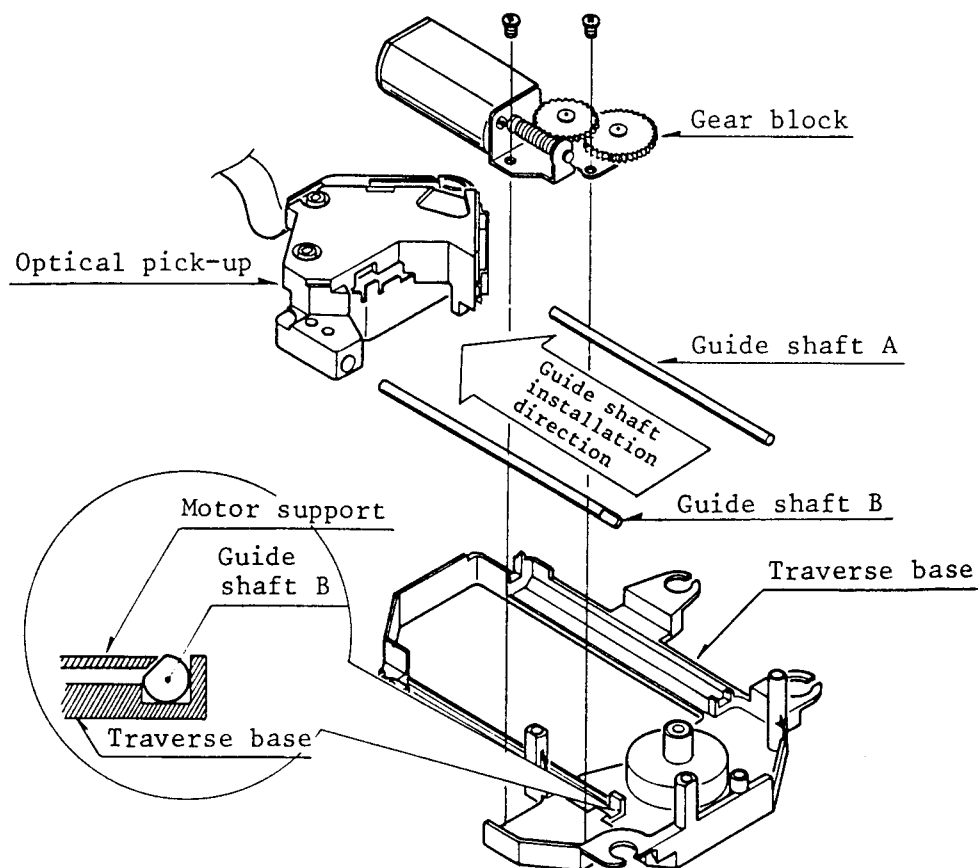


Fig. 3-7

- ③ Tighten the rack fastening screw with the rack in correct position as shown in Fig.3-8.

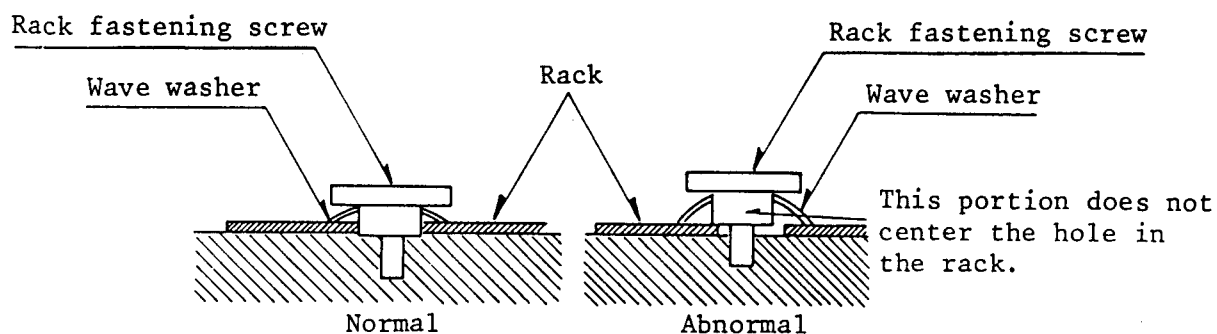


Fig. 3-8

6-2. Adjustment after Replacement of Optical Pick-Up

Preparation for Adjustment and Adjusting Points

On completion of replacing the optical pick-up, set up the player so that power-on check can be conducted.
(Set up as shown in Fig. 1-12.)

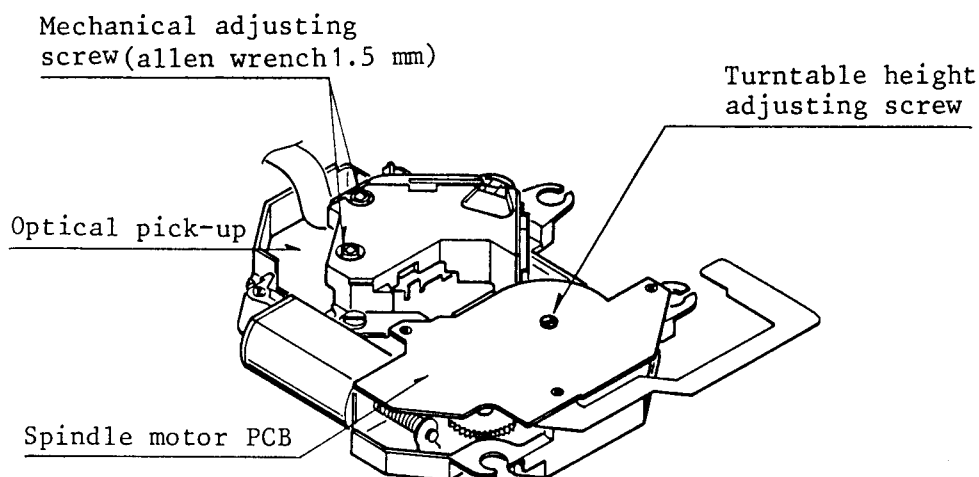
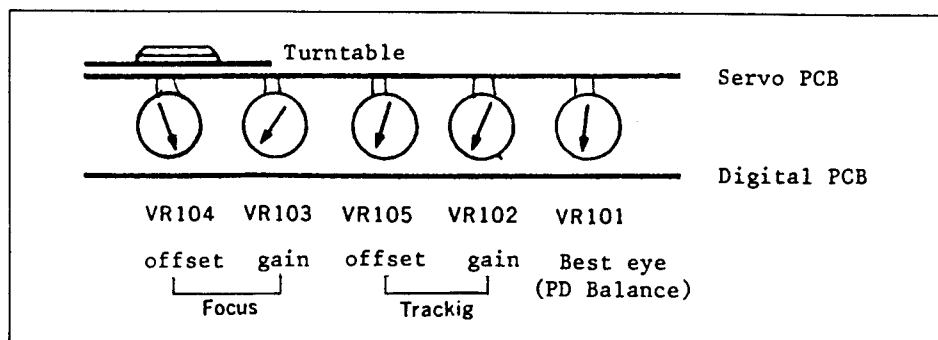


Fig. 3-9

Initial setting points of adjusting variable resistors

• Adjusting variable resistors

The player operates but not optimum at the above settings of the adjusting variable resistors. Adjust them according to the adjusting procedure. Must conduct the electrical adjustment when any electrical part is replaced. Perform ① optical pick-up adjustment and ② electric adjustment in the stated order when the optical pick-up is replaced.



A. Turntable Height Adjustment

- ① Position the switches of the PCB connection cord as shown in Fig.3-10.

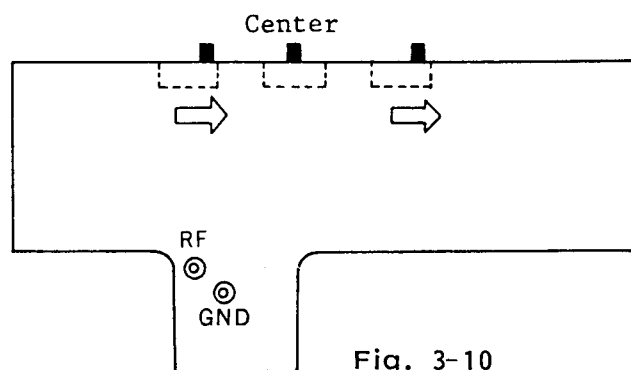


Fig. 3-10

- ② Connect the oscilloscope to the terminals RF and GND of the PCB connection cord.

Oscilloscope Setting	{	VOLT	200mV
		SWEEP	50msec.
		Input selector.....	A.C

- ③ Lean the front cabinet against the set as show in Fig. 3-11.
- ④ Place the test disc (SZZP1014F) and turn on the power supply switch.

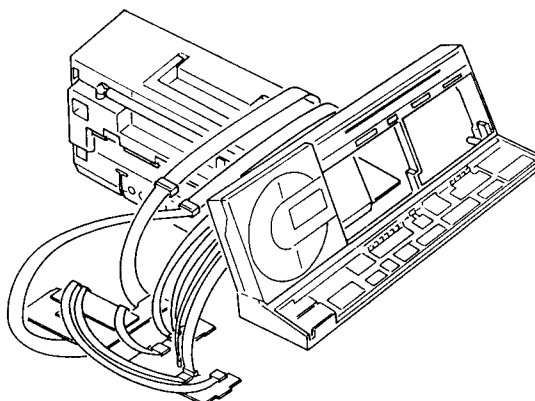


Fig. 3-11

- ⑤ Be sure that the waveform shown in Fig. 3-12 is displayed on the oscilloscope.
- ⑥ If not, adjust the turntable height adjusting screw shown in Fig. 3-9 so that the waveform shall be as illustrated in Fig. 3-12.
(Handle the turntable height adjustive screw the care because the screw is plastic.)
- ⑦ After adjust, add the lock screw glue "like a nail paint" in turntable height adjusting screw on spindle PCB.
- ⑧ Turn off the power supply switch.

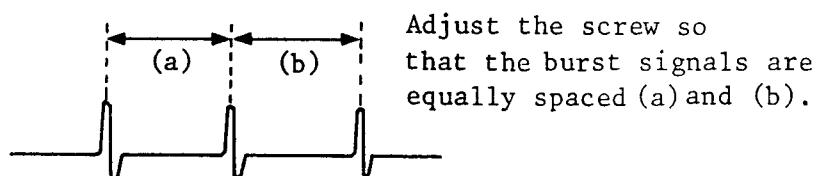


Fig. 3-12

B. Mechanical Adjustment

- ① Position the switches of the PCB connection cord as illustrated in Fig. 3-13.

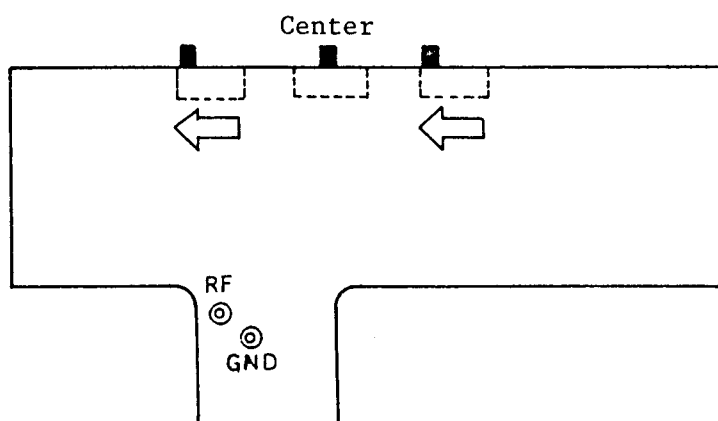


Fig. 3-13

- ② Connect the oscilloscope to the terminals RF and GND of the PCB connection cord.

Oscilloscope setting	{	VOLT	200 mV
		SWEEP	0.5 sec.
		Input selector	A.C

- ③ Turn on the power supply switch.
- ④ Place the test disc (SZZP1014F) and set the player to the playing condition.

- ⑤ The RF signal will be displayed on the oscilloscope. Adjust the two Mechanical adjusting screws so that the eye pattern is stretched most as shown in Fig. 3-14.

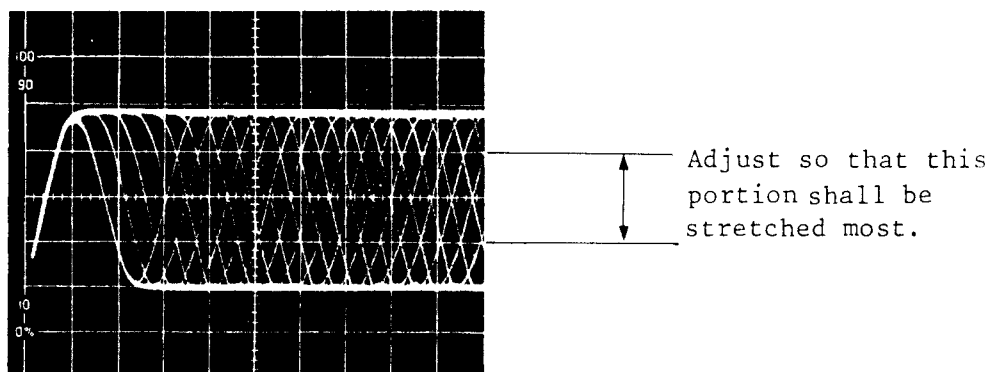


Fig. 3-14

[(Note) Must conduct electrical adjustment on completion of replacing and adjusting the optical pick-up.]

POINTS TO CHECK FOLLOWING REPAIR

- After servicing this unit, be sure to check the operations described below.
- (1) Press the power switch on the unit and check to see if the POWER/BATT. LED illuminates.
 - (2) Set the function button to the CD (O) position.
 - (3) Press the CD eject button to unlock the disc compartment cover. Check to see that the cover opens to its proper position.
 - (4) Fully open the disc compartment cover by swinging it toward you.
 - (5) Place the disc on the spindle's center, swing the disc compartment cover up and close it by pressing the PUSH TO CLOSE portion. Check to see that the disc loads properly.
 - (6) Check to see that the disc rotates and operates properly.
 - (7) Press the open button. When the disc compartment cover opens to its proper position, check to see that the gap between the cover and front cabinet is at least 6mm. (Measure the gap with calipers.) (See Fig. 1)
 - (8) In (7) above, close the disc compartment cover until the gap between the cover and front cabinet is 4.6mm. Check to see that the compact disc does not rotate. (see Fig. 2)
 - (9) With the disc compartment cover completely closed, check to see that the gap between the cover and front cabinet is 3mm or less. (See Fig. 3)

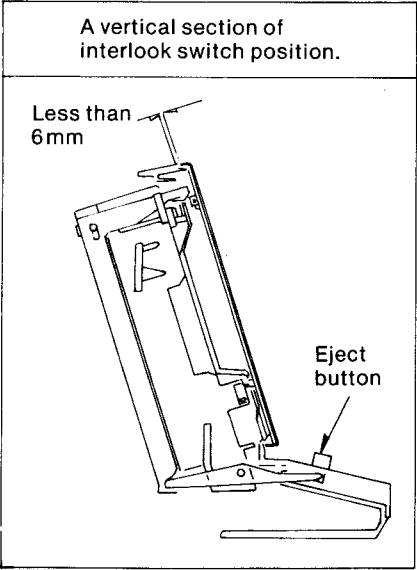


Fig. 1

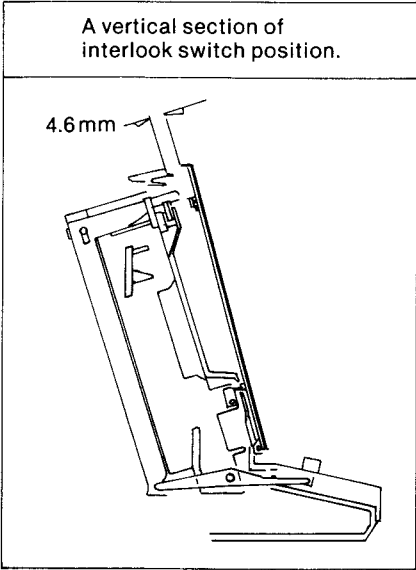


Fig. 2

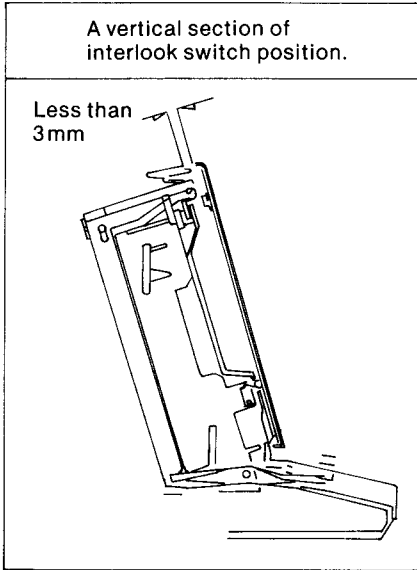


Fig. 3

MEASUREMENTS AND ADJUSTMENTS

ALIGNMENT INSTRUCTION

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT					
1. Set volume control to maximum.			5. Set power source voltage to 15V DC.		
2. Set treble, bass control to center.			6. Output of signal generator should be no higher than necessary to obtain an output reading.		
3. Set band switch to AM or FM.					
4. Set function selector to radio.					

AM ALIGNMENT

BAND	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (ELECTRONICS VOLTMETER or SCOPE)	ADJUSTMENT	REMARKS
	CONNECTIONS	FREQUENCY				
AM-IF ALIGNMENT						
1)	AM	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455kHz 30% Mod. at 400Hz	Point of non-interference. (on/ about 600kHz)	Output meter across voice coil.	T2 (AM IFT) Adjust for maximum output.
AM-RF ALIGNMENT						
2)	AM	"	511kHz	Tuning capacitor fully closed.	"	L5 (AM OSC Coil) "
3)	AM	"	1,650 kHz	Tuning capacitor fully open.	"	CT3 (AM OSC Trimmer) "
4)	AM	"	550kHz	Tune to signal.	"	(*1) L4 (AM ANT Coil) Adjust for maximum output. Adjust L4 by moving coil bobbin along ferrite core.
5)	AM	"	1,500kHz	"	"	CT4 (AM ANT Trimmer) Adjust for maximum output. Repeat steps (2)~(5).
(*1) Cement antenna bobbin with wax after completing alignment.						

FM ALIGNMENT

BAND	SIGNAL GENERATOR or SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (ELECTRONICS VOLTMETER or SCOPE)	ADJUSTMENT	REMARKS	
	CONNECTIONS	FREQUENCY					
FM-IF ALIGNMENT							
1)	FM	High side thru. 0.001μF to test point ⑤. Negative side to test point ②.	10.7MHz (SWP.)	Point of non-interference. (on/ about 90MHz)	Connect vert. amp. of scope to test point ⑤. Negative side to test point ②.	T1 (FM 1st IFT)	Adjust for maximum amplitude. (Refer to fig. 1.)
2)	FM	"	"	"	"	T3 (FM 2nd IFT)	Adjust for maximum amplitude. (Refer to fig. 2.)
FM-RF ALIGNMENT							
3)	FM	Connect to test point ④ through FM dummy antenna. Negative side to test point ②.	86.2MHz	Variable capacitor fully closed.	Output meter across voice coil.	L3 (FM OSC Coil)	(*2) Adjust for maximum output.
4)	FM		109.2MHz	Variable capacitor fully open.	"	CT2 (FM OSC Trimmer)	"
5)	FM		106MHz	"	"	CT1 (FM ANT Trimmer)	(*2) Adjust for maximum output. Repeat steps (3)~(5).
(*2) Three output responses will be present; proper tuning is the center frequency.							

SEPARATION ALIGNMENT

ITEM	FM SIGNAL GENERATOR SOURCE CONNECTION	EQUIPMENT CONNECTION ELECTRONIC COUNTER	ADJUSTMENT	SPECIFICATION	REMARKS
Adjustment of pilot signal.	98MHz, 60dB (CW) Connect to test point ▼ through FM dummy antenna. Negative side to test point ▼.	▼...(+) ▼...(-)	VR1	19kHz	Adjust VR1, for 19kHz (±150Hz) reading on electronics counter.

TAPE ADJUST

ITEM
Azimuth
Playback gain
Erase current (Tape 1)
Bias (Tape 1)
Overall gain (Tape 1)

TAPE SPEED

ITEM
Tape speed adjustment for high speed. (Tape ① & ②)
Tape speed adjustment for normal speed. (Tape ① & ②)

- Notes:
- 1. Adjust the ta (The normal
 - 2. Adjust the ta

no higher reading.

REMARKS

Adjust for maximum output.

"

"

Adjust for maximum output. Adjust L4 by moving coil bobbin along ferrite core.

Adjust for maximum output. Repeat steps (2)~(5).

REMARKS

Adjust for maximum amplitude. (Refer to fig. 1.)

Adjust for maximum amplitude. (Refer to fig. 2.)

(*2) Adjust for maximum output.

(*2) Adjust for maximum output. Repeat steps (3)~(5).

REMARKS

t VR1, for 19kHz (Hz) reading on onics counter.

■ TAPE ADJUSTMENT

ITEM	INPUT	MEASUREMENT POINT	SPECIFICATION	ADJUSTMENT POINT	REMARKS
Azimuth	QZZCFM (8kHz, -20dB)	LINE OUT	Maximum output.	Azimuth screw (FWD, REV)	Playback mode Mode switch → STEREO (Refer to Fig. 7)
Playback gain	QZZCFM (315Hz, 0dB)	LINE OUT		TAPE 1 : VR102 (LCH) VR202 (RCH) TAPE 2 : VR101 (LCH) VR201 (RCH)	Playback mode
Erase current (Tape 1)	Use NORMAL tape	▼... (+) ▼... (-) (R306 1Ω)	70±5mV	VR301	Record mode • CrO ₂90±10mV • METAL...180±10mV
Bias (Tape 1)	Use NORMAL tape	▼... (+) (Lch) ▼... (+) (Rch) ▼... (-) Lch...R104, Rch...R204	4.7±0.3mV	Lch...VR103 Rch...VR203	Record mode • CrO ₂7±1mV • METAL...11.5±2mV
Overall gain (Tape 1)	Use NORMAL tape	AUX IN -14dB/1kHz	Output...0±1dB	VR104 (Lch) VR204 (Rch)	1. Apply a -14dB/1kHz signal front the AUX IN. 2. Then, with the unit in the record mode, record a signal. 3. Playback the recorded part, and measure the output voltage of LINE OUT. 4. Compare the output voltage measured in items 2 and 3, and adjust so there is no difference in the level. (Adjust to obtain 0±1dB.)

■ TAPE SPEED ADJUSTMENT

ITEM	FM SIGNAL GENERATOR SOURCE CONNECTION	EQUIPMENT CONNECTION ELECTRONIC COUNTER	ADJUSTMENT	REMARKS
Tape speed adjustment for high speed. (Tape 1 & 2)	QZZCWAT (3kHz) Use QZZCWC (1.5kHz) tape when using a wow/flutter meter.	LINE OUT	VR302 (Tape 1) VR304 (Tape 2)	1. Short Q335 as shown in the Fig. 5 below to enter the high speed mode. Tape 2...6kHz±30Hz Tape 1...-60±30Hz for tape speed of tape 1. (Refer to Fig. 3 & 4 when using a wow/flutter meter)
Tape speed adjustment for normal speed. (Tape 1 & 2)	QZZCWAT (3kHz)	LINE OUT	VR303 (Tape 1) VR305 (Tape 2)	1. Open Q335 and set the tape speed to normal. 2. Tape 2...3kHz±15kHz Tape 1...-30±15Hz of the speed of tape 1. (Refer to Fig. 3 & 4 when using a wow/flutter meter)

Notes:

- Adjust the tape speed by first adjusting the height speed. Do not adjust the height speed after adjusting the normal speed. (The normal speed changes if the height speed is adjusted afterwards)
- Adjust the tape advance speed in the following order: tape 2 height, normal speed; tape 1 height, normal speed.

• NEEDLE POSITION OF THE WOW/FLUTTER METER

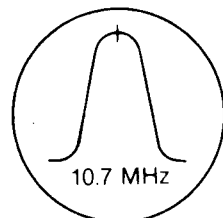


Fig. 1

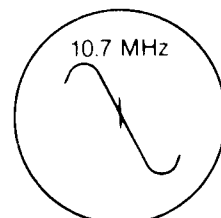


Fig. 2

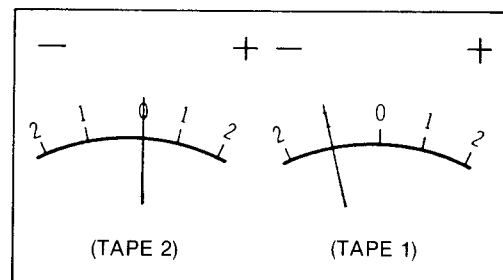


Fig. 3

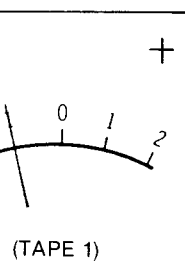


Fig. 4

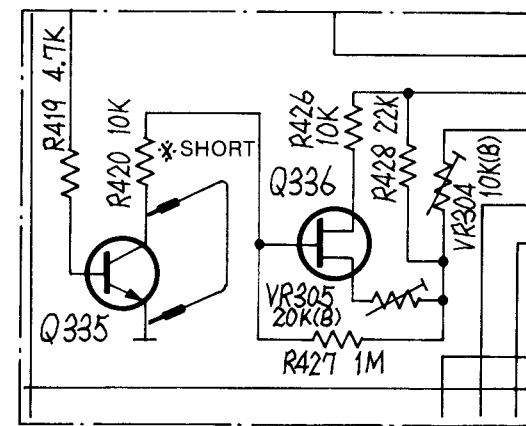


Fig. 5

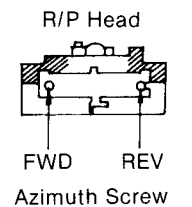


Fig. 7

■ ALIGNMENT POINTS

* Please refer to Circuit Board Diagram which is located test point.

TUNER P.C.B.

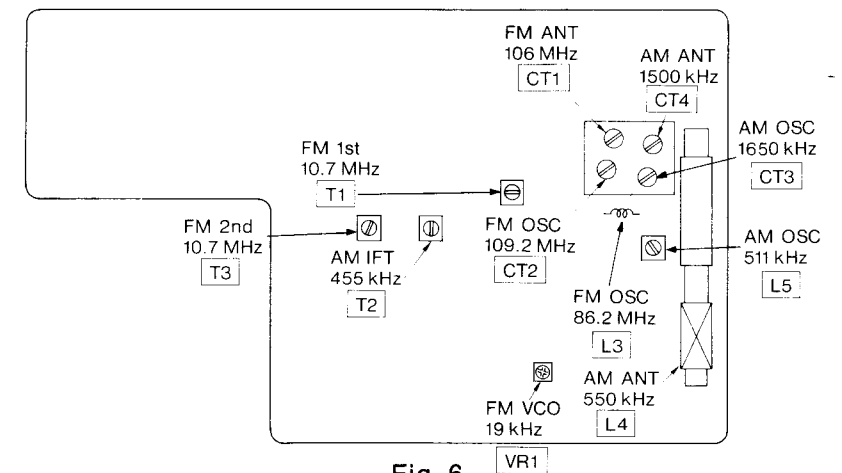


Fig. 6

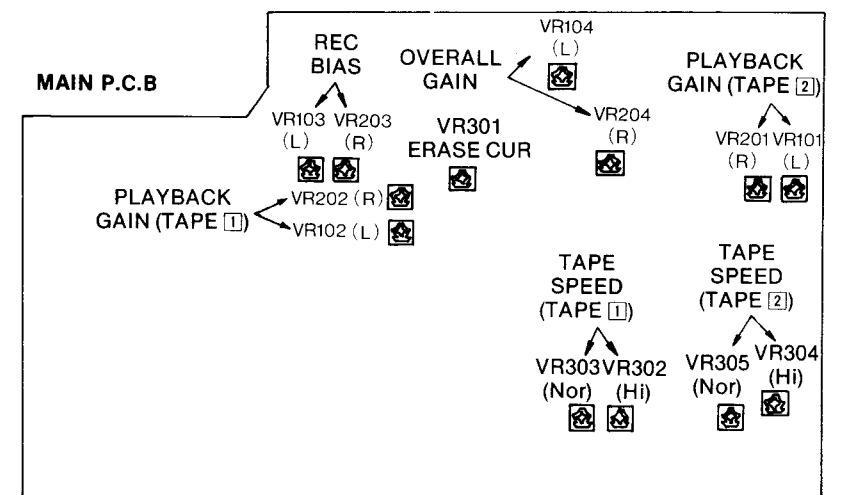
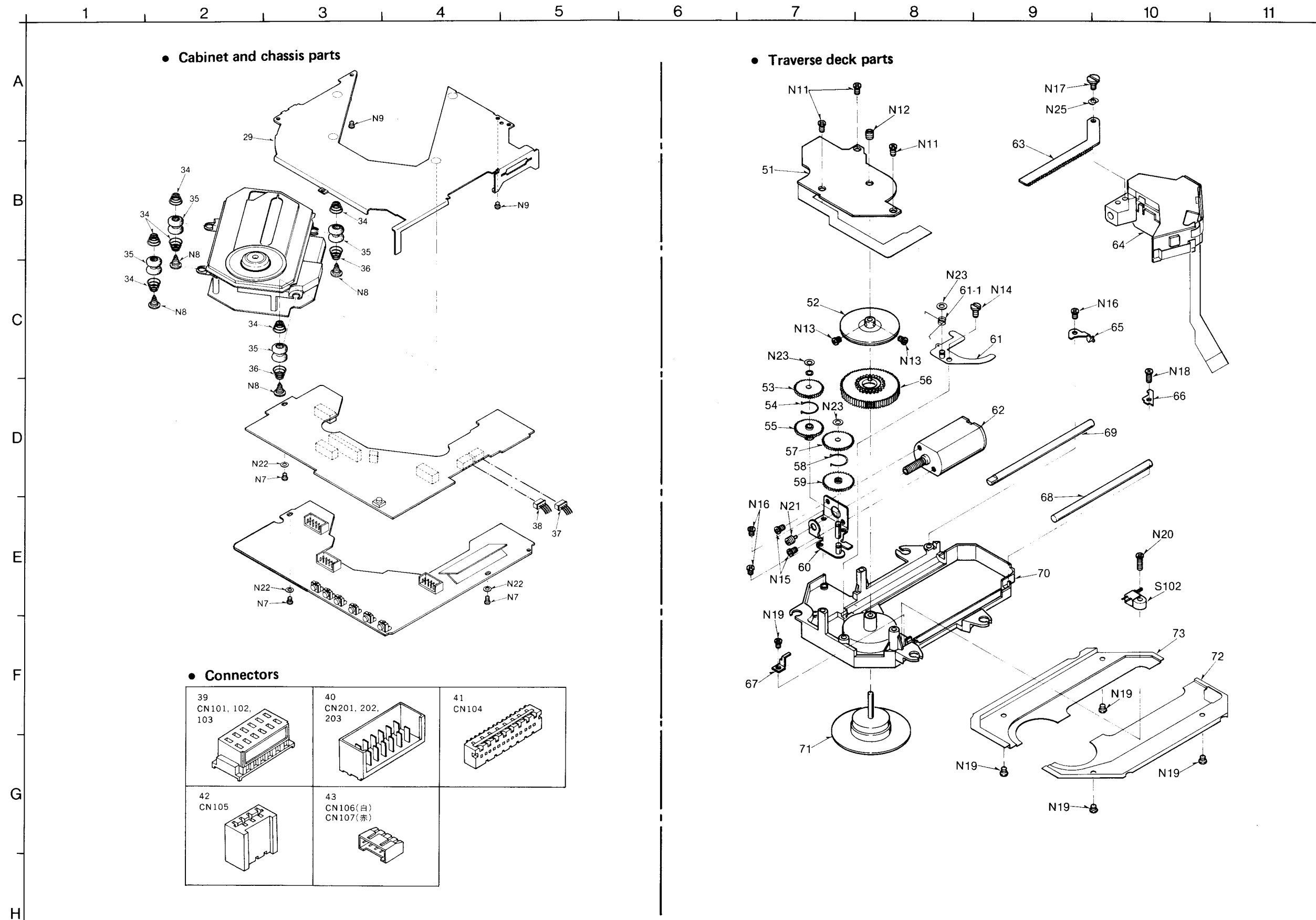


Fig. 8

■ EXPLODED VIEWS (CD PLAYER SECTION)



■ REPLACEMENT PARTS

Note:

All the parts listed below are supplied by the Division.

- Notes:**
1. Part numbers are indicated on most parts. Please use this part number for parts.
 2. Important safety notice: Components identified by Δ are important for safety. When replacing any of these components, use only the specified parts.

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC 101	AN8370S	IC
IC 102, 103	AN6556S	IC
IC 201, 202	AN1393S	IC
IC 203	SVIMB3763PF	IC
IC 301	AN8371S	IC
IC 401	MN15845PDA4	IC
IC 402	MN1280-R	IC
IC 501	AN8281S	IC
IC 601	MN6617	IC
IC 602	MN4416S-12	IC
IC 702	AN8005	IC
IC 731	SVIM5236ML	IC
IC 801	SVIPCM55HP	IC
IC 803	SVIJM4560M	IC
IC 804, 805	SVIUPD4053G	IC
IC 1001, 1002	MN4011BS	IC
IC 1003	MN4071BS	IC
TRANSISTORS		
Q 101, 102, 103	2SD601A	Transistor (Si)
Q 104	2SB709A	Transistor (Ge)
Q 105	2SB766QTX	Transistor (Ge)
Q 106	2SD874QTX	Transistor (Si)
Q 108	2SD601A	Transistor (Si)
Q 109	2SB709A	Transistor (Ge)
Q 110	2SB766QTX	Transistor (Ge)
Q 111	2SD874QTX	Transistor (Si)
Q 402	2SB709RPSK	Transistor (Ge)
Q 501, 502, 503, 504	2SB766QTX	Transistor (Ge)
Q 711, 712	2SB709A	Transistor (Ge)
Q 713, 714	2SD601A	Transistor (Si)
Q 715	2SB709A	Transistor (Ge)
Q 716	2SB956RTX	Transistor (Ge)
Q 717	2SD1280QTX	Transistor (Si)
Q 731	2SB766QTX	Transistor (Ge)
Q 732, 733	2SB709A	Transistor (Ge)
Q 734, 735	2SD874QTX	Transistor (Si)
Q 807	2SB709A	Transistor (Ge)
Q 808	2SD601RPSK	Transistor (Si)
Q 809	2SD601A	Transistor (Si)
Q 1001	2SD601	Transistor (Si)

REPLACEMENT PARTS LIST

MEMO

Note:
All the parts listed below are supplied by the Hi-Fi Audio Division.

- Notes:**
- 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
 - 2. Important safety notice:
Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description			
INTEGRATED CIRCUITS			DIODES			TRAVERSE DECK PARTS					
IC 101	AN8370S	IC	D 401, 402, 403	MA151WK	Diode (Si)	45	SJSD1501	Connector			
IC 102, 103	AN6556S	IC		MA151APSK	Diode (Si)	46	SJSD1602	Connector			
IC 201, 202	AN1393S	IC		D 501	MA153	Diode (Si)	47	EMCS0450BL	Connector (White)		
	SVIMB3763PF	IC		D 1001, 1002, 1003	MA151WK	Diode (Si)	47	EMCS0450BLR	Connector (Red)		
	AN8371S	IC									
IC 301	AN8371S	IC	CRYSTAL								
IC 401	MN15845PDA4	IC	X 601	SVQAT1693	Crystal, 16.9344 MHz	51	SXPD30	Spindle P.C.B. Ass'y			
IC 402	MN1280 - R	IC		FILTERS			52	S0MD2A	Rotor Ass'y		
IC 501	AN8281S	IC		LPF 801, 802	SVIAL041	Low Pass Filter	53	SDGD3	Gear		
IC 601	MN6617	IC			HALL ELEMENTS			54	SUSD1	Spring (A)	
IC 602	MN4416S - 12	IC			H 501, 502	SVUHW101A	Hall Element	55	SDGD2 - 1	Gear (A)	
IC 702	AN8005	IC	VARIABLE RESISTORS			56	SDGD6	Gear			
	SVIM5236ML	IC	VR 101			EVND1AA00B53	Variable Resistor, 5kΩ (B)	57	SDGD5	Gear	
	SVIPCM55HP	IC		VR 102, 103, 104, 105		EVND1AA00B14	Variable Resistor, 10kΩ (B)	58	SUSD2	Spring (B)	
	SVINJM4560M	IC				VR 301	EVML4GA00B52	Variable Resistor, 1kΩ (B)	59	SDGD4	Gear (B)
	SVIUPD4053G	IC			SWITCHES			60	SUWD4R	Bracket	
MN4011BS	IC	S 101			SSD1		Laser ON/OFF	61	SUWD5E	Bracket	
MN4071BS	IC		S 102		SSHD1		Rest	61-1	SUSD3	Spring	
Q 101, 102, 103	2SD601A			Transistor (Si)	S 103		SSHD1	Open/Close	62	SJGD1R	Motor Ass'y
	2SB709A			Transistor (Ge)		COIL			63	SDGD7	Rack
	2SB766QTX			Transistor (Ge)		L 701	SLQDE45S100K	10μF	64	S0AD10A	Optical Pick-up Ass'y 
	2SD874QTX	Transistor (Si)		CABINET AND CHASSIS PARTS			65	SUWD1	Plate (A)		
	2SB709RPSK	Transistor (Ge)	29	SUAD1E - 2			Chassis	66	SUWD2	Plate (B)	
Q 501, 502, 503, 504	2SB766QTX	Transistor (Ge)		34	S0SD6 - 1		Spring	67	SUWD3	Plate (C)	
	2SB709A	Transistor (Ge)			35		SHGD1 - 1	Rubber Spacer	68	SUXD1	Guide Shaft (A)
	2SB956RTX	Transistor (Ge)				36	S0SD10 - 1	Spring	69	SUXD2	Guide Shaft (B)
	2SD1280QTX	Transistor (Si)					CONNECTORS			70	SUND1E - 1
	Q 731	2SB766QTX	Transistor (Ge)				41	SWKDXP7061	Connector Ass'y	71	SD0D1E
Q 732, 733	2SB709A	Transistor (Ge)	42	SWKDP7082				Connector Ass'y	72	SGXD13	Cover
Q 734, 735	2SD874QTX	Transistor (Si)		43	EMCSK12P00A1			Connector	SCREWS AND WASHERS		
Q 807	2SB709A	Transistor (Ge)			44	EMCSK12S00A1		Connector	N 7	XQN17 + C3FYR	Screw, M1.7×3
Q 808	2SD601RPSK	Transistor (Si)				N 8		SNSD6 - 1	Screw		
Q 809	2SD601A	Transistor (Si)				N 9	XTN17 + 3JFYR	Screw, M1.7×3			
	2SD601	Transistor (Si)	N 11			XQS17 + A3	Screw				
			N 12	SNSD3		Screw					
			N 13	XQN14 + A14	Screw, M1.4×1.4						
			N 14	SNSD5	Screw						
Q 1001	2SD601	Transistor (Si)	N 15	XQS2 + A25	Screw, M2×2.5						
			N 16	XQN17 + C3	Screw, M1.7×3						
			N 17	SNSD4	Screw						
			N 18	XQN17 + A6	Screw, M1.7×6						
			N 19	XQN17 + A16FZ	Screw, M1.7×1.6						
		N 20	XQN17 + C5	Screw, M1.7×5							
		N 21	SNSD2	Screw							
		N 22	SUED1	Washer							
		N 23	SHWD1	Washer							
		N 25	SNWD1	Washer							

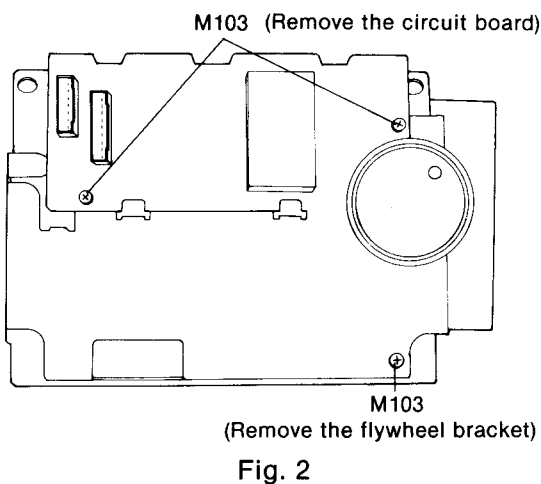
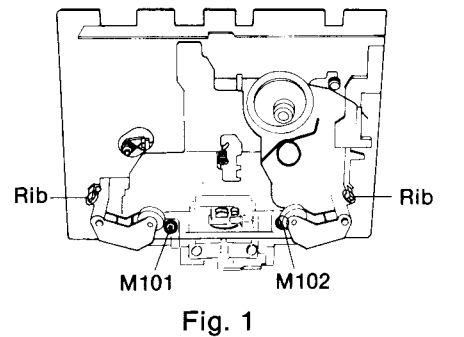
DISASSEMBLY PROCEDURES FOR THE MAJOR MECHANICAL PARTS

■ PINCH ROLLER (Fig. 1)

- Remove the two ribs and pull out the pinch roller (L, R)

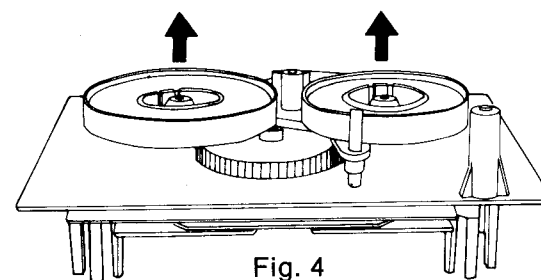
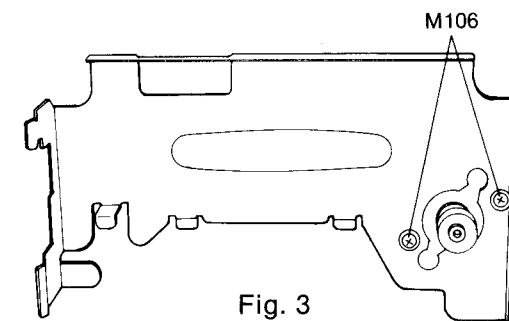
■ HEAD BLOCK Ass'y (Fig. 1)

- Remove the one screw M101 (3×8)mm and the one screw M102 (3×5)mm.



■ FLYWHEEL Ass'y (Fig. 4)

- Remove the flywheel bracket by removing the motor ass'y.
- Pull out the flywheel ass'y in the direction of arrow.



■ MOTOR Ass'y (Fig. 2, 3)

- Remove the two screws M103 (2.6×7)mm and remove the print circuit board. (Fig. 2)
- Remove the one screw M103 (2.6×7)mm and remove the flywheel bracket (Fig. 2) (At this time, the belt also comes off. To install the belt, see the section below on installing the belt)
- Remove the two screws M106 (2.6×3)mm. (Fig. 3)

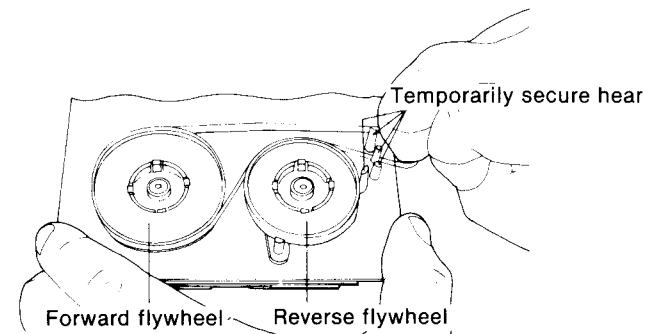


Fig. 6

- Attach the flat belt to the forward flywheel. Then attach it to the reverse flywheel and then temporarily secure it to the base where the round belt is secured. (Fig. 6)

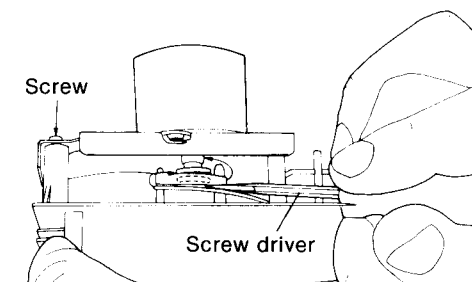


Fig. 8

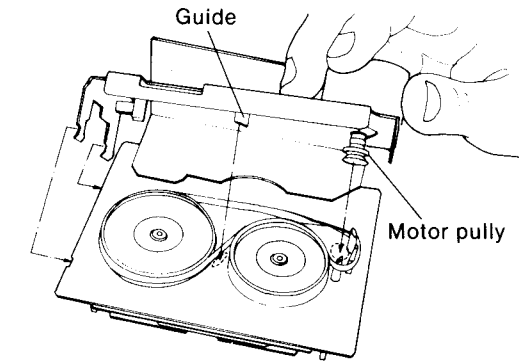


Fig. 7

- When mounting the flywheel bracket, position the mechanism chassis and the flywheel bracket so that the motor pulley and guide fit on the chassis as shown in Fig. 7.
- Screw down the flywheel bracket. (Fig. 8)
- Using a screwdriver, position the flat belt on the top side of the motor pulley and then the round belt on the bottom side of the motor pulley.

DISASSEMBLY MECHANISM CIRCUIT BOARD

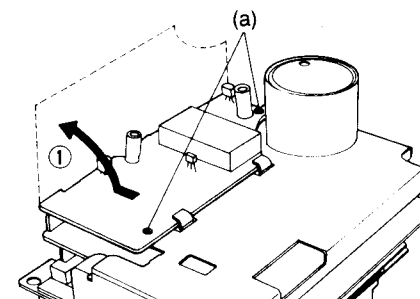


Fig. 9

- Remove the two (a) screws (2.6×7)mm
- Pick up the circuit board in the direction of arrow ①.

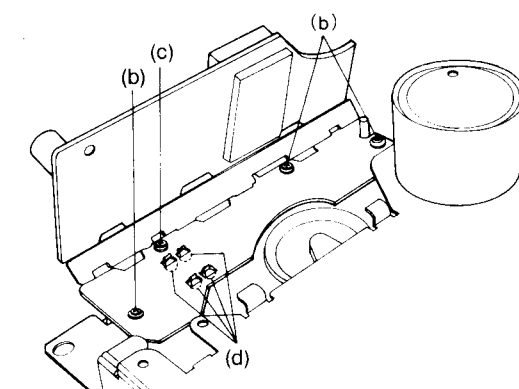


Fig. 10

- Remove the three (b) screws (2×5)mm and the one (c) screw (2×15)mm.
- Pull out the pin socket (d)×4.

■ SPRING PARTS LOCATION

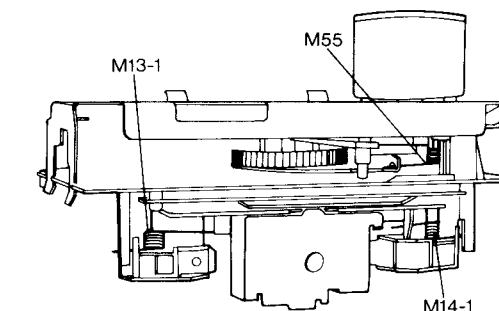
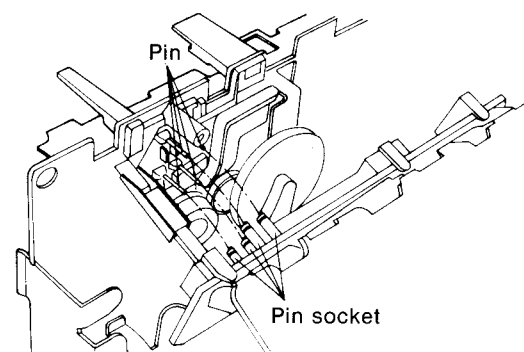


Fig. 11

- When mounting the printed circuit board, be sure the pins are inserted firmly in the pin sockets.



■ INSTALLING THE BELT

- If the belt has come off, install as follows. (The flywheel bracket has been removed in the following illustrations.)

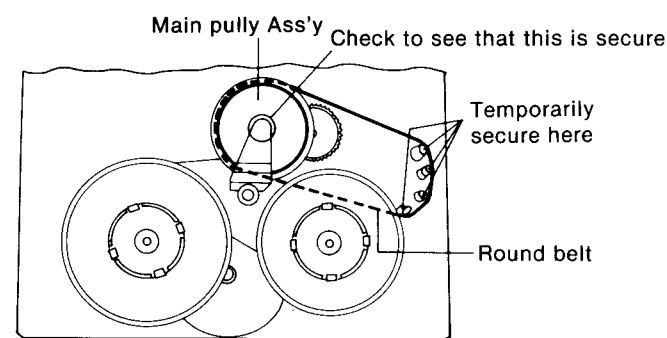


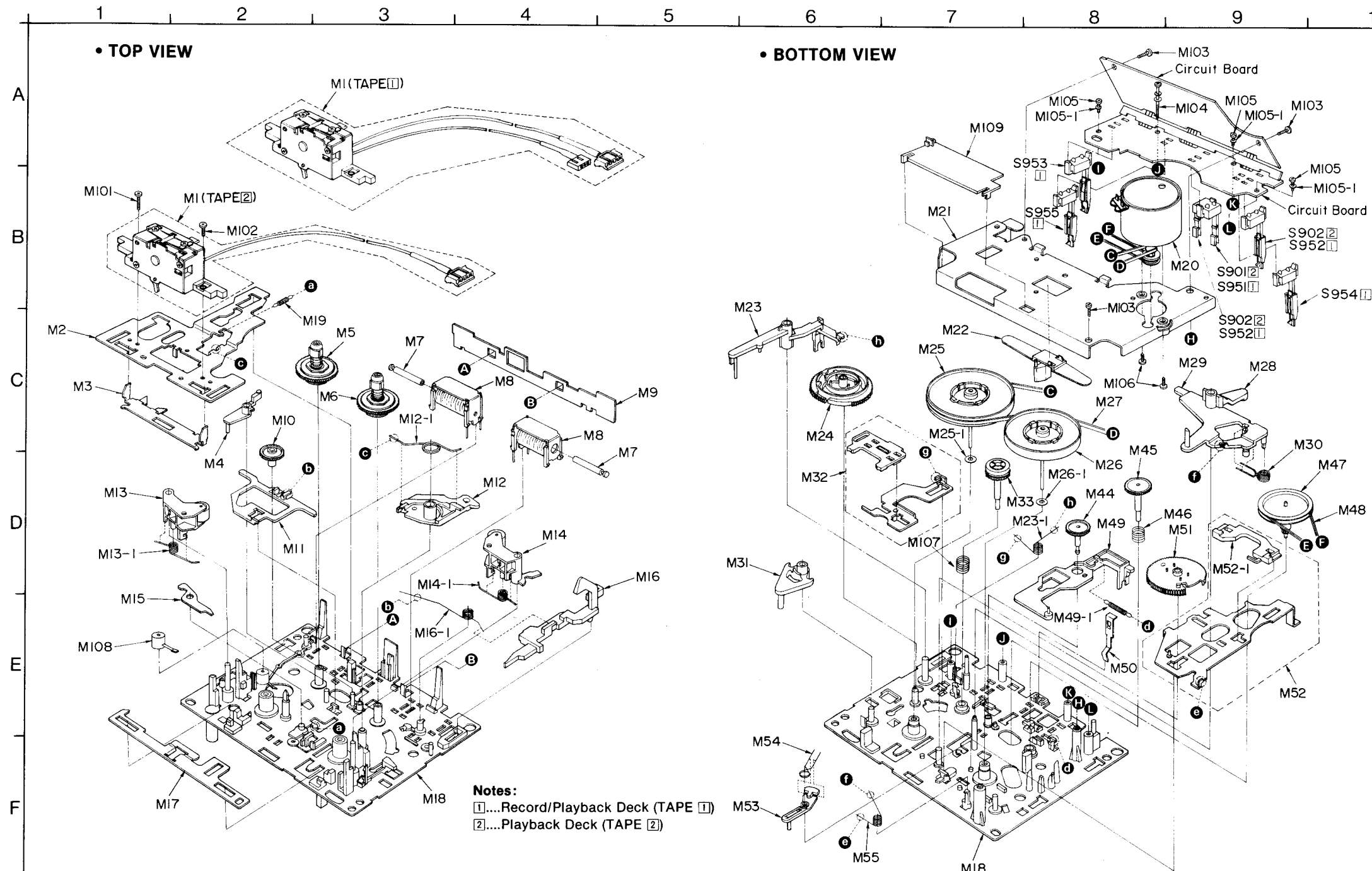
Fig. 5

- Attach the round belt to the main pulley ass'y and temporarily secure to the base on the mechanism chassis. (Check to be sure that the main pulley ass'y is firmly secured since the rubber tension of the belt will pull on it.)

MECHANISM PARTS LOCATION

• TOP VIEW

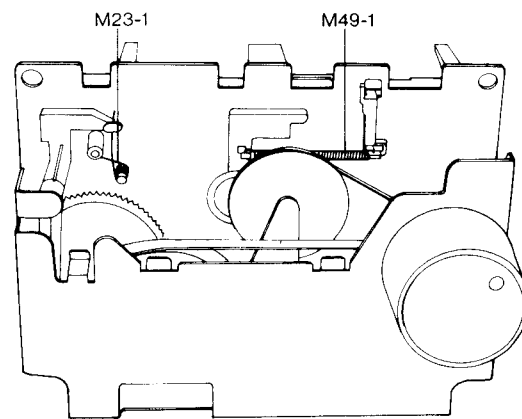
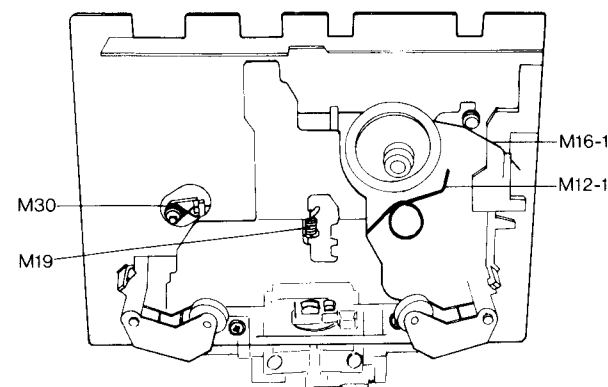
• BOTTOM VIEW



Notes:

- ①.....Record/Playback Deck (TAPE 1)
②.....Playback Deck (TAPE 2)

■ SPRING PARTS LOCATION



Specifications

Playback torque	40^{+20}_{-12} g·cm
Fast Forward torque	90^{+35}_{-25} g·cm
Rewind torque	90^{+35}_{-25} g·cm
Takeup tension	more than 90g
Pressure of pressure roller	210 ± 30 g
Wow and flutter	Less than 0.08% (WRMS)

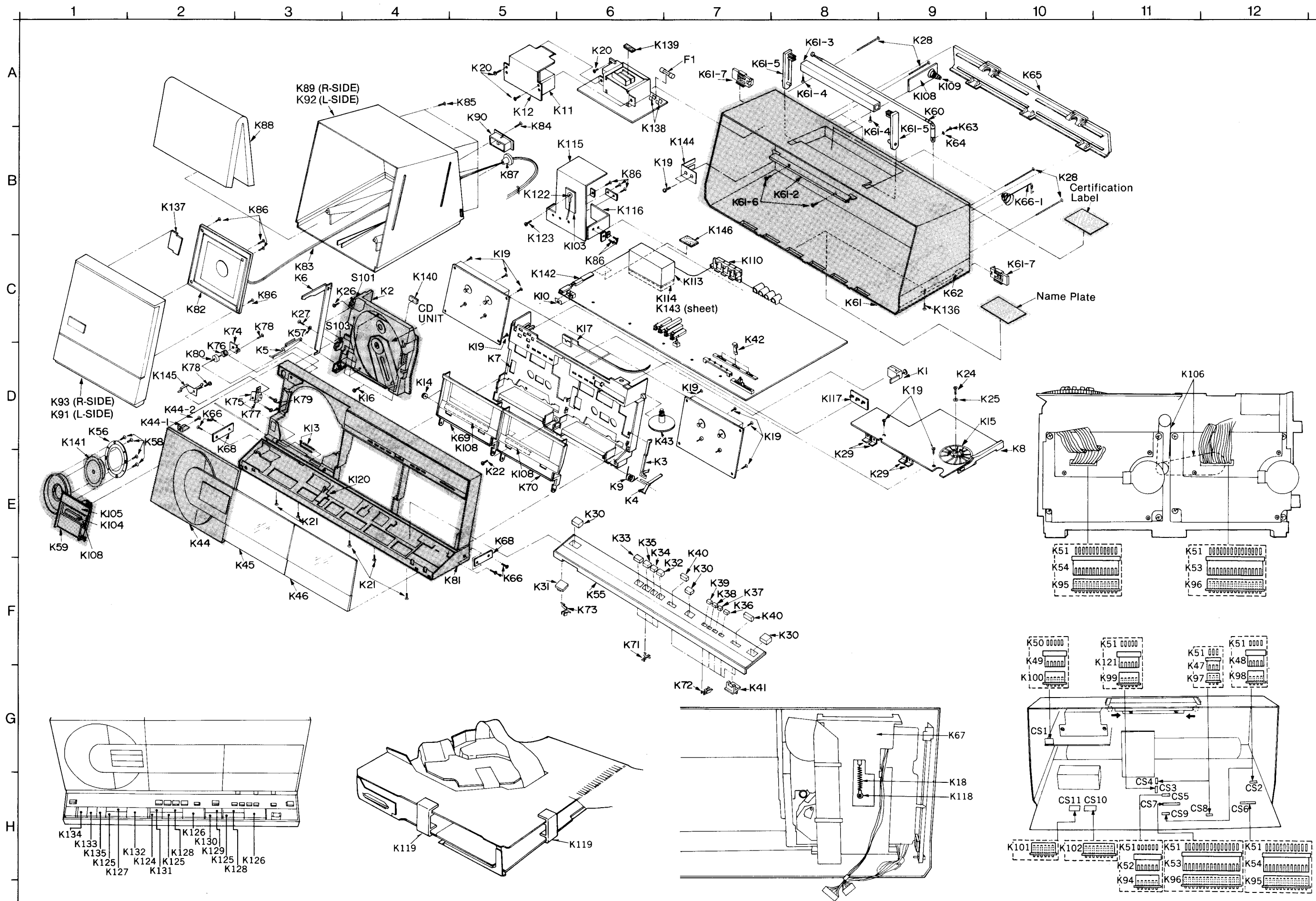
Mechanism Operation: Full Auto Stop.

REPLACEMENT PARTS LIST

The color name in parentheses () in the parts list is the color of that part.

Ref. No.	Part No.	Part Name & Description
MECHANICAL PARTS		
M 1	RMDG0012Z	Head Block Ass'y (Tape 2): Play Deck
M 1	RMDG0013Z	Head Block Ass'y (Tape 1): REC/Play Deck
M 2	RUA9029X	Head Base
M 3	RUB342Z	Pinch Roller Change Rod
M 4	RUB347Z	Arm, Take Up
M 5	RDMG0002Z	Reel Table Ass'y (Reverse)
M 6	RDMG0001Z	Reel Table Ass'y (Forward)
M 7	RUB358Z	Shaft, Plunger Ass'y
M 8	RUEG0005Z	Plunger Ass'y
M 9	RUB344Z	Lever, Switch
M 10	RDG5772Z	Gear, Take Up Relay Gear
M 11	RUB353Z	Brake Rod
M 12	RUBG0001Z	Main Lever Ass'y
M 12-1	RUBG0001Z	Spring, Main Lever Ass'y
M 13	RUBG0007Z	Pinch Roller Ass'y (Forward)
M 13-1	RUBG0007Z	Spring, Pinch Roller Ass'y (Forward)
M 14	RUBG0006Z	Pinch Roller Ass'y (Reverse)
M 14-1	RUBG0006Z	Spring, Pinch Roller Ass'y (Reverse)
M 15	RUB343Z	Lever, FF
M 16	RUB414Z	Cassette Lock Rod
M 16-1	RUB414Z	Spring, Cassette Lock Rod
M 17	RUB341Z	FR Change Rod
M 18	RUBG0001Z	Mecha Chassis Ass'y
M 19	RUBG0001Z	Spring, Head Base
M 20	RJGQ0001Z	DC Motor Ass'y
M 21	RUL734Z	Bracket, Flywheel
M 22	RMD5001Z	Spacer
M 23	RUB350Z	Lever, Main Control
M 23-1	RUB350Z	Spring, Main Control Lever
M 24	RDG5776Z	Gear, Main
M 25	RDWG0001Z	Flywheel Ass'y (Reverse)
M 25-1	QBG9212Z	Washer, Flywheel Ass'y (Reverse)
M 26	RDWG0002Z	Flywheel Ass'y (Forward)
M 26-1	QBG9212Z	Washer, Flywheel Ass'y (Forward)
M 27	RDV43Z	Belt, Main
M 28	RUB346Z	Arm, FF
M 29	RUB348Z	Lever, FF Spring
M 30	RUB9Z	Spring, FF Arm
M 31	RUB354Z	Arm, FR Select
M 32	RUBG0003Z	FR Rod Ass'y
M 33	RDGG0003Z	Reel Table Gear Ass'y
M 44	RDG5773Z	Gear, FF Relay Gear
M 45	RDG5769Z	Gear, Reel Table
M 46	RUQ10Z	Spring, Back Tension
M 47	RDRG0001Z	Main Pulley Ass'y
M 48	RDV42Z	Belt, FF
M 49	RUB349Z	Lever, Sub Control
M 49-1	RUB349Z	Spring, Sub Control Lever
M 50	RUB349Z	Spring, Sub Control Lever
M 51	RUB349Z	Spring, Sub Control Lever
M 52	RUBG0004Z	FF Rod Ass'y
M 52-1	RUB345Z	FF Select Rod
M 53	RUB359Z	Lever, Take Up Change
M 54	RUB15Z	Spring, Take Up Change Lever
M 55	RUB8Z	Spring, FF Rod Ass'y
M 101	XTN2 + 8B	Screw, Head Block Ass'y M'tg
M 102	XTN2 + 5B	Screw, Head Block Ass'y M'tg
M 103	XTN26 + 7B	Screw, Circuit Board, Flywheel Bracket M'tg
M 104	XYC2 + FF15	Screw, Circuit Board M'tg
M 105	XTN2 + 5B	Screw, Circuit Board M'tg
M 105-1	XWG2	Washer, Circuit Board M'tg
M 106	XSN26 + 3	Screw, DC Motor Ass'y M'tg
M 107	RUQ30Z	Cushion
M 108	RNZ1Z	Damper Arm
M 109	RUV751Z	Holder, Lead Wire

CABINET PARTS LOCATION



REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark
characteristics important for safety.
When replacing any of these compo
only manufacturer's specified parts.

Ref. No.	Part No.	Part Name
CABINET PARTS		
K 1	RSE204Z	Tape Cartridge
K 2	RUA676Z	Chassis
K 3	RUB415Z	Connect
K 4	RUB416Z	Lever, C
K 5	RUB417Z	Lever, M
K 6	RUB418Z	Lever, M
K 7	RZAXCD70J	Chassis
K 8	RHR3071Z	Rack H
K 9	RUV57Z	Spring,
K 10	RUV745Z	Switch
K 11	RMC1049Z	Shield Pl
K 12	RMC1052Z	Shield Pl
K 13	RDF3088Z	Shaft, M
K 14	RDG5709Z	Gear, C
K 15	RDG5904Z	Dial Dra
K 16	XQN17 + A4FZ	Screw (
K 17	RZPXCD70J	Dial Po
K 18	RUD45Z	Spring,
K 19	XTV3 + 10G	Tapping (Mech
K 20	XTV3 + 12G	Tapping (Power
K 21	XTV3 + 16GFZ	Tapping (Operat
K 22	XTV3 + 25G	Tapping (Mech
K 23	XTN2 + 8G	Tapping (Dial Po
K 24	XSN26 + 5	Screw (
K 25	XWA26B	Washer
K 26	XQN17 + AJ5	Screw (
K 27	XQN2 + AJ7	Screw (
K 28	XTN3 + 60G	Tapping (Front C
K 29	RBC845Z	Button,
K 30	RBC846Z	Button,
K 31	RBC847Z	Button,
K 32	RBC848W	Function (AUX)(E
K 33	RBC848X	Function
K 34	RBC848Y	Function
K 35	RBC848Z	Function (Tape)(
K 36	RBC849V	Reverse
K 37	RBC849W	Reverse
K 38	RBC849X	Reverse
K 39	RBC849Y	Reverse
K 40	RBC849Z	Dolby/B
K 41	RBD375Z	Volume
K 42	RBD376Z	Slide K
K 43	RBT259Z	Tuning
K 44	RYP3XCD70M	CD Con
K 44-1	RUL793Z	Holder, Cover

RX-CD70 IMPORTANCE PARTS

When replacing the following components, use only manufacturer's specified parts in the shaded area of cabinet parts location and below figure.

Parts Name	Remarks
C.D. Unit	
Safety Interlock Switch (Laser Power Switch)	S101
Safety Interlock Switch (Close Switch)	S103
Lock Bracket (Switch Terminal)	K44-1
Operating Instruction	A2
Certification Label	
Name Plate	
Front Cabinet Ass'y	K81
Disc Holder Cover	K44
Clamp Holder Ass'y	K59
Chassis C.D. M'tg	K2
Rear Cabinet Ass'y	K61
Shaft, C.D. Disc Holder Cover	K13

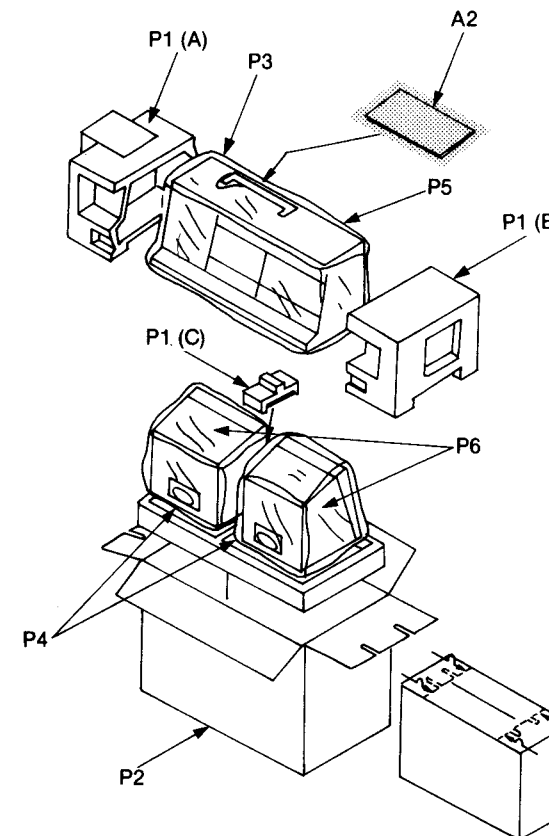
REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

The color name in parentheses () in the parts list is the color of that part.

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
CABINET PARTS								
K 1	RSE204Z	Tape Counter	K 44-2	XQN2 + A4	Screw $\phi 2 \times 4$ (Cover Holder M'tg)	K 87	RHG3011Z	Bushing, SP. Cord
K 2	RUA676Z	Chassis, CD Player	K 45	RYP1XCD70M1	Cassette Panel-L Ass'y (Tape [1])	K 88	RHS722Z	Acoustic Material
K 3	RUB415Z	Connection Lever, Cassette Eject	K 46	RYP2XCD70M1	Cassette Panel-R Ass'y (Tape [2])	K 89	RKF810Z	Rear Cabinet-R, SP (Black)
K 4	RUB416Z	Lever, Cassette Eject	K 47	RJS3L4Z	Socket (3P/CS4, 8)	K 90	RKE512Z4	Cord Holder (Black)
K 5	RUB417Z	Lever, Magnet Holder Open	K 48	RJS4L4Z	Socket (4P/CS2, 9)	K 91	RYM3XCD70M	Speaker Grill-L Ass'y (Black)
K 6	RUB418Z	Lever, Magnet Holder Lock	K 49	RJS5L3Z	Socket (5P/CS1)	K 92	RKF810Y	Rear Cabinet-L, SP (Black)
K 7	RZAXCD70J	Chassis Assembly	K 50	RJT707Z	Contact-A	K 93	RYM2XCD70M	Speaker Grill-R Ass'y (Black)
K 8	RHR3071Z	Rack Holder	K 51	RJT807Y	Contact	K 94	RJP6G10Z	Plug (6P/CS5)
K 9	RUV57Z	Spring, Cassette Eject	K 52	RJS6L4Z	Socket (6P/CS5)	K 95	RJP12G10Z	Plug (12P/CS6, CN901)
K 10	RUV745Z	Switch Cover	K 53	RJS15L4Z	Socket (15P/CS7, CN951)	K 96	RJP15G10Z	Plug (15P/CS7, CN951)
K 11	RMC1049Z	Shield Plate (A)	K 54	RJS12L4Z	Socket (12P/CS6, CN901)	K 97	RJP3G10Z	Plug (3P/CS4, 8)
K 12	RMC1052Z	Shield Plate (B)	K 55	RYEXCD70M	Operation Panel Ass'y (Black)	K 98	RJP4G10Z	Plug (4P/CS2, 9)
K 13	RDF3088Z	Shaft, Magnet Holder	K 56	RME401Z	Plate, Magnet Holding	K 99	RJP5G10Z	Plug (5P/CS3)
K 14	RDG5709Z	Gear, Cassette Holder	K 57	XWE2X4BW	Washer (S103 M'tg)	K 100	RJP5G4Y	Plug (5P/CS1)
K 15	RDG5904Z	Dial Drum	K 58	XQN2 + AJ4FN	Screw $\phi 2 \times 4$	K 101	RJP6G4Y	Plug (6P/CS11)
K 16	XQN17 + A4FZ	Screw $\phi 1.7 \times 4$ (Chassis M'tg)	K 59	RKE543Z	Clamper Holder	K 102	RJP8G4Y	Plug (8P/CS10)
K 17	RZPXCD70J	Dial Point Assembly	K 60	XEARR225EAK	Telescopic Antenna	K 103	RHR3078Z	Sheet
K 18	RUD45Z	Spring, Lead Wire Holder	K 61	RYF1XCD70M	Rear Cabinet Ass'y (Black)	K 104	RJS24Q9Z	Socket (24P/CS12)
K 19	XTV3 + 10G	Tapping Screw $\phi 3 \times 10$ (Mechanism, Tuner P.C.B. M'tg)	K 61-1	RJC931Z	Battery Terminal (+/-)	K 105	EDD062C53A3P	LCD
K 20	XTV3 + 12G	Tapping Screw $\phi 3 \times 12$ (Power Supply P.C.B. M'tg)	K 61-2	RUL804Z	Angle, Handle Reinforcement	K 106	QDB0310	Counter/Relay Belt
K 21	XTV3 + 16GFZ	Tapping Screw $\phi 3 \times 16$ (Operation Panel M'tg)	K 61-3	RKX349Z	Pipe, Handle (Black)	K 108	RUP2038Y	P.C. Board (LCD, Battery, Cassette Lid)
K 22	XTV3 + 25G	Tapping Screw $\phi 3 \times 25$ (Mechanism M'tg)	K 61-4	XTC3 + 10CFZ	Tapping Screw $\phi 3 \times 10$ (Handle M'tg)	K 109	RJC511Z	Battery Spring (-)
K 23	XTN2 + 8G	Tapping Screw $\phi 2 \times 8$ (Dial Point Guide M'tg)	K 61-5	RKX350Z	Arm, Handle (Black)	K 110	QJT1104	Terminal, EXT Speaker
K 24	XSN26 + 5	Screw $\phi 2.6 \times 5$ (Dial Drum M'tg)	K 61-6	XTV3 + 10G	Tapping Screw $\phi 3 \times 10$ (Reinforcement Angle M'tg)	K 113	RMC1050Z	Shield Plate
K 25	XWA26B	Washer $\phi 2.6$ (Dial Drum M'tg)	K 61-7	RGE88Z	Lock Plate, Speaker Box (Black)	K 114	RMC1051Z	Shield Plate
K 26	XQN17 + AJ5	Screw $\phi 1.7 \times 5$ (S101 M'tg)	K 62	RJT1040Z	Earth Terminal	K 115	RMV212Z	Heat Sink (IC310, Q327)
K 27	XQN2 + AJ7	Screw $\phi 2 \times 7$ (S102 M'tg)	K 63	XSN3 + 15BVS	Screw $\phi 3 \times 15$ (Antenna M'tg)	K 116	RMV213Z	Heat Sink (IC311, Q330)
K 28	XTN3 + 60G	Tapping Screw $\phi 3 \times 60$ (Front Cabinet M'tg)	K 64	XWA3BFZ	Washer $\phi 3$ (Antenna M'tg)	K 117	RUP2076Z	P.C. Board (LED)
K 29	RBC845Z	Button, Band/Mode (Black)	K 65	RKK213Z	Battery Cover (Black)	K 118	RJT207Z	Lug Terminal
K 30	RBC846Z	Button, Eject (Gray)	K 66	XSS3 + 6BVS	Screw $\phi 3 \times 6$ (Cabinet Reinforcement Angle M'tg)	K 119	RHR3087Z	Spacer (P.C.B. Holding)
K 31	RBC847Z	Button, Power (Silver)	K 67	RUV750Z	Lead Wire Holder	K 120	RJT1043Z	Earth Plate
K 32	RBC848W	Function Button (AUX)/(Black)	K 68	RUL803Z	Holder, Cabinet	K 121	RJS5L4Z	Socket (5P/CS3)
K 33	RBC848X	Function Button (CD)/(Black)	K 69	RYQ1XCD70J	Cassette Holder Ass'y (Tape [1])/(Black)	K 122	RJT202B	Lug Terminal
K 34	RBC848Y	Function Button (TU.)/(Black)	K 70	RYQ2XCD70J	Cassette Holder Ass'y (Tape [2])/(Black)	K 123	XTV3 + 6B	Tapping Screw $\phi 3 \times 6$ (Lug Terminal M'tg)
K 35	RBC848Z	Function Button (Tape)/(Black)	K 71	RUB419Z	Changing Lever, Operation	K 124	RBC850Z	Record Mute Button (Gray)
K 36	RBC849V	Reverse Mode Button (/Black)	K 72	RUB420Z	Changing Lever, Dolby/B*S/Reverse Mode	K 125	RBC851Z	Stop Button (Silver)
K 37	RBC849W	Reverse Mode Button (/Black)	K 73	RUB421Z	Changing Lever, Power	K 126	RBC852Z	Play Button (Silver)
K 38	RBC849X	Reverse Mode Button (/Black)	K 74	RUL795Z	Angle, Open Button	K 127	RBC853Y	CD Skip Button (Silver)
K 39	RBC849Y	Reverse Mode Button (/Black)	K 75	RUL796Z	Angle, CD Dumper Gear	K 128	RBC853Z	Fast Button (Silver)
K 40	RBC849Z	Dolby/Blank Button (Black)	K 76	RUL796Z	Angle, CD Dumper Gear	K 129	RBC854Z	Dubbing (High) Button (Red)
K 41	RBD375Z	Volume Knob (Silver)	K 77	RUV58Z	Spring, Eject Button	K 130	RBC855Z	Dubbing (Normal) Button (Red)
K 42	RBD376Z	Slide Knob (Bass/Treble/Balance)/(Black)	K 78	RDG5024Z	CD Dumper Gear	K 131	RBC856Z	Record Stand-by Button (Red)
K 43	RBT259Z	Tuning Knob (Black)	K 79	XTV3 + 10G	Tapping Screw $\phi 3 \times 10$ (Dumper Gear Angle M'tg)	K 132	RBC857Z	CD Play/Pause Button (Silver)
K 44	RYP3XCD70M	CD Compartment Cove Assembly	K 80	XQN2 + A4	Screw $\phi 2 \times 4$ (CD Dumper Gear M'tg)	K 133	RBC858X	Repeat/Buton (Silver)
K 44-1	RUL793Z	Holder, CD Compartment Cover	K 81	RHR1306Z	Pin, CD Open	K 134	RBC858Y	Rem Time Button (Silver)
			K 82	RYM1XCD70M	Front Cabinet Ass'y (Black)	K 135	RBC858Z	Memo/Recall Button (Silver)
			K 83	EAS10S01SA	Speaker (Woofer)	K 136	XYN2 + E6FZ	Screw $\phi 2 \times 6$ (Earth Terminal M'tg)
			K 84	RJE147Z	Speaker Cord	K 137	EFBS21A41HA2	Speaker (Tweeter)
			K 85	XTV3 + 12GFY	Tapping Screw $\phi 3 \times 12$ (Cord Holder M'tg)	K 138	QTF1054	Fuse Holder Δ
			K 86	XTV3 + 18G	Tapping Screw $\phi 3 \times 18$ (Speaker M'tg)	K 139	RHR3090Z	Rubber Cushion (for T302)
						K 140	RHR3086Z	Rubber Cushion (for CD UNIT)
						K 141	RZUXCD70M	Magnet Ass'y
						K 142	RMX313Z	Cover (for Main P.C.B.)
						K 143	RUV761	Shield Plate
						K 144	RUL823Z	Reinforcement Plate, Battery
						K 145	RUS670Z	Earth Spring (for CD UNIT)
						K 146	RHR3093Z	Rubber Cushion (for Main P.C.B.)

ACCESSORY AND PACKING MATERIALS



* A1 (in the Battery Compartment)

REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description
ACCESSORIES		
A 1	RJA22X	Power Cord Δ
A 2	RQA4711Z	Operating Instruction
PACKINGS		
P 1	RPN9516Z	Pad Completion
P 2	RPK2181Z	Gift Box
P 3	RPP728Z	Protection Cover (for UNIT)
P 4	RPP685Z	Poly Bag (for Speaker-R)
P 5	RPH509Z	Poly Sheet (for UNIT)
P 6	RPH510Z	Poly Sheet (for Speaker)

Service Manual

Radio Cassette

Portable Stereo Component System

RX-CD70**Supplement**This is the Service Manual
for the all areas.

Please use this manual along with the original service manuals for the below models.

Area	Order No.	Area	Order No.
☐ M... For U.S.A.	GAD8510541C1	☐ C... For Canada	GAD8601508A1
☐ Z... For all European areas except United Kingdom, F.R. Germany.	GAD8601504A2	☐ X... For Asia, Latin America, Middle East and Africa areas.	GAD8512558C3
☐ E... For United Kingdom.		☐ L... For Australia.	
☐ G... For F.R. Germany.			
☐ ME... For AAFES EUROPE.	GAD8602513A4		
☐ MF... For AAFES PACIFIC.			

Notes:

- Traverse motor block and circuits of this unit were changed during the period of production in an attempt to improve the performance. This must be kept in mind when servicing.
- This supplement mentions only the after-change parts list, circuit diagram and P.C.B. diagram. For the adjustment procedures after change, refer to the Technical Information (Order No. HAD8602364T0).

CHANGES

■ REPLACEMENT PARTS LIST

Ref. No.	Change of Part No.		Description	Remarks
	Old	 New		
TRAVERSE DECK PARTS				
60	SUWD4R	SDGD2R	Motor Block Ass'y	Change
62	SJGD1R			
VARIABLE RESISTOR				
VR991	——	EVML4GA00B53	Variable Resistor, 5kΩ (B)	Addition
RESISTORS				
R991, 992	——	ERJ6GMYJ102M	Chip Type Carbon, 1/4W, 1kΩ	Addition
CAPACITORS				
C321	——	ECQV1H104JZ	TF, 50V, 0.1μF	Addition
C991, 992	——	RCUV1H102KB	Chip Type Ceramic, 50V, 0.001μF	Addition
C993, 994	——	RCUV1H271JC	Chip Type Ceramic, 50V, 270pF	Addition

Matsushita Engineering and
Service Company
50 Meadowland Parkway,
Secaucus, New Jersey 07094

Panasonic Hawaii Inc.
91-238 Kauhū St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

National / Panasonic

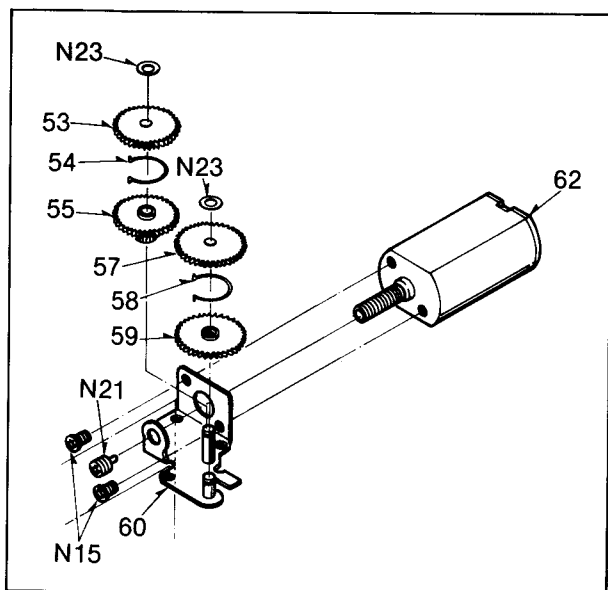
Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

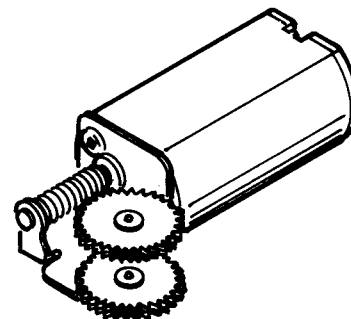
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Supply of Motor Block

Motor block is supplied in ass'y to improve the serviceability.



• Motor block Ass'y

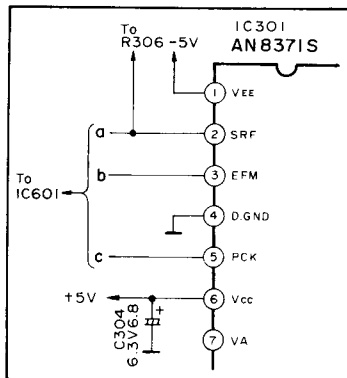


■ SCHEMATIC DIAGRAM

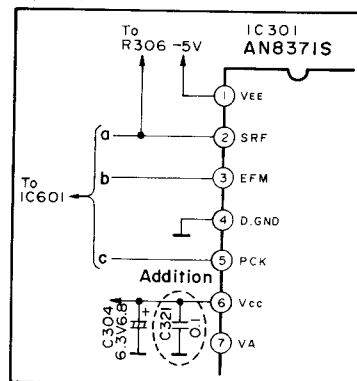
Capacitor and tracking offset compensation circuit are added in order to improve the playability.

Addition of Capacitor (C321)

(Old)

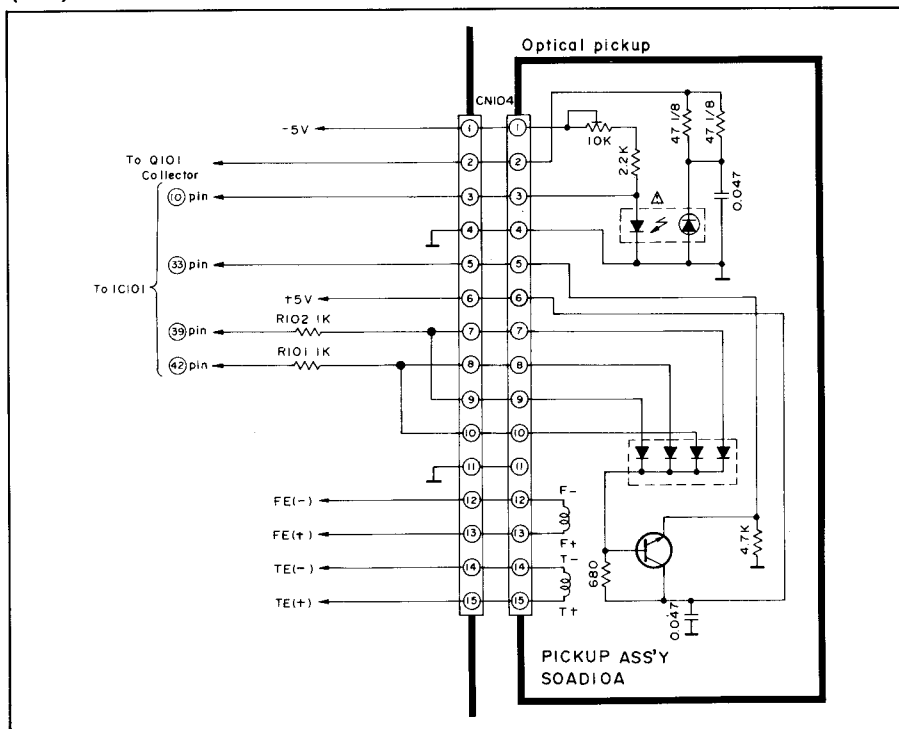


(New)

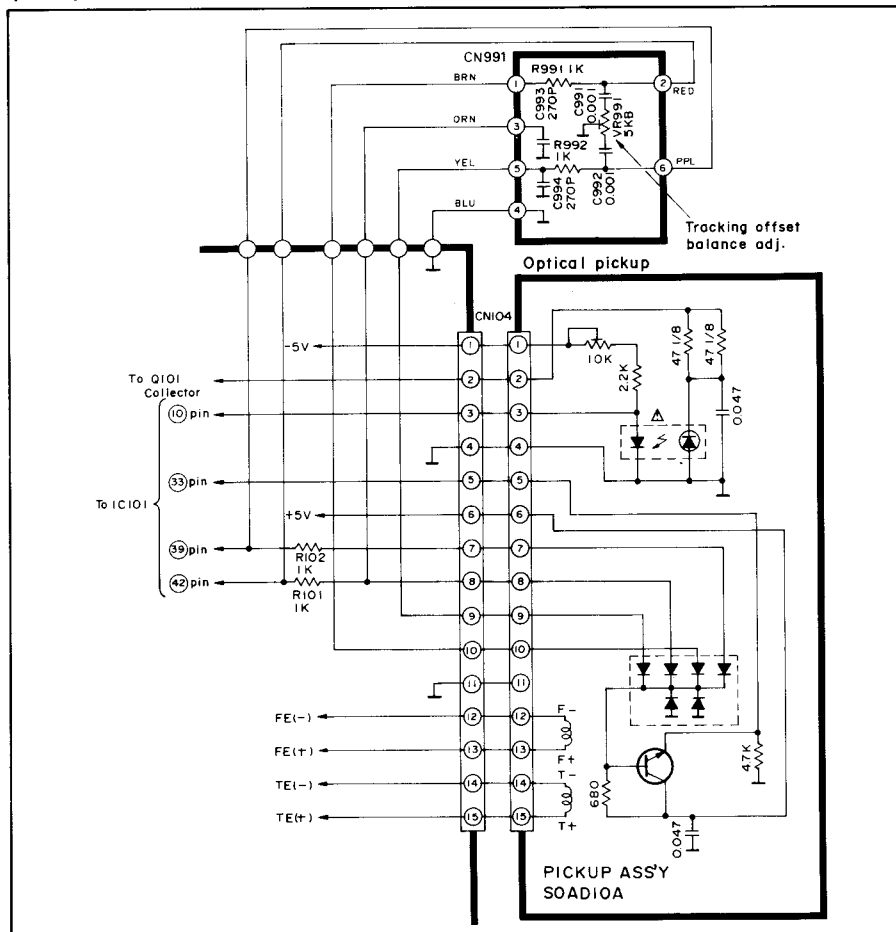


Addition of Tracking Offset Compensation Circuit

(Old)



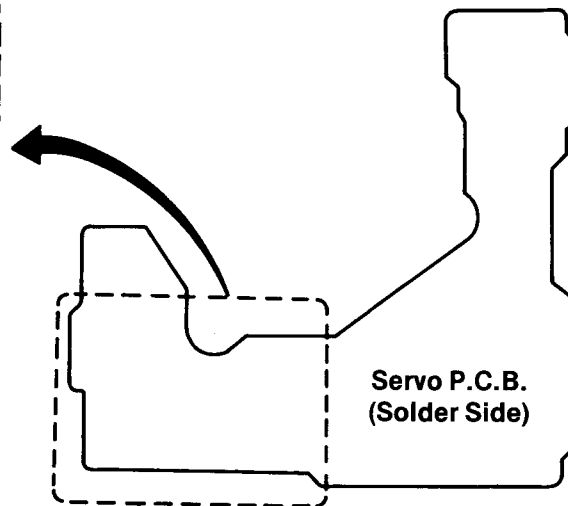
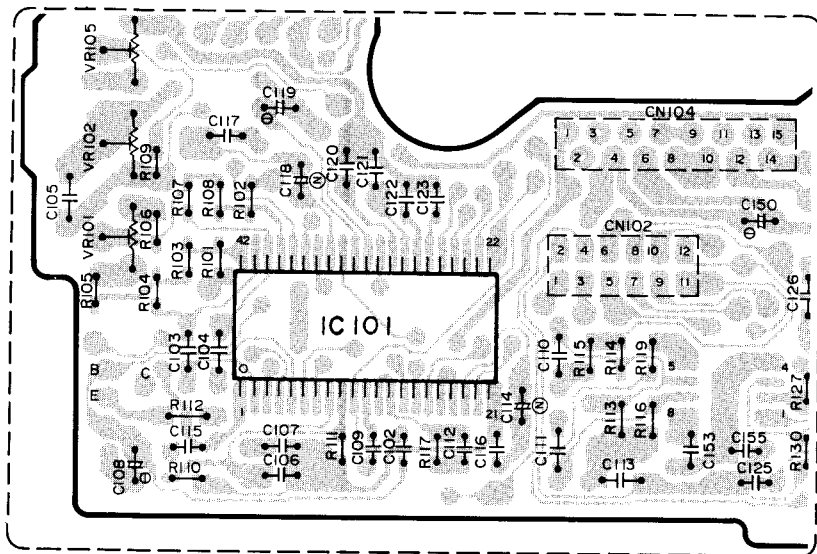
(New)



■ PRINTED CIRCUIT BOARD

Addition of Tracking Offset Compensation P.C.B.

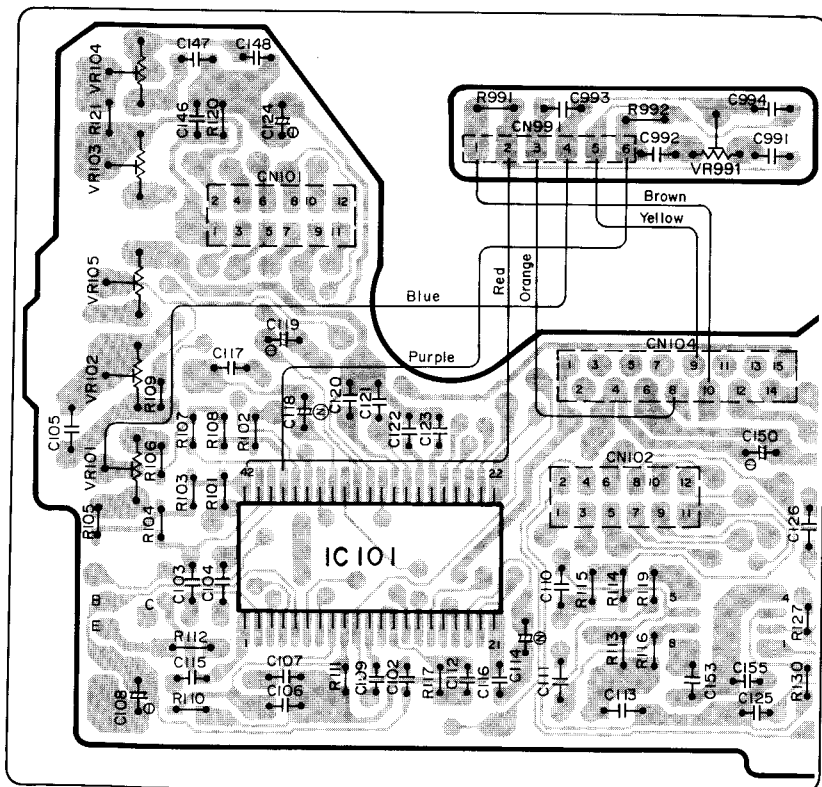
(Old)



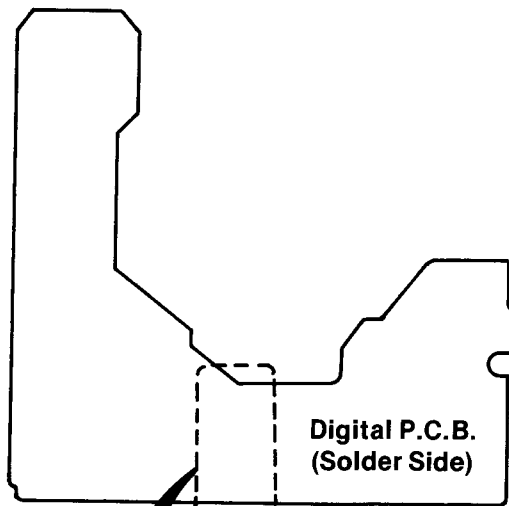
Servo P.C.B.
(Solder Side)



(New)

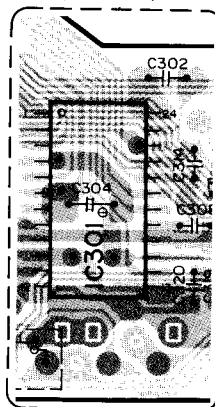


Addition of Capacitor (C321)

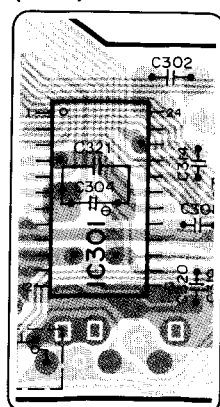


Digital P.C.B.
(Solder Side)

(Old)



(New)



Service Manual

Radio Cassette

Portable Stereo Component System

RX-CD70**Supplement**This is the Service Manual
for the all areas.

Please use this manual along with the original service manuals for the below models.

Area	Order No.	Area	Order No.
☐ ... For U.S.A.	GAD8510541C1	☐ ... For Canada	GAD8601508A1
☐ ... For all European areas except United Kingdom, F.R. Germany.	GAD8601504A2	☐ ... For Asia, Latin America, Middle East and Africa areas.	GAD8512558C3
☐ ... For United Kingdom.		☐ ... For Australia.	
☐ ... For F.R. Germany.			
☐ ... For AAFES EUROPE. ☐ ... For AAFES PACIFIC.	GAD8602513A4		

Notes:

- Traverse motor block and circuits of this unit were changed during the period of production in an attempt to improve the performance. This must be kept in mind when servicing.
- This supplement mentions only the after-change parts list, circuit diagram and P.C.B. diagram. For the adjustment procedures after change, refer to the Technical Information (Order No. HAD8602364T0).

CHANGES

■ REPLACEMENT PARTS LIST

Ref. No.	Change of Part No.		Description	Remarks
	Old	 New		
TRAVERSE DECK PARTS				
60	SUWD4R	SDGD2R	Motor Block Ass'y	Change
62	SJGD1R			
VARIABLE RESISTOR				
VR991	——	EVML4GA00B53	Variable Resistor, 5kΩ (B)	Addition
RESISTORS				
R991, 992	——	ERJ6GMYJ102M	Chip Type Carbon, 1/4W, 1kΩ	Addition
CAPACITORS				
C321	——	ECQV1H104JZ	TF, 50V, 0.1μF	Addition
C991, 992	——	RCUV1H102KB	Chip Type Ceramic, 50V, 0.001μF	Addition
C993, 994	——	RCUV1H271JC	Chip Type Ceramic, 50V, 270pF	Addition

Matsushita Engineering and
Service Company
50 Meadowland Parkway,
Secaucus, New Jersey 07094

Panasonic Hawaii Inc.
91-238 Kauhū St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

National / Panasonic

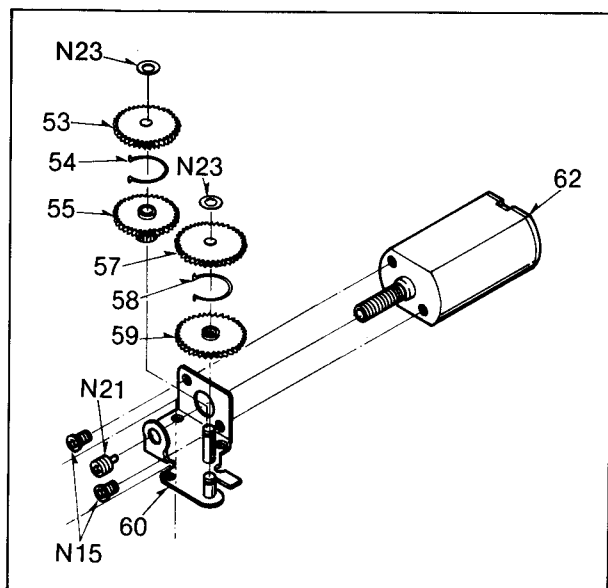
Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

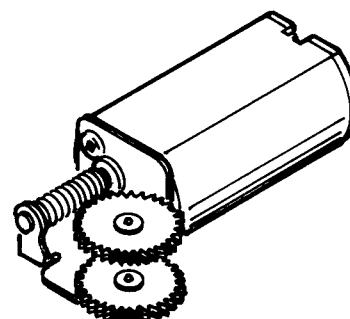
Matsushita Electric Trading Co., Ltd.
PO Box 288, Central Osaka Japan

Supply of Motor Block

Motor block is supplied in ass'y to improve the serviceability.



• Motor block Ass'y

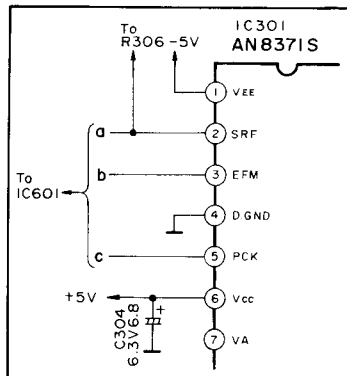


■ SCHEMATIC DIAGRAM

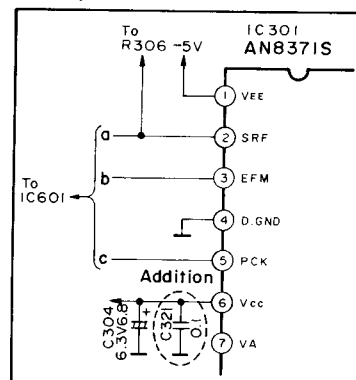
Capacitor and tracking offset compensation circuit are added in order to improve the playability.

Addition of Capacitor (C321)

(Old)



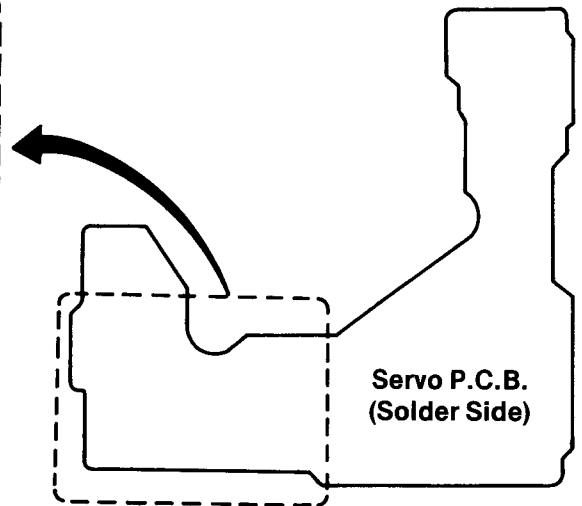
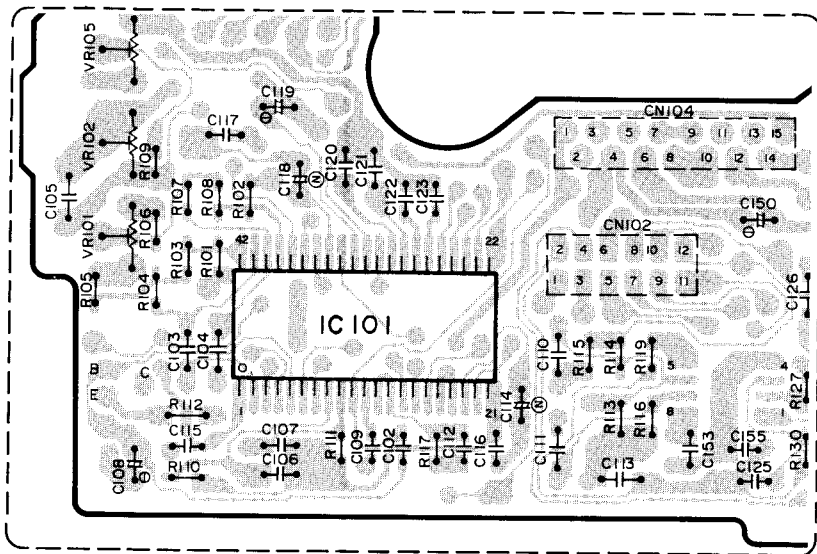
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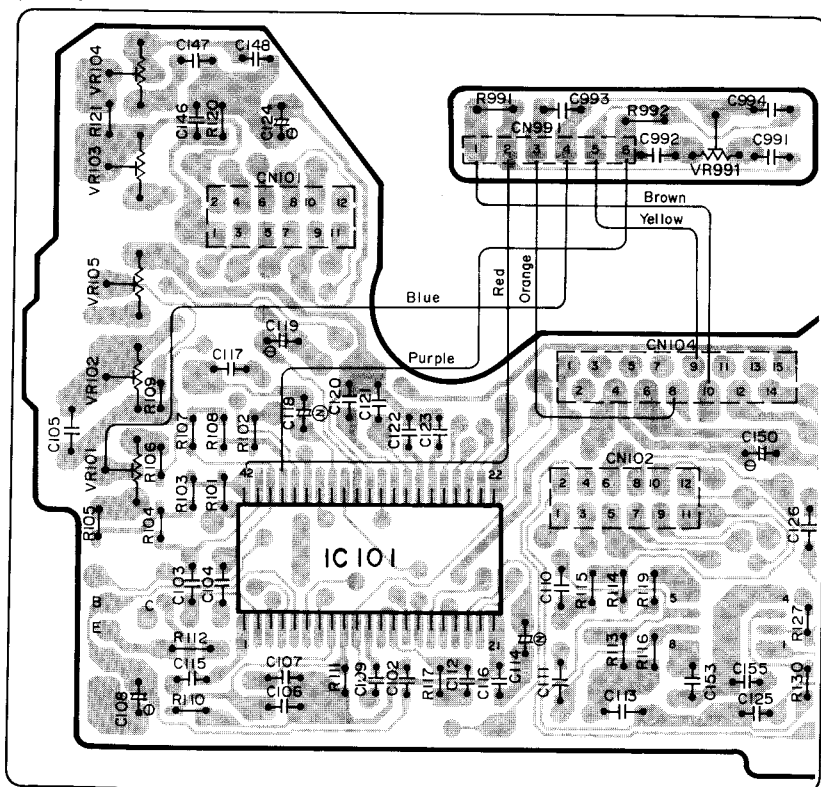
■ PRINTED CIRCUIT BOARD

Addition of Tracking Offset Compensation P.C.B.

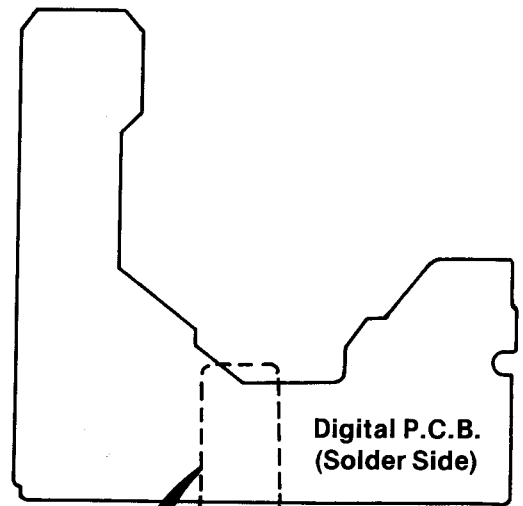
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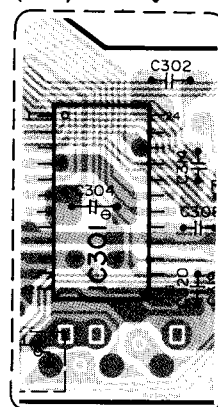
(New)



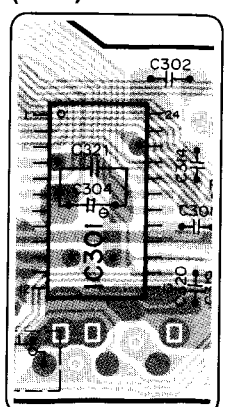
Addition of Capacitor (C321)



(Old)



(New)



Service Manual

Radio Cassette

Portable Stereo Component System

RX-CD70**Supplement**This is the Service Manual
for the all areas.

Please use this manual along with the original service manuals for the below models.

Area	Order No.	Area	Order No.
☐ M ... For U.S.A.	GAD8510541C1	☐ C ... For Canada	GAD8601508A1
☐ Z ... For all European areas except United Kingdom, F.R. Germany.	GAD8601504A2	☐ X ... For Asia, Latin America, Middle East and Africa areas.	GAD8512558C3
☐ E ... For United Kingdom.		☐ L ... For Australia.	
☐ G ... For F.R. Germany.			
☐ ME ... For AAFES EUROPE. ☐ MF ... For AAFES PACIFIC.	GAD8602513A4		

Notes:

- Traverse motor block and circuits of this unit were changed during the period of production in an attempt to improve the performance. This must be kept in mind when servicing.
- This supplement mentions only the after-change parts list, circuit diagram and P.C.B. diagram. For the adjustment procedures after change, refer to the Technical Information (Order No. HAD8602364T0).

CHANGES

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National / Panasonic

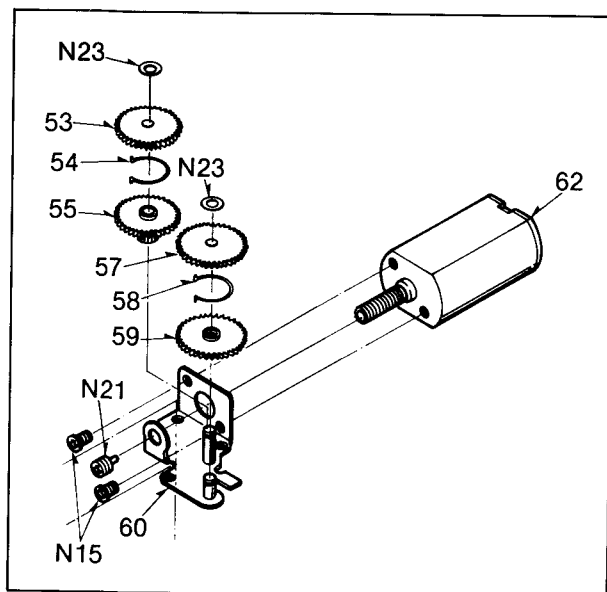
Panasonic Sales Company,
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Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
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Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
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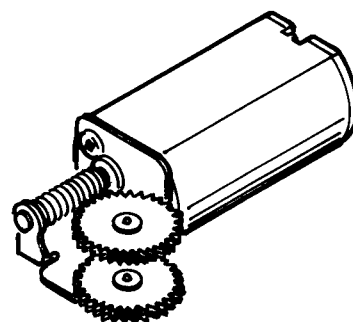
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Supply of Motor Block

Motor block is supplied in ass'y to improve the serviceability.



• Motor block Ass'y

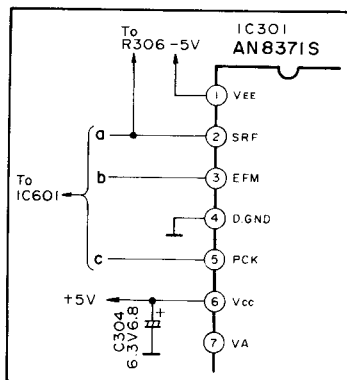


■ SCHEMATIC DIAGRAM

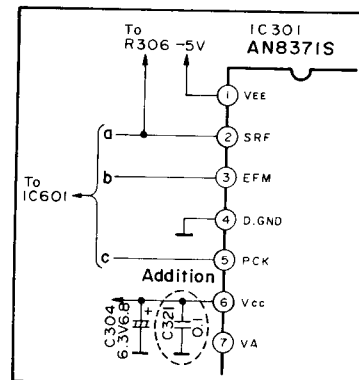
Capacitor and tracking offset compensation circuit are added in order to improve the playability.

Addition of Capacitor (C321)

(Old)

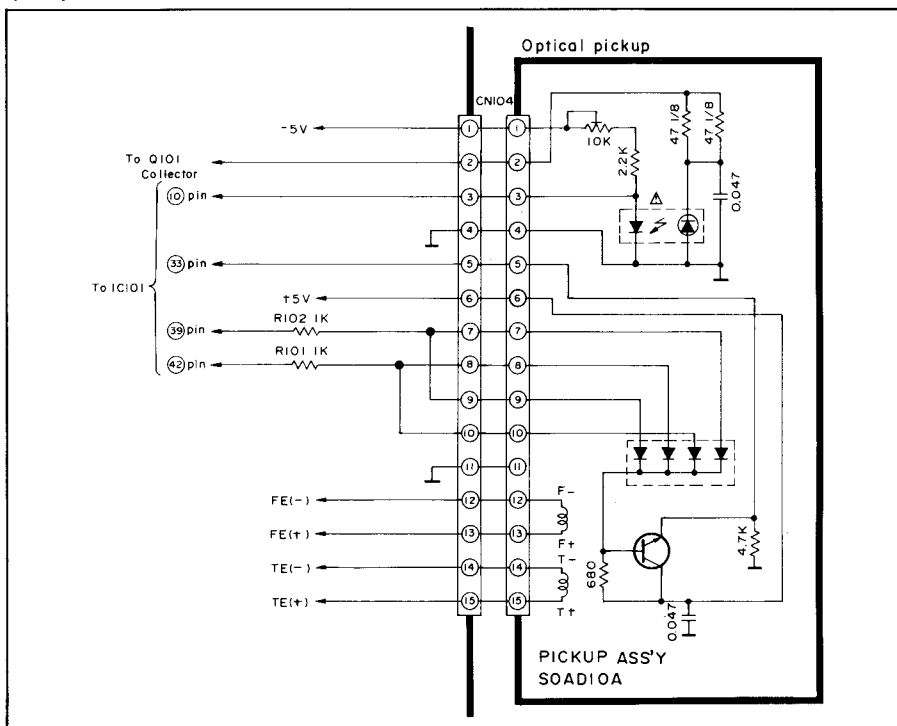


(New)

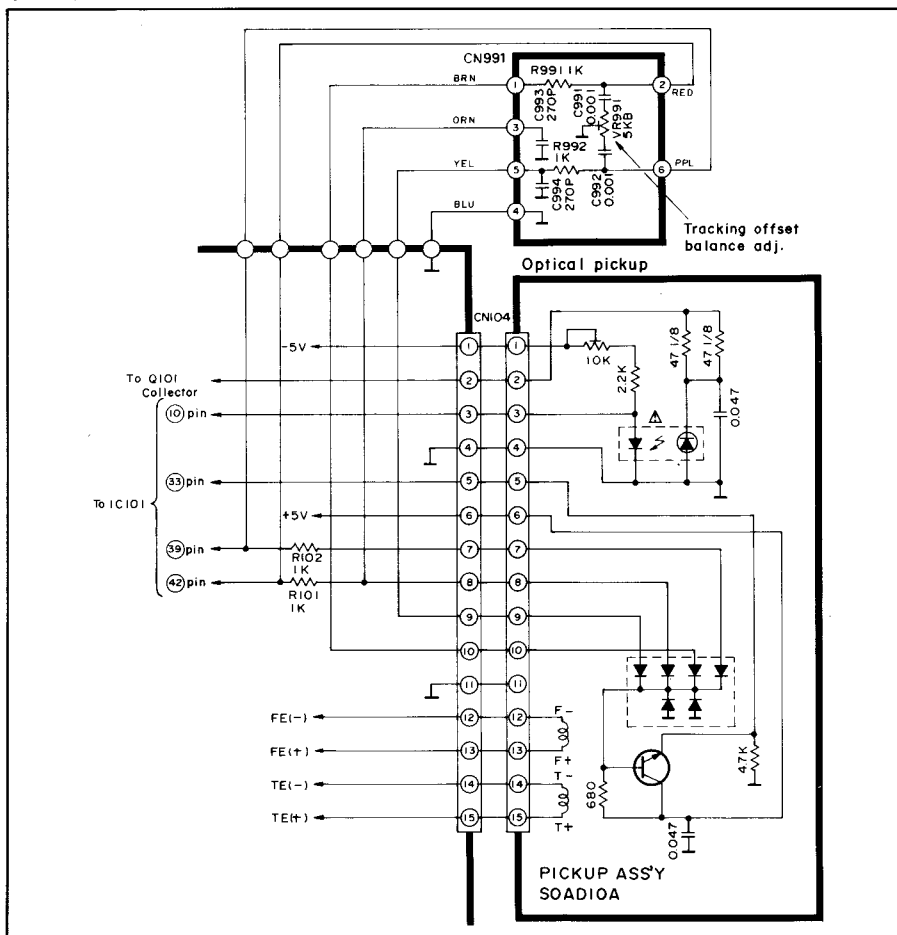


Addition of Tracking Offset Compensation Circuit

(Old)



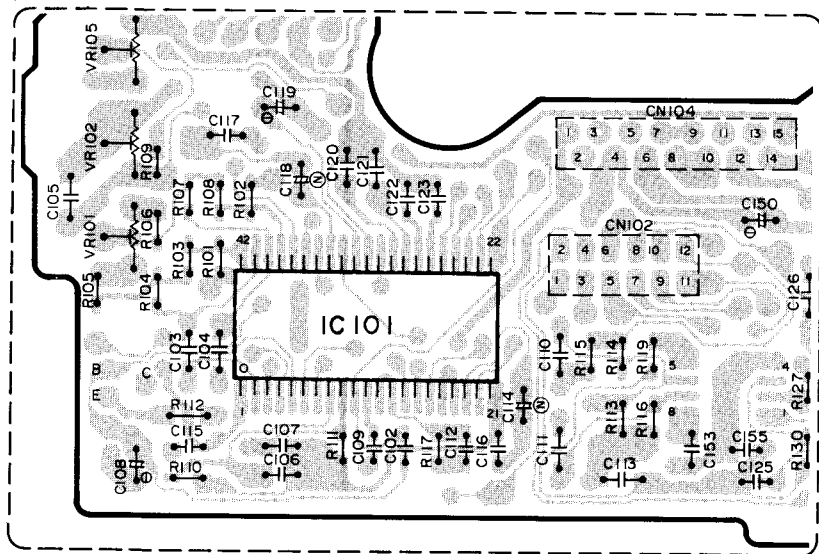
(New)



PRINTED CIRCUIT BOARD

Addition of Tracking Offset Compensation P.C.B.

(Old)



Parts Change Notice

This is the Service Manual for the following areas.	
☒ Z	For all European areas except United Kingdom.
☐ E	For United Kingdom.
☐ G	For F.S.Germany.
☒ X	For Asia, Latin America, Middle East and Africa Areas.
☐ L	For Australia.
☐ ME	For Aafes Euarope.
☐ MF	For Aafes Pacific.

Model No. **RX—CD70**

Please revise the original parts list in the Service Manual to conform to the change(s) shown herein. If new part numbers are shown, be sure to use then ordering parts.

(ORDER NO. GAD8601504A2)

GAD8512558C3

GAD8602513A4

Reason for Change		*The circled item indicates the reason. If no marking, see the Notes in the bottom column.				
1. Improve performance						
2. Change of material or dimension						
3. To meet approved specification						
4. Standardization						
5. Addition						
6. Deletion						
⑦ Correction						
8. Other						
Interchangeability Code		**The circled item Indicates the interchangeability. If no marking, see the Notes in the bottom column.				
Parts	Set Production					
A	Original  Early New Late	Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.				
B	Original  Early New Late	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.				
C	Original  Early New Late	New parts only may be used in early or late production sets. Stock new parts.				
D	Original  Early New Late	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.				
E	Other					
Part Number						
Model No.	Ref. No.	Original Part No.	New Part No.	Notes	Part Name & Description	Price
	M20	RJGQ0001Z	RFM70Z	7	DC Motor Ass'y	

File this Parts Change Notice with your copy of the Service Manual.

National / Panasonic

Panasonic Tokyo Office
Matsushita Electric Trading Co., Ltd.
6th Floor, World Trade Center Bldg.,
No. 4-1, Hamamatsu-cho 2-Chome, Minato-ku,
Tokyo 105, Japan

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan