SANYO

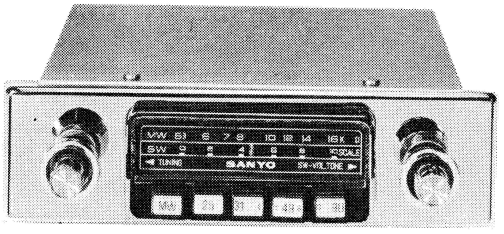
9 Transistor, MW/SW 2-band Car Radio with double superhet. system

MODEL F-8404

SERVICE MANUAL

SANYO ELECTRIC CO., LTD.

INTERNATIONAL DIIVISION: SANYO ELECTRIC TRADING CO., LTD.



SPECIFICATIONS

CIRCUIT SYSTEM·····9 transistor plus 3 diodes super-heterodyne with RF amplification, and band spread system in SW bands

FREQUENCY RANGE···MW 530 – 1605 KC
SW 90, 60, 49, 41, 31 & 25m

SENSITIVITY (for 500mW output)·····MW 20μV (12V)
SW 30μV (12V)

OUTPUT POWER·····Maximum 6W (12V), 3W (6V)
Undistorted 4W (12V), 2W (6V)

POWER SUPPLY·····12V and 6V (Reversible polarity)

CURRENT DRAIN·····No signal 160 mA (12V), 180 mA (6V)
Maximum 1000 mA (12V), 1400 mA (6V)

LOUDSPEAKER·····5″×7″ permanent dynamic type
4 ohm voice coil impedance

TRANSISTORS·····2SA222 SW Mixer
2SA222 SW Oscillator
2SA322 RF Amplifier
2SA322 Converter
2SA322 IF Amplifier
2SC537 Audio Amplifier
2SC537 Driver
2SB407-V4×2 Power Amplifier

DIODES·····1S188 AGC
1S188 Detector
1S188 Oscillator Dynamic Damper

THERMISTOR·····SDT-02 Temperature Compensator

DIMENSIONS·····160 wide×50 high×160mm deep

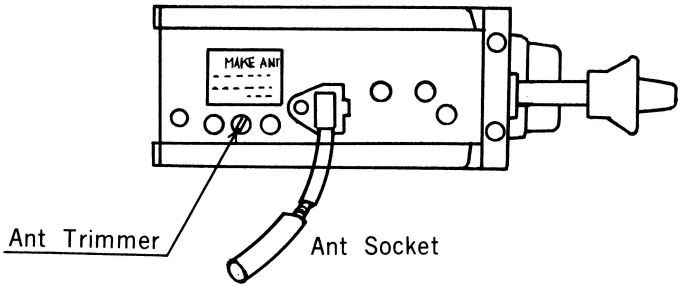
SHAFT SPACING·····130mm (distance between control shafts)

WEIGHT·····Radio unit 3.3 lbs. Speaker unit 1.9 lbs.

ALIGNMENT PROCEDURES

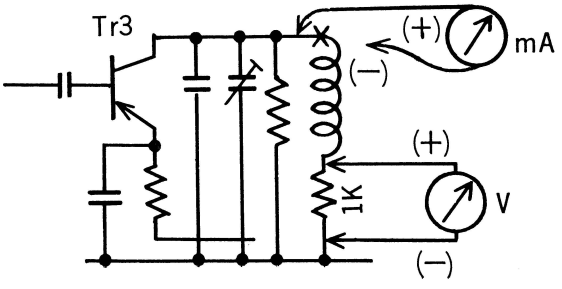
a) ANTENNA TRIMMER ADJUSTMENT

With radio installed in car and auto antenna fully extended, tune in a weak station near 1400KC and adjust CT2 for maximum output.



b) COLLECTOR CURRENT ADJUSTMENT

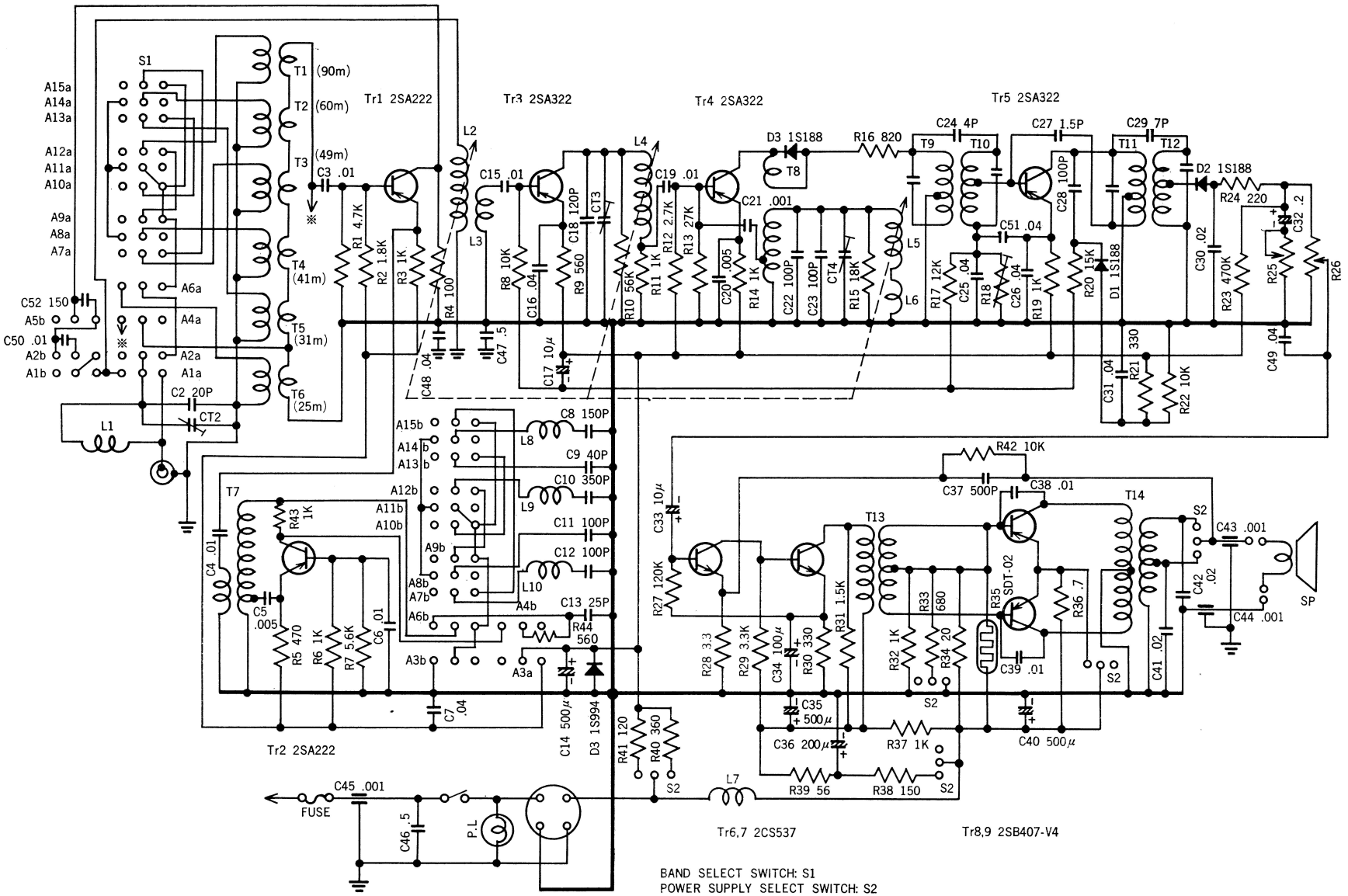
With power supply voltage (13.2V) and load (4 ohms) applied, operate the unit to receive MW band without connection of car antenna. Insert a miliammeter or connect a volt-meter as shown and adjust Semi-fixed Resistor (R18 250K) for 350 to 400 micro-ampere circulation thru the collector of Tr3 (2SA322).



PARTS LIST

SCHEMATIC LOCATIONS	PART NUMBER	DESCRIPTION
SEMICONDUCTORS		
Tr1 Tr2	2SA222	Transistor
Tr3	2SA322	〃 (black coloring)
Tr4	2SA322 or 2SA101×	〃
Tr5	2SA322	〃 (blue coloring)
Tr6 Tr7	2SC537	〃 (C or D class)
Tr8 Tr9	2SB407-V4	〃 (orange, yellow, green)
D1 D2 D3	1S188	Diode
R35	SDT-02	Thermistor
CONTROLS		
	R-S81399	Tuner Assembly
R25 R26	R-R124703	Variable Resistor (dual)
R18	R-R11018	Semi-fixed Resistor
CT2 CT3	R-C0029d	Trimmer 65pF
CT4	R-C0028d	Trimmer 50pF
	R-S4544	Slide Switch - 6V/12V Select
	R-S4436	Push Switch - band select
COILS & TRANSFORMERS		
T1	R-W2717	Antenna Coil 90m
T2	R-W2718	Antenna Coil 60m
T3	R-W2719	Antenna Coil 49m
T4	R-W2720	Antenna Coil 41m
T5	R-W2721	Antenna Coil 31m
T6	R-W2722	Antenna Coil 25m
T7	R-W8708	Oscillator Coil SW
T8	R-W8210	Oscillator Coil MW
T9	R-W5T218	IF Transformer - primary of 1st IF
T10	R-W5T219	IF Transformer - secondary of 1st IF
T11	R-W5T220	IF Transformer - primary of 2nd IF
T12	R-W5T221	IF Transformer - secondary of 2nd IF
T13	R-W6369	Input Transformer
T14	R-W6370	Output Transformer
L1	R-W1015b	Choke Coil
L6	R-W1064	Choke Coil
L7	R-W6264a	Choke Coil (line filter)
L8	R-W1702	Choke Coil 60m
L9	R-W1701	Choke Coil 90m
L10	R-W1703	Choke Coil 49m
SPEAKER		
	R-S6324	Speaker 5″×7″ 4 ohms
	R-112755	Speaker Box - housing only
ELECTROLYTIC CAPACITORS		
C17 C33	R-C9060 or R-C9170	10μF 10WV
C34	R-C9145 or R-C9172	100μF 10WV
C36	R-C9146	200μF 10WV
C14 C35	R-C9162	500μF 10WV
C40	R-C9127a	500μF 15WV
C32	R-C9120	0.2 μF 10V

PART NUMBER	DESCRIPTION	Q'ty
HOUSING		
R-113304a	Side Housing	1
R-112984	Front Housing	1
R-112985	Bottom Housing	1
R-113305	Top Housing	1
R-112338a	Trim Plate	1
R-28160	Nose Panel - escutcheon for dial	1
R-38181	Dial Scale	1
R-112346a	Back Screen - behind dial scale	1
R-A261933	Push Button MW	1
R-A261934	Push Button 25m	1
R-A261935	Push Button 31m	1
R-A261936	Push Button 49m	1
R-A261937	Push Button 90m	1
R-S87055	Knob - volume control	1
R-S87056	Knob - tone control	1
R-S87057	Knob - tuning control	1
R-S81643	Pointor	1
R-	Red Vinyl Tubing 1φ×16mm - pointor	1
R-471601	Specification Sheet	1
R-47963a	Marking Paper - ant. trimmer adjustment	1
R-112336a	Washer	2
R-24950	Hex Nut. - shafts mtg	2
R-113232①	Special Washer - trim plate	2
R-24523①	Hex Nut - trim plate	2
R-261938	Heat Sink	1
R-S81644a	Tuning Shaft	1
R-15095a	Tension Spring - dial stringing	1
R-12325	Spring	1
R-	Dial Cord tetron 0.5φ 350mm	1
MISCELLANEOUS		
R-R7028	Special Resistor (wire wound) 0.7ohm 1W R36	1
R-S81222a	Spark Plate Capacitor C43 C44 C45	1
R-S1246	Fuse 2A	1
R-S3138a	Speaker Leads (Female) - radio unit	1
R-S3139b	Speaker Leads (Male) - speaker box	1
R-S2156②	Antenna Receptacle	1
R-S1165a	Pilot Lamp	1
R-S2140a	Pilot Socket	1
R-S2164	Polarity Reverse Socket	1
R-S1102	Polarity Reverse Plug	1
R-S1291	Fuse Holder	1
R-23204L	Lug Terminal - power transistor	2
R-471602	Instruction Book	1
R-R7006	Noise Suppressor Resistor	1
R-C4005	Noise Suppressor Capacitor	1
R-111663a	Mounting Angle - radio front mtg	2
R-111685	Perforated Mounting Metal	1



BAND SELECT SWITCH: S1
POWER SUPPLY SELECT SWITCH: S2
Capacitors shown in micro-farads (μF or Nano Farad) unless otherwise Specified. P=μμF
Resistors shown in ohms. (K=1000 ohms)

c) ALIGNMENT OF BAND COVERAGE & TRACKING

Signal generator output : Modulation frequency 400cps. Modulation percentage 30%.
Signal level just high enough to provide meter deflection.

Signal application: Antenna receptacle thru the dummy antenna.

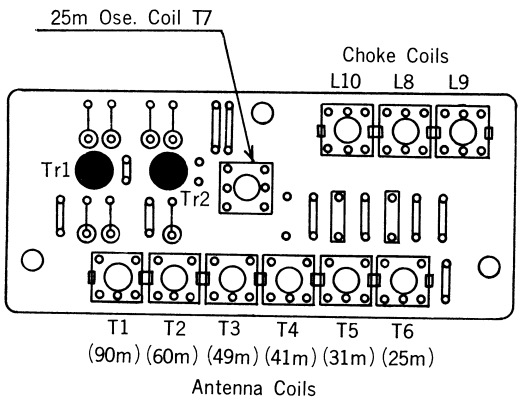
Output meter connection: Across the speaker or dummy load (4 ohms)

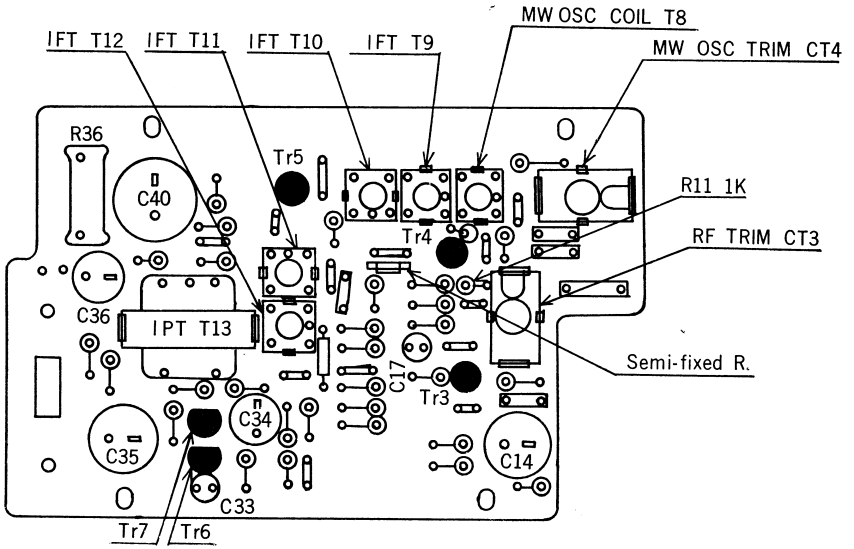
STEP	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	ADJUST FOR MAXIMUM
IF ALIGNMENT				
1	Thru dummy to antenna receptacle	455 KC	MW, low frequency end stop	IF transformers T12 T11 T10 T9
MW ALIGMENT				
2	Thru dummy to antenna receptacle	520 KC	MW, low frequency end stop	T8 Oscillator coil
3	〃	1625 KC	MW, high frequency end stop	CT4 Oscillator trimmer
4	〃	1400 KC	1400 KC	CT3 (RF trimmer) CT2 (ANT trimmer)
Repeat steps 2,3, and 4.				

STEP	BUTTONS TO BE PUSHED	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	ADJUST
5	25m	Thru dummy to antenna receptacle	11.84 MC	Any point between 800 & 1200KC	T7 (Oscillator coil) to catch S.G. signal in the specified range. T6 (Antenna coil) for maximum output.
6	31m	〃	9.64 MC	〃	Check receptability of signal between the range. T5 (Antenna coil) for maximum output.
7	31m 49m	〃	7.20 MC	〃	Check receptability of signal between the range. T4 (Antenna Coil) for maximum output.
8	49m	〃	6.075 MC	〃	L10 (Choke coil) to catch signal between the range. T3 (Antenna coil) for maximum output.
9	49m 90m	〃	4.90 MC	〃	L8 (Choke coil) to catch signal between the range. T2 (Antenna Coil) for maximum output
10	90m	〃	3.30 MC	〃	L9 (Choke coil) to catch signal between the range. T1 (Antenna coil) for maximum output

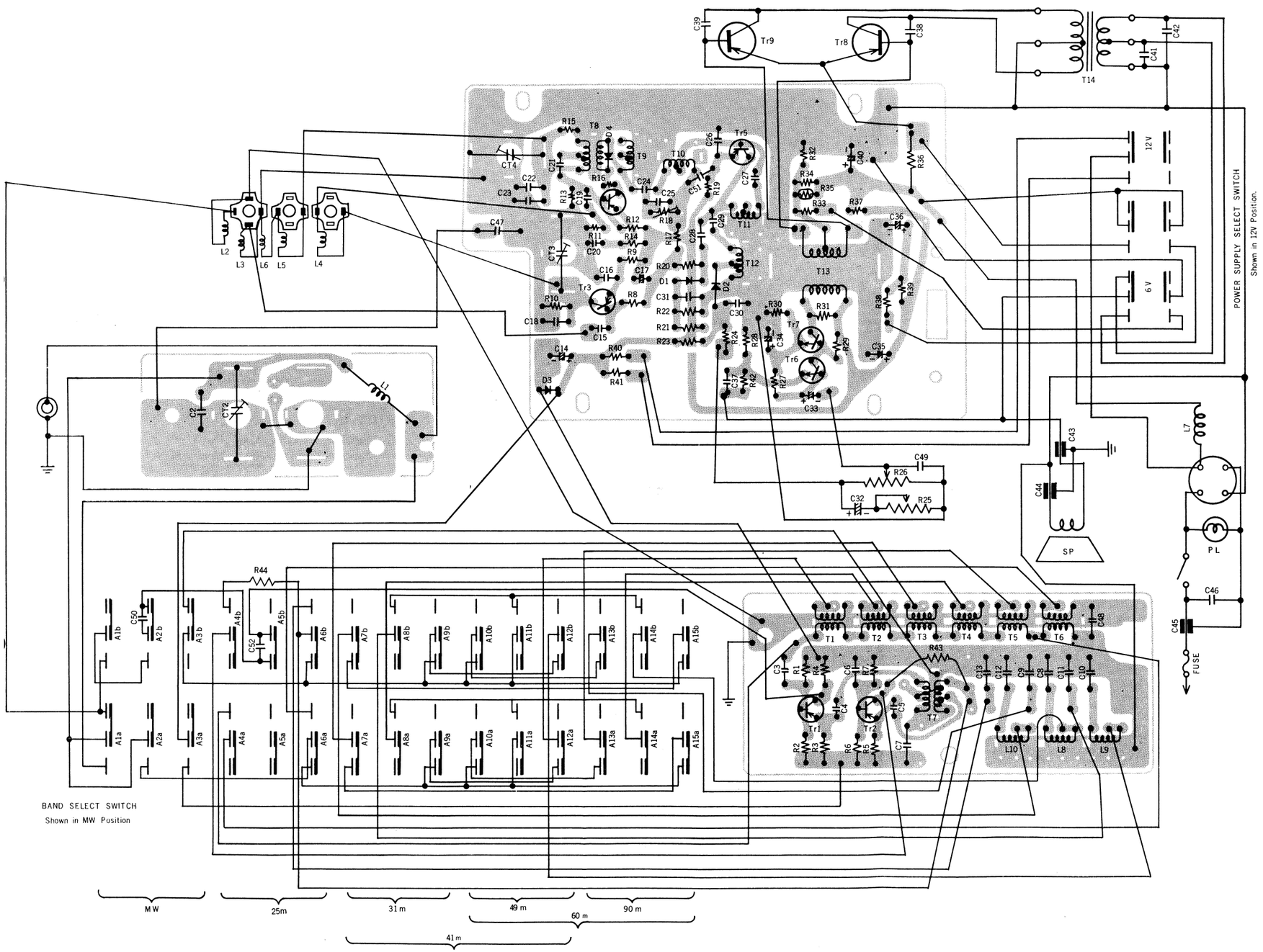
NOTE: the (specified) range means the allowable location of Pointor between the letters of 800 and 1200 on dial scale.

MAIN PARTS IDENTIFICATION





INTER-PARTS WIRING ILLUSTRATION



SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
FIXED VALUE RESISTORS		
R1	R-R472K	4.7K ohms ±10%
R2	R-R182K	1.8K ohms ±10%
R3 R6 R11	R-R102K	1K ohms ±10%
R4	R-R101K	100 ohms ±10%
R5	R-R471K	470 ohms ±10%
R7	R-R562K	5.6K ohms ±10%
R8 R22 R42	R-R103K	10K ohms ±10%
R9 R44	R-R561K	560 ohms ±10%
R10	R-R563K	56K ohms ±10%
R12	R-R272K	2.7K ohms ±10%
R13	R-R273K	27K ohms ±10%
R14 R19 R37	R-R102K	1K ohms ±10%
R15	R-R183K	18K ohms ±10%
R16	R-R821K	820 ohms ±10%
R17	R-R123K	12K ohms ±10%
R20	R-R153K	15K ohms ±10%
R21 R30	R-R331K	330 ohms ±10%
R23	R-R474K	470K ohms ±10%
R24	R-R221K	220 ohms ±10%
R27	R-R124K	120K ohms ±10%
R28	R-R3N3K	3.3 ohms ±10%
R29	R-R332K	3.3K ohms ±10%
R31	R-R152K	1.5K ohms ±10%
R32	R-R102J	1K ohms ±5%
R33	R-R681J	680 ohms ±5%
R34	R-R200J	20 ohms ±5%
R38	R-R151J	150 ohms ±5%
R39	R-R560J	56 ohms ±5%
R40	R-R361J	360 ohms ±5%
R41	R-R121J	120 ohms ±5%
R43	R-R102K	1K ohms ±10%
FIXED VALUE CAPACITORS		
C2	R-CKD200K	Ceramic 20pF ±10%
C3 C4 C6	R-CQS103Y	Mylar 0.01μF +30%
C5 C20	R-CQS502Y	Mylar 0.005μF +30%
C7 C25 C26	R-CKD403Z	Ceramic 0.04μF +80%
C8	R-CQT151K	Styrol 150pF ±10%
C9	R-CKD400K	Ceramic 40pF ±10%
C10	R-CQT351K	Styrol 350pF ±10%
C11	R-CKD101K	Ceramic 100pF ±10% N=1500
C12	R-CKD101K	Ceramic 100pF ±10% N=750
C13	R-CKD250K	Ceramic 25pF ±10%
C15 C19 C50	R-CQS103Y	Mylar 0.01μF 30%
C16 C49	R-CQS403Y	Mylar 0.04μF +30%
C22	R-CQT101K	Styrol 100pF ±10%
C23 C28	R-CKD101K	Ceramic 100pF ±10% (Insulated)
C24	R-CKD040K	Ceramic 4pF ±0.5pF
C27	R-CKD1N5M	Ceramic 1.5pF ±0.25pF
C29	R-CKD070K	Ceramic 7pF ±0.5pF
C30 C41 C42	R-CQS203Y	Mylar 0.02μF +30%
C31 C48 C51	R-CKD403Z	Ceramic 0.04μF +80%
C37	R-CKD501M	Ceramic 500pF ±20%
C38 C39	R-CKD103M	Ceramic 0.01μF ±20%
C46	R-CPD504M	Metalized 0.5μF ±20%
C47	R-CPD504M	0.5μF ±20%
C52	R-CKD151K	Ceramic 150pF ±10%
C18	R-CKD121K	Ceramic 120pF ±10% (Insulated)
C21	R-CQS102Y	Mylar 0.001μF +30%