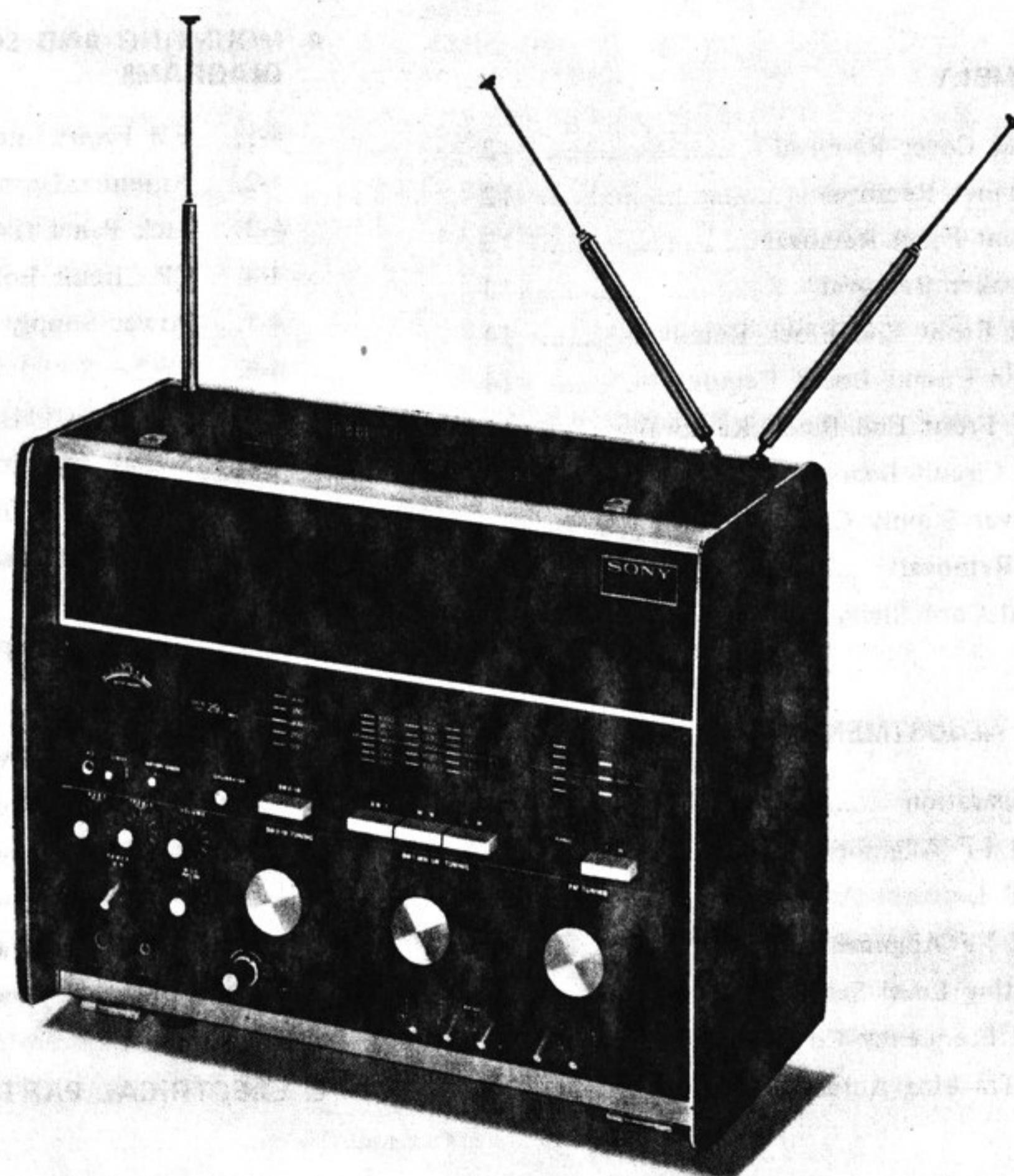




Set using ISO screws

CRF-220

GEP Model
NEP Model



SONY®
SERVICE MANUAL

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SECTION 1 OUTLINE

1-1. SPECIFICATIONS

Circuit System:	Superheterodyne (FM, MW, LW, SW1) Double superheterodyne (SW2 ~ SW19)
Semiconductor:	25 transistors, 3 FET's for reception, 17 transistors for auxiliary functions, 33 diodes, 2 thermistors
Frequency Coverage:	FM ; 87.5 - 108 MHz MW ; 530 - 1,605 kHz (566 - 187 m) LW ; 150 - 400 kHz (2,000 - 750 m) SW1 ; 1.6 - 4.5 MHz (187 - 66 m; Marine Band) SW2 ; 2.0 - 2.6 MHz (120 m) <u>SW3 ; 3.0 - 3.6 MHz (90 m)</u> SW4 ; 3.5 - 4.1 MHz (75 - 81 m) SW5 ; 4.5 - 5.1 MHz (60 m) SW6 ; 5.8 - 6.4 MHz (49 m) SW7 ; 7.0 - 7.6 MHz (40 - 41 m) SW8 ; 9.5 - 10.1 MHz (31 m) SW9 ; 11.5 - 12.1 MHz (25 m) SW10 ; 14.0 - 14.6 MHz (20 m) SW11 ; 15.0 - 15.6 MHz (19 m) SW12 ; 17.5 - 18.1 MHz (16 m) SW13 ; 21.0 - 21.6 MHz (15 m) SW14 ; 21.4 - 22.0 MHz (13 m) SW15 ; 25.5 - 26.1 MHz (11 m) SW16 ; 26.8 - 27.4 MHz (11 m) SW17 ; 28.0 - 28.6 MHz (10 m) SW18 ; 28.6 - 29.2 MHz (10 m) SW19 ; 29.2 - 29.8 MHz (10 m)
Intermediate Frequency:	FM ; 10.7 MHz MW, LW, SW1 ; 455 kHz SW2 ~ SW19 ; 1st : 1.6 - 2.2 MHz 2nd: 455 kHz
Antenna System:	FM ; telescopic antennas 1,000 mm 2 pcs external antenna terminals (300 Ω , 75 Ω) are provided MW, LW ; built-in ferrite bar antenna, 10 mm dia \times 180 mm external antenna terminals are provided SW1 ~ SW19 ; telescopic antenna 1,470 mm external antenna terminals are provided
Power Requirements:	AC 110, 127, 220, 240V, 50/60 Hz DC 9V, battery (size "D") 6 pcs DC 12V, with SONY car battery cord DCC-126 (optional)
Power Output: at 10% distortion	4W with AC power supply 1.5W with DC power supply
Current Drain: at zero signal	AC 180 mA DC 90 mA
Maximum Sensitivity: at output 50 mW, S/N 6 dB	FM ; -2 dB (0.8 μ V) MW ; 28 dB/m (25 μ V/m) LW ; 36 dB/m (63 μ V/m) SW ; 0 dB (1 μ V); average

Selectivity:	LW, MW, SW1 ~ SW19; 40 dB at BROAD position 60 dB at SHARP position
Muting Level:	10 ~ 30 dB (adjustable)
Signal-to-Noise Ratio:	FM ; 63 dB at 54 dB input, 400 Hz, 30% modulation MW ; 37 dB at 60 dB input, 400 Hz, 30% modulation LW ; 30 dB at 60 dB input, 400 Hz, 30% modulation SW ; 44 dB at 44 dB input, 400 Hz, 30% modulation
Image Rejection:	FM ; 72 dB at 98 MHz MW ; 60 dB at 1,605 kHz LW ; 80 dB at 360 kHz SW1 ; 30 dB at 4.5 MHz SW2 ; 80 dB at 2.5 MHz SW19 ; 30 dB at 29 MHz
Frequency Response:	100 - 20,000 Hz within ± 10 dB by tone control
AUX IN Jack	
input impedance:	5 k Ω
maximum sensitivity:	-53 dB (1.7 mV) at 50 mW output
MPX OUT Jack	
output impedance:	5 k Ω
output level:	-24 dB (49 mV) at 5 k Ω load impedance
Record Jack	
output impedance:	2.2 k Ω
output level:	-50 dB (2.5 mV)
REC OUT Connector	
output impedance:	80 k Ω
output level:	-29.5 dB (26 mV)
EXT SP Jack:	3 ~ 8 Ω speakers can be connected
HEADPHONE Jack:	8 Ω headphone can be connected
EARPHONE Jack:	8 Ω earphone can be connected
Special Controls:	BATTERY CHECK switch CALIBRATOR knob MGC knob BFO control knob SELECTIVITY switch ANL switch MUTING switch SENSITIVITY switch AFC switch
Dimensions:	17 $\frac{3}{16}$ " (W) x 12 $\frac{3}{16}$ " (H) x 7 $\frac{1}{2}$ " (D) (452 mm x 325 mm x 190 mm)
Weight:	30 lb, 13.5 kg (without batteries)
Supplied Accessories:	AC power cord Polishing cloth

1-2. BLOCK DIAGRAM

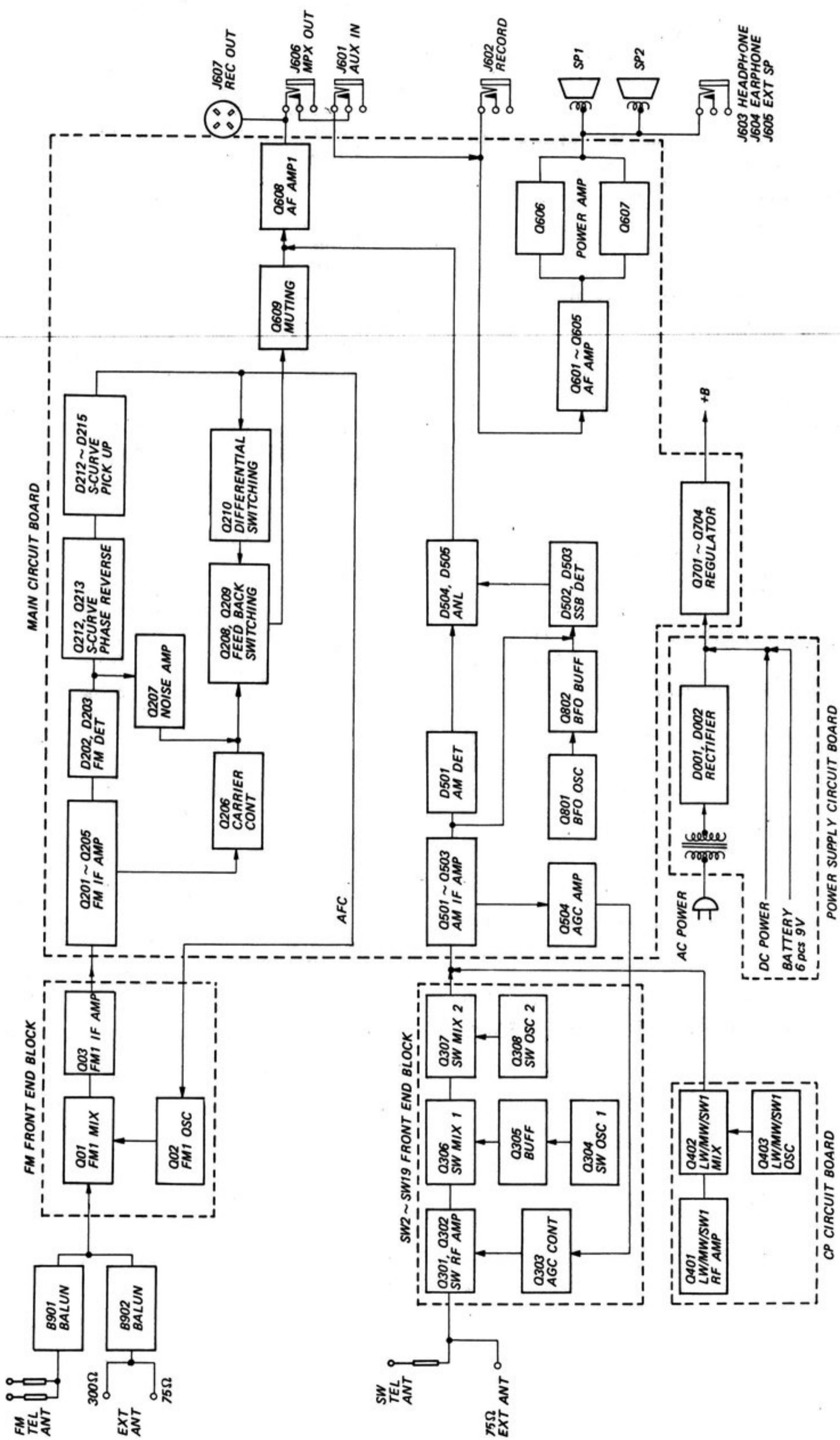


Fig. 1-1.

1-3. TECHNICAL FEATURES

The SONY Model CRF-220 is a high-performance radio receiver having many features found in communication receivers. Among them are the following:

- A total of 22 bands covering the broadcast frequencies of any country in the world. Included are an FM band, 19 SW bands, an MW band and an LW band.
- FET (Field Effect Transistor) front ends in FM and SW bands provide superior sensitivity, image rejection, and stability.
- Easy-to-tune SW bands due to a dual-conversion system providing a uniform 600 kHz tuning range on each band.
- Product detector for receiving ssb signals.
- An fm i-f circuit employing ceramic filters. An a-m i-f circuit employing two ceramic filters with two-step adjustable selectivity.
- Individual tuning knobs for SW2 ~ 19 bands, SW1/MW/LW bands and FM band. Preset-tuning of three stations is available.
- The power supply will operate from household current in any country of the world (via built-in voltage selector), internal battery, or car battery.
- Stable, noise-free FM tuning by means of AFC and a muting system.
- ANL (Automatic Noise Limiter) to minimize noise.
- Up to 4 watts of undistorted audio power output with two built-in speakers or external speakers.

1-4. CIRCUIT OPERATIONS

AFC (Automatic Frequency Control)

The automatic frequency control employed in the CRF-220 for the FM band is a little different circuitry from ordinary ones as shown in Fig. 1-2. Output signals from the detector diodes are applied to the bases of Q211 and Q212 in the manner of phase-reversal. Hence, the outputs at the collectors of Q211 and Q212 are phase-reversed each other. R260, R261, R262 and R263 in the output circuit of the transistors compose a balanced bridge circuit, and the d-c voltage at the junction of R260 and R261, point (A), is maintained constant at 1.5 volts. This constant 1.5 V d-c is applied to the variable-capacitance diode D101 for biasing through the AFC switch S202 in the AFC OFF mode. When the AFC switch is set to the AFC ON position, control bias is taken from the point (B) and the AFC circuit is activated.

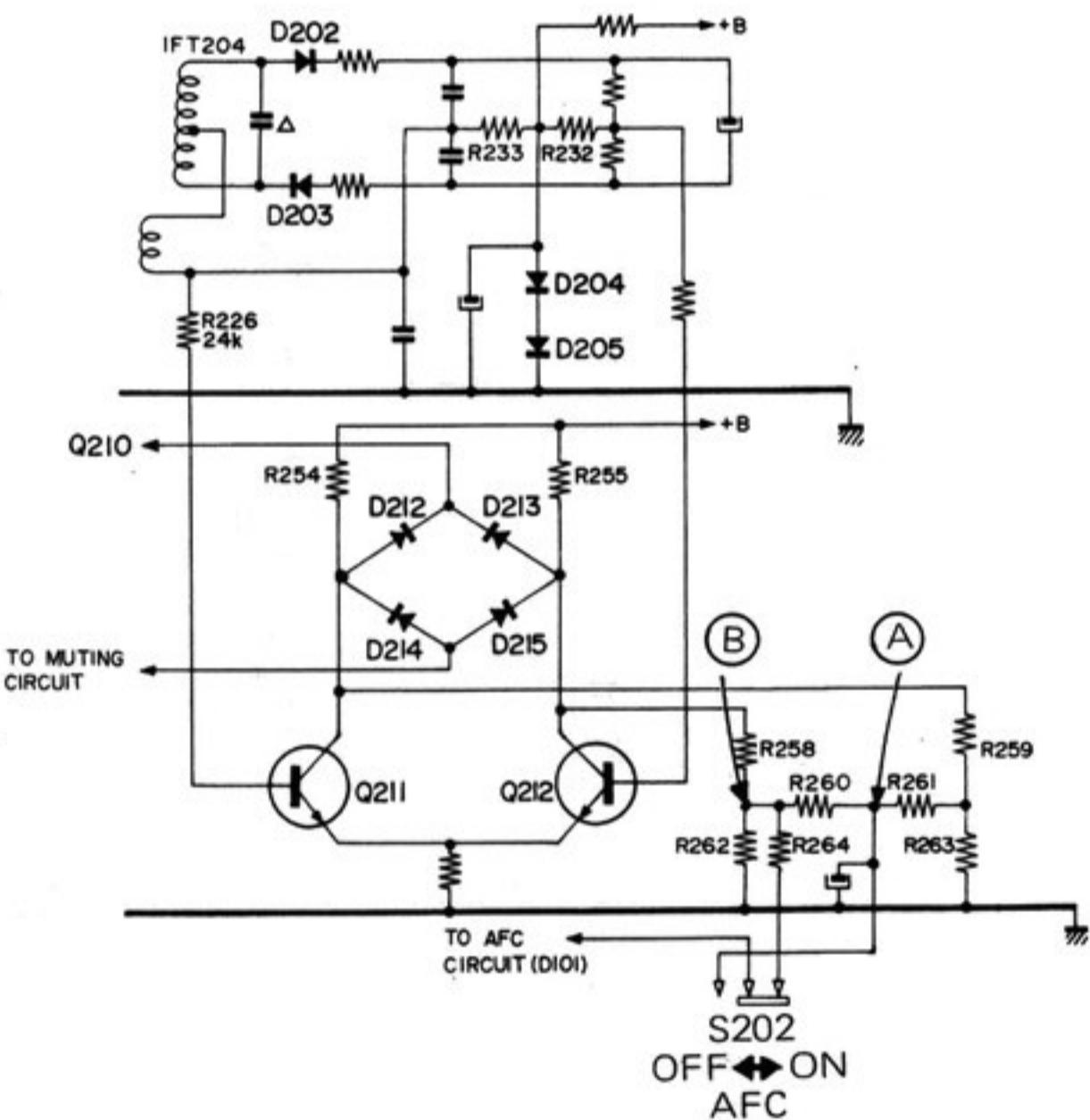


Fig. 1-2

Muting Circuit:

When the receiver is detuned from a signal, the signal decreases. Since less i-f signal is then rectified by diodes D207 and D208, the negative output voltage of these rectifiers can no longer back bias the positive voltage applied to the base of transistor Q206 through adjustable resistor VR901 (Fig. 1-3). This allows Q206 to conduct lowering its collector voltage. Since the collector of Q206 is connected to the base of PNP transistor Q209, Q209 conducts when its base voltage decreases (with respect to ground), thereby causing transistor Q208 to conduct. The collector voltage of Q208 then drops to near ground potential. The voltage at the collector of Q208 is fed to the base of transistor Q609 through MUTING switch S203. Since this voltage is so low Q609 cannot conduct and complete the emitter circuit of transistor Q608. This prevents Q608 from amplifying the detector output.

When tuned to a signal, the opposite actions occur. I-f signal through capacitor C227 is rectified into negative d-c voltage by diodes D207 and D208. This voltage cuts off transistor Q206 and eventually turns on transistor Q609, thereby enabling transistor Q608 to amplify the detector output. The muting level can be adjusted by potentiometer VR901. The muting level is usually set approximately 20 dB

lower than the signal level. If the receiver tuning is shifted within range B of Fig. 1-4, the difference between the collector voltages of transistors Q211 and Q212 becomes large enough drops across resistors R251 and R252, thus lowering the base voltage of PNP transistor Q209 and results in its conduction. As before, the conduction of Q209 begins a chain of events which prevents Q608 from amplifying. If the tuning is shifted within range C of Fig. 1-4, the difference between the collector voltages of transistors Q211 and Q212 is so small that transistor Q210 is turned off within this range as well as in range A. Noise components caused by detuning, however, are coupled to transistor Q207 through capacitor C240 and resistor R247 from the detector output.

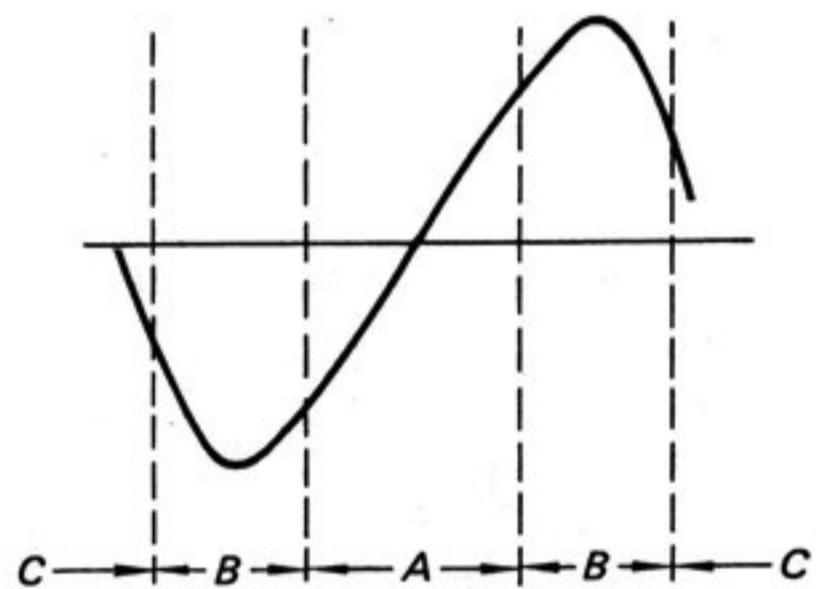


Fig. 1-4 Discriminator characteristic

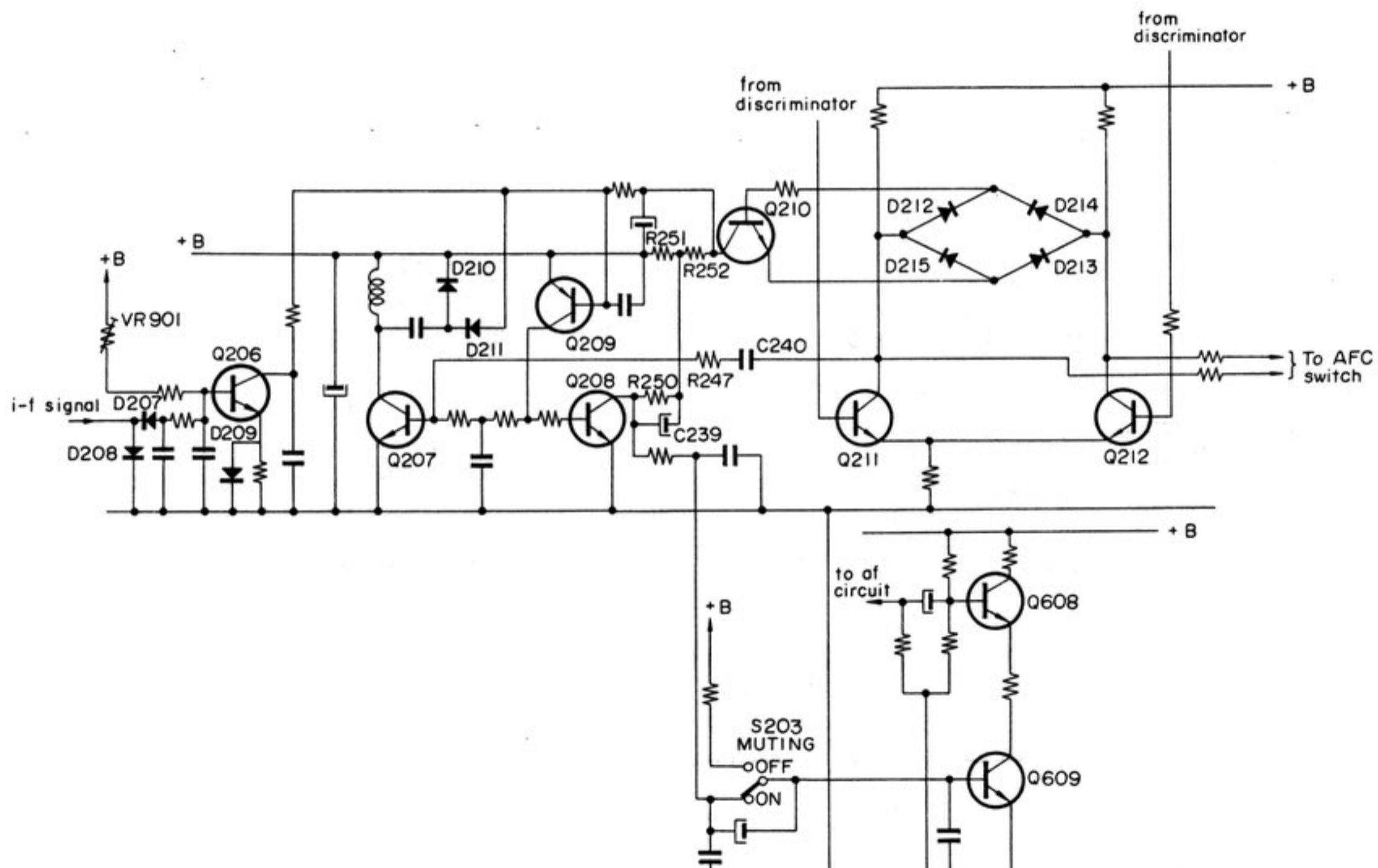


Fig. 1-3

The noise is amplified, rectified into negative d-c voltage by diodes D210 and D211, and applied to the base of transistor Q209 to turn it on. Since the base voltage of Q207 is controlled by the collector voltage of Q209, the amplification of transistor Q207 increases due to increased base bias, and transistor Q209 is held conducting quite reliably. As before, transistor Q608 cuts off the detector output.

Positive feedback through resistor R250 and capacitor C239 from transistor Q209 aids in turning off Q208.

Adjustable Selectivity Employing Ceramic Filters:

The bandwidth in a-m reception can be altered by changing the coupling between the sections of ceramic filters in the a-m i-f circuit. Ceramic filters CF501 and CF502 can be manually set to narrow or wide bandwidth by switch S501.

The net result of the switch manipulations on the ceramic filter circuits are summarized in Table. The overall selectivity curves of the a-m i-f strip are shown in Fig. 1-5.

Band width	CF501 (S501-1)	CF502 (S501-2 ~ 3)	Overall response (Fig. 1-5)
Sharp			A
Broad			B

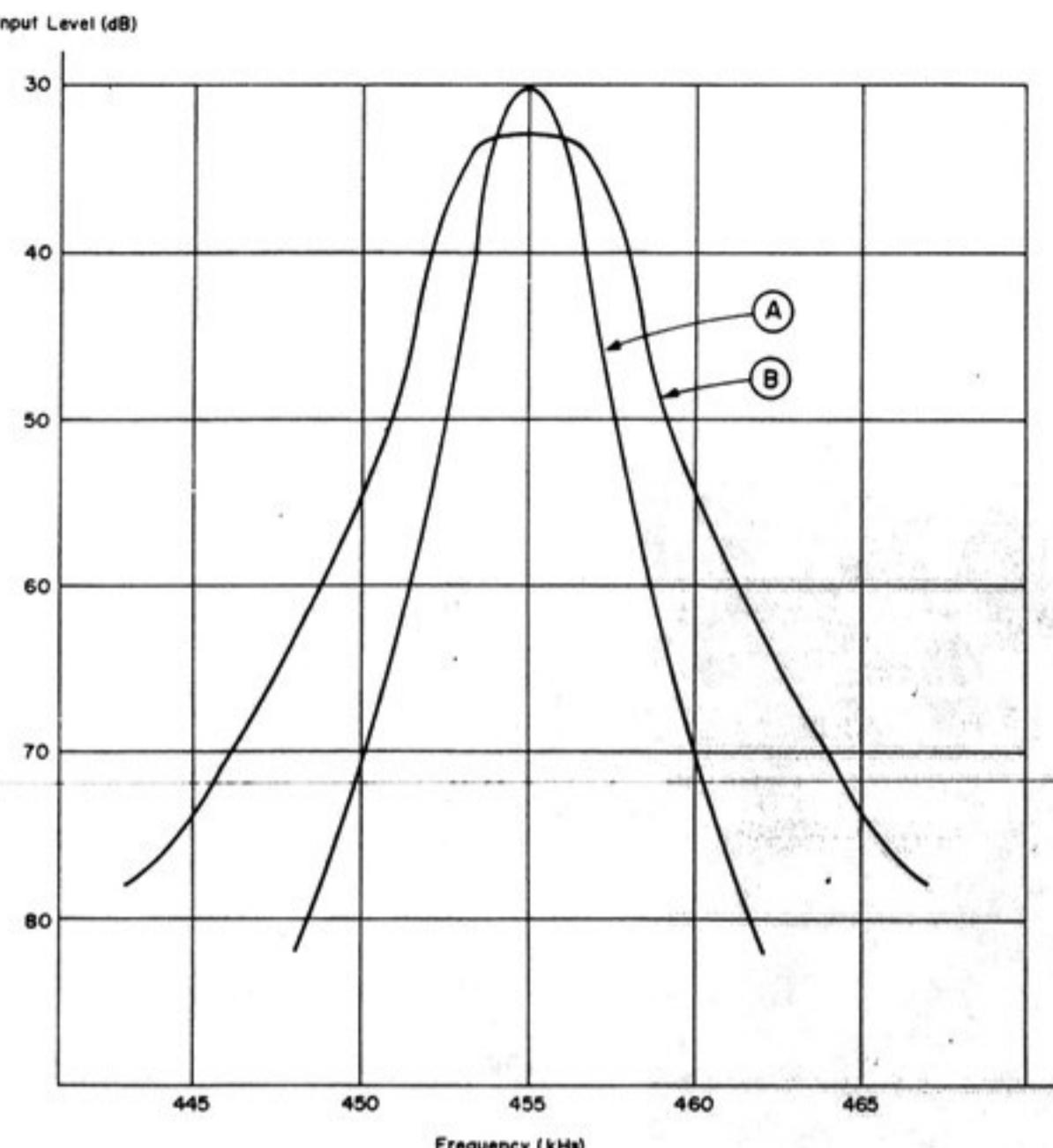


Fig. 1-5 Overall i-f response curve

ANL (Automatic Noise Limiter):

This limiter in the a-m section clips any noise pulses accompanying the signal to a level no longer than the signal amplitude. The clipping level is automatically adjusted to match the variations in signal level. The collector voltage of i-f amplifier Q502 forward biases diodes D504 and D505 through resistors R509 and R521, while the output voltage of detector D501 provides a reverse-bias voltage (Fig. 1-6). These two bias voltages adjust the clipping level of diodes D504 and D505 to match the average signal level.

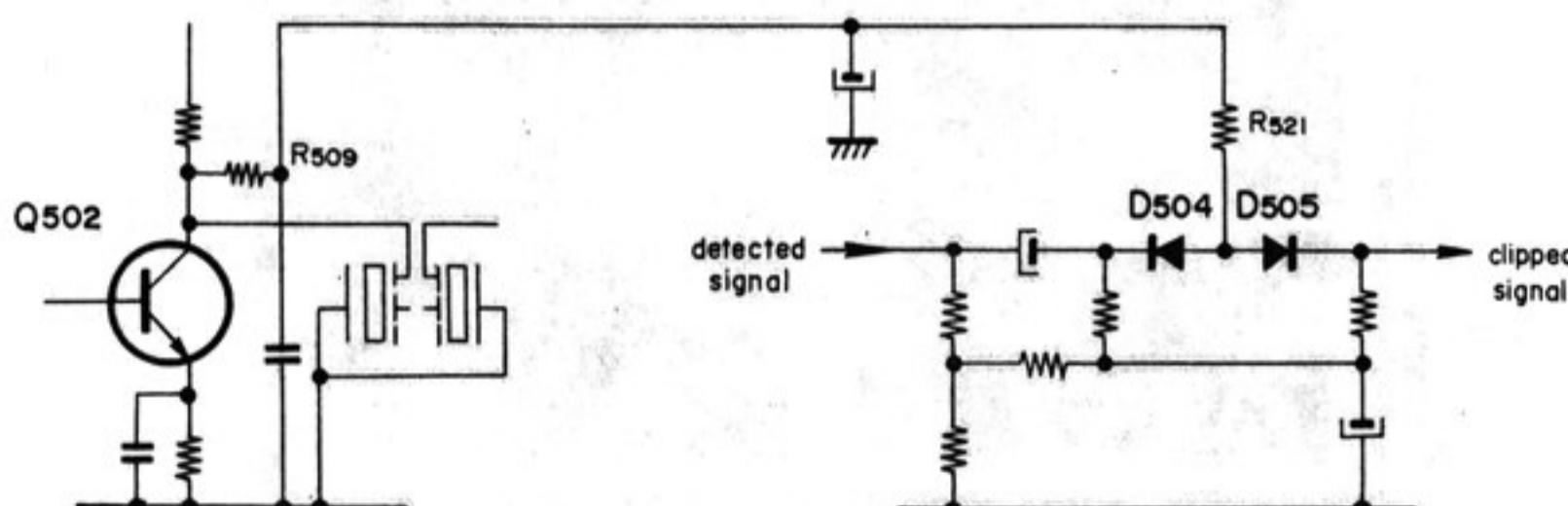


Fig. 1-6 Automatic noise limiter circuit

Product Detector for Single-Sideband Reception:

A product detector is a type of heterodyne detector. Single-sideband signals can be recovered by passing them through nonlinear device after being mixed with a carrier identical in frequency to that used during modulation at the transmitter. That is, these two signals, sideband and carrier, are converted into two beat signals, upper and lower, against the carrier frequency by heterodyne action. The upper beat signal is eliminated by passing through the filter circuit and the lower beat signal is fed to the next stage as audio signals.

In the model CRF-220, the detector utilizes the square-law characteristic (output current proportional to the square of the effective value of the input voltage) of a diode for the nonlinear device.

To minimize distortion, two diodes D502 and D503 are connected in reverse each other and applied the signals respectively positive in phase. That is because the range of square-law curve of one diode is narrow causing distorted detection for strong input signal.

The BFO injection voltage used for carrier reinsertion is comparatively high (about 0.8 volt is optimum) to set the operating point of the detector within a linear portion of the diodes' characteristic. This results to minimize distortion of the recovered audio signal.

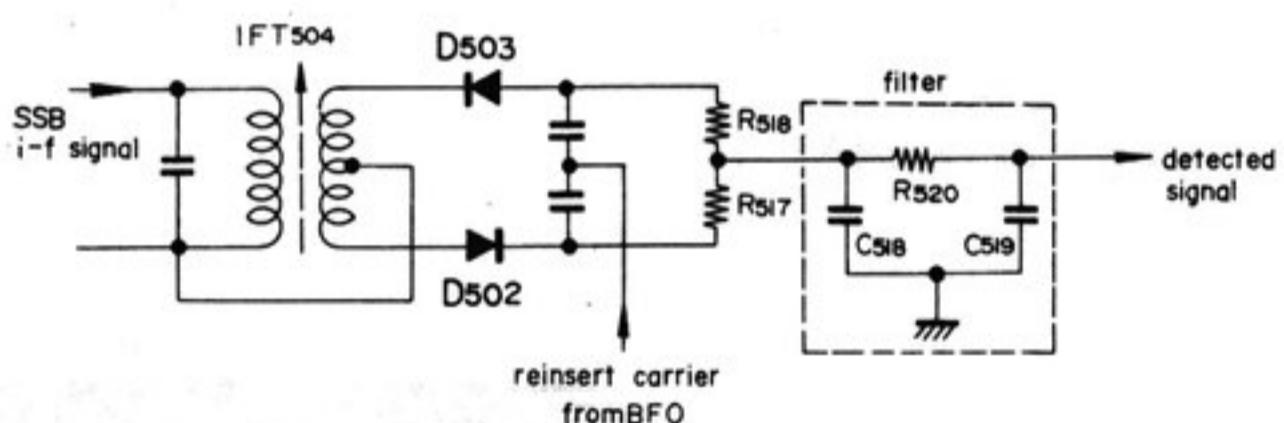


Fig. 1-7 Product detector

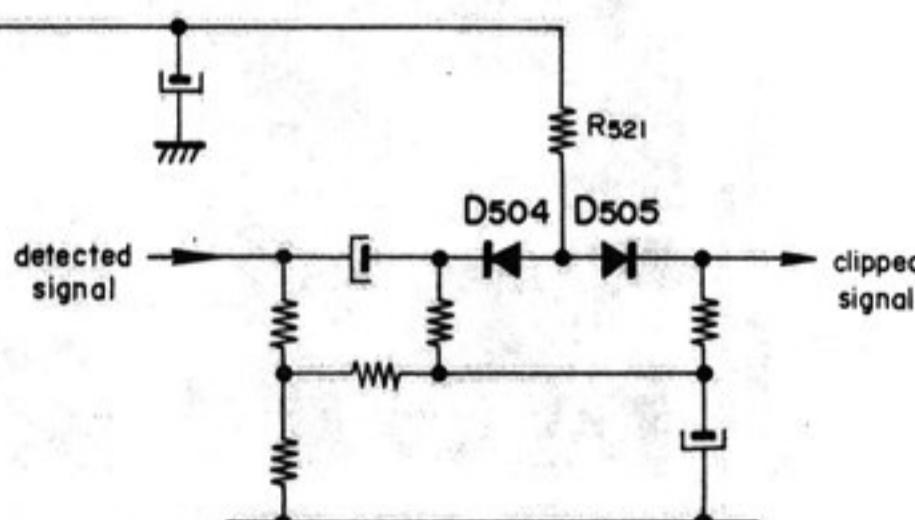


Fig. 1-7 Product detector

1-5. EXTERNAL VIEW

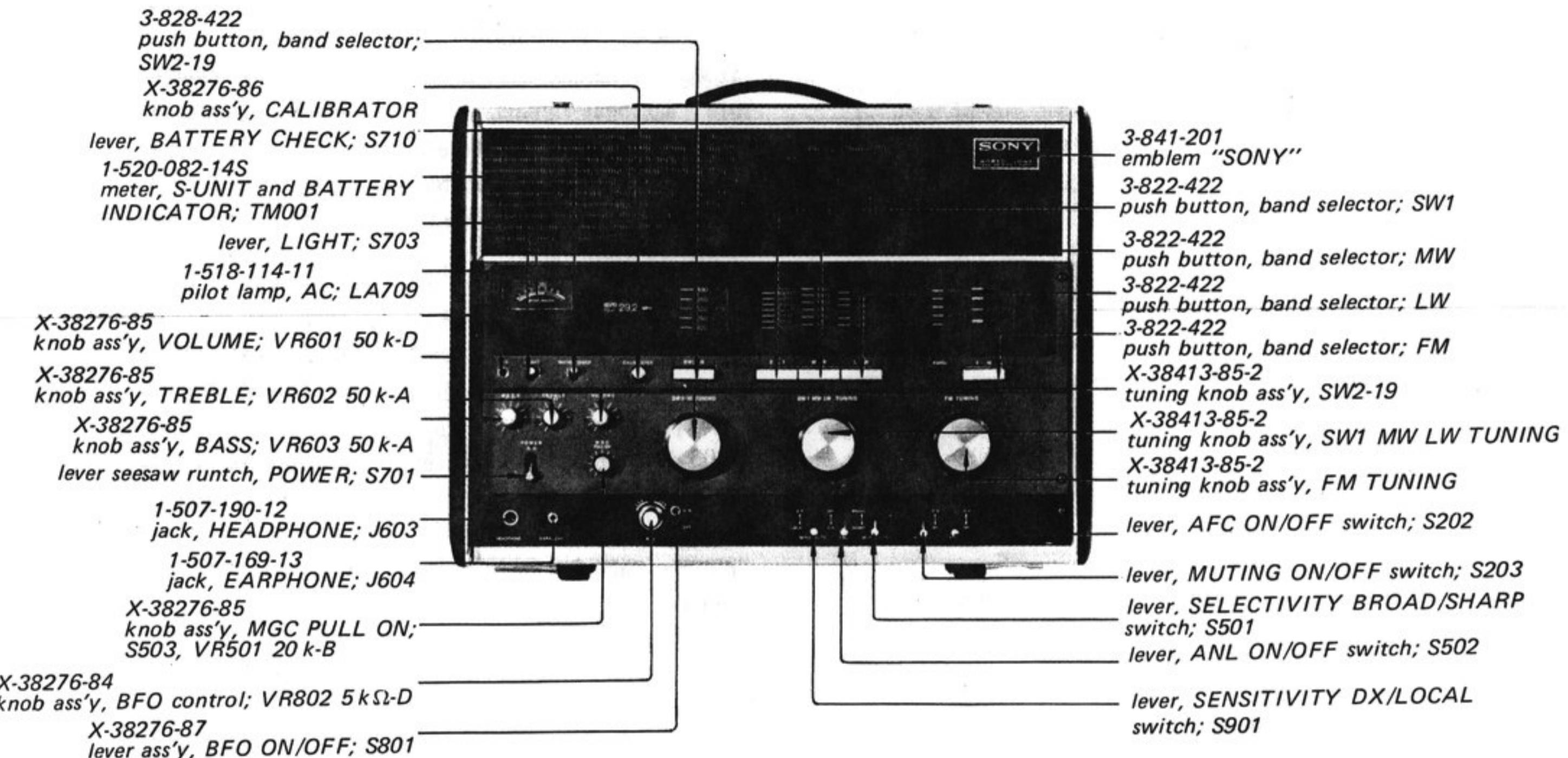


Fig. 1-8

1-6. INTERNAL VIEW

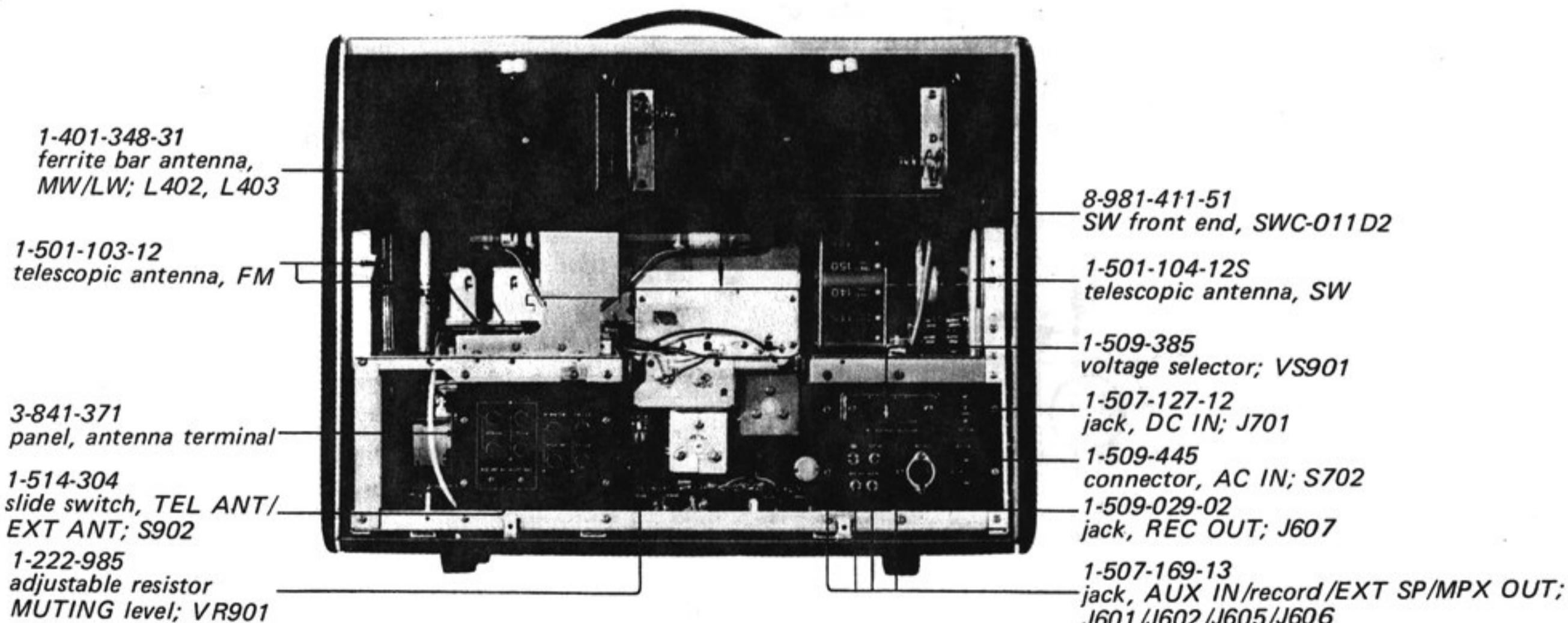


Fig. 1-9.

1-7. CHASSIS VIEW

— Front —

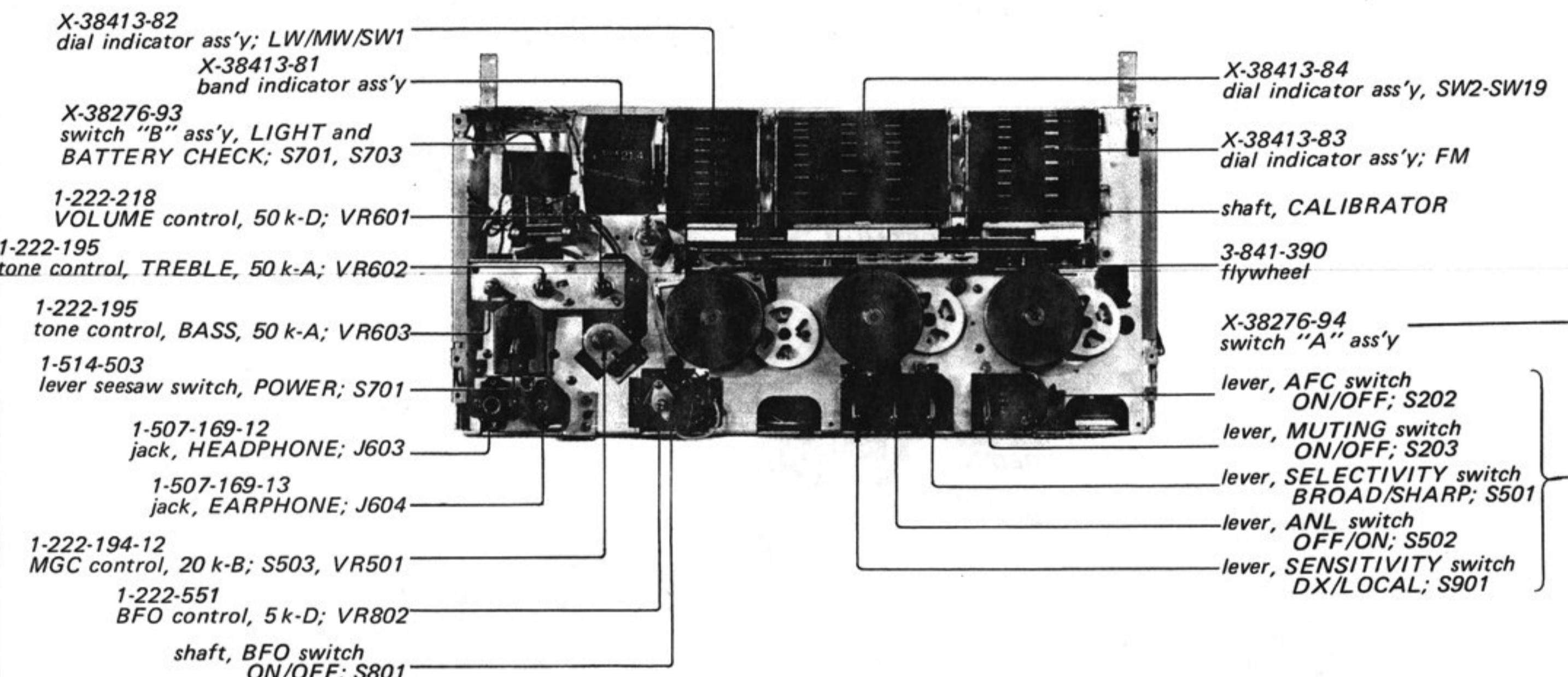


Fig. 1-10

— Bottom —

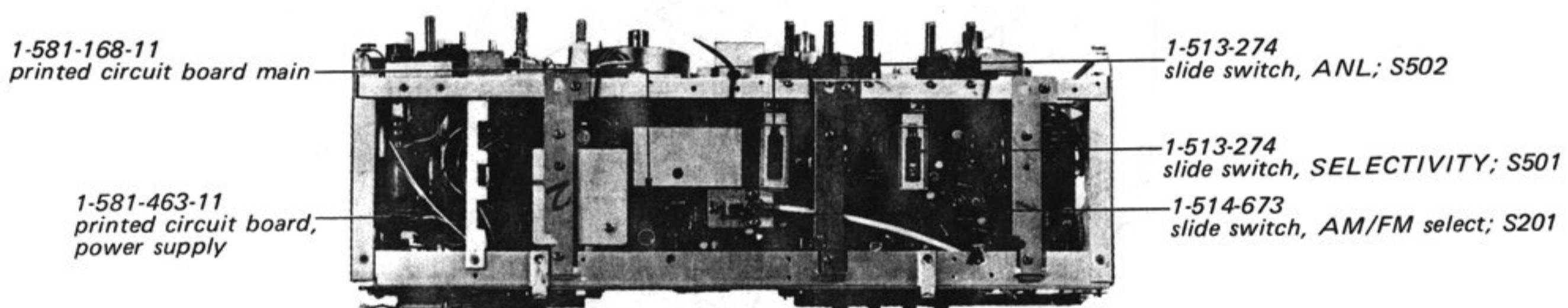


Fig. 1-11

SECTION 2 DISASSEMBLY

2-1. REAR COVER REMOVAL

1. Remove the six screws marked **(A)** in Fig. 2-1.
2. Remove the rear cover in the direction shown by the arrow **(B)**.
3. Remove the two wood screws marked **(C)** in Fig. 2-1.

2-2. CABINET REMOVAL

1. Remove the four screws marked **(E)** in Fig. 2-1.
2. Push up the three telescopic antennas' bottom.
3. Remove the six screws marked **(F)** and **(G)** in details (1) and (3) of Fig. 2-1.
4. Unsolder the coaxial cable and the three lead wires shown in details (1) and (3) of Fig. 2-1.
5. Loosen the three set screws fixing band selector knob shown in detail (2) of Fig. 2-1 and pull off the band selector knob.

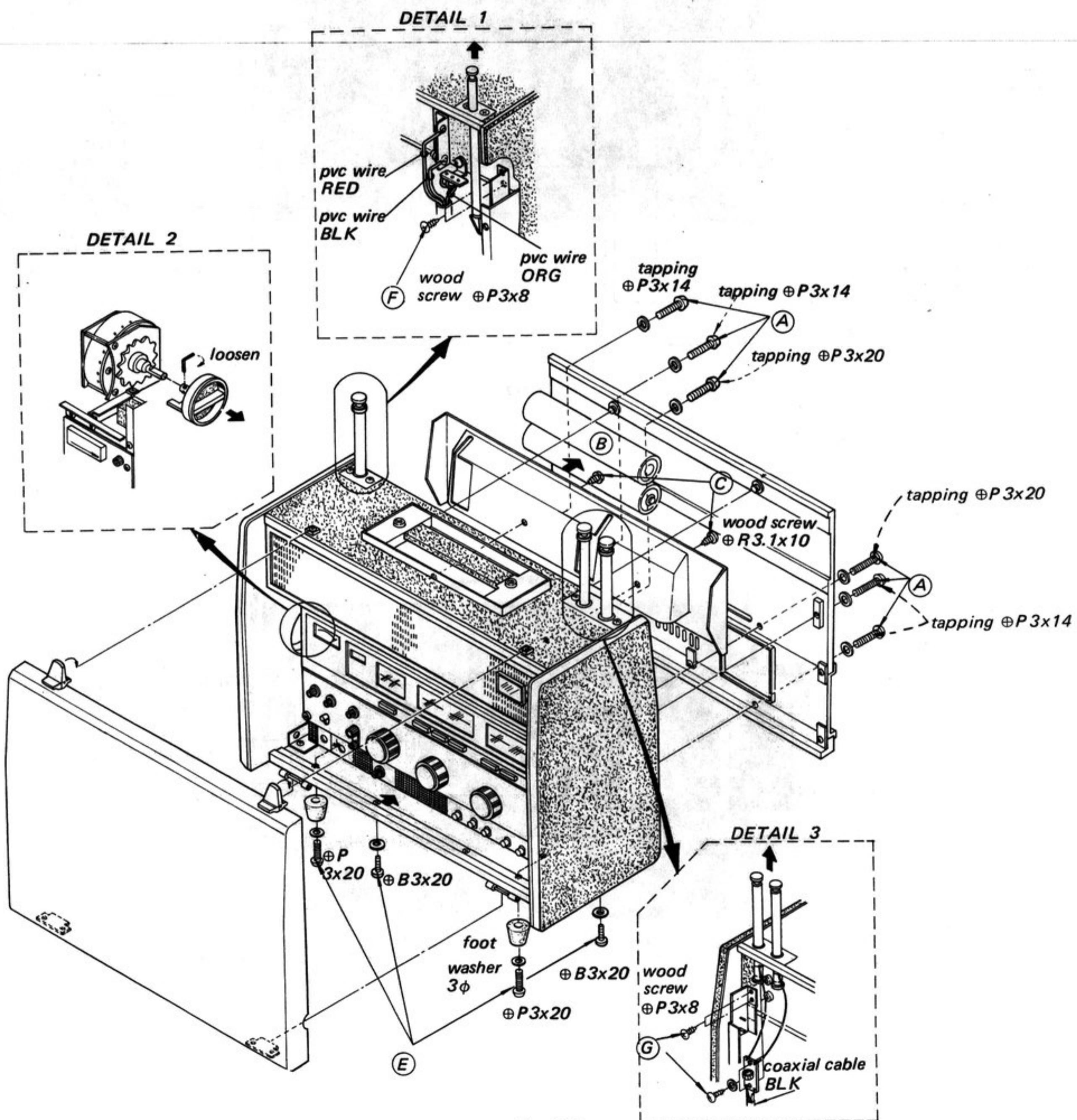


Fig. 2-1.

2-3. FRONT PANEL REMOVAL

1. Remove the three TUNING knobs and the CALIBRATOR knob by loosening their set-screws.
2. Pull off the five control knobs marked * in Fig. 2-2.
3. Remove the six screws marked (H) and remove the main panel and the sub-panel.

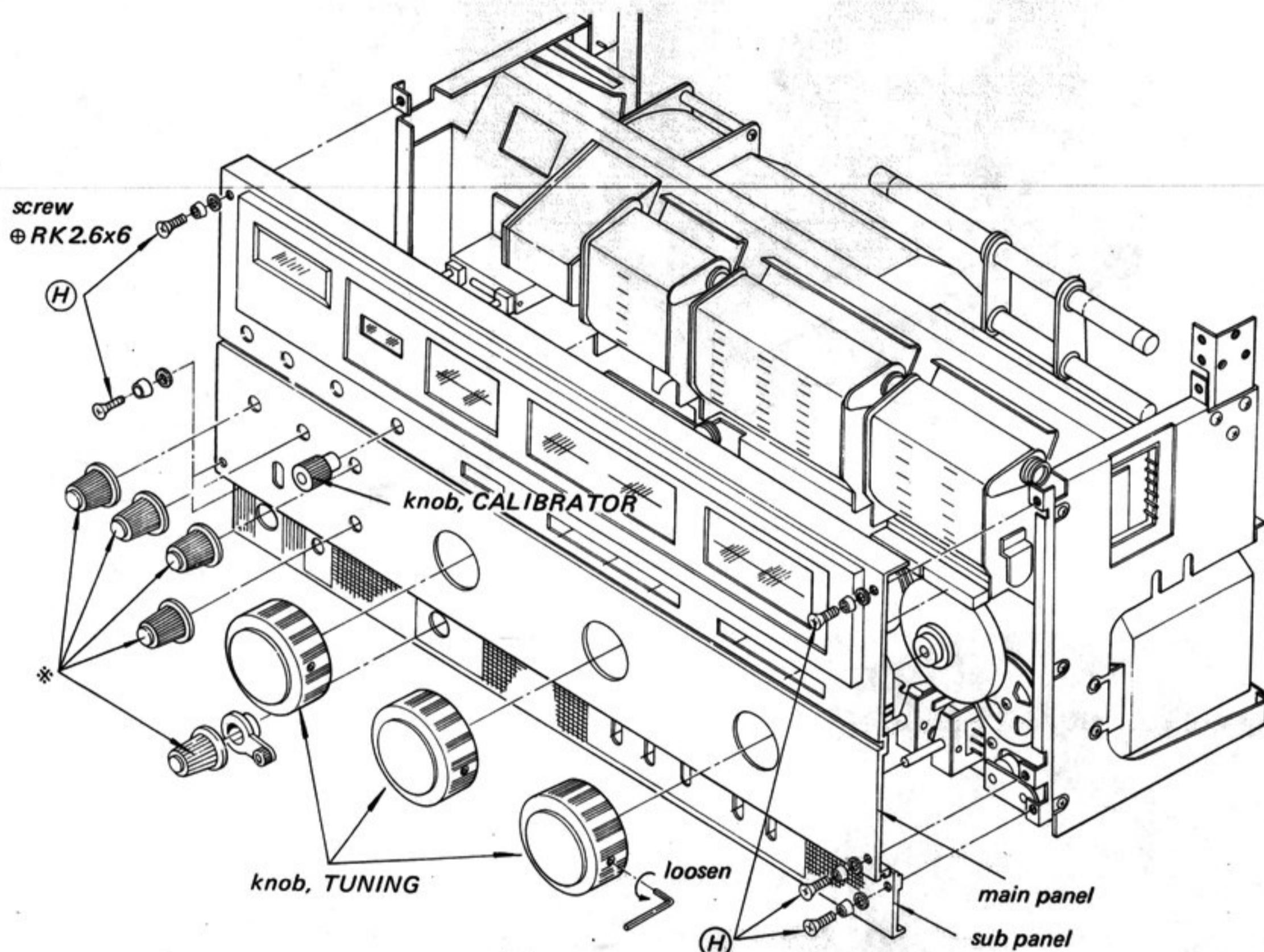


Fig. 2-2.

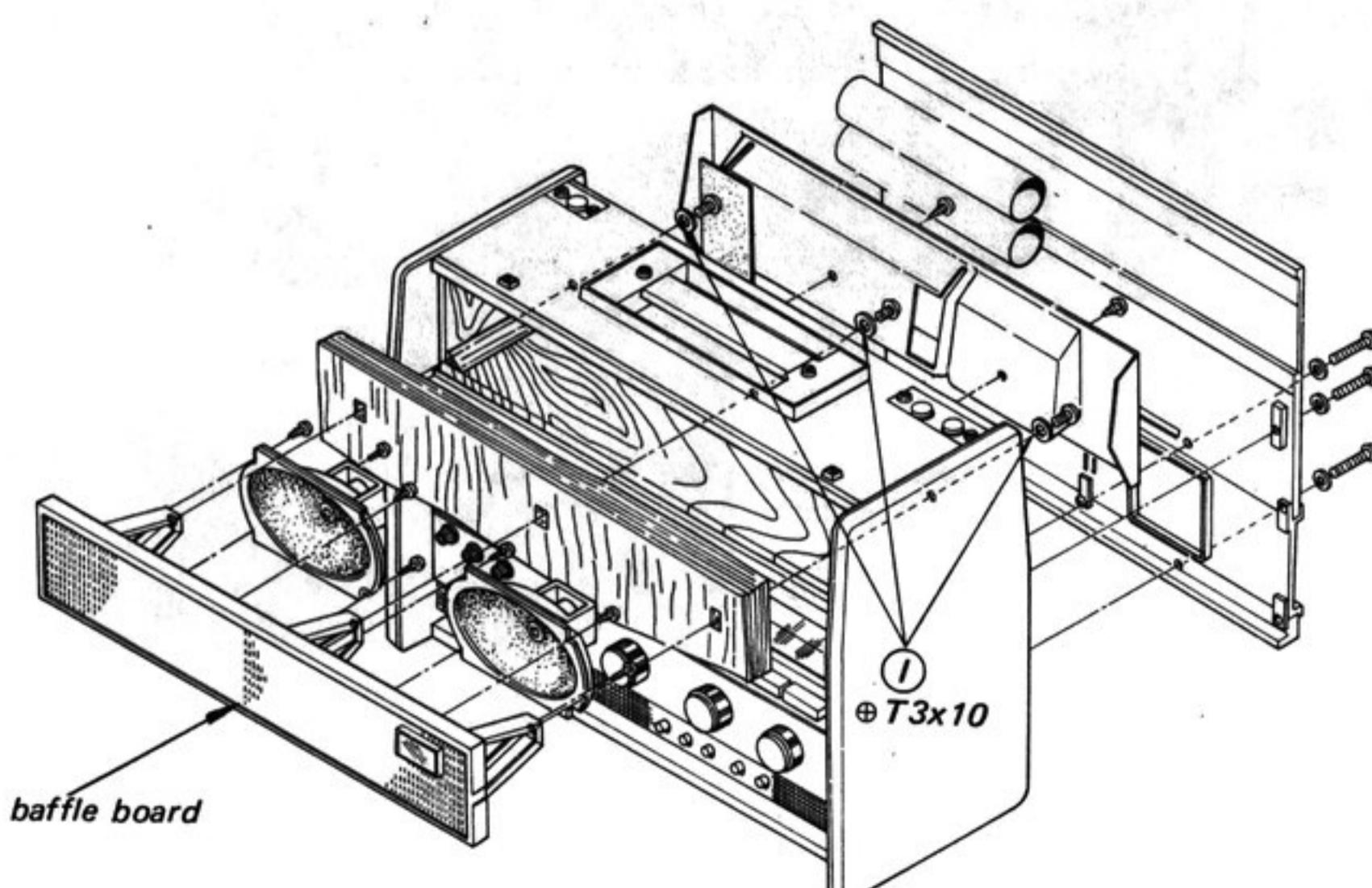


Fig. 2-3.

2-5. FM FRONT END BLOCK REMOVAL

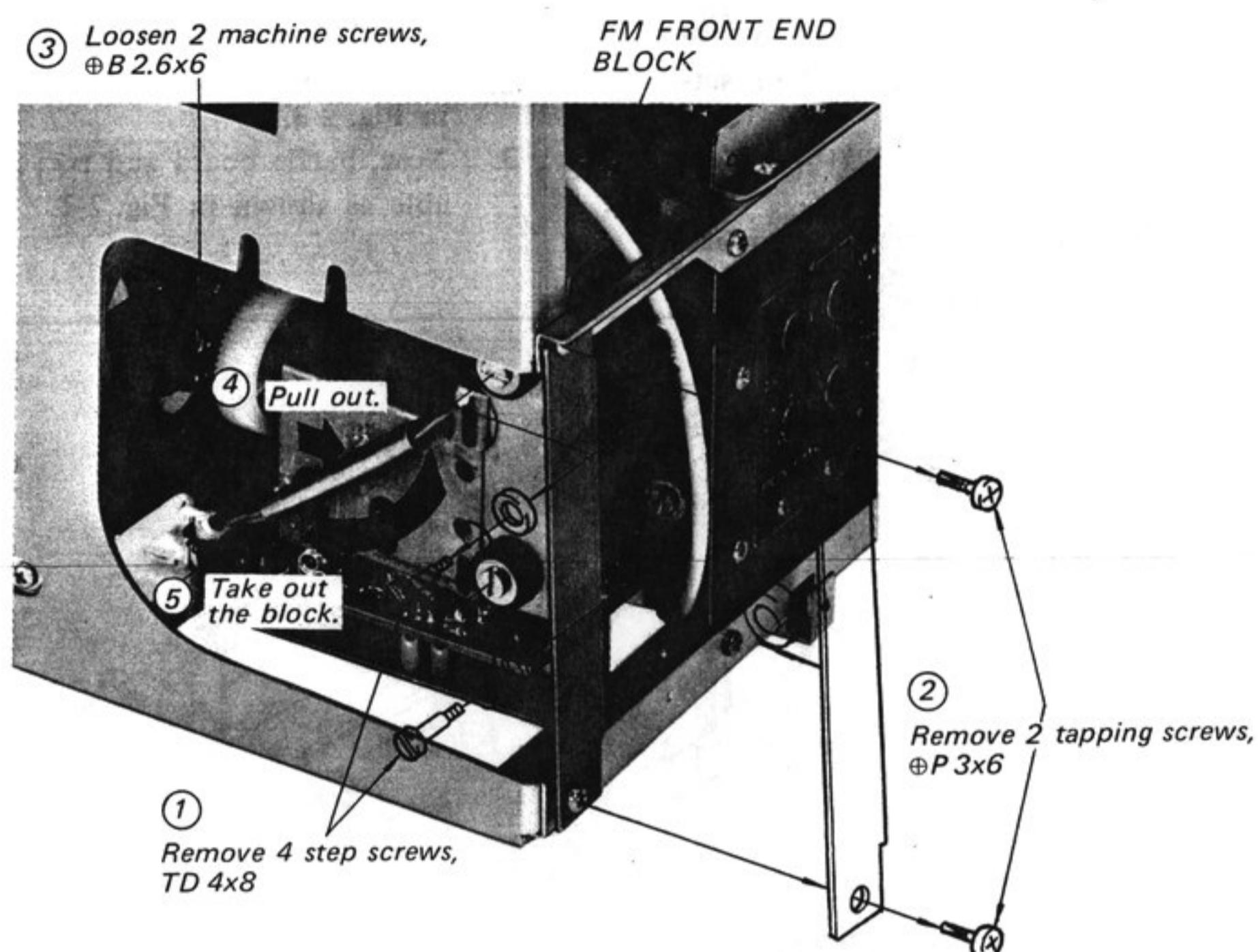


Fig. 2-4

2-6. MAIN CIRCUIT BOARD REMOVAL

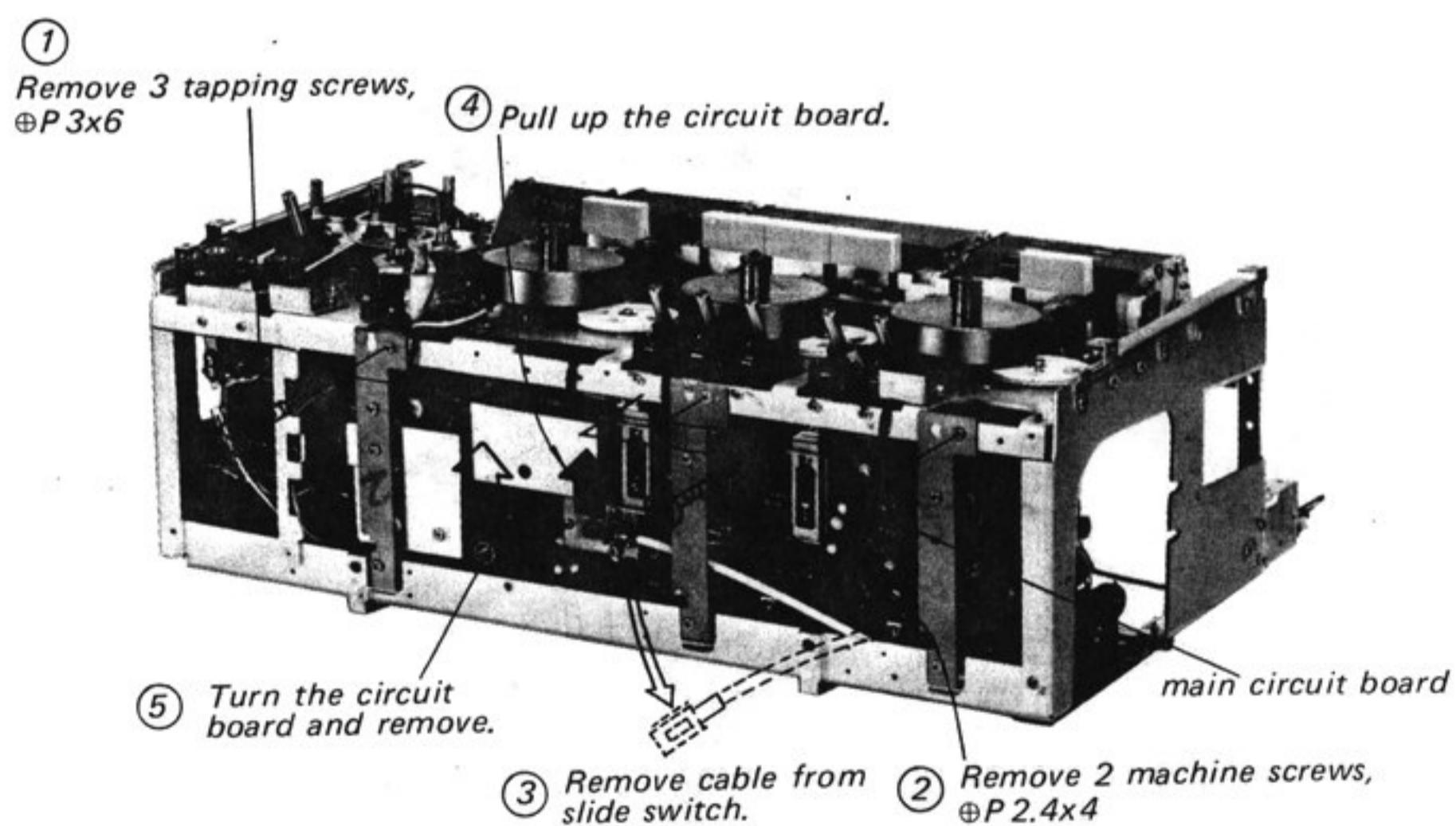
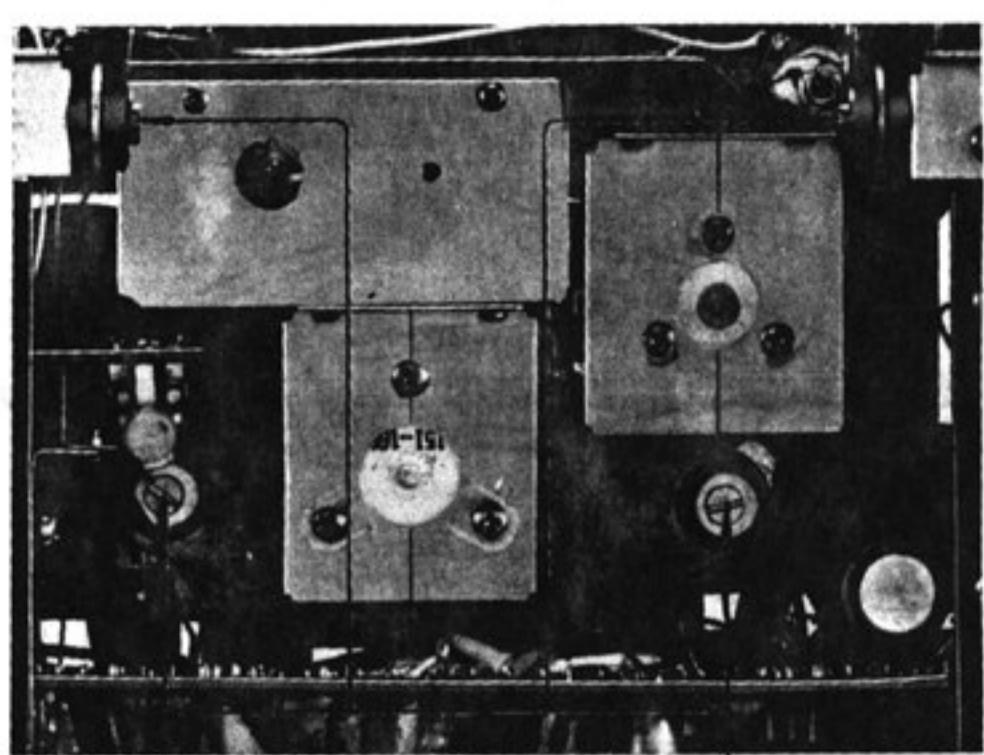


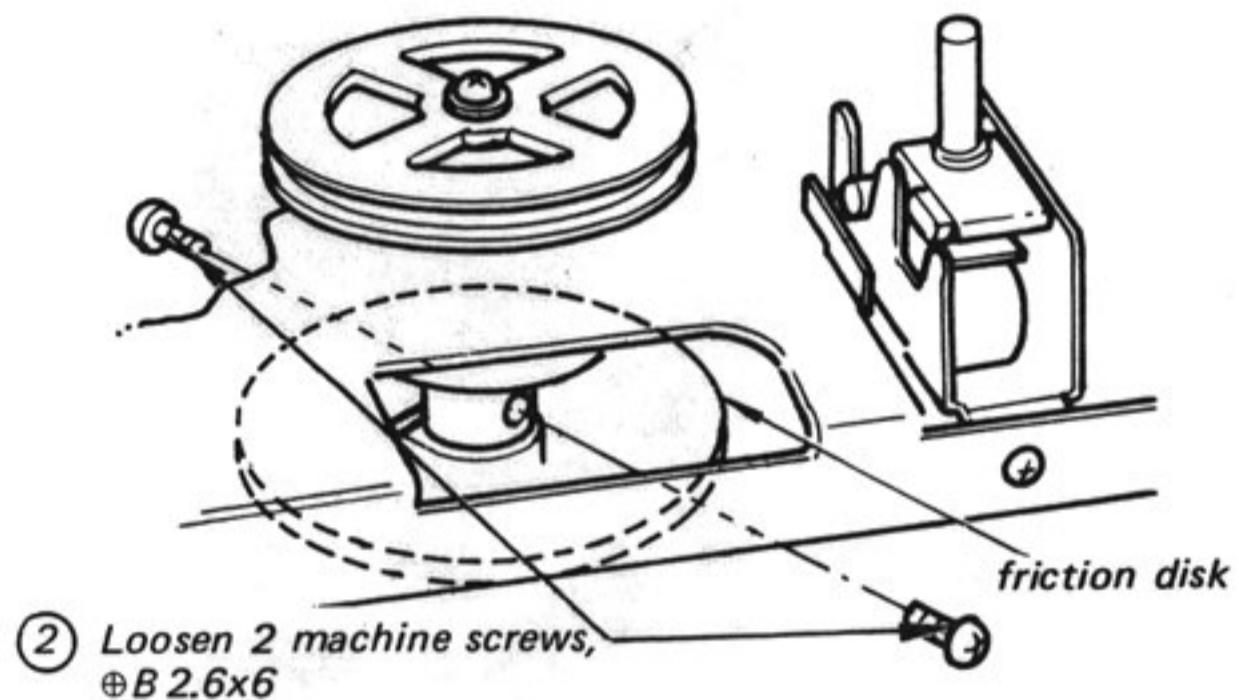
Fig. 2-5

2-7. SW FRONT END BLOCK REMOVAL



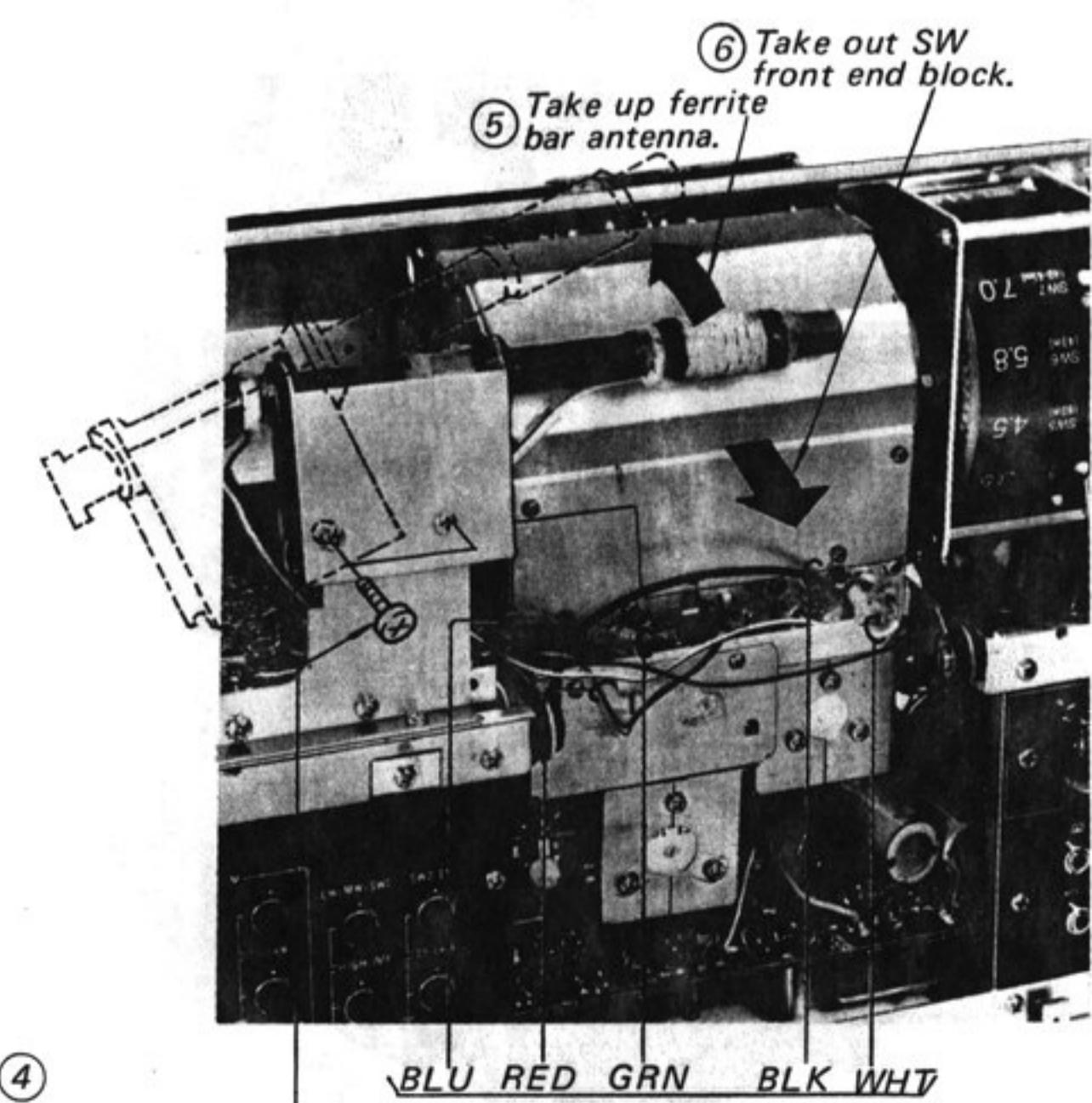
- ① Remove 4 step screws,
TD 4x8

Fig. 2-6



- ② Loosen 2 machine screws,
⊕B 2.6x6

Fig. 2-7



- ④ Remove 2 tapping screws,
⊕P 3x6
③ Unsolder the five pvc wires.

Fig. 2-8

2-8. CP CIRCUIT BOARD REMOVAL

Locate the cp circuit board from Fig. 2-10.

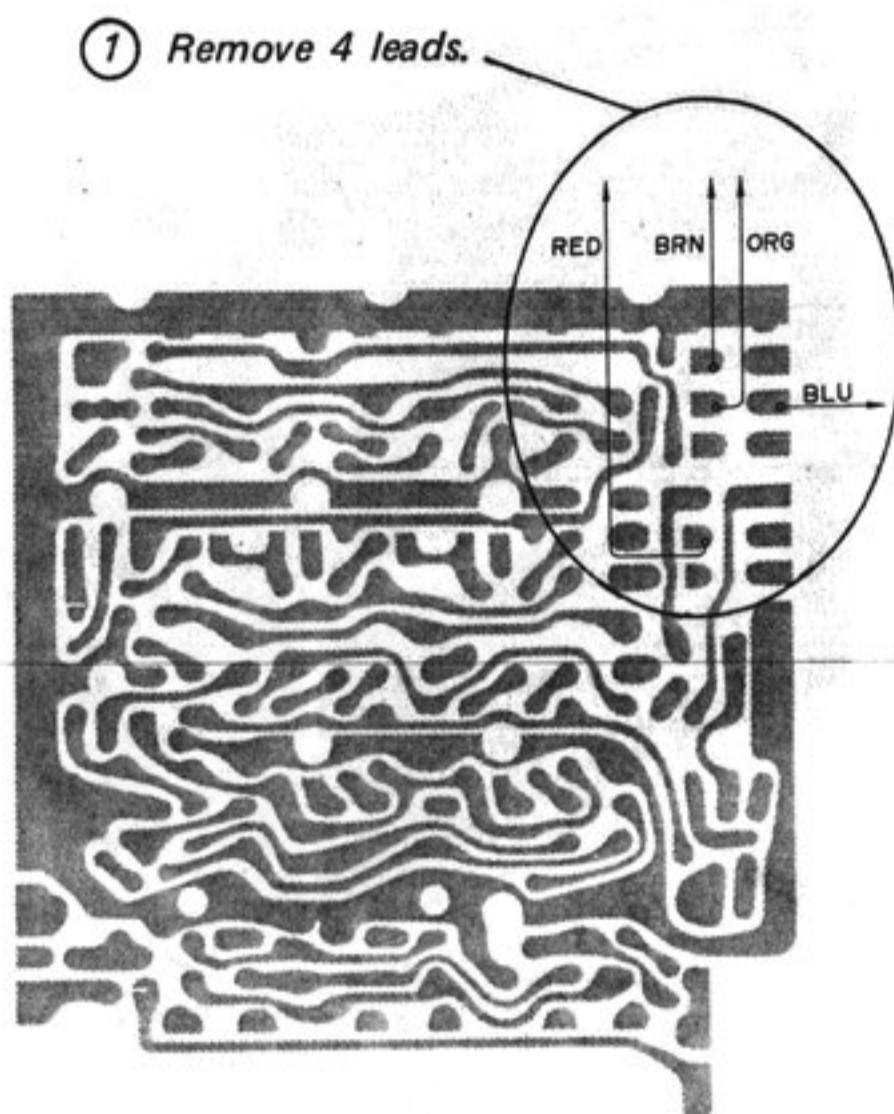


Fig. 2-9

- ③ Remove 3 machine screws, ⊕P 2.6x4

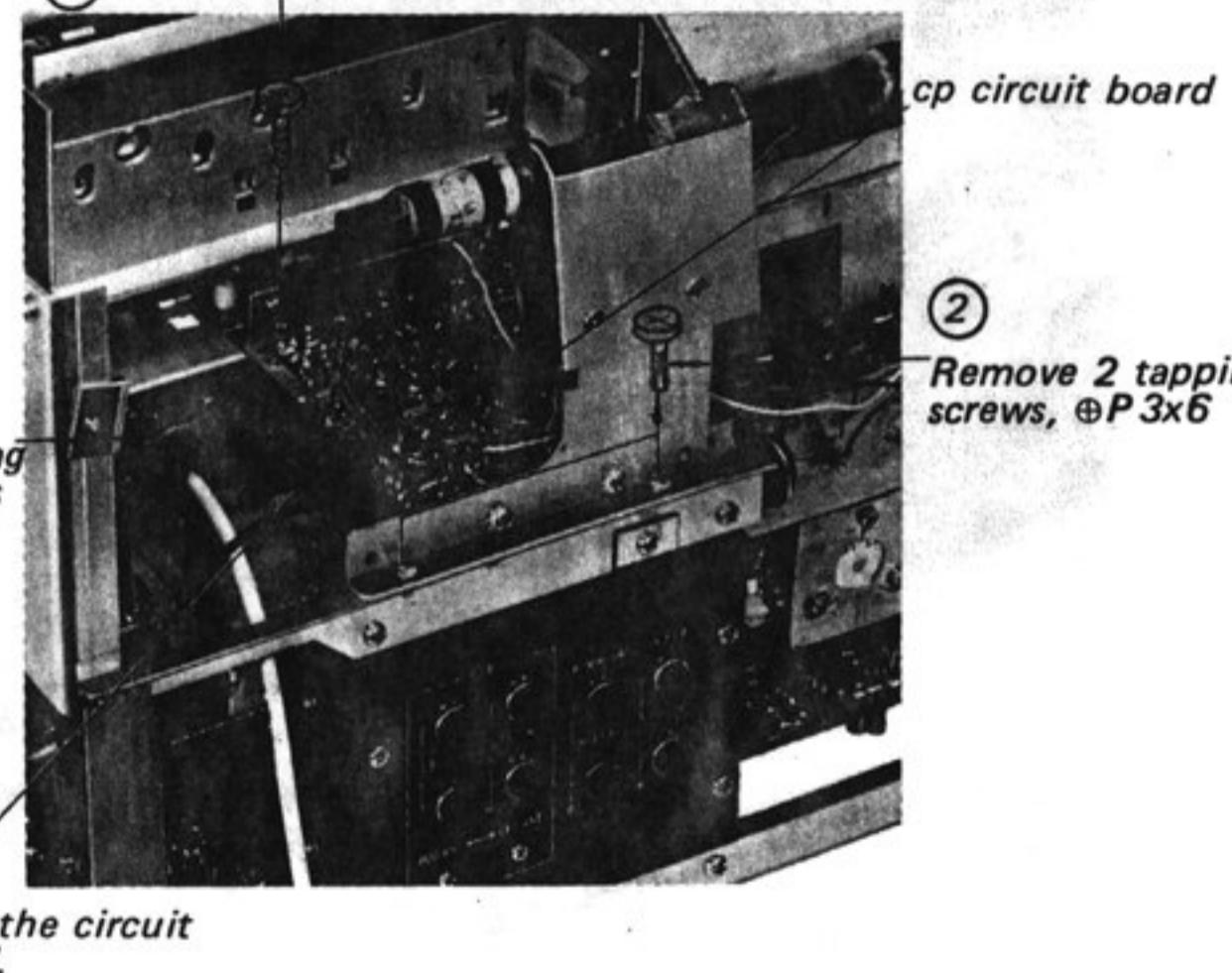


Fig. 2-10

2-9. POWER SUPPLY CIRCUIT BOARD REMOVAL

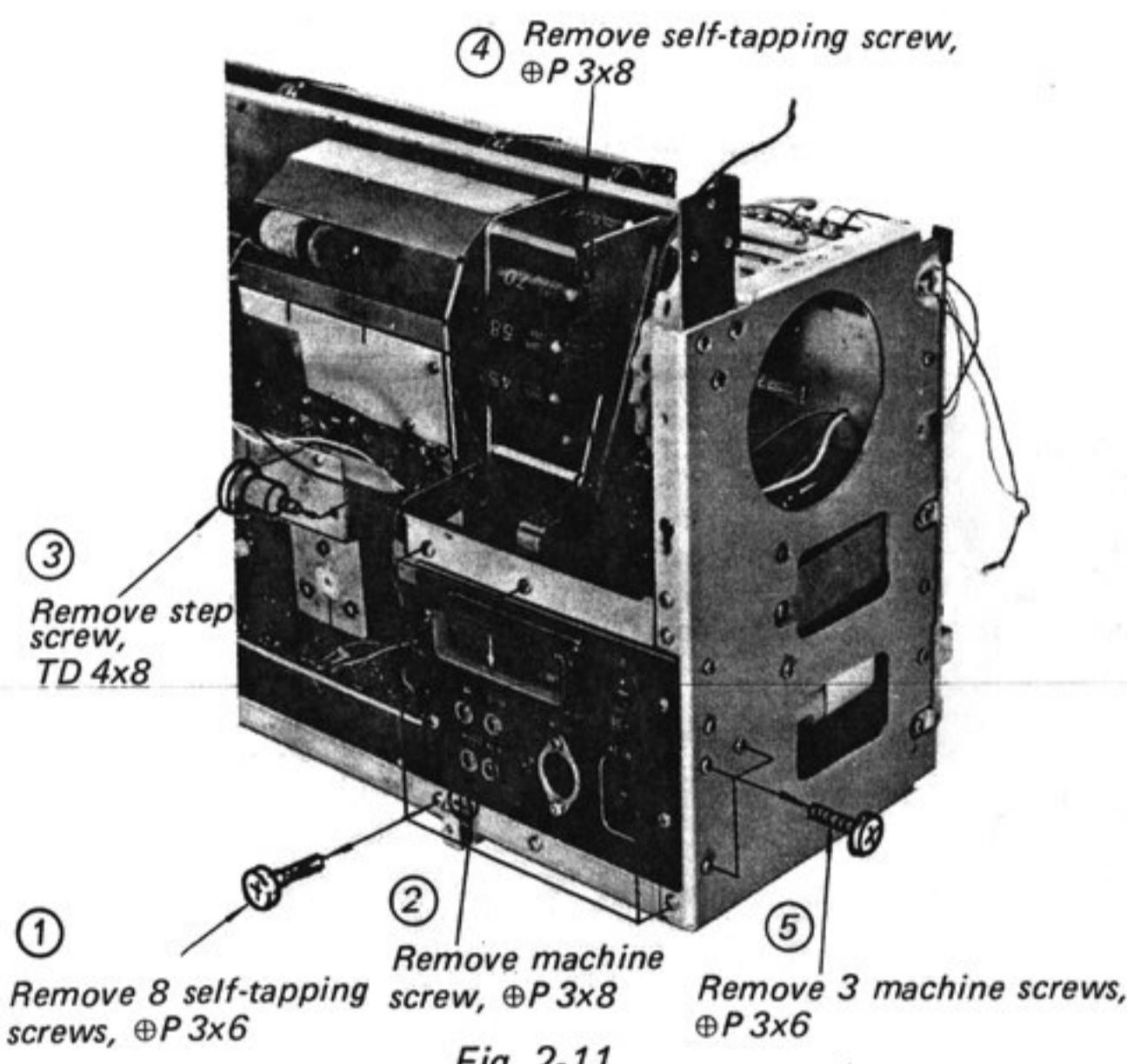


Fig. 2-11

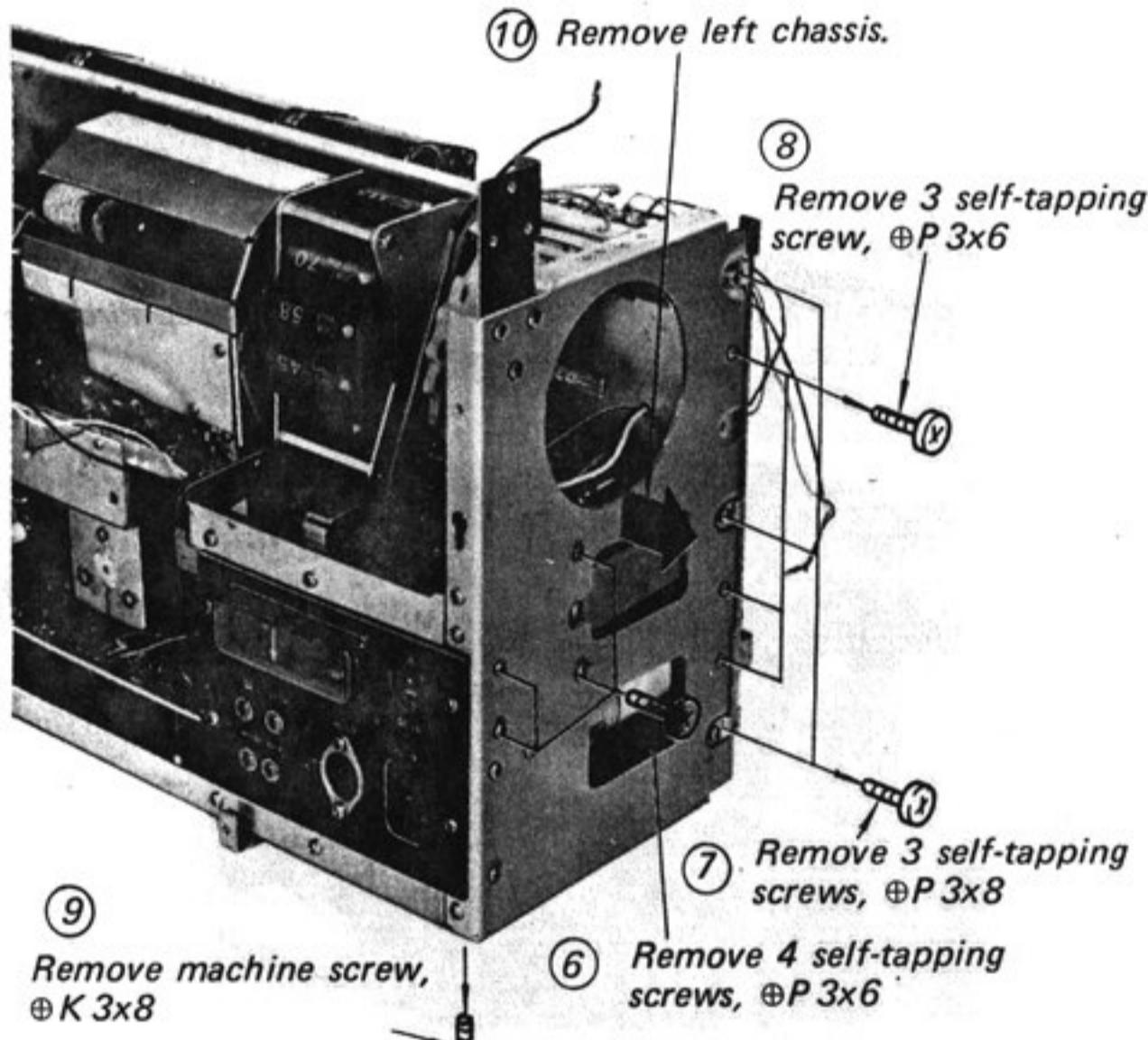


Fig. 2-12

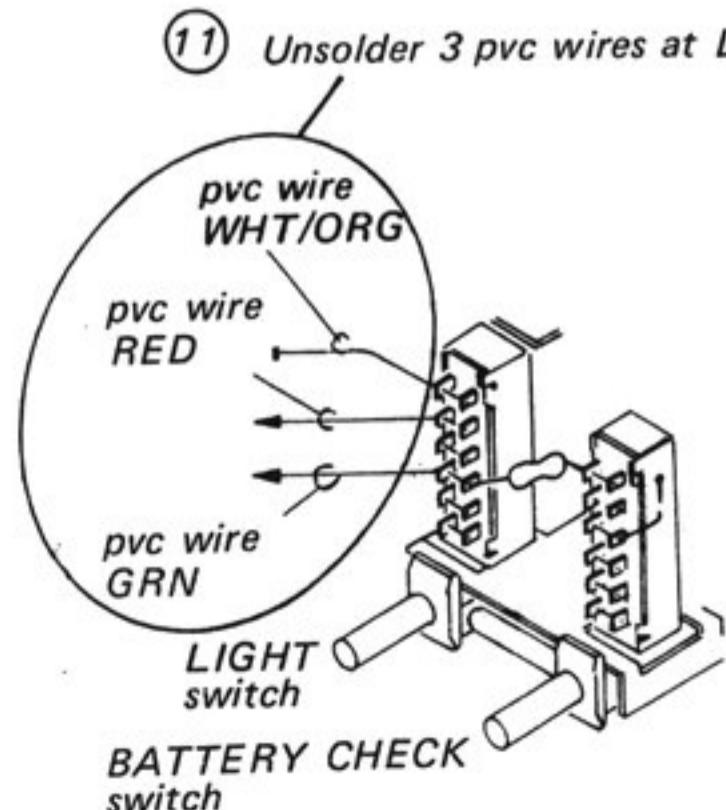


Fig. 2-13

⑫ Unsolder 7 pvc wires at 6-P terminal strip.

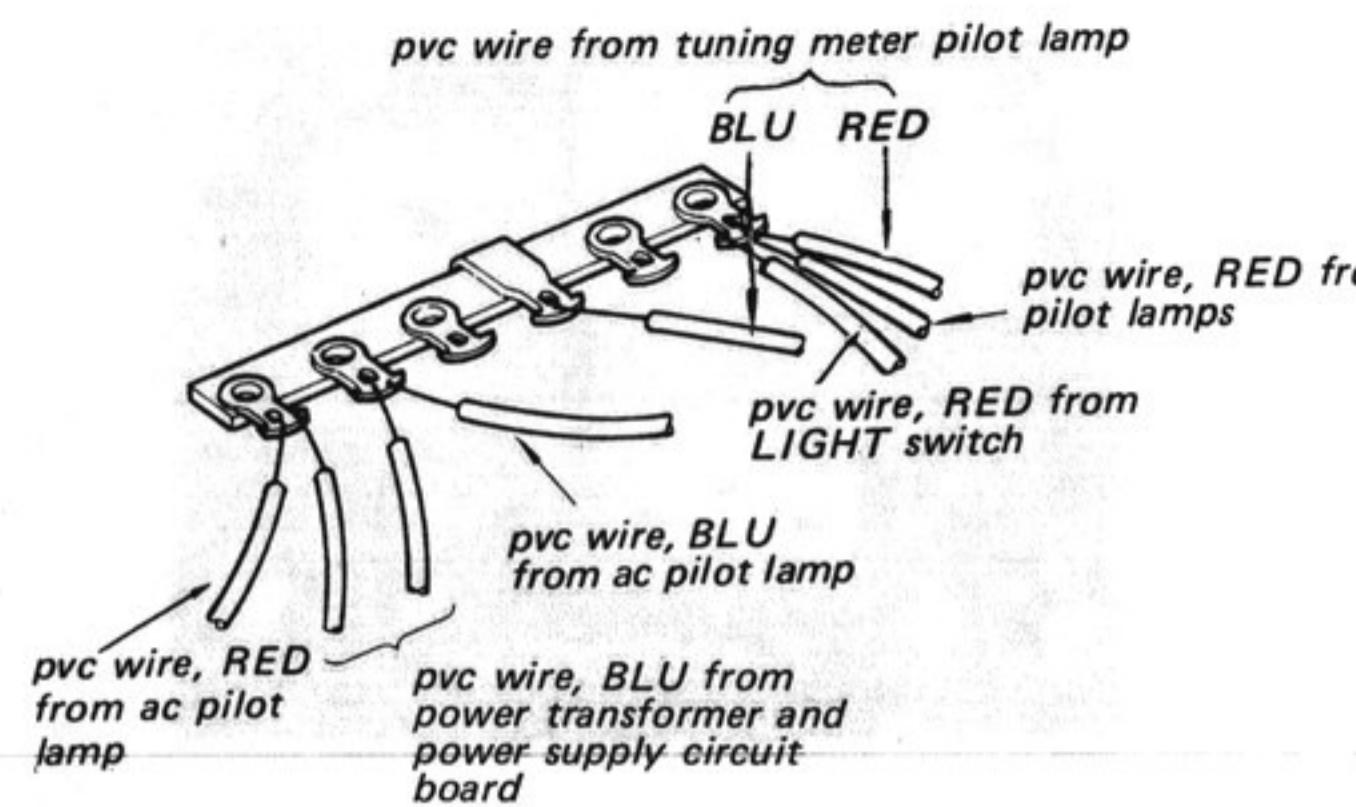


Fig. 2-14

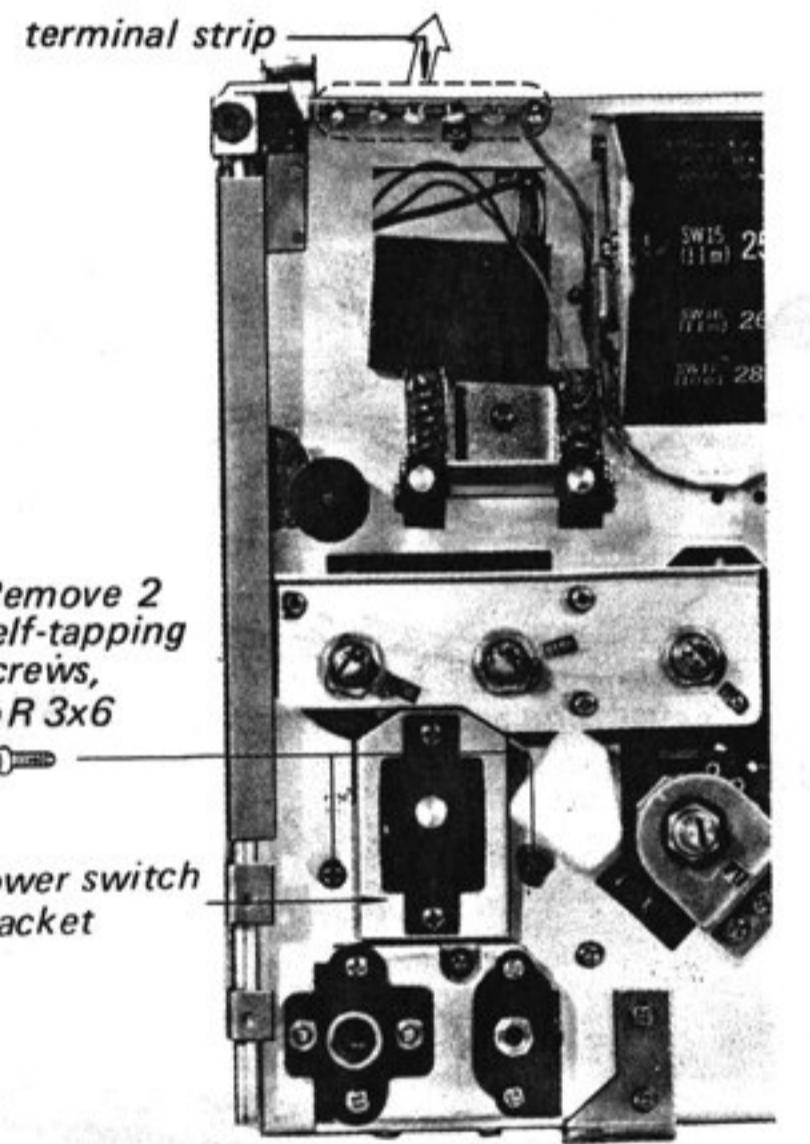


Fig. 2-15

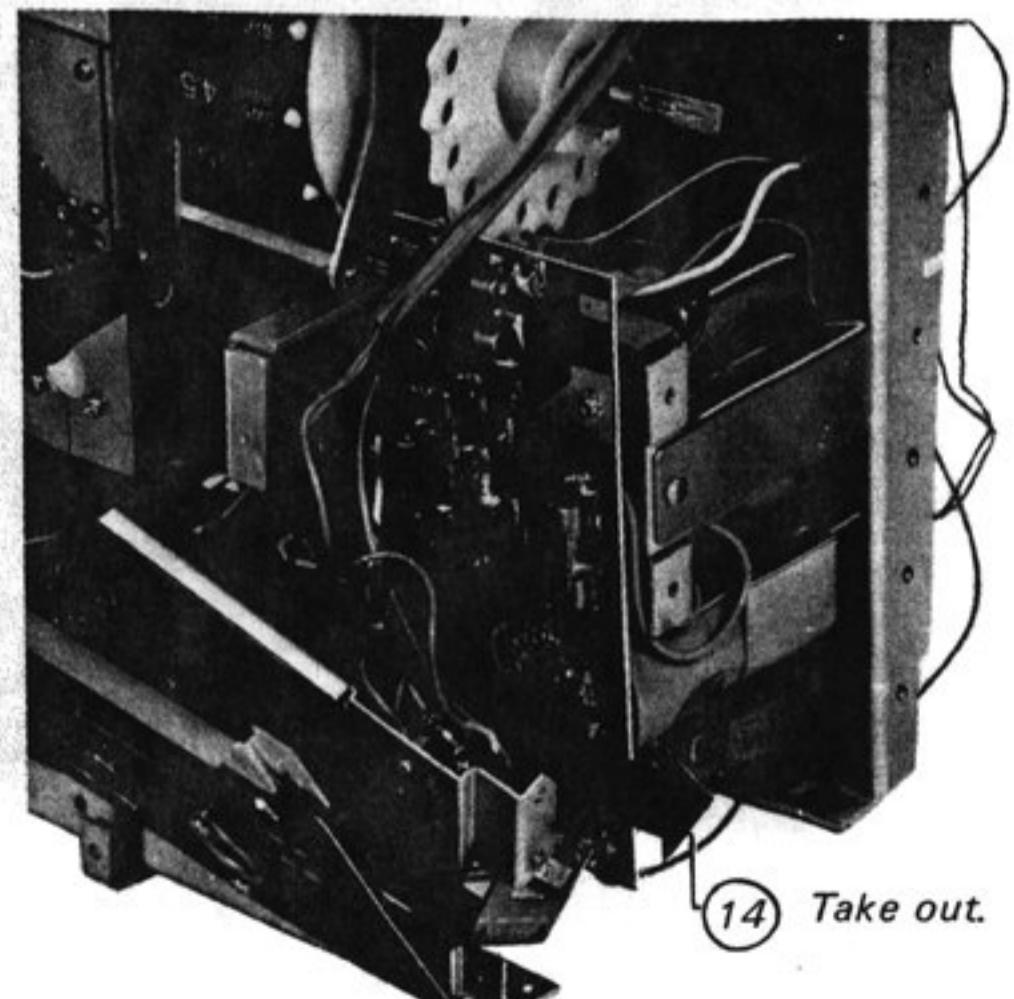


Fig. 2-16

2-10. DIAL CORD STRINGING

Dial cord and dial film is shown in Fig. 2-23.

dial cord Part No. 7-633-120-52

dial cord [1] : FM

dial cord [2] : MW/LW/SW1

dial cord [3] : SW2 ~ SW19

dial cord [4], [5] : SW2 ~ SW19 calibrator

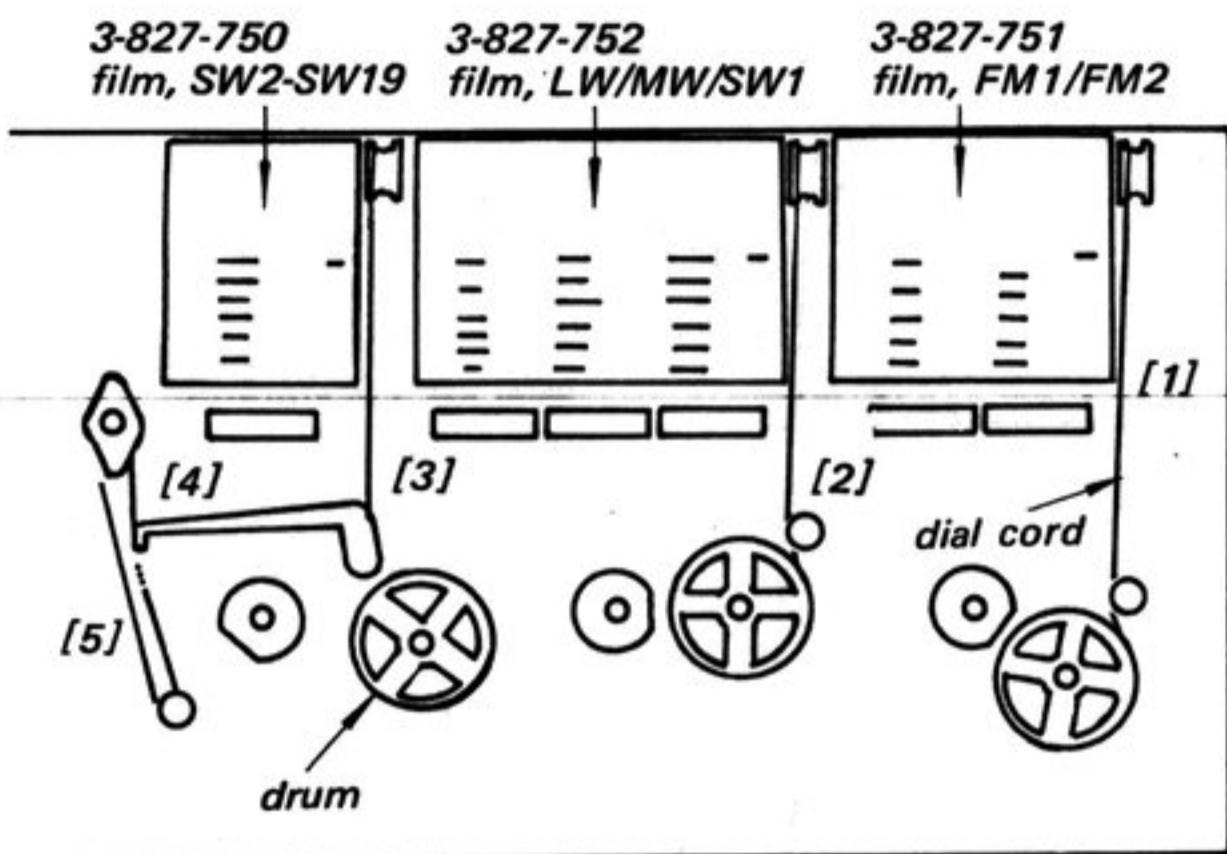


Fig. 2-17

1. FM Dial Cord

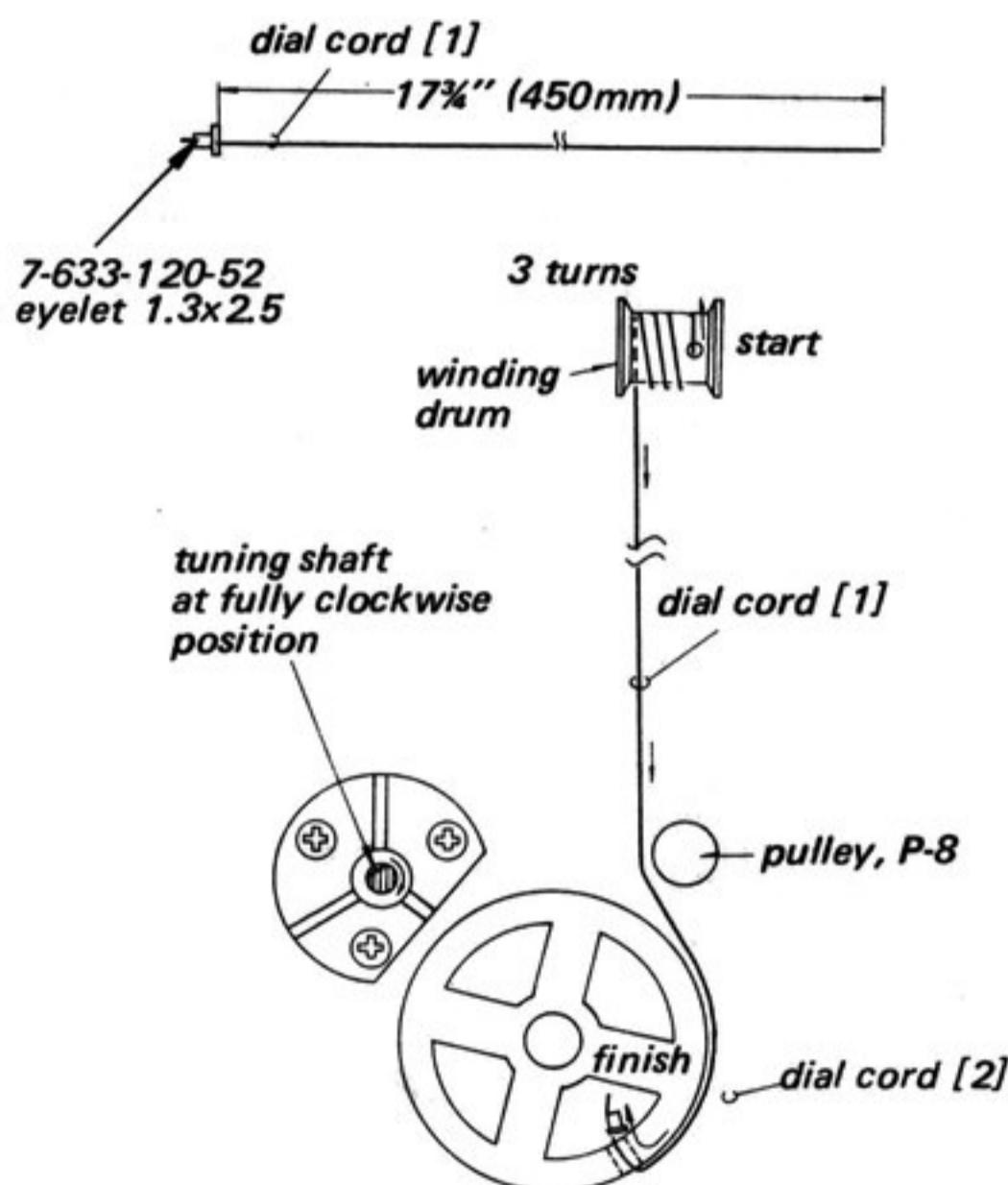


Fig. 2-18

2. MW/LW/SW1 Dial Cord

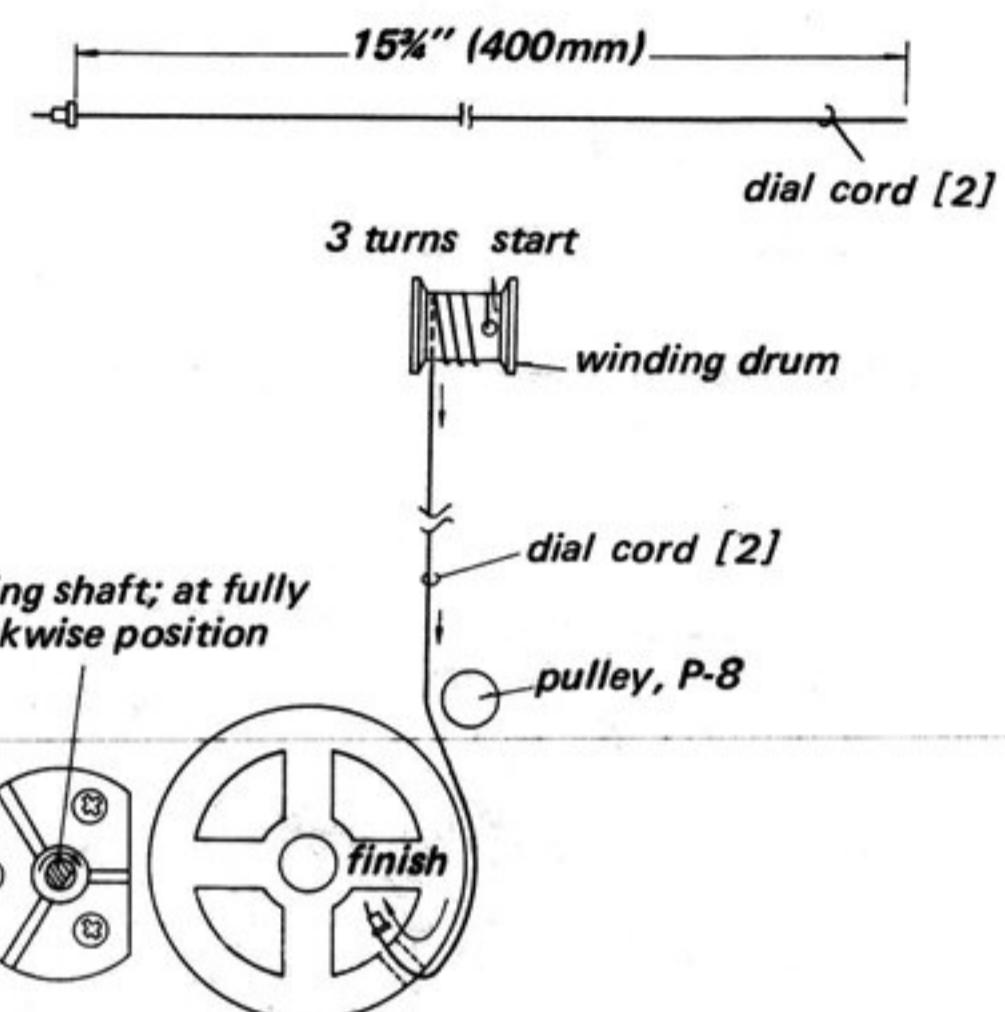


Fig. 2-19

3. SW2 ~ SW19 Dial Cord

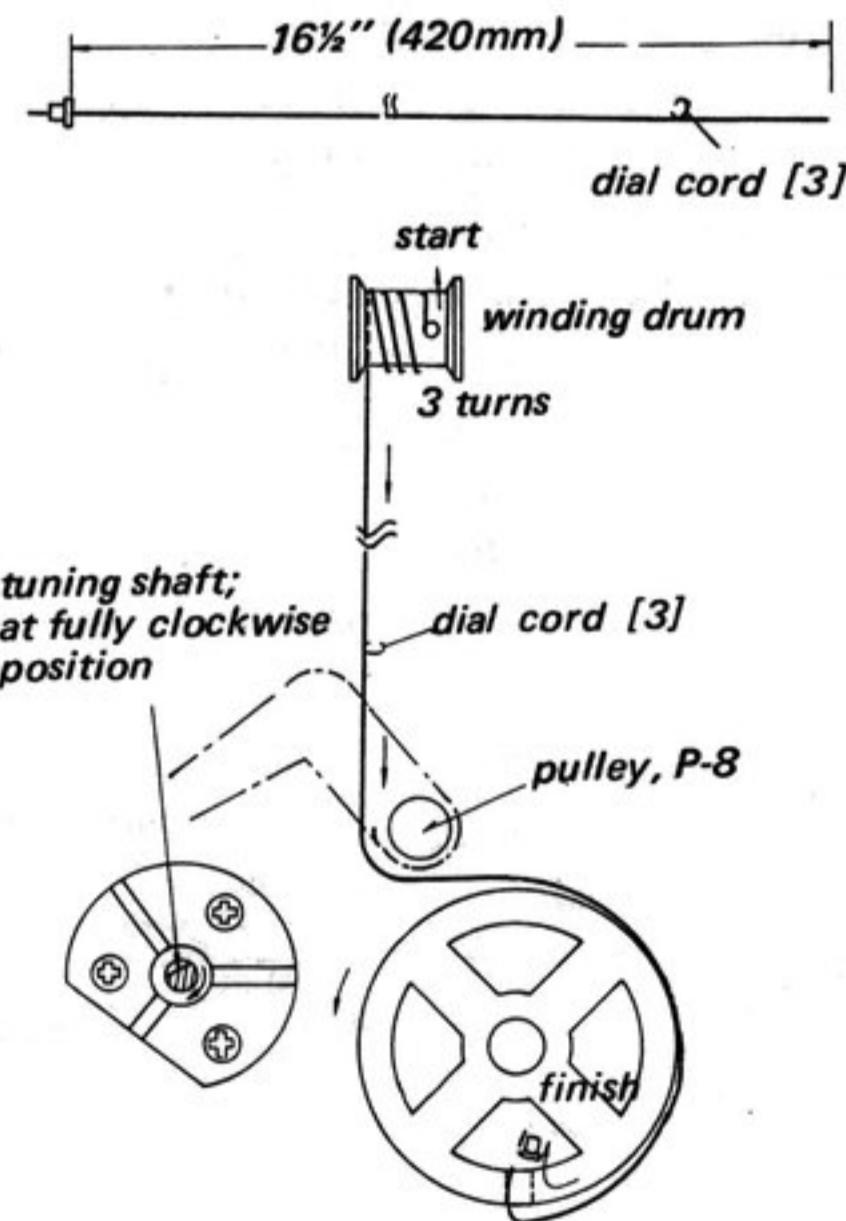


Fig. 2-20

4. SW2 ~ SW19 Tuning Capacitor Driving Cord

String the cord by removing the SW2 ~ SW19 front end block from the chassis.

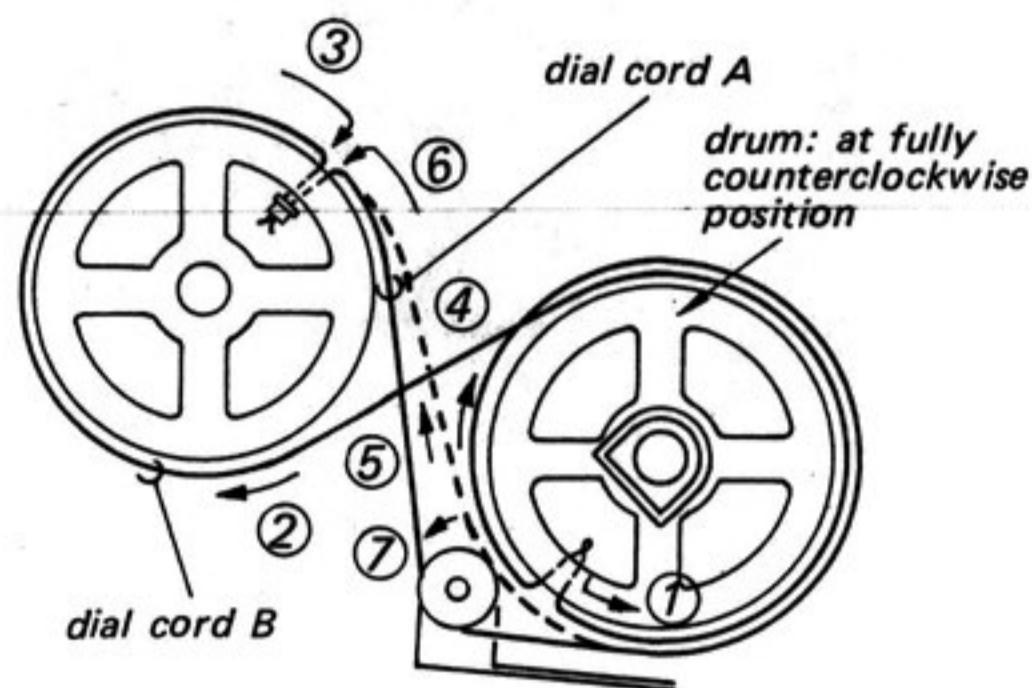
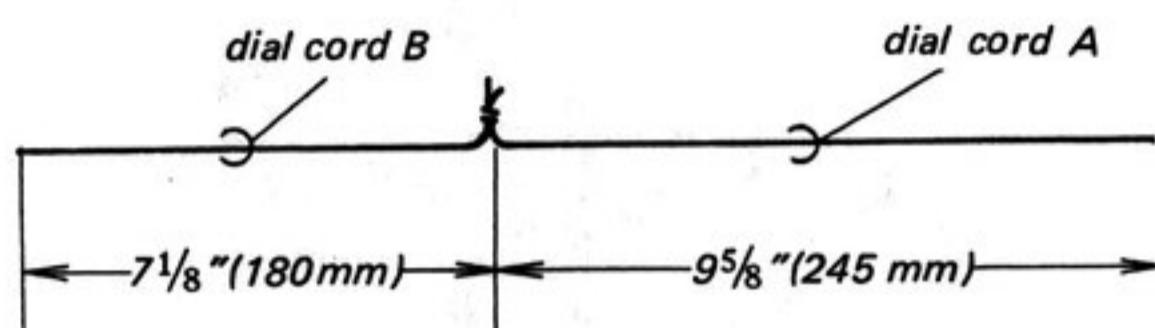


Fig. 2-21

5. SW2 ~ SW19 Calibrator Dial Cord

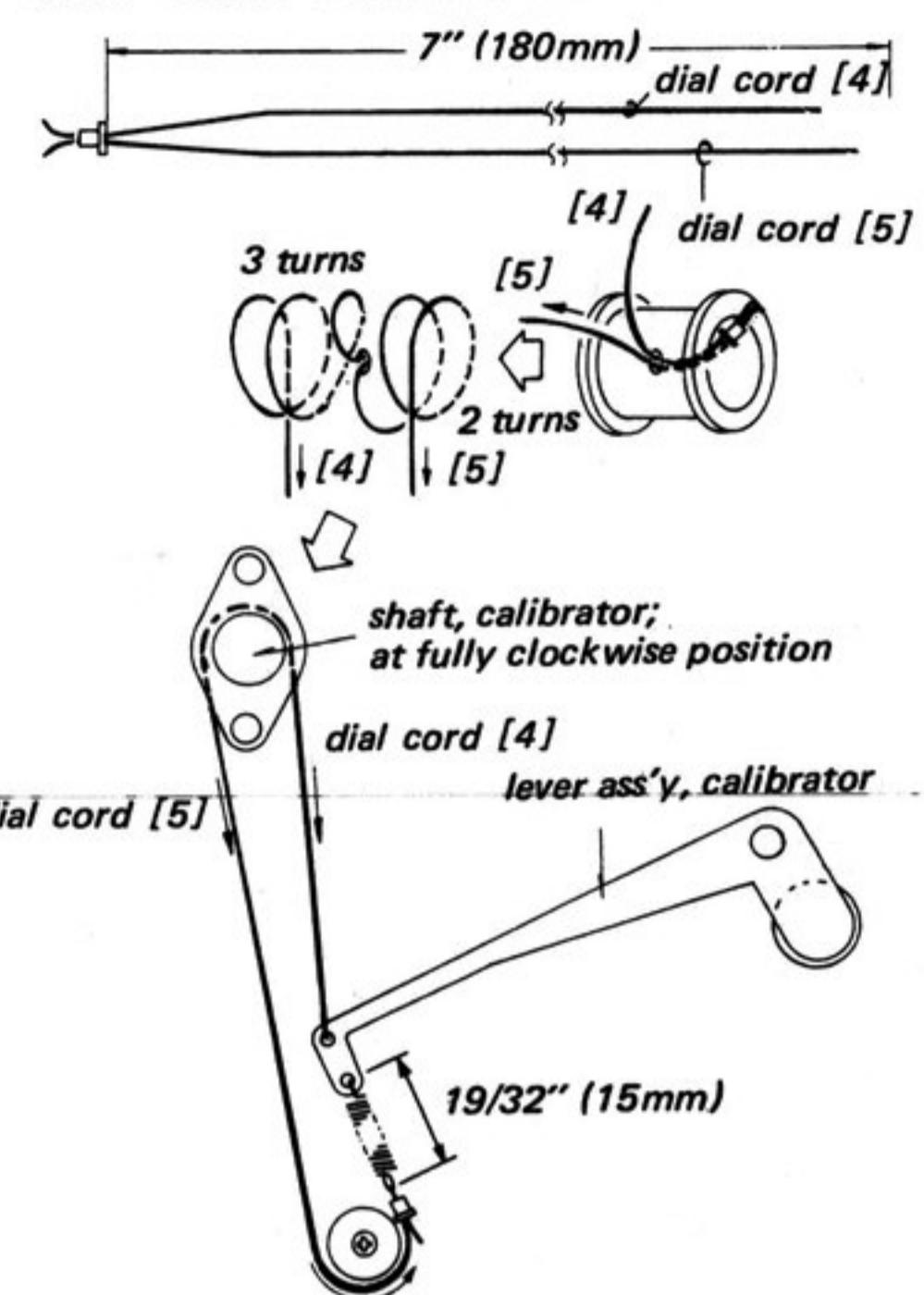


Fig. 2-22

6. Dial Film Setting

1. Set the top of dial film to the film-drum as shown in Fig. 2-29 (step ①).
2. Attach the other end of dial film with an adhesive tape (step ②).
3. Turn the ratchet-wheel four turns in the direction shown by the arrow (step ③).

4. Set the side mark of the film on the film setting position. After setting the film you must keep the film with fingers or adhesive tape so that the film does not move.
5. String the dial cord as shown in Fig. 2-29 (step ⑤).

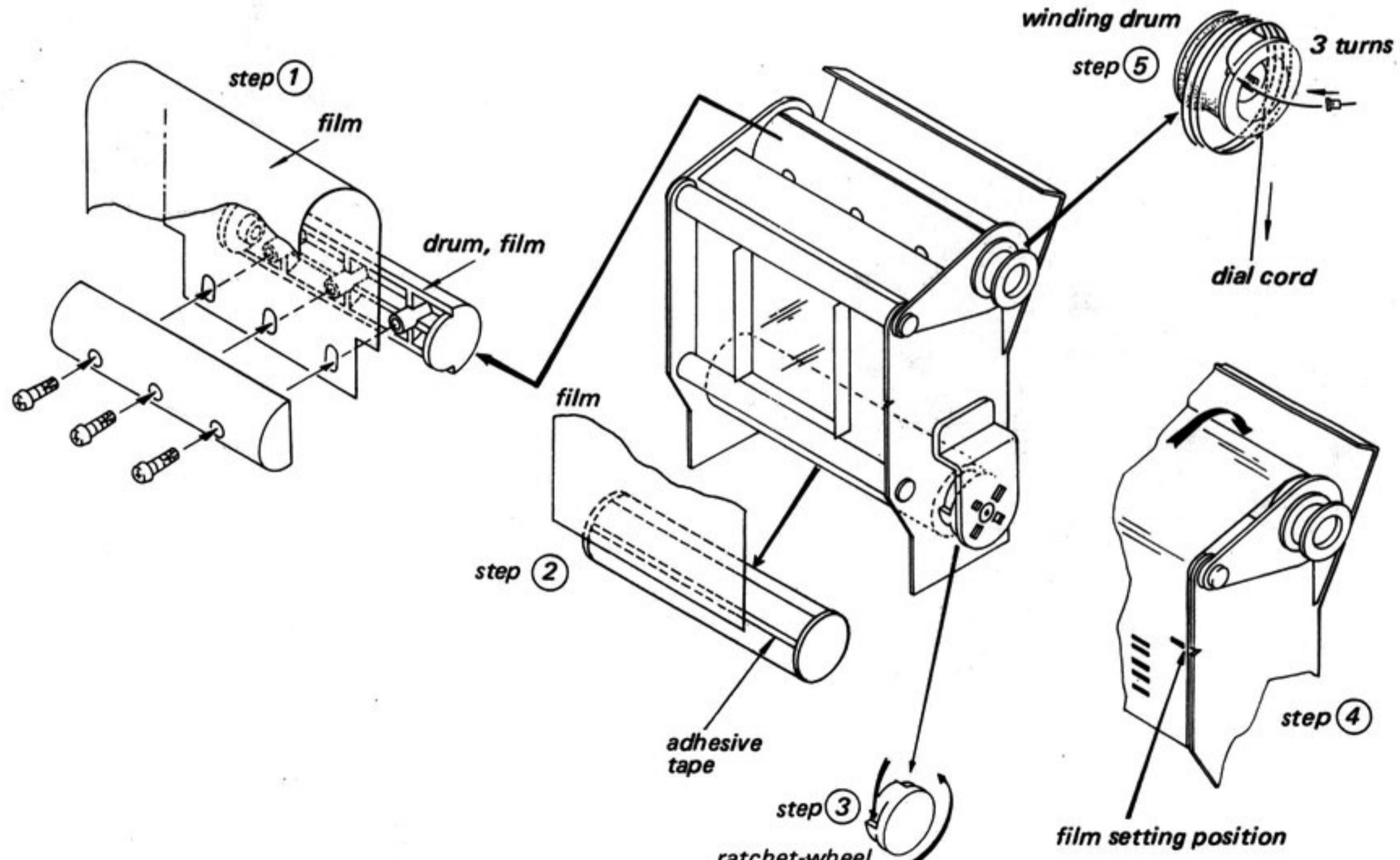


Fig. 2-23

SECTION 3

CIRCUIT ADJUSTMENTS

3-1. PREPARATION

1. Power Supply

At circuit adjustment remove the cabinet and front panel, and supply dc 9V across the red and the black lead wires shown in Fig. 3-1.

2. Receiver Control Setting

Set control knobs as follows except noted in each adjustment.

- * VOLUME Control : Maximum
- * BASS Control : FLAT
- * TREBLE Control : FLAT
- * SENSITIVITY : DX
- * SELECTIVITY : SHARP
- * ANL : OFF
- * BFO : OFF
- * AFC : OFF
- * MUTING : OFF

3. Test Equipment/Tools Required

- * Rf Signal Generator
- * 10.7 MHz Sweep/Marker Generator
- * Loop Antenna
- * Oscilloscope
- * VTVM
- * 0.01 μ F ceramic capacitor
- * 4 Ω Resistor
- * Screwdriver For Alignment

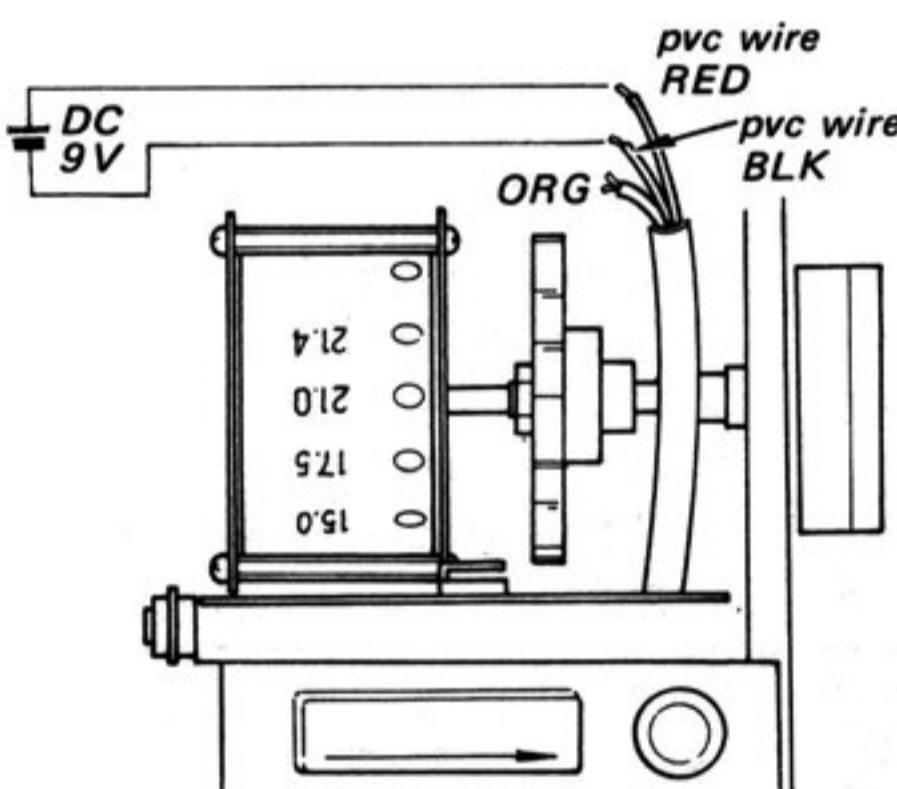


Fig. 3-1

3-2. AM I-F ALIGNMENT

Preparation:

Band Selector: MW

Rf Signal Generator Coupling:

Loop antenna (See Fig. 3-2)

Modulation:

1-kHz 30% amplitude-modulated signal

VTVM Connection:

To EXT SP jack in parallel with 4 Ω resistor

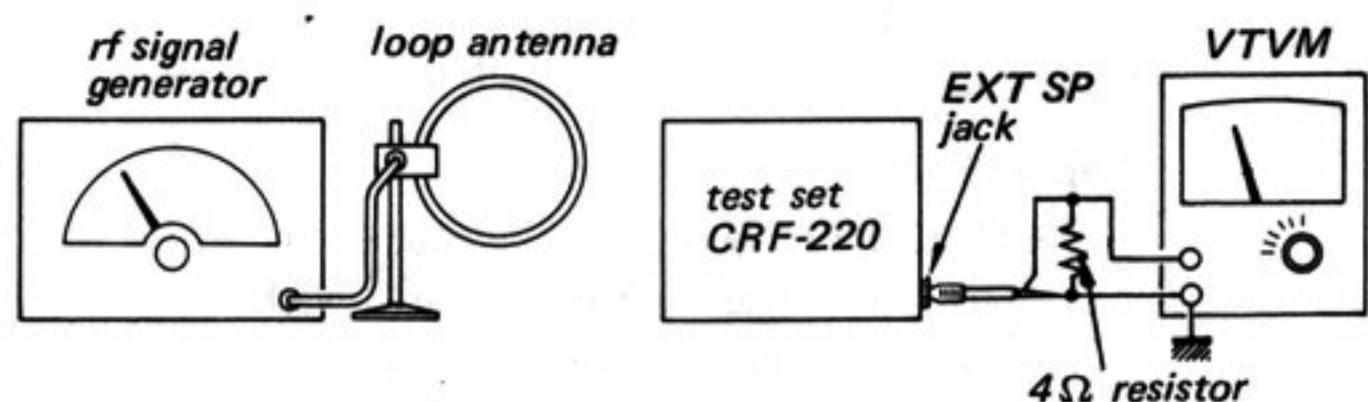


Fig. 3-2 A-m i-f alignment setup

Rf Signal Generator Frequency	Adjust	Remarks
455 kHz	IFT 401 IFT 501 IFT 502 IFT 504	Adjust for maximum meter reading on VTVM.

Note: IFT401 is on the cp circuit board.
See Fig. 3-13 on page 25.

3-3. SSB DETECTOR ADJUSTMENT

Preparation:

Band Selector: MW

SELECTIVITY switch: SHARP

BFO Switch: ON

BFO Knob: Mechanical mid position

Rf Signal Generator Coupling: Loop antenna

Setup: See Fig. 3-3.

Note: Be sure that a-m i-f section is aligned for the normal operating condition before adjusting ssb detector.

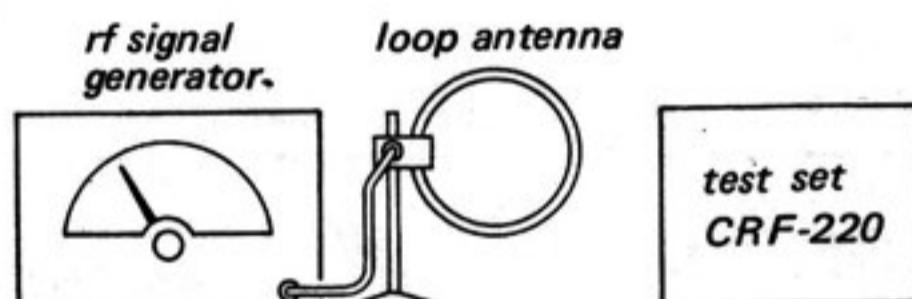


Fig. 3-3 Ssb detector adjustment setup

Rf Signal Generator Frequency	Adjust	Remarks
455 kHz unmodulated signal	BFO osc coil LT 801 See Fig. 3-7.	Adjust for zero beat hearing

3-4. FM I-F ALIGNMENT

Test Equipment/Tools Required

- * 10.7 MHz Sweep/Marker Generator
- * Oscilloscope
- * 1 kΩ carbon type resistor
- * Screwdriver for Alignment

Preparation:

Sweep/Marker Generator Connection:

On the main circuit board with 1 kΩ resistor in series (See Fig. 3-4).

Oscilloscope Connection: MPX OUT jack

Sweep Generator Center Frequency:

10.7 MHz

Marker Generator Center Frequency:

10.7 MHz

Band Selector: FM

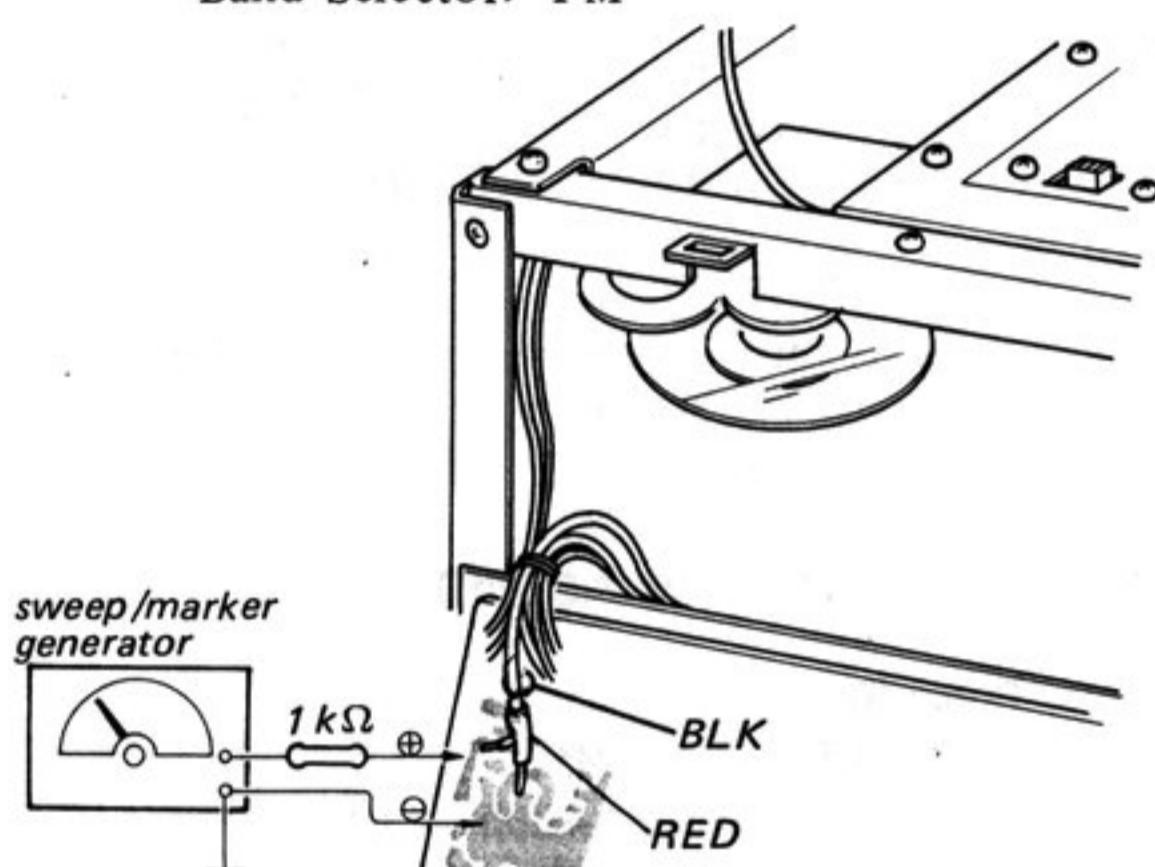


Fig. 3-4

Procedure:

1. Turn the core of discriminator transformer (IFT 204) fully counterclockwise.
2. Turn the core of fm i-f transformer (IFT 201, IFT 202) and discriminator transformer (IFT 203) to obtain the maximum amplitude response curve shown in Fig. 3-5.
3. Turn the core of discriminator transformer (IFT 204) to obtain the S curve response shown in Fig. 3-6.

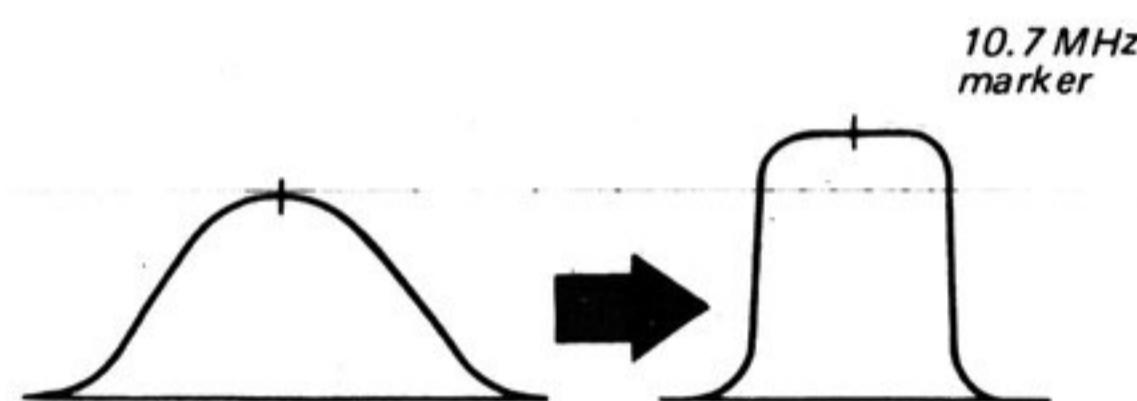


Fig. 3-5 Response curve

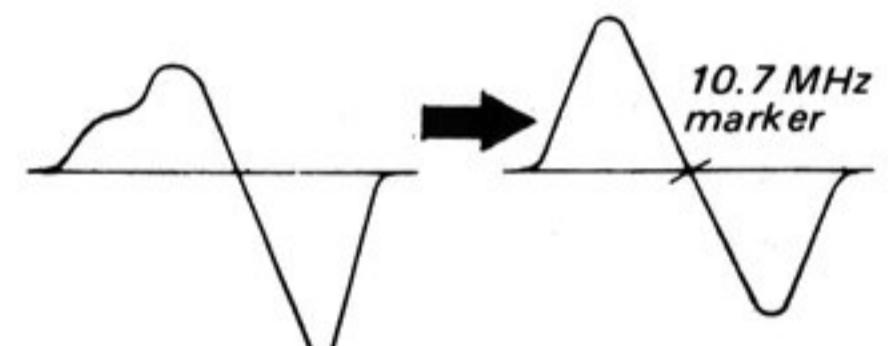


Fig. 3-6 "S" curve

Sweep/Marker Generator Coupling	Sweep/Marker Generator Frequency	Oscilloscope Connection	Adjust	Remarks
On the main circuit board with 1 kΩ resistor in series. (See Fig. 3-4)	10.7 MHz	MPX OUT jack	IFT201 IFT202 IFT203 IFT204	Band Selector: FM AFC Switch: OFF Adjust for maximum amplitude and symmetrical S curve on the scope.

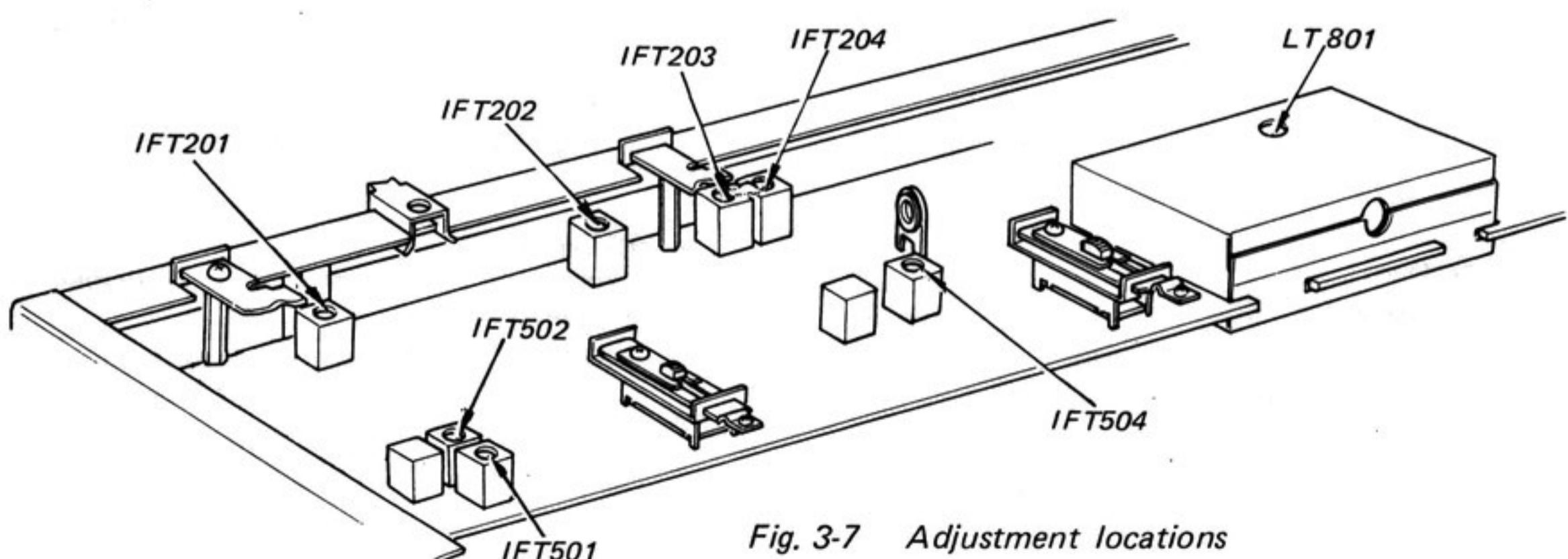


Fig. 3-7 Adjustment locations

3-5. MUTING LEVEL SETTING

Preparation:

Band Selector: FM

MUTING Switch: ON

ROD ANT-EXT ANT Switch: EXT ANT

Rf signal Generator Coupling:

To FM EXT ANT 75 OHM terminals

VTVM Connection:

To EXT SP jack in parallel with 4Ω resistor

Rf Signal Modulation:

Fm 400-Hz ± 22.5 -kHz frequency-modulated signal (rf signal: 98 MHz)

Note: Be sure that fm i-f section is operating in normal condition before setting the muting level.

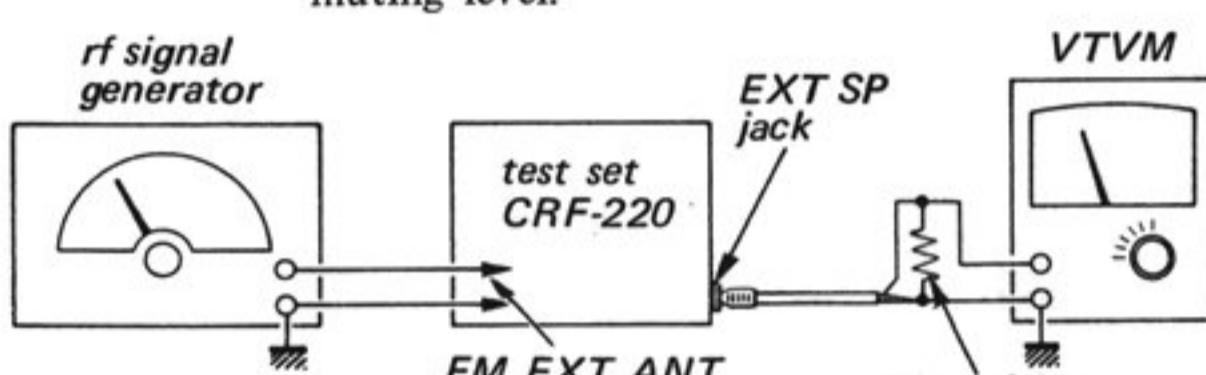


Fig. 3-8 Muting level setting setup

Procedure:

1. Detune from rf signal.
2. Turn the muting level adjustable resistor VR901 fully counterclockwise.
3. Gradually turn VR901 clockwise and set it at the position that the VTVM shows minimum indication.

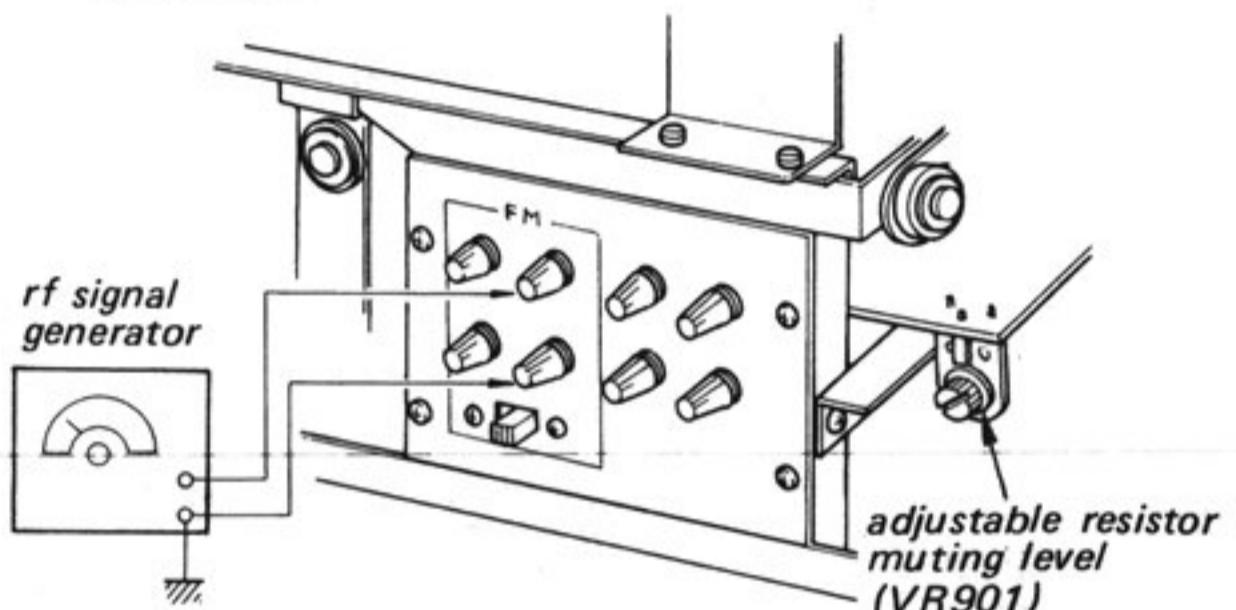


Fig. 3-9. Rf signal generator coupling and parts location

Rf Signal Generator Frequency	Receiver Dial Setting	Adjust
98 MHz	90 MHz (Detune from rf signal of 98 MHz)	Muting level adjustable resistor VR901

3-6. FM FREQUENCY COVERAGE ADJUSTMENT

Preparation:

Band Selector: FM

ROD ANT-EXT ANT Switch: EXT ANT

Rf Signal Generator Coupling:

Direct connection across FM EXT ANT 75 OHM terminals

Rf Signal Modulation:

400-Hz ± 22.5 -kHz frequency-modulated signal

VTVM Connection:

To EXT SP jack in parallel with 4Ω resistor

Adjustment Setup: Same as Fig. 3-8.

Note: 1. In West Germany the FM frequency coverage should be within the range between 87.5 MHz and 108 MHz. Make the frequency coverage by adjusting osc coil L104 and osc trimmer CT1-4 with the intended frequency signal from the rf signal generator.
2. The special test equipment required for tracking adjustment makes this strictly a factory adjustment.
3. IFT101 shown in Fig. 3-10 is to be adjusted for i-f alignment. Adjust IFT101 for maximum meter reading on VTVM with the same setup as FM frequency coverage adjustment.

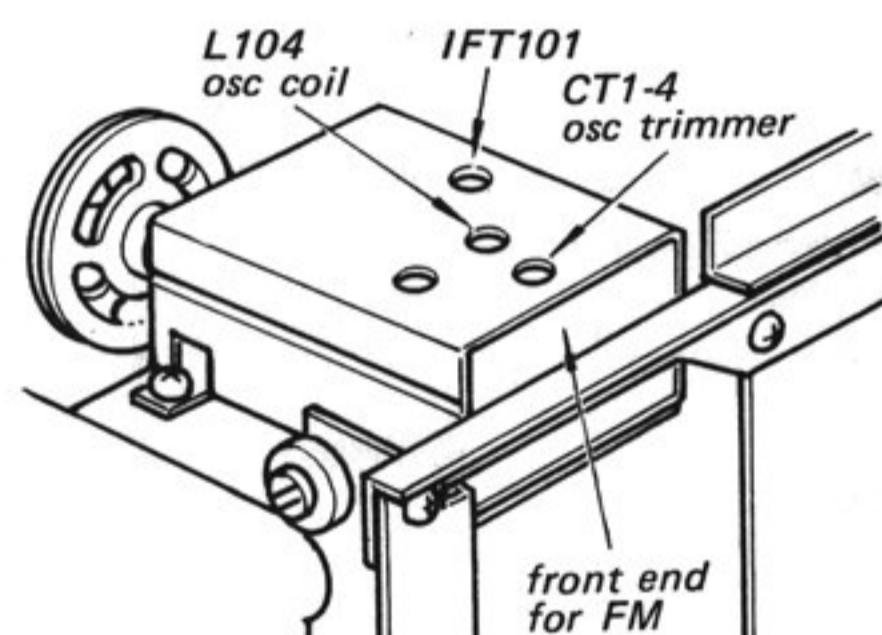


Fig. 3-10. Adjustment locations

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
FM Frequency Coverage	87.5 MHz	Fully counterclockwise	FM osc coil L104	Band Selector: FM Adjust for maximum meter reading on VTVM.
	108 MHz	Fully clockwise	FM osc trimmer CT1-4	

3-7. LW/MW/SW1 FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Preparation:

Rf Signal Generator Coupling:

Loop antenna

Rf Signal Modulation:

1-kHz 30% amplitude-modulated signal

VTVM Connection:

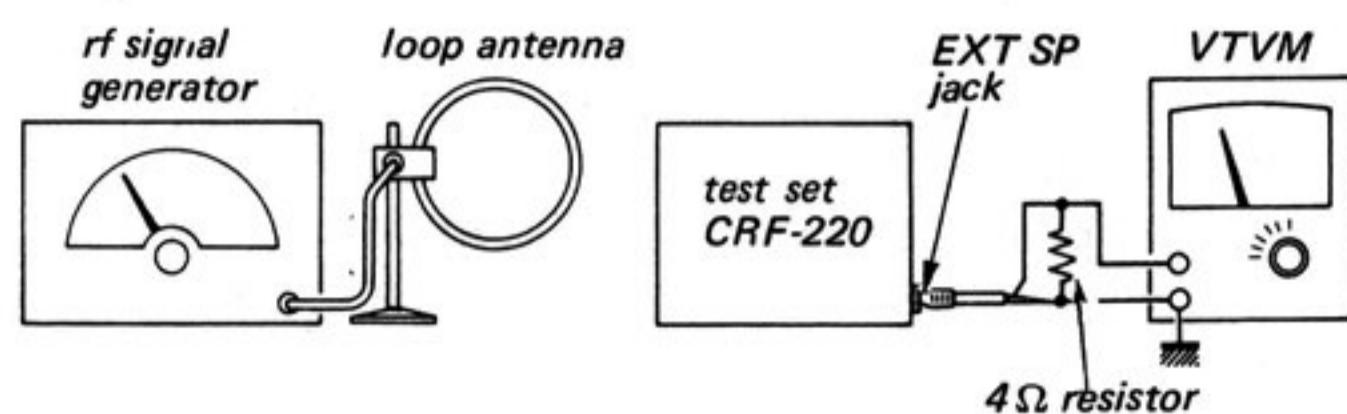
To EXT SP jack in parallel with 4Ω load resistor

Fig. 3-11 LW/MW/SW1 frequency coverage and tracking adjustment setup

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
LW Frequency Coverage	145 kHz	Fully counterclockwise	LW osc coil L409	Band Selector: LW Adjust for maximum meter reading on VTVM.
	410 kHz	Fully clockwise	LW osc trimmer CT409	
LW Tracking	160 kHz	Tune to 160 kHz signal	LW ant coil L403, LW rf coil L406	
	360 kHz	Tune to 360 kHz signal	LW ant trimmer CT403, LW rf trimmer CT406	
MW Frequency Coverage	520 kHz	Fully counterclockwise	MW osc coil L408	Band Selector: MW Adjust for maximum meter reading on VTVM.
	1,680 kHz	Fully clockwise	MW osc trimmer CT408	
MW Tracking	620 kHz	Tune to 620 kHz signal	MW ant coil L402, MW rf coil L405	
	1,400 kHz	Tune to 1,400 kHz signal	MW ant trimmer CT402, MW rf trimmer CT405	
SW1 Frequency Coverage	1,550 kHz	Fully counterclockwise	SW1 osc coil L407	Band Selector: SW1 Adjust for maximum meter reading on VTVM.
	4,600 kHz	Fully clockwise	SW1 osc trimmer CT407	
SW1 Tracking	1,800 kHz	Tune to 1,800 kHz signal	SW1 ant coil L401, SW1 rf coil L404	
	4,200 kHz	Tune to 4,200 kHz signal	SW1 rf trimmer CT404	

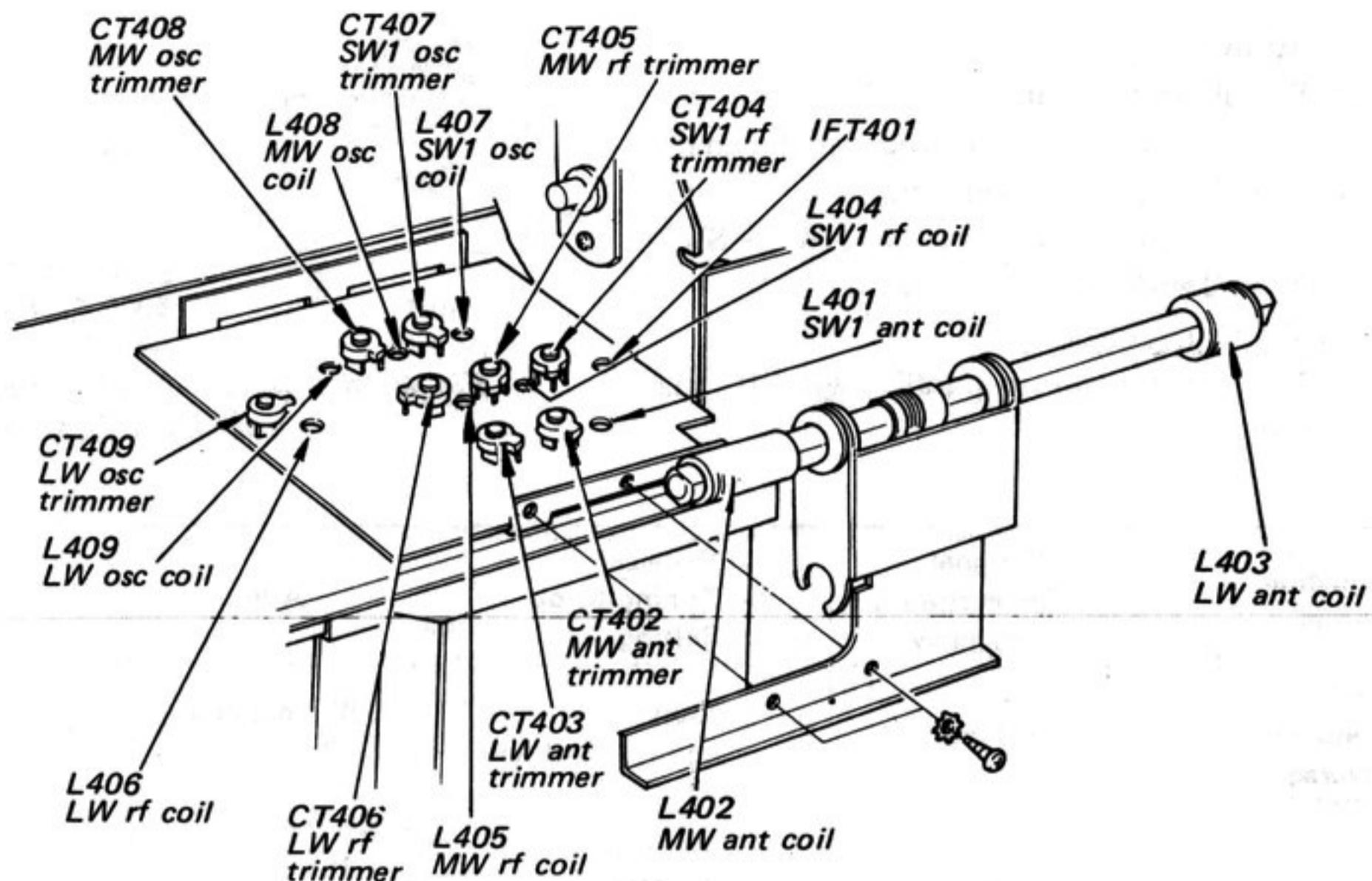


Fig. 3-12 Adjustment locations

3-8. SW2-SW19 1st I-F ALIGNMENT, FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Preparation:

Rf Signal Modulation:

1-kHz 30% amplitude-modulation

Rf Signal Generator Coupling:

To hermetic terminal HT304 with $0.01\mu F$ ceramic capacitor

VTVM Connection:

Across the coaxial cable (to cp circuit board) through the 455-kHz amplifier

DC 4.5V Supply:

To feed-through capacitor CP305

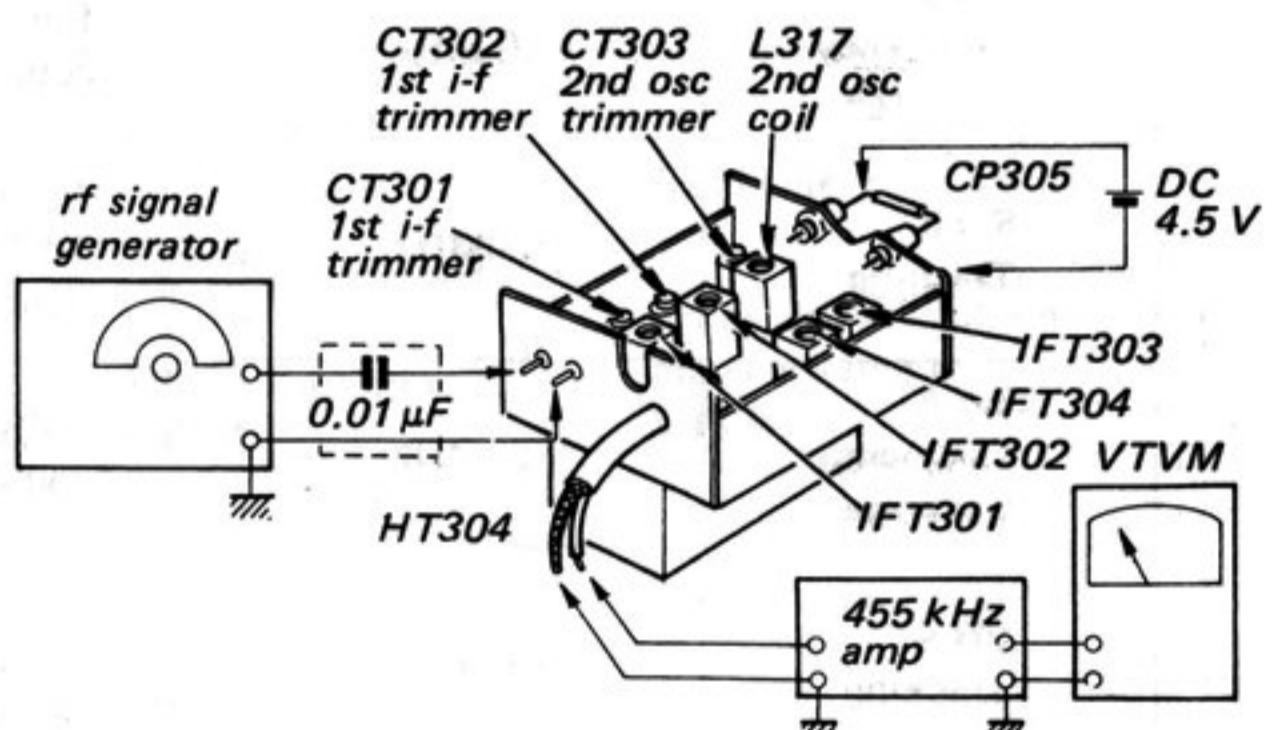


Fig. 3-13 Adjustment setup and adjustment locations

Adjustment Item	Rf Signal Generator Frequency	Adjust	Remarks
Frequency Coverage	1.6 MHz	2nd osc coil L317	Adjust for maximum meter reading.
	2.2 MHz	2nd osc trimmer CT303	
Tracking	1.6 MHz	IFT 301 IFT 302	- ditto -
	2.2 MHz	CT301 CT302	
I-f Alignment	1.6 MHz ~ 2.2 MHz	IFT 303 IFT 304	- ditto -

3-9. SW2 ~ SW19 FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Preparation:**Rf Signal Modulation:**

1-kHz 30% amplitude-modulated signal

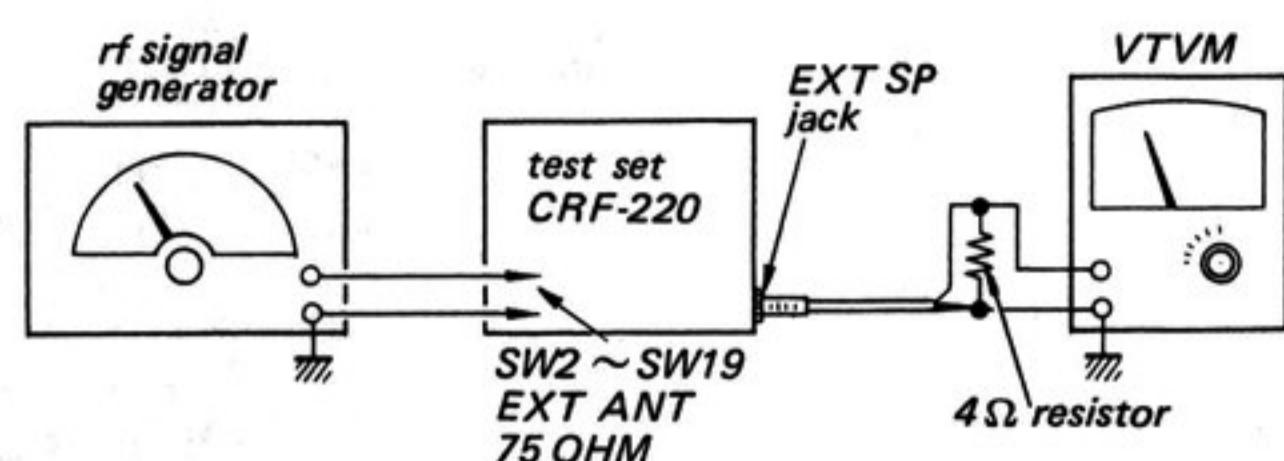
Rf Signal Generator Coupling:Direct connection across the SW2 ~ SW19
75 OHM antenna terminals**VTVM Connection:**To EXT SP jack in parallel with 4Ω load
resistor

Fig. 3-14 SW2 ~ SW19 frequency coverage and tracking adjustment setup

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
SW 2 Frequency Coverage	2.0 MHz	Fully counterclockwise	SW 2 osc coil L324	
SW 2 Tracking	2.1 MHz	Tune to 2.1 MHz signal	SW 2-4 ant coil L301, SW 2-4 rf coil L307	Band Selector: SW 2
	2.5 MHz	Tune to 2.5 MHz signal	SW 2 ant trimmer CT304, SW 2 rf trimmer CT322	Adjust for maximum meter reading on VTVM.
SW 3 Frequency Coverage	3.0 MHz	Fully counterclockwise	SW 3 osc coil L325	Band Selector: SW 3
SW 3 Tracking	3.5 MHz	Tune to 3.5 MHz signal	SW 3 ant trimmer CT305 SW 3 rf trimmer CT323	Adjust for maximum meter reading on VTVM.
SW 4 Frequency Coverage	3.5 MHz	Fully counterclockwise	SW 4 osc coil L326	Band Selector: SW 4
SW 4 Tracking	4.0 MHz	Tune to 4.0 MHz signal	SW 4 ant trimmer CT306, SW 4 rf trimmer CT324	Adjust for maximum meter reading on VTVM.
SW 5 Frequency Coverage	4.5 MHz	Fully counterclockwise	SW 5 osc coil L327	Band Selector: SW 5
SW 5 Tracking	4.6 MHz	Tune to 4.6 MHz signal	SW 5-7 ant coil L302, SW 5-7 rf coil L308	Adjust for maximum meter reading on VTVM.
	5.0 MHz	Tune to 5.0 MHz signal	SW 5 ant trimmer CT307 SW 5 rf trimmer CT325 trimmer	
SW 6 Frequency Coverage	5.8 MHz	Fully counterclockwise	SW 6 osc coil L328	Band Selector: SW 6
SW 6 Tracking	6.3 MHz	Tune to 6.3 MHz signal	SW 6 ant trimmer CT308, SW 6 rf trimmer CT326	Adjust for maximum meter reading on VTVM.

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
SW 7 Frequency Coverage	7.0 MHz	Fully counterclockwise	SW 7 osc coil L329	
SW 7 Tracking	7.5 MHz	Tune to 7.5 MHz signal	SW 7 ant trimmer CT309, SW 7 rf trimmer CT327	Band Selector: SW 7 Adjust for maximum meter reading on VTVM.
SW 8 Frequency Coverage	9.5 MHz	Fully counterclockwise	SW 8 osc coil L330	
SW 8 Tracking	9.6 MHz	Tune to 9.6 MHz signal	SW 8-10 ant coil L303, SW 8-10 rf coil L309	Band Selector: SW 8
	10.0 MHz	Tune to 10.0 MHz signal	SW 8 ant trimmer CT310, SW 8 rf trimmer CT328	Adjust for maximum meter reading on VTVM.
SW 9 Frequency Coverage	11.5 MHz	Fully counterclockwise	SW 9 osc coil L331	
SW 9 Tracking	12.0 MHz	Tune to 12.0 MHz signal	SW 9 ant trimmer CT311, SW 9 rf trimmer CT329	Band Selector: SW 9 Adjust for maximum meter reading on VTVM.
SW 10 Frequency Coverage	14.0 MHz	Fully counterclockwise	SW 10 osc coil L332	
SW 10 Tracking	14.5 MHz	Tune to 14.5 MHz signal	SW 10 ant trimmer CT312, SW 10 rf trimmer CT330	Band Selector: SW 10 Adjust for maximum meter reading on VTVM.
SW 11 Frequency Coverage	15.0 MHz	Fully counterclockwise	SW 11 osc coil L333	
SW 11 Tracking	15.1 MHz	Tune to 15.1 MHz signal	SW 11-13 ant coil L304 SW 11-13 rf coil L310	Band Selector: SW 11 Adjust for maximum meter reading on VTVM.
	15.5 MHz	Tune to 15.5 MHz signal	SW 11 ant trimmer CT313, SW 11 rf trimmer CT331	
SW 12 Frequency Coverage	17.5 MHz	Fully counterclockwise	SW 12 osc coil L334	
SW 12 Tracking	18.0 MHz	Tune to 18.0 MHz signal	SW 12 ant trimmer CT314, SW 12 rf trimmer CT322	Band Selector: SW 12 Adjust for maximum meter reading on VTVM.

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
SW 13 Frequency Coverage	21.0 MHz	Fully counterclockwise	SW 13 osc coil L335	Band Selector: SW 13
SW 13 Tracking	21.5 MHz	Tune to 21.5 MHz signal	SW 13 ant trimmer CT315, SW 13 rf trimmer CT333	Adjust for maximum meter reading on VTVM.
SW 14 Frequency Coverage	21.4 MHz	Fully counterclockwise	SW 14 osc coil L336	Band Selector: SW 14
SW 14 Tracking	21.5 MHz	Tune to 21.5 MHz	SW 14-16 ant coil L305, SW 14-16 rf coil L311	Adjust for maximum meter reading on VTVM.
	21.9 MHz	Tune to 21.9 MHz signal	SW 14 ant trimmer CT316, SW 14 rf trimmer CT334	
SW 15 Frequency Coverage	25.5 MHz	Fully counterclockwise	SW 15 osc coil L337	Band Selector: SW 15
SW 15 Tracking	26.0 MHz	Tune to 26.0 MHz signal	SW 15 ant trimmer CT317, SW 15 rf trimmer CT335	Adjust for maximum meter reading on VTVM.
SW 16 Frequency Coverage	26.8 MHz	Fully counterclockwise	SW 16 osc coil L338	Band Selector: SW 16
SW 16 Tracking	27.3 MHz	Tune to 27.3 MHz signal	SW 16 ant trimmer CT318 SW 16 rf trimmer CT336	Adjust for maximum meter reading on VTVM.
SW 17 Frequency Coverage	28.0 MHz	Fully counterclockwise	SW 17 osc coil L339	Band Selector: SW 17
SW 17 Tracking	28.1 MHz	Tune to 28.1 MHz signal	SW 17-19 ant coil L306, SW 17-19 rf coil L312	Adjust for maximum meter reading on VTVM.
	28.5 MHz	Tune to 28.5 MHz signal	SW 17 ant trimmer CT319, SW 17 rf trimmer CT337	
SW 18 Frequency Coverage	28.6 MHz	Fully counterclockwise	SW 18 osc coil L340	Band Selector: SW 18
SW 18 Tracking	29.1 MHz	Tune to 29.1 MHz	SW 18 ant trimmer CT320, SW 18 rf trimmer CT338	Adjust for maximum meter reading on VTVM.

Adjusting	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
SW 19 Frequency Coverage	29.2 MHz	Fully counterclockwise	SW 19 osc coil L341	Band Selector: SW 19
SW 19 Tracking	29.7 MHz	Tune to 29.7 MHz signal	SW 19 ant trimmer CT321, SW 19 rf trimmer CT339	Adjust for maximum meter reading on VTVM.

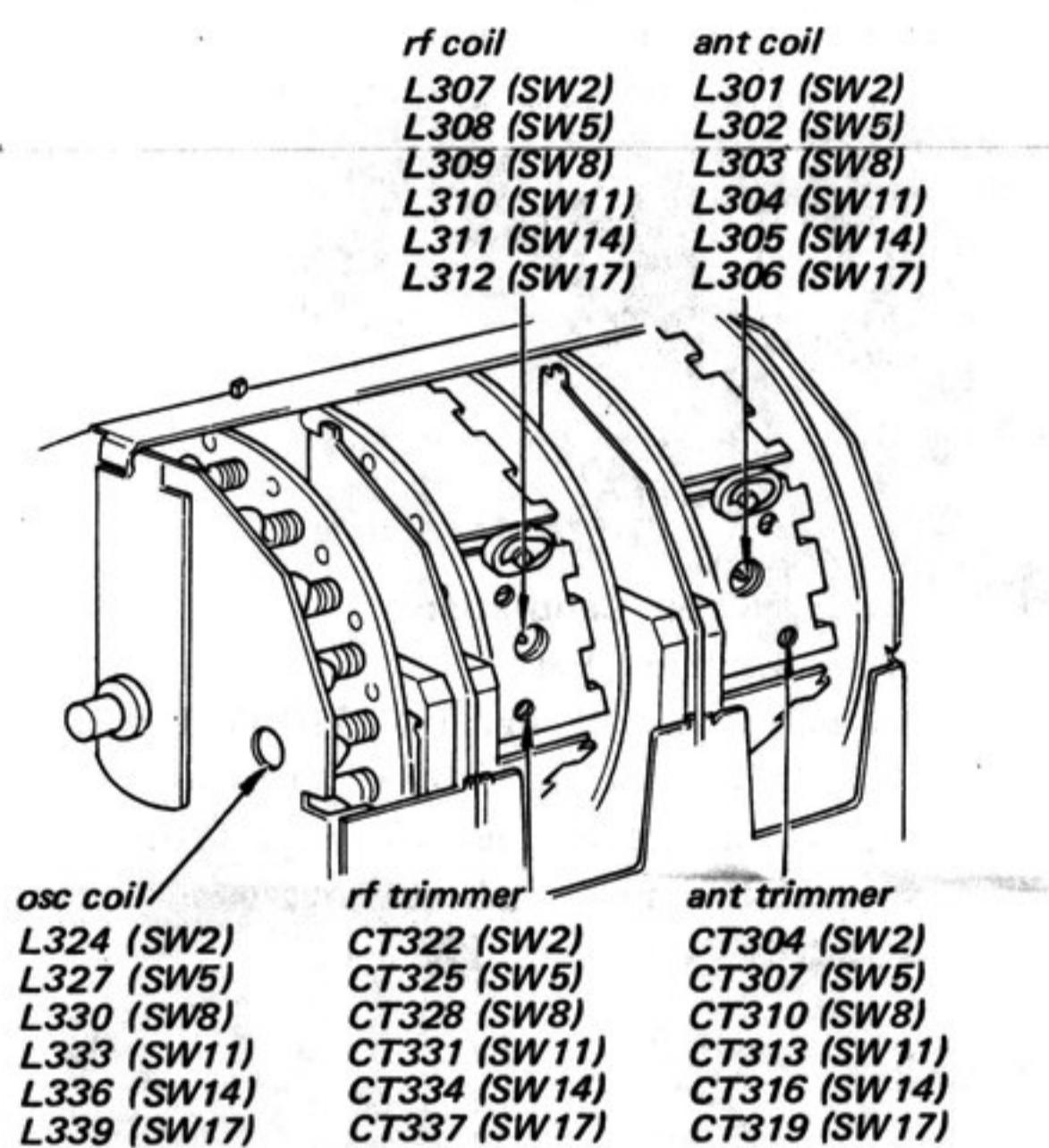


Fig. 3-15. Adjustment locations for SW2, SW5, SW8, SW11, SW14 and SW17

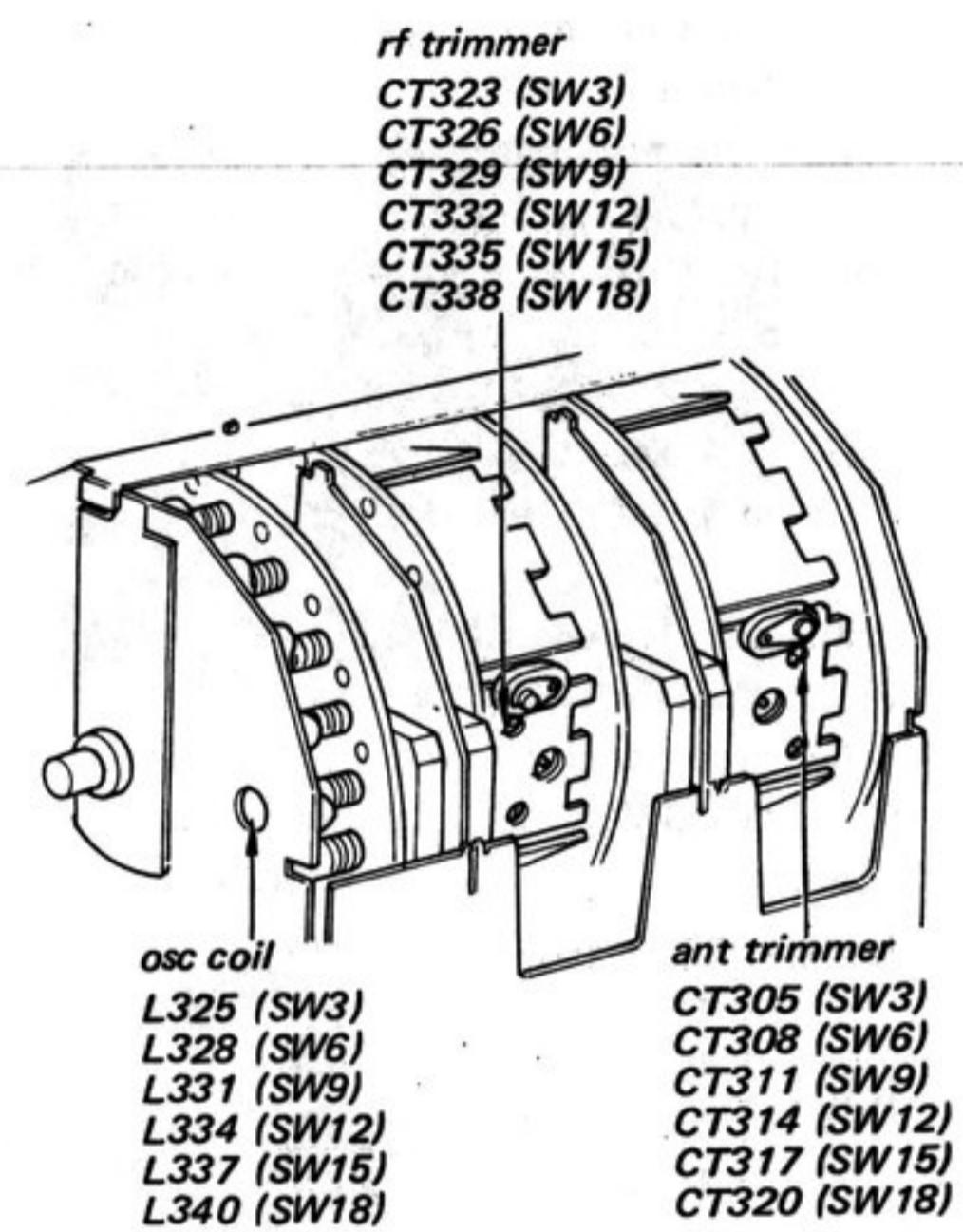


Fig. 3-16. Adjustment locations for SW3, SW6, SW9, SW12, SW15 and SW18

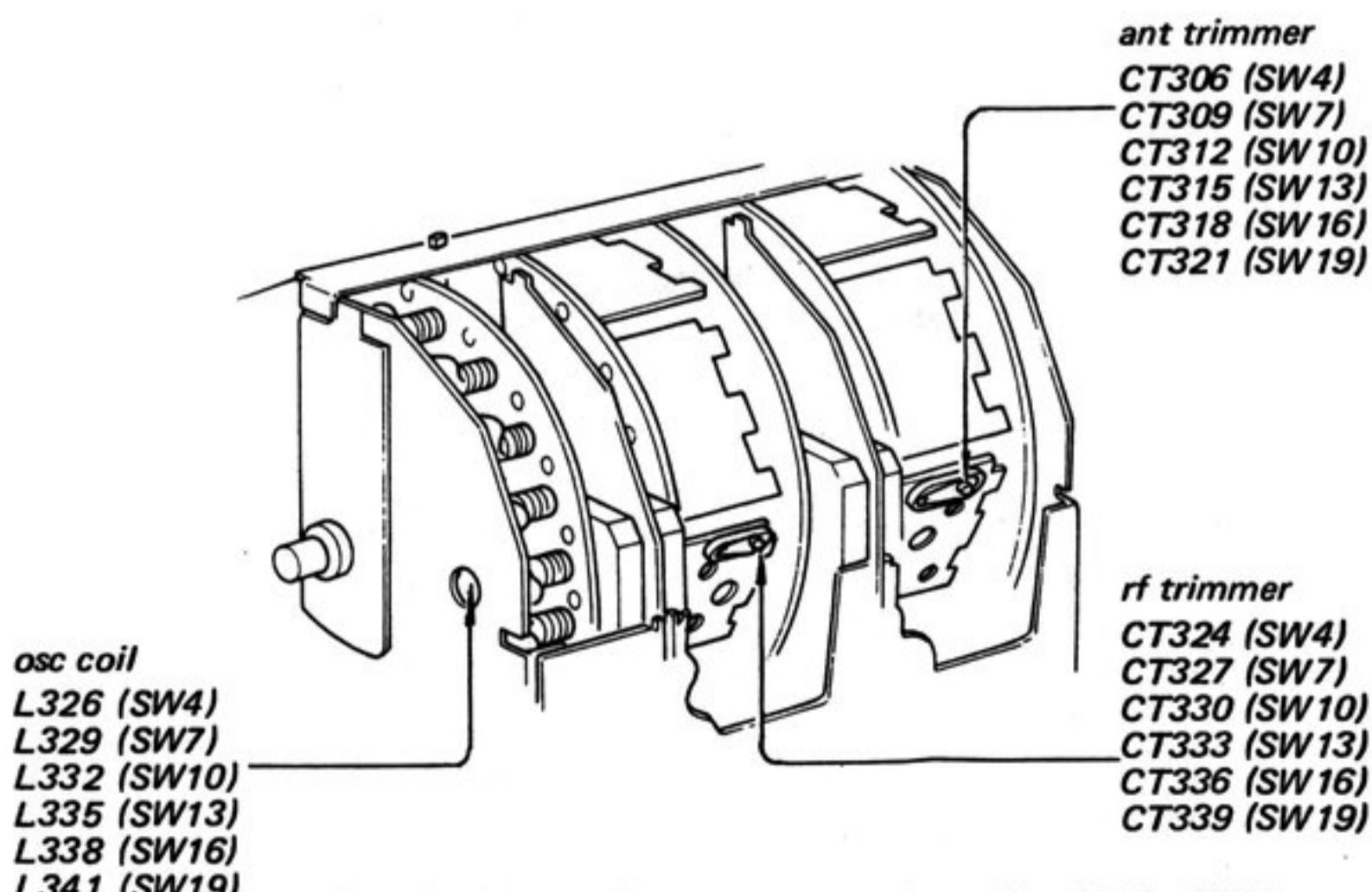


Fig. 3-17. Adjustment locations for SW4, SW7, SW10, SW13, SW16 and SW19

3-10. VOLTAGE AND CURRENT ADJUSTMENT**A. Emitter Voltage of Q201**

1. Band Selector: FM
2. R202 is to be selected to obtain 1.0 ± 0.1 V at the emitter of Q201.

Locate R202 from Fig. 3-18.

R202	1-244-706	24 k Ω
	1-244-707	27 k Ω
	1-244-708	30 k Ω
	1-244-709	33 k Ω

B. Collector Current of Q401

1. Band Selector: MW
2. Select the resistance value of R401 to obtain 0.27 ± 0.02 V at the emitter of Q401. Then collector current may be adjusted at $270\mu A$.

Locate R401 from Fig. 3-18.

R401	1-242-717	68 k Ω
	1-242-718	75 k Ω
	1-242-719	82 k Ω

C. Collector Current of Q501

1. Band Selector: MW
2. Select the resistance value of R503 to obtain 0.32 ± 0.03 V at the emitter of Q501. Then collector current may be adjusted at $600\mu A$.

Locate R503 from Fig. 3-18.

R503	1-240-514	51 k Ω
	1-240-515	56 k Ω
	1-240-516	62 k Ω
	1-240-517	68 k Ω

D. Collector Current of Q502

1. Band Selector: MW
2. Select the resistance value of R507 to obtain 0.40 ± 0.04 V at the emitter of Q502. Then collector current may be adjusted at $800\mu A$. Locate R507 from Fig. 3-18.

R507	1-240-514	51 k Ω
	1-240-515	56 k Ω
	1-240-516	62 k Ω
	1-240-517	68 k Ω

E. Regulator Voltage Adjustment

Select the resistance value of R703 to obtain 4.5 ± 0.1 V at the emitter of Q701.

Locate R703 from Fig. 3-18.

R703	1-244-652	130 Ω
	1-244-653	150 Ω
	1-244-654	160 Ω
	1-244-655	180 Ω
	1-244-656	200 Ω
	1-244-657	220 Ω

F. Tuning Meter Calibration

1. Band Selector: FM
2. Supply a 98 MHz signal of $310\mu V$ (50 dB) to the FM EXT ANT 75 OHM terminals.
3. Adjust the adjustable resistor VR201 (5 k Ω) so that the meter indicates between 8 and 9. Locate VR201 from Fig. 3-18.

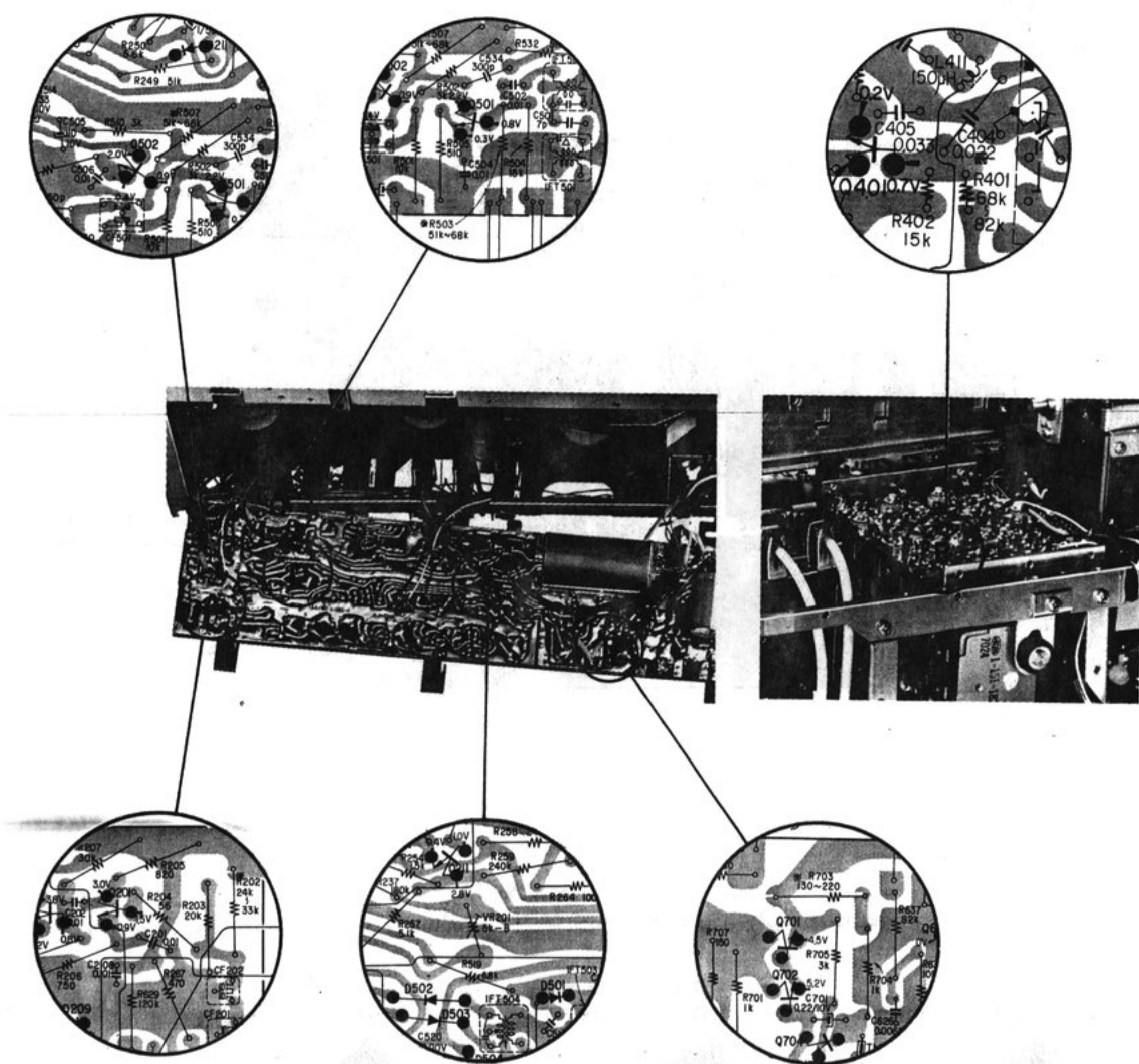


Fig. 3-18 Adjustment locations for voltage and current adjustment

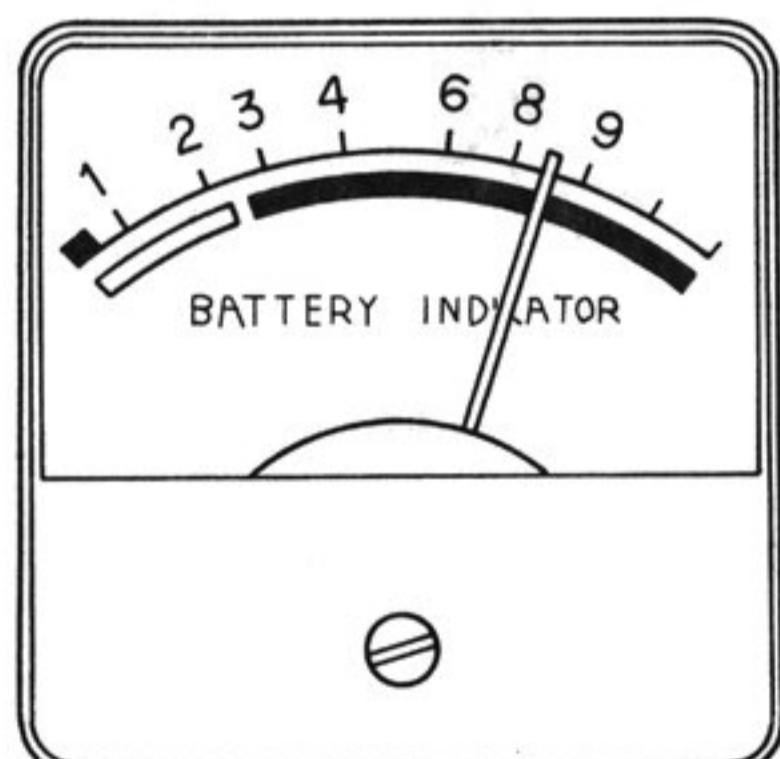


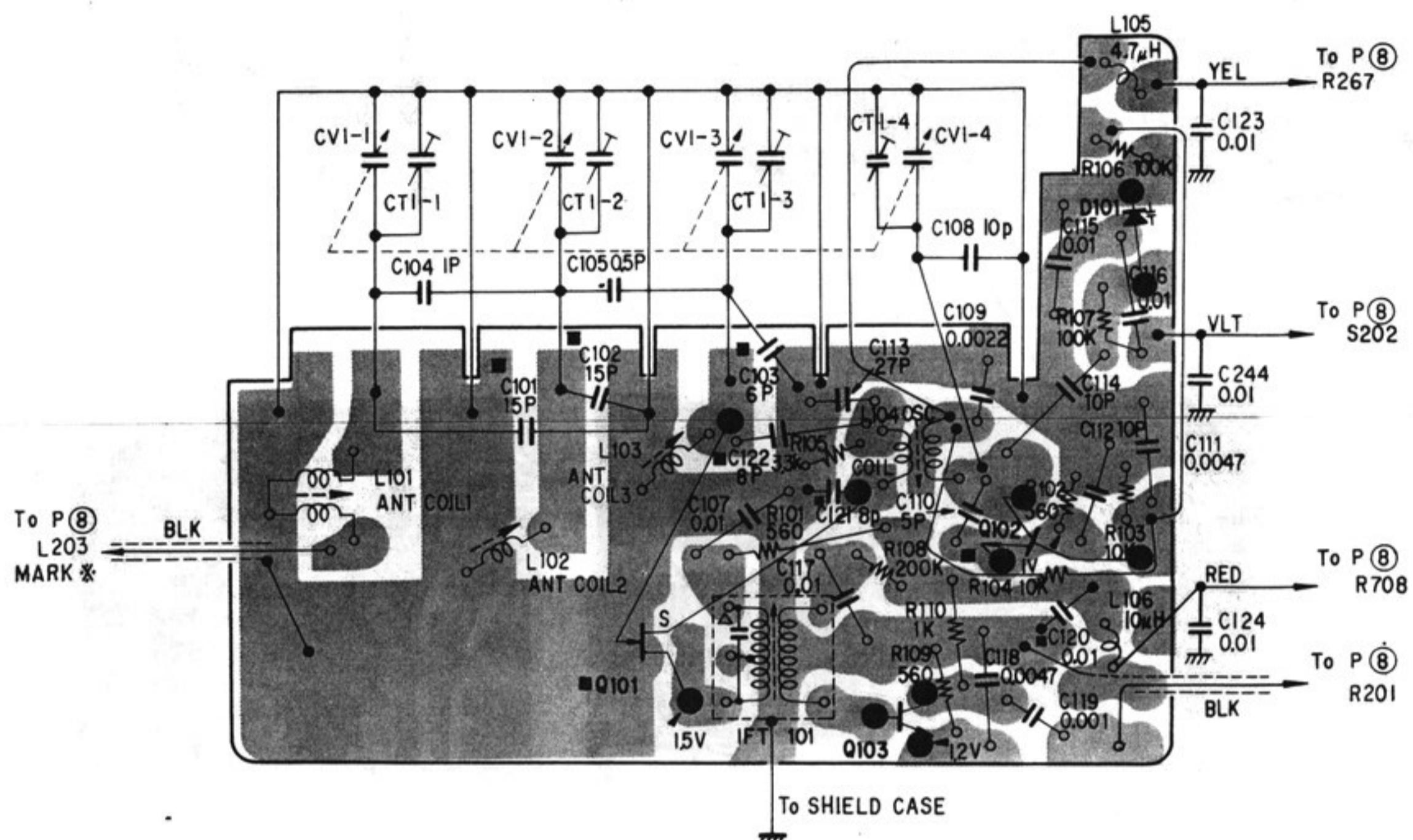
Fig. 3-19 Tuning meter calibration

SECTION 4

MOUNTING AND SCHEMATIC DIAGRAMS

4-1. FM FRONT END (P2)

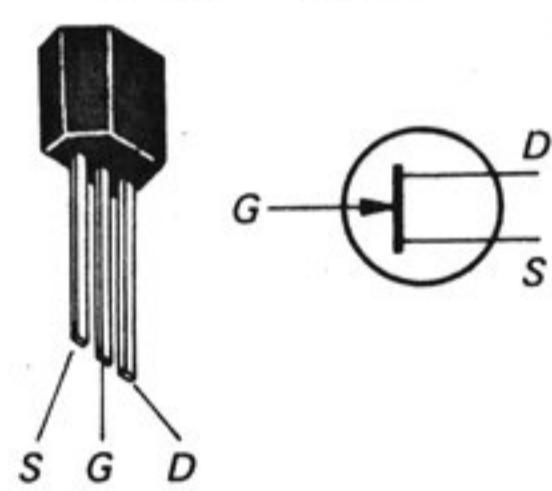
— Conductor Side —



Printed circuit board, Part No. 1-538-793-12

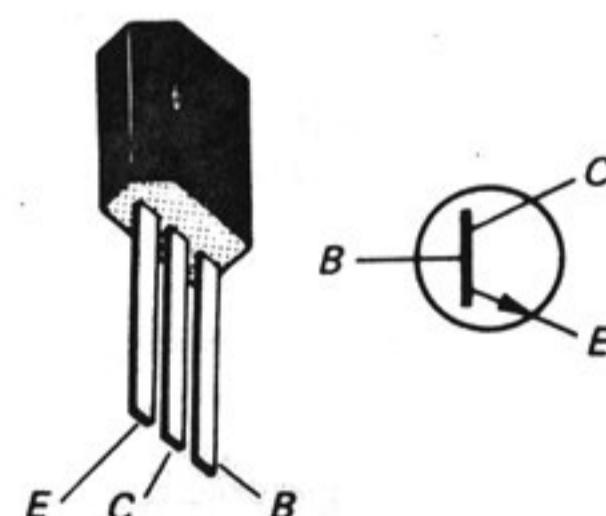
The parts marked ■ are mounted on the conductor side.

Q101: 2SK23



Q102: 2SC629

Q103: 2SC403A



D101: 1T240-3

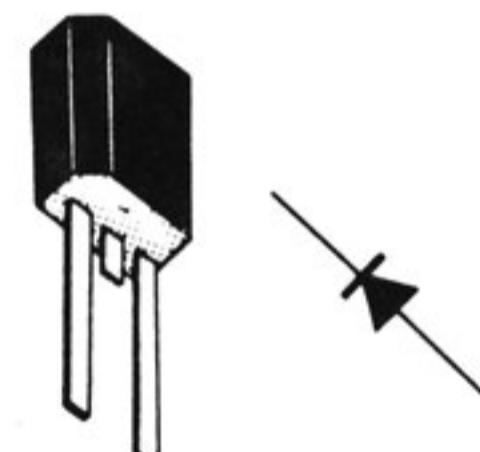


Fig. 4-1.

4.2. ANTENNA TERMINAL (P3)

— Conductor Side —

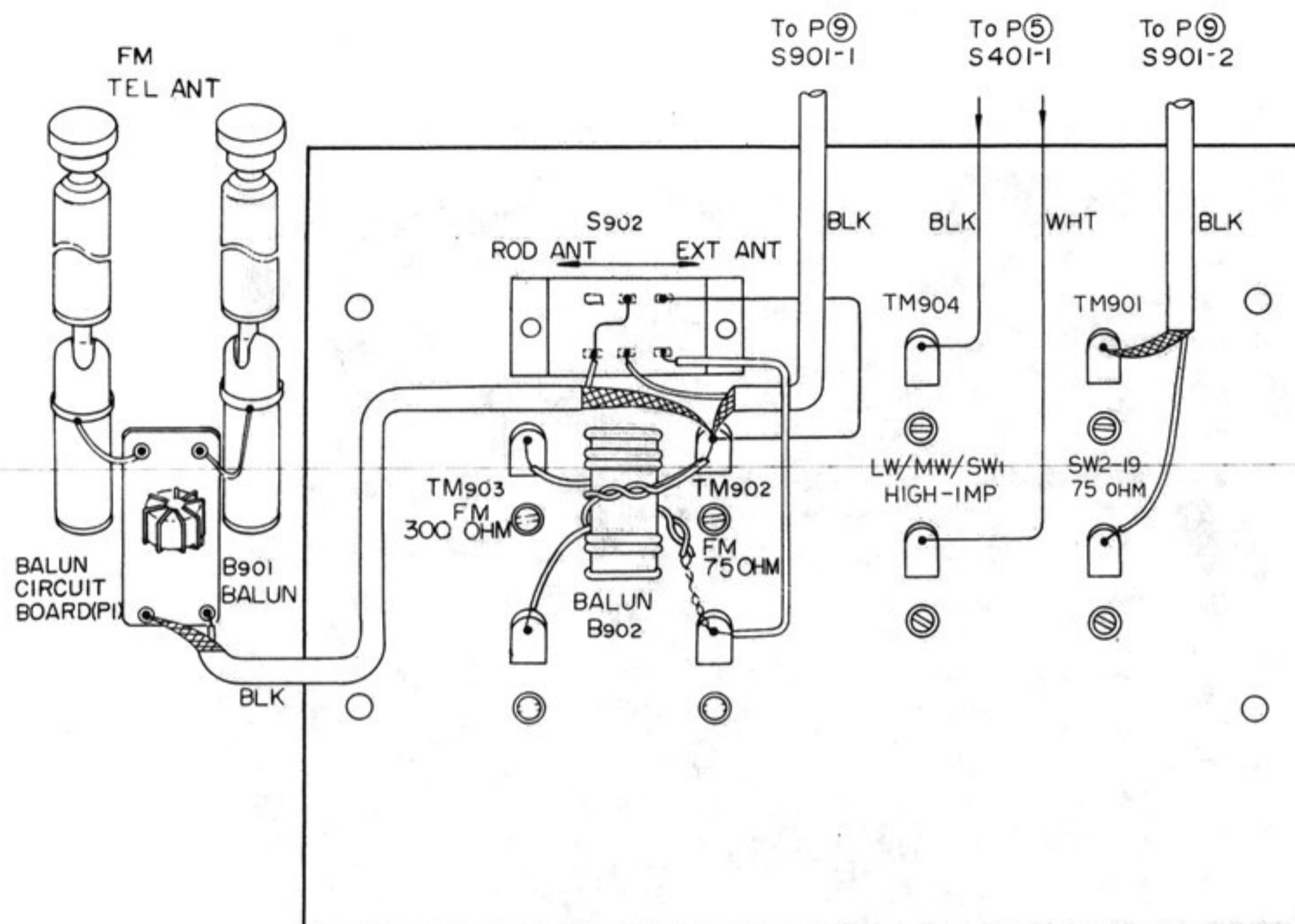


Fig. 4-2.

4.3. JACK PANEL (P4)

— Conductor Side —

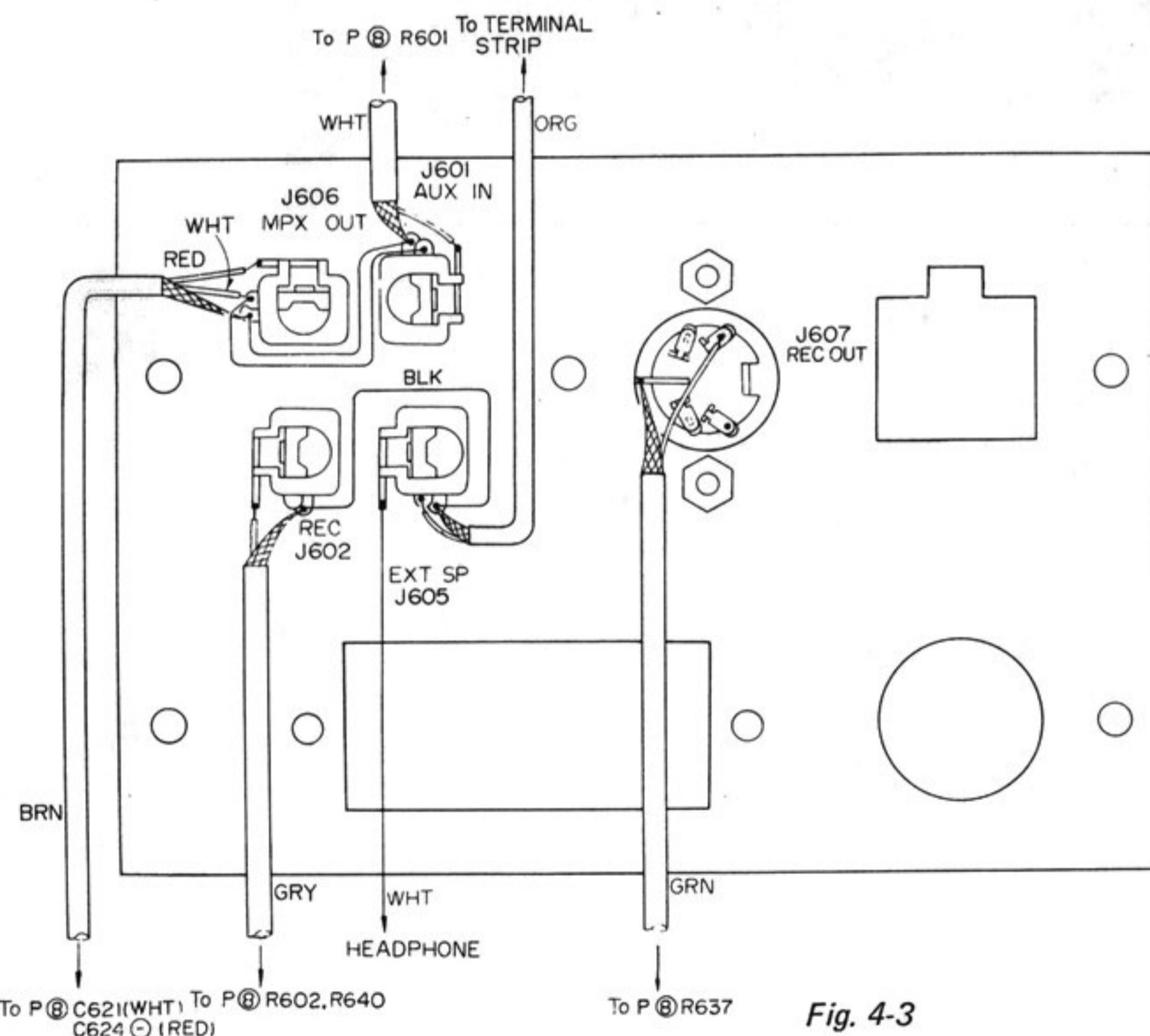
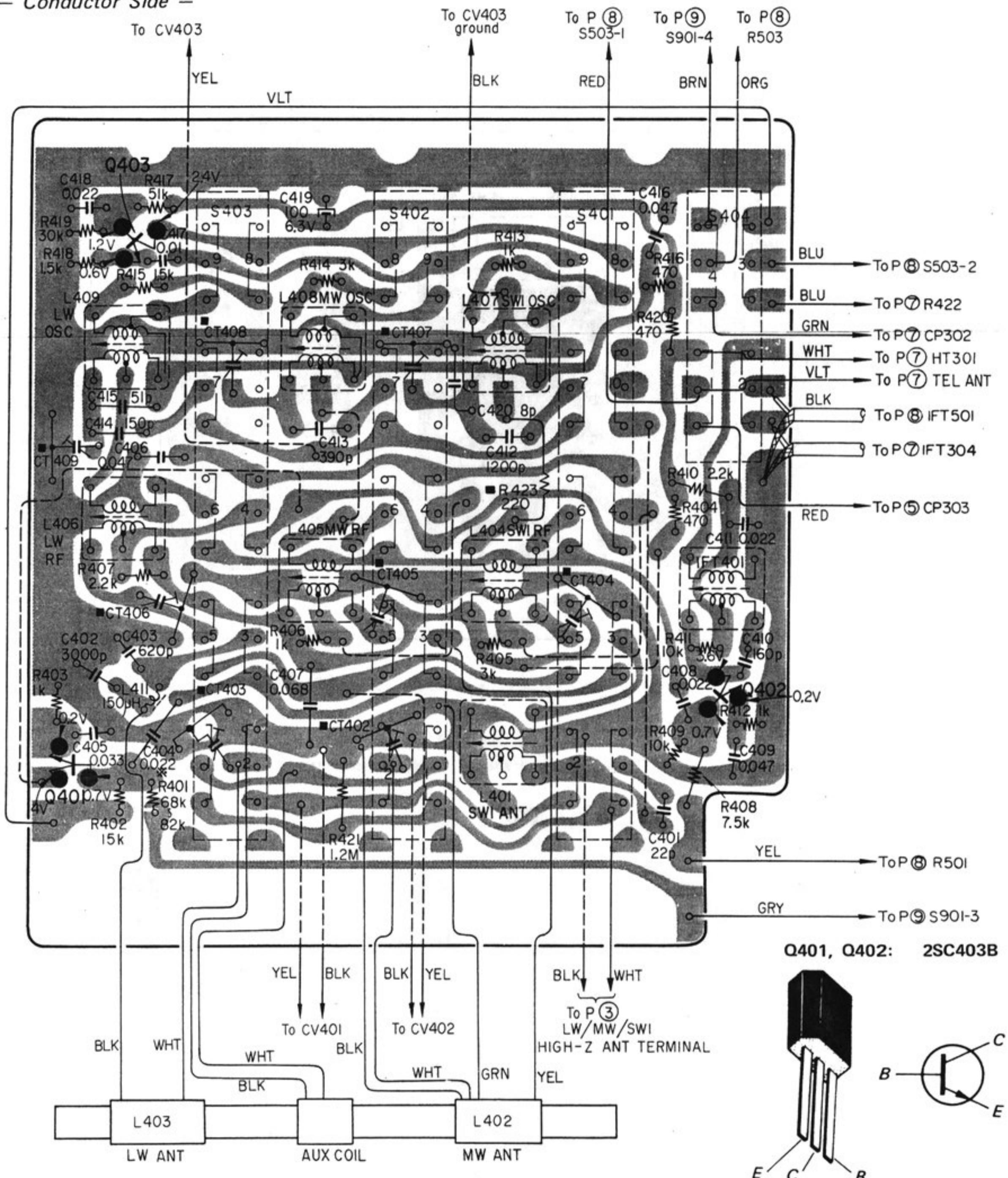


Fig. 4-3

4-4. CP CIRCUIT BOARD (P5)

— Conductor Side —



Printed circuit board, Part No. 1-581-165-11
The parts marked ■ are mounted on the conductor side.

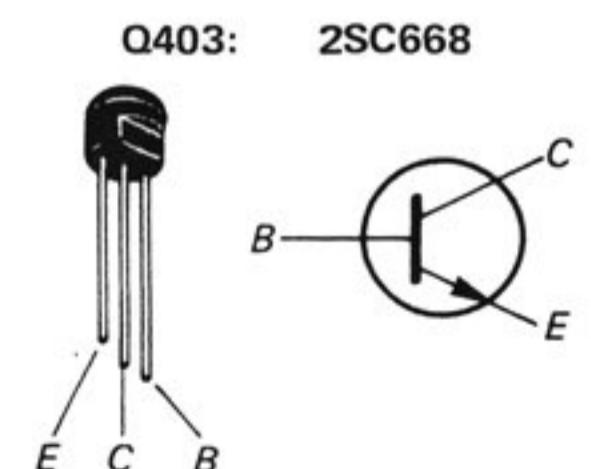
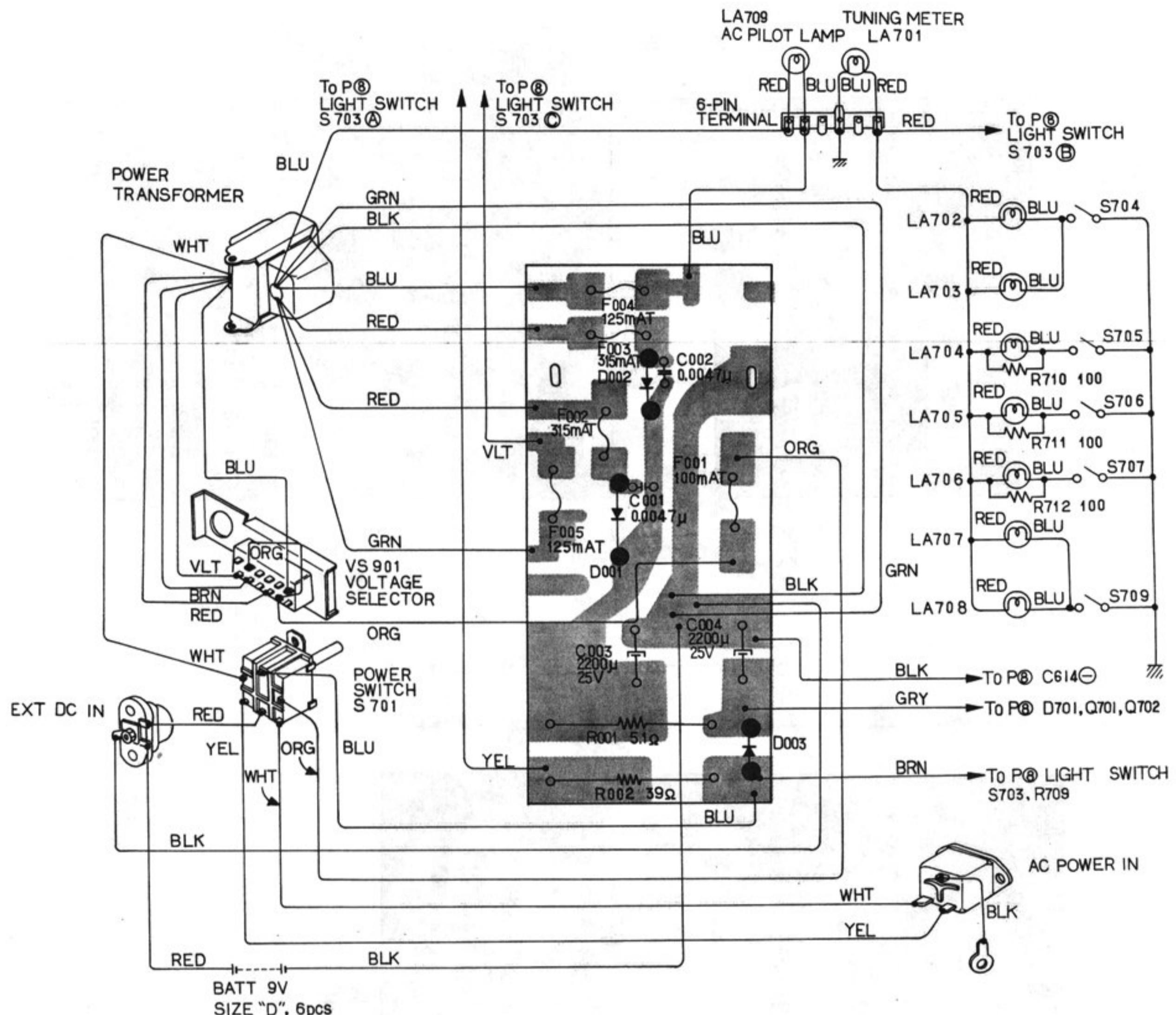


Fig. 4-4.

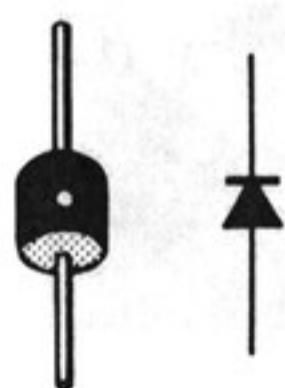
4-5. POWER SUPPLY CIRCUIT BOARD (P6)

— Conductor Side —



Printed circuit board, Part No. 1-581-463-11

D001, D002: 10D-2



D003: 2SB378B

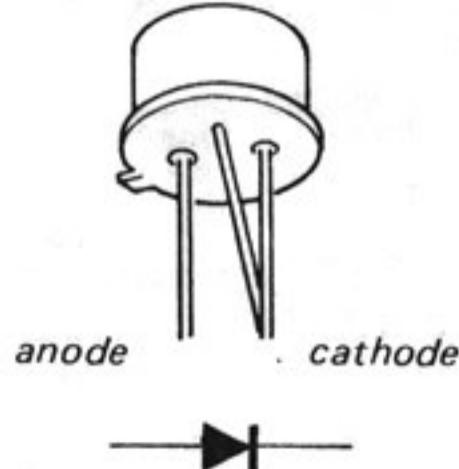


Fig. 4-5.

4-6. SW2 ~ SW19 FRONT END BLOCK (P7)

- Conductor Side -

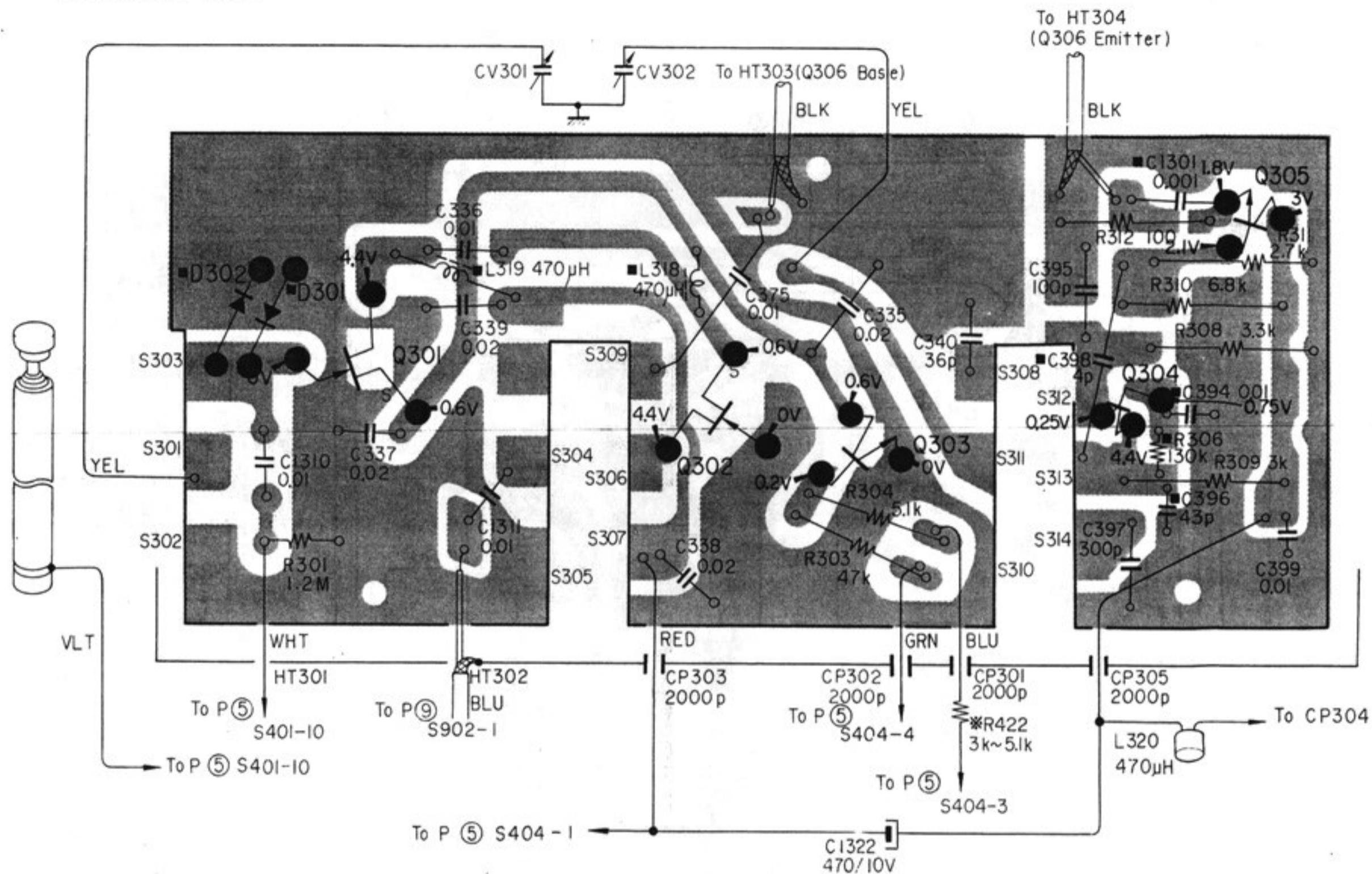


Fig. 4-6

Q301, Q302: 2SK23

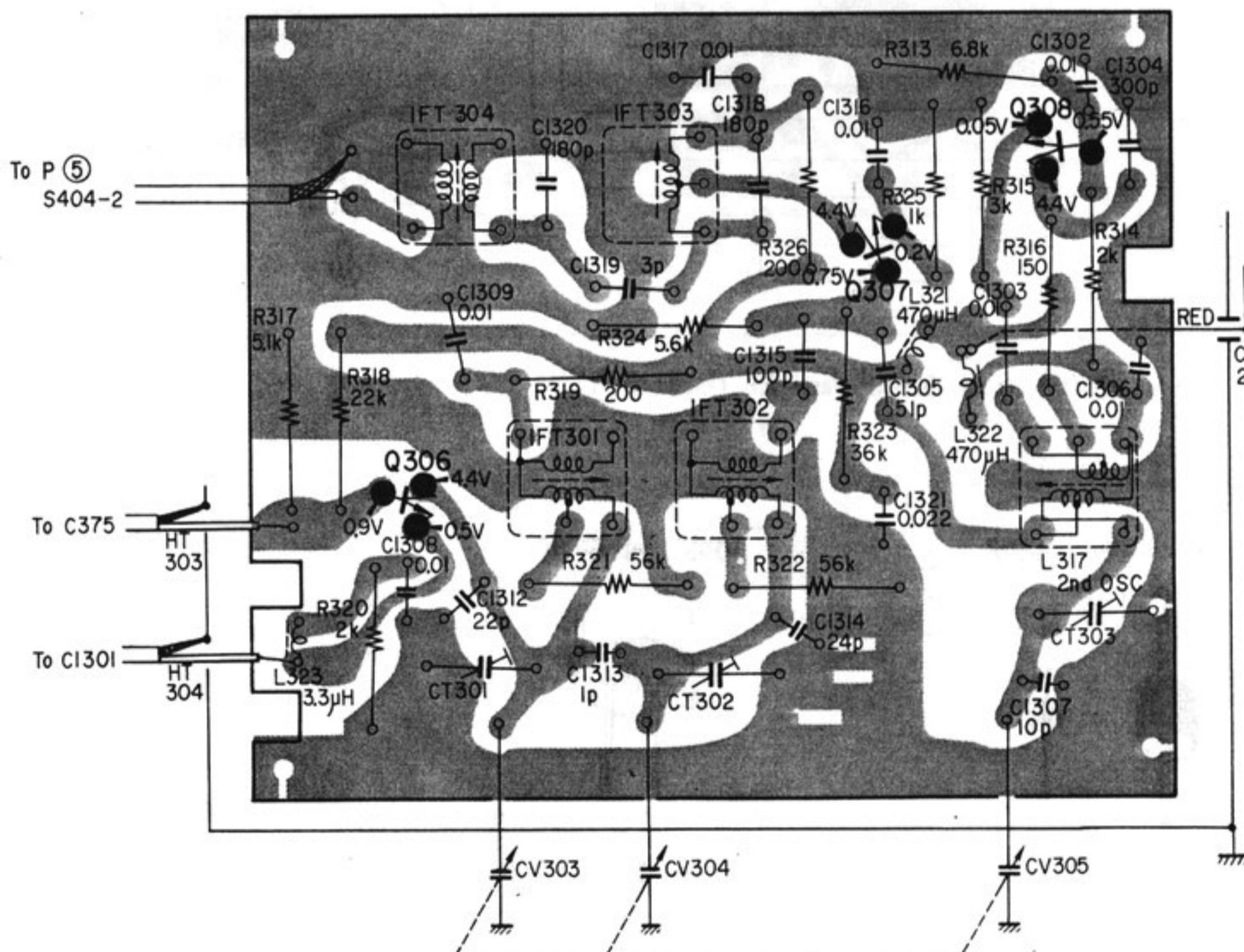


Fig. 4-7

Q303: 2SC633A

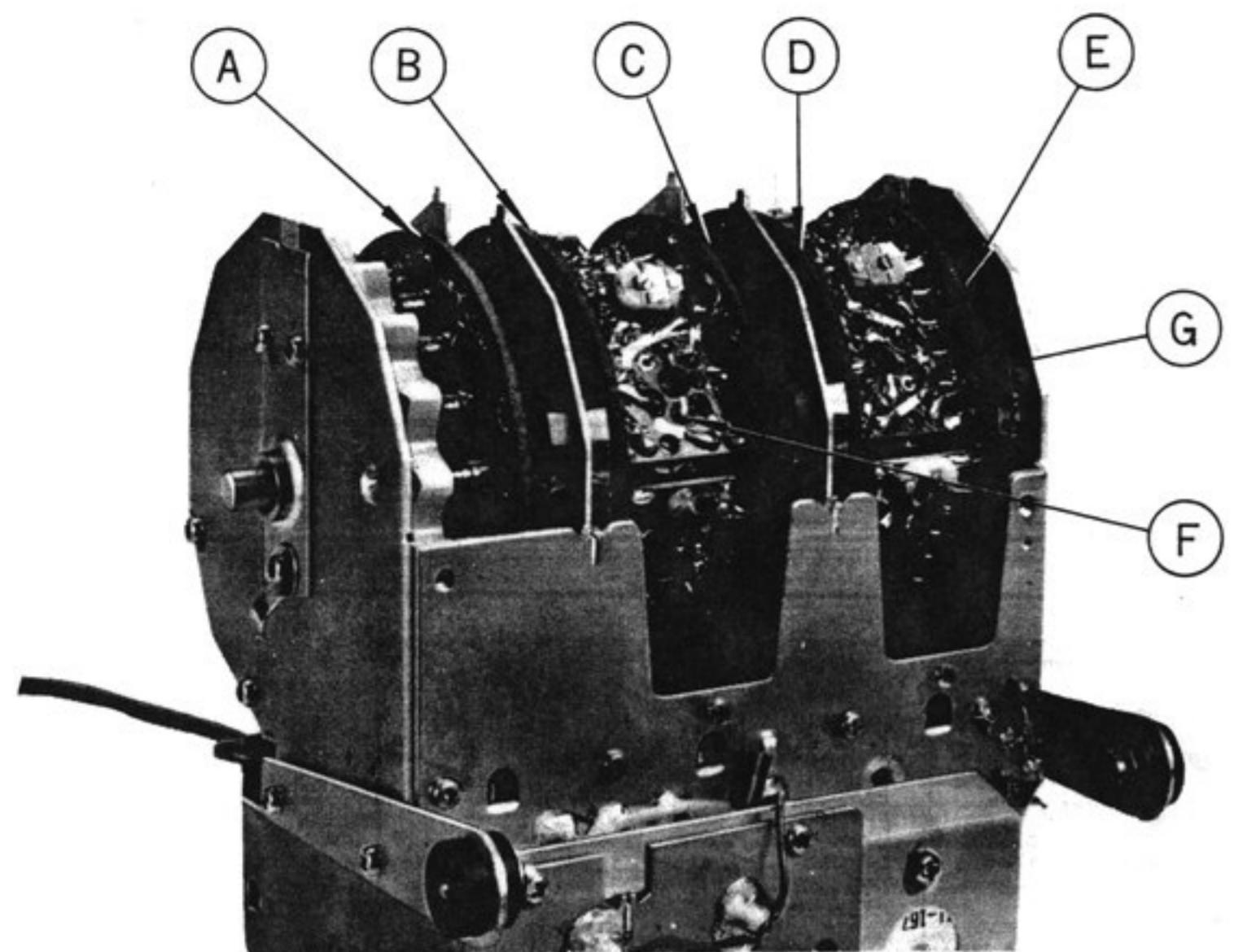
1

- 6 -

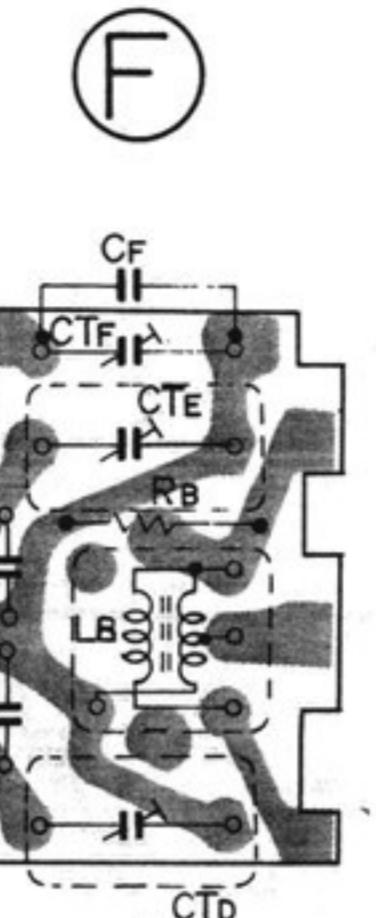
0304- 2SC668

Q504. 25000

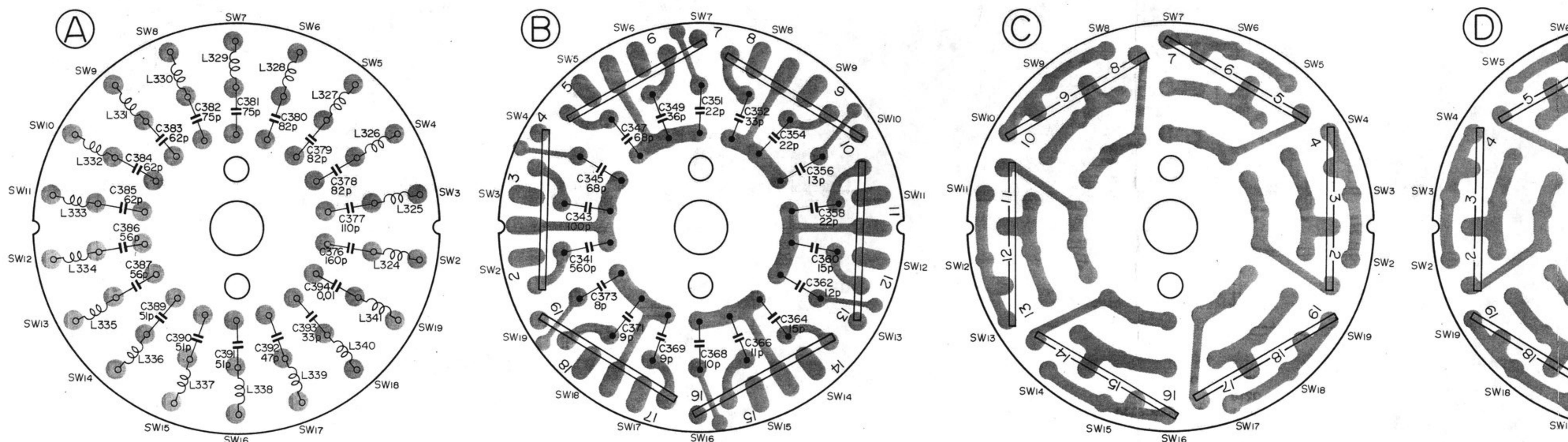
E C B



BAND	SW2~19 RF COIL			TRIMMER CAPACITOR			RB	
	LB	CD	CE	CF	CTD	CTE	CTF	
SW2~ SW4	L307	C342 220P	C344 75P	C346 43P	CT322	CT323	CT324	R305 18k
SW5~ SW7	L308	C348 75P	C350 22P		CT325	CT326	CT327	R328 33k
SW8~ SW10	L309	C353 68P	C355 24P		CT328	CT329	CT330	
SW11~ SW13	L310	C359 56P	C361 27P		CT331	CT332	CT333	
SW14~ SW16	L311	C365 36P	C367 10P		CT334	CT335	CT336	
SW17~ SW19	L312	C370 10P	C372 7P	C374 7P	CT337	CT338	CT339	

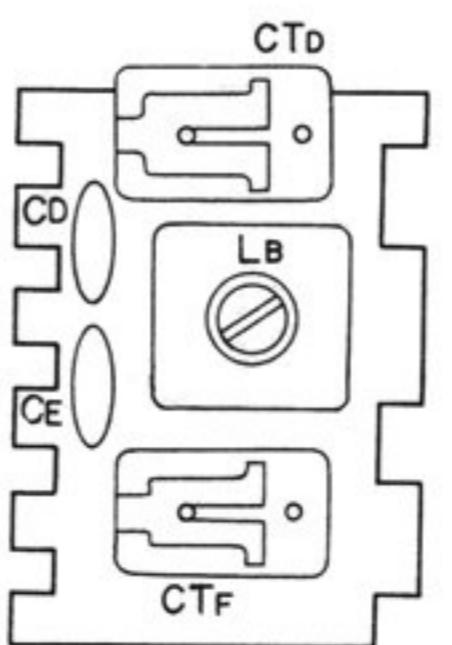


BAND	SW2~19 ANT COIL			TRIMMER CAPACITOR			RB	
	LA	CA	CB	CC	CTA	CTB	CTC	
SW2~ SW4	L301	C302 20P	C304 75P	C306 43P	CT304	CT305	CT306	R305 18k
SW5~ SW7	L302	C308 75P	C310 22P		CT307	CT308	CT309	R328 33k
SW8~ SW10	L303	C313 68P	C315 24P		CT310	CT311	CT312	
SW11~ SW13	L304	C319 56P	C321 27P		CT313	CT314	CT315	
SW14~ SW16	L305	C325 36P	C327 10P		CT316	CT317	CT318	
SW17~ SW19	L306	C330 10P	C332 7P	C334 7P	CT319	CT320	CT321	

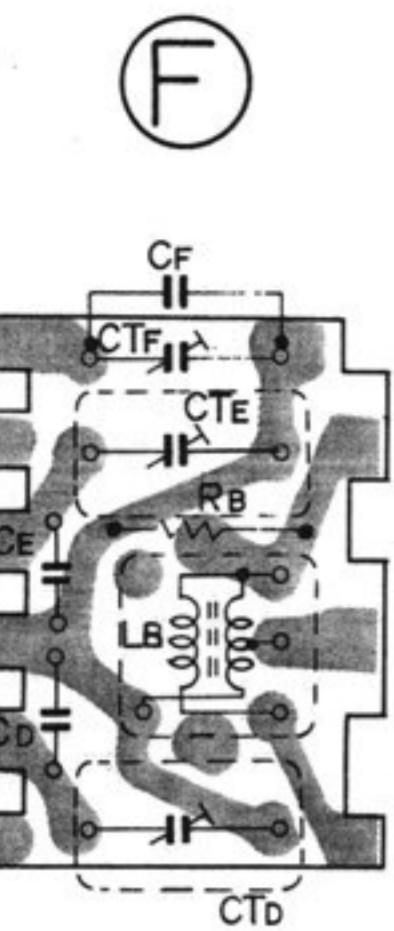


SW2 ~ 19: 1st OSC Coil.
All coils and capacitors: Mounted on the Conductor Side.

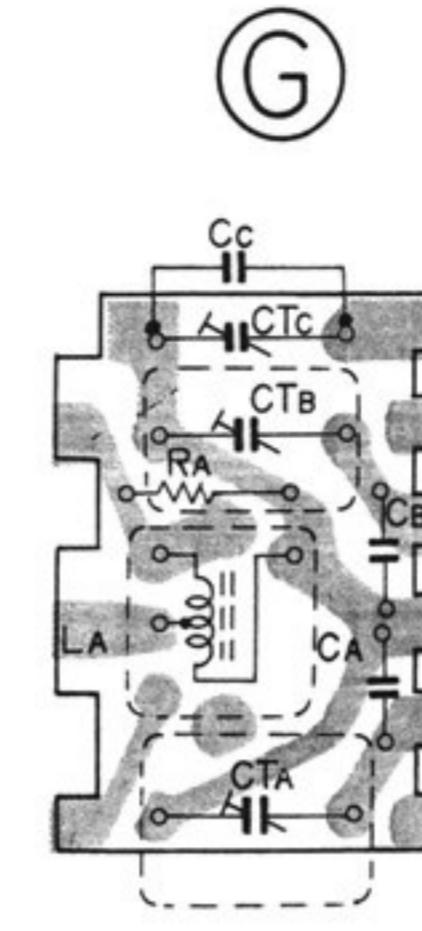
All capacitors: Mounted on the Conductor Side.



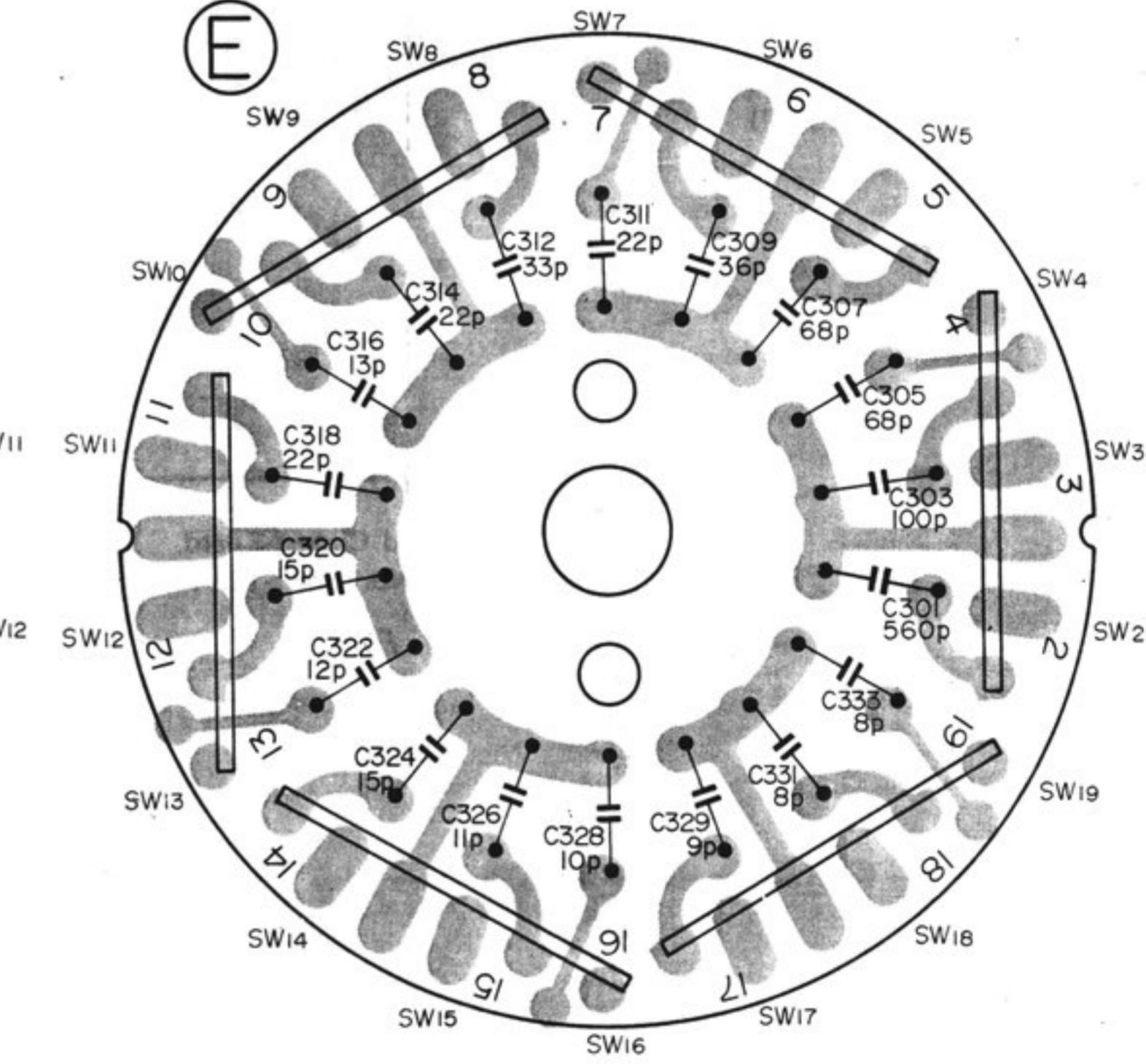
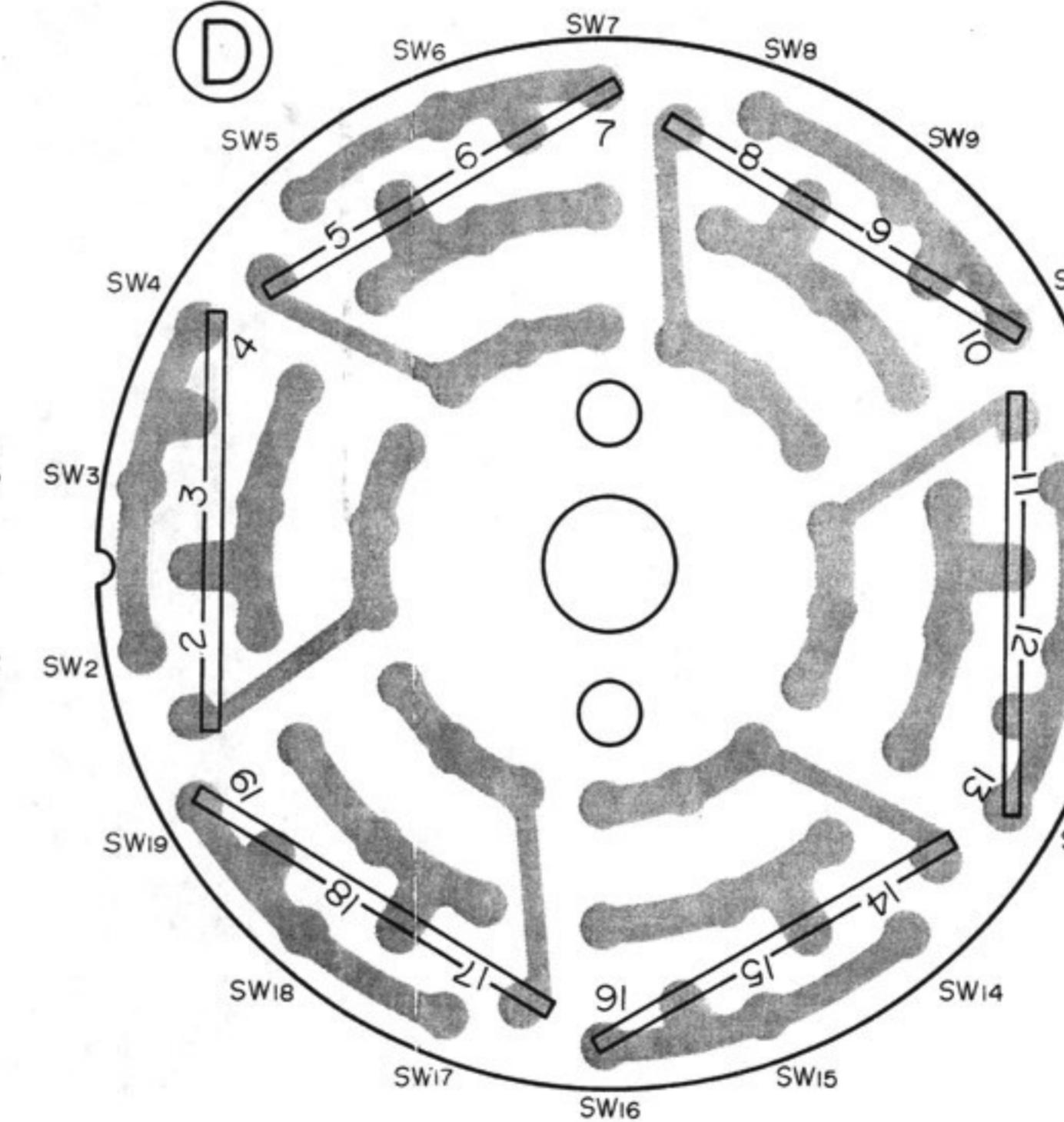
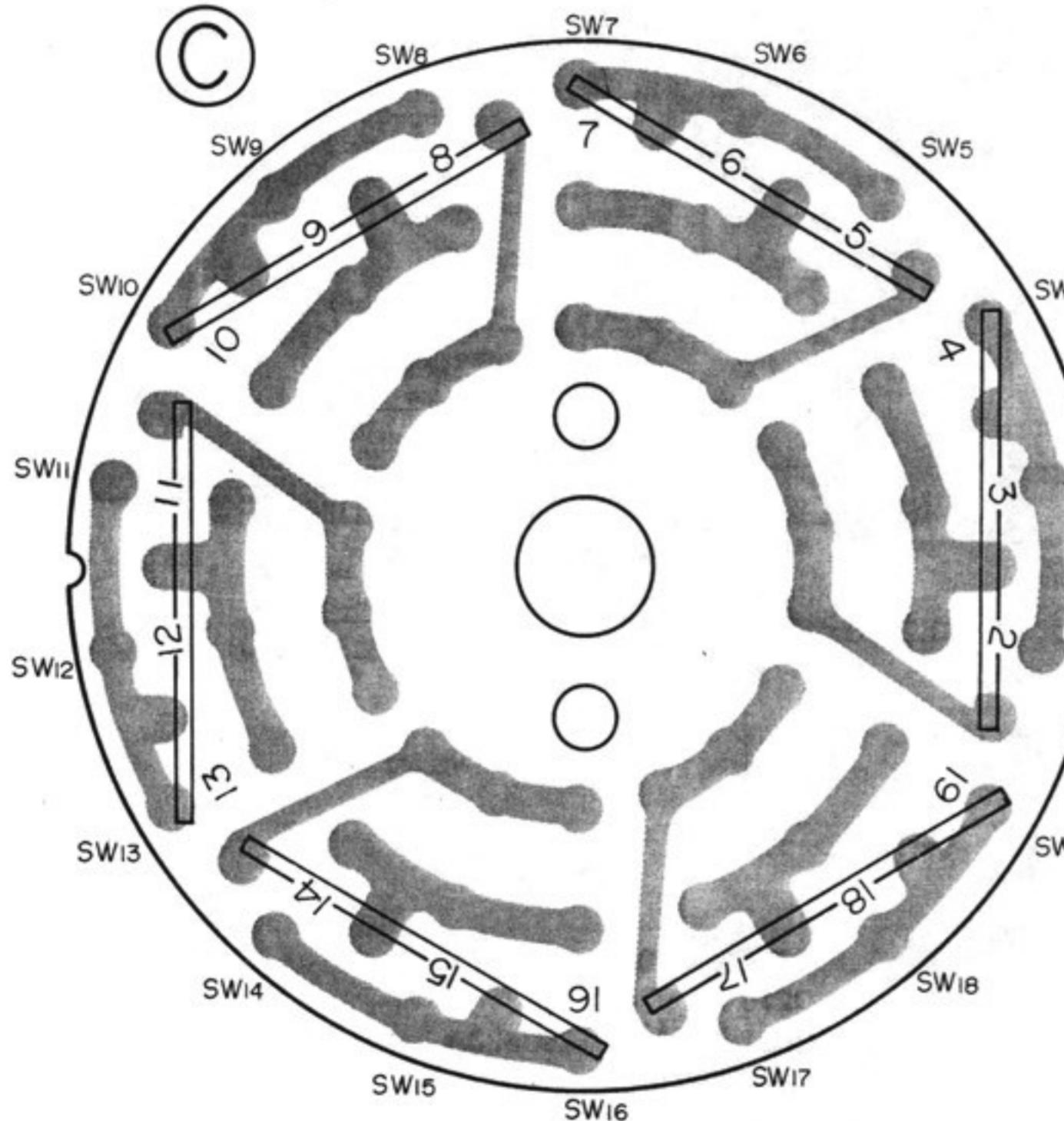
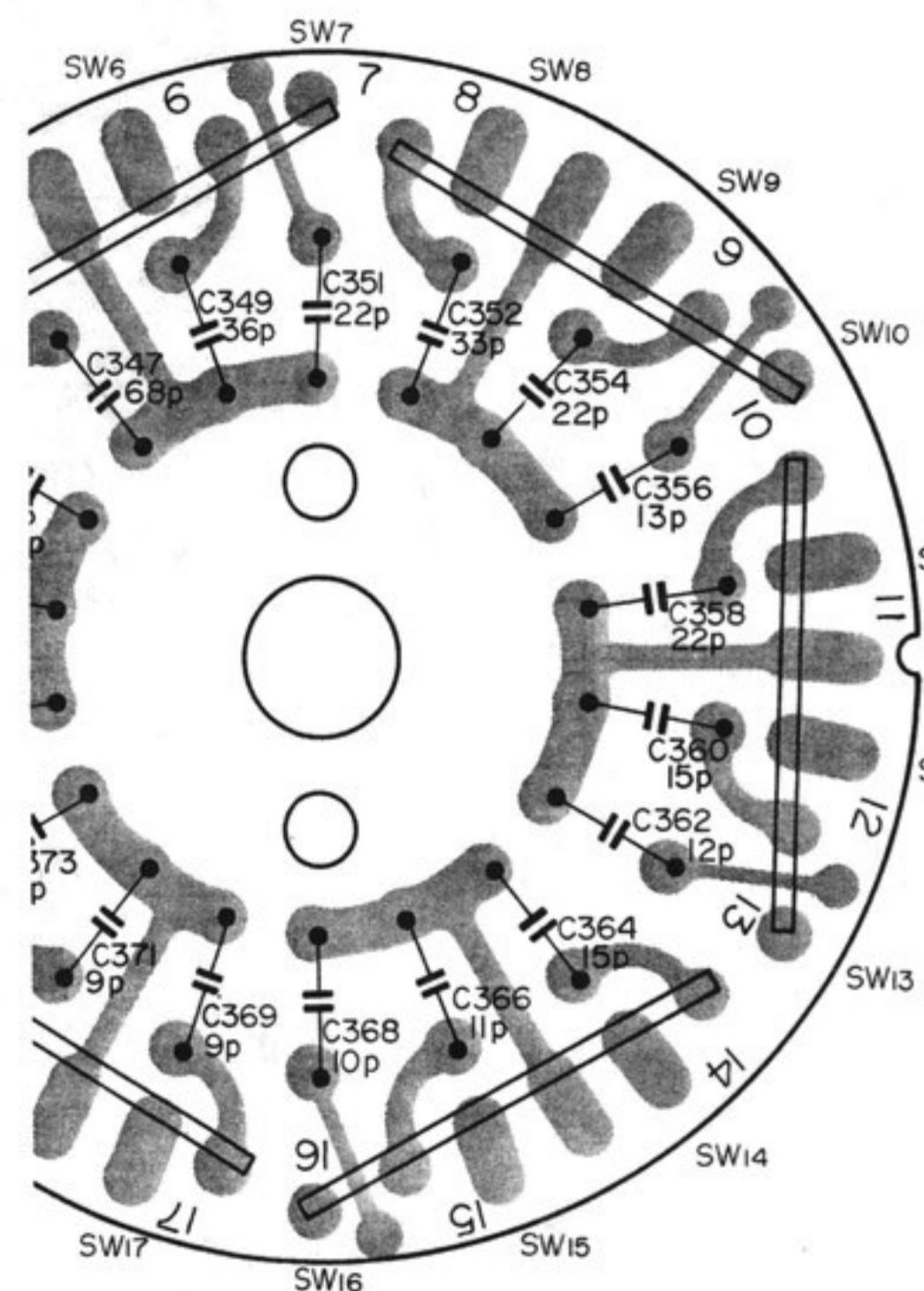
	TRIMMER CAPACITOR			RB
CF	CTD	CTE	CTF	
C346 43P	CT322	CT323	CT324	R305 18k
	CT325	CT326	CT327	R328 33k
	CT328	CT329	CT330	
	CT331	CT332	CT333	
	CT334	CT335	CT336	
C374	CT337	CT338	CT339	
	7P			



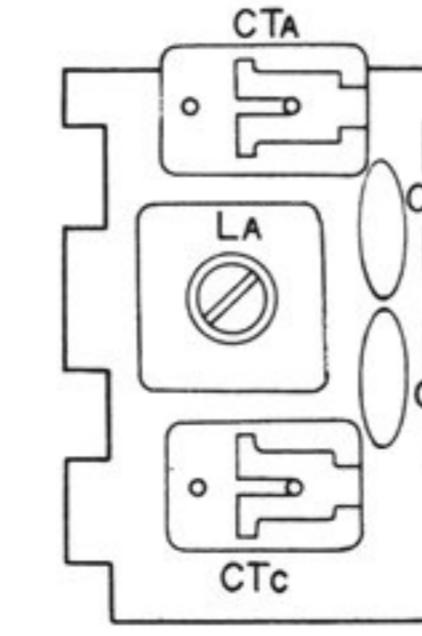
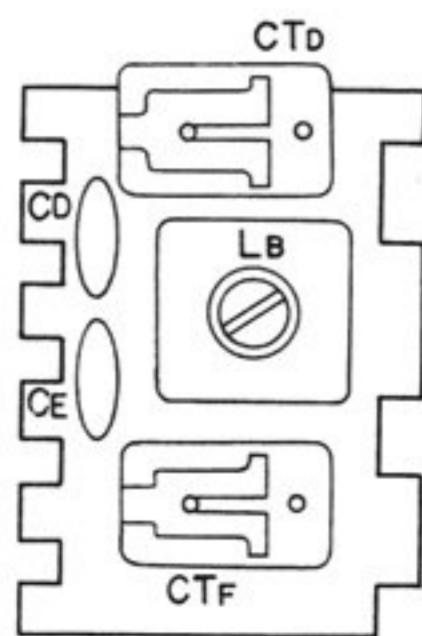
BAND	LA	SW2~19 ANT COIL			TRIMMER CAPACITOR			RA
		CA	CB	CC	CTA	CTB	CTC	
SW2~SW4	L301	C302 20P	C304 75P	C306 43P	CT304	CT305	CT306	R302 18k
SW5~SW7	L302	C308 75P	C310 22P		CT307	CT308	CT309	R327 33k
SW8~SW10	L303	C313 68P	C315 24P		CT310	CT311	CT312	
SW11~SW13	L304	C319 56P	C321 27P		CT313	CT314	CT315	
SW14~SW16	L305	C325 36P	C327 10P		CT316	CT317	CT318	
SW17~SW19	L306	C330 10P	C332 7P	C334 7P	CT319	CT320	CT321	



CC, CTC, RA: Mounted on the Conductor Side.



CTD: Mounted on the Conductor Side.

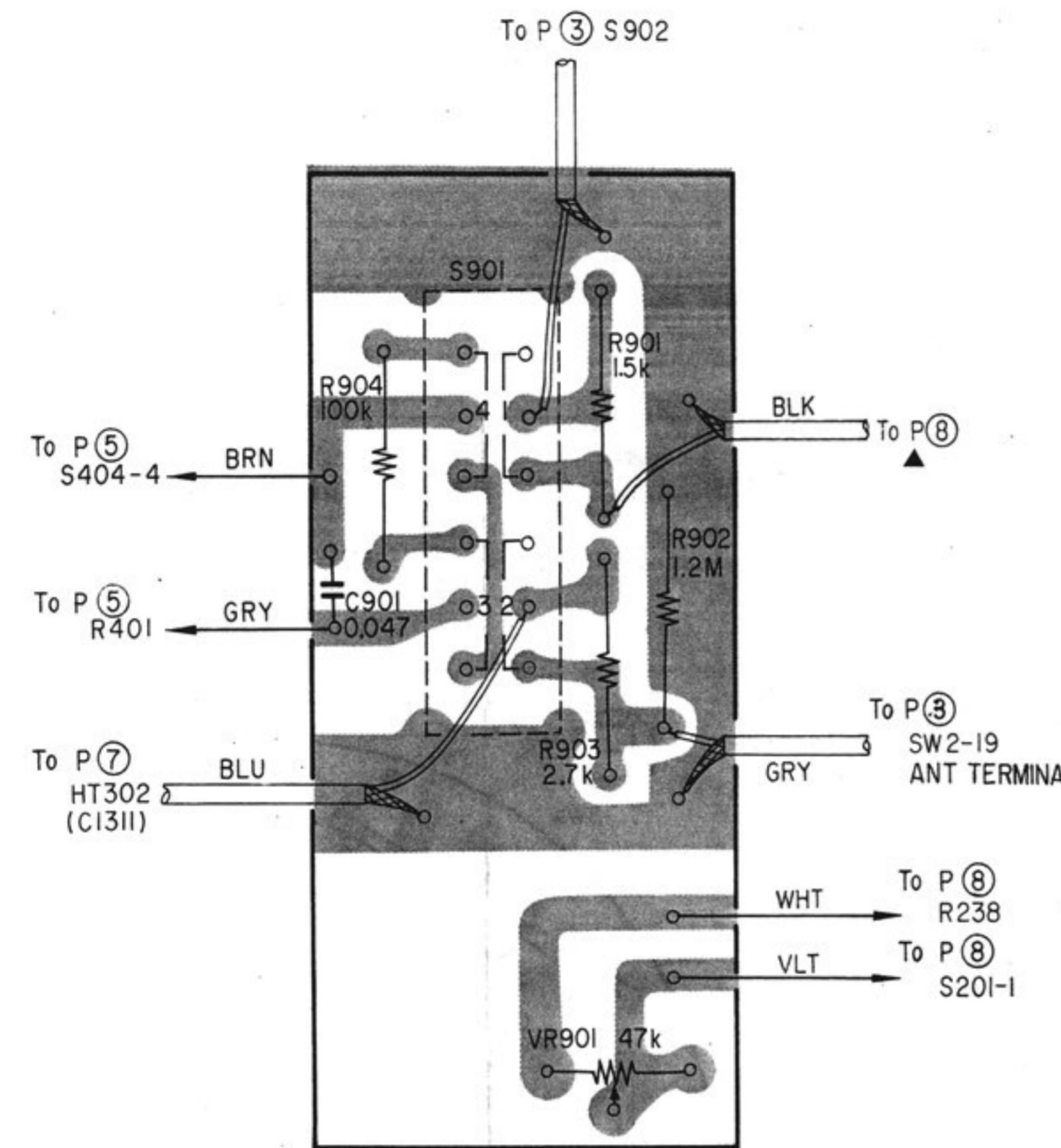


All capacitors: Mounted on the Conductor Side.

Fig. 4-8

4-7. SWITCH CIRCUIT BOARD (P9)

— Conductor Side —

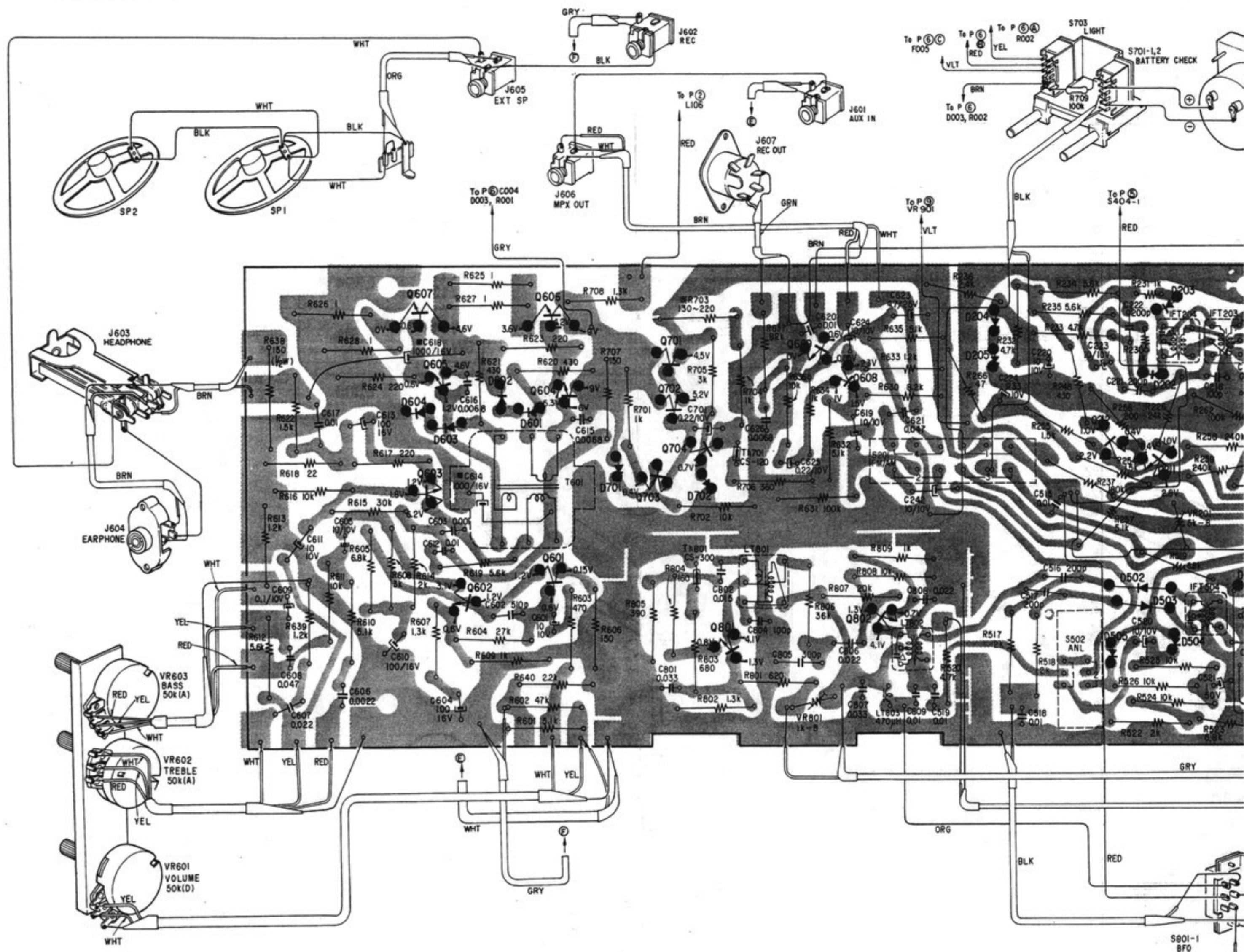


Printed Circuit Board,
Part No. 1-581-166-11

Fig. 4-9

4-8. MAIN CIRCUIT BOARD (P8)

— Conductor Side —



Q206 ~ Q208
Q210
Q601 ~ Q605 } 2SC633A
Q608, Q609
Q702, Q704

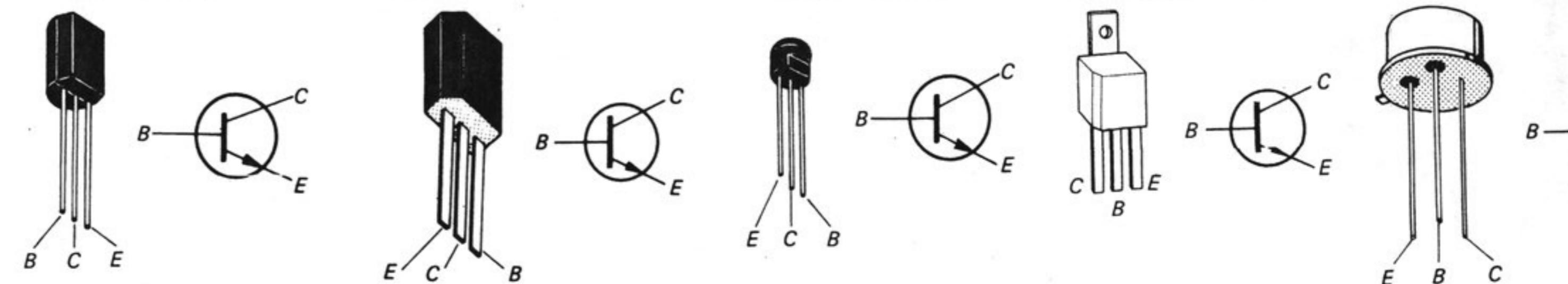
Q201 ~ Q205: 2SC710
Q801: 2SC870
Q802

Q211, Q212
Q501 ~ Q504 } 2SC403B

Q209: 2SC678

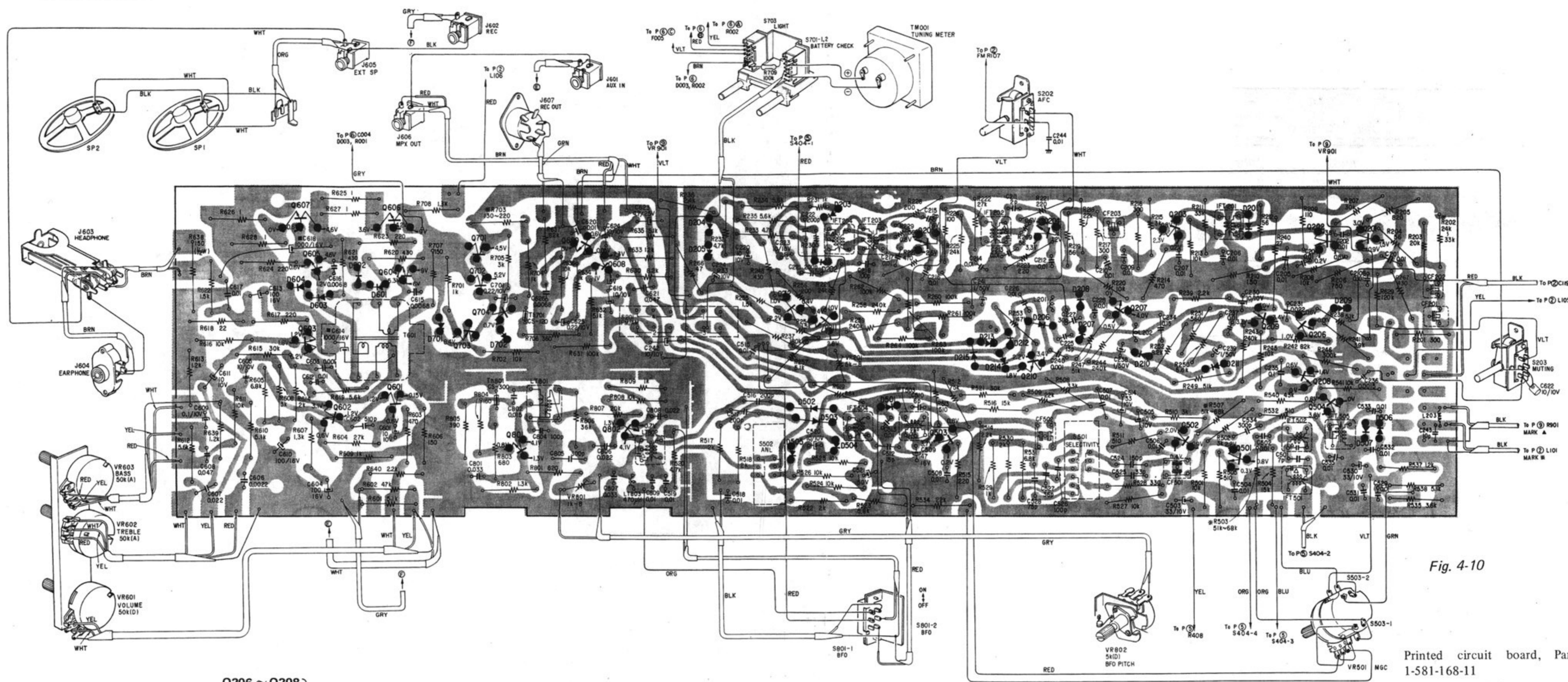
Q606, Q607: 2SC1014

Q701: 2SC:



4-8. MAIN CIRCUIT BOARD (P8)

— Conductor Side —

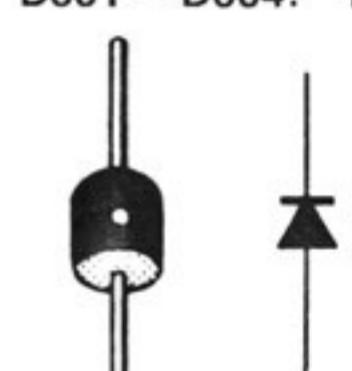
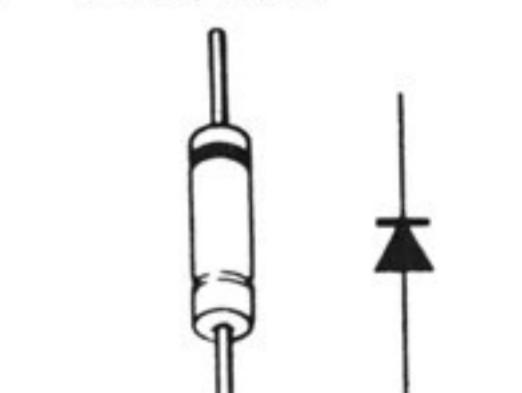
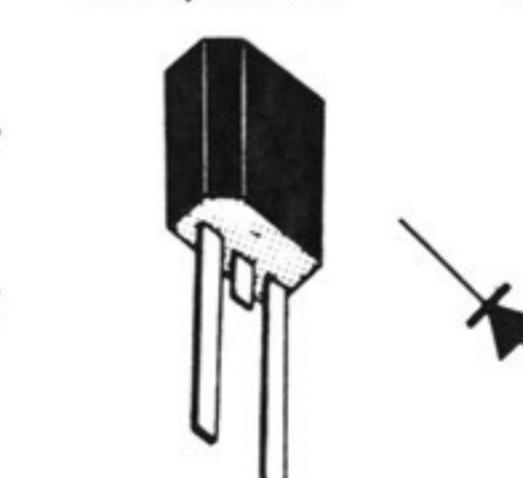
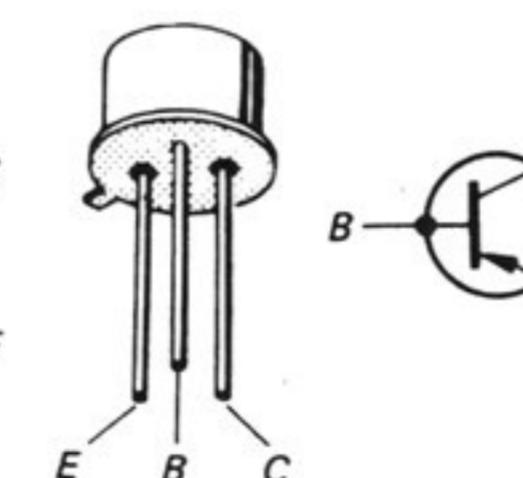
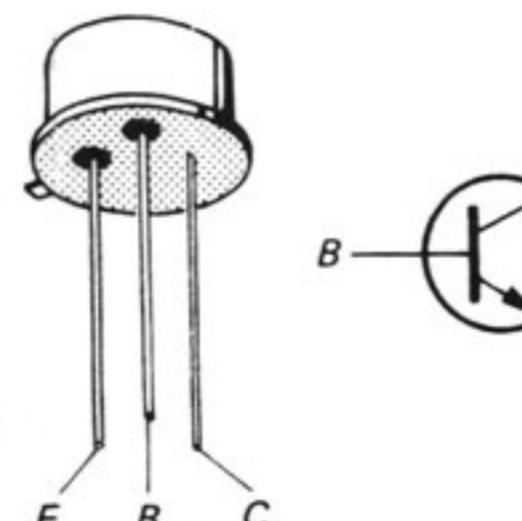
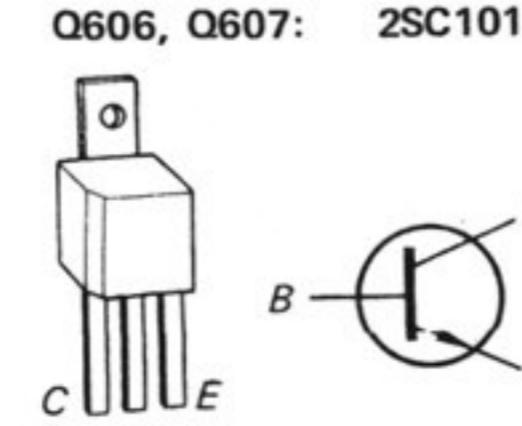
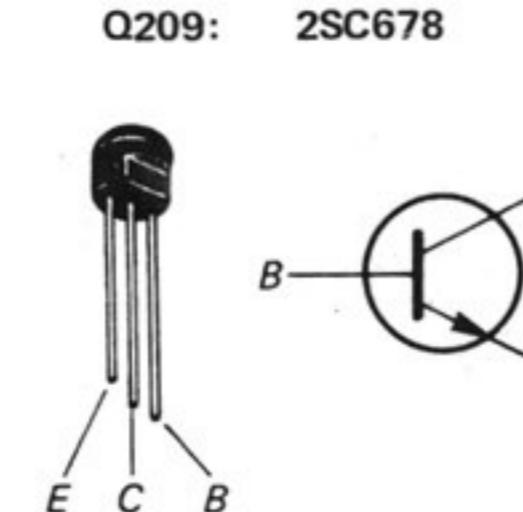
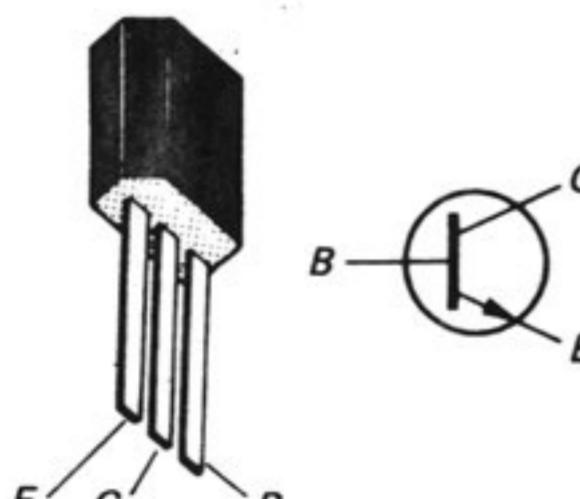
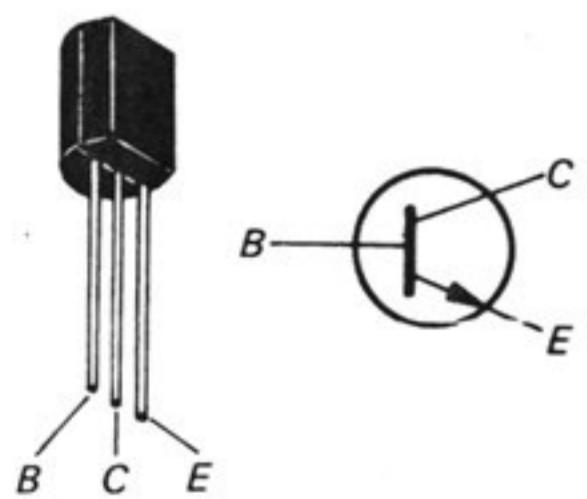


Printed circuit board, Part No.
1-581-168-11

The parts marked ■ are mounted on
the conductor side.

Q201 ~ Q205: 2SC710
Q801: 2SC870

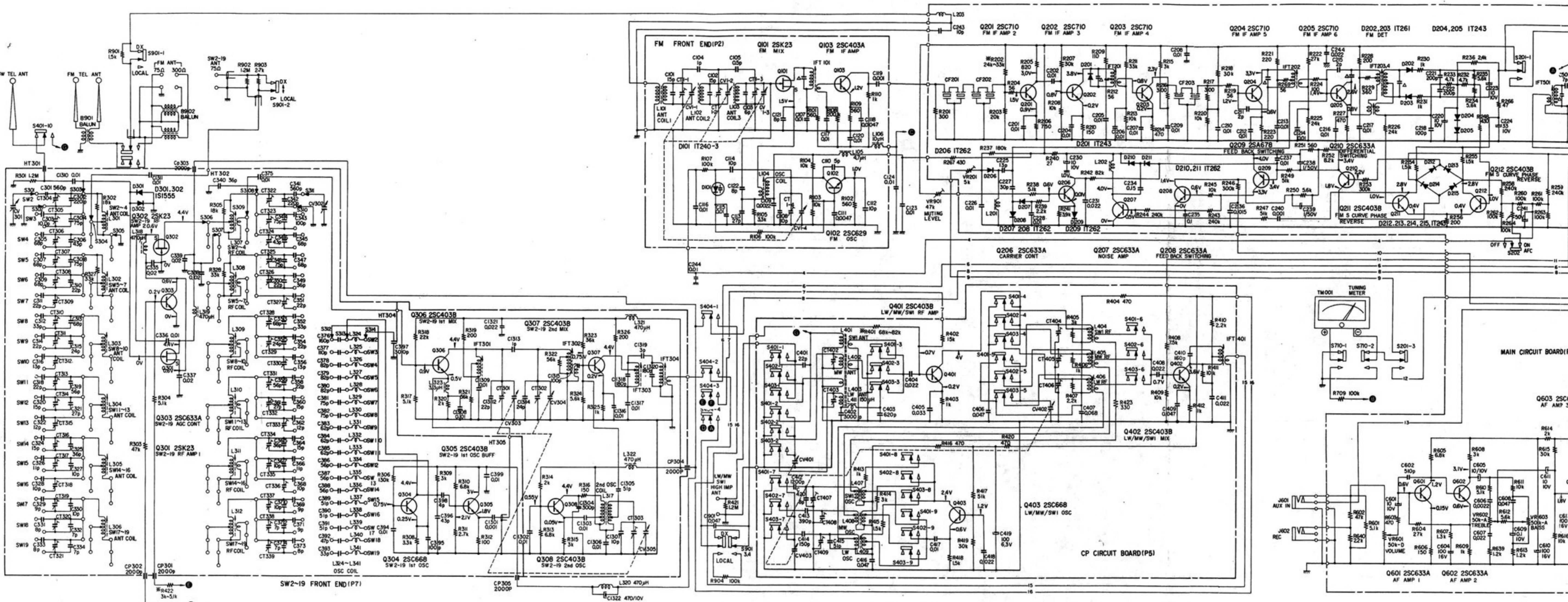
Q206 ~ Q208
Q210
Q601 ~ Q605 } 2SC633A
Q608, Q609
Q702, Q704
Q211, Q212 } 2SC403B
Q501 ~ Q504
Q802



D201, D204, D205 } 1T261
D212 ~ D215 } 1T262
D504, D505 } 1T243
D501 ~ D503 } 1T264
D506, D507) 1T23

D601 ~ D604: 10D-2

4-9. SCHEMATIC DIAGRAM

**Note:**

- Symbol shows grounding to chassis.
- All resistors and capacitors are in Ω and μF , unless otherwise indicated.
- Capacitor marked Δ is built in i-f transformer.
- The symbol $*$ indicates a component whose value is selected to yield specified operating condition.
- Voltage value is measured to ground circuit with a dc voltmeter ($20 \text{ k}\Omega/\text{V}$) and current value is measured with a dc ammeter. Voltage and current are taken with no radio signal received. Variations may be noted due to normal production tolerances.

6. Switch Position

Switch	Function	Position	Switch	Function	Position
S201	FM/AM select	FM	S701	POWER	OFF
S202	AFC	ON	S703	LIGHT	OFF
S203	MUTING	ON	S704	LIGHT	(ON with ac power source)
S401	Band Selector (SW1)	OFF	S709	BATTERY CHECK	built in band selector
S402	Band Selector (MW)	OFF	S710	ON	
S403	Band Selector (LW)	OFF	S801	BFO	OFF
S404	Band Selector (SW2-19)	ON	S901	SENSITIVITY (LOCAL/DX)	DX
S501	SELECTIVITY (BROAD/SHARP)	BROAD	S902	ROD ANT/EXT ANT	ROD ANT
S502	ANL	OFF			
S503	MGC	OFF			

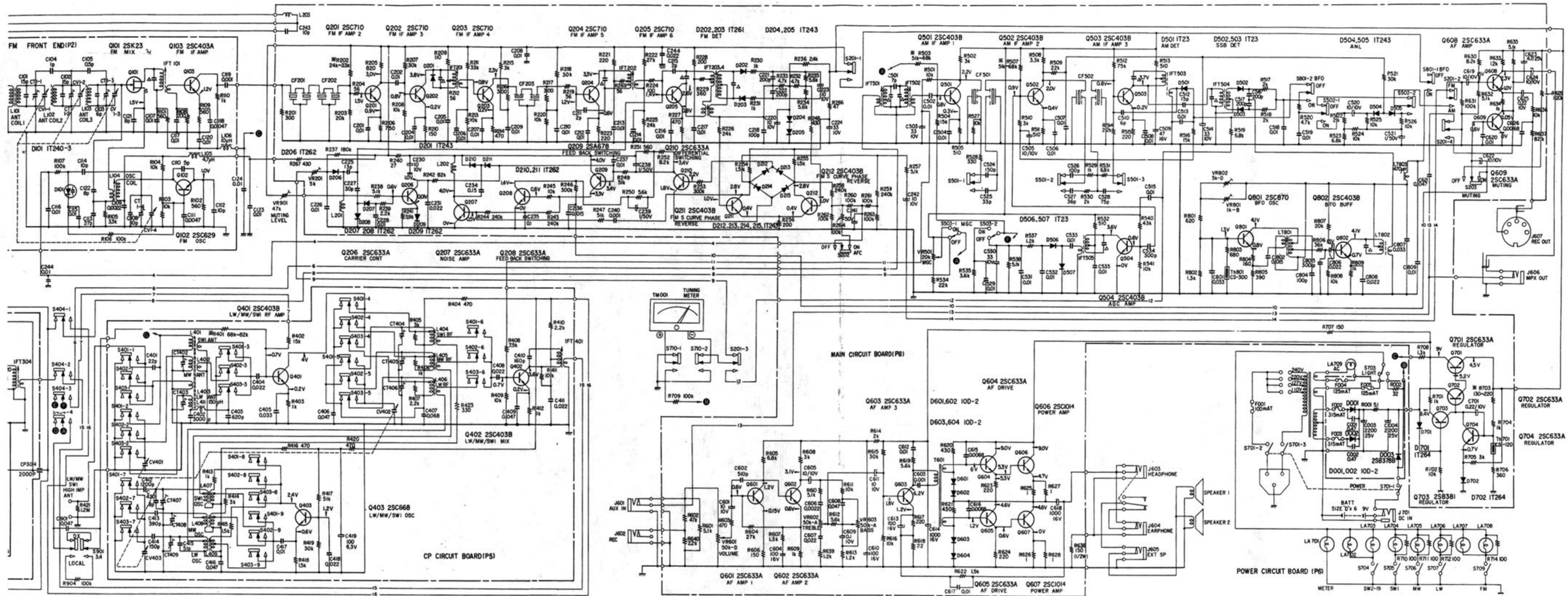


Fig. 4-11

<u>Position</u>	<u>Switch</u>	<u>Function</u>	<u>Position</u>
FM	S701	POWER	OFF
ON			
ON	S703	LIGHT	OFF (ON with ac power source)
OFF	S704	LIGHT	
OFF	S709		built in band selector
OFF	S710	BATTERY CHECK	ON
ON	S801	BFO	OFF
ROAD	S901	SENSITIVITY (LOCAL/DX)	DX
OFF	S902	ROD ANT/EXT ANT	ROD ANT
OFF			

SECTION 5

PACKING AND EXPLODED VIEWS

5-1. PACKING

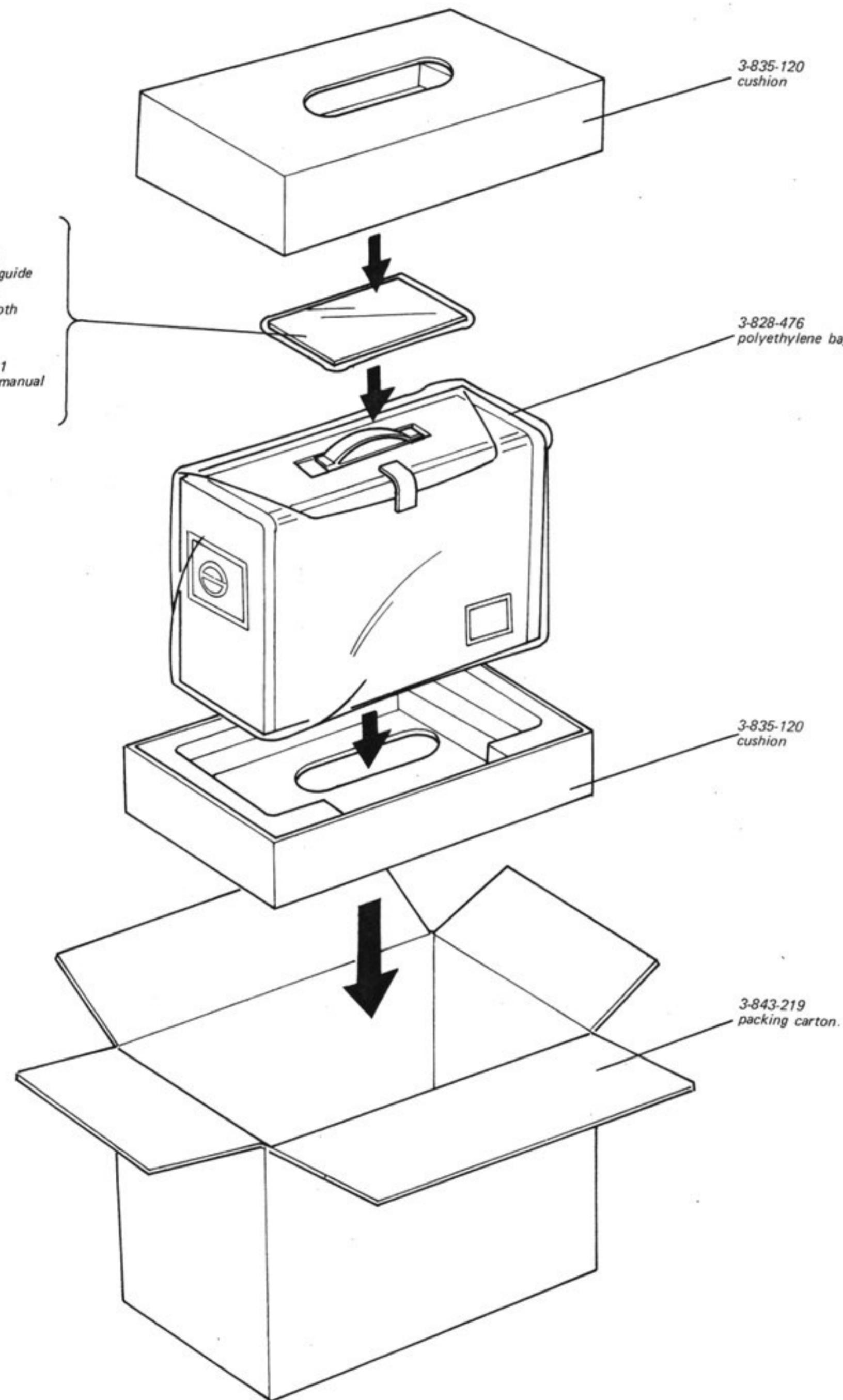


Fig. 5-1.

5-2. EXPLODED VIEW (1)

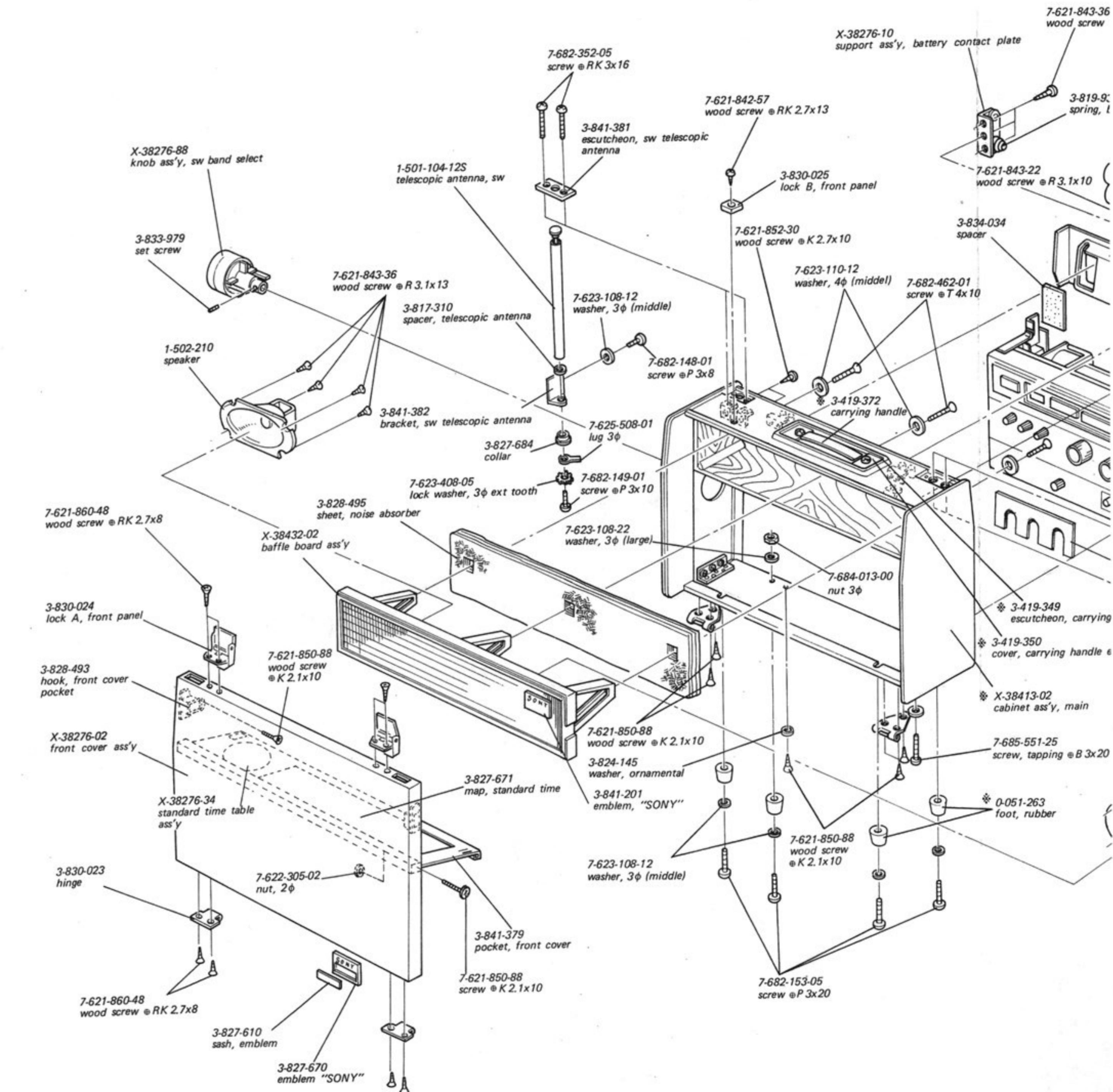
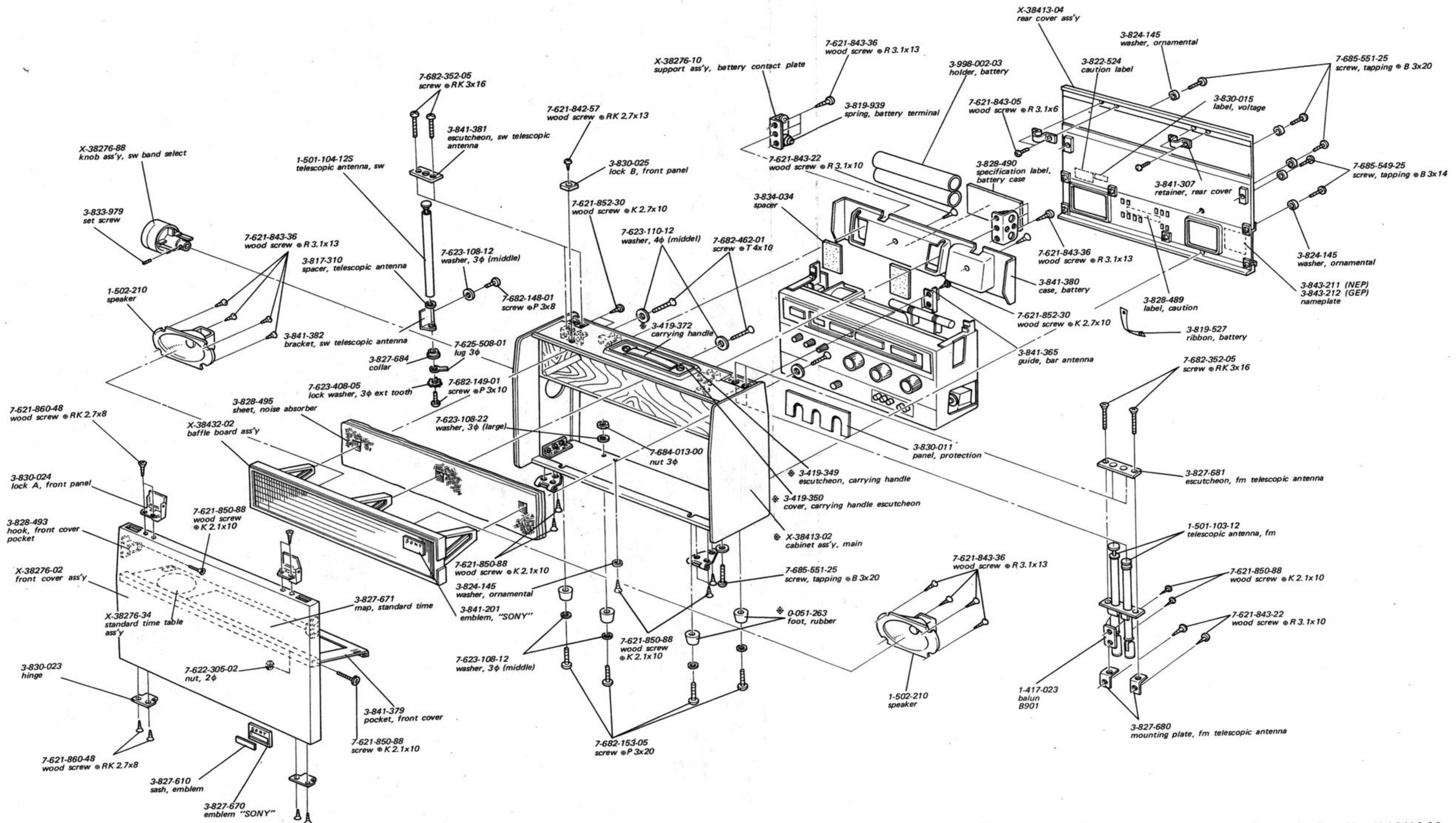


Fig. 5-2.

5-2. EXPLODED VIEW (1)

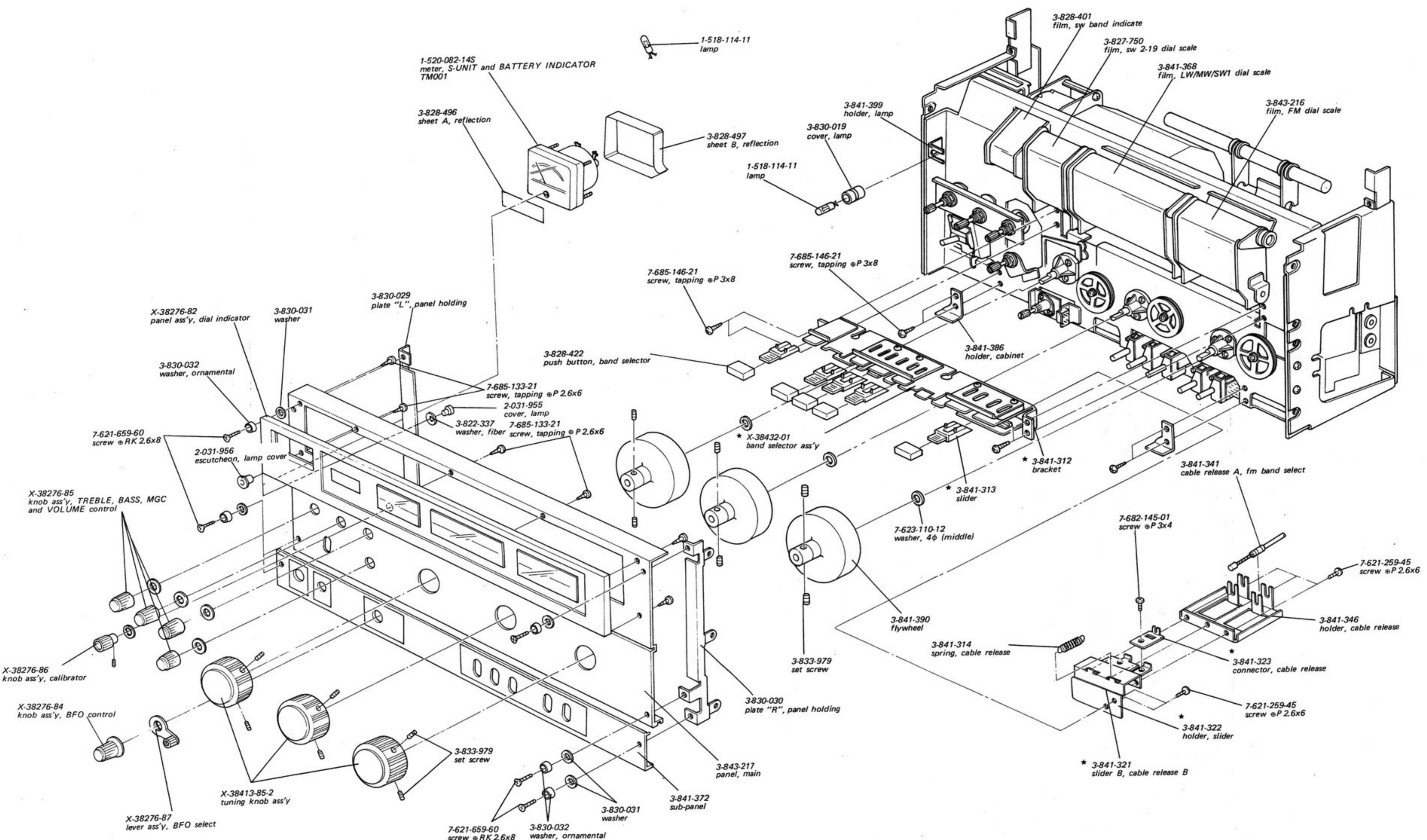


The parts marked **•X•** are included in main cabinet ass'y, Part No. X-38413-02.

Fig. 5-2.

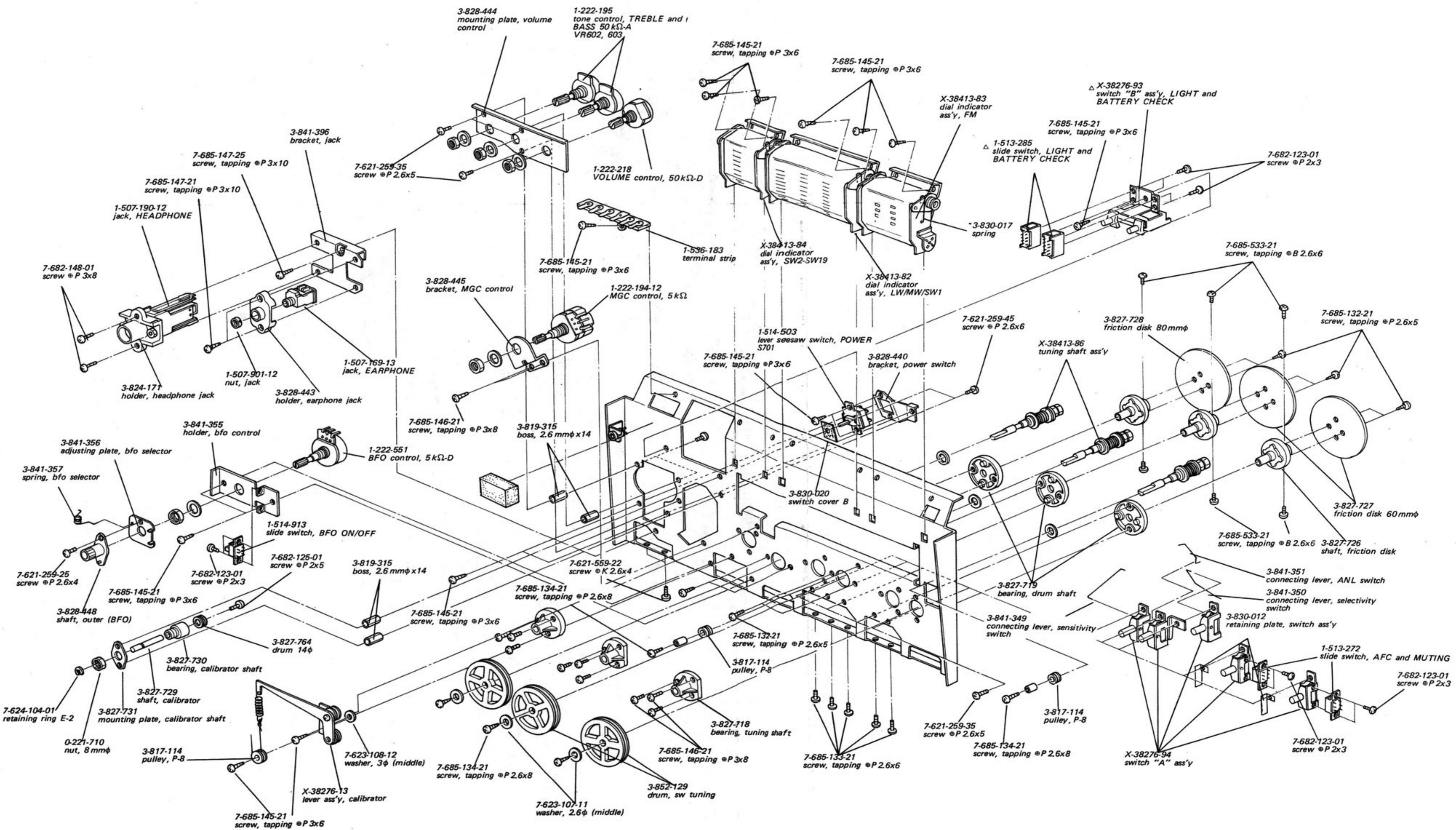
CRF-220 CRF-220

5-3. EXPLODED VIEW (2)



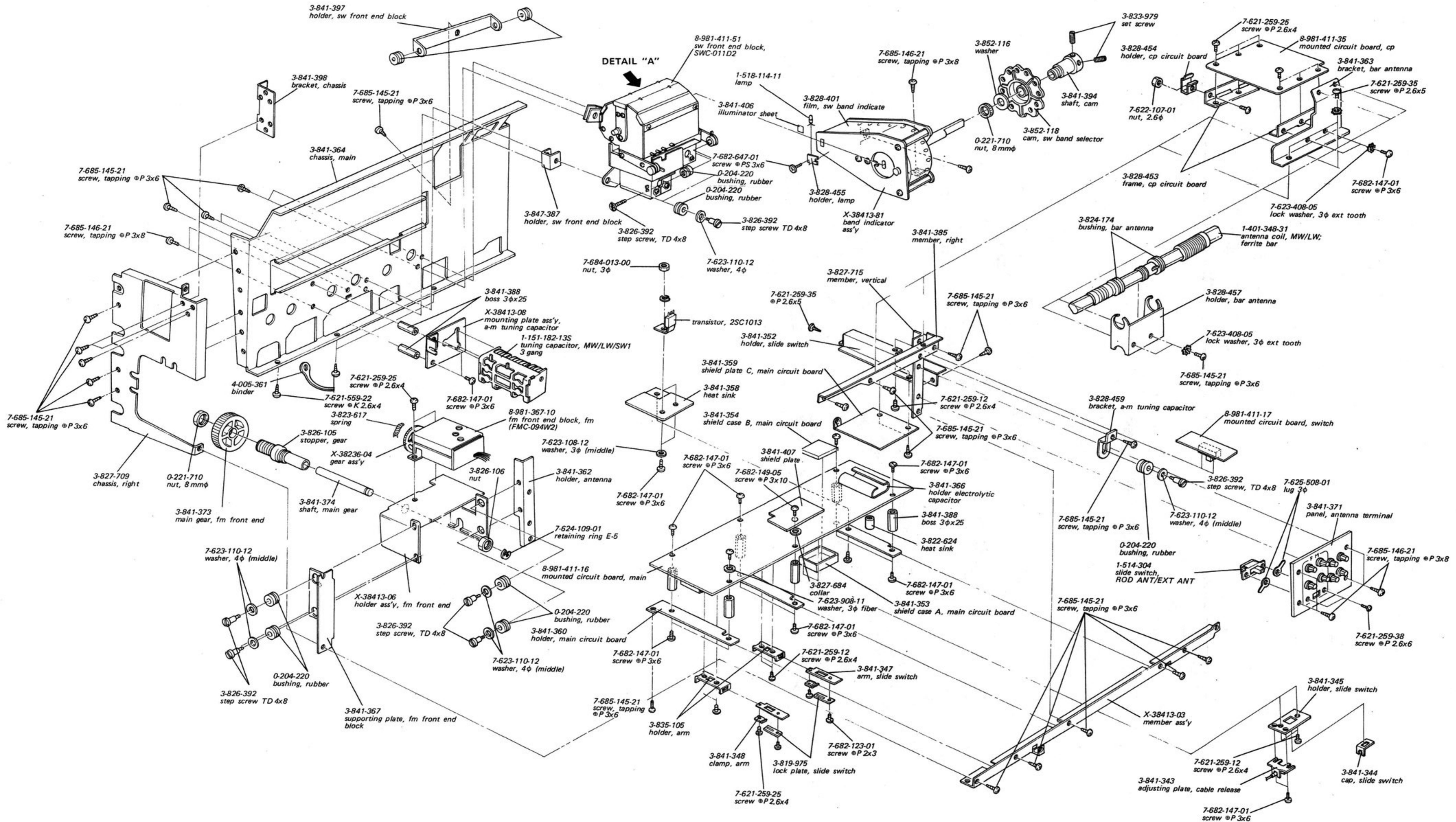
The parts marked ★ are included in band selector ass'y, Part No. X-38432-01-00.

5-4. EXPLODED VIEW (3)

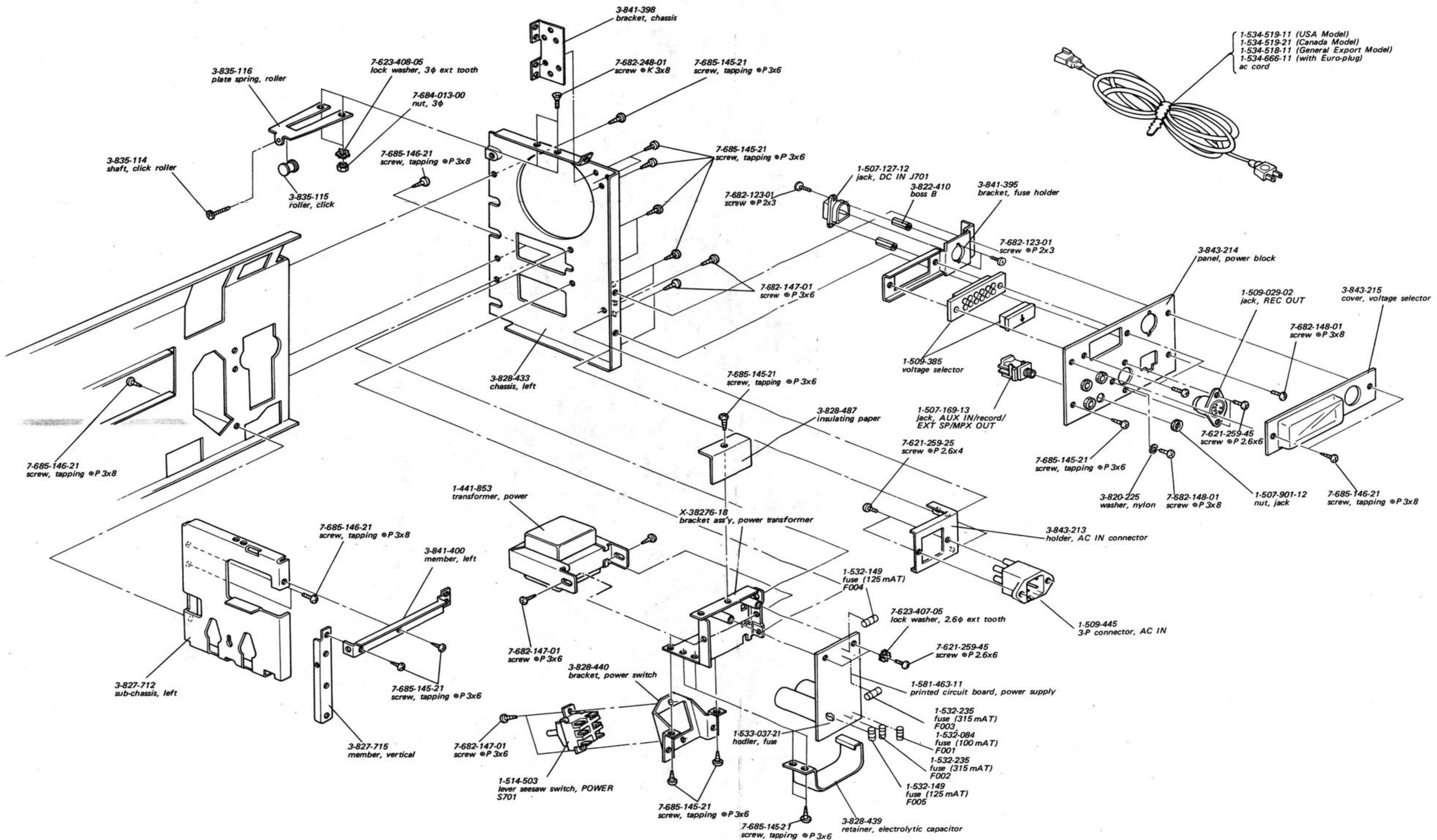


CRF-220 CR F-220

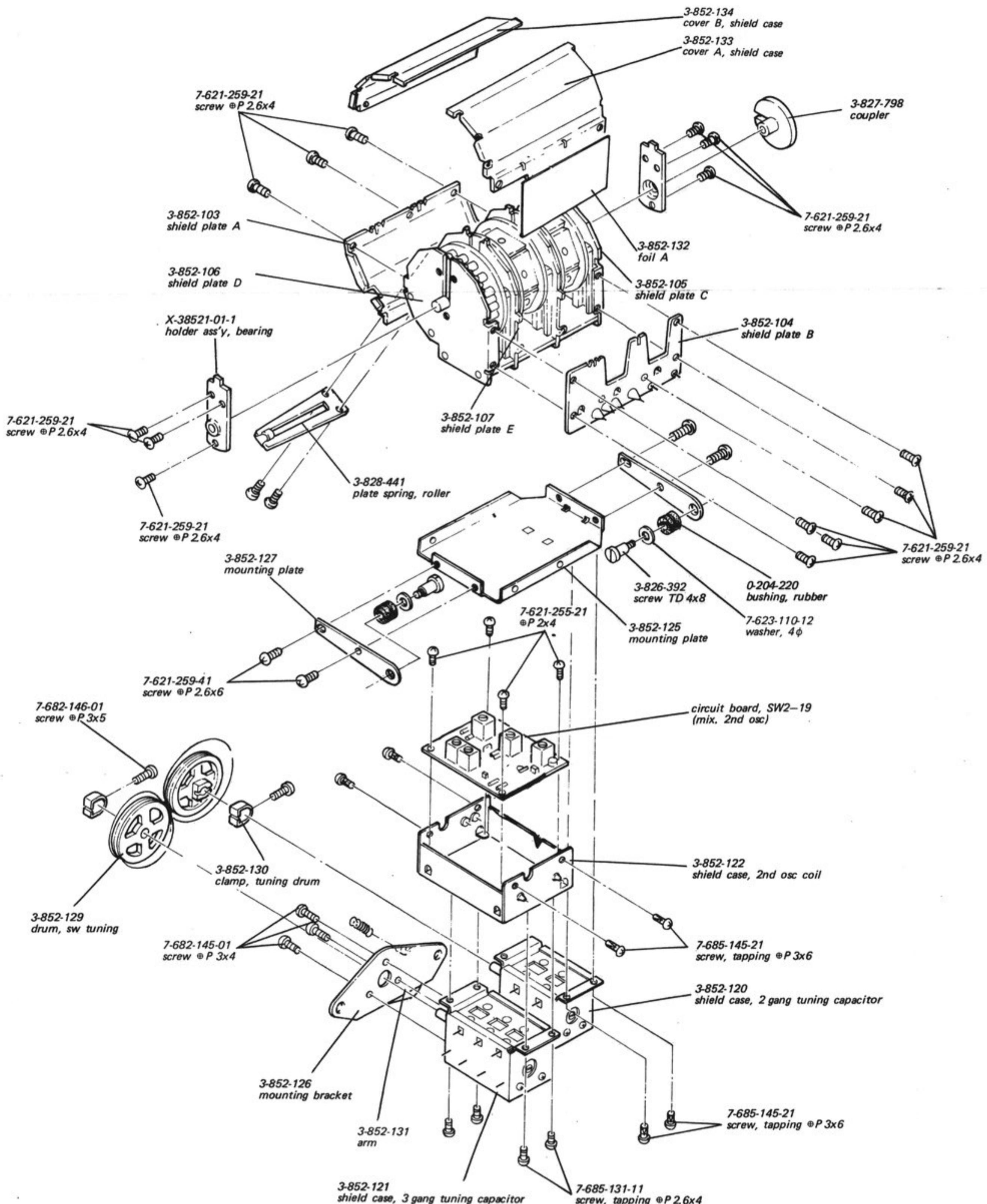
5. EXPLODED VIEW (4)



5-6. EXPLODED VIEW (5)



5-7. EXPLODED VIEW (6)



SECTION 6

ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
SEMICONDUCTORS					
Q101	transistor	2SK23	Q801		transistor 2SC870
Q102	transistor	2SC629	Q802		transistor 2SC403B
Q103	transistor	2SC403A	D001		diode 10D-2
Q201	transistor	2SC710	D002		diode 10D-2
Q202	transistor	2SC710	D003		diode 2SB378E
Q203	transistor	2SC710	D101		diode 1T240-3
Q204	transistor	2SC710	D201		diode 1T243
Q205	transistor	2SC710	D202		diode 1T261
Q206	transistor	2SC633A	D203		diode 1T261
Q207	transistor	2SC633A	D204		diode 1T243
Q208	transistor	2SC633A	D205		diode 1T243
Q209	transistor	2SC678	D206		diode 1T262
Q210	transistor	2SC633A	D207		diode 1T262
Q211	transistor	2SC403B	D208		diode 1T262
Q212	transistor	2SC403B	D209		diode 1T262
			D210		diode 1T262
			D211		diode 1T262
Q301	transistor	2SK23	D212		diode 1T243
Q302	transistor	2SK23	D213		diode 1T243
Q303	transistor	2SC633A	D214		diode 1T243
Q304	transistor	2SC668	D215		diode 1T243
Q305	transistor	2SC403B	D301		diode 1S1555
Q306	transistor	2SC403B	D302		diode 1S1555
Q307	transistor	2SC403B	D501		diode 1T23
Q308	transistor	2SC403B	D502		diode 1T23
			D503		diode 1T23
Q401	transistor	2SC403B	D504		diode 1T243
Q402	transistor	2SC403B	D505		diode 1T243
Q403	transistor	2SC668	D506		diode 1T23
			D507		diode 1T23
Q501	transistor	2SC403B	D601		diode 10D-2
Q502	transistor	2SC403B	D602		diode 10D-2
Q503	transistor	2SC403B	D603		diode 10D-2
Q504	transistor	2SC403B	D604		diode 10D-2
			D701		diode 1T264
Q601	transistor	2SC633A	D702		diode 1T264
Q602	transistor	2SC633A	Th701		thermistor CS-120
Q603	transistor	2SC633A	Th801		thermistor CS-300
Q604	transistor	2SC633A			
Q605	transistor	2SC633A			
Q606	transistor	2SC1014			
Q607	transistor	2SC1014			
Q608	transistor	2SC633A			
Q609	transistor	2SC633A			
			COILS AND TRANSFORMERS		
Q701	transistor	2SC352A	L101	1-425-526	ant coil 1, FM
Q702	transistor	2SC633A	L102	1-425-525	ant coil 2, FM
Q703	transistor	2SB381			
Q704	transistor	2SC633A			

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
L103	1-425-525	ant coil 3, FM	L407	1-405-484	osc coil, SW1
L104	1-405-386	osc coil, FM	L408	1-405-357	osc coil, MW
L105	1-407-186	4.7 μ H, FM	L409	1-405-358	osc coil, LW
L106	1-407-190	10 μ H, FM	L410	1-425-445	transformer, AM i-f
L201	1-407-177	470 μ H, micro inductor	L411	1-407-171	150 μ H, micro inductor
L202	1-407-177	470 μ H, micro inductor	LT801	1-405-450	osc coil, bfo
L203	1-425-740-00	inductor	LT802	1-403-128	output coil, bfo
L301	1-401-463	ant coil, SW2 ~ SW4	LT803	1-407-177	470 μ H, micro inductor
L302	1-401-341	ant coil, SW5 ~ SW7	IFT101	1-403-294	transformer, FM i-f
L303	1-401-342	ant coil, SW8 ~ SW10	IFT201	1-403-244-31	transformer, FM i-f
L304	1-401-343	ant coil, SW11 ~ SW13	IFT202	1-403-244-31	transformer, FM i-f
L305	1-401-345	ant coil, SW14 ~ SW16	IFT203	1-403-272-31	transformer, FM discriminator
L306	1-401-345	ant coil, SW17 ~ SW19	IFT204	1-403-273-31	transformer, FM discriminator
L307	1-425-680	rf coil, SW2 ~ SW4	IFT301	1-425-434	transformer, SW 1st i-f
L308	1-425-429	rf coil, SW5 ~ SW7	IFT302	1-425-434	transformer, SW 1st i-f
L309	1-425-430	rf coil, SW8 ~ SW10	IFT303	1-403-812	transformer, SW 1st i-f
L310	1-425-431	rf coil, SW11 ~ SW13	IFT304	1-403-812	transformer, SW 1st i-f
L311	1-425-433	rf coil, SW14 ~ SW16	IFT501	1-403-139	transformer, AM i-f
L312	1-425-433	rf coil, SW17 ~ SW19	IFT502	1-403-139	transformer, AM i-f
L317	1-405-352	osc coil, SW 2nd	IFT503	1-403-128	transformer, AM i-f
L318	1-407-177	470 μ H, micro inductor	IFT504	1-403-135	transformer, AM i-f
L319	1-407-177	470 μ H, micro inductor	IFT505	1-403-128	transformer, AM i-f
L320	1-407-177	470 μ H, micro inductor	CF201	1-527-501	ceramic filter, FM i-f
L321	1-407-177	470 μ H, micro inductor	CF202	1-527-501	ceramic filter, FM i-f
L322	1-407-177	470 μ H, micro inductor	CF203	1-527-501	ceramic filter, FM i-f
L323	1-407-184	3.3 μ H, micro inductor	CF501	1-403-161-13	ceramic filter, AM i-f
L324	1-405-334	osc coil, SW2	CF502	1-403-161-13	ceramic filter, AM i-f
L325	1-405-335	osc coil, SW3	B901	1-417-023	balun
L326	1-405-336	osc coil, SW4	B902	1-417-014	balun
L327	1-405-337	osc coil, SW5	T601	1-423-114	transformer, driver
L328	1-405-338	osc coil, SW6	T701	1-441-853	transformer, power
L329	1-405-339	osc coil, SW7	CAPACITORS		
L330	1-405-340	osc coil, SW8	All fixed capacitors are in μ F except as specified with p, which means $\mu\mu$ F.		
L331	1-405-341	osc coil, SW9	CV1-1~1-4)	1-151-223-12	tuning capacitor, FM
L332	1-405-342	osc coil, SW10	CT1-1~1-4		
L333	1-405-343	osc coil, SW11	CV301, 302	1-151-214	tuning capacitor, SW 2 gang
L334	1-405-344	osc coil, SW12	CV303~305	1-151-168	tuning capacitor, SW 3 gang
L335	1-405-345	osc coil, SW13	CV401~403	1-151-182-13S	tuning capacitor, MW/LW/SW1 3 gang
L336	1-405-346	osc coil, SW14			
L337	1-405-347	osc coil, SW15			
L338	1-405-348	osc coil, SW16			
L339	1-405-349	osc coil, SW17			
L340	1-405-350	osc coil, SW18			
L341	1-405-351	osc coil, SW19			
L401	1-401-467	ant coil, SW1			
L402)	1-401-348-31	ant coil, MW/LW ferrite bar			
L403					
L404	1-425-684	rf coil, SW1			
L405	1-425-685	rf coil, MW			
L406	1-425-444	rf coil, LW			

<i>Ref. No.</i>	<i>Part No.</i>	<i>Description</i>		<i>Ref. No.</i>	<i>Part No.</i>	<i>Description</i>	
CT301	1-141-097	capacitor, trimmer	(10 p)	C004	1-121-389-21	2,200	25 V electrolytic
CT302	1-141-097	capacitor, trimmer	(10 p)	C101	1-101-861	15 p	ceramic
CT303	1-141-097	capacitor, trimmer	(10 p)	C102	1-101-861	15 p	ceramic
CT304	1-141-078	capacitor, trimmer	(16 p)	C103	1-101-956	6 p	ceramic
CT305	1-141-078	capacitor, trimmer	(16 p)	C104	1-101-937	1 p	ceramic
CT306	1-141-095	capacitor, trimmer	(16 p)	C105	1-101-936	0.5 p	ceramic
CT307	1-141-078	capacitor, trimmer	(16 p)	C106	-----		
CT308	1-141-078	capacitor, trimmer	(16 p)	C107	1-101-072	0.01	ceramic
CT309	1-141-080	capacitor, trimmer	(10 p)	C108	1-102-508	10 p	ceramic
CT310	1-141-078	capacitor, trimmer	(16 p)	C109	1-102-121	0.0022	ceramic
CT311	1-141-078	capacitor, trimmer	(16 p)	C110	1-102-864	5 p	ceramic
CT312	1-141-080	capacitor, trimmer	(10 p)	C111	1-102-090	0.0047	ceramic
CT313	1-141-078	capacitor, trimmer	(16 p)	C112	1-102-508	10 p	ceramic
CT314	1-141-078	capacitor, trimmer	(16 p)	C113	1-101-869	27 p	ceramic
CT315	1-141-080	capacitor, trimmer	(10 p)	C114	1-101-976	10 p	ceramic
CT316	1-141-078	capacitor, trimmer	(16 p)	C115	1-101-072	0.01	ceramic
CT317	1-141-079	capacitor, trimmer	(10 p)	C116	1-101-072	0.01	ceramic
CT318	1-141-080	capacitor, trimmer	(10 p)	C117	1-101-072	0.01	ceramic
CT319	1-141-079	capacitor, trimmer	(10 p)	C118	1-105-829-12	0.0047	mylar
CT320	1-141-079	capacitor, trimmer	(10 p)	C119	1-101-918	0.001	ceramic
CT321	1-141-080	capacitor, trimmer	(10 p)	C120	1-101-072	0.01	ceramic
CT322	1-141-078	capacitor, trimmer	(16 p)	C121	1-101-958	8 p	ceramic
CT323	1-141-078	capacitor, trimmer	(16 p)	C122	1-101-958	8 p	ceramic
CT324	1-141-095	capacitor, trimmer	(16 p)	C123	1-101-072	0.01	ceramic
CT325	1-141-078	capacitor, trimmer	(16 p)	C124	1-101-072	0.01	ceramic
CT326	1-141-078	capacitor, trimmer	(16 p)	C201	1-105-673-12	0.01	mylar
CT327	1-141-080	capacitor, trimmer	(10 p)	C202	1-105-673-12	0.01	mylar
CT328	1-141-078	capacitor, trimmer	(16 p)	C203	-----		
CT329	1-141-078	capacitor, trimmer	(16 p)	C204	1-105-673-12	0.01	mylar
CT330	1-141-080	capacitor, trimmer	(10 p)	C205	1-105-673-12	0.01	mylar
CT331	1-141-078	capacitor, trimmer	(16 p)	C206	1-105-673-12	0.01	mylar
CT332	1-141-078	capacitor, trimmer	(16 p)	C207	1-105-673-12	0.01	mylar
CT333	1-141-080	capacitor, trimmer	(10 p)	C208	1-105-673-12	0.01	mylar
CT334	1-141-078	capacitor, trimmer	(16 p)	C209	1-105-673-12	0.01	mylar
CT335	1-141-079	capacitor, trimmer	(10 p)	C210	1-105-673-12	0.01	mylar
CT336	1-141-080	capacitor, trimmer	(10 p)	C211	1-102-939	2 p	ceramic
CT337	1-141-079	capacitor, trimmer	(10 p)	C212	1-105-673-12	0.01	mylar
CT338	1-141-079	capacitor, trimmer	(10 p)	C213	1-105-673-12	0.01	mylar
CT339	1-141-080	capacitor, trimmer	(10 p)	C214	1-105-673-12	0.01	mylar
CT401		-----		C215	1-102-939	2 p	ceramic
CT402	1-141-135	capacitor, trimmer	(30 p)	C216	1-105-673-12	0.01	mylar
CT403	1-141-135	capacitor, trimmer	(30 p)	C217	1-105-673-12	0.01	mylar
CT404	1-141-135	capacitor, trimmer	(30 p)	C218	1-107-085	100 p	silvered mica
CT405	1-141-135	capacitor, trimmer	(30 p)	C219	-----		
CT406	1-141-135	capacitor, trimmer	(30 p)	C220	1-121-469	10	10 V electrolytic
CT407	1-141-135	capacitor, trimmer	(30 p)	C221	1-107-092	200 p	silvered mica
CT408	1-141-135	capacitor, trimmer	(30 p)	C222	1-107-092	200 p	silvered mica
CT409	1-141-135	capacitor, trimmer	(30 p)	C223	1-121-469	10	10 V electrolytic
C001	1-105-881-12	0.47	mylar	C224	1-121-402	33	10 V electrolytic
C002	1-105-881-12	0.47	mylar	C225	1-102-950	13 p	ceramic
C003	1-121-389-21	2,200	25 V	C226	1-105-673-12	0.01	mylar

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>			<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		
C227	1-102-962	30p		ceramic	C335	1-101-924	0.02		ceramic
C228	1-105-673-12	0.01		mylar	C336	1-101-923	0.01		ceramic
C229		-----			C337	1-101-924	0.02		ceramic
C230	1-121-469	10	10V	electrolytic	C338	1-101-924	0.02		ceramic
C231	1-105-677-12	0.022		mylar	C339	1-101-924	0.02		ceramic
C232		-----			C340	1-107-074	36p		silvered mica
C233		-----			C341	1-103-619	560p		styrol
C234	1-105-687-12	0.15		mylar	C342	1-107-093	220p		silvered mica
C235	1-105-685-12	0.1		mylar	C343	1-107-085	100p		silvered mica
C236	1-105-675-12	0.015		mylar	C344	1-107-082	75p		silvered mica
C237	1-105-673-12	0.01		mylar	C345	1-107-081	68p		silvered mica
C238	1-121-391	1	50V	electrolytic	C346	1-107-076	43p		silvered mica
C239	1-121-391	1	50V	electrolytic	C347	1-107-081	68p		silvered mica
C240	1-105-661-12	0.001		mylar	C348	1-107-082	75p		silvered mica
C241	1-121-391	1	50V	electrolytic	C349	1-107-074	36p		silvered mica
C242	1-121-469	10	10V	electrolytic	C350	1-107-069	22p		silvered mica
C243	1-102-508	10p		ceramic	C351	1-107-069	22p		silvered mica
C244	1-101-072	0.01		ceramic	C352	1-107-073	33p		silvered mica
					C353	1-107-081	68p		silvered mica
C301	1-103-619	560p		styrol	C354	1-107-069	22p		silvered mica
C302	1-107-093	220p		silvered mica	C355	1-107-070	24p		silvered mica
C303	1-107-085	100p		silvered mica	C356	1-107-064	13p		silvered mica
C304	1-107-082	75p		silvered mica	C357		-----		
C305	1-107-081	68p		silvered mica	C358	1-107-069	22p		silvered mica
C306	1-107-076	43p		silvered mica	C359	1-107-079	56p		silvered mica
C307	1-107-081	68p		silvered mica	C360	1-107-065	15p		silvered mica
C308	1-107-082	75p		silvered mica	C361	1-107-071	27p		silvered mica
C309	1-107-074	36p		silvered mica	C362	1-107-063	12p		silvered mica
C310	1-107-069	22p		silvered mica	C363		-----		
C311	1-107-069	22p		silvered mica	C364	1-107-065	15p		silvered mica
C312	1-107-073	33p		silvered mica	C365	1-107-074	36p		silvered mica
C313	1-107-081	68p		silvered mica	C366	1-107-062	11p		silvered mica
C314	1-107-069	22p		silvered mica	C367	1-107-061	10p		silvered mica
C315	1-107-070	24p		silvered mica	C368	1-107-061	10p		silvered mica
C316	1-107-064	13p		silvered mica	C369	1-107-106	9p		silvered mica
C317		-----			C370	1-107-061	10p		silvered mica
C318	1-107-069	22p		silvered mica	C371	1-107-106	9p		silvered mica
C319	1-107-079	56p		silvered mica	C372	1-107-104	7p		silvered mica
C320	1-107-065	15p		silvered mica	C373	1-107-105	8p		silvered mica
C321	1-107-071	27p		silvered mica	C374	1-107-104	7p		silvered mica
C322	1-107-063	12p		silvered mica	C375	1-101-923	0.01		ceramic
C323		-----			C376	1-107-090	160p		silvered mica
C324	1-107-065	15p		silvered mica	C377	1-107-086	110p		silvered mica
C325	1-107-074	36p		silvered mica	C378	1-107-083	82p		silvered mica
C326	1-107-062	11p		silvered mica	C379	1-107-083	82p		silvered mica
C327	1-107-061	10p		silvered mica	C380	1-107-083	82p		silvered mica
C328	1-107-061	10p		silvered mica	C381	1-107-082	75p		silvered mica
C329	1-107-106	9p		silvered mica	C382	1-107-082	75p		silvered mica
C330	1-107-061	10p		silvered mica	C383	1-107-080	62p		silvered mica
C331	1-107-105	8p		silvered mica	C384	1-107-080	62p		silvered mica
C332	1-107-104	7p		silvered mica	C385	1-107-080	62p		silvered mica
C333	1-107-105	8p		silvered mica	C386	1-107-079	56p		silvered mica
C334	1-107-104	7p		silvered mica	C387	1-107-079	56p		silvered mica

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C388	1-107-079	56 p	silvered mica	C418	1-105-837-12	0.022	mylar
C389	1-107-078	51 p	silvered mica	C419	1-121-413	100	6.3 V electrolytic
C390	1-107-078	51 p	silvered mica	C420	1-107-105	8 p	silvered mica
C391	1-107-078	51 p	silvered mica	C501	1-102-944	7 p	ceramic
C392	1-107-077	47 p	silvered mica	C502	1-105-673-12	0.01	mylar
C393	1-107-073	33 p	silvered mica	C503	1-121-402	33	10 V electrolytic
C394	1-105-673-12	0.01	mylar	C504	1-105-673-12	0.01	mylar
C395	1-103-601	100 p	styrol	C505	1-121-469	10	10 V electrolytic
C396	1-102-871	43 p	ceramic	C506	1-105-673-12	0.01	mylar
C397	1-103-612	300 p	styrol	C507	1-105-673-12	0.01	mylar
C398	1-107-101	4 p	silvered mica	C508	1-105-673-12	0.01	mylar
C399	1-105-673-12	0.01	mylar	C509	1-121-409	47	16 V electrolytic
C1301	1-101-918	0.001	ceramic	C510	1-102-943	6 p	ceramic
C1302	1-105-673-12	0.01	mylar	C511	-----		
C1303	1-105-673-12	0.01	mylar	C512	1-102-951	15 p	ceramic
C1304	1-107-096	300 p	silvered mica	C513	1-105-673-12	0.01	mylar
C1305	1-107-078	51 p	silvered mica	C514	1-121-402	33	10 V electrolytic
C1306	1-105-673-12	0.01	mylar	C515	1-105-673-12	0.01	mylar
C1307	1-107-061	10 p	silvered mica	C516	1-107-092	200 p	silvered mica
C1308	1-105-673-12	0.01	mylar	C517	1-107-092	200 p	silvered mica
C1309	1-105-673-12	0.01	mylar	C518	1-105-673-12	0.01	mylar
C1310	1-101-923	0.01	ceramic	C519	1-105-673-12	0.01	mylar
C1311	1-101-923	0.01	ceramic	C520	1-121-469	10	10 V electrolytic
C1312	1-107-069	22 p	silvered mica	C521	1-121-391	1	50 V electrolytic
C1313	1-107-098	1 p	silvered mica	C522	-----		
C1314	1-107-070	24 p	silvered mica	C523	-----		
C1315	1-107-085	100 p	silvered mica	C524	1-107-089	150 p	silvered mica
C1316	1-105-673-12	0.01	mylar	C525	1-107-073	33 p	silvered mica
C1317	1-105-673-12	0.01	mylar	C526	1-107-085	100 p	silvered mica
C1318	1-103-607	180 p	styrol	C527	1-107-074	36 p	silvered mica
C1319	1-107-100	3 p	silvered mica	C528	1-107-082	75 p	silvered mica
C1320	1-103-607	180 p	styrol	C529	1-105-673-12	0.01	mylar
C1321	1-105-837-12	0.022	mylar	C530	1-121-402	33	10 V electrolytic
C1322	1-121-425	470	10 V	C531	1-105-673-12	0.01	mylar
C401	1-107-069	22 p	silvered mica	C532	1-105-673-12	0.01	mylar
C402	1-103-636	3,000 p	styrol	C533	1-105-673-12	0.01	mylar
C403	1-103-620	620 p	styrol	C534	1-107-096	300 p	silvered mica
C404	1-105-837-12	0.022	mylar	C535	1-105-673-12	0.01	mylar
C405	1-105-839-12	0.033	mylar	C601	1-121-469	10	10 V electrolytic
C406	1-105-841-12	0.047	mylar	C602	1-107-235	510 p	silvered mica
C407	1-105-843-12	0.068	mylar	C603	1-105-661-12	0.001	mylar
C408	1-105-837-12	0.022	mylar	C604	1-121-415	100	16 V electrolytic
C409	1-105-841-12	0.047	mylar	C605	1-121-469	10	10 V electrolytic
C410	1-103-606	160 p	styrol	C606	1-105-665-12	0.0022	mylar
C411	1-105-837-12	0.022	mylar	C607	1-105-677-12	0.022	mylar
C412	1-103-627	1,200 p	styrol	C608	1-105-681-12	0.047	mylar
C413	1-103-615	390 p	styrol	C609	1-127-019	0.1	10 V solid aluminum
C414	1-107-089	150 p	silvered mica	C610	1-121-415	100	16 V electrolytic
C415	1-101-882	51 p	ceramic	C611	1-121-469	10	10 V electrolytic
C416	1-105-841-12	0.047	mylar	C612	1-105-673-12	0.01	mylar
C417	1-105-833-12	0.01	mylar	C613	1-121-415	100	16 V electrolytic

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>			<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		
C614	1-121-245	1,000	16V	electrolytic	R108	1-208-088	200 k	1/16W	ceramic
C615	1-105-671-12	0.0068		mylar	R109	1-208-027	560	1/16W	ceramic
C616	1-105-671-12	0.0068		mylar	R110	1-208-033	1 k	1/16W	ceramic
C617	1-105-673-12	0.01		mylar	R201	1-244-660	300		
C618	1-121-245	1,000	16V	electrolytic	R202	1-244-706	24 k		
C619	1-121-469	10	10V	electrolytic		1-244-707	27 k		
C620	1-105-673-12	0.01		mylar		1-244-708	30 k		
C621	1-105-681-12	0.047		mylar		1-244-709	33 k		
C622	1-121-469	10	10V	electrolytic		R203	1-244-704	20 k	
C623	1-121-395	4.7	25V	electrolytic	R204	1-244-643	56		
C624	1-121-469	10	10V	electrolytic	R205	1-244-671	820		
C625	1-127-020	0.22	10V	solid aluminum	R206	1-244-670	750		
C626	1-105-671-12	0.0068		mylar	R207	1-244-708	30 k		
C701	1-127-020	0.22	10V	solid aluminum	R208	1-244-697	10 k		
C801	1-105-679-12	0.033		mylar	R209	1-244-650	110		
C802	1-105-675-12	0.015		mylar	R210	1-244-653	150		
C803	-----				R211	1-244-709	33 k		
C804	1-101-914	100p		ceramic	R212	1-244-643	56		
C805	1-107-096	300p		silvered mica	R213	1-244-697	10 k		
C806	1-105-677-12	0.022		mylar	R214	1-244-665	470		
C807	1-105-679-12	0.033		mylar	R215	1-244-684	3 k		
C808	1-105-677-12	0.022		mylar	R216	1-244-660	300		
C809	1-105-673-12	0.01		mylar	R217	1-244-660	300		
C901	1-105-841-12	0.047		mylar	R218	1-244-708	30 k		
CP301~305	1-101-799	2,000p		ceramic	R219	1-244-643	56		
HT301~304	1-535-036	hermetic terminal			R220	1-244-697	10 k		
RESISTORS									
All fixed resistors are in Ω , $\frac{1}{4}W$, $\pm 5\%$ carbon film type unless otherwise noted.									
VR201	1-221-635	adjustable resistor, 5 k Ω			R221	1-244-657	220		
VR501	1-222-194-12	MGC control, 20 k Ω -B			R222	1-244-707	27 k		
VR601	1-222-218	VOLUME control, 50 k Ω -D			R223	1-244-657	220		
VR602	1-222-195	tone control, TREBLE 50 k Ω -A			R224	1-244-649	100		
VR603	1-222-195	tone control, BASS 50 k Ω -A			R225	1-244-706	24 k		
VR801	1-221-634-12	adjustable resistor, 1 k Ω -B			R226	1-244-706	24 k		
VR802	1-222-551	BFO control, 5 k Ω -D			R227	1-244-665	470		
VR901	1-222-985	adjustable resistor, MUTING level			R228	1-244-656	200		
R101	1-208-027	560	1/16W	ceramic	R229	1-244-662	360		
R102	1-208-027	560	1/16W	ceramic	R230	1-244-673	1 k		
R103	1-244-697	10 k			R231	1-244-673	1 k		
R104	1-244-697	10 k			R232	1-244-689	4.7 k		
R105	1-208-045	3.3 k	1/16W	ceramic	R233	1-244-689	4.7 k		
R106	1-208-145	100 k	1/16W	ceramic	R234	1-244-691	5.6 k		
R107	1-208-145	100 k	1/16W	ceramic	R235	1-244-691	5.6 k		
					R236	1-244-684	2.4 k		
					R237	1-244-727	180 k		
					R238	1-244-690	5.1 k		
					R239	1-244-681	2.2 k		
					R240	1-244-635	27		
					R241	1-244-687	3.9 k		
					R242	1-244-719	82 k		
					R243	1-244-730	240 k		
					R244	1-244-730	240 k		
					R245	1-244-697	10 k		
					R246	1-244-732	300 k		

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R247	1-244-714	51 k				1-242-717	68 k
R248	1-244-664	430		✳ R401		1-242-718	75 k
R249	1-244-714	51 k				1-242-719	82 k
R250	1-244-691	5.6 k		R402	1-242-701	15 k	
R251	1-244-667	560		R403	1-242-673	1 k	
R252	1-244-695	8.2 k		R404	1-242-665	470	
R253	1-244-732	300 k		R405	1-242-684	3 k	
R254	1-244-677	1.5 k		R406	1-242-673	1 k	
R255	1-244-677	1.5 k		R407	1-242-681	2.2 k	
R256	1-244-656	200		R408	1-242-694	7.5 k	
R257	1-244-690	5.1 k		R409	1-242-697	10 k	
R258	1-244-730	240 k		R410	1-242-681	2.2 k	
R259	1-244-730	240 k		R411	1-242-697	10 k	
R260	1-244-721	100 k		R412	1-242-673	1 k	
R261	1-244-721	100 k		R413	1-242-673	1 k	
R262	1-244-721	100 k		R414	1-242-684	3 k	
R263	1-244-721	100 k		R415	1-242-677	1.5 k	
R264	1-244-721	100 k		R416	1-242-665	470	
R265	-----			R417	1-242-714	51 k	
R266	1-244-641	47		R418	1-242-677	1.5 k	
R267	1-244-664	430		R419	1-242-708	30 k	
R268	-----			R420	1-242-665	470	
R269	1-244-643	56		R421	1-202-647	1.2 M	$\frac{1}{2}$ W
					1-244-684	3 k	composition
					1-244-685	3.3 k	
R301	1-202-647	1.2 M	$\frac{1}{2}$ W		1-244-686	3.6 k	
R302	1-244-703	18 k		✳ R422	1-244-687	3.9 k	
R303	1-244-713	47 k			1-244-688	4.3 k	
R304	1-244-690	5.1 k			1-244-689	4.7 k	
R305	1-244-703	18 k			1-244-690	5.1 k	
R306	1-244-724	130 k		R423	1-244-661	330	
R307	-----						
R308	1-244-685	3.3 k		R501	1-244-697	10 k	
R309	1-244-684	3 k		R502	1-244-684	3 k	
R310	1-244-693	6.8 k			1-244-714	51 k	
R311	1-244-683	2.7 k		✳ R503	1-244-715	56 k	
R312	1-244-649	100			1-244-716	62 k	
R313	1-244-693	6.8 k			1-244-717	68 k	
R314	1-244-680	2 k		R504	1-244-701	15 k	
R315	1-244-684	3 k		R505	1-244-666	510	
R316	1-244-653	150		R506	-----		
R317	1-244-690	5.1 k			1-244-714	51 k	
R318	1-244-705	22 k		✳ R507	1-244-715	56 k	
R319	1-244-656	200			1-244-716	62 k	
R320	1-244-680	2 k			1-244-717	68 k	
R321	1-244-715	56 k		R508	1-244-685	3.3 k	
R322	1-244-715	56 k		R509	1-244-705	22 k	
R323	1-244-710	36 k		R510	1-244-684	3 k	
R324	1-244-691	5.6 k		R511	1-244-666	510	
R325	1-244-673	1 k		R512	1-244-718	75 k	
R326	1-244-656	200		R513	1-244-666	510	
R327	1-244-709	33 k		R514	1-244-705	22 k	
R328	1-244-709	33 k		R515	1-244-657	220	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R516	1-244-701	15 k	R627	1-244-601	1
R517	1-244-680	2 k	R628	1-244-601	1
R518	1-244-680	2 k	R629	1-244-723	120 k
R519	1-244-693	6.8 k	R630	1-244-695	8.2 k
R520	1-244-689	4.7 k	R631	1-244-721	100 k
R521	1-244-708	30 k	R632	1-244-690	5.1 k
R522	1-244-680	2 k	R633	1-244-675	1.2 k
R523	1-244-693	6.8 k	R634	1-244-673	1 k
R524	1-244-697	10 k	R635	1-244-690	5.1 k
R525	1-244-697	10 k	R636	1-244-697	10 k
R526	1-244-697	10 k	R637	1-244-719	82 k
R527	1-244-697	10 k	R638	1-244-853	150 $\frac{1}{2}$ W carbon
R528	1-244-661	330	R639	1-244-675	1.2 k
R529	1-244-673	1 k	R640	1-244-681	2.2 k
R530	1-244-680	2 k			
R531	1-244-693	6.8 k	R701	1-244-673	1 k
R532	1-244-666	510	R702	1-244-702	10 k
R533	-----		* R703	1-244-652	130
R534	1-244-705	22 k		1-244-653	150
R535	1-244-686	3.6 k		1-244-654	160
R536	-----			1-244-655	180
R537	1-244-675	1.2 k		1-244-656	200
R538	1-244-690	5.1 k		1-244-657	220
R539	-----			R704	1-244-673 1 k
R540	1-244-712	43 k		R705	1-244-684 3 k
R541	1-244-697	10 k		R706	1-244-662 360
				R707	1-244-653 150
R601	1-244-690	5.1 k		R708	1-244-676 1.3 k
R602	1-244-713	47 k		R709	1-244-721 100 k
R603	1-244-665	470		R710	1-244-650 110
R604	1-244-707	27 k		R711	1-244-650 110
R605	1-244-693	6.8 k		R712	1-244-650 110
R606	1-244-653	150		R713	1-244-650 110
R607	1-244-676	1.3 k		R714	1-244-650 110
R608	1-244-684	3 k			
R609	1-244-673	1 k		R801	1-244-668 620
R610	1-244-690	5.1 k		R802	1-244-676 1.3 k
R611	1-244-697	10 k		R803	1-244-669 680
R612	1-244-691	5.6 k		R804	1-244-654 160
R613	1-244-675	1.2 k		R805	1-244-663 390
R614	1-244-680	2 k		R806	1-244-710 36 k
R615	1-244-708	30 k		R807	1-244-704 20 k
R616	1-244-697	10 k		R808	1-244-697 10 k
R617	1-244-657	220		R809	1-244-673 1 k
R618	1-244-633	22			
R619	1-244-691	5.6 k		R901	1-244-677 1.5 k
R620	1-244-664	430		R902	1-202-647 1.2 M $\frac{1}{2}$ W composition
R621	1-244-664	430		R903	1-244-683 2.7 k
R622	1-244-677	1.5 k		R904	1-244-721 100 k
R623	1-244-657	220			
R624	1-244-657	220		R001	1-211-001 5.1 1 W carbon
R625	1-244-601	1		R002	1-202-539 39 $\frac{1}{2}$ W composition
R626	1-244-601	1			

* : to be selected

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
MISCELLANEOUS					
1-538-793-12	printed circuit board, FM		S801	1-514-913	slide switch, BFO ON/OFF
1-538-825-11	printed circuit board, G		S901	1-514-673	slide switch, SENSITIVITY
1-538-826-11	printed circuit board, F		S902	1-514-304	slide switch, ROD ANT/EXT ANT
1-538-827-11	printed circuit board, disk E			1-509-385	voltage selector
1-538-828-11	printed circuit board, disk D	SW front end	LA701~709	1-533-037-21	holder, fuse
1-538-829-11	printed circuit board, disk C		TM001	1-518-114-11	lamp
1-538-830-11	printed circuit board, disk B			1-520-082-14S	meter, S-UNIT and BATTERY INDICATOR
1-538-831-11	printed circuit board, disk A			1-536-111	terminal strip
1-581-176-11	printed circuit board, rf			1-536-183	terminal strip
1-581-177-12	printed circuit board, osc		FM TEL ANT	1-501-103-12	telescopic antenna, FM
1-581-165-11	printed circuit board, cp		SW TEL ANT	1-501-104-12S	telescopic antenna, SW
1-581-168-11	printed circuit board, main		SP1	1-502-210	speaker
1-581-166-11	printed circuit board, switch		SP2	1-502-210	speaker
1-581-163-11	printed circuit board, power supply		J601	1-507-169-13	jack, AUX IN
F001	1-532-084	fuse, 100 mAT	J602	1-507-169-13	jack, record
F002	1-532-235	fuse, 315 mAT	J603	1-507-190-12	jack, HEADPHONE
F003	1-532-235	fuse, 315 mAT	J604	1-507-169-13	jack, EARPHONE
F004	1-532-149	fuse, 125 mAT	J605	1-507-169-13	jack, EXT SP
F005	1-532-149	fuse, 125 mAT	J606	1-507-169-13	jack, MPX OUT
S201	1-514-673	slide switch, FM/AM select	J607	1-509-029-02	jack, REC OUT
S202	1-513-272	slide switch, AFC	J701	1-507-127-12	jack, DC IN
S203	1-513-272	slide switch, MUTING		1-507-901-12	nut, jack
S401	1-513-304	slide switch, band selector SW1		1-509-445	connector, AC IN
S402	1-513-304	slide switch, band selector MW		8-981-367-10	FM front end block, FM (FMC-094W)
S403	1-513-304	slide switch, band selector LW		8-981-411-51	SW front end block, SW2~SW19 (SWC-011D2)
S404	1-513-302	slide switch, band selector SW2 ~ SW19		8-981-411-16	mounted circuit board, main
S501	1-513-274	slide switch, SELECTIVITY		8-981-411-35	mounted circuit board, cp
S502	1-513-274	slide switch, ANL		8-981-411-17	mounted circuit board, switch
S503		switch, MGC; built in MGC control (VR501)			
S701	1-514-503	lever seesaw switch, POWER			
S703	1-513-285	slide switch, LIGHT			
S710	1-513-285	slide switch, BATTERY CHECK			
S704 ~ 707)		switch, lamp; built in band selector			
S709					

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