CF-610/620

General Export Model
GEP Model

CF-610

CF-620

ISO
Set using ISO screws

SPECIFICATIONS

General

Power Requirements:	AC 100, 110, 120, 127, 220 & 240V with voltage selector
Semiconductors:	43-transistors, 29-diodes and 1-FET
Speaker:	Two lid-speakers, 6½" (16 cm) dynamic Impedance: 8Ω
Maximum Output:	6W each of L and R channels
Dimensions:	16½(W) x 12 7/16(H) x 11¾"(D) (420 x 316 x 298mm) with lid-speakers
Weight:	24 lb 3 oz (11 kg)

Radio Section

Circuit System:	Superheterodyne
Frequency Coverage:	FM 87.5~108 MHz (3.43~2.78 m) AM 530~1,605 kHz (566~187 m)
Intermediate Frequency:	FM 10.7 MHz AM 455 kHz
Antenna System:	FM built-in telescopic antenna AM built-in ferrite bar antenna
Sensitivity:	FM 2.4μV (7.5 dB) at S/N 30 dB AM 250μV/m (48 dB/m) at S/N 20 dB with built-in ferrite bar antenna 20μV (26 dB) at S/N 20 dB with EXT ANTENNA terminal
Selectivity:	FM 40 dB at 98 MHz ±400 kHz AM 21 dB at 1,400 kHz ±10 kHz
Signal-to-Noise Ratio:	FM 65 dB at 98 MHz with 61 dB input AM 40 dB at 1,000 kHz with 74 dB/m input
Current Drain:	FM 87 mA AM 45 mA
FM Stereo Separation:	35 dB at 400 Hz

Tape Recorder Section

Track System:	4-track cassette stereo
Tape Speed:	1 7/8 ips (4.8 cm/s)
Tape:	Tape cassette
Heads:	Rec./PB head, PP128-3602, 750Ω/1 kHz Erase head, EF135-36, 640Ω/80 kHz
Motor:	D-009G
Recording Bias Frequency:	Approx. 85 kHz
Frequency Response:	30~12,000 Hz (NORMAL) 30~13,000 Hz (SPECIAL)
Signal-to-Noise Ratio:	Greater than 46 dB
Flutter and Wow:	Less than 0.22% (WRMS)
Inputs:	Two MIC inputs Impedance; low Maximum sensitivity; 0.2 mV (-72 dB) Two AUX INputs Impedance; 100 kΩ Maximum sensitivity; 60 mV (-22 dB) Two PHONO inputs Impedance; 40 kΩ Maximum sensitivity; 1.1 mV (-57 dB)
Outputs:	Two LINE OUTputs Load impedance; greater than 10 kΩ Output level; 0.775 V (0 dB) with 10 kΩ load Two SPEAKER outputs Load impedance; 8Ω Output level; 2.8 V (11.2 dB) HEADPHONE output Load impedance; 8Ω Output level; 30 mV (-28 dB)

SONY®

SERVICE MANUAL

TABLE OF CONTENTS

** The contents described are common to CF-610 and CF-620, and are also common to General Export and GEP Models unless otherwise noted.*

** In West Germany the fm frequency coverage is prescribed within the range between 87.5 MHz and 108 MHz. Check or make the frequency coverage adjustment for the Model. (See page 15.)*

SECTION 1
OUTLINE

1-1. GENERAL DESCRIPTION

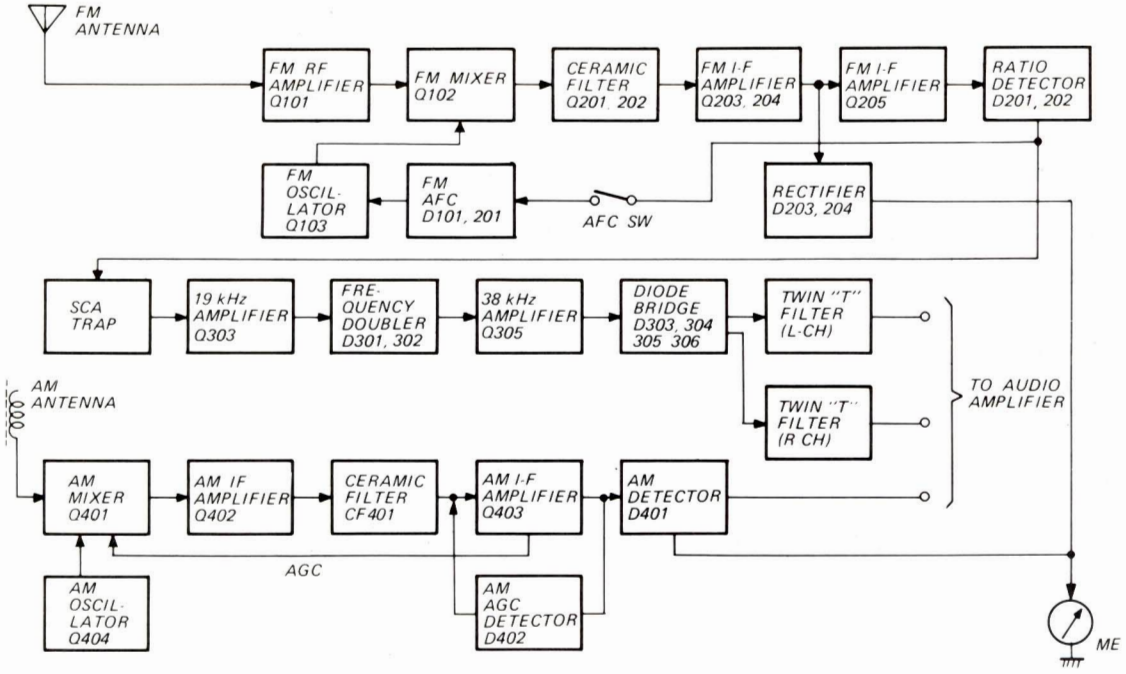
The SONY Model CF-610 or CF-620 is the combination model of radio (FM stereo/FM mono/AM) and cassette tape recorder. The model CF-610 is designed for a portable type with the carrying handle-equipped cabinet which is covered with the black leatherette.

The model CF-620 is designed for a family type with the handsome wood-grain cabinet. The models have the following outstanding features.

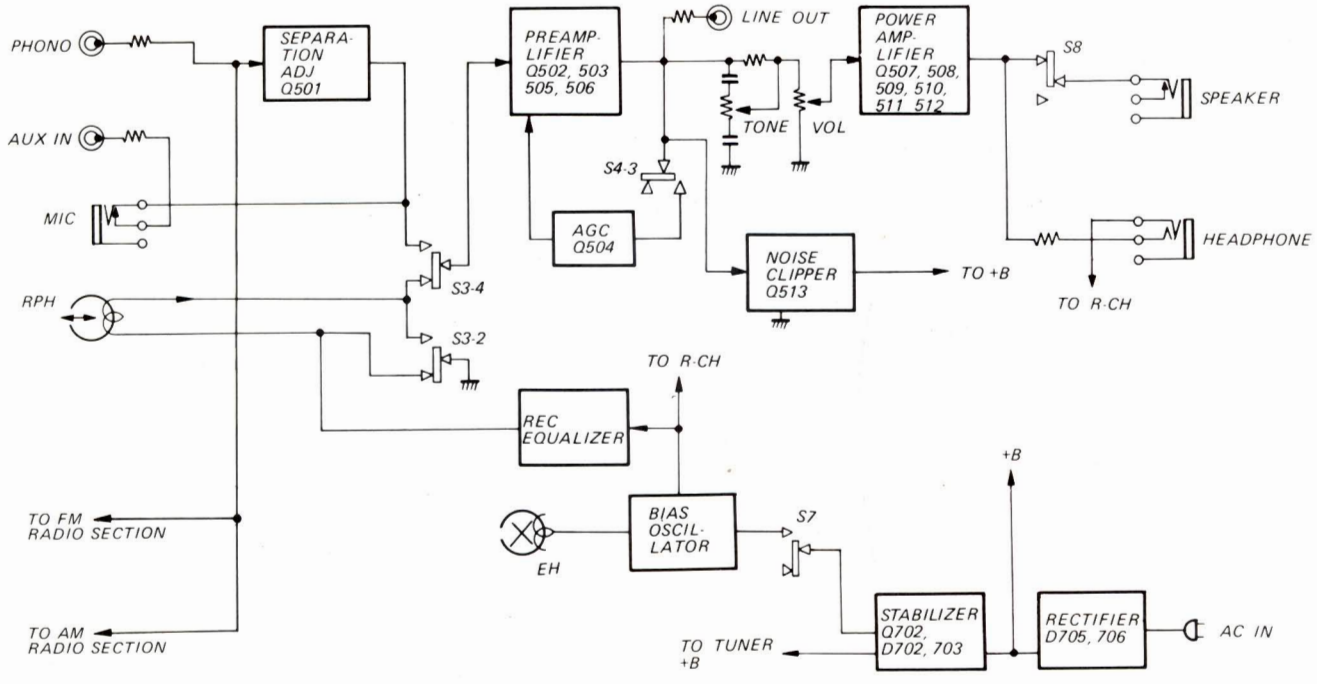
a. Variable MONITOR volume control
b. Automatic gain control circuit for recording
c. Slide type VOLUME and TONE controls
d. A special tape such as the SONY SLH tape or a chromium dioxide tape can be used with the TAPE SELECT switch.
e. TAPE PILOT shows the tape running in the each mode of the record, playback, fast-forward and rewind.
f. Easy operation with the piano-key type function selector
g. Miss-erase prevention mechanism
h. Three digit tape index counter
i. High sensitivity with the FET (field effect transistor) in the FM front end circuit
j. Automatic FM Stereo-Mono switching with the INPUT SELECTOR

1-2. BLOCK DIAGRAM

1-2-1. Radio Section



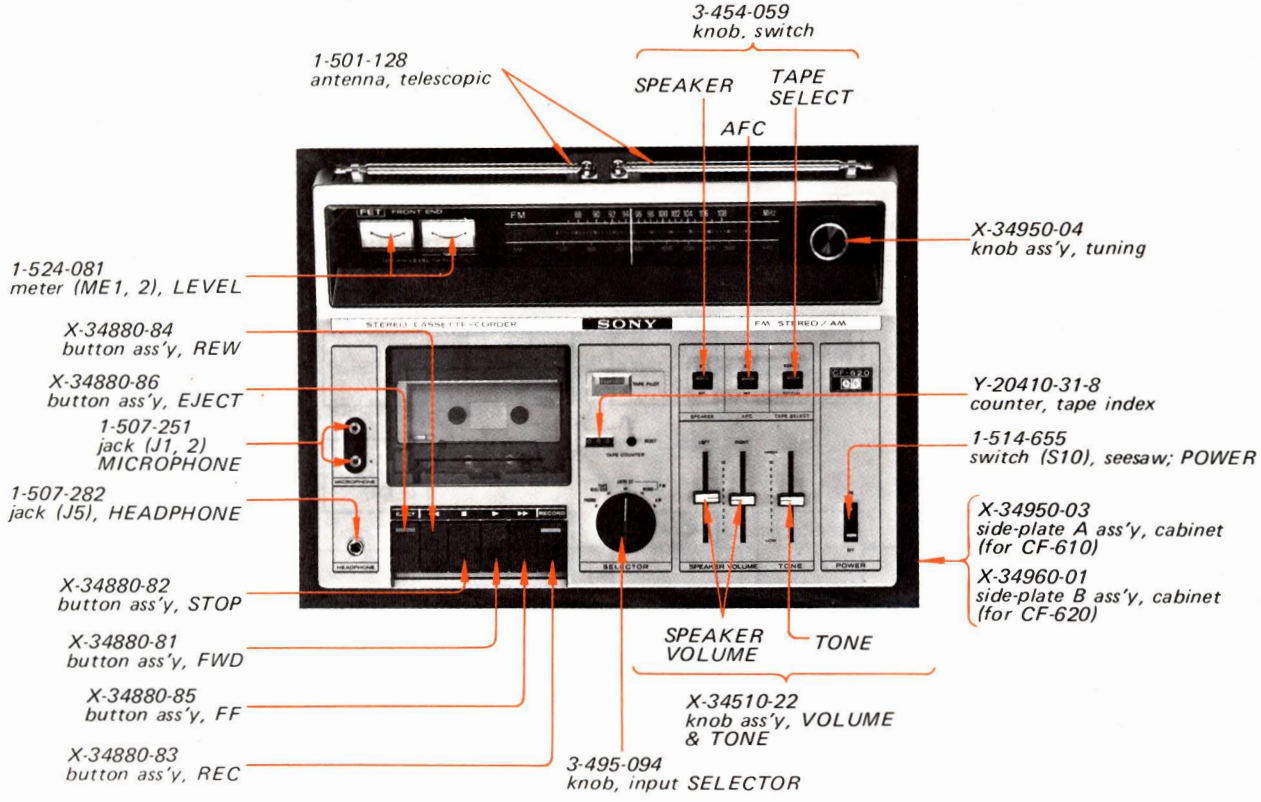
1-2-2. Audio Amp. & Tape Recorder Section



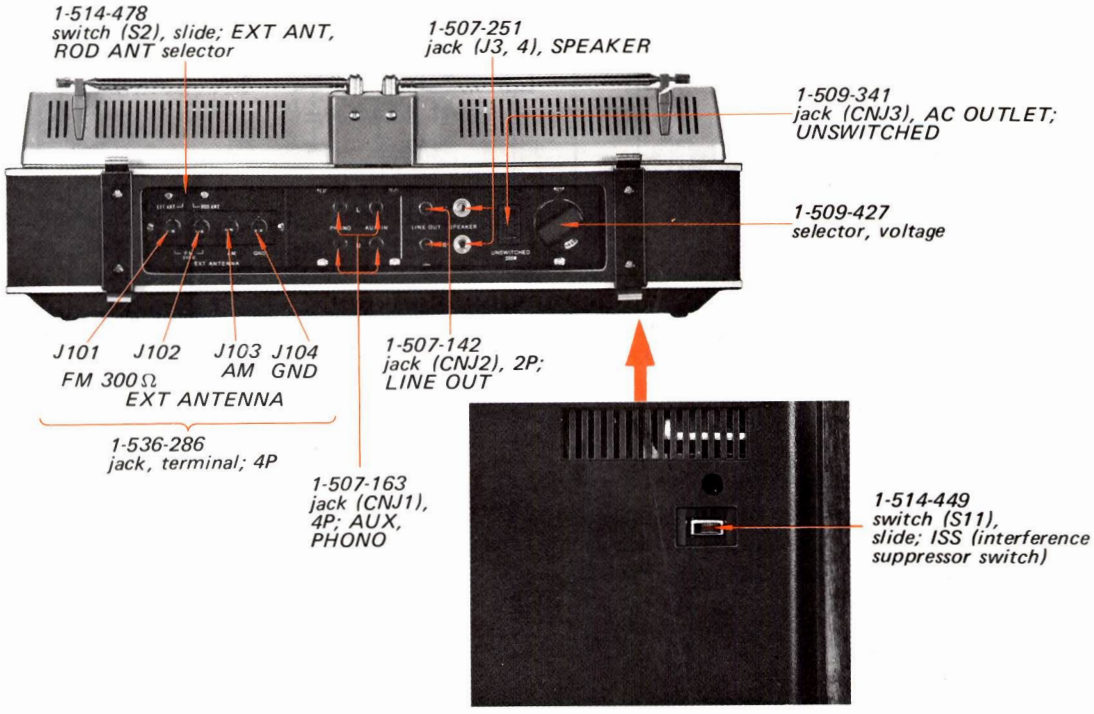
S3, 4 REC/PB SWITCH (IN PB MODE)
S7 BIAS SWITCH (IN OFF POSITION)
S8 SPEAKER SWITCH (IN ON POSITION)

1-3. VIEWS

1-3-1. Cabinet Top View

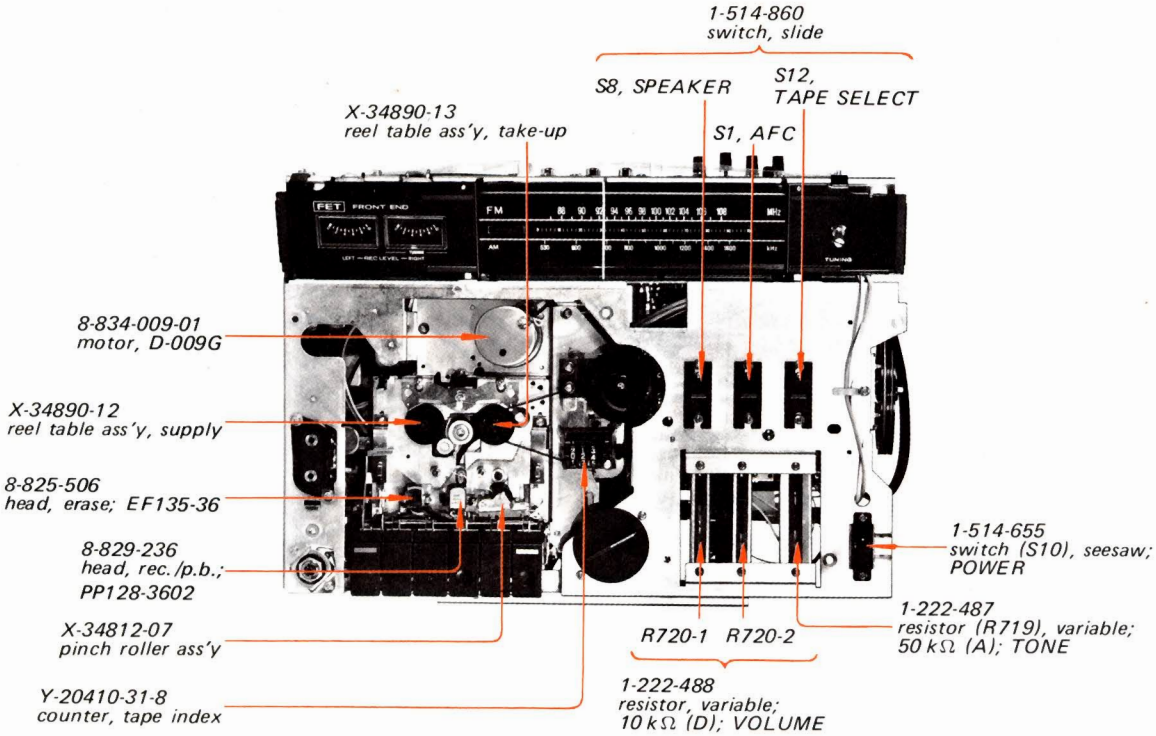


1-3-2. Cabinet Back Veiw

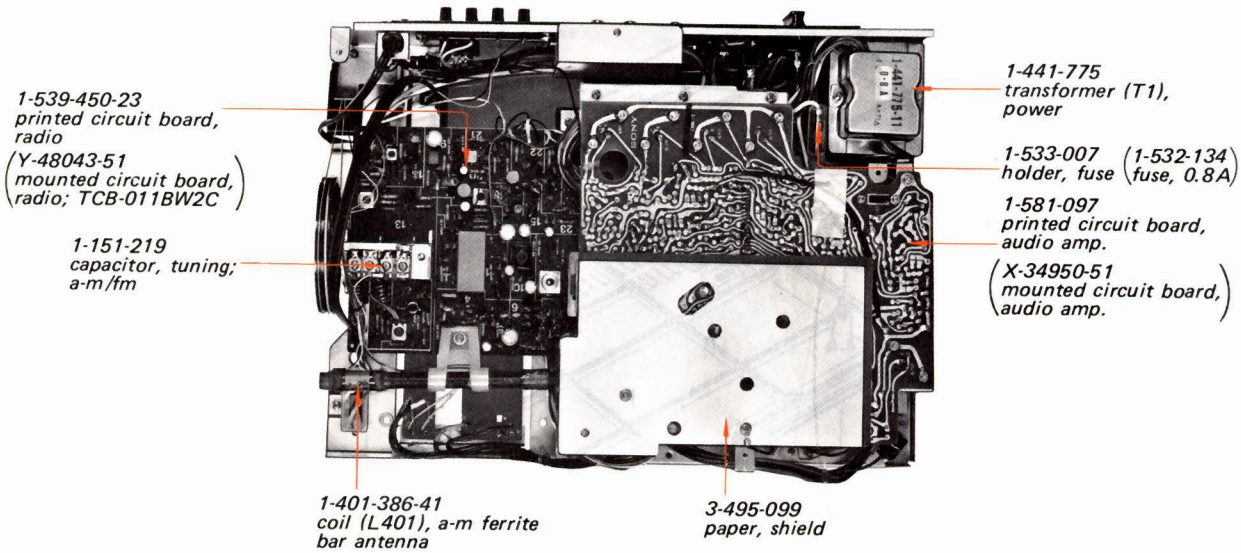


– Bottom View –

1-3-3. Chassis Top View



1-3-4. Chassis Bottom View



SECTION 2
DISASSEMBLY

2-1. CABINET REMOVAL

1. The lower cabinet ass'y can be removed by removing the four screws marked ●.
2. The cabinet side plate ass'y can be removed by removing the two screws marked △.
3. The upper cabinet ass'y can be removed by removing the parts marked ○.

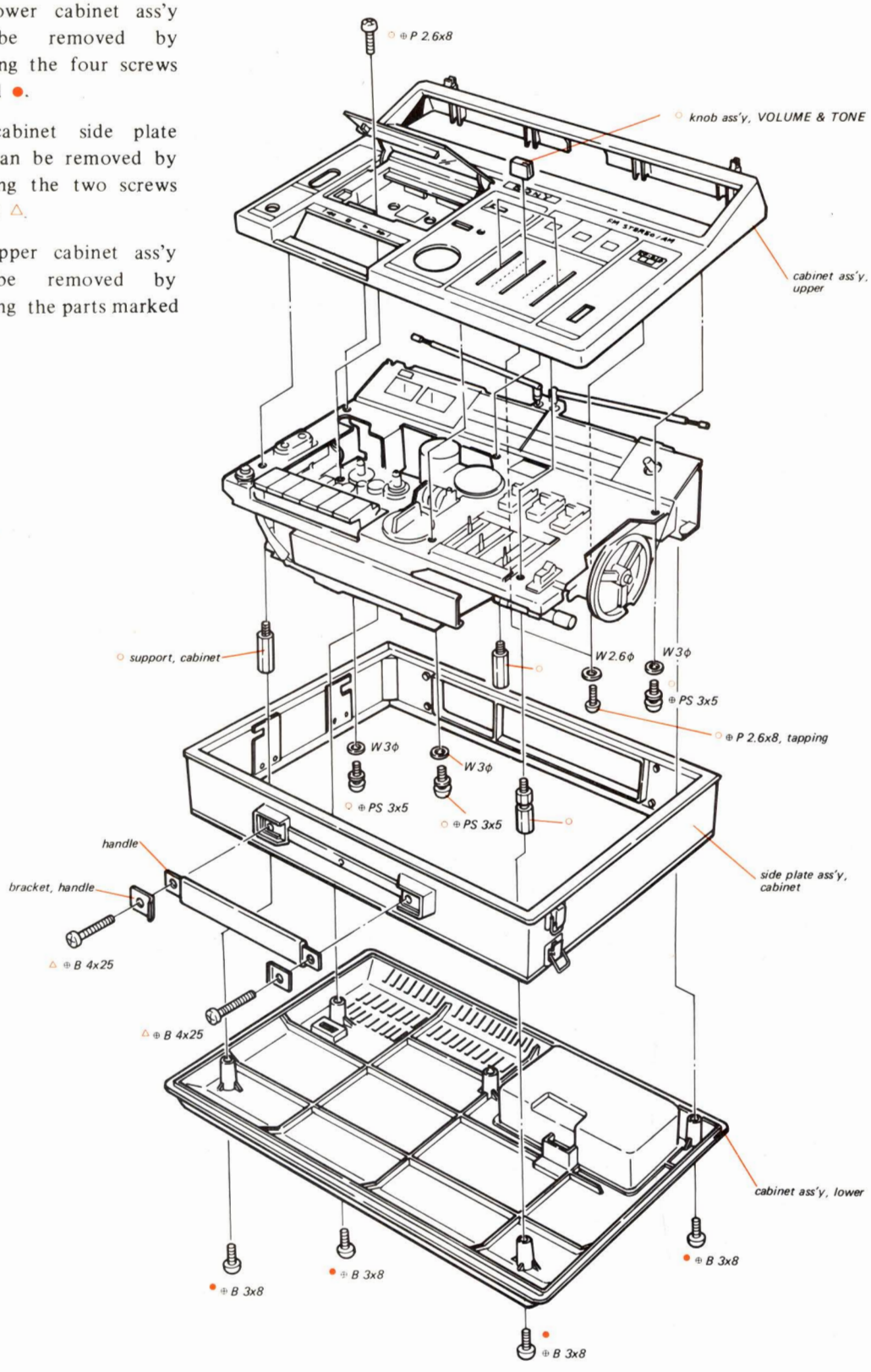


Fig. 2-1-1. Cabinet removal

2-2. AUDIO AMP CIRCUIT BOARD REMOVAL

Remove the five screws shown in Fig. 2-2-1.

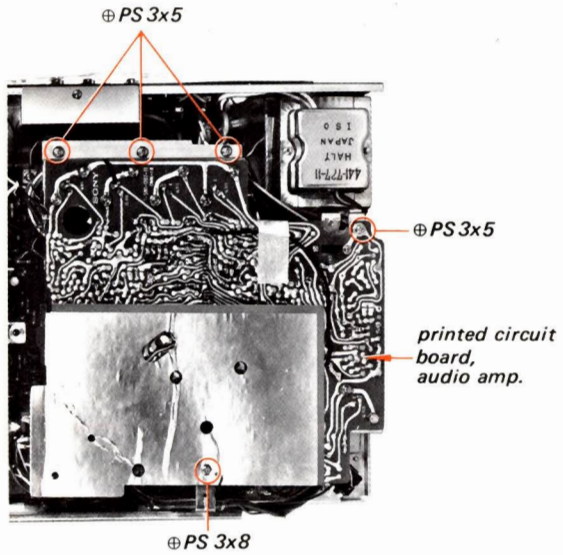


Fig. 2-2-1. Audio amp. circuit board removal

2-3. RADIO CIRCUIT BOARD REMOVAL

1. Fix the dial string at the hatched portions in Fig. 2-3-1 with tape.
2. Loosen the two screws marked ● in Fig. 2-3-1 and remove the dial drum.
3. Remove the two screws marked △ in Fig. 2-3-1.

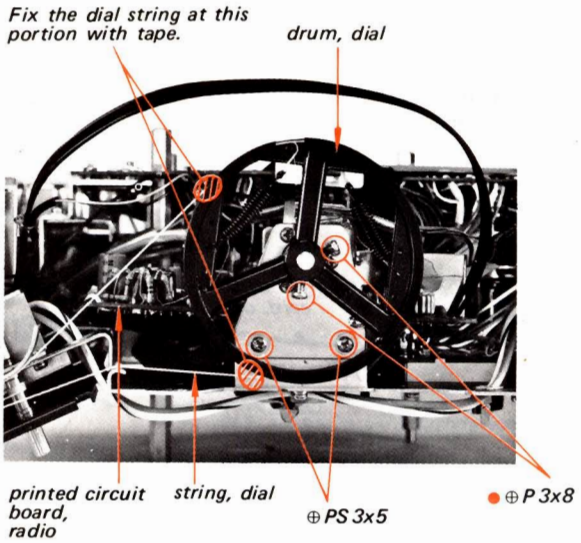


Fig. 2-3-1. Radio circuit board removal

4. When reassembling the dial drum, assemble it as shown in Fig. 2-3-2.

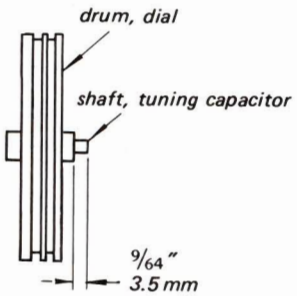


Fig. 2-3-2. Dial drum reassembling

2-4. DIAL CORD STRINGING

2-4-1. Dial Cord Stringing

1. Connect the dial cord to the tension springs in the numerical order shown.

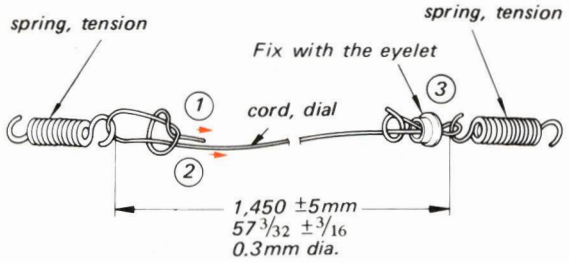


Fig. 2-4-1-1. Tension spring connection

2. Turn the tuning capacitor fully counterclockwise. (C max.)
3. String the dial cord in the numerical order shown.

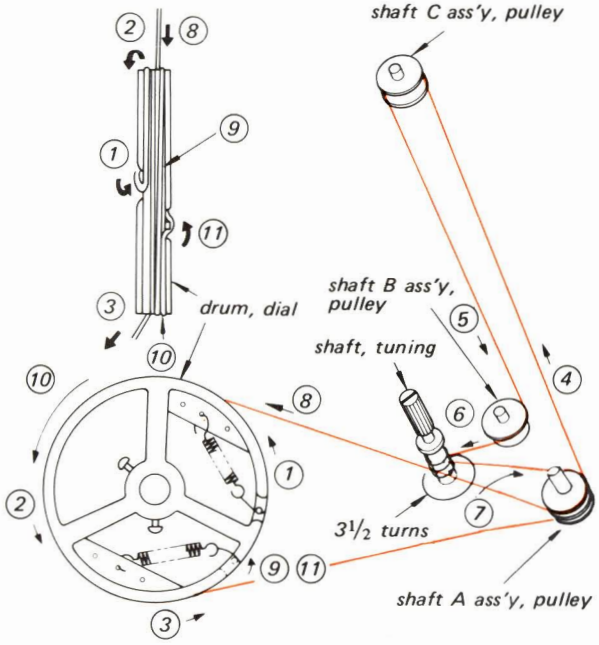


Fig. 2-4-1-2. Dial cord stringing

2-4-2. Pointer Guide Stringing

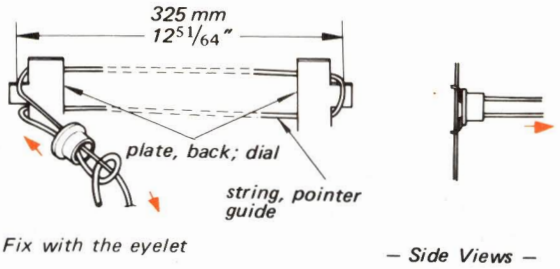


Fig. 2-4-2-1. Pointer guide stringing

2-4-3. Dial Pointer Attachment

1. Turn the tuning shaft fully counterclockwise.
2. Attach the dial pointer to the dial cord.
3. Adjust the dial pointer position so that it indicates the figure "0" on the dial scale.

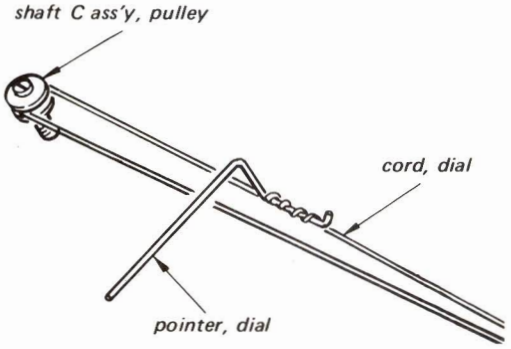


Fig. 2-4-3-1. Dial pointer attachment

SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENT

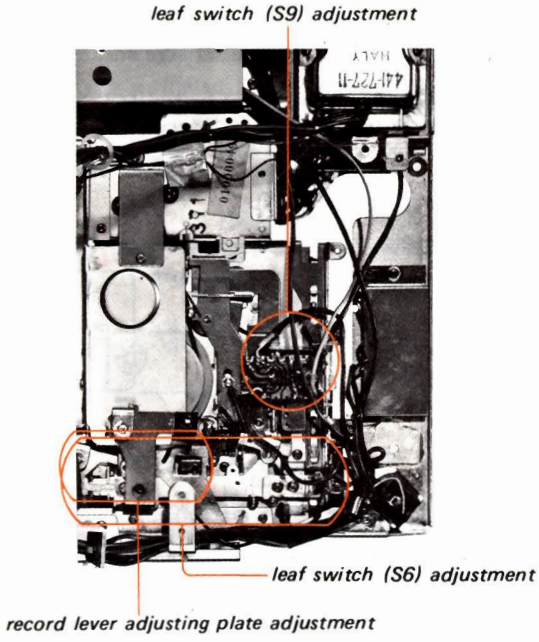
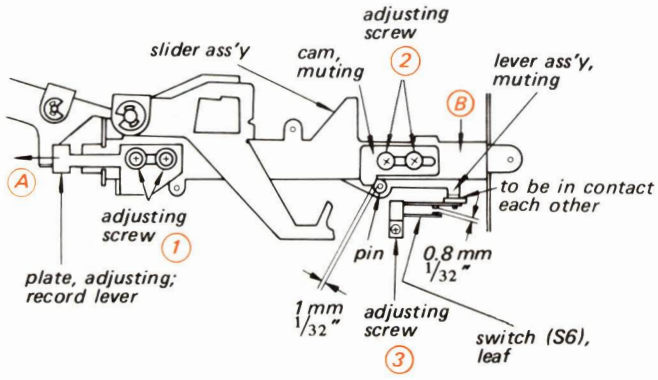


Fig. 3-1-1. Adjusting parts location

Leaf Switch (S6) Adjustment

– in STOP mode –

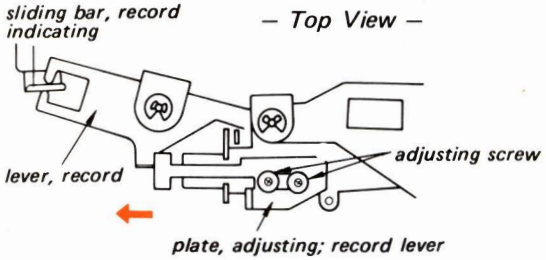
1. Loosen the adjusting screws ① and slide the record lever adjusting plate fully in the direction shown by the arrow Ⓐ. Fix it with the screws.
2. Loosen the adjusting screws ② and adjust the muting cam position so that the clearance between the muting cam and pin is 1/32" (1 mm).
3. Push the slider ass'y fully in the direction shown by the arrow Ⓑ, loosen the adjusting screw ③ and adjust the position of the leaf switch (S6) as shown.
4. Apply lock paint to all the adjusting screws.



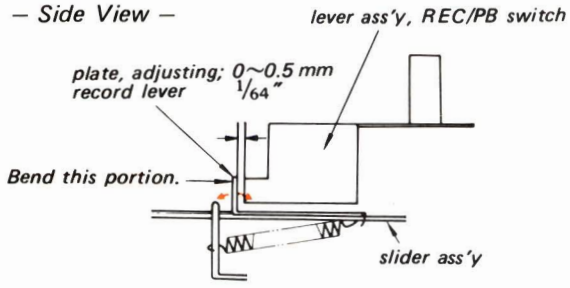
Record Lever Adjusting Plate Adjustment

– in STOP mode –

1. Loosen the adjusting screws.
2. Slide the record lever adjusting palte fully in the direction shown by the arrow and fix it with the screws.



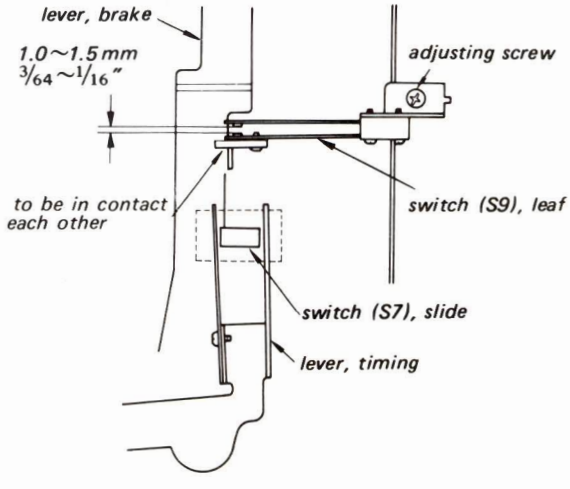
3. Adjust to obtain the clearance shown. When the clearance is too much, the REC/PB switch does not turn completely.



Leaf Switch (S9) Adjustment

– in STOP mode –

1. Loosen the adjusting screw and adjust the position of the leaf switch (S9) so that the clearance shown is obtained.
2. Make sure that when depressing the FWD button slowly, the slide switch (S7) turns after the leaf switch (S9) closes.
3. Apply lock paint to the adjusting screw.



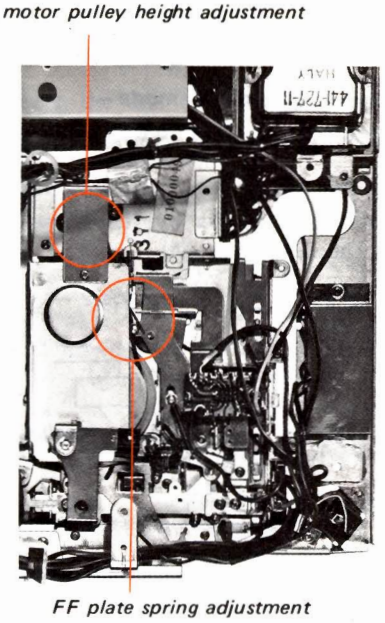
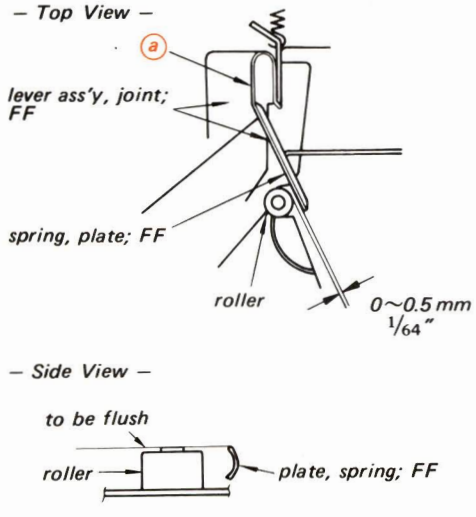


Fig. 3-1-2. Adjusting parts location

FF Plate Spring Adjustment

– in STOP mode –

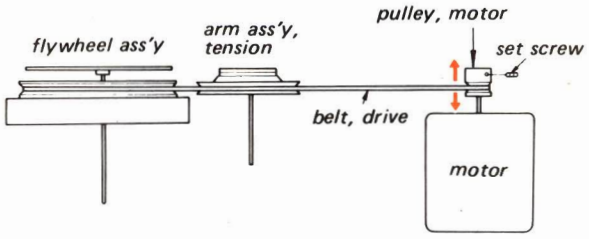
1. Adjust by bending the portion (a) to obtain the clearance shown.
2. Make sure that when depressing the FF button, the take-up reel begins to rotate before the FF button is locked. When the clearance is too much, the take-up reel begins to rotate after the FF button is locked.



Motor Pulley Height Adjustment

– in STOP mode –

1. Loosen the set screw and adjust the height of the motor pulley so that the belt is straight.
2. Apply lock paint to the set screw.
3. The drive belt should not be twisted and soiled.



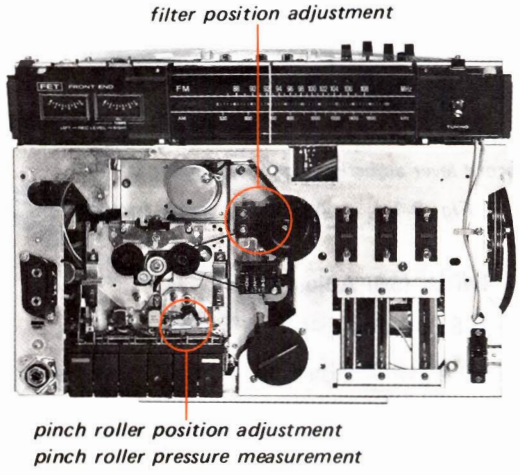
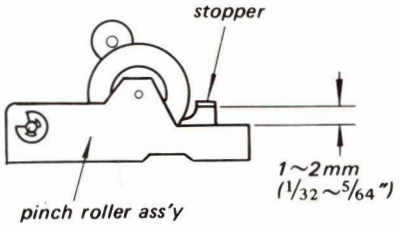


Fig. 3-1-3. Adjusting parts location

Pinch Roller Position Adjustment

– in FWD mode –

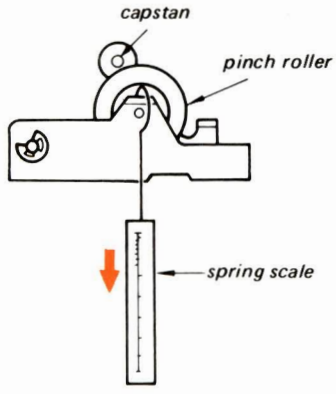
Adjust by bending the stopper to obtain the clearance shown.



Pinch Roller Pressure Measurement

– in FWD mode –

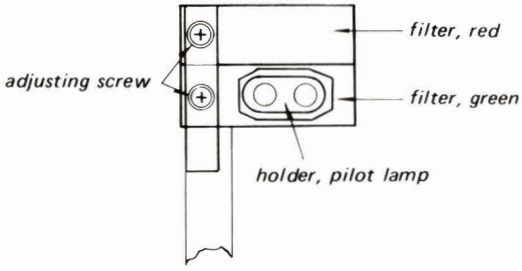
1. Pull the spring scale in the direction shown by the arrow.
2. Bring the pinch roller near the capstan and read the spring scale just when the pinch roller starts to rotate. The pressure should be between 10 and 13 oz (280 and 360 g).



Filter Position Adjustment

– in STOP mode –

1. Loosen the adjusting screws.
2. Adjust the position of green filter to cover the pilot lamp holder completely and tighten the screw.
3. Bring the red filter close together with the green filter and tighten the screw.
4. Depress the REC button with a cassette loaded and make sure that the red filter covers the pilot lamp holder completely.



Tape Speed Adjustment

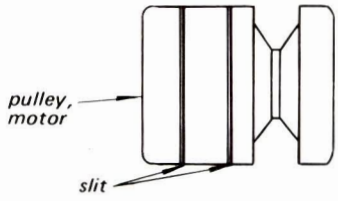
– in PLAYBACK mode –

1. Play back the SONY alignment tape SPC-4 and read the LINE OUT signal frequency with a frequency counter at the beginning and end of the tape.

STANDARD:	975 ~ 1,030 Hz
DIFFERENCE between the beginning and end:	less than 10 Hz

2. If the standard value is not obtained, replace the motor pulley.

	Part No.	Slit	Speed
Motor Pulley	3-489-117-01	no slit	slow
	3-489-117-11	one	medium
	3-489-117-21	two	fast



Check after the Adjustment

1. Button Operation

a. FWD, FF, REW and REC buttons can be locked, and STOP and EJECT buttons cannot be locked.

b. FWD mode to FF, REW or STOP mode is possible.
PLAYBACK mode to REC mode or ejection is impossible.

c. FF mode to FWD, REW or STOP mode or ejection is possible.
FF mode to REC mode is impossible.

d. REW mode to FWD, FF or STOP mode or ejection is possible.
REW mode to REC mode is impossible.

e. REC mode to FF, REW or STOP mode is possible.
REC mode to ejection is impossible.

f. Depressing EJECT button in FWD mode makes the cassette lid open.

2. Wow and Flutter Measurement

Play back the SONY alignment tape WS-48 and measure the wow (flutter) at the beginning and end of the tape.

The wow (flutter) should be less than 0.38% (RMS).

3. After the adjustment, clean the following parts with cloth moistened with denatured alcohol.

belts, idlers
tires, pinch roller
capstan

3-2. ELECTRICAL ADJUSTMENT

3-2-1. Radio Section

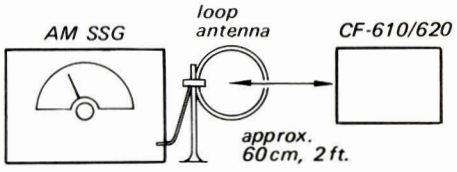
Preface:

a) Equipment to be prepared

AM Standard Signal Generator
FM Standard Signal Generator
Stereo Signal Generator
IF Sweep Generator, FM and AM
AF Signal Generator
Oscilloscope
VTVM
Attenuator (600Ω)
Loop Antenna

b) Equipment connection

INPUT
(AM)



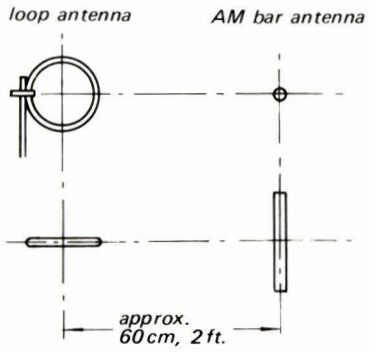


Fig. 3-2-1. A-m input connection

(FM)
Described in the each adjustment item.

OUTPUT

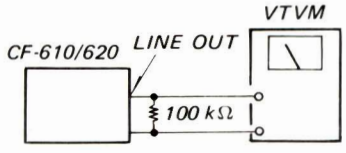


Fig. 3-2-2. Output connection

The output connections for the AM IF, FM IF and MPX section adjustments are described in the each adjustment procedure.

c) General

1. AFC switch (S1) should be set to OFF position unless otherwise specified.
2. When tuning a fm signal, three peaks will appear in output, take the center peak.

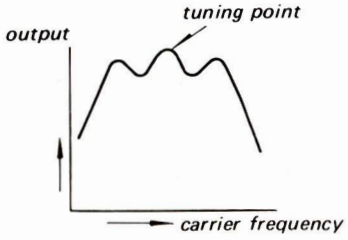


Fig. 3-2-3. Fm signal tuning

3. When a FM standard signal generator of which output impedance is unbalanced is used, use an impedance converter as shown.

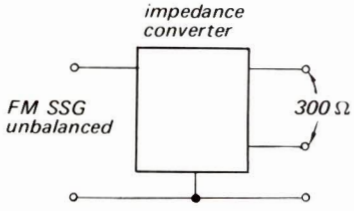


Fig. 3-2-4. Impedance converter connection

4. The adjustment should be made in listing order.
5. SSG Modulation
   AM: 30% modulation with 400 Hz
   FM: 100% (±75 kHz) modulation with 400 Hz

ADJUSTMENTS

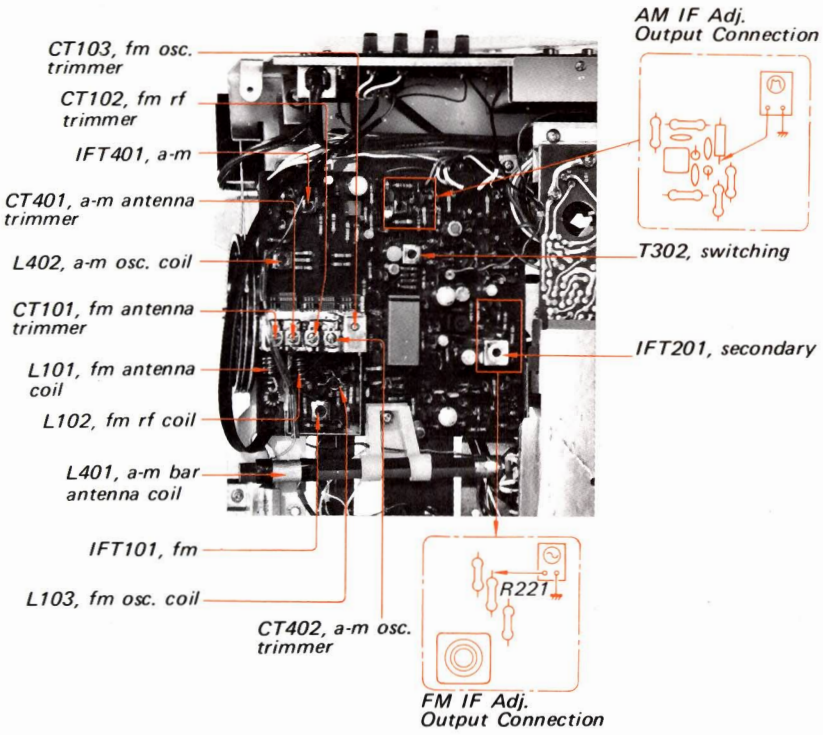


Fig. 3-2-5. Adjusting parts location

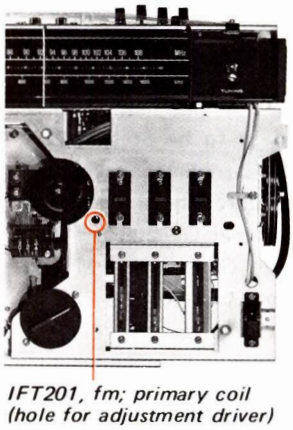


Fig. 3-2-6. Adjusting parts location

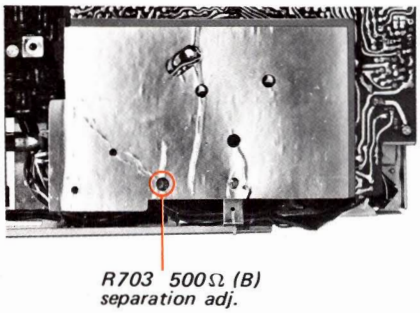
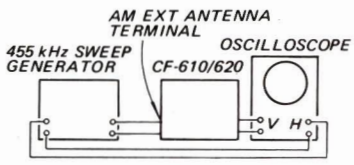
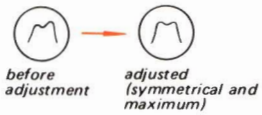
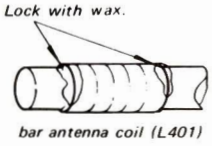
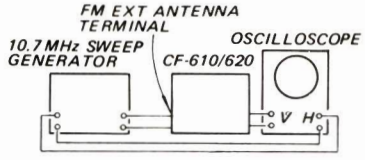
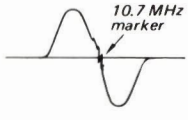
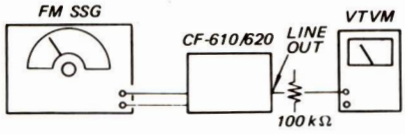
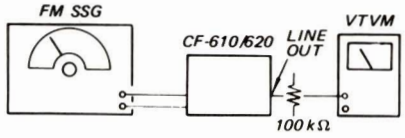
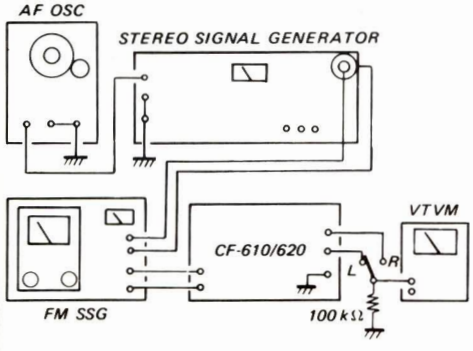


Fig. 3-2-7. Adjusting parts location

Item	Connection and Standard	Procedures
AM IF Alignment	 **STANDARD** 	**Preparation** SELECTOR: AM tuning knob: fully clockwise (f max.) i-f sweep generator: center frequency, 455 kHz sweep width, 25 kHz Adjust IFT401 to obtain the figure on the oscilloscope shown left. (See Fig. 3-2-5.)
AM Frequency Coverage Adjustment	**STANDARD** 520 kHz ~ 1,680 kHz	**Preparation** SELECTOR: AM Ⓐ At f min. 1. Turn the tuning knob fully counterclockwise. 2. Deliver a 520 kHz signal. 3. Adjust L402 for the maximum VTVM reading. (See Fig. 3-2-5.)

Item	Connection and Standard	Procedures
		Ⓑ At f max. 1. Turn the tuning knob fully clockwise. 2. Deliver a 1,680 kHz signal. 3. Adjust CT402 for the maximum VTVM reading. (See Fig. 3-2-5.) Ⓒ Repeat Ⓐ and Ⓑ several times.
AM Tracking Adjustment	**STANDARD** maximum output level  	**Preparation** SELECTOR: AM 1. Deliver a 620 kHz signal. 2. Tune to the signal by turning the tuning knob. 3. Adjust the AM bar antenna coil L401 by sliding the coil on the bar for the maximum VTVM reading. 4. Make sure that the output level at 620 kHz decreases when bringing the both of a brass ring and a ferrite core close to the bar antenna coil alternately. 5. Deliver a 1,400 Hz signal. 6. Tune to the signal by turning the tuning knob. 7. Adjust the trimmer capacitor CT401 for the maximum VTVM reading. 8. Repeat the check as described in the step 4 at 1,400 Hz and also at 620 kHz again. 9. Lock the antenna coil with wax.
FM IF Alignment	 **STANDARD** symmetrical and maximum  	**Preparation** SELECTOR: FM MONO tuning knob: fully clockwise (f max.) i-f sweep generator: center frequency, 10.7 MHz sweep width, 1 MHz 1. Deliver the signal across the trimmer capacitor CT102. (See Fig. 3-2-5.) 2. Connect an oscilloscope across C207 of the discriminator output. (See Fig. 3-2-5.) 3. Adjust the secondary core of IFT201 to obtain a symmetrical S-curve with a 10.7 MHz marker. (See Fig. 3-2-6.) 4. Adjust the core of IFT101 and primary core of IFT201 to obtain the maximum S-curve with the 10.7 MHz marker. (See Fig. 3-2-5 and 3-2-6.) 5. Repeat the steps 3 and 4.

Item	Connection and Standard	Procedures
FM Frequency Coverage Adjustment	 **STANDARD** 86 MHz ~ 109.5 MHz (87.5 MHz ~ 108.0 MHz) ( ): for West Germany	**Preparation** SELECTOR: FM MONO Ⓐ At f min. 1. Turn the tuning knob fully counterclockwise. 2. Deliver a 86 MHz (87.5 MHz) signal to the FM EXT ANT terminals. 3. Adjust the oscillator coil L103 for the maximum VTVM reading. (See Fig. 3-2-5.) Ⓑ At f max. 1. Turn the tuning knob fully clockwise. 2. Deliver a 109.5 MHz (108.0 MHz) signal to the FM EXT ANT terminals. 3. Adjust the trimmer capacitor CT103 for the maximum VTVM reading. (See Fig. 3-2-5.) Repeat the procedures Ⓐ and Ⓑ ( ): for West Germany
FM Tracking Adjustment		**Preparation** Same as the fm frequency coverage adjustment. Ⓐ At 86 MHz 1. Deliver a 86 MHz signal to the FM EXT ANT terminals and tune to the signal. 2. Adjust the antenna coil L101 and rf coil L102 for the maximum VTVM reading. (Expand or contract the coils.) (See Fig. 3-2-5.) Ⓑ At 109.5 MHz 1. Deliver a 109.5 MHz signal to the FM EXT ANT terminals and tune to the signal. 2. Adjust the trimmer capacitors CT101 and CT102 for the maximum VTVM reading. (See Fig. 3-2-5.)
Stereo Separation Adjustment	 **STANDARD** separation, greater than 28 dB	**Preparation** SELECTOR: FM AUTO FM SSG carrier freq.: 98 MHz mod: ext mod. with a stereo signal generator, 100% (±75 kHz) modulation To modulate the FM SSG, proceed as follows. 1. Deliver the pilot signal only and adjust the signal level so that the FM SSG is 10% (±7.5 kHz) modulated. Take off the signal. 2. Set the audio signal input selector switch of stereo signal generator to "L" or "R" and the main channel switch to "ON". 3. Adjust the output level of the AF signal generator so that the FM SSG is 45% (±33.75 kHz) modulated. 4. Set the sub-channel and pilot switches to "ON".

Item	Connection and Standard	Procedures
		L to R Leakage stereo signal generator: audio signal input selector switch to "L" 1. Tune to the 98 MHz signal. 2. Adjust the switching transformer T302 for the maximum VTVM reading (for the L-channel). Remember the value. (See Fig. 3-2-5.) 3. Read the R-channel LINE OUT level and make sure that the separation (the difference between the output level values in the steps 2 and 3) is greater than 28 dB. 4. If not, adjust the semi-fixed resistor R703 for the standard separation. (See Fig. 3-2-7.) R to L Leakage stereo signal generator: audio signal input selector switch to "R" 5. Read the R-channel LINE OUT level. Remember the value. 6. Read the L-channel LINE OUT level and make sure that the separation is greater than 28 dB. 7. If not, readjust the semi-fixed resistor R703.

3-2-2. Tape Recorder Section

Preface:

1. Before making the adjustment, be sure to clean the heads with cloth or swab moistened with denatured alcohol and to demagnetize the rec./p.b. head with a head demagnetizer (SONY HE-2).
2. After the adjustment, apply lock paint to the parts adjusted.
3. The adjustment or measurement should be made in the listing order.
4. The switch positions should be as follows unless otherwise specified.

   INPUT SELECTOR: TAPE AUX/MIC
   SPEAKER: ON
   TAPE SELECT: NORMAL

5. MIC jack for signal input and LINE OUT jack for signal output should be used unless otherwise specified.
6. The following test equipment is to be provided for the adjustment or measurement.

   digital frequency counter
   af signal generator
   attenuator 600Ω
   VTVM
   resistors 8Ω (10W), 300Ω, 600Ω, 10kΩ and 100kΩ
   blank tape C-60
   SONY alignment tapes
   P-4-A81 (6.3 kHz, −10 dB)
   P-4-L81 (333 Hz, 0 dB)

7. INPUT and OUTPUT connections are as follows.

INPUT ※ Rx: MIC, PHONO 300Ω
AUX IN 10kΩ

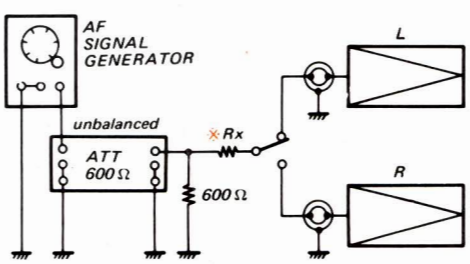


Fig. 3-2-8. Input connection

OUTPUT ※Rx: LINE OUT..... 100 kΩ
SPEAKER ..... 8 Ω

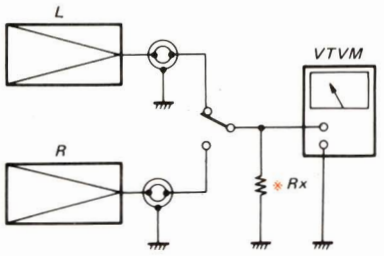


Fig. 3-2-8'. Output connection

8. The standard INPUT and OUTPUT levels should be as follows.

INPUT

Input	MIC	AUX IN	PHONO
Input Level	-60 dB, 0.77 mV	-10 dB, 0.24 V	-43 dB, 5.4 mV

OUTPUT

Output	LINE OUT		SPEAKER
Load Resistance	100 kΩ		8Ω
Output Level	REC	+2.5 dB, 1.02V	+11.2 dB, 2.8 V
	PB	+1 dB, 0.865 V	

9. The adjustment or measurement should be made for the both channels of L and R.

ADJUSTMENTS AND MEASUREMENTS

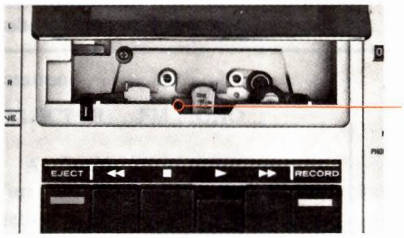


Fig. 3-2-9. Adjusting parts location

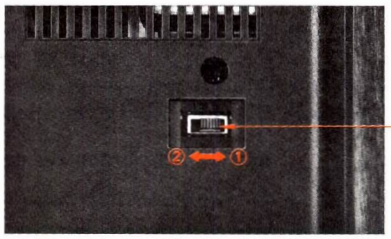


Fig. 3-2-10. ISS switch (S11), interference suppressor switch

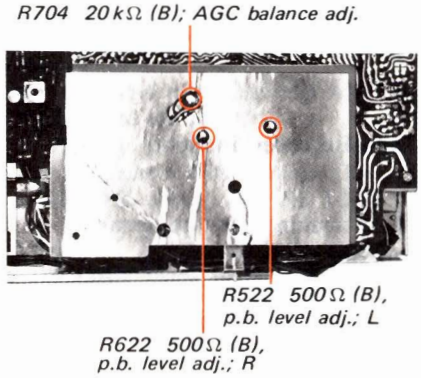
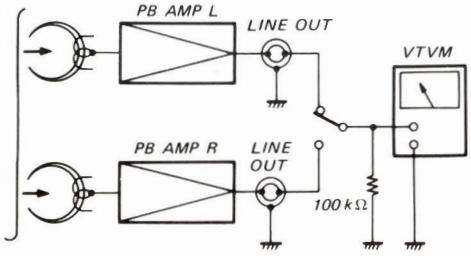
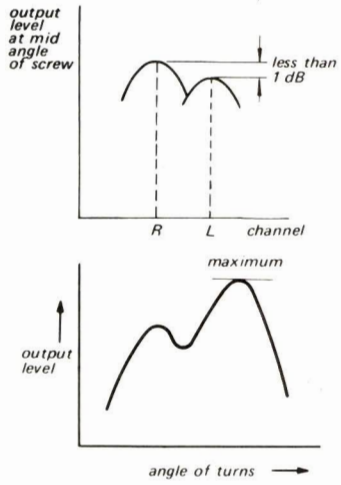
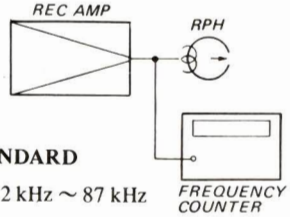
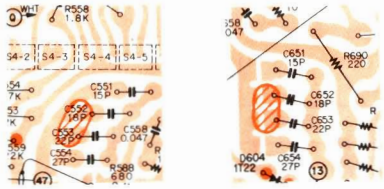
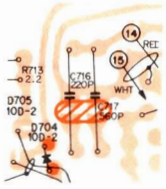
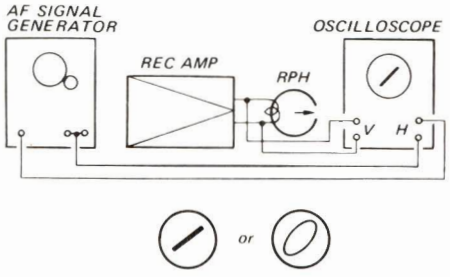
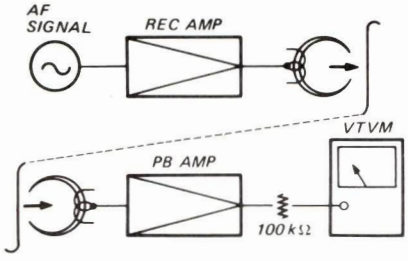
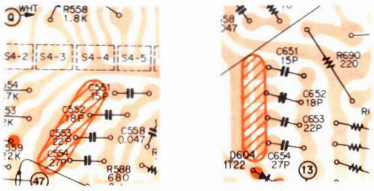
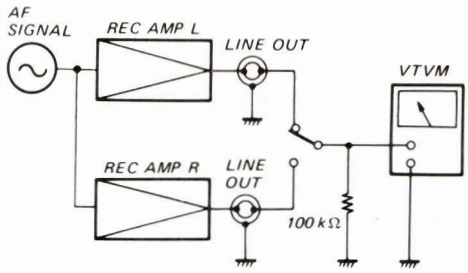
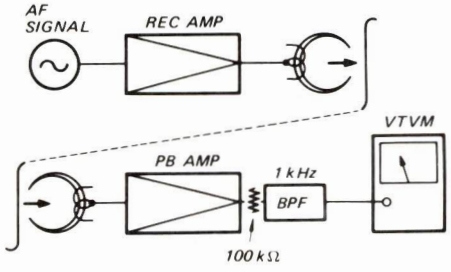
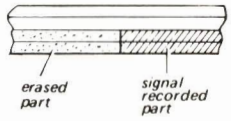


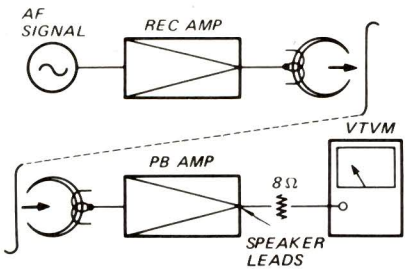
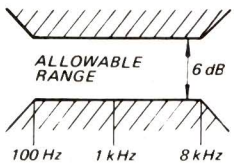
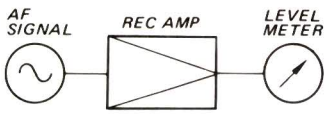
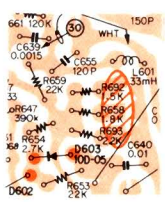
Fig. 3-2-11. Adjusting parts location

Item	Connection and Standard	Procedures
Rec/PB Head Azimuth Adjustment		1. Play back the alignment tape P-4-A81 and adjust the azimuth adjusting screw to obtain the maximum output levels at the both L and R LINE OUTput jacks. (See Fig. 3-2-9.) **Note:** 1. When the maximum LINE OUTput levels of L and R are not the same, take the mid angle of screw. 2. When the difference between the two output levels is greater than 1 dB, replace the rec/pb head. 3. When turning the screw, several peaks appear. Take the biggest one. 2. Repeat the FWD◄►STOP several times and make sure that the both LINE OUTput levels are not changed.

Item	Connection and Standard	Procedures
	STANDARD maximum (difference between L and R, less than 1 dB) 	3. Apply lock paint to the screw.
PB Output Level Adjustment	**Connection** Same as Rec/PB Head Azimuth Adjustment **STANDARD** +3 dB 1.09 V (difference between L and R, less than 1 dB)	Play back the alignment tape P-4-L81 and adjust the semi-fixed resistor R522 (R622) so that the both L and R LINE OUTput levels are +3 dB, 1.09 V. (See Fig. 3-2-11.)
PB Frequency Response Measurement	**Connection** Same as Rec/PB Head Azimuth Adjustment **STANDARD** −9 dB ~ −3 dB 0.27 V ~ 0.55 V	Play back the alignment tape P-4-A81 and read the LINE OUTput levels of L and R.
PB Signal-to Noise Ratio Measurement	**Connection** Same as Rec/PB Head Azimuth Adjustment **STANDARD** greater than 44 dB	1. Play back the alignment tape P-4-L81 and remember the LINE OUTput levels of L and R. (The values may be approximately +3 dB, 1.09 V.) 2. Place a empty cassette in the set, make the playback mode and read the LINE OUTput levels of L and R. 3. Make sure the difference between the levels read in the steps 1 and 2 is greater than 44 dB.
Record Bias Frequency Adjustment and Measurement	 **STANDARD** 82 kHz ~ 87 kHz	1. Slide the ISS switch (S11) in ①. (See Fig. 3-2-10.) 2. Solder the printed conductor patterns at the hatched portion in Fig. ⓐ 3. Place the set in the record mode with no input signal.

Item	Connection and Standard	Procedures
	 *Fig. (a) Bias voltage adjusting capacitors*  *Fig. (b) Bias frequency adjusting capacitors* 	4. Read the bias frequency across the rec/pb head and adjust by *selecting the capacitors C716 and C717 for the standard frequency. (Solder or unsolder the printed conductors at the hatched portion in Fig. (b).) **Note:** Sliding the ISS switch to ② position, the bias frequency is lowered approximately 2.5 kHz. With no frequency counter 1. Proceed the steps 1 and 2 in the preceding way. 2. Deliver an approximately 84.5 kHz signal to the H terminals of an oscilloscope. 3. Deliver the signal across the rec/pb head to the V terminals. 4. Vary the signal frequency from the af signal generator for the Lissajous figure as illustrated, read the frequency when the figure appears and make sure that the frequency is standard. 5. If not, adjust by *selecting the capacitors C716 and C717. (Solder or unsolder the printed conductors at the hatched portion.) * Capacitors Selection a. C716 and C717 connected b. One connected and other open c. The both open **Note:** This adjustment varies the overall frequency response. Perform the recording bias adjustment after completing this adjustment.
Record Bias Adjustment	 **STANDARD** Playback LINE output level deviation of 8 kHz from 333 Hz, less than ±1 dB.  *Fig. (c) Bias voltage adjusting capacitors*	1. Deliver 333 Hz and 8 kHz signals of −80 dB (0.077 mV) to the MIC jack in order and record them on a blank tape. 2. Play back the recorded signals and check whether the standard is obtained or not. 3. If not, adjust by selecting the capacitors shown. When the 8 kHz output level is too high, take a larger capacitance. When the output level is too low take a smaller capacitance. 4. Check the overall frequency response.

Item	Connection and Standard	Procedures
AGC Balance Adjustment	 **STANDARD** Difference, less than 0.5 dB.	1. Deliver a 1 kHz signal of −60 dB, 0.77 mV to the MIC jacks of L and R and place the set in the stereo record mode. 2. Adjust the semi-fixed resistor R704 for same output levels of L and R. (See Fig. 3-2-11.)
Overall Signal-to-Noise Ratio Measurement	**Connection** Same as in the Record Bias Adjustment **STANDARD** NORMAL, greater than 40 dB SPECIAL, greater than 40 dB	This measurement should be performed with the TAPE SELECT switch at the both positions NORMAL and SPECIAL. 1. Deliver a 1 kHz signal of −60 dB, 0.77 mV to the MIC jack and record it on a blank tape. 2. Take off the signal, terminate the MIC jack with a 600 Ω dummy resistor and continue the recording with no input signal. 3. Play back the tape and read the difference between the signal recorded and no signal recorded parts in the output level.
Overall Distortion Measurement	**Connection** Same as in the Record Bias Adjustment except a distortion meter for the VTVM. **STANDARD** NORMAL, less than 3% SPECIAL, less than 3%	This measurement should be performed with the TAPE SELECT switch at the both positions NORMAL and SPECIAL. 1. Deliver a 1 kHz signal of −60 dB, 0.77 mV to the MIC jack and record it on a blank tape. 2. Play back the tape and read the distortion.
Erase Ratio Measurement	 **STANDARD** NORMAL, greater than 60 dB SPECIAL, greater than 60 dB 	This measurement should be performed with the TAPE SELECT switch at the both positions NORMAL and SPECIAL. 1. Deliver a 1 kHz signal of −30 dB, 24.5 mV to the MIC jack and record it on a blank tape approximately 15 seconds. 2. Take off the signal, rewind the signal recorded part a half and erase the rewound part (run the tape in the record mode with no input signal). 3. Play back the tape and read the difference between the two output levels.

Item	Connection and Standard	Procedures
Overall Maximum Output Level Measurement	**STANDARD** greater than +19 dB, 6.8 V 	1. Deliver a 1 kHz signal of −60 dB, 0.77 mV to the MIC jack and record it on a blank tape. 2. Play back the tape with the VOL and TONE controls set to "10" position, and read the SPEAKER output level.
Overall Frequency Response Measurement	**Connection** Same as in the Record Bias Adjustment **STANDARD** NORMAL  SPECIAL Compared with the LINE OUTput level of each frequency in NORMAL 1 kHz: within the range of +0.5 ~ +1.5 dB 8 kHz: within the range of −3 ~ −9 dB	1. Set the TAPE SELECT switch to NORMAL, deliver 100 Hz, 1 kHz and 8 kHz signals of −80 dB, 0.077 mV to the MIC jack in order and record them on a blank tape. 2. Set the TAPE SELECT switch to SPECIAL, deliver 1 kHz and 8 kHz signals of −80 dB, 0.077 mV to the MIC jack in order and record them on a blank tape. 3. Play back the tape and read the LINE OUTput level of each frequency.
Level Meter Calibration	 **STANDARD** The pointer should stops on the place between the figures 5 and 8. Difference between L and R, one figure. 	1. Place the set in the record mode, deliver a 1 kHz signal of −60 dB, 0.77 mV to the L-channel MIC jack and read the level meter of L-channel. 2. Make sure that the pointer stops on the place as specified in the standard. 3. Deliver the signal to the R-channel MIC jack and read the level meter indication of R-channel. 4. Make sure that the pointer stops on the place as specified in the standard. 5. Make sure that the difference between the two readings of L and R pointers is within the range of the standard. 6. If not, adjust by selecting the resistors. (Solder or unsolder the printed conductors at the hatched portion.)

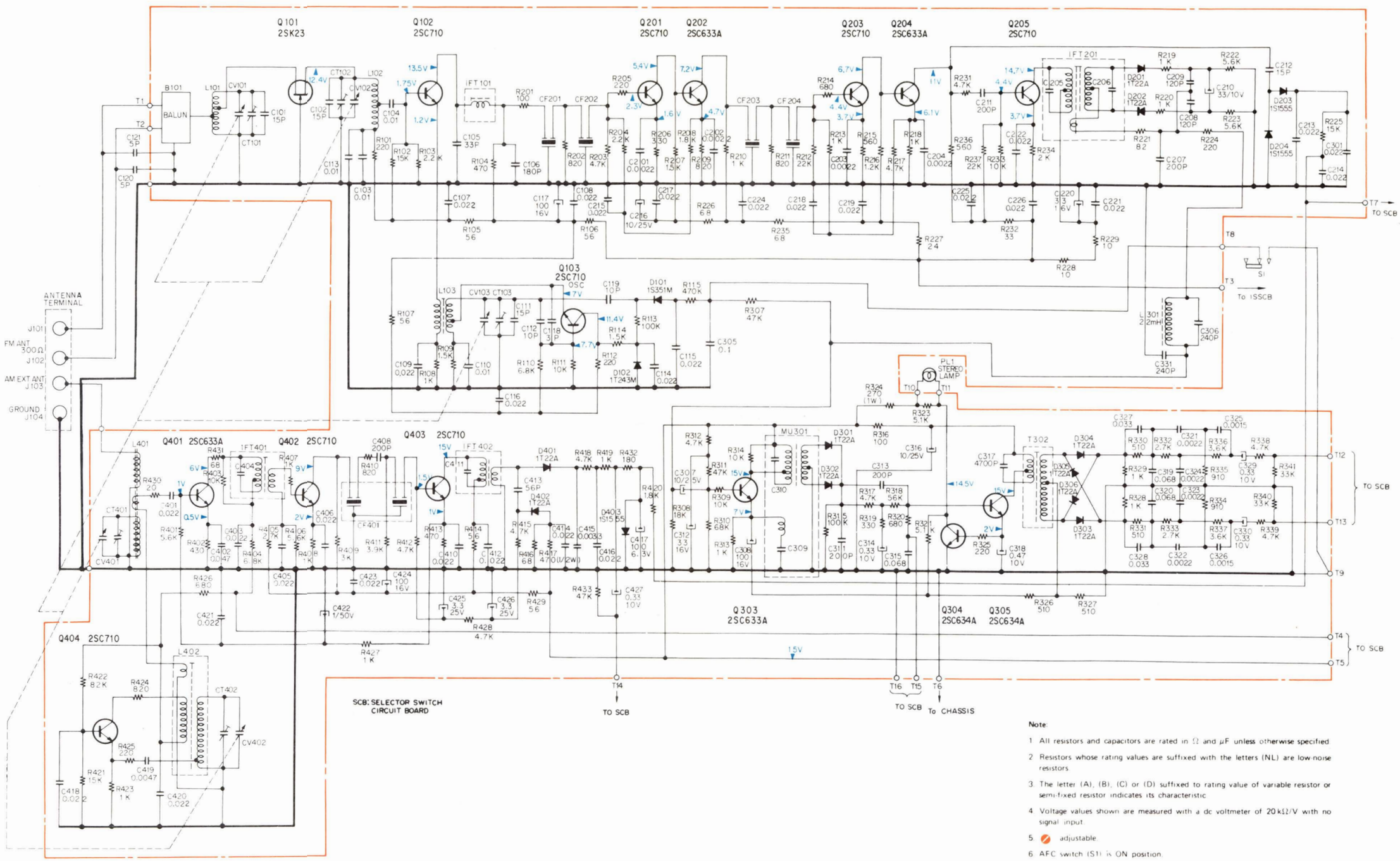
MEMO

SECTION 4
DIAGRAMS

4-1. SCHEMATIC AND MOUNTING DIAGRAMS

SCHEMATIC DIAGRAM

Radio Section



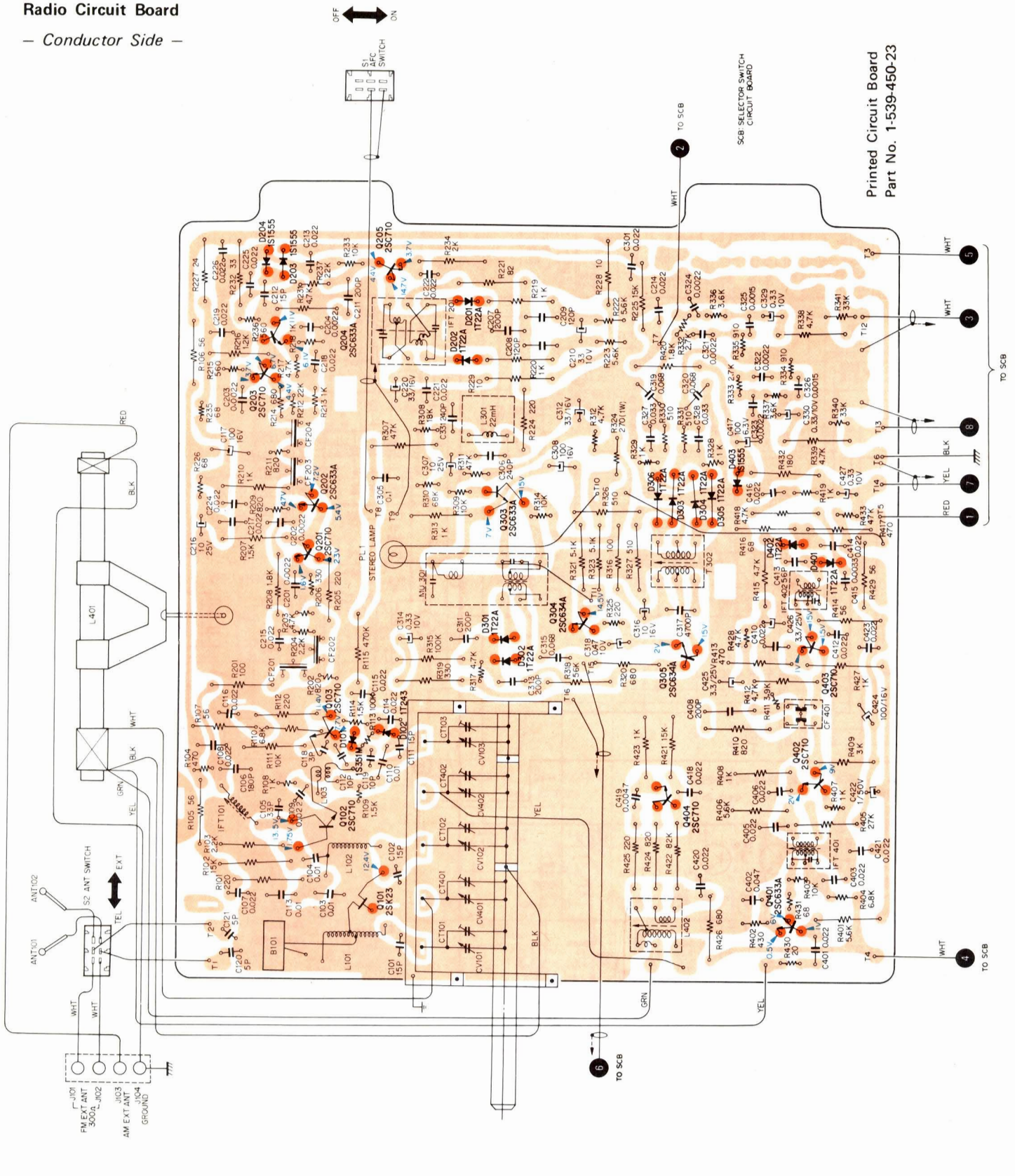
Note:

1. All resistors and capacitors are rated in Ω and μF unless otherwise specified.
2. Resistors whose rating values are suffixed with the letters (NL) are low-noise resistors.
3. The letter (A), (B), (C) or (D) suffixed to rating value of variable resistor or semi-fixed resistor indicates its characteristic.
4. Voltage values shown are measured with a dc voltmeter of 20 kΩ/V with no signal input.
5. ⊘ adjustable.
6. AFC switch (S1) is ON position.

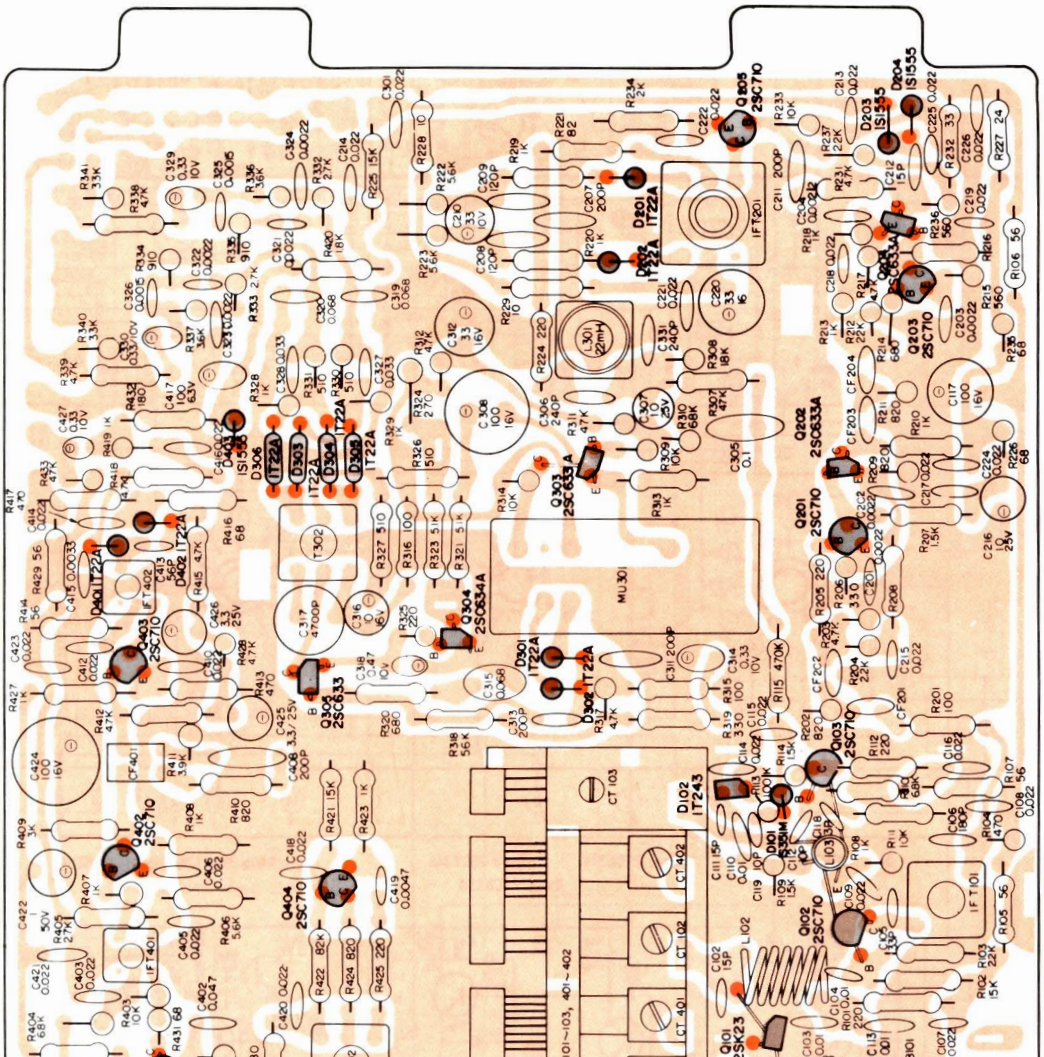
MOUNTING DIAGRAM

Radio Circuit Board

— Conductor Side —

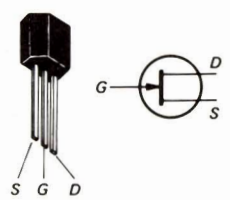


— *Component Side* —

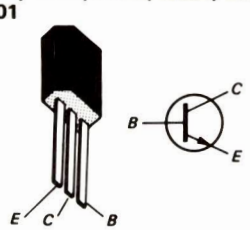


— *Semiconductor Electrode* —

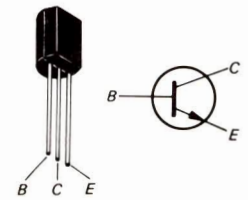
Q101



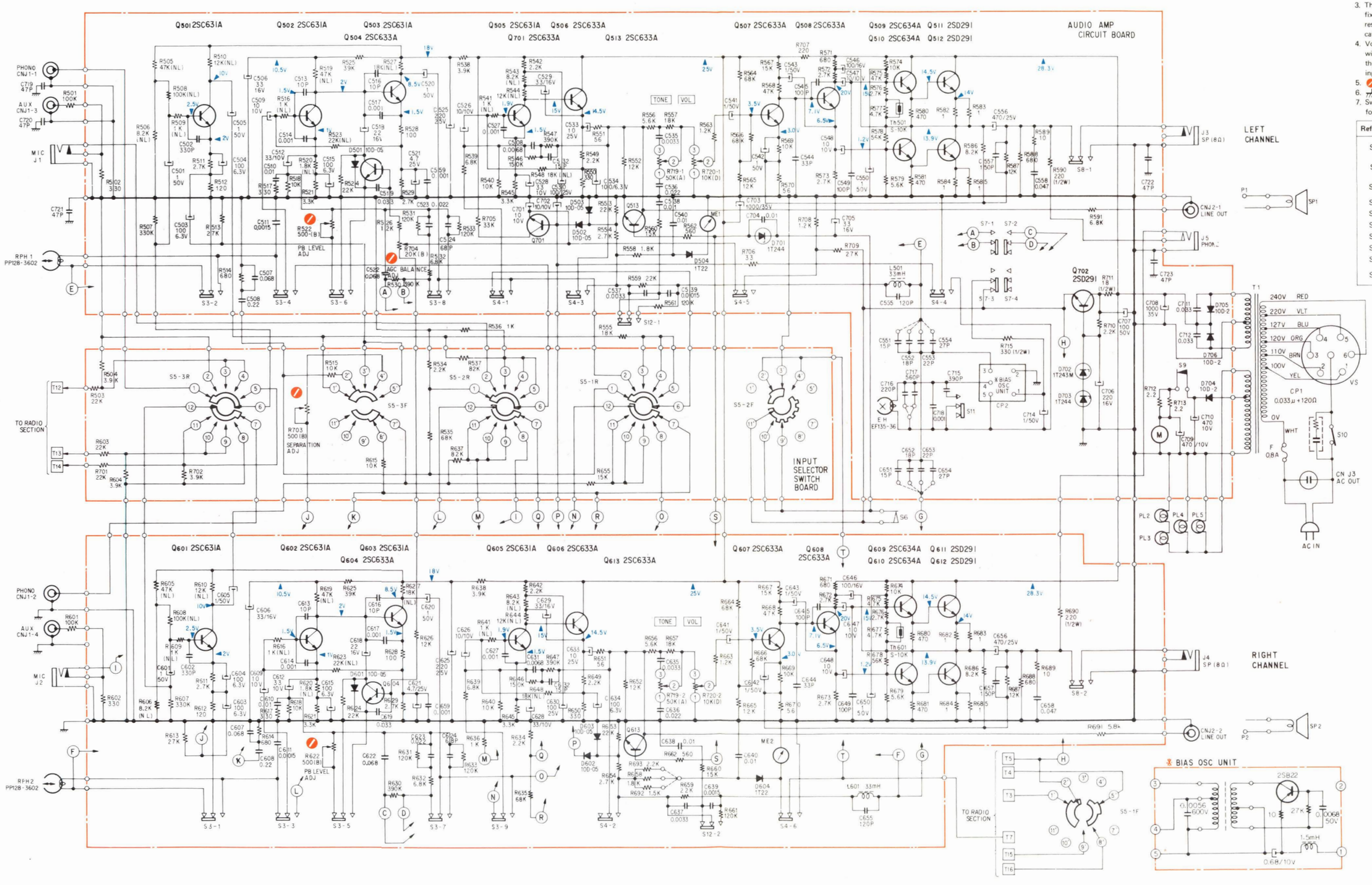
Q202, Q204, Q303, Q304, Q305
Q401



Q102, Q103, Q201, Q203, Q205
Q402~404



SCHEMATIC DIAGRAM
Audio Amp. Section

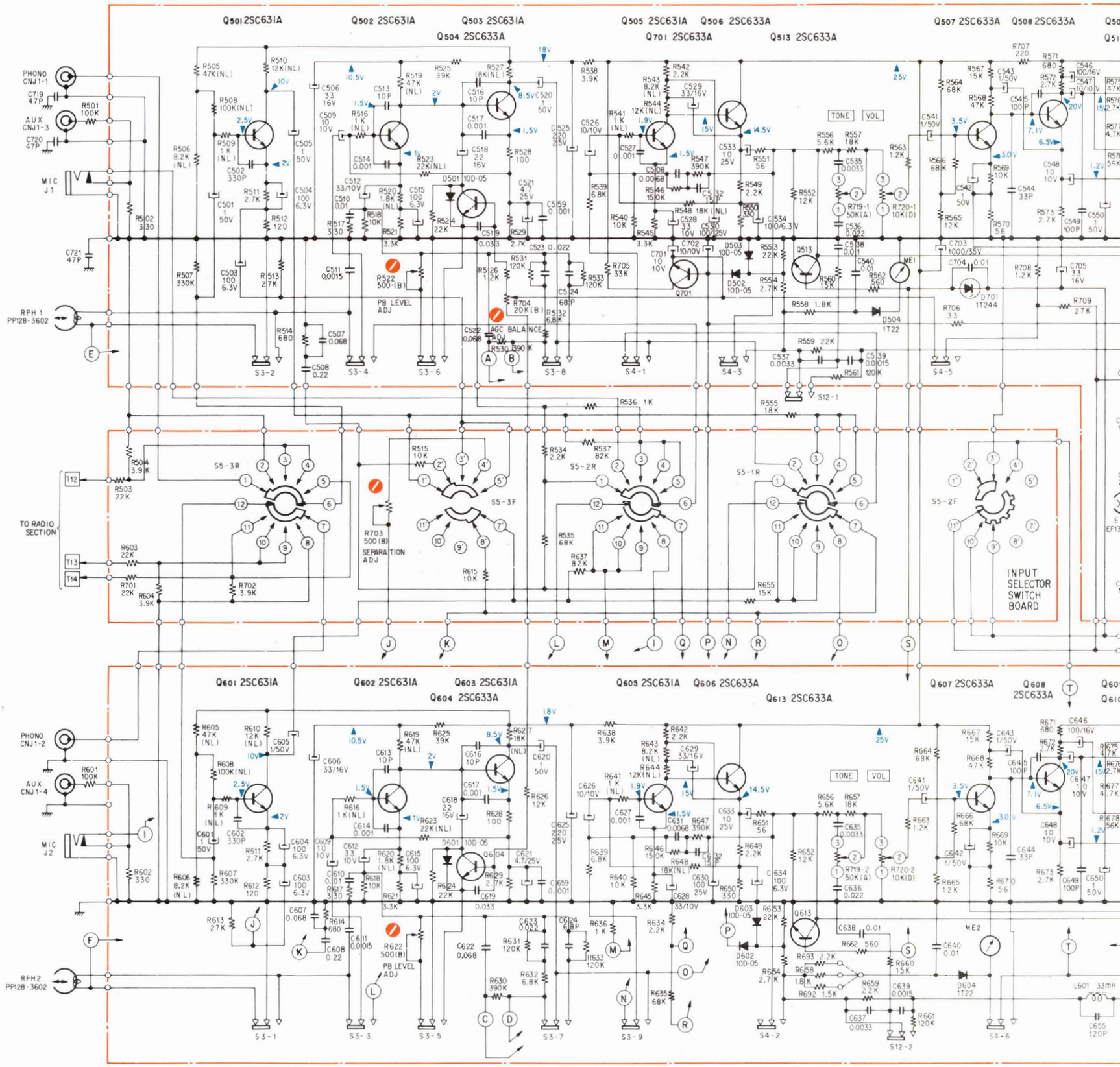


Note:

1. All resistors and capacitors are rated in Ω and μF unless otherwise specified.
2. Resistors whose rating values are suffixed with the letters (NL) are low-noise resistors.
3. The letter (A), (B), (C) or (D) suffixed to rating value of variable resistor or semi-fixed resistor indicates its characteristic.
4. Voltage values shown are measured with a dc voltmeter of 20kΩ/V in the playback mode with no signal input.
5. ⊘ : adjustable
6. ⏚ : grounded to chassis
7. Switching positions are as the table following.

Ref. No.	Description	Position
S3	REC/PB SWITCH	PB
S4	REC/PB SWITCH	PB
S5	INPUT SELECTOR	PHONO
S6	MUTING	OFF
S7	BIAS	ON
S8	SPEAKER	ON
S9	MOTOR	ON
S10	POWER	ON
S11	ISS	1
S12	TAPE SELECTOR	NORMAL

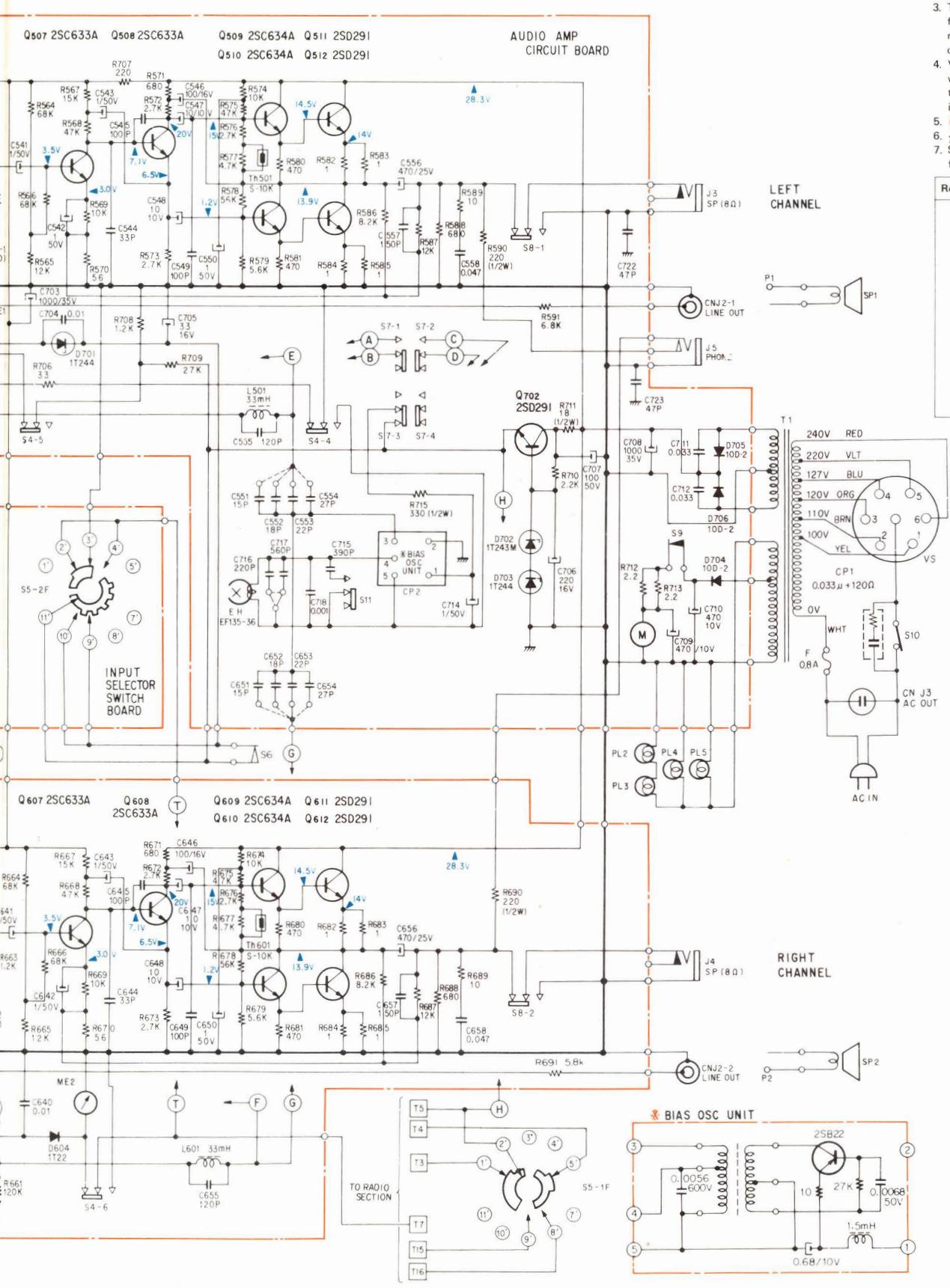
SCHEMATIC DIAGRAM
Audio Amp. Section



Note:

1. All resistors and capacitors are rated in Ω and μF unless otherwise specified.
2. Resistors whose rating values are suffixed with the letters (NL) are low-noise resistors.
3. The letter (A), (B), (C) or (D) suffixed to rating value of variable resistor or semi-fixed resistor indicates its characteristic.
4. Voltage values shown are measured with a dc voltmeter of 20 kΩ/V in the playback mode with no signal input.
5. ⊘ : adjustable
6. ⏚ : grounded to chassis
7. Switching positions are as the table following.

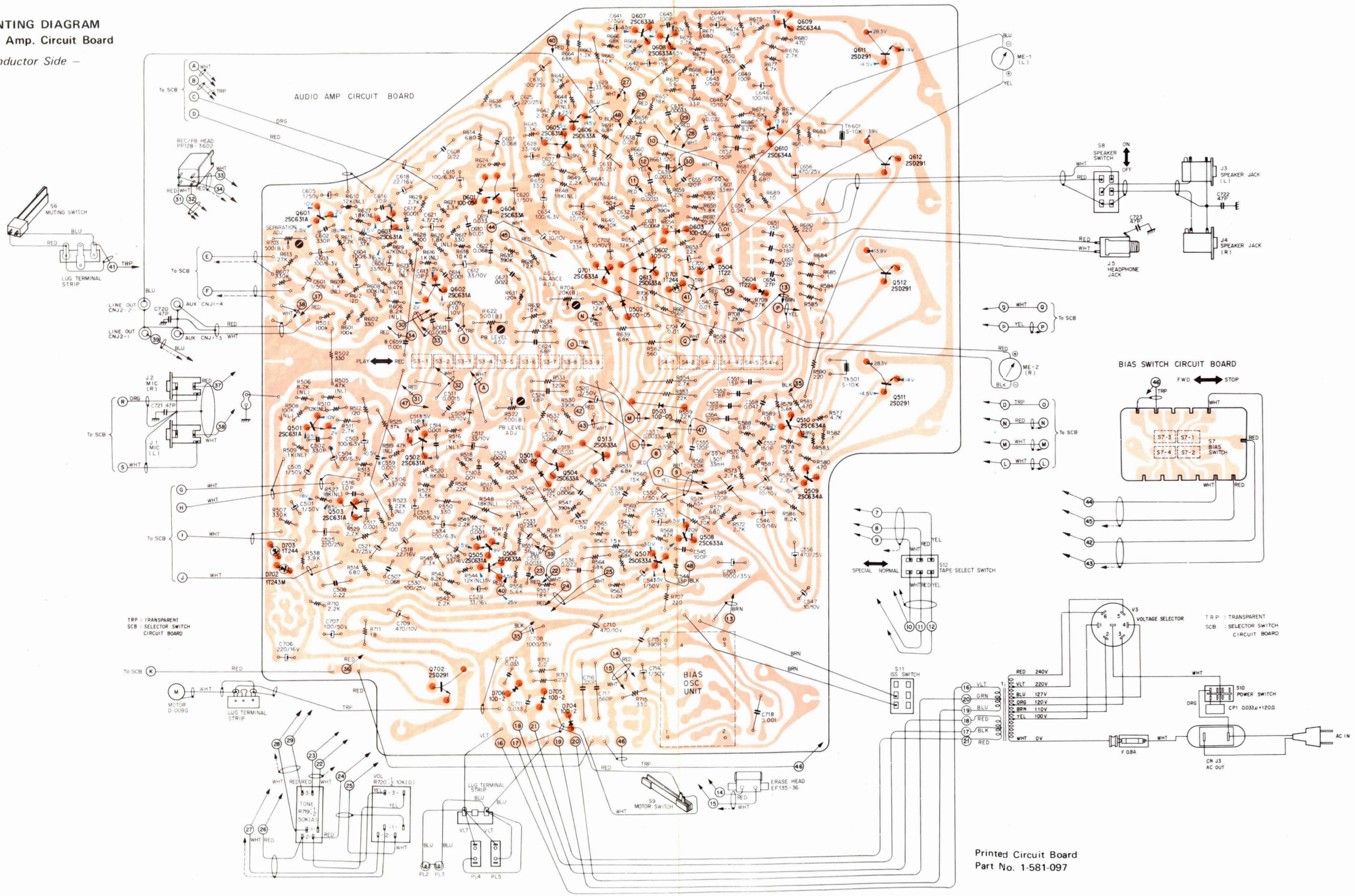
Ref. No.	Description	Position
S3	REC/PB SWITCH	PB
S4	REC/PB SWITCH	PB
S5	INPUT SELECTOR	PHONO
S6	MUTING	OFF
S7	BIAS	ON
S8	SPEAKER	ON
S9	MOTOR	ON
S10	POWER	ON
S11	ISS	1
S12	TAPE SELECTOR	NORMAL



MOUNTING DIAGRAM

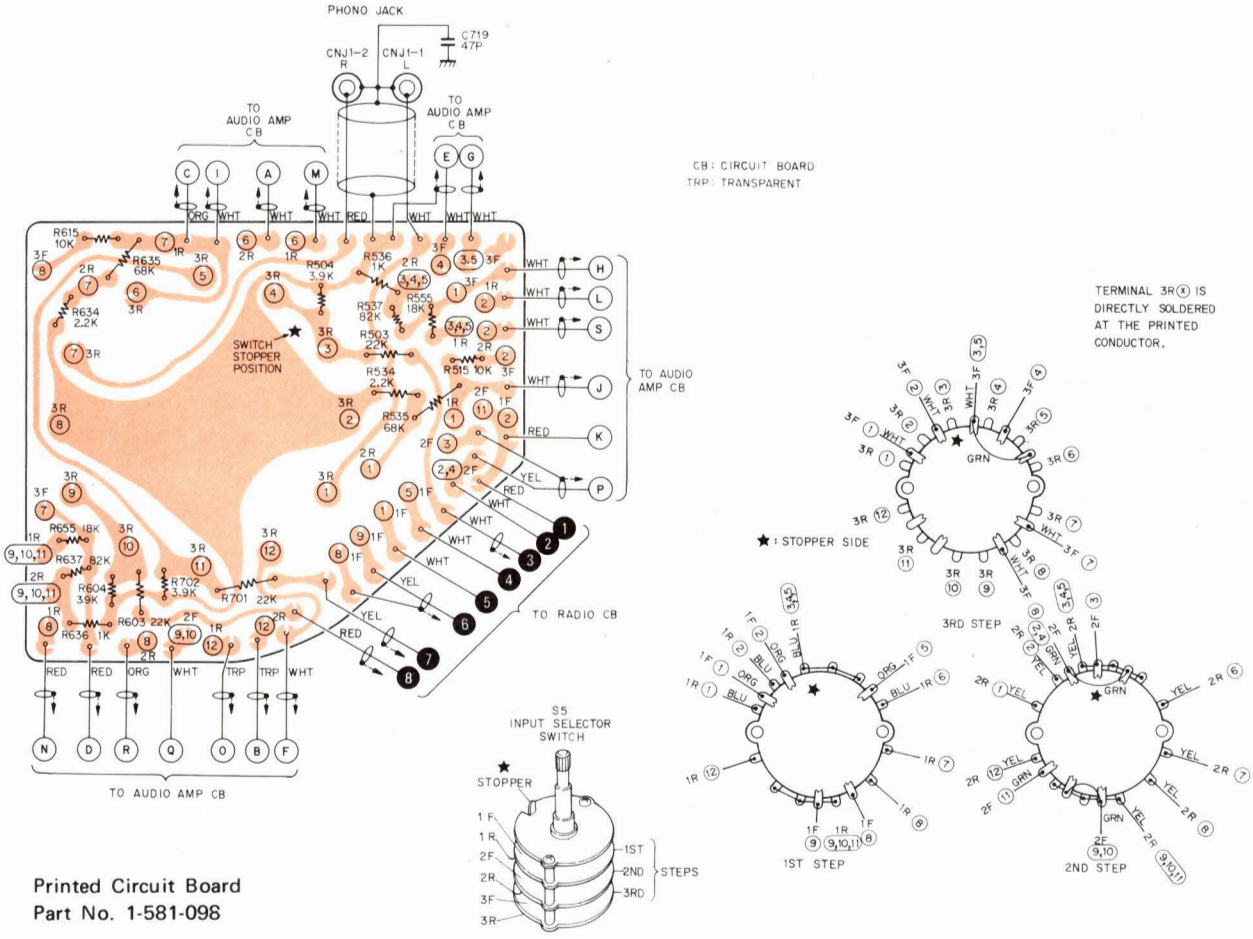
Audio Amp. Circuit Board

– Conductor Side –



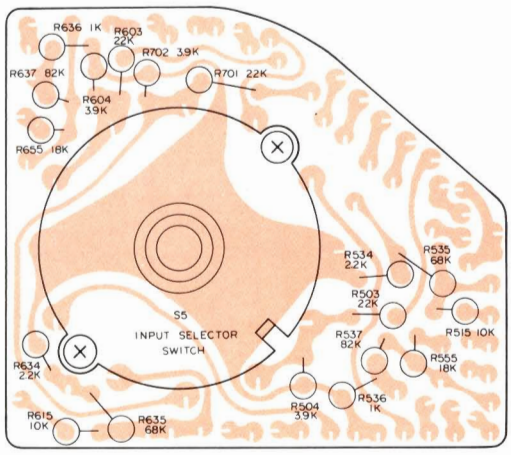
SELECTOR Switch Circuit Board

– Conductor Side –



Printed Circuit Board
Part No. 1-581-098

– Component Side –



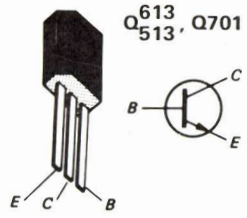
Audio Amp. Circuit Board

– Component Side –

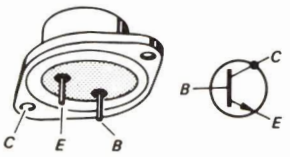
– Semiconductor Electrode –

$Q_{501 \sim 510}^{601 \sim 610}$

Q_{513}^{613}, Q701

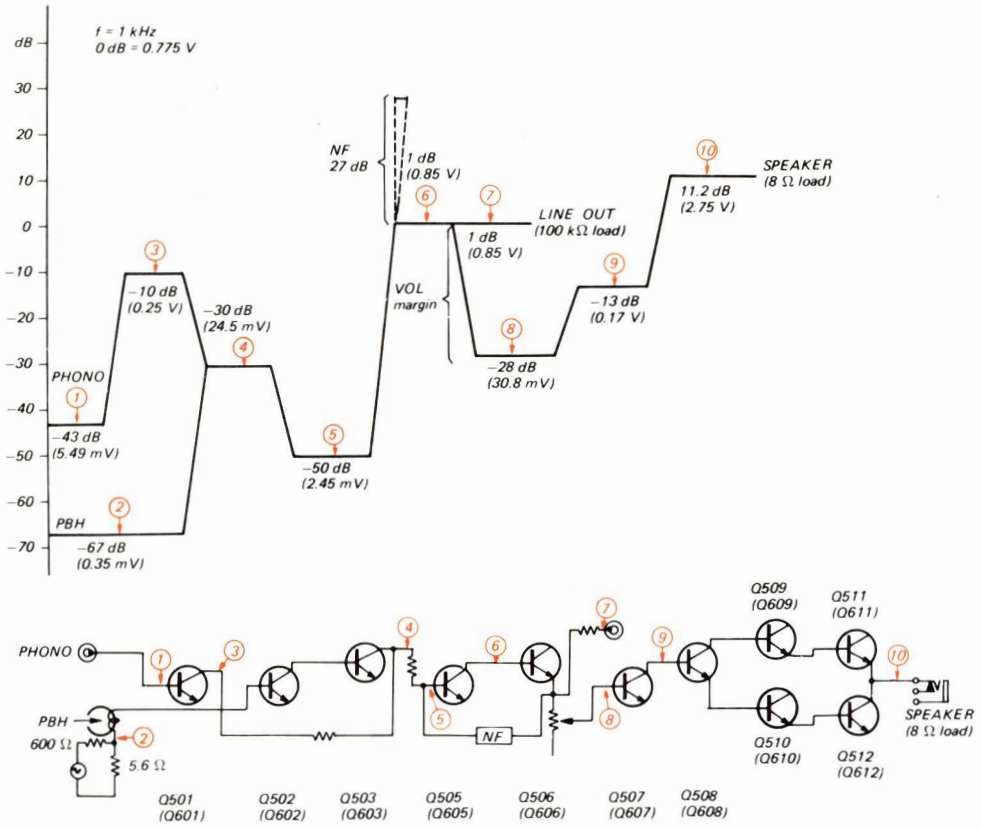


$Q_{511 \sim 512}^{611 \sim 612}$, Q702

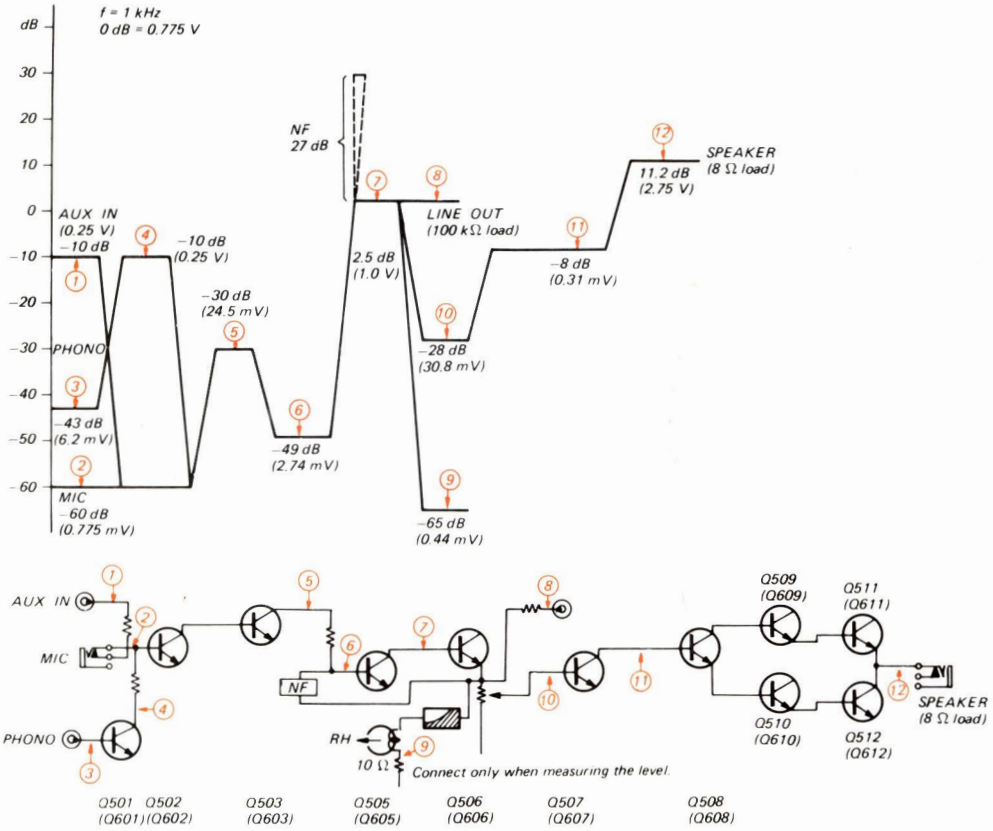


4-2. LEVEL DIAGRAM

Playback

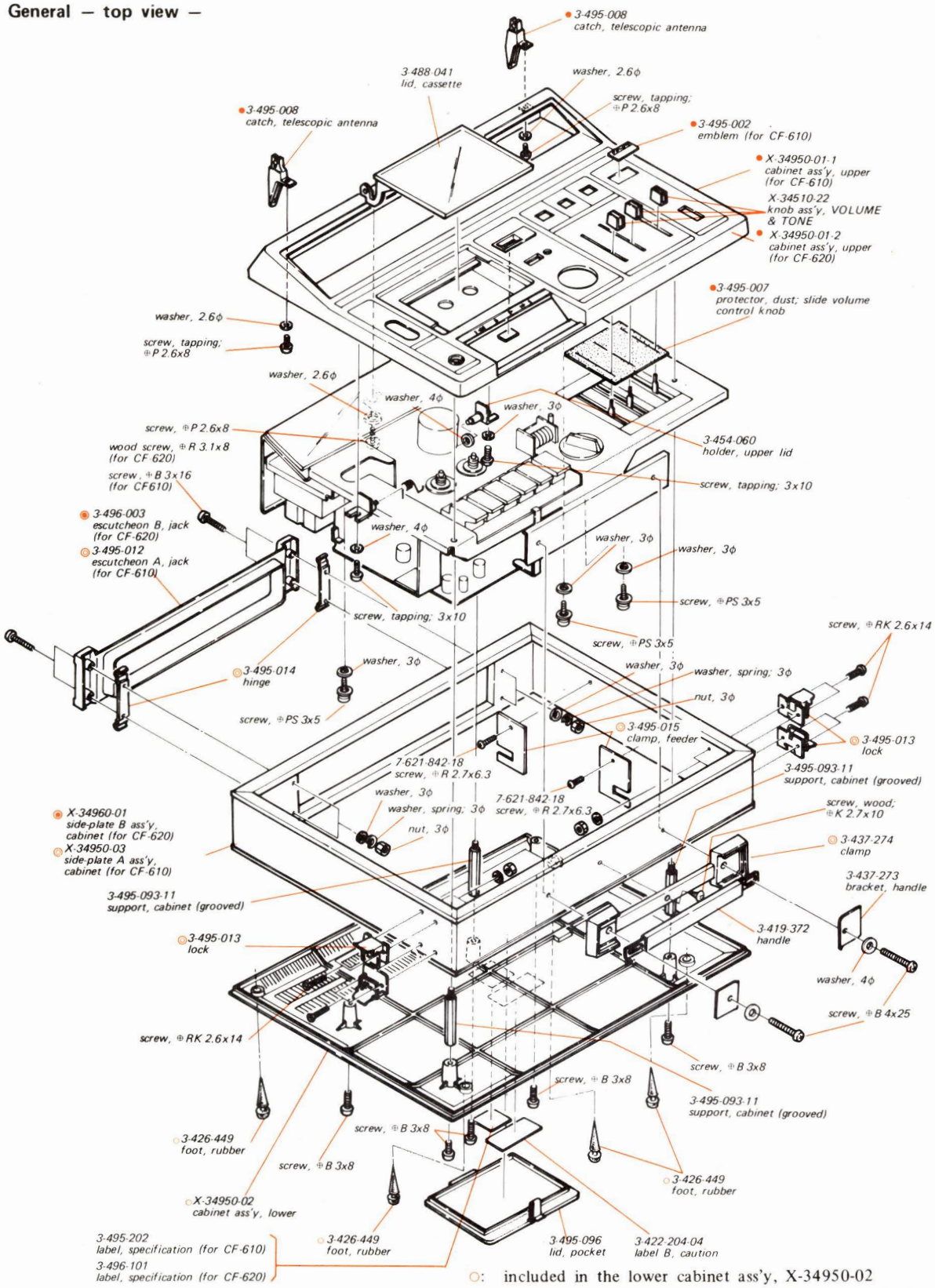


Record



SECTION 5
EXPLODED VIEW

General — top view —



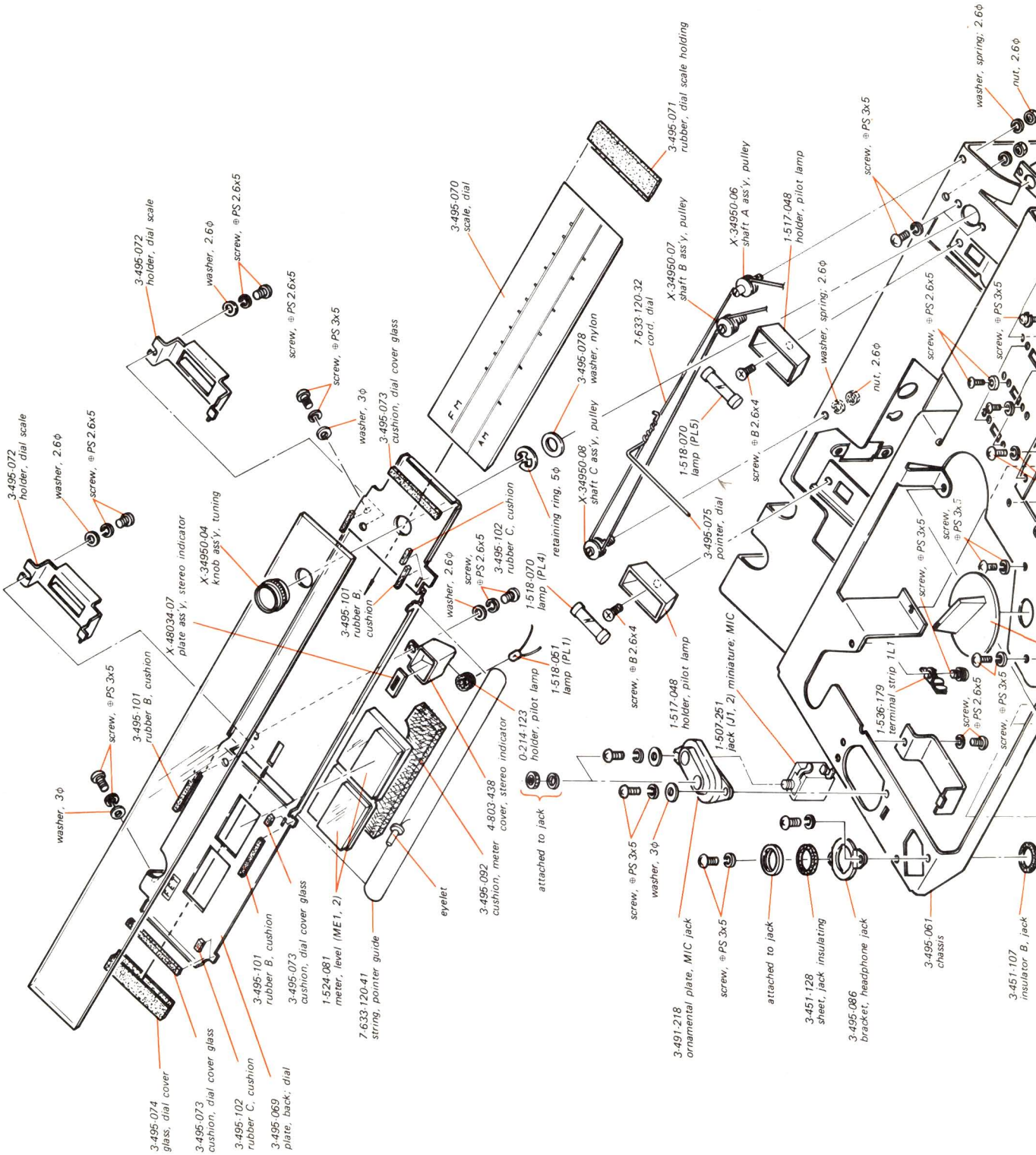
○: included in the lower cabinet ass'y, X-34950-02

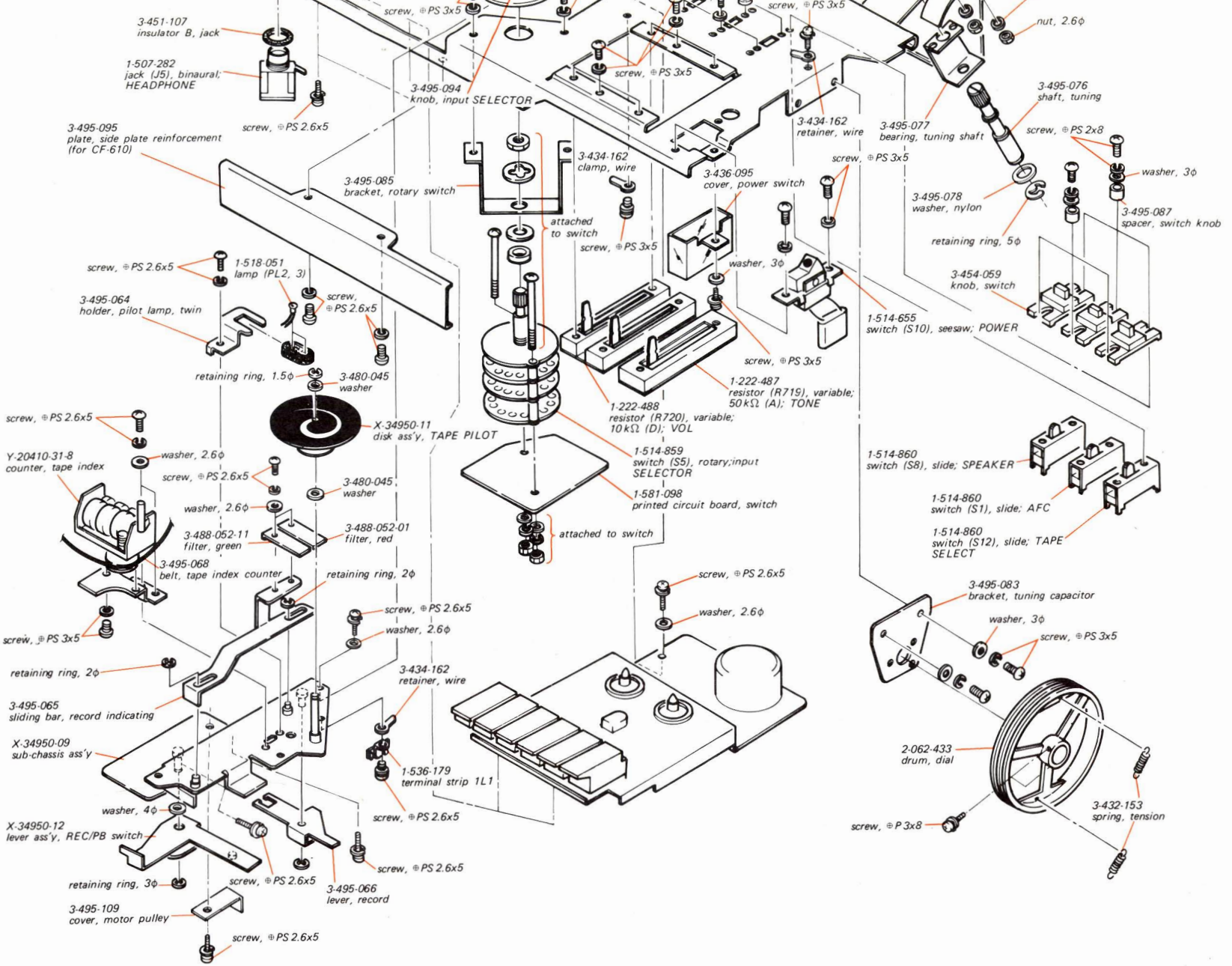
●: included in the upper cabinet ass'y, X-34950-01 -1 (for CF-610) -2 (for CF-620)

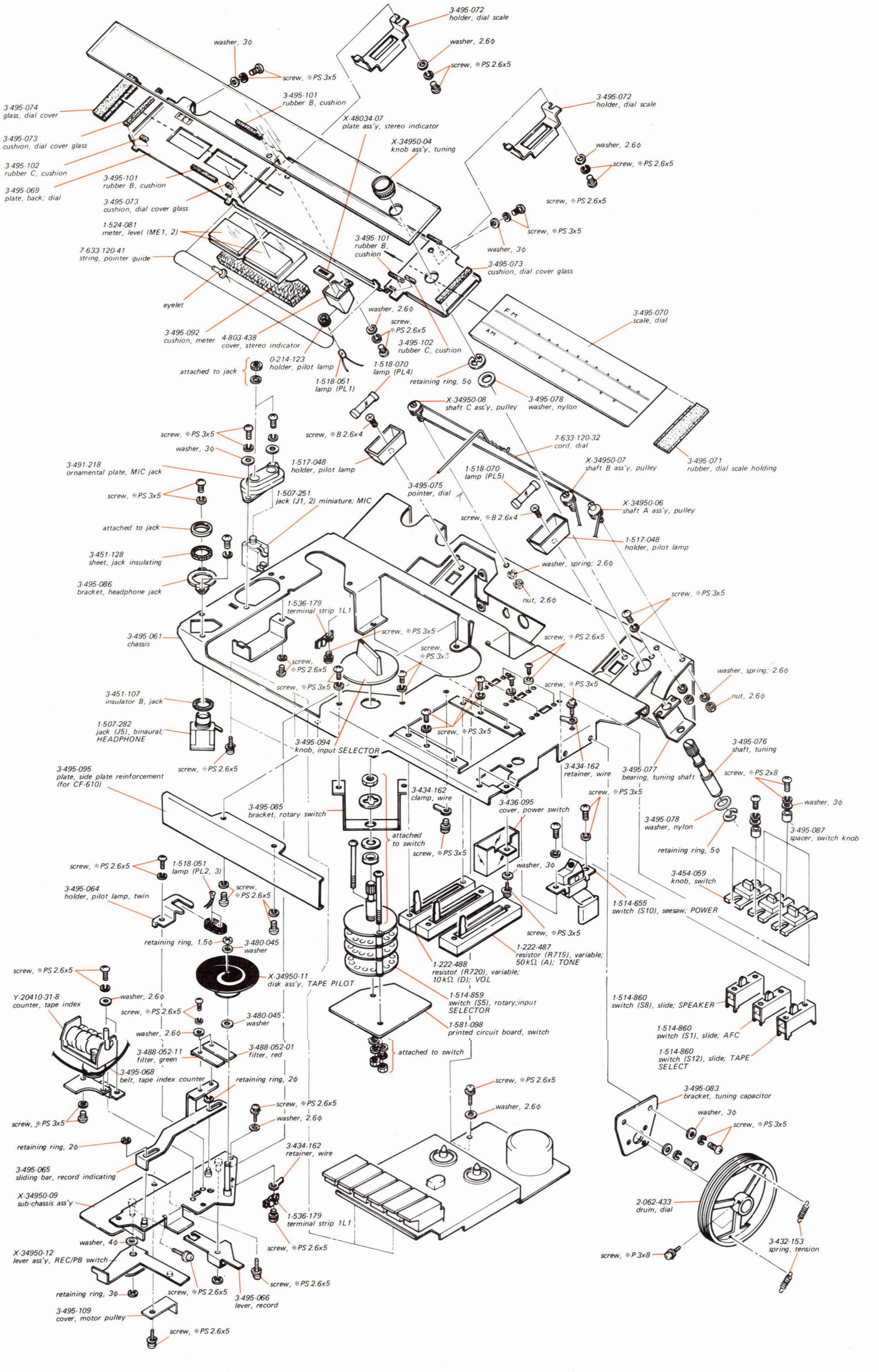
◎: included in the cabinet side-plate A ass'y, X-34950-03 (for CF-610)

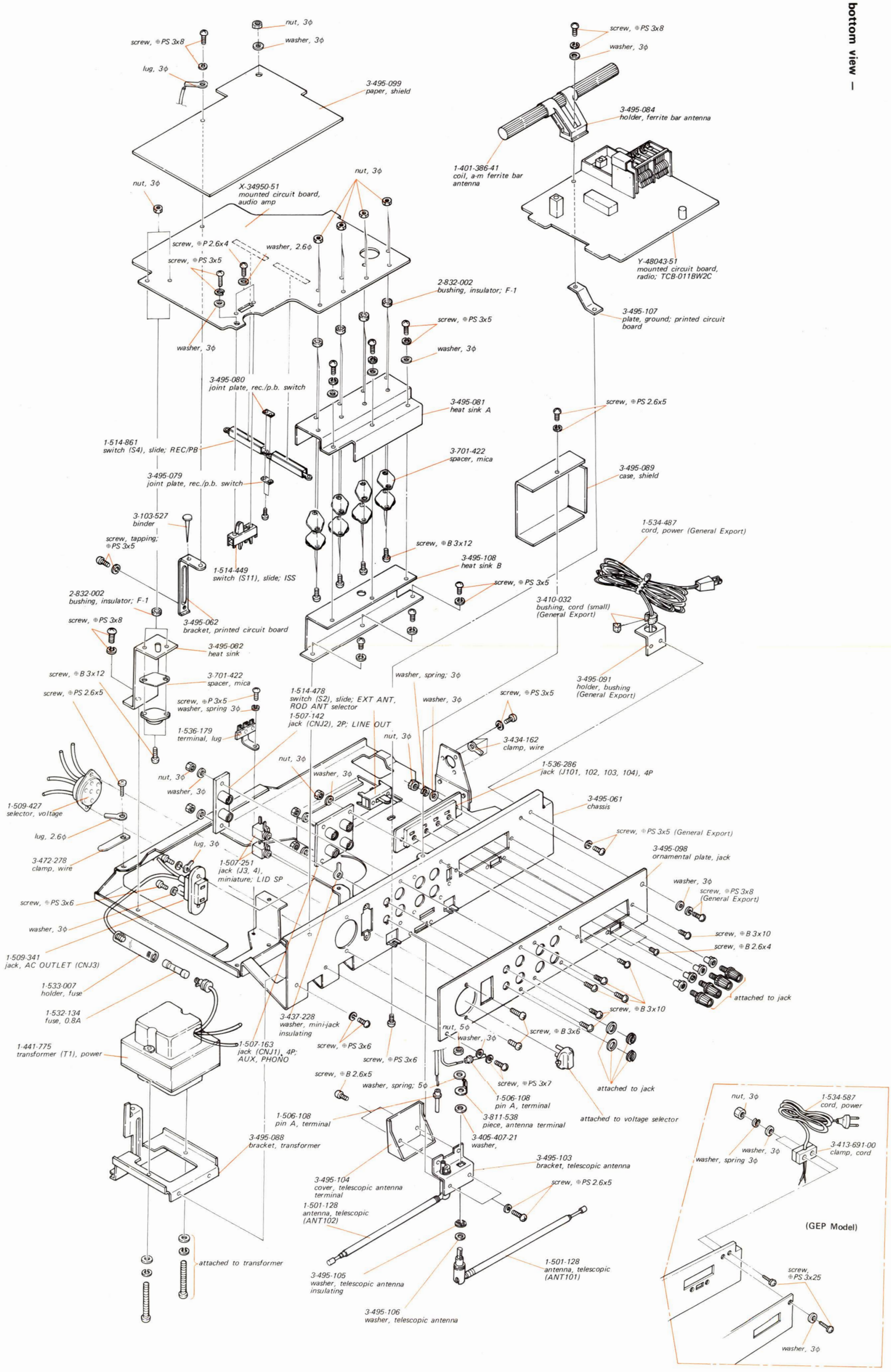
◉: included in the cabinet side-plate B ass'y, X-34960-01 (for CF-620)

Chassis — top view —

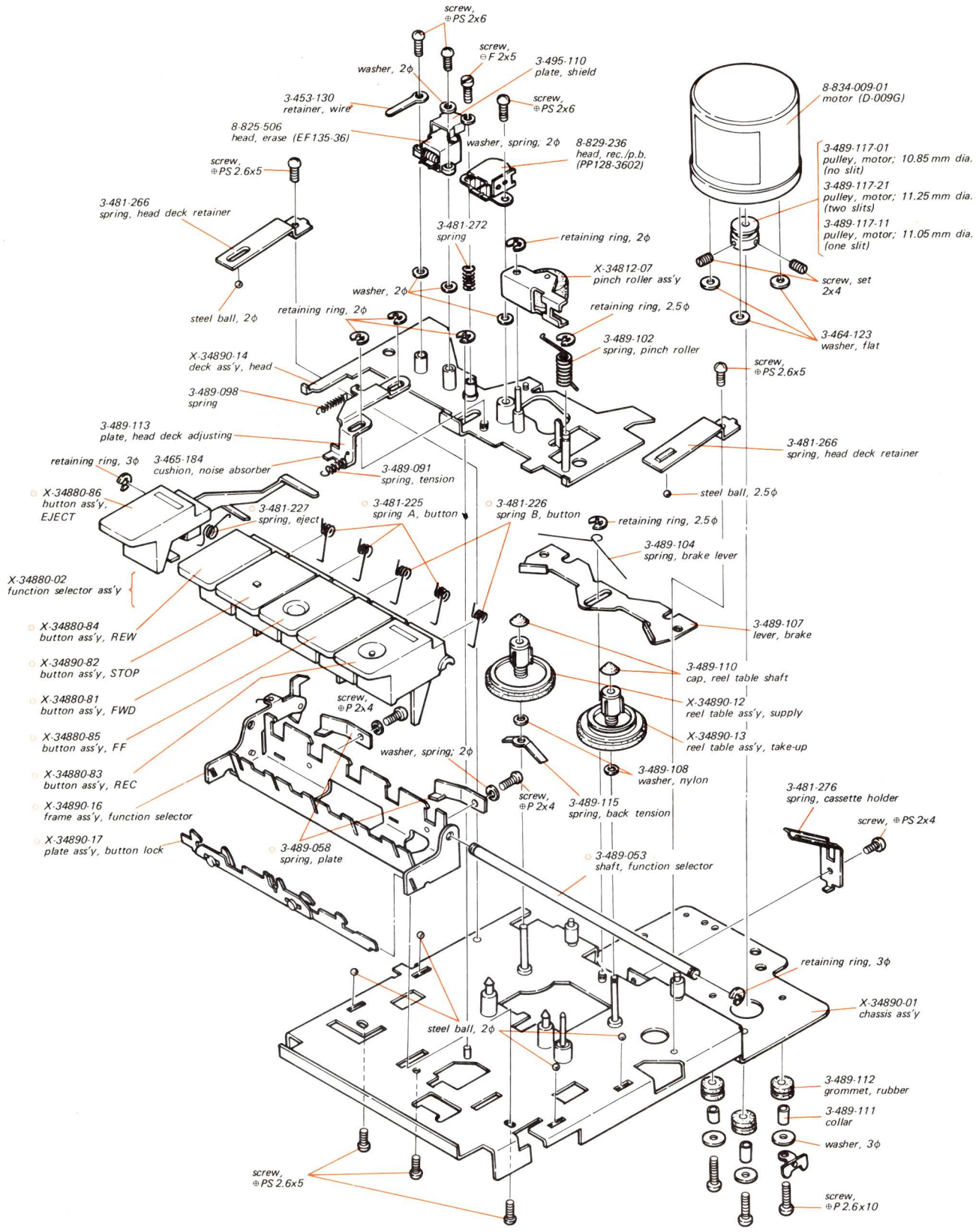



3-451-107
insulator B, jack
1-507-282
jack (J5), binaural; HEADPHONE
screw, ⊕PS 2.6x5
screw, ⊕PS 3x5
3-495-094
knob, input SELECTOR
3-495-095
plate, side plate reinforcement (for CF-610)
3-495-085
bracket, rotary switch
3-434-162
clamp, wire
attached to switch
screw, ⊕PS 3x5
3-434-162
retainer, wire
3-495-077
bearing, tuning shaft
3-436-095
cover, power switch
3-495-076
shaft, tuning
screw, ⊕PS 2x8
washer, 3φ
3-495-078
washer, nylon
retaining ring, 5φ
3-495-087
spacer, switch knob
3-454-059
knob, switch
1-514-655
switch (S10), seesaw; POWER
1-518-051
lamp (PL2, 3)
3-495-064
holder, pilot lamp, twin
retaining ring, 1.5φ
3-480-045
washer
X-34950-11
disk ass'y, TAPE PILOT
Y-20410-31-8
counter, tape index
washer, 2.6φ
3-480-045
washer
3-488-052-11
filter, green
3-488-052-01
filter, red
3-495-068
belt, tape index counter
1-222-488
resistor (R720), variable; 10kΩ (D); VOL
1-222-487
resistor (R719), variable; 50kΩ (A); TONE
1-514-859
switch (S5), rotary; input SELECTOR
1-581-098
printed circuit board, switch
attached to switch
1-514-860
switch (S8), slide; SPEAKER
1-514-860
switch (S1), slide; AFC
1-514-860
switch (S12), slide; TAPE SELECT
3-495-083
bracket, tuning capacitor
2-062-433
drum, dial
3-432-153
spring, tension
screw, ⊕P 3x8
retaining ring, 2φ
3-495-065
sliding bar, record indicating
X-34950-09
sub-chassis ass'y
3-434-162
retainer, wire
1-536-179
terminal strip 1L1
washer, 4φ
X-34950-12
lever ass'y, REC/PB switch
retaining ring, 3φ
3-495-109
cover, motor pulley
3-495-066
lever, record


3-495-072 holder, dial scale
washer, 2.6φ
screw, ⊕PS 2.6x5
washer, 3φ
screw, ⊕PS 3x5
3-495-101 rubber B, cushion
3-495-074 glass, dial cover
3-495-073 cushion, dial cover glass
3-495-102 rubber C, cushion
3-495-069 plate, back; dial
X-48034-07 plate ass'y, stereo indicator
X-34950-04 knob ass'y, tuning
1-524-081 meter, level (ME1, 2)
7-633-120-41 string, pointer guide
eyelet
3-495-092 cushion, meter
4-803-438 cover, stereo indicator
3-495-070 scale, dial
FM
AM
0-214-123 holder, pilot lamp
attached to jack
1-518-051 lamp (PL1)
1-518-070 lamp (PL4)
retaining ring, 5φ
3-495-078 washer, nylon
X-34950-08 shaft C ass'y, pulley
screw, ⊕B 2.6x4
7-633-120-32 cord, dial
3-495-071 rubber, dial scale holding
X-34950-07 shaft B ass'y, pulley
1-518-070 lamp (PL5)
3-495-075 pointer, dial
X-34950-06 shaft A ass'y, pulley
1-517-048 holder, pilot lamp
3-491-218 ornamental plate, MIC jack
1-507-251 jack (J1, 2) miniature; MIC
3-451-128 sheet, jack insulating
3-495-086 bracket, headphone jack
1-536-179 terminal strip 1L1
3-495-061 chassis
3-451-107 insulator B, jack
1-507-282 jack (J5), binaural; HEADPHONE
3-495-094 knob, input SELECTOR
3-495-095 plate, side plate reinforcement (for CF-610)
3-434-162 retainer, wire
3-495-077 bearing, tuning shaft
3-495-076 shaft, tuning
screw, ⊕PS 2x8
3-495-078 washer, nylon
3-495-087 spacer, switch knob
retaining ring, 5φ
3-454-059 knob, switch
3-434-162 clamp, wire
3-495-085 bracket, rotary switch
3-436-095 cover, power switch
attached to switch
1-518-051 lamp (PL2, 3)
3-495-064 holder, pilot lamp, twin
retaining ring, 1.5φ
3-480-045 washer
1-514-655 switch (S10), seesaw; POWER
1-222-487 resistor (R719), variable; 50kΩ (A); TONE
1-222-488 resistor (R720), variable; 10kΩ (D); VOL
X-34950-11 disk ass'y, TAPE PILOT
Y-20410-31-8 counter, tape index
3-480-045 washer
3-488-052-11 filter, green
3-488-052-01 filter, red
3-495-068 belt, tape index counter
1-514-859 switch (S5), rotary; input SELECTOR
1-581-098 printed circuit board, switch
1-514-860 switch (S8), slide; SPEAKER
1-514-860 switch (S1), slide; AFC
1-514-860 switch (S12), slide; TAPE SELECT
3-495-083 bracket, tuning capacitor
2-062-433 drum, dial
3-432-153 spring, tension
retaining ring, 2φ
3-495-065 sliding bar, record indicating
X-34950-09 sub-chassis ass'y
X-34950-12 lever ass'y, REC/PB switch
retaining ring, 3φ
3-495-109 cover, motor pulley
3-495-066 lever, record
washer, spring; 2.6φ
nut, 2.6φ
screw, ⊕P 3x8

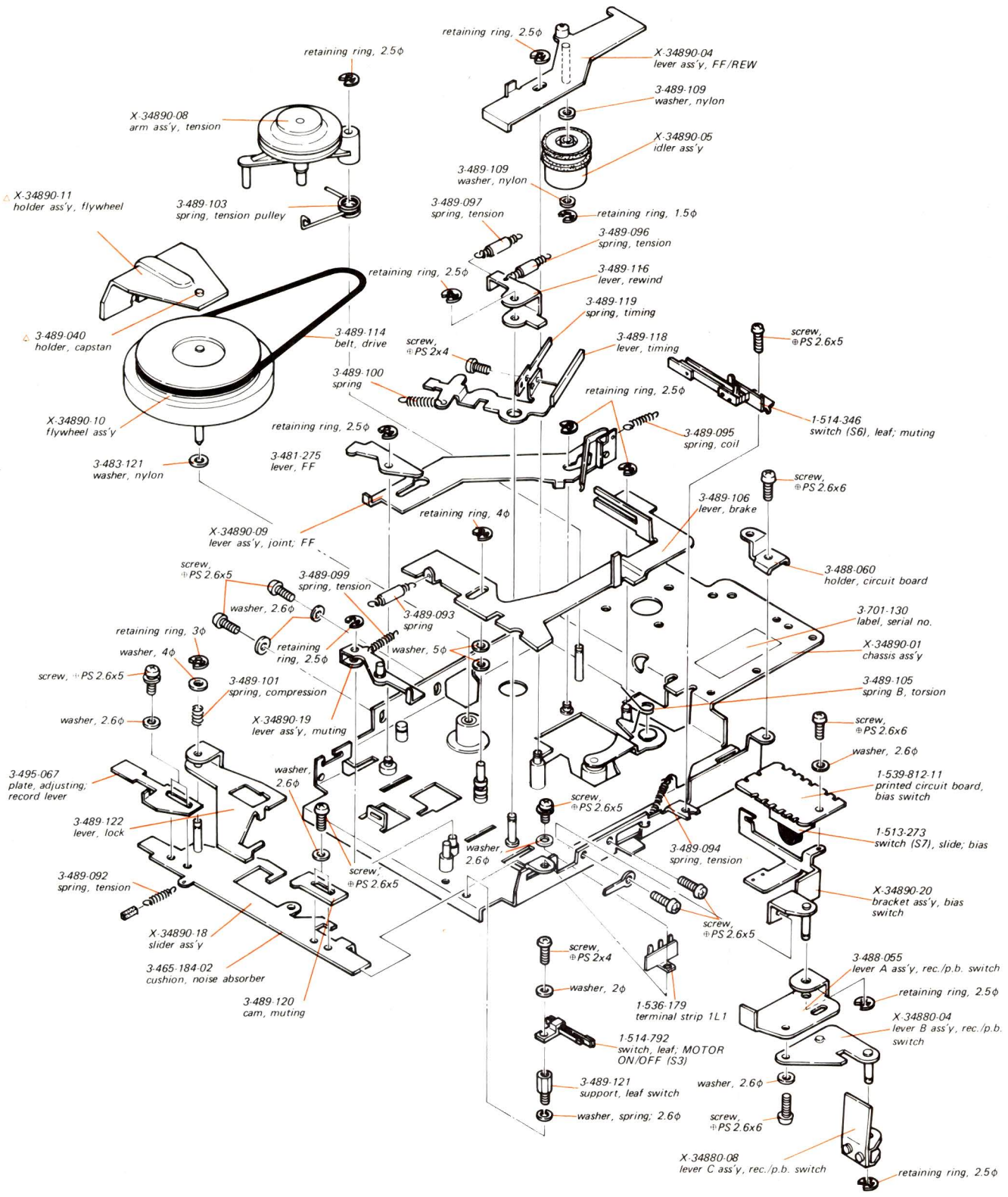

nut, 3ϕ
washer, 3ϕ
screw, ⊕PS 3x8
lug, 3ϕ
3-495-099
paper, shield
X-34950-51
mounted circuit board,
audio amp
screw, ⊕P 2.6x4
washer, 2.6ϕ
screw, ⊕PS 3x5
2-832-002
bushing, insulator; F-1
screw, ⊕PS 3x5
washer, 3ϕ
3-495-080
joint plate, rec./p.b. switch
3-495-081
heat sink A
1-514-861
switch (S4), slide; REC/PB
3-701-422
spacer, mica
3-495-079
joint plate, rec./p.b. switch
3-103-527
binder
screw, tapping;
⊕PS 3x5
1-514-449
switch (S11), slide; ISS
screw, ⊕B 3x12
3-495-108
heat sink B
screw, ⊕PS 3x5
2-832-002
bushing, insulator; F-1
screw, ⊕PS 3x8
3-495-062
bracket, printed circuit board
3-495-062
heat sink
screw, ⊕B 3x12
3-701-422
spacer, mica
screw, ⊕PS 2.6x5
screw, ⊕P 3x5
washer, spring 3ϕ
1-536-179
terminal, lug
1-514-478
switch (S2), slide; EXT ANT,
ROD ANT selector
1-507-142
jack (CNJ2), 2P; LINE OUT
nut, 3ϕ
washer, 3ϕ
1-509-427
selector, voltage
lug, 2.6ϕ
3-472-278
clamp, wire
lug, 3ϕ
1-507-251
jack (J3, 4),
miniature; LID SP
screw, ⊕PS 3x6
washer, 3ϕ
1-509-341
jack, AC OUTLET (CNJ3)
1-533-007
holder, fuse
1-532-134
fuse, 0.8A
1-441-775
transformer (T1), power
1-507-163
jack (CNJ1), 4P;
AUX, PHONO
3-495-088
bracket, transformer
attached to transformer
screw, ⊕PS 3x8
washer, 3ϕ
3-495-084
holder, ferrite bar antenna
1-401-386-41
coil, a-m ferrite bar
antenna
Y-48043-51
mounted circuit board,
radio; TCB-011BW2C
3-495-107
plate, ground; printed circuit
board
screw, ⊕PS 2.6x5
3-495-089
case, shield
1-534-487
cord, power (General Export)
3-410-032
bushing, cord (small)
(General Export)
3-495-091
holder, bushing
(General Export)
washer, spring; 3ϕ
washer, 3ϕ
screw, ⊕PS 3x5
3-434-162
clamp, wire
1-536-286
jack (J101, 102, 103, 104), 4P
3-495-061
chassis
screw, ⊕PS 3x5 (General Export)
3-495-098
ornamental plate, jack
washer, 3ϕ
screw, ⊕PS 3x8
(General Export)
screw, ⊕B 3x10
screw, ⊕B 2.6x4
attached to jack
screw, ⊕B 3x10
3-437-228
washer, mini-jack
insulating
nut, 5ϕ
washer, 3ϕ
screw, ⊕B 3x6
screw, ⊕PS 3x6
screw, ⊕PS 3x6
screw, ⊕B 2.6x5
washer, spring; 5ϕ
screw, ⊕PS 3x7
attached to jack
1-506-108
pin A, terminal
attached to voltage selector
1-506-108
pin A, terminal
3-811-538
piece, antenna terminal
3-405-407-21
washer,
3-495-088
bracket, transformer
3-495-103
bracket, telescopic antenna
3-495-104
cover, telescopic antenna
terminal
screw, ⊕PS 2.6x5
1-501-128
antenna, telescopic
(ANT102)
1-501-128
antenna, telescopic
(ANT101)
3-495-105
washer, telescopic antenna
insulating
3-495-106
washer, telescopic antenna
nut, 3ϕ
1-534-587
cord, power
washer, 3ϕ
3-413-691-00
clamp, cord
washer, spring 3ϕ
(GEP Model)
screw,
⊕PS 3x25
washer, 3ϕ

Tape Recorder Chassis — top view —

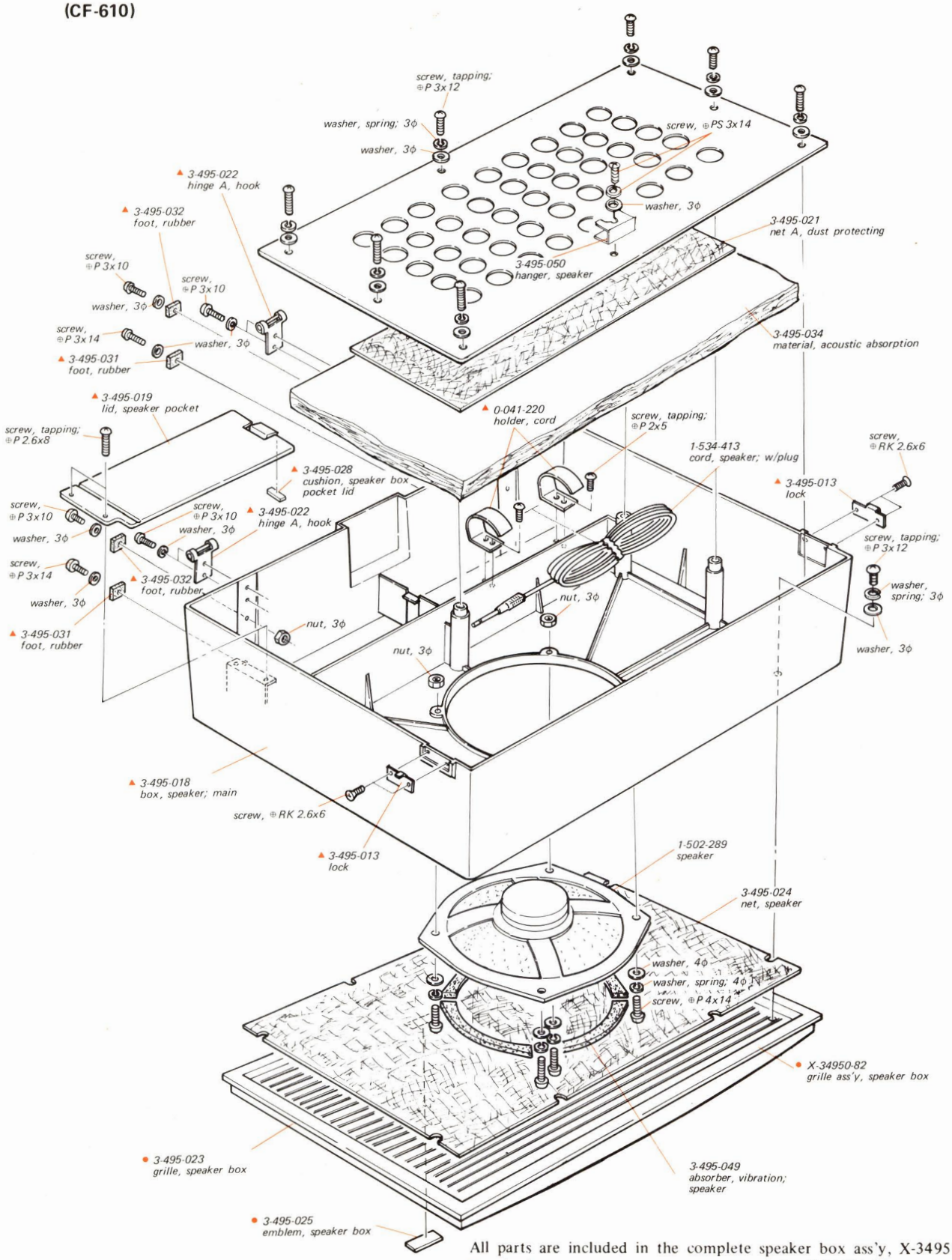


○ : included in the function selector ass'y, X-34880-02

Tape Recorder Chassis — bottom view —

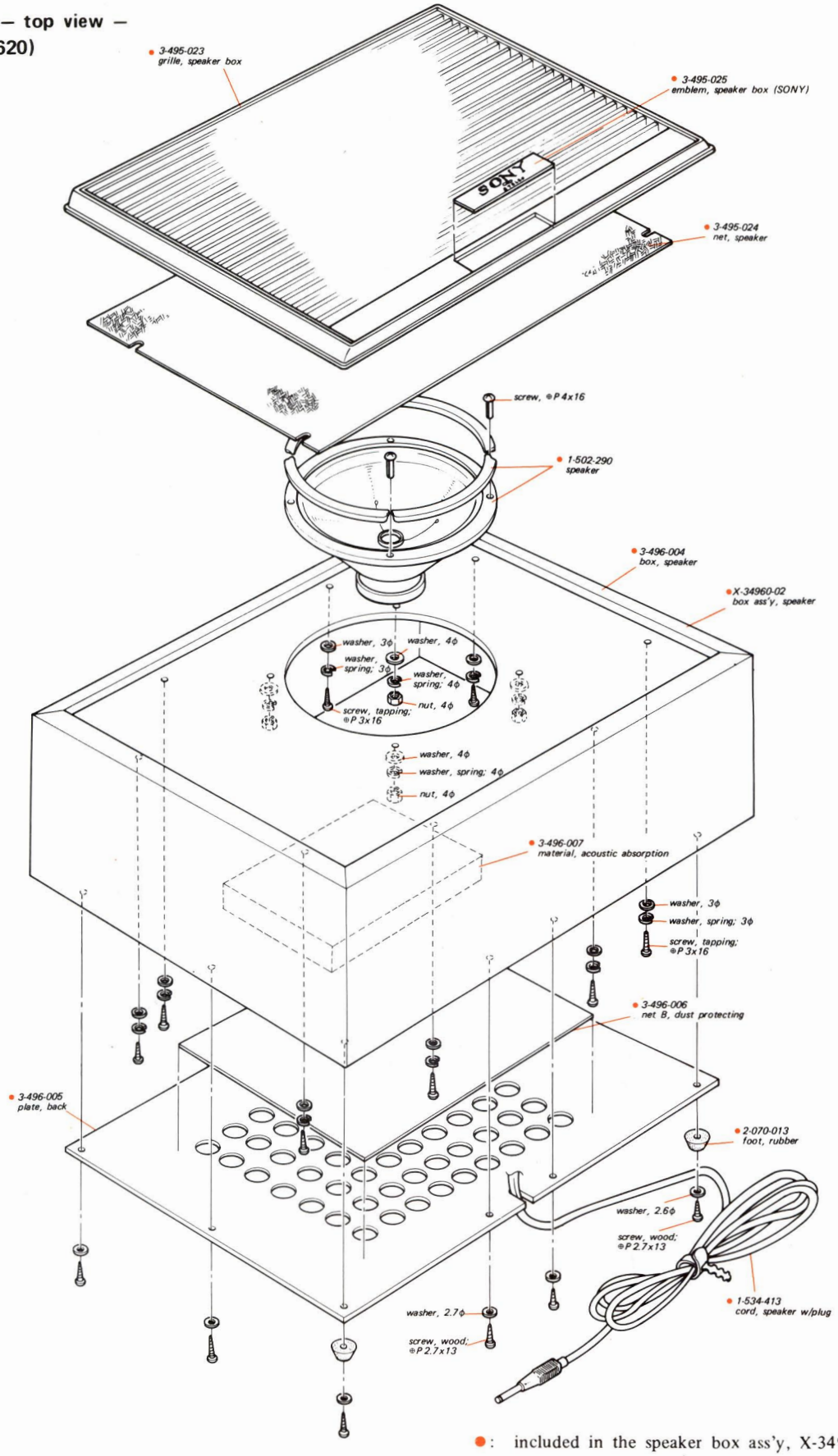


Speaker Box – top view –
(CF-610)



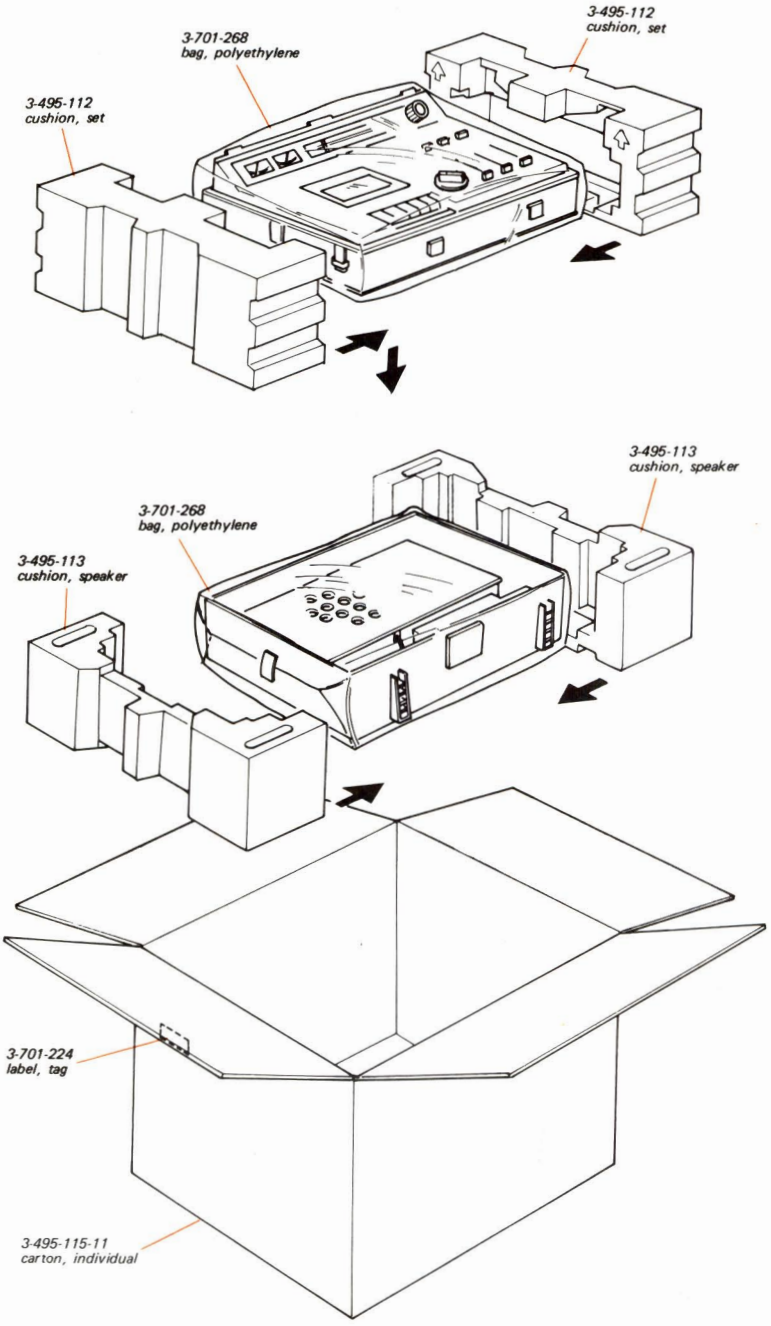
All parts are included in the complete speaker box ass'y, X-34950-05.
●: included in the speaker box grille ass'y, X-34950-82.
▲: included in the speaker box ass'y, X-34950-81.

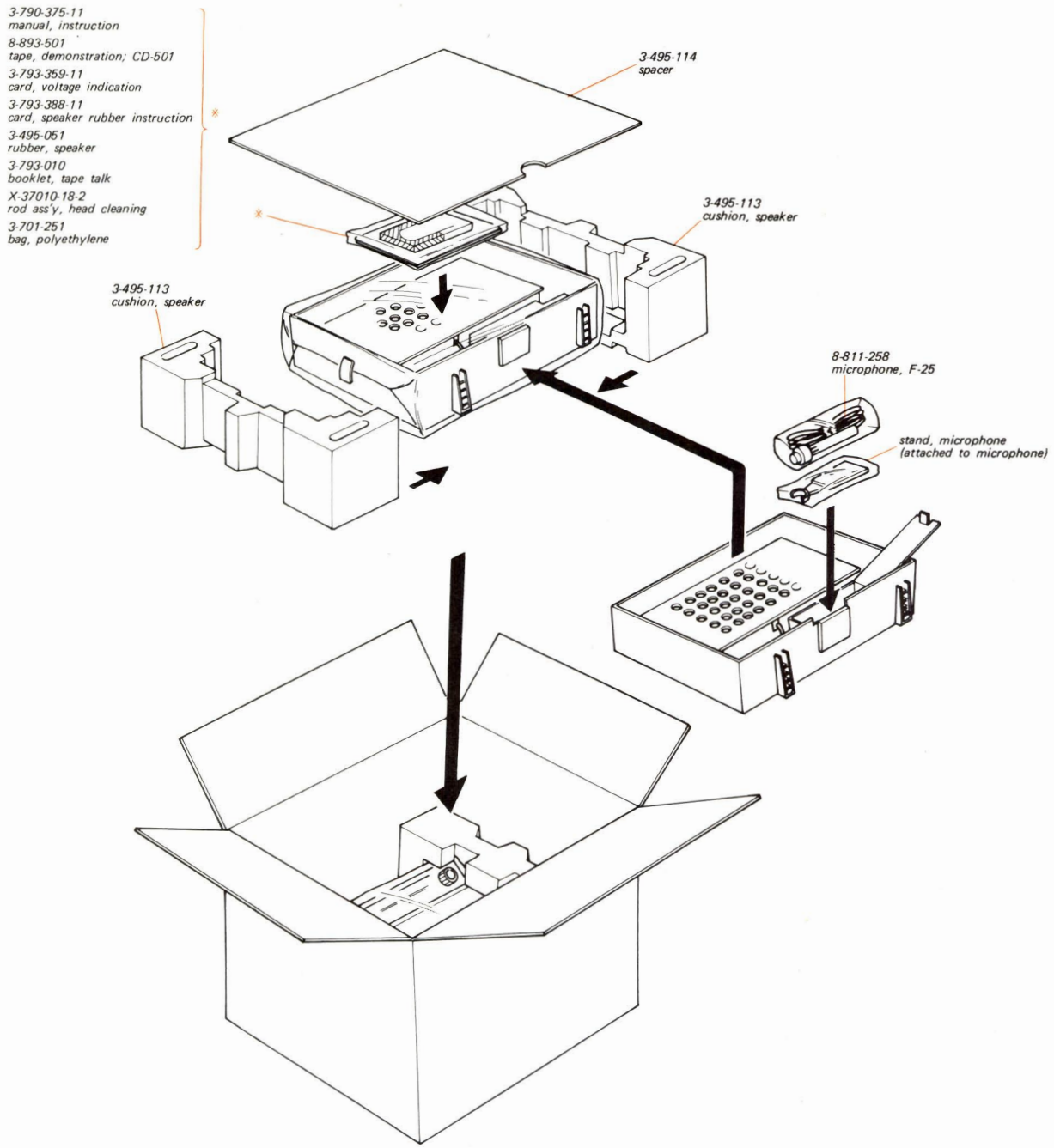
Speaker Box — top view — (CF-620)



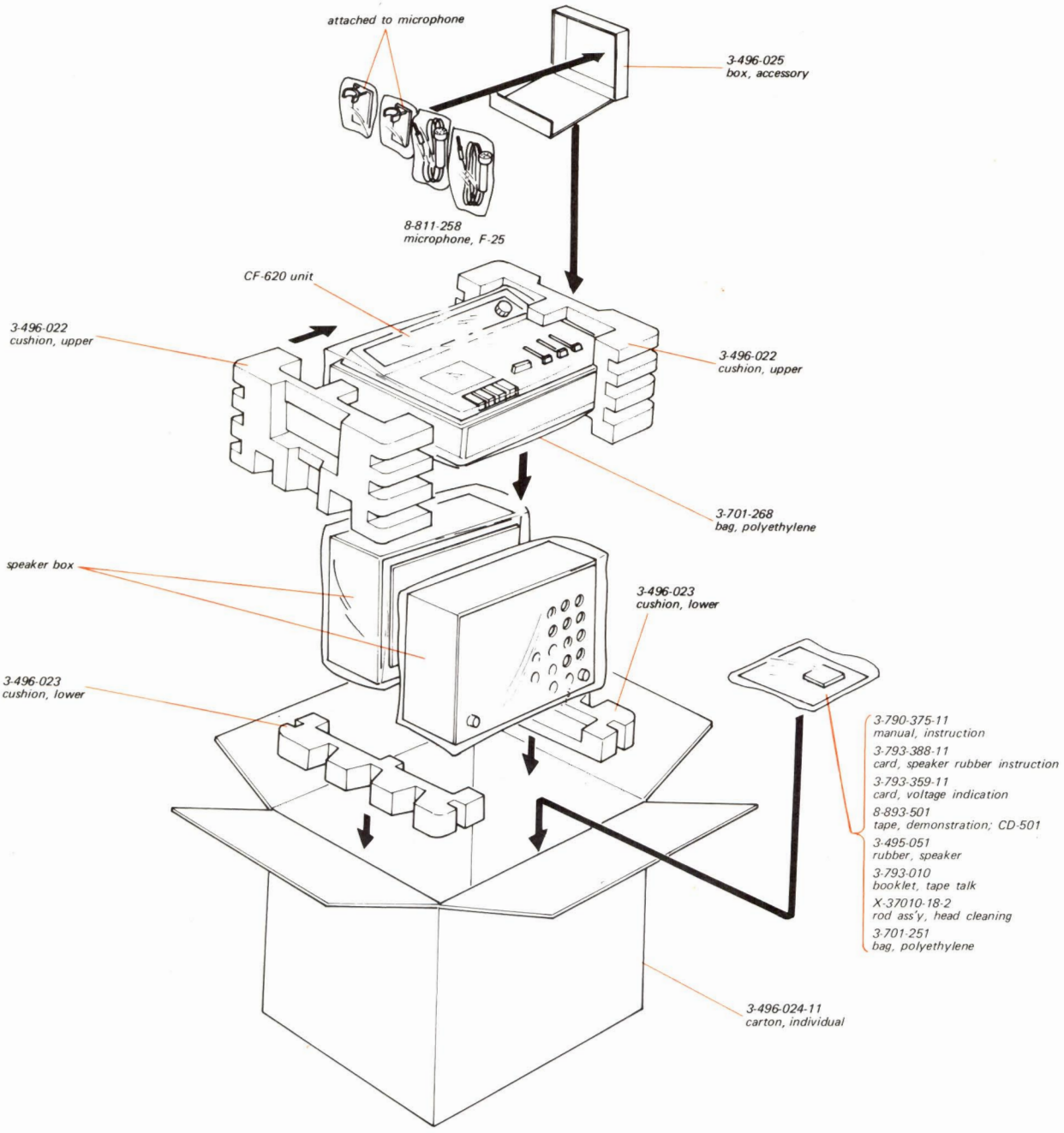
●: included in the speaker box ass'y, X-34960-02.

Packing
(CF-610)




3-790-375-11
manual, instruction
8-893-501
tape, demonstration; CD-501
3-793-359-11
card, voltage indication
3-793-388-11
card, speaker rubber instruction
3-495-051
rubber, speaker
3-793-010
booklet, tape talk
X-37010-18-2
rod ass'y, head cleaning
3-701-251
bag, polyethylene
※
※
3-495-114
spacer
3-495-113
cushion, speaker
3-495-113
cushion, speaker
8-811-258
microphone, F-25
stand, microphone
(attached to microphone)

Packing
(CF-620)



SECTION 6
PARTS LIST

6-1. ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	MOUNTED CIRCUIT BOARDS	
	Y-48043-51	radio (TCB-011BW2C)
	X-34950-52	switch
	X-34950-51	audio amp.
	PRINTED CIRCUIT BOARDS	
	1-539-450-23	radio
	1-581-097	audio amp.
	1-581-098	input selector switch
	SEMICONDUCTORS	
Q101		transistor 2SK23
Q102		transistor 2SC710
Q103		transistor 2SC710
Q201		transistor 2SC710
Q202		transistor 2SC633A
Q203		transistor 2SC710
Q204		transistor 2SC633A
Q205		transistor 2SC710
Q301		– discarded –
Q302		transistor 2SK23
Q303		transistor 2SC633A
Q304		transistor 2SC634A
Q305		transistor 2SC634A
Q401		transistor 2SC633A
Q402		transistor 2SC710
Q403		transistor 2SC710
Q404		transistor 2SC710
Q501, 601		transistor 2SC631A
Q502, 602		transistor 2SC631A
Q503, 603		transistor 2SC631A
Q504, 604		transistor 2SC633A
Q505, 605		transistor 2SC631A
Q506, 606		transistor 2SC633A
Q507, 607		transistor 2SC633A
Q508, 608		transistor 2SC633A
Q509, 609		transistor 2SC634A
Q510, 610		transistor 2SC634A
Q511, 611		transistor 2SD291
Q512, 612		transistor 2SD291
Q513, 613		transistor 2SC633A
Q701		transistor 2SC633A
Q702		transistor 2SD291
D101		diode 1S351M
D102		diode 1T243M
D201		diode 1T22A
D202		diode 1T22A
D203		diode 1S1555
D204		diode 1S1555
D301		diode 1T22A
D302		diode 1T22A
D303		diode 1T22A
D304		diode 1T22A
D305		diode 1T22A
D306		diode 1T22A
D401		diode 1T23A or 1T22A
D402		diode 1T23A or 1T22A
D403		diode 1S1555
D501, 601		diode 10D-05
D502, 602		diode 10D-05
D503, 603		diode 10D-05
D504, 604		diode 1T22
D701		diode 1T244
D702		diode 1T243M
D703		diode 1T244
D704		diode 10D-2
D705		diode 10D-2
D706		diode 10D-2
Th501, 601		thermistor S-10K
	COILS & TRANSFORMERS	
L101	1-401-391	coil, fm antenna
L102	1-425-547	coil, fm rf
L103	1-405-434	coil, fm osc.
L301	1-407-418	coil, SCA trap; 22 mH
L401	1-401-386-41	coil, ferrite am antenna
L402	1-405-391	coil, a-m osc.
L501, 601	1-407-212	inductor, micro; 33 mH
IFT101	1-403-556-21	transformer, i-f; 10.7 MHz
IFT201	1-403-291	transformer, discriminator; 10.7 MHz
IFT401	1-403-152	transformer, i-f; 455 kHz
IFT402	1-403-128	transformer, i-f; 455 kHz
T1	1-441-775	transformer, power
CF201~204	1-403-562-91	ceramic filter, 10.7 MHz
CF401	1-403-153-14	ceramic filter, 455 kHz
B101	1-417-025-12	transformer, antenna matching
T302	1-425-260-12	transformer, switching; 38 kHz
	CAPACITORS	
CV101~103 CV401~402	1-151-219	tuning
CT101~103 CT401~402		built in tuning capacitor
C101	1-102-951	15 pF 50 V ceramic
C102	1-102-951	15 pF 50 V ceramic

Ref. No.	Part No.	Description		
C103	1-101-004	0.01 μF	50 V	ceramic
C104	1-101-923	0.01 μF	25 V	ceramic
C105	1-102-963	33 pF	50 V	ceramic
C106	1-102-982	180 pF	50 V	ceramic
C107	1-101-924	0.022 μF	25 V	ceramic
C108	1-101-924	0.022 μF	25 V	ceramic
C109	1-101-924	0.022 μF	25 V	ceramic
C110	1-101-004	0.01 μF	50 V	ceramic
C111	1-102-894	15 pF	50 V	ceramic
C112	1-102-947	10 pF	50 V	ceramic
C113	1-101-004	0.01 μF	50 V	ceramic
C114	1-101-924	0.022 μF	25 V	ceramic
C115	1-101-924	0.022 μF	25 V	ceramic
C116	1-101-924	0.022 μF	25 V	ceramic
C117	1-121-415	100 μF	16 V	electrolytic
C118	1-102-862	3 pF	50 V	ceramic
C119	1-102-947	10 pF	50 V	ceramic
C120	1-102-942	5 pF	50 V	ceramic
C121	1-102-942	5 pF	50 V	ceramic
C201	1-101-919	0.0022 μF	25 V	ceramic
C202	1-101-919	0.0022 μF	25 V	ceramic
C203	1-101-919	0.0022 μF	25 V	ceramic
C204	1-101-919	0.0022 μF	25 V	ceramic
C205		built in IFT201		
C206		built in IFT201		
C207	1-102-977	200 pF	25 V	ceramic
C208	1-101-340	120 pF	50 V	ceramic
C209	1-101-340	120 pF	50 V	ceramic
C210	1-121-402	33 μF	10 V	electrolytic
C211	1-102-977	200 pF	25 V	ceramic
C212	1-102-951	15 pF	50 V	ceramic
C213	1-101-924	0.022 μF	25 V	ceramic
C214	1-101-924	0.022 μF	25 V	ceramic
C215	1-101-924	0.022 μF	25 V	ceramic
C216	1-121-398	10 μF	25 V	electrolytic
C217	1-101-924	0.022 μF	25 V	ceramic
C218	1-101-924	0.022 μF	25 V	ceramic
C219	1-101-924	0.022 μF	25 V	ceramic
C220	1-121-403	33 μF	16 V	electrolytic
C221	1-101-924	0.022 μF	25 V	ceramic
C222	1-101-924	0.022 μF	25 V	ceramic
C223		– discarded –		
C224	1-101-924	0.022 μF	25 V	ceramic
C225	1-101-924	0.022 μF	25 V	ceramic
C226	1-101-924	0.022 μF	25 V	ceramic
C301	1-101-924	0.022 μF	25 V	ceramic
C302		– discarded –		
C303		– discarded –		
C304		– discarded –		
C305	1-105-685-12	0.1 μF	50 V	mylar
C306	1-107-140	240 pF	50 V	silvered mica

Ref. No.	Part No.	Description		
C307	1-121-398	10 μF	25 V	electrolytic
C308	1-121-415	100 μF	16 V	electrolytic
C309		built in MU301		
C310		built in MU301		
C311	1-102-977	200 PF	50 V	ceramic
C312	1-121-403	33 μF	16 V	electrolytic
C313	1-102-977	200 pF	50 V	ceramic
C314	1-127-021	0.33 μF	10 V	electrolytic, alox
C315	1-105-683-12	0.068 μF	50 V	mylar
C316	1-121-398	10 μF	25 V	electrolytic
C317	1-103-575	4,700 pF	50 V	styrol
C318	1-127-022	0.47 μF	10 V	electrolytic, alox
C319	1-105-683-12	0.068 μF	50 V	mylar
C320	1-105-683-12	0.068 μF	50 V	mylar
C321	1-105-665-12	0.0022 μF	50 V	mylar
C322	1-105-665-12	0.0022 μF	50 V	mylar
C323	1-105-665-12	0.0022 μF	50 V	mylar
C324	1-105-665-12	0.0022 μF	50 V	mylar
C325	1-105-663-12	0.0015 μF	50 V	mylar
C326	1-105-663-12	0.0015 μF	50 V	mylar
C327	1-105-679-12	0.033 μF	50 V	mylar
C328	1-105-679-12	0.033 μF	50 V	mylar
C329	1-127-021	0.33 μF	10 V	electrolytic, alox
C330	1-127-021	0.33 μF	10 V	electrolytic, alox
C331	1-107-140	240 pF	50 V	silvered mica
C401	1-101-924	0.022 μF	25 V	ceramic
C402	1-105-681-12	0.047 μF	50 V	mylar
C403	1-101-924	0.022 μF	25 V	ceramic
C404		built in IFT401		
C405	1-101-924	0.022 μF	25 V	ceramic
C406	1-101-924	0.022 μF	25 V	ceramic
C407		– discarded –		
C408	1-103-608	200 pF	50 V	styrol
C409		– discarded –		
C410	1-105-677-12	0.022 μF	50 V	mylar
C411		built in IFT402		
C412	1-101-924	0.022 μF	25 V	ceramic
C413	1-101-884	56 pF	50 V	ceramic
C414	1-101-924	0.022 μF	25 V	ceramic
C415	1-105-667-00	0.0033 μF	50 V	mylar
C416	1-105-677-12	0.022 μF	50 V	mylar
C417	1-121-413	100 μF	6.3 V	electrolytic
C418	1-101-924	0.022 μF	25 V	ceramic
C419	1-105-669-00	0.0047 μF	50 V	mylar
C420	1-101-924	0.022 μF	25 V	ceramic
C421	1-101-924	0.022 μF	25 V	ceramic
C422	1-121-391	1 μF	50 V	electrolytic
C423	1-101-924	0.022 μF	25 V	ceramic
C424	1-121-415	100 μF	16 V	electrolytic
C425	1-121-392	3.3 μF	25 V	electrolytic
C426	1-121-392	3.3 μF	25 V	electrolytic
C427	1-127-021	0.33 μF	10 V	electrolytic, alox

Ref. No.	Part No.	Description		
C501, 601	1-121-391	1 μF	50 V	electrolytic
C502, 602	1-107-143	330 pF	50 V	silvered mica
C503, 603	1-121-413	100 μF	6.3 V	electrolytic
C504, 604	1-121-413	100 μF	6.3 V	electrolytic
C505, 605	1-121-391	1 μF	50 V	electrolytic
C506, 606	1-121-402	33 μF	10 V	electrolytic
C507, 607	1-105-683-12	0.068 μF	50 V	mylar
C508, 608	1-105-689-12	0.22 μF	50 V	mylar
C509, 609	1-121-469	10 μF	10 V	electrolytic
C510, 610	1-105-673-12	0.01 μF	50 V	mylar
C511, 611	1-105-663-12	0.0015 μF	50 V	mylar
C512, 612	1-121-402	33 μF	10 V	electrolytic
C513, 613	1-107-107	10 pF	50 V	silvered mica
C514, 614	1-101-918	1,000 pF	25 V	ceramic
C515, 615	1-121-413	100 μF	6.3 V	electrolytic
C516, 616	1-107-107	10 pF	50 V	silvered mica
C517, 617	1-101-918	1,000 pF	25 V	ceramic
C518, 618	1-121-479	22 μF	16 V	electrolytic
C519, 619	1-105-839-12	0.033 μF	50 V	mylar
C520, 620	1-121-391	1 μF	50 V	electrolytic
C521, 621	1-121-395	4.7 μF	25 V	electrolytic
C522, 622	1-105-683-12	0.068 μF	50 V	mylar
C523, 623	1-105-677-12	0.022 μF	50 V	mylar
C524, 624	1-107-127	68 pF	50 V	silvered mica
C525, 625	1-121-422	220 μF	25 V	electrolytic
C526, 626	1-121-469	10 μF	10 V	electrolytic
C527 627	1-101-918	1,000 pF	25 V	ceramic
C528, 628	1-121-402	33 μF	10 V	electrolytic
C529, 629	1-121-403	33 μF	16 V	electrolytic
C530, 630	1-121-416	100 μF	25 V	electrolytic
C531, 631	1-105-671-12	0.0068 μF	50 V	mylar
C532, 632	1-107-051	15 pF	50 V	silvered mica
C533, 633	1-121-398	10 μF	25 V	electrolytic
C534, 634	1-121-413	100 μF	6.3 V	electrolytic
C535, 635	1-105-667-12	0.0033 μF	50 V	mylar
C536, 636	1-105-677-12	0.022 μF	50 V	mylar
C537, 637	1-105-667-12	0.0033 μF	50 V	mylar
C538, 638	1-105-673-12	0.01 μF	50 V	mylar
C539, 639	1-105-663-12	0.0015 μF	50 V	mylar
C540, 640	1-105-833-12	0.01 μF	50 V	mylar
C541, 641	1-121-391	1 μF	50 V	electrolytic
C542, 642	1-121-391	1 μF	50 V	electrolytic
C543, 643	1-121-391	1 μF	50 V	electrolytic
C544, 644	1-107-119	33 pF	50 V	silvered mica
C545, 645	1-107-131	100 pF	50 V	silvered mica
C546, 646	1-121-415	100 μF	16 V	electrolytic
C547, 647	1-121-469	10 μF	10 V	electrolytic
C548, 648	1-121-469	10 μF	10 V	electrolytic
C549, 649	1-107-131	100 pF	50 V	silvered mica
C550, 650	1-121-391	1 μF	50 V	electrolytic
C551, 651	1-107-051	15 pF	500 V	silvered mica
C552, 652	1-107-001	18 pF	500 V	silvered mica
C553, 653	1-107-052	22 pF	500 V	silvered mica
C554, 654	1-107-053	27 pF	500 V	silvered mica
C555, 655	1-107-058	120 pF	500 V	silvered mica
C556, 656	1-121-733	470 μF	25 V	electrolytic
C557, 657	1-107-135	150 pF	50 V	silvered mica
C558, 658	1-105-841-12	0.047 μF	50 V	mylar
C559, 659	1-101-918	1,000 pF	25 V	ceramic
C701	1-121-469	10 μF	10 V	electrolytic
C702	1-121-469	10 μF	10 V	electrolytic
C703	1-121-388	1,000 μF	35 V	electrolytic
C704	1-105-833-12	0.01 μF	50 V	mylar
C705	1-121-403	33 μF	16 V	electrolytic
C706	1-121-421	220 μF	16 V	electrolytic
C707	1-121-417	100 μF	50 V	electrolytic
C708	1-121-388	1,000 μF	35 V	electrolytic
C709	1-121-425	470 μF	10 V	electrolytic
C710	1-121-425	470 μF	10 V	electrolytic
C711	1-105-839-12	0.033 μF	50 V	mylar
C712	1-105-839-12	0.033 μF	50 V	mylar
C713		– discarded –		
C714	1-121-391	1 μF	50 V	electrolytic
C715	1-107-060	390 pF	500 V	silvered mica
C716	1-107-005	220 pF	500 V	silvered mica
C717	1-107-035	560 pF	500 V	silvered mica
C718	1-129-702	0.001 μF	630 V	polyethylene
C719	1-107-123	47 pF	50 V	silvered mica
C720	1-107-123	47 pF	50 V	silvered mica
C721	1-107-123	47 pF	50 V	silvered mica
C722	1-107-123	47 pF	50 V	silvered mica
C723	1-107-123	47 pF	50 V	silvered mica

RESISTORS

All resistors are ¼W and carbon type, unless otherwise noted.

R101	1-244-657	220 Ω
R102	1-244-701	15 kΩ
R103	1-244-681	2.2 kΩ
R104	1-242-665	470 Ω
R105	1-244-643	56 Ω
R106	1-244-643	56 Ω
R107	1-244-643	56 Ω
R108	1-242-673	1 kΩ
R109	1-242-677	1.5 kΩ
R110	1-244-693	6.8 kΩ
R111	1-244-697	10 kΩ
R112	1-244-657	220 Ω
R113	1-242-721	100 kΩ
R114	1-242-677	1.5 kΩ
R115	1-244-737	470 kΩ
R201	1-244-649	100 Ω
R202	1-242-671	820 Ω

Ref. No.	Part No.	Description
R203	1-242-689	4.7 kΩ
R204	1-242-681	2.2 kΩ
R205	1-244-657	220 Ω
R206	1-242-661	330 Ω
R207	1-244-677	1.5 kΩ
R208	1-244-679	1.8 kΩ
R209	1-242-671	820 Ω
R210	1-244-673	1 kΩ
R211	1-242-671	820 Ω
R212	1-242-705	22 kΩ
R213	1-242-673	1 kΩ
R214	1-242-669	680 Ω
R215	1-242-667	560 Ω
R216	1-244-675	1.2 kΩ
R217	1-242-689	4.7 kΩ
R218	1-242-673	1 kΩ
R219	1-244-673	1 kΩ
R220	1-244-673	1 kΩ
R221	1-244-647	82 Ω
R222	1-242-691	5.6 kΩ
R223	1-242-691	5.6 kΩ
R224	1-244-659	220 Ω
R225	1-244-701	15 kΩ
R226	1-242-645	68 Ω
R227	1-244-634	24 Ω
R228	1-244-625	10 Ω
R229	1-244-625	10 Ω
R230		– discarded –
R231	1-244-689	4.7 kΩ
R232	1-244-637	33 Ω
R233	1-242-697	10 kΩ
R234	1-244-680	2 kΩ
R235	1-242-645	68 Ω
R236	1-242-667	560 Ω
R237	1-242-705	22 kΩ
R301	1-242-709	33 kΩ
R302		– discarded –
R303		– discarded –
R304		– discarded –
R305		– discarded –
R306		– discarded –
R307	1-244-713	47 kΩ
R308	1-242-703	18 kΩ
R309	1-242-697	10 kΩ
R310	1-242-717	68 kΩ
R311	1-242-713	47 kΩ
R312	1-242-689	4.7 kΩ
R313	1-244-673	1 kΩ
R314	1-242-697	10 kΩ
R315	1-244-721	100 kΩ
R316	1-244-649	100 Ω
R317	1-242-689	4.7 kΩ
R318	1-244-715	56 kΩ
R319	1-244-661	330 Ω
R320	1-244-669	680 Ω
R321	1-244-690	5.1 kΩ
R322		– discarded –
R323	1-244-690	5.1 kΩ
R324	1-211-149	270 Ω 1W
R325	1-242-657	220 Ω
R326	1-244-666	510 Ω
R327	1-244-666	510 Ω
R328	1-242-673	1 kΩ
R329	1-242-673	1 kΩ
R330	1-242-666	510 Ω
R331	1-242-666	510 Ω
R332	1-242-683	2.7 kΩ
R333	1-242-683	2.7 kΩ
R334	1-242-672	910 Ω
R335	1-242-672	910 Ω
R336	1-242-686	3.6 kΩ
R337	1-242-686	3.6 kΩ
R338	1-244-689	4.7 kΩ
R339	1-244-689	4.7 kΩ
R340	1-242-709	33 kΩ
R341	1-242-709	33 kΩ
R401	1-244-691	5.6 kΩ
R402	1-242-664	430 Ω
R403	1-242-697	10 kΩ
R404	1-242-693	6.8 kΩ
R405	1-244-707	27 kΩ
R406	1-244-691	5.6 kΩ
R407	1-242-673	1 kΩ
R408	1-244-673	1 kΩ
R409	1-244-684	3 kΩ
R410	1-244-671	820 Ω
R411	1-242-687	3.9 kΩ
R412	1-244-689	4.7 kΩ
R413	1-244-665	470 Ω
R414	1-244-643	56 Ω
R415	1-244-689	4.7 kΩ
R416	1-244-645	68 Ω
R417	1-202-565	470 Ω ½W composition
R418	1-244-689	4.7 kΩ
R419	1-242-673	1 kΩ
R420	1-244-679	1.8 kΩ
R421	1-244-701	1.5 kΩ
R422	1-244-719	82 kΩ
R423	1-244-673	1 kΩ
R424	1-244-671	820 Ω
R425	1-244-657	220 Ω
R426	1-244-669	680 Ω
R427	1-244-673	1 kΩ
R428	1-242-689	4.7 kΩ

Ref. No.	Part No.	Description	
R429	1-244-643	56Ω	
R430	1-242-632	20Ω	
R431	1-242-645	68Ω	
R432	1-244-655	180Ω	
R433	1-242-713	47kΩ	
R501, 601	1-242-721	100kΩ	
R502, 602	1-244-661	330Ω	
R503, 603	1-242-705	22kΩ	
R504, 604	1-242-687	3.9kΩ	
R505, 605	1-242-713	47kΩ	
R506, 606	1-242-695	8.2kΩ	
R507, 607	1-242-733	330kΩ	
R508, 608	1-242-721	100kΩ	
R509, 609	1-242-673	1kΩ	
R510, 610	1-242-699	12kΩ	
R511, 611	1-242-683	2.7kΩ	
R512, 612	1-242-651	120Ω	
R513, 613	1-242-707	27kΩ	
R514, 614	1-242-669	680Ω	
R515, 615	1-242-697	10kΩ	
R516, 616	1-242-673	1kΩ	
R517, 617	1-242-661	330Ω	
R518, 618	1-242-697	10kΩ	
R519, 619	1-242-713	47kΩ	
R520, 620	1-242-679	1.8kΩ	
R521, 621	1-242-685	3.3kΩ	
R522, 622	1-221-465	500Ω (B)	semi-fixed
R523, 623	1-242-705	22kΩ	
R524, 624	1-242-705	22kΩ	
R525, 625	1-242-711	37kΩ	
R526, 626	1-242-699	12kΩ	
R527, 627	1-242-703	18kΩ	
R528, 628	1-242-649	100Ω	
R529, 629	1-242-683	2.7kΩ	
R530, 630	1-242-735	390kΩ	
R531, 631	1-242-723	120kΩ	
R532, 632	1-242-697	10kΩ	
R533, 633	1-242-723	120kΩ	
R534, 634	1-242-681	2.2kΩ	
R535, 635	1-242-717	68kΩ	
R536, 636	1-242-673	1kΩ	
R537, 637	1-242-719	82kΩ	
R538, 638	1-242-687	3.9kΩ	
R539, 639	1-242-693	6.8kΩ	
R540, 640	1-242-697	10kΩ	
R541, 641	1-242-673	1kΩ	
R542, 642	1-242-681	2.2kΩ	
R543, 643	1-242-695	8.2kΩ	
R544, 644	1-242-699	12kΩ	
R545, 645	1-242-685	3.3kΩ	
R546, 646	1-242-725	150kΩ	
R547, 647	1-242-735	390kΩ	
R548, 648	1-242-703	18kΩ	
R549, 649	1-242-681	2.2kΩ	
R550, 650	1-242-661	330Ω	
R551, 651	1-242-643	56Ω	
R552, 652	1-242-699	12kΩ	
R553, 653	1-242-705	22kΩ	
R554, 654	1-242-683	2.7kΩ	
R555, 655	1-242-703	18kΩ	
R556, 656	1-242-691	5.6kΩ	
R557, 657	1-242-703	18kΩ	
R558, 658	1-242-679	1.8kΩ	
R559, 659	1-242-705	22kΩ	
R560, 660	1-242-701	15kΩ	
R561, 661	1-242-723	120kΩ	
R562, 662	1-242-667	560Ω	
R563, 663	1-242-675	1.2kΩ	
R564, 664	1-242-717	68kΩ	
R565, 665	1-242-699	12kΩ	
R566, 666	1-242-717	68kΩ	
R567, 667	1-242-701	15kΩ	
R568, 668	1-242-713	47kΩ	
R569, 669	1-242-697	10kΩ	
R570, 670	1-242-643	56Ω	
R571, 671	1-242-669	680Ω	
R572, 672	1-242-683	2.7kΩ	
R573, 673	1-242-683	2.7kΩ	
R574, 674	1-242-697	10kΩ	
R575, 675	1-242-713	47kΩ	
R576, 676	1-242-683	2.7kΩ	
R577, 677	1-242-689	4.7kΩ	
R578, 678	1-242-715	56kΩ	
R579, 679	1-242-691	5.6kΩ	
R580, 680	1-242-665	470Ω	
R581, 681	1-242-665	470Ω	
R582, 682	1-242-601	1Ω	
R583, 683	1-242-601	1Ω	
R584, 684	1-242-601	1Ω	
R585, 685	1-242-601	1Ω	
R586, 686	1-242-695	8.2kΩ	
R587, 687	1-242-699	12kΩ	
R588, 688	1-242-669	680Ω	
R589, 689	1-242-625	10Ω	
R590, 690	1-202-557	220Ω	½W composition
R591, 691	1-242-693	6.8kΩ	
R692	1-242-677	1.5kΩ	
R693	1-242-681	2.2kΩ	
R701	1-242-705	22kΩ	
R702	1-242-687	3.9kΩ	
R703	1-221-465	500Ω (B)	semi-fixed
R704	1-221-952	20kΩ (B)	semi-fixed
R705	1-242-709	33kΩ	

Ref. No.	Part No.	Description	
R706	1-244-637	33Ω	
R707	1-242-657	220Ω	
R708	1-242-675	1.2kΩ	
R709	1-242-707	27kΩ	
R710	1-242-681	2.2kΩ	
R711	1-202-531	18Ω	½W
R712	1-242-609	2.2Ω	
R713	1-242-609	2.2Ω	
R714		– discarded –	
R715	1-202-549	330Ω	½W
R716		– discarded –	
R717		– discarded –	
R718		– discarded –	
R719	1-222-487	50kΩ (A)	variable; TONE
R720	1-222-488	10kΩ (D)	variable; VOL
		SWITCHES	
S1	1-514-860	slide, AFC	
S2	1-514-478	slide, fm antenna selector	
S3	1-514-813	slide, REC/PB	
S4	1-514-861	slide, REC/PB	
S5	1-514-859	rotary, input SELECTOR	
S6	1-514-346	leaf, muting	
S7	1-513-273	slide, bias	
S8	1-514-860	slide, SPEAKER	
S9	1-514-702	leaf, MOTOR	
S10	1-514-655	seesaw, POWER	
S11	1-514-449	slide, ISS (interference suppressor switch)	
S12	1-514-860	slide, TAPE SELECT	
		JACKS	
CNJ1	1-507-163	4P-phono, AUX, PHONO	
CNJ2	1-507-142	2P-phono, LINE OUT	
CNJ3	1-509-341	AC OUTLET	
J1	1-507-251	M-10, MIC	
J2	1-507-251	M-10, MIC	
J3	1-507-251	M-10, LID SP	
J4	1-507-251	M-10, LID SP	
J5	1-507-282	binaural, HEADPHONE	
J101～104	1-536-286	4P-phono, antenna	
		MISCELLANEOUS	
MU301	1-425-548	unit, MPX	
CP1	1-231-057	encapsulated component CR 0.033μF + 120Ω	
	1-464-005	unit, bias osc.	
ANT101, 102	1-501-128	antenna, telescopic	
	1-506-108	pin A, terminal	
	1-517-048	holder, pilot lamp	
PL1, 2, 3	1-518-051	lamp, pilot; 0.04A	
PL4, 5	1-518-070	lamp, pilot	
ME1, 2	1-524-081	meter, level	
P1, 2	1-534-413	cord, connection; speaker w/plug	
	1-534-487	cord, power (General Export)	
	1-534-587	cord, power (GEP)	
	1-536-179	lug, terminal strip C type 1L1	
	1-536-248	pin, terminal; circuit board	
RPH	8-829-136	head, rec/pb; PP128-3602	
EH	8-828-136	head, erase; EF65-36	
F	1-532-134	fuse, 0.8A	
	1-533-007	holder, fuse	
VS	1-509-427	selector, voltage	

When ordering replacement parts you should use PART NUMBER listed on the ELECTRICAL PARTS LIST or the EXPLODED VIEW. The reference number should not be used for ordering purposes.

6-2. HARDWARES

Part No.	Description
	SCREWS
7-621-255-45	⊕ P 2 x 6
7-628-253-25	⊕ PS 2 x 6
7-621-259-25	⊕ P 2.5 x 4
7-621-721-81	⊕ P 2.6 x 8 tapping
7-621-770-36	⊕ B 2.6 x 4
7-621-770-62	⊕ B 2.6 x 5
7-621-771-38	⊕ B 2.6 x 8
7-628-254-05	⊕ PS 2.6 x 5
7-682-148-01	⊕ P 3 x 8
7-685-147-21	⊕ P 3 x 10, tapping
7-682-548-14	⊕ B 3 x 8
7-682-549-14	⊕ B 3 x 10
7-682-550-13	⊕ B 3 x 12
7-682-646-01	⊕ PS 3 x 5
7-682-647-01	⊕ PS 3 x 6
7-682-648-01	⊕ PS 3 x 8
7-685-145-51	⊕ P 3 x 6, FTS
7-682-567-15	⊕ B 4 x 25
	NUTS
7-622-207-02	2.6φ
7-684-023-01	3φ
7-684-025-00	5φ
	WASHERS
7-623-105-12	2φ, middle
7-623-107-02	2.6φ, small
7-623-107-12	2.6φ, middle
7-623-108-02	3φ, small
7-623-108-12	3φ, middle
7-623-110-02	4φ, small
7-623-110-12	4φ, middle
	LOCK WASHER
7-623-408-01	3φ
	SPRING WASHERS
7-623-205-27	2φ
7-623-207-22	2.6φ
7-623-208-22	3φ
7-623-212-27	5φ
	RETAINING RINGS
7-624-102-01	1.5φ
7-624-104-01	2φ
7-624-106-01	3φ
7-624-109-01	5φ
	LUGS
7-623-507-11	2.6φ
7-623-508-11	3φ

– Hardware Nomenclature –

P – Pan Head Screw .....

PS – Pan Head Screw with Spring Washer .....

K – Flat Countersunk Head Screw ...

B – Binding Head Screw .....

RK – Oval Countersunk Head Screw ..

T – Truss Head Screw .....

R – Round Head Screw .....

F – Flat Fillister Head Screw .....

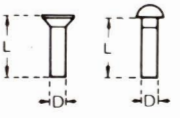
SC – Set Screw .....

E – Retaining Ring (E Washer) .....

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –

⊕ P 3x10
- Type of Slot
- Length in mm (L)
- Diameter in mm (D)
- Type of Head



SONY CORPORATION