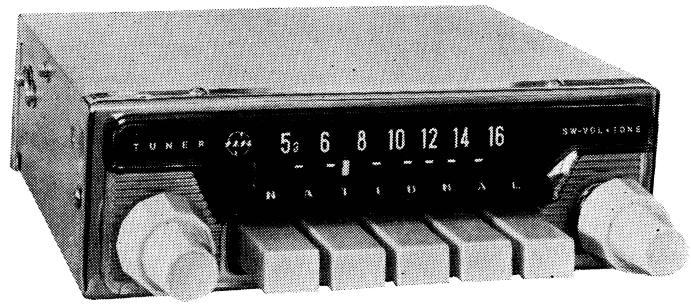
ALL TRANSISTOR CAR RADIO

MODEL AT-250

SERVICE NOTE

MATSUSHITA



CONTENTS

MATSUSHITA COMMUNICATION INDUSTRIAL CO., LTD.

TSUNASHIMA YOKOHAMA JAPAN

1. SPECIFICATIONS

Receiving system:	class B push-pull output with one RF amplification stage
Tuning:	5 push buttons
Reception band:	535 KC ~ 1605 KC
Intermediate frequency:	455 KC
Sensitivity:	under 20 μV for 500 mW output
Selectivity:	over 16 dB at ± 10 KC detuning
Frequency response:	within —15 dB at 100 c/s 0 dB at 400 c/s within —24 dB at 4000 c/s
Output power:	1.5 W
Power source voltage:	11~16V (13.5V standard)
Power consumption:	approx. 5.5 W (13.5 V × 0.4 A at maximum output) (170 mA: current drain without signal)

2. COMPOSITION

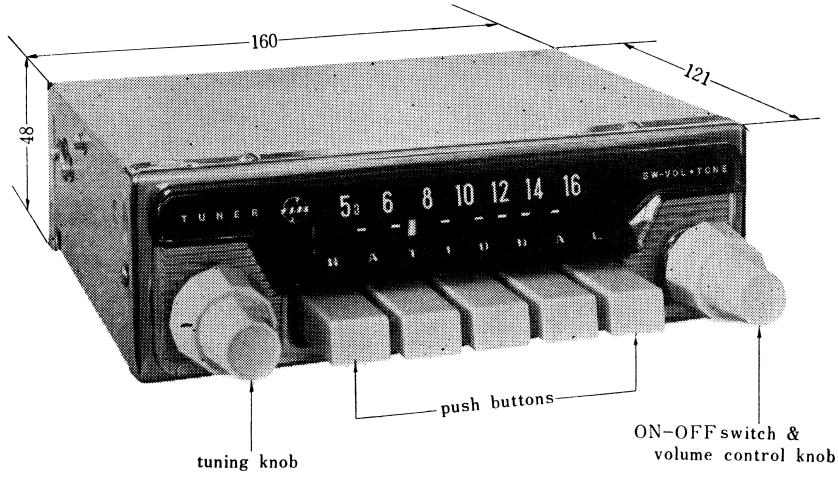
Radio set	1	(See Section 2-1)
Speaker box	1	(See Section 2-2)
Accessories	1 set	(See Section 2-3)

※ This set works on 12V power source only.

As the set adopts class B push-pull circuit for the output stage, the current varies in proportion to the input signal. Therefore, even if the voltage is dropped to 12V with a voltage dropper, the set cannot be installed to the car equipped with 24V power source.

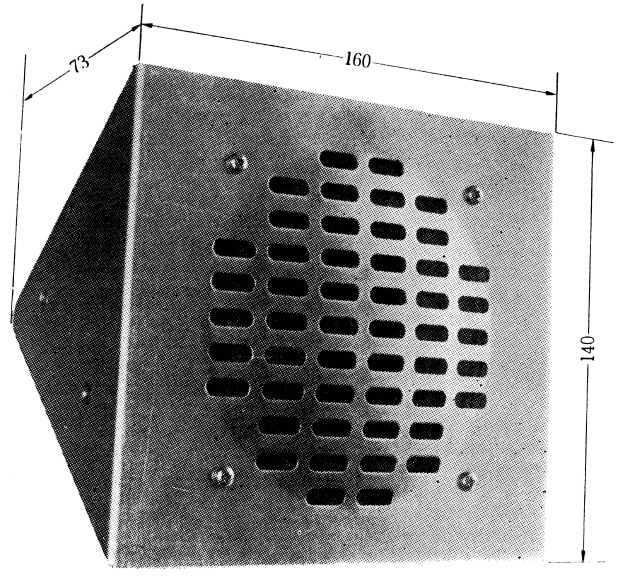
2-1 Radio Set (Weight: 1.4kg)

(Unit: m/m)



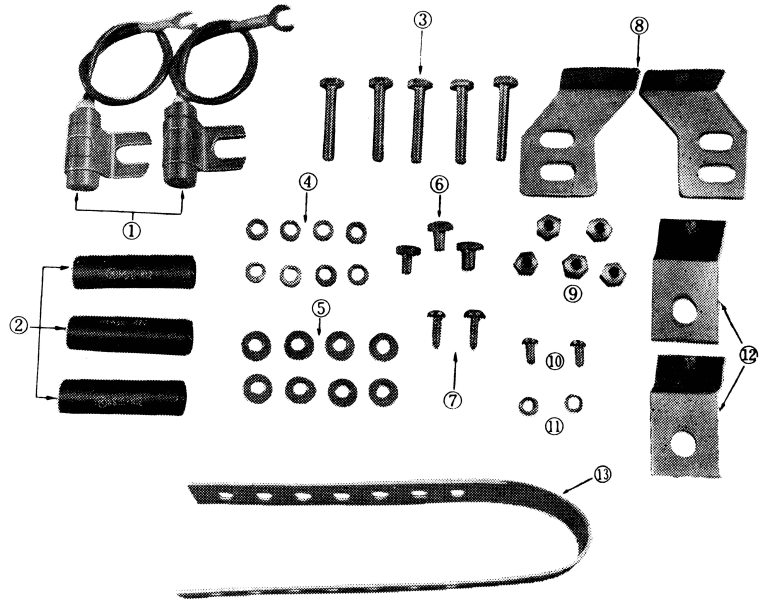
2-2 Speaker Box (Weight: about 0.6 kg)

P-524S (Impedance: 3.0 Ω)



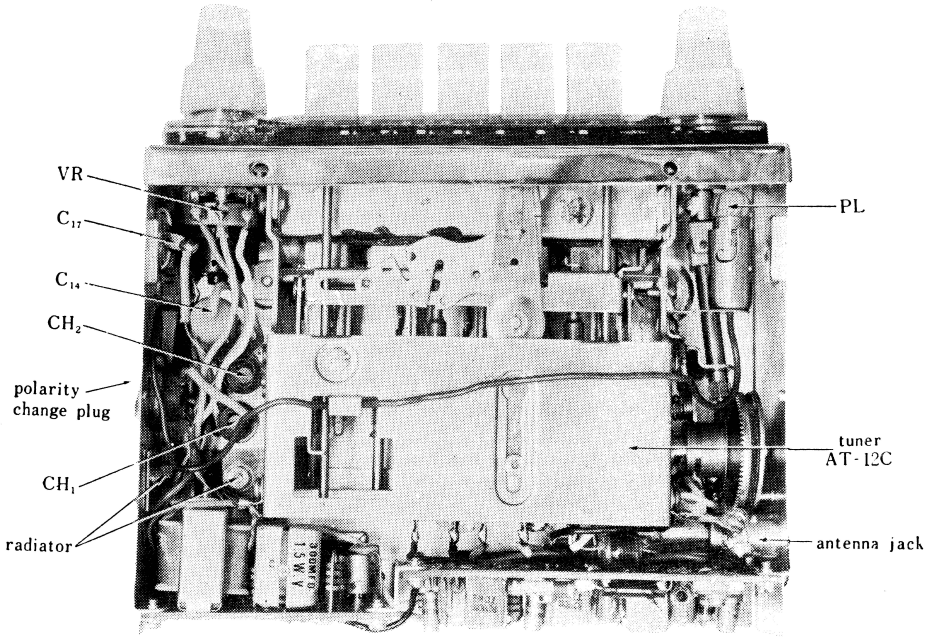
2-3 Accessories

No.	Item	Rating	Q'ty
1	Noise suppresser condenser	0.5μF 250V	2
2	S-type noise suppresser		3
3	Hexagonal head screw.	5mmØ×30	5
4	Spring washer	5mmØ	8
5	Washer	5mmØ	8
6	Hexagonal head screw	5mmØ×8	3
7	Wood screw	SC-15 ⊖ head	2
8	Mounting bracket B		1 each for left & right
9	Hexagonal nut	5mmØ	5
10	Screw	4mmØ×8 ⊕ head	2
11	Spring washer	4mmØ	2
12	Speaker bracket		2
13	Mounting bracket A		1

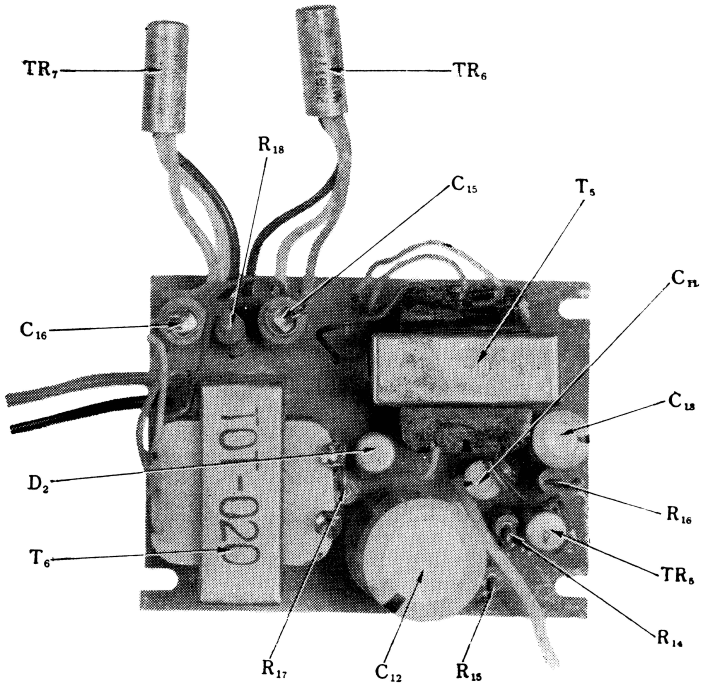


3. PARTS LOCATION

3-1 Inside of the Radio Set (the upper side)

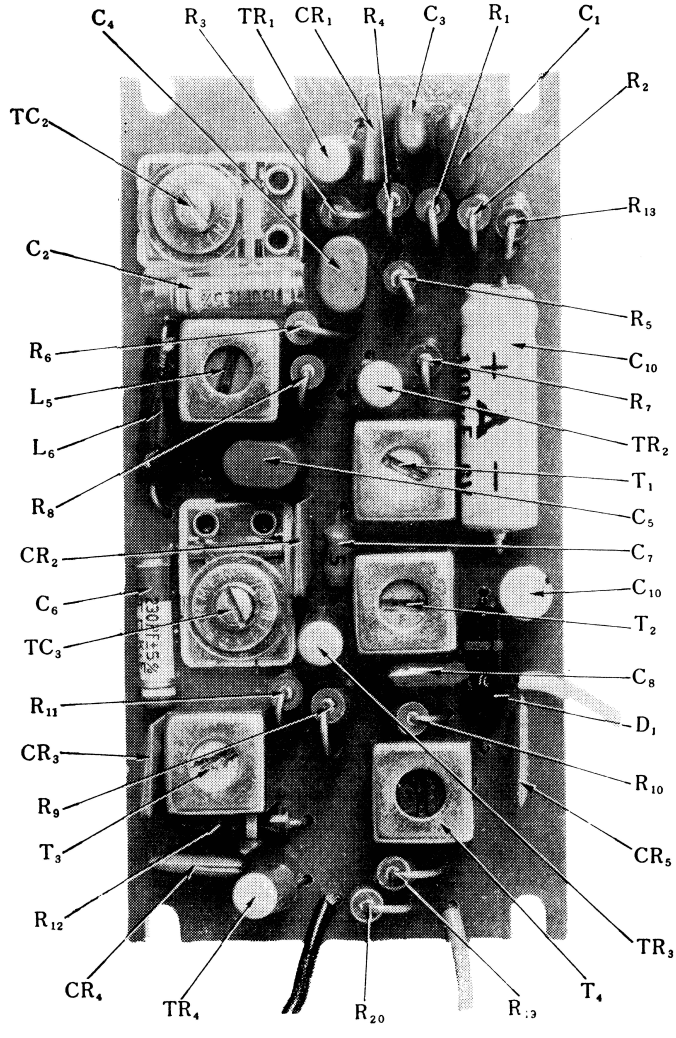


3-2 Printed Circuit Board (P-250B)



3-3 Printed Circuit Board (P-250A)

R:	Resistor	C:	Condenser
TR:	Transistor	CR:	Condenser & Resistor
T:	Transformer	TC:	Trimmer condenser
L:	Coil		



4. POLARITY CHANGE

Model AT-250 can be installed either in plus (+) earthed car or in minus (—) earthed car. Polarity can be changed by moving the polarity change plug located on the right side of the chassis.

The radio set is originally minus (—) earthed in factory.

(1) How to set the radio set for plus (+) earthed power source.

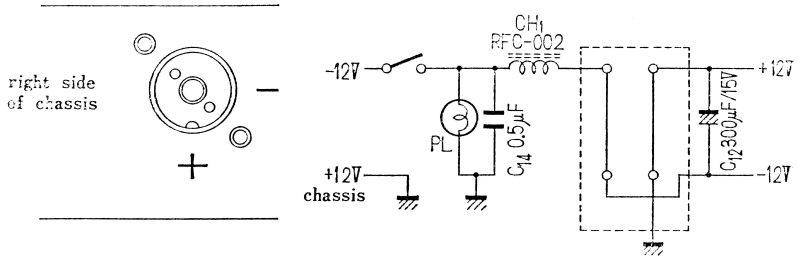


Fig. 4 - 1

(2) How to set the radio set for minus (—) earthed power source.

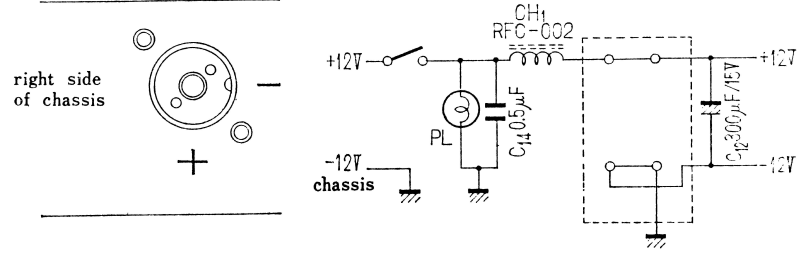


Fig. 4 - 2

5. ALIGNMENT

5-1 Preparations for Alignment

1) Regulate the power source voltage at the standard DC 13.5V constant.

2) Set the modulating frequency of the standard signal generator at 400 c/s. Modulation degree should be 30%.

3) The output of the signal generator should be as low as possible.

4) Set the volume control at its maximum position.

5) Dummy antenna should be set as shown in Fig. 5-2.

5-2 Procedures of Alignment

Process	Alignment Part	Signal Frequency	Dial pointer position	Alignment
1.	T_4 (IFT-005)	455KC	Set it at the right end	Repeat the procedures 1 to 4, 2 or 3 times so as to get the maximum output.
2.	T_3 (IFT-004)	〃	〃	
3.	T_2 (IF-22002)	〃	〃	
4.	T_1 (IF-22001)	〃	〃	
5.	L_5 (OSC-006)	530KC	Set it at the left end	
6.	TC_3 (TT-70)	1610KC	Set it at the right end	
7.	TC_2 (TT-70)	1400KC	Set it at 1400KC point	Align to get the maximum output.
8.	TC_1 (TL-70)	〃	〃	

Note: When the radio set is installed in a car, or when the antenna is changed, never fail to align again the TC_1 to get the maximum output receiving a program at or around 1400KC.

5-3 Parts to Be Aligned and Signal Frequency

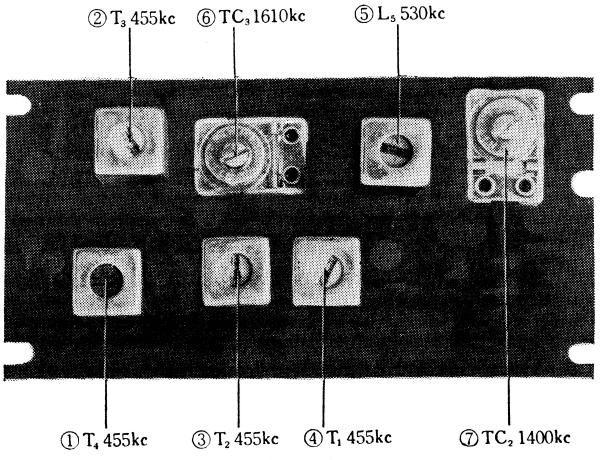


Fig. 5-1

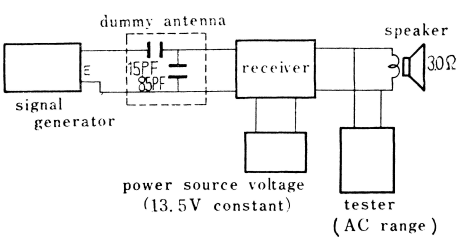


Fig. 5-2

6. STANDARD VOLTAGES AT VARIOUS POINTS OF THE CIRCUIT

1) Given voltages are the standard ones indicated on a tester which has 20KΩ/V internal resistance.

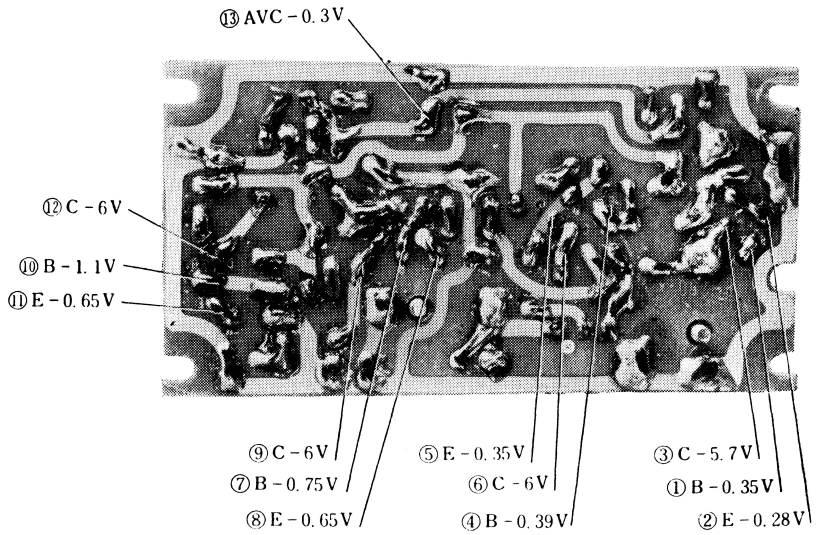
2) The standard measuring points are on plus (+) side.

3) Given voltages under 0.5V are measured with a 1.5V range tester and those between 0.5~2.5V with a 2.5V range tester.

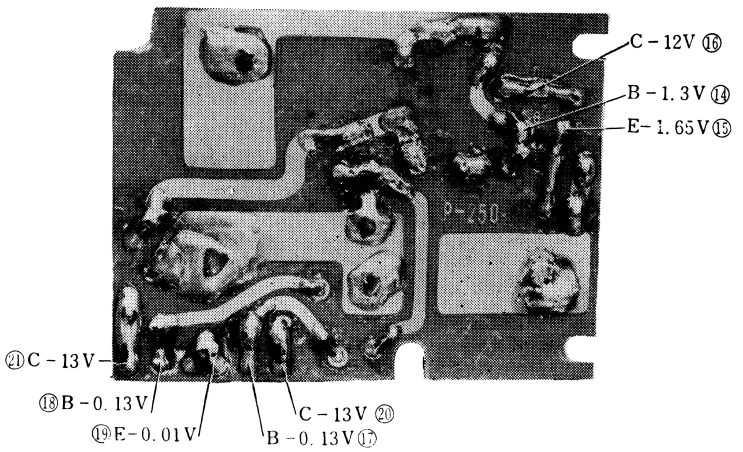
4) The figure in ○ indicates its position in the circuit diagram.

C: collector, B: base, E: emitter.

High frequency section



Low frequency section

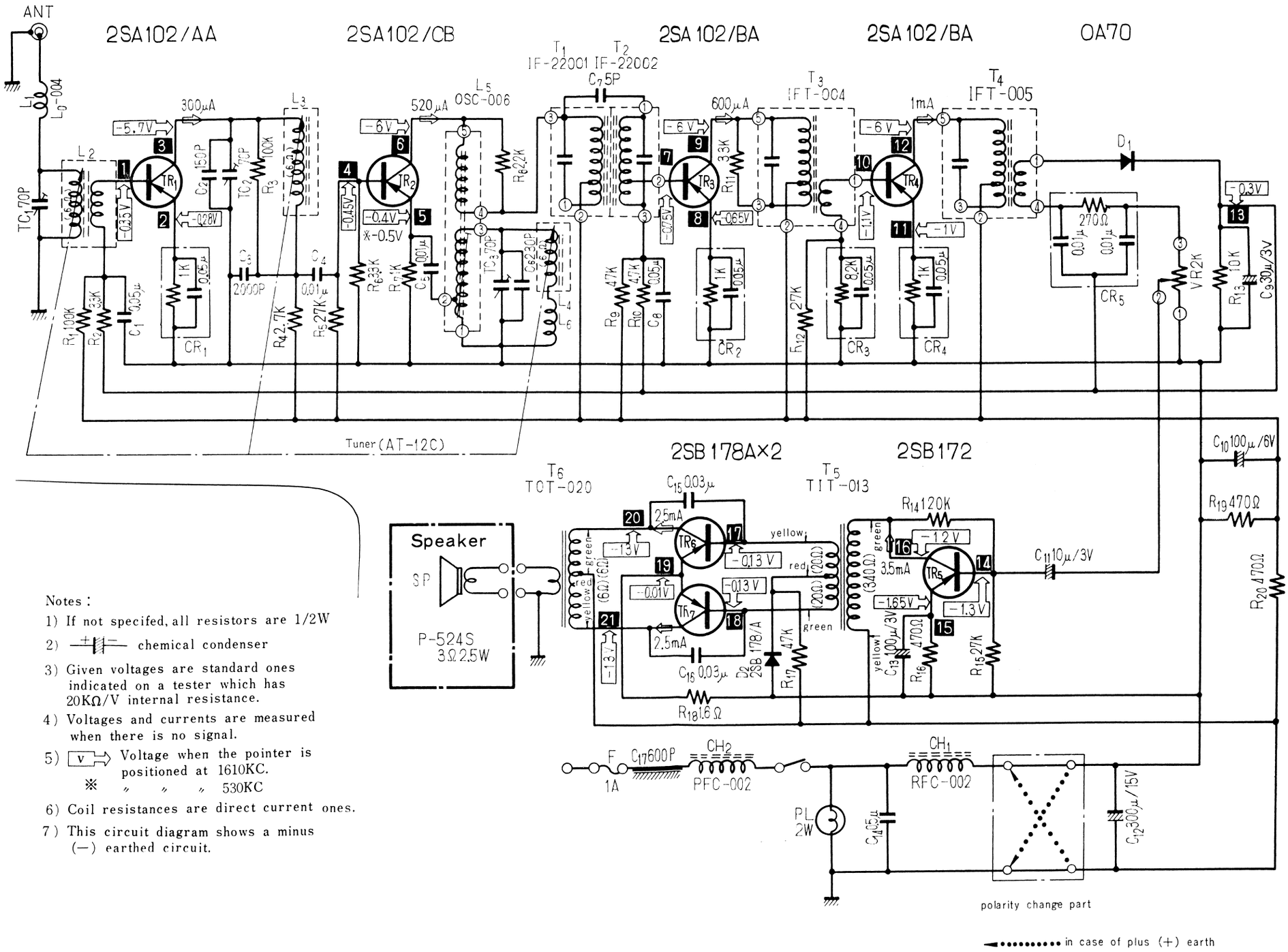


9. AT-250 PARTS LIST

Note: 1) For requirement of parts, please specify them by their type numbers.
2) Principal parts are marked with *.

No.	Name		Type No.		Note
TR_1	transistor		2SA102/AA		
TR_2	〃		2SA102/CA		
TR_3.TR_4	〃		2SA102/BA		
TR_5	〃		2SA172/AD		
TR_6.TR_7	〃		2SB178/A		Pair type transistor
D_1	diode		OA70		
D_2	transistor		2SB178/A		varistor
R_1.R_3	solid resistor	½W	RC½BFK	100KΩ	
R_4	〃	½W	RC½BFK	2.7KΩ	
R_2.R_6	〃	½W	RC½BFK	3.3KΩ	
R_7	〃	½W	RC½BFK	1KΩ	
R_{11}	〃	½W	RC½BFK	33KΩ	
R_8	〃	½W	RC½BFK	2.2KΩ	
R_9	〃	½W	RC½BFK	47KΩ	
R_{10}.R_{17}	〃	½W	RC½BFK	4.7KΩ	
R_5.R_{12}.R_{15}	〃	½W	RC½BFK	27KΩ	
R_{13}	〃	½W	RC½BFK	10KΩ	
R_{14}	〃	½W	RC½BFK	120KΩ	
R_{16}.R_{19}.R_{20}	〃	½W	RC½BFK	470Ω	
*R_{18}	synthetic resin coated resistor		WR½RN	1.6Ω	
*VR	volume control	2KΩ	PNVM 24$C_1$37.5 2KΩDSG		
C_1.C_8	miler condenser	0.05μF	MS-05503M		
C_2	titanium condenser	150PF	CC-30 150PF		
C_3	miler condenser	0.002μF	A-202K		
C_4.C_5	〃				
C_6	titanium condenser	230PF	CC-25 230PF		
C_7	〃	5PF 50V			insulated type
C_9.C_{11}	chemical condenser	10μF 3V	NCA-3V10		
C_{10}	〃	100μF 6V	NCA-6V100		
C_{12}	〃	300μF 15V	NCA-15V300		
C_{13}	〃	100μF 3V	NCA-3V100		
C_{14}	MP tubular condenser	0.5μF	MAPR-1504M		
C_{15}.C_{16}	〃	0.03μF	MPBS-2303M		
C_{17}	spark plate	600PF			

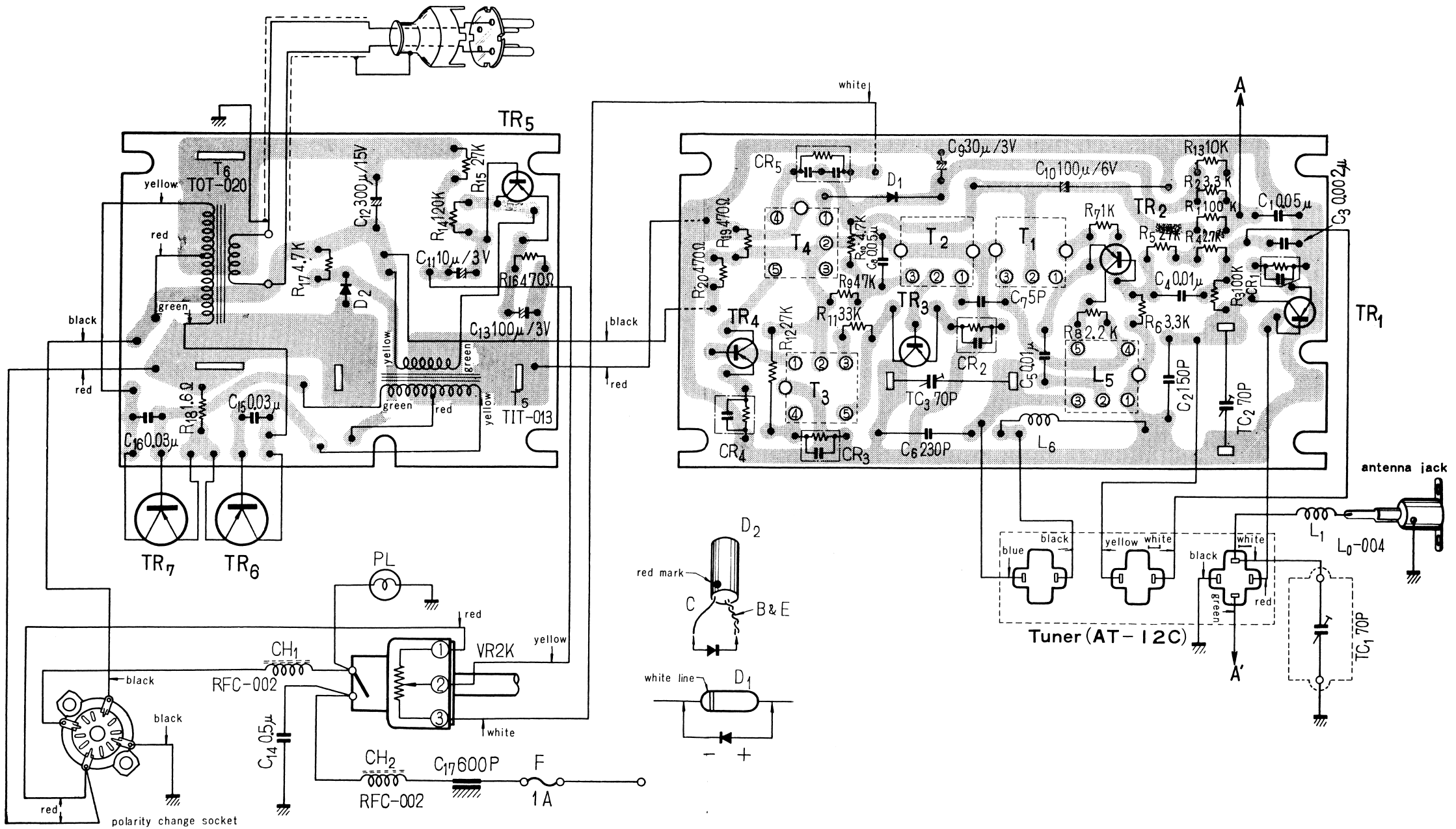
AT-250 CIRCUIT DIAGRAM



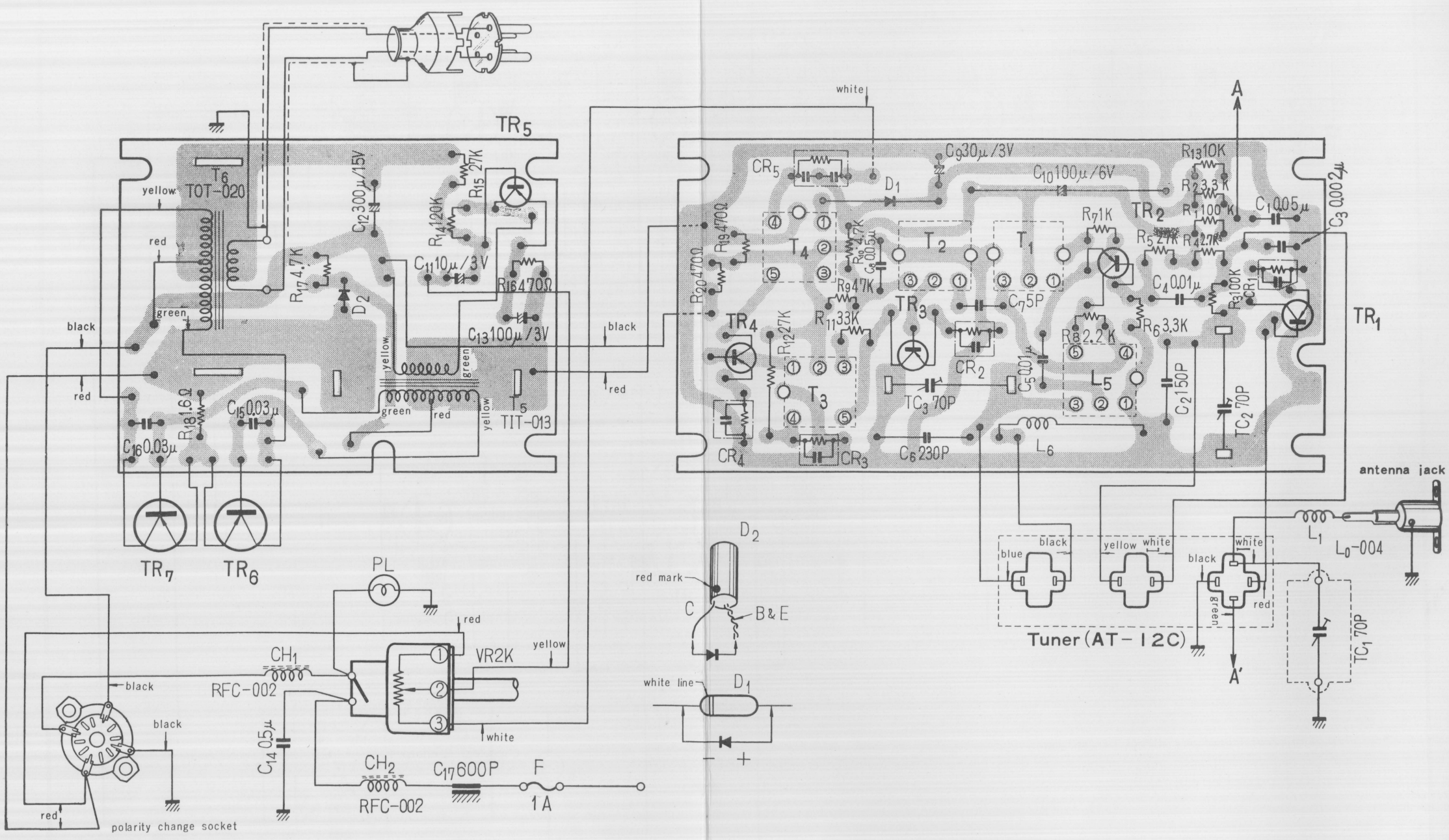
Notes :

1) If not specifed, all resistors are 1/2W
2) ⊣⊢ chemical condenser
3) Given voltages are standard ones indicated on a tester which has 20KΩ/V internal resistance.
4) Voltages and currents are measured when there is no signal.
5) [V] ⇨ Voltage when the pointer is positioned at 1610KC.
   ※ 〃 〃 〃 530KC
6) Coil resistances are direct current ones.
7) This circuit diagram shows a minus (−) earthed circuit.

AT-250 PRINTED CIRCUIT BOARD



AT-250 PRINTED CIRCUIT BOARD



No.	Name	Type No.	Note
*CR_1.CR_2.CR_4	Condenser & resistor 1KΩ 0.05μF	RC 11010KYZ	
*CR_3	〃 8.2KΩ 0.05μF	RC 11018KYZ	
*CR_5	〃 270Ω 0.01μF×2	RC 12004MYZ	
*TC_1	trimmer condenser	TL-70	
*TC_2.TC_3	〃	TT-70	
*L_1	loading coil	L_0-004	
L_2.L_3.L_4	tuner	AT-12C	
L_5	oscillating coil	OSC-006	
L_6	oscillating series coil	FC-23M3	
*T_1	intermediate frequency transformer	IF-22001	1st IFT
*T_2	〃	IF-22002	2nd IFT
*T_3	〃	IFT-004	3rd IFT
*T_4	〃	IFT-005	4th IFT
*T_5	input transformer	TIT-013	
*T_6	output transformer	TOT-020	
*CH_1.CH_2	hush choke coil	RF-002	
*SP	speaker	P-524S	3Ω, 2.5W
F	fuse	1A glass tube type	
PL	pilot lamp	FL-002 (12V 2w)	
	dial plate		
	dial knob		
	antenna jack		
	4P speaker plug		
	4P socket		
	polarity change socket SM-033		
	〃 plug 4P-GP		

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