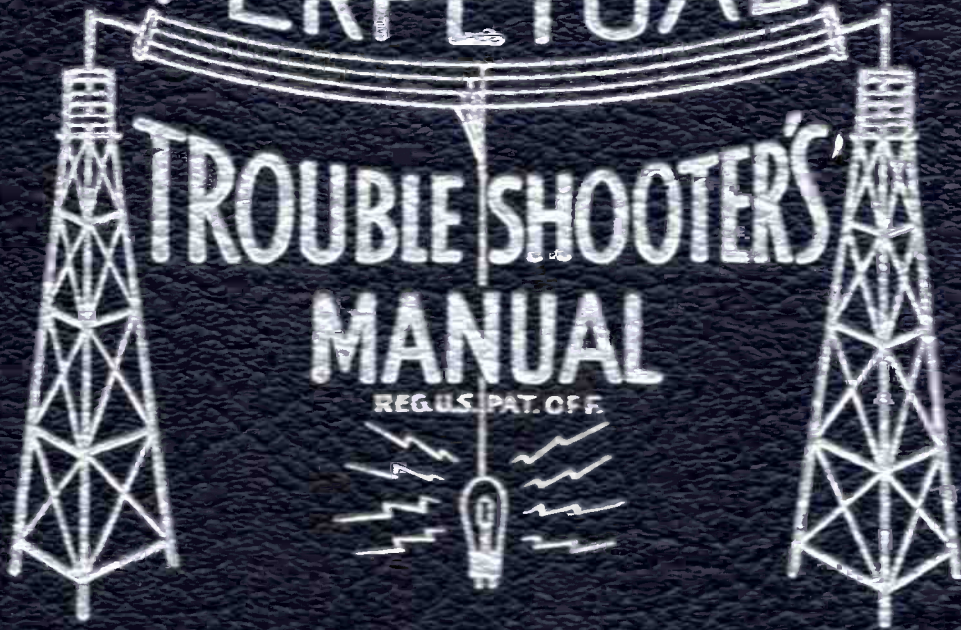


VOLUME XX

PERPETUAL

TROUBLE SHOOTER'S
MANUAL

REG. U.S. PAT. OFF.



JOHN F. RIDER

MODEL D1949

STAGE GAIN MEASUREMENT PROCEDURE

REQUIRED INSTRUMENTS: The amount of amplification or "gain" of most of the stages of this receiver can be measured with an A.C. Vacuum Tube Voltmeter of the high frequency type. An AM (600 KC.) as well as an FM (98 MC.) signal source is required. For gain measurements in the FM antenna—FM converter—FM 1st I.F. stages, a microvolt calibrated FM signal generator should preferably be used.

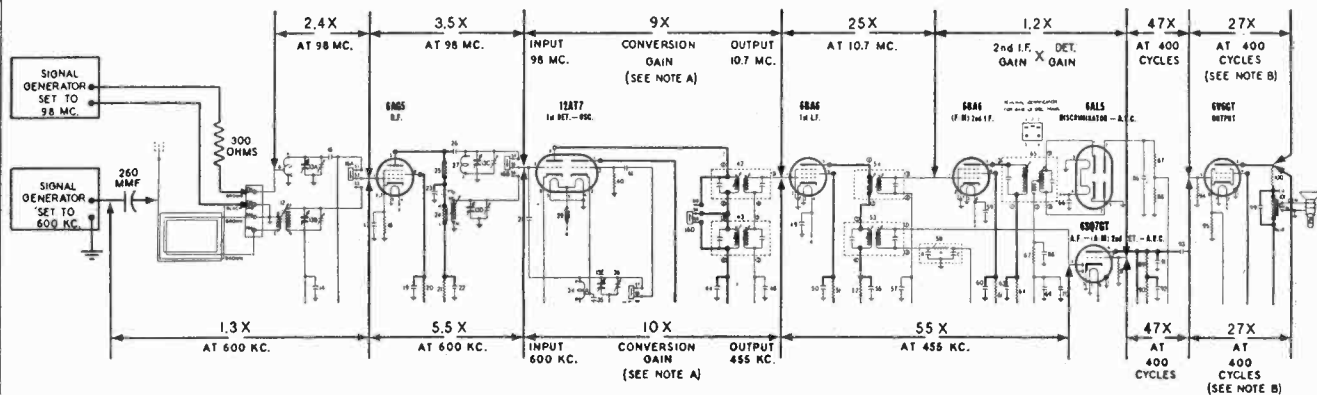
PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F., I.F. and Discriminator stages are carefully and accurately aligned by utilizing the alignment procedure given in this manual.
2. Connect Signal Generator as shown below. Note that generator connections differ for "AM" and "FM" measurements.
3. For "AM" measurements, set signal generator to 600 KC. (400 cycle modulation) and then carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
4. For "FM" measurements, set signal generator to 98 MC. (400 cycle modulation with 22½ KC. deviation) and then carefully tune radio receiver to this signal by using a D.C. Vacuum Tube Volt-

meter as an output indicator—meter must be connected between pin No. 7 of 6AL5 tube and chassis. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.

The values of stage gain which are given here were measured with a fixed bias of -3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. system. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to both A.V.C. supply lines by effecting a common connection to terminal 4 of 2nd FM-I.F. transformer and terminal 2 of 1st AM-I.F. transformer. Then connect the positive battery lead to the receiver chassis.

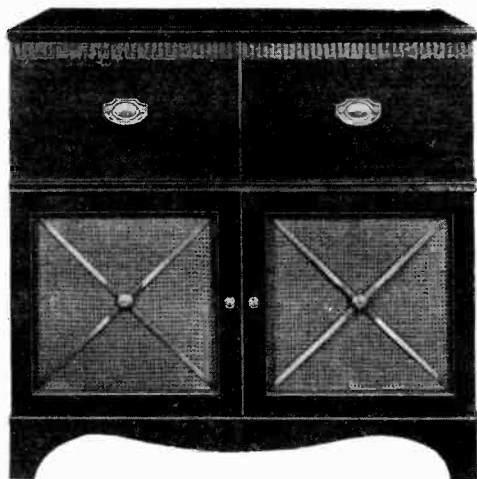
R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.



NOTE A: Short oscillator grid (pin 2 of 12AT7) to ground when measuring input voltage at signal grid (pin 7) of 12AT7 tube.

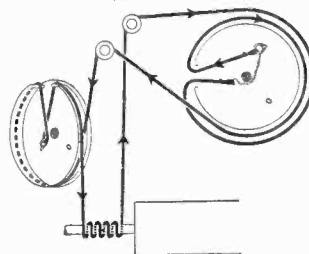
NOTE B: Measured with input voltage of 0.3.

DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

SIDE VIEW



To string dial cord, set gang condenser to fully open position and use the following parts:
 114955 Clip on end of cord
 117057 Cord (3 feet)
 119087 Ring for dial cord
 505161 Tension spring

Do not connect to a Direct Current (D. C.) or to a 50 cycle A.C. power supply.

BROADCAST BAND --"AM"--ALIGNMENT PROCEDURE

1. Disconnect leads from FM-AM antenna terminal strip (labeled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis and speaker. If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.
2. Stand chassis on one edge so that all trimmers are accessible.
3. Loop antenna leads (on cabinet) do not have to be connected to terminal strip on chassis while I. F. stages are being aligned. Before starting alignment of Ant., R.F., and Osc. stages, reconnect all antenna leads to chassis—do not attempt to use extension leads; place chassis as close as required to cabinet so that connections may be made direct to antenna terminal strip at back.
4. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.
5. Connect on output meter across speaker voice coil, or from plate of 6V6GT tube to chassis through a 0.1 Mfd. condenser.
6. Connect ground lead of signal generator to the receiver chassis.
7. Set volume control of maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Lug on trimmer No. 6 at top of gang (see figure below for location of trimmer).	455 KC	AM Broadcast (Middle)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
260 MMFD. Mica Condenser	External Antenna Clip on Cabinet	1500 KC	AM Broadcast (Middle)	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
260 MMFD. Mica Condenser	External Antenna Clip on Cabinet	1500 KC	AM Broadcast (Middle)	Tune to 1500 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
					7	Broadcast Antenna	Adjust for maximum output.
260 MMFD. Mica Condenser	External Antenna Clip on Cabinet	600 KC	AM Broadcast (Middle)	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast R.F. Coil.	Adjust for maximum output.
					9	Adjustable core of Broadcast Antenna Coil.	Adjust for maximum output.

Repeat adjustment of trimmers 6 & 7 and slugs 8 & 9 until one no longer detunes the other.

NOTE: It is preferable to check the alignment of the I.F. stages in the FM channel after completing AM alignment.

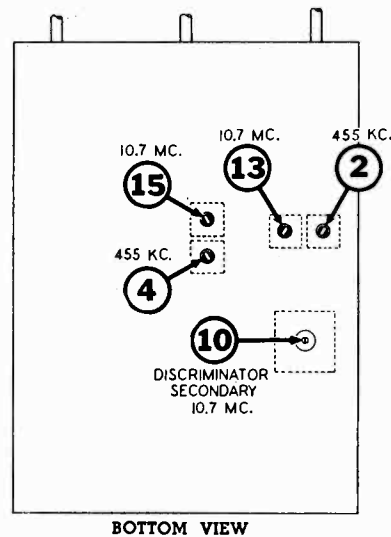
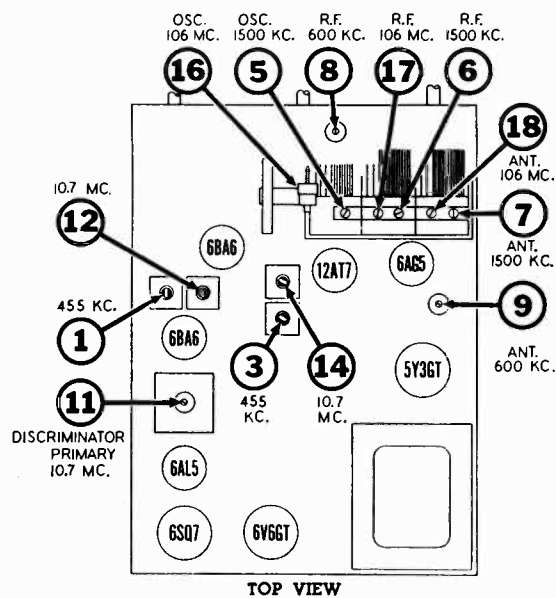
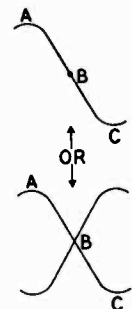


Fig. 1
TRIMMER LOCATION CHART

This single "S" curve pattern results when scope uses properly phased "sine wave" horizontal deflection voltage.



This double "S" curve pattern results when scope uses properly phased "Sawtooth" horizontal deflection voltage whose frequency is twice the modulation frequency of signal generator.

FIG. 2

MODEL D1949

**FREQUENCY MODULATION—"FM"—ALIGNMENT PROCEDURE
(USING A VACUUM TUBE VOLTMETER AND AM SIGNAL GENERATOR)**

INSTRUMENTS: Although it is preferable to use on FM generator and an oscilloscope, reasonably accurate alignment is obtainable when using a conventional AM generator and vacuum tube voltmeter providing proper care is exercised in adjusting the discriminator circuit trimmer.

IMPORTANT: When using an AM signal generator, it should be capable of producing fundamental frequencies of 10.7 MC and 88 to 108 MC — avoid using an AM generator which produces signals in the 88 to 108 MC range by using harmonics higher than the second. Generators which are dependent upon third, fourth or fifth harmonics for output frequencies of 88 to 108 MC will generally produce undesirable spurious beat signals with the local oscillator in the receiver and alignment will be exceedingly difficult.

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in chart below (AM alignment procedure is given on the preceding page).

2. Disconnect leads from FM-AM aerial terminal strip (labelled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis and speaker. If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 88 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.
4. A specific setting of the receiver volume control is not required. However, it will be found convenient to leave it in the maximum volume position so that alignment signals will be audible even though the output indication is obtained by a V-T voltmeter connected to points in the discriminator circuit.
5. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
6. Set band switch to the FM (extreme counter-clockwise) position.

SIGNAL GENERATOR CONNECTIONS	FREQUENCY & TYPE OF MODULATION	VACUUM TUBE VOLTMETER CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
Connect high side in series with an .01 Mfd condenser to lug on trimmer No. 17 at top of gang (see illustration on page 8 for location of trimmer). Connect ground lead to receiver chassis in vicinity of 12AT7 tube.	10.7 MC AM signal may be 400 cycle modulated.	Connect common (or ground) terminal of meter to receiver chassis. D.C. probe lead of meter is then connected to pin No. 7 of the 6AL5 tube.	Any position where it does not affect the signal.	11	Discriminator Primary	Adjust these trimmers for maximum meter reading—the output voltage will be of negative polarity.
				12 and 13	2nd I.F.	
				14 and 15	1st I.F.	
Same as above	Same as above	Connect common (or ground) terminal of V-T voltmeter to the junction of resistors 87 and 88 in the discriminator circuit. D.C. probe lead of meter is then connected to junction of resistor No. 67 (18,000 ohms) and condenser No. 70 (.003 MFD.) which are in the discriminator output circuit. Set meter for operation on its lowest D.C. voltage range.	Same as above	10	Discriminator Secondary	Note that as trimmer No. 10 is rotated a point will be found where voltmeter will swing from a positive to a negative reading or vice versa. Correct setting of trimmer No. 10 is obtained when meter reads zero as trimmer is moved through this point. The adjustment is somewhat critical and considerable care must be exercised to set the trimmer for a zero meter indication.

Recheck adjustment of trimmers No. 10 and No. 11 to be sure that both are set as accurately as possible to obtain the specified output indication.

Connect generator "high" side in series with a 300 ohm carbon resistor to end terminal marked "FM" on strip at back of chassis. Generator ground lead must connect to next terminal marked "GND".	106 MC AM signal may be 400 cycle modulated.	Connect common (or ground) terminal of meter to receiver chassis. D.C. probe lead of meter is then connected to Pin No. 7 of the 6AL5 tube.	106 MC	16	Oscillator Trimmer	Set trimmer No. 16 to receive 106 MC. signal as indicated by maximum meter reading. IMPORTANT: It will be noted that there are two different settings of trimmer No. 16 at which the 106 MC. signal will be received—always select the trimmer setting which is nearest to the low capacity end of its range.
				17	R.F. Trimmer	Adjust trimmer No. 17 for maximum meter reading.
				18	Antenna Trimmer	Adjust trimmer No. 18 for maximum meter reading.
Same as above	Same as above	Same as above	Tune to 106 MC. generator signal.	14 and 15	1st I.F.	Recheck adjustment of these trimmers for maximum meter reading.

Check calibration and tracking of receiver with input signals of 90 and 98 MC. If difference between dial pointer setting and 90 or 98 MC. calibration mark does not exceed ± 0.3 MC. and antenna and R.F. circuits are tracking properly, then alignment may be considered satisfactory and no further adjustment is necessary. Where the calibration error is greater than ± 0.3 MC. it is advisable to make the following adjustments:

1. If pointer falls above the 90 MC. calibration point, it will be necessary to slightly spread the windings of the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16, 17 and 18 at 106 MC. Should it be found impossible to obtain the 106 MC. signal at the proper point on the dial by adjust-

ment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.

2. If pointer falls below the 90 MC. calibration point, it will be necessary to push the windings together on the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16, 17 and 18 at 106 MC. Should it be found impossible to obtain the 106 MC. signal at the proper point on the dial by adjustment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.
3. Correction for mistracking of antenna and R.F. may be accomplished by adjusting coil turns and gang plate spacing in the same manner as outlined above for the oscillator stage.

FREQUENCY MODULATION—"FM"—ALIGNMENT PROCEDURE (USING AN OSCILLOSCOPE AND FM "SWEEP" GENERATOR)

INSTRUMENTS: Alignment of the FM circuits in this receiver can be most conveniently accomplished with an FM signal generator. When using this type generator, the output indicator must be an oscilloscope.

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in chart below (AM alignment procedure is given on page 8).
2. Disconnect leads from FM-AM aerial terminal strip (labelled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis and speaker. (If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.)
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 88 on the dial.

If it is set incorrectly, hold tuning shaft steady and reposition pointer.

4. A specific setting of the receiver volume control is not required, however, it will be found convenient to leave it in the maximum volume position so that alignment signals will be audible even though the output indication is obtained by an oscilloscope connected to points in the discriminator circuit.
5. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
6. Set band switch to the FM (extreme counter-clockwise) position.
7. Set tone control to fully counter-clockwise position.

SIGNAL GENERATOR CONNECTIONS	FREQUENCY & TYPE OF MODULATION	OSCILLOSCOPE CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
Connect high side in series with an .01 Mfd condenser to lug on trimmer No. 17 at top of gang (see illustration on page 8 for location of trimmer). Connect ground lead to receiver chassis in vicinity of 12AT7 tube.	10.7 MC FM signal should preferably be modulated ± 400 KC.	Connect vertical amplifier "high" lead to junction of resistor No. 67 (18000 ohms) and condenser No. 70 (.003 Mfd.) which are in discriminator output circuit. Connect scope ground lead to receiver chassis. Set vertical amplifier of scope for maximum amplification. Where FM signal generator provides an output voltage for synchronization, connect this voltage to "sync" terminals of the scope.	Any position where it does not affect the signal.	10	Discriminator Secondary	Before attempting to adjust trimmer No. 10, set trimmers No. 11, 12, 13, 14 and No. 15 for approximately maximum sound output from the speaker (output meter not required). This is done to obtain sufficient signal for an oscilloscope pattern of desirable amplitude when making the following discriminator trimmer adjustment. Adjust setting of trimmer No. 10 until a pattern similar to that shown in Fig. 2 appears on the screen. If pattern does not remain stationary operate sweep frequency control on 'scope and also "sync" control until desired result is obtained. Correct setting of trimmer No. 10 is obtained when crossover point "B" (Fig. 2) is centrally located in both the horizontal and vertical directions; in addition that portion of the curve between "A" and "C" should be as linear (straight) as possible.
Same as above	Same as above	Same as above	Same as above	11 12 and 13 14 and 15	Discriminator Primary 2nd I.F. 1st I.F.	Adjust these trimmers for maximum amplitude and steepness of that portion of the pattern between "A" and "C" (see Fig. 2).
Recheck adjustments of trimmers No. 10 and No. 11 to be sure that both are set as accurately as possible to obtain correct cross-over point or symmetry of pattern.						
Connect generator "high" side in series with a 300 ohm carbon resistor to end terminal marked "FM" on strip at back of chassis. Generator ground lead must connect to next terminal marked "GND"	106 MC FM signal should preferably be modulated ± 400 KC.	Same as above	106 MC	16	Oscillator Trimmer	Adjust trimmer No. 16 to obtain the symmetrical pattern shown in Fig. 2. Correct setting of trimmer No. 16 is obtained when cross-over point in pattern is centrally located. IMPORTANT: It will be noted that there are two different settings of trimmer No. 16 at which the desired 'scope pattern can be obtained—always select the trimmer setting which is nearest to the low capacity end of its range.
Same as above	Same as above	Same as above	Tune to 106 MC. generator signal.	17 18 14 and 15	R.F. Trimmer Antenna Trimmer 1st I.F.	Adjust trimmer No. 17 for maximum amplitude of pattern. Adjust trimmer No. 18 for maximum amplitude of pattern. Recheck adjustment of these trimmers for maximum amplitude of pattern.

Check calibration and tracking of receiver with input signals of 90 and 98 MC. If difference between dial pointer setting and 90 or 98 MC. calibration mark does not exceed ± 0.3 MC. and antenna and R.F. circuits are tracking properly, then alignment may be considered satisfactory and no further adjustment is necessary.

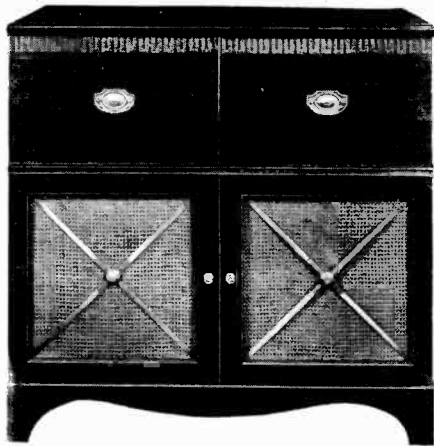
Where the calibration error is greater than ± 0.3 MC. it is advisable to make the following adjustments:

1. If pointer falls above the 90 MC. calibration point, it will be necessary to slightly spread the windings of the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16, 17 and 18 at 106 MC. Should it be found impossible to obtain the 106 MC. signal at the proper point on the dial by adjustment

of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.

2. If pointer falls below the 90 MC. calibration point, it will be necessary to push the windings together on the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16, 17 and 18 at 106 MC. Should it be found impossible to obtain the 106 MC. signal at the proper point on the dial by adjustment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.
3. Correction for mistracking of antenna and R.F. may be accomplished by adjusting coil turns and gang plate spacing in the same manner.

MODEL D1952



This radio receiver and phonograph combination must be connected to 60 cycle Alternating Current (A.C.) at 105 to 125 volts.

Do not connect to a Direct Current (D.C.) or to a 50 cycle A.C. power supply.

STAGE GAIN MEASUREMENT PROCEDURE

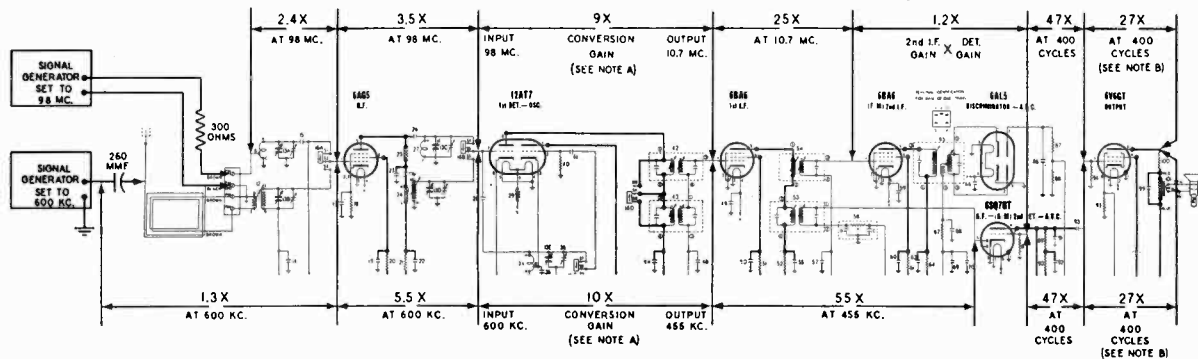
REQUIRED INSTRUMENTS: The amount of amplification or "gain" of most of the stages of this receiver can be measured with an A.C. Vacuum Tube Voltmeter of the high frequency type. An AM (600 KC.) as well as an FM (98 MC.) signal source is required. For gain measurements in the FM antenna—FM converter—FM 1st I.F. stages, a microvolt calibrated FM signal generator should preferably be used.

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F., I.F. and Discriminator stages are carefully and accurately aligned by utilizing the alignment procedure given in this manual.
2. Connect Signal Generator as shown below. Note that generator connections differ for "AM" and "FM" measurements.
3. For "AM" measurements, set signal generator to 600 KC. (400 cycle modulation) and then carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
4. For "FM" measurements, set signal generator to 98 MC. (400 cycle modulation with 22½ KC. deviation) and then carefully tune radio receiver to this signal by using a D.C. Vacuum Tube Volt-

meter as an output indicator—meter must be connected between pin No. 7 of 6AL5 tube and chassis. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.

5. The values of stage gain which are given here were measured with a fixed bias of -3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. system. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to both A.V.C. supply lines by effecting a common connection to terminal 4 of 2nd FM-I.F. transformer and terminal 2 of 1st AM-I.F. transformer. Then connect the positive battery lead to the receiver chassis.
6. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.



NOTE A: Short oscillator grid (pin 2 of 12AT7) to ground when measuring input voltage at signal grid (pin 7) of 12AT7 tube.

NOTE B: Measured with input of 0.3 volt.

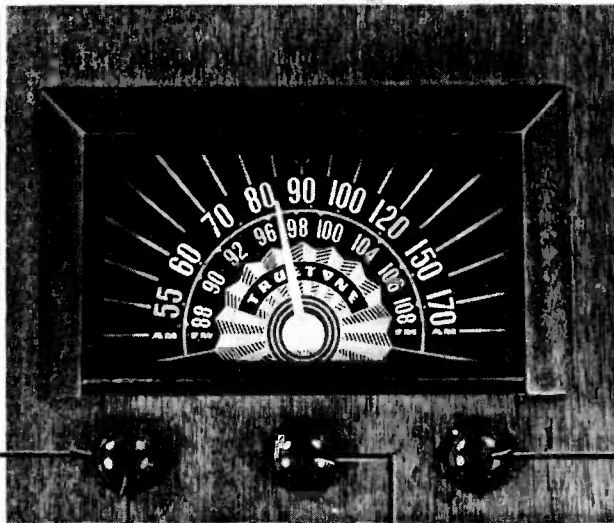
DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

HOW TO OPERATE THE CONTROLS

THE DIAL has two separate scales. **UPPER SCALE** covers standard "Broadcast" band frequencies between 540 and 1700 Kc.; add a zero to the dial numbers on this scale to obtain frequency in kilocycles (Kc.). **BOTTOM SCALE** covers frequencies between 88 and 108 Mc. (Megacycles). All of the new Frequency Modulation ("FM") stations are located in this tuning range.

TONE CONTROL

Use this control (large knob) to select most pleasing tone. Extreme clockwise setting is recommended for speech and settings in the middle range are suggested for music. If a mellow tone with reduced high note content is desired, turn knob fully counter-clockwise.



FM-AM-PHONO SWITCH

For Standard Broadcast stations, turn knob to center position (AM). For FM stations, turn knob counter-clockwise to position marked (FM). For PHONO operation, turn knob to clockwise position marked (PHONO).

ON-OFF SWITCH AND VOLUME CONTROL

Turn this (small) knob clockwise to turn set on. Continuing to turn clockwise will increase volume.

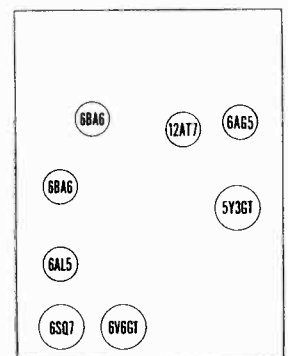
TUNING CONTROL

Use this control to tune receiver to the desired station.

TUBES USED

The tubes used in this receiver are arranged on the chassis as shown in illustration at the right.

NOTE: IF TUBES ARE REMOVED FOR TEST OR REPLACEMENT, MAKE CERTAIN THAT EACH TUBE IS PLACED IN ITS PROPER SOCKET WHEN REPLACING THE TUBES IN THE SET.



REAR OF CHASSIS

MODEL D1952

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

ALL MEASUREMENTS MADE WITH BAND SWITCH IN "FM" POSITION UNLESS OTHERWISE INDICATED

DIAL TUNED TO 88 MC. FOR "FM" MEASUREMENTS

DIAL TUNED TO 540 KC. FOR "AM" MEASUREMENTS

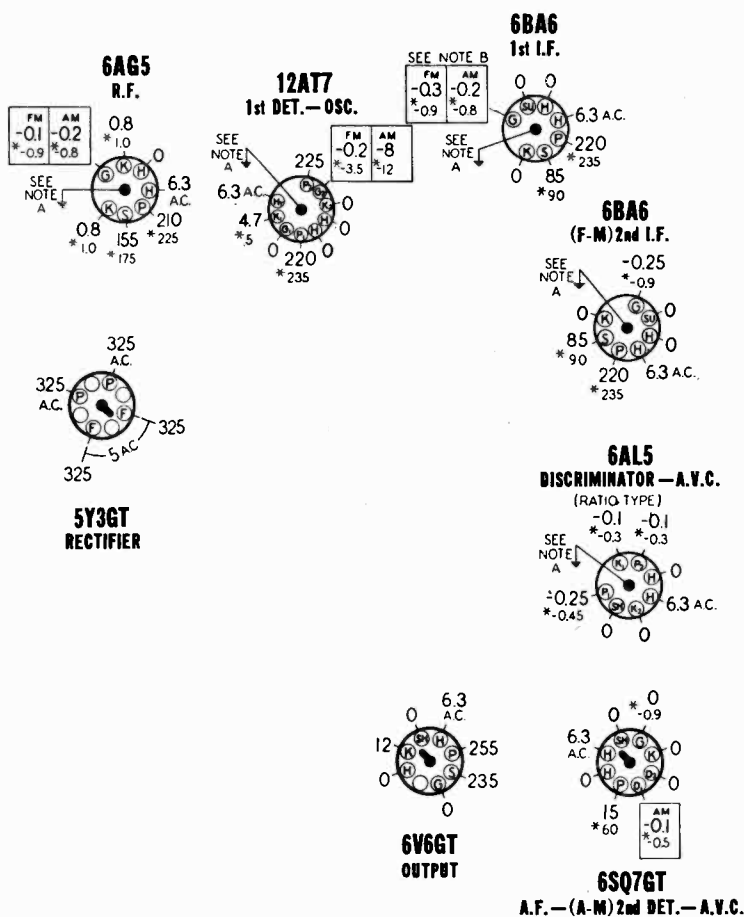
VOLUME CONTROL SET TO MINIMUM WITH NO SIGNAL

GROUND ALL ANTENNA TERMINALS

BOTTOM VIEW OF CHASSIS

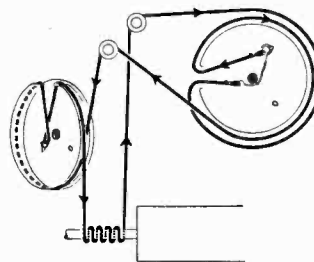
117 VOLT 60 CYCLE A. C.
POWER SUPPLY USED
FOR THESE MEASUREMENTS.

ALL VOLTAGES MEASURED BETWEEN
SOCKET TERMINALS AND CHASSIS.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

SIDE VIEW



To string dial cord, set gang condenser to fully open position and use the following parts:
 114955 Clip on end of cord
 117057 Cord (3 feet)
 119087 Ring for dial cord
 505161 Tension spring

REAR OF CHASSIS

NOTE A: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.

NOTE B: Oscillation may occur when meter probe contacts this tube pin. In that event, the vacuum tube voltmeter measurement will be approximately -4.5 volts.

BROADCAST BAND --"AM"--ALIGNMENT PROCEDURE

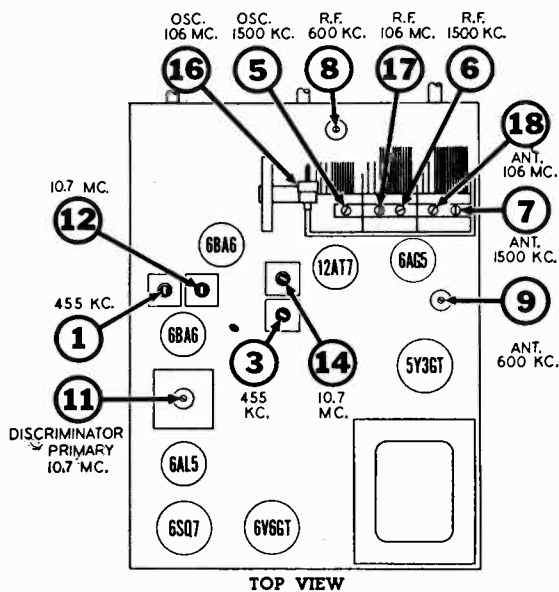
1. Disconnect leads from FM-AM antenna terminal strip (labeled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis and speaker. If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.
2. Stand chassis on one edge so that all trimmers are accessible.
3. Loop antenna leads (on cabinet) do not have to be connected to terminal strip on chassis while I. F. stages are being aligned. Before starting alignment of Ant., R.F., and Osc. stages, reconnect all antenna leads to chassis—do not attempt to use extension leads; place chassis as close as re-

- quired to cabinet so that connections may be made direct to antenna terminal strip at back.
4. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.
5. Connect on output meter across speaker voice coil, or from plate of 6V6GT tube to chassis through a 0.1 Mfd. condenser.
6. Connect ground lead of signal generator to the receiver chassis.
7. Set volume control of maximum volume position and use a weak signal from the signal generator.

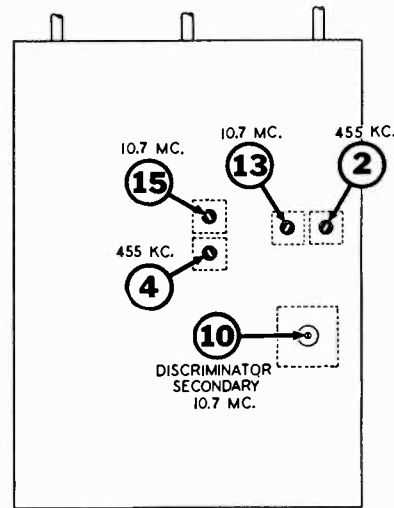
DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Lug on trimmer No. 6 at top of gang (see figure below for location of trimmer).	455 KC	AM Broadcast (Middle)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
260 MMFD. Mica Condenser	External Antenna Clip on Cabinet	1500 KC	AM Broadcast (Middle)	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
260 MMFD. Mica Condenser	External Antenna Clip on Cabinet	1500 KC	AM Broadcast (Middle)	Tune to 1500 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
					7	Broadcast Antenna	Adjust for maximum output.
260 MMFD. Mica Condenser	External Antenna Clip on Cabinet	600 KC	AM Broadcast (Middle)	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast R.F. Coil.	Adjust for maximum output.
					9	Adjustable core of Broadcast Antenna Coll.	Adjust for maximum output.

Repeat adjustment of trimmers 6 & 7 and slugs 8 & 9 until one no longer detunes the other.

NOTE: It is preferable to check the alignment of the I.F. stages in the FM channel after completing AM alignment.



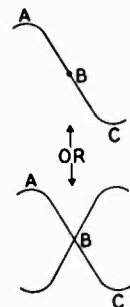
TOP VIEW



BOTTOM VIEW

Fig. 1 TRIMMER LOCATION CHART

This single "S" curve pattern results when scope uses properly phased "sine wave" horizontal deflection voltage.



This double "S" curve pattern results when scope uses properly phased "Sawtooth" horizontal deflection voltage whose frequency is twice the modulation frequency of signal generator.

FIG. 2

MODEL D1952

**FREQUENCY MODULATION—"FM"—ALIGNMENT PROCEDURE
(USING A VACUUM TUBE VOLTMETER AND AM SIGNAL GENERATOR)**

INSTRUMENTS: Although it is preferable to use an FM generator and an oscilloscope, reasonably accurate alignment is obtainable when using a conventional AM generator and vacuum tube voltmeter providing proper care is exercised in adjusting the discriminator circuit trimmer.

IMPORTANT: When using an AM signal generator, it should be capable of producing fundamental frequencies of 10.7 MC and 88 to 108 MC — avoid using an AM generator which produces signals in the 88 to 108 MC range by using harmonics higher than the second. Generators which are dependent upon third, fourth or fifth harmonics for output frequencies of 88 to 108 MC will generally produce undesirable spurious beat signals with the local oscillator in the receiver and alignment will be exceedingly difficult.

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in chart below (AM alignment procedure is given on the preceding page).

2. Disconnect leads from FM-AM aerial terminal strip (labelled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis and speaker. If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 88 on the dial. If it is set incorrectly, hold tuning shaft steady and reposition pointer.
4. A specific setting of the receiver volume control is not required. However, it will be found convenient to leave it in the maximum volume position so that alignment signals will be audible even though the output indication is obtained by a V-T voltmeter connected to points in the discriminator circuit.
5. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
6. Set band switch to the FM (extreme counter-clockwise) position.

SIGNAL GENERATOR CONNECTIONS	FREQUENCY & TYPE OF MODULATION	VACUUM TUBE VOLTMETER CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
Connect high side in series with an .01 Mfd condenser to lug on trimmer No. 17 at top of gang (see illustration on page 8 for location of trimmer). Connect ground lead to receiver chassis in vicinity of 12AT7 tube.	10.7 MC AM signal may be 400 cycle modulated.	Connect common (or ground) terminal of meter to receiver chassis. D.C. probe lead of meter is then connected to pin No. 7 of the 6AL5 tube.	Any position where it does not affect the signal.	11	Discriminator Primary	Adjust these trimmers for maximum meter reading—the output voltage will be of negative polarity.
				12 and 13	2nd I.F.	
				14 and 15	1st I.F.	
Same as above	Same as above	Connect common (or ground) terminal of V-T voltmeter to the junction of resistors 87 and 88 in the discriminator circuit. D.C. probe lead of meter is then connected to junction of resistor No. 67 (18,000 ohms) and condenser No. 70 (.003 MFD.) which are in the discriminator output circuit. Set meter for operation on its lowest D.C. voltage range.	Same as above	10	Discriminator Secondary	Note that as trimmer No. 10 is rotated a point will be found where voltmeter will swing from a positive to a negative reading or vice versa. Correct setting of trimmer No. 10 is obtained when meter reads zero as trimmer is moved through this point. The adjustment is somewhat critical and considerable care must be exercised to set the trimmer for a zero meter indication.

Recheck adjustment of trimmers No. 10 and No. 11 to be sure that both are set as accurately as possible to obtain the specified output indication.

Connect generator "high" side in series with a 300 ohm carbon resistor to end terminal marked "FM" on strip at back of chassis. Generator ground lead must connect to next terminal marked "GND".	106 MC AM signal may be 400 cycle modulated.	Connect common (or ground) terminal of meter to receiver chassis. D.C. probe lead of meter is then connected to Pin No. 7 of the 6AL5 tube.	106 MC	16	Oscillator Trimmer	Set trimmer No. 16 to receive 106 MC. signal as indicated by maximum meter reading. IMPORTANT: It will be noted that there are two different settings of trimmer No. 16 at which the 106 MC. signal will be received—always select the trimmer setting which is nearest to the low capacity end of its range.
Same as above	Same as above	Same as above	Tune to 106 MC. generator signal.	17	R.F. Trimmer	Adjust trimmer No. 17 for maximum meter reading.
				18	Antenna Trimmer	Adjust trimmer No. 18 for maximum meter reading.
				14 and 15	1st I.F.	Recheck adjustment of these trimmers for maximum meter reading.

Check calibration and tracking of receiver with input signals of 90 and 98 MC. If difference between dial pointer setting and 90 or 98 MC. calibration mark does not exceed ± 0.3 MC. and antenna and R.F. circuits are tracking properly, then alignment may be considered satisfactory and no further adjustment is necessary. Where the calibration error is greater than ± 0.3 MC. it is advisable to make the following adjustments:

1. If pointer falls above the 90 MC. calibration point, it will be necessary to slightly spread the windings of the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16, 17 and 18 at 106 MC. Should it be found impossible to obtain the 106 MC. signal at the proper point on the dial by adjust-

ment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.

2. If pointer falls below the 90 MC. calibration point, it will be necessary to push the windings together on the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16, 17 and 18 at 106 MC. Should it be found impossible to obtain the 106 MC. signal at the proper point on the dial by adjustment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.
3. Correction for mistracking of antenna and R.F. may be accomplished by adjusting coil turns and gang plate spacing in the same manner as outlined above for the oscillator stage.

FREQUENCY MODULATION—"FM"—ALIGNMENT PROCEDURE (USING AN OSCILLOSCOPE AND FM "SWEEP" GENERATOR)

INSTRUMENTS: Alignment of the FM circuits in this receiver can be most conveniently accomplished with an FM signal generator. When using this type generator, the output indicator must be an oscilloscope.

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in chart below (AM alignment procedure is given on page 8).
2. Disconnect leads from FM-AM aerial terminal strip (labelled FM-FM-AM-AM) at back of chassis; also disconnect speaker leads and phono plugs. Remove chassis and speaker. (If desired, allow speaker to remain in cabinet and connect to receiver by extension leads.)
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 88 on the dial.

If it is set incorrectly, hold tuning shaft steady and reposition pointer.

4. A specific setting of the receiver volume control is not required, however, it will be found convenient to leave it in the maximum volume position so that alignment signals will be audible even though the output indication is obtained by an oscilloscope connected to points in the discriminator circuit.
5. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
6. Set band switch to the FM (extreme counter-clockwise) position.
7. Set tone control to fully counter-clockwise position.

SIGNAL GENERATOR CONNECTIONS	FREQUENCY & TYPE OF MODULATION	OSCILLOSCOPE CONNECTIONS	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
Connect high side in series with an .01 Mfd condenser to lug on trimmer No. 17 at top of gang (see illustration on page 8 for location of trimmer). Connect ground lead to receiver chassis in vicinity of 12A7 tube.	10.7 MC FM signal should preferably be modulated ± 400 KC.	Connect vertical amplifier "high" lead to junction of resistor No. 67 (18,000 ohms) and condenser No. 70 (.003 Mfd.) which are in discriminator output circuit. Connect scope ground lead to receiver chassis. Set vertical amplifier of scope for maximum amplification. Where FM signal generator provides an output voltage for synchronization, connect this voltage to "sync" terminals of the scope.	Any position where it does not affect the signal.	10	Discriminator Secondary	Before attempting to adjust trimmer No. 10, set trimmers No. 11, 12, 13, 14 and No. 15 to approximately maximum sound output from the speaker (output meter not required). This is done to obtain sufficient signal for an oscilloscope pattern of desirable amplitude when making the following discriminator trimmer adjustment. Adjust setting of trimmer No. 10 until a pattern similar to that shown in Fig. 2 appears on the screen. If pattern does not remain stationary operate sweep frequency control on scope and also "sync" control until desired result is obtained. Correct setting of trimmer No. 10 is obtained when crossover point "B" (Fig. 2) is centrally located in both the horizontal and vertical directions; in addition that portion of the curve between "A" and "C" should be as linear (straight) as possible.
				11	Discriminator Primary	Adjust these trimmers for maximum amplitude and steepness of that portion of the pattern between "A" and "C" (see Fig. 2).
				12 and 13	2nd I.F.	
Same as above	Same as above	Same as above	Same as above	14 and 15	1st I.F.	
Recheck adjustments of trimmers No. 10 and No. 11 to be sure that both are set as accurately as possible to obtain correct cross-over point or symmetry of pattern.						
Connect generator "high" side in series with a 300 ohm carbon resistor to end terminal marked "FM" on strip at back of chassis. Generator ground lead must connect to next terminal marked "GND".	106 MC FM signal should preferably be modulated ± 400 KC.	Same as above	106 MC	16	Oscillator Trimmer	Adjust trimmer No. 16 to obtain the symmetrical pattern shown in Fig. 2. Correct setting of trimmer No. 16 is obtained when cross-over point in pattern is centrally located. IMPORTANT: It will be noted that there are two different settings of trimmer No. 16 at which the desired scope pattern can be obtained always select the trimmer setting which is nearest to the low capacity end of its range.
				17	R.F. Trimmer	Adjust trimmer No. 17 for maximum amplitude of pattern.
				18	Antenna Trimmer	Adjust trimmer No. 18 for maximum amplitude of pattern.
Same as above	Same as above	Same as above	Tune to 106 MC. generator signal.	14 and 15	1st I.F.	Recheck adjustment of these trimmers for maximum amplitude of pattern.

Check calibration and tracking of receiver with input signals of 90 and 98 MC. If difference between dial pointer setting and 90 or 98 MC. calibration mark does not exceed ± 0.3 MC. and antenna and R.F. circuits are tracking properly, then alignment may be considered satisfactory and no further adjustment is necessary.

Where the calibration error is greater than ± 0.3 MC. it is advisable to make the following adjustments:

1. If pointer falls above the 90 MC. calibration point, it will be necessary to slightly spread the windings of the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16, 17 and 18 at 106 MC. Should it be found impossible to obtain the 106 MC. signal at the proper point on the dial by adjustment

of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.

2. If pointer falls below the 90 MC. calibration point, it will be necessary to push the windings together on the FM oscillator coil. Then repeat the two preceding adjustments of trimmers 16, 17 and 18 at 106 MC. Should it be found impossible to obtain the 106 MC. signal at the proper point on the dial by adjustment of the trimmers it will then be necessary to adjust the spacing of the gang condenser plates.
3. Correction for mistracking of antenna and R.F. may be accomplished by adjusting coil turns and gang plate spacing in the same manner.

Instructions for Using Your RADIO - ALARM CLOCK Combination Receiver

This skillfully designed and carefully constructed combination will give you long and enjoyable service. This Receiver can perform the following services for the user:

1. Provide accurate time.
2. Receive broadcast programs being transmitted and within range—at any time.
3. Turn off radio program at will of user up to 60 minute interval or less.
4. Turn on radio program for awakening.
5. Turn buzzer Alarm on 10 minutes after Radio starts playing.
6. Turn on buzzer Alarm for awakening—with Radio silenced.

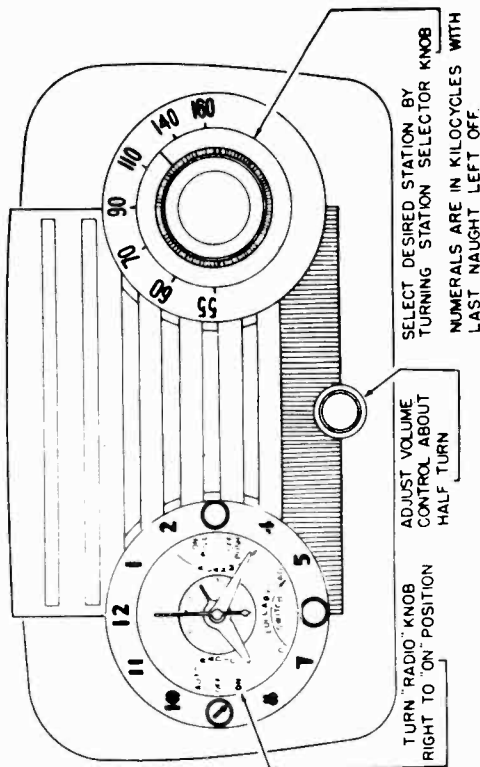
INSTALLATION—Check the voltage and cycles of the electric power supplied to your home. This combination will operate **ONLY** on 60 cycle alternating current (a-c), from 105 to 125 volts. **THIS SET WILL NOT OPERATE ON ANY OTHER TYPE OF CURRENT OR CYCLES.** Your electric company will help you make certain that you have the correct kind of power.

This combination includes a sensitive five multi-purpose tube super-heterodyne radio including a rectifier tube. Your radio has a self contained duro-loop antenna capable of supplying sufficient volume in areas of normal reception. If you live in an area where radio reception is poor, you can improve the performance by connecting an outside antenna to the screw marked EXT. ANT. which you will find on the right hand side of the rear of the cabinet.

1. TO SET THE CLOCK

Your self-starting TELECHRON movement will begin operating when the set is plugged into the proper outlet and your sweep second hand begins to rotate. Set the correct time by means of the small knob at the right REAR of the cabinet. Turn **ONLY** in the direction shown on the back cover.

2. TO TURN ON RADIO MANUALLY

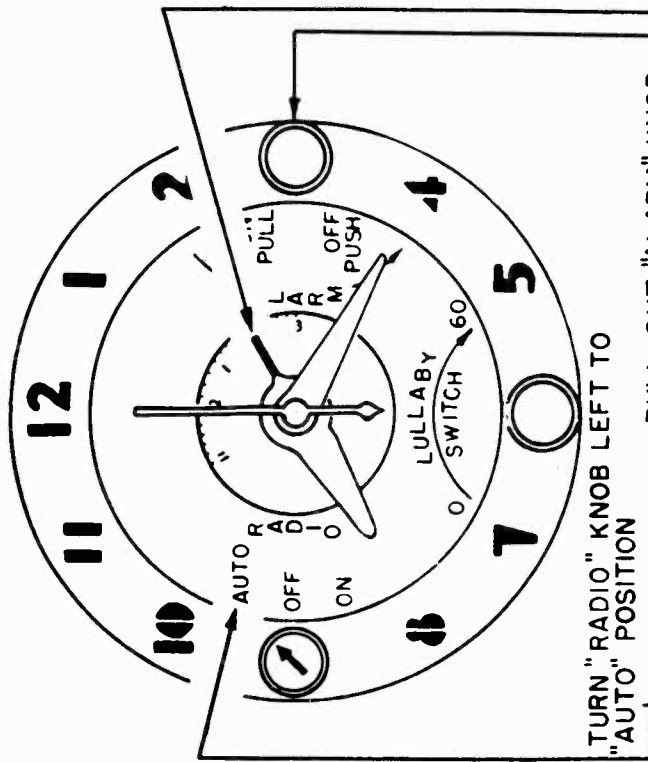


MODEL D2014

4.

TO AWAKE TO MUSIC

Select station and adjust volume to level sufficient to awaken you (as indicated in Illustration 2)

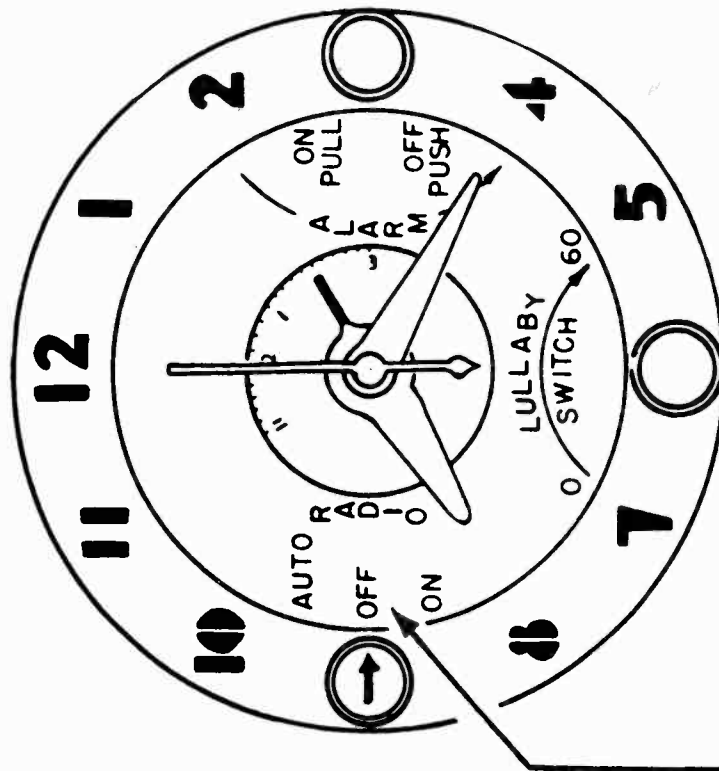


PULL OUT "ALARM" KNOB AND TURN IN COUNTER CLOCKWISE (ARROW) DIRECTION UNTIL POINTER IS OVER HOUR FIGURE AND MINUTE MARKS DESIRED FOR AWAKENING

THIS TIME SETTING MAY BE 11 HOURS IN ADVANCE OR LESS. AFTER HAVING SET AWAKENING HOUR PUSH IN "ALARM" KNOB.

3.

TO TURN OFF RADIO MANUALLY

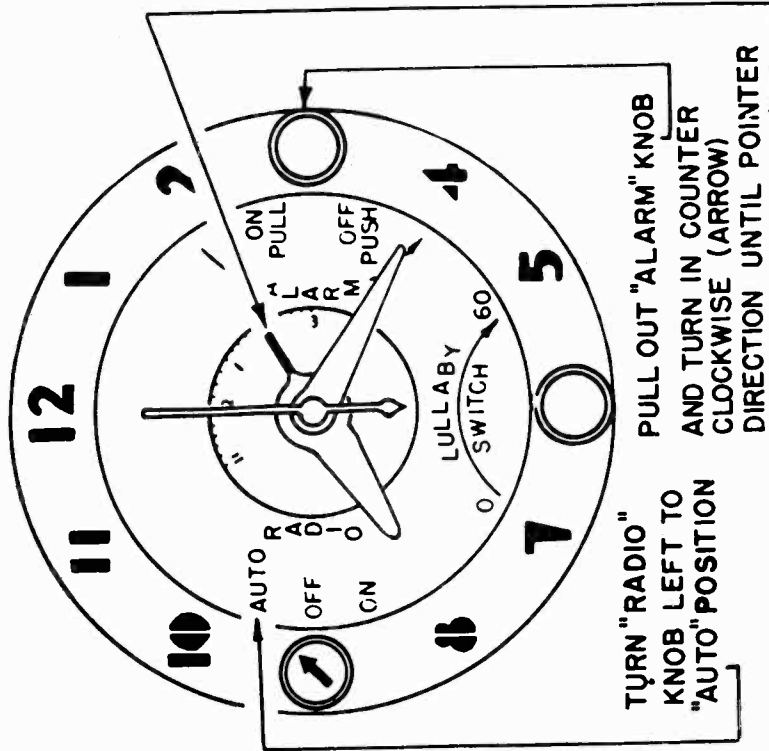


TURN "RADIO" KNOB LEFT TO "OFF"

6.

TO AWAKE TO MUSIC AND BUZZER ALARM

Select station and adjust volume to level sufficient to awaken you (as indicated in Illustration 2)



TURN "RADIO" KNOB LEFT TO "OFF" POSITION

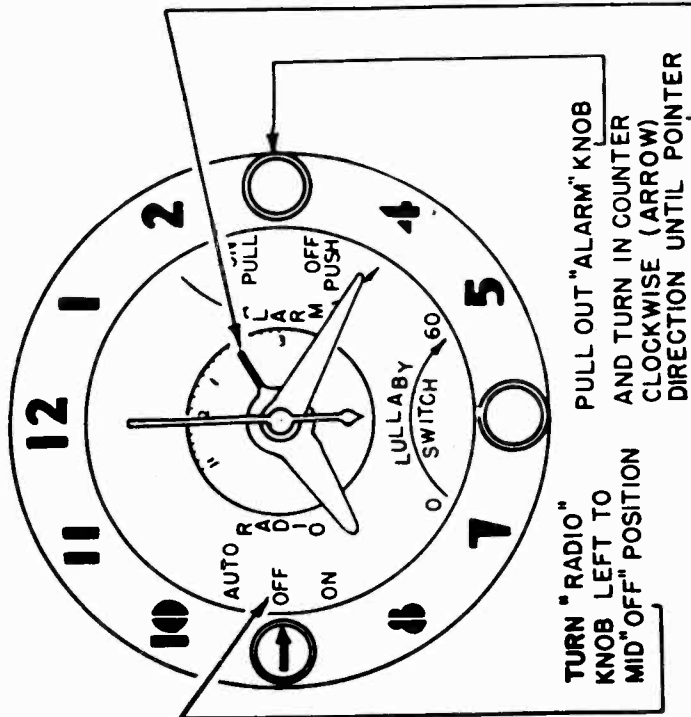
PULL OUT "ALARM" KNOB AND TURN IN COUNTER CLOCKWISE (ARROW) DIRECTION UNTIL POINTER IS OVER HOUR FIGURE AND MINUTE MARKS DESIRED FOR AWAKENING.

THIS TIME SETTING MAY BE 11 HOURS IN ADVANCE OR LESS.

Buzzer sounds as a reminder approximately 10 minutes after radio comes on. To shut off buzzer push in "Alarm" Knob.

5.

TO AWAKE TO BUZZER ALARM



TURN "RADIO" KNOB LEFT TO "MID-OFF" POSITION

PULL OUT "ALARM" KNOB AND TURN IN COUNTER CLOCKWISE (ARROW) DIRECTION UNTIL POINTER IS SET TEN MINUTES AHEAD OF HOUR FIGURE AND MINUTE MARKS DESIRED FOR AWAKENING

THIS TIME SETTING MAY BE 11 HOURS IN ADVANCE OR LESS.

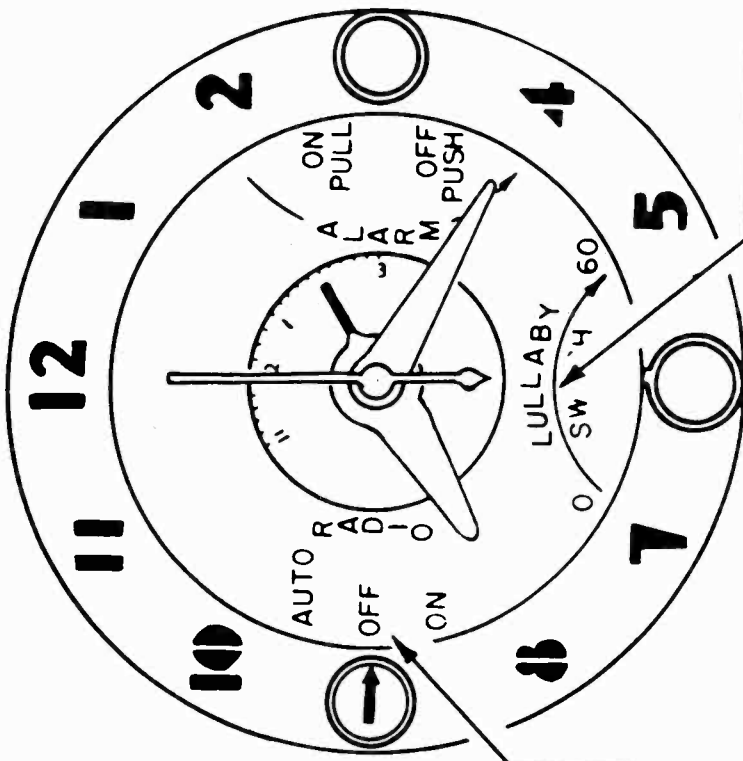
FOR EXAMPLE -- SHOULD YOU DESIRE TO AWAKEN AT 7, SET ALARM POINTER TO 6:50

TO SHUT OFF BUZZER PUSH IN "ALARM" KNOB

MODEL D2014

7. TO TURN RADIO OFF AUTOMATICALLY WHEN RETIRING

This receiver can be adjusted to play for a period of 60 or fewer minutes before retirement if desired by the listener.



TURN "RADIO" KNOB TO MID "OFF" POSITION

TURN LULLABY KNOB CLOCKWISE (TO RIGHT) FOR PLAYING TIME DESIRED. ESTIMATE TIME BETWEEN 0 AND 60 MARKS ALONG ARROW

8.—To Turn Radio Off Automatically When Retiring and Awaken to Music

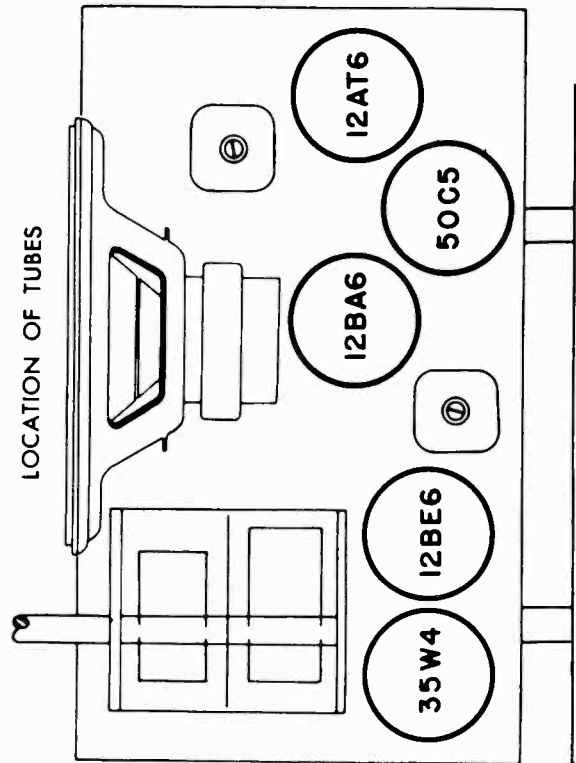
Set "Radio" Control as in Illustration 4,
Set "Lullaby" Knob as in Illustration 7.

9.—To Turn Radio Off Automatically When Retiring and Awaken to Buzzer Alarm

Set Controls as in Illustration 5.
Set "Lullaby" Knob as in Illustration 7.

10.—To Turn Radio Off Automatically When Retiring, Awaken to Music and Buzzer Alarm

Set "Radio" Control as in Illustration 6.
Set "Lullaby" Knob as in Illustration 7.



ALIGNMENT PROCEDURE

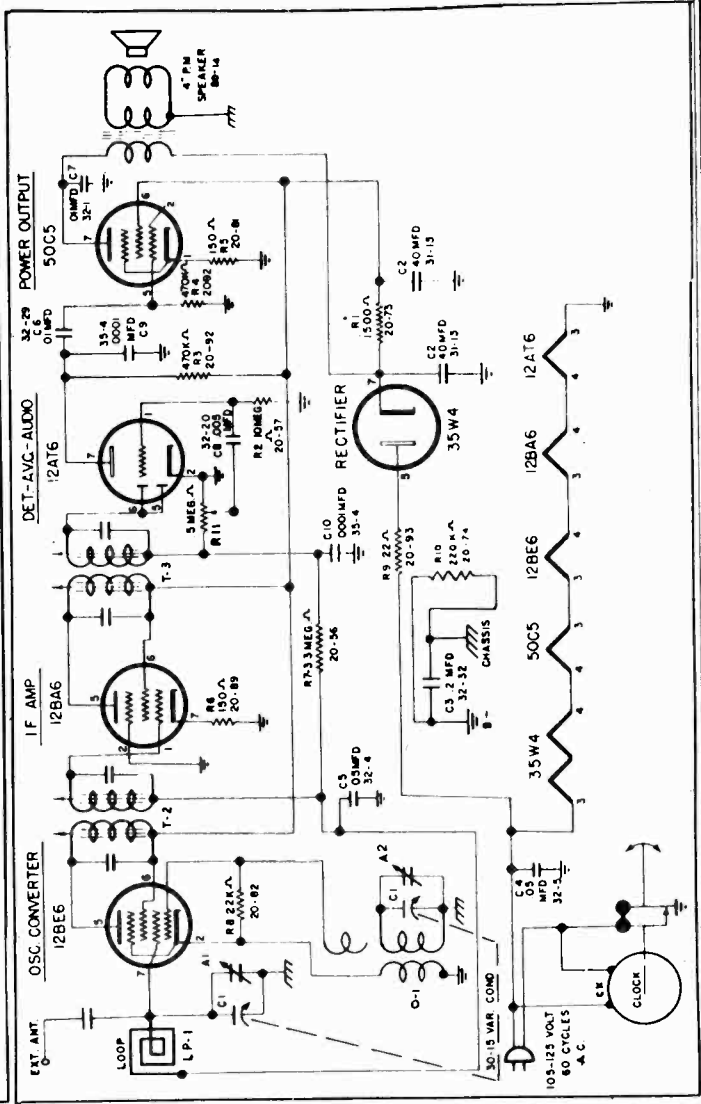
- Output meter across voice coil (3.2 ohm)
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 1.28 volts (0.5 watt).

SIGNAL GENERATOR		Connections to Receiver	Ground Connection	TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor				
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

* Seven markings on the dial bracket represent respectively 550 kc, 600 kc, 700 kc, 800 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.

REPLACEMENT PARTS LIST

Ref. No.	Part No.	DESCRIPTION
CAPACITATORS		
C1	30-15	Variable Condenser, 2 gang
C2	31-13	40 mfd.—40 mfd., 150 volt dual electrolytic condenser
C3	32-32	.2 mfd., 200 volt, paper
C4	32-5	.05 mfd., 400 volt, paper
C5	32-4	.05 mfd., 200 volt, paper
C6	32-1	.01 mfd., 400 volt, paper
C7	32-1	.01 mfd., 400 volt, paper
C8	32-20	.005 mfd., 600 volt, paper
C9	35-4	.0001 mfd., 500 volt, mica
C10	35-4	.0001 mfd., 500 volt, mica
RESISTORS		
R1	20-73	1500 ohm, 1 watt 20%
R2	20-57	10 megohm, 1/4 watt 20%
R3	20-92	470,000 ohm, 1/4 watt 20%
R4	20-92	470,000 ohm, 1/4 watt 20%
R5	20-81	150 ohm, 1/2 watt 20%
R6	20-89	150 ohm, 1/4 watt 20%
R7	20-56	3.3 megohm, 1/4 watt 20%
R8	20-82	22,000 ohm, 1/4 watt 20%
R9	20-93	22 ohm, 1/2 watt 20%
R10	20-74	220,000 ohm, 1/4 watt 20%
R11	50-15B	1/2 meg. volume control with switch
COILS AND TRANSFORMERS		
O-1	60-9	Oscillator coil
T-2	61-11	Input IF transformer
T-3	61-11	Output IF transformer
LP-1	62-15	Loop antenna
MISCELLANEOUS		
80-14	80-14	4 inch P.M. speaker with output transformer
122-19	122-19	Selector knob
122-15	122-15	Volume knob
120-33	120-33	Cabinet—walnut
140-6	140-6	Clock



MODEL D2025A

MODEL D2025A

TONE CONTROL

ON-OFF SWITCH AND
VOLUME CONTROL

TUNING KNOB

BAND AND PHONO
RADIO SWITCH**CHECK YOUR LINE VOLTAGE**

Unless otherwise marked this radio must be operated on a supply of 105-125 volts AC, 50 to 60 cycles only. Do not connect the radio to a wall outlet unless certain that the power supply is correct for the receiver. If in doubt, telephone your local power company before inserting the plug. Radios of this model which are to be used on other power supplies are marked accordingly.

NOTE: An external ground should not be used at any time.

IF THE RADIO FAILS TO OPERATE SATISFACTORILY

Recheck the foregoing instructions. If the radio still does not appear to operate satisfactorily, proceed as follows:

FIRST—Check Power Supply. Be sure there is power at the convenience outlet to which the radio is connected. To determine this, connect a lamp to the outlet and see whether or not the lamp lights.

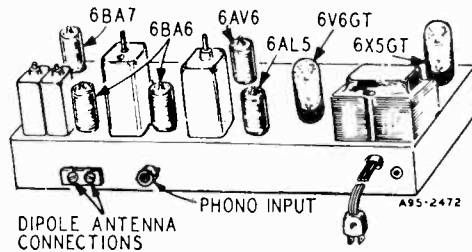
Check the voltage and frequency of the power supply with that shown on the power rating label on the radio. If there is any doubt concerning the power supply, withdraw the plug from the outlet and consult the local power company before reinserting the plug.

SECOND — Check Tube Positions. See that the tubes are in the correct sockets as shown in the illustration.

Make certain that the tubes are operating. (Glass tubes will light very dimly).

THIRD — Check Antenna. If an outside antenna is being used, inspect the antenna system to see that it is in good condition and not grounded at any point.

FOURTH—Test Tubes. Remove the tubes from the radio, take them to your local radio dealer and have them tested either by means of a tube tester or by inserting them in a radio that is operating satisfactorily.

GENERAL INFORMATION**TUBES AND DIAL LAMP**

The type designation of each tube is stamped on the tube and the radio chassis base. The correct positions in which the tubes must be installed are shown in the tube position illustration.

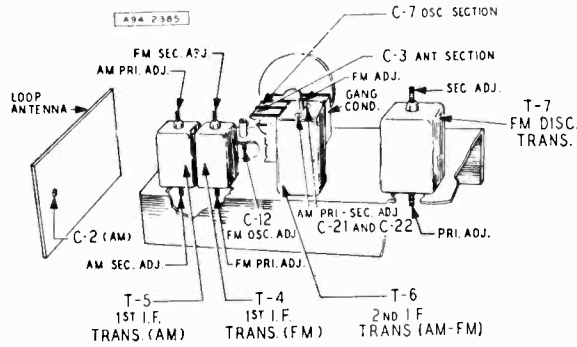
The tubes in the radio should be checked periodically by taking them out and having them tested. To reach the tubes for servicing, remove the cabinet back from the rear of the receiver. See instructions on cabinet back.

When replacing the tubes, be sure that they are inserted in the proper sockets. To install a tube, insert the center guide pin into the center hole of the tube socket and turn the tube until the key drops into position. Then push the tube down until it is held firmly in the socket. All tubes must be in their sockets to operate the radio. Use only No. 47 dial lamps.

Refasten the cabinet back in place before operating the radio.

FAULTY FM RECEPTION

The requirements for FM reception are more critical than for Standard band broadcast or short wave reception. This includes the area in which the receiver is located, the type of antenna used, the distance the receiver is located from the station to be received and other factors not encountered in Standard band broadcast reception. It is to be noted that reception in the high frequency FM band is usually limited to "line of sight" distances or up to about 45 miles. Also tall buildings or other structures between the transmitter and the receiver may be found to affect reception. Reception under these conditions will sometimes be helped by the addition of an external folded dipole antenna with a 300 ohm line lead-in. Information concerning this is given in the Antenna paragraph.

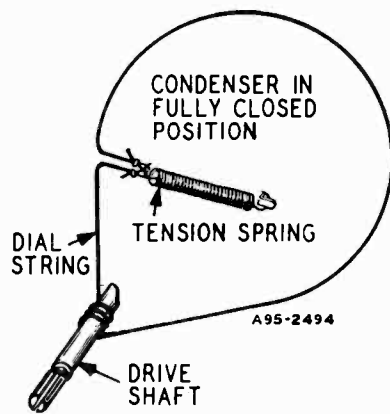


ELECTRICAL SPECIFICATIONS

- Power Consumption—
117 volts AC—35 watts
- Power Output—
1.5 watts maximum
.9 watts 10% distortion
- Speaker—5¼ inch PM dynamic
- Frequency Ranges—
Broadcast 540-1600 KC
Frequency modulation 88-108 MC
- Intermediate Frequency—
AM 455 KC — FM 10.7 MC
- Selectivity — AM — 60 KC broad
at 1000 times signal, measured
at 1000 KC
I.F. FM—200 KC broad at 2 times
down
I.F. FM—700 KC broad at 200
times down
- AM Sensitivity—(For .5 watt output
with external antenna)
10 microvolts average
- FM Sensitivity—(For .5 watt output)
100 microvolts average

DRIVE CORD REPLACEMENT

Replacement of the drive cord may be accomplished as shown in the illustration. For this purpose use the new drive cord assembly listed in the Replacement Parts List. Turn the gang condenser until the plates are fully meshed. Then install the string as shown, winding three turns counter-clockwise around the tuning shaft with the turns progressing away from the chassis. After the cord is installed, rotate the tuning shaft several times in order to take up any slack in the cord.



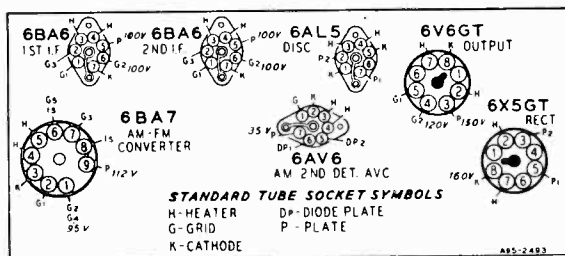
RECORD PLAYER AND TELEVISION SOUND CONNECTIONS

For models not equipped with built-in record player, a socket marked PHONO is provided on the back of the chassis for connections to an external record player or automatic record changer. When it is desired to play records through the radio, insert the connector on the cable of any standard record player into this socket. Turn the phono-radio switch to the phono position and use the volume control to adjust the sound level.

When television programs become available in your community, the audio amplifier and speaker of this radio may be used in conjunction with a Television Picture Receiver and sound converter to reproduce the sound portion of the television programs. Simply insert the connector on the cable of the Television Converter into the socket marked PHONO and operate the receiver in the same manner as described in the foregoing paragraph.

TUBE SOCKET VOLTAGES

Socket voltages are shown on the Bottom Socket diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:



- Line voltage117 Volts AC
- Signal InputNone
- A Variation of ±10% is usually permissible.

ALIGNMENT PROCEDURES

AM STAGES

Volume Control Maximum all Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following is required for aligning:

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 Antennas — .1 mf, and 50 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	CONNECTION AT RADIO	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TUNING SLUGS AND TRIMMERS
455 KC	Control Grid 1st 6BA6 Pin No. 1	Chassis Base	.1 mf	Turn Rotor to Full Open	2nd I.F. C-21 & C-22
455 KC	Control Grid 6BA7 Pin No. 7 1st Det.	Same as above	.1 mf	Turn Rotor to Full Open	1st I.F. Pri. & Sec.
1620 KC	Control Grid 6BA7 Pin No. 7	Same as above	.1 mf	Turn Rotor to Full Open	Oscillator C-7
1400 KC	External Antenna Clip	Same as above	50 mmf	Turn Dial to 1400 KC. See Note A	Antenna C-2

NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

FM STAGES

Allow chassis and signal generator to warm up for several minutes.

The following equipment is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.

Non-metallic screwdriver.

Dummy Antennas and I-F Loading Resistor—2500 mmf, 300 ohms and a 3300 ohm .5 watt resistor with short leads.

Zero center scale DC vacuum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.)

SIGNAL GENERATOR						
	FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUSTMENT FOR MAX. METER DEFLECTION
Discriminator	10.7 MC	6BA6 2nd I-F Pin 1 & Chassis	2500 mmf	FM	Rotor Fully Open	Disc. Pri. Note A
	10.7 MC	Same as above	2500 mmf	FM	Rotor Fully Open	Disc. Sec. Note B
	10.7 MC	Same as above	2500 mmf	FM	Rotor Fully Open	Disc. Pri. Note A
	10.7 MC	Same as above	2500 mmf	FM	Rotor Fully Open	Disc. Sec. Note B
I-F	10.7 MC Note E	6BA6 1st I-F Pin 1 & Chassis	2500 mmf	FM	Rotor Fully Open	2nd I-F Note C
Discriminator	10.7 MC	6BA6 2nd I-F Pin 1 & Chassis	2500 mmf	FM	Rotor Fully Open	Disc. Pri. Note A
I-F	10.7 MC	Antenna and Chassis	2500 mmf	FM	Rotor Fully Open	1st. I-F Pri. and Sec. and Note C
	10.7 MC	Antenna and Chassis Solder a 3300 ohm resistor across terminals 3 and 4 of 1st. I-F trans.	2500 mmf	FM	Rotor Fully Open	1st. I-F Pri. Note C
	10.7 MC	Antenna and Chassis Note D	2500 mmf	FM	Rotor Fully Open	1st. I-F Sec. Note C

RECHECK I-F ADJUSTMENTS IN ORDER GIVEN

Oscillator	108.4 Note F	Disconnect hank antenna and connect generator to dipole terminals with resistor in series	300 ohms	FM	Rotor Fully Open	Osc. C-12
Antenna	104.5	Same as above	300 ohms	FM	Tune rotor for max. AVC voltage	Ant. C-3

RECHECK ANTENNA & OSC. ADJUSTMENTS IN ORDER GIVEN

FM ALIGNMENT NOTES

NOTE A—The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the AVC line. A signal of .1 volt must be fed into the receiver for this adjustment.

Note output voltage on the zero center DC vacuum tube voltmeter.

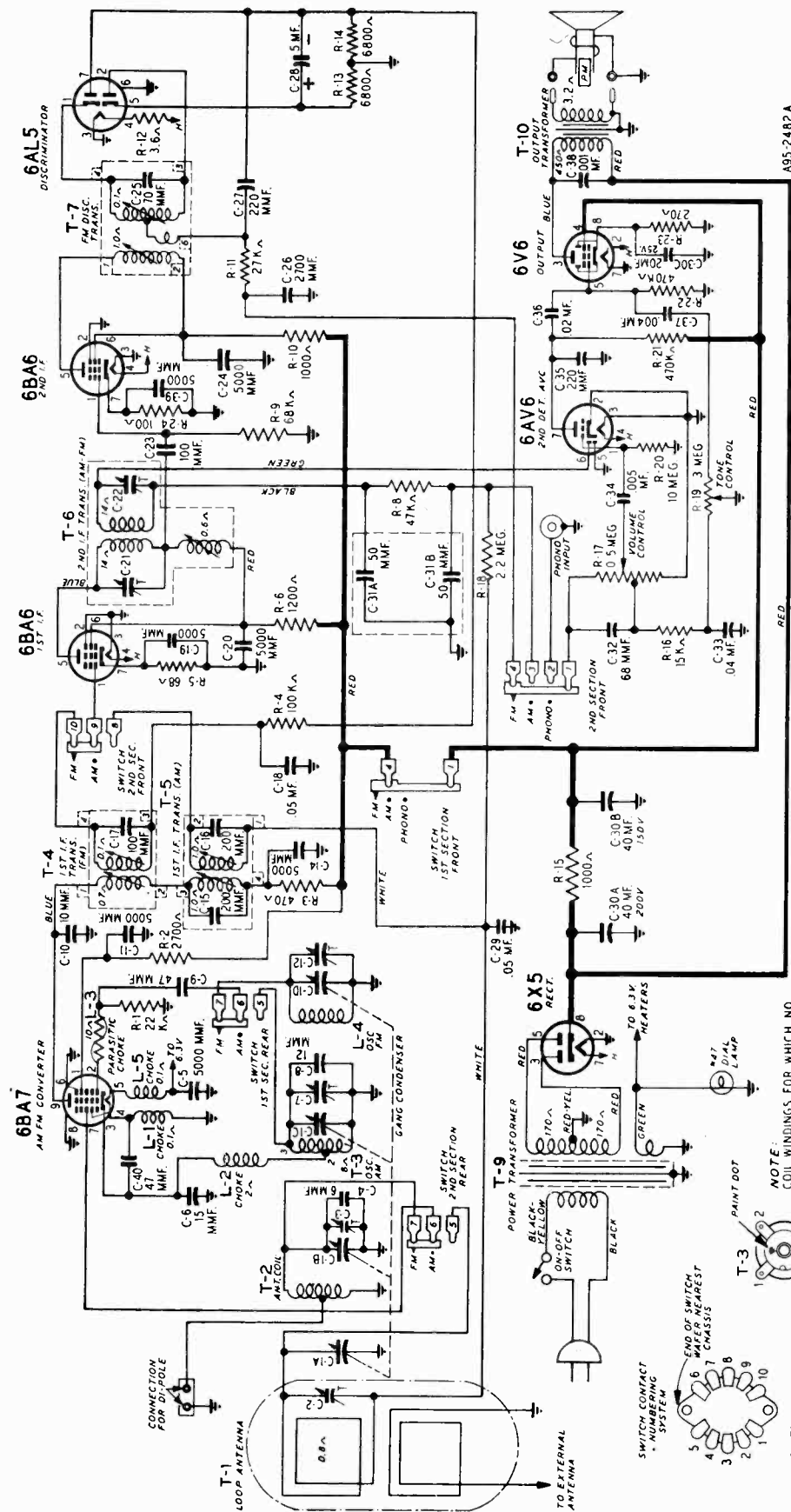
NOTE B—Disconnect zero center DC vacuum tube voltmeter from AVC and connect it to the audio takeoff point at the 27 K ohm resistor (R-11) and its junction with the terminal strip. Adjust for zero voltage indication.

NOTE C—Connect zero center DC vacuum tube voltmeter as in Note A. Adjust input to give same output on the zero center DC vacuum tube voltmeter as in Note A.

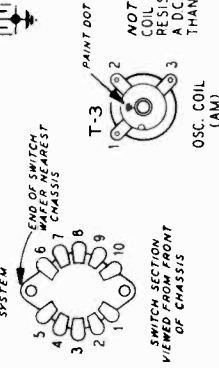
NOTE D—Unsolder 3300 ohm resistor from terminals 3 and 4 of 1st I-F transformer and resolder across terminals 1 and 2.

NOTE E—2nd I-F Trimmers (AM) must be aligned before attempting to adjust 2nd I-F (FM) tuning slug.

NOTE F—Remove the 3300 ohm load resistor before attempting to check the antenna and oscillator adjustments.



NOTE: COIL WINDINGS FOR WHICH NO RESISTANCES ARE SHOWN HAVE A DC RESISTANCE OF LESS THAN 0.1 Ω .



MODEL D2025A

REPLACEMENT PARTS LIST

NOTICE: There is a model number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information on this label.

MISCELLANEOUS

12A494	5 1/4" P.M. Speaker	.....
4X1055	Escutcheon	.....
10A734	Knob	.....
13X546	Line Cord & Plug Assembly	.....
2A375	Band Change Switch	.....
3A303	Molded Octal Tube Socket	.....
3A305	Phono Socket	.....
3A426	Tube Socket (Miniature)	.....
3A443	Tube Socket (For 6BA7 Tube)	.....
14X466	Speaker Baffle	.....
14X467	Grille Cloth	.....
20X1551	Stud (Mtg. Speaker to Baffle)	.....
	Mahogany Cabinet No. 906	.....

CAPACITORS

C-1	14A208	Gang Condenser & Pulley	.....
C-2	17A256	2-24 mmf	Trimmer.....
C-3 } C-7 }	Part of C-1 (Gang Condenser)		
C-4	47X521	6 mmf	Ceramic.....
C-5 C-11 C-14 C-19 }	47X507	5000 mmf	Ceramic.....
C-20 C-24 C-39 }	47X552	15 mmf	Ceramic.....
C-6	47X522	12 mmf	Ceramic.....
C-8	47X517	47 mmf	Ceramic.....
C-9	47X512	10 mmf	Ceramic.....
C-10	17A255	1-8 mmf	Trimmer.....
C-12 } C-15 }	Part of T-5 (1st I-F Trans. AM)		
C-16 }	Part of T-4 (1st I-F Trans. FM)		
C-17 }	B66503	.05 mf	200 V Tubular.....
C-18 } C-29 }	Part of T-6 (2nd I-F Trans. AM-FM)		
C-21 }	47X476	100 mmf	Ceramic.....
C-22 }	Part of T-7 (FM-Disc. Trans.)		
C-23	47X492	2700 mmf	Molded Mica.....
C-25	47X468	220 mmf	Ceramic.....
C-26 } C-27 }	45X361	5 mf	100 V Dry Electrolytic
C-35 }	45X360	40 mf	200 V
C-28		40 mf	150 V Dry Electrolytic
C-30A }		20 mf	25 V
C-30B }	47X112	50-50 mmf	Dual Mica.....
C-30C }	47X471	68 mmf	Molded Mica.....
C-31A }	B66403	.04 mf	200 V Tubular.....
C-31B }	D66502	.005 mf	400 V Tubular.....
C-32	D66203	.02 mf	400 V Tubular.....
C-33	B66402	.004 mf	200 V Tubular.....
C-34	H66102	.001 mf	800 V Tubular.....
C-36	47X509	47 mmf	Ceramic.....
C-37			
C-38			
C-40			

RESISTORS

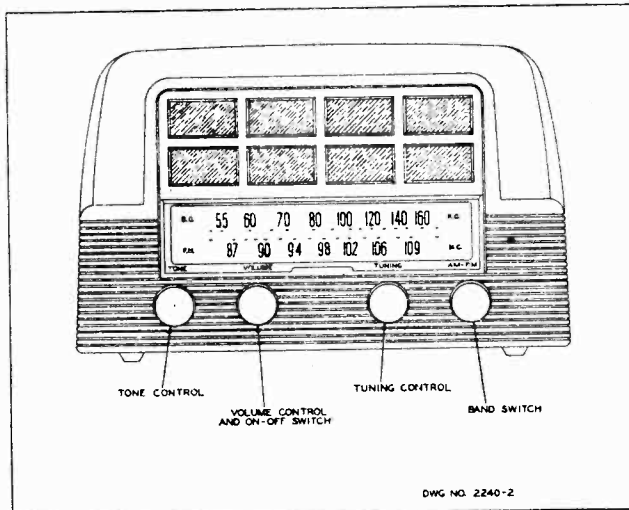
		Ohms	Watts	
R-1	B84223	22K	0.5	Carbon.....
R-2	B84272	2700	0.5	Carbon.....
R-3	B84471	470	0.5	Carbon.....
R-4	B85104	100K	0.5	Carbon.....
R-5	B83680	68	0.5	Carbon.....
R-6	B85122	1200	0.5	Carbon.....
R-8	B85473	47K	0.5	Carbon.....
R-9	B84683	68K	0.5	Carbon.....
R-10	B85102	1000	0.5	Carbon.....
R-11	B85273	27K	0.5	Carbon.....
R-12	43X233	3.6	0.5	Wirewound...
R-13 } R-14 }	B84682	6800	0.5	Carbon.....
R-15	D84102	1000	2.0	Carbon.....
R-16	B85153	15K	0.5	Carbon.....
R-17	36X372	.5 meg.		Volume Control & Switch
R-18	B85225	2.2 meg.	0.5	Carbon.....
R-19	40X285	3 meg.		Tone Control.
R-20	B85106	10 meg.	0.5	Carbon.....
R-21 } R-22 }	B85474	470K	0.5	Carbon.....
R-23	B84271	270	0.5	Carbon.....
R-24	B84101	100	0.5	Carbon.....

TRANSFORMERS AND COILS

L-1 }	9A2044	Filament Choke	.....
L-5 }	35A5	Insulated Choke 2 uh	.....
L-2	9A1940	Parasitic Choke	.....
L-3	9A2021	Oscillator Coil (FM)	.....
L-4	9A2046	"B" Range Loop Antenna	.....
T-1	9A1956	Antenna Coil	.....
T-2	9A1997	Oscillator Coil (AM)	.....
T-3	9A2037	1st I-F Trans. (FM)	.....
T-4	9A2038	1st I-F Trans. (AM)	.....
T-5	9A1999	2nd I-F Trans. (AM-FM)	.....
T-6	9A2036	Discriminator Coil Assembly	.....
T-7	53X291	Power Transformer	.....
T-9	51X144	Output Transformer	.....
T-10			

DIAL AND DRIVE ASSEMBLY

58X724	Dial Glass	.....
15X250	Pointer	.....
19X192	"C" Washer (Mtg. Drive Shaft)	.....
20X260	Condenser Cushions Stud	Mounting
		Gang
6X67	Rubber Grommet	Condenser
25X1636	Dial Bracket	.....
26X486	Drive Shaft	.....
28X113	Drive Cord Tension Spring	.....
7A103	No. 47 Pilot Light	.....
7A225	Pilot Light Socket Assembly	.....
10X71	Drive Cord Assembly	.....



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 $\frac{1}{4}$ 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.

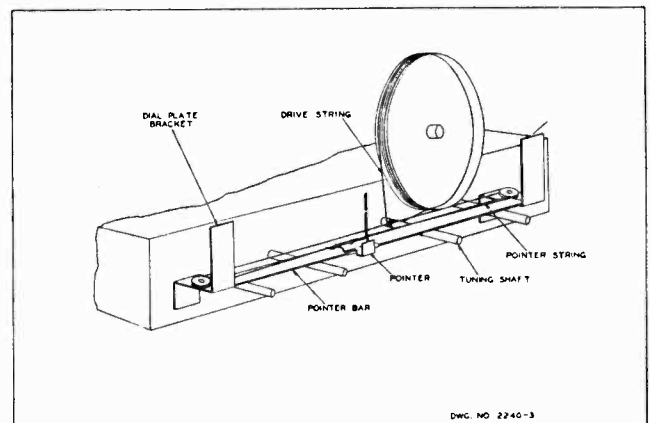
5. Pass around idler pulleys from front to rear and cross directly under drum pulley.

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 $\frac{1}{4}$ 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

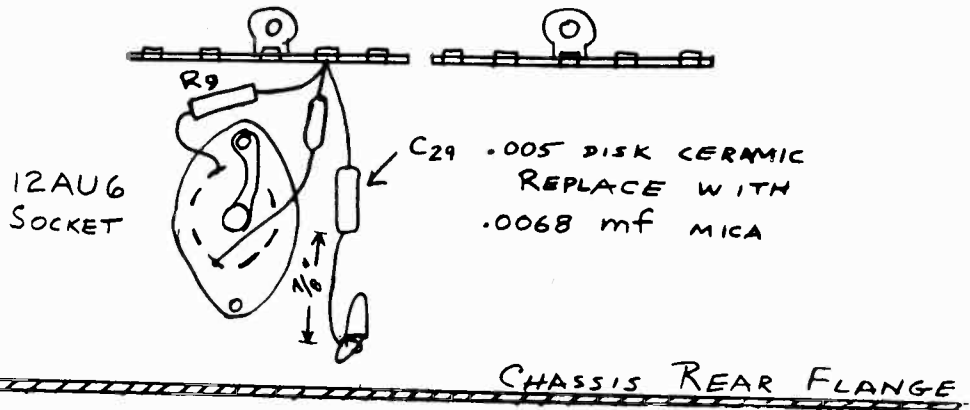
MODEL D2919

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.

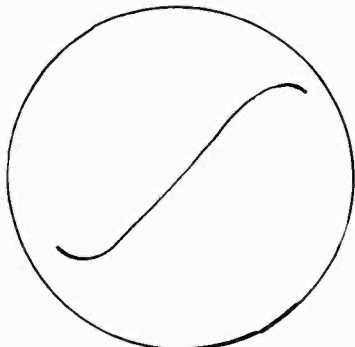


FIGURE 2

PROPER
RESPONSE

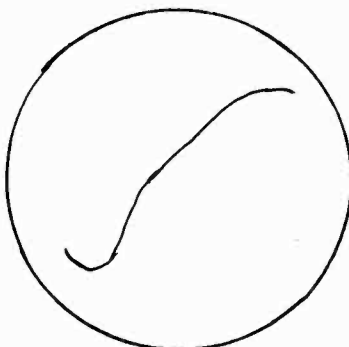


FIGURE 3

SLIGHTLY
UNSTABLE

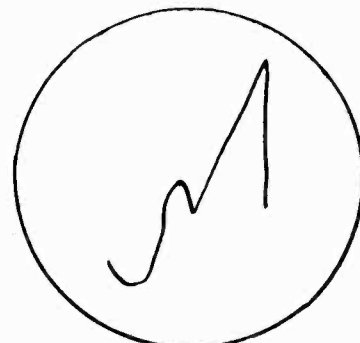


FIGURE 4

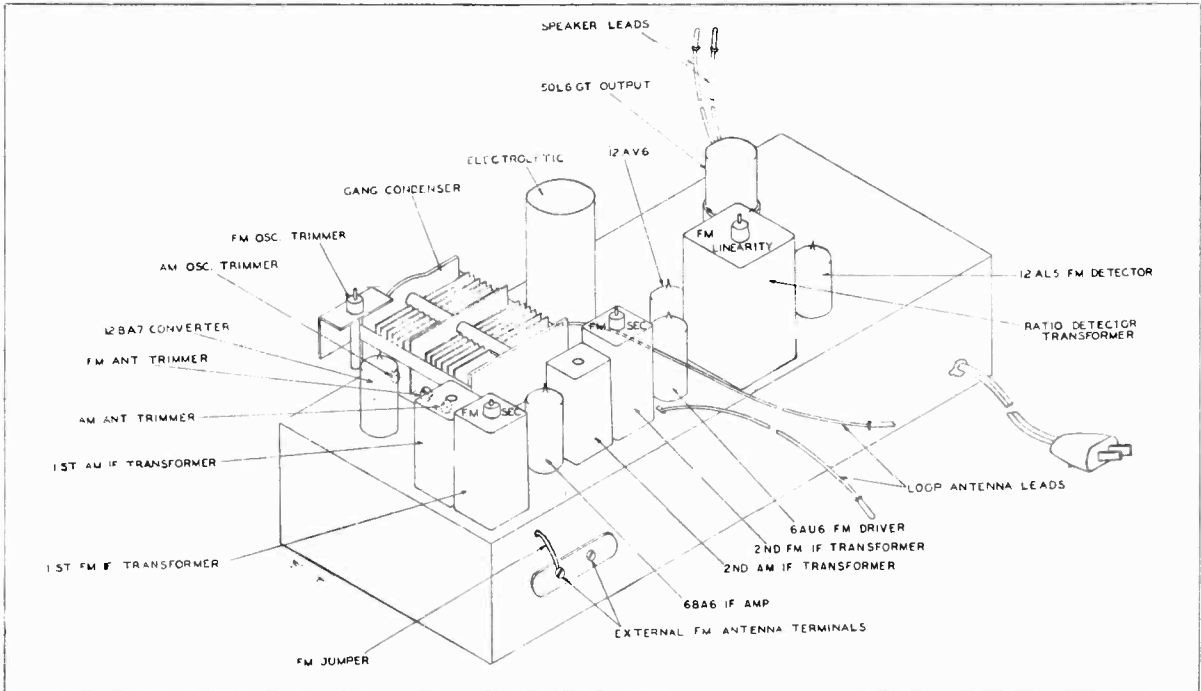
VERY
UNSTABLE

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

MODEL D2919

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

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.

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

NOTE

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.

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 "C"
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 "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.

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.

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	V T V M 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	

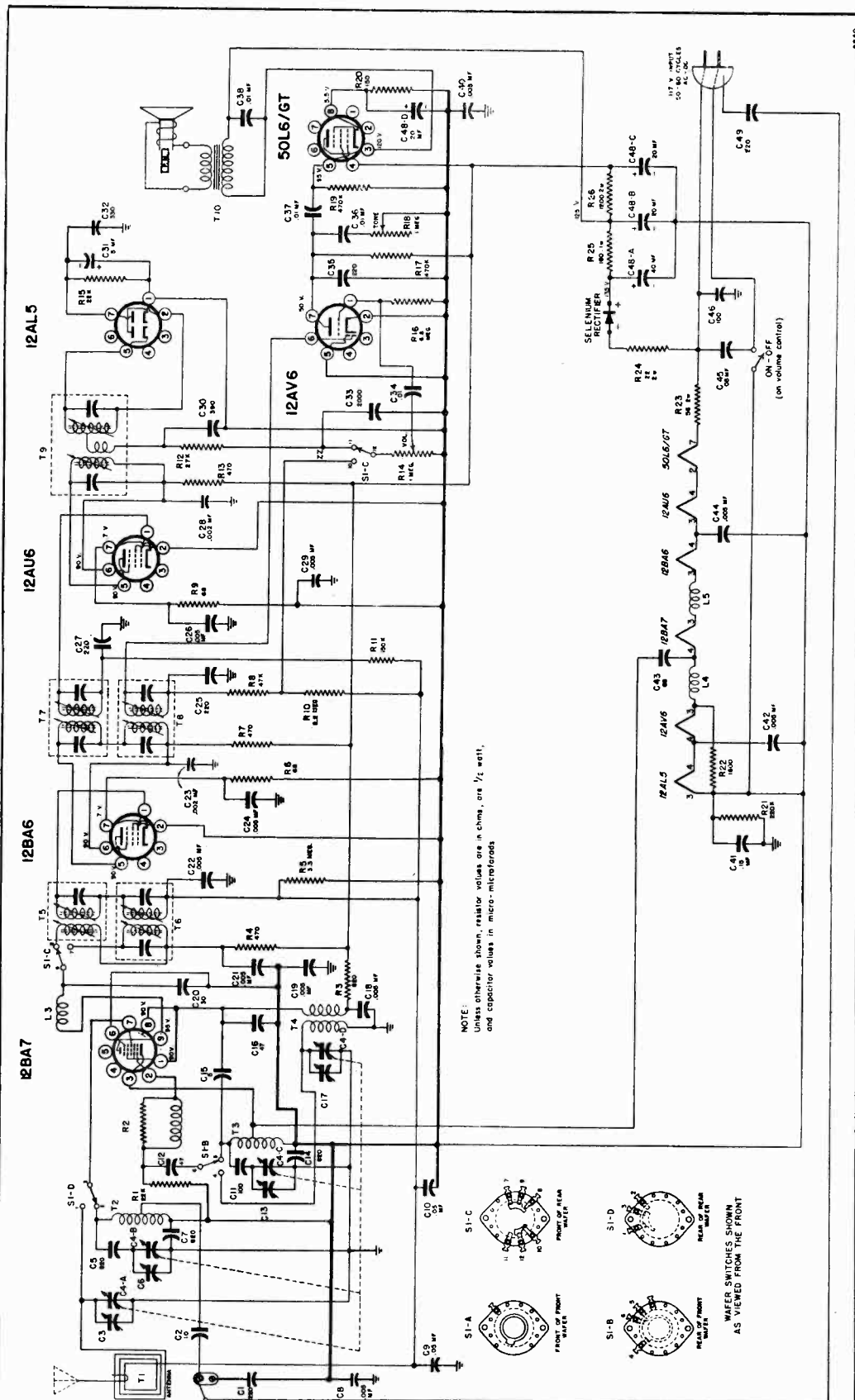
NOTE "A"—If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt-meter

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	1	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	1	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	1	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				B-2G-16005	Dial Pointer	1	
R1, 15	C-9B1-78	22K ohms, 1/2 watt, 10%	2	A-49A-10078	Tension spring	2	
R2	A-16M-16035	Suppressor	1	A-3H-10299	Idler pulley	2	
R3	C-9B1-61	820 ohms, 1/2 watt, 10%	1	Miscellaneous			
k4, 7, 13	C-9B1-58	470 ohms, 1/2 watt, 10%	3	B-18A-16024	PM speaker, 4"x6", oval	1	
R5	C-9B1-34	3.3 megohms, 1/2 watt, 20%	1	A-15B-13430	Socket, miniature, 9 pin	1	
R6, 9	C-9B1-48	68 ohms, 1/2 watt, 10%	2	A-15B-16297	Socket, miniature, 7 pin	4	
R8	C-9B1-82	47K ohms, 1/2 watt, 10%	1	A-15B-10440	Socket, octal	1	
R10	C-9B1-33	2.2 megohms, 1/2 watt, 20%	1	B-15B-13785	Lytic mounting plate	1	
R11	C-9B1-26	150K ohms, 1/2 watt, 20%	1	B-14M-16251	Line cord and plug, 3-wire	1	
R12	C-9B1-79	27K ohms, 1/2 watt, 10%	1	5C-13180-36	Cabinet	1	
R14	A-10A-15853	1 megohm, volume control and switch	1	A-2M-10096	Snap pins for back	2	
R16	C-9B1-36	6.8 megohm, 1/2 watt, 20%	1	B-5B-11131-41	Knob, plain	3	
R17, 19	C-9B1-94	470K ohms, 1/2 watt, 10%	2	B-5B-16057-41	Knob, with dot	1	
R18	A-11B-15852	1 megohm tone control	1	A-21J-12775	Selenium rectifier	1	
R20	C-9B1-52	150 ohms, 1/2 watt, 10%	1	A-3B-16009	Bushing for tuning shaft	1	
R21	C-9B1-27	220K ohms, 1/2 watt, 10%	1	A-7B-13050	FM dipole terminal strip	1	
R22	C-9B1-65	1800 ohms, 1/2 watt, 10%	1	B-2D-15432	Loop mounting bracket	1	
R23	C-9C4-1084	56 ohms, 2 watts, 10%	1	B-29J-13364	Rubber washer	3	
R24	C-9C4-1079	22 ohms, 2 watts, 10%	1	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: At 50L6GT socket the "95 v." should refer to pin 4 rather than pin 5.

SPECIFICATIONS

Power Supply....."A" Battery Supply—7½ volts
50 Ma.
"B" Battery Supply—90 volts 13
Ma.
OR
105-125 volts AC, 50-60 cycles 25
watts
OR
105-125 volts DC

Intermediate
Frequency.....455 KC
Selectivity.....at 1000 KC, 41 KC wide at 1000
times signal
Sensitivity.....(for .05 watt output with external
antenna)
50. microvolts average
Power Output......280 watt maximum
.130 watt 10% harmonics
Speaker.....5" P.M.

Frequency Range.540-1600 KC

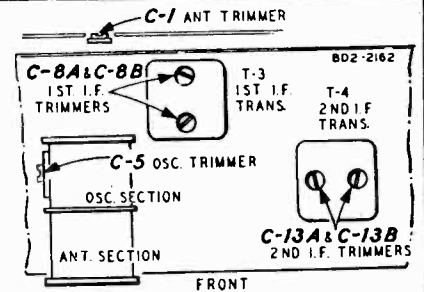
ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat
Up" for several minutes.
The equipment in column at right is required
for aligning.

A Signal Generator which will provide an accu-
rately calibrated signal at the test frequencies
as listed.
Output Indicating Meter—Non-Metallic Screw-
driver.
Dummy Antennas—.1 mf., 100 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	CONNECTION AT RADIO	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Remove chassis from cabinet.					
455 KC	Signal Grid of 1st Det. (1R5 Pin 6)	Chassis base thru .1 mf Condenser	.1 mf.	Turn Rotor to Full Open	2nd I.F. (C-13A) & (C-13B) 1st I.F. (C-8A) & (C-8B)
1600 KC	Signal Grid of 1st Det. (1R5 Pin 6)	Chassis base thru .1 mf Condenser	.1 mf.	Turn Rotor to Full Open	Oscillator (C-5)
Reassemble chassis in cabinet.					
1400 KC	External Antenna Clip	External Ground Clip on Antenna	100 mmf.	Turn Rotor to Max. Output	Antenna (C-1)

CAUTION—As the metal chassis is connected to one side of the line, in any service work keep it on a wood or other insulated surface to avoid contact with ground.



REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet, it will be necessary to pull off the 2 control knobs and then unscrew the 2 screws fastening the chassis to the cabinet. See the tube position illustration for the location of these screws. After these screws have been removed, carefully pull out the chassis taking care not to damage the connections to the loop antenna.

REPLACEMENT PARTS LIST

NOTICE: There is a model number label on the chassis. This label identifies the radio as to model and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

- 12A446 5" P.M. Speaker.....
- Cone and Voice Coil Assembly (Specify Part Number and Letters Stamped on Speaker).....
- 14X291 Metal Grille.....
- Grille Cloth (4¼" x 7¾" Color 426 W Beige).....
- 4X952 Escutcheon.....
- No. 6 x ¼" R.H. Wood Screw, Steel Cad. Plated (Mtg. escutcheon).....
- 3A303 Socket—Octal (8 prong) Molded.....
- 3A312 Miniature Tube Socket.....
- 32X221 Tube Shield.....
- 25X840 Volume Control Mtg. Bracket.....
- 20X329 Cond. Cushion Stud. { Mtg. Gang Copactor.....
- 6X21 Rubber Grammet.....
- 2A183 Changeover Switch.....
- 13X328 Line Cord and Plug Assembly.....
- 13X544 "A" and "B" Battery Cable Assembly.....
- 10A586 Knob (Tuning).....
- 10A587 Knob (Volume, On-Off).....
- 15X233 Pointer.....

TRANSFORMERS AND COILS

- T-1 9A1447 "B" Range Loop Antenna.....
- T-2 9A1836 Oscillator Coil Assembly.....
- T-3 9A1837 1st I-F Transformer and Can Assembly.....
- T-4 9A1838 2nd I-F Transformer and Can Assembly.....
- T-5 51X126 Output Transformer.....

CAPACITORS

- C-1 17A123 1.0-12 mmf Trimmer.....
- C-2A, C-2B 14A183 Gang Capacitor.....
- C-3 47X476 100 mmf Moulded.....
- C-4 47X463 47 mmf Moulded.....
- C-5 Part of C-2 (Gang Capacitor).....
- C-6, C-7 B66403 .04 mf 200V Tubular.....
- C-8A, C-8B Part of T-3 (1st I-F Transformer).....
- C-9 B66104 .1 mf 200 V Tubular.....
- C-10 B66254 .25 mf 200 V Tubular.....
- C-11, C-17 B66503 .05 mf 200 V Tubular.....
- C-13A, C13B Part of T-4 (2nd I-F Transformer).....
- C-14A, C-14B 47X112 50 mmf Dual mica.....
- C-15, C-19 B66502 .005 mf 200 V Tubular.....
- C-16A } 40 mf 150 V } Dry
- C-16B } 40 mf 150 V } Electrolytic
- C-16C } 200 mf 35 V } Electrolytic
- C-18 47X480 150 mmf Moulded.....
- C-20 D66502 .005 mf 400 V Tubular.....
- C-21 D67104 .10 mf 400 V Tubular.....

RESISTORS

- | | Ohms | Watts | Material |
|------------|--------|---------|------------------------------|
| R-1 | 884104 | 100 K | 0.5 Carbon |
| R-2 | 884221 | 220 | 0.5 Carbon |
| R-3 | 884271 | 270 | 0.5 Carbon |
| R-4 | C83201 | 200 | 1.0 Carbon |
| R-5 | B83242 | 2400 | 0.5 Carbon |
| R-6 | B84102 | 1 K | 0.5 Carbon |
| R-7, R-8 | B85225 | 2.2 meg | 0.5 Carbon |
| R-9 | B85473 | 47 K | 0.5 Carbon |
| R-10 | 36X310 | 500 K | Volume control and switch... |
| R-11 | B85475 | 4.7 meg | 0.5 Carbon |
| R-12 | 43X216 | 2050 | 7.0 Wire wound |
| R-13 | B84222 | 2200 | 0.5 Carbon |
| R-14, R-16 | B85335 | 3.3 meg | 0.5 Carbon |
| R-15 | B85105 | 1 meg | 0.5 Carbon |
| R-17 | C84270 | 27 | 1.0 Carbon |
| R-18 | B84223 | 22 K | 0.5 Carbon |

MODEL D3615

BATTERY OPERATION

The following size battery pack, consisting of a 90 volt "B" section and a 7½ volt "A" section is required:

10¼ x 3¼ x 4 inches high.

To install a battery pack, remove the wooden block at the bottom of the cabinet by taking out the two screws. Place the battery in the cabinet with the socket facing upward and near the front of the cabinet under the speaker. Note the position of the prongs on the battery cable plug and the holes in the socket on the battery. Then insert the plug into the socket. Place the wooden block flush against the battery pack. It may not always be possible to use the original holes when replacing the screws, as battery packs will vary in size. Wind the power line cord around the two hooks just above the battery.

CAUTION—Secure the power line plug in position so that it cannot move around the cabinet.

AC-DC — BATTERY SWITCH — Push the switch at the back of the chassis to the "BATT" position. (See illustration on page 2).

AC-DC OPERATION

Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50-60 cycles only or 105-125 volts DC. Do not connect the radio to a power outlet until certain that the power supply is correct for the receiver. If in doubt, check with your local power company before connecting the radio.

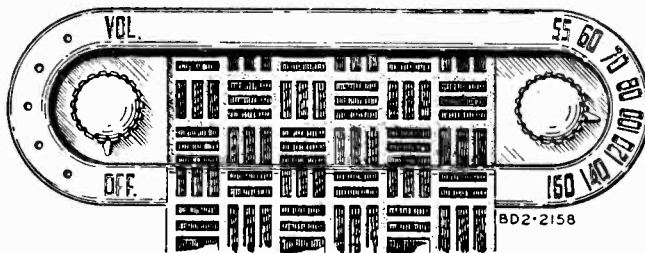
To connect the radio for AC-DC operation, open the cabinet back and unwind the power line cord from the hooks at the sides of the cabinet and pass the cord through

one of the lower openings in the back. Push the switch at the back of the chassis to the AC-DC position. (see illustration on page 2).

CAUTION: Never open the back of the cabinet or allow the metal chassis to come in contact with any ground while the power line plug is inserted in the power outlet. If excessive hum is encountered while using the radio on an AC power supply, reverse the plug. Leave the plug inserted in the position that results in the least hum.

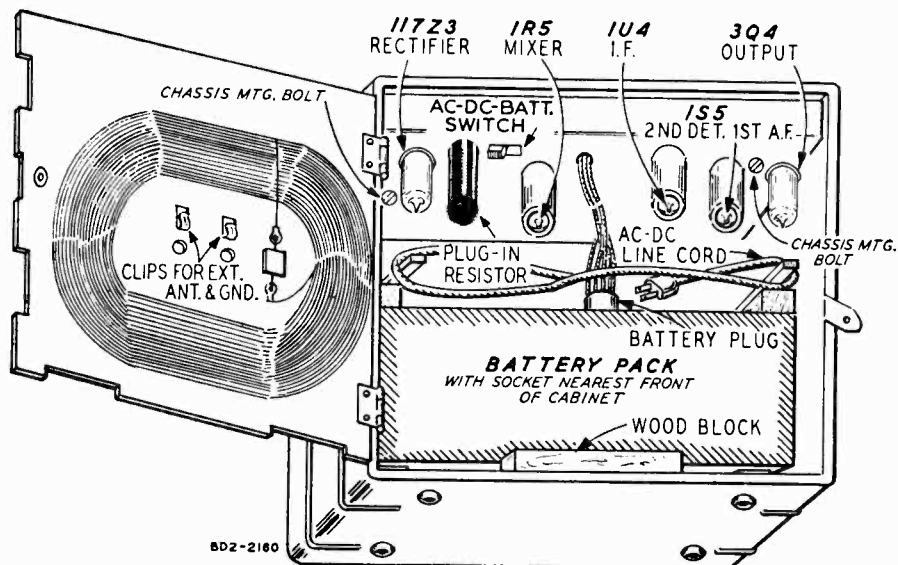
110 VOLT DC OPERATION

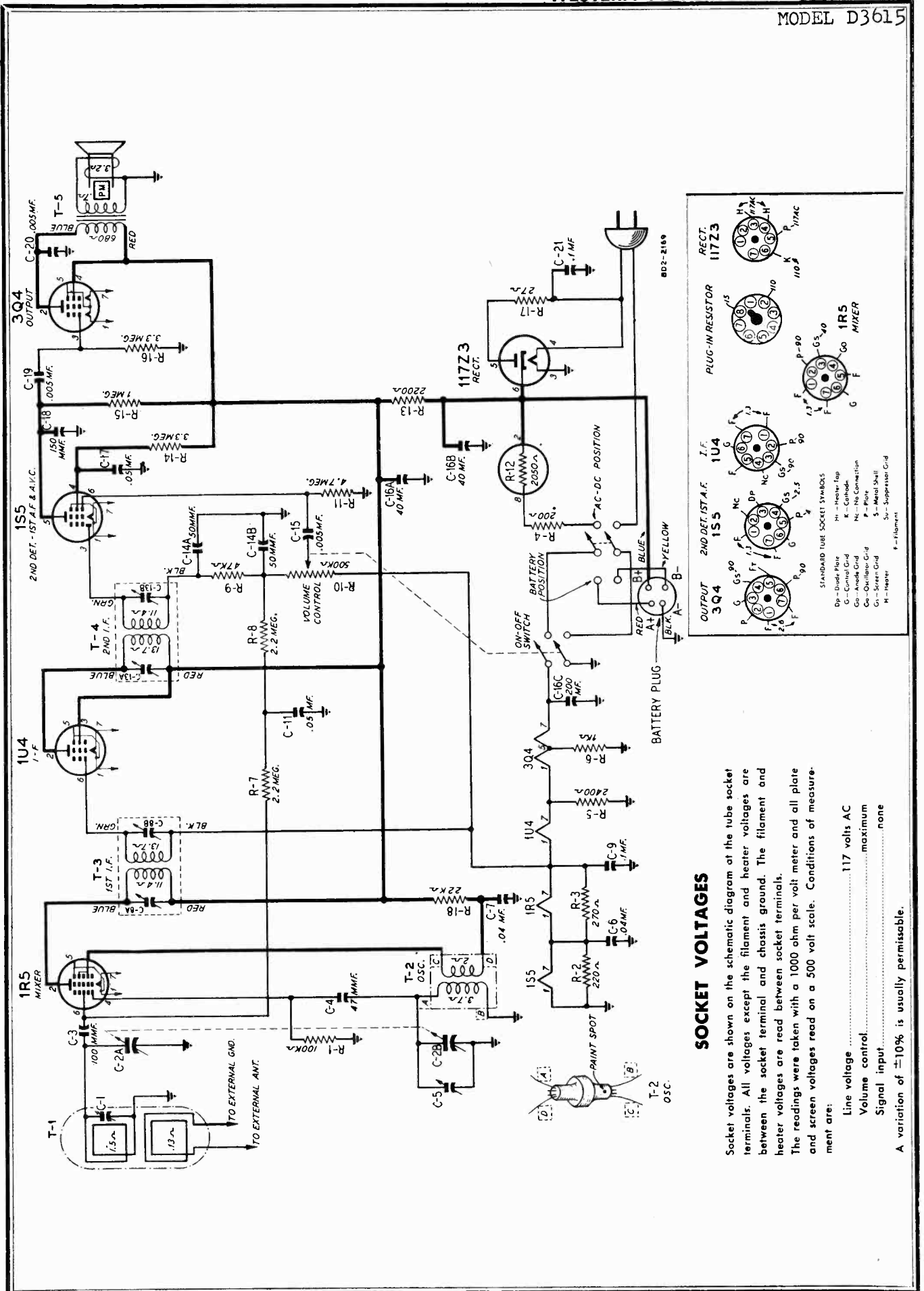
Insert the plug so that the red mark on the side of the plug is on the positive side of the line. **CAUTION**—If polarity of line is not known, insert plug; if set does not operate after one minute, reverse plug.



ON-OFF SWITCH AND VOLUME CONTROL

TUNING KNOB



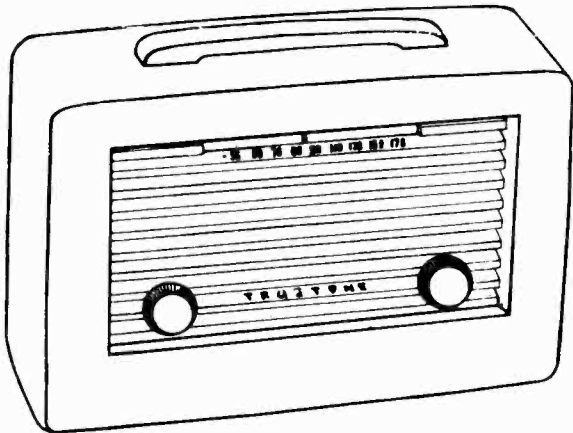


SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except the filament and heater voltages are between the socket terminal and chassis ground. The filament and heater voltages are read between socket terminals. The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

- Line voltage 117 volts AC
- Volume control maximum
- Signal input none
- A variation of ±10% is usually permissible.

MODEL D3809



POWER SUPPLY

The battery supply to be used with this receiver is as follows:

"A" supply 1½ volts.
Use three type "D" flashlight cells; Wizard No. B-6722, B-6740, or B-6745, or Burgess No. 2, or Winchester No. 1511, or Eveready No. 950 or equivalent.

Use Wizard No. B-6258 or Burgess No. XX45 or Winchester No. 1710 or Eveready No. 467 or equivalent.

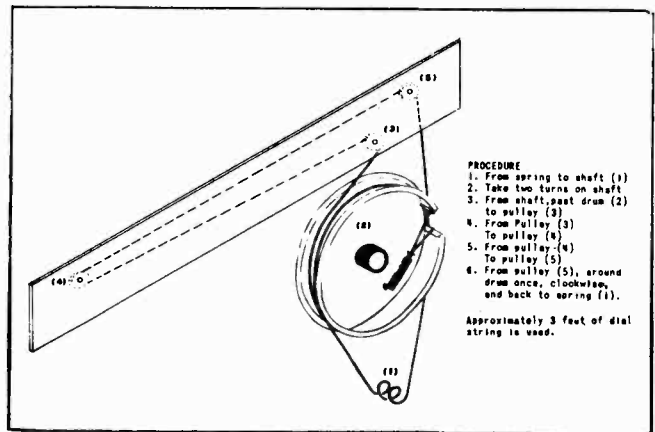
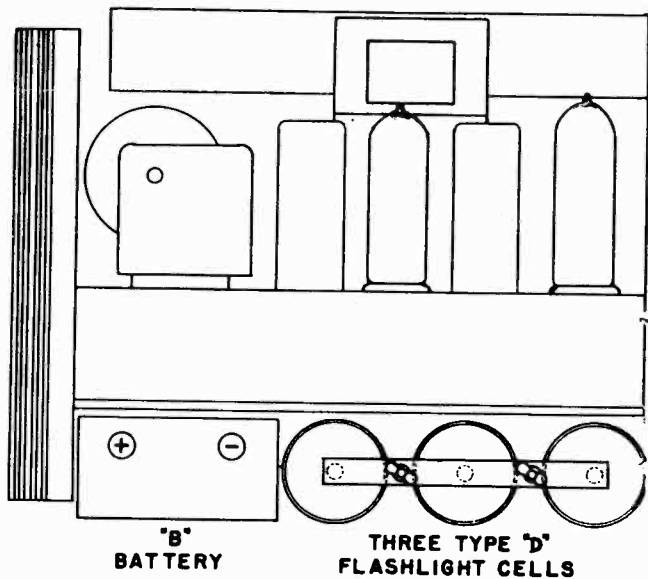
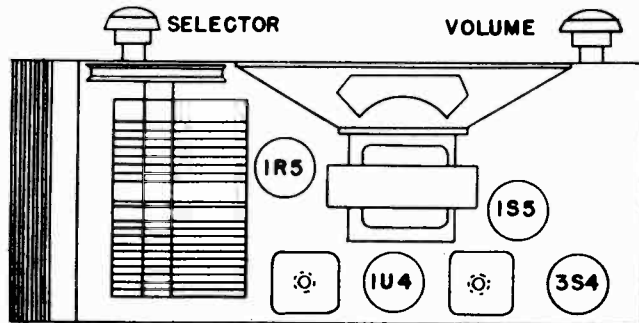
REPLACEMENT OF CELLS

The three "D" cells are inserted so that the brass caps on the positive terminals fit snugly into the holes provided in the contact strip. The contact strip is held in place with the two wing nuts provided.

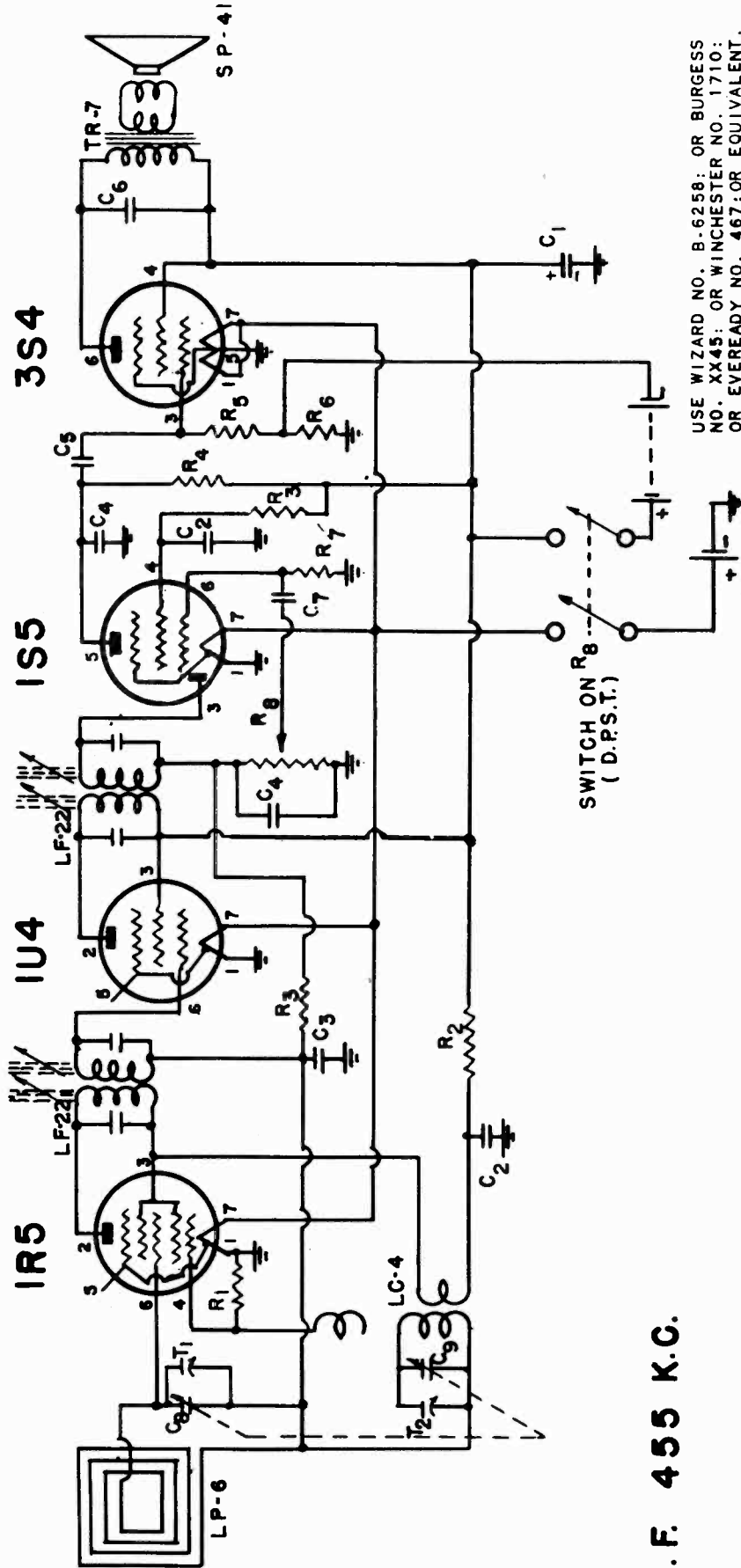
Clip the fastener to the terminals on the "B" battery so that they snap tight, and place the battery in the space provided.

ELECTRICAL SPECIFICATIONS

Batteries	A—1½ volts. 250 ma. B—67½ volts. 8 ma. average.
Frequency Range	530 to 1700 kc.
Intermediate Freq.	455 kc.
Tuning	Two-gang capacitor
Antenna	Built-in loop
Speaker	4 inch PM; voice coil Impedance 3.5 ohms.
Power Output	80 milliwatts undistorted 140 milliwatts maximum
Sensitivity	800 microvolts per meter for 50 milliwatt output
Selectivity	55 kc broad at 1000 times signal at 1000 kc.



Replacement of Drive Cord



I.F. 455 K.C.

USE WIZARD NO. B-6258; OR BURGESS NO. XX45; OR WINCHESTER NO. 1710; OR EVEREADY NO. 467; OR EQUIVALENT.

USE THREE TYPE 'D' FLASHLIGHT CELLS. WIZARD NO. B-6722. B-6740 OR B-6745; OR BURGESS NO. 2; OR WINCHESTER NO. 1511; OR EVEREADY NO. 950; OR EQUIVALENT

MODEL D3809

ALIGNMENT PROCEDURE

- Output meter across 3.5 ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				SETTING TUNER	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Factor	Connection to Receiver	Ground Connection		
455 kc	.1 mfd	1R5 Grid	B—	Rotor full open (Plates out of mesh)	Input and output trimmers on IF cans
1700 kc	.1 mfd	1R5 Grid	B—	Rotor full open (Plates out of mesh)	Oscillator trimmer T2
1500 kc		Radiating Loop		1500 kc*	Antenna trimmer T1

* Five markings on the dial bracket represent respectively 530 kc., 600 kc., 1000 kc., 1500 kc., and 1700 kc., reading from left to right. These points are to be used for the alignment of the receiver.

REPLACEMENT PARTS LIST

Ref. No. Part No. Description

CAPACITORS

C1	CE-14	16 mfd, 100 volt, Electrolytic
C2	CP-103-3	.01 mfd, 200 volt, paper
C3	CP-503-4	.05 mfd, 200 volt, paper
C4	CM-101-2	100 mmf, 500 volt, mica
C5	CP-202-2	.002 mfd, 200 volt, paper
C6	CP-502-1	.005 mfd, 400 volt, paper
C7	CP-102-3	.001 mfd, 200 volt, paper
C8, C9	CV-10	Variable condenser, two gang

RESISTORS

R1	RC-104-1	100,000 ohms	1/2 watt	20%
R2	RC-153-1	15,000 ohms	1/2 watt	20%
R3	RC-335-1	3.3 megohms	1/2 watt	20%
R4	RC-105-1	1 megohm	1/2 watt	20%
R5	RC-225-1	2.2 megohms	1/2 watt	20%
R6	RC-821-2	820 ohms	1/2 watt	10%
R7	RC-106-1	10 megohms	1/2 watt	20%
R8	VC-6	1 meg. Vol. control with switch		

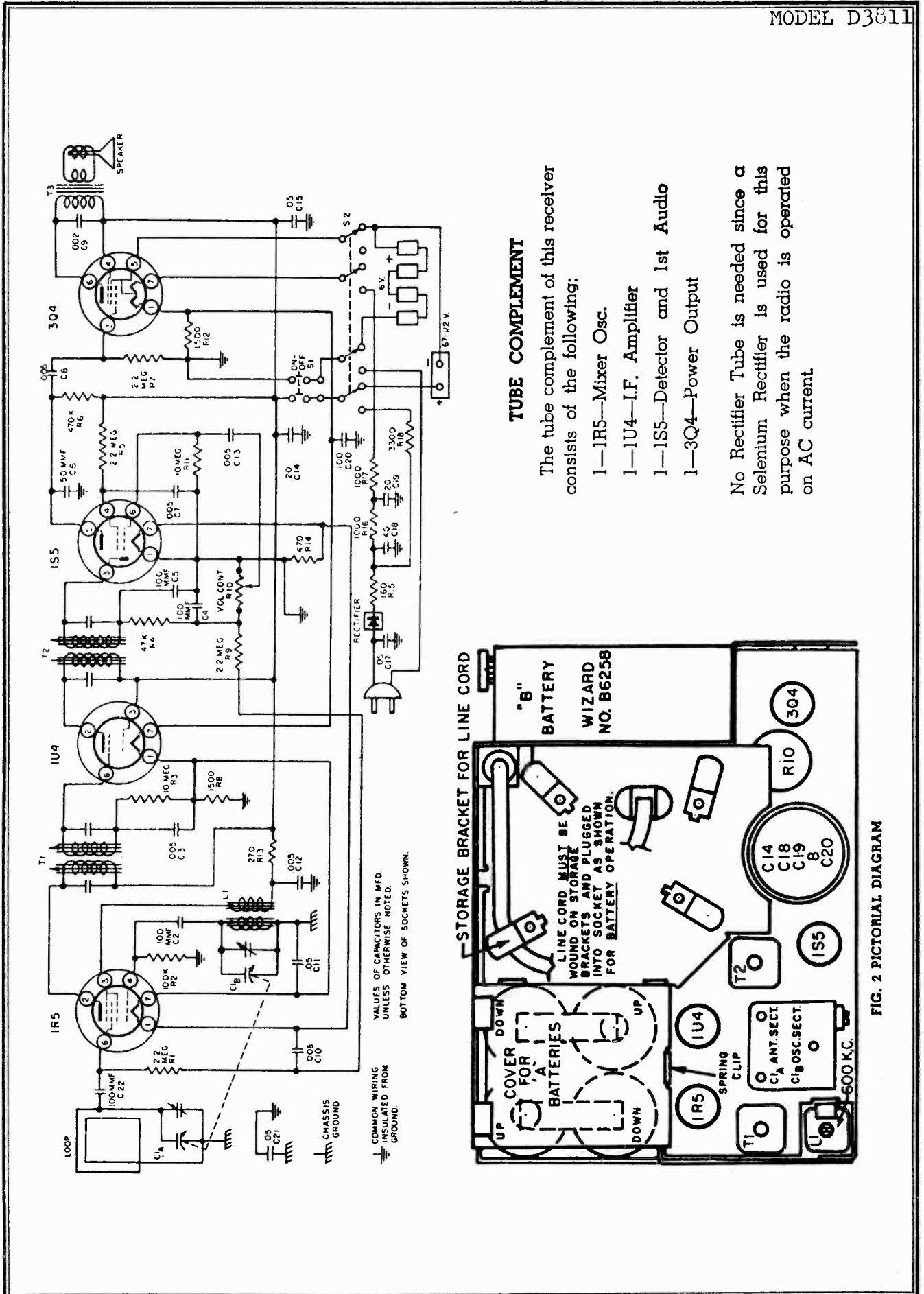
Ref. No. Part No. Description

COILS AND TRANSFORMERS

LC-4	Oscillator Coil
LF-22	I.F. Transformer
LP-6	Loop Antenna
TR-7	Output Transformer

MISCELLANEOUS

SP-41	4 inch P.M. Speaker
PN-6	Pointer (Specify Color)
CR-2	Drive Cord
SG-1	Spring for Drive Cord
KN-20-4	Knob
BK-20	Cabinet Back with Hardware (Specify Color)
CB-104A	Assembled Cabinet without Back and Handle (Specify Color)
HA-2	Handle for Cabinet with Springs and Pins (Specify Color)
AS-3	Battery Holder



TUBE COMPLEMENT

The tube complement of this receiver consists of the following:

- 1-1R5—Mixer Osc.
- 1-1U4—I.F. Amplifier
- 1-1S5—Detector and 1st Audio
- 1-3Q4—Power Output

No Rectifier Tube is needed since a Selenium Rectifier is used for this purpose when the radio is operated on AC current

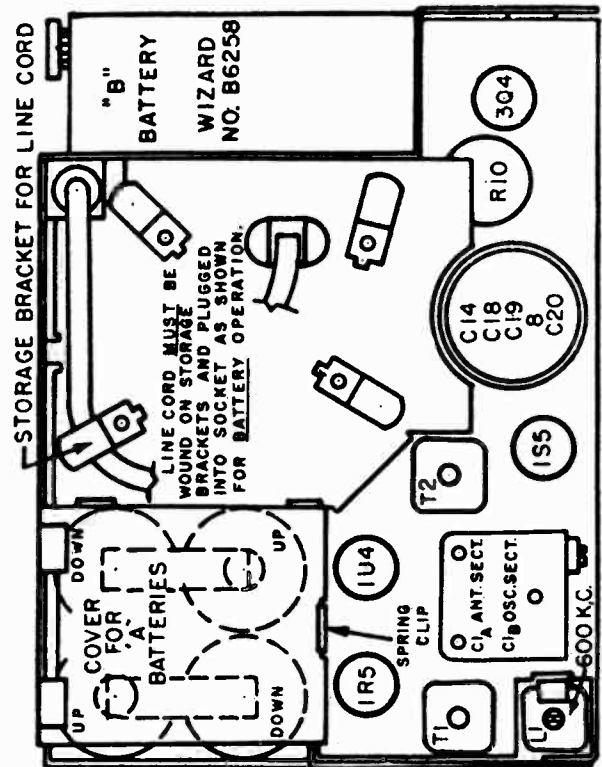


FIG. 2 PICTORIAL DIAGRAM

MODEL D3811

POWER SUPPLY

This receiver is designed to operate from self contained batteries, or from 105-125 volt AC or DC power supply. One 67½ volt "B" battery, Wizard No. B6258, and four "A" batteries, either Wizard No. B6722, B6732, B6740 or B6745 are used for battery operation. If True-tone batteries are not available Eveready No. 467, Burgess No. XX45, Ray-O-Vac No. 4367 or similar "B" bottery may be used. Any standard No. 2 flash light dry cells can be used as "A" batteries.

SERVICE NOTES

Voltages taken from the different points of the circuit to common "B" are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly indicated on the voltage chart.

All voltages should be measured with a line voltage of 117 volts.

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

ALIGNING INSTRUCTIONS

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given below in the order listed. After realignment has been completed repeat the procedure as a final check.

ALIGNMENT PROCEDURE

- Volume control—Maximum: all adjustments.
- Connect ground lead of signal generator to common "B."
- Connect dummy antenna in series with output lead of signal generator.
- Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:

- Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.
- Output meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., .00025 mfd.

For alignment points refer to Figure No. 2.

CAUTION: This is an A.C.-D.C. receiver and if alignment is made with the receiver connected to 117 volts A.C. or D.C., it is necessary to isolate the signal generator or the receiver from the line by use of a transformer, or place a .2 M.F.D. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T2	Output I.F.
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T1	Input I.F.
Fully open	1600 KC	.00025	*1R5 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1400 KC	—	Loosely coupled to loop	C1A	Antenna
**Tune in signal from generator	600 KC	—	Loosely coupled to loop	L1	600 KC Padder

*Connect ground lead of signal generator to chassis.

**When making this adjustment the variable should be rocked back and forth.

VOLTAGE CHART

All voltages are measured from minus "B" with a 20,000 ohm per volt meter, volume control at maximum, no signal applied, and the radio operating from a 117 volt AC power supply. NOTE: Normal tolerance on component values may cause a plus or minus of 10% in voltage readings.	TUBE Pin Numbers							
		1	2	3	4	5	6	7
	1R5	1.6	65	67	—8	1.5	0	2.8
	1U4	2.8	65	65	0	2.8	0	4.2
	1S5	0	0	0	18	20	0	1.5
	3Q4	4.2	64	0	65	5.9	64	6.8

PARTS LIST

Circuit Diagram Reference	Part No.	Description
C2, C4, C5, C22	A15-190	100 MMF Mica condenser.....
C1A, C1B	B19-190	Variable condenser
C3, C7, C8	A16-181	.005 MFD 150 volt condenser.....
C10, C12, C13		
C6	A15-191	50 MMF mica condenser.....
C11, C17, C21	A16-172	.05 MFD 400 volt condenser.....
C14, C19		
C18	A18-282	} 20 MFD 150 volt Electrolytic condenser 40 MFD 150 volt Electrolytic condenser 100 MFD 25 volt Electrolytic condenser
C20		
C15	A16-171	
C9	A16-182	.05 MFD 200 volt condenser.....
		.002 MFD 200 volt condenser.....

RESISTORS

R1, R5, R7, R9	A60-726	2.2 Megohm ½ watt resistor.....
R2	A60-727	100K ohm ½ watt resistor.....
R3, R11	A60-728	10 Megohm ½ watt resistor.....
R4	A60-730	47K ohm ½ watt resistor.....
R6	A60-731	470K ohm ½ watt resistor.....
R8, R12	A60-729	1500 ohm ½ watt resistor.....
R10	A24-172	Volume control, 1 megohm.....
R13	A60-723	270 ohm ½ watt resistor.....
R14	A60-722	470 ohm ½ watt resistor.....
R15	A60-725	160 ohm 3 watt resistor.....
R16, R17	A60-713	2000 ohm 10 watt resistor (1000 ohms each)
R18	A60-724	3300 ohm 1 watt resistor.....

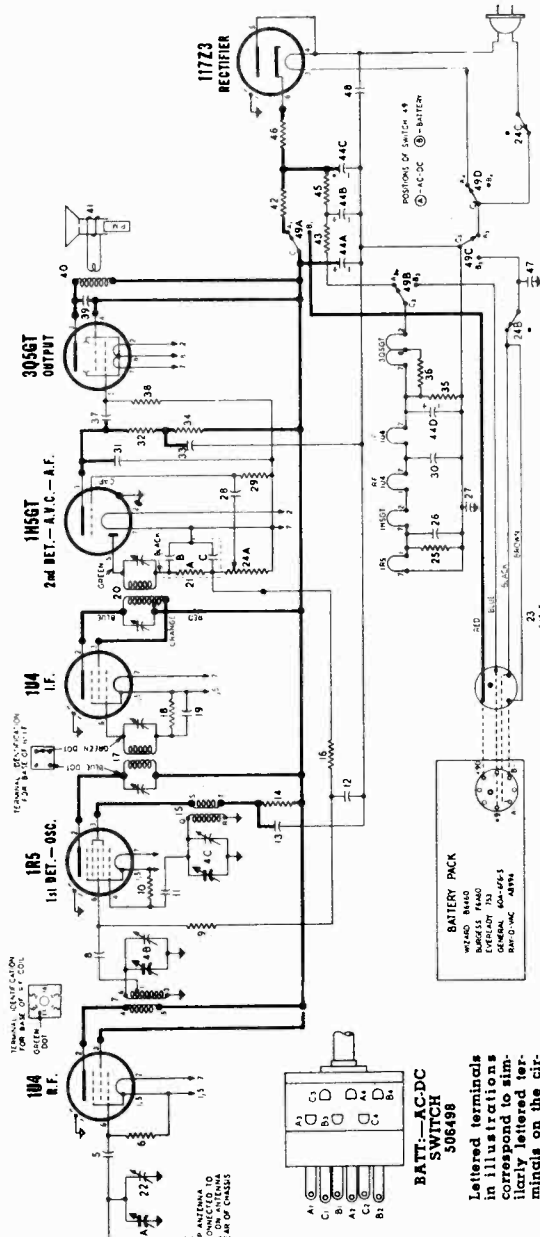
COILS

T1, T2	C10-475	1st and 2nd I.F. Transformer.....
T3	A80-231	Output transformer
L1	B10-477	Oscillator coil

MISCELLANEOUS

S84-112	Cover assembly for "A" batteries.....
S84-207	Front cover assembly for case, with loop.
S84-169	Rear cover assembly for case.....
S84-111	Hub and Pointer assembly.....
A52-227	Knob, On-Off switch
A52-229	Knob, tuning
A52-232	Knob, volume control
A83-391	Selenium Rectifier
B79-353	Speaker, P.M.
A69-174	Switch, AC-DC—Battery
A69-175	Switch, On-Off
A76-34	Terminal for "B" battery
B23-156	Line cord
D21-108	End Cap, for handle
A83-494	Handle

MODEL D3840



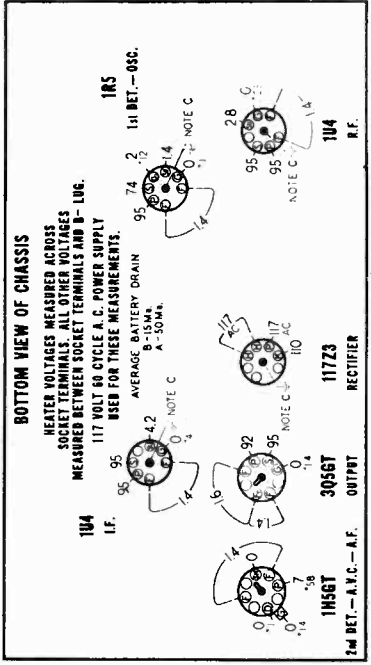
I.F. 455 KC.

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

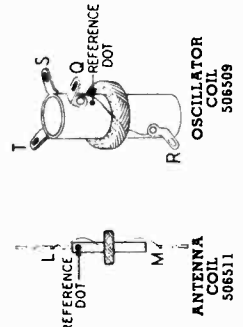
VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC.

"BATT.—AC-DC" SWITCH IN "AC-DC" POSITION



DIA. GRAM NO.	PART NO.	DESCRIPTION
1	506340	Condenser—ceramic 100 Mmfd. 500 volt.
4-A, B, C	506496	Condenser—variable gung and drum
5	506340	Condenser—ceramic 100 Mmfd. 500 volt.
8	506340	Condenser—ceramic 100 Mmfd. 500 volt.
11	504973	Condenser—ceramic 22 Mmfd. 500 volt.
12	512068	Condenser—.05 Mfd. 200 volt.
13	512014	Condenser—.02 Mfd. 200 volt.
14	512014	Condenser—.02 Mfd. 200 volt.
22	511932	Condenser—trimmer 2 to 15 Mmfd.
25	512044	Condenser—.25 Mfd. 200 volt.
27	512040	Condenser—.15 Mfd. 400 volt.
28	505873	Condenser—ceramic .005 Mfd. 450 volt.
30	512044	Condenser—.25 Mfd. 200 volt.
30-B, C	506338	Condenser—ceramic 100 Mmfd. 400 volt. (part of diode filter unit)
31	506340	Condenser—ceramic 100 Mmfd. 500 volt.
33	512032	Condenser—.1 Mfd. 200 volt.
37	512008	Condenser—.01 Mfd. 200 volt.
39	512002	Condenser—.002 Mfd. 600 volt.
44-A to D	506492	Condenser—electrolytic
		A—10 Mfd. 150 volt
		B—20 Mfd. 150 volt
		C—40 Mfd. 150 volt
		D—100 Mfd. 25 volt
47	512026	Condenser—.05 Mfd. 200 volt.
48	512028	Condenser—.05 Mfd. 400 volt.
5	510193	Resistor—carbon 2.2 Meg. 1/2 watt
6	510173	Resistor—carbon 100,000 ohms 1/2 watt
10	510173	Resistor—carbon 100,000 ohms 1/2 watt
11	510173	Resistor—carbon 100,000 ohms 1/2 watt
15	510194	Resistor—carbon 3.3 Meg. 1/2 watt
16	510194	Resistor—carbon 3.3 Meg. 1/2 watt
18	510193	Resistor—carbon 2.2 Meg. 1/2 watt
24-A, B, C	506497	Resistor—volume control 1 Meg. (with switch)
25	510127	Resistor—carbon 330 ohms 1/2 watt ± 10%
29	510194	Resistor—carbon 3.3 Meg. 1/2 watt
30-A	506338	Resistor—carbon 47,000 ohms 1/5 watt (part of diode filter unit)
32	510191	Resistor—carbon 1 Meg. 1/2 watt
34	510185	Resistor—carbon 470,000 ohms 1/2 watt
35	510132	Resistor—carbon 860 ohms 1/2 watt ± 10%
36	510123	Resistor—carbon 190 ohms 1/2 watt ± 10%
37	510123	Resistor—carbon 190 ohms 1/2 watt ± 10%
42	510713	Resistor—carbon 750 ohms 1/2 watt ± 5%
43	510710	Resistor—wire wound 1700 ohms 10 watt ± 5%
45	510119	Resistor—carbon 100 ohms 1/2 watt
46	510210	Resistor—carbon 33 ohms 1 watt
2	506511	Coil—antenna (series)
7	506510	Coil—R.F. (with shield)
15	506509	Coil—BC Oscillator
17	506493	Transformer—1st I. F.
20	506494	Transformer—2nd I. F.
40	502902	Transformer output for 506495 speaker

PARTS LIST



DIA. GRAM NO.	PART NO.	DESCRIPTION
23	506507	Battery cable
30-A, B, C	506338	Diode filter unit
A	506338	Resistor—carbon 47,000 ohms 1/5 watt
B	506338	Condenser—ceramic 100 Mmfd. 400 volt.
C	506338	Condenser—ceramic 100 Mmfd. 400 volt.
41	506495	Speaker—8" PM Dynamic (5 inch) includes output transformer.
49-A to D	506498	Switch—"BATT.—AC-DC"
OTHER ELECTRICAL PARTS		
504981		Base for mtg. electrolytic condenser
506423		Cabinet—black (for Model D3840)
505451		Catch and latch for rear door
506343		Clip—coil mtg.
505101		Clip—retainer on end of dial cord
114955		Cord—dial drive (for Model D3840)
505407		Door—rear for Model D3840
505441		Door—front for Model D3840
506424		Escutcheon plate for Model D3840
505711		Handle for front door
505452		Hinge (pair) for rear door
506514		Knob—"BATT.—AC-DC"
506515		Knob—"Tune"
506513		Knob—"Volume Off"
131575		Plug for battery cable (fits batt. pack)
506516		Pointer
18145		Ring for dial cord
19884		Shield—tuning control, for mtg. chassis
502524		Shield—tube
505367		Shield—tube (miniature)
117716		Shield—tube
504397		Socket—miniature
506491		Socket—dial
505161		Spring; dial cord tension
506506		Terminal strip—(ANT-EXT-ANT)

NOTE C: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.

GROUND: Do not connect a ground wire to this receiver while it is connected to the electric power supply. Failure to observe this caution may result in damage to the receiver.

When connecting the radio to the electric power outlet be sure that outlet will supply the proper current and voltage. This radio may be connected to either 50 or 60 cycle Alternating Current (A.C.) at 105 to 125 volts or Direct Current (D.C.) at 105 to 125 volts.

The bottom compartment of the cabinet provides adequate space to accommodate a single unit battery pack. Any of the following single unit type battery packs may be used as a suitable power supply for this receiver.

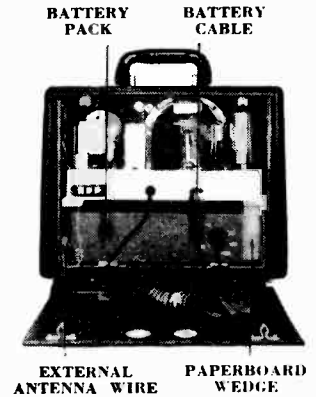


FIG. 1

- WIZARD B6460
- EVEREADY 753
- GENERAL 60A-6F6-5
- RAY-O-VAC AB-994
- BURGESS F6A60

HOW TO OPERATE THE CONTROLS

SELECTOR SWITCH
AC-DC (counter-clockwise position): Use this position when receiver power cord is connected to an electric power outlet.
BATTERY (clockwise position): Use this position when operating the receiver on the self-contained battery.

ON-OFF SWITCH AND VOLUME CONTROL
 Turn this knob clockwise to turn set on. Continuing to turn clockwise will increase volume.

TUNING CONTROL
 Use this control to tune receiver to the desired station.

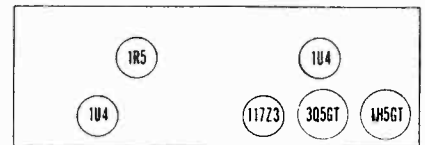
THE DIAL SCALE is calibrated to cover standard "broadcast" band frequencies between 540 Kc and 1600 Kc.

TUBES USED

The tubes used in this receiver are arranged on the chassis as shown in illustration at the right.

IMPORTANT: DISCONNECT POWER CORD FROM WALL OUTLET BEFORE ATTEMPTING TO REMOVE TUBES FOR TEST OR REPLACEMENT. MAKE CERTAIN THAT EACH TUBE IS INSTALLED IN ITS PROPER SOCKET WHEN REPLACING THE TUBES IN THE SET.

TUBE LOCATIONS



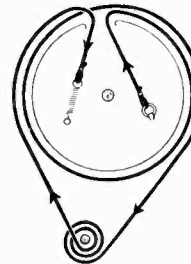
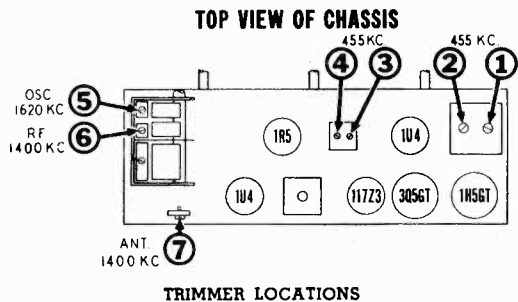
REAR OF CHASSIS

MODEL D3840

ALIGNMENT PROCEDURE

1. Disconnect and remove battery from cabinet. Then remove the two plug buttons which are located at bottom of cabinet so that a long blade screwdriver may be inserted to remove chassis hold-down screws. After removing these screws be sure to replace and reconnect the battery as battery position affects alignment of loop antenna circuit.
2. Partially withdraw the chassis from cabinet so as to obtain access to trimmer adjustments—do not completely remove the chassis from the cabinet as position of chassis relative to loop antenna is important.
3. In order to provide a means of coupling the signal generator to the antenna, wind approximately two turns of insulated wire around outside of cabinet so that its position corresponds to that of the built-in loop. Then connect both leads of this coupling to signal generator.
4. Connect an output meter across voice coil of speaker or between plate of 3Q5GT output tube and chassis through a 0.1 mfd. condenser.
5. Set the volume control at maximum volume position and use a weak signal from the signal generator.
6. Set "BATT.—AC-DC" Switch in "AC-DC" position.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	SIGNAL GENERATOR CONNECTION	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
None	Connect directly to coupling turn around cabinet.	455 KC	Any point where it does not affect the signal.	1-2 3-4	2nd I.F. 1st I.F.	Adjust for maximum output. Then repeat adjustment.
None	Connect directly to coupling turn around cabinet.	1620 KC	Set so that gang condenser is in fully open position.	5	Broadcast Oscillator	Adjust for maximum output.
None	Connect directly to coupling turn around cabinet.	1400 KC	Tune to 1400 KC generator signal	6	Broadcast R. F.	Adjust for maximum output.
None	Connect directly to coupling turn around cabinet.	1400 KC	Tune to 1400 KC generator signal	7	Broadcast Antenna	Adjust for maximum output. Slide chassis all the way into cabinet when making this adjustment.



DIAL DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully open position and use following parts:

- 114955 Clip on end of cord
- 117057 Cord (3 feet)
- 119087 Ring for dial cord
- 505161 Tension Spring

STAGE GAIN MEASUREMENT PROCEDURE

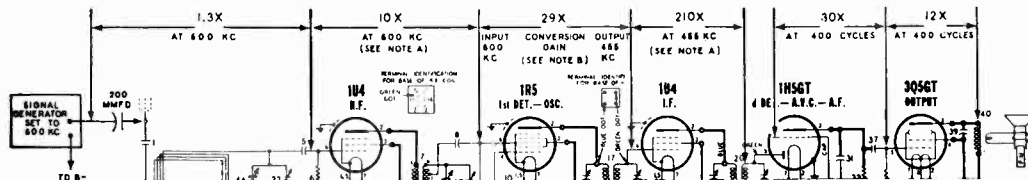
REQUIRED INSTRUMENTS: The amount of amplification or "gain" of each of the stages of this receiver may be measured with an A.C. Vacuum Tube Voltmeter or a "channel" type instrument containing a tuned and calibrated amplifier.

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F. and I.F. stages are carefully and accurately aligned by utilizing the alignment procedure given above.
2. Connect Signal Generator as shown below.
3. The values of stage gain which are given here were measured with a fixed bias of 1½ volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 1½ volt battery to A.V.C. at

junction of resistors No. 9 and 16 and connect the positive battery to B—

4. Set Signal Generator for operation at 600 Kc with 400 cycle modulation and carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.
6. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



NOTE A: Measured with input voltage of 0.1.
NOTE B: Measured with input voltage of 0.2.

DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

SPECIFICATIONS

<p>Power Supply 105, 125 volt AC-DC or Batteries</p> <p>Batteries Five 1½ volt "A" Wizard B6722, B6732, B6740 or B6745 One 67½ volt "B" Wizard B6258</p> <p>Tuning Range 545 to 1610 KC</p>	<p>I.F. Frequency 455 KC</p> <p>Loud Speaker 4 inch P.M.</p> <p>Voice Coil Impedence 3.2 ohms at 400 cycles</p> <p>Power Output Maximum 100 milliwatts</p>	<p>Tube Complement 1R5—Oscillator Conv. 1U4—I.F. Amplifier 1S5—AVC, Detector, 1st Audio 3V4—Power Output</p>
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CAUTION: This is an AC-DC receiver and if alignment is made with the receiver connected to 117 volts AC or DC, it is necessary to isolate the signal generator or the receiver from the line by use of a transformer, or place a .2 MFD condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T2	Output I.F.
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T1	Input I.F.
Fully open	1610 KC	.00025	*1R5 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1400 KC	—	Loosely coupled to loop	C1A	Antenna

*Connect ground lead of signal generator to common "B" negative.

ALIGNMENT PROCEDURE

ALIGNING INSTRUCTIONS

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given below in the order listed. After realignment has been completed repeat the procedure as a final check. For alignment points refer to Figure No. 2.

- Volume control—Maximum: all adjustments.
- Connect ground lead of signal generator to common "B." negative.
- Connect dummy antenna in series with output lead of signal generator.
- Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:

- Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.
- Output meter.
- Non-metallic screwdriver.
- Dummy antennas— .1 mfd., .00025 mfd.

MODEL D3910

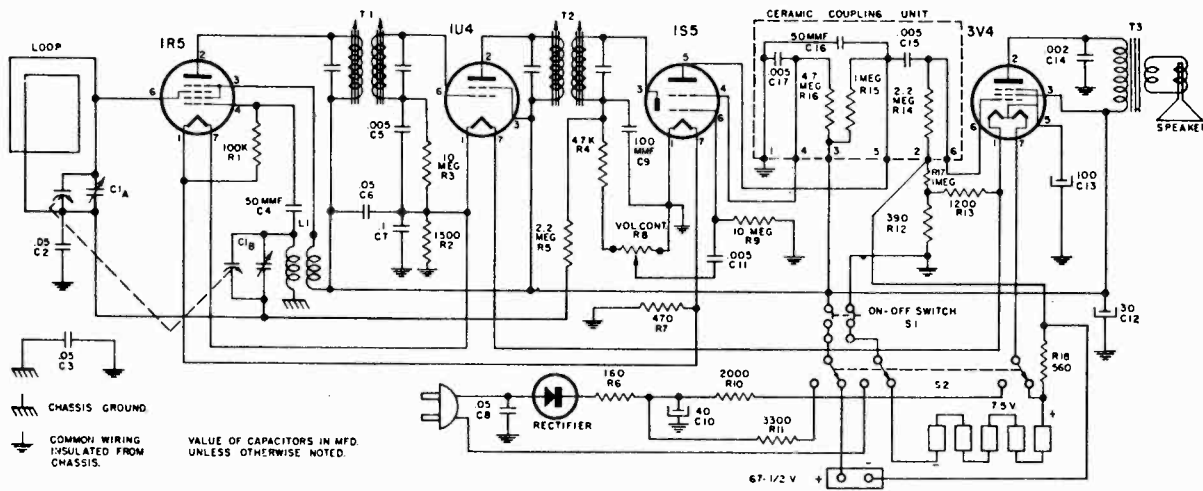


Fig. 1 Schematic Diagram

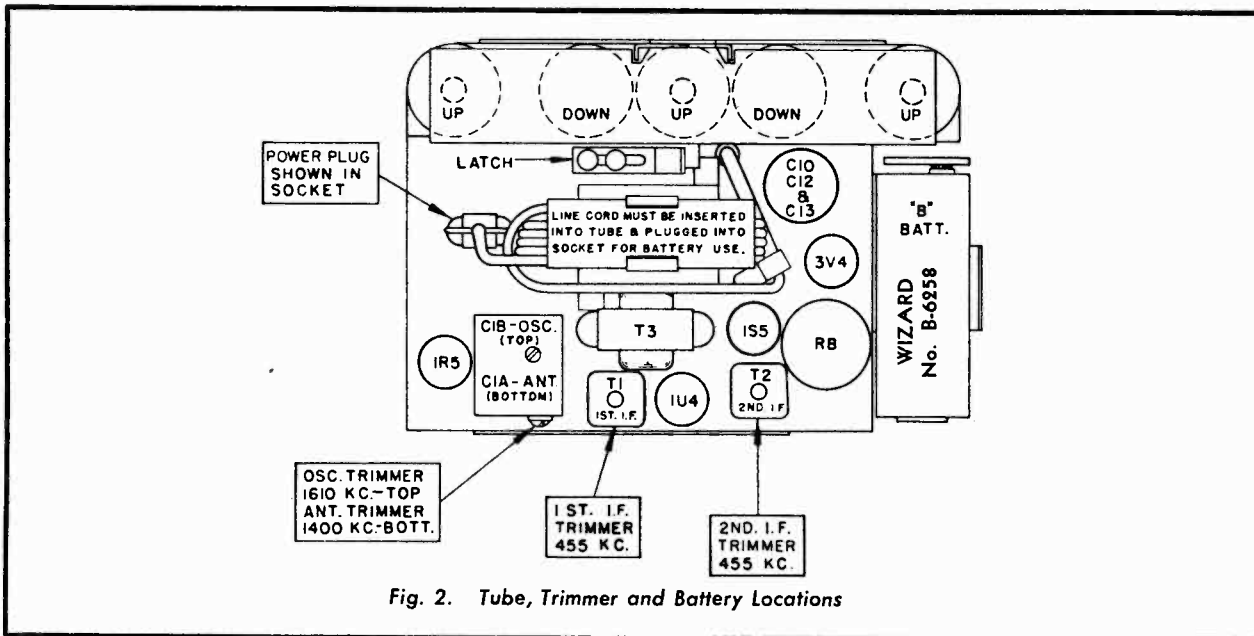


Fig. 2. Tube, Trimmer and Battery Locations

All voltages are measured from tube pin to common "B" negative with a 20,000 ohm per volt voltmeter.

Voltages shown in circles are obtained when set is operated on 117 volt current.

Voltages shown outside the circles are obtained when the set is operated on batteries. New batteries in good condition should be used for these measurements.

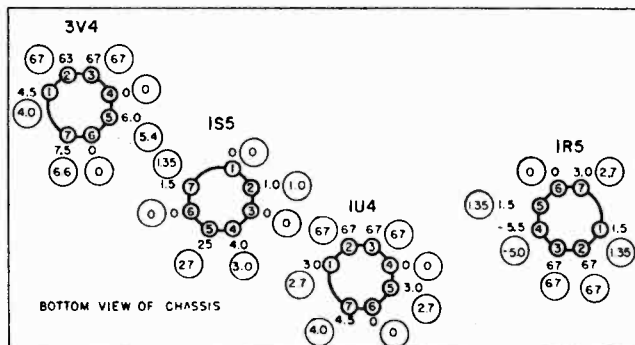


Fig. 3 Voltage Chart

PARTS LIST

Circuit
Diagram
Reference

Part No.

CONDENSERS

Description

C1A, C1B	B19-197	Variable condenser	
C2, C6	A16-152	.05 MFD 200 volt condenser	
C3, C8	A16-158	.05 MFD 400 volt condenser	
C4	A15-175	50 MMF mica condenser	
C5, C11	A16-153	.005 MFD 600 volt condenser	
C7	A16-157	.1 MFD 200 volt condenser	
C9	A15-188	100 MMF mica condenser	
C10	A18-290	40 MFD 150 volt electrolytic condenser	}
C12		30 MFD 150 volt electrolytic condenser	
C13		100 MFD 10 volt electrolytic condenser	
C14	A16-182	.002 MFD 200 volt condenser	
C15	*A17-100	.005 MFD	} See Note Below
C16		50 MMF	
C17		.005 MFD	

RESISTORS

R1	A60-671	100K ohm 1/2 watt 20% resistor	
R2	A60-680	1500 ohm 1/2 watt 10% resistor	
R3, R9	A60-663	10 megohm 1/2 watt 20% resistor	
R4	A60-685	47K ohm 1/2 watt 20% resistor	
R5	A60-684	2.2 megohm 1/2 watt 20% resistor	
R6	A60-725	160 ohm 5 watt 10% resistor	
R7	A60-722	470 ohm 1/2 watt 10% resistor	
R8	A24-178	Volume control, with switch	
R10	A60-757	2000 ohm 10 watt 10% resistor	
R11	A60-724	3300 ohm 1 watt, 10% resistor	
R12	A60-665	390 ohm 1/2 watt 10% resistor	
R13	A60-756	1200 ohm 1/2 watt 10% resistor	
R14	*A17-100	2.2 megohm	} See Note Below
R15		1 megohm	
R16		4.7 megohm	
R17	A60-668	1 megohm 1/2 watt 20% resistor	
R18	A60-758	560 ohm 1/2 watt 10% resistor	

COILS

L1	A10-514	Oscillator coil	
T1, T2	C10-475	1st and 2nd I.F. transformer	
T3	B80-245	Output transformer	

MISCELLANEOUS

A11-320	Bracket, handle, mounting
S84-242	Bracket, "A" battery retainer
A72-32	Bushing, thimble, chassis mounting
D42-442	Cabinet, (includes back cover)
A83-421	Clip, I.F. transformer mounting
B67-530	Dial, tuning
B67-531	Dial, volume
C83-559	Handle, molded
S84-243	Hub and pointer assembly
C52-268	Knob, tuning
B52-269	Knob, volume
A83-568	Rectifier, selenium
A71-38	Retainer, paper tube, for line cord
A68-35	Socket, tube
B79-364	Speaker, 4" P.M.
A70-141	Spring, compression, for handle
A76-49	Terminal, for "B" battery
B82-58	Loop Antenna

* NOTE: C15, C16, C17, R14, R15, R16, are contained in the Ceramic Coupling Unit, Part No. A17-100,

MODEL D4818

ELECTRICAL SPECIFICATIONS

Power Supply.....6.3 volts DC
 Current.....4.8 amp. average
 Frequency Range.....540 to 1600 KC
 I. F. Frequency.....455 KC
 Speaker.....4" P. M.
 Power Output.....1.2 watts, undistorted
 2.5 watts, maximum
 Sensitivity.....10 microvolts average for 1 watt output
 Selectivity.....20 KC broad at 1000 times signal, at 1000 KC

The tube compliment of this receiver is as follows:

- 1—6SK7GT—R. F. Amplifier.
- 1—6SA7GT—Converter.
- 1—6SK7GT—I.F. Amplifier.
- 1—6SQ7—Detector—AVC—1st audio.
- 1—6V6GT—Power output.
- 1—6X5GT—Rectifier.

SERVICE NOTES

Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets, no signal applied, and with a volt meter having a resistance of 20,000 ohms per volt. These voltages are clearly shown on the voltage chart. (Fig. 4).

All voltages should be measured with an input voltage of 6.3 volts DC.

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

ALIGNING INSTRUCTION

Never attempt any adjustments on this receiver unless it becomes necessary to replace a coil or transformer, or the adjustments have been tampered with in the field. Always make certain that other circuit components, such as tubes, condensers, resistors, etc., are normal before proceeding with realignment.

If realignment is necessary follow the instructions given under the heading "ALIGNMENT PROCEDURE". After realignment has been completed repeat the procedure as a final check.

INSTRUCTIONS FOR REMOVING CHASSIS FROM THE CASE

The bottom cover (the one with the speaker louvers) can be removed to permit servicing of major components, such as tubes and vibrator, by removing the eight (8) screws holding it to the top cover. There are three (3) screws on each side, one (1) in the rear, and one (1) in the front.

CAUTION: Before attempting to remove the top cover, to service condensers, resistors, etc., the screw connecting the spark plate to the "A" terminal (inside case) must be removed. This is a round head screw, and is located on the rear of the case, close to the mounting stud bolt. It is recessed in a 1/2 inch hole in the case itself, thereby permitting contact with the spark plate.

After removing the spark plate screw, remove the two knobs by pulling forward and remove the eight (8) screws securing the cover to the chassis. Lift the chassis at the rear, at the same time moving it away from the front of the case so that the volume and tuning shafts will clear the holes in the cover.

NOTE: When reinstalling the chassis into the case, be sure the screw connecting the spark plate to the "A" terminal (inside case) is tightened very securely, otherwise the receiver will not operate properly.

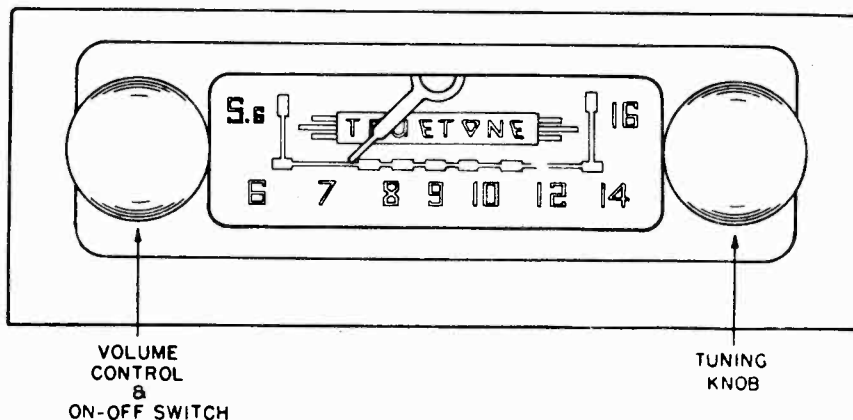
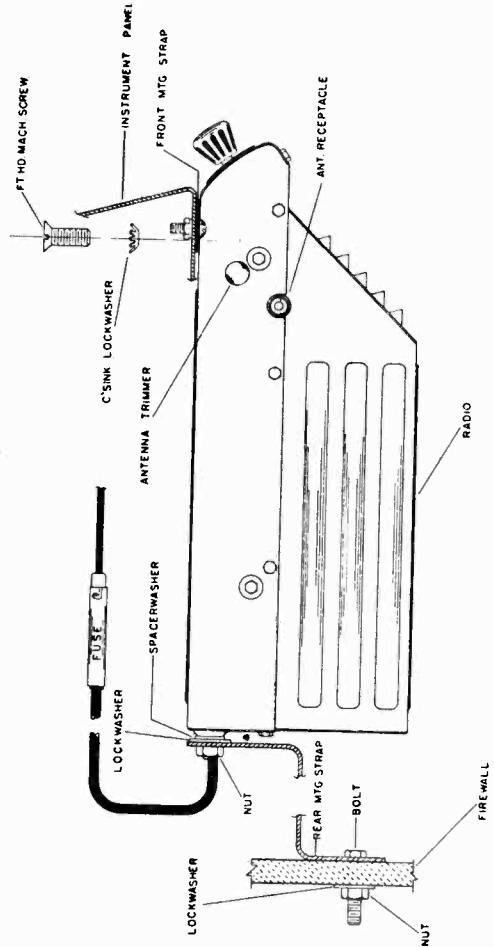
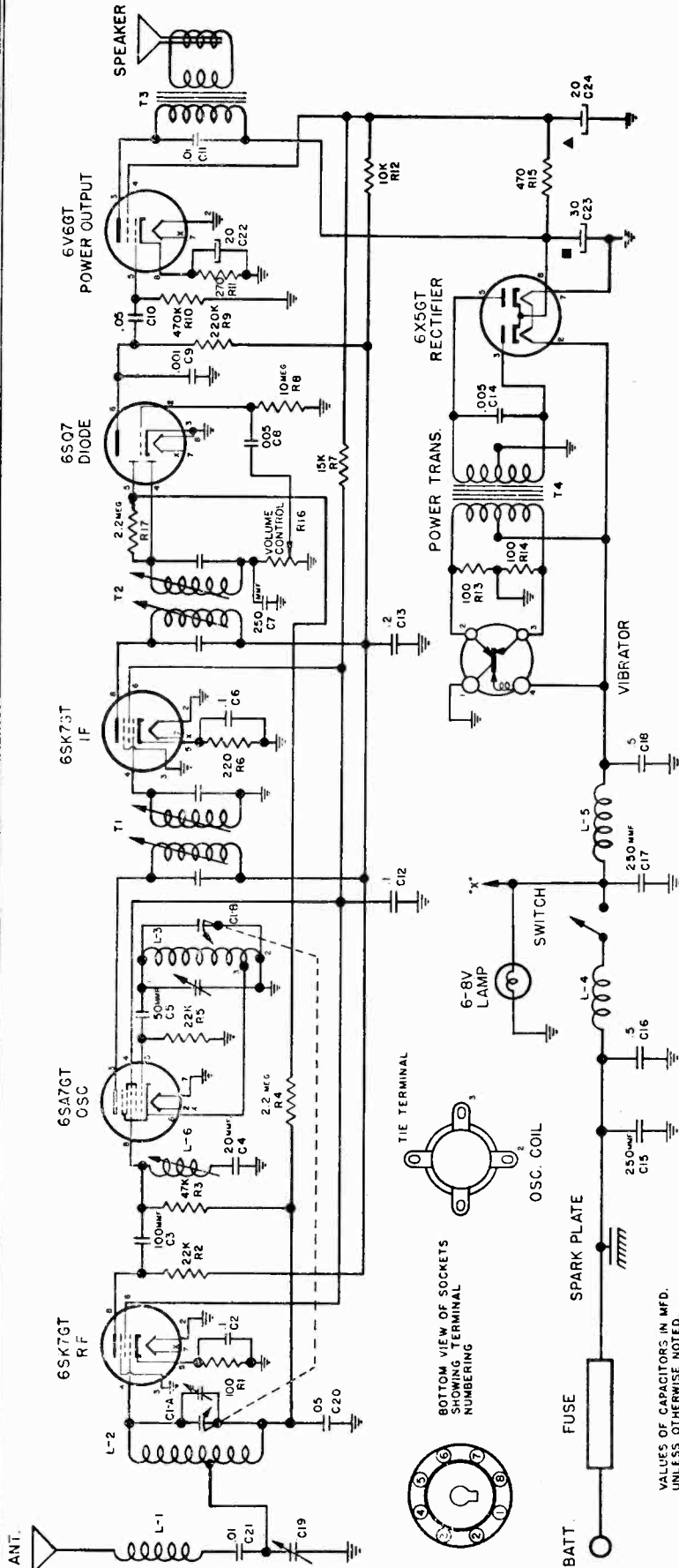


Fig. 1 Front View

MODEL D4818



PARTS LIST CONDENSERS

Schematic Diagram Reference	Part No.	Description
C1A, C1B	B19-196	Variable Condenser
C2, C6, C12	A16-187	.1 MFD. 400 Volt Condenser
C3	A15-196	100 MMFD Ceramic Condenser
C4	A15-202	20 MMFD Ceramic Condenser
C5	A15-204	50 MMFD Ceramic Condenser
C7, C15, C17	A15-176	250 MMFD Mica Condenser
C8	A16-190	.005 MFD. 600 Volt Condenser
C9	A16-191	.001 MFD. 400 Volt Condenser
C10	A16-193	.05 MFD. 600 Volt Condenser
C11, C21	A16-192	.01 MFD. 400 Volt Condenser
C13	A16-188	.2 MFD. 400 Volt Condenser
C14	A16-185	.005 MFD. 1600 Volt Oil Filled Condenser
C16, C18	A16-184	.5 MFD. 100 Volt Condenser
C19	A20-145	Trimmer Condenser
C20	A16-189	.05 MFD. 400 Volt Condenser
C22	A18-289	20 MFD 25 Volt Electrolytic Condenser
C23		30 MFD 350 Volt Electrolytic Condenser
C24		20 MFD. 350 Volt Electrolytic Condenser

RESISTORS

R1, R13, R14	A60-752	100 Ohm 1/2 Watt 10% Resistor
R2, R5	A60-744	22K Ohm 1/2 Watt 10% Resistor
R3	A60-685	47K Ohm 1/2 Watt 20% Resistor
R4, R17	A60-726	2.2 Megohm 1/2 Watt 20% Resistor
R6	A60-753	220 Ohm 1/2 Watt 10% Resistor
R7	A60-716	15K Ohm 1 Watt 10% Resistor
R8	A60-728	10 Megohm 1/2 Watt 20% Resistor
R9	A60-667	220K Ohm 1/2 Watt 20% Resistor
R10	A60-731	470K Ohm 1/2 Watt 20% Resistor
R11	A60-754	270 Ohm 1 Watt 10% Resistor
R12	A60-698	10K Ohm 1 Watt 10% Resistor
R15	A60-694	470 Ohm 1 Watt 10% Resistor
R16	A24-176	Volume Control, 500,000 Ohms, with Switch

COILS

L1	A10-513	Antenna Loading Coil
L2	B10-511	Antenna Coil
L3	A10-512	Oscillator Coil
L4	A33-229	Choke, "A" Line
L5	A33-228	Choke, Vibrator Hash
L6	A10-510	I.F. Trap Coil
T1	A10-508	1st I.F. Transformer
T2	A10-509	2nd I.F. Transformer

TRANSFORMERS

T3	B80-242	Output Transformer (Part of Speaker)
T4	B80-243	Power Transformer

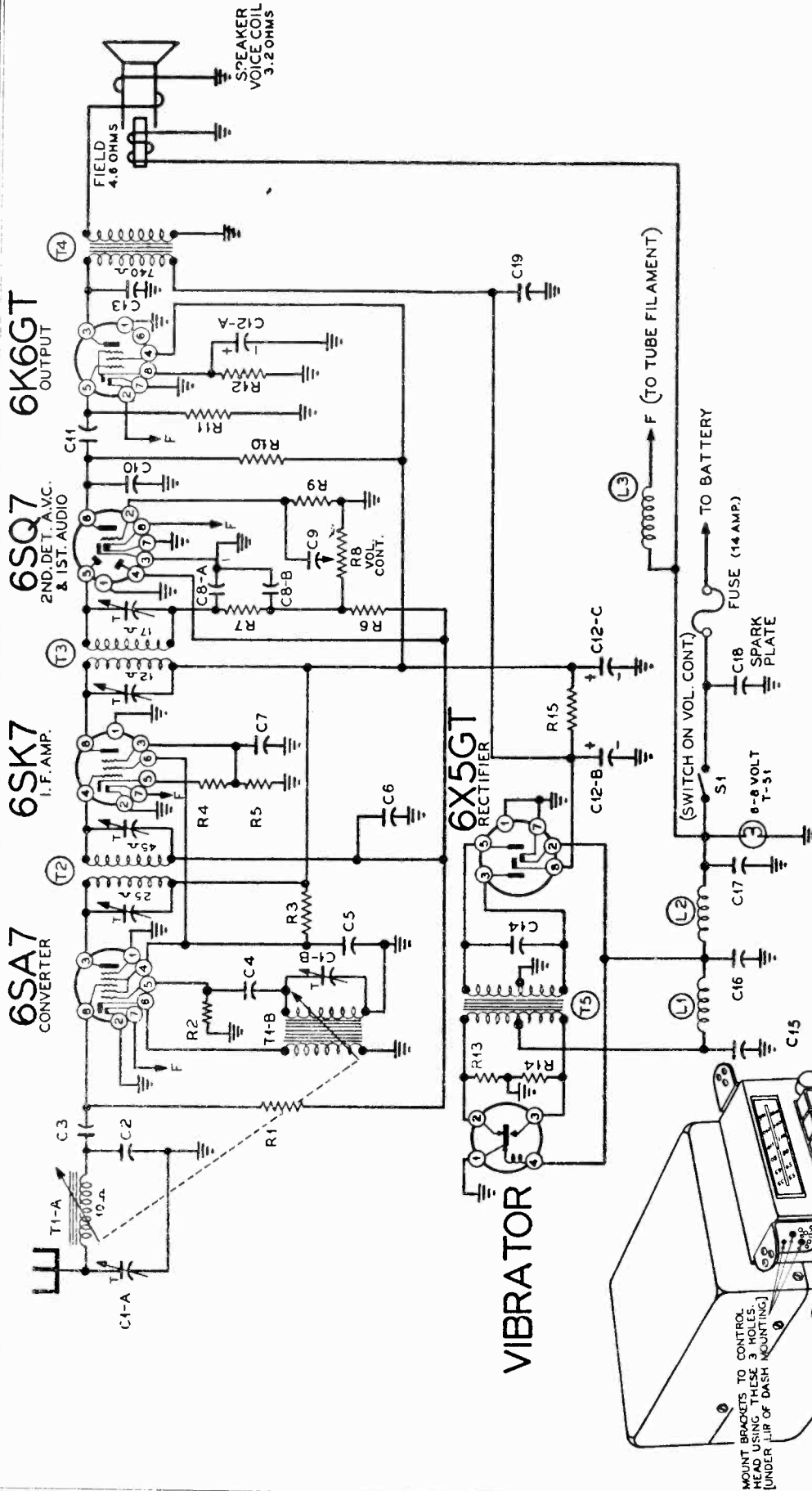
DIAL PARTS

A11-303	Bracket, Dial Scale
A11-304	Bracket, String Guide
A72-29	Bushing, Tuning Shaft Bearing
A70-130	Clip, Spring, for Tuning Shaft
A48-43	Dial Crystal
A58-55	Dial Pointer
B67-516	Dial Scale
A28-101	Gasket for Speaker
A52-247	Knob
A89-10	Pilot Light, Type G.E. No. 422
A65-37	Rivet, Shoulder, for String Guide Bracket
A75-66	Shaft, Tuning
A75-67	Shaft, for Dial Pointer
A70-132	Spring, for Pilot Light Socket
A70-133	Spring, String Tension, Pointer Drive
A70-135	Spring, String Tension, Tuning

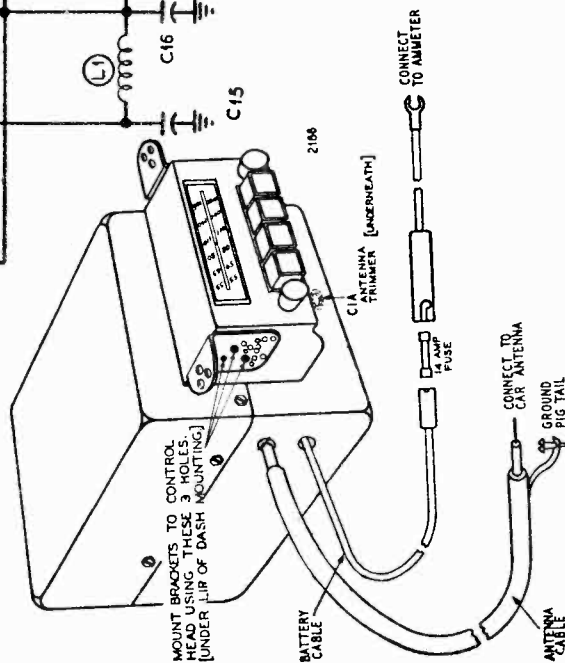
MISCELLANEOUS

A83-421	Clip, I.F. Transformer Mounting
A83-517	Clip, Oscillator Coil Mounting
A43-10	Fuse, 15 Amp.
A47-112	Grommet, Rubber (for Mounting Speaker and Variable Condenser)
B31-134	Mounting Strap, Rear
B31-133	Mounting Plate, Front
S84-192	Mounting Parts Kit
A87-38	Receptacle, Antenna Cable
B79-362	Speaker, 4" P.M. (includes Output Transformer)
S84-193	Suppression Kit Assembly
A34-105	Vibrator
A83-519	Wiper, Grounding, for Case Covers

MODEL D4620



This view shows the battery cable, antenna and ground cable and the two mounting brackets at the side of the tuning dial which are used to mount the radio to the underlip of the dash. These brackets are packed with the kit of hardware and should be fastened to the chassis using the holes shown in solid black. They are then bolted to the underlip of the dash and the rear mounting strap used as shown in the Chevrolet installation. Under Dash Mounting must be used on cars not shown as Dash Mounting in the chart above.



FINAL CONNECTIONS

The antenna cable should be connected and the shield grounded to the car body.

Connect the battery cable to the hot side of the ammeter behind the instrument panel and then insert the fuse in the cable receptor.

ANTENNA TRIMMER

(See Chassis View)

The input circuit has been especially designed to be used with a low capacity antenna of the fish pole or whip type.

Truetone antennas are especially designed to be used with this radio.

Tune in a station on the high frequency end of the dial and adjust the antenna trimmer for maximum volume. A weak station which does not fade is best for this adjustment.

ELIMINATING MOTOR NOISE

GENERATOR CONDENSER

A Generator Condenser must be connected in all cases from the battery terminal of the generator to the Generator frame.

This condenser must not be connected across the field winding terminal on late cars which use Automatic Cutouts.

It is advisable that you find out from your local car dealers where the manufacturer recommends the condenser be connected for each make of car.

DISTRIBUTOR SUPPRESSOR

A Distributor Suppressor is required in practically all cases, except Ford V8's where none is used. The high tension lead must be removed from the distributor head and the suppressor inserted in its place. The high tension lead is then plugged into the suppressor.

AMMETER CONDENSER

A .5 Mfd. by pass condenser should be connected from one ammeter terminal to a good ground on the instrument panel. Usually this condenser plus the generator condenser and distributor suppressor will remove all objectionable ignition noise.

ELECTRICAL ACCESSORIES

If the above procedure has not reduced the noise sufficiently, it will be necessary to continue by passing sources of noise.

Accessories such as lighters, electric motor heaters, horns, light switches, automatic relays, electrical gauges such as oil, water and gas are often a source of interference. In these cases the procedure is to try a condenser from ground to various accessories until the interference is eliminated, then install the condensers in those places permanently. Spark intensifiers should not be used.

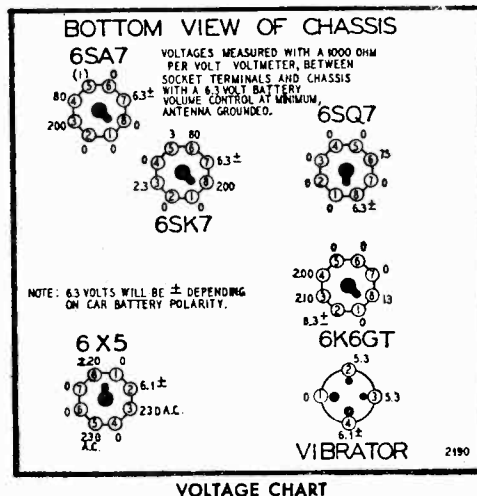
HIGH AND LOW TENSION LEADS

In many cars the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.



MODEL D4620

ELECTRICAL SPECIFICATIONS

Power Supply..... 6 volts D.C.
 Frequency Range..... 530 to 1600 kc.
 Intermediate Freq..... 455 kc.
 Tuning..... Two permeability-tuned circuits.
 Antenna System..... Adjustable to accommodate various car antennae capacities.
 Speaker..... 5-inch; electro dynamic voice coil impedance 3.2 ohms.
 Power Output..... 1 watt undistorted; 1.6 watts maximum.
 Sensitivity..... 20 microvolts average for 500-milli-watt output.
 Selectivity..... 50 kc broad at 1000 times signal at 1000 kc.

ALIGNMENT PROCEDURE

(Refer to Chassis View)

- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to radio chassis.

SIGNAL GENERATOR

BAND	Frequency	Dummy Antenna	Connection to Radio	Ground Connection	ADJUSTMENT Adjust for Max. Output
L.F.	455 kc	.1 mfd.	Pin #4 Grid 6SK7 Tube	Chassis	Adjust Trimmers of T3 output I.F.
L.F.	455 kc	.1 mfd.	Pin #8 Grid 6SA7 Tube	Chassis	Adjust Trimmers of T2 input I.F.
Broadcast Band	1600 kc	30 mmfd.	Antenna Lead	Chassis	Adjust Trimmers C1-B Oscillator and C1-A Antenna.
Broadcast Band	1400 kc	30 mmfd.	Antenna Lead	Chassis	*Slide Antenna Coil lengthwise for max. output by means of a screw driver.
Broadcast Band	1600 kc	30 mmfd.	Antenna Lead	Chassis	**Adjust Antenna Trimmer C1-A to maximum output.

*This adjustment will seldom be necessary in service work as the Antenna Coil is adjusted and sealed in place at the factory. The necessity of this adjustment can be checked quickly by tuning set to a 1400 kc. signal and adjusting C1-A. If a large increase in output is noted the Antenna Coil should be adjusted.

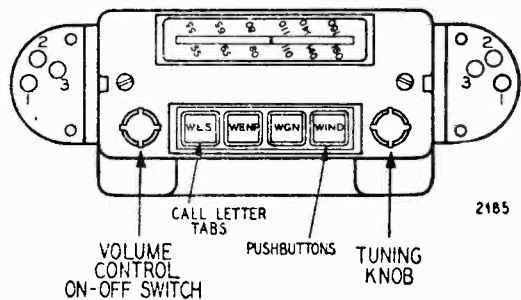
**If Antenna Coil is adjusted, C1-A should be readjusted at 1600 kc. These two adjustments (Antenna Trimmer C1-A and Antenna Coil) should be repeated until no further improvement is noted.

NOTE: At 1600 kc., the Oscillator Core should extend 31/32 inch from the edge of the Coil Form.

1941, 1942 and 1946 Chevrolet

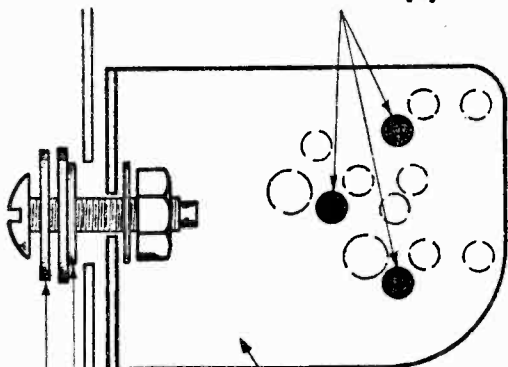
This view shows how the chassis is mounted to the dash. The rear mounting strap (in the kit of hardware) should be bent as shown and used to support the chassis at the back. The two front mounting brackets should be fastened to the chassis using the solid black holes as shown. Lay the bracket on the left hand drawing and the black circles will show through the holes to be used. The two holes marked No. 1 in the front brackets, as shown in the Dial View Drawing, should be used to bolt the chassis to the dash.

FOR CHEV. MOUNTING USE HOLES MARKED [1]
 FOR PONTIAC MOUNTING USE HOLES MARKED [2]
 FOR FORD MOUNTING USE HOLES MARKED [3]



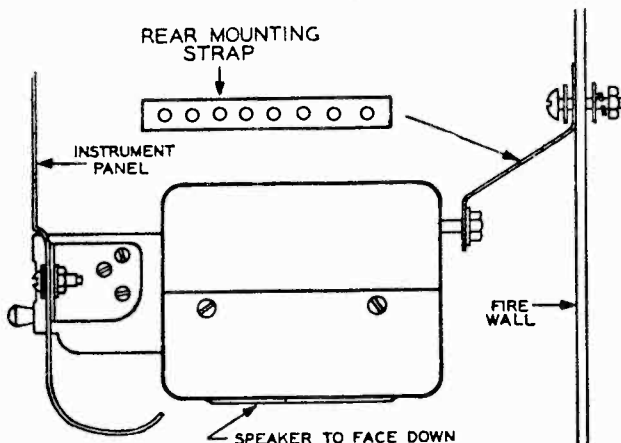
DIAL VIEW WHEN MOUNTED

MOUNT BRACKETS TO CONTROL HEAD USING THESE [3] HOLES.



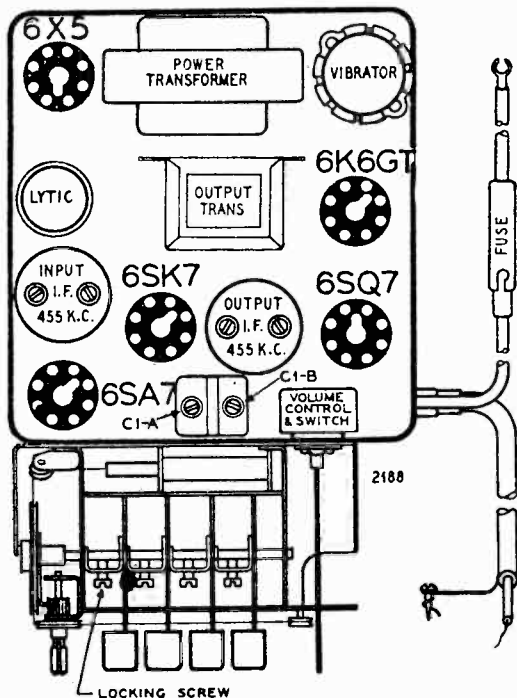
NOTE: USE BRACKET MARKED "LEFT" ON SIDE NEAREST TO STEERING WHEEL.

"LARGE" EXTRUDED WASHER.
 POLISHED FLAT WASHER.



2183

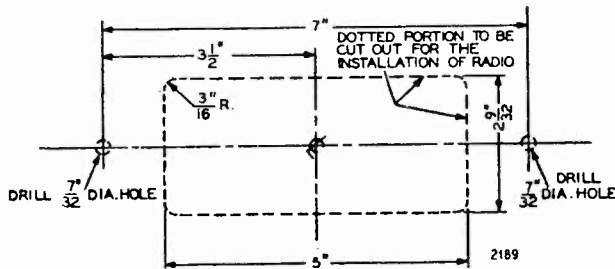
NOTE: Mount Chassis as shown with the speaker face down. Be sure to use rear mounting strap.



CHASSIS VIEW—Showing tube location, trimmers, and the push-button locking-screws.

1941 and 1942 Americar Models (Willys)

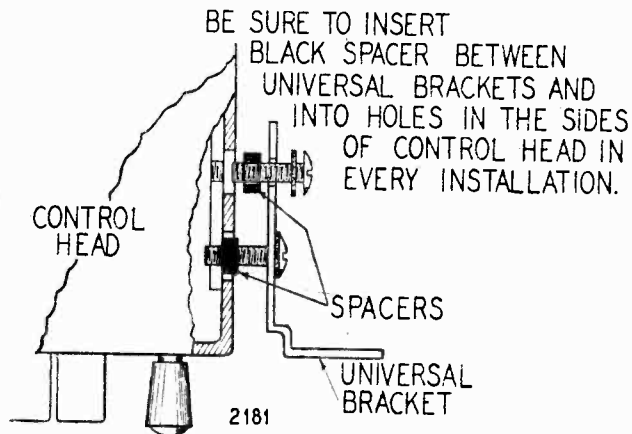
Remove the panel from the left side of the dash and cut an opening, using the dimensions below. Mount the chassis the same as in the Chevrolet installation.



MODEL D4620

IMPORTANT (ALL INSTALLATIONS)

1. Two universal mounting brackets are supplied with the kit of hardware and are mounted in various positions on the chassis for installation in or under the dash of different cars.
2. In all installations it is very important that the black metal spacers be used between the front mounting brackets and the side of the chassis. The spacers must fit into the holes in the side of the chassis. They are packed in the kit of hardware.
3. Be sure to draw the rear mounting strap up tight so that it holds the chassis rigid.
4. In some installations it may be necessary to adjust the antenna trimmer before bolting the chassis to the dash.
5. Two pairs of extruded washers are supplied for use when bolting the chassis to the dash. Be sure the washers seat properly in the dash mounting holes and use the pair which fits the holes snugly.

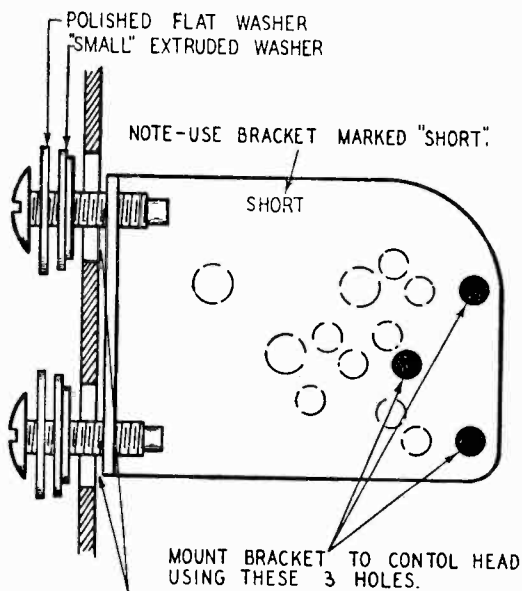
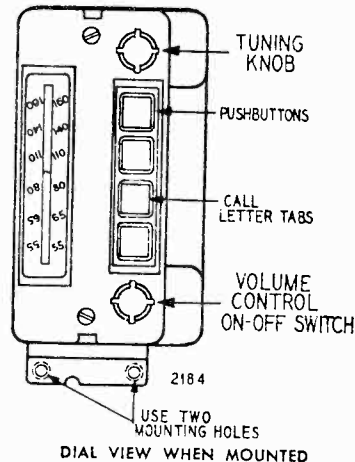


Dash Panel Mounting

1940, 1941, 1942 and 1946 Models of Chrysler, De Soto, Dodge, Plymouth

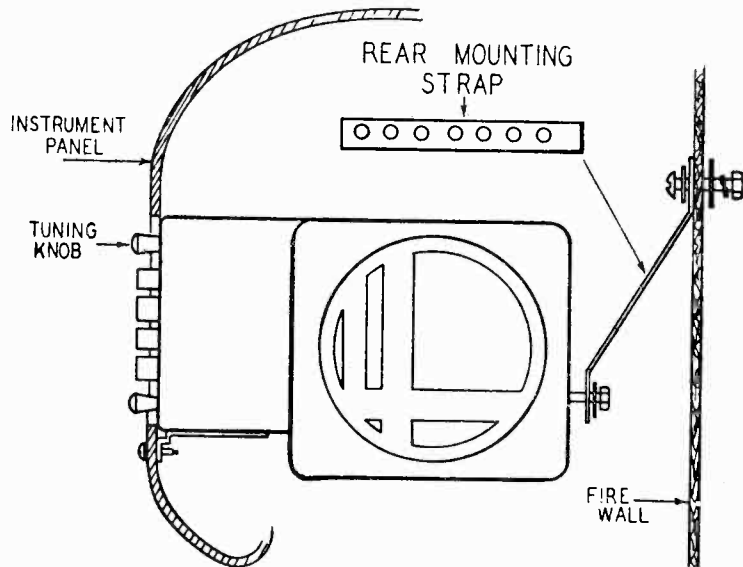
Mount the chassis as shown with the dial vertical. A special bracket marked "short" is supplied with the kit of hardware. Mount this bracket to the chassis, using the solid black holes shown in the left hand drawing. Note that the chassis should be mounted with the tuning knob at the top. It may be necessary in some installations to reverse the bolt in the cowl lever to prevent it from hitting the speaker grill. On Plymouth cars remove Pal nut behind dash at top of dial opening so the dial will come up flush.

The call letters must be carefully trimmed to fit the push-buttons horizontally. Be sure to use the black spacers pictured above when mounting the front (short) bracket.



ON 1941 DODGE INSERT CARDBOARD WASHERS SUPPLIED IN HARDWARE KIT.

NOTE: Lay the bracket on drawing above to identify holes. Bracket when mounted will of course be at bottom of tuner.



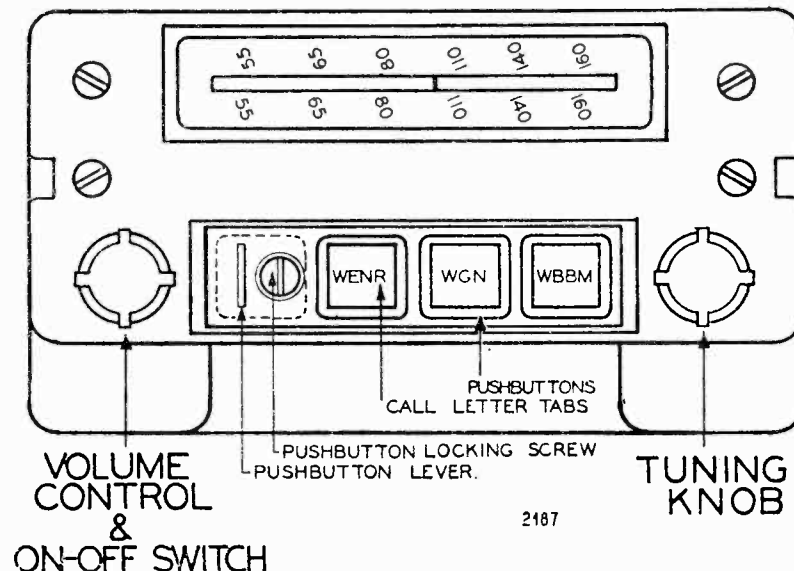
NOTE: Mount Chassis as shown — Be sure to use Rear Mounting Strap.

REPLACEMENT PARTS LIST

When ordering, specify part number, model number, and manual issue

Part No.	Schematic Diagram Reference	Description	No. Used in Set
CONDENSERS			
100-26	C9	.02 x 400 Volt Tubular.....	1
100-87	C13	.01 x 600 Volt Tubular.....	1
100-13	C6	.05 x 400 Volt Tubular.....	1
100-20	C7	.1 x 200 Volt Tubular.....	1
100-9	C5	.05 x 200 Volt Tubular.....	1
100-125	C14	.0035 x 1600 Volt Tubular.....	1
100-25	C11	.002 x 600 Volt Tubular.....	1
100-31	C15, C16, C17	.5 x 120 Volt Oval Type.....	3
100-81		.5 Mfd. Generator Cond.....	1
100-82		.5 Mfd. Ammeter Cond.....	1
119-105	C12 A-B-C	Electrolytic Filter Condenser—20 Mfd. x 25 Volt; 15 Mfd. x 350 Volt; 15 Mfd. x 350 Volt.....	1
124-187	C1-A-B	Ant. and Osc. Dual Trimmer.....	1
129-161	C8A-B	.0001 Dual Mica—10%.....	1
129-2	C3, C10	.0005 Mica Type—20%.....	2
129-188	C2	.00008 Mica Type—3%.....	1
129-21	C4	.0002 Mica Type—20%.....	1
129-12	C19	.00025 Mica Type—20%.....	1
11749B	C18	Spark Plate.....	1
RESISTORS			
C-9B1-35	R9	4.7 Megohm, 1/2 Watt—20%.....	1
C-9B1-27	R10	220K Ohm, 1/2 Watt—20%.....	1
C-9B1-29	R11	470K Ohm, 1/2 Watt—20%.....	1
C-9B1-60	R12	680 Ohm, 1/2 Watt—10%.....	1
C-9B1-34	R6	3.3 Megohm, 1/2 Watt—20%.....	1
C-9B1-23	R7	47K Ohm, 1/2 Watt—20%.....	1
C-9B1-31	R1	1 Megohm, 1/2 Watt—20%.....	1
C-9B1-22	R2	33K Ohm, 1/2 Watt—20%.....	1
C-9B2-76	R3	15K Ohm, 1 Watt—10%.....	1
C-9B2-64	R15	1500 Ohm, 1 Watt—10%.....	1
C-9B1-50	R13, R14	100 Ohm, 1/2 Watt—10%.....	2
C-9B1-52	R4	150 Ohm, 1/2 Watt—10%.....	1
C-9B1-56	R5	330 Ohm, 1/2 Watt—10%.....	1
COILS			
108139B	T2	Input I.F. Coil.....	1
108211	T3	Output I.F. Coil.....	1
C-211-10961		Permeability Tuning Unit Complete with Ant. and Osc. Coils.....	1
T1-A; T1-B			1
10566	L3	"A" Choke No. 16 Wire.....	1
10568	L1-L2	"A" Choke No. 18 Wire.....	2
TRANSFORMERS			
104295	T5	Power Transformer.....	1
B-12C-10235	T4	Output Transformer for Speaker.....	1

Part No.	Schematic Diagram Reference	Description	No. Used in Set
SPEAKER			
B-18B10236		Five Inch Electrodynamic Speaker. Less Output Transformer.....	1
VIBRATOR UNIT			
12629		Plug-In Vibrator Unit.....	1
DIAL AND TUNER PARTS			
A-6D-10740		Dial Scale.....	1
D-4B-10750		Escutcheon.....	1
1121029		Set of Station Call Letters.....	1
128773-45		Knob—For Tuning and Volume.....	2
115860		Shaft for Volume Control.....	1
128766-45		Pushbuttons.....	4
1121027		Pointer.....	1
A-53A-10989		String for Pointer.....	1
120442		Tension Spring for Pointer String.....	1
1121026		Diffuser for Dial.....	2
A-2M-7758		Snap-In Rivet to Fasten Diffuser.....	2
107400		Socket Assembly for Pilot Lite.....	1
10797		6-8 Volt Lite. Type T-51.....	1
115807		Pushrod—For Pushbuttons.....	4
115799		"U" Cam—With Set Screw.....	4
120-184		Return Spring—For Pushrods.....	4
117924		Tuning Shaft.....	1
117311		Pinion Gear—Drives Crown Gear.....	1
13623		Drum Assembly Complete with 115800 Crown Gear.....	1
120441		Tension Spring for Slug String.....	1
MISCELLANEOUS			
107360B		Antenna Cable.....	1
107244		Ammeter Cable.....	1
131225		Fuse—14 Amp.—Type SFE.....	1
115713		Mounting Strap Bracket.....	1
115808		Case Mounting Bracket—Left.....	1
115809		Case Mounting Bracket—Right.....	1
115810		Case Mounting Bracket—Short Left.....	1
117929		Mounting Spacer.....	6
132293		No. 10-32 x 3/4 Fancy Head Screw.....	2
131145		Flat Steel Washer—For Above Screw.....	2
131403		Extruded Washer for Chevrolet 1941-42-46.....	2
131397		Extruded Washer for Dodge—DeSoto—Plymouth—Chrysler 1940-41-42-46.....	2
13625		Complete Kit of Mounting Hardware Including Brackets, Condensers, Screws, etc.....	1
131-50		Buzz, Clips—for case.....	10



MODELS D4842A,
D4842B

SPECIFICATIONS

Power Consumption .....6.5 Amperes at 6.6 Volts	Selectivity .....40 KC Broad at 1000 Times Signal
Power Output (6.6 Volts) .....6.5 Watts 10% Distortion 9.0 Watts Maximum	Tuning Frequency Range 540 to 1600 KC
Sensitivity 2 Microvolts at 1 Watt Output	Intermediate Frequency 455 KC
	Speaker 6" PM Dynamic

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.05 mf., See Note A.

SIGNAL GENERATOR		DUMMY ANTENNA	IRON CORE SETTING	ADJUST TUNING SLUGS (IF) AND TRIMMERS TO MAXIMUM (See Fig. 4)
FREQUENCY SETTING	CONNECTION AT RADIO			1st I.F. PRI. & SEC. ADJ	2nd I.F. PRI. & SEC. ADJ
I.F. 455 KC	Control Grid (prong No. 7) 6BE6 Mixer Tube	.05 mf.	Extreme Position out of Coil	
OSCILLATOR				
1600 KC	Antenna Cable See Note A	See Note A	Extreme Position out of Coil	Oscillator (C1C)
1400 KC ADJUSTMENT				
1400 KC	Antenna Cable	See Note A	Tune to Max. Output with Tuning Knob	RF (C1B) Ant. (C1A)

Reassemble Radio—Install in Car—Connect Car Antenna to Radio.

Car Antenna Readjustment—Tune in weak signal near 1400 KC—Readjust Antenna Trimmer C1A for maximum output.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

NOTE A—Insert the antenna cable plug in the antenna socket on the chassis. The total

capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 30 mmf., use a 30 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through

the dummy antenna capacity to the output of the signal generator.

CALIBRATION—To calibrate the radio see article "Calibrating the Radio"

ANTENNA

HIGH CAPACITY ANTENNA

If this radio is to be installed with a high capacity car antenna (200 to 500 mmf. total capacity of antenna and shielded cable), a 24 inch shielded adapter extension cable is necessary. The adapter is inserted in the socket at the side of the radio case. Then the antenna cable plug is inserted in the socket at the other end of the adapter.

Types of High Capacity Antennas—Over-the-roof types which are long and are mounted close to the metal roof of the car; ordinary built-in roof antennas (not metal roof). Under-car antennas (these are usually high capacity) are not recommended for this radio.

ANTENNA CABLE

CAUTION—Be careful not to bend the antenna cable too sharply or to

clamp it tightly as the small wire inside the cable may be broken.

Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end, otherwise ignition noise may be picked up. The length of the pigtail from the grounding point to the end of the antenna cable should be kept as short as possible, preferably not over one inch.

For the "fish pole" and over-the-roof type antennas, the antenna lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the outside.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed several inches up into the pillar post.

A shielded antenna cable (30 mmf. capacity) with bayonet connector plug is required.

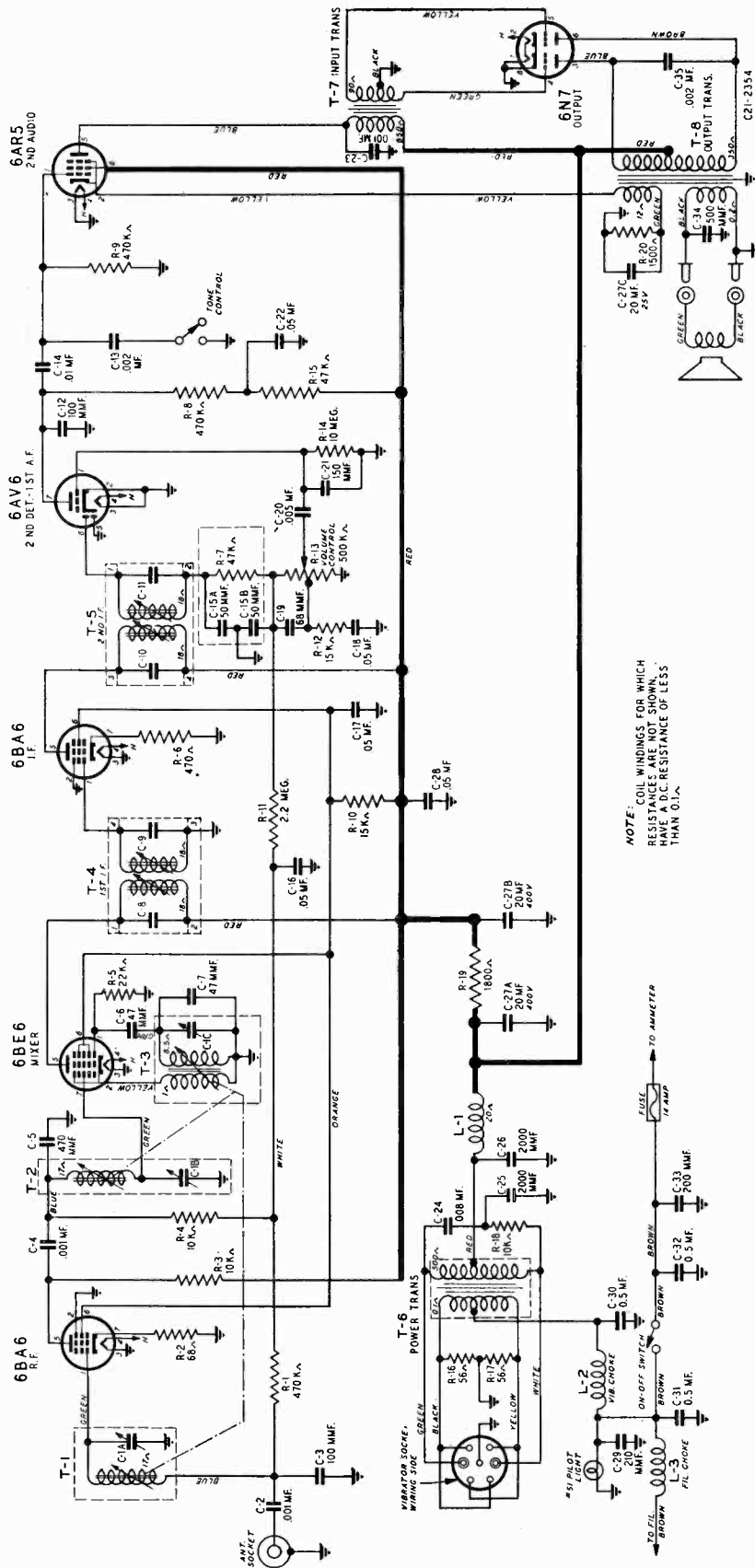
The plug on the antenna cable is inserted in the socket at the side of the radio case as shown in Fig. 3. The wire at the other end of the cable is connected to the antenna.

LOW CAPACITY ANTENNA

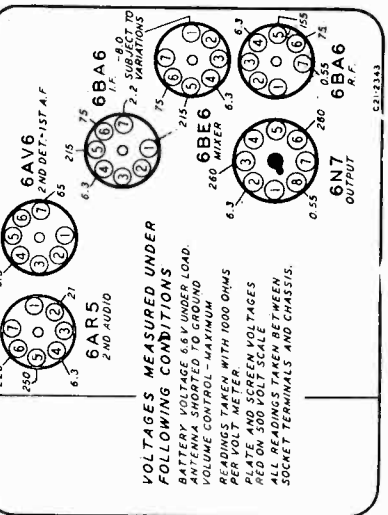
This radio is designed for a low capacity car antenna. The total capacity of antenna and shielded cable should be 40 to 200 mmf.

Types of Low Capacity Antennas—"Fishpole" type, such as door hinge and cowl; over-the-roof types which are short and are mounted quite a distance from the metal roof of the car.

Mount the antenna on the same side of the car as the radio.

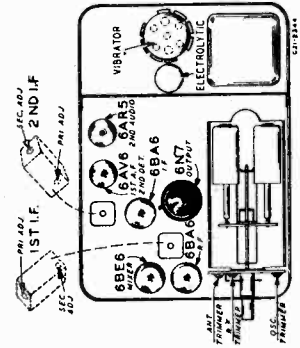


NOTE: COIL WINDINGS FOR WHICH RESISTANCES ARE NOT SHOWN, SHALL BE LESS THAN 0.1 Ω.



Calibrating the Radio
To calibrate the radio, tune in a station of known frequency, loosen the knurled nut at the tuning control clamp fitting and turn the flexible shaft with the fingers until the dial pointer indicates the frequency of the station being received.
Slide the flexible shaft in or out of the tuning control clamp fitting until a smooth action with a minimum of backlash is obtained.
The knurled nut should then be tightened with the fingers.

Fig. 4—Location of Tubes and Vibrator



Adjusting Antenna Trimmer
After the antenna is connected, tune in a weak signal at approximately 1400 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (CIA) in or out until maximum output is obtained. See Fig. 3 for location of this trimmer.

MODELS D4842A,
D4842B

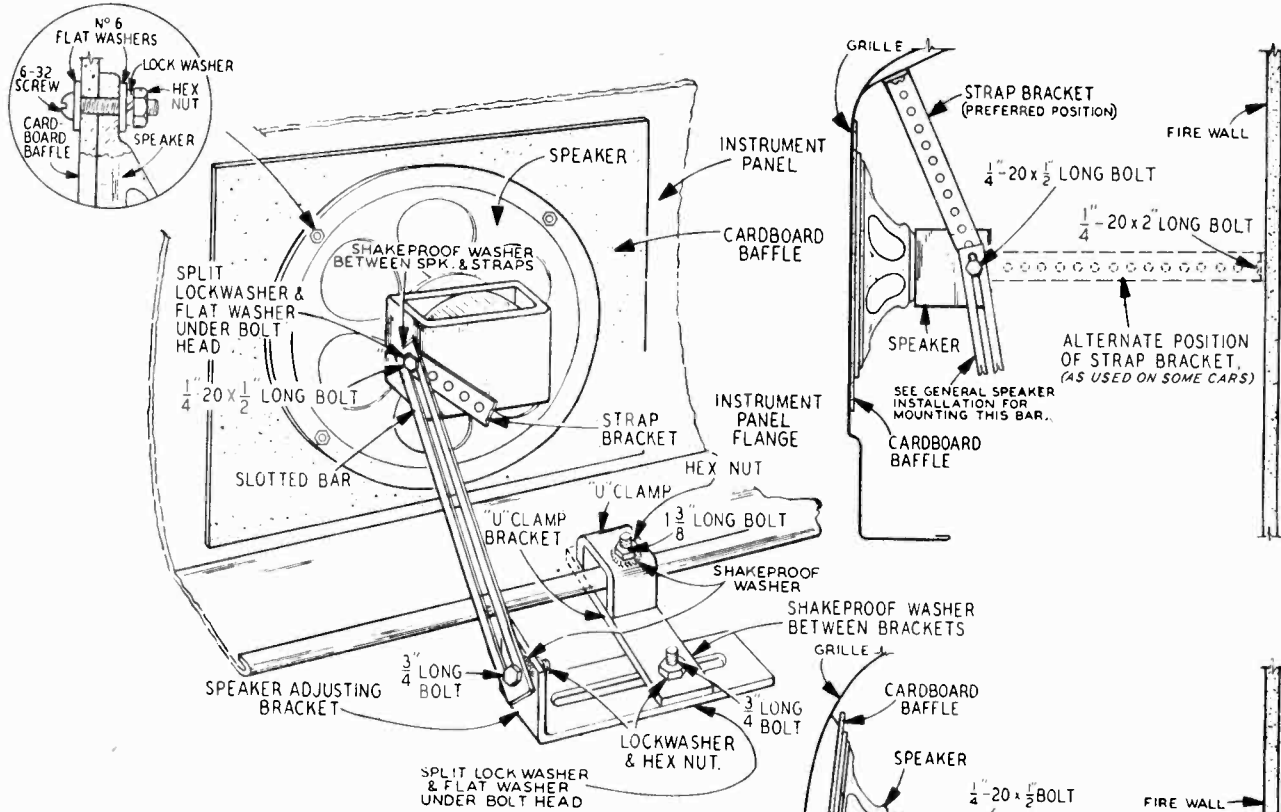


Fig. 2—Typical Methods of Mounting Speaker Behind Instrument Panel Grille

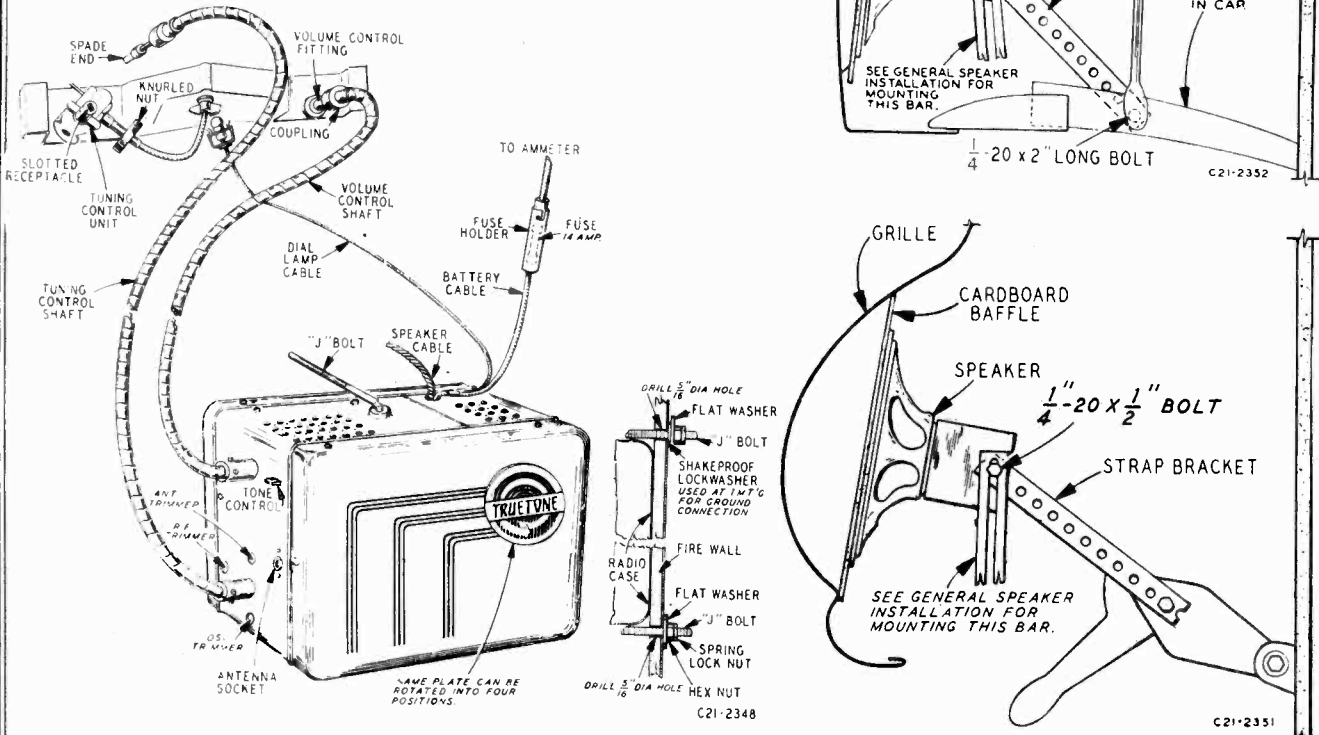


Fig. 3—General Installation View

MODELS D4842A,
D4842B

REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A487	6" P.M. Speaker
76X1	Resistor Capacitor Combination
20A100	Iron Core Tuning Assembly, complete with Coils, Trimmers, etc.
32X390	Tube Shield (miniature)
3A303	Tube Socket Octal (8 prong) Molded
3A442	Tube Socket (miniature)
2A175	Tone Control Switch
3A440	Vibrator Socket (7 prong) Molded
19A42	Vibrator Unit
28X52	Spring Clamp for Vibrator
34X540	Top Cover for Chassis Case, Less Nameplate
4X1018	Name Plate
34X541	Bottom Cover for Chassis Case
28X48	Spring Clip to Ground Covers to Case

TRANSFORMERS AND COILS

L-1	9A1964 R.F. Choke Assembly
L-2	9A1958 Choke Assembly
L-3	
T-1, T-2, T-3	Antenna, R-F, Oscillator Coils and Iron Cores are a part of the 20A100 Tuning Assembly. Entire Assembly must be ordered. (See Miscellaneous).
T-4	9A1963 1st and 2nd I.F. Transformer
T-5	
T-6	53X295 Power Transformer
T-7	50X47 Input Transformer
T-8	51X138 Output Transformer

CAPACITORS

CAPACITY		VOLTAGE	
C-1A	Part of Iron Core Tuning Assembly (See Miscellaneous)		
C-1B			
C-1C			
C-2	46X399	001 mf	400 V Tubular
C-4	47X526	100 mmf	Mica
C-3	47X525	470 mmf	Mica
C-5	47X495	47 mmf	Ceramic
C-6	47X517	47 mmf	Ceramic
C-7	Part of T-4, 1st I.F. Transformer		
C-8			
C-9	Part of T-5, 2nd I.F. Transformer		
C-10			
C-11	47X497	100 mmf	Ceramic
C-12	46X407	.002 mf	600 V Molded
C-13	46X401	.01 mf	400 V Molded
C-14	50-50 mmf Part of 76X1 Res. Cap. Combination (See Miscellaneous)		
C-15A			
C-15B			
C-16	46X397	.05 mf	400 V Molded
C-22	46X398	.05 mf	200 V Molded
C-28			
C-17	46X471	68 mmf	Mica
C-18	46X400	.005 mf	200 V Molded
C-19	47X527	150 mmf	Ceramic
C-20	46X406	.001 mf	1000 V Molded
C-21	P54802	.008 mf	1600 V Tubular
C-22	47X527	2000 mmf	Ceramic
C-25			
C-26	45X366	27 mf	400 V Dry Electrolytic
C-27A			
C-27			
C-27C	47X114	210 mmf	Mica
C-29			
C-30	46X395	.5 mf	100 V Tubular
C-31			
C-32	47X129	200 mmf	Mica
C-33	47X496	500 mmf	Ceramic
C-34	46X405	.002 mf	1000 V Molded
C-35			

RESISTORS

		OHMS	WATTS		
R-1	}	B85474	470 K	0.5	Carbon
R-8					
R-9					
R-2	B85680	68	0.5	Carbon	
R-3	C85103	10 K	1.0	Carbon	
R-4	}	B85103	10 K	0.5	Carbon
R-18					
R-5	B85223	22 K	0.5	Carbon	
R-6	B84471	470	0.5	Carbon	
R-7		47 K	Part of 76X1 Res. Cap. Combination (See Miscellaneous)		
R-10	D84153	15 K	2.0	Carbon	
R-11	B85225	2.2 Meg.	0.5	Carbon	
R-12	B85153	15 K	0.5	Carbon	
R-13	36X377	.5 Meg.	Volume Control		
R-14	E85106	10 Meg.	0.5	Carbon	
R-15	B85473	47 K	0.5	Carbon	
R-16	}	C85560	56	1.0	Carbon
R-17					
R-19	D84182	1800	2.0	Carbon	
R-20	C84152	1500	1.0	Carbon	

CONTROL UNIT ASSEMBLY PARTS

	Quantity Used	
*20A92	1	Tuning Control Unit
*20A91	1	Volume Control Fittings
†	2	Control Knobs, Specify Name of Car, Year, and Model.
		Molded Type
		Chromium Type
* Shipped with each radio. † Shipped with each panel kit.		

INSTALLATION ITEMS

CABLE AND FLEXIBLE SHAFT ASSEMBLIES

	Quantity Used	
18A53	2	27" Tuning Control and Volume Control Flexible Drive Shafts
18A54	2	20" Same as above
18A55	2	36" Same as above
13X390	1	Battery Cable (long section with Fuse Receptacle)
7A162	1	Dial Lamp Socket and Cable Assembly
13X336	1	"A" Cable (Short Section connected to Chassis)
13X582	1	Speaker Cable Assembly (on chassis)

INSTRUMENT PANEL SPEAKER MOUNTING PARTS

26A493	1	Speaker Mounting Kit (For mounting speaker on Instrument Panel) complete with Speaker Baffle, Brackets, Clamps, Nuts, Bolts, and Washers
25X789	1	Strap Bracket
25X787	1	Speaker Adjusting Bracket ("L" Shaped)
30X154	1	"U" Clamp
25X786	1	Bracket for "U" Clamp
25X785	1	9" Slotted Speaker Bar
14X437	1	Cardboard Speaker Baffle
8X108	1	Sponge Rubber Strip

FIRE WALL SPEAKER MOUNTING PARTS

26A380	1	Speaker Mounting Kit (for mounting speaker on Fire Wall) complete with Speaker Housing, Grille Cloth, Speaker Screen, Washers, and Nuts
14X321	1	Speaker Housing only
14X322	1	Grille Cloth
14X320	1	Speaker Screen

MISCELLANEOUS ITEMS

26A492	1	Radio Mounting Bolt Kit complete with "J" Bolts, Nuts, and Washers
20X1549	2	"J" Bolts only
16X27	1	14 Ampere Fuse
21A6	1	Distributor Suppressor
48X27	1	Generator Condenser
7A32	1	No. 51 Pilot Light Bulb
21A7	1	Spark Plug Suppressors (Not shipped with Radio)
21A5	1	Choke-Condenser Unit (Not shipped with Radio)

MODEL H-198,
Ch. V-2137-2



SPECIFICATIONS

FREQUENCY RANGES:

Amplitude Modulation 540 to 1600 kc.
Frequency Modulation 88 to 108 mc.

INTERMEDIATE FREQUENCIES:

Amplitude Modulation 455 kc.
Frequency Modulation 10.7 mc.

TUBE COMPLEMENT:

- 1 12AT7 R-F Amp. and Mixer (FM)
- 1 6BE6 H-F Osc. (AM/FM) and converter (AM)
- 1 6BA6 I-F Amp.
- 1 6BA6 I-F Driver (FM)
- 1 6AL5 Ratio Det. and AVC (FM)
- 1 6AV6 Det. & AVC (AM) and A-F Amp.
- 1 6V6GT Output Amp.
- 1 5Y3GT Rectifier

PILOT LAMPS:

2 Westinghouse No. 47 6.3 v., 0.15 a.

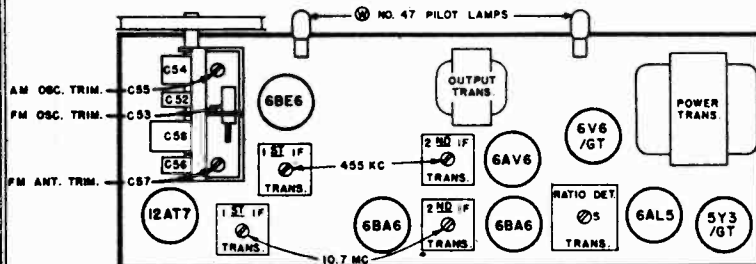
POWER OUTPUT:

Undistorted 3.5 watts
Maximum 6 watts

LOUDSPEAKER: 6" P.M.

OPERATING VOLTAGE: 105 to 120 volts,
60 cycles A-C

POWER CONSUMPTION: 85 watts



CHASSIS NO. V-2137-2

FIG. 1 — TOP VIEW

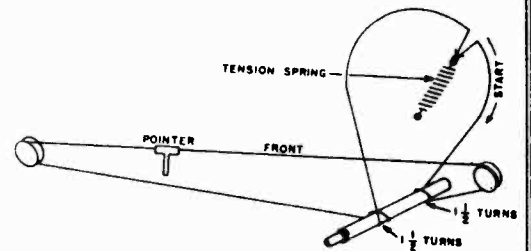
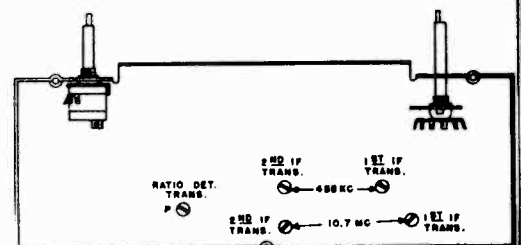


FIG. 2 — DIAL DRIVE



CHASSIS NO. V-2137-2

FIG. 3 — BOTTOM VIEW

MODEL H-198,
Ch. V-2137-2

ALIGNMENT
Broadcast Band

Connect an output meter across the speaker voice coil.

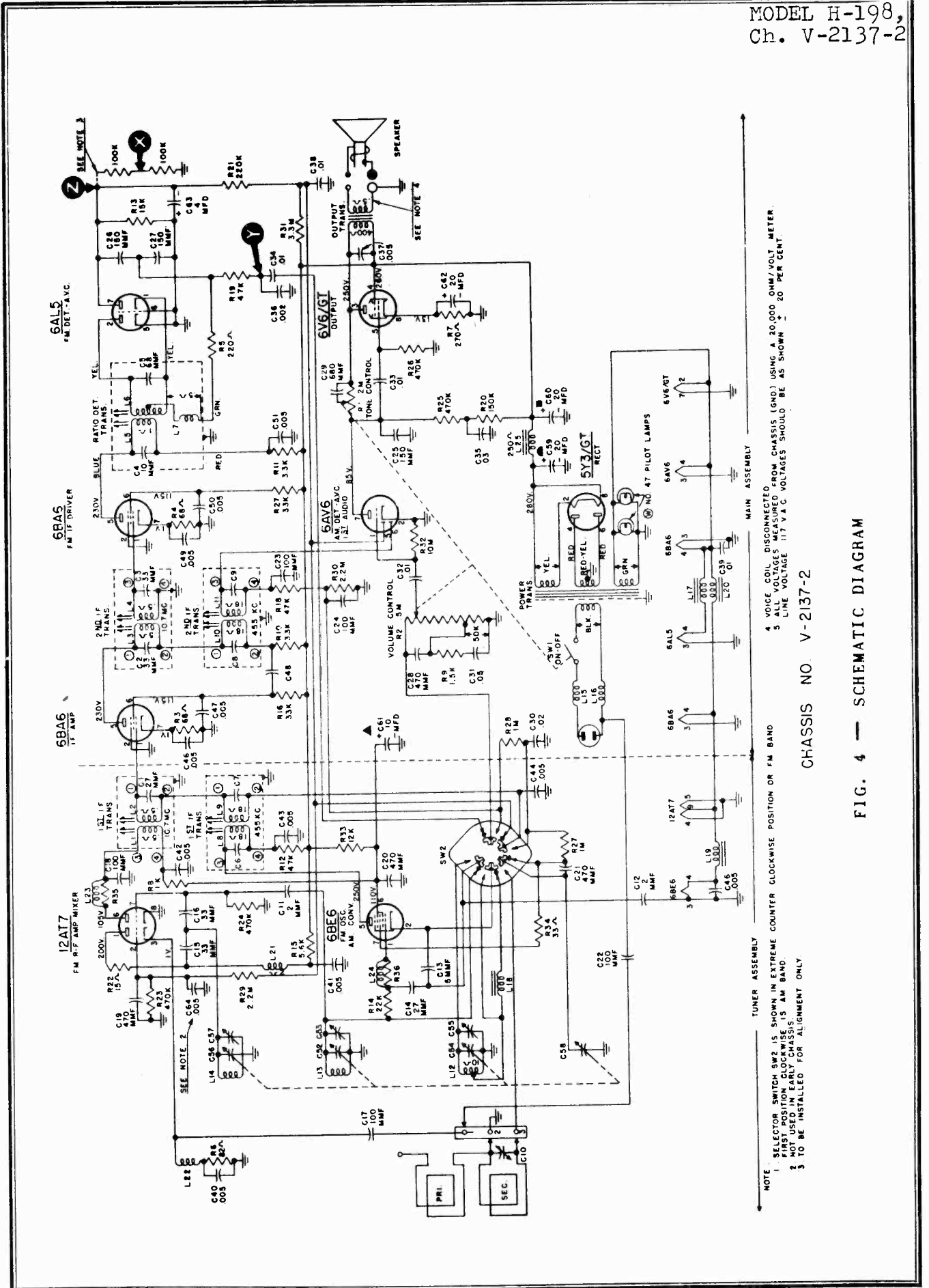
While making the following adjustments, keep the volume control set for maximum output, the tone control set for maximum treble, and the signal generator output attenuated to avoid A.V.C. action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set the band switch to AM.			
2	Stator of tuning capacitor (C58) through a 0.1 mfd capacitor	455 kc.	maximum capacity	455 kc. pri. and sec. of 1st and 2nd I-F trans. for max. output
<p><i>NOTE: If the I-F transformers are badly mis-aligned, it may be impossible to obtain sufficient output using the above system. In this event, it will be necessary to align each transformer separately. Start with the last I-F transformer and work forward, connecting the signal generator through a 0.1 mfd capacitor to the control grid of the tube preceding the transformer under alignment.</i></p>				
3	Radiated signal (no actual connection)	1600 kc.	1600 kc.	AM osc. trimmer (C55) for max. output
4	Radiated signal (no actual connection)	1400 kc.	tune to signal	AM ant. trimmer (C10, located on rear cover) for max. output (rock-in adjustment)

FM Band

Do not align the FM circuits until all AM adjustments have been completed.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set the band switch to FM.			
2	Connect two 100,000 ohm resistors (the resistances must be equal within 5 percent) between pin #7 of the 6AL5 tube and ground as shown on the schematic diagram.			
3	Connect a V.T.V.M. between points "X" and "Y" (see schematic diagram).			
4	Stator of FM conv. section (C56) of tuning capacitor through a .01 mfd mica capacitor	10.7 mc.	maximum capacity	Sec. of ratio det. trans. for zero (use medium strength signal)
5	Connect the V.T.V.M. between point "Z" and ground.			
6	Same as step 4	10.7 mc.	maximum capacity	Pri. of ratio det. trans. and pri. and sec. of 10.7 mc. 1st and 2nd I-F trans. for max.
<p><i>NOTE: The pri. of the ratio det. trans. peaks in two places. Use the peak with the slug farthest out.</i></p>				
7	Reconnect the V.T.V.M. between point "X" and "Y", and increase the signal strength 2 times.			
8	Same as step 4	10.7 mc.	maximum capacity	Recheck sec. of ratio det. trans. for zero voltage
9	Reconnect the V.T.V.M. between point "Z" and ground.			
10	Same as step 4	10.7 mc.	maximum capacity	Pri. of ratio det. trans. for maximum voltage
11	Remove the two 100,000 ohm resistors that were inserted in step 2.			
12	FM ant. terminal through a 300 ohm non-inductive resistor	105 mc.	105 mc.	FM osc. trimmer (C53) for maximum output
13	Same as step 12	105 mc.	105 mc.	FM ant. trimmer (C57) for maximum output



NOTE
 1 SELECTOR SWITCH SW2 IS SHOWN IN EXTREME COUNTER CLOCKWISE POSITION OR FM BAND
 2 FIRST POSITION CLOCKWISE IS AM BAND
 3 NOT USED IN THIS MODEL
 4 VOICE COIL DISCONNECTED FROM CHASSIS (GND) USING A 20,000 OHM/VOLT METER.
 5 ALL VOLTAGES MEASURED FROM CHASSIS SHOULD BE AS SHOWN ± 20 PER CENT.

CHASSIS NO. V-2137-2

FIG. 4 — SCHEMATIC DIAGRAM

MODEL H-198,
Ch. V-2137-2

PARTS LIST FOR MODEL H-198

When ordering parts, specify model number of set in addition to part number and description of part.

CABINET

Part No.	Description
V-6021-6	Bumper
V-1175-1	Cabinet
V-5860-5	Cable Assembly, speaker
V-6447	Cover Rivet Assembly, back
V-6432-2	Feet, cabinet
V-6611-1	Grille Cloth
V-6146-1	Knob, off-on-tone
V-6146-2	Knob, band
V-6147-1	Knob, rear (volume)
V-6147-2	Knob, rear (tuning)
V-6448	Loop, AM antenna and trimmer (C10)
V-6043-3	Panel Assembly, control
V-6449	Speaker, 6" P.M.
V-3267S-6	Washer, flat (chassis mounting)
V-5421-5	Washer, felt (knob)

CHASSIS

V-6120	Background, dial
R2CC30CK020D	Capacitor, ceramic, 2 mmf (C11)
R2CC30OUK020D	Capacitor, ceramic, 2 mmf (C12)
R2CC30CK050D	Capacitor, ceramic, 5 mmf (C13)
R3CC30CK270K	Capacitor, ceramic, 27 mmf (C14)
R3CC26CK330M	Capacitor, ceramic, 33 mmf (C15, 16)
R3CC30SL101M	Capacitor, ceramic, 100 mmf (C17)
R3CC30SL101J	Capacitor, ceramic, 100 mmf (C18)
R5CC21ZY471M	Capacitor, ceramic, 470 mmf (C19, 20, 21)
RCM20A101M	Capacitor, 100 mmf (C22, 23, 24)
RCM20A151M	Capacitor, 150 mmf (C25)
RCM20A151J	Capacitor, 150 mmf (C26, 27)
RCM20A471M	Capacitor, 470 mmf (C28)
RCM20A681M	Capacitor, 680 mmf (C29)
RCP10W2203A	Capacitor, .02 mfd 200 v. (C30)
RCP10W2503A	Capacitor, .05 mfd 200 v. (C31)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C32, 33, 34)
RCP10W4303A	Capacitor, .03 mfd 400 v. (C35)
RCP10W6202A	Capacitor, .002 mfd 600 v. (C36)
RCP10M6502A	Capacitor, .005 mfd 600 v. (C37)
V-5040-13	Capacitor, .01 mfd 200 v. (C38, 39)
V-5596	Capacitor, Hi Kap .005 mfd (C40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 64)
V-6442	Capacitor, variable (C52, 53, 54, 55, 56, 57)
V-8139	Capacitor, trimmer-FM osc. (C53)
V-6121	Capacitor, electrolytic, 20-20 mfd 400 v., 10 mfd 350 v., 20 mfd 25 v. (C59, 60, 61, 62)
V-6638	Capacitor, electrolytic, 4 mfd 150 v. (C63)
V-5426	Clip, I-F mounting
V-6164	Coil, AM osc. (L12)
V-6138	Coil, FM osc. (L13)
V-6806	Coil, FM antenna (L14)
V-6122	Control, volume 0.5 meg. (R2), tone 2 meg. (R1), SW1
V-6123	Dial
No. 47	Lamp, pilot
V-6125	Pointer
V-3166S	Pulley, 7/16" diameter

Part No.	Description
V-4886-11	Reactor, RF (L15, 16)
V-4886-1	Reactor, RF 14 microhenries (L17)
V-4886-2	Reactor, RF 1.1 microhenries (L18, 19, 20)
V-4886-4	Reactor, RF (L21)
V-4886-10	Reactor, RF (L22)
V-4886-6	Reactor, RF (L23, R35)
V-4886-7	Reactor, RF (L24, R36)
V-6161	Reactor, filter choke (L25)
RC10AE680K	Resistor, 68 ohms 1/4 w. (R3, 4)
RC10AE221M	Resistor, 220 ohms 1/4 w. (R5)
RC10AE820K	Resistor, 82 ohms 1/4 w. (R6)
RC30AE271K	Resistor, 270 ohms 1 w. (R7)
RC10AE102K	Resistor, 1000 ohms 1/4 w. (R8)
RC10AE152M	Resistor, 1500 ohms 1/4 w. (R9)
RC30AE332K	Resistor, 3300 ohms 1 w. (R10, 11)
RC10AE472K	Resistor, 4700 ohms 1/4 w. (R12)
RC10AE153K	Resistor, 15,000 ohms 1/4 w. (R13)
RC10AE223K	Resistor, 22,000 ohms 1/4 w. (R14)
RC30AE562K	Resistor, 5600 ohms 1 w. (R15)
RC30AE333K	Resistor, 33,000 ohms 1 w. (R16, 17)
RC10AE473M	Resistor, 47,000 ohms 1/4 w. (R18, 19)
RC10AE154M	Resistor, 150,000 ohms 1/4 w. (R20)
RC10AE224M	Resistor, 220,000 ohms 1/4 w. (R21)
RC10AE150M	Resistor, 15 ohms 1/4 w. (R22)
RC10AE474M	Resistor, 470,000 ohms 1/4 w. (R23, 24, 25, 26)
RC10AE105M	Resistor, 1.0 megohm 1/4 w. (R27, 28)
RC10AE225M	Resistor, 2.2 megohms 1/4 w. (R29, 30)
RC10AE335M	Resistor, 3.3 megohms 1/4 w. (R31)
RC10AE106M	Resistor, 10.0 megohms 1/4 w. (R32)
RC41AE123K	Resistor, 12,000 ohms 2 w. (R33)
RC10AE330K	Resistor, 33 ohms 1/4 w. (R34)
V-6127	Sleeve, dial drive
V-4195	Socket, molded octal (6V6G, 5Y3GT)
V-5673	Socket, miniature wafer (unshielded) (6AV6)
V-6072-1	Socket, miniature wafer (12AT7)
V-6163-1	Socket, miniature (6BE6)
V-6165-2	Socket, dial light
V-6295-1	Socket, miniature wafer (6BA6, 6AL5)
V-3248S	Spring, dial drive
V-3167S-2	Stud, pulley (threaded)
V-6607-1	Switch, selector (SW2)
V-5808	Terminal board, speaker
V-6606	Terminal board, ANT.-GND.
V-6142	Transformer, FM 1st I-F (C1, L1, 2)
V-6129	Transformer, FM 2nd I-F (C2, 3, L3, 4)
V-6128	Transformer, ratio detector (C4, 5, L5, 6, 7)
V-6199-2	Transformer, AM 1st and 2nd I-F (C6, 7, 8, 9, L8, 9, 10, 11)
V-5798	Transformer, audio output
V-6667	Transformer, power

MODEL H-199,
Ch. V-2137-1

MODEL H-199

SPECIFICATIONS

FREQUENCY RANGES:

Amplitude Modulation 540 to 1600 kc.
Frequency Modulation 88 to 108 mc.

INTERMEDIATE FREQUENCIES:

Amplitude Modulation 455 kc.
Frequency Modulation 10.7 mc.

TUBE COMPLEMENT:

1 12AT7 R-F Amp. and Mixer (FM)
1 6BE6 H-F Osc. (AM/FM) and converter (AM)
1 6BA6 I-F Amp.
1 6BA6 I-F Driver (FM)
1 6AL5 Ratio Det. (FM)
1 6AV6 Det. & AVC (AM) and A-F Amp.
1 6V6GT Output Amp.
1 5Y3GT Rectifier

PILOT LAMPS:

2 Westinghouse No. 47 6.3 v., 0.15 a.

POWER OUTPUT:

Undistorted 3.5 watts
Maximum 6 watts

LOUDSPEAKER: 10" P.M.

OPERATING VOLTAGE: 105 to 120 volts,
60 cycles A-C

POWER CONSUMPTION: 110 watts

MODEL H-199,
Ch. V-2137-1

ALIGNMENT

Broadcast Band

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output, the tone control set for maximum treble, and the signal generator output attenuated to avoid A.V.C. action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set the band switch to AM.			
2	Stator of tuning capacitor (C53) through a 0.1 mfd capacitor	455 kc.	maximum capacity	455 kc. pri. and sec. of 1st and 2nd I-F trans. for max. output
NOTE: If the I-F transformers are badly mis-aligned, it may be impossible to obtain sufficient output using the above system. In this event, it will be necessary to align each transformer separately. Start with the last I-F transformer and work forward, connecting the signal generator to the control grid of the tube preceding the transformer under alignment.				
3	Radiated signal (no actual connection)	1600 kc.	1600 kc.	AM osc. trimmer (C55) for max. output
4	Radiated signal (no actual connection)	1400 kc.	tune to signal	AM ant. trimmer (C57) for max. output (rock-in adjustment)

FM Band

Do not align the FM circuits until all AM adjustments have been completed.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Set the band switch to FM.			
2	Connect two 100,000 ohm resistors (the resistances must be equal within 5 percent) between pin #7 of the 6AL5 tube and ground as shown on the schematic diagram.			
3	Connect a V.T.V.M. between points "X" and "Y" (see schematic diagram).			
4	Stator of FM ant. section (C52) on tuning capacitor through a .01 mfd mica capacitor	10.7 mc.	maximum capacity	Sec. of ratio det. trans. for zero (use medium strength signal)
5	Connect the V.T.V.M. between point "Z" and ground.			
6	Same as step 4	10.7 mc.	maximum capacity	Pri. of ratio det. trans. and pri. and sec. of 10.7 mc. 1st and 2nd I-F trans. for max.
NOTE: The pri. of the ratio det. trans. peaks in two places. Use the peak with the slug farthest out.				
7	Reconnect the V.T.V.M. between points "X" and "Y", and increase the signal strength 2 times.			
8	Same as step 4	10.7 mc.	maximum capacity	Recheck sec. of ratio det. trans. for zero voltage
9	Reconnect the V.T.V.M. between point "Z" and ground.			
10	Same as step 4	10.7 mc.	maximum capacity	Pri. of ratio det. trans. for maximum voltage
11	Remove the two 100,000 ohm resistors that were inserted in step 2.			
12	FM ant. terminal through a 300 ohm non-inductive resistor	105 mc.	105 mc.	FM osc. trimmer (C54) for maximum output
13	Same as step 12.	105 mc.	105 mc.	FM ant. trimmer (C56) for maximum output

PARTS LIST FOR MODEL H-199

When ordering parts, specify model number of set in addition to part number and description of part.

Part No.	Description	Part No.	Description
V-5982-2	Antenna Assembly, AM loop .	V-6415-1	Cable, phono
V-5986-5	Antenna Assembly, FM dipole	V-5860-4	Cable Assembly, speaker
V-6120	Background, dial	R2CC30CK020D	Capacitor, 2 mmf (C10)
V-6253-1	Bracket, chassis support . .	R2CC30UK020D	Capacitor, 2 mmf (C11)
V-1172-1	Cabinet, mahogany	R2CC30CK050D	Capacitor, 5 mmf (C12)

MODEL H-199,
Ch. V-2137-1

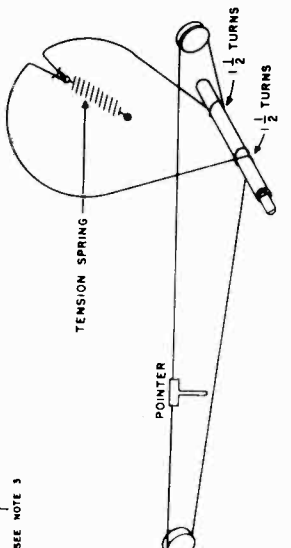
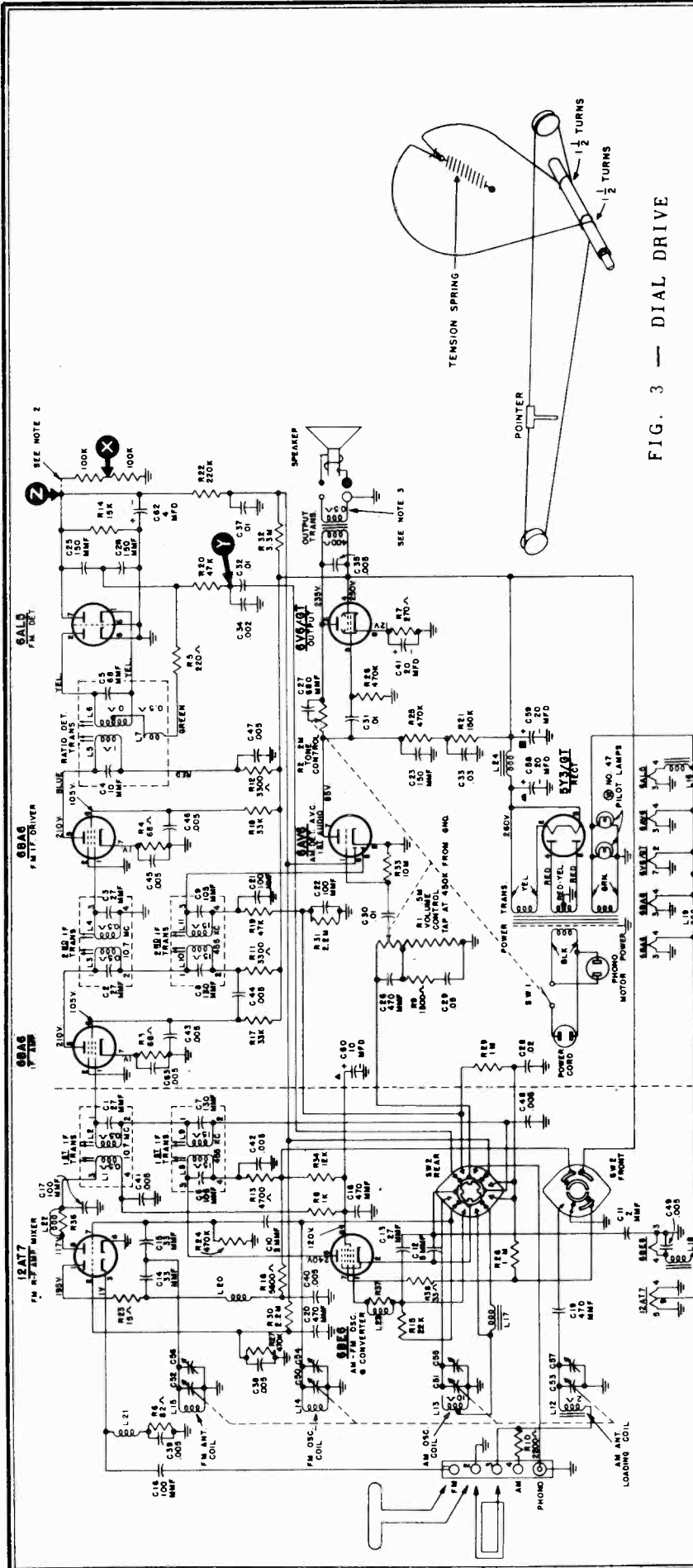
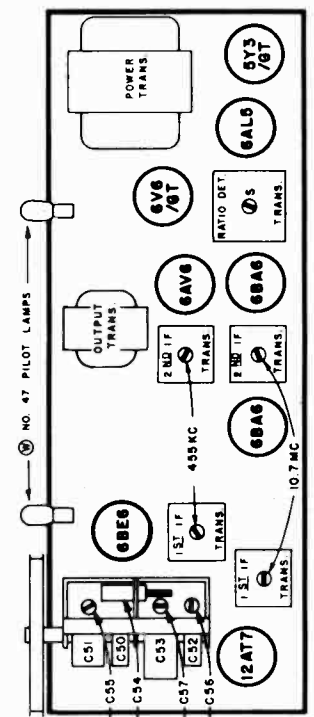


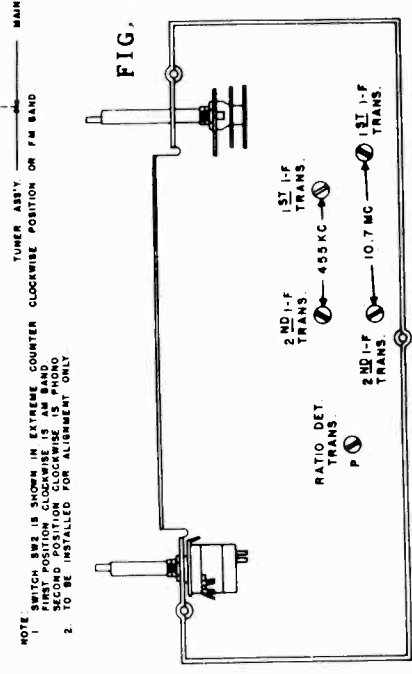
FIG. 3 — DIAL DRIVE

NOTE:
1 SWITCH SW2 IS SHOWN IN EXTREME COUNTER CLOCKWISE POSITION ON FM BAND
2 SECOND POSITION CLOCKWISE IS PHONO
3 VOICE COIL DISCONNECTED FROM CHASSIS (GND) USING A 20,000 OHM/VOLT METER
4 LINE VOLTAGE 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.



CHASSIS NO. V-2137-1

FIG. 1 — TOP VIEW



CHASSIS NO. V-2137-1

FIG. 2 — BOTTOM VIEW

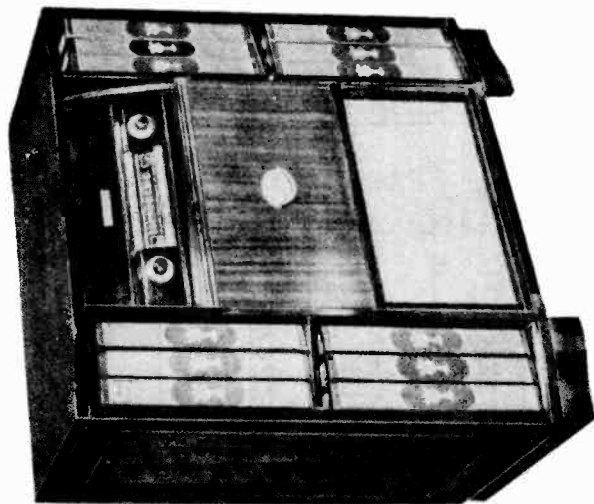
FIG. 4 — SCHEMATIC DIAGRAM

MODEL H-199,
Ch. V-2137-1

PARTS LIST FOR MODEL H-199

Part No.	Description	Part No.	Description	Part No.	Description
RC10AE221M	Resistor, 220 ohms $\frac{1}{2}$ w. (R5)	V-6165-2	Socket, dial light, 7" leads	V-5596	Capacitor, hi Kaps .005 mfd (C38, 39, 40, 41, 42, 43, 44)
RC10AE220K	Resistor, 82 ohms $\frac{1}{2}$ w. (R6)	V-6295-1	Socket, miniature wafer (6BA6, 6AL5)	V-6137	45, 46, 47, 48, 49, 63) ...
RC30AE271K	Resistor, 270 ohms 1 w. (R7)	V-5571	Speaker, 10" P.M.	V-6121	Capacitor, variable (C50, 51, 52, 53, 54, 55, 56, 57)
RC10AE102K	Resistor, 1000 ohms $\frac{1}{2}$ w. (R8)	V-3248S	Spring, dial drive		Capacitor, electrolytic
RC10AE152M	Resistor, 1500 ohms $\frac{1}{2}$ w. (R9)	V-6140	Switch, selector (V-6132-1 tuner assembly)		20 mfd 400 v. (C58)
RC10AE222K	Resistor, 2200 ohms $\frac{1}{2}$ w. (R10)		Front wafer - SW2		10 mfd 400 v. (C59)
RC30AE332K	Resistor, 3300 ohms 1 w. (R11, 12)	V-6136	Rear wafer - SW3		20 mfd 25 v. (C61)
RC10AE472K	Resistor, 4700 ohms $\frac{1}{2}$ w. (R13)		Terminal board, phono-ant.	V-4885	Capacitor, electrolytic,
RC10AE153K	Resistor, 15,000 ohms $\frac{1}{2}$ w. (R14)	V-5798	-GND	V-5426	4 mfd 450 v. (C62)
RC10AE223K	Resistor, 22,000 ohms $\frac{1}{2}$ w. (R15)	V-6128	Transformer, audio output	V-6157	Clip, I-F mounting
RC30AE562K	Resistor, 5600 ohms 1 w. (R16)	V-6129	Transformer, ratio detector (L5, 6, 7, C4, 5)	V-6164	Coil, antenna loading (L12)
RC30AE333K	Resistor, 33,000 ohms 1 w. (R17, 18)	V-6130	Transformer, FM 2nd I-F (L3, 4, C3, 4)	V-6138	Coil, AM oscillator (L13)
RC10AE473M	Resistor, 47,000 ohms $\frac{1}{2}$ w. (R19, 20)		Transformer, AM 1st and 2nd I-F (L8, 9, 10, 11, C6, 7, 8, 9)	V-6139	Coil, FM antenna (L15) ...
RC10AE154M	Resistor, 150,000 ohms $\frac{1}{2}$ w. (R21)	V-6131	Transformer, power	V-6122	Control, volume, 0.5 megohm (R1); tone, 2.0 megohms (R2) and switch (SW1)
RC10AE224M	Resistor, 220,000 ohms $\frac{1}{2}$ w. (R22)	V-6142	Transformer, FM 1st I-F (L1, 2, C1, 2)	V-6314	Dial
RC10AE150M	Resistor, 15 ohms $\frac{1}{2}$ w. (R23)	V-5421-5	Washer, felt (knobs)	V-6155	Fastener, control panel ...
RC10AE474M	Resistor, 470,000 ohms $\frac{1}{2}$ w. (R24, 25, 26, 27)	R3CC30CK270K	Capacitor, 27 mmf (C13) ..	V-4902	Glide, furniture
RC10AE105M	Resistor, 1.0 megohm $\frac{1}{2}$ w. (R28, 29)	R3CC26CK330M	Capacitor, 33 mmf (C14, 15)	V-6310-1	Grille Cloth, speaker
RC10AE225M	Resistor, 2.2 megohms $\frac{1}{2}$ w. (R30, 31)	R3CC30SL101M	Capacitor, 100 mmf (C16)	V-4852	Grommet, chassis mounting
RC10AE335M	Resistor, 3.3 megohms $\frac{1}{2}$ w. (R32)	R3CC30SL101J	Capacitor, 100 mmf (C17) ..	V-4644	Grommet, chassis mounting
RC10AE106M	Resistor, 10.0 megohms $\frac{1}{2}$ w. (R33)	R5CC21ZY471M	Capacitor, 470 mmf (C18, 19, 20)	V-6298-1	Hinge Assembly, L.H.
RC41AE123K	Resistor, 12,000 ohms, 2 w. (R34)	RCM20A101M	Capacitor, 100 mmf (C21, 22)	V-6298-2	Hinge Assembly, R.H.
RC10AE330K	Resistor, 33 ohms $\frac{1}{2}$ w. (R38)	RCM20A151M	Capacitor, 150 mmf (C23) ..	V-6146-1	Knob, off-on, tone
V-6126-1	Sleeve, dial drive	RCM20A151J	Capacitor, 150 mmf (C24, 25)	V-6146-2	Knob, band
V-6300-1	Slide, mechanism (upper L.H.)	RCM20A471M	Capacitor, 470 mmf (C26) ..	V-6147-1	Knob, volume
V-6300-2	Slide, mechanism (lower L.H.)	RCM20A681M	Capacitor, 680 mmf (C27) ..	V-6147-2	Knob, tuning
V-6300-3	Slide, mechanism (upper R.H.)	RCP10W2203A	Capacitor, .02 mfd 200 v. (C28)	No. 47	Lamp, pilot
V-6300-4	Slide, mechanism (lower R.H.)	RCP10W2503A	Capacitor, .05 mfd 200 v. (C29)	V-6160	Molding, control panel ...
V-4195	Socket, molded octal tube (6V6, 5Y3)	RCP10W4103A	Capacitor, .01 mfd 200 v. (C30, 31, 32)	V-6154-2	Panel, control
V-5405	Socket, molded (phono AC)	RCP10W4303A	Capacitor, .03 mfd 400 v. (C33)	V-6043-2	Panel Assembly, control ...
V-5673	Socket, miniature wafer (unshielded) (6AV6)	RCP10W6202A	Capacitor, .002 mfd 600 v. (C34)	V-6125	Pointer
V-6072-1	Socket, miniature wafer (12AT7)	RCP10M6502A	Capacitor, .005 mfd 600 v. (C35)	V-6299-1	Pull, door
V-6163-1	Socket, miniature wafer (6BE6)	V-5040-13	Capacitor, molded paper .01 mfd 200 v. (C36, 37)	V-3166S	Pulley, 7/16" diameter ...
				V-4886-1	Reactor, R-F 14 microhenries (L16)
				V-4886-2	Reactor, R-F 1.1 microhenries (L17, 18, 19)
				V-4886-4	Reactor, R-F (L20)
				V-4886-10	Reactor, R-F (L21)
				V-4886-6	Reactor, R-F (L22, R36) ...
				V-4886-7	Reactor, R-F (L23, R37) ...
				V-6161	Reactor, filter choke (L24) ..
				RC10AE680K	Resistor, 68 ohms $\frac{1}{2}$ w. (R3, 4)

MODELS H-214, H-214A,
Ch. V-2103-3



SPECIFICATIONS

FREQUENCY RANGE 540 to 1600 kc.
INTERMEDIATE FREQUENCY 455 kc.

TUBE COMPLEMENT:

- 1 6SA7 Converter
- 1 6SF7 I-F Amp., Det. and AVC
- 1 6SC7 Audio Amp. and Phase Inverter
- 2 25L6GT Power Output Amp.
- 1 25Z6GT Rectifier

PILOT LAMP Westinghouse No. 47, 6.3 v.,
0.15 amp.

POWER OUTPUT:

Undistorted 2.3 watts
Maximum 3 watts

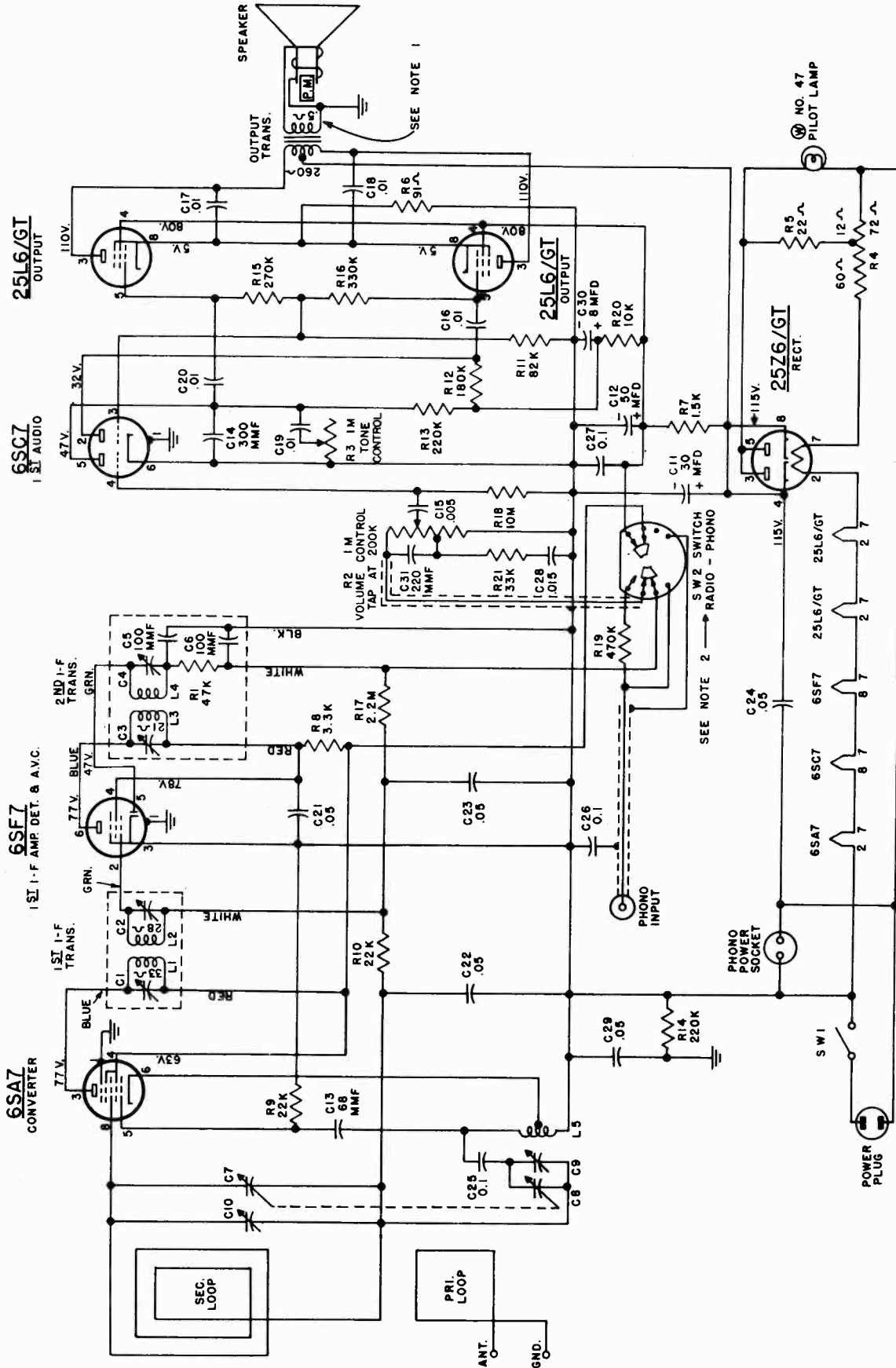
LOUDSPEAKER 6 1/2" PM

OPERATING VOLTAGE 105 to 120 volts,
60 cycles A-C

POWER CONSUMPTION 80 watts

Part No.	Description	Part No.	Description
V-5268	Background, dial	V-4362-6	Knob Assembly, radio-phonograph
V-7895	Board, phono (H-214)	V-5028-1	Knob, volume and tuning
V-7896	Board, phono (H-214A)	#47	Lamp, pilot
V-1173-1	Cabinet (H-214)	V-6338-1	Loop, antenna
V-1173-5	Cabinet (H-214A)	V-5022	Nameplate, stations
V-6340-1	Cable and plug, phono A-C	V-5023	Nameplate, volume
V-6320-1	Cable and socket, phono A-C	V-5632-1	Nameplate
V-6418	Capacitor, variable, two gang (C7, 8, 9)	V-3712	Needle, phonograph
V-3423-1	Capacitor, antenna trimmer (C10)	V-5033	Plate, front glass
V-3304	Capacitor, electrolytic, 30 mfd, 130 v., 50 mfd, 95 v. (C11, 12)	V-4986	Pointer
RCM20A680M	Capacitor, 68 mmfd mica (C13)	V-6309-1	Pull, drawer
RCM20A301M	Capacitor, 300 mmfd mica (C14)	V-3166S	Pulley, 7/16" diameter
RCP10W6502A	Capacitor, .005 mfd 400 v. (C15)	V-3311	Resistor, ballast (R4)
RCP10W4103A	Capacitor, .01 mfd 400 v. (C16, 17, 18, 19, 20)	RC20AE220M	Resistor, 22 ohms 1/2 w. (R5)
RCP10W4503A	Capacitor, .05 mfd 400 v. (C21, 22, 23, 24)	RC30AE910J	Resistor, 91 ohms 1 w. (R6)
RCP10W4104A	Capacitor, 0.1 mfd 400 v. (C25, 26, 27)	RC40AE152M	Resistor, 1500 ohms 2 w. (R7)
RCP10W4153A	Capacitor, .015 mfd 400 v. (C28)	RC10AE332M	Resistor, 3300 ohms 1/2 w. (R8)
V-5618-1	Capacitor, .05 mfd 400 v. (C29)	RC10AE223M	Resistor, 22 K 1/2 w. (R9, 10)
V-6321-1	Capacitor, electrolytic, 8 mfd 150 v. (C30)	RC10AE823K	Resistor, 82 K 1/2 w. (R11)
RCM20A221M	Capacitor, 220 mmfd mica (C31)	RC20AE184K	Resistor, 180 K 1/2 w. (R12)
V-3382	Coil, oscillator (L5)	RC20AE224K	Resistor, 220 K 1/2 w. (R13)
V-5585	Connector, phono pickup cable	RC10AE224M	Resistor, 220 K 1/2 w. (R14)
V-6341	Connector, phono	RC10AE274K	Resistor, 270 K 1/2 w. (R15)
V-6443	Control, volume, tone, and switch (R2, R3, SW1)	RC10AE334K	Resistor, 330K 1/2 w. (R16)
V-3219S-1	Cord, dial	RC10AE225M	Resistor, 2.2 megohms 1/2 w. (R17)
V-4983	Dial	RC10AE106M	Resistor, 10 megohms 1/2 w. (R18)
V-7897	Drawer	RC10AE474M	Resistor, 470 K 1/2 w. (R19)
V-4902	Grille, furniture	RC20AE103M	Resistor, 10 K 1/2 w. (R20)
V-6330-1	Grille cloth	RC20AE333M	Resistor, 33 K 1/2 w. (R21)
V-4362-3	Knob Assembly, tone and switch	V-6323-1	Sleeve, dial drive
		V-3353-3	Slide mechanism (L.H.)
		V-3353-4	Slide mechanism (R.H.)
		V-6325-1	Spacer, radio-phonograph switch mounting
		V-6336	Speaker, 6 1/2" P.M.
		V-3258S	Spring, knob (tone and switch, radio-phonograph)
		V-3248S	Spring, dial drive
		V-6326-1	Switch, selector
		V-3328	Transformer, 1st I-F (C1, C2, L1, L2)
		V-3329	Transformer, 2nd I-F (C3, C4, C5, C6, L3, L4, R1)
		V-3297	Transformer, output

MODELS H-214, H-214A,
Ch. V-2103-3



NOTE:
 1. SPEAKER DISCONNECTED.
 2. SWITCH SW2 IS SHOWN IN BROADCAST POSITION.
 SECOND POSITION CLOCKWISE IS PHONO.
 3. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER.
 LINE VOLTAGE 117 VOLTS A-C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.

CHASSIS NO. V-2103-3

MODELS H-214, H-214A,
Ch. V-2103-3

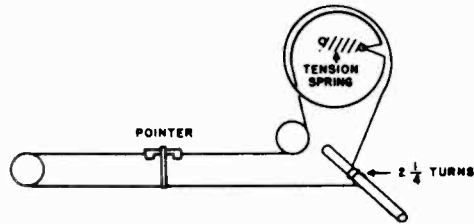


FIG. 2 — DIAL DRIVE

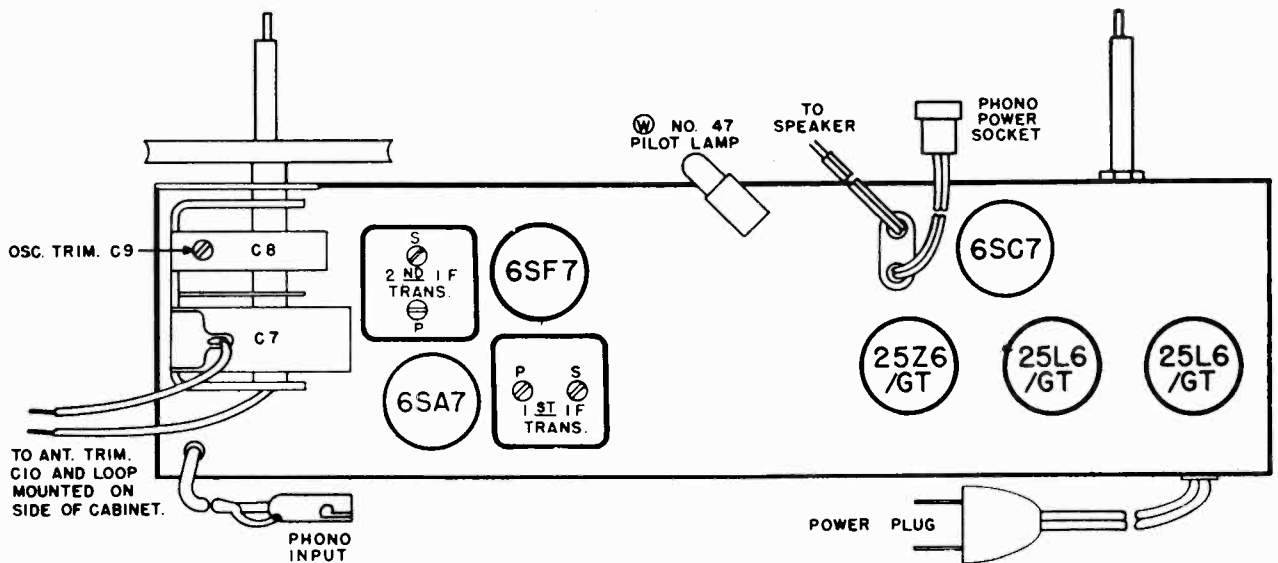


FIG. 3 — CHASSIS LAYOUT

ALIGNMENT PROCEDURE

The use of an isolation transformer in the power line is recommended.

Connect an output meter across the speaker voice coil.

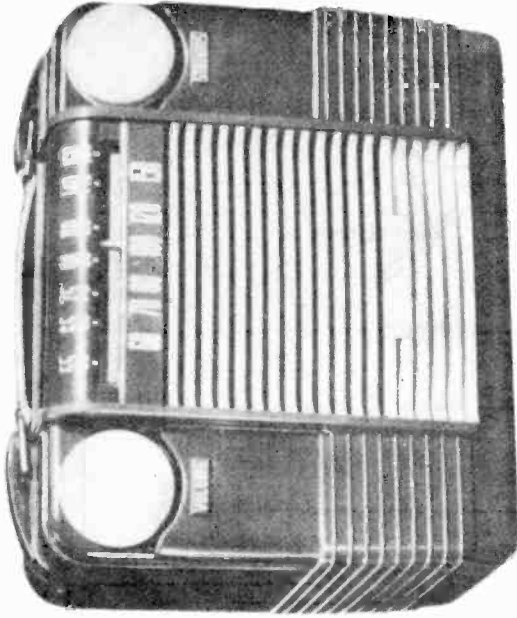
While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid A.V.C. action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial Setting	Adjust
1	Pin No. 2 of 6SF7 tube through a 200 mmf capacitor	455 kc	540 kc	Secondary and primary of 2nd I-F transformer for maximum output
2	Stator of tuning capacitor (C7) through a 200 mmf capacitor	455 kc	540 kc	Secondary and primary of 1st I-F transformer for maximum output
3	Recheck 1st and 2nd I-F transformers.			
4	Antenna terminal through a 200 mmf capacitor	1615 kc	1615 kc	Oscillator trimmer (C9) for maximum output
5	Radiated signal (no actual connection)	1400 kc	1400 kc	Antenna trimmer (C10) for maximum output

MODELS H-303P4,
H-304P4, Ch. V-2153

H-303P4
LUGGAGE TAN

H-304P4
BLONDE



SPECIFICATIONS

FREQUENCY RANGE: 540 to 1615 kc. POWER SUPPLY:

Battery Operation:

- 1 Westinghouse V-9292 "A" battery (4.5 v.)
- 1 Westinghouse V-9293 "B" battery (90 v.)

Line Operation:

105 to 120 volts, 50 - 60 cycles A-C, or D-C

TUBE COMPLEMENT:

- 1 1R5 Converter
- 1 1U4 I-F Amp.
- 1 1U5 Det., AVC and 1st A-F Amp.
- 1 3V4 Power Output Amp.

POWER OUTPUT:

Maximum 0.23 watt
Undistorted 0.12 watt

CURRENT CONSUMPTION (Battery Operation):

"A" Battery 0.1 amp.
"B" Battery 0.014 amp.

LOUDSPEAKER: 4" P.M. POWER CONSUMPTION (Line Operation): 15 watts

ALIGNMENT

It is recommended that the chassis be isolated from the power line by means of an isolation transformer.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid AVC action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial	Adjust for Maximum Output —
1.	Stator of R-F tuning capacitor (C5) through a 200 mmf capacitor	455 kc.	minimum capacity	Top and bottom slugs in 2nd and 1st I-F trans. in order given*
2.	Same as step 1	1615 kc.	minimum capacity	Osc. trimmer (C8)
3.	Radiated signal	1400 kc.	1400 kc.	R-F trimmer (C6)

**It is recommended that a fiber aligning tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot.*

BATTERY PLACEMENT NOTE: The batteries should be inserted in the relative positions shown in Fig. 2 with the connector end of the "B" battery facing the front of the receiver and the connector end of the "A" battery facing the side of the "B" battery.

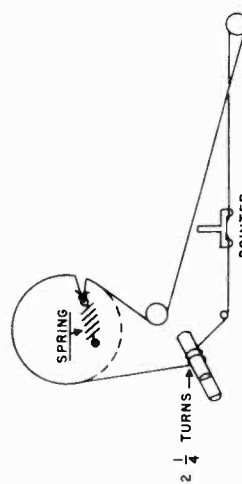
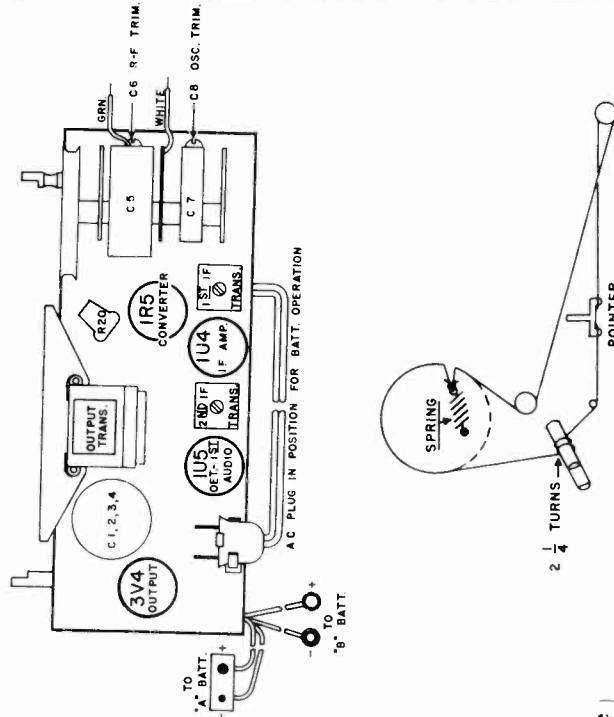
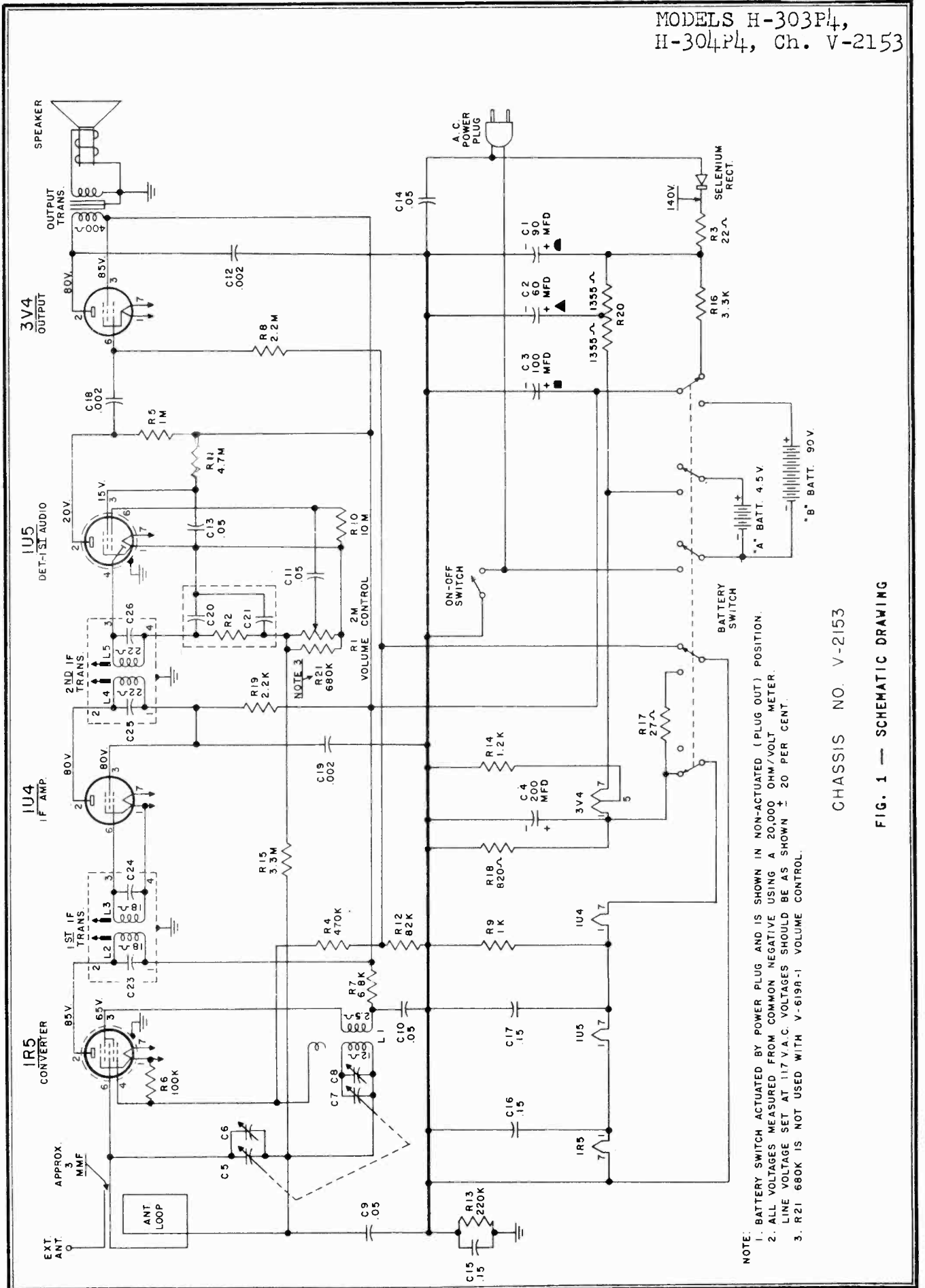


FIG. 3 — DIAL DRIVE

MODELS H-303P4,
H-304P4, Ch. V-2153



- NOTE:
1. BATTERY SWITCH ACTUATED BY POWER PLUG AND IS SHOWN IN NON-ACTUATED (PLUG OUT) POSITION.
 2. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER. LINE VOLTAGE SET AT 117 V.A.C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.
 3. R21 680K IS NOT USED WITH V-6198-1 VOLUME CONTROL.

CHASSIS NO. V-2153

FIG. 1 — SCHEMATIC DRAWING

MODELS H-303P4,
H-304P4, Ch. V-2153

PARTS LIST

CABINET AND ACCESSORIES

<i>Part No.</i>	<i>Description</i>
V-5675-2	Baffle and grille cloth assembly
V-9292	Battery "A"
V-9293	Battery "B"
V-4836-8	Button, trimmer adj. hole (tan)
V-4836-9	Button, trimmer adj. hole (blonde)
V-1157-6	Cabinet (tan)
V-1157-7	Cabinet (blonde)
V-5684	Clip, tubular (back cover catch)
V-5678-2	Handle
V-5698-1	Knob
V-9405	Loop, antenna
V-5764	Shelf, battery support
V-5687	Spring, back cover hinge
V-4651	Stud, baffle and grille cloth mounting

V-2153 CHASSIS

V-5652	Background, dial
V-4169-1	Base (1R5, 1U5)
V-9415	Cable assembly, battery
V-9416	Capacitor, electrolytic, 90, 60 and 100 mfd at 150 v, 200 mfd 25 v. (C1, 2, 3, 4)
V-5651	Capacitor, variable (C5, 6, 7, 8)
RCP10W2503M	Capacitor, .05 mfd 200 v. (C9, 10, 11)
V-6066-4202M	Capacitor, .002 mfd 400 v. (C12)
V-6066-2503M	Capacitor, .05 mfd 200 v. (C13)
V-6066-4503M	Capacitor, .05 mfd 400 v. (C14)
RCP10W2154M	Capacitor, .15 mfd 200 v. (C15, 16, 17)
RCP10W4202M	Capacitor, .002 mfd 400 v. (C18)
RCP10W6202M	Capacitor, .002 mfd 600 v. (C19)
V-5426	Clip, I-F mounting
V-5661	Coil, oscillator (L1)
V-6198-1	Control, volume on-off (R1 - 2 megohms)
V-4349-8	Cord, A-C
V-3219S-1	Cord, dial drive
V-6232-2	Filter, diode (R2, C20, 21)
V-5398-1	Pulley
V-9446-1	Rectifier, selenium
RC30AE220M	Resistor, 22 ohms 1 w. (R3)
RC20AE474M	Resistor, 470,000 ohms ½ w. (R4)
RC20AE105M	Resistor, 1 megohm ½ w. (R5)
RC20AE104M	Resistor, 100,000 ohms ½ w. (R6)
RC20AE682M	Resistor, 6800 ohms ½ w. (R7)
RC20AE225M	Resistor, 2.2 megohms ½ w. (R8)
RC20AE102M	Resistor, 1000 ohms ½ w. (R9)
RC20AE106M	Resistor, 10 megohms ½ w. (R10)
RC20AE475M	Resistor, 4.7 megohms ½ w. (R11)
RC20AE823K	Resistor, 82,000 ohms ½ w. (R12)
RC20AE224M	Resistor, 220,000 ohms ½ w. (R13)
RC20AE122K	Resistor, 1200 ohms ½ w. (R14)
RC20AE335M	Resistor, 3.3 megohms ½ w. (R15)
RC20AE332K	Resistor, 3300 ohms ½ w. (R16)
RC20AE270K	Resistor, 27 ohms ½ w. (R17)
RC20AE821K	Resistor, 820 ohms ½ w. (R18)
RC20AE222M	Resistor, 2200 ohms ½ w. (R19)
V-9125-2	Resistor, filament dropping (R20)
RC20AE684M	Resistor, 680,000 ohms ½ w. (R21)
V-6191-1	Shaft, tuning
V-4169-2	Shield, tube (1R5, 1U5)
V-4292S-1	Socket, miniature molded
V-6295-3	Socket, miniature wafer
V-9419	Speaker, 4" P.M.
V-4057	Spring, dial drive
V-9420	Switch, line-battery
V-6972-3	Transformer, 1st I-F (L2, 3, C23, 24)
V-6972-4	Transformer, 2nd I-F (L4, 5, C25, 26)

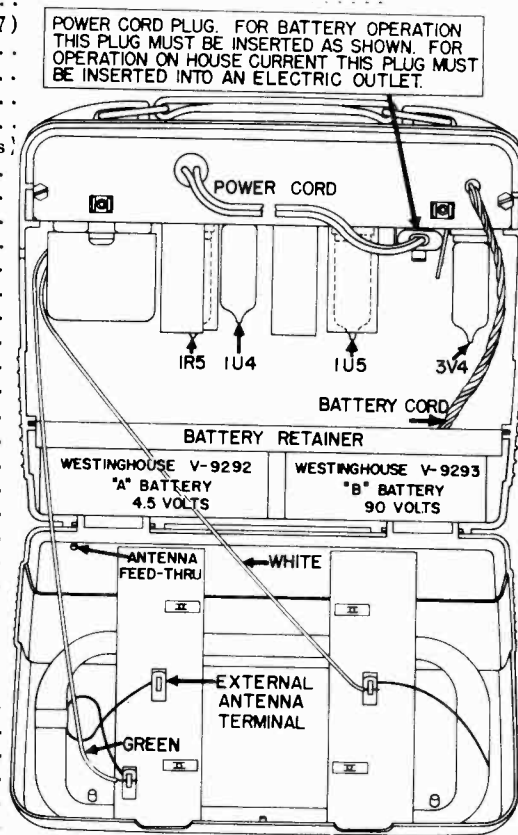


FIG. 2 — REAR VIEW WITH COVER OPEN

MODELS H-300T5,
H-301T5; Ch. V-2148



H-300T5 AND H-301T5

(BROWN)

(IVORY)

SERVICE NOTES

SPECIFICATIONS

FREQUENCY RANGE: 540 to 1615 kc.

INTERMEDIATE FREQUENCY: 455 kc.

TUBE COMPLEMENT:

1	12BE6	.....	Converter
1	12BA6	.....	I-F Amp.
1	12AT6	.....	Det., AVC, and 1st A-F Amp.
1	50C5	.....	Output Amp.
1	35W4	.....	Rectifier

PILOT LAMP: Westinghouse No. 47

POWER OUTPUT:

Undistorted	.....	1.0 watt
Maximum	.....	1.9 watts

LOUDSPEAKER: 5" P.M.

OPERATING VOLTAGE: 105 to 120 volts 50 - 60 cycles A-C or D-C

POWER CONSUMPTION: 35 watts

MODELS H-300T5,
H-301T5; Ch. V-2148

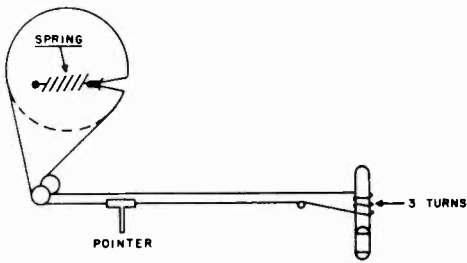


FIG. 1 — DIAL DRIVE

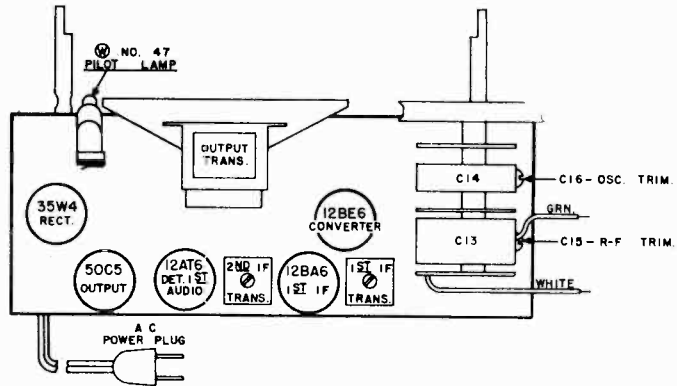
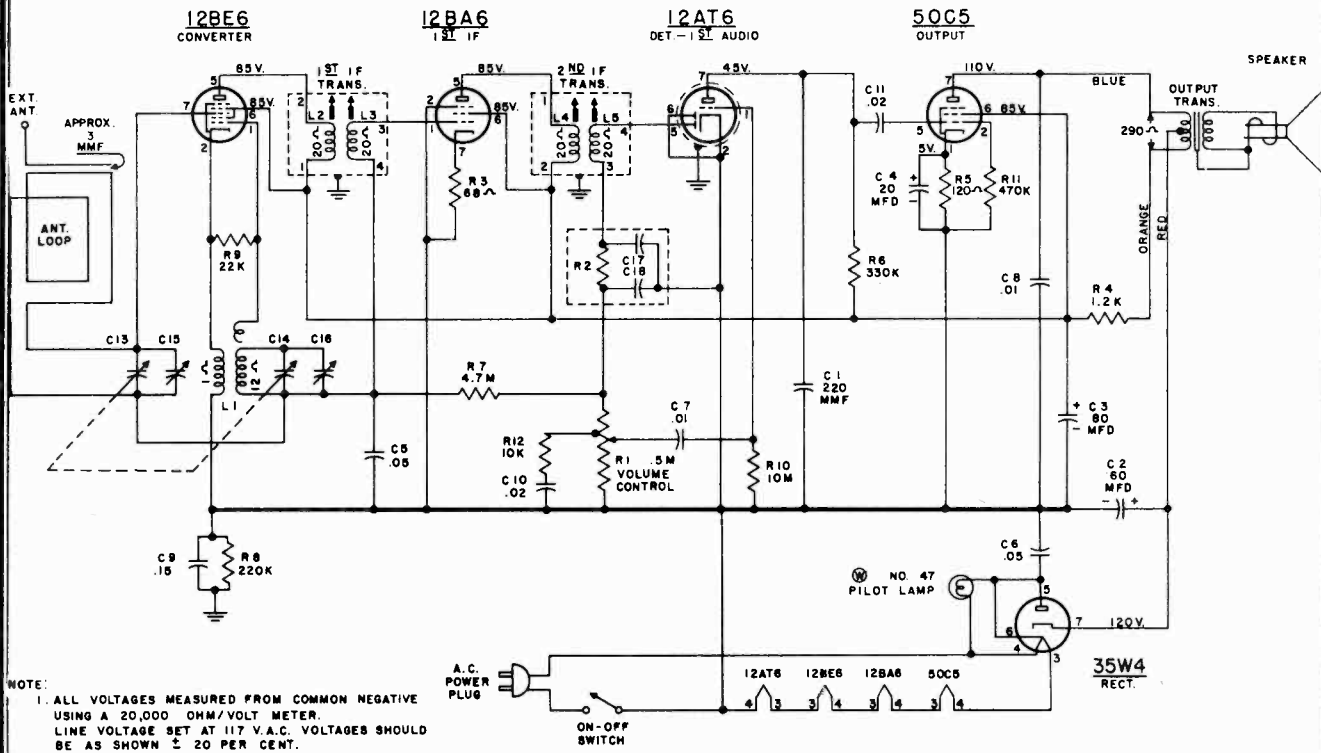


FIG. 2 — CHASSIS LAYOUT



CHASSIS NO. V-2148

FIG. 3 — SCHEMATIC DIAGRAM

MODELS H-300T5,
H-301T5; Ch. V-2148

ALIGNMENT

It is recommended that the chassis be isolated from the power line by means of an isolation transformer.

Make certain that the dial pointer is correctly positioned with respect to the dial scale.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid AVC action.

Step	Connect Signal Generator to —	Signal Generator Frequency	Radio Dial	Adjust for Maximum Output —
1.	Stator of R-F tuning capacitor (C13) through a 200 mmf capacitor	455 kc.	minimum capacity	Top and bottom slugs in 2nd and 1st I-F trans. in order given *
2.	Same as step 1	1615 kc.	minimum capacity	Osc. trimmer (C16)
3.	Radiated Signal	1400 kc.	1400 kc.	R-F trimmer (C15)

* *It is recommended that a fiber aligning tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot.*

H-300T5 AND H-301T5 PARTS LIST

When ordering parts, specify model number of set in addition to part number and description of part.

CABINET AND MISCELLANEOUS

Part No.	Description
V-6697-1	Baffle and grille cloth assembly
V-1181-5	Cabinet (Brown)
V-1181-6	Cabinet (Ivory)
V-6700-8	Knob, tuning, volume, on-off (Brown)
V-6700-9	Knob, tuning, volume, on-off (Ivory)
V-9397-2	Shield, mounting plate
V-4491-9	Strip, dial
V-3752S	Washer, felt (knobs)

V-2148 CHASSIS

R5CC20ZY221M	Capacitor, 220 mmf (C1)
V-9413-1	Capacitor, electrolytic, 60, 80 mfd 150 v., 20 mfd 25 v. (C2, 3, 4)
RCP10W4503M	Capacitor, .05 mfd 400 v. (C5, 6)
RCP10W4103M	Capacitor, .01 mfd 400 v. (C7, 8)
RCP10W2154M	Capacitor, .15 mfd 200 v. (C9)
RCP10W4203M	Capacitor, .02 mfd 400 v. (C10, 11)
V-9406	Capacitor, variable (C13, 14, 15, 16)
V-9450	Coil, oscillator (L1)
V-3219S-1	Cord, dial
V-6198-3	Control, volume, on-off (R1)
V-9412-1	Dial, background assembly
V-9407	Dial, glass
V-6232-2	Filter, diode (R2, C17, 18)
W #47	Lamp, pilot
V-9408-1	Loop, antenna
V-6690	Pointer
HC20AE680K	Resistor, 68 ohms ½ w. (R3)
HC30AE122K	Resistor, 1200 ohms ½ w. (R4)
RC20AE121M	Resistor, 120 ohms ½ w. (R5)
RC20AE334M	Resistor, 330,000 ohms ½ w. (R6)
RC20AE475M	Resistor, 4.7 megohms ½ w. (R7)
RC20AE224M	Resistor, 220,000 ohms ½ w. (R8)
RC20AE223M	Resistor, 22,000 ohms ½ w. (R9)
RC20AE106M	Resistor, 10 megohms ½ w. (R10)
HC20AE474M	Resistor, 470,000 ohms ½ w. (R11)
RC20AE103M	Resistor, 10,000 ohms ½ w. (R12)
V-6191-4	Shaft, tuning
V-4169-2	Shield, tube
V-4292S-1	Socket, miniature molded (12AT6)
V-5673	Socket, miniature wafer, unshielded (35W4, 50C5)
V-5852-1	Socket, miniature wafer (12BA6, 12BE6)
V-9122-1	Socket, pilot lamp
V-9410	Speaker, 5" P.M.
V-6199-2	Transformer, 1st and 2nd I-F (L2, 3, 4, 5)

MODEL H-302P5,
Ch. V-2151-1



SPECIFICATIONS

FREQUENCY RANGE	540 to 1615 kc.	LOUDSPEAKER	5" PM
INTERMEDIATE FREQUENCY	455 kc.	POWER SUPPLY:	
TUBE COMPLEMENT:		Battery Operation	1 Westinghouse
1 1U4	R-F Amplifier	V-9291 "AB" Battery (9 v. "A" and 90 v. "B")	
1 1R5	Converter	Line Operation	105 to 120 volts, D-C
1 1U4	1-F Amplifier	or 50 to 60 cycles A-C	
1 1U5	Det., AVC, and 1st A-F Amp.	CURRENT CONSUMPTION (Battery Operation):	
1 3V4	Output Amplifier	"A" section of "AB" battery .....	.05 amp.
POWER OUTPUT:		"B" section of "AB" battery .....	.016 amp.
Maximum .....	.038 watt	POWER CONSUMPTION (Line Operation).....	15 watts
Undistorted .....	.018 watt		

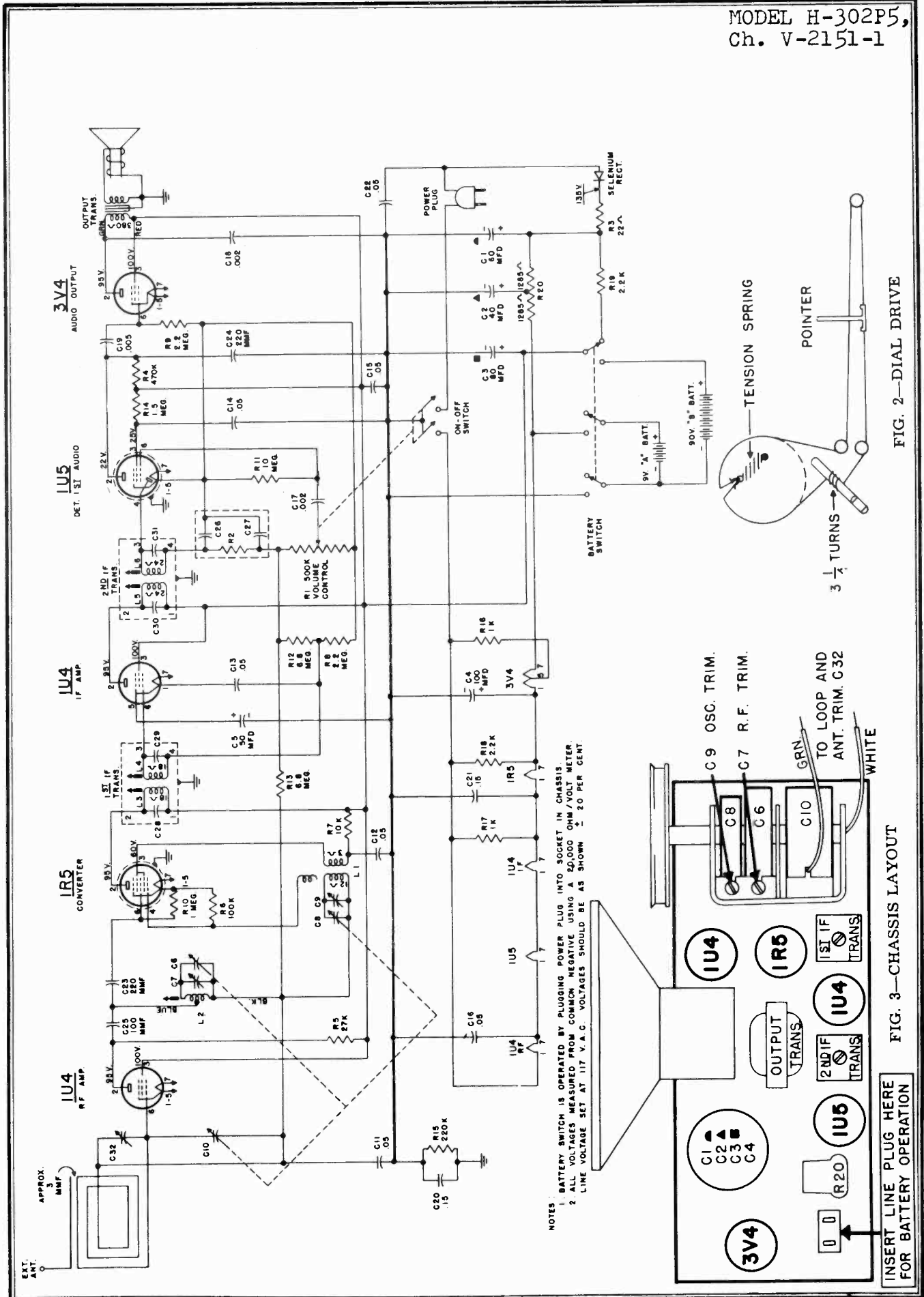
ALIGNMENT

It is recommended that the chassis be isolated from the power line by means of an isolation transformer. While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid AVC action.

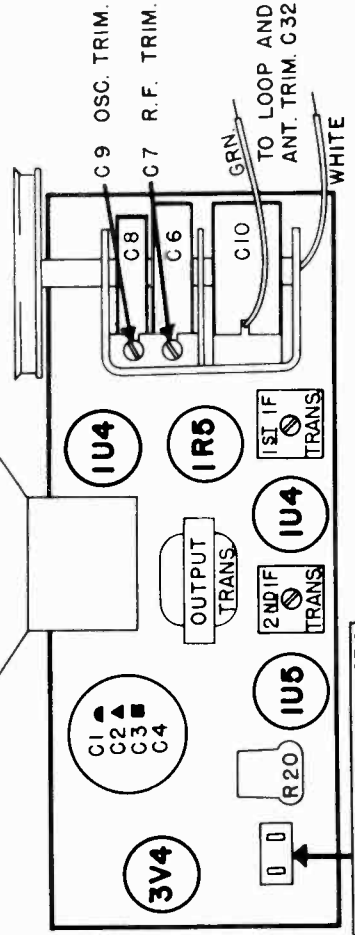
Step	Connect Signal Generator to—	Signal Generator Frequency	Radio Dial Setting	Adjust for Maximum Output—
1	Pin No. 6 of the 1R5 converter through a 200 mmf capacitor	455 kc.	Minimum capacity	Top and bottom slugs in 2nd and 1st 1-F trans. in order given *
2	Stator of antenna tuning section of gang (C10) through a 200 mmf capacitor	1615 kc.	Minimum capacity	Osc. trimmer (C9)
3	Same as step 2	1400 kc.	1400 kc.	R-F trimmer (C7)
4	Same as step 2	600 kc.	600 kc.	Slug of R-F coil (L2) **
5	Recheck steps 3 and 4			
6	Radiated signal	1400 kc.	1400 kc.	Antenna trimmer (C32)

* It is recommended that a fiber aligning tool that snugly fits the slot in the powdered iron core be used to prevent chipping of the slot.

** A 10/32" Allen wrench can be used to adjust the slug in L2.



NOTES:
 1. BATTERY SWITCH IS OPERATED BY PLUGGING POWER PLUG INTO SOCKET IN CHASSIS.
 2. ALL VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER.
 LINE VOLTAGE SET AT 117 V. A. C. VOLTAGES SHOULD BE AS SHOWN ± 20 PER CENT.



MODEL H-302P5,
Ch. V-2151-1

PARTS LIST FOR MODEL H-302P5

When ordering parts, specify model number of set in addition to part number and description of part.

CABINET AND ACCESSORIES

Part No.	Description	Part No.	Description
V-9387-1	Baffle and grille cloth assembly	V-6432-2	Fleet, cabinet
V-9291	Battery pack, "A-B" Portable....	V-9389	Handle
V-6945	Bracket (on chassis for mtg.)....	V-5630-2	Hinge
V-6946	Bracket (on cabinet for mtg. chassis)	V-9391-1	Knob, volume
V-4836-2	Button, plug	V-9391-2	Knob, tuning
V-1195-1	Cabinet (tan)	V-9401	Loop, antenna (with trimmer capacitor C32)
V-6947-1	Catch, friction (back cover)....	V-6569-1	Strike, back cover
V-9390	Dial	V-4491-9	Strip, dial
V-9388	Escutcheon	V-6949	Stud, handle
		V-3668S	Washer, felt (knobs)

V-2151-1 CHASSIS

Part No.	Description	Part No.	Description
V-4169-1	Base, Miniature tube shield 1U5, 1R5	RC20AE103M	Resistor, 10,000 ohms ½ w. (R7)
V-6554-1	Cable assembly, battery	RC20AE225M	Resistor, 2.2 megohms ½ w. (R8, 9)
V-6552	Capacitor, electrolytic 60, 40, 80 mfd at 150 v., 100 mfd at 25 v. (C1, C2, C3, C4)	RC20AE105M	Resistor, 1 megohm ½ w. (R10)
V-4636	Capacitor, electrolytic, 50 mfd 25 v. (C5)	RC20AE106M	Resistor, 10 megohm ½ w. (R11)
V-6556	Capacitor, variable (C6, C7, C8, C9, C10)	RC20AE685M	Resistor, 6.8 megohms ½ w. (R12, 13)
V-6066-2503M	Capacitor, .05 mfd 200 v. (C11, 12, 13, 14, 15, 16)	RC20AE155M	Resistor, 1.5 megohms ½ w. (R14)
V-6066-4204M	Capacitor, .002 mfd 400 v. (C17, 18)	RC20AE224M	Resistor, 220,000 ohms ½ w. (R15)
V-6066-4502M	Capacitor, .005 mfd 400 v. (C19)	RC20AE102K	Resistor, 1000 ohms ½ w. (R16, 17)
V-6066-2154M	Capacitor, .15 mfd 200 v. (C20, 21)	RC20AE222K	Resistor, 2200 ohms ½ w. (R18)
V-6066-4503M	Capacitor, .05 mfd 400 v. (C22)	RC30AE222K	Resistor, 2200 ohms ½ w. (R19)
RCM20A221M	Capacitor, 220 mmf (C23, 24)....	V-9125	Resistor, ballas, 2570 ohms (R20)
RCM20A101M	Capacitor, 100 mmf (C25)	V-9015-1	Shaft, tuning
V-5426	Clip, I-F mounting	V-4169-2	Shield, miniature tube, 1U5, 1R5
V-5661	Coil, oscillator (L1)	V-6295-3	Socket, miniature wafer, 1U4....
V-5666-3	Control, volume, on-off, 500,000 ohms (R1)	V-4292S-1	Socket, miniature molded 3V4, 1U4, 1R5, 1U5
V-4349-6	Cord, power A-C	V-6555	Speaker, 5" P.M.
V-3219S-1	Cord, dial drive	V-4057	Spring, dial cord
V-6232-2	Filter, diode (R2, C26, 27)	V-6565	Switch, line-battery
V-6568	Pointer	V-6561	Transformer, R-F (L2)
V-5398-1	Pulley	V-6972-3	Transformer, I-F slug tuned (L3, 4, C28, 29)
V-6558-1	Rectifier, selenium	V-6972-4	Transformer, I-F slug tuned (L5, 6, C30, 31)
RC30AE220M	Resistor, 220 ohms 1 w. (R3)....	V-6567	Transformer, output
RC20AE474M	Resistor, 470,000 ohms ½ w. (R4)		
RC20AE273M	Resistor, 27,000 ohms ½ w. (R5)		
RC20AE104M	Resistor, 100,000 ohms ½ w. (R6)		

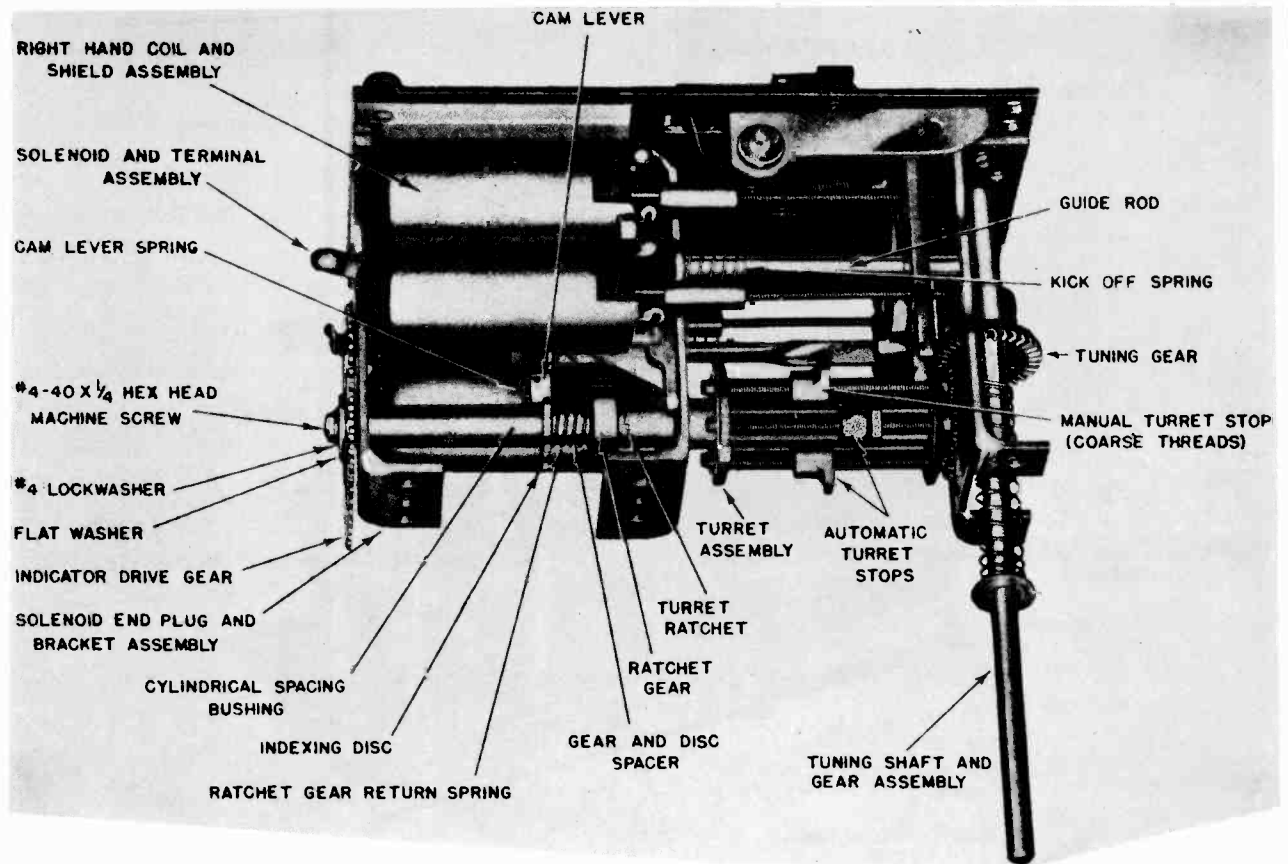


FIG. 1

OPERATING PRINCIPLE

When the station selector push button or foot switch is depressed all the way, the solenoid (Fig. 1) is energized by current from the car battery. The cross arm assembly is pulled from the right or resting position from any one of the six turret stops on the turret assembly to the left or closed position. As this assembly approaches the closed position, the ratchet cam shaft (Fig. 2) turns the ratchet drive gear clockwise. The ratchet drive gear turns the ratchet gear counter clockwise 60° or until it engages the ratchet teeth on the turret shaft. The detent lever (inset Fig. 2) prevents the turret assembly from turning counter clockwise during this operation. At the same time a cam on the hub of the ratchet drive gear lifts the cam lever from its locking position in the indexing disc (inset Fig. 2). This will allow the turret assembly (Fig. 2) to be turned clockwise. The tuning unit will remain in the closed position until the push button or foot switch is released.

When the push button or foot switch is released the cross arm return spring pulls the cross arm assembly back to the resting position. As this assembly starts the return stroke to the resting position, the ratchet camshaft turns the ratchet drive gear counter clockwise. The ratchet drive gear turns the ratchet gear clockwise 60°. As the ratchet gear turns it rotates the turret assembly clockwise 60°. When the turret assembly has been turned 60°, the cam lever is pulled into locking position in the indexing disc, preventing the turret assembly from moving farther.

There are six turret stops, one for each of the five automatic tuning positions, which may be adjusted to five desired stations, and one to be used for tuning the radio manually. For information concerning setting up the five automatic tuning positions refer to Owner's Manual or the Service Manual for the radio in question.

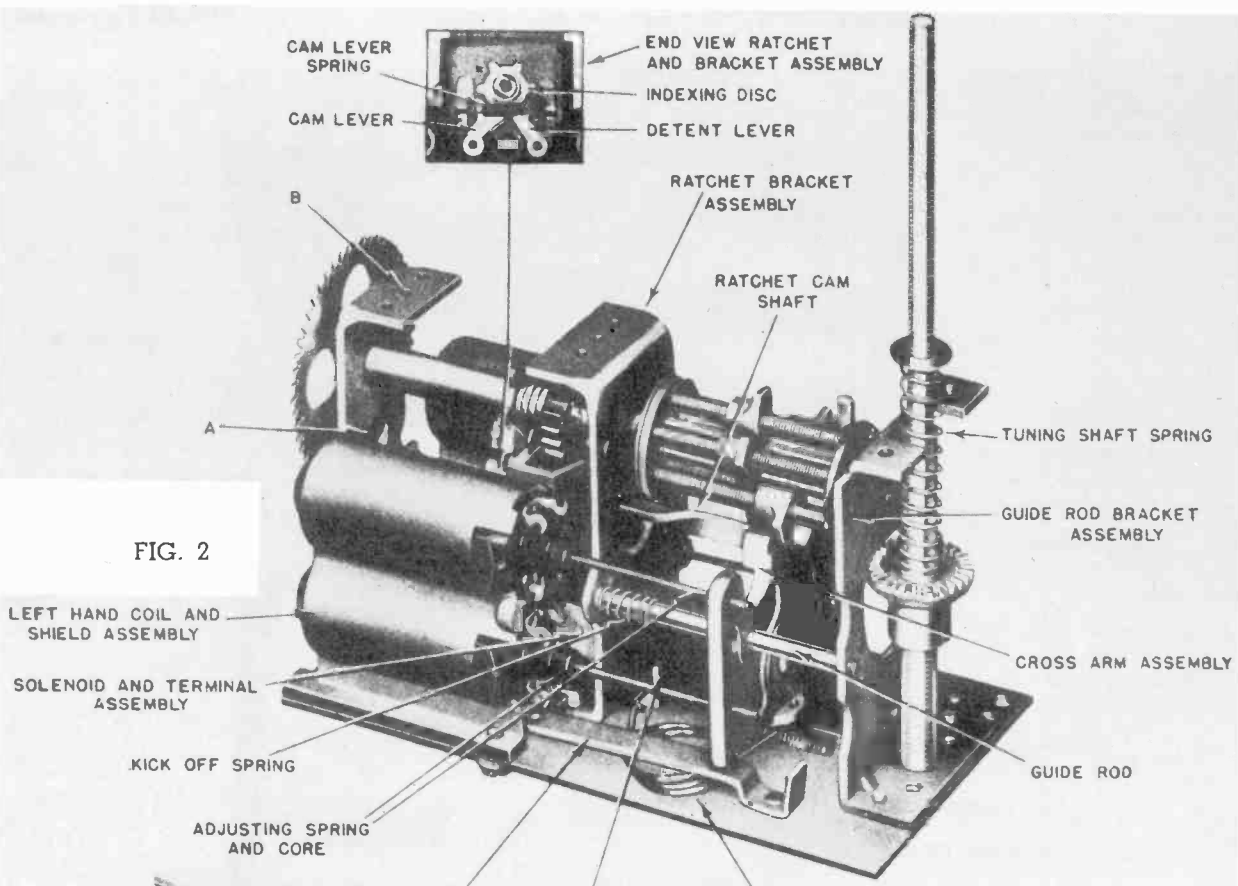


FIG. 2

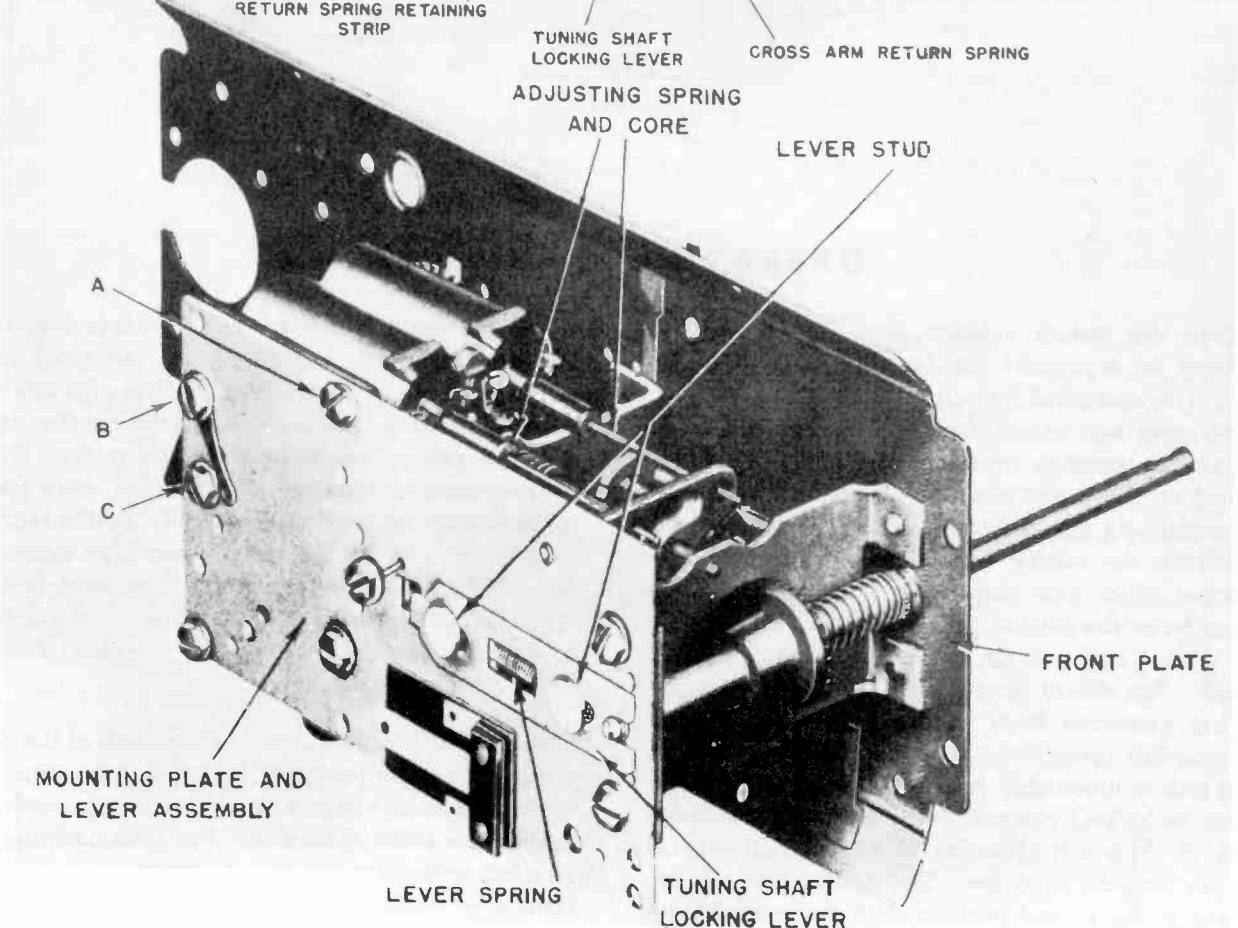
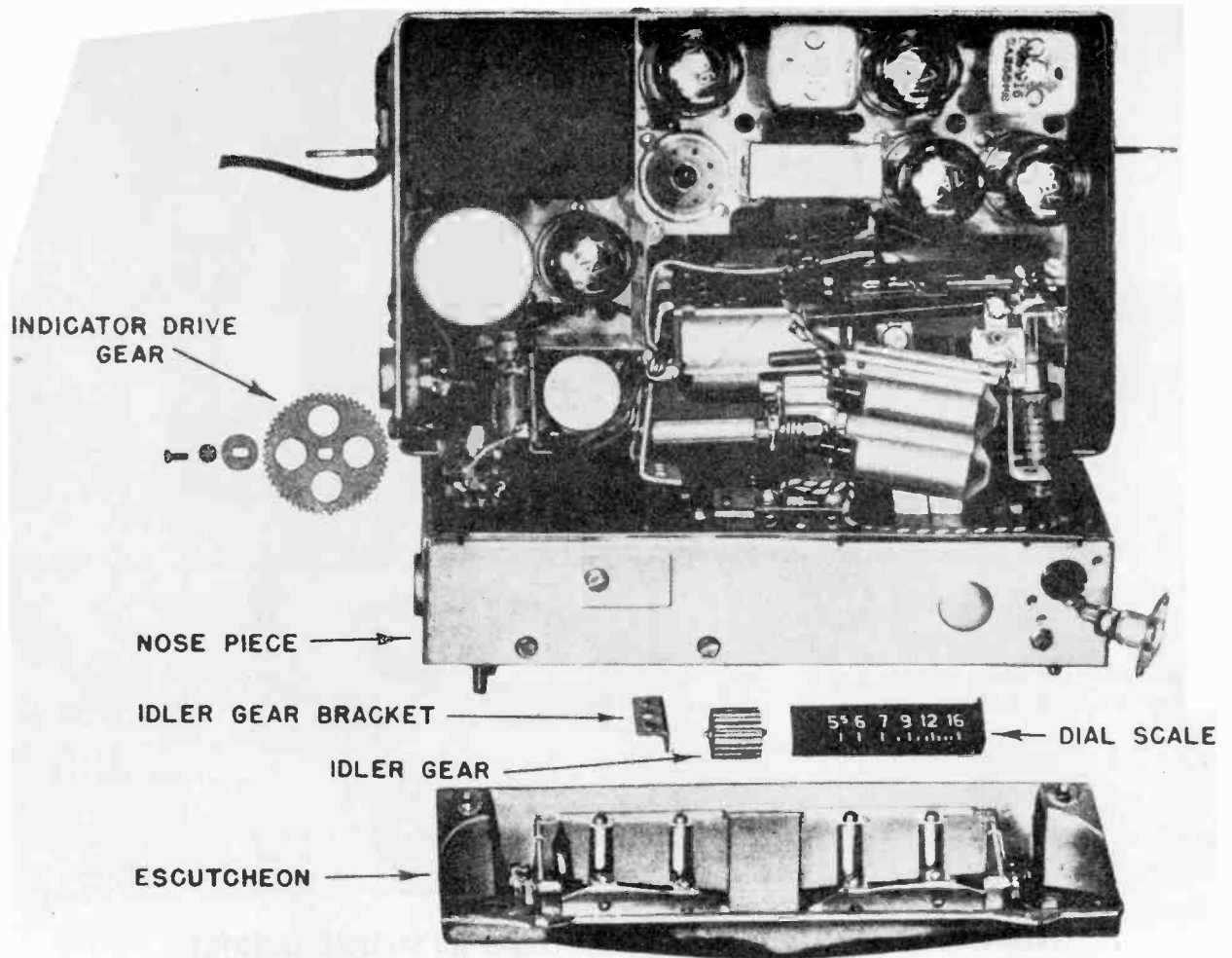


FIG. 3

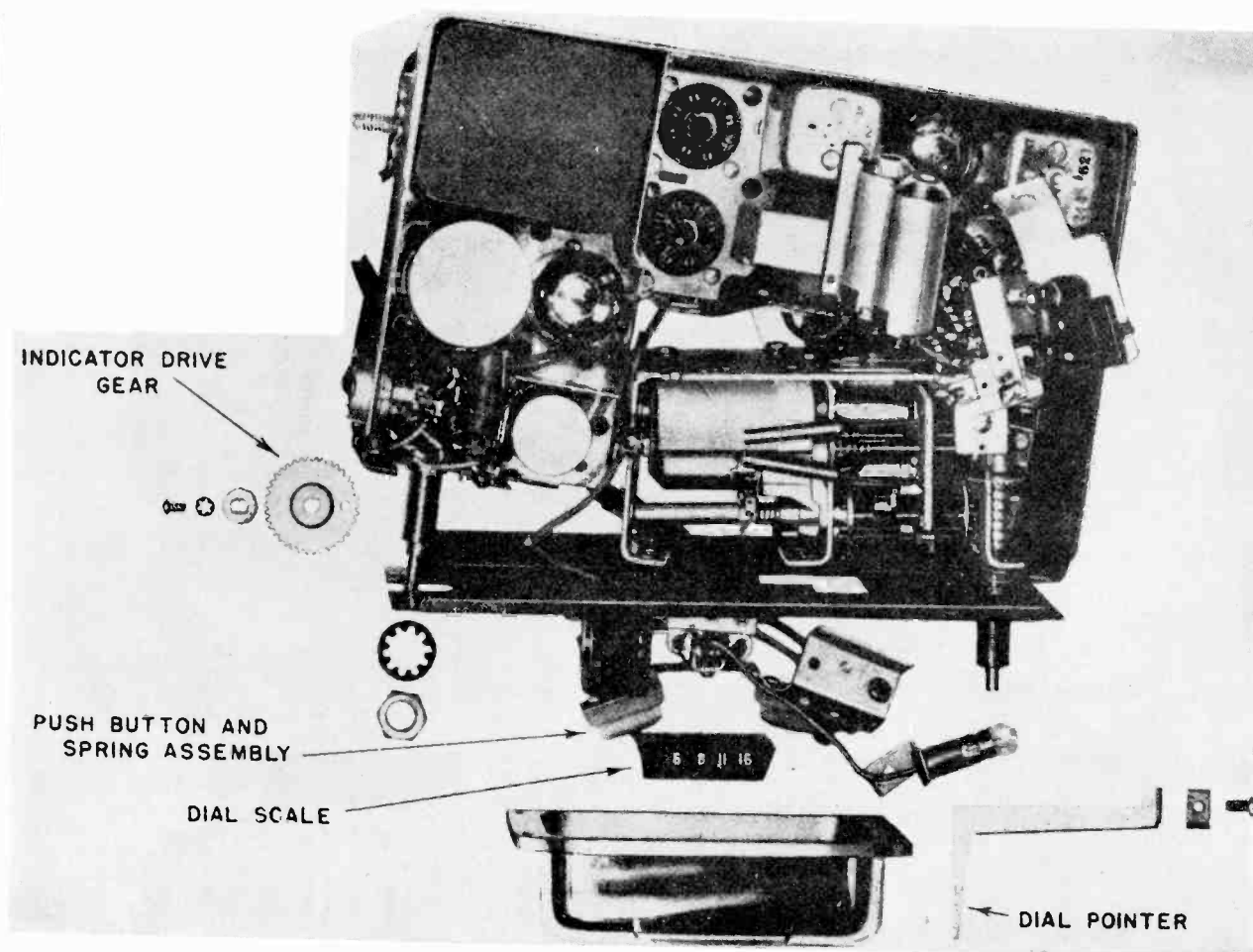


HOW TO CHANGE THE RATCHET GEAR IN MODEL 6MF080

Before starting the following operations **BE SURE THE TUNER IS ON MANUAL.** Set Dial at 16.

- 1—Remove the top and bottom covers of the receiver. Remove 7C5 and 7B6 tubes. Take off knobs.
- 2—Remove the complete escutcheon assembly.
- 3—Loosen the antenna socket and trimmer from the nose piece. NOTE: On this receiver the nose piece and front plate are welded together.
- 4—Loosen the speaker socket on the left hand of the nose piece.
- 5—Remove the drum dial idler gear and bracket, also the dial scale.
- 6—Loosen the tuner assembly from the front plate.
- 7—Loosen the front plate and nose piece from receiver.
- 8—Remove the two assembly screws in the back plate of the tuner holding the top right coil and shield assembly. Slip the coils toward the left end of the receiver until clear of the tuner slugs. This will allow access to the turret shaft and gear.
- 9—Remove the screw lock washer, flat washer and brass indicator drive gear from the end of turret shaft.
- 10—Remove the screw holding the solenoid end plug and bracket assembly to the back plate of the tuner. IMPORTANT: Remove only the one screw holding the bracket to the rear plate.
- 11—Disconnect one side of the small lever spring. Be careful not to lengthen or distort this spring. If the spring is distorted the detent and cam levers may not work properly after assembly.
- 12—Remove the long cylindrical brass spacer, indexing disc, ratchet return spring and short cylindrical spacer. IMPORTANT: Note the position of the teeth before removing the ratchet gear.
- 13—Replace the ratchet gear. Make sure the teeth are in exactly the same position as the original gears.
- 14—Be sure the tuning mechanism and indicator drum is in the "M" position when replacing the indicator idler gear.
- 15—Reassemble the tuner unit in reverse order. Replace front plate and dial scale.

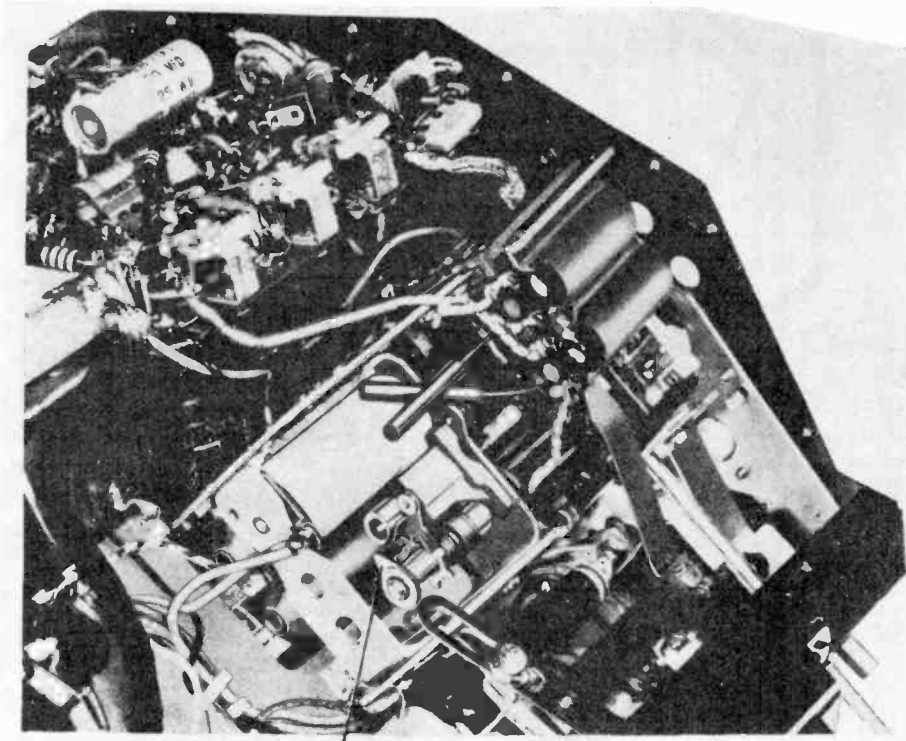
TUNER



HOW TO CHANGE THE RATCHET GEAR IN MODEL 6MH081

BE SURE THE TUNER IS ON MANUAL. Set Dial at 16.

- 1—Remove the top and bottom covers of the receiver. Remove 7C5 and 7B6 tubes.
- 2—Remove the knobs and the complete escutcheon from the front plate.
- 3—Loosen the front plate from the receiver.
- 4—Remove the $\frac{3}{8}$ " nut and lock washer from the volume control shaft.
- 5—Remove the dial pointer from the tuner assembly.
- 6—Remove the automatic station selector switch, and pilot light bracket from the front plate.
- 7—Remove plastic push buttons and spring assembly.
- 8—Remove the screws holding the front plate to the tuner.
- 9—Remove the dial scale from its mounting to avoid scratching.
- 10—Remove front plate from receiver.
- 11—Pull the front plate from the left end of the receiver until it clears the volume control shaft.
- 12—Loosen the antenna socket and bracket from the tuning assembly.
- 13—Loosen the right hand top two turret coils. Slip the coils to the left end of the set until free of the tuning slugs. This will allow access to the turret shaft and gear.
- 14—Remove the screw and lock washer, and flat washer from the end of the turret shaft. Remove the brass indicator drive gear.
- 15—Remove the rear assembly screw from the solenoid end plug and bracket assembly.
- 16—Push the solenoid end plug and bracket assembly toward the left of the receiver until it clears the turret shaft.
- 17—Disconnect one side of the small lever spring. Be careful not to distort or lengthen this spring. The detent and cam levers may not operate properly when the unit is reassembled if this spring is bent or distorted.
- 18—Remove the long cylindrical brass spacer, indexing disc, spring and short cylindrical spacer. **IMPORTANT:** Note the position of the teeth before removing the ratchet gear.
- 19—Replace the ratchet gear. Make sure the teeth are in exactly the same position as the original gear. The tuning mechanism and the indicator drum must be on "M" position when replacing the indicator drive gear.
- 20—Reassemble the tuner unit in reverse order. Replace the front plate, dial scale, automatic push button switch and pilot light bracket.

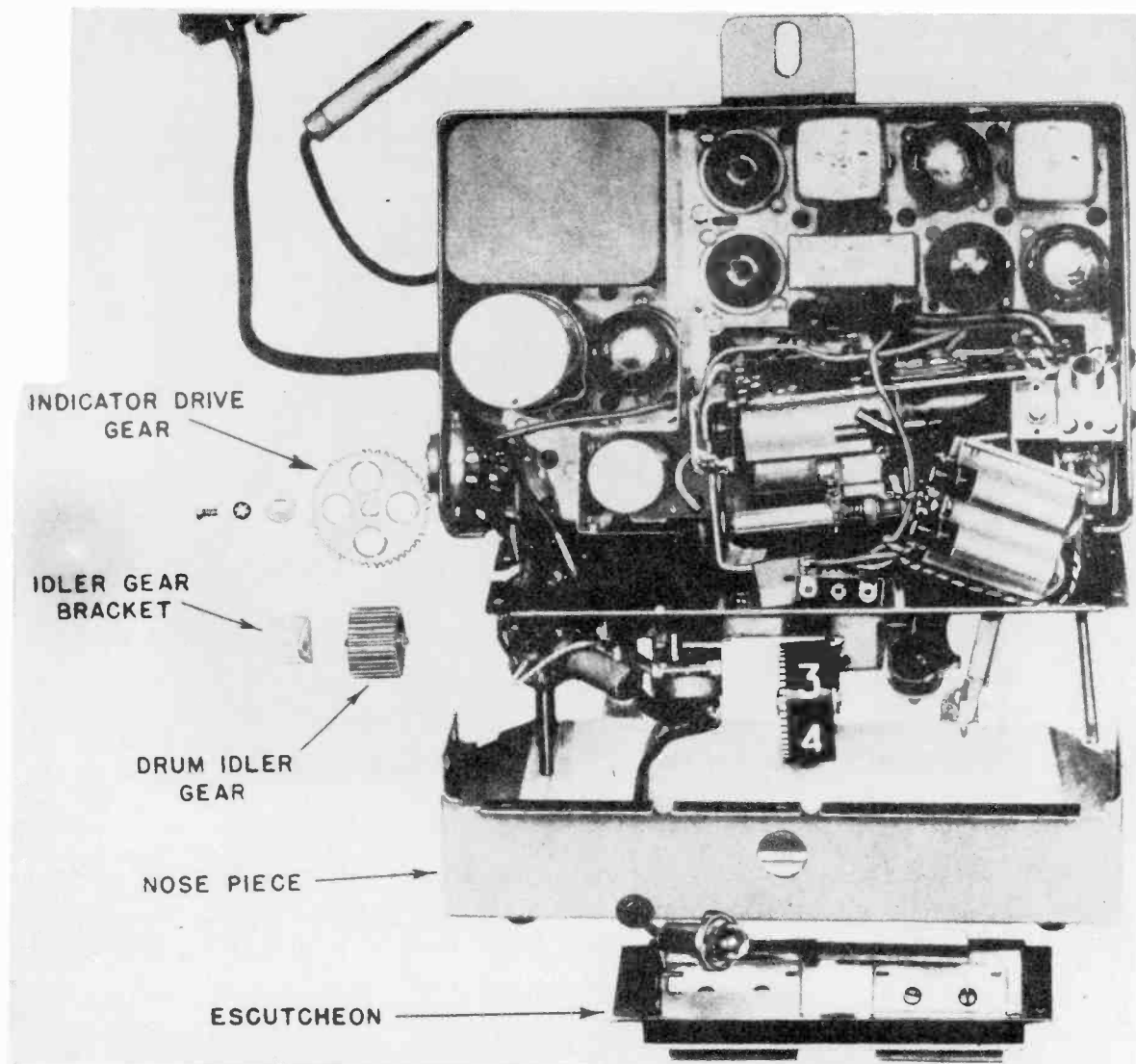


INDICATOR CAM

HOW TO CHANGE THE RATCHET GEAR IN MODEL 7ML080-7ML081

- 1—Remove the top cover of the receiver.
- 2—Remove the screw, lock washer and flat washer and indicator cam from the turret shaft. This can be accomplished by inserting a small screw driver through a hole in the solenoid end bracket.
- 3—Disconnect the cam lever spring. Be careful not to stretch or distort this spring. If this spring is distorted the detent and cam levers may not operate properly when tuner is reassembled.
- 4—Remove the brass cylindrical spacer, indexing disc, brass spacer and spring. **IMPORTANT:** Note the position of the teeth in the ratchet gear before it is removed.
- 5—Replace ratchet gear. Make sure the ratchet gear teeth engage exactly the same as the original gear.
- 6—Reassemble the brass spacer spring, long cylinder spacer, flat washer, etc., to turret shaft. Replace detent spring.

TUNER



HOW TO CHANGE THE RATCHET GEAR IN MODEL 6MN082

BE SURE THE TUNER IS ON MANUAL. Set Dial at 16.

- 1—Remove the top and bottom covers. Loosen dial light from the nose piece. Remove 7C5 and 7B6 tubes.
- 2—Remove the escutcheon from the nose piece.
- 3—Remove the nose piece from the front plate. Remove dial scale from nose piece.
- 4—Remove the indicator dial idler gear and bracket. This is necessary to get at the solenoid bracket and plug front assembly screw.
- 5—Remove the two remaining assembly screws holding the tuner unit to the front plate.
- 6—Loosen the front plate from the receiver, and pull forward as far as possible.
- 7—Remove the brass drum indicator drive gear from the turret drive shaft.
- 8—Remove the rear assembly screw holding the solenoid end plug and bracket assembly to the back plate.
- 9—Push the solenoid end plug bracket assembly toward the left end of the receiver.

- 10—Remove the mounting screws from the top tuner coil assembly, and push the coil assembly toward the left end of the receiver until the coils are free of the tuner slug.
- 11—Disconnect one side of lever spring. Be careful not to distort or lengthen this spring. If the spring is distorted the detent and cam levers may not operate properly when reassembled.
- 12—Remove the long brass cylindrical spacer, indexing disc, and ratchet return spring, and short brass spacer. **IMPORTANT:** Note the position of the teeth before removing the ratchet gear.
- 13—Replace the ratchet gear. Make sure the teeth are in exactly the same position as the original gear. Also be sure the tuning mechanism and the indicator drum is in the "M" position when replacing the idler gear and bracket.
- 14—Replace the ratchet gear. Reassemble tuner unit. Replace the front plate, nose piece, dial scale and escutcheon.

CHANGING THE SOLENOID IN MODELS 6MF080, 6MH081 AND 6MN082 AUTO RECEIVERS

- 1—(a) Nash—Perform operations 1 to 10 inclusive under changing ratchet gear in Model 6MN082.
(b) Ford—Perform operations 1 to 10 inclusive under changing ratchet gear in Model 6MF080.
(c) Hudson—Perform operations 1 to 16 inclusive under changing ratchet gear in Model 6MH081.
- 2—Unsolder the yellow wires from the solenoid and terminal assembly.
- 3—Remove the solenoid bracket and plug assembly.
- 4—Slide solenoid toward the left end of the receiver until free of the solenoid magnet core.
- 5—Replace solenoid and reassemble tuning unit. Be sure to check the position of the ratchet gear—one tooth engaging the ratchet drive gear. Also make sure the tuning mechanism and the indicator drum are in the "M" position.

CHANGING THE SOLENOID IN MODELS 7ML080 AND 7ML081 AUTO RECEIVERS

- 1—Remove top cover from the receiver.
- 2—Set the tuner to manual position and tune set to 16 on the dial.
- 3—Unsolder the yellow wires from the solenoid.
- 4—Remove solenoid end plug and bracket assembly.
- 5—Slide solenoid toward the left end of receiver until free of the solenoid magnet core.
- 6—Replace solenoid and reassemble tuning unit.

REPLACING THE RATCHET AND BRACKET ASSEMBLY

- 1—Loosen the left hand lower tuning coil assembly. Slip the assembly to the left of the set until free of the tuning slugs.
- 2—Follow the procedure outlined above for removing the solenoid.
- 3—Remove the ratchet and bracket assembly, held in place by one screw through the front plate, and one screw through the front plate.
- 4—With replacement ratchet and bracket assembly, reassemble the tuner in reverse order.

LUBRICATION

The ratchet gear must engage freely with the ratchet on the turret assembly. It, therefore, must be clean and lubricated with a good grade of clock oil. **WARNING:** Do not use a heavy grade of lubricant.

The points of friction on the guide rods, dial

pointer, solenoid magnet core, and the hub of the station indicator drum must also be lubricated with clock oil.

All other points of friction should be lubricated with Texaco RCX-148 low temperature grease No. 67 or its equivalent.

TROUBLE SHOOTING

Mechanism fails to move from one position to the next or jams tightly between two positions

- 1—Be sure the "A" battery supply is capable of delivering 5.5 volts at 20 amperes.
- 2—Check lubrication of ratchet gear and guide rods.
- 3—Check dial pointer and indicator drum and drive gear assemblies for binding or warped parts.
- 4—Teeth on ratchet gear are worn or damaged. Replace gear.
- 5—Lever spring missing from ratchet and bracket assembly. Replace spring.
- 6—Detent lever or cam lever broken from ratchet and bracket assembly. Replace ratchet and bracket assembly.

**Mechanism fails to return all the way to resting position
or 16 on the dial when tuned manually**

- | | |
|---|---|
| 1—Check lubrication of guide rods. | 3—Be sure of proper distance between holes and slot in pointer. |
| 2—Be sure pointer does not rub on dial glass or dial scale. | |

**Tuning knob will not remain in the "Out" position when it is
pulled out to set up the stations or to tune manually**

- | | |
|--|---|
| 1—Tuning shaft locking lever bent. Bend lever back to original position. (Fig. 3). | 2—Shoulder rivet pulled out. Replace rivet, or replace mounting plate and lever assembly. |
|--|---|

**Knob fails to return to the "In" position when the push
button or foot switch is pressed**

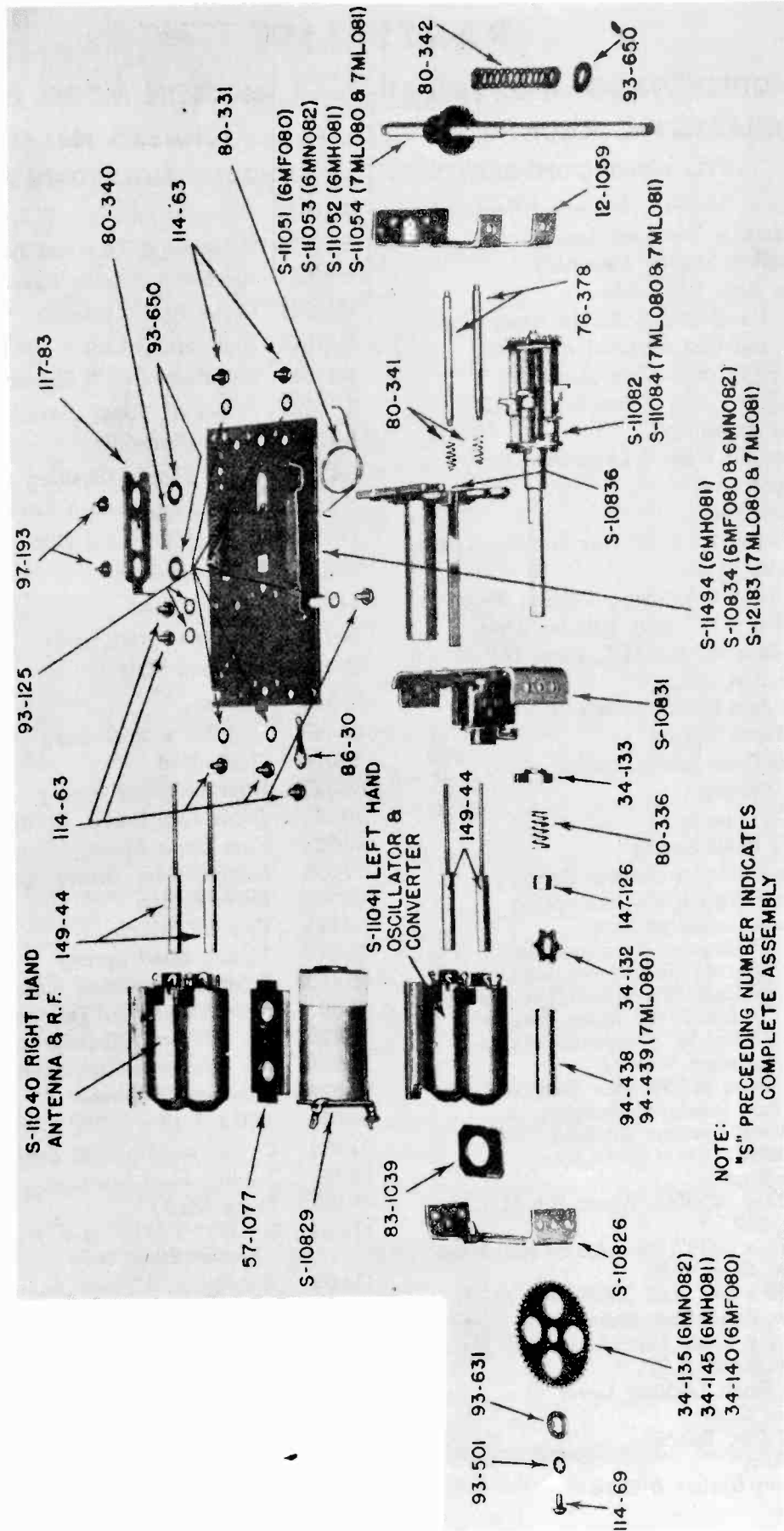
- 1—End broken from lever (Fig. 2). Replace lever or replace complete mounting plate and lever assembly.

Pointer sticks at the low frequency end of dial

- | | |
|--|---|
| 1—Tuning knob too close to panel. Will not allow knob to rotate freely when it is in the "IN" position. Loosen knob, and re-fit. Allow approximately $\frac{1}{8}$ " clearance between knob and panel. | (b) Remove escutcheon and check drive gear and indicator drum to make sure they do not bind against the idler gear or front plate. |
| 2—Plastic ring loosened from knob (Ford only) allowing same conditions as above. Replace knob. | 4—Cross arm return spring broken. Replace spring. To replace spring, loosen left hand coil and shield assembly and pull loose end of return spring retaining strip upward. This will permit the easy removal of the spring. (Fig. 2.) |
| 3—Idle gear or indicator drum binding.
(a) Be sure drum does not rub on escutcheon. | |

NOTE: MOUNTING PLATE AND LEVER ASSEMBLIES S-10834, S-12183 AND S-11494 INCLUDE PARTS NO. 97-193, 117-83, 80-340 AND 93-650. THESE CAN BE PURCHASED SEPARATELY.

NOTE: 6MN082 SAME AS 6MN088. 6MH081 SAME AS 6MH089.



NOTE: "S" PRECEDING NUMBER INDICATES COMPLETE ASSEMBLY

EXPLODED VIEW

TUNER

PARTS LIST

LINCOLN MODELS 7ML080 AND 7ML081
(CHASSIS No. 7C80)

"PUSH-PULL" AUTO TUNER COMPONENTS

S-10826 Solenoid End Plug & Bracket Assembly
 S-10829 Solenoid & Terminal Assembly
 S-10831 Ratchet & Bracket Assembly
 S-10836 Cross Arm Assembly
 S-11040 Right Hand Coil & Shield Assembly
 S-11041 Left Hand Coil & Shield Assembly
 S-11054 Tuning Shaft & Gear Assembly
 S-11074 Push-Pull Tuner Assembly (Final)
 S-11084 Turret Assembly
 S-12183* Mounting Plate & Lever Assembly
 34-132 Indexing Disc
 34-133 Ratchet Gear
 54-34 No. 6-32 x 1/4 x 3/32" Hex. Nut, Steel, N.P.
 57-1077 Protector Plate
 64-146 .088 dia. x 5/32" long Tubular Rivet
 64-315 .088 dia. x 3/8" long Tubular Rivet
 69-163 No. 4-36 x 3/8" R.H.M.S., Steel, N.P.
 76-378 Guide Rod
 80-331 Cross Arm Return Spring
 80-332 Cam Lever Spring
 80-336 Ratchet Gear Return Spring
 80-340 Lever Spring
 80-341 Kick-Off Spring
 80-342 Tuning Shaft Spring
 80-429 Indicator Switch Contact Spring
 80-430 Indicator Switch Contact Spring
 83-1039 Solenoid Insulating Strip
 86-30 No. 6 Shakeproof Terminal No. 2101-6
 93-125 No. 6 Internal Shakeproof Lockwasher
 93-501 No. 4 Internal Shakeproof Lockwasher
 93-650 .010 x 3/16 x 7/16" Brass Washer
 93-706 .020 x 7/16 x 3/4" Neoprene Washer
 93-715 Split Insulating Washer
 93-748 .018 x .096 x 1/4" Washer, Steel, N.P.
 94-431 Cross Arm Insulating Bushing
 94-439 Cylindrical Spacing Bushing
 97-193 Lever Stud
 97-220 Pointer Stud
 114-48 No. 6-32 x 1/4" Hex. Acorn Hd. M.S.,
 Steel, N.P.
 114-63 No. 6-32 x 3/16" Hex. Acorn Hd. Mach.
 Screw, Steel, N.P.
 114-69 No. 4-40 x 1/4" Hex. Acorn Hd. Mach.
 Screw, Steel, Cad. Plate
 114-150 No. 6-32 x 5/32" Hex. Acorn Hd. Mach.
 Screw, Steel, N.P.
 117-83 Tuning Shaft Locking Lever
 128-22 Indicator Cam
 147-126 Gear & Disc Spacer
 148-45 Cross Arm
 149-44 Adjusting Spring & Core

HUDSON MODEL 6MH081
(CHASSIS No. 6C81)

"PUSH-PULL" AUTO TUNER COMPONENTS

S-10826 Solenoid End Plug & Bracket Assembly
 S-10829 Solenoid & Terminal Assembly
 S-10831 Ratchet & Bracket Assembly
 S-10836 Cross Arm Assembly
 S-11040 Right Hand Coil & Shield Assembly
 S-11041 Left Hand Coil & Shield Assembly
 S-11072 Push-Pull Tuner Assembly (Final)
 S-11082 Turret Assembly
 S-11308 Front Plate & Bushing Assembly
 S-11494* Mounting Plate & Lever Assembly
 17-69 Pointer Retaining Clip
 34-132 Indexing Disc
 34-133 Ratchet Gear
 34-145 Indicator Drive Gear
 57-1077 Protector Plate
 59-158 Pointer
 64-146 .088 dia. x 5/32" long — Tubular Rivet
 76-378 Guide Rod
 80-329 Gear Indexing Spring
 80-331 Cross Arm Return Spring
 80-332 Cam Lever Spring
 80-336 Ratchet Gear Return Spring
 80-340 Lever Spring
 80-341 Kick-Off Spring
 80-342 Tuning Shaft Spring
 83-1039 Solenoid Insulating Strip
 86-30 No. 6 Shakeproof Terminal Lug
 93-125 No. 6 Internal Shakeproof Lockwasher
 93-501 No. 4 Internal Shakeproof Lockwasher
 93-631 Retaining Washer
 93-650 .010 x 3/16 x 7/16" Brass Washer
 94-438 Cylindrical Spacing Bushing
 94-463 Tuning Shaft Bushing
 97-193 Lever Stud
 114-63 No. 6-32 x 3/16" Hex. Acorn Hd. Mach.
 Screw, Steel, N.P.
 114-69 No. 4-40 x 1/4" Hex. Acorn Hd. Mach.
 Screw, Steel, Cad. Plate
 114-150 No. 6-32 x 5/32" Hex. Acorn Hd. Mach.
 Screw, Steel, N.P.
 114-159 No. 6 x 1/4" Hex. Hd. Self Tapping Screw,
 Steel, Cad. Plate
 117-83 Tuning Shaft Locking Lever
 147-126 Gear & Disc Spacer
 149-44 Adjusting Spring & Core

NOTE: Parts marked * include Parts No. 97-193, 117-83, 80-340 and 93-650. These parts can be purchased separately.

PARTS LIST

FORD MODEL 6MF080
(CHASSIS No. 6C80)

"PUSH-PULL" AUTO TUNER COMPONENTS

S-10826 Solenoid End Plug & Bracket Assembly
 S-10829 Solenoid & Terminal Assembly
 S-10831 Ratchet & Bracket Assembly
 S-10834* Mounting Plate & Lever Assembly
 S-10836 Cross Arm Assembly
 S-11040 Right Hand Coil & Shield Assembly
 S-11041 Left Hand Coil & Shield Assembly
 S-11051 Tuning Shaft & Gear Assembly
 S-11071 Push-Pull Tuner Assembly (Final)
 S-11082 Turret Assembly
 34-132 Indexing Disc
 34-133 Ratchet Gear
 34-140 Indicator Drive Gear
 57-1077 Protector Plate
 76-378 Guide Rod
 80-331 Cross Arm Return Spring
 80-332 Cam Lever Spring
 80-336 Ratchet Gear Return Spring
 80-340 Lever Spring
 80-341 Kick-Off Spring
 80-342 Tuning Shaft Spring
 83-1039 Solenoid Insulating Strip
 86-30 No. 6 Shakeproof Terminal
 93-125 No. 6 Internal Shakeproof Lockwasher
 93-501 No. 4 Internal Shakeproof Lockwasher
 93-573 Shoulder Washer
 93-631 Retaining Washer
 93-650 .010 x 3/16 x 7/16" Brass Washer
 94-431 Cross Arm Insulating Bushing
 94-438 Cylindrical Spacing Bushing
 97-193 Lever Stud
 114-63 No. 6-32 x 3/16" Hex. Acorn Hd. Mach. Screw, Steel, N.P.
 114-69 No. 4-40 x 1/4" Hex. Acorn Hd. Mach. Screw, Steel, Cad. Plate
 114-150 No. 6-32 x 5/32" Hex. Acorn Hd. Mach. Screw, Steel, N.P.
 117-83 Tuning Shaft Locking Lever
 147-126 Gear & Disc Spacer
 149-44 Adjusting Spring & Core

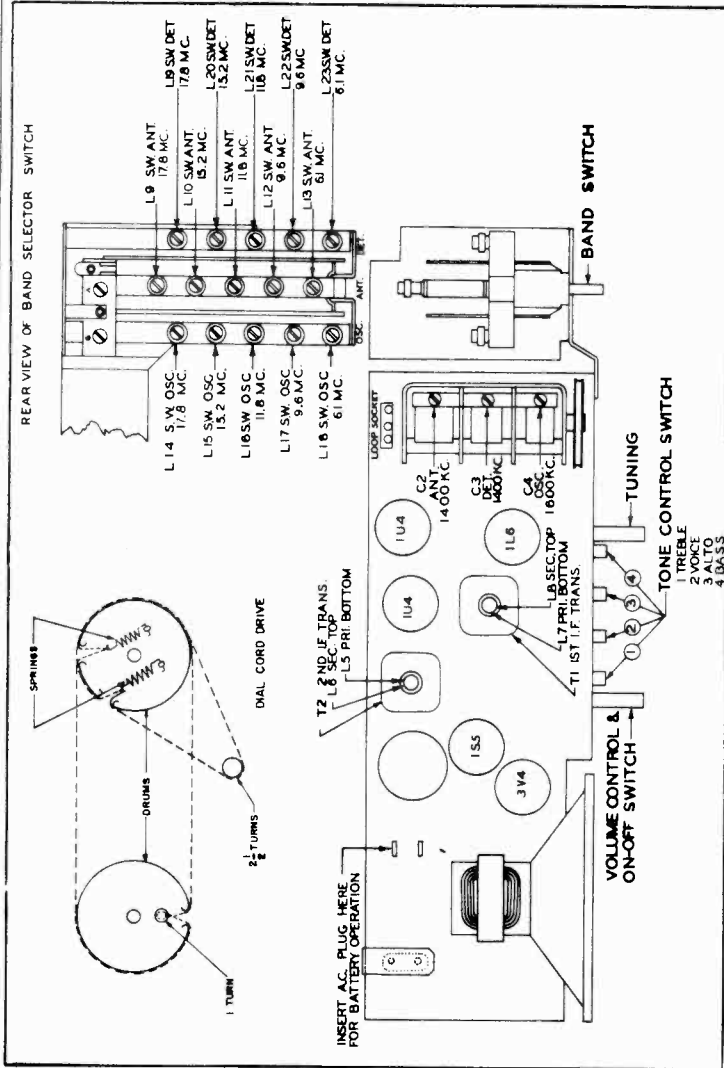
NASH MODEL 6MN082
(Chassis No. 6C82)

"PUSH-PULL" AUTO TUNER COMPONENTS

S-10826 Solenoid End Plug & Bracket Assembly
 S-10829 Solenoid & Terminal Assembly
 S-10831 Ratchet & Bracket Assembly
 S-10834* Mounting Plate & Lever Assembly
 S-10836 Cross Arm Assembly
 S-11040 Right Hand Coil & Shield Assembly
 S-11041 Left Hand Coil & Shield Assembly
 S-11053 Tuning Shaft & Gear Assembly
 S-11073 Push-Pull Tuner Assembly (Complete)
 S-11082 Turret Assembly
 S-11180 Front Plate & Clamping Strip Assembly
 34-132 Indexing Disc
 34-133 Ratchet Gear
 34-135 Indicator Drive Gear
 57-1077 Protector Plate
 76-378 Guide Rod
 80-331 Cross Arm Return Spring
 80-332 Cam Lever Spring
 80-336 Ratchet Gear Return Spring
 80-340 Lever Spring
 80-341 Kick-Off Spring
 80-342 Tuning Shaft Spring
 83-1039 Solenoid Insulating Strip
 86-30 No. 6 Shakeproof Terminal
 93-125 No. 6 Internal Shakeproof Lockwasher
 93-501 No. 4 Internal Shakeproof Lockwasher
 93-631 Retaining Washer
 93-650 Brass Washer
 94-431 Cross Arm Insulating Bushing
 94-438 Spacing Bushing
 97-193 Lever Stud
 112-484 No. 6-32 x 3/16" B.H.M.S.
 114-63 No. 6-32 x 3/16" Hex. Acorn Hd. M.S.
 114-69 No. 4-40 x 1/4" Hex. Acorn Hd. M.S.
 114-150 No. 6-32 x 5/32" Hex. Acorn Hd. M.S.
 117-83 Tuning Shaft Locking Lever
 147-126 Gear & Disc Spacer
 149-44 Adjusting Spring & Core

NOTE: Parts marked * include Parts No. 97-193, 117-83, 80-340, and 93-650. These parts can be purchased separately.

MODEL G500,
Ch. 5G40



TUBE, TRIMMER LOCATION AND DIAL CABLE DRAWING
ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO ANTENNA	DUMMY ANTENNA	INPUT SIG. FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.1 mfd.	455 Kc.	BC	600 Kc.	L5, 6, 7, 8	Align I.F.
2	One turn loop Coupled loosely to Broadcast Wavemagnet		1600 Kc.	BC	1600 Kc.	C4	Set Oscillator to Scale
3			1400 Kc.	BC	1400 Kc.	C3	Alignment of Detector
4	3 feet of wire Approx. 1 foot from Extended Waverod		1400 Kc.	BC	1400 Kc.	C2	Alignment of B.C. Wavemagnet
5*			6.1 Mc.	49 Met.	6.1 Mc.	L18, 23, 13	L17, 22, 12
6*			9.6 Mc.	31 Met.	9.6 Mc.	L16, 21, 11	
7*			11.8 Mc.	25 Met.	11.8 Mc.	L15, 20, 10	Alignment of S.W. Oscillator, detector and antenna
8*			15.2 Mc.	19 Met.	15.2 Mc.	L14, 19, 9	
9*			17.8 Mc.	16 Met.	17.8 Mc.		

*NOTE: Rock Tuning Condenser When Making Alignment Under Operations 5, 6, 7, 8 and 9.

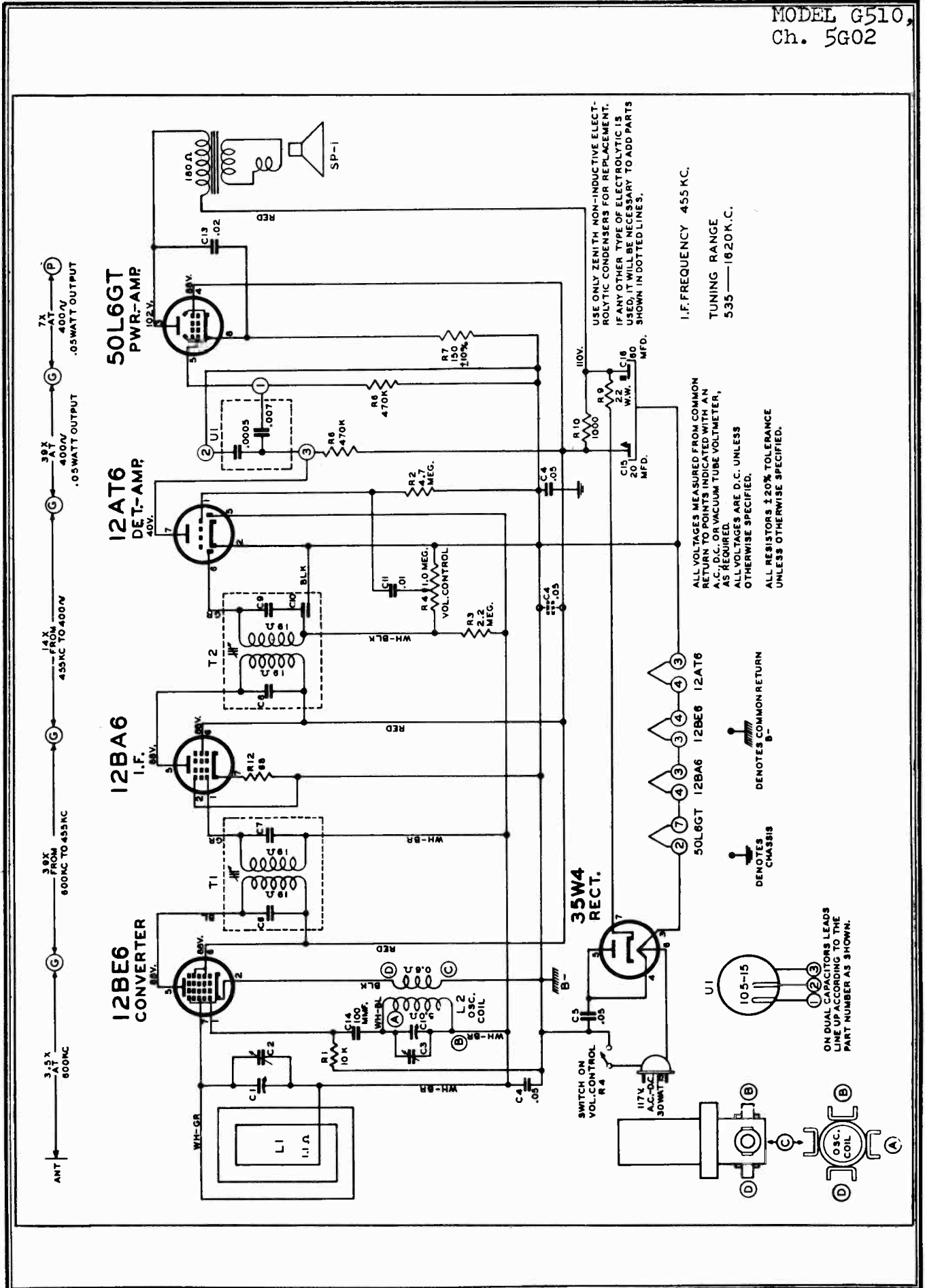
TO THE SERVICE MAN:

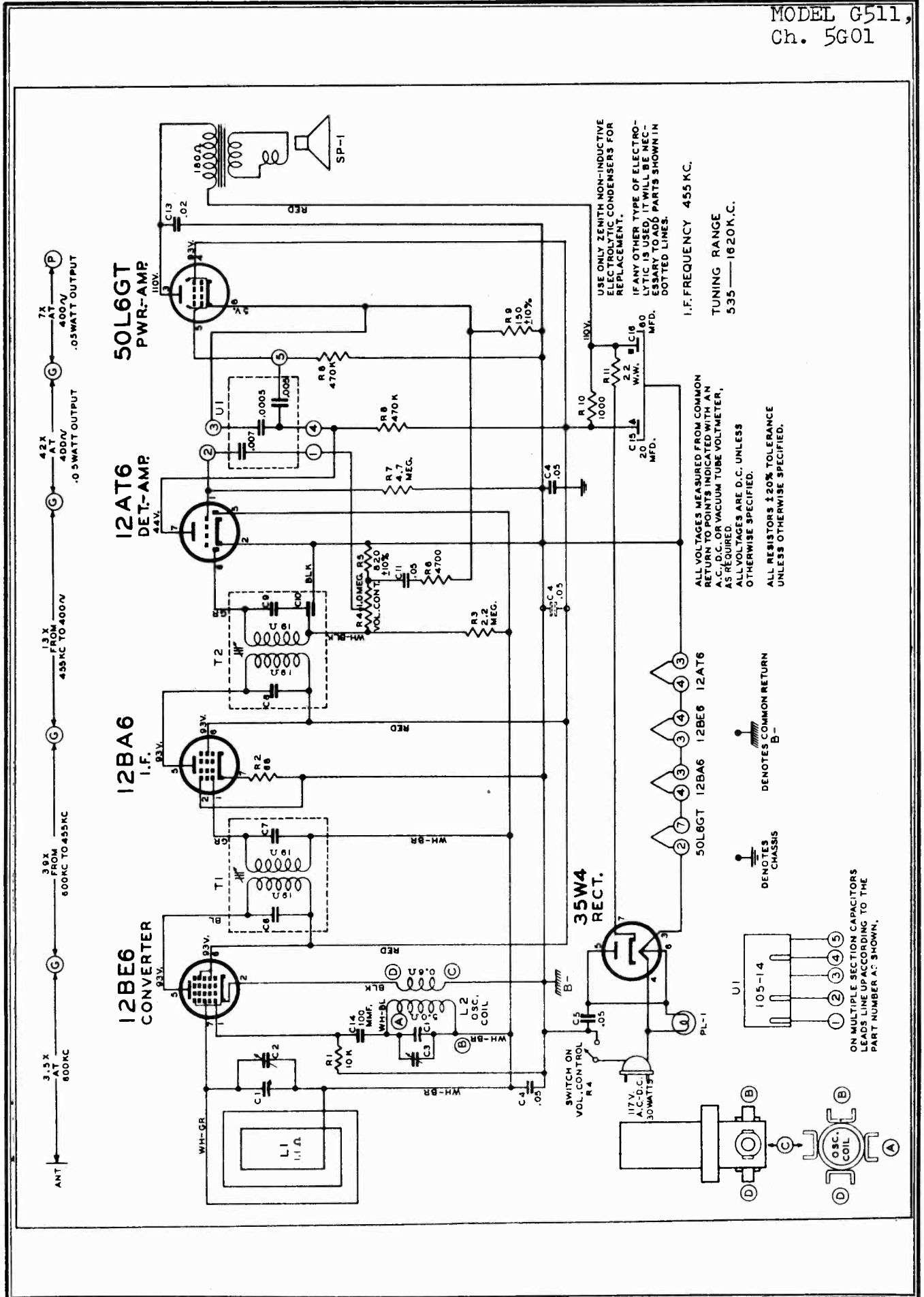
Chassis 5G40 features a high gain tuned RF stage ahead of a conventional superheterodyne circuit with band spread tuning on the 49, 31, 25, 19 and 16 meter bands. If removal of the chassis from the cabinet ever becomes necessary this should be done with care.

The alignment of chassis 5G40 is conventional. However, care must be exercised when making adjustments, and the alignment procedure must be followed exactly. Set the chassis over a metal plate approximately the same distance the battery pack is from the bottom of the chassis when it is in the cabinet. This procedure will introduce the approximate amount of metal in the field of the RF and oscillator coils as when the chassis is in the cabinet. A signal generator of reasonable accuracy and good attenuation must be used. An output meter (AC) of the copper oxide rectifier type with a range of 1 to 30 volts in several steps is necessary to get accurate output readings. Alignment wrenches should be of the non-metallic type, especially when making adjustments at the higher frequencies.

When reinstalling the chassis in the cabinet be careful not to disturb the cabling between the short wave coil assembly and chassis. Tune in a weak broadcast signal near 1400 Kc. and touch up trimmer C2. This will insure maximum performance after alignment.

The I.F. transformers incorporated in this receiver are of the new permeability tuned type. The advantage of an I.F. transformer of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these I.F. transformers the tuning wrench 68-7 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated. The tuning wrench is so designed that turning one slug does not affect the adjustment of the other.





USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT. IF ANY OTHER TYPE OF ELECTROLYTIC IS USED, IT WILL BE NECESSARY TO ADD PARTS SHOWN IN DOTTED LINES.

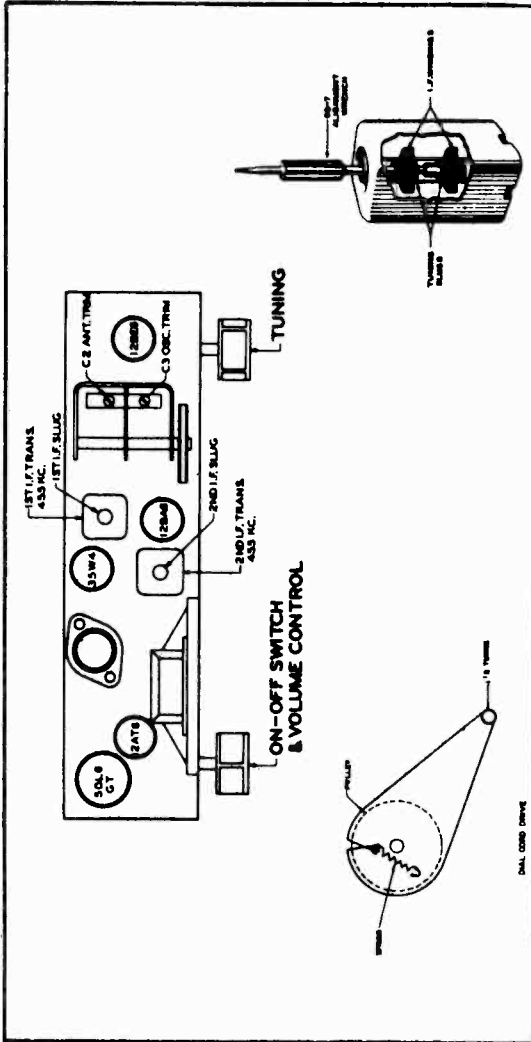
I.F. FREQUENCY 455 KC.
TUNING RANGE
535 — 1620K.C.

ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER, AS REQUIRED.
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

⊕ DENOTES CHASSIS
⊖ DENOTES COMMON RETURN B-

ON MULTIPLE SECTION CAPACITORS LEADS LINE UP ACCORDING TO THE PART NUMBER A: SHOWN.

MODEL G511,
Ch. 5G01



TUBE, TRIMMER LOCATION, DIAL CABLE DRAWING AND DETAILED VIEW OF I. F. TRANSFORMERS.

The I.F. transformers incorporated in this receiver are of the new permeability tuned type. The advantage of an I. F. transformer of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these I. F. transformers the tuning wrench 68-7 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated. The tuning wrench is so designed that turning one slug does not affect the adjustment of the other.

ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO ANTENNA	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	Adjust Primary & Secondary Slugs	For I. F. Alignment
2	One Turn Loop Coupled Loosely to Wave Magnet	--	1600 Kc.	1600 Kc.	C-3	Set Oscillator to Dial Scale.
3		--	1400 Kc.	1400 Kc.	C-2	Align Antenna Stage

- PARTS LIST**
- DIAL ASSEMBLY**
- 26-433 Dial Scale
 - 59-236 Dial Pointer
 - 76-515 Tuning Shaft
 - 80-209 Pilot Light Socket & Wire
 - 80-820 Dial Cord Tension Spring
 - 100-67 Dial Light Bulb - 6.3V .15 amp.
 - 188-32 Retaining Ring
 - S-14843 Dial Cord & Eyelet Assem.

- COILS & CHOKES**
- 85-1101 1st I. F. Transformer
 - 85-1102 2nd I. F. Transformer
 - S-14842 Osc. Coil Assem.

- CONDENSERS**
- 22-5 110 Mmfd. 500V
 - C-4 .05 Mfd. 200V
 - C-11 .05 Mfd. 200V
 - 22-1158 .02 Mfd. 400V
 - C-13 .02 Mfd. 400V
 - 22-1017 .05 Mfd. 400V
 - C-5 22-1804 Dry Electrolytic 60 x 20 Mfd. 150V
 - C-15, 16 Two Section Gang
 - U-1 Dual Ceramic

- RESISTORS**
- R-9 150 Ohm W.W. Insl. 1 W.
 - R-11 22 Ohm W.W. Insl. 1/2 W
 - R-10 10000 Ohm Insl. 1 W
 - R-4 Vol. Con. & Sw.
 - 63-1660 68 Ohm Insl. 1/2 W
 - 63-1737 820 Ohm Insl. 1/2 W
 - R-5 63-1782 4700 Ohm Insl. 1/2 W
 - R-6 63-1814 10M Ohm Insl. 1/2 W
 - R-1 63-1828 470M Ohm Insl. 1/2 W
 - R-8 2.2 Megohm Insl. 1/2 W
 - R-3 4.7 Megohm Insl. 1/2 W
 - R-7 63-1840

- MISCELLANEOUS**
- 11-79 Line Cord & Plug (6 Ft.)
 - 14-1011 Model G511W Plastic Cabinet
 - 14-1011W Model G511Y Plastic Cabinet
 - 14-1011Y Model G511Y Plastic Cabinet
 - 43-165 Handle Housing
 - 48-744 Tuning or Vol. Con. Knob (2 used) (G511)
 - 46-744Y Tuning or Vol. Con. Knob (2 used) (G511W-G511Y)
 - 49-645 4" P.M. Speaker
 - SP-1 206-645 Output Trans.
 - 208-645 Cone & Voice Coil
 - Speed Nut
 - 61-1057 Cabinet Front Grille
 - 57-1614 Socket - Electrolytic
 - 78-275 Socket - Octal Tube (8 Contact)
 - 78-611 Socket - Miniature Tube
 - 78-806 Socket - Miniature Tube
 - 78-807 Line Cord Insulating Strip
 - 83-1057 Rubber Strip (Handle)
 - 83-1393 1/16 x 1/4 x 3/8 Steel Washer
 - 93-487 Gang Cond. Mig. Bushing (166-41)
 - 94-334 46 x 7/16 Sraight Side B.H.S.T. Screw
 - 112-697 46-32 x 7/16 Hex Acorn Hd. M.S. (3 Used)
 - 114-67 48 x 1/4 Hex Hd. Slotted S.T. Screw (2 Used)
 - 114-217 Rubber Grommet
 - 125-17 Spk. Baffle
 - 139-83 Trimount Stud (Cab. Back Mtg.)
 - 159-69 Rubber Bumper (or 166-41)
 - 166-44 Flexible Handle Sleeve (G511)
 - 199-103 Flexible Handle Sleeve (G511W-511Y)
 - 202-773 Instruction Book
 - S-13210 Strip & Rivet Assem. (Handle Strap)
 - S-16471 Front Grille & Spk. Baffle Assem.
 - S-14876 Wavemagnet Assem. (G511-G511Y)
 - S-14877 Wavemagnet Assem. (G511W)

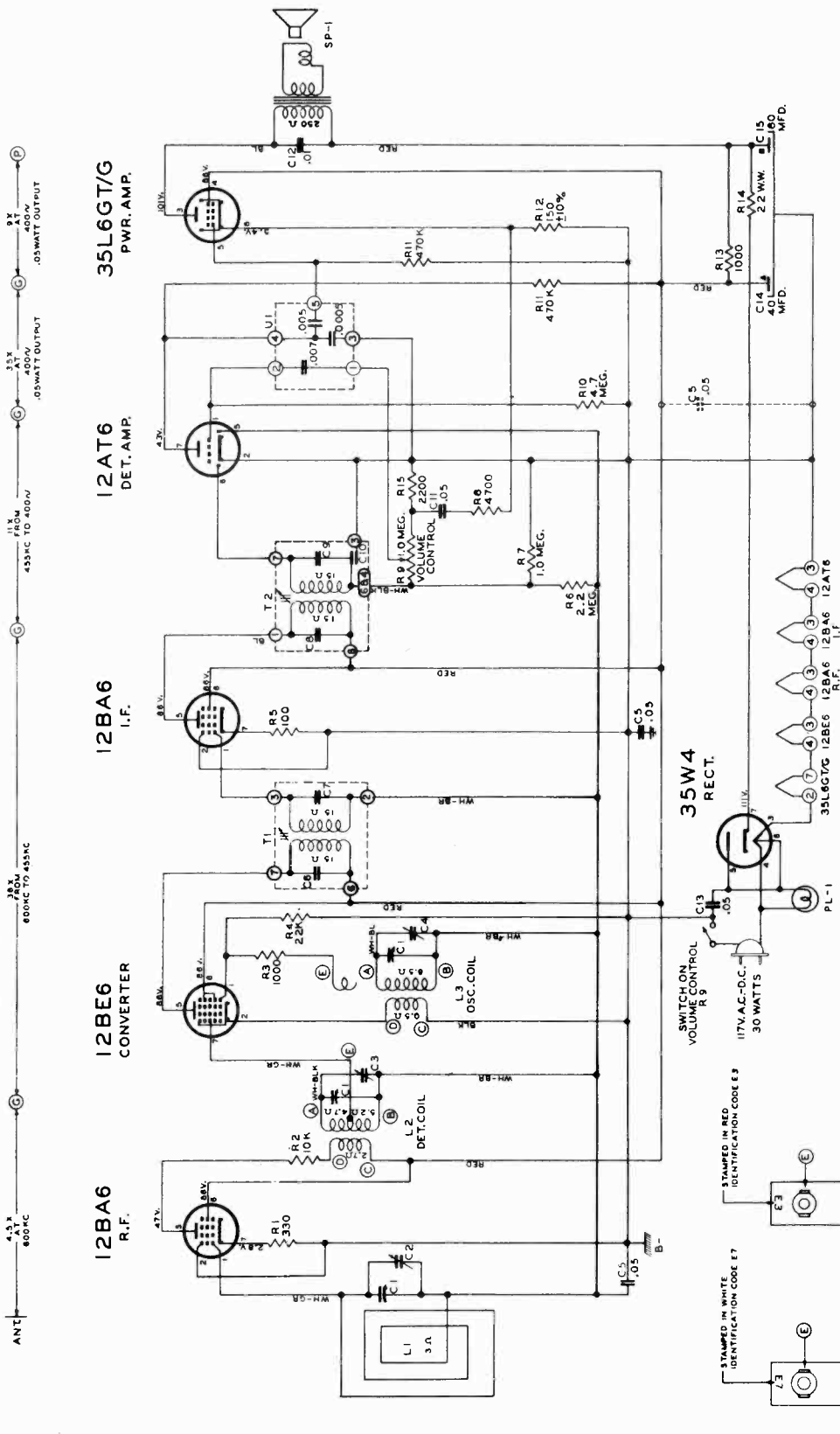
L-1
L-1

Flexible Handle Sleeve (G615W & G615Y)
Instruction Book
Wavemagnet Assembly (G615W only)

199-103Y
202-793
S-14888
S-14978
L1

Speaker Baffle
Trinount Stud (Cab Back Mfg.) (4 used)
Rubber Bumper (or 166-41)
Pilot Light Lens
Flexible Handle Sleeve

139-71
159-69
166-44
171-10
199-103



IF TRANSFORMER NUMBERS STARTS WITH (WH) IF
TERMINAL AS FIRST TERMINAL, CLOCKWISE AND
ADJACENT TO MARKER AS VIEWED FROM BOTTOM
OF CHASSIS.

USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC
CONDENSERS FOR REPLACEMENT.
IF ANY OTHER TYPE OF ELECTROLYTIC IS USED, IT
WILL BE NECESSARY TO ADD C3 SHOWN IN DOTTED
LINES.

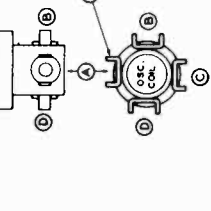
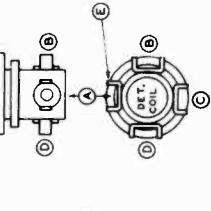
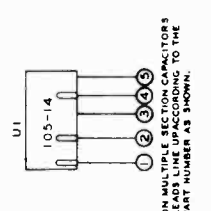
IF FREQUENCY 455KC.
TUNING RANGE
5.35 — 16.20 KC.

ALL VOLTAGES MEASURED FROM COMMON
RETURN TO POINTS INDICATED WITH "M"
A.C./D.C. OR VACUUM TUBE VOLTMETER.
ALL VOLTAGES ARE D.C. UNLESS
OTHERWISE SPECIFIED.

ALL RESISTORS ±20% TOLERANCE
UNLESS OTHERWISE SPECIFIED.

STAMPED IN RED
IDENTIFICATION CODE E3

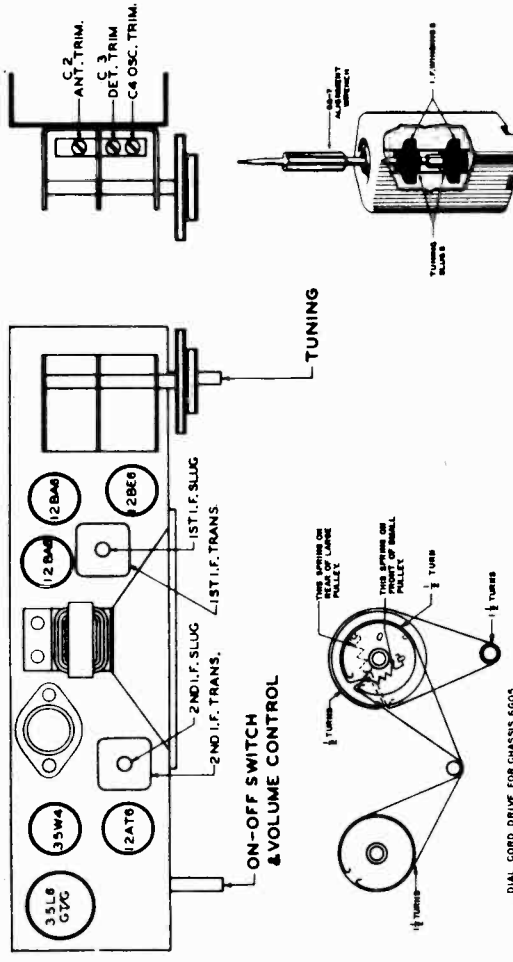
STAMPED IN WHITE
IDENTIFICATION CODE E7



MODEL G615,
Ch. 6G05

PARTS LIST
DESCRIPTION
DIAL ASSEMBLY
Dial Scale
Dial Pointer
Tuning Shaft
Dial Light Socket and Wire
Dial Cord Tension Spring
Dial Cord Guide Stud
Dial Light Bulb - 6.3 VC .15 Amp.
Retaining Ring
Retaining Ring
Dial Cord and Eyelet Assy. (Short)
Dial Cord and Eyelet Assy. (Long)
Pointer Pulley and Bushing Assy.
Pointer Pulley Bracket and Stud Assy.
COILS & CHOKES
1st I.F. Transformer
2nd I.F. Transformer
Detector Coil Assembly
Oscillator Coil Assembly
CONDENSERS
.05 Mfd.
.05 Mfd.
.01 Mfd.
.05 Mfd.
Three Section Gang
Dry Electrolytic 80 x 40 Mfd.
Multiple Capacitor Unit
RESISTORS
150 Ohm Insulated
22 Ohm W.W. Insulated
1M Ohm Insulated
Volume Control and Switch
100 Ohm Insulated
330 Ohm Insulated
1M Ohm Insulated
4700 Ohm Insulated
10M Ohm Insulated
22M Ohm Insulated
470M Ohm Insulated
1 Megohm Insulated
2.2 Megohm Insulated
4.7 Megohm Insulated
2200 Ohm Insulated
MISCELLANEOUS
Line Cord and Plug
Model G615 Plastic Cabinet
Model G615W Plastic Cabinet
Model G615Y Plastic Cabinet
Handle Housing
Tuning & Vol. Con. Knob (2 used)
Tuning & Vol. Con. Knob (2 used)
(G615 & G615Y)
5 1/4" P. M. Speaker
206-643 Output Trans.
208-643 Cone and Voice Coil
8-32 x 5/16 Hex Nut (Spk. Mfg.)
Speed Nut (Used on 26-411 and 57-1409)
Cabinet Front Plate
Socket Electrolytic
Socket Octal Tube (8 Contact)
Socket Miniature Tube
Socket Miniature Tube (4 used)
Line Cord Insulating Strip
Handle Strap
Handle Strap (Slotted)
Handle Strip (Rubber)
Black Feet Washer
Gang Cond. Mfg. Bushing
#6 x 7/16 Straight Side B.H.S.T. Screw
#8-32 x 7/16 Hex Hd Slotted M.S. (Spk. Mfg.)
Rubber Grommet

PART NO. REF.NO.
26-434
59-238
76-519
78-822
80-69
80-209
97-284
100-67
188-32
188-60
S-14834
S-16593
S-14867
S-14868
PL-1
T1
T2
L2
L3
C-11
C-5
C-12
C-13
C-1
C-14, 15
U-1
R12
R14
R13
R9
R5
R1
R3
R8
R2
R4
R11
R7
R6
R10
R15
11-85
14-1015
14-1015Y
43-165
46-744
46-744Y
49-643
SP-1
54-30
54-129
57-1619
78-275
78-611
78-806
78-807
83-1057
83-1165
83-1166
83-1393
93-138
94-334
112-697
114-291
125-17

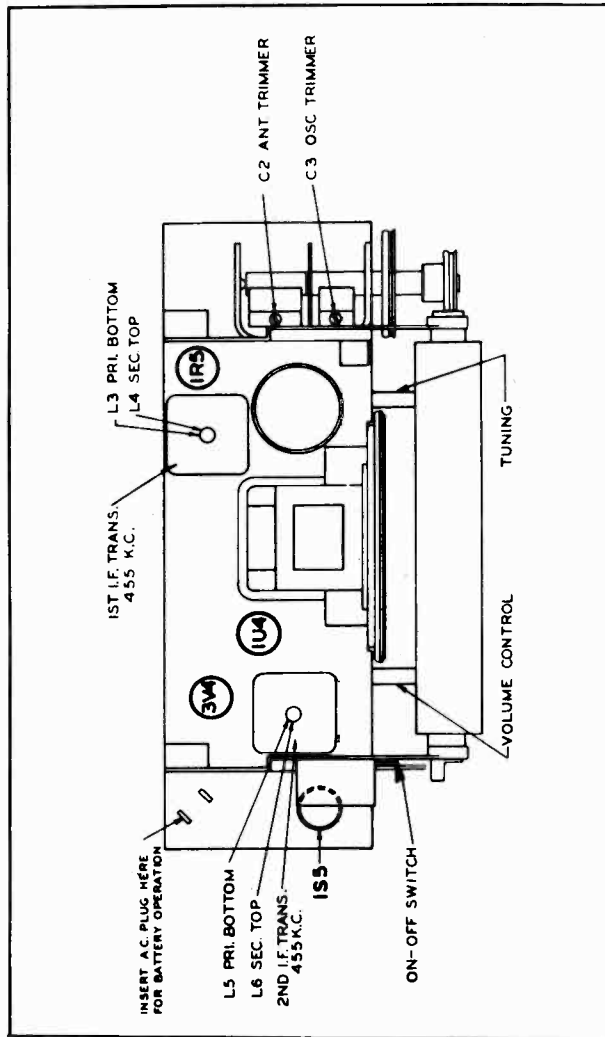


TUBE, TRIMMER LOCATION, DIAL CABLE DRAWING AND DETAILED VIEW OF I. F. TRANSFORMERS.
The I.F. transformers incorporated in this receiver are of the new permeability tuned type. The advantage of an I. F. transformer of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these I. F. transformers the tuning wrench 68-7 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated. The tuning wrench is so designed that turning one slug does not affect the adjustment of the other.

ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mid.	455 Kc.	600 Kc.	Adjust Primary & Secondary Slugs	For I.F. Alignment
2	Single Turn Loosely Coupled to Wave Magnet	--	1600 Kc.	1600 Kc.	C-4	Set Oscillator to Dial Scale.
3		--	1400 Kc.	1400 Kc.	C-3	Detector Alignment
4		--	1400 Kc.	1400 Kc.	C-2	Antenna Alignment

TUBE, TRIMMER LOCATION



TO THE SERVICE MAN:

The 4F40 chassis is an AC, DC or battery operated super-heterodyne. The chassis is isolated from the DC circuit, and all measurements must be made from a common negative point. The most convenient place to reach this negative point is the terminal strip to which C17 is connected. When the change over Switch S1 is in AC position, the DC resistance from chassis to any circuit must be almost infinite. If any circuit becomes grounded a hum will result. Microphonic tubes will cause audio howl. Check the 1R5 and 1S5.

The wavemagnet is connected to the chassis by two wires that pass through the hollow dial pivots. If the R.F. becomes weak or dead, check the D.C. resistance of the wavemagnet. This D.C. resistance should be approximately .9 ohm. If it is open check the wavemagnet.

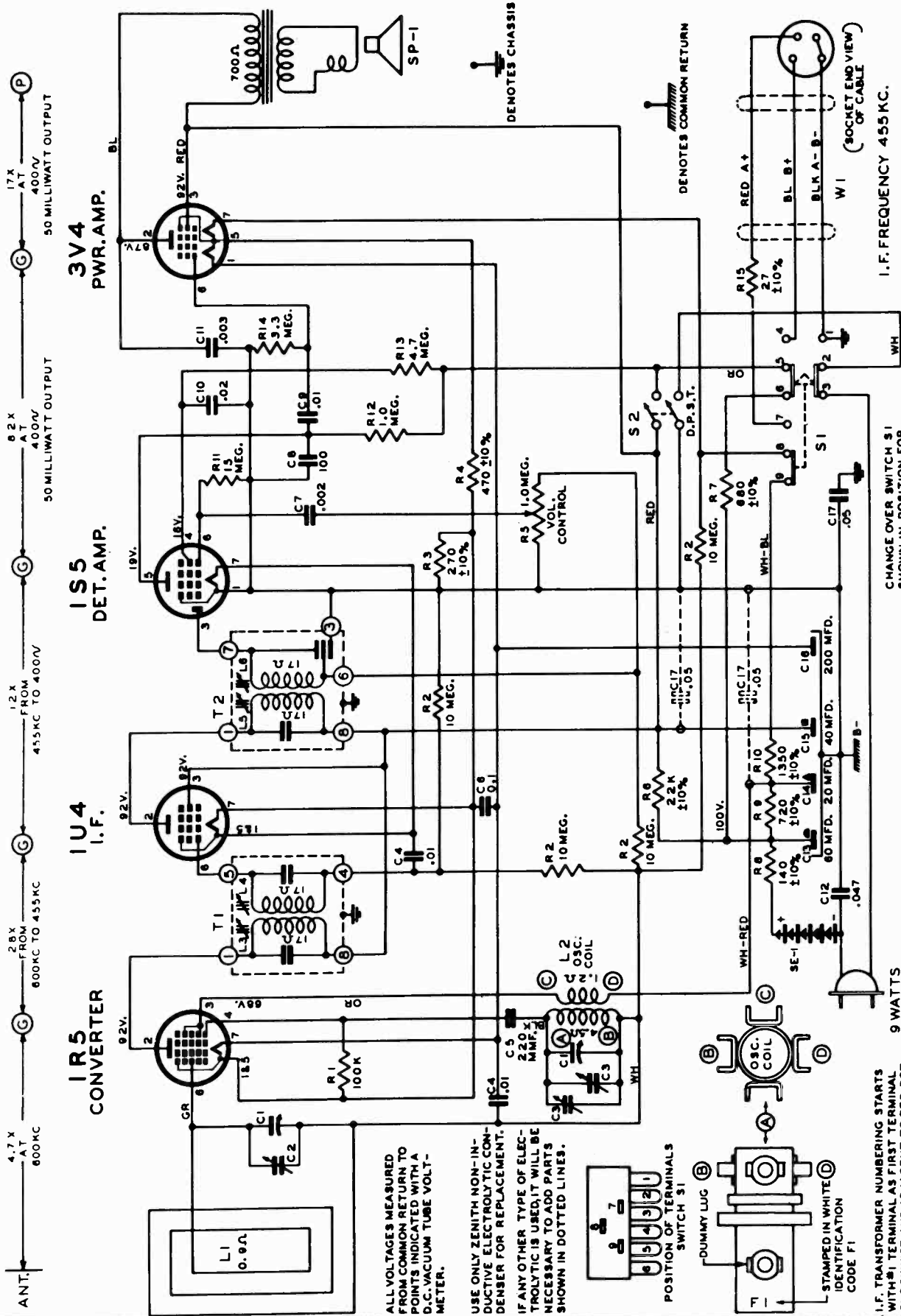
IF Alignment: Remove the chassis from the cabinet and arrange the units so that the wavemagnet can be connected. All the connections and adjustments can be made from the top of the chassis. Connect a signal generator, through a .1 mfd. dummy antenna, to the converter grid and B (common return). Connect an output meter across the voice coil of the speaker (two lugs provided). Set the signal generator to 455 Kc. and adjust L3, L4, L5 and L6 for maximum indication on the output meter. Always keep the signal output from the generator just high enough to get an indication, otherwise excessive loading may result.

RF Alignment: Connect a two turn loop across the leads of the signal generator, loosely couple this loop to the wavemagnet. Set the signal generator and the dial pointer of the receiver to 1600 Kc. and adjust C3 oscillator trimmer to resonance. Set the signal generator and dial pointer to 1400 and adjust C2 antenna trimmer to resonance. These trimmers are on the top of gang condenser. Check operation and re-install set in cabinet. Tune in a weak station near 1400 Kc. or use background noise and readjust antenna trimmer for maximum sensitivity.

ALIGNMENT PROCEDURE

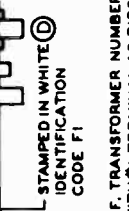
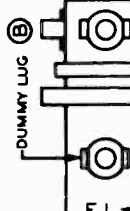
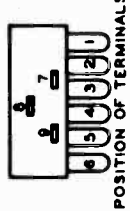
OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	BAND	SET DIAL TO	TRIMMERS	PURPOSE
1	Converter Grid	.1 Mfd	455 Kc.	BC	600 Kc.	L3, 4, 5 & 6	I.F. Alignment
2	Two turns loosely coupled to Wavemagnet		1600 Kc.	BC	1600 Kc.	Osc. Trim. C3	Set Oscillator to scale
3	Two turns loosely coupled to Wavemagnet		1400 Kc.	BC	1400 Kc.	Ant. Trim. C2	Align Wavemagnet

MODEL 4G903,
Ch. 4F40



ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLT-METER.

USE ONLY ZENITH NON-INDUCTIVE ELECTROLYTIC CONDENSER FOR REPLACEMENT. IF ANY OTHER TYPE OF ELECTROLYTIC IS USED, IT WILL BE NECESSARY TO ADD PARTS SHOWN IN DOTTED LINES.



I.F. TRANSFORMER NUMBERING STARTS WITH #1 TERMINAL AS FIRST TERMINAL CLOCKWISE AND ADJACENT TO RED DOT AS VIEWED FROM BOTTOM OF CHASSIS. BATTERY PACK NO. Z 909

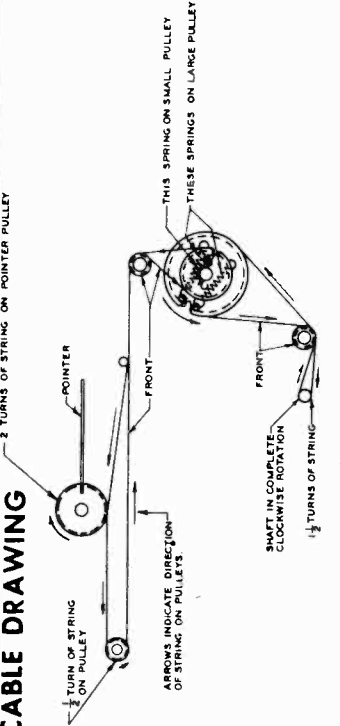
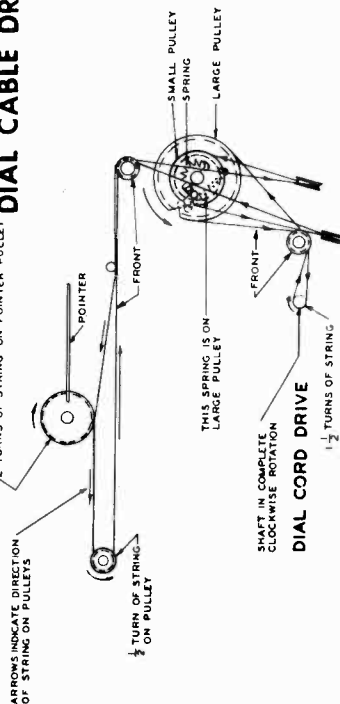
9 WATTS
117V. A.C.-D.C.
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

CHANGE OVER SWITCH S1 SHOWN IN POSITION FOR A.C. OPERATION.

I.F. FREQUENCY 455 KC.
TUNING RANGE
535-1620 K.C. STD. B.C.

DIAL CABLE DRAWING

DIAL CABLE DRAWING



On receivers using Tuning Gang #22-2032, Dial String Assemblies #S-15440 (short) and #S-15441 (long) must be used.

On receivers using Tuning Gang #22-2108, Dial String Assemblies #S-15440 (short) and #S-16106 (long) must be used.

PARTS LIST

PART NO.	REF. NO.	DESCRIPTION	PART NO.	REF. NO.	DESCRIPTION
DIAL ASSEMBLY					
12-1554		Tuning Shaft Bracket	R12		1 Meg Ohm 1/2W 20% Ins.
26-420		Dial Scale	R14		3.3 Meg Ohm 1/2W 20% Ins.
46-785		Tuning & Vol. Control Knob (2 Used)	R13		4.7 " " " 1/2W 20% " "
57-1490		Emblem Plate	R2		10 " " " 1/2W 20% " "
57-1493		Trim Plate	R11		15 " " " 1/2W 20% " "
57-1513		Emblem Plate (Y Model only)	R8		140 Ohm 3W 10% (Zippohm) Ins. (or 63-2014)
57-1514		Trim Plate (Y Model only)	R9, R10		Two Section Candohm
76-540		Tuning Shaft	R5		Volume Control
80-209		Dial Cord Tension Spring (3 Used)			
93-978		Felt Washer (Used behind Pointer Assem.)			
188-32		Retaining Ring (Used on 76-540)			
S-15430		Pointer & Pulley Assem.			
S-15440		Dial Cord Assem. (Short)			
S-15441		Dial Cord Assem. (Long)			
S-16016		Dial Cord Assem. (Long)			
COILS & CHOKES					
95-1132	T1	1st. I. F. Transformer			
95-1133	T2	2nd. I. F. " "			
S-15429	L2	Osc. Coil Assem.			
CONDENSERS					
22-3	C9	.01 Mfd. (Ceramic Disc.)			
22-182	C5	220 Mmfd. (Molded Mica)	500V		
22-326	C11	.003 Mfd.	500V		
22-492	C7	.002 " "	400V		
22-826	C4	.01 " " "	600V		
22-827	C6	.01 " " "	200V		
22-829	C17	.05 " " "	200V		
22-1386	C10	.02 " " "	200V		
22-1569	C8	100 Mmfd.	500V		
22-1741	C13, C14				
22-1775	C12	Four Section Electrolytic			
22-2032	C1	.047 Mfd. (Molded) (or 22-1914)	400V		
22-2108	C1	Two Section Gang			
RESISTORS					
63-1719	R15	27 Ohm 1/2W 10% Ins.			
63-1761	R3	270 " 1/2W 10% Ins.			
63-1771	R4	470 " 1/2W 10% Ins.			
63-1778	R7	680 " 1/2W 10% Ins.			
63-1841	R6	22K " 1/2W 10% Ins.			
63-1870	R1	100K Ohm 1/2W " "			
MISCELLANEOUS					
78-782		Miniature Tube Socket			
78-806		Miniature Tube Socket			
78-807		Miniature Tube Socket (2 Used)			
80-699		Latch Spring			
83-1600		Handle Strip (Slotted)			
83-1610		Wavemagnet Retaining Strip (2 Used)			
85-450	S1	Power Change-Over Switch			
85-451	S2	On-Off Switch			
94-472		Handle Mfg. Bushing (2 Used)			
112-761		#2 X 1/4" Phil. R.H.S.T. Type 2 Steel N.P. (2 Used on Emblem Plate)			
113-18		#6-32 X 5/16 Hex. Hd. Slotted M.S. Steel Cad. Pl. Shakeprf. (2 Used on 85-450)			
113-23		#8-32 X 5/16 Hex Hd. Sl. M.S. Steel Cad. Pl. Int. Shakeprf. Lock (2 Used on S-15633)			
114-159		#6 X 1/4" Hex Hd. S.T. Screw Cad. Pl. (4 Used on S-15437)			
114-311		#6-32 X 1" Hex Hd. Slotted M.S. Steel N.P. (1 Used to Mt. Rectifier)			
114-319		#8-32 X 1 1/16" Hex Hd. Slotted M.S. Steel Cad. Pl. (2 Used to Mt. Handle)			
147-156		Speaker Mfg. Spacer			
156-37		Door Latch			
156-38		Rear Cover Catch (2 Used-Black)			
156-39		Door Latch (Y Model only)			
166-44		Rubber Bumper (Speaker & Gang)			
192-124		Dial Glass			
199-115		Flexible Handle Sleeve (With Cardboard Strips)			
199-116		Paper Sleeve (Used on Wavemagnet Lead)			
202-689		Instruction Book			
212-5	SE-1	Selenium Rectifier (or 212-2)			
S-15427		Cabinet Front & Hinge Assem.			
S-15433		Support Brkt. & Idler Pulley Assem. (Gang & Door)			
S-15434		Wavemagnet Winding Assem.			
S-15438		Battery Cable & Socket Assem.			
S-15473	W1	Speaker Baffle & Grille Cloth Assem. (110-137)			
S-15548		Cabinet Rear Cover Assem.			
S-15549		Handle End Pieces Assem. (2 Used)			
S-15595		Brkt. & Idler Pulley Assem. (Lower)			
S-15631		Cabinet Front & Hinge Assem. (Y Model only)			
S-15632		Cabinet Rear Cover Assem. (Y Model only)			
S-15633		Handle End Pieces Assem. (Y Model only)			

MODELS 6MH889, Ch. 6E89;
DB-48, Hudson

SPECIFICATIONS AND CIRCUIT FEATURES

MODEL 6MH889—CHASSIS 6E89

TUBE COMPLEMENT: 7A7 R.F., 7B8 Converter, 6BA6 I.F., 7B6 Detector, A.V.C., 1st Audio, 6V6GT Beam Power Output, 7Y4 Rectifier.

TUNING RANGE: 540 to 1600 Kilocycles.

AUTOMATIC POSITIONS: 6.

SPEAKER: 6" x 9" Oval Permanent Magnet externally mounted behind instrument panel. Voice coil impedance 3.2 ohms at 400 cycles.

TONE CONTROL: Continuously variable.

POWER OUTPUT: Maximum 4.5 watts. Measured at voice coil.

VIBRATOR: Non-synchronous.

POWER RATING: Current drain 6 amperes.

FUSE: 14 amperes. Type SFE-14.

SENSITIVITY: 4 Microvolts at one watt output.

I.F. FREQUENCY: 265 Kilocycles.

WARRANTY AND SERVICE

The DB48 Hudson Receiver is covered by warranty against defect in material and workmanship for a period of 90 days after retail delivery.

This warranty covers a receiver installed at the factory or a receiver installed in the field as an accessory.

IMPORTANT

A warranty registration tag is furnished with each receiver. This tag must be filled in and attached to the unit at the time of retail delivery and must accompany the receiver when service during the warranty period is expected by the customer or dealer. Otherwise regular charges for labor and material prevail. All warranty labor claims must be made to the Hudson Dealer. Do NOT send claims to the radio manufacturer. Defective parts in warranty will be replaced, no charge to you, by the nearest Zenith Distributor.

OPERATING INSTRUCTIONS

OFF-ON SWITCH AND VOLUME CONTROL

To turn the receiver on, turn the volume control knob to the right until it clicks and the dial is illuminated. Allow the receiver to reach operating temperature. (Approximately 20 seconds.) To increase the volume, continue to turn this control knob to the right. To turn the receiver off turn the volume control knob to the left until it clicks.

TONE CONTROL

The tone control is located directly behind the volume control knob (Fig. 1). Rotating this control to the right or left will change the tone of the receiver. Tuning to the right will emphasize the high notes, while turning to the left will emphasize the bass notes.

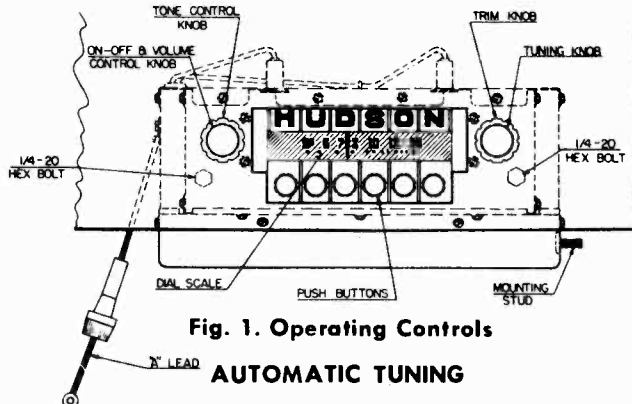


Fig. 1. Operating Controls

AUTOMATIC TUNING

There are six automatic tuning positions, each of which may be adjusted to any desired station. In order to simplify the identification of the stations, it is advisable to set the automatic tuning mechanism in sequence according to frequencies of the stations, beginning with the station broadcasting on the lowest frequency, and progressing to the station broadcasting on the highest frequency. If the positions have not been previously adjusted, proceed as follows:

1. Loosen the first push button by turning it counter-clockwise with your fingers, not more than two turns. If the push button is completely unscrewed, the plunger assembly, inside the receiver, may fall apart. Then it will be necessary to remove the radio from the car, open the case, and reassemble the plunger.
2. Turn the manual tuning control knob (Fig. 1) to tune in the desired station. Carefully tune to the middle of the signal for clearest reception.
3. Push the first push button in as far as it will go. Release the button, and tighten securely by turning it clockwise with the fingers.
4. Repeat the above procedure for the remaining five push buttons.

MANUAL TUNING

To tune manually it is only necessary to turn the manual tuning knob (on the right side of the receiver, see Fig. 1). Tune to exact frequency for the best tone quality. This can be done at any time without disturbing the automatic setting

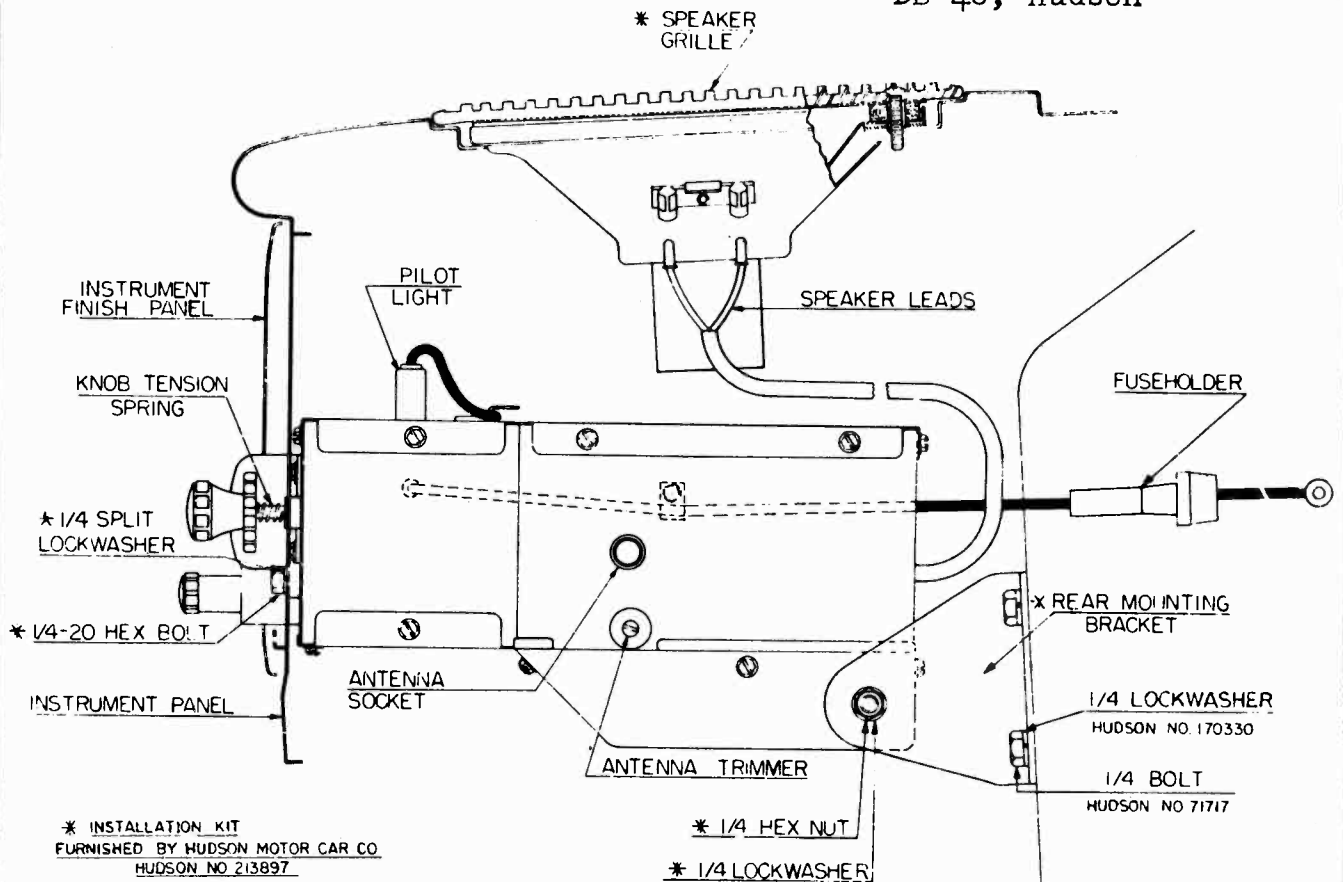
MODELS 6MH889, Ch. 6E89;
DB-48, Hudson

Fig. 2. Mounting Details and Connections
INSTALLATION INSTRUCTIONS

1. Install the antenna. (Complete instructions are furnished with each kit.)
2. Remove door on left hand side of instrument panel by removing the three screws from the back.
3. Remove ornament from center of trim panel above radio opening by means of removing the two face screws.
4. Remove the instrument finish panel and remove the escutcheon plug from the panel.
5. Remove the two bolts, Hudson No. 71717, from the fire wall and install the rear mounting bracket No. 12-1410. Do not tighten the bracket at this time. (Fig. 2.)
6. With the dial end of the receiver up, push the receiver up between the instrument panel and the air hopper. Turn the radio until the knob shafts slide through the openings in the instrument panel and the tapped spacers provided on the front plate of the set line up with the two corresponding holes in the instrument panel. Bring the receiver forward as far as it will go. (Fig. 2.)
7. With the receiver held in this position start the two $\frac{1}{4} \times 20 \times \frac{1}{2}$ fillister head screws, with lockwashers, into the holes.
8. Slip the elongated hole in mounting bracket over the stud on the set and install lockwasher and nut.
9. Before locking the receiver securely in position, place the instrument finish panel into position over the clock and speedometer and note whether or not the radio and trim panel are centered correctly. If not, move the radio until the dash trim panel and radio dial escutcheon assembly are in alignment. Then permanently fasten set in position by tightening the two front screws and the nut and bolts on the rear mounting bracket. Replace instrument finish panel and fasten securely.
10. Connect the "A" lead of the set to the battery terminal of the circuit breaker, mounted on the instrument panel brace over the steering column (Fig. 3).

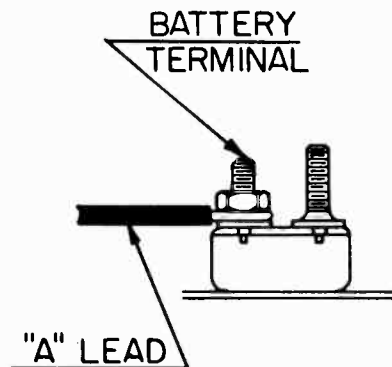


Fig. 3

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DB-48, Hudson

11. Plug in antenna cable (Fig. 2).
12. Remove speaker cover plate, and pull speaker leads through opening in dash.
13. Plug speaker leads into pin jack mounted on speaker. Make sure green lead plugs into green spotted pin jack.
14. Lower speaker into position, and line up with holes in the instrument panel. Place speaker grille, included in radio package, over speaker, making sure the mounting holes line up, then fasten securely with the four chrome plated screws provided in kit.
15. Place tone control knob onto shaft, put on volume control knob, tighten set screw (Fig. 1). Be sure there is no binding.
16. Place knob tension spring No. 80-594 over the tuning shaft. Put on trim ring and press on tuning control knob as far as it will go. Tighten set screw (Fig. 1).
17. Replace ornament and door.
18. **IMPORTANT:** Turn the receiver on and allow it to operate for approximately fifteen minutes in order for it to reach normal operating temperature. Tune in a weak station near 1200 Kc. With a small screw driver adjust the antenna trimmer, located on the right side of the receiver for maximum volume (Fig. 2).

INTERFERENCE ELIMINATION

IMPORTANT: Use the utmost care in the following operations to insure freedom from motor noise. Be sure that good ground contacts are made between the interference condensers and the car body. If necessary, clean away paint or dirt with emery paper. Tighten all nuts and bolts securely.

1. Remove the mounting screw of the voltage regulator and under this screw mount the condenser No. 22-1537. Connect the lead to the voltage regulator "A" terminal. (Fig. 4.)
2. Install suppressor No. 63-1252 in center of hole of distributor cap. Place high tension lead in top of suppressor. Be sure the suppressor and the lead are fastened securely. (Fig. 5.)
3. Remove bolt on the right side of the ignition coil. Mount condenser No. 22-1537 under this bolt. Connect lead to coil terminal marked (-). (Fig. 6.)

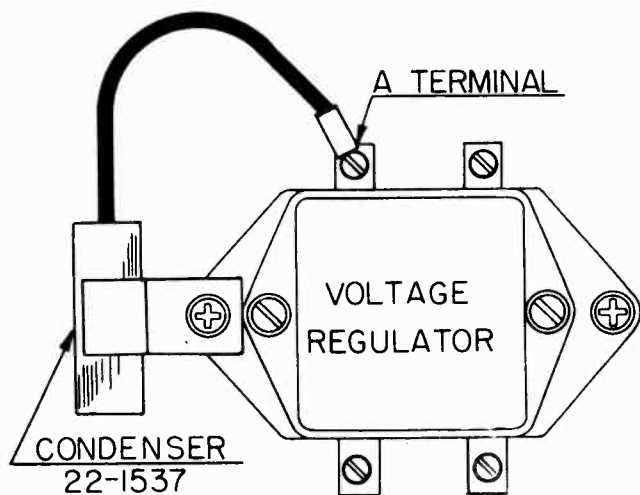


Fig. 4

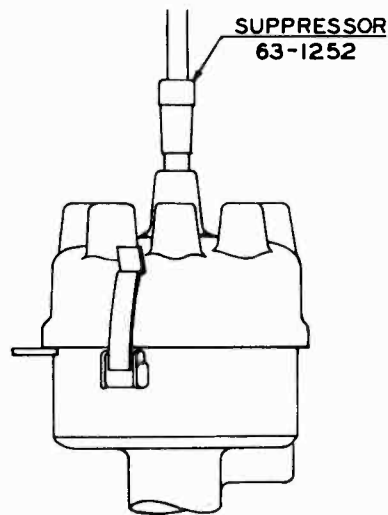


Fig. 5

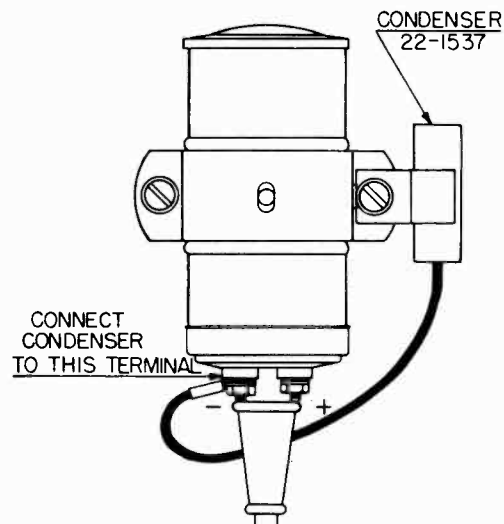


Fig. 6

MODELS 6MH889, Ch. 6E89;
DB-48, Hudson

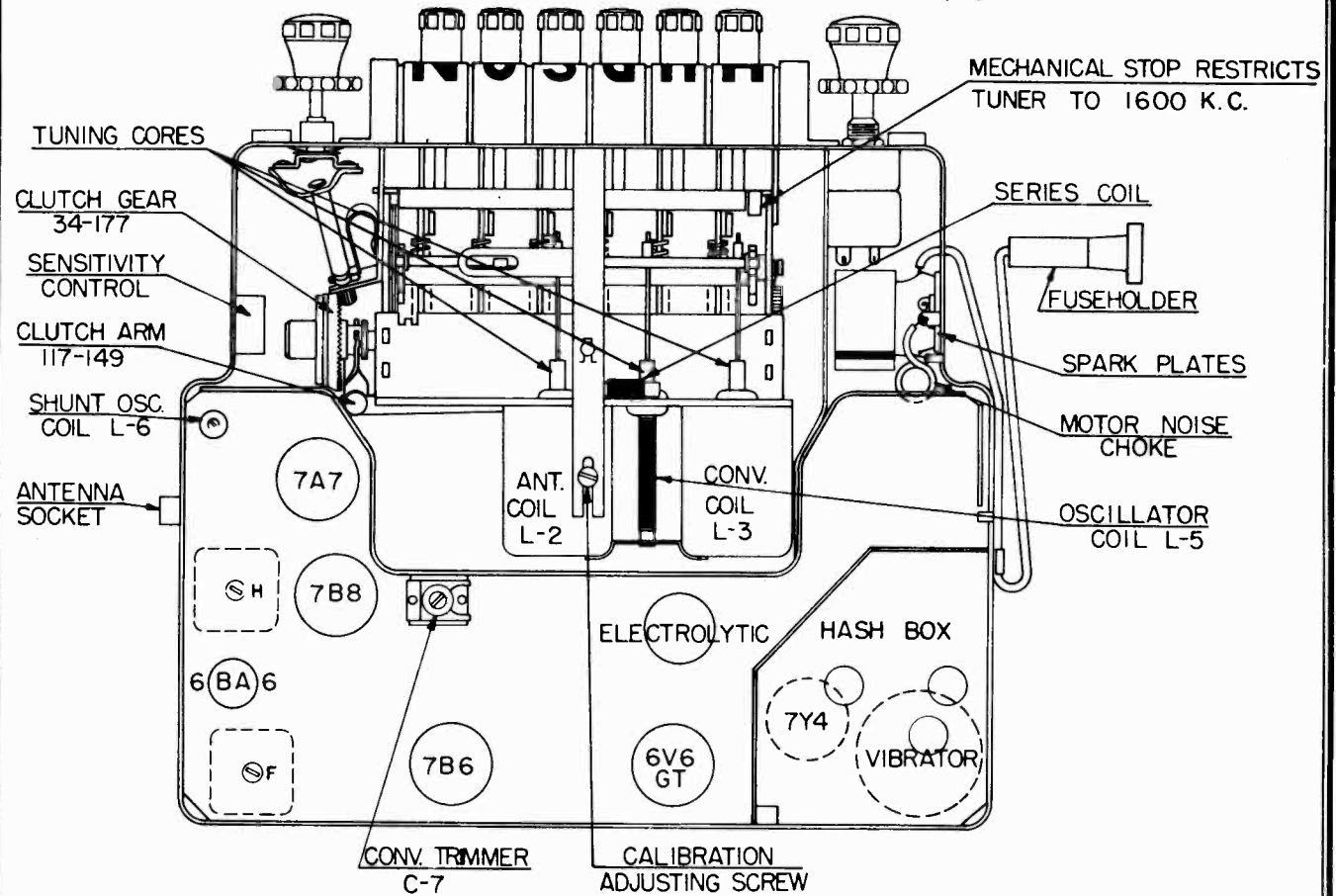


Fig. 7. Top View of Chassis

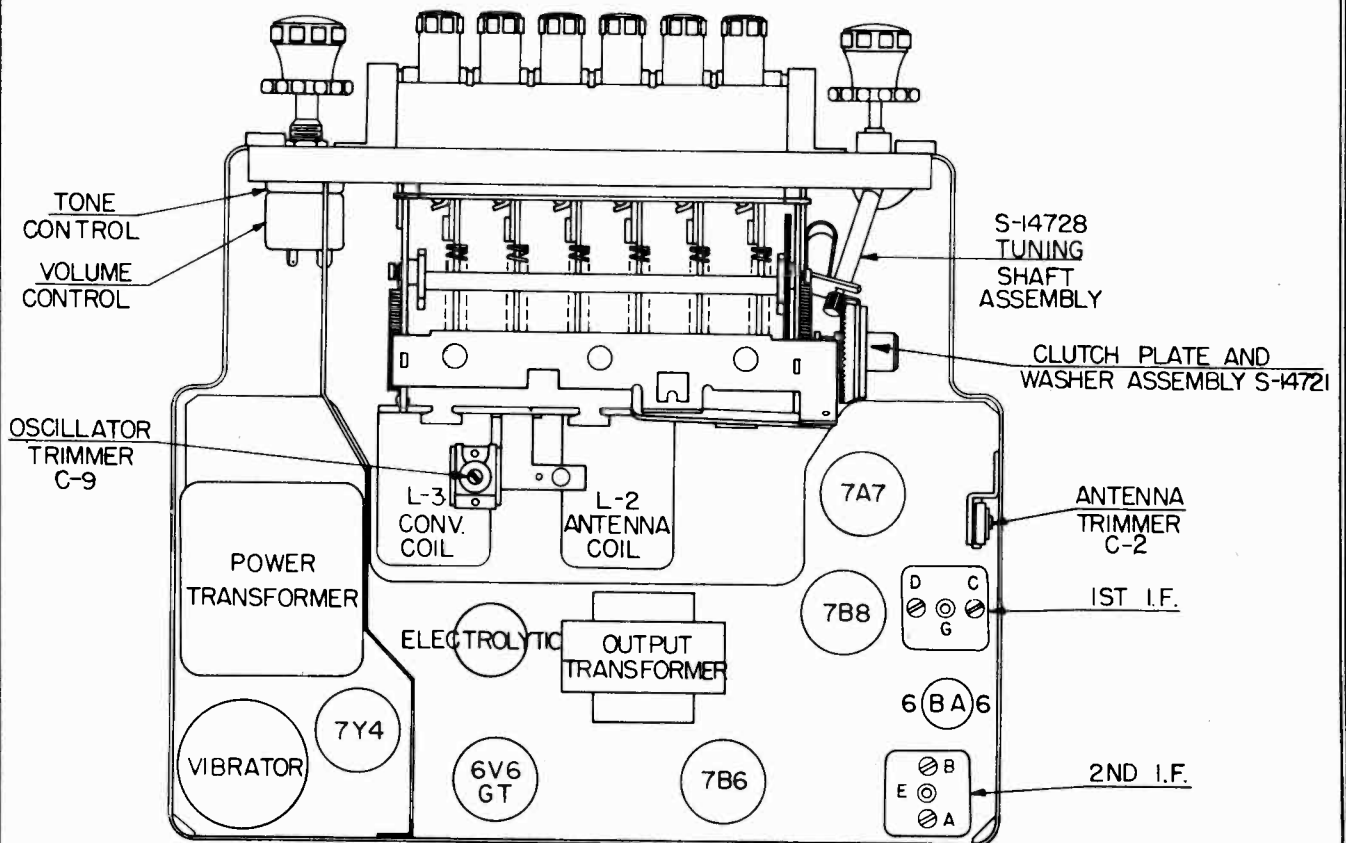


Fig. 8. Bottom View of Chassis

MODELS 6MH889, Ch. 6E89;
DB-48, Hudson

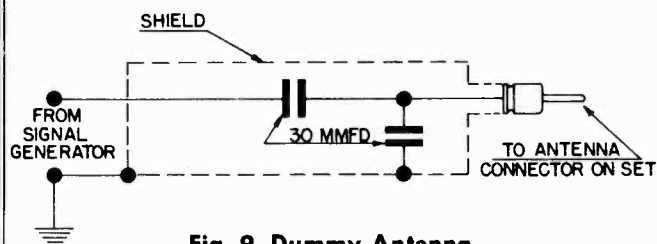


Fig. 9. Dummy Antenna

Fig. 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustment to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove top and bottom covers from receiver.
2. Set signal generator to 265 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
4. Adjust I.F. trimmers A, B, C, and D in order named for maximum output. Repeat the operation to assure accurate alignment. Some units have I.F. transformers that are slug tuned. In this case adjust I.F. slugs E, F, G, and H in order named for maximum output and repeat the operation to assure accurate alignment. (Figs. 7-8.)

R.F. AND OSCILLATOR ALIGNMENT

1. Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver. This is important.
2. Set signal generator to 535 Kc.
3. Tune set to 535 Kc.
4. Adjust oscillator trimmer C-9 (Fig. 8) for maximum response.
5. Set signal generator to 1400 Kc.
6. Tune set to 1400 Kc.
7. Adjust converter trimmer C-7 (Fig. 8) and antenna trimmer C-2 (Fig. 7) for maximum response.
8. If dial calibration is off after making above adjustments, a correction can be made by tuning eccentric screw at fulcrum of dial pointer. (Fig. 7.)

CORE OR COIL REPLACEMENT ONLY

WARNING: The following adjustments are to be made **ONLY** if a core or coil is replaced.

The steel clamp collar normally grips the core spring and before a core is screwed in or out this tension must be released.

TO REMOVE CORE:

Remove the steel clamp collar using stubby nosed pliers by pressing the lugs of the collar together. Using core alignment tool, part number S-13064, screw the core spring down to the support bracket. With your fingers, screw the core spring past the bracket and lift out of the coil.

TO REPLACE CORE:

Place the core in the coil, screw the core spring into and past the support bracket. Use core tuning wrench, part number S-13064.

1. Set signal generator to 1675 Kc.
2. Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna receptacle on the receiver.
3. Set receiver dial to 1600 Kc. (maximum high frequency end of dial).
4. Screw the cores completely out of the antenna coil, the converter coil, and the oscillator coil.
5. Adjust oscillator trimmer C-9 (Fig. 8) at 1675 Kc.
6. Adjust converter trimmer C-7, and antenna trimmer C-2 (Figs. 7 and 8) for maximum output reading.
7. Replace cores to their approximate original position.
8. Set signal generator dial and receiver dial to 1400 Kc.
9. Adjust oscillator core L-5 (Fig. 8) to scale at 1400 Kc.
10. Adjust the antenna core L-2, and converter core L-3 (Fig. 7) for maximum output reading.
11. Set signal generator to 600 Kc.
12. "Rock in" shunt oscillator coil L-6 (Fig. 8) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padder condenser on a general condenser receiver.
13. Check receiver at 1400 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.
14. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the lug stop near the volume control should be bent to limit the frequency coverage to 1605 Kc.
15. Replace the steel clamp collar over the threaded insulating bushing.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station at approximately 1400 Kc.

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Ch. 6E89; DB-48
Hudson

PARTS LIST

Diag. No.	Zenith Part No.	Hudson Part No.	Description	Diag. No.	Zenith Part No.	Hudson Part No.	Description	
COILS AND CHOKES				RESISTORS				
L8	20-213	204890	Main Hash Choke	R2	63-1379	209877	Sensitivity Control (or 63-1267)	
T1	95-1087	215456	1st I.F. Transformer (or 95-1077)	R8	63-1398	209929	33M Ohm 1 W.	
T2	95-1088	215457	2nd I.F. Transformer (or 95-1060)	S2	63-1587	215473	Volume Control, Switch and Tone Control	
L1	S-8819	209741	Antenna Motor Noise Choke Assembly	R11				
L7	S-11232	209571	Motor Noise Choke Coil Assembly	R16				
L2	S-14219	215458	Tuner Coil Unit Assembly (Ant., R.F. and Osc.)	R18	63-1620	215474	1800 Ohm 2 W.	
L3				R17	63-1621	215475	270 Ohm 1 W.	
L5				R19	63-1740	215476	82 Ohm 1/2 W.	
L6	S-14225	215459	Oscillator Shunt Coil Assembly	R20			150 Ohm 1/2 W.	
L4	S-14226	215460	Oscillator Series Coil Assembly	R7	63-1835	215478	15M Ohm 1/2 W.	
L2	S-14227	215462	Antenna Coil Assembly	R3	63-1838	215479	18M Ohm 1/2 W.	
L3	S-14227	215462	R.F. Coil Assembly	R12	63-1841	215480	22M Ohm 1/2 W.	
L5	S-14228	215461	Oscillator Coil Assembly	R10	63-1849	215481	33M Ohm 1/2 W.	
CONDENSERS				R5	63-1862	215482	68M Ohm 1/2 W.	
C13	22-170	204901	.1 Mfd. 400 V.	R1	63-1891	215483	330M Ohm 1/2 W.	
C16	22-182	204902	250 Mmfd. 500 V.	R4				
C4	22-190	209577	.1 Mfd. 200 V.	R14				
C12	22-250	204904	.05 Mfd. 200 V.	R15				
C3	22-365	215465	100 Mmfd. 500 V.	R9	63-1912	215484	1 Megohm 1/2 W.	
C19	22-838	204905	.005 Mfd. 600 V.	R6	63-1834	215485	15M Ohm 1/2 W.	
C1	22-906	204906	.005 Mfd. 200 V.	R13	63-1961	215486	15 Megohm 1/2 W.	
C14								
C6	22-1136	209505	250 Mmfd. 500 V.	MISCELLANEOUS				
C17	22-1170	204910	.01 Mfd. 600 V.	19-158			I.F. Transformer Mtg. Clip	
C18	22-1180	209587	.003 Mfd. 200 V.	SP1	49-623	213880	P.M. Speaker (6" x 9" Oval Type) (S-14205)	
C15	22-1270	215465	.02 Mfd. 200 V.	52-455	215489		Volume Control Cable	
C22	22-1448	209579	.008 Mfd. 1600 V.	52-452	213873		Battery Cable—Fuse to Ammeter (or 52-474)	
C20	22-1644	215466	Electrolytic—20 Mfd. 350 V. x 10 Mfd. 300 V. (or 22-1554)	52-472	215488		Speaker Cable and Plug	
C21				52-473	215487		Battery Cable—Fuse to Set	
C8	22-1712	215467	260 Mmfd. Compensating	74-49	213881		Speaker Screen	
C2	22-1714	215468	Single Section Trimmer (Antenna—50 Mmfd.)	78-596	215490		Loktal Tube Socket (4 used)	
C7	22-1715	215469	Single Section Trimmer (Converter—50 Mmfd.)	78-782	215492		Miniature Tube Socket	
C9	22-1716	215470	Single Section Trimmer (Oscillator—50 Mmfd.)	78-796	215493		Antenna Connector Socket	
C23	22-1728	215471	.5 Mfd. 100 V.	78-801	215491		Octal Tube Socket	
C24				78-804	215494		Vibrator Socket	
C5	22-1730	215472	100 Mmfd. (Ceramic) 500 V.	93-888	215486		Vibrator Cushion Washer	
C10				T3	95-1030	215497		Output Transformer
C11				T4	95-1066	215498		Power Transformer
				125-16	171277		Rubber Grommet	
				125-63	171273		Rubber Grommet (3 used on S-14219)	
				114-199	171252		6-32 x 3/16" Hex. H.D. Slotted S.T. Screw	

MODELS 6MH889, Ch. 6E89;
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PARTS LIST (Continued)

Diag. No.	Zenith Part No.	Hudson Part No.	Description	Diag. No.	Zenith Part No.	Hudson Part No.	Description
	126-553	215499	Miniature Tube Shield		93-885	215437	1/32 x .191 x 3/8" Bakelite Washer (2 used on S-14454)
	138-24	211640	Speaker Grille (Hudson No. 211640) Supplied by Hudson				
	149-62	215436	Iron Core and Screw (used on S-14225)	S3 S5	} 100-36	171113	Dial Light Bulb—Mazda No. 44
V1	190-22	215495	Vibrator				112-699	171251	No. 4-40 x 3/16" R.H.S.T. Screw—Stan - Tap - Cad. Pl. (57-1341) . . . . .
	202-562	213879	Instruction Book (Owner's Manual)		149-63	215453	Iron Core and Screw (3 used)
	202-591	215438	Noise Suppression Supplement Sheet		192-114	215444	Escutcheon Window
	S-14205		Speaker and Screen Assembly		S-14212	215449	Tuner Unit Assembly
	S-14210	215439	Case Cover Set Mtg. Stud and Spring Assembly		S-14215	215451	Pointer Bracket and Stud Assembly
	S-14458	213897	Installation Parts Kit (Hudson No. 213897) Supplied by Hudson		S-14216	215452	Pointer Drive Link and Stud Assembly
INSTALLATION PARTS							
	S-14203	213898	Installation Kit—Complete		S-14217	215453	Dial Light Socket and Wire Assembly
	46-698	213896	Trim Knob		S-14224	215454	Cross Arm and Bushing Assembly
	46-699	213895	Tone Control Knob		S-14721		Clutch Plate and Washer
	52-452	213873	Battery Cable—Fuse to Ammeter		S-14728		Tuning Shaft, Pinion Gear and Coupling Assembly
	80-594	213894	Knob Tension Spring	S1	S-14733		Muting Switch Assembly
S4	136-11	170480	14 Ampere Fuse—Type SFE-14		17-102		Cam Lock
					34-177		Clutch Gear
DIAL AND TUNING MECHANISM ASSEMBLY							
	S-14756	215434	Push Button Knob Assembly (6 required)		64-162		.088 D x 5/32" Rivet
	26-391	215440	Dial Scale		73-118		No. 6-32 x 1/4" Hex Head Slotted Set Screw
	56-228	215442	Cross Arm Guide Rod		80-640		Yoke Tension Spring
	57-1340	215443	Escutcheon		80-641		Clutch Release Bar Spring
	57-1341	215445	Escutcheon Window Retaining Plate		80-642		Clutch Spring
	59-207	215446	Dial Pointer		93-921		Tuning Shaft Steel Washer
	80-379	215447	Pointer Retaining Spring		93-922		Tuning Shaft Spring Washer
	80-586	215455	Cross Arm Tension Spring (2 used)		93-923		Fishpaper Washer
	80-594	213894	Knob Tension Spring		97-305		Clutch Arm Stud
	80-625	215448	Pointer Link Tension Spring		117-149		Clutch Lever
					188-111		Retaining Ring

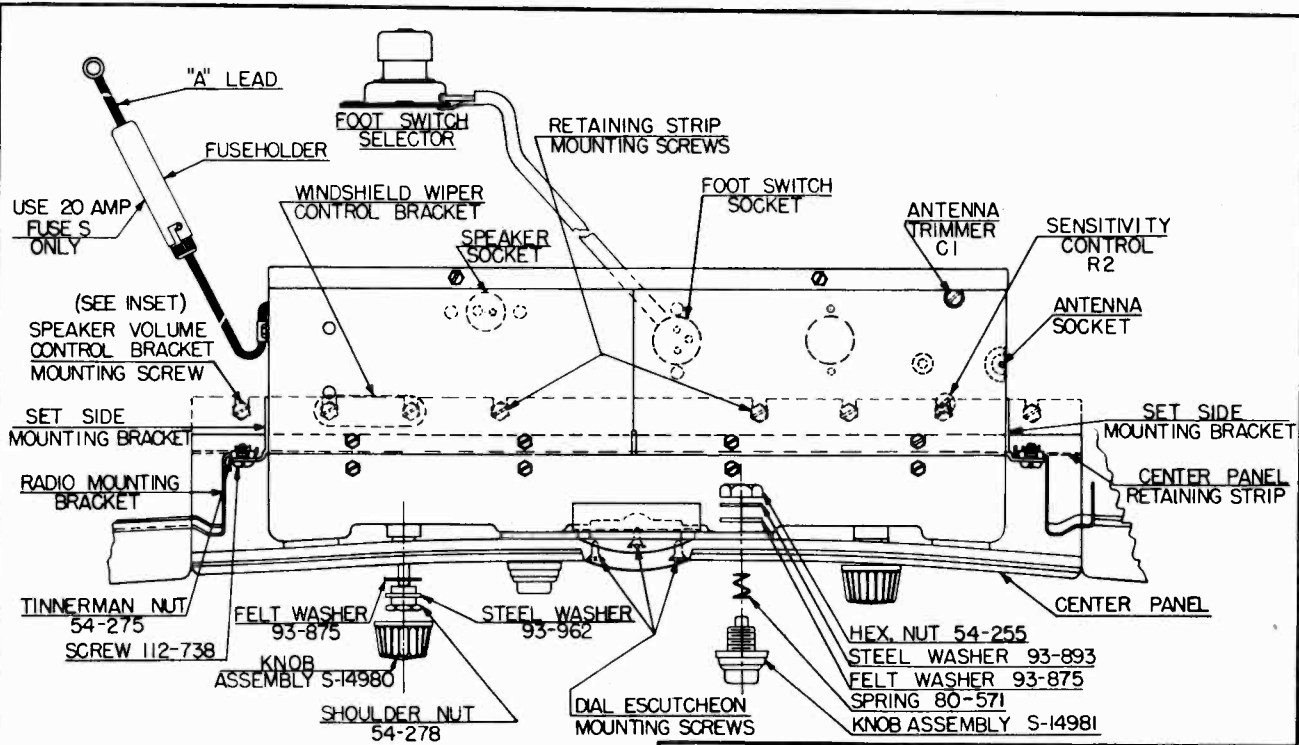
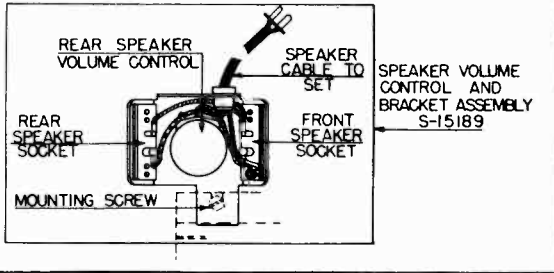


Fig. 1

antenna cable, and foot switch control cable. Remove the control knobs and mounting nuts, and washers from the center panel. Loosen the 8/32 hex-head retaining strip mounting screws and remove the center panel. Remove the four #112-738 10/32 machine screws from the car radio mounting brackets. (Fig. 1)



RECEIVER INSTALLATION

Figures 1 and 4, illustrating the installed receiver, the escutcheon plate, and the control knobs, are given here to facilitate removal and reinstallation of this receiver when service or repair is necessary.

To take the receiver from the car, disconnect the rear speaker control bracket, the 'A' lead, speaker cable,

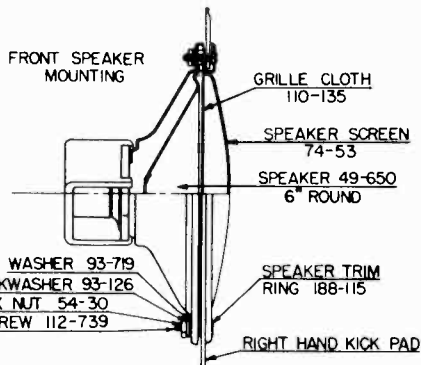


Fig. 2

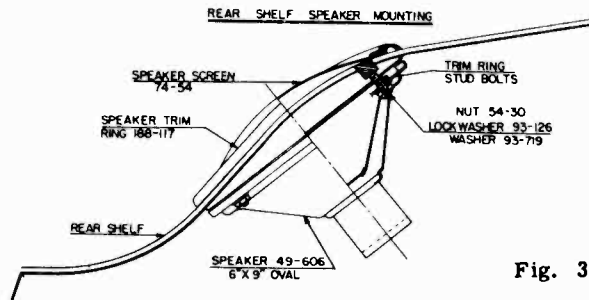


Fig. 3

SPEAKER INSTALLATIONS

To take out front speaker, remove the right side kick pad, and remove the four lock washers #93-126, four nuts #54-30, four screws #112-739, and trim ring #188-115, that holds the speaker to the kick pad. Figure 2.

To take out the rear speaker, remove the four flat washers #93-719, four lock-washers #93-126, and four hex-nuts #54-30, that holds the speaker to the underside of the rear shelf. Figure 3.

OPERATION

The purpose and position of each control is shown in Fig. 3. To turn the receiver on, turn the volume control knob to the right until it clicks and the dial is illuminated. Rotation of the knob to the right increases the volume. To turn the receiver off, turn the volume control knob to the left until it clicks.

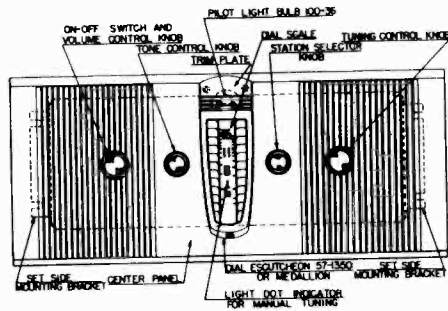


Fig. 4

MANUAL TUNING

To tune set manually, push the station selector knob until the light dot on the dial scale is illuminated. It is only necessary for the manual tuning knob to be turned to select stations.

TONE CONTROL

The tone control has four positions. Any one of these positions can be selected by pushing the tone control knob.

MUTING CIRCUIT

Lightly pressing either the station selector knob or the foot control switch mutes the receiver. This action is accomplished by shorting out the speaker voice coil.

REPLACEMENT OF DIAL LIGHT

NOTE: The top dial light can be replaced while the set is installed in the car by removing the escutcheon trim plate.

When replacing this light, be careful to adjust the black cardboard shield to a position where the slot

directs the light on the dial pointer and not on the scale background. (Fig. 4)

AUTOMATIC TUNING

Pressing the station selector knob repeatedly will cause the tuning mechanism to change through a cycle of six positions. The five automatic positions may be set for favorite local stations, while the sixth position at which the light dot on the dial scale is illuminated, may be used for selecting stations manually.

Using the manual tuning position as a reference point, the remaining five positions may be adjusted in succession to any desired dial setting. However in order to simplify the identification of the stations, it is advisable to set the tuner in sequence according to the frequencies of the stations, beginning with the station broadcasting at the lowest frequency and progressing to the station broadcasting at the highest frequency.

Turn the receiver on and allow it to operate for at least 15 minutes in order for each part to reach normal operating temperature before making the proper setting.

1. Press the station selector knob repeatedly until the light dot on the dial scale appears. Press the station selector knob once more to get the tuner to the No. 1 position.
2. To select the station desired, pull the tuning control knob outward and turn at the same time. Tune very carefully for clearest reception.
3. Press station selector knob, pull and hold tuning control knob outward, and tune in station desired for No. 2 position. Use same procedure for positions No. 3, 4, and 5.

INTERFERENCE ELIMINATION

There should be no motor noise or interference from the ignition circuit if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

The "A" lead should be connected to the terminal block near the steering column behind instrument panel as shown in figure 5.

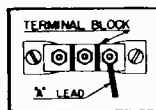


FIG. 5

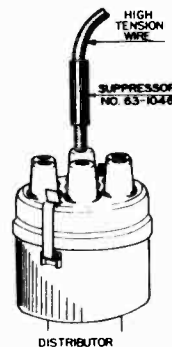


FIG. 6

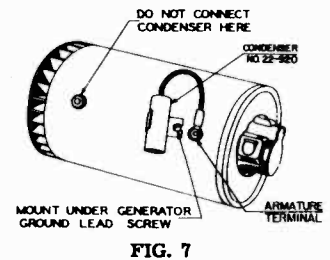


FIG. 7

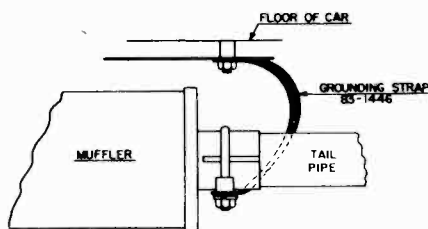


FIG. 10

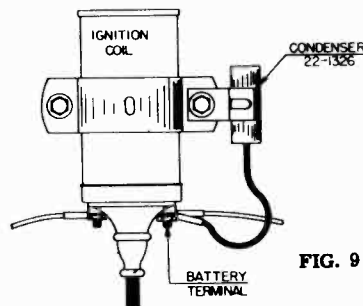


FIG. 9

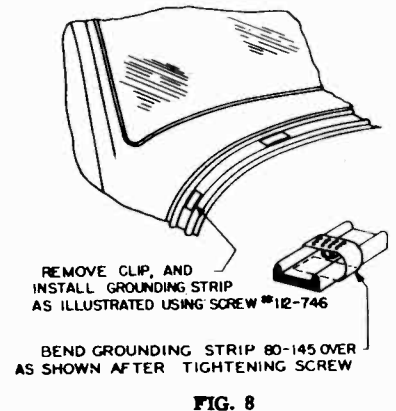


FIG. 8

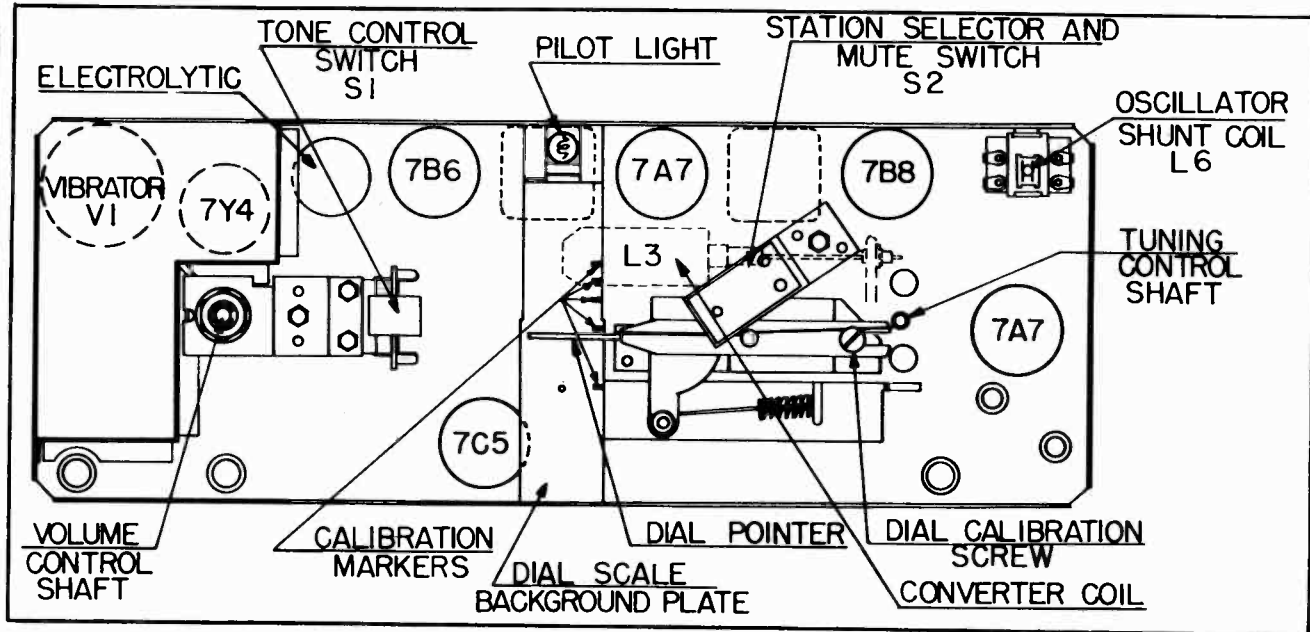


Fig. 11 Front View of Chassis

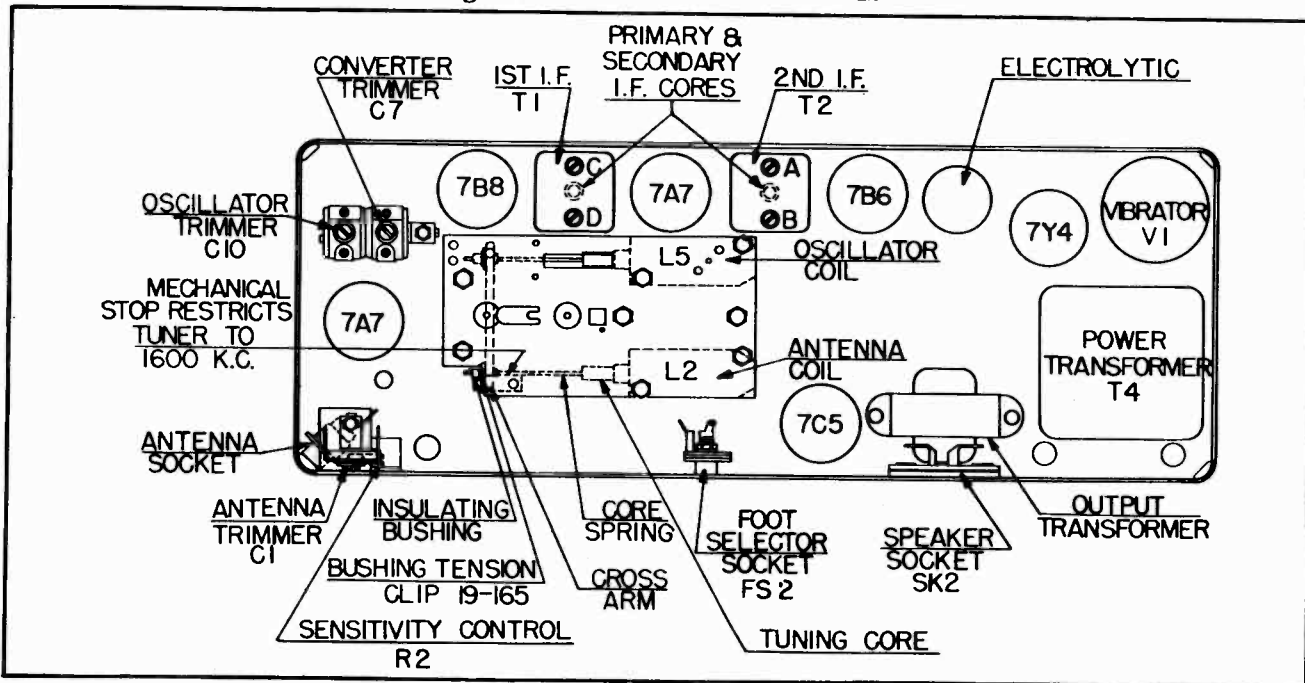


Fig. 12 Rear View of Chassis

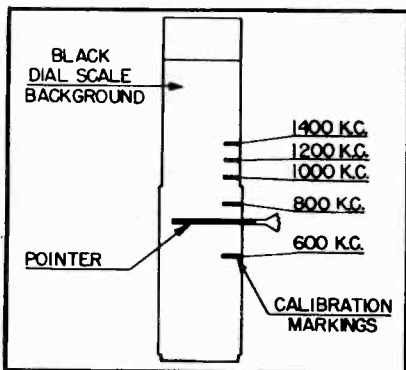


Fig. 13

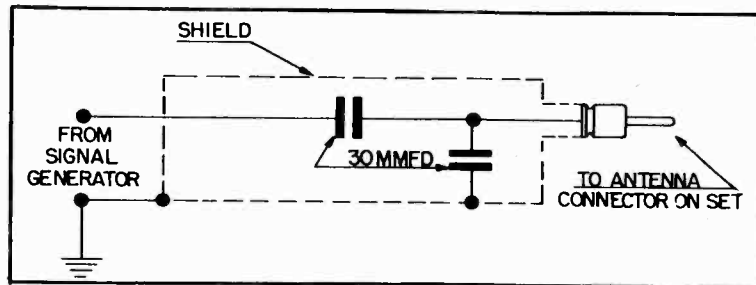


Fig. 14

Figure 14 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R. F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver, therefore follow these instructions carefully.

CAUTION: Make all alignment adjustments to the receiver with the volume control set at maximum. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove front and rear covers from receiver.
2. Set signal generator to 165 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket)
4. Adjust I.F. trimmers, A, B, C, and D in order named for maximum output. (Fig. 12) Some units have I.F. transformers that are core tuned. In this case adjust primary and secondary I.F. cores from the top of the I.F. cans with core alignment tool 68-7. Repeat the operation to assure accurate alignment.

R.F. AND OSCILLATOR ALIGNMENT

Use the markings on the dial scale background as calibration points during alignment. Figure 13

1. Connect signal generator leads through dummy, illustrated in Fig. 14, to antenna lead in socket on receiver. This is important.
2. Set signal generator to 600 Kc.
3. Tune set to 600 Kc.
4. Adjust oscillator trimmer C-10 (Fig. 12), for maximum response.
5. Set signal generator to 1400 Kc.
6. Tune set to 1400 Kc.
7. Adjust converter trimmer C-7, and antenna trimmer C-1 (Fig. 12) for maximum response.
8. If dial calibration is off after making above adjustments, a correction can be made by tuning eccentric screw at fulcrum of dial pointer. (Fig. 11)

TO ADJUST OR REPLACE THE ADJUSTING SPRING AND CORE

1. Remove the top cover from the receiver.
2. Remove 7A7 R.F. tube, 7B8 converter tube, and 7A7 I.F. tube.
3. When bushing tension clips 19-165 are used, remove them from the cross arm insulating bushing with bent nose pliers. (Fig. 12)
4. Put automatic tuner in manual position and set the tuner carriage all the way out to the high frequency position or with the cores out of the coils.
5. With core alignment tool, No. S-13064, screw the antenna core back all the way, at the same time using the fingers to guide it out of the automatic unit. With the fingers, remove core by turning core spring past and through the cross arm insulating bushing.

6. Screw the converter and oscillator cores completely out of the coils. Set antenna tuner carriage to half way position. Screw the converter and oscillator cores back all the way, at the same time using the fingers to guide them between the I.F. cans and out of the tuner unit. With the fingers, remove the cores by turning them past and through the cross arm insulating bushing.
7. To replace cores, set tuner carriage at half way position. With the fingers, guide the oscillator and converter cores between the I.F. coils and screw the core springs through the cross arm insulating bushing. Set tuner carriage to high frequency position and also using the fingers, screw the antenna core spring through the cross arm insulating bushing. Use core alignment tool No. S 13064 for further adjustments.
8. Replace tubes and top cover.
9. After all adjustments or replacements are completed, be sure to replace the bushing tension clip. When bushing clips are not used, glue core springs with speaker cement.

ALIGNMENT PROCEDURE AFTER CORE OR COIL REPLACEMENT.

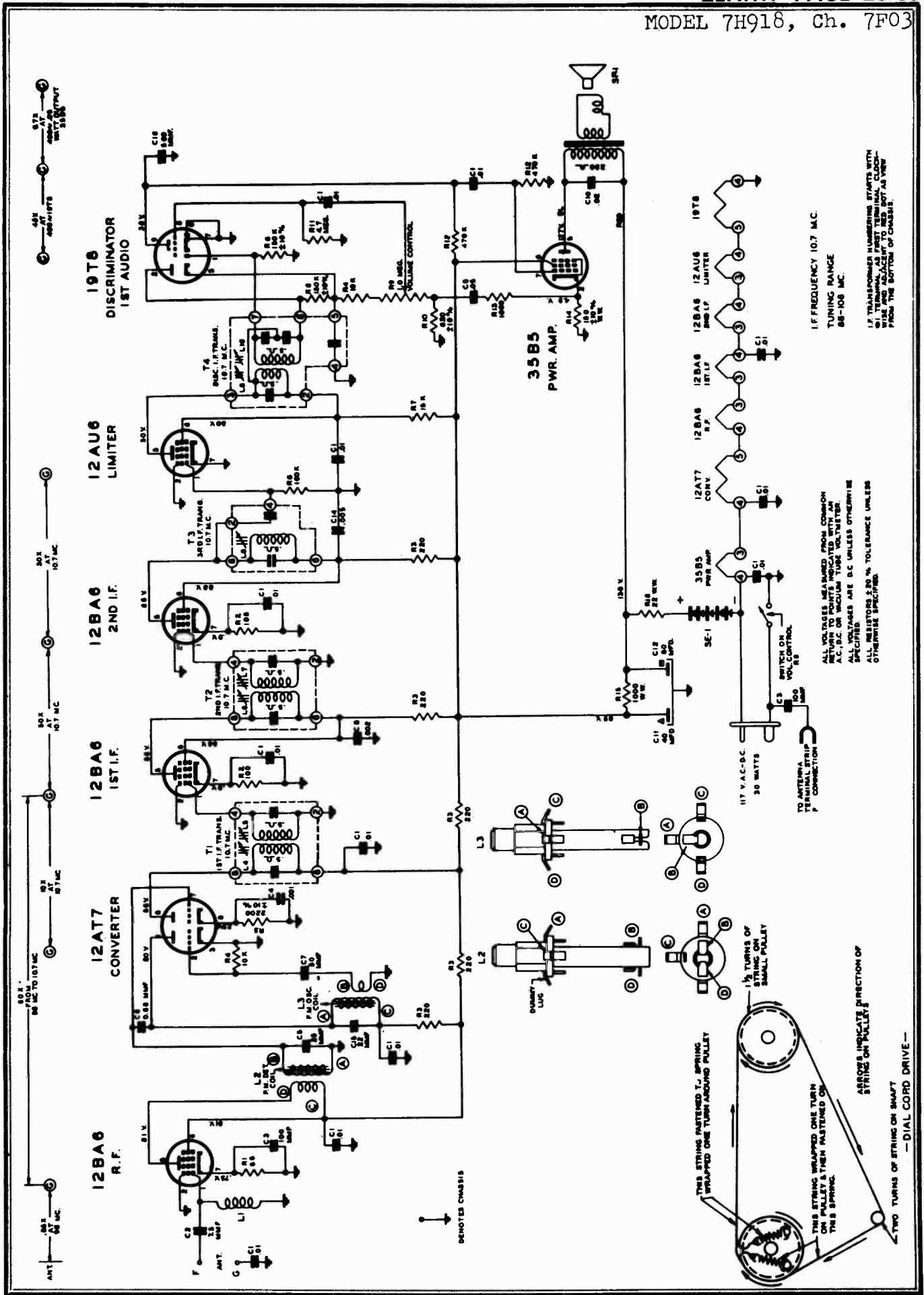
WARNING: The following adjustments are to be made only after a core or coil is replaced.

1. Set signal generator to 1675 Kc.
2. Connect signal generator leads through dummy, illustrated in Fig. 14 to antenna receptacle on the receiver.
3. Set receiver dial to 1600 Kc. (Maximum high frequency end of dial.)
4. Screw the cores completely out of the antenna coil, the converter coil, and the oscillator coil.
5. Adjust the oscillator trimmer C-10 (Fig. 12) at 1675 Kc.
6. Adjust the converter trimmer C-7, and antenna trimmer C-1 (Fig. 12) for maximum output reading.
7. Set signal generator dial and receiver dial to 1400 Kc.
8. Replace cores to their approximate original position (so that the cores project about 11/16 of an inch from the end of the coil form).
9. Adjust the oscillator core L-5 (Fig. 12) s scale at 1400 Kc.
10. Adjust the antenna core L-2, and converter core L-3 (Figs. 11 and 12) for maximum output reading.
11. Set signal generator at 800 Kc.
12. "Rock in" shunt oscillator coil L-6 (Fig. 11) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padder condenser on a gang condenser receiver.
13. Check receiver at 1400 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10, and 11.
14. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the lug stop should be bent to limit the frequency coverage to 1605 Kc. (Fig. 12)

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station at approximately 1400 Kc.

PARTS LIST MODEL 6MN988 NASH PART No. A. C. 149-1

Diag. No.	Part No.	Description	Diag. No.	Part No.	Description
<u>COILS & CHOKES</u>					
L9	20-213	Main Hash Choke Coil	R5	63-1859	56M ohm 1/2 W. Insl.
T1	95-1056	1st I.F. Transformer	R16	63-1870	100M ohm 1/2 W. Insl.
T2	95-1057	2nd I.F. Transformer	R1	63-1891	330M ohm 1/2 W. Insl.
L1	S-8819	Ant. Motor Noise Choke Assem.	R4		
L4	S-11229	Osc. Series Coil Assy.	R14		
L5	S-12053	Osc. Coil Assy.	R15		
L2	S-12060	R.F. Coil Assy. (2 used)	R9	63-1912	1 Megohm 1/2 W. Insl.
L6	S-13998	Osc. Shunt Coil Assy.	R13	63-1961	15 Megohm 1/2 W. Insl.
L8	S-13999	Motor Noise Choke Assy.	<u>MISCELLANEOUS</u>		
L2	S-14176	R.F. Coil & Shield Assy.	19-87		Cable Retaining Clip
L3	S-14177	Osc. & Converter Coil & Shield Assem.	19-165		Bushing Tension Clip
L5			46-485		Rear Spkr. Vol. Cont. Knob
			49-606		6" x 9" P.M. Speaker
			49-650		6" P.M. Speaker
			52-486		Bat. Cable (Set to Fuse)
			52-510		Rear Spkr. Cable & Plug
			52-511		Rear Spkr. Cont. Cable & Plug
			54-34		#6-32 X 1/4 X 3/32 Hex Nut
			57-1054		Spark Plate Capacitor
			73-36		8-32 X 3/8 Headless Set Screw
			74-53		Speaker Screen
			74-54		Rear Speaker Screen
			FS2	78-406	Ft. Sw. Cable Plug Socket
				78-559	Ant. Connector Socket
				78-596	Loktal Base Tube Socket
				78-804	Vibrator Socket
			SK2	78-833	Speaker Plug Socket
				80-232	Knob Retaining Spring
				80-276	Socket Ground Spring
				80-585	Pointer Overthrow Spring
				83-1437	Top Cover Spacer Strip
			S1	85-414	Tone Control Switch
			S2	85-415	Selector Switch
				93-125	6 Int. Lockwasher
				93-297	1/32 X .136 X 3/8 Steel Washer
				93-456	Vibrator Cushion Washer
				93-686	Bakelite Shoulder Washer
			T3	95-1028	Output Transformer
			T4	95-1065	Power Transformer
				110-135	Grille Cloth
				114-49	6-32 X 5/8 Acorn Hd. M.S.
				114-297	6-32 X 1/4 Hex.Hd.Slotted S.T. Screw (Used on 19-87)
				125-58	Strain Relief Grommet
				125-59	Strain Relief Grommet
				147-102	Socket Mtg. Spacer
				159-50	Plug Button
				188-30	Drive Arm Retaining Ring
				188-115	Speaker Trim Ring
				188-117	Speaker Trim Ring
			V1	190-20	Vibrator
				193-31	Footswitch Template
				196-102	Rubber Gasket for Top Cover
				196-103	Felt Gasket for Top Cover
				202-556	Instruction Book (Owners Manual)
				S-13536	Turret Assem.
<u>CONDENSERS</u>					
C16	22-182	250 MMFD 600 V.			
C6	22-1136	250 MMFD 600 V.			
C3	22-1256	75 MMFD 500 V.			
C22	22-1448	.008 MFD 1600 V.			
C9	22-1478	350 MMFD Compensator			
C21	22-1644	Dry Electrolytic 10 MFD.			
C10	22-1680	300 V. X 20 MFD. 350 V. Trimmer (Osc. & Conv.)			
C7					
C1	22-1704	Ant. Trimmer			
C23	22-1728	.5 MFD 100 V.			
C24					
C5	22-1730	100 MMFD. Ceramicon 500 V. (or 22-162)			
C8					
C11					
C13	22-1748	.1 MFD. 400 V. (or 22-170)			
C14	22-1777	.1 MFD. 200 V. (or 22-190)			
C12	22-1778	.047 MFD. 200 V. (or 22-250)			
C2	22-1779	.01 MFD. 600 V. (or 22-1170)			
C18	22-1780	.0033 MFD. 400 V. (or 22-1180)			
C15	22-1781	.022 MFD. 200 V. (or 22-1270)			
C19	22-1782	.0047 MFD. 600 V. (or 22-838)			
C14	22-1783	.0047 MFD. 400 V. (or 22-906)			
<u>RESISTORS</u>					
R22	63-1375	5.1 ohm W.W. 2 W. Insl. (10%)			
R2	63-1379	Sensitivity Control			
R8	63-1398	33 M ohm 1 W. Insl.			
S3					
R11	63-1586	Volume Control & Switch			
R18	63-1620	1800 ohm 2 W. Insl.			
R17	63-1621	270 ohm 1 W. Insl.			
	63-1683	Vol. Control (Rear Spkr.)			
R19	63-1740	82 ohm 1/2 W. Insl.			
R20					
R23	63-1744	100 ohm 1/2 W. Insl.			
R6	63-1827	10M ohm 1/2 W. Insl. (10%)			
R7	63-1835	15M ohm 1/2 W. Insl.			
R3	63-1838	18M ohm 1/2 W. Insl.			
R12	63-1841	22M ohm 1/2 W. Insl. (10%)			
R10	63-1849	33M ohm 1/2 W. Insl.			
R21	63-1856	47M ohm 1/2 W. Insl.			



ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1 (a)	Pin 1 (grid) on 12A06 limiter	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L9 coil slug Primary discr.	Align primary of discriminator for maximum reading.
2 (b)	Pin 1 (grid) on 12A06 limiter	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L10 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
3 (c)	Pin 1 (grid) on 12BA6 2nd IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L8 Prim. of 3rd IF trans.	Align 3rd IF transformer for maximum reading.
4 (c)	Pin 1 (grid) on 12BA6 1st IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L6 and L7 Prim. and Sec. of 2nd IF trans.	Align 2nd IF transformer for maximum reading.
5 (c)	Pin 7 (grid) on 12AT7 converter tube socket	.05 Mfd.	10.7 Mc. Unmodulated	FM 100		L4 and L5 Prim. and Sec. of 1st IF transformer	Align 1st IF transformer for maximum reading.
6 (c) (d)	Antenna Post FM (Remove line ant)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L3 Osc. Coil Slug	Set Oscillator to dial scale
7 (c) (d)		270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L2 Det. Coil Slug	Align det. stage to maximum reading.

IMPORTANT

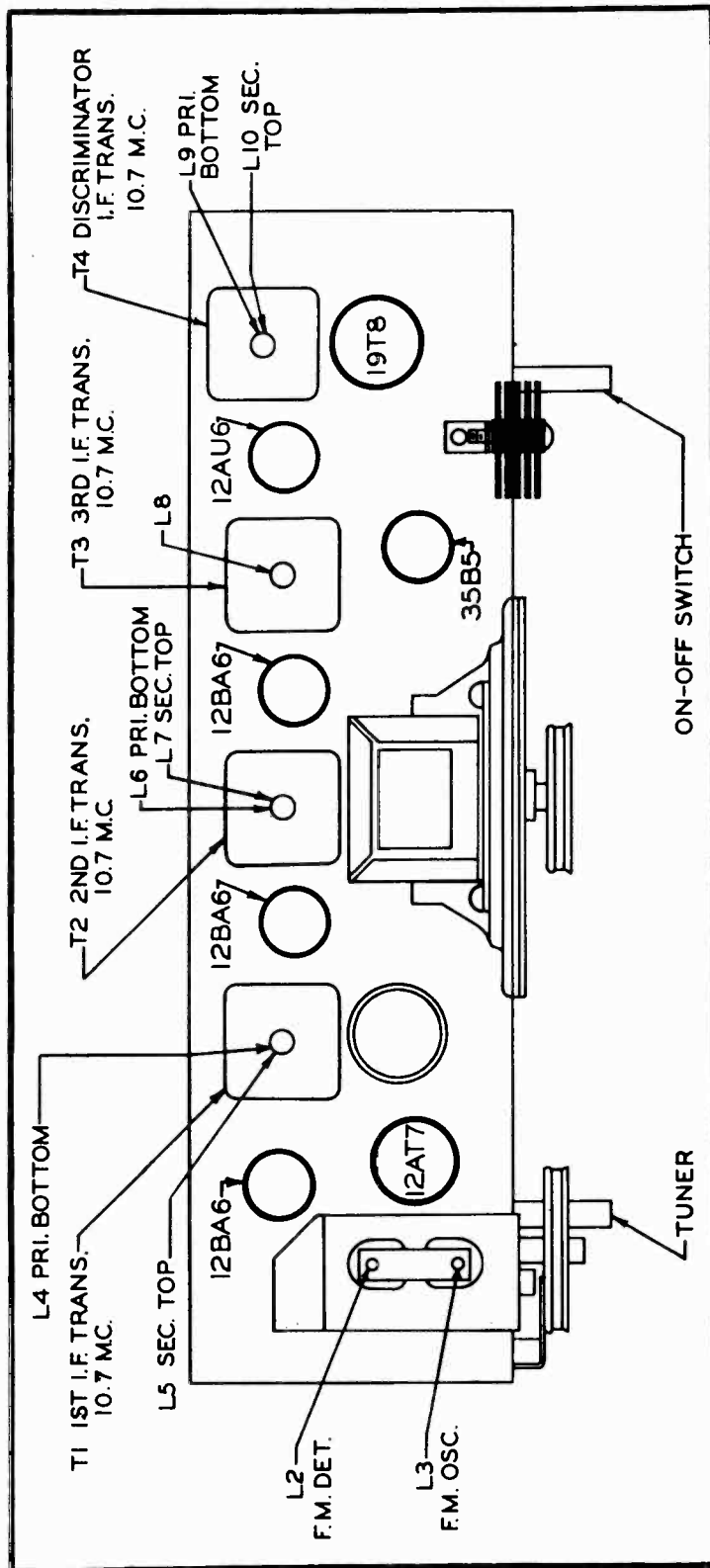
Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 2,000,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

The signal generator output should be kept just high enough to get an indication on the meter.

- (a) Vacuum Tube Voltmeter Lug 7 on discriminator transformer to chassis (half discriminator load).
- (b) Vacuum Tube Voltmeter Lug 5 on discriminator transformer to chassis (full discriminator load).
- (c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.
- (d) Loosen Slugs by applying a hot iron to the cement.



TUBE AND TRIMMER LOCATION

To The Service Man:

The 7F03 chassis incorporates a superheterodyne circuit with two stages of IF, on the FM Band. There is one stage of RF amplification on the FM Band.

When adjustments are made on the 7F03 or any AC-DC chassis, a line isolation transformer (110 V input to 110 V output) is recommended in order to avoid a "hot" chassis. If an isolation transformer is not available, check the AC voltage between chassis and bench ground, and if there is any indication of voltage, reverse the plug before handling the set.

RF Alignment: The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustment the shafts must be secured with a drop of speaker cement.

IF Alignment: The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool or the threads in the coil forms will strip and adjustment will be impossible.

IF Alignment: Because of the wide band pass, it is desirable to use a FM signal generator and a cathode ray oscilloscope when aligning the IF channel. The instruction book for the Zenith Model 800 Signal Generator (Form Z8001) covers complete FM alignment procedure. If visual alignment equipment is unavailable, reasonably accurate alignment can be made by following the procedure outlined below.

Discriminator Alignment: When the secondary of the discriminator is aligned (operation 5) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 7 12AT7 Converter 2 turns loosely cpd. to wavemagnet	.05 Mfd.	455 KC. Modulated	BC	600 Kc.	L-9, 10, 13, 14, 17 and 18	Align I. F. channel for maximum output.
2	2 turns loosely cpd. to wavemagnet		1600 Kc. Modulated	BC	1600 Kc.	C4	Set oscillator to dial scale.
3	2 turns loosely cpd. to wavemagnet		1400 Kc. Modulated	BC	1400 Kc.	C2 and C3	Align det. and ant. stages.
4 (a)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L19 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L20 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 12BA6 2nd. IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L15 and L16 Prim. and Sec. of 3rd. IF transformer	Align 3rd. IF transformer for maximum reading.
7 (c)	Pin 1 (grid) on 12BA6 1st. IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L11 and L12 Prim. and Sec. of 2nd. IF transformer	Align 2nd. IF transformer for maximum reading.
8 (c)	Pin 7 (grid) on 12AT7 converter tube socket	.05 Mfd.	10.7 Mc. Unmodulated	FM		L7 and L8 Prim. and Sec. of 1st. IF transformer	Align 1st. IF Transformer for maximum reading.
9 (c) (d)	Antenna Post F (Re-move line ant.)	270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L5 Osc. Coil Slug L3 and L2 Det. and RF coil Slugs	Set Oscillator to dial scale. Align det. and ant. stages to maximum reading.
10 (c) (d)		270 ohms	98 Mc. Unmodulated	FM	98 Mc.		

IMPORTANT

Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 2,000,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

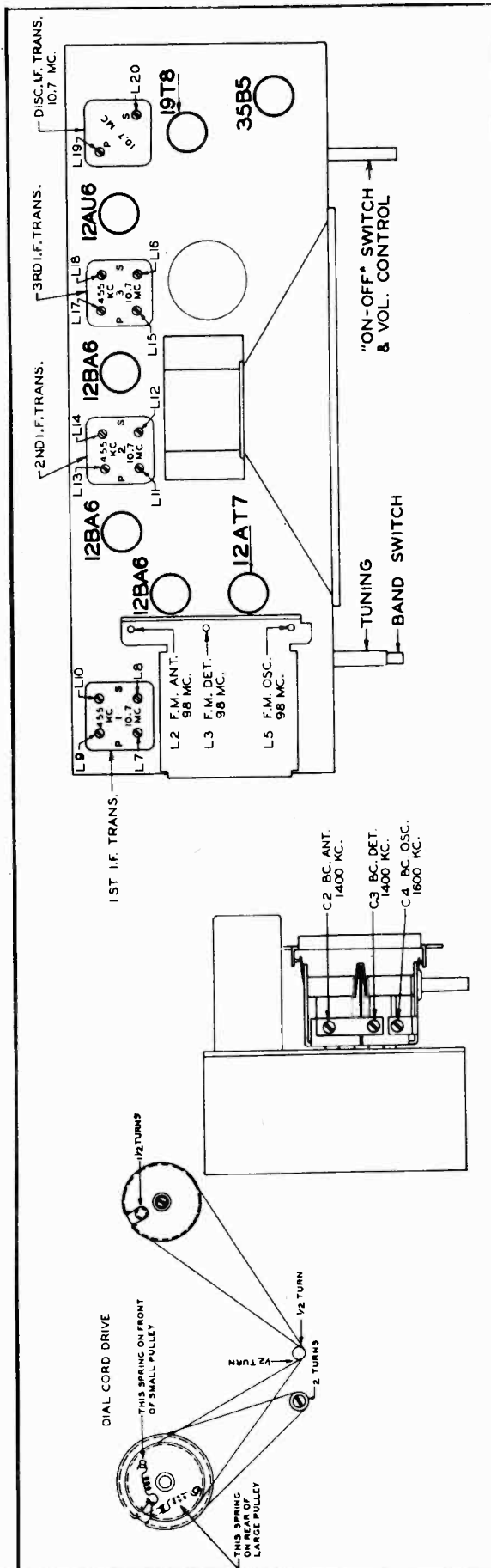
The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter Lug 6 on discriminator transformer to chassis (half discriminator load).

(b) Vacuum Tube Voltmeter Lug 3 on discriminator transformer to chassis (full discriminator load).

(c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.

(d) Loosen Slugs by applying a hot iron to the cement.



TUBE AND TRIMMER LOCATION

The 7F01 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands. When adjustments are made on the 7F01 or any AC-DC chassis, a line isolation transformer (110 V input to 110 V output) is recommended in order to avoid a "hot" chassis. If an isolation transformer is not available, check the AC voltage between chassis and bench ground, and if there is any indication of voltage, reverse the plug before handling the set.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustment the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM I.F.'s. Observe the same precautions when making adjustments.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 5) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 7 12BE6 Converter 2 turns loosely cpld. to wavemagnet	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L8, 9, 12, 13	Align I. F. channel for maximum output.
2	2 turns loosely cpld. to wavemagnet		1600 Kc. Modulated	BC	1600 Kc.	C3	Set oscillator to dial scale.
3	2 turns loosely cpld. to wavemagnet		1400 Kc. Modulated	BC	1400 Kc.	C2	Align antenna stage.
4 (a)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L15 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L16 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 12BA6 2nd IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L14 Prim. of 3rd IF trans.	Align 3rd IF transformer for maximum reading.
7 (c)	Pin 1 (grid) on 12BA6 1st IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L10 and L11 Prim. and Sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 7 (grid) on 12BE6 converter tube socket.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L6 and L7 Prim. and Sec. of 1st IF transformer.	Align 1st IF transformer for maximum reading.
9 (c)	Antenna Post FM (Re- move line ant.)	270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L3 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c) (d)		270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L4 Det. Coil Slug	Align det. stage to maximum reading.

IMPORTANT

Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 2,000,000 ohms in series with the hot lead will serve for FM adjustments.

This lead should be shielded.

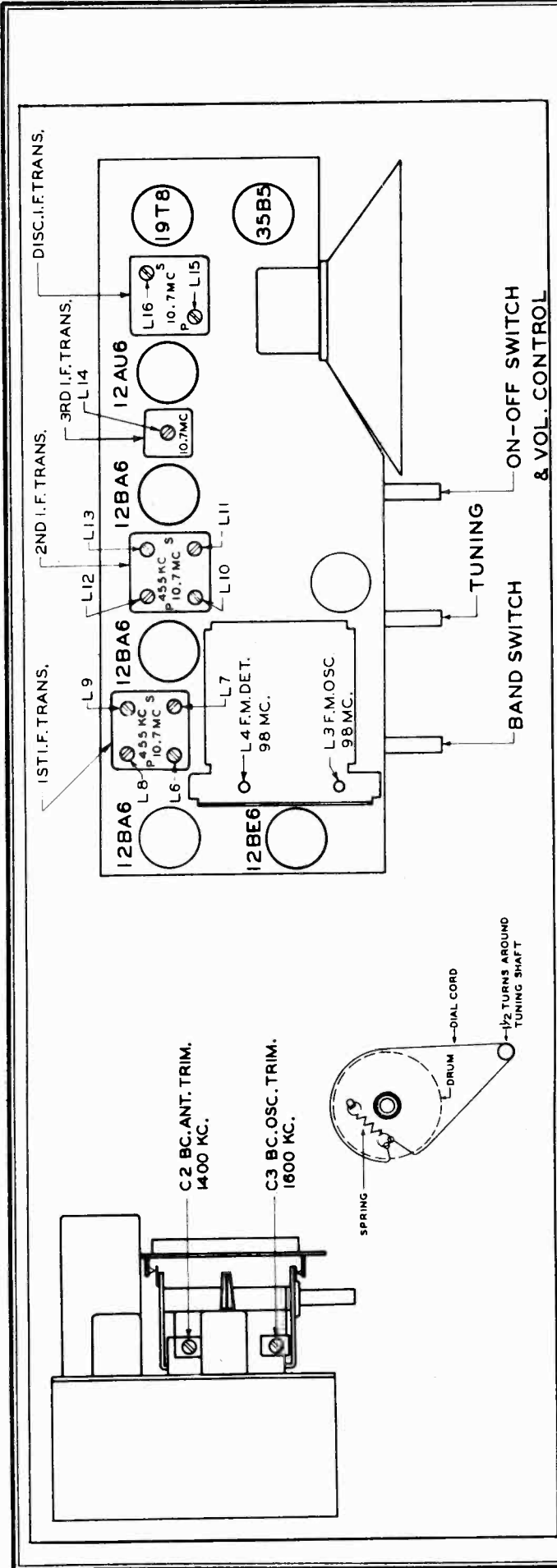
An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments. The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter Lug 6 on discriminator transformer to chassis (half discriminator load).

(b) Vacuum Tube Voltmeter Lug 3 on discriminator transformer to chassis (full discriminator load).

(c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.

(d) Loosen Slugs by applying a hot iron to the cement.



TUBE AND TRIMMER LOCATION

The 7F04 chassis incorporates a superheterodyne circuit with two stages of IF, on the FM Band, and one stage on the AM Band. There is one stage of RF amplification on the FM Band.
 When adjustments are made on the 7F04 or any AC-DC chassis, a line isolation transformer (110 V input to 110 V output) is recommended in order to avoid a "hot" chassis. If an isolation transformer is not available, check the AC voltage between chassis and bench ground, and if there is any indication of voltage, reverse the plug before handling the set.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustment the shafts must be secured with a drop of speaker cement.

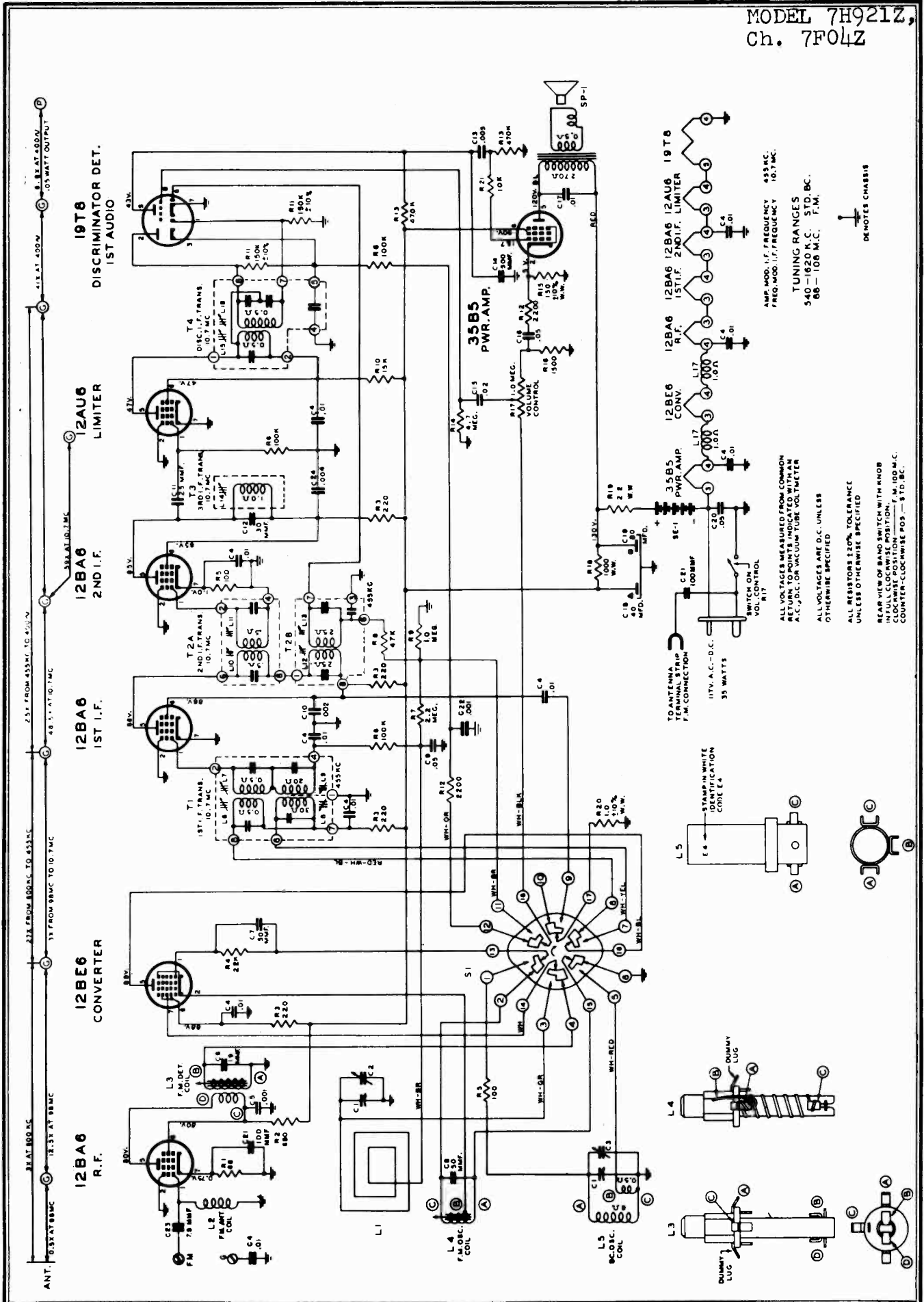
FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM IF's. Observe the same precautions when making adjustments.

FM IF Alignment: Because of the wide band pass, it is desirable to use a FM signal generator and a cathode ray oscilloscope when aligning the FM IF channel. The instruction book for the Zenith Model 800 Signal Generator (Form Z8001) covers complete FM alignment procedure. If visual alignment equipment is unavailable, reasonably accurate alignment can be made by following the procedure outlined below.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 5) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero centermeter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

PARTS LIST

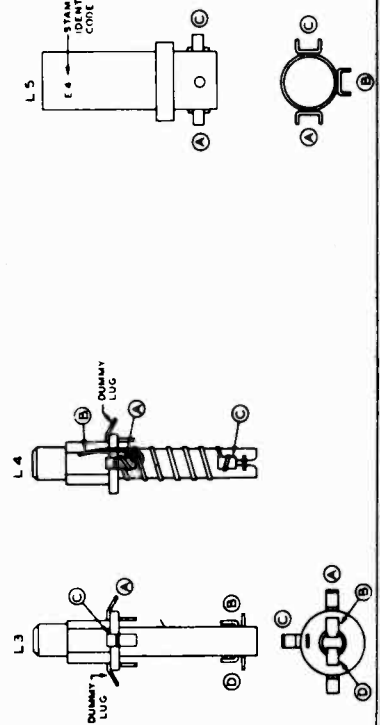
PART NO.	REF.NO.	DESCRIPTION	PART NO.	REF.NO.	DESCRIPTION
<u>DIAL ASSEMBLY</u>			<u>RESISTORS</u>		
26-403		Dial Scale	63-1876	R11	150K " " " " (2 Used)
46-734		Tuning & Vol. Control Knob (2 Used)	63-1898	R13	470K " " " "
46-735		Band Switch Knob	63-1912	R9	1 Meg. " " " "
46-769		Tuning & Vol. Control Knob (2 Used on W Model only)	63-1926	R7	2.2 Meg. Ohm " " " "
46-770		Band Switch Knob (W Model only)	63-1940	R14	4.7 " " " "
57-1486		Cabinet Emblem Plate			<u>MISCELLANEOUS</u>
59-146		Dial Pointer			Wavemagnet Mtg. Brkt.
76-506		Tuning Control Shaft	12-1070		Cabinet For Model 7H921
80-402		Dial Cord Tension Spring	14-1022		" " " " 7H921 White
80-444		Tuner Arm Tension Spring	14-855		Coil Mtg. Clip (S-14509)
80-580		" " Stop	19-179		" Retaining Clip
80-581		" " Pressure	19-189		4" P.M. Speaker
93-956		1/16 X 9/32 X 3/4" Black Felt Washer (Used on 59-146)	49-667	SP-1	208-667 Cone & Voice Coil
114-271		#6 X 1/2" Hex Hd. Slotted S.T. Type Z N.P. (1 Used on 26-403)	54-139		206-667 Output Trans.
188-32		Retaining Ring (76-506)	54-266		3/8-32 X 9/16" Palnut-Type 9 N Cad. (1 Used on Vol. Cont. - 1 Used on 85-430)
S-14523		Tuning Shaft Brkt. & Insulating Strip Assem.	54-267		Speed Nut (1 Used S-13871 & 1 Used on S-14695)
S-14524		Condenser Pulley & Cam Assem.	54-269		#6-32 X 5/16 Palnut Steel Cad. (Used on 26-403)
S-14525		Tuner Arm Assem.	54-271		#8-32 X 5/16 " " " " (1 Ea. Used on I. F.'s & Disc. Trans.)
S-14526		Dial Cord & Eyelet Assem.	54-271		#6-32 X 1/4" Palnut Steel Cad. (2 Used on S-14509)
<u>COILS & CHOKES</u>					I.F. Trans. Terminal Plate (6 Used)
S-13871	L3	F. M. Detector Coil Assem.	57-1269		Two Prong Plug
S-13973	T4	Discriminator Transformer Assem.	58-128		#6-32 X 1/4" Hex. Hd. Slotted Set Screw Cuppoint (2 Used)
S-13997	L17	Filament Choke Coil Assem.	73-30		Two Contact Socket
S-14480	L2	F. M. Antenna Coil Assem.	78-787		Miniature Tube Socket (9 Contact)
S-14481	L5	Broadcast Osc. Coil Assem.	78-788		" " " " (5 Used)
S-14509	T3	3rd. I. F. Coil Assem.	78-806		Wavemagnet Mtg. Strip
S-14521	T1	1st. I. F. Trans. "	78-807		Insulating Strip
S-14522	T2	2nd. I. F. Trans. "	83-1056		" " (3 hole strip over controls)
S-14695	L4	F. M. Osc. Coil Assem.	83-1090		Rectifier Insulating Strip
<u>CONDENSERS</u>					Insulating Strip (1 Ea. Used on S-13973 - S-14521 & S-14522)
22-3	C22	.01 Mfd. (Ceramic) 500V	83-1498		Felt Strip (2 Used on Dial Glass)
22-162	C21	100 " (Mica) (or 22-1669) 500V	83-1520		Band Switch
22-229	C13	.005 " 600V	83-1545		#6 Int. Shakeprf. Lockwasher #1206 (6 Used)
22-829	C9	.05 " 200V	83-1593		1/8" thick X 3/4" diameter Rubber Washer (mtg. on Speaker Flange)
22-830	C15	.02 " 600V	85-430	S1	Felt Washer - Brown (3 Used behind Knobs)
22-854	C14	500 Mmfd. 600V	93-125		Chassis Mtg. Stud (2 Used)
22-1017	C20	.05 Mfd. 400V	93-855		#10 X 3/4" Oval Bind. Hd. S.T. Type Z Stat. (Bronze (2 Used to mount chassis))
22-1126	C17	.01 " 400V	93-910		#6 X 7/16" Straight Side B.H.S.T. Steel Cad. Pl. (4 Used on S-14549)
22-1158	C16	.05 " 200V	97-293		#6-32 X 1/4" Hex. Hd. Slotted M.S. Steel (Shakeprf. Lock (2 Used))
22-1220	C10	.002 " (2 Used) 600V	112-281		#6 X 1-1/8" Hex. Hd. S.T. Type Z Cad. Pl. (1 Used on 212-3)
22-1385	C4	.01 Mfd. (9 Used) 200V	112-697		#6 X 32 X 3/8" Hex Hd. Slotted M.S. Steel (1 Ea. Used on 26-403 & 139-79)
22-1492	C8	50 Mmfd. (Ceramic) 500V			Speaker Baffle
22-1507	C11	25 " (") 500V			Iron Core & Spring (2 Used)
22-1511	C7	50 " (") 500V			" " " " (1 Used on S-14509)
22-1676	C5	.001 Mfd. (") 500V			Cinch Plug Button-Black (4 Used to Mt. dial glass)
22-1688	C6	19 Mmfd. (") 500V			Dial Glass
22-1742	C1	Two Section Variable			Speaker Gasket
22-1757	C18,19	Electrolytic Cond. 80-40 Mfd. 150V			Dial Scale Spacer Sleeve
22-1768	C12	30 Mmfd. (Ceramic) 500V			F.M. Instruction Book
<u>RESISTORS</u>					Instruction Book
63-686	R15	150 Ohm W.W. 1/2W 10% Ins.	139-79		Selenium Rectifier
63-1223	R20	1 Ohm " " " "	149-64		Wavemagnet Lead & Stop Assem.
63-1450	R19	22 Ohm " " 1W 20% "	149-65		Cabinet Back, Socket & A.C. Cord Assem.
63-1527	R18	1000 Ohm " " 3W " "	159-50		Wavemagnet Assem.
63-1646	R17	Volume Control & Switch			Cabinet Back, Socket & A.C. Cord Assem.
63-1737	R1	68 Ohm 1/2W 20% Ins.	192-117		Speaker Support Brkt. & Plate Assem.
63-1744	R5	100 " " " "	196-111		
63-1758	R3	220 " " " " (4 Used)	199-35		
63-1779	R2	680 " " " "	202-697		
63-1793	R16	1500 Ohm " " " "	202-721		
63-1800	R12	2200 " " " " (2 Used)	212-3	SE-1	
63-1835	R10	15K " " " "	S-14527		
63-1842	R4	22K " " " " (2 Used)	S-14549		
63-1856	R8	47K " " " "	S-14957		
63-1870	R6	100K " " " " (2 Used)	S-15325		
			S-15739		



AMP. MOD. I.F. FREQUENCY 455KC.
 FREQ. MOD. I.F. FREQUENCY 10.7 MC.
 TUNING RANGES
 540-1620 K.C. STD. BC.
 88-108 M.C. F.M.

ALL VOLTAGES MEASURED FROM COMMON
 RETURN TO POINTS INDICATED WITH AN
 A.C. D.C. OR VACUUM TUBE VOLTMETER
 UNLESS OTHERWISE SPECIFIED
 ALL VOLTAGES ARE D.C. UNLESS
 OTHERWISE SPECIFIED
 ALL RESISTORS 5% OHM. TOLERANCE
 UNLESS OTHERWISE SPECIFIED
 REAR VIEW OF BAND SWITCH WITH KNOB
 IN FULL CLOCKWISE POSITION. F.M. 100 M.C.
 COUNTER-CLOCKWISE POS. - 8 TO 10 M.C.

DE NOTES CHASSIS



ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 7 12BE6 Converter 2 turns loosely cpld. to wave magnet	.05 Mfd.	455 Kc. Modulated 1600 Kc.	BC	600 Kc.	L8, 9, 12, 13	Align I. F. channel for maximum output.
2	2 turns loosely cpld. to wave magnet		1400 Kc. Modulated	BC	1600 Kc.	C 3	Set oscillator to dial scale.
3	Pin 1 (grid) on 12AU6 limiter,	.05 Mfd.	10.7 Mc. Unmodulated	BC	1400 Kc.	C 2	Align antenna stage.
4 (a)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L15 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)	Pin 1 (grid) on 12BA6 2nd IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L16 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 12BA6 1st IF.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L14 Prim. of 3rd IF trans.	Align 3rd IF transformer for maximum reading.
7 (c)	Pin 7 (grid) on 12BE6 converter tube socket.	.05 Mfd.	10.7 Mc. Unmodulated	FM		L10 and L11 Prim. and Sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading.
8 (c)	Antenna Post FM (Re- move line cnt.)	270 ohms	10.7 Mc. Unmodulated	FM		L6 and L7 Prim. and Sec. of 1st IF transformer.	Align 1st IF transformer for maximum reading.
9 (c)		270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L4 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c) (d)		270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L3 Det. Coil Slug	Align det. stage to maximum reading.

IMPORTANT

Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 2,000,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter Lug 7 on discriminator transformer to chassis (half discriminator load).

(b) Vacuum Tube Voltmeter Lug 5 on discriminator transformer to chassis (full discriminator load).

(c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.

(d) Loosen Slugs by applying a hot iron to the cement.

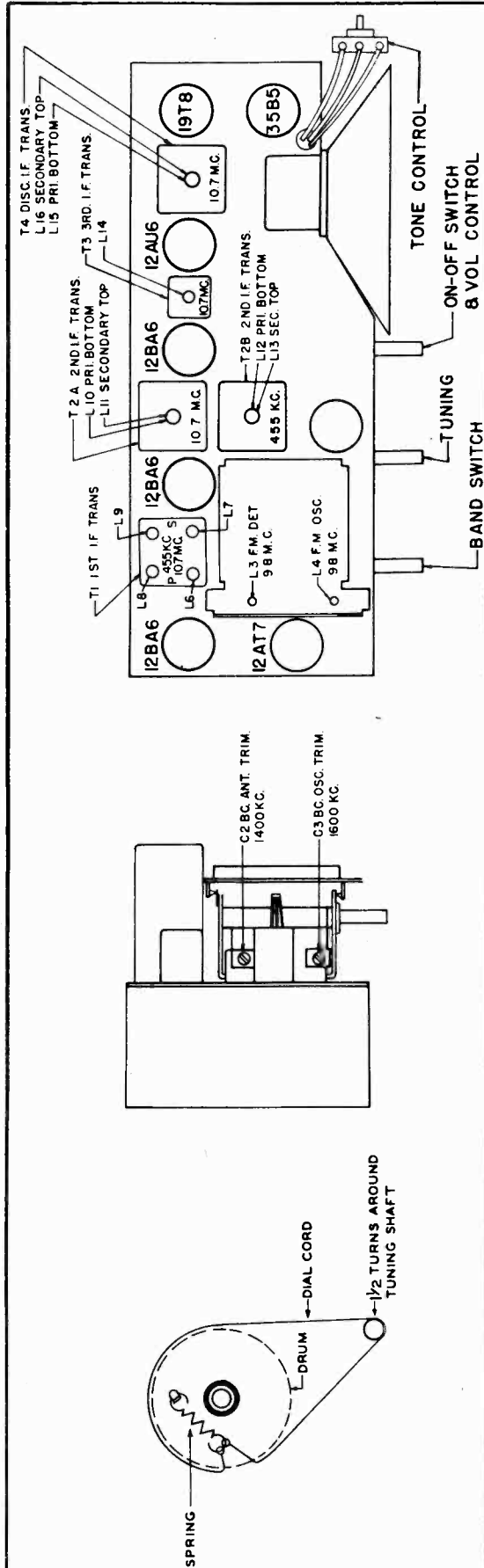
ALIGNMENT PROCEDURE

Operation	Connect Oscillator To	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 2 12AT7 Converter 2 turns loosely cpid. to wavemagnet	.05 Mfd.	455 Kc. Modulated 1600 Kc.	BC	600 Kc.	L8, 9, 12, 13	Align I. F. channel for maximum output.
2	2 turns loosely cpid. to wavemagnet		Modulated 1400 Kc.	BC	1600 Kc.	C3	Set oscillator to dial scale.
3	2 turns loosely cpid. to wavemagnet		Modulated 10.7 Mc.	BC	1400 Kc.	C2	Align antenna stage.
4 (a)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	Unmodulated 100	FM		L15 coil slug Primary discr.	Align primary of discriminator for maximum reading.
5 (b)	Pin 1 (grid) on 12AU6 limiter.	.05 Mfd.	Unmodulated 10.7 Mc.	FM		L16 coil slug sec. of discr.	Adjust secondary of discriminator for zero reading.
6 (c)	Pin 1 (grid) on 12BA6 2nd. IF.	.05 Mfd.	Unmodulated 10.7 Mc.	FM		L14 Prim. of 3rd. IF trans.	Align 3rd. IF transformer for maximum reading.
7 (c)	Pin 1 (grid) on 12BA6 1st. IF.	.05 Mfd.	Unmodulated 10.7 Mc.	FM		L10 and L11 Prim. and Sec. of 2nd. IF transformer	Align 2nd IF transformer for maximum reading.
8 (c)	Pin 2 (grid) on 12AT7 converter tube socket.	.05 Mfd.	Unmodulated 10.7 Mc.	FM		L6 and L7 Prim. and Sec. of 1st. IF transformer.	Align 1st. IF transformer for maximum reading.
9 (c)	Antenna Post FM (Re- move line ant.)	270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L4 Osc. Coil Slug	Set Oscillator to dial scale.
10 (c) (d)		270 ohms	98 Mc. Unmodulated	FM	98 Mc.	L3 Det. Coil Slug	Align det. stage to maximum reading.

IMPORTANT

Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.
 Correct alignment can only be made if the following procedure is followed:
 A vacuum tube voltmeter with an isolation resistor of 2,000,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.
 An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.
 (a) Vacuum Tube Voltmeter Lug 7 on discriminator transformer to chassis (half discriminator load).
 (b) Vacuum Tube Voltmeter Lug 5 on discriminator transformer to chassis (full discriminator load).
 (c) Vacuum Tube Voltmeter from Limiter Grid to Chassis.
 (d) Loosen Slugs by applying a hot iron to the cement.



TUBE AND TRIMMER LOCATION

The 7F02 chassis incorporates a superheterodyne circuit with two stages of IF, on the FM Band, and one stage on the AM Band. There is one stage of RF amplification on the FM Band.

When adjustments are made on the 7F02 or any AC-DC chassis, a line isolation transformer (110 V input to 110 V output) is recommended in order to avoid a "hot" chassis. If an isolation transformer is not available, check the AC voltage between chassis and bench ground, and if there is any indication of voltage, reverse the plug before handling the set.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustment the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The FM IF transformers in this receiver are of the new permeability tuned type. The advantage of an I.F. transformer of this type is its extreme stability under various humidity

and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these I.F. transformers the tuning wrench 68-7 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated. The tuning wrench is so designed that turning one slug does not affect the adjustment of the other.

FM IF Alignment: Because of the wide band pass, it is desirable to use a FM signal generator and a cathode ray oscilloscope when aligning the FM IF channel. The instruction book for the Zenith Model 800 Signal Generator (Form Z8001) covers complete FM alignment procedure. If visual alignment equipment is unavailable, reasonably accurate alignment can be made by following the procedure outlined below.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 5) use sufficient signal input to get a good positive and negative indicating before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when the meter starts to go to the left (negative) of zero will give the same results.

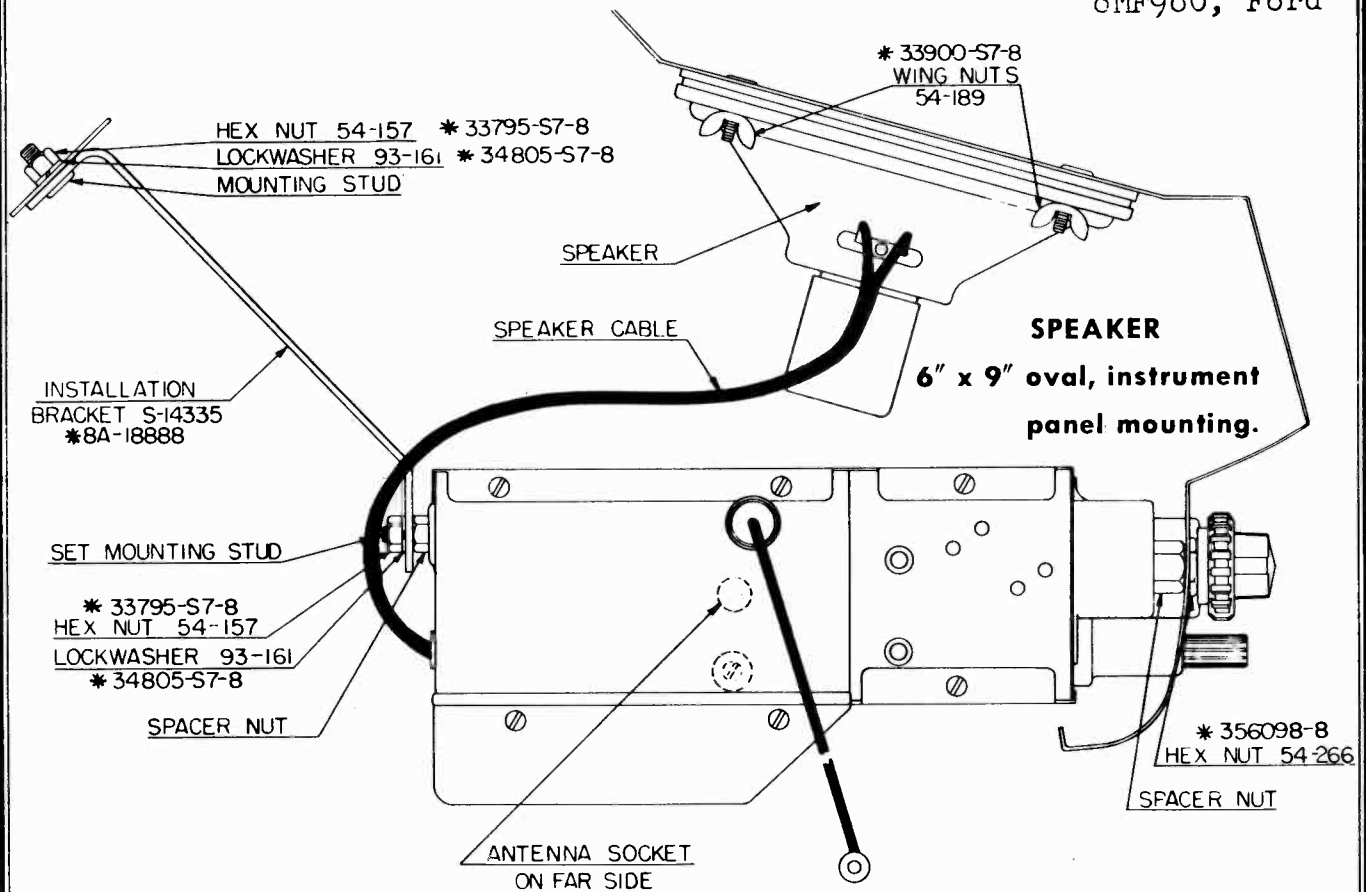
MODELS 8MF880,
8MF980, Ford

Fig. 1. Set Installed, Cut Away View

RECEIVER INSTALLATION

Figures 1 and 2, illustrating the escutcheon plate, control knobs and the installed receiver, are given here to facilitate removal and reinstallation of the receiver when service or repair is necessary.

1. Disconnect the "A" lead, the speaker cable, and the antenna from the receiver. (Fig. 1.)
2. Remove the volume control, tone control, trim and tuning knobs from the set. Remove the two front hex-nuts 54-266. Disconnect the bottom of the set rear mounting bracket S-14335 by removing the hex-nut 54-157, and lockwasher 93-161 from the set rear mounting stud, and take the set from its position behind the instrument panel. (Fig. 1.)
3. To take the speaker from behind the instrument panel remove the four 8-32 wing-nuts No. 54-189. (Fig. 1.)

OPERATING INSTRUCTIONS**TO TURN RADIO ON:**

The radio is connected to the accessory terminal of the ignition switch, therefore, it is necessary to turn the ignition key to the left, if the engine is not running, before turning the radio on. Press any one of the five automatic push buttons. (Fig. 2.) Allow approximately 20 seconds for the receiver to reach operating temperature.

To turn the receiver off, press the "Off" push button (Fig. 2).

* Indicates Ford part number.

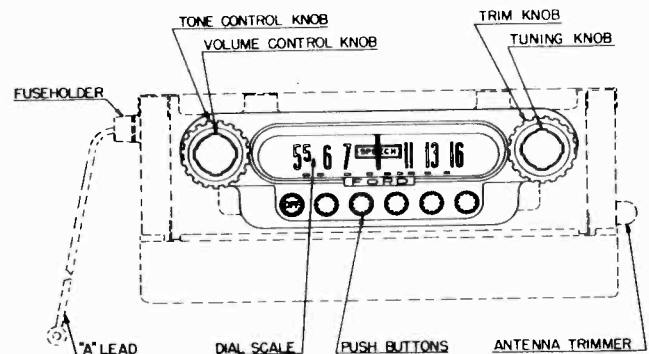


Fig. 2. Front Panel View

MANUAL TUNING:

To operate the manual tuning control simply turn the tuning knob. (Fig. 2.) When tuning in a station, be sure to tune to the exact frequency for the best tone quality.

VOLUME CONTROL:

Turn the volume control knob for the desired volume. (Fig. 2.)

TONE CONTROL:

The tone control knob is located directly behind the volume control knob. Turning this control to the right or left will change the tone of the receiver. The control has four positions. The position to which the control is set is indicated in the window in the center of the dial scale.

MODELS 8MF880,
8MF980, Ford

AUTOMATIC TUNING:

There are five automatic tuning push buttons located to the right of the "Off" push button. (Fig. 2.)

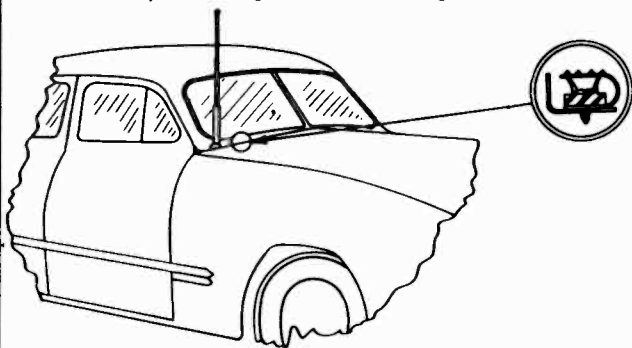
The five buttons may be adjusted in succession to any desired dial setting. To simplify the identification of the stations, it is advisable to set the buttons in sequence according to the frequencies of the stations, beginning with the station broadcasting at the lowest frequency and progressing to the station broadcasting at the highest frequency.

To adjust the automatic tuning push buttons:

1. Turn the receiver on and allow it to operate for at least 15 minutes in order for each part to reach normal operating temperature.
2. Tune in the station desired for number 1 position by turning the tuning knob. (Fig. 2.) Be sure to tune to the exact frequency to insure the best tone.
3. Loosen the number one push button, located nearest the "OFF" push button (Fig. 2) by turning it counterclockwise with your fingers not more than two turns. If the push button is completely unscrewed, the plunger assembly, inside the receiver, may come apart. Then it will be necessary to remove the radio from the car, open the case, and reassemble the plunger.
4. Press the button in as far as it will go.
5. Release the number 1 button and tighten it by turning it clockwise with your fingers.
6. Use the same procedure for adjusting positions 2, 3, 4, and 5. When the five automatic tuning push buttons have been adjusted to the five desired stations, any one of the five stations can be instantly tuned in by pressing the automatic push button that is adjusted to it.

INTERFERENCE SUPPRESSION

There should be no motor noise or interference from the ignition circuit if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:



REMOVE SCREW FROM HOOD PAD ON COWL AT LOCATION SHOWN AND INSTALL HOOD BONDING SPRING 80-145 WITH SCREW 112-365. *51A-18870
*32923-57-8

Fig. 3

The hood bonding spring No. 80-579 should be installed on the cowl at the location shown in Fig. 3.

The generator condenser, No. 22-1601, should be mounted under the top assembly bolt on the rear end plate of the generator, and the lead connected to the ARMATURE terminal of the generator. (Fig. 4.)

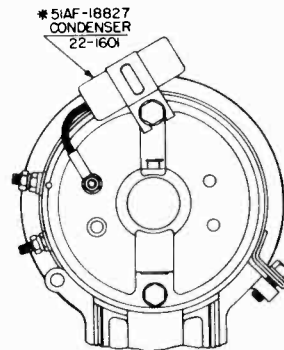


Fig. 4

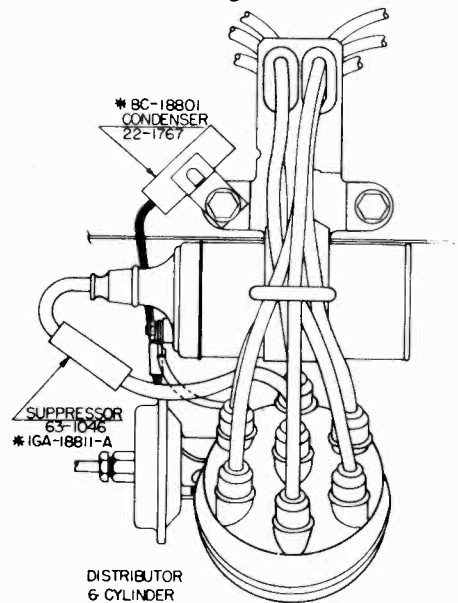


Fig. 5

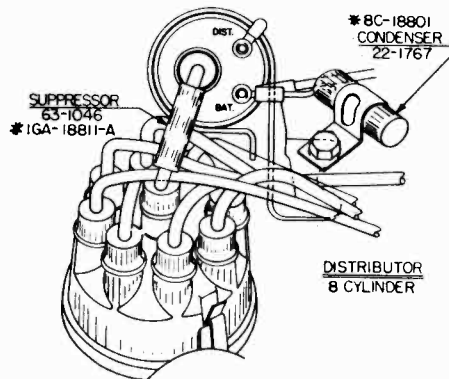


Fig. 6

The suppressor, No. 63-1046, should be in the high tension wire, approximately 1 1/2 inches from the distributor cap. (Figs. 5 and 6.) The ignition coil condenser, No. 22-1767, should be connected to the BAT, terminal of the ignition coil. (Figs. 5 and 6.)

* Indicates Ford part number.

MODELS 8MF880,
8MF980, Ford

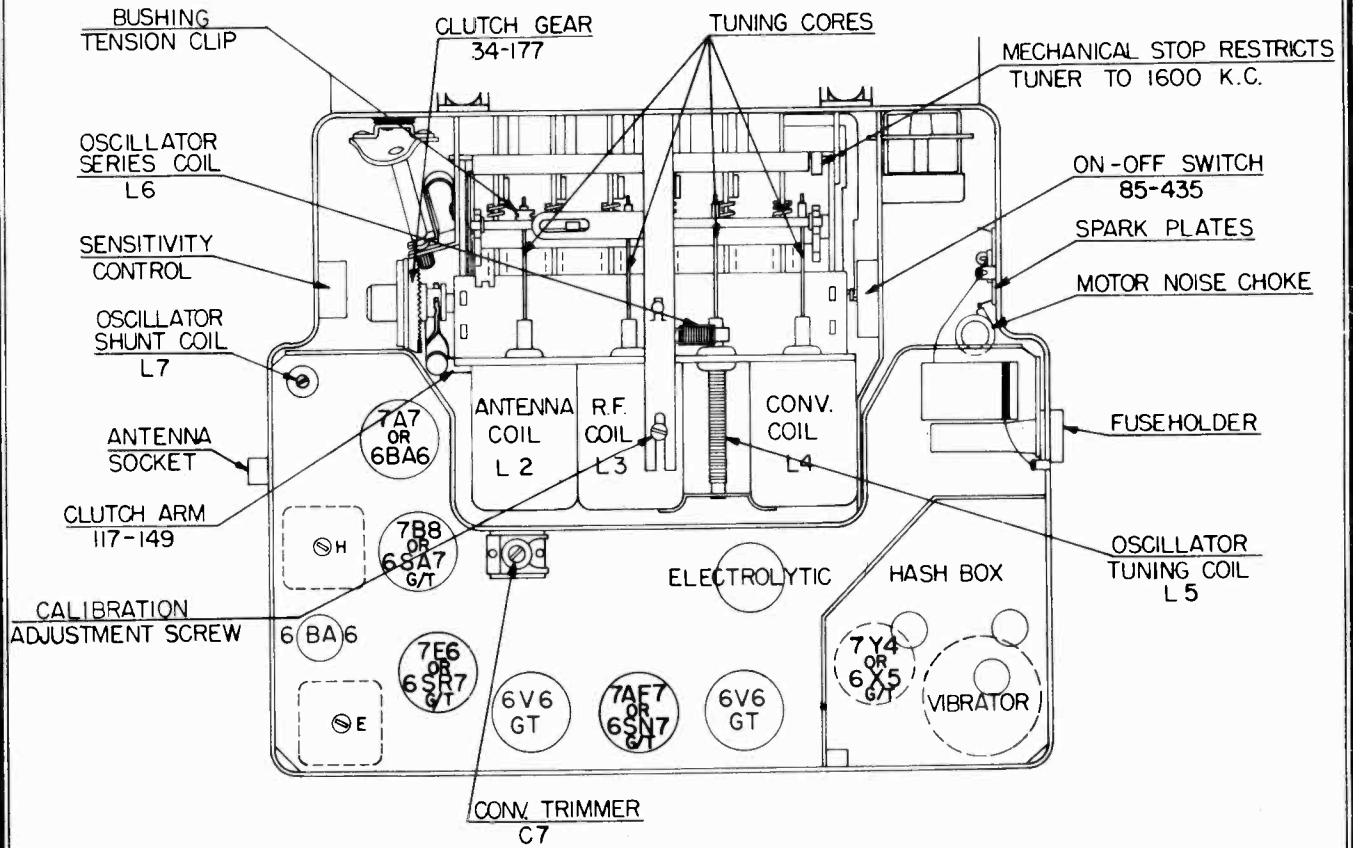


Fig. 7. Top View
of Chassis

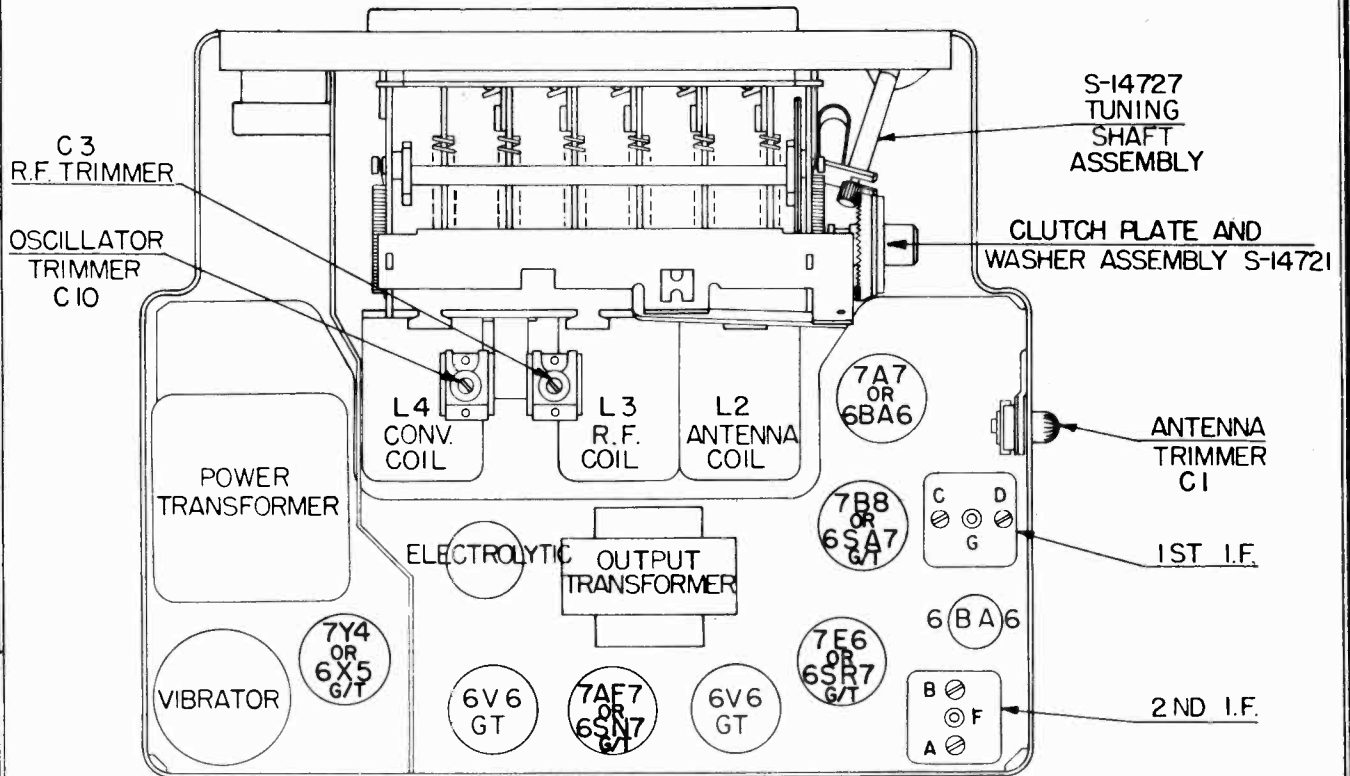


Fig. 8. Bottom View
of Chassis

MODELS 8MF880,
8MF980, Ford

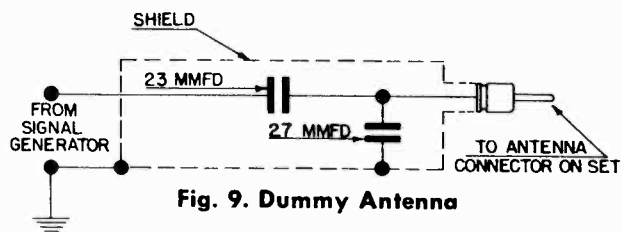


Fig. 9. Dummy Antenna

Figure 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustment to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove top and bottom covers from receiver.
2. Set signal generator to 265 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
4. Adjust I.F. trimmers A, B, C, and D in order named for maximum output. (Fig. 8.) Some units have I.F. transformers that are slug tuned. In this case adjust I.F. slugs E, F, G, and H in order named. Repeat the operation to assure accurate alignment. (Figs. 7 and 8.)

R.F. AND OSCILLATOR ALIGNMENT

1. Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver. This is important.
2. Set signal generator to 535 Kc.
3. Tune set to 535 Kc.
4. Adjust oscillator trimmer C-10 (Fig. 8), for maximum response.
5. Set signal generator to 1300 Kc.
6. Tune set to 1300 Kc.
7. Adjust converter trimmer C-7, R.F., trimmer C3 and antenna trimmer C-1 (Fig. 8) for maximum response (Figs. 7 and 8).
8. If dial calibration is off after making above adjustments, a correction can be made by tuning eccentric screw at fulcrum of dial pointer. (Fig. 7.)

TO ADJUST OR REPLACE THE ADJUSTING SPRING AND CORE

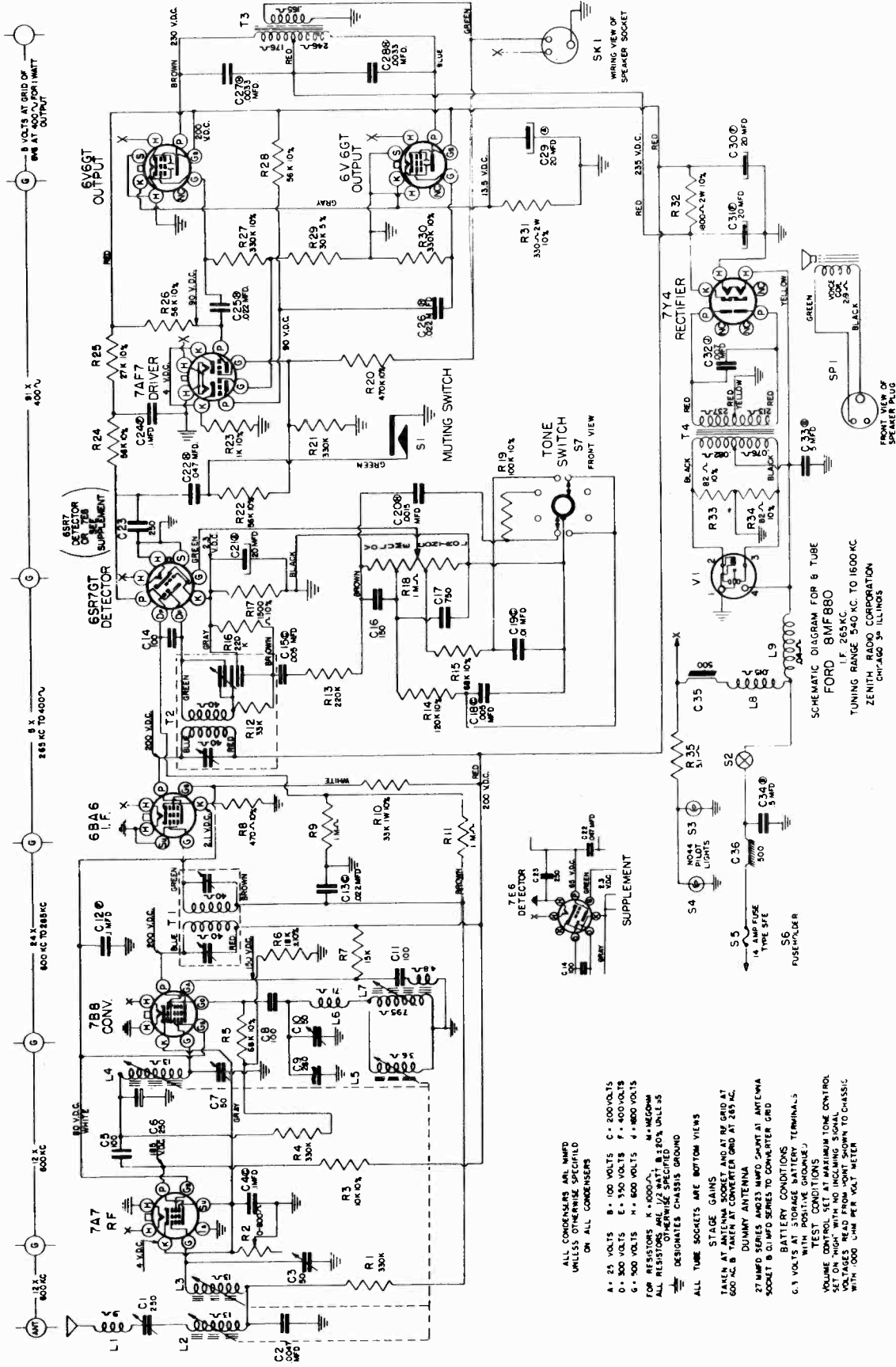
1. Remove the top and bottom covers from the receiver. Remove the escutcheon assembly.
2. With pliers remove the bushing tension clip from the cross arm insulating bushing.
3. With core alignment tool, part No. S-13064, screw the core in, or out, to the desired position.
4. After all adjustments or replacements are completed, be sure to replace the bushing tension clip.

ALIGNMENT PROCEDURE AFTER CORE OR COIL REPLACEMENT

WARNING: The following adjustments are to be made only after a core or coil is replaced.

1. Set signal generator to 1675 Kc.
2. Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna receptacle on the receiver.
3. Set receiver dial to 1600 Kc. (Maximum high frequency end of dial.)
4. Screw the cores completely out of the antenna coil, the R.F. coil, the converter coil, and the oscillator coil.
5. Adjust the oscillator trimmer C-10 (Fig. 8) at 1675 Kc.
6. Adjust the converter trimmer C-7, R.F. trimmer C3, and antenna trimmer C-1 (Figs. 7 and 8) for maximum output reading.
7. Set signal generator dial and receiver dial to 1300 Kc.
8. Replace cores to their approximate original position (so that the cores project about $1\frac{1}{8}$ of an inch from the end of the coil form).
9. Adjust the oscillator core L-5 (Fig. 7) to scale at 1300 Kc.
10. Adjust the antenna core L-2, R.F. core L3, and converter core L-4 (Fig. 7) for maximum output reading.
11. Set signal generator to 600 Kc.
12. "Rock in" shunt oscillator coil L-7 (Fig. 7) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the paddler condenser on a gang condenser receiver.
13. Check receiver at 1300 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10, and 11.
14. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the lug stop near the volume control should be bent to limit the frequency coverage to 1605 Kc.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station at approximately 1300 Kc.



ALL CONDENSERS ARE MFD UNLESS OTHERWISE SPECIFIED ON ALL CONDENSERS

A • 25 VOLTS B • 50 VOLTS C • 100 VOLTS
 D • 200 VOLTS E • 350 VOLTS F • 500 VOLTS
 G • 750 VOLTS H • 1000 VOLTS I • 1500 VOLTS
 J • 2000 VOLTS K • 3000 VOLTS L • 5000 VOLTS
 M • 10000 VOLTS N • 15000 VOLTS O • 20000 VOLTS
 P • 25000 VOLTS Q • 30000 VOLTS R • 35000 VOLTS
 S • 40000 VOLTS T • 45000 VOLTS U • 50000 VOLTS
 V • 55000 VOLTS W • 60000 VOLTS X • 65000 VOLTS
 Y • 70000 VOLTS Z • 75000 VOLTS

ALL RESISTORS ARE IN OHMS UNLESS DESIGNATED OTHERWISE

ALL TUBE SOCKETS ARE BOTTOM VIEWS

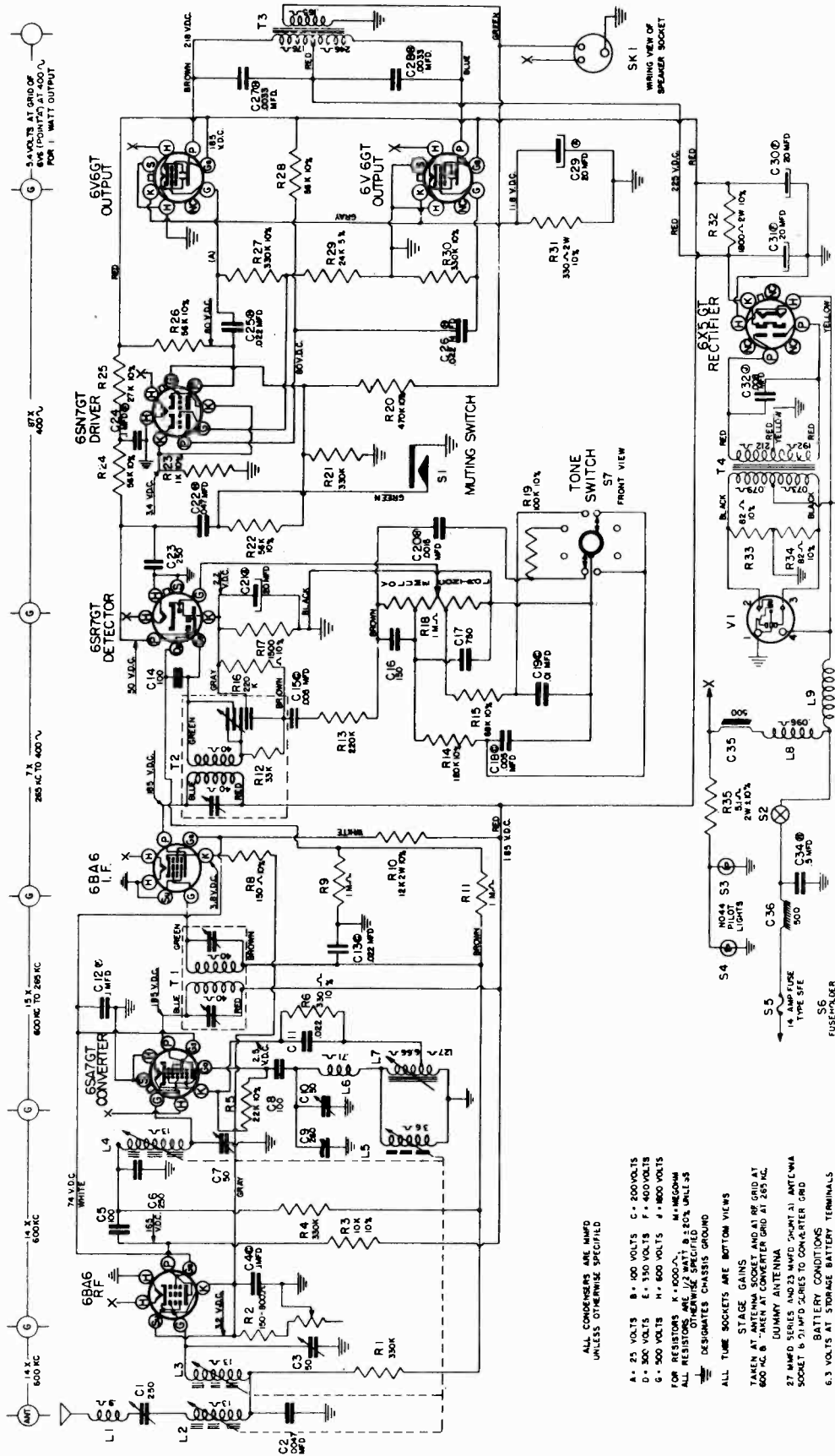
STAGE GAINS
 TAKEN AT ANTENNA SOCKET AND AT RF GRID AT 600 KC
 TAKEN AT CONVERTER GRID AT 265 KC
 DUMMY ANTENNA
 27 MFD SERIES AND 33 MFD SHUNT AT ANTENNA SOCKET
 6.3 MFD SERIES TO CONVERTER GRID

BATTERY CONDITIONS
 6.3 VOLTS AT STORAGE BATTERY TERMINALS
 TEST CONDITIONS
 VOLUME CONTROL SET AT MAXIMUM TONE CONTROL SET ON "HIGH" WITH NO INCLUDING SIGNAL VOLTAGES READ FROM CHASSIS DOWN TO CHASSIS WITH 1000 OHM PER VOL. METER

CURRENT CONSUMPTION: 8 amperes

SENSITIVITY: 5 microvolts at one watt output.

UNDISTORTED POWER OUTPUT: 6 watts measured at the voice coil.



SCHEMATIC DIAGRAM FOR 8 TUBE
 FORD 8MF980
 I.F. 265KC
 TUNING RANGE 340 KC TO 1600 KC
 ZENITH RADIO CORPORATION
 CHICAGO 30 ILLINOIS

- A - 25 VOLTS B - 100 VOLTS C - 200 VOLTS
- D - 500 VOLTS E - 150 VOLTS F - 400 VOLTS
- G - 500 VOLTS H - 600 VOLTS I - 1000 VOLTS
- FOR RESISTORS K = 1000 Ω, M = 100,000 Ω, ALL RESISTORS UNLESS OTHERWISE SPECIFIED
- Ω = DESIGNATES CHASSIS GROUND
- ALL TUBE SOCKETS ARE BOTTOM VIEWS
- STAGE GAINS TAKEN AT "A" WHEN AT CONVERTER GRID AT 265 KC, 600 KC, B
- DUMMY ANTENNA 27 MFD SERIES AND 23 MFD SHUNT AT ANTENNA SOCKET & 21 MFD ZUNES TO CONVERTER GRID
- BATTERY CONDITIONS 6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUND
- TEST CONDITIONS VOLUME CONTROL SET ON "HIGH FIDELITY" WITH NO INCOMING SIGNAL VOLTAGE READ FROM POINT SHOWN TO CHASSIS WITH 100 Ω CHM PER VOLT METER

MODELS 8MF880,
8MF980, Ford**PARTS LIST FORD AUTOMOTIVE RECEIVER**

Diagram			Diagram		
No.	Part No.	Description	No.	Part No.	Description
COILS AND CHOKES					
L 9	20-213	Main Hash Choke	R31	63-1622	330 Ohm (Insulated) 2 W.
T 1	95-1077	1st I.F. Transformer	R33 } R34 }	63-1740	82 Ohm (Insulated) ½ W.
T 2	95-1078	2nd I.F. Transformer	R 8	63-1771	470 Ohm (Insulated) ½ W.
L 1	S-8819	Antenna Motor Noise Choke Assembly	R23	63-1785	1000 Ohm (Insulated) ½ W.
L 8	S-11232	Motor Noise Choke Assembly	R17	63-1792	1500 Ohm (Insulated) ½ W.
L 7	S-14225	Oscillator Shunt Coil Assembly	R 3	63-1827	10M Ohm (Insulated) ½ W.
L 6	S-14226	Oscillator Series Coil Assembly	R 7	63-1835	15M Ohm (Insulated) ½ W.
L 3	S-14227	RF Coil Assembly	R25	63-1845	27M Ohm (Insulated) ½ W.
L 2	S-14227	Antenna Coil Assembly	R29	63-1846	30M Ohm (Insulated) ½ W.
L 4	S-14227	Converter Coil Assembly	R12	63-1849	33M Ohm (Insulated) ½ W.
L 5	S-14228	Oscillator Coil Assembly	R22 } R24 } R26 } R28 }	63-1859	56M Ohm (Insulated) ½ W.
L 2 } L 3 } L 4 } L 5 }	S-14295	Tuner Coil Unit Assembly	R 5	63-1862	68M Ohm (Insulated) ½ W.
CONDENSERS					
C12	22-170	.1 Mfd.	R19	63-1869	100M Ohm (Insulated) ½ W.
C23	22-182	250 Mmfd.	R14	63-1873	120M Ohm (Insulated) ½ W.
C 4	22-190	.1 Mfd.	R13 } R16 }	63-1884	220M Ohm (Insulated) ½ W.
C17	22-242	750 Mmfd.	R27 } R30 }	62-1890	330M Ohm (Insulated) ½ W.
C15 } C18 }	22-906	.005 Mfd.	R 1 } R 4 } R21 }	63-1891	330M Ohm (Insulated) ½ W.
C 6	22-1136	250 Mmfd.	R20	63-1897	470M Ohm (Insulated) ½ W.
C16	22-1137	150 Mmfd.	R 9 } R11 }	63-1912	1 Megohm (Insulated) ½ W.
C34	22-1238	.5 Mfd.	R 6	63-1838	18M Ohm ½ W.
C19	22-1466	.01 Mfd.	MISCELLANEOUS		
C29 } C30 } C31 }	22-1484	Electrolytic 20 Mfd.—25 V. x20-20 Mfd.	46-715	Antenna Trimmer Knob (used on 22-1721)	
C21	22-1553	20 Mfd. Electrolytic	SP 1	49-627	P.M. Speaker (6" x 9" Oval) (See S-14303)
C 9	22-1712	260 Mmfd. Compensating	S 6	52-451	Battery Cable—Fuse to Set—Fuse-holder
C32	22-1713	.007 Mfd.	52-455	Volume Control Cable	
C 7	22-1715	Single Section Trimmer (Converter)	52-470	Speaker Cable and Plug	
C 1	22-1721	Single Section Trimmer (Antenna)	73-50	No. 6-32 x ¼" Headless Slotted Set Screw—Cuppoint	
C 3 } C10 }	22-1722	Two Section Trimmer (R.F. and Osc.)	78-596	Socket—Loktal Tube	
C33	22-1728	.5 Mfd.	SK 1	78-728	Socket—Speaker
C 5 } C11 }	22-1730	100 Mmfd. Ceramic (or 22-162)	78-782	Socket—Miniature Tube	
C14		500 V.	78-796	Socket—Antenna Connector	
C20	22-1743	.0015 Mfd.	78-801	Socket—Octal Base Tube	
C27 } C28 }	22-1747	.0033 Mfd.	78-804	Socket—Vibrator	
C24	22-1748	.1 Mfd.	93-888	Vibrator Cushion Washer	
C22	22-1749	.047 Mfd.	T 4	95-1071	Power Transformer
C25 } C26 }	22-1750	.022 Mfd.	T 3	95-1079	Output Transformer
C13	22-1751	.022 Mfd.	125-63	Rubber Grommet (used on S-14295)	
C 2	22-1752	.0047 Mfd. (or 22-1022)	126-553	Miniature Tube Shield	
RESISTORS					
R 2	63-1379	Sensitivity Control	149-62	Iron Core and Screw	
R10	63-1398	33M Ohm (Insulated)	149-63	Iron Core and Spring (4 used)	
S 7 } R18 }	63-1590	Volume Control and Tone Switch	V 1	190-22	Vibrator
R32	63-1620	1800 Ohm (Insulated)	196-91	Speaker Gasket and Screen	
		2 W.	199-81	Tone Gear Sleeve	
			202-575	Instruction Book (Owner's Manual)	
			202-605	Interference Elimination Instruction Sheet	

MODELS 8MF880,
8MF980, Ford

Diagram No.	Part No.	Description
	S-14303	Speaker and Gasket Assembly (use 49-627 and 196-91)

INSTALLATION PARTS

	S-14330	Installation Kit Assembly (complete)
	52-458	Battery Cable—Fuse to Ammeter
	54-157	1/4-20 x 7/16" x 3/16" Hex Nut—Steel—Cad. Pl. (4 used)
S 5	136-11	14 Ampere Fuse—Type S.F.E. No. 14
	54-266	1/2-28 x 1 1/16" x 1/8" Hex Nut
	54-189	No. 8-32 Wing Nut
	93-161	1/4" External Lockwasher
	S-14335	Installation Bracket Assembly

MOTOR NOISE SUPPRESSION KIT

	S-14331	Motor Noise Suppression Kit Assembly (complete)
	22-1110	Fuel Gauge Capacitor
	22-1601	Generator Capacitor
	22-1767	Ignition Coil Capacitor
	63-1046	Distributor Suppressor
	80-145	Motor Hood Bond Spring
	112-365	No. 8 x 1/2" B.H. Sheet Metal Screw

DIAL ASSEMBLY

	12-1437	Dial Scale Retaining Bracket
	19-165	Insulating Bushing Tension Clip (4 used)
	19-167	Window Retaining Clip (R.H.)
	19-168	Window Retaining Clip (L.H.)
	26-397	Dial Scale
	46-711	Tone Control Knob
	46-714	"Off" Switch Knob
	56-228	Cross Arm Guide Rod
	57-1357	Escutcheon
	59-210	Dial Pointer
	80-232	Knob Retaining Spring
	80-651	Pointer Retaining Spring
	80-586	Cross Arm Tension Spring (2 used)
	80-625	Pointer Link Tension Spring
	83-1523	Light Diffusion Strip
	94-607	Tuning Shaft Bushing
	94-608	Volume Control Bushing
	94-609	Cross Arm Insulating Bushing

Diagram No.	Part No.	Description
S 3	100-36	Dial Light Bulb—Mazda No. 44
S 4	112-699	No. 4-40 x 3/16" R.H. Self Tapping Screw—Stan Top—Steel—Cad
	114-294	No. 6-20 x 1/4" Hex Hd. Self Tapping Screw Type No. 25 (Escutcheon Mtg.)
	192-116	Dial Window
	S-14215	Pointer Support Bracket and Stud Assembly
	S-14216	Pointer Drive Link and Stud Assembly
	S-14300	Cross Arm and Bushing Assembly
	S-14659	Dial Light Socket and Wire Assembly
	S-14660	Dial Light Socket and Wire Assembly
	S-14307	Tone Gear and Bushing Assembly
	S-14308	Tone Drum Shaft and Gear Assembly (26-390)
	S-14333	Tuning Control and Knob Assembly
	S-14334	Volume Control Knob and Spring Assembly
S 2	S-14281	Tuner Unit Assembly
	85-435	"On-Off" Switch (on Tuner)
	S-14754	Automatic Knob and Screw Assembly
	S-14721	Clutch Plate and Washer
	S-14727	Tuning Shaft, Pinion Gear and Coupling Assembly
	17-102	Cam Lock (5 used)
	34-177	Clutch Gear
	64-162	.088 D x 1/32" Rivet (2 used on S-14733)
	73-118	No. 6-32 x 1/4" Hex Hd. Slotted Set Screw (2 used)
	80-640	Yoke Tension Spring (2 used)
	80-641	Clutch Release Bar Spring
	80-642	Clutch Spring
	93-921	Tuning Shaft Steel Washer
	93-922	Tuning Shaft Spring Washer
	93-923	Fishpaper Washer (2 used)
	97-305	Clutch Arm Stud
	117-149	Clutch Lever
	188-32	Retaining Ring
S 1	S-14733	Mute Switch Assembly

PARTS LIST MODEL 8MF980

The parts list for model 8MF980 is the same as for model 8MF880 with the following parts added and omitted:

ADD		
Diag.No.	Part No.	Description
C 1	22-1812	Antenna Trimmer
C11	22-1751	.022Mfd Condenser
C32	22-1448	Buffer Condenser
R 2	63-1662	Sensitivity Control
R 5	63-1841	22K Ohm 1/2 W.
R 6	63-1764	330 Ohm 1/2 W.
R 8	63-1750	150 Ohm 1/2 W.
R10	63-1623	12K Ohm 2W.
R29	63-1843	24K 1/2 W.
L 7	S-14846	Oscillator Shunt Coil
L 8	S-14761	Motor Noise Choke
T 4	95-1073	Power Transformer
	202-637	Instruction Book
S-14836		Tone Drum Shaft & Gear Assembly
26-409		Dial Scale
63-1375		5.1 ohm W. W. resistor

OMIT		
Diag.No.	Part No.	Description
C 1	22-1721	Antenna Trimmer
C11	22-1730	100 Mmf Condenser
C32	22-1713	Buffer Condenser
R 2	63-1379	Sensitivity Control
R 5	63-1862	68K Ohm 1/2 W. Resistor
R 6	63-1838	18K Ohm 1/2 W. Resistor
R 7	63-1835	15K Ohm 1/2 W. Resistor
R 8	63-1771	470 Ohm 1/2 W. Resistor
R10	63-1398	33K Ohm 1 W. Resistor
R29	63-1846	30K Ohm 1/2 W. Resistor
L 7	S-14225	Oscillator Shunt Coil
L 8	S-11232	Motor Noise Choke
T 4	95-1071	Power Transformer
	202-575	Instruction Book
S-14308		Tone Drum Shaft & Gear Assembly
26-397		Dial Scale

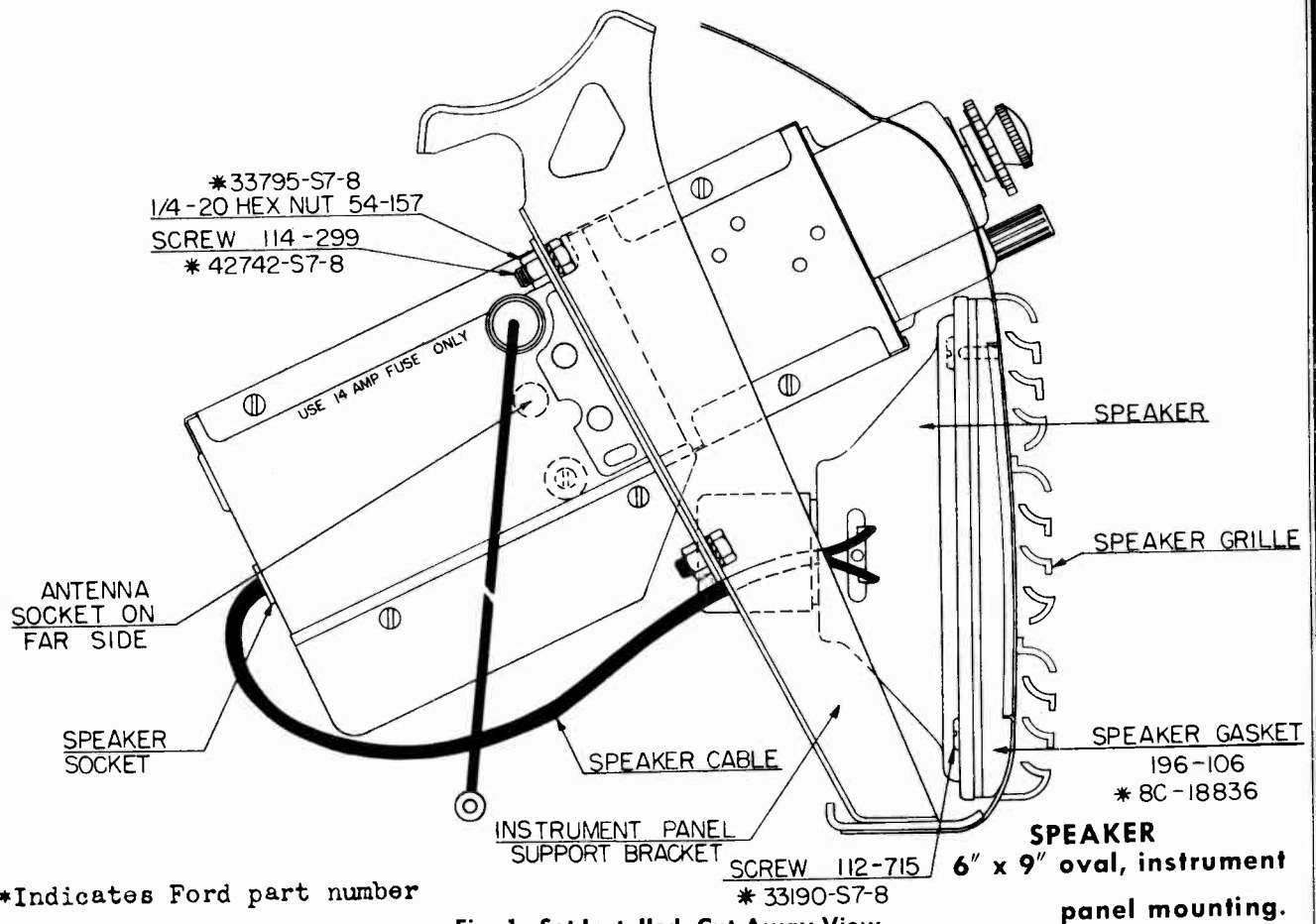
MODEL 8MF881,
Ford

Fig. 1. Set Installed, Cut Away View

RECEIVER INSTALLATION

Figures 1 and 2, illustrating the escutcheon plate, control knobs and the installed receiver, are given here to facilitate removal and reinstallation of the receiver when service or repair is necessary.

1. Disconnect the "A" lead, the speaker cable, and the antenna from the receiver. (Fig. 1.)
2. Remove the four 1/4" screws No. 114-299, and take the set from its position behind the instrument panel. (Fig. 1.)
3. To take the speaker from behind the instrument panel remove the two screws No. 112-715. (Fig. 1.)

OPERATING INSTRUCTIONS**TO TURN RADIO ON:**

The radio is connected to the accessory terminal of the ignition switch, therefore, it is necessary to turn the ignition key to the left, if the engine is not running, before turning the radio on. Press any one of the five automatic push buttons. (Fig. 2.) Allow approximately 20 seconds for the receiver to reach operating temperature.

To turn the receiver off, press the "Off" push button (Fig. 2.)

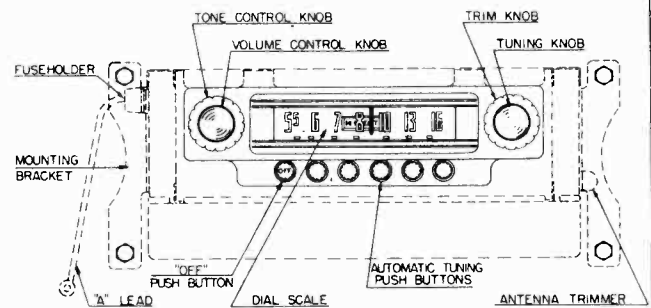


Fig. 2. Front Panel View

MANUAL TUNING:

To operate the manual tuning control simply turn the tuning knob. (Fig. 2.) When tuning in a station, be sure to tune to the exact frequency for the best tone quality.

VOLUME CONTROL:

Turn the volume control knob for the desired volume. (Fig. 2.)

TO NE CONTROL:

The tone control knob is located directly behind the volume control knob. Turning this control to the right or left will change the tone of the receiver. The control has four positions. The position to which the control is set is indicated in the window in the center of the dial scale.

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AUTOMATIC TUNING:

There are five automatic tuning push buttons located to the right of the "Off" push button. (Fig. 2.)

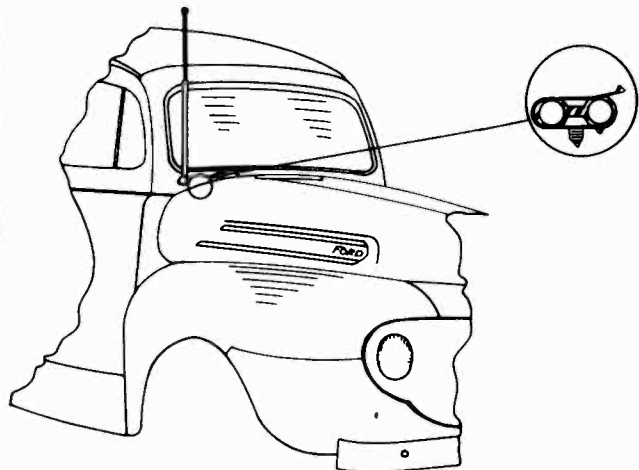
The five buttons may be adjusted in succession to any desired dial setting. To simplify the identification of the stations, it is advisable to set the buttons in sequence according to the frequencies of the stations, beginning with the station broadcasting at the lowest frequency and progressing to the station broadcasting at the highest frequency.

To adjust the automatic tuning push buttons:

1. Turn the receiver on and allow it to operate for at least 15 minutes in order for each part to reach normal operating temperature.
2. Tune in the station desired for number 1 position by turning the tuning knob. (Fig. 2.) Be sure to tune to the exact frequency to insure the best tone.
3. Loosen the number one push button, located nearest the "OFF" push button (Fig. 2) by turning it counterclockwise with your fingers not more than two turns. If the push button is completely unscrewed, the plunger assembly, inside the receiver, may fall apart. Then it will be necessary to remove the radio from the car, open the case, and reassemble the plunger.
4. Press the button in as far as it will go.
5. Release the number 1 button and tighten it by turning it clockwise with your fingers.
6. Use the same procedure for adjusting positions 2, 3, 4, and 5. When the five automatic tuning push buttons have been adjusted to the five desired stations, any one of the five stations can be instantly tuned in by pressing the automatic push button that is adjusted to it.

INTERFERENCE SUPPRESSION

There should be no motor noise or interference from the ignition circuit if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:



REMOVE SCREW FROM HOOD PAD ON COWL AT LOCATION SHOWN AND INSTALL HOOD BONDING SPRING 80-579 *51A-18870 WITH SCREW 112-365 *32923-S7-8

Fig. 3

The hood bonding spring No. 80-579 should be installed on the cowl at the location shown in Fig. 3.

The generator condenser, No. 22-1601, should be mounted under the top assembly bolt on the rear end plate of the generator, and the lead connected to the ARMATURE terminal of the generator. (Fig. 4.)

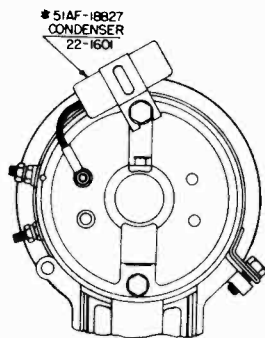


Fig. 4

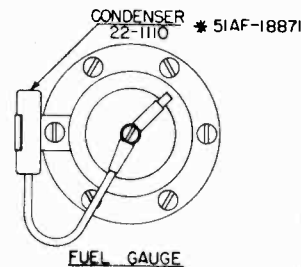


Fig. 5

A condenser, Part No. 22-1110, should be connected to the fuel gauge tank unit. (Fig. 5.)

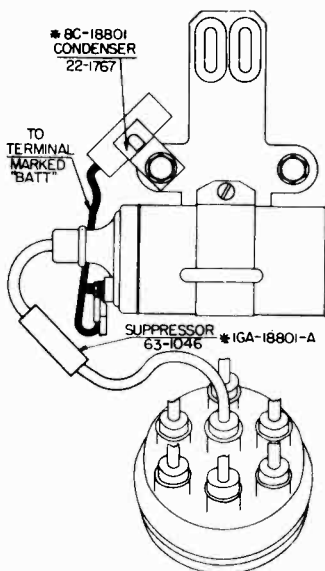


Fig. 6

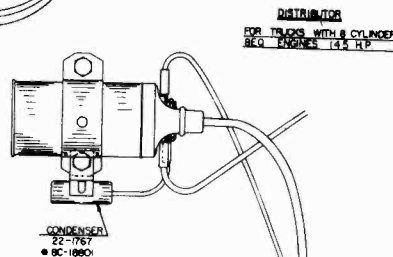


Fig. 6B

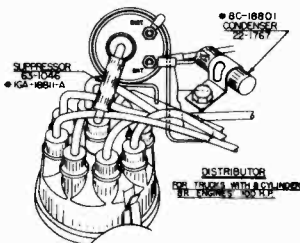


Fig. 6A

The suppressor, No. 63-1046, should be in the high tension wire, approximately 1 1/2 inches from the distributor cap. (Figs. 6, 6A and 6B.) The ignition coil condenser, No. 22-1767, should be connected to the BAT, terminal of the ignition coil. (Figs. 6, 6A and 6B.)

*Indicates Ford part number

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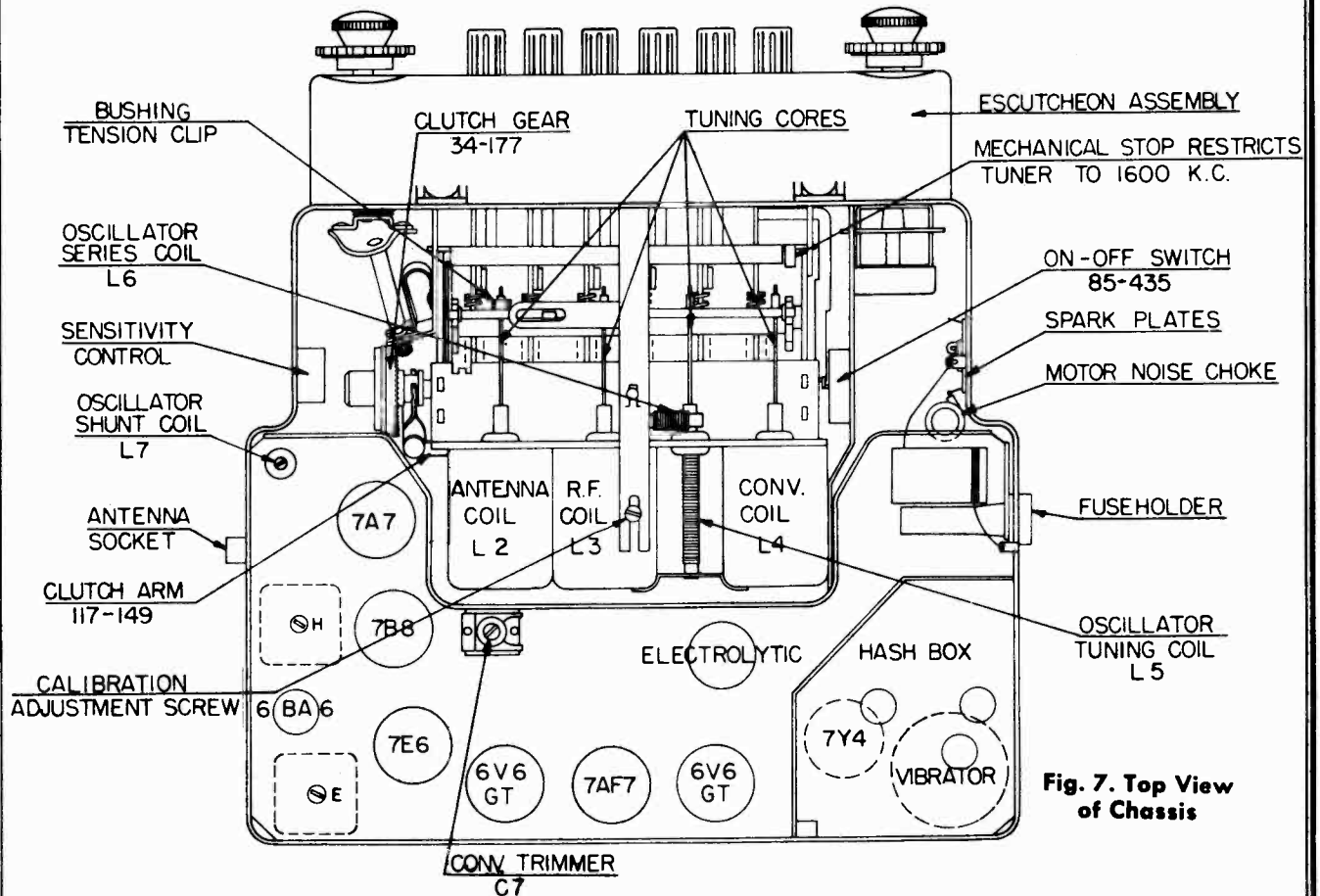


Fig. 7. Top View of Chassis

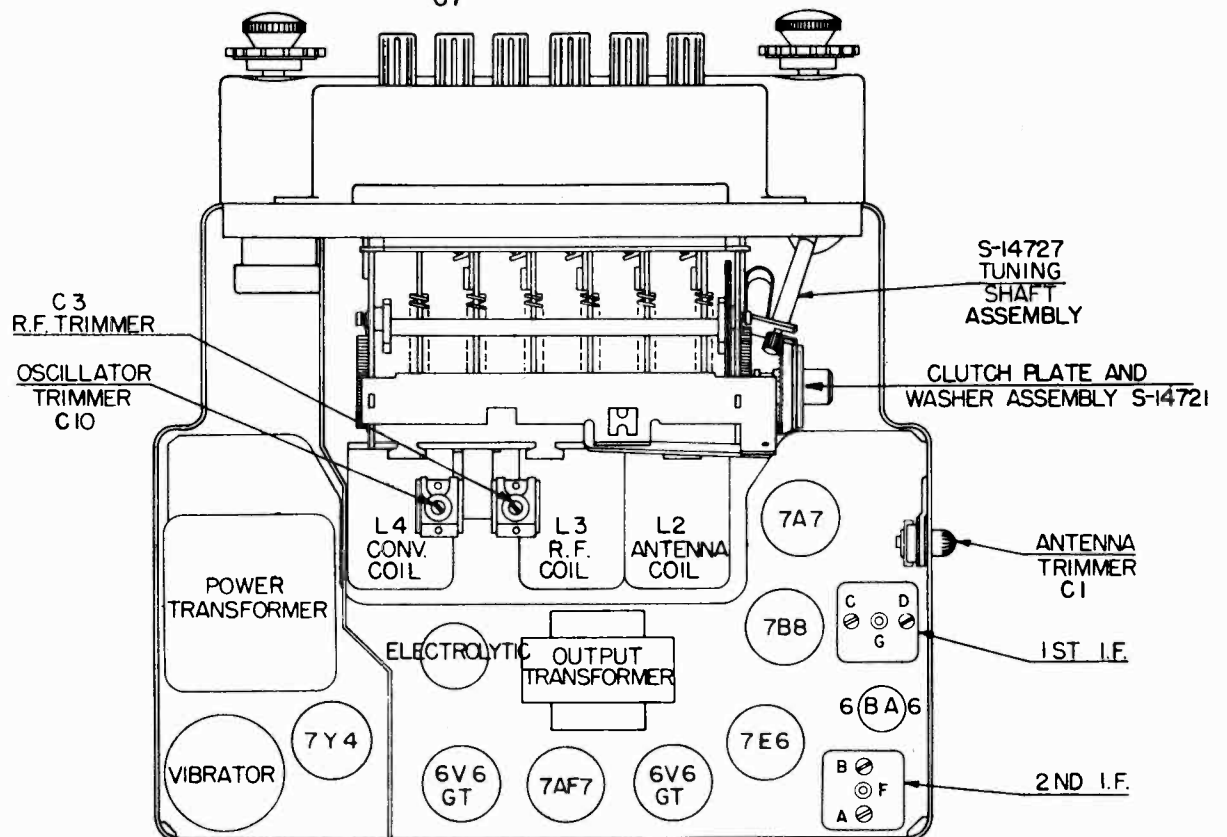


Fig. 8. Bottom View of Chassis

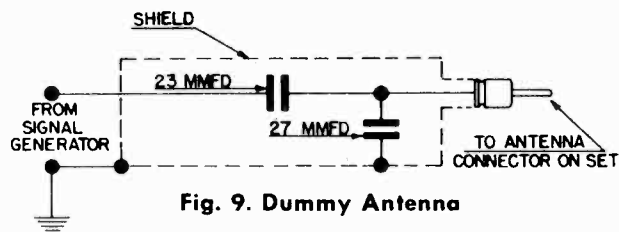
MODEL 8MF881,
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Fig. 9. Dummy Antenna

Figure 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustment to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove top and bottom covers from receiver.
2. Set signal generator to 265 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
4. Adjust I.F. trimmers A, B, C, and D in order named for maximum output. (Fig. 8.) Some units have I.F. transformers that are slug tuned. In this case adjust I.F. slugs E, F, G, and H in order named. Repeat the operation to assure accurate alignment. (Figs. 7 and 8.)

R.F. AND OSCILLATOR ALIGNMENT

1. Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver. This is important.
2. Set signal generator to 535 Kc.
3. Tune set to 535 Kc.
4. Adjust oscillator trimmer C-10 (Fig. 8), for maximum response.
5. Set signal generator to 1300 Kc.
6. Tune set to 1300 Kc.
7. Adjust converter trimmer C-7, R.F. trimmer C3 and antenna trimmer C-1 (Fig. 8) for maximum response (Figs. 7 and 8).
8. If dial calibration is off after making above adjustments, a correction can be made by turning eccentric screw at fulcrum of dial pointer. (Fig. 7.)

TO ADJUST OR REPLACE THE ADJUSTING SPRING AND CORE

1. Remove the top and bottom covers from the receiver. Remove the escutcheon assembly.
2. With pliers remove the bushing tension clip from the cross arm insulating bushing.
3. With core alignment tool, part No. S-13064, screw the core in, or out, to the desired position.
4. After all adjustments or replacements are completed, be sure to replace the bushing tension clip.

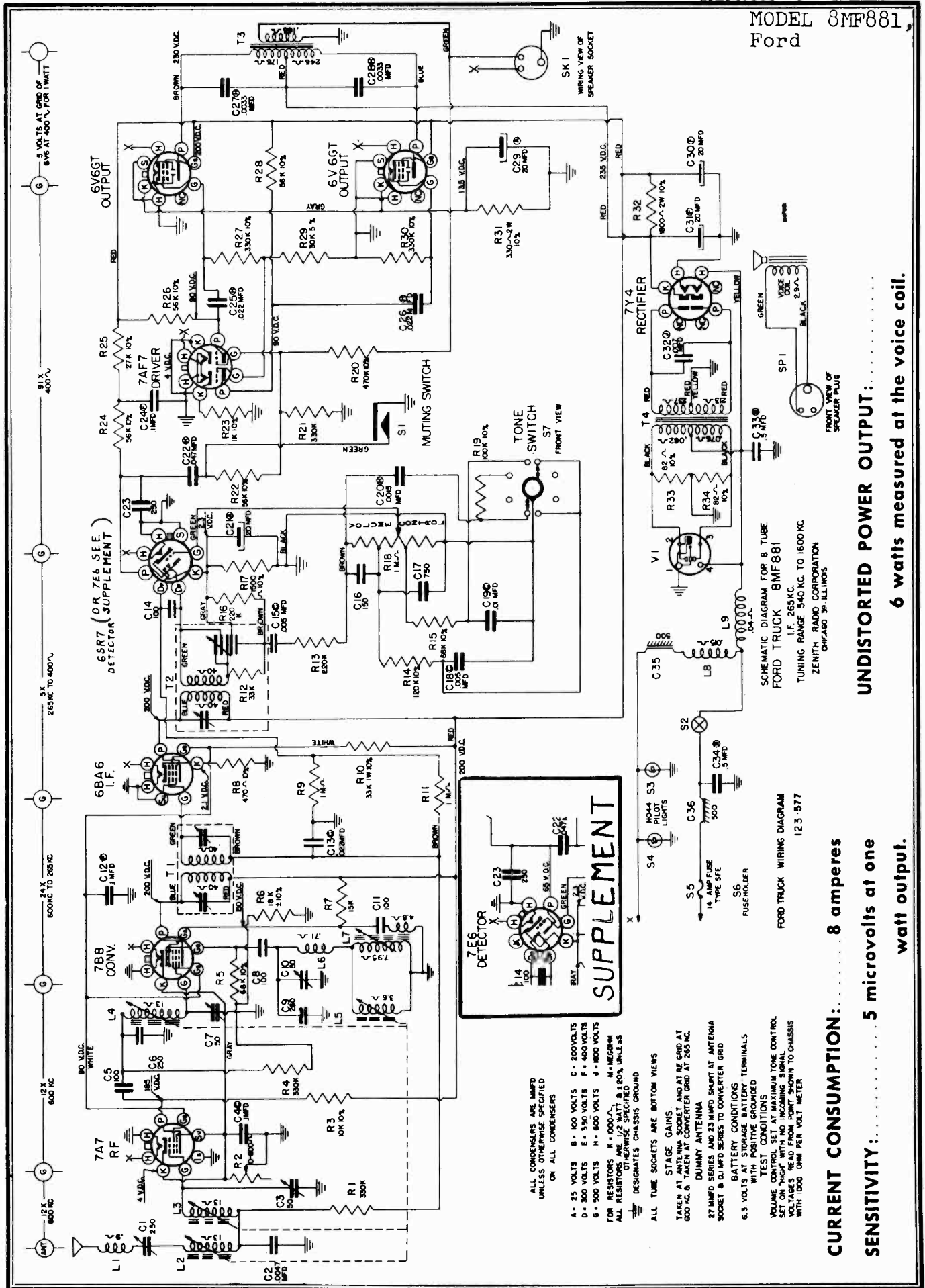
ALIGNMENT PROCEDURE AFTER CORE OR COIL REPLACEMENT

WARNING: The following adjustments are to be made only after a core or coil is replaced.

1. Set signal generator to 1675 Kc.
2. Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna receptacle on the receiver.
3. Set receiver dial to 1600 Kc. (Maximum high frequency end of dial.)
4. Screw the cores completely out of the antenna coil, the R.F. coil, the converter coil, and the oscillator coil.
5. Adjust the oscillator trimmer C-10 (Fig. 8) at 1675 Kc.
6. Adjust the converter trimmer C-7, R.F. trimmer C3, and antenna trimmer C-1 (Figs. 7 and 8) for maximum output reading.
7. Set signal generator dial and receiver dial to 1300 Kc.
8. Replace cores to their approximate original position (so that the cores project about $\frac{1}{16}$ of an inch from the end of the coil form).
9. Adjust the oscillator core L-5 (Fig. 7) to scale at 1300 Kc.
10. Adjust the antenna core L-2, R.F. core L3, and converter core L-4 (Fig. 7) for maximum output reading.
11. Set signal generator to 600 Kc.
12. "Rock in" shunt oscillator coil L-7 (Fig. 7) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padder condenser on a gang condenser receiver.
13. Check receiver at 1300 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10, and 11.
14. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the lug stop near the volume control should be bent to limit the frequency coverage to 1605 Kc.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station at approximately 1300 Kc.

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ALL CONDENSERS ARE MFD UNLESS OTHERWISE SPECIFIED ON ALL CONDENSERS

- A • 25 VOLTS B • 100 VOLTS C • 200 VOLTS
- D • 300 VOLTS E • 350 VOLTS F • 400 VOLTS
- G • 500 VOLTS H • 600 VOLTS I • 1000 VOLTS
- J • 1000 VOLTS K • 1000 VOLTS L • 1000 VOLTS
- M • MEGOHMS N • MEGOHMS O • MEGOHMS
- P • MEGOHMS Q • MEGOHMS R • MEGOHMS
- S • MEGOHMS T • MEGOHMS U • MEGOHMS
- V • MEGOHMS W • MEGOHMS X • MEGOHMS
- Y • MEGOHMS Z • MEGOHMS

ALL TUBE SOCKETS ARE BOTTOM VIEWS

STAGE GAINS

TAKEN AT ANTENNA SOCKET AND AT RE GRID AT 600 KC. B TAKEN AT CONVERTER GRID AT 245 KC.

DUMMY ANTENNA

27 MFD SERIES AND 23 MFD SHUNT AT ANTENNA SOCKET & 0.1 MFD SERIES TO CONVERTER GRID

BATTERY CONDITIONS

6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUND

TEST CONDITIONS

VOLUME CONTROL SET AT MAXIMUM TONE CONTROL SET ON "HIGH" WITH NO INCOMING SIGNAL VOLTAGES READ FROM POINT SHOWN TO CHASSIS WITH 1000 OHM PER VOLT METER

SCHEMATIC DIAGRAM FOR 8 TUBE FORD TRUCK 8MF881 I.F. 265 KC TUNING RANGE 540 KC TO 1600 KC ZENITH RADIO CORPORATION CHICAGO 36 ILLINOIS

FORD TRUCK WIRING DIAGRAM 123-377

UNDISTORTED POWER OUTPUT:

6 watts measured at the voice coil.

CURRENT CONSUMPTION: 8 amperes

SENSITIVITY: 5 microvolts at one

watt output.

MODEL 8MF881,
Ford

PARTS LIST FORD TRUCK RECEIVER

Diagram No.	Part No.	Description
COILS AND CHOKES		
L 9	20-213	Main Hash Choke
T 1	95-1077	1st I.F. Transformer
T 2	95-1078	2nd I.F. Transformer
L 1	S-8819	Antenna Motor Noise Choke Assembly
L 8	S-11232	Motor Noise Choke Assembly
L 7	S-14225	Oscillator Shunt Coil Assembly
L 6	S-14226	Oscillator Series Coil Assembly
L 3	S-14227	RF Coil Assembly
L 2	S-14227	Antenna Coil Assembly
L 4	S-14227	Converter Coil Assembly
L 5	S-14228	Oscillator Coil Assembly
L 2 } L 3 } L 4 } L 5 }	S-14295	Tuner Coil Unit Assembly

Diagram No.	Part No.	Description
CONDENSERS		
C12	22-170	.1 Mfd. 400 V.
C23	22-182	250 Mmfd. 400 V.
C 4	22-190	.1 Mfd. 200 V.
C17	22-242	750 Mmfd. 500 V.
C15 } C18 }	22-906	.005 Mfd. 200 V.
C 6	22-1136	250 Mmfd. 500 V.
C16	22-1137	150 Mmfd. 500 V.
C34	22-1238	.5 Mfd. 120 V.
C19	22-1466	.01 Mfd. 200 V.
C29 } C30 } C31 }	22-1484	Electrolytic 20 Mfd.—25 V. x20-20 Mfd. 400 V.
C21	22-1553	20 Mfd. Electrolytic. 25 V.
C 9	22-1712	260 Mmfd. Compensating
C32	22-1713	.007 Mfd. 1600 V.
C 7	22-1715	Single Section Trimmer (Converter)
C 1	22-1721	Single Section Trimmer (Antenna)
C 3 } C10 }	22-1722	Two Section Trimmer (R.F. and Osc.)
C33	22-1728	.5 Mfd. 100 V.
C 5 } C11 }	22-1730	100 Mmfd. Ceramic (or 22-162)
C14		500 V.
C20	22-1743	.0015 Mfd. 600 V.
C27 } C28 }	22-1747	.0033 Mfd. 600 V.
C24	22-1748	.1 Mfd. 400 V.
C22	22-1749	.047 Mfd. 600 V.
C25 } C26 }	22-1750	.022 Mfd. 600 V.
C13	22-1751	.022 Mfd. 200 V.
C 2	22-1752	.0047 Mfd. (or 22-1022) 600 V.

Diagram No.	Part No.	Description
RESISTORS		
R 2	63-1379	Sensitivity Control
R10	63-1398	33M Ohm (Insulated) 1 W.
S 7 } R18 }	63-1590	Volume Control and Tone Switch
R32	63-1620	1800 Ohm (Insulated) 2 W.
R31	63-1622	330 Ohm (Insulated) 2 W.
R33 } R34 }	63-1740	82 Ohm (Insulated) 1/2 W.
R 8	63-1771	470 Ohm (Insulated) 1/2 W.
R23	63-1785	1000 Ohm (Insulated) 1/2 W.
R17	63-1792	1500 Ohm (Insulated) 1/2 W.
R 3	63-1827	10M Ohm (Insulated) 1/2 W.
R 7	63-1835	15M Ohm (Insulated) 1/2 W.
R25	63-1845	27M Ohm (Insulated) 1/2 W.
R29	63-1846	30M Ohm (Insulated) 1/2 W.
R12	63-1849	33M Ohm (Insulated) 1/2 W.
R22 } R24 } R26 } R28 }	63-1859	56M Ohm (Insulated) 1/2 W.
R 5	63-1862	68M Ohm (Insulated) 1/2 W.
R19	63-1869	100M Ohm (Insulated) 1/2 W.
R14	63-1873	120M Ohm (Insulated) 1/2 W.
R13 } R16 }	63-1884	220M Ohm (Insulated) 1/2 W.
R27 } R30 }	63-1890	330M Ohm (Insulated) 1/2 W.
R 1 } R 4 } R21 }	63-1891	330M Ohm (Insulated) 1/2 W.
R20	63-1897	470M Ohm (Insulated) 1/2 W.
R 9 } R11 }	63-1912	1 Megohm (Insulated) 1/2 W.
R 6	63-1838	18M Ohm. 1/2 W.

Diagram No.	Part No.	Description
MISCELLANEOUS		
	12-1423	Set Mounting Bracket
	12-1424	Set Mounting Bracket
	46-715	Antenna Trimmer Knob (used on 22-1721)
SP 1	49-627	P.M. Speaker (6" x 9" Oval) (See S-14344)
S 6	52-451	Battery Cable—Fuse to Set—Fuse-holder
	52-455	Volume Control Cable
	52-470	Speaker Cable and Plug
	73-50	No. 6-32 x 1/4" Headless Slotted Set Screw—Cuppoint
	78-596	Socket—Loktal Tube
SK 1	78-728	Socket—Speaker
	78-782	Socket—Miniature Tube
	78-796	Socket—Antenna Connector
	78-801	Socket—Octal Base Tube

MODEL 8MF881,
Ford

Diagram No.	Part No.	Description
	78-804	Socket—Vibrator.....
	93-888	Vibrator Cushion Washer.....
	93-891	Tone Control Knob Washer.....
T 4	95-1071	Power Transformer.....
T 3	95-1079	Output Transformer.....
	125-63	Rubber Grommet (used on S-14295).....
	126-553	Miniature Tube Shield.....
	149-62	Iron Core and Screw.....
	149-63	Iron Core and Spring (4 used)....
V 1	190-22	Vibrator.....
	196-106	Speaker Gasket.....
	199-81	Tone Gear Sleeve.....
	202-577	Instruction Book (Owner's Manual)
	202-606	Interference Elimination Instruction Sheet.....
	S-14344	Speaker and Gasket Assembly (use 49-627 and 196-106)

INSTALLATION PARTS

	S-14339	Installation Kit Assembly (complete).....
	52-458	Battery Cable—Fuse to Ammeter
	54-157	1/4-20 x 7/16" x 3/16" Hex Nut—Steel—Cad. Pl. (4 used).....
	112-715	No. 8 x 5/8" Binding Hd. Self Tapping Screw.....
	114-299	1/4-20 x 1/2" Hex. Hd. M. Screw—Steel—Cad. Pl.....
S 5	136-11	14 Ampere Fuse—Type S.F.E. No. 14.....

MOTOR NOISE SUPPRESSION KIT

	S-14340	Motor Noise Suppression Kit Assembly (complete).....
	22-1110	Fuel Gauge Capacitor.....
	22-1601	Generator Capacitor.....
	22-1767	Ignition Coil Capacitor.....
	63-1046	Distributor Suppressor.....
	80-579	Motor Hood Bond Spring.....
	112-365	No. 8 x 1/2" B.H. Sheet Metal Screw.....

DIAL ASSEMBLY

	12-1435	Dial Scale Retaining Bracket (2 used).....
	19-165	Insulating Bushing Tension Clip (4 used).....
	26-395	Dial Scale.....
	46-727	Tone Control Knob.....
	46-714	"Off" Switch Knob.....

Diagram No.	Part No.	Description
	56-228	Cross Arm Guide Rod.....
	57-1349	Escutcheon.....
	57-1344	Dial Background Plate.....
	59-208	Dial Pointer.....
	80-232	Knob Retaining Spring.....
	80-379	Pointer Retaining Spring.....
	80-586	Cross Arm Tension Spring (2 used)
	80-625	Pointer Link Tension Spring.....
	94-609	Cross Arm Insulating Bushing....
S 3 } S 4 }	100-36	Dial Light Bulb—Mazda No. 44
	112-699	No. 4-40 x 3/16" R.H. Self Tapping Screw—Stan Top—Steel—Cad
	114-294	No. 6-20 x 1/4" Hex Hd. Self Tapping Screw Type No. 25 (Escutcheon Mtg.).....
	S-14215	Pointer Support Bracket and Stud Assembly.....
	S-14216	Pointer Drive Link and Stud Assembly.....
	S-14300	Cross Arm and Bushing Assembly.
	S-14304	Dial Light Socket and Wire Assembly.....
	S-14307	Tone Gear and Bushing Assembly
	S-14308	Tone Drum Shaft and Gear Assembly (26-390).....
	S-14342	Tuning Control and Knob Assembly
	S-14343	Volume Control Knob and Spring Assembly.....
	S-14386	Tuner Unit Assembly.....
S 1	S-14534	Tuner Unit Final Assembly
S 2	85-435	"On-Off" Switch (on Tuner).....
	S-14754	Automatic Knob and Screw Assembly.....
	S-14721	Clutch Plate and Washer.....
	S-14729	Tuning Shaft, Pinion Gear and Coupling Assembly.....
	17-102	Cam Lock (5 used).....
	34-177	Clutch Gear.....
	64-162	.088 D x 5/32" Rivet (2 used on S-14733).....
	73-118	No. 6-32 x 1/4" Hex Hd. Slotted Set Screw (2 used).....
	80-640	Yoke Tension Spring (2 used)....
	80-641	Clutch Release Bar Spring.....
	80-642	Clutch Spring.....
	93-921	Tuning Shaft Steel Washer.....
	93-922	Tuning Shaft Spring Washer.....
	93-923	Fishpaper Washer (2 used).....
	97-305	Clutch Arm Stud.....
	117-149	Clutch Lever.....
	188-111	Retaining Ring (2 used).....

MODELS 8ML882,
8ML882Z, Lincoln

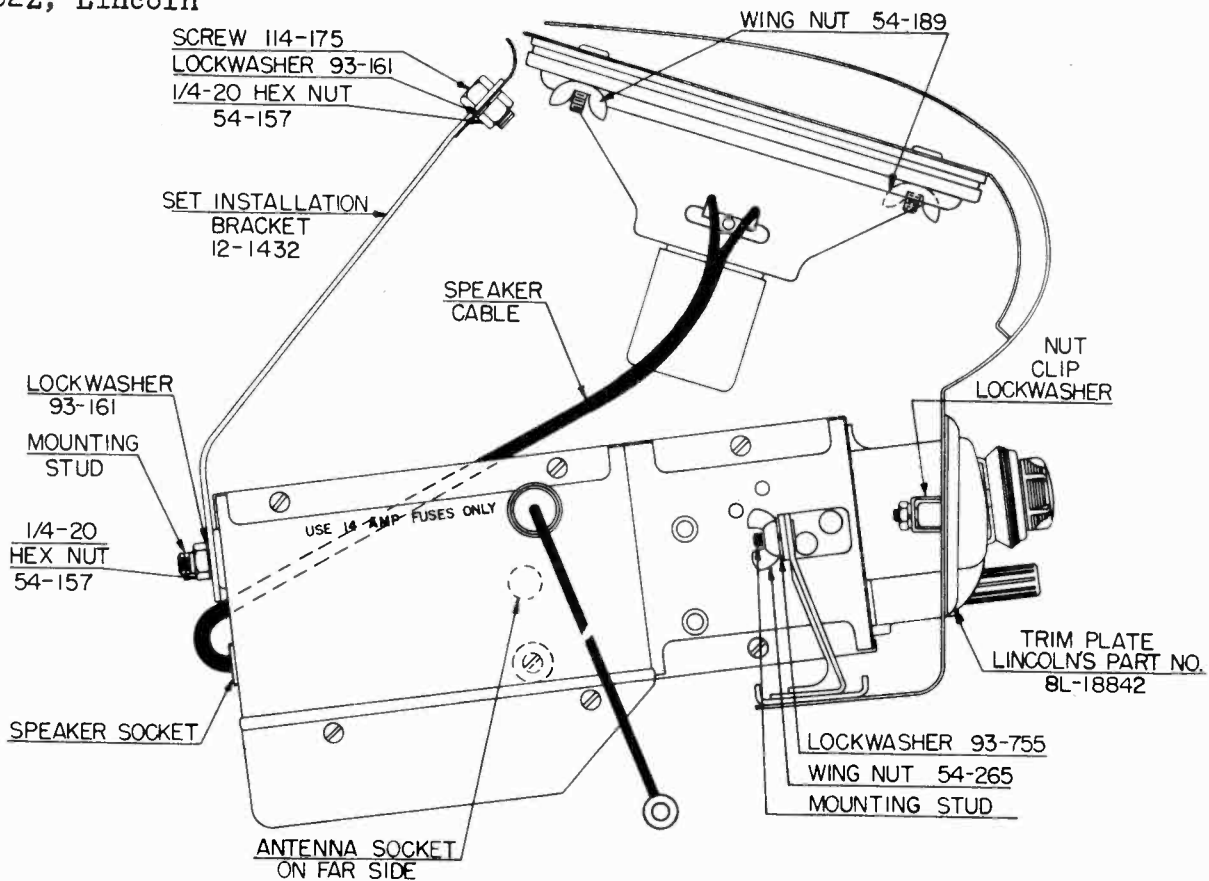


Fig. 2. Model 8ML882

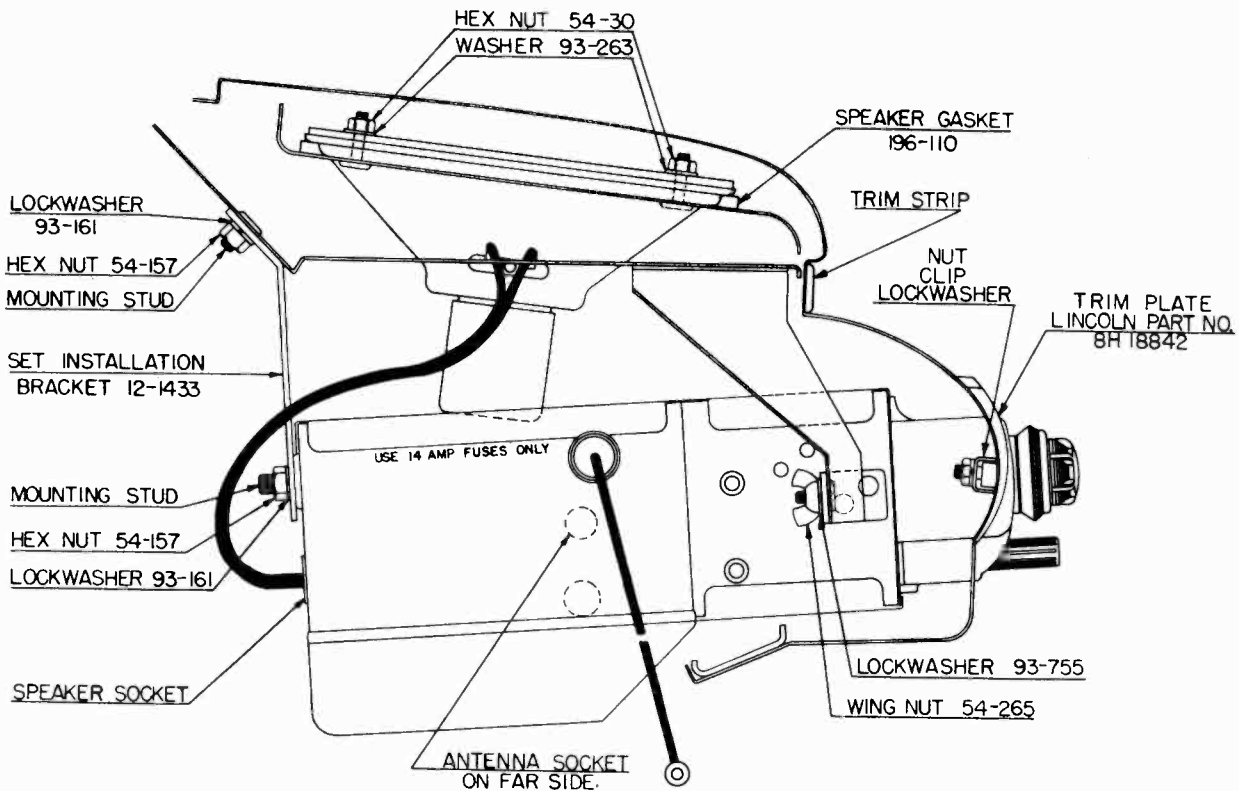


Fig. 2A. Model 8ML882Z

MODELS 8ML882,
8ML882Z, Lincoln**RECEIVER INSTALLATIONS**

Figures 1, 1A, 2 and 2A, illustrating the escutcheon plates, control knobs and the installed receivers, are given here to facilitate removal and reinstallation of the receivers when service or repair is necessary.

To take the receiver from the car:

1. Remove the plenum chamber of the heater (Model 8L Lincoln only), by removing the two sheet metal screws at each end of the chamber.
2. Disconnect the "A" lead at the set. Remove the speaker plug from the set and disconnect the antenna.
3. Loosen the top of the set installation bracket, and remove the bottom of the bracket from the set. (Figs. 2-2A.)
4. Remove the 8/32 wingnuts and lockwashers from the instrument panel support brackets. (Figs. 2-2A.)

To take the speaker from the Model 8H Lincoln, pry off the trim strip along the bottom edge of the speaker grille. Remove the three sheet metal screws from the lower edge of the speaker grille, and remove the grille. Remove the two 8/32 hex nuts and flat washers holding the speaker in place. (Fig. 2A.)

To take the speaker from the Model 8L Lincoln, remove the two stamped wingnuts from the stud bolts on the rear of the instrument panel. (Fig. 2.)

OPERATING INSTRUCTIONS

TO TURN RADIO ON:

The radio is connected to the accessory terminal of the ignition switch, therefore, it is necessary to turn the ignition key to the left, if the engine is not running, before turning the radio on. Press any one of the five automatic push buttons. (Figs. 1, 1-A.) Allow approximately 20 seconds for the receiver to reach operating temperature.

To turn the receiver off, press the "Off" push button. (Fig. 1.)

MANUAL TUNING:

To operate the manual tuning control simply turn the tuning knob. (Figs. 1, 1A.) When tuning in a station, be sure to tune to the exact frequency for the best tone quality.

VOLUME CONTROL:

Turn the volume control knob for the desired volume. (Figs. 1, 1A.)

TONE CONTROL:

The tone control knob is located directly behind the volume control knob. Turning this control to the right or left will change the tone of the receiver. The control has four positions. The position to which the control is set is indicated in the window in the center of the dial scale.

AUTOMATIC TUNING:

There are five automatic tuning push buttons located to the right of the "Off" push button. (Figs. 1, 1A.)

The five buttons may be adjusted in succession to any desired dial setting. To simplify the identification of the stations, it is advisable to set the buttons in sequence according to the frequencies of the stations, beginning with the station broadcasting at the lowest frequency and progressing to the station broadcasting at the highest frequency.

To adjust the automatic tuning push buttons:

1. Turn the receiver on and allow it to operate for at least

15 minutes in order for each part to reach normal operating temperature.

2. Tune in the station desired for number 1 position by turning the tuning knob. (Fig. 1.) Be sure to tune to the exact frequency to insure the best tone.
3. Loosen the number one push button, located nearest the "OFF" push button (Fig. 1.), by turning it counterclockwise with your fingers not more than two turns. If the push button is completely unscrewed, the plunger assembly, inside the receiver, may fall apart. Then it will be necessary to remove the radio from the car, open the case, and reassemble the plunger.
4. Press the button in as far as it will go.
5. Release the number 1 button and tighten it by turning it clockwise with your fingers.
6. Use the same procedure for adjusting positions 2, 3, 4, and 5. When the five automatic tuning push buttons have been adjusted to the five desired stations, any one of the five stations can be instantly tuned in by pressing the automatic push button that is adjusted to it.

INTERFERENCE SUPPRESSION

There should be no motor noise or interference from the ignition circuit if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

The hood bonding spring No. 80-579 should be installed on the cowl at the location shown in Fig. 3.

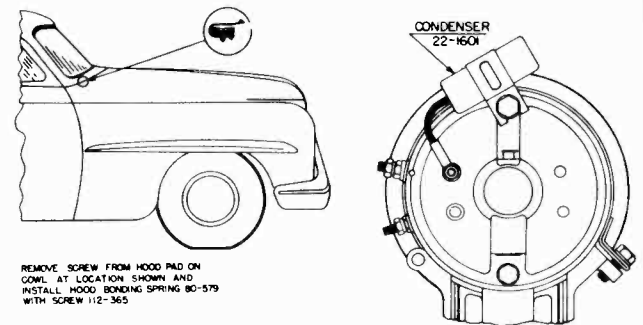


Fig. 3

Fig. 4

The generator condenser, No. 22-1601, should be mounted under the top assembly bolt on the rear end plate of the generator, and the lead connected to the ARMATURE terminal of the generator. (Fig. 4.)

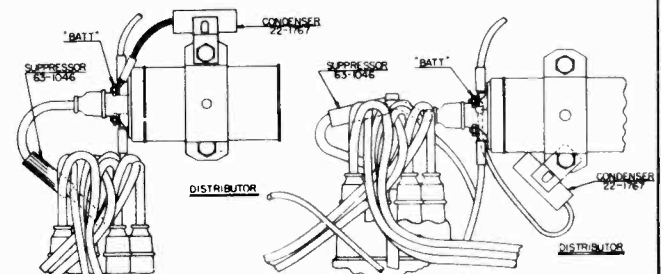


Fig. 5

Fig. 6

The suppressor, No. 63-1046, should be in the high tension wire, approximately 1½ inches from the distributor cap. (Figs. 5 and 6.) The ignition coil condenser, No. 22-1767, should be connected to the BAT. terminal of the ignition coil. (Figs. 5 and 6.)

MODELS 8ML882,
8ML882Z, Lincoln

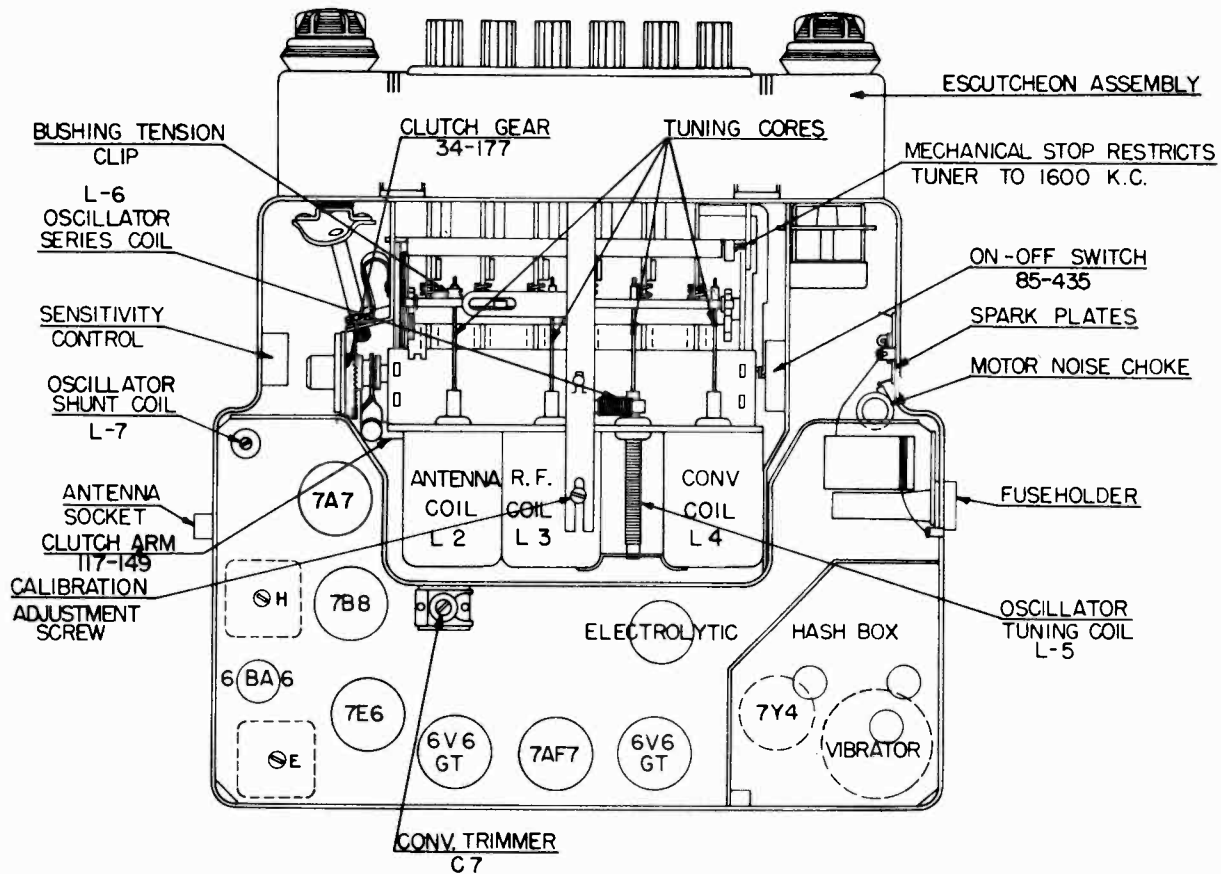


Fig. 7. Top View of Chassis

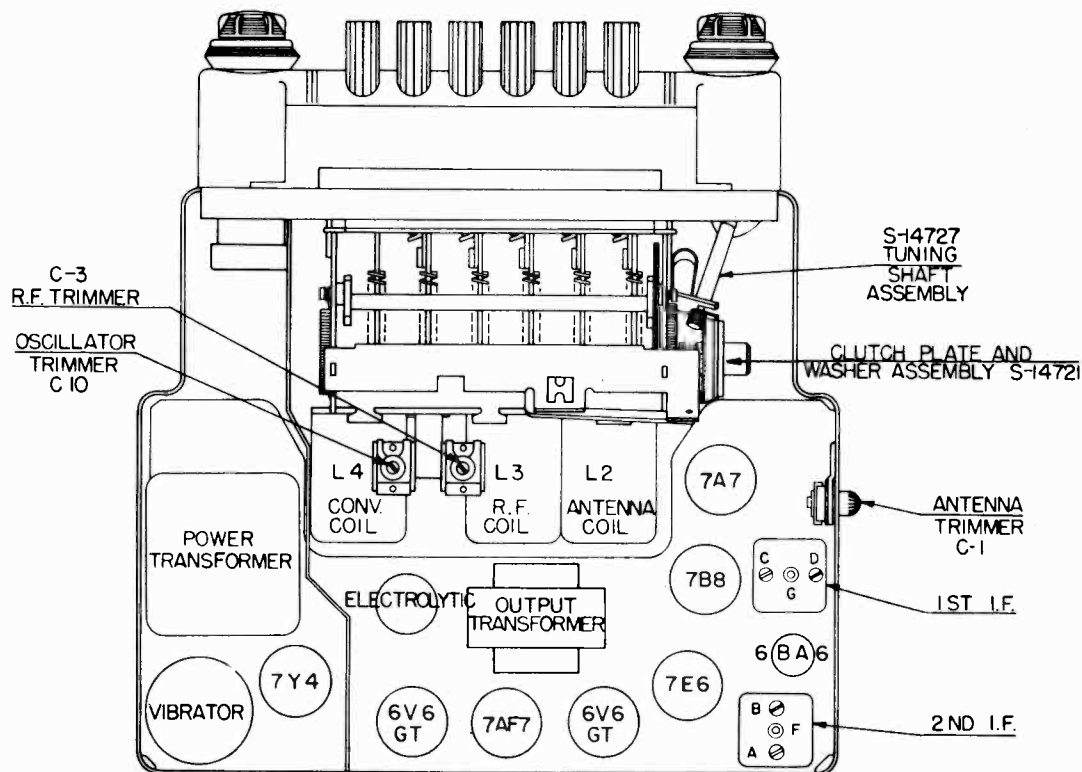


Fig. 8. Bottom View of Chassis

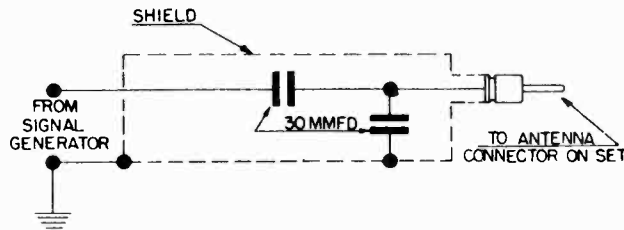


Fig. 9. Dummy Antenna

Figure 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustment to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove top and bottom covers from receiver.
2. Set signal generator to 265 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
4. Adjust I.F. trimmers A, B, C, and D in order named for maximum output. (Fig. 8.) Some units have I.F. transformers that are slug tuned. In this case adjust I.F. slugs E, F, G, and H in order named. Repeat the operation to assure accurate alignment. (Figs. 7 and 8.)

R.F. AND OSCILLATOR ALIGNMENT

1. Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver. This is important.
2. Set signal generator to 535 Kc.
3. Tune set to 535 Kc.
4. Adjust oscillator trimmer C-10 (Fig. 8), for maximum response.
5. Set signal generator to 1300 Kc.
6. Tune set to 1300 Kc.
7. Adjust converter trimmer C-7, R.F. trimmer C3 and antenna trimmer C-1 (Fig. 8) for maximum response (Figs. 7 and 8).
8. If dial calibration is off after making above adjustments, a correction can be made by tuning eccentric screw at fulcrum of dial pointer. (Fig. 7.)

TO ADJUST OR REPLACE THE ADJUSTING SPRING AND CORE

1. Remove the top and bottom covers from the receiver. Remove the escutcheon assembly.
2. With pliers remove the bushing tension clip from the cross arm insulating bushing.
3. With core alignment tool, part No. S-13064, screw the core in, or out, to the desired position.
4. After all adjustments or replacements are completed, be sure to replace the bushing tension clip.

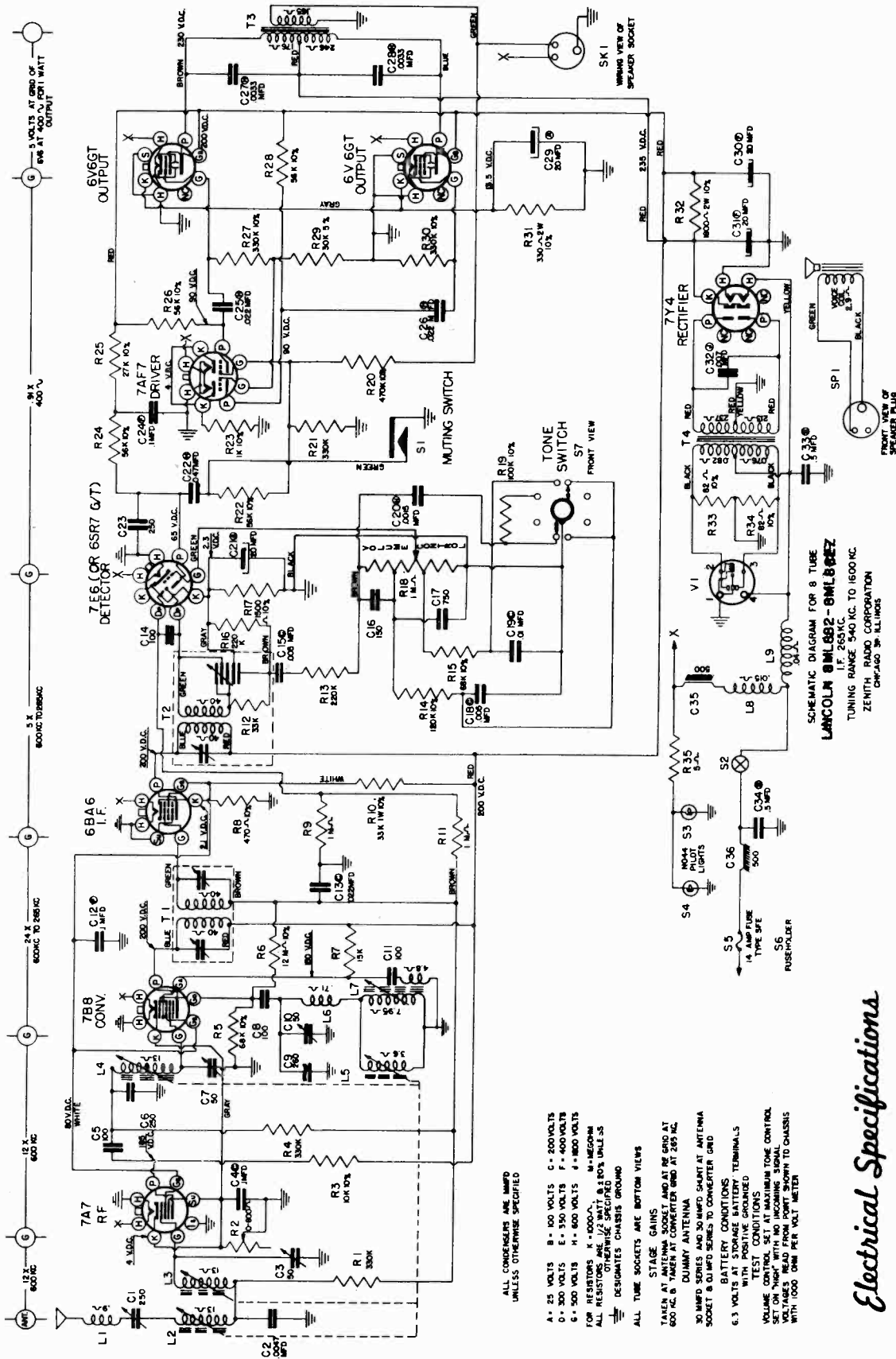
ALIGNMENT PROCEDURE AFTER CORE OR COIL REPLACEMENT

WARNING: The following adjustments are to be made only after a core or coil is replaced.

1. Set signal generator to 1675 Kc.
2. Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna receptacle on the receiver.
3. Set receiver dial to 1600 Kc. (Maximum high frequency end of dial.)
4. Screw the cores completely out of the antenna coil, the R.F. coil, the converter coil, and the oscillator coil.
5. Adjust the oscillator trimmer C-10 (Fig. 8) at 1675 Kc.
6. Adjust the converter trimmer C-7, R.F. trimmer C3, and antenna trimmer C-1 (Figs. 7 and 8) for maximum output reading.
7. Set signal generator dial and receiver dial to 1300 Kc.
8. Replace cores to their approximate original position (so that the cores project about $1\frac{1}{16}$ of an inch from the end of the coil form).
9. Adjust the oscillator core L-5 (Fig. 7) to scale at 1300 Kc.
10. Adjust the antenna core L-2, R.F. core L3, and converter core L-4 (Fig. 7) for maximum output reading.
11. Set signal generator to 600 Kc.
12. "Rock in" shunt oscillator coil L-7 (Fig. 7) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padding condenser on a gang condenser receiver.
13. Check receiver at 1300 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10, and 11.
14. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the lug stop near the volume control should be bent to limit the frequency coverage to 1605 Kc.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station at approximately 1300 Kc.

MODELS 8ML882,
8ML882Z, Lincoln



Electrical Specifications

TUNING RANGE: 540-1600 KC. SPEAKER: 6" x 9" oval, instrument panel mounting.

INTERMEDIATE FREQUENCY: 265 KC. CURRENT CONSUMPTION: 8 amperes

SENSITIVITY: 5 microvolts at one tube output. 7A7 R.F., 7B8 converter, 6BA6 I.F., 7E6 detector and 1st audio, 7A7 driver and phase-inverter, 2-6V6GT push pull power out-put, and 7Y4 rectifier.

UNDISTORTED POWER OUTPUT: 6 watts measured at the voice coil.

ALL CONDENSERS ARE MFD UNLESS OTHERWISE SPECIFIED

A = 25 VOLTS B = 100 VOLTS C = 200 VOLTS
 D = 300 VOLTS E = 350 VOLTS F = 400 VOLTS
 G = 500 VOLTS H = 600 VOLTS I = 800 VOLTS
 FOR RESISTORS X = 100% ± 1% RESISTANCE
 ALL RESISTORS ARE 1/2 WATT 5% UNLESS OTHERWISE SPECIFIED
 ⏏ DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEWS

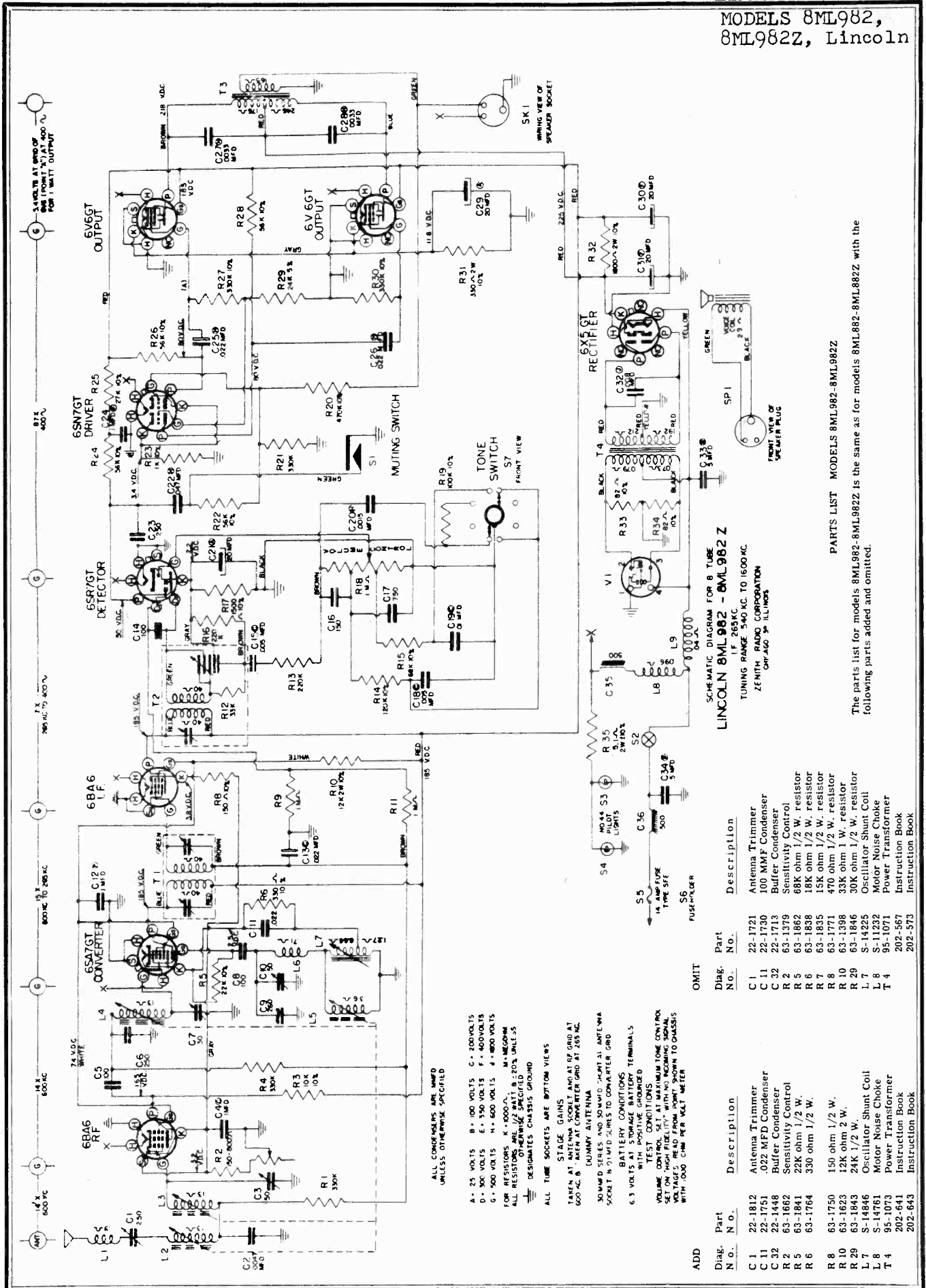
STAGE GAINS
 TAKEN AT ANTENNA SOCKET AND AT GRID NO. 2
 600 KC. B "TAKEN AT CONVERTER GRID AT 265 KC.
 DUMMY ANTENNA

30 MFD SERIES AND 30 MFD SHUNT AT ANTENNA
 SOCKET & 0.1 MFD SERIES TO CONVERTER GRID

BATTERY CONDITIONS
 6.3 VOLTS AT STORAGE BATTERY TERMINALS
 WITH POSITIVE GROUND

VOLUME CONTROL POSITION WITH TONE CONTROL
 SET ON "NIGHT" WITH NO INCOMING SIGNAL
 VOLTAGES READ FROM POINT SHOWN TO CHASSIS
 WITH 1000 OHM PER VOLT METER

MODELS 8ML982,
8ML982Z, Lincoln



SCHEMATIC DIAGRAM FOR 8 TUBE
LINCOLN 8ML982 - 8ML982Z
IF 265 KC.
TUNING RANGE 540 KC. TO 1600 KC.
ZENITH RADIO CORPORATION
CHICAGO 34, ILLINOIS

ADD	Part No.	Description	OMIT	Part No.	Description
C 1	22-1812	Antenna Trimmer	C 1	22-1721	Antenna Trimmer
C 11	022 MFD	Condenser	C 11	22-1730	100 MFD Condenser
C 32	22-1448	Buffer Condenser	C 32	22-1713	Buffer Condenser
R 2	63-1682	Sensitivity Control	R 2	63-1379	Sensitivity Control
R 3	63-1841	22K ohm 1/2 W.	R 3	63-1862	68K ohm 1/2 W. resistor
R 6	63-1764	530 ohm 1/2 W.	R 6	63-1858	18K ohm 1/2 W. resistor
R 8	63-1750	150 ohm 1/2 W.	R 7	63-1855	13K ohm 1/2 W. resistor
R 10	63-1623	12K ohm 2 W.	R 8	63-1855	470 ohm 1/2 W. resistor
R 29	63-1843	24K 1/2 W.	R 9	63-1771	33K ohm 1 W. resistor
L 7	S-14846	Oscillator Shunt Coil	R 10	63-1398	30K ohm 1/2 W. resistor
L 8	S-14761	Motor Noise Choke	R 29	S-14225	Oscillator Shunt Coil
T 4	95-1073	Power Transformer	L 7	S-11232	Motor Noise Choke
	202-641	Instruction Book	L 8	95-1071	Power Transformer
	202-643	Instruction Book	T 4	202-567	Instruction Book

PARTS LIST MODELS 8ML982-8ML982Z

The parts list for models 8ML982-8ML982Z is the same as for models 8ML882-8ML882Z with the following parts added and omitted.

ALL CONDENSERS ARE MFD UNLESS OTHERWISE SPECIFIED
A - 25 VOLTS B - 100 VOLTS C - 200 VOLTS
D - 500 VOLTS E - 500 VOLTS F - 400 VOLTS
G - 500 VOLTS H - 600 VOLTS J - 800 VOLTS
FOR RESISTORS: K - 1000Ω M - MEGOHM
ALL RESISTORS ARE 1/2 WATT 5% UNLESS OTHERWISE SPECIFIED
DESIGNATES CHASSIS GROUND
ALL TUBE SOCKETS ARE BOTTOM VIEWS
STAGE GAINS
TAKEN AT ANTENNA SOCKET AND AT GRID AT 600 KC. B - TAKEN AT CONVERTER GRID AT 265 KC.
DUMMY ANTENNA
30 MFD SERIES AND 50 MFD PARALLEL ANTENNA
SOCKET IN 21 MFD SERIES TO CONVERTER GRID
BATTERY CONDITIONS
6.3 VOLTS AT STORAGE BATTERY TERMINALS
WITH POSITIVE GROUND
TEST CONDITIONS
VOLUME CONTROL FULLY OPEN TONE CONTROL
SELECTOR FULLY OPEN WITH NO COMING SIGNAL
VOLTAGES READ FROM POINT SHOWN TO CHASSIS
WITH 1000 OHM PER VOLT METER

MODELS 8ML882,
8ML882Z, Lincoln

PARTS LIST MODEL 8ML882 (Chassis 8E82)

Diagram
No. Part No. Description

COILS AND CHOKES

L 9	20-213	Main Hash Choke
T 1	95-1077	1st I.F. Transformer
T 2	95-1078	2nd I.F. Transformer
L 1	S-8819	Antenna Motor Noise Choke Assembly
L 8	S-11232	Motor Noise Choke Coil Assembly
L 7	S-14225	Oscillator Shunt Coil Assembly
L 6	S-14226	Oscillator Series Coil Assembly
L 3	S-14227	R.F. Coil Assembly
L 2	S-14227	Antenna Coil Assembly
L 4	S-19227	Converter Coil Assembly
L 5	S-14228	Oscillator Coil Assembly
L 2	S-14295	Tuner Coil Unit Assembly
L 3		
L 4		
L 4		
L 5		

CONDENSERS

C12	22-170	.1 Mfd	400 V.
C23	22-182	250 Mmfd	500 V.
C 4	22-190	.1 Mfd	200 V.
C17	22-242	750 Mmfd	500 V.
C15	22-906	.005 Mfd	200 V.
C18			
C 6	22-1136	250 Mmfd	500 V.
C16	22-1137	150 Mmfd	500 V.
C34	22-1238	.5 Mfd	120 V.
C19	22-1466	.01 Mfd	200 V.
C29	22-1484	Electrolytic 20 Mfd. 25 V. x 20-20 Mfd.	400 V.
C30			
C31			
C21	22-1553	20 Mfd. Electrolytic	25 V.
C 9	22-1712	260 Mmfd. Compensating	
C32	22-1713	.007 Mfd	1600 V.
C 7	22-1715	Single Section Trimmer (Converter)	
C 1	22-1721	Single Section Trimmer (Antenna)	
C 3	22-1722	Two Section Trimmer (R.F. and Osc.)	
C10			
C33	22-1728	.5 Mfd	100 V.
C 5	22-1730	100 Mmfd. Ceramic (or 22-162)	500 V.
C11			
C14			
C20	22-1743	.0015 Mfd	600 V.
C27	22-1747	.0033 Mfd	600 V.
C28			
C24	22-1748	.1 Mfd	400 V.
C22	22-1749	.047 Mfd	600 V.
C25	22-1750	.022 Mfd	600 V.
C26			
C13	22-1751	.022 Mfd	200 V.
C 2	22-1752	.0047 Mfd. (or 22-1022)	600 V.

Diagram
No. Part No. Description

RESISTORS

R35	63-1375	5 Ohm (Wirewound)	2 W.
R 2	63-1379	Sensitivity Control	
R10	63-1398	33M Ohm	1 W.
R18	63-1590	Volume Control and Tone Switch	
S 7			
R32	63-1620	1800 Ohm	2 W.
R31	63-1622	330 Ohm	2 W.
R34	63-1740	82 Ohm	1/2 W.
R35			
R 8	63-1771	470 Ohm	1/2 W.
R23	63-1785	1000 Ohm	1/2 W.
R17	63-1792	1500 Ohm	1/2 W.
R 3	63-1827	10M Ohm	1/2 W.
R 7	63-1835	15M Ohm	1/2 W.
R25	63-1845	27M Ohm	1/2 W.
R29	63-1846	30M Ohm	1/2 W.
R12	63-1849	33M Ohm	1/2 W.
R22	63-1859	56M Ohm	1/2 W.
R24			
R26			
R28			
R 5	63-1862	68M Ohm	1/2 W.
R15			
R19	63-1869	100M Ohm	1/2 W.
R14	63-1873	120M Ohm	1/2 W.
R13	63-1884	220M Ohm	1/2 W.
R16			
R27	63-1890	330M Ohm	1/2 W.
R30			
R 1	63-1891	330M Ohm	1/2 W.
R 4			
R21	63-1897	470M Ohm	1/2 W.
R20			
R 9	63-1912	1 Megohm	1/2 W.
R11			
R 6	63-1960	15 Megohm	1/2 W.

MISCELLANEOUS

	12-1414	Set Mouffing Bracket (2 used)
	12-1432	Set Installation Bracket
	46-715	Antenna Trimmer Knob (used on 22-1721)
SP 1	49-627	P.M. Speaker (6" x 9" Oval)
S 6	52-451	Battery Cable—Fuse to Set—Fuse Holder
	52-455	Volume Control Cable
	52-470	Speaker Cable and Plug
	73-50	No. 6-32 x 1/4" Headless Slotted Set Screw—Cuppoint
	78-596	Socket—Loktal Tube
SK 1	78-728	Socket—Speaker
	78-782	Miniature Tube Socket
	78-796	Socket—Antenna Connector
	78-801	Socket—Octal Base Tube
	78-804	Socket—Vibrator
	93-888	Vibrator Cushion Washer

Diagram No.	Part No.	Description
T 4	95-1071	Power Transformer
T 3	95-1079	Output Transformer
	125-63	Rubber Grommet (used on S-14295)
	126-553	Miniature Tube Shield
	149-63	Iron Core and Spring (4 used)
V 1	190-22	Vibrator
	196-91	Speaker Gasket
	199-81	Tone Gear Sleeve
	202-567	Instruction Book (Owner's Manual)
	202-607	Interference Elimination Instruction Sheet
	S-14303	Speaker and Gasket Assembly (Use 49-627 and 196-91)

DIAL ASSEMBLY

	12-1435	Dial Scale Retaining Bracket (2 used)
	19-165	Insulating Bushing Tension Clip (4 used)
	26-392	Dial Scale
	46-708	Tone Control Knob
	46-714	"Off" Switch Knob
	56-228	Cross Arm Guide Rod
	57-1338	Escutcheon
	57-1356	Dial Background Plate
	59-208	Dial Pointer
	80-232	Knob Retaining Spring
	80-379	Pointer Retaining Spring
	80-586	Cross Arm Tension Spring (2 used)
	80-625	Pointer Link Tension Spring
S 3-S 4	Dial Light Bulb—Mazda No. 44	
	112-699	No. 4-40 x 3/16" R.H. Self Tapping Screw — Stan Top — Steel — Cad.
	114-294	No. 6-20 x 1/4" Hex Hd. Self Tapping Screw—Type No. 25 (Escutcheon Mtg.)
	126-566	Dial Light Shield
	S-14215	Pointer Support Bracket and Stud Assembly
	S-14216	Pointer Drive Link and Stud Assembly
	S-14281	Tuner Unit Assembly
	S-14300	Cross Arm and Bushing Assembly
	S-14304	Dial Light Socket and Wire Assembly
	S-14307	Tone Gear and Bushing Assembly
	S-14308	Tone Drum Shaft and Gear Assembly (26-392)

Diagram No.	Part No.	Description
	S-14320	Tuning Control and Trim Knob Assembly (46-705-707)
	S-14321	Volume Control Knob and Spring Assembly (46-706)
S 2	85-435	On-Off Switch (on tuner)
	S-14754	Automatic Knob and Screw Assembly
	S-14721	Clutch Plate and Washer
	S-14727	Tuning Shaft, Pinion Gear and Coupling Assembly
S 1	S-14733	Muting Switch Assembly
	17-102	Cam Lock (5 used)
	34-177	Clutch Gear
	64-162	.088 D x 3/32" Rivet (2 used on S-14733)
	73-118	No. 6-32 x 1/4" Hex Head Slotted Set Screw (2 used)
	80-640	Yoke Tension Spring (2 used)
	80-641	Clutch Release Bar Spring
	80-642	Clutch Spring
	93-921	Tuning Shaft Steel Washer
	93-922	Tuning Shaft Spring Washer
	93-923	Fishpaper Washer (2 used)
	97-305	Clutch Arm Stud
	117-149	Clutch Lever
	118-111	Retaining Ring (2 used)

INSTALLATION PARTS

	S-14317	Installation Kit Assembly (complete)
	52-458	Battery Cable (Fuse to Ammeter)
	54-157	1/4-20 x 7/16" x 3/16" Hex Nut
	54-189	No. 8-32 Wing Nut
	54-265	No. 8-32 Wing Nut (Forged)
	93-161	1/4" External Shakeproof Lockwasher
	93-755	No. 8 External Shakeproof Lockwasher
	114-175	1/4-20 x 1/2" Hex Hd. M. Screw
S 5	136-11	14 Amp. Fuse (Type SFE-14)

MOTOR NOISE SUPPRESSION KIT

S-14285	Motor Noise Suppression Kit Assembly (complete)
22-1601	Generator Capacitor
22-1767	Ignition Coil Capacitor
63-1046	Distributor Suppressor
80-579	Motor Hood Bond Spring
112-365	No. 8 x 1/2" B.H. Sheet Metal Screw

PARTS LIST MODEL 8ML882Z (Chassis 8E82)

The parts list for Model 8ML882Z is the same as for Model 8ML882 with the following parts omitted and added:

ADD

Part No.	Description
196-110	Speaker Gasket
202-573	Instruction Book
202-615	Interference Elimination Sheet
49-627	P.M. Speaker (6" x 9" oval)
S-14325	Installation Kit Assembly

OMIT

Part No.	Description
196-91	Speaker Gasket
202-567	Instruction Book
202-607	Interference Elimination Sheet
S-14303	Speaker and Gasket Assembly
S-14317	Installation Kit Assembly

MODEL 8MM890, Ch. 8E90,
Lincoln-Mercury

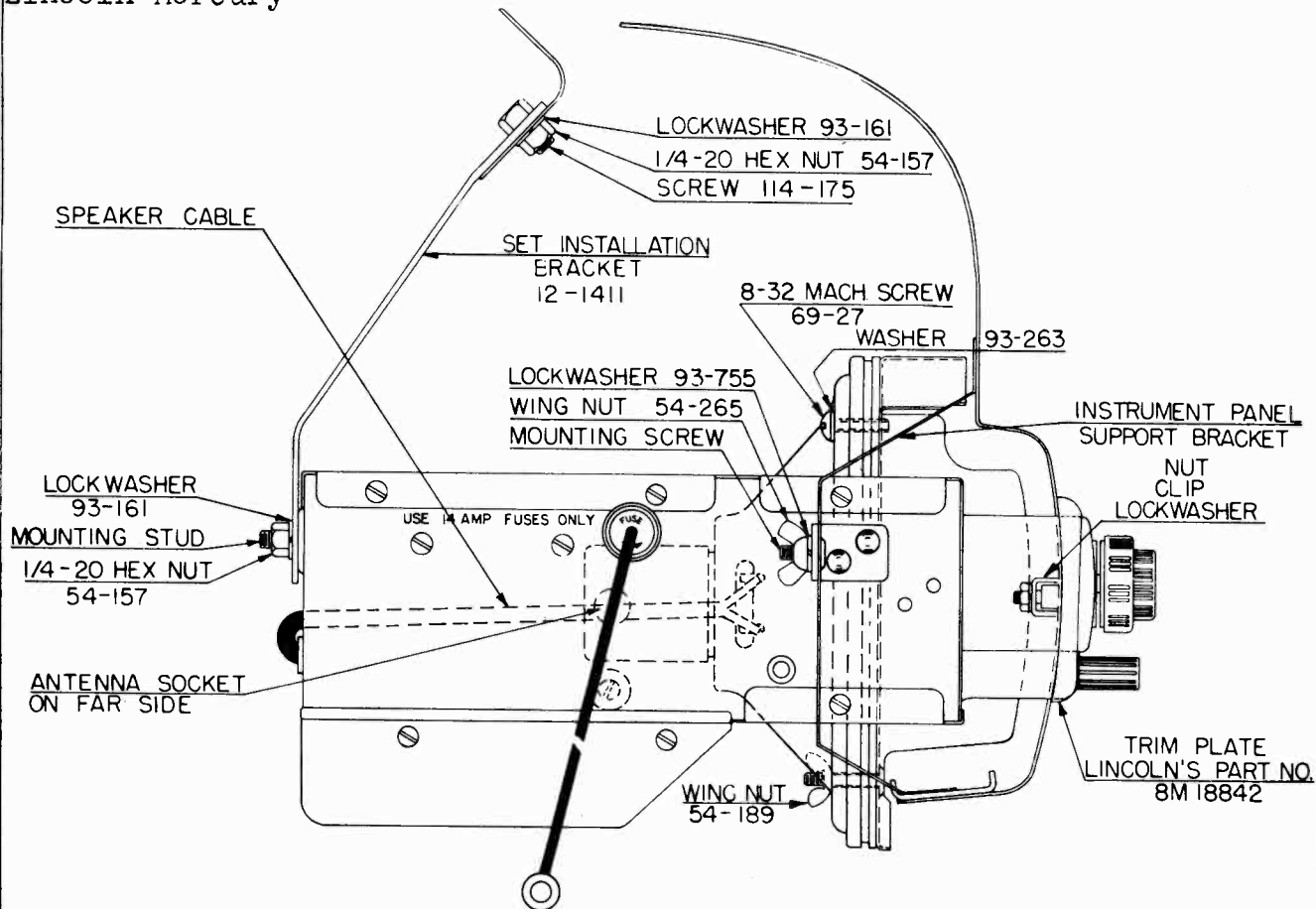


Fig. 1. Set Installed, Cut Away View

RECEIVER INSTALLATIONS

Figures 1 and 2, illustrating the escutcheon plate, control knobs and the installed receiver, are given here to facilitate removal and reinstallation of the receivers when service or repair is necessary.

1. Disconnect the "A" lead at the set. Remove the speaker plug from the set and disconnect the antenna.
2. Loosen the top of the set installation bracket, and remove the bottom of the bracket from the set. (Fig. 1.)
3. Remove the 8/32 wingnuts and lockwashers from the instrument panel support brackets. (Fig. 1.)

To take the speaker from the car, remove the stamped wingnut and the 8/32 machine screws from the rear of the instrument panel. (Fig. 1.)

OPERATING INSTRUCTIONS

TO TURN RADIO ON:

The radio is connected to the accessory terminal of the ignition switch, therefore, it is necessary to turn the ignition key to the left, if the engine is not running, before turning the radio on. Press any one of the five automatic push buttons. (Fig. 2.) Allow approximately 20 seconds for the receiver to reach operating temperature.

To turn the receiver off, press the "Off" push button (Fig. 2.)

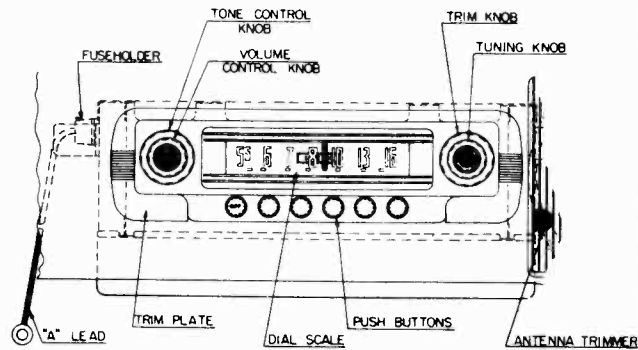


Fig. 2. Front Panel View

MANUAL TUNING:

To operate the manual tuning control simply turn the tuning knob. (Fig. 2.) When tuning in a station, be sure to tune to the exact frequency for the best tone quality.

VOLUME CONTROL:

Turn the volume control knob for the desired volume. (Fig. 2.)

TONE CONTROL:

The tone control knob is located directly behind the volume control knob. Turning this control to the right or left will change the tone of the receiver. The control has four positions. The position to which the control is set is indicated in the window in the center of the dial scale.

MODEL 8MM890, Ch. 8E90,
Lincoln-Mercury

AUTOMATIC TUNING:

There are five automatic tuning push buttons located to the right of the "Off" push button. (Fig. 2.)

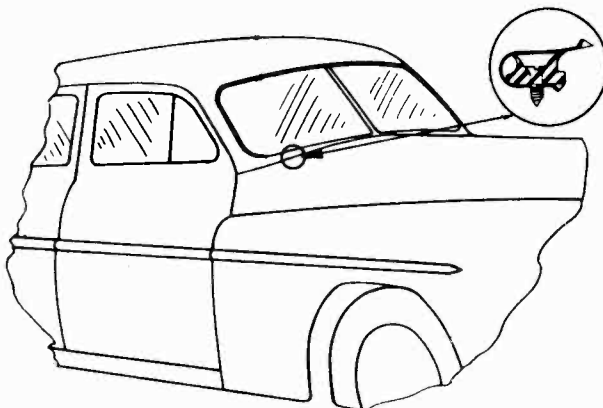
The five buttons may be adjusted in succession to any desired dial setting. To simplify the identification of the stations, it is advisable to set the buttons in sequence according to the frequencies of the stations, beginning with the station broadcasting at the lowest frequency and progressing to the station broadcasting at the highest frequency.

To adjust the automatic tuning push buttons:

1. Turn the receiver on and allow it to operate for at least 15 minutes in order for each part to reach normal operating temperature.
2. Tune in the station desired for number 1 position by turning the tuning knob. (Fig. 2.) Be sure to tune to the exact frequency to insure the best tone.
3. Loosen the number one push button, located nearest the "OFF" push button (Fig. 2) by turning it counterclockwise with your fingers not more than two turns. If the push button is completely unscrewed, the plunger assembly, inside the receiver, may fall apart. Then it will be necessary to remove the radio from the car, open the case, and reassemble the plunger.
4. Press the button in as far as it will go.
5. Release the number 1 button and tighten it by turning it clockwise with your fingers.
6. Use the same procedure for adjusting positions 2, 3, 4, and 5. When the five automatic tuning push buttons have been adjusted to the five desired stations, any one of the five stations can be instantly tuned in by pressing the automatic push button that is adjusted to it.

INTERFERENCE SUPPRESSION

There should be no motor noise or interference from the ignition circuit if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:



REMOVE SCREW FROM HOOD PAD
ON COWL AT LOCATION SHOWN
AND INSTALL HOOD BONDING SPRING
80-579 WITH SCREW 112-365

Fig. 3

The hood bonding spring No. 80-579 should be installed on the cowl at the location shown in Fig. 3.

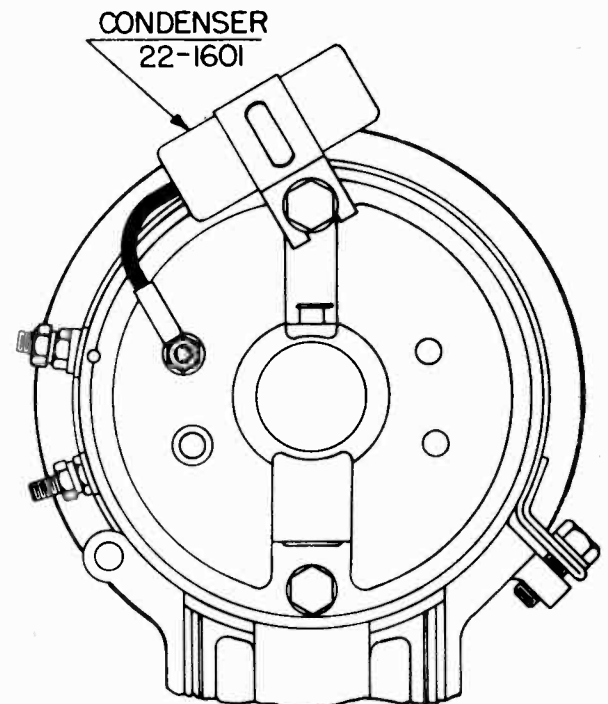


Fig. 4

The generator condenser, No. 22-1601, should be mounted under the top assembly bolt on the rear end plate of the generator, and the lead connected to the ARMATURE terminal of the generator. (Fig. 4.)

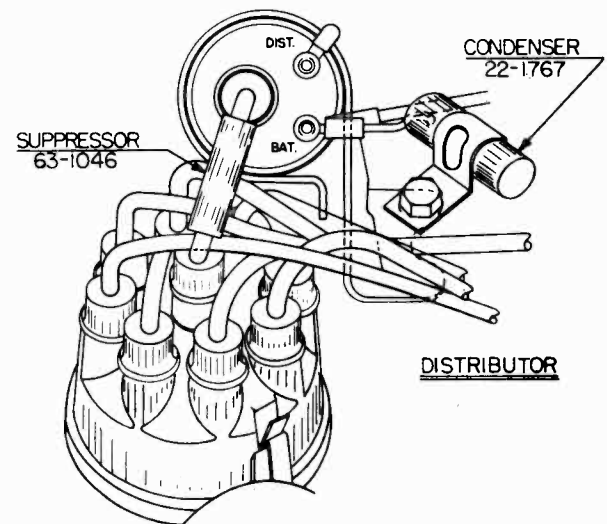


Fig. 5

The suppressor, No. 63-1046, should be in the high tension wire, approximately 1½ inches from the distributor cap (Fig. 5). The ignition coil condenser, No. 22-1767, should be connected to the BAT. terminal of the ignition coil. (Fig. 5.)

MODEL 8MM890, Ch. 8E90,
Lincoln-Mercury

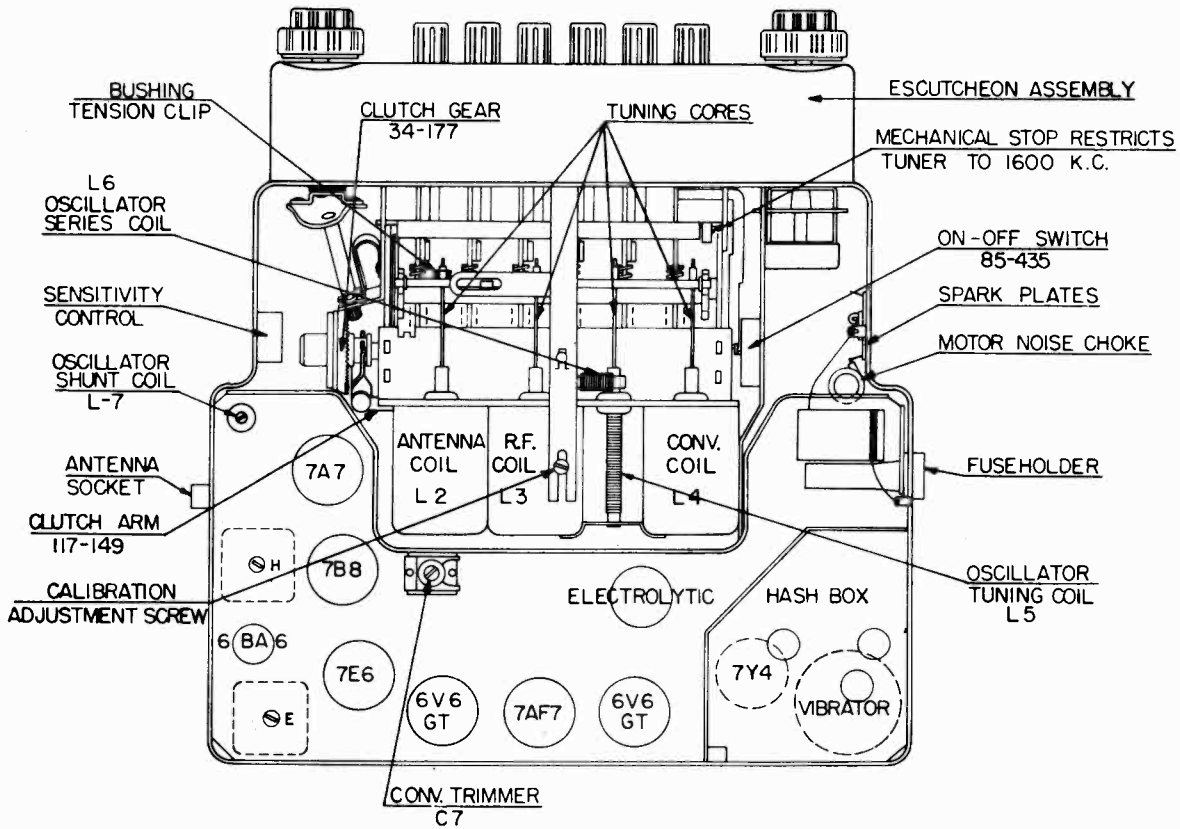


Fig. 6. Top View of Chassis

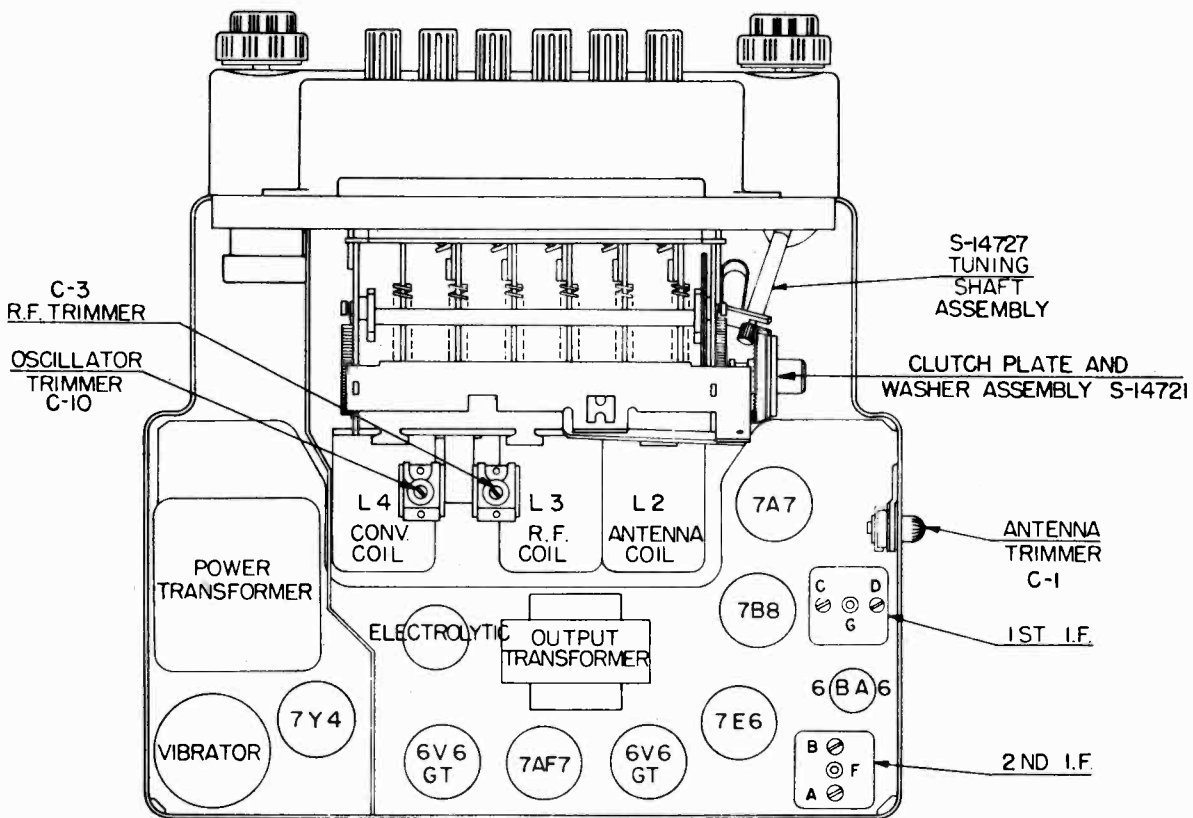


Fig. 7. Bottom View of Chassis

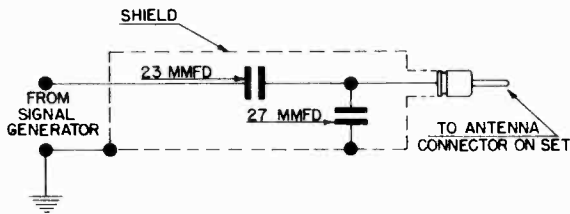


Fig. 8 Dummy Antenna

Figure 8 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustment to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove top and bottom covers from receiver.
2. Set signal generator to 265 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
4. Adjust I.F. trimmers A, B, C, and D in order named for maximum output (Fig. 7). Some units have I.F. transformers that are slug tuned. In this case adjust I.F. slugs E, F, G, and H in order named for maximum output. Repeat the adjustments to assure accurate alignment. (Figs. 6 and 7.)

R.F. AND OSCILLATOR ALIGNMENT

1. Connect signal generator leads through dummy, illustrated in Fig. 8, to antenna lead in socket on receiver. This is important.
2. Set signal generator to 535 Kc.
3. Tune set to 535 Kc.
4. Adjust oscillator trimmer C-10 (Fig. 7), for maximum response.
5. Set signal generator to 1300 Kc.
6. Tune set to 1300 Kc.
7. Adjust converter trimmer C-7, R.F. trimmer C3 (Figs. 6 and 7) and antenna trimmer C-1 (Fig. 7) for maximum response.
8. If dial calibration is off after making above adjustments, a correction can be made by tuning eccentric screw at fulcrum of dial pointer. (Fig. 6.)

TO ADJUST OR REPLACE THE ADJUSTING SPRING AND CORE

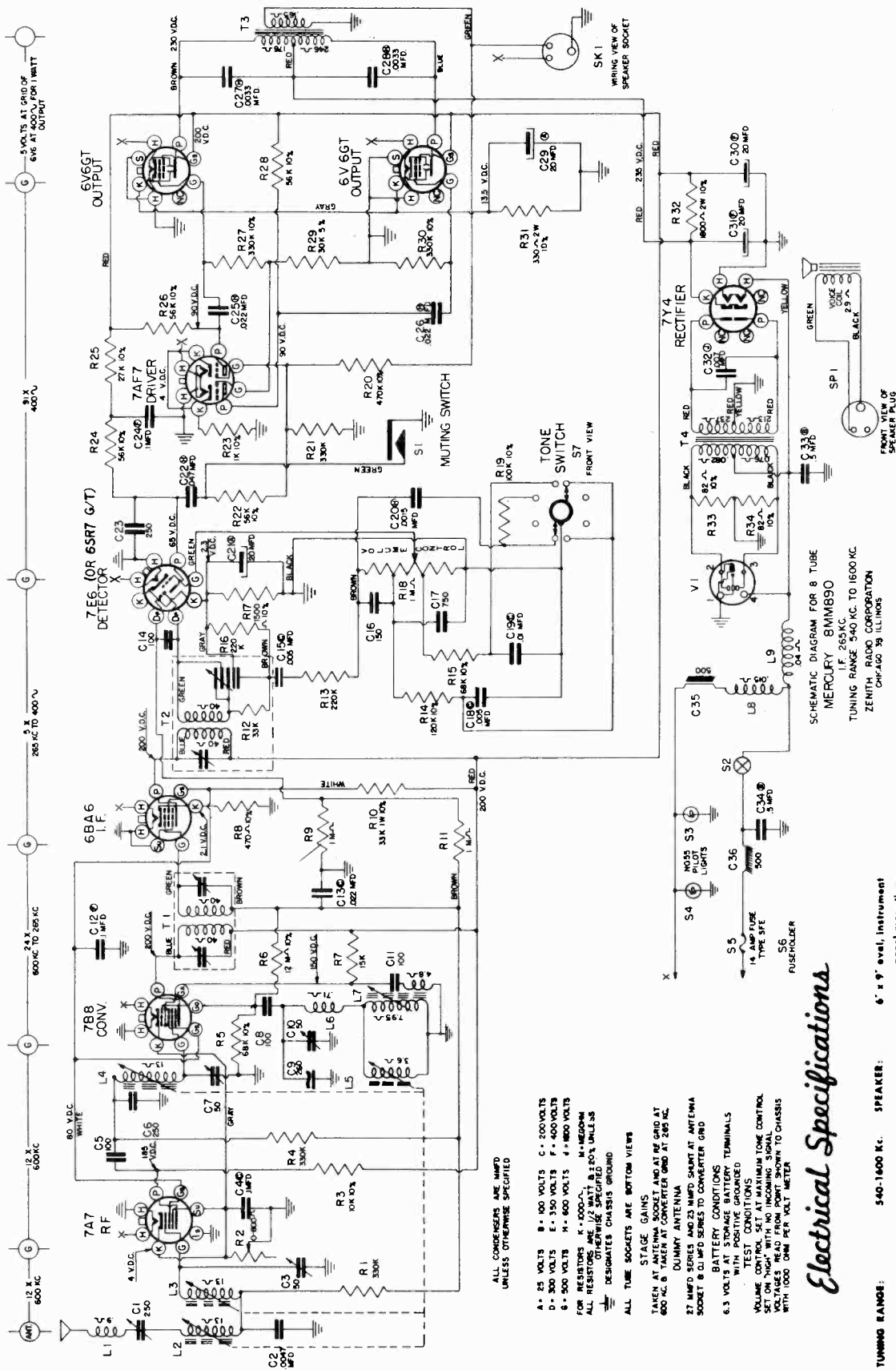
1. Remove the top and bottom covers from the receiver. Remove the escutcheon assembly.
2. Remove, with pliers, the bushing tension clip from the cross arm insulating bushing.
3. With core alignment tool, part No. S 13064, screw the core in, or out, to the desired position.
4. After all adjustments or replacements are completed, be sure to replace the bushing tension clip.

ALIGNMENT PROCEDURE AFTER CORE OR COIL REPLACEMENT

WARNING: The following adjustments are to be made only after a core or coil is replaced.

1. Set signal generator to 1675 Kc.
2. Connect signal generator leads through dummy, illustrated in Fig. 8, to antenna receptacle on the receiver.
3. Set receiver dial to 1600 Kc. (Maximum high frequency end of dial.)
4. Screw the cores completely out of the antenna coil, R.F. coil, the converter coil, and the oscillator coil.
5. Adjust oscillator trimmer C-10 (Fig. 7) at 1675 Kc.
6. Adjust converter trimmer C-7, R.F. trimmer C3, and antenna trimmer C-1 (Figs. 6 and 7) for maximum output reading.
7. Set signal generator dial and receiver dial to 1300 Kc.
8. Replace cores to their approximate original position (so that the cores project about $1\frac{1}{8}$ of an inch from the end of the coil form).
9. Adjust oscillator core L-5 (Fig. 6) to scale at 1300 Kc.
10. Adjust the antenna core L-2, R.F. core L3, and converter core L-4 (Fig. 6) for maximum output reading.
11. Set signal generator to 600 Kc.
12. "Rock in" shunt oscillator coil L-7 (Fig. 6) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padder condenser on a gang condenser receiver.
13. Check receiver at 1300 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10, and 11.
14. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the lug stop near the volume control should be bent to limit the frequency coverage to 1605 Kc.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station at approximately 1300 Kc.



SCHEMATIC DIAGRAM FOR 8 TUBE
MERCURY 8MM890
TUNING RANGE 540 KC. TO 1600 KC.
ZENITH RADIO CORPORATION
CHICAGO 99 ILLINOIS

Electrical Specifications

- TUNING RANGE: 540-1600 KC. SPEAKER: 6" x 9" oval, instrument panel mounting.
- INTERMEDIATE FREQUENCY: 265 KC. CURRENT CONSUMPTION: 8 amperes
- SENSITIVITY: 5 microvolts at one watt output. TUBE COMPLEMENT: 7A7 R.F., 7B8 converter, 6BA6 I.F., 7E6 detector and 1st audio, 7A7 driver and photo-inverter, 2-4V6GT push pull power out. put, and 7Y4 rectifier.
- UNDISTORTED POWER OUTPUT: 6 watts measured at the voice coil.

ALL CONDENSERS ARE MFD UNLESS OTHERWISE SPECIFIED

A - 25 VOLTS B - 100 VOLTS C - 200 VOLTS
D - 350 VOLTS E - 500 VOLTS F - 400 VOLTS
G - 500 VOLTS H - 600 VOLTS I - 800 VOLTS
FOR RESISTORS K - 1000-Ω, M - 100,000-Ω
ALL RESISTORS ARE 1/2 WATT UNLESS
OTHERWISE SPECIFIED

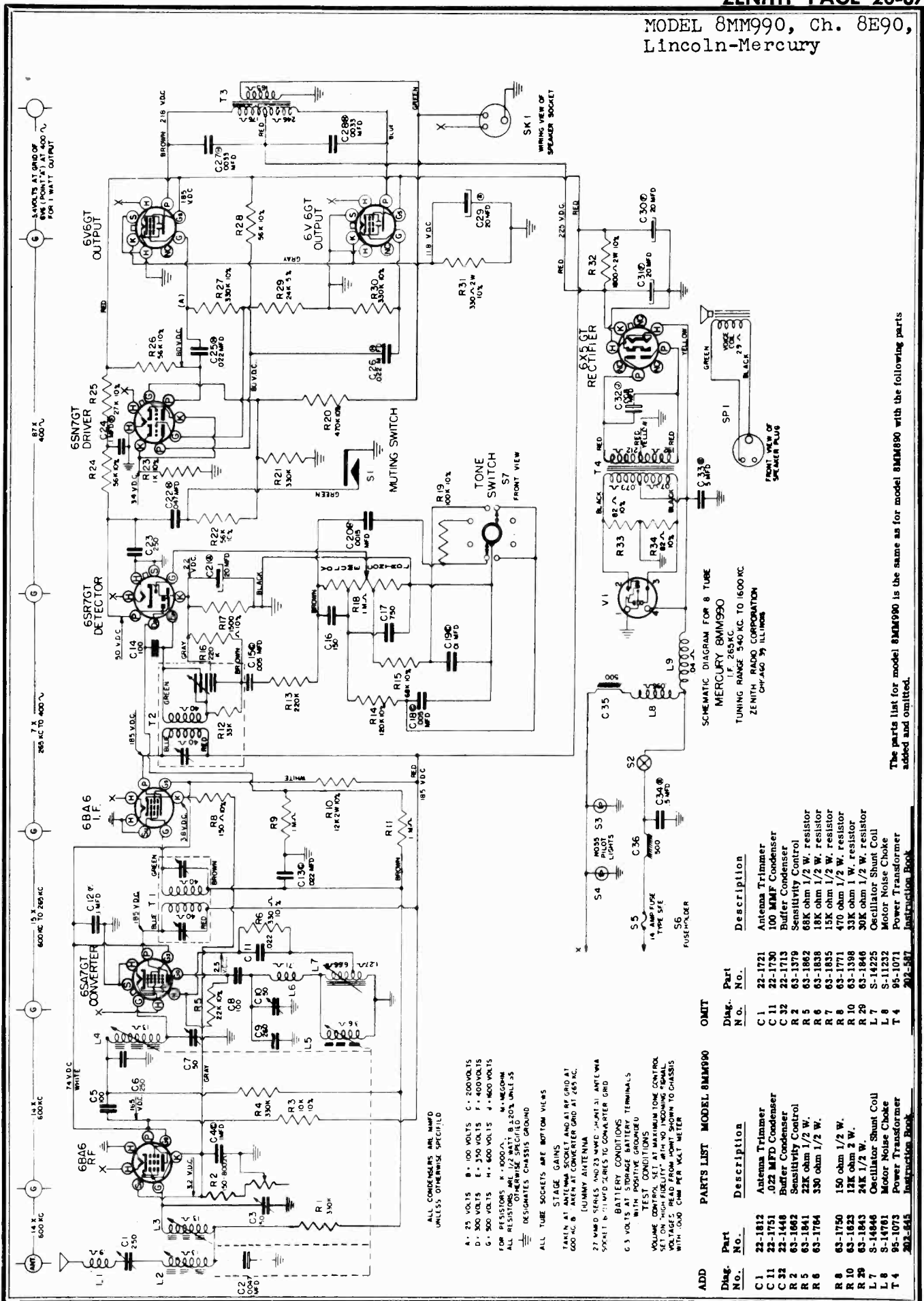
ALL TUBE SOCKETS ARE BOTTOM VIEWS

STAGE GAINS
TAKEN AT ANTENNA SOCKET AND AT RE GRID AT
600 KC. 6 TUNING ANTENNA SOCKET AT 265 KC.
7Y4 RECTIFIER ANTENNA SOCKET AT ANTENNA
SOCKET B DUMPS SIGNALS TO CONVERTER GRID

6.3 VOLTS AT STORAGE BATTERIES TERMINALS
WITH POSITIVE GROUND

TEST CONDITIONS
VOLUME CONTROL SET AT MAXIMUM TONE CONTROL
POSITION. TONE CONTROL SET AT MAXIMUM
POSITION. VOLTAGES READ FROM POINT-TO-POINT
WITH 1000 ΩMM PER VOLT METER

MODEL 8MM990, Ch. 8E90,
Lincoln-Mercury



ALL CONDENSERS ARE MFD UNLESS OTHERWISE SPECIFIED

A = 25 VOLTS B = 100 VOLTS C = 200 VOLTS
 D = 300 VOLTS E = 350 VOLTS F = 400 VOLTS
 G = 500 VOLTS H = 600 VOLTS J = 600 VOLTS
 FOR RESISTORS K = 1000 Ω M = 10000 Ω
 ALL RESISTORS ARE 1/2 WATT B ± 20% UNLESS OTHERWISE SPECIFIED
 ⚡ DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEW

STAGE GAINS:
 TAKEN AT ANTENNA SOCKET AND A1 BY GRID AT 600 AC
 TAKEN AT CONVERTER GRID AT 265 AC

DUMMY ANTENNA
 27 MHD SERIES AND 23 MHD SHUNT AT ANTENNA SOCKET IN 11 MHD SERIES TO CONVERTER GRID

BATTERY CONDITIONS
 WITH POSITIVE BATTERY TERMINALS
 WITH NEGATIVE BATTERY TERMINALS

VOLUME CONTROL CONDITIONS
 WITH TONE CONTROL SET ON "HIGH FIDELITY" WITH NO INCOMING SIGNAL
 VOLTAGE READ FROM HOWIT SHOWS TO CHASSIS WITH 100 OHM PER VOLT METER

ADD	Diag. No.	Part No.	Description
	C 1	22-1812	Antenna Trimmer
	C 11	22-1751	.022 MFD Condenser
	C 32	22-1448	Buffer Condenser
	R 2	63-1662	Sensitivity Control
	R 5	63-1841	22K ohm 1/2 W.
	R 6	63-1764	33K ohm 1/2 W.
	R 8	63-1750	150 ohm 1/2 W.
	R 10	63-1625	12K ohm 2 W.
	R 20	63-1843	24K 1/2 W.
	L 7	S-14846	Oscillator Shunt Coil
	L 8	S-14761	Motor Noise Choke
	T 4	95-1073	Power Transformer
		202-545	Instruction Book

OMIT	Diag. No.	Part No.	Description
	C 1	22-1721	Antenna Trimmer
	C 11	22-1750	100 MFD Condenser
	C 32	22-1713	Buffer Condenser
	R 2	63-1379	Sensitivity Control
	R 5	63-1862	68K ohm 1/2 W. resistor
	R 6	63-1838	18K ohm 1/2 W. resistor
	R 7	63-1835	15K ohm 1/2 W. resistor
	R 8	63-1771	470 ohm 1/2 W. resistor
	R 10	63-1398	33K ohm 1 W. resistor
	R 20	63-1846	30K ohm 1/2 W. resistor
	L 7	S-14225	Oscillator Shunt Coil
	L 8	S-11232	Motor Noise Choke
	T 4	95-1071	Power Transformer
		202-587	Instruction Book

SCHMATIC DIAGRAM FOR 8 TUBE MERCURY 8MM990
 TUNING RANGE 540 AC TO 1600 MC
 ZENITH RADIO CORPORATION
 CHICAGO 79 ILLINOIS

The parts list for model 8MM990 is the same as for model 8MM890 with the following parts added and omitted.

AGE 20-88 ZENITH

MODEL 8MM890, Ch. 8E90,
Lincoln-Mercury

PARTS LIST

Diagram No.	Part No.	Description
COILS AND CHOKES		
L 9	20-213	Main Hash Choke
T 1	95-1077	1st I.F. Transformer
T 2	95-1078	2nd I.F. Transformer
L 1	S-8819	Antenna Motor Noise Choke Assembly
L 8	S-11232	Motor Noise Choke Assembly
L 7	S-14225	Oscillator Shunt Coil Assembly
L 6	S-14226	Oscillator Series Coil Assembly
L 3	S-14227	RF Coil Assembly
L 2	S-14227	Antenna Coil Assembly
L 4	S-14227	Converter Coil Assembly
L 5	S-14228	Oscillator Coil Assembly
L 2 } L 3 } L 4 } L 5 }	S-14295	Tuner Coil Unit Assembly

Diagram No.	Part No.	Description	Value
CONDENSERS			
C12	22-170	.1 Mfd.	400 V.
C23	22-182	250 Mmfd.	400 V.
C 4	22-190	.1 Mfd.	200 V.
C17	22-242	750 Mmfd.	500 V.
C15 } C18 }	22-906	.005 Mfd.	200 V.
C 6	22-1136	250 Mmfd.	500 V.
C16	22-1137	150 Mmfd.	500 V.
C34	22-1238	.5 Mfd.	120 V.
C19	22-1466	.01 Mfd.	200 V.
C29 } C30 } C31 }	22-1484	Electrolytic 20 Mfd.—25 V. x20-20 Mfd.	400 V.
C21	22-1553	20 Mfd. Electrolytic	25 V.
C 9	22-1712	260 Mmfd. Compensating	
C32	22-1713	.007 Mfd.	1600 V.
C 7	22-1715	Single Section Trimmer (Converter)	
C 1	22-1721	Single Section Trimmer (Antenna)	
C 3 } C10 }	22-1722	Two Section Trimmer (R.F. and Osc.)	
C33	22-1728	.5 Mfd.	100 V.
C 5 } C11 } C14 }	22-1730	100 Mmfd. Ceramic (or 22-162)	500 V.
C20	22-1743	.0015 Mfd.	600 V.
C27 } C28 }	22-1747	.0033 Mfd.	600 V.
C24	22-1748	.1 Mfd.	400 V.
C22	22-1749	.047 Mfd.	600 V.
C25 } C26 }	22-1750	.022 Mfd.	600 V.
C13	22-1751	.022 Mfd.	200 V.
C 2	22-1752	.0047 Mfd. (or 22-1022)	600 V.

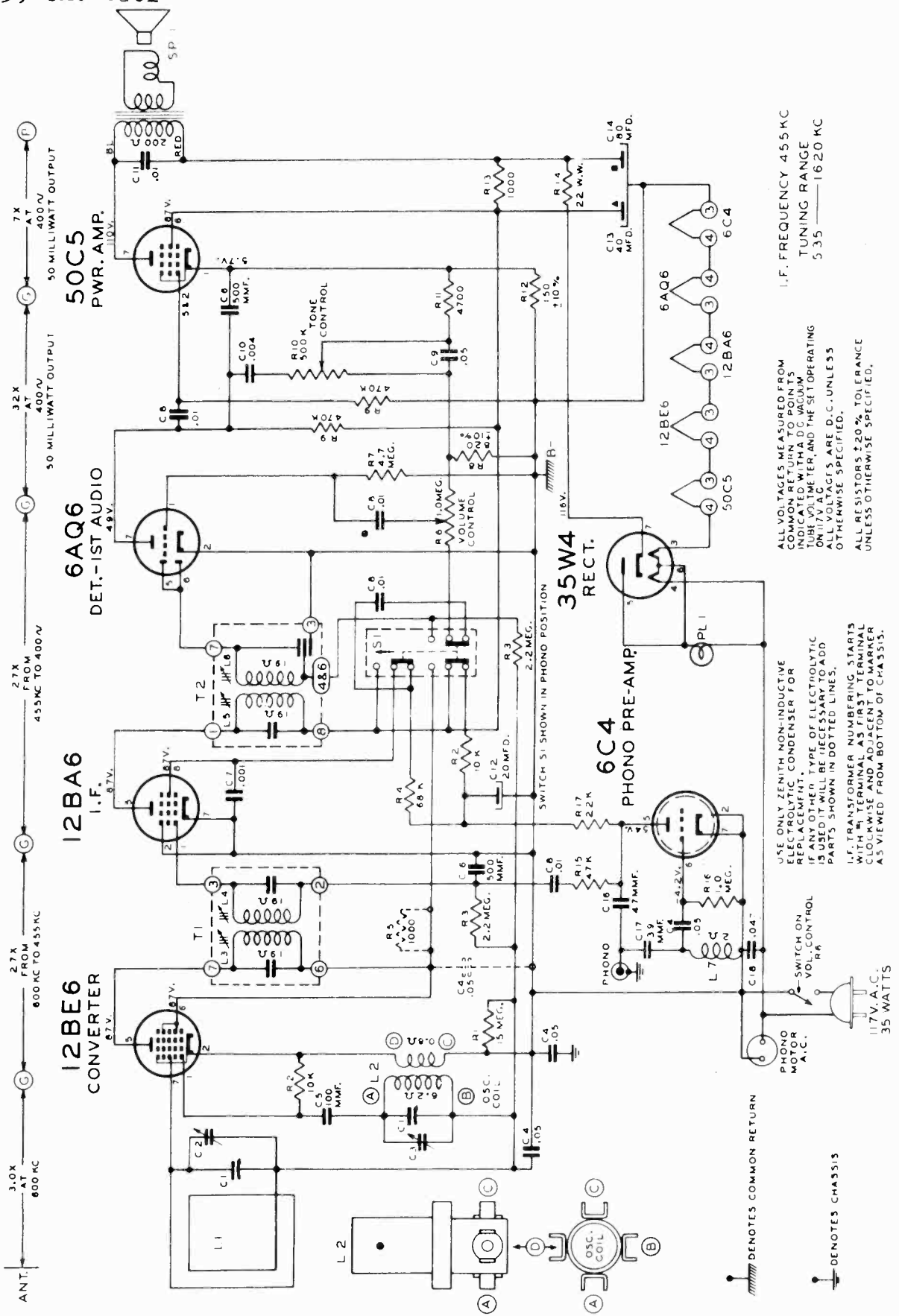
Diagram No.	Part No.	Description
RESISTORS		
R 2	63-1379	Sensitivity Control
R10	63-1398	33M Ohm (Insulated) 1 W.
R18	63-1590	Volume Control and Tone Switch
R32	63-1620	1800 Ohm (Insulated) 2 W.
R31	63-1622	330 Ohm (Insulated) 2 W.
R33 } R34 }	63-1740	82 Ohm (Insulated) 1/2 W.
R 8	63-1771	470 Ohm (Insulated) 1/2 W.
R23	63-1785	1000 Ohm (Insulated) 1/2 W.
R17	63-1792	1500 Ohm (Insulated) 1/2 W.
R 3	63-1827	10M Ohm (Insulated) 1/2 W.
R 7	63-1835	15M Ohm (Insulated) 1/2 W.
R25	63-1845	27M Ohm (Insulated) 1/2 W.
R29	63-1846	30M Ohm (Insulated) 1/2 W.
R12	63-1849	33M Ohm (Insulated) 1/2 W.
R22 } R24 } R26 } R28 }	63-1859	56M Ohm (Insulated) 1/2 W.
R 5 } R17 }	63-1862	68M Ohm (Insulated) 1/2 W.
R19	63-1869	100M Ohm (Insulated) 1/2 W.
R14	63-1873	120M Ohm (Insulated) 1/2 W.
R13 } R16 }	63-1884	220M Ohm (Insulated) 1/2 W.
R27 } R30 }	63-1890	330M Ohm (Insulated) 1/2 W.
R 1 } R 4 }	63-1891	330M Ohm (Insulated) 1/2 W.
R21 } R20 }	63-1897	470M Ohm (Insulated) 1/2 W.
R 9 } R11 }	63-1912	1 Megohm (Insulated) 1/2 W.
	63-1957	12 Megohm (Insulated) 1/2 W.

Diagram No.	Part No.	Description
MISCELLANEOUS		
	12-1414	Set Mounting Bracket (2 used)
	46-715	Antenna Trimmer Knob (used on 22-1721)
SP 1	49-627	P.M. Speaker (6" x 9" Oval) (See S-14303)
S 6	52-451	Battery Cable—Fuse to Set—Fuse-holder
	52-455	Volume Control Cable
	52-470	Speaker Cable and Plug
	73-50	No. 6-32 x 1/4" Headless Slotted Set Screw—Cuppoint
	78-596	Socket—Loktal Tube
SK 1	78-728	Socket—Speaker
	78-782	Socket—Miniature Tube
	78-796	Socket—Antenna Connector
	78-801	Socket—Octal Base Tube

MODEL 8MM890, Ch. 8L90,
Lincoln-Mercury

Diagram No.	Part No.	Description	Diagram No.	Part No.	Description
	78-804	Socket—Vibrator		26-395	Dial Scale
	93-888	Vibrator Cushion Washer		46-701	Tone Control Knob
T 4	95-1071	Power Transformer		46-714	"Off" Switch Knob
T 3	95-1079	Output Transformer		56-228	Cross Arm Guide Rod
	125-63	Rubber Grommet (used on S-14295)		57-1339	Escutcheon
	126-553	Miniature Tube Shield		57-1344	Dial Background Plate
	149-62	Iron Core and Screw		59-208	Dial Pointer
	149-63	Iron Core and Spring (4 used)		80-232	Knob Retaining Spring
V 1	190-22	Vibrator		80-379	Pointer Retaining Spring
	196-91	Speaker Gasket		80-586	Cross Arm Tension Spring (2 used)
	199-81	Tone Gear Sleeve		80-625	Pointer Link Tension Spring
	202-587	Instruction Book (Owner's Manual)	S 3)	100-31	Dial Light Bulb—Mazda No. 55
	202-608	Interference Elimination Instruction Sheet	S 4)	112-699	No. 4-40 x 3/16" R.H. Self Tapping Screw—Stan Top—Steel—Cad
	S-14303	Speaker and Gasket Assembly (use 49-627 and 196-91)		114-294	No. 6-20 x 1/4" Hex Hd. Self Tapping Screw Type No. 25 (Escutcheon Mtg.)
INSTALLATION PARTS					
	S-14284	Installation Kit Assembly (complete)		S-14215	Pointer Support Bracket and Stud Assembly
	12-1411	Set Installation Bracket		S-14216	Pointer Drive Link and Stud Assembly
	52-456	Battery Cable—Fuse to Ammeter		S-14281	Tuner Unit Assembly
	54-157	No. 1/4-20 x 7/16" x 3/16" Hex Nut—Steel, Cad. Pl.		S-14300	Cross Arm and Bushing Assembly
	54-189	No. 8-32 Wing Nut		S-14301	Tuning Control and Trim Knob Assembly
	54-265	No. 8-32 Wing Nut (Forged)		S-14302	Volume Control Knob and Spring Assembly
	69-27	No. 8-23 x 5/8" R.H.M.S.—Steel, N.P.		S-14304	Dial Light Socket and Wire Assembly
	93-161	1/4 Ext. Shakeproof Lockwasher No. 1114		S-14307	Tone Gear and Bushing Assembly
	93-263	1/32 x .136 x 3/8" Steel Washer—Cad. Pl.		S-14308	Tone Drum Shaft and Gear Assembly (26-390)
	93-755	No. 8 External Shakeproof Lockwasher	S 1	S-14534	Tuner Unit Final Assembly
	114-175	1/4-20 x 1/2" Hex Hd. M.S., Steel—Zinc Plate	S 2	85-435	"On-Off" Switch (on Tuner)
S 5	136-11	14 Ampere Fuse—Type S.F.E. No. 14		S-14754	Automatic Knob and Screw* Assembly
MOTOR NOISE SUPPRESSION KIT					
	S-14285	Motor Noise Suppression Kit Assembly (complete)		S-14721	Clutch Plate and Washer
	22-1601	Generator Capacitor		S-14727	Tuning Shaft, Pinion Gear and Coupling Assembly
	22-1767	Ignition Coil Capacitor	S 1	S-14733	Muting Switch Assembly
	63-1046	Distributor Suppressor		17-102	Cam Lock (5 used)
	80-579	Motor Hood Bond Spring		34-177	Clutch Gear
	112-365	No. 8 x 1/2" B.H. Sheet Metal Screw		64-162	.088 D x 5/32" Rivet (2 used on S-14733)
DIAL ASSEMBLY					
	12-1435	Dial Scale Retaining Bracket (2 used)		73-118	No. 6-32 x 1/4" Hex Hd. Slotted Set Screw (2 used)
	19-165	Insulating Bushing Tension Clip (4 used)		80-640	Yoke Tension Spring (2 used)
				80-641	Clutch Release Bar Spring
				80-642	Clutch Spring
				93-921	Tuning Shaft Steel Washer
				93-922	Tuning Shaft Spring Washer
				93-923	Fishpaper Washer (2 used)
				97-305	Clutch Arm Stud
				117-149	Clutch Lever
				188-111	Retaining Ring (2 used)

MODELS G660, G663,
G665; Ch. 6G01



ALL VOLTAGES MEASURED FROM
COMMON RETURN POINTS
INDICATED WITH D.C. VACUUM
TUBE VOLTMETER AND THE SET OPERATING
ON 117V A.C.
ALL VOLTAGES ARE D.C. UNLESS
OTHERWISE SPECIFIED.
ALL RESISTORS ±20% TOLERANCE
UNLESS OTHERWISE SPECIFIED.

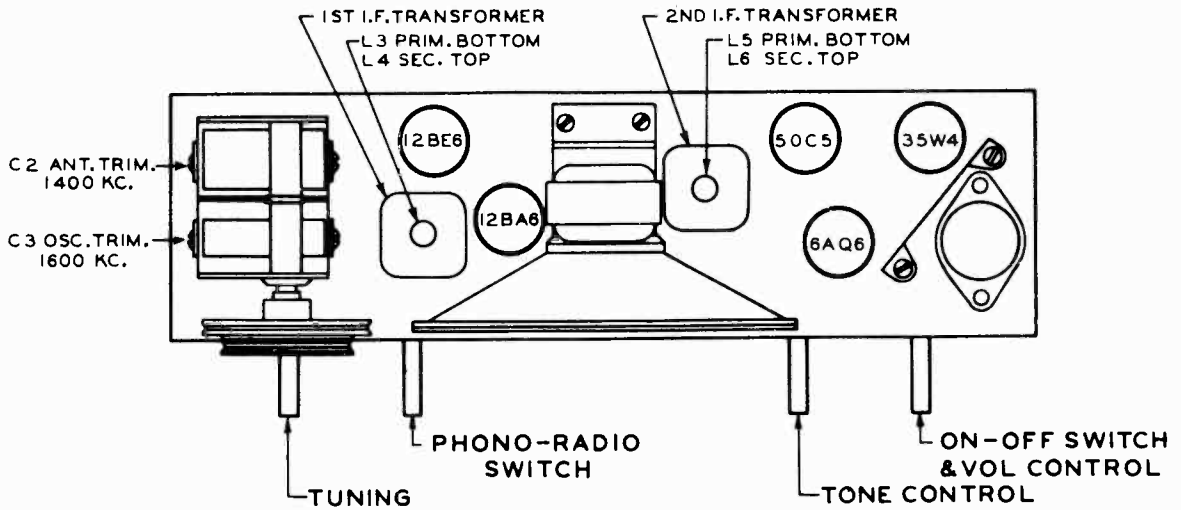
USE ONLY ZENITH NON-INDUCTIVE
ELECTROLYTIC CONDENSER FOR
REPLACEMENT.
IF ANY OTHER TYPE OF ELECTROLYTIC
IS USED IT WILL BE NECESSARY TO ADD
PARTS SHOWN IN DOTTED LINES.
I.F. TRANSFORMER NUMBERING STARTS
WITH "1" TERMINAL AS FIRST TERMINAL
CLOCKWISE AND ADJACENT TO MARKER
AS VIEWED FROM BOTTOM OF CHASSIS.

PHONO MOTOR
A.C.
117V A.C.
35 WATTS

PHONO MOTOR
A.C.
117V A.C.
35 WATTS

IF. FREQUENCY 455 KC
TUNING RANGE
5.35 — 16.20 KC

MODELS G660, G663,
G665; Ch. 6G01

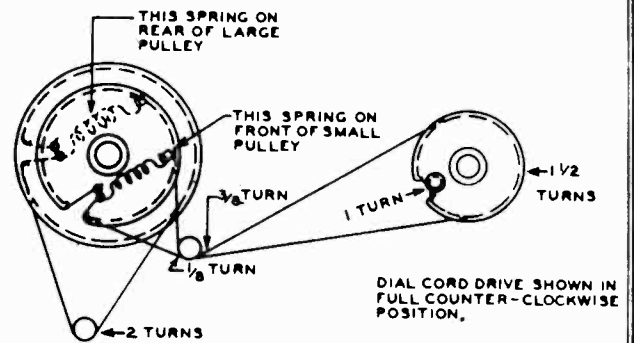


TUBE AND TRIMMER LOCATION

ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	L3, 4, 5, 6	For I. F. Alignment
2	One Turn Loop Coupled Loosely to Wave Magnet	--	1600 Kc.	1600 Kc.	C-3	Set Oscillator to Dial Scale.
3		--	1400 Kc.	1400 Kc.	C-2	Align Antenna Stage

The I.F. transformers incorporated in this receiver are of the new permeability tuned type. The advantage of an I.F. transformer of this type is its extreme stability under various humidity and temperature conditions. The upper coil is the secondary and the lower the primary. When adjusting these I.F. transformers the tuning wrench 68-7 can be inserted into the top slug, rotated until maximum output is obtained and then dropped down to the lower slug and the same operation repeated. The tuning wrench is so designed that turning one slug does not affect the adjustment of the other.



**DIAL CABLE DRAWING AND
DETAIL OF I. F. TRANSFORMER**

MODELS G660, G663,
G665; Ch. 6G01

PARTS LIST

G660 (CHASSIS 6G01)

DIAL ASSEMBLY

26-424 Dial Scale & Escutcheon
46-811 Tuning & Volume Control Knob (2 used)
46-812 Tone Control Knob
46-816 Radio-Phono Knob
59-229 Dial Pointer
76-556 Tuning Control Shaft
78-808 Pilot Light Socket & Wire
80-69 Dial Cord Tension Spring
80-209 Felt Washer (Used on S-16029)
93-138 Dial Light Bulb
100-67 Pilot Light Lens
171-10 Dial Cord Assembly (Short)
S-15903 " " " " (Long)
S15904 Pulley & Bushing Assembly
S-16028 Bracket & Stud Assembly
S-16029

COILS & CHOKES

95-1101 1st I.F. Transformer
95-1102 2nd " "
S-12603 Phono Oscillator Coil Assembly
S-13799 Oscillator Coil Assembly

CONDENSERS

22-3 .01 Mfd. Ceramic (Disc) 500 V
22-4 .004 " " " " 500 V
22-5 .0001 " " " " 500 V
22-178 C9 .05 " " " " 200 V
22-289 C16 47 " (Molded) 500 V
22-829 C4 .05 " " " " 200 V
22-854 C6 .0005 " " " " 600 V
22-1182 C11 .01 " " " " 400 V
22-1444 C7 39 Mmfd. Ceramic 500 V
22-1775 C18 .047 Mfd. 400 V
22-2085 C1 Two Gang Variable Condenser (With Pulleys)
22-2086 C12,13,14 Elect. Cond. 20 Mfd. 150 V - 40 Mfd. 150 V - 80 Mfd. 150 V

RESISTORS

63-1219 R-14 22 ohm W.W. 1/2 W 20% Ins. Resistor
63-1574 R-13 1000 " " " " " "
63-1782 R-8 820 " " " " " "
63-1814 R-11 4700 " " " " " "
63-1828 R-2 10K " " " " " "
63-1842 R-17 22K " " " " " "
63-1856 R-15 47K " " " " " "
63-1863 R-4 68K " " " " " "
63-1898 R-9 470K " " " " " "
63-1912 R-16 1.0 Megohm 1/2 W 20% " "
63-1926 R-3 2.2 Megohm 1/2 W 20% " "
63-1940 R-7 4.7 " " " " " "

RESISTORS (CONT'D.)

15 Megohm 1/2 W 20% Ins. Resistor
150 Ohm 1 W 10% " "
Tone Control
Volume Control & Switch

MISCELLANEOUS

Line Cord & Plug (7 ft. Long)
Plastic Cabinet for G660
Wavemagnet Retaining Clamp
Record Changer Mtg. Clip (4 used)
Cabinet Top Cover
" Bottom Cover
" Cover Hinge (R.H.)
" " (L.H.)
5-1/4" P.M. Speaker
*208-669 Cone & Voice Coil
*206-669 Output Transformer
Two Prong Receptacle & Cable
3/8-32X9/16" Nut Cad. (1 ea. used 85-465-63-2045-63-2046)
Speed Nut (4 used to mt. S-16053)
6-32X5/16" Nut Cad. (1 ea. used 95-1101-95-1102)
Cover Plate
Elect. Cond. Socket
Phono Connector Socket
Miniature Tube Socket (2 used)
" " " " (3 " "
" " " " " "
Line Cord Retaining Strip
Wavemagnet Terminal Strip
Phono-Radio Switch (or 85-466)
#8 Ext. Shakeproof Lockwasher (2 used on 54-30)
Gang Cond. Mtg. Bushing
Grille Cloth
#6X3/8 Phill. B.H.S.T. Screw Stat. Bronze (14 used)
Record Changer Mtg. Screw (4 used)
#8X1" Phill. B.H.S.T. Stat. Br. (6 used on 24-513)
#8-32X7/16" Hex. Hd. Sl. M.S. (2 used on S-16029)
#6X1/4" Hex. Hd. Sl. S.T. (2 used on 126-624)
#10-32X1/2" Hex. Washer Hd. M.S. Steel Stat. Bronze
(4 used Chassis Mtg.)
Rubber Grommet (3 used on Gang)
" " (4 " " Changer)
Heat Shield
Rubber Bumper (1 used on Gang)
Retaining Ring (Used on S-16028)
" " " "
Instruction Book (Radio-Phono)
Dual Speed Record Changer
Wavemagnet Assembly
Speaker Baffle Assembly

63-1961 R-1
63-1977 R-12
63-2045 R-10
63-2046 R-6

11-104
14-1204
17-116
19-123
24-512
24-513
40-87
40-88
49-669 SP-1

52-538
54-139
54-211
54-267
57-1551
78-229
78-644
78-806
78-807
78-861
83-1670
83-1671
85-465
93-755
94-295
110-142
112-773
112-775
112-781
114-291
114-297
114-333

S1

125-17
125-76
126-624
166-41
188-32
188-60
202-743
S-14023
S-15896
S-16053