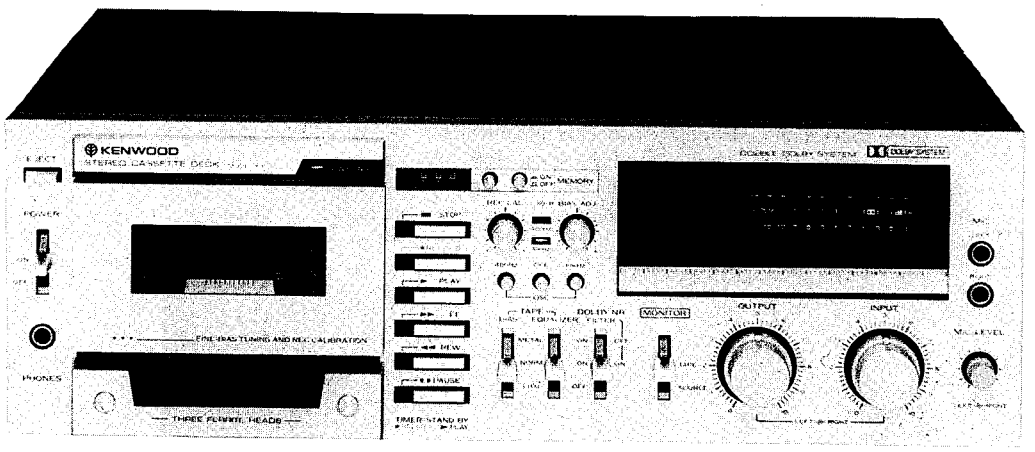
KENWOOD®

HI/FI STEREO COMPONENTS

SERVICE MANUAL

KX-2060
(KX-2006)



STEREO CASSETTE DECK

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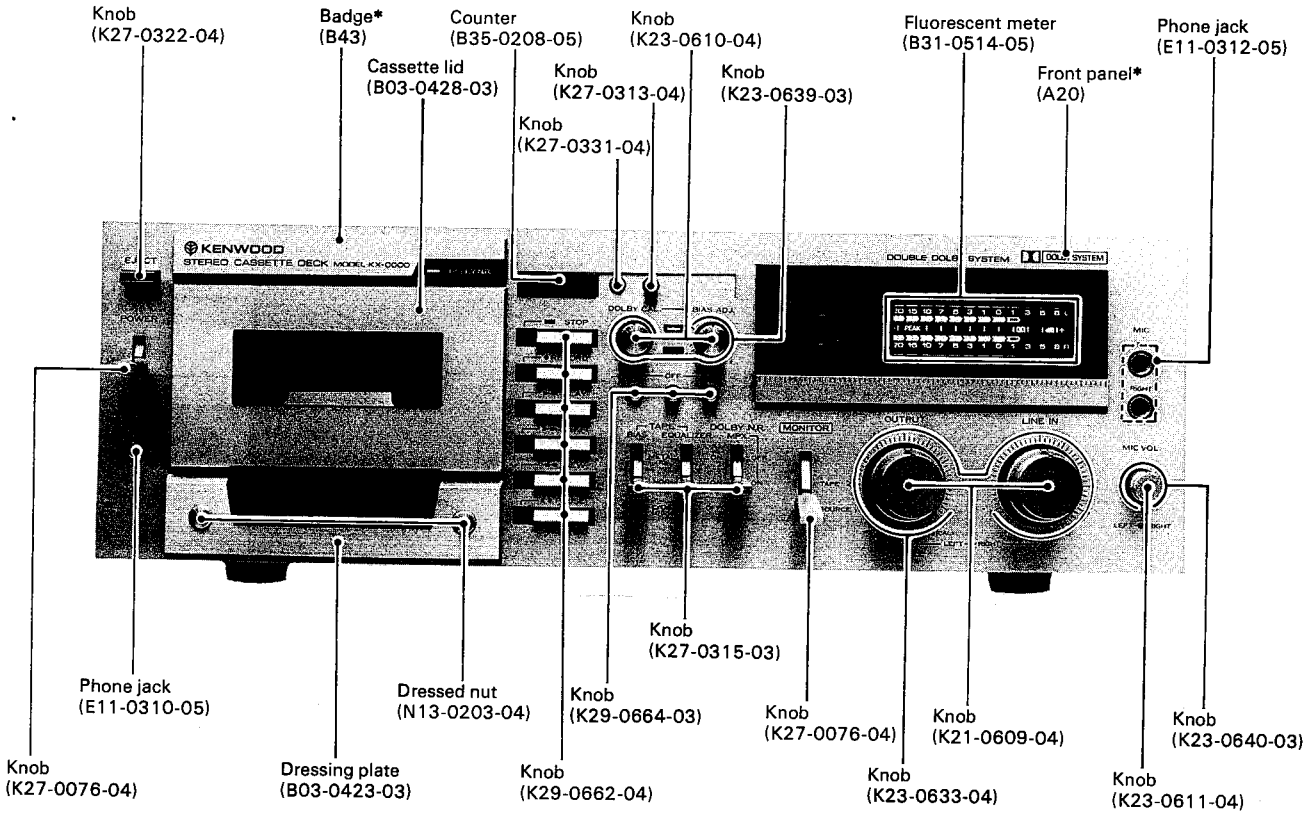
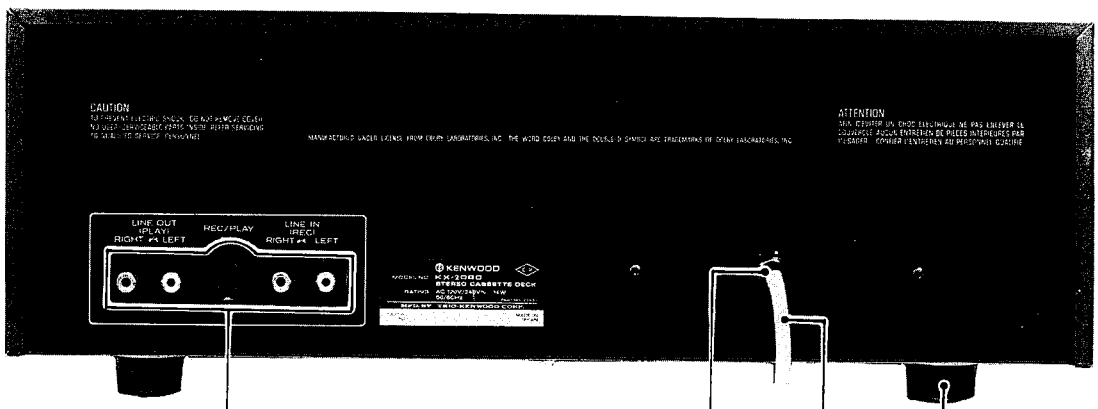
Note:
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on the U.S. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

Region	Code
U.S.A.	K
Canada	P
PX	U
Australia	X
Europe & Scandinavia	W
England	T
South Africa	S
Other Areas	M
Audio Club	H

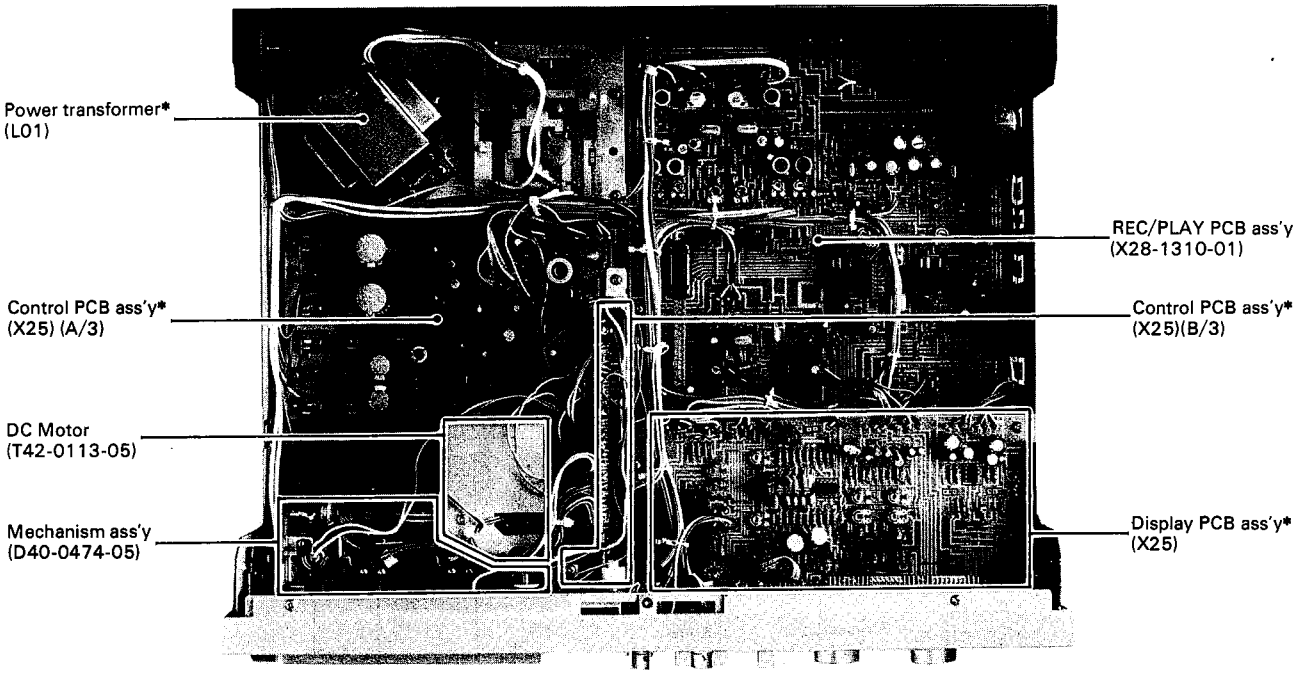
EXTERNAL VIEW





* Refer to Parts List.

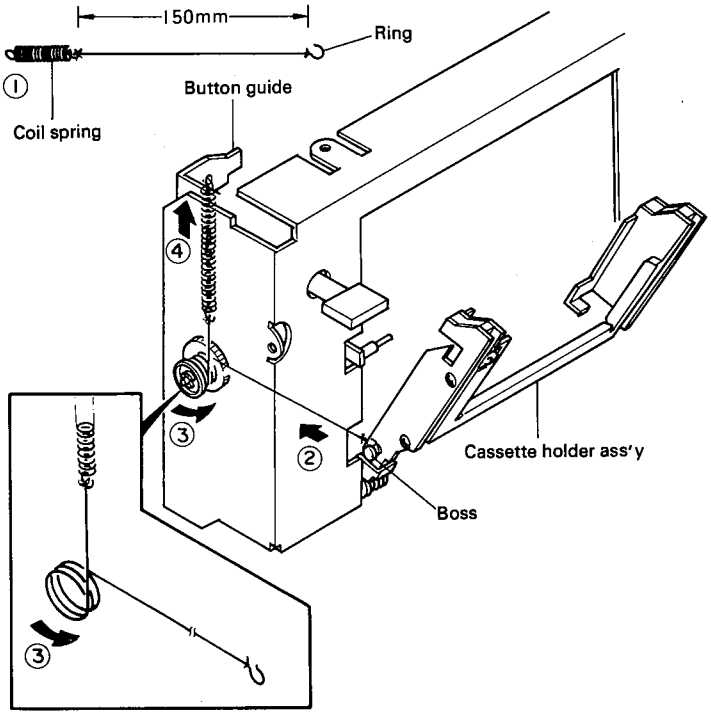
INTERNAL VIEW/CORD STRINGING



* Refer to Parts List.

CORD STRINGING

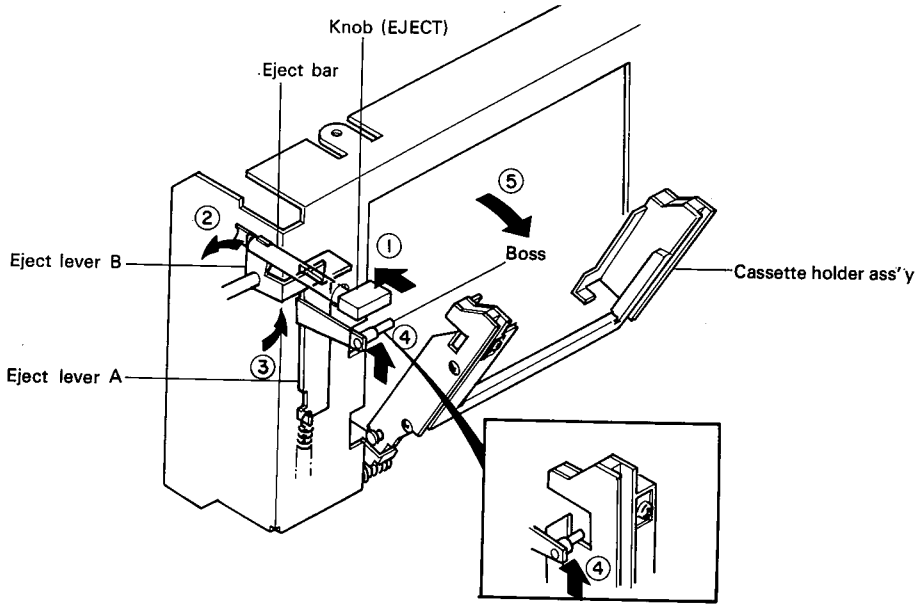
1. Cord length: 150 mm.
2. Hook the ring onto the boss of the cassette holder ass'y and proceed in the direction by the arrow ②.
3. Wrap the cord around the pulley three times, starting from the upper side in the direction of the arrow (see detailed insert).
4. Stretching the coil spring in the direction of the arrow ④, hook it onto the button guide.



EJECT/AUTO SHUT OFF MECHANISM

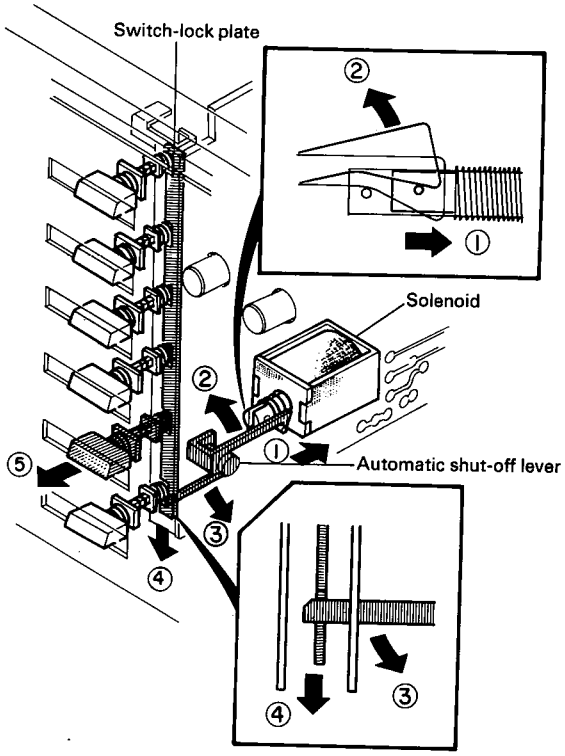
EJECT MECHANISM

Pressing the Knob (EJECT) in the direction indicated by the arrow ① causes the eject lever B to rotate about 45° in the direction of arrows ② and ③. This brings the eject lever A up, moving the attached boss retaining the cassette holder ass'y in the closed position up out of its retaining groove in the direction of arrow ④. This releases the cassette holder ass'y to eject in the direction of arrow ⑤. If the Knob (EJECT) is pressed during tape travel, the leaf switch installed on the rear portion of the eject bar is pressed. As a result, the contact of the leaf switch breaks, stopping the tape transport mechanism prior to ejecting the holder.



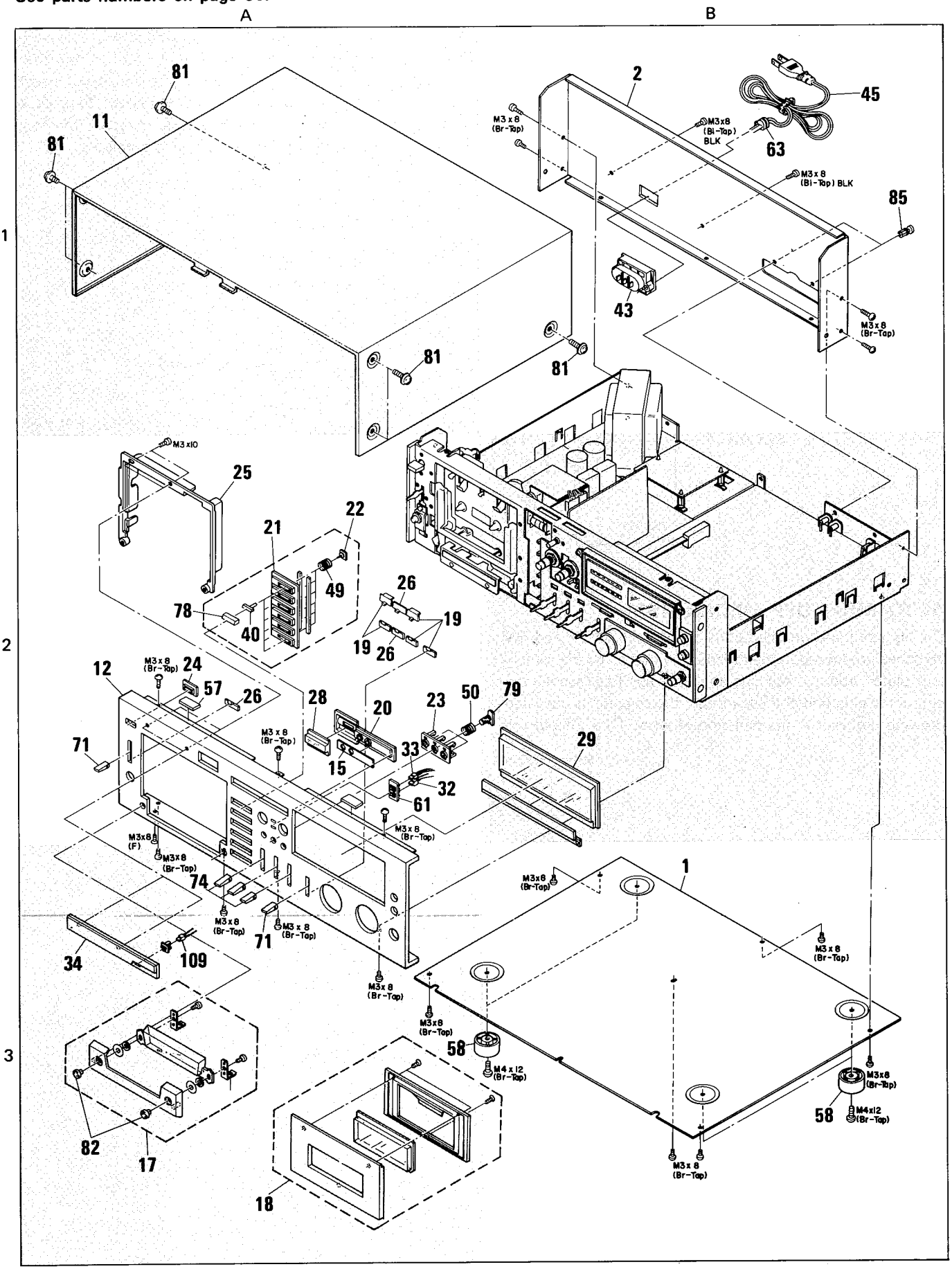
AUTO SHUT OFF MECHANISM

During tape transport operations, the REC, PLAY, FF and RW switches are locked in their respective modes by the switch-lock plate. About 2 seconds after the tape has reached the end of travel in one of these modes, the solenoid is activated drawing the lever in the direction of arrow ① . This forces the lever link on the solenoid side up in the direction of the arrow ②, and the opposite link down in the direction of arrow ③ . This pulls the switch-lock plate in a downward direction (arrow ④), releasing all engaged switches.

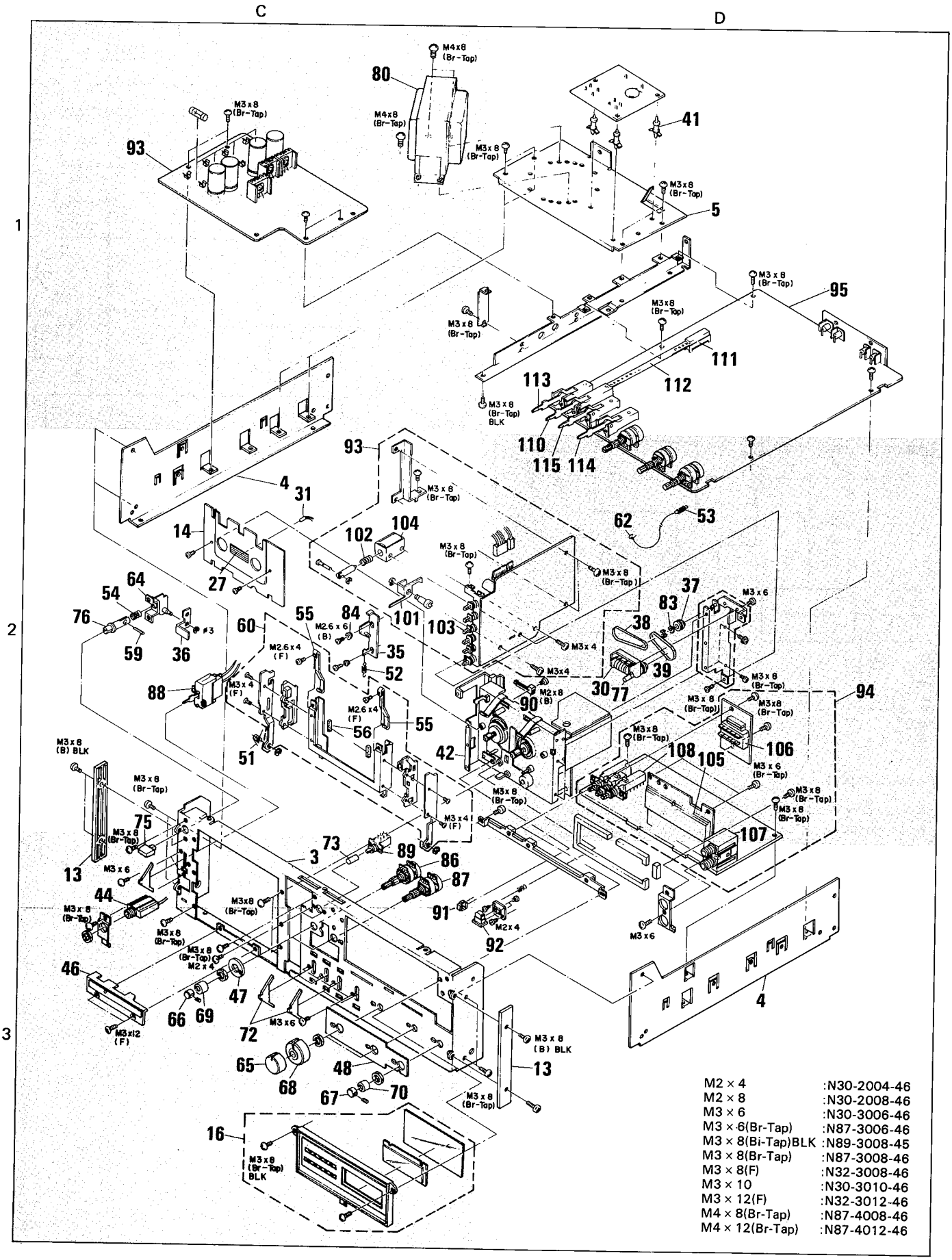


EXPLODED VIEW (1)

See parts numbers on page 30.

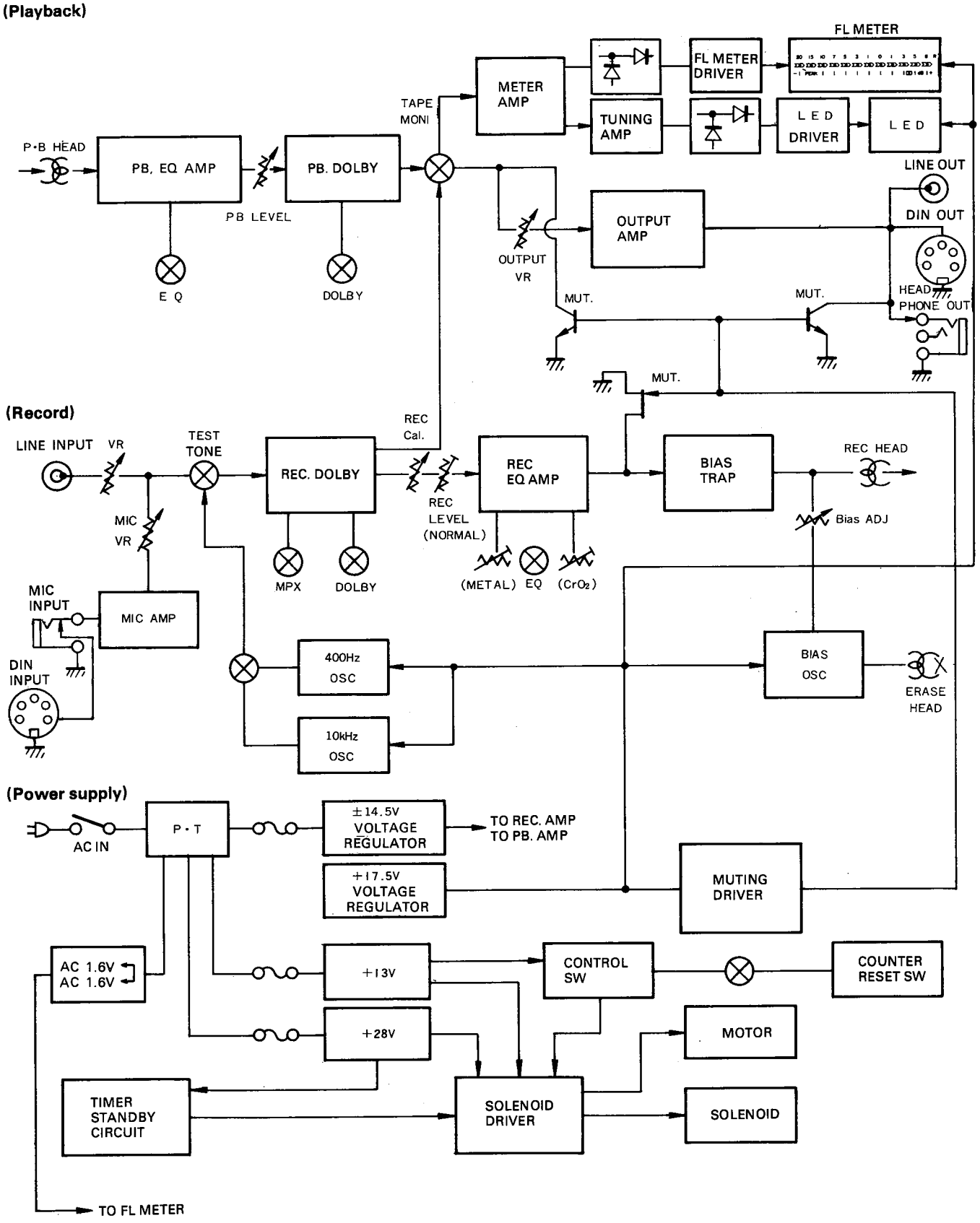


EXPLODED VIEW (2)



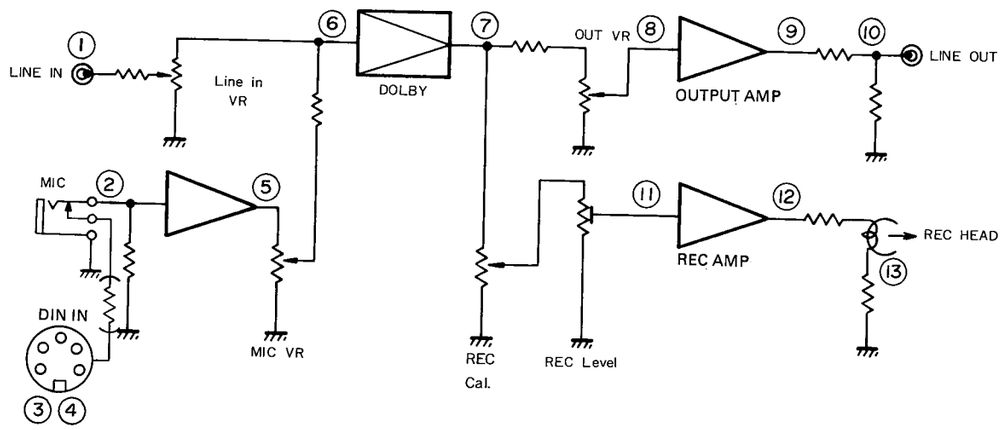
M2 × 4	:N30-2004-46
M2 × 8	:N30-2008-46
M3 × 6	:N30-3006-46
M3 × 6(Br-Tap)	:N87-3006-46
M3 × 8(Bi-Tap)BLK	:N89-3008-45
M3 × 8(Br-Tap)	:N87-3008-46
M3 × 8(F)	:N32-3008-46
M3 × 10	:N30-3010-46
M3 × 12(F)	:N32-3012-46
M4 × 8(Br-Tap)	:N87-4008-46
M4 × 12(Br-Tap)	:N87-4012-46

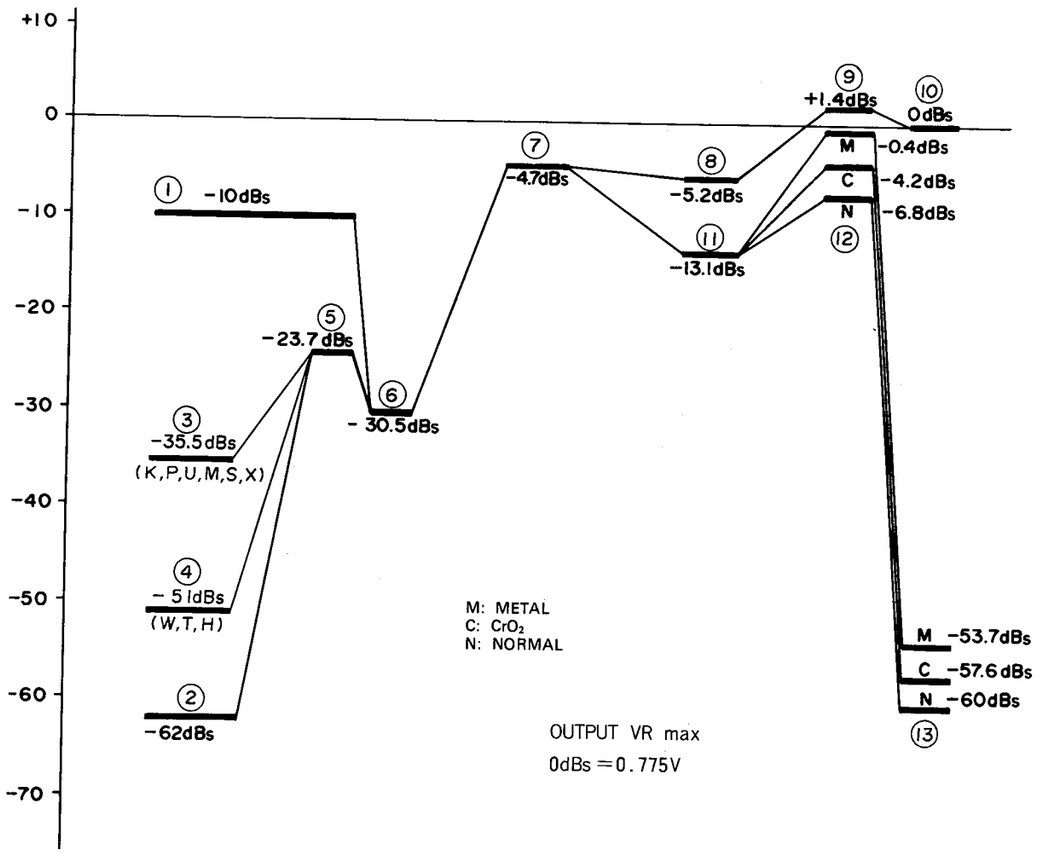
BLOCK DIAGRAM



LEVEL DIAGRAM (1)

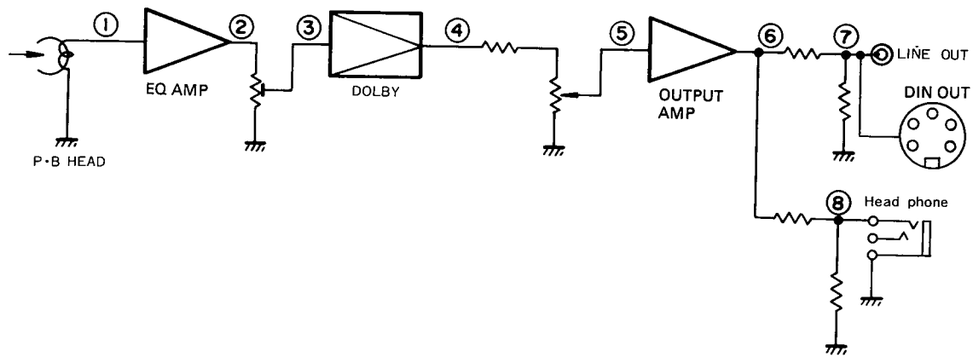
Record (315 Hz)

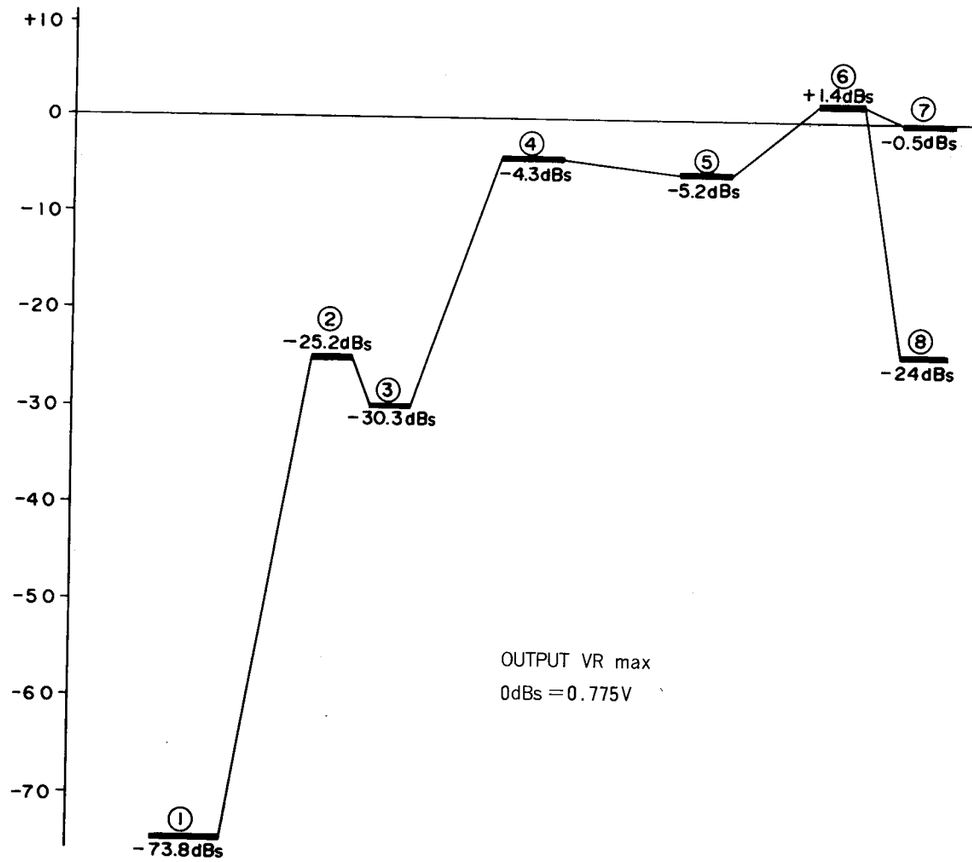




LEVEL DIAGRAM (2)

Playback Test tape MTT-216: 315 Hz 0 dB)





KX-2060 KX-2060

ADJUSTMENT

1. Test Instruments

- AC voltmeter (High input impedance)
- Audio signal generator: AG
- Oscilloscope
- Frequency counter
- Wow and flutter meter
- Weighting filter
  (ASA A characteristic with NAB curve)
- Band pass filter
  (Attenuation: 75 dB/oct. or more)
- Cassette type torque gage
- Spring balance
- Torque dial
- Head demagnetizer
- M300 head and guide gage
- Cleaning tape (T93-0014-05)

2. Test Tapes

a) Test tapes for recording system adjustment
NORMAL:
MAXELL UD-XL1 (T93-0013-15)
CHROME:
TDK AC-511 (T93-0010-05) or SAC-60
METAL: TDK AC-701 (T93-0018-05)

b) Test tape for playback measurement
TEAC MTT-111:
(Tape speed. azimuth)
TEAC MTT-216 (MTT-116U)
(Frequency characteristic)
TEAC MTT-216R (MTT-116R)
(Frequency characteristic)
Mirror tape

3. Notes for Adjustments and Measurements

1. **Load resistance:** A pure resistance load of 100 kΩ should be connected to the LINE OUTPUT terminal.
2. **Standard level:** 0 dB = 0.775V
3. The electrical system should be adjusted by dividing it into playback and recording.
   Adjustment of recording requires perfect performance of the playback system.
   No special adjustment should be required unless inner components are replaced.
4. When the head is replaced, its stray magnetism must be completely erased by the demagnetizer prior to mounting the tape.
5. Unless otherwise designated, measurement should be carried out with the Dolby NR switch off.

4. Meanings of Technical Words

Standard playback condition: The state obtained by playback the level prescribe signal from the test tape 315 Hz (160 pWb/mm) and by adjusting the playback volume control so that standard output level (0 dBs = 0.775V) can be obtained at the LINE OUTPUT terminal.

Standard record condition: For line input, the RECORD LEVEL control is to be adjusted so that the LINE output level is 0 dB when a −10 dB line input (1 kHz) is recorded then played back under the standard playback condition.

Standard input level: The standard input level necessary for obtaining the normal recording level. The levels at respective input jacks are as specified below.

MIC INPUT ..... −62 dBs (0VU)
LINE INPUT ..... −10 dBs (0VU)
PEC/PLAY INPUT ..... −51 dBs (0VU) K.P.U.M.X.Ś
−35.5 dBs (0VU) W.T.H.

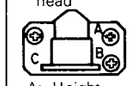
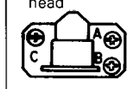
Standard output level: This standard signal level obtained at the line output jack when the level reference signal is reproduced from the test tape 315 Hz.

MTT-216R 315 Hz (250 pWb/mm)
Output level: 4 dBs
MTT-216 315 Hz (160 pWb/mm)
Output level: 0 dBs

TEST TAPE SPECIFICATION

MODEL	TITLE	TIME CONSTANT	DESCRIPTION		APPLICATION
			FREQ/LEVEL	PROGRAM	
MTT-111	FLUTTER	—	3 kHz −10 dB	30 Min.	Tape Speed Test Wow and Flutter Test
MTT-116R (MTT-216R)	FREQUENCY	1590 μs and 120 μs	40 Hz∼18 kHz 0 dB/−10 dB 0 dB DIN REFERENCE LEVEL		Frequency Response Test
MTT-116U (MTT-216)	FREQUENCY	3180 μs and 120 μs	315 Hz∼14 kHz 0 dB/−20 dB 0 dB: DIN REFERENCE LEVEL −4 dB		Frequency Response Test

ADJUSTMENT

Step	Item	Tape used	Test instruments	Input signal	Condition and methods	Adjustment points L	Adjustment points R	Standard and remarks
1	**Removing REC/PLAY head**	—	—	—	Remove the cassette door, the dressing plate and the head cover in this order. Remove adhesive fixing the REC/PLAY head retaining screws with thinner, then remove these three screws to remove the head.			REC/PLAY head  A: Height B: Tilt C: Azimuth
2	**Installing**	—	—	—	Slightly tighten the REC/PLAY head retaining screws A, B and C. (Tighten them by 4 turns.) Adjust screw C so that the head is parallel to the head panel.	Screw A, B, C		
(A) Adjusting REC/PLAY head (using M-300)								
3	**Head height**	—	M-300	—	Set the reference plate of the M-300 in the cassette holder. Let the block gage of the M-300 on the reference plate with its wide surface in contact with the reference plate. Adjust screw A so that the block gage enters the tape guide.	Screw A		
4	**Head tilt**	—	M-300		Place the block gage vertically on the head. Adjust screw B so that the block gage comes into contact with the reference plate.	Screw B		
Repeat Steps 3 and 4 several times because the head height is changed when tilt is adjusted.								
5	**Demagnetization and cleaning**	—	—	—	Demagnetize the REC/PLAY head with a head demagnetizer. Clean the REC/PALY head, erase head, capstan and pinch roller with an applicator soaked with head cleaner.			
6	**Head azimuth**	MTT-116U (MTT-216) 10kHz, −20dB	AC voltmeter Oscilloscope		Adjust the screw C so that, the maximum output is obtained.	Screw C		
Check height, tilt and azimuth of the head again.								
7	**Tape running**	Mirror tape	—	—	Play the mirror tape and check whether or not the tape edge contact the tape guide. If they do, repeat steps 2, 3 and 6.			
(B) Adjusting REC/PLAY head (without using M-300)								
8	**Head height**	Mirror tape	—	—	Turn the power off, install the mirror tape and raise the head ass'y by a finger, then tighten the three screws so that the tape guide of the REC/PLAY head becomes parallel to that of the erase head.	Screw A, B, C		REC/PLAY head 
9	**Head tilt**	Mirror tape	—	—	Play the mirror tape and tighten screws A and B so that the tape edge does not touch the tape guide and therefore cannot be twisted by it.	Screw A, B		
Demagnetize and clean the REC/PLAY head (Refer to Step 5).								
10	**Head azimuth**	MTT-116U 10kHz, −20dB	AC voltmeter Oscilloscope		REC: OFF, PLAY: ON, BIAS: NORMAL, EQ: NORMAL, DOLBY: OFF, MONITOR: TAPE, OUTPUT: MAX Play the 10 kHz, −30 dB section of the test tape and adjust screw C so that the maximum LINE OUT level is obtained.	Screw C		
11	**Head tilt**	Maxell XL-1	AC voltmeter Oscilloscope	10kHz −20dB	REC: ON, PLAY: ON, BIAS: NORMAL, EQ: NORMAL, DOLBY: OFF, MONITOR: TAPE, OUTPUT: MAX, INPUT: 8 Fine adjust screws A and B (especially B) so that the maximum LINE OUT level is obtained.			
Perform Steps 10 and 11 repeatedly, then play the mirror tape and check that the tape edges do not contact the tape guide.								

When the erase head is replaced, the tape edges must not contact the tape guide.

ADJUSTMENT

0dBs = 0.775V

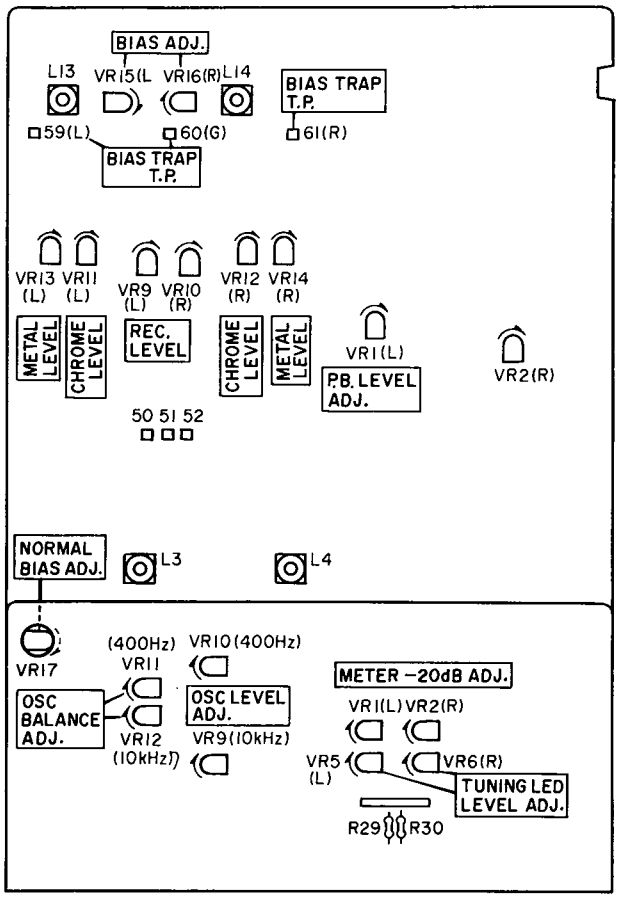
Step	Item	Tape used	Test instruments	Input signal	Condition and methods	Adjustment points L	Adjustment points R	Standard and remarks
1	**Tape speed**	MTT-111	Frequency counter	—	Adjust the trimming potentiometer in the DC motor so that the frequency counter indicates 3000 Hz.	Trimming potentiometer in the DC motor		—
2	**Playback level**	MTT-116U (MTT-216)	AC voltmeter Oscilloscope	—	REC: OFF, PLAY: ON, BIAS: NORMAL, EQ: NORMAL, DOLBY: OFF, MONITOR: TAPE, OUTPUT: MAX Play back the 315 Hz, 0 dB section of the test tape and adjust VR1 and VR2 so that the LINE OUT levels are −0.5 dBs.	VR1	VR2	
						X28-1310-01		
3	**Bias oscillation frequency**	Cassette tape	AC voltmeter Frequency counter	—	REC: ON, PLAY: ON, BIAS: METAL, EQ: METAL, BIAS ADJ.: CENTER, PAUSE: ON Connect the AC voltmeter and the frequency counter across R37 (X25-1460-01) and adjust L1 so that the oscillation frequency is 105 kHz.	L1		EQ switches to NORMAL and CrO_2 positions and check that the oscillation frequency is 102.5kHz or more at both positions.
						X25-1460-01 (−02, −03)		
4	**Bias trap**	Cassette tape	AC voltmeter Oscilloscope		REC: ON, PLAY: ON, BIAS: METAL, EQ: METAL, BIAS ADJ.: CENTER, PAUSE: ON Connect the AC voltmeter and the oscilloscope between TP59 (L) and TP60 (G) or TP61 (R) and TP60 (G), and adjust L13 or L14, respectively, so that the waveform is symmetrical at minimum output.	L13	L14	−14dBs: Check that the output level is the same as this level at both NORMAL and CrO_2 position.
						X28-1310-01		
5	**MPX filter**	—	AC voltmeter AG	19kHz −20dBs	REC: ON, PLAY: ON, DOLBY NR FILTER: ON, MONITOR: SOURCE, OUTPUT: MAX, INPUT: 9 AdjustL3 and L4 so that the LINE OUT levels are minimized.	L3	L4	−40dBs
						X28-1310-01		
6	**Standard setting**	Maxell XL-1 AC-511 AC-701	AC voltmeter AG	1kHz −30dBs	BIAS: , EQ: , DOLBY: OFF, MONITOR: SOURCE, OUTPUT: MAX, REC CAL.: CENTER, BIAS ADJ.: Adjust the INPUT volume control so that the LINE OUT level is −20 dBs. Set BIAS and EQ switches according to the tape used.	—		—
7a	**Bias level**	Maxell XL-1	AC voltmeter AG	1kHz −30dBs, 10kHz −30dBs	Under the condition for Step 6, set REC and PLAY ON, BIAS and EQ to NORMAL and MONITOR to TAPE. Adjust VR15 and VR16 so that the LINE OUT levels are the same for both 1 kHz and 10 kHz.	VR15	VR16	—
						X28-1310-01		
7b	**REC level (NORMAL)**	Maxell XL-1	AC voltmeter AG	1kHz −30dBs	Under the condition for Step 7a, adjust VR9 and VR10 so that the LINE OUT levels at 10 kHz are −20 dBs.	VR9	VR10	—
						X28-1310-01		
7c	**Bias level**	AC-511	AC voltmeter AG	10kHz −30dBs	Set BIAS and EQ to CrO_2 and adjust VR15 and VR16 so that the LINE OUT levels at 10 kHz are −20 dBs.	VR15	VR16	—
						X28-1310-00		
7d	**REC level (CrO_2)**	AC-511	AC voltmeter AG	1kHz −30dBs	Under the condition for Step 7c, adjust VR11 and VR12 so that the LINE OUT levels at 1 kHz are −20 dBs.	VR11	VR12	—
						X28-1310-01		
7e	**Bias level**	AC-701	AC voltmeter AG	10kHz −30dBs	Set BIAS and EQ to METAL and check that the LINE OUT levels at 10 kHz are −20 ±0.5 dBs.	—		—
7f	**REC level (METAL)**	AC-701	AC voltmeter AG	1kHz −30dBs	Under the condition for Step 7e, adjust VR13 and VR14 so that the LINE OUT levels at 1 kHz are −20 dBs.	VR13	VR14	—
						X28-1310-01		
7g	**Bias level (NORMAL)**	Maxell XL-1	AC voltmeter AG	10kHz 30dBs	Set BIAS and EQ to NORMAL and adjust VR17 so that the lower LINE OUT level at 10 kHz is −20 dBs.	VR17		—
						X28-1310-01		
8a	**Fluorescent meter**	—	AC voltmeter AG	1kHz −31.3dBs	Set the switches as for Step 6 and check that the LINE OUT levels are −21.3 dBs. Adjust VR1 and VR2 so that the 20 dB segments of the indicators are completely lit.	VR1	VR2	—
						X25-1470-01 (−02, −03, −04)		

ADJUSTMENT

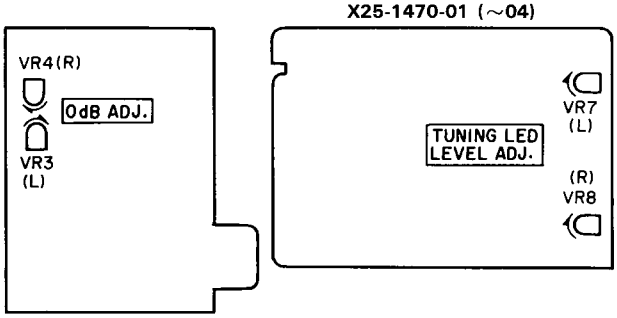
Step	Item	Tape used	Test instruments	Input signal	Condition and methods	Adjustment points L	Adjustment points R	Standard and remarks
8b	**Fluorescent meter**	—	AC voltmeter AG	1kHz −10.3dBs	Apply input signals of −10.3 dBs with the other conditions the same as for Step 8a, and adjust VR3 and VR4 so that the 0 dB segment of the indicators are completely lit.	VR3	VR4	—
						X25-1470-01 (−02, −03, −04)		
Repeat step 8a and 8b several times.								
9	**Test tone level (400Hz)**	—	AC voltmeter	—	MONITOR: SOURCE; OUTPUT: MAX; 400 Hz OSC: ON; REC CAL.: CENTER. Connect the AC voltmeter between Pin 49 and Pin 48 on X28-1310-01. Adjust VR10 so that the AC voltmeter reading is 580 mV.	—	VR10	—
						X25-1470-01 (−02, −03, −04)		
10	**Test tone balance (400Hz)**	—	AC voltmeter	—	Under the same conditions as for Step 9, connect the AC voltmeter between Pin 47 and Pin 48 of X28-1310-01 and adjust VR11 so that the AC voltmeter reading is 580 mV. Check that the +1 dB segments of the indicators are lit.	VR11	—	—
						X25-1470-01 (−02, −03, −04)		
11	**Test tone level (10kHz)**	—	AC voltmeter	—	MONITOR: SOURCE; OUTPUT: MAX; 10 kHz OSC: ON; BIAS ADJ.: CENTER. Connect the AC voltmeter between Pin 49 and Pin 48 of X28-1310-01 and adjust VR9 so that the AC voltmeter reading is 46 mV.	—	VR9	—
						X25-1470-01 (−02, −03, −04)		
12	**Test tone balance (10kHz)**	—	AC voltmeter	—	Under the same conditions as for Step 11, connect the AC voltmeter between Pin 47 and Pin 48 of X28-1310-01 and adjust VR12 so that the AC voltmeter reading is 46 mV. Check that the −20 dBs segments of the fluorescent meter are lit.	VR12	—	—
						X25-1470-01 (−02, −03, −04)		
13a	**Tuning LED level**	—	—	—	MONITOR: SOURCE; 400 Hz OSC: ON; REC CAL.: CENTER. Turn VR5 and VR6 until the indication changes from −1 to −2.	VR5	VR6	This adjustment is needed after the tuning LED driver IC has been replaced.
						X25-1470-01 (−02, −03, −04)		
13b	**Tuning LED level**	—	—	—	Connect a 94 kΩ resistor in parallel to R29 (R30) as shown in Fig. 13 b and turn VR7 (VR8) until the indication changes from 0 to −1.	VR7	VR8	—
						X25-1470-01 (−02, −03, −04)		
13c	**Tuning LED level**	—	—	—	Replace the resistor with 200 kΩ and adjust VR5 and VR6 until the indication changes from +1 to 0.	—		—
13d	**Tuning LED level**	—	AC voltmeter	—	Remove the resistor connected in parallel and check the center LEDs (red: 0) are lit.	—		—
13e	**Tuning LED level**	—	AC voltmeter	—	Under the same conditions as for Step 9, confirm that the AC voltmeter connected between Pin 49 and Pin 48 indicates 502 mV when the tuning LED indication changes from 0 to −1 and 658 mV when it changes from 0 to 1 when turning VR10. If not, repeat Steps 13a to 13d.	—		—
14	**REC CAL. check (400Hz)**	Maxell XL-1	—	—	REC: ON; PLAY: ON; BIAS: NORMAL; EQ: NORMAL; DOLBY: OFF; MONITOR: TAPE; 400 Hz QSC: ON; REC CAL.: CENTER; BIAS ADJ.: CENTER. Check the center tuning LEDs (red) are lit. Even if not so, it is OK if they light when REC CAL is adjusted (within ±2 graduations).	—		—
15	**BIAS ADJ. chek (10kHz)**	Maxell XL-1	—	—	REC: ON; PLAY: ON; BIAS: NORMAL; EQ: NORMAL; DOLBY: OFF; MONITOR: TAPE; 10 kHz OSC: ON; REC CAL.: CENTER; BIAS ADJ.: CENTER. Check the center tuning LEDs (red) are lit. Even if they do not, it is OK if they light when REC ADJ is adjusted (within ±2 graduations).	—		—

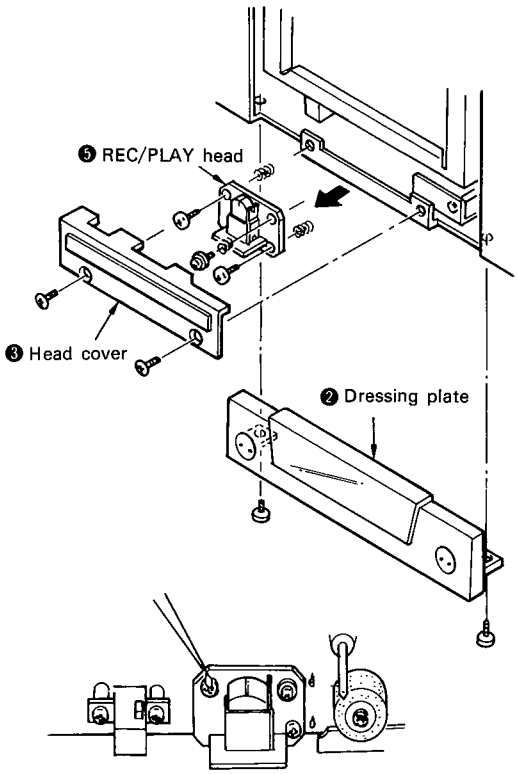
ADJUSTMENT

X28-1310-01



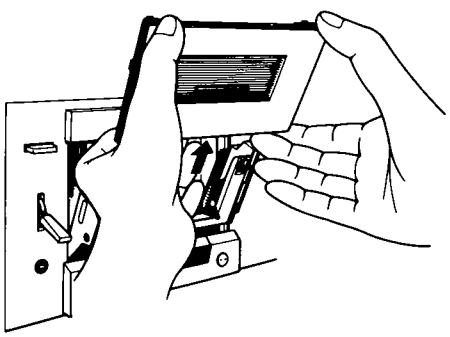
X25-1470-01 (~04)



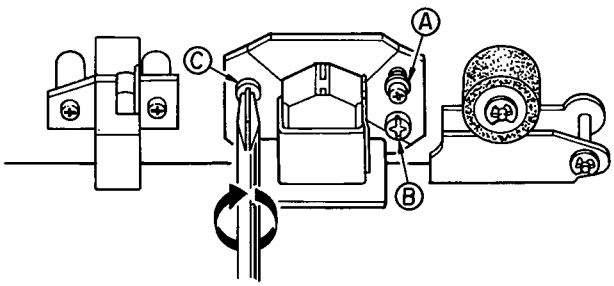


① Removing REC/PLAY head

❶ Cassette door



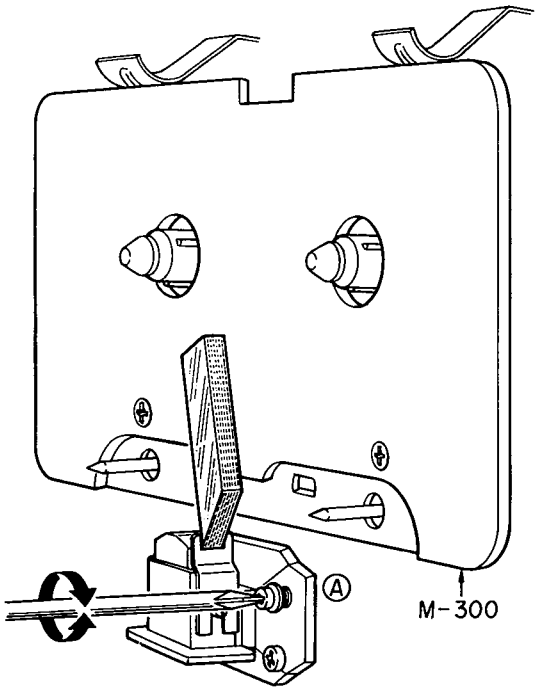
② Installing REC/PLAY head



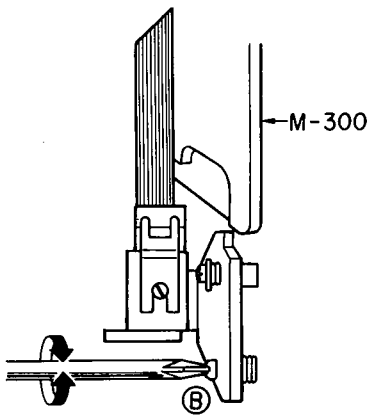
- Use a demagnetized screwdriver.
- Tighten 3 screws by 4 turns.

(A) Adjusting REC/PLAY head (using M-300)

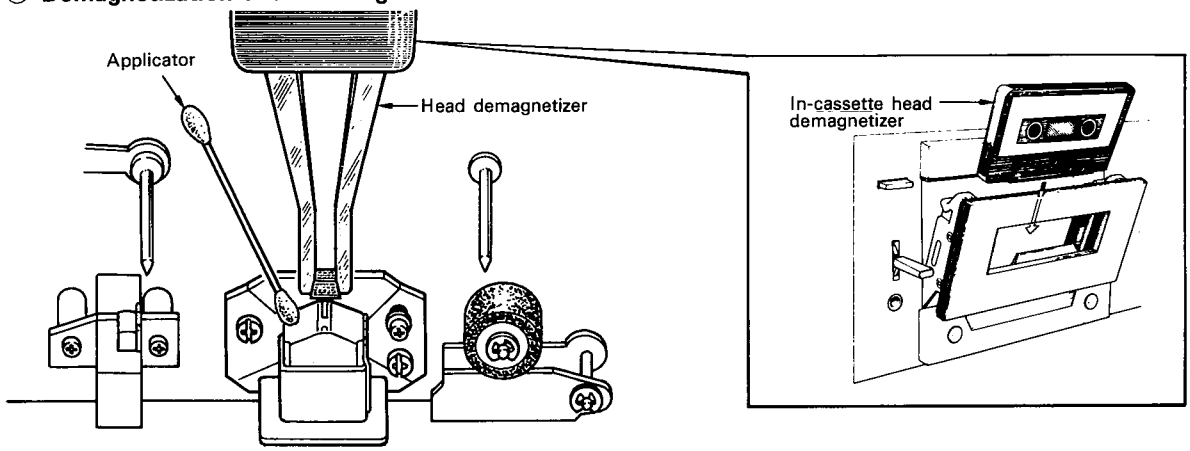
③ Head height adjustment



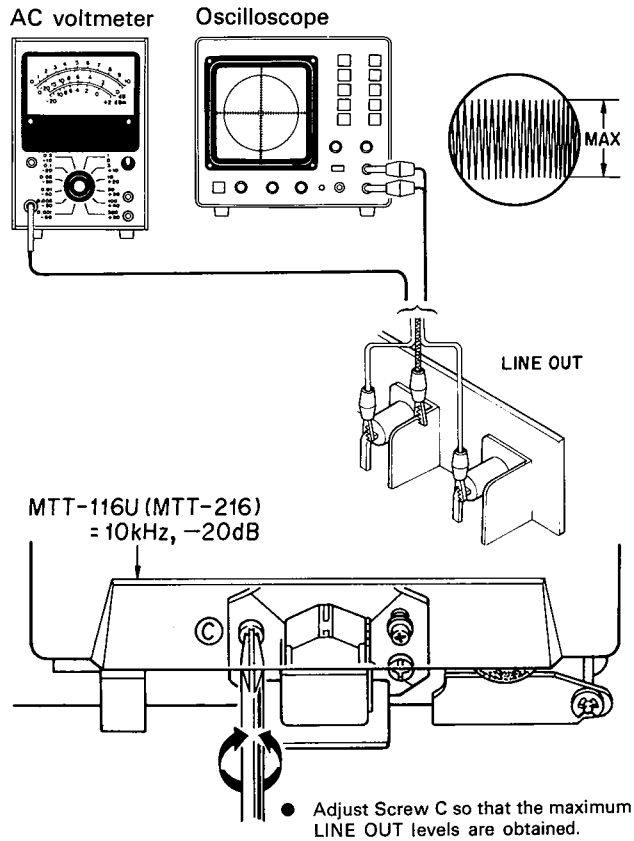
④ Head tilt adjustment



⑤ Demagnetization and cleaning

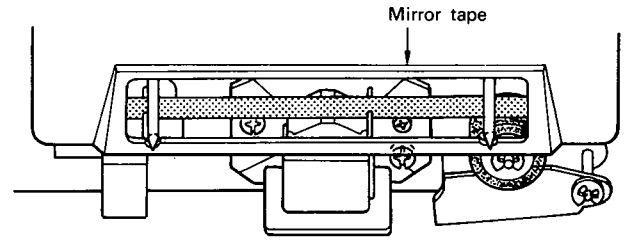


⑥ Head azimuth adjustment



● Adjust Screw C so that the maximum LINE OUT levels are obtained.

⑦ Tape running check using mirror tape



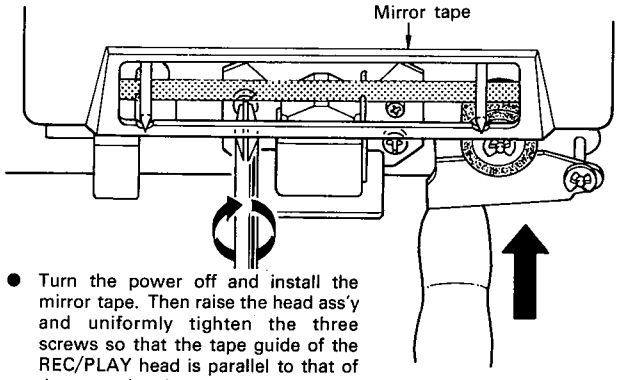
● Play the mirror tape and check that the tape edges do not contact the tape guide.

ADJUSTMENT

(B) Adjusting REC/PLAY head (without using M-300)

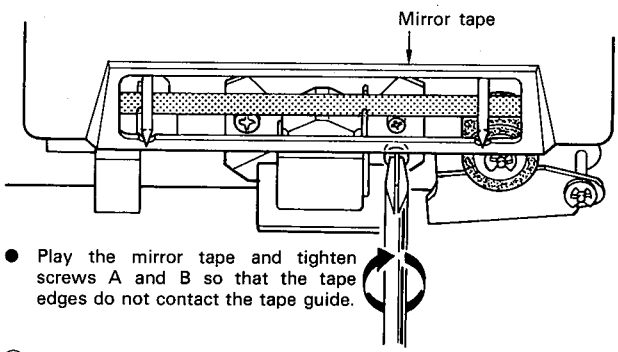
⑧ Head height adjustment

(Power: OFF, Using mirror tape)



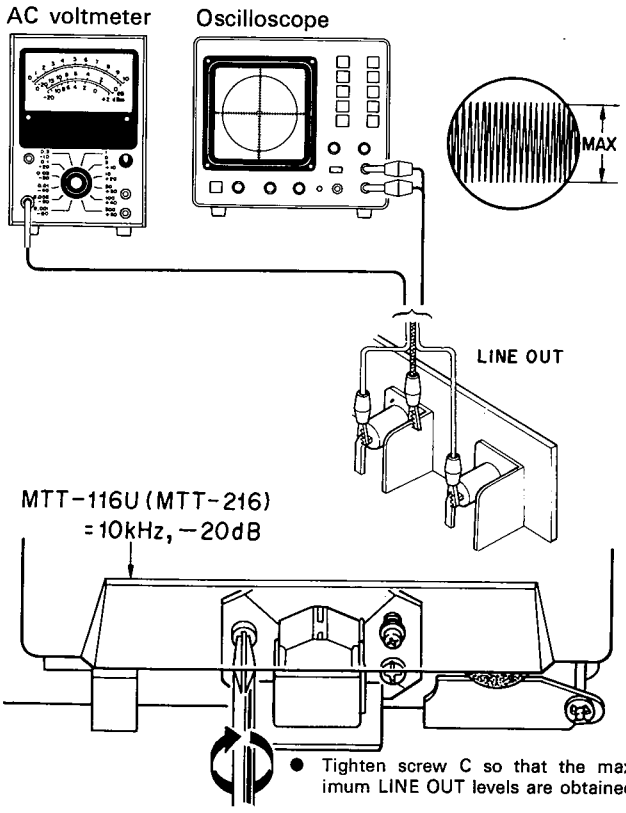
- Turn the power off and install the mirror tape. Then raise the head ass'y and uniformly tighten the three screws so that the tape guide of the REC/PLAY head is parallel to that of the erase head.

⑨ Head tilt adjustment (using mirror tape)



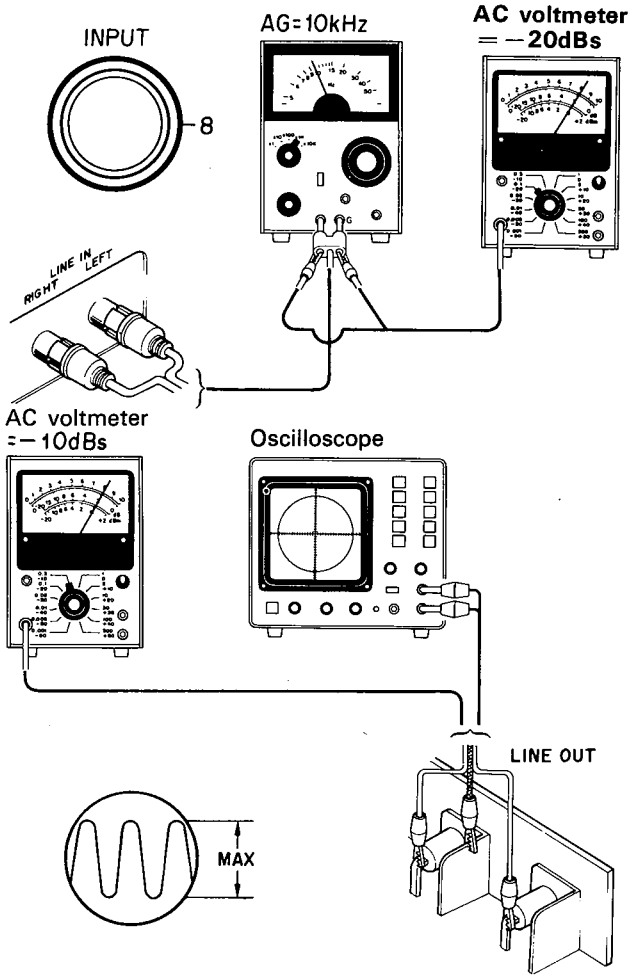
- Play the mirror tape and tighten screws A and B so that the tape edges do not contact the tape guide.

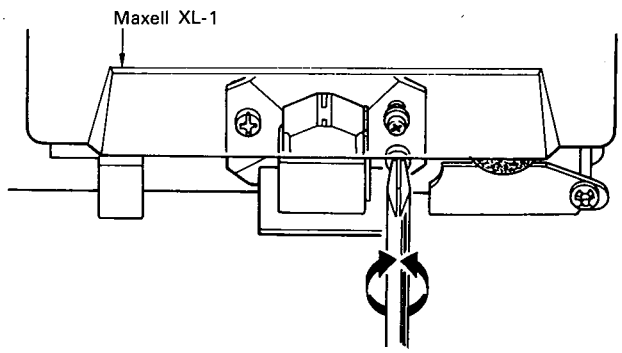
⑩ Head azimuth adjustment (using MTT-116U)



- Tighten screw C so that the maximum LINE OUT levels are obtained.

⑪ Head tilt adjustment (using Maxell XL-1)

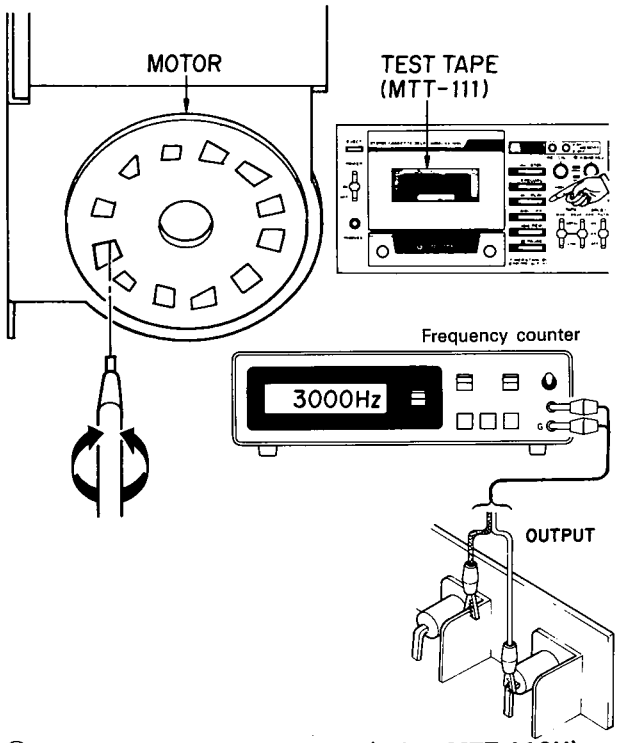




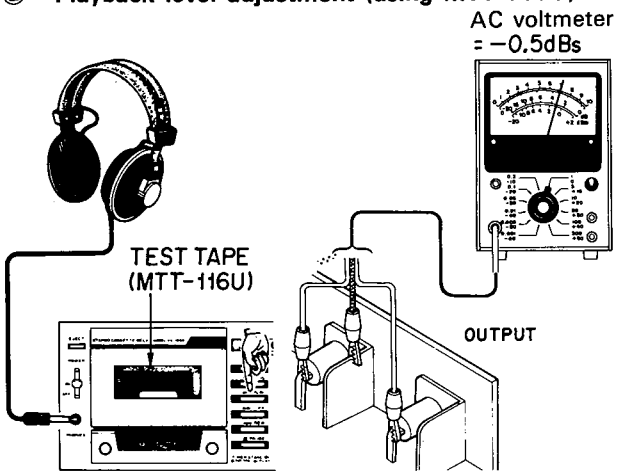
- Fine screws A and B (especially B) so that the maximum LINE OUT levels are obtained.

ADJUSTMENT

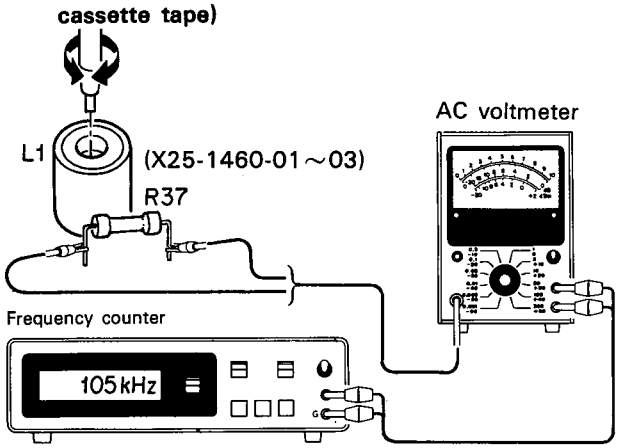
① **Tape speed adjustment (using MTT-111)**



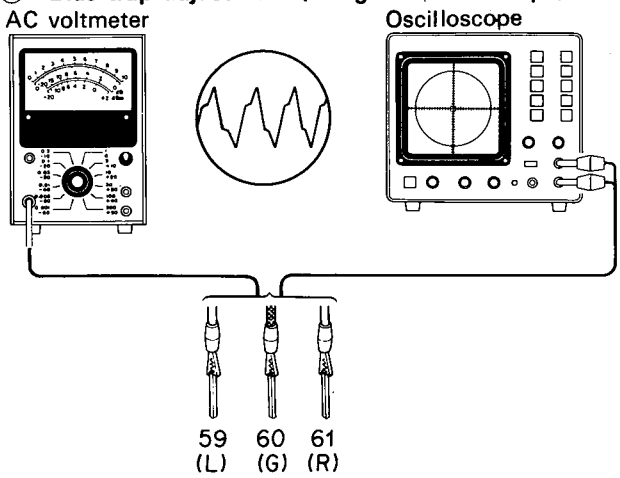
② **Playback level adjustment (using MTT-116U)**



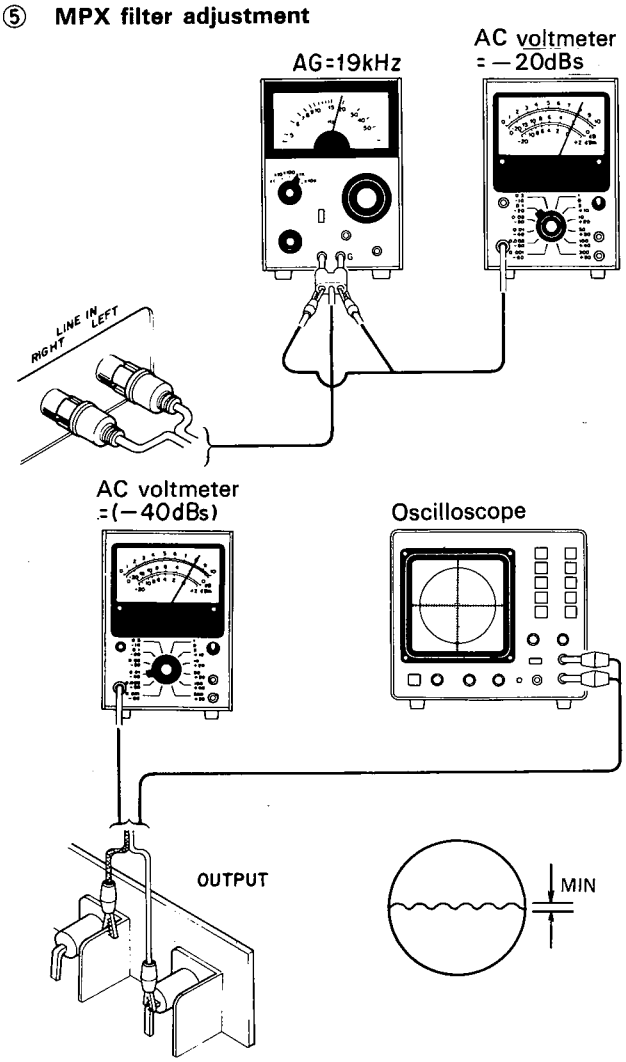
③ **Bias oscillation frequency adjustment (using a cassette tape)**



④ **Bias trap adjustment (using a cassette tape)**

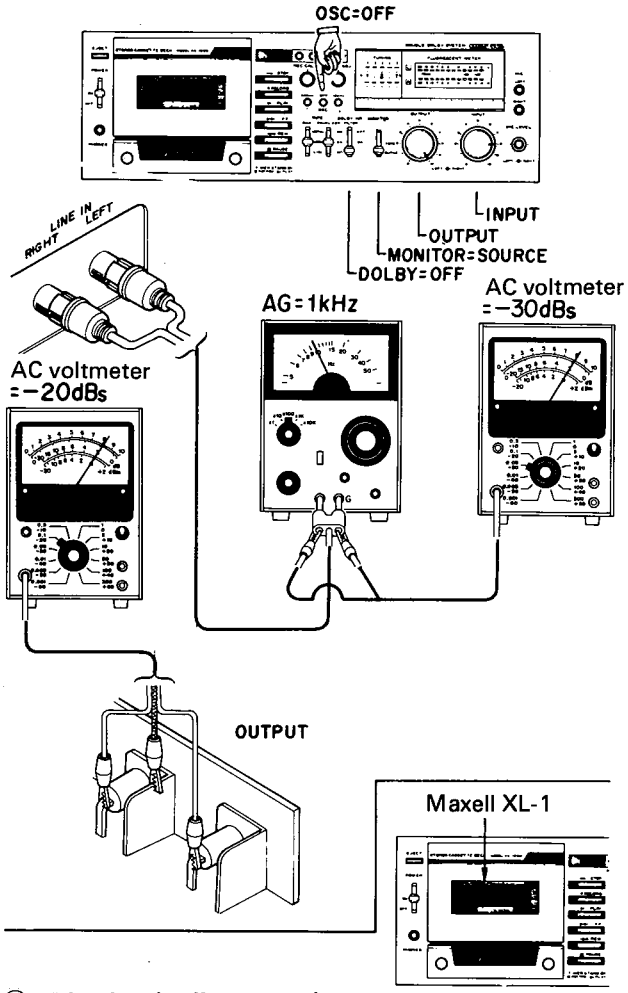


⑤ **MPX filter adjustment**

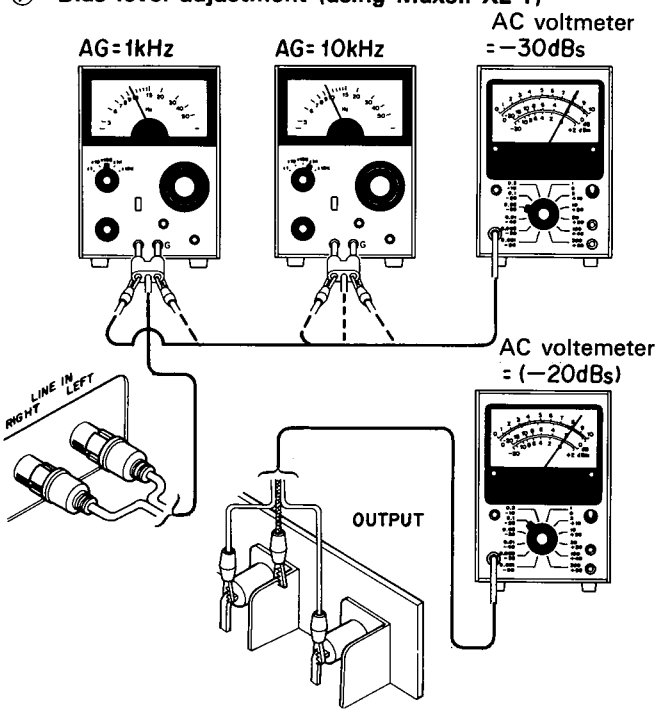


ADJUSTMENT

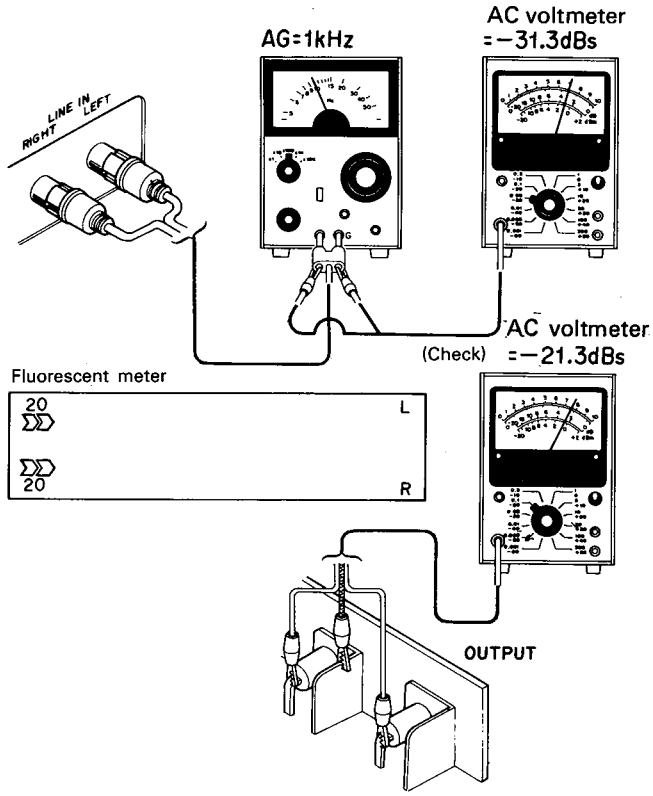
⑥ **Standard setting (using Maxell XL-1, AC-511, AC-8010)**



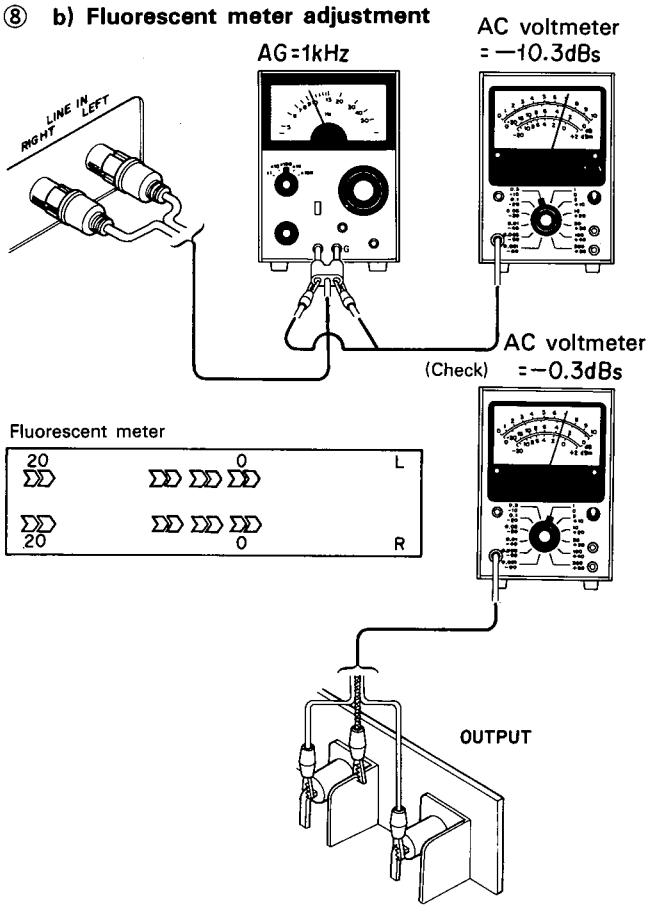
⑦ **Bias level adjustment (using Maxell XL-1)**



⑧ **a) Fluorescent meter adjustment**

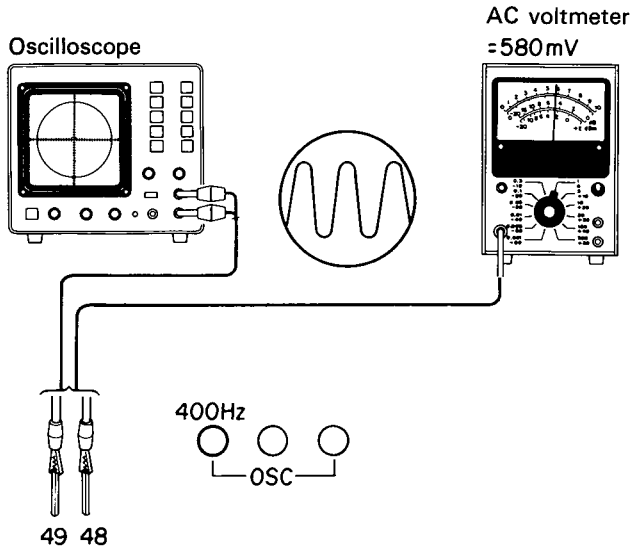


⑧ **b) Fluorescent meter adjustment**

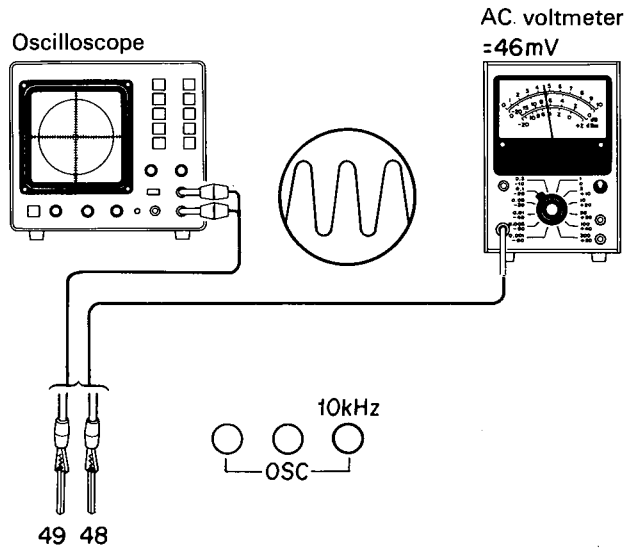


ADJUSTMENT

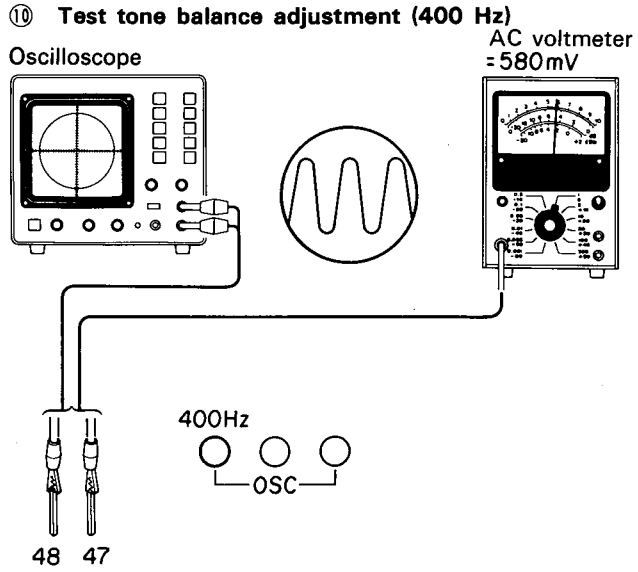
⑨ **Test tone level adjustment (400 Hz)**



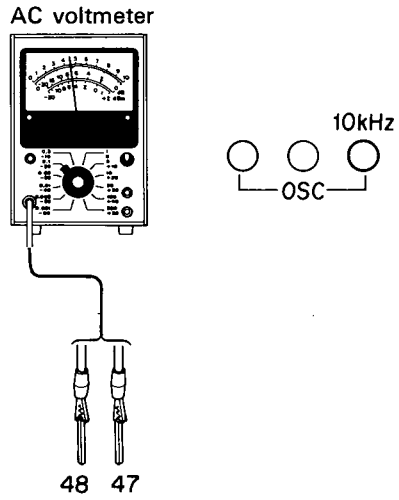
⑪ **Test tone level adjustment (10 kHz)**



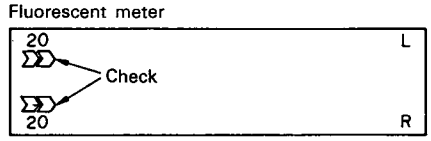
⑩ **Test tone balance adjustment (400 Hz)**



⑫ **Test tone balance adjustment (10 kHz)**

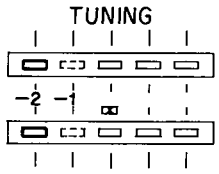


Fluorescent meter

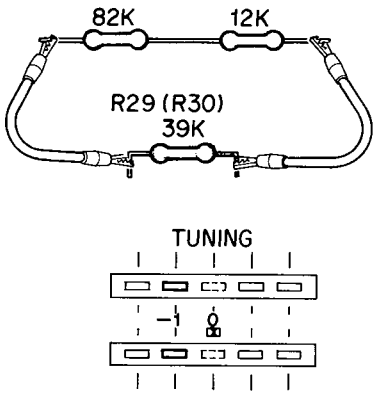


ADJUSTMENT

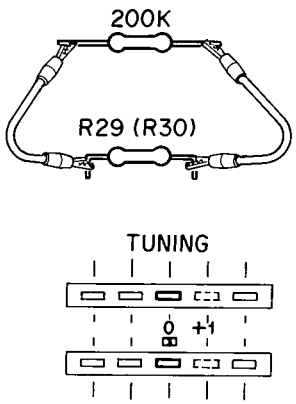
⑬ a) Tuning LED level adjustment



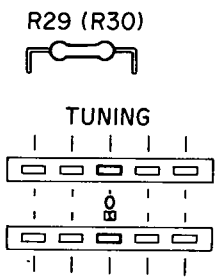
⑬ b) Tuning LED level adjustment



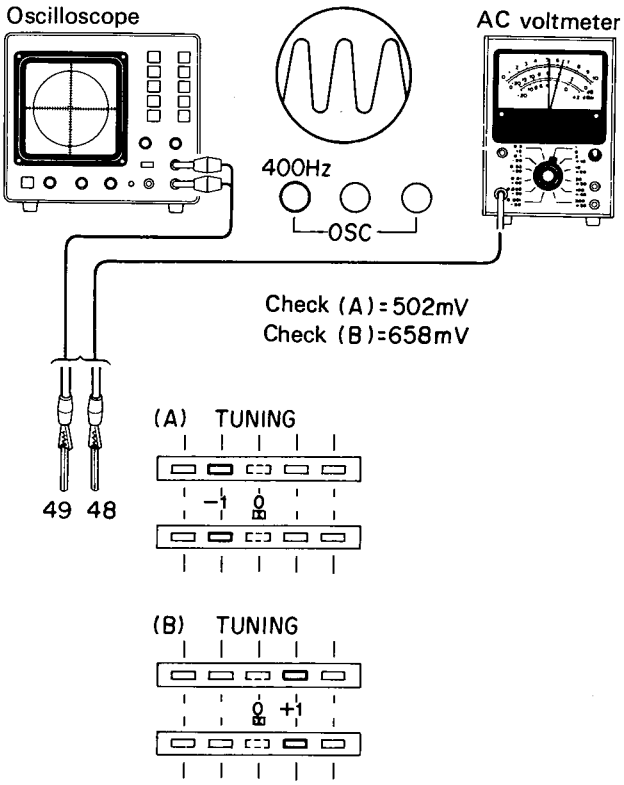
⑬ c) Tuning LED level adjustment



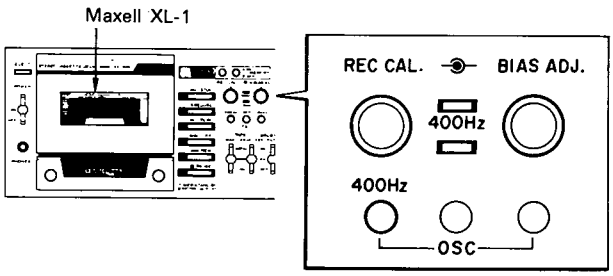
⑬ d) Tuning LED level check



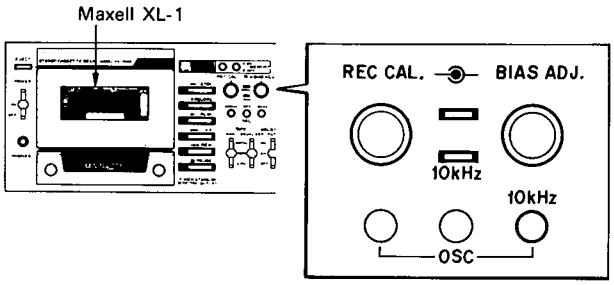
⑬ e) Tuning LED level check



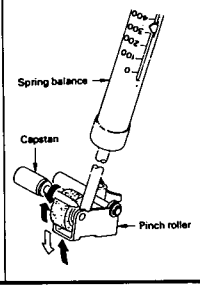
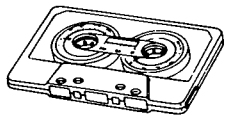
⑭ REC CAL (400 Hz) check (using Maxell XL-1)



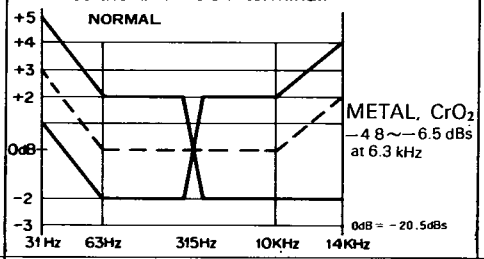
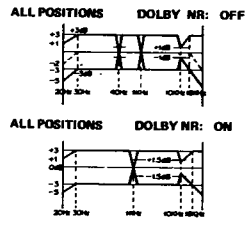
⑮ BIAS ADJ (10 kHz) check (using Maxell XL-1)



MEASUREMENT (MECHANISM)

Adjustment items	Tape used	Test instruments	Input signal	Conditions and methods	Standard and remarks
1. Torque				REC / PLAY / BIAS / EQ / DOLBY / MONITOR OFF / / NORMAL / NORMAL / OFF / TAPE	
PLAY	SRK-CT-100M TW-2111	—	—	With a tape loaded, press the PLAY button and measure the dynamic torque.	40～75 g.cm
FF & REW	SRK-CT-160L TW-2231	—	—	Release the PLAY button and load the specified tape. Press the FF button. When the tape is fully wound, measure the static torque. Next, press the REW button. When the tape is fully rewound, measure the static torque. Repeat the above procedures 3 or 4 times and obtain averages of FF and REW torques.	FF torque: 80～160 g.cm REW torque: 80～160 g.cm
Back Tension	SRK-CT-10M TW-2111	—	—	With the FF and REW buttons released, load the specified tape. Press the PLAY button at the beginning of tape and measure the dynamic torque.	10.5～14 g.cm (supply reel)
2. Auto Stop Operating Time	SRK-CT-160L (Other tapes may be used) TW-2111	• Stop watch	—	Measure the time required to release the tape button (FF, PLAY, REW) after the tape reaches the end.	2.5 sec. ±1 sec.
3. Tape Counter Indication	C-120	—	—	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])	950±49 count
4. Tape Speed and Wow/flutter	MTT-111 JIS	• AC voltmeter • Counter • Wow/flutter meter	—	With the specified tape loaded, press the PLAY button and measure the tape speed and wow/flutter. For tape speed variation, measure the difference between the maximum and minimum tape speed deviation. For wow/flutter, measure WRMS value at the peak (JIS) on the wow/flutter meter. This measurement should be made at the beginning, middle and end of the tape with the PB VR set to the MAX position.	TAPE SPEED Dev. 3 kHz±1.5% TAPE SPEED Vari. 1.3% W&F (JIS) 0.06% WRMS
6. FF and REW TIME	C-60	• Stop watch	—	Measure the winding time in FF and REW modes.	Within 95 sec. each.
7. Pinch Roller Pressure	—	• Spring balance	—	Use a compression spring balance to push the pinch roller 1～2 mm, from the capstan thus stopping the pinch roller. Then, allow the pinch roller to contact the capstan just enough to start the pinch roller turning slightly, and read the measurement.   Cassette type torque gauge	350±50g

MEASUREMENT (AMP)

Adjustment items	Tape used	Test instrument	Input signal	Conditions and methods	Standard and remarks
1. Playback Level	MTT-116U (MTT-216)	• AC voltmeter • Oscilloscope	—	REC: OFF, PLAY: ON, BIAS: NORMAL, EQ: NORMAL, DOLBY: OFF, MONITOR: TAPE Play a 315 Hz, 0dB signal and measure the playback level at the MAX position of PB VR.	−0.5 dBs±0.5 dB
2. Headphone Output Level	MTT-116U (MTT-216)	• 8Ω (1/2W) resistor • AC voltmeter	—	Play a 315 Hz, 0dB signal. With PB VR set to the MAX position, connect a 8-ohm load resistor to the HEADPHONE output. Measure the output voltage across the resistor with AC voltmeter.	−24 dBs±2 dB (CH level difference: 3 dB max.)
3. Playback S/N	MTT-116U (MTT-216)	• AC voltmeter	—	Play a 315 Hz, 0dB signal under the standard playback condition and measure the output level. Then, set the tape deck in PLAY mode with cleaning tape and measure the output level. Obtain the ratio between the two output levels. Also, measure the LINE output through a weighting circuit using the above procedure.	47 dB min. (CH level difference: 5 dB max.) 55 dB min. (CH level difference: 5 dB max.)
4. Playback Frequency Response	MTT-116U (MTT-216)	• AC voltmeter	—	Under the standard playback condition, play each frequency on MTT-116U and measure the level at the LINE OUT terminal. 	See the figure at left.
5. Minimum Input Level				REC: OFF, PLAY: OFF, BIAS: NORMAL, EQ: NORMAL, DOLBY: OFF, MONITOR:	
LINE	—	• Audio signal generator • AC voltmeter • Oscilloscope	1 kHz	RECORD LEVEL..... MAX OUTPUT LEVEL..... MAX INPUT SELECTOR SW ... LINE Under the standard playback condition, apply a 1 kHz signal to LINE IN. Adjust the audio signal generator so that a signal of 0dBs (standard output level) is obtained at LINE OUT. Read the value of the input level at this condition.	−20 dBs±2 dBs
MIC	—	• Audio signal generator • AC voltmeter • Oscilloscope	1 kHz	INPUT SELECTOR SW ... MIC Set other switches as shown above. Apply a 1 kHz signal to the MIC jack. Adjust the audio signal generator so that a signal of 0dBs (standard output level) is obtained at LINE OUT. Measure the input level at this condition.	−72 dBs±2 dBs
6. Overall Frequency Response	UD-XL1 AC-511 AC-701	• Audio signal generator • AC voltmeter	40 Hz 100 Hz 1 kHz 6.3 kHz 10 kHz 13 kHz 16 kHz −30 dBs each	REC: ON, PLAY: ON, BIAS: , EQ: , DOLBY: , MONITOR: TAPE Set the DOLBY SW to OFF. Other switches should be set as shown above. Record and play each of the specified signals and check that the frequency response meets the specifications. Next, set the DOLBY SW to ON and check the frequency response of each signal.	
7. Distortion	UD-XL1 AC-511 AC-701	• Audio signal generator • AC voltmeter • Distortion meter	1 kHz −10 dBs	REC: ON, PLAY: ON, BIAS: , EQ: , DOLBY: , MONITOR: TAPE Under the standard recording and playback conditions, apply the specified signal to LINE IN. Record and play the signal and measure the distortion of the playback signal using a distortion meter. Measure distortion on each tape with the BIAS and EQ switches set to appropriate positions.	METAL: within 0.85% NORMAL: within 0.9% CrO_2: within 0.65%

MEASUREMENT (AMP)

Adjustment items	Tape used	Test instrument	Input signal	Conditions and methods	Standard and remarks
8. Overall S/N	UD-XL1 AC-511 AC-701	• Audio signal generator • AC voltmeter • Oscilloscope	1 kHz −10 dBs	REC: ON, PLAY: ON, BIAS: , EQ: , DOLBY: OFF, MONITOR: TAPE Set the BIAS and EQ switches according to the type of tape used. Under the standard recording and playback conditions, apply the specified signal to LINE IN and record. Next, shut off the signal and set the tape deck in recording mode. Measure the playback levels with signal and without signal. Obtain the ratio between the two playback levels. Next, connect a weighting circuit between LINE OUT and AC voltmeter and measure the playback level in the same manner. Also, set the DOLBY SW to ON and measure in the same manner.	ALL POSITIONS TAPE / Weighting filter: NORMAL — : DOLBY: ON 47 dB or more; DOLBY: OFF 45 dB or more OFF: DOLBY: ON 53 dB or more; DOLBY: OFF 50 dB or more ON TAPE / Weighting filter: METAL CHROME — : DOLBY: ON 50 dB or more; DOLBY: OFF 48 dB or more OFF: DOLBY: ON 56 dB or more; DOLBY: OFF 52 dB or more ON
9. Erase ratio	UD-XL1 AC-511 AC-701	• Audio signal generator • AC voltmeter • 1 kHz band-pass filter	1 kHz 0 dBs	REC: ON, PLAY: ON, BIAS: , EQ: , DOLBY: OFF, MONITOR: TAPE Under the standard recording and playback conditions, apply the specified signal to LINE IN. Record the signal and then rewind the tape slightly. Next, record the tape without applying signal. Rewind the tape and measure the ratio of the playback level with signal to the level without signal, using a 1 kHz band-pass filter.	METAL: 70 dB min NORMAL: 75 dB min CrO_2: 75 dB min
10. Channel Separation	UD-XL1	• Audio signal generator • AC voltmeter • 100 Hz band-pass filter	100 Hz −10 dBs	REC: ON, PLAY: ON, BIAS: NORMAL, EQ: NORMAL, DOLBY: OFF, MONITOR: TAPE Under the standard recording and playback conditions, apply the specified signal to one channel only. Record the signal on the channel. In this case, no signal is recorded on the other channel. Rewind and play the tape. Measure the ratio of the playback level with signal to the level without signal, using a 100 Hz band-pass filter.	40 dB min.
11. Crosstalk between Tracks	UD-XL1	• Audio signal generator • AC voltmeter • 100 Hz band-pass filter	100 Hz −10 dBs	REC: ON, PLAY: ON, BIAS: NORMAL, EQ: NORMAL, DOLBY: OFF, MONITOR: TAPE Under the standard recording and playback conditions, apply the specified signal to LINE IN. Record the signal. Next, reverse the cassette and play the tape. Measure the crosstalk using a 100 Hz band-pass filter.	50 dB min.
12. Bias Leak	—	• AC voltmeter	—	REC: ON, PLAY: ON, BIAS: , EQ: , DOLBY: OFF, MONITOR: TAPE Under the standard recording and playback conditions, measure the output levels.	METAL: −62 dBs max NORMAL: −65 dBs max CrO_2: −65 dBs max
13. Field through	Cleaning tape	• Audio signal generator • AC voltmeter	15 kHz −10 dBs	REC: ON, PLAY: ON, BIAS: , EQ: , DOLBY: OFF, MONITOR: SOURCE Under the standard recording and playback conditions, apply the specified signal to LINE IN. Measure output level (15 kHz leak between REC and P.B. head).	METAL: −15 dB max NORMAL: −25 dB max CrO_2: −25 dB max
14. Maximum output level	UD-XL1	• Audio signal generator • AC voltmeter • Distortion meter	1 kHz	Under the standard recording and playback conditions, apply the specified signal to LINE IN. Record the signal. Gradually increase the input level from −10 dBs and measure the output level to obtain the output distortion 3%.	+6.5 dBs min

PC BOARD

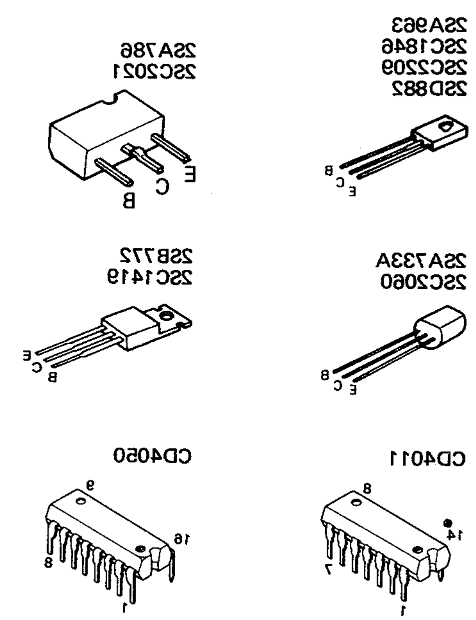
KX-2060

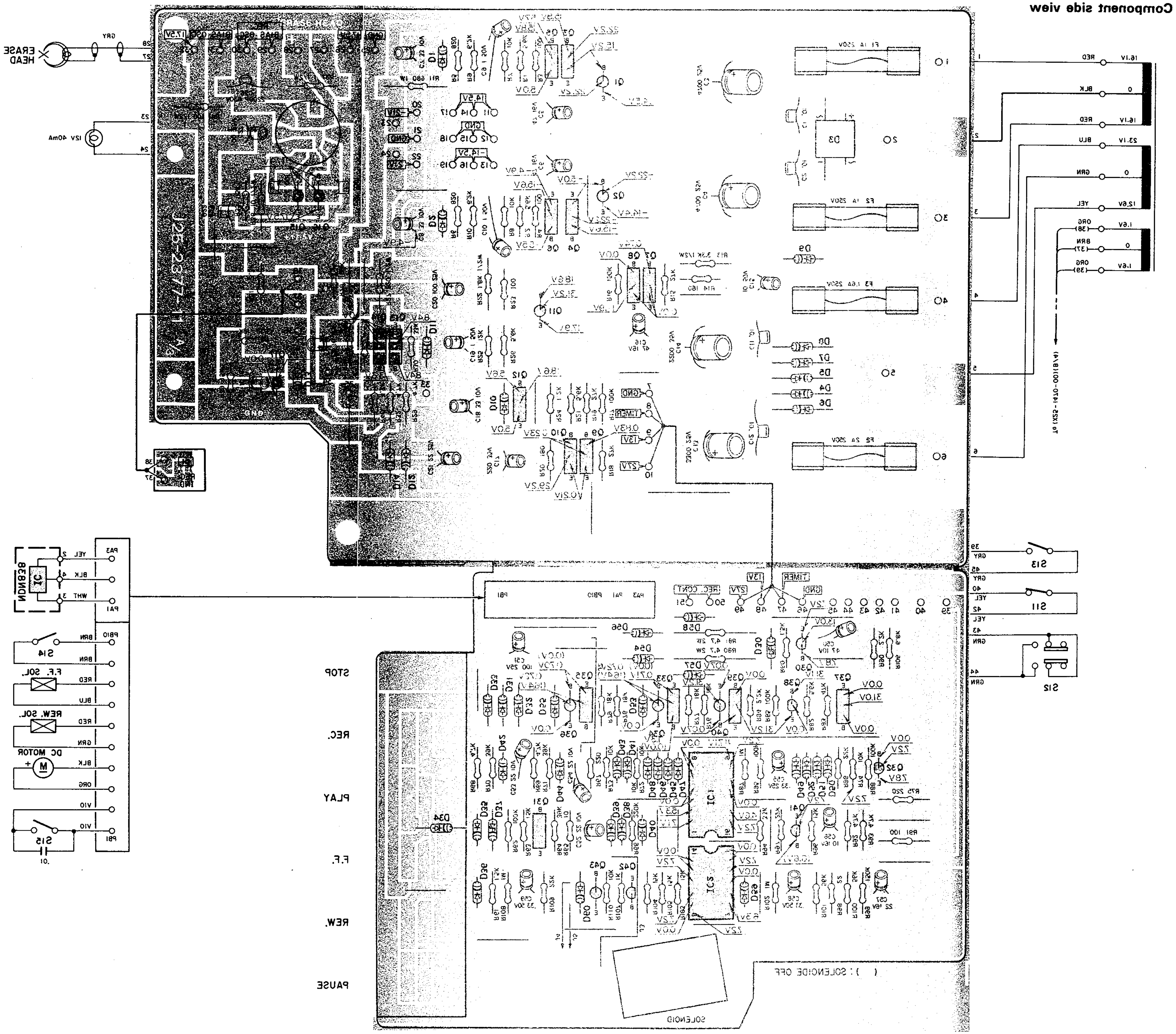
CONTROL (X25-1460-01,-02,-03)

Component side view

Q1,34,36,40,43	:	2SC2209(Q,R) or 2SD882(Q,P)
Q2	:	2SA963(Q,R) or 2SB772 (Q,P)
Q3,5,7~10,12,31,33,35,37,39	:	2SC2021FLN(R,S)
Q4,6,13,14	:	2SA786FLN(R,S)
Q15~17,30	:	2SC2060(Q,R)
Q18	:	2SC1419(C)
Q11	:	2SC1846(Q,R)
Q32,38,41,42	:	2SA733A(Q,R)
IC1	:	CD4050BE
IC2	:	CD4011BE
D1,2	:	RD5.1E(B)
D3	:	ESAB03-02A
D4~8	:	GP-15BL
D9,12~14,34~36,38~52,59	:	IS2076
D11	:	RD4.3E(B)
D30,37	:	RD8.2E(B)
D10	:	RD5.1E(B2)
D31~33,53~58,60	:	IN4003
S11	:	EJECT SW. (OFF)
S12	:	MEMORY STOP SW. (OFF)
S13	:	COUNTER SW. (OFF)
S14	:	DOOR SW. (OFF)
S15	:	REC. SW. (OFF)

S11 ~ S15 belong to Mecanism ass'y.



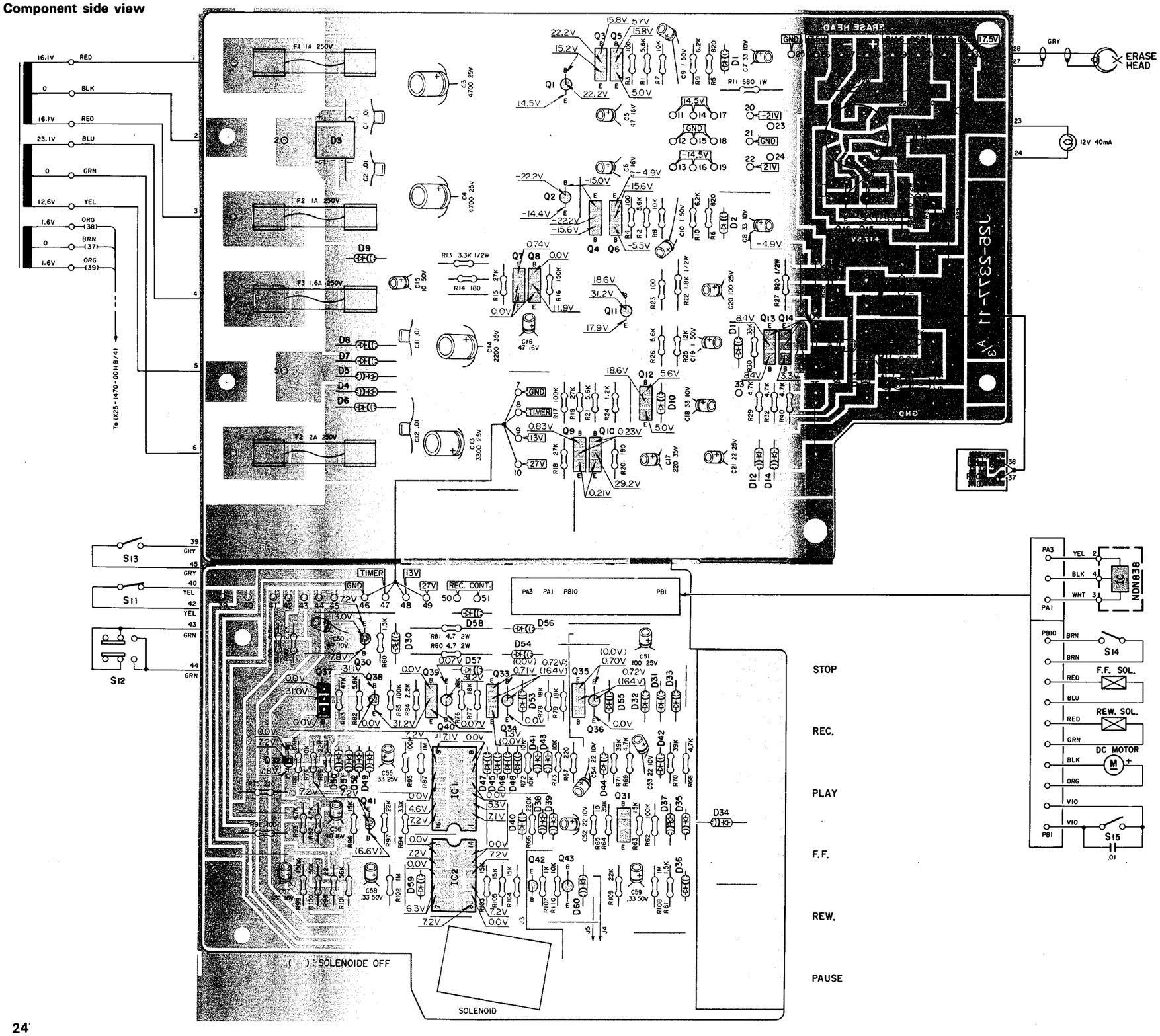


KX-2060 KX-2060

PC BOARD

CONTROL (X25-1460-01,-02,-03)

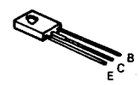
Component side view



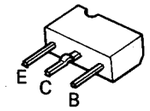
Q1,34,36,40,43	:	2SC2209(Q,R) or 2SD882(Q,P)
Q2	:	2SA963(Q,R) or 2SB772(Q,P)
Q3,5,7~10,12,31,33,35,37,39	:	2SC2021FLN(R,S)
Q4,6,13,14	:	2SA786FLN(R,S)
Q15~17,30	:	2SC2060(Q,R)
Q18	:	2SC1419(C)
Q11	:	2SC1846(Q,R)
Q32,38,41,42	:	2SA733A(Q,R)
IC1	:	CD4050BE
IC2	:	CD4011BE
D1,2	:	RD5.1E(B)
D3	:	ESAB03-02A
D4~8	:	GP-15BL
D9,12~14,34~36,38~52,59	:	IS2076
D11	:	RD4.3E(B)
D30,37	:	RD8.2E(B)
D10	:	RD5.1E(B2)
D31~33,53~58,60	:	IN4003
S11	:	EJECT SW. (OFF)
S12	:	MEMORY STOP SW. (OFF)
S13	:	COUNTER SW. (OFF)
S14	:	DOOR SW. (OFF)
S15	:	REC. SW. (OFF)

S11 ~ S15 belong to Mecanism ass'y.

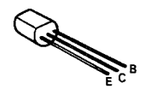
2SA963
2SC1846
2SC2209
2SD882



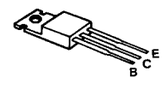
2SA786
2SC2021



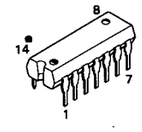
2SA733A
2SC2060



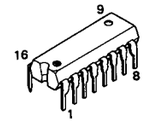
2SB772
2SC1419



CD4011



CD4050



PC BOARD

KX-2060 KX-2060

DISPLAY (XZ5-1470-01,-02,-03,-04)
Component side view

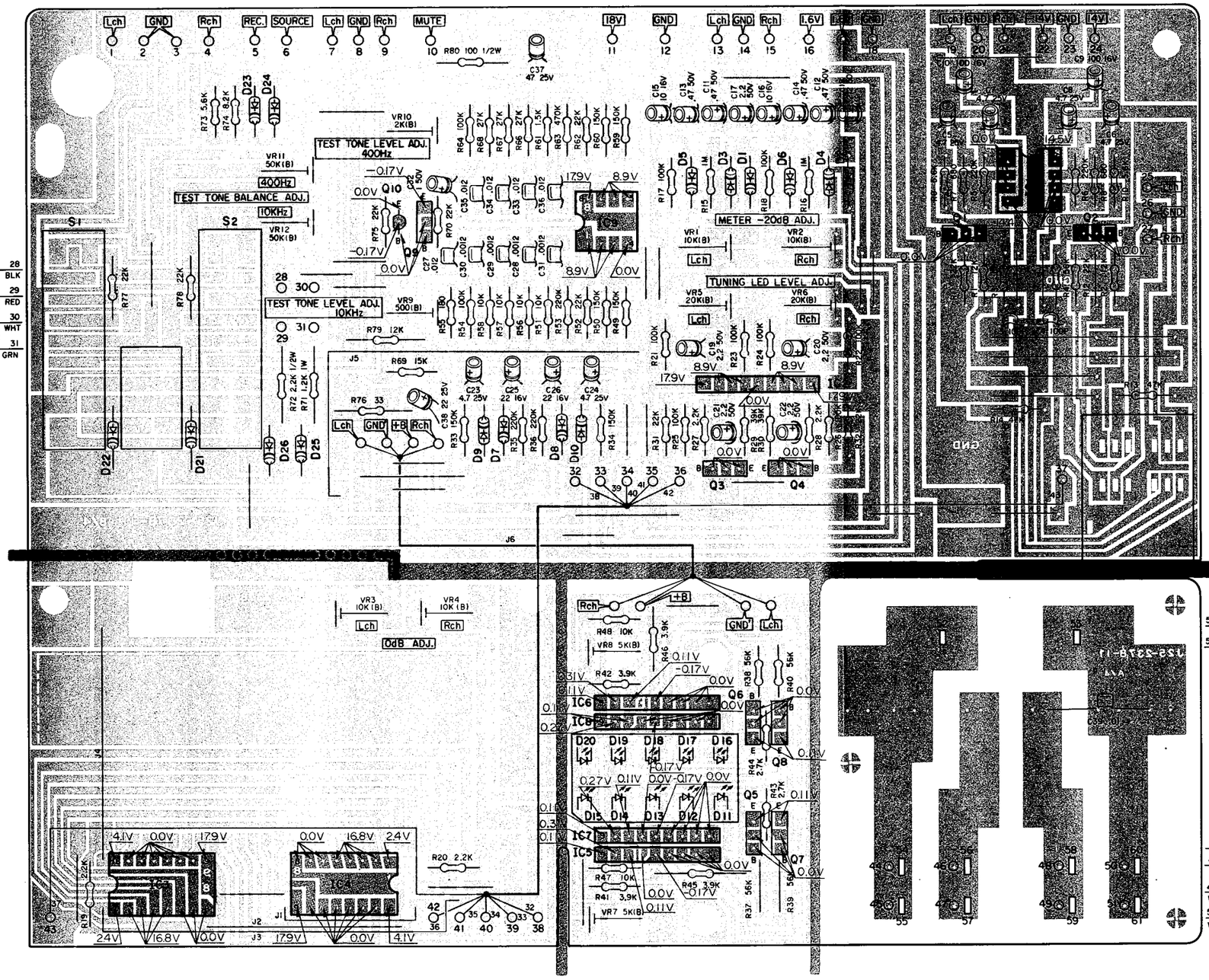
Q1~4,9	:	2SC2021FLN(R,S)
Q5~8	:	2SA786FLN(R,S)
Q10	:	2SC2060(Q,R)
IC1	:	TL-082CP
IC2	:	AN6551
IC3,4	:	BA658
IC5~8	:	AN6875
IC9	:	μPC4558C
D1~4,7~10	:	1N60P5P
D5,6,21,23,24	:	1S2076
D11,12,14~17,19,20	:	LN324GP LED
D13,18	:	LN224RP ASS'Y
D22	:	1N4003
S1	:	400Hz TEST OSC. SW. (OFF)
S2	:	10KHz TEST OSC. SW. (OFF)

KX-2060 KX-2060

PC BOARD

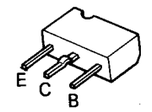
DISPLAY (X25-1470-01,-02,-03,-04)

Component side view

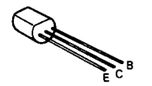


Q1~4,9	:	2SC2021FLN(R,S)
Q5~8	:	2SA786FLN(R,S)
Q10	:	2SC2060(Q,R)
IC1	:	TL-082CP
IC2	:	AN6551
IC3,4	:	BA658
IC5~8	:	AN6875
IC9	:	μPC4558C
D1~4,7~10	:	IN60PSP
D5,6,21,23,24	:	IS2076
D11,12,14~17,19,20	:	LN324GP ┐ LED
D13,18	:	LN224RP ┘ ASS'Y
D22	:	IN4003
S1	:	400Hz TEST OSC. SW. (OFF)
S2	:	10kHz TEST OSC. SW. (OFF)

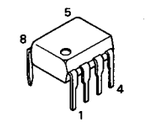
2SA786
2SC2021



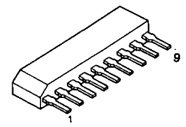
2SC2060



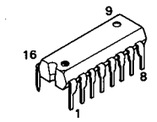
TL082
μPC4558C



AN6551
AN6875



BA658



PC BOARD

Component side view

Q1,2,7,8	:	2SA786FLN(Q,R)
Q3~6,19,20	:	2SK136(Q,R)
Q9~12,17,18	:	2SC2021FLN(R,S)
Q13,14	:	2SC945(Q,R)
Q15,16	:	2SA733A(Q,R)
IC1~4	:	LM1011N
IC5,6	:	AN6551
IC7	:	TL-082CP or TL-072CP
D1~4,7,8,11,12	:	IS2076
S1a~d	:	P.B. & REC. EQ 1. METAL 2. NORMAL 3. CrO_2
S2	:	BIAS SEL. 1. METAL 2. NORMAL 3. CrO_2
S3a~f	:	TAPE MONITOR 1. TAPE 2. SOURCE
S4a~c	:	DOLBY 1. DOLBY ON MPX. FILTER OFF 2. DOLBY ON MPX. FILTER ON 3. DOLBY OFF MPX. FILTER OFF

2SA786
2SC2021

2SA733A
2SC945

2SK136

LM1011N

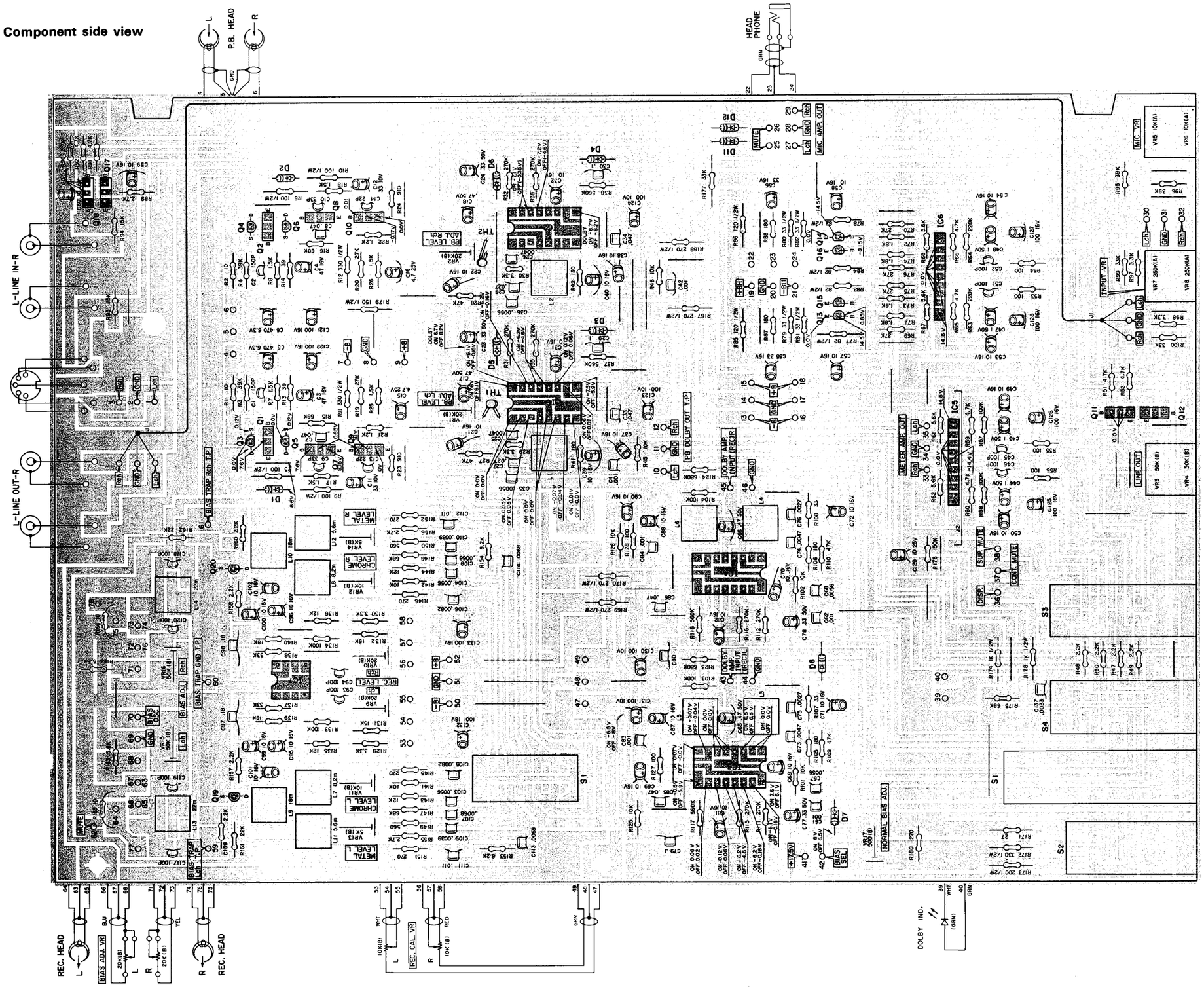
AN6551

TL082
TL072

KX-2060 KX-2060

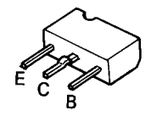
PC BOARD

Component side view

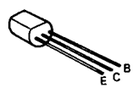


Q1,2,7,8	:	2SA786FLN(Q,R)
Q3~6,19,20	:	2SK136(Q,R)
Q9~12,17,18	:	2SC2021FLN(R,S)
Q13,14	:	2SC945(Q,R)
Q15,16	:	2SA733A(Q,R)
IC1~4	:	LM1011N
IC5,6	:	AN6551
IC7	:	TL-082CP or TL-072CP
D1~4,7,8,11,12	:	IS2076
S1a~d	:	P.B. & REC. EQ 1. METAL 2. NORMAL 3. CrO_2
S2	:	BIAS SEL. 1. METAL 2. NORMAL 3. CrO_2
S3a~f	:	TAPE MONITOR 1. TAPE 2. SOURCE
S4a~c	:	DOLBY 1. DOLBY ON MPX. FILTER OFF 2. DOLBY ON MPX. FILTER ON 3. DOLBY OFF MPX. FILTER OFF

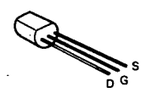
2SA786
2SC2021



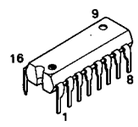
2SA733A
2SC945



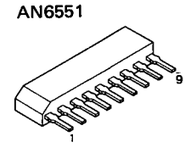
2SK136



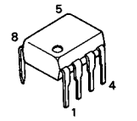
LM1011N



AN6551



TL082
TL072



PARTS LIST

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Remarks 備考
S1C	S90-0306-05	FLEX.SW(SLIDE) <111>	
S1B	S90-0307-05	FLEX.SW(WIRE) <112>	*
S2	S33-2308-05	LEVER SWITCH <113>	
S3	S33-6307-05	LEVER SWITCH <114>	
S4	S33-4306-05	LEVER SWITCH <115>	*
D1 -4	V11-0271-05	1S2076	
D7 ,8	V11-0271-05	1S2076	
D11 ,12	V11-0271-05	1S2076	
IC1 -4	V30-0277-20	LM1011AN	*
IC5 ,6	V30-0353-10	AN6551	
IC7	V30-0350-10	TL-082CP	
Q1 ,2	V01-0786-20	2SA786FLN(R,S)	
Q3 -6	V09-0127-20	2SK105	
Q7 ,8	V01-0786-20	2SA786FLN(R,S)	
Q9 -12	V03-2021-10	2SC2021FLN(R,S)	
Q13 ,14	V03-0945-40	2SC945(Q,R)	
Q15 ,16	V01-0733-30	2SA733A(R,Q)	
Q17 ,18	V03-2021-10	2SC2021FLN(R,S)	
Q19 ,20	V09-0127-20	2SK105	
TH1 ,2	V22-0005-05	SDT-1000	*

KX-2060

A product of

TRIO-KENWOOD CORPORATION

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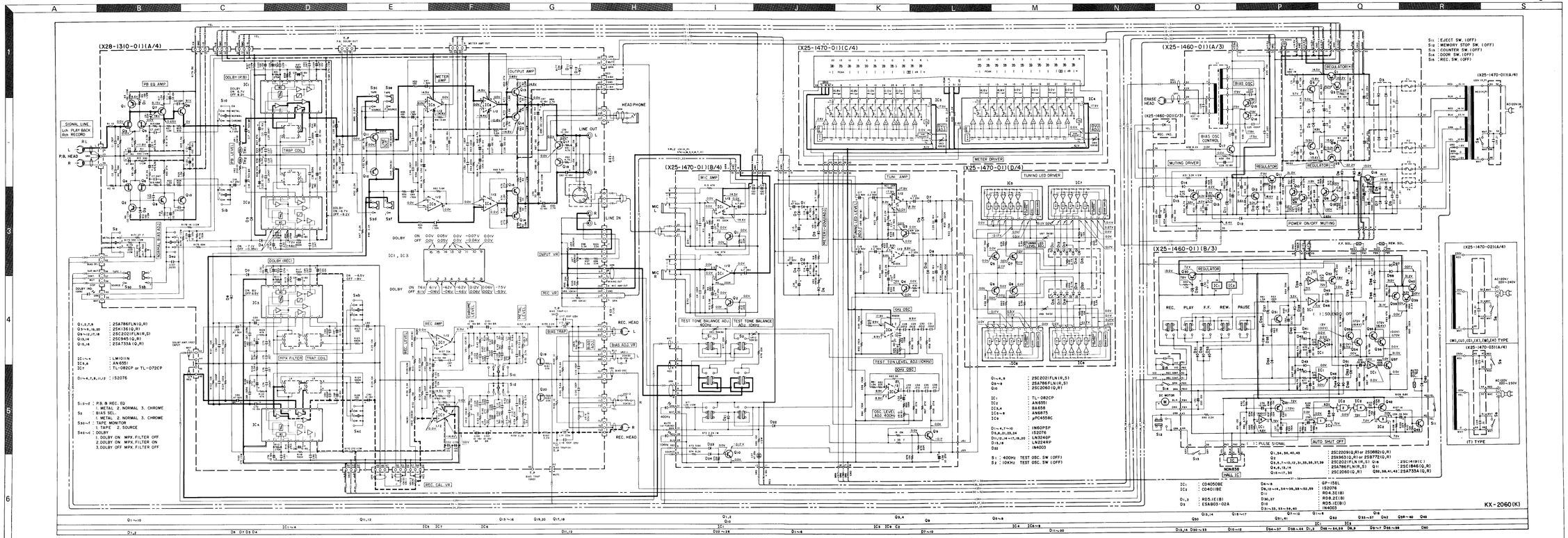

SPECIFICATIONS

Type	Front Loading Stereo Cassette Deck with Dolby NR System
Track System	4-Track 2-Channel Stereo/Mono Recording/Playback
Recording System	AC Bias System (Bias Frequency 105 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 × 1 Erase Head × 1 Electronically Controlled DC Motor
Motor	Approx. 80 seconds with C-60 tape
Fast Winding Time	Normal Tape: 20 Hz to 18 000 Hz (25 Hz to 17 500 Hz +3 dB)
Frequency Response	CrO_2 Tape: 20 Hz to 19 000 Hz (25 Hz to 18 000 Hz +3 dB) Metal Tape: 20 Hz to 19 000 Hz (25 Hz to 18 000 Hz +3 dB)
Signal to Noise Ratio:	Dolby NR ON (Over 5 kHz): 66 dB (Normal Tape) 69 dB (CrO_2 Tape), 70 dB (Metal Tape)
Harmonic Distortion	Dolby NR OFF: 56 dB (Normal Tape), 59 dB (CrO_2 Tape), 60 dB (Metal Tape)
Wow and Flutter	Less than 1.0% (at 1 kHz, DIN) with Metal Tape)
Input Sensitivity/Impedance	0.04% (WRMS)
	Line × 2: 77.5 mV/50k ohms
	DIN × 1: 0.1 mV/k ohms Europe, U.K. and Scandinavia models 1.4 mV/10k ohms Models for Other Countries
Output Level/Load Impedance	Microphones × 2: 0.19 mV/ 56k ohms
	Line × 2: 775 mV (0VU)/100k ohms
	DIN × 1: 775 mV (0VU)/100k ohms
	Headphones × 1: 48.9 mV/8 ohms
Built-in Features	Three Ferrite Heads
	Dolby Noise Reduction System with LED Indicator
	Three Position Bias Selector (Normal-Chrome-Metal)
	Three Position Equalization Selector (Normal-Chrome-Metal)
	Dolby Recording Calibrator and Fine Bias Adjustment Controls with Oscillator
	LED Test Tone Indicators (400 Hz/10 kHz)
	Full Auto Shut-Off Mechanism in all Modes
	Memory Index
	LINE/MIC Mixing
	LED Recording Indicator
	Tape Monitor
	MPX Filter Switch (at Dolby NR ON Position)
	Tuner Stand By Mechanism
	Three Digit Tape Counter
	Fluorescent Peak Meters and Tuning Meters
	Two Microphone Jacks, Headphone Jack
	DIN Rec/Playback Connector
Power Requirements	AC 120V, 60 Hz, USA and Canada Models
	AC 120V/220-240V (Switchable) 50/60 Hz Other Countries
Power Consumption	40.0 watts
Dimensions	W 440 mm (17-5/16") H 153 mm (6") D 377 mm (14-7/8")
Weight	9.3 kg (20.5 lbs)
Supplied Accessories	Stereo Connection Cables 2 Head Cleaning Kit 1
Reference Tapes	Normal: MAXELL XLI Chrome: TDK SA, Metal: TDK MA-R

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

Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.

2SA733A
2SC945
2SC2060

2SA786
2SC2021

2SA963
2SC1846
2SC2209
2SD882

2SB772
2SC1419

2SK136

BA658
CD4050
LM1011N

CD4011

TL082
TL072
μPC4558C

AN6551
AN6875

All DC voltage values except those of bias circuit are measured with a DC voltmeter (25 kΩ/V) with a cassette loaded in the playback mode.
DC voltages of bias circuit are measured in the recording mode.