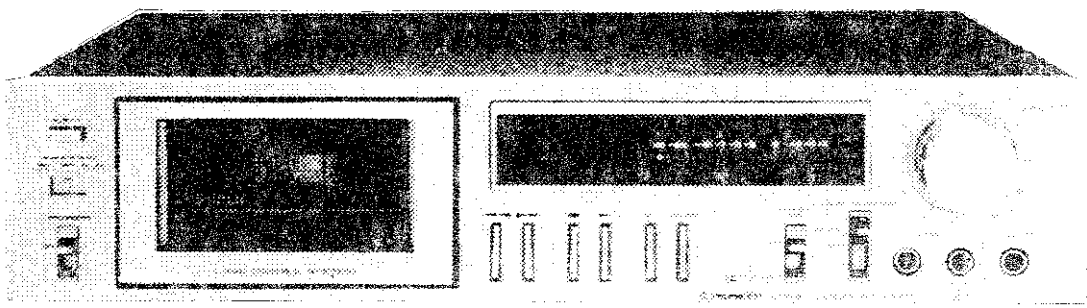
CASSETTE TAPE DECK

CT-300



MODEL CT-300 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS.

Type	Voltage	Remarks
HE	220V and 240V switchable	Europe model
HG	220V and 240V switchable	U.K. model
HP	220V and 240V switchable	Europe model
KU	240V only	U.S.A. model
C	110V, 120V and 240V switchable	Canada model
CG	120V, 220V and 240V switchable	U.K., Hong Kong

* This service manual is applicable to the CT-300/HE, HG and HP types.

CONTENTS

PIONEER®

1. SPECIFICATIONS

Systems . . . . . Compact cassette, 2-channel stereo
Motor . . . . . DC servo motor x 1
Heads
. . . "Hard Permalloy" recording/playback head x 1
. . . . . "Ferrite" erasing head x 1
Fast Winding Time
. . . . . Approximately 100 seconds (C-60 tape)
Wow and Flutter . . . . No more than 0.05% (WRMS)
No more than 0.17% (DIN)
Frequency Response
–20dB recording:
Standard, LH tapes . . . . . 20 to 15,000Hz
(30 to 14,000 Hz ±3dB)
Chromium dioxide tape . . . . . 20 to 17,000Hz
(30 to 16,000Hz ±3dB)
Metal tape . . . . . 20 to 18,000Hz
(30 to 17,000Hz ±3dB)
0dB recording:
Chromium dioxide tape . . . . 30 to 8,000Hz ±3dB
Metal tape . . . . . 30 to 12,500Hz ±3dB
Signal-to-Noise Ratio
Dolby NR OFF . . . . . More than 58dB
Dolby NR ON . . . . . More than 68dB (over 5kHz)
Harmonic Distortion . . . . No more than 1.2 % (0dB)
Input
(Sensitivity/Maximum allowable input/Impedance)
MIC (L, R)
. . . . . 0.3mV/57mV/10kΩ, 6mm diam. jack
(Reference MIC impedance; 250Ω to 10kΩ)
LINE (INPUT) 50mV/25V/75kΩ
Output (Reference level/Load impedance)
LINE (OUTPUT) 450mV/50kΩ
Headphones . . . . . 65mV/8Ω, 6mm diam. jack

Subfunctions

- Dolby NR system (ON/OFF)
- Stand-by mechanism with unattended recording
- 3 position tape selector (NORM/CrO_2/METAL)
- IC full logic control
- Fluorescent display level meter (–20 to +8dB)
- Air damp eject function
- Full automatic stop mechanism

Miscellaneous

Power Requirements . . . AC 220V/240V (switchable) 50/60Hz
Power Consumption . . . . . 19 watts
Dimensions . . . . . 420(W) x 99(H) x 327(D)mm
16-9/16(W) x 3-7/8(H) x 12-7/8(D)in
Weight (without package) . . . . . 4.7 kg (10 lb 6 oz)

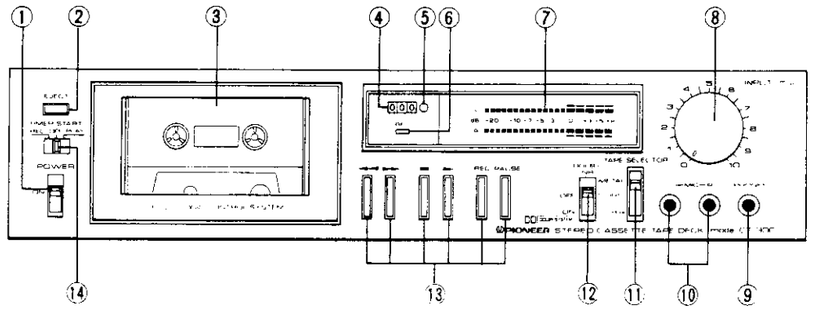
Furnished Parts

Operating instructions . . . . . HB and HP models; 1
HE model (English, German/French); 2

NOTE:
Specifications and the design subject to possible modifications without notice due to improvements.

NOTES:
1. Reference Tapes: Standard & LH: DIN 45513/BLATT6 or equiv.
: CrO_2 : DIN45513/BLATT7 (CrO_2) or equiv.
2. Reference Recording Level: Meter 0dB indicating level (160 nwb/m magnetic level = Philips cassette reference level)
3. Reference Signal; 333Hz
4. Wow & Flutter: • JIS [3kHz, with acoustic compensation (weighted), rms value] DIN [3,150Hz, with acoustic compensation (weighted) PEAK value] ; DIN45507
5. Frequency Response: • Measured at –20dB level, DOLBY NR OFF, level deviation is ±6dB without indication.
6. Signal to Noise Ratio: • Measured at the third harmonic distortion 3% level, weighted.
7. Sensitivity: Input level (mV) required for reference recording level with input (REC) controls set to maximum.
8. Maximum Allowable Input: While decreasing settings of input (REC) level controls and increasing level at input jacks, this is the maximum input level (mV) at the point where recording amplifier output waveform becomes clipped.
9. Reference Output Level: Playback output level when meter indicates 0dB.
10. This model doesn't employ a recording/playback connector (DIN-type).

2. FRONT PANEL FACILITIES



① POWER SWITCH

Set this switch to ON to supply power to the tape deck.

NOTE:
For about 4 seconds after the power has been switched on, the function buttons will not work even when depressed.

② EJECT BUTTON

When this switch is depressed, the cassette holder is jumped out.

③ CASSETTE HOLDER

④ TAPE COUNTER

⑤ COUNTER RESET BUTTON

Use this switch to reset the tape counter to "000".

⑥ REC (RECORDING) INDICATOR

⑦ LEVEL METERS

These indicate the input level during recording and the output level during playback.

⑧ INPUT (RECORDING LEVEL) CONTROLS

Use these to adjust the level of the input signals from the MIC jacks or rear panel INPUT jacks.
Turning these controls to the right increases the level. The controls are coupled to the left and right channels, but you can use them to adjust the right channel (back) and the left channel (front) independently by rotating the appropriate control and holding the other in position.

⑨ HEADPHONE JACK

This is the output jack for stereo headphones. Plug your headphones into this jack when you want to listen to a tape privately.

NOTES:

- *Use low-impedance headphones. If you use a high-impedance model, you will not be able to obtain sufficient volume.*
- *Do not connect a microphone to this jack as the microphone may be damaged.*

⑩ MIC JACKS

These are the input jacks for microphone recording. Plug the left channel microphone into the L jack and the right channel microphone into the R jack.

⑪ TAPE SELECTOR SWITCH

This selector allows the bias and equalizer characteristics to be selected during recording and the equalizer characteristics during playback in line with the type of tape you are using.

METAL position: For using metal tapes
NORM position: For using standard or LH tapes
CrO_2 position: For using chrome tapes

⑫ DOLBY* NR SWITCH

Set this switch to ON for recording with the built-in Dolby noise reduction system and for playback of tapes which have been recorded using the Dolby NR system.

**Manufactured under license from Dolby Laboratories.*
**Dolby and ◻◻ are trademarks of Dolby Laboratories.*

⑬ OPERATING SWITCHES

◄◄ (REW): Depress this switch to rewind the tape at high speed. (The tape will travel from right to left.)

►► (FF): Depress this switch to send the tape forward at high speed. (The tape will travel from left to right.)

■ (Stop): Depress this switch to stop the tape run and to release the operating mode.

► (Play): Depress this switch when playing back a tape. (The tape will travel from left to right.)

REC: Depress this switch together with the **► (Play)** switch for recording. This switch will not work when a cassette is not loaded or when the erasure prevention tabs of a loaded cassette have been broken off.

PAUSE: Depress this switch to stop the tape temporarily during recording or playback. Depress ► (Play) switch to allow the tape to continue to travel.

NOTE:
If the POWER switch is set to the OFF position while the deck is operating (in any mode), all the operating mode will be released (shutdown mode).

⑭ TIMER START SWITCH

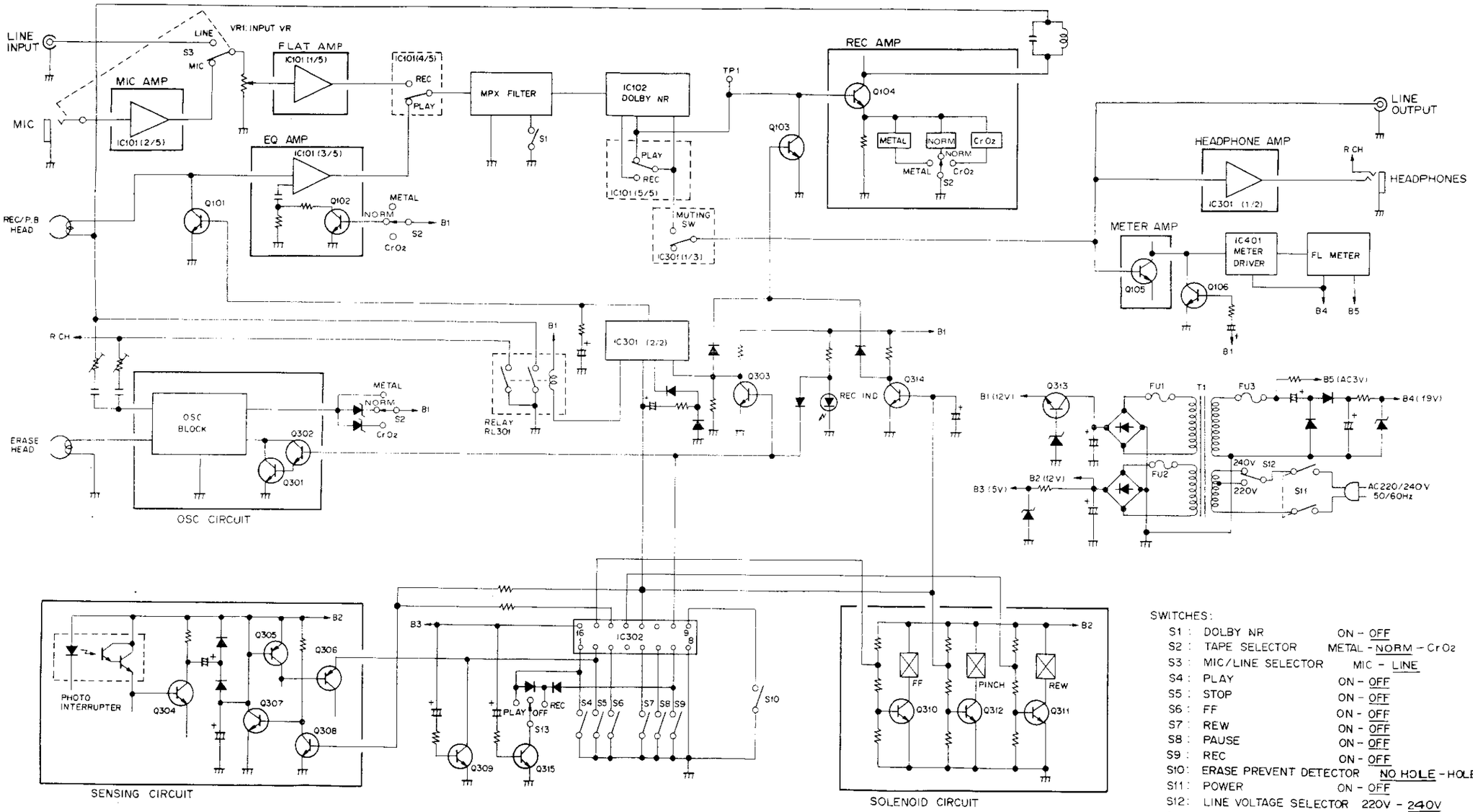
This is used when the timer is employed along with the deck for unattended recording and wake up playback.

REC: Set to this position to set the deck automatically to the recording mode at the time preset on the timer and to start the recording of programs unattended, for instance.

OFF: Set to this position for normal tape playback and recording.

PLAY: Set to this position to set the deck automatically to the playback mode at the time preset on the timer and to start the playback. The tape playback function can be used to wake up in the morning instead of an alarm clock.

3. BLOCK DIAGRAM

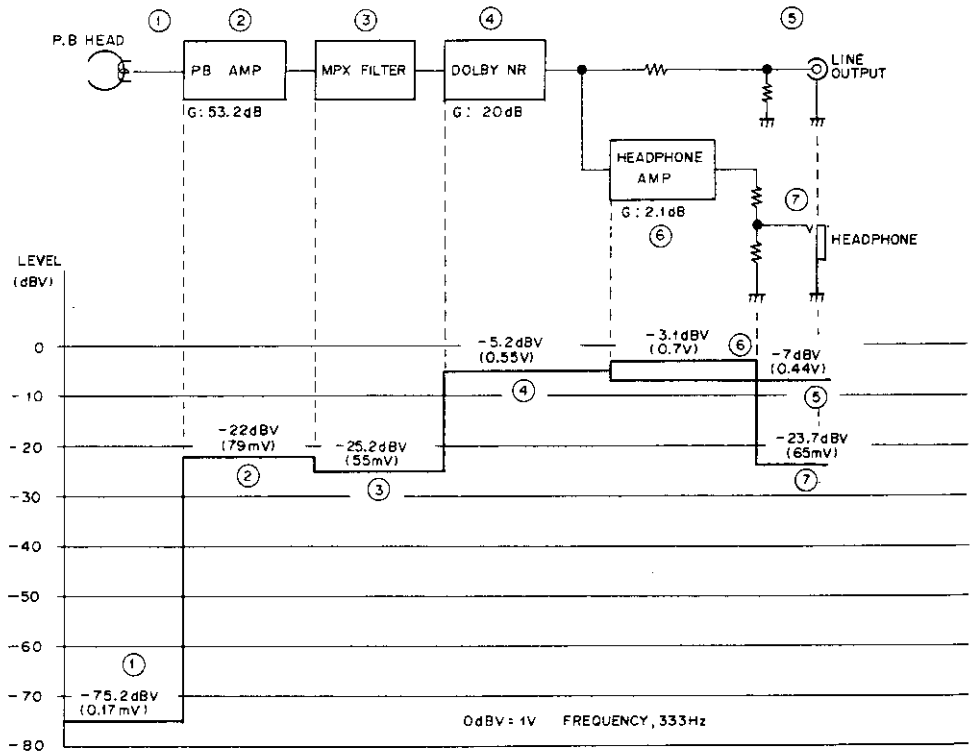


SWITCHES:

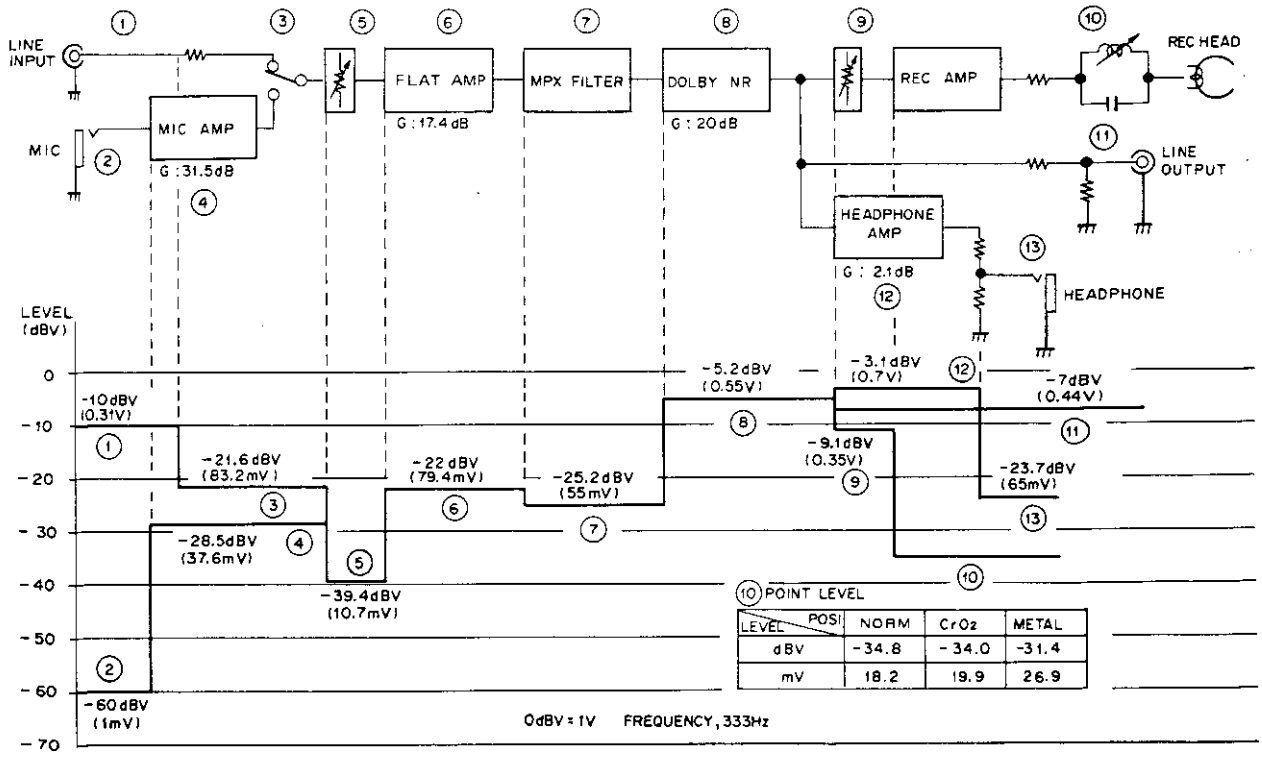
S1 :	DOLBY NR	ON - OFF
S2 :	TAPE SELECTOR	METAL - NORM - CrO2
S3 :	MIC/LINE SELECTOR	MIC - LINE
S4 :	PLAY	ON - OFF
S5 :	STOP	ON - OFF
S6 :	FF	ON - OFF
S7 :	REW	ON - OFF
S8 :	PAUSE	ON - OFF
S9 :	REC	ON - OFF
S10:	ERASE PREVENT DETECTOR	NO HOLE - HOLE
S11:	POWER	ON - OFF
S12:	LINE VOLTAGE SELECTOR	220V - 240V
S13:	TIMER	PLAY - STOP - REC/P.B

4. LEVEL DIAGRAM

Playback Mode



Recording Mode



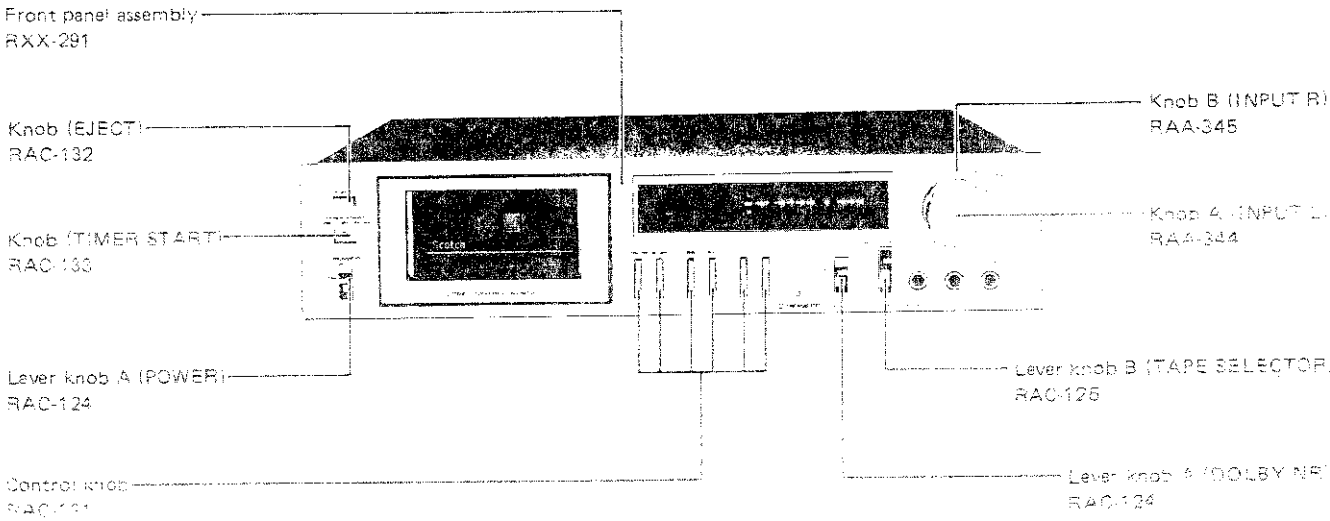
⑩ POINT LEVEL

LEVEL \ POSI	NORM	CrO2	METAL
dBV	-34.8	-34.0	-31.4
mV	18.2	19.9	26.9

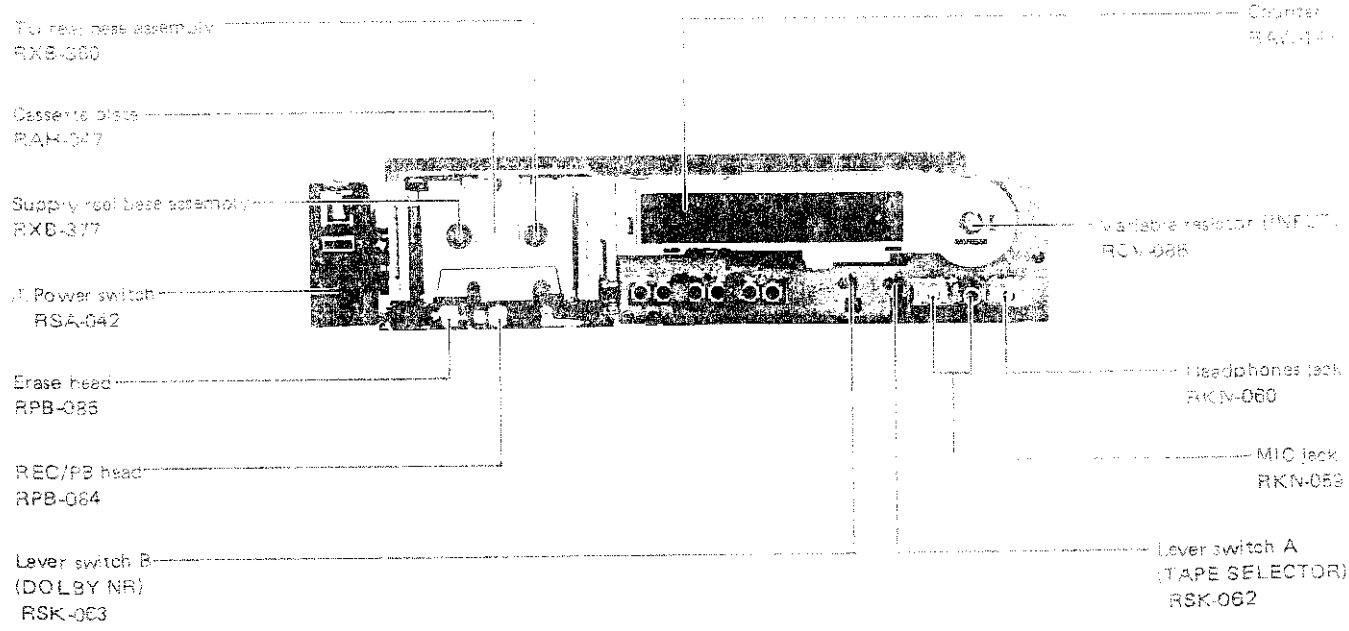
5. PARTS LOCATION

- *The ⚠ mark found on some component parts indicates of the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

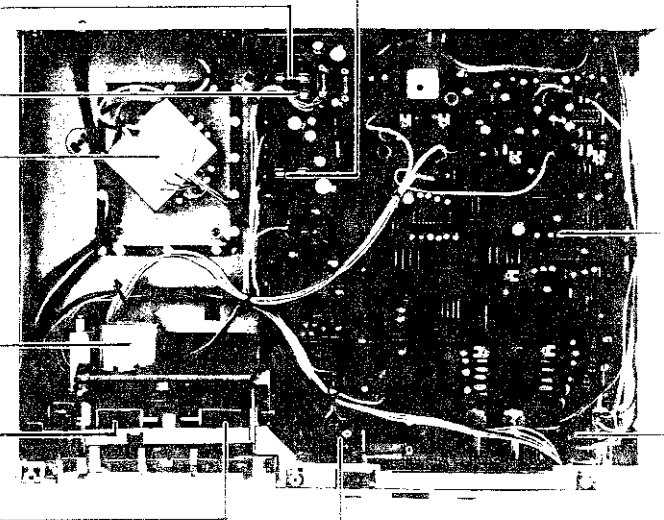
Front Panel View



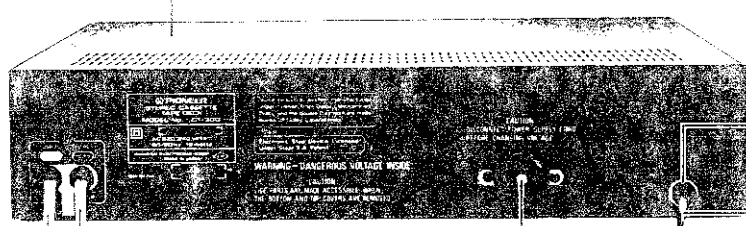
Front View with Front Panel Removed



Top View with Bonnet Removed



Rear Panel View



6. CIRCUIT DESCRIPTIONS

6.1 SIGNAL PATHS

Recording Mode

The signal from MIC is first amplified to the fixed level by the MIC amplifier (HA12005) and then applied via the MIC position of the S3; MIC/LINE selector (MIC position switched in automatically when microphone plugged into the MIC jack) to the VR1; INPUT level control, flat amplifier (HA12005), MPX filter, and DOLBY NR circuit.

The signal from the LINE INPUT is passed via S3 to the INPUT level control, flat amplifier, MPX filter, and DOLBY NR circuit. After the frequency response has been equalized by the recording amplifier (Q104) equalizer circuit (according to the type of tape being employed), the output signal is applied to the recording head.

Play Mode

The signal from the playback head is first equalized in the playback equalizer amplifier (HA12005) according to the type of tape being employed, and then it is amplified to the fixed level. The output of DOLBY NR is then applied to the LINE OUTPUT via the REC/PB switch (located HA12005) and MUTE switch (located HA12006).

6.2 LEVEL METER CIRCUIT

After the output from the muting amp has been amplified by transistor Q105, it is rectified by D103 and D104. This direct current is supplied to the display driver IC (IC401). There are 12 display comparators within the display driver IC serving to adjust the up-down level by driving each segment. +B is connected to the comparator's negative sides, and sets the standard voltage for them. The standard voltage applied to the comparators is sequentially lowered by the ones with a lower level. The voltage is then compared with the DC rectified by D103 and D104, and when the compared voltage is greater than standard, the segments are lighted.

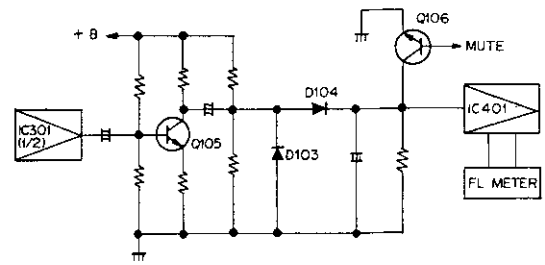


Fig. 6-1 Level meter circuit

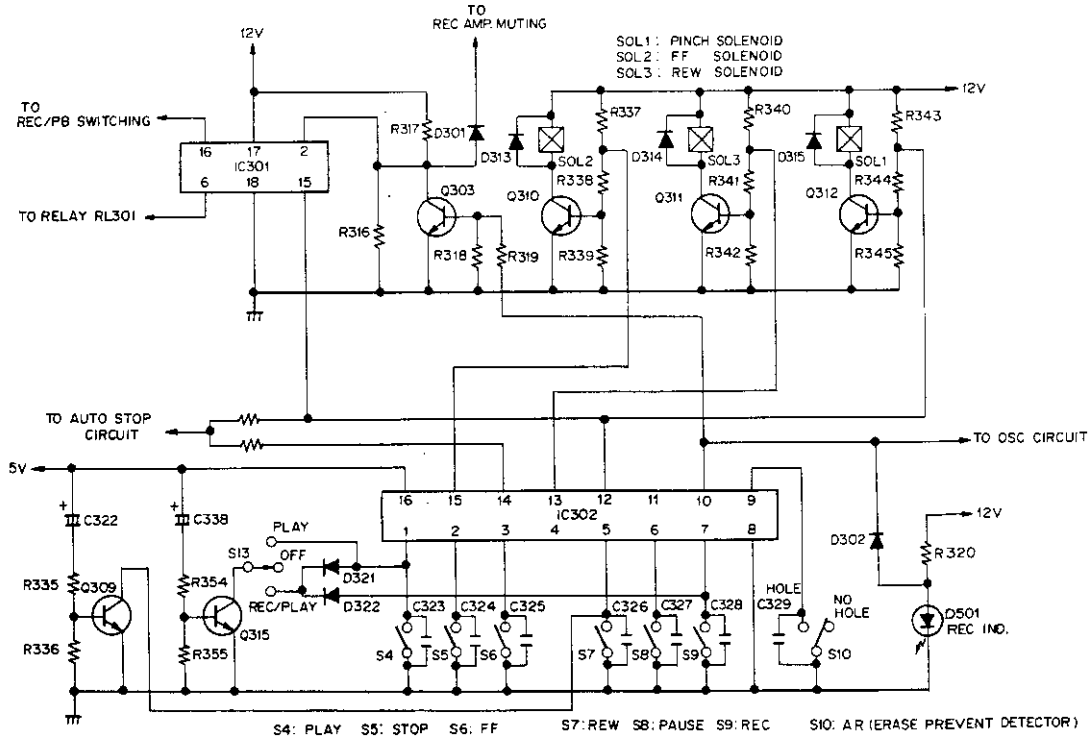


Fig. 6-2 Control circut

6.3 CONTROL CIRCUIT

The control circuit employed in this tape deck IC(BA843) for use in the electronic control of the switching. See Fig. 6-3 and Fig. 6-4 for the corresponding pin arrangement and input/output truth table.

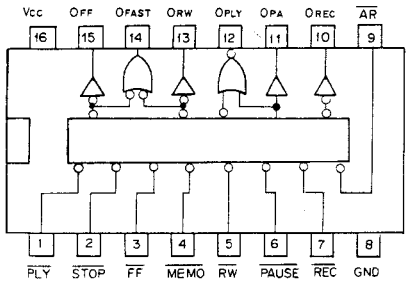


Fig. 6-3 Pin arangement of BA843

For 1.5 ~ 2.5 seconds after the power has been turned on, Q309 is ON (until charge-amp C322 has completed). Since IC302 (2 pin) is at a LOW level, it is in a STOP status and no key is operable.

Play Operation

1. When play switch S4 is pressed ON, IC302 (12 pin) goes to a high level (hereafter called H level). This causes +B to flow through R343, R344, and Q312, turning Q312 ON.
2. The pinch solenoid (P.S.) is activated starting play operation.

Record Operation

1. Loading a cassette with an erase prevention detector ($\overline{AR}$ SW S10 is on no hole side), press play switch S4 and record switch S9 simultaneously.
2. IC302 (12 pin) and (10 pin) go to H level, current flows from R319 to Q303 and Q303 comes ON. IC301 (HA12006) (2 pin) goes to a low level (hereafter called L level).
3. As IC301 (2 pin) goes to L level, IC301 (6 pin) and (16 pin) go to H level and the head goes to a record status.
4. At the same time, as was noted earlier, IC302 (10 pin) goes to H level and the bias oscillator comes ON.
5. When a cassette without an erase prevention detector, $\overline{AR}$ SW is on the hole side, IC302 (9 pin) is shorted to ground causing IC302 (10 pin) not to go to H level, and preventing recording.

FF, REW Operation.

1. Pressing FF switch S6 to ON causes IC302 (15 pin) to go to H level. +B flows through R337, R338, and Q310 and Q310 comes ON.
2. FFS (Fast Forward Solenoid) becomes operative and FF operation begins.
3. Rewind operation is essentially the same as FF.

Pause Operation

When either in the play or record mode, pressing the pause switch S8 to ON causes IC302 (12 pin) to go from an H level to an L level. This causes Q312 to go OFF, releasing the pinch solenoid and temporarily stopping play or record.

Timer Start Operation

- Play operation

1. Turn the timer switch S13 to PLAY, and turn the power on at the timer.
2. As the power comes on, Q315 comes ON by the charge current from C338, and Q309 by the charge current from C322. (As determined by the time constant circuit C338, R354, and R355, Q315 requires 3-5 seconds; and Q309 requires 1.5 ~ 2.5 seconds as determined by C322, R335, and R336.) IC302 (1 pin) and (2 pin) go to L level.
3. While IC302 (2 pin) is at L level, IC302 (12 pin) is also at L level.

Input signal	Output						Output mode
	0-FAST	0-FF	0-RW	0-REC	0-PAUSE	0-PLAY	
$\overline{STOP}$	L	L	L	L	L	L	STOP mode
$\overline{FF}$	H	H	L	L	L	L	FF mode
$\overline{RW}$	H	L	H	L	L	L	REW mode
$\overline{PLAY}$	L	L	L	L	L	H	PLAY mode
$\overline{PAUSE}$	L	L	L	L	H	L	PAUSE mode
$\overline{REC/PLAY}$	L	L	L	H	L	H	REC/PLAY mode
$\overline{REC/PAUSE}$	L	L	L	H	H	L	REC/PAUSE mode

Fig. 6-4 Input/output truth table

4. After C322 has completed charging, Q309 goes OFF and IC302 (2 pin) goes to H level. Since at that time, IC302 (1 pin) is at L level, IC302 (12 pin) will be at H level supplying current to the base of Q312. Q312 goes ON, PS is activated, and play operation commences.

■ Record/Play operation

1. Turn the timer switch S13 to REC/PLAY and turn the power ON at the timer. IC302 (1 pin), (2 pin), and (9 pin) will go to L level.
2. While IC302 (2) is at L level, IC302 (10 pin) and (12 pin) is also at L level.
3. After C322 has completed charging up, Q309 goes OFF, and IC302 (2 pin) goes to H level. Since at this time IC302 (1 pin) and (9 pin) are L level, IC302 (10 pin) and (12 pin) are at H level and operation is the same as REC operation.

Auto-stop Circuit

When the tape has reached the end of its travel, the control IC goes into the STOP mode, stopping the mechanism. A photo-interruptor is used as the tape travel sensor. It is connected by belt to the take-up reel and uses fan blades to intercept the path of light.

1. During tape travel, the turning of the fan causes the photo-interruptor to generate a pulse signal. This causes Q304 to cycle ON-OFF and C321 repeats a charge-discharge cycle.
2. When tape travel stops, the signal from the photo-interruptor is lost, and Q304 stops its switching operation. +B charges C321 by route of R326 → R327 → C321. Along with the charging of C321, the potential at the base of Q305 rises and Q305 goes OFF. When Q305 goes OFF, Q306 goes ON, IC302 goes to STOP mode and operation ceases. This circuit is only effective during PLAY, FF and REW operations.

6.4 MUTING CIRCUIT

This set uses an IC-HA12006 for line output muting. This IC (IC301) is only effective in muting when REC input (2 pin) is at H level st the same time PLAY input (15 pin) is at L level. [IC301 (12 pin) gose L level]

FF/REW/STOP

At FF, REW, and STOP, IC302 (10 pin) and (12 pin) are both at L level. When IC302 (12 pin) is at L level, IC301 (15 pin) is also at L level, and when IC302 (10 pin) is at L level, Q303 is OFF. This causes IC302 (2 pin) to go to H level, muting LINE OUT, and current to flow from IC301 (2 pin) through the route D301 → R154 → Q103, muting the record amp.

Turning the Power Switch ON

When the power switch is turned ON, as was mentioned previously, the set is in a STOP status for 1.5 ~ 2.5 seconds after the power is turned on, and LINE OUT and the record amp is muted. Also current flows through the route C334 → R360 → R161 → Q106 and Q106 goes to ON. The meter is muted until C334 is charged up and Q106 goes to OFF.

Going from STOP Status to PLAY

When going from STOP to PLAY, IC302 (12 pin) goes from L level to H level and through C315 → R349 → D304, sends current to IC301 (1 pin), muting LINE OUT. Muting continues unitl C315 is charged up. (approx. 0.6 sec.)

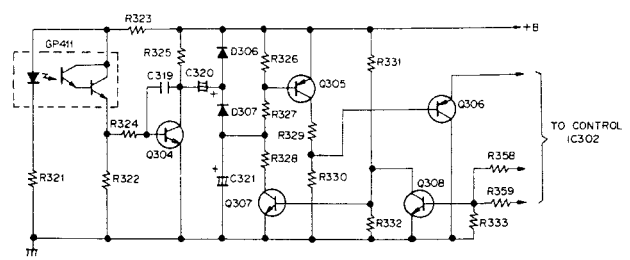


Fig. 6-5 Auto-stop circuit

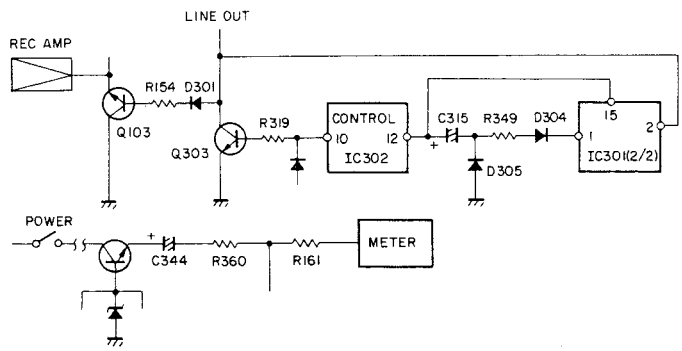
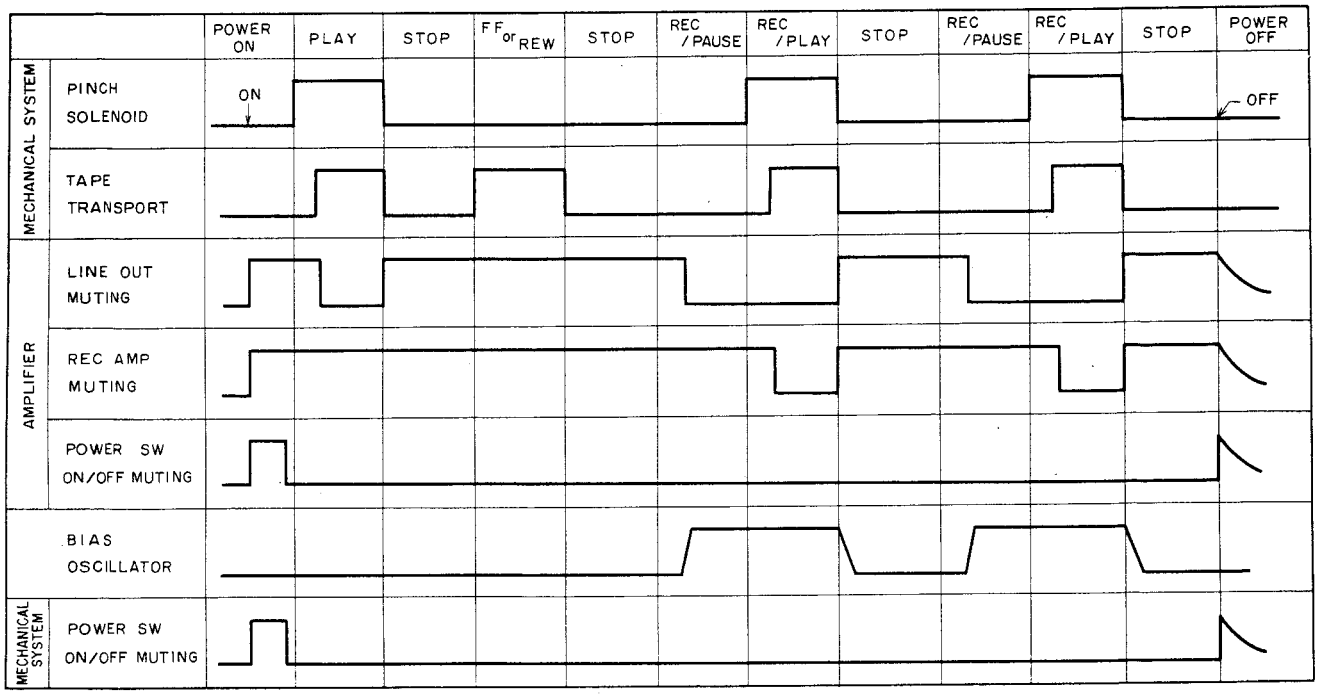


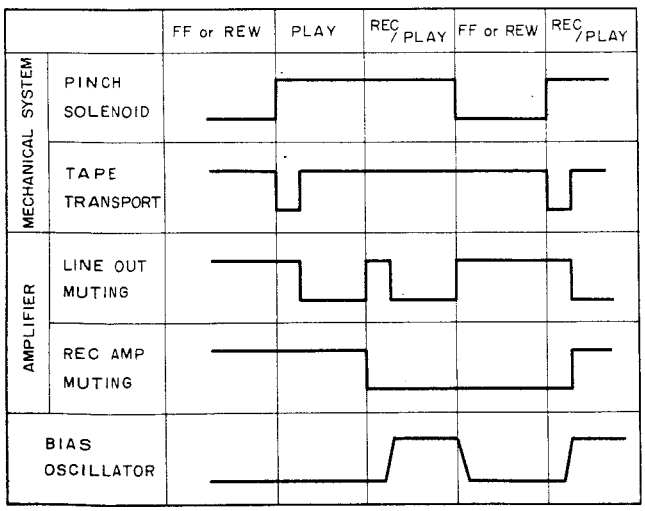
Fig. 6-6 Muting circuit

6.5 TIMING CHART

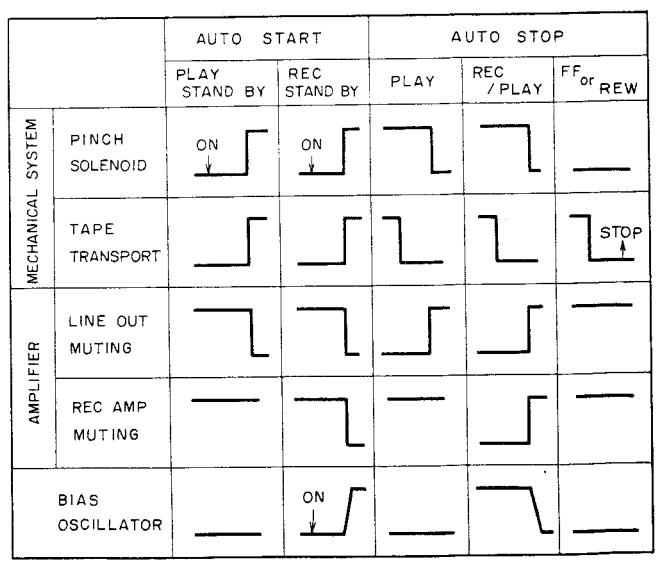
NORMAL OPERATION



DIRECT CHANGE



AUTO START



7. MECHANICAL ADJUSTMENTS

7.1 PINCH ROLLER PRESSURE ADJUSTMENT

1. Put the tape deck into the playback mode.
2. Gently push against the pinch roller arm with the tension gauge (Part No. GGK-047) and separate the pinch roller slightly from the capstan.
3. Then the pinch roller back onto the capstan, and read the value when the pinch roller starts to rotate. If the reading fails to lie within 350g ~ 550g, replace the pinch roller pressure spring (Part No. RBH-742).

7.2 REEL BASE TORQUE ADJUSTMENT

Prior to adjustment

Clean the both reel base, the capstan and the pinch roller with an alcohl moistened swab.

Adjustment

Measure the torque with the torque meter during playback, fast forward (FF) and rewind (REW) modes. The measured values should normally lie within the allowable ranges listed in the table 1 below.

If the measured values lie outside the relevant ranges, replace the TU (take-up) reel base assembly and/or supply reel base assembly (Part No. RXB-377), or driving arm full assembly (Part No. RXB-376).

Torque meter

Part No.	Description	Remarks
STD-605	Cassette test tape	FF/REW torque Adjustment

Table 1

	TU reel base	Supply reel base
Playback mode	35 ~ 50g·cm	*2 ~ 5g·cm
FF mode	72 ~ 100g·cm	*1 ~ 5g·cm
REW mode	*2 ~ 5g·cm	72 ~ 110g·cm

** denotes back tension torque*

7.3 TAPE SPEED ADJUSTMENT

1. Connect the frequency counter to the OUTPUT terminals (to pin code).
2. Playback the 3kHz portion of the STD-301 test tape. At the beginning, the frequency should be lie within the 2995Hz ~ 3010Hz range, and may be adjusted by turning the semi-fixed resistor located in the capstan motor adjustment hole as shown in Fig. 7-2.

Tape speed is increased by turning the semifixed resistor clockwise, and decreased by turning counter-clockwise.

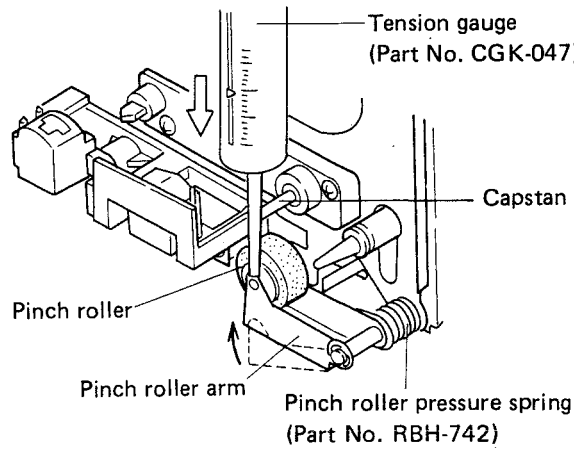


Fig. 7-1 Pinch roller pressure adjustment

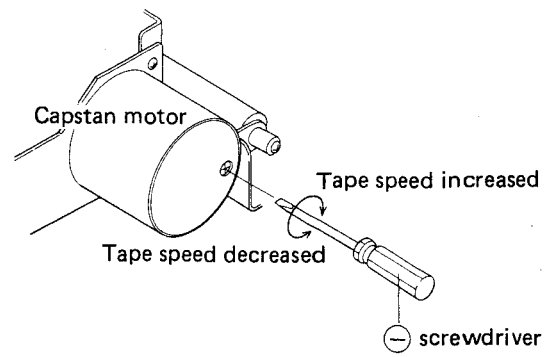


Fig. 7-2 Tape speed adjustment

7.4 REC DETECTOR SWITCH ADJUSTMENT

Adjust the tang (⇨) shown in Fig. 7-3 by the arrow to a position where when a cassette with an erase prevention detector is loaded into the holder, the lever switch is ON, and when a cassette without the detector is loaded, the switch is OFF.

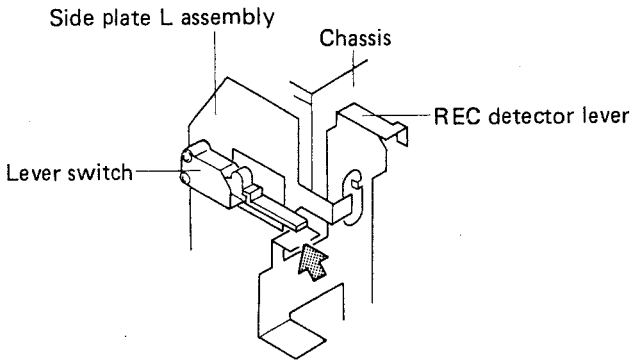


Fig. 7-3 REC detector switch adjustment

7.5 FF SOLENOID ADJUSTMENT

1. Put the deck into FF mode.
2. Loosen screws ❶ and adjust the FF solenoid mounting position so that the square hole of the reel base full assembly is flush against the boss of the driving arm full assembly (i.e. 0 separation) as shown in Fig. 7-4.

7.6 REW SOLENOID ADJUSTMENT

1. Put the deck into REW mode
2. Loosen screws ❷ and adjust the REW solenoid mounting position so that the square hole of the reel base full assembly is flush against the boss of the driving arm full assembly (i.e. 0 separation) as shown in Fig. 7-4.

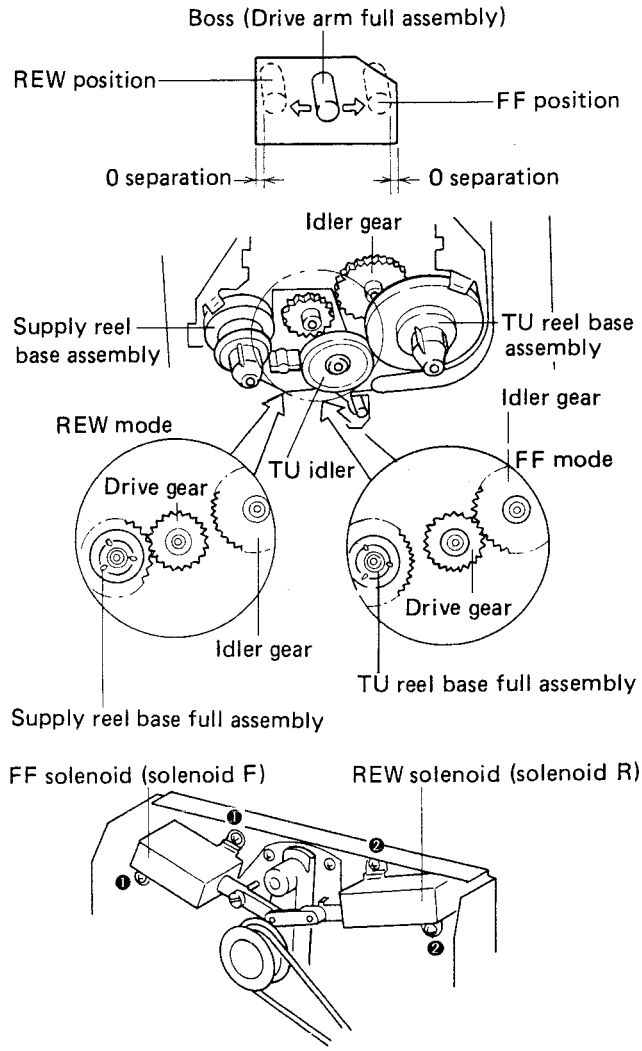


Fig. 7-4 FF (REW) solenoid adjustment

8. ELECTRICAL ADJUSTMENTS

Precaution

1. Mechanical adjustment should be complted.
2. Clean the following parts with an alcohol moistened swab: Record/Playback head, Pinch roller, Erase head, Rubber belts and Capstan.
3. Demagnetize record/playback head with a head demagnetizer.
4. Do not use magnetized screwdriver for adjustments.
5. Adjustments and measurements should be performed for both L-ch and R-ch with rated power supply voltage.
6. Adjustments should be performed in the order given in this service manual. Altering the order can hinder proper adjustments, resulting in loss of performance.
7. Level during measurements are based on 0dBv = 1V. Connect a 50kΩ dummy resistor across the OUTPUT terminals.
8. Let the CT-300 warm up (aging) for a few minutes before proceeding with the adjustment.
9. Set the DOLBY NR switch OFF unless directed otherwise.

Test Equipments/Tools Required;

1. Test tape
   - STD-331A..... for general playback purpose
   - STD-341A..... for playback adjustment
   - STD-601 ..... NORMAL blank tape
   - STD-603 ..... CrO_2 blank tape
   - STD-604 ..... METAL blank tape
2. Audio oscillator
3. AC millivoltmeter (AC mV)
4. Attenuator
5. Oscilloscope
6. Resistor 50kΩ (¼ W)

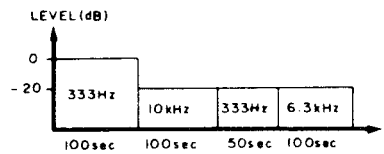


Fig. 8-1 Contents of the test tape STD-341A

8.1 HEAD AZIMUTH ADJUSTMENT

Setting:

MODE..... Playback
TAPE SELECTOR ..... NORM
VR101, VR201..... Max.
TEST TAPE STD-341A
AC mV meter ..... OUTPUT terminals

Procedure:

Adjust the azimuth adjusting screw for maximum AC mV meter readings for both L and R channels.

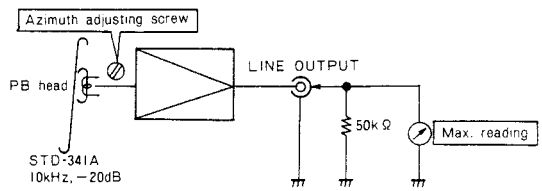


Fig. 8-2 Head azimuth adjustment

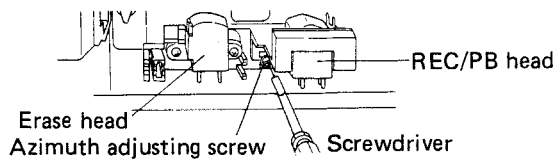


Fig. 8-3 Head azimuth adjustment

8.2 PLAYBACK EQUALIZER CHECK

Setting:

MODE..... Playback
TAPE SELECTOR .... NORM, METAL (or CrO_2)
TEST TAPE STD-341A
AC mV meter ..... OUTPUT terminals

Procedure:

1. Set the TAPE SELECTOR to the NORM position. Playback the 333Hz and 6.3kHz portions of the STD-341A test tape, and check that the difference in output level between two is +0.5dB ± 1dB.
2. Next set the TAPE SELECTOR to the METAL (or CrO_2) position. Playback the 333Hz and 6.3kHz portions of the STD-341A test tape, and check that the difference in output level between two is −3.5dB ± 1dB.

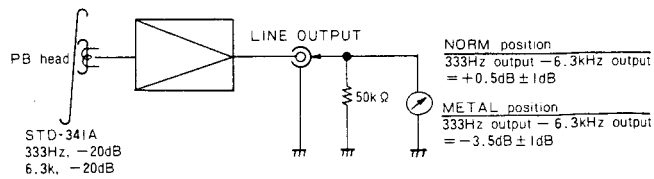


Fig. 8-4 Playback equalizer check

8.3 PLAYBACK LEVEL ADJUSTMENT

Since this adjustment determines the DOLBY NR level during playback, it should be performed precisely.

Setting:

MODE. . . . . Playback
TAPE SELECTOR . . . . NORM
TEST TAPE STD-341A
AC mV meter . . . . . TP1 (Lch) and TP2 (Rch) of the mother assembly

Procedure:

Adjust the VR101 (Lch) and VR201 (Rch) so that the AC mV meter reads −1.2dBv (0.87V).

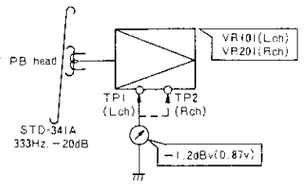


Fig. 8-5 Playback level adjustment

8.4 F.L. METER INDICATION CHECK

Setting:

MODE . . . . . Record
Input signal (INPUT) . . 333Hz,−10dBv (316mV)
AC mV meter . . . . . TP1(Lch) and TP2(Rch) of the mother assembly

Procedure:

Adjust the INPUT level control so that the AC mV meter reads −5.2dBv (0.54V). Then check the F.L. meter indication is 0dB ± 1dB.

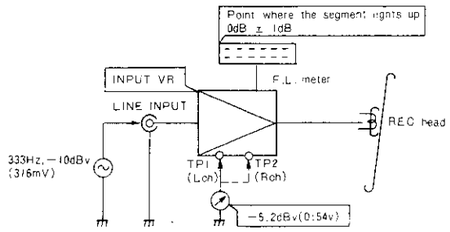


Fig. 8-6 F.L. meter indication check

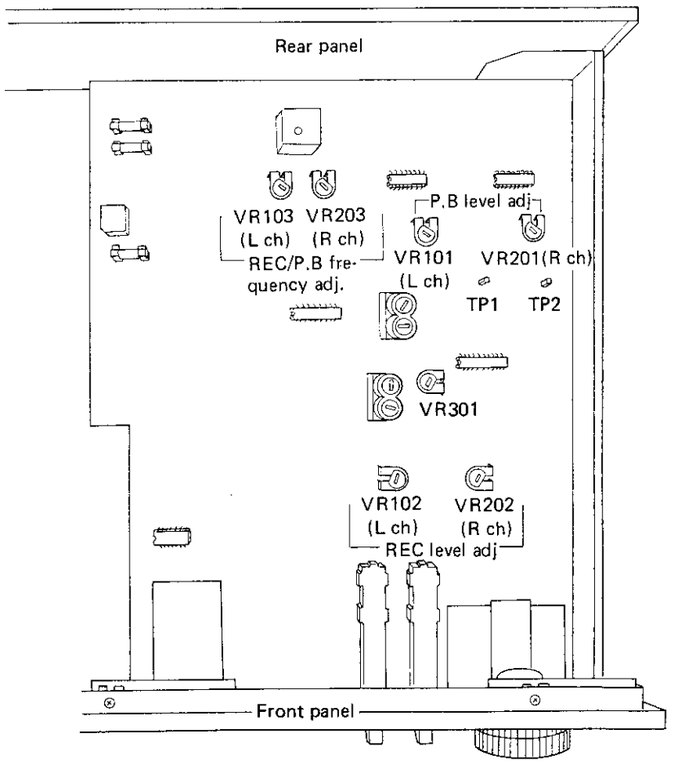


Fig. 8-7 Adjustment points

8.5 RECORDING / PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

Setting:

MODE . . . . . Record
TAPE SELECTOR . . . . . NORM
INPUT SIGNAL (INPUT) 333Hz,−30dBv (31mV)
TEST TAPE STD-601
AC mV meter . . . . . OUTPUT terminals

Procedure:

1. Set the TAPE SELECTOR to the NORM position. Apply the 333Hz, −30dBv (31mV) signal to the INPUT terminals, and adjust the INPUT level control so that the AC mV meter reads −27dBv (44.6mV).
2. Record the 333Hz and 6.3kHz signals onto the STD-601 test tape. Playback the tape and adjust the VR103 (Lch) and VR203 (Rch) so that the AC mV meter reads 0dB. Then confirm that the playback output deviation of the 6.3kHz signal is within 0dB $^{+1}_{-0.5}$ dB of the 333Hz signal.

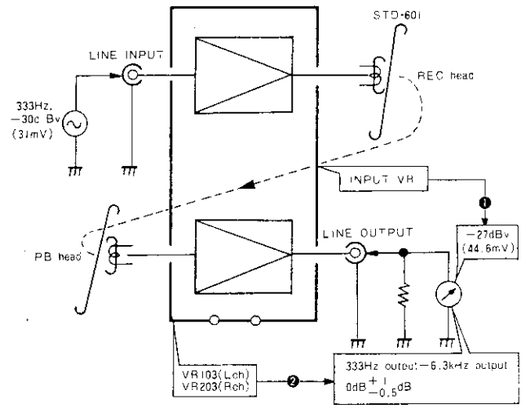
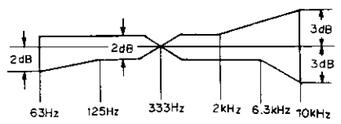


Fig. 8-8 Recording/Playback frequency response adjustment

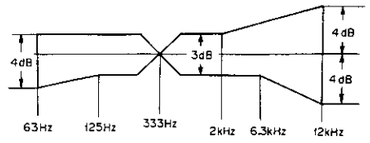
Frequency Response

Using STD-331A and the TAPE SELECTOR NORM position, with DOLBY NR OFF
However, the right channel is compensated by −1dB at 63Hz, and −0.5dB at 125Hz because of the insulation effect.

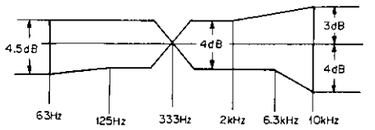


Overall Frequency Response

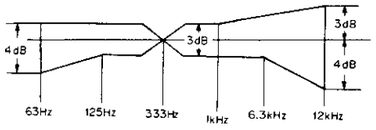
Using STD-601 and TAPE SELECTOR NORM position, with DOLBY NR OFF



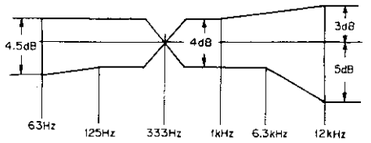
Using STD-601 and TAPE SELECTOR NORM position, with DOLBY NR ON



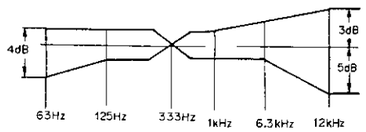
Using STD-603 and TAPE SELECTOR CrO_2 position, with DOLBY NR OFF



Using STD-603 and TAPE SELECTOR CrO_2 position, with DOLBY NR ON



Using STD-604 and TAPE SELECTOR METAL position, with DOLBY NR OFF



Using STD-604 and TAPE SELECTOR METAL position, with DOLBY NR ON

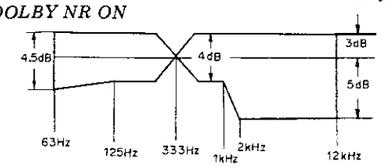


Fig. 8-9 Frequency response

8.5 RECORDING / PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

Setting:

MODE ..... Record
TAPE SELECTOR ..... NORM
INPUT SIGNAL (INPUT) 333Hz,—30dBv (31mV)
TEST TAPE STD-601
AC mV meter ..... OUTPUT terminals

Procedure:

1. Set the TAPE SELECTOR to the NORM position. Apply the 333Hz, —30dBv (31mV) signal to the INPUT terminals, and adjust the INPUT level control so that the AC mV meter reads —27dBv (44.6mV).
2. Record the 333Hz and 6.3kHz signals onto the STD-601 test tape. Playback the tape and adjust the VR103 (Lch) and VR203 (Rch) so that the AC mV meter reads 0dB. Then confirm that the playback output deviation of the 6.3kHz signal is within 0dB $^{+1}_{-0.5}$ dB of the 333Hz signal.

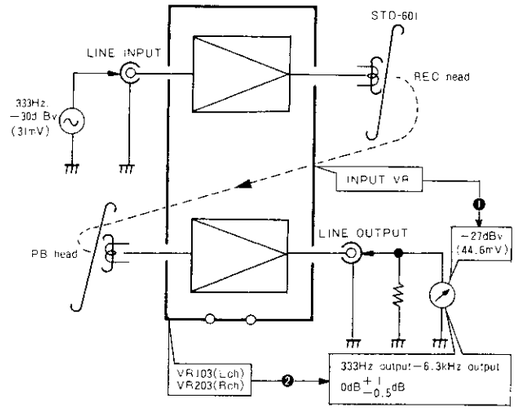


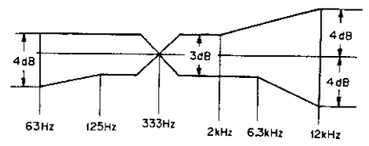
Fig. 8-8 Recording/Playback frequency response adjustment

Frequency Response

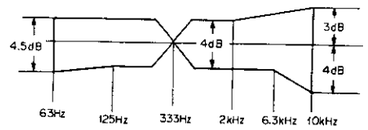
Using STD-331A and the TAPE SELECTOR NORM position, with DOLBY NR OFF
However, the right channel is compensated by —1dB at 63Hz, and —0.5dB at 125Hz because of the insulation effect.

Overall Frequency Response

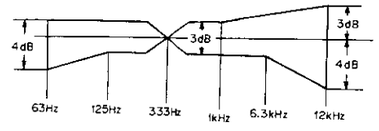
Using STD-601 and TAPE SELECTOR NORM position, with DOLBY NR OFF



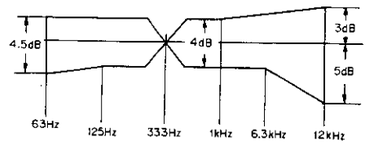
Using STD-601 and TAPE SELECTOR NORM position, with DOLBY NR ON



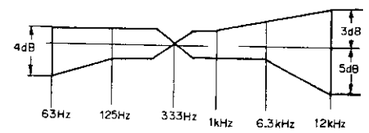
Using STD-603 and TAPE SELECTOR CrO_2 position, with DOLBY NR OFF



Using STD-603 and TAPE SELECTOR CrO_2 position, with DOLBY NR ON



Using STD-604 and TAPE SELECTOR METAL position, with DOLBY NR OFF



Using STD-604 and TAPE SELECTOR METAL position, with DOLBY NR ON

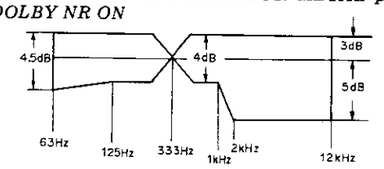


Fig. 8-9 Frequency response

8.6 RECORDING LEVEL ADJUSTMENT

Since this adjustment determines the DOLBY NR level during recording, it should be performed precisely.

Setting:

MODE ..... Record
TAPE SELECTOR ..... NORM, CrO_2, METAL
INPUT SIGNAL (INPUT) 333Hz,—10dBv (316 mV)
TEST TAPE STD-601, STD-604
AC mV meter ..... TP1 (Lch) and TP2 (Rch) of the mother assembly
DOLBY NR SWITCH ... OFF → ON

Procedure:

1. Set the TAPE SELECTOR to the NORM and DOLBY NR switch to the OFF position. Apply the 333Hz signal to the INPUT terminals, and adjust the INPUT level control so that the AC mV meter reads —5.2dBv (0.54V).
2. Next the DOLBY NR switch to the ON position and record the 333Hz signal onto the STD-601 test tape. Playback the signal and adjust the VR102 (Lch) and VR202 (Rch) so that the AC mV meter reads —5.2dBV (0.54V).
3. Set the TAPE SELECTOR to the CrO_2 position and record the 333Hz signal onto the STD-603 test tape. Playback signal and check that the AC mV meter reads —5.2dBV (0.54V) ±1.5dB.
4. Set the TAPE SELECTOR to the METAL position and record the 333Hz signal onto the STD-604 test tape. Playback signal and check that the AC mV meter reads —6.2dBv (0.48V) ± 1.5dB.

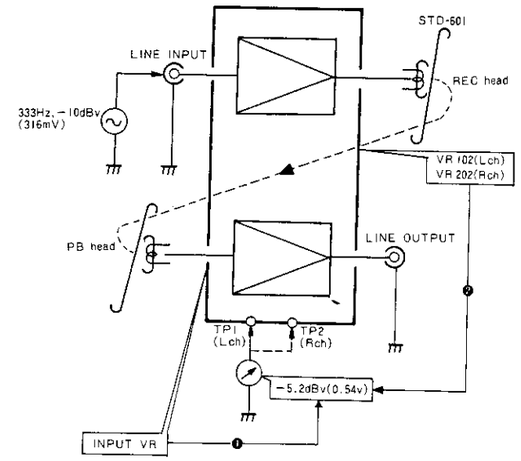
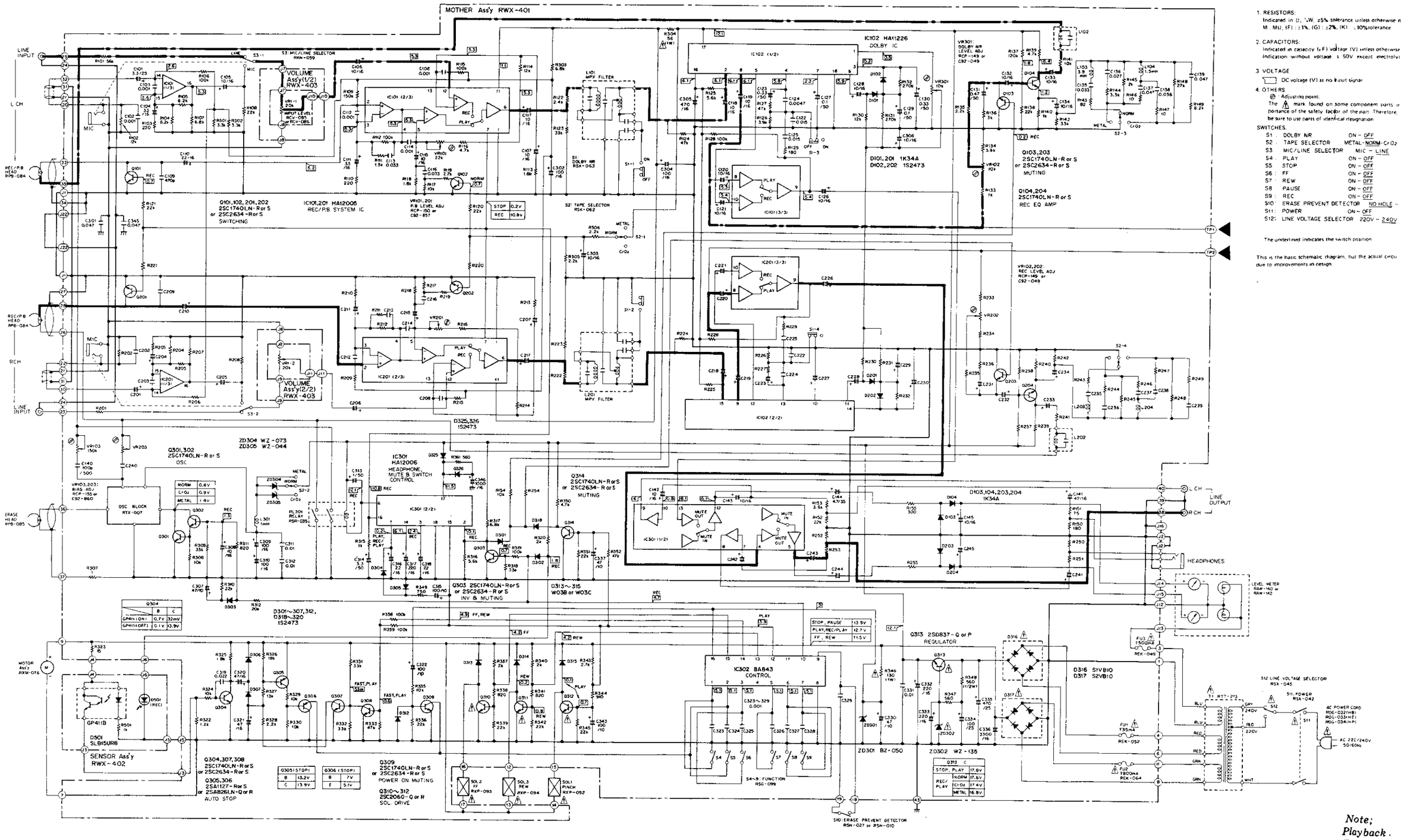


Fig. 8-10 Recording level adjustment

9. SCHEMATIC DIAGRAM



1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise n
M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% tolerance

2. CAPACITORS:
Indicated in capacity (μF) voltage (V) unless otherwise
Indication without voltage is 50V except electrolyt

3. VOLTAGE
DC voltage (V) at no input signal

4. OTHERS
Adjusting point
The ⚠ mark found on some component parts is
portance of the safety factor of the part. Therefore,
be sure to use parts of identical designation

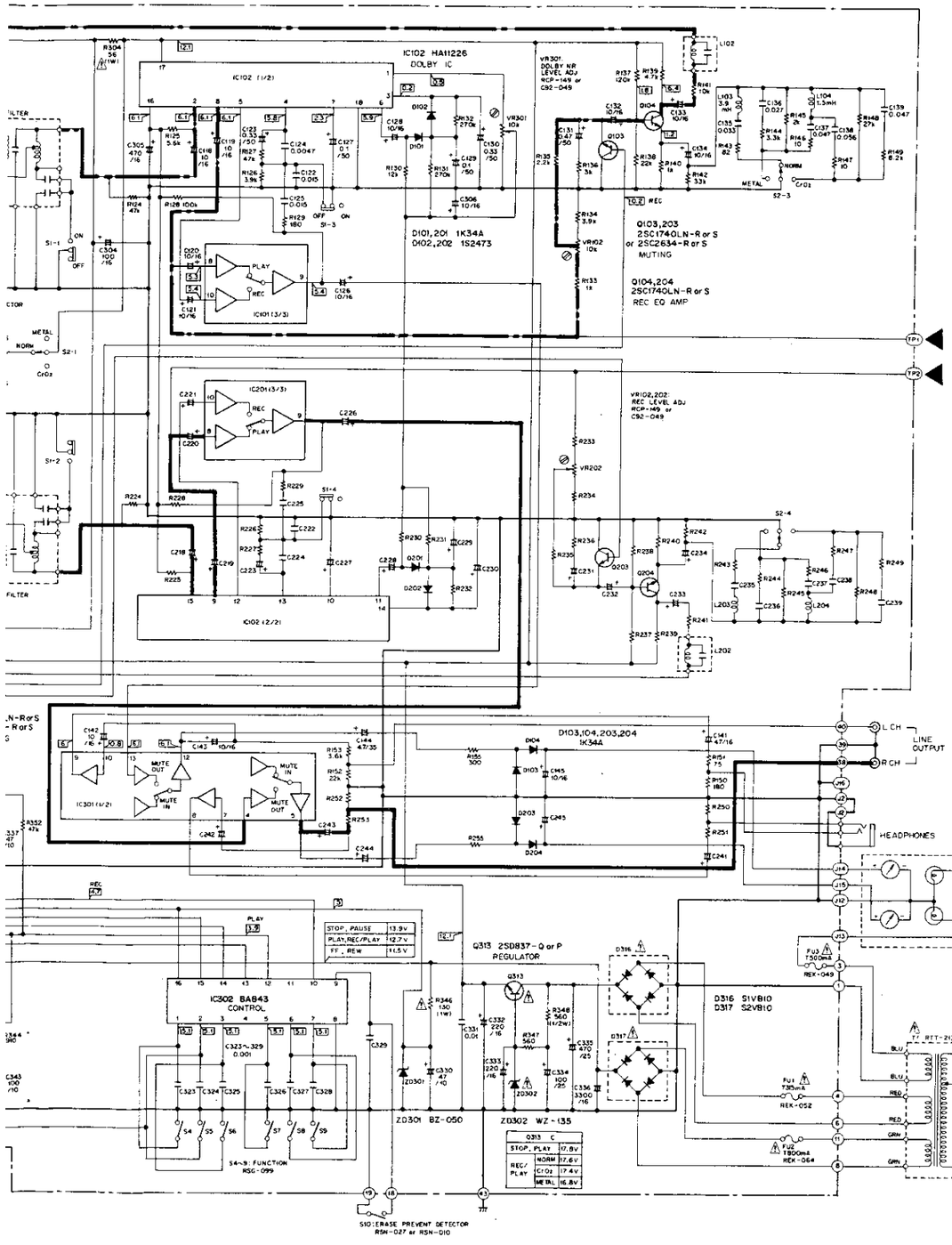
SWITCHES

S1 :	DOLBY NR	ON – OFF
S2 :	TAPE SELECTOR	METAL-NORM-CrO2
S3 :	MIC/LINE SELECTOR	MIC – LINE
S4 :	PLAY	ON – OFF
S5 :	STOP	ON – OFF
S6 :	FF	ON – OFF
S7 :	REW	ON – OFF
S8 :	PAUSE	ON – OFF
S9 :	REC	ON – OFF
S10 :	ERASE PREVENT DETECTOR	NO HOLE –
S11 :	POWER	ON – OFF
S12 :	LINE VOLTAGE SELECTOR	220V – 240V

The underlined indicates the switch position

This is the basic schematic diagram, but the actual circu
due to improvements in design.

Note;
Playback .
Recordin



1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% tolerance

2. CAPACITORS.
Indicated in capacity (μF) voltage (V) unless otherwise noted p : pF
Indication without voltage : 50V except electrolytic capacitor.

3. VOLTAGE
DC voltage (V) at no input signal

4. OTHERS.
⊘ Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation

SWITCHES.

S1	DOLBY NR	ON – OFF
S2	TAPE SELECTOR	METAL–NORM–CrO2
S3	MIC/LINE SELECTOR	MIC – LINE
S4	PLAY	ON – OFF
S5	STOP	ON – OFF
S6	FF	ON – OFF
S7	REW	ON – OFF
S8	PAUSE	ON – OFF
S9	REC	ON – OFF
S10	ERASE PREVENT DETECTOR	NO HOLE – HOLE
S11	POWER	ON – OFF
S12	LINE VOLTAGE SELECTOR	220V – 240V

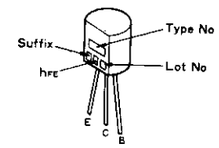
The underlined indicates the switch position

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

Note;
Playback signal route ——
Recording signal route —·—

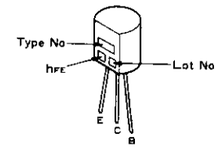
External Appearance of Transistors and ICs

2SA826LN
2SC1740LN



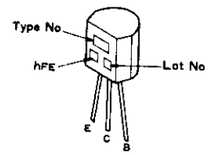
A

2SA1127
2SC2634

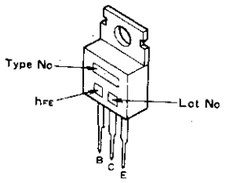


B

2SC2060

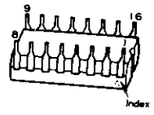


2SD837



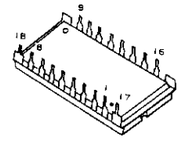
C

HA12005
HA12019
BA843

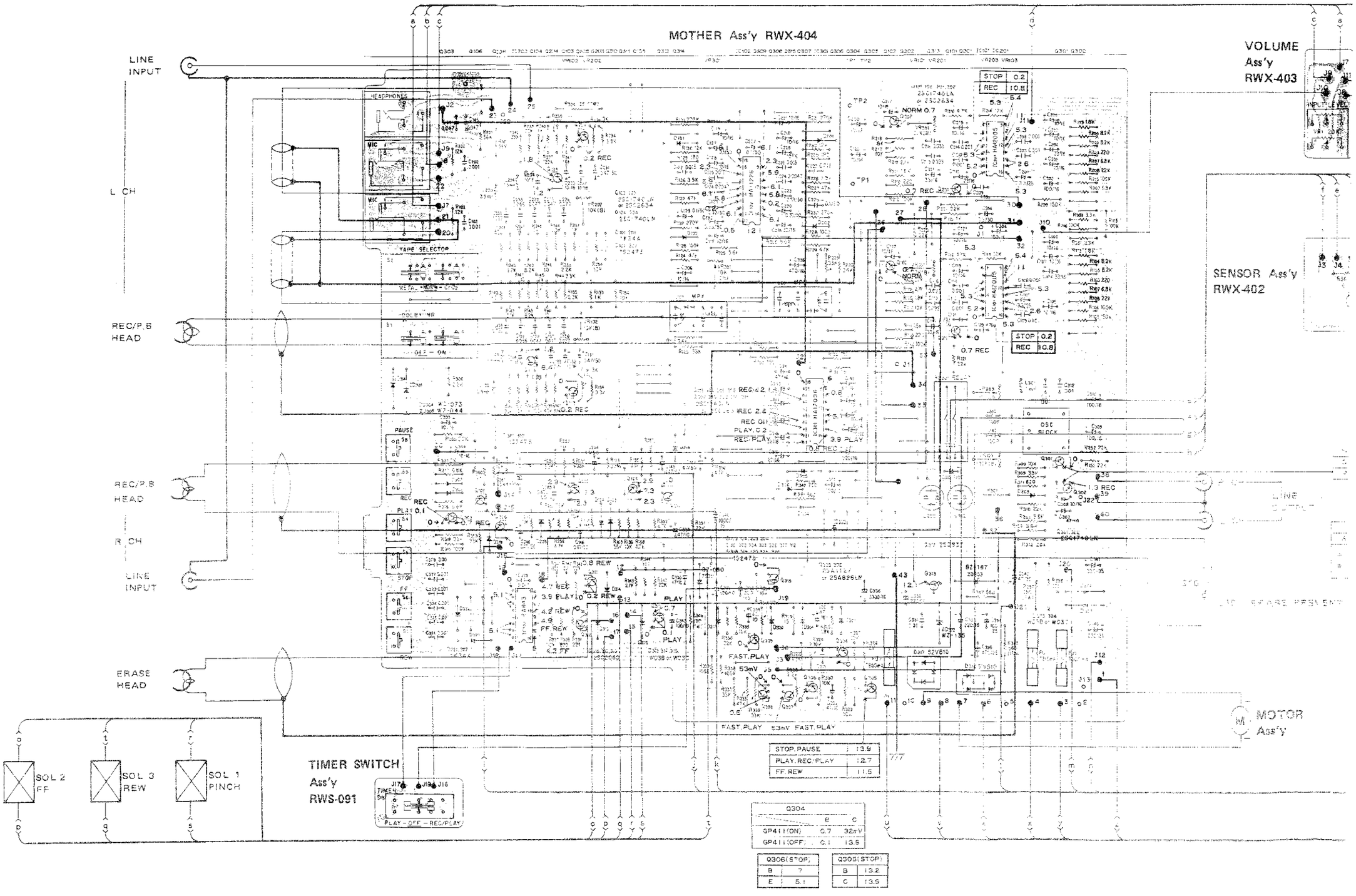


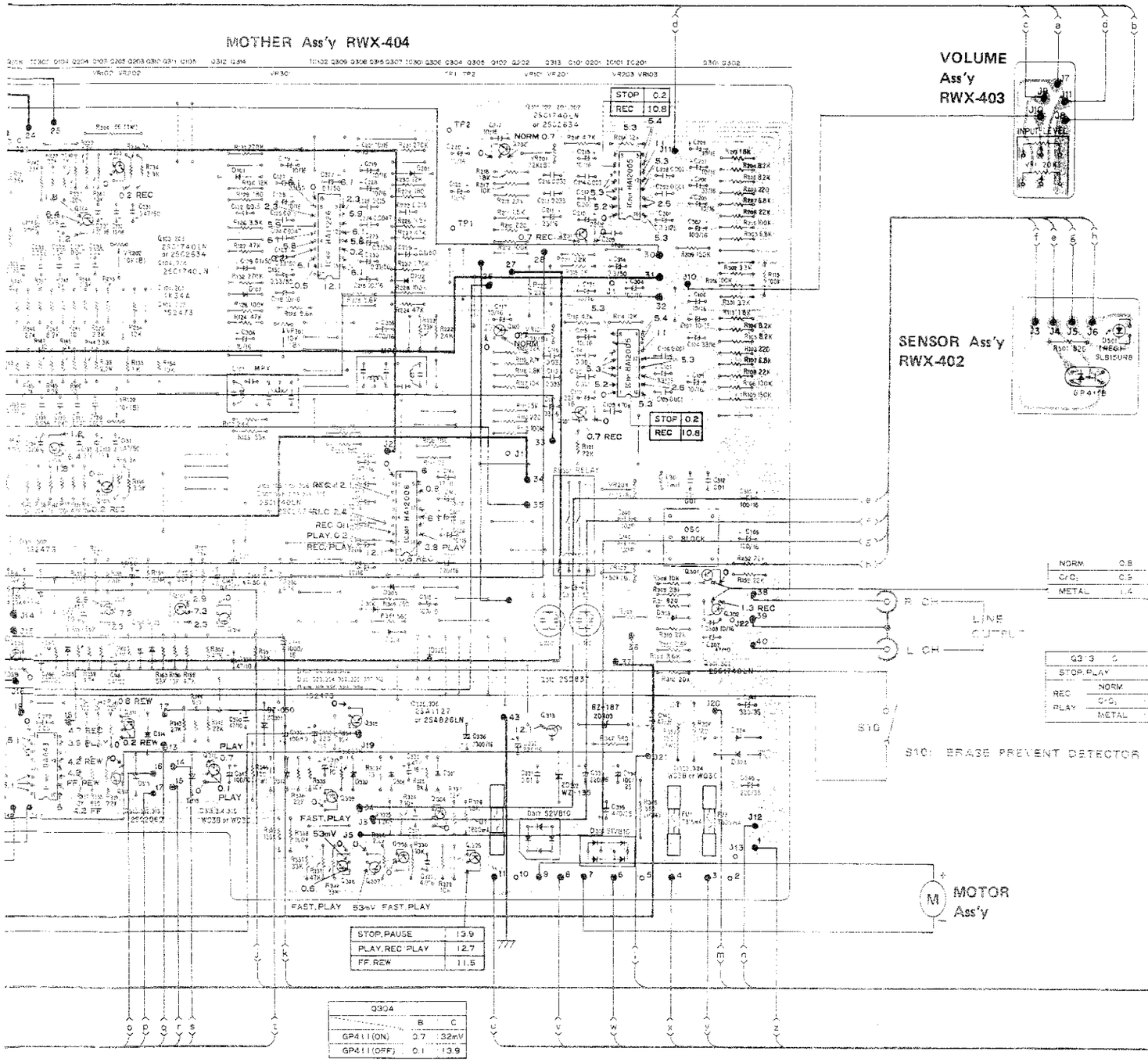
D

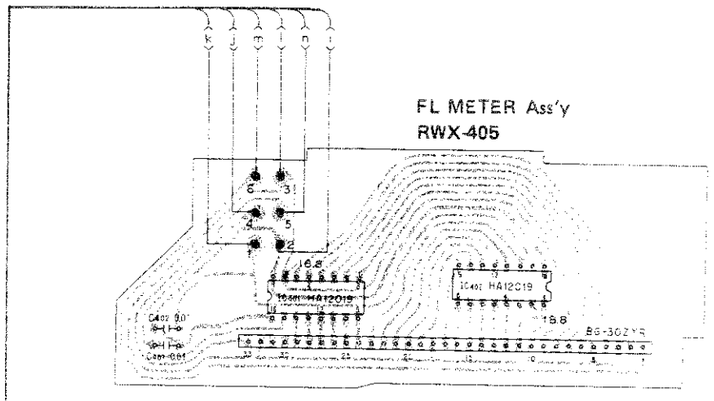
HA11226
HA12006



10. P.C.BOARD CONNECTION DIAGRAM



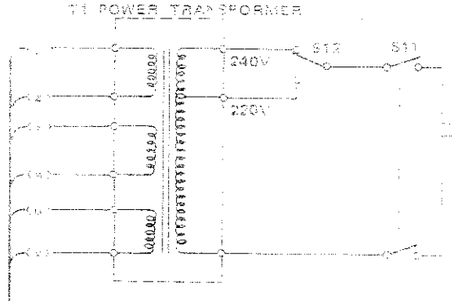




S12: LINE VOLTAGE SELECTOR

S11: POWER

T1 POWER TRANSFORMER



11. PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  - *Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).*
    - *560Ω——56 ×10¹——561 . . . . . RD¼PS 5 6 1 J*
    - *47kΩ——47 ×10³——473 . . . . . RD¼PS 4 7 3 J*
    - *0.5Ω——0R5 . . . . . RN2H 0 R 5 K*
    - *1Ω——010 . . . . . RS1P 0 1 0 K*
  - *Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).*
    - *5.62kΩ 562 × 10¹ 5621 . . . . . RN¼SR 5 6 2 1 F*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Miscellaneous Parts List

P.C. BOARD ASSEMBLIES

Part No.	Symbol & Description	
RWX-404		Mother assembly
RWX-402		Sensor assembly
RWX-403		Volume assembly
RWX-405		F.L. assembly
RWS-091		Timer-switch assembly

SWITCHES

Part No.	Symbol & Description	
⚠RSA-042	S11	Power switch
⚠RSX-045	S12	Line voltage selector (switchable 2 positions)

OTHERS

Part No.	Symbol & Description	
⚠ RTT-214	T1	Power transformer
⚠ RDG-033		Power cord (for HE type)
⚠ RDG-032		Power cord (for HB type)
⚠ RDG-029		Power cord (for HP type)
⚠ REC-272		Strain relief
RXX-291		Front panel assembly

Mother Assembly (RWX-404)

SWITCHES AND JACKS

Part No.	Symbol & Description	
RSK-063	S1	Lever switch B (DOLBY NR)
RSK-062	S2	Lever switch A (TAPE SELECTOR)
RKN-059	S3	Mic Jack
RSG-099	S4-S9	Push switch
RKN-060		Headphones jack

COILS FILTER AND RELAY

Part No.	Symbol & Description	
RTX-007		OSC block
RSR-035	RL301	Lead relay
RFT-083	L101, L201	MPX filter block
RTF-084	L102, L202	Trap coil
RTF-085	L103, L203	Peaking coil (3.9mH)
RTF-086	L104, L204	Peaking coil (1.5mH)
RTF-057	L301	Line coil

CAPACITORS

Part No.	Symbol & Description
CEANL 3R3M 25	C101,C201
CEANL 220M 16	C110,C210
CEAH 0R10M 50	C127,C129,C227,C229
CEAH 0R33M 50	C123,C130,C223,C230
CEAH 0R47M 50	C131,C145,C146,C231,C245,C246
CEAH 3R3M 50	C314
CEAH 010M 50	C313
CEA 331M 35	C341
CEA 471M 25	C335
CEAH 101M 25	C334
CEA 332M 16	C336
CEA 471M 16	C305
CEAH 221M 16	C317,C332,C333
CEAH 101M 16	C302,C304,C309,C310
CEAH 470M 16	C141,C241,C320–C322
CEAH 330M 16	C104,C111,C204,C211,C307

Part No.	Symbol & Description
CEAH 220M 16	C316,C318
CEAH 100M 16	C105–C107, C115, C117–C121, C126, C128, C132–C134, C142, C143, C205–C207, C215, C217–C221, C226, C228, C232–C234, C242, C243, C303, C306, C308, C344
CEAH 470M 10	C330,C337,C339
CEAH 221M 10	C338
CEAH 101M 10	C315,C343
CEA 221M 35	C340
CEAH 470M 35	C342
CEAH 4R7M 35	C144,C244
CQMAH 563J 50	C138,C238
CQMAH 473J 50	C137,C139,C237,C239
CQMAH 333J 50	C135,C235
CQMAH 273J 50	C136,C236
CQMAH 153K 50	C122,C125,C222,C225
CQMAH 472K 50	C124,C224
CQMAH 102K 50	C102,C103,C108,C112,C114,C202,C203, C208,C212,C214
CQMAH 333K 50	C113,C116,C213,C216
CQMAH 223K 50	C319
CKDYF 473Z 50	C301
CKDHYF 103Z 50	C311,C312,C331
CKDHYF 102Z 50	C323–C329
CQSA 101K 250	C140,C240
REC-018	C109,C209

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RCP-150 (C92-857)	VR101,VR201 Semi-fixed 22k-B
RCP-149 (C92-049)	VR102,VR202,VR301 Semi-fixed 10k-B
RCP-155 (C92-860)	VR103,VR203 Semi-fixed 100k-B
⚠RS1PF□□□J	R304,R346,R357
RS1PF□□□J	R314,R356
RD¼PSF□□□J	R313,R348
RD¼PM□□□J	R101–R161, R163, R201–R261, R263, R301–R303, R305–R312, R315–R320, R335–R345, R347, R349–R355, R358–R360, R322–R333

SEMICONDUCTORS

Part No.	Symbol & Description
HA12005	IC101,IC201
HA11226	IC102
HA12006	IC301
BA843	IC302
2SC1740LN (2SC2634)	Q101–Q103, Q105, Q106, Q201–Q203, Q205, Q206, Q303, Q304, Q307–Q309, Q314, Q315
2SC1740LN	Q104,Q204,Q301,Q302
2SA826LN (2SA1127)	Q305, Q306
⚠2SC2060	Q310–Q312
⚠2SD837	Q313
BZ-050	ZD301
⚠WZ-135	ZD302
BZ-187	ZD303
1K34A	D101, D201, D321, D322
1S2473	D102–D104, D202–D204, D301–D307, D312, D318–D320
⚠W03B (W03C)	D313–D315, D323, D324
⚠S1VB10	D316
⚠S2VB10F	D317

OTHERS

Part No.	Symbol & Description	
⚠REK-052	FU1	Fuse T315mA
⚠REK-064	FU2	Fuse T800mA
⚠REK-049	FU3	Fuse T500mA
RBF-041		Tube

Timer Switch Assembly (RWS-091)

Part No.	Symbol & Description	
RSH-051	S13	Slide switch (TIMER START)

Sensor Assembly (RWX-402)

Part No.	Symbol & Description
RD¼PM102J	R501
GP-411B	Photo interruptor
SLB15UR8	D501

Volume Assembly (RWX-403)

Part No.	Symbol & Description	
RCV-085 (RCV-086)	VR1	Variable resistor (INPUT)

F.L. Meter Assembly (RWX-405)

Part No.	Symbol & Description
CKDYF 103Z 50	C401,C402
HA12019	IC401,IC402
BG-30ZYR	F.L. Meter

Part No.	Symbol & Description
CEAH 220M 16	C316,C318
CEAH 100M 16	C105–C107, C115, C117–C121, C126, C128, C132–C134, C142, C143, C205–C207, C215, C217–C221, C226, C228, C232–C234, C242, C243, C303, C306, C308, C344
CEAH 470M 10	C330,C337,C339
CEAH 221M 10	C338
CEAH 101M 10	C315,C343
CEA 221M 35	C340
CEAH 470M 35	C342
CEAH 4R7M 35	C144,C244
CQMAH 563J 50	C138,C238
CQMAH 473J 50	C137,C139,C237,C239
CQMAH 333J 50	C135,C235
CQMAH 273J 50	C136,C236
CQMAH 153K 50	C122,C125,C222,C225
CQMAH 472K 50	C124,C224
CQMAH 102K 50	C102,C103,C108,C112,C114,C202,C203, C208,C212,C214
CQMAH 333K 50	C113,C116,C213,C216
CQMAH 223K 50	C319
CKDYF 473Z 50	C301
CKDHYF 103Z 50	C311,C312,C331
CKDHYF 102Z 50	C323–C329
CQSA 101K 250	C140,C240
REC-018	C109,C209

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RCP-150 (C92-857)	VR101,VR201 Semi-fixed 22k-B
RCP-149 (C92-049)	VR102,VR202,VR301 Semi-fixed 10k-B
RCP-155 (C92-860)	VR103,VR203 Semi-fixed 100k-B
⚠RS1PF□□□J	R304,R346,R357
RS1PF□□□J	R314,R356
RD½PSF□□□J	R313,R348
RD¼PM□□□J	R101–R161, R163, R201–R261, R263, R301–R303, R305–R312, R315–R320, R335–R345, R347, R349–R355, R358–R360, R322–R333

SEMICONDUCTORS

Part No.	Symbol & Description
HA12005	IC101,IC201
HA11226	IC102
HA12006	IC301
BA843	IC302
2SC1740LN (2SC2634)	Q101–Q103, Q105, Q106, Q201–Q203, Q205, Q206, Q303, Q304, Q307–Q309, Q314, Q315
2SC1740LN	Q104,Q204,Q301,Q302
2SA826LN (2SA1127)	Q305, Q306
⚠2SC2060	Q310–Q312
⚠2SD837	Q313
BZ-050	ZD301
⚠WZ-135	ZD302
BZ-187	ZD303
1K34A	D101, D201, D321, D322
1S2473	D102–D104, D202–D204, D301–D307, D312, D318–D320
⚠W03B (W03C)	D313–D315, D323, D324
⚠S1VB10	D316
⚠S2VB10F	D317

OTHERS

Part No.	Symbol & Description	
⚠REK-052	FU1	Fuse T315mA
⚠REK-064	FU2	Fuse T800mA
⚠REK-049	FU3	Fuse T500mA
RBF-041		Tube

Timer Switch Assembly (RWS-091)

Part No.	Symbol & Description	
RSH-051	S13	Slide switch (TIMER START)

Sensor Assembly (RWX-402)

Part No.	Symbol & Description
RD¼PM102J	R501
GP-411B	Photo interruptor
SLB15UR8	D501

Volume Assembly (RWX-403)

Part No.	Symbol & Description	
RCV-085 (RCV-086)	VR1	Variable resistor (INPUT)

F.L. Meter Assembly (RWX-405)

Part No.	Symbol & Description
CKDYF 103Z 50	C401,C402
HA12019	IC401,IC402
BG-30ZYR	F.L. Meter

12. EXPLODED VIEWS

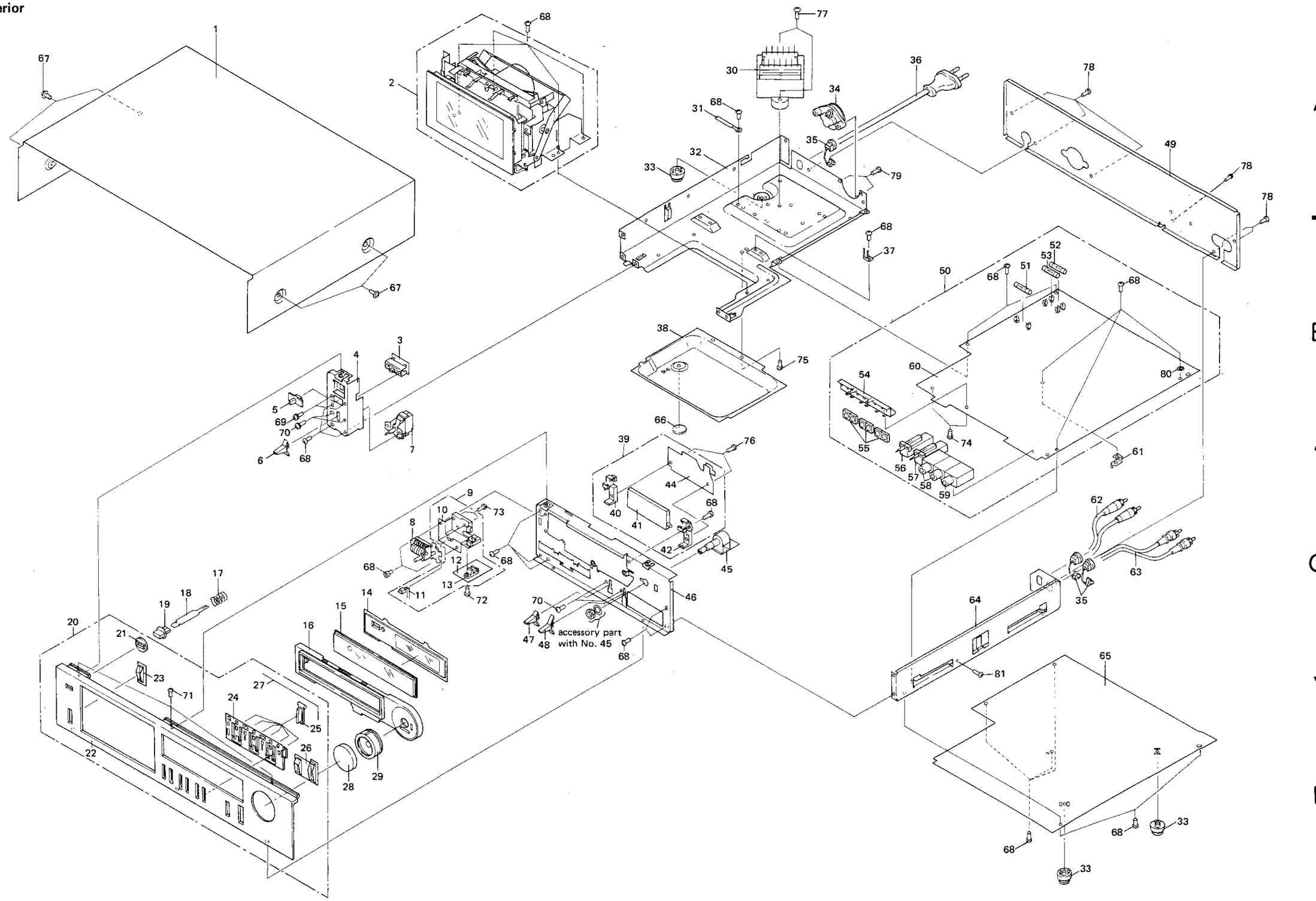
NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Parts List

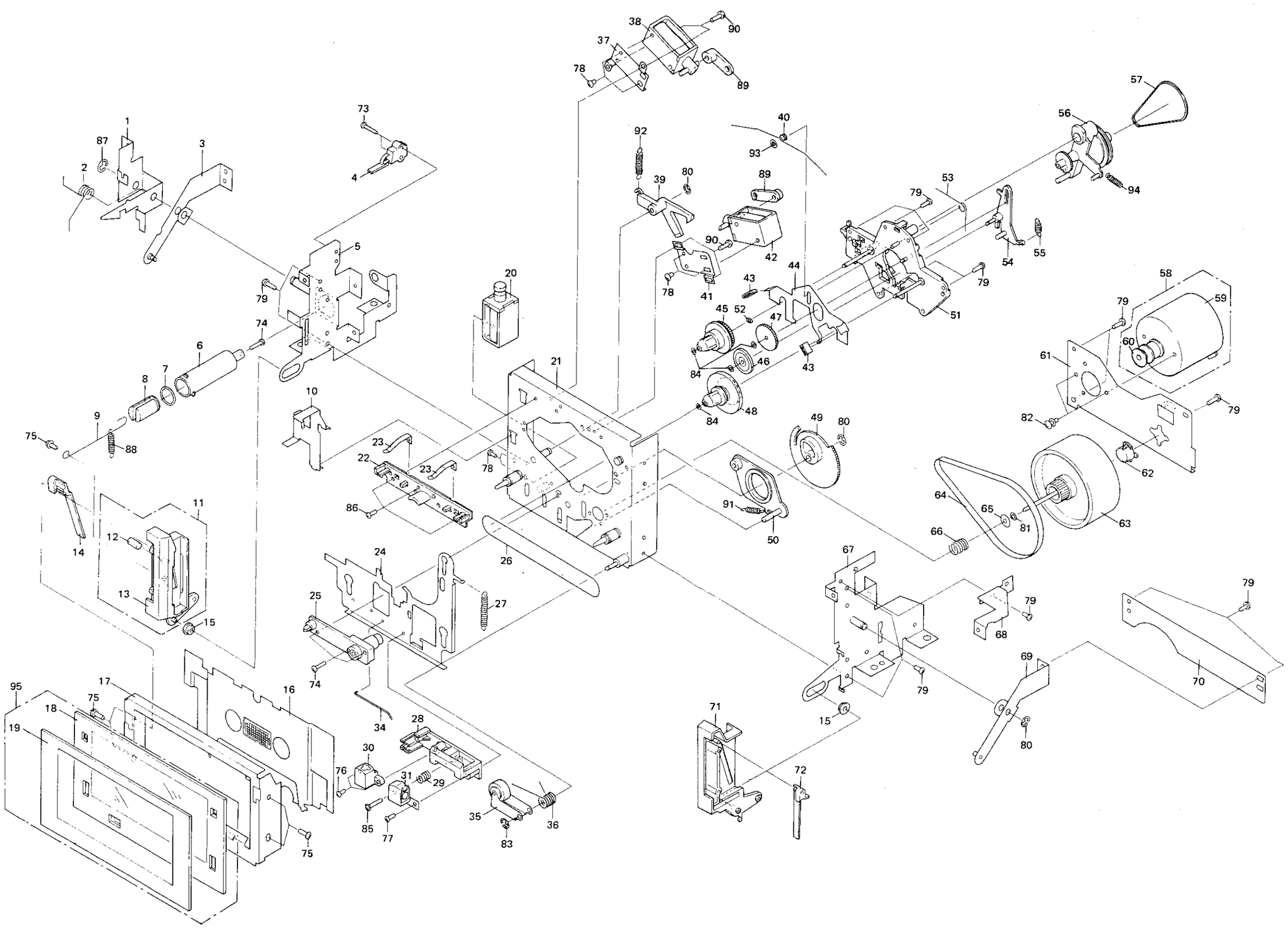
Key No.	Part No.	Description
1.	RNA-509	Bonnet
2.		Mechanism assembly
3.	RWS-091	Timer-switch assembly
4.		Sub panel stay
5.	RAC-133	Knob (TIMER START)
6.	RAC-124	Lever knob A (POWER)
⚠ 7.	RSA-042	Power switch
8.	RAW-141	Counter
9.	RWX-402	Sensor assembly
10.		Counter holder
11.	SLB15UR8	LED
12.		Sensor p.c.b.
13.	GP-411P	Photo interruptor
14.	RNL-074	Meter lens
15.	RNL-075	Front cover
16.	RNL-073	Escutcheon
17.	RBH-750	Eject spring
18.		Eject plate
19.	RAC-132	Knob (EJECT)
20.	RXX-291	Front panel assembly
21.	RNL-078	Knob guide
22.		Front panel
23.	RNL-076	Escutcheon S
24.	RNL-082	Knob holder
25.	RAC-131	Control knob
26.	RNL-077	Escutcheon W
27.	RBH-751	Earth spring
28.	RAA-344	Knob A (INPUT L)
29.	ARR-345	Knob B (INPUT R)
⚠30.	RTT-214	Power transformer
31.		UL cord clamper
32.		Chassis
33.	REC-356	Foot
⚠34.	RSX-045	Line voltage selector
⚠35.	REC-272	Strain relief
⚠36.	RDG-033	Power cord (for HE type)
	RDG-032	Power cord (for HB type)
	RDG-029	Power cord (for HP type)
37.		Terminal (GND)
38.		Bottom cover
39.	RWX-405	F.L. meter assembly
40.		Meter holder

Key No.	Part No.	Description
41.	BG-30ZYR	F.L. meter
42.		Meter holder R
43.	.....	
44.		F.L. meter p.c.b.
45.	RWX-403	Volume assembly
46.		Panel stay
47.	RAC-124	Lever knob A (DOLBY NR)
48.	RAC-125	Lever knob B(TAPE SELECTOR)
49.		Rear panel
50.	RWX-404	Mother assembly
⚠51.	REK-064	Fuse (T 800mA)
⚠52.	REK-049	Fuse (T 500mA)
⚠53.	REK-052	Fuse (T 315mA)
54.		Switch holder
55.	RSG-099	Push switch
56.	RSK-063	Lever switch (DOLBY NR)
57.	RSK-062	Lever switch(TAPE SELECTOR)
58.	RKN-059	MIC jack
59.	RKN-060	Headphones jack
60.		Mother p.c.b.
61.		P.C.B holder
62.	RDE-046	Pin cord B (OUTPUT)
63.	RDE-045	Pin cord A (INPUT)
64.		Side frame
65.		Bottom plate
66.	REC-355	Sliding stopper
67.	ATZ40P080FZK	Screw
68.	VCZ30P060FMC	Screw
69.	PMA26P060FMC	Screw
70.	PMA30P060FMC	Screw
71.	CMZ30P060FMC	Screw
72.	PBZ30P120FMC	Screw
73.	PBZ26P060FMC	Screw
74.	CBZ26P060FMC	Screw
75.	VCT30P060FZK	Screw
76.	CTZ26P060FMC	Screw
77.	VBZ40P160FMC	Screw
78.	VCZ30P060FZK	Screw
79.	VBZ30P080FZK	Screw
80.	WA30W100R100	Washer
81.	VCZ30P100FMC	Screw

Exterior



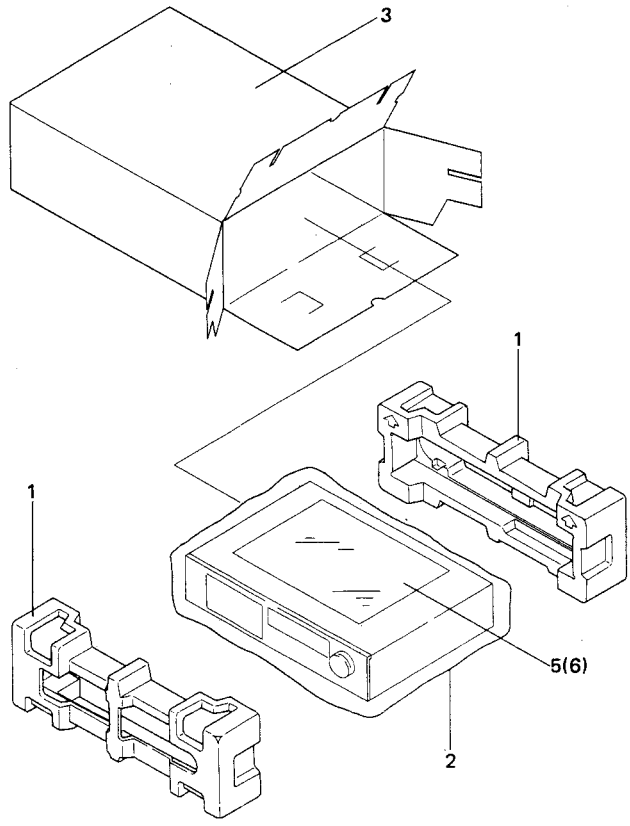
Mechanism Assembly



Parts List

Key No.	Part No.	Description
1.		Eject lever
2.	RBH-743	Eject lever spring
3.		Side arm L assembly
4.	RSN-027	Lever switch
5.		Side plate L assembly
6.	RNK-995	Cylinder
7.	REB-323	O ring
8.	RNL-053	Piston
9.	RBH-726	Connection rod
10.		REC prevent lever
11.	RXB-405	Pocket L assembly
12.		Bush
13.		Pocket L
14.	RNL-057	Pocket spring L
15.	RNK-994	Guide roller
16.	RAH-347	Cassete plate
17.		Pocket frame
18.		Door
19.		Door panel
⚠ 20.	RXP-092	Solenoid P
21.		Chassis assembly
22.	RNL-042	Half receptacle
23.	RNF-895	Half spring
24.		Head base
25.	RXB-359	Bearing holder assembly
26.	REB-417	Counter belt
27.	RBH-741	HB return spring
28.	RNL-050	Sub head base
29.	RBH-723	Head adjust spring
30.	RPB-085	Erase head
31.	RPB-084	REC/PB head
32.	.....	
33.	.....	
34.	RBH-759	HB drive spring
35.	RXB-414	Pinch arm assembly
36.	RBH-742	Pinch pressure spring
37.		Solenoid bracket L
⚠ 38.	RXP-094	Solenoid R
39.	RNL-051	Gear lever
40.	RBH-727	Brake spring
41.		Solenoid bracket R
⚠ 42.	RXP-093	Solenoid F
43.	REB-187	Brake shoe
44.		Brake plate
45.	RXB-377	Supply reel base assembly
46.	RNK-999	TU idler
47.	RNK-998	Idler gear
48.	RXB-360	TU reel base assembly
49.	RNL-059	Cam gear
50.	RXB-387	Lever assembly
51.	RXB-378	Reel base assembly
52.	WA21D040D025	Washer
53.	RBH-725	FR spring
54.	RXB-374	Idler arm assembly
55.	RBH-724	Idler pressure spring
56.	RXB-376	Driving arm full assembly
57.	REB-413	Drive belt
58.	RXM-076	Motor assembly
59.		Motor
60.		Motor pulley
61.		Flywheel holder
62.		Thrust receptacle
63.	RXB-358	Flywheel assembly
64.	REB-411	Capstan belt
65.	RBF-050	Oil stop wahser
66.	RBH-721	Flywheel spring
67.		Side plate R assembly
68.		Mounting plate
69.		Side arm R assembly
70.		Connection plate
71.	RNL-049	Pocket R
72.	RNL-058	Pocket spring R
73.	PMZ20P080FMC	Screw
74.	VCZ26P090FMC	Screw
75.	ATZ26P060FZK	Screw
76.	PMZ20P130FMC	Screw
77.	PMZ20P120FMC	Screw
78.	PMZ26P030FMC	Screw
79.	VCZ26P060MFC	Screw
80.	YE30FUC	Washer
81.	WA21D040D25	Washer
82.	PMA26P040FMC	Screw
83.	YE20FUC	Washer
84.	WA17D032D025	Washer
85.	IMZ20Y120FMC	Screw
86.	PCZ26P060FMC	Screw
87.	YE40FUC	Washer
88.	RBH-761	Earth spring
89.	RNL-047	Solenoid arm
90.	PMZ26P060FMC	Screw
91.	RBH-744	Lever spring
92.	RBH-722	Gear lever spring
93.	YS20FBT	Washer
94.	RBH-758	FF spring
95.	RXX-290	Door assembly

13. PACKING



Parts List

Key No.	Part No.	Description
1.	RHA-220	Pad
2.	RHX-031	Sheet C
3.	RHG-360	Packing case
4.	.....	
5.	RRB-136	Operating instructions (English)
(6).	RRD-046	*Operating instructions (German/ French)

*

The operating instructions (German/French) is provided with HE type only.