SANYO

MODEL
AFT-10

All-transistor Radio
Service Manual

SPECIFICATIONS

FREQUENCY RANGE

MW	530 – 1605 kc
LW	150 – 350 kc
SW	5 – 12 mc
FM	87 – 108 mc

INTERMEDIATE FREQUENCY

AM	455 kc
FM	10.7 mc

POWER SUPPLY

9 volts (6 D–size flashlight batteries)

CURRENT DRAIN

No signal	25 mA
Maximum	250 mA

POWER OUTPUT

Undistorted	900 mW
Maximum	1400 mW

S/N RATIO

AM 33 db (at 1000 kc, 1 mV/m signal input)
FM 45 db

SENSITIVITY

AM (for 10 mW output)

MW	180 μV/m
LW	75 μV/m
SW	10 μV

FM (for 50 mW output) 3 μV

LOUDSPEAKERS

5″ permanent dynamic speaker	8 ohms
2″ permanent dynamic tweeter	8 ohms

TRANSISTORS

(1)	2SA224	FM RF Amplifier
(2)	2SA260	FM Converter
(3)	2SA221	AM Local Oscillator
(4)	2SA324	FM 1st IF Amplifier/AM Mixer
(5)	2SA324	FM 2nd IF/AM 1st IF Amplifier
(6)	2SA324	FM 3rd IF/AM 2nd IF Amplifier
(7)	2SB185	AF Amplifier
(8)	2SB186	Driver
(9)	2SB272 × 2	Power Amplifier

DIODES & THERMISTOR

(1)	1S554	Diode	FM AFC
(2)	1S188	Diode	FM AGC
(3)	1S188	Diode	AM Detector
(4)	1S188 × 2	Diode (Twin)	FM Discriminator
(5)	SDT–06	Thermistor	Temperature Compensator

DIMENSIONS

11″ wide × 7⅛″ high × 3½″ deep

WEIGHT 5.5 lbs

SANYO ELECTRIC CO., LTD.

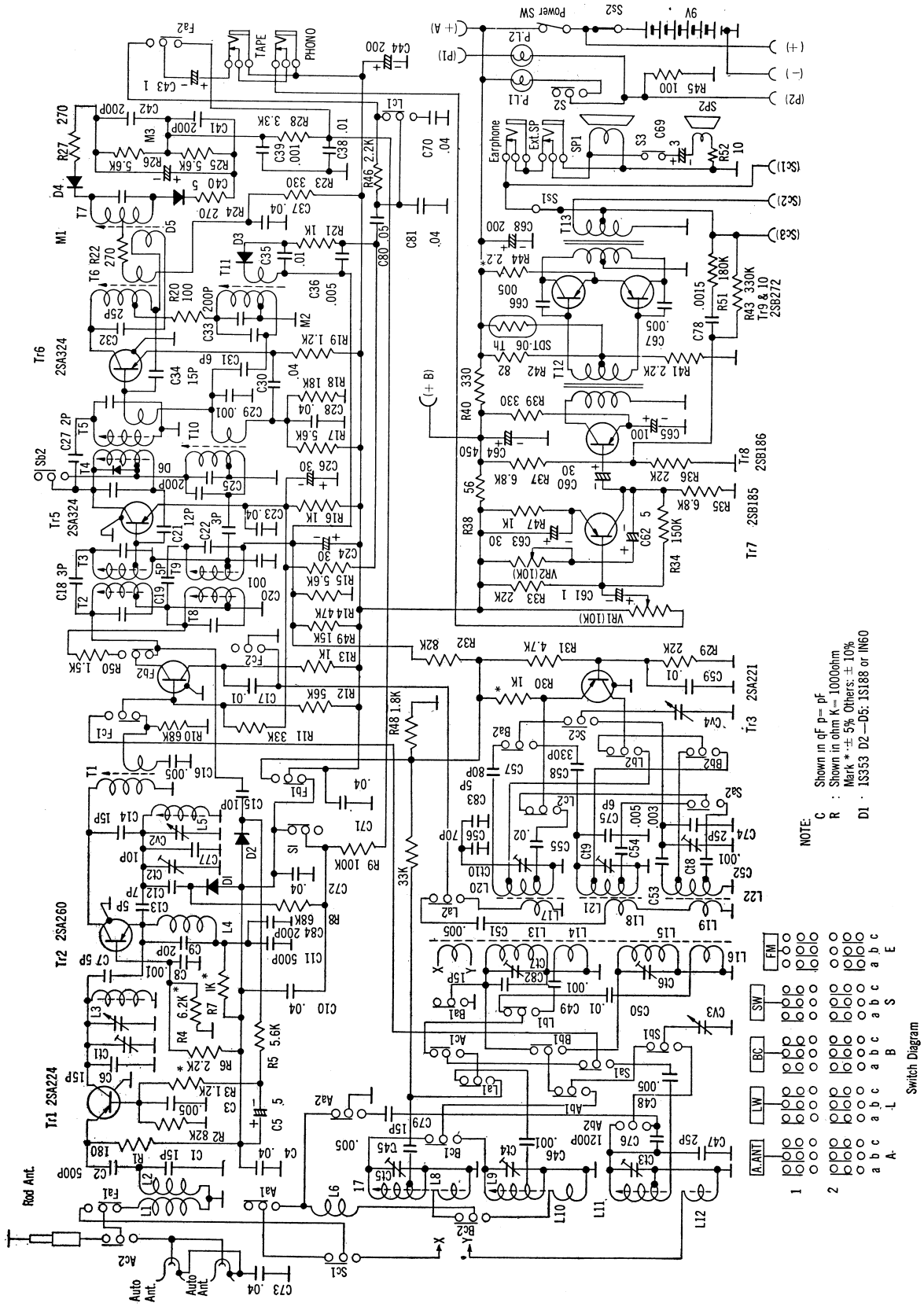
SANYO ELECTRIC CO., LTD.

OSAKA, JAPAN.

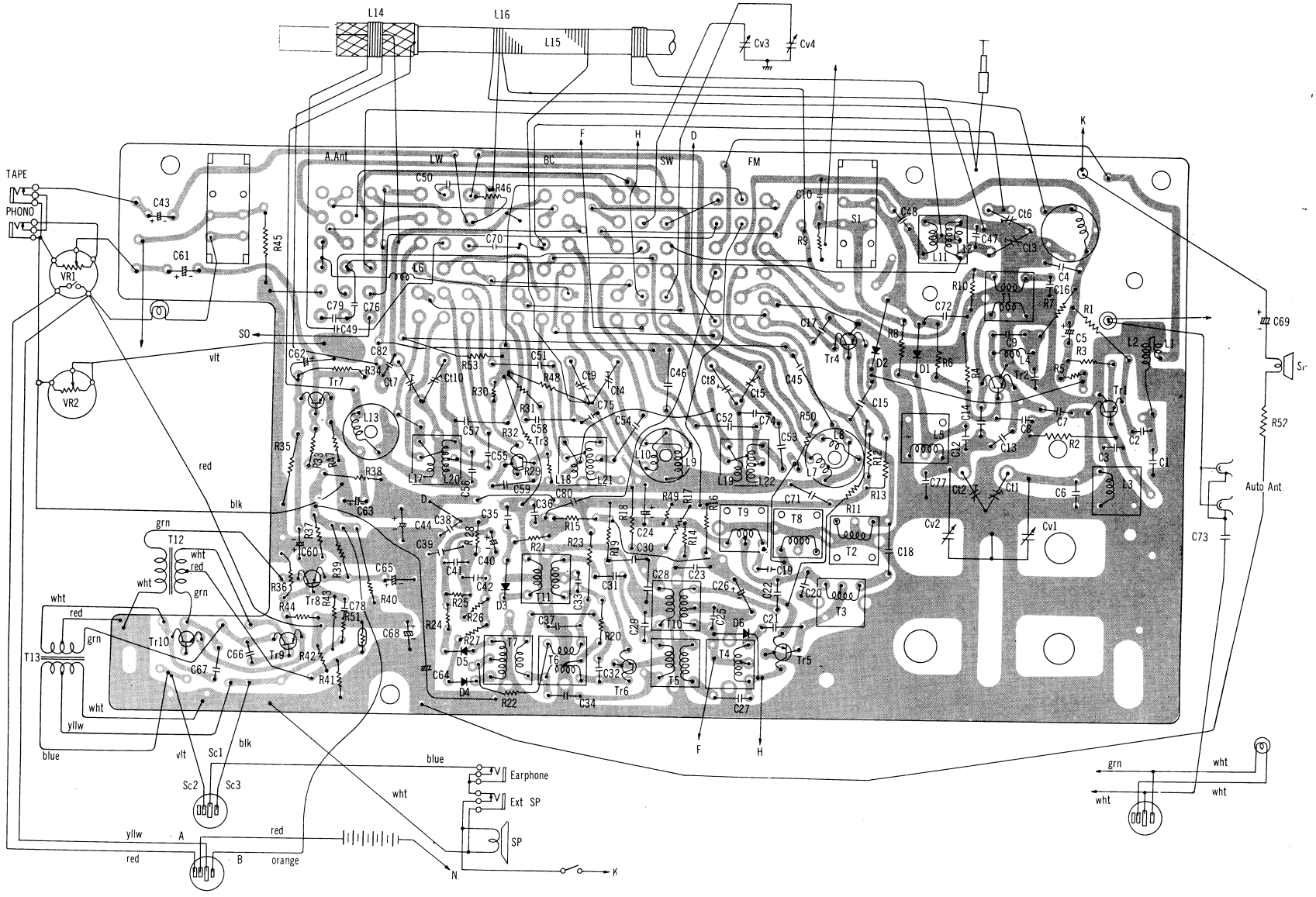
INTERNATIONAL DIVISION : SANYO ELECTRIC TRADING CO., LTD.

Printed in Japan

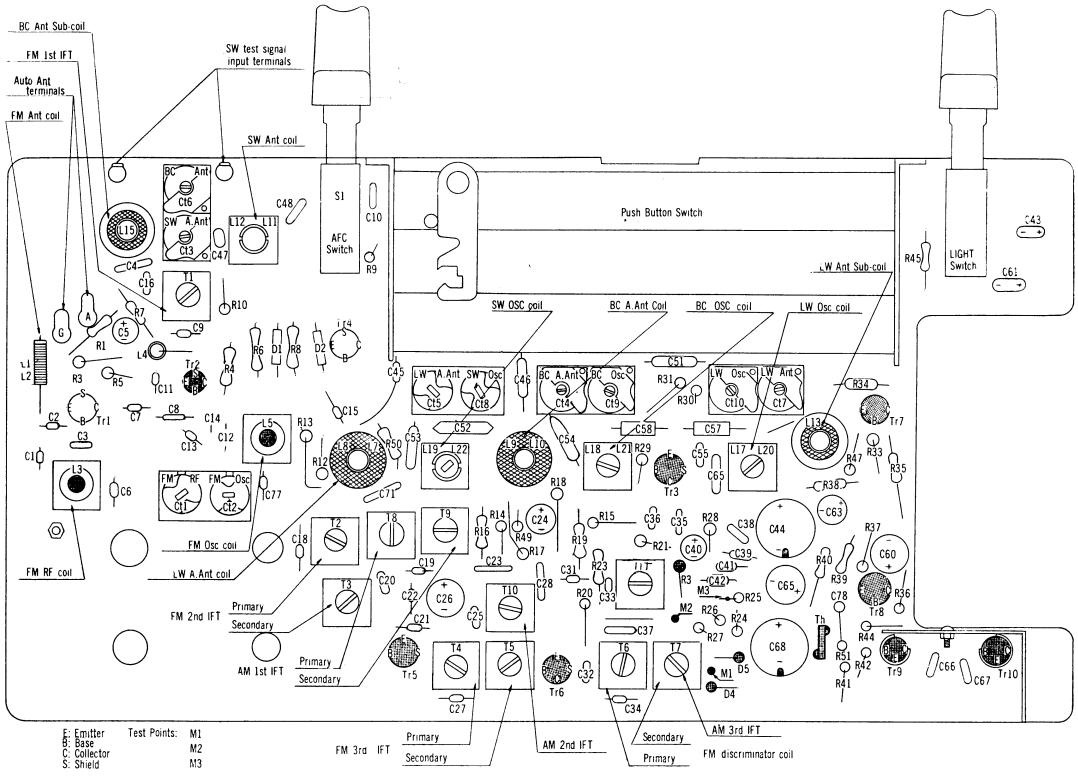
CIRCUIT DIAGRAM



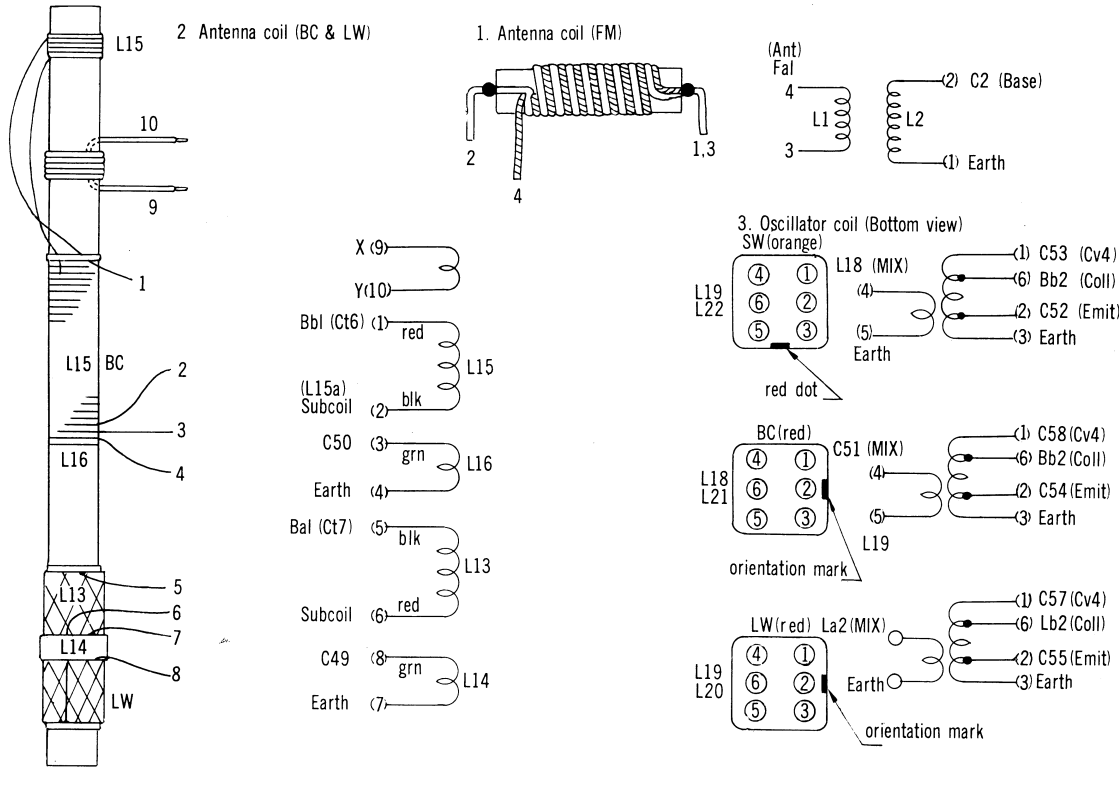
INTER-PARTS WIRING ILLUSTRATION



MAIN PARTS LAYOUT



MAIN PARTS CONNECTION

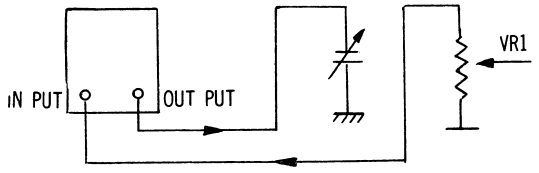


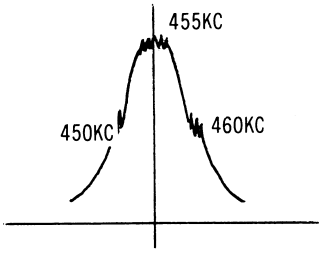
ALIGNMENT PROCEDURES

Before cabinet installation

1. AM IF alignment

Connection





Visual alignment by use of 455 kc sweep marker is employed because response curve of IF amplification greatly affects tuning characteristics as AFT-10 is multi-band portable radio which is also designed for car installation use.

(a) A. Antenna button in OFF position. BC band reception. Tuning capacitor is at max capacitance value.

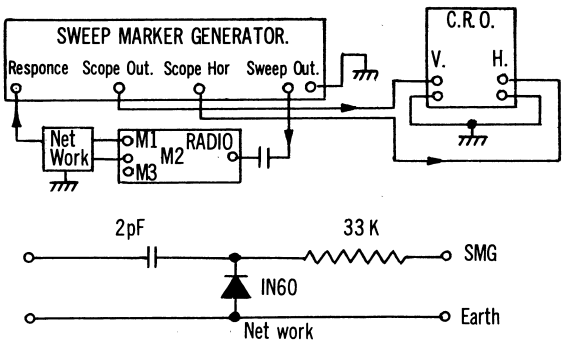
(b) Adjust T8, T9, T10 and T11 in numerical sequence to obtain maximum gain as well as to orient the 455 kc marker at the top center of the pattern, and to make the response curve symmetric.

(c) Note: T8-T9 is a double-tuned network. So careful adjustment is required, especially in secondary winding T9. If you find small peak at bottom trail of each slope, IF stages are considered to be oscillating.

2. FM IF and Discriminator alignment

IF alignment

Connection

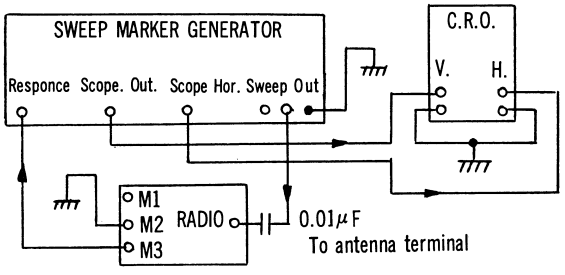


(a) A. Antenna button in OFF position. Volume control at minimum. Tuning gang at its maximum capacitance. Signal (10.7 mc, sweep range 1 mc) input just high enough to provide sufficient pattern.

(b) Adjust T6, T5-T4, T3-T2 and T1 to obtain maximum gain as well as to orient the 10.7 mc marker at the top center of the pattern, and to make the response curve symmetric.

Discriminator alignment

Connection



(a) A. Antenna button in OFF position. Volume control at maximum. Tuning gang at its maximum capacitance.

(b) Adjust T6 for optimum symmetrical response curve with T7 detuned. After adjustment of T6, tune and adjust T7 in order to obtain S-shaped curve (symmetrical double curve) in which 10.7 mc marker locates at zero level and which is symmetric in viewing from the reference point of symmetry, i. e. 10.7 mc marker.

3. AM pre-alignment of LW & BC Bands. (A. Antenna button in OFF position)

LONG WAVE RF

STEP	SIGNAL GENERATOR OUTPUT	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT
1	Radiate signal through the loop antenna, which connected with signal generator output cable	160 kc	160 kc	LW osc coil L17 L20
2		340 kc	340 kc	LW osc trim. Ct10
3		Repeat steps 1 and 2.		
4		*1 160 kc	160 kc	LW Ant. coil L
5		340 kc	340 kc	LW Ant. trim. Ct7
6		Repeat steps 4 and 5.		

BROADCAST RF

7	Radiate signal through the loop antenna, which connected with signal generator output cable	600 kc	600 kc	BC osc coil L18 L21
8		1400 kc	1400 kc	BC osc trim. Ct9
9		Repeat steps 7 and 8.		
10		*2		

*1 : Before proceeding steps 4—5, detune the slug of compensating coil L13 and make L13 have minimum inductance.

*2 : Detune the slug of compensating coil L15 and make it have minimum inductance.

4. AM alignment of LW & BC Bands **

LONG WAVE RF

11	Radiate signal through the loop antenna, which connected with signal generator output cable	160 kc	160 kc	LW coil L13
12		340 kc	340 kc	LW Ant. trim. Ct7
13		Repeat steps 11 and 12.		

BROADCAST RF

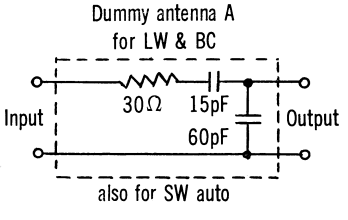
14	Radiate signal through the loop antenna, which connected with signal generator output cable	600 kc	600 kc	BC coil L15
15		1400 kc	1400 kc	BC Ant. trim. Ct6
16		Repeat steps 14 and 15.		

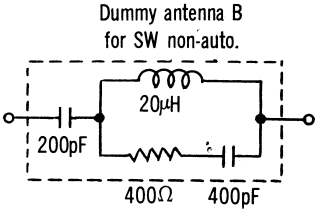
5. AM alignment of LW & BC Band Tracking on Auto-reception **

(A. Antenna button in ON position)

17	Inject signal through the dummy antenna, which connected with signal generator output cable	160 kc	160 kc	LW A. Ant. coil L7–L8
18		340 kc	340 kc	LW A. Ant. trim. Ct5
19		Repeat steps 17 and 18		
20		600 kc	600 kc	BC A. Ant. coil L9–L10
21		1400 kc	1400 kc	BC A. Ant. trim. Ct4
22		Repeat steps 20 and 21		

** Apply volt meter across the voice coil. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain output reading.





6. AM alignment of SW Band (A. Antenna button in OFF position)

23	Inject through the dummy antenna, which connected with signal generator output cable. (Use dummy antenna B)	5.5 mc	5.5 mc	SW osc coil L19–L22
24		11.5 mc	11.5 mc	SW osc trim. Ct8
25		Repeat steps 23 and 24.		
26		5.5 mc	5.5 mc	SW ant. coil L11–L12
27		11.5 mc	11.5 mc	SW ant. coil Ct3
28		Repeat steps 26 and 27.		

7. AM alignment of SW Band on Auto-reception** (A. Antenna button in ON position)

29	Inject through the dummy antenna, which connected with signal generator output cable. (Use dummy antenna A)	5.5 mc	5.5 mc	Sufficiently enough to check adjustment
30		11.5 mc	11.5 mc	

**Apply volt-meter across the voice coil. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain output reading.

8. RF alignment

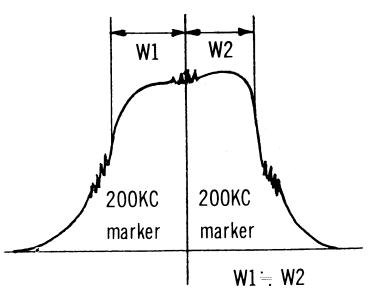
Apply volt-meter across the voice coil. Volume control should be at maximum position. Output of signal generator should be no higher than necessary in order to avoid limiting effect.

STEP	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT
1	Inject through the dummy antenna, which connected with signal generator output cable.	108 mc	108 mc	Osc trim. Ct2
2		87 mc	87 mc	Osc coil L5
3		Repeat steps 1 and 2.		
4		108 mc	108 mc	RF trim. Ct1
5		87 mc	87 mc	RF coil L3
6		Repeat steps 4 and 5.		
7		Repeat entire steps 1 to 6.		

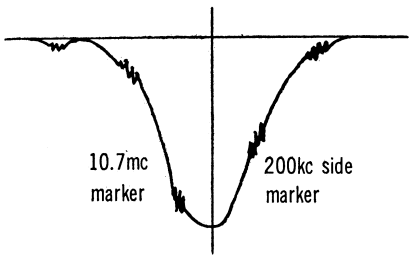
Effect of automatic frequency control.

To confirm effectiveness of AFC, apply FM signal (87 mc, 1 mv) to the antenna terminal, and tune in this signal. If signal, which is diverged by 150—300 kc from 87 mc, is searched and tuned in, then this proves the efficiency of AFC.

Note: T5–T4 and T3–T2 are double tuned networks. T5 and T3 have effects on the right half of IF characteristic pattern, T4 and T2 on the left half. On adjusting T5 and T3, find a point in which the top of the right half is higher than that of the left one, as well as a broader band width is obtained at summit of total curve.

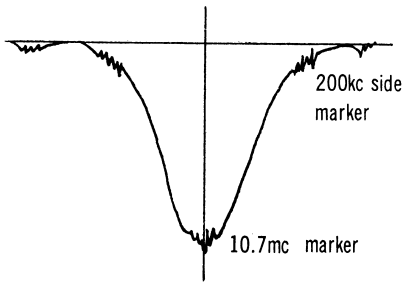


Incomplete IF characteristic pattern



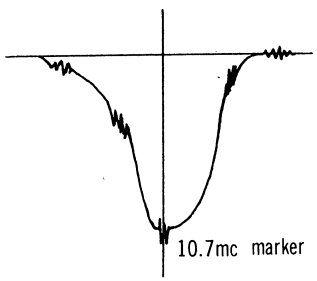
Symmetric curve, but off-centered 10.7 mc marker.

Scope pattern of complete IF characteristic



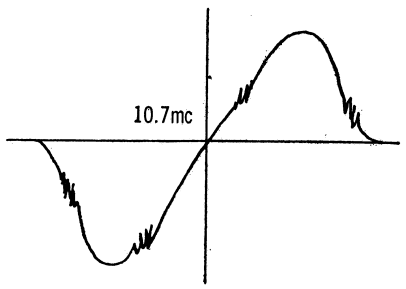
Curve is symmetric. 10.7 mc marker locates at center of curve. Symmetrical location of side markers.

Incomplete IF characteristic scope pattern



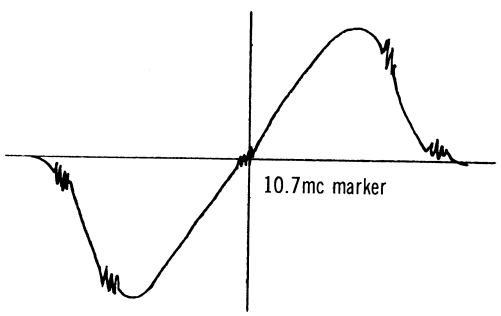
10.7 mc marker on center of curve, but unsymmetric curve.

Incomplete detector characteristic scope pattern



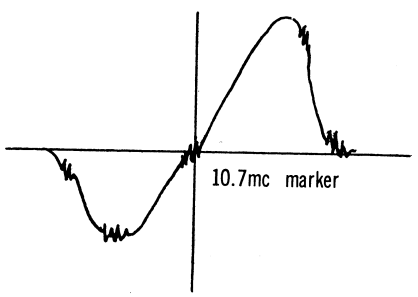
Symmetric curve, but bad location of markers.

Complete detector characteristic scope pattern



"S" curve and location of markers are symmetric in reference to 10.7 mc marker.

Incomplete detector characteristic scope pattern



"S" curve is unsymmetric viewed from reference point of 10.7 mc marker.

PARTS LIST

PART NO.	DESCRIPTION				

FIXED CAPACITORS-1

C 1	15	pF	±10 %	25	WV
C 2	500	〃	±20 %	50	〃
C 3	0.005	μF	+80, −20 %	〃	〃
C 4	0.04	〃	〃	〃	〃
C 6	15	pF	±10 %	25	〃
C 7	5	〃	±0.5 pF	〃	〃
C 8	0.002	μF	+80, −20 %	59	〃
C 9	20	pF	±10 %	25	〃
C10	0.04	μF	+80, −20 %	50	〃
C11	500	pF	±20 %	〃	〃
C12	7	〃	±0.5 pF	25	〃
C13	5	〃	〃	〃	〃
C14	15	〃	±10 %	〃	〃
C15	10	〃	±1 pF	〃	〃
C16	0.005	μF	+80, −20 %	50	〃
C17	0.01	〃	+30, −20 %	〃	〃
C18	3	〃	±0.5 pF	25	〃
C19	5	pF	〃	〃	〃
C20	0.001	μF	+80, −20 %	50	〃
C21	12	pF	±10 %	25	〃
C22	3	〃	±0.5 pF	〃	〃
C23	0.04	μF	+80, −20 %	50	〃
C25	200	pF	±20 %	500	〃
C57	2	〃	±0.5 pF	25	〃
C28	0.04	μF	+80, --20 %	50	〃
C29	0.001	〃	〃	〃	〃
C30	0.04	〃	〃	〃	〃
C31	6	pF	±0.5 pF	25	〃
C32	25	〃	±10 %	500	〃
C33	200	〃	±20 %	〃	〃
C34	15	〃	±10 %	25	〃
C35	0.01	μF	+30, −20 %	50	〃
C36	0.005	〃	〃	〃	〃
C37	0.04	〃	+80, −20 %	〃	〃
C38	0.01	〃	+30, −20 %	〃	〃
C39	0.001	〃	+80, −20 %	〃	〃
C41	200	pF	±20 %	500	〃
C42	200	〃	〃	〃	〃
C45	0.005	μF	+30, −20 %	50	〃
C46	0.001	〃	〃	〃	〃
C47	25	pF	±10 %	500	〃
C48	0.005	μF	+30, −20 %	50	〃
C49	0.001	〃	〃	〃	〃
C50	0.01	μF	〃	〃	〃
C51	0.005	〃	〃	〃	〃
C52	0.001	〃	〃	〃	〃
C53	0.003	〃	〃	〃	〃

PART NO.	DESCRIPTION				

FIXED CAPACITORS-2

C54	0.005	μF	+30, −20 %	50	WV
C55	0.02	〃	〃	〃	〃
C56	70	pF	±10 %	500	〃
C57	180	〃	〃	125	〃
C58	330	〃	〃	〃	〃
C59	0.01	μF	+80, −20 %	50	〃
C66	0.005	〃	+30, −20 %	〃	〃
C67	0.005	〃	〃	〃	〃
C70	0.04	〃	〃	〃	〃
C71	0.04	〃	+80, −20 %	〃	〃
C72	0.04	〃	〃	〃	〃
C73	0.04	〃	〃	〃	〃
C74	25	pF	±10 %	500	〃
C75	6	〃	±0.5 pF	25	〃
C76	1200	〃	±10 %	35	〃
C77	10	〃	±1 pF	25	〃
C78	0.002	μF	+30, −20 %	50	〃
C79	15	pF	±10 %	25	〃
C80	0.05	μF	+80, −20 %	10	〃
C81	0.04	〃	+30, −20 %	50	〃
C82	15	pF	±10 %	25	〃
C83	5	〃	±0.5 pF	〃	〃
C84	200	〃	±20 %	500	〃

PART NO.	STOCK NO.	DESCRIPTION			

ELECTROLYTIC CAPACITORS

C 5	R-C9078	5	μF	6	WV
C24	R-C9080	30	〃	3	〃
C26	R-C9105	30	〃	6	〃
C40	R-C9078	5	〃	〃	〃
C43	R-C9076	1	〃	10	〃
C44	R-C9074	200	〃	〃	〃
C60	R-C9105	30	〃	6	〃
C61	R-C9076	1	〃	10	〃
C62	R-C9097	0.5	〃	〃	〃
C63	R-C9080	30	〃	3	〃
C64	R-C9056	450	〃	16	〃
C65	R-C9082	100	〃	6	〃
C68	R-C9074	200	〃	10	〃
C69	R-C9007	3	〃	150	〃

STOCK NO.	DESCRIPTION			

FIXED RESISTORS-1

R 1	180	ohm	±10 %	¼ W
R 2	82 k	〃	〃	〃
R 3	1.2 k	〃	〃	〃
R 4	6.2 k	〃	±5 %	〃
R 5	5.6 k	〃	±10 %	〃
R 6	2.2 k	〃	±5 %	〃
R 7	1 k	〃	〃	〃
R 8	68 k	〃	±10 %	〃
R 9	100 k	〃	〃	〃
R10	68 k	〃	〃	〃
R11	33 k	〃	〃	〃
R12	56 k	〃	〃	〃
R13	1 k	〃	〃	〃
R14	47 k	〃	〃	〃
R15	5.6 k	〃	〃	〃
R16	1 k	〃	〃	〃
R17	5.6 k	〃	〃	〃
R18	18 k	〃	〃	〃
R19	1.2 k	〃	〃	〃
R20	100	〃	〃	〃
R21	1 k	〃	〃	〃
R22	270	〃	〃	〃
R23	330	〃	〃	〃
R24	270	〃	〃	〃
R25	5.6 k	〃	〃	〃
R26	5.6	〃	〃	〃
R27	270	〃	〃	〃
R28	3.3 k	〃	〃	〃
R29	22 k	〃	〃	〃
R30	1 k	〃	±5 %	〃
R31	4.7 k	〃	±10 %	〃
R32	82 k	〃	〃	〃
R33	22 k	〃	〃	〃
R34	150 k	〃	〃	〃
R35	6.8 k	〃	〃	〃
R36	22 k	〃	〃	〃
R37	6.8 k	〃	〃	〃
R38	56	〃	〃	〃
R39	330	〃	〃	〃
R40	330	〃	〃	〃
R41	2.2 k	〃	〃	〃
R42	82	〃	〃	〃
R43	330 k	〃	〃	〃
R44	2.2	〃	±5 %	〃
R45	100	〃	±10 %	〃
R46	2.2 k	〃	〃	〃
R47	1 k	〃	〃	〃
R48	1.8 k	〃	〃	〃
R49	15 k	〃	〃	〃

STOCK NO.	DESCRIPTION			

FIXED RESISTORS-2

R50	1.5 k	ohm	±10 %	¼ W
R51	180 k	〃	〃	〃
R52	10	〃	〃	〃
R58	33 k	〃	〃	〃

STOCK NO.	DESCRIPTION

MISCELLANEOUS

R-38206	Dial plate	
R-32306	Spacer	
R-36107a	Back screen	
R-11192	Pilot holder	-right
R-111833	Pilot holder	-left
R-24345	Stud nut	-back cover mtg.
R-S8540	Pointer assembly	
R-15096a	Tension spring	
R-S8145a	Drum	
R-15041	Tension spring	
	Dial cord	0.3 ∅ 900 mm
	Dial cord	0.5 ∅ 650 mm
R-31481	Cabinet	
R-26618	Knob panel	-SW·VOL, TONE
R-26619	Knob panel	-Tuning
R-26620	Metal strip	-SANYO
R-26623	Tweeter panel	-Metal punched
R-26622	Oval frame	-Tweeter
R-26624	Panel	
R-26621a	Metal strip	-L section
R-24770	Stud nut	7 ∅ × 27
R-24690	Stud nut	6 ∅ × 19
R-24561	Stud nut	7 ∅ × 36
R-24689	Stud nut	6 ∅ × 39
R-31482	Back cover	
R-32298	Battery compartment lid	
R-33341	Tone knob	
R-S8536	Tuning knob	
R-S8537	Volume knob	
R-24099	Stud nut	6∅ × 20 -Back cover mtg.
R-35170	Battery cover	
R-S6210	Earphone	
R-S1151	Pilot lamp	
R-S1152	Telescopic rod antenna	
R-S2081a	Dual jack	-Earphone, tape
R-S1011	Antenna socket	-For auto antenna
R-S8535	Antenna lead with plug and cup	