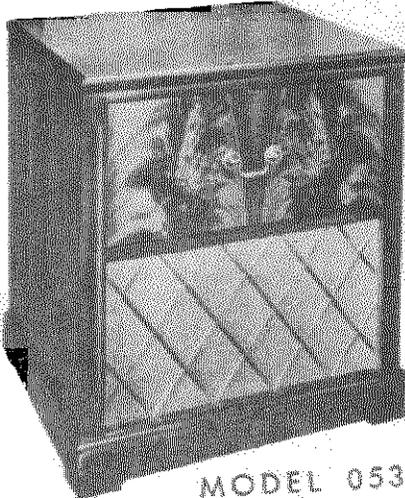


MODELS 053, JP50-3,
JP90-3, Ch.RP5L, RP5U

PARTS LIST



COILS AND TRANSFORMERS

REF. NO.	PART NO.	DESCRIPTION
L ₁	A-1493-10	Loop Antenna
L ₂	A-1492-10	Oscillator Coil
T ₁	A-1490-10	Input IF Transformer
T ₂	A-1491-10	Output IF Transformer
T ₃	A-1656-13	Audio Output Transformer 2500Ω to 3.2

MISCELLANEOUS

C-2500-14	Record changer - VM
A-1059-4	Control knob
A-1060-4	Pointer knob
100-84	Record Changer - Webster

CAPACITORS

REF. NO.	PART NO.	DESCRIPTION
C ₁	A-1200-6	TUNING CAPACITOR
C ₂	CWZ 04203 M	.02 Mfd 400 volts
C ₃	CWZ 04503 M	.05 Mfd 400 volts
C ₄	CWZ 06502 M	.005 Mfd 600 volts
C ₅	CWZ 04203 M	.02 Mfd 400 volts
C ₆	CED-4415	DUAL 40 Mfd 150 volt electrolytic capacitor
C ₇	CWR-04503 M	.05 Mfd resonant
C ₈	CCC, 05050 M	5 Mmf ceramic or mica

RESISTORS

REF. NO.	PART NO.	DESCRIPTION
R ₁	RCC 224 M	220,000 ohms ± 20% ½ watt Resistor
R ₂	RCC 105 M	1.0 megohms ± 20% ½ watt Resistor
R ₃	RCC 223 M	22,000 ohms ± 20% ½ watt Resistor
R ₄	RCC 106 M	10 megohms ± 20% ½ watt Resistor
R ₅	RVC-301S	500,000 ohms volume control audio taper with switch
R ₆	RCC 151 M	150 ohms ± 20% ½ watt
R ₇	RCC 154 M	150,000 ohms ± 20% ½ watt
R ₈	RCC 154 M	150,000 ohms ± 20% ½ watt
R ₉	RCF 222 M	2,200 ohms ± 20% 1 watt
R ₁₀	RCC 150 M	15 ohms ± 20% ½ watt

VOLTAGE CHART

PIN	#1	#2	#3	#4	#5	#6	#7
12BE6	-7.5	0	12AC	23AC	90	90	0
12BA6	-0.8	0	23AC	35AC	90	90	0
12AT6	-0.8	0	0	12AC	-0.8	-0.5	45
50C5	6	0	35AC	83AC	0	90	120
35W4	0	0	83AC	117AC	115AC	0	130

NOTES:

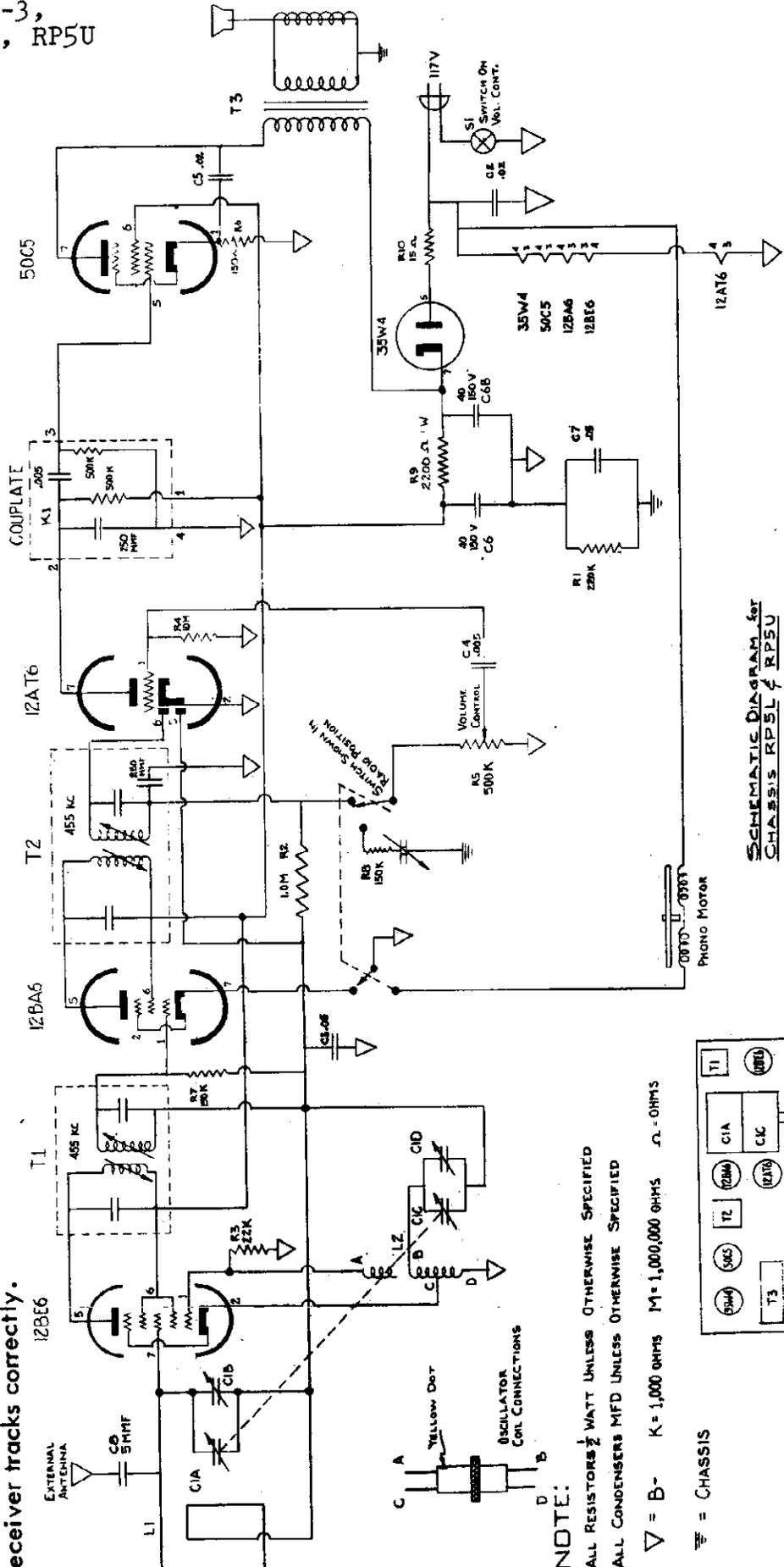
1. Measured with VTVM from indicated pin to B- line.
2. Phono-radio switch in radio position.
3. Line voltage set at 117V 60~AC.
4. Voltage s may vary considerably due to variations in line voltage and components.

MODELS 053, JP50-3,
JP90-3, Ch. RP5L, RP5U

ALIGNMENT PROCEDURE

Feed a 455 K.C. modulated signal from grid (pin No. 7 12BE6 through a .01 M.F.D. condenser) and B-. Connect an output meter across the voice coil. Tune slugs on first and second I.F. transformers for maximum indication on meter. Set signal generator to 1600 KC modulated signal and couple loosely to loop antenna. Set dial to 1600 K.C. and tune oscillator trimmer for maximum indication on meter.

Set signal generator and dial to 1400 K.C. and tune R.F. trimmer, for maximum indication on meter. Check tracking at 600 K.C., knife gang if necessary. Repeat these adjustments until the receiver tracks correctly.

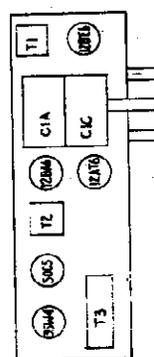


SCHMATIC DIAGRAM for
CHASSIS RP5L & RP5U

NOTE:
ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED
ALL CONDENSERS MFD UNLESS OTHERWISE SPECIFIED

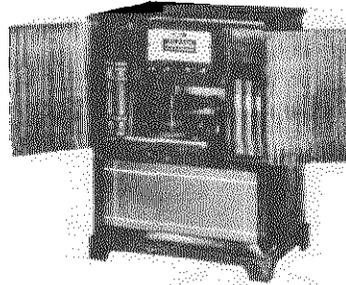
∇ = B- K = 1,000 OHMS M = 1,000,000 OHMS Ω = OHMS

⊞ = CHASSIS



TOP VIEW OF CHASSIS

MODELS 153,
3170, Ch. AM7A



MODEL 153

HOW TO OPERATE THE RADIO:

This radio is equipped with four controls, the left hand control is the combined off-on switch and volume control. The second knob from the left is the phono-radio switch, the third knob is the tone control, the fourth control is used for tuning the desired station. To place the set in operation, rotate on-off volume control knob to right and allow 30 seconds for set to warm up. Rotate tuning control to desired station. Adjust volume control to desired volume, set tone control to treble or base response. To use phonograph follow above steps, except turn phono-radio switch, to phono position. Place records on changer in sequence desired, push reject button, and allow changer to cycle.

VOLTAGE CHART

PIN	#1	#2	#3	#4	#5	#6	#7
12BE6	-7.3	0	24*	24*	78	78	0
12BA6	-8.	0	24*	12*	89	89	0
12AT6	-1.8	0	0	-8. *	-8.	-2.3	34
12AT6	-.45	0	0	12*	0	0	45
50C5	-7.2	0	60*	12*	0	89	120
50C5	-7.2	0	80*	36*	0	89	120
35W4	-0	0	86*	120*	115*	115*	120

Measured with V.TVM from

Set in radio position.

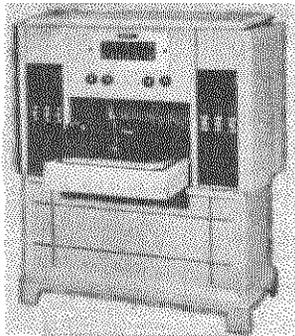
Pin to B- line.

* A.C. Volts.

ALIGNMENT PROCEDURE

Feed a 455 K.C. modulated signal from grid to ground (pin No. 7 12BE6). Connect A output meter across the voice coil. Tune slugs on first and second I.F. transformers for maximum indication on meter. Set signal generator to 1600 K.C. Modulated signal and couple loosely to loop antenna. Set dial to 1600 K.C. and tune oscillator trimmer for maximum indication on meter.

Set signal generator and dial to 1400 K.C. and tune R.F. trimmer, for maximum indication on meter. Check tracking at 600 K.C., knife gang if necessary. Repeat these adjustments until the receiver tracks correctly.



MODEL 350
SPECIFICATIONS

Power Supply.....105-125 volts 60 cycle AC only.
 Power Consumption.....65 Watts.
 Frequency Range FM.....88 to 108 MC.
 Frequency Range AM.....540 to 1600 KC.
 I.F. Frequency FM.....10.7 MC.
 I.F. Frequency AM.....455 KC.
 Band width, FM, Ratio Detector.....330 KC.
 Band width, FM, 1st I.F.....280 KC.
 Band width, FM, Converter.....220 KC.

All voltage readings are taken from tube pin to chassis. ALIGNMENT NOTES

All measurements are made with no signal, using a 20,000 ohm per volt meter.

AC input voltage must be maintained at 117 volts for accurate readings.

AC voltages shown are at 1000 ohms per volt.

All voltages shown are approximate.

VOLTAGE CHART

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
6BE6 FM & AM OSC AM CONV	0	0	0	6 AC	155	125	0		
12AT7 FM RF AMP & CONV	170	0	1.5	0	0	155	0	1	6 AC
6BA6 1st IF AM & FM	0	0	6 AC	0 AC	150	100	0		
6BA6 2nd IF FM	0	0	6 AC	0 AC	155	110	1		
6AL5 FM DETECTOR	0	0	6 AC	0 AC		0	0		
6AT6 AM DETECTOR, AVC, AUDIO	—,5	0	6 AC	0 AC	0	0	60		
6AQ5 POWER OUTPUT	0	7.5	6 AC	0 AC	215	170	0		
6X4 POWER RECTIFIER	230 AC		6 AC	0 AC	235	230 AC	235 AC		

Band Switch on AM position. Dial 1600 KC. No Signal.

SERVICE NOTES

GENERAL

CAUTION: If realignment is necessary be sure the proper test equipment is available, as listed below, before proceeding with the alignment procedure as given on page 5.

Due to the high frequencies at which FM signals are received the service man must use great care when servicing these sets. Extreme caution must be used regarding the moving of component parts in the R.F. and oscillator circuits of the receiver as those circuits can be detuned in this manner.

If it becomes necessary to replace components such as resistors and condensers they must be replaced with parts of the same size, type, voltage rating and tolerance as called for in the parts list.

When installing new parts they should be placed in the same position as the original, and the leads should be cut to the same length.

This receiver has been thoroughly inspected and tested at the factory, using the most modern test equipment available, such as FM sweep generators and oscilloscopes. All R.F. and I.F. circuits have been accurately adjusted at the factory and no attempt should be made to realign these circuits unless it is absolutely necessary.

EQUIPMENT USED FOR ALIGNMENT

Vacuum tube voltmeter.

AM Signal generator

FM Sweep generator.

Oscilloscope.

Insulated screw driver.

Dummy antenna:

.1 MFD condenser

.00025 MED mica condenser

150 ohm resistor (2)

Output meter.

The tubes used are as follows:

12AT7 FM RF Amplifier, Converter

6BE6 FM Osc, Am Osc, Converter

6BA6 FM-AM, 1st I.F. Amplifier

6BA6 FM, 2nd I.F. Amplifier

6AL5 FM Detector

6AT6 AM Detector, AVC, Audio

6AQ5 Power Output

6X4 Power Rectifier

No. 44 Pilot Lights (2)

MODELS 350,
5120, Ch. FA8A

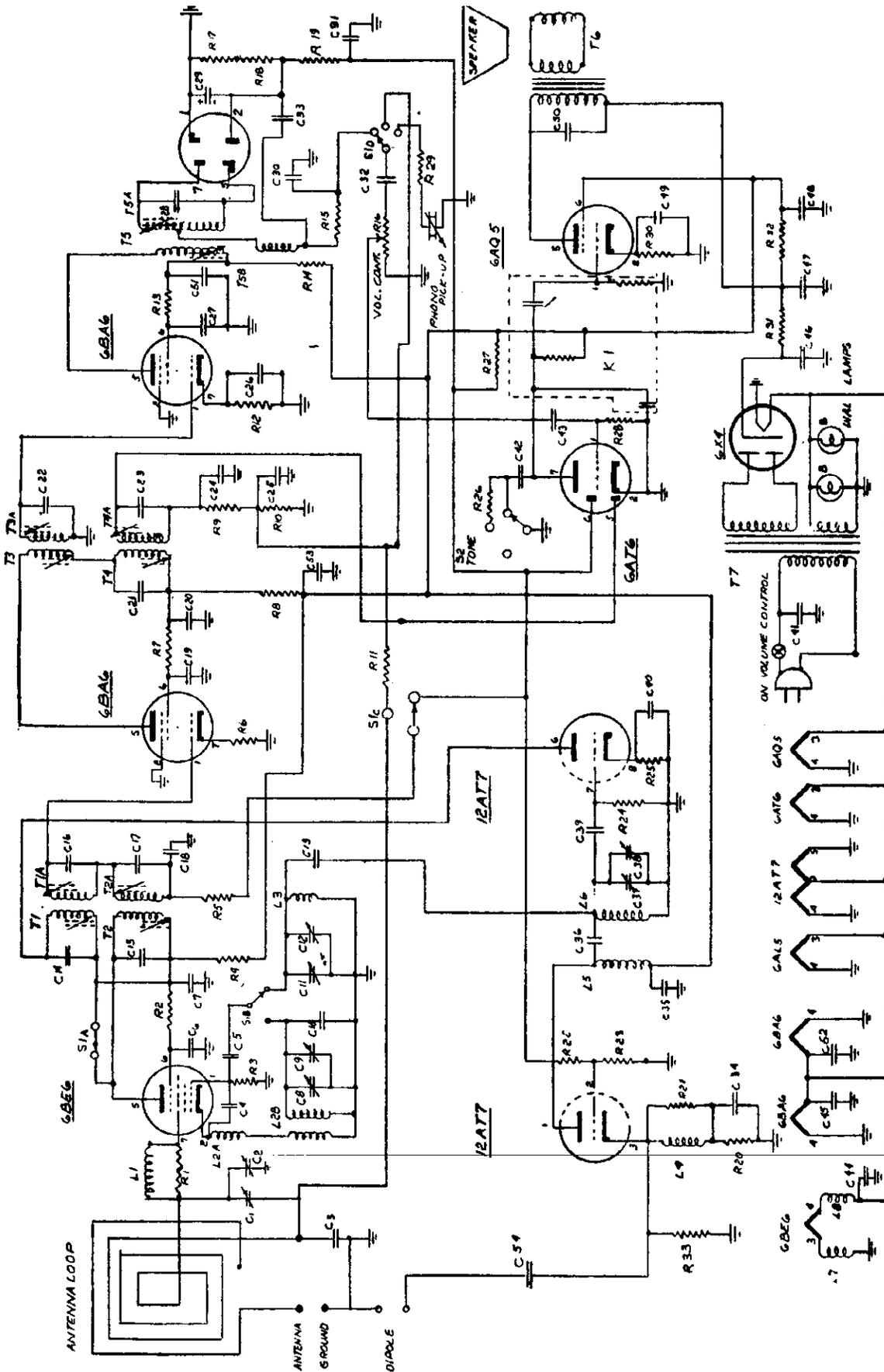


FIG. 1 SCHEMATIC DIAGRAM

ALIGNMENT PROCEDURE

STEPS	RECEIVER DIAL SETTING	BAND SWITCH POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTIONS	OUTPUT INDICATOR	TRIMMER ADJUSTMENT	TRIMMER FUNCTION	REMARKS
1	Minimum capacity	AM	455 KC 400 cycle AM	.1 MFD	High side—grid of AM converter tube (6BE6) Low side—chassis	Output Meter across voice coil	T2 & T4	AM I.F.	Adjust for maximum output
2	"	"	1600 KC 400 cycle AM	"	"	"	AM OSC	AM Oscillator	"
3	1400 KC	"	1400 KC 400 cycle AM	.00025 MFD	High side—One ant. terminal Low side—Other ant. terminal	"	Ant Loop	AM Antenna	"
4	Any position where there is no station interference.	FM	10.7 MC unmodulated .1 volt output.	.1 MFD	High side—grid of 2nd I.F. amplifier tube (6BA6) Low side—chassis	Connect V.T.V.M. to plates of Ratio Deflector tube, pin 2 (6AL5)	Top T5	Ratio detector primary	Adjust for maximum negative voltage.
5	"	"	10.7 MC 400 cycle 250 KC Deviation	"	"	Connect scope to audio take-off point (across vol. cont.)	Bottom T5	Ratio detector secondary	Adjust for a balanced pattern on scope. See Fig. 2
6	"	"	10.7 MC 400 cycle 80 KC Deviation	"	High side—grid of 1st I.F. amplifier tube (6BA6) Low side—chassis	"	T3	FM 2nd I.F.	Adjust for maximum gain and best pattern on scope. See Fig. 2
7	"	"	"	"	High side—grid (pin 7) of FM converter tube (12A7) Low side—chassis	"	T1	FM 1st I.F.	"
8	108.5 MC	"	108.5 MC 400 cycle 30% modulation (22.5 KC deviation)	300 ohms in high side	High side—ant. terminal Low side—chassis	Connect output meter across voice coil	FM OSC.	FM oscillator	Adjust for maximum output
9	105 MC	"	105 MC 400 cycle 30% modulation (22.5 KC deviation)	"	"	"	FM RF	FM R.F.	"

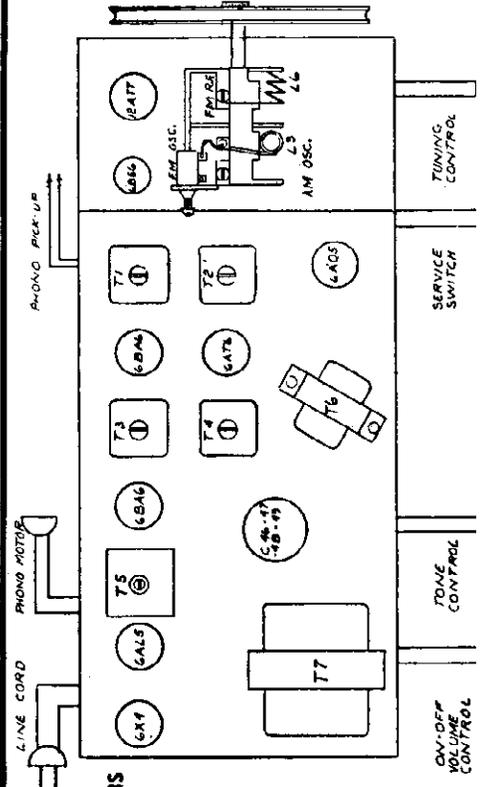


FIG. 3 TUBE AND TRIMMER LOCATIONS



NOTE A: When aligning the FM I.F. circuits, keep the output from the signal generator as low as possible.

FIGURE 2

MODELS 350,
5120, Ch. FA8A

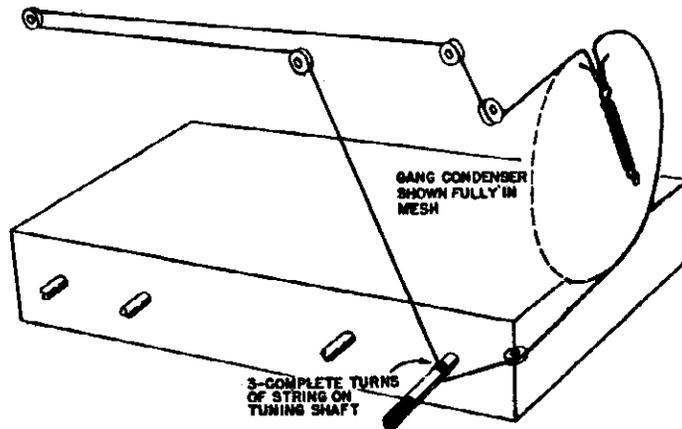
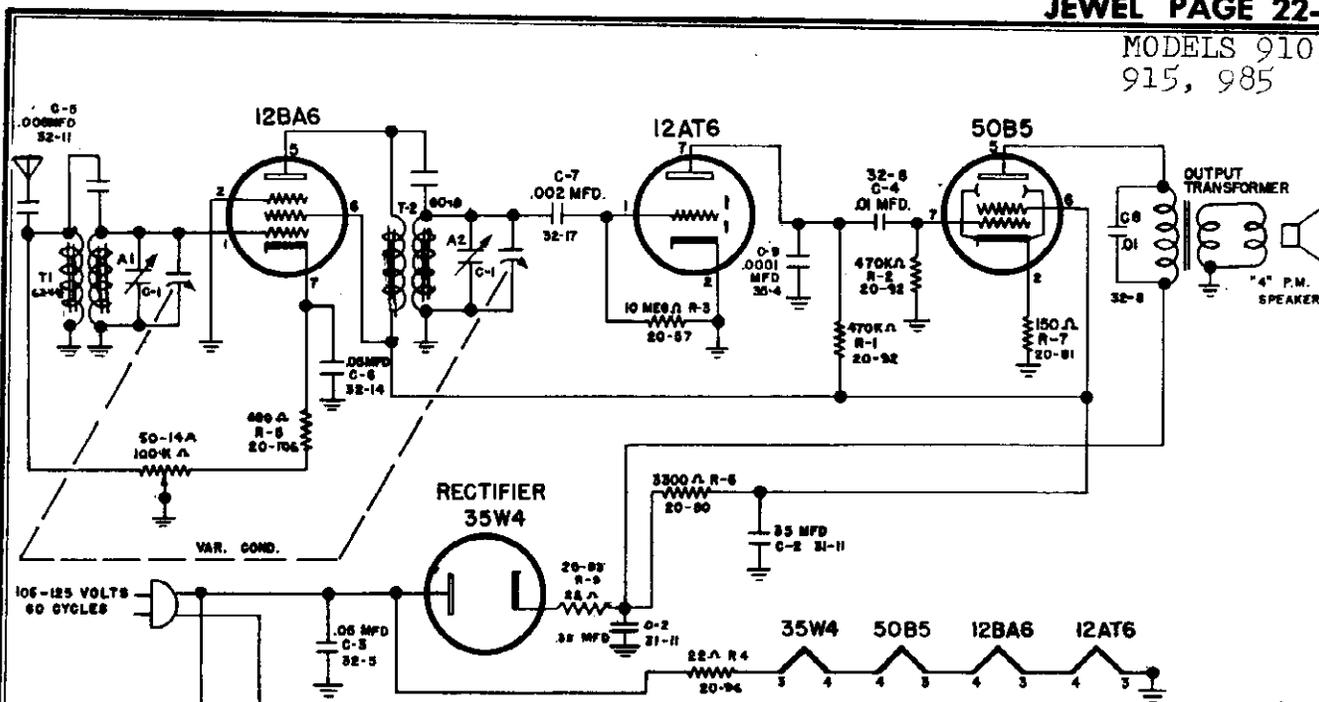


FIG. 4 DIAL CORD STRINGING

PARTS LIST

Schematic Diagram Reference	Description		
		R10, R23, R24	470K ohm Resistor.....
		R11, R22	2.2M ohm Resistor.....
		R16	.5M Vol. Cont. — SPST.....
C1	Loop Trimmer.....	R17, R18	12K Resistor.....
C2	Variable Cond.....	R20	220 ohm Resistor.....
C8, C9		R25	2.2K ohm.....
C11, C37		R27	3.3M ohm.....
C38	.05-200V Condenser.....	R28	6.8M ohm.....
C3		R30	270 ohm — 1 Watt.....
C4	2.2 MMF Gimmick Cond.....	R31	100 ohm — 1 Watt.....
C5	33 MMF (Erie Style A N14004).....	R32	1000 ohm — 5 Watt.....
C6, 18		R33	560 ohm.....
C19, 27	} 5000 MMFD GMV.....	K1	CRL Triode couplate.....
C26		L1	AM Grid Choke on R1.....
C42, C45, 51		L2A, B	AM Osc. Coil.....
C50, C52		L3	FM Osc. Coil.....
C10		L4	FM Cathode choke on R21.....
C12	15 MMFD + or — 10% O° T.C. (Erie).....	L5	FM plate choke.....
C13	FM Osc Trimmer.....	L6	FM RF Coil.....
C14, 15, 16, 17	} Integral part of respective IF—XFMRs	D-1	Dial Scale.....
21, 22, 23, 24, 28		L7, 8	Filament choke.....
C31, 32, 53, 7, 20	} 10,000 MMFD GMV.....	T1	1st FM IF.....
C25		T2	1st AM IF.....
36, 39, 54	100 MMF ceramic cond.....	T3	2nd FM IF.....
C29	4 - 50V Lytic condenser.....	T4	2nd AM IF.....
C30	2000 MMFD Condenser.....	T5	Ratio Detector.....
C33	470 MMFD Condenser.....	T6	Out Put XFMR.....
C34, 35	} 1000 MMFD GMV condenser.....	T7	Power XFMR.....
40, 44, 53		B	Loop Ant.
C41	.1 - 400V condenser.....		No. 44 Pilot Light.....
C43	.01 - 200V condenser.....		Line cord.....
C46, 47	} 40-350V, 30-300V FP Lytic Condenser.		300 ohm Line Di-Pole Ant.....
48, 49		30-300V, 10-25V	
R2	4.7K ohm Resistor.....	K=1000	
R3, R15	22K ohm Resistor.....	M=1,000,000	
R4, R8, R14	1K ohm Resistor.....	All Resistors ½ Watt unless otherwise noted.	
R5, R19	100K ohm Resistor.....	Values of Capacitors in MFD. unless otherwise stated.	
R6, R12	68 ohm Resistor.....	Tolerance on Capacitors and Resistors + or — 20%	
R7, R13	10K ohm Resistor.....	unless otherwise stated.	
R9, R26	47K ohm Resistor.....		



SERVICE DATA

ALIGNMENT PROCEDURE

- Output meter across voice coil (3.2 ohm)
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 1.28 volts (0.5 watt).

SIGNAL GENERATOR				Tuner Adjustment	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connections to Receiver	Ground Connection		
1650 kc	50 MFD	Antenna**	B-	Rotor full open (Plates out of mesh)	RF trimmer A2 Antenna trimmer A1
1500 Kc	50 MFD	Antenna**	B-	1500 Kc*	RF Trimmer A2 Antenna Trimmer A1

* Seven markings on the dial bracket represent respectively 550 kc, 600 kc, 700 kc, 900 kc, 1100 kc, 1400 kc, and 1600 kc reading from left to right. These points are to be used for the alignment of the receiver.

** Disconnect antenna hank by unsoldering

WAKE MASTER "JEWEL"
MODEL 910-915-985
105-125 VOLTS, 60 CYCLES
RANGE 540-1650 KC

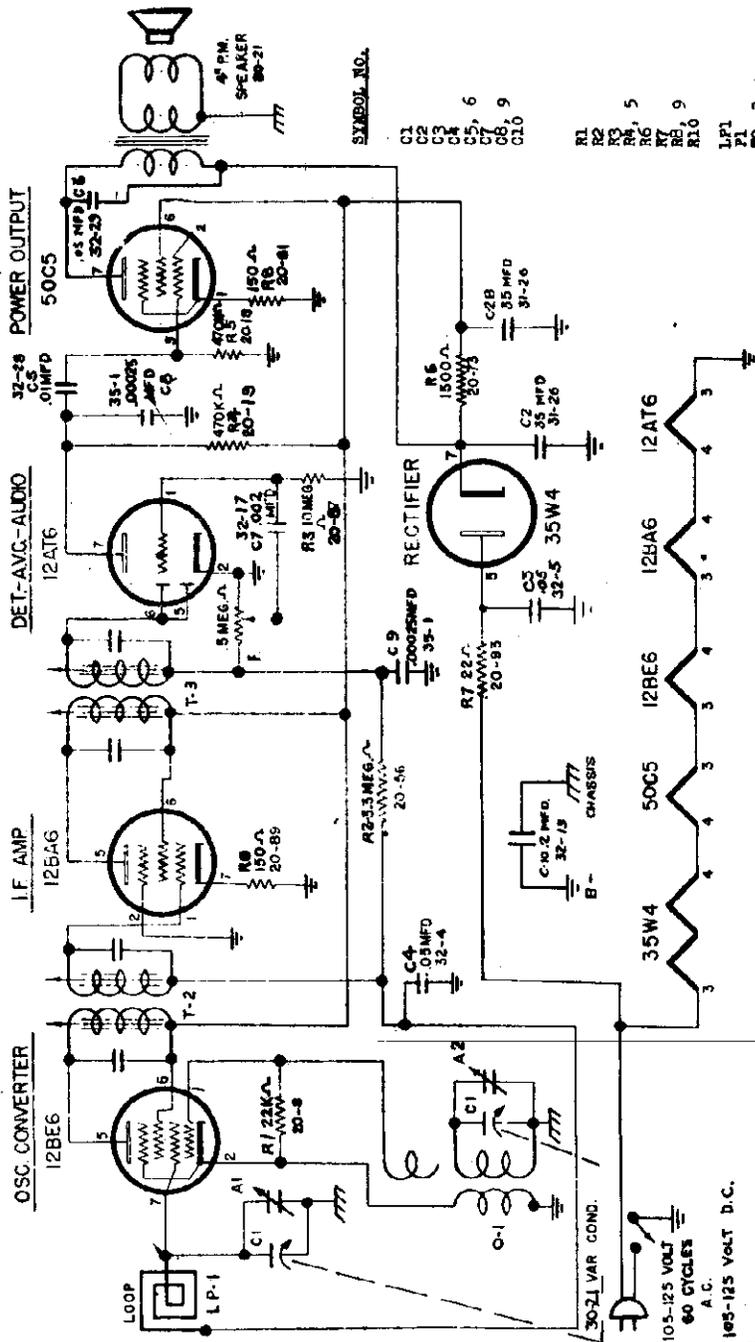
PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION	RESISTORS
			R1,2 20-92
			R3 20-97
			R4 20-96
			R5 20-106
			R6 20-80
			R7 20-81
			R8 50-14A
			R9 20-93
			T1 62-14
			T2 60-8
			80-12
			140-k
			120-25K
			122-19
			122-15
C1	30-16	VARIABLE CONDENSER, 2 GANG, 420 & 420 MMF	470 K - 1/4 W - 20%
C2	31-11	ELECTROLYTIC CONDENSER, 35 & 35 MFD/150 V	10 MEGS 1/4 W - 20%
C3	32-5	TUBULAR PAPER CONDENSER, .05 MFD/400 V	22 OHMS 1 W - 20%
C4,8	32-8	" " " " .01 MFD/150 V	680 OHMS - 1/4 W - 20%
C5	32-11	" " " " .005 MFD/150 V	3300 OHMS - 1 W - 20%
C6	32-14	" " " " .05 MFD/200 V	150 OHMS - 1/2 W - 20%
C7	32-17	" " " " .002 MFD/150 V	VOLUME CONTROL, 100 K, WITHOUT SWITCH
C9	35-4	MICA CONDENSER, .0001 MFD	22 OHMS - 1/2 W - 20%
			ANTENNA COIL
			R.F. COIL
			4" P.M. SPEAKER WITH OUTPUT TRANSFORMER
			CLOCK
			CABINET
			SELECTOR KNOB (IVORY)
			VOLUME KNOB (IVORY)

MODEL 956U

REPLACEMENT PART LIST

SYMBOL NO.	PART NO.	DESCRIPTION
C1	30-21	Variable Condenser, 20uMf, 420 R168 muf.
C2	31-26	Electrolytic Condenser, 35x35 mfd/150V.
C3	32-5	Tubular Paper Condenser, .05mfd/200V.
C4	32-4	" " " " .05mfd/200V.
C5	32-29	" " " " .01mfd/200V.
C6	32-17	" " " " .002mfd/200V.
C7	35-1	Mica Condenser, 250mfd/500V.
C8	35-1	Tubular Paper Condenser, .2mfd/400V.
C9	32-13	" " " " .002mfd/200V.
C10	32-13	" " " " .002mfd/200V.
R1	20-3	22K 20% 1/4W
R2	20-56	3.3Meg 20% 1/4W
R3	20-8	10Meg 20% 1/4W
R4	20-19	470K 20% 1/4W
R5	20-73	1.5K 20% 1/4W
R6	20-93	22.01M 20% 1/4W
R7	20-81	150 OHMS 20% 1/4W
R8	20-18A	Volume Control, 0.5Meg with spec switch
R9	20-81	150 OHMS 20% 1/4W
R10	20-81	150 OHMS 20% 1/4W
L1	62-21	Loop Oscillator Coils
P1	60-17	I.F. Transformers
T2	61-11	I.F. Transformers
T3	80-21, 22	4" P.M. Speaker with Output Transformer
T4	120-408	Cabinet
T5	Y122-89	Selecter Knob
T6	Y122-30	Volume Knob
T7	142-9	Dial Crystal



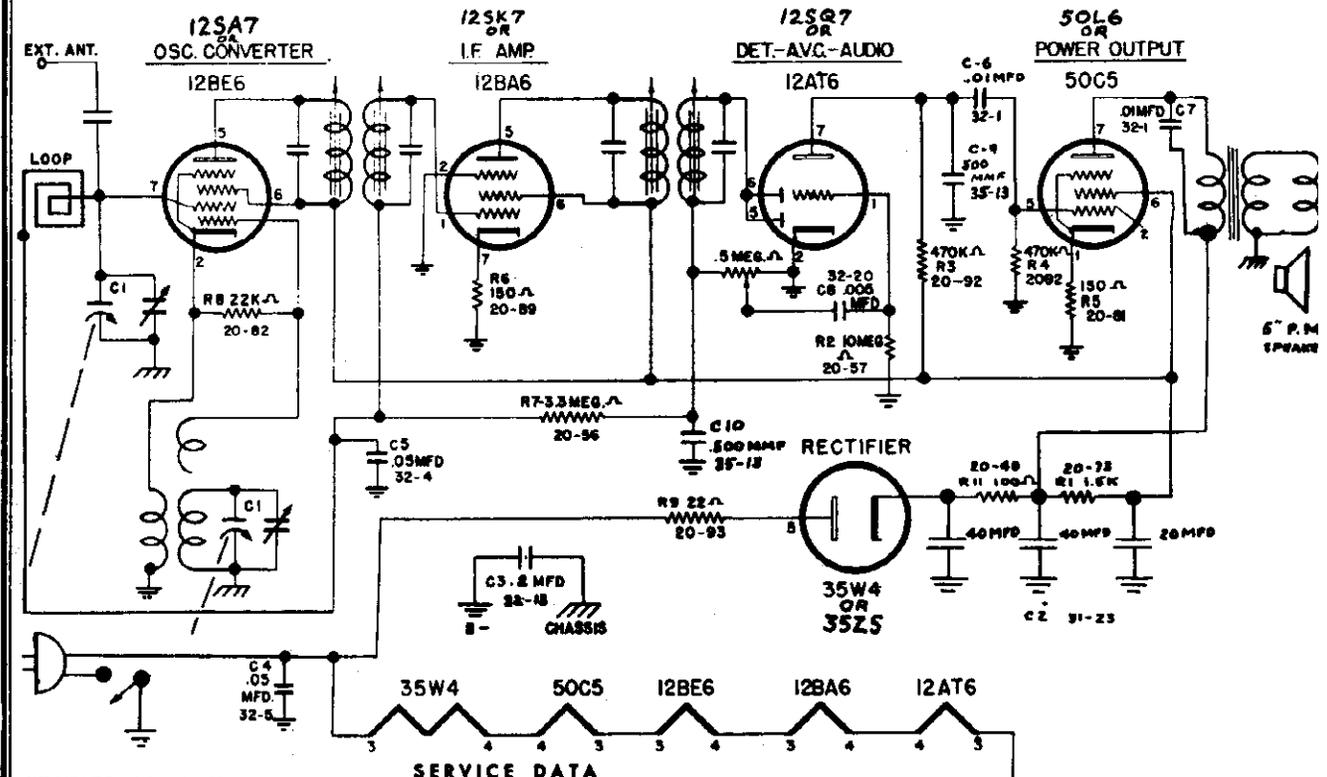
ALIGNMENT PROCEDURE

• Output meter across voice coil (3.2 ohm)
 • Volume control at maximum for all adjustments.
 • Align for maximum output. Reduce input as needed to keep output near 1.28 volts (0.5 watt).

* Ten markings on the dial represent respectively 550Kc, 650Kc, 750Kc, 850Kc, 950Kc, 1050Kc, 1200Kc, 1350Kc, 1500Kc, & 1600Kc, reading from top to bottom. These points are to be used for the alignment of the receiver

SIGNAL GENERATOR		TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Ground Connection	
455 kc	0.1 mfd.	12BE6 grid	B- Rotor full open (Plates out of mesh)
1650 kc	0.1 mfd.	12BE6 grid	B- Rotor full open (Plates out of mesh)
1500 kc		Radiating Loop	Oscillator trimmer A2 Antenna trimmer A1

DATE 6-17-39
 DRAWING NO. 130-77



117 VOLTS 60 CYCLES A.C.
117 VOLTS D.C.

SERVICE DATA

ALIGNMENT PROCEDURE

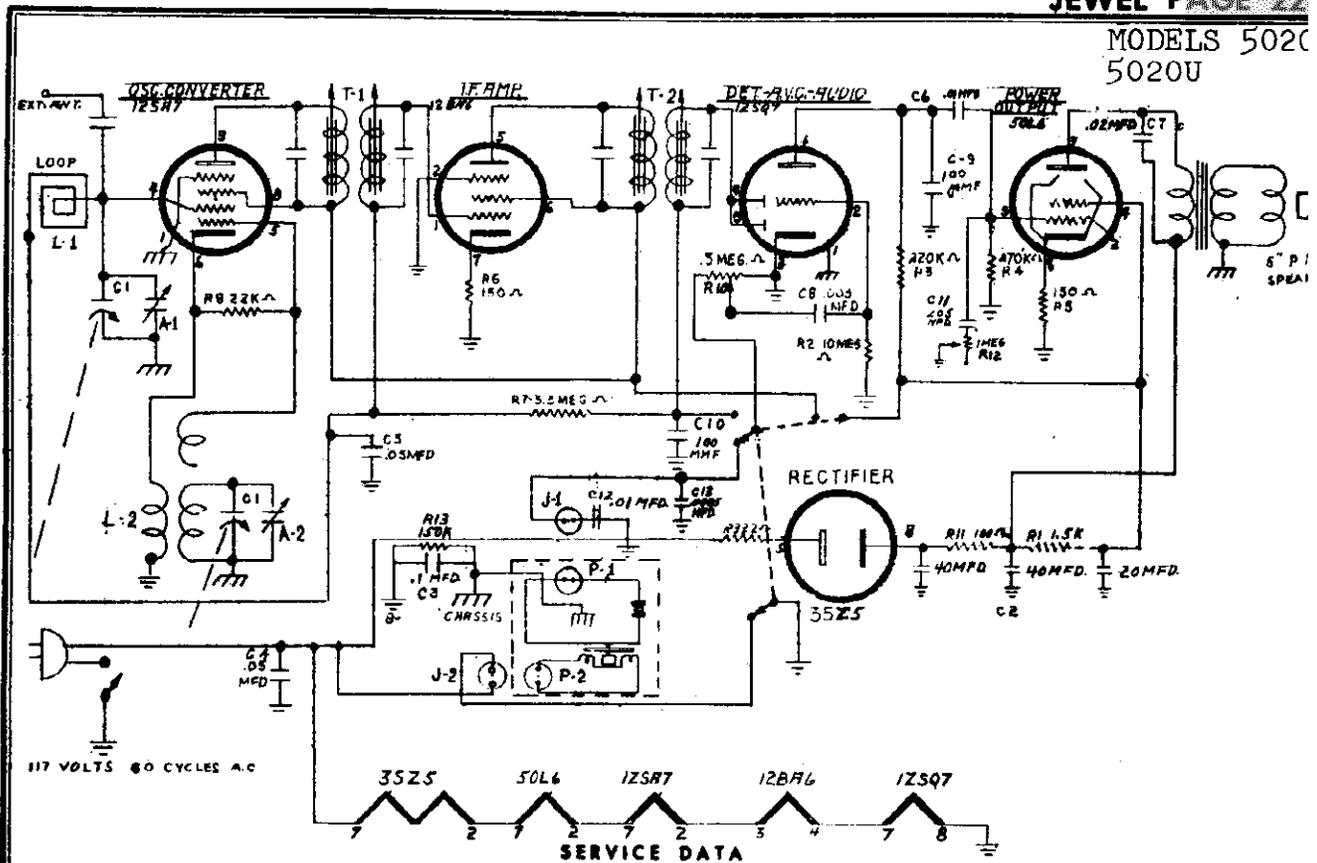
- Output meter across voice coil (3.2 ohm)
 - Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 1.28 volts (0.5 watt).

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connections to Receiver	Ground Connection		
455 kc	0.1 mfd.	12BE6 grid	B—	Rotor full open (Plates out of mesh)	Input and output slugs of IF cans
1650 kc	0.1 mfd.	12BE6 grid	B—	Rotor full open (Plates out of mesh)	Oscillator trimmer A2
1500 kc		Radiating Loop		1500 kc*	Antenna trimmer A1

*Nine markings on the dial represent respectively 550KC, 600KC, 650KC, 750KC, 900KC, 1200KC, 1350KC, 1550KC, and 1650KC reading from left to right. These points are to be used for the alignment of the receiver.

REPLACEMENT PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION	PART NO.	COILS
CAPACITORS				
C1	10-20A	VARIABLE CONDENSER, 2 GANG, 120 MV - 162 MF		
C2	31-24 (UL 31-25)	4040K20 MFD. 150 VOLT ELECTROLYTIC COND.		
C3	32-32 (UL 32-13)	.2 MFD - 200 V. TUBULAR		
C4	32-7 (UL 32-55)	.05 MFD - 400 V. -		
C5	32-4	.05 MFD - 200 V. -		
C6,7	32-1	.01 MFD - 400 V. -	U. L.	
C8	32-20 (UL 32-45)	.005 MFD - 200 V. -	60-18	60-16
C9	32-13	500 MF - 500 V. MCA	61-11	61-17
C10	32-13	500 MF - 500 V. MCA	61-11	61-17
RESISTORS				
R1	20-73	1.5 K, 1 WATT 20%		
R2	20-77	10 MEGOHM - 1/4 WATT - 20%		
R3,4	20-92	470,000 OHM 1/4 WATT - 20%	80-23	80-20
R5	20-81	150 OHM - 1/2 WATT - 20%		120-41
R6	20-89	150 OHM - 1/4 WATT - 20%		122-26
R7	20-26	3.3 MEGOHM 1/4 WATT - 20%		122-31
R8	20-82	22,000 OHM 1/4 WATT - 20%		122-31
R9	20-93	22 OHM 1/2 WATT - 20%		
R10	50-19A	1/2 MEG. VOLUME CONTROL WITH SWITCH		
R11	20-88	100 OHM - 1/2 WATT - 20%		
COILS				
				OSCILLATOR COIL
				INPUT I.F. TRANSFORMER
				OUTPUT I.F. TRANSFORMER
				LOOP ANTENNA
MISC.				
				5 INCH P.M. SPEAKER WITH OUTPUT TRANSFORMER
				CASSETTE (SPECIFY COLOR)
				KNOB POINTER
				SELECTOR KNOB
				VOLUME KNOB
				FREQ RANGE: ALIGN AT TRACK AT



ALIGNMENT PROCEDURE

- Output meter across voice coil (32 ohm)
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 1.28 volts (0.5 watt).

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connections to Receiver	Ground Connection		
455 kc	0.1 mfd.	GRID 12SA7	B—	Rotor full open (Plates out of mesh)	Input and output trimmer of IF cans
1650 kc	0.1 mfd.	GRID 12SA7	B—	Rotor full mesh (Plates out of mesh)	Oscillator trimmer A2
1500 kc		Radiating Loop	B—	1500 kc*	Antenna trimmer A1

MODEL 5020, 5020U

REPLACEMENT PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION
CAPACITORS		
C1	30-20A	VARIABLE CONDENSER, 2 GANG, 420 MMF and 162 MMF
C2	31-30A	ELECTROLYTIC COND., 4000x20 MFD, 150 V.
C3	32-57	.1 MFD - 400 V TUBULAR PAPER
C4	32-55	.05 MFD - 400 V MOULDED PHENOLIC
C5	32-4	.05 MFD - 200 V TUBULAR PAPER
C6, 12	32-1	.01 MFD - 400 V
C7	32-3	.02 MFD - 400 V
C8	32-15	.005 MFD - 600 V
C9, 10	35-4	100 MMF - 500 V MICA
C11	35-28	.005 MFD DISC CERAMIC G. P.
C13	35-13	.0005 MFD MICA
RESISTORS		
R1	20-73	1.5 K - 1 WATT - 20%
R2	20-87	10 MEG - 1/4 WATT - 20%
R3	20-74	220 K - 1/4 WATT - 20%
R4	20-92	470 K - 1/4 WATT - 20%
R5	20-81	150 OHM - 1/2 WATT - 20%
R6	20-89	150 OHM - 1/4 WATT - 20%
R7	20-28	3.3 MEG. - 1/4 WATT - 20%
R8	20-82	22 K - 1/4 WATT - 20%
R9	20-93	22 OHM - 1/2 WATT - 20%
R10	20-19	VOLUME CONTROL, 1/2 MEG., S.P.S.T. SWITCH
R11	20-40	100 OHM - 1/2 WATT - 20%
R12	50-31	100 OHM - 1/2 WATT - 20%
R13	20-14	150 K - 1/3 WATT - 20%

* Nine markings on dial represent respectively 550 Kc, 600 Kc, 700 Kc, 800 Kc, 900 Kc, 1100 Kc, 1250 Kc, 1450 Kc, and 1600 Kc reading from left to right. These points are to be used for the alignment of the receiver.

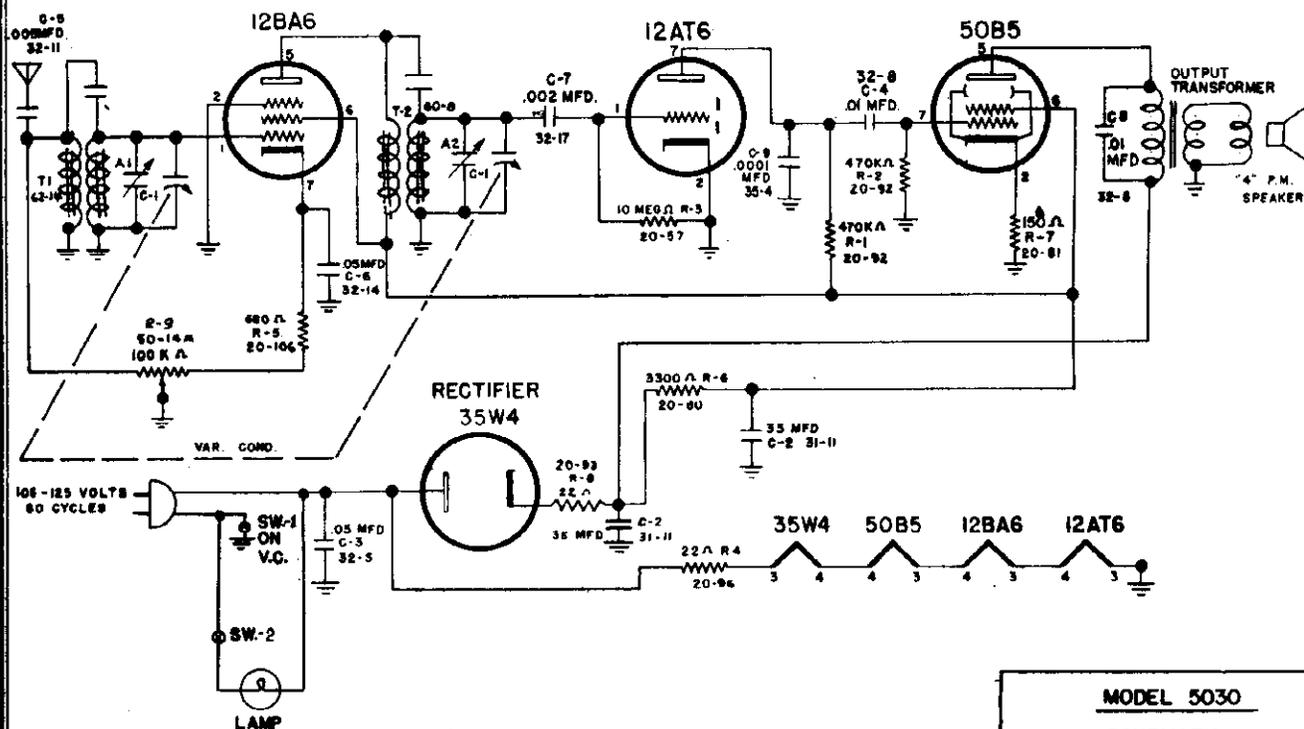
COILS

- L1 62-20
- L2 60-18
- T1, 2 61-11

MISC.

- LOOP ANTENNA OSCILLATOR COIL
- I.F. TRANSFORMER
- 5 INCH. P. M. SPEAKER WITH OUTPUT TRANSFORMER
- PHONO PICKUP JACK WITH CABLE
- PHONO MOTOR JACK WITH LEADS
- CABINET (COMPLETE)
- KNOB POINTER
- KNOB (SELECTOR, VOLUME)
- PLASTIC DIAL
- RECORD CHANGER

MODEL 5030



SERVICE DATA

ALIGNMENT PROCEDURE

- Output meter across voice coil (3.2 ohm)
- Volume control at maximum for all adjustments.

- Align for maximum output. Reduce input as needed to keep output near 1.28 volts (0.5 watt).

MODEL 5030

SCHEMATIC

105-125 VOLTS, 60 CYCLES
RANGE 540-1650 K.C.

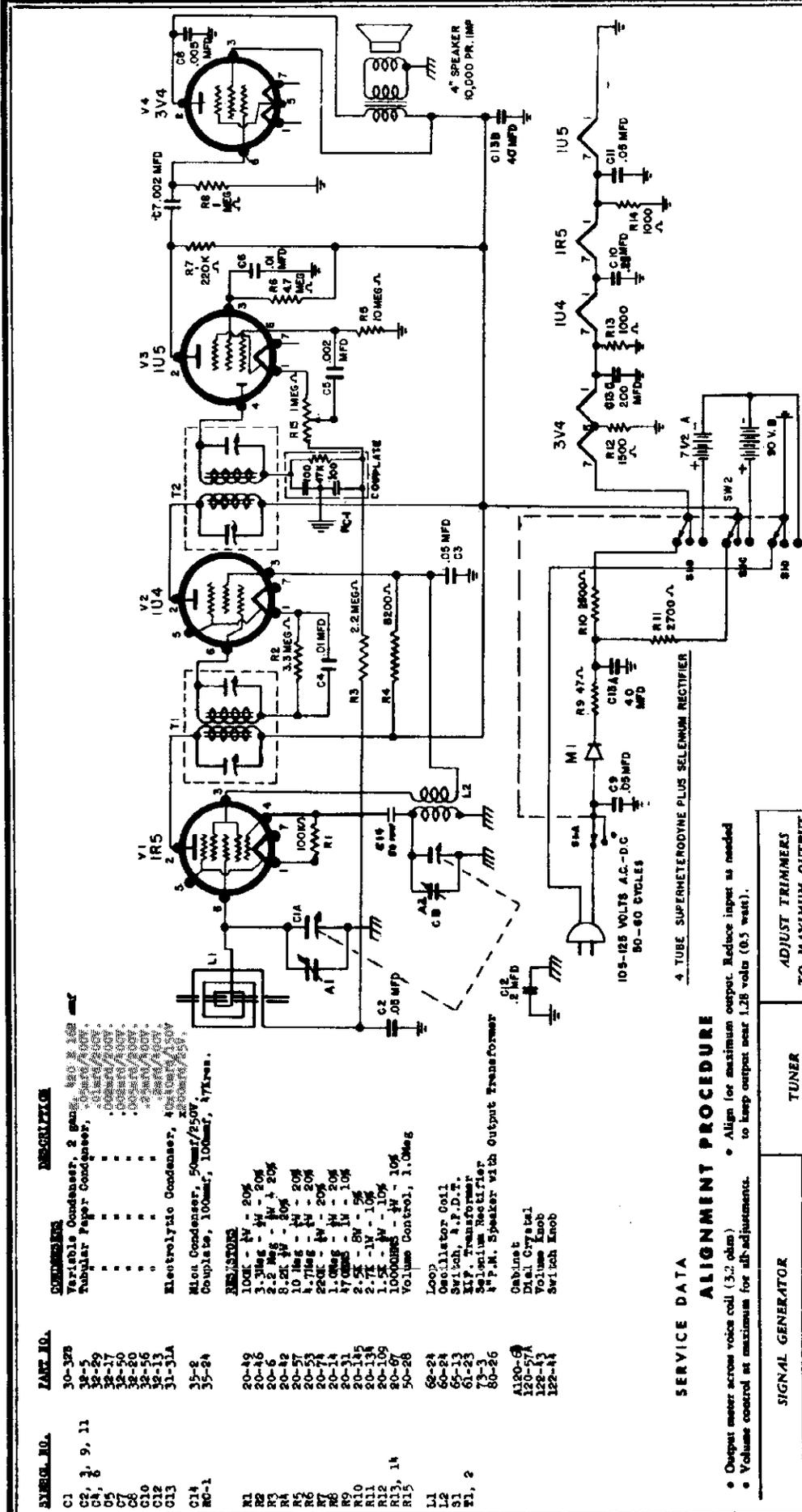
SIGNAL GENERATOR				Tuner Adjustment	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connections to Receiver	Ground Connection		
1650 Kc	50 μ F	Antenna**	Chassis	Rotor full open (Plates out of mesh)	RF trimmer A2 Antenna trimmer A1
1500 Kc	50 μ F	Antenna**	Chassis	1500 Kc*	RF Trimmer A2 Antenna Trimmer A1

* Seven markings on the tuning knob represent respectively 550 Kc, 600 Kc, 700 Kc, 900 Kc, 1100 Kc, 1400 Kc, and 1650 Kc, reading from right to left. These points are to be used for the alignment of the receiver.

** Disconnect antenna hank by unsoldering

PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION
CONDENSERS		
C1	30-36A	Variable Condenser, 2 Gang, 420 & 420 Med.
C2	31-11	Electrolytic Condenser, 35 35 MFD/150V
C3	32-5	Tubular Paper Condenser, .05MFD/100V
C4, 8	32-8	" " " " .01MFD/150V
C5	32-11	" " " " .005MFD/150V
C6	32-4	" " " " .05MFD/200V
C7	32-17	" " " " .002MFD/150V
C9	35-4	Mica Condenser, .0001MFD/500V
RESISTORS		
R1, 2	20-92	470 K - $\frac{1}{2}$ W - 20%
R3	20-57	10 Meg. - $\frac{1}{2}$ W - 20%
R4	20-96	22 Ohms - 1W - 20%
R5	20-106	680 Ohms - $\frac{1}{2}$ W - 20%
R6	20-80	3.3K - 1W - 20%
R7	20-81	150 Ohms - $\frac{1}{2}$ W - 20%
R8	20-93	22 Ohms - $\frac{1}{2}$ W - 20%
R9	50-33	Volume Control, 100K, with Switch
T1	62-14	Antenna Coil
T2	60-8B	R.F. Coil
SW2	80-17A or 80-18A 65-14B	4" P.M. Speaker Switch, A.C. Plunger Type
	11-70	Light Socket
	10-117A	Window Retainers
	114-85	Felt Bumper Screws
	140-12	Frosted Window
	120-64D	Cabinet
	122-51	Selector Knob
	122-52	Volume Knob



- COMPONENTS**
- C1 30-375
 - C2 2, 9, 11
 - C3 8
 - C4 8
 - C5
 - C6
 - C7
 - C8
 - C9
 - C10
 - C11
 - C12
 - C13
 - C14
 - MG-1
 - R1
 - R2
 - R3
 - R4
 - R5
 - R6
 - R7
 - R8
 - R9
 - R10
 - R11
 - R12
 - R13
 - R14
 - R15
 - L1
 - L2
 - S1
 - SI, 2

- RESISTORS**
- 100K - 1/4W - 20%
 - 3.3K - 1/4W - 20%
 - 2.2 M - 1/4W - 20%
 - 8.2K - 1/4W - 20%
 - 10 M - 1/4W - 20%
 - 4.7K - 1/4W - 20%
 - 220K - 1/4W - 20%
 - 1.0M - 1/4W - 20%
 - 470K - 1/4W - 10%
 - 2.5K - 1/4W - 5%
 - 2.7K - 1/4W - 10%
 - 1.5K - 1/4W - 10%
 - 1000R - 1/4W - 10%
 - Volume Control, 1.0Meg
- COILS**
- Oscillator Coil
 - Switch, A.P.D.T.
 - 12.7 Transformer
 - 12.7 Transformer
 - 4 P.A. Speaker with Output Transformer
- OTHER**
- Cabinet
 - Dial Crystal
 - Volume Knob
 - Switch Knob

- COMPONENTS**
- 30-375
 - 2, 9, 11
 - 8
 - 8
 -
 -
 -
 -
 -
 -
 -
 -
 -
 -
 -
 - MG-1
 - R1
 - R2
 - R3
 - R4
 - R5
 - R6
 - R7
 - R8
 - R9
 - R10
 - R11
 - R12
 - R13
 - R14
 - R15
 - L1
 - L2
 - S1
 - SI, 2

- RESISTORS**
- 100K - 1/4W - 20%
 - 3.3K - 1/4W - 20%
 - 2.2 M - 1/4W - 20%
 - 8.2K - 1/4W - 20%
 - 10 M - 1/4W - 20%
 - 4.7K - 1/4W - 20%
 - 220K - 1/4W - 20%
 - 1.0M - 1/4W - 20%
 - 470K - 1/4W - 10%
 - 2.5K - 1/4W - 5%
 - 2.7K - 1/4W - 10%
 - 1.5K - 1/4W - 10%
 - 1000R - 1/4W - 10%
 - Volume Control, 1.0Meg
- COILS**
- Oscillator Coil
 - Switch, A.P.D.T.
 - 12.7 Transformer
 - 12.7 Transformer
 - 4 P.A. Speaker with Output Transformer
- OTHER**
- Cabinet
 - Dial Crystal
 - Volume Knob
 - Switch Knob

SERVICE DATA

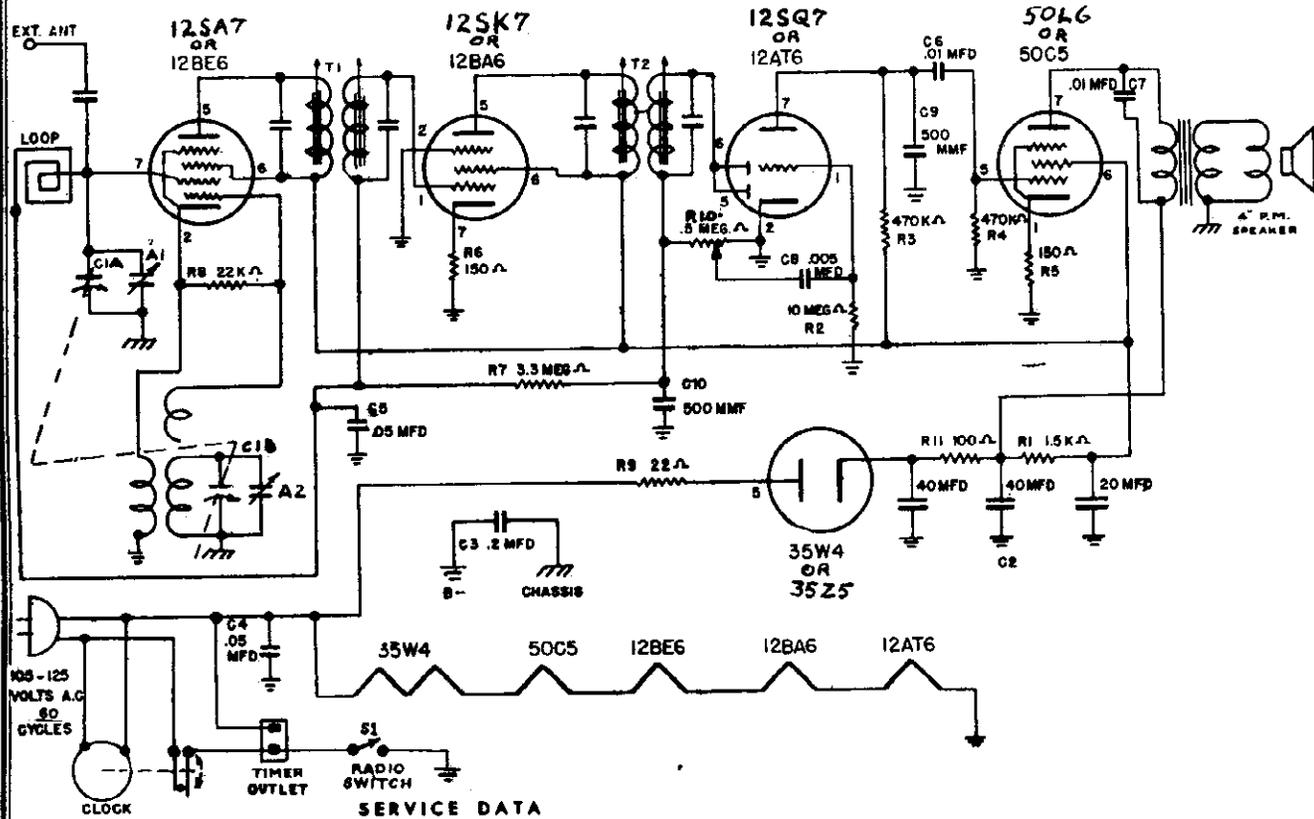
ALIGNMENT PROCEDURE

- Output meter across voice coil (3.2 ohm)
- Align for maximum output. Reduce input as needed to keep output near 1.28 volts (0.5 watt).
- Volume control at maximum for all adjustments.

Frequency	SIGNAL GENERATOR		TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order above)
	Coupling Capacitor	Connections to Receiver		
455 kc	0.1 mfd.	LR5 grid	Rotor full open (Plates out of mesh)	Input and output stage of IF cans
1650 kc	0.1 mfd.	LR5 grid	Rotor full open (Plates out of mesh)	Oscillator trimmer A2
1500 kc		Radiating Loop	1500 kc	Antenna trimmer A1

*Eight markings on the dial bracket represent respectively 1600KC, and 1300KC, 1150KC, 1000KC, 850KC, 750KC, 650KC, and 550KC reading clockwise. These points are to be used for the alignment of the receiver.

MODEL 5057U



SERVICE DATA
ALIGNMENT PROCEDURE

- Output meter across voice coil (3.2 ohm)
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 1.28 volts (0.5 watt).

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connections to Receiver	Ground Connection		
455 kc	0.1 mfd.	12BE6 grid	B—	Rotor full open (Plates out of mesh)	Input and output slugs of IF cans
1650 kc	0.1 mfd.	12BE6 grid	B—	Rotor full mesh (Plates out of mesh)	Oscillator trimmer A2
1500 kc		Radiating Loop		1500 kc*	Antenna trimmer A1

*Nine markings on the dial represent respectively 540KC, 600KC, 700KC, 800KC, 900KC, 1100KC, 1300KC, 1500KC, and 1650KC reading from left to right. These points are to be used for the alignment of the receiver.

REPLACEMENT PARTS LIST

SYMBOL NO.	PART NO.
C1	30-06
C2	31-30A
C3	38-13
C4	38-75
C5	32-4
C6,7	38-1
C8	38-20
C9,10	35-13

DESCRIPTION	QUANTITY
VARIABLE CONDENSER, 2 GANG, 400 & 160 MMF.	1
ELECTROLYTIC CONDENSER, 400-0200 MFD/150 V	1
TUBULAR PAPER CONDENSER, .2 MFD/400 V	1
PERMICOLE, .05 MFD/400V	1
PERMICOLE, .02 MFD/200 V	1
PERMICOLE, .01 MFD/400 V	1
PERMICOLE, .005 MFD/600 V	1
MICA CONDENSER, 500 MMFD/500 V	1

SYMBOL NO.	PART NO.
R1	22-75
R2	20-57
R3,4	20-92
R5	20-81
R6	20-89
R7	20-95
R8	20-82
R9	20-93
R10	20-27
R11	20-40
T1,2	60-18
	61-11
	A-125-3A-B
	65-11
S1	80-22A
	120-74
	120-48
	122-31
	140-7

REMARKS

1500 OHMS - 1/2 W - 20%
10 MHΩ - 1/4 W - 20%
470 K - 1/4 W - 20%
150 OHMS - 1/2 W - 20%
150 OHMS - 1/4 W - 20%
3.3 MHΩ - 1/4 W - 20%
22 K - 1/4 W - 20%
22 OHMS - 1/2 W - 20%
VOLUME CONTROL, 0.5 MHΩ
100 OHMS - 1/2 W - 20%

- OSCILLATOR COIL
- IF TRANSFORMER
- BACK ASSEMBLY, INCL. LOOP
- RADIO SWITCH
- 4" P.M. SPEAKER WITH OUTPUT TRANSFORMER
- CABINET (WITHOUT CLOCK INSERT)
- CENTER CLOCK INSERT
- SWCS (2)
- CLOCK

DESCRIPTION

1. General

The new LEARAVIAN Model P-10B is a compact portable radio receiver employing six tubes in a highly sensitive superheterodyne circuit designed for reception in three bands - Marine Band - 2.0 to 5.5 MC - ship-to-shore communications, Coast Guard weather reports, universal radio service for aircraft, U.S. Standard Time Signals, 2.5 to 5.0 MC shortwave broadcasts; Standard Broadcast Band - 550 to 1600 KC - entertainment, newcasts and weather information; Airways Band - 200 to 400 KC - airport communication weather reports via range stations and airways 4-course beacon signals (A/N).

A built-in loop antenna provides adequate reception on all bands. As an added feature a panel mounted jack offers a convenient connection for an external antenna which is useful under adverse receiving conditions or where the set is used as a direction finder.

The new LEARAVIAN is designed for operation on 105-125 volts, 50-60 cycles ac (alternating current) or 105-125 volts dc (direct current) or battery pack. Special "refresher battery charging" circuits are incorporated for appreciably extending the life of the battery pack.

A panel mounted jack is also provided for plugging in headphones. When the headphones are plugged in the loud speaker is automatically made inoperative.

2. Power Supplies (AC, DC and Battery Pack).

CAUTION

DO not plug in this radio receiver to any other power supply outlet than specified below or severe damage to the equipment may result. If you are in doubt as to the voltage rating of the power supply, consult the building electrician or your local power company before inserting plug of electric attachment cord.

Any of the following sources of electrical power are suitable for operation of the LEARAVIAN Model P-10B:

- a) Ac (alternating current) - 105 to 125 volts 50 to 60 cycle.
- b) Dc (direct current) - 105 to 125 volts.
- c) Battery packs (any one of the following types.)
 - General - No. 60A6F6.
 - Eveready - No. 753.
 - Burgess - No. F6A60.
 - Ray-O-Vac - No. 60A-6F.

3. Tube Complement

The LEARAVIAN Model P-10B is shipped from the factory with a complete set of fully tested tubes installed in their proper sockets. The tube complement is as follows:

- 1 Type 1U4 Radio-frequency amplifier
- 1 Type 1R5 Converter (r-f).
- 1 Type 1U4 Intermediate-frequency amplifier.
- 1 Type 1U5 Detector-AVC-1st Audio amplifier.
- 1 Type 3V4 Power Amplifier.
- 1 Type 11723 Rectifier

4. Frequency Bands.

The frequency bands are as follows:

<u>Dial Identification</u>	<u>Band</u>	<u>Frequency</u>
Marine (Blue)	Short-Wave	1960 to 5750 KC
BC (Red)	Broadcast	550 to 1650 KC
Range (Green)	Long-wave	1.95 to 5.5 MC

MODEL P-10B

The color of each dial scale corresponds with the color of one of the positions on the rim type band switch knob located at the right hand edge of the dial. Changing from one band to another is accomplished simply by rotating the knob up or down so that the desired band is in line with the indicating arrow. The proper dial scale for that band will then be in position also and in line with the indicating arrow. This is the scale that would be observed for tuning stations in the desired band.

INSTALLATION

NOTE

Since the LEARAVIAN Model P-10B is designed primarily as a portable radio receiver, very little consideration need be given the subject of "Installation." However, this set is also highly adaptable for marine and aviation use where a combination entertainment and utility portable receiver is desired. For these applications, an external antenna (to be used in conjunction with the built-in loop antenna) may be used to advantage as described in the following paragraphs.

1. Connecting to AC or DC (105 to 125 volts only).

The electric attachment cord for AC or DC operation is contained inside the cabinet and is arranged so it can be withdrawn after the back of the cabinet is opened. A notch for clearing the cord then permits the cabinet back to be closed. When the receiver is to be used on battery power, the cord can be replaced inside the cabinet.

2. Installing Battery Pack.

Ample space is provided in the bottom of the cabinet for any one of the correct types of battery packs listed. With the cabinet back opened, the battery holding bracket will be found held to the bottom of the cabinet with two screws. Remove the screws and bracket, then place battery pack in position as shown in Fig. 2. The battery socket should be on the right so that the battery connecting plug can be inserted. Replace battery bracket and fasten firmly with the two screws. Insert battery connecting plug and close cabinet back.

3. Installing External Antenna.

An external antenna may be used with the LEARAVIAN P-10B to improve reception under adverse conditions. The effectiveness of an outside (external) antenna depends largely on its location and length and no specific instructions can be given which will be found ideal under all circumstances.

In general the antenna should be about 20 to 40 ft. long. Small size insulated wire is usually most convenient. DO NOT USE SHIELDED WIRE. The insulation must be removed from the end of the lead-in to make connection to the INNER connector of a standard phone plug (PL-55) which is then plugged into the jack marked "ANT".

Marine or aircraft installations will be governed to a great extent by structural facilities. In all cases, however, the external antenna should be well constructed. Do not shield the lead-in. Be sure that neither the antenna proper nor the lead-in interferes with the existing controls or equipment of the boat or airplane. Secure lead-in at intervals throughout its length to prevent fouling.

In most cases, the LEARAVIAN performs well in a boat or airplane that does not have shielded ignition circuits. However, shielding of spark plugs, magnetos and generator, along with all ignition wires is very desirable. Complete shielding will remove all trace of background ignition noises which tend to reduce the effective receiving range of the radio.

OPERATION

1. Warning on Power Source.

Do not connect this receiver to any power supply other than 105-125 volts 50-60 cycles ac (alternating current) or 105-125 volts dc (direct current) or battery packs as specified previously.

2. Selecting Power Source.

Move Power Selector Switch Knob (at left end of dial) so that marking on knob ("BATT" or "AC") is opposite the indicating arrow, depending on whether battery operation or AC-DC operation is desired. DO NOT MOVE KNOB TO "CHARGE" UNTIL DIRECTIONS IN PARAGRAPH 10 HAVE BEEN NOTED CAREFULLY.

3. Applying Power.

With the Power Selector Switch knob in the correct position, turn the ON-OFF switch and Volume Control knob (at left of handle) clockwise until a click is heard. Further rotation increases volume. Power is now being applied to the radio. On "BATT" (Battery) operation, stations can be tuned in immediately, but on "AC" (AC or DC) operation allow a few moments for the tubes to heat up. Where the set is plugged in to dc (direct current) and no response is obtained after one minute, reverse the electric attachment plug in the socket.

4. Selecting Frequency Band.

Move Band Selector switch knob (at right end of dial) up or down so that marking on knob ("RANGE", "BC", or "MARINE") is opposite the indicating arrow, depending on which band is desired. The dial scales are so arranged that as the knob is moved to any of the three positions, the corresponding scale will move simultaneously and be in line with the indicating arrow.

5. Tuning in a Desired Station.

Turn Station Selector knob (at right end of handle) to right or left until dial pointer is over the approximate frequency reading of the desired station (as read on the dial scale opposite the indicating arrow).

Then advance (turn clockwise) the volume control knob until reception is audible. Turn station selector knob right or left slowly until desired station is perfectly tuned in (on the "center" of the station) and adjust volume as required. Never reduce the volume by tuning "off" the station since this will cause distorted reception.

6. Loop Antenna Directional Effects.

The built-in loop antenna provides a directional receiving effect which is noticeable when the LEARAVIAN is lifted by the handle and turned slowly first in one direction and then the other. The station will come in strongest when either end of the set faces the direction of the station, and the station will be weakest or fade out (null) when either the front (speaker) or back faces that same station.

This directional effect serves a three-fold purpose:

- a) Weak or distant stations can be received better by rotating the set until they are best received.
- b) Local noise interference can be minimized on a particular station by rotating the set until the signal-to-noise ratio is best.
- c) Direction finding is possible since the fade out or null is comparatively "sharp" when the front or back of the set faces the station.

NOTE For direction finding applications of the LEARAVIAN, an external antenna plugged in and used as described in par. 7 is recommended.

MODEL P-10B

7. Direction Finding.

To determine the direction of a received station, slide the RECEIVING DIRECTION FINDING switch to the DIRECTION-FINDING positions and plug in the external antenna. Rotate set until station fades out, then unplug external antenna and slowly rotate set first in one direction and then the other so that the exact aural-null point is determined. At this point the speaker of the set is pointing to the station.

8. Headphone Reception.

To connect headphones to the LEARAVIAN, attach a Type PL-55 (or equivalent size) phone plug to the cord and plug in to the "PHONES" jack (to the left of the "RECEIVING-DIRECTION FINDING" switch).

When phones are plugged in, the loudspeaker is automatically cut out of the circuit and therefore silenced.

NOTE Headphones having 200 ohms resistance are recommended for use with the LEARAVIAN.

9. Shutting OFF Power.

Turn ON-OFF switch and Volume Control Knob counter-clockwise until a click is heard. This shuts off power, either from AC-DC or battery.

Be sure to shut off power when through using the set, especially, if the set is being operated on battery.

10. "Charging Battery"

The useful life of the battery pack may be extended appreciably by periodic "charging". This is conveniently done by plugging the attachment cord in to 105 to 125 volt, 50 to 60 cycle ac or 105 to 125 volt dc electric outlet and moving the Power Selector Switch Knob to "charge". Then apply power by turning ON-OFF switch to "ON" position.

For best results it is recommended that the battery be charged twice as long as it was discharged. For example, if the set has been battery operated for a period of four hours, the battery should be charged for approximately eight hours. It is desirable to charge the battery after each period of battery operation, rather than charging for a long time to cover several operative periods.

NOTE During the charge cycle, the radio is inoperative.

On completion of the charge cycle always return the Power Selector Switch to either "AC" or "BATT" positions, even if the ON-OFF switch is turned "OFF".

CARE AND MAINTENANCE

NOTE There are no adjustments of any kind to be made on the chassis or speaker.

1. Battery Replacement.

After extended use of the pattery pack its reserve power may be weakened sufficiently so that the "CHARGE" operation will no longer be effective and the performance of the set on "BATT" may not be satisfactory. The battery pack should then be replaced. Replacement battery packs may be obtained from your local Lear dealer or from radio supply houses. Be sure the number of the battery corresponds with one of the listed previously.

To replace battery, refer to par. "Installing Battery Pack". Carefully disconnect battery cable attachment plug from old battery and remove battery bracket permitting removal of battery.

2. Tube Replacement.

The Tubes in the set should be checked occasionally either by taking them out and having them tested or by obtaining a new set of tubes and inserting them in the sockets, one at a time, noting any difference in performance.

The type of tubes required and the position of these tubes are clearly shown in Fig. 2. The type number is etched or stamped on each tube. Should it be necessary to replace any tubes, gently rotate the tube until the pins drop into the socket. Then push down until tube is seated firmly in socket.

Alignment Chart (See diagram Fig. 2)

Step	Alignment of	Generator Connected	Dummy Antenna	Generator Frequency	Receiver Dial Setting	Adjustment ***
1.	Set dial pointer to thin line at end of dial with tuning gang fully closed.					
2.	I.F.	r-f section of gang and ground	.01 mf	455 kc	1000 kc	T5 Bottom and top
3.						TL Bottom and top
4.	Range	Ant. Jack and ground				C22 (osc. trimmer)
5.						C16 (r-f trimmer)
6.	Band	Ant. jack and ground	30 mmf	400 kc	400 kc	C7 (Ant. trimmer)
7.				220 kc	220 kc*	C20 (osc. padder)
8.	Repeat steps 1,5,6 and 7 until no further improvement is obtained.					
9.						C21 (osc. trimmer)
10.	Broadcast Band	Ant. jack and ground	30 mmf	1500 kc	1500 kc	C15 (r-f trimmer)
11.						C6 (ant. trimmer)
12.				600 kc	600 kc*	C19 (osc. padder)
13.	Marine Band	Ant. jack & ground	30 mmf	5 mc	5 mc*	C13 (osc. trimmer)
14.						C12 (r-f trimmer)
15.						C4 (ant. trimmer)
16.		**	1 ft. lead	5 mc	5 mc	C4 (loop trimmer)

*Rock tuning gang rotor while adjusting.

** Place 1 ft. antenna lead from generator near loop.

The loop and antenna trimmer C4 is reached through hole in back cover of cabinet.

*** All adjustment are for maximum output.

MODEL P-10B

VOLTAGE MEASUREMENTS								
Tube		Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1U4	VT1	2.6	93	93	.3	-	-	4
1R5	VT2	0	93	55	-8	0	-	1.3
1U4	VT3	4	93	93	-	3.9	-.4	5.4
1U5	VT4	1.3	40	25	-	-	-	2.6
3V4	VT5	5.4	90	93	93	6.5	-	7.8
11723	VT6	-	117AC	0	0	115AC	120	-

RESISTANCE MEASUREMENTS								
1U4	VT1	45	*200	*0	2M	45	5M	60
1R5	VT2	-	*16	15 K	100K	.2	5M	28
1U4	VT3	60	*24	0	-	60	1.6	70
1U5	VT4	28	470 K	5M	1M	1M	10M	45
3V4	VT5	70	650	0	0	75	2.2	95
11723	VT6	-	-	700	0	725	2400	-

NOTES:

All resistance measurements are to artificial ground (indicated by symbol \perp on schematic diagram); those marked * are from the 90 volt positive pin on the battery plug (see schematic diagram no. 64165).

All voltage measurements are to artificial ground (indicated by symbol \perp on schematic diagram). All are DC unless otherwise indicated.

Measurements made with 20,000 ohm per volt meter.

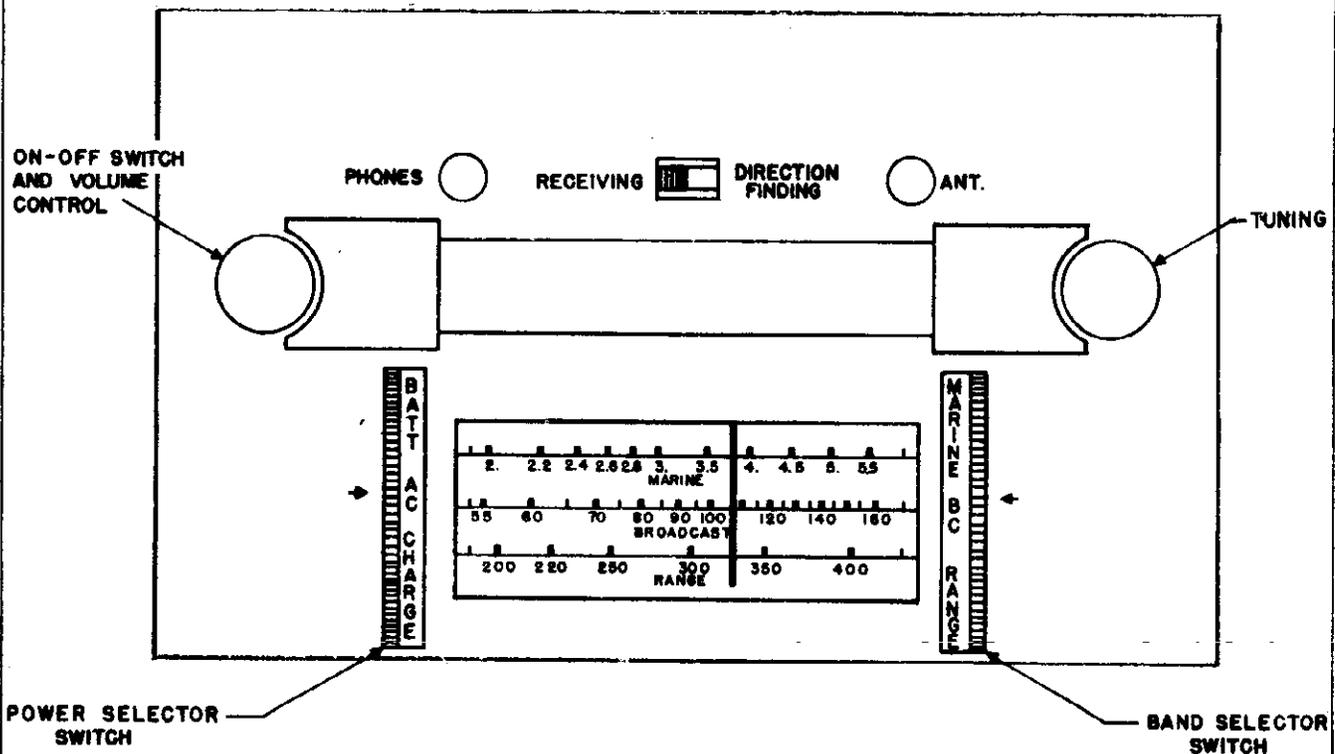
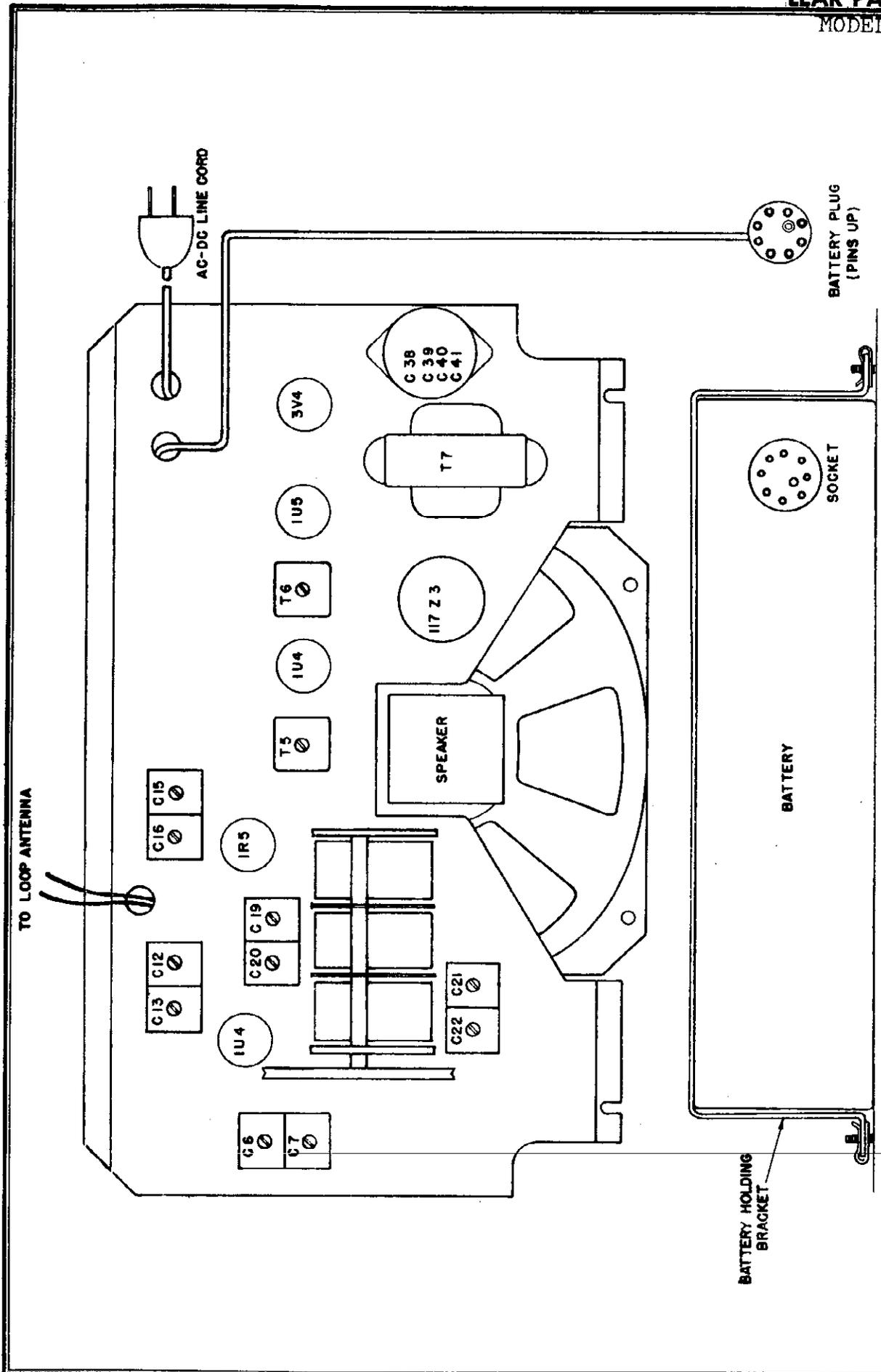


FIG. I OPERATING CONTROLS



2 SCREWS HOLDING BRACKET TO BASE OF CABINET

FIG 2 TUBE PLACEMENT AND ALIGNMENT DIAGRAM

HOW TO CONNECT BATTERIES—

BE SURE RADIO IS TURNED OFF—

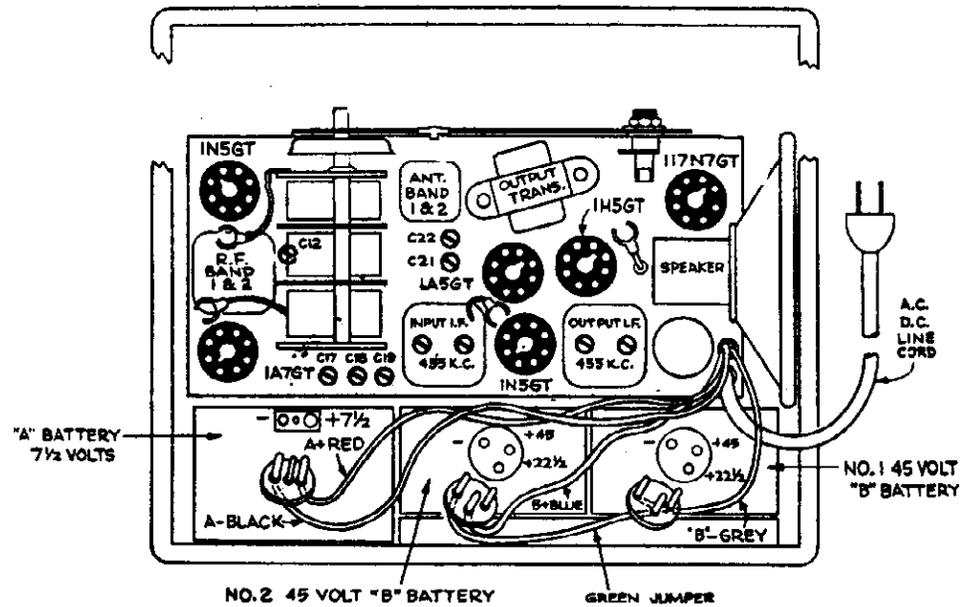


FIG. 1

INSTALLING AND CONNECTING THE BATTERIES— BE SURE THE RADIO IS TURNED OFF

1. Remove the back of the cabinet by removing the four screws which hold the back in place. Remove the cardboard spacer.
2. Place the three batteries in the cabinet exactly as shown in the above illustration (Fig. 1).
3. Insert the plug of the "A" battery cable from the radio into the socket on the "A" battery.
4. Next insert the two three-prong "B" battery plugs into the sockets on the "B" batteries, marked "Battery No. 1" and "Battery No. 2" in Fig. 1.
5. Replace the back of the cabinet and fasten it in place with the four screws.

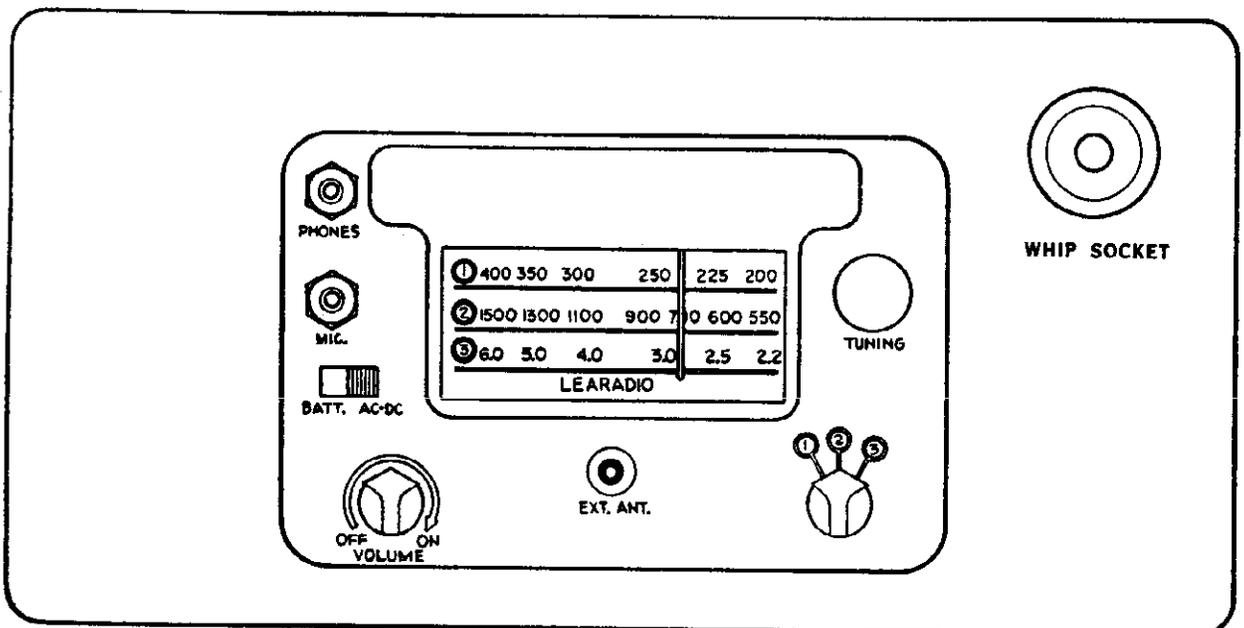


FIG. 2

SERVICE DATA FOR PROFESSIONAL SERVICE MEN

DESCRIPTION:

- TUBES—**
 The tube complement of this chassis consists of the following tubes:
- 1—Type 1N5GT R.F. Amplifier.
 - 1—Type 1A7GT Mixer, First Detector-Oscillator.
 - 1—Type 1N5GT, First I.F. Amplifier (455 K.C.).
 - 1—Type 1H5GT Second Detector, A.V.C. First Audio.
 - 1—Type 1A5GT Output Amplifier. (Battery only.)
 - 1—117N7GT-Rectifier and Output Tube. (A.D., D.C. only.)

SERVICE NOTES—

Volages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1,000 ohms per volt. All volages are indicated on the voltage chart.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with

sockets, or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. Weak batteries are also a source of trouble.

ALIGNING INSTRUCTIONS—

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, defective tubes, condensers and resistors. In order to properly align this chassis an oscillator (generator) is absolutely necessary.

HEADPHONES—

Best results will be obtained with 200 ohm headphones.

ALIGNMENT PROCEDURE

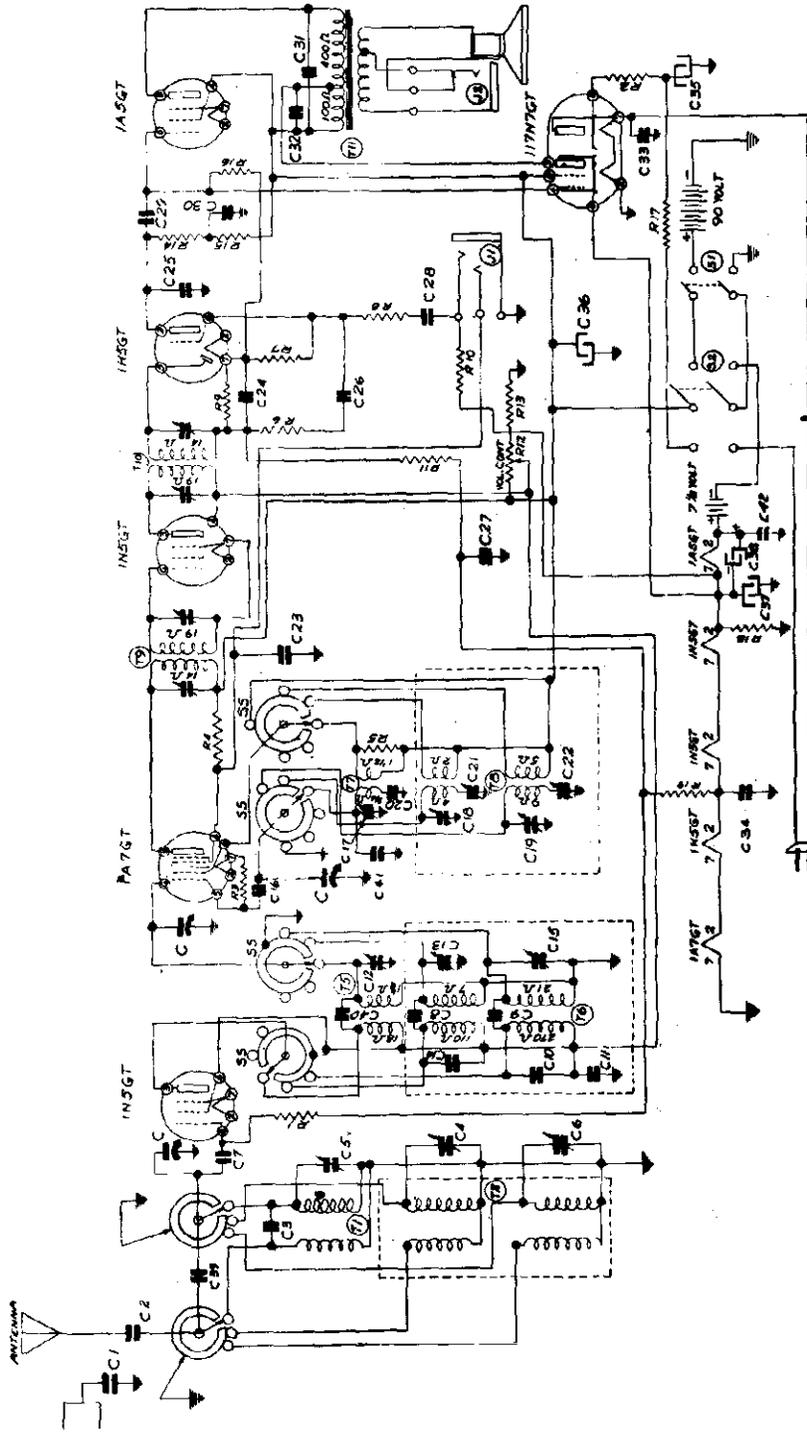
The following equipment is required for alignment:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antenna—1 Mfd., 20 MMFD.

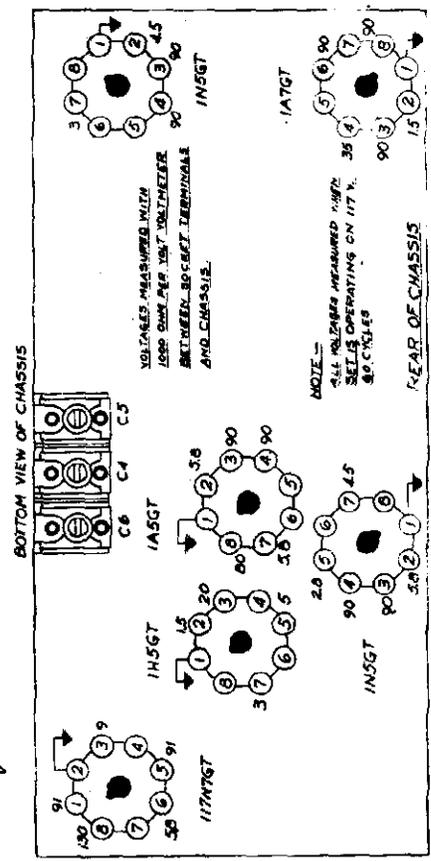
- Volume control—Maximum all adjustments.
- Connect generator ground to shell of antenna socket.
- Connect dummy antenna valve in series with generator output lead.
- Connect output meter into phone jacks and set generator input at 200 ohms.
- Allow chassis and signal generator to "heat up" for several minutes.

Band	Switch Position	Signal Generator Frequency Setting	Dummy Antenna	Connection To Radio	Dial Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I F	2	455 Kc.	.1 Mfd.	1A7GT Grid	Rotor full closed	Four trimmers on top of I. F. cans	Output and input I. F.	Adjust to maximum output
Adjust dial pointer to read 2.2 mc. on band 3 with gang condenser fully closed.								
1	1	400 Kc.	20 MMFD	Antenna and Ground Terminal	400 Kc.	C 19 C 6, C 15	Band 1 oscillator trimmer Band 1 antenna & R. F. trimmers	Adjust to max. output Adjust for max. output
1	1	220 Kc.	20 MMFD	Antenna and Ground Terminal	Rock rotor while adjusting	C 22	Band 1 Oscillator paddler	Adjust for max. output
1	1	400 Kc.	20 MMFD	Antenna and Ground Terminal	400 Kc.	C 15 & C 6	R. F. & Ant. trimmers	Adjust for max. output
2	2	1400 Kc.	20 MMFD	Antenna and Ground Terminal	400 Kc.	C 18 C 4 & C 13	Antenna & R. F. trimmers	Adjust for max. output Adjust for max. output
2	2	600 Kc.	20 MMFD	Antenna and Ground Terminal	600 Kc. Rock rotor while adjusting	C 21	Oscillator paddler	Adjust for max. output
3	3	6 Mc.	20 MMFD	Antenna and Ground Terminal	6 Mc.	C 17	Osc. trimmer	Adjust for max. output
3	3	6 Mc.	20 MMFD	Antenna and Ground Terminal	Rock rotor while adjusting	C 5 & C 12	Antenna & R. F. trimmers	Adjust for max. output

NOTE:—Trimmers C4, C5, and C6 can be reached by removing the Leaf nameplate on the side of the cabinet. The above adjustments should be made several times to insure exact settings of trimmers and paddlers.



NOTE: ALL VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.



HOW TO CONNECT BATTERIES—Read Carefully

BE SURE RADIO IS TURNED OFF—

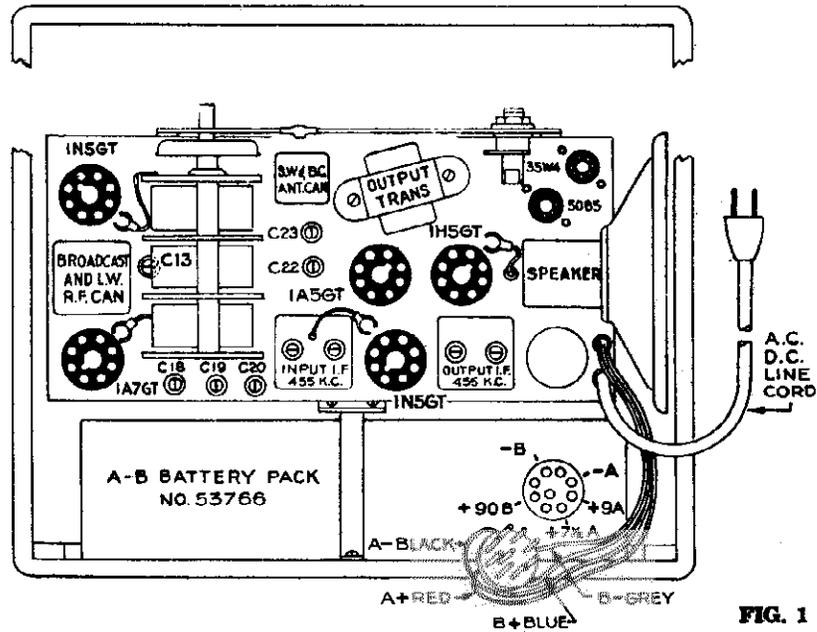


FIG. 1

INSTALLING AND CONNECTING THE BATTERIES — BE SURE THE RADIO IS TURNED OFF

1. Remove the back and loop of the cabinet by removing the four screws which hold the back in place.
2. Place the battery in the cabinet exactly as shown in the above illustration (Fig. 1).
3. Insert the plug of the battery cable from the radio into the socket on the battery.
4. Replace battery clamp and holding screw.
5. Replace the back of the cabinet and fasten it in place with the four screws.

*Caution when the receiver is operating on A.C. or D.C.—door in rear of cabinet should be left open in order to provide for ventilation.

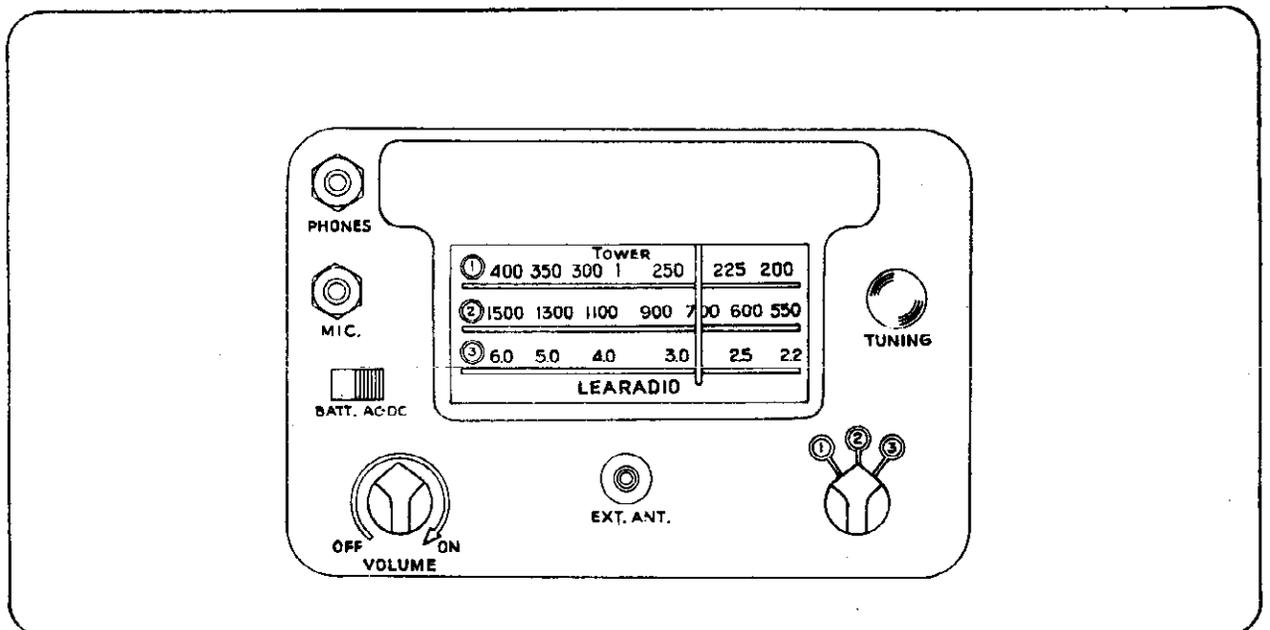


FIG. 2

MODEL RM-402C

CARE AND MAINTENANCE

BATTERY REPLACEMENTS—

The battery is designed especially for the Lear RM 402 C Portable and will give approximately 200 hours of service.

HOW TO REMOVE RADIO-CHASSIS FROM CABINET—

To remove chassis from the cabinet proceed as follows:

1. Remove back of cabinet, (four screws).
2. Disconnect the loop antenna.
3. Remove 2 chassis mounting screws from top of cabinet and 2 from front of cabinet, also 2 holding dial.

Specify No. 53766 when ORDERING BATTERIES.

Most of the newer types of radio sets are designed to use less battery current when the set is operated at low volume and to use maximum battery current only when large volume is desired. For this reason you will obtain longer life from your "B" batteries by not operating your set any louder than is necessary.

Be careful not to leave your radio turned on over night. The long drain uses a lot of current and gives the batteries no chance to recuperate. Remember also that the life of your batteries will depend upon the number of hours each day that you use your set. Turning the radio off when it is not needed saves the batteries accordingly.

The battery used in this radio has an approximate life of 200 hours. This battery life may be expected with an average of several hours daily use. Allowing the radio to run for long periods at a time reduces the life of the batteries. When reception becomes weak a new battery should be installed.

MODEL RM-402 C

Series I

When ordering parts always mention complete factory model number, and series.

LIST OF REPAIR PARTS

Code No.	Part No.	Description				
		RESISTORS				
R1	55489	1 Megohm	1/2 W.	C18	53157	Shortwave Osc. Trimmer
R2	55485	220K ohm	1/2 W.	C19	53157	Broadcast Osc. Trimmer
R3	55482	68K ohm	1/2 W.	C20	53157	Longwave Osc. Trimmer
R4	55477	10K ohm	1/2 W.	C21	53844	1600 Mmfd Mica
R5	55492	3.3 Megohm	1/2 W.	C22	53713	Broadcast Padder
R6	55408	1200 ohm	1/2 W.	C23	53713	Longwave Padder
R7	55408	1200 ohm	1/2 W.	C24	56603	.1 Mfd 200 V.
R8	55489	1 Megohm	1/2 W.	C25	56603	.1 Mfd 200 V.
R9	55481	47K ohm	1/2 W.	C26	56603	.1 Mfd 200 V.
R10	55493	4.7 Megohm	1/2 W.	C27	56600	.05 Mfd 200 V.
R11	55492	3.3 Megohm	1/2 W.	C28	56057	100 Mmfd Mica
R12	56344	1 Meg. vol. cont.		C29	56614	002 Mfd 400 V.
R13	55483	100K ohm	1/2 W.	C30	56057	100 Mmfd Mica
R14	55487	470K ohm	1/2 W.	C31	56061	470 Mmfd Mica
R15	2312	1900 ohm	10 W.	C32	56622	.01 Mfd 400 V.
R16	55485	220K ohm	1/2 W.	C33	56603	.1 Mfd 200 V.
R17	55483	100K ohm	1/2 W.	C34	56622	.01 Mfd 400 V.
R18	55935	470 ohm	2 W.	C35	56618	.005 Mfd 400 V.
R19	55492	3.3 Megohm	1/2 W.	C36	56614	.002 Mfd 400 V.
R20	55489	1 Megohm	1/2 W.	C37	60003	20 Mfd 25 V.
R21	55398	180 ohm	1/2 W.	C38	56628	.05 Mfd 400 V.
R22	55388	27 ohm	1/2 W.	C39	53728	50 Mfd 150 WV
R23	55492	3.3 Megohm	1/2 W.	C40	53728	30 Mfd 150 WV
		CAPACITORS		C41	53728	200 Mfd 6WV
C	54070	3 Gang Variable		C42	54057	200 Mfd 10 WV
C1	56622	.01 Mfd 400 V.				COILS
C2	56059	220 Mmfd Mica		T1	53711	Longwave Loop
C3	53734	Longwave Ant. Trimmer		T2	53771	S.W.&B.C. Ant. Shunt Coil
C5	53734	Shortwave Ant. Trimmer		T3	50160	S.W. R.F. Coil
C6	(ON T2)	Shortwave Coup. Cap.		T4	53740	L.W.&B.C. R.F. Coil
C7	56059	220 Mmfd Mica		T5	50236	Shortwave Osc. Coil
C8	(ON T3)	Shortwave Coup. Cap.		T6	53739	L.W.&B.C. Osc. Coil
C9	(ON T4)	Broadcast Coup. Cap.		T7	53730	1st. I.F. Coil
C10	(ON T4)	Longwave Coup. Cap.		T8	53729	2nd. I.F. Coil
C11	56057	100 Mmfd Mica		T9	53733	Output Trans.
C12	56600	.05 Mfd 200 V.				PARTS
C13	56748	Shortwave R. F. Trimmer		S1		On-Off Switch (on R 12)
C14	(ON T4)	Broadcast R. F. Trimmer		S2	50230	Power Change-Over Switch
C15	(ON T4)	Longwave Trimmer		SS	53764	Band Switch
C16	56057	100 Mmfd Mica		J2	2628	Phone Jack
C17	2189	20 Mmfd Ceramic		J1	2638	Microphone Jack
					53737	Sockets
					53742	Tuning Knob
					53741	Volume & Switch Knob
				PC1	54935	Power Cord

On One Bracket

In One Can

SERVICE DATA

SERVICE NOTES—

Voltagcs taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1,000 ohms per volt. All voltages are indicated on the voltage chart.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with

sockets, or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. Weak batteries are also a source of trouble.

ALIGNING INSTRUCTIONS—

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, defective tubes, condensers and resistors. In order to properly align this chassis an oscillator (generator) is absolutely necessary.

HEADPHONES—

Best results will be obtained with 200 ohm headphones.

DESCRIPTION:

TUBES—

The tube complement of this chassis consists of the following tubes:

- 1—Type IN5GT R.F. Amplifier.
- 1—Type 1A7GT Mixer, First Detector-Oscillator.
- 1—Type IN5GT, First I.F. Amplifier (455 K.C.).
- 1—Type 1H5GT Second Detector, A.V.C. First Audio.
- 1—Type 1A5GT Output Amplifier. (Battery only.)
- 1—Type 50B5 Output Amplifier. (AC-DC only.)
- 1—Type 35W4 Rectifier. (AC-DC only.)

- Volume control—Maximum all adjustments.
- Connect generator ground to shell of antenna socket.
- Connect dummy antenna valve in series with generator output lead.
- Connect output meter into phone jack and set generator input at 200 ohms.
- Allow chassis and signal generator to "heat up" for several minutes.

ALIGNMENT PROCEDURE

The following equipment is required for alignment:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-magnetic screwdriver.
- Dummy antenna—1 Mfd., 20 MMFD.

Band	Switch Position	Signal Generator Frequency Setting	Dummy Antenna	Connection To Radio	Dial Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
IF	2	455 Kc.	.1 Mfd.	1A7GT Grid Terminal	Rotor fully closed	Four trimmers on top of I. F. case	Output and input I. F.	Adjust to maximum output
Adjust dial pointer to read 2.2 mc. on band 3 with gang condenser fully closed.								
1	1	400 Kc.	20 MMFD	Antenna and Ground Terminal	400 Kc.	C 20 C 6, C 15	Band 1 oscillator trimmer	Adjust to max. output
1	1	270 Kc.	20 MMFD	Antenna and Ground Terminal	Rock rotor while adjusting	C 23	Band 1 antenna & R. F. trimmers	Adjust for max. output
1	1	400 Kc.	20 MMFD	Antenna and Ground Terminal	400 Kc.	C 15 & C 3	Band 1 Oscillator padder	Adjust for max. output
							R. F. & Ant. trimmers	Adjust for max. output
2	• 2	1400 Kc.	20 MMFD	Antenna and Ground Terminal	400 Kc.	C 19 C 4 & C 14	Osc.	Adjust for max. output
2	2	600 Kc.	20 MMFD	Antenna and Ground Terminal	600 Kc. Rock rotor while adjusting	C 22	Antenna & R. F. trimmers	Adjust for max. output
							Oscillator padder	Adjust for max. output
3	3	6 Mc.	20 MMFD	Antenna and Ground Terminal	6 Mc.	C 18	Osc. trimmer	Adjust for max. output
3	3	6 Mc.	20 MMFD	Antenna and Ground Terminal	Rock rotor while adjusting	C 5 & C 13	Antenna & R. F. trimmers	Adjust for max. output

NOTE— Trimmers C3, C4, and C5 can be reached by removing the Lear nameplate on the side of the cabinet. The above adjustments should be made several times to insure exact settings of trimmers and padder.

