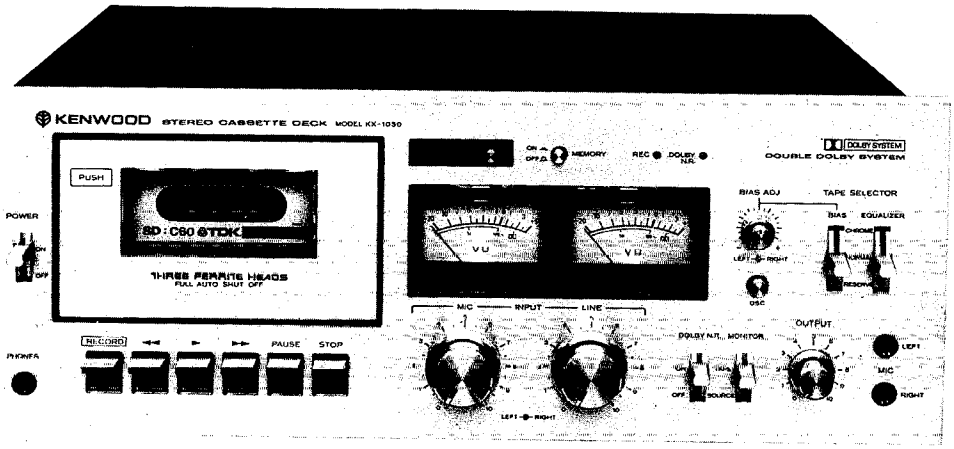
103

KENWOOD

HI/FI STEREO COMPONENTS

SERVICE MANUAL

KX-1030
(KX-1003)



STEREO CASSETTE DECK

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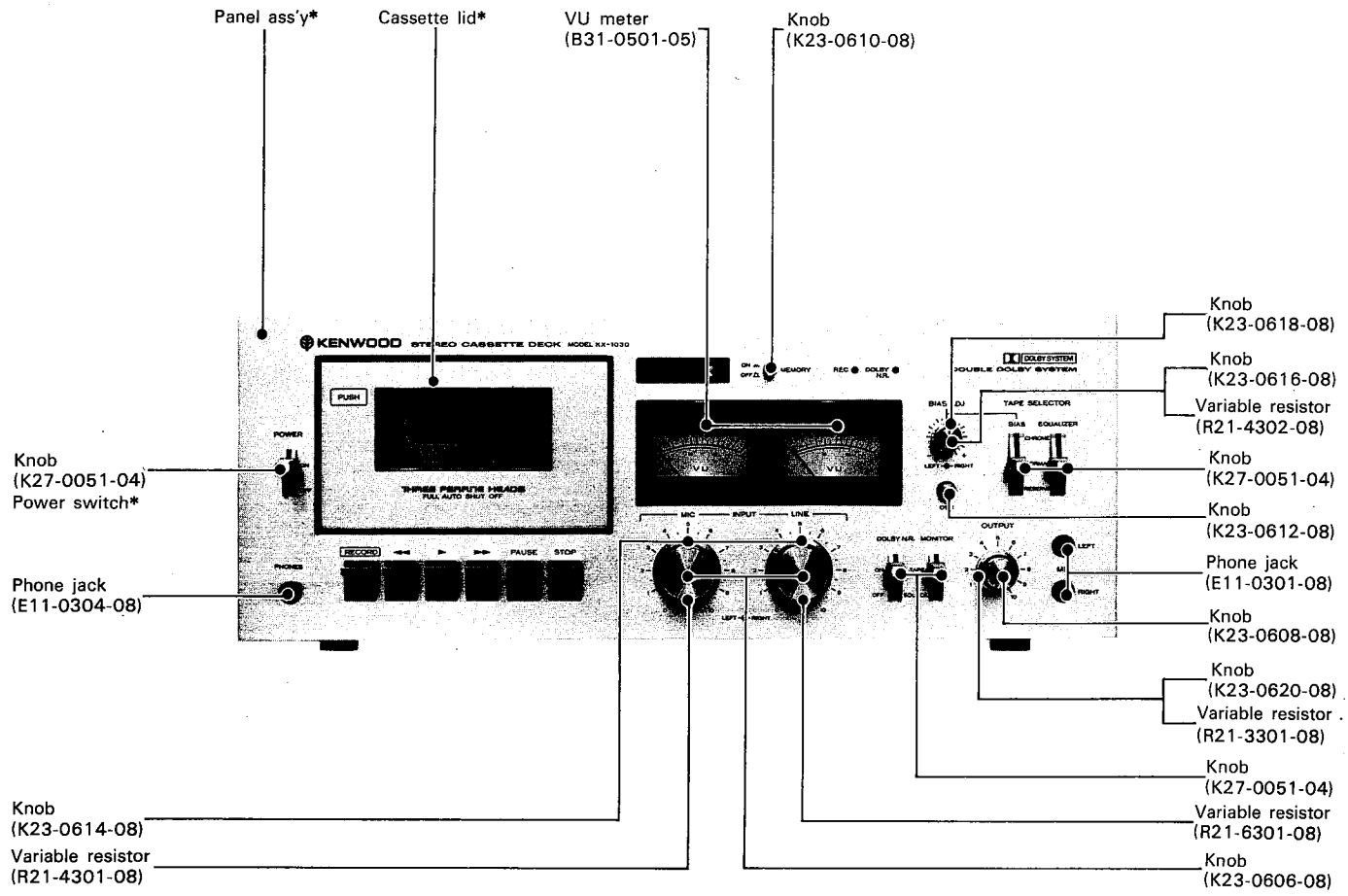
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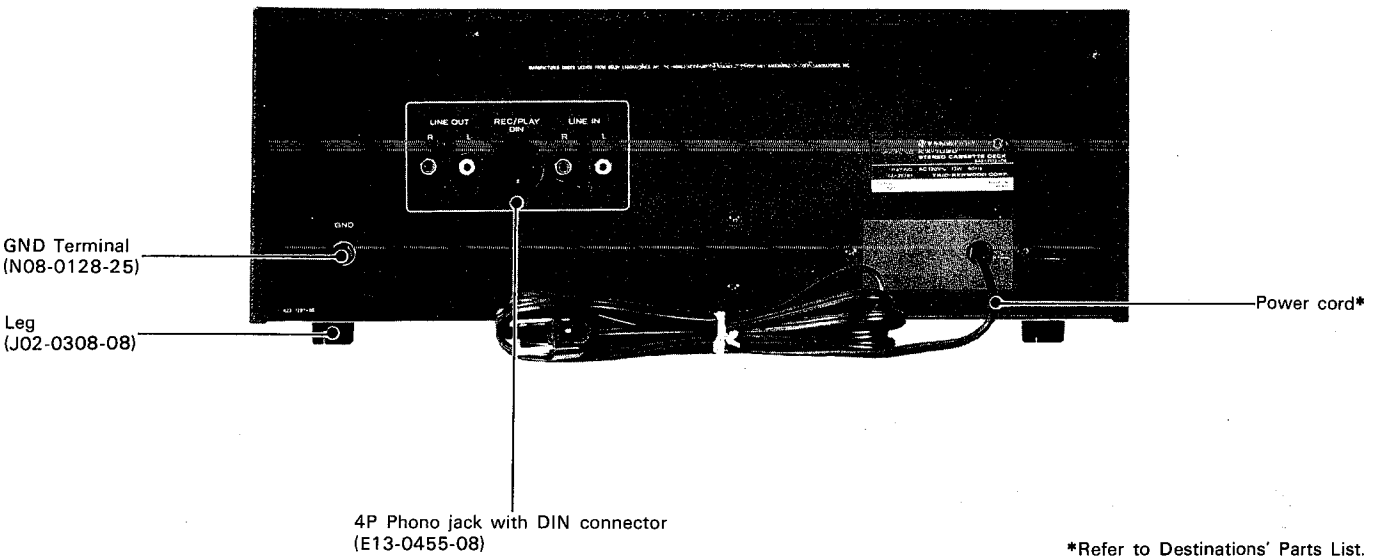
Note:
The products are subject to modification in components and circuits in different countries and regions. This is because each product must be used under the best condition. This manual provides information of modification based on the standard in the U.S., for the convenience of ordering associated components and parts.

U.S.A.	K
Canada	P
PX	U
Australia	X
Europe	W
England	T
Scandinavia	L
South Africa	S
Other Areas	M

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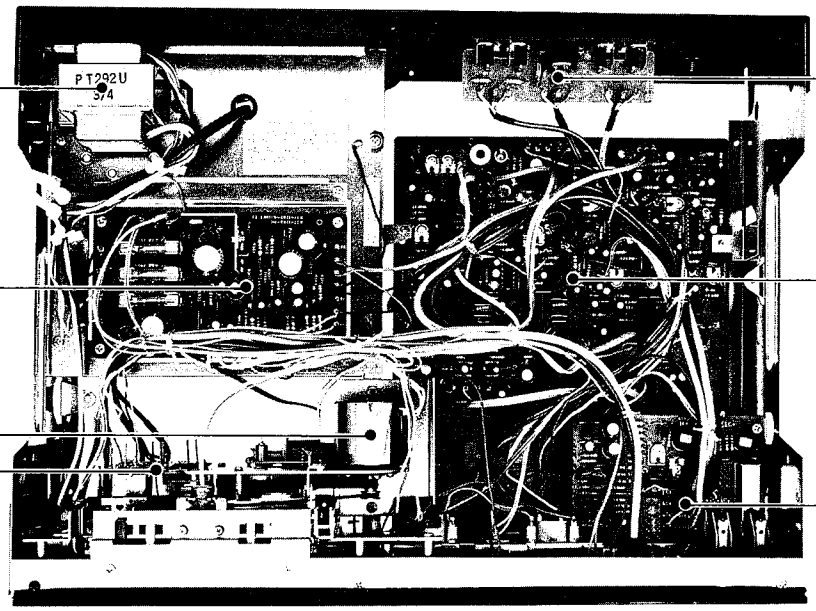
EXTERNAL VIEW

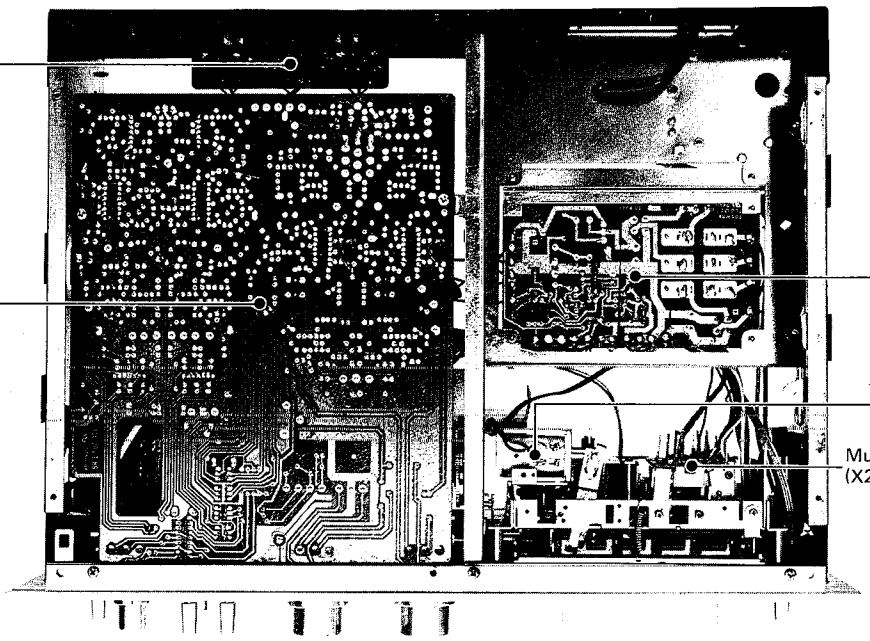




*Refer to Destinations' Parts List.

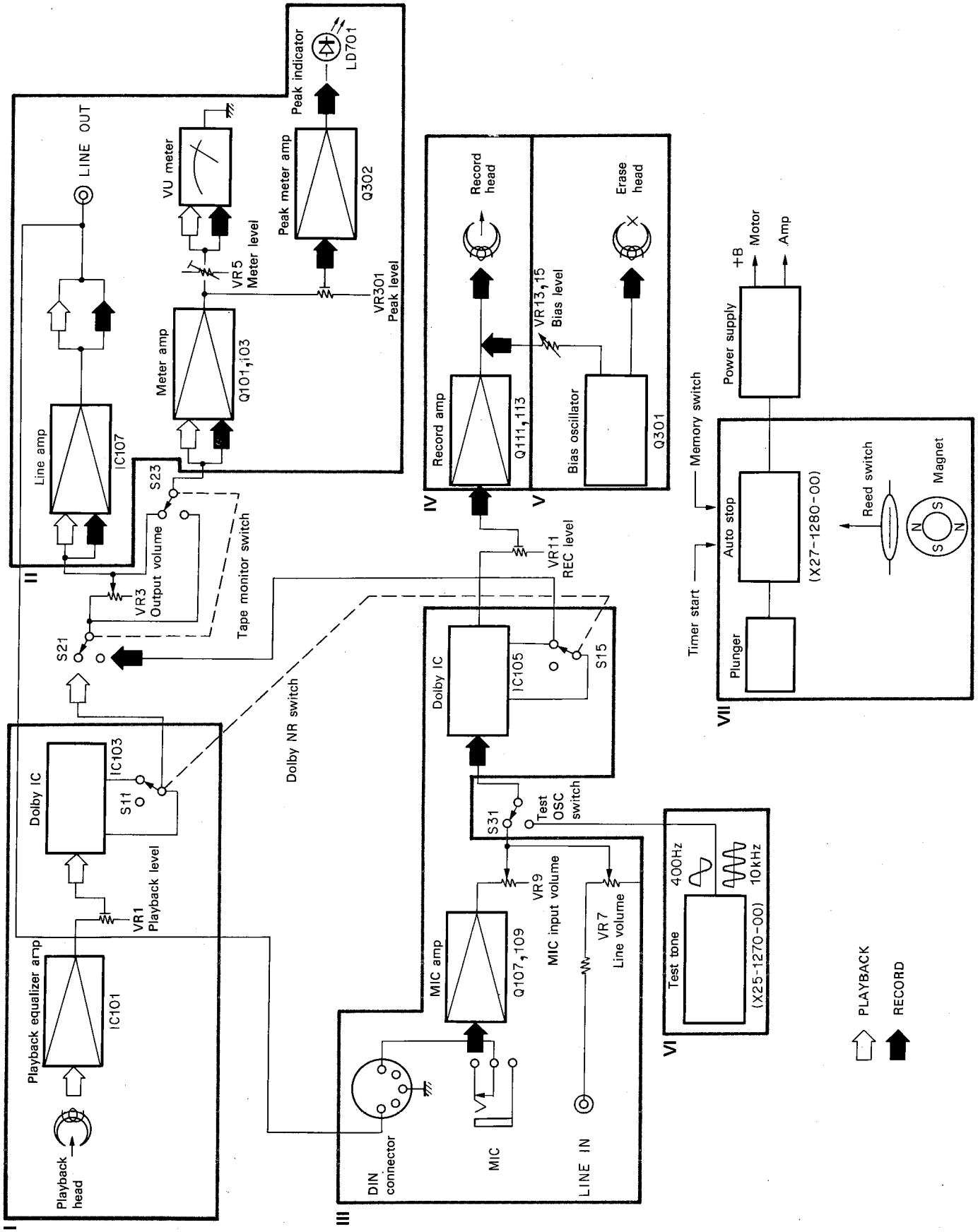
INTERNAL VIEW





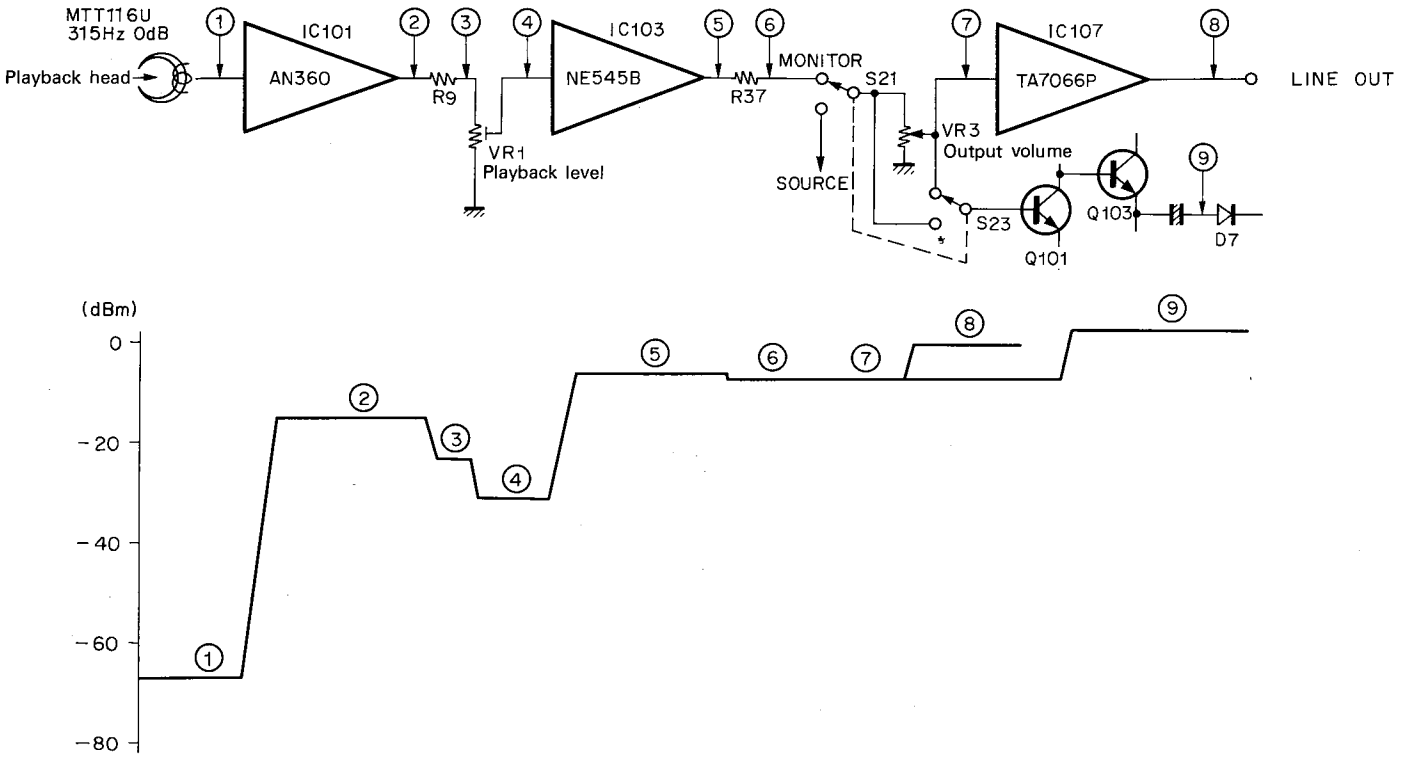
*Refer to Destinations' Parts List.

BLOCK DIAGRAM

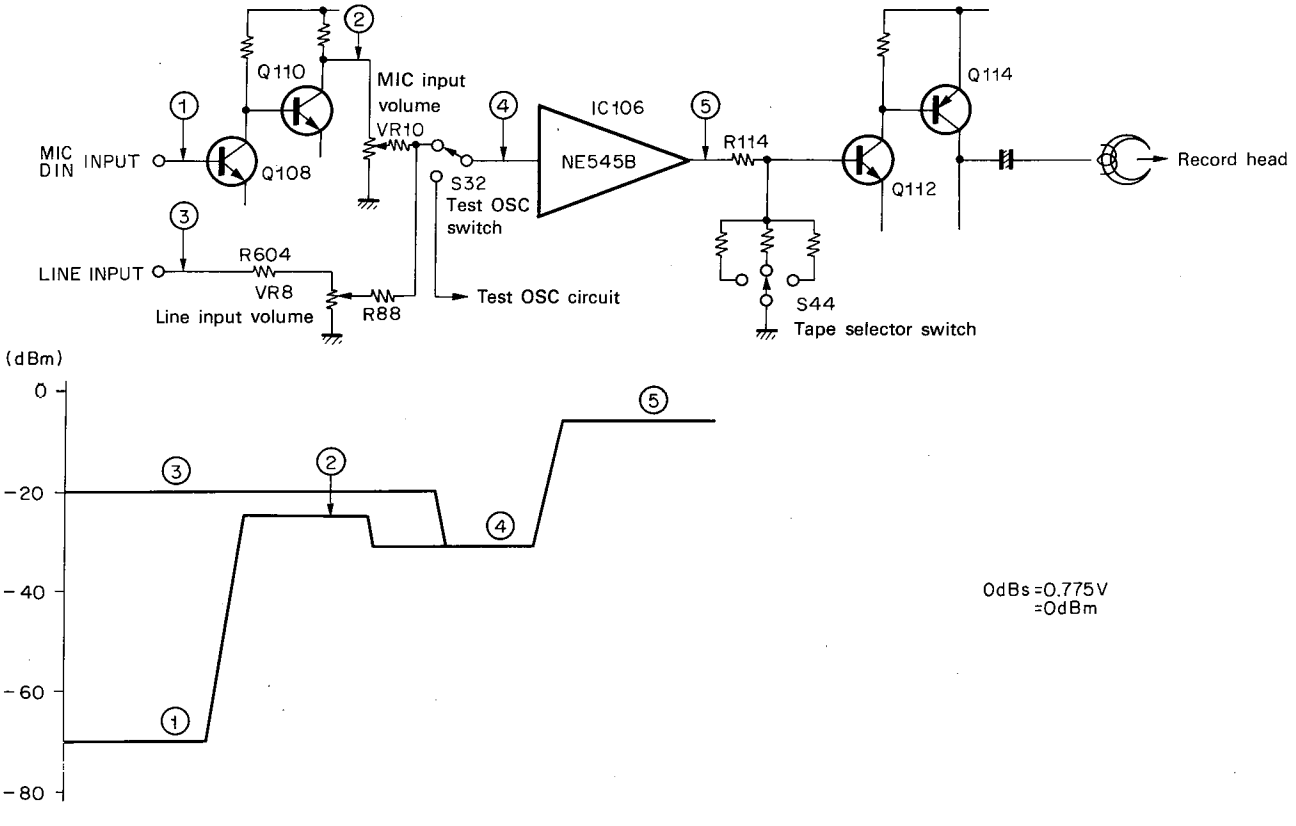


LEVEL DIAGRAM

Playback (Lch)



Record (Rch)



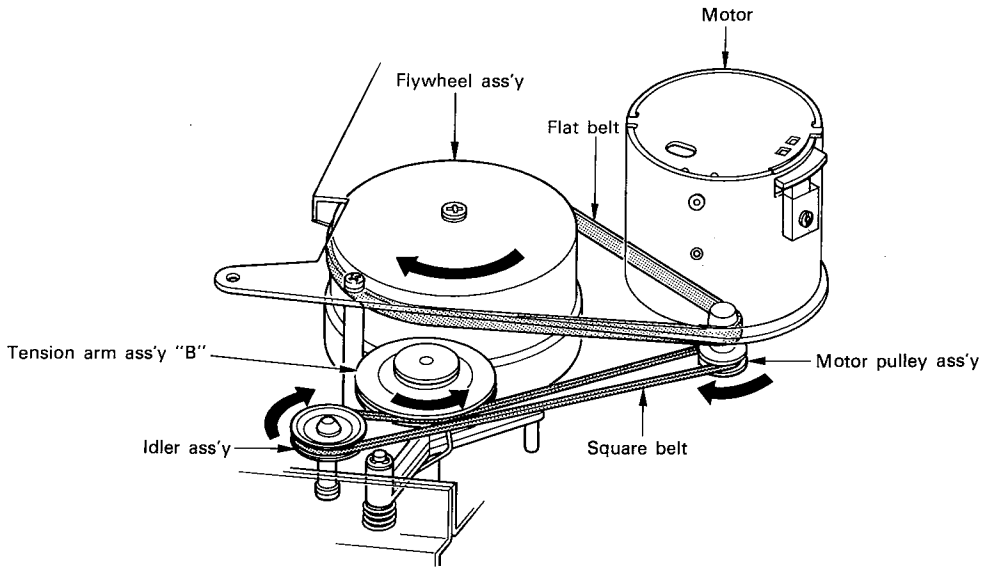
0dBs=0.775V
=0dBm

OPERATION OF MECHANISM

1. Main Drive Mechanism

Press the rewind (◀◀), fast-forward (▶▶) or play (▶) button. The start switch S7 will be set to ON to start the motor operating.

* With the motor running, the flywheel ass'y is driven by the flat type drive belt while the tension arm ass'y "B" (takeup pulley shaft) is driven by the square type drive belt and the idler ass'y. This assures constant speed of the capstan shaft (flywheel ass'y) and reliable tape winding without causing mutual interference.



Main Driving Mechanism

2. Playback (forward movement)

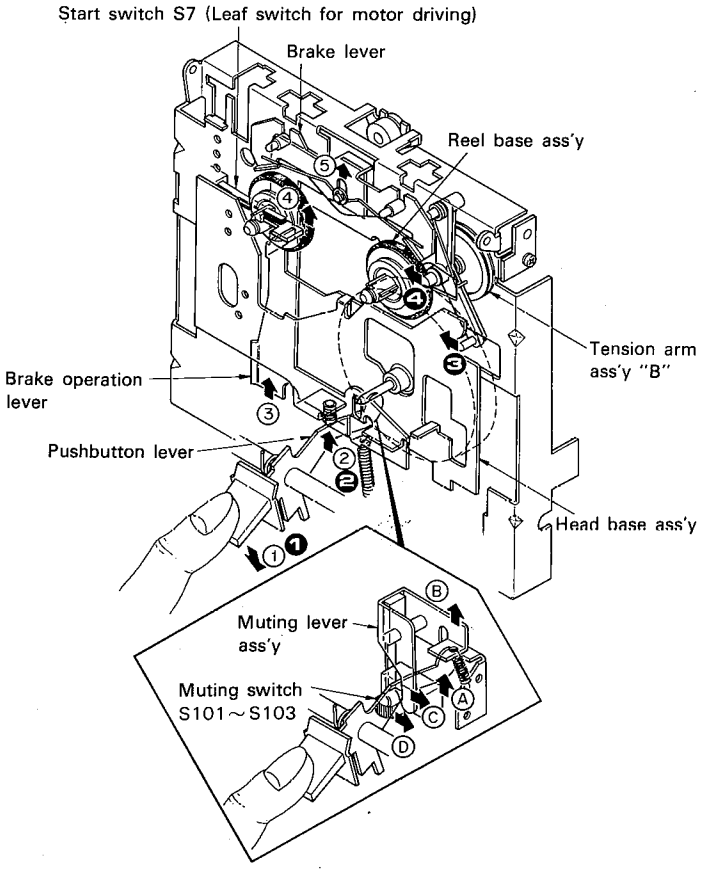
① Press the play button (▶).
② The head base ass'y is lifted by the action of the pushbutton lever.
③ The brake operation lever is lifted by the action of the head base ass'y.
④ The start switch S7 is actuated to turn on by the boss provided on the brake operation lever (+B voltage is applied to the motor).
⑤ The brake lever moves up.

❶ ❷ ❸ The shaft of the tension arm travels toward the cutout section of the head base ass'y.

❹ The takeup pulley is forced against the reel base ass'y. By pressing the play button, the muting switches S101-S103 turn off in the following sequence:

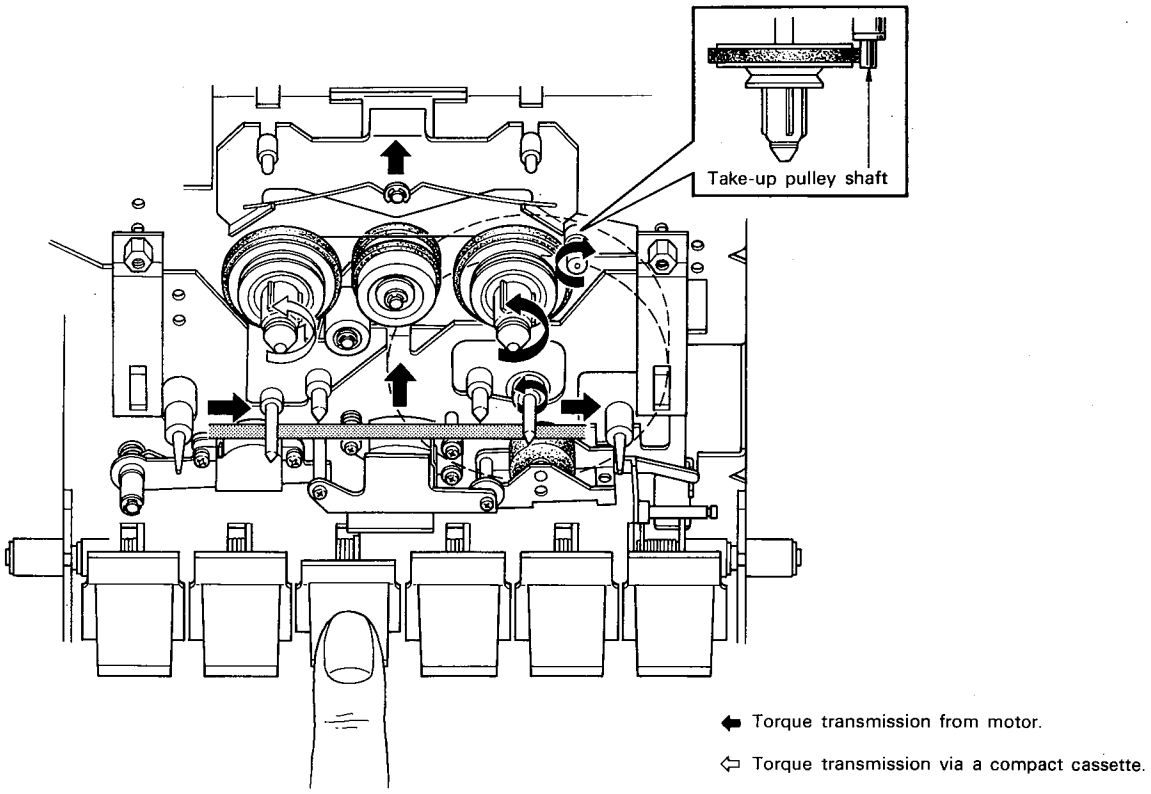
Ⓐ The pushbutton lever forces the muting lever ass'y.
Ⓑ Ⓒ The muting lever ass'y starts rotating.
Ⓓ The muting switches are turned off by the action of the plate spring of the muting lever ass'y.

The turning force is transmitted from the takeup pulley shaft to the reel base ass'y.



Forward Operation Mechanism

OPERATION OF MECHANISM



Torque Transmission for Forward Operation

3. Recording

The tape travels in the same way as for playback.

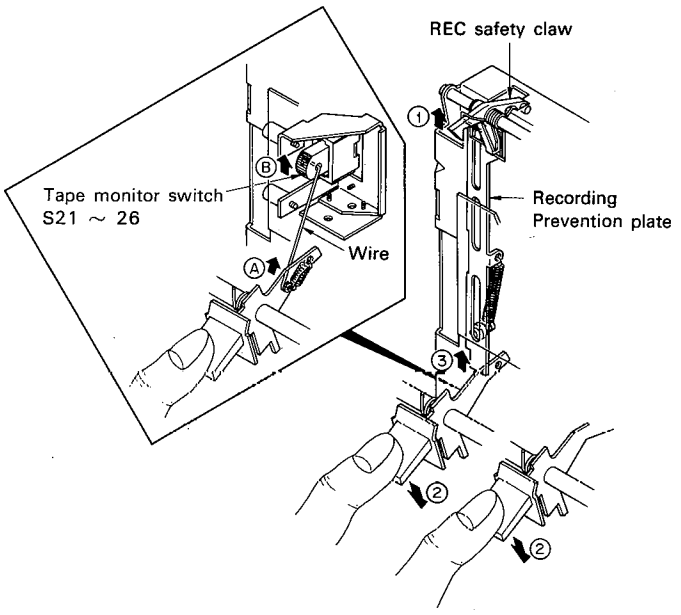
① When a cassette with erasure preventive tabs is loaded, the REC safety claw moves upward.

② Press the record button and play button (▶) at the same time.

③ The recording prevention plate moves up (record button can be pressed). The tape monitor switches S21-25 change the tape from playback mode to recording mode as follows:

Ⓐ The switches are forced by the wire connected to the pushbutton lever.

Ⓑ The switches are now activated to change the mode of tape operation.



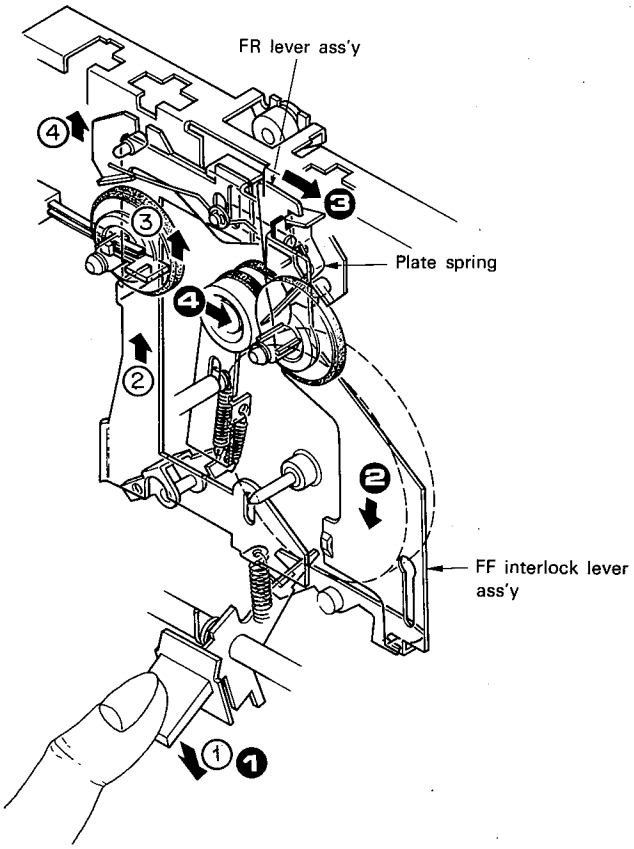
Recording Mechanism

OPERATION OF MECHANISM

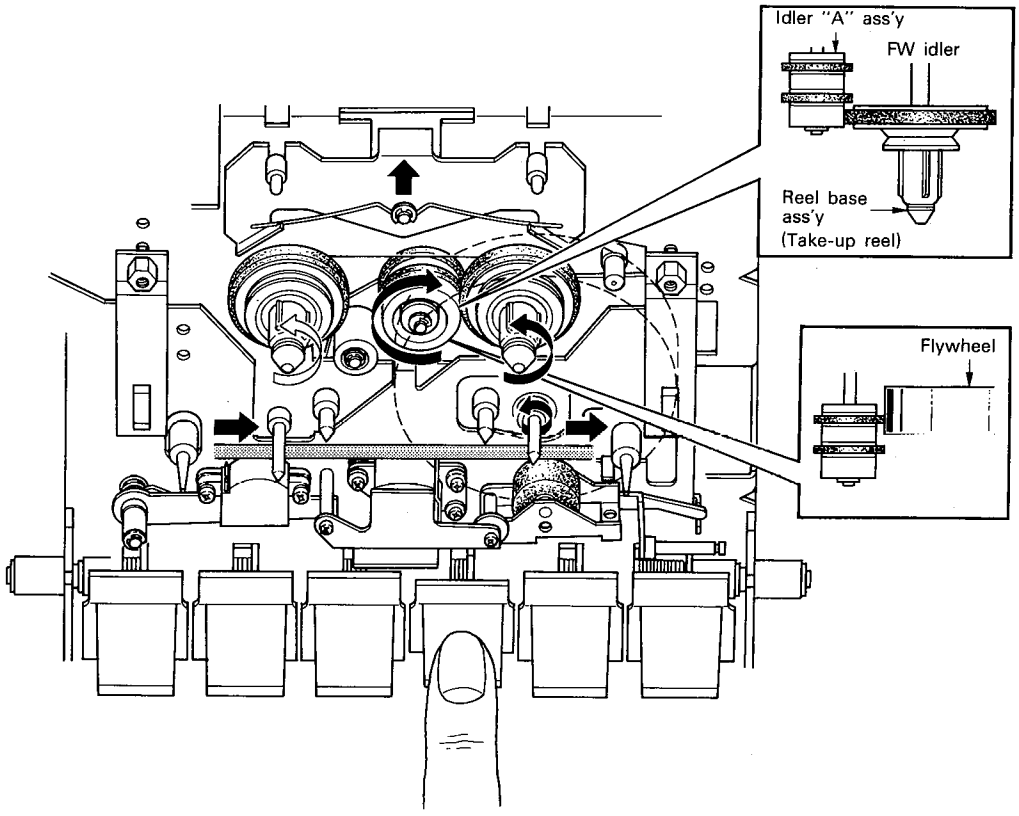
4. Fast Forward (FF)

① Press the fast forward button (▶▶).
② The brake operation lever moves up by the action of the pushbutton lever.
③ The start switch turns to ON.
④ The brake lever moves upward.

❶ ❷ The FF interlock lever ass'y is moved down by the action of the pushbutton lever.
❸ The boss on the FR lever ass'y is forced down by the action of the plate spring of the FF interlock lever ass'y.
❹ The idler "A" ass'y, mounted on the FR lever ass'y, comes in contact with the reel base.



Fast Forward Operation Mechanism



Torque Transmission for Fast Forward Operation

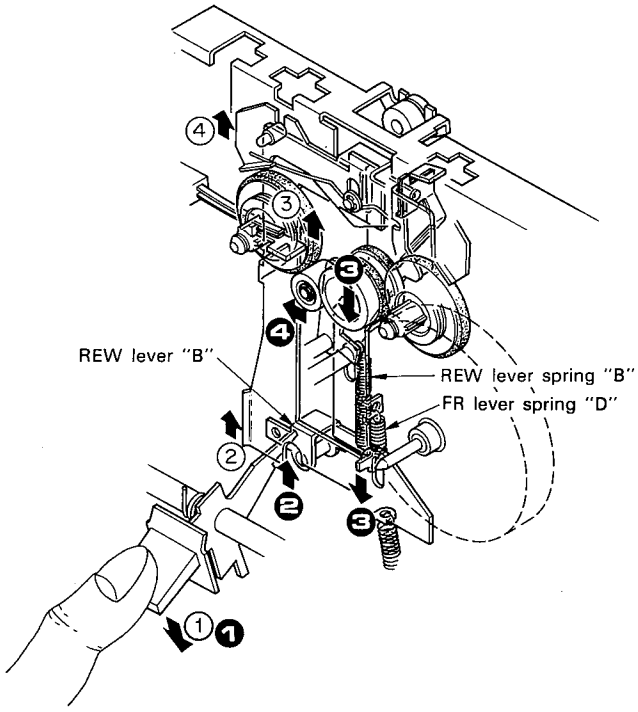
OPERATION OF MECHANISM

5. Rewind

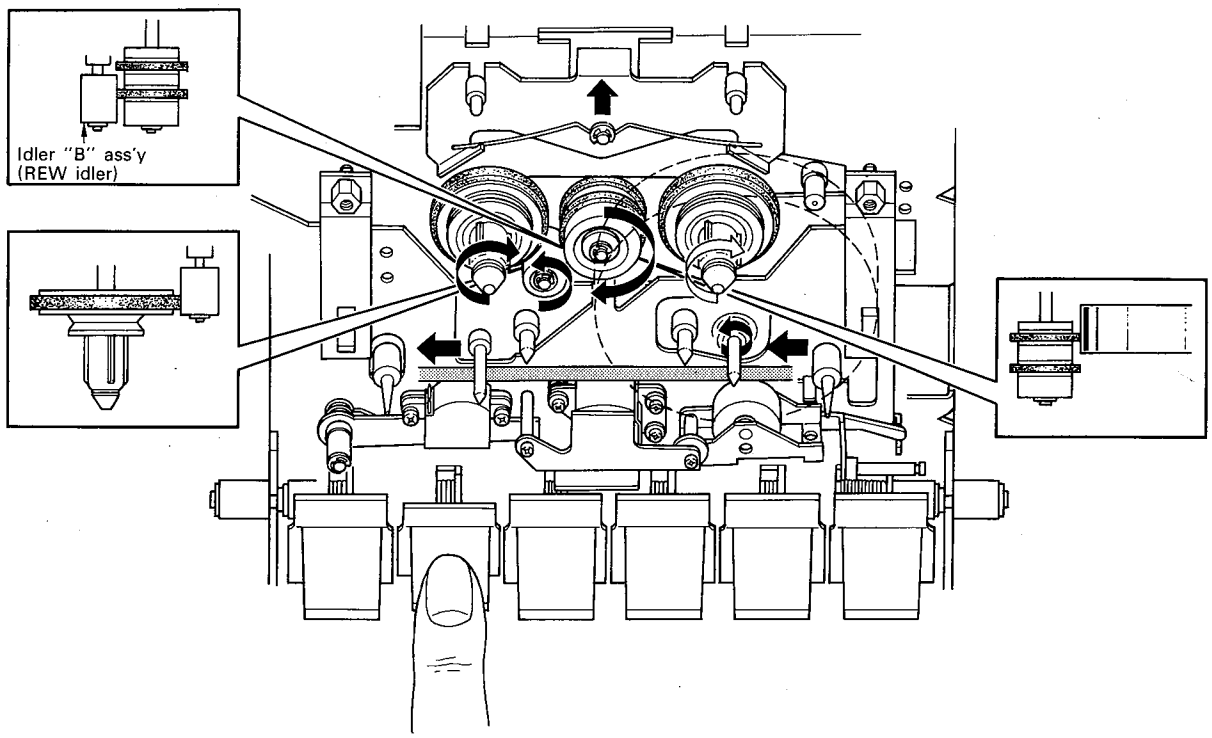
① Press the rewind button (◀◀).
② The brake operation lever is forced up by the action of the pushbutton lever.
③ The start switch turns to ON.
④ The brake lever moves upward.

❶ ❷ The REW lever is forced by the pushbutton lever.
❸ The FR lever ass'y is pulled down by the REW lever spring "B" and FR lever spring "D", thus the idler "A" ass'y moves down.
❹ The idler "A" ass'y presses the idler "B" ass'y to left until it comes in contact with the reel base ass'y.

The turning force is transmitted to the flywheel, idler "A" ass'y, idler "B" ass'y and the reel base ass'y, in turn.



Rewinding Mechanism



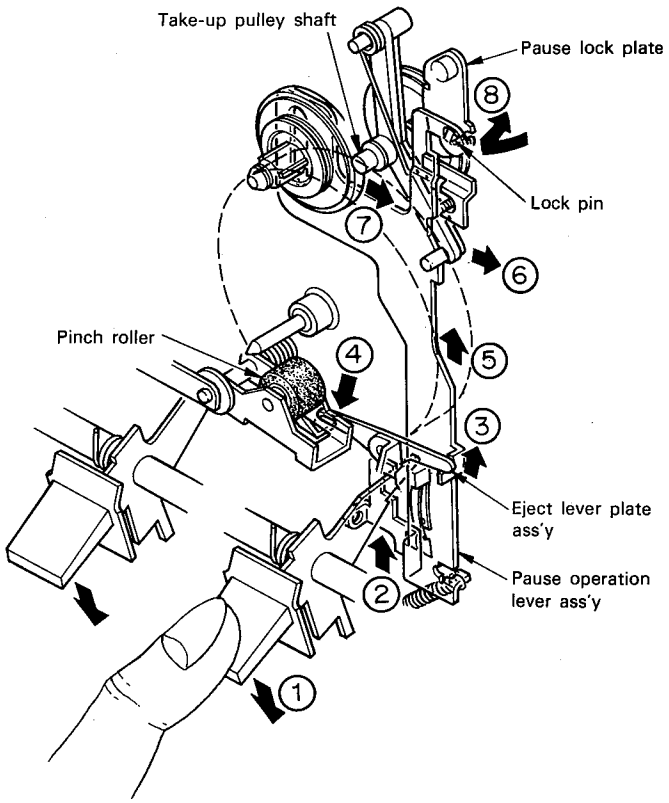
Torque Transmission for Rewinding

OPERATION OF MECHANISM

6. Pause

The pause button functions only when the tape is in recording or playback mode.

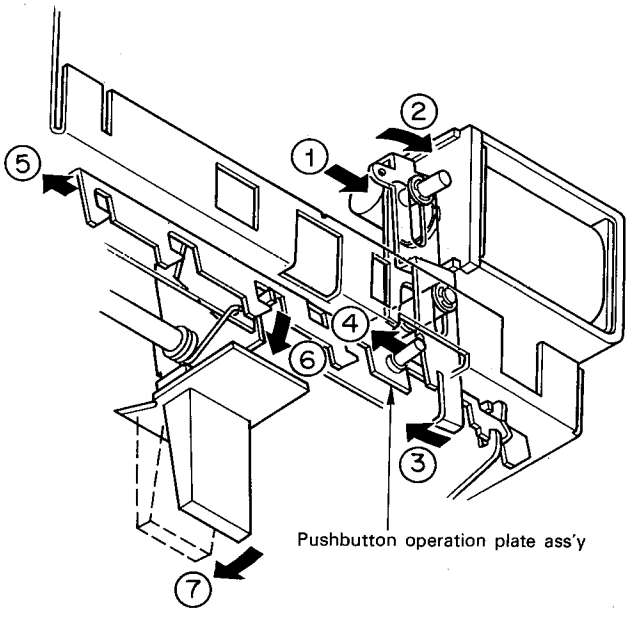
① While the play button (▶) is depressed, press the pause button.
② The pause operation lever ass'y is forced upward by the action of the pushbutton lever.
③ The boss on the pause operation lever ass'y presses the eject lever plate ass'y.
④ The eject lever plate ass'y releases the pinchroller from the capstan shaft.
⑤ ⑥ Since the pause operation lever ass'y moves up, the tension arm ass'y moves in the direction ⑥.
⑦ The eject lever plate ass'y releases the pinch roller base ass'y, thus stopping the reel base.
⑧ The lock pin of the pause operation lever ass'y enters the cutout section of the pause lock plate and, hence, the tape is set in pause mode.



Pause Mechanism

7. Automatic Shut-off

① When the tape reaches the end, the shut-off circuit is energized, activating the plunger a few seconds later.
② The shut-off lever (1) is forced by the rod of the plunger piston.
③ ④ The shut-off lever (1) presses the pin on the pushbutton operation plate ass'y.
⑤ The pushbutton operation plate ass'y moves to left.
⑥ The claw of the pushbutton lever is released from the pushbutton operation plate ass'y.
⑦ The play button (▶) is released.

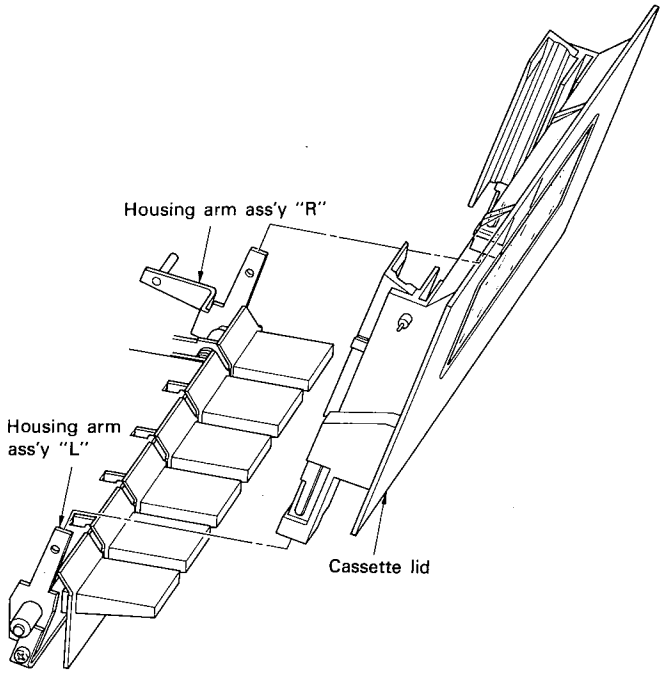


Automatic Shut-off Mechanism

OPERATION OF MECHANISM

8. Removal of Cassette Lid

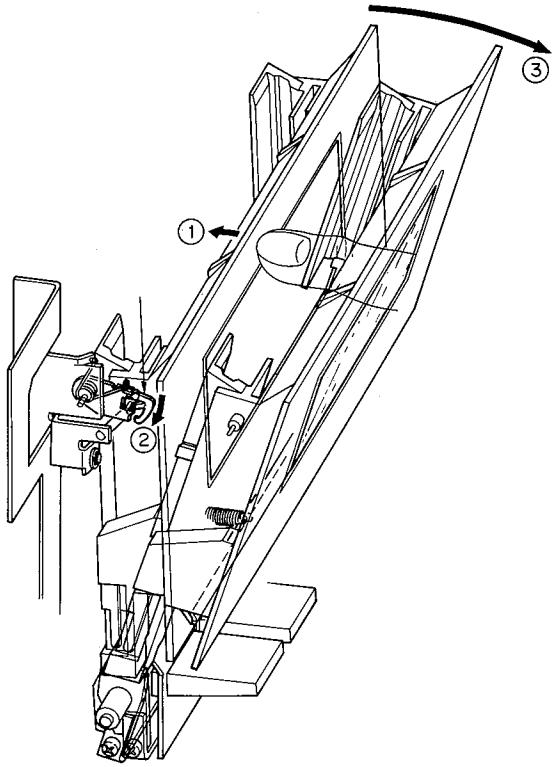
The cassette lid can be removed easily from the housing arm ass'y.



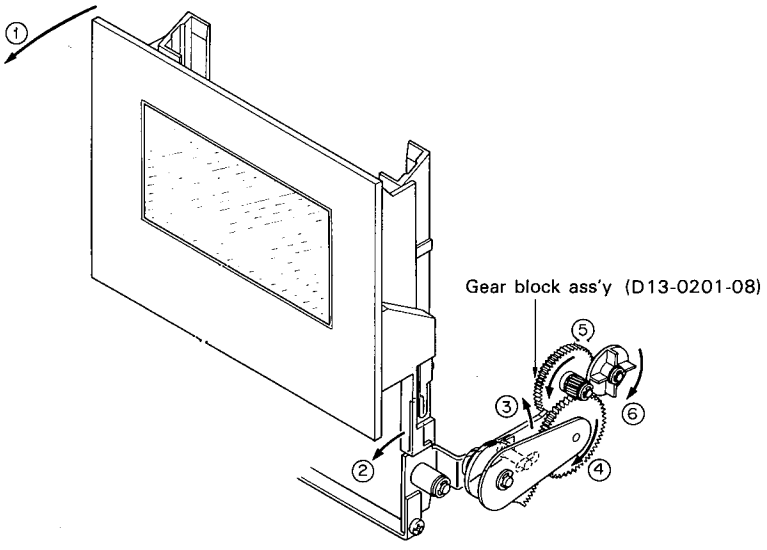
Removal of Cassette Lid

9. Cassette Lid Opening Function

① Press the cassette lid.
② The pin on the cassette lid is released from the cassette lock plate.
③ The cassette lid opens smoothly with the gear block mechanism (open gear operating function ③ ~ ⑥).



Cassette Lid Opening Function

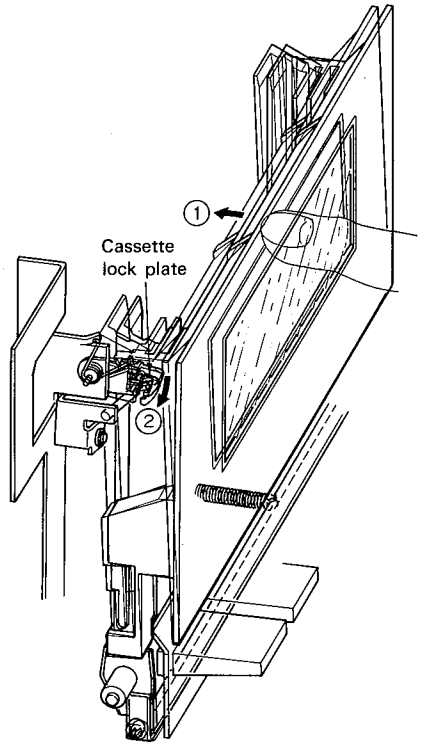


Open Gear Operating Function

OPERATION OF MECHANISM

10. Cassette Lid Closing Function

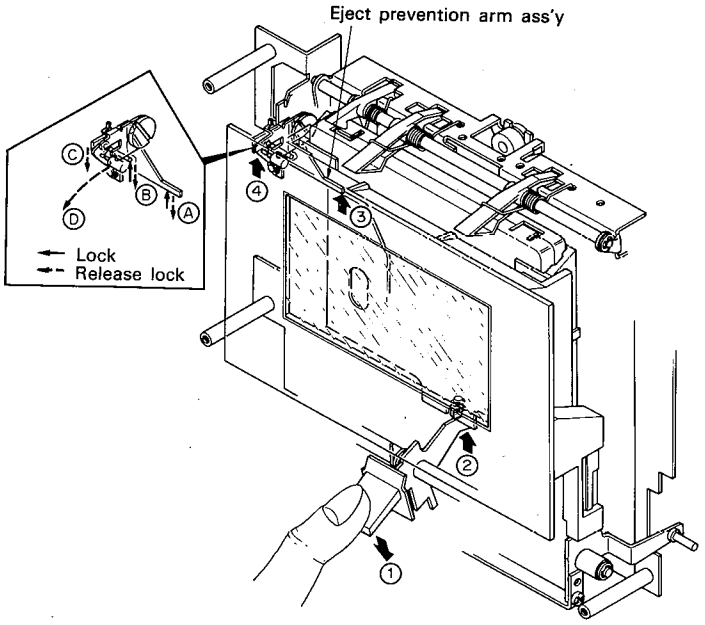
① Press the cassette lid.
② The pin on the cassette lid is locked in the cassette lock plate.



Cassette Lid Closing Function

11. Cassette Lid Eject Prevention Mechanism

① Press the play button (▶) while the cassette lid is closed.
② The pushbutton lever presses the head base ass'y upward.
③ The eject prevention arm ass'y is forced up by the action of the head base ass'y.
④ In this way, the pin on the cassette lid will not be released from the cassette lock plate even when the cassette lid is pressed.



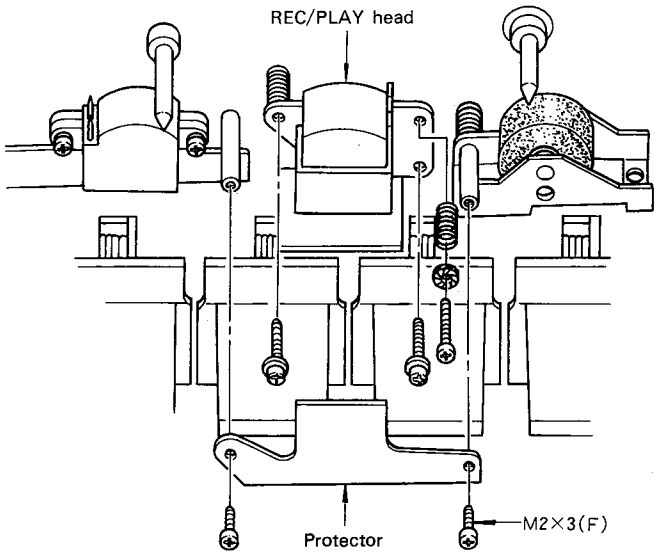
Cassette Lid Eject Prevention Mechanism

DISASSEMBLY

NOTE: Remove the panel ass'y and the case before disassemble parts. Only the knob of BIAS ADJ volume is fixed with a set screw. When removing screws, if fixed with paint, melt it with thinner. When reassembling, fix screws with paint.

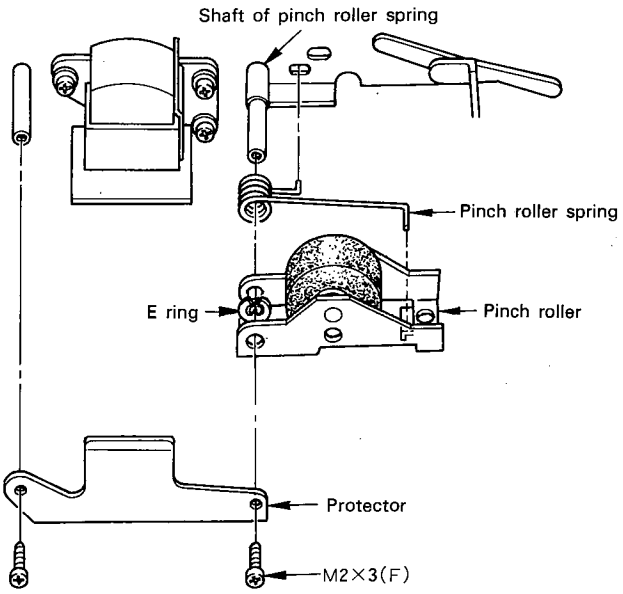
1. REC/PLAY Head

① Remove two screws for the protector.
② Remove three screws for the REC/PLAY head.
③ After adjusting the REC/PLAY head, fix its screws with paint.



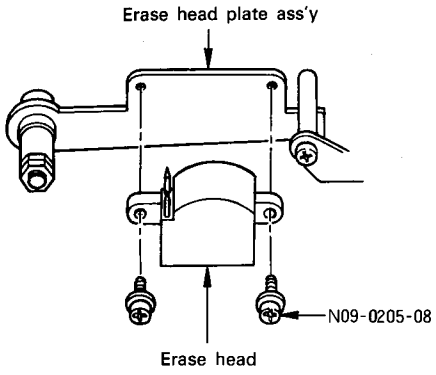
2. Pinch Roller

① Remove the protector.
② Remove the E ring.



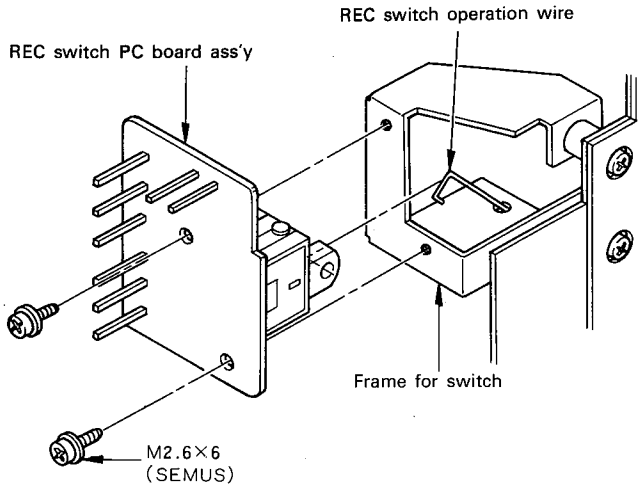
3. Erase Head

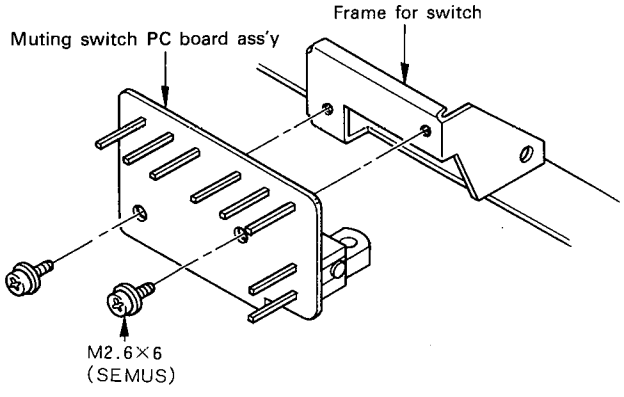
① Remove two screws for the erase head.
② After replacing the erase head, confirm its fitting using a compact cassette with a mirror.



4. REC Switch PC Board Ass'y and Muting Switch PC Board Ass'y

① Remove two screws for the PC board ass'y.
② Remove the REC switch operation wire only when removing the REC switch PC board ass'y.

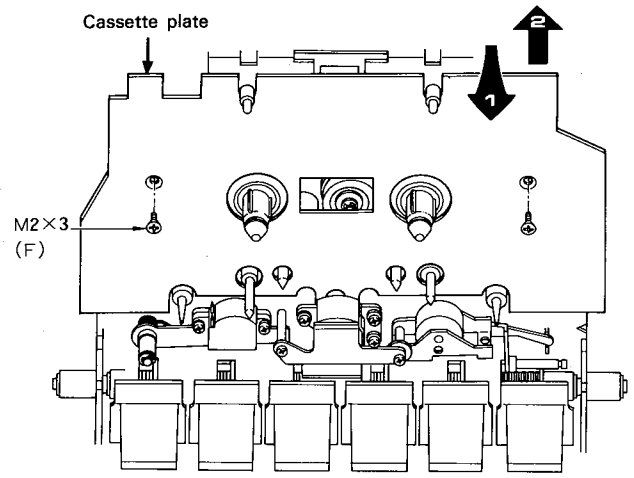




DISASSEMBLY

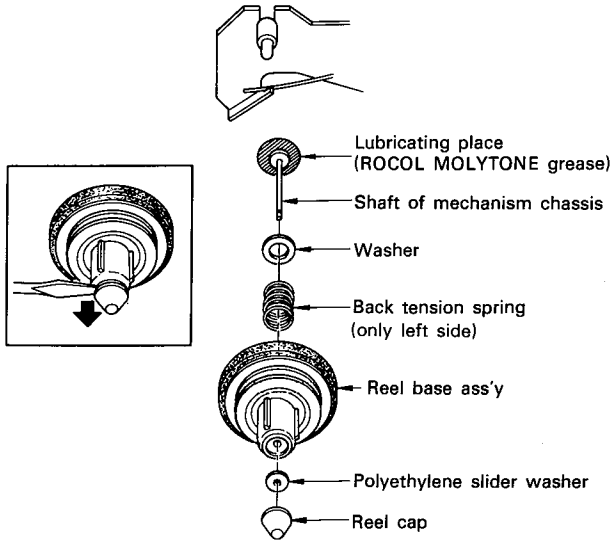
5. Cassette Plate

① Remove two screws for the cassette plate.



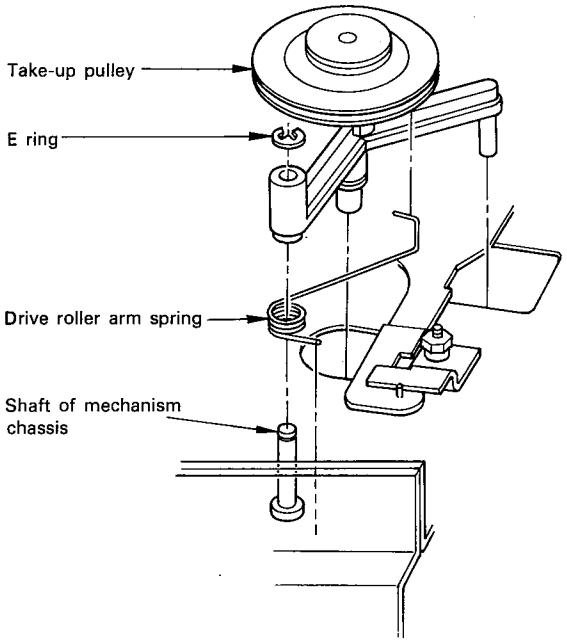
6. Reel Base Ass'y

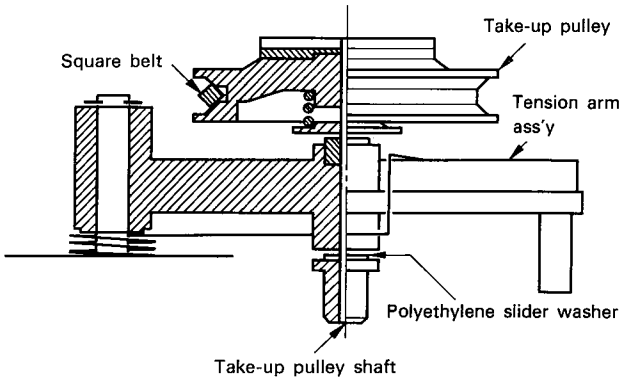
① Remove the reel cap with a screw driver.



7. Tension Arm Ass'y "B"

① Remove the E ring.





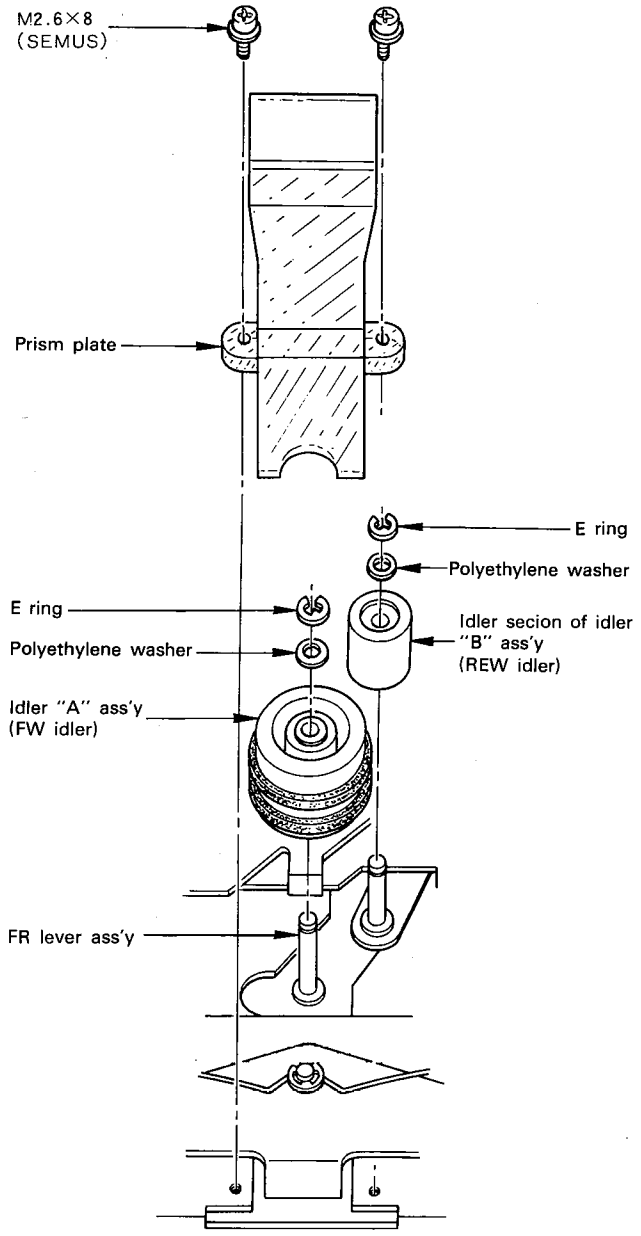
Construction of Tension Arm Ass'y

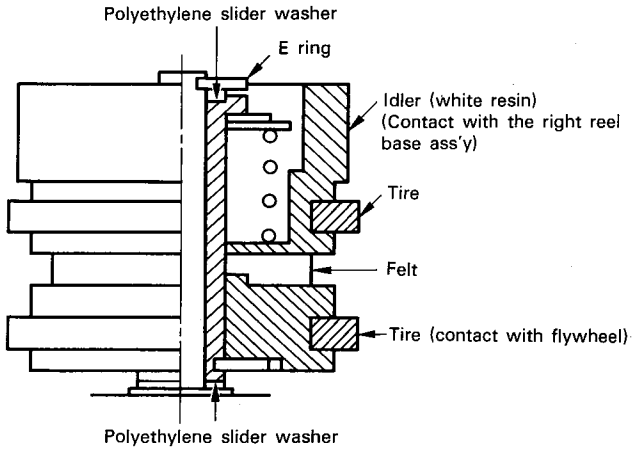
DISASSEMBLY

8. Idler

① Remove the cassette plate.
② Remove the prism plate.
③ When removing the FW idler, pull out the E ring from the FR lever ass'y.

Note:
When replacing the Rew idler, replace only the idler section.

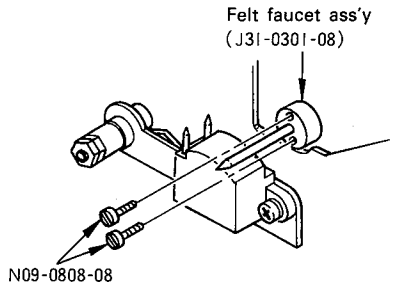




Construction of FW Idler Ass'y

9. Felt Faucet

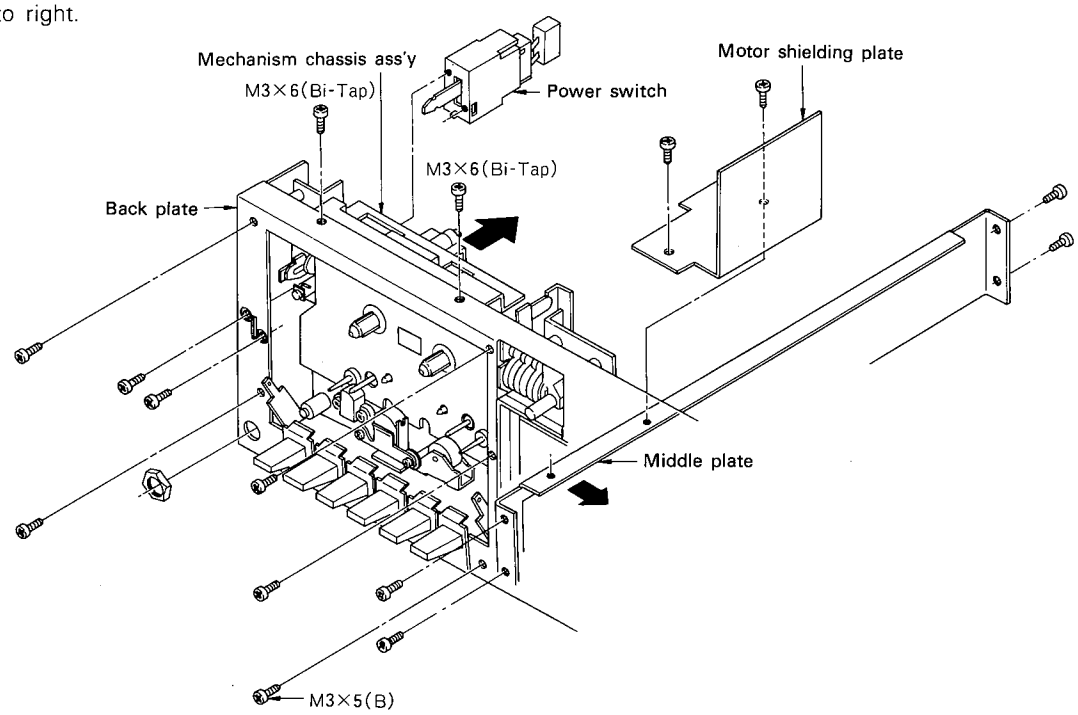
① Remove the two screws for the felt faucet.



DISASSEMBLY

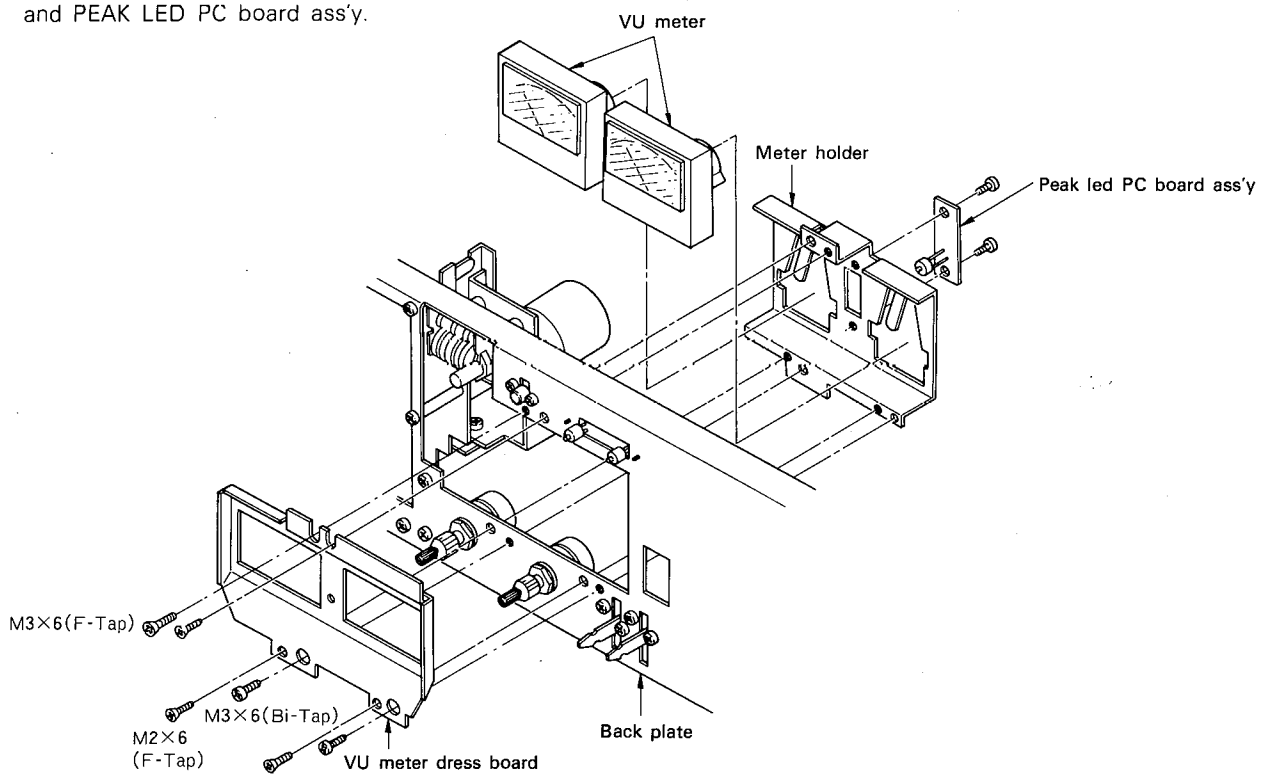
10. Mechanism Chassis ass'y

① Remove the power switch and the motor shielding plate.
② Remove the screws fixing the mechanism chassis ass'y to the back plate.
③ Remove four screws for the middle plate, and move it to right.
④ Remove the No. 179 pin (refer to EXPLODED VIEW) from the gear block ass'y.
⑤ Remove the mechanism chassis after moving it to rear side.



11. VU Meter

① Remove the VU meter dress board, meter holder and PEAK LED PC board ass'y.



DISASSEMBLY

12. Pushbutton Block Ass'y

① Remove three screws fixing the pushbutton block ass'y to the mechanism chassis.
② Remove the spring fitted to the REC operation button.

13. Tape Counter

① Remove two screws fixing the mechanism holder "R" ass'y to the mechanism chassis ass'y.
② Remove three screws fixing the mechanism holder "R" ass'y to the back plate.

14. Motor

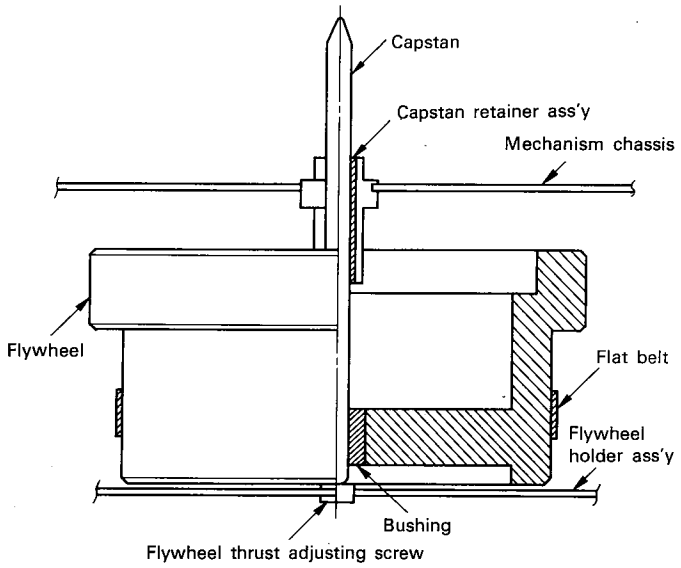
① Remove the tape counter.
② Remove three screws fixing the motor to the flywheel holder ass'y.

15. Flywheel Ass'y

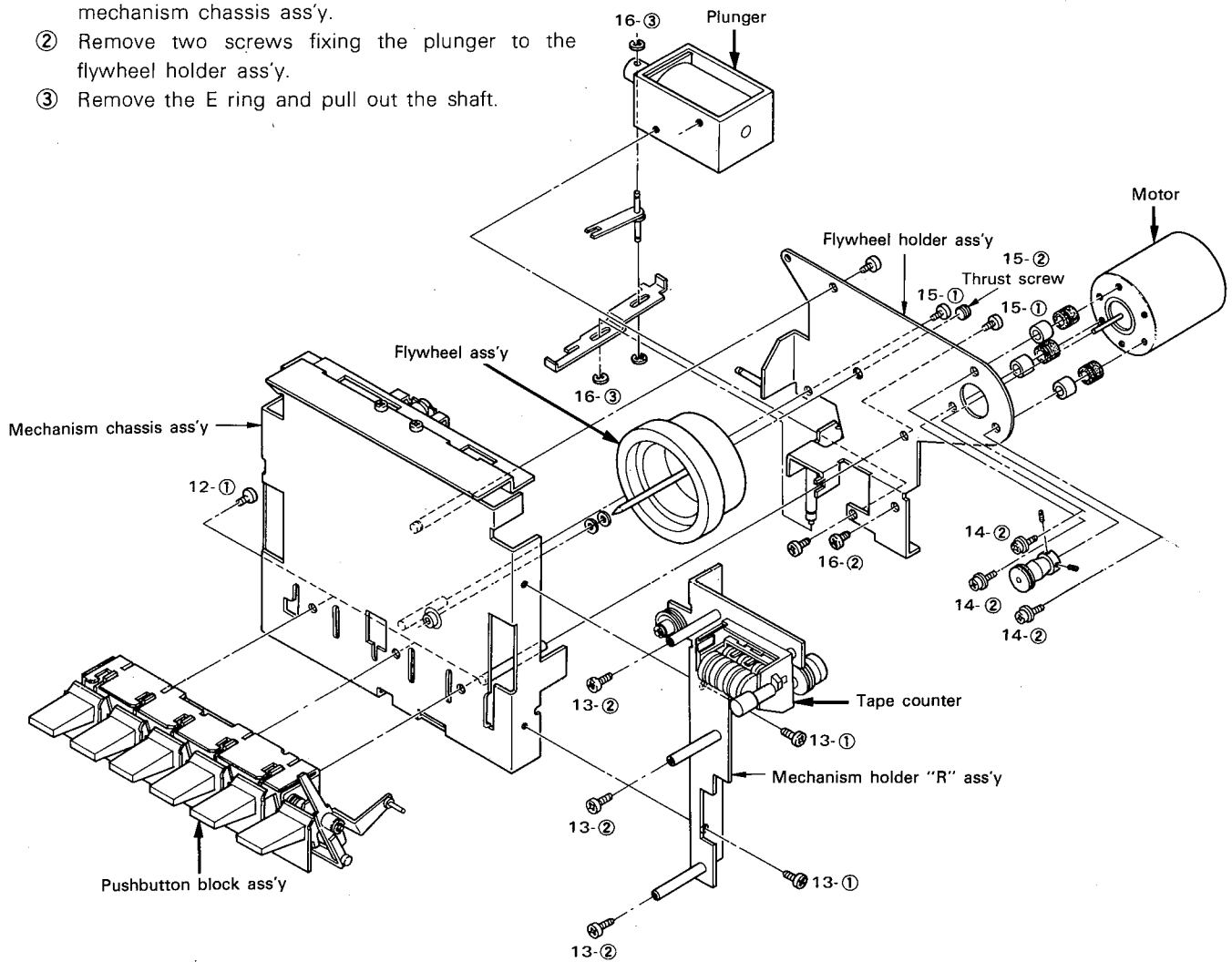
① Remove the flywheel holder ass'y from the mechanism chassis ass'y.
② Remove the thrust adjusting screw.

16. Plunger

① Remove the flywheel holder ass'y from the mechanism chassis ass'y.
② Remove two screws fixing the plunger to the flywheel holder ass'y.
③ Remove the E ring and pull out the shaft.



Construction of Flywheel Ass'y



MECHANISM ADJUSTMENT/CLEANING/LUBRICATION

ADJUSTMENT OF TAKE-UP TORQUE (FORWARD TORQUE)

Note:
Take-up torque should be measured when flywheel components, flat belt, etc. are cleaned.
If this treatment is omitted, basic characteristics such as constant running, wow and flutter, etc. may be influenced adversely.

① If take-up torque is deviating from the standard 35 ~ 60g • cm, the tension arm assembly "B" (because of felt abrasion) and the drive roller arm spring must be replaced.

ADJUSTMENT OF FF AND REW TORQUES

① Confirm the REW and FW idlers whether they rotate normally. Lubricate them if necessary. (A single drop of spindle oil).
② Clean the REW idler, FW idler, reel bases (L and R) and each idler section.
③ Bend the FF lever spring of the FF interlock lever assembly. (Refer to the right figure).
④ For the REW torque, confirm the rotation of REW idler and movements to the right and left.

Note:
If the torque is still insufficient after above adjustments, the idler ass'y must be replaced.

CLEANING

Thoroughly clean the following parts with alcohol:
① Capstan spindle over which the pinch roller contacts.
② Flywheel.
③ Idler "A" ass'y (FW idler).
④ Drive belt (flat type).
⑤ Motor pulley over which the drive belt contacts.
⑥ Idler "B" ass'y (REW idler).
⑦ Pinch roller.
⑧ Tape heads.

LUBRICATION

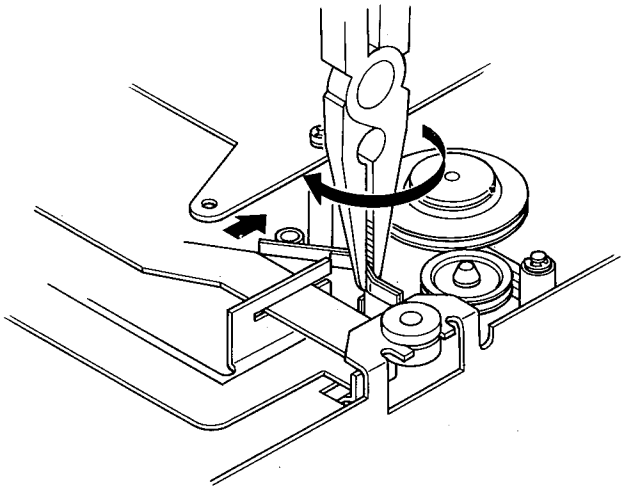
Disassemble the tape mechanism to remove deposits of oil and dirt. Lubricate the parts specified with recommended oil.

① ROCOL MOLYTONE grease #265 (W01-9997-09)
Contact areas of the mechanism such as reel base shafts, idler shaft and other rotary parts.
② Spindle oil 2035 (W01-9995-09)
Capstan spindle, motor shaft and other rotary parts using oilless metal.

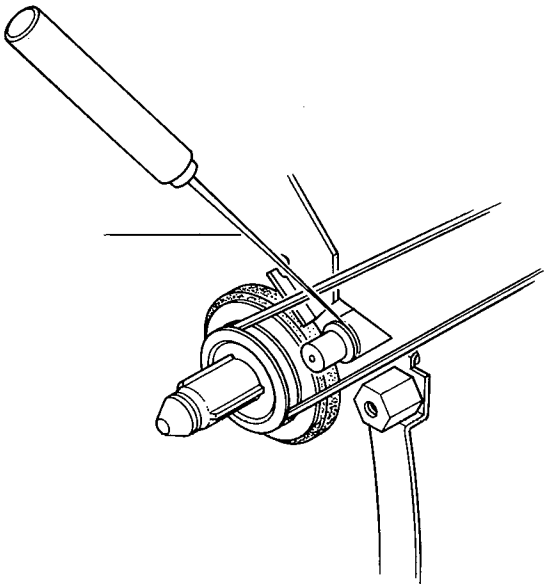
Note:
Lubricate with a small amount (1 drop) of oil using a small screwdriver. After lubricating, clean the drive belts and the idler with alcohol to remove excess oil.

CONFIRMATION OF WOW AND FLUTTER

Note:
If wow and flutter is out of standard, repair as follows:
① Clean the flat belt and the pinch roller with alcohol.
② Adjust the thrust screw, if necessary.
③ Replace the flywheel ass'y, if necessary.
④ Replace the flat belt and the pinch roller, if necessary.

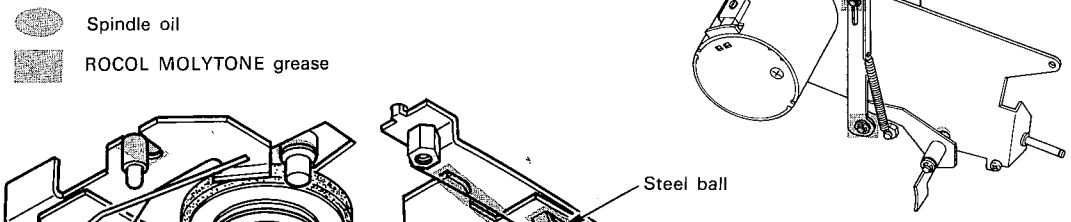


Bend FF Lever Spring



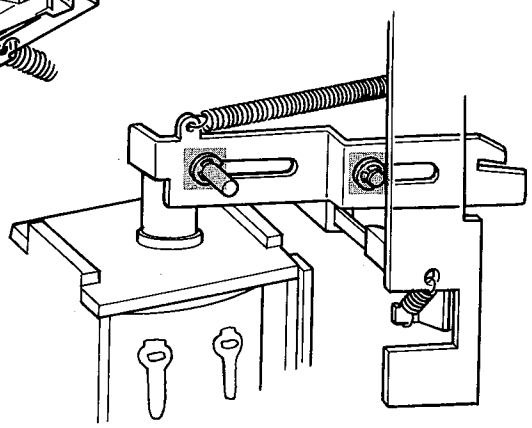
Lubrication of Take-up Pulley Shaft (Spindle Oil 2035)

LUBRICATION

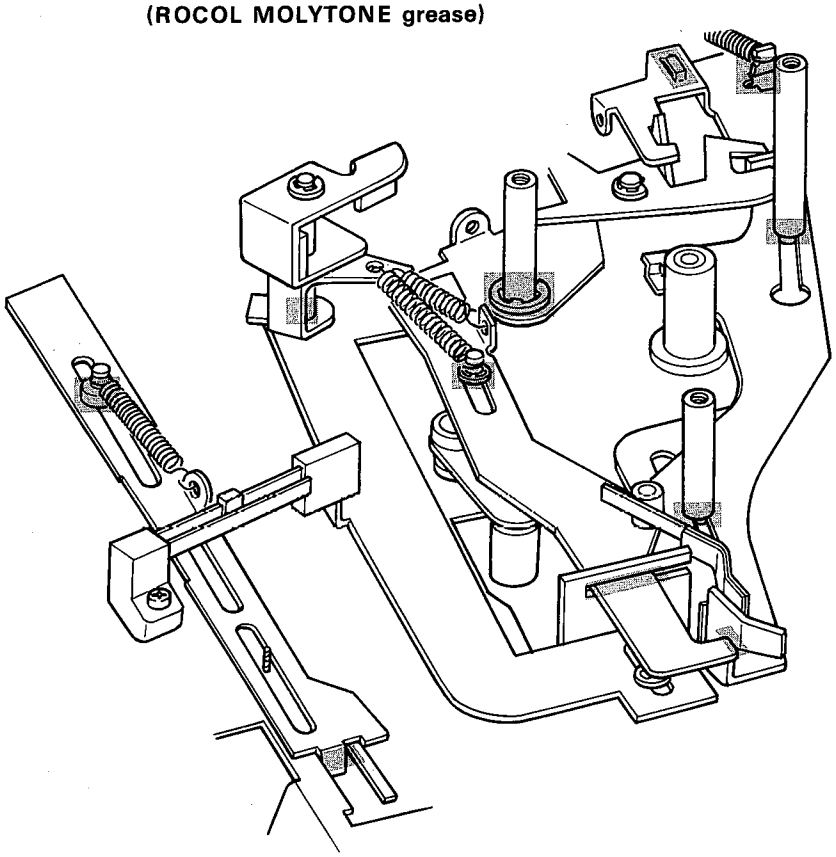


Lubrication of Near Motor
(ROCOL MOLYTONE grease)

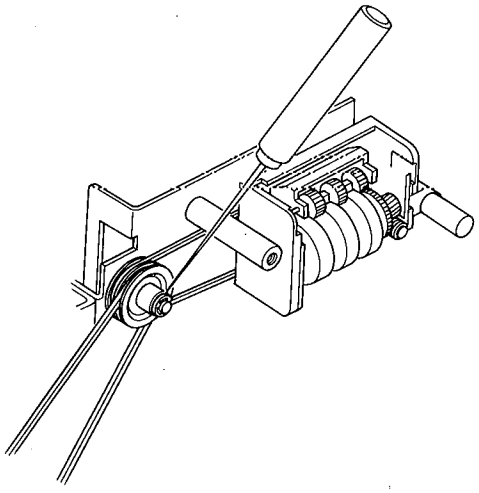
Lubrication of Rear Side of Mechanism Chassis
(ROCOL MOLYTONE grease)



Lubrication of Plunger
(ROCOL MOLYTONE grease)



Lubrication of Rear Side of Mechanism Chassis
(ROCOL MOLYTONE grease)



Lubrication of Counter Pulley
(ROCOL MOLYTONE grease)

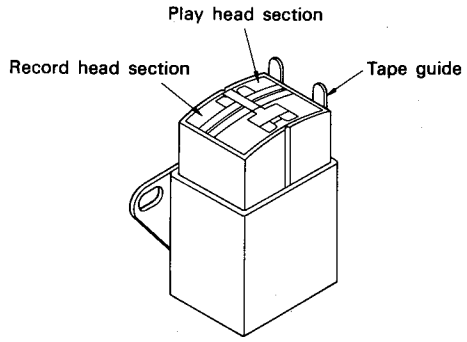
CIRCUIT DESCRIPTION

3-head Type

KX-1030 is a 3-head (erase, record and play heads) type tape deck. The record and play heads are assembled in a single case.

Advantages of 3-head type:

1) Signals being recorded can be monitored through the play head.
2) Since the record and play heads are completely separated from each other, each head can be designed with optimum gap width (4 $\sim$ 5μ for record head and 1 $\sim$ 1.5μ for play head). This assures less distortion and improves the saturation level and high frequency dynamic range.



Auto-stop Mechanism

The counter pulley keeps rotating during playback (▶), fast forward (▶▶) or rewind (◀◀) operation so that the reed switch repeats ON/OFF operation by the ring magnet mounted on the counter pulley. Thus, C508 is charged and discharged repeatedly, while Q504 is held in ON state, Q506 is ON and Q507 is OFF; the plunger is not operated.

When the tape is fully wound, the counter pulley stops which, in turn, stops the reed switch. C508 also stops its function and, hence, Q504 is OFF, C509 is discharged, and the base of Q506 is earthed. Since Q506 is OFF, Q507 and Q508 are turned to ON, activating the plunger to release the tape function button.

Timer Start

This circuit functions to release the pause button as the power turns on. When this circuit is energized, Q502 is ON and Q503 is OFF, which turns on Q505 through C511. The base of Q506 is earthed, activating the plunger to release the pause button.

Memory Rewind

The tape counter has a counter switch S111 at the first digit. This switch is OFF except when the counter indicates "9". When the tape is set in rewind mode with the memory switch S10 depressed, the switch S111 turns to ON as the counter reaches "999". Thus, +B is applied to C510 to drive the base of Q505. Since Q505 is turned on, the auto stop circuit is energized to stop the tape movement.

Test Tone

Q401 and Q402 form the phase shift oscillators. Q401 oscillates 400 Hz and Q402 10 kHz. Q405 and Q406 represent an unstable multi-vibrator. It oscillates at 2 second intervals for switching Q403 and Q404. The sine wave signals of 400 Hz and 10 kHz appear alternately at 2 second intervals on the No. 107 terminal of the test tone PC board ass'y (X25-1270-00) through S31 and S32.

During the operation of the test tone circuit, Q105 and Q106 are ON to increase the gain of the VU meter amplifiers. Q407 is interlocked with the multi-vibrator to flicker LED. The test tone circuit is used in conjunction with the bias current adjusters (VR15, VR16) to obtain a flat record/play frequency response.

Muting Circuit (X25-1360-00)

1. Muting in pause mode
   When S26 is set to TAPE, the muting circuit is activated and the emitter of Q904 is earthed. When the pause switch S8 is set to ON, a voltage(+B) is applied to the base of Q904 and thus Q904 turns to ON.
   The voltage at the base of Q903 is lowered by R904, so Q903 turns to ON. Q901 and 902 are also energized by the voltage (+B) from Q903, thereby the signal line is earthed to shut off the output.
2. Prevention of shock noise at power OFF
   When the power is OFF, the voltage rectified through D901 and 902 is discharged earlier than the voltage from Q501 and, hence, the voltage at the cathode of D903 is lowered below the anode voltage. Thus, D903 is energized and the output is shut off by the voltage drop through R904, as in item 1 above.
3. Muting circuit for unattended recording
   Before unattended recording is started, Q503 is ON and D904 is energized. This also shuts off the output by the voltage drop through R904, as in item 1 above.
   After the unattended recording is started, Q503 turns to OFF and D904 is deenergized and thus the muting circuit turns off.
   D905 is used to prevent reverse flow of current.
4. S101, 102
   When the play button (▶) is in its released position, S101 and 102 are ON. At this time, the collector and emitter of Q904 are shorted, so the muting circuit functions the same as when Q904 is ON.

ADJUSTMENT

1. Test Instrument

- Solid state volt meter:
  SSVM
- Audio frequency generator:
  AG
- Oscilloscope
- Frequency counter
- Weighting filter
  (ASA A characteristic with NAB curve)
- Band pass filter
  (Center frequency: 100 Hz, 1 kHz,
  Attenuation: 18 dB/oct. or more)
- Cassette type torque gauge
- Spring balance

2. Test Tape

a) Test tape for recording system adjustment
NORMAL:
TDK AC-211 (T93-0009-05) or SDC-90
CHROME (for measurement):
TDK AC-511 (T93-0010-05) or SAC-60

b) Test tape for playback measurement
TEAC MITT-111 (Tape speed, azimuth)
TEAC MTT-116R (Frequency characteristic)
TEAC MITT-116U (Frequency characteristic)

3. Meaning of Technical Word

a) **Normal recording level:** A level to obtain residual magnetic flux of 160 pWb/mm on the standard recording tape, which 4 dB below the level 315 Hz, 0 dB (250 pWb/mm) of the test tape (MTT-116R).

b) **Normal input level:** The standard input level necessary for obtaining the normal recording level. The levels at respective input jacks are as specified below. However 80kΩ resistor should be inserted in the input of the DIN connector in series.

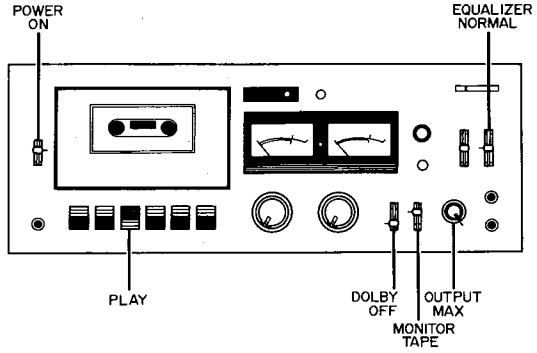
Note:
For W and L type no resistor is inserted.

MIC INPUT ..... −60 dBs (0 VU)
LINE INPUT ..... −10 dBs (0 VU)
DIN INPUT ..... −24 dBs (0 VU) Except W,L
−60 dBs (0 VU) For W, L

c) **Normal recording condition:** The state obtained by applying the 1 kHz signal to the LINE input jack at the normal input level (−10 dBs) and by adjusting the LINE volume control so that recording can be carried out at the normal recording level. (Volume position is at about 7 graduation).

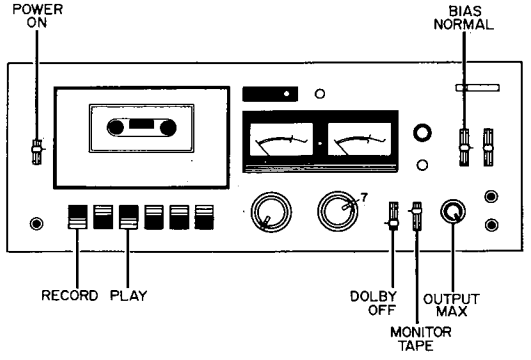
d) **Normal output level:** The standard signal level obtained at the LINE output jack when the level reference signal is reproduced from the test tape 315 Hz.
MITT-116R 315 Hz (250 pWb/mm)
Output level: 4 dBs
MITT-116U 315 Hz (160 pWb/mm)
Output level: 0 dBs

e) **Standard playback**



POWER → ON
(▶) BUTTON → Press
EQUALIZER → NORMAL
MONITOR → TAPE
DOLBY N.R. → OFF
OUTPUT → MAX

f) **Standard recording**



POWER → ON
(RECORD), (▶) BUTTON → Press
BIAS → NORMAL
BIAS ADJ → CENTER
MONITOR → SOURCE
DOLBY → OFF
MIC → MIN
LINE → About 7

ADJUSTMENT

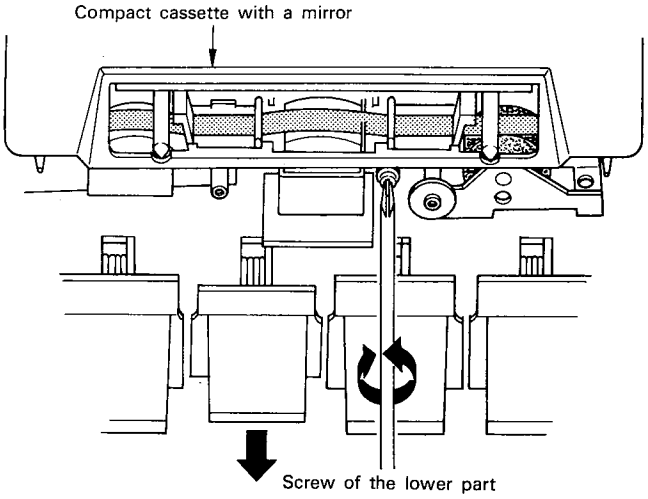
0 dBs = 0.775V
= 0 dBm

NO.	ALIGN	INPUT SIGNAL	CHECK POINTS	DECK SETTING	ADJUSTING POINTS	ADJUSTING METHOD	REMARKS
HEAD							
①	**HEIGHT OF REC/PLAY HEAD**	—	Tape guide	Push the play button. The power is off.	Three screws for REC/PLAY head.	Fix three screws for the REC/PLAY head so that the tape guide of the REC/PLAY head is parallel to that of the erase head using a compact cassette with a mirror.	
②	**TILT OF REC/PLAY HEAD**	—	Tape guide	Push the play button. The power is on.	Tilt screw. (Right lower side screw).	Fix the screw so that the tape does not contact with the tape guide using a compact cassette with a mirror.	
③	**AZIMUTH OF REC/PLAY HEAD**	MTT-116R 10 kHz, −10 dB	LINE OUT	Standard playback	Azimuth screw (Left side screw)	Output level (L.R): MAX.	
Note: Repeat the alignments of ② and ③ a few times, and then fix the screws with paint. Proceed adjustments after erasing and cleaning the REC/PLAY head.							
TAPE SPEED							
④	**TAPE SPEED**	MTT-111	LINE OUT	Standard playback	Semi-fixed resistor in the DC motor.	Frequency counter indicates 3000 Hz.	
PLAYBACK SYSTEM							
⑤	**PLAYBACK LEVEL (DOLBY LEVEL)**	MTT-116R 315 Hz, 0 dB	LINE OUT	Standard playback	VR1, 2	Output level: 4 dBs	Reference value: +4 dBs ±1.5 dB
RECORDING SYSTEM (Use AC-211 (T93-0009-05))							
⑥	**BIAS OSCILLATING FREQUENCY**	—	T301 in REC/PLAY/OSC (X25-1260-01)	Recording	—	After connecting the frequency counter to the No. 112 terminal of (X25-1260-01) and check the oscillating frequency. Standard: 85 kHz ±10% Check the oscillating voltage after disconnecting the frequency counter. Standard: AC 6V	Replace the OSC coil T301 if it is deviating from the standard.
⑦	**BIAS CURRENT**	LINE IN 1 kHz, −10 dBs	LINE OUT	Standard recording	VR13, 14	Lower the output level by 0.5 dB from MAX. Keep turning VR13 or VR14 clockwise ⑦a.	The bias should be set at the excessive bias position. The bias becomes excessive when turning VR13 or VR14 clockwise.
⑧	**OVERALL FREQUENCY CHARACTERISTIC**	LINE IN 1 kHz, −30 dBs 10 kHz, −30 dBs	LINE OUT	Standard setting	VR13, 14	Make the outputs of 1 kHz and 10 kHz equally. The output level is about −20 dBs.	Fine adjustment.
Note: 1. The bias becomes insufficient and high frequency range raise when turning VR13 or VR14 counter clockwise. 2. Since VR13 and VR14 are adjusted in BIAS CURRENT, they should be adjusted slightly in OVERALL FREQUENCY CHARACTERISTIC. 3. Repeat the alignments of (8) a few times.							
⑨	**REC LEVEL**	LINE IN 1 kHz, −10 dBs	LINE OUT	Standard recording	VR11, 12	Output level: 0 dBs	0 dBs ±1.5 dB
⑩	**VU METER**	LINE IN 1 kHz, −10 dBs	LINE OUT and VU meter	Standard recording only MONITOR SW→ SOURCE	VR5, 6	VU meter indicates 0 VU.	Reference value: 0 VU ± 1 VU
⑪	**PEAK INDICATOR**	LINE IN 1 kHz, −4 dBs Feed the signal to L and R jacks at the same time.	Peak indicator	Standard recording only MONITOR SW→ SOURCE	VR301	Peak indicator lights.	Reference value: −4 dBs −1.0 dB
⑫	**OSC BALANCE**	—	VU meter	Standard recording MONITOR SW→ SOURCE OSC SW→ON	VR401	Make the outputs of 400 Hz and 10 kHz equally.	
⑬	**OSC LEVEL**	—	VU meter	Standard recording MONITOR SW→ SOURCE OSC SW→ON	VR402	VU meter indicates 0 VU.	

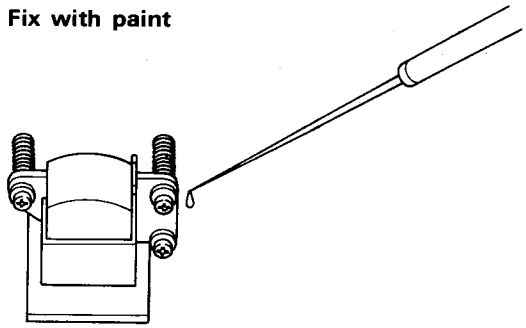
ADJUSTMENT

Note:
Adjust in numerical order. An adjustment illustration on ① HEIGHT OF REC/PLAY HEAD is not printed.

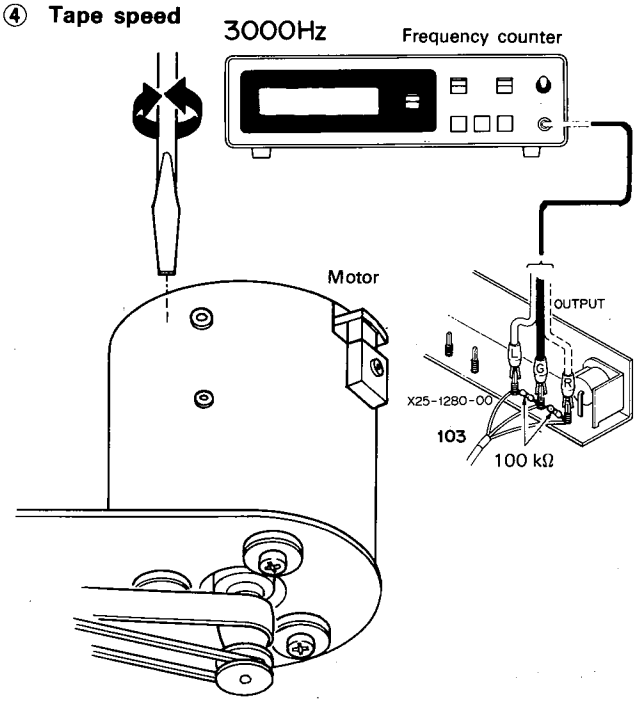
② Tilt of REC/PLAY head



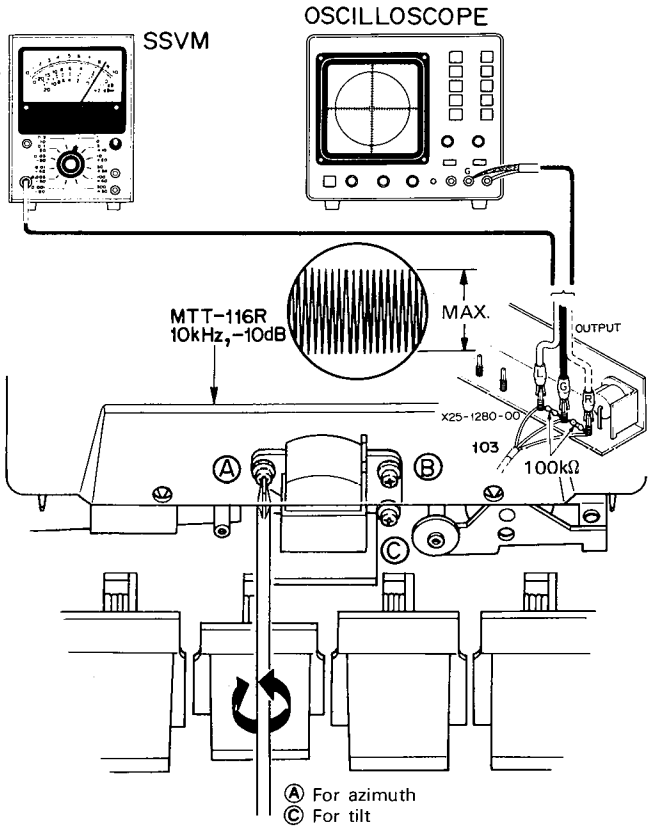
③a Fix with paint



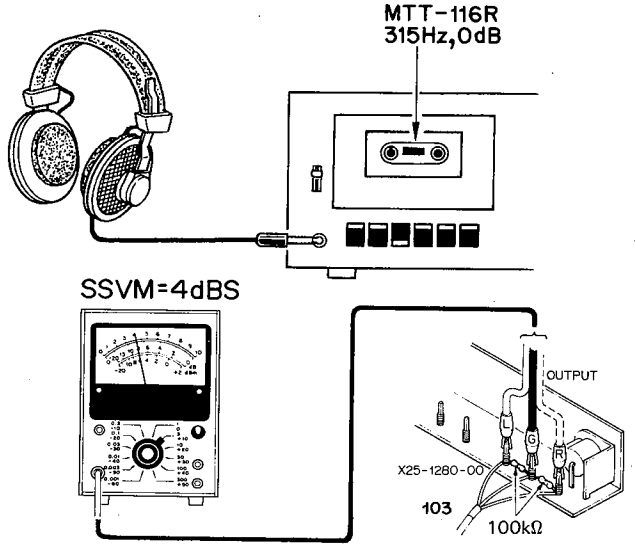
④ Tape speed



③ Azimuth of REC/PLAY head



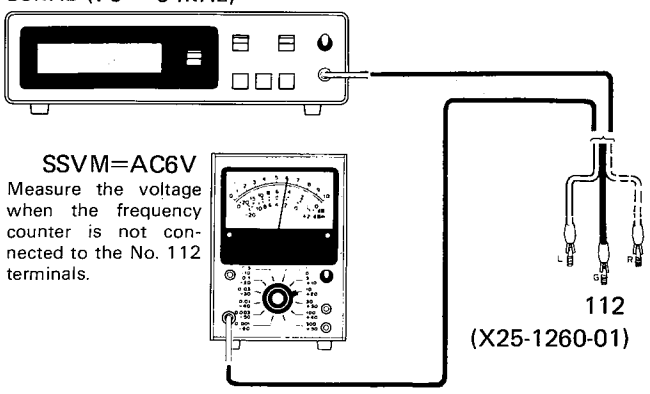
⑤ Playback level VR1, 2 (Standard playback)

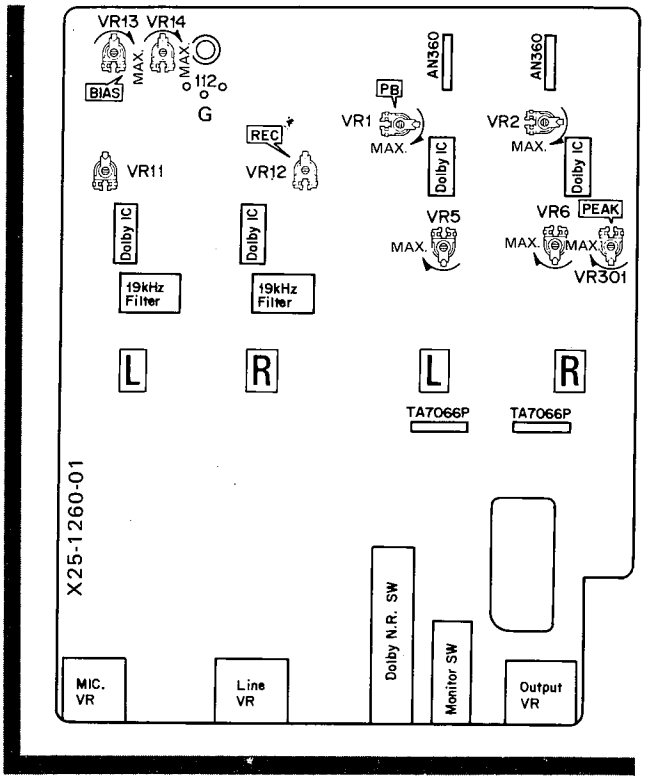


ADJUSTMENT

⑥ BIAS oscillating frequency (Recording)

85kHz (76 ~ 94kHz)

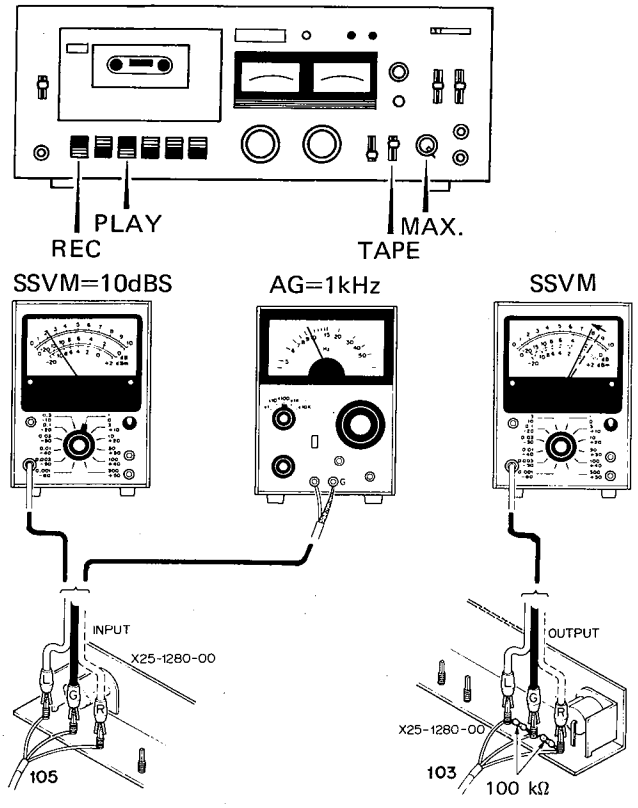




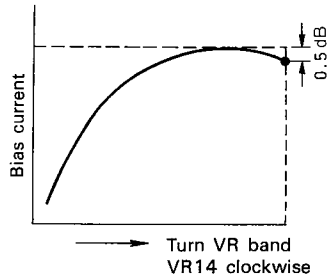
⑦ BIAS current

VR13, 14 (Standard recording)

(Raugh adjustment)



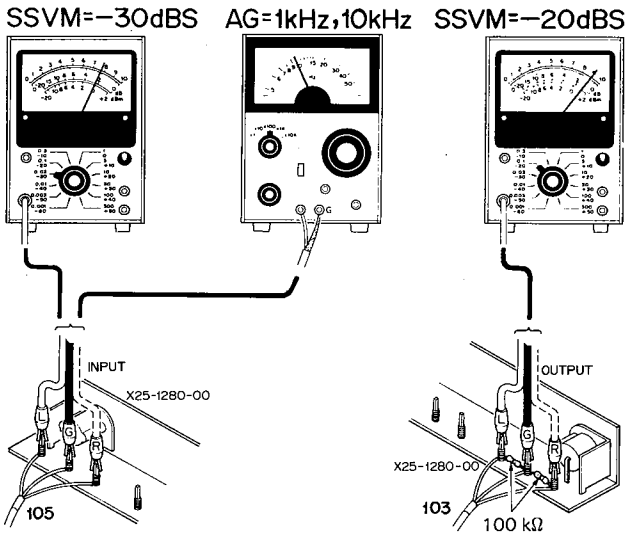
⑦a



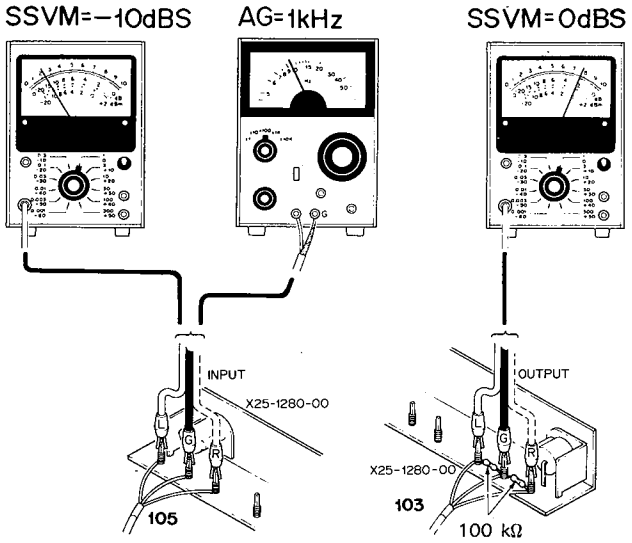
ADJUSTMENT

⑧ **Overall frequency caracteristic**
VR13, 14 (Standard recording. Make the outputs of 1 kHz and 10 kHz equally.

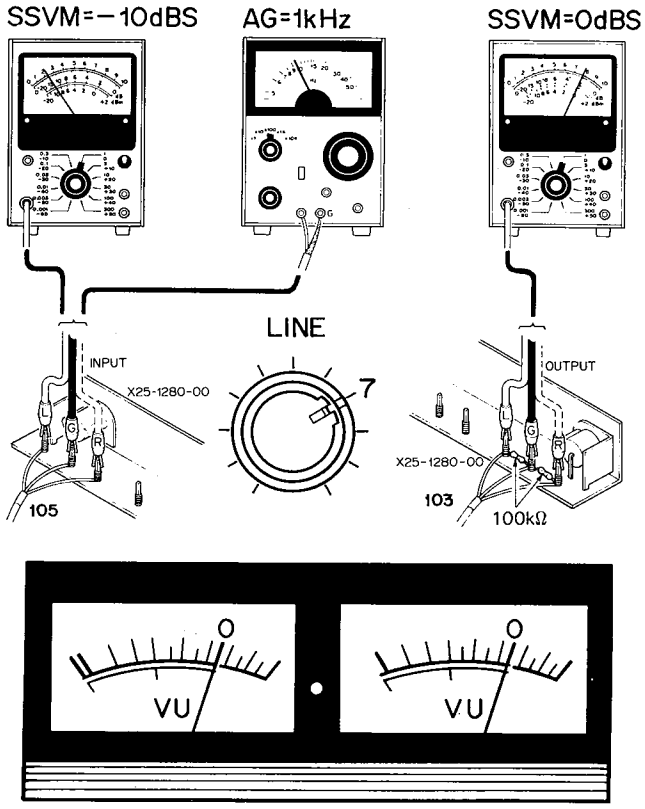
(Fine adjustment)



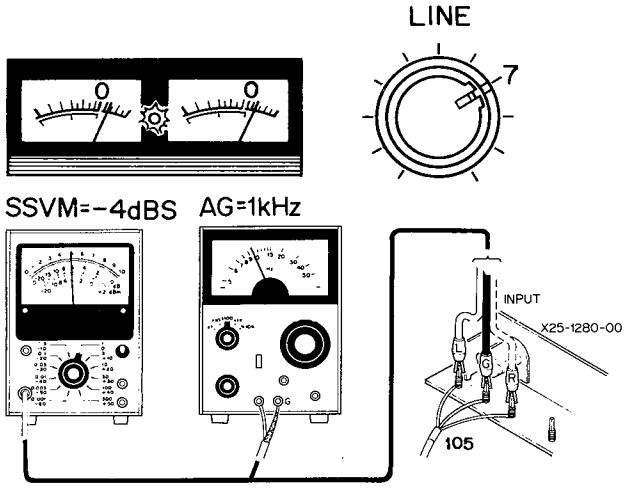
⑨ **REC level**
VR11, 12 (Standard recording)



⑩ **VU meter**
VR5, 6
(Standard recording. MONITOR SW → SOURCE)



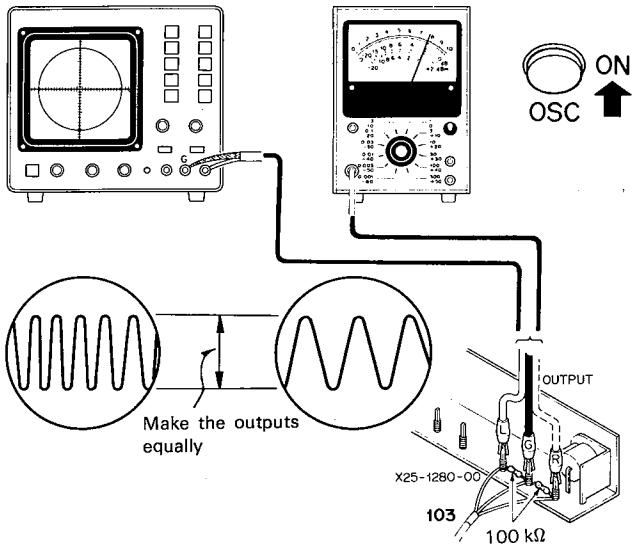
⑪ **Peak indicator**
VR301 (Recording, MONITOR SW → SOURCE)

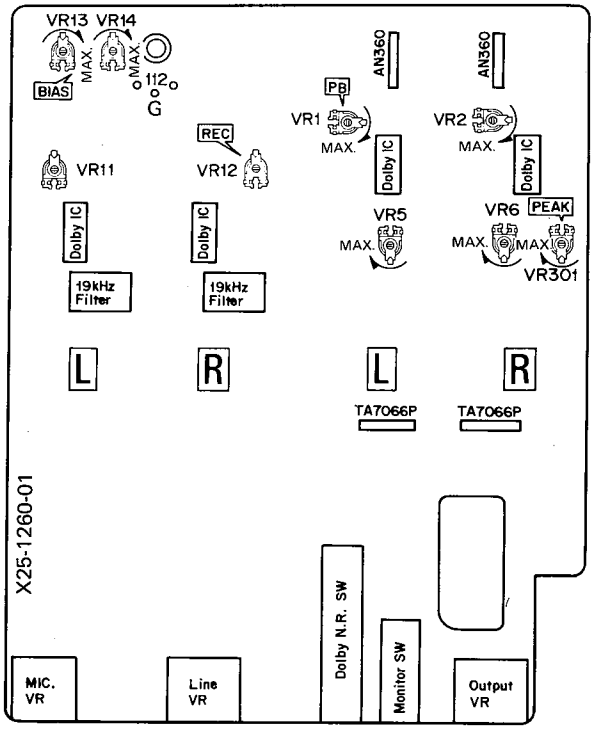


ADJUSTMENT

⑫ **OSC Balance**

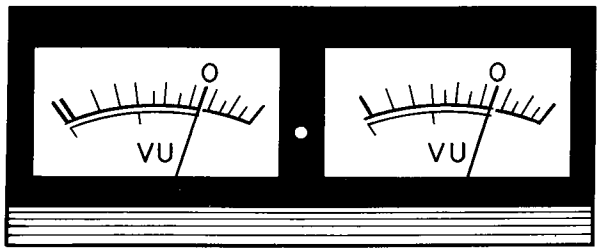
VR401 (Recording, MONITOR SW → SOURCE)



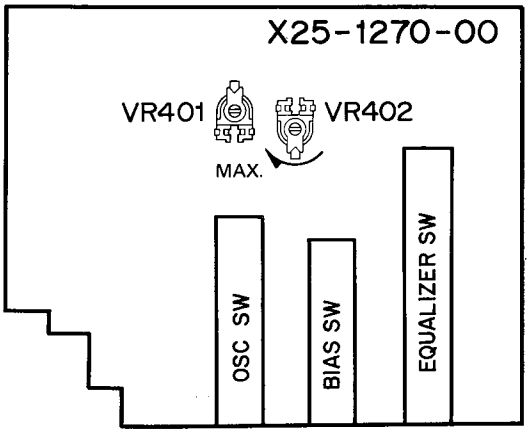


⑬ **OSC level**

VR402 (Recording, MONITOR SW → SOURCE)



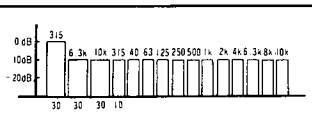
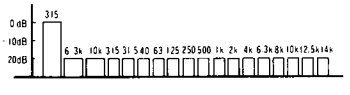




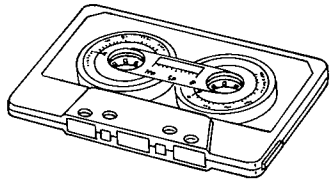
MEASUREMENT

NO.	ALIGN	INPUT SIGNAL	CHECK POINTS	SETTING	MEASUREMENT	MEASURED VALUE	REMARKS
MECHANISM SECTION							
1.	TAPE SPEED DEVIATION	MTT-111 3 kHz	LINE OUT	Playback	Error (%) = $\frac{f\text{-}3\ kHz}{3\ kHz} \times 100$	±2.2%	
2.	TAPE SPEED VARIATION	MTT-111 3 kHz	LINE OUT	Playback	Measure the difference between the maximum and minimum tape speed deviation.	±1%	
3.	WOW AND FLUTTER	MTT-111 3 kHz	LINE OUT	Playback	Measure at the beginning of, in the middle of, and at the end of tape running.	0.12% WRMS	
4.	TAKE-UP TORQUE	Cassette type torque gauge	—	Playback	—	35 ~ 60 g.cm	
5.	FF TORQUE	Cassette type torque gauge	—	FF	—	80 g.cm or more	
6.	REW TORQUE	Cassette type torque gauge	—	REW	—	80 g.cm or more	
7.	PINCH ROLLER PRESSURE	—	—	Playback	The ▶ (PLAY) button should be pressed at once. Then, pull the pinch roller with a spring balance and measure the pressure when the gap is 0.2 ~ 0.3 mm between the pinch roller and the capstan.	500 ± 50 g	
8.	TIME FOR FAST FOR-WARD AND REWINDING	C-60	—	FF/REW	Measure the winding time necessary for FF and REW operation respectively.	100 sec. or less	
9.	TAPE COUNTER INDICATION	C-120	—	FF/REW PLAY/REC	Read out the counter indication from the beginning to the end of the tape, in FF, REW, PLAY and REC setting. (Prior to starting the tape, press the reset button of the counter to clear the figure [000].)	940 ±50 count	
10.	TIME FOR AUTO-STOP OPERATION	—	—	FF/REW PLAY/REC	Measure the time from the moment the tape stops running until the auto-stopper functions.	3 $^{+2}_{-1}$ sec.	

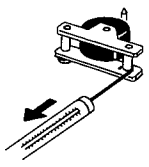
TEST TAPE SPECIFICATION

MTT-116R	Frequency	1590 μs and 120 μs	40 Hz ~ 10 kHz 0 dB = 250 pWb/mm	
MTT-116U	Frequency	3180 μs and 120 μs	31.5 Hz ~ 14 kHz 0 dB = 160 pWb/mm	

A normal recording level 250 pWb/mm is about 4 dB above the normal recording level 160 pWb/mm.



Cassette Type Torque Gauge (CT-100M)

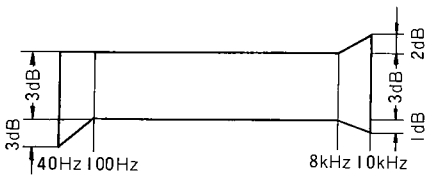


To Measure Pinch Roller Pressure

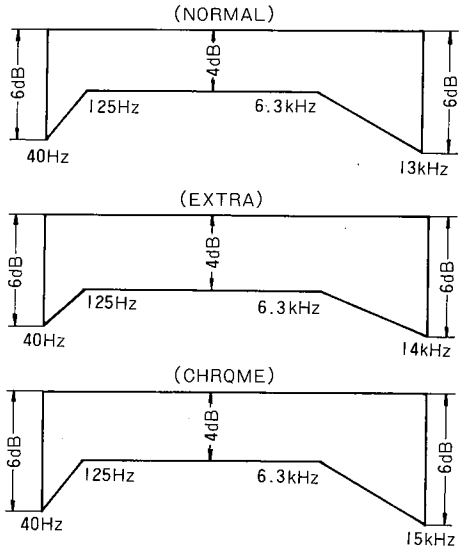
MEASUREMENT

NO.	ALIGN	INPUT SIGNAL	CHECK POINTS	SETTING	MEASUREMENT	MEASURED VALUE	REMARKS
AMP SECTION							
1.	**PLAYBACK LEVEL**	MTT-116R 315 kHz, 0 dB	1) LINE OUT 2) DIN Connector 3) Headphone jack	Standard playback	Check the output level	4 dBs±1.5 dB [LINE OUT, DIN Connector] −20dBs±3dB (Headphones)	
2.	**PLAYBACK FREQUENCY CHARAC-TERISTICS**	MTT-116U −10 dB	LINE OUT	Standard playback	Plot output levels at respective frequencies.		See Fig. 1.
3.	**PLAYBACK SN RATIO**	MTT-116U 315 Hz, 0 dB	LINE OUT	Standard playback	Check the ratio of output in the playback state vs. that in the pause state.	48dB or more (with compensation) 45dB or more (without compensation)	Weighting filter is required.
4.	**PLAYBACK OUTPUT LEVEL DEVIATION**	MTT-116R 6.3 kHz −10 dB	LINE OUT	Standard playback	Check deviation in the output level. For 60 sections or more.	3 dB or less	
5.	**OVERALL FREQUENCY CHARAC-TERISTIC (1) WITH DOLBY NR OFF**	−20 dB below the normal recording level input (−10 dBs) at each frequency, LINE IN	LINE OUT	Standard recording → Standard playback (DOLBY OFF, input signal −20 dB below the normal recording level input, equalizer in 3 stages)	Plot output levels at respective frequencies.		Channel balance should be made within 4 dB (See Fig. 2.)
6.	**OVERALL FREQUENCY CHARACTER-ISTIC (2) WITH DOLBY NR ON**	−20 dB below the normal recording level input at each frequency, LINE IN	LINE OUT	Standard recording → Standard playback (DOLBY ON, input signal −20 dB below the normal recording level input, equalizer in 3 stages)	Plot output levels at respective frequencies.		See Fig. 3.
7.	**ERASING RATE**	+6B above the normal recording level input at 1 kHz, LINE IN	LINE OUT	Recording → Playback → Erasing	Measure the output level where recording and playback have been performed and the one where the tape has been erased, using a band-pass filter. Express the resultant level difference in dB.	60 dB or more	
8.	**DISTOR-TION**	Normal recording level input 1 kHz, LINE IN	LINE OUT	Standard recording → Standard playback	Measure total harmonic distortion factor in playback output.	NORMAL 3.0 % or less CHROME 3.0 % or less	
9.	**OVERALL SN RATIO**	Normal recording level input at 1 kHz, LINE IN and no signal	LLINE OUT	Standard recording → Standard playback	Check the ratio of playback level at 1 kHz vs. noise output level in no-signal tape.	DOLBY NR OFF: 46 dB or more (with compensation) 43 dB or more (without compensation) DOLBY NR ON: 50 dB or more (with compensation) 43 dB or more (without compensation)	Weighting filter is required. Channel balance should be made within 5 dB.
10.	**CHANNEL SEPARA-TION**	One channel: Normal recording level input at 100 Hz Another channel: no signal, LINE IN	LINE OUT	Standard recording → Standard playback	Measure the playback level in the recorded track and the crosstalk output level in the unrecorded track, using a band-pass filter. Express the resultant level difference in dB.	30 dB or more	
11.	**CROWWTALK BETWEEN TRACKS**	Normal recording level input at 100 Hz, LINE IN	LINE OUT	Standard recording → Standard playback	Measure the playback lever in the recorded track and the crosstalk output level in the unrecorded track of the Same tape section, using a band-pass filter. Express the resultant level difference in dB.	30 dB or more	

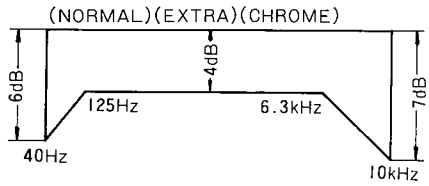
DATA



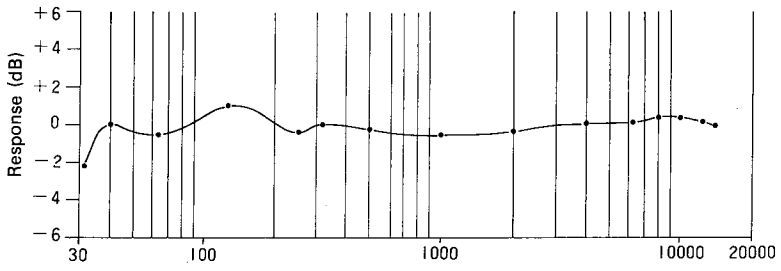
Standard: Playbakck Frequency Characteristic (Fig. 1)



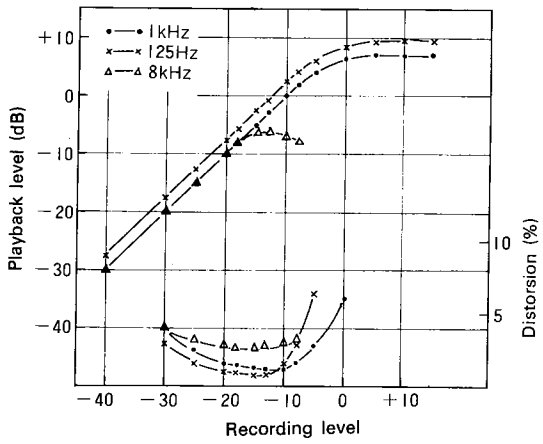
Standard: Overall Frequency Characteristic (1) (Fig. 2)



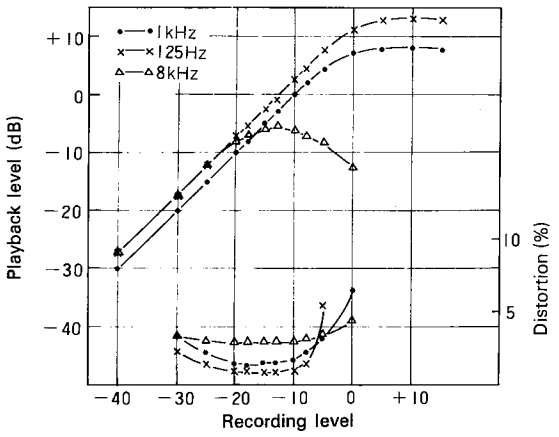
Standard: Overall Frequency Characteristic (2) (Fig. 3)



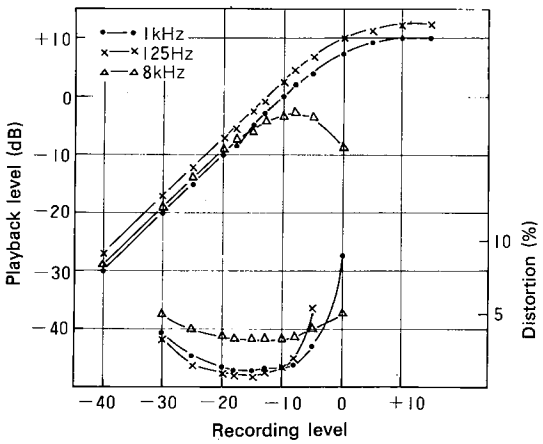
MITT-116U Playback Frequency Characteristic



TDK AC-211 (NORMAL)
Overall Frequency Characteristic

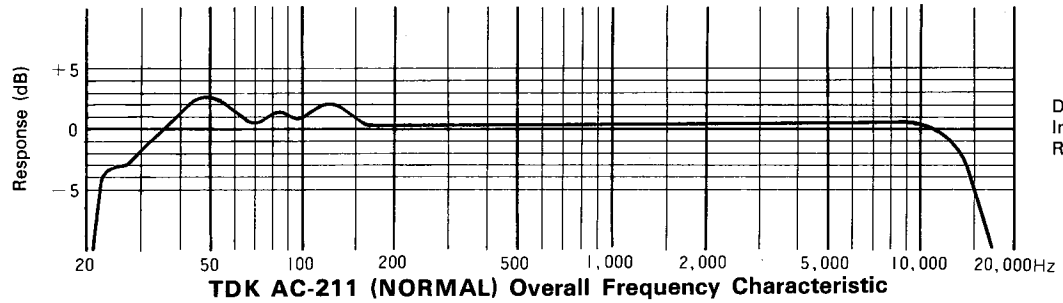


TDK AC-511 (CHROME)
Overall Frequency Characteristic



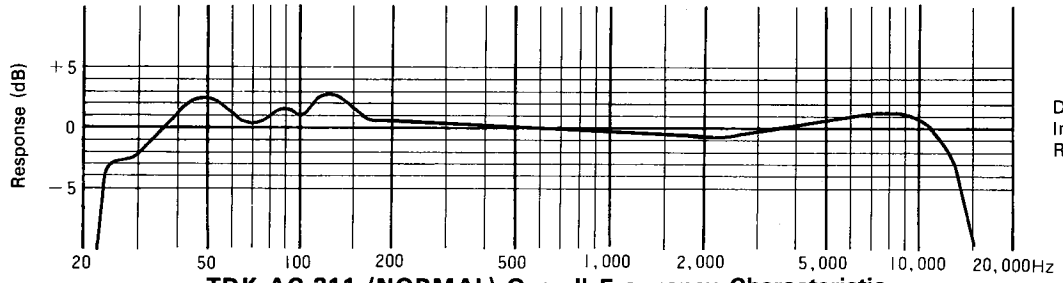
SONY CS-30 (RESERVE)
Overall Frequency Characteristic

DATA



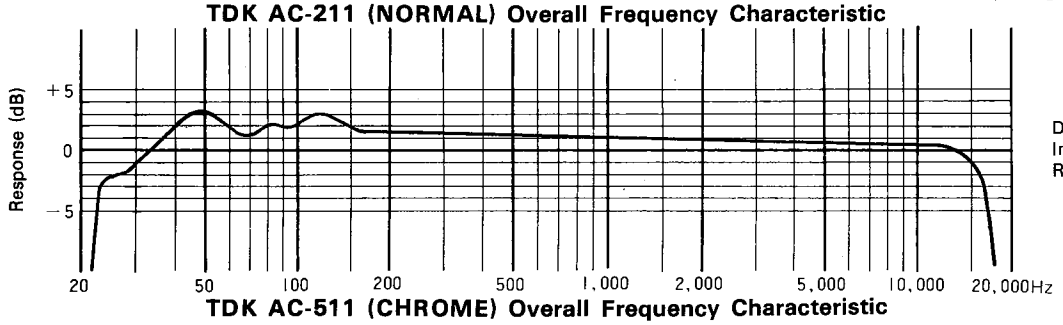
DOLBY OFF
Input – 30 dBs
Rch

TDK AC-211 (NORMAL) Overall Frequency Characteristic



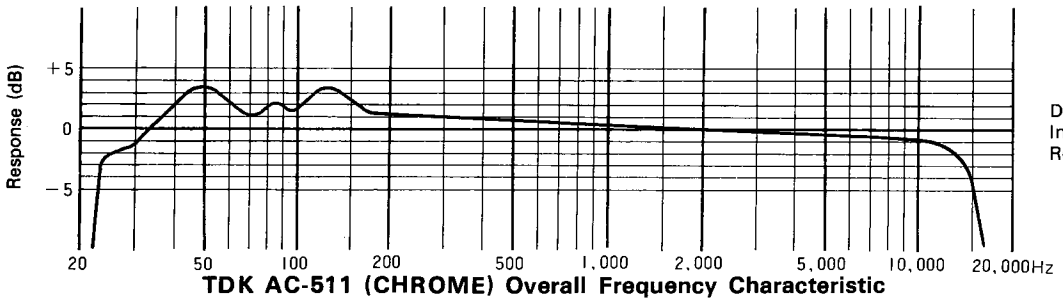
DOLBY ON
Input – 30 dBs
Rch

TDK AC-211 (NORMAL) Overall Frequency Characteristic



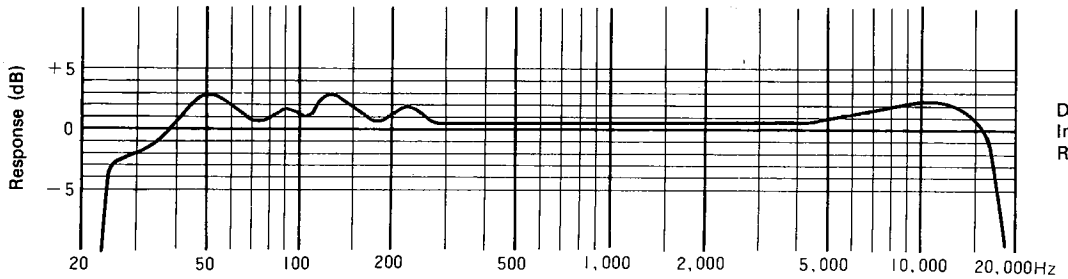
DOLBY OFF
Input – 30 dBs
Rch

TDK AC-511 (CHROME) Overall Frequency Characteristic



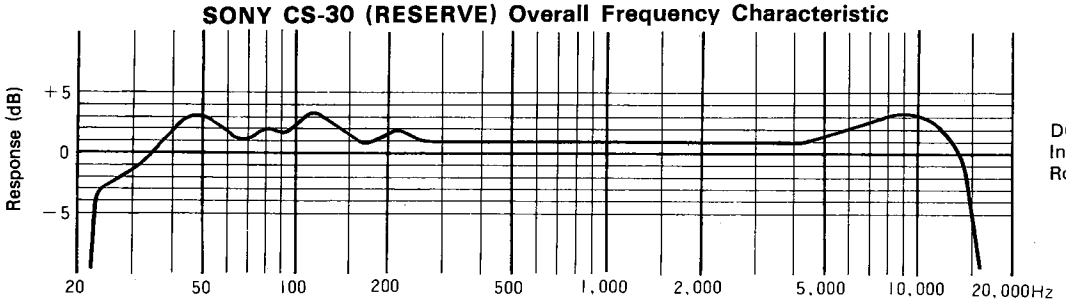
DOLBY ON
Input – 30 dBs
Rch

TDK AC-511 (CHROME) Overall Frequency Characteristic



DOLBY OFF
Input – 30 dBs
Rch

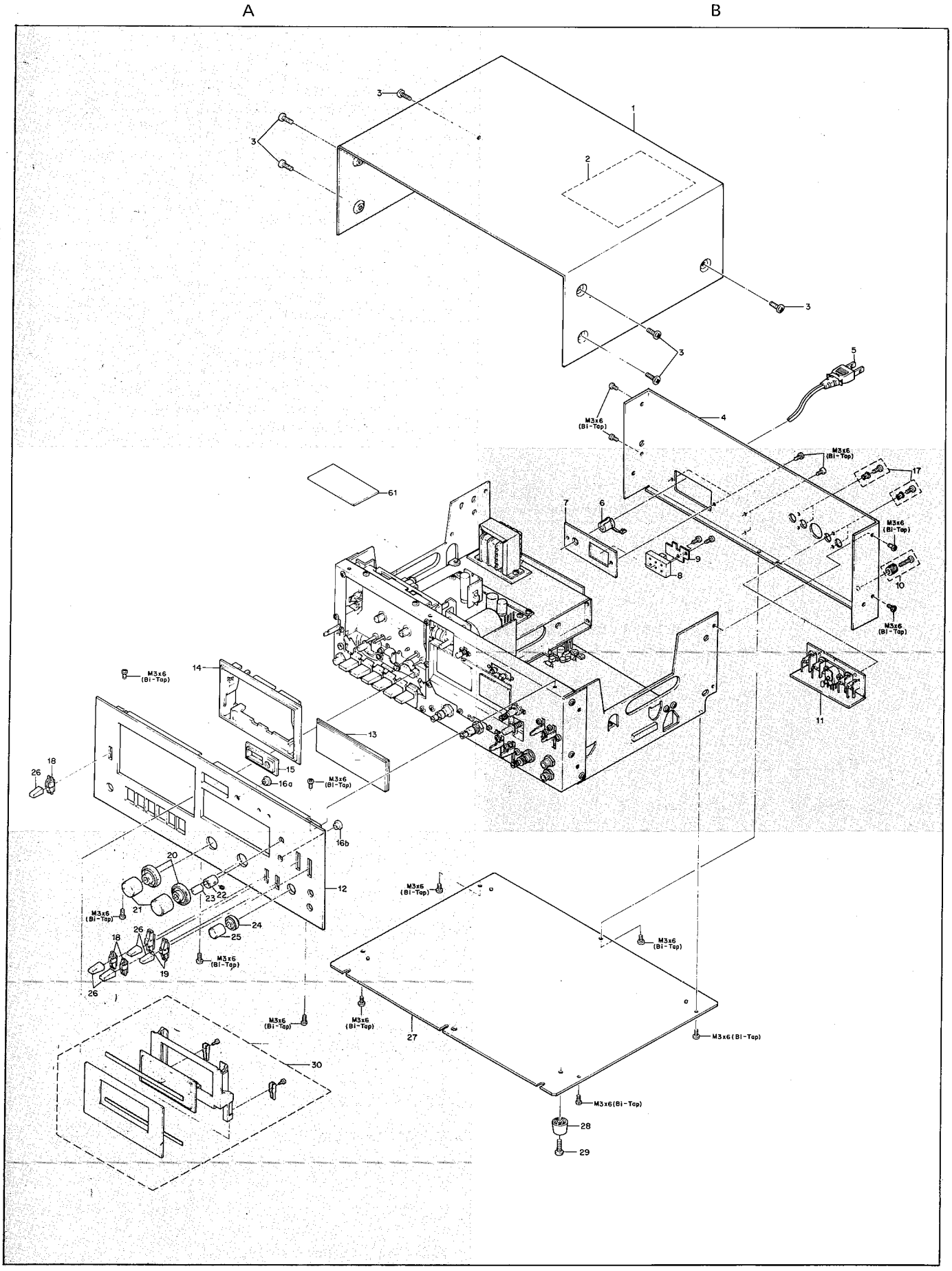
SONY CS-30 (RESERVE) Overall Frequency Characteristic



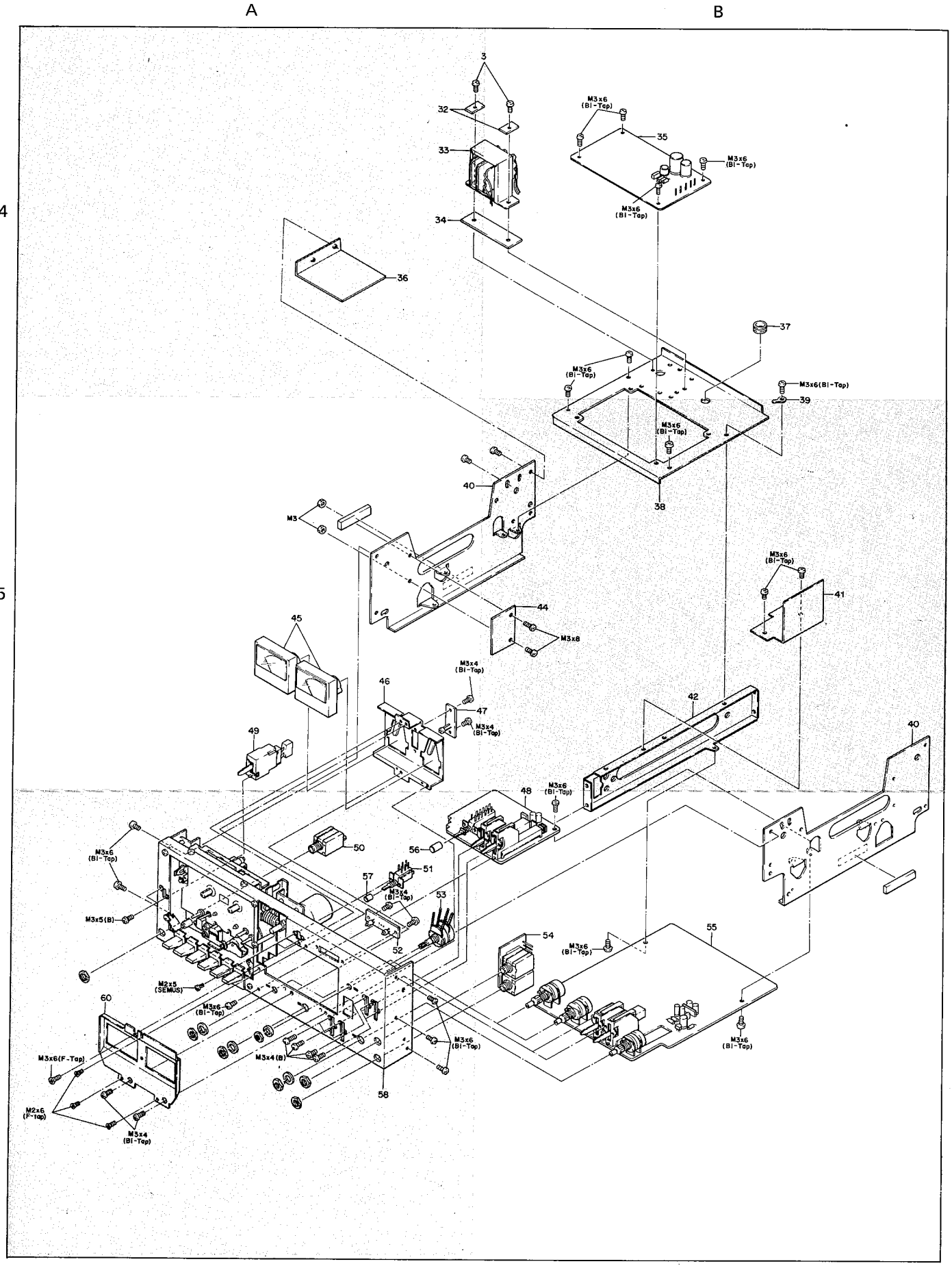
DOLBY ON
Input – 30 dBs
Rch

SONY CS-30 (RESERVE) Overall Frequency Characteristic

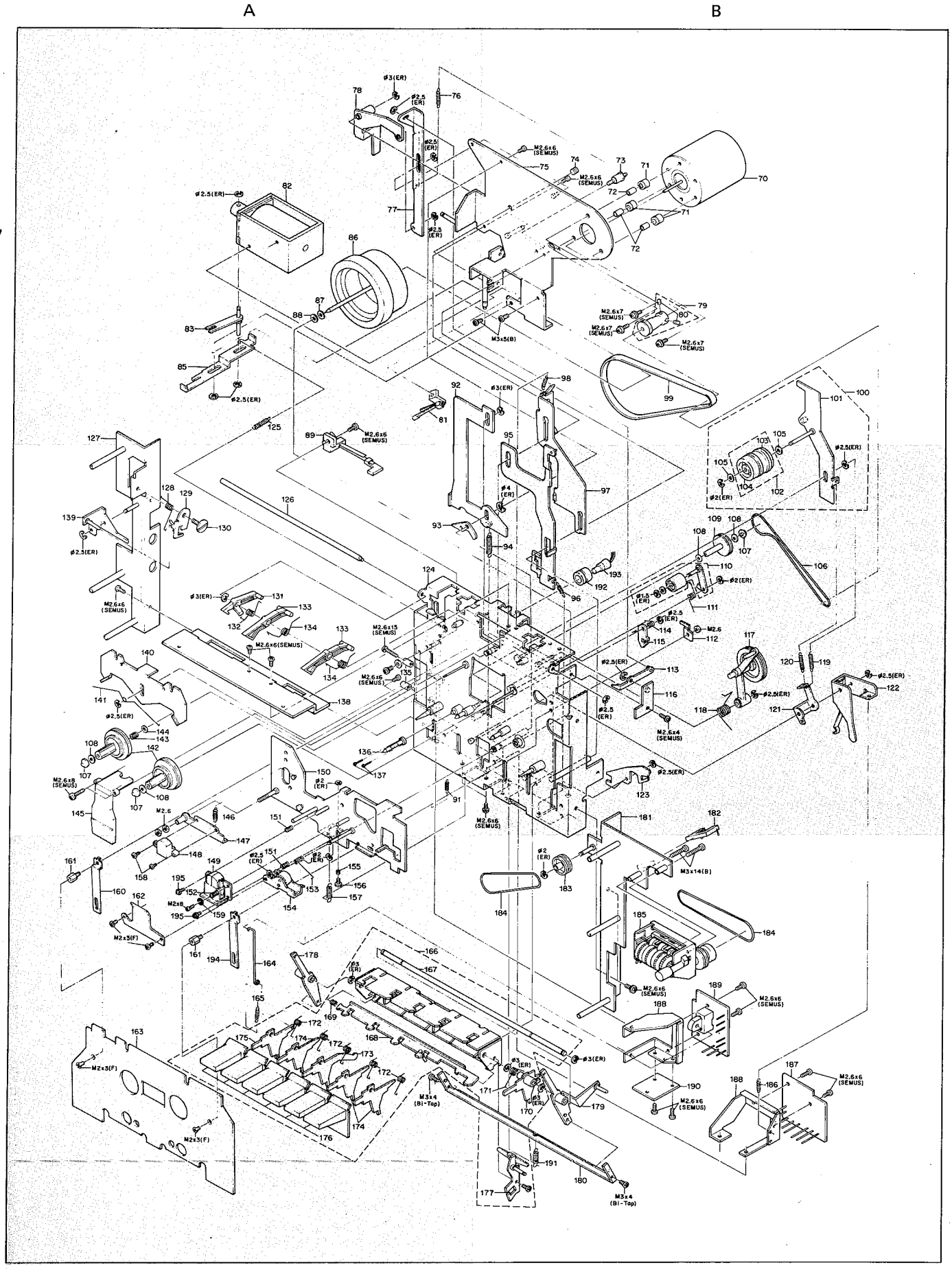
EXPLODED VIEW



EXPLODED VIEW



EXPLODED VIEW



EXPLODED VIEW PARTS LIST

● : Refer to Destinations' Parts List
☆ : New parts

Fig. No.	Parts No.	Description	Remarks
1	A01-0603-08	Case	☆ 1B
2	B42-1334-08	Adjustment sheet	☆ 1B
3	N09-0233-08	Binding head tap tight screw M4×8	1A,B
4	A23-1207-08	Rear panel	☆ 2B
5	●	Power cord	1B
6	●	Power cord bushing	2B
7	●	Power cord clamp holder A	☆ 2B
8	●	Slide switch	2B
9	●	Switch stopper holder	2B
10	N08-0128-25	GND terminal	2B
11	●	JACK PC board ass'y	☆ 2B
12	●	Panel ass'y (includes the parts of 13,14,15,16,18 and 19)	☆ 3A
13	B10-0501-08	Meter front glass	☆ 2A
14	B07-0511-08	Escutcheon for mechanism chassis ass'y	☆ 2A
15	B07-0510-08	Escutcheon for tape counter	☆ 3A
16a	B07-0508-08	Switch sleeve A	☆ 2A
16b	B07-0509-08	Switch sleeve B	☆ 3A
17	N29-0202-08	Nylon rivet ϕ3.5 × 5.5	2B
18	B07-0205-04	Escutcheon (small)	☆ 3A
19	B07-0206-04	Escutcheon (big)	☆ 3A
20	K23-0614-08	Knob (lever switch, outside)	☆ 3A
21	K23-0606-08	Knob (lever switch, inside)	☆ 3A
22	K23-0618-08	Knob (BIAS VR, outisde)	☆ 3A
23	K23-0616-08	Knob (BIAS VR, inside)	☆ 3A
24	K23-0620-08	Knob (OUTPUT VR, outside)	☆ 3A
25	K23-0608-08	Knob (OUTPUT VR, inside)	☆ 3A
26	K27-0051-04	Knob (lever switch)	☆ 3A
27	A40-0518-08	Bottom plate	☆ 3A
28	J02-0308-08	Leg	3B
29	N09-0571-08	Binding head tap tight screw	3B
30	●	Cassette lid	☆ 3A
31	—	—	—
32	F31-0403-08	Power transformer holder	4A
33	●	Power transformer	☆ 4A
34	F20-0404-08	Insulation plate	☆ 4A
35	●	POWER SUPPLY/AUTO STOP PC board ass'y	☆ 4B
36	F10-1009-08	Shielding plate for power transformer	☆ 4A
37	J42-0308-08	Bushing	4B
38	J21-2243-08	Top plate	☆ 5B
39	J19-0468-08	Lead holder	5B
40	J21-2241-08	Side plate	☆ 5A,5B
41	F20-0403-08	Shielding plate for motor	☆ 5B
42	J21-2242-08	Middle plate	☆ 5B
43	—	—	
44	F20-0402-08	Insulating sheet for power switch	☆ 5B
45	B31-0501-05	VU meter	☆ 5A
46	J21-2244-08	VU meter holder	☆ 5A
47	X25-1300-00	PEAK LED PC board ass'y	☆ 5A
48	X25-1270-00	TEST TONE PC board ass'y	☆ 6B
49	●	Power switch	☆ 5A
50	E11-0304-08	Headphone jack	6A
51	S40-2304-08	Pushbutton switch for memory rewind operation	☆ 6A
52	X25-1290-00	LED PC board ass'y	☆ 6A

Fig. No.	Parts No.	Description	Remarks
53	R21-4302-08	Variable resistor 50kΩ(B) × 2 VR15, 16	☆ 6A
54	X25-1310-00	MIC JACK PC board ass'y	☆ 6B
55	X25-1260-01	REC/PLAY/OSC PC board ass'y	☆ 6B
56	K23-0612-08	Knob (OSC)	☆ 6A
57	K23-0610-08	Knob (MEMORY REWIND)	☆ 6A
58	J21-2240-08	Back plate	☆ 6A
59	—	—	
60	A21-0646-08	VU meter dress board	☆ 6A
61	X25-1360-00	MUTING (2) PC board ass'y	☆ 2A
62	—	—	—
63	—	—	—
64	—	—	—
65	—	—	—
66	—	—	—
67	—	—	—
68	—	—	—
69	—	—	—
70	T42-0104-08	Motor	7B
71	G13-0415-08	Rubber for motor	☆ 7B
72	J31-0128-08	Faucet for motor	7B
73	D21-0624-08	Stopping shaft	☆ 7B
74	N09-0208-18	Flywheel thrust adjusting screw	☆ 7B
75	J19-1224-08	Flywheel holder ass'y	☆ 7B
76	G01-0638-08	Spring for returning	☆ 7A
77	D10-0521-08	Link lever for removing pause lock	☆ 7A
78	D10-0477-08	Lever (1) ass'y for removing pause lock	☆ 7A
79	D15-0503-08	Motor pulley ass'y	☆ 7B
80	N70-2003-16	Set screw	7B
81	S46-1302-08	Leaf switch (PAUSE)	7A
82	T94-0055-08	Plunger	☆ 7A
83	D10-0478-08	Shut-off lever (2) ass'y	☆ 7A
84	—	—	
85	D10-0484-08	Shut-off lever (1)	☆ 7A
86	D01-0303-08	Flywheel ass'y	☆ 7A
87	N19-0234-08	Washer ϕ2.5 × 0.25	7A
88	N19-0504-08	Polyethylene slider washer ϕ5 × ϕ2.5 × 0.25	7A
89	S46-1304-08	Leaf switch for motor	7A
90	—	—	
91	G01-0294-08	Record prevention spring	☆ 8A
92	D10-0197-08	Brake operation lever	7A
93	D10-0199-08	Lock defeat plate	8A
94	G01-0632-08	Brake operation lever spring	☆ 8B
95	D10-0469-18	Pause operation lever ass'y	☆ 8B
96	G01-0633-08	Pause operation lever spring	☆ 8B
97	D10-0195-18	FF interlock lever ass'y	8B
98	G01-0297-08	FF interlock lever spring	7B
99	D16-0206-08	Flat belt	☆ 7B
100	D10-0468-08	FR lever block ass'y	☆ 7B
101	D10-0193-08	FR lever ass'y	7A
102	D14-0204-08	Idler "A" ass'y (FW idler)	☆ 8B
103	D14-0055-08	Idler "A1" ass'y	8B
104	D14-0203-08	Idler "A2" ass'y	8B
105	N19-0529-08	Washer ϕ2.5 × 0.1	8B

EXPLODED VIEW PARTS LIST

Fig. No.	Parts No.	Description	Remarks	
106	D16-0207-08	Square belt	☆	8B
107	B09-0008-18	Reel cap		8A
108	N19-0249-08	Polyethylene slider washer $\phi 1.6 \times \phi 6 \times 0.25$		8A
109	D14-0205-08	Idler ass'y	☆	8B
110	D14-0056-08	Idler "B" ass'y (REW idler)		8B
111	G01-0303-08	Idler "B" lever spring		8B
112	D19-0203-08	Pause slide holding plate		8B
113	D10-0479-08	Lever (2) ass'y for removing pause lock	☆	8B
114	G01-0300-08	Pause lock plate spring		8B
115	D12-0205-08	Pause lock plate	☆	8B
116	D10-0476-08	Plate ass'y for unattended recording operation		8B
117	D10-0496-08	Tension arm ass'y "B"	☆	8B
118	G09-0203-08	Drive roller spring		8B
119	G01-0307-08	REW lever spring "B"		8B
120	G01-0302-08	FR lever spring "D"		8B
121	D10-0201-08	REW lever "B"		8B
122	D10-0480-08	Muting lever ass'y	☆	8B
123	D10-0483-08	FF lever	☆	8B
124	A10-1015-08	Mechanism chassis ass'y	☆	8A
125	G01-0639-08	Eject safty claw	☆	7A
126	D21-0625-08	Cassette helf holding lever shaft	☆	8A
127	J21-2239-08	Mechanism holder "L" ass'y	☆	8A
128	G09-0211-08	Cassette lock plate spring	☆	8A
129	D12-0206-08	Cassette lock plate	☆	8A
130	N09-0582-08	Screw with steps M3 × 5	☆	8A
131	D19-0204-08	REC safety claw	☆	8A
132	G09-0210-08	REC safety claw spring	☆	8A
133	D10-0485-08	Cassette half holding lever	☆	8A
134	G09-0209-08	Cassette half spring	☆	8A
135	J31-0412-08	Faucet for mounting frame	☆	8A
136	J31-0301-08	Felt faucet ass'y	☆	8A
137	N09-0808-08	Flat head screw M1.6 × 4	☆	8A
138	A13-0506-08	Angle for mounting mechanism	☆	8A
139	D10-0482-08	Arm ass'y for preventing eject operation	☆	8A
140	D10-0198-08	Brake lever		8A
141	G03-0011-08	Brake lever spring		8A
142	D03-0007-18	Reel base ass'y	☆	8A
143	G01-0635-18	Back tension spring	☆	8A
144	N19-0515-08	Washer $\phi 6.2 \times \phi 9.5 \times 0.15$	☆	8A
145	B11-0303-08	Prism plate	☆	9A
146	G09-0208-18	Erase head plate spring	☆	8,9A
147	J21-2237-18	Erase head plate ass'y	☆	9A
148	T32-0004-08	Erase head		9A
149	T34-0005-05	REC/PLAY head	☆	9A
150	A11-0316-08	Head base ass'y	☆	8A
151	G01-0629-08	Adjusting head spring	☆	8A
152	G01-0630-08	Fixing head spring	☆	9A
153	G01-0305-18	Pinch roller spring		9A
154	D10-0467-18	Pinch roller arm ass'y	☆	9A
155	G01-0634-08	Head base shaft spring		9A
156	D39-0043-08	Head base shaft		9A
157	G10-0631-08	Head base spring	☆	9A
158	N09-0205-08	Screw with toothed washer M2 × 5		9A
159	N19-1020-46	Toothed washer		9A
160	G02-0065-08	Head base holding spring		9A
161	N09-0583-08	Hexagonal screw M2.6	☆	9A
162	F01-0608-08	Head protector	☆	9A
163	A29-0301-08	Cassette plate	☆	9A
164	G09-0207-08	REC switch operation wire	☆	9A
165	G01-0672-08	Brake operation lever spring (1)	☆	9A
166	K29-0629-08	Pushbutton block ass'y	☆	9A
167	D21-0623-08	Pushbutton shaft	☆	9A
168	D10-0474-08	Pushbutton operation plate ass'y	☆	9A
169	G01-0645-08	Pushbutton operation plate spring	☆	9A
170	D10-0473-08	STOP pushbutton lever ass'y	☆	9B
171	G09-0206-08	STOP pushbutton spring	☆	9B
172	G09-0205-08	Pushbutton spring	☆	9A
173	D10-0470-08	Pushbutton lever "A"	☆	9A
174	D10-0471-08	Pushbutton lever "B"	☆	9A
175	D10-0472-08	REC pushbutton lever	☆	9A
176	K29-0630-08	Operational pushbutton	☆	9A
177	D10-0475-08	Eject lever holder ass'y	☆	9B
178	D10-0481-18	Housing arm ass'y "L"	☆	9A
179	D10-0497-18	Housing arm ass'y "R"	☆	9B
180	D10-0486-08	Housing arm interlock plate	☆	9B
181	J21-2238-08	Mechanism holder "R" ass'y	☆	8B
182	S59-1043-08	Reed switch		8B
183	D14-0206-08	Counter idler	☆	9B
184	D16-0208-08	Counter belt	☆	9B
185	B35-0203-08	Tape counter	☆	9B
186	G01-0636-08	Muting lever spring	☆	9B
187	X25-1330-00	MUTING SWITCH PC board ass'y	☆	9B
188	A15-0303-08	Frame for switch		9B
189	X25-1320-00	REC SWITCH PC board ass'y	☆	9B
190	J21-2262-08	Wire holder	☆	9B
191	G01-0637-08	Housing arm spring	☆	9B
192	F14-0106-08	Lamp tube		8B
193	B30-0507-08	Pilot lamp 12V 60 mA	☆	8B
194	G02-0311-08	Head base holding screw "B"		9A
195	N09-0813-08	Screw with toothed washer		9A

Fig. No.	Parts No.
M2 × 8	N30-2008-46
M3 × 8	N30-3008-46
M3 × 4 (Bi-Tap)	N89-3004-46
M3 × 6 (Bi-Tap)	N89-3006-46
M2.6 × 4 (SEMUS)	N09-0199-08
M2.6 × 6 (SEMUS)	N09-0202-08
M2.6 × 7 (SEMUS)	N09-0200-08
M2.6 × 8 (SEMUS)	N09-0203-08
M2.6 × 15 (SEMUS)	N09-0201-08
M2 × 3 (F)	N32-2003-46
M3 × 5 (B)	N35-3005-46
M3 × 14 (B)	N35-3014-46
M2.6	N10-2026-46
M3	N10-2030-46
$\phi 1.5$ (ER)	N24-3015-60
$\phi 2$ (ER)	N24-3020-60
$\phi 2.5$ (ER)	N24-3025-60
$\phi 3$ (ER)	N24-3030-60
$\phi 4$ (ER)	N24-3040-60

☆ : New parts

Fig. No.	U.S.A. (K)	Canada (P)	PX (U)	Australia (X)	Europe (W), (W(E)) Scandinavia (L)	England (T)	South Africa (S)	Other Areas (M)	KX-1003 (Hu)	Description
30	A09-0304-08	A09-0304-08	A09-0304-08	A09-0304-08	A09-0304-08	A09-0304-08	A09-0304-08	A09-0304-08	A09-0306-08	Cassette lid☆
12	A20-1913-08	A20-1913-03	A20-1913-08	A20-1913-08	A20-1913-08	A20-1914-08	A20-1913-08	A20-1913-08	A20-1917-08	Panel ass'y☆
—	B46-0061-10	B46-0055-20	B46-0062-10	—	—	B46-0060-00	—	—	B46-0062-10	Warranty card
—	—	—	B46-0063-00	—	—	—	—	—	—	Warranty card
—	B50-2234-00	B50-2236-00	B50-2234-00	B50-2234-00	B50-2234-00	B50-2235-00	B50-2234-00	B50-2234-00	B50-2246-00	Instruction manual☆
—	—	—	B59-0018-00	—	—	—	—	—	—	Kenwood service stations' list
—	—	—	—	—	C91-0306-05	C91-0306-05	—	—	C91-0306-05	Ceramic capacitor × 2 0.01μF☆
9	—	—	D32-0306-08	—	D32-0306-05	—	D32-0306-08	D32-0306-08	D32-0306-08	Switch stopper holder☆
5	E30-0181-05	E30-0181-05	E30-1317-05	E30-0185-05	E30-0567-08	E30-0587-05	040-0306-05	E30-1317-05	E30-0567-08	Power cord
F1,2	F05-8018-05	F05-8018-05	F05-8015-05	F05-8015-05	F05-8012-05	F05-8012-05	F05-8012-05	F05-8015-05	F05-8012-05	Fuse 0.8A 250V
							F05-8015-05			Fuse 0.8A 250V
F3	F05-1225-08	F05-1225-08	F05-1226-08	F05-1226-08	F05-1227-05	F05-1227-05	F05-1226-08	F05-1226-08	F05-1227-05	Fuse 1.25A 250V
—	H01-2252-08	H01-2254-08	H01-2255-08	H01-2252-08	H01-2252-08	H01-2253-08	H01-2252-08	H01-2252-08	H01-2256-08	Carton case☆
—	H10-2226-08	H10-2226-08	H10-2227-08	H10-2226-08	H10-2226-08	H10-2226-08	H10-2226-08	H10-2226-08	H10-2226-08	Polystyrene foamed fixture × 2☆
—	—	—	—	—	—	—	—	H25-0159-04	—	Sealed polyethylene bag
—	—	—	—	—	—	—	—	H40-0005-04	—	Anti-rust paper
7	J21-2258-08	J21-2258-08	J21-2259-08	J21-2260-08	J21-2261-08	J21-2260-08	J21-2260-08	J21-2259-08	J21-2261-08	Power cord clump holder A☆
6	J41-0034-05	J41-0034-05	J41-0034-05	J41-0024-05	J41-0033-05	J41-0033-05	J41-0024-05	J41-0034-05	J41-0033-05	Power cord bushing
33	L01-6091-08	L01-6101-08	L01-6094-08	L01-6094-08	L01-6094-08	L01-6094-08	L01-6094-08	L01-6094-08	L01-6094-08	Power transformer☆
SK	R90-0110-08	R90-0401-08	R90-0111-08	R90-0111-08	—	—	R90-0111-08	R90-0111-08	—	Spark killer
8	—	—	S31-2301-05	—	S31-2301-05	—	S31-2301-05	S31-2301-05	S31-2301-05	Slide switch
49	S33-1301-08	S33-1301-08	S33-1301-08	S33-2302-08	S33-2302-08	S33-2302-08	S33-2302-08	S33-1301-08	S33-2302-08	Power switch☆
11	X25-1280-00	X25-1280-00	X25-1280-00	X25-1280-00	X25-1280-61	X25-1280-00	X25-1280-00	X25-1280-00	X25-1280-00	JACK PC board ass'y☆
35	X27-1280-13	X27-1280-13	X27-1280-13	X27-1280-13	X27-1280-63	X27-1280-63	X27-1280-13	X27-1280-13	X27-1280-13	POWER SUPPLY PC board ass'y☆

PARTS LIST

TOTAL

☆ new parts

Ref. No.	Parts No.	Description	Remarks
—	B42-0009-04	Passed sticker	
—	E30-0541-05	Audio cord	
—	H25-0078-08	Instruction bag	
—	H25-0606-04	Polyethylene bag	
—	W01-0301-05	Head cleaning bar	

REC/PLAY/OSC (X25-1260-01)

Ref. No.	Parts No.	Description	Remarks
		CAPACITOR	
C1,2	CE04AW1C100CC	Electrolytic 10μF 16WV	
C3,4	CC45SL1H151J	Ceramic 150pF ±5%	
C5,6	CE04W1C100	Electrolytic 10μF 16WV	
C7,8	CC45SL1H470J	Ceramic 47pF ±5%	
C9,10	CE04W1C100	Electrolytic 10μF 16WV	
C13,14	CE04W1C330	Electrolytic 33μF 16WV	
C15～18	CQ92M1H682J	Mylar 0.0068μF ±5%	
C19,20	CE04AW1H1R0CC	Electrolytic 1μF 50WV	
C23,24	CQ92S1H151J	Polystyrene 150pF ±5%	
C25,26	CQ92M1H332J	Mylar 0.0033μF ±5%	
C27,28	CQ92M1H273J	Mylar 0.027μF ±5%	
C29,30	CQ92M1H562	Mylar 0.0056μF ±5%	
C31,32	CQ92M1H472J	Mylar 0.0047μF ±5%	
C33～36	CE04W1C100	Electrolytic 10μF 16WV	
C37,38	CQ92M1H473J	Mylar 0.047μF ±5%	
C39,40	CE04W1H1R0	Electrolytic 1μF 50WV	
C41,42	C90-0701-08	Electrolytic 0.1μF 50WV	
C43,44	C90-0702-08	Electrolytic 0.33μF 50WV	
C45,46	CE04W1C330	Electrolytic 33μF 16WV	
C47,48	CE04W1H1R0	Electrolytic 1μF 50WV	
C49,50	CE04W1HR47	Electrolytic 0.47μF 50WV	
C51～54	CE04W1C100	Electrolytic 10μF 16WV	
C55,56	CQ92M1H102M	Mylar 0.001μF +80%−20%	
C57,58	CE04W1H1R0	Electrolytic 1μF 50WV	
C59,60	CE04W1C100	Electrolytic 10μF 16WV	
C61,62	CE04W1H2R2	Electrolytic 2.2μF 50WV	
C63,64	CE04W1H3R3	Electrolytic 3.3μF 50WV	
C65,66	CE04W1C4R7	Electrolytic 4.7μF 16WV	
C67,68	CQ92M1H103M	Mylar 0.01μF ±20%	
C69,70	CE04W1H1R0	Electrolytic 1μF 50WV	
C71,72	CE04W1C470	Electrolytic 47μF 16WV	
C73,74	CC45SL1H221J	Ceramic 220pF ±5%	
C75,76	CE04W1C100	Electrolytic 10μF 16WV	
C77,78	CC45SL1H470J	Ceramic 47pF ±5%	
C79～82	CE04W1C100	Electrolytic 10μF 16WV	
C83,84	CE04W1C330	Electrolytic 33μF 16WV	
C85,86	CE04AW1H1R0CC	Electrolytic 1μF 50WV	
C87,88	CE04W1C100	Electrolytic 10μF 16WV	
C89,90	CQ92M1H273J	Mylar 0.027μF ±5%	
C91,92	CQ92M1H472J	Mylar 0.0047μF ±5%	
C93,94	CE04W1C100	Electrolytic 10μF 16WV	
C95,96	CQ92M1H562J	Mylar 0.0056μF ±5%	
C97,98	CE04W1C100	Electrolytic 10μF 16WV	
C99,100	CQ92M1H473J	Mylar 0.047μF ±5%	
C101,102	C90-0701-08	Electrolytic 0.1μF 50WV	
C103,104	C90-0702-08	Electrolytic 0.33μF 50WV	
C105,106	CE04W1H1R0	Electrolytic 1μF 50WV	
C107,108	CE04W1C100	Electrolytic 10μF 16WV	
C109,110	CE04W1H1R0	Electrolytic 1μF 50WV	
C111,112	CE04W1C100	Electrolytic 10μF 16WV	
C113,114	CC45SL1H470J	Ceramic 47pF ±5%	
C115,116	C90-0703-08	Electrolytic 0.15μF 50WV	
C117,118	CE04W1C100	Electrolytic 10μF 16WV	
C119,120	CQ92M1H392J	Mylar 0.0039μF ±5%	
C121,122	CQ92S1H151J	Polystyrene 150pF ±5%	
C123,124	CM93D2B220J	Mica 22pF ±5%	
C301,302	CQ92M1H472J	Mylar 0.0047μF ±5%	
C303	CE04W1E101	Electrolytic 100μF 25WV	
C304	CQ92S2C821J	Polystyrene 820pF ±5%	
C305	CQ92S2C680J	Polystyrene 68pF ±5%	
C306	CE04W1H1R0	Electrolytic 1μF 50WV	
C307	CE04W1E101	Electrolytic 100μF 25WV	
C308,309	CE04W1C101	Electrolytic 100μF 16WV	
		RESISTOR	
R15,16	RN14BK2E183F	Metal film 18kΩ ±1% 1/4W	
R17,18	RN14BK2E334F	Metal film 330kΩ ±1% 1/4W	
		SEMICONDUCTOR	
Q101～106	V03-9991-06	Transistor 2SC828(R)	
	V03-0339-05	or 2SC536(F)	
Q107～112	V03-1327-10	Transistor 2SC1327(S) or (T)	
		or 2SC1571(G) or (H)	
Q113,114	V01-0220-05	Transistor 2SA721(R) or (S)	
Q301	V02-0057-05	Transistor 2SB22(Blue)	
Q302,303	V03-9991-05	Transistor 2SC828(R)	
	V03-0339-05	or 2SC536(F)	
IC101, 102	V30-0259-10	IC AN360	
IC103～106	V30-0139-05	IC NE545(B)	
IC107, 108	V30-0154-05	IC TA7066P	
D1～10	V11-9990-05	Diode 1S188AM	
	V11-0051-05	or 1N60	
	V11-0197-05	or OA90	
D301	V11-0420-05	Diode TD9600-16-1	
		or 1S2473	☆
		or WG-713	☆
		POTENTIOMETER	
VR1,2	R12-3043-08	Semi-fixed resistor 20kΩ(B) PB LEVEL	
VR3,4	R21-3301-08	Variable resistor 10kΩ(A) OUTPUT VOL	☆
VR5,6	R12-1034-08	Semi-fixed resistor 2kΩ(B) METER LEVEL	
VR7,8	R21-6301-08	Variable resistor 250kΩ(A) LINE INPUT VOL	☆
VR9,10	R21-4301-08	Variable resistor 50kΩ(A) MIC INPUT VOL	☆
VR11,12	R12-3043-08	Semi-fixed resistor 20kΩ(B) REC LEVEL	
VR13,14	R12-4301-08	Semi-fixed resistor 200kΩ(B) BIAS LEVEL	
		MISCELLANEOUS	
—	F02-0033-08	Heat sink for 2SB22	
T301	L32-0189-08	Bias OSC coil	
L1～4	L39-0077-08	Inductor 22 mH (223K)	
F1,2	L79-0302-08	Low pas filter	
S11～17	S33-8301-08	Lever switch (Non short-circuit type) DOLBY	☆
S21～25	S33-6304-08	Lever switch (Non short-circuit type) TAPE	☆

PARTS LIST

TEST TONE (X25-1270-00)

Ref. No.	Parts No.	Description	Remarks
		CAPACITIR	
C201,202	CQ92M1H123J	Mylar 0.012μF ±5%	
C203,204	CQ92M1H333J	Mylar 0.033μF ±5%	
C205,206	CQ92M1H822J	Mylar 0.0082μF ±5%	
C209,210	CQ92M1H103J	Mylar 0.01μF ±5%	
C401	CE04W1C330	Electrolytic 33μF 16WV	
C402	CE04W1H1R0	Electrolytic 1μF 50WV	
C403～406	CQ92M1H103J	Mylar 0.01μF ±5%	
C407	C90-0701-08	Electrolytic 0.1μF 50WV	
C408	CQ92M1H102J	Mylar 0.001μF ±5%	
C410～413	CC45SL1H471J	Ceramic 470pF ±5%	
C414,415	CE04W1E101	Electrolytic 100μF 25WV	
		SEMICONDUCTOR	
Q401～407	V03-9991-05	Transistor 2SC828(R)	
	V03-0339-05	or 2SC536(F)	
D401～404	V11-0420-05	Diode TD9600-16-1	
		or 1S2473	☆
		or WG-713	☆
		POTENTIOMETER	
VR401	R12-4301-08	Semi-fixed resistor 50kΩ(B) OSC BALANCE	
VR402	R12-0301-08	Semi-fixed resistor 500Ω(B) OSC OUTPUT LEVEL	
		MISCELLANEOUS	
L201,202	L39-0302-08	Inductor 8.2 mH (822)	
S31～34	S40-4301-08	Push switch (locked, non short-circuit type) TEST OSC	☆
S41～46	S33-6301-08	Lever switch (short-circuit type) TAPE SELECTOR	☆
S51	S33-2301-08	Lever switch Pshort-circuit type) BIAS	

JACK (X25-1280-)

Ref. No.	Parts No.	Description	Remarks
		RESISTOR	
R601,602	RD14BY2E182J	Carbon 1.8kΩ ±5% 1/4W (Except W, L)	−00
	RD14BY2E682J	Carbon 6.8kΩ ±5% 1/4W (For W, L)	−61
		MISCELLANEOUS	
—	E13-0455-08	Pin jack (4P with DIN connector)	

LED (X25-1290-00)

Ref. No.	Parts No.	Description	Remarks
LD801	V11-0404-05	LED GD4-207RD (Red)	
LD802	V11-7200-20	LED GD4-207GD (Green)	☆

PEAK LED (X25-1300-00)

Ref. No.	Parts No.	Description	Remarks
		SEMICONDUCTOR	
LD701	V11-0390-05	LED GD4-203RD (Red)	

Ref. No.	Parts No.	Description	Remarks
		MISCELLANEOUS	
—	J31-0413-08	LED holder	

MIC JACK (X25-1310-00)

Ref. No.	Parts No.	Description	Remarks
		MISCELLANEOUS	
—	E11-0301-08	Mic jack × 2 (with switch)	

REC SWITCH (X25-1320-00)

Ref. No.	Parts No.	Description	Remarks
		MISCELLANEOUS	
S61～63	S31-4301-08	Slide switch	☆

MUTING SWITCH (X25-1330-00)

Ref. No.	Parts No.	Description	Remarks
S101～103	S31-4302-08	Slide switch	

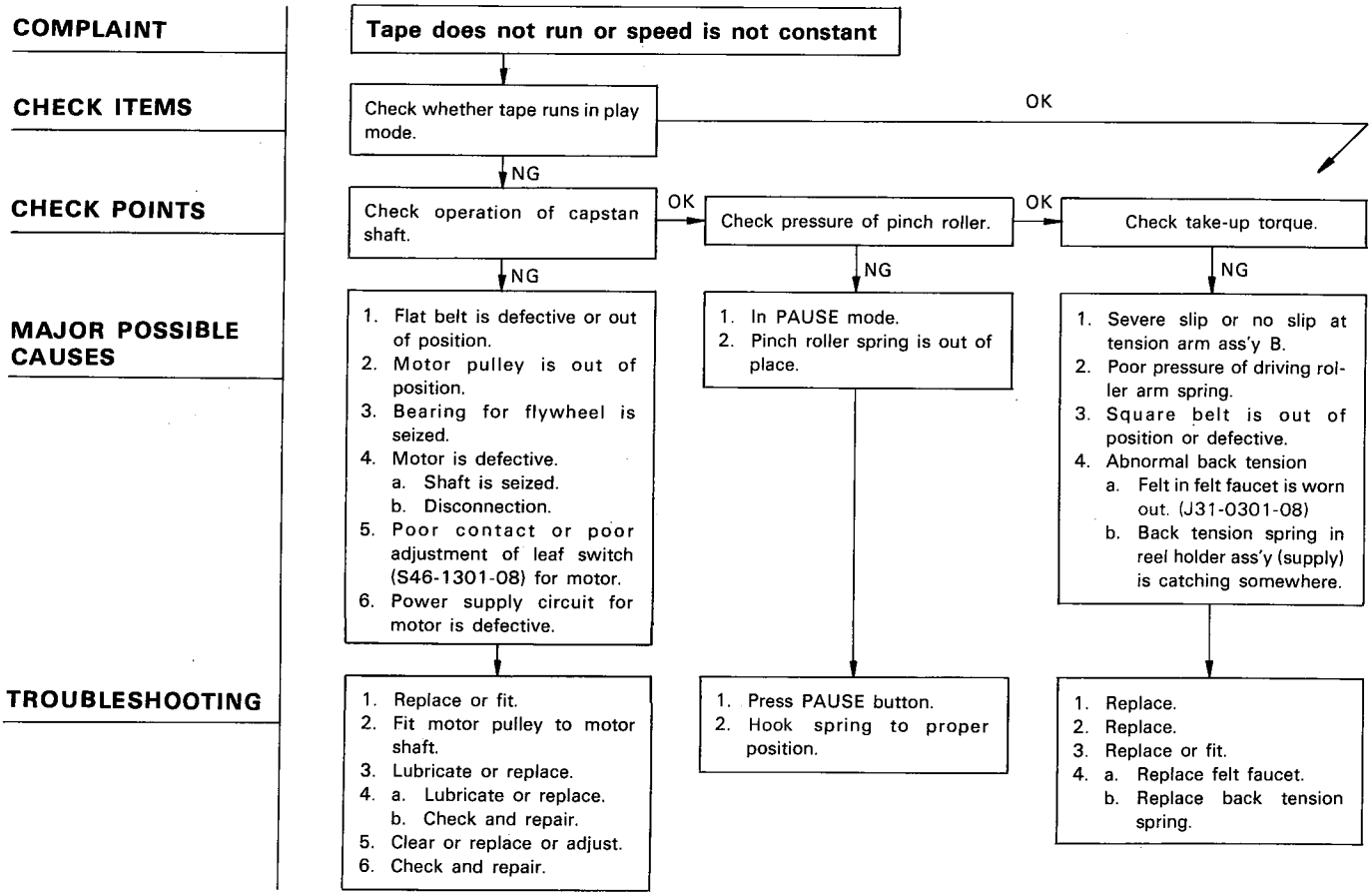
POWER SUPPLY/AUTO STOP (X27-1280-)

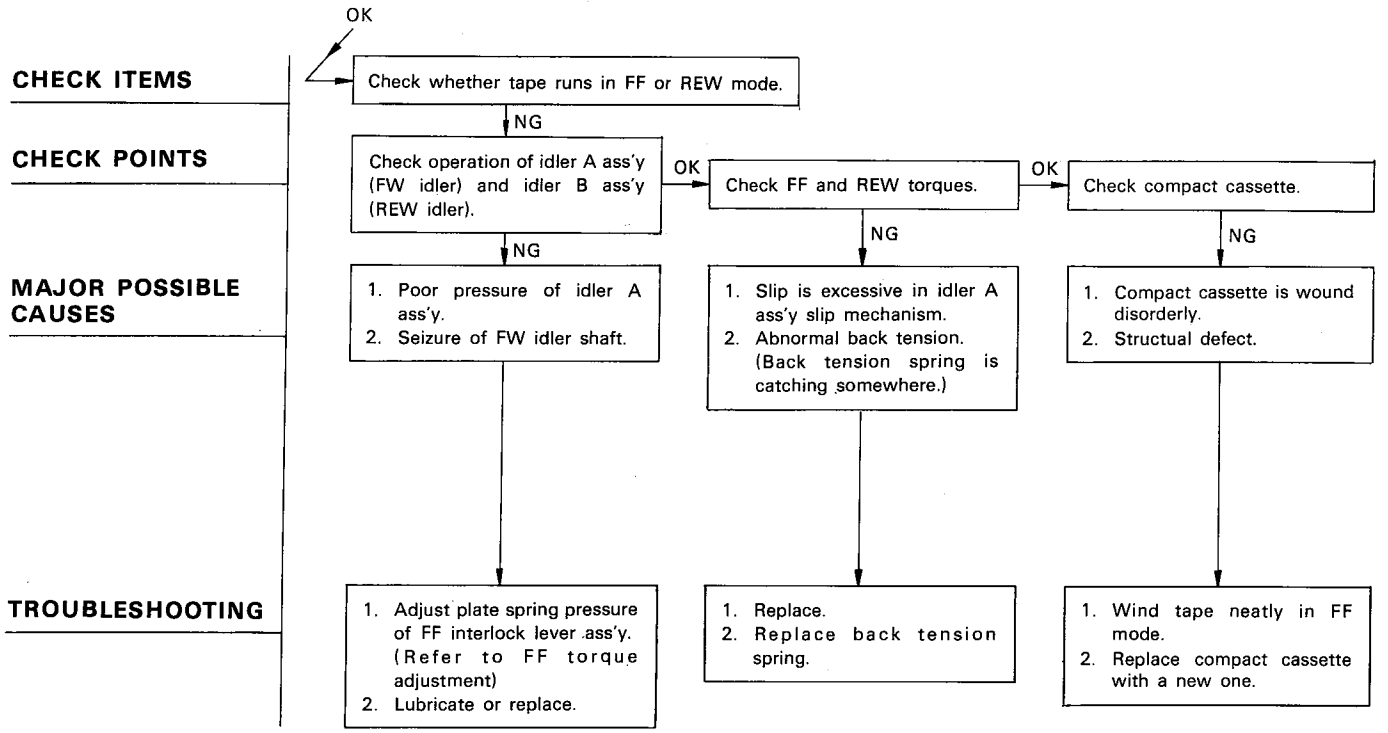
Ref. No.	Parts No.	Description	Remarks
		CAPACITOR	
C501	CE04W1V222	Electrolytic 2200μF 35WV	
C502	CE04W1E471	Electrolytic 470μF 25WV	
C503	CE04W1E221	Electrolytic 220μF 25WV	
C504	CE04W1E102	Electrolytic 1000μF 25WV	
C505	CE04W1C221M	Electrolytic 220μF 16WV	
C507	CQ92M1H102M	Mylar 0.001μF ±20%	
C508	CE04W1C220	Electrolytic 22μF 16WV	
C509	CE04W1C470	Electrolytic 47μF 16WV	
C510,511	CE04W1H010	Electrolytic 1μF 50WV	
C512,513	CE04W1C100	Electrolytic 10μF 16WV	
C514	CE04W1C330	Electrolytic 33μF 16WV	
		RESISTOR	
R501	RS14AB3A821J	Metal film 820Ω ±5% 1W	
R502	RS14AB2H471J	Metal film 470Ω ±5% 1/2W	
		SEMICONDUCTOR	
Q501	V03-1226-10	Transistor 2SC1226(Q) or (R)	
Q502,503	V03-9991-05	Transistor 2SC828(R)	
	V03-0339-05	or 2SC536(F)	
Q504	V01-0163-05	Transistor 2SA564(R)	
Q505～507	V03-9991-05	Transistor 2SC828(R)	
	V03-0339-05	or 2SC536(F)	
Q508	V01-0164-05	Transistor 2SA699(O) or (R)	
D501,502	V11-2400-20	Diode bridge W02	
D503	V11-0419-05	Diode 1N4002	
D504～507	V11-0420-05	Diode TD9600-16-1	
		or 1S2473 or WG-713	
ZD501	V11-4100-10	Zener diode WZ-182	
		MISCELLANEOUS	
—	J13-0047-08	Fuse holder (X27-1280-13) × 6 (for M,U,K,P,S,X)	
—	J13-0048-08	Fuse holder (X27-1280-63) × 6 (for W,W(E),T,L,Hu)	

Continued to page 45.

TROUBLESHOOTING

MECHANISM SECTION (1)





TROUBLESHOOTING

MECHANISM SECTION (2)

COMPLAINT

Playback sound is abnormal.

CHECK ITEMS

Reproduce another tape.

NG

CHECK POINTS

Check playback sound by use of speed deviation measuring tape MT-111.

OK → Check wow and flatter value.

NG

MAJOR POSSIBLE CAUSES

1. Poor pressure of pinch roller.
2. Poor take-up torque.
3. Slip due to dirty capstan and pinch roller.
4. Abnormal back tension.
   a. Replace felt faucet.
   b. Back tension spring is catching somewhere.
   c. Poor pressure of erase head plate spring.

1. Pinch roller is locking in oil or damaged.
2. Unstable take-up torque.
3. Capstan shaft is worn out.
4. Various belts are damaged or contaminated.
5. Abnormal back tension.

TROUBLESHOOTING

1. Replace pinch roller spring or pinch roller.
2. Refer to item of take-up torque confirmation.
3. Clean.
4. a. Replace felt faucet.
   b. Replace back tension spring.
   c. Replace erase head plate spring.

1. Lubricate or replace.
2. Refer to take-up torque confirmation item.
3. Lubricate or replace. (If bearing is defective, replace mechanism chassis ass'y (A10-1015-08).)
4. Clean or replace.
5. Refer to item of checking playback sound by use of speed deviation measuring tape MT-111.

COMPLAINT

Operating buttons are out of order.

CHECK ITEMS

Check PLAY operation.

NG

CHECK POINTS

Check lock of PLAY button.

NG

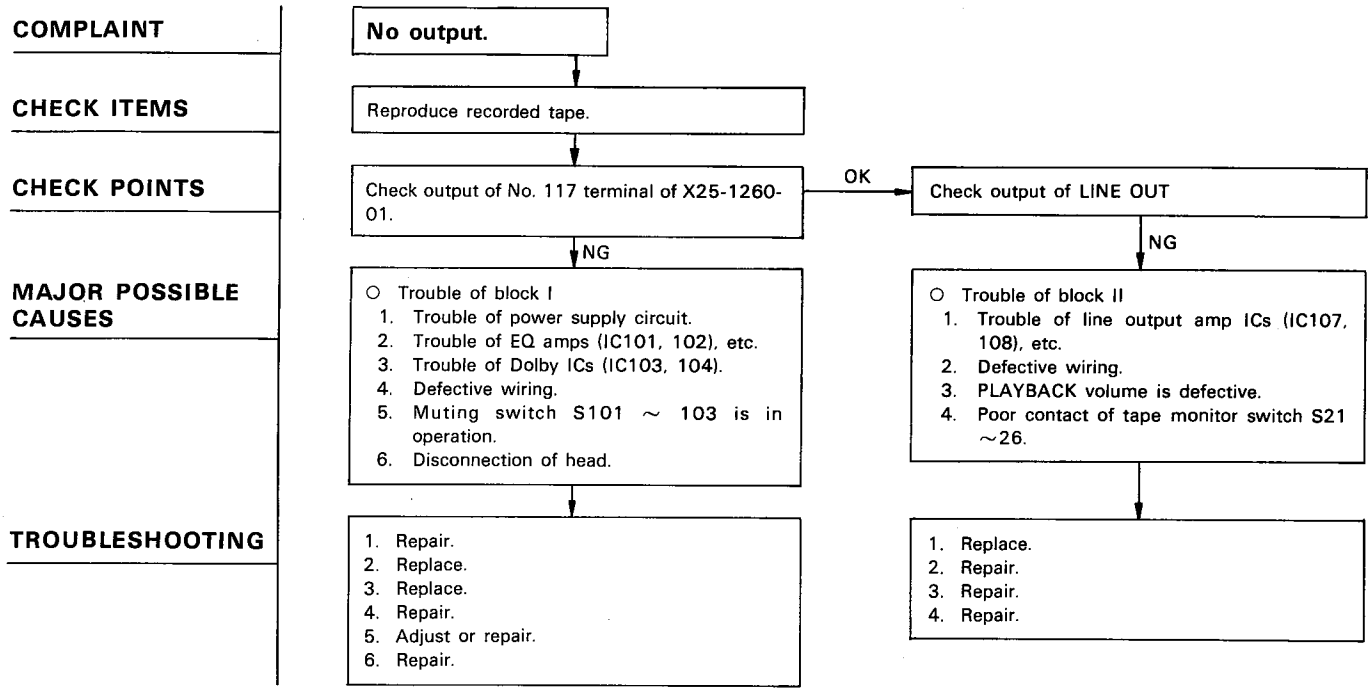
MAJOR POSSIBLE CAUSES

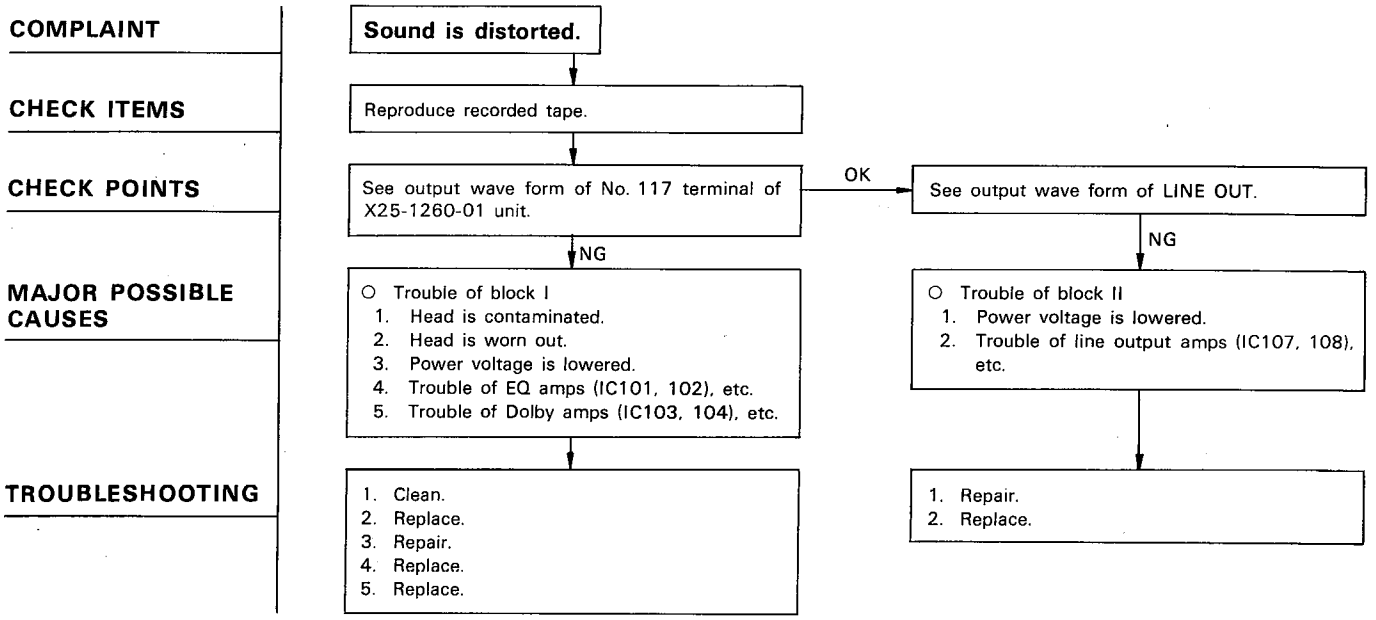
1. Unsmooth movement of head plate.
2. Pushbutton lever is not locked in pushbutton operation plate.
3. Unsmooth movement of eject protection arm.

TROUBLESHOOTING

1. Apply grease and adjust.
2. Replace pushbutton operation plate spring.
3. Apply grease and adjust.

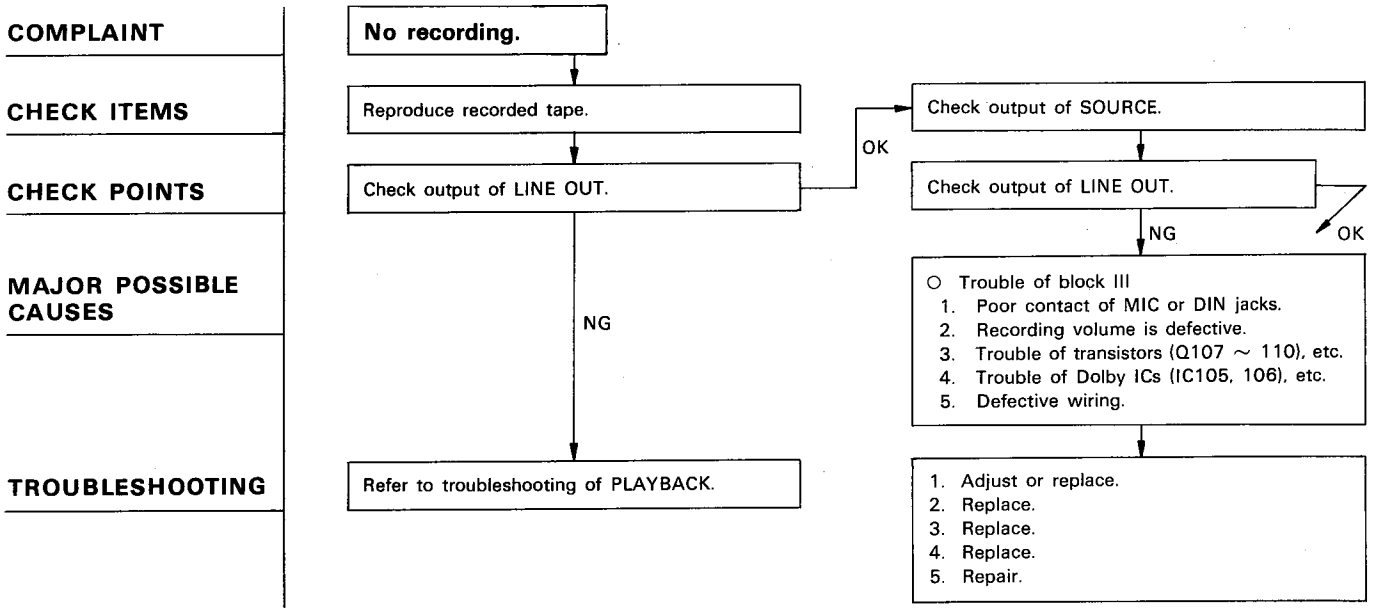
PLAYBACK (Refer to BLOCK DIAGRAM)

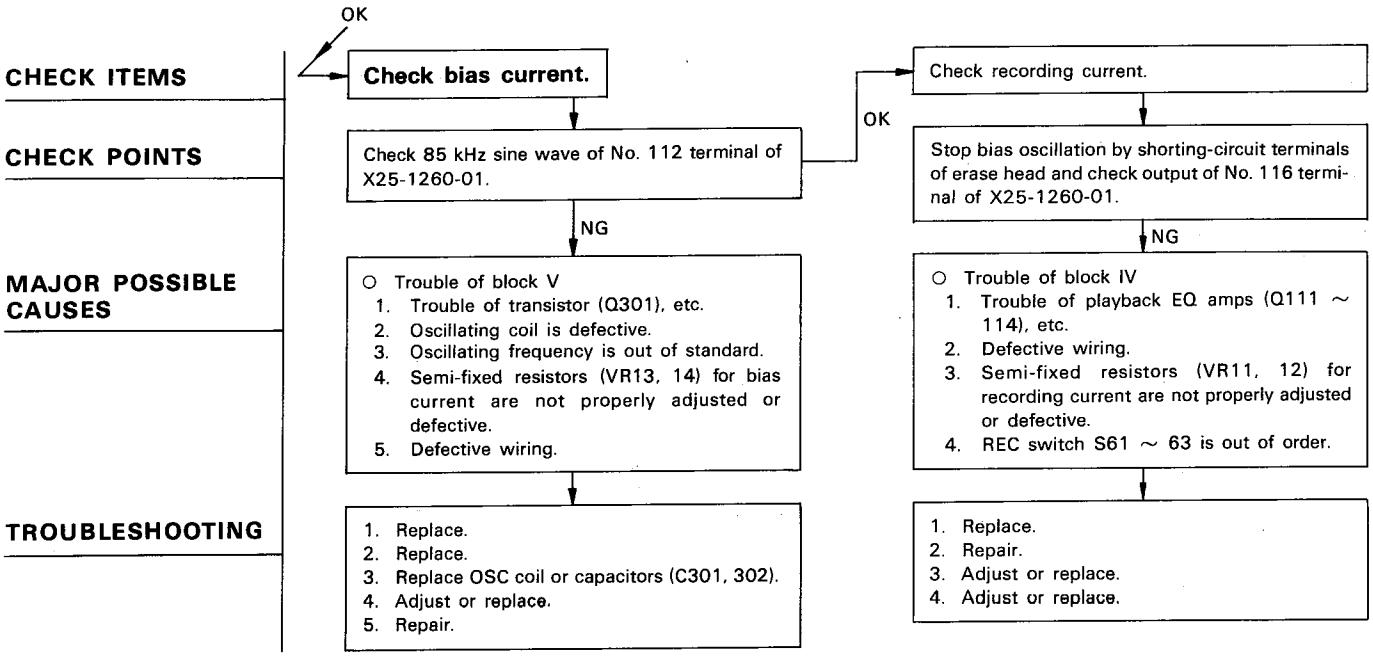




TROUBLESHOOTING

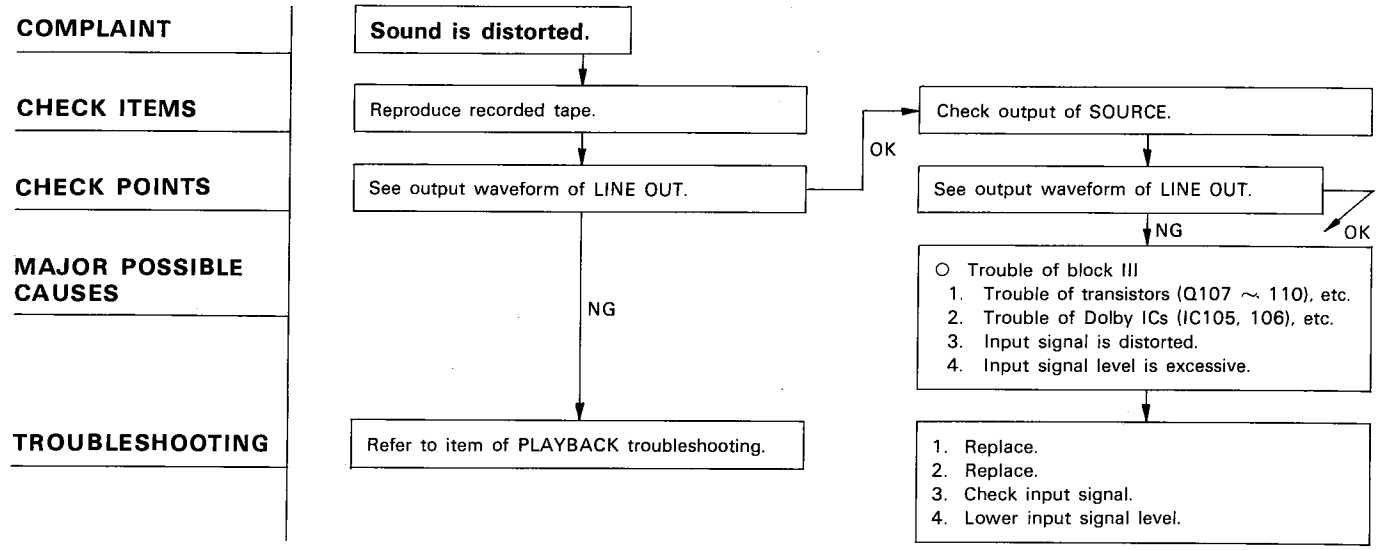
RECORD (1)

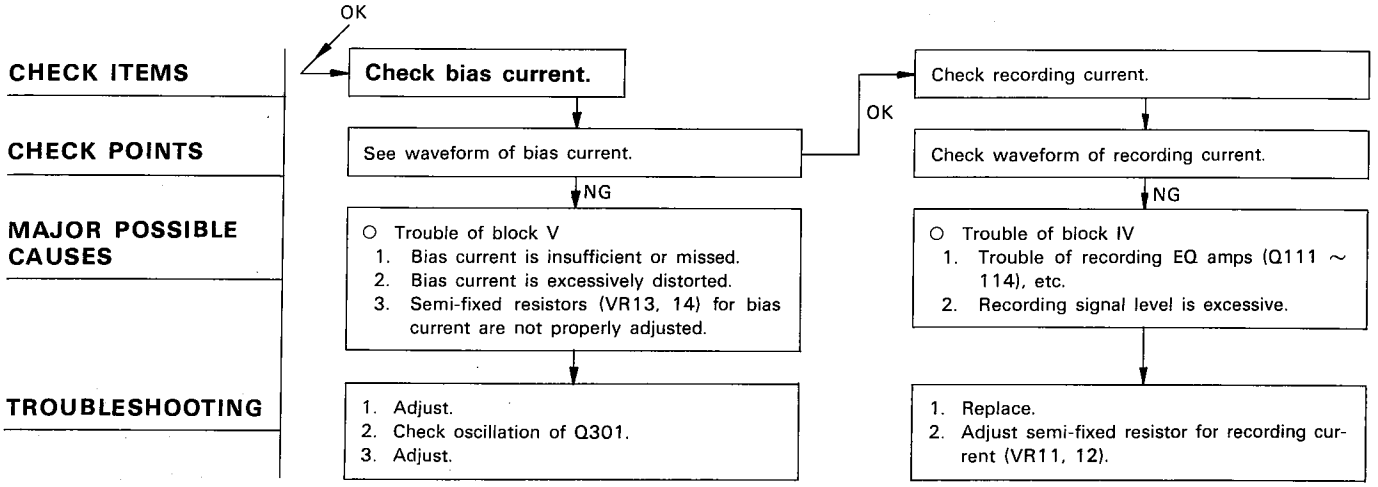




TROUBLESHOOTING

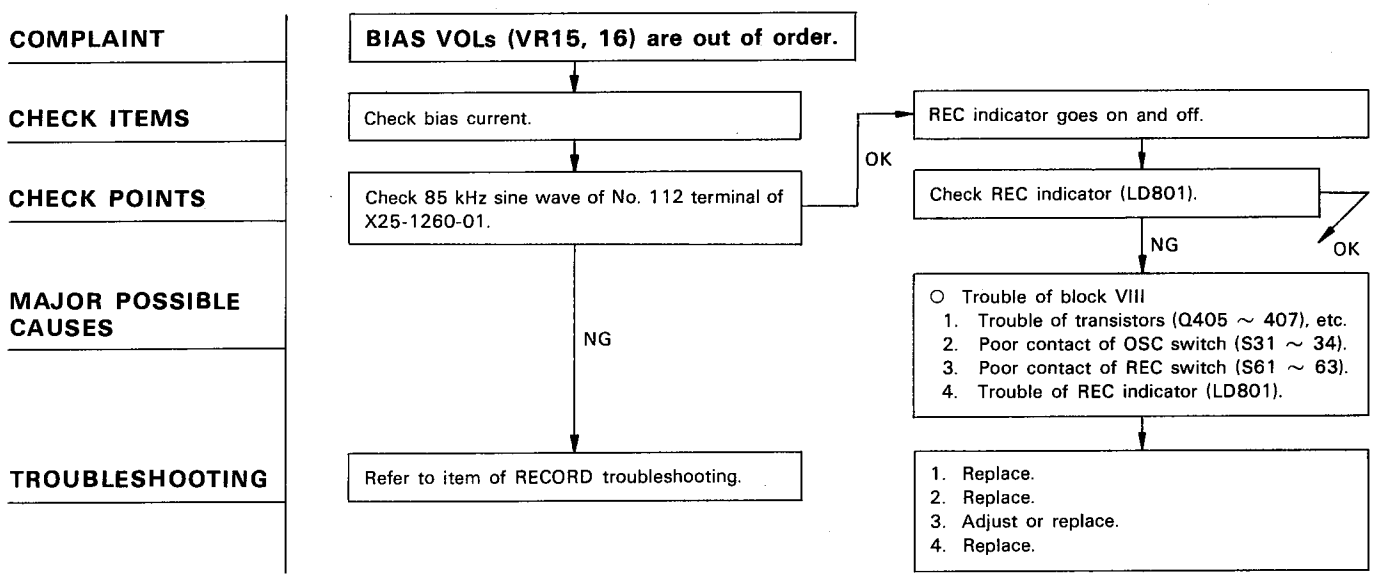
RECORD (2)



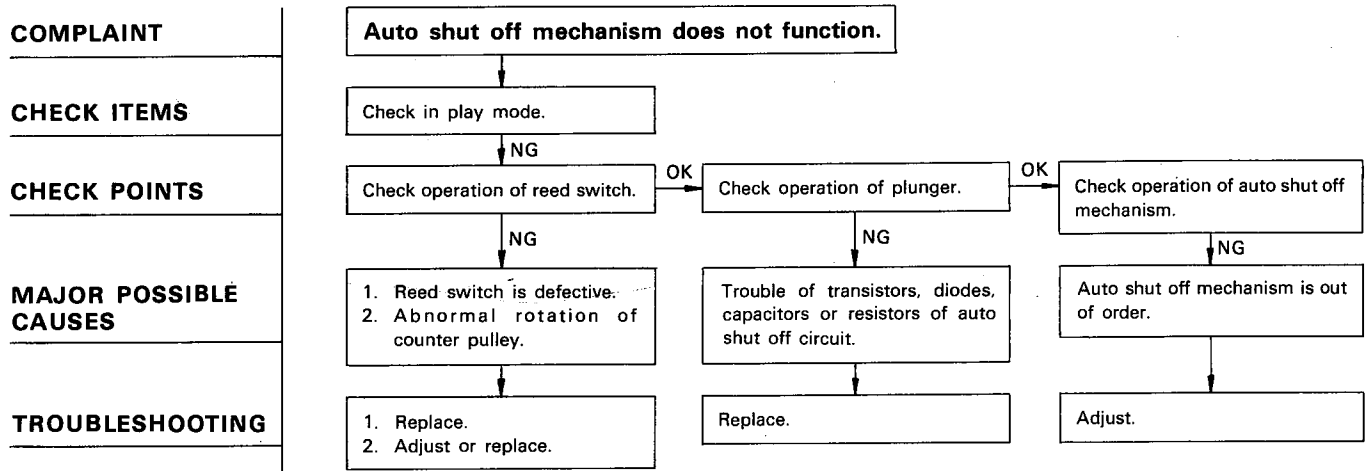


TROUBLESHOOTING/PARTS LIST

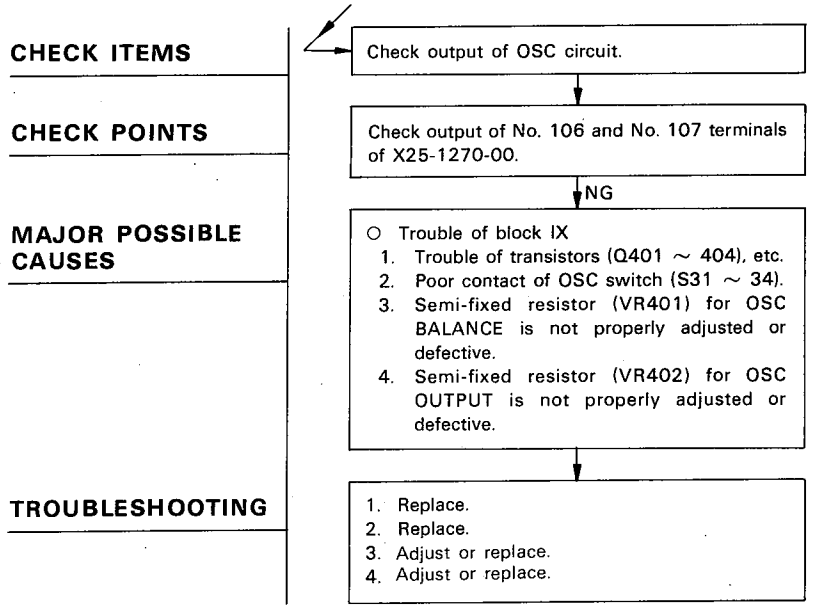
ANCILLARY CIRCUIT (1)



ANCILLARY CIRCUIT (2)



OK

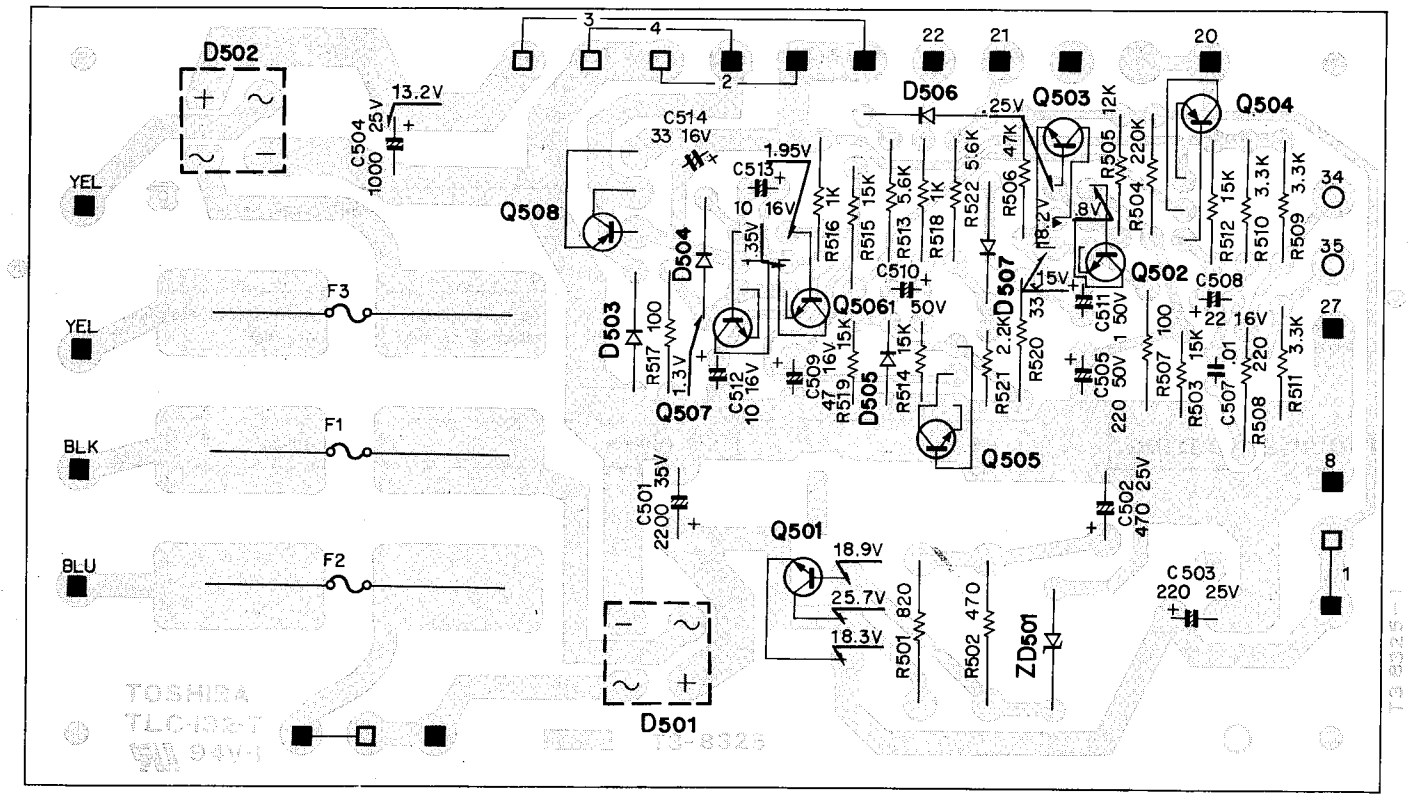


MUTING (2) (X25-1360-00)

Ref. No.	Parts No.	Description	Remarks
C901,902	CE04W1C330	Electrolytic 33μF 16WV	
C903	CE04W1H010	Electrolytic 1μF 50WV	
		SEMICONDUCTOR	
Q901,902	V03-9991-05	Transistor 2SC828(R)	
	V03-0339-05	or 2SC536(F)	
Q903	V01-0163-05	Transistor 2SA564(R)	
Q904	V03-9991-05	Transistor 2SC828(R)	
	V03-0339-05	or 2SC536(F)	
D901,902	V11-0419-05	Diode 1N4002	
D903,904	V11-0420-05	Diode TD9600-16-1	
		or 1S2473	
		or WG-713	☆
D905	V11-9990-05	Diode 1S188AM	☆
	V11-0051-05	or 1N60	
	V11-0197 05	or OA90	

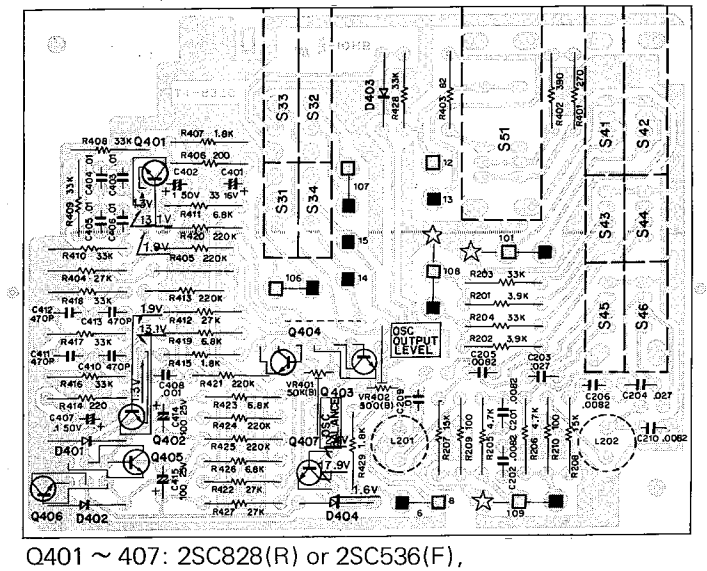
PC BOARD

▼ POWER SUPPLY (X27-1280-13)



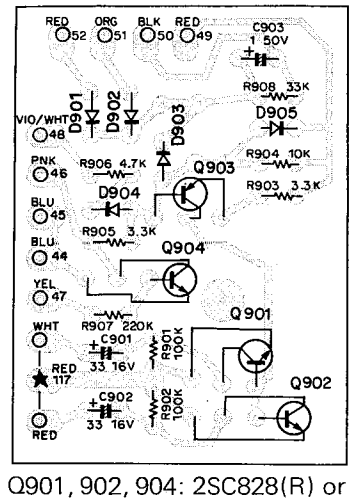
Q501: 2SC1226(Q), (R), Q502,503: 2SC828(R) or 2SC536(F), Q504: 2SA564(R), Q505 ~ 507: 2SC828(R) or 2SC536(F), Q508: 2SA699(Q), (R), D501,502: W02, D503: 1N4002, D504,505: WG713 or 1S2473 or TD9600-16-1, ZD501: WZ182

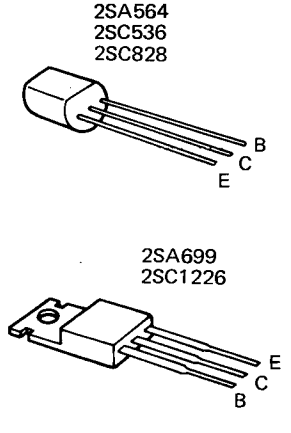
▼ TEST TONE (X25-1270-00)



Q401 ~ 407: 2SC828(R) or 2SC536(F), D401 ~ 403: WG713 or TD9600-16-1

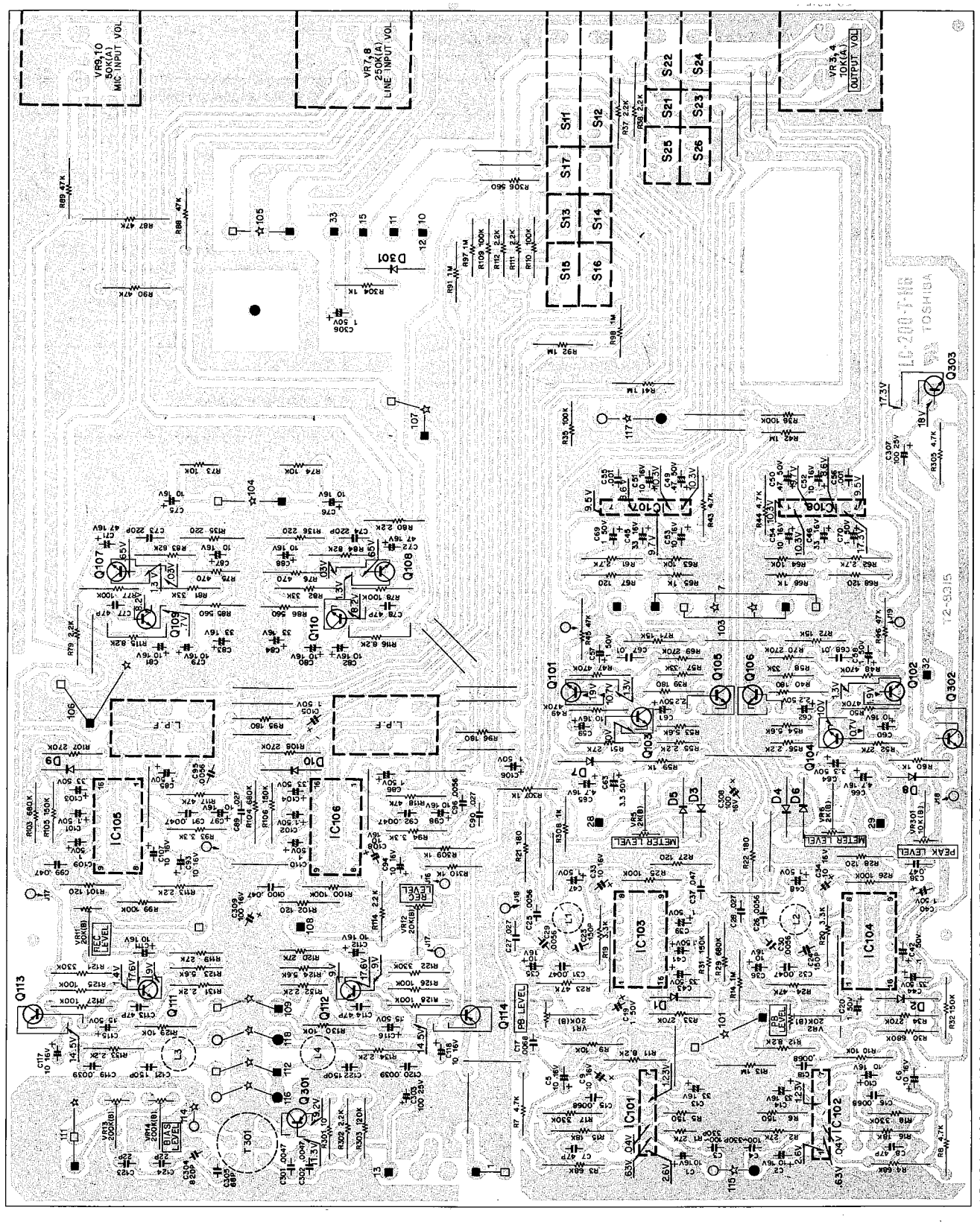
▼ MUTING (2) (X25-1360-00)





Q901, 902, 904: 2SC828(R) or 2SC536(F), Q903: 2SA564(R), D901, 902: 1N4002, D903, 904: WG713 or 1S2473 or TD9600-16-1, D905: 1S188AM or 1N60 or OA90

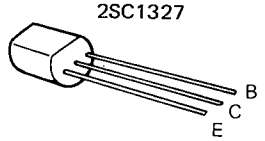
▼ REC/PLAY/OSC (X25-1260-01)



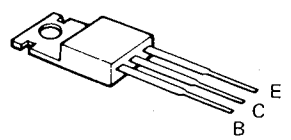
IC101, 102: AN360, IC103 ~ 106: NE545B, Q101 ~ 106, 302, 303: 2SC828(R) or 2SC536(F), Q107 ~ 112: 2SC1327(S), (T) or 2SC1571(G), (H), Q113, 114: 2SA721(R), (S), Q301: 2SB22, D1 ~ 10: 1S188AM or 1N60 or OA90, D301: WG713 or 1S2473 or TD9600-16-1, IC107, 108: TA7066P

SCHEMATIC DIAGRAM

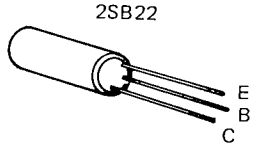
2SA564
2SA721
2SC536
2SC828
2SC1327



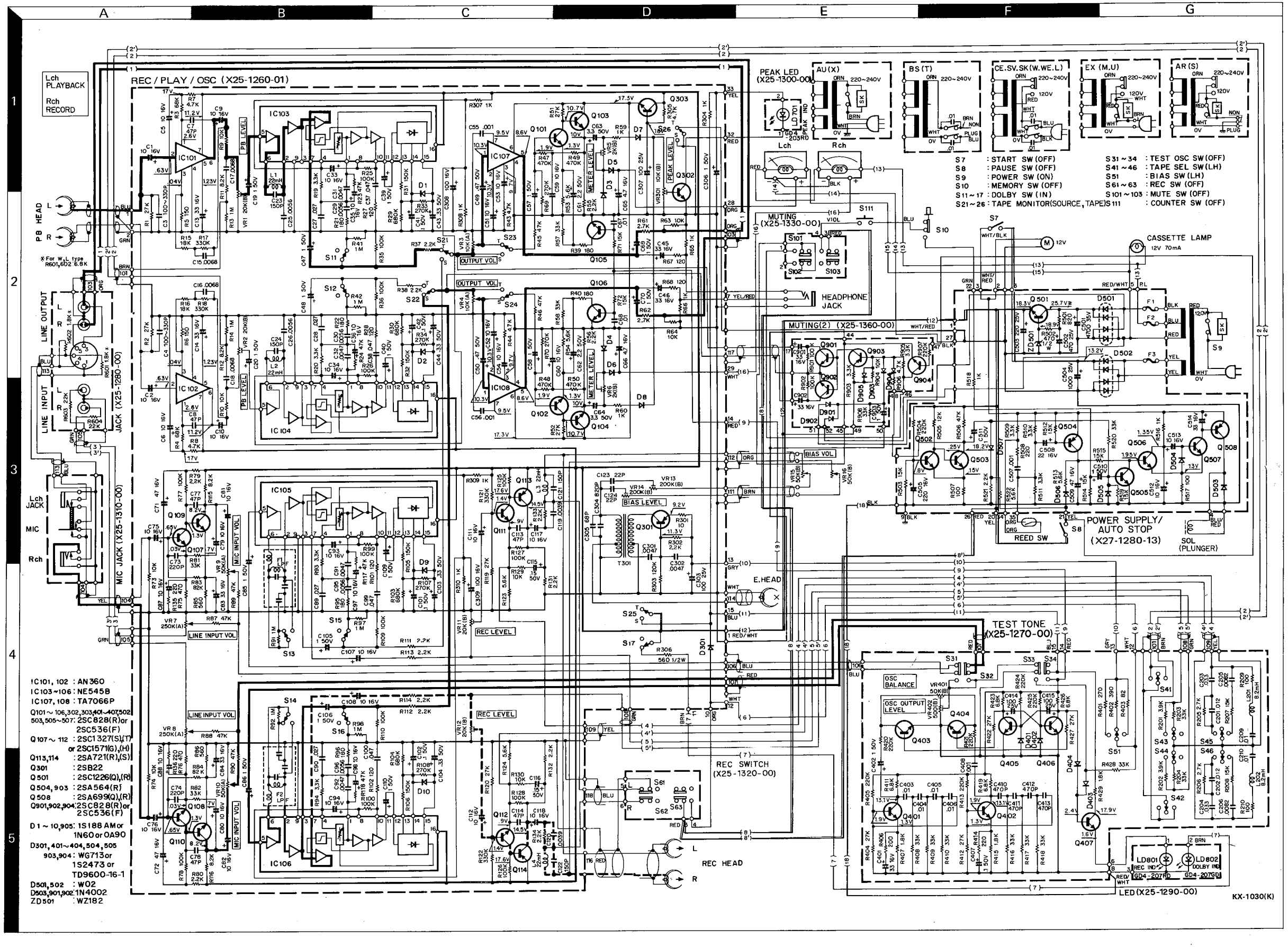
2SA699
2SC1226



2SB22



Semiconductor name	Substitutions
2SA564	2SA733
2SA699	2SB595, 2SB596
2SA721	2SA640, 2SA620WB
2SB22	–
2SC828	2SC536, 2SC945
2SC1226	2SC1013
2SC1327	2SC1000
AN360	–
NE545B	–
TA7060P	–



SPECIFICATION

Type	Front Loading Stereo Cassette Deck with Dolby System
Track System	4-Track, 2-Channel Stereo/Mono Recording/Playback
Recording System	AC Bias System (Bias Frequency: 85 kHz)
Erasing System	AC System
Tape Speeds	4.76 cm/sec (1-7/8 ips)
Heads	Three Ferrite Heads Type
	Recording and Playback Combination Head x 1
	Erasing Head x 1
Motor	Electronically-Controlled DC Motor
Fast Winding Time	Approx. 80 seconds with C-60 tape
Frequency Response	Normal Tape: 25 Hz to 17,000 Hz (35 Hz to 15,000 Hz±3 dB)
	CrO_2 Tape: 25 Hz to 20,000 Hz (35 Hz to 18,000 Hz±3 dB)
	Ferri-CrO_2 Tape: 25 Hz to 19,000 Hz (35 Hz to 17,000 Hz±3 dB)
Signal to Noise Ratio	Dolby ON (Over 5 kHz): 65 dB (Normal Tape), 67 dB (CrO_2)
	Dolby OFF: 55 dB (Normal Tape), 57 dB (CrO_2)
Harmonic Distortion	Less than 1.3% (at 1 kHz, 0VU with Normal Tape)
Wow and Flutter	0.06% (WRMS)
Input Sensitivity/Impedance	Line x 2: 77.5 mV/56k ohms
	0.1 mV/1.0k ohms: Europe and Scandinavia model
	DIN x 1: 10.9 mV/1.5k ohms: Other Countries model
	Microphones x 2: 0.19 mV/10k ohms
Output Level/Load Impedance	Line x 2: 775 mV (0VU)/2.0k ohms
	DIN x 1: 775 mV (0VU)/2.0k ohms
	Headphones/1: 48.9 mV/8 ohms to 16 ohms
Build in Features	Three Ferrite Heads Type
	Dolby Noise Reduction System with Indicator
	Three Position Bias Selector (Normal-Chrome-Reserve)
	Three Position Equalization Selector (Normal-Chrome-Reserve)
	Fine Bias Adjustment Controls with Oscillator
	Full Auto Shut-Off Mechanism in all Modes
	Mic/Line Mixing
	Memory Rewind
	LED Peak and Recording Indicator
	Tape Monitor
	Three Digit Tape Counter
	Two Large Size Illuminated VU Meters
	Two Microphone Jacks, Headphone Jack
	DIN Rec/P.B. Connector
Power Requirements	AC 120V, 60 Hz: USA and Canada Model
	AC 220V, 50 Hz: Australia Model
	AC 240V, 50 Hz: U.K. Model
	AC 120V/220V (Switchable), 50/60 Hz: Other Countries
Power Consumption	13.0 watts
Dimensions	W: 430 mm/16-15/16″
	H: 167 mm/6-9/16″
	D: 332 mm/13-1/16″
Weight	7.5 kg, 16.5 lbs
Supplied Accessories	Stereo Connection Cord x 2
	Head Cleaning Kit x 1
Reference Tape*	Normal: TDK SD C-90
	Chrome: TDK SA C-60
	Reserve: SONY DUAD C-60

TRIO follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

NOTE: *Dolby is trademark of Dolby Laboratories, Inc.

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