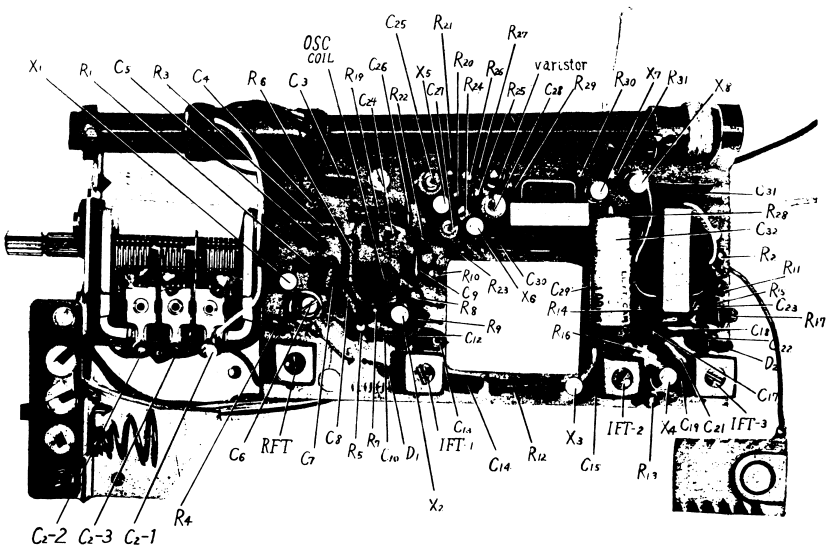
Voltage and current distribution for TR-84

	Collector current	Collector voltage Volt	Base voltage Volt	Emitter voltage Volt
X_1	180~280 μA_{500} μA	3.8_5	0.28_1	0.17_1
X_2	350 μA_{500} μA	3.9_5	0.5_1	0.5_5
X_3	300~400 μA_{500} μA	4.1_5	0.5_1	0.3_5
X_4	800~900 $\mu A_{2.5}$ mA	3.6_5	0.7_1	0.5_5
X_5	1.1~1.3 $mA_{2.5}$ mA	3.0_5	0.7_1	0.6_5
X_6	2.1~2.4 $mA_{2.5}$ mA	3.8_5	0.8_1	0.65_5
X_7	650 μA~1 $mA_{2.5}$ mA	4.5_5	0.17_1	—
X_8	" " "	"	"	—

(a) Battery voltage: 4.5 Volts. Battery current: 9 mA±20% at 0 signal.
(b) Data show approximate values at 0 signal (the set is not tuned to any station and the volume control is set at minimum).
(c) Internal resistance of voltmeter used for measurement is 20 KΩ/m.
(d) Small figures next to data show meter ranges.

Mounting of TR-84



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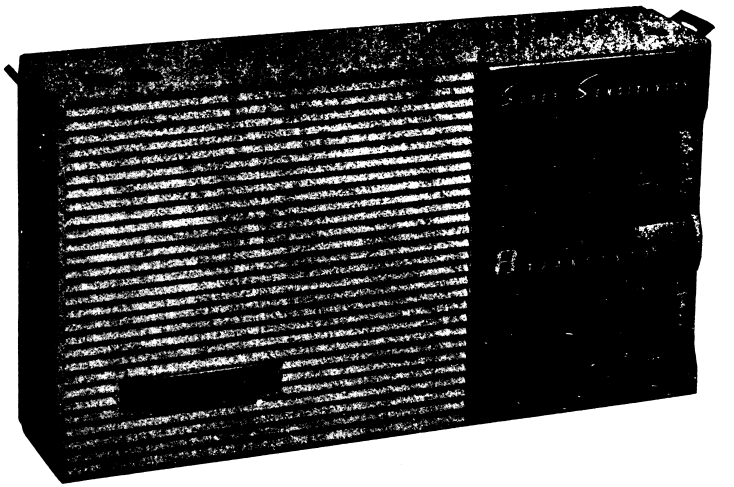
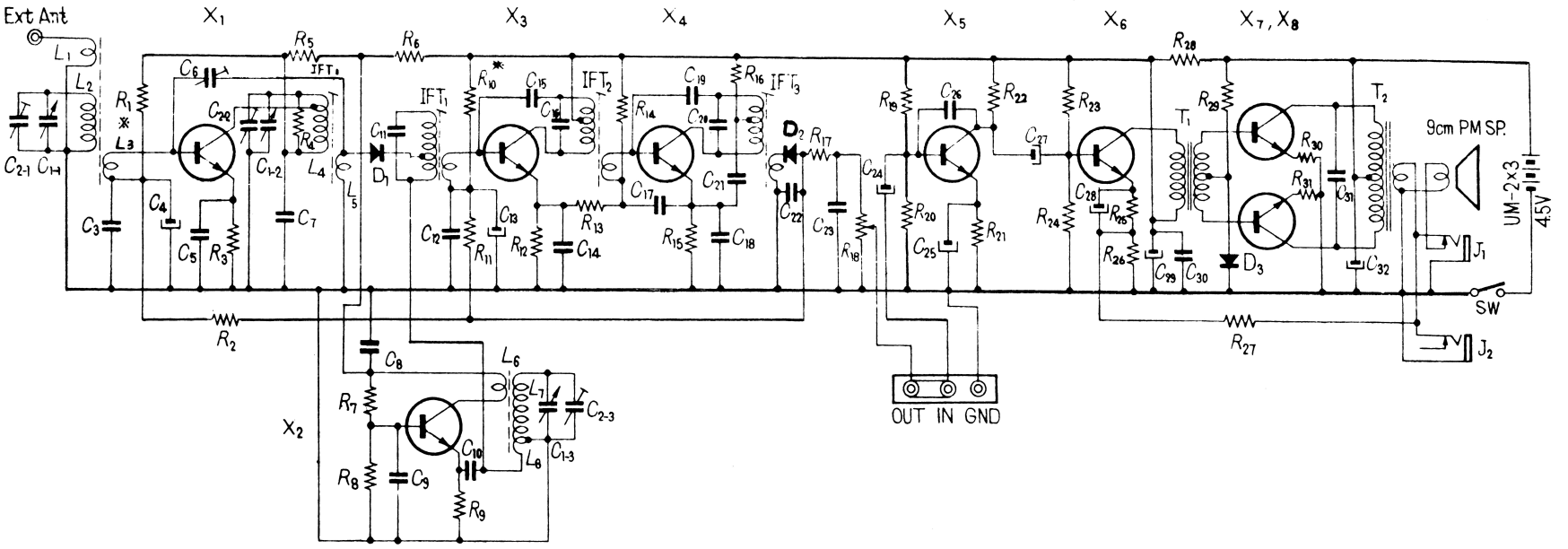


Specifications for TR-84

Circuit	:	8 transistor superheterodyne with RF stage
Covering range	:	535~1,605 Kc
IF frequency	:	455 Kc
Sensitivity	:	30 μV/m at 10 mW output with built-in ferrite bar antenna 1 μV/m at S/N=15 db with external aerial (effective height of 5 m.)
Selectivity	:	26 db (10 Kc off)
Output power	:	100 mW (non-distorted)
Current drain	:	Approx. 9 mA at 0 signal
Speaker	:	3½" PM dynamic 8 Ω.
Battery	:	3 size "C" flashlight batteries (4.5 Volts)
Dimensions	:	187×103×45 mm (7⅜"×4⅛"×1 11/16")
Weight	:	Approx. 800 gr. (1.8 lb.)
Color	:	Cream, Light Green and Brownish Yellow

SONY CIRCUIT DIAGRAM FOR TR— 84



$C_{1-1,2,3}$	Tuning Capacitor	C_{14}	0.05 μF	C_{27}	10 μF 3 V	R_7	56 KΩ ± 5% 1/8 W	R_{20}	3.3 KΩ ± 5% 1/8 W	X_1	RF 2T7	$L_{4,5}$	Oscillator Coil
$C_{2-1,2,3}$	Trimmer	C_{15}	2 PF	C_{28}	30 μF 3 V	R_8	12 KΩ " "	R_{21}	470 Ω " "	X_2	Osc. 2T7	IFT_1	I.F. Trans.
C_3	0.05 μF	C_{16}	180 PF (inside IFT)	C_{29}	100 μF 6 V	R_9	1 KΩ " "	R_{22}	1 KΩ " "	X_3	IF1 2T7	IFT_2	"
C_4	10 μF 3 V	C_{17}	0.02 μF	C_{30}	0.05 μF	R_{10} *	56 KΩ " "	R_{23}	10 KΩ " "	X_4	IF2 2T7	IFT_3	"
C_5	0.005 μF	C_{18}	0.02 μF	C_{31}	0.1 μF	R_{11}	12 KΩ " "	R_{24}	3.3 KΩ " "	X_5	AF1 2T6	T_1	Input Trans. 1.5 KΩ: 2 KΩ
C_6	2~20 PF Trimmer	C_{19}	2 PF	C_{32}	100 μF 6 V	R_{12}	470 Ω " "	R_{25}	330 Ω " "	X_6	AF2 2T6	T_2	Output Trans. 200 Ω: 8 Ω
C_7	0.05 μF	C_{26}	180 PF (inside IFT)			R_{13}	2.2 KΩ " "	R_{26}	5 Ω " "	X_7	PA 2T6		
C_8	0.05 μF	C_{21}	0.05 μF	R_1 *	150 KΩ ± 5% 1/8 W	R_{14}	15 KΩ " "	R_{27}	220 Ω " "	X_8	PA 2T6		
C_9	0.02 μF	C_{22}	0.02 μF	R_2	8.2 KΩ " "	R_{15}	470 Ω " "	R_{28}	60 Ω " "	D_1	Mix. 1T2		
C_{10}	0.002 μF	C_{23}	0.02 μF	R_3	560 Ω " "	R_{16}	470 Ω " "	R_{29}	2.2 KΩ " "	D_2	Det. 1T2		
C_{11}	180 PF (inside IFT)	C_{24}	10 μF 3 V	R_4	150 KΩ " "	R_{17}	3.3 KΩ " "	R_{30}	5 Ω " "	D_3	1T5		
C_{12}	0.02 μF	C_{25}	30 μF 3 V	R_5	220 Ω " "	R_{18}	5 KΩ with Switch	R_{31}	5 Ω " "	$L_{1,2,3}$	Bar Antenna		
C_{13}	10 μF 3 V	C_{26}	0.005 μF	R_6	220 Ω " "	R_{19}	15 KΩ ± 5% 1/8 W			$L_{4,5}$	RF Trans.		

Note : * Adjusting Resistors

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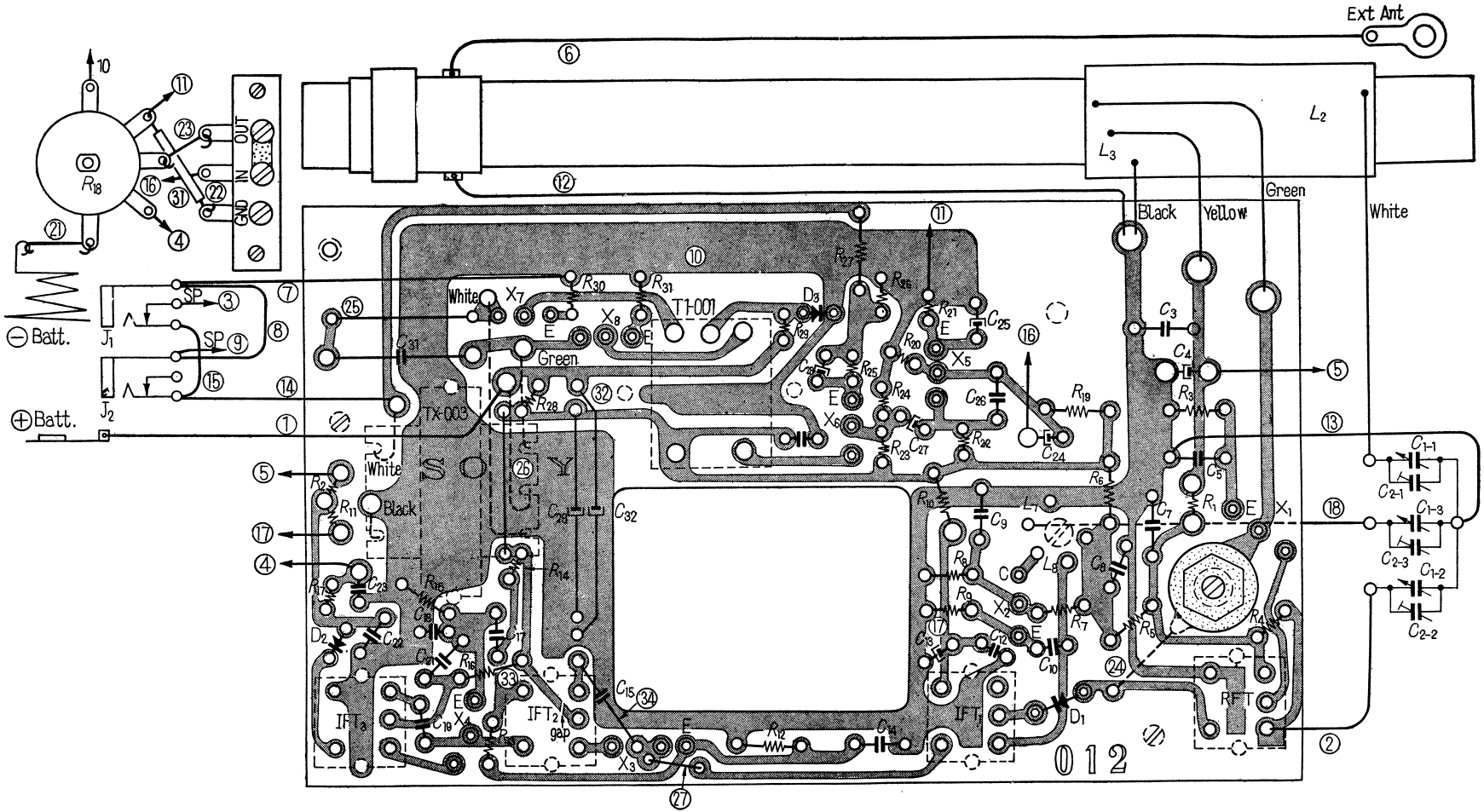
Mounting diagram of TR-84
(Printed side)



1. Diode mixer

Generally, transistor radio with RF stage tends to be unstable. To avoid this trouble it is usually designed to have lower gain which will cancel the merit of the RF stage. But TR-84 secures quite stable operation in spite of high sensitivity such as 30 μV/m, which has resulted from introduction of "Diode mixer circuit" and newly developed RF transistor 2T734. (CES 2SC73)

Appropriate value of injection voltage of oscillation is 0.25~0.3 Volt. Lower oscillator voltage will deteriorate sensitivity while the voltage higher than 0.3 Volt is apt to cause undesirable oscillation or un-even sensitivity due to saturated conversion gain.

The diode is not needed to be chosen when it is replaced as the spread of its characteristics scarcely affect on S/N. Check oscillator voltage across R_8 1 kΩ and adjust it by replacing R_7 56 kΩ.

2. Current adjustment

RF stage

X_1 collector current must be 180~280 μA as shown in the table. Check the current when X_1 is replaced as RF stage affects on S/N. In case of lower S/N, decrease the collector current by increasing the value of R_1.

IF stage

X_3 collector current must be 300~400 μA. The current can be checked by connecting mili-ammeter across the gap which is provided on the printed circuit.

Current can be adjusted by replacing R_{16} 56 KΩ.

The gap must be bridged with the solder without fail after decking the current.

3. Adjustment

IFT

Adjust in ordinary way.

RF

i) Set cylindrical trimmer C_6 (neutralizing condenser) at 2/3 position.

ii) Set variable condenser at maximum. Adjust oscillator coil $L_{6,7,8}$ to receive 520 Kc.
Set variable condenser at minimum. Adjust C_{2-3} to receive 1,650 Kc.

iii) Adjust Antenna coil (L_2, L_3) position and RF transformer core to get maximum sensitivity at 640 Kc. (Variable condenser must be tuned to 640 Kc.)
Adjust C_{2-1} and C_{2-2} to get maximum sensitivity at 1,400 Kc. (Variable condenser must be tuned to 1,400 Kc.)
Repeat adjustment 2 or 3 times until the output decreases when either end of tuning wand* is approached to the antenna coil.

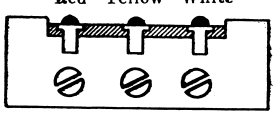
* Flexible vinylite aligner. Brass insert at one end; iron core at other.

iv) If the circuit tends to ocsillate in higher frequency range, turn cylindrical trimmer screw counter clockwise until the oscillation stops. When the oscillation is taking place remarkable noise will be observed.

v) After the cylindrical trimmer is adjusted re-check upper end of the frequency coverage (1,605 Kc) and tracking at 1,400 Kc.

vi) Connecting wires between the antenna coil (L_2) and the variable condenser are recommendable to keep off the circuit board. When the circuit oscillates which is not cured by ordinary procedure, try to change sense of L_3.

Trimmers on variable condenser



(1)~C_{2-2} Sensitive adjustment at 1,400 Kc.
(2)~C_{2-3} 1,605 Kc adjustment
(3)~C_{2-1} Sensitive adjustment at 1,400 Kc.

4. To take out chassis from cabinet

Remove securing post for back cover fix screw, nut under battery contact spring, nut under left end of ferrite bar and a screw on the right upper side of the circuit board. When it is wanted to take out circuit board only, remove 3 screws on the circuit board and desengage ferrite bar from support at right end.

5. Helpful informations

i) Sometimes oscillation may take place when the set is tuned to approximately 910 Kc which is due to improper position of D_2 or C_{22} (0.02 μF). In this case try to correct their positions slightly until the oscillation stops. Attention must be payed especially when D_2 or C_{22} were replaced.

ii) Power switch is provided to cut power supply on negative side. Therefore, if any wire of ground potential is in contact with chassis or securing post for back cover fix screw, the power supply is not cut even when the power switch is turned off.

iii) Be careful not to short circuit stator and rotor blades of C_{1-2} which will produce heavy current flow as the stator side is in positive potential.

6. Interchangeability of transistor

Transistors used in this model can be replaced as follows.

2T734.....2T73Y or 2T73 (CES 2SC73)
2T750.....2T75 or 2T76 or 2T768 or 2T757 (CES 2SC76)
2T652.....2T65 or 2T66 (CES 2SD65 or 2SD66)
2T69 .....2T692 or 2T693 (CES 2SD63)

7. Audio transformer

Input transformer

TI-001 1.5 KΩ : 2KΩ
DC resistance 145 Ω±20% : 240 Ω±20%

Output transformer

TX-003 200 Ω : 8 Ω
DC resistance 14 Ω±20% : 0.5 Ω±20%

8. Recording of radio program and playing back of record.

Inside the cabinet 3 terminal strip will be found on the left bottom side. Audio section can be isolated from RF section by disconnecting upper terminal (OUT) and center terminal (IN).

When the record is wanted to be played back, connect inner conductor of pick up cord to terminal "IN.", outer shield to terminal "GND" after disengaging "IN" and "OUT".

For this purpose, medium impedance magnetic pick-up is recommended.

To record radio program, connect terminal "OUT" and "GND" to the tape recorder with a shielded wire. Terminal "GND" and ground side of the tape recorder must be connected with shielding conductor, of course.

In this case it is not needed to disconnect "IN" and "OUT".