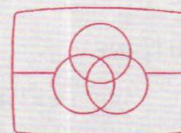


# CF-420L

*AEP Model*



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## FM/SW/MW/LW RADIO CASSETTE-CORDER

### RADIO SECTION

### SPECIFICATIONS

<b>Circuit:</b>	Superheterodyne
<b>Frequency Ranges:</b>	FM 87.5 ~ 108 MHz (3.43 ~ 2.78 m) MW 530 ~ 1,605 kHz (566 ~ 187 m) SW 6 ~ 18 MHz (51 ~ 17 m) LW 150 ~ 350 kHz (2,000 ~ 857 m)
<b>Intermediate Frequencies:</b>	FM 10.7 MHz AM 455 kHz
<b>Antennas:</b>	FM, SW built-in telescopic (5 section, 87 cm long) MW, LW built-in ferrite bar (10 mm dia x 13 cm)
<b>Sensitivity</b> at 50 mW output:	FM 2.5 dB (1.3 $\mu$ V) S/N 6 dB 13 dB (4.5 $\mu$ V) S/N 30 dB MW 33 dB/m (45 $\mu$ V/m) S/N 6 dB SW 7 dB (2.2 $\mu$ V) S/N 6 dB LW 41 dB/m (110 $\mu$ V/m) S/N 6 dB
<b>Selectivity</b> at 10 kHz off-resonance:	MW 29 dB at 1,400 kHz
<b>Signal-to-Noise Ratio:</b>	FM 62 dB at 98 MHz input level 55 dB (550 $\mu$ V) MW 35 dB at 1,000 kHz input level 60 dB/m (1 mV/m) SW 44 dB at 10 MHz input level 44 dB (160 $\mu$ V) LW 26 dB at 250 kHz input level 60 dB/m (1 mV/m)

### TAPE RECORDER SECTION

<b>Track:</b>	Two-track mono
<b>Record Bias Frequency:</b>	Approximately 35 kHz
<b>Frequency Response:</b>	50 ~ 10,000 Hz
<b>Wow and Flutter:</b>	0.3 % (RMS) weighted
<b>Signal-to-Noise Ratio:</b>	42 dB
<b>Overall Distortion:</b>	3.5 %
<b>Record/playback Head:</b>	PP134-36 (250 $\Omega$ /1 kHz)
<b>Erase Head:</b>	EBF5-02B (ferrite)
<b>Motor:</b>	D-009C (DC governor)
<b>Electret Condenser Microphone:</b>	C-1002S
<b>Automatic Shut-off Mechanism:</b>	Operates in playback, record, fast

forward and rewind modes by  
detecting reel spindle rotation and  
turns RADIO switch OFF.

<b>Inputs:</b>	MIC minimum level: -72 dB (0.2 mV) impedance: low LINE IN minimum level: -11 dB (0.22 V) impedance: 100 k $\Omega$
<b>Outputs:</b>	MONITOR normal level: -19 dB (85 mV) with 8 $\Omega$ load load impedance: 8 $\Omega$ LINE OUT normal level: -1.5 dB (0.65 V) with 100 k $\Omega$ load load impedance greater than 10 k $\Omega$
<b>REC/PB Connector:</b>	Input normal level: -33 dB (17.35 mV) impedance: 10 k $\Omega$ Output normal level: -1.5 dB (0.65 V) load impedance: 10 k $\Omega$

### GENERAL

<b>Power Requirements:</b>	AC 110, 127, 220, 240 V 50/60 Hz DC 6 V Battery size "D" x 4 Rechargeable battery BP-8 Car Battery DC 12 V by using SONY car battery cord DCC-127, DCC-126
<b>Power Consumption:</b>	AC 8 W
<b>Speaker:</b>	12 cm (5") dia, 20 $\Omega$
<b>Output Power:</b>	2.7 W
<b>Semiconductors:</b>	1 FET, (included in electret condenser microphone), 18 transistors and 12 diodes
<b>Dimensions:</b>	340 (w) x 224 (h) x 103 (d) mm 13 <sup>7</sup> / <sub>16</sub> (w) x 8 <sup>7</sup> / <sub>8</sub> (h) x 4 <sup>1</sup> / <sub>16</sub> (d) inches
<b>Weight:</b>	3.75 kg, 8 lb 4 oz (with battery)

# SONY

## SERVICE MANUAL

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*When ordering replacement parts, use PART NUMBERS listed in Parts Lists or shown in EXPLODED VIEWS. Parts List reference numbers should not be used.*

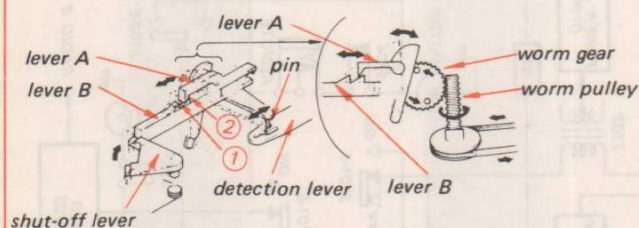
*In West Germany the fm frequency coverage should be within the range between 87.5 MHz and 108 MHz. Adjust the frequency coverage by osc coil and osc trimmer (See FM Frequency Coverage Adjustment on page 29).*

## SECTION 1 OUTLINE

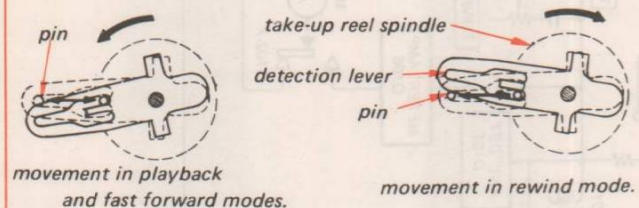
### 1-1. AUTOMATIC SHUT-OFF MECHANISM OPERATION

The automatic shut-off mechanism operates in record, playback, fast forward and rewind modes. Operation is shown step by step in numerical order.

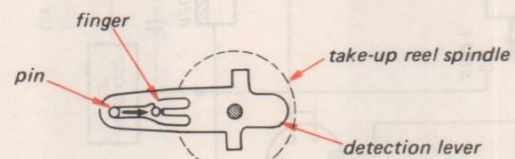
**1** The operation in playback mode is explained as an example. When the forward button is depressed and locked, the brake lever is pushed and turns the power switch ON starting the motor.



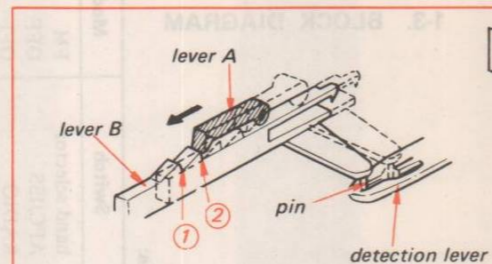
**2** Turning force is transmitted as shown. Lever A, activated by the worm gear rotation, moves lever B back and forth as shown.



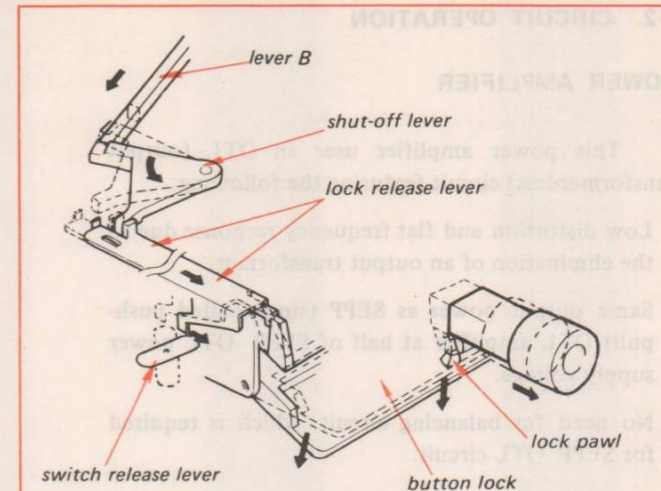
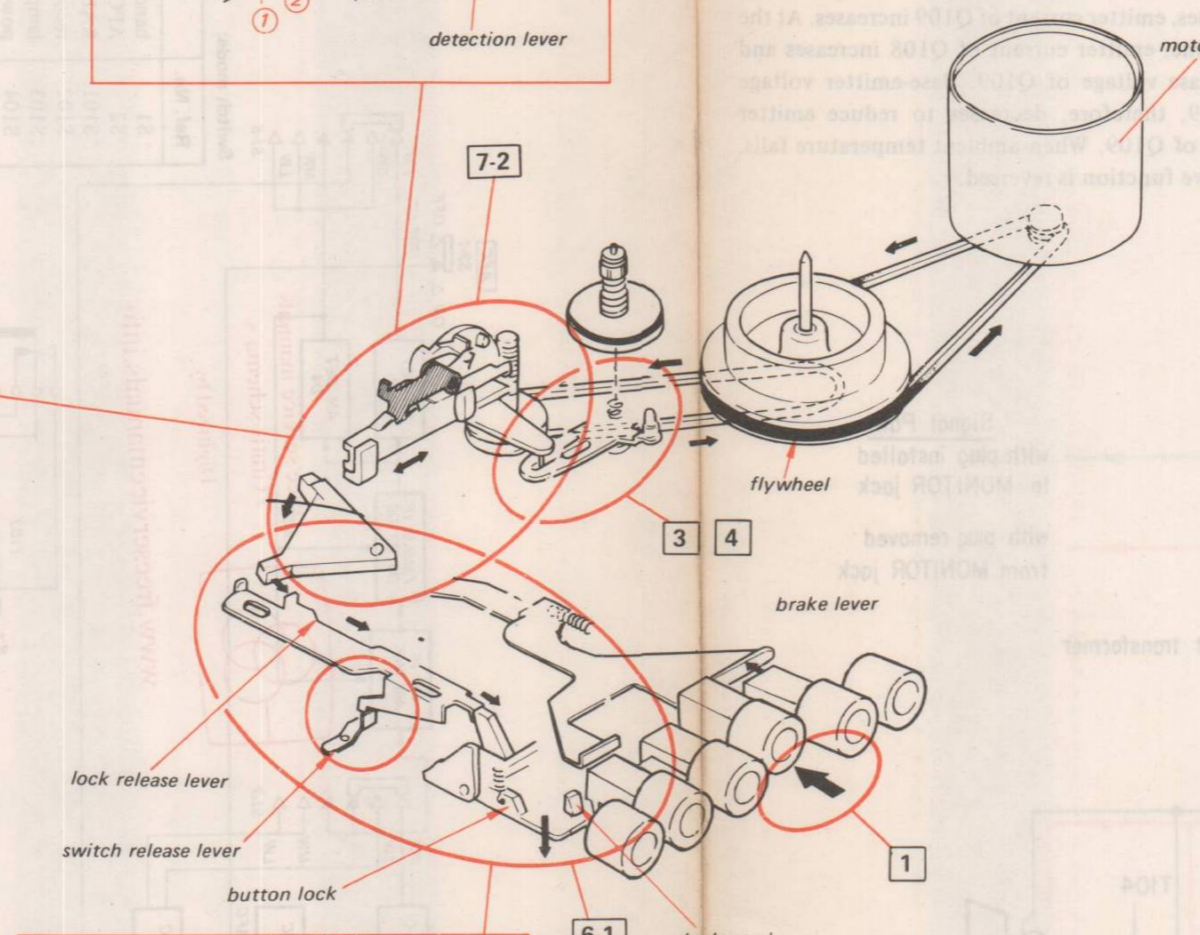
**3** Take-up reel spindle rotates as long as there is some tape remaining on the supply reel. The rotational force on the detection lever, which is attached to the take-up reel spindle through a spring, permits movement of the pin as shown above in various modes.



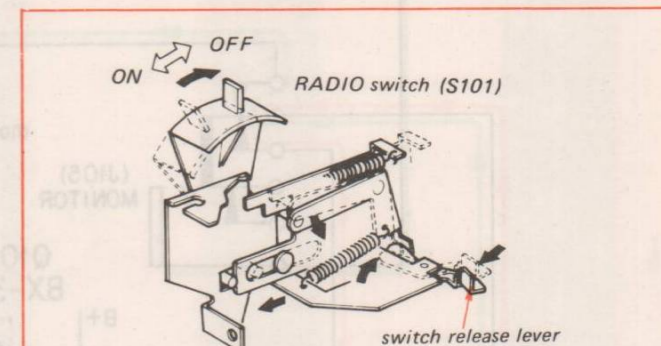
**4** When tape supply ends, the rotational force on the detection lever stops and the pin movement is limited by the finger.



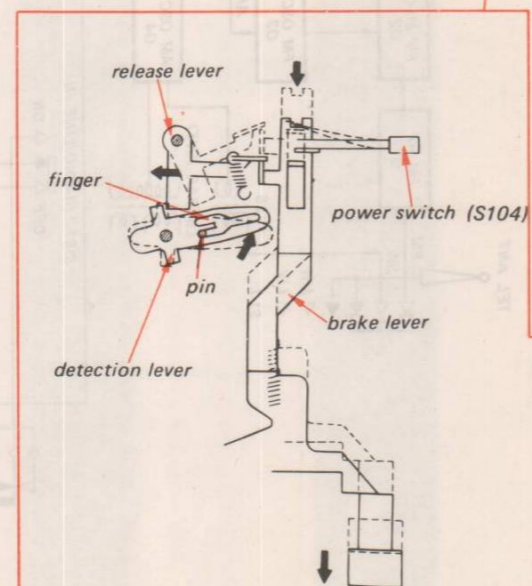
**5** The finger holds the pin (lever B) forward far enough so that the pawl of lever A is able to push lever B at position 2.



**6-1** Then lever B can push the shut-off lever far enough to release the button lock and the function button as shown.

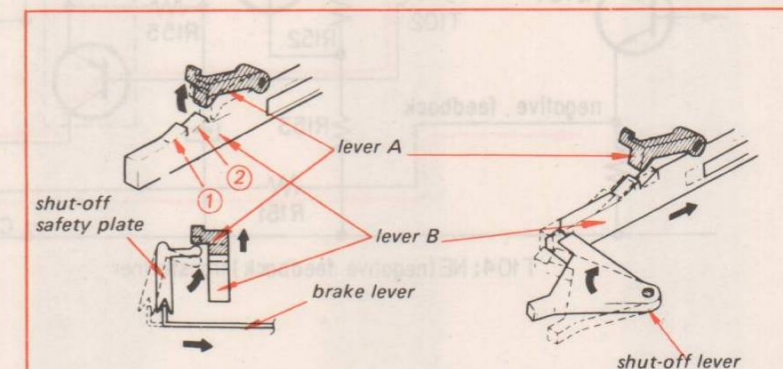


**6-2** RADIO switch (S101) is released as shown.



#### 7-1 RELEASE OPERATION (1)

With the function button released, the brake lever moves in the direction shown by the arrow, the power switch (S104) turns OFF and the release lever hits the detection lever and releases the pin from the finger.



#### 7-2 RELEASE OPERATION (2)

By the brake lever movement, the shut-off safety plate releases lever A as shown.

1-2. CIRCUIT OPERATION

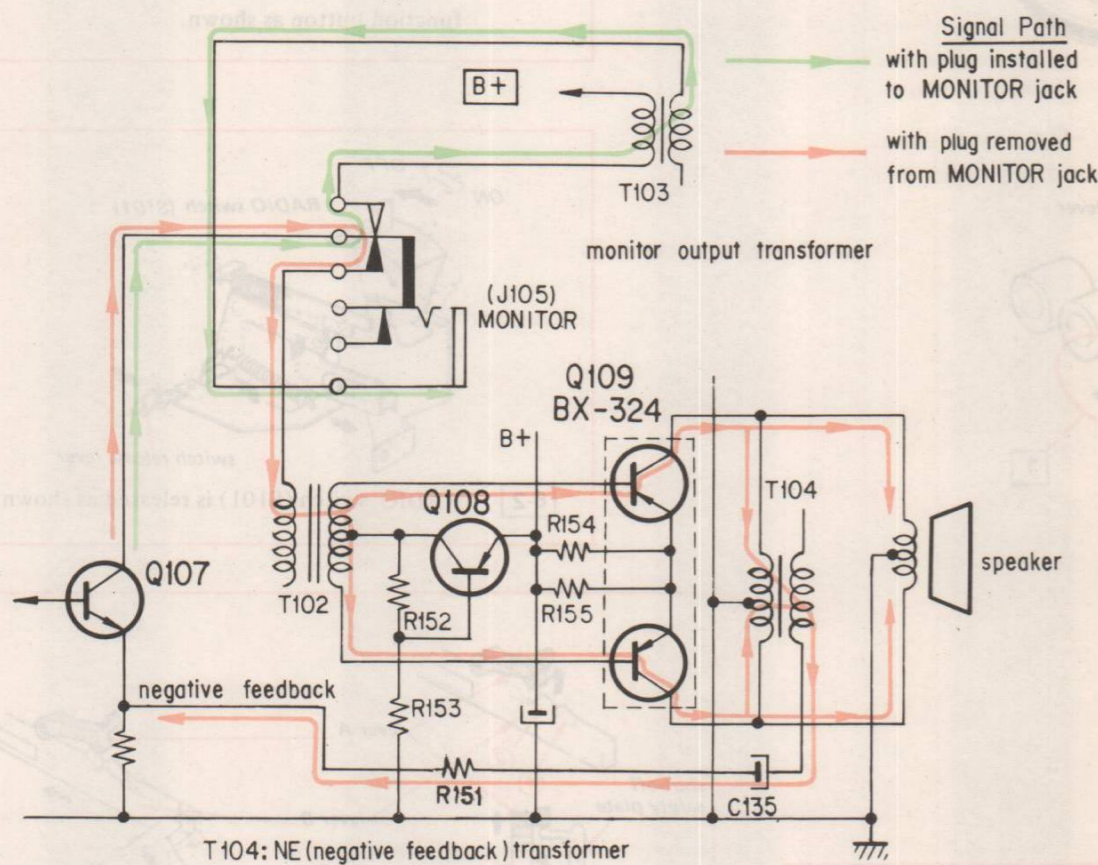
POWER AMPLIFIER

This power amplifier uses an OTL (output transformer-less) circuit featuring the following:

1. Low distortion and flat frequency response due to the elimination of an output transformer.
2. Same output power as SEPP (single-ended push-pull) OTL amplifier at half of SEPP OTL power supply voltage.
3. No need for balancing circuit, which is required for SEPP OTL circuit.

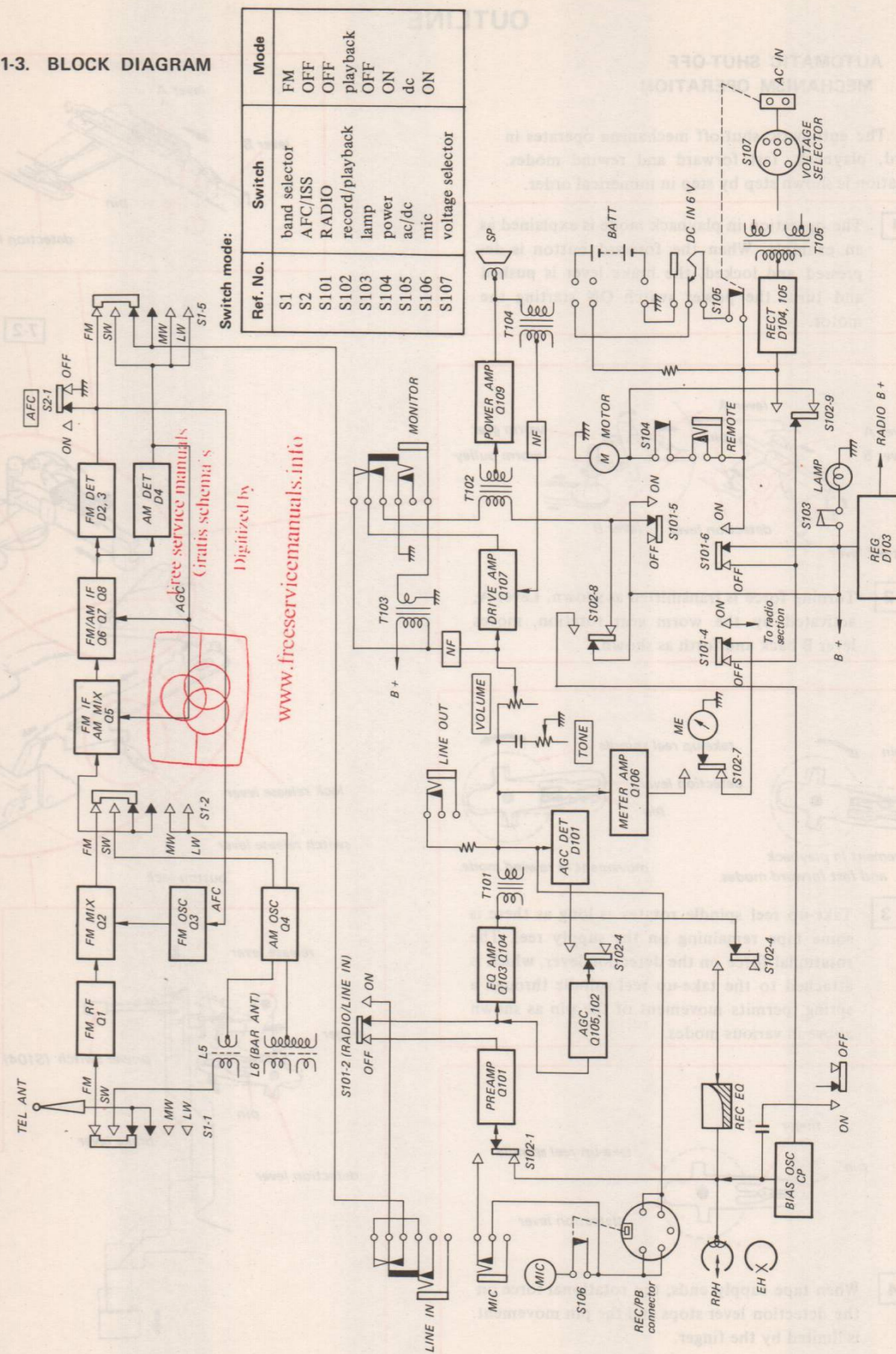
Q108:

To obtain high degree of circuit stability, Q108 neutralizes emitter current variations of Q109 caused by effects of ambient temperature, since Q108 and Q109 are germanium transistors having the same thermal response. When ambient temperature rises, emitter current of Q109 increases. At the same time, emitter current of Q108 increases and raises base voltage of Q109. Base-emitter voltage of Q109, therefore, decreases to reduce emitter current of Q109. When ambient temperature falls, the above function is reversed.

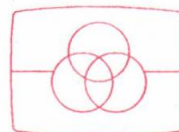


Signal Path with plug installed to MONITOR jack  
with plug removed from MONITOR jack

1-3. BLOCK DIAGRAM



1-4. EXTERNAL VIEW

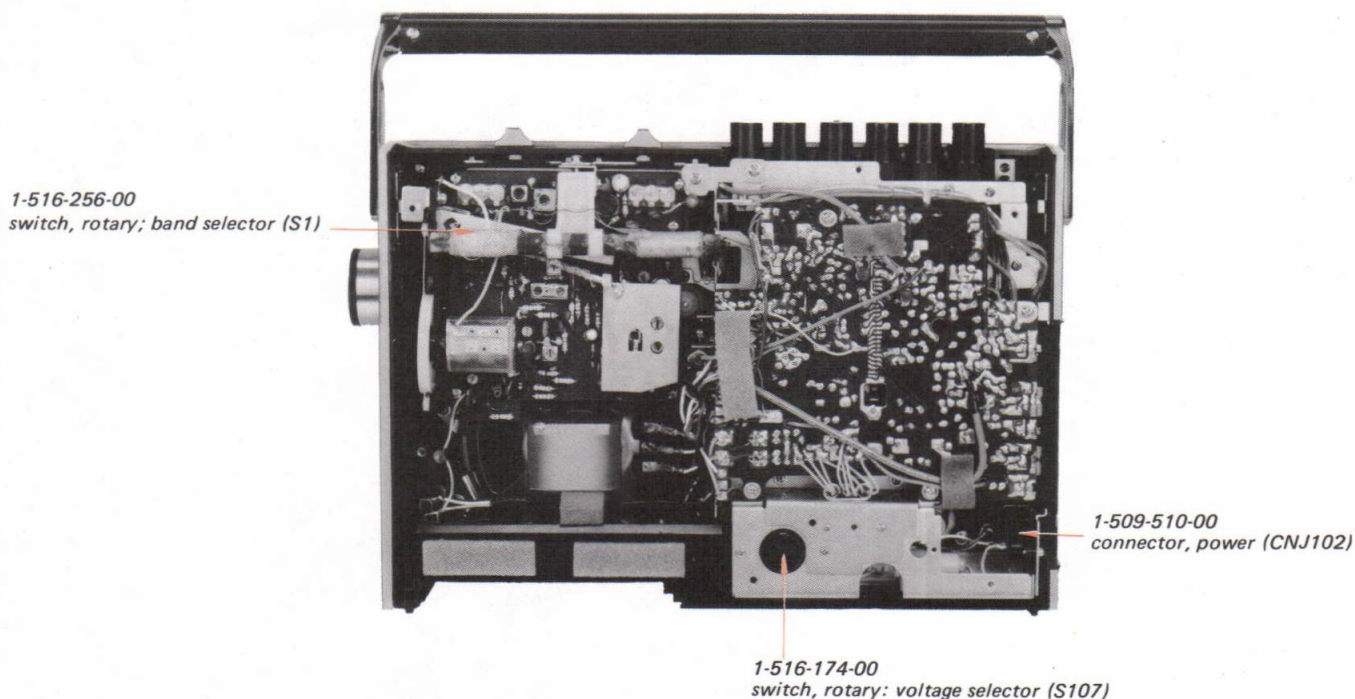


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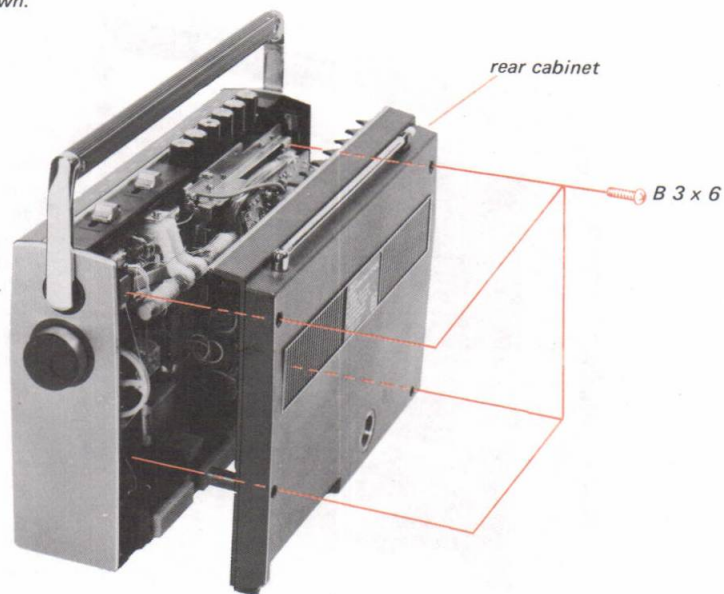
1-5. INTERNAL VIEW



## SECTION 2 DISASSEMBLY

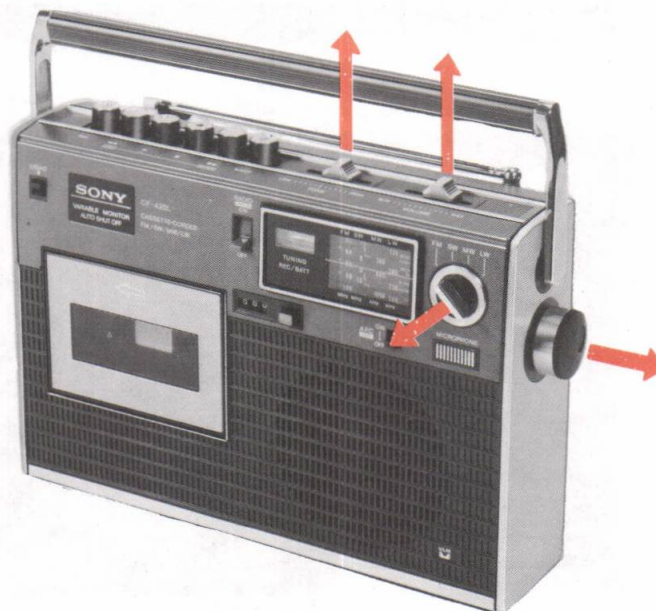
### 2-1. REAR CABINET REMOVAL

Remove four screws shown.

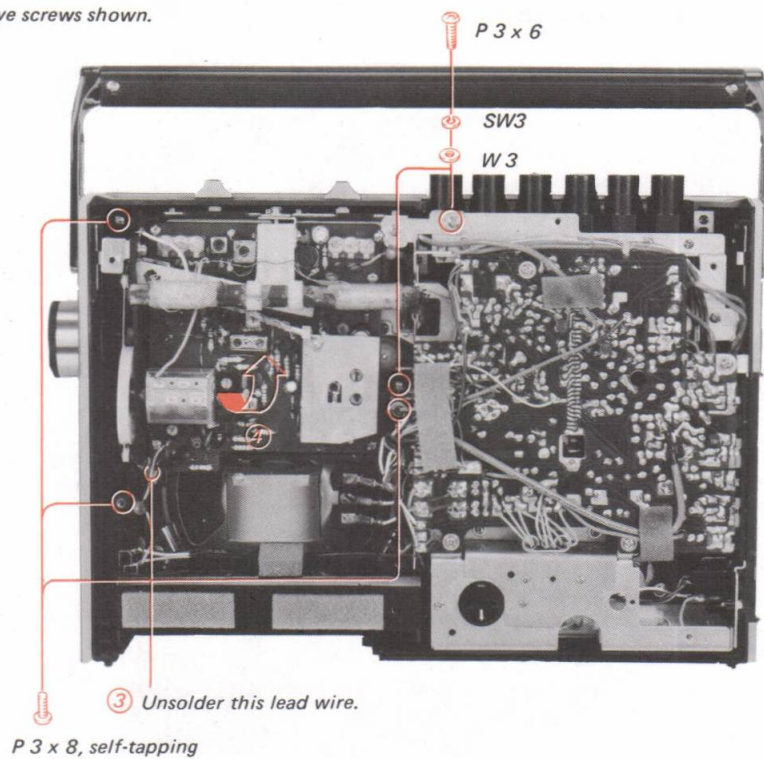


### 2-2. RADIO CHASSIS REMOVAL

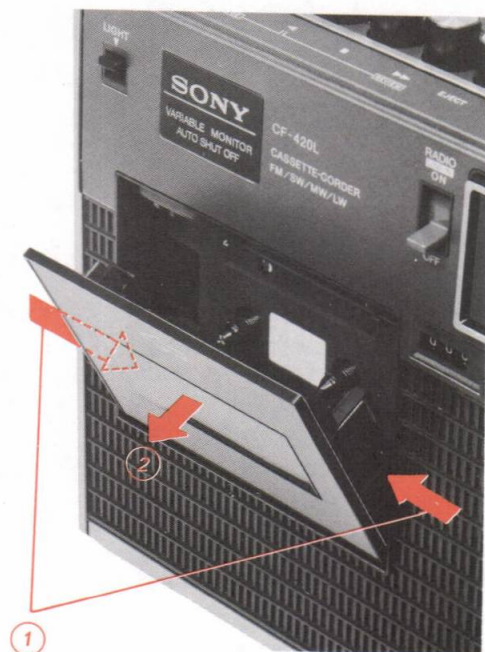
① Remove these knobs.



② Remove five screws shown.



### 2-3. CASSETTE HOLDER REMOVAL



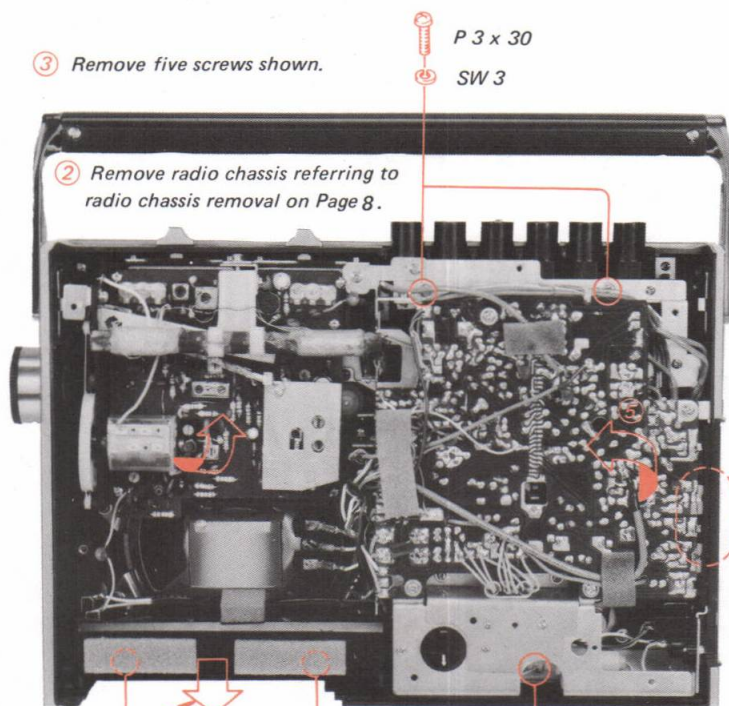
### 2-4. TAPE RECORDER CHASSIS REMOVAL

① Remove this screw.



③ Remove five screws shown.

② Remove radio chassis referring to radio chassis removal on Page 8.



**Note:** Carefully remove tape recorder circuit board in the direction shown by the arrow, since REC/PB connector securing screw is caught on cabinet.

④ Remove battery case in the direction shown by arrow.

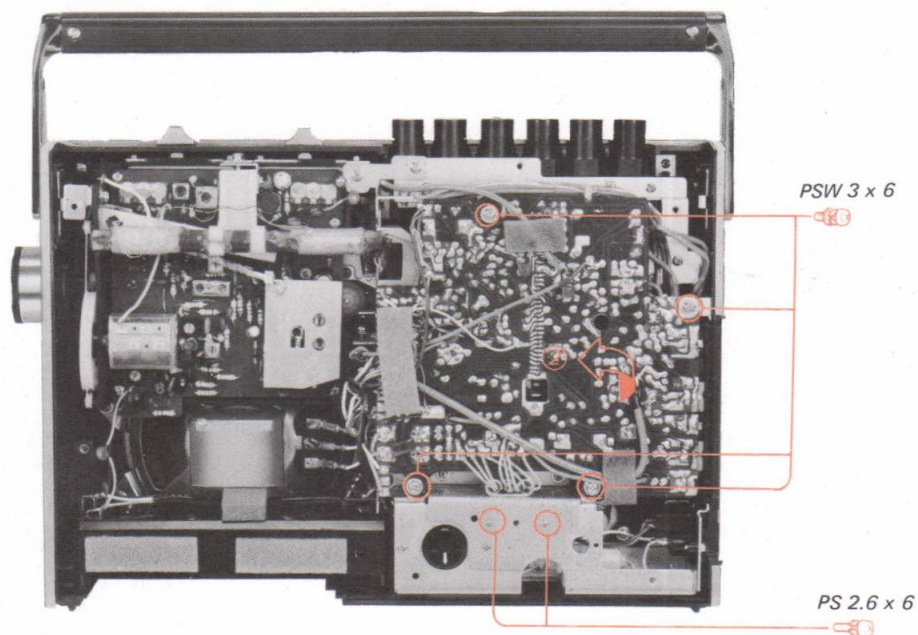
P 3 x 6, self-tapping  
(Remove from front side.)

W 3  
SW 3  
P 3 x 6



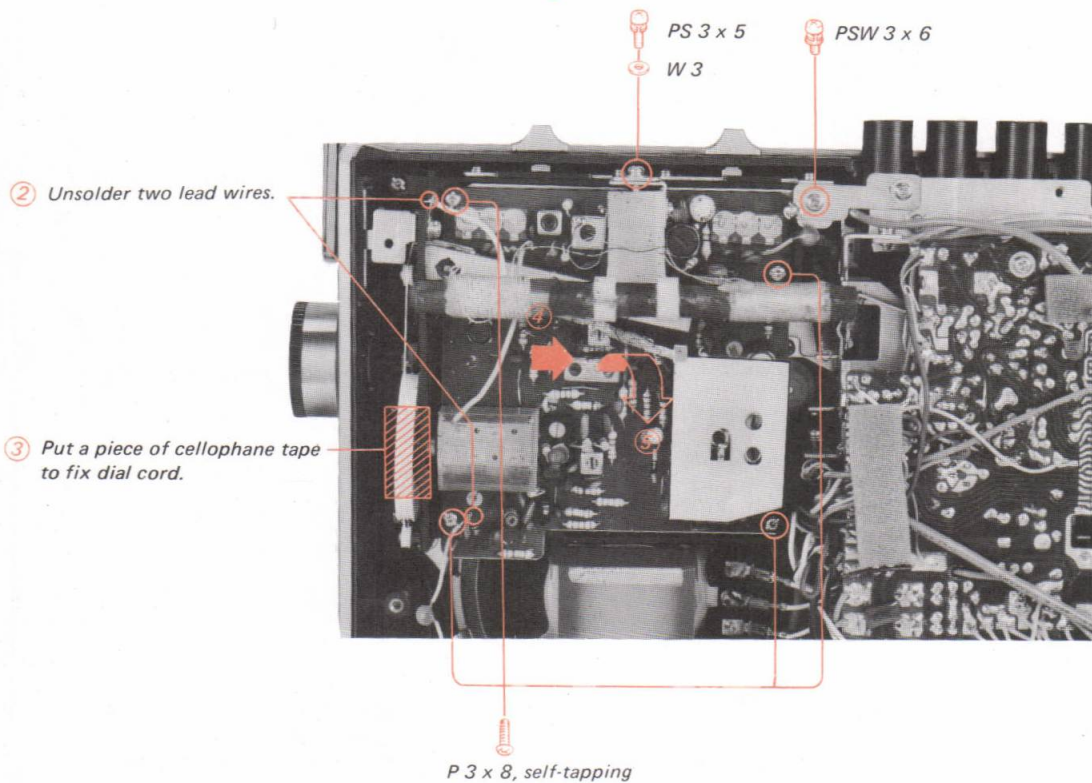
## 2-5. TAPE RECORDER CIRCUIT BOARD REMOVAL

① Remove six screws shown.



## 2-6. RADIO CIRCUIT BOARD REMOVAL

① Remove six screws shown.

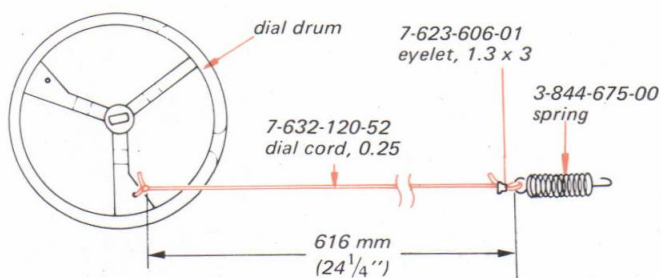


## 2-7. DIAL CORD STRINGING

Remove rear cabinet. (See Page 8)

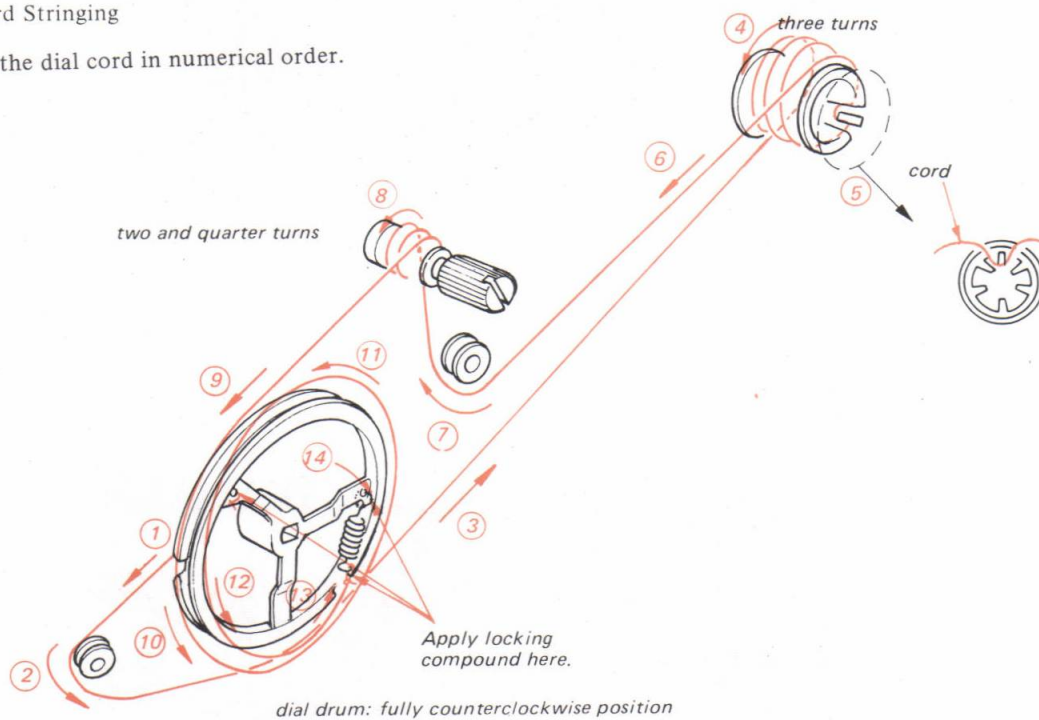
Remove radio chassis. (See Page 8 and 9)

### 1. Dial Cord Assembly



### 2. Dial Cord Stringing

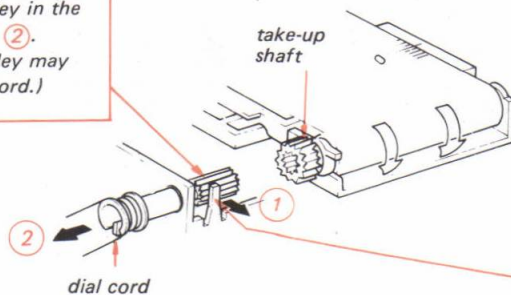
String the dial cord in numerical order.



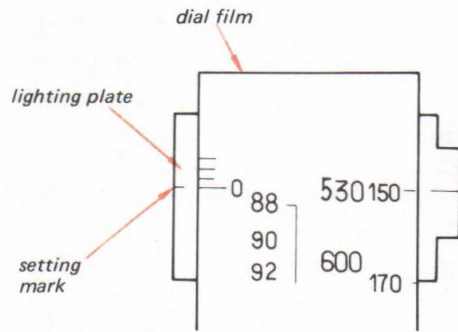
### 3. Dial Film Adjustment

dial drum: fully counterclockwise position

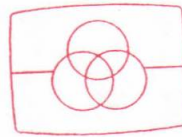
② Remove this stringing pulley in the direction shown by arrow ②. (Excessive pull of this pulley may cause to remove the dial cord.)



③ Turn take-up shaft so that "0" scale on the dial film comes at setting mark on lighting plate.



④ Insert the stringing pulley to take-up shaft.

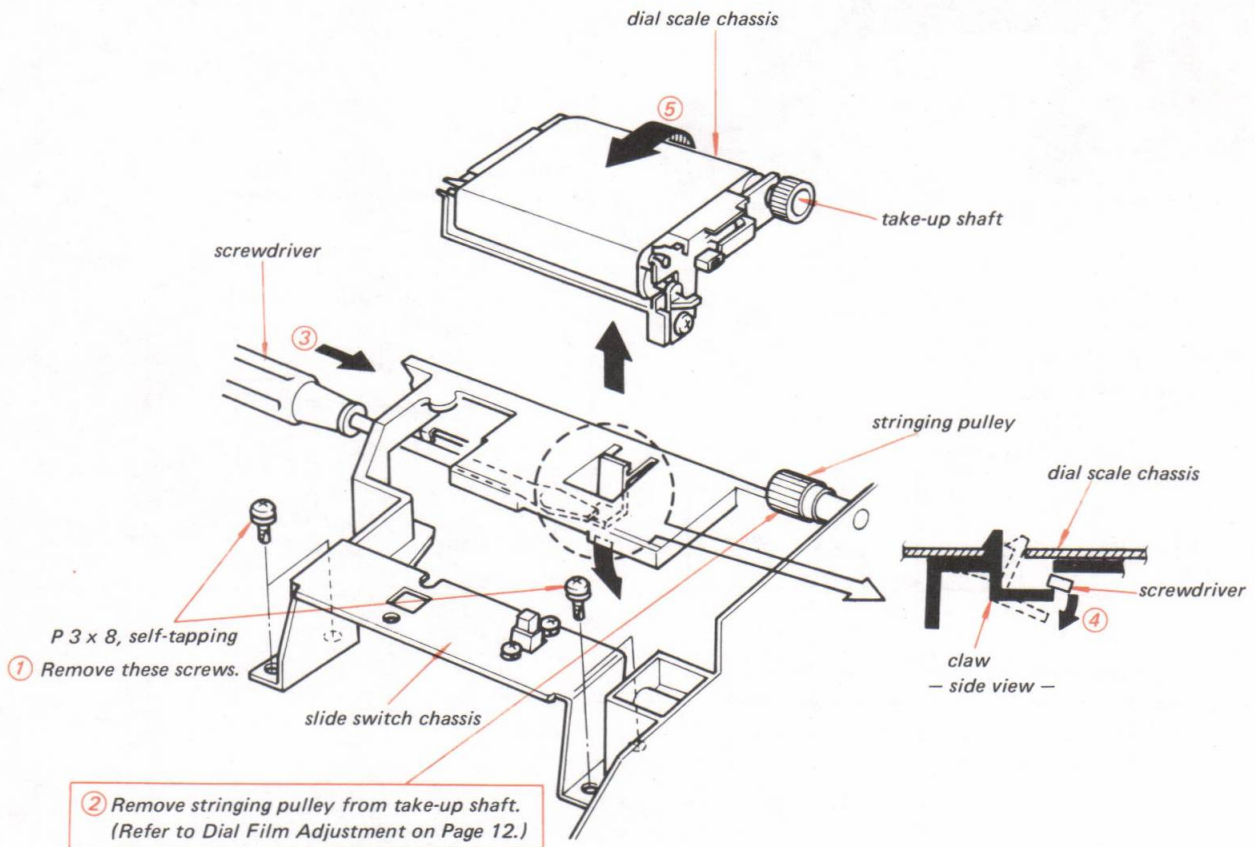


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### 2-8. DIAL SCALE CHASSIS REMOVAL

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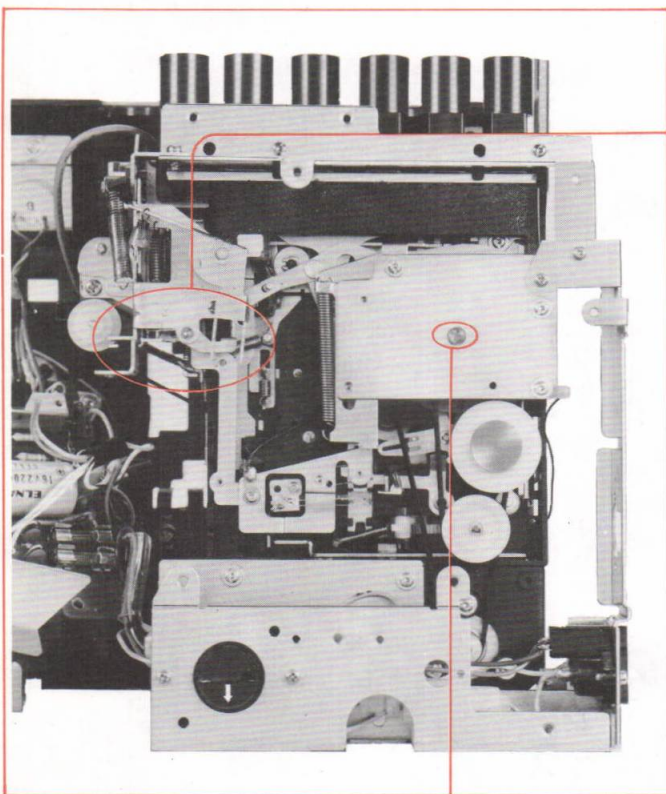


## SECTION 3

### ADJUSTMENTS

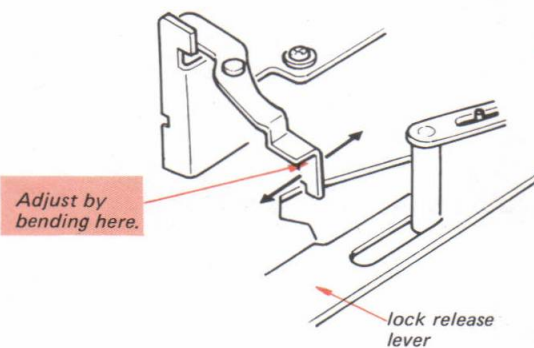
#### 3-1. MECHANICAL ADJUSTMENTS

Remove tape recorder chassis. (See Page 10)

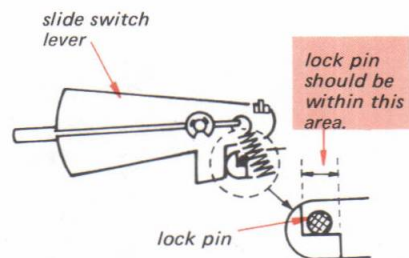


#### RADIO Switch Timing Adjustment — rewind mode —

- [1] Turn RADIO switch ON.
- [2] When shut-off mechanism operates at the tape end, ensure that rewind button releases after RADIO switch turns OFF. If necessary, adjust as follows:

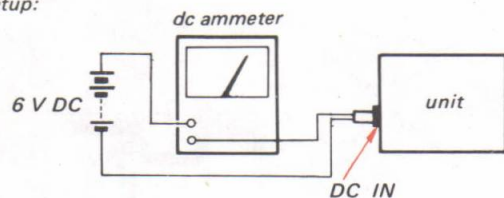


**Note:** After the adjustment, ensure that lock pin positions as shown below.



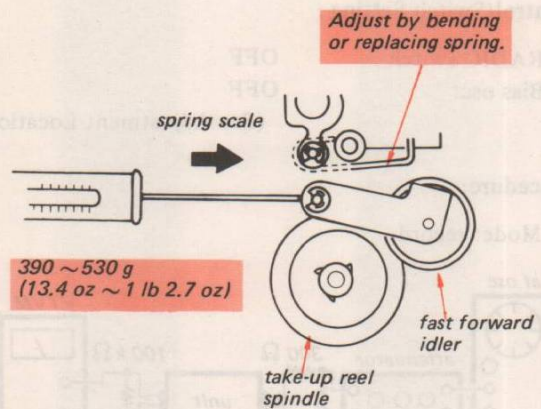
#### Flywheel Thrust Play Adjustment — playback mode —

##### 1. Setup:

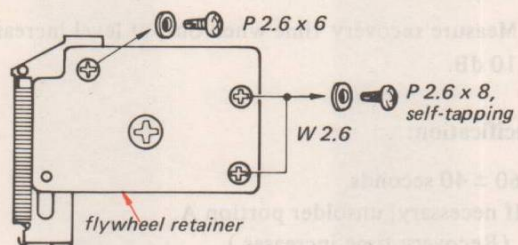


2. Position unit horizontally with flywheel side up.
3. Loosen thrust screw for sufficient flywheel play.
4. Tighten the screw until current suddenly increases, then loosen the screw  $\frac{1}{4}$  turn.

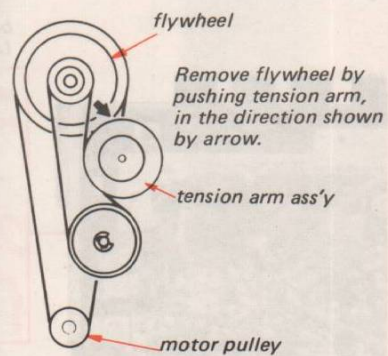
**Fast Forward Idler Pressure Adjustment**  
— fast forward mode —



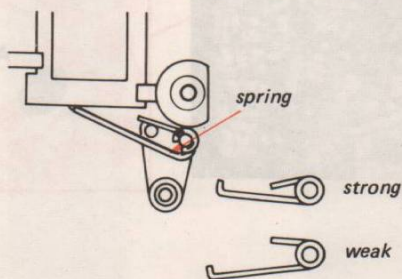
When adjusting, proceed as follows:  
[1] Remove Flywheel Retainer



[2] Remove Flywheel

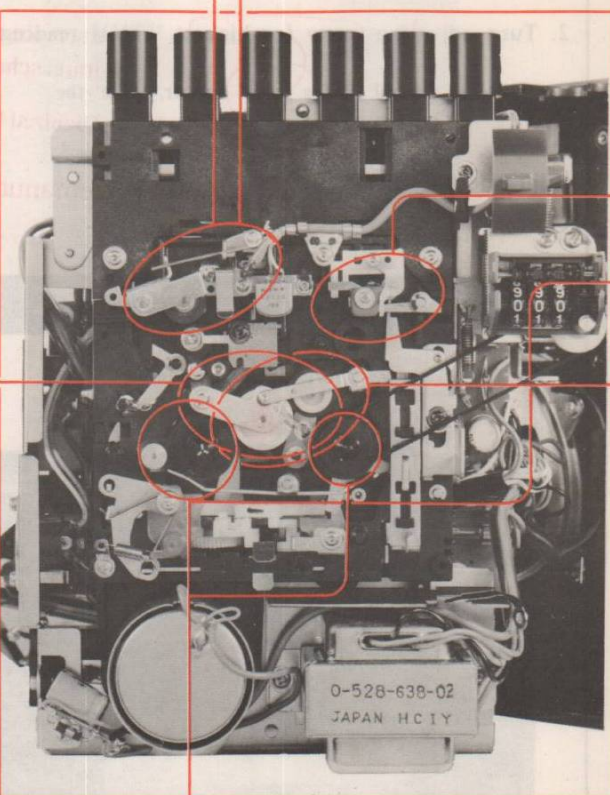
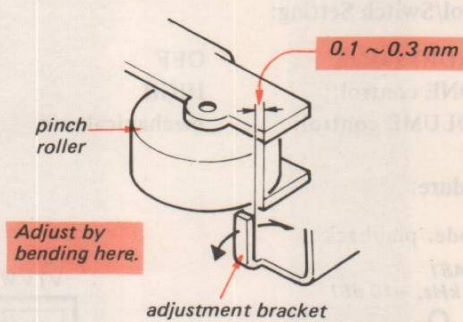


[3] Adjust by bending or replacing spring.



After the adjustment, clean the belts with alcohol moistend swab and install them without twist.

**Pinch Roller Timing Adjustment**  
— playback mode —



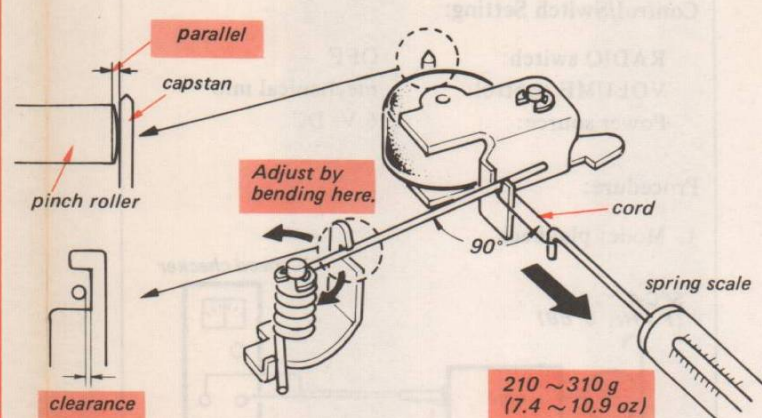
**Torque Measurement**

Mode	Torque meter	Meter reading
Playback	* CQ-101	25 ~ 50 g.cm
	General torque meter	35 ~ 60 g.cm (0.49 ~ 0.83 oz.inch)
fast forward	* CQ-201	50 ~ 100 g.cm
	General torque meter	50 ~ 100 g.cm (0.7 ~ 1.39 oz.inch)
rewind	* CQ-201	50 ~ 100 g.cm
	General torque meter	50 ~ 100 g.cm (0.7 ~ 1.39 oz.inch)

\* SONY cassette type torque meter

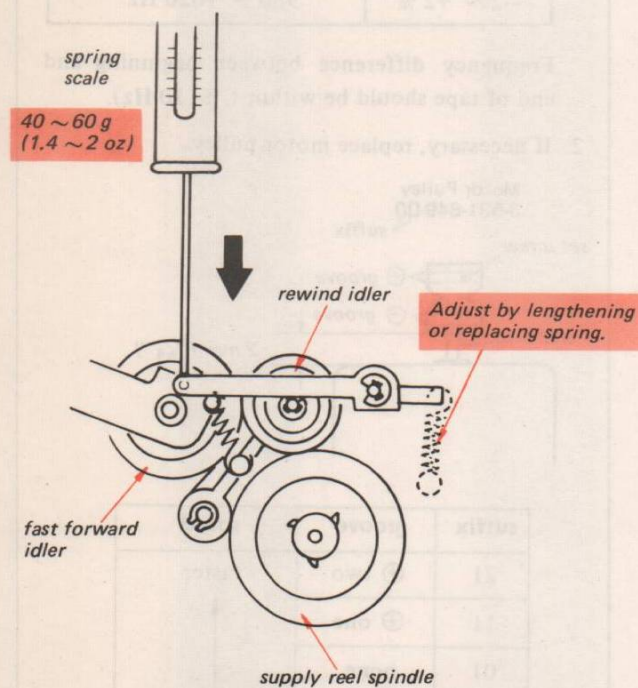
Part No.	Model Name
Y-20926-01-1	CQ-101
Y-20926-11-1	CQ-201

**Pinch Roller Pressure Adjustment**  
— playback mode —



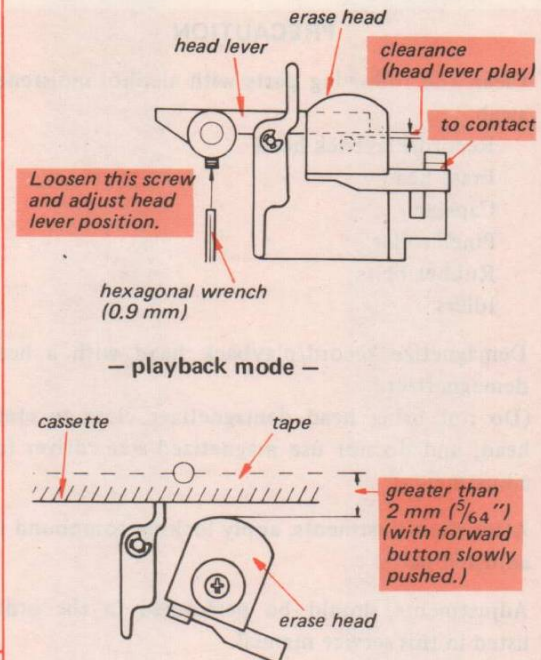
Note: The pressure should be measured just when the pinch roller contacts the capstan after being separated.

**Rewind Idler Pressure Adjustment**  
— rewind mode —

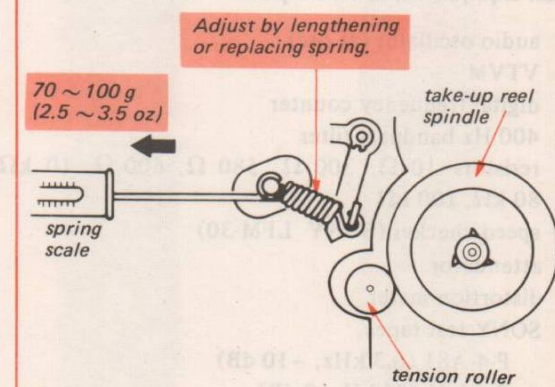


Note: The pressure should be measured just when the rewind idler contacts the supply reel spindle after being separated.

**Head Lever Adjustment**  
— record mode —



**Tension Roller Pressure Adjustment**  
— playback mode —



Note: The pressure should be measured just when the tension roller contacts the take-up reel spindle after being separated.

3-2. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

PRECAUTION

- Clean the following parts with alcohol moistened swab:
  - Record/Playback head
  - Erase head
  - Capstan
  - Pinch roller
  - Rubber belts
  - Idlers
- Demagnetize record/playback head with a head demagnetizer. (Do not bring head demagnetizer close to erase head, and do not use magnetized screwdriver for adjustments).
- After the adjustments, apply locking compound to adjusted parts.
- Adjustments should be performed in the order listed in this service manual.
- Adjustments and measurements should be performed with rated power supply voltage unless otherwise specified.

TAPE RECORDER SECTION

Test Equipment/Tools Required

- audio oscillator (af osc)
- VTVM
- digital frequency counter
- 400 Hz bandpass filter
- resistors 10 Ω, 300 Ω, 580 Ω, 600 Ω, 10 kΩ, 80 kΩ, 100 kΩ
- speed checker (SONY LFM-30)
- attenuator
- distortion meter
- SONY test tapes
  - P-4-A81 (6.3 kHz, -10 dB)
  - P-4-L81 (333 Hz, 0 dB)
  - SPC-4 (1 kHz, 0 dB)
  - WS-48 (3 kHz, 0 dB)
- blank tape cassette (completely erased)
- wow meter

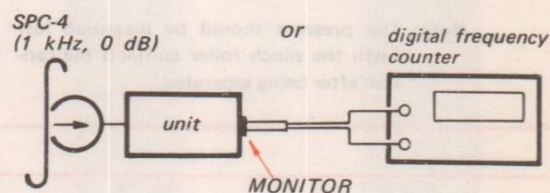
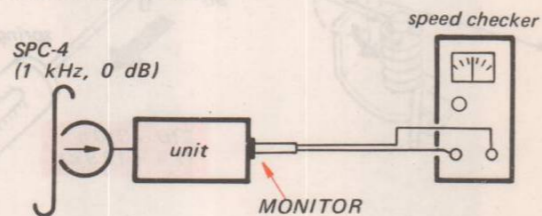
1. Tape Speed Adjustment

Control/Switch Setting:

RADIO switch: OFF  
 VOLUME control: mechanical mid  
 Power source: 6 V DC

Procedure:

- Mode: playback

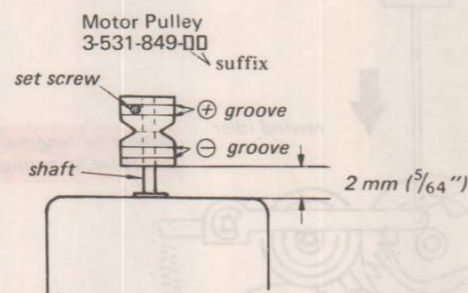


Specification:

speed checker	digital frequency counter
-2 ~ +2 %	980 ~ 1020 Hz

Frequency difference between beginning and end of tape should be within 1 % (10 Hz).

- If necessary, replace motor pulley.



suffix	groove	speed
21	⊕ two	faster
11	⊕ one	↑ ↓
01	none	
31	⊖ one	
41	⊖ two	slower

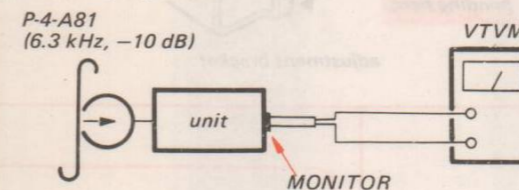
2. Record/playback Head Azimuth Adjustment

Control/Switch Setting:

RADIO switch: OFF  
 TONE control: HIGH  
 VOLUME control: mechanical mid

Procedure:

- Mode: playback



- Turn adjusting screw for highest VTVM reading.

Note: Several peaks may appear, take the highest.

Adjustment Location:



Note: Remove the cassette holder for azimuth adjustment. (See Page 9.)

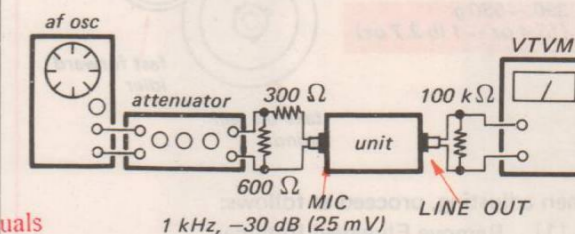
3. AGC Recovery Time Adjustment

Control/Switch Setting :

RADIO switch : OFF  
 Bias osc: OFF  
 (See Adjustment Location)

Procedure:

- Mode: record

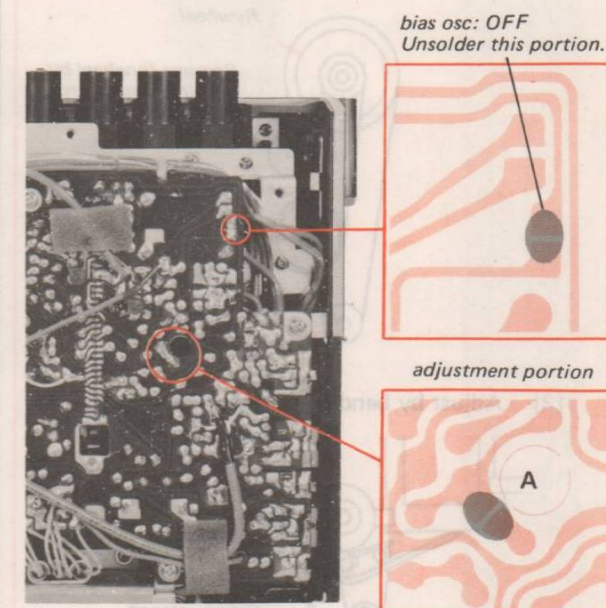


- Quickly decrease input signal to -60 dB (0.77 mV).
- Measure recovery time when output level increases 10 dB.

Specification:

60 ± 40 seconds.  
 If necessary, unsolder portion A.  
 (Recovery time increases.)

Adjustment Location



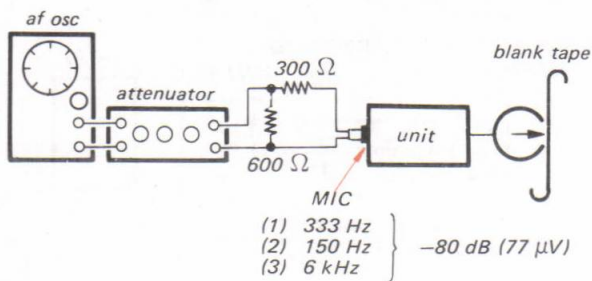
#### 4. Bias Adjustment

##### Control/Switch Setting:

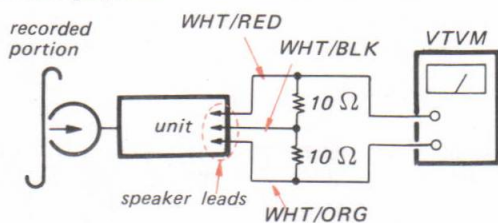
RADIO switch: OFF  
TONE control: HIGH

##### Procedure:

1. Mode: record

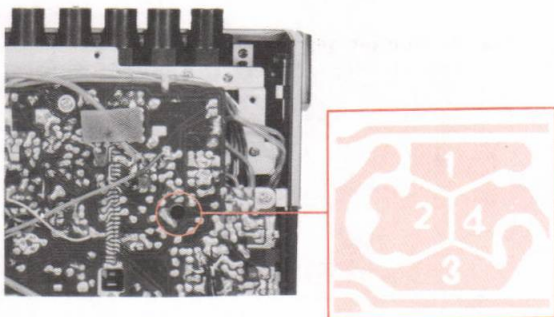


2. Mode: playback



Recorded signal	VTVM reading
333 Hz	Adjust VOLUME control for -10 dB (0.25 V)
150 Hz	6 dB allowable range
6 kHz	

If necessary, adjust by soldering.



##### R125, 126, 127, 128 connections

Connect	Resistance value (Ω)	6 kHz level
3 and 4	100	decrease ↑ ↓ increase
1 and 4	177	
2 and 4	250	
2 and 3	280	
1 and 2	340	
open	430	

#### 5. REC/BATT Meter Adjustment

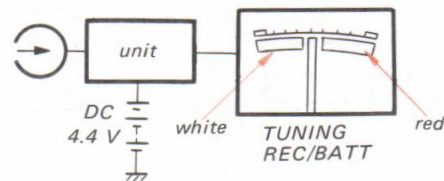
##### Control/Switch Setting:

RADIO switch: OFF  
Power Source: 4.4 V DC

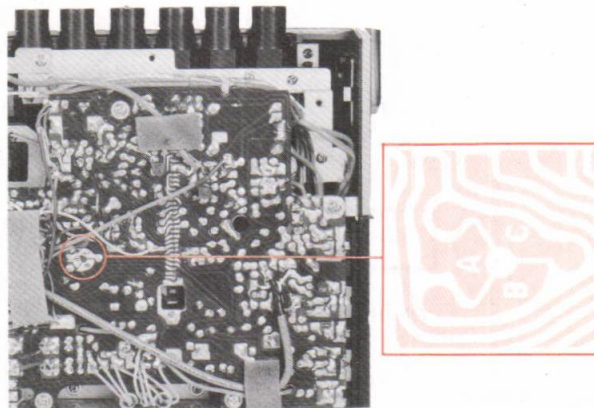
##### Procedure:

1. Mode: playback

Ensure that the pointer is at boundary between white and red zone.



If necessary, adjust by soldering.



##### R158, 159, 160 connections

Connect	Resistance value (Ω)	Meter reading
B and C	40.3 k	red zone ↓ white zone
A and C	43 k	
open	46.9 k	

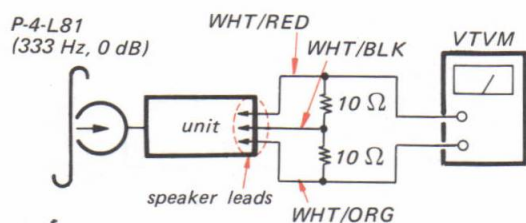
## 6. Playback Frequency Response Measurement

### Control/Switch Setting:

RADIO switch: OFF  
TONE control: HIGH

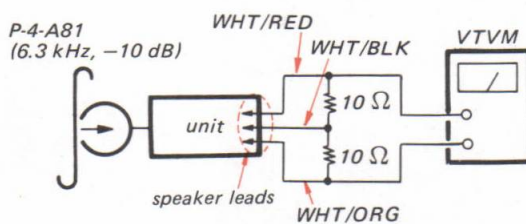
### Procedure:

1. Mode: playback



2. Adjust VOLUME control for 0 dB (0.775 V) VTVM reading.

3. Mode: playback



### Specification .

-12 ~ -4 dB (0.19 ~ 0.49 V)

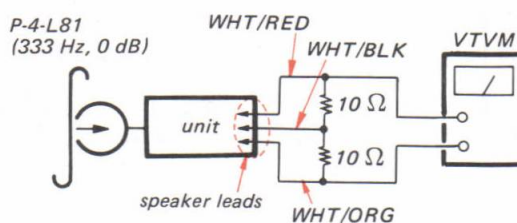
## 7. Playback Signal-to-Noise Ratio Measurement

### Control/Switch Setting :

RADIO switch: OFF  
TONE control: HIGH

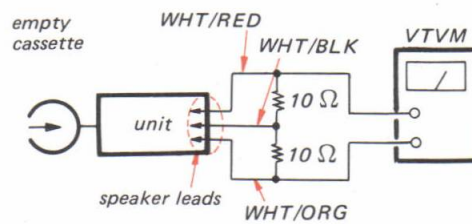
### Procedure:

1. Mode: playback



2. Adjust VOLUME control for 0 dB (0.775 V) VTVM reading.

3. Mode: playback



### Specification:

Less than -46 dB (3.9 mV) for household current  
Less than -48 dB (3.1 mV) for battery

**Note:** Perform this adjustment for both household current and battery.



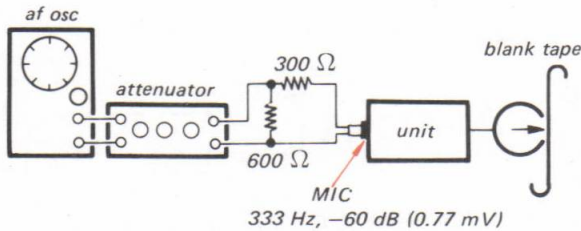
### 8. Overall Signal-to-Noise Ratio Measurement

#### Control/Switch Setting:

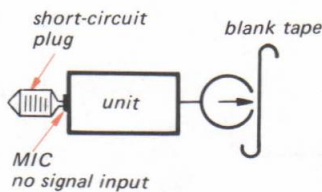
RADIO switch: OFF  
TONE control: HIGH

#### Procedure:

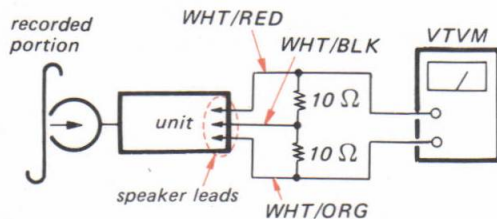
1. Mode: record



2. Mode: record



3. Mode: playback



Recorded signal	VTVM reading
333 Hz	Adjust VOLUME control for 0 dB (0.775 V)
no signal	Less than -36 dB (12 mV) for household current Less than -38 dB (9.5 mV) for battery

**Note:** Perform this adjustment for both household current and battery.

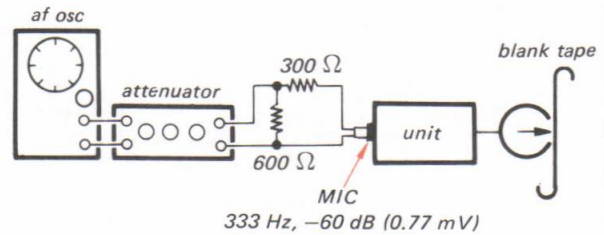
### 9. Overall Maximum Output Measurement

#### Control/Switch Setting:

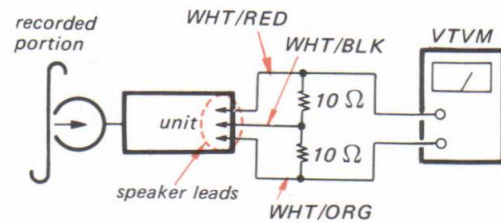
RADIO switch: OFF  
TONE control: HIGH  
VOLUME control: MAX

#### Procedure:

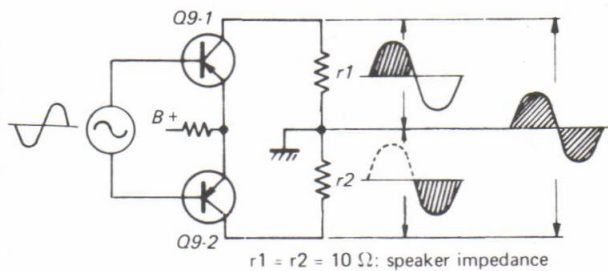
1. Mode: record



2. Mode: playback



#### Note:



This unit uses 20 Ω impedance speaker having a center tap. Due to class B amplifier, Q9-1 amplifies negative half cycles of input signals and Q9-2 amplifies positive half cycles. Positive half cycles of output voltage are obtained across r1 and negative half cycles across r2. Full-wave output voltage across (r1 + r2) is voltage obtained alternately across r1 and across r2. Load resistance, therefore, is 10 Ω.

$$\text{Output power (W)} = \frac{(\text{voltage across } r1 + r2)^2}{10 (\Omega)}$$

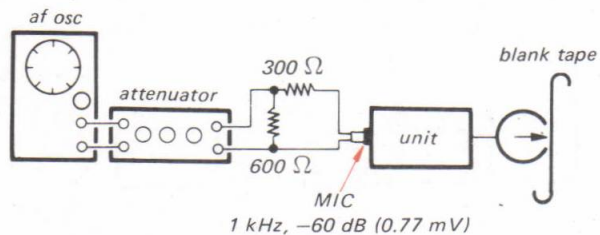
### 10. Overall Distortion Measurement

#### Control/Switch Setting:

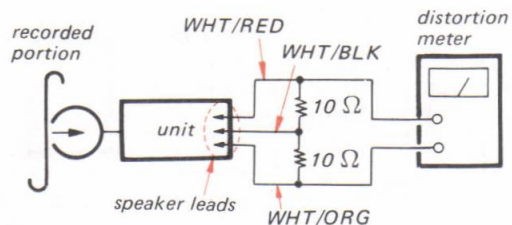
RADIO switch: OFF  
TONE control: HIGH

#### Procedure:

1. Mode: record



2. Mode: playback



#### Specification:

less than 8 %

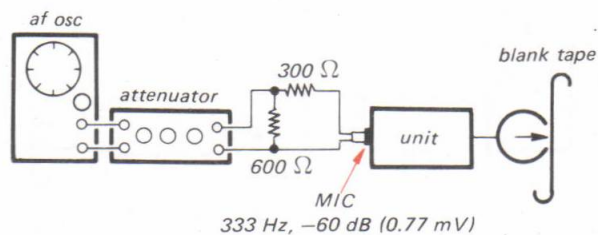
### 11. Overall LINE OUT Level Measurement

#### Control/Switch Setting:

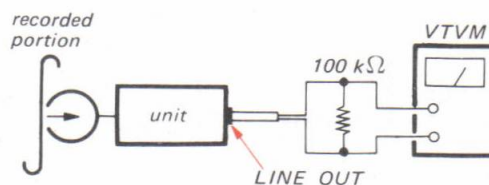
RADIO switch: OFF  
VOLUME control: MIN

#### Procedure:

1. Mode: record



2. Mode: playback



#### Specification:

-3.8 ~ +3.8 dB (0.47 ~ 1.2 V)

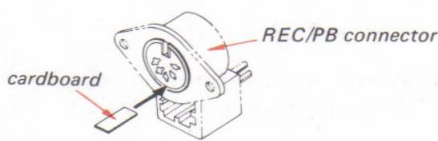
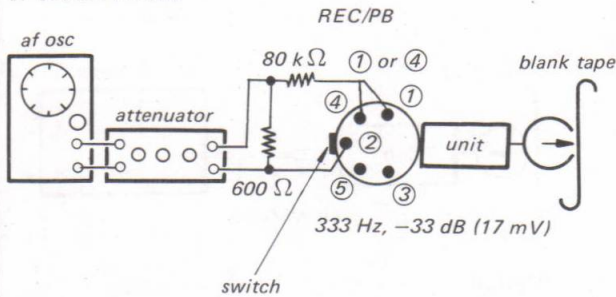
**12. Overall REC/PB Connector Level Measurement**

**Control/Switch Setting:**

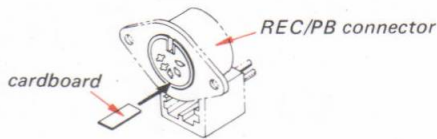
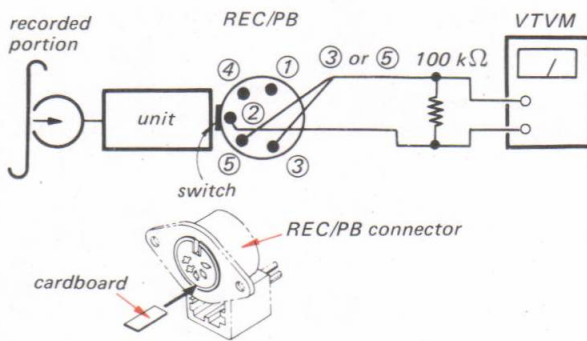
RADIO switch: OFF  
TONE control: HIGH  
VOLUME control: MIN

**Procedure:**

1. Mode: record



2. Mode: playback



**Specification:**

-3.8 dB ~ +2 dB (0.47 ~ 0.95 V)

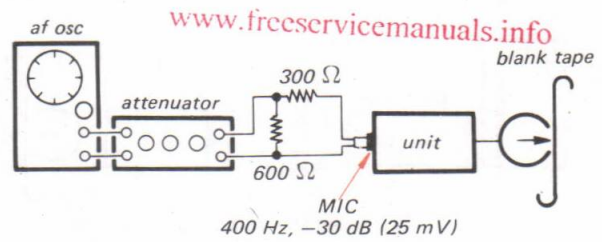
**13. Erase Ratio Measurement:**

**Control/Switch Setting**

RADIO switch: OFF  
TONE control: HIGH

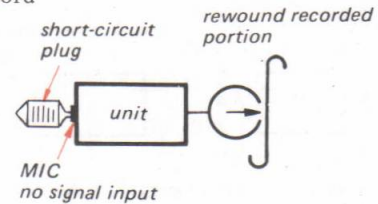
**Procedure:**

1. Mode: record

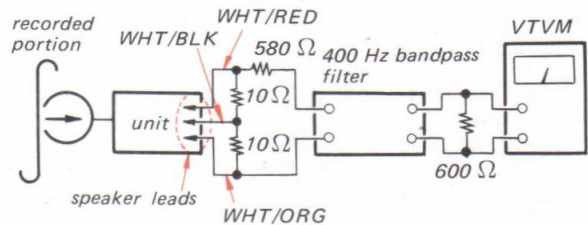


2. Rewind half of the recorded portion.

3. Mode: record



4. Mode: playback



Recorded signal	VTVM reading
400 Hz	Adjust VOLUME control for 0 dB (0.775 V) VTVM reading.
no signal	Less than -60 dB (0.77 mV).

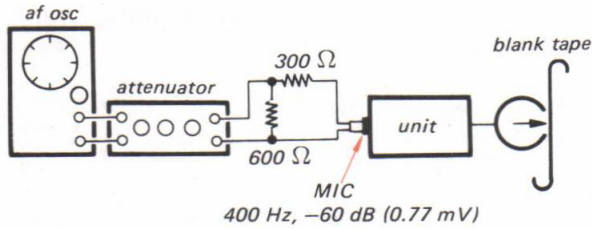
### 14. Cross-talk Measurement (between tracks)

#### Control/Switch Setting:

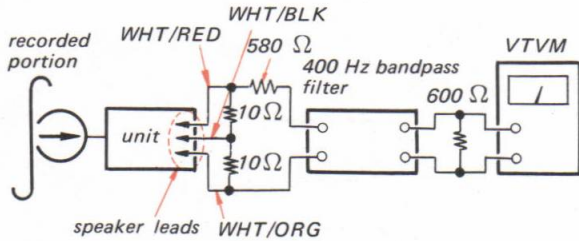
RADIO switch: OFF  
TONE control: HIGH

#### Procedure:

1. Mode: record



2. Mode: playback

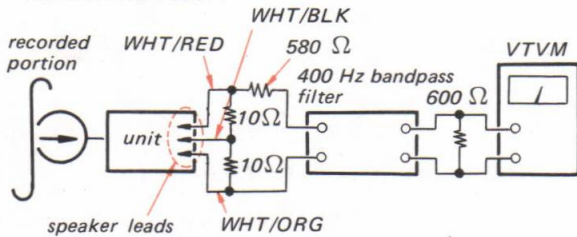


3. Adjust VOLUME control for 0 dB (0.775 V) VTVM reading.

4. Turn the cassette over.

5. Mode: playback

adjacent track of the recorded track



#### Specification:

less than -55 dB (1.4 mV)

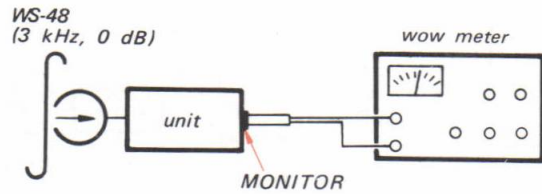
### 15 Wow and Flutter Measurement

#### Control/Switch Setting:

RADIO switch: OFF  
VOLUME control: mechanical mid  
POWER source: 6 V

#### Procedure:

1. Mode: playback



#### Specification:

less than 0.38 % (RMS)

**Note:** Measure wow and flutter for beginning and end portion of tape (WS-48).

**RADIO SECTION****Test Equipment/Tools Required:**

AM rf signal generator  
 FM rf signal generator  
 VTVM  
 volt-ohm meter  
 loop antenna  
 resistors 10  $\Omega$   
 capacitors 0.01  $\mu$ F, 10 pF

**Note:** 1. Modulation

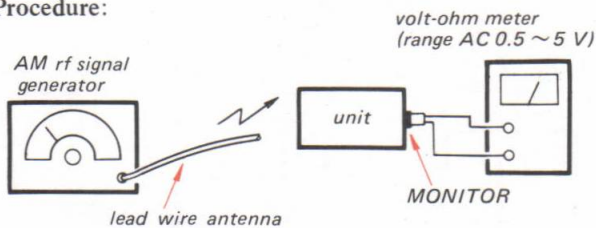
AM: 30 % amplitude modulation by  
 400 Hz signal.

FM:  $\pm$  22.5 kHz frequency modulation  
 by 400 Hz signal.

2. AM, FM rf signal generator output level  
 should be as low as possible for following  
 adjustments.

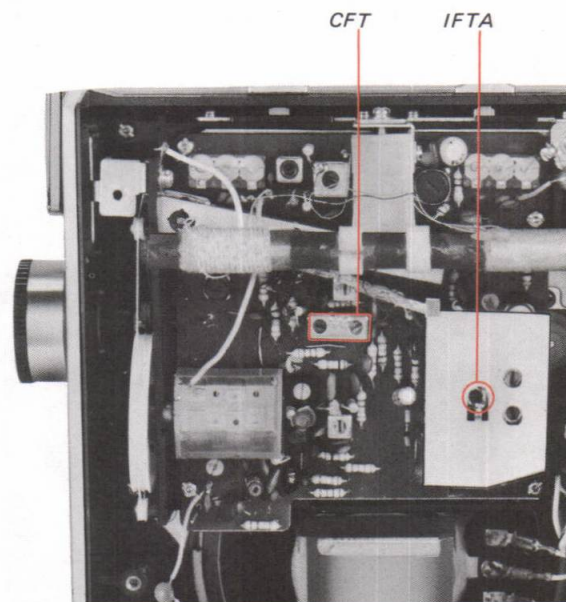
**1. AM I-f Alignment****Control/Switch Setting:**

RADIO switch: ON  
 band selector switch: MW  
 VOLUME control: MAX

**Procedure:**

Step	AM rf signal generator frequency	Tuning knob	Adjust	Volt-ohm meter reading
1	455 kHz	Detune broadcasting signals.	CFT IFTA	maximum

**Note:** Adjust CFT and IFTA alternately.

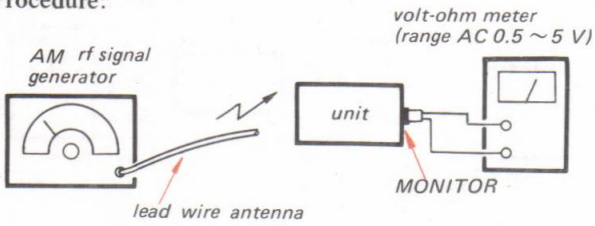
**Adjustment Location:**

## 2. MW Frequency Coverage and Tracking Adjustments

### Control/Switch Setting:

RADIO switch: ON  
 band selector switch: MW  
 VOLUME control: MAX

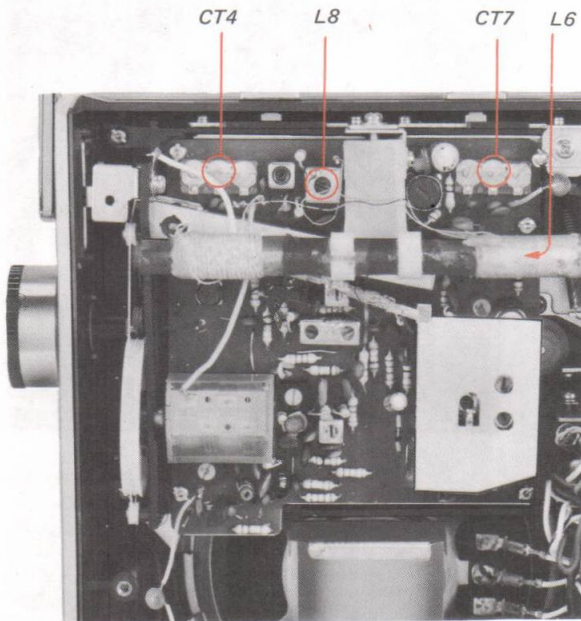
### Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	Volt-ohm meter reading
Frequency coverage	1	520 kHz	fully counter-clockwise	L8	maximum
	2	1,680 kHz	fully clockwise	CT7	maximum
Tracking	1	620 kHz	tune to 620 kHz	L6	maximum
	2	1,400 kHz	tune to 1,400 kHz	CT4	maximum

**Note:** Repeat Tracking Adjustment steps two or three times.

### Adjustment Location :

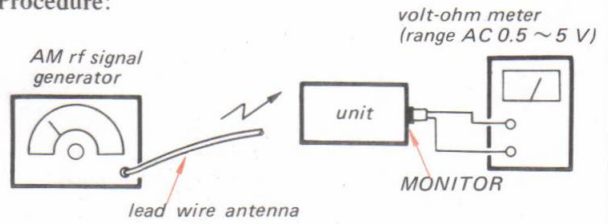


## 3. LW Frequency Coverage and Tracking Adjustments

### Control/Switch Setting:

RADIO switch: ON  
 band selector switch: LW  
 VOLUME control: MAX

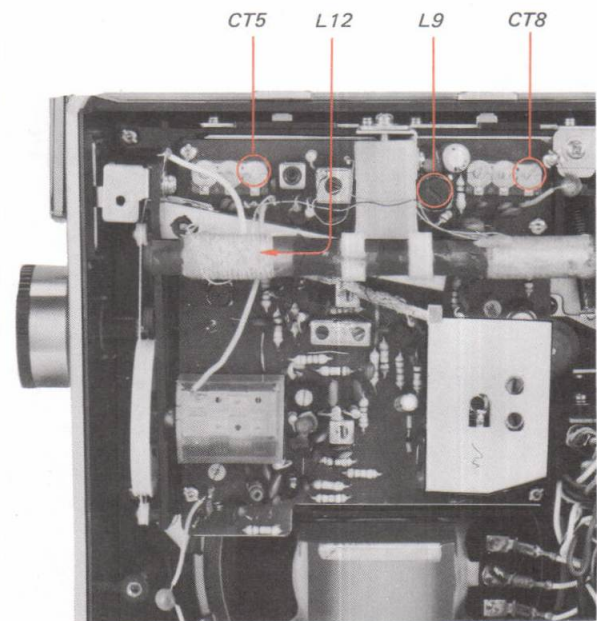
### Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	Volt-ohm meter reading
Frequency coverage	1	145 kHz	fully counter-clockwise	L9	maximum
	2	365 kHz	fully clockwise	CT8	maximum
Tracking	1	160 kHz	tune to 160 kHz	L12	maximum
	2	330 kHz	tune to 330 kHz	CT5	maximum

**Note:** Repeat above steps two or three times.

### Adjustment Location:



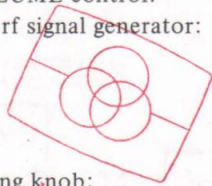
#### 4. MW and LW Maximum Sensitivity Measurement

##### Control/Switch Setting:

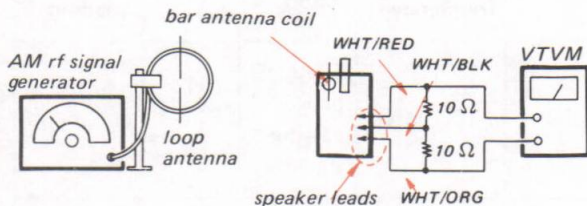
RADIO switch: ON  
 band selector switch: MW or LW  
 TONE control: HIGH  
 VOLUME control: MAX  
 AM rf signal generator:

MW	LW
620 kHz (400 kHz)	160 kHz (330 kHz)

tuning knob: MW tune to 620 kHz (400 kHz)  
 LW tune to 160 kHz (330 kHz)



##### Procedure:



1. Adjust AM rf signal generator output for -1 dB (0.69 V) VTVM reading.
2. Modulation Signal (400 Hz) : OFF  
Memorize the VTVM reading.
3. Measure S/N ratio between Step 1 and 2.

$S/N \text{ Ratio} \geq 6 \text{ dB}$

Maximum Sensitivity =  $\boxed{\text{AM rf signal generator output level}} - \boxed{* \text{attenuation (dB)}}$

$S/N \text{ Ratio} < 6 \text{ dB}$

Increase AM rf signal generator output level so that S/N ratio is 6 dB, keeping VTVM reading -1 dB (0.69 V) by sliding VOLUME control.

Maximum Sensitivity =  $\boxed{\text{AM rf signal generator output level}} - \boxed{* \text{attenuation (dB)}}$

##### Specification:

MW 33 dB/m (45  $\mu\text{V/m}$ ) at S/N 6 dB  
 LW 41 dB/m (110  $\mu\text{V/m}$ ) at S/N 6 dB

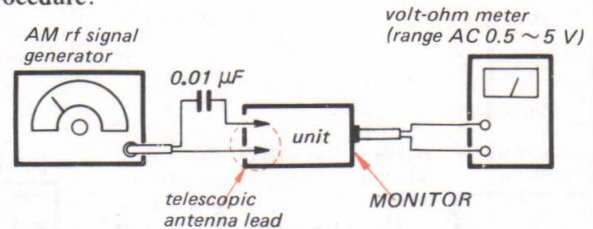
**Note:** \* Attenuation is given according to characteristics of loop antenna and distance between bar antenna of radio set and loop antenna.

#### 5. SW Frequency Coverage and Tracking Adjustments

##### Control/Switch Setting:

RADIO switch: ON  
 band selector switch: SW  
 VOLUME control: MAX

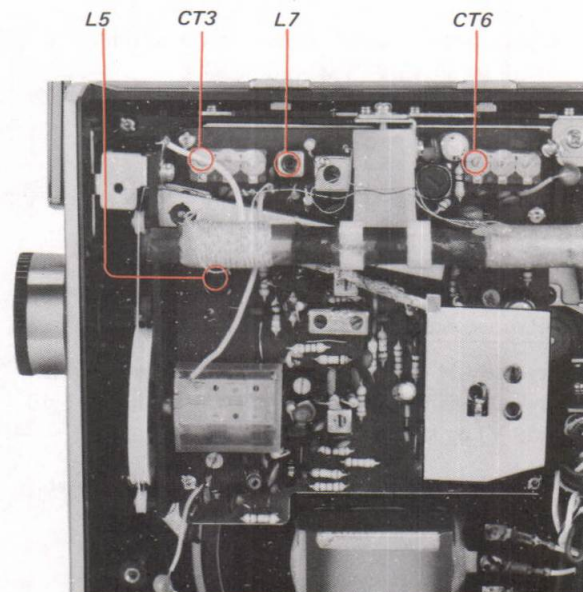
##### Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	Volt-ohm meter reading
Frequency coverage	1	5.8 MHz	fully counter-clockwise	L7	maximum
	2	18.4 MHz	fully clockwise	CT6	maximum
Tracking	1	5.8 MHz	fully counter-clockwise	L5	maximum
	2	18.4 MHz	fully clockwise	CT3	maximum

**Note:** Repeat above steps two or three times.

##### Adjustment Location:

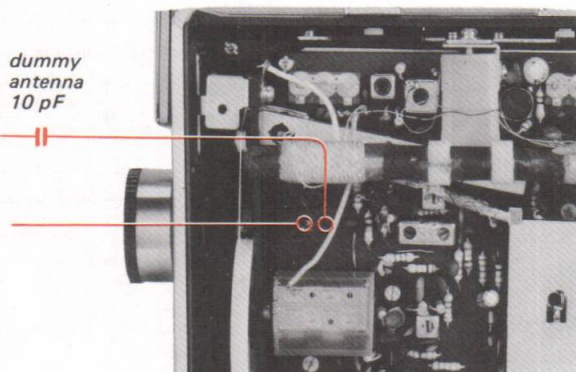
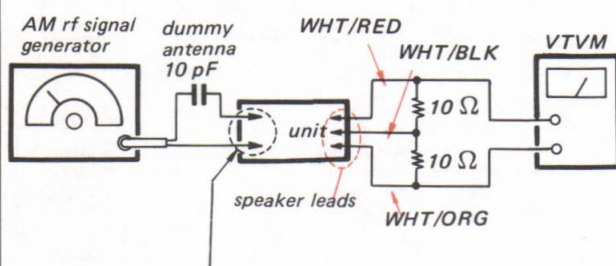


### 6. SW Maximum Sensitivity Measurement

#### Control/Switch Setting:

- RADIO switch: ON
- band selector switch: SW
- TONE control: HIGH
- VOLUME control: MAX
- AM rf signal generator frequency: 5.8 MHz (18.4 MHz)
- tuning knob: tune to 5.8 MHz (18.4 MHz)

#### Procedure:



1. Adjust AM rf signal generator output level for -1 dB (0.69 V) VTVM reading.
2. Modulation signal (400 Hz) : OFF  
Memorize the VTVM reading.
3. Measure S/N ratio between Step 1 and 2.

$S/N \text{ Ratio} \geq 6 \text{ dB}$

Maximum Sensitivity = AM rf signal generator output level

$S/N \text{ Ratio} < 6 \text{ dB}$

Increase AM rf signal generator output level so that S/N ratio is 6 dB, keeping VTVM reading -1 dB (0.69 V) by sliding VOLUME control.

Maximum Sensitivity = AM rf signal generator output level.

#### Specification:

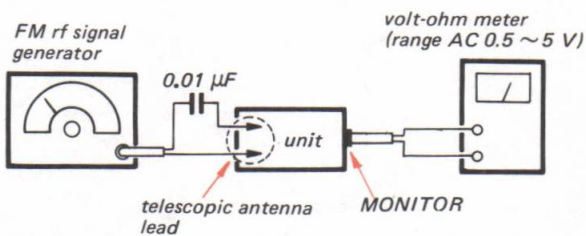
7 dB (2.2  $\mu$ V) at S/N 6 dB

### 7. FM I-f Alignment

#### Control/Switch Setting:

- RADIO switch: ON
- band selector switch: FM
- AFC/ISS switch: OFF
- VOLUME control: MAX

#### Procedure:

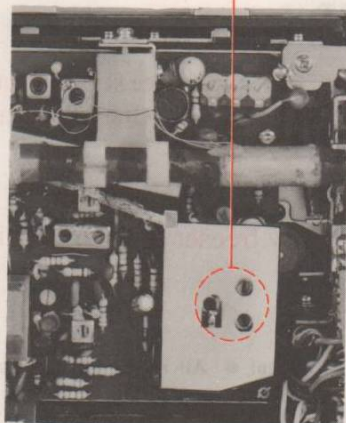
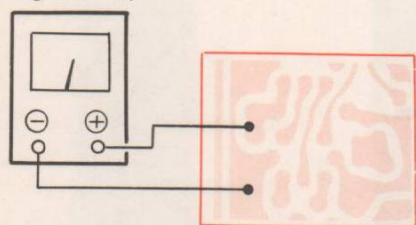


Step	FM rf signal generator frequency	Tuning knob	Adjust	volt-ohm meter reading
1	10.7 MHz	Detune broadcasting signals.	IFT F1 ~ F4	maximum
2	10.7 MHz	Detune broadcasting signals.	FM rf signal generator tuning knob	maximum
3	Repeat above steps two or three times.			
4	no signal	Detune broadcasting signals.	IFT F4	DC 0 V (See Figure on Page 29.)

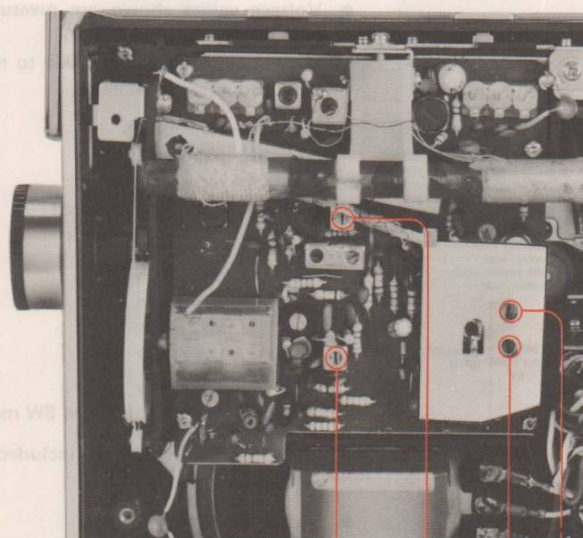
- continued on next page -



volt-ohm meter  
(range DC 1V)



Adjustment Location:



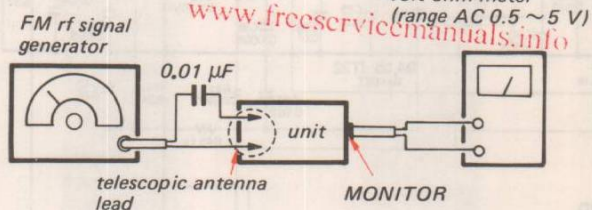
IFT F1 IFT F2 IFT F3  
IFT F4

## 8. FM Frequency Coverage and Tracking Adjustments

Control/Switch Setting:

RADIO switch: ON  
band selector switch: FM  
AFC/ISS switch: OFF  
VOLUME control: MAX

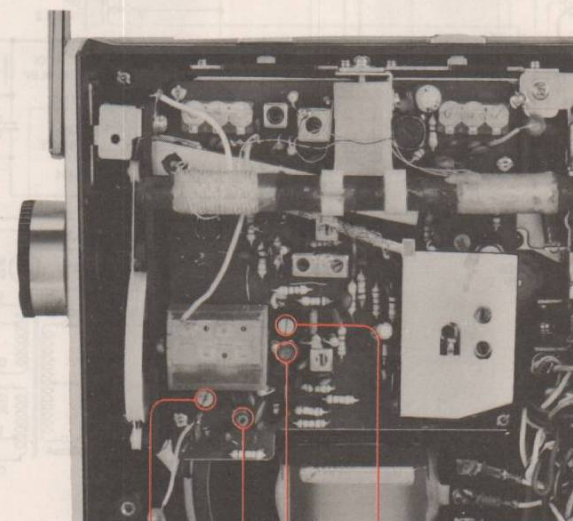
Procedure:



Adjustment	Step	FM rf signal generator frequency	Tuning knob	Adjust	volt-ohm meter reading
Frequency coverage	1	87.1 MHz	fully counter-clockwise	L4	maximum
	2	108.5 MHz	fully clockwise	CT2	maximum
Tracking	1	87.1 MHz	fully counter-clockwise	L2	maximum
	2	108.5 MHz	fully clockwise	CT1	maximum

Note: Repeat above steps two or three times.

Adjustment Location:



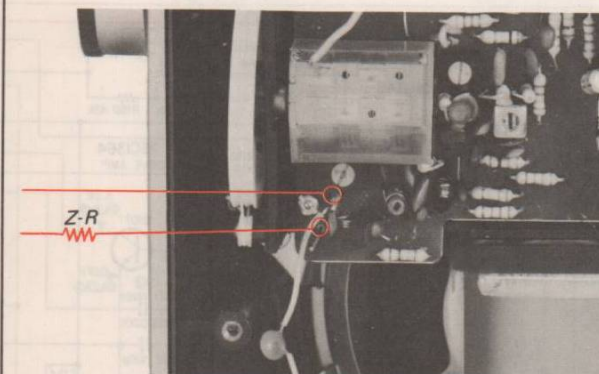
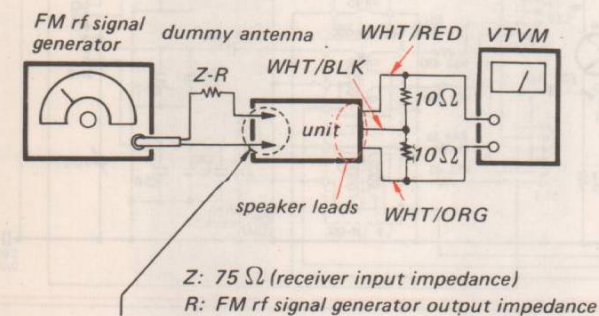
CT1 L2 L4 CT2

## 9. FM Usable Sensitivity Measurement

Control/Switch Setting:

RADIO switch: ON  
band selector switch: FM  
AFC/ISS switch: OFF  
TONE control: mechanical mid  
VOLUME control: mechanical mid  
FM rf signal generator output level: 15 dB (5.6 μV)  
FM rf signal generator frequency: 87.1 MHz (108.5 MHz)  
tuning knob: tune to 87.1 MHz (108.5 MHz)

Procedure:



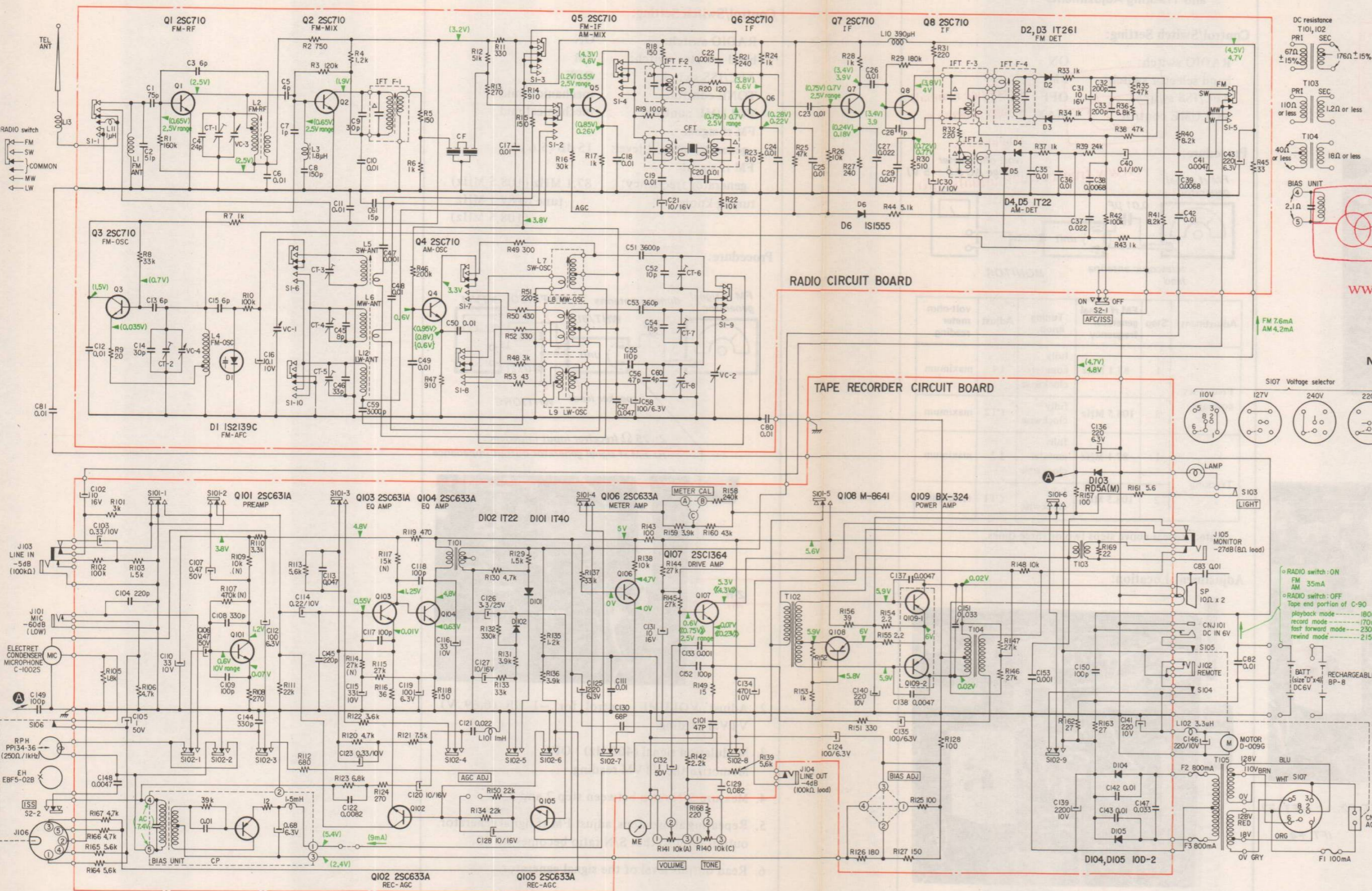
- Adjust VOLUME control for -1 dB (0.69 V) VTVM reading.
- Modulation signal (400 Hz) : OFF  
Memorize the VTVM reading.
- Measure S/N ratio between step 2 and 3.
- Repeating above steps, adjust FM rf signal generator output level so that S/N ratio becomes 30 dB.
- Read output level of the signal generator.

Specification:

13 dB (4.5 μV) at S/N 30 dB

# SECTION 4 DIAGRAMS

## 4-1. SCHEMATIC DIAGRAM



Free service manuals  
Gratis schema's  
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Note: ● All resistors and capacitors are in  $\Omega$  and  $\mu F$ , unless otherwise specified.

- Letter in ( ) suffixed to variable resistor value indicates characteristics.
- $\text{---}$  : Chassis ground
- (N): Low noise resistor
- Voltage values shown are measured with a voltmeter (20  $k\Omega/V$ ). Variations may be noted due to normal production tolerances.

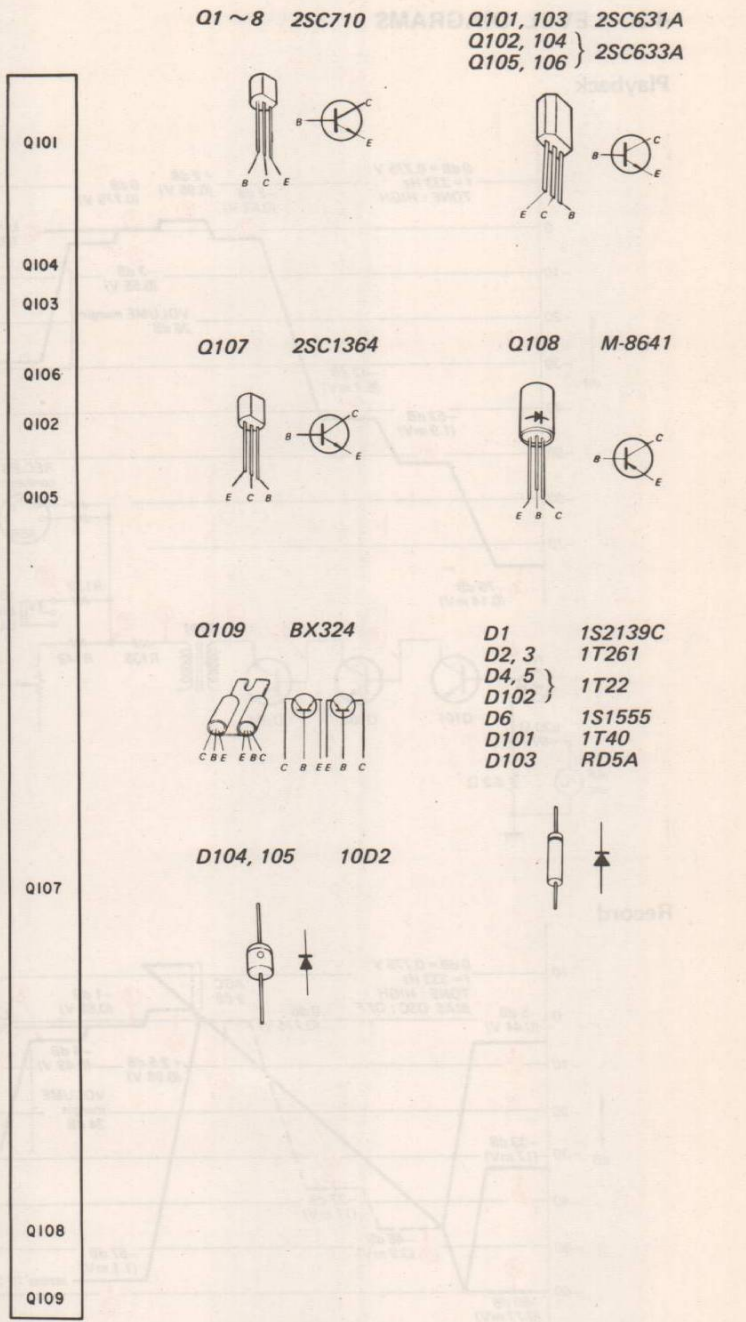
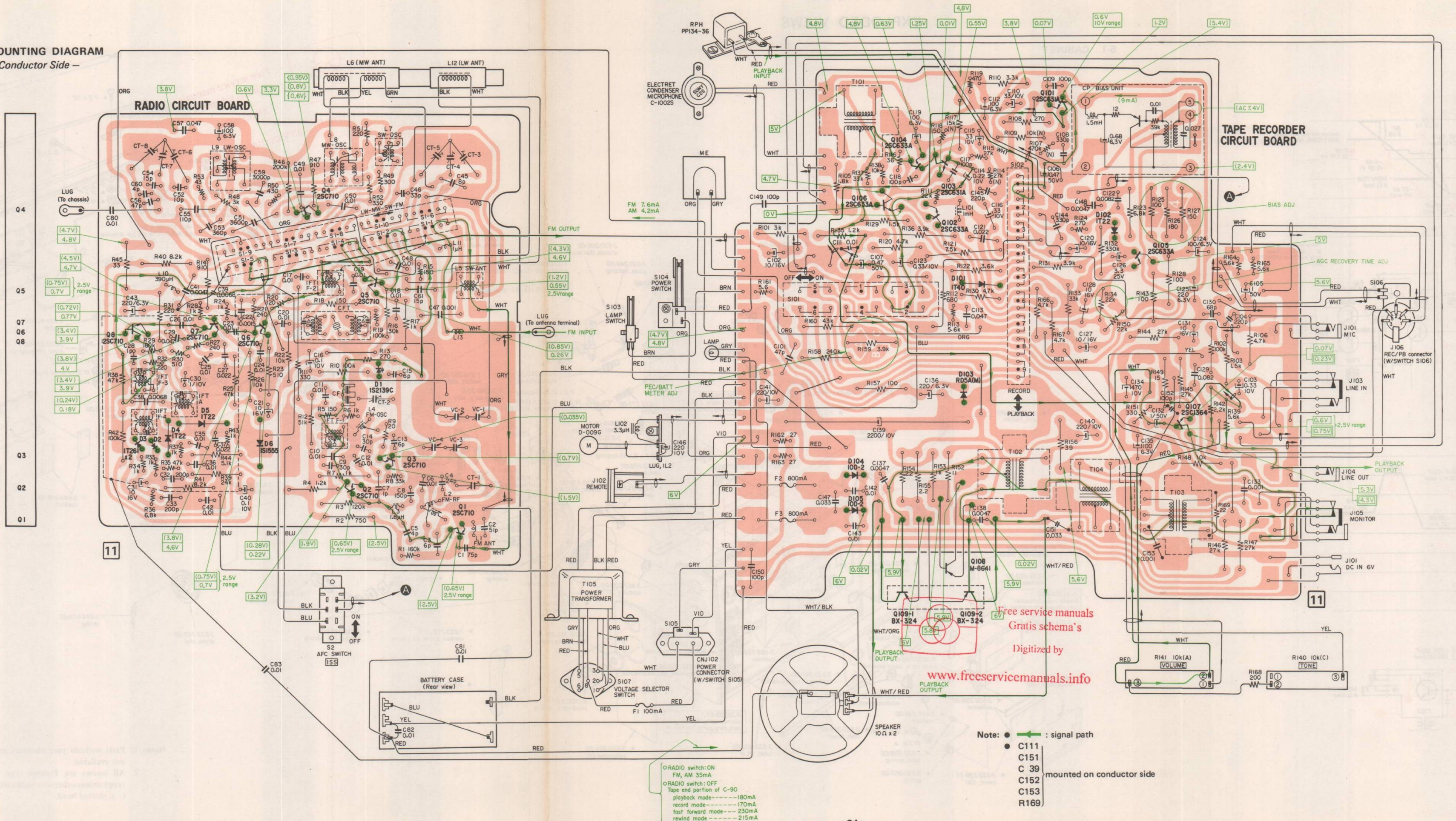
tape recorder section  
no mark: playback mode  
( ): record mode  
◀ ▶: With plug installed MONITOR jack

radio section (detuned)  
( ): FM mode  
{ }: MW mode  
[ ]: LW mode  
< >: SW mode  
no mark: FM, MW, LW and SW mode

- Capacitors marked  $\Delta$  are included in i-f transformers.
- Switch mode:

Ref. No.	Switch	Mode
S1	band selector	FM
S2	AFC/ISS	OFF
S101	RADIO	OFF
S102	record/playback	playback
S103	lamp	OFF
S104	power	ON
S105	ac/dc	dc
S106	mic	ON
S107	voltage selector	

4-2. MOUNTING DIAGRAM - Conductor Side -



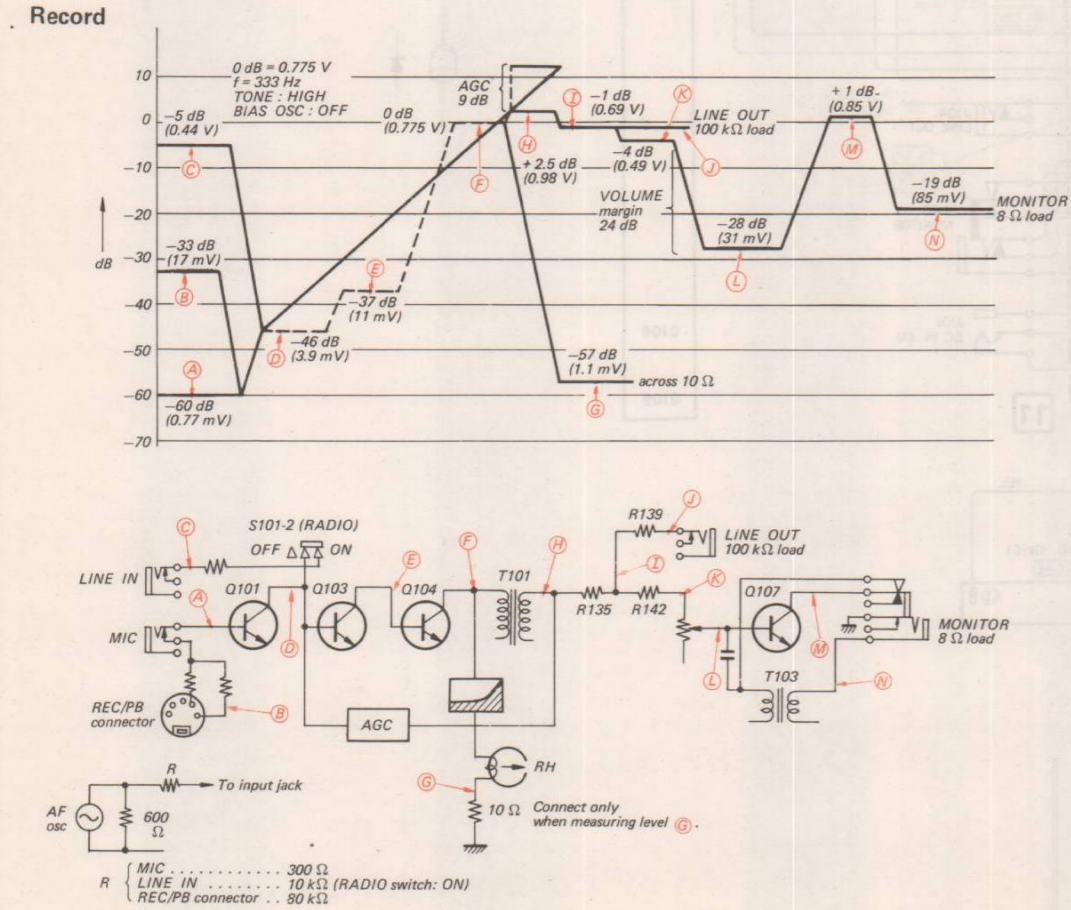
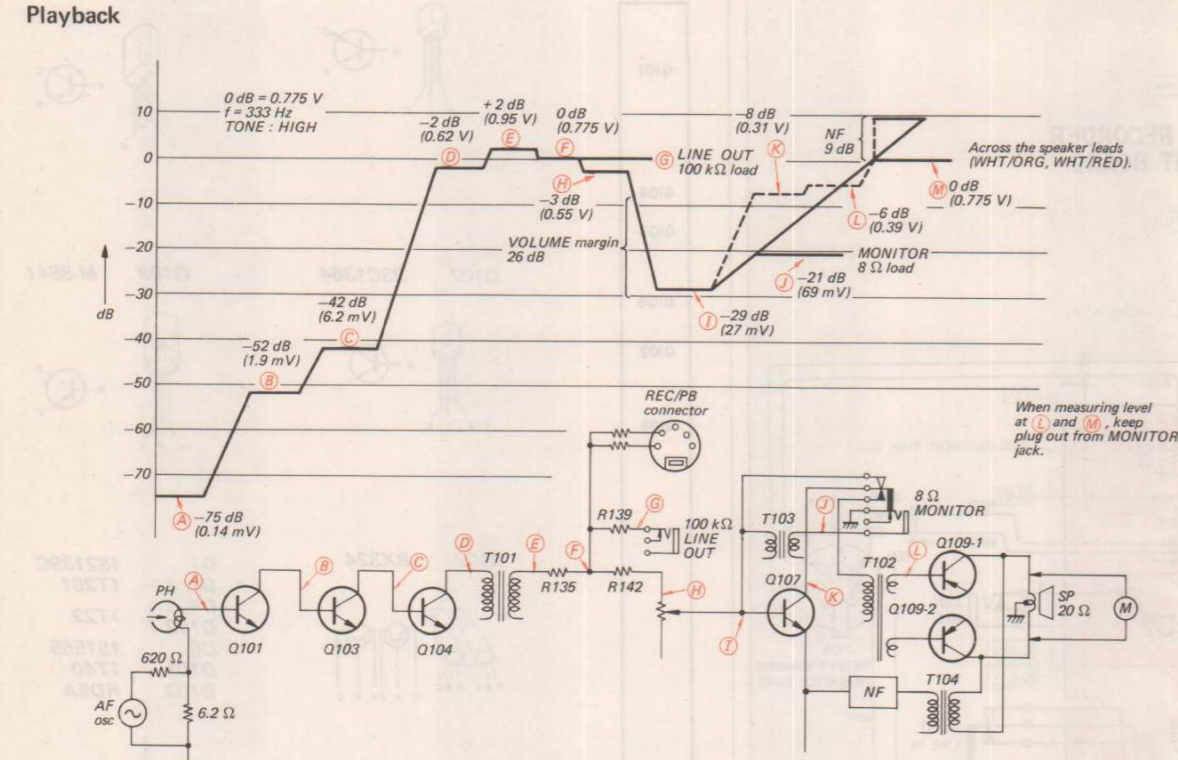
RADIO switch: ON  
 FM, AM 35mA  
 RADIO switch: OFF  
 Tape end portion of C-90  
 playback mode-----180mA  
 record mode-----170mA  
 fast forward mode---230mA  
 rewind mode-----215mA

Note: ● → : signal path  
 ● C111  
 C151  
 C 39 mounted on conductor side  
 C152  
 C153  
 R169

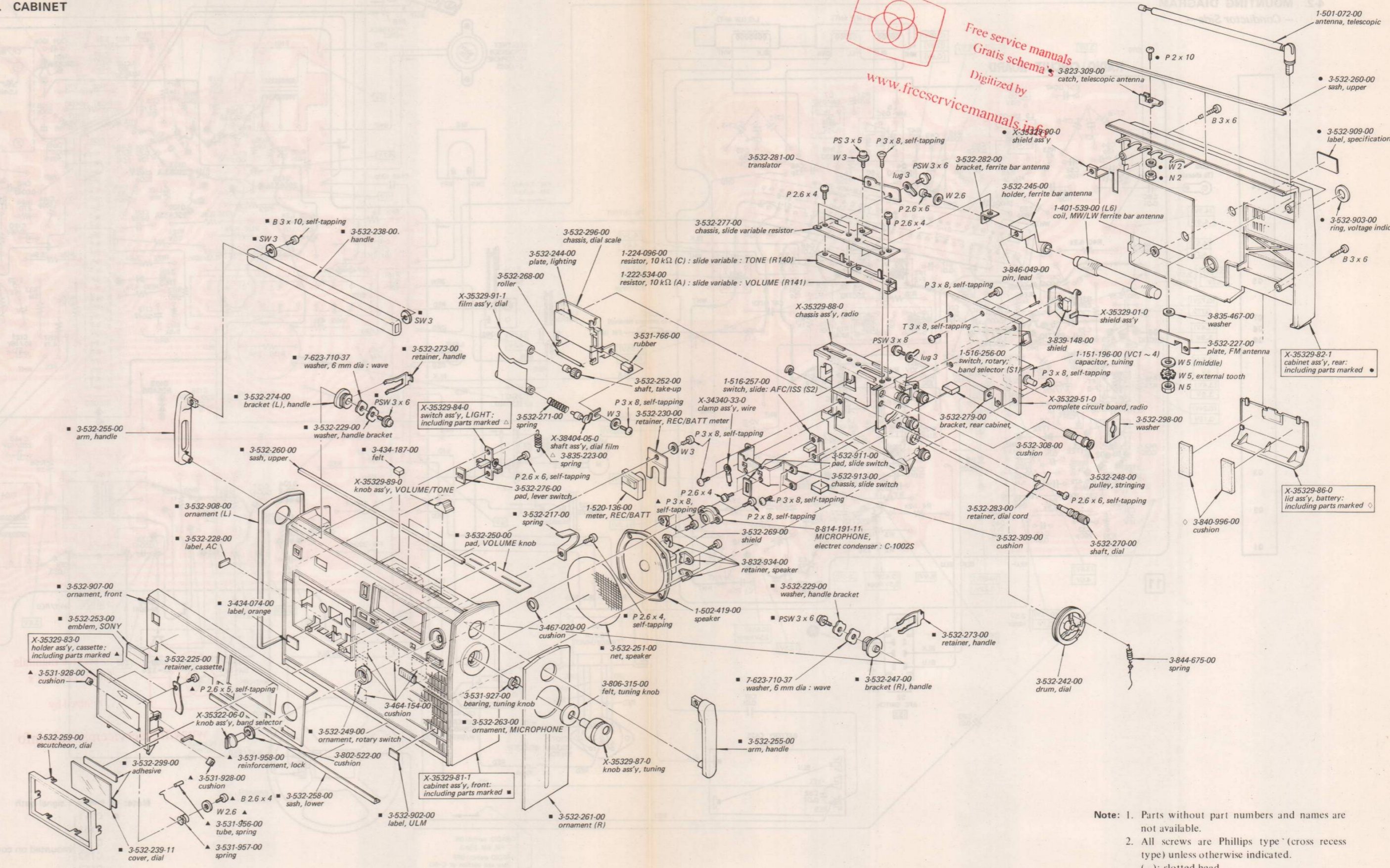
Free service manuals  
 Gratis schema's  
 Digitized by  
 www.freeservicemanuals.info

SECTION 5  
EXPLODED VIEWS

4-3. LEVEL DIAGRAMS



5-1. CABINET

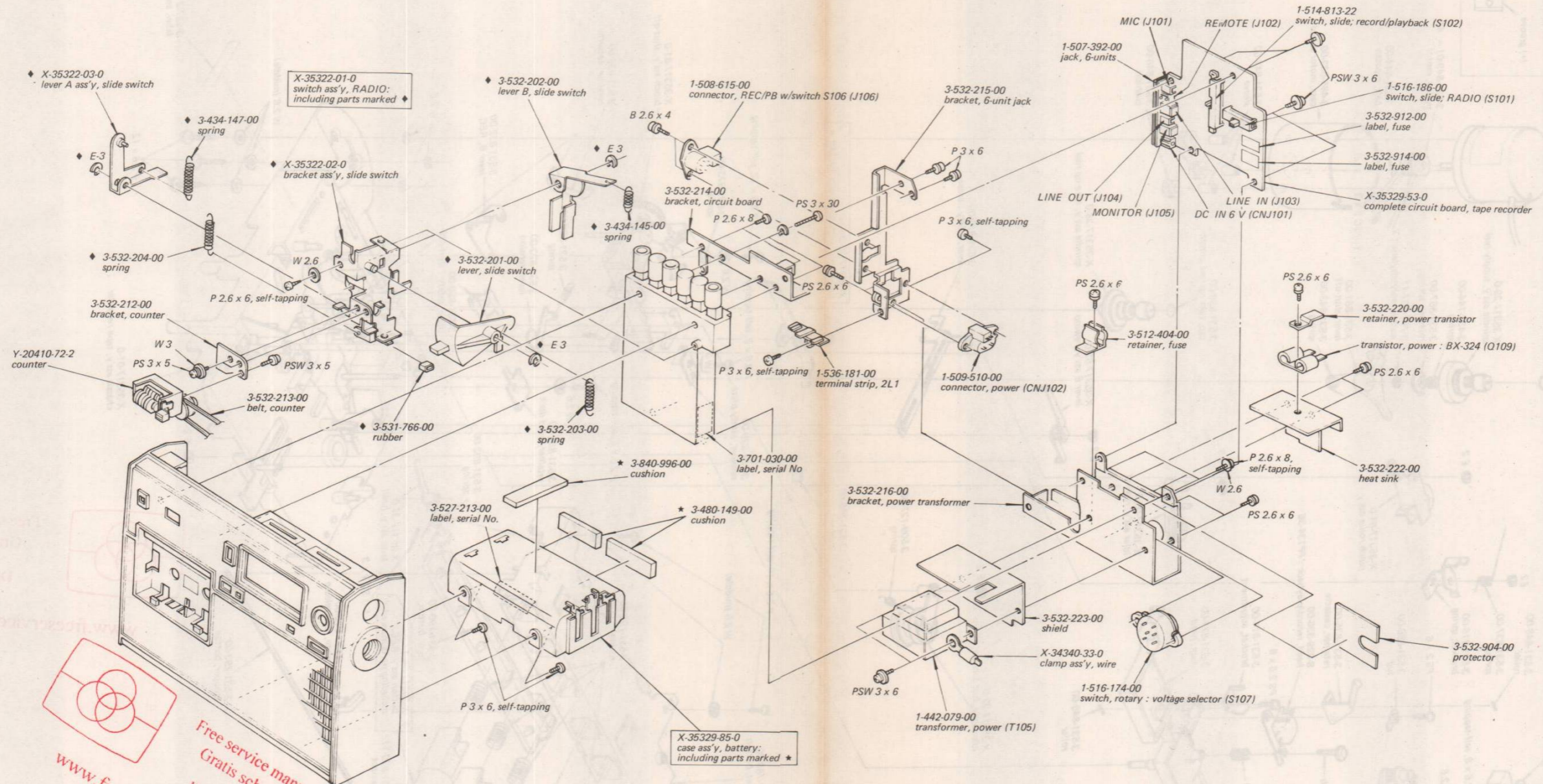


Free service manuals  
Gratis schema's  
Digitized by  
www.freerepairmanuals.info

**Note:**

1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.  
(-): slotted head

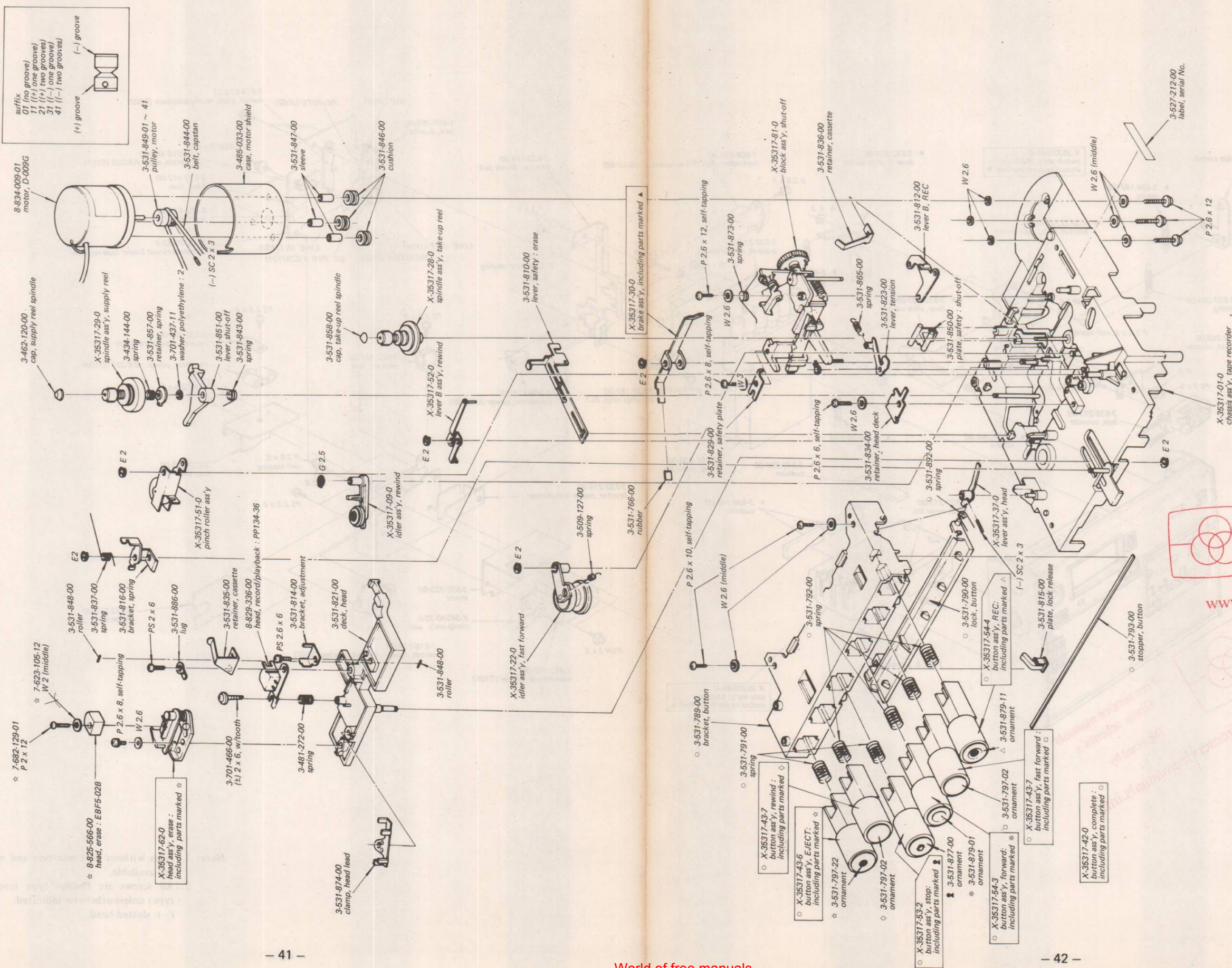
5-2. RADIO SECTION



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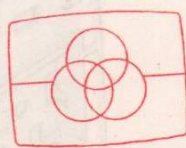
**Note:** 1. Parts without part numbers and names are not available.  
 2. All screws are Phillips type (cross recess type) unless otherwise indicated.  
 (-): slotted head

5-3. CHASSIS - Top View -



B-2 RADIO SECTION

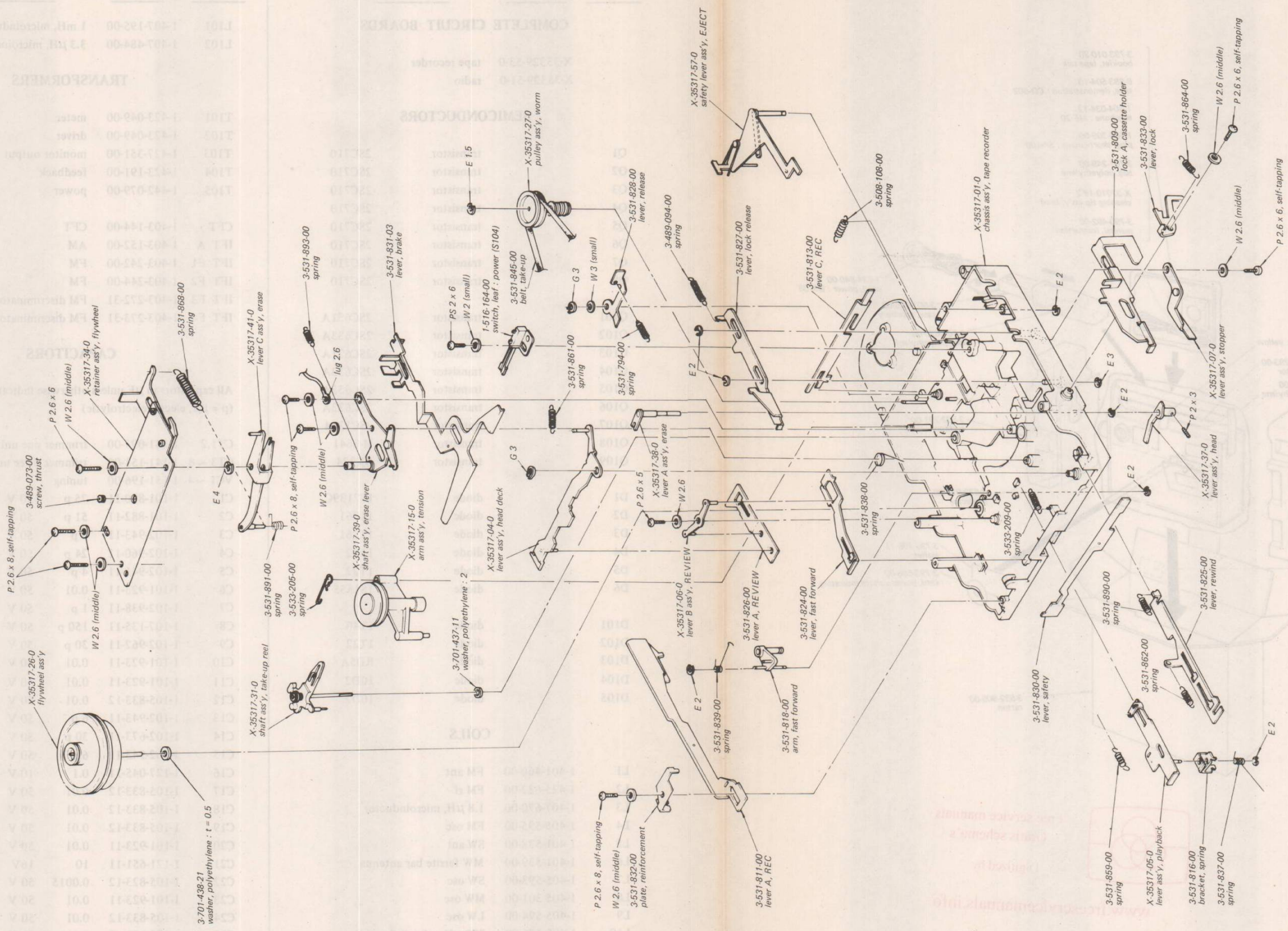
- Note:**
1. Parts without part numbers and names are not available.
  2. All screws are Phillips type (cross recess type) unless otherwise indicated.  
(-): slotted head



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Gratis schema's  
Digitized by

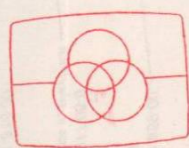
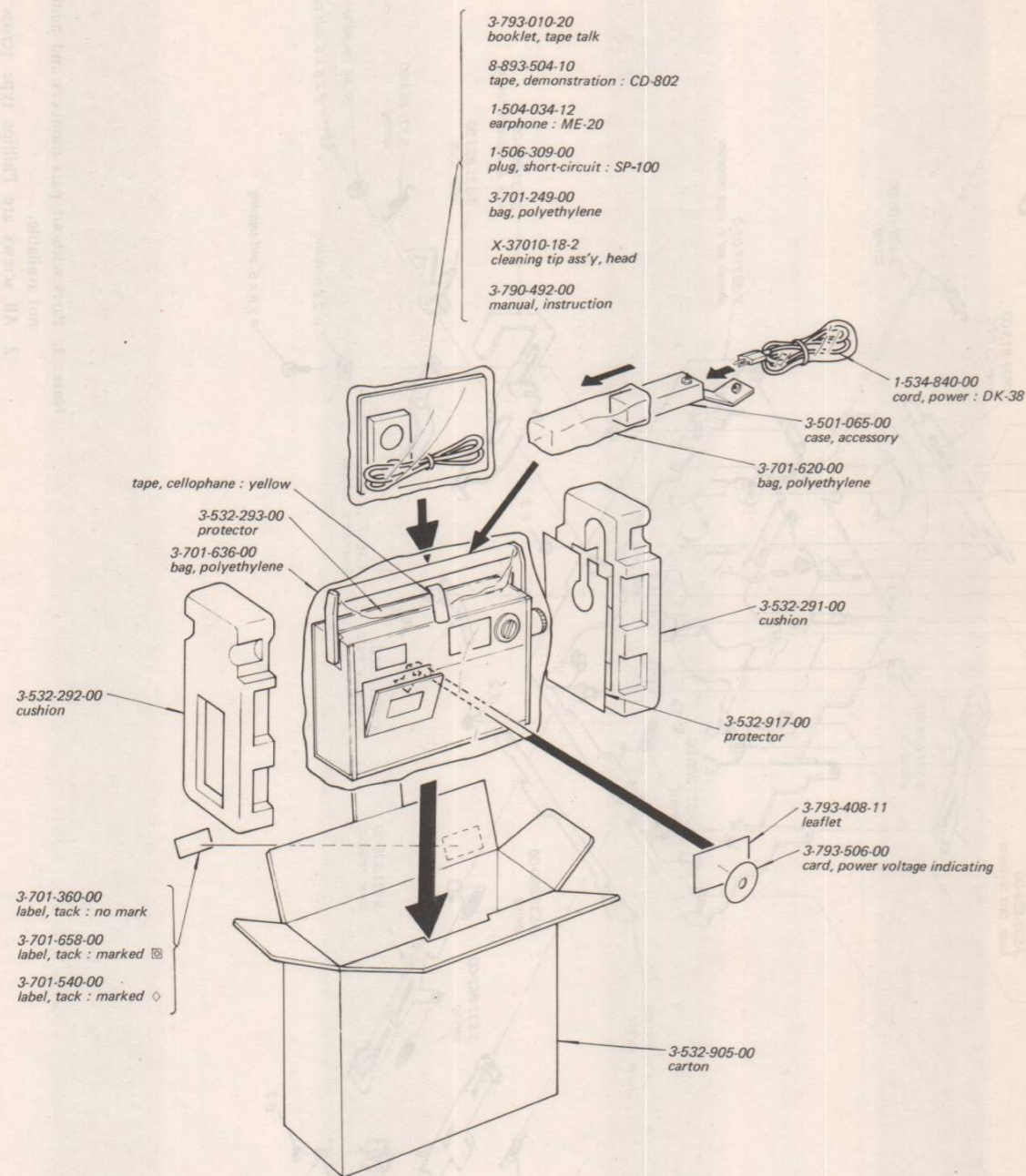
www.freesevicemanuals.info

5-4. CHASSIS - Bottom View -



Note: 1. Parts without part numbers and names are not available.  
2. All screws are Phillips type (cross recess type) unless otherwise indicated.  
(-): slotted head

5-5. PACKING



Free service manuals  
Gratis schema's  
Digitized by

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Note. Parts without part numbers and names are not available.

SECTION 6  
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
<b>COMPLETE CIRCUIT BOARDS</b>		
X-35329-53-0		tape recorder
X-35329-51-0		radio
<b>SEMICONDUCTORS</b>		
Q1		transistor 2SC710
Q2		transistor 2SC710
Q3		transistor 2SC710
Q4		transistor 2SC710
Q5		transistor 2SC710
Q6		transistor 2SC710
Q7		transistor 2SC710
Q8		transistor 2SC710
Q101		transistor 2SC631A
Q102		transistor 2SC633A
Q103		transistor 2SC631A
Q104		transistor 2SC633A
Q105		transistor 2SC633A
Q106		transistor 2SC633A
Q107		transistor 2SC1364
Q108		transistor M-8641
Q109		transistor BX324
D1		diode 1S2139C
D2		diode 1T261
D3		diode 1T261
D4		diode 1T22
D5		diode 1T22
D6		diode 1S1555
D101		diode 1T40
D102		diode 1T22
D103		diode RD5A
D104		diode 10D2
D105		diode 10D2
<b>COILS</b>		
L1	1-401-460-00	FM ant
L2	1-425-632-00	FM rf
L3	1-407-670-00	1.8 μH, microinductor
L4	1-405-595-00	FM osc
L5	1-401-538-00	SW ant
L6	1-401-539-00	MW ferrite bar antenna
L7	1-405-593-00	SW osc
L8	1-405-301-00	MW osc
L9	1-405-594-00	LW osc
L10	1-407-176-00	390 μH, microinductor
L11	1-407-178-00	1 μH, microinductor
L12		included in MW ferrite bar antenna (L6)
L13	1-401-219-11	loading

Ref. No.	Part No.	Description			
L101	1-407-195-00	1 mH, microinductor			
L102	1-407-484-00	3.3 μH, microinductor			
<b>TRANSFORMERS</b>					
T101	1-423-049-00	meter			
T102	1-423-049-00	driver			
T103	1-427-351-00	monitor output			
T104	1-423-191-00	feedback			
T105	1-442-079-00	power			
CFT	1-403-144-00	CFT			
IFT A	1-403-152-00	AM			
IFT F1	1-403-242-00	FM			
IFT F2	1-403-244-00	FM			
IFT F3	1-403-272-31	FM discriminator			
IFT F4	1-403-273-31	FM discriminator			
<b>CAPACITORS</b>					
All capacitors in μF unless otherwise indicated. (p = μμ, elect = electrolytic)					
CT1,2	1-141-097-00	trimmer one unit			
CT3 ~ 8	1-141-151-00	trimmer three units			
VC1 ~ 4	1-151-196-00	tuning			
C1	1-101-890-11	75 p	50 V		ceramic
C2	1-101-882-11	51 p	50 V		ceramic
C3	1-102-943-11	6 p	50 V		ceramic
C4	1-102-960-11	24 p	50 V		ceramic
C5	1-102-941-11	4 p	50 V		ceramic
C6	1-101-923-11	0.01	50 V		ceramic
C7	1-102-938-11	1 p	50 V		ceramic
C8	1-107-135-11	150 p	50 V		silvered mica
C9	1-102-962-11	30 p	50 V		ceramic
C10	1-101-923-11	0.01	50 V		ceramic
C11	1-101-923-11	0.01	50 V		ceramic
C12	1-105-833-12	0.01	50 V		mylar
C13	1-102-943-11	6 p	50 V		ceramic
C14	1-102-673-11	30 p	50 V		ceramic
C15	1-102-943-11	6 p	50 V		ceramic
C16	1-127-045-11	0.1	10 V		solid aluminum elect
C17	1-105-833-12	0.01	50 V		mylar
C18	1-105-833-12	0.01	50 V		mylar
C19	1-105-833-12	0.01	50 V		mylar
C20	1-101-923-11	0.01	50 V		ceramic
C21	1-121-651-11	10	16V		elect
C22	1-105-823-12	0.0015	50 V		mylar
C23	1-101-923-11	0.01	50 V		ceramic
C24	1-105-833-12	0.01	50 V		mylar
C25	1-105-833-12	0.01	50 V		mylar
C26	1-101-923-11	0.01	50 V		ceramic
C27	1-105-837-12	0.022	50 V		mylar



<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>			<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		
C28	1-102-938-11	1 p	50 V	ceramic	C115	1-121-402-11	33	10 V	elect
C29	1-105-841-12	0.047	50 V	mylar	C116	1-121-402-11	33	10 V	elect
C30	1-127-049-11	1	10 V	solid aluminum elect	C117	1-102-106-11	100 p	50 V	ceramic
C31	1-121-651-11	10	16 V	elect	C118	1-102-106-11	100 p	50 V	ceramic
C32	1-107-138-11	200 p	50 V	silvered mica	C119	1-121-413-11	100	6.3 V	elect
C33	1-107-138-11	200 p	50 V	silvered mica	C120	1-121-651-11	10	16 V	elect
C34		-----			C121	1-105-677-12	0.022	50 V	mylar
C35	1-105-833-12	0.01	50 V	mylar	C122	1-105-672-12	0.0082	50 V	mylar
C36	1-105-833-12	0.01	50 V	mylar	C123	1-127-021-11	0.33	10 V	solid aluminum elect
C37	1-105-837-12	0.022	50 V	mylar	C124	1-121-413-11	100	6.3 V	elect
C38	1-105-671-12	0.0068	50 V	mylar	C125	1-121-419-11	220	6.3 V	elect
C39	1-105-671-12	0.0068	50 V	mylar	C126	1-121-392-11	3.3	25 V	elect
C40	1-127-045-11	0.1	10 V	solid aluminum elect	C127	1-121-651-11	10	16 V	elect
C41	1-102-102-11	0.0047	50 V	ceramic	C128	1-121-651-11	10	16 V	elect
C42	1-101-923-11	0.01	50 V	ceramic	C129	1-105-684-12	0.082	50 V	mylar
C43	1-121-419-11	220	6.3 V	elect	C130	1-101-889-11	68 p	50 V	ceramic
C44		-----			C131	1-121-651-11	10	16 V	elect
C45	1-102-945-11	8 p	50 V	ceramic	C132	1-121-391-11	1	50 V	elect
C46	1-102-969-11	33 p	50 V	ceramic	C133	1-105-821-12	0.001	50 V	mylar
C47	1-101-918-11	0.001	50 V	ceramic	C134	1-121-425-11	470	10 V	elect
C48	1-101-923-11	0.01	50 V	ceramic	C135	1-121-413-11	100	6.3 V	elect
C49	1-105-833-12	0.01	50 V	mylar	C136	1-121-419-11	220	6.3 V	elect
C50	1-101-923-11	0.01	50 V	ceramic	C137	1-105-829-12	0.0047	50 V	mylar
C51	1-103-888-11	3600 p		styrol	C138	1-105-829-12	0.0047	50 V	mylar
C52	1-102-285-11	10 p	50 V	ceramic	C139	1-119-356-11	2200	10 V	elect
C53	1-107-241-11	360 p	50 V	silvered mica	C140	1-121-420-11	220	10 V	elect
C54	1-102-951-11	15 p	50 V	ceramic	C141	1-121-420-11	220	10 V	elect
C55	1-107-132-11	110 p	50 V	silvered mica	C142	1-101-923-11	0.01	50 V	ceramic
C56	1-101-881-11	47 p	50 V	ceramic	C143	1-101-923-11	0.01	50 V	ceramic
C57	1-105-841-12	0.047	50 V	mylar	C144	1-102-112-11	330 p	50 V	ceramic
C58	1-121-413-11	100	6.3 V	elect	C145	1-102-110-11	220 p	50 V	ceramic
C59	1-103-886-11	3000 p		styrol	C146	1-121-420-11	220	10 V	elect
C60	1-102-941-11	4 p	50 V	ceramic	C147	1-105-679-12	0.033	50 V	mylar
C61	1-102-956-11	15 p	50 V	ceramic	C148	1-105-709-12	0.0047	50 V	mylar
C80	1-101-923-11	0.01	50 V	ceramic	C149	1-102-106-11	100 p	50 V	ceramic
C81	1-101-923-11	0.01	50 V	ceramic	C150	1-102-106-11	100 p	50 V	ceramic
C82	1-101-923-11	0.01	50 V	ceramic	C151	1-105-679-12	0.033	50 V	mylar
C83	1-101-923-11	0.01	50 V	ceramic	C152	1-102-106-11	100 p	50 V	ceramic
C101	1-101-881-11	47 p	50 V	ceramic	C153	1-101-918-11	0.001	50 V	ceramic
C102	1-121-651-11	10	16 V	elect					
C103	1-127-021-11	0.33	10 V	solid aluminum elect					
C104	1-102-110-11	220 p	50 V	ceramic					
C105	1-121-391-11	1	50 V	elect					
C106	1-121-726-11	0.47	50 V	elect					
C107	1-121-726-11	0.47	50 V	elect					
C108	1-102-112-11	330 p	50 V	ceramic					
C109	1-102-106-11	100 p	50 V	ceramic					
C110	1-121-402-11	33	10 V	elect					
C111	1-105-833-12	0.01	50 V	mylar					
C112	1-121-413-11	100	6.3 V	elect					
C113	1-105-681-12	0.047	50 V	mylar					
C114	1-127-020-11	0.22	10 V	solid aluminum elect					

## RESISTORS

All resistors are 1/4W, carbon type and in  $\Omega$  unless otherwise indicated. (k = 1,000)

R1	1-242-726-11	160 k
R2	1-244-670-11	750
R3	1-244-723-11	120 k
R4	1-244-675-11	1.2 k
R5	1-242-653-11	150
R6	1-242-673-11	1 k
R7	1-244-673-11	1 k
R8	1-242-709-11	33 k
R9	1-242-632-11	20
R10	1-244-721-11	100 k

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R11	1-244-661-11	330	R110	1-244-685-11	3.3 k
R12	1-244-714-11	51 k	R111	1-242-705-11	22 k
R13	1-244-659-11	270	R112	1-242-669-11	680
R14	1-244-672-11	910	R113	1-242-715-11	56 k
R15	1-242-653-11	150	R114	1-242-707-09	27 k low noise
R16	1-244-708-11	30 k	R115	1-242-707-11	27 k
R17	1-244-673-11	1 k	R116	1-242-638-11	36
R18	1-244-653-11	150	R117	1-244-701-09	1.5 k low noise
R19	1-242-721-11	100 k	R118	1-242-653-11	150
R20	1-242-651-11	120	R119	1-242-665-11	470
R21	1-242-658-11	240	R120	1-244-689-11	4.7 k
R22	1-244-697-11	10 k	R121	1-244-694-11	7.5 k
R23	1-244-666-11	510	R122	1-244-686-11	3.6 k
R24	1-242-673-11	1 k	R123	1-244-693-11	6.8 k
R25	1-244-713-11	47 k	R124	1-242-659-11	270
R26	1-244-697-11	10 k	R125	1-244-649-11	100
R27	1-242-658-11	240	R126	1-244-655-11	180
R28	1-242-673-11	1 k	R127	1-244-653-11	150
R29	1-242-727-11	180 k	R128	1-244-649-11	100
R30	1-242-666-11	510	R129	1-244-677-11	1.5 k
R31	1-244-657-11	220	R130	1-242-689-11	4.7 k
R32	1-242-657-11	220	R131	1-244-687-11	3.9 k
R33	1-242-673-11	1 k	R132	1-244-733-11	330 k
R34	1-242-673-11	1 k	R133	1-244-709-11	33 k
R35	1-242-713-11	47 k	R134	1-242-705-11	22 k
R36	1-242-693-11	6.8 k	R135	1-244-675-11	1.2 k
R37	1-242-673-11	1 k	R136	1-244-687-11	3.9 k
R38	1-244-713-11	47 k	R137	1-242-709-11	33 k
R39	1-244-706-11	24 k	R138	1-242-697-11	10 k
R40	1-244-695-11	8.2 k	R139	1-244-691-11	5.6 k
R41	1-244-695-11	8.2 k	R140	1-224-096-00	10 k (C), slide variable; TONE
R42	1-244-721-11	100 k	R141	1-222-534-00	10 k (A), slide variable; VOLUME
R43	1-242-673-11	1 k	R142	1-244-681-11	2.2 k
R44	1-244-690-11	5.1 k	R143	1-244-649-11	100
R45	1-244-637-11	33	R144	1-244-707-11	27 k
R46	1-244-728-11	200 k	R145	1-244-707-11	27 k
R47	1-244-672-11	910	R146	1-244-707-11	27 k
R48	1-242-684-11	3 k	R147	1-244-707-11	27 k
R49	1-242-660-11	300	R148	1-244-697-11	10 k
R50	1-242-664-11	430	R149	1-244-629-11	15
R51	1-242-657-11	220	R150	1-242-705-11	22 k
R52	1-242-661-11	330	R151	1-242-661-11	330
R53	1-242-640-11	43	R152	1-244-624-11	11
			R153	1-244-673-11	1 k
R101	1-244-684-11	3 k	R154	1-244-609-11	2.2
R102	1-244-721-11	100 k	R155	1-244-609-11	2.2
R103	1-244-677-11	1.5 k	R156	1-244-639-11	39
R104	-----		R157	1-244-649-11	100
R105	1-244-679-11	1.8 k	R158	1-244-730-11	240 k
R106	1-244-689-11	4.7 k	R159	1-244-687-11	3.9 k
R107	1-242-717-11	470 k low noise	R160	1-244-712-11	43 k
R108	1-244-659-11	270	R161	1-242-619-11	5.6
R109	1-244-697-09	10 k low noise	R162	1-242-635-11	27

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R163	1-242-635-11	27
R164	1-242-691-11	5.6 k
R165	1-242-691-11	5.6 k
R166	1-244-689-11	4.7 k
R167	1-244-689-11	4.7 k
R168	1-242-657-11	220
R169	1-244-633-11	22

### SWITCHES

S1	1-516-256-00	rotary, band selector
S2	1-516-257-00	slide, AFC/ISS
S101	1-516-186-00	slide, RADIO
S102	1-514-813-22	slide, record/playback
S103		included in lamp switch ass'y (X-35329-84-0)
S104	1-516-164-00	leaf, power
S105		included in power connector (CNJ102)
S106		included in REC/PB connector (J106)
S107	1-516-174-00	rotary, voltage selector

### JACKS

J101	1-507-392-00	6-units:	MIC
J102			REMOTE
J103			LINE IN
J104			LINE OUT
J105			MONITOR
CNJ101			DC IN 6 V

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
J106	1-508-615-00	connector, REC/PB w/switch S106
CNJ102	1-509-510-00	connector, power

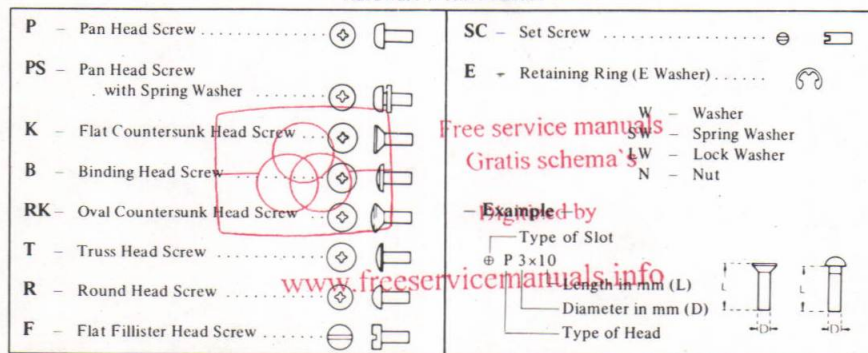
### MISCELLANEOUS

	8-829-336-00	head, record/playback: PP134-36
	8-825-566-00	head, erase: EBF5-02B
	8-834-009-01	motor, D-009G
	1-464-007-00	unit, bias osc
	1-527-184-11	~15 filter, ceramic
	1-502-419-00	speaker
	1-501-072-00	antenna, telescopic
	8-814-191-11	MICROPHONE, electret condenser: C-1002S
	1-518-095-13	lamp, 6 V: 35 mA: dial
	1-520-136-00	meter, REC/BATT
F1	1-532-084-00	fuse, 100 mA: primary
F2,3	1-532-080-00	fuse, 800 mA: secondary
	1-533-037-00	holder, fuse: secondary
	1-533-102-00	holder, fuse: primary
	1-536-181-00	terminal strip, 2L1
	1-535-047-00	terminal, solderless
	1-535-050-00	connector, circuit board

## SECTION 7 HARDWARE

<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
<b>SCREWS</b>			
7-621-255-15	P 2 x 3	7-623-105-11	2 (middle)
7-621-255-67	P 2 x 10	7-623-105-12	2 (middle)
7-621-259-25	P 2.6 x 4	7-623-107-12	2.6 (middle)
7-621-259-45	P 2.6 x 5	7-623-107-19	2.6 (middle)
7-621-259-72	P 2.6 x 12	7-623-108-12	3
7-621-720-46	P 2 x 8 self-tapping	7-623-112-19	5 (middle)
7-621-721-52	P 2.6 x 4 self-tapping	7-623-208-21	3 spring
7-621-721-61	P 2.6 x 5 self-tapping	7-623-412-01	5 external tooth
7-621-721-71	P 2.6 x 6 self-tapping	7-623-710-37	6 wave
7-621-721-81	P 2.6 x 8 self-tapping	<b>NUTS</b>	
7-621-721-91	P 2.6 x 10 self-tapping	7-622-205-02	2
7-621-722-02	P 2.6 x 12 self-tapping	7-684-025-01	5
7-621-773-86	B 2.6 x 4	<b>LUGS</b>	
7-628-154-15	PS 2.6 x 6	7-623-505-01	2
7-628-253-25	PS 2 x 6	7-623-505-11	2
7-682-129-01	P 2 x 12	7-623-507-11	2.6
7-682-135-01	P 2.6 x 6	7-623-508-11	3
7-682-547-04	B 3 x 6	<b>RETAINING RINGS</b>	
7-682-624-01	PS 2 x 4	7-624-102-01	E 1.5
7-682-626-01	PS 2 x 4	7-624-104-01	E 2
7-682-646-01	PS 3 x 5	7-624-106-01	E 3
7-682-647-01	PS 3 x 6	7-624-108-01	E 4
7-682-655-01	PS 3 x 30	7-624-171-41	G 2.5
7-682-946-01	PSW 3 x 5	7-624-171-51	G 3
7-682-947-01	PSW 3 x 6	<b>DIAL CORD</b>	
7-682-948-01	PSW 3 x 8	7-632-120-52	0.25
7-683-126-00	(-) SC 2 x 3	<b>EYELET</b>	
7-685-145-01	P 3 x 6 self-tapping	7-623-606-01	1.3 x 3
7-685-145-51	P 3 x 6 self-tapping		
7-685-146-21	P 3 x 8 self-tapping		
7-685-446-21	T 3 x 8 self-tapping		
7-685-547-24	B 3 x 10 self-tapping		
<b>WASHERS</b>			
7-623-105-01	2 (small)		

— Hardware Nomenclature —



**SONY CORPORATION**