# MODEL F-167

## Sixteen-Tube, Seven-Band, A-C Superheterodyne Receiver

## Electrical Specifications

FREQUENCY RANGES

| | |
|---|---|
| "Standard Broadcast" (A) | 530-1,720 kc |
| "M.W." Medium Wave (B) | 2,400-7,100 kc |
| "S.W." Short Wave (C) | 7,100-21,750 kc |
| "49M." (49 Meters) | 5,970-6,240 kc |
| "31M." (31 Meters) | 9,410-9,690 kc |
| "25M." (25 Meters) | 11,680-11,920 kc |
| "19M." (19 Meters) | 15,090-15,380 kc |

R-F ALIGNMENT FREQUENCIES

| | |
|---|---|
| "49M." (49 Meters) | 6,100 kc (osc., det., ant.) |
| "31M." (31 Meters) | 9,600 kc (osc.) |
| "25M." (25 Meters) | 11,700 kc (osc.) |
| "19M." (19 Meters) | 15,300 kc (osc.) |
| "S.W." Short Wave (C) | 9,500 kc (osc.), 20,000 kc (osc.) |
| "M.W." Medium Wave (B) | 6,000 kc (osc.) |
| "Standard Broadcast" (A) | 600 kc (osc.), 1,500 kc (osc.) |

Intermediate Frequency ..... 460 kc

RADIOTRON COMPLEMENT

| | |
|---|---|
| (1) Type-6K7 | R-F Amplifier |
| (2) Type-6L7 | First Detector |
| (3) Type-6J7 | Heterodyne Oscillator |
| (4) Type-6J7 | Oscillator Control |
| (5) Type-6K7 | First I-F Amplifier |
| (6) Type-6K7 | A-V-C, A-F-C, and Eye I-F Amplifier |
| (7) Type-6K7 | Second I-F Amplifier |
| (8) Type-6H6 | Second Detector |
| (9) Type-6H6 | A.V.C., A.F.C., and Eye |
| (10) Type-6C5 | First Audio Amplifier |
| (11) Type-6F6 | Audio Driver |
| (12) Type-6L6 | Power Output |
| (13) Type-6L6 | Power Output |
| (14) Type-6G5 | Tuning Tube |
| (15) Type-5T4 | Half-wave Rectifier |
| (16) Type-5T4 | Half-wave Rectifier |

Pilot Lamps (11) ..... Mazda No. 46, 6.3 volts, 0.25 amp.

POWER SUPPLY RATINGS

Rating A ..... 105-125 volts, 50-60 cycles, 200 watts
Rating B ..... 105-125 volts, 25 cycles, 200 watts

POWER OUTPUT

| | |
|---|---|
| Undistorted | 25 watts |
| Maximum | 30 watts |

LOUDSPEAKER

| | |
|---|---|
| Type | 12-inch Electrodynamic |
| Impedance (v.c.) | 11.5 ohms at 400 cycles |

## Mechanical Specifications

| | |
|---|---|
| Height | 43 inches |
| Width | 30⅝ inches |
| Depth | 17¾ inches |
| Weight (net) | 124 pounds |
| Weight (shipping) | 168 pounds |
| Chassis Base Dimensions | 22⅛ inches x 12⅜ inches x 4⅛ inches |
| Over-all Chassis Height | 12⅞ inches |
| Operating Controls | (1) Power Switch—Speech-Music, (2) Volume, (3) Tuning, (4) Range Selector, (5) Manual-Electric-Remote, (6) Fidelity |
| Tuning Drive Ratios (manual) | 10 to 1 and 50 to 1 |

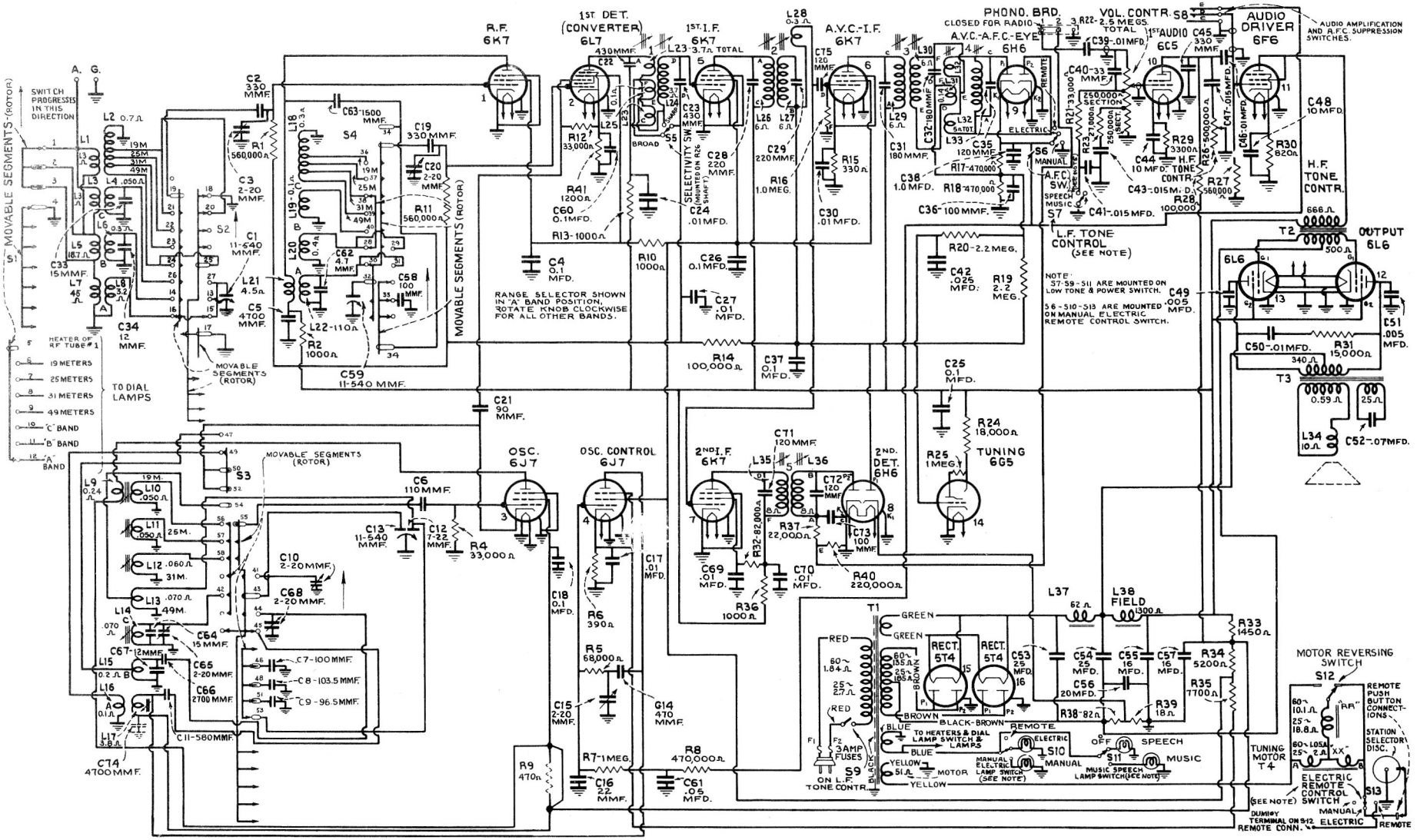



*Figure 1—Schematic Circuit Diagram*

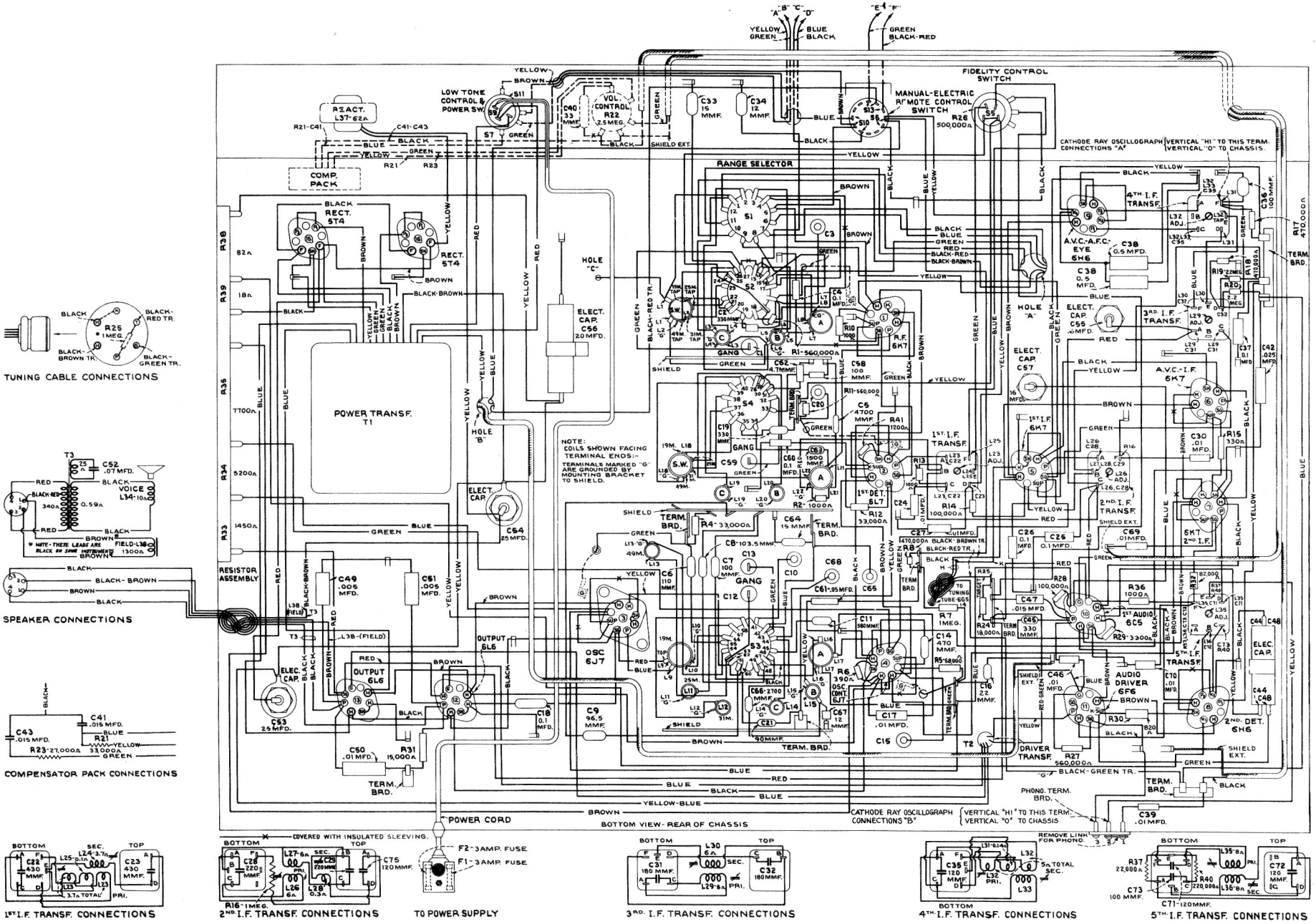


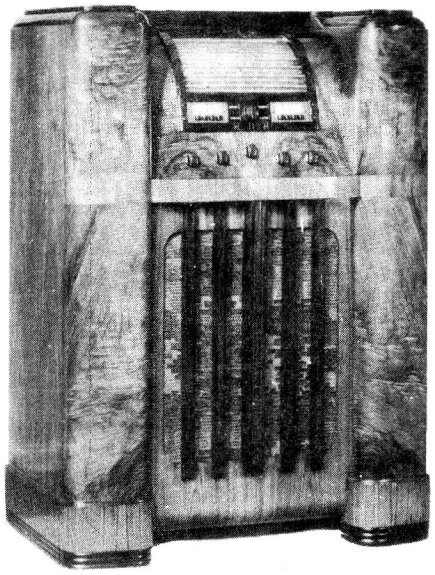

*Figure 2—Chassis Wiring Diagram*

# General Description

This receiver employs a sixteen-tube, seven-band, "Sentry Box" superheterodyne circuit. Features of design include "Touch Tuning" with push-button operation; automatic frequency control; spread-band "Sliding Rule" dial; "qumulative-wound" antenna and detector "A" band coils; tuned r-f amplifier; magnetite-core adjusted i-f transformers and low-frequency "A" and "C" oscillator tracking; two-stage signal i-f amplifier; parallel a-v-c., a-f-c., and "Tuning Eye" i-f amplifier; phonograph terminal board; "Tuning Eye" tuning tube; twelve-inch electrodynamic loudspeaker; plunger-type, air-dielectric trimming capacitors; temperature-stabilized capacitors; two-point aural-compensated volume control; "Fidelity" control; "Music-Speech" control; and a driven push-pull power output stage.

# Circuit Arrangement

The circuit consists of an r-f amplifier stage, first-detector (converter) stage, separate heterodyne-oscillator stage, oscillator control stage, two signal i-f amplifier stages, diode detector stage, a parallel automatic-frequency-control and automatic-volume-control i-f amplifier stage, diode automatic-frequency and volume control stage, audio voltage-amplifier stage, audio driver stage, beam power tube push-pull power-amplifier stage, tuning indicator "Tuning Eye," and a full-wave rectifier.



*Model* F167

The antenna and first-detector coils are constructed with a special type of winding ("qumulative") to provide increased sensitivity and selectivity on the "Standard Broadcast" band. Special capacitors shunting the spread-band oscillator coils change in capacity with temperature variations to reduce oscillator frequency drift.

Spread-band tuning is accomplished electrically by shunting the low-capacity section of the oscillator variable capacitor with relatively large temperature-stabilized fixed capacitors for tuning the oscillator coil on the "19M," "25M," "31M," and "49M" bands. Antenna and first-detector coils are designed to be sufficiently broad-tuned to require no variable tuning over the narrow frequency range of the spread-bands.

The spread-band oscillator coils and the "Standard Broadcast," "M.W.," and "S.W." band oscillator, first detector, and antenna coils are all wound on separate forms. The antenna and first detector spread-band coils are tapped. Undesirable interaction between coils is avoided by shorting proper unused sections by means of the range selector.

The signal intermediate-frequency amplifier consists of two Type-6K7 tubes in a two-stage transformer-coupled circuit. The windings of all i-f transformers are resonated by fixed capacitors and are adjusted by molded magnetite cores to tune to 460 kc. A third winding, L25, in the first i-f transformer, closely coupled to the primary, L23, is placed in series with the main secondary, L24, when the fidelity control switch S5 is thrown to "broad" position (see figure 1), thereby increasing the coupling between the primary and secondary circuits with a consequent broadening of the band width of the i-f amplifier, permitting higher fidelity reception. The grid of the automatic-volume-control i-f amplifier is supplied by winding L28.

The function of the automatic-frequency-control circuit is to automatically change the frequency of the heterodyne oscillator so that the correct i-f frequency is formed for the i-f amplifier. The circuit consists essentially of an i-f discriminator which, as the name implies, discriminates or furnishes control voltage of the correct polarity to an oscillator frequency-control tube for generated i-f carrier frequencies slightly above and below 460 kc, or the frequency to which the i-f amplifier is tuned.

The plate circuit of the Type-6J7 oscillator control tube is caused to act as an apparent variable inductance in parallel with the "A" band oscillator tuned circuit of which coil L17 is a part. The series **combination** of resistor R5 and the capacitor C16 is also in parallel with the oscillator tuned circuit. Since the resistance of R5 is many times greater than the reactance of C16, at the oscillator frequency, the r-f current through the combination will be practically in phase with the r-f voltage across the oscillator tuned circuit. However, the r-f voltage impressed across the C16 capacitance section of the combination, or from grid to cathode, will lag the r-f voltage across the combination, or the tuned circuit, approximately 90 degrees. The grid-cathode r-f voltage will be amplified by the control tube but will be shifted an additional 180 degrees (grid and plate voltages of all tubes are always opposite in phase) so that the amplified r-f voltage appearing across the plate circuit will now lead the voltage across the combination or the tuned circuit by 90 degrees, or, in other words, the control tube is acting as an equivalent shunt inductance. The amount of this action is determined by the amplification of the tube, which in turn is governed by the grid-cathode bias voltage. In operation a residual bias is developed across the cathode resistor R6. The d-c control grid voltage is fed to the control grid from the discriminator circuit through resistor R7. If this voltage is negative with respect to ground, the amplification of the control tube will be decreased, the apparent plate circuit inductance of the tube increased, which will lower the frequency of the oscillator tube. The converse will occur when the grid voltage is positive with respect to ground.

The action of the discriminator circuit depends upon the fact that a 90-degree phase difference exists between the primary and secondary potentials of a double-tuned loosely-coupled transformer when the resonant frequency is applied and that this phase difference varies as the applied frequency varies, i.e., the maximum resultant response voltage across the primary and secondary windings connected in series will occur at a frequency either lower or higher in frequency than the frequency to which the individual windings are resonated, respectively depending on whether the windings are connected series aiding or opposing.

The discriminator, or fourth i-f transformer, consists of the primary winding, L31, which is a part of the third i-f transformer secondary tuned circuit (tuned to 460 kc) and the center-tapped secondary, L32. The upper and lower halves of L32 may be considered as two secondary coils, the upper series aiding and the lower series opposing the primary, L31. The magnetite core in L32 is inserted to inductively balance the two halves. The function of coil L33 (magnetite core adjusted), in parallel with L32, is to tune the secondary to 460 kc. Therefore, the maximum voltage will be applied to diode circuit $P_1K_1$ and R17 when the i-f signal frequency is below 460 kc and to the diode circuit $P_2K_2$ and R18 when the i-f signal frequency is above 460 kc. Resistors R17 and R18 are connected in series between ground and a point leading to the oscillator control tube grid.

D-c voltages, resulting from diode rectification, across R17 and R18 are always in opposition, consequently the oscillator control-tube grid-bias voltage is a differential amount, depending upon the i-f signal strength and its frequency deviation from the nominal value of 460 kc. The polarity of this differential oscillator control-tube grid-bias, with respect to ground, depends on whether the i-f signal frequency is above or below 460 kc, but is always in the direction which will bring the generated i-f frequency nearer to 460 kc. A-f-c action is automatically eliminated for "manual" tuning by grounding diode cathode $K_1$ through switch S6.

# Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

**Precautionary Lead Dress.**—(1) Green bus lead from C1 to S2 should be 2¾ inches long, (2) green bus lead from C59 to S4 should be 2½ inches long, (3) green bus lead from C13 to S3 should be 2¾ inches long, (4) bare bus lead from C12 to S3 should be 1⅛ inches long, (5) blue and red leads from tube No. 3 to L9 should be dressed away from the coil, (6) tube No. 3 grid lead should be 6 inches long, (7) all leads to rear of oscillator coils should be dressed close to the chassis, (8) clamp "Tuning Eye" cable to the dial bracket, (9) filament leads should all be twisted, (10) leads from C44 and C48 should be replaced dressed away from other leads, (11) twisted a-c leads near R22 should be dressed away from R22, (12) leads from S5 to the first i-f transformer should be twisted, (13) temperature-stabilizing capacitors marked 1A, 2A, and 3A should be dressed perpendicular to chassis, (14) blue bus lead from L21 to tube No. 1 plate should be dressed away from shield plate on range selector assembly, (15) C36, C38, and $K_2$ of tube No. 9 should be grounded to the ground lances near corner of chassis. The following should be dressed away from chassis: (16) Yellow bus lead from cathode of tube No. 3 to S3, (17) yellow bus lead to OG of tube No. 2, (18) yellow bus lead from the 5th i-f transformer to phonograph terminal board, (19) blue bus lead from C47 to R26. When necessary to replace bus leads, use only wire having same diameter as original.

**Phonograph Attachment.**—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. Model R-93, Record Player should be connected as follows: Remove the link from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 1; yellow to terminal 2; shield terminal 3; and tape up the red and blue. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw-terminals on Radio-Record switch. If additional volume is desired, connect a GE Stock No. 9632 transformer between the 2-conductor twisted cable and the screw-terminals on Radio-Record switch as follows: Yellow and brown transformer leads and one side of twisted cable to ground screw-terminal

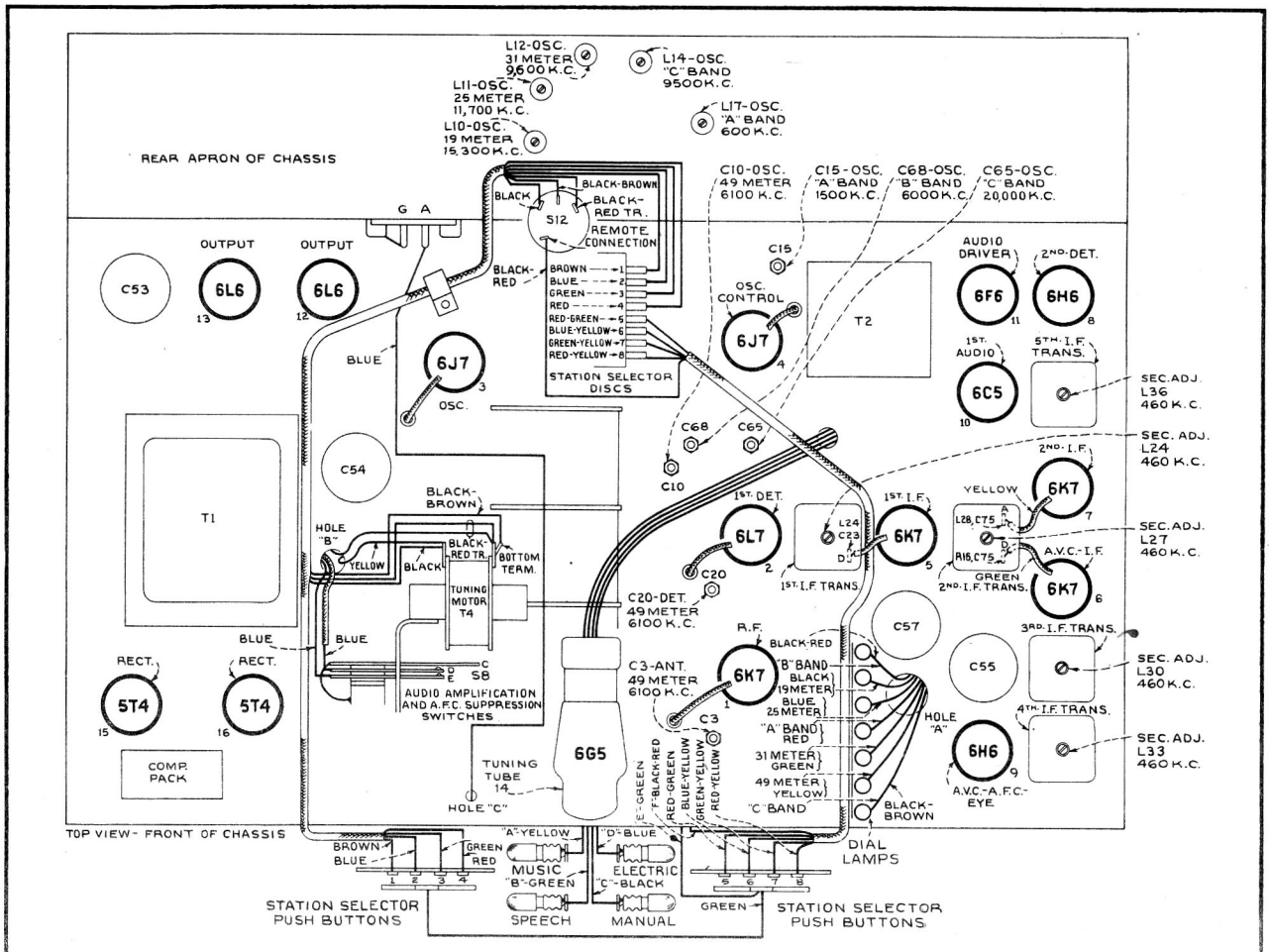



*Figure 3—Radiotron, Coil, and Trimmer Locations*

on switch; black transformer lead to other side of twisted cable; and blue transformer lead to other screw-terminal on switch.

**Loudspeaker.**—Two types of loudspeakers are used which will be referred to as types 1 and 2. In type 1 the cone centering diaphragm is cemented to a fixed ring, while in type 2 the centering diaphragm is cemented to an adjustable ring. Replacement of cone for either type is identical. Centering of cone for type 1 loudspeaker is made with three narrow celluloid or paper feelers after first removing the front dust cover and cutting free the cone centering diaphragm. The dust cover may be removed by a light application of acetone, using care not to allow the acetone to flow into the air gap. The centering diaphragm should be cemented in place after placement of feelers. Sufficient time should be allowed for the ambroid to set before removing feelers. Use ambroid to replace dust cover. Centering of cone for type 2 loudspeaker differs only in that it is not necessary to cut free the centering diaphragm, adjustment being made in the usual manner by means of screws on the adjustable cone centering ring.

# Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the left ends of horizontal calibration lines with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

The "Fidelity" control should be turned counter-clockwise during all alignment operations. The "Manual-Electric-Remote" switch should be turned to "Manual" (clockwise) during alignment unless otherwise specified. The bottom shield pan must be in place during spread-band alignment. Permit the set to operate at least five minutes before attempting alignment.

**CAUTION.**—The magnetite core screw L32 on the bottom of the 4th i-f transformer has been accurately adjusted, for an exact electrical balance of coil L32 to center tap, during manufacture and **should not be disturbed.** However, if for any reason the adjustment has been moved from its original position, it will be necessary to mechanically adjust this screw until the end of the stud protrudes exactly ⅛ of an inch (four threads exposed) above the brass bushing prior to any alignment operations.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. A-f-c discriminator adjustments should follow r-f and i-f adjustments tabulated below. Adjustment locations are shown on figures 3 and 6.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 2. Cathode-ray connection "A" is used for adjustment of i-f transformers Nos. 1, 2, and 3 and connection "B" for adjustment of i-f transformer No. 5. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position. The Tuning Eye may be used as an output indicator for all adjustments except L35 and L36. It is preferable to replace the 6G5 tuning tube with a 6E5 during alignment.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action and reduce possibility of error in spread-band adjustments.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator. "Min. Eye" means minimum width of dark sector of Tuning Eye.

| Order of Alignment | Test Oscillator | | | Range-Selector | Receiver Dial Setting | Circuit to Adjust | Adjustment Symbols | Adjust to Obtain |
|---|---|---|---|---|---|---|---|---|
| | Connection to Receiver | Dummy Antenna | Frequency Setting | | | | | |
| 1 | ——— | ——— | ——— | ——— | ——— | 4th I-F Trans. | L33 | Turn Extreme Counter-clockwise |
| 2 | No. 6 6K7 Eye I-F Grid Cap | .001 Mfd. | 460 kc | "Standard Broadcast" | No Signal 550-750 kc | 3rd I-F Trans. | L29 and L30 | Min. Eye |
| 3 | No. 5 6K7 1st I-F Grid Cap | .001 Mfd. | 460 kc | "Standard Broadcast" | No Signal 550-750 kc | 2nd I-F Trans. | L26 and L27 | Min. Eye |
| 4 | No. 2 6L7 Det. Grid Cap | .001 Mfd. | 460 kc | "Standard Broadcast" | No Signal 550-750 kc | 1st I-F Trans. | L23 and L24 | Min. Eye |
| 5 | No. 2 6L7 Det. Grid Cap | .001 Mfd. | 460 kc | "Standard Broadcast" | No Signal 550-750 kc | 5th I-F Trans. | L35 and L36 | Max. (peak) |
| 6 | Ant. Term. | 300 Ohms | 6,000 kc [a] | "49M." | 6.0 mc | "49M." Osc. | C10 | Min. Eye [b] |
| 7 | Ant. Term. | 300 Ohms | 6,100 kc | "49M." | 6.1 mc | "49M." Osc. | C10 | Min. Eye |
| 8 | Ant. Term. | 300 Ohms | 6,100 kc | "49M." | 6.1 mc | "49M." Det. | C20 | Min. Eye |
| 9 | Ant. Term. | 300 Ohms | 6,100 kc | "49M." | 6.1 mc | "49M." Ant. | C3 | Min. Eye |
| 10 | Ant. Term. | 300 Ohms | 1,200 kc [c] | "31M." | 9.6 mc | "31M." Osc. | L12 | Min. Eye [d] |
| 11 | Ant. Term. | 300 Ohms | 1,300 kc | "25M." | 11.7 mc | "25M." Osc. | L11 | Min. Eye [e] |
| 12 | Ant. Term. | 300 Ohms | 1,700 kc | "19M." | 15.3 mc | "19M." Osc. | L10 | Min. Eye [f] |
| 13 | Ant. Term. | 300 Ohms | 20,000 kc | "S.W." | 20 mc | "S.W." H-F Osc. ("C") | C65 | Min. Eye [g] |
| 14 | Ant. Term. | 300 Ohms | 9,500 kc | "S.W." | 9.5 mc | "S.W." L-F Osc. ("C") | L14 | Min. Eye [h] |

| Order of Alignment | Test Oscillator | | | Range-Selector | Receiver Dial Setting | Circuit to Adjust | Adjustment Symbols | Adjust to Obtain |
|---|---|---|---|---|---|---|---|---|
| | Connection to Receiver | Dummy Antenna | Frequency Setting | | | | | |
| 15 | Ant. Term. | 300 Ohms | 20,000 kc | "S.W." | 20 mc | "S.W." H-F Osc. ("C") | C65 | Min. Eye |
| 16 | Ant. Term. | 300 Ohms | 6,000 kc | "M.W." | 6.0 mc | "M.W." Osc. ("B") | C68 | Min. Eye |
| 17 | Ant. Term. | 200 Mmfd. | 1,500 kc | "Standard Broadcast" | 1,500 kc | "A" H-F Osc. | C15 | Min. Eye |
| 18 | Ant. Term. | 200 Mmfd. | 600 kc | "Standard Broadcast" | 600 kc | "A" L-F Osc. | L17 | Min. Eye |
| 19 | Ant. Term. | 200 Mmfd. | 1,500 kc | "Standard Broadcast" | 1,500 kc | "A" H-F Osc. | C15 | Min. Eye |
| 20 | Proceed to A-F-C Discriminator Adjustments Outlined Below | | | | | | | |

a—Refer to "Spread-band Adjustments" below for method of using the G-E Stock No. 9572 Crystal Calibrator for adjustments 6, 7, 8, and 9.
b—Use minimum capacity peak if two peaks can be obtained from 1,000 kc harmonics.
c—Refer to "Spread-band Adjustments" below for Test Oscillator setting for adjustments 10, 11 and 12.
d—To check for correct harmonic carefully set Test Oscillator to 1,600 kc using Crystal Calibrator. Signal should be indicated by "Tuning Eye" in "31M." band near 9.6 mc.
e—To check for correct harmonic carefully set Test Oscillator to 900 kc using Crystal Calibrator. Signal should be indicated by "Tuning Eye" in "25M." band near 11.7 mc.
f—To check for correct harmonic carefully set Test Oscillator to 900 kc using Crystal Calibrator. Signal should be indicated by "Tuning Eye," in "19M." band near 15.3 mc.
g—After this adjustment, check for image signal by shifting receiver dial to 19.08 mc. (19,080 kc).
h—Check for image at 8.58 mc. (8,580 kc).

**Spread-band Adjustments.** — Alignment of the spread ("Overseas") bands requires special procedure since test oscillators used alone are not ordinarily sufficiently accurate for this purpose. The GE Stock No. 9572 Crystal Calibrator affords a convenient and accurate alignment standard. Wrap a few turns of wire around the crystal calibrator and connect one free end to the antenna terminal of the receiver. Snap crystal calibrator "Hi-Lo" switch to "Hi" (1,000 kc), turn the range selector to "49M." band, and set receiver dial pointer to 6.0 mc. Adjust oscillator trimming capacitor C10 for minimum "Tuning Eye" opening (Min. Eye). Use the peak indicated by the alignment table. Snap "Hi-Lo" switch to "Lo" (100 kc) and locate 6,100 kc (the first 100 kc harmonic above 6,000 kc) by slightly readjusting C10 with the dial pointer set at 6.1 mc. This method insures selection of correct crystal calibrator harmonic. Adjust 1st detector and antenna trimming capacitors, C20 and C3, for maximum output.

Follow the tabulated alignment procedure for the "31M.", "25M.", and "19M." bands. Use the crystal calibrator to obtain the necessary accuracy. For example, tune the receiver to the 1,000 kc crystal calibrator output with the crystal calibrator "Hi-Lo" switch in "Hi" position. Snap "Hi-Lo" switch to "Lo" and carefully tune receiver to 1,200 kc (the second 100 kc harmonic above 1,000 kc) for minimum "Tuning Eye" opening. Move crystal calibrator away from antenna wire, connect test oscillator, and carefully adjust test oscillator for minimum "Tuning Eye" opening at a setting of approximately 1,200 kc. Raise test oscillator output to give sufficient harmonic output and use 8th harmonic (9,600 kc) for aligning in "31M." band at 9.6 mc. Align in the "25M." band at 11.7 mc, (11,700 kc), the 9th harmonic of the test-oscillator 1,300 kc output. Align in the "19M." band at 15.3 mc (15,300 kc), the 9th harmonic of the test-oscillator 1,700 kc output. In each case select the peak giving minimum "Tuning Eye" opening.

When aligning with the GE Stock No. 150 Test Oscillator use the varible (unmodulated) oscillator† and "Tuning Eye" indication of receiver output. Set test-oscillator dial 800 kc lower than the desired signal for the four lower frequency ranges and 800 kc higher than the desired signal for the two high ranges and use in same manner as TMV97-C. Insert an open-circuit telephone plug in the test oscillator "Ext. Mod." jack, so the modulated fixed-frequency oscillator will be cut off, and align on the unmodulated variable oscillator signal, which will close the "Tuning Eye" and evidence itself by a rushing noise in the speaker.

If the crystal calibrator signals are weak, disconnect test oscillator while using the crystal calibrator.

More accurate alignment in the spread-bands can be accomplished by making final slight adjustments using American, English, or German short-wave broadcasting stations of known frequency for frequency standards.

**A-F-C Discriminator Adjustments.**—These adjustments are rather critical and should be performed with extreme care. Improper adjustment may result in complete failure of the oscillator control tube to function or else may cause it to detune the oscillator instead of tuning it to the signal. It is assumed that the magnetite core adjusting screw L33 (top of 4th i-f transformer) has been turned all the way out (extreme counter-clockwise) during the preceding tabulated adjustments. Adjustments are as follows: Remove spring "N" on link and arm assembly which connects the "Manual-Electric-Remote" switch shaft to the throw-out gear bracket. Turn "Fidelity" control counter-clockwise. Connect antenna to receiver antenna terminal. With the "Manual-Electric-Remote" switch in "Manual" (right) position, tune in a strong local station near 600 kc or the low-frequency end of the "A" band as accurately as possible by means of the tuning tube "Tuning Eye." The most accurate adjustment will be obtained by adjusting the "vernier" tuning knob mid-way between the two points where the eye just appears to start to open. This will place the generated i-f carrier signal frequency exactly in the center of the i-f amplifier response curve (should be 460 kc if i-f amplifier was properly aligned) and is the frequency to which the a-f-c discriminator (4th i-f transformer) should be tuned to resonance. Without disturbing any of the receiver adjustments, place the "high" test-oscillator lead about ¾ of an inch from the grid cap lead of the Type-6K7, 1st i-f amplifier tube, adjust the test-oscillator output to maximum, turn test-oscillator "Modulation" off, and carefully zero-beat the test-oscillator frequency (approximately 460 kc) with the i-f carrier signal. Avoid placing the test-oscillator lead nearer to the grid cap lead than specified above, as doing so will tend to detune the i-f amplifier. It may be necessary to reduce the local station signal, during this operation, by shortening antenna lead or grounding antenna "A" terminal to chassis in order to increase the loudness of the beat note sufficiently for accurate zero-beat adjustment.

Throw "Manual-Electric-Remote" switch to "Electric" (center) position. A high whistle or beat note will now be heard. Turn the magnetite core screw L33 (top of 4th i-f

† The No. 150 Test Oscillator employs a fixed-frequency (800 kc), modulated oscillator and a variable, unmodulated oscillator. The scale is calibrated to the sum frequency for the two higher frequency ranges and to the difference frequency for the four lower frequency ranges.

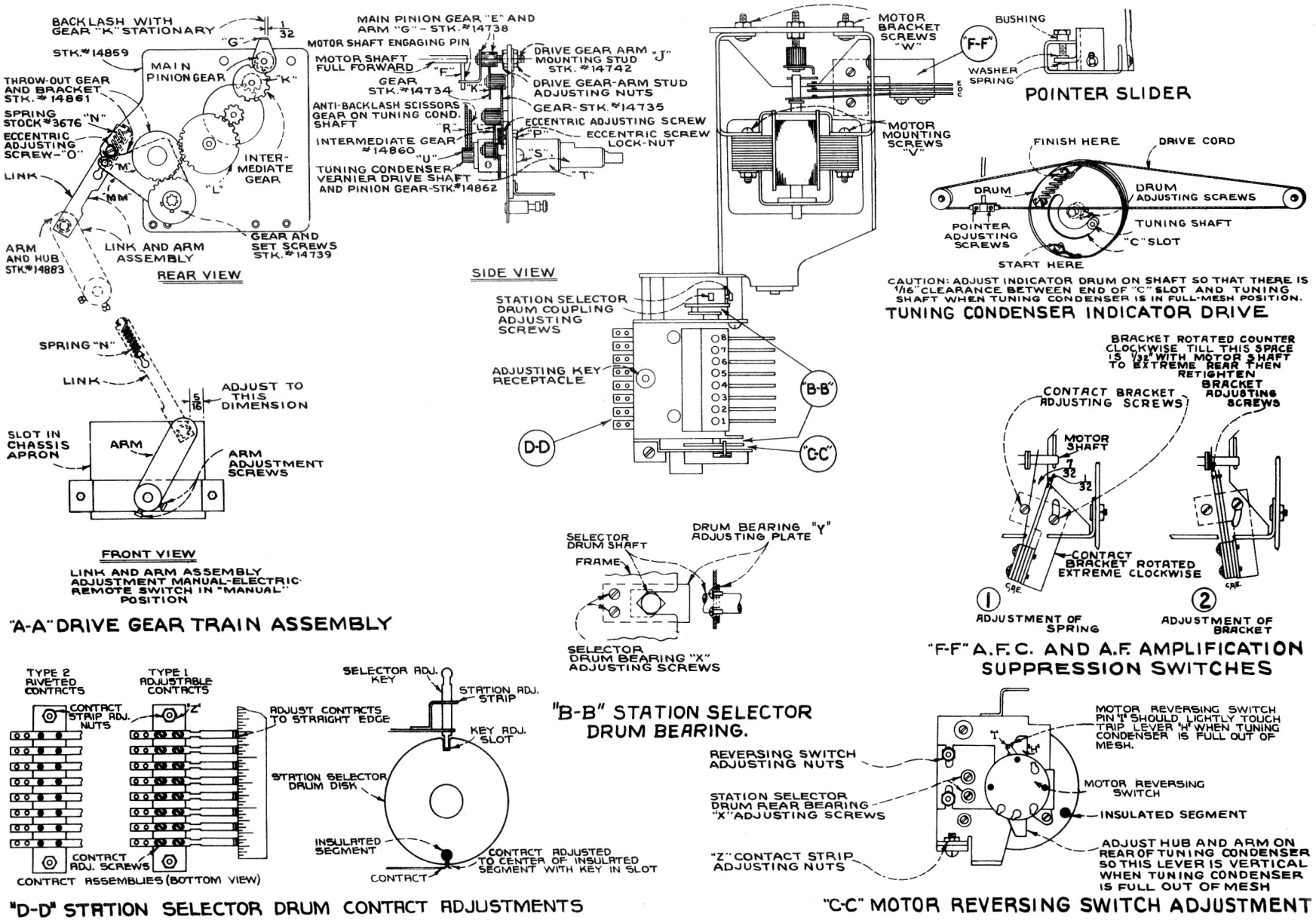



*Figure 4—"Electric Tuning" Mechanism Adjustments*

transformer) slowly clockwise. As this screw is turned, the beat note will first increase to a high audio frequency and will then decrease to a **zero-beat** and then increase in frequency again. The point of exact **zero-beat** is the position for correct adjustment of the discriminator. Zero-beat should also still exist when the "Manual-Electric-Remote" switch is thrown back to "Manual" position. The adjustment is now complete and may be checked by slightly detuning the receiver above and below the local station frequency with the "Manual-Electric-Remote" in "Manual" position, switching to "Electric" position, and noting the oscillator pull-in. Replace spring "N."

# TOUCH TUNING

## Principle of Operation

The Touch tuning mechanism consists essentially of a quick engaging and dis-engaging reversible electric motor, tuning condenser driving gear train, and eight mechanically interlocked (pushing one button releases all others) station selector push buttons respectively wired to eight adjustable station selector contactor discs (each with a motor stopping insulated segment) mounted on a drum which is direct-coupled to the gang tuning condenser shaft. The arrangement permits any one of eight pre-determined stations to be electrically tuned in by merely touching the correct push button. If all eight buttons are inadvertently locked in, firmly pushing the right-hand button will release them.

The operation may be more readily understood by reference to figures 1, 4, and 5. When the motor is not energized, the armature is pushed to the rear or slightly out of the magnetic center by tension of contact spring "C" and the motor shaft is dis-engaged from the driving gear train. Pressing in any one of the eight push buttons will complete the motor circuit through a station selector contactor disc, assuming that the "Manual-Electric-Remote" switch is in "Electric" position and that the insulated segment in the contactor disc is not opposite its contactor. As the motor starts, the armature will be drawn forward, due to solenoid action, and the pin "F" on the end of its shaft will engage the arm "G" on the small main pinion gear, thereby driving the tuning mechanism. At the same time contact springs "E" and "D" will be grounded, causing suppression of audio amplification and automatic frequency control during the tuning cycle. The motor will continue to operate until the insulated segment in the selector disc breaks the motor circuit, whereupon spring "C" will instantly dis-engage the motor pin

### Radiotron Cathode Current Readings

**Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements**

| | | |
|---|---|---|
| ( 1) | Type-6K7—R-F Amp. | 6.2 ma. |
| ( 2) | Type-6L7—1st Det. | 3.0 ma. |
| ( 3) | Type-6J7—Osc. | 10.0 ma. |
| ( 4) | Type-6J7—Osc. Control | 1.2 ma. |
| ( 5) | Type-6K7—1st I-F Amp. | 6.7 ma. |
| ( 6) | Type-6K7—A-V-C, A-F-C, Eye I-F Amp. | 8.0 ma. |
| ( 7) | Type-6K7—2nd I-F Amp. | 6.9 ma. |
| ( 8) | Type-6H6—2nd Det. | ——— |
| ( 9) | Type-6H6—A.V.C., A.F.C., and Eye. | ——— |
| (10) | Type-6C5—A-F Amp. | 1.0 ma. |
| (11) | Type-6F6—Driver | 23.0 ma. |
| (12) | Type-6L6—Output | 51.5 ma. |
| (13) | Type-6L6—Output | 51.5 ma. |
| (14) | Type-6G5—Tuning Tube | 2.2 ma. |
| (15) | Type-5T4—Rectifier | 90 ma.** |
| (16) | Type-5T4—Rectifier | 90 ma.** |

(**Cannot be measured at socket)

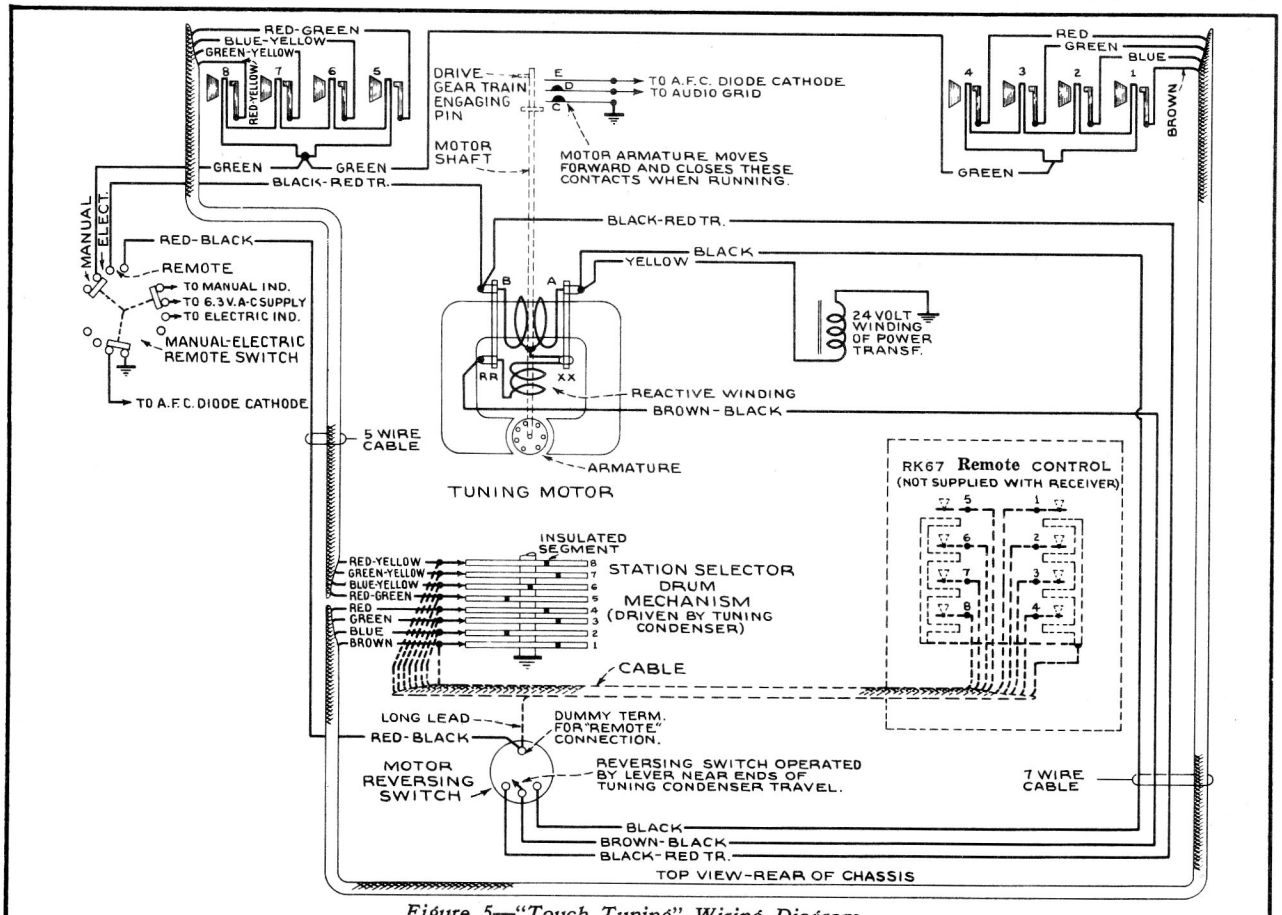



*Figure 5—"Touch Tuning" Wiring Diagram*
*(Viewed from rear of chassis)*

"F" from the arm "G" on the small pinion driving gear and open contacts "E" and "D." Pushing another button will cause the above mentioned cycle to be repeated except that the motor will be interrupted by the insulated segment on a corresponding disc. The discs are individually adjustable on a drum mechanism, providing a choice of eight "Touch Tuned" "Broadcast" stations. The arrangement of the motor is such that its rotation will continue in the same direction regardless of the number of "Touch" tuning cycles until the tuning condenser approaches either full-out or full-in of mesh, whereupon lever "H" trips switch S12 which reverses the direction of rotation. A throw-out idler gear is link-coupled to the "Manual-Electric-Remote" control to disconnect the motor drive gear train when the control is thrown to "Manual" position.

## Mechanism Adjustments

The electric tuning mechanism is designed to be as simple in construction and as fool proof in operation as is possible. In order to maintain the accurate results possible with this device care must be taken in effecting any repairs or adjustments. Reference should be made to figure 4 and the following:

**A-F-C and A-F Amplification Suppression Switches.**—This switch assembly is located on the motor bracket and closes due to solenoid action of motor armature. The tension of the long contact spring "C" is important in bringing about quick dis-engagement of the motor and in permitting the motor to pull into mesh with the drive mechanism. Normal adjustment is attained when the short springs "D" and "E" are aligned exactly straight with contact points separated approximately 1/32 of an inch and with the spring "C" spaced approximately 7/32 of an inch from spring "D" at the point of contact. If necessary, in order to obtain positive pull-in and quick dis-engagement of the motor, the tension of spring "C" should be increased or decreased by bending. This action should be checked with the front apron of the chassis raised two inches higher than the rear. Contacts of the switch must be kept clean. Crocus cloth or a relay burnisher may be used for this purpose.

**Motor Reversing Switch.**—It is necessary to automatically stop and reverse the drive motor before the tuning condenser reaches the ends of its travel. Approximately 175 degrees of sweep is required, and the reversal must take place above 1,700 kc and below 540 kc but not too near the limits of the scale. The coupling between the station selector drum and the tuning condenser shaft should be attached so that the reversing switch trip lever "H" is exactly vertical when the condenser is full-out of mesh. There should be 1/32 of an inch clearance between the end of the condenser shaft and the selector drum shaft. While the trip lever is in this position the reversing switch bracket should be adjusted by means of its elongated mounting holes until the switch pin "I" just lightly touches trip lever "H."

**Main Pinion Gear.**—Clearance between the small high-speed pinion gear "E" and the intermediate gear "K" determines the amount of mechanical noise produced. Correct adjustment will give approximately 1/32 of an inch movement of back lash at the end of pinion arm "G" when gear "K" is held stationary. Arm "G" must also be adjusted for correct mesh with motor shaft drive pin "F." With the motor shaft completely forward and pinion "E" tight against its front bearing, the pinion mounting stud "J" should be adjusted so that pin "F" meshes full thickness with the rotating arm "G." An increase of this mesh will increase over travel on tuning while a decrease of mesh will decrease the over travel. The elongated hole in the front bracket allows sufficient movement of the mounting stud "J" to permit above mentioned gear mesh adjustment.

**"Manual-Electric-Remote" Changeover.** — (1) Link and arm adjustment—To properly line up the mechanical link between the switch shaft and throw-out gear bracket "MM," the set screws holding the link arm on the switch shaft must be loosened, the switch turned to the "Manual" position (extreme right) and the link lever revolved until the distance between the link-connecting pin (extends through chassis apron) and the right-hand (viewed from front) side of the slot, in front apron of chassis, is exactly 5/16 of an inch. If this adjustment is not properly made, correct operation of "Electric" or "Remote" tuning will not result. (2) Throw-out Gear Adjustment—To obtain smooth operation on "Electric" or "Remote" positions it is important that the proper clearance is maintained between the throw-out gear "M" and the intermediate gear "L." With the "Manual-Electric-Re-

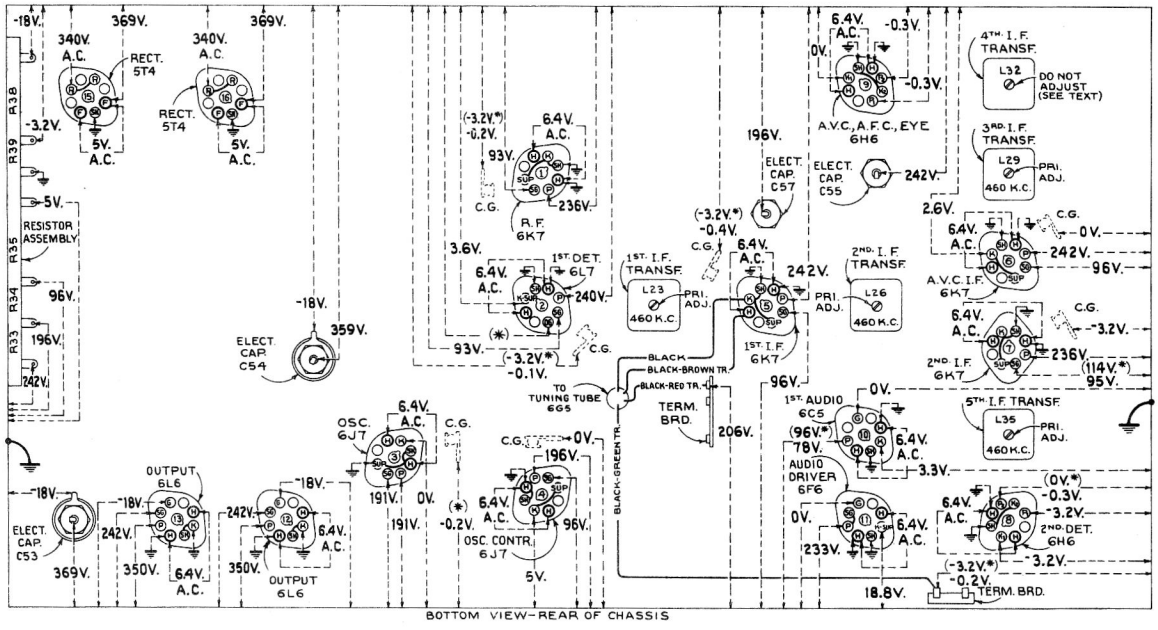



*Figure 6—Radiotron Socket Voltages, Coil, and Trimmer Locations*

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—"Manual" control—No signal being received—Volume control minimum—Fidelity control optional

***Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.***

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250 and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

mote" control thrown to "Remote" position (extreme left) adjust the mesh between these gears by means of the eccentric screw "O" and lock nut "P," contacting the throw-out gear bracket "MM," until there is approximately 1/64 of an inch backlash of gear "L" when gear "M" is held stationary.

**Vernier Tuning.**—In case it becomes necessary to remove tuning condenser drive shaft "T," it should be replaced by sliding anti-backlash gear "R" on condenser shaft apart so that compression amounting to one tooth on the gear is obtained in the springs. Adjust mesh of gear "R" with pinion gear "U" on vernier shaft before tightening screws "S" so that smooth tuning is obtained throughout the range.

**Motor Alignment.** — The motor shaft must be exactly aligned with the axis of the pinion gear with which it engages. This may be adjusted by loosening the mounting screws "V" of the motor and aligning shaft by sight. Correct alignment may be tested by slowly rotating motor and observing the relation between the pin "F" of the motor shaft and the arm "G" on the pinion. The relation of the two should remain the same throughout the revolution. Additional movement for adjustment may be obtained by the motor bracket screws "W" if necessary.

**Station Selector Drum.**—(1) Bearing Adjustment—The selector drum may be removed by unscrewing the two bearing adjusting screws "X" on the front and rear bearings and sliding shaft out of slots on frame. To replace drum, the reverse procedure should be followed holding bearing adjusting plates "Y" firmly against the shaft and tightening adjusting screws. (2) Contact adjustment—Two types of contact strips are used. They are designated on figure 4, as types 1 and 2, on which the individual contacts are respectively adjustable and fixed. On type 1, the individual contacts should be adjusted by setting the end contact springs near the mid-position of their travel and aligning the remaining springs to them by means of a straight edge. Either type of contact strip should be adjusted to the selector drum by firmly placing two selector adjusting keys in the station adjustment strip, positions 1 and 8 (locking respective discs), loosening contact strip adjusting nuts "Z" and shifting the contact strip until the end contacts are exactly centered on the respective disc insulating segments. More accurate adjustment may be made by silhouetting the point of contact with a piece of white paper held behind the contact. Adjustment will be facilitated by removing complete assembly from rear of tuning condenser by unscrewing the three mounting screws. Contacts and discs must be kept free of dirt, filings, and other extraneous matter.

**Lubrication.** — The dial pointer slide should be greased with petrolatum. This same lubrication should be applied lightly to all gear faces of the drive mechanism and sparingly with a cloth to the station selector discs. Any good household oil, such as "3-IN-ONE," is suitable for the motor shaft bearings. A light grade of engine oil should be used for all gear bearings. Medium viscosity engine oil, similar to "PYROIL" (B), should be applied between the thrust washers on the motor shaft. "CASTORDAG," a mixture of graphite and castor oil, is recommended for use at the selector drum end-bearing slots and at the bearings of cable pulleys.

## Station Adjustment

Any eight stations may be chosen for "Touch" tuning. Remove the two escutcheon plates from the side of the dial, place proper call letter labels in the celluloid windows, and replace escutcheons. Turn the power on and proceed to set up the "Touch" tuning as follows:

1. Set Range Selector to "Standard Broadcast."
2. Turn "Manual-Electric-Remote" control to "Electric."
3. Turn Fidelity control counter-clockwise.
4. Press push button No. 1 (left) and wait until station pointer comes to rest.
5. Turn the "Manual - Electric - Remote" control to "Manual."
6. Remove adjusting key from receptacle on top of station selector drum mechanism.
7. Insert key in position marked "1" in station adjustment strip and push the key all the way down to properly fit in slot in disc.
8. Tune the receiver very carefully by means of the manual tuning knob and the "Tuning Eye" to station chosen for No. 1.
9. Remove key.
10. Turn the "Manual-Electric-Remote" control to "Electric."

Button No. 1 is now properly set for "Touch" tuning. Proceed similarly for the other seven push buttons, matching each station on the dial with the same number on the station adjustment strip. Repeat the above steps but place the key respectively in positions 2, 3, 4, etc., and in each case tune to the proper station. Pressing the proper button will now cause the desired station to be tuned in electrically.

# Remote Control

When a Model RK67 remote control is attached to the receiver as shown in figure 5 it duplicates the action of the push buttons on the front panel when the "Manual-Electric-Remote" control is turned to "Remote" position.

## Service Hints

a. Capacitors C18 and C74 should be carefully checked for leakage or short circuit in cases of intermittent operation or no operation. C74 should be eliminated from the circuit, R9 should be shorted out, and C18 replaced by Stock No. 4839, as shown by the Schematic Circuit Diagram figure 1, in the event of trouble in this circuit.

b. Capacitor C5 should be checked for leakage or short circuit.

c. Resistor R5 was 33,000 ohms in some instruments. Replace with Stock No. 12333.

d. Capacitor C16 was 82 mmfd. in some instruments. Replace with Stock No. 14021.

# REPLACEMENT PARTS

| STOCK No. | DESCRIPTION | | STOCK No. | DESCRIPTION | |
|---|---|---|---|---|---|
| | **RECEIVER ASSEMBLIES** | | 12607 | Cap-First or second I-F Transformer shield cap..... | |
| 14726 | Arm-Hub and arm complete with set screws -Connects station selector drum to rear of tuning condenser shaft..... | | 12581 | Cap-Third,fourth or fifth I-F transformer shield cap..... | |
| 14883 | Arm-Arm and hub assembly located on"Manual-Electric-Remote" switch shaft..... | | 11350 | Cap-Grid contact cap-Pkg.of 5..... | |
| 14517 | Board-Antenna and ground terminal board. | | 12884 | Capacitor-Adjustable trimmer (long)(C3,C10, C15,C20,C65,C68)..... | |
| 12717 | Board-Phonograph terminal board..... | | 14392 | Capacitor-4.7 Mmfd. (C62..... | |
| 14885 | Bracket-Left hand dial bracket and pulley assembly..... | | 13002 | Capacitor-12 Mmfd. (C67)..... | |
| 14884 | Bracket-Right hand dial bracket and pulley assembly..... | | 30016 | Capacitor-12 Mmfd. (C34)..... | |
| 14878 | Bracket-Tuning tube mounting bracket and clamp assembly..... | | 12896 | Capacitor-15 Mmfd. (C64)..... | |
| 5237 | Bushing-Variable condenser rubber mounting bushing assembly-Pkg.of 3..... | | 30015 | Capacitor-15 Mmfd. (C33)..... | |
| 14919 | Cable-5 conductor push-button selector cable..... | | 12948 | Capacitor-33 Mmfd. (C40)..... | |
| 14918 | Cable-7 conductor tuning drive motor and push-button selector cable..... | | 12813 | Capacitor-82 Mmfd. (C16)..... | |
| S-1823 | Cable-Tuning tube cable & socket assembly complete..... | | 14910 | Capacitor-90 Mmfd. (C21)..... | |
| | | | 14908 | Capacitor-96.5 Mmfd. (C9)..... | |
| | | | 14906 | Capacitor-100 Mmfd. (C7)..... | |
| | | | 12720 | Capacitor-100 Mmfd. (C36,C58)..... | |
| | | | 14960 | Capacitor-100 Mmfd. (C73)..... | |
| | | | 14907 | Capacitor-103.5 Mmfd. (C8)..... | |
| | | | 14909 | Capacitor-110 Mmfd. (C6)..... | |
| | | | 12404 | Capacitor-120 Mmfd. (C35,C71,C72,C75)..... | |
| | | | 14712 | Capacitor-180 Mmfd. (C31,C32)..... | |

| STOCK No. | DESCRIPTION |
|---|---|
| 14711 | Capacitor-220 Mmfd. (C28,C29) |
| 12952 | Capacitor-330 Mmfd. (C2,C19,C45) |
| 14710 | Capacitor-430 Mmfd. (C22,C23) |
| 13052 | Capacitor-470 Mmfd. (C14) |
| 14911 | Capacitor-580 Mmfd. (C11) |
| 13140 | Capacitor-1500 Mmfd.(C63) |
| 30160 | Capacitor-2700 Mmfd. (C66) |
| 12897 | Capacitor-4700 Mmfd. (C5,C18,C74, |
| 4838 | Capacitor-.005 Mfd. (C49,C51) |
| 4937 | Capacitor-.01 Mfd. (C50) |
| 13138 | Capacitor-.01 Mfd.(C17,C24,C27,C30,C39,C46,C69, C70) |
| 11315 | Capacitor-.015 Mfd. (C47) |
| 4870 | Capacitor-.025 Mfd. (C42) |
| 4886 | Capacitor-.05 Mfd. (C61) |
| 4839 | Capacitor-0.1 Mfd. (C4,C18,C25,C26,C37,C60) |
| 12741 | Capacitor-0.5 Mfd. (2 in parallel) (C38) |
| 5212 | Capacitor-16 Mfd. (C55) |
| 14377 | Capacitor-16 Mfd. (C57) |
| 13611 | Capacitor-20 Mfd. (C56) |
| 14531 | Capacitor-25 Mfd. (C53,C54) |
| 30053 | Capacitor Pack-Compensating capacitor pack comprising two .015 mfd.capacitors,one 27,000 ohm and one 33,000 ohm resistors(C41,C43,R21,R23) |
| 14902 | Capacitor Pack-Comprising two sections 10 Mfd.each (C44,C48) |
| 14948 | Coil-"A" band antenna coil (L7,L8) |
| 14949 | Coil-"B" band antenna coil (L5,L6) |
| 14950 | Coil-"C" band antenna coil (L3,L4) |
| 14951 | Coil-Special band spread antenna coil (L1,L2) |
| 14867 | Coil-"A" band detector coil (L21,L22) |
| 14952 | Coil-"B" band detector coil (L20) |
| 14953 | Coil-"C" band detector coil (L19) |
| 14954 | Coil-Special band spread detector coil (L18) |
| 14869 | Coil-"A" band oscillator coil (L16,L17) |
| 14955 | Coil-"B" band oscillator coil (L15) |
| 14956 | Coil-"C" band oscillator coil (L14) |
| 14873 | Coil-19 meter band oscillator coil (L9,L10) |
| 14872 | Coil-25 meter band oscillator coil(L11) |
| 14871 | Coil-31 metre band oscillator coil(L12) |
| 14957 | Coil-49 meter band oscillator coil(L13) |
| 14858 | Condenser-3 gang variable tuning condenser complete with gear train (C1,C12,C13,C59) |
| 5040 | Connector-4 contact female connector for reproducer cable |
| 14733 | Contact-Spring contact for engaging discs in station selector drum-Pkg.of 8 |
| 30365 | Contact-Comprising 8 spring contacts assembled on insulating strip for engaging discs in station selector drum (type 2 contact assembly) |
| 14857 | Cord-Indicator drive cord |
| 12006 | Core-Adjustable core and stud for I-F transformers |
| S-1804 | Cushion-Black rubber dial cushion |
| 14862 | Drive-Tuning condenser vernier drive shaft and pinion gear |
| 14856 | Drum-Drive cord drum complete with set screws |
| 14731 | Drum-Station selector drum rotor-comprising 8 station selector contactor discs assembled on shaft. |
| 5140 | Fuse-5 Amp.(F1)-Pkg.of 2 |
| 14738 | Gear-Drive pinion gear and arm |
| 14739 | Gear-Drive gear and set screws-located on tuning condenser knob shaft |
| 14734 | Gear-Intermediate gear assembly-comprising one .749-in.O.D.,34 tooth gear and one .291 in O.D., 12 tooth pinion assembled |
| 14735 | Gear-Intermediate gear assembly-comprising one 1.541-in.O.D.,72 tooth gear and one .291-in.O.D., 12 tooth pinion assembled |
| 14860 | Gear-Intermediate gear assembly-comprising one 1.541-in.O.D.,72 tooth gear and hub assembled |
| 14861 | Gear-Throwout gear and bracket |
| 14900 | Indicator-Station selector indicator pointer |
| 5226 | Lamp-Dial lamp-Pkg.of 2 |
| 14729 | Motor-Tuning drive motor for 60 cycle models only (M-1) |
| 14730 | Motor-Tuning drive motor for 25 cycle models only (M-1) |
| 14859 | Plate-Tuning condenser front plate and studs assembled for mounting drive gears |
| 12471 | Plate-6J7 socket mounting plate assembly for cushion socket-less socket |
| 14886 | Pulley-Indicator drive cord pulley-located on right or left hand dial bracket |
| 14946 | Reactor-Filter reactor (L37) |
| 13250 | Resistor-330 ohms,carbon type,1/4 watt (R15) |
| 11355 | Resistor-390 ohms,carbon type,1/4 watt (R6) |
| 5030 | Resistor-470 ohms,carbon type,1/4 watt (R9) |
| 30158 | Resistor-820 ohms,carbon type,1/2 watt (R30) |
| 11935 | Resistor-1000 ohms,carbon type,1/10 watt(R2,R13) |
| 14720 | Resistor-1000 ohms,carbon type,1/4 watt (R10,R36) |
| 14993 | Resistor-1200 ohms,carbon type,1/10 watt (R41) |
| 13031 | Resistor-3300 ohms,carbon type,1/10 watt (R29) |
| 5114 | Resistor-15,000 ohms,carbon type, 1 watt (R31) |
| 14078 | Resistor-18,000 ohms,carbon type, 1 watt (R24) |
| 14284 | Resistor-22,000 ohms,carbon type,1/10 watt (R37) |
| 12454 | Resistor-33,000 ohms,insulated,1/4 watt (R4,R12) |
| 12333 | Resistor-68,000 ohms,carbon type,1/4 watt (R5) |
| 11365 | Resistor-82,000 ohms,carbon type,1/4 watt (R32) |
| 5145 | Resistor-100,000 ohms,carbon type,1/4 watt(R14,R28) |
| 11398 | Resistor-220,000 ohms,carbon type,1/10 watt (R40) |
| 11452 | Resistor-470,000 ohms,carbon type,1/10 watt (R17,R18) |
| 11172 | Resistor-470,000 ohms,carbon type,1/4 watt (R8) |
| 11397 | Resistor-560,000 ohms,carbon type,1/10 watt(R1,R27) |
| 5035 | Resistor-560,000 ohms,carbon type,1/4 watt (R11) |
| 12013 | Resistor-1 Megohm,carbon type,1/10 watt (R25) |
| 3033 | Resistor-1 Megohm,carbon type,1/4 watt (R7) |
| 12200 | Resistor-1 Megohm,insulated,1/4 watt (R16) |
| 12679 | Resistor-2.2 Megohm,insulated,1/4 watt (R19,R20) |
| 14876 | Resistor-Voltage divider comprising one 1450 ohm, one 5200 ohm,one 7700 ohm,one 18 ohm and one 82 ohm sections(R33,R34,R35,R38,R39) |
| 14887 | Retainer-Indicator drive cord pulley retainer-Pkg.of 20 |
| 30014 | Scale-19 meter glass dial strip |
| 30013 | Scale-25 meter glass dial strip |
| 30011 | Scale-31 meter glass dial strip |
| 30010 | Scale-49 meter glass dial strip |
| 14962 | Scale-"C" band glass dial strip |
| 14961 | Scale-"B" band glass dial strip |
| 30285 | Scale-"A" band glass dial strip |
| 4669 | Screw-No. 8-32x5/32 square head set screw for drum Stock No.14856 arm Stock No.14726 and Stock No. 14883-Pkg.of 10 |
| 12418 | Screw-No. 8-32x3/16 milled head screw for gear Stock No.14739-Pkg.of 10 |
| 14848 | Selector-Station selector drum mechanism-comprising selector contactor disc's,spring contacts,and motor reversing switch assembled in metal frame.. |
| 14882 | Shield-Chassis bottom shield |
| 12735 | Shield-Dial lamp shield-Pkg.of 5 |
| 12008 | Shield-I-F transformer shield can |
| 14901 | Shield-Rubber shield for tuning tube |
| 14892 | Slide-Indicator pointer slider and spring assembly |
| 11195 | Socket-5 contact 5T4 Radiotron socket |
| 11196 | Socket-8 contact 6K7,6L6,6J7,6F6,6H6,or 6C5, Radiotron socket |
| 14877 | Socket-8 contact 6J7 Radiotron impregented socket for socket mounting plate Stock No.12471 and 6K7 or 6L7 Radiotron |
| 14114 | Socket-Dial lamp socket |
| 13638 | Spring-Drive cord tension spring-Pkg.of 10 |
| 12007 | Spring-Retaining spring for core Stock No.12006-Pkg.of 10 |
| 3676 | Spring-Tension spring for link and arm Stock No. 14883-Pkg.of 5 |
| 14694 | Spring-Tension spring for station selector push-button switch latch bar-Pkg.of 10 |
| 14889 | Strap-Strap and bolt assembly used to hold glass dial strips in position-Pkg.of 2 |
| 14891 | Strip-Finish strip used between glass dial strips. |
| 14742 | Stud-Mounting stud for gear and arm Stock No. 14738-Pkg.of 5 |
| 14874 | Switch-"Manual-Electric-Remote" switch(S6,S10,S13) |
| 14863 | Switch-L-F tone and power switch (S7,S9,S11) |
| 14732 | Switch-Motor reversing switch and mounting plate for station selector (S12) |
| 14947 | Switch-Range switch (S2,S3,S4) |
| 14728 | Switch-A-F-C and A-F amplification suppression switch (S8) |
| 14904 | Switch-Station selector switch parts,comprising one 4 point contact board,one 4 point conductor plate, insulator and lockplate |
| 14703 | Tone control-H-F tone control (R26,S5) |
| 14706 | Transformer-First I-F transformer (L23,L24,L25, C22,C23) |
| 14958 | Transformer-Second I-F transformer (L26,L27,L28, C28,C29,C75,R16) |
| 14708 | Transformer-Third I-F transformer(L29,L30,C31,C32) |
| 14709 | Transformer-Fourth I-F transformer(L31,L32,L33,C35) |
| 14959 | Transformer-Fifth I-F transformer (L35,L36,C71,C72, C73,R37,R40) |
| 14855 | Transformer-Driver transformer (T2) |
| 14944 | Transformer-Power transformer 105-125 volts, 50-60 cycle (T1) |
| 14945 | Transformer-Power transformer 105-125 volts, 25-60 cycle (T1) |
| 12861 | Volume Control (R22) |
| | **REPRODUCER ASSEMBLIES (RL76-3)** |
| 14606 | Cap-Dust cap for cone center-Pkg.of 10 |
| 14922 | Coil-Reproducer field coil (L38) |
| 14602 | Cone-Reproducer cone,voice coil,center suspension and dust cap (L34) |
| 5039 | Plug-4 contact male plug for reproducer |
| 30131 | Reproducer-Complete |
| 14992 | Transformer-Output transformer (T3,C52) |
| 14357 | Washer-Spring washer to hold field coil securely-Pkg.of 5 |
| | **MISCELLANEOUS ASSEMBLIES** |
| 14745 | Button-Station selector switch button-Pkg.of 4 |
| 30361 | Card-Call letter cards for station selector |
| 14925 | Crystal-Dial escutcheon crystal only |
| 14923 | Escutcheon-Dial and tuning tube escutcheon only-less crystal and buttons |
| 14924 | Escutcheon-Dial and tuning tube escutcheon and crystal complete |
| 14926 | Indicator-"Electric Manual" indicating screen |
| 14927 | Indicator-"Music-Speech" indicating screen |
| 14751 | Key-Key for use in adjusting "Electric Tuning"-Pkg.of 2 |
| 12699 | Knob-Large station selector knob |
| 12700 | Knob-Range switch knob |
| 11347 | Knob-Volume Control "Manual-Electric-Remote" Switch, H.F. Tone Control, L.F. Tone Control or small Station Selector Knob |
| 4982 | Spring-Retaining spring for knob Stock No. 12699-Pkg.of 10 |
| 14270 | Spring-Retaining spring for knob Stock Nos.12700 and 11347-Pkg.of 5 |