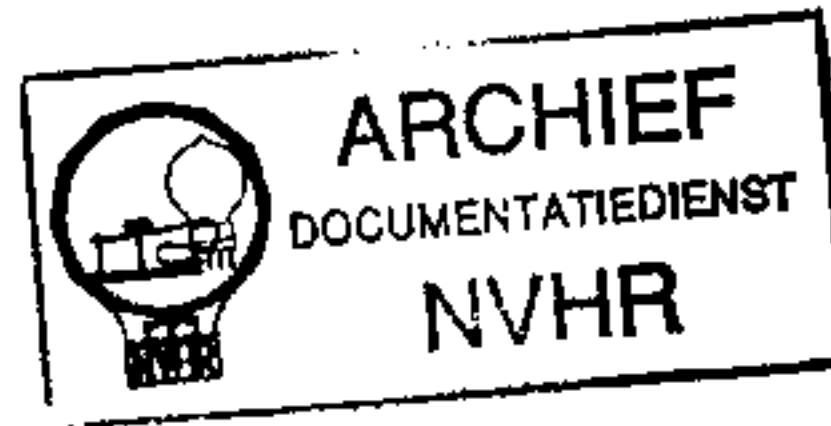


Ned. Ver. v. Historie v/d Radio

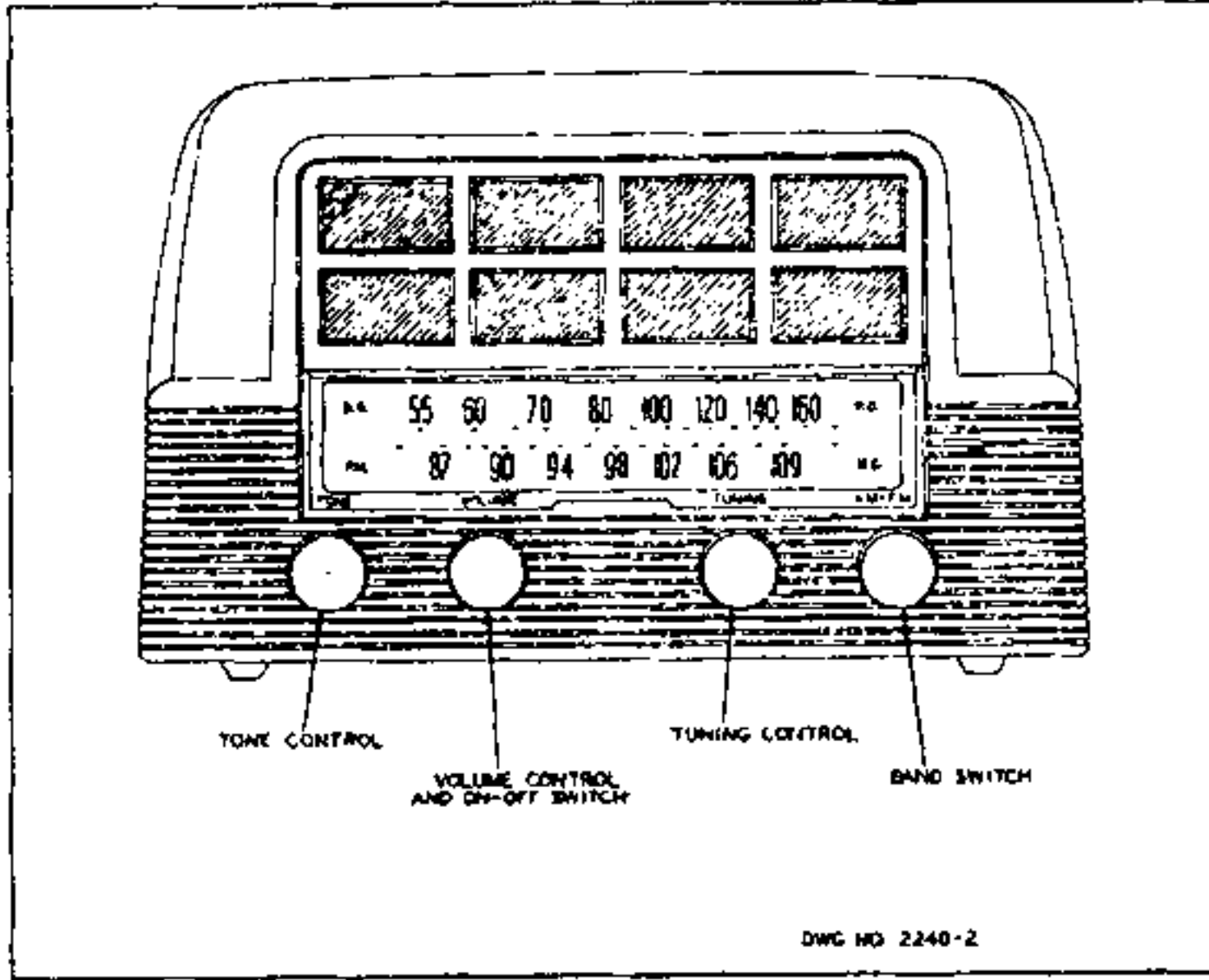


BROADCAST BAND

This is the tuning band in which the standard broadcast stations operate. The upper scale on the dial covers the broadcast range of 535-1620 Kc., and is calibrated in channel numbers. To obtain the kilocycle reading, multiply the number on the dial by 10; thus 80 on the dial corresponds to 800 kilocycles.

FM BAND

The FM tuning range covers the newly allocated frequency-modulation band of 88 to 108 megacycles



APPLYING POWER TO RADIO

This receiver, unless otherwise marked must be operated on an AC voltage of 105 to 125 volts, 50 to 60 cycles, or on a DC voltage of 105 to 125 volts.

REPLACEMENT OF DIAL CORDS

REPLACEMENT OF DIAL CORDS

GENERAL—A dual track drum pulley and two individual cords are used on this model.

The rear track on the drum carries the *Drive String* (see illustration) while the front track carries the *Pointer String*.

DRIVE STRING 1. To replace the *Drive String*, take approximately 20 inches of dial cord and wrap three times around *Tuning Shaft* as shown.

2. Pass ends of cord around drum and through the hole in the rear track, then through loop in end of tension spring (not shown, inside drum).

3. Hook other end of tension spring over ear near center of drum. Draw string through spring loop until spring is extended 1/4 inch. Tie string to loop.

POINTER STRING 4. To replace the *Pointer String* take approximately 40 inches of dial cord and place across inside of *Dial Plate Brackets* at each end.

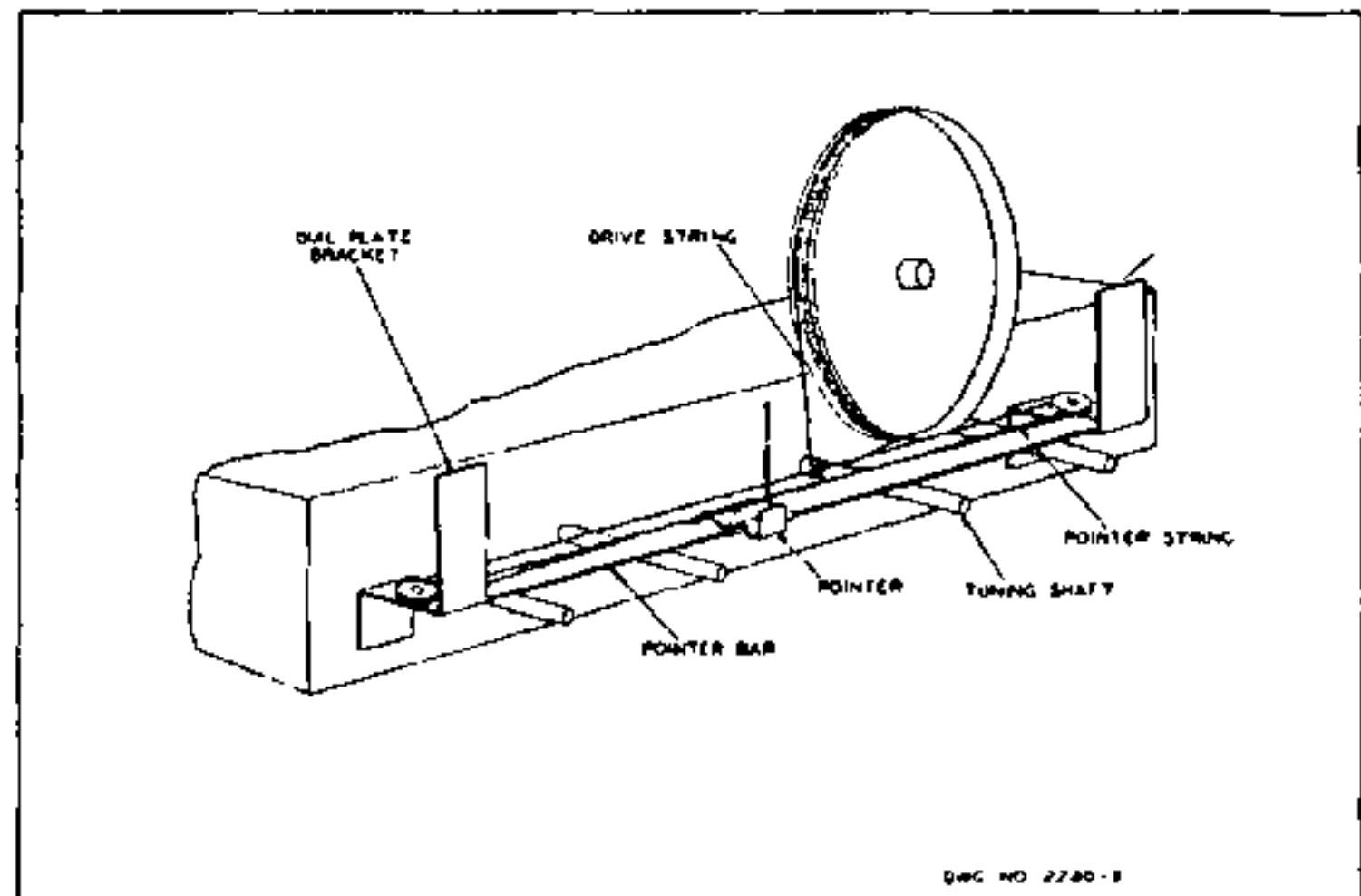
5. Pass around idler pulleys from front to rear and cross directly under drum pulley.

6. Rotate drum pulley so that hole in the front track is uppermost. Pass cord end from right hand idler pulley around left side of front track of drum pulley. Pass cord end from left hand idler pulley around right hand side of front track. Drop ends through hole

in front track then through loop in end of pointer tension spring (not shown, inside drum).

7. Hook other end of tension spring over ear near center of drum. Draw string through spring loop until spring is extended 1/4 inch. Tie string to loop.

8. Rotate drum so that gang is closed. Slide *Pointer* to left end of *Pointer Bar* so that right edge of pointer coincides with right edge of first calibration marker (low frequency end of dial). Loop *Pointer String* once around upright ear on *Pointer* carriage.



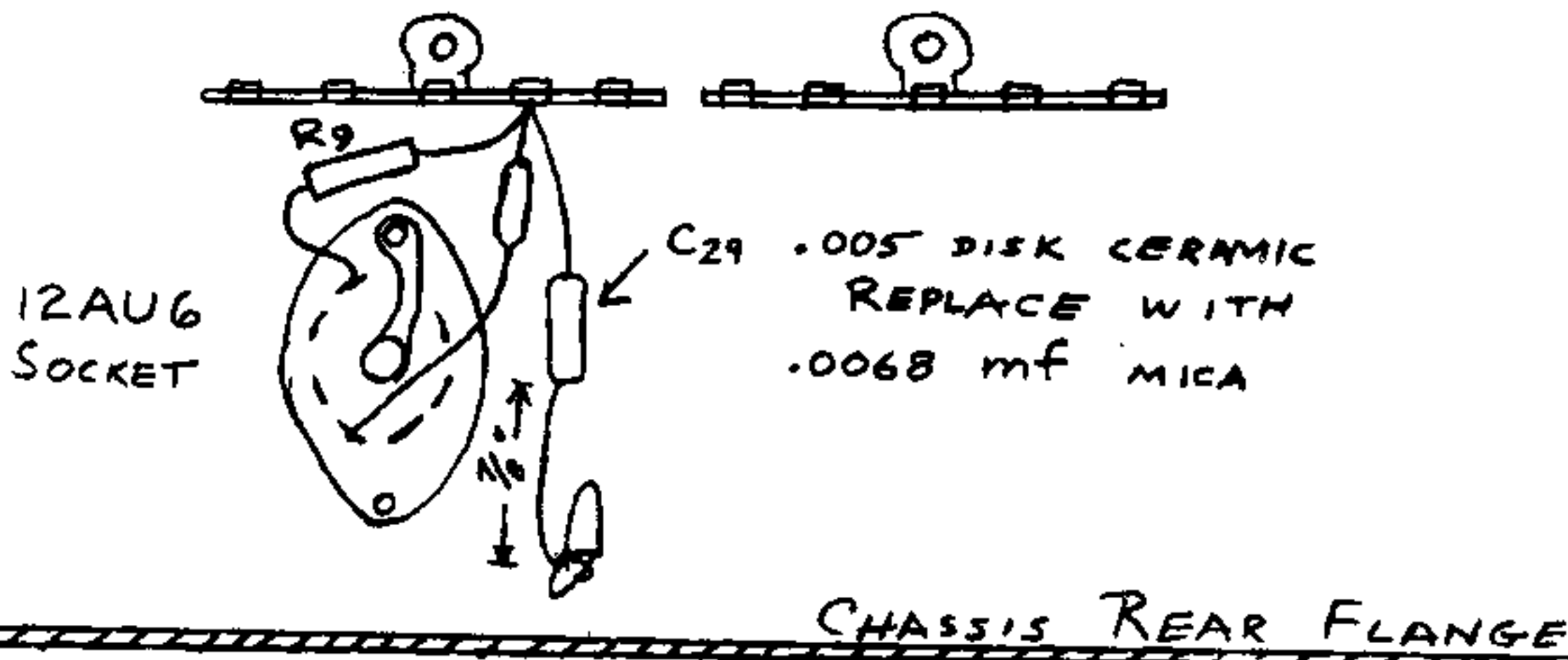
Pointer Stringing and Alignment

MODEL D2919

It has been found that in some instances instability has developed in the FM band in these receivers, which may cause distorted reception and in extreme cases loss of reception entirely. In practically every case the trouble lies in the lead length on condenser C29. Aging of this condenser may cause a change in value upsetting circuit conditions. It is recommended that C29 be replaced with a .0068 mf mica condenser, $\pm 10\%$ tolerance. These may be obtained by ordering part number C-8F9-135. Condenser must be installed with approximately $7/8$ in. lead length from chassis lug to condenser body. Other lead length approximately $3/4$ in. (to be adjusted as per following procedure).

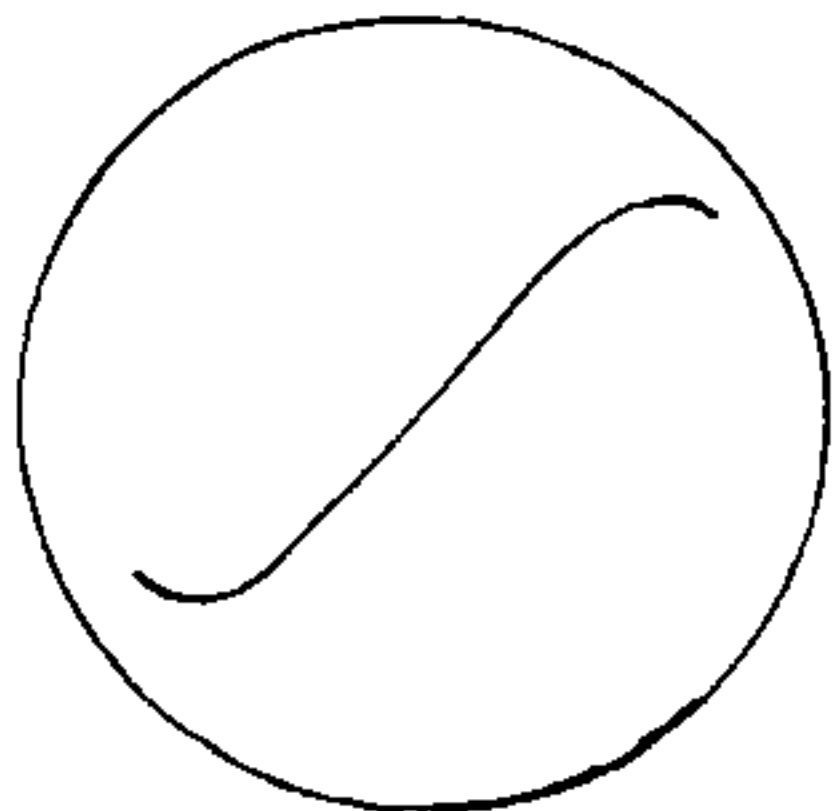
ADJUSTMENT USING OSCILLOSCOPE

To make the adjustment, remove the chassis from the cabinet and lay on its back flange on bench. Locate the condenser indicated in figure #1. (This is shown as C29 in the service manual schematic) Carefully remove the lead connecting the condenser at the terminal strip.

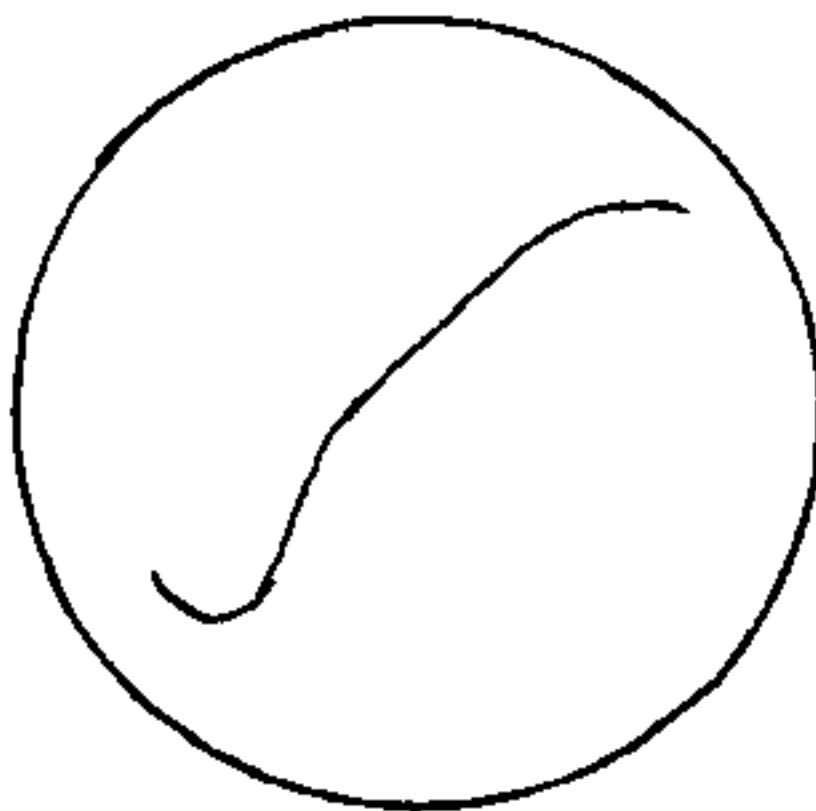
FIGURE 1

Connect signal generator thru a 300 ohm resistor to "dipole 300a" FM antenna terminals. Connect vertical deflection amplifier of scope to end terminals of volume control (black wire ground and white wire high). Set oscilloscope amplifier for maximum gain and generator to 10.7 MC with approximately 150 KC FM deviation.

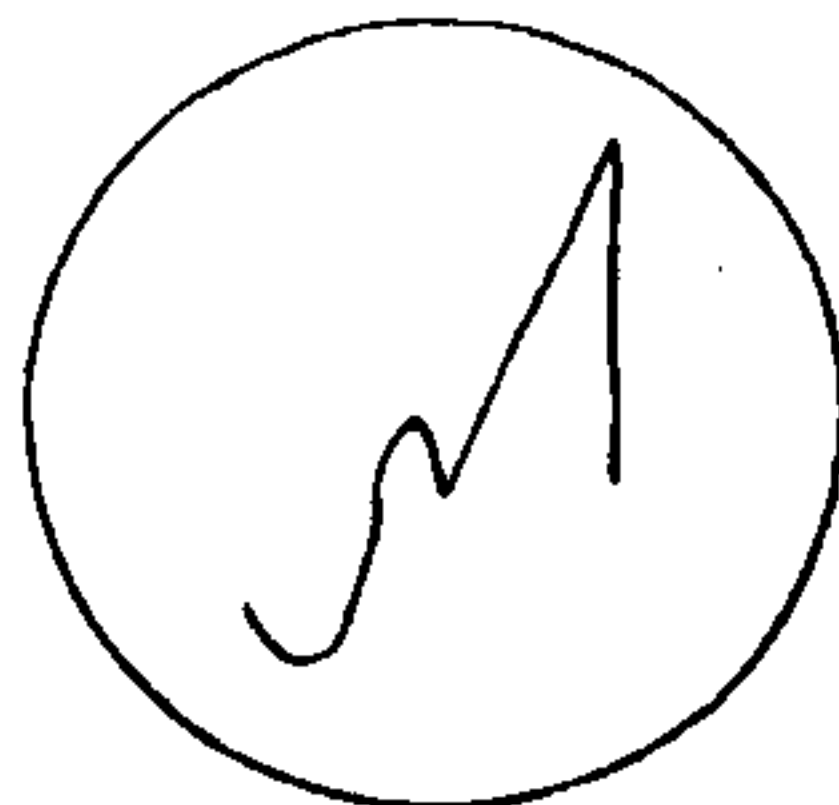
Temporarily reconnect condenser C29 using maximum length of wire available. If part of lead has broken off, splice on an additional one-half inch. Adjust generator output until a response is seen. If necessary slightly readjust frequency. Figure #2 shows a correct response, figure #3 a poor response, and figure #4 one very poor. Observe response and if not correct shorten condenser lead by one-eighth inch. Repeat this in steps of one-eighth inch until a response like figure #2 is obtained. This lead length is fairly critical and if the lead is either too long or too short distortion will result. After finding the best lead length permanently solder wire at this point.

FIGURE 2

PROPER
RESPONSE

FIGURE 3

SLIGHTLY
UNSTABLE

FIGURE 4

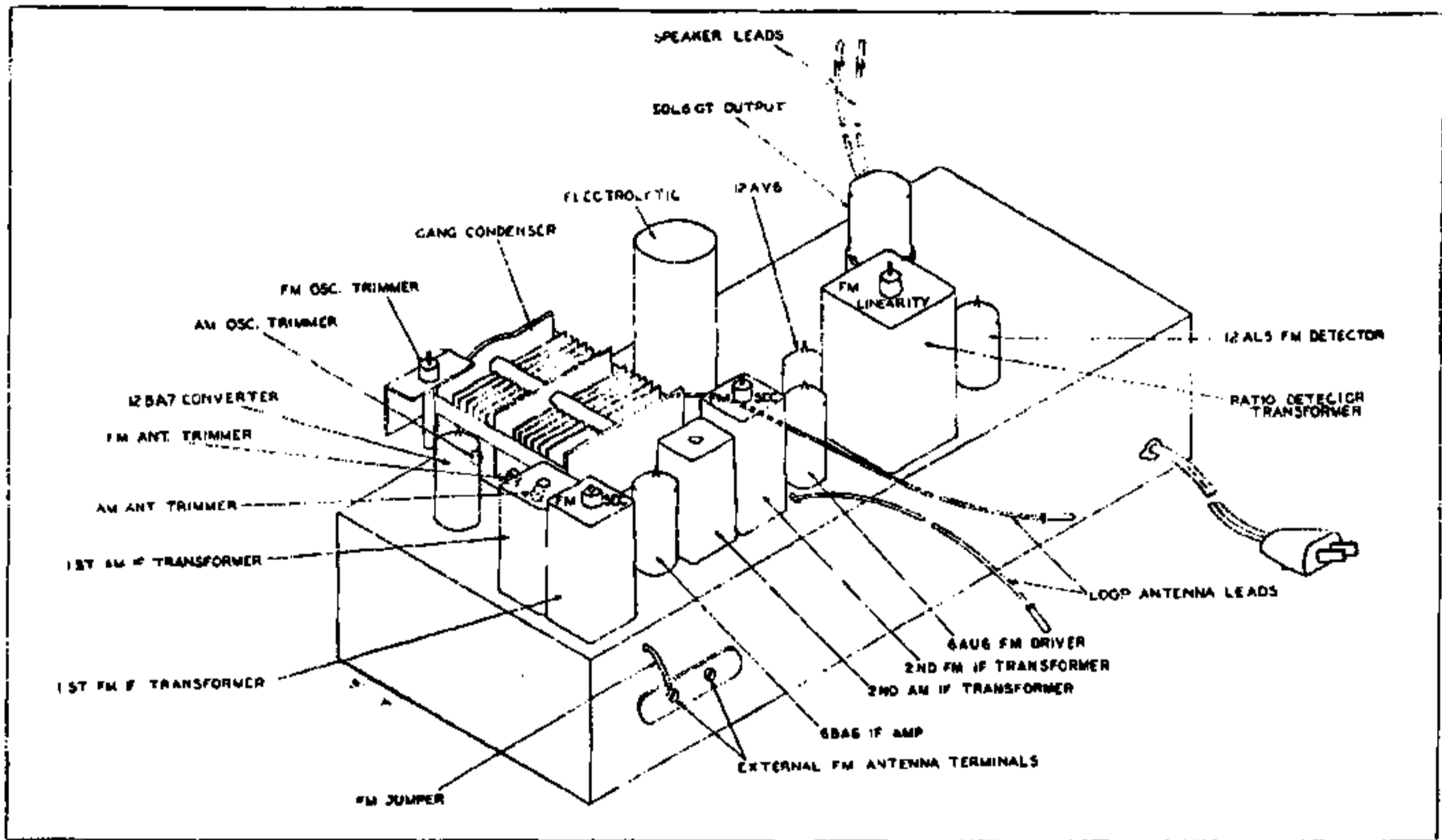
VERY
UNSTABLE

ADJUSTMENT ON FM BROADCAST STATION

(If Oscilloscope & Signal Generator are not available)

Remove chassis from cabinet and lay on its back flange. Connect speaker and antenna and tune in any FM station. If distortion is severe only a slight disturbance may be heard. Locate the condenser indicated in Figure #1. This is shown as C29 in the service manual. Carefully remove the lead connecting the condenser at the terminal strip.

Temporarily reconnect condenser C29 using maximum length of wire available. If part of lead has broken off, splice on an additional one-half inch. Retune station and observe results. Reduce lead length by one-eighth inch and repeat. Find the length that produces the lowest background noise, clearest response and easiest tuning and permanently solder condenser lead at this point. The exact length is fairly critical and distortion will result if it is either too long or too short.



ERRATUM: 6BA6, 6AU6 should be 12BA6, 12AU6 respectively.

ALIGNMENT PROCEDURE

Broadcast Band Section I. F. and R. F.

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 40 volts AC across this resistor will be approximately equivalent to 50 milliwatt output with the speaker con-

nected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.

AM - I. F. ALIGNMENT

SIGNAL GENERATOR FREQUENCY	Band Switch in AM Position, Gang Open, Dummy Antenna .1 Mfd. CONNECTION TO RADIO	ADJUSTMENTS TO BE MADE	ADJUST FOR
455 Kc. Use 1000 microvolts	Pin 1 of 12BA6 I.F. Amp. and B minus	Primary and Secondary of T8. See chassis view.	Maximum output Should be 50 Milliwatts
455 Kc. Use 30 microvolts	Pin 7 of 12BA7 Converter and B minus	Primary and Secondary of T6. See chassis view.	Maximum output Should be 50 Milliwatts
400 cycles. Use 17 millivolts	High Side of Volume Control and B minus	None	Maximum output Should be 50 Milliwatts

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BROADCAST BAND-R. F. ALIGNMENT

Check pointer so that the right hand edge of the pointer skirt coincides with the right hand edge of marker to the extreme left when gang is closed.

For Adjustment, see dial mechanism illustration.

SIGNAL GENERATOR FREQUENCY	SET POINTER AT	CONNECT TO RADIO	ADJUST
1620 Kc.	Extreme Right Calibration Marker	AM Antenna Clip and B minus	Oscillator trimmer C17 for maximum
1400 Kc.	Second Calibration from Left	AM Antenna Clip and B minus	Antenna trimmer C3 for maximum

Check tracking at 1000 Kc, 600 Kc, and 535 Kc to be sure oscillator is set correctly.

NOTE: A special fibre alignment tool having a hex end (similar to an Allen wrench) is required for adjusting the 455 Kc. IF transformers.

ALIGNMENT PROCEDURE

FM Band Section I. F. and R. F.

A non-metallic alignment tool must be used.

IMPORTANT

NOTE

No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment.

The following alignment is based in the use of the new Simpson vacuum tube voltmeter which has a "floating ground". In other words, the meter, when used as a vacuum tube voltmeter, can have both the positive and negative sides connected to points above ground and still give true readings.

All components used in this radio are extremely stable and the tuned circuits should require no adjustment over a long period of time.

A standard AM signal generator is required.

FM-I. F. ALIGNMENT

Band Switch in FM Position. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUSTMENTS TO BE MADE	ADJUST FOR
10.7 Mc. Use about .1 volt	Pin No. 1 of 12AU6	Pin No. 7 of 12AL5 and B minus	Top Core Primary of T9	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No. 1 of 12AU6	Pin No. 7 of 12AL5 and B minus	Bottom Core Secondary of T9	Zero. Use zero center scale See note "A"
10.7 Mc. Use about 3300 microvolts	Pin No. 1 of 12BA6	See note "A"	Primary and Secondary of T7 See chassis view.	Resonance should be about 3 volts
10.7 Mc. Use about 200 microvolts	Pin No. 7 of 12BA7	Pin No. 7 of 12AL5 and B minus	Primary and Secondary of T5 See chassis view.	Resonance should be about 3 volts

NOTES ON FM-I. F. ALIGNMENT

NOTE "A"—Connect two resistors in series, 100K OHMS each, from Pin No.7 of 12AL5 to B minus (pin no.1). These resistors must be matched within 5%. Connect vacuum tube voltmeter between the midpoint of the resistors and point zz.

NOTE "C"—To use a VTVM which does not have the "floating ground" feature, in step 2 above connect "ground" side of VTVM to B minus and "high" side to midpoint of 100K resistors (Note A). Adjust bottom core of T9 for zero reading.

NOTE "B"—If T9 has been tampered with, it is possible that no crossover point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL—Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

FM - R.F. ALIGNMENT

Check pointer so that the right hand edge of the pointer skirt coincides with the right hand edge of marker to the extreme left when gang is closed.

For Adjustment, see dial mechanism illustration.

SIGNAL GENERATOR FREQUENCY	POINTER	CONNECTION TO RADIO	ADJUST	VTVM CONNECTIONS
108 MC.	108 MC. Marker	FM antenna terminals	FM Osc C13 for maximum	Pin No. 7 of 12AL5 to B minus
98 MC.	Tune in Gen. Signal	See Note "B" below	FM Ant. C6 for maximum	

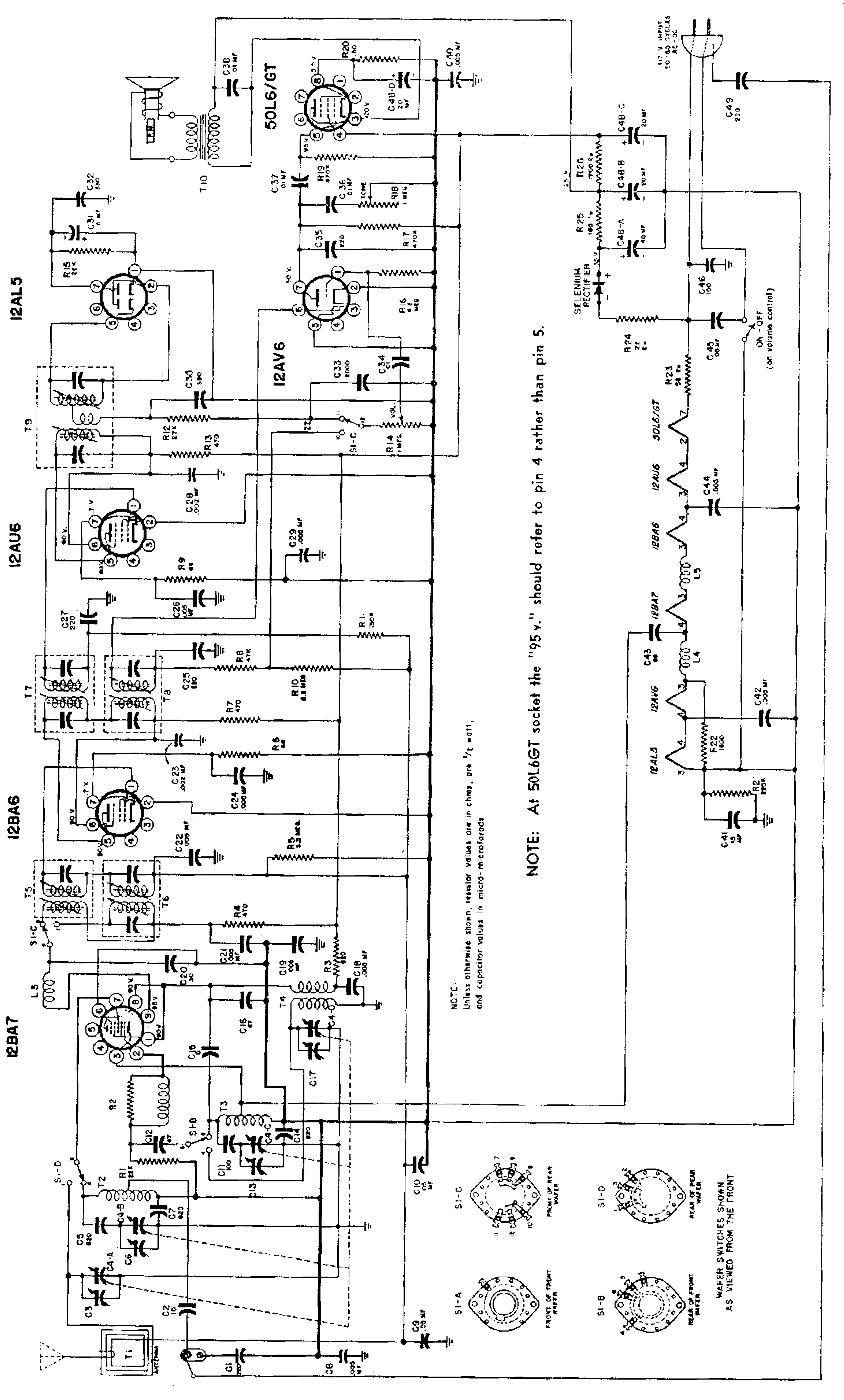
NOTE "A"—If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt-meter

as above for resonance indication. A weak carrier, however, will not produce 3 volts.

NOTE "B"—Connect 300 ohms in series with "hot" side of generator and connect to left hand screw of external FM Antenna Terminals. Connect cold side of generator to right hand screw.

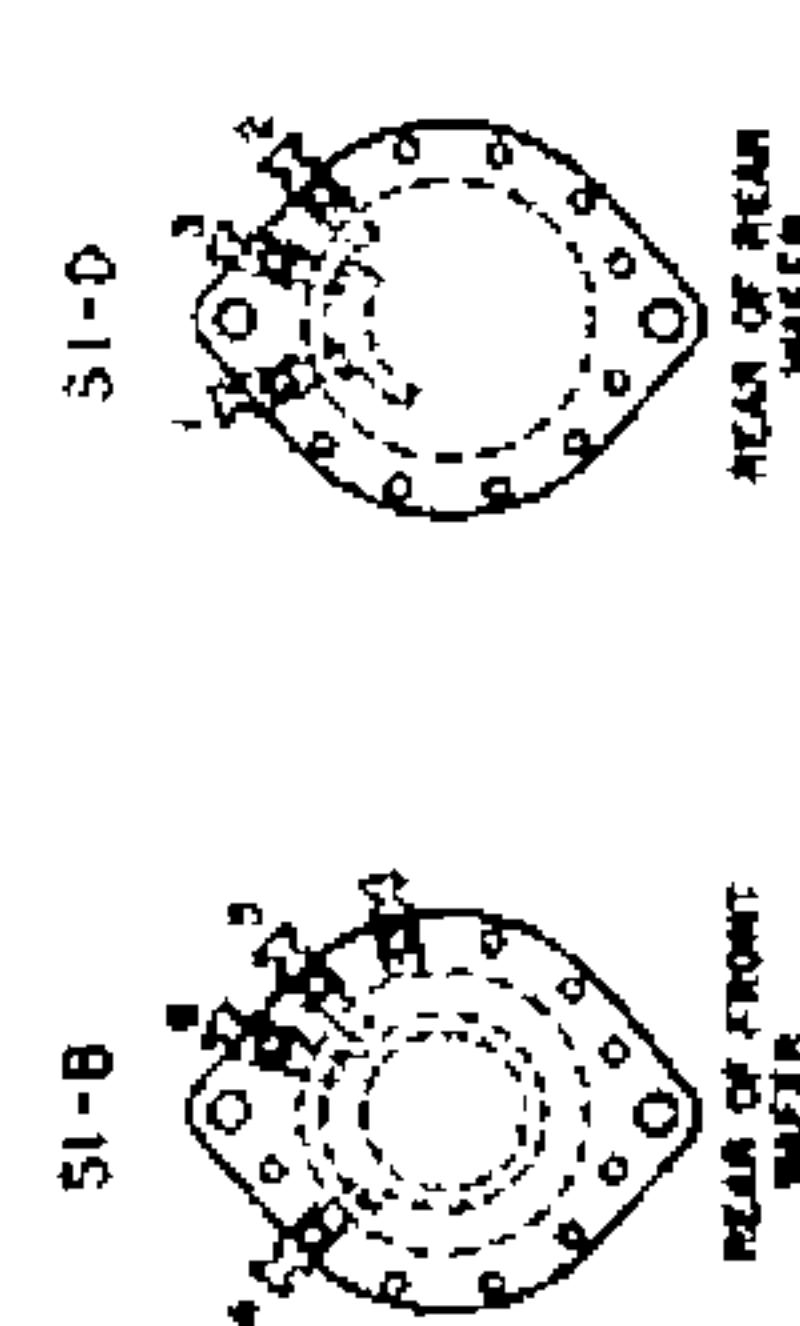
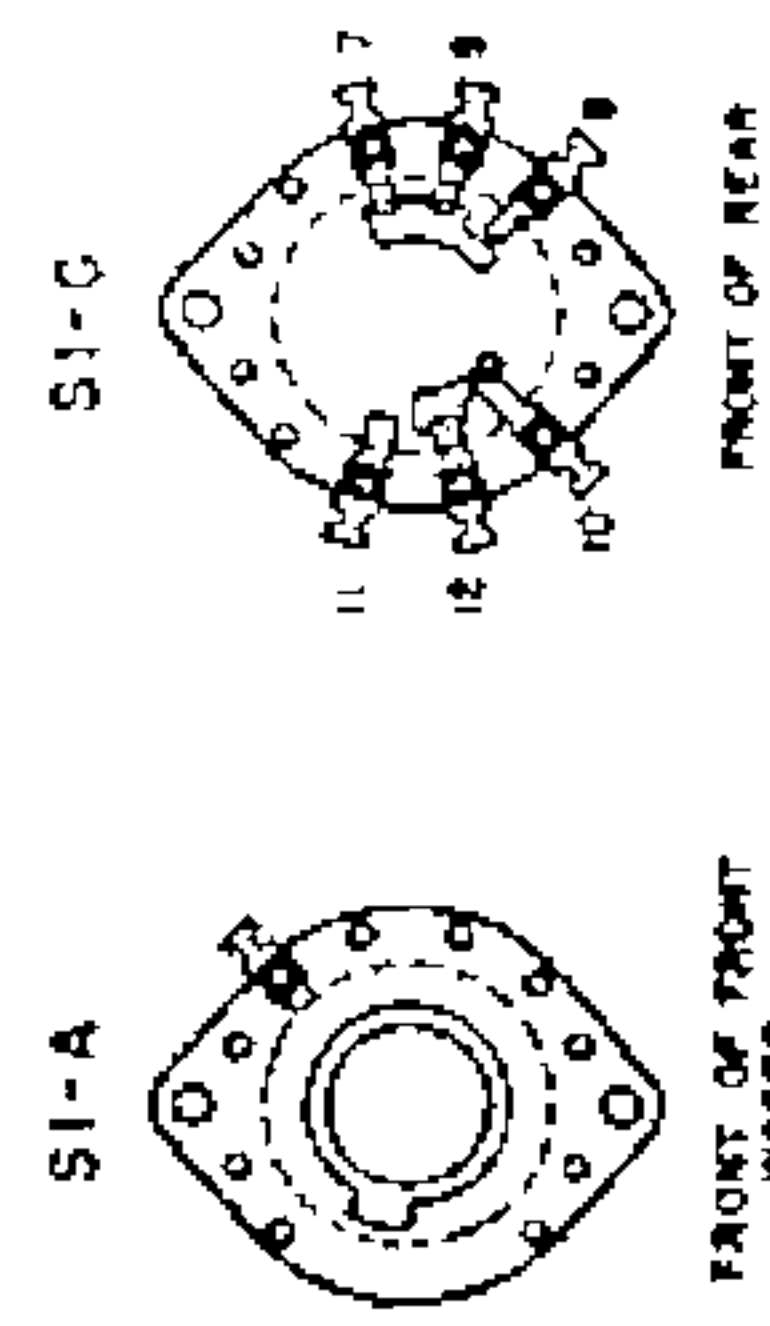
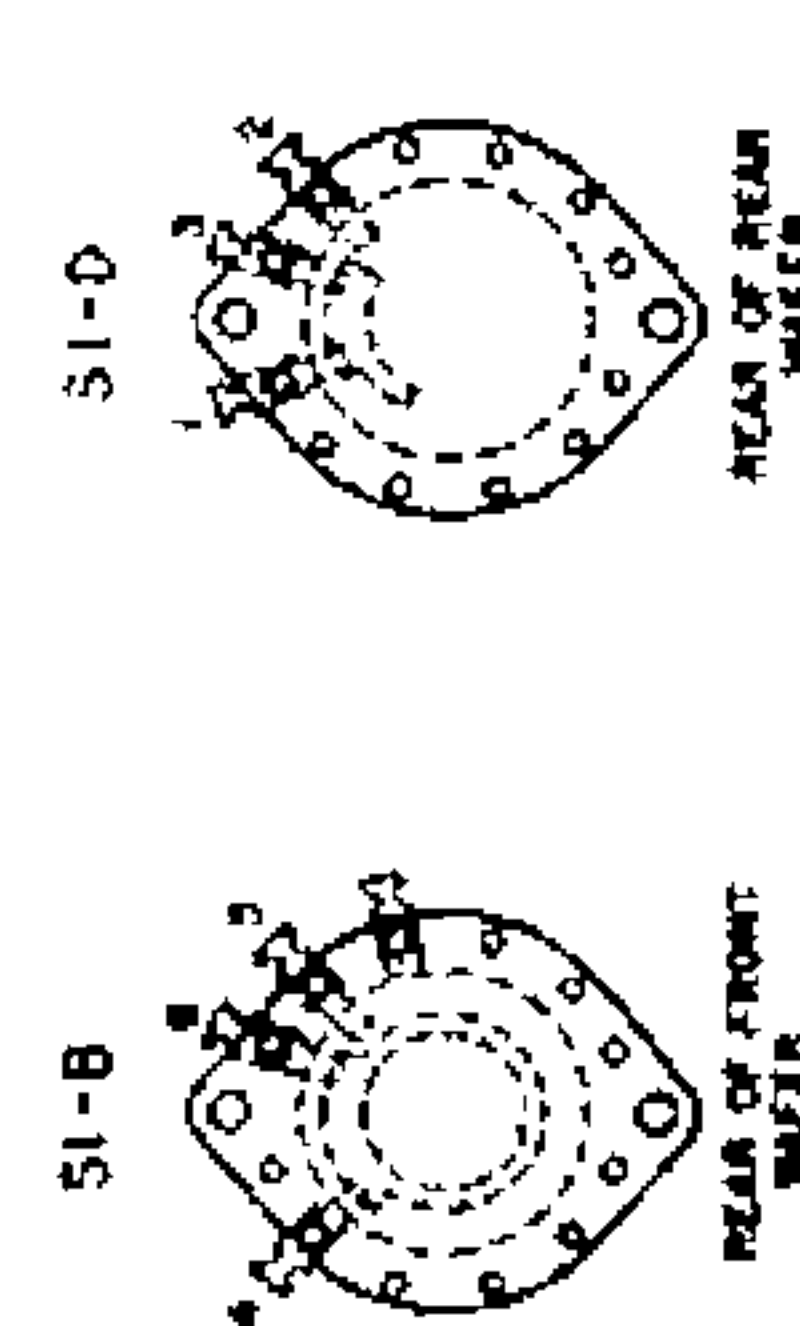
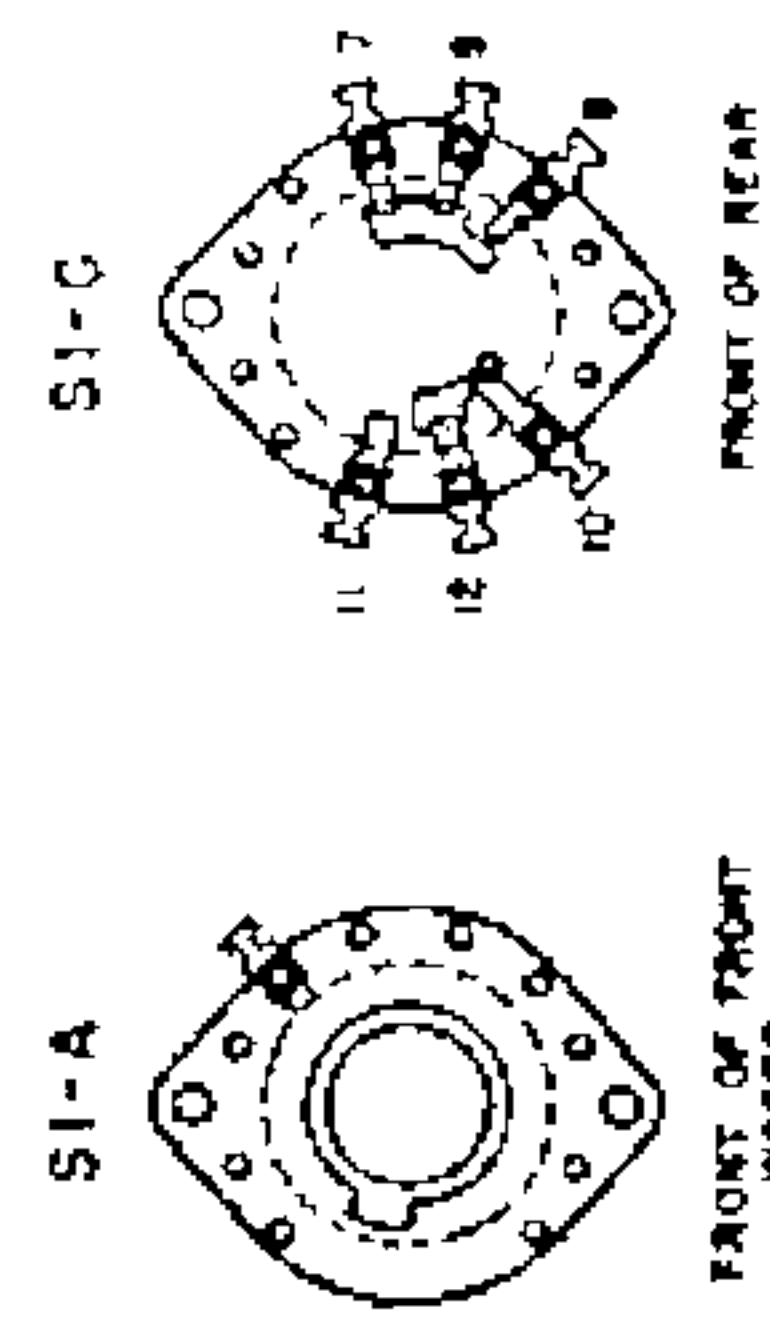
REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Qty. Used	Ref. No.	Part No.	Description	Qty. Used
Condensers							
C1, 25, 35, 49, 27	C-8G-11733	220 mmf, ceramic	5	R25	C-9B2-53	180 ohms, 1 watt, 10%	1
C2	C-8G-12199	10 mmf, ceramic	1	R26	C-9B4-63	1200 ohms, 2 watts, 10%	1
C3	On gang	Trimmer, Antenna AM		Coils and Transformers			
C4, A,B,C,D	B-8A-15843	Gang Condenser	1	L3, L4, L5	A-16B-16023	Choke	1
C5, 7, 14	C-8F3-124	820 mmf, mica	3	T1	C-13E-16028	Loop antenna	1
C6	On gang	Trimmer, Antenna FM		T2	A-13E-16032	FM antenna coil	1
C8, 18, 19, 21, 22, 24, 26, 29, 40, 42, 44	A-8G-13962	.005 mf, ceramic	11	T3	A-13D-16031	FM oscillator coil	1
C9, 45	C-8D-10813	.05 mf, 400 volts, tubular	2	T4	B-13D-16002	AM oscillator coil	1
C10	C-8D-10770	.05 mf, 200 volts, tubular	1	T5	B-13A-15999	FM input IF transformer	1
C11, 46	C-8F3-113	100 mmf, mica	2	T6	B-13A-16301	AM input IF transformer	1
C12, 16	C-8G-12198	47 mmf, ceramic	2	T7	B-13B-16000	FM driver IF transformer	1
C13	On gang	Trimmer, Oscillator AM		T8	B-13B-16302	AM output IF transformer	1
C15	A-8G-12495-6	4.7 mmf, ceramic	1	T9	B-13M-16001	Ratio detector transformer	1
C17	A-201-15142	Trimmer, Oscillator FM	1	T10	B-12C-16014	Output transformer	1
C20	C-8G-12159	30 mmf, ceramic	1	Dial Parts			
C23, 28, 33	C-8G-16049	.002 mf, ceramic	3	B-2C-16063	Dial plate		1
C30	C-8F3-120	390 mmf, mica	1	B-6A-16062	Dial crystal		1
C31	C-8D-16013	5 mf, 100 volts, electrolytic	1	A-2M-16034	Clip for crystal		2
C32	C-8F3-11	330 mmf, mica	1	A-3A-16004	Tuning shaft		1
C34, 36, 37, 38	C-8D-10761	.01 mf, 400 volts, tubular	4	B-29C-15876	"C" washer		1
C41	C-8D-10953	.15 mf, 400 volts, tubular	1	B-2M-15992	Pointer bar		1
C43	C-8G-10648	68 mmf, ceramic	1	A-2D-15991	Dial bracket		2
C48, A,B,C,D	B-8C-15880	40-20-20-20 mf, electrolytic	1	A-53A-10989	Dial string, 60" reg.		1
Resistors							
R1, 15	C-9B1-78	22K ohms, 1/2 watt, 10%	2	B-2G-16005	Dial Pointer		1
R2	A-16M-16035	Suppressor	1	A-49A-10078	Tension spring		2
R3	C-9B1-61	820 ohms, 1/2 watt, 10%	1	A-3H-10299	Idler pulley		2
K4, 7, 13	C-9B1-58	470 ohms, 1/2 watt, 10%	3	Miscellaneous			
R5	C-9B1-34	3.3 megohms, 1/2 watt, 20%	1	B-18A-16024	PM speaker, 4"x6", oval		1
R6, 9	C-9B1-48	68 ohms, 1/2 watt, 10%	2	A-15B-13430	Socket, miniature, 9 pin		1
R8	C-9B1-82	47K ohms, 1/2 watt, 10%	1	A-15B-16297	Socket, miniature, 7 pin		4
R10	C-9B1-33	2.2 megohms, 1/2 watt, 20%	1	A-15B-10440	Socket, octal		1
R11	C-9B1-26	150K ohms, 1/2 watt, 20%	1	B-15B-13785	Lytic mounting plate		1
R12	C-9B1-79	27K ohms, 1/2 watt, 10%	1	B-14M-16251	Line cord and plug, 3-wire		1
R14	A-10A-15853	1 megohm, volume control and switch	1	5C-13180-36	Cabinet		1
R16	C-9B1-36	6.8 megohm, 1/2 watt, 20%	1	A-2M-10096	Snap pins for back		2
R17, 19	C-9B1-94	470K ohms, 1/2 watt, 10%	2	B-5B-11131-41	Knob, plain		3
R18	A-11B-15852	1 megohm tone control	1	B-5B-16057-41	Knob, with dot		1
R20	C-9B1-52	150 ohms, 1/2 watt, 10%	1	A-21J-12775	Selenium rectifier		1
R21	C-9B1-27	220K ohms, 1/2 watt, 10%	1	A-3B-16009	Bushing for tuning shaft		1
R22	C-9B1-65	1800 ohms, 1/2 watt, 10%	1	A-7B-13050	FM dipole terminal strip		1
R23	C-9C4-1084	56 ohms, 2 watts, 10%	1	B-2D-15432	Loop mounting bracket		1
R24	C-9C4-1079	22 ohms, 2 watts, 10%	1	B-29J-13364	Rubber washer		3
				42A-10874	3/4" chassis mtg. screws		3
				B-29A-2104	Steel washers for above		3
				B-23K-13191	Grill screens		1
				A-19A-15257	Pin for speaker leads		2
				B-20A-16003	Band change switch		1



NOTE: Unless otherwise shown, resistor values are in ohms, are 1/2 watt, and capacitor values in micro-microfarads

NOTE: At 50L6GT socket the "95 v." should refer to pin 4 rather than pin 5.



WAFER SWITCHES SHOWN AS VIEWED FROM THE FRONT