CRF-5100

US Model
Canadian Model
E Model
(for 120 V)

FM-AIR-PSB-SW-MW-LW 10-BAND PORTABLE RADIO

SPECIFICATIONS

Circuit: superheterodyne

Semiconductors: 13 transistors, 12 diodes
7 transistors for auxiliary circuit

Frequency Ranges:

PSB	147 – 174 MHz (2.04 – 1.72 m)
AIR	108 – 136 MHz (2.78 – 2.21 m)
FM	87.5 – 108 MHz (3.43 – 2.78 m)
LW	150 – 400 kHz (2000 – 750 m)
MW	530 – 1,605 kHz (566 – 187 m)
SW1	1.6 – 3.5 MHz (187 – 86 m)
SW2	3.5 – 9.0 MHz (86 – 33 m)
SW3	9.0 – 14.0 MHz (33 – 21 m)
SW4	14.0 – 21.0 MHz (21 – 14 m)
SW5	21.0 – 26.0 MHz (14 – 11 m)

Intermediate Frequencies:

FM/AIR/PSB	10.7 MHz
LW/MW/SW	455 kHz

Antennas:

FM/AIR/ PSB/SW	telescopic antenna or external antenna (impedance 75 Ω)
LW/MW	built-in ferrite bar antenna or external antenna (high impedance)

Sensitivity at 50 mW output:

PSB	1.3 μV (2 dB), S/N = 6 dB
AIR	1 μV (0 dB), S/N = 6 dB
FM	0.8 μV (–2 dB), S/N = 6 dB 3.2 μV (10 dB), S/N = 30 dB
LW	100 μV/m (40 dB/m), S/N = 6 dB
MW	24 μV/m (27 dB/m), S/N = 6 dB
SW1	1.2 μV (1 dB), S/N = 6 dB
SW2	1 μV (0 dB), S/N = 6 dB
SW3	1 μV (0 dB), S/N = 6 dB
SW4	1.2 μV (1 dB), S/N = 6 dB
SW5	1.3 μV (2 dB), S/N = 6 dB

Selectivity: 40 dB at ± 10 kHz off-resonance at 1,400 kHz

Signal-to-Noise Ratio:

PSB	50 dB (54 dB input at 160 MHz)
AIR	48 dB (44 dB input at 124 MHz)
FM	55 dB (54 dB input at 100 MHz)
LW	30 dB (60 dB/m input at 360 kHz)
MW	37 dB (60 dB/m input at 1,000 kHz)
SW	40 dB (44 dB input at mid range)

Power Output

at 10 % distortion:	3 W
at maximum:	4.7 W

Current Drain

at zero signal:	FM 56 mA, MW 50 mA
at maximum output:	600 mA

Jacks:

record out	1 kΩ
EARPHONE	4 Ω

Power Requirements:

DC	eight "D" size flashlight batteries 12 volts or car battery by using SONY car battery cord DCC-2AW
AC	house current 120 V 60 Hz

Power Consumption: 8 W AC

Speaker: 10 cm x 15 cm (4" x 6"), 4 Ω

Dimensions: 340 (w) x 230 (h) x 160 (d) mm ($13\frac{3}{8}$" x $9\frac{1}{16}$" x $6\frac{5}{16}$")

Weight: 6.4 kg, 14 lb 2 oz with batteries

SONY®

SERVICE MANUAL

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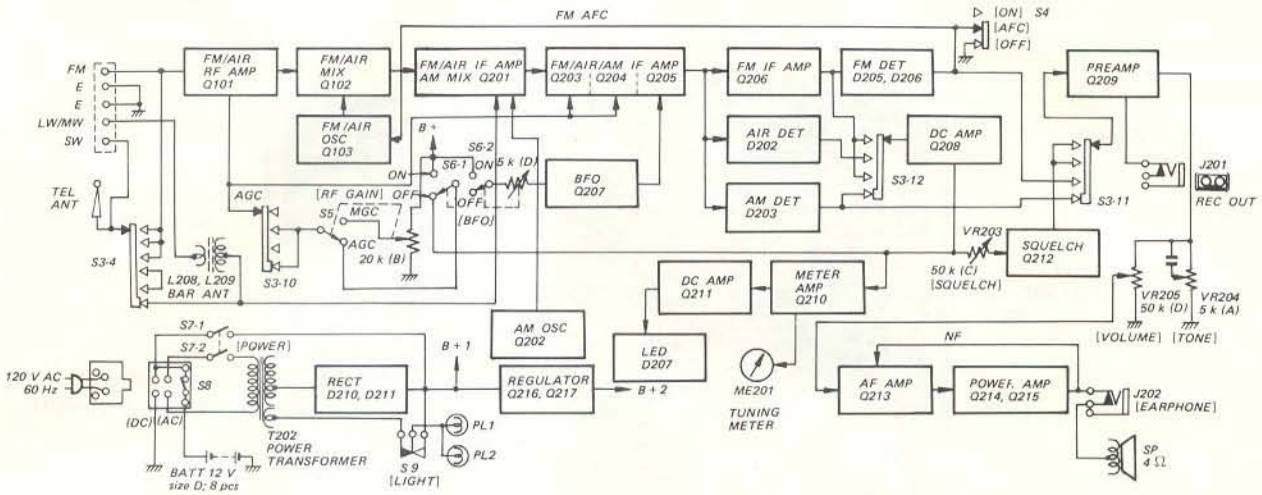
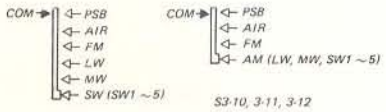
SECTION 1

OUTLINE

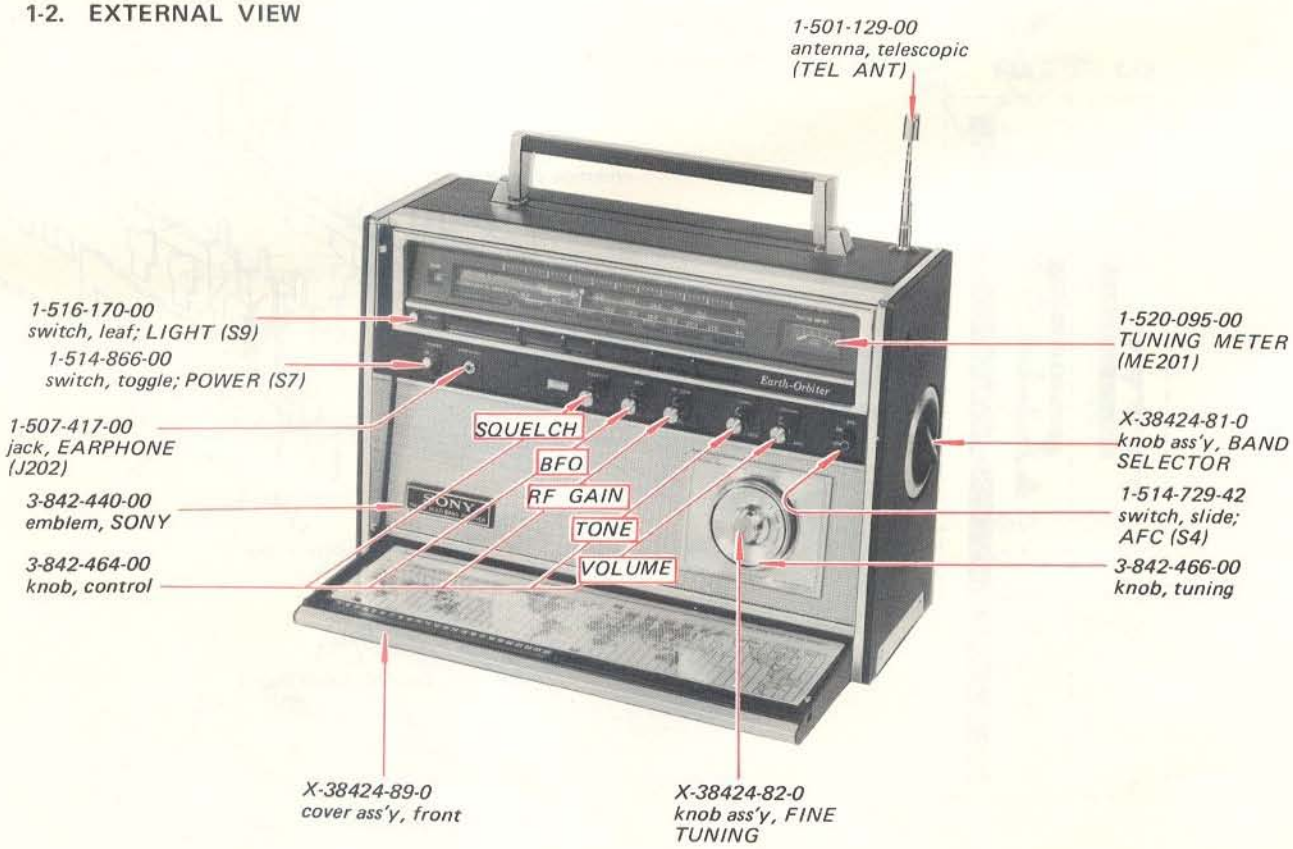
1-1. BLOCK DIAGRAM



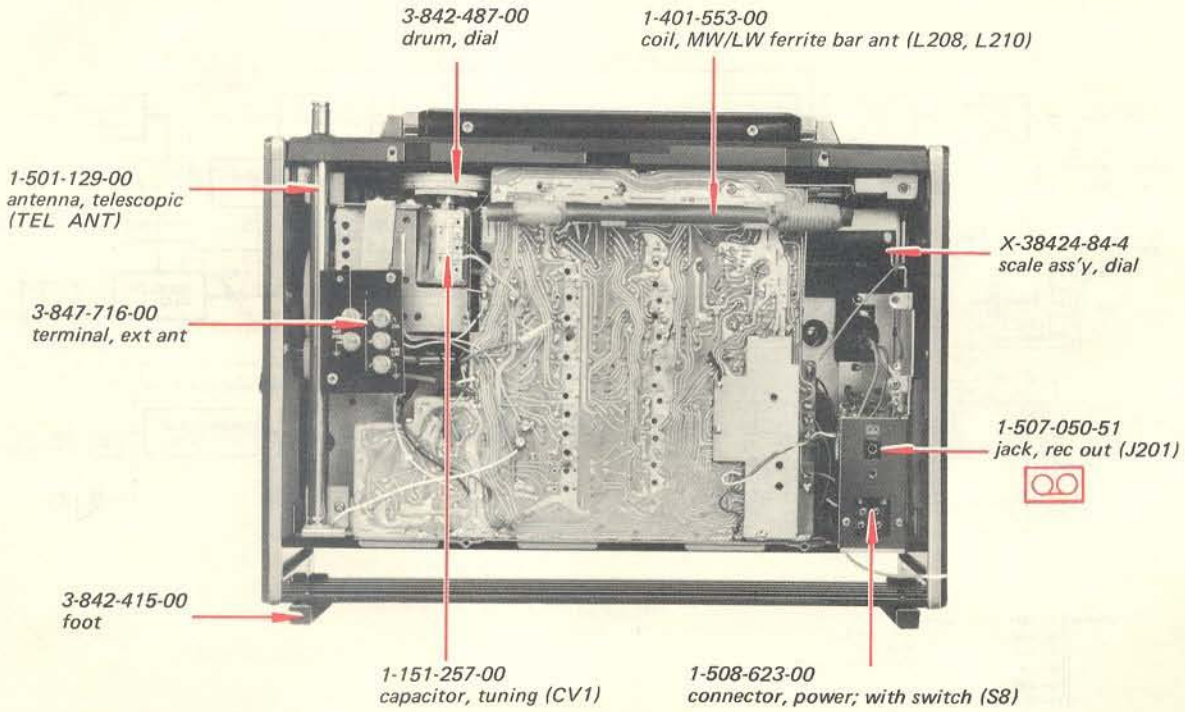
FM : FM and PSB



1-2. EXTERNAL VIEW

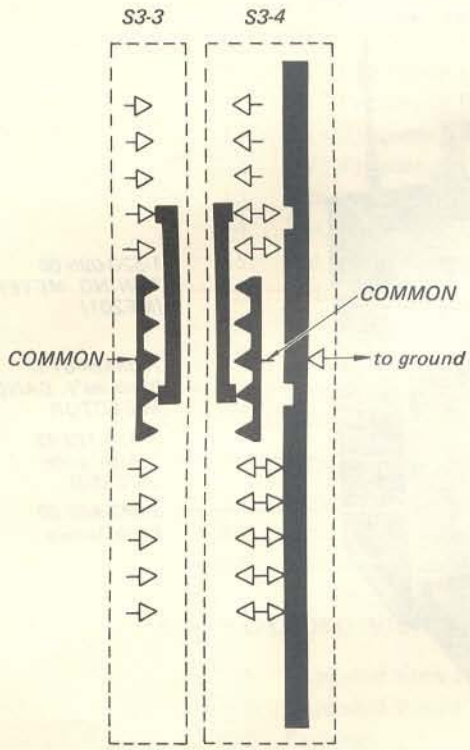


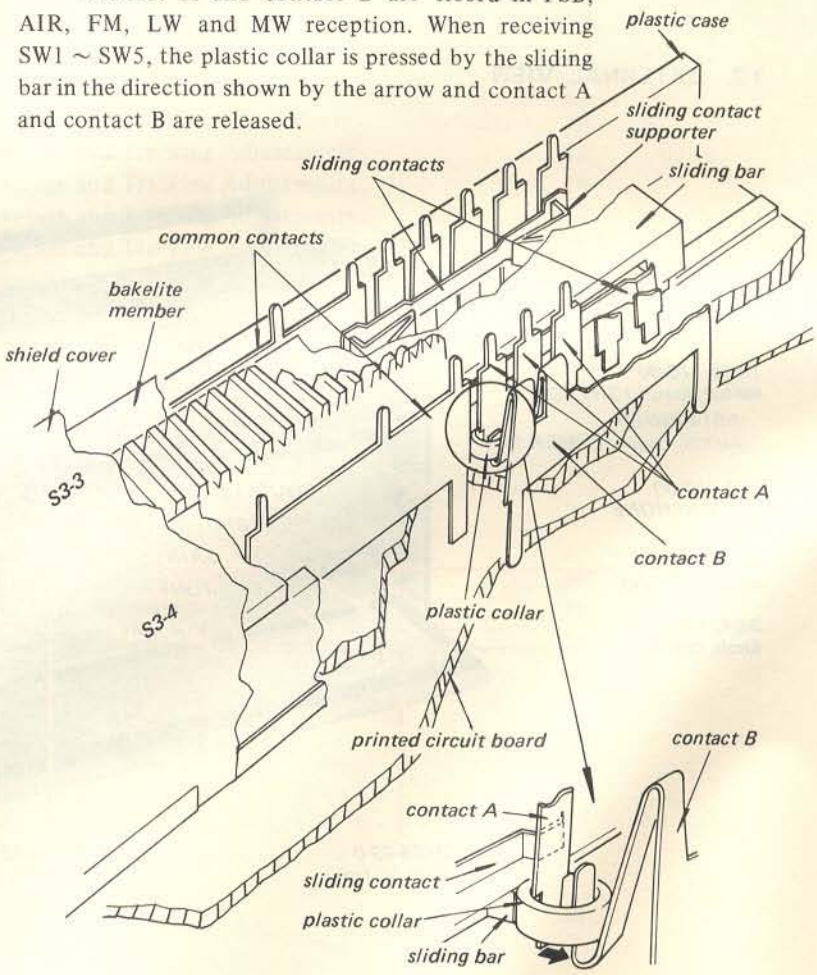
1-3. INTERNAL VIEW



1-4. ROTARY-SLIDE SWITCH OUTLINE

Contact A and contact B are closed in PSB, AIR, FM, LW and MW reception. When receiving SW1 ~ SW5, the plastic collar is pressed by the sliding bar in the direction shown by the arrow and contact A and contact B are released.

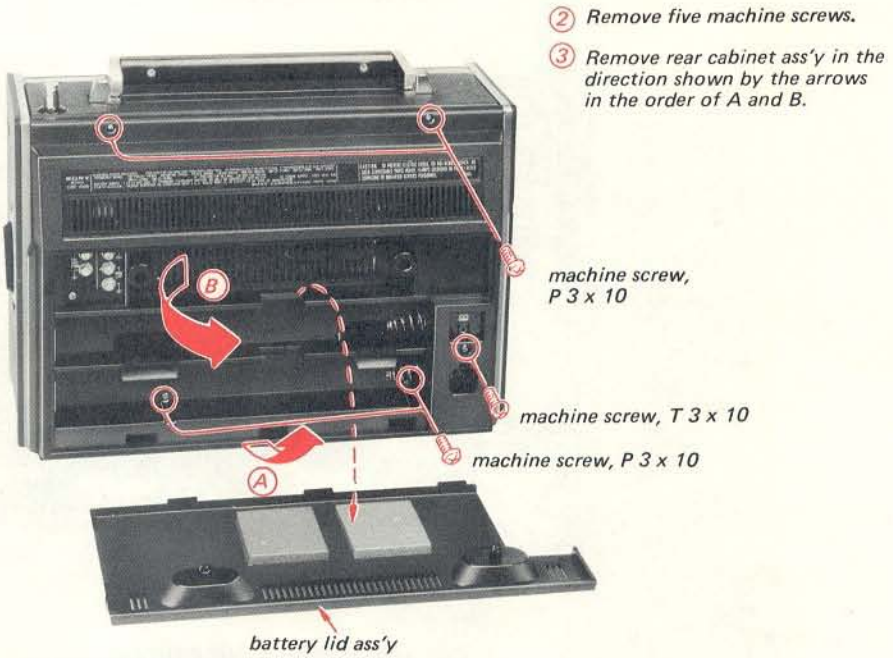




SECTION 2
DISASSEMBLY

2-1. REAR CABINET ASS'Y REMOVAL

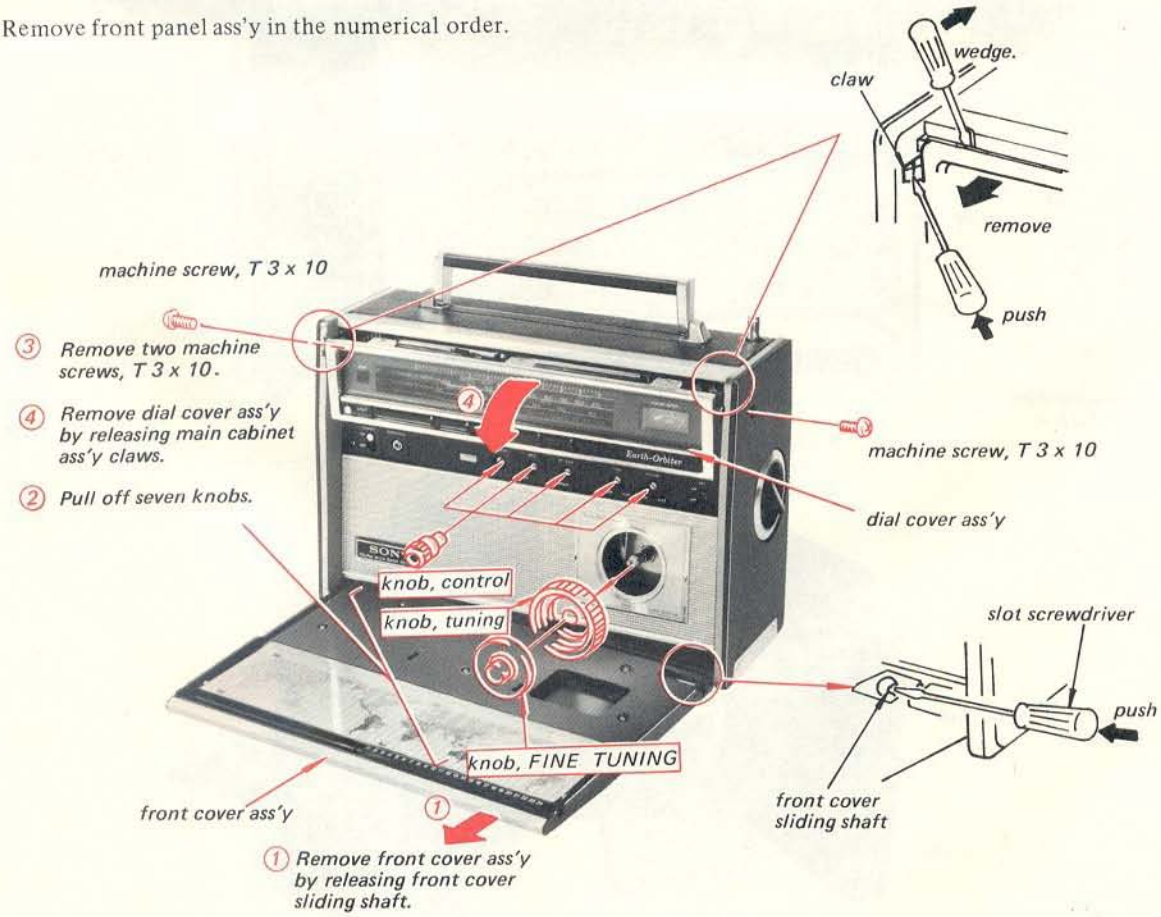
Remove rear cabinet ass'y in the numerical order.



① Remove battery lid ass'y.

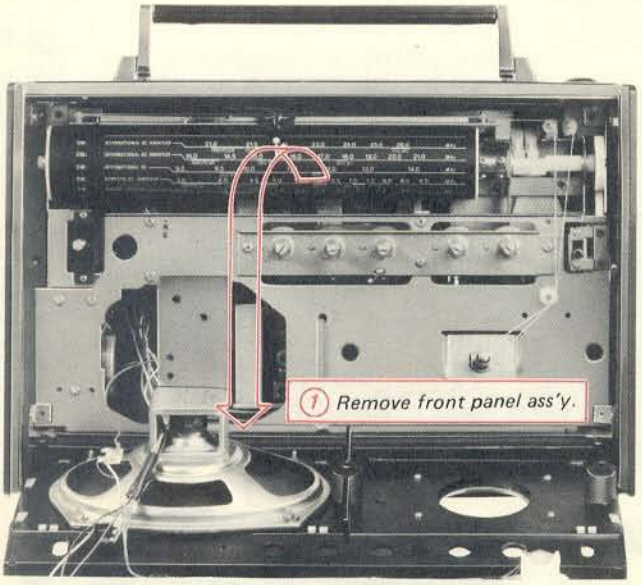
2-2. FRONT PANEL ASS'Y REMOVAL

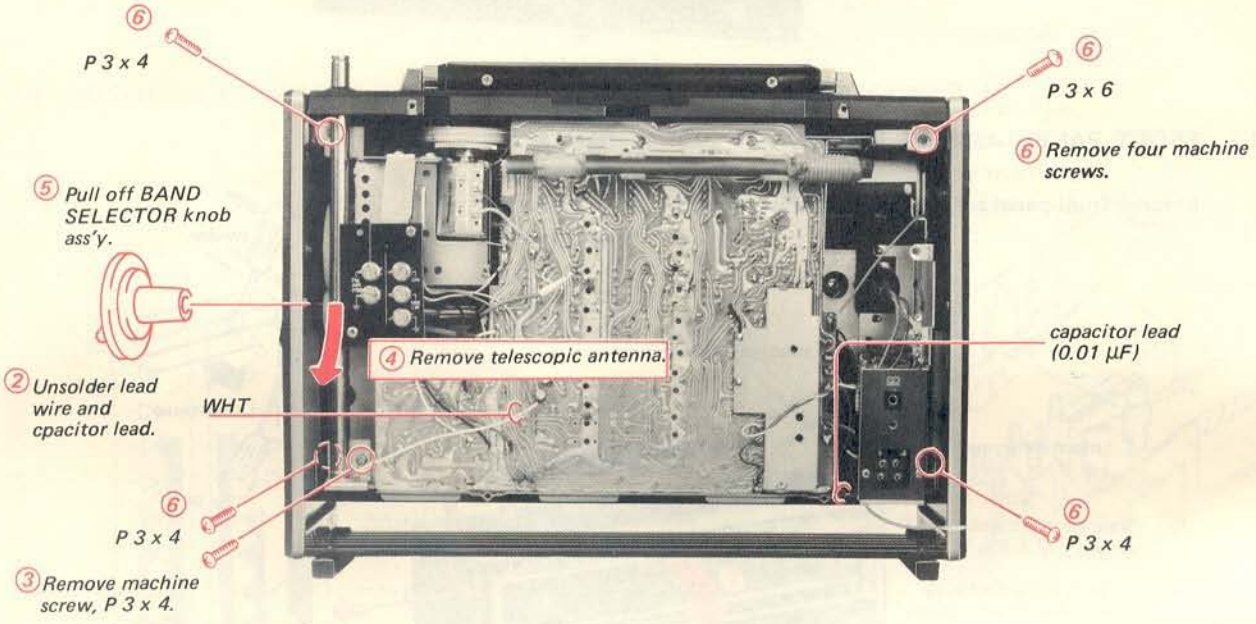
Remove front panel ass'y in the numerical order.

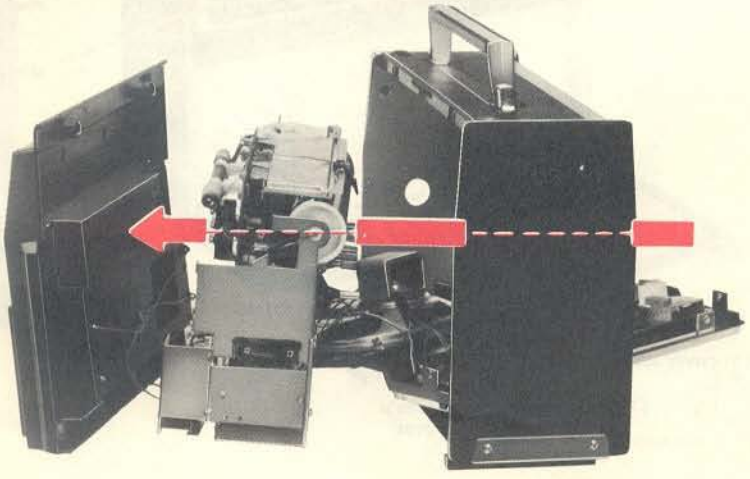


2-3. CHASSIS REMOVAL

Remove chassis in the numerical order.

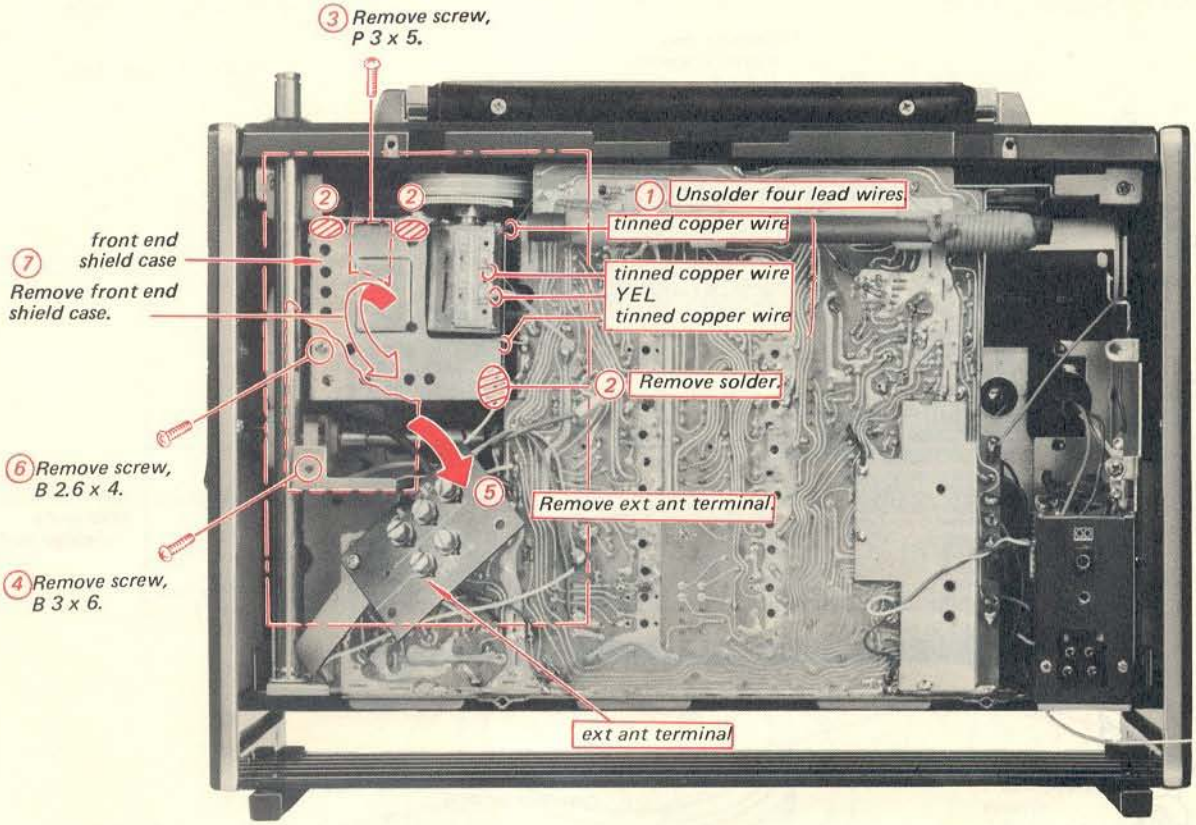


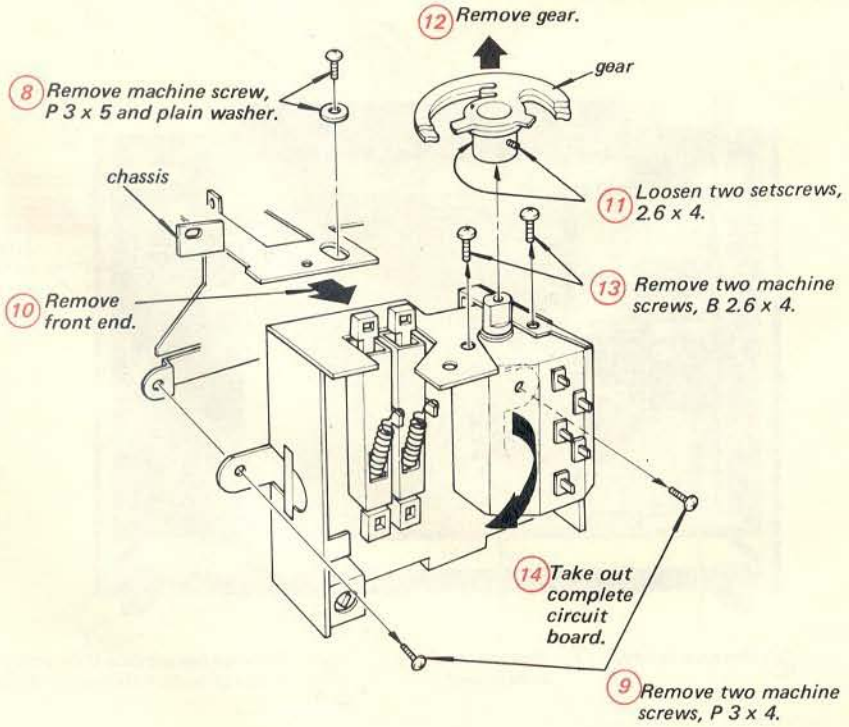




2-4. FRONT END REMOVAL

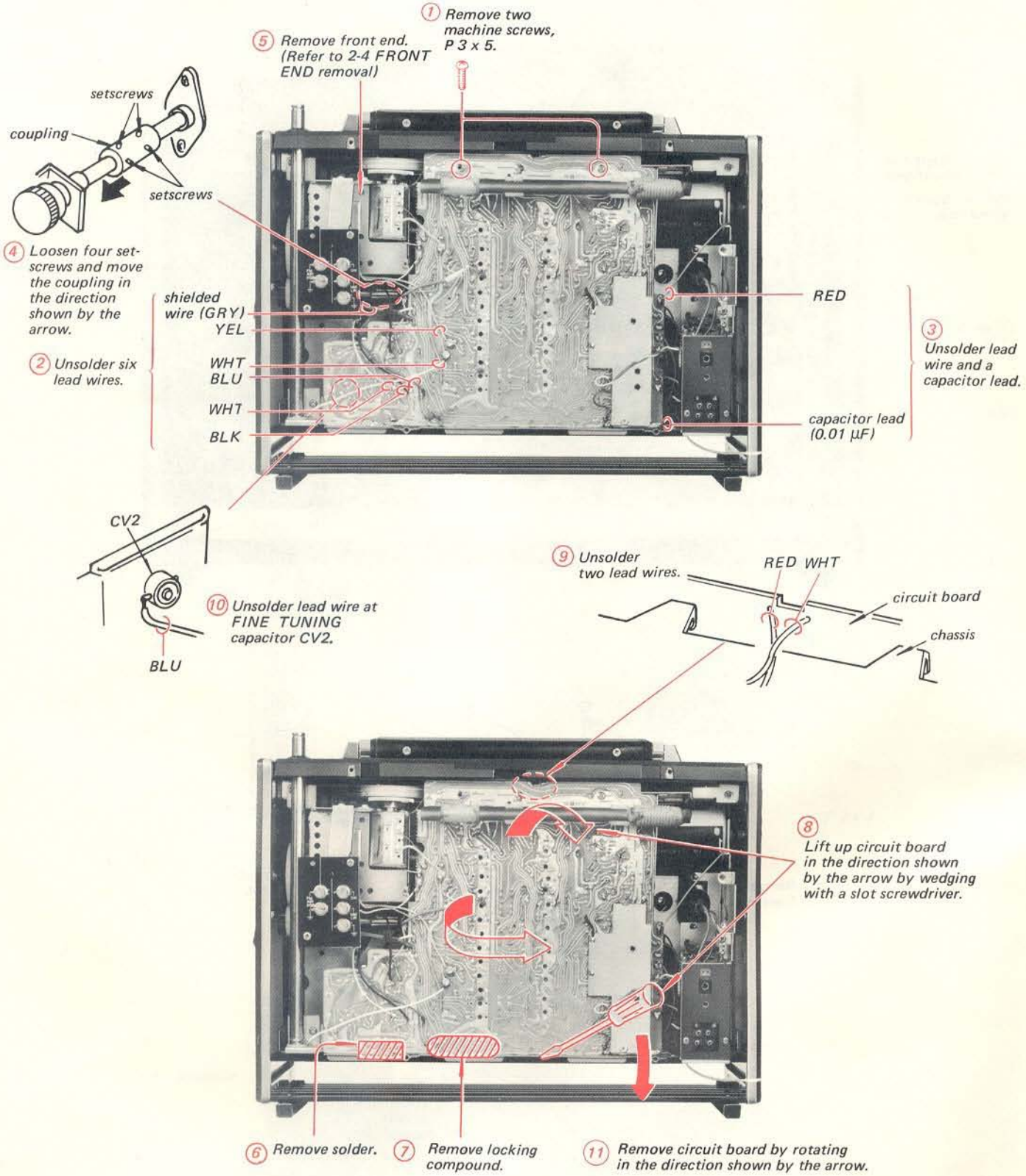
Remove front end in the numerical order.





2-5. PRINTED CIRCUIT BOARD REMOVAL

Remove rear cabinet ass'y and remove printed circuit board in the numerical order.

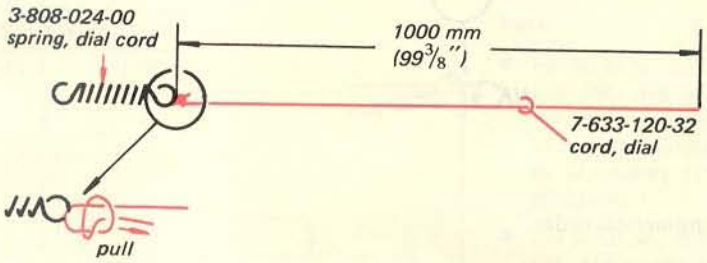


2-6. DIAL CORD STRINGING

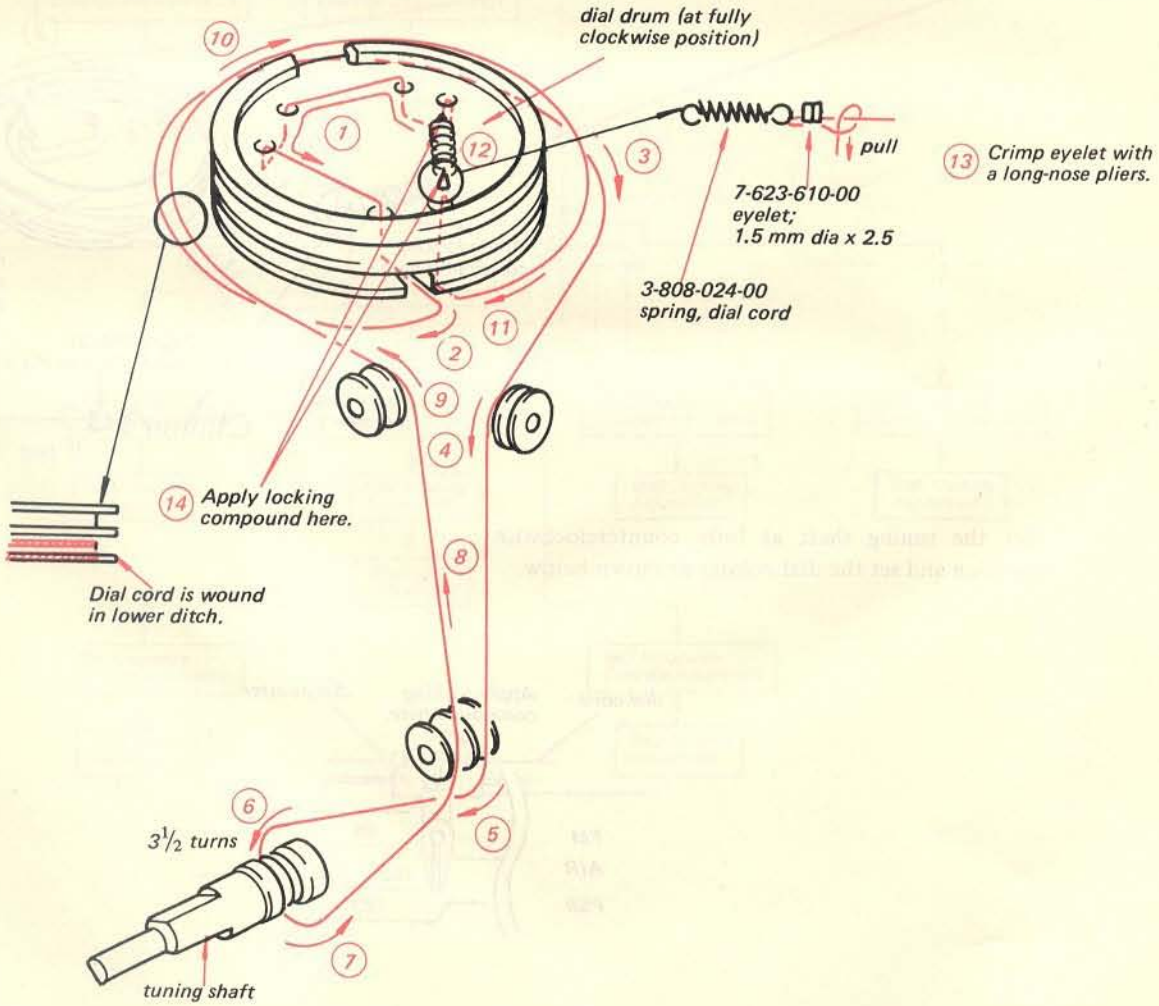
Perform the chassis removal outlined in 2-3 on page 6 and proceed to the following procedure.

Dial Drum Driving:

1. Assemble dial cord and dial cord spring.

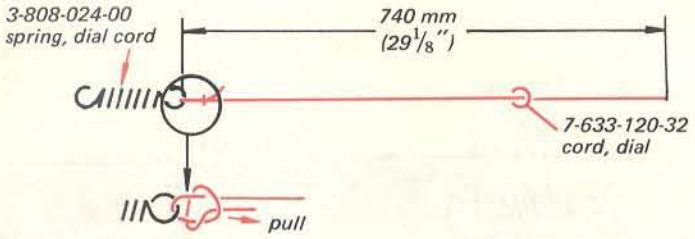


2. String dial cord in the numerical order.

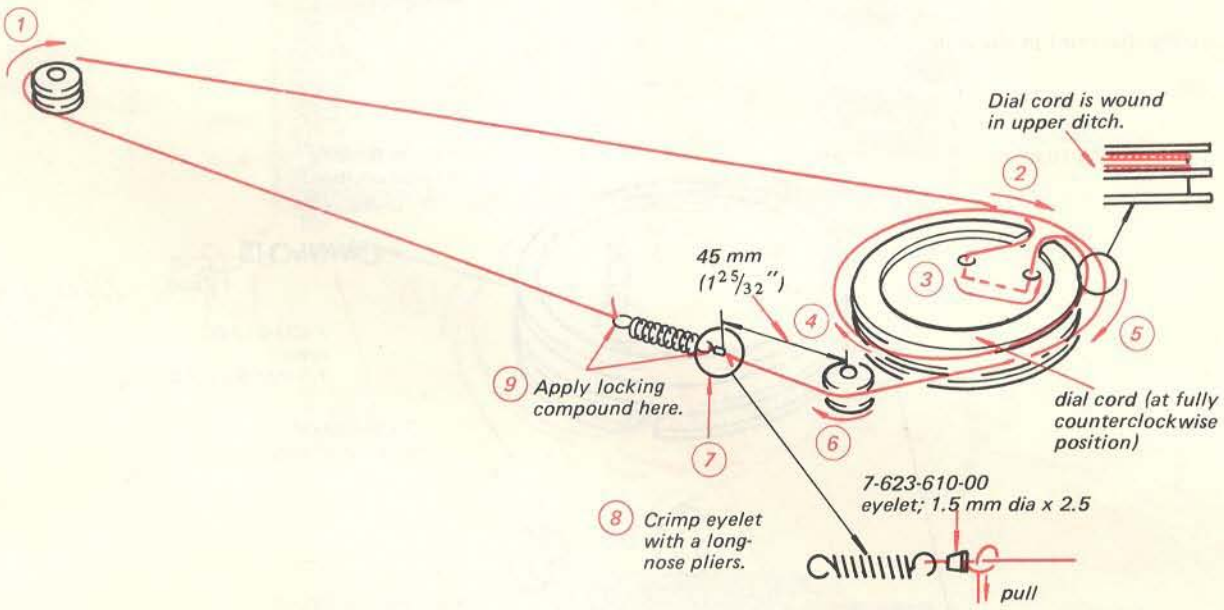


Dial Pointer Driving:

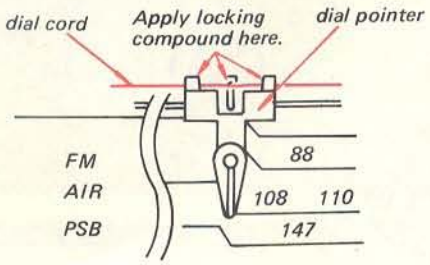
1. Assemble dial cord and dial cord spring.



2. String dial cord in the numerical order.



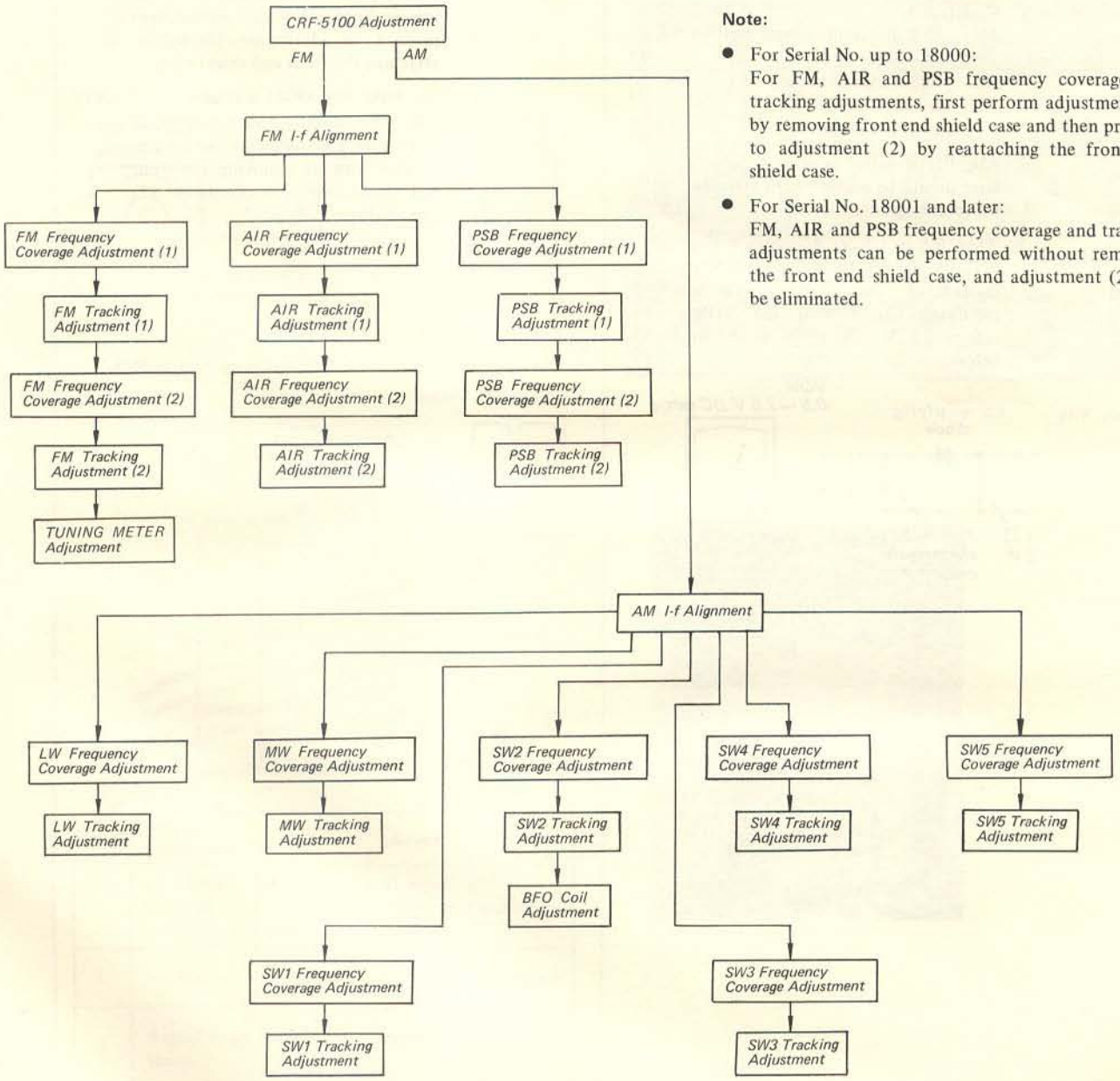
3. Set the tuning shaft at fully counterclockwise position and set the dial pointer as shown below.



SECTION 3

ADJUSTMENTS

ADJUSTMENT FLOW CHART



Note:

- For Serial No. up to 18000:
  For FM, AIR and PSB frequency coverage and tracking adjustments, first perform adjustment (1) by removing front end shield case and then proceed to adjustment (2) by reattaching the front end shield case.
- For Serial No. 18001 and later:
  FM, AIR and PSB frequency coverage and tracking adjustments can be performed without removing the front end shield case, and adjustment (2) can be eliminated.

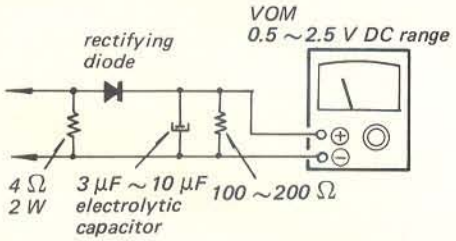
Test Equipment/Tools Required:

AM rf signal generator
FM rf signal generator
VOM
VTVM
Loop antenna
4 Ω, 2 W resistor

Note: 1. Modulation
AM: 30 % amplitude modulation by 400 Hz signal.
FM: ± 22.5 kHz frequency deviation modulated by 400 Hz signal.

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

3. When 0.5 ~ 1.5 V AC range is not available on the VOM, use a VTVM instead of the VOM or use a rectifying circuit with the VOM 0.5 ~ 2.5 V DC range as shown below.



4. It is recommended that MW, SW, AIR, and FM/PSB maximum sensitivity measurements on pages 14 and 15 be performed in a standard shielded room.

5. For Serial No. up to **18000**:
For FM, AIR and PSB frequency coverage and tracking adjustments, first perform adjustment (1) by removing front end shield case and then proceed to adjustment (2) by re-attaching the front end shield case.

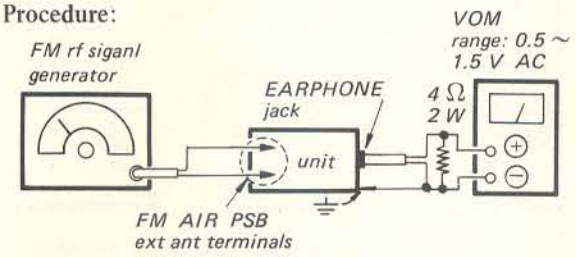
For Serial NO. **18001** and later:
FM, AIR and PSB frequency coverage and tracking adjustments can be performed without removing the front end shield case, and adjustment (2) can be eliminated.

1. FM I-f Alignment and Discriminator Adjustment

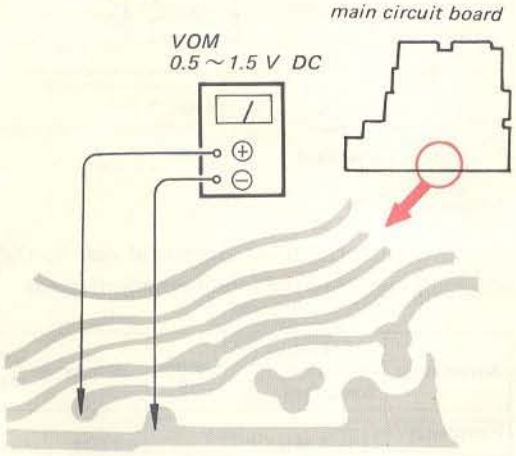
Settings:

BAND SELECTOR switch:	FM
VOLUME control:	MAX
TONE control:	HIGH
AFC switch:	OFF
RF GAIN control:	NORMAL

Procedure:

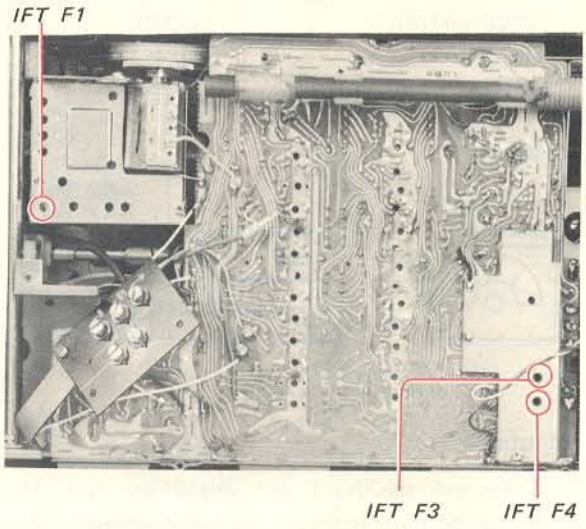


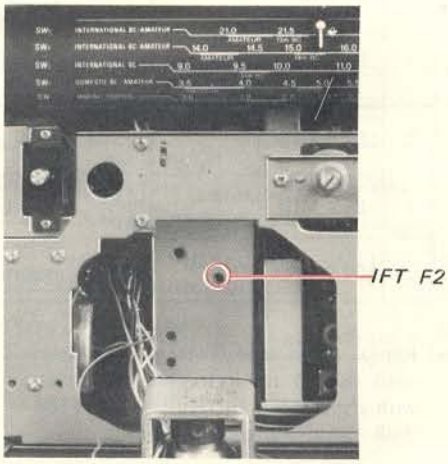
VOM connection for step 4.



Step	Signal frequency	Tuning knob	Adjust	VOM reading
1	10.7 MHz with FM modulation	No station. no beating position	Rf signal generator frequency	maximum
2	– ditto –	–ditto –	IFT F1 ~ 4	maximum
3	Repeat steps 1 and 2 two or three times.			
4	Turn modulation off. Increase output a little.	– ditto –	IFT F4	"0 V DC"

Adjustment Locations:



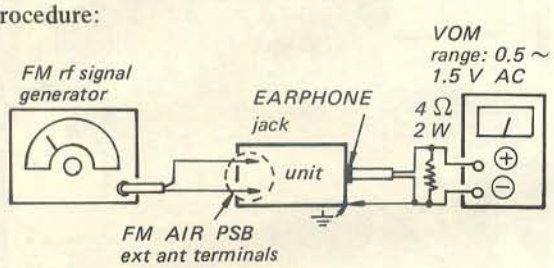


2. FM Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	FM
VOLUME control:	MAX
TONE control:	HIGH
AFC switch:	OFF
RF GAIN control:	NORMAL

Procedure:



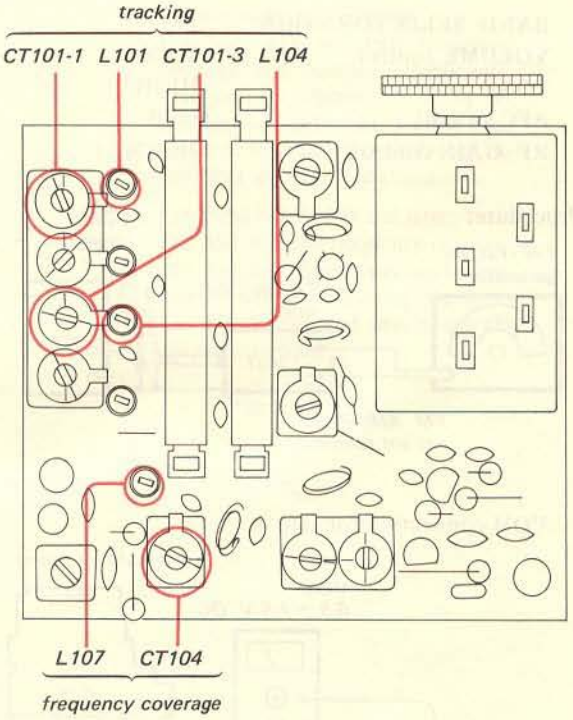
Adjustment (1)

Remove the front end shield case from the front end and proceed to the following adjustments.

Adjustment	Step	FM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	86.5 MHz	fully counter-clockwise	L107	maximum
	2	109.5 MHz	fully clockwise	CT104	maximum
Tracking	1	86.5 MHz	tune in 86.5 MHz	L101 L104	maximum
	2	109.5 MHz	tune in 109.5 MHz	CT101-1 CT101-3	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with steps 2. Fix L107, L101 and L104 with wax after adjustment.

Adjustment Locations:

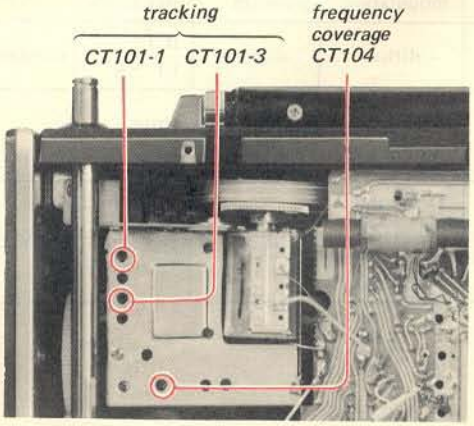


Adjustment (2)

Reattach the front end shield case to the front end and proceed to the following adjustments.

Adjustment	FM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency coverage	109.5 MHz	fully clockwise	CT104	maximum
Tracking	109.5 MHz	fully clockwise	CT101-1 CT101-3	maximum

Adjustment Locations:

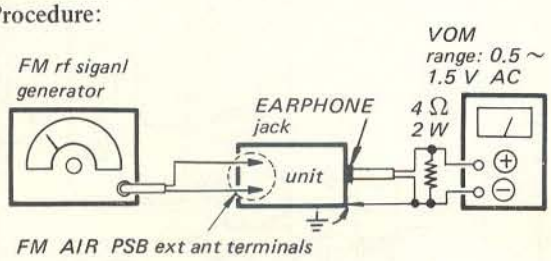


3. AIR Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	FM
VOLUME control:	MAX
TONE control:	HIGH
AFC switch:	OFF
RF GAIN control:	NORMAL

Procedure:



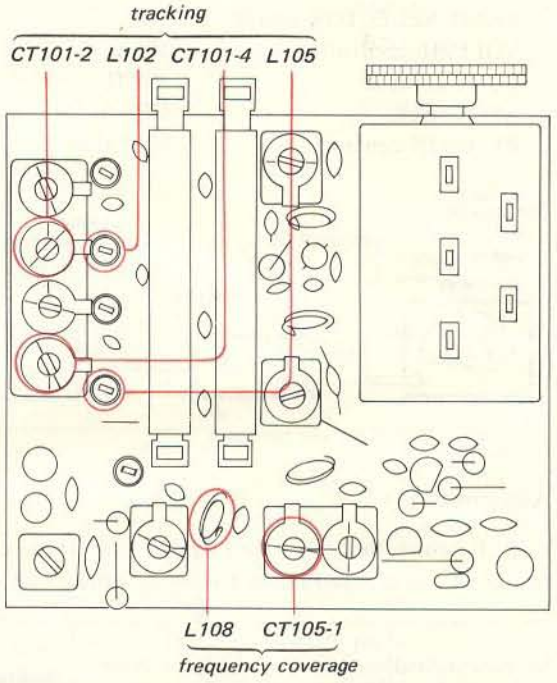
Adjustment (1)

Remove the front end shield case from the front end and proceed to the following adjustments.

Adjustment	Step	FM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency coverage	1	107 MHz	fully counter-clockwise	L108	maximum
	2	137.5 MHz	fully clockwise	CT105-1	maximum
Tracking	1	107 MHz	fully counter-clockwise	L102 L105	maximum
	2	137.5 MHz	fully clockwise	CT101-2 CT101-4	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with steps 2. Fix L102, L105 and L108 with wax after adjustment.

Adjustment Locations:

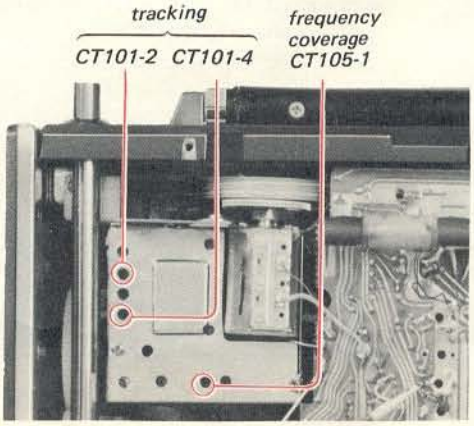


Adjustment (2)

Reattach the front end shield case to the front end and proceed to the following adjustments.

Adjustment	FM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency coverage	137.5 MHz	fully clockwise	CT105-1	maximum
Tracking	137.5 MHz	fully clockwise	CT101-2 CT101-4	maximum

Adjustment Locations:

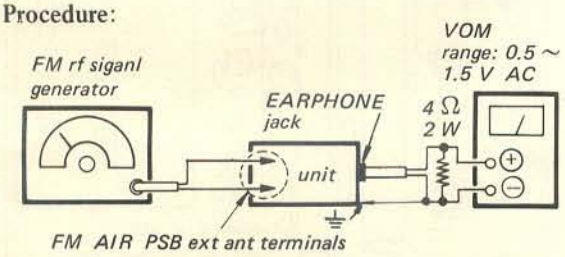


4. PSB Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	PSB
VOLUME control:	MAX
TONE control:	HIGH
AFC switch:	OFF
RF GAIN control:	NORMAL

Procedure:



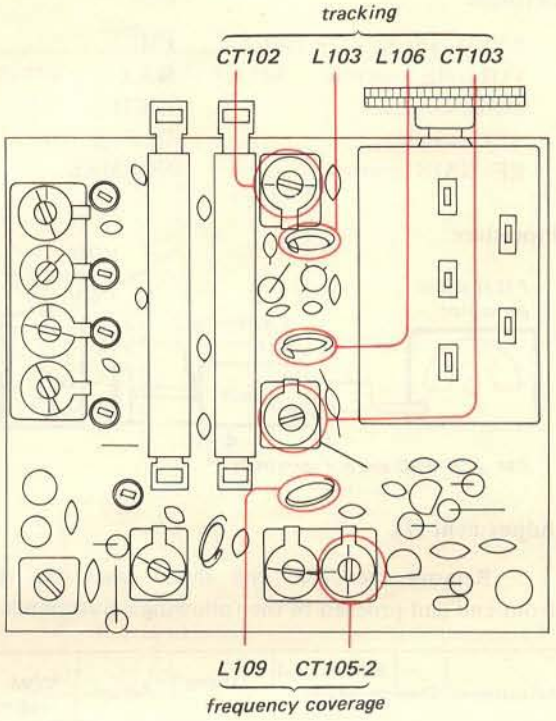
Adjustment (1)

Remove the front end shield case from the front end and proceed to the following adjustments.

Adjustment	Step	FM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency coverage	1	145 MHz	fully counter-clockwise	L109	maximum
	2	176 MHz	fully clockwise	CT105-2	maximum
Tracking	1	145 MHz	fully counter-clockwise	L103 L106	maximum
	2	176 MHz	fully clockwise	CT102 CT103	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with steps 2. Fix L103, L106 and L109 with wax after adjustment.

Adjustment Locations:

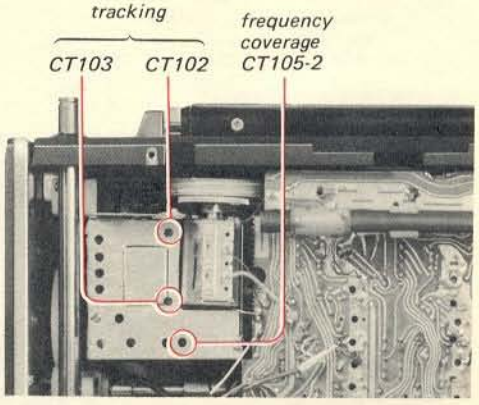


Adjustment (2)

Reattach the front end shield case to the front end and proceed to the following adjustments.

Adjustment	FM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency coverage	176 MHz	fully clockwise	CT105-2	maximum
Tracking	176 MHz	fully clockwise	CT102 CT103	maximum

Adjustment Locations:

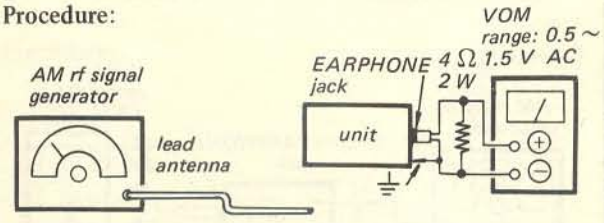


5. AM I-f Alignment

Settings:

BAND SELECTOR switch:	MW
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

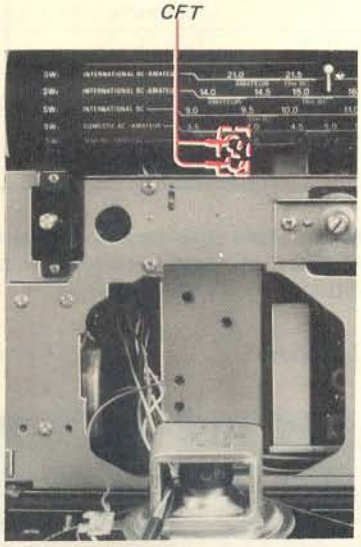
Procedure:



455 kHz (modulated 30 % by 400 Hz signal)

Adjust	VOM reading
CFT	maximum

Adjustment Location:

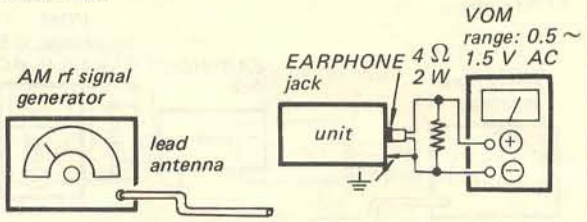


6. MW Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	MW
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

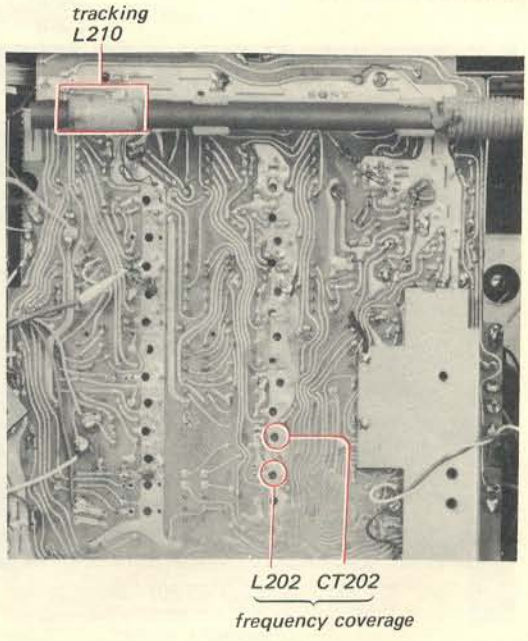
Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	520 kHz	fully counter-clockwise	L202	maximum
	2	1680 kHz	fully clockwise	CT202	maximum
Tracking	1	620 kHz	tune in 620 kHz	L210	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with step 2 (frequency coverage).
Fix L210 with wax after adjustment.

Adjustment Locations:

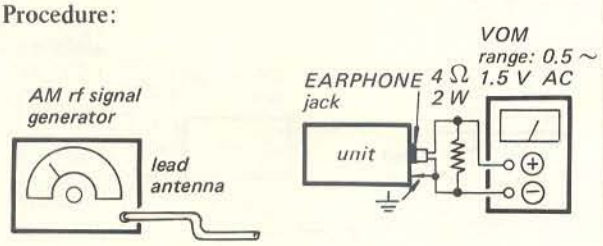


7. LW Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	LW
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

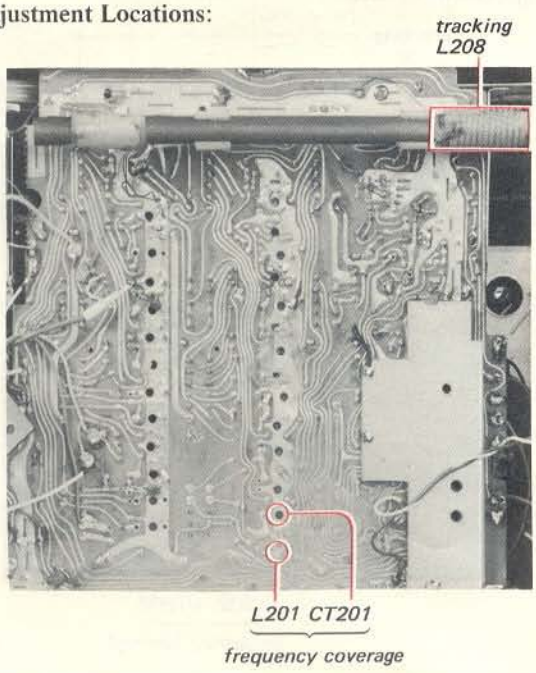
Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	145 kHz	fully counter-clockwise	L201	maximum
	2	410 kHz	fully clockwise	CT201	maximum
Tracking	1	160 kHz	tune in 160 kHz	L208	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with step 2 (frequency coverage).
Fix L208 with wax after adjustment.

Adjustment Locations:

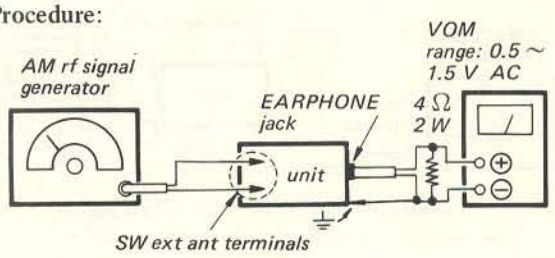


8. SW1 Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	SW1
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

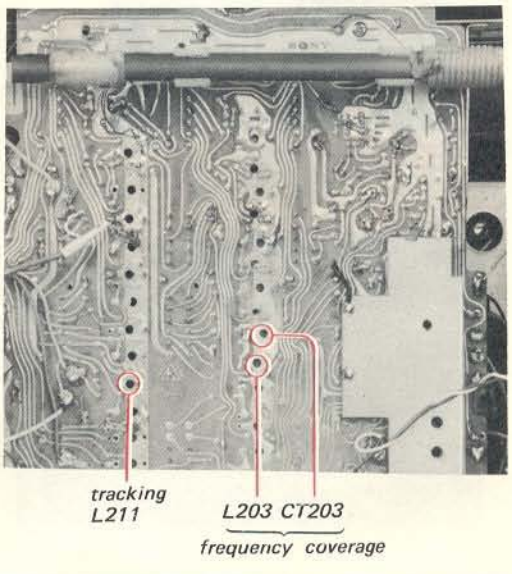
Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	1.55 MHz	fully counter-clockwise	L203	maximum
	2	3.6 MHz	fully clockwise	CT203	maximum
Tracking	1	1.55 MHz	fully counter-clockwise	L211	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with step 2 (frequency coverage).

Adjustment Locations:

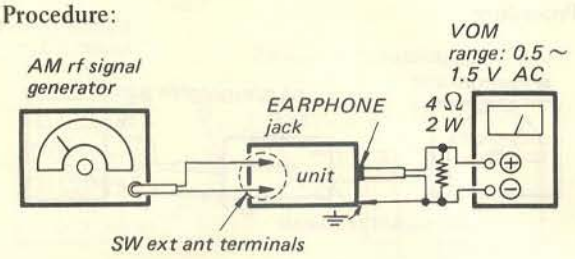


9. SW2 Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	SW2
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

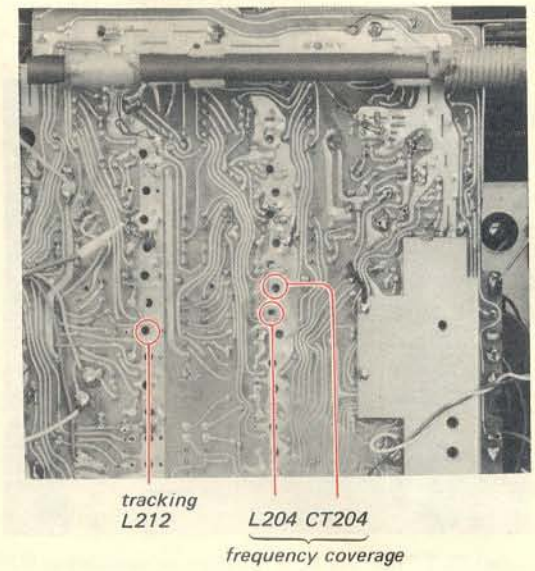
Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	3.4 MHz	fully counter-clockwise	L204	maximum
	2	9.2 MHz	fully clockwise	CT204	maximum
Tracking	1	3.4 MHz	fully counter-clockwise	L212	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with step 2 (frequency coverage).

Adjustment Locations:

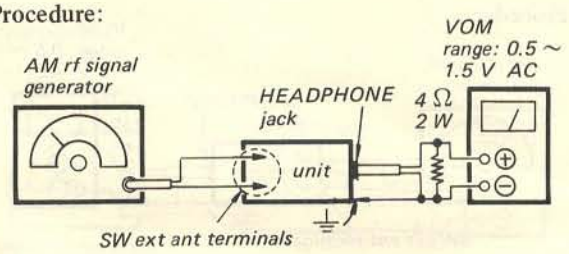


10. SW3 Frequency Coverage and Tracking Adjustment

Settings:

BAND SELECTOR switch:	SW3
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

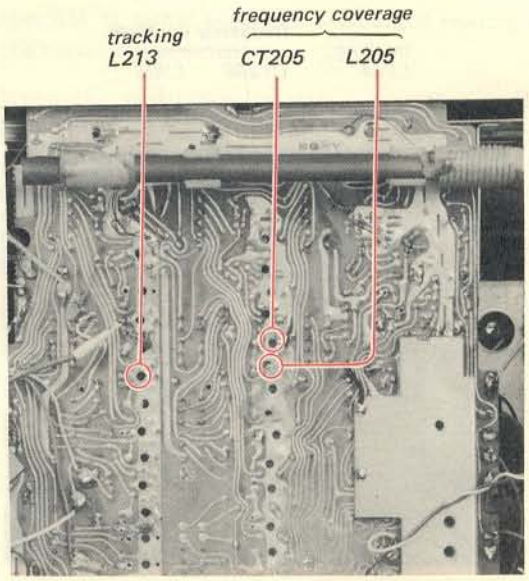
Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	8.9 MHz	fully counter-clockwise	L205	maximum
	2	14.3 MHz	fully clockwise	CT205	maximum
Tracking	1	8.9 MHz	fully counter-clockwise	L213	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with step 2 (frequency coverage).

Adjustment Location:

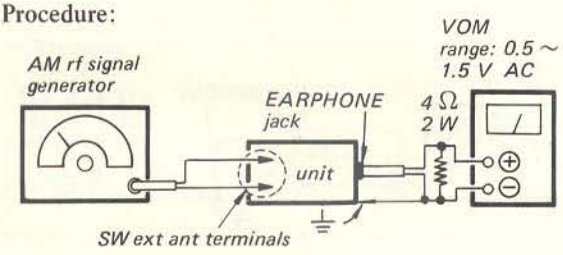


11. SW4 Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	SW4
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

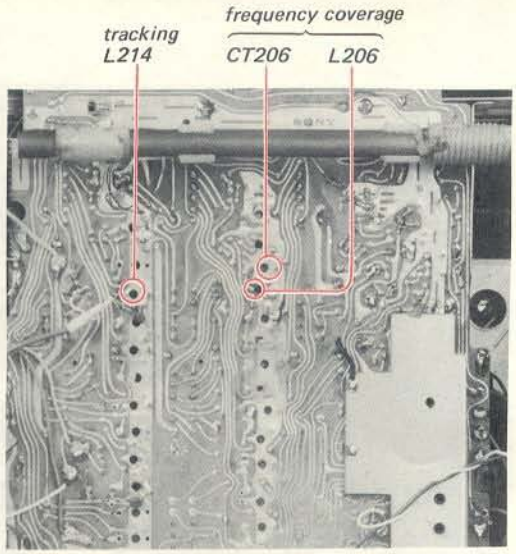
Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	13.8 MHz	fully counter-clockwise	L206	maximum
	2	21.4 MHz	fully clockwise	CT206	maximum
Tracking	1	13.8 MHz	fully counter-clockwise	L214	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with step 2 (frequency coverage).

Adjustment Location:

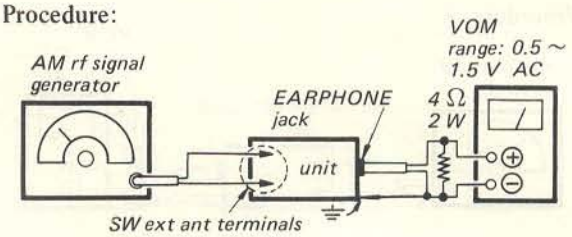


12. SW5 Frequency Coverage and Tracking Adjustments

Settings:

BAND SELECTOR switch:	SW5
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

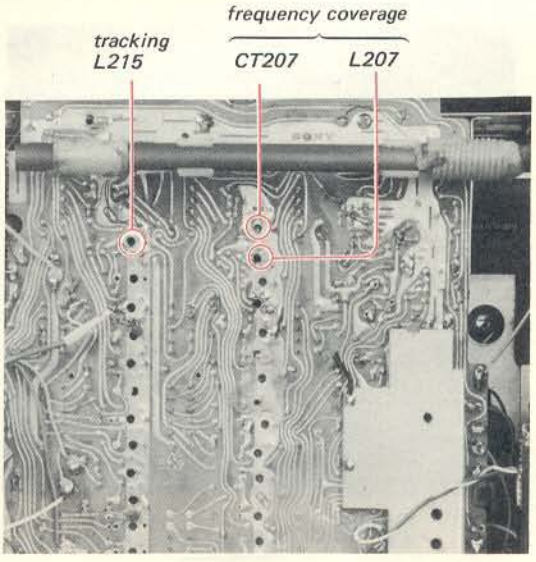
Procedure:



Adjustment	Step	AM rf signal generator frequency	Tuning knob	Adjust	VOM reading
Frequency Coverage	1	20.7 MHz	fully counter-clockwise	L207	maximum
	2	27.7 MHz	fully clockwise	CT207	maximum
Tracking	1	20.7 MHz	fully counter-clockwise	L215	maximum

Note: Repeat above steps two or three times until desired result is obtained ending with step 2 (frequency coverage).

Adjustment Locations:

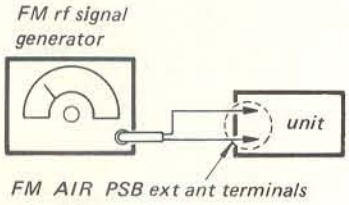


13. TUNING METER ADJUSTMENT

Settings:

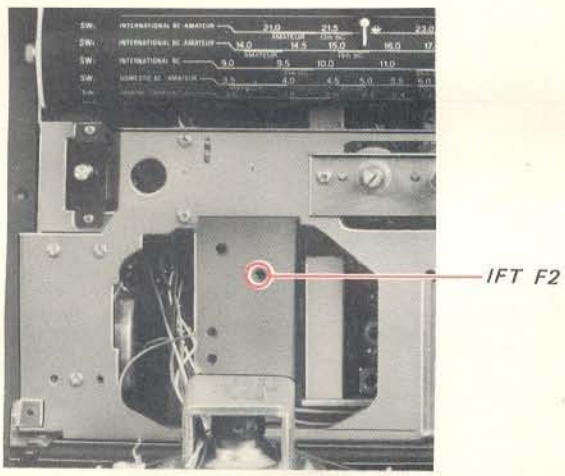
BAND SELECTOR switch:	FM
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

Procedure:



FM rf signal generator frequency	Tuning knob	Adjust	TUNING METER
Any of 86 ~109 MHz	Tune in FM rf signal frequency	IFT F2	maximum

Adjustment Location:

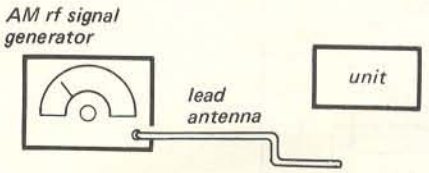


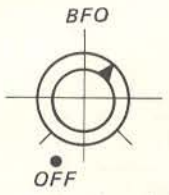
14. BFO Coil Adjustment

Settings:

BAND SELECTOR switch:	SW2
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL

Procedure:

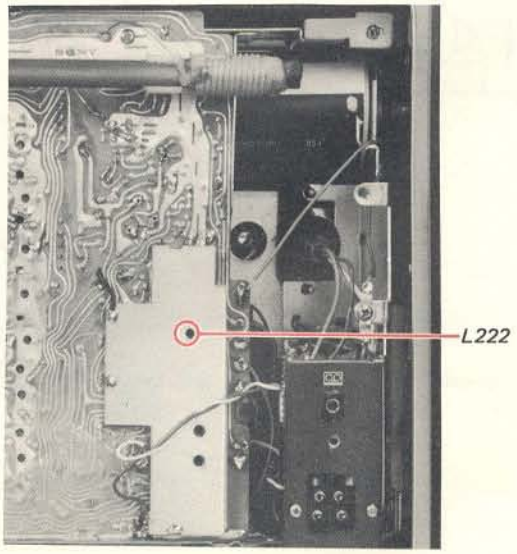




BFO knob setting

AM rf signal generator frequency	Tuning knob	Adjust
5 MHz modulation off	Tune in 5 MHz signal to obtain maximum deflection on TUNING METER	L222 Adjust for zero beating

Adjustment Location:

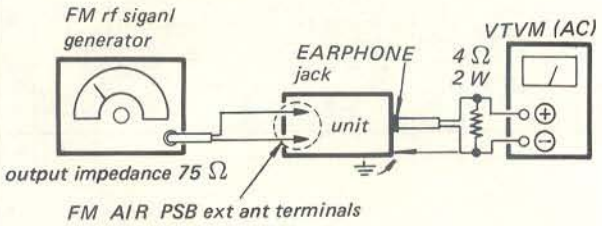


15. FM and PSB Maximum Sensitivity Measurement

Settings:

BAND SELECTOR switch:	FM or PSB
VOLUME control:	MAX
TONE control:	HIGH
AFC switch:	OFF

Procedure:



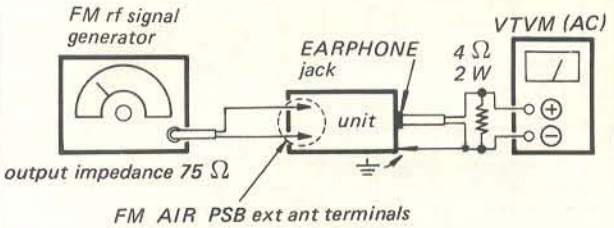
1. Set FM rf signal generator frequency to 98 MHz (FM) or 160 MHz (PSB), modulation to 400 Hz, 22.5 kHz deviation, attenuator to about −2 dB (FM) or 2 dB (PSB).
2. Turn tuning knob of the unit and tune in 98 MHz (FM) or 160 MHz (PSB) signal.
3. Vary VOLUME control until 0.447 V (50 mW output) is obtained on VTVM. Note VTVM reading in dB.
4. Turn modulation off and note VTVM reading in dB.
5. The difference of VTVM readings obtained in steps 3 and 4 is the signal-to-noise ratio at this condition.
6. Adjust FM rf signal generator attenuator until 6 dB signal-to-noise ratio is obtained.
7. Repeat adjustment turning modulation on and off and varying VOLUME control keeping 0.447 V (50 mW output) until desired 6 dB signal-to-noise ratio is obtained. When the unit is not operating normally, 50 mW output at 6 dB signal-to-noise may not be obtained.
8. Read the amount of signal generator attenuator. This is the maximum sensitivity.
9. FM maximum sensitivity is 0.8 μV (−2 dB), PSB maximum sensitivity is 1.3 μV (2 dB).

16. AIR Maximum Sensitivity Measurement

Settings:

BAND SELECTOR switch:	AIR
VOLUME control:	MAX
TONE control:	HIGH

Procedure:



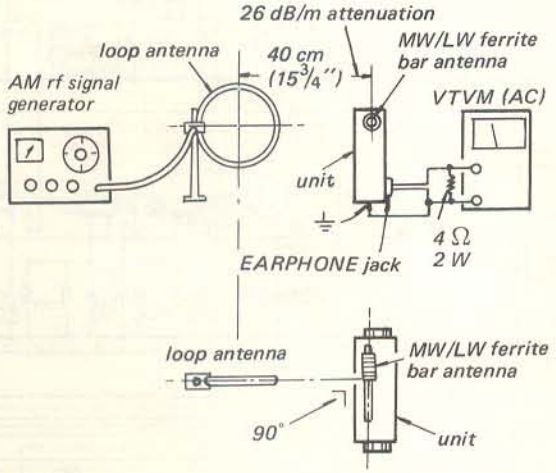
1. Set FM rf signal generator frequency to 120 MHz, modulation to 400 Hz, 30 % AM, attenuator to about 0 dB.
2. Turn tuning knob of the unit and tune in 120 MHz signal to obtain maximum VTVM reading.
3. Vary VOLUME control until 0.447 V (50 mW output) is obtained on VTVM. Note VTVM reading in dB.
4. Turn modulation off and note VTVM reading in dB.
5. The difference of VTVM readings obtained in steps 4 and 5 is the signal-to-noise ratio at this condition.
6. Adjust FM rf signal generator attenuator until 6 dB signal-to-noise ratio is obtained.
7. Repeat adjustment turning modulation on and off and varying VOLUME control keeping 0.447 V (50 mW output) until desired 6 dB signal-to-noise ratio is obtained. When the unit is not operating normally, 50 mW output at 6 dB signal-to-noise ratio may not be obtained.
8. Read the amount of signal generator attenuator. This is the maximum sensitivity.
9. AIR maximum sensitivity is 1 μV (0 dB).

17. MW Maximum Sensitivity Measurement

Settings:

BAND SELECTOR switch:	MW
VOLUME control:	MAX
TONE control:	MAX
RF GAIN control:	NORMAL
BFO control:	OFF

Procedure:



Note: Distance between center of loop antenna and center axis of MW/LW ferrite bar antenna and attenuation are dependent upon loop antenna used. In this case the attenuation is 26 dB/m at 40 cm.

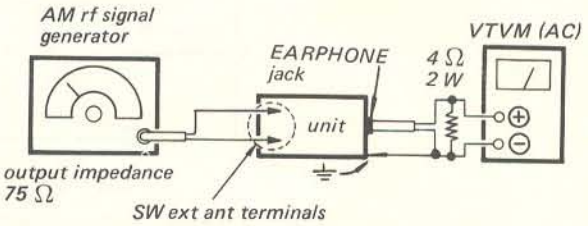
1. Set AM rf signal generator frequency to 1000 kHz, modulation to 400 Hz, 30 %.
2. Turn tuning knob of the unit and tune in 1000 kHz signal.
3. Vary AM rf signal generator attenuator to obtain 0.447 V (50 mW output) on the VTVM.
   Note VTVM reading in dB.
4. Turn modulation off and note VTVM reading in dB.
5. The difference of VTVM readings obtained in steps 3 and 4 is the signal-to-noise ratio at this condition.
6. Adjust AM rf signal generator attenuator until 6 dB signal-to-noise ratio is obtained keeping 0.447 V (50 mW output) varying VOLUME control. When the unit is not operating normally, 50 mW output at 6 dB signal-to-noise ratio may not be obtained.
7. Read the amount of signal generator attenuator and determine maximum sensitivity by subtracting 26 dB from the attenuator reading.
8. MW maximum sensitivity is 24 μV/m (27 dB/m).

18. SW Maximum Sensitivity Measurement

Settings:

BAND SELECTOR switch:	any of SW1 ~ 5
VOLUME control:	MAX
TONE control:	HIGH
RF GAIN control:	NORMAL
BFO control:	OFF

Procedure:

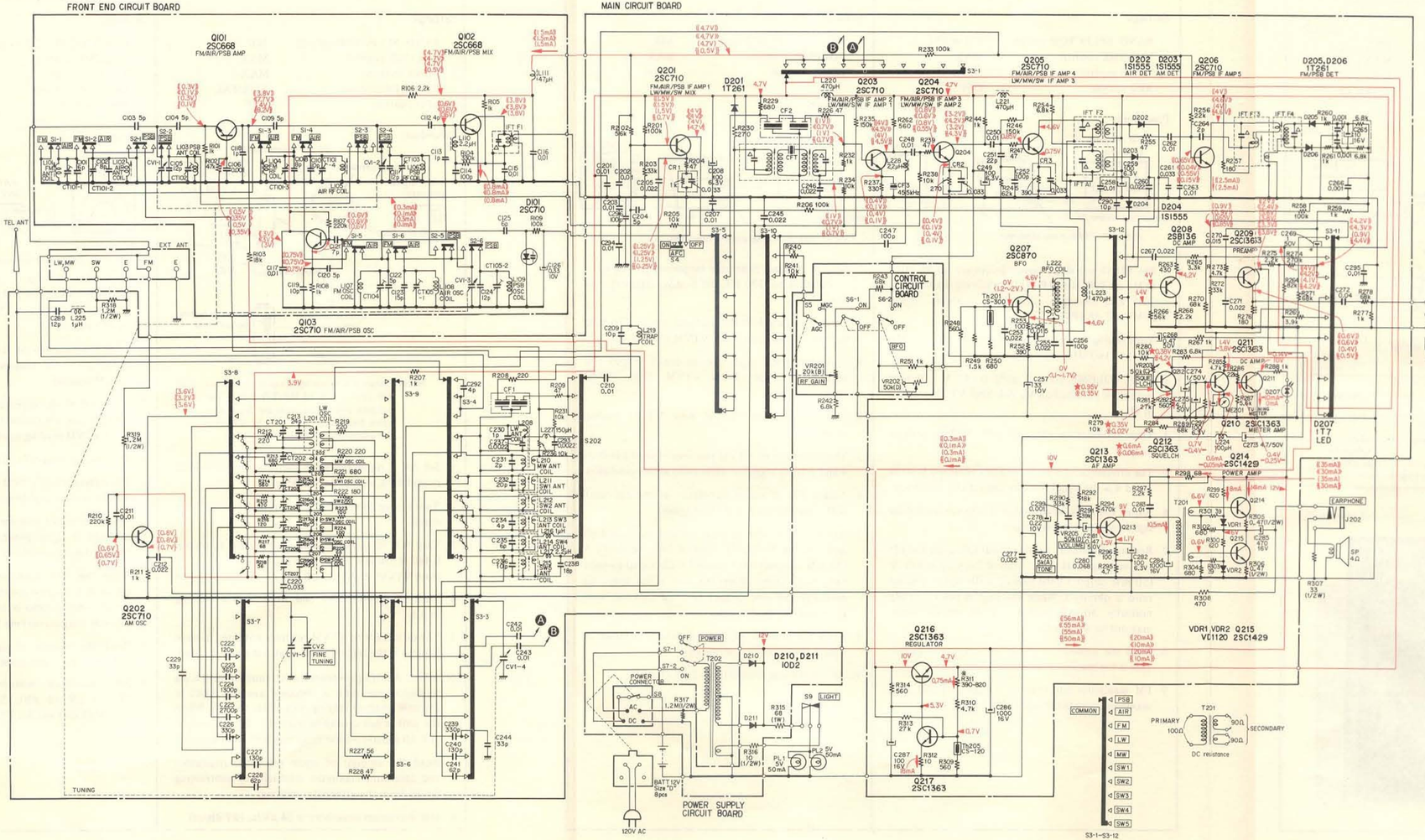


1. Set AM rf signal generator frequency to 2.5 MHz (SW1), 6.5 MHz (SW2), 11.5 MHz (SW3), 17.5 MHz (SW4) or 23.5 MHz (SW5), modulation to 400 Hz, 30 %.
2. Turn tuning knob of the unit and tune in AM rf signal generator frequency to obtain maximum VTVM reading.
3. Vary AM rf signal generator attenuator to obtain 0.447 V (50 mW output) on the VTVM.
   Note VTVM reading in dB.
4. Turn modulation off and note VTVM reading in dB.
5. The difference of VTVM readings obtained in steps 3 and 4 is the signal-to-noise ratio at this condition.
6. When the signal-to-noise ratio is more than 6 dB, the AM rf signal generator attenuator reading is the maximum sensitivity.
7. When the signal-to-noise ratio is less than 6 dB, adjust AM rf signal generator attenuator until 6 dB signal-to-noise ratio is obtained keeping 0.447 V (50 mW output) varying VOLUME control.
8. Read the amount of signal generator attenuator and determine maximum sensitivity.
9. SW1 maximum sensitivity is 1.2 μV (1 dB), SW2 1 μV (0 dB), SW3 1 μV (0 dB), SW4 1.2 μV (1 dB) and SW5 1.3 μV (2 dB).

SECTION 4
DIAGRAMS

4-1. SCHEMATIC DIAGRAM

Applicable to the sets that the part No. of printed circuit boards are 1-591-005-11~15 and 1-581-748-11~15. For the others, see page 32.



Note:

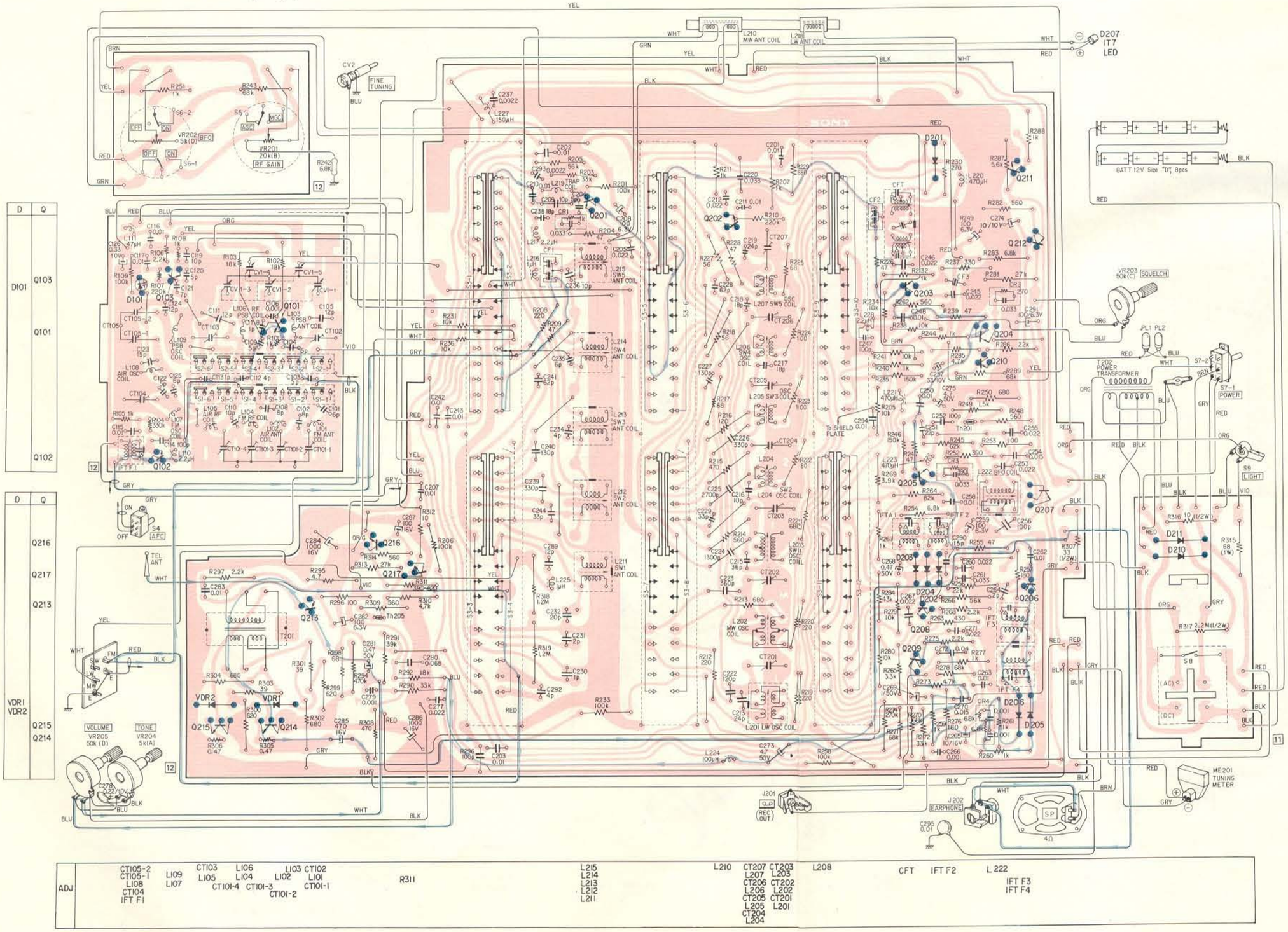
- All fixed capacitors are in μF, ceramic type unless otherwise specified, p = μμ
- All fixed resistors are in Ω, ¼ W, ±5 % carbon film type unless otherwise specified, k = 1000, M = 1000 k
- Capacitors marked △ are included in I-F transformers and ceramic filter.
- All voltage readings are taken at no input signal with a 20 kΩ/V DC VOM with reference to ground line. Variations may be noted due to normal production tolerances.
  ( )) : PSB, ≪ ≫ : AIR, ( ) : FM
  ( ) : LW, [ ]] : MW, | | : SW
  ‖ ‖ : common for LW, MW and SW
  < > : SW, BFO ON
  ✱ : SQUELCH MAX
  ✱ : SQUELCH MIN
  (- -) : tuned-in condition)
- ——— : B+ line
- Switch mode:

Ref. No.	Switch	Mode
S1] S2]	FM/AIR/PSB selector	PSB
S3	BAND SELECTOR	SW5
S4	AFC	OFF
S5	AGC/MGC selector	AGC
S6	BFO	OFF
S7	POWER	OFF
S8	AC/DC selector	DC
S9	LIGHT	OFF

4-2. MOUNTING DIAGRAM

– Conductor Side –

Applicable to the sets that the part No. of printed circuit boards are 1-591-005-11~15 and 1-581-748-11~15. For the others, see page 32.



Q101, 102: 2SC668 *D101: 2SC710*

Q103, 201, 202, 203, 204, 205, 206: 2SC710
Q207: 2SC870

D201, 205, 20(
1T261
D202, 203, 20
1S1555

Q208: 2SB136 *D207: 1T7 (LED)*

Q209, 210, 211, Q212, 213, 216, Q217: 2SC1363 *D210, 211: 10D2*

Q214, 215: 2SC1429 *VDR1, 2: VD11*

letter-printed sid

Positioning of shielded coils, CFT and transformers.

DC resistance T201

90 Ω SEC
PRI. 100 Ω 90 Ω

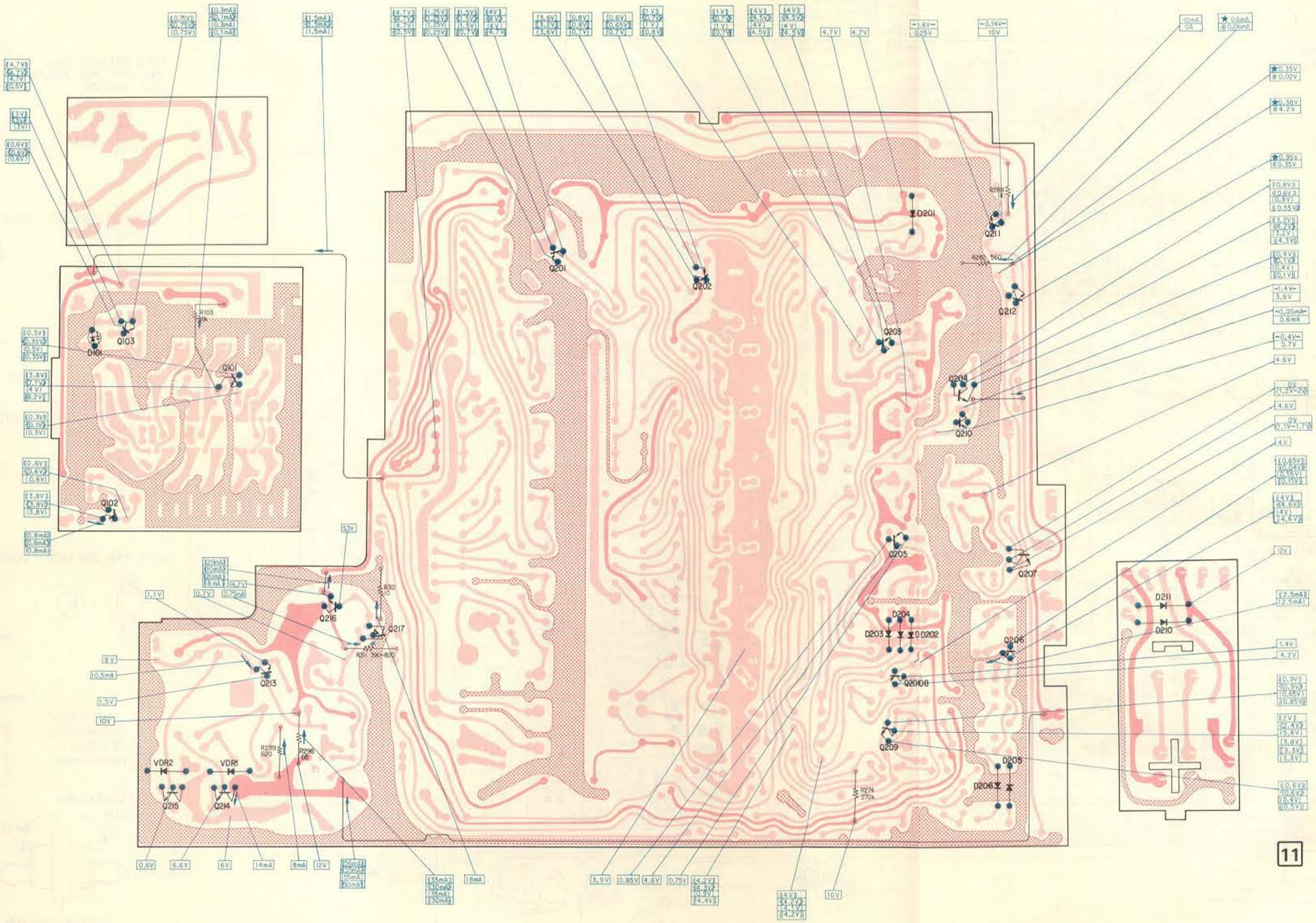
letter-printed side

: FM signal path

4-3. MOUNTING DIAGRAM

Voltages and Currents

– Conductor Side –



Note:

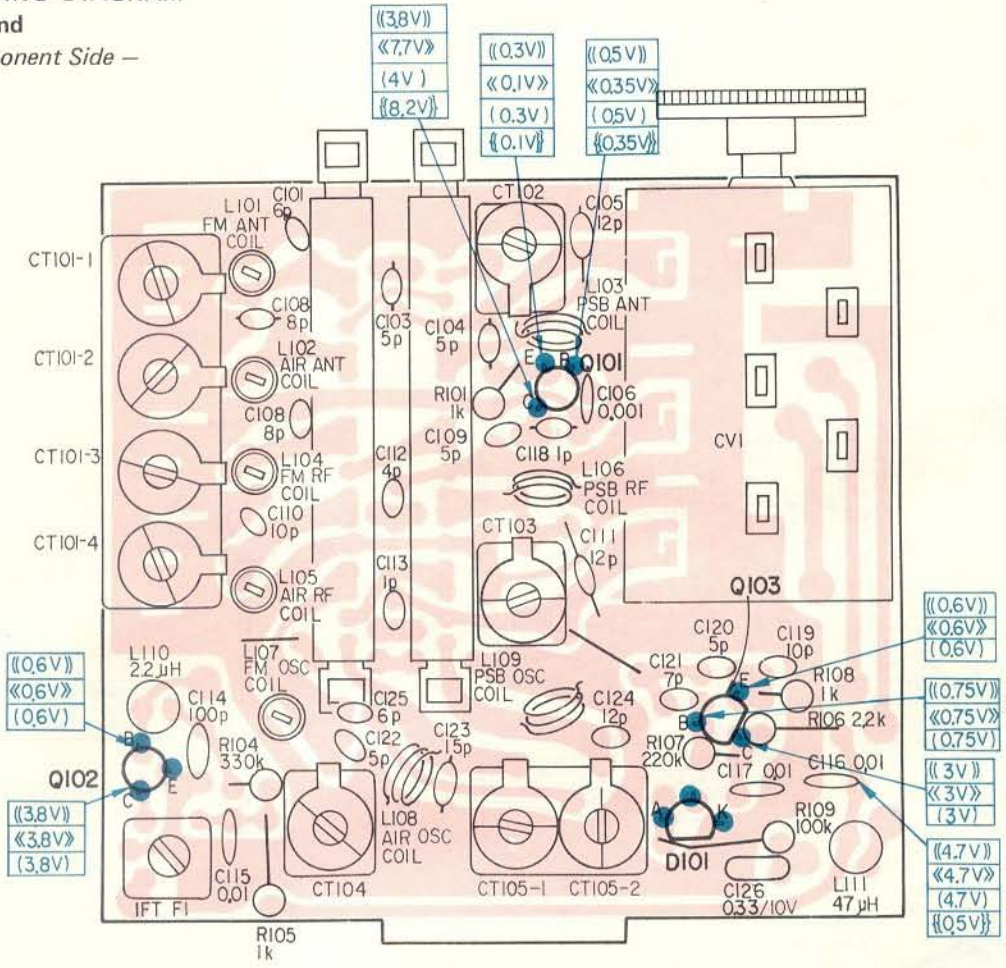
All voltage and curent readings are taken at no input signal with a 20 kΩ/V DC VOM with reference to ground line. Variations may be noted due to normal production tolerances.

(( )) : PSB, ⩽ ⩾ : AIR, ( ) : FM
[ ] : LW, [[ ]] : MW, { } : SW
{{ }} : common for LW, MW and SW
< > : SW, BFO ON
★ : SQUELCH MAX
※ : SQUELCH MIN
(- - : tuned-in condition)
: B + pattern
: ground pattern

4-4. MOUNTING DIAGRAM

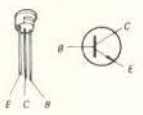
Front End

– Component Side –

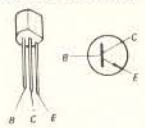


ADJ	CT101-1	L101		CT102
	CT101-2	L102		L103
	CT101-3	L104		L106
	CT101-4	L105		CT103
		L107	L108	L109
	IFT FI	CT104		CT105-1 CT105-2

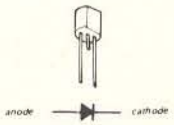
Q101, 102: 2SC668



Q103: 2SC710

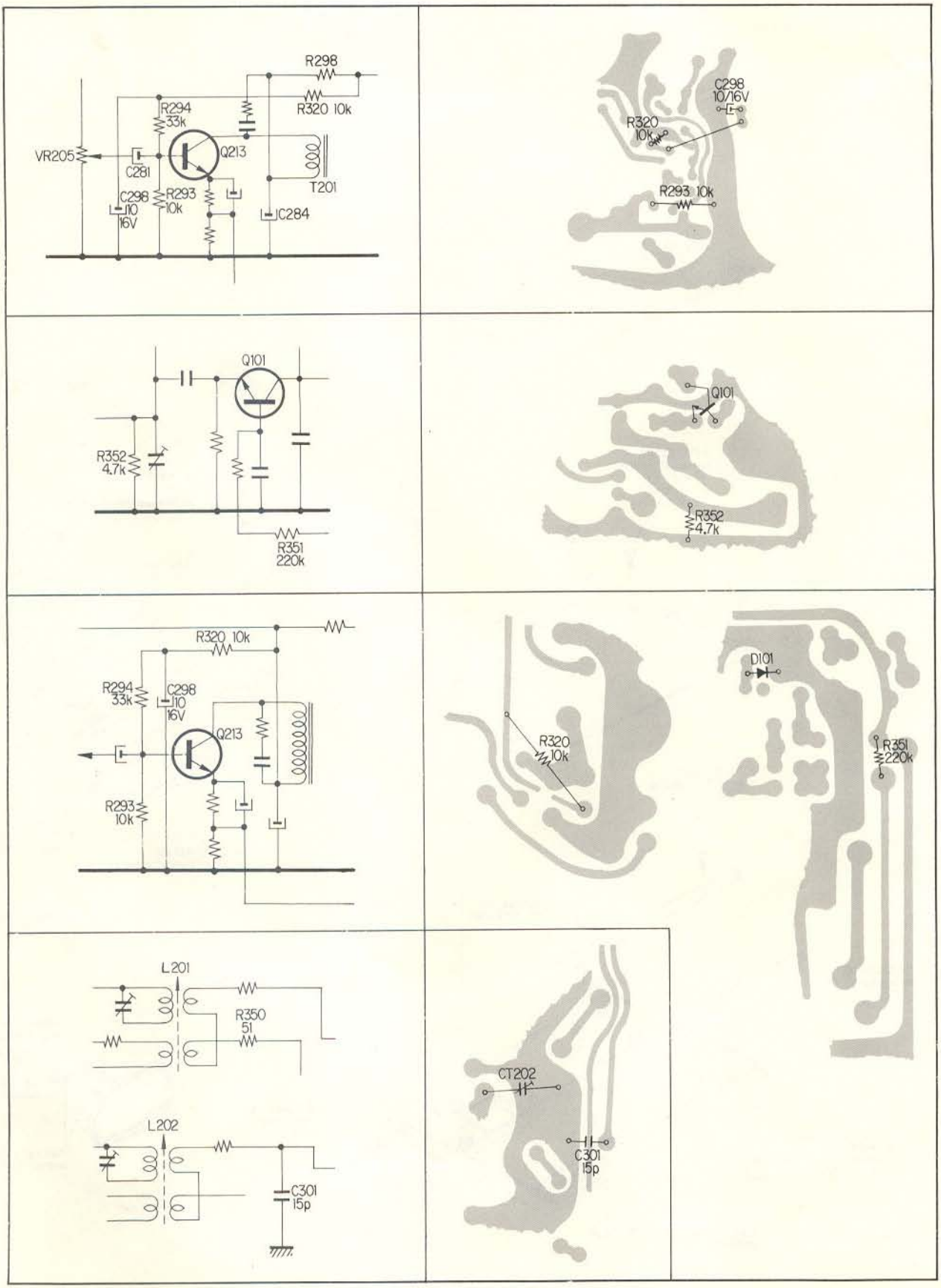


D101: 2SC710



4-5. SCHEMATIC AND MOUNTING DIAGRAMS

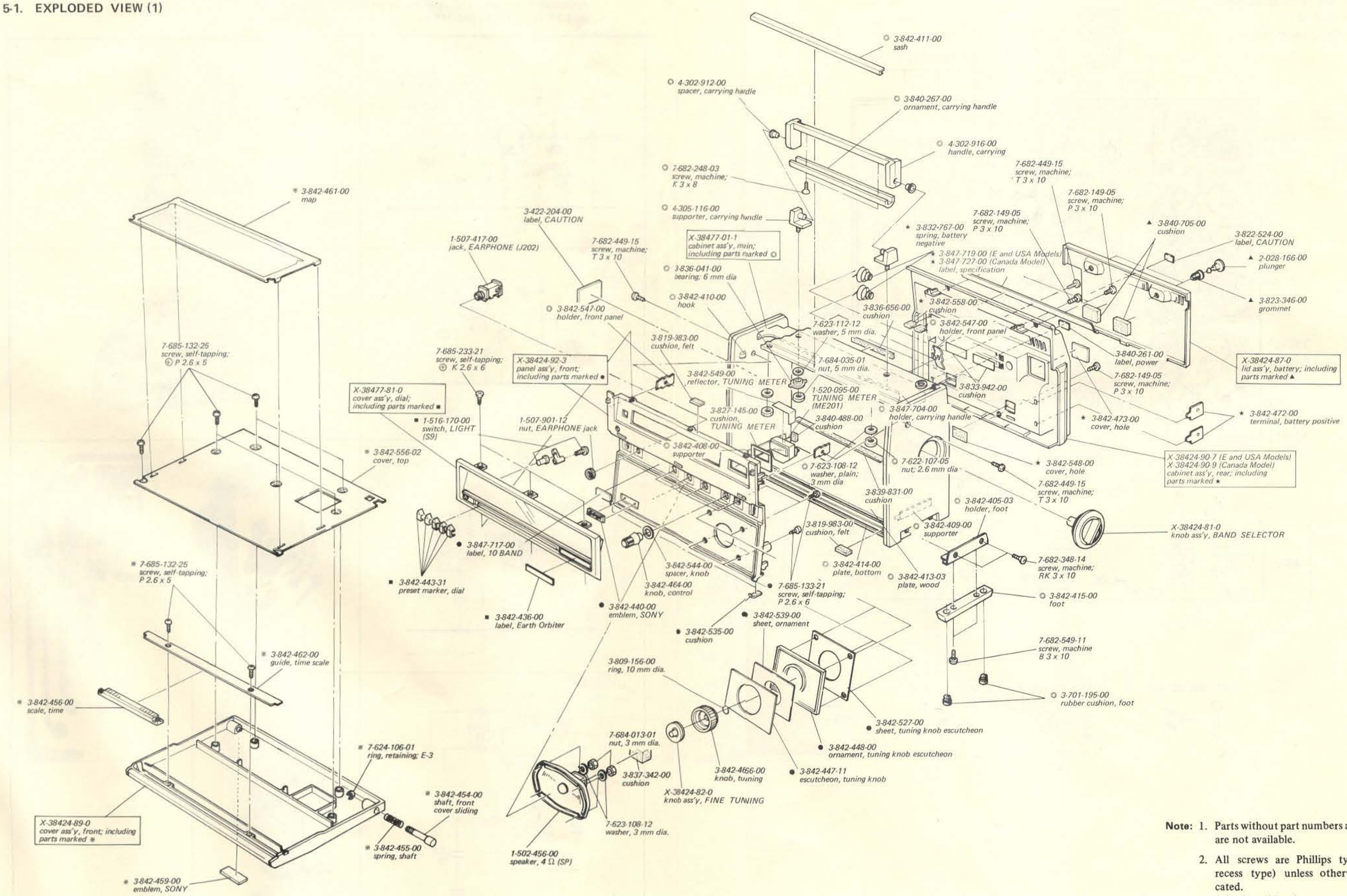
Applicable to the sets that the part No. of printed circuit boards are 1-591-005-16 and 1-581-748-16.



SECTION 5

EXPLODED VIEWS AND PACKING

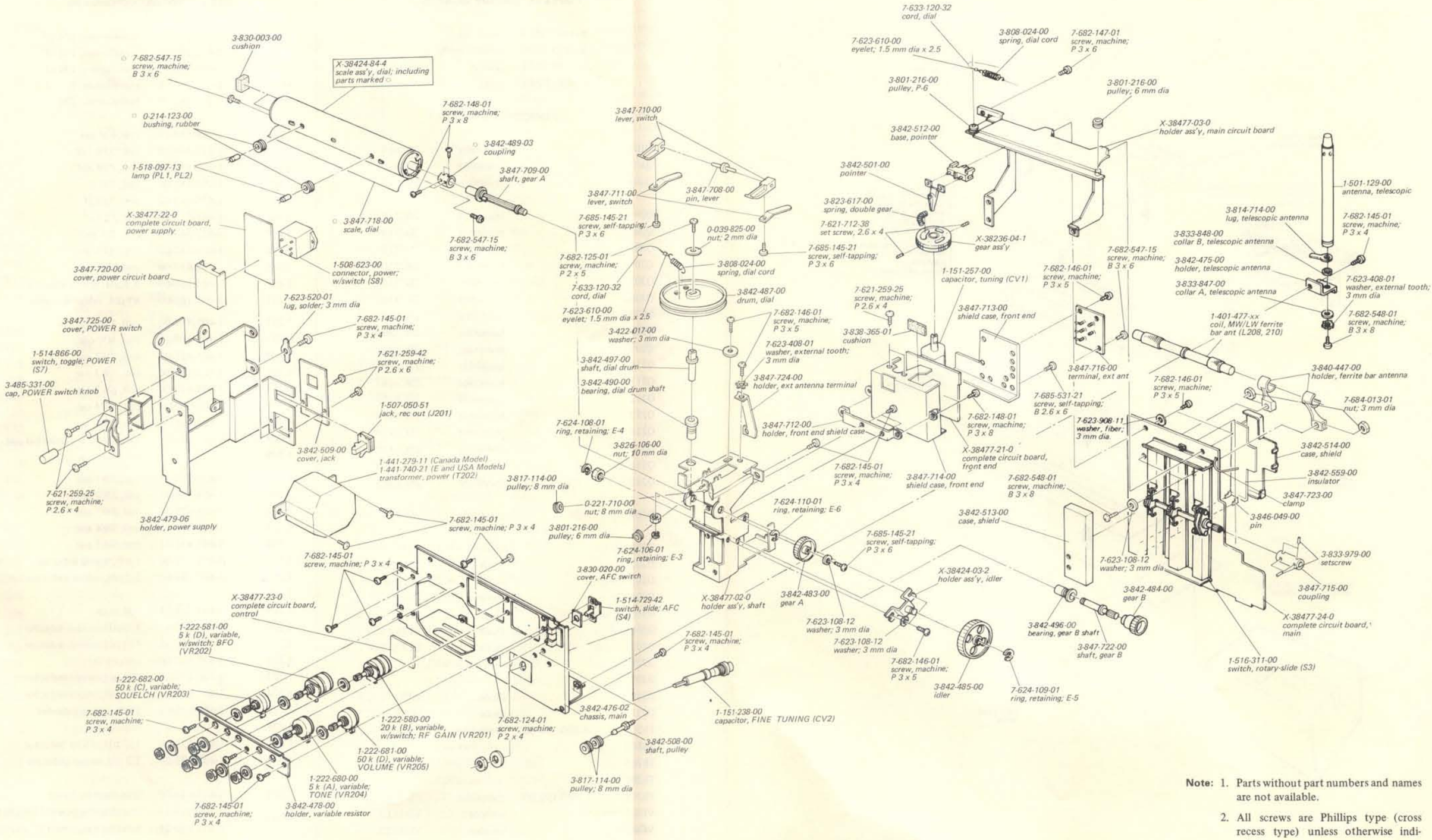
5-1. EXPLODED VIEW (1)



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

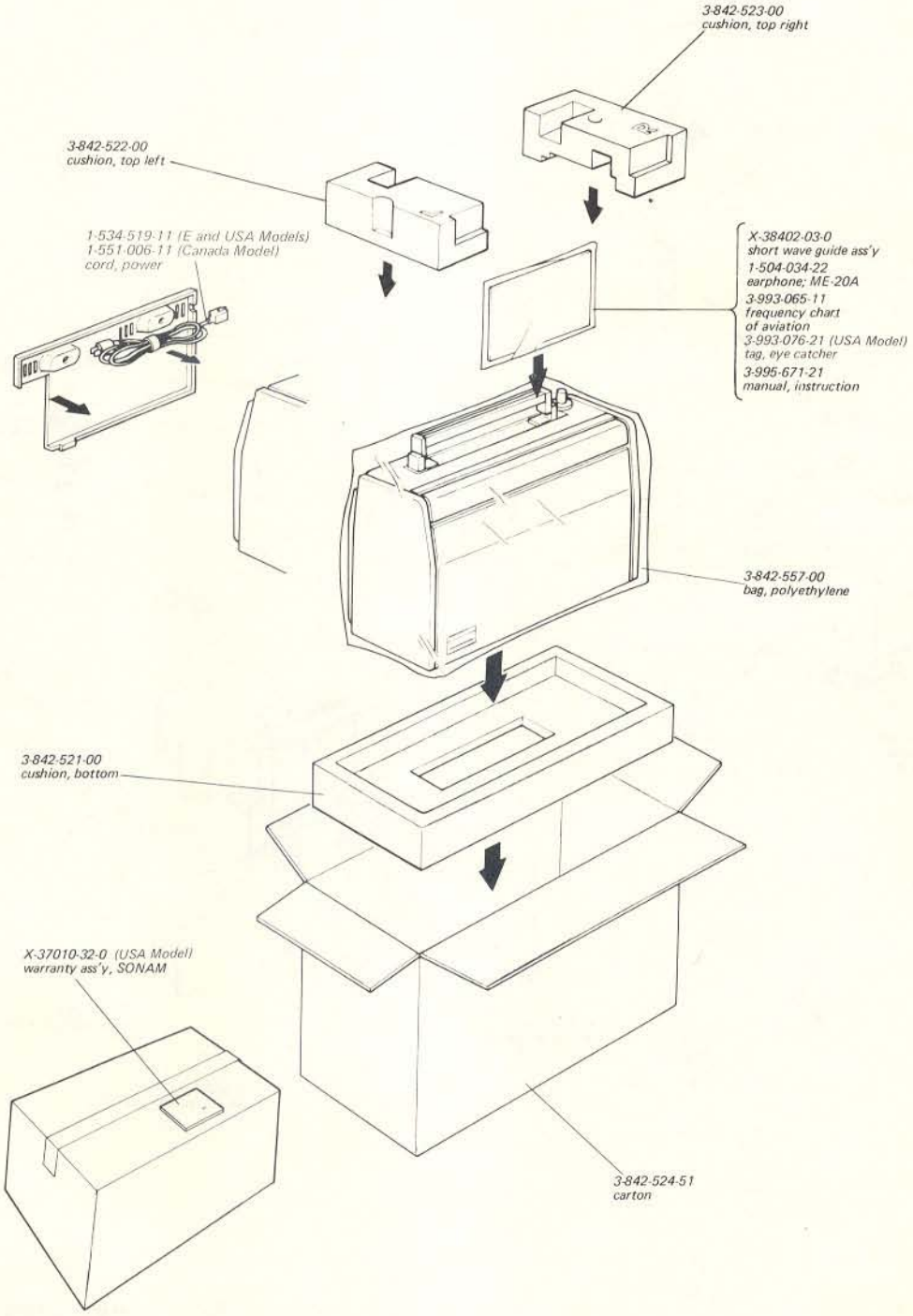
5-2. EXPLODED VIEW (2)



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. PACKING



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

SECTION 6

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	
	COMPLETE CIRCUIT BOARDS		
	X-38477-21-0	front end	
	X-38477-22-0	power supply	
	X-38477-23-0	control	
	X-38477-24-0	main	
	SEMICONDUCTORS		
Q101		transistor	2SC668
Q102		transistor	2SC668
Q103		transistor	2SC710
Q201		transistor	2SC710
Q202		transistor	2SC710
Q203		transistor	2SC710
Q204		transistor	2SC710
Q205		transistor	2SC710
Q206		transistor	2SC710
Q207		transistor	2SC870
Q208		transistor	2SB136
Q209		transistor	2SC1363
Q210		transistor	2SC1363
Q211		transistor	2SC1363
Q212		transistor	2SC1363
Q213		transistor	2SC1363
Q214		transistor	2SC1429
Q215		transistor	2SC1429
Q216		transistor	2SC1363
Q217		transistor	2SC1363
D101		transistor	2SC710
D201		diode	1T261
D202		diode	1S1555
D203		diode	1S1555
D204		diode	1S1555
D205		diode	1T261
D206		diode	1T261
D207		diode	1T7 (LED)
D208		----------	
D209		----------	
D210		diode	10D2
D211		diode	10D2
Th201	1-800-196-00	thermistor	CS-300
Th202		----------	
Th203		----------	
Th204		----------	
Th205	1-800-192-00	thermistor	CS-120
VDR1		varistor	VD1120
VDR2		varistor	VD1120

Ref. No.	Part No.	Description
	COILS AND TRANSFORMERS	
IFT A1	1-403-174-11	transformer, AM i-f
IFT F1	1-403-242-31	transformer, FM i-f
IFT F2	1-403-555-11	transformer, FM i-f
IFT F3	1-403-287-11	transformer, FM i-f
IFT F4	1-403-287-21	transformer, FM i-f
L101	1-401-554-00	coil, FM ant
L102	1-425-349-00	coil, AIR ant
L103	1-401-555-00	coil, PSB ant
L104	1-401-554-00	coil, FM rf
L105	1-425-349-00	coil, AIR rf
L106	1-401-555-00	coil, PSB rf
L107	1-425-349-00	coil, FM osc
L108	1-405-612-00	coil, AIR osc
L109	1-405-612-00	coil, PSB osc
L110	1-407-182-00	2.2 μH, micro inductor
L111	1-407-165-00	47 μH, micro inductor
L201	1-405-497-00	coil, LW osc
L202	1-405-399-00	coil, MW osc
L203	1-405-451-00	coil, SW1 osc
L204	1-405-498-00	coil, SW2 osc
L205	1-405-499-00	coil, SW3 osc
L206	1-405-500-00	coil, SW4 osc
L207	1-405-501-00	coil, SW5 osc
L208, 210	1-401-477-xx	coil, MW/LW ferrite bar ant
L209		----------
L211	1-401-373-11	coil, SW1 ant
L212	1-401-478-11	coil, SW2 ant
L213	1-401-479-11	coil, SW3 ant
L214	1-401-480-11	coil, SW4 ant
L215	1-401-481-11	coil, SW5 ant
L216	1-407-178-00	1 μH, micro inductor
L217	1-407-182-00	2.2 μH, micro inductor
L218		----------
L219	1-401-201-11	coil, trap
L220	1-407-177-xx	470 μH, micro inductor
L221	1-407-177-xx	470 μH, micro inductor
L222	1-405-502-00	coil, BFO
L223	1-407-177-xx	470 μH, micro inductor
L224	1-407-169-xx	100 μH, micro inductor
L225	1-407-178-xx	1 μH, micro inductor
L226		----------
L227	1-407-171-00	150 μH, micro inductor
L228	1-407-182-00	2.2 μH, micro inductor
T201	1-423-140-00	transformer, driver
T202	1-441-279-11	transformer, power (Canada Model)
	1-441-740-21	transformer, power (E and USA Models)

CAPACITORS

All fixed capacitors are in μF and ceramic type unless otherwise specified. p = μμ, elect = electrolytic

Ref. No.	Part No.	Description		
C101	1-102-808-11	6 p		
C102	1-102-810-11	8 p		
C103	1-102-807-11	5 p		
C104	1-102-807-11	5 p		
C105	1-102-955-11	12 p		
C106	1-108-227-12	0.001		mylar
C107		----------		
C108	1-102-810-11	8 p		
C109	1-102-807-11	5 p		
C110	1-102-954-11	10 p		
C111	1-102-952-11	12 p		
C112	1-102-941-11	4 p		
C113	1-102-934-11	1 p		
C114	1-102-975-11	100 p		
C115	1-101-923-11	0.01		
C116	1-101-923-11	0.01		
C117	1-101-923-11	0.01		
C118	1-102-934-11	1 p		
C119	1-102-954-11	10 p		
C120	1-102-807-11	5 p		
C121	1-102-809-11	7 p		
C122	1-101-998-11	5 p		
C123	1-102-259-11	15 p		
C124	1-102-749-11	12 p		
C125	1-102-808-11	6 p		
C126	1-127-021-11	0.33	10 V	solid aluminum
C201	1-101-923-11	0.01		
C202	1-101-923-11	0.01		
C203	1-101-923-11	0.01		
C204	1-102-807-11	5 p		
C205	1-108-242-12	0.022		mylar
C206		----------		
C207	1-101-923-11	0.01		
C208	1-121-413-11	100	6.3 V	elect
C209	1-102-954-11	10 p		
C210	1-101-923-11	0.01		
C211	1-108-239-12	0.01		mylar
C212	1-108-242-12	0.022		mylar
C213	1-102-960-11	24 p		
C214		----------		
C215	1-102-964-11	36 p		
C216	1-102-253-11	10 p		
C217	1-102-958-11	18 p		
C218	1-102-958-11	18 p		
C219	1-102-252-11	24 p		
C220	1-108-244-12	0.033		mylar
C221		----------		
C222	1-107-133-11	120 p		silvered mica
C223	1-107-241-11	360 p		silvered mica
C224	1-103-778-11	1300 p		styrol
C225	1-103-785-11	2700 p		styrol
C226	1-107-143-11	330 p		silvered mica
C227	1-107-134-11	130 p		silvered mica
C228	1-107-126-11	62 p		silvered mica
C229	1-102-969-11	33 p		
C230	1-102-934-11	1 p		
C231	1-102-935-11	2 p		
C232	1-102-958-11	20 p		
C233		----------		
C234	1-102-941-11	4 p		
C235	1-102-808-11	6 p		
C236	1-102-954-11	10 p		
C237	1-106-009-12	0.0022		mylar
C238	1-102-957-11	18 p		
C239	1-107-143-11	330 p		silvered mica
C240	1-107-134-11	130 p		silvered mica
C241	1-107-126-11	62 p		silvered mica
C242	1-101-923-11	0.01		
C243	1-101-923-11	0.01		
C244	1-102-969-11	33 p		
C245	1-101-924-11	0.022		
C246	1-101-924-11	0.022		
C247	1-102-975-11	100 p		
C248	1-101-923-11	0.01		
C249	1-121-413-11	100	6.3 V	elect
C250	1-101-923-11	0.01		
C251	1-102-967-11	22 p		
C252	1-102-975-11	100 p		
C253	1-108-242-12	0.022		mylar
C254	1-108-240-12	0.015		mylar
C255	1-108-242-12	0.022		mylar
C256	1-102-734-11	100 p		
C257	1-121-402-11	33	10 V	elect
C258	1-108-239-12	0.01		mylar
C259	1-121-413-11	100	6.3 V	elect
C260	1-108-242-12	0.022		mylar
C261	1-108-244-12	0.033		mylar
C262	1-101-923-11	0.01		
C263	1-101-923-11	0.01		
C264	1-102-939-11	2 p		
C265	1-121-469-11	10	10 V	elect
C266	1-108-227-12	0.001		mylar
C267	1-108-242-12	0.022		mylar
C268	1-121-726-11	0.47	50 V	elect
C269	1-121-391-11	1	50 V	elect
C270	1-108-240-12	0.015		mylar

Ref. No.	Part No.	Description		
C271	1-108-242-12	0.022		mylar
C272	1-101-925-11	0.04		
C273	1-121-396-11	4.7	50 V	elect
C274	1-121-496-11	10	10 V	elect
C275	1-121-396-11	4.7	50 V	elect
C276		----------		
C277	1-108-242-12	0.022		mylar
C278	1-127-046-11	0.22	10 V	solid aluminum
C279	1-108-227-12	0.001		mylar
C280	1-108-249-12	0.068		mylar
C281	1-121-726-11	0.47	50 V	elect
C282	1-121-413-11	100	6.3 V	elect
C283	1-101-923-11	0.01		
C284	1-121-245-11	1000	16 V	elect
C285	1-121-426-11	470	16 V	elect
C286	1-121-245-11	1000	16 V	elect
C287	1-121-415-11	100	16 V	elect
C288		----------		
C289	1-102-955-11	12 p		
C290	1-102-956-11	15 p		
C291	1-121-413-11	100	6.3 V	elect
C292	1-102-941-11	4 p		
C293	1-102-204-11	0.0022		
C294	1-101-923-11	0.01		
C295	1-101-923-11	0.01		
C296	1-102-975-11	100 p		
C297, 298		----------		
C299	1-108-227-12	0.001		mylar
CT101	1-141-153-00	capacitor, trimmer; 4-unit		
CT102	1-141-097-00	capacitor, trimmer		
CT103	1-141-097-00	capacitor, trimmer		
CT104	1-141-097-00	capacitor, trimmer		
CT105	1-141-144-00	capacitor, trimmer; 2-unit		
CT201	1-141-142-00	capacitor, trimmer		
CT202	1-141-142-00	capacitor, trimmer		
CT203	1-141-142-00	capacitor, trimmer		
CT204	1-141-142-00	capacitor, trimmer		
CT205	1-141-142-00	capacitor, trimmer		
CT206	1-141-142-00	capacitor, trimmer		
CT207	1-141-142-00	capacitor, trimmer		
CV1	1-151-257-00	capacitor, tuning		
CV2	1-151-238-00	capacitor, FINE TUNING		

RESISTORS

All fixed resistors are in Ω, 1/4 W, ± 5 % carbon film type unless otherwise specified. k = 1000, M = 1000 k

Ref. No.	Part No.	Description
R101	1-244-673-11	1 k
R102	1-244-713-11	47 k
R103	1-244-703-11	18 k
R104	1-244-733-11	330 k
R105	1-242-673-11	1 k
R106	1-242-681-11	2.2 k
R107	1-244-729-11	220 k
R108	1-244-673-11	1 k
R109	1-242-721-11	100 k
R201	1-244-721-11	100 k
R202	1-244-715-11	56 k
R203	1-244-709-11	33 k
R204	1-244-641-11	47
R205	1-244-697-11	10 k
R206	1-244-721-11	100 k
R207	1-244-673-11	1 k
R208	1-244-657-11	220
R209	1-244-641-11	47
R210	1-244-729-11	220 k
R211	1-244-673-11	1 k
R212	1-244-657-11	220
R213	1-244-669-11	680
R214	1-244-667-11	560
R215	1-244-665-11	470
R216	1-244-651-11	120
R217	1-244-645-11	68
R218	1-244-643-11	56
R219	1-244-657-11	220
R220	1-244-657-11	220
R221	1-244-669-11	680
R222	1-244-655-11	180
R223	1-244-649-11	100
R224	1-244-649-11	100
R225	1-224-645-11	68
R226	1-244-641-11	47
R227	1-244-643-11	56
R228	1-244-641-11	47
R229	1-244-669-11	680
R230	1-244-659-11	270
R231	1-244-697-11	10 k
R232	1-244-673-11	1 k
R233	1-244-721-11	100 k
R234	1-244-697-11	10 k
R235	1-244-725-11	150 k
R236	1-244-697-11	10 k
R237	1-244-661-11	330
R238	1-244-697-11	10 k
R239	1-244-641-11	47
R240	1-244-673-11	1 k
R241	1-244-697-11	10 k
R242	1-244-693-11	6.8 k
R243	1-244-717-11	68 k
R244	1-244-673-11	1 k

Ref. No.	Part No.	Description
R245	1-244-716-11	62 k
R246	1-244-725-11	150 k
R247	1-244-641-11	47
R248	1-244-667-11	560
R249	1-244-677-11	1.5 k
R250	1-244-669-11	680
R251	1-244-673-11	1 k
R252	1-244-663-11	390
R253	1-244-649-11	100
R254	1-244-693-11	6.8 k
R255	1-244-641-11	47
R256	1-244-705-11	22 k
R257	1-244-655-11	180
R258	1-244-721-11	100 k
R259	1-244-673-11	1 k
R260	1-244-673-11	1 k
R261	1-244-673-11	1 k
R262	1-244-667-11	560
R263	1-244-664-11	430
R264	1-244-719-11	82 k
R265	1-244-685-11	3.3 k
R266	1-244-715-11	56 k
R267	1-244-673-11	1 k
R268	1-244-681-11	2.2 k
R269	1-244-687-11	3.9 k
R270	1-244-717-11	68 k
R271	1-244-717-11	68 k
R272	1-244-709-11	33 k
R273	1-244-689-11	4.7 k
R274	1-244-731-11	270 k
R275	1-244-681-11	2.2 k
R276	1-244-655-11	180
R277	1-244-673-11	1 k
R278	1-244-717-11	68 k
R279	1-244-697-11	10 k
R280	1-244-697-11	10 k
R281	1-244-707-11	27 k
R282	1-244-667-11	560
R283	1-244-693-11	6.8 k
R284	1-244-712-11	43 k
R285	1-244-689-11	4.7 k
R286	1-244-705-11	22 k
R287	1-244-691-11	5.6 k
R288	1-244-673-11	1 k
R289	1-244-717-11	68 k
R290	1-244-709-11	33 k
R291	1-244-711-11	39 k
R292	1-244-703-11	18 k
R293	----------	----------
R294	1-244-737-11	470 k
R295	1-244-617-11	4.7

Ref. No.	Part No.	Description
R296	1-244-649-11	100
R297	1-244-681-11	2.2 k
R298	1-244-645-11	68
R299	1-244-668-11	620
R300	1-244-668-11	620
R301	1-244-639-11	39
R302	1-244-669-11	680
R303	1-244-639-11	39
R304	1-244-669-11	680
R305	1-207-459-11	0.47 ½ W wirewound
R306	1-207-459-11	0.47 ½ W wirewound
R307	1-244-837-31	33 ½ W
R308	1-244-665-11	470
R309	1-244-667-11	560
R310	1-244-689-11	4.7 k
※ R311	1-244-663-11	390
	1-244-665-11	470
	1-244-666-11	510
	1-244-669-11	680
	1-244-671-11	820
R312	1-244-625-11	10
R313	1-244-707-11	27 k
R314	1-244-667-11	560
R315	1-202-762-31	68 1 W composition
R316	1-202-525-31	10 ½ W composition
R317	1-202-723-31	2.2 M ½ W composition
R318	1-202-647-31	1.2 M ½ W composition
R319	1-202-647-31	1.2 M ½ W composition
VR201	1-222-580-00	20 k (B), variable, w/switch; RF GAIN
VR202	1-222-581-00	5 k (D), variable, w/switch; BFO
VR203	1-222-682-00	50 k (C), variable; SQUELCH
VR204	1-222-680-00	5 k (A), variable; TONE
VR205	1-222-681-00	50 k (D), variable; VOLUME

※: to be selected

MISCELLANEOUS

CFT	1-403-165-21	filter, ceramic
* CF1	1-527-184-11	filter, ceramic (red)
	1-527-184-12	filter, ceramic (blue)
	1-527-184-13	filter, ceramic (orange)
	1-527-184-14	filter, ceramic (black)
	1-527-184-15	filter, ceramic (white)
* CF2	1-527-184-11	filter, ceramic (red)
	1-527-184-12	filter, ceramic (blue)
	1-527-184-13	filter, ceramic (orange)
	1-527-184-14	filter, ceramic (black)
	1-527-184-15	filter, ceramic (white)
CF3	1-403-154-00	filter, ceramic
CR1	1-231-168-11	encapsulated component; 1 kΩ + 0.033 μF

*: Color mark of CF1 and CF2 should be the same and be replaced with the same-colored ceramic filters as origina ones.

Ref. No.	Part No.	Description
CR2	1-231-208-11	encapsulated component; 270 Ω + 0.033 μF
CR3	1-231-209-11	encapsulated component; 390 Ω + 0.033 μF
CR4	1-231-202-11	encapsulated component; 6.8 kΩ + 6.8 kΩ + 0.001 μF + 0.001 μF
J201	1-507-050-51	jack, rec out
J202	1-507-412-00	jack, EARPHONE
ME201	1-520-095-00	TUNING METER
S1	1-514-861-22	switch, slide
S2	1-514-861-22	switch, slide
S3	1-516-311-00	switch, rotary-slide
S4	1-514-729-42	switch, slide; AFC
S5		----------
S6		----------
S7	1-514-866-00	switch, toggle; POWER
S8	1-508-623-00	connector, power; w/switch
S9	1-516-170-00	switch, leaf; LIGHT
SP	1-502-456-00	speaker, 4 Ω
TEL ANT	1-501-129-00	antenna, telescopic
	1-507-901-12	nut, EARPHONE jack

Hardware Nomenclature

P – Pan Head Screw

PS – Pan Head Screw with Spring Washer

K – Flat Countersunk Head Screw

B – Binding Head Screw

RK – Oval Countersunk Head Screw

T – Truss Head Screw

R – Round Head Screw

F – Flat Fillister Head Screw

SC – Set Screw

E – Retaining Ring (E Washer)

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

– Example –

⊕ P 3×10
- P: Type of Head
- 3: Diameter in mm (D)
- 10: Length in mm (L)
- ⊕: Type of Slot

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