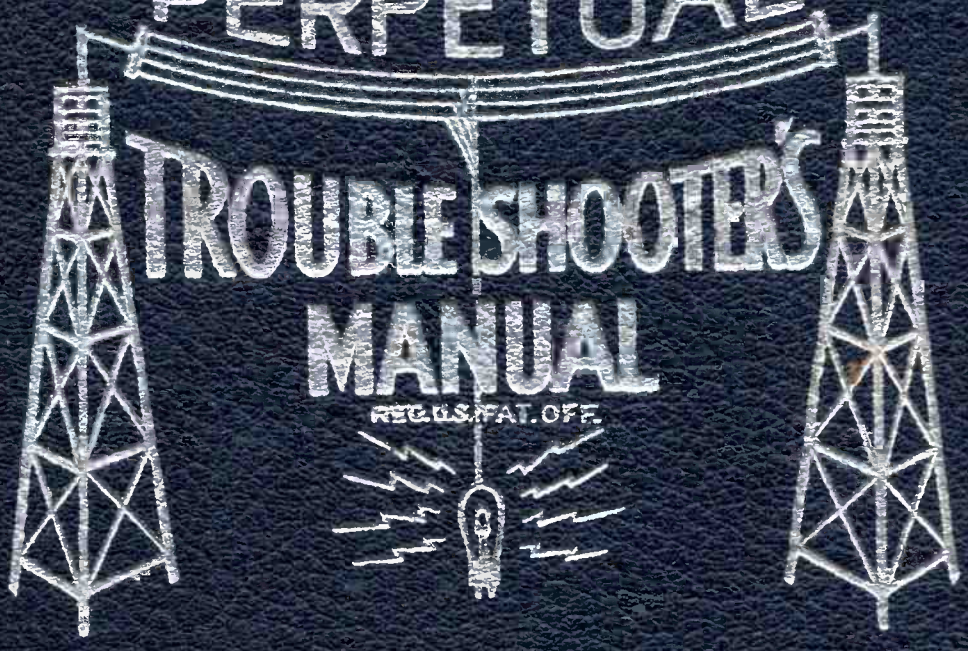
VOLUME XI

PERPETUAL TROUBLESHOOTER'S MANUAL

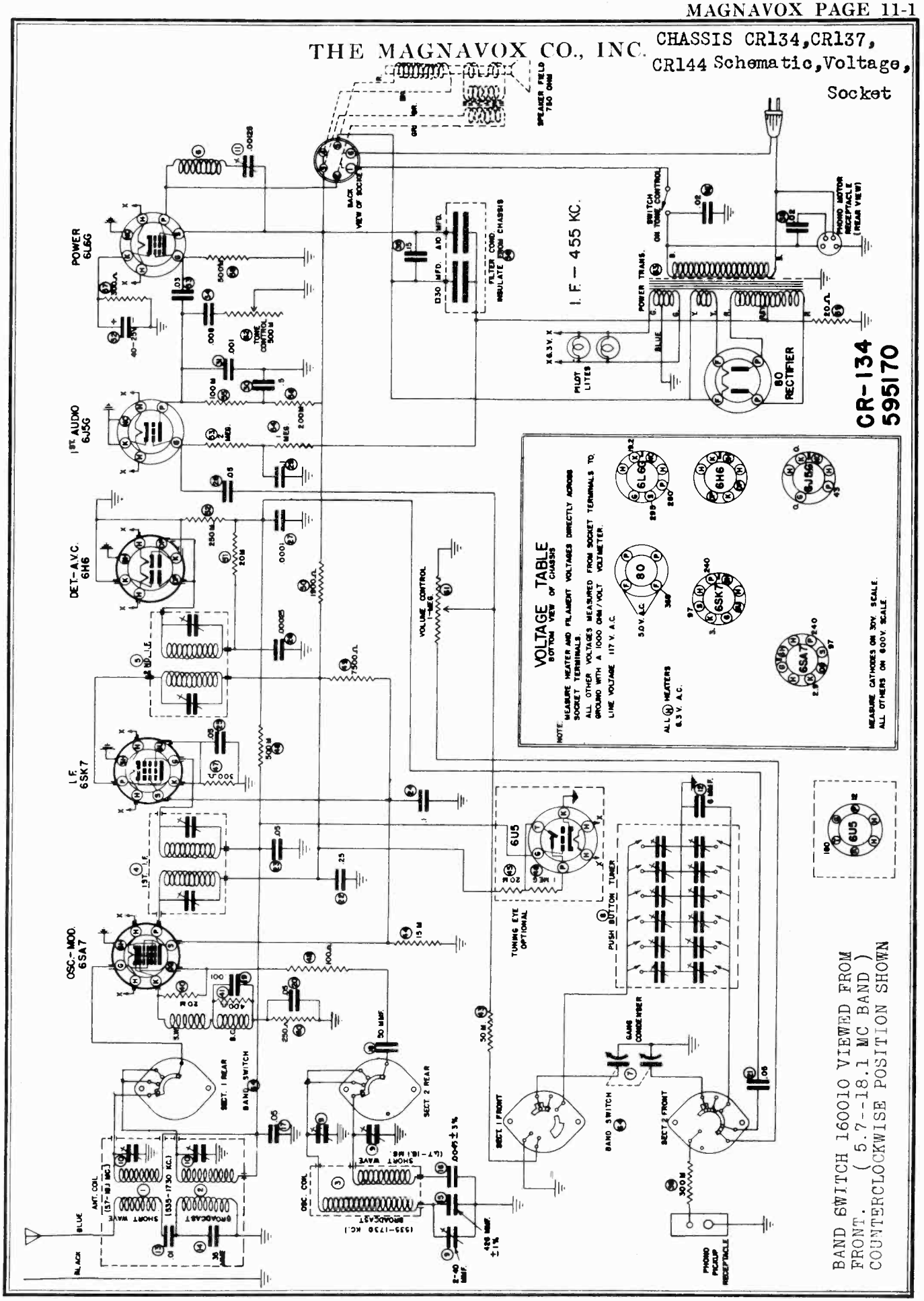
REG. U.S. PAT. OFF.



JOHN F. RIDER

THE MAGNAVOX CO., INC.

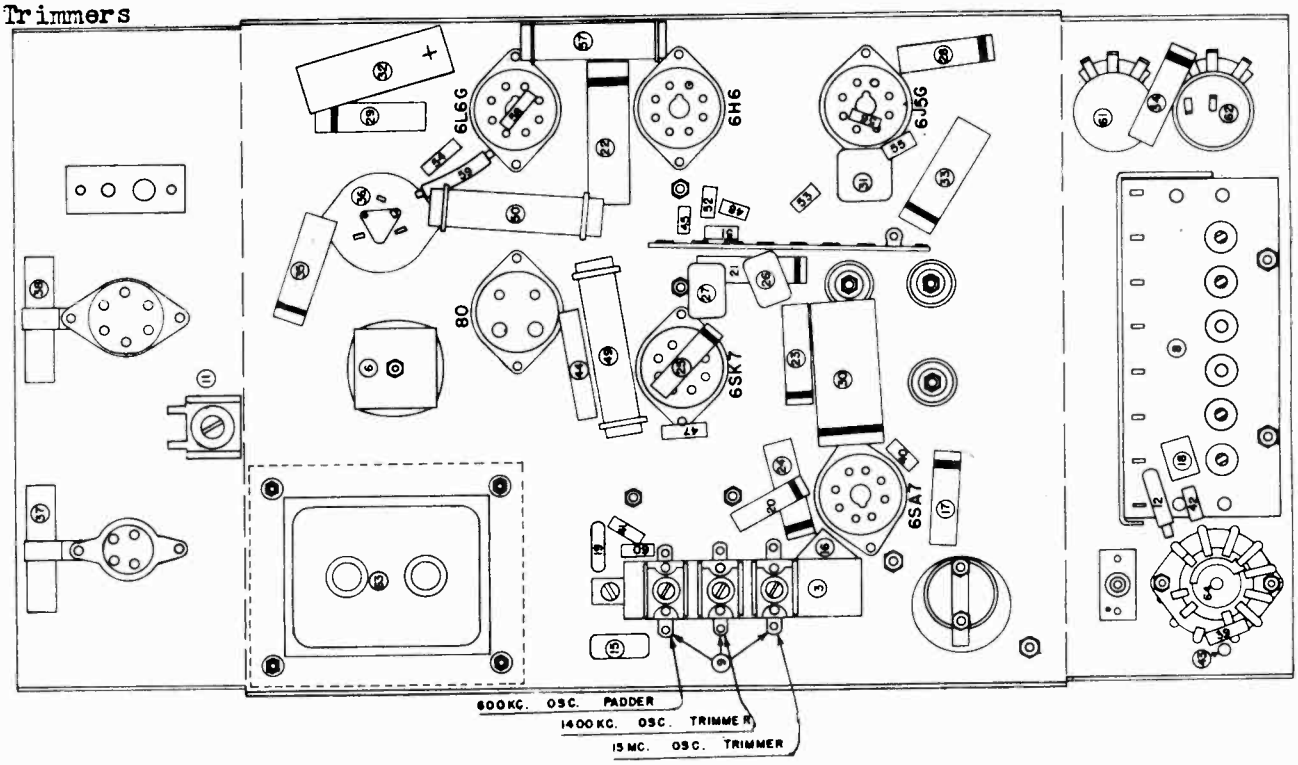
CHASSIS CR134, CR137, CR144 Schematic, Voltage, Socket



CHASSIS CR134,CR137
CR144

THE MAGNAVOX CO., INC.

Chassis,Aligmment
Trimmers



SPECIFICATIONS

Primary voltage.....117 V. AC; Intermediate frequency.....455 KC;
Power consumption..... 90 watts; Tuning frequency range: 535 - 1730 KC;
Power output..... 6 watts; 5.7 - 18.1 MC;

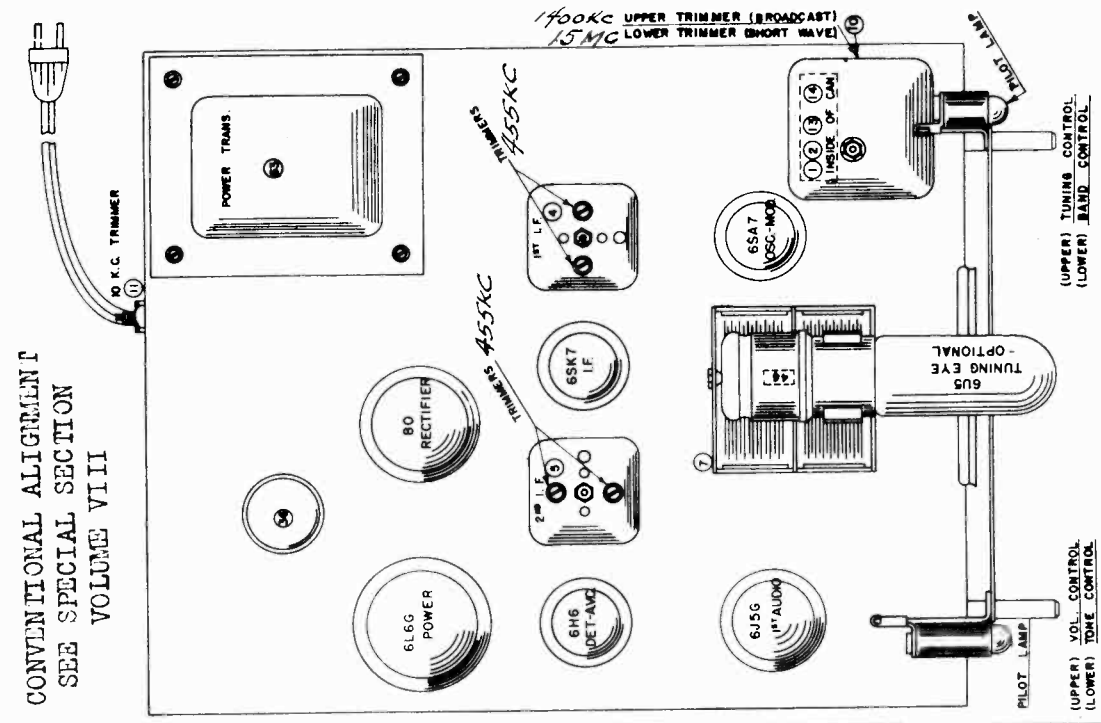
Circuit: Superheterodyne with two tuning ranges, treble control, A.V.C.; bass compensation in volume control for phonograph pickup; push-button condenser-type tuner.

Speaker:
Field coil..... 750 ohms;
Transformer.....3500 ohms;

CR-134 -- Used in Concerto Combination.

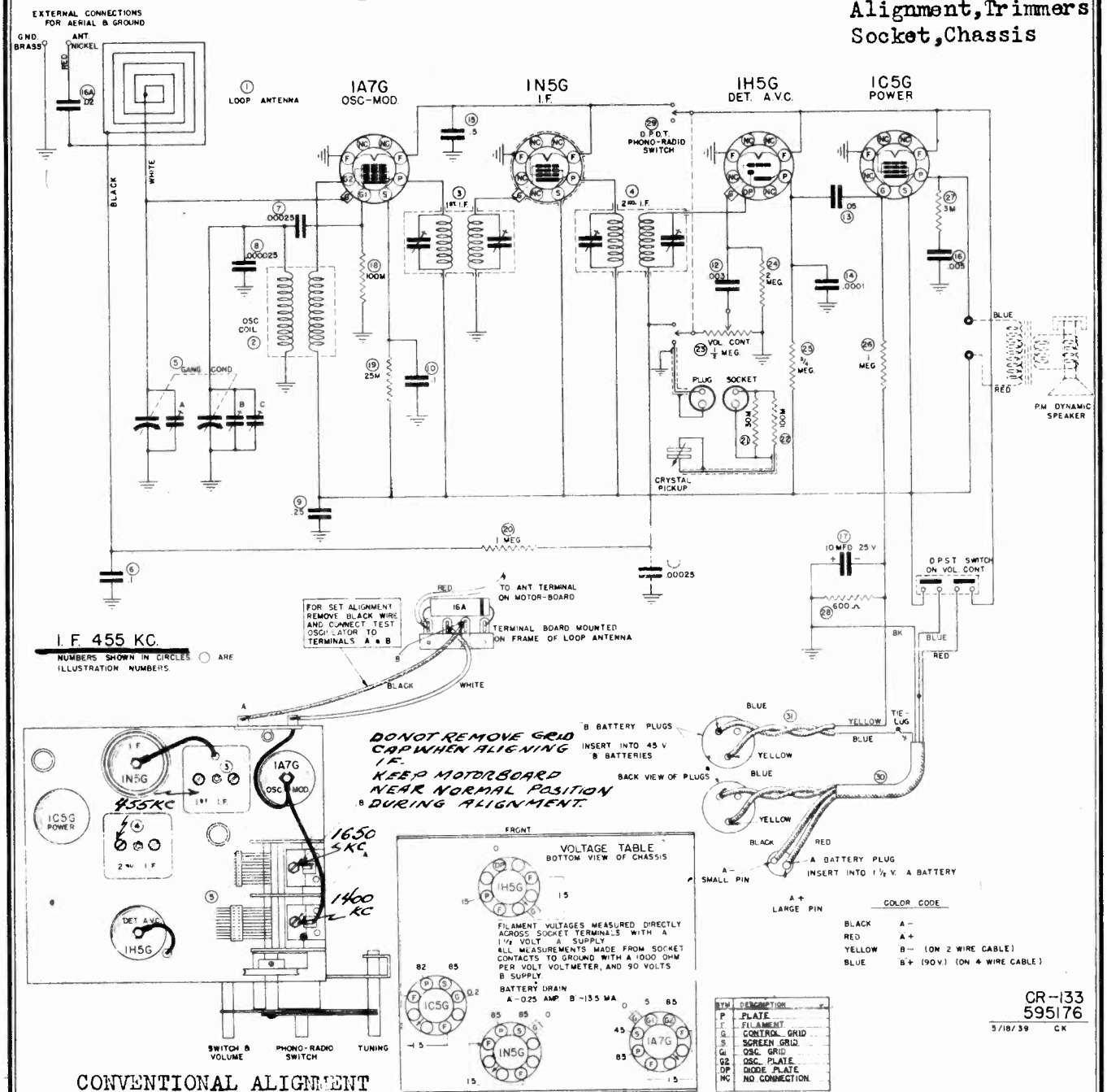
CR-144 -- Used in Chairside and Modern American Combinations, same as CR-134 with addition of tuning eye.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII



THE MAGNAVOX CO., INC.

CHASSIS CR133
Schematic, Voltage
Alignment, Trimmers
Socket, Chassis



CR-133
595176
5/18/39 CK

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

SPECIFICATIONS

"A" Battery voltage.....1.5 volt;
"B" Battery voltage..... 90 volt;
"A" Battery drain.....0.25 amp.;
"B" Battery drain.....13.5 m.a.;
Power output..... 0.2 watt;
Intermediate frequency.....455 K.C.;
Tuning frequency range:
540 -- 1650 K.C.;
Speaker transformer.....8000 ohms;
Type circuit:..... Superheterodyne;

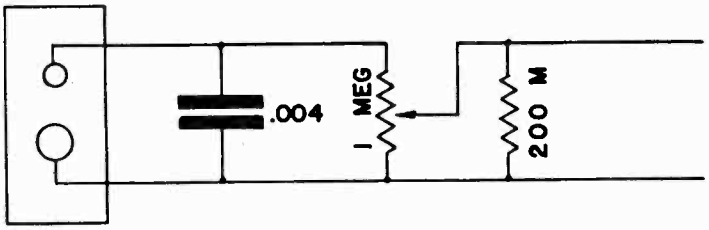
CHASSIS CR134,CR136,CR140
CR142,CR143 to CR153 incl. THE MAGNAVOX CO., INC.
10-kc Filter Adjustment
CHASSIS CR141,CR142 MODEL CR-141 and CR-142.

Changes

Since the first production of this model was released, several circuit changes have been made to improve the fidelity and volume of phonograph reproduction. These changes were made at two different times and are shown in Figures B and C. Figure A shows the original circuit. It is possible to check the phonograph input circuit on this radio without removing the chassis from the cabinet by the use of an ohmmeter, according to instructions shown.

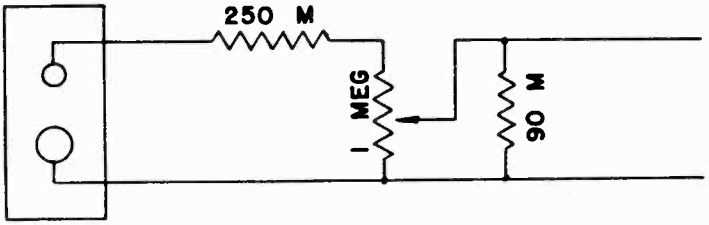
TURN WAVE SWITCH TO PHONO POSITION, REMOVE PICKUP PLUG AND CONNECT OHMMETER TO PICKUP SOCKET — MEASURE RESISTANCE WITH VOLUME CONTROL OFF AND FULL ON.

A



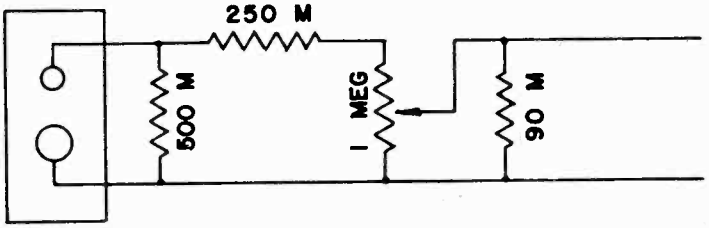
VOLUME CONTROL	
OFF	ON
1 MEG	157,000Ω

B



VOLUME CONTROL	
OFF	ON
1,250,000Ω	332,000Ω

C



VOLUME CONTROL	
OFF	ON
356,000Ω	200,000Ω

IF IT IS FOUND THAT CIRCUIT "A" OR "B" IS USED, CHANGE TO CIRCUIT "C".

10 K.C. FILTER ADJUSTMENT

MODELS CR-136, CR-146, CR-147, CR-148, CR-149, CR-152, CR-153.

With the tone control set for maximum treble response and the Band Expander set in the High Fidelity position (accomplished by rotating the treble control to the right as far as possible), tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser at the rear center of the chassis. In the absence of such a signal source in the daytime, an ACCURATE audio oscillator may be used to feed a 10 KC into the volume control.

MODELS CR-134, CR-140, CR-142, CR-144, CR-143, CR-145, CR-150, CR-151.

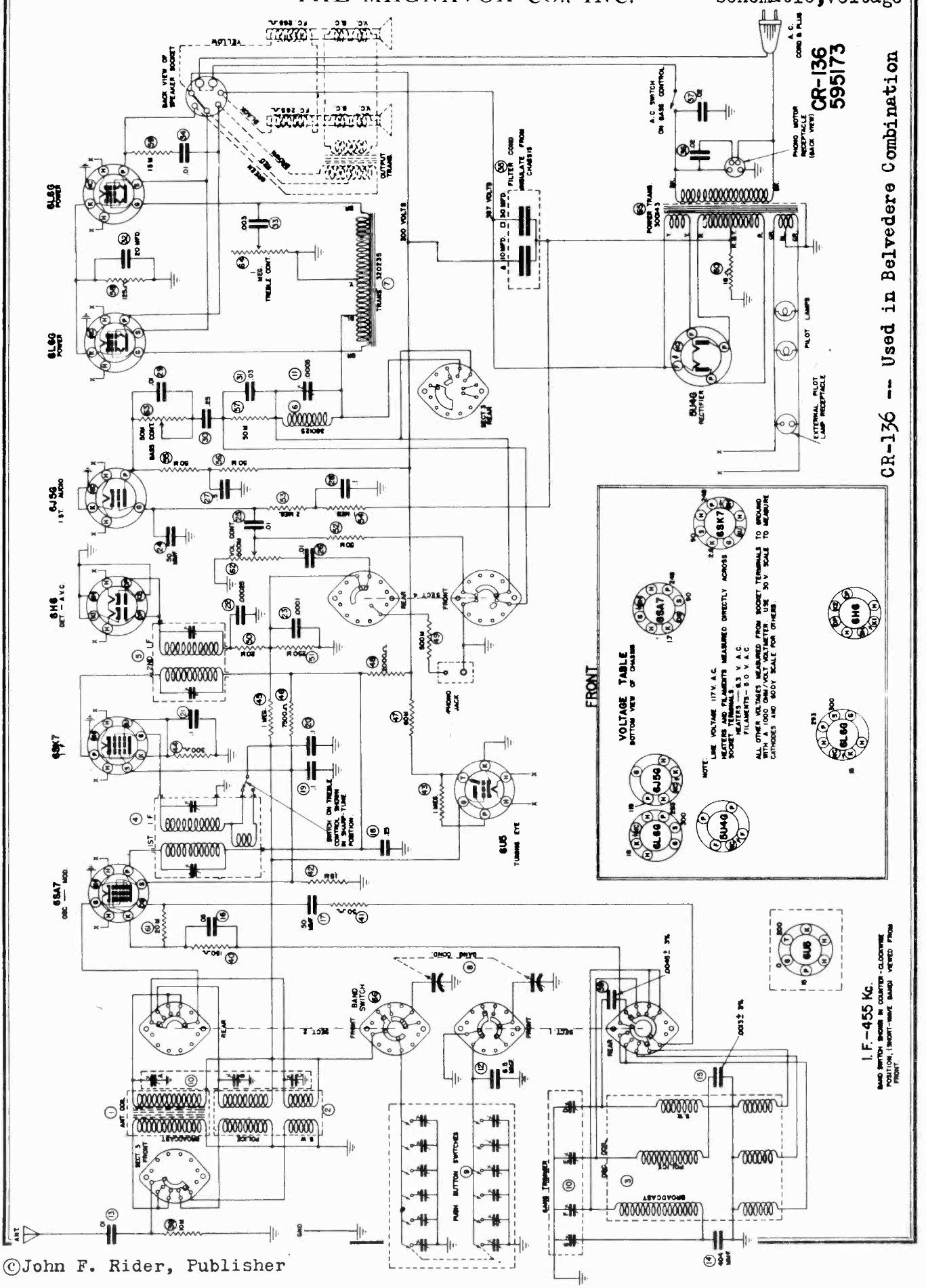
With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser at the rear center of the chassis.

THE MAGNAVOX CO., INC.

CHASSIS CR136
Schematic, Voltage

CR-136
595173

CR-136 -- Used in Belvedere Combination



CHASSIS CR136
Chassis, Alignment
Socket, Trimmers

THE MAGNAVOX CO., INC.

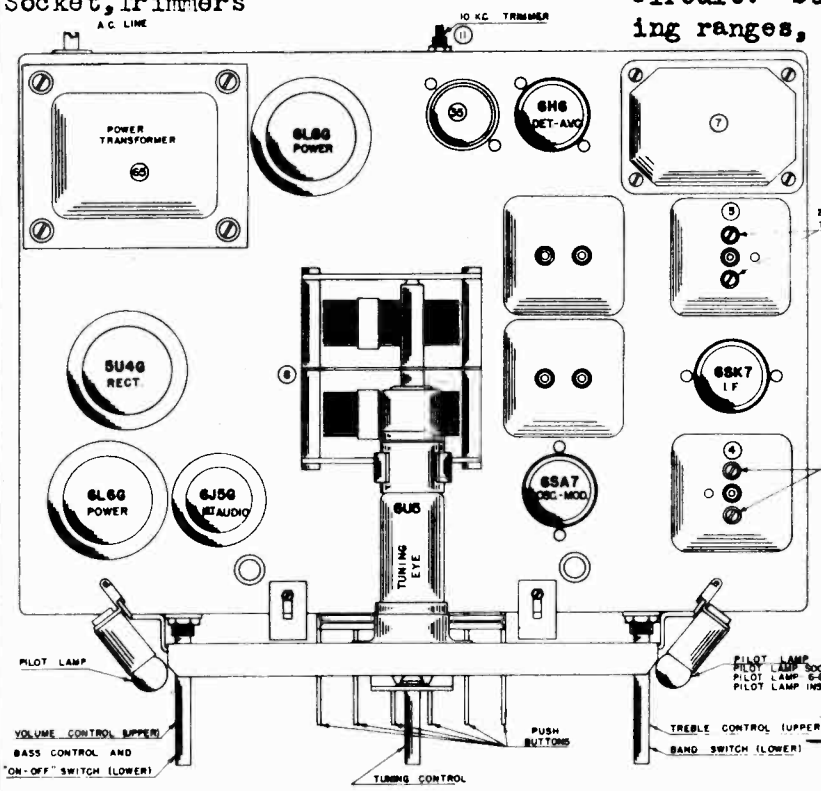
Circuit: Superheterodyne with three tuning ranges, treble and bass controls, I.F. band expansion, A.V.C., bass compensation control for phonograph pickup.

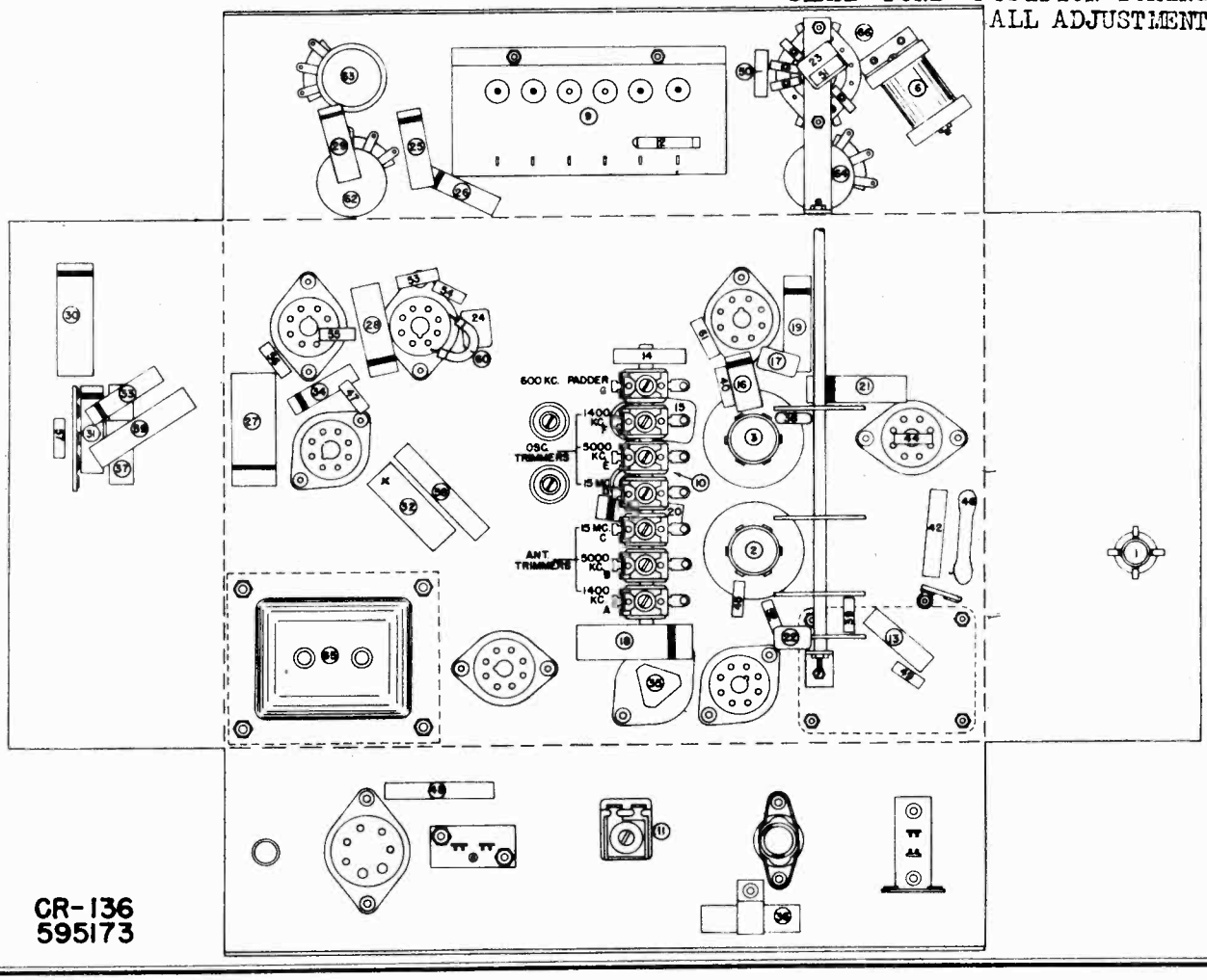
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

SPECIFICATIONS

Primary voltage...117 V. AC;
Power consumption..134 watts;
Power output..... 20 watts;
Speaker (12C131):
455KC Field Coil... 250 ohms;
1ST I.F. TRANS TRIMMERS Transformer.. NONE
Speaker (302):
Field Coil... 250 ohms;
Transformer.. 5M ohms ; (for dual speakers)
Intermediate frequency 455 KC;
Tuning range: 535 - 1730 KC;
1.65 - 5.8 MC;
5.6 - 18.2 MC;

ALIGNMENT NOTE:
KEEP BAND EXPANDER SWITCH IN "SHARP TONE" POSITION DURING ALL ADJUSTMENTS.

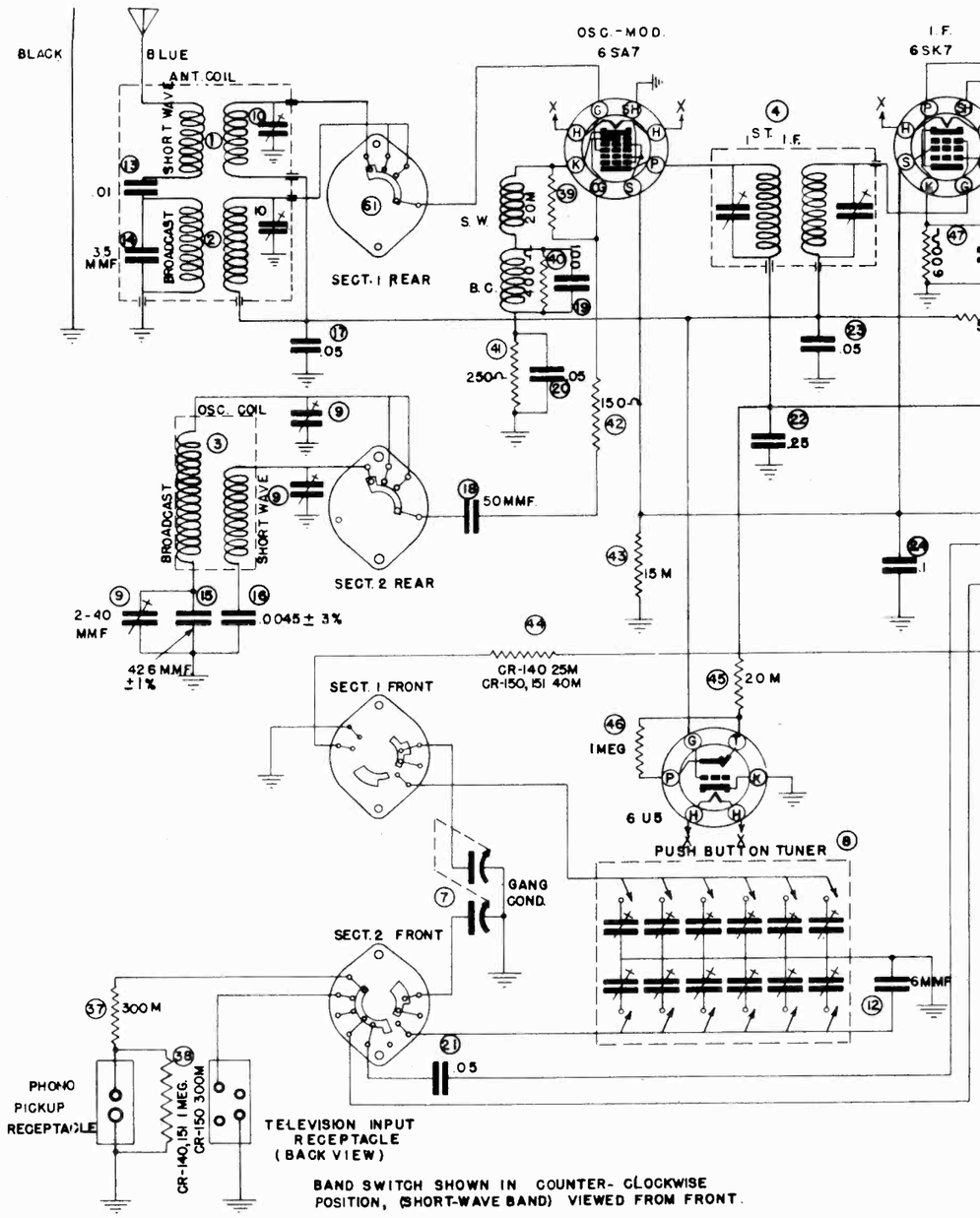




CR-136
595173

THE MAGNAVOX CO., INC.

CHASSIS CR140, CR150, CR151
Schematic, Voltage



VOLTAGE TABLE

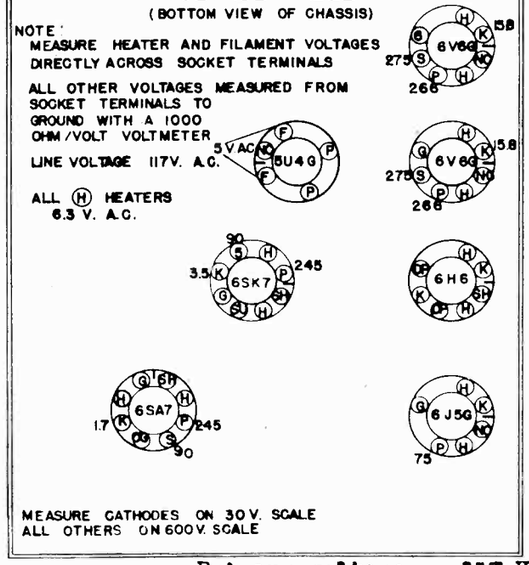
(BOTTOM VIEW OF CHASSIS)

NOTE:
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS

ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER

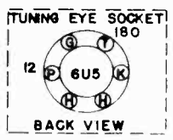
LINE VOLTAGE 117V. A.C.

ALL (H) HEATERS 6.3 V. A.C.



MEASURE CATHODES ON 30 V. SCALE
ALL OTHERS ON 600 V. SCALE

I.F. 455 K.C.



CR-140
CR-150-595184-CR-151

CR-140 Used in American Modern Combination
Used in Chairside Combination
Used in Sheraton Combination

CR-150 Used in Grinnell Model 60 Combination
Used in Chippendale Combination

CR-151 Used in Sheraton Combination

SPECIFICATIONS

Primary voltage....117 V. 50-60 cycle AC;
Power consumption..... 100 watts;
Power output..... 12 watts;

Speaker:

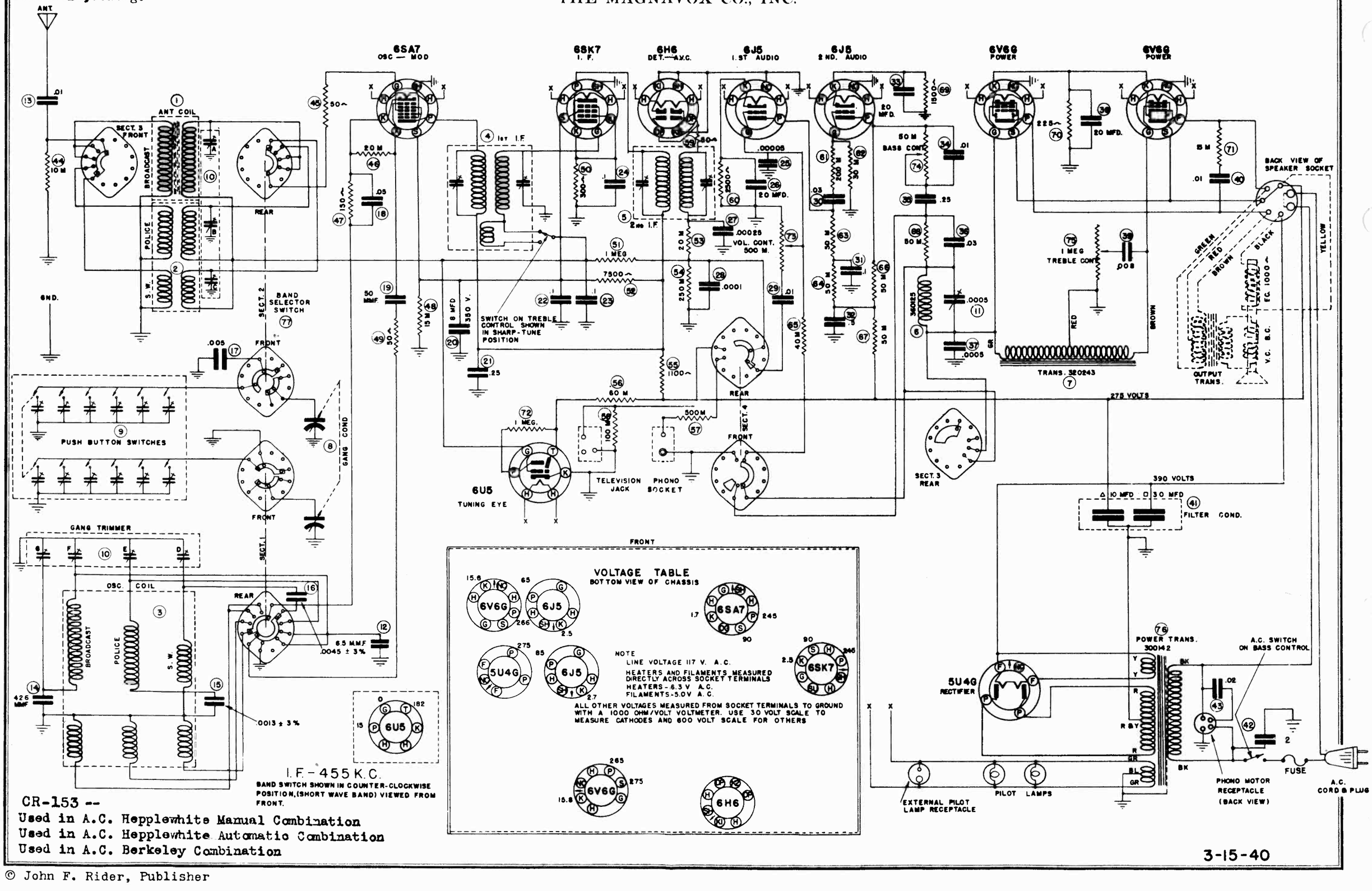
Field coil..... 1000 ohms;
Transformer..... 8000 ohms;

Intermediate frequency.....455 KC;
Tuning frequency range:
539 - 1677 KC;
5.7 - 18.1 MC;

Circuit: Superheterodyne with two tuning ranges, treble control, AVC, bass compensation in volume control for phonograph pickup, push-button condenser-type tuner, television input receptacle.

CHASSIS CR153
Schematic, Voltage

THE MAGNAVOX CO., INC.

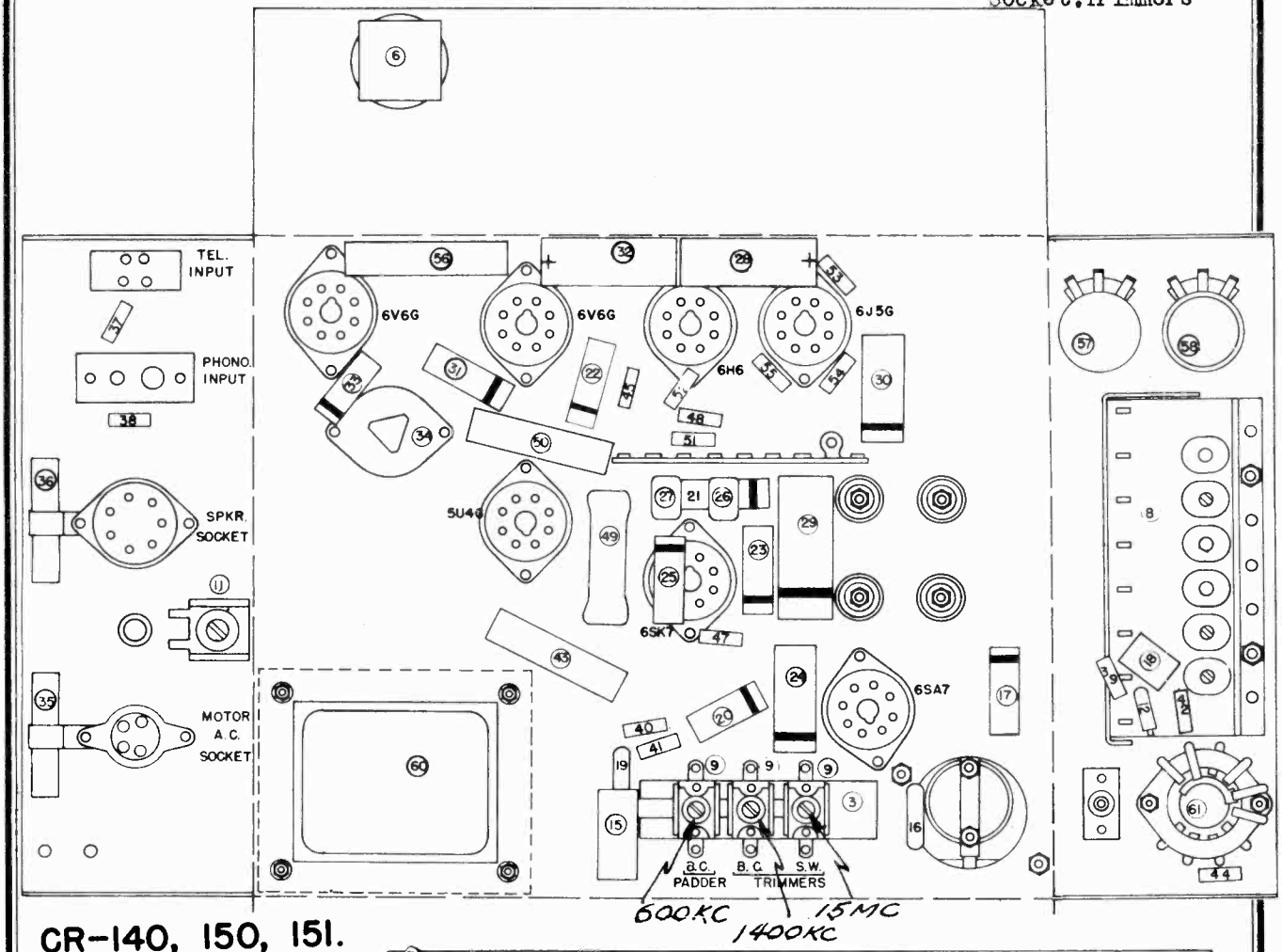


CR-153 --
Used in A.C. Hepplewhite Manual Combination
Used in A.C. Hepplewhite Automatic Combination
Used in A.C. Berkeley Combination

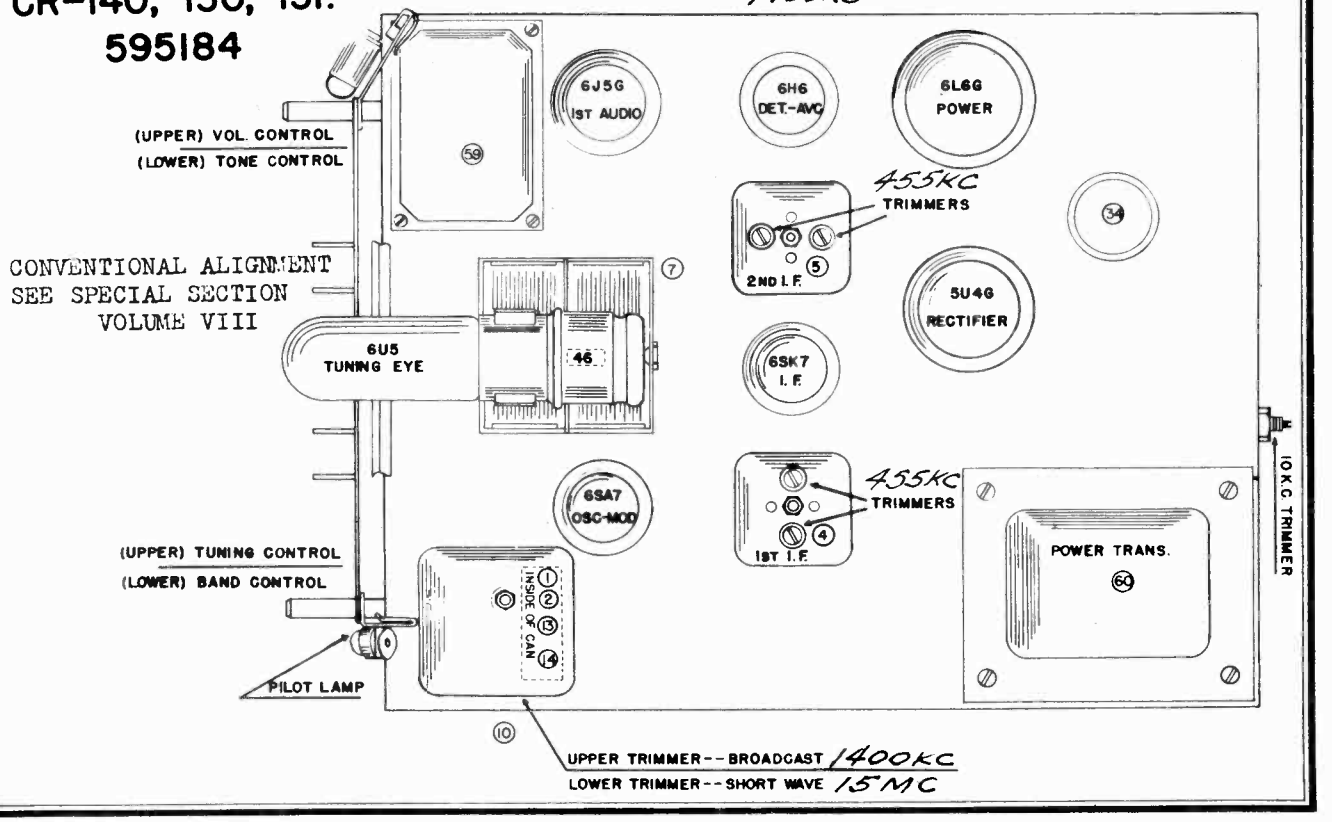
3-15-40

CHASSIS CR140,CR150
CR151
Chassis,Alignment
Socket,Trimmers

THE MAGNAVOX CO., INC.



CR-140, 150, 151.
595184



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

CHASSIS CR153
Chassis, Alignment
Socket, Trimmers
Notes

THE MAGNAVOX CO., INC.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.

SPECIFICATIONS

Primary voltage.....117 V. AC; Intermediate frequency.....455 KC;
Power consumption.....103 watts; Tuning frequency range 535 - 1730 KC;
1.65 - 5.8 MC;
Power output.....12 watts; 5.60 - 18.2 MC;

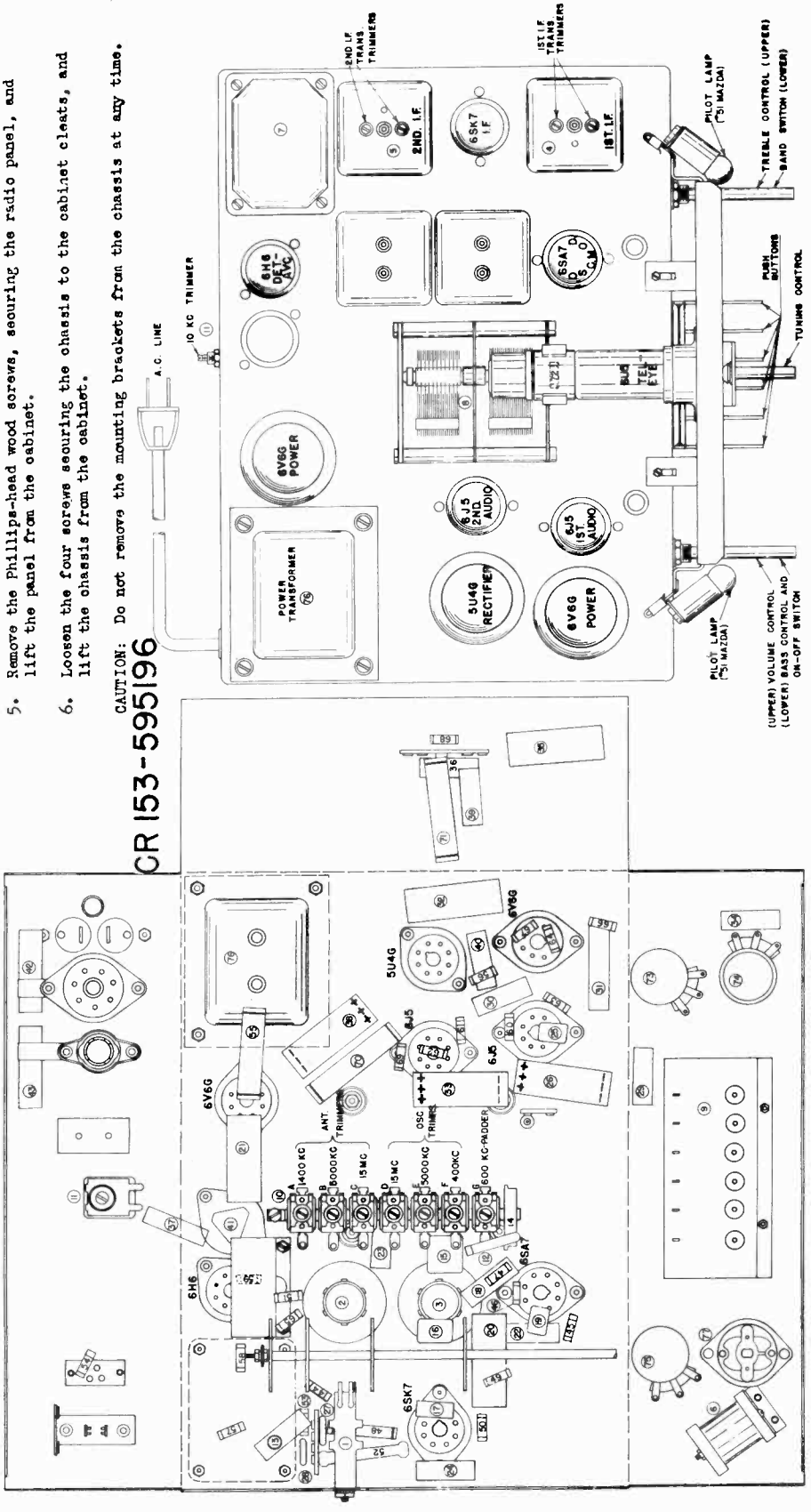
Speaker:
Circuit: Superheterodyne with three tuning ranges, treble and bass controls, bass compensation in volume control for phonograph pickup, A.V.C., condenser type push-button tuner, variable selectivity.
Field Coil.....1000 ohms;
Transformer.....8000 ohms;

BERKELEY AND HEPPLEWHITE UNITS

TO REMOVE THE CHASSIS FROM THE CABINET:

1. Remove the four plugs from the lower side of the chassis and remove the antenna-ground terminal board from the side of the cabinet.
2. Pull the control knobs and the push button knobs from their shafts.
3. Remove the stay-hinge from the lid of the cabinet by removing the two upper wood screws holding it in place. Tilt the cabinet lid back and rest it on a support.
4. Remove the stay-hinge plate from the radio panel.
5. Remove the Phillips-head wood screws, securing the radio panel, and lift the panel from the cabinet.
6. Loosen the four screws securing the chassis to the cabinet cleats, and lift the chassis from the cabinet.

CAUTION: Do not remove the mounting brackets from the chassis at any time.

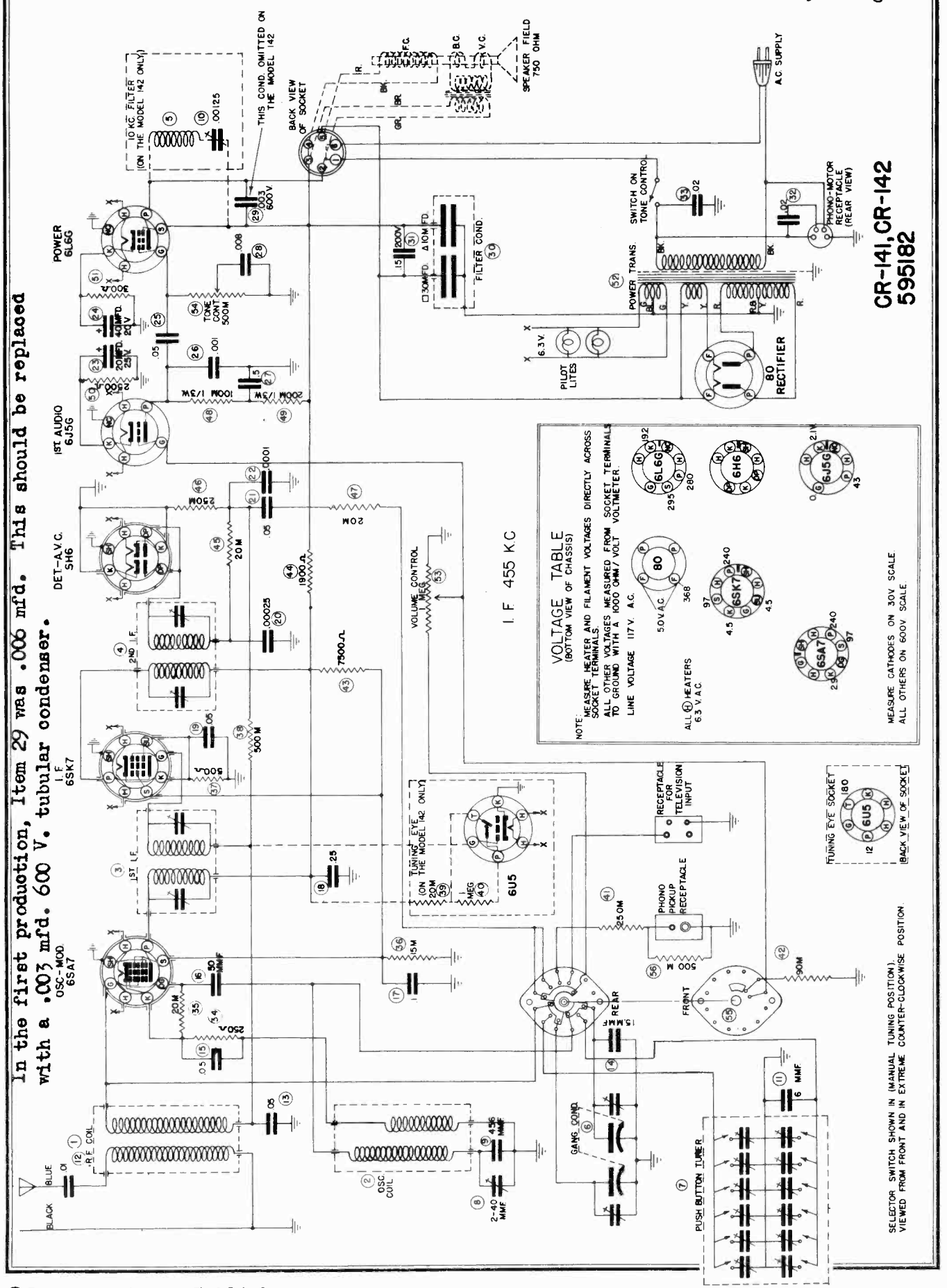


THE MAGNAVOX CO., INC.

CHASSIS CR141, CR142
Schematic, Voltage

CR-141, CR-142
595182

In the first production, Item 29 was .006 mfd. This should be replaced with a .003 mfd. 600 V. tubular condenser.



CHASSIS CR141,CR142
Chassis,Alignment
Socket,Trimmers

THE MAGNAVOX CO., INC.

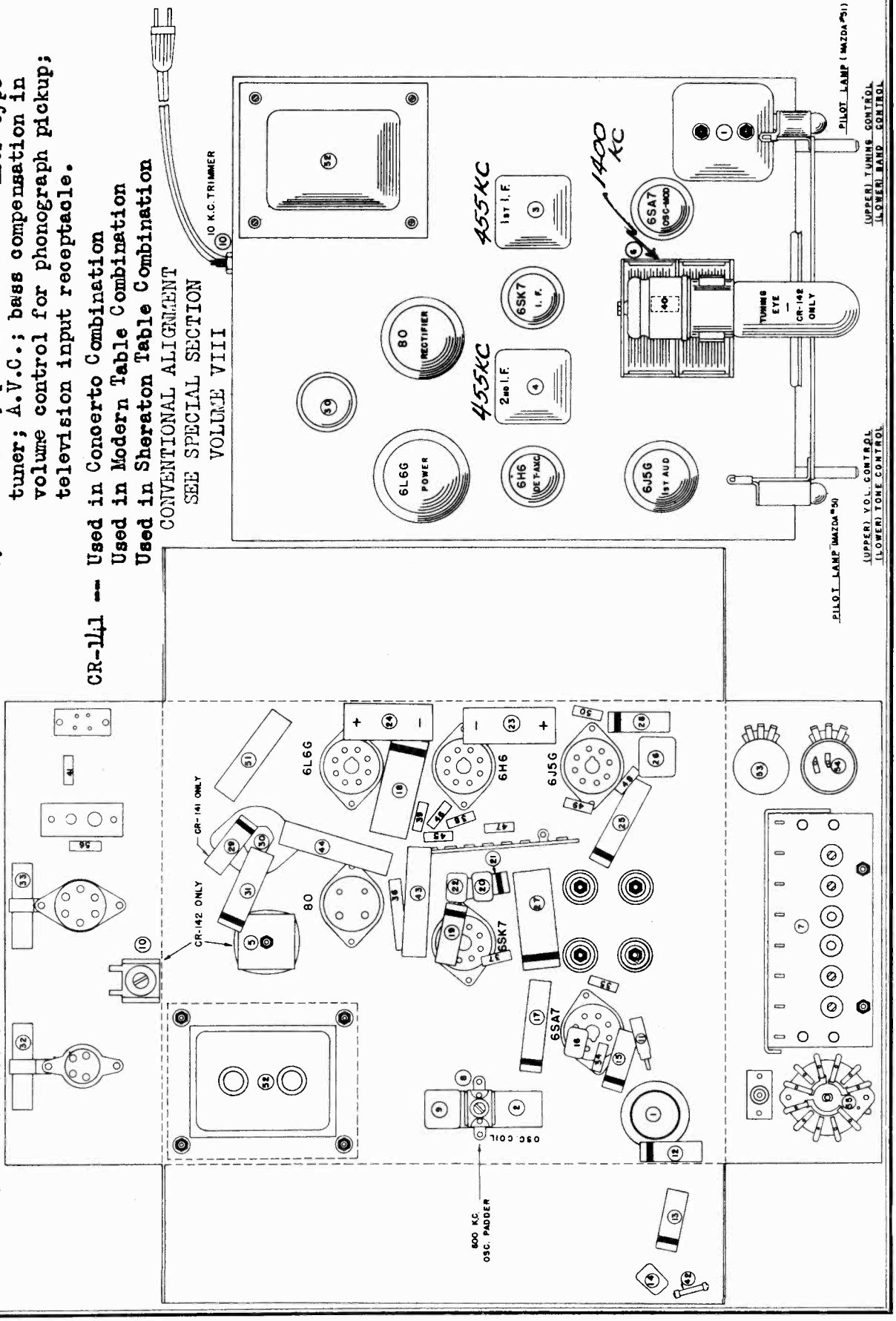
SPECIFICATIONS

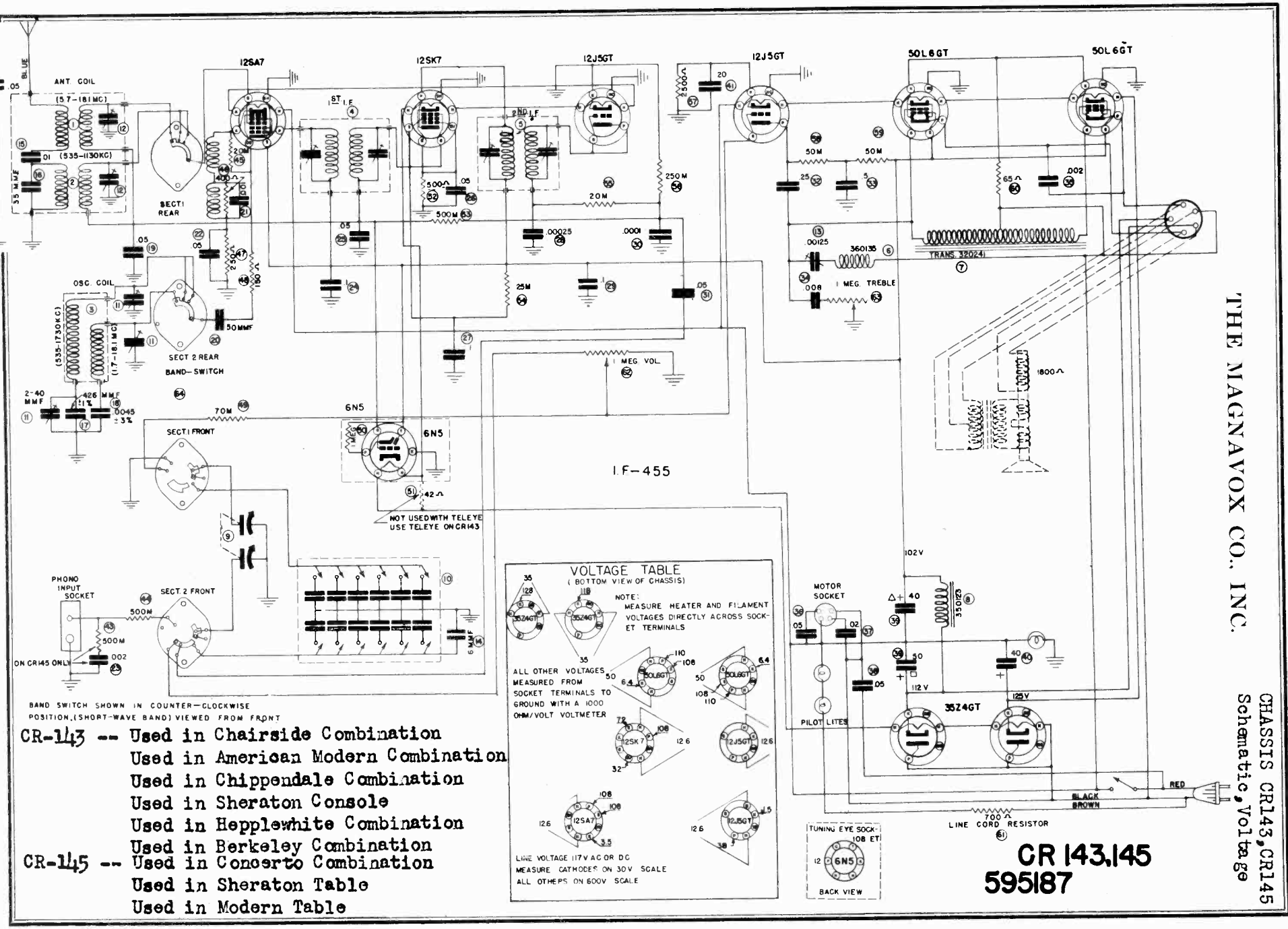
Primary voltage.....117 V. AC; Speaker:
Power consumption....82 watts; Field Coil.....1000 ohms;
Power output.....6 watts; Transformer.....8000 ohms;

Intermediate frequency.....455 KC;
Tuning frequency range... 535-1730 KC;
Circuit: Superheterodyne with treble control; push-button condenser type tuner; A.V.C.; bass compensation in volume control for phonograph pickup; television input receptacle.

CR-141 -- Used in Concerto Combination
Used in Modern Table Combination
Used in Sheraton Table Combination

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII





CR-143 -- Used in Chairside Combination
Used in American Modern Combination
Used in Chippendale Combination
Used in Sheraton Console
Used in Hepplewhite Combination
Used in Berkeley Combination

CR-145 -- Used in Concerto Combination
Used in Sheraton Table
Used in Modern Table

CHASSIS CR143,CR145
Chassis,Alignment
Socket,Trimmers

THE MAGNAVOX CO., INC.

SPECIFICATIONS

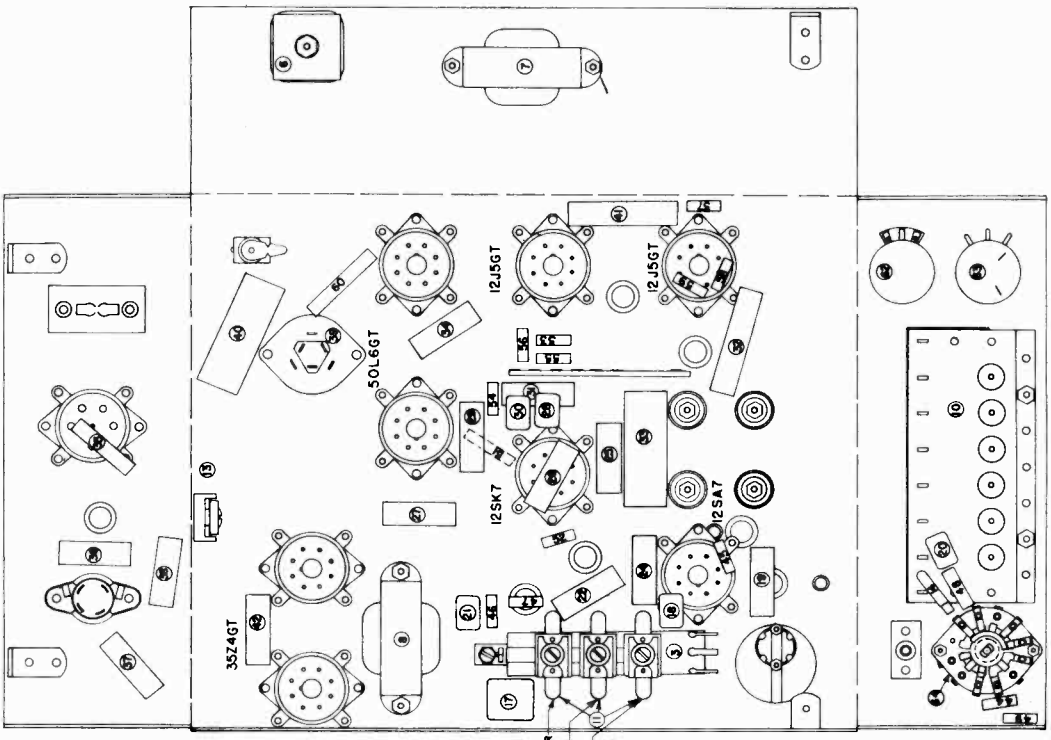
Primary voltage.....117 V. AC-DC;
Power consumption..... 85 watts;

Speaker:

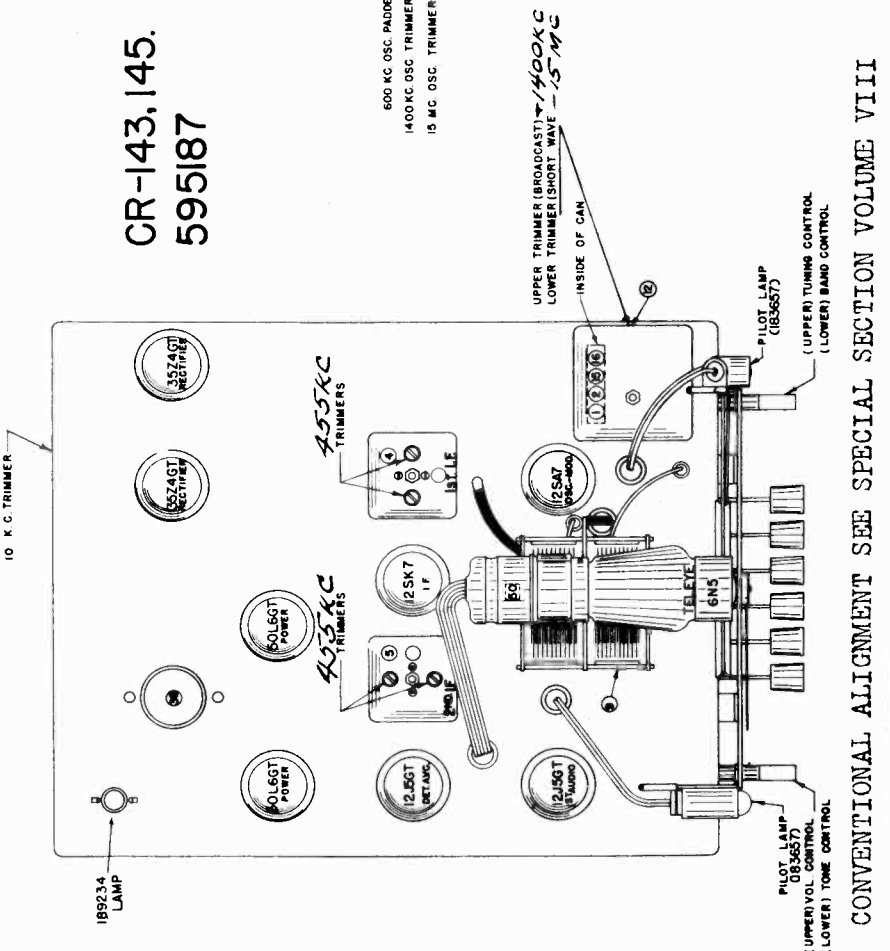
Field Coil.....1800 ohms;
Transformer.....3000 ohms;

Intermediate frequency.....455 KC;
Tuning frequency range: 535 - 1730 KC;
5.7 - 18.1 MC;

Circuit: Superheterodyne with two tuning ranges, treble control; A.V.C.; bass compensation in volume control for phonograph pickup; push-button condenser-type tuner.



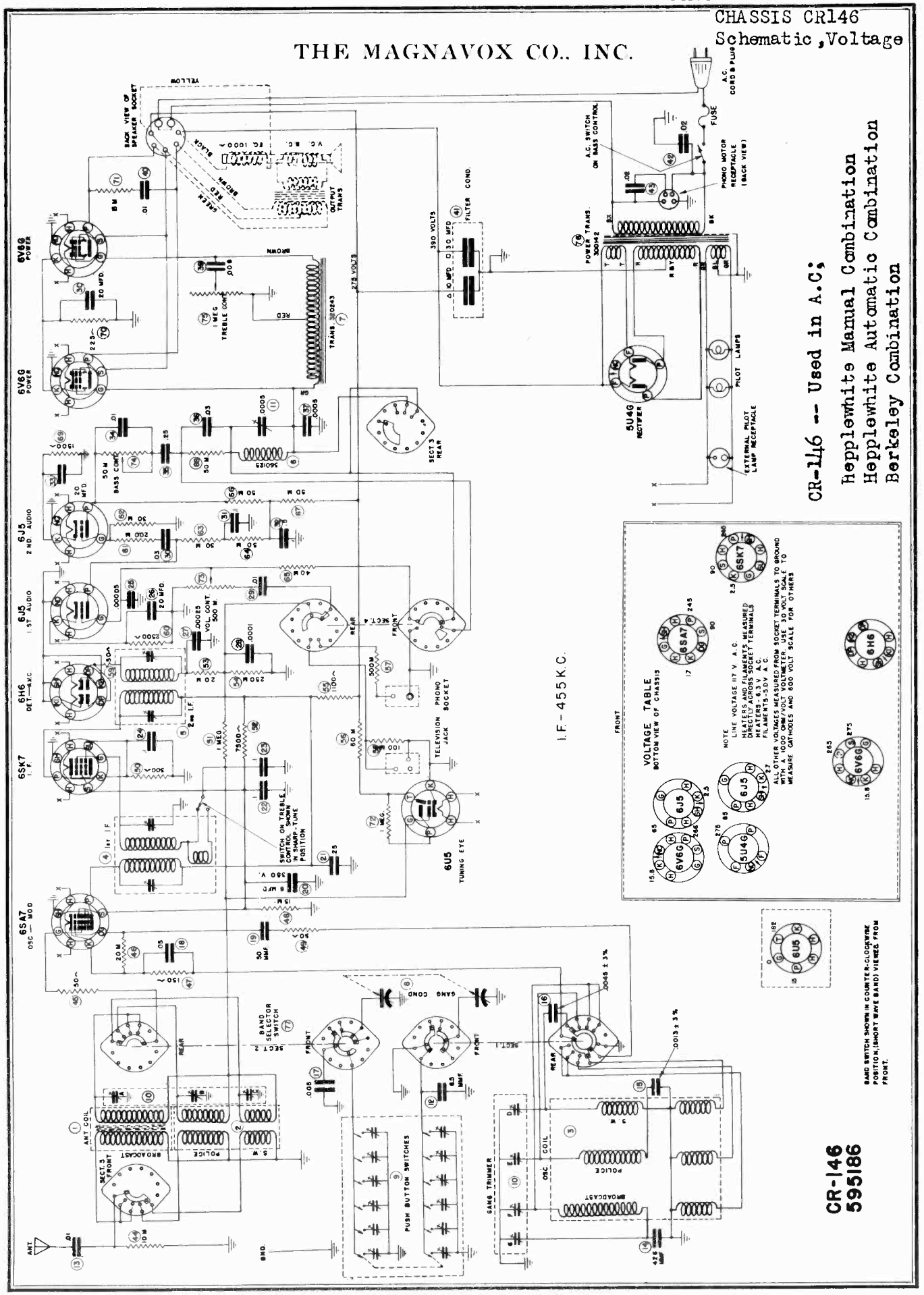
CR-143,145.
595187



CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

CHASSIS CR146
Schematic, Voltage

THE MAGNAVOX CO., INC.



SPECIFICATIONS

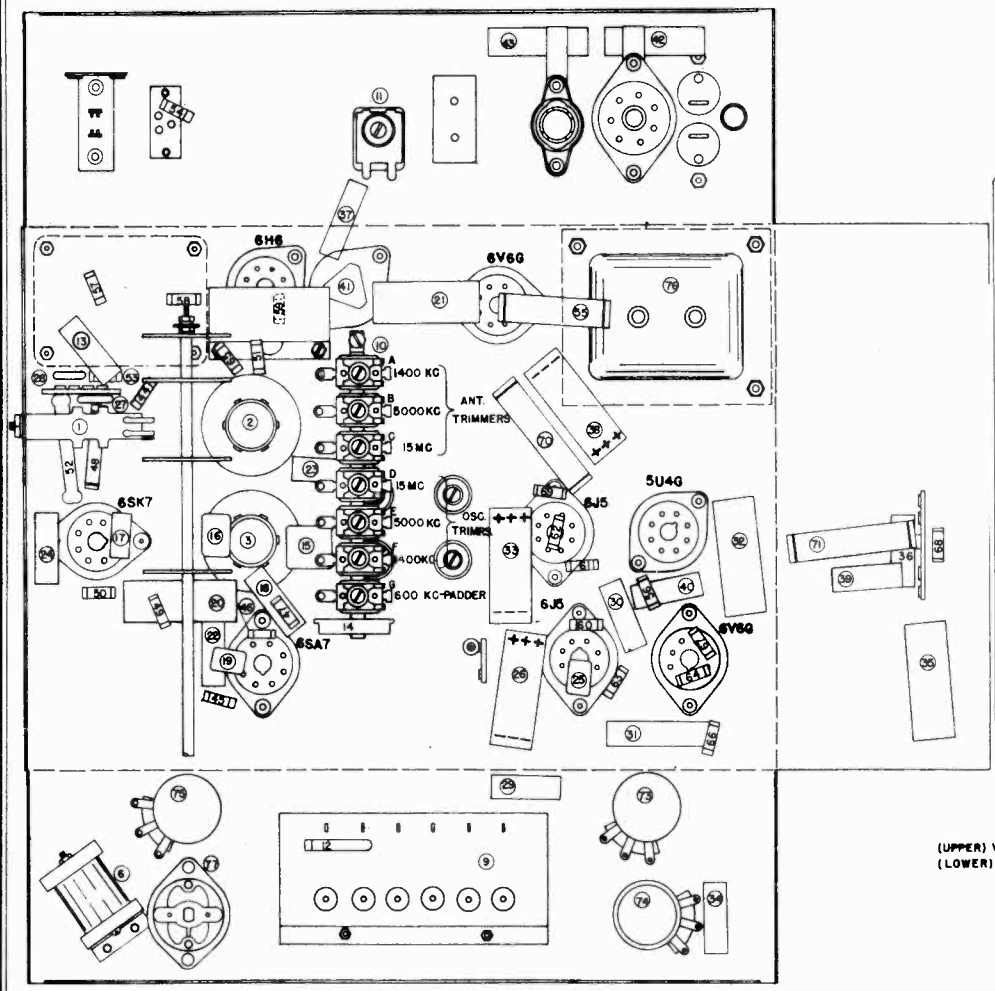
Primary voltage....117 V. AC;
Power consumption..103 watts;
Power output.....12 watts;

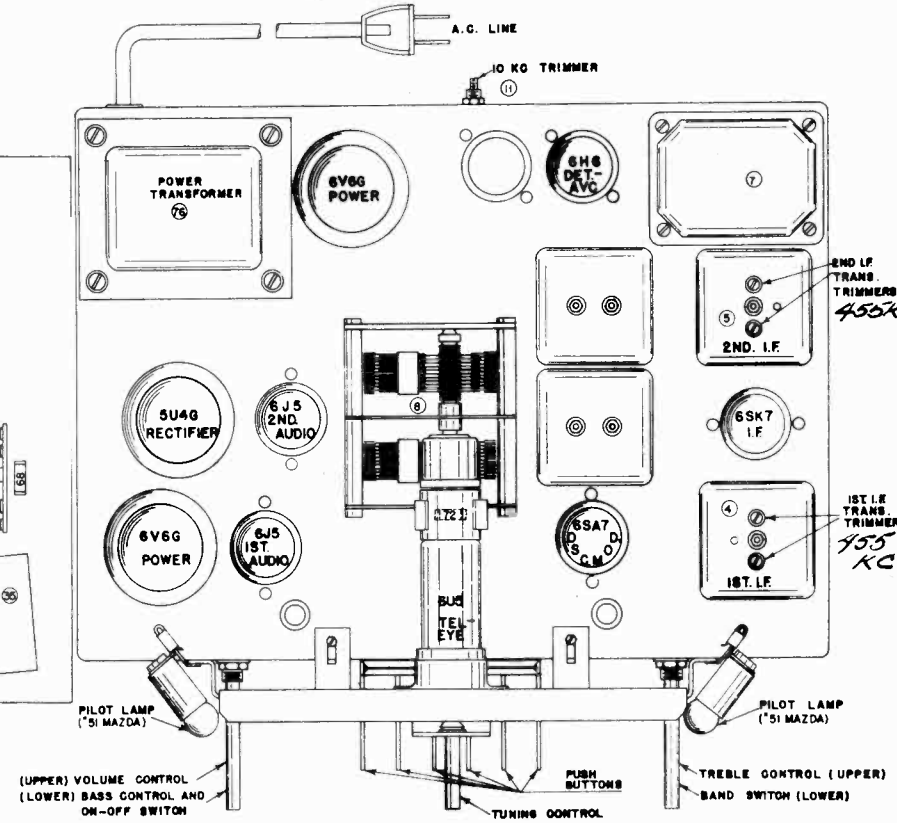
Speaker:
Field Coil....1000 ohms;
Transformer...8000 ohms;

Intermediate frequency.....455 KC;
Tuning frequency range 535 - 1730 KC;
1.65 - 5.8 MC;
5.60 - 18.2 MC;

Circuit: Superheterodyne with three tuning ranges, treble and bass controls, bass compensation in volume control for phonograph pickup, A.V.C., condenser type push-button tuner, variable selectivity.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII





THE MAGNAVOX CO., INC.

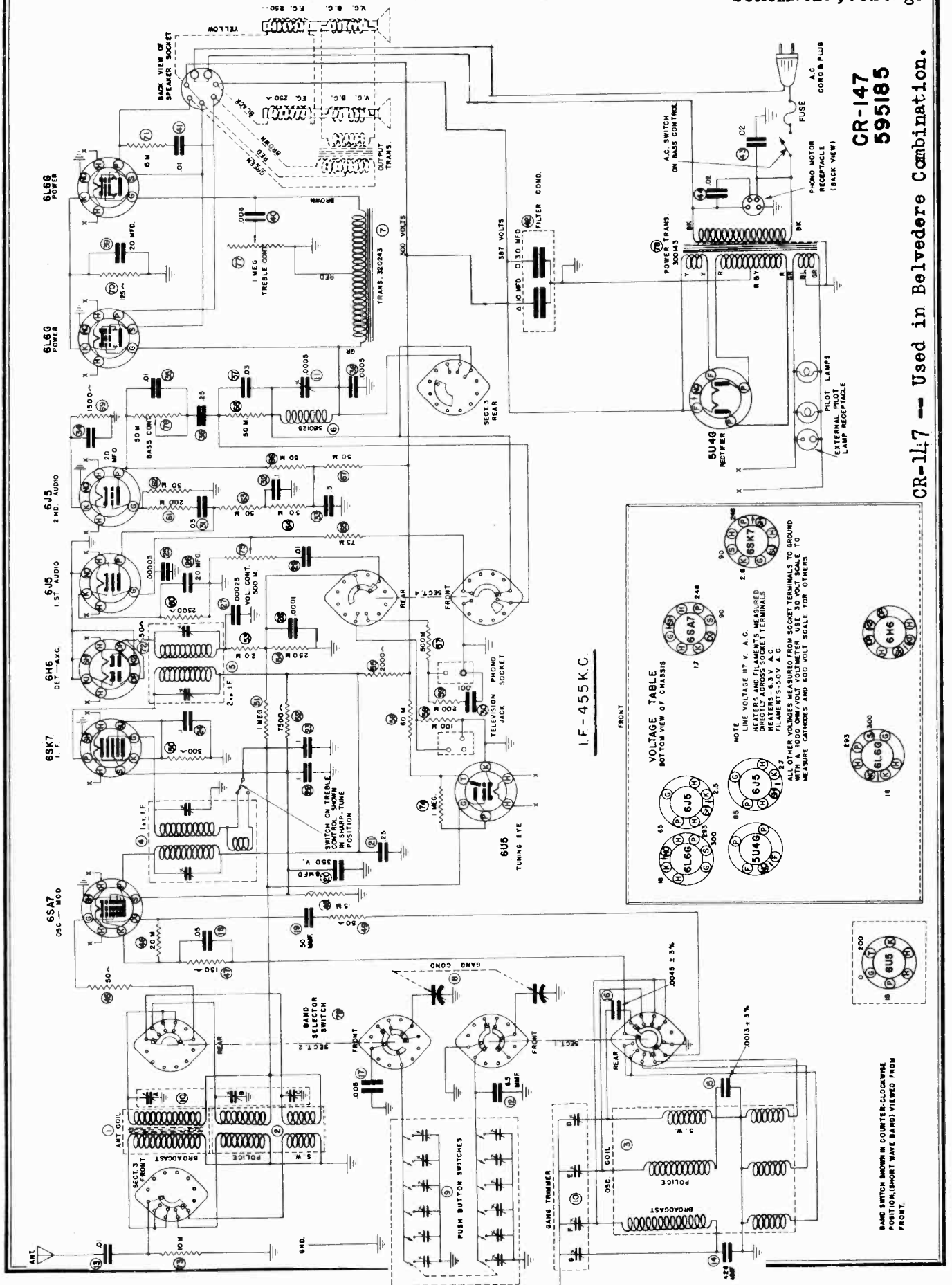
CR146 595186

THE MAGNAVOX CO., INC.

CHASSIS CR147
Schematic, Voltage

CR-147
595185

CR-147 -- Used in Belvedere Combination.



CHASSIS CR147
Chassis,Alignment
Socket,Trimmers

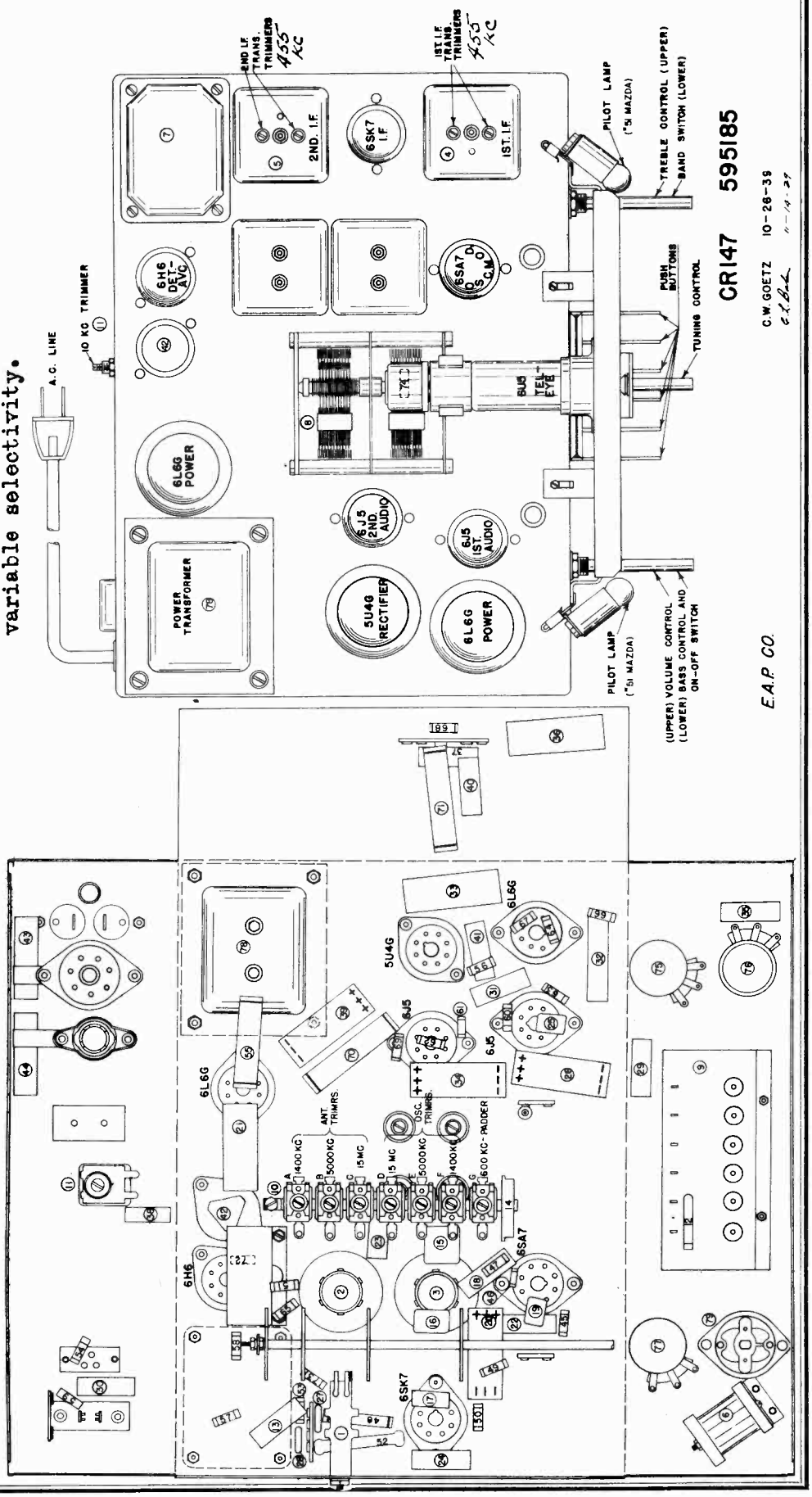
THE MAGNAVOX CO., INC.

SPECIFICATIONS

Intermediate frequency.....455 KC;
Tuning frequency range: 535 - 1730 KC;
1.65 - 5.8 MC;
5.6 - 18.2 MC;
Circuit: Superheterodyne with three tuning ranges, treble and bass controls, I.F. band expansion, A.V.C., bass compensation in volume control for phonograph pickup, variable selectivity.

Speaker (12C131):
Field Coil..... 250 ohms; Primary voltage...117 V. AC;
Transformer..... NONE Power consumption. 160 watts;
Speaker (302):
Field Coil..... 250 ohms;
Transformer..... 5M ohms; Power output..... 20 watts;

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

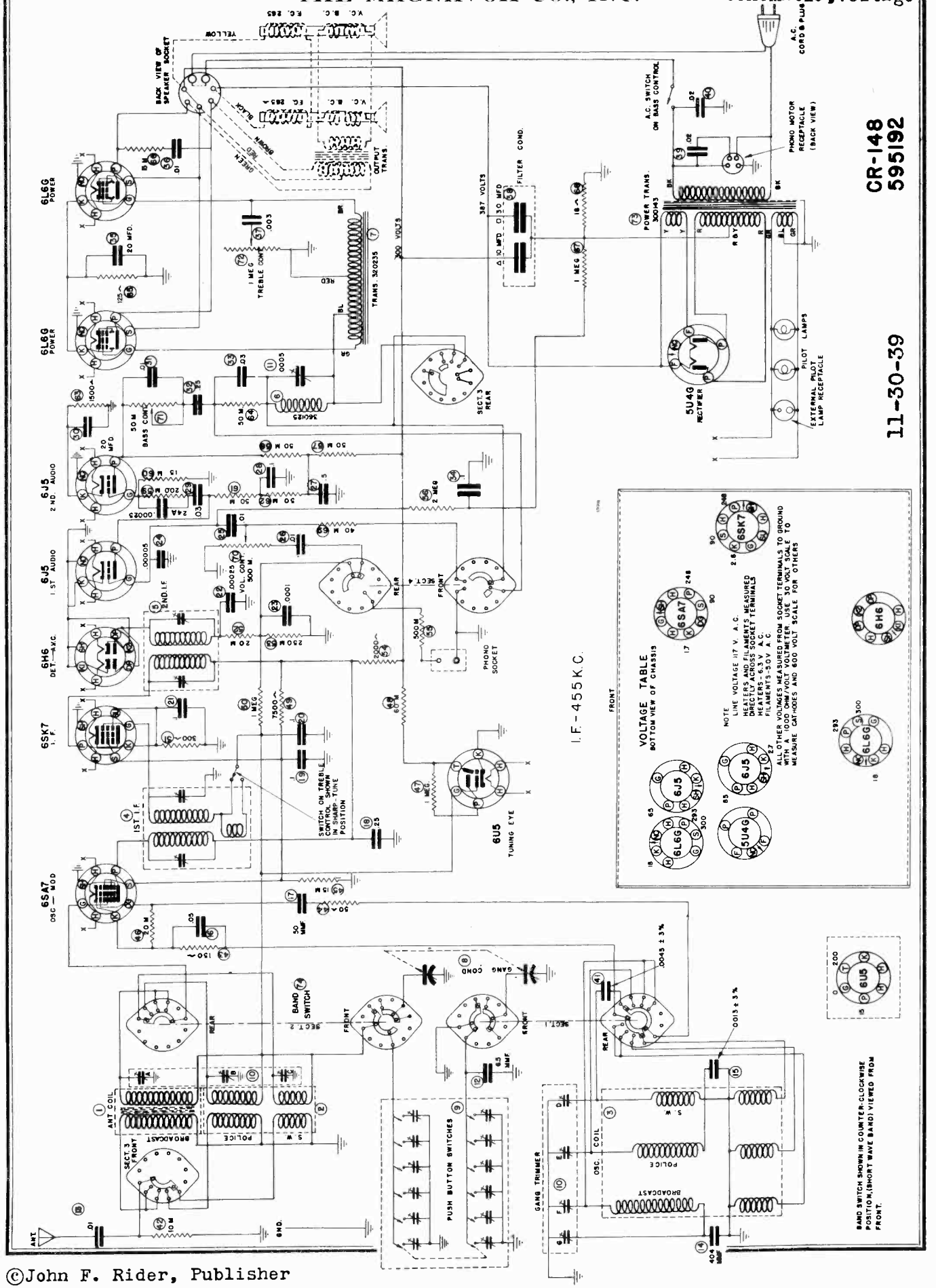


CHASSIS CR148
Schematic, Voltage

THE MAGNAVOX CO., INC.

CR-148
595192

11-30-39



CHASSIS CR148
Chassis, Alignment
Socket, Trimmers

THE MAGNAVOX CO., INC.

CR-148 -- Used in Belvedere Combination

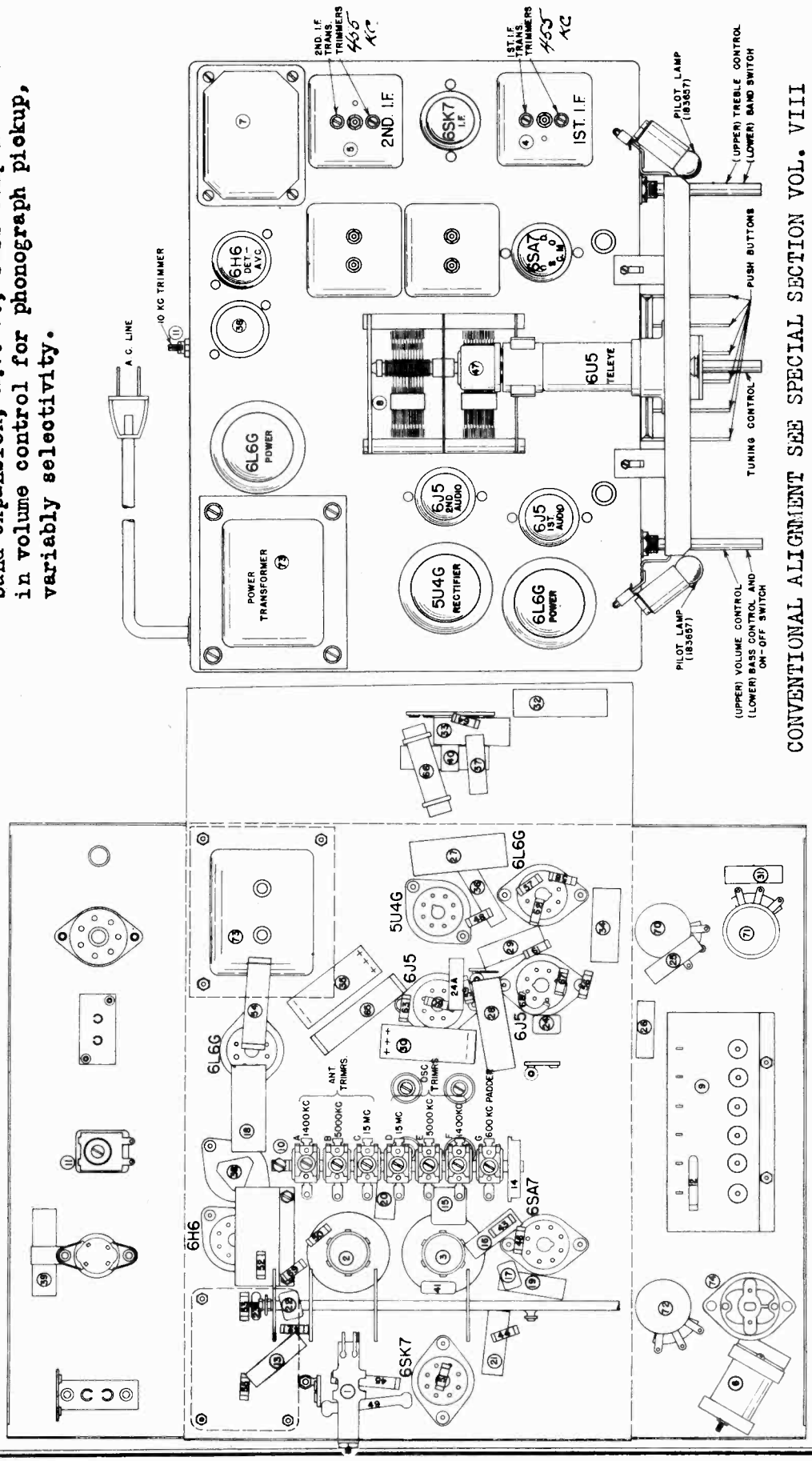
Speaker (12C131):
Field Coil.....250 Ohms;
Transformer..... None
Speaker (302):
Field Coil.....250 Ohms;
Transformer..... 5M Ohms;

Primary voltage...117 V. AC;
Power consumption.160 watts;
Power output..... 20 watts;

Intermediate frequency.....455 KC;
Tuning frequency range: 535 - 1730 KC;
1.65 - 5.8 MC;
5.6 - 18.2 MC:

Circuit: Superheterodyne with three tuning ranges, treble and bass controls, I.F. band expansion, A.V.C., bass compensation in volume control for phonograph pickup, variably selectivity.

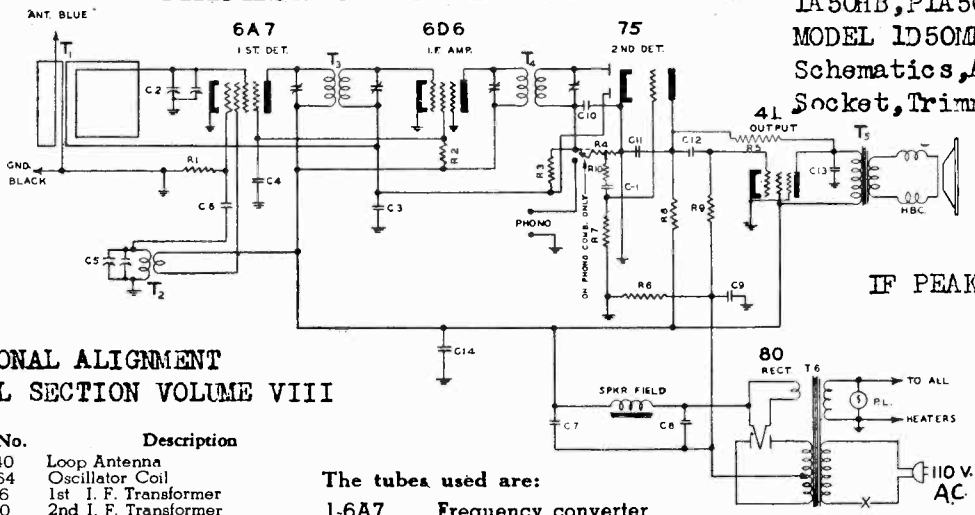
CR148 595192



CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII

MODELS 1A50A, 1A50F
1A50H, 1A50AB, 1A50FB
1A50HB, P1A50, P1A50B
MODEL 1D50MB
Schematics, Alignment
Socket, Trimmers, Tuner

MAJESTIC RADIO & TELEV. CORP



IF PEAK 455 KC

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

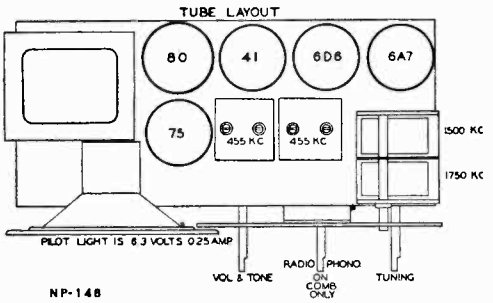
Schematic Location	Part No.	Description
T1	Y-CR-40	Loop Antenna
T2	Y-CS-64	Oscillator Coil
T3	Y-CI-36	1st I. F. Transformer
T4	Y-CI-60	2nd I. F. Transformer
T5		Speaker Output Transformer
T6	Y-TP-30	Power Transformer
C1,C12	C-15754	Tubular cond. .01 mfd. 400V
C2,C5	Y-CV-37	Variable Condenser
C3	C-15752	Tubular cond. .05 mfd. 200V
C4	C-15756	Tubular cond. .05 mfd. 400V
C6	CM-29	Mica cond. 50 mmf. 30%
C10,C11	CM-30	Mica cond. 250 mmf. 30%
C7,C8,C9	Y-CE-43	Electrolytic Condenser
C13	C-25	Tubular cond. .006 mfd. 400V
C14	C-15757	Tubular cond. .1 mfd. 400V
R1	R-15511	Carbon res. 50K ohm ½W 20%
R2	R-83	Carbon res. 35K ohm 1W 20%
R3	R-15500	Carbon resistor 2meg ½W 20%
R4	Y-VC-30	Volume Control
R5	R-15559	Carbon resistor 3meg ½W 20%
R6	R-117	Carbon res. 275 ohm ½W 20%
R7	R-109	Carbon resistor 5meg ½W 20%
R8,R9	R-15520	Carbon res. 500K ohm ½W 20%
R10	R-15515	Carbon res. 100K ohm ½W 20%
P.L.	LB-44	Pilot Light Mazda #44

The tubes used are:

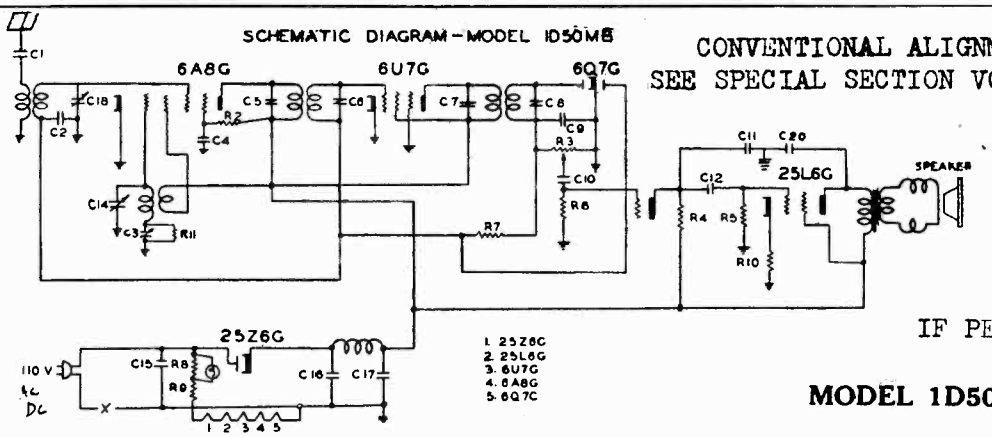
1-6A7	Frequency converter
1-6D6	Intermediate frequency amplifier
1-75	2nd Detector, AVC, and audio driver
1-41	Power output
1-80	Rectifier

Model 1A50-A
Model 1A50-F
Model 1A50-H
Model P-1A50

Model 1A50-A-B
Model 1A50-F-B
Model 1A50-H-B
Model P-1A50-B



NP-148



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

IF PEAK 455 KC

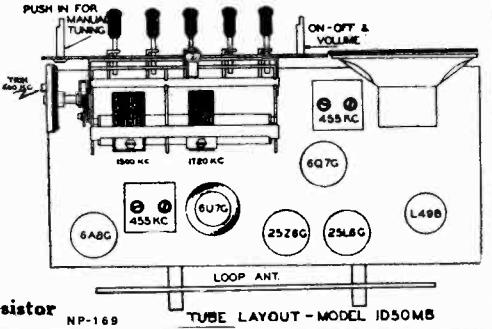
MODEL 1D50-MB

PUSH-BUTTONS: Unscrew the push-button on which you desire to receive a certain station. Tune in this station manually. Push in the push button and screw it tightly while holding it in. Repeat for other stations.
Insert station tabs in the escutcheon by snapping them in place. Pushing in any button will cause the desired station to be heard.

Schematic Location	Part No.	Description
C1,C12	C-15754	Tubular cond. .01 mfd. 400V
C2,C4	C-15752	Tubular cond. .05 mfd. 200V
C15	C-15756	Tubular cond. .05 mfd. 400V
C10	C-15753	Tubular cond. .002 mfd. 600V
C16,C17,C13	Y-CE-46	Electrolytic
C9	CM-30	Mica cond. 250 mmf. 30%
C11	CM-31	Mica cond. 100 mmf. 30%
C3	Y-CP-8	Padding Condenser
R11	R-15511	Carbon res. 50K ohm ½W 20%
R5	R-15520	Carbon res. 500K ohm ½W 20%
R4	R-15512	Carbon res. 250K ohm ½W 20%
R6	R-79	Carbon resistor 15meg ½W 20%
R10	R-46	Carbon res. 110 ohm ½W 20%
R7	R-15500	Carbon resistor 2meg ½W 20%
R3	Y-CV-25	Volume Control
R8,R9	L-49-B	Plug in Ballast Resistor

The tubes used are:

1-6A8G	Converter
1-6U7G	I. F. Amplifier
1-6Q7G	2nd Detector
1-25L6G	Beam Output
1-25Z6G	Rectifier
1-L49B	Plug-in Ballast Resistor



NP-169

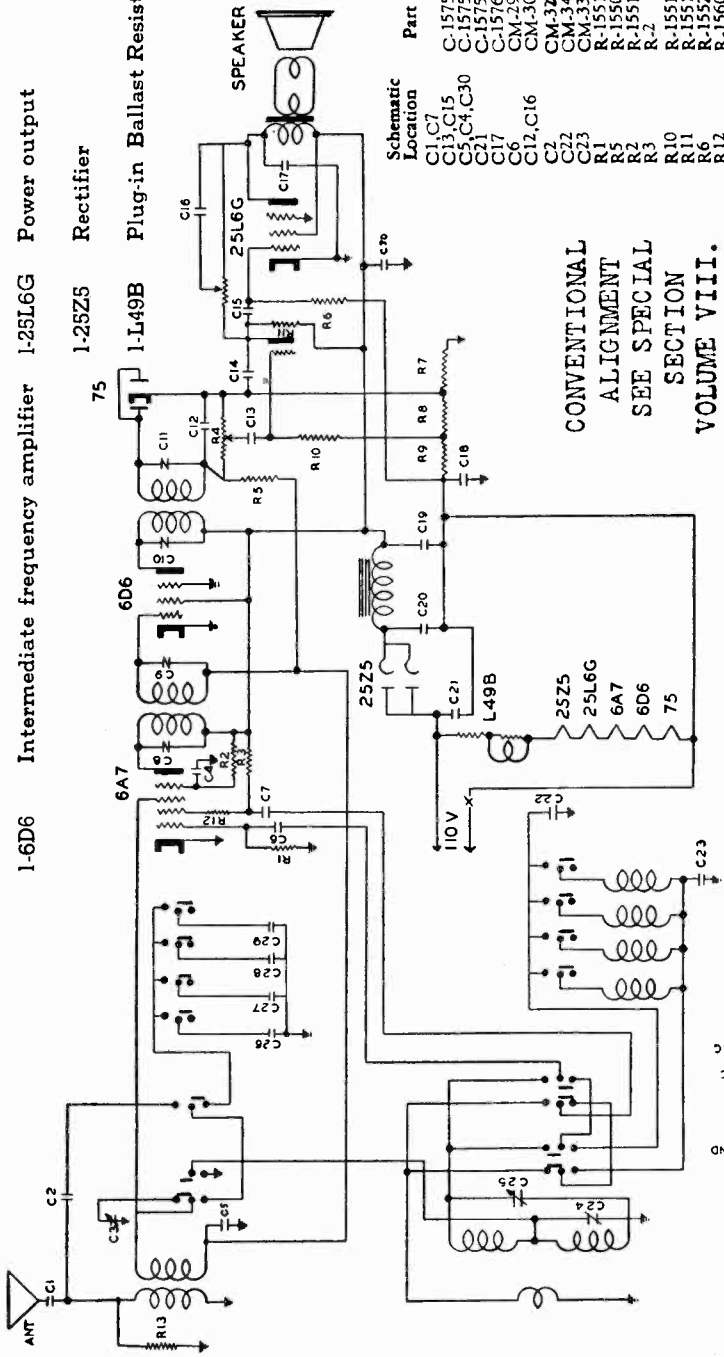
TUBE LAYOUT - MODEL 1D50MB

MODEL 1D59-EB-PL
Schematic, Socket
Alignment, Trimmers
Tuner

MAJESTIC RADIO & TELEV. CORP.

The tubes used are: 1-6A7 Frequency converter 1-75 2nd detector, AVC, and A. F. Amplifier
1-6D6 Intermediate frequency amplifier 1-25L6G Power output
1-25Z5 Rectifier
1-L49B Plug-in Ballast Resistor

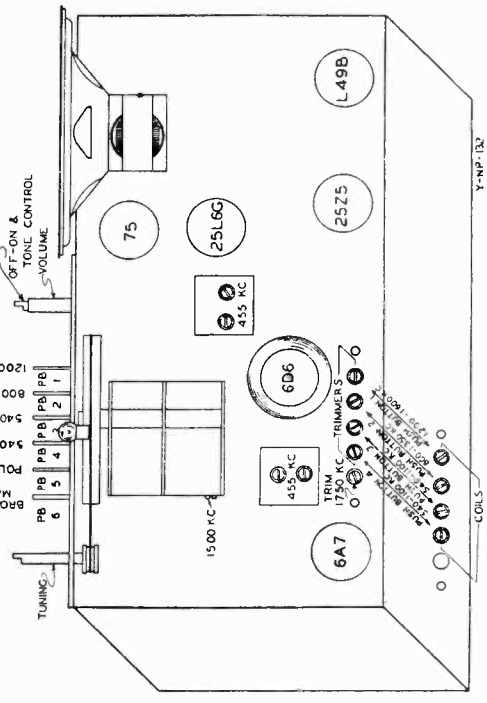
The bands covered are:
(A) 538 to 1750 Kilocycles.
(B) 2.3 to 6.5 Megacycles.



Schematic Location	Part No.	Description
C1,C7	C-15754	Tubular cond. .01 mfd. 400 V
C13,C15	C-15752	Tubular cond. .05 mfd. 200V
C5,C4,C30	C-15757	Tubular cond. .1 mfd. 400V
C21	C-15760	Tubular cond. .02 mfd. 400V
C17	CM-29	Mica cond. 50 mmf. 30%
C6	CM-30	Mica cond. 250 mmf. 30%
C12,C16	CM-32	Mica cond. 10 mmf. 30%
C2	CM-34	Mica cond. 150 mmf. 5%
C22	CM-33	Mica cond. 250 mmf. 5%
C23	R-15511	Carbon res. 50K ohm ½W 20%
R1	R-15500	Carbon res. 2 meg. ½W 20%
R5	R-15516	Carbon res. 15K ohm ½W 20%
R2	R-2	Carbon res. 5K ohm ½W 20%
R3	R-15517	Carbon res. 1 meg. ½W 20%
R10	R-15512	Carbon res. 250K ohm ½W 20%
R11	R-15528	Carbon res. 400K ohm ½W 20%
R6	R-15601	Carbon res. 100 ohm ½W 20%
R12	RC-8	Candohm Resistor
R7,R8,R9	R-15531	Carbon res. 10K ohm ½W 20%
R13	Y-VC-33	Volume and tone control

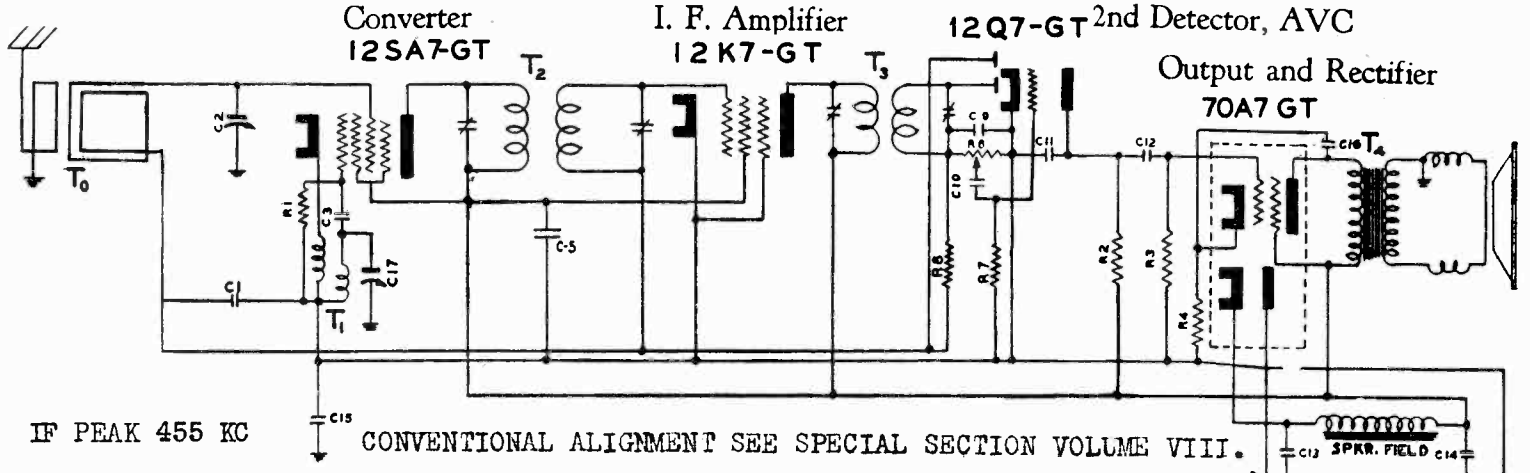
ADJUSTMENTS OF PUSH BUTTONS

These push-buttons are adjusted so as to come within three (3) frequency ranges. The first button from the left is for stations lying between 1200 and 1600 kylocycles. The second (2) button is for stations lying between 800 and 1350 kilocycles. The third (3) and fourth (4) buttons are for stations lying between 540 and 1100 kilocycles. To set up these buttons, determine which four (4) stations you wish to receive most frequently. Ascertain their frequencies and determine on which button they should be set up. Push in the button on which a particular station is to be set up and, with a screw driver, turn the screw at the rear of the chassis corresponding to this push-button, until the station you desire to hear is received with best quality and tone. Go to the top rear of the chassis and adjust the corresponding trimmer condenser until that station is heard with maximum volume. Repeat for the other push-buttons. The location of these adjustment points is shown in figure 1.



MAJESTIC RADIO & TELEV. CORP.

MODELS 1M40I, 1M40R
1M40W
Schematic, Socket
Alignment, Trimmers

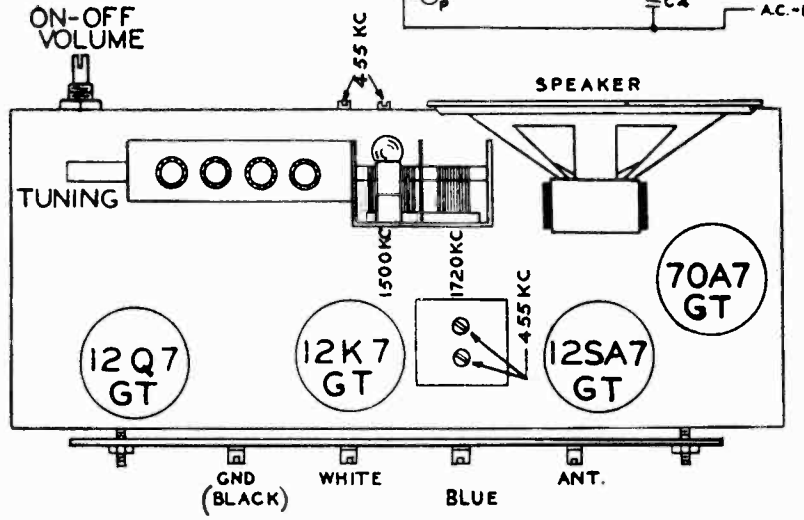


IF PEAK 455 KC

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.

MODELS 1M40-W, 1M40-I, 1M40-R

Location	*Part No.*	*Description*
C1	C-15752	.05—200 V Tubular Condenser
C4	C-15756	.05—400 V Tubular Condenser
C5	C-15757	.1—400 V Tubular Condenser
C10	C-15774	.002—400 V Tubular Condenser
C12	C-15754	.01—400 V Tubular Condenser
C15	C-15751	.25—200 V Tubular Condenser
C16	C-15760	.02—400 V Tubular Condenser
C3	CM-29	50 mmfd. 30% Mica Condenser
C9	CM-30	250 mmfd. 30% Mica Condenser
C11	CM-31	100 mmfd. 30% Mica Condenser
C2, C17	Y-CV-48	Variable Condenser
C13, C14	Y-CE-50	Electrolytic Condenser
R1	R-15510	20K ohm ¼ W 20% Carbon Resistor
R2	R-15512	250K ohm ¼ W 20% Carbon Resistor
R3	R-15520	500K ohm ¼ W 20% Carbon Resistor
R4	R-106	150 ohm ¼ W 20% Carbon Resistor
R5	R-86	70 ohm 2 W Flexible Resistor
R6	Y-VC-40	500K ohm Volume Control
R7	R-107	7 megohm ¼ W 20% Carbon Resistor
R8	R-15500	2 megohm ¼ W 20% Carbon Resistor



To	Y-CR-44	Loop Antenna
T1	Y-CS-113	Oscillator Coil
T2	Y-IFA-7	1st I.F. Transformer
T3	Y-CI-32	2nd I.F. Transformer
T4		Speaker Output Transformer

MODELS 3C80,3C80P,380;3SC80,3SC80B;3C90,390;3SC90.

PUSH BUTTON TUNING

Six buttons on this set are provided to allow you to select your favorite station in the broadcast band instantaneously without any operation except that of pushing a button. These buttons start from the fourth from the left to the fourth from the right, inclusive, and numbering them from the left to the right, as 1, 2, 3, 4, 5, and 6.

The buttons numbered 1, 2, and 3 are designed to cover the frequency range from 1700 to 800 Kc. Buttons number 4, 5, and 6 are designed to cover the range from 1200 to 540 Kc. To set up these buttons it is only necessary to select one of the buttons which includes the frequency of the station which you wish to receive, and depress that button. Select the corresponding screw in the back of the receiver and with a small screw driver adjust it by turning the screw in or out until the station is being received as well as possible. Then, using the same screw driver, adjust the corresponding trimmer from the top of the chassis until maximum volume is obtained on that station. The other buttons may be adjusted in exactly the same fashion to different stations. Every time a button is adjusted for a certain station, remove the call letter tab from the sheet of call letters furnished with the receiver, and insert it through the small slit in the side of the knob so that the call letters show through the top of the knob. After the buttons have been once adjusted in this fashion, it is only necessary to press the button marked with the call letters of the station you wish to receive, whereupon it will be heard instantaneously.

MODELS 5BDA, 5BEA

PUSH BUTTONS: Looking at the front of the set counting from left to right, the first four push buttons are for setting up stations.

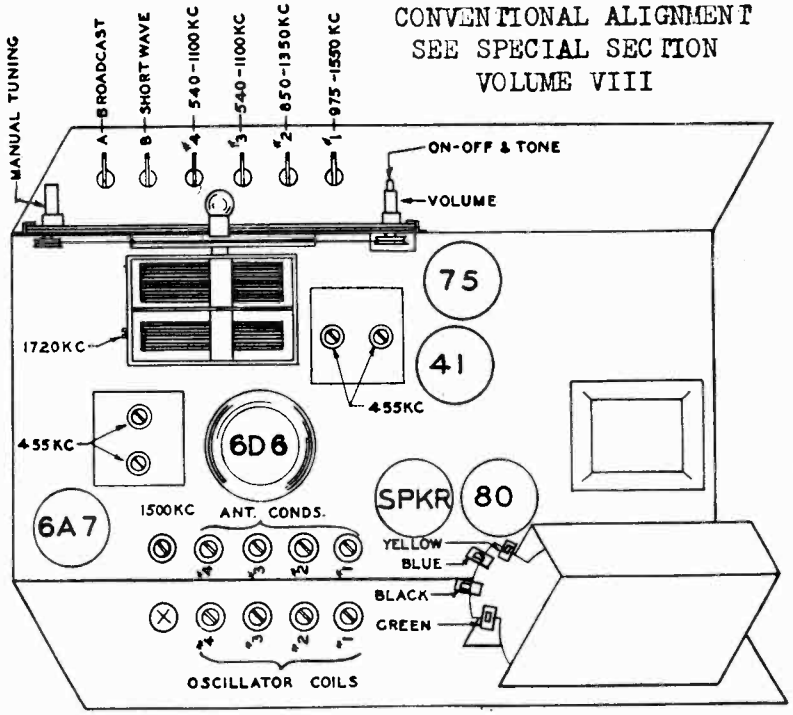
Button number 1 is for stations lying between 975 and 1550 Kilocycles
Button number 2 is for stations lying between 850 and 1350 Kilocycles
Button number 3 is for stations lying between 540 and 1100 Kilocycles
Button number 4 is for stations lying between 540 and 1100 Kilocycles
Button number A is for Broadcast Band.
Button number B is for Short Wave Band

Determine on which button a desired station is to be set up. Push that button in. Going to the rear of the receiver, adjust the coil corresponding to the chosen push button until the desired station is heard with maximum volume and best tone. Adjust the trimmer corresponding to the chosen button until that station is heard with maximum volume. Repeat for other push buttons.

MODEL 1M40.

ADJUSTMENT OF PUSH BUTTONS

Determine on which push button you wish to set a particular station. Pull off that button. Using a screw driver, loosen the screw covered by the button. Tune the set manually by means of the station dial drum until the desired station is heard with best tone and volume. Push the push button shaft as far as it will go, tighten the screw, insert the proper station tab in the slot of the push button, and replace the push button on the push button shaft. Repeat for other stations.



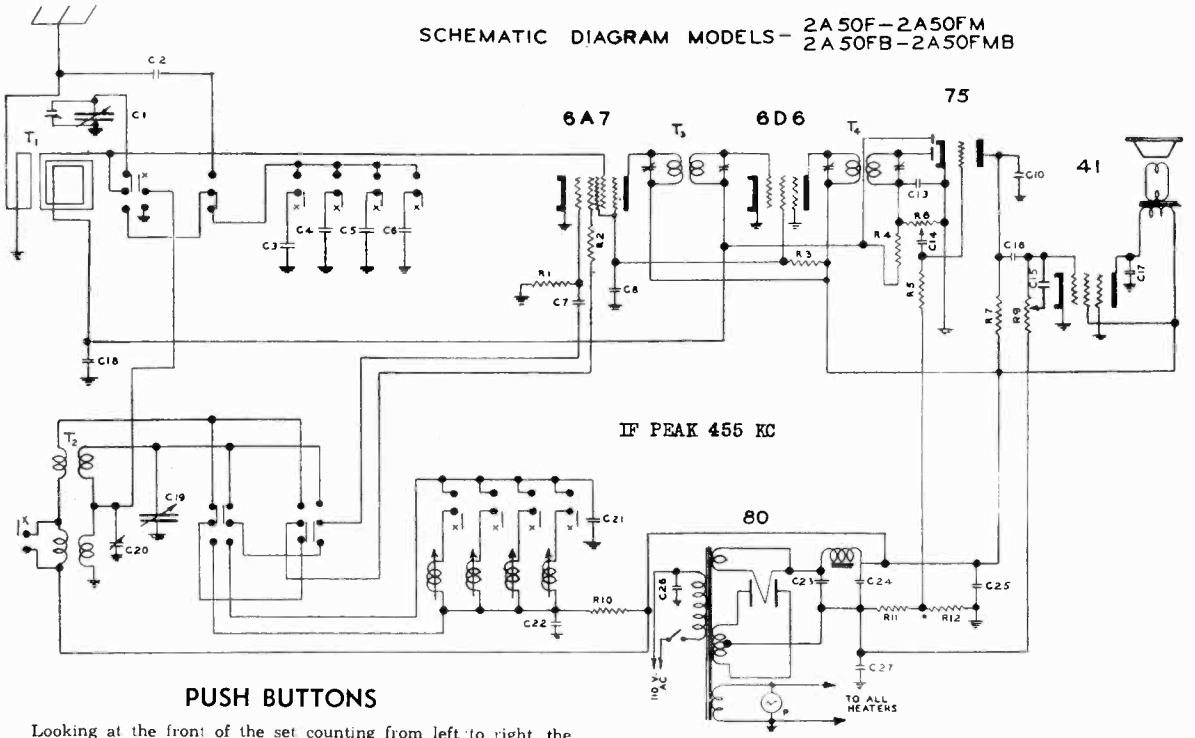
MODELS 5BDA, 5BEA

Socket Trimmers
Tuner

MAJESTIC RADIO & TELEV. CORP.

MODELS 2A50F, 2A50FB
2A50FM, 2A50FMB
Schematic, Alignment

SCHEMATIC DIAGRAM MODELS – 2A50F–2A50FM
2A50FB–2A50FMB



PUSH BUTTONS

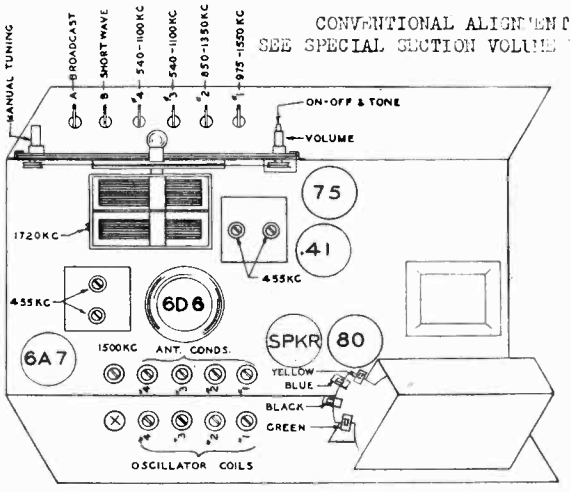
Looking at the front of the set counting from left to right, the first four push buttons are for setting up stations.
Button number 1 is for stations lying between 975 and 1550 Kilocycles.
Button number 2 is for stations lying between 850 and 1350 Kilocycles.
Button number 3 is for stations lying between 540 and 1100 Kilocycles.
Button number 4 is for stations lying between 540 and 1100 Kilocycles.
Button number A is for Broadcast Band.
Button number B is for Short Wave Band.

Determine on which button a desired station is to be set up. Push that button in. Going to the rear of the receiver adjust the coil corresponding to the chosen push button until the desired station is heard with maximum volume and best tone. Adjust the trimmer corresponding to the chosen button until that station is heard with maximum volume. Repeat for other push buttons.

Plug in the line cord to an AC power line of 105-130 Volts of 60 Cycles for Models 2A50-F and 2A50-F-M, and 50 or 60 Cycles for Models 2A50-F-B and 2A50-F-M-B.

The tubes used are:

1—6A7	Frequency converter
1—6D6	Intermediate frequency amplifier
1—75	Second detector, AVC, and Audio frequency amplifier
1—41	Output
1—80	Rectifier



TUBE LAYOUT MODEL 2A50
(*See Figure No. 1*)

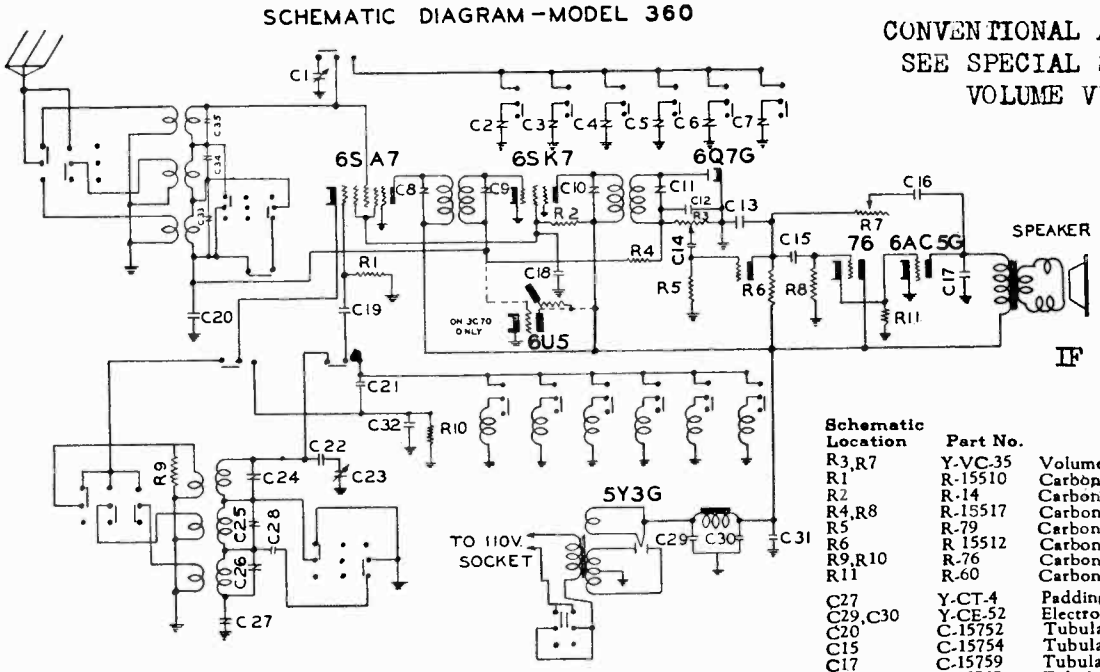
REPLACEMENT PARTS LIST FOR MODELS 2A50-F, 2A50-F-B, 2A50-F-M, 2A50-F-M-B

Schematic Location	*Part Number*	*Description*
R1	R-15511	50K ohm ¼ W 20% Carbon Resistor
R2	R-15601	100 ohm ¼ W 20% Carbon Resistor
R3	R-15544	15K ohm 1 W 20% Carbon Resistor
R4	R-15500	2 megohm ¼ W 20% Carbon Resistor
R5	R-15517	1 megohm ¼ W 20% Carbon Resistor
R6, R9	Y-VC-33	Volume and Tone Control
R7	R-15512	250K ohm ¼ W 20% Carbon Resistor
R10	R-2	5000 ohm ¼ W 20% Carbon Resistor
R11	R-82	35 ohm ¼ W 20% Carbon Resistor
R12	R-98	150 ohm ½ W 10% Carbon Resistor
T1	Y-CS-100	Loop Antenna
T2	Y-CS-102	Oscillator Coil
T3	Y-CI-40	1st I.F. Transformer
T4	Y-CI-42	2nd I.F. Transformer
C2, C14	C-15754	.01 mfd. 400 V Tubular Condenser
C8, C25	C-15756	.05 mfd. 400 V Tubular Condenser
C15	C-30	.001 mfd. 400 V Tubular Condenser
C16, C17	C-25	.006 mfd. 400 V Tubular Condenser
C18	C-15752	.05 mfd. 200 V Tubular Condenser
C26	C-18	.01 mfd. 400 V 20% Tubular Ceramic
C7	CM-29	50 mmf. 30% Mica Condenser
C10	CM-31	100 mmf. 30% Mica Condenser
C22	CM-33	250 mmf. 5% Mica Condenser
C21	CM-34	150 mmf. 5% Mica Condenser
C3, C4, C5, C6		
C20	Y-CT-30B	Trimmer Strip
C23, C24, C27	Y-CE-43	Electrolytic Condenser

MODELS 3C70,360
Schematic, Alignment
Socket, Trimmers
Tuner

MAJESTIC RADIO & TELEV. CORP.

SCHEMATIC DIAGRAM—MODEL 3C70 360



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

IF PEAK 455 KC

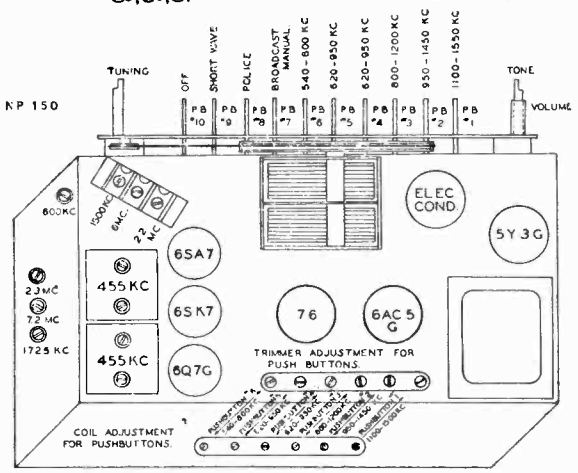
Schematic Location	Part No.	Description
R3,R7	Y-VC-35	Volume and Tone control
R1	R-15510	Carbon res. 20K ohm ¼ W 20%
R2	R-14	Carbon res. 10K ohm 2W 20%
R4,R8	R-15517	Carbon res. 1 meg. ¼ W 20%
R5	R-79	Carbon res. 15 meg. ¼ W 20%
R6	R 15512	Carbon res. 250K ohm ¼ W 20%
R9,R10	R-76	Carbon res. 400 ohm ¼ W 20%
R11	R-60	Carbon res. 25K ohm ¼ W 20%
C27	Y-CT-4	Padding Condenser
C29,C30	Y-CE-52	Electrolytic Condenser
C20	C-15752	Tubular cond. .05 mfd. 200V
C15	C-15754	Tubular cond. .01 mfd. 400 V
C17	C-15759	Tubular cond. .006 mfd. 600V
C31	C-15757	Tubular cond. .1 mfd. 400V
C14	C-15774	Tubular cond. .002 mfd. 400V
C18	C-15756	Tubular cond. .05 mfd. 400V
C12,C13,C19	CM-31	Mica cond. 100 mmfd. 30%
C16	CM-30	Mica cond. 250 mmfd. 30%
C22	CM-2	Mica cond. 4330 mmfd. 5%
C28	CM-36	Mica cond. 2770 mmfd. 5%
C21	CM-13	Mica cond. 100 mmfd. 5%
C32	CM-27	Mica cond. 2000 mmfd. 3%
C2,C3,C4, C5,C6,C7	CT-28	Trim. capacities for P.B. tuning

The receiver operates with the following tubes:

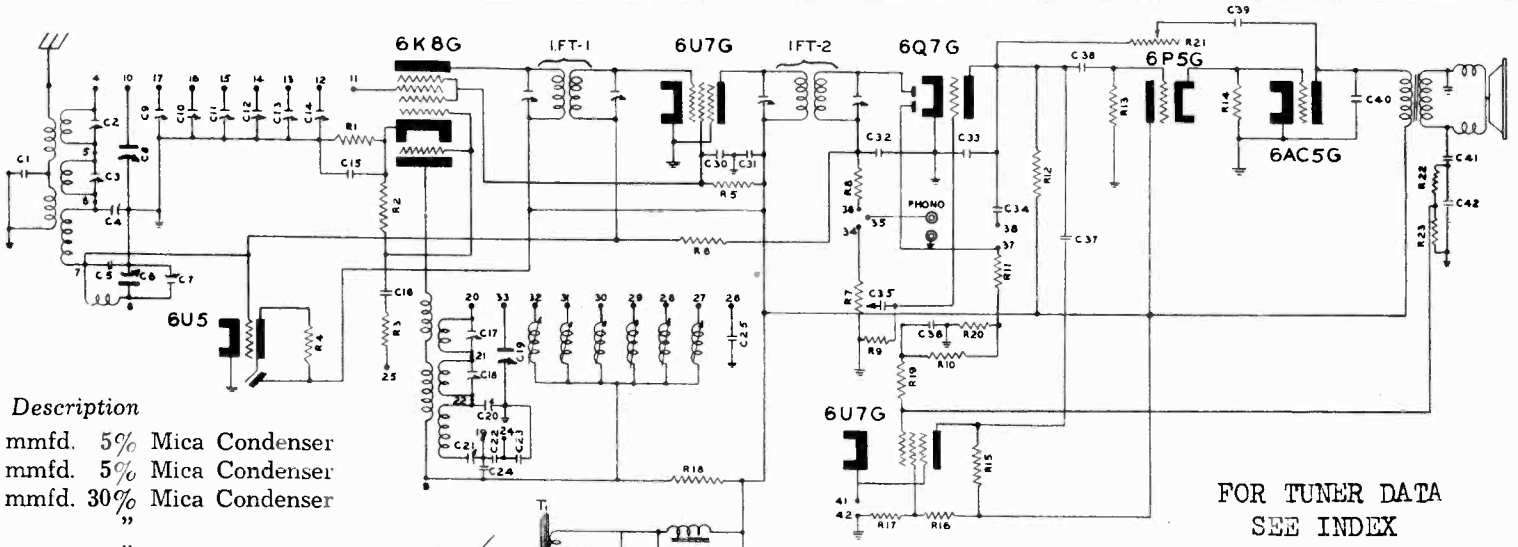
1-6SA7	Single ended frequency converter
1-6SK7	Single ended intermediate frequency amplifier
1-6Q7G	2nd detector, A. V. C. and A. F. driver
1-76	Output tube driver
1-6AC5G	Dynamically coupled output stage
1-5Y3G	Rectifier
1-6U5	Tuning indicator (Model 3C70 only)

SETTING UP OF PUSH—BUTTONS

Button No. 1 is for stations lying between 1100 and 1550 KC's.
" No. 2 is for stations lying between 950 and 1450 KC's.
" No. 3 is for stations lying between 800 and 1200 KC's.
" No. 4 is for stations lying between 620 and 950 KC's.
" No. 5 is for stations lying between 620 and 950 KC's.
" No. 6 is for stations lying between 540 and 800 KC's.



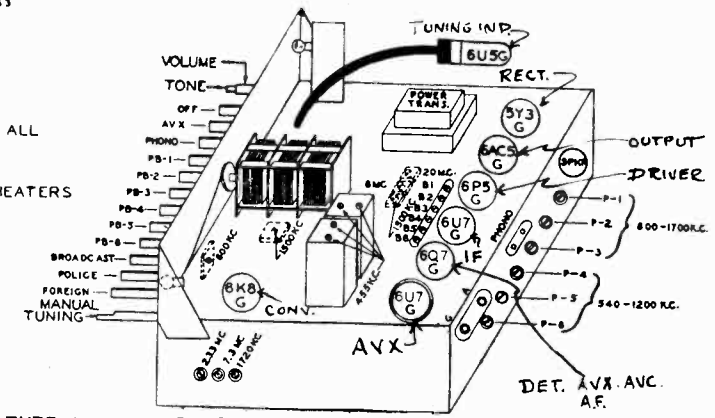
1. Select the stations that you wish to set up on the push-buttons.
2. Determine on which push-buttons these stations should be set up, according to above table.
3. Push the button on which you should set up a particular station.
4. Using a screw driver, adjust the coil corresponding to the proper push-button until the desired station is heard with maximum volume and best tone.
5. Adjust the trimmer condenser corresponding to the proper push-button until the desired station is heard with maximum volume.
6. Repeat for other push-buttons.



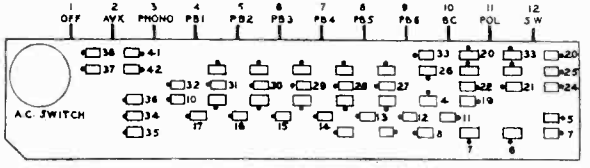
Schematic

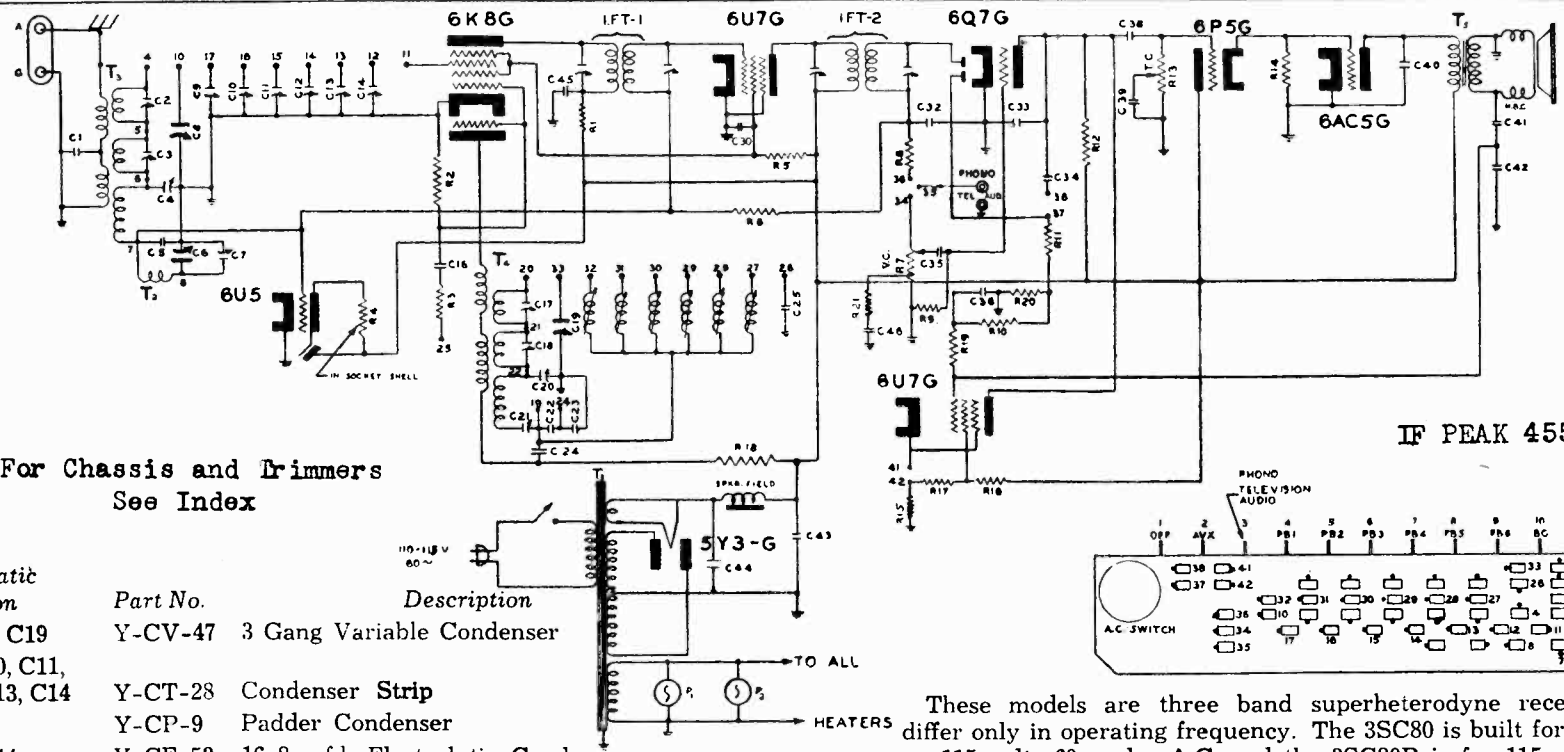
Location	*Part Number*	*Description*
C23	CM-38	4900 mmfd. 5% Mica Condenser
C22	CM-39	2300 mmfd. 5% Mica Condenser
C32	CM-31	100 mmfd. 30% Mica Condenser
C33	"	"
C16	"	"
C25	CM-13	100 mmfd. 5% Mica
R2	R-15511	50K ¼ W 20% Carbon
R16 R8 R3	R-111	60 ohm ¼ W 20% Carbon Resistor
R1	R-108	250 ohm ¼ W 20% Carbon Resistor
R19	R-15520	500K ¼ W 20% Carbon Resistor
R6	R-15500	2 megohm ¼ W 20% Carbon Resistor
R10 R13	R-15517	1 megohm ¼ W 20% Carbon Resistor
C9, C10, C11, C12, C13, C14	Y-CT-28	Condenser Strip
C6, C8, C19	Y-CV-47	3 Gang Variable Condenser
C44, C43	Y-CE-52	16-8 mfd. Electrolytic Condenser
R21, R7	Y-VC-39	Combination Volume & Tone Control
IFT-1	Y-IFA-5	1st I.F. Transformer
IFT-2	Y-IFA-6	2nd I.F. Transformer
T	Y-TP-5	Power Transformer
C24 C29 C37 C38 C41	C-15754	.01 400 Volts Tubular Condenser
C5 C15 C36	C-15752	.05 200 Volts Tubular Condenser
C30, C31	C-15756	.05 400 Volts Tubular Condenser
C40 C34 C35	C-21	.005 400 Volts Tubular Condenser
C42	C-15753	.002 600 Volts Tubular Condenser
C39	C15767	.001 600 Volts Tubular Condenser
R17	R-2	5K ¼ W 20% Carbon Resistor
R12	R-15515	100K ¼ W 20% Carbon Resistor
R14	R-15529	25K ¼ W 20% Carbon Resistor
R5	R-15501	25K 1 W 20% Carbon Resistor
R23	R-76	400 ohm ¼ W 20% Carbon Resistor
R22	R-15601	100 ohm ¼ W 20% Carbon Resistor
R15	R-15512	250K ¼ W 20% Carbon Resistor
R18	R-15552	30K ½ W 20% Carbon Resistor

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.



TUBE LAYOUT Models 3C80, 3C80-P, 3SC80—3SC80B.





For Chassis and Trimmers See Index

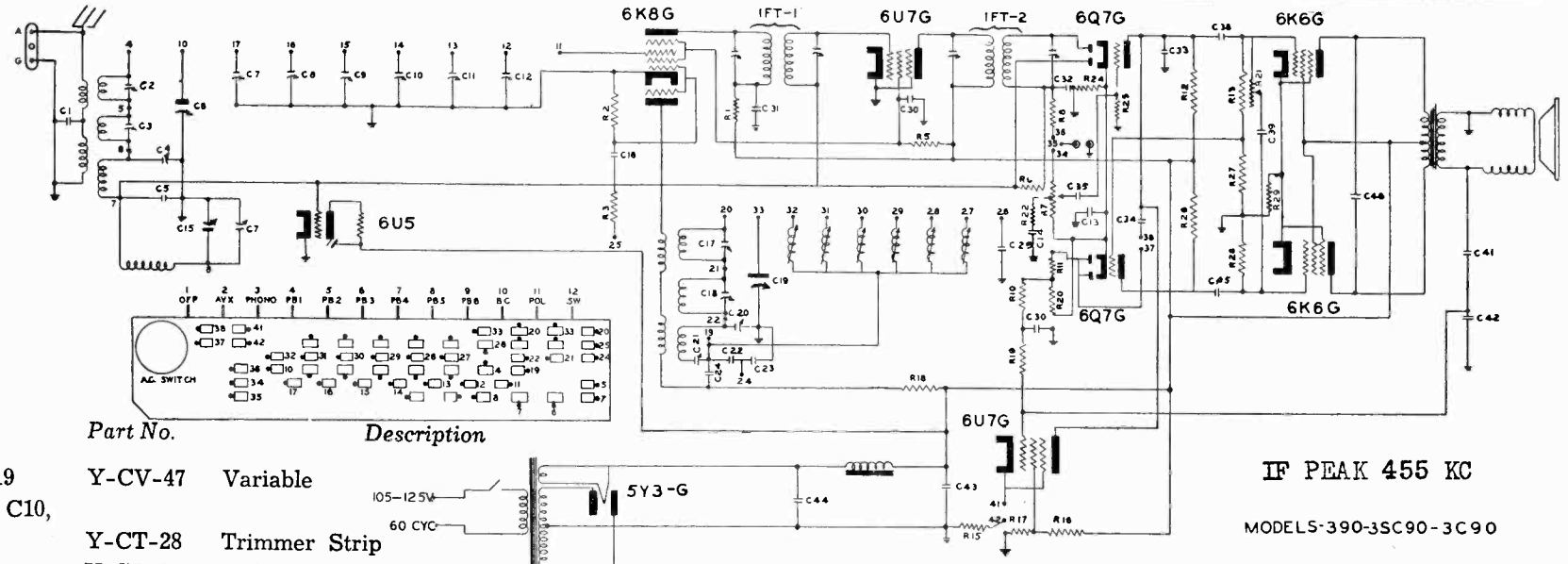
Schematic Location	*Part No.*	*Description*
C6, C8, C19	Y-CV-47	3 Gang Variable Condenser
C9, C10, C11, C12, C13, C14	Y-CT-28	Condenser Strip
C21	Y-CP-9	Padder Condenser
C43, C44	Y-CE-52	16-8 mfd. Electrolytic Condenser
R7, R13	Y-VC-39	Combination Volume & Tone Control
IFT-1	Y-IFA-5	1st I.F. Transformer
IFT-2	Y-IFA-6	2nd I.F. Transformer
P1, P2	LB-51	Pilot Lights Mazda No. 51
T1	Y-TP-5	Power Transformer
T2	Y-CS-120	Preselector Coil
T3	Y-CS-116	Antenna Coil Assembly
T4	Y-CS-115	Oscillator Coil Assembly
T5	Y-SPA-64	Output Transformer
C5, C36	C-15752	.05 mfd. 200 Volts Tubular Condenser
C24, C38, C41, C45, C46	C-15754	.01 mfd. 400 Volts Tubular Condenser
C30	C-15756	.05 mfd. 400 Volts Tubular Condenser
C34, C35, C39, C40	C-21	.005 mfd. 400 Volts Tubular Condenser
C42	C-15753	.002 mfd. 600 Volts Tubular Condenser
C1, C16, C32, C33	CM-31	100 mmfd. 30% Mica Condenser

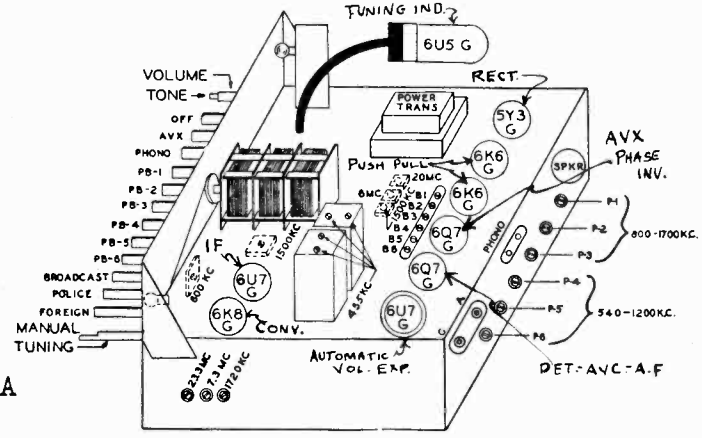
These models are three band superheterodyne receivers and differ only in operating frequency. The 3SC80 is built for operation on 115 volts 60 cycles A.C. and the 3SC80B is for 115 volts 50-60 cycles A.C.

C22	CM-39	2300 mmfd. 5% Mica Condenser
C23	CM-38	4900 mmfd. 5% Mica Condenser
C25	CM-13	100 mmfd. 5% Mica Condenser
R1, R15	R-15542	1000 ohm ¼ W 20% Carbon Resistor
R2, R8, R21	R-15511	50K ohm ¼ W 20% Carbon Resistor
R3	R-15536	100 ohm ¼ W 20% Carbon Resistor
R4	R-43	1 megohm ¼ W 20% Carbon Resistor
R5	R-15501	25K ohm 1 W 20% Carbon Resistor
R6, R10	R-15500	2 megohm ¼ W 20% Carbon Resistor
R9	R-109	5 megohm ¼ W 20% Carbon Resistor
R11, R19, R20	R-15520	500K ohm ¼ W 20% Carbon Resistor
R12	R-15515	100K ohm ¼ W 20% Carbon Resistor
R14	R-15529	25K ohm ¼ W 20% Carbon Resistor
R16	R-15524	50K ohm 1 W 20% Carbon Resistor
R17	R-2	5K ohm ¼ W 20% Carbon Resistor
R18	R-15506	30K ohm ½ W 20% Carbon Resistor

MAJESTIC RADIO & TELEV. CORP.

MODELS 3C90, 3SC90
390
Schematic, Alignment
Socket, Trimmers
Tuner Layout





CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.

FOR TUNER DATA SEE INDEX

Schematic Location	*Part No.*	*Description*
C6, C15, C19	Y-CV-47	Variable
C7, C8, C9, C10, C11, C12	Y-CT-28	Trimmer Strip
C21	Y-CP-8	Padder Condenser
C43, C44	Y-CE-52	Electrolytic Condenser
C1, C16, C32, C33	CM-31	100 mmfd. 30% Mica Condenser
C23	CM-38	4900 mmfd. 5% Mica Condenser
C22	CM-39	2300 mmfd. 5% Mica Condenser
C29	CM-13	100 mmfd. 5% Mica Condenser
C35	CM-15909	500 mmfd. 20% Mica Condenser
C5, C30	C-15752	.05 mfd. 200 V Tubular Condenser
C13, C14, C24, C38, C41, C45	C-15754	.01 mfd. 400 V Tubular Condenser
C30, C31	C-15756	.05 mfd. 400 V Tubular Condenser
C34, C48	C-21	.005 mfd. 400 V Tubular Condenser
C39, C42	C-15753	.002 mfd. 600 V Tubular Condenser
R1, R24	R-15542	1000 ohm ¼ W 20% Carbon Resistor
R2, R8, R22	R-15511	50K ohm ¼ W 20% Carbon Resistor
R3	R-15601	100 ohm ¼ W 20% Carbon Resistor
R5	R-15501	25K ohm 1 W 20% Carbon Resistor
R6	R-15500	2 megohm ¼ W 20% Carbon Resistor
R7, R21	Y-VC-39	Volume and Tone Control
R10, R11, R25	R-15517	1 megohm ¼ W 20% Carbon Resistor
R12, R26	R-15515	100K ohm ¼ W 20% Carbon Resistor
R13, R19, R28	R-15520	500K ohm ¼ W 20% Carbon Resistor

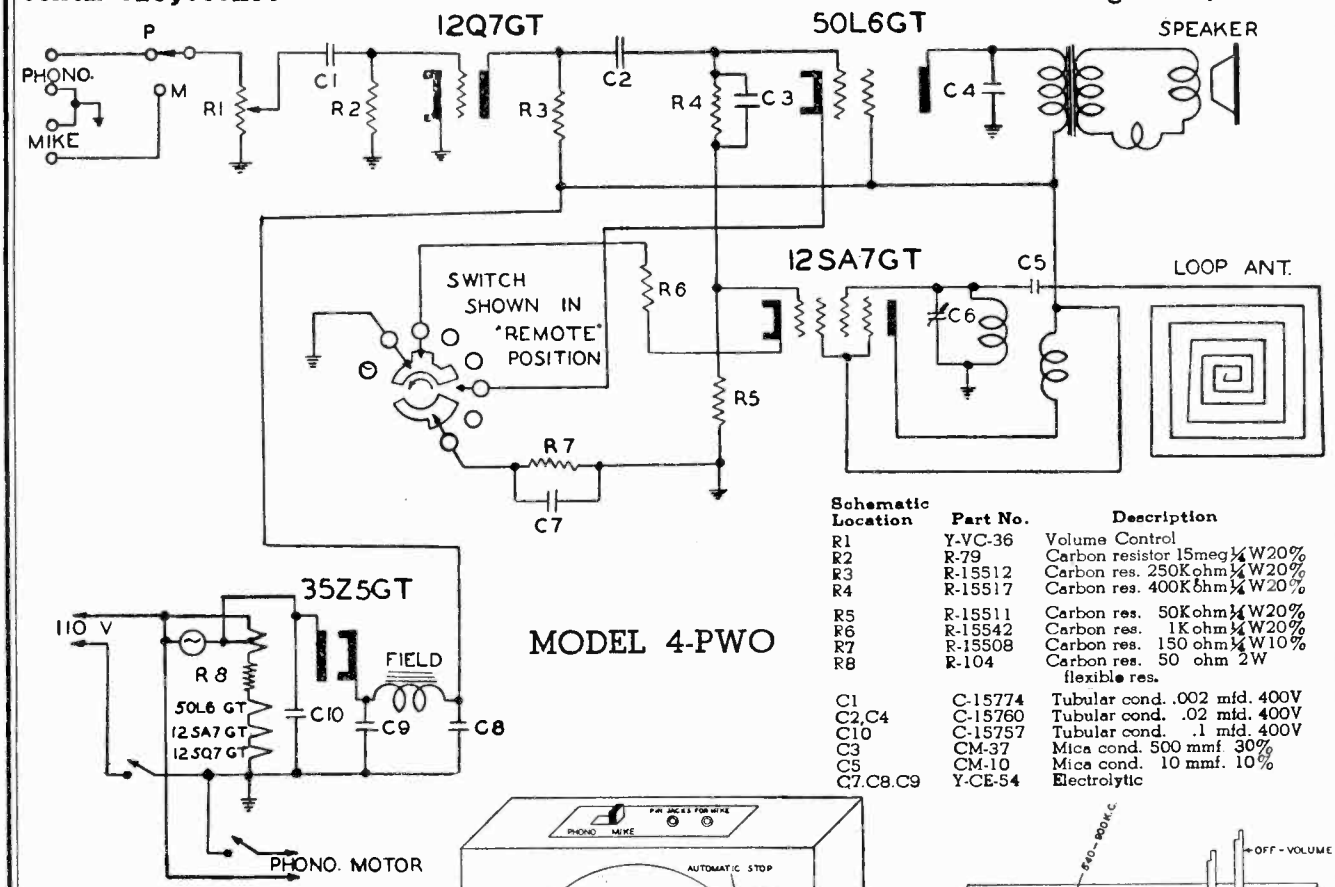
These models are three band superheterodyne receivers and differ only in the provision for record changer.

R15	R-16	8K ohm ¼ W 20% Carbon Resistor
R16	R-15524	50K ohm 1 W 20% Carbon Resistor
R17	R-15576	5000 ohm ¼ W 10% Carbon Resistor
R18	R-15506	30K ohm ½ W 20% Carbon Resistor
R20	R-15512	250K ohm ¼ W 20% Carbon Resistor
R27	R-15531	10K ohm ¼ W 20% Carbon Resistor
R29	R-15600	200 ohm 1 W 20% Carbon Resistor

MODEL 4-PWO
Wireless Record Player
Schematic, Socket

MAJESTIC RADIO & TELEV. CORP

MODEL 6UL51
Schematic, Socket
Alignment, Trimmers

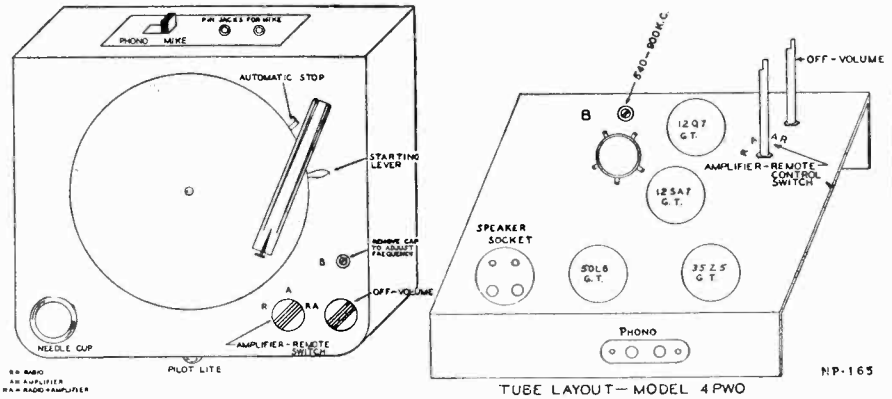


MODEL 4-PWO

Schematic Location	Part No.	Description
R1	Y-VC-36	Volume Control
R2	R-79	Carbon resistor 15meg ¼W 20%
R3	R-15512	Carbon res. 250K ohm ¼W 20%
R4	R-15517	Carbon res. 400K ohm ¼W 20%
R5	R-15511	Carbon res. 50K ohm ¼W 20%
R6	R-15542	Carbon res. 1K ohm ¼W 20%
R7	R-15508	Carbon res. 150 ohm ¼W 10%
R8	R-104	Carbon res. 50 ohm 2W flexible res.
C1	C-15774	Tubular cond. .002 mfd. 400V
C2,C4	C-15760	Tubular cond. .02 mfd. 400V
C10	C-15757	Tubular cond. .1 mfd. 400V
C3	CM-37	Mica cond. 500 mmf 30%
C5	CM-10	Mica cond. 10 mmf. 10%
C7.C8.C9	Y-CE-54	Electrolytic

The tubes used are

1-12Q7GT	Pre Amplifier
1-50L6GT	Beam power output
1-12SA7GT	Modulator oscillator
1-35Z5GT	Rectifier



TUBE LAYOUT—MODEL 4PWO

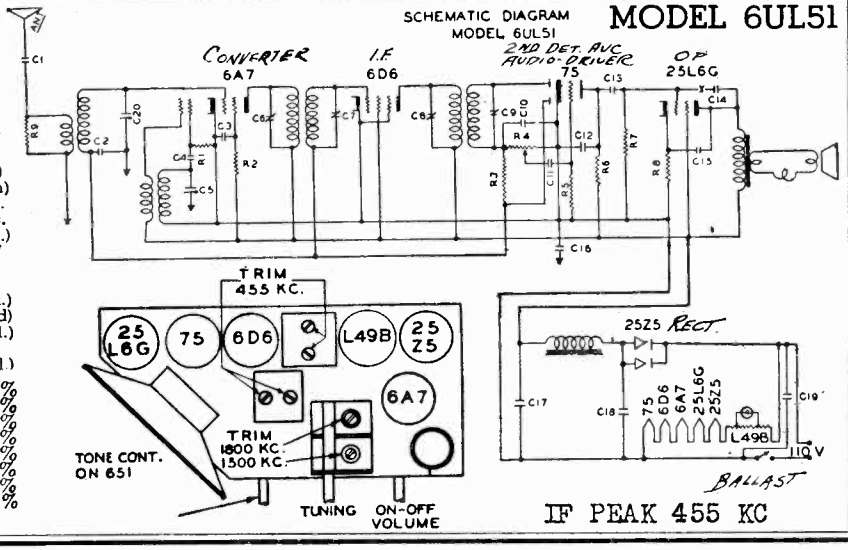
Model 4PWO operates on 105-130 volts, 60 cycles, AC. It can be made to operate on 50-cycles AC by changing a bushing on the motor shaft.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

Schematic Location	Part No.	Description
C1,C13	C-15754	Tubular cond. .01 mfd. 400V
C2	C-15752	Tubular cond. .05 mfd. 200V
C5, C20	Y-CV-22	Variable cond. (Osc. Section) / Variable cond. (Signal Section)
C6,C7	Y-CT-1	Trimmer cond. 1st I.F. Trans.
C8,C9	Y-CT-1	Trimmer cond. 2nd I.F. Trans.
C16	C-20	Paper cond. .25 mfd. 200V (Mol.)
C15	C-15760	Tubular cond. .02 mfd. 400V
C4	CM-29	Mica cond. 50 mmf.
C10,C12,C14	CM-31	Mica cond. 100 mmf.
C17	Y-CE-40	Electr. cond. 16 mfd. 150V (Met.)
C18	Y-CE-39	Electr. cond. 40 mfd. 200V (Clad)
C19	C-24	Paper cond. .1 mfd. 300V (Mol.)
C11	C-15774	Tubular cond. .002 mfd. 400V
C3	C-28	Paper cond. .05 mfd. 200V (Mol.)
R1	R-15511	Carbon res. 50K ohm ¼W 20%
R2	R-15516	Carbon res. 15K ohm ¼W 20%
R3	R-15500	Carbon resistor 2meg ¼W 20%
R5	R-79	Carbon resistor 15meg ¼W 20%
R6	R-15512	Carbon res. 250K ohm ¼W 20%
R7	R-15520	Carbon res. 500K ohm ¼W 20%
R9	R-15531	Carbon resistor 10K ¼W 20%
R8	R-56	Carbon res. 100 ohm ½W 10%
R4	Y-VC-21	Volume Control

MODEL 6UL51

SCHEMATIC DIAGRAM
MODEL 6UL51

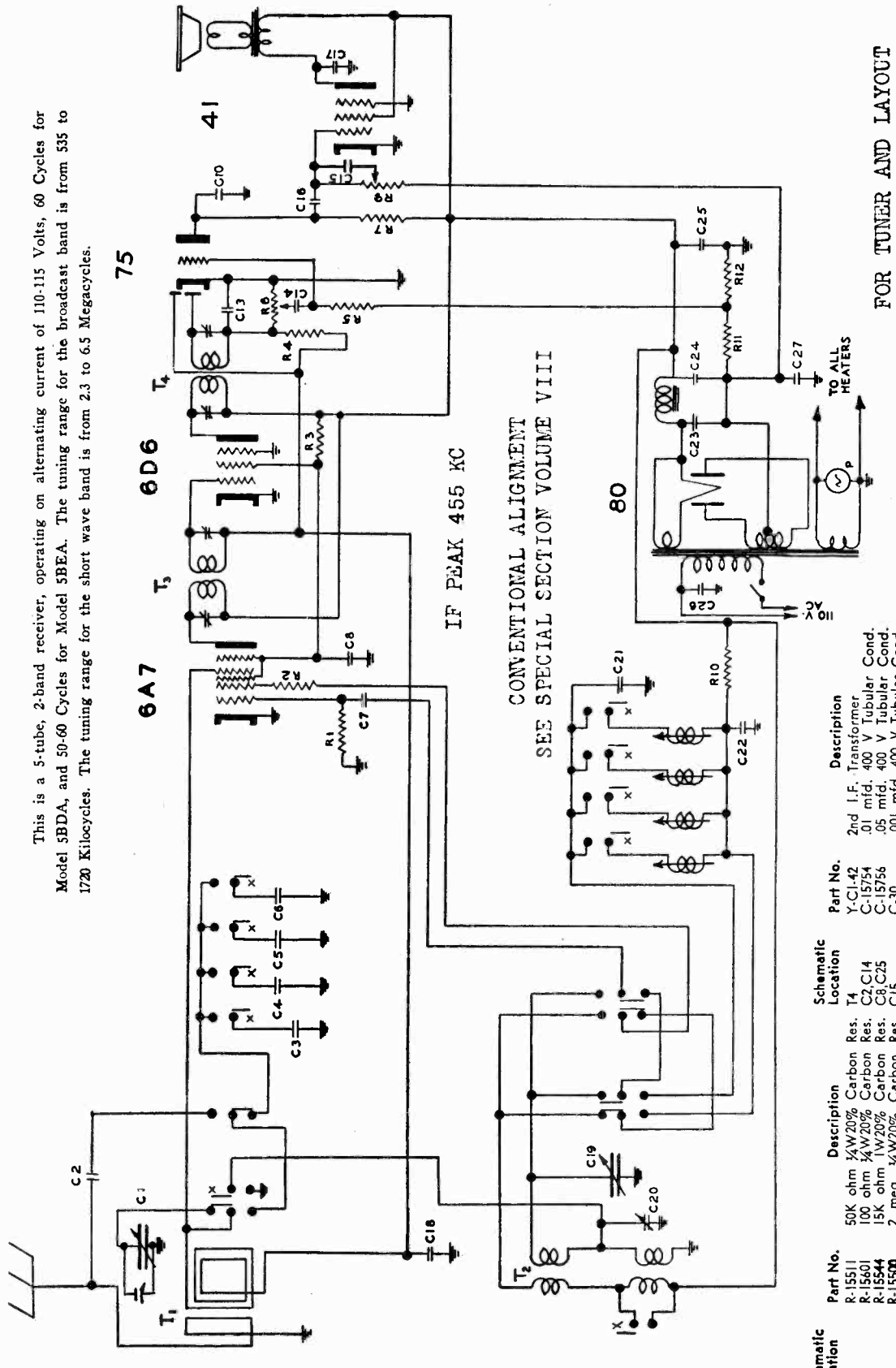


IF PEAK 455 KC

MODELS 5BDA, 5BEA
Schematic

MAJESTIC RADIO & TELEV. CORP.

This is a 5-tube, 2-band receiver, operating on alternating current of 110-115 Volts, 60 Cycles for Model 5BDA, and 50-60 Cycles for Model 5BEA. The tuning range for the broadcast band is from 535 to 1720 Kilocycles. The tuning range for the short wave band is from 2.3 to 6.5 Megacycles.



FOR TUNER AND LAYOUT
SEE INDEX

The tubes used are:

1—6A7	Frequency converter	
1—6D6	Intermediate frequency amplifier	
1—75	Second detector, AVC, and Audio frequency amplifier	
1—41	Output	
1—80	Rectifier	

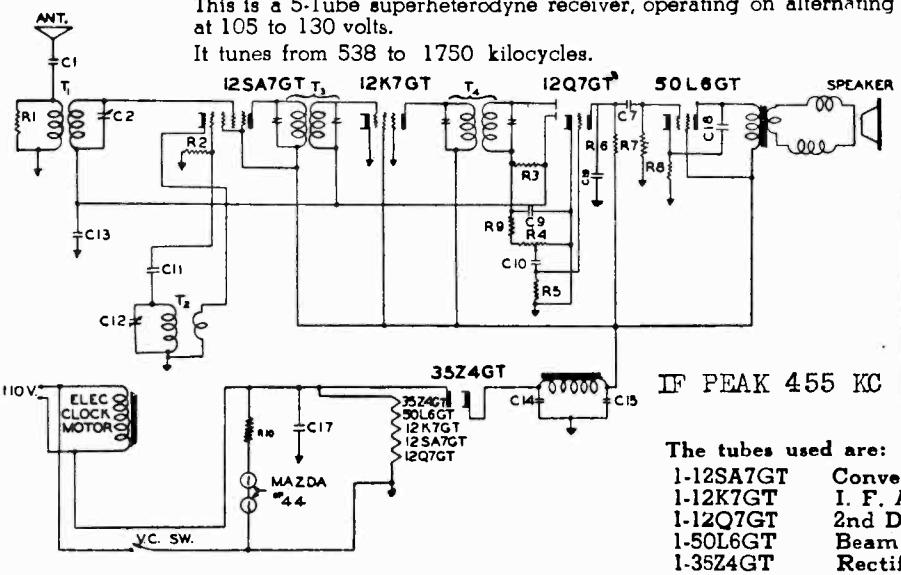
Schematic Location	Part No.	Description
R1	R-1551 1	50K ohm ¼W 20% Carbon Res.
R2	R-1560 1	100 ohm ¼W 20% Carbon Res.
R3	R-1554 4	15K ohm 1W 20% Carbon Res.
R4	R-1550 0	2 meg. ¼W 20% Carbon Res.
R5	R-1551 7	1 meg. ¼W 20% Carbon Res.
R6,R9	Y-VC-33	Volume and Tone Control
R7	R-1551 2	250K ohm ¼W 20% Carbon Res.
R10	R-2	5000 ohm ¼W 20% Carbon Res.
R11	R-82	35 ohm ¼W 20% Carbon Res.
R12	R-98	150 ohm ½W 10% Carbon Res.
T1	Y-CS-100	Loop Antenna
T2	Y-CS-102	Oscillator Coil
T3	Y-CI-40	1st I.F. Transformer
T4	Y-CI-42	2nd I.F. Transformer
C2,C14	C-15754	.01 mfd. 400 V Tubular Cond.
C8,C25	C-15756	.05 mfd. 400 V Tubular Cond.
C15	C-30	.001 mfd. 400 V Tubular Cond.
C16,C17	C-25	.006 mfd. 400 V Tubular Cond.
C18	C-15752	.05 mfd. 200 V Tubular Cond.
C26	C-18	.01 mfd. 400 V Ceramic
C7	CM-29	50 mmf. Mica Condenser
C10	CM-31	100 mmf. Mica Condenser
C22	CM-33	250 mmf. 5% Mica Condenser
C21	CM-34	150 mmf. 5% Mica Condenser
C3,C4,C5,C6		
C20	Y-CT-308	Trimmer Strip
C23,C24,C27	Y-CE-43	Electrolytic Condenser

MODELS 5T, 5TO
MODELS 140, 148
Schematics, Socket Trimmers, Alignment

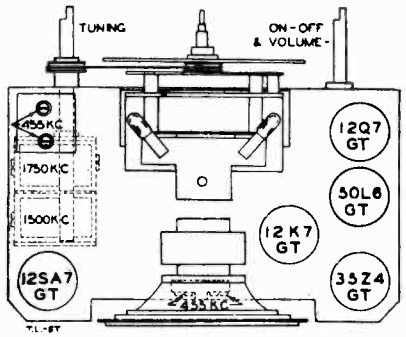
MAJESTIC RADIO & TELEV. CORP.

This is a 5-Tube superheterodyne receiver, operating on alternating current of 60 cycles only, at 105 to 130 volts.

It tunes from 538 to 1750 kilocycles.



IF PEAK 455 KC



TUBE LAYOUT MODEL 5T

The tubes used are:

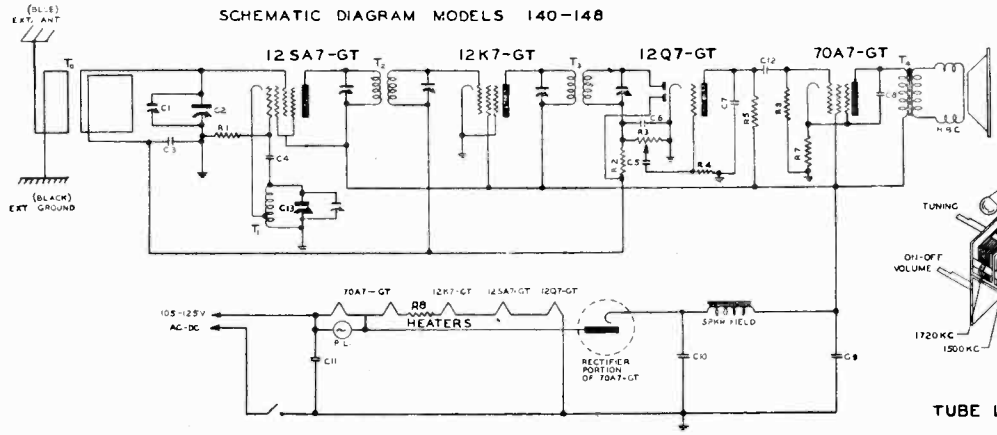
1-12SA7GT	Converter
1-12K7GT	I. F. Amplifier
1-12Q7GT	2nd Detector, A.V.C., Driver
1-50L6GT	Beam Power Output
1-35Z4GT	Rectifier

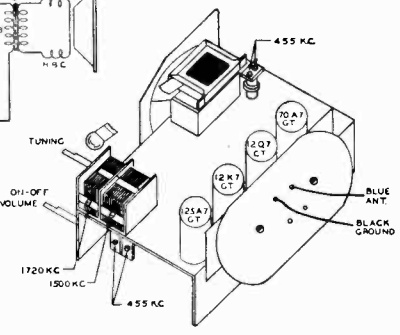
MODELS 5T—5TO

Schematic Location	Part No.	Description
R1	R-15531	Carbon res. 10K ohm ½W 20%
R2	R-15510	Carbon res. 20K ohm ½W 20%
R3	R-15500	Carbon resistor 2meg ½W 20%
R4	Y-VC-21	Volume Control
R5	R-50	Carbon resistor 5meg ½W 20%
R6	R-15512	Carbon res. 250K ohm ½W 20%
R7	R-15520	Carbon res. 500K ohm ½W 20%
R8	R-80	Carbon res. 110 ohm ½W 20%
R9	R-15515	Carbon res. 100K ohm ½W 20%
R10	LC-14	Line Cord
C1, C7	C-15754	Tubular cond. .01 mfd. 400V
C13	C-15752	Tubular cond. .05 mfd. 200V
C10	C-15774	Tubular cond. .002 mfd. 400V
C17, C18	C-15760	Tubular cond. .02 mfd. 400V
C11	CM-29	Mica cond. 50 mmfd. 30%
C9, C19	CM-30	Mica cond. 250 mmfd. 30%
C14, C15	Y-CE-55	40 16 mfd. 150 V
T-1	Y-CS-111	Antenna Coil
T-3	CI-69	1st I. F. Transformer
T-4	Y-CI-32	2nd I. F. Transformer
	Y-M-26	Electric Clock
T-2	CS-112	Osc. Coil

CONVENTIONAL ALIGNMENT FOR ALL MODELS SEE SPECIAL SECTION VOLUME VIII

SCHEMATIC DIAGRAM MODELS 140-148





TUBE LAYOUT MODELS-140-148

IF PEAK 455 KC

MODELS 140, 148

This set is a one band, 4-tube superheterodyne receiver equipped with a Majestic High Q loop. This set will operate on 105-125 volts AC or DC current, and will receive stations lying between 540 and 1720 Kc. This includes standard broadcast and most police stations.

The tubes used are:

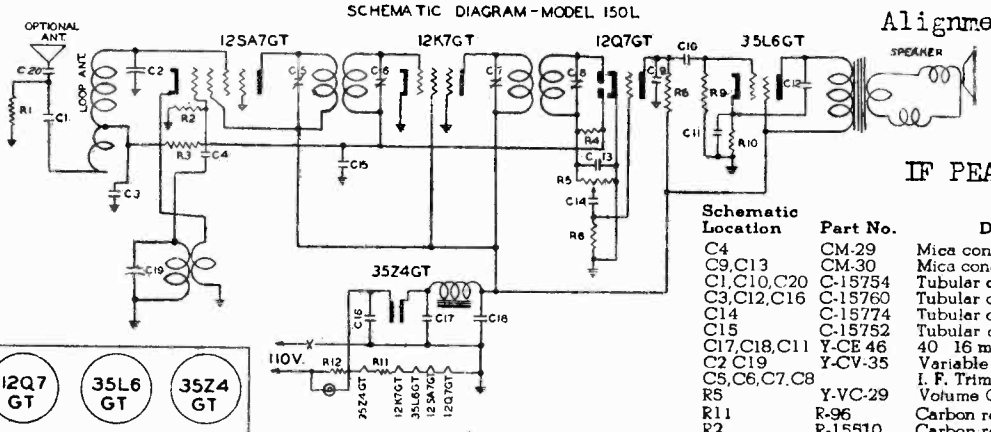
1-12SA7GT	Frequency Converter and Osc.
1-12K7GT	I. F. Amplifier
1-12Q7GT	2nd Detector, AVC, First Audio
1-70A7GT	Output and Rectifier

Schematic Location	Part No.	Description
C3	C-15752	Tubular cond. .05 mfd. 200V
C5	C-15753	Tubular cond. .002 mfd. 600V
C8	C-15760	Tubular cond. .02 mfd. 400V
C11	C-15756	Tubular cond. .05 mfd. 400V
C12	C-15754	Tubular cond. .01 mfd. 400V
C2, C13	Y-CV-15	Variable Condenser
C9, C10	Y-CE-56	Electrolytic Condenser
C4	CM-29	Mica cond. 50 mmfd.
C6, C7	CM-30	Mica cond. 250 mmfd.
R1	R-15510	Carbon res. 20K ohm ½W 20%
R2	R-15500	Carbon resistor 2meg ½W 20%
R3	Y-VC-15	Volume Control
R4	R-15559	Carbon resistor 3meg ½W 20%
R5	R-15512	Carbon res 250K ohm ½W 20%
R6	R-15520	Carbon res. 500K ohm ½W 20%
R7	R-106	Carbon res. 150 ohm ½W 20%
R8	R-86	Flexible res. 70 ohm 2W
T0	Y-CS-131	Loop Assembly
T1	Y-CS-105	Oscillator Coil
T2	Y-CS-106	1st I. F. Transformer
T3	Y-CS-107	2nd I. F. Transformer
P.L.	LB-47	Pilot Light Mazda #47

MAJESTIC RADIO & TELEV. CORP.

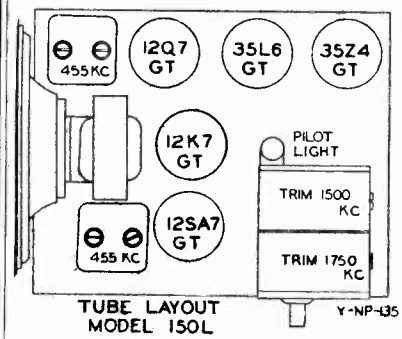
MODELS 130,130U
MODEL 150L
Schematics, Socket
Alignment, Trimmers

SCHEMATIC DIAGRAM - MODEL 150L



IF PEAK 455 KC

Schematic Location	Part No.	Description
C4	CM-29	Mica cond. 50 mmf. 30%
C9,C13	CM-30	Mica cond 250 mmf. 30%
C1,C10,C20	C-15754	Tubular cond. .01 mfd. 400V
C3,C12,C16	C-15760	Tubular cond. .02 mfd 400V
C14	C-15774	Tubular cond. .002 mfd. 400V
C15	C-15752	Tubular cond. .05 mfd. 200V
C17,C18,C11	Y-CE 46	40 16 mfd. 150V 20 mfd. 25V
C2 C19	Y-CV-35	Variable Condenser
C5,C6,C7,C8		I. F. Trimmer Condenser
R5	Y-VC-29	Volume Control and Switch
R11	R-96	Carbon res. 50 ohm 1W20%
R2	R-15510	Carbon res. 20K ohm ¼W20%
R9	R-15520	Carbon res. 500K ohm ¼W20%
R4	R-15500	Carbon res. 2 meg. ¼W20%
R6	R-79	Carbon res. 15 meg ¼W20%
R10	R-80	Carbon res. 110 ohm ½W20%
R1	R-15531	Carbon res 10K ohm ¼W20%
R3	R-15515	Carbon res. 100K ohm ¼W20%
R12	R-83	Carbon res. 35 ohm 1W20%



MODEL 150-L

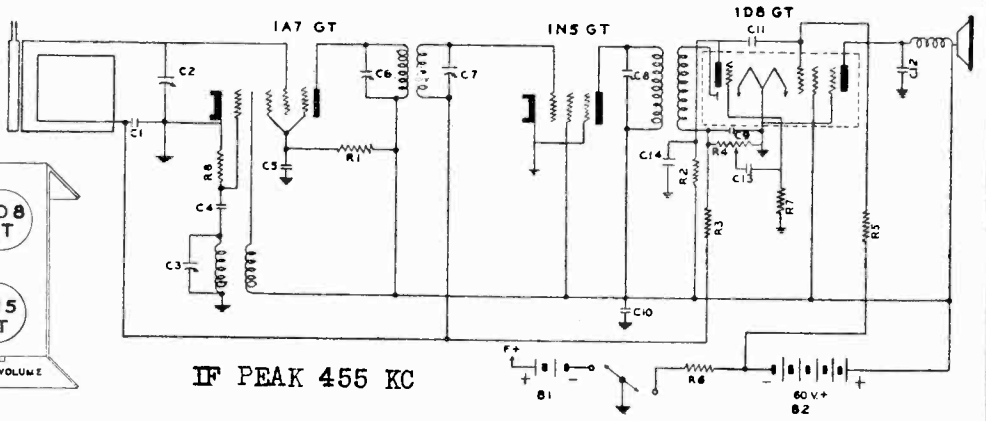
The tubes used are:

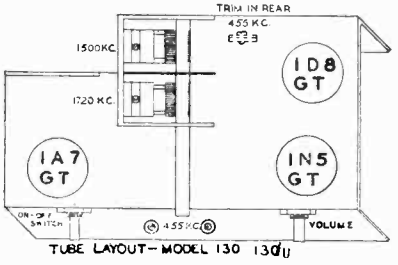
1-12SA7-GT	Frequency converter
1-12K7-GT	Intermediate frequency amplifier
1-12Q7-GT	Second Detector, Automatic Volume, and Audio Driver
1-35L6-GT	Beam power output
1-35Z4-GT	Rectifier

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

MODEL
130, 130U

SCHEMATIC DIAGRAM MODEL-130





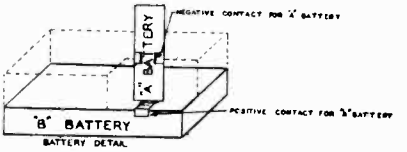
TUBE LAYOUT-MODEL 130 130U

IF PEAK 455 KC

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

To change the "A" battery, remove the old one from its bracket. Remove the wrapping or tube from the new battery and snap it in position as shown in Figure 1, making certain that the small center contact of the battery makes a good connection to the spring contact as shown in Figure 1.

To change the "B" battery, slide the old one from underneath the chassis. Remove the plug from this battery. Insert the plug into the new battery and replace the new battery.



The tuning range is from 540 to 1750 kilocycles.

The tubes used are:

1—1A7GT	Combined oscillator and 1st detector.
1—1N5GT	Intermediate frequency amplifier.
1—1D8GT	Combined second detector, Audio driver, and Power output.

MODEL 130

B1	No. 9 Majestic Battery No. 9 1.5V
B2	No. 3A40P Majestic Battery No. 3A40P 60V

MODEL 130U

1—P-94A Majestic Battery No. P-94A 1.5V
2—P-5303 Majestic Battery No. P-5303 45V

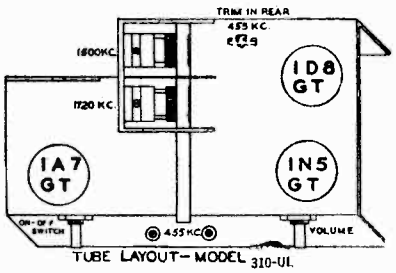
Schematic Location	Part No.	Description
C1	C-45	Tubular cond. .05 mfd. 200V
C2, C3	Y-CV-46	Variable Condenser
C4	CM-31	Mica cond. 100 mmfd.
C5, C11	C-48	Tubular cond. .01 mfd. 400V
C6, C7	CT-1	Trimmer condenser
C8	CT-32	Trimmer condenser
C9, C14	CM-30	Mica cond. 250 mmfd.
C10	CE-58	4 mfd. 100V Electrolyt c
C12, C13	C-47	Tubular cond. .004 mfd. 400V
R1	R-105	Carbon res. 5K ohm
R2	R-102	Carbon res. 1 meg.
R3, R5, R7	R-101	Carbon res. 2 meg.
R8	R-99	Carbon res. 200K ohm
R6	R-103	Carbon res. 60 ohm

MODEL 310UL
MODELS 419B, 420
420PL, 421, 421PL
Schematics, Socket
Trimmers, Alignment

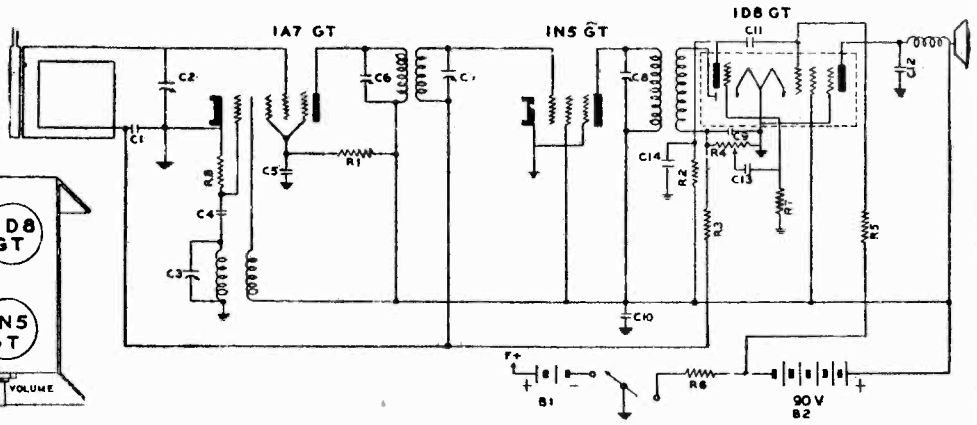
MAJESTIC RADIO & TELEV. CORP.

MODEL 310UL

IF PEAK 455 KC



TUBE LAYOUT—MODEL 310-UL

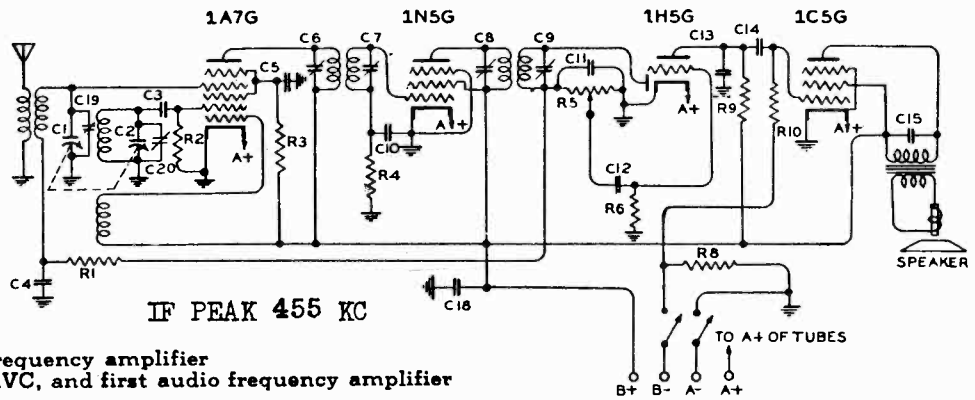


The tubes used are:
1—1A7GT Combined oscillator and 1st detector.
1—1N5GT Intermediate frequency amplifier.
1—1D8GT Combined second detector, Audio driver, and Power output.

Schematic Location	Part No.	Description			
C1	C-45	Tubular cond. .05 mfd. 200V	R1	R-105	Carbon res. 5K ohm
C2, C3	Y-CV-46	Variable Condenser	R2	R-102	Carbon res. 1 meg.
C4	CM-31	Mica cond. 100 mmfd.	R3, R5, R7	R-101	Carbon res. 2 meg.
C5, C11	C-48	Tubular cond. .01 mfd. 400V	R8	R-15515	Carbon res. 100K ohm
C6, C7	CT-1	Trimmer condenser	R6	R-103	Carbon res. 600 ohm
C8	CT-32	Trimmer condenser			
C9, C14	CM-30	Mica cond. 250 mmfd.	B1	1—P-94A	Majestic Battery No. P-96 1.5V
C10	CE-58	4 mfd. 100V Electrolytic	B2	2—P-5303	Majestic Battery No. P-530 45V
C12, C13	C-47	Tubular cond. .004 mfd. 400V			

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII.

Model 419-B
Model 420
Model 420-PL
Model 421
Model 421-PL

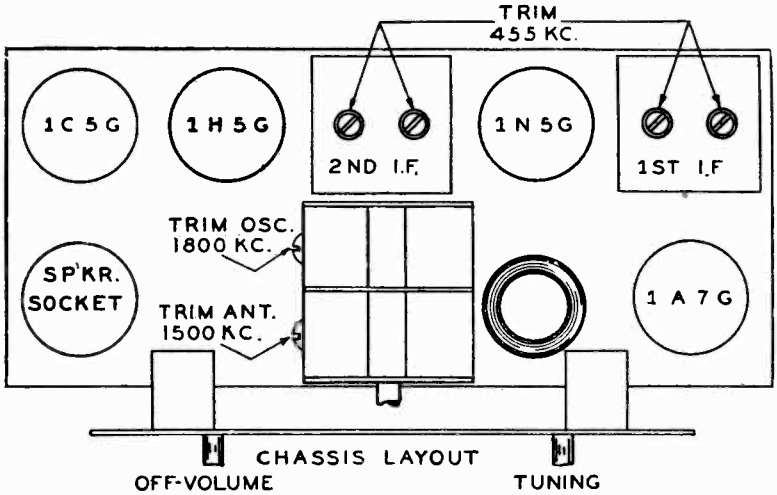


IF PEAK 455 KC

The tubes used are:
1-1A7G Converter
1-1N5G Intermediate frequency amplifier
1-1H5G 2nd detector, AVC, and first audio frequency amplifier
1-1C5G Output tube

Schematic Location	Part No.	Description
C4,C5	C-15752	.05 mfd. 200V
C10,C12,C14	C-15763	.01 mfd. 200V
C15	C-25	.006 mfd. 400V
C3,C11,C13	CM-15918	100 mmf Type "O" Mica
C1,C2	Y-CV-26	Variable Condenser
C6 C7,C8,C9	Y-CT-2	I. F. Trimmer Condenser
C18	CE-35	8 mfd. 150V Electrolytic
R9	R-15520	500K ¼W 20%
R10	R-15517	1 meg. ¼W 20%
R8	R-72	600 ohms ¼W 20%
R2	R-15523	200K ¼W 20%
R6	R-15559	3 meg. ¼W 20%
R3	R-44	70K ¼W 10%
R1,R4	R-15500	2 meg. ¼W 20%
R5	Y-VC-26	Volume Control

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII



This receiver is designed to operate on the following dry batteries.

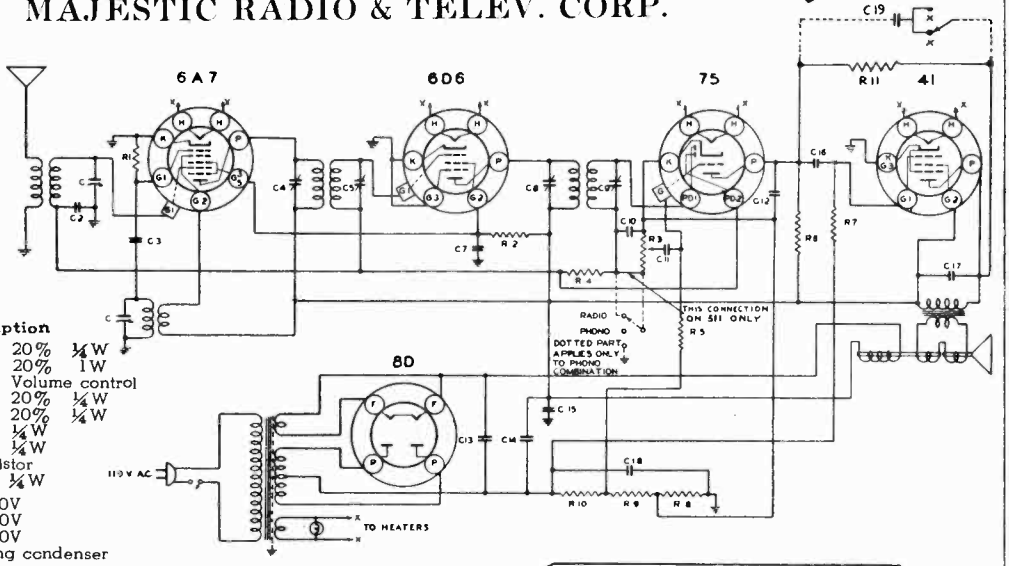
1. 1½ volt A-battery — Eveready 742A — RAY-O-VAC P-94A or the equivalent.
2. 45 volt B-batteries — Eveready 762 — RAY-O-VAC P-5303 or the equivalent.

Schematic, Socket Trimmers, Alignment
MODEL 699P
Schematic

MODELS 511, 511A
519P, 519PA Late

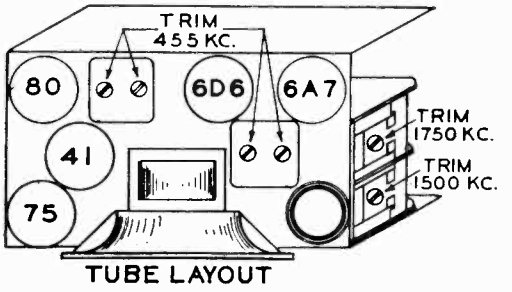
MAJESTIC RADIO & TELEV. CORP.

Model 511
Model 511A
Model 519P
Model 519PA



Schematic Location	Part No.	Description
R1	R-15511	50K ohms 20% ½W
R2	R-15544	15K ohms 20% 1W
R3	Y-VC-17	500K ohms Volume control
R4	R-15500	2 meg ohms 20% ½W
R5	R-15517	1 meg ohm 20% ½W
R6	R-15520	500K 20% ½W
R7	R-15528	400K 20% ½W
R10 R9,R8	RC-7	Candohm resistor
R11	R-50	5 meg 20% ½W
C2	C-15752	.05 mfd. 200V
C7,C15	C-15756	.05 mfd. 400V
C11,C16	C-15754	.01 mfd 400V
C	Y-CV-17	Variable gang condenser
C4,C5 C8,C9	Y-CT-1	I. F. Trimmers
C10,C12	CM-15918	100 mmfd. 20%
C3	CM-15929	50 mmfd. 20%
C13,C14,C18	Y-CE-43	Electrolytic condenser 12 8 mfd. 300 V 20 mfd. 25 V
C19	CM-16	150 mmfd. 20%
C17	C-15759	.006 mfd. 600V

IF PEAK 455 KC



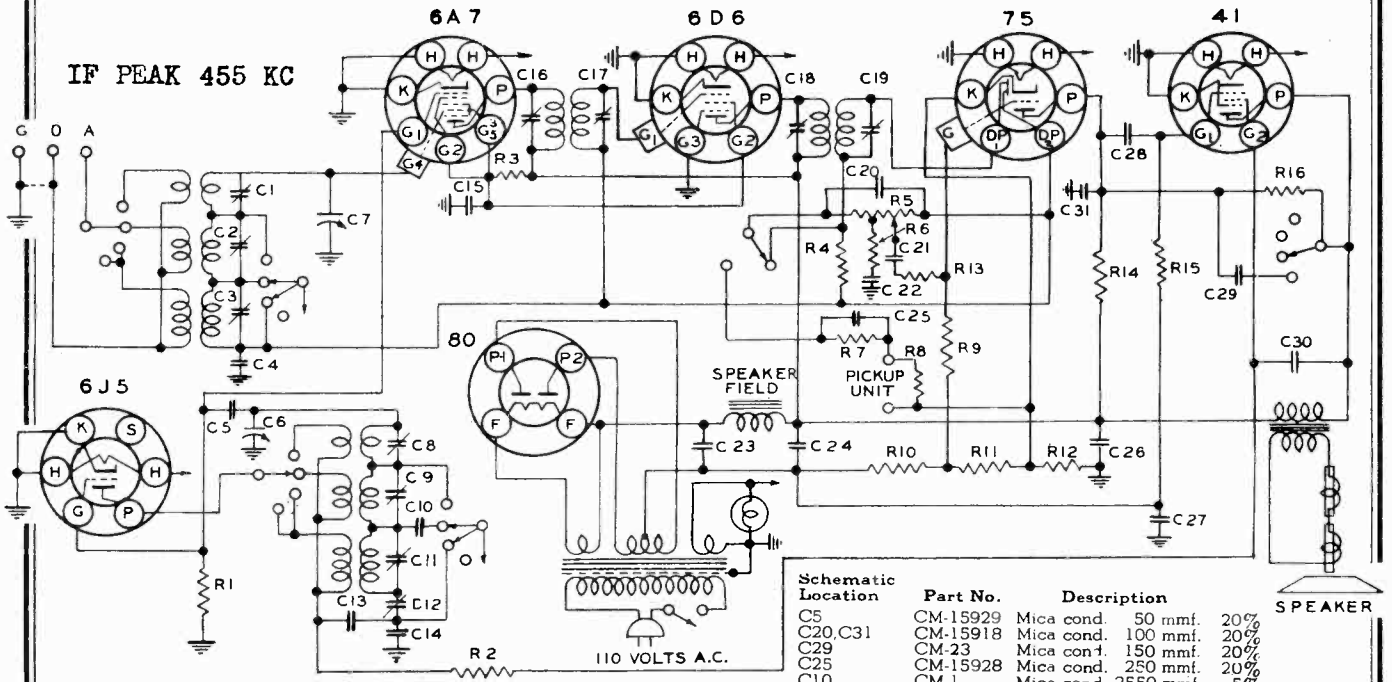
TUBE LAYOUT

The tubes used are:

1—6A7	Converter tube
1—6D6	I. F. Amplifier
1—75	Second detector, automatic volume control and audio amplifier
1—41	Power output
1—80	Rectifier

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.

IF PEAK 455 KC



MODEL 699-P

Schematic Location	Part No.	Description
R1,R6	R-15511	Carbon resistor 50K ¼W 20%
R4,R7,R16	R-15500	Carbon resistor 2 Meg ¼W 20%
R13,R8,R14	R-15512	Carbon resistor 250K ¼W 20%
R5	R-2	Carbon resistor 5K ¼W 20%
R9	R-15517	Carbon resistor 1 Meg ½W 20%
R15	R-15520	Carbon resistor 5 Meg ½W 20%
R3	R-15535	Carbon resistor 13K 2W 20%
R10,R11,R12	RC-6	Candohm resistor
R5	Y-VC-22	Volume control

Schematic Location	Part No.	Description
C5	CM-15929	Mica cond. 50 mmf. 20%
C20,C31	CM-15918	Mica cond. 100 mmf. 20%
C29	CM-23	Mica cond. 150 mmf. 20%
C25	CM-15928	Mica cond. 250 mmf. 20%
C10	CM-1	Mica cond. 2550 mmf 5%
C14	CM-17	Mica cond. pre. 4330 mmf. 3%
C15,C26	C-15756	Tubular cond. .05 mfd. 400 V
C13,C21 C22,C28	C-15754	Tubular cond. .01 mfd. 400 V
C30	C-15759	Tubular cond. .006 mfd. 400 V
C4	C-15752	Tubular cond. .05 mfd. 200 V
C1,C2,C3	Y-CP-1	Trimmer cond. ant.
C8,C9,C11	Y-CP-1	Trimmer cond. ant.
C12	Y-CP-16472	Osc. Padder condenser
C16,C17	Y-CT-1	Trimmer cond 1st I. F.
C18 C19	Y-CT-1	Trimmer cond. 2nd I. F.
C23,C24,C27	Y-CE-7	Elect. cond. 16.16 mfd. 400 V, 12 mfd. 25V
C6,C7	Y-CV-19	2 gang variable cond.

MODEL 699-P

Model 699-P is a six tube radio phonograph combination operating on a 110 volts 50-60 cycles. The receiver tunes to three bands, these are:

A—Broadcast band 538 to 1750 kilocycles.

B—Police and airplane 1.75 to 5.8 M.C.

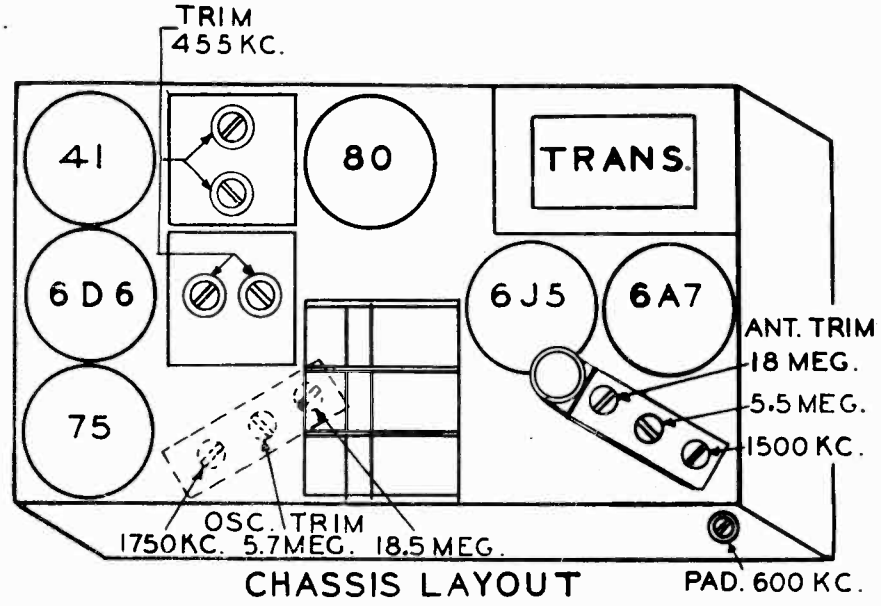
C—American and foreign short wave receptions 5.8 to 18.6 M.C.

The receiver is equipped with automatic volume control, inverse feedback, inverse feedback tone control, base compensation, and mechanical push button tuning.

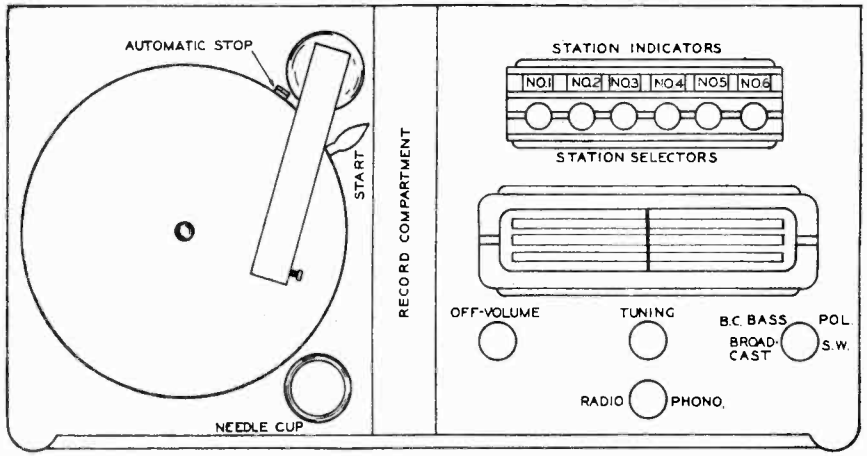
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.

The tubes used are:

1—6A7	First detector
1—6J5	Oscillator
1—6D6	I. F. Amplifier
1—75	Second detector, automatic volume control and first audio amplifier
1—41	Power output
1—80	Rectifier



CHASSIS LAYOUT



Operations For Setting Up Of Buttons

(1) Decide which station you desire to hear on any one button.

(2) Loosen this button by turning it to the left.

(3) Tune in your desired station manually until it is heard with best quality.

(4) Push in the button while holding the manual tuning knob fixed on the station.

(5) Tighten the button by turning it to the right while the button is pushed all the way in, as tightly as possible. Allow the button to come out and tighten still more. It is of the utmost importance that the buttons be logged as tightly as possible.

(6) Repeal this procedure to set up the other buttons.

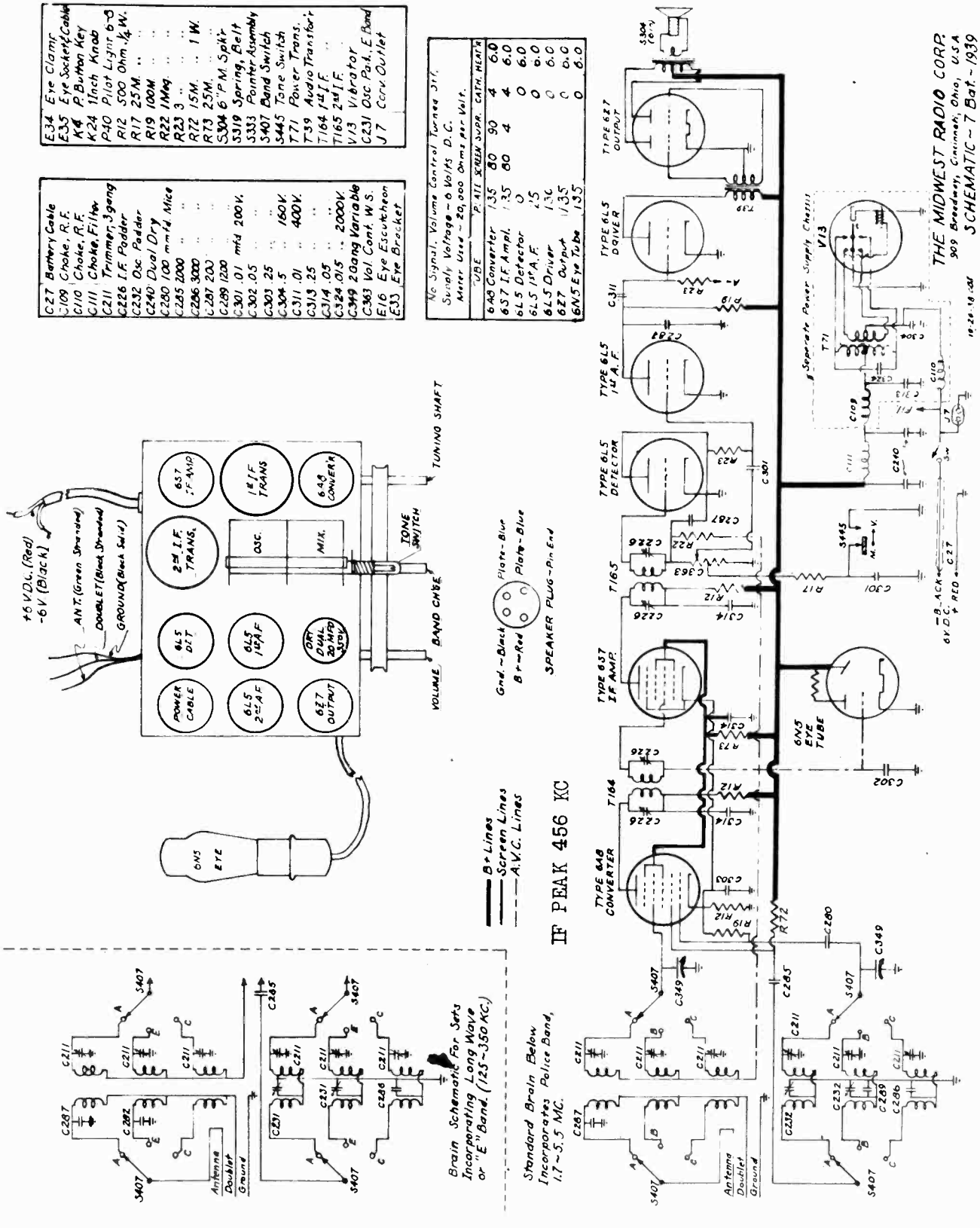
IT IS IMPORTANT THAT ALL THE BUTTONS BE LOGGED ON STATIONS LYING BETWEEN 550 AND 1700 KILOCYCLES AND THAT THESE BUTTONS BE SCREWED TIGHTLY. IF THIS IS NOT DONE THE CAMS OPERATING THE PUSH BUTTON UNIT MAY WANDER AND JAM THE WHOLE UNIT.

If there are not enough stations in your locality to log all six buttons, the unused buttons should be logged somewhere between 550 and 1700 kilocycles:

To change any one setting at any time repeat the above procedure. After that, to get this station, push the desired button with an even firm push until it has reached the end of its travel. After the push buttons are adjusted to your desired station, cut out the proper station call letters from the enclosed station call letter sheet, and snap this tab into the rectangular opening above the push buttons. Cover them with the small transparent celluloid tabs supplied with the call letters. These openings are shown in Fig. 1 as No. 1, No. 2, No. 3, No. 4, No. 5 and No. 6.

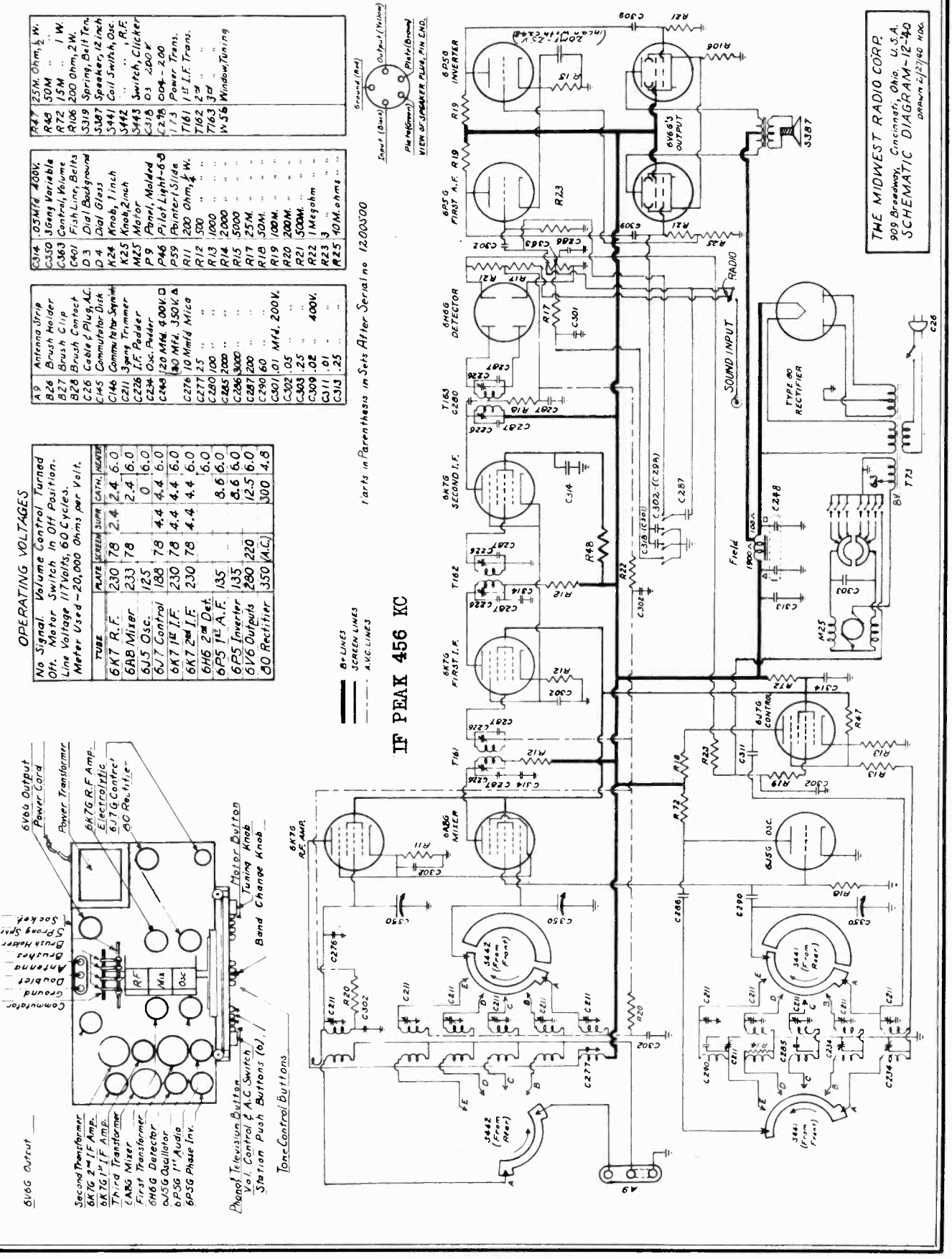
MIDWEST RADIO CORP.

MODEL 7-39 Batt.
Schematic, Socket
Voltage



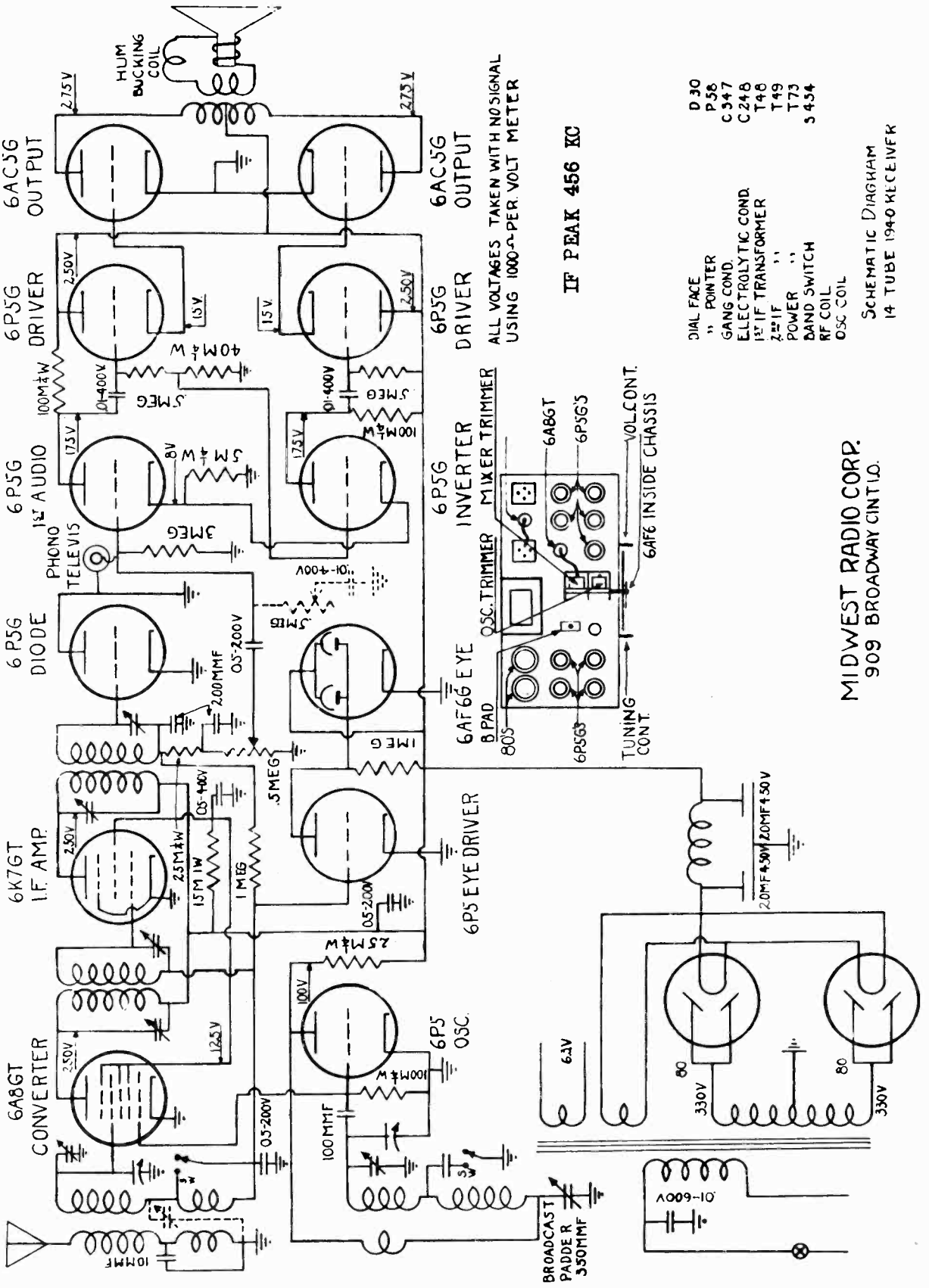
MODEL 12-40
Schematic, Socket
Voltage

MIDWEST RADIO CORP.



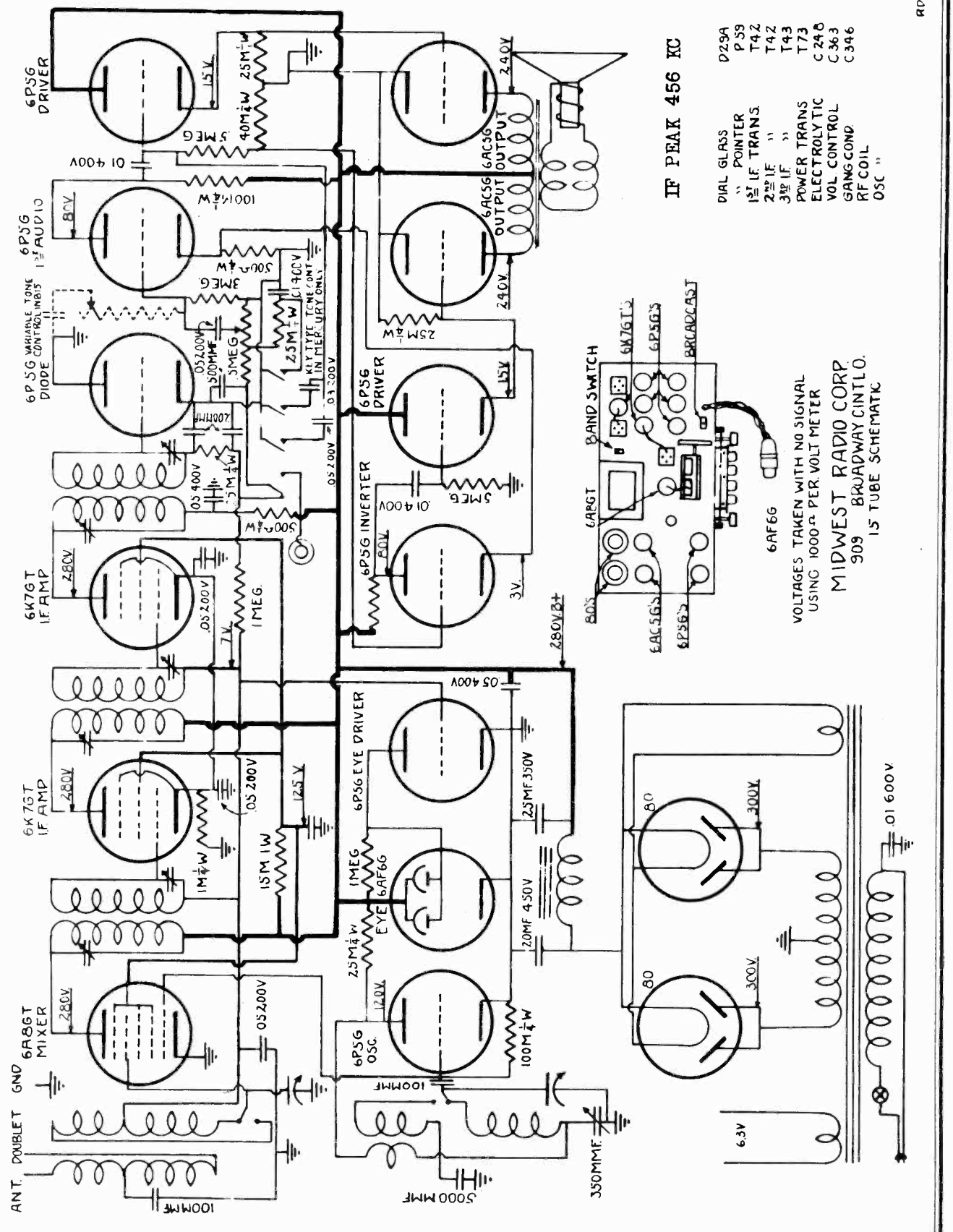
MIDWEST RADIO CORP.

MODEL 14-40
Schematic, Voltage
Socket, Trimmers



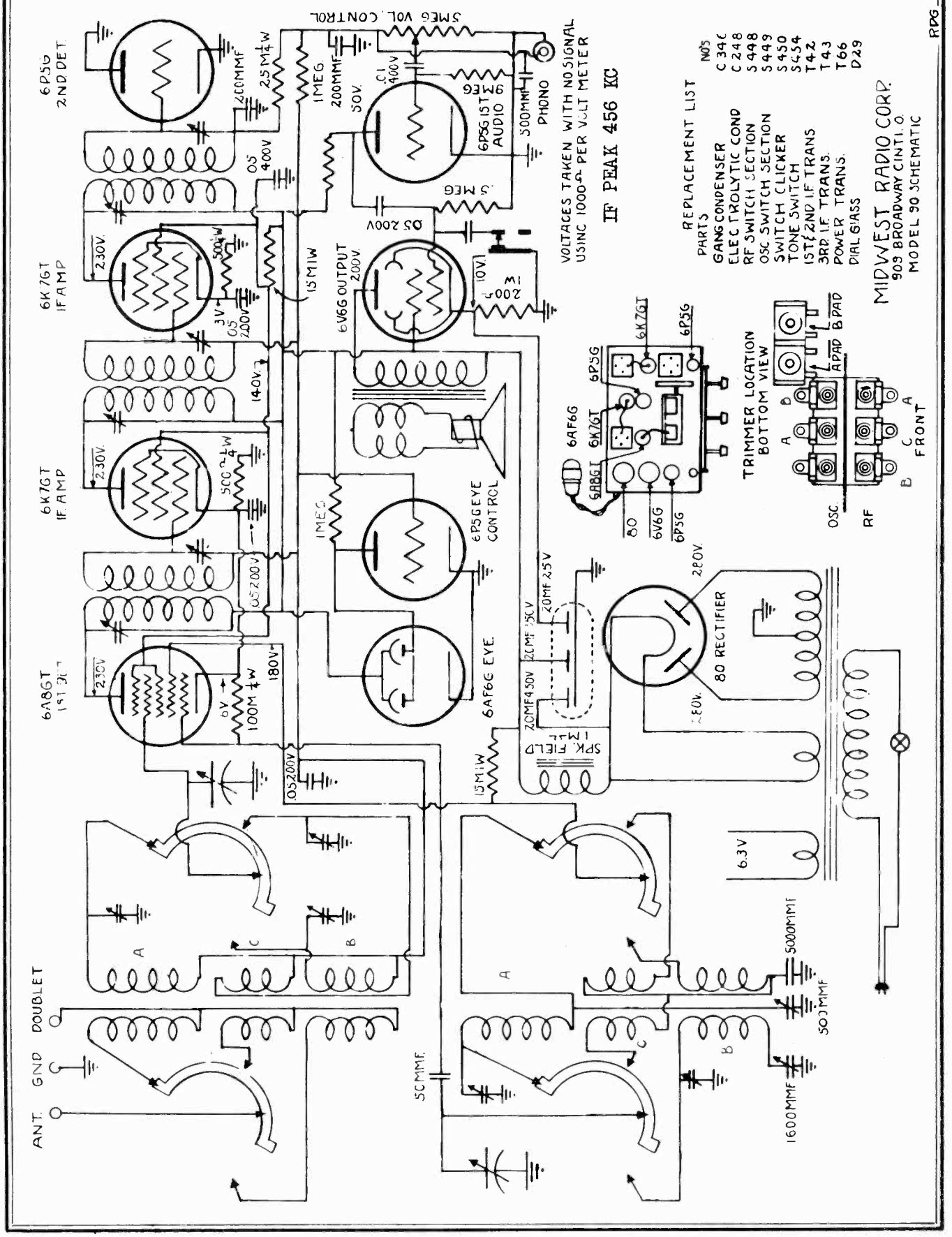
MODEL 15-40
Schematic, Voltage
Socket

MIDWEST RADIO CORP.



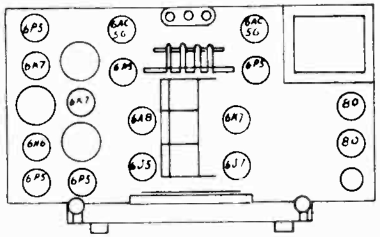
MIDWEST RADIO CORP.

MODEL 90
Schematic, Voltage
Socket, Trimmers



MODEL 170
Schematic, Voltage
Socket

MIDWEST RADIO CORP.



OPERATING VOLTAGES

No Signal Volume Control Turned Down. Motor Switch in UP Position. Line Voltage 117 Volts, 60 Cycles Meter Used 20,000 ohms per Volt

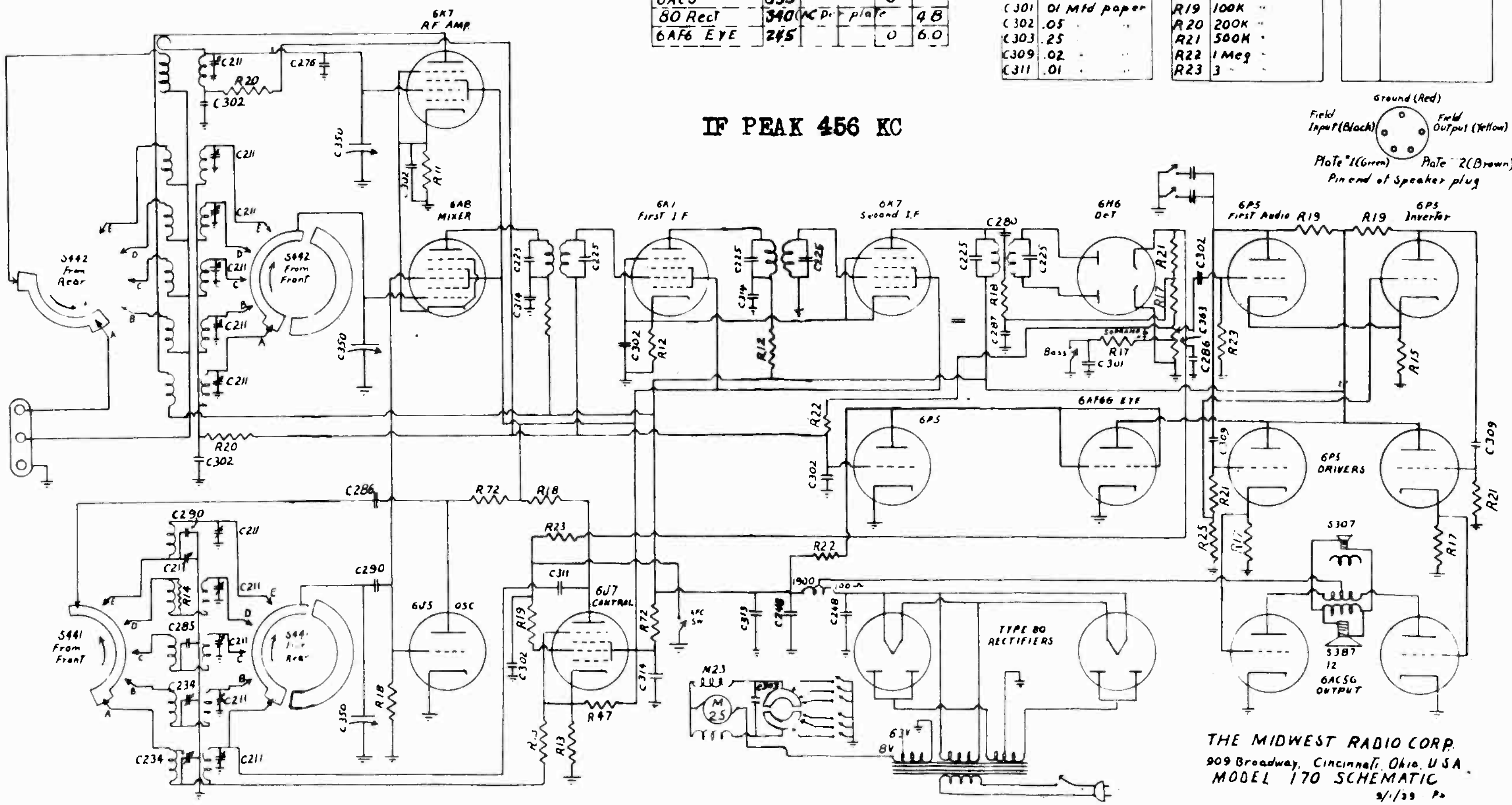
TUBE	PLATE	SCREEN	SUP	CATH	HEATER
6K7 RF	245	85	2.4	2.4	6.0
6A8 Mixer	"	"		"	"
6J5 Osc	140			0	"
6J7 Control	200	85	4.4	4.4	"
6K7 1st IF	245	85	"	"	"
6K7 2nd IF		"	"	"	"
6P5 DC AMP					"
6H6 2nd Det					"
6P5 1st AF	150			9.2	"
6P5 Inverter	"			"	"
6P5 Drivers	245			10	"
6AC5	335			0	"
80 Rect	340 AC per plate				4.8
6AF6 EYE	245			0	6.0

A9	Ant Binding post
B26	Brush Holder
B27	Brush Clip
B28	Brush Contact
C20	Cable & Plug
C145	Commutator Disk
C 40	" Segment
C211	3Gang Trimmer
C225	IF Padder
C234	Osc Pad(2gang)
C248	Filter Cond.
C276	10 MMFD
C277	25 "
C280	100 "
C285	2000 "
C286	3000 "
C287	200 "
C290	60 "
C301	.01 Mfd paper
C302	.05 " "
C303	.25 " "
C309	.02 " "
C311	.01 " "

C313	.25 Mfd
C314	.05
C350	3Gang Var Cond
C363	Control Volume
C401	Drive Cable
D 3	Dial Background
D4A	Dial Glass
K24	Knob (Brown-1")
M23	Motor
P10	Panel
R18	50K ohm
P46	Pilot Light 6-8V
P59	Pointer & Slide
R11	200 Ohm
R12	500 "
R13	1000 "
R14	2000 "
R15	5000 "
R17	25K "
R19	100K "
R20	200K "
R21	500K "
R22	1 Meg "
R23	3 " "

R25	40K Ohms
R47	25K "
R48	50K "
R72	15K "
S307	Speaker 3½"
S387	" 12"
S441	Band Sw. Osc
S442	" " RF
T73	Pwr. Trans.

IF PEAK 456 KC

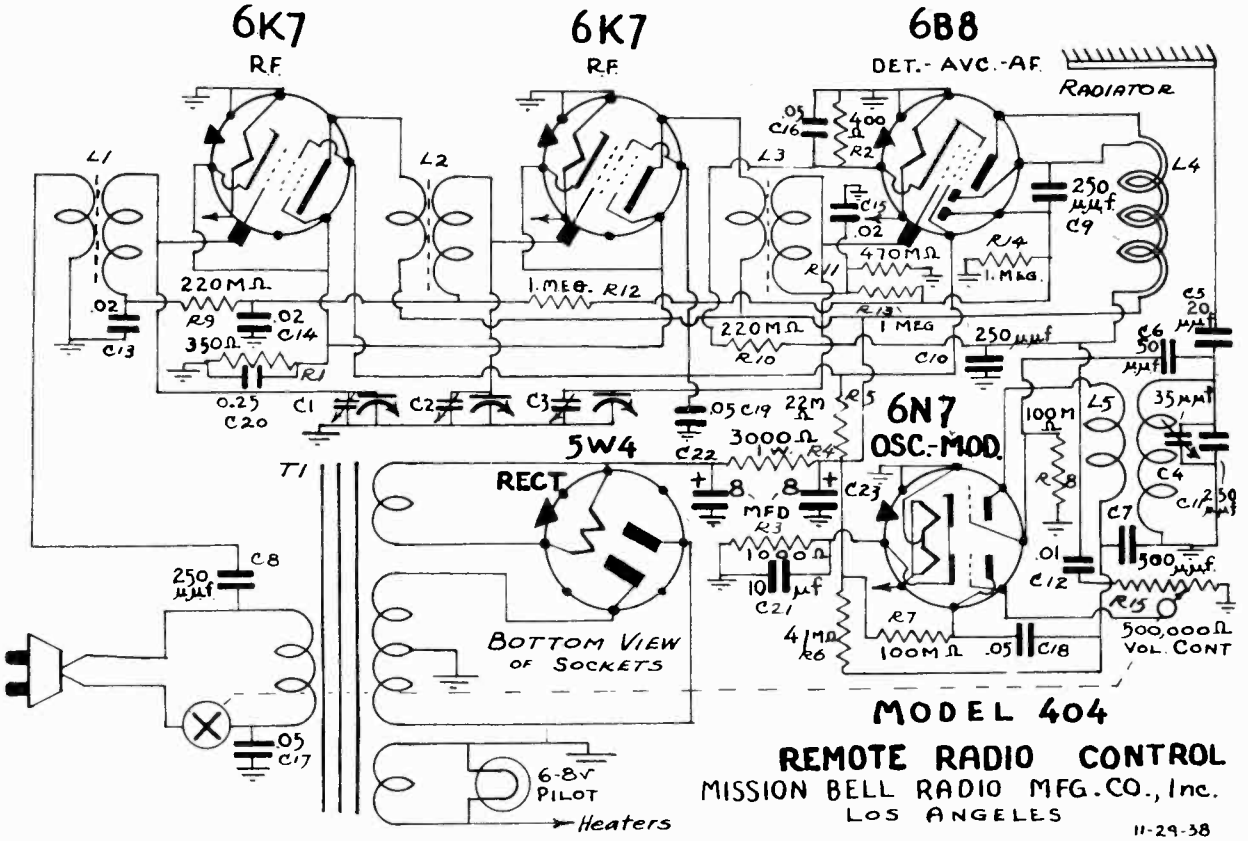


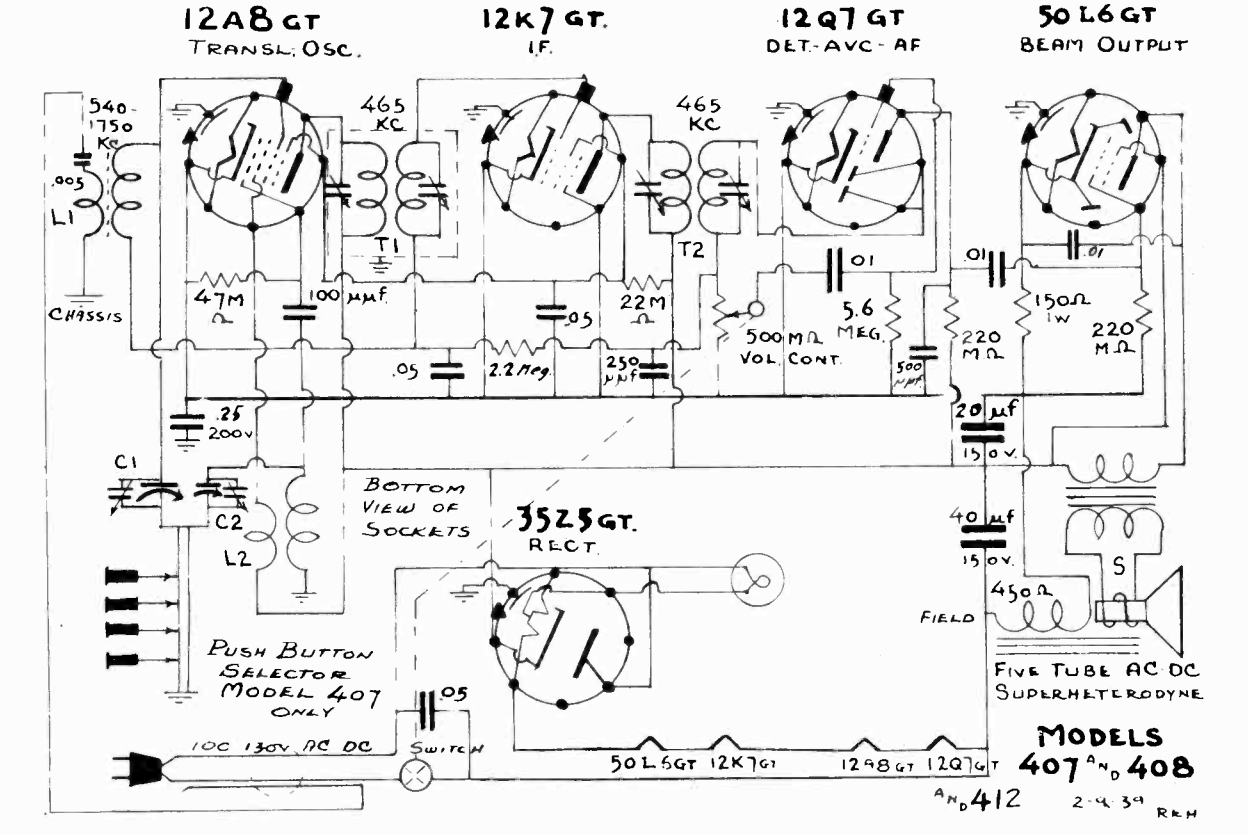
MODEL 404

MISSION BELL RADIO MFG. CO., INC.

MODELS 407, 408, 412

Schematics

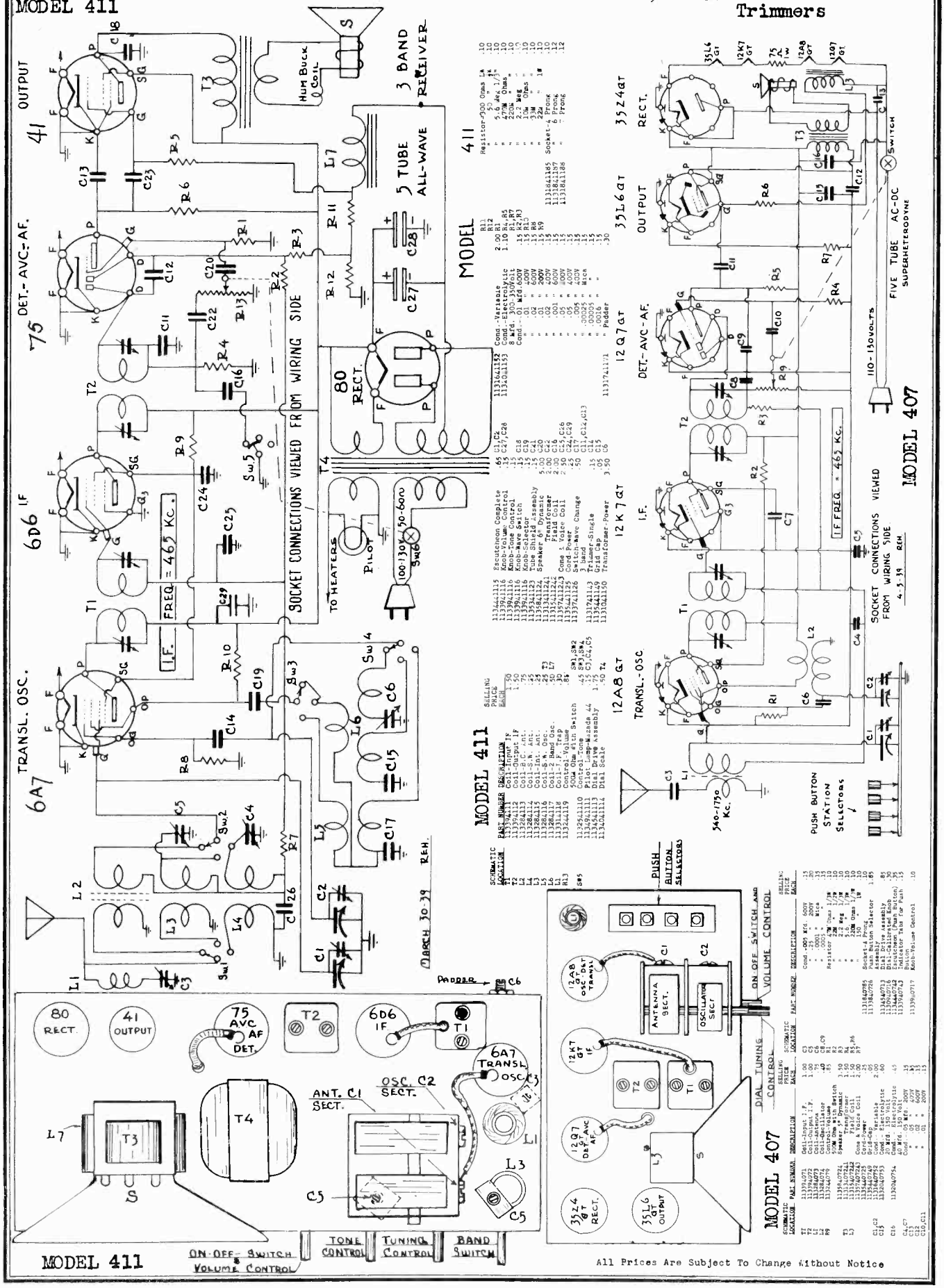




MODEL 407 Late
MODEL 411

MISSION-BELL RADIO MFG. CO., INC.

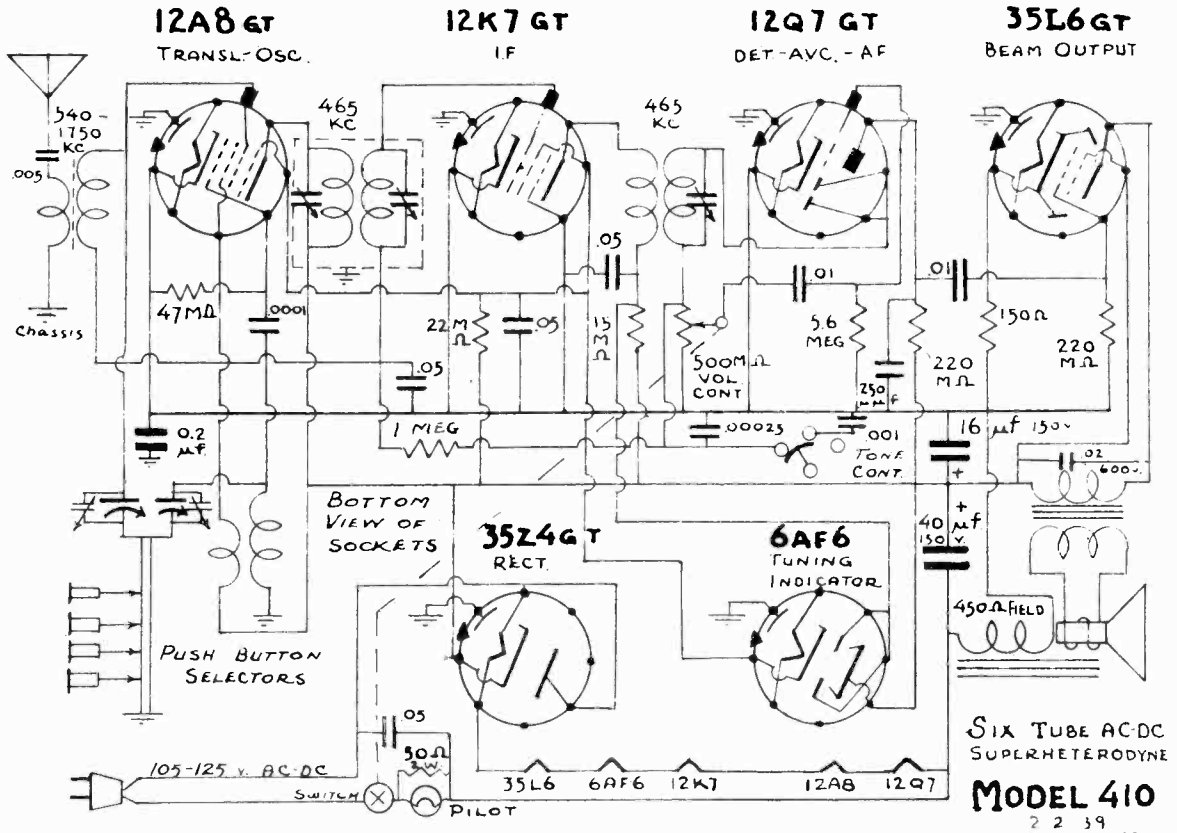
Schematics, Socket Trimmers

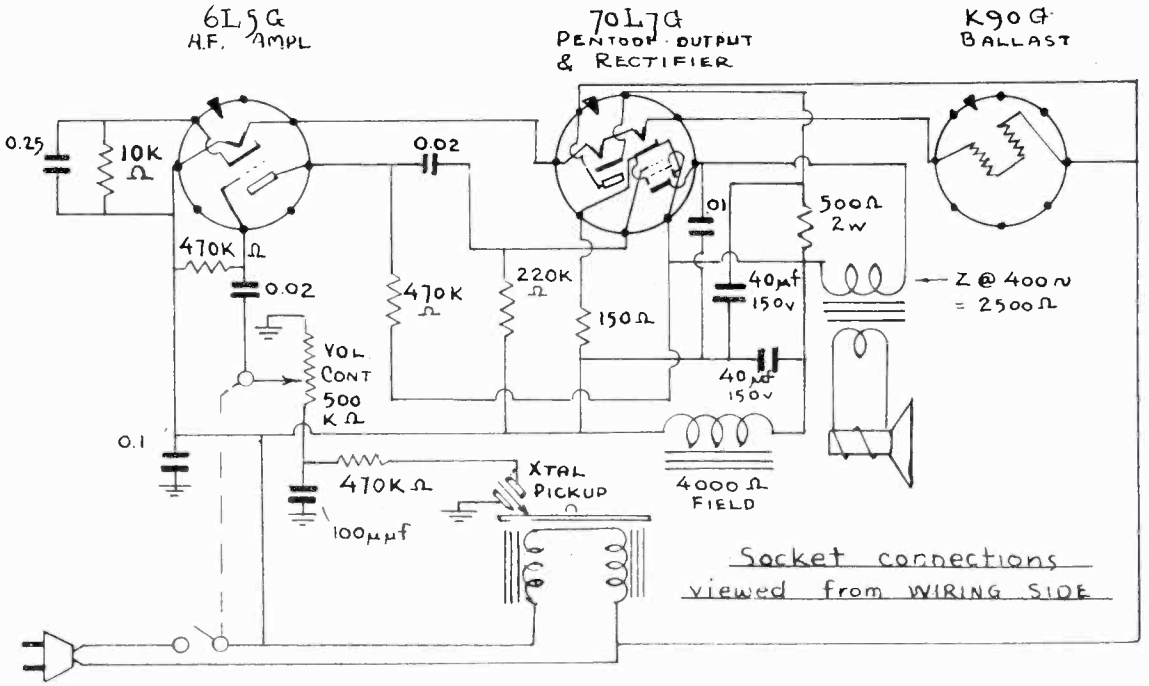


Schematics

MODEL 410
MODEL 498 Record Player

MISSION BELL RADIO MFG. CO., INC.



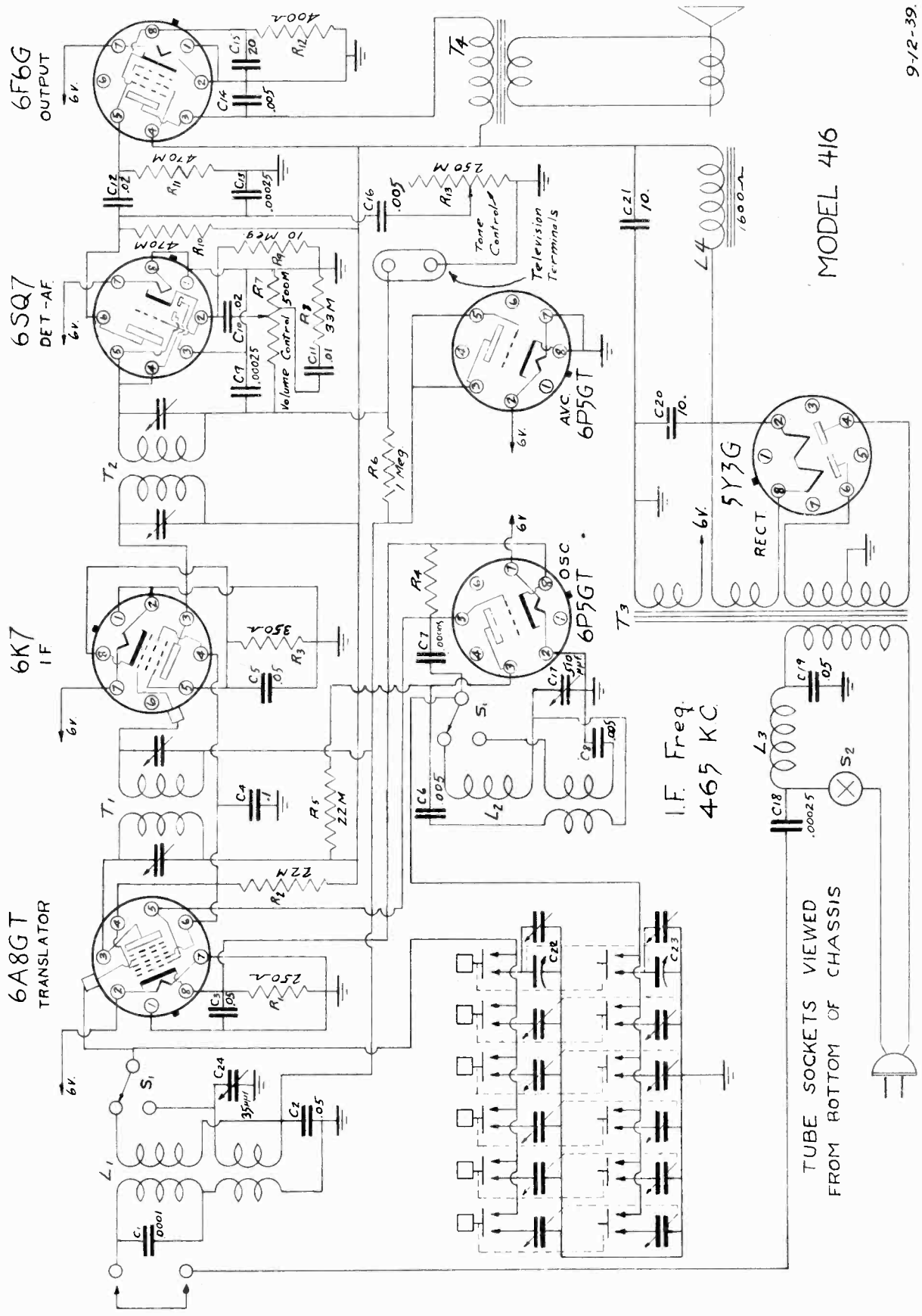


AMPLIFIER
RECORD PLAYER
MODEL 498

MISSION BELL RADIO
MFG. CO., INC.
LOS ANGELES
6-19-39 REH

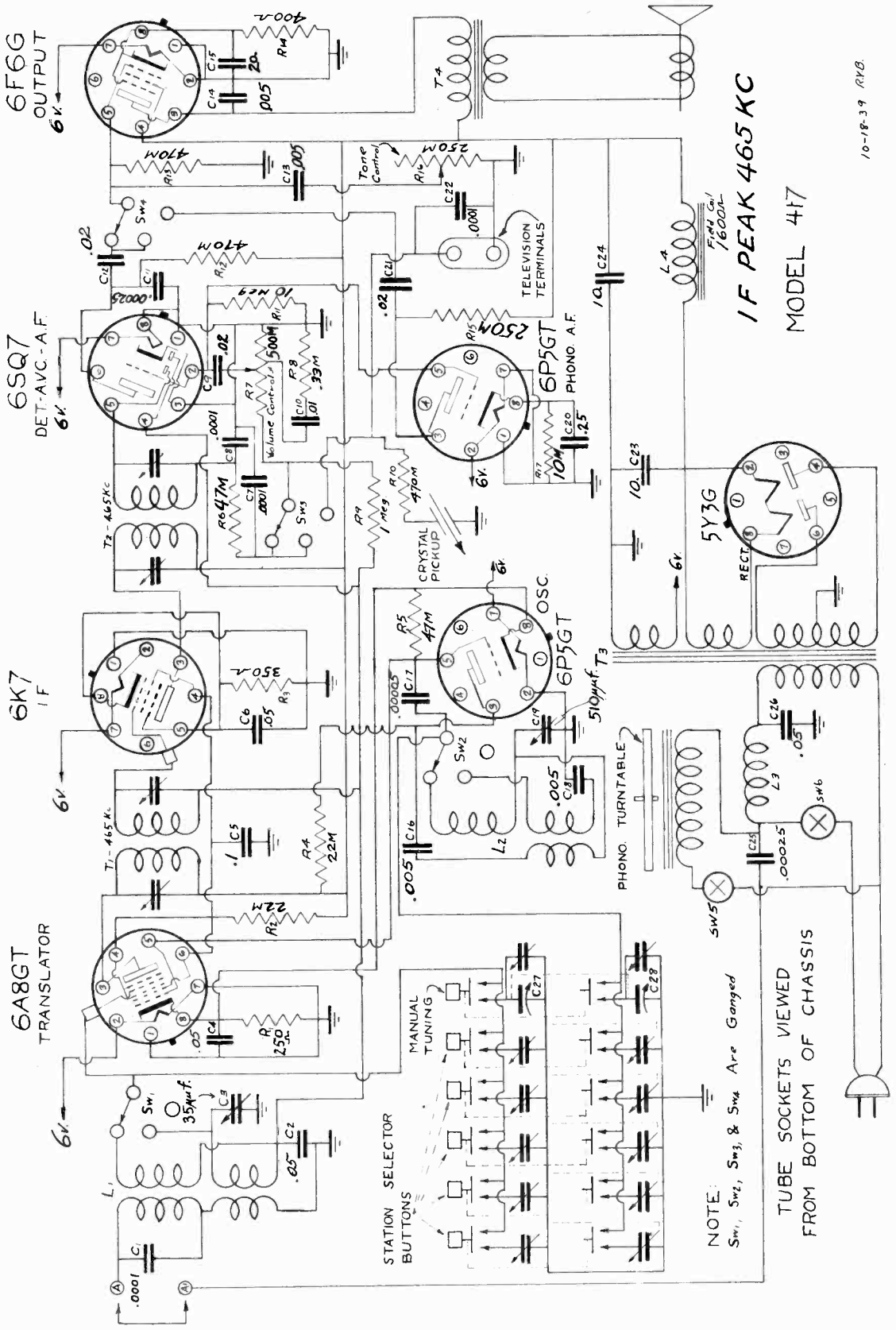
MODEL 416
Schematic

MISSION BELL RADIO MFG. CO., INC.



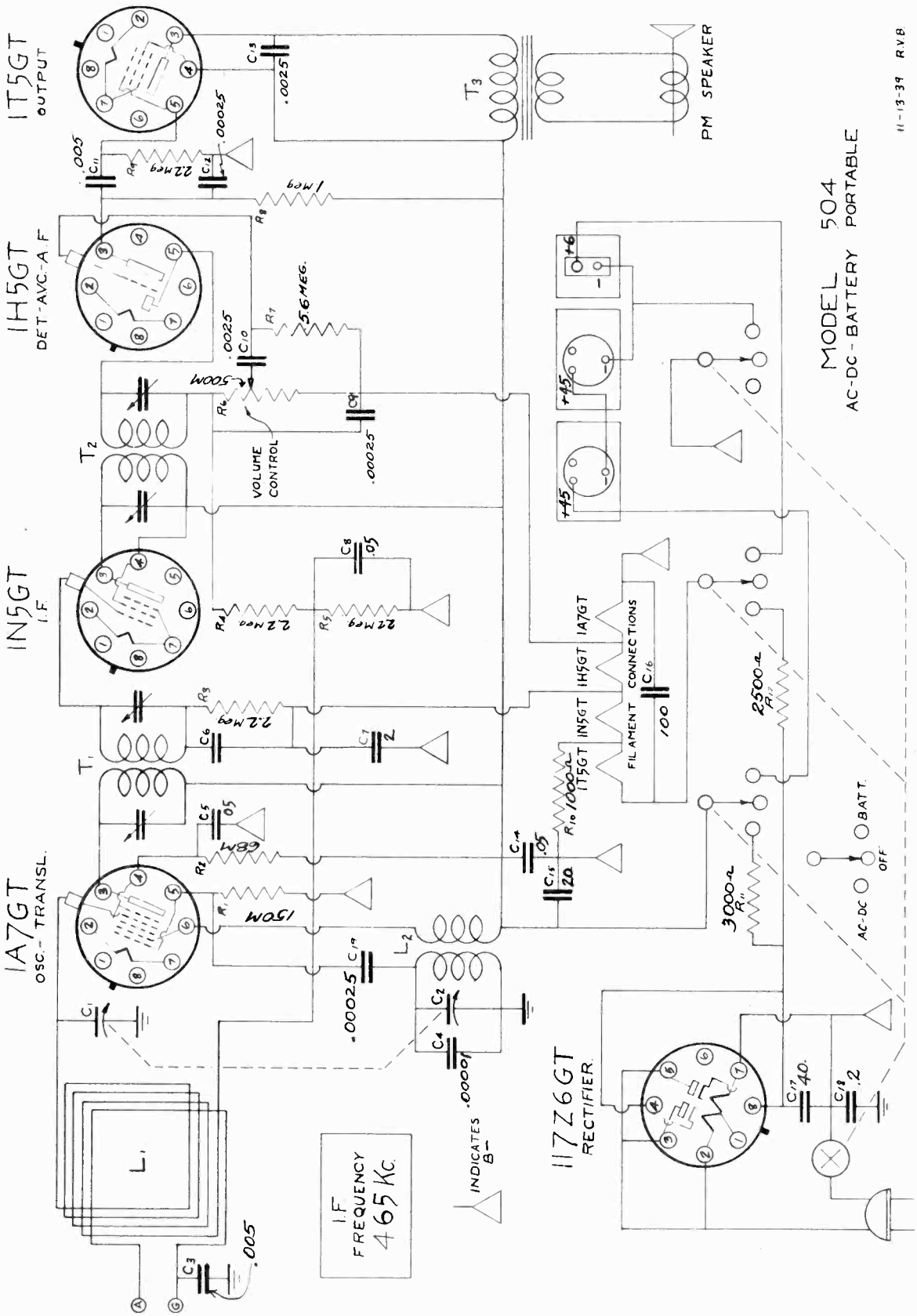
MODEL 417
Schematic

MISSION BELL RADIO MFG. CO., INC.



MODEL 504
Schematic

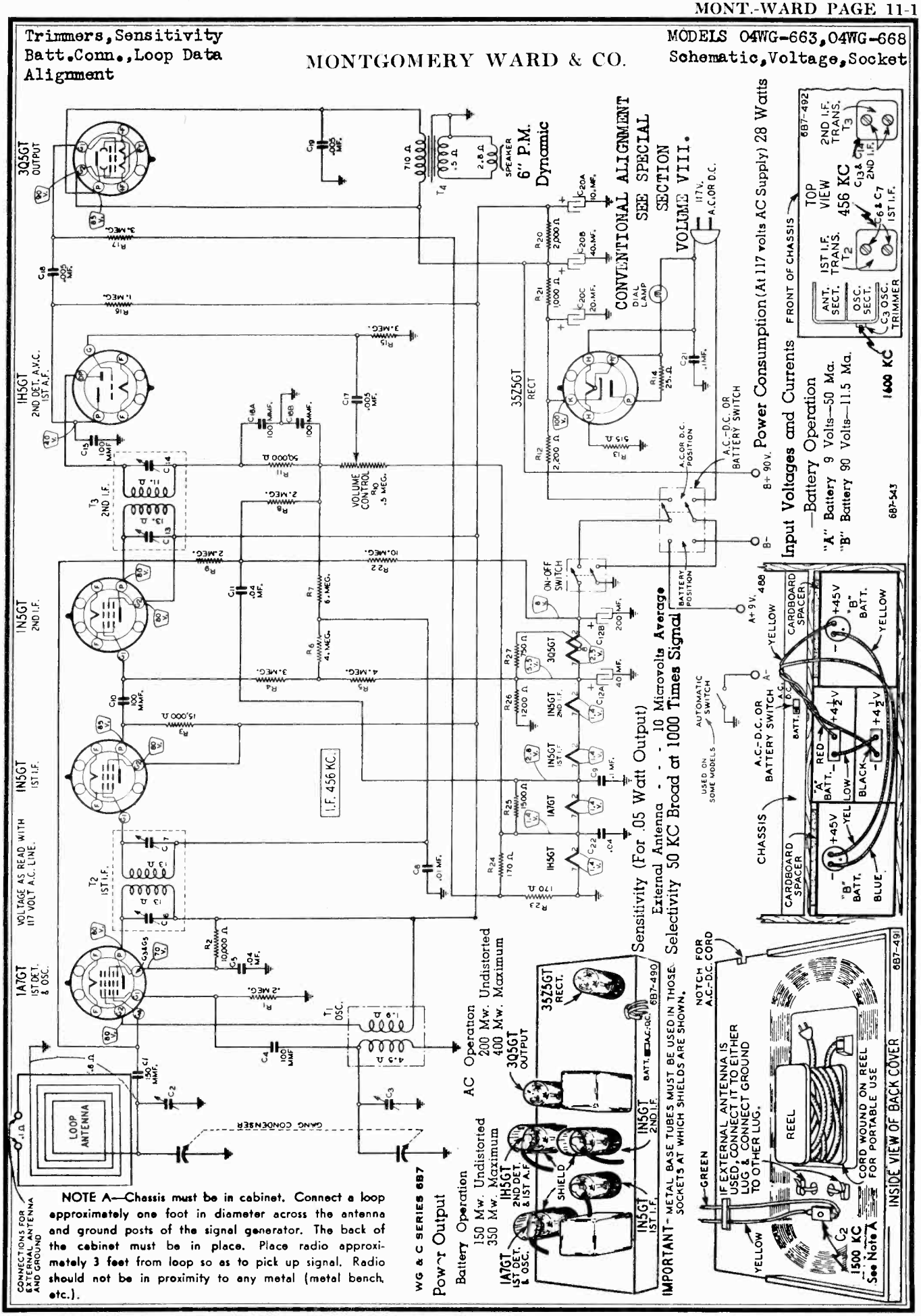
MISSION BELL RADIO MFG. CO., INC.



Trimmers, Sensitivity
Batt. Conn., Loop Data
Alignment

MONTGOMERY WARD & CO.

MODELS 04WG-663, 04WG-668
Schematic, Voltage, Socket



Power Consumption (At 117 volts AC Supply) 28 Watts

Input Voltages and Currents
—Battery Operation
"A" Battery 9 Volts—50 Ma.
"B" Battery 90 Volts—11.5 Ma.

Sensitivity (For .05 Watt Output)
External Antenna - - - 10 Microvolts Average
Selectivity 50 KC Broad at 1000 Times Signal

AC Operation
200 Mw. Undistorted
400 Mw. Maximum

Battery Operation
150 Mw. Undistorted
350 Mw. Maximum

IMPORTANT—METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.

NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

WG & C SERIES 687

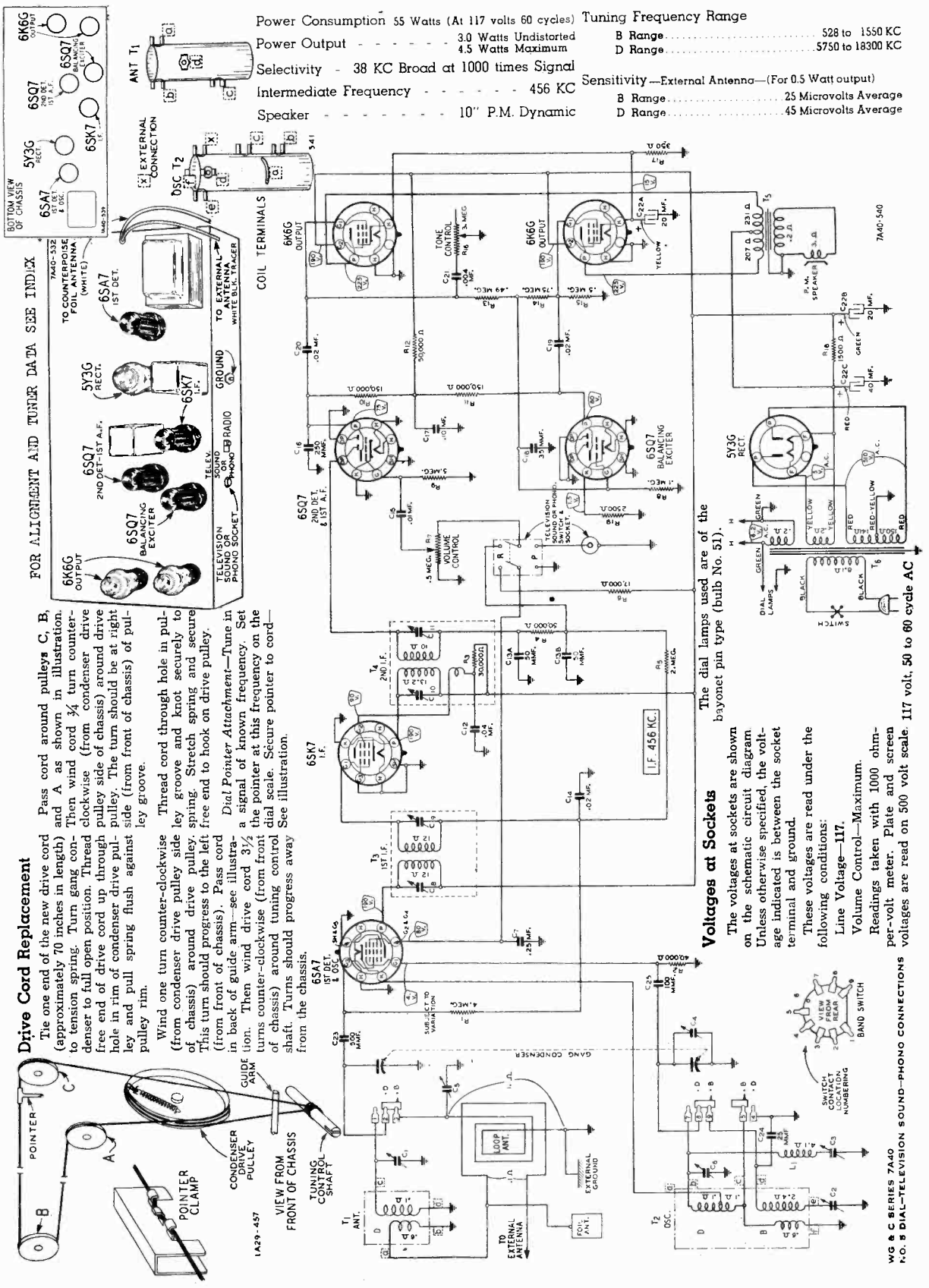
MODEL 04WG-725
Schematic, Voltage
Socket, Trimmers
Sensitivity

MONTGOMERY WARD & CO.

Power Consumption 55 Watts (At 117 volts 60 cycles)
Power Output - - - - - - - 3.0 Watts Undistorted, 4.5 Watts Maximum
Selectivity - 38 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - 10" P.M. Dynamic

Tuning Frequency Range
B Range ..... 528 to 1550 KC
D Range ..... 5750 to 18300 KC

Sensitivity—External Antenna—(For 0.5 Watt output)
B Range ..... 25 Microvolts Average
D Range ..... 45 Microvolts Average



Drive Cord Replacement

Tie one end of the new drive cord (approximately 70 inches in length) to tension spring. Turn gang condenser to full open position. Thread free end of drive cord up through hole in rim of condenser drive pulley and pull spring flush against pulley rim.

Pass cord around pulleys C, B, and A as shown in illustration. Then wind cord ¾ turn counter-clockwise (from condenser drive pulley side of chassis) around drive pulley. The turn should be at right side (from front of chassis) of pulley groove.

Wind one turn counter-clockwise (from condenser drive pulley side of chassis) around drive pulley. This turn should progress to the left (from front of chassis). Pass cord in back of guide arm—see illustration. Then wind drive cord 3½ turns counter-clockwise (from front of chassis) around tuning control shaft. Turns should progress away from the chassis.

Thread cord through hole in pulley groove and knot securely to spring. Stretch spring and secure free end to hook on drive pulley.

Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord—See illustration.

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.
Volume Control—Maximum.

Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.

The dial lamps used are of the bayonet pin type (bulb No. 51).

117 volt, 50 to 60 cycle AC

WG & C SERIES 7A40
NO. 8 DIAL—TELEVISION SOUND—PHONO CONNECTIONS

MODELS 62-303,62-433
Schematic,Socket,Coils
Transformer,Phono.Conn.

MONTGOMERY WARD & CO.

POWER CONSUMPTION---160 WATTS AT 117 V. 60 CYCLES.
190 WATTS (MOTOR OPERATING).
POWER OUTPUT---------20 WATTS UNDISTORTED.
30 WATTS MAXIMUM.

SPEAKER:-
12" DYNAMIC.

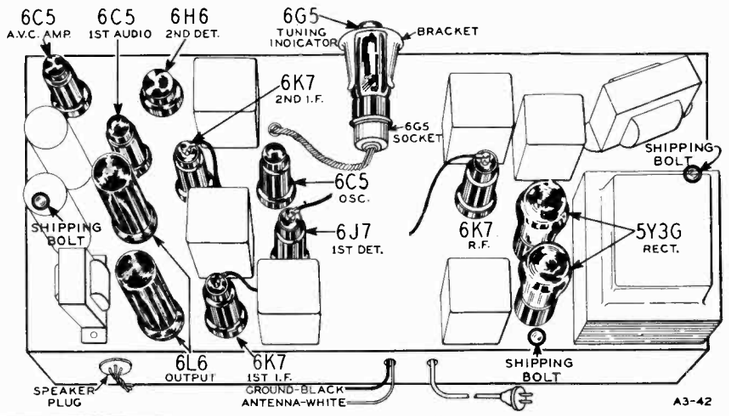
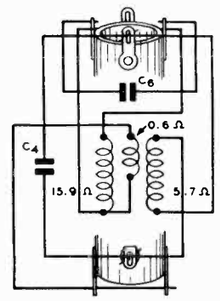
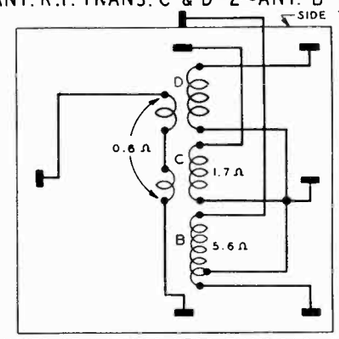


Fig. 6—Location of Tubes

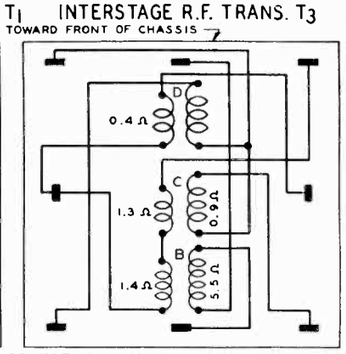
1ST ANT. "B" TRANS. T2



ANT. R.F. TRANS. "C" & "D" - 2ND ANT. "B" T1



INTERSTAGE R.F. TRANS. T3

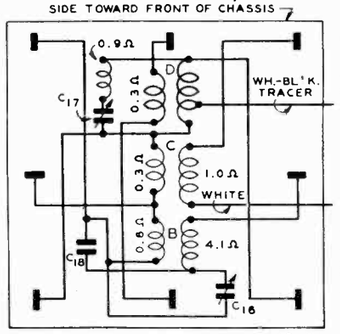


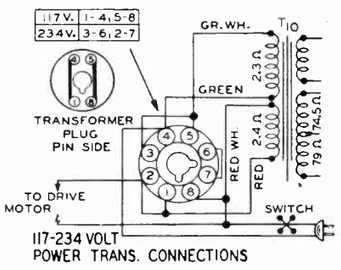
NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1Ω ARE NOT SHOWN A3-81

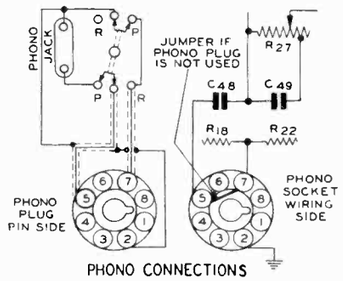
Fig. 5—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

RANGES:-
B- 528 - 1830 KC
C- 1810 -6350 KC
D- 6300 - 22000 KC

OSC. COIL T4







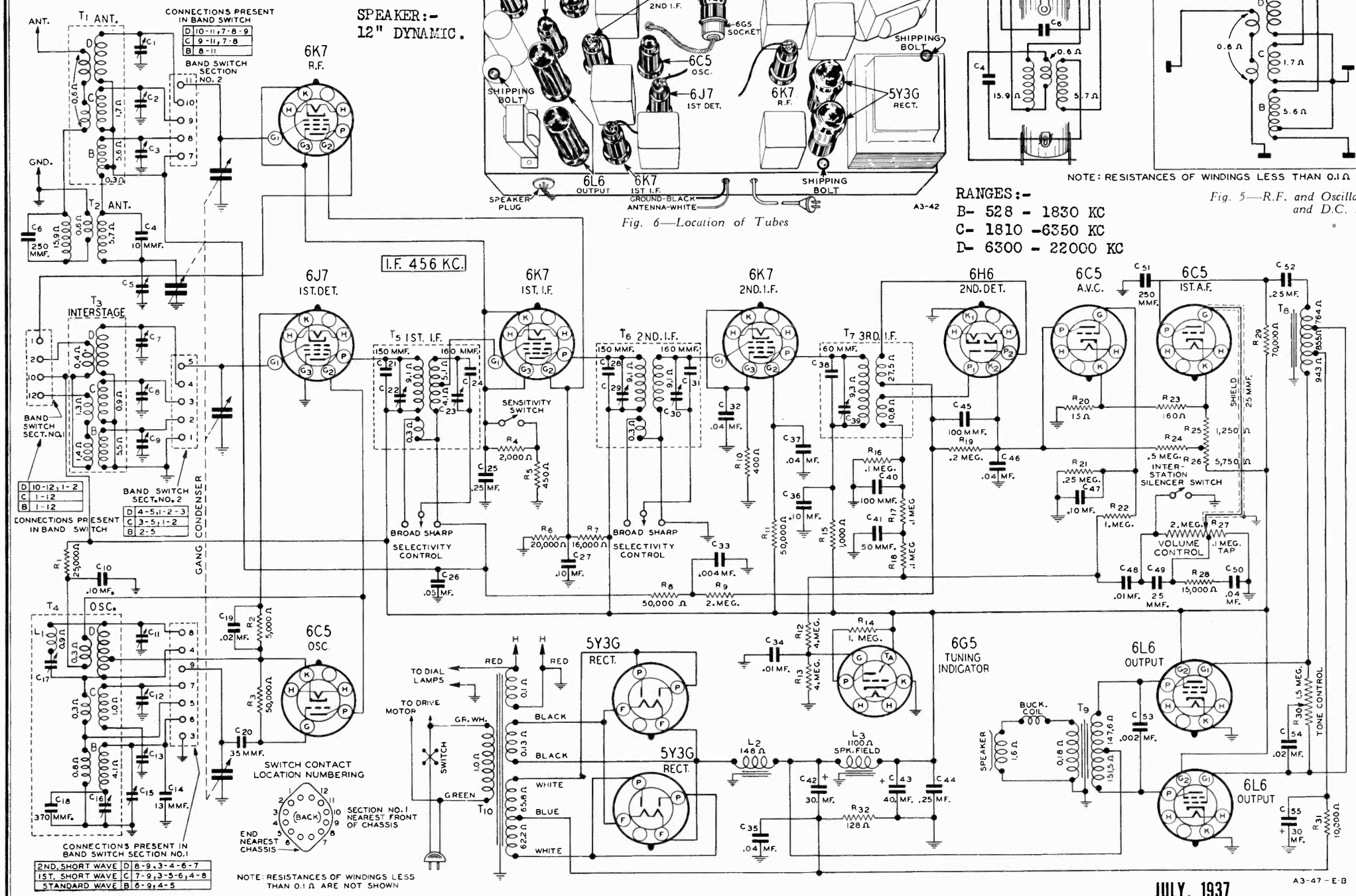


Fig. 2—Schematic Circuit Diagram

JULY, 1937

MONTGOMERY WARD & CO

MODELS 62-303,62-433
Alignment,Trimmers
Voltage,Notes

13 TUBE • 3 BAND • ALL WAVE A. C. POWER SUPPLY

ALIGNMENT PROCEDURE

Local-Distance Switch — Distance Position.
Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position 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:
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., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
3rd I.F.	Range B	.1 mf.	456 KC	Grid of 2nd I.F. Tube	3rd I.F. (C39)	Turn Rotor to Full Open	Adjust to Maximum Output
2nd I.F.	Range B	.1 mf.	456 KC	Grid of 1st I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C15)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st & 2nd Ant. Range B (C5) & (C3)—Int. Range B (C9)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C16)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Ant. Range C (C2) Int. Range C (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C13)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C1) Int. Range D (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C17)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

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

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

On the electric drive models, the pointer is held to the shaft by a friction clip arrangement. With the electric-manual lever in the manual position, hold the tuning knob and move the pointer to the 1500 KC mark on the dial.

In sets using any other type of dial mechanism, it will be necessary to adjust the position of the indicator until it is at the 1500 KC mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

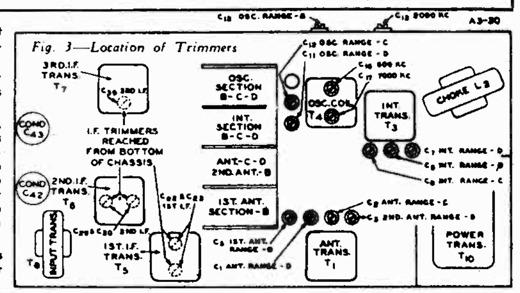


Fig. 3—Location of Trimmers

117-234 Volt Power Transformer

Some models are equipped with a 117-234 volt universal power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

Models without the electric drive, which are equipped with this transformer, may be used on a power supply of 40 to 60 cycles. If an electric drive motor is used, however, it is important that the set be operated on a 60 cycle power supply only. The reason for this is that the 60 cycle motor in the electric drive panel of this model will not operate satisfactorily at any frequency other than 60 cycle. Consequently, if one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 25 cycle model, is used for this purpose.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Twenty-Five Cycle Models

Twenty-five cycle receivers not equipped with an electric motor drive, differ from sixty cycle receivers only in the fact that a different power transformer is used. The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true—a sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control Maximum — Antenna Shorted to Ground
Local-Distance Switch in Distance Position
Readings taken with 1000 Ohm-per-volt meter — Position of Band Switch: Standard Wave

VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7—6U7G	R.F.	0	6.1(1)	250	130	10.0(2)		6.1(1)	10.0(2)
6J7—6J7G	1st Det.	0	6.1(1)	250	115	0		6.1(1)	6.0
6C5—6C5G	Osc.	0	6.1(1)	115				6.1(1)	0
6K7—6U7G	1st I.F.	0	6.1(1)	250	130	10.0(2)		6.1(1)	10.0(2)
6K7—6U7G	2nd I.F.	0	6.1(1)	240	130	5.0		6.1(1)	5.0
6H6	2nd Det.	0	6.1(1)					6.1(1)	0
6C5—6C5G	A.V.C.	0	6.1(1)	5(3)				6.1(1)	.5
6C5—6C5G	1st A.F.	0	6.1(1)	145				6.1(1)	6.0
6L6—6L6G	Output	0	6.1(1)	330	250	21(4)		6.1(1)	0
5Y3G	Rectifier	0	4.7(5)		1100(6)		1100(6)		4.7(5)
6G5	Tuning Indicator	Plate to Ground 20(3)		Target to Ground 250		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with a 1000 Ohm-per-volt meter (500 volt scale).
(4) Bias as read across L4 or R32, depending on speaker arrangement. See Schematic Diagram.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

A phono cable assembly may then be purchased On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service NOTES issued for this chassis. (see index)

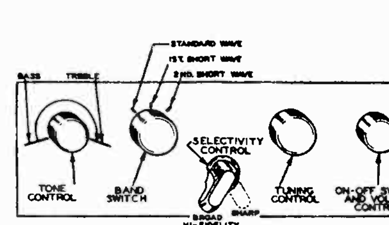


Fig. 1—Arrangement of Controls

MODELS 62-303,62-309,62-321
62-347,62-417,62-433,62-447
62-449,62-451
Elec.Drive Panel Assembly

MONTGOMERY WARD & CO.

Replacement Instructions
Notes

MODEL 62-303, 62-309, 62-321, 62-347, 62-417

ELECTRIC DRIVE PANEL ASSEMBLY

SEPTEMBER,1937

MODEL 62-433, 62-447, 62-449, 62-451

General Information

The electric drive panel assembly is the same for all touch tuning radios, and may be removed from the chassis as described in the article on that subject.

All sets since August 23, 1937, incorporate several changes in the electric drive unit. These later sets are identified by the number 2 (or higher) stamped on the bracket over the motor On-Off switch located at the upper right of the drive assembly (from the back).

The principal changes made in these later models are the following:

(1) Originally a friction drive was used from the motor to the gear train. This friction drive has been replaced with a fibre gear drive.

(2) A new method of stringing the main drive cable has been used. The new drive cable is not interchangeable with the old.

Instructions for replacing the original friction drive with the new gear drive and for replacing the original drive cable with the new drive cable are not included, since these replacements should not be made in the field.

If major trouble develops in the early models (these do not have a number on the motor On-Off switch bracket), a replacement electric drive panel assembly should be ordered.
The defective panel may then be returned for credit. There is one exception to this and that is in the case of the early 7-tube sets. Instructions for handling repairs on the electric drive panel in these models will be found further on in this manual.

Replacing Electric Drive Panel on Chassis

Remove the chassis from the cabinet using extreme care not to damage the setting button shafts. To do this, it is necessary to remove the touch tuning buttons by pushing down the lower end of the small hairpin spring at the back of the button and, at the same time, pulling the button off the shaft. It is not necessary to remove the setting buttons.

Remove the speaker plug from the socket at the back of the chassis and also the tuning eye tube from its clamp bracket. Loosen the screw holding the bottom shield connection to the back of the chassis. Unscrew and remove the two L bolts (located under the chassis shelf) which are secured to the two rear chassis mounting feet. The screws in the wooden support behind the electric drive panel must be unscrewed and the support removed from the cabinet.

To remove the panel from the chassis, turn the electric-manual lever to the electric position. Unsolder the wire on the silencer switch on the front panel and also the motor connections under the chassis.

Take off the collars from the volume and tone control shafts.

Remove the glass screen from the panel by taking the screw out of the bracket in the upper right corner and loosening the screw in the lower left corner.

Early 7-tube models have four RED SCREWS (two located at bottom of panel and one on each side of the shaft extending through the center of the panel). Unscrew these four red screws.

THE PANEL USED FOR REPLACEMENT PURPOSES CANNOT BE MOUNTED ON THE EARLY 7-TUBE RADIOS (See article on Early 7 Tube Models).

Later models have four RED SCREWS (two located at bottom of panel and two behind glass screen). Unscrew these four red screws. DO NOT remove the screws on each side of the shaft extending through center of panel.

The following procedure for removing the panel from early models is given only in case minor repairs are necessary. If trouble serious enough to require replacement of the panel develops, the entire chassis or complete radio must be sent to the factory. A replacement panel cannot be mounted on the early type chassis.

On early models, pull the panel away from the chassis about ½", being careful not to damage the steel cable. Then tilt the upper part of the panel toward the chassis. Lower the panel about ½" and slide it to the left so the steel cable will pass under the bracket at the bottom of the projector compartment. After the cable clears this bracket, the panel may be removed.

On later models, the panel can be pulled straight out from the chassis.

To replace the assembly, reverse the above procedure. Before mounting the panel, caution must be taken that the driver arm on the drive gear and the spring clip on the gang condenser drive pulley line up properly. When they line up, the arm fits into the spring clip as the panel is pushed in toward the chassis.

When installing a new replacement panel on a late model 7 tube chassis, or any 9, 11, or 13 tube chassis, the following points must be observed carefully.

MOUNTING BOLTS

Two bolts with heads painted red are furnished with the new panel. These bolts are longer than those used in the old panel and must be used in the TOP mounting holes only. (Holes behind glass screen.) The bolts used on the old panel may be used in the two lower mounting holes of the new panel.

MOTOR CONNECTIONS

The motor cable assembly in the new panel has only two lead wires extending from it, while the old motor cable assembly has three. The third lead on the old cable assembly was connected to a condenser which is not necessary when the new drive assembly is used.

The two leads from this condenser (metal shell, tubular type) to the terminal strips should be disconnected. The condenser can be left in the chassis, or it can be removed.

One motor lead is soldered to the terminal strip lug to which is connected one wire of the power cord and one power transformer primary lead. The other motor lead is soldered to the terminal strip lug to which is also connected the lead from the On-Off switch and the other power transformer primary lead.

CAUTION

When the electric drive panel is removed from the chassis, lay it face down and not back down. The reason for this is that there is a possibility that the motor On-Off switch on the back of the unit will be damaged or thrown out of adjustment.

In handling the electric drive panel, do not carry it by the switch operating lever (See Fig. 6) which actuates the motor On-Off switch. This bar may be bent and damaged by such handling.

A NEW ELECTRIC DRIVE PANEL CANNOT BE MOUNTED ON THE EARLY 7-TUBE MODELS

These models may be identified by the fact that when the chassis is removed from the cabinet and the electric-manual lever is in the electric position all four red mounting screws can be seen - See Fig. 1. On late models, the two top red screws are behind the glass screen and cannot be seen unless this screen is removed - See Fig. 2.

If trouble serious enough to require replacement of the electric drive panel develops in the early model radio, it will be necessary to send the entire chassis or the complete radio to the factory to have this done. A replacement panel should not be ordered as it cannot be mounted on the early type 7-tube chassis.

If Dial Figures Go Back and Forth Without Stopping

THE BUTTON MAY BE SET TOO CLOSE TO THE END OF THE DIAL

It is not advisable to set a station close to the end of the dial travel, at the point where the reversing switch operates. If, when a setting button is depressed, you should turn the tuning knob too far, a click will be heard near the end of the dial travel. Then, whenever THIS touch tuning button is depressed, the dial figures will continue to move back and forth without stopping.

This condition is easily corrected as follows: Remember which tuning button it is, on which the above condition takes place.

Turn the electric-manual lever to the manual position. Turn the manual tuning knob until the 550 KC figure is at the line on the screen.

Turn the manual tuning knob to the left 2½ complete revolutions (5 half turns).

Turn the radio off.

At the back of the assembly are 8 circular discs which correspond to the 8 buttons in front. The first disc corresponds to the first button, etc. Now, refer to the disc which corresponds to the button mentioned above (the dial figures continue to move back and forth when this button is depressed).

The disc of this button will be approximately in the position shown in Fig. 3. With the flat end of a long pencil or a thin piece of wood, carefully depress lever "A" and rotate disc "B" about one inch in the direction shown by the arrow. Do not use a metal rod or the pointed end of the pencil. Disc "B" will turn readily after lever "A" has been depressed.

This will correct the condition, the stations may be set, and the radio operated in the usual manner.

Of course, when tuning in a station manually, as explained in the article "Tuning in a Station with the Manual Tuning Knob" in the instruction book, you can tune to the extreme end of the dial travel without the above condition taking place.

THE PAWL ON THE SETTING DISC MAY NOT ENGAGE THE STOPPING LEVER

The outer edge of pawl "A" (Fig. 4) should extend beyond the outside diameter of setting disc "B". As the setting disc rotates, pawl "A" will pass over stop lever "C" in one direction. When the setting disc is rotating in the other direction, stop lever "C" will engage the tip end of pawl "A" and cause pawl "A" to slide over and permit stop lever arm "C" to fall into notch in the setting disc.

If the tip end of pawl "A" does not extend a sufficient amount beyond the outer edge of the setting disc, the above mentioned action will not take place and the setting disc will rotate beyond stop lever "C" in either direction of rotation.

Should this faulty condition exist on one of the setting discs, whenever the touch tuning button corresponding to this disc is depressed, the dial figures will continue to move back and forth without stopping.

This condition is easily corrected as follows: Using a pair of side cutters, grip the tip of the pawl as shown in Fig. 4 about 1/32 inch from the edge. Pinch firmly and push outward (away from the center of setting disc). Do this until the tip of the pawl is a little more than 1/64 inch beyond the outer edge of the setting disc.

After this procedure has been followed, depress the setting button corresponding to this setting disc and see whether the stop lever edge engages the pawl properly.

IF THIS OCCURS WHEN NO TOUCH TUNING BUTTON IS DEPRESSED

Adjust the motor On-Off switch. See the article on this subject.

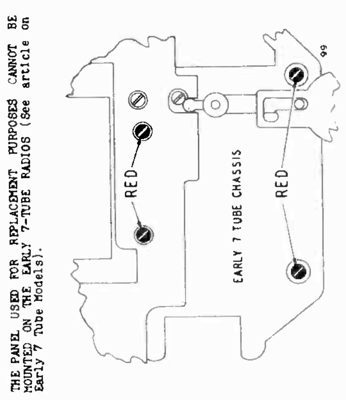


Fig.1 - Location of 4 Red Mounting Bolts in Early Models

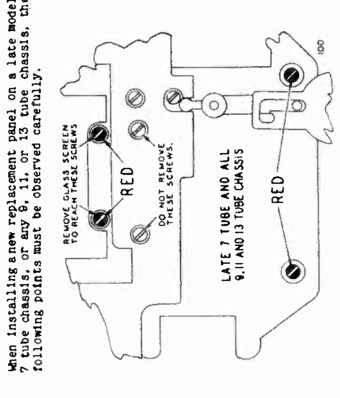


Fig.2 - Location of 4 Red Mounting Bolts in Late Models

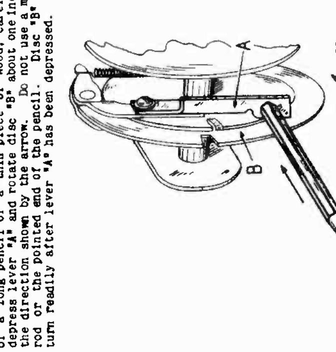


Fig.3 - Adjusting Position of Setting Disc

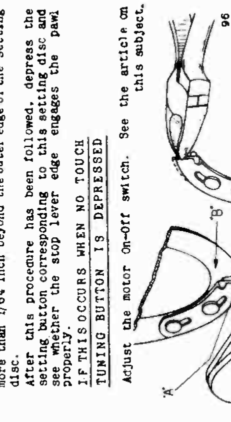


Fig.4 - Pinching Pawl of Setting Disc

MONTGOMERY WARD & CO.

MODELS 62-303, 62-309, 62-321
62-347, 62-417, 62-433, 62-447
62-449, 62-451

Drive Panel Adjustments
Compound Gear Notes

General Adjustments

IF, WHEN A TOUCH TUNING BUTTON IS PUSHED IN, THE MOTOR DOES NOT TURN

Push the button which has previously been depressed or any other touch tuning button, all the way in and release. Then again push in the button which is wanted and this time the drive should function.

The motor On-Off switch may be out of adjustment - See article on that subject in this manual.

JUMPY ACTION WHEN TUNING THE RADIO MANUALLY

Put gear drive in motor - Return electric drive panel to factory to have this done.

EXCESSIVE BACKLASH IN MANUAL TUNING

If there is too much backlash when tuning the radio manually, free the film drum cable. To do this, stretch the tension spring which holds the idler pulley on the film drum cable. Also stretch the phosphor bronze film drum cable and oil the pulleys on which this cable runs. Check the tightness of the set screws holding the drive drum to the tuning condenser shaft.

MOTOR ROTATES BUT DIAL FIGURES DO NOT MOVE

Correct this condition in the same manner as described above under "Backlash in Manual Tuning" (early models only).

Occasionally this condition can be remedied by turning the electric-manual lever to the manual position and holding it in this position. Then turn the tuning knob with the other hand a slight amount in the direction in which it turns most easily. Then turn the electric-manual lever back to the electric position.

The friction disc in the motor may slip. Change to the gear drive in the motor - Return electric drive panel to factory to have this done.

The fibre gear No. 1 (see Fig. 6) may be slipping on its hub. Replace this gear - See article on that subject in this manual.

IF THE DIAL DOES NOT STOP AT THE SAME POINT EACH TIME THE BUTTON IS DEPRESSED

IF THIS OCCURS ON ONE BUTTON ONLY - It will be necessary to replace the defective setting disc at the top of the electric drive assembly which corresponds to that button. Return the electric drive panel to the factory to have this done.

IF THIS OCCURS ON ALL BUTTONS - Tighten the main drive cable by means of the turnbuckle.

See if set screws on top pulley of main drive cable are tight.

Check spring clip on drive drum of tuning condenser which holds drive arm to see whether or not it is gripping this arm tightly.

The silencer switch spring assembly at the front of the electric drive panel may not have sufficient spring tension to push back the motor armature after the circuit is broken. This assembly has a two-fold purpose. First, it silences the radio while the motor is in operation. Its second function is to exert a slight amount of spring tension on the end of the armature shaft which extends from the motor.

Inside of the motor is a small pinion gear which rotates freely on the front motor bearing. There are two pins on the armature and two extensions on this gear. The entire armature shaft assembly slides back and forth in its bearings.

When the circuit thru the motor is complete, magnetic action causes the armature shaft to slide toward the front of the panel. The force is strong enough to overcome the tendency of the silencer switch spring to prevent this movement.

The small gear comes into close proximity with the armature and the two pins and two extensions mentioned above engage, causing this gear to rotate with the armature. The electric tuning mechanism turns as a result. When the circuit thru the motor is broken, the magnetic pull on the armature is released and the silencer switch spring forces the armature toward the back of the panel, causing the small gear to disengage from the armature proper.

Now to get back to our original thought. If there is insufficient tension in this spring, it will not push back the armature shaft after the circuit is broken and the inertia of the motor will continue to exert a driving force on the train of gears. To overcome this condition, tighten the spring by bending it. Care must be taken not to get too much tension on this spring as this would prevent engaging the gear with the armature when the current is on. Care should also be taken not to bend the spring assembly in such a manner that the two points will be permanently in contact.

DRIVE SLIPPAGE WHEN TUNING THE RADIO MANUALLY

Excessive amount of oil on drive belt - Clean off oil.

Increase tension on drive belt by re-adjusting position of idler (early models only).

Both drive cables too tight - Loosen tension on main drive cable by means of turnbuckle, and on film drum cable by lessening tension on idler tension spring.

Friction disc in motor binds - Change to gear drive in motor - Return electric drive panel to factory to have this done.

BUTTONS WORK STIFFLY

The touch tuning buttons may not push in easily. This may be due to the fact that the chassis is too far forward in the cabinet - Pull it back slightly.

Put some grease on each touch tuning button shaft at the point where it passes thru the front locking plate.

IF THE DIAL FIGURES REACH THE END OF THE SCALE AND STOP, BUT MOTOR CONTINUES TO OPERATE

Loosen the reversing switch mounting screws and adjust position of this bracket up or down until the switch operates properly. If this procedure does not remedy the condition, put one of the centering springs on the reversing switch - one of these can be obtained from the factory. Later models are already equipped with this spring. See Fig. 5.

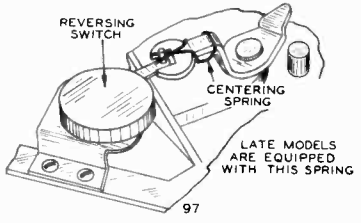


Fig.5 - Use of Centering Spring on Early Models

Adjusting or Replacing the Motor On-Off Switch

ADJUSTING SWITCH

The motor On-Off switch is at the upper right side of the panel (from back of radio). If this switch is not adjusted properly, the motor may not start when the touch tuning button is depressed or the circuit thru the motor may not be broken at the proper moment when the station is tuned in by means of the electric mechanism.

To check this switch, remove the fibre cover by taking out the screw which holds the bracket over this fibre cover.

When the switch operating lever (offset metal piece across back of assembly which interacts with the 8 setting discs - see Fig. 6) is in its lowest position, the switch should be off. As this lever is raised, the switch will close and at the highest position of the lever the switch will again open.

If the switch does not appear to operate in this manner, loosen the 2 screws which hold it in place. Grasp the bakelite base of the switch at the left side (from back) and raise or lower it until the action as mentioned above is obtained. In exceptional cases, the switch base may have to be bent toward the switch operating lever to get the proper throw of the switch mechanism.

REPLACING SWITCH

If the switch mechanism is broken or cannot be put in proper working order, a new one may be ordered. The old switch is removed by taking out the 2 screws which hold it in place and unsoldering the 2 switch leads.

Replacing Compound Gear

In a few of the first sets incorporating the gear drive from the motor, the fibre gear of compound gear 1 (See Fig. 6) may slip on its hub. There is a spring washer which holds this gear to its hub and this washer may become too loose. When this occurs, the large fibre gear will be seen to rotate while the hub and small metal pinion gear which engages with gear 2, remains stationary.

In a case of this kind, compound gear 1 must be replaced. In the later type, the metal hub is rigidly secured to the fibre gear. Following is the replacement procedure:

Remove electric panel assembly from chassis and lay it face down on the bench.

Remove belt and idler pulley - See Fig. 6.

Refer to turnbuckle take-up on steel drive cable - See Fig. 6. Observe position of hex nut on the stud of this turnbuckle, that is, see how many threads this nut is from the end of the stud.

Loosen the main drive cable by loosening the hex nut on turnbuckle and backing off the round knurled nut about 5 half turns.

Remove horseshoe washer from gears 1 and 2, spreading the horseshoe washers by means of long nose pliers and screwdriver.

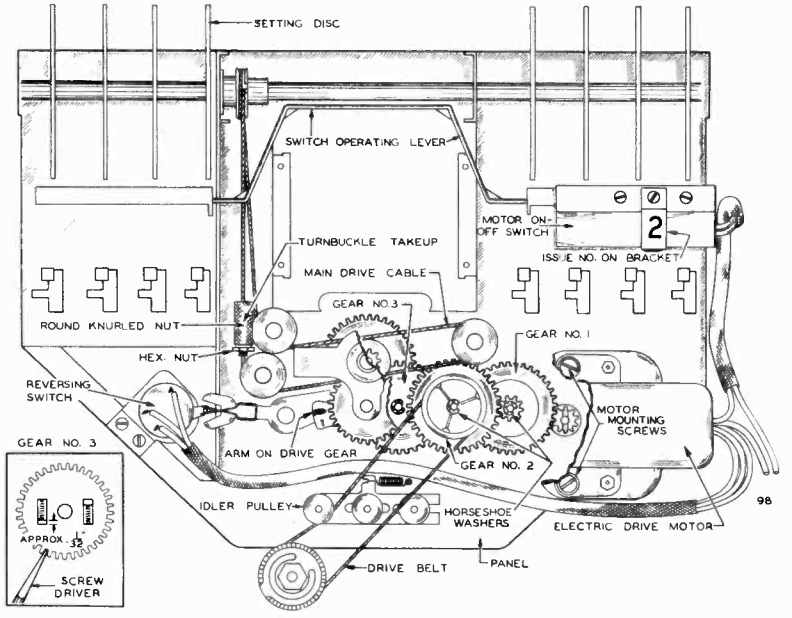


Fig.6 - Rear View of Electric Drive Panel Showing Gear Assembly

Take out the 2motor mounting screws and lift the motor out of place - See Fig. 6.

Lift up the main drive cable to clear the teeth at the top of gear 2 - take care not to nick the cable.

Remove gears 2 and 1.

Put the new fibre tooth gear 1on the shaft and replace horseshoe washer.

Now refer to gear assembly 3- See Fig. 6. The top gear of this assembly is movable and the bottom gear is fixed. Rotate the top gear one tooth clockwise relative to the bottom gear and hold the two in this position with a screwdriver - See Fig. 6.

Slide gear 2on its shaft, pulling the main drive cable over the top of the teeth - again care must be taken not to nick the cable.

Push gear 2 all the way on its shaft, engaging gears 1 and 3. Replace the horseshoe washers.

Check for take-up on gear 3. Approximately 1/32 inch of the fixed gear (bottom) will show through slot in top gear - See Fig. 6.

Reassemble motor to frame, pushing tension spring under motor shaft. Be sure to use the same screws to mount the motor to the frame that were taken off. Care must be taken that the pinion gear in the motor meshes properly with the teeth of fibre gear No.1. If these two gears appear to be so close together that they bind, pull the motor away from gear No. 1 before tightening the mounting screws.

Replace belt and idler pulley.

Retighten turnbuckle on main drive cable bringing hex nut to its former position and round knurled nut down tight against hex nut washer.

Reassemble electric drive panel to chassis.

Replacing Main Drive Cable
(No. 2 and Later Issue Panels)

The main drive cable is the steel cable which has the turnbuckle take-up. A change was made in this cable and the method of stringing it early in production.

Later models with the new cable can be identified by the numeral 2 stamped on the bracket over the motor On-Off switch and also by the large drop of solder adjacent to one of the set screws which hold the top pulley of this cable in place.

EARLY MODEL CABLE - Should cable breakage or any kind of major cable trouble be experienced which would require restringing of this cable in the early models, do not attempt to restring this cable. Instead, order a new electric drive panel assembly from Wells-Gardner and Co. (except in case of early 7-tube set).

LATER MODEL CABLE - Should cable restringing be required in the case of the later type, this can readily be accomplished by ordering a new drive cable, if one is necessary, and putting it on in accordance with the following instructions:

Remove electric drive panel from chassis.

Remove the old drive cable. It will have to be unsoldered at pulleys B and E, See Fig. 11. Turn electric-manual lever to manual position.

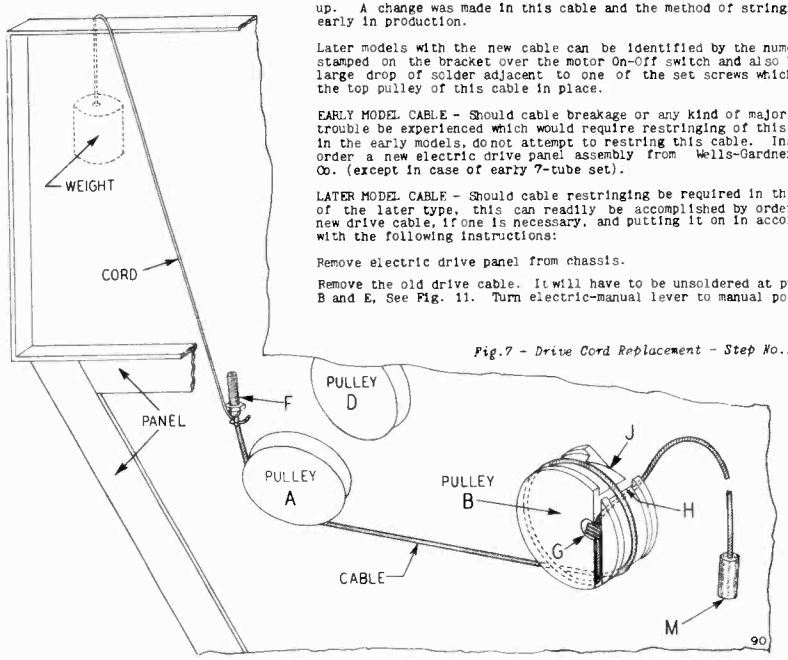


Fig.7 - Drive Cord Replacement - Step No.1

From the front of the panel, turn manual tuning knob to the right (clockwise) as far as it will go. This will bring the arm on the drive gear to the left (from back of panel) - See Fig. 6.

Now support the panel in such a manner that it is held firmly in an upright position, the back of the panel toward the operator. The bottom of the casting can be gripped at a number of points in a vise or clamp - care should be taken not to distort the casting.

Referring to the new drive cable, it will be noted that one end has a screw fitting and the other end has a round knurled nut fitting. These two fittings together with the hex nut and lock washer comprise the turnbuckle take-up.

With screw end F(Fig. 7) hanging down, place the cable into the vertical slot at the back of pulley B with the knot inside of the opening at point G.

Then wind the screw end of the cable on pulley B in a clockwise direction one turn, passing over the portion of this cable which is in slot H.

Bring the screw end of the cable over to pulley A and hold it in this position. This can be done by fastening a 10 inch stout cord to the end of cable F. Attach a weight to the other end of this cord and let the weight hang over the top of the panel as shown in Fig. 7. Instead of a stout cord, the round knurled nut and old cable can be secured to the screw end of the new cable.

Now refer to the portion of the cable that is in the slot at point H pulley B. Using a small wooden prod, bend this cable and bring it back onto pulley B at groove J. CAUTION: Do not use a metal prod as this may damage the cable. It is important that the cable at groove J be kept close to the front flange of pulley B (flange nearest panel) while the portion of the cable which extends downward from point G be kept close to the back flange of this pulley so that the cable from pulley A will ride freely in the center of pulley B - as shown in Fig. 11.

Then from groove J bring the cable in a counterclockwise direction 1/2 turn around pulley B, over to pulley C, 1/2 turn around pulley C, over to the bottom of pulley D, and then up to the shaft at the right of pulley E - Be sure the cable is well down in slot H, pulley B.

Wind the cable LOOSELY one and one-half turns around this shaft, progressing toward the left as shown in Fig. 8.

Rotate the setting discs until pulley E is approximately in the position shown in Fig.9. Using a thin wooden prod, place cable in slot L with knot in hole at point K of pulley E. Rotate the setting discs a slight amount back and forth. This will provide clearance while getting the cable in the slot. Push the cable well down into slot L - See Fig. 9.

Rotate the setting discs 3/4 of a complete revolution in such a direction that the top of the discs move toward the front of the panel. Bring the round knurled nut under the loop of the cable as shown in Fig. 10.

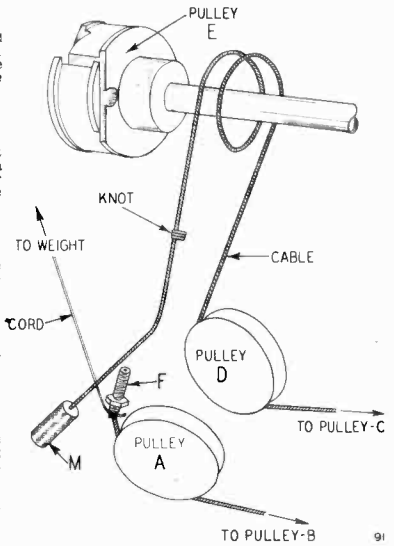


Fig.8 - Drive Cord Replacement - Step No.2

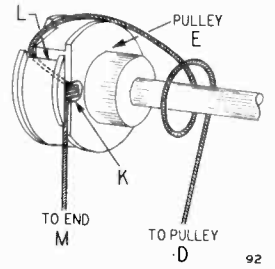


Fig.9 - Drive Cord Replacement - Step No.3

Remove weight and cord (or round nut) from screw end F of the cable. Put the lock washer against the hex nut on this cable. Screw round knurled nut onto screw end of cable. While this is being done, the setting discs should be grasped by another person and rotated as far as they will go in such a direction that the top of the discs moves away from the front of the panel. The purpose of this is to take up all slack in the cable and to enable the two ends of the turnbuckle to be secured together.

The cable must be firm and with all slack out. It should not be so tight, however, that the setting discs and pulleys do not turn freely. Tension of the cable is regulated by the position of the hex nut. The round knurled nut must be screwed tightly against the lock washer next to the hex nut.

Solder knots at points G and K on pulleys B and E respectively. Reassemble the electric drive panel to chassis.

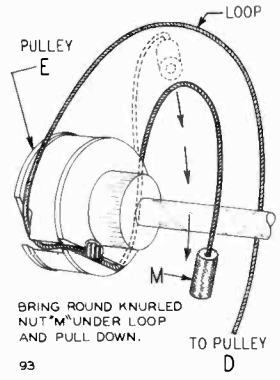


Fig. 10 - Drive Cord Replacement - Step No. 4

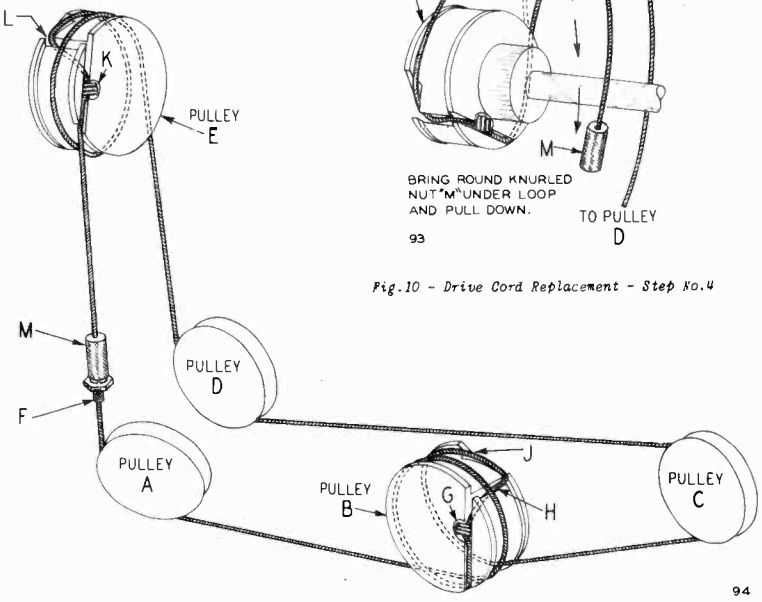


Fig. 11 - Drive Cord Replacement - Complete Assembly

Place cable from pulley D on pulley E at left flange (from back of panel). Now holding cable from pulley D, rotate setting discs in such a direction that the top of the discs move away from the front of the panel. Rotate the discs approximately 3/4 of a turn or until the slack in the cable from pulley D is all taken up. Pulley E and the cable will then be in the position shown in Fig. 11 and the knurled nut end M of the cable will be hanging down from pulley E and must be held in tension.

The next step is to connect the two portions of the turnbuckle together. Before doing this, see that the cable is on all of the pulleys as shown in Fig. 11. Tension should still be applied to both ends of the cable.

25 Cycle Electric Drive Panel

The 25 cycle electric drive panel assembly is identical to the 60 cycle assembly except that a 25 cycle motor and a different gear No. 1 (see Fig. 6). are used.

The pinion gear in the 25 and 60 cycle motors are not the same. If, therefore, one of these pinions is ordered, the type of motor must be specified. (Both 25 and 60 cycle motors are furnished with pinion included.)

40 Cycle Power Supply

An electric drive chassis equipped with a 117-234 volt 40 to 60 cycle power transformer can be used on a 60 cycle power supply only, unless changed as mentioned below. The electric drive panels of these sets are equipped with 60 cycle motors and these will function satisfactorily only at that frequency.

If one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 25 cycle model is used for this purpose.

Movie Dial Adjustments and Replacements

Replacing and Positioning the Dial Lamp

Caution—If a new lamp is required, use only a No. 81 lamp, Wards catalogue No. 61-8204.

Turn the radio off and turn the band switch to the standard wave position.

Remove the lamp housing by unscrewing and removing the two screws which hold this housing in place—See Fig. 1.

Remove the old lamp from the housing. It will be necessary to depress the contact plug retaining spring which will be seen in the narrow slot near the upper end of the housing and pull the plug out a slight amount from the housing, in order to remove the lamp. Replace the lamp and push the plug down until the locking spring snaps into place.

Replace the lamp housing by means of the two screws, but do not tighten these screws yet.

Turn the radio on.

Then grasp the top of the lamp housing assembly and move it up or down until the image on the screen is clearest and the lines are horizontal. The effect of having the lamp assembly too high or low is shown in the illustration in the instruction book. Tighten the two screws.

Replacing Film

Turn the band switch to the standard wave position. Then remove the lamp housing (See article "Replacing and Positioning the Dial Lamp").

Unscrew and take out the six screws spaced around the edge of the film drum casting. Then carefully lift the edge of the film nearest the back of the chassis. At the same time, lower the opposite edge of the film and slide it in toward the center of the film drum casting. (On two band radios, it will be necessary to lift the lens assembly as high as it will go while removing the film.) When the film clears the lens, it may be lifted out.

To replace the film, reverse the above procedure. Make certain that the entire lower edge of the film rests on the shoulder near the bottom inside the film drum. The radio is calibrated as described in the article under that name in this manual.

Calibrating the Radio

To calibrate the electric drive movie dial radios, tune in a station of known frequency between 530 and 900 KC. In the early models loosen the two set screws in the hub of the film drum pulley. Turn the film drum until it is at the correct kilocycle mark on the dial scale and then tighten the pulley set screws.

In the case of later models, the film drum is held in position by a friction washer which will be seen under the drum. In these models, the film drum can be turned without loosening the set screws.

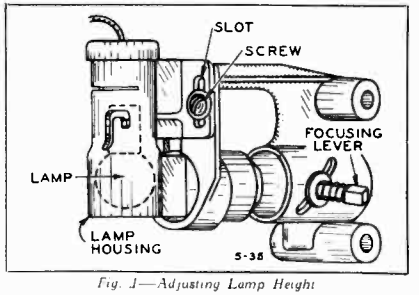


Fig. 1—Adjusting Lamp Height

MODELS 62-303,62-309,62-321
62-347,62-417,62-433,62-447
62-449,62-451
Film Drum Cable,Notes,Parts
MONTGOMERY WARD & CO.

Replacement Parts List

There is a number on the On-Off switch bracket which identifies the panel as to major part changes. Be sure to mention this issue number when ordering parts for the Electric Drive Panel.

For names of parts shown in the Electric Drive Panel list, refer to the illustrations especially Figs. 3, 6, 7, 8, 9, 10 and 11.

ELECTRIC DRIVE PANEL REPLACEMENT PARTS

Bin No.	Part No.	Description	Selling Price
	25A176	60 Cycle Electric Drive Panel Complete—Includes Main Casting, Gears, Pulleys, Switches, Motor, Setting Discs, Tuning and Setting Button Plungers, and Tone and Volume Indicators. (Less Gang Condenser and Movie Dial Projector Assembly, Tuning and Setting Buttons, and Glass Screen and Screen Clamps.)	$18.04
	25A247	25 Cycle Electric Drive Panel Complete—Same as above except with 25 Cycle Motor and No. 1 Gear Assembly	18.88
	57X8	Locking Plate	.28
	28X139	Spring for Locking Plate Doz.	.14
	37X93	Interlocking Lever	.06
	37X95	Clutch Release Lever	.06
	28X137	Spring used on above Lever Doz.	.16
	26X259	Tuning Knob Shaft	.04
	37X94	Yoke for Clutch Lever (Fits in Groove on above Shaft)	.06
	19X88	Keyway Washer (Used on Clutch Bearing) Doz.	.08
	24X294	Pulley for Manual Drive Belt (On Back of Tuning Shaft)	.14
	20X212	Roller Bearing for above Pulley Doz.	.08
	57X10	Clutch Plate	.06
	28X152	Clutch Release Spring (In front of Clutch Plate from Back of Panel) Doz.	.04
	8X57	Manual Drive Belt	.16
	26A74	Belt Tension Pulley and Bracket Assembly	.10
	28X150	Spring for above Assembly Doz.	.10
	24X316	Belt (Idler Pulley only	.06
	25A178	Setting Disc Assembly	.36
	28X134	Tension Spring (Fastened to Auxiliary and Drum Release Levers) Doz.	.12
	28X151	Tension Spring for Pawl of Setting Disc Doz.	.12
	26X255	Setting Disc Shaft	.20
	20X192	Ball Bearings in Retainer (For Setting Disc Shaft)	.06
	20X207	Bearing Cone (Without Set Screw)—On Setting Disc Shaft	.08
	20X195	Bearing Cone (With Set Screw)—On Setting Disc Shaft	.10
	24X288	Pulley for Drive Cable (On Setting Disc Shaft)	.08
	25X403	Support Bracket for Setting Disc Shaft (Left side from back)	.06
	25X412	Support Bracket for Setting Disc Shaft and Motor On-Off Switch	.08
	26A75	Adjusting and Support Rod for Motor On-Off Switch (Panel Issue No. 4 and Later)	.06
	2A105	Motor On-Off Switch Assembly Complete	.48
	37X85	Switch Lever (Right section from back)	.10
	37X96	Switch Lever (Left section from back)	.10
	25X413	Switch Lever (Center section)	.08
	28X137	Switch Lever Spring Doz.	.16
	37X82	Stop Lever	.06
	28X148	Stop Lever Spring Doz.	.08
	25A181	Rocker Arm and Rocker Arm Stop Assembly Complete with Spring	.10
	28X131	Spring for Rocker Arm Stop Doz.	.06
	26X256	Rocker Arm Shaft	.06
	26X261	Setting Button Plunger	.06
	10A114	Setting Button only	.06
	26X254	Tuning Button Plunger with Stop Pin	.08
	28X138	Tuning Plunger Spring Doz.	.06
	10A113	Tuning Button only	.06
	28X129	Hairpin Springs for Tuning Buttons Doz.	.06
	10X26	Main Drive Cable Complete with Turnbuckle	.40
	12X75	60 Cycle Motor Complete	2.28
	24X296	Pinion Gear only (On Motor Armature Shaft)—60 Cycle	.06
	12X82	25 Cycle Motor Complete	3.08
	25A233	No. 1 Pinion and Gear Assembly (For 60 Cycle Operation)	.22
	25A248	No. 1 Pinion and Gear Assembly (For 25 Cycle Operation)	.28
	24X307	No. 2 Gear and Pulley	.10
	25A184	No. 3 Gear Assembly	.16
	25A221	No. 4 Gear Assembly	.26
	28X141	Spreader Springs for Gears No. 3 and 4 Doz.	.04
	26A73	Pulley Bracket Assembly complete with Gear No. 5, Pulleys and Roller Bearing Assembly	.80
	25A186	No. 5 Gear and Drive Arm Assembly only	.14

RETAIL STORES: Order any parts from Repair Service Department at Chicago or Oakland, on Repair Parts Order Form No. 19567. Order by bin number and description. If no bin number is shown, order by part number and description.

Return defective parts to Repair Service Department only.

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the model number and this issue letter.

Bin No.	Part No.	Description	Selling Price
	2A97	Reversing Switch	$0.18
	37X98	Lever for Operating Reversing Switch	.06
	28X158	Centering Spring (Used on Reversing Switch Lever)	.06
	25X430	Bracket for Reversing Switch	.06
	25A239	Silencer Spring Assembly complete with Shield	.10
	58X226	Glass Screen	.26
	30X89	Clamps for Glass Screen Doz.	.14
	15X107	Tone Indicator Assembly	.08
	15X108	Volume Indicator Assembly	.08
	28X147	Spring for Tone or Volume Indicator Doz.	.12
		8" Black Cord for Tone or Volume Indicator Doz.	.10
10631	29X20	Brass Collars (Used on Tone or Volume Control Shafts)	.04
	26A56	Station Call Letter Discs and 25 Celluloid Discs	.16
	25X405	Shipping Support Bracket (Top of Electric Drive Panel to Wood Brace)	.10
10565	8X23	Rubber Cushion (Used with Shipping Support Bracket)	.04

PROJECTOR ASSEMBLY PARTS

Bin No.	Part No.	Description	Selling Price
	26A76	Gang Condenser and Projector Assembly Complete (Series 57A4) Includes Condenser Mounting Bracket, Condenser Drive Drum, Film Drum Cable and Pulleys, Film Drum Support Bracket, Film Drum, Film, Lamp Housing Bracket, Lamp Contact Plug, Lens Housing, Lens Housing Bracket, Color Filter, Projector Compartment, and Elevator and Link Assembly	$8.40
	26A77	Gang Condenser and Projector Assembly Complete (Series 53A3), includes same parts as above	9.24
	26A78	Gang Condenser and Projector Assembly Complete (Series 59A5 and 51A2) includes same parts as above	8.40
	25A194	Front Support Bracket for Gang Condenser—Complete with Two Pulleys and Shafts	.40
	8X43	Rubber Cushion (Mounted on above Bracket)	.06
	20X152	Stud—Used with Rubber Grommet (6X8) on Front Support Bracket for Gang Condenser	.06
	26A79	Drive Drum for Gang Condenser	.24
	25X393	Support Bracket for Lens Housing, Projector Compartment and Elevator Lever	.44
	25A198	Elevator Lever Arm and Bakelite Link Assembly	.26
	29X83	Lever Bearing Rod	.06
	19X21	Horse Shoe Washer for above Rod Doz.	.04
	37X90	Lever Arm—Short (Fastened to Band Switch Shaft)	.08
	28X59	Hairpin Spring (Used on above Lever Arm) Doz.	.04
	28X134	Tension Spring for Elevator Lever Doz.	.16
	29X85	Support Bracket for Film Drum Shaft and Pulley (Series 57A4, 59A5, 51A2)	.24
	29X88	Support Bracket for Film Drum Shaft and Pulley (Series 53A3)	.28
	26A80	Film Drum Pulley Assembly	.12
	26X253	Shaft for Film Drum	.06
	25A196	Tension Arm Assembly for Film Drum Cable less Tension Spring	.08
	24X236	Guide Pulley only for above Arm and for Front Support Bracket on Gang Condenser	.04
	28X149	Spring only for Tension Arm Doz.	.14
	6X8	Rubber Grommets—Small (For Mounting Rear of Gang Condenser to Film Drum Support Bracket) Doz.	.08
	20X201	Stud (Used with above Grommet) Doz.	.12
	20X150	Stud (For Mounting Rear of Gang Condenser to Chassis)	.06
	25X362	"L" Bracket (For Mounting Rear of Gang Condenser to Chassis)—Series 57A4, 59A5, 51A2	.04
	25X382	"L" Bracket (Same as above)—Series 53A3	.06
	6X18	Rubber Grommet (Used on above Bracket) Doz.	.14
	2X236	Rubber Washer (Flat—Used with above Bracket) Doz.	.08
	10X28	Film Drum Drive Cable	.10
	24X284	Film Drum only less Film (Early type with Flat Side in Drum Center Hole—Spring Washer not used with this type)	.16
	24X284A	Film Drum only less Film (Late type with Round Drum Center Hole—Spring Washer used with this type)	$0.16
	26A70	Film and Rim (Used on Series 59A5, 51A2, 53A3)	.24
	26A71	Film and Rim (Used only on Series 57A4)	.24
	30X84	Clamp for Holding Film to Drum Doz.	.08
	28X165	Spring Washer with Three Fingers (Used under Film Drum on late models)	.06
	25A199	Color Filter Assembly Bracket (Series 59A5, 51A2, 53A3)	.06
	25A214	Color Filter Assembly Bracket (Used only on Series 57A4)	.06
	25X394	Lens Housing Casting less Condenser and Projector Lens and Bearing Rods	$0.24
	29X84	Bearing Rod only for above Casting	.06
	19X67	Horse Shoe Washer (Used on above Rod) Doz.	.08
	12X73	Condenser Lens (Lens nearest Dial Lamp)	.08
	28X128	Lens Retaining Spring Doz.	.06
	12X72	Projector Lens	.60
11551	29X77	Focusing Lever Assembly	.06
	7A58	Lamp Housing and Socket	.14
	61-8204	Dial Lamp No. 81	.10
	26A81	Plug Assembly for Dial Lamp with Wire less Dial Lamp and Housing	.14
	32X85	Projector Compartment	.08

Prices Subject to Change Without Notice.

Replacing Film Drum Cable

Remove the electric drive panel from the chassis as explained in the article "Replacing Electric Drive Panel on Chassis" in Manual 124, and lay it face down in front of the chassis. It is unnecessary to unsolder motor or silencer switch connections or to disconnect tone and volume control collars.

Remove the old film drum cable, unsoldering it from pulley "F" at point "S" on early models, or from the pin on later models—See Fig. 2.

Close the gang condenser completely and arrange to hold it in this position while replacing the cable.

Now insert one end of the new cable in hole "B" of condenser drive drum "A" which will be in the position shown in Fig. 2. Bring the cable down and around ½ turn in the groove in the drum, progressing in a clockwise direction, passing it over pulley "C."

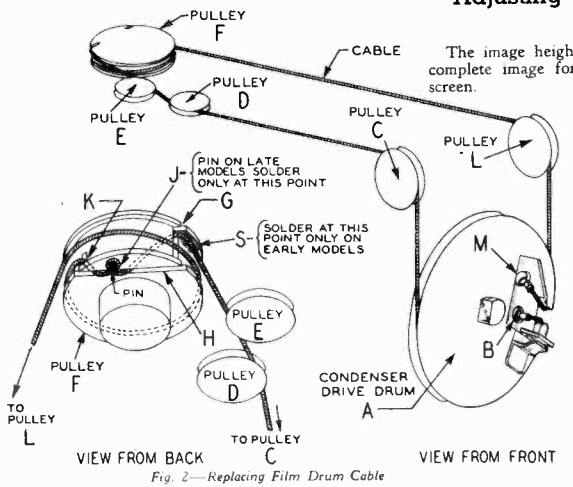


Fig. 2—Replacing Film Drum Cable

Extend the cable horizontally toward the back of the chassis passing it through the groove on the left side of pulley "D" and through the groove on the right side of pulley "E." (See Fig. 2, view from front.)

Place pulley "F" in the position shown in the back view in Fig. 2, with the slot "H" nearly parallel with the back of the chassis. Continue the cable from pulley "E" to the slot on the right side (from back) of pulley "F" keeping the cable in the upper part of the slot. The cable should rest on about ⅛ inch of the pulley surface before entering slot "G."

Insert the cable in slot "G" and continue down and out through slot "H" at point "K." If pulley "F" is the later type, wrap the cable once around the pin as shown in Fig. 2.

Wind the cable one complete turn around pulley "F" keeping it below the cable on the right side and above the cable on the left side. Now extend the cable horizontally to pulley "L" and down to the groove in condenser drive drum "A." Insert end of cable in slot "M."

Now solder the cable to the pin on pulley "F" on late models, or solder the cable to the pulley at point "S" on early models.

Replace the electric drive panel on the chassis and calibrate the dial as explained in the article "Calibrating the Radio."

Adjusting Height of Image on Screen

The image height should be so adjusted that the complete image for each band will appear on the screen.

If any portion of the image on any band is cut off, turn the radio on and turn the band switch to the 2nd short wave (green) position. Loosen the two set screws of the lever arm on the band switch shaft. This lever arm is connected to the bakelite strip which in turn moves the lamp assembly height mechanism.

Turn the tuning knob until the high frequency end (22.0 MC) of the band is reached. Move the lever arm until the megacycle line is lined up with the letter "W" of the word "West" at either side of the glass screen. Tighten the set screws.

The image height should then be correct for the other two bands.

FOR ELECTRIC DRIVE
DATA SEE INDEX

MONTGOMERY WARD & CO.

MODELS 62-309, 62-449
Schematic, Selectivity
Transformer Data

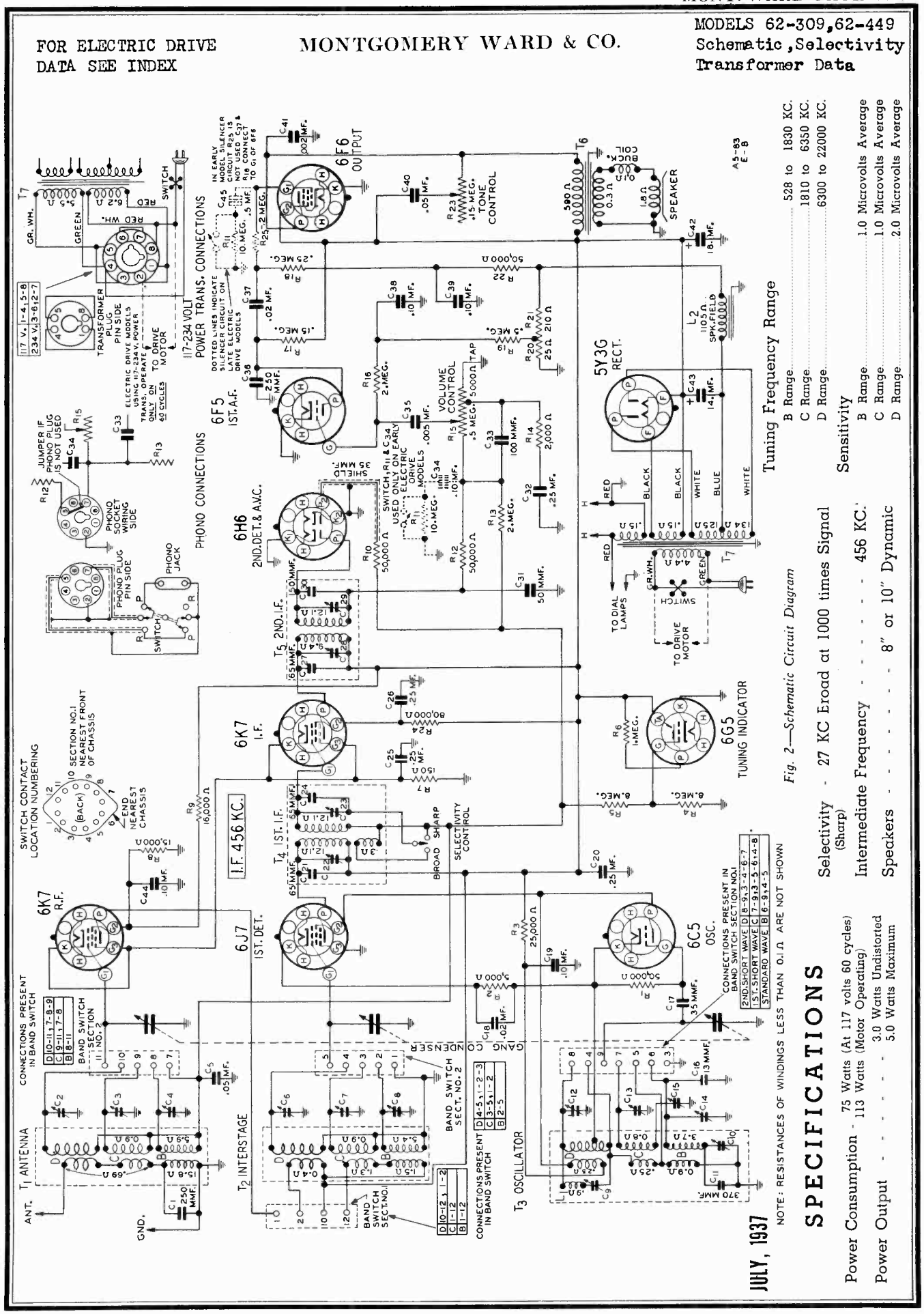


Fig. 2—Schematic Circuit Diagram

Tuning Frequency Range

B Range	528 to 1830 KC.
C Range	1810 to 6350 KC.
D Range	6300 to 22000 KC.

Sensitivity

B Range	1.0 Microvolts Average
C Range	1.0 Microvolts Average
D Range	2.0 Microvolts Average

SPECIFICATIONS

Power Consumption	75 Watts (At 117 volts 60 cycles) 113 Watts (Motor Operating)
Power Output	3.0 Watts Undistorted 5.0 Watts Maximum
Selectivity (Sharp)	27 KC Eroad at 1000 times Signal
Intermediate Frequency	456 KC.
Speakers	8" or 10" Dynamic

NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T4. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R15 is a filter composed of condensers C32 and C33 and resistor R14. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

A 6F5 triode tube functions as the first audio amplifier while the output stage uses a 6F6 output pentode tube. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

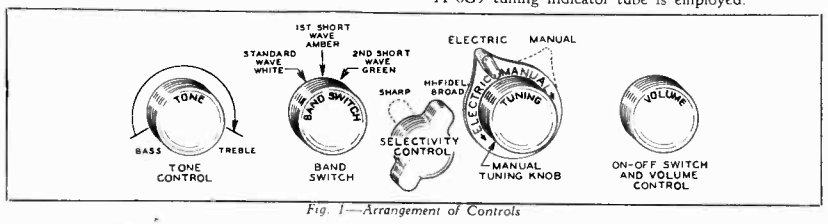


Fig. 1—Arrangement of Controls

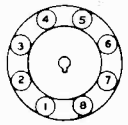


Fig. 5—Octal Tube Terminal Numbering (bottom of socket).

General Service Data

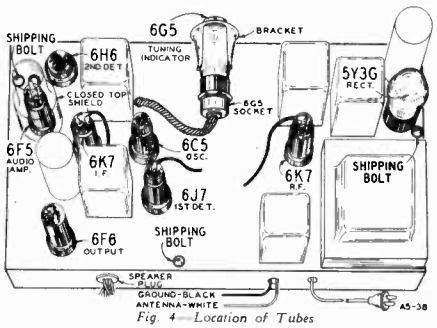


Fig. 4—Location of Tubes

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and electric drive motor are used.

Ordinarily, a twenty-five cycle receiver may be operated from a sixty cycle power supply. However, the electric drive models cannot be operated in this manner because the twenty-five cycle motor will not operate properly on a sixty cycle power supply.

The sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

117-234 Volt Power Transformer

A 117-234 volt 60 cycle power transformer is also available for this model. *It is important that these sets be operated on a 60 cycle power supply only.*

Ordinarily, radios equipped with a 117-234 volt universal transformer may be operated on a 40 to 60 cycle power supply. However, the 60 cycle motor in the electric drive panel of this model will not operate satisfactorily at any frequency other than 60 cycles. Consequently, if one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 25 cycle model is used for this purpose.

Connections for the 117-234 volt transformer are shown in Fig. 2. There is a 1⅛ inch round knockout on the back panel of the chassis which may be removed to permit installation of a special octal socket. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

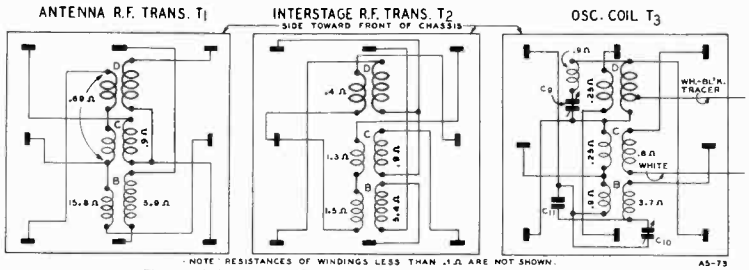


Fig. 6—Coil Terminal Arrangement and D.C. Resistance of Windings

Phonograph Connections

Phonograph connections are made as shown in Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inch in diameter. An octal base socket is mounted in this knockout opening and wired as illustrated.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph radio switch and double tip jack.

Dial and Drive Assembly

SEE INDEX.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum — Antenna Shorted to Ground

Readings taken with 1000 Ohm-per-volt meter — Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.2(1)	245	118	2.5		6.2(1)	2.5
6J7	1st Det.	0	6.2(1)	245	114	0		6.2(1)	6.2
6C5	Osc.	0	6.2(1)	114				6.2(1)	0
6K7	I.F.	0	6.2(1)	245	118	2.5		6.2(1)	2.5
6H6	2nd Det.	0	6.2(1)		0			6.2(1)	0
6F5	1st A.F.	0	6.2(1)		155			6.2(1)	0(2)
6F6	Power	0	6.2(1)	230	245	16(3)		6.2(1)	0
5Y3G	Rectifier	0	5.0(4)		680(5)		680(5)		5.0(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 245		Cathode to Ground 0		Across Heater 6.2	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R20.
(3) Bias (16 volts) as read across resistors R20 and 21.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

MONTGOMERY WARD & CO.

MODELS 62-309,62-449
MODELS 62-321,62-451
MODELS 62-347,62-417
62-447

Alignment, Trimmers

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position 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:
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., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.					Models 62-309,-449	Models 62-321,-451		
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C28) & (C29)	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B								
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Oscillator Range B (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	600 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C								
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C13)	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C15)	2000 KC (C14)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D								
22.000 KC	Range D	400 Ohm	22.000 KC	Antenna Lead	Oscillator Range D (C12)	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20.000 KC	Range D	400 Ohm	20.000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C9)	7000 KC (C18)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Models 62-347, 62-417, 62-447

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
2nd I.F.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C25) & (C26)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output
Range B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C2) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C9)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
Range D							
19800 KC	Range D	400 ohm	19800 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
16000 KC	Range D	400 ohm	16000 KC	Antenna Lead	Ant. Range D (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
6000 KC	Range D	400 ohm	6000 KC	Antenna Lead	6000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B

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

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the electric drive, loosen the two set screws in the hub of the film drum assembly pulley. Turn the film drum until it is at the 1500 KC mark on the dial and then tighten the two pulley set screws. (On later models, the film drum can be turned without loosening the set screws.)

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Special Note on Calibration—Movie Dial Sets

If after following the above procedure, the red line on the screen does not intersect the proper call letters when a station is tuned in, proceed as follows:

(1) Tune in any station between 530 KC and approximately 900 KC on the dial. After the station is tuned in, adjust the position of the film drum, as explained above under Note A, until the line on the crosses the call letters of the station tuned in. Modify this adjustment if necessary until all stations between *530 KC and approximately 900 KC* are tuned in with some part of their call letters touching the vertical line on the screen.

(2) Set the signal generator for exactly 1500 KC. Turn the tuning knob until the line on the screen is at the 1500 KC mark. Then adjust the oscillator B Range trimmer until the signal is tuned in to maximum output.

(3) Adjust the 1st and 2nd antenna Range B trimmers to maximum output at 1500 KC.

(4) Check the 600 KC adjustment for maximum output.

Calibration should now be substantially correct over the entire dial. If it is not, repeat the above procedure.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15.000 KC. The signal will then be heard at 15.000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15.000 less 912 KC, or 14.088 KC on the dial. It may be necessary to increase the input signal to hear the image.

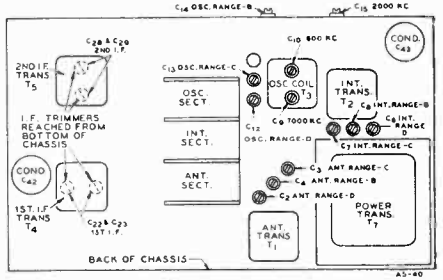


Fig. 3—Location of Trimmers
Models 62-309, 62-449

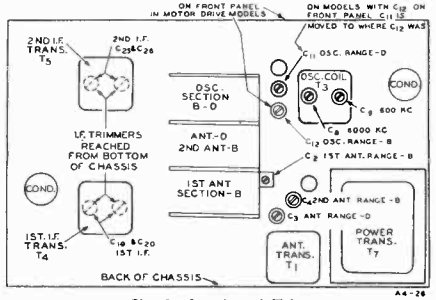


Fig. 3—Location of Trimmers
Models 62-347, 62-417, 62-447

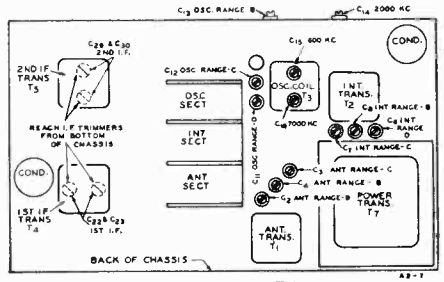
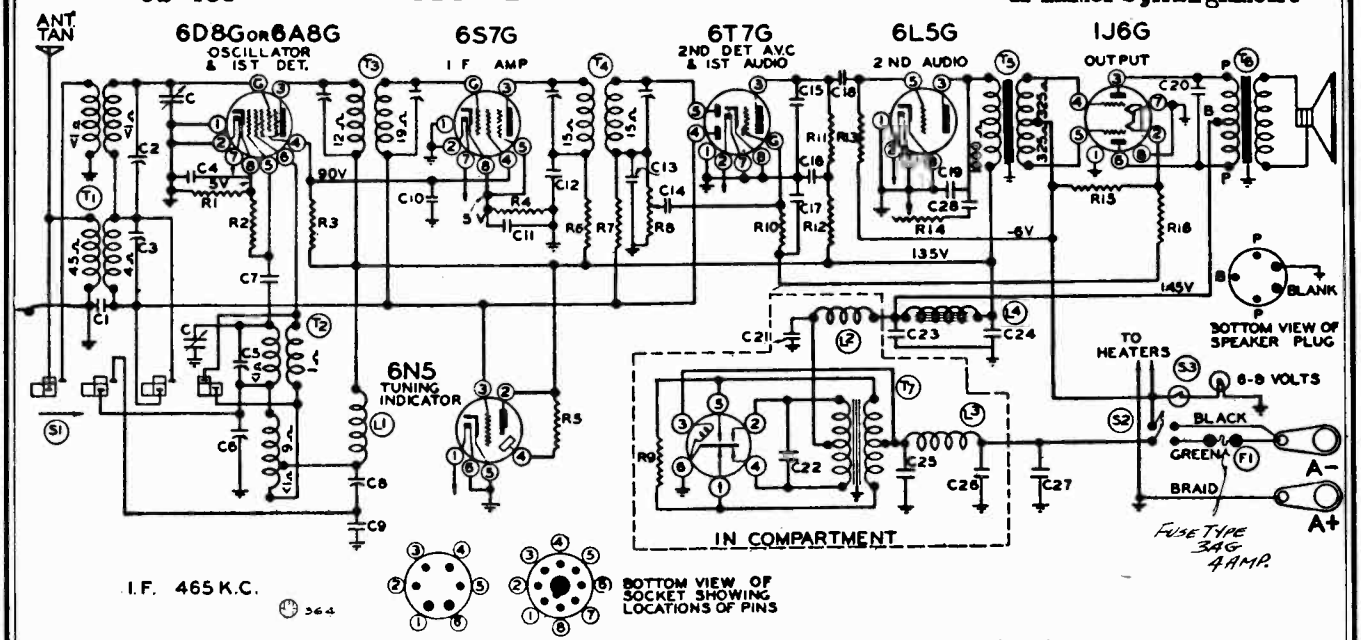


Fig. 3—Location of Trimmers
Models 62-321, 62-451

MODELS 62-376, 62-425
62-486

MONTGOMERY WARD & CO.

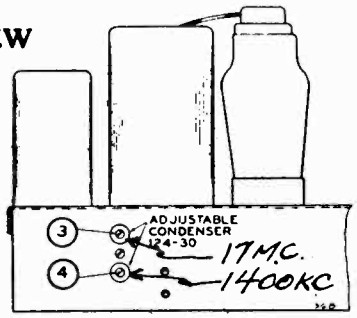
Schematic, Socket Trimmers, Alignment



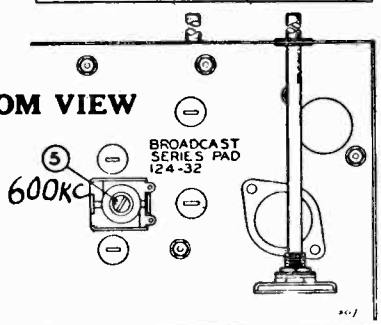
LIST OF REPAIR PARTS (Serial No. 7E607720 and up)

Part No.	Schematic Reference	Description	No. Used in Set
		CONDENSERS	
BE100-11	C14, C17	.01 x 400 Volt Tubular	2
BE100-14	C21	.1 x 200 Volt Tubular	1
BE100-20	C1, C4, C10, C11, C12, C16 C27	.1 x 200 Volt Tubular	7
BE100-25	C19, C20	.002 x 600 Volt Tubular	2
BE100-26	C18, C28	.02 x 400 Volt Tubular	2
BE100-34	C22	.005 x 1200 Volt Tubular	1
BE100-35	C25, C26	.5 x 200 Volt (Oval Type)	2
BE119-41	C23, C24	8-4 MFD. 200 W. V. Lytic Filter	1
BE124-32	C8 C5, C6	Series Padder Condenser	1
BE124-30	C2, C3	Dual Ceramic Padder Condenser	2
BE129-5	C13	.0001 Mica — Type MT — 20%	1
BE129-12	C15	.00025 Mica — Type MT — 20%	1
BE129-39	C7	.00005 Mica — Type MT — 20%	1
BE129-54	C9	.003 Mica — Type MW — 2½%	1
		RESISTORS	
BE130-12	R2	50M Ohm—1/3 Watt—20%—Carbon	1
BE130-19	R10, R16	1 Meg Ohm—1/3 Watt—20%—Carbon	2
BE130-20	R11, R12	100M Ohm—1/3 Watt—20%—Carbon	2
BE130-31	R4, R6	1500 Ohm—1/3 Watt—20%—Carbon	2
BE130-38	R7, R13	2 Megohm—1/3 Watt—20%—Carbon	2
BE130-54	R1	500 Ohm—1/3 Watt—20%—Carbon	1
BE130-84	R9	200 Ohm—1/3 Watt—20%—Carbon	1
BE130-149	R3	15M Ohm—1/3 Watt—20%—Carbon	1
BE130-158	R15	16 Ohm—1 Watt—5% Wire Wound	1
		COILS	
BE B-108-92B	T4	Output I. F. Coil Assembly complete with can	1
BE B-108-93B	T3	Input I. F. Coil Assembly complete with can	1
BE B-110-61	T2	Broadcast and Short-wave Oscillator Coil Assembly complete with can	1
BE B-111-77	T1	Broadcast and Short-wave Antenna Coil Assembly complete with can	1
		CHOKE COILS	
BE105-19	L3	"A" Choke Coil	1
BE B-105-30D	L4	Filter Choke (400 Ohms)	1
BE105-35	L1, L2	R. F. "B" Choke Coil	2
		TRANSFORMERS	
BE B-104-62C	T7	Power Transformer for Vibrator	1
BE B-105-36B	T5	Input Audio Transformer	1
		SPEAKER	
BE114-58	T6	Six inch P. M. Dynamic Speaker	1
		MISCELLANEOUS	
BE101-81	R8, S2	Volume Control and Switch (500M Ohm)	1
BE101-82	R14	Tone Control (100M Ohm)	1
BE107-105	(R5)	Cable and Socket Assembly complete with 250M Ohm Resistor	1

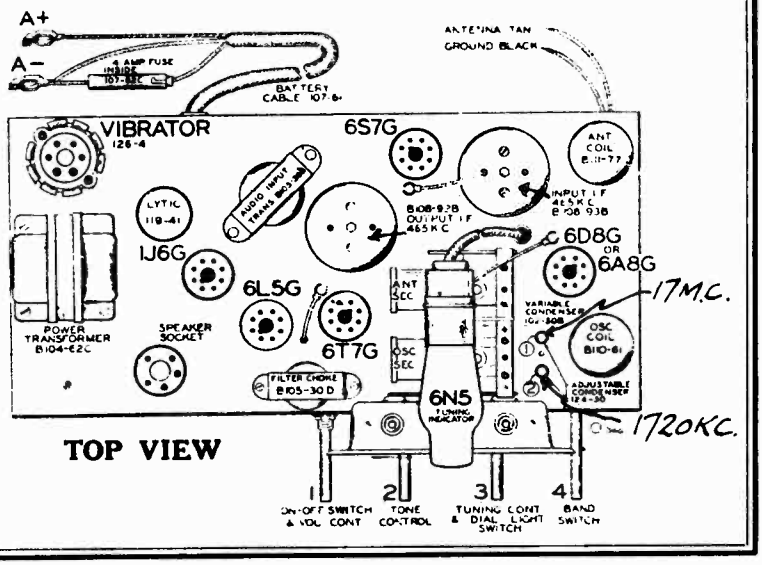
REAR VIEW



BOTTOM VIEW



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII



TOP VIEW

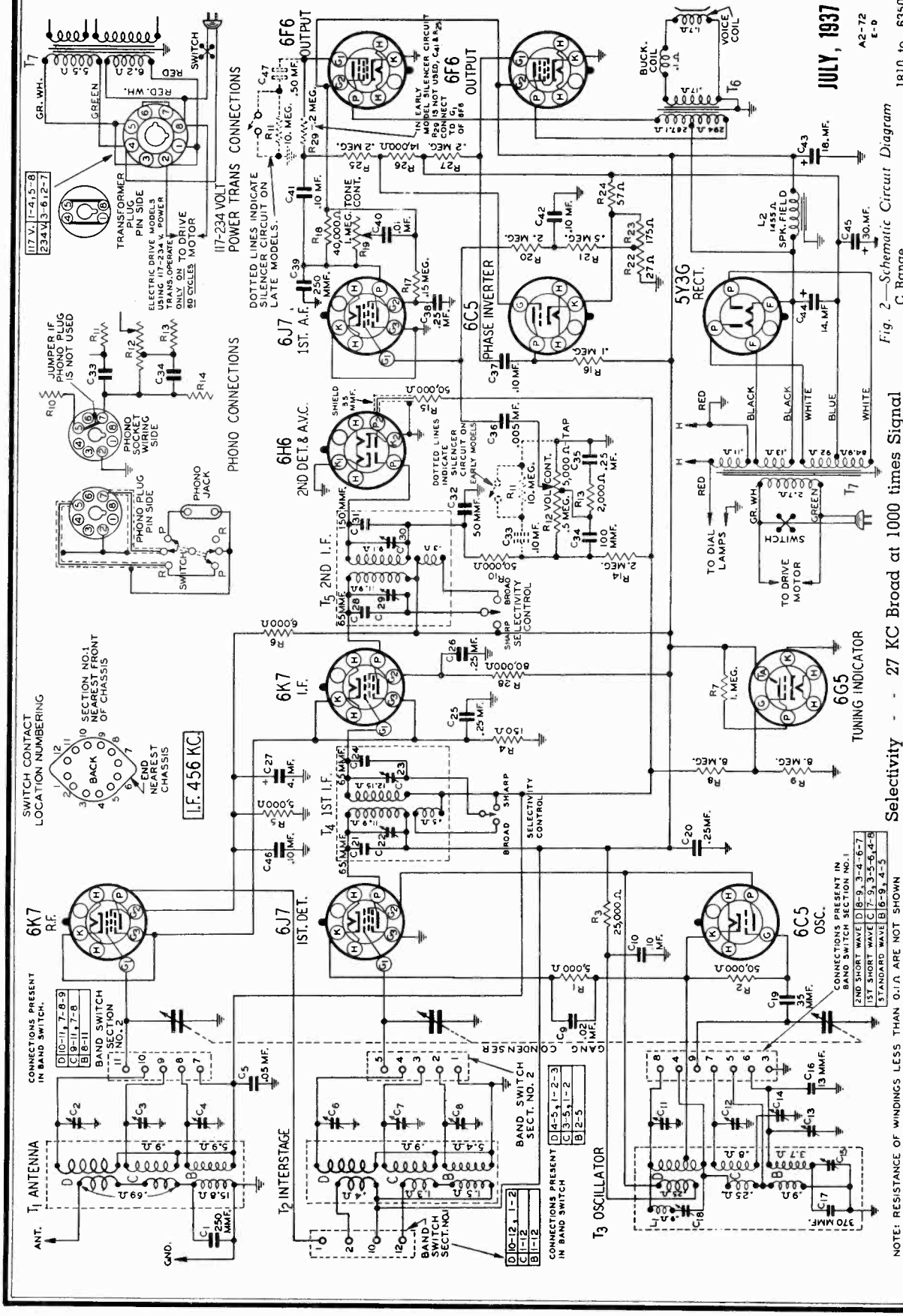
FOR TUNER AND ALIGNMENT SEE INDEX

MONTGOMERY WARD & CO

MODELS 62-321, 62-451
Schematic, Sensitivity
Transformer Data
Phono. Conn.

JULY, 1937

A2-72
E-D



SPECIFICATIONS

Power Consumption -	100 Watts (At 117 volts 60 cycles) 138 Watts (Motor Operating)
Power Output - - - - -	9.8 Watts Undistorted 12 Watts Maximum
Selectivity - - 27 KC Broad at 1000 times Signal (Sharp)	
Intermediate Frequency - - - - - - - - - -	456 KC.
Speaker - - - - - - - - - -	10" Dynamic
Tuning Frequency Range B Range	528 to 1830 KC.
Sensitivity B Range C Range D Range	1.0 Microvolts Average 1.0 Microvolts Average 2.0 Microvolts Average

Fig. 2—Schematic Circuit Diagram

C Range ..... 1810 to 6350 KC.
D Range ..... 6300 to 22000 KC.

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C, and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to the 1st and 2nd I.F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R12 is a filter composed of condensers C34 and C35 and resistor R13. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7 1st A. F. tube. The output of this tube is fed through resistance coupling into the 6F6 output tube shown nearest to it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6C5 balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6 output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

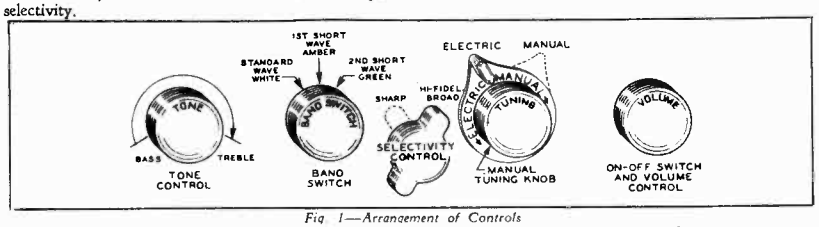


Fig. 1—Arrangement of Controls

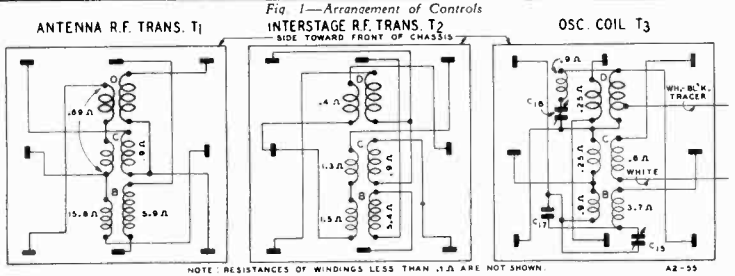


Fig. 6—Coil Terminal Arrangement and DC Resistance of Windings

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and electric drive motor are used.

Ordinarily, a twenty-five cycle receiver may be operated from a sixty cycle power supply. However, the electric drive models cannot be operated in this manner because the twenty-five cycle motor will not operate properly on a sixty cycle power supply.

The sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

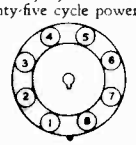


Fig. 4—Octal Tube Terminal Numbering (bottom of socket

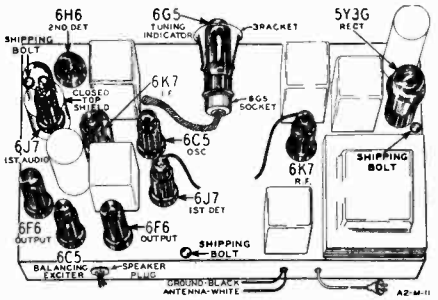


Fig. 5—Location of Tubes

117-234 Volt Power Transformer

A 117-234 volt 60 cycle power transformer is also available for this model. *It is important that these sets be operated on a 60 cycle power supply only.*

Ordinarily, radios equipped with a 117-234 volt universal transformer may be operated on a 40 to 60 cycle power supply. However, the 60 cycle motor in the electric drive panel of this model will not operate satisfactorily at any frequency other than 60 cycles. Consequently, if one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 25 cycle model is used for this purpose.

Connections for the 117-234 volt transformer are shown in Fig. 2. There is a 1⅛ inch round knockout on the back panel of the chassis which may be removed to permit installation of a special octal socket. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

Phonograph Connections

Phonograph connections are made as shown in Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inch in diameter. An octal base socket is mounted in this knockout opening and wired as illustrated.

A phono cable assembly may then be purchased On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Dial and Drive Assembly

SEE INDEX

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

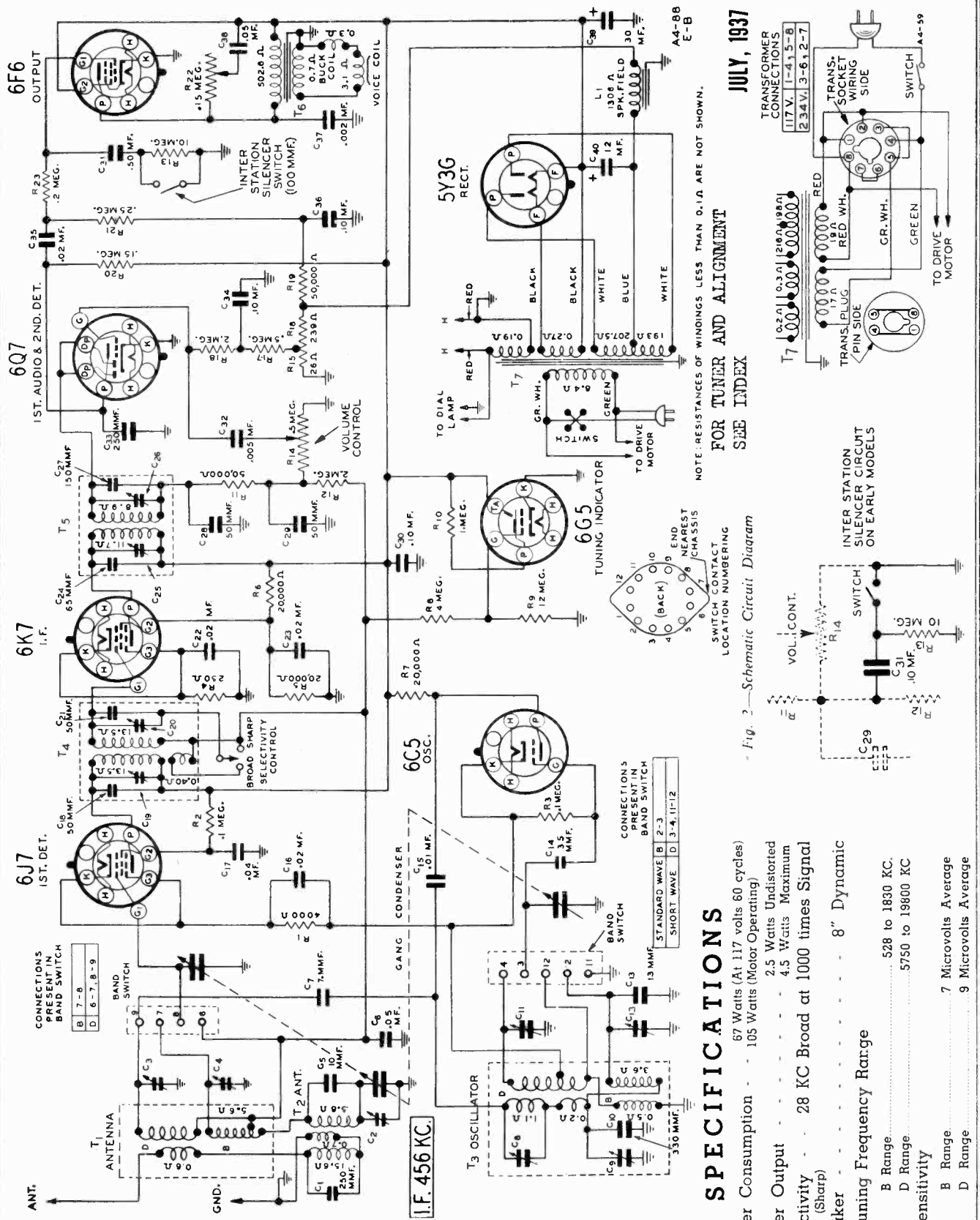
TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.1(1)	250	105	2.5		6.1(1)	2.5
6J7	1st Det.	0	6.1(1)	250	125	0		6.1(1)	5.8
6C5	Osc.	0	6.1(1)	125(2)				6.1(1)	0
6K7	I.F.	0	6.1(1)	250	100	2.5		6.1(1)	2.5
6H6	2nd Det.—A.V.C.	0	6.1(1)					6.1(1)	0
6J7	1st A.F.	0	6.1(1)	110	120	0(3)		6.1(1)	0(3)
6C5	Balancing Exciter	0	6.1(1)	100				6.1(1)	18.5
6F6	Output	0	6.1(1)	330	250			6.1(1)	0(4)
5Y3G	Rectifier	0	4.8(5)		730(6)		730(6)		4.8(5)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 250		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) Bias (2.5 volts) as read across resistor R22.
(4) Bias (24 volts) as read across resistors R22, R23, & R24.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

MONTGOMERY WARD & CO.

MODELS 62-347, 62-417, 62-447
Schematic, Sensitivity
Transformer Data

JULY, 1937



FOR TUNER AND ALIGNMENT
SEE INDEX

Fig. 2—Schematic Circuit Diagram

SPECIFICATIONS

Power Consumption	67 Watts (At 117 volts 60 cycles) 105 Watts (Motor Operating)
Power Output	2.5 Watts Undistorted 4.5 Watts Maximum
Selectivity (Sharp)	28 KC Broad at 1000 times Signal
Speaker	8" Dynamic
Tuning Frequency Range	
B Range	528 to 1830 KC.
D Range	5750 to 19800 KC
Sensitivity	
B Range	7 Microvolts Average
D Range	9 Microvolts Average

Circuit

This model is a two band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna coil assemblies and T3 is the oscillator coil assembly. The standard wave and short wave coils in each assembly are indicated by the letters B and D respectively.

The band switch completes connections to the coils in use. When it is in the Range B position, a double tuned antenna R.F. stage is used while for the D Range, a single tuned secondary is used.

A type 6J7 tube functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to Fig 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T4. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A type 6Q7 duo-diode triode functions as the second detector and a one stage audio amplifier. AVC voltage is applied to the 1st detector and I.F. tubes.

Resistance coupling is used between the 1st audio stage and the output stage which employs a type 6F6 ouput pentode tube. A dynamic reproducer is used.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

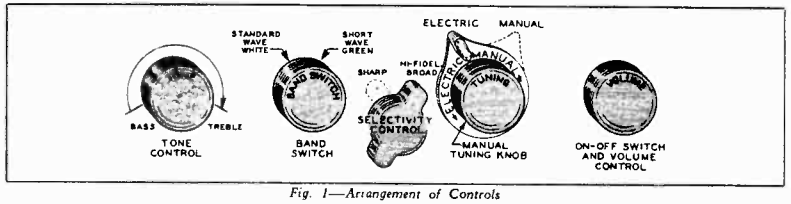


Fig. 1—Arrangement of Controls

General Service Data

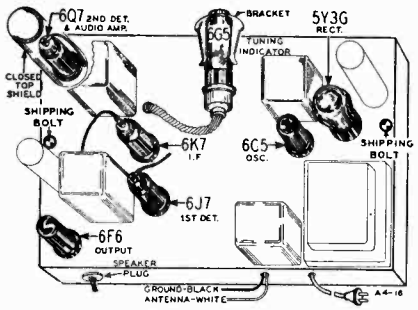


Fig. 5—Location of Tubes

Dial and Drive Assembly

SEE INDEX

Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and electric drive motor are used.

Ordinarily, a twenty-five cycle receiver may be operated from a sixty cycle power supply. However, the electric drive models cannot be operated in this manner because the twenty-five cycle motor will not operate properly on a sixty cycle power supply.

The sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

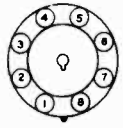


Fig. 6—Octal Tube Terminal Numbering (bottom of socket).

117-234 Volt Power Transformer

A 117-234 volt 60 cycle power transformer is also available for this model. *It is important that these sets be operated on a 60 cycle power supply only.*

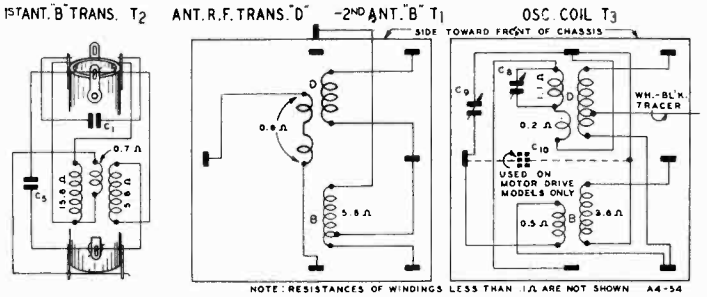


Fig. 4—Coil Terminal Arrangement and D.C. Resistance of Windings

Ordinarily, radios equipped with a 117-234 volt universal transformer may be operated on a 40 to 60 cycle power supply. However, the 60 cycle motor in the electric drive panel of this model will not operate satisfactorily at any frequency other than 60 cycles. Consequently, if one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 25 cycle model is used for this purpose.

Connections for the 117-234 volt transformer are shown in Fig. 2. There is a 1¼ inch round knockout on the back panel of the chassis which may be removed to permit installation of a special octal socket. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

Phonograph Connections

Phonograph connections are made as shown in Fig. 7. On the side panel of the chassis base is a round knockout 1⅛ inch in diameter. An octal base socket is mounted in this knockout opening and wired as illustrated.

A phono cable assembly may then be purchased On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

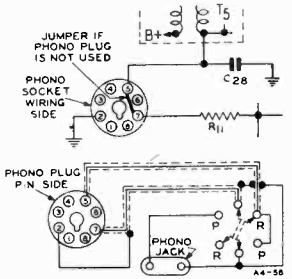


Fig. 7—Phonograph Connections

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter

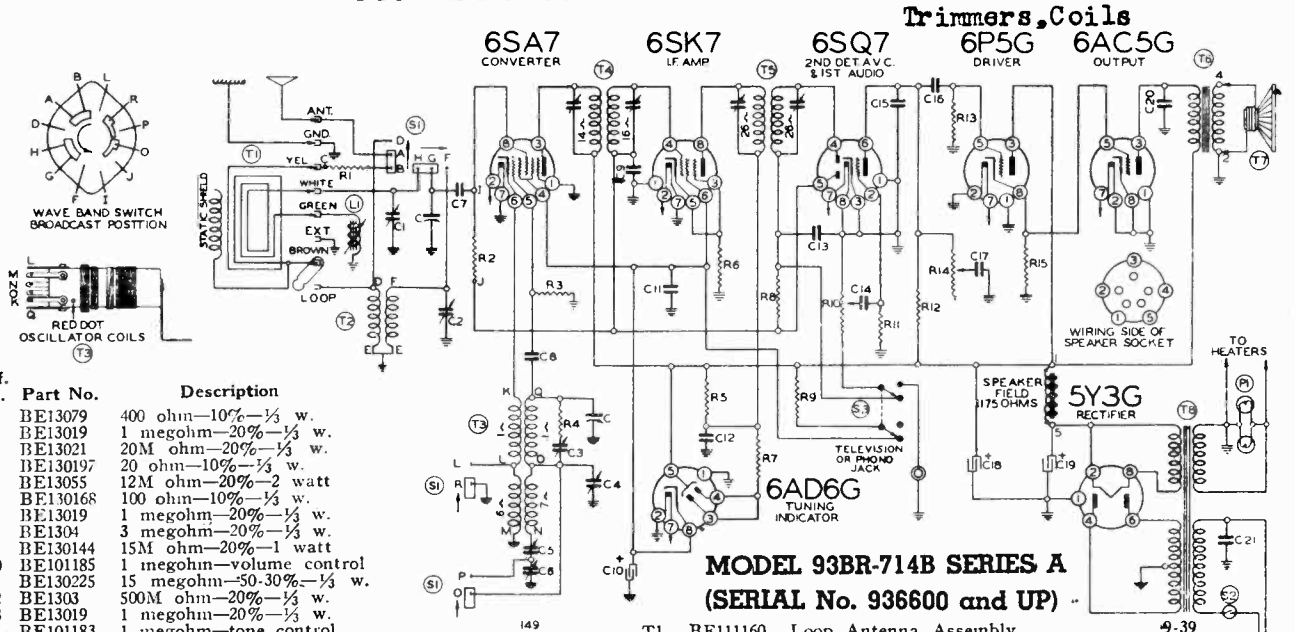
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6J7	1st Det.	0	6.2(1)	230	145	9.5		6.2(1)	9.5
6K7	I.F.	0	6.2(1)	230	100	2.0		6.2(1)	2.0
6C5	Osc.	0	6.2(1)	140				6.2(1)	0
6Q7	1st Audio & 2nd Det.	0	6.2(1)	100				6.2(1)	0(2)
6F6	Power Amp.	0	6.2(1)	210	230			6.2(1)	0(3)
5Y3G	Rectifier	0	5.0(4)		630(5)		630(5)		5.0(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 230		Cathode to Ground 0		Across Heater 6.2 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R15 and R16.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

MODEL 93BR-714B, Series A

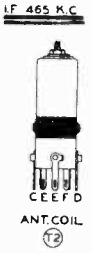
MONTGOMERY WARD & CO. Schematic, Voltage, Socket Trimmers, Coils



Ref. No.	Part No.	Description
R1	BE13079	400 ohm—10%—⅓ w.
R2	BE13019	1 megohm—20%—⅓ w.
R3	BE13021	20M ohm—20%—⅓ w.
R4	BE130197	20 ohm—10%—⅓ w.
R5	BE13055	12M ohm—20%—2 watt
R6	BE130168	100 ohm—10%—⅓ w.
R7	BE13019	1 megohm—20%—⅓ w.
R8	BE1304	3 megohm—20%—⅓ w.
R9	BE130144	15M ohm—20%—1 watt
R10	BE101185	1 megohm—volume control
R11	BE130225	15 megohm—50-30%—⅓ w.
R12	BE1303	500M ohm—20%—⅓ w.
R13	BE13019	1 megohm—20%—⅓ w.
R14	BE101183	1 megohm—tone control
R15	BE1301	25M ohm—20%—⅓ w.
C	BE102122	2 gang variable condenser
C1	BE124109	B.C. Antenna Trimmer
C2	BE124109	S.W. Antenna Trimmer
C3	BE12476	S.W. Oscillator Trimmer
C4	BE12476	B.C. Oscillator Trimmer
C5	BE124114	B.C. Series Pad
C6	BE124114	S.W. Series Pad
C7	BE1292	.0005 mica—20%
C8	BE12960	.00015 mica—20%
C9	BE1009	.05 x 200 v.—25%
C10	BE11984	5. mfd. x 300 v. lytic
C11	BE1001	.1 x 400 v.—50-10%
C12	BE1001	.1 x 400 v.—50-10%
C13	BE1295	.0001 mica—20%
C14	BE10071	.004 x 600 v.—25%
C15	BE1292	.0005 mica—20%
C16	BE10026	.02 x 400 v.—25%
C17	BE10071	.004 x 600 v.—25%
C18	BE11984	15 mfd. x 350 v lytic
C19	BE11984	10 mfd. x 450 v. lytic
C20	BE10019	.006 x 600 v.—25%
C21	BE10061	.02 x 600 v.—20%

C5 and C6 in one unit C3 and C4 in one unit
C10, C18 and C19 in one unit

I.F. 465 K.C.



MODEL 93BR-714B SERIES A
(SERIAL No. 936600 and UP)

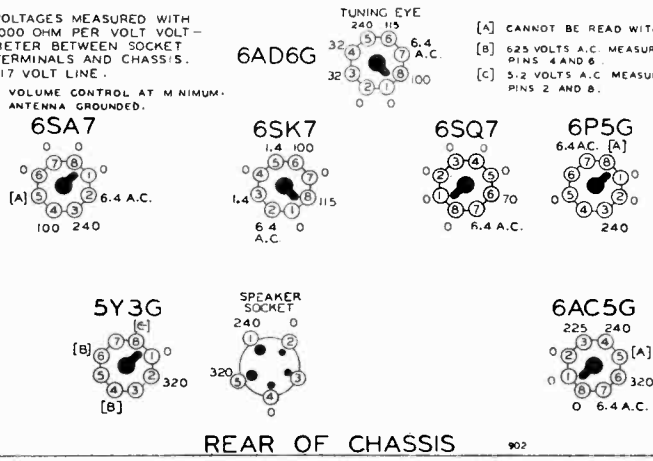
T1	BE111160	Loop Antenna Assembly
T2	BE111155	S.W. Antenna Coil Complete
T3	BE110137	B.C. S.W Oscillator Coil Complete
T4	BE108166	Input I.F Coil—465 kc.
T5	BE108132B	Output I.F. Coil—465 kc.
T6	BE10590	Output Transformer
T7	BE114168	8" Dynamic Speaker (1175 Ohm Field)
T8	BE104139E	Power Transformer
P1	BE10794	2 6-8 volt pilot light T44
S1	BE12596	Band Switch
S2	BE12577B	AC Switch
S3	BE12570	Phone or Television—Radio Switch
L1	BE111153	Loop Adjusting Coil

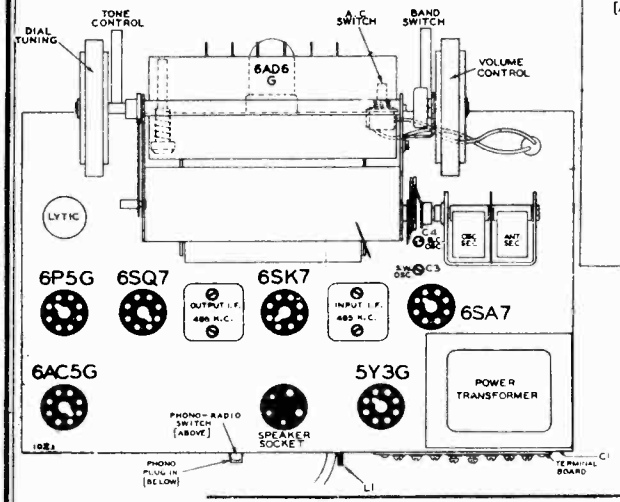
BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLT-METER BETWEEN SOCKET TERMINALS AND CHASSIS. 117 VOLT LINE.

VOLUME CONTROL AT MINIMUM. ANTENNA GROUNDED.

[A] CANNOT BE READ WITH VOLTMETER.
[B] 625 VOLTS A.C. MEASURED ACROSS PINS 4 AND 6.
[C] 5.2 VOLTS A.C MEASURED ACROSS PINS 2 AND 8.



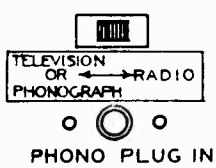


ANTENNA AND GROUND CONNECTIONS:

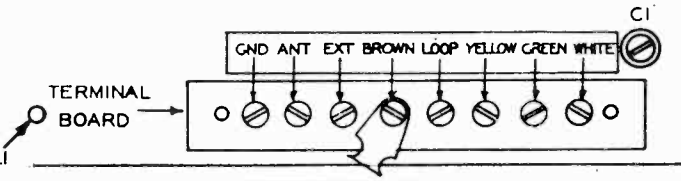
When an outside antenna is used connect the antenna to the binding screw on the rear of the chassis, marked "Ant." Connect the ground to the binding screw marked "Gnd." Move the connector bar from the terminal marked "Loop" and connect it to terminal marked "Ext."

NOTE:—Make certain that the connector bar is connected to the terminal marked "Loop" if no outside antenna is used.

FOR TUNER AND ALIGNMENT SEE INDEX



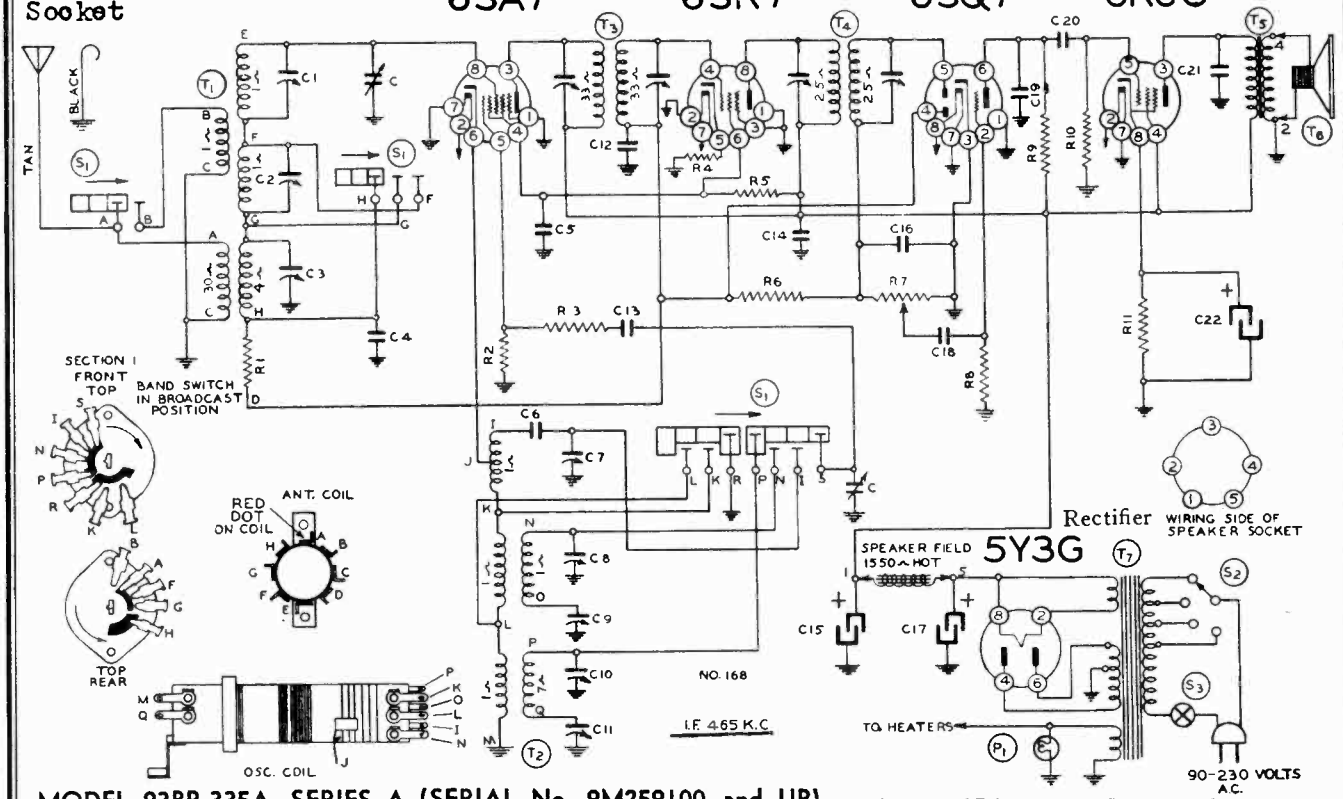
REAR VIEW OF CHASSIS



MODEL 93BR-335A, Ser. A
Schematic, Voltage
Alignment, Trimmers
Socket

MONTGOMERY WARD & CO.

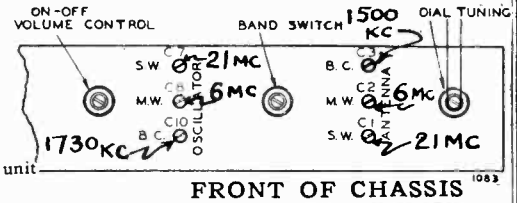
First Detector-Oscillator. 6SA7 — I. F. Amplifier. 6SK7 — Second Detector, A.V.C. First Audio. 6SQ7 — Output Amplifier. 6K6G



MODEL 93BR-335A, SERIES A (SERIAL No. 9M259100 and UP)

CONVENTIONAL ALIGNMENT 12-39

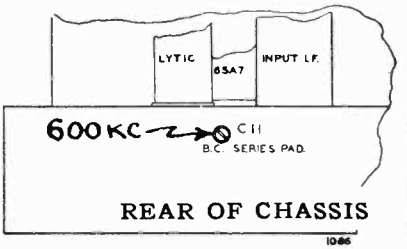
SEE SPECIAL SECTION VOLUME VIII

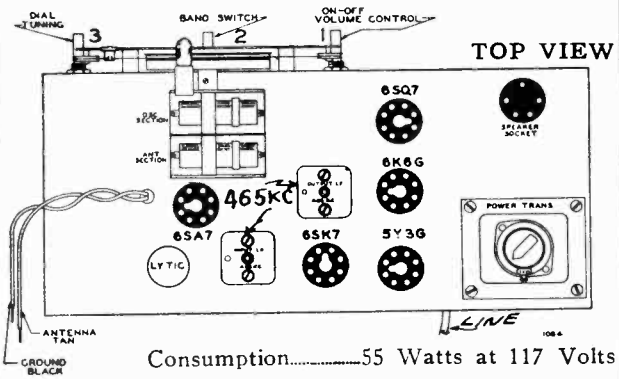


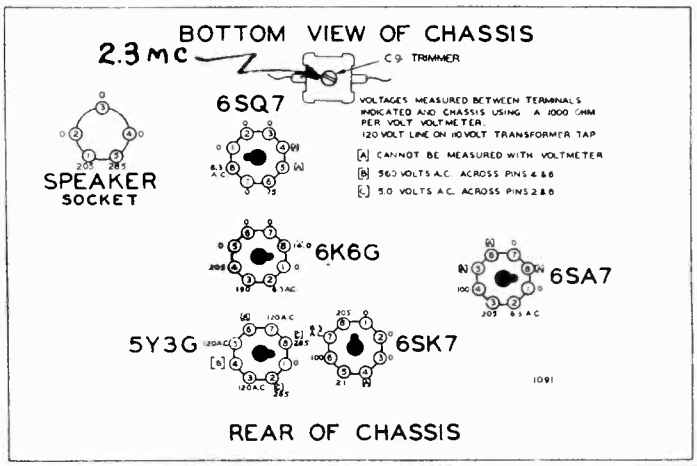
Ref. No.	Part No.	Description
		RESISTORS
R1	BE13011	250M ohm—⅓ w.
R2	BE130194	35M ohm—⅓ w.
R3	BE130299	10 ohm—⅓ w.
R4	BE130239	250 ohm—⅓ w.
R5	BE130242	12M ohm—1 watt
R6	BE1304	3 megohm—⅓ w.
R7	BE101208	1 megohm volume control
R8	BE130223	10 megohm—⅓ w.
R9	BE13011	250M ohm—⅓ w
R10	BE13019	1 megohm—⅓ w.
R11	BE13070	500 ohm—⅓ w.
		CONDENSERS
C	BE102124	Two Gang Variable Cond
C1	BE124124	S. W. Antenna Trimmer
C2	BE124124	M. W. Antenna Trimmer
C3	BE124124	B. C. Antenna Trimmer
C4	BE1009	.05 x 200 v.
C5	BE1001	.1 x 400 v.
C6	BE129153	.006—S. W. Padder (Set at Factory)
C7	BE124123	S. W. Oscillator Trimmer
C8	BE124123	M. W. Oscillator TrimmerP1
C9	BE129154	.0025 M. W. Padder
C10	BE124123	B. C. Oscillator Trimmer
C11	BE129155	B. C. Padder
C12	BE10026	.02 x 400 v.
C13	BE1295	.0001 Mica
C14	BE1001	.1 x 400 v.
C15	BE119103	40 mfd. lytic
C16	BE1295	.0001 Mica
C17	BE119103	10 mfd. lytic
C18	BE10025	.002 x 600 v
C19	BE1292	.0005 Mica
C20	BE10026	.02 x 400 v.
C21	BE10071	.004 x 600 v.
C22	BE119103	20 mfd. lytic x 25 w. v. C15, C17 and C22 in same unit

PARTS

T1	BE111169	Antenna Coil
T2	BE110143	Oscillator Coil
T3	BE108169B	Input I. F.
T4	BE108170	Output I. F.
T5	BE10575	Output Transformer
T6	BE114176	6" Dynamic Speaker (1550 ohm field)
T7	BE104193	Power Transformer 40-60 cycles 90-230 volts
S1	BE125105	Band Switch
S2		Voltage Switch on Power Transformer
S3		Volume Control—On-Off switch
P1	BE10794	Pilot Light Bulb T-44







Consumption.....55 Watts at 117 Volts

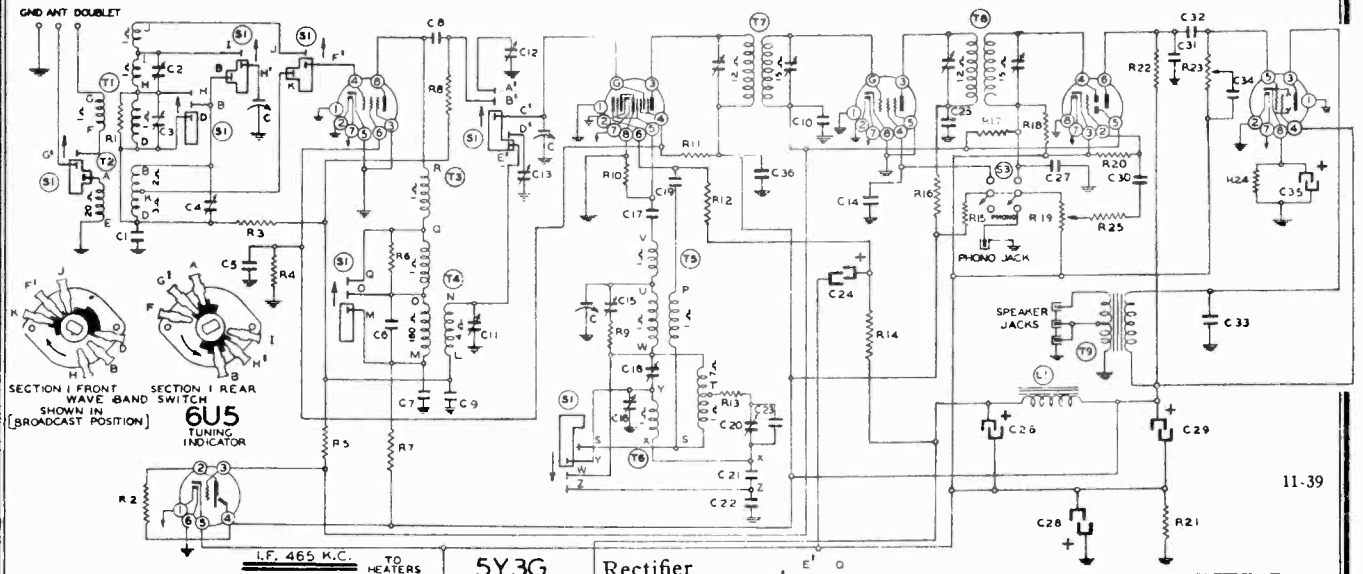
Output.....1.5 Watts Undistorted, 3 Watts Maximum

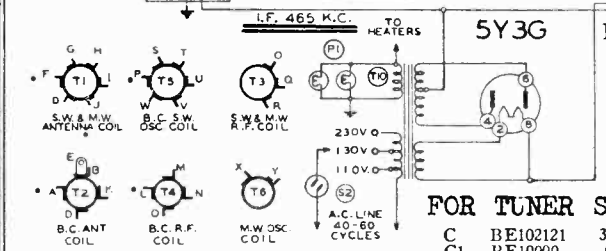
Alignment, Socket Trimmers

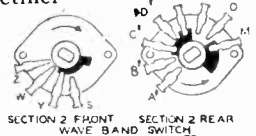
MONTGOMERY WARD & CO.

MODEL 93BR-391A, Ser. A
Schematic, Voltage
Second Detector, A.V.C.

R. F. Amplifier.	First Detector-Oscillator.	I. F. Amplifier.	First Audio.	Output
6SK7	6K8	6K7	6SQ7	6V6G







MODEL 93BR-391A SERIES A

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

Power Consumption.....65 Watts at 117 Volts
Power Output .....4 Watts Undistorted, 6.5 Watt Maximum

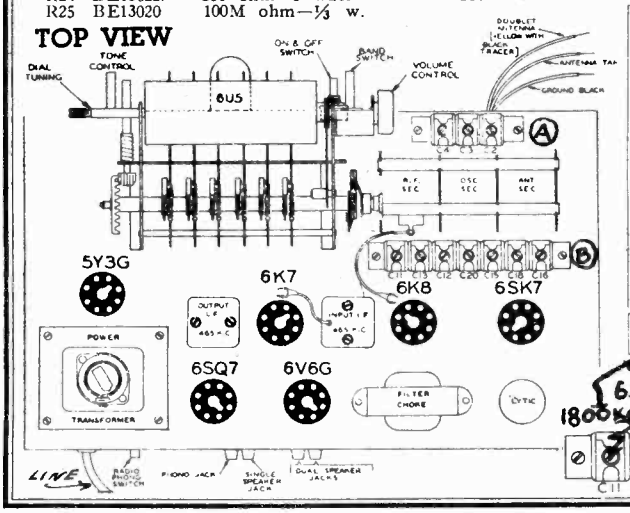
FOR TUNER SEE INDEX

(SERIAL No. 9K188300 and UP)

Ref. No.	Part No.	Description
R1	BE13094	50M ohm—⅓ w.—10%
R2	BE1303	500M ohm—⅓ w.
R3	BE13020	100M ohm
R4	BE13012	50M ohm—⅓ w.
R5	BE13026	1000 ohm—⅓ w.
R6	BE130232	25M ohm—⅓ w.
R7	BE13026	1000 ohm—⅓ w.
R8	BE13019	1 megohm—⅓ w.
R9	BE13097	200 ohm—⅓ w.
R10	BE13012	50M ohm—⅓ w.
R11	BE130304	12M ohm—2 watt
R12	BE13017	10M ohm—⅓ w.
R13	BE130299	10 ohm—⅓ w.
R14	BE13017	10M ohm—⅓ w.
R15	BE13020	100M ohm—⅓ w.
R16	BE13023	2M ohm—⅓ w.
R17	BE1304	3 megohm—⅓ w.
R18	BE1304	3 megohm—⅓ w.
R19	BE101184	1 megohm volume control
R20	BE130225	15 megohm—⅓ w.
R21	BE130303	35 ohm—⅓ w.
R22	BE1309	200M ohm—⅓ w.
R23	BE101206	150M ohm tone control
R24	BE130227	250 ohm—1 watt
R25	BE13020	100M ohm—⅓ w.

C	BE102121	3 gang variable condenser
C1	BE10090	.02 x 400 v.
C2	BE124118	S.W. Antenna Trimmer
C3	BE124118	M.W. Antenna Trimmer
C4	BE124118	B.C. Antenna Trimmer
C5	BE10013	.05 x 400 v.
C6	BE12938	.00005 mica
C7	BE10090	.02 x 400 v.
C8	BE10090	.02 x 400 v.
C9	BE10090	.02 x 400 v.
C10	BE1009	.05 x 200 v.
C11	BE124119	B.C. R.F. Trimmer
C12	BE124119	S.W. R.F. Trimmer
C13	BE124119	M.W. R.F. Trimmer
C14	BE10013	.05 x 400 v.
C15	BE124119	S.W. Oscillator Trimmer
C16	BE124119	M.W. Oscillator Trimmer
C17	BE12962	.00003 Mica
C18	BE124119	B.C. Oscillator Trimmer
C19	BE10025	.002 x 600 v.
C20	BE124119	B.C. Padding Condenser
C21	BE129149	.0028 Compression M.W. Pad
C22	BE129105	.0035 Compression S.W. Pad
C23	BE12959	.0003 mica
C24	BE11981	16 uf. lytic x 400 w. v.
C25	BE1001	.1 x 400 v.
C26	BE119100	30 uf. lytic x 450 w. v.
C27	BE1295	.0001 mica
C28	BE11991	40 uf. lytic x 25 w. v.
C29	BE119100	30 uf. lytic x 450 w. v.
C30	BE10025	.002 x 600 v.
C31	BE12912	.00025 mica
C32	BE10013	.05 x 400 v.
C33	BE10097	.02 x 600 v.
C34	BE10078	.01 x 200 v.
C35	BE119100	40 uf. lytic—25 w. v.
C36	BE10013	.05 x 400 v.
		C26, C29, and C35 in same unit
T1	BE111156	S.W. M.W. Ant. Coil
T2	BE111158	B.C. Antenna Coil
T3	BE10955	S.W. M.W. R.F. Coil
T4	BE10956	B.C. R.F. Coil
T5	BE110140	B.C. S.W. Osc. Coil
T6	BE110138	M.W. Oscillator Coil
T7	BE108165	1st I. F. Input Coil
T8	BE108119	2nd I. F. Output Coil
T9	BE10598	Output Transformer
T10	BE104181	Universal Transformer
	BE114179	8" P. M. Speaker
L1	BE10597B	"B" Filter Choke
S1	BE12595	Wave Band Switch
S2	BE12581	On & Off Switch
S3	BE12570	Radio Phono Switch
P1	BE10794	(2) Pilot Lights - T44

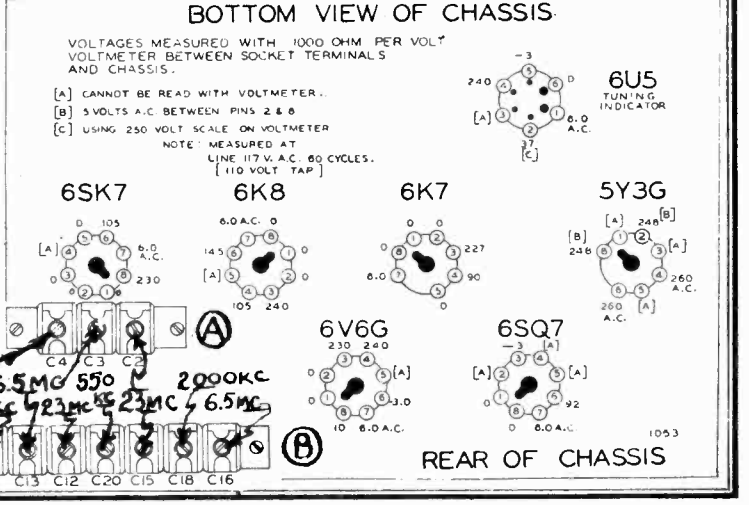
TOP VIEW



BOTTOM VIEW OF CHASSIS

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

[A] CANNOT BE READ WITH VOLTMETER.
[B] 5 VOLTS A.C. BETWEEN PINS 2 & 8
[C] USING 250 VOLT SCALE ON VOLTMETER
NOTE: MEASURED AT LINE 117 V. A.C. 60 CYCLES. [110 VOLT TAP]



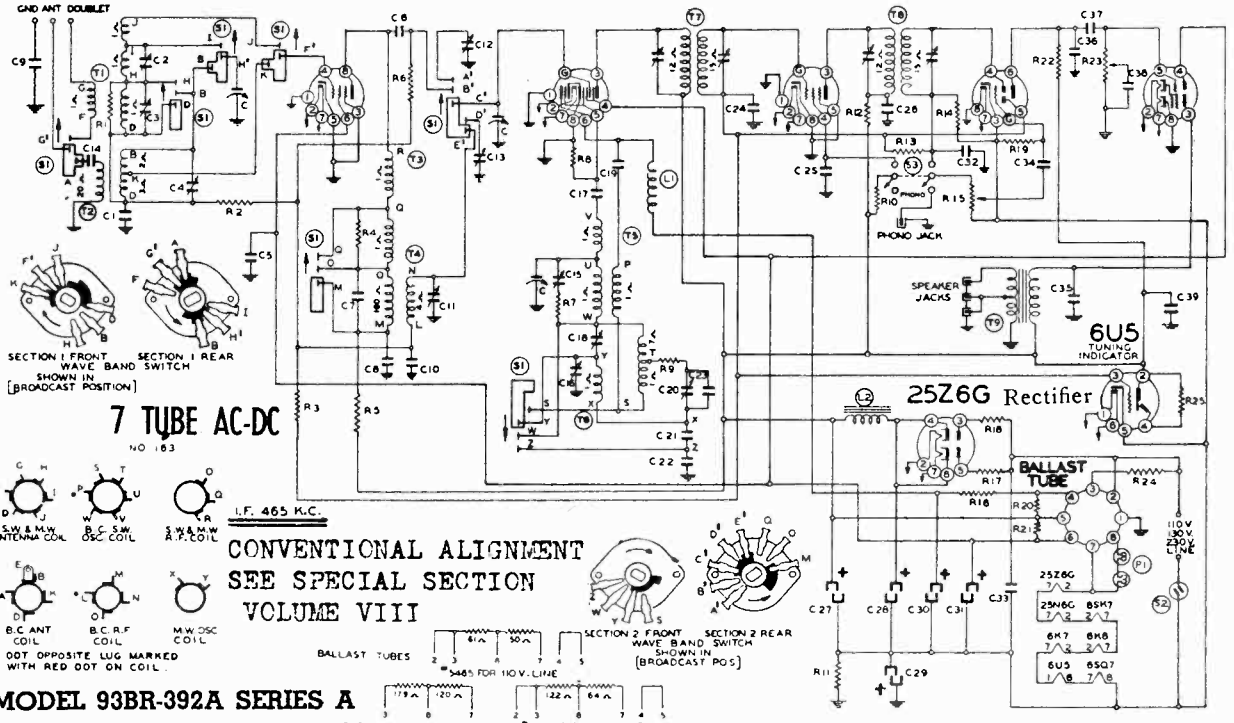
MODEL 93BR-392A, Ser. A
Schematic, Voltage

MONTGOMERY WARD & CO.

Alignment, Socket Trimmers

Second Detector, A.V.C.

R. F. Amplifier. 6SK7 | First Detector-Oscillator. 6K8 | I. F. Amplifier. 6K7 | First Audio. 6SQ7 | Output 25N6G



MODEL 93BR-392A SERIES A
(SERIAL No. 9K167300 and UP)

Ref. No.	Part No.	Description 11-39
R1	BE13094	50M ohm—½ w.
R2	BE13020	100M ohm—½ w.
R3	BE13026	1000 ohm—½ w.
R4	BE130232	25M ohm—½ w.—10%
R5	BE13026	1000 ohm—½ w.
R6	BE13019	1 megohm—½ w.
R7	BE13097	200 ohm—½ w.—10%
R8	BE13012	50M ohm—½ w.
R9	BE130299	10 ohm—½ w.—10%
R10	BE13020	100M ohm—½ w.
R11	BE130197	20 ohm—½ w.—10%
R12	BE13023	2000 ohm—½ w.
R13	BE1304	3 megohm—½ w.
R14	BE1304	3 megohm—½ w.
R15	BE101184	1 megohm volume control
R16	BE13022	5000 ohm—½ w.
R17	BE130168	100 ohm—½ w.
R18	BE130168	100 ohm—½ w.—10%
R19	BE130225	15 megohm—½ w.
R20	BE130176	20M ohm—½ w.—10%
R21	BE130302	9M ohm—1.5 watt—10%
R22	BE1309	200M ohm—½ w.
R23	BE101207	1 megohm tone control
R24	BE10658	300 ohm—10%—50 watt
R25	BE13019	1 megohm—½ w.
C	BE102121	Three gang variable condenser
C1	BE10090 B	.02 x 400 v
C2	BE124118	S.W. Antenna Trimmer
C3	BE124118	M.W. Antenna Trimmer
C4	BE124118	B.C. Antenna Trimmer
C5	BE10013	.05 x 400 v.
C6	BE10090	.02 x 400 v.
C7	BE12938	.00005 mica
C8	BE10090	.02 x 400 v.
C9	BE10026	.02 x 400 v.
C10	BE10090	.02 x 400 v.
C11	BE124119	B.C. R.R. Trimmer
C12	BE124119	S.W. R.F. Trimmer
C13	BE124119	M.W. R.F. Trimmer
C14	BE10026	.02 x 400 v.
C15	BE124119	S.W. Oscillator Trimmer
C16	BE124119	M.W. Oscillator Trimmer
C17	BE12962	.0003 mica
C18	BE124119	B.C. Oscillator Trimmer
C19	BE10025	.002 x 600 v.
C20	BE124119	B.C. Padding Condenser
C21	BE129149	.0028 Compression M.W. Pad
C22	BE129105	.0035 Compression S.W. Pad
C23	BE12959	.0003 mica
C24	BE1009	.05 x 200 v.
C25	BE10013	.05 x 400 v.
C26	BE1001	.1 x 400 v.
C27	BE11998	30 uf. lytic—300 w.v.
C28	BE11998	30 uf. lytic—300 w.v.
C29	BE11998	40 uf. lytic—25 w.v.
C30	BE11964	15 uf. lytic—400 w.v.
C31	BE11964	10 uf. lytic—350 w.v.
C32	BE1295	.0001 mica
C33	BE10013	.05 x 400 v.
C34	BE10025	.002 x 600 v.
C35	BE10026	.02 x 400 v.
C36	BE12912	.00025 mica
C37	BE10013	.05 x 400 v.
C38	BE10078	.01 x 200 v.
C39	BE10013	.05 x 400 v.

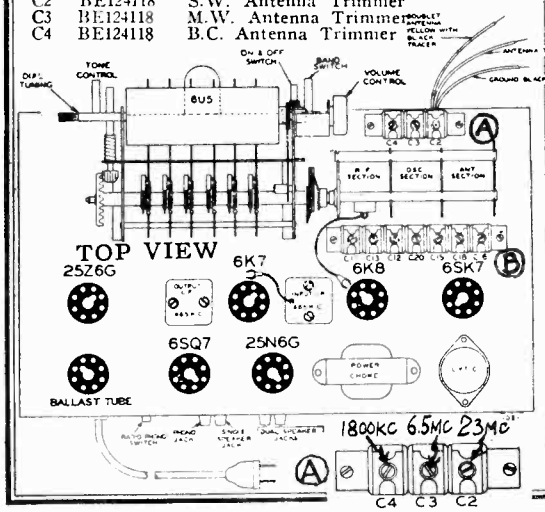
FOR TUNER SEE INDEX

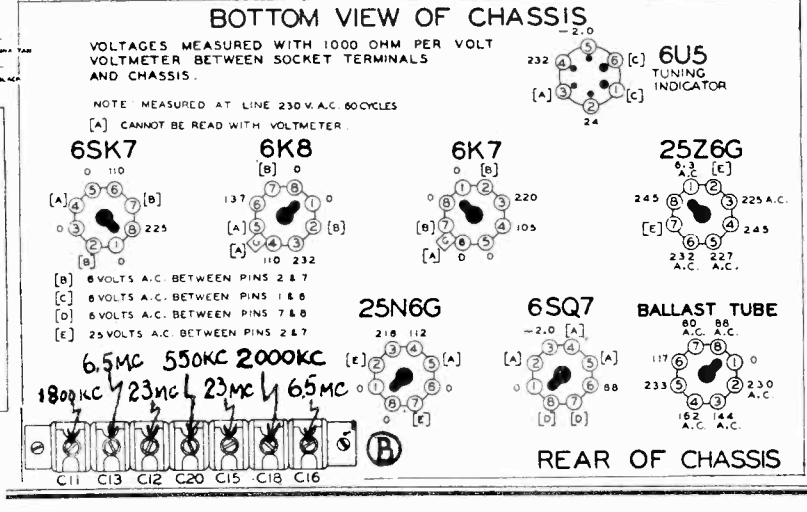
Consumption.....110 Watts at 230 Volts

Output.....4 Watts Undistorted, 5 Watt Maximum (Measured with 230 Volt Line Voltage)

C2, C3 and C4 are in same unit.
C11, C12, C13, C15, C16, C18 and C20 in same unit.
C27, C28 and C29 in same unit.
C30 and C31 in same unit.

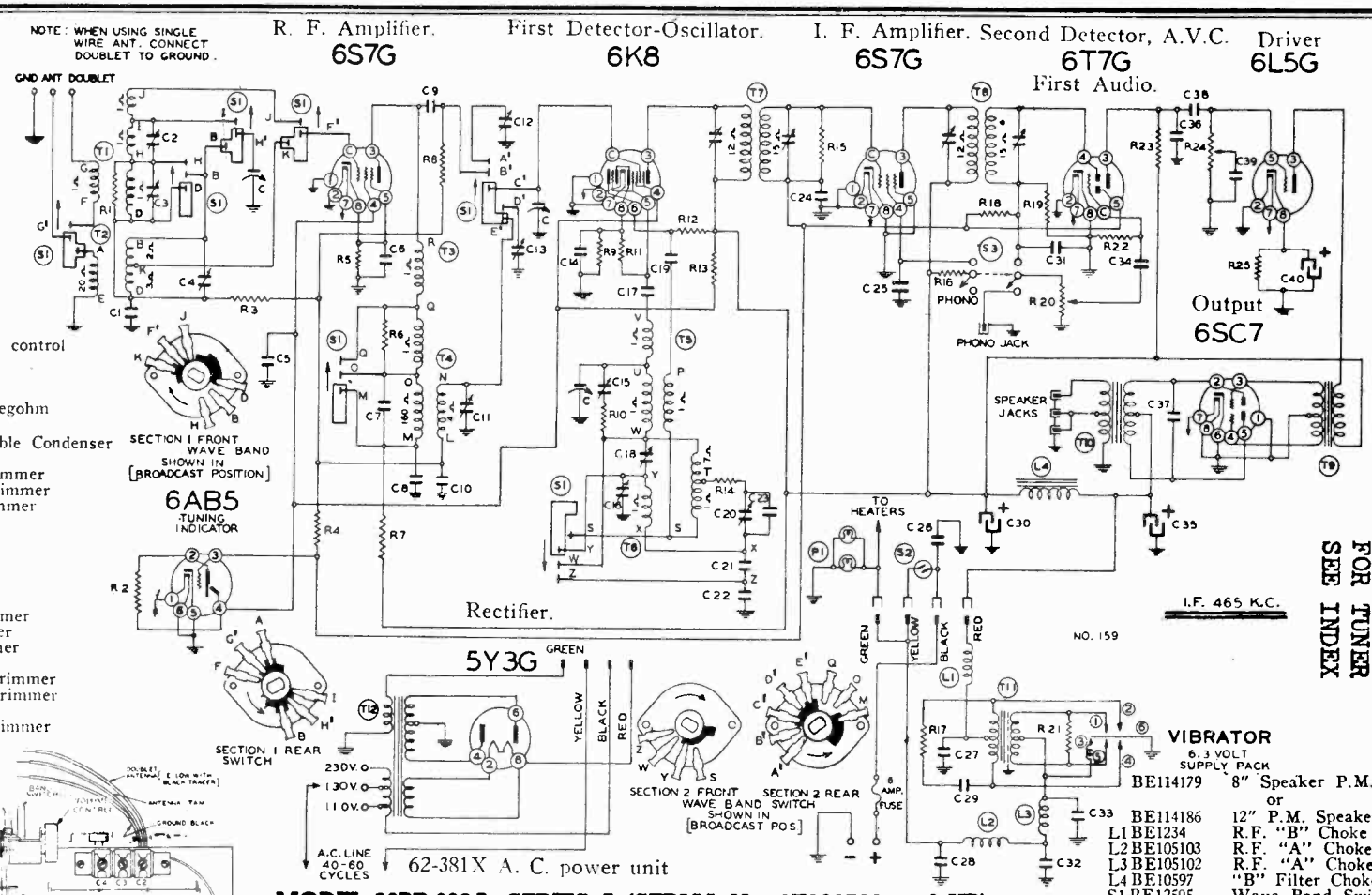
T1	BE111156	S.W. M.W. Antenna Coil
T2	BE111158	B.C. Antenna Coil
T3	BE10955	S.W. M.W. R.F. Coil
T4	BE10956	B.C. R.F. Coil
T5	BE110140	B.C. S.W. Oscillator Coil
T6	BE110138	M.W. Oscillator Coil
T7	BE108165	1st I. F. Input Coil
T8	BE108119	2nd I. F. Output Coil
T9	BE10598	Output Transformer
	BE114179	8" P.M. Speaker
L1	BE1234	R.F. Choke
L2	BE10597B	"B" Filter Choke
S1	BE12595	Wave Band Switch
S2	BE12581	On and Off Switch
S3	BE12570	Radio-Phono Switch
P1 *	BE10794	(2) Pilot Lights T-44



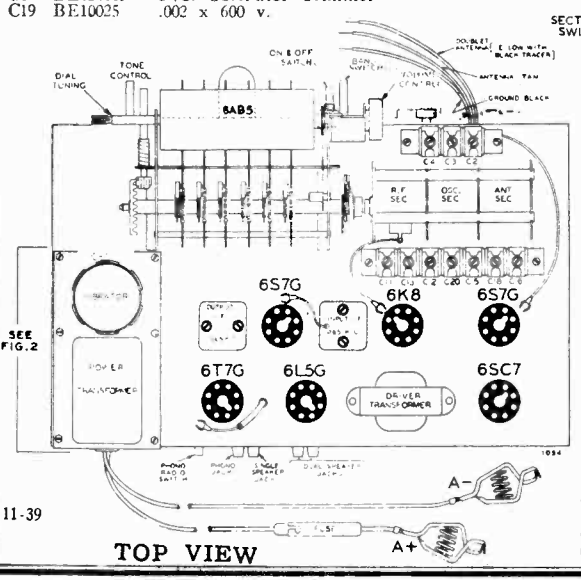


S.P.U. MODEL 62-381X MONTGOMERY WARD & CO. MODEL 93BR-393A, Ser. A Serial 9K166700 up Schematic, Socket Trimmers

FOR TUNER SEE INDEX



Ref. No.	Part No.	Description
R1	BE13094	50M ohm—⅓ w.
R2	BE1304	3 megohm—⅓ w.
R3	BE13020	100M ohm—⅓ w.
R4	BE13026	1000 ohm—⅓ w.
R5	BE13070	500 ohm—⅓ w.
R6	BE130232	25M ohm—⅓ w.
R7	BE13026	1000 ohm—⅓ w.
R8	BE13019	1 megohm—⅓ w.
R9	BE13083	300 ohm—⅓ w.
R10	BE13097	200 ohm—⅓ w.
R11	BE13012	50M ohm—⅓ w.
R12	BE13048	15M ohm—⅓ w.
R13	BE130245	10M ohm—1 watt
R14	BE130299	10 ohm—⅓ w.
R15	BE13019	1 megohm—⅓ w.
R16	BE13012	50M ohm—⅓ w.
R17	BE13064	3500 ohm—⅓ w.
R18	BE1304	3 megohm—⅓ w.
R19	BE1304	3 megohm—⅓ w.
R20	BE101184	1 megohm volume control
R21	BE13084	200 ohm—⅓ w.
R22	BE130257	5 megohm—⅓ w.
R23	BE1309	200M ohm
R24	BE101207	Tone Control—1 megohm
R25	BE130235	1500 ohm—⅓ w.
C	BE102121	Three Gang Variable Condenser
C1	BE10090	.02 x 400 v.
C2	BE124118	S.W. Antenna Trimmer
C3	BE124118	M.W. Antenna Trimmer
C4	BE124118	B.C. Antenna Trimmer
C5	BE10013	.05 x 400 v.
C6	BE1009	.05 x 200 v.
C7	BE12938	.00005 mica
C8	BE10090	.02 x 400 v.
C9	BE10090	.02 x 400 v.
C10	BE10090	.02 x 400 v.
C11	BE124119	B. C. R. F. Trimmer
C12	BE124119	S.W. R.F. Trimmer
C13	BE124119	M.W. R.F. Trimmer
C14	BE1009	.05 x 200 v.
C15	BE124119	S.W. Oscillator Trimmer
C16	BE124119	M.W. Oscillator Trimmer
C17	BE12962	.00003 mica
C18	BE124119	B.C. Oscillator Trimmer
C19	BE10025	.002 x 600 v.

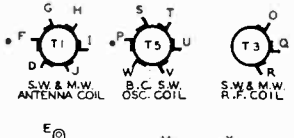


TOP VIEW

MODEL 93BR-393A, SERIES A (SERIAL No. 9K166700 and UP)

Power Consumption—3.8 Amps. at 6.3 Volts
Power Output—2 Watts Undistorted, 3 Watts Maximum

C20	BE124119	B.C. Padding Cond.
C21	BE129149	.0028 Compression (M.W. Pad)
C22	BE129105	.0035 Compression (S.W. Pad)
C23	BE12959	.0003 mica
C24	BE1009	.05 x 200 v.
C25	BE10013	.05 x 400 v.
C26	BE10020	.1 x 200 v.
C27	BE10013	.05 x 400 v.
C28	BE10031	.5 x 120 v.
C29	BE100114	.006 x 1200 v. oil type
C30	BE11998	30 uf. lytic—300 w.v.
C31	BE1295	.0001 mica
C32	BE10031	.5 x 120 v.
C33	BE10031	.5 x 120 v.
C34	BE10025	.002 x 600 v.
C35	BE11998	30 uf. lytic—300 w.v.
C36	BE12912	.00025 mica
C37	BE10071	.604 x 600 v.
C38	BE10011	.01 x 400 v.
C39	BE10078	.01 x 200 v.
C40	BE11998	40 uf. lytic—25 w.v.



DOT OPPOSITE LUG MARKED WITH RED DOT ON COIL.

C2, C3 and C4 are in same unit
C11, C12, C13, C15, C16, C18, and C20 are in same unit
C30, C35, and C40 are in same unit.

T1	BE111156	S.W.—M.W. Antenna Coil
T2	BE111158	B.C. Antenna Coil
T3	BE10955	S.W.—M.W. R.F. Coil
T4	BE10956	B.C.—R.F. Coil
T5	BE110140	B.C.—S.W. Oscillator Coil
T6	BE110138	M.W. Oscillator Coil
T7	BE108164	1st I.F. Coil—Input
T8	BE108119	2nd I.F. Coil—Output
T9	BE105101	Input Transformer
T10	BE10599	Output Transformer
T11	BE104180	Vibrator Transformer
T12	BE104179	Universal Transformer Power
	BE12616	Vibrator

MODEL 93BR-393A, Ser. A
Voltage, Alignment
Trimmers
S.P.U. Notes

MONTGOMERY WARD & CO.

ALIGNMENT FREQUENCIES

IF 465 KC
SHORT WAVE BAND 23 MC
Align S.W. Osc.(C15), Ant.(C2), RF (C12)
MEDIUM WAVE BAND 6.5 MC
Align M Osc.(C16), Ant.(C3), RF (C13)
BROADCAST BAND
Align Osc.(C18) at 2000 KC.
Align Ant.(C4), RF (C11) at 1800 KC.
Align Osc. Series Pad (C20) at 550 KC.

THE ALIGNMENT IS CONVENTIONAL
SEE SPECIAL SECTION VOLUME VIII.

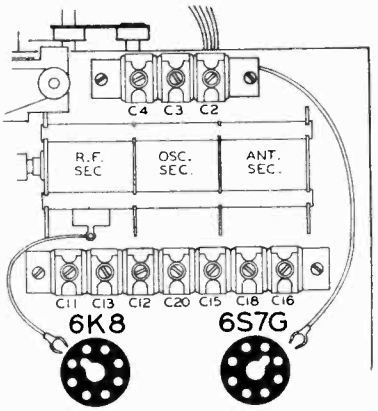


FIG. 5—TOP OF CHASSIS

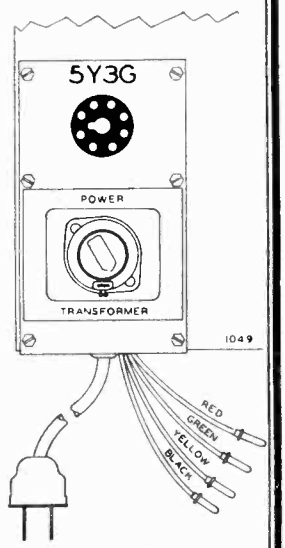


FIG. 2—MODEL 62-381X A. C. POWER UNIT

BATTERY AND POWER SUPPLY:

This radio obtains its power entirely from a six volt storage battery—no other batteries are required.

1. For 6 volt storage battery operation:
   (a) Connect the lead (containing the fuse receptacle) marked A positive (+) to the positive (+) post of the storage battery.
   (b) Connect the lead marked A negative (—) to the negative (—) post of the storage battery.
2. For 100-250 volts, 40/60 cycle operation; see Fig. 2.

Installing the Model 62-381X Power Unit

(For 100-250 Volt 40/60 Cycle A. C. Operation)

To install the Model 62-381X A.C. power unit proceed as follows:—

1. **Remove the chassis from the cabinet,** by removing the four chassis mounting bolts from the bottom of the cabinet.
2. Referring to Fig. 1, note that the **6-volt power unit** is fastened to the top of the radio chassis with **eight copper head screws,** (six on top of chassis, and two on rear flange of chassis).
3. Remove the eight copper head screws.
4. Disconnect the four flexible leads of the power unit from the chassis connector strip. These leads clip into pin jacks. Note that the color of each flexible lead matches the color dot on the chassis pin jack connector strip.
5. Place the model 62-381X A.C. power unit (see Fig. 2) on the top of the radio chassis and plug the four flexible leads into the pin jacks on the chassis connector strip.
   (a) The **red lead** should be plugged into the pin jack which is marked with a **red dot.**
   (b) The **green lead** connects to the pin jack which is marked with a **green dot.**
   (c) The **yellow lead** connects to the pin jack which is marked with a **yellow dot.**
   (d) The **black lead** connects to the pin jack which is marked with a **black dot.**
6. Mount the power unit to the chassis using the eight copper head screws.

IMPORTANT:

After the A.C. power unit has been installed check the connections again to make sure you have followed the instructions correctly. Set the switch on the top of the power transformer to the proper voltage.

SERVICE NOTES:

Voltage taken from different points of circuit to chassis are measured with volume control at minimum, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages as indicated on the voltage chart are measured with a fully charged 6 volt storage battery or from 117 volt A. C. line if the Model 62-381X A. C. power unit is installed in place of the 6 volt power unit.

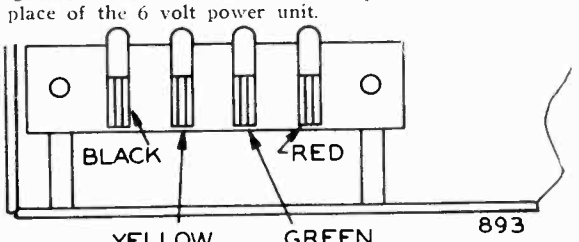
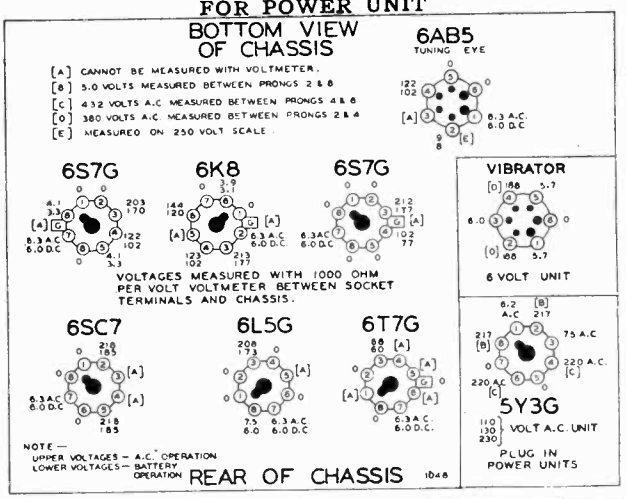


FIG. 3—CONNECTOR STRIP ON CHASSIS FOR POWER UNIT



MONTGOMERY WARD & CO.

MODELS 93BR-420A, 93BR-421A Series A; 93BR-420B, 93BR-421B, 93BR-423B, 93BR-424B 93BR-431B, Series B
Serial 813000 up, Ser. B
Schematic, Voltage, Socket Sensitivity, Trimmers

FOR ALIGNMENT
SEE INDEX

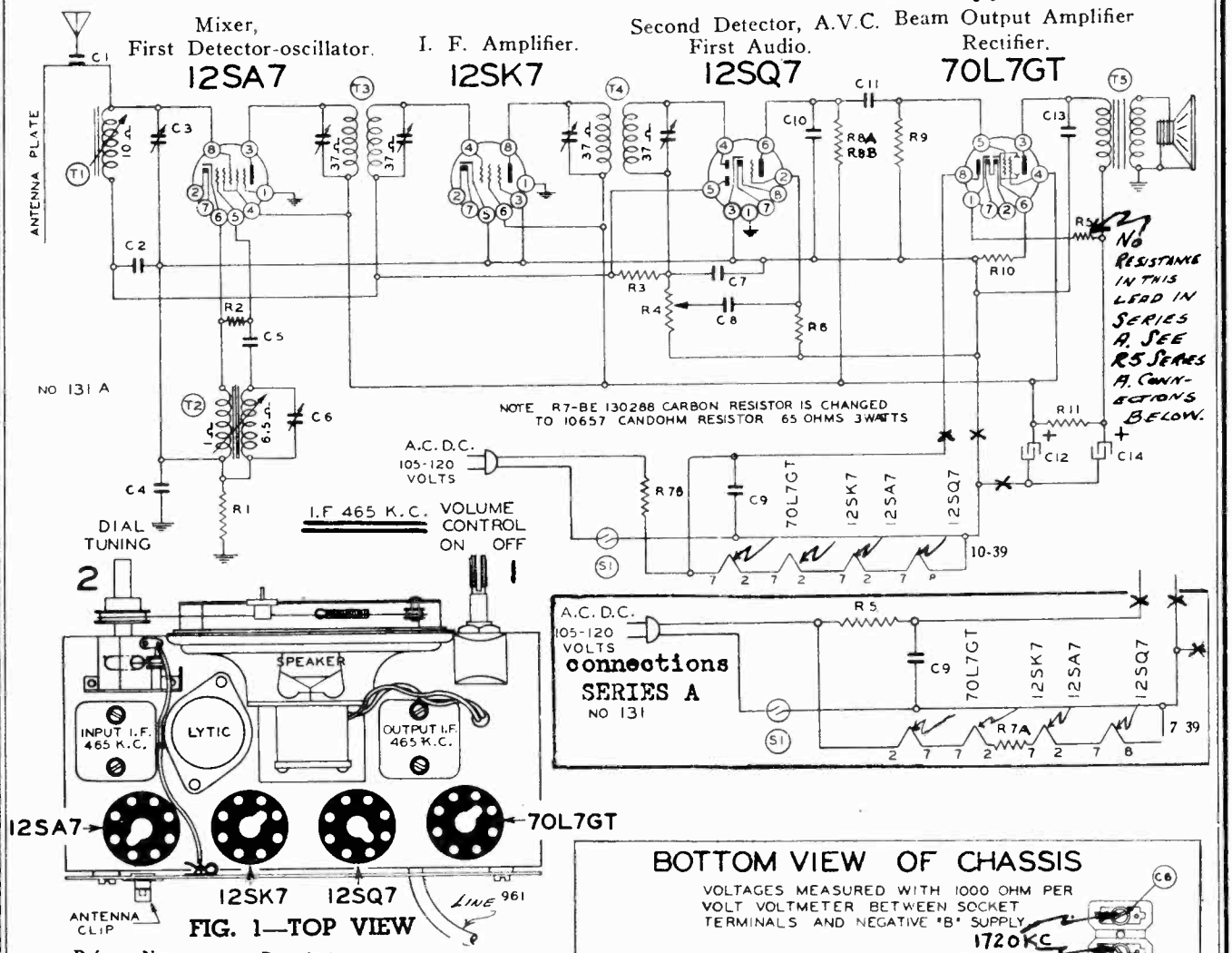
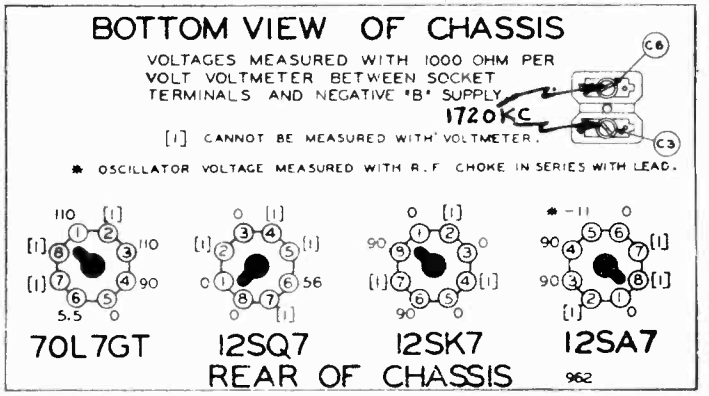


FIG. 1—TOP VIEW

Ref.	No.	Description
		RESISTORS
R1	BE130100	150M ohm—⅓ w.
R2	BE130176	20M ohm—⅓ w.
R3	BE1304	3 megohm—⅓ w.
R4	BE101188	Volume control (500M ohm)
R5	BE130293	30 ohm—1 watt
R6	BE130257	5 megohm—⅓ w.
R7A	BE130288	50 ohm—1½ watt
R8A	BE1302	75M ohm—⅓ w.
R7B	BE10657	65 ohm—3 watt
R8B	BE13011	250M ohm—⅓ w.
R9	BE13011	250M ohm—⅓ w.
R10	BE130166	150 ohm—⅓ w.
R11	BE130279	1M ohm—1 watt
		CONDENSERS
C1	BE131262	.00001 washer condenser (Ant. Clip on Back Plate)
C2	BE1009	.05 x 200 v.
C3	BE124100	Antenna Trimmer
C4	BE10091	.15 x 400 v.
C5	BE12939	.00005 mica
C6	BE124100	Osc. Trimmer
C7	BE12912	.00025 mica
C8	BE10025	.002 x 600 v
C9	BE10013	.05 x 400 v.
C10	BE1292	.0005 mica
C11	BE10011	.01 x 400 v.
C12	BE11992	20 ufd. x 150 w. v. lytic
C13	BE10011	.01 x 400 v.
C14	BE11992	40 ufd. x 150 w. v. lytic C3 and C6 in one unit C12 and C14 in one unit



BOTTOM VIEW

Power Consumption	35 Watts
Power Output	800 Milliwatts Undistorted
Sensitivity (for .05 Watts Output)	60 Microvolts Average
Selectivity	75 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range	540 to 1720 KC
Intermediate Frequency	465 KC
Speaker	4 in. P. M. Dynamic

ALIGNMENT PROCEDURE

Models No 93-BR-420B, 93BR-421B, 93BR-423B, 93BR-424B and 93BR-431B Models No. 93BR-420A and 93BR-421A

- Volume control—Maximum all adjustments.
- Connect —B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1720 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Trimmer (C6) (See bottom of Radio, Fig. 3)	Oscillator	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Iron Cores All the way out	Trimmer (C3) (See bottom of Radio, Fig. 3)	Antenna	Adjust to maximum output (See Note "A"
	1400 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Turn Dial to 1400 Kc.	Adjust position of antenna coil up or down (see Fig. 4)	Antenna Coil Adjustment	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See Fig. 3)	Antenna	Check for tracking (See Note "B"

NOTE "A"—The antenna coil assembly is made so that it is movable up or down. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antennna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

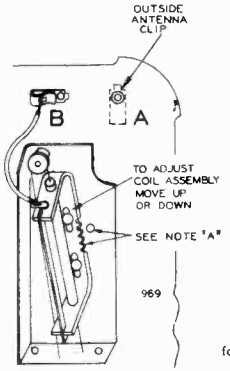


FIG. 4

MODELS 93BR-461A,-462A.

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

NOTE "A"—A 1 megohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer, (C3). The loop antenna must be disconnected from the chassis.

NOTE "B"—Remove the 1 megohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust trimmer (C2). (See note "C").

NOTE "C"—Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F. 93BR-461A ONLY	465 Kc.	.1 MFD.	Grid of 1A7G Tube	Rotor full open (Plates out of mesh)	Four trimmers on top (See Fig. 1)	Output and input I. F.	(See Note "A") Adjust to maximum output
I. F. 93BR-462A ONLY	465 Kc.	.1 MFD.	Grid of 1N5GT I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	(See Note "A") Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1A7GT	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	(See Note "A") Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 1A7G Tube	Rotor full open (Plates out of mesh)	Trimmer (C3) front section of gang (See Fig. 4)	Oscillator	(See Note "A") Adjust to maximum output
	1400 Kc.		See Note "C"	Set dial at 1400 Kc.	Trimmer (C2) rear section of gang (See Fig. 4)	Antenna	(See Note "B") Adjust to maximum output

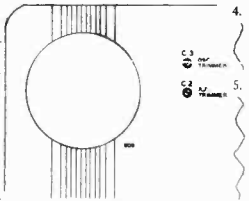


Fig. 4
MODELS 93BR-461A,-462A.

MODEL 93BR-714B (CAT.NO.62-721)

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I F.	465 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	18 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 18 Mc.	Trimmer C3	Short Wave oscillator	Adjust to maximum output
	18 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 18 Mc.	Trimmer C2 (See Fig. 4)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C6 (See Fig. 4)	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C4	Broadcast oscillator	Adjust to maximum output
	540 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Set Dial at 540 Kc.	Trimmer C5 (See Fig. 4)	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1500 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1500 Kc.	Trimmer C1	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer L1	Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the **Short Wave Band** and to the grid of the 6SA7 tube and ground terminal when setting the **Broadcast Band** oscillator end frequencies, (1600 and 540 K.C.).

The loop antenna need not be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected to the terminal board. The signal generator is connected to the "ANT." and "GND." terminals and the jumper on the terminal board connected to "EXT." terminal (See Fig. 1).

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

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

After each band is completed, repeat the procedure as a final check.

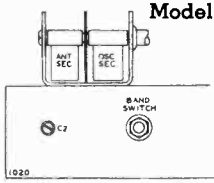
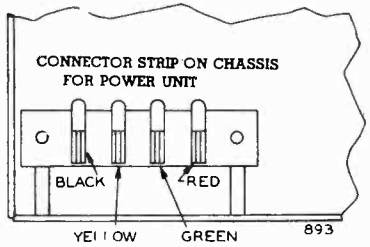


FIG. 4
FRONT VIEW

Installing the Model 62-381 Power Unit

(For 105-125 Volt 50/60 Cycle A. C. Operation)

MODEL 93BR-658A and 93BR-666A SERIES A



To install the Model 62-381 A.C. power unit proceed as follows:—

1. Remove the chassis from the cabinet, by removing the four chassis mounting bolts from the bottom of the cabinet.
2. Referring to Fig. 1, page 1, note that the 6-volt power unit is fastened to the top of the radio chassis with eight copper head screws, (six on top of chassis, and two on rear flange of chassis).
3. Remove the eight copper head screws.
4. Disconnect the four flexible leads of the power unit from the chassis connector strip. These leads clip into pin jacks. Note that the color of each flexible lead matches the color dot on the chassis pin jack connector strip.
5. Place the model 62-381 A.C. power unit on the top of the radio chassis and plug the four flexible leads into the pin jacks on the chassis connector strip.
   (a) The red lead should be plugged into the pin jack which is marked with a red dot.
   (b) The green lead connects to the pin jack which is marked with a green dot.
   (c) The yellow lead connects to the pin jack which is marked with a yellow dot.
   (d) The black lead connects to the pin jack which is marked with a black dot.
6. Mount the power unit to the chassis using the eight copper head screws.

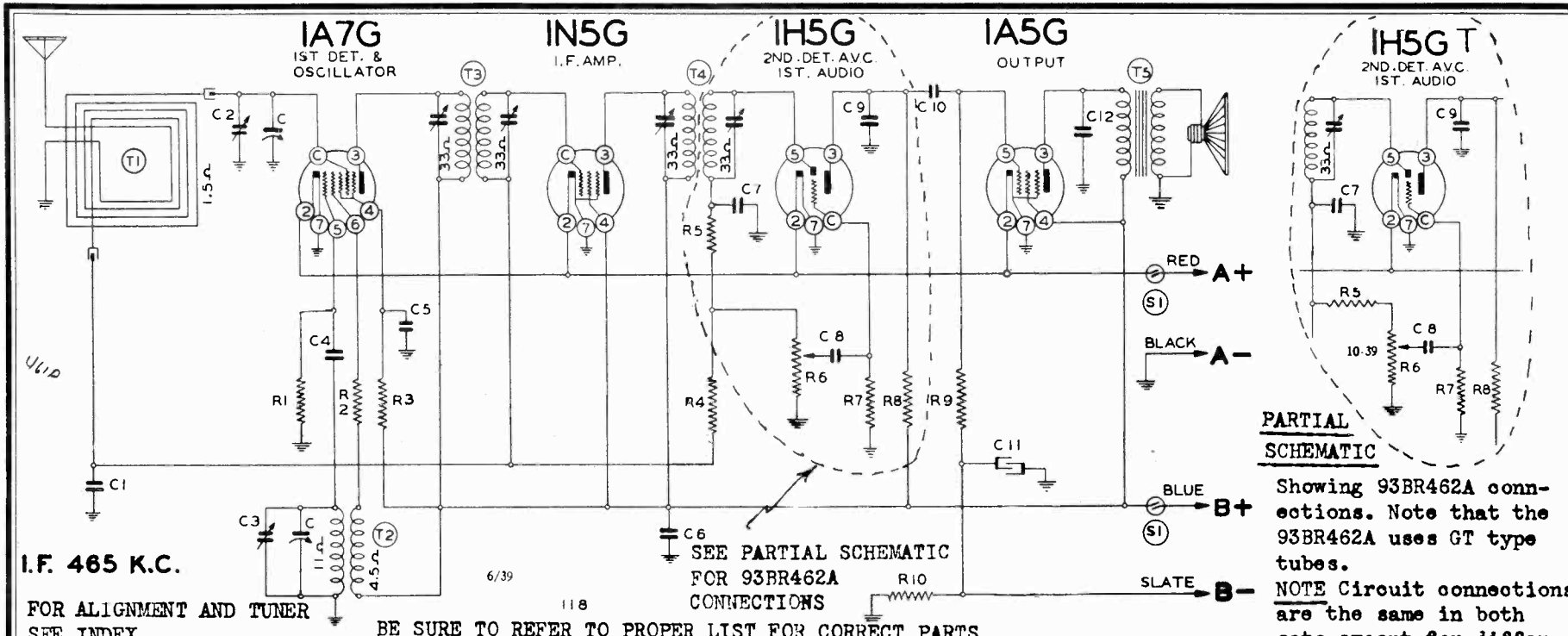
IMPORTANT:

After the A.C. power unit has been installed check the connections again to make sure you have followed the instructions correctly.

Specifications

Model No. 93BR-714B

Power Consumption	65 Watts
Power Output	2.5 Watts Undistorted
Sensitivity (for .5 Watts Output)	
Broadcast Band	30 Microvolts Average
Shortwave Band	50 Microvolts Average
Selectivity	45 KC Broad at 1000 Times Signal at 1000 KC



I.F. 465 K.C.

FOR ALIGNMENT AND TUNER SEE INDEX

SEE PARTIAL SCHEMATIC FOR 93BR462A CONNECTIONS

PARTIAL SCHEMATIC

Showing 93BR462A connections. Note that the 93BR462A uses GT type tubes.

NOTE Circuit connections are the same in both sets except for differences above.

MODELS 93BR-461A, Serial 759400 up
93BR-462A, Ser. 939800 up
Schematics, Sensitivity

BE SURE TO REFER TO PROPER LIST FOR CORRECT PARTS

MODEL 93BR-462A (SERIAL No. 939800 and UP)

Ref. No.	Part No.	Description
		RESISTORS
R1	BE1309	200M ohm - ⅓ w. - 20%
R2	BE13018	4M ohm - ⅓ w. - 20%
R3	BE13012	50M ohm - ⅓ w. - 20%
R4	BE1304	3 megohm - ⅓ w. - 20%
R5	BE13020	100M ohm - ⅓ w. - 20%
R6	BE101204	1 megohm - volume control
R7	BE130257	5 megohm - ⅓ w. 25%
R8	BE13037	750M ohm - ⅓ w. 20%
R9	BE13038	2 megohm - ⅓ w. - 20%
R10	BE13070	500 ohm - ⅓ w. - 10%
		CONDENSERS
C	BE102120	2 gang variable condenser
C1	BE1009	.05 x 200 v. - 25%
C2	BE124115	R. F. Trimmer on loop
C3		Oscillator Trimmer on Gang
C4	BE12921	.0002 mica - 20%
C5	BE1009	.05 x 200 v. - 25%
C6	BE1006	.25 x 200 v. - 20%
C7	BE1295	.0001 mica - 20%
C8	BE10012	.003 x 600 v. - 25%
C9	BE12912	.00025 mica - 20%
C10	BE10078	.01 x 200 v. - 25%
C11	BE11975	10 mfd. x 25 w. v. lytic
C12	BE10012	.003 x 600 v. - 25%
		PARTS
T1	BE111159	Loop Antenna Complete
T2	BE110139	Oscillator Coil
T3	BE108167	Input I. F. Coil
T4	BE108168	Output I. F. Coil
T5	BE105100	Output Transformer
T6	BE114183	4" P. M. Speaker
S1	BE12597	On-Off Switch No. 153

"A" Battery
1—1½ volt "A" Battery; Article No. 62-5021.

"B" Batteries
2—45 volt "B" Batteries; Article No. 62-4951.

MODEL 93BR-461A (SERIAL No. 759400 and UP)

Schematic

Ref. No.	Part No.	Description
		RESISTORS
R1	BE1309	200M ohm—⅓ w. 20%
R2	BE13018	4M ohm—⅓ w. 20%
R3	BE130208	40M ohm—⅓ w. 20%
R4	BE13038	2 megohm—⅓ w. 20%
R5	BE13020	100M ohm—⅓ w. 20%
R6	BE101173	1 megohm volume control
R7	BE130257	5 megohm—⅓ w. 25%
R8	BE13037	750M ohm—⅓ w. 20%
R9	BE13038	2 megohm—⅓ w. 20%
R10	BE13070	500 ohm—⅓ w. 10%
		CONDENSERS
C	BE102108	2 gang variable condenser
C1	BE10022	.05 x 200 v. 25%
C2		R. F. Trimmer on Gang
C3		Oscillator Trimmer on Gang
C4	BE12912	.00025 mica—20%
C5	BE1009	.05 x 200 v. 25%
C6	BE1006	.25 x 200 v. 20%
C7	BE12912	.00025 Mica 20%
C8	BE10025	.002 x 600 v. 25%
C9	BE12912	.00025 Mica 20%
C10	BE10078	.01 x 200 v. 25%
C11	BE11975	10 mfd. x 25 w. v. lytic
C12	BE10025	.002 x 600 v. 25%
		PARTS
T1	BE111131	Loop Antenna Complete
T2	BE110121	B. C. Oscillator Coil
T3	BE108151	Input I. F. Coil
T4	BE108152	Output I. F. Coil
T5	BE114165	5" Speaker with output transformer
S1		D.P.S.T. On-off switch on volume control

2—45 Volt "B" Batteries; Catalog No. 4951.
1—1½ Volt "A" Battery; Catalog No. 5022.

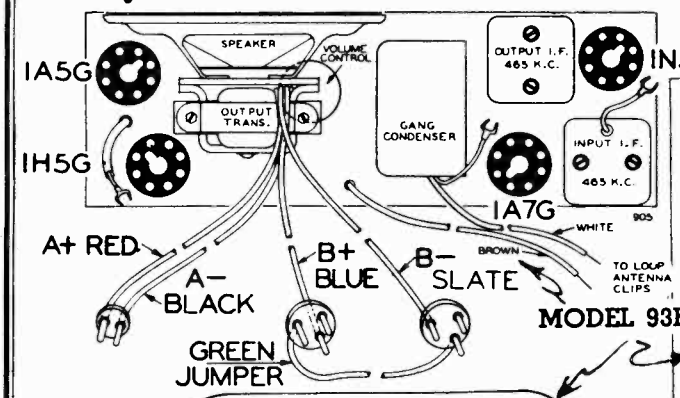
Specifications

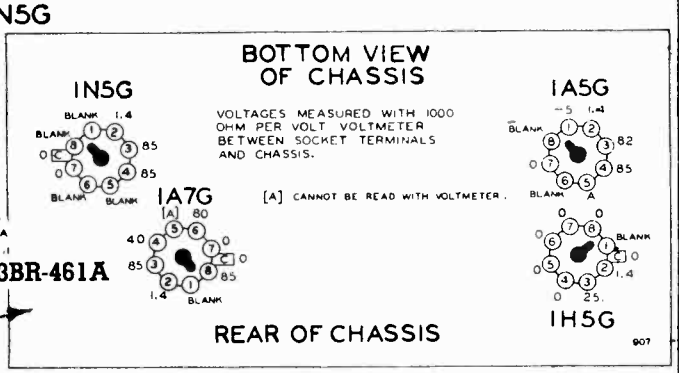
	Model No. 93BR-461A	Model No. 93BR-462A
Power Consumption	"A" Battery 200 MA; "B" Battery 8.15 MA.	"A" Battery 200 MA; "B" Battery 8 MA.
Power Output	100 Milliwatts, Undistorted	100 Milliwatts, Undistorted
Sensitivity (for .05 Watts)	60 Microvolts Average	75 Microvolts Average
Selectivity	52 Kc. Broad at 1000 Times Signal at 1000 Kc.	50 Kc. Broad at 1000 Times Signal at 1000 Kc.

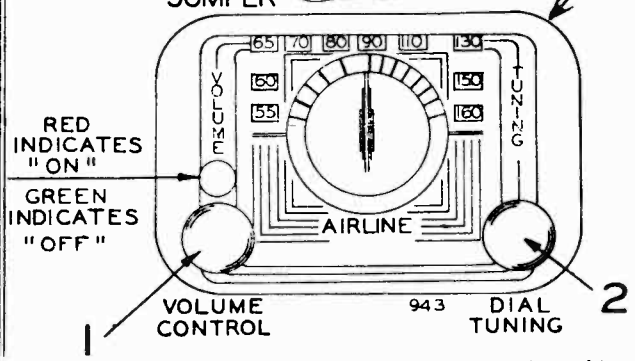
MODEL 93BR-461A
Voltage, Trimmers
Battery Conn. Socket

MONTGOMERY WARD & CO.

MODEL 93BR-462A
Voltage, Trimmers
Notes, Batt. Conn.







ADJUSTING THE ANTENNA:

IMPORTANT: **MODEL 93BR-462A**

After the batteries have been installed and the radio placed in operation, tune in a weak station around 1400 Kc. on the dial.

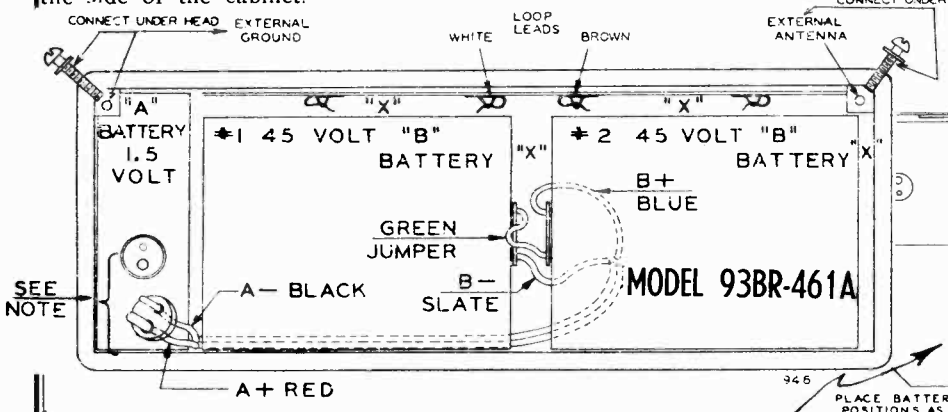
On the back of the cabinet a small adjustment screw is provided, (see C2, Fig. 2).

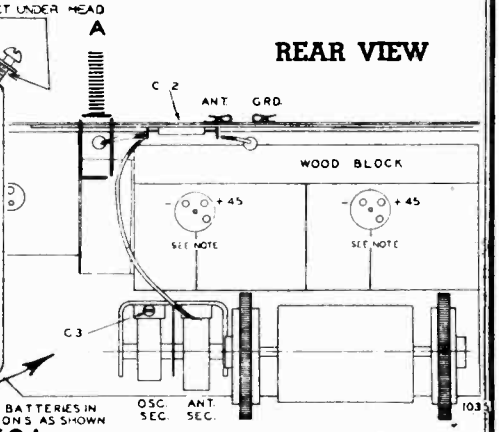
Very carefully turn this adjustment screw in or out until the station is as clear and loud as it can be made.

This adjustment should be made in any case whether the radio is used with an outside antenna and ground or whether only the built-in loop antenna is used.

NEXT:—Tune in a station around 600 Kc. on the dial and adjust adjustment screw (See A, Fig. 2). Both these adjustments are very important for best reception.

NOTE: The "A" battery should be placed in the cabinet so that the plug-in socket on the top of the battery is nearer to the side of the cabinet which is faced down than to the side of the cabinet which is facing up. Also, the "A" battery should be pushed all the way into the cabinet so that it fits between the left end of the radio chassis and the side of the cabinet.

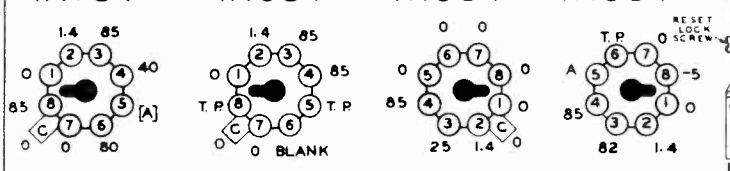




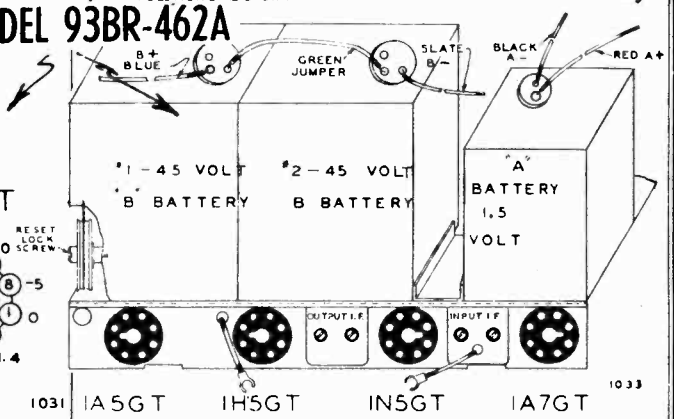
PRONG VIEW

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

[A] CANNOT BE READ WITH VOLTMETER
T. P.—TIE POINT



MODEL 93BR-462A

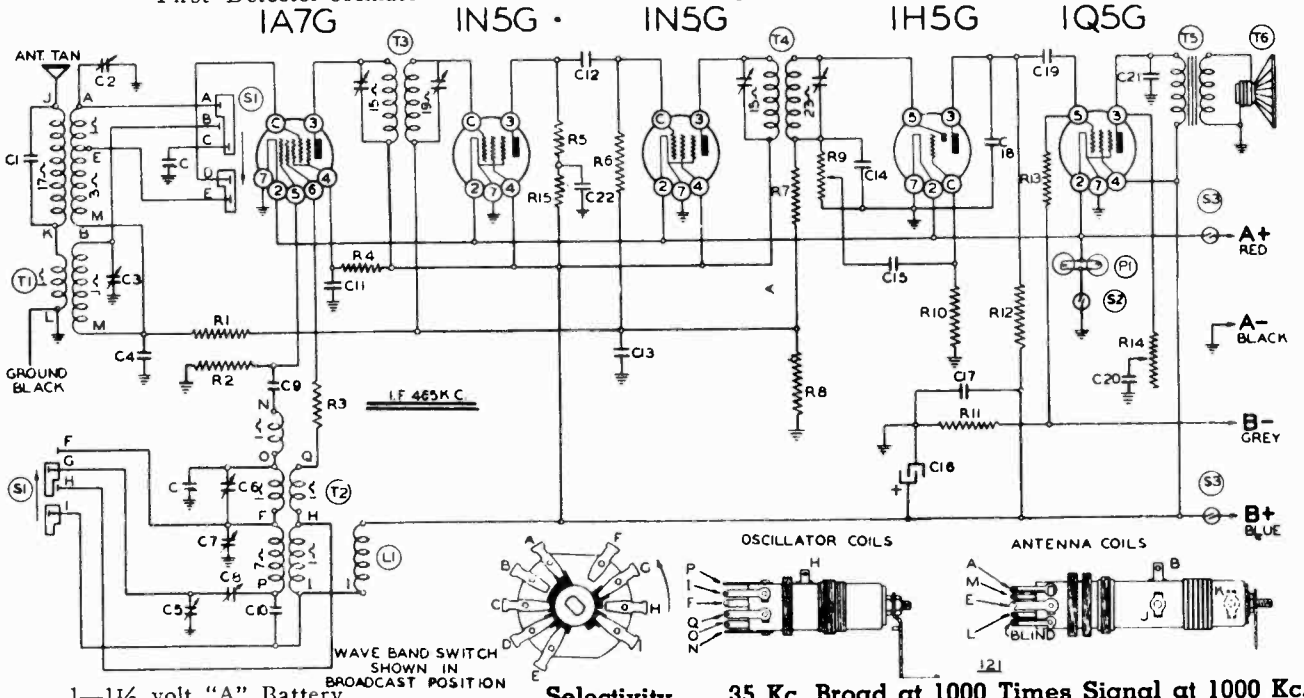


MODELS 93BR-561A, 93BR-563A
Serial 783300 up

MONTGOMERY WARD & CO.

Schematic, Socket, Voltage Alignment, Trimmers, Coils

Mixer, First Detector-oscillator 1A7G · 1st I. F. Amplifier IN5G · 2nd I. F. Amplifier IN5G · Second Detector, A.V.C., 1st Audio 1H5G · Output 1Q5G



1—1½ volt "A" Battery.
2—45 volt "B" Batteries.

Selectivity - .35 Kc. Broad at 1000 Times Signal at 1000 Kc.
Sensitivity (for .05 Watts) Broadcast—10 Microvolts Average
Short Wave—20 Microvolts Average

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

Consumption - - -
"A" Battery 300 MA; "B" Battery 11 MA.

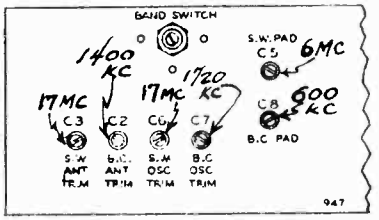
Output - - - -
190 Milliwatts, Undistorted

MODELS 93BR-561A and 93BR-563A (SERIAL No. 783300 and UP)

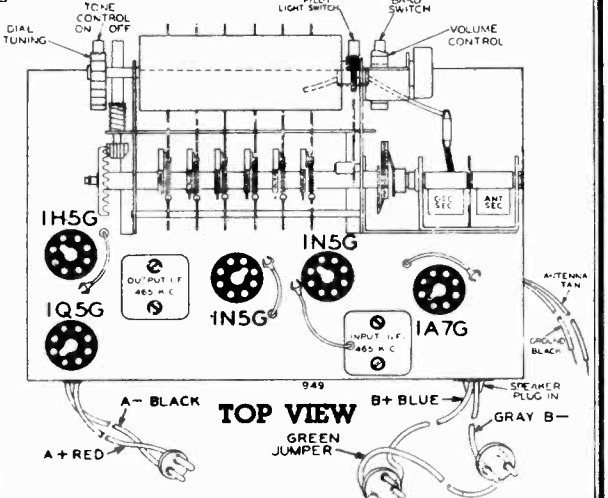
Ref. No.	Part No.	Description
		RESISTORS
R1	BE13020	100M ohm—½ w.
R2	BE1309	200M ohm—½ w.
R3	BE13056	100 ohm—½ w.
R4	BE13012	50M ohm—½ w.
R5	BE13022	5M ohm—½ w.
R6	BE13020	100M ohm—½ w.
R7	BE1304	3 megohm—½ w.
R8	BE1304	3 megohm—½ w.
R9	BE101184	1 megohm—volume control
R10	BE130225	15 megohm—½ w.
R11	BE130101	600 ohm—½ w.
R12	BE1303	500M ohm—½ w.
R13	BE13019	1 megohm—½ w.
R14	BE101179	Tone Control
R15	BE13017	10M ohm—½ w.
		CONDENSERS
C	BE102106B	2 gang variable condenser
C1	BE129132	.000125 mica
C2	BE12485	B. C. Trimmer
C3	BE12485	S. W. Trimmer
C4	BE1009	.05 x 200 v.
C5	BE12486	S. W. Pad
C6	BE12484	S. W. Trimmer
C7	BE12484	B. C. Trimmer
C8	BE12486	B. C. Pad
C9	BE12939	.00005 mica
C10	BE1009	.05 x 200 v.
C11	BE1009	.05 x 200 v.
C12	BE1292	.0005 mica
C13	BE1009	.05 x 200 v.
C14	BE12960	.00015 mica
C15	BE10012	.003 x 600 v.
C16	BE11986	8 mfd. lytic
C17	BE1006	.25 x 200 v.
C18	BE12921	.0002 mica
C19	BE10011	.01 x 400 v.
C20	BE10026	.02 x 400 v.
C21	BE10071	.004 x 600 v.
C22	BE10020	.1 x 200 v.

C2 and C3 in one unit. C6 and C7 in same unit. C5 and C8 in one unit.

		PARTS
T1	BE111120	B. C.—S. W. Antenna Coil
T2	BE110118	B. C.—S. W. Osc. Coil
T3	BE108111G	Input I. F. Coil
T4	BE108112	Output I. F. Coil
T5	BE10569	Output Transformer
T6	BE114162R	6" P. M. Speaker (for 62-563)
T6	BE114169	8" P. M. (for 62-561)
S1	BE12579	Band Switch
S2	BE12581	Pushbutton Switch—Pilot
S3		Off-on switch on tone control
P1	BE107243	(2) 1.5 v. Pilot Lights
L1	BE1233	R. F. Choke Coil

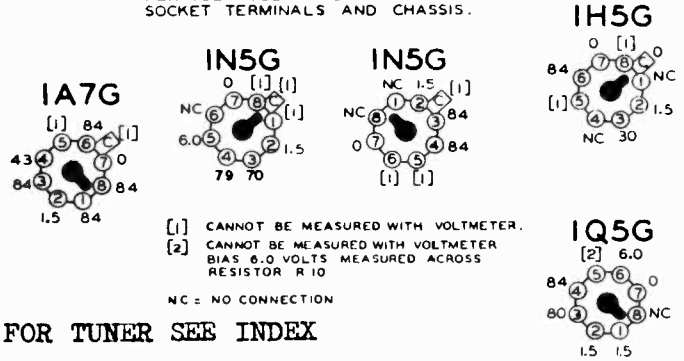


TRIMMERS ON FRONT OF CHASSIS



BOTTOM VIEW OF CHASSIS

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



[1] CANNOT BE MEASURED WITH VOLTMETER.
[2] CANNOT BE MEASURED WITH VOLTMETER BIAS 6.0 VOLTS MEASURED ACROSS RESISTOR R 10

NC = NO CONNECTION

FOR TUNER SEE INDEX

REAR OF CHASSIS

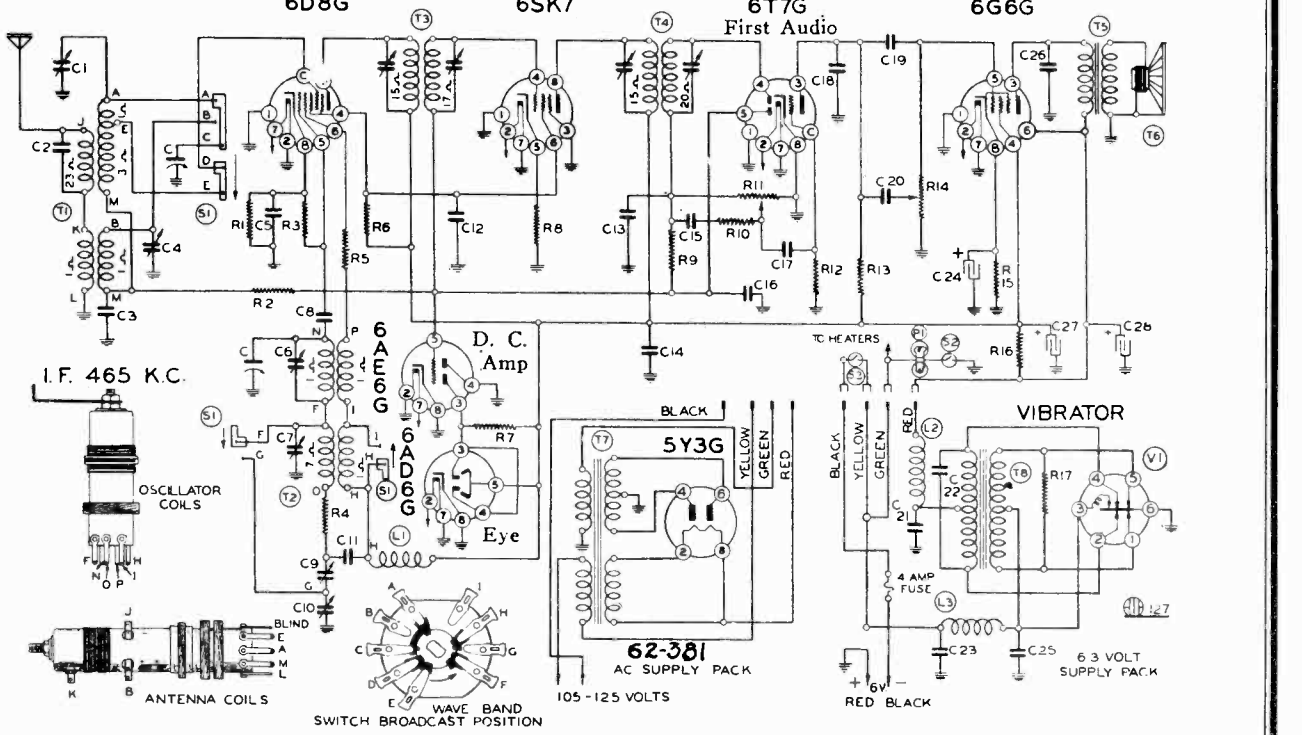
948

MODELS 93BR-658A, 93BR-666A
Series A, Serial 9F824600 up

MONTGOMERY WARD & CO.

Schematic, Voltage, Socket Alignment, Trimmers

First Detector-oscillator 6D8G | I. F. Amplifier 6SK7 | Second Detector, A.V.C. 6T7G | First Audio | Output 6G6G



MODEL 93BR-658A and 93BR-666A SERIES A (SERIAL No. 9F824600 and UP)

RESISTORS

Ref. No.	Part No.	Description
R1	BE13083	300 ohm—½ w.
R2	BE13020	100M ohm—½ w.
R3	BE13012	50M ohm—½ w.
R4	BE130286	20 ohm—½ w.
R5	BE130168	100 ohm—½ w.
R6	BE13048	15M ohm—½ w.
R7	BE13019	1 megohm—½ w.
R8	BE13097	200 ohm—½ w.
R9	BE1304	3 megohm—½ w.
R10	BE13012	50M ohm—½ w.
R11	BE101184	1 Megohm volume control
R12	BE130225	15 megohm—½ w.
R13	BE1305	300M ohm—½ w.
R14	BE101177	500M ohm tone control
R15	BE13070	500 ohm—½ w.
R16	BE130199	1500 ohm—1 watt
R17	BE130285	200 ohm—½ w.

CONDENSERS

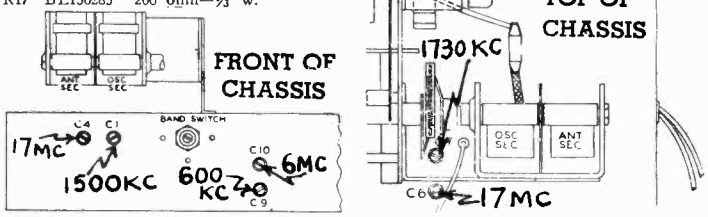
C	BE102106B	2 gang variable condenser
C1	BE12475	BC Antenna Trimmer
C2	BE129132	.000125 mica
C3	BE1009	.05 x 200
C4	BE12475	S. W. Antenna Trimmer
C5	BE10020	.1 x 200 v.
C6	BE12476	S. W. Oscillator Trimmer
C7	BE12476	B. C. Oscillator Trimmer
C8	BE12938	.00005 Mica
C9	BE12488	B. C. Series Pad
C10	BE12488	S. W. Series Pad
C11	BE10020	.1 x 200 v.
C12	BE10020	.1 x 200 v.
C13	BE1295	.0001 Mica
C14	BE10020	.1 x 200 v.
C15	BE1295	.0001 mica
C16	BE10026	.02 x 400 v.
C17	BE10019	.006 x 600 v.
C18	BE1292	.0005 mica
C19	BE10026	.02 x 400 v.
C20	BE10019	.006 x 600 v.
C21	BE10020	.1 x 200 v.
C22	BE10068	.003 x 1400 v.
C23	BE10040	.5 x 120 v.
C24	BE11985	20 mfd.—25 w. v. lytic
C25	BE10040	.5 x 120 v.
C26	BE10019	.006 x 600 v.
C27	BE11985	30 mfd.—200 w. v. lytic
C28	BE11985	30 mfd.—200 w. v. lytic

C24, 27, 28 in same unit

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

FOR TUNER
SEE INDEX

T1	BE111121	Antenna Coil
T2	BE110117	Oscillator Coil
T3	BE108111-I	Input I. F.
T4	BE108112E	Output I. F.
T5	BE10569C	Output Transformer
T6	BE114162J	6 in. P.M. speaker—for model 91BR-666A
T6	BE114169	8 in. P.M. speaker—for model 93BR-658A
T7	BE104165	AC Power Transformer
T8	BE104164	Vibrator Transformer
V1	BE12616	Vibrator
L1	BE1233	R. F. Choke
L2	BE1233	R. F. Choke
L3	BE10568	"A" Choke
S1	BE12579	Wave Band Switch
S2	BE12581	Pilot Light Switch
S3		Off-on switch on tone control
P1	BE10789	Pilot light 6.3 v.—150 ma.—T-40

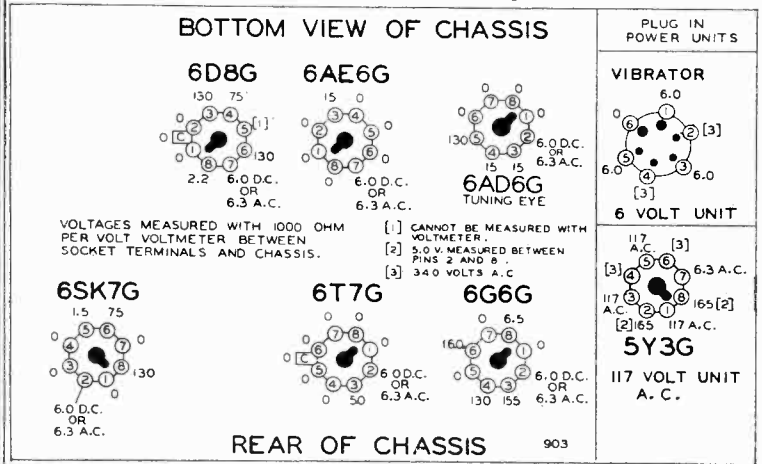


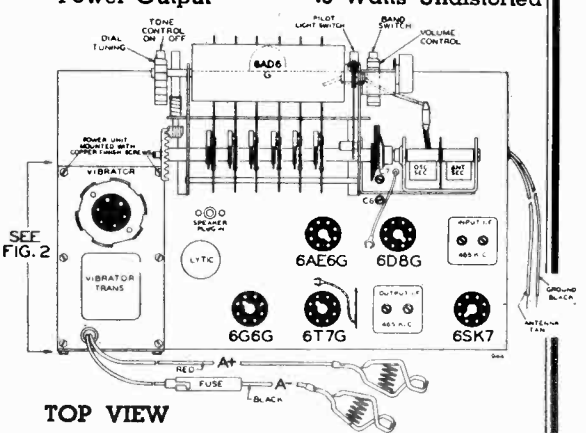
Sensitivity (for .05 Watts Output) - Broadcast 15 Microvolts Average
Shortwave 30 Microvolts Average

Selectivity - 35 KC Broad at 1000 Times Signal at 1000 KC

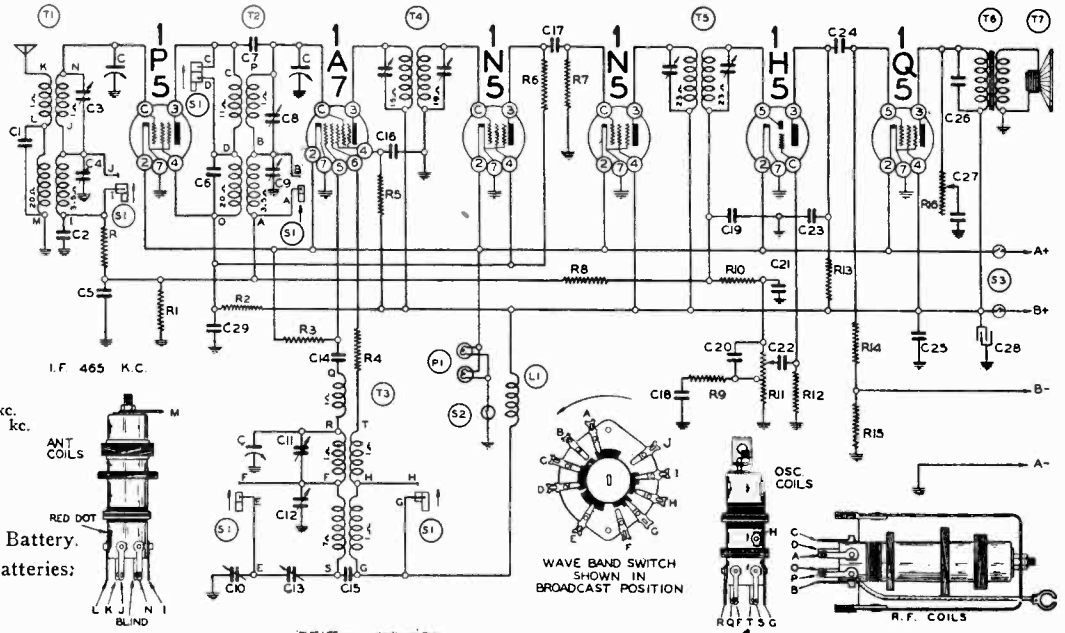
Power Consumption 2.5 Amp. at 6.3 Volts

Power Output .6 Watts Undistorted





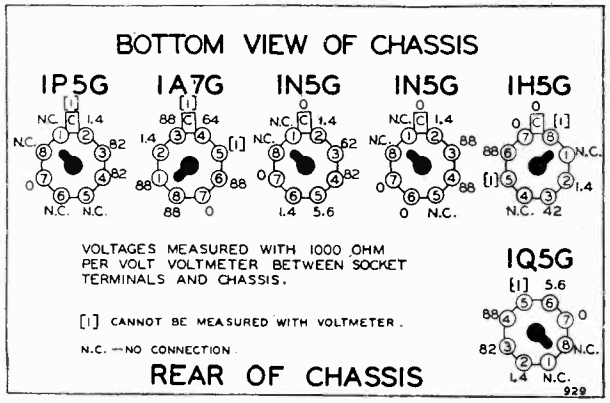
Ref. No.	Part No.	Description
		RESISTORS
R	BE130100	150M ohm—½ w.
R1	BE1304	3 megohm—½ w.
R2	BE13023	2M ohm—½ w.
R3	BE1309	200M ohm—½ w.
R4	BE13056	100 ohm—½ w.
R5	BE13012	50M ohm—½ w.
R6	BE130149	15M ohm—½ w.
R7	BE13020	100M ohm—½ w.
R8	BE1304	3 megohm—½ w.
R9	BE130149	15M ohm—½ w.
R10	BE13012	50M ohm—½ w.
R11	BE101180	1 megohm—volume control
R12	BE130225	15 megohm—½ w.
R13	BE1303	500M ohm—½ w.
R14	BE13019	1 megohm—½ w.
R15	BE130222	350 ohm—½ w.
R16	BE101179	1 megohm tone control
		CONDENSERS
C	BE102112	3 gang variable condenser
C1	BE1295	.0001 mica condenser
C2	BE10026	.02 x 400 v.
C3	BE12496	Dual Trimmer (S.W. Ant.)
C4	BE12496	Dual Trimmer (B.C. Ant.)
C5	BE1009	.05 x 200 v.
C6	BE1295	.0001 mica
C7	BE129143	.000005 ceramicon
C8	BE12495	Dual Trimmer (S.W. R.F.)
C9	BE12495	Dual Trimmer (B.C. R.F.)
C10	BE12493	Dual Compression Trimmer —S. W. Series Pad
C11	BE12494	Dual Trimmer (S.W. Osc.)
C12	BE12494	Dual Trimmer (B.C. Osc.)
C13	BE12493	Dual Compression Trimmer B. C. Series Pad
C14	BE12939	.00005 mica
C15	BE1009	.05 x 200 v.
C16	BE1009	.05 x 200 v.
C17	BE1292	.0005 mica
C18	BE10011	.01 x 400 v.
C19	BE12939	.00005 mica
C20	BE12960	.00015 mica
C21	BE12939	.00005 mica
C22	BE10012	.003 x 600 v.
C23	BE1295	.0001 mica
C24	BE10011	.01 x 400 v.
C25	BE1006	.25 x 200 v.
C26	BE10071	.004 x 600 v.
C27	BE10026	.02 x 400 v.
C28	BE11986	8 mfd. lytic—150 w. v.
C29	BE1006	.25 x 200 v.
S1	BE12580	Band Switch
S2	BE12581	Pilot Light Switch
S3		On-off switch on tone control
T1	BE111133	B.C.—S.W. Antenna Coil
T2	BE10951	B.C.—S.W. R.F. Coil
T3	BE110123	B.C. S.W. Oscillator Coil
T4	BE108111J	Input I.F. Transformer—465 kc.
T5	BE108132	Output I.F. Transformer—465 kc.
T6	BE10592	Output Transformer
T7	BE114173	6" speaker—For 93BR-659A
T7	BE114169	8" speaker—For 93BR-660A
L1	BE1233	R.F. Choke Coil
P1	BE107243	Pilot Light—1.35 v.



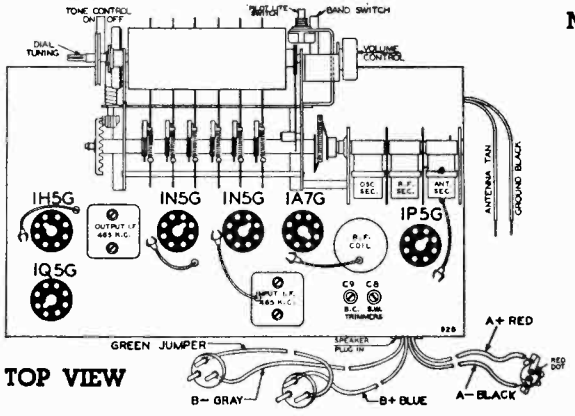
The type and function of each tube is as follows.

1—Type 1P5G R. F. Amplifier.
1—Type 1A7G Mixer, First Detector-oscillator.
1—Type 1N5G Remote Cut-Off Pentode, 1st I. F. Amplifier (465 K.C.).
1—Type 1N5G Remote Cut-Off Pentode, 2nd I. F. Amplifier (465 K.C.).
1—Type 1H5G Second Detector, A.V.C., 1st Audio.
1—Type 1Q5G Output Amplifier.

1—1½ volt "A" Battery.
2—45 volt "B" Batteries.



FOR TUNER SEE INDEX



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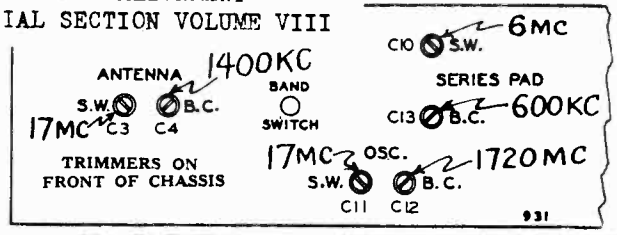
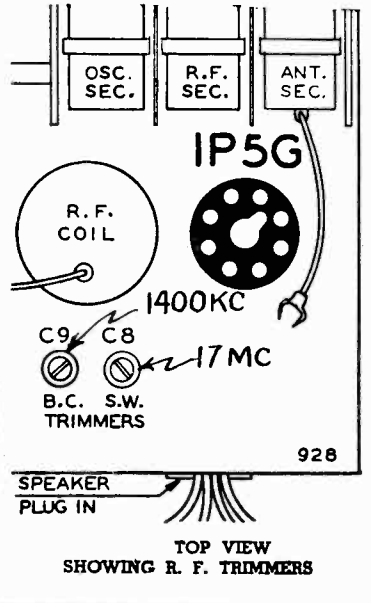
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII



MODELS 93BR-659A and 93BR-660A 122
(SERIAL No. 9F806900 and UP)



Power Consumption - - -	"A" Battery 350 MA; "B" Battery 15 MA.
Power Output - - - - - - - - - - - -	190 Milliwatts, Undistorted
Sensitivity (for .05 Watts) -	Broadcast Band—6 Microvolts Average Short Wave Band—15 Microvolts Average
Selectivity - - -	35 Kc. Broad at 1000 Times Signal at 1000 Kc.

MODELS 93BR-714A, 93BR-716A
Serial 939200 and up
93BR-715A, Ser. A
Serial 786400 and up
Schematic, Voltage, Socket

Trimmers, Alignment, Coils

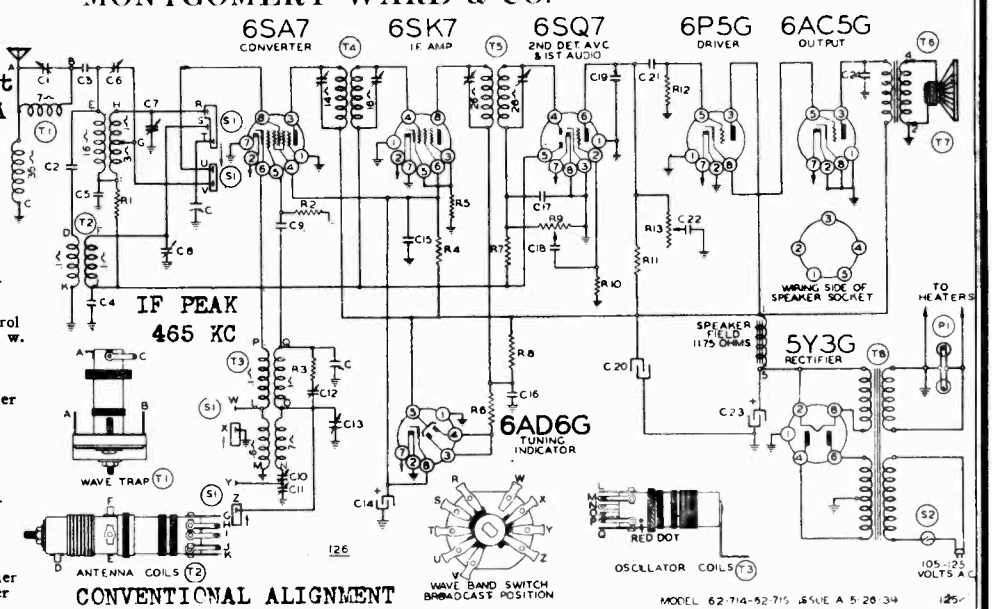
MONTGOMERY WARD & CO.

MODEL 93BR-714A, 93BR-716A
SERIES A
(SERIAL No. 939200 and UP)

No.	Part No.	Description
R1	BE13011	250M ohm—20%—½ w.
R2	BE13021	20M ohm—20%—½ w.
R3	BE130197	20 ohm—10%—½ w.
R4	BE130144	15M ohm—20%—1 watt
R5	BE130168	100 ohm—10%—½ w.
R6	BE130110	1 megohm—10%—1/10 w.
R7	BE1304	3 megohm—20%—½ w.
R8	BE13055	12M ohm—20%—2 watt
R9	BE101185	1 megohm—volume control
R10	BE130225	15 megohm—50—30%—½ w.
R11	BE1303	500M ohm—20%—½ w.
R12	BE13019	1 megohm—20%—½ w.
R13	BE101183	1 megohm—tone control
C	BE102114	2 gang variable condenser
C1	BE12467	Wave Trap Trimmer
C2	BE129140	.00016 mica—5%
C3	BE10011	.01 x 400 volt—25%
C4	BE1009	.05 x 200 volt—25%
C5	BE129131	.002775 mica—3%
C6	BE12468	Image Trimmer
C7	BE12475	B. C. Antenna Trimmer
C8	BE12475	S. W. Antenna Trimmer
C9	BE12960	.00015 Mica—20%
C10	BE12487	B. C. Series Pad
C11	BE12487	S. W. Series Pad
C12	BE12476	S. W. Oscillator Trimmer
C13	BE12476	B. C. Oscillator Trimmer
C14	BE11984	5. mfd. x 300 v. lytic
C15	BE1001	.1 x 400 v. 50—10%
C16	BE1001	.1 x 400 v. 50—10%
C17	BE1295	.0001 mica—20%
C18	BE10071	.004 x 600 v.—25%
C19	BE1292	.0005 mica—20%
C20	BE11984	15 mfd. x 350 v. lytic
C21	BE10026	.02 x 400 v.—25%
C22	BE10071	.004 x 600 v.—25%
C23	BE11984	10 mfd. x 450 v. lytic
C24	BE10019	.006 x 600 v.—25%

C7 and C8 in one unit. C10 and C11 in one unit.
C12 and C13 in one unit. C14, C20, and C23 in one unit.

T1	BE108146	Wave Trap
T2	BE111122	Antenna Coil Complete
T3	BE110115	Oscillator Coil Complete
T4	BE108111H	Input I. F. Coil—465 kc.
T5	BE108132B	Output I. F. Coil—465 kc.
T6	BE10590	Output Transformer
T7	BE114168	8" Dynamic Speaker (1175 Ohm Field)
T8	BE104139D	Power Transformer
P1	BE10794	6-8 volt pilot light T44
S1	BE12584	Band Switch
S2	BE12577	AC Switch



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

NOTE:-Refer to proper parts list for correct parts.

Power Consumption 65 Watts

Output 2.5 Watts Undistorted

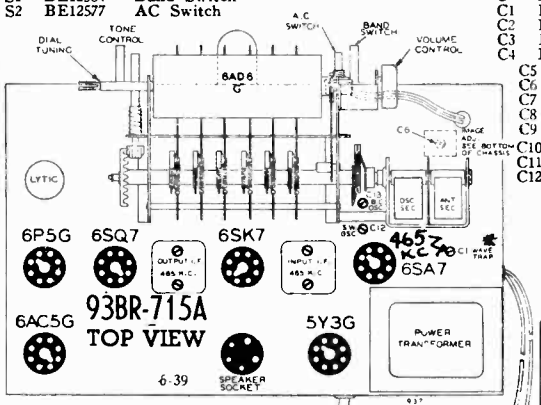
FOR TUNER SEE INDEX

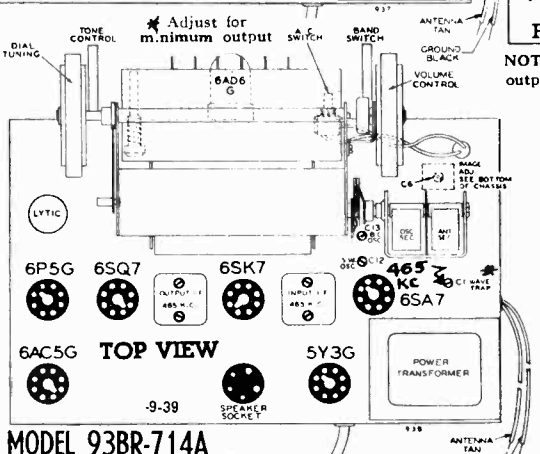
MODEL 93BR-715A SERIES A (SERIAL No. 786400 and UP)

Ref. No.	Part No.	Description
R1	BE13011	250M ohm—20%—½ w.
R2	BE13021	20M ohm—20%—½ w.
R3	BE130197	20 ohm—10%—½ w.
R4	BE130144	15M ohm—20%—1 watt
R5	BE130168	100 ohm—10%—½ w.
R6	BE130110	1 megohm—10%—1/10 w.
R7	BE1304	3 megohm—20%—½ w.
R8	BE13055	12M ohm—20%—2 watt
R9	BE101184	1 megohm—volume control
R10	BE130225	15 megohm—50—30%—½ w.
R11	BE1303	500M ohm—20%—½ w.
R12	BE13019	1 megohm—20%—½ w.
R13	BE101176	1 megohm—tone control
C	BE102106B	2 gang variable condenser
C1	BE12467	Wave Trap Trimmer
C2	BE129140	.00016 mica—5%
C3	BE10011	.01 x 400 volt—25%
C4	BE1009	.05 x 200 volt—25%
C5	BE129131	.002775 mica—3%
C6	BE12468	Image Trimmer
C7	BE12475	B. C. Antenna Trimmer
C8	BE12475	S. W. Antenna Trimmer
C9	BE12960	.00015 Mica—20%
C10	BE12487	B. C. Series Pad
C11	BE12487	S. W. Series Pad
C12	BE12476	S. W. Oscillator Trimmer
C13	BE12476	B. C. Oscillator Trimmer
C14	BE11984	5. mfd. x 300 v. lytic
C15	BE1001	.1 x 400 v. 50—10%
C16	BE1001	.1 x 400 v. 50—10%
C17	BE1295	.0001 mica—20%
C18	BE10071	.004 x 600 v.—25%
C19	BE1292	.0005 mica—20%
C20	BE11984	15 mfd. x 350 v. lytic
C21	BE10026	.02 x 400 v.—25%
C22	BE10071	.004 x 600 v.—25%
C23	BE11984	10 mfd. x 450 v. lytic
C24	BE10019	.006 x 600 v.—25%

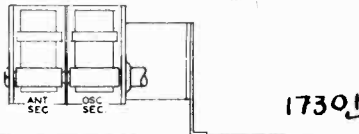
C7 and C8 in one unit. C10 and C11 in one unit.
C12 and C13 in one unit. C14, C20, and C23 in one unit.

T1	BE108146	Wave Trap
T2	BE111122	Antenna Coil Complete
T3	BE110115	Oscillator Coil Complete
T4	BE108111H	Input I. F. Coil—465 kc.
T5	BE108132B	Output I. F. Coil—465 kc.
T6	BE10590	Output Transformer
T7	BE114161	6" Dynamic Speaker (1175 Ohm Field)
T8	BE104139D	Power Transformer
P1	BE10794	6-8 volt pilot light T44
S1	BE12579	Band Switch
S2	BE12581	AC Switch





MODEL 93BR-714A
" 93BR-716A



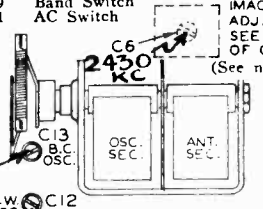
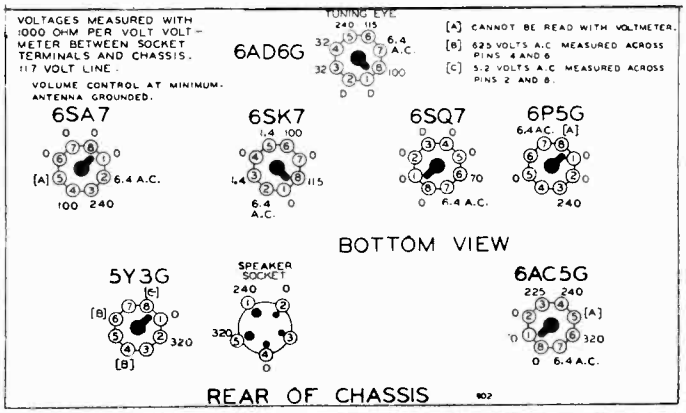


IMAGE ADJ. SEE BOTTOM OF CHASSIS (See note "B")

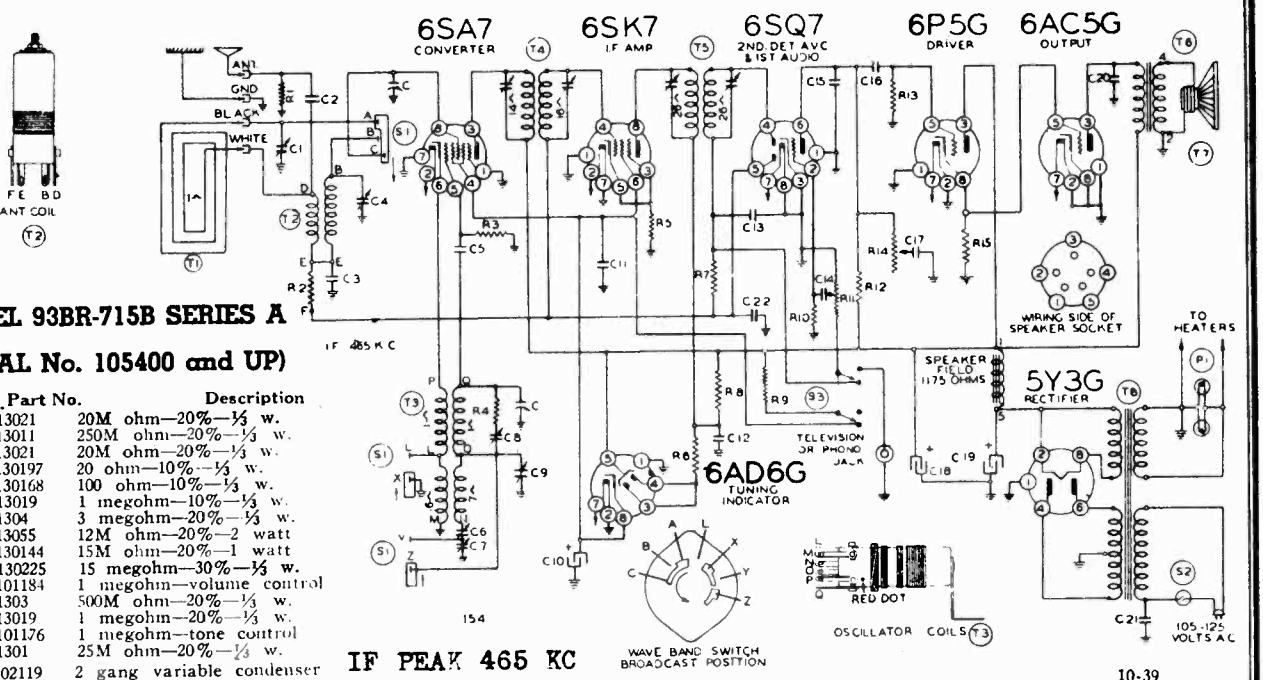
NOTE "B" 1500 KC. is the image frequency of 2430 KC. Adjust Trimmer (C6) until a **minimum** output is obtained. Trimmer (C6) is mounted on the bottom of the chassis.



MODEL 93BR-715B, Series A
Serial 105400 up
Schematic, Voltage, Socket

MONTGOMERY WARD & CO.

Trimmers, Alignment
Sensitivity, Coils



MODEL 93BR-715B SERIES A

(SERIAL No. 105400 and UP)

Ref. No.	Part No.	Description
R1	BE13021	20M ohm—20%—½ w.
R2	BE13011	250M ohm—20%—½ w.
R3	BE13021	20M ohm—20%—½ w.
R4	BE130197	20 ohm—10%—½ w.
R5	BE130168	100 ohm—10%—½ w.
R6	BE13019	1 megohm—10%—½ w.
R7	BE1304	3 megohm—20%—½ w.
R8	BE13055	12M ohm—20%—2 watt
R9	BE130144	15M ohm—20%—1 watt
R10	BE130225	15 megohm—30%—½ w.
R11	BE101184	1 megohm—volume control
R12	BE1303	500M ohm—20%—½ w.
R13	BE13019	1 megohm—20%—½ w.
R14	BE101176	1 megohm—tone control
R15	BE1301	25M ohm—20%—½ w.
C	BE102119	2 gang variable condenser
C1	BE124109	B.C. Antenna Trimmer
C2	BE10025	.002 x 600 v.—25%
C3	BE12954	.003 mica—3%
C4	BE124109	S.W. Antenna Trimmer
C5	BE12960	.00015 mica—20%
C6	BE124120	B.C. Series Pad
C7	BE129150	S.W. Series Pad
C8	BE12476	S.W. Oscillator Trimmer
C9	BE12476	B.C. Oscillator Trimmer
C10	BE11984	5. mfd. x 300 v. lytic
C11	BE1001	.1 x 400 v.—10%
C12	BE1001	.1 x 400 v.—10%
C13	BE1295	.0001 mica—20%
C14	BE10071	.004 x 600 v.—25%
C15	BE1292	.0005 mica—20%
C16	BE10026	.02 x 400 v.—25%
C17	BE10071	.004 x 600 v.—25%
C18	BE11984	15 mfd. x 350 v. lytic
C19	BE11984	10 mfd. x 450 v. lytic
C20	BE10019	.006 x 600 v.—25%
C21	BE10061	.02 x 600 v.—Bakelite
C22	BE1009	.05 x 200 v.—25%
		C8 and C9 in one unit
		C10, C18 and C19 in one unit
T1	BE111166	B.C. Loop Assembly
T2	BE111167	S.W. Antenna Coil Complete
T3	BE110141	Oscillator Coil Complete
T4	BE108166	Input I.F. Coil—465 kc.
T5	BE108132B	Output I.F. Coil—465 kc.
T6	BE10590	Output Transformer
T7	BE114161	6" Dynamic Speaker
T8	BE104139E	Power Transformer
P1	BE10794	2 6.8 volt pilot light T44
S1	BE125102	Band Switch
S2	BE12581	AC Switch
S3	BE12570	Phono or Television-Radio Switch

IF PEAK 465 KC

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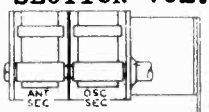
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII

SEE ALSO NOTES

ALIGNMENT PROCEDURE MODEL 93BR-714B.



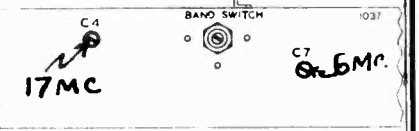
Power Consumption - - - 65 Watts

Power Output - 2.5 Watts Undistorted

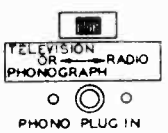
Sensitivity (for .5 Watts Output)

Broadcast Band—30 Microvolts Average

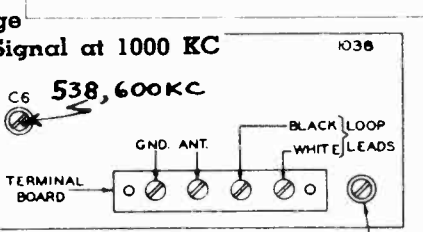
Shortwave Band—50 Microvolts Average



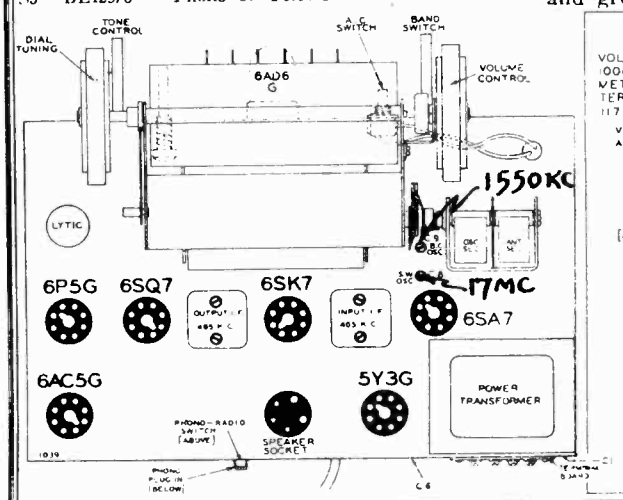
Selectivity - 45 KC Broad at 1000 Times Signal at 1000 KC

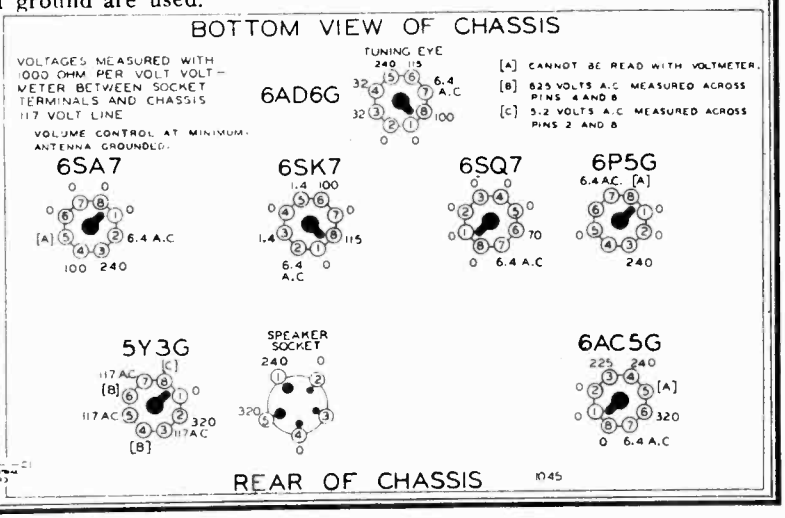


FOR TUNER SEE INDEX



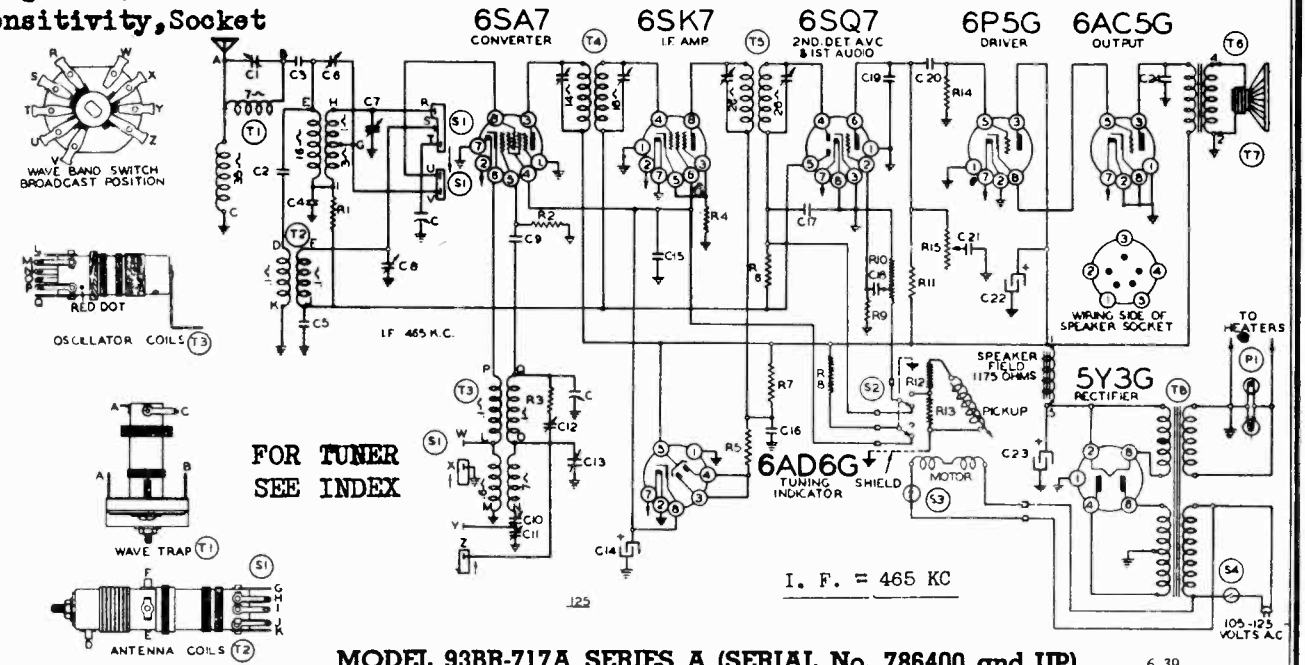
When an outside antenna is used connect the antenna to the binding screw on the rear of the chassis, marked "Ant." Connect the ground to the binding screw marked "Gnd." Do not disconnect the loop antenna when an outside antenna and ground are used.





MODEL 93BR-717A, Series A
Serial 786400 up
Schematic, Voltage, Coils
Alignment, Trimmers
Sensitivity, Socket

MONTGOMERY WARD & CO.



MODEL 93BR-717A SERIES A (SERIAL No. 786400 and UP) 6-39

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

Power Consumption - - - - - - - - 115 Watts **Sensitivity (for .5 Watts Output) - -**

Power Output - - - - - 2.5 Watts Undistorted

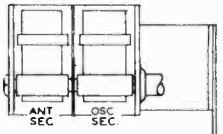
Broadcast Band—30 Microvolts Average
Shortwave Band—50 Microvolts Average

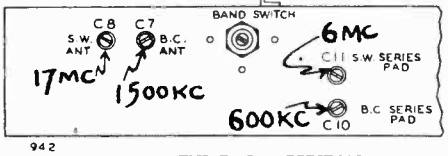
Selectivity - 45 KC Broad at 1000 Times Signal at 1000 KC

Ref. No.	Part No.	Description
R1	BE13011	250M ohm—20%—⅓ w.
R2	BE13021	20M ohm—20%—⅓ w.
R3	BE130197	20 ohm—10%—⅓ w.
R4	BE130168	100 ohm—10%—⅓ w.
R5	BE130110	1 megohm—10%—1/10 w.
R6	BE1304	3 megohm—20%—⅓ w.
R7	BE13055	12M ohm—20%—2 watt
R8	BE130144	15M ohm—20%—1 watt
R9	BE130225	15 megohm—50-30%—⅓ w.
R10	BE101184	1 megohm—volume control
R11	BE1303	500M ohm—20%—⅓ w.
R12	BE130268	350M ohm—20%—⅓ w.
R13	BE130100	150M ohm—20%—⅓ w.
R14	BE13019	1 megohm—20%—⅓ w.
R15	BE101176	1 megohm—Tone control
C	BE102106B	2 gang variable condenser
C1	BE12467	Wave Trap Trimmer
C2	BE129140	.00016 mica—5%
C3	BE10011	.01 x 400 volt—25%
C4	BE129131	.002775 mica—3%
C5	BE1009	.05 x 200 volt—25%
C6	BE12468	Image Trimmer
C7	BE12475	B. C. Antenna Trimmer
C8	BE12475	S. W. Antenna Trimmer
C9	BE12960	.00015 Mica—20%
C10	BE12487	B. C. Series Pad
C11	BE12487	S. W. Series Pad
C12	BE12476	S. W. Oscillator Trimmer
C13	BE12476	B. C. Oscillator Trimmer
C14	BE11984	5. mfd. x 300 v. lytic
C15	BE1001	.1 x 400 v. 50—10%
C16	BE1001	.1 x 400 v. 50—10%
C17	BE12939	.00005 Mica—20%
C18	BE10071	.004 x 600 v.—25%
C19	BE1292	.0005 mica—20%
C20	BE10026	.02 x 400 v.—25%
C21	BE10071	.004 x 600 v.—25%
C22	BE11984	15 mfd. x 350 v. lytic
C23	BE11984	10 mfd. x 450 v. lytic
C24	BE10019	.006 x 600 v.—25%

C7 and C8 in one unit. C10 and C11 in one unit. C12 and C13 in one unit. C14, C22, and C23 in one unit.

T1	BE108146	Wave Trap
T2	BE111122	Antenna Coil Complete
T3	BE110115	Oscillator Coil Complete
T4	BE108111H	Input I. F. Coil—465 kc.
T5	BE108132B	Output I. F. Coil—465 kc.
T6	BE10590	Output Transformer
T7	BE114161	6" Dynamic Speaker (1175 Ohm Field)
T8	BE104139D	Power Transformer
P1	BE10794	6-8 volt pilot light T44
S1	BE12579	Band Switch
S2	BE12570B	Phono-Radio Switch
S3	BE12588	Motor switch
S4	BE12581	A. C. Switch



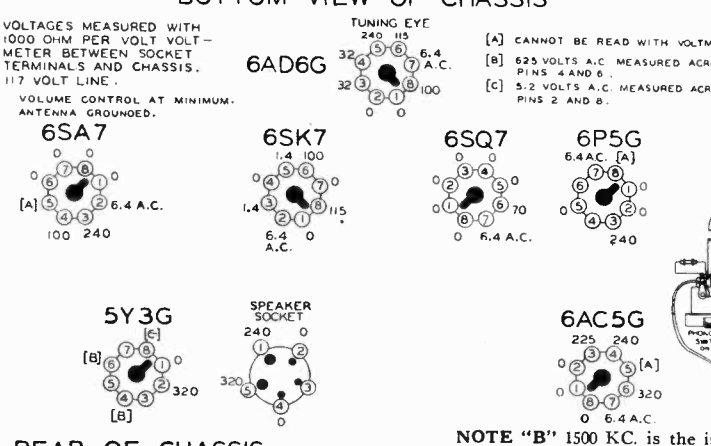


942

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLT-METER BETWEEN SOCKET TERMINALS AND CHASSIS. 117 VOLT LINE.

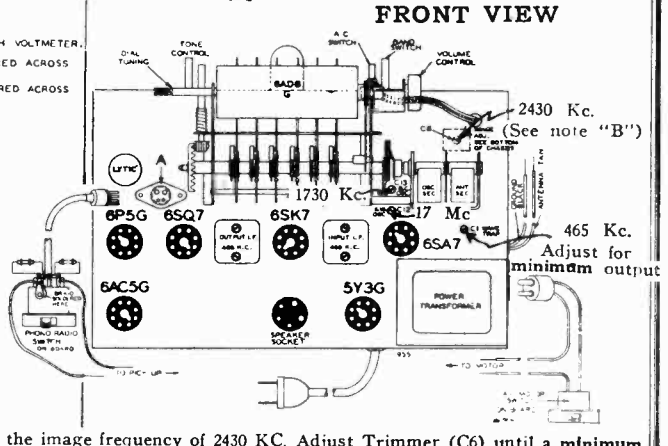
VOLUME CONTROL AT MINIMUM. ANTENNA GROUNDED.



[A] CANNOT BE READ WITH VOLTMETER.
[B] 625 VOLTS A.C. MEASURED ACROSS PINS 4 AND 6.
[C] 5.2 VOLTS A.C. MEASURED ACROSS PINS 2 AND 8.

REAR OF CHASSIS

FRONT VIEW

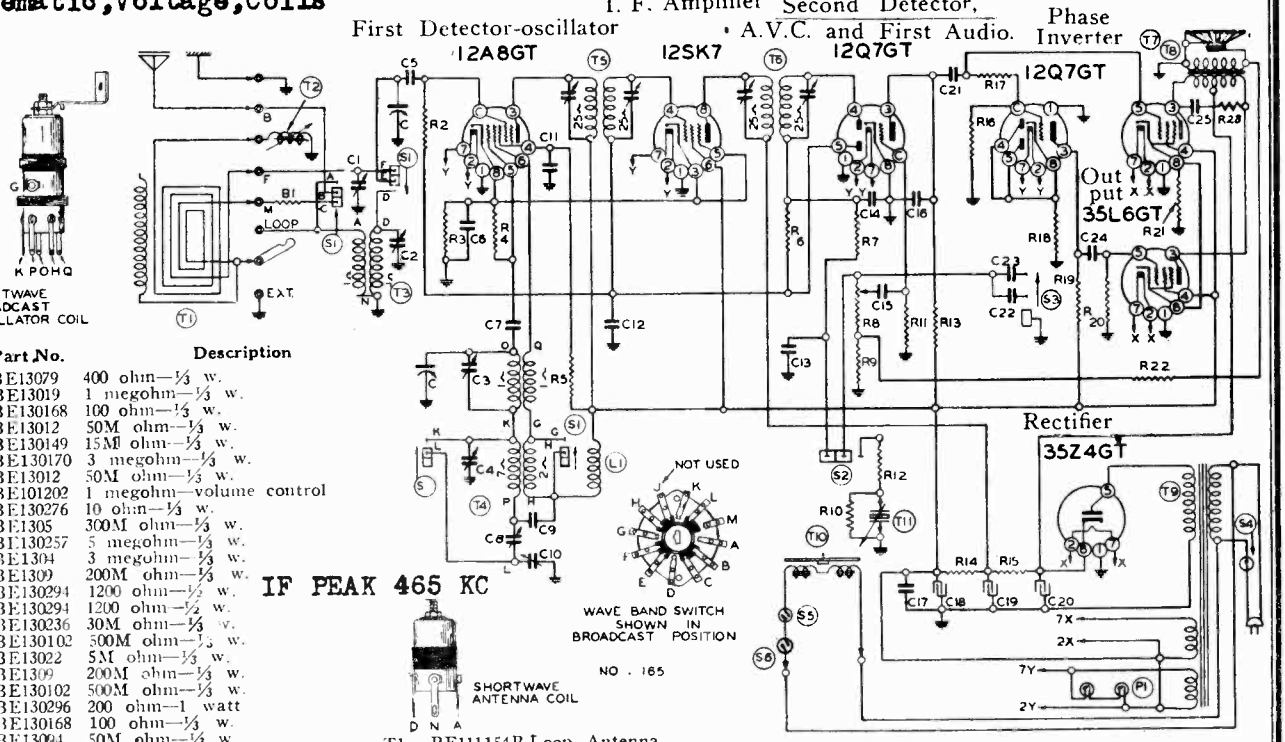


NOTE "B" 1500 KC. is the image frequency of 2430 KC. Adjust Trimmer (C6) until a minimum output is obtained. Trimmer (C6) is mounted on the bottom of the chassis.

MODEL 93BR-719A, Series A
Serial 9L228300 up
Schematic, Voltage, Coils

MONTGOMERY WARD & CO.

Alignment, Trimmers
Sensitivity, Socket



Ref. No.	Part No.	Description
R1	BE13079	400 ohm—⅓ w.
R2	BE13019	1 megohm—⅓ w.
R3	BE130168	100 ohm—⅓ w.
R4	BE13012	50M ohm—⅓ w.
R5	BE130149	15M ohm—⅓ w.
R6	BE130170	3 megohm—⅓ w.
R7	BE13012	50M ohm—⅓ w.
R8	BE101202	1 megohm—volume control
R9	BE130276	10 ohm—⅓ w.
R10	BE1305	300M ohm—⅓ w.
R11	BE130257	5 megohm—⅓ w.
R12	BE1304	3 megohm—⅓ w.
R13	BE1309	200M ohm—⅓ w.
R14	BE130294	1200 ohm—½ w.
R15	BE130294	1200 ohm—½ w.
R16	BE130236	30M ohm—½ w.
R17	BE130102	500M ohm—⅓ w.
R18	BE13022	5M ohm—⅓ w.
R19	BE1309	200M ohm—⅓ w.
R20	BE130102	500M ohm—⅓ w.
R21	BE130296	200 ohm—1 watt
R22	BE130168	100 ohm—⅓ w.
R23	BE13094	50M ohm—⅓ w.
C	BE102119	2 gang variable condenser
C1	BE124111	B.C. Adj. Trimmer (Antenna)
C2	BE124111	S.W. Adj. Trimmer (Antenna)
C3	BE124112	S.W. Adj. Trimmer (Oscillator)
C4	BE124112	B.C. Adj. Trimmer (Oscillator)
C5	BE1292	.0005 mica
C6	BE100104	.5 x 100 v.
C7	BE12939	.00005 mica
C8	BE124113	B.C. Series Pad
C9	BE1009	.05 x 200 v.
C10	BE124113	S.W. Series Pad
C11	BE10020	.1 x 200 v.
C12	BE1009	.05 x 200 v.
C13	BE1295	.0001 mica
C14	BE1295	.0001 mica
C15	BE10025	.002 x 600 v.
C16	BE1292	.0005 mica
C17	BE10020	.1 x 200 v.
C18	BE119101	20 mfd. lytic
C19	BE119101	20 mfd. lytic
C20	BE119101	40 mfd. lytic
C21	BE10026	.02 x 400 v.
C22	BE1298	.0006 mica
C23	BE100112	.001 x 200 v.
C24	BE10026	.02 x 400 v.
C25	BE1001	.1 x 400 v.

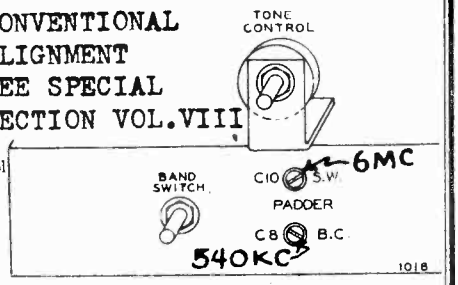
FOR TUNER SEE INDEX

T1	BE111154B Loop Antenna
T2	BE111153 Loop Adjusting Coil
T3	BE111151 S.W. Antenna Coil
T4	BE110135 B.C. S.W. Oscillator Coil
T5	BE108163 Input I.F.—465 kc.
T6	BE108173 Output I.F.—465 kc.
T7	BE114178B 10" P.M. Dynamic Speaker
T8	BE10596 Output Transformer
T9	BE104175 Power Transformer
T10	BE104194 Phono Motor Complete
T11	BE114120 Phono Pickup Arm Complete
S1	BE12594 Band Switch
S2	BE125101 Phono Radio Switch
S3	BE12598 Tone Switch Off-on switch on volume control
S5	BE12588 AC Motor Switch
S6	BE104195 Automatic stop switch
L1	BE1233 R.F. "B" Choke
P1	BE10794 2 6-8 v. pilot lights

C1 and C2 in same unit
C8 and C10 in same unit
C18, C19 and C20 in same unit
C3 and C4 in same unit

MODEL 93BR-719A SERIES A (SERIAL No. 9L228300 and UP)

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII

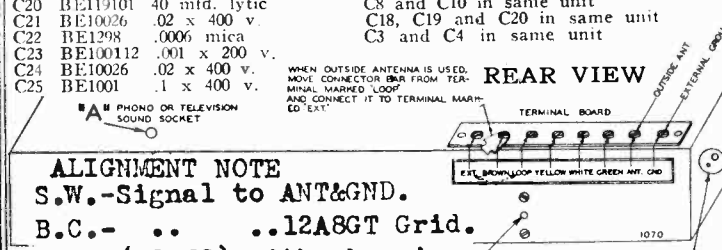


Selectivity - 50 KC Broad at 1000 Times Signal at 1000 KC

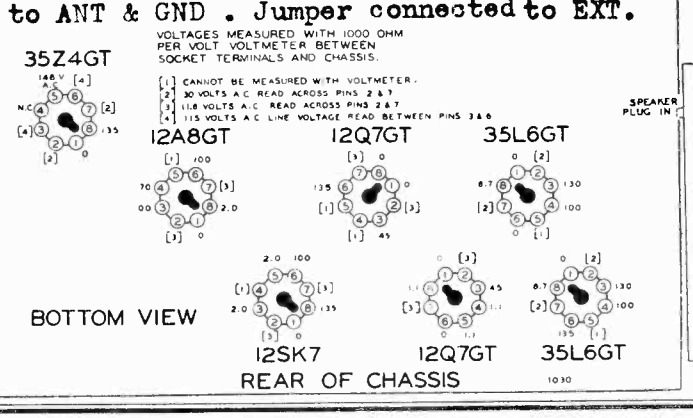
Sensitivity (for .5 Watts Output)
Broadcast Band —45 Microvolts Average
Shortwave Band—50 Microvolts Average

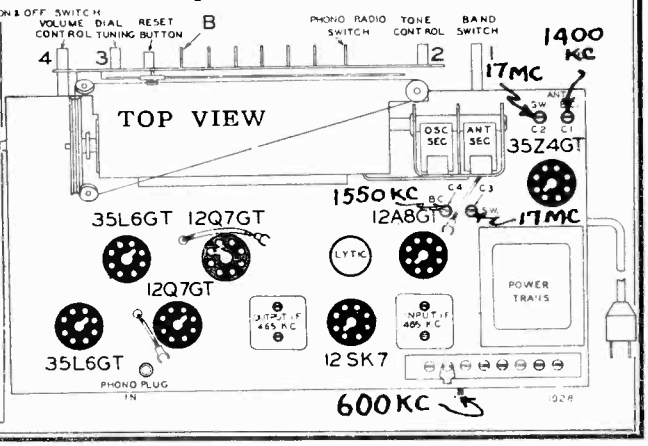
Power Consumption
(Radio Chassis Only) 55 Watts
(Radio Chassis and Phono Motor) 80 Watts

Power Output 3 Watts Undistorted



ALIGNMENT NOTE
S.W.-Signal to ANT&GND.
B.C.- .. ..12A8GT Grid.
LOOP-(C1, T2) with chassis mounted, loop connected. signal to ANT & GND . Jumper connected to EXT.

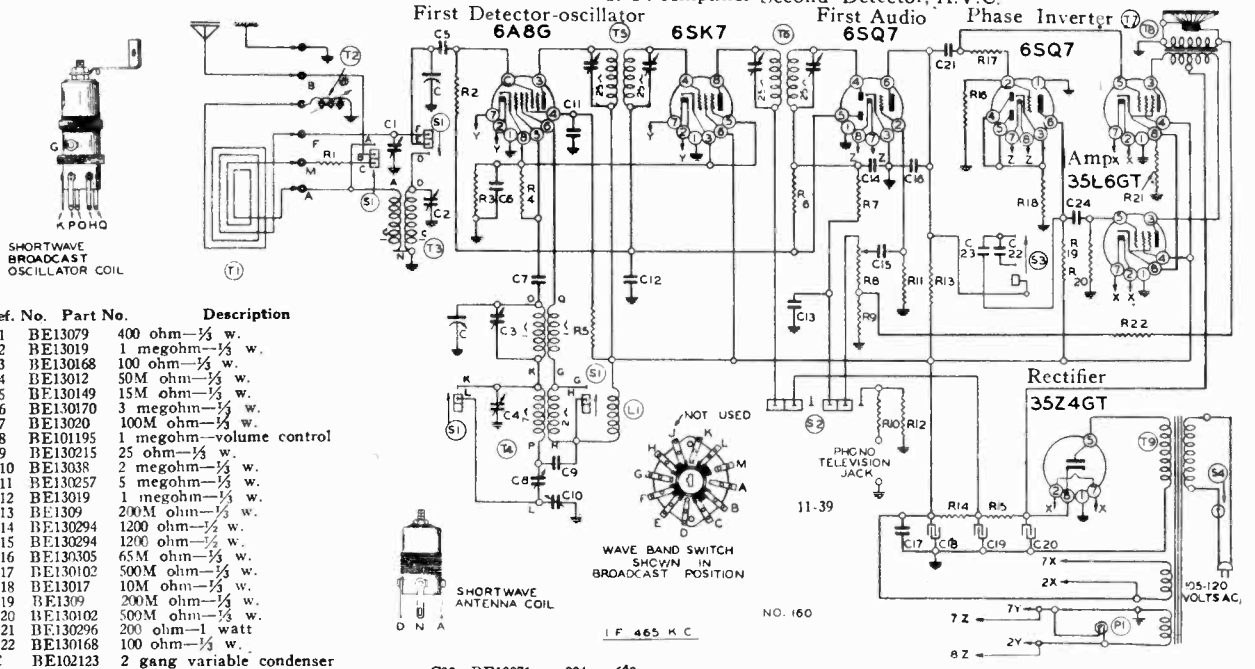




MODEL 93BR-720A, Series A
Serial 9L221400 up
Schematic, Voltage, Coils

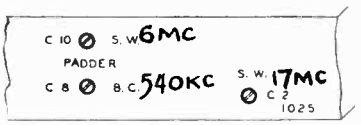
MONTGOMERY WARD & CO.

Alignment, Trimmers
Sensitivity, Socket



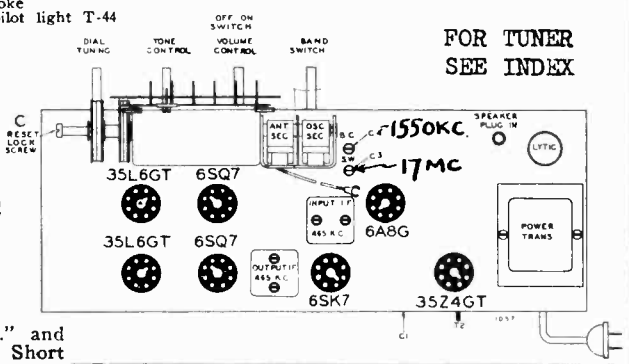
Ref. No.	Part No.	Description
R1	BE13079	400 ohm—½ w.
R2	BE13019	1 megohm—½ w.
R3	BE130168	100 ohm—½ w.
R4	BE13012	50M ohm—½ w.
R5	BE130149	15M ohm—½ w.
R6	BE130170	3 megohm—½ w.
R7	BE13020	100M ohm—½ w.
R8	BE101195	1 megohm—volume control
R9	BE130215	25 ohm—½ w.
R10	BE13038	2 megohm—½ w.
R11	BE130257	5 megohm—½ w.
R12	BE13019	1 megohm—½ w.
R13	BE1309	200M ohm—½ w.
R14	BE130294	1200 ohm—½ w.
R15	BE130294	1200 ohm—½ w.
R16	BE130305	65M ohm—½ w.
R17	BE130102	500M ohm—½ w.
R18	BE13017	10M ohm—½ w.
R19	BE1309	200M ohm—½ w.
R20	BE130102	500M ohm—½ w.
R21	BE130296	200 ohm—1 watt
R22	BE130168	100 ohm—½ w.
C	BE102123	2 gang variable condenser
C1	BE124117	B. C. Adj. Trimmer (Antenna)
C2	BE124116	S. W. Adj. Trimmer (Antenna)
C3	BE124112	S. W. Adj. Trimmer (Oscillator)
C4	BE124112	B. C. Adj. Trimmer (Oscillator)
C5	BE1292	.0005 mica
C6	BE100104	.5 x 100 v.
C7	BE12939	.00005 mica
C8	BE124113	B. C. Series Pad
C9	BE1009	.05 x 200 v.
C10	BE124113	S. W. Series Pad
C11	BE10020	.1 x 200 v.
C12	BE1009	.05 x 200 v.
C13	BE12939	.00005 Mica
C14	BE12939	.00005 Mica
C15	BE10025	.002 x 600 v.
C16	BE1292	.0005 Mica
C17	BE10020	.1 x 200 v.
C18	BE119101	20 mfd. lytic x 200 v.
C19	BE119101	20 mfd. lytic x 200 v.
C20	BE119101	40 mfd. lytic x 200 v.
C21	BE10026	.02 x 400 v.
C22	BE10071	.004 x 600 v.
C23	BE10071	.004 x 600 v.
C24	BE10026	.02 x 400 v. C8 and C10 in same unit. C3 and C4 in same unit. C18, C19 and C20 in same unit.
T1	BE111157	Loop Antenna
T2	BE111153	Loop Adjusting Coil
T3	BE111163	S.W. Antenna Coil
T4	BE110135	B.C. S.W. Oscillator Coil
T5	BE108163C	Input I.F. - 465 kc.
T6	BE108163D	Output I.F. - 465 kc.
T7	BE114182	6" P.M. Speaker
T8	BE10596	Output Transformer
T9	BE104184	Power Transformer
S1	BE125100	Band Switch
S2	BE12570	Phono Radio Switch
S3	BE12599	Tone Switch
S4	BE.	Off-on switch on volume control.
L1	BE1233	R.F. Choke
P1	BE10794	6-8 v. pilot light T-44

MODEL 93BR-720A SERIES A
(SERIAL No. 9L221400 and UP)



FRONT OF CHASSIS

FOR TUNER SEE INDEX



Power Consumption - - - - - - - - 55 Watts
Power Output - - - - - - - - 3 Watts Undistorted
Sensitivity (for .5 Watts Output) - -
Broadcast Band —35 Microvolts Average
Shortwave Band—52 Microvolts Average
Selectivity - 46 KC Broad at 1000 Times Signal at 1000 KC

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

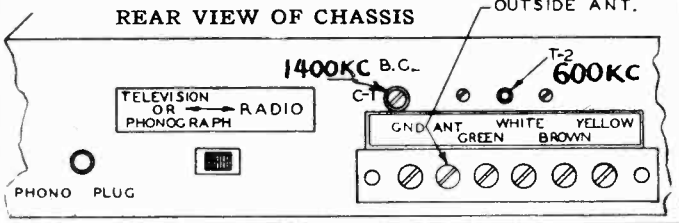
ALIGNMENT NOTES:-

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the Short Wave Band and to the grid of the 6A8G tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1550 and 540 K.C.). The loop antenna need not be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected to the terminal board. The signal generator is connected to the "ANT." and "GND." terminals.

When an outside antenna is used connect the antenna to the binding screw on the rear of the chassis, marked "Ant." Connect the ground to the binding screw marked "Gnd." Do not diseonnect the loop antenna when an outside antenna and ground are used.

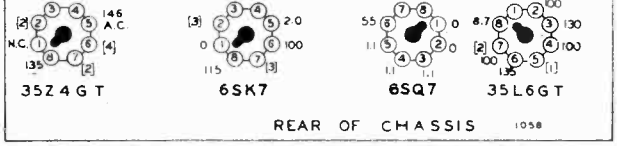
REAR VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS

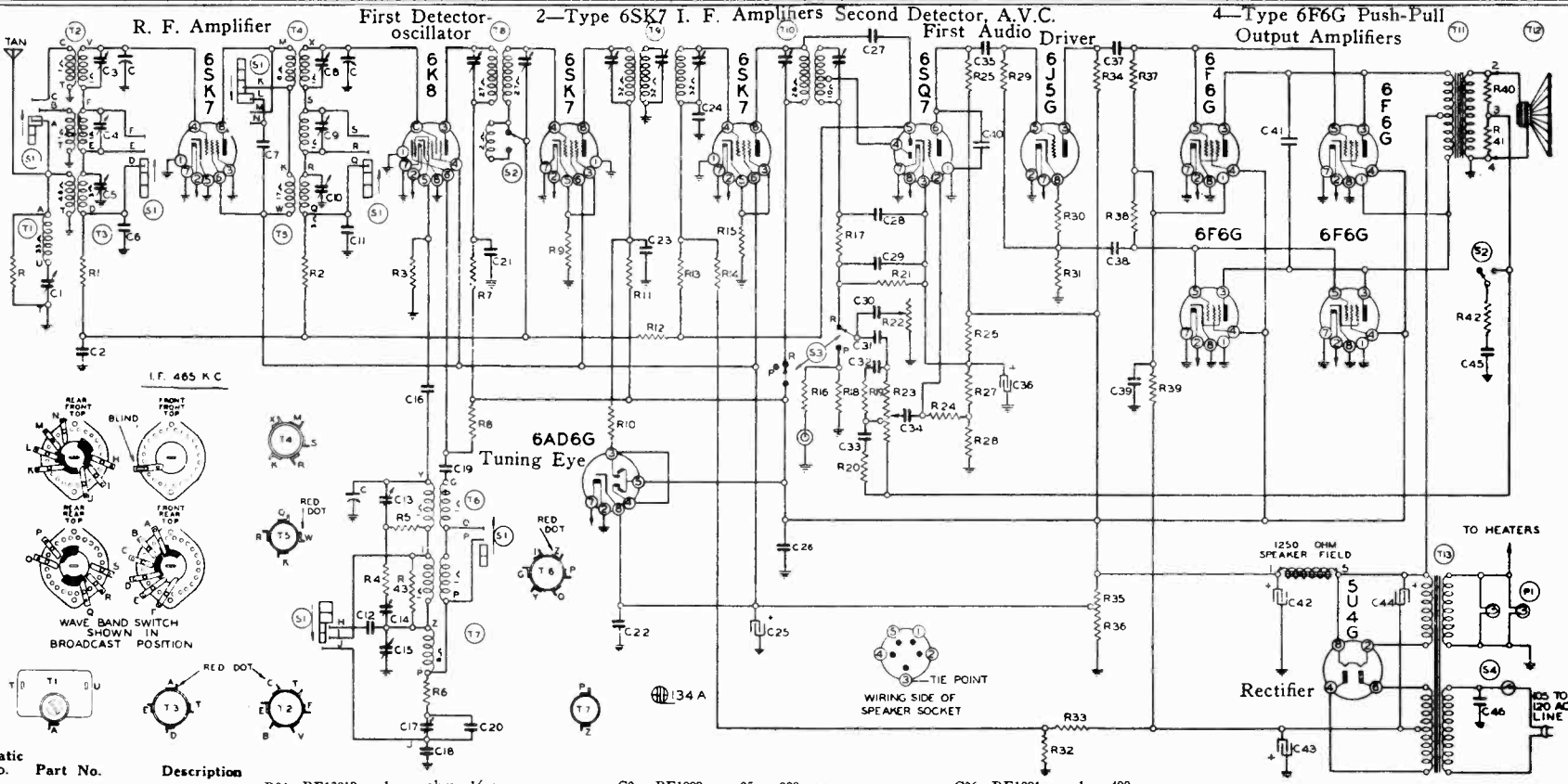
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS

[1] CANNOT BE MEASURED WITH VOLTMETER
[2] 30 VOLTS A.C. READ ACROSS PINS 2 & 7
[3] 5.9 VOLTS A.C. READ ACROSS PINS 2 & 7
[4] 115 VOLTS A.C. LINE VOLTAGE READ BETWEEN PINS 4 & 6
N.C. — NO CONNECTION
T.P. — TIE POINT
[5] 5.9 VOLTS A.C. READ ACROSS PINS 7 & 5.



MONTGOMERY WARD & CO.

MODEL 93BR-1201A, Series A
Serial 9F826400 up
Schematic



MODEL 93BR-1201A SERIES A
(SERIAL No. 9F826400 and UP)

Schematic Ref. No.	Part No.	Description
R	BE13082	10M ohm—½ w.
R1	BE13020	100M ohm—½ w.
R2	BE13011	250M ohm—½ w.
R3	BE13012	50M ohm—½ w.
R4	BE130240	30 ohm—½ w.
R5	BE130174	50 ohm—½ w.
R6	BE130197	20 ohm—½ w.
R7	BE13043	2500 ohm—½ w.
R8	BE130196	30M ohm—1 watt
R9	BE13097	200 ohm—½ watt
R10	BE13019	1 megohm—½ w.
R11	BE130219	20M ohm—1 watt
R12	BE13019	1 megohm—½ w.
R13	BE1303	500M ohm—½ w.
R14	BE1303	500M ohm—½ w.
R15	BE130294	1200 ohm—½ w.
R16	BE13011	250M ohm—½ w.
R17	BE13066	75M ohm—½ w.
R18	BE13011	250M ohm—½ w.
R19	BE130103	100M ohm—½ w.
R20	BE13076	30M ohm—½ w.
R21	BE130292	125M ohm—½ w.
R22	BE101182	50M ohm tone control
R23	BE101181	1 megohm volume control
R24	BE13019	1 megohm—½ w.
R25	BE13011	250M ohm—½ w.
R26	BE130291	50M ohm—1 watt
R27	BE130270	180 ohm—½ w.
R28	BE13071	4M ohm—½ w.
R29	BE1303	500M ohm—½ w.
R30	BE130218	5M ohm—½ w.
R31	BE130103	100M ohm—½ w.
R32	BE10655	20 ohm resistor strip—½ watt
R33	BE10655	125 ohm—resistor strip—5 watt
R34	BE130103	100M ohm—½ w.
R35	BE10656	3M ohm resistor strip 7½ w.
R36	BE10656	3300 resistor strip—3½ w.
R37	BE130103	100M ohm—½ w.
R38	BE130103	100M ohm—½ w.
R39	BE130290	300M ohm—½ w.
R40	BE13079	400 ohm—½ w.
R41	BE130168	100 ohm—½ w.
R42	BE130174	50 ohm—½ w.
R43	BE13048	15M ohm—½ w.
		R32 and R33 in same unit
		R35 and R36 in same unit
C	BE102111	3 gang variable condenser
C1	BE12499	Wave trap—adj. condenser
C2	BE1009	.05 x 200 v.
C3	BE12497	SW Antenna Trimmer
C4	BE12497	MW Antenna Trimmer
C5	BE12497	BC Antenna Trimmer
C6	BE10096	.02 x 200 v.
C7	BE12972	.0004 mica
C8	BE12498	SW—R. F. Trimmer
C9	BE12498	M.W.—R.F. Trimmer
C10	BE12498	B.C.—R.F. Trimmer
C11	BE10093	.05 x 200 v.
C12	BE129144	.00395 mica comp. type
C13	BE12498	S.W. Oscillator trimmer
C14	BE12498	M.W. Oscillator trimmer
C15	BE12498	B.C. Oscillator trimmer
C16	BE12939	.00005 mica
C17	BE12498	B.C. Series Pad adjustable
C18	BE129129	.0025 mica
C19	BE10025	.002 x 600 v.
C20	BE129104	.00045 mica
C21	BE1001	.1 x 400 v.
C22	BE1001	.1 x 400 v.
C23	BE1001	.1 x 400 v.
C24	BE10026	.02 x 400 v.
C25	BE11989	10 mfd. lytic—350 w. v.
C26	BE1001	.1 x 400 v.
C27	BE129145	.00001 ceramicon
C28	BE1295	.0001 mica
C29	BE1295	.0001 mica
C30	BE10019	.006 x 600 v.
C31	BE10022	.05 x 200 v.
C32	BE1295	.0001 mica
C33	BE10011	.01 x 400 v.
C34	BE10022	.05 x 200 v.
C35	BE10013	.05 x 400 v.
C36	BE11989	20 mfd.—25 w.v. lytic
C37	BE1001	.1 x 400 v.
C38	BE1001	.1 x 400 v.
C39	BE10048	.25 x 200 v.
C40	BE1295	.0001 mica
C41	BE10073	.008 x 1200 v.
C42	BE10310B	30 mfd.—450 w.v. lytic
C43	BE11991	40 mfd.—25 w.v. lytic
C44	BE10310C	30 mfd.—450 w.v. lytic
C45	BE100108	.5 x 100 v.
C46	BE10061	.02 x 600 v.—Bakelite
		C25 and C36 in same unit

PARTS

T1	BE108159	Wave Trap Coil
T2	BE111135	S.W.—M.W. Antenna Coils
T3	BE111134	B.C.—Antenna Coil
T4	BE10953	S.W.—M.W. R.F. Coil
T5	BE10952	B.C.—R.F. Coil
T6	BE110124	S.W.—M.W. Osc. Coil
T7	BE110125	B.C. Oscillator Coil
T8	BE108154	Input I.F.—465 kc.
T9	BE108155	Interstage I.F.—465 kc.
T10	BE108156	Output I.F.—465 kc.
T11	BE10593	Output Transformer
T12	BE114167	12" Dynamic Speaker
T13	BE104166	Power Transformer
S1	BE12582	Band Switch
S2		Hi-Fi Switch on tone control
S3	BE12570	Radio-Phono Switch
S4	BE12577B	Off-on AC Switch
P1	BE10794	2—6-8 v. pilot lights T44

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6SK7 (2nd I.F.)	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	(See Note "A") Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6SK7 (1st I.F.)	Broadcast	Rotor full open (Plates out of mesh)	Three trimmers on top (See Fig. 1)	Interstage I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	21 Mc.	400 ohms	Antenna lead	Short Wave	Set Dial at 21 Mc.	Trimmer (C13) (See Fig. 3)	Short Wave oscillator	(See Note "B") Adjust to maximum output
	21 Mc.	400 ohms	Antenna lead	Short Wave	Dial Set at 21 Mc.	Trimmers (C3 & C8) (See Fig. 3)	Short Wave antenna & R. F.	Adjust to maximum output
MIDDLE WAVE BAND	6 Mc.	400 ohms	Antenna lead	Middle Wave	Set Dial at 6 Mc.	Trimmer (C14) (See Fig. 3)	Middle Wave oscillator	Adjust to maximum output
	6 Mc.	400 ohms	Antenna lead	Middle Wave	Dial Set at 6 Mc.	Trimmers (C4) (C9) (See Fig. 3)	Middle Wave antenna and R. F.	Adjust to maximum output
	2.3 Mc.	400 ohms	Antenna lead	Middle Wave	Set Dial at 2.3 Mc.	Trimmer (C12) (See Bottom of Chassis)	Middle Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND	1730 Kc.	200 mmf.	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer (C15) (See Fig. 3)	Broadcast oscillator	Adjust to maximum output
	1500 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1500 Kc.	Trimmers (C5) (C10) (See Fig. 3)	Broadcast antenna and R. F.	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C17) (See Fig. 3)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "D")
	465 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 600 Kc.	Trimmer (C1) (See Fig. 3)	I. F. Wave Trap	Adjust for minimum output (See Note "E")

NOTE "A" I.F. Alignment as given is for use with output meter. For oscilloscope alignment; connect oscilloscope between ground and high side of 125M ohm diode load resistor on output I.F. Make same adjustments as above except readjust input I.F. trimmers in broad position for uniform expansion.

NOTE "B" Make certain that the 21MC signal and not the image has been tuned in by noting that the image falls near 20MC. on the dial scale.

NOTE "C" The middle wave oscillator series padder condenser is mounted on the bottom of the chassis at the rear of the bandswitch. When adjusting this trimmer turn the dial back and forth slightly (rock) and adjust until the peak of greatest intensity is obtained.

NOTE "D" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "E" After adjusting wavetrap trimmer (C1), go over 1730 Kc, 1500 Kc and 600 Kc adjustments again.

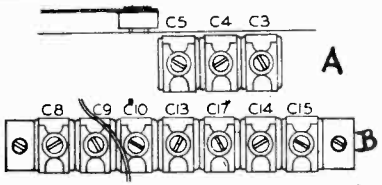


FIG. 3—TOP VIEW

Power Consumption - - - - - 165 Watts

Power Output - - 21 Watts Undistorted

Sensitivity (for .5 Watts Output) - -

Broadcast Band—4 Microvolts Average

Middle Band—6 Microvolts Average

Shortwave Band—10 Microvolts Average

FOR TUNER SEE INDEX

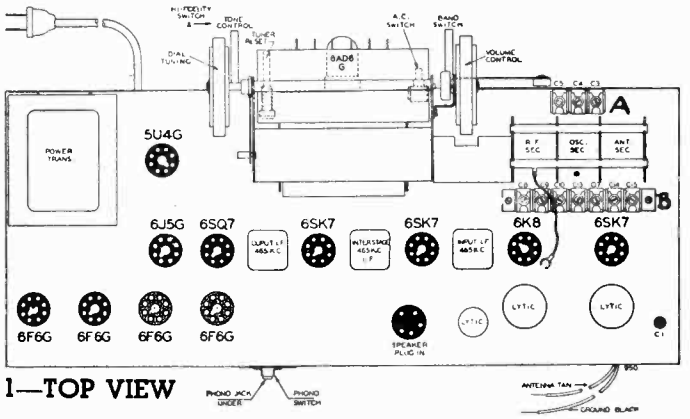
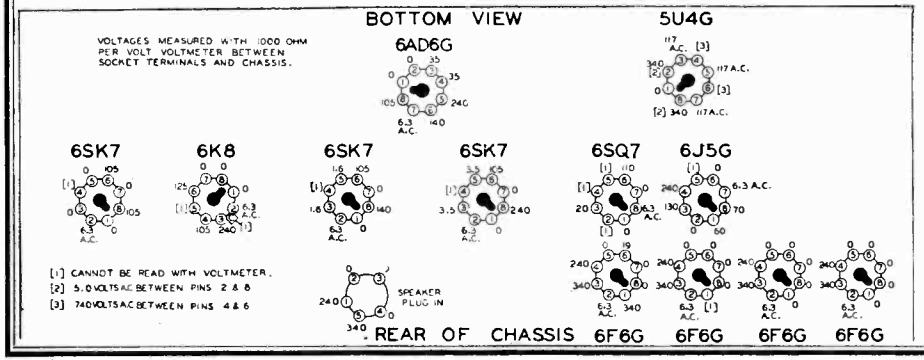
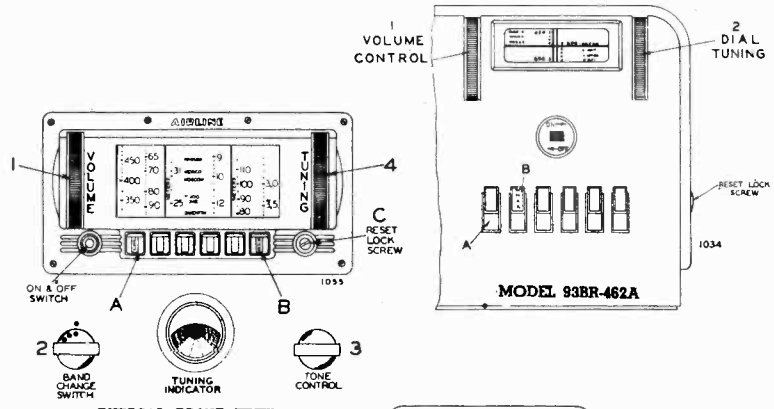


FIG. 1—TOP VIEW



MODELS 93BR-391A, 93BR-392A,
93BR-393A, 93BR-462A, 93BR-561A
93BR-658A, 93BR-659A, 93BR-714A, B
93BR-715B, 93BR-717A, 93BR-719A
93BR-720A, 93BR-1201A
Tuner Data



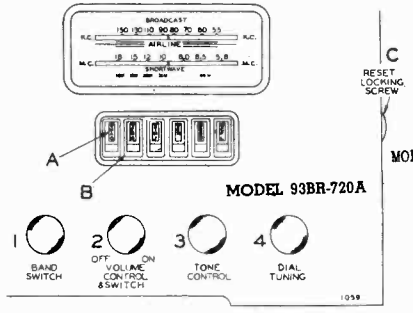


FIG. 2—FRONT VIEW

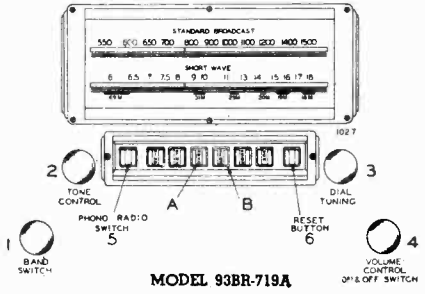


FIG. 3.

MODELS:-93BR-391A,-392A,-393A,-462A,-561A,-563A,-658A,-666A,-659A,-660A,-714A,-716A, 93BR-714B (CAT.NO.62-721), 93BR-715A,-715B(CAT. NO.62-722),-717A,-720A,-1201A.

Procedure for Setting the Automatic Push Buttons

IMPORTANT—Read carefully before setting the automatic push buttons:

There are six push buttons by means of which six stations may be selected, (See "A" Fig. 2). Make a list of local stations or stations you tune in regularly; any number up to and including six.

On the front of each automatic push button an opening is provided for inserting the call letter tabs, (See "B" Fig. 2).

Insert the call letter tabs in the rectangular openings of each of the automatic push buttons. One of the small celluloid tabs supplied should be inserted into place over each of the station call letter tabs.

NOW, PROCEED AS FOLLOWS:

Unlock the Tuner Mechanism.

(NOTE:—The automatic tuner mechanism is locked tight when radio is shipped from the factory.)

1. Remove the snap-in button from the dial escutcheon plate on the front panel of the radio (see "C," Reset Lock Screw, Fig. 2). If the snap-in button will not come out easily using your fingers, pry it off with a screwdriver or a knife, being careful not to mar the finish on the escutcheon plate.
2. Unlock the tuner mechanism by inserting a screwdriver through the hole in the panel. Press in and loosen the locking screw by turning it to the left as far as it will turn without forcing.
   You will note that as the locking screw is turned it will turn easily until the dial reaches its stop and then a slight amount of force will be required to actually start unlocking the tuner mechanism. Beyond this point, the locking screw will turn quite easily again until the tuner mechanism is completely unlocked. At this point do not force the locking screw any further. The tuner mechanism is now unlocked.

SETTING PUSH BUTTONS

1. Press in all the way any one of the automatic tuner push-buttons. Holding it in firmly, tune in by means of the Dial Tuning Control, No. 4, the station indicated on the station call letter tab on this push button. Move the Dial Tuning Control very slowly up and down (while still holding the automatic tuner push button in firmly), noting the width of the shadow on the screen of the cathode-ray tuning eye. Minimum width on the tuning eye indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.
2. Press in another tuner push button. Holding it in firmly, carefully tune in the station indicated on the call letter tab on this push button.
3. Follow this procedure until you have selected all of your favorite stations.

   (NOTE:—If the dial mechanism works hard or has a tendency to slip when setting up a station for one of the push buttons, it is due to the tuner mechanism not being unlocked all the way. Loosen the reset locking screw. The Dial Tuning Control should turn the dial drum freely with a push button pushed in.)

LOCKING THE TUNER MECHANISM:

1. To lock the tuner mechanism insert a screwdriver through the hole in the escutcheon panel and press in and turn the reset locking screw to the right until it cannot be turned any further without forcing it.
2. This will lock the tuner mechanism and all the stations that have been set up on the push buttons will be locked in place for automatic tuning.

Press in any one of the push buttons and—YOUR FAVORITE STATION IS SELECTED.

MODEL:- 93BR-719A

Procedure for Setting the Automatic Pushbuttons

1. Make a list of six stations you tune in regularly. There are six pushbuttons on the front of the radio by means of which six stations may be tuned automatically (See "B," Fig. 3.)

2. Punch out the call letters of the stations you have selected from the set of station call letter tabs supplied.

On the front of each automatic tuner button an opening is provided for inserting the call letter tabs, (see "A," Fig. 3).

Insert the call letter tabs in the rectangular openings in each of the automatic tuner pushbuttons. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

3. Stations may be set up in any sequence desired.

NOW, PROCEED AS FOLLOWS:

1. Pull the "Reset" button all the way out (see control No. 6, Fig. 3), and rotate the button to the left (counter-clockwise) until it cannot be turned any further.

You will note that as the button is rotated it will turn easily until the pointer reaches the end of the dial scale and then a slight amount of force will be required to actually start unlocking the tuner mechanism. Beyond this point the button will turn quite easily again until the tuner mechanism is completely unlocked. At this point do not force the button any further. The tuner mechanism is now unlocked.

(NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)

2. Push in all the way any one of the pushbuttons and at the same time push in firmly on the dial tuning knob. Both the dial tuning knob and the pushbutton should be pushed hard enough to make them stay latched in.

You may find it necessary to rotate the dial tuning knob slightly when pushing it in to make certain that the gears mesh properly.

3. Both the pushbutton and the Dial Tuning Knob are now latched in. Do not hold the pushbutton in by hand while tuning in a station. Tune in by means of the dial tuning knob the station indicated on the station call letter tab on the push-button which is latched in. Turn the dial tuning knob very slowly back and forth until the station is clearest. The station will then be accurately tuned in.

4. Push in all the way another pushbutton, at the same time push the dial tuning knob in so that both the pushbutton and the dial tuning knob are latched in together. Tune in the station indicated on the call letter tab on this pushbutton.

5. Follow this procedure until you have tuned in all of your favorite stations.

6. Pull the "Reset" button all the way out and rotate the button to the right (clockwise) until it cannot be turned any further. This will lock the automatic tuner mechanism and the stations you have set up for automatic tuning will be locked in place.

CHANGING STATIONS:

If you should desire to change any station you selected to another, pull the "Reset" button all the way out and rotate the button to the left (counter-clockwise) and unlock the tuner mechanism. Select the new station as explained.

(NOTE:—If the dial mechanism works hard when setting up a new station for one of the automatic tuner pushbuttons, it is due to the tuner mechanism not being unlocked all the way. Pull the "Reset" button out all the way and rotate the button to the left (counter-clockwise) until it will turn no further. The dial mechanism should work freely with a tuner push-button latched-in.

After you have selected the new station, pull the "Reset" button all the way out and rotate the button to the right (clockwise) to lock the tuner mechanism. Be sure the button is turned until it will turn no further.

The automatic tuner buttons are now set up for quick tuning.

MODELS 93WG-1103 and 93WG-1104 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.

IMPORTANT—Follow procedure in the order shown.

The following equipment 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., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C23) & (C24) 1st I.F. (C20) & (C21)
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C6) Rock Rotor—See Note A
RANGE C 5400 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C11)
5000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C7)
RANGE B 1600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1400 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note B	Ant. Range B (C4) Int. Range B (C8)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C13) Rock Rotor—See Note A

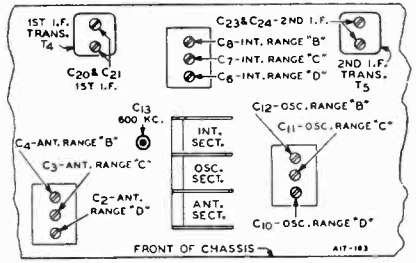
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE B—If the pointer is not at 1400 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1400 KC mark, and tighten the clamps.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.



Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.

Procedure for Setting the Station Buttons

FOR MODELS 93WG-382, 04WG-725, 93WG-754,-755, 93WG-800,801,805 (LOOP MODELS) 93WG-801,802,805, 93WG-1000,1001 and 93WG-1000,1001 (LOOP MODELS)

Selecting the Stations to be Set

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

Setting a Station Button

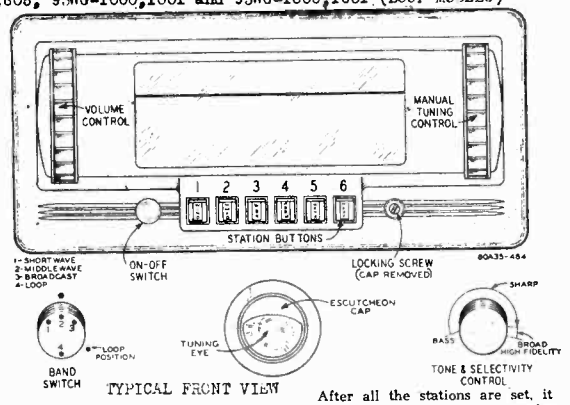
Turn the manual tuning control so that the dial moves toward 1700 KC until the stop is reached.

At the right side of the escutcheon (from the front) will be seen a cap which covers a hole in the escutcheon —See illustration. Pull off this cap.

At the end of the tube in back of the hole in the escutcheon is the locking screw. Using a small handled screwdriver, unlock the mechanism by turning this screw in a counter-clockwise direction several turns.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning control using the tuning eye as a guide.



TYPICAL FRONT VIEW

With one hand, hold the manual tuning control to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in*. It is better to start with button No. 1.

Hold *this* button all the way in. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning control a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way in.*

Release the button slowly after the station is tuned in.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Carefully tune in the second station on your list. Then hold the tuning control and push the second button slowly and firmly all the way in. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning control so that the dial moves toward 1700 KC until the stop is reached. Then, with a SMALL HANDLED screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads. Replace the cap over the hole.

Remove the correct station call letter tabs from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

MODEL 93WG-510

Drive Cord Replacement

Remove dial lamp socket and bracket from dial mounting plate.

Remove tension spring from pulley. Double new drive cord and knot both ends to same loop on tension spring. There should be a distance of 13 inches between knot and looped end of cord.

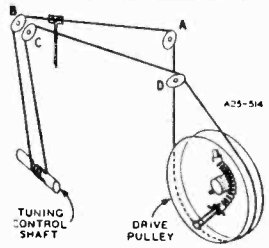
Secure other end of spring to hook on pulley. Thread looped end of cord, starting from inside of drive pulley, through hole in rim of drive pulley.

Turn gang condenser to completely closed position. Remove any twists in doubled cord. Pass one portion of cord over pulleys A and B as shown in illustration. Then wind 3½ turns counter-clockwise (from rear of chassis) around tuning control shaft—See illustration.

Loop ½ turn around bottom half of drive pulley. Continue cord over pulley D. Pull remaining portion of cord and place over pulley C.

Dial Pointer Attachment—Tune in a station of known frequency. Set the pointer at this frequency on the dial scale and secure pointer to cord —See illustration.

MODEL 93WG-510



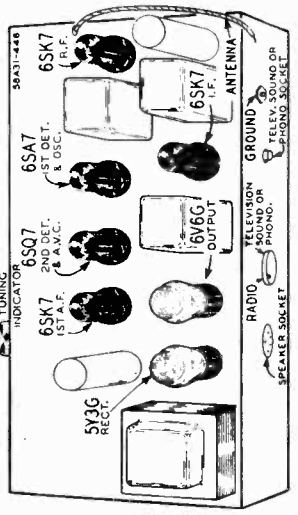
Caution

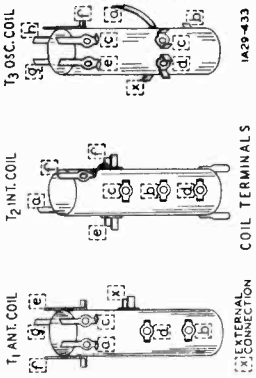
The metal chassis is connected to one side of the line through a .25 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

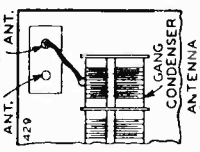
Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.

MONTGOMERY WARD & CO.

MODEL 93WG-382
Schematic, Voltage Sensitivity, Coils Socket







ANTENNA SELECTION SOCKET—At the right front corner (from back of cabinet) of the chassis base is a 2 hole pin tip socket—See illustration. If it is desired to operate the radio using the loop antennas, the pin tip should be inserted in the hole farthest from the side of the chassis. If it is desired to operate the radio using an external antenna, insert the pin tip in the hole nearest the side of the chassis.

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.

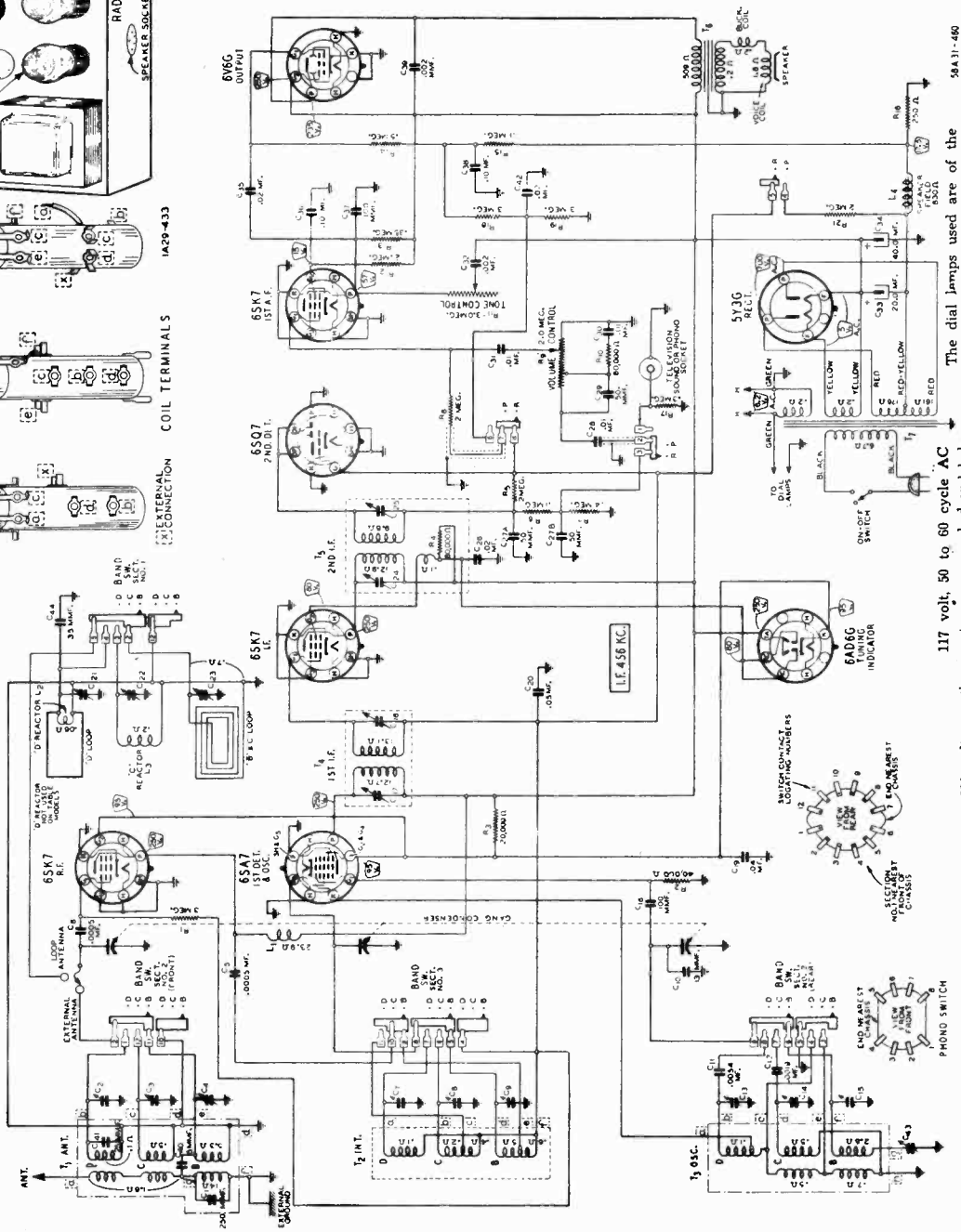
Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.

Power Consumption 70 Watts (At 117 volts 60 cycles) **Sensitivity** —External Antenna—(For 0.5 Watt output)

Power Output	4.0 Watts Undistorted	B Range	1.0 Microvolt Average
	5.0 Watts Maximum	C Range	1.0 Microvolt Average
		D Range	3.0 Microvolts Average

Selectivity - - 30 KC Broad at 1000 times Signal **Tuning Frequency Range**

Intermediate Frequency - - - - - - - -	456 KC	B Range	528 to 1730 KC
		C Range	2200 to 7000 KC
Speaker - - - - - - - -	8" Electro-Dynamic	D Range	7000 to 22000 KC



117 volt, 50 to 60 cycle **AC**

230 volt, or other service are so marked on label.

The dial lamps used are of the bayonet pin type (bulb No. 51).

58A31-460

MODEL 04WG-725
MODEL 93WG-382
MODELS 93WG754, 93WG755
Alignment, Trimmers

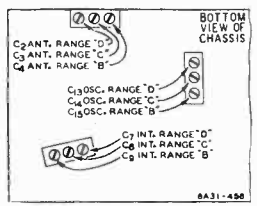
MONTGOMERY WARD & CO.

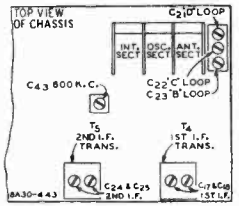
Volume Control—Maximum All Adjustments.

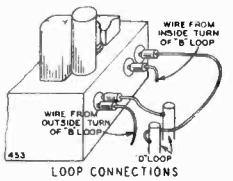
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

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

SIGNAL GENERATOR MODEL 93WG-382 CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.				
456 KC Grid of 1st Det.	.1 mf.	B Range See Note A	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C24) & (C25)
RANGE B				
1730 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note B	Ant. Range B (C4) Int. Range B (C9)
600 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C43) Rock Rotor—See Note C
RANGE C				
7000 KC Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C8)
RANGE D				
22,000 KC Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
21,000 KC Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C7) Rock Rotor—See Note C
LOOP RANGE B				
1500 KC See Note D None—See Note D		B Range	Turn Rotor to Max. Output	Loop Trimmer (C23) See Note E
LOOP RANGE C				
6000 KC See Note D None—See Note D		C Range	Turn Rotor to Max. Output	Loop Trimmer (C22) See Note E
LOOP RANGE D				
21,000 KC See Note D None—See Note D		D Range	Turn Rotor to Max. Output	Loop Trimmer (C21) Rock Rotor—See Note C







LOOP CONNECTIONS

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

After each range is completed, repeat the procedure as a final check.

NOTE A—For all adjustments, with the exception of the 3 loop range adjustments, the pin tip should be in the external antenna hole of the Antenna Selection Socket—See illustration on page one.

NOTE B—If the indicator is not at 1500 KC, it will be necessary to re-calibrate. Loosen the set screw on the dial hub near the volume control drum. Hold the tuning control drum stationary and at the same time turn the dial drum the necessary amount in the required direction. Retighten the set screw.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

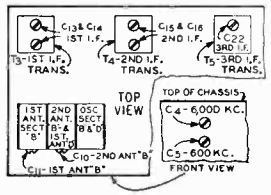
NOTE D—Re-install set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet. Insert pin tip in loop antenna hole of Antenna Selection Socket—See illustration on page one.

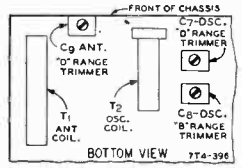
NOTE E—Console models only—Turn knob of loop until output is maximum.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

MODEL 93WG-754 93WG-755

I. F.				
456 KC Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C13) & (C14) 2nd I.F. (C15) & (C16) 3rd I.F. (C22)
RANGE B				
1730 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
1500 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	1st Ant. Range B (C11) 2nd Ant. Range B (C10)
600 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C5) Rock Rotor—See Note A
RANGE D				
18,300 KC Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
16,000 KC Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C9) Rock Rotor—See Note A
6000 KC Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C4) Rock Rotor—See Note A





CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

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

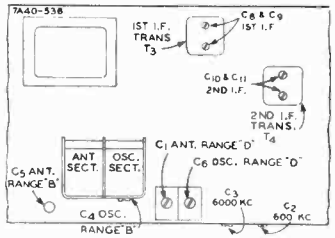
After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CALIBRATION—Chassis should be in cabinet. If it is necessary to recalibrate the radio, loosen the set screw on the dial hub near the volume control drum. Tune in a signal of known frequency. Hold the tuning control drum stationary and at the same time turn the dial drum the necessary amount in the required direction. If the radio detunes as the dial drum is turned, loosen the set screw a slight additional amount and recalibrate. Retighten the set screw.

MODEL 04WG-725

I. F.				
456 KC Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C8) & (C9) 2nd I.F. (C10) & (C11)
RANGE B				
1550 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C4)
1400 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C5)
600 KC Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C2) Rock Rotor—See Note B
RANGE D				
18,300 KC Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C6)
17,000 KC Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B
6000 KC Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C3) Rock Rotor—See Note B
LOOP RANGE B				
1400 KC See Note C	None See Note C	B Range	Turn Rotor to Max. Output	Ant. Range B (C5)



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

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

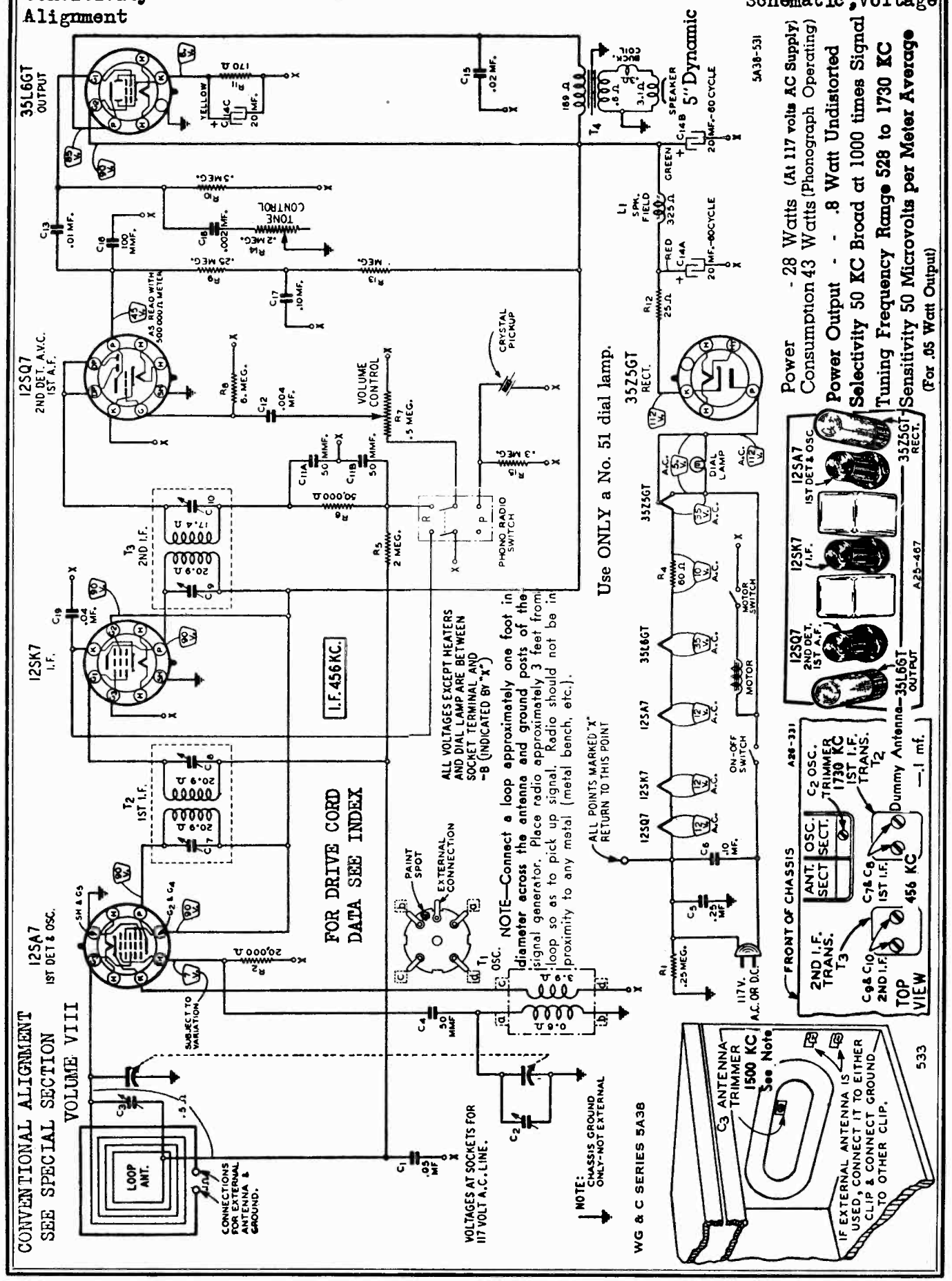
NOTE C—Reinstall set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Trimmers, Socket Sensitivity Alignment

MONTGOMERY WARD & CO.

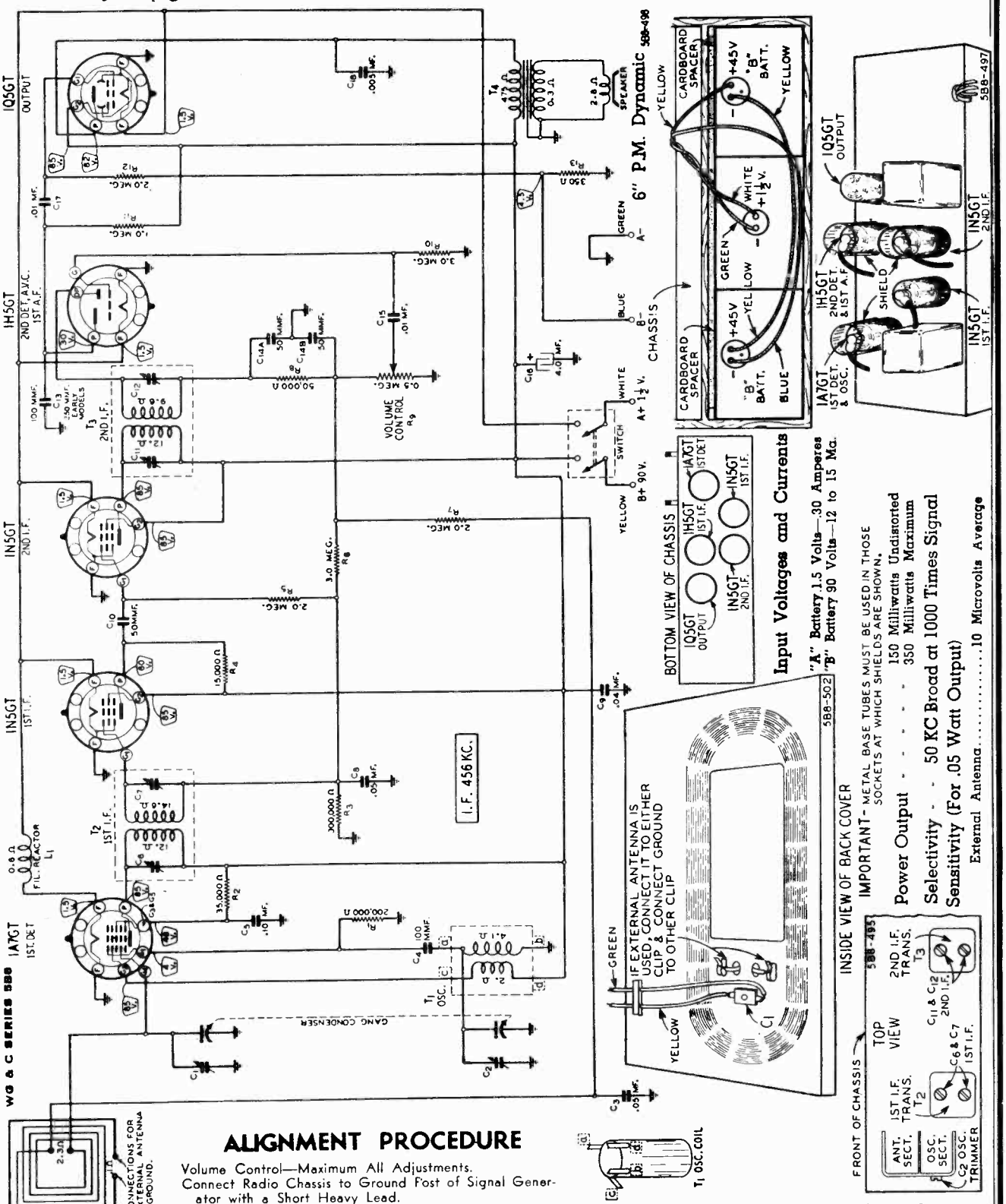
MODEL 93WG-510
Schematic, Voltage



MODEL 93WG-565A
Schematic, Voltage

MONTGOMERY WARD & CO.

Socket, Trimmers
Alignment, Sensitivity



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.

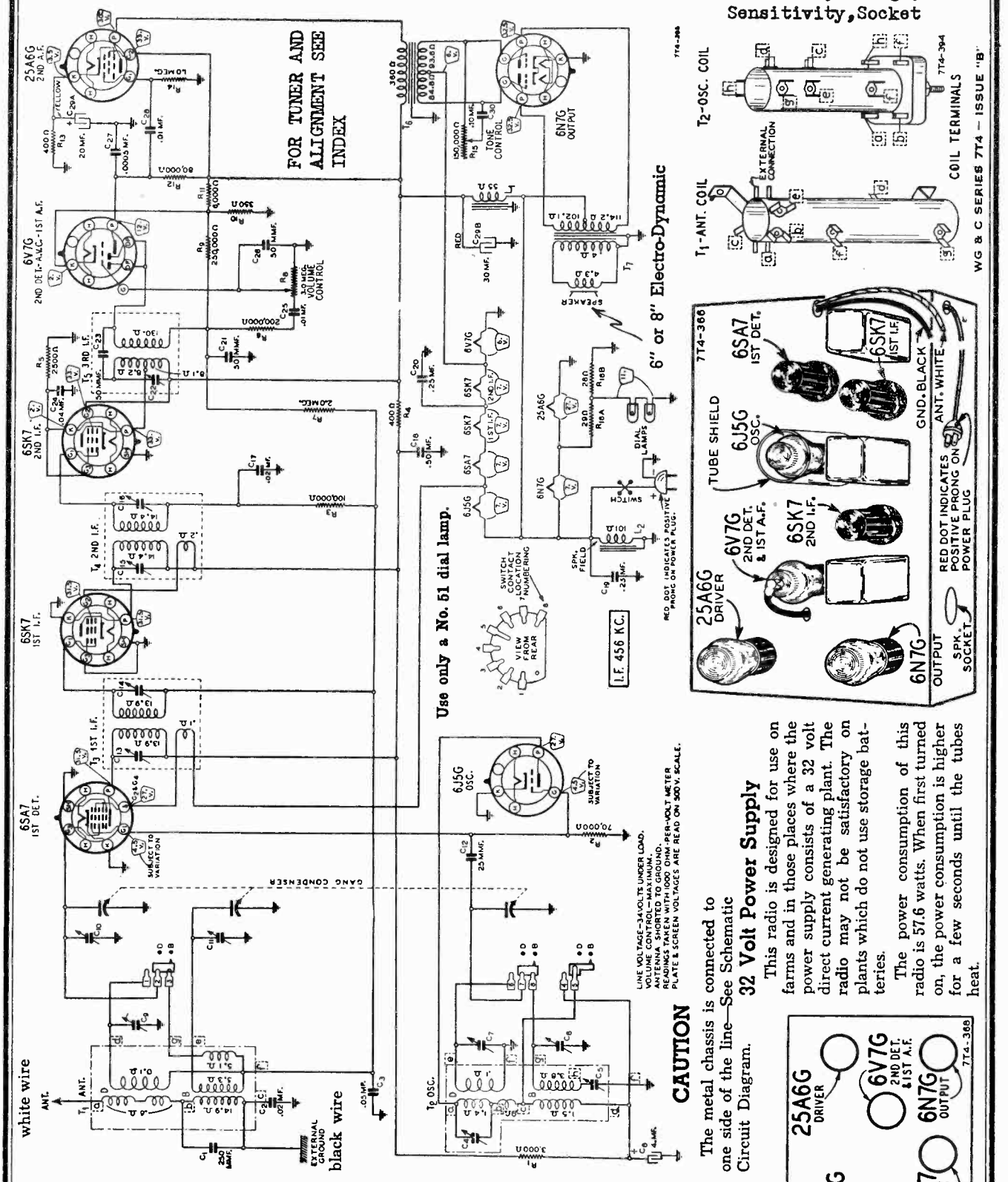
SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA.	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
456 KC	Signal Grid of 1st Det. (Top Cap)	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C11) & (C12)
1600 KC	Signal Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C2)
1500 KC	None—See Note A		Turn rotor to max. output Antenna (C1)	

NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, hold the pulley at the back of the dial, loosen the pointer screw, set the pointer at the 800 KC mark, and retighten the pointer screw.

MONTGOMERY WARD & CO.

MODELS 93WG-754, 93WG-755
Schematic, Voltage, Coils
Sensitivity, Socket



CAUTION

The metal chassis is connected to one side of the line—See Schematic Circuit Diagram.

32 Volt Power Supply

This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant. The radio may not be satisfactory on plants which do not use storage batteries.

The power consumption of this radio is 57.6 watts. When first turned on, the power consumption is higher for a few seconds until the tubes heat.

Power Consumption - 1.60 Amperes at 36 Volts DC

Power Output - - - - - - - .17 Watt Undistorted
.40 Watt Maximum

Selectivity - - 30 KC Broad at 1000 times Signal

Sensitivity (For .05 watt output)

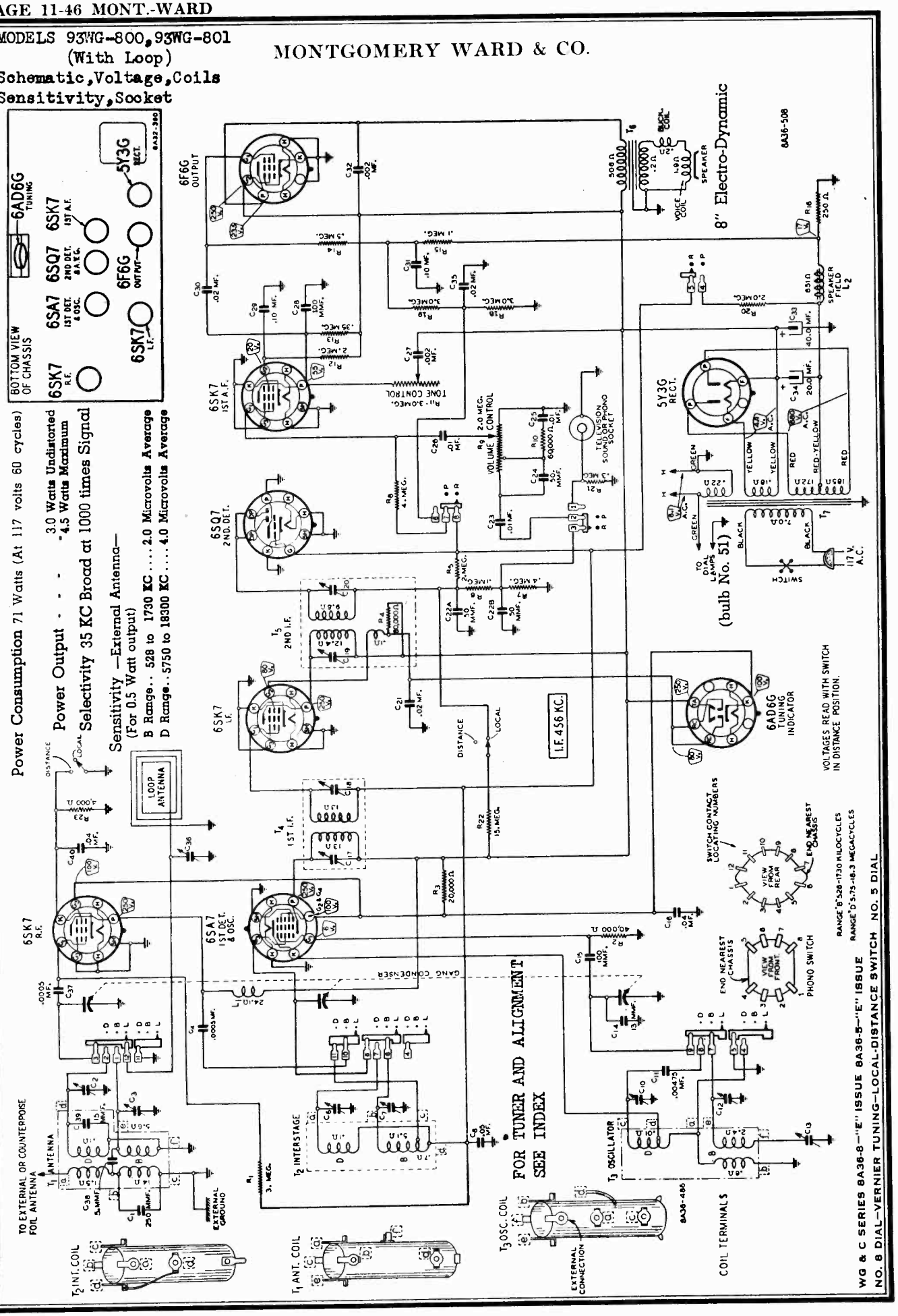
B Range .... 528 to 1730 KC ..6.0 Microvolts Average
D Range ....5750 to 18300 KC ...8.0 Microvolts Average

Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

MODELS 93WG-800, 93WG-801
(With Loop)
Schematic, Voltage, Coils
Sensitivity, Socket

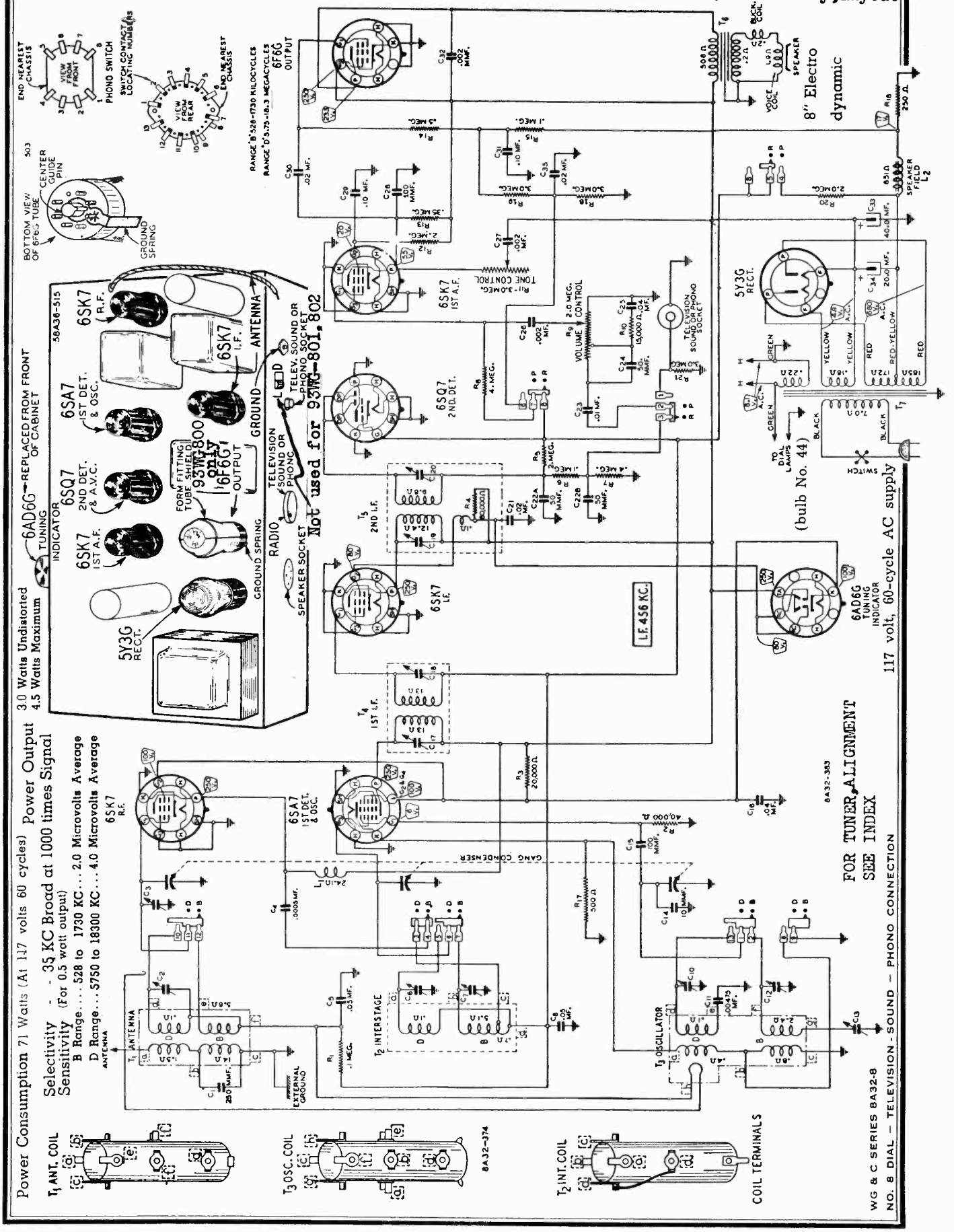
MONTGOMERY WARD & CO.



MODELS 93WG-800, 93WG-801
Chassis Layout

MONTGOMERY WARD & CO.

MODELS 93WG-801, 93WG-802
Schematic, Voltage, Coils
Socket, Sensitivity, Layout



MODELS 93WG-754, 93WG-755 MODEL 93WG-800 Drive Cord Replacement

MONTGOMERY WARD & CO.

MODELS 93WG-800, 93WG-801 93WG-802, 93WG-805 MODELS 93WG-1000, 93WG-1001 Alignment, Trimmers

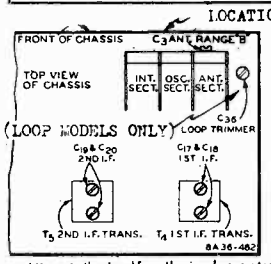
ALIGNMENT PROCEDURE MODELS 93WG-800,-801,-802,-805, (EARLY and LOOP MODELS)

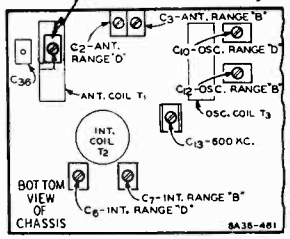
Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several minutes.

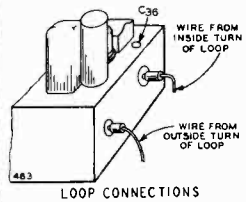
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C19) & (C20)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range Ext. Ant.	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	Antenna Lead	200 mmf.	B Range Ext. Ant.	*Set Indicator to 1500 KC—See Note AT Turn Rotor to Max. Output	Ant. Range B (C3) Int. Range B (C7)
600 KC	Antenna Lead	200 mmf.	B Range Ext. Ant.	Turn Rotor to Max. Output	600 KC (C13) Rock Rotor—See Note A
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
18,300 KC	Antenna Lead	400 Ohm	D Range	Keep Rotor at Full Open Position	Ant. Range D (C2) Int. Range D (C6) Rock Rotor—See Note A
LOOP RANGE B (LOOP MODELS ONLY)					
1500 KC See Note B	None See Note B		Loop	Turn Rotor to Max. Output	See Note C Loop Trimmer (C36)

LOCATION OF C2 and C3 ON 93WG-801,-802 and -805 (EARLY MODELS)







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

After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

93WG-801,-802,-805.

NOTE AT— If the indicator is not at 1500 KC, it will be necessary to re-calibrate. Loosen the screw—See illustration ⊕. Lift the tuning control drum upward so that the gears disengage and rotate the drum assembly the necessary amount in the required direction. Re-engage the gears and retighten the screw.

NOTE B—Reinstall set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet.

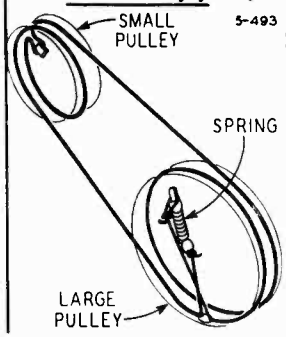
NOTE C (CONSOLE MODELS)—Turn knob of loop until output is maximum.

CALIBRATION—Chassis should be in cabinet. If it is necessary to recalibrate the radio, loosen the set screw on the dial hub near the volume control drum. Tune in a signal of known frequency. Hold the tuning control drum stationary and at the same time turn the dial drum the necessary amount in the required direction. If the radio detunes as the dial drum is turned, loosen the set screw a slight additional amount and recalibrate. Retighten the set screw.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Drive Cord Replacement

MODELS 93WG-754,5,-800.



Use a new drive cord approximately 27 inches in length. Tie one end of drive cord to tension spring. Thread the other end of cord, starting from inside of large pulley, through hole in groove of pulley. Do not secure spring to hook on pulley.

Turn gang condenser to completely closed position.

Rotate tuning control drum so that hole in groove of small pulley is on top. Wind cord 1½ turns clockwise (from tuning control side of chassis) around small drive pulley. Turn should start at right side (from front of chassis) of pulley groove and progress toward the left. Thread cord through hole in groove. Thread cord back through same hole, leaving a small loop below the pulley rim. Secure loop to hook on pulley—See illustration. Pull cord tight.

Wind cord one turn clockwise (from tuning control side of chassis) around large drive pulley. This turn should start at left side (from front of chassis) of pulley groove and progress toward the right.

Rotate large pulley until hole in groove is on top. Pass cord through hole. Tie a knot with a small loop at free end of cord. Secure loop to hook on pulley. Stretch spring and secure free end to same hook.

ALIGNMENT PROCEDURE 93WG-1000,-1001 (EARLY AND LOOP MODELS)

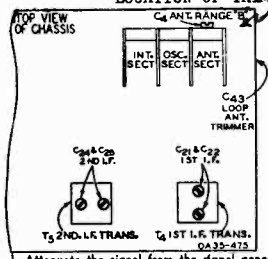
Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several minutes.

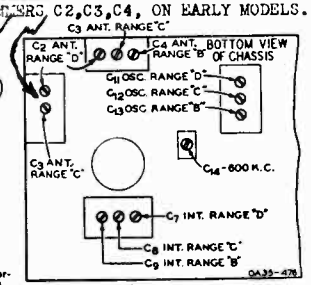
Selectivity Control—Sharp Position All Adjustments.

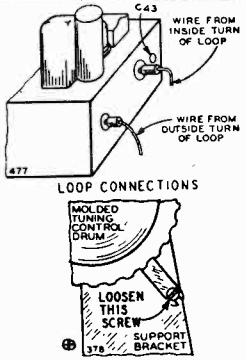
Connect Radio Chassis to Ground Post of Signal Generator with a short Heavy Lead.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C24) & (C25)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C21) & (C22)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range Ext. Ant.	Turn Rotor to Full Open	Oscillator Range B (C13)
1500 KC	Antenna Lead	200 mmf.	B Range Ext. Ant.	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C4) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range Ext. Ant.	Turn Rotor to Max. Output	600 KC (C14) Rock Rotor—See Note B
RANGE C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C12)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C8)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C11)
22,000 KC	Antenna Lead	400 Ohm	D Range	Keep rotor at full open position	Ant. Range D (C2) Int. Range D (C7)
LOOP RANGE B (LOOP MODELS ONLY)					
1500 KC See Note C	None See Note C		Loop	Turn Rotor to Max. Output	See Note D Loop Trimmer (C43)

LOCATION OF TRIMMERS C2,C3,C4, ON EARLY MODELS.







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

After each range is completed, repeat the procedure as a final check.

NOTE A—If the indicator is not at 1500 KC, it will be necessary to re-calibrate. Loosen the screw—See illustration ⊕. Lift the tuning control drum upward so that the gears disengage and rotate the drum assembly the necessary amount in the required direction. Re-engage the gears and retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Re-install set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet.

Note D (CONSOLE MODELS)—Turn knob of loop until output is maximum.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

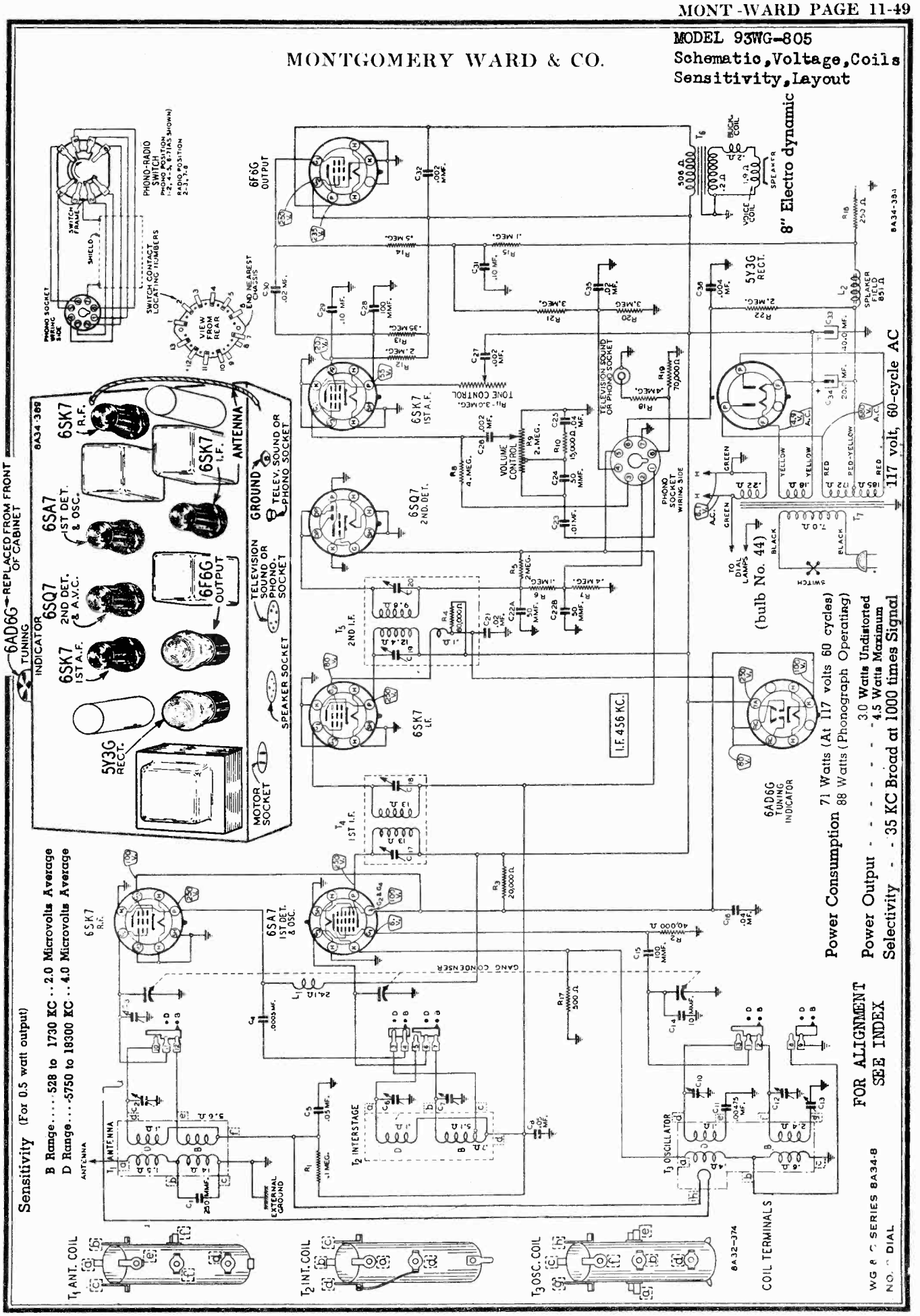
Line Voltage—117.

Volume Control—Maximum.

Local-Distance Switch—Distance position.

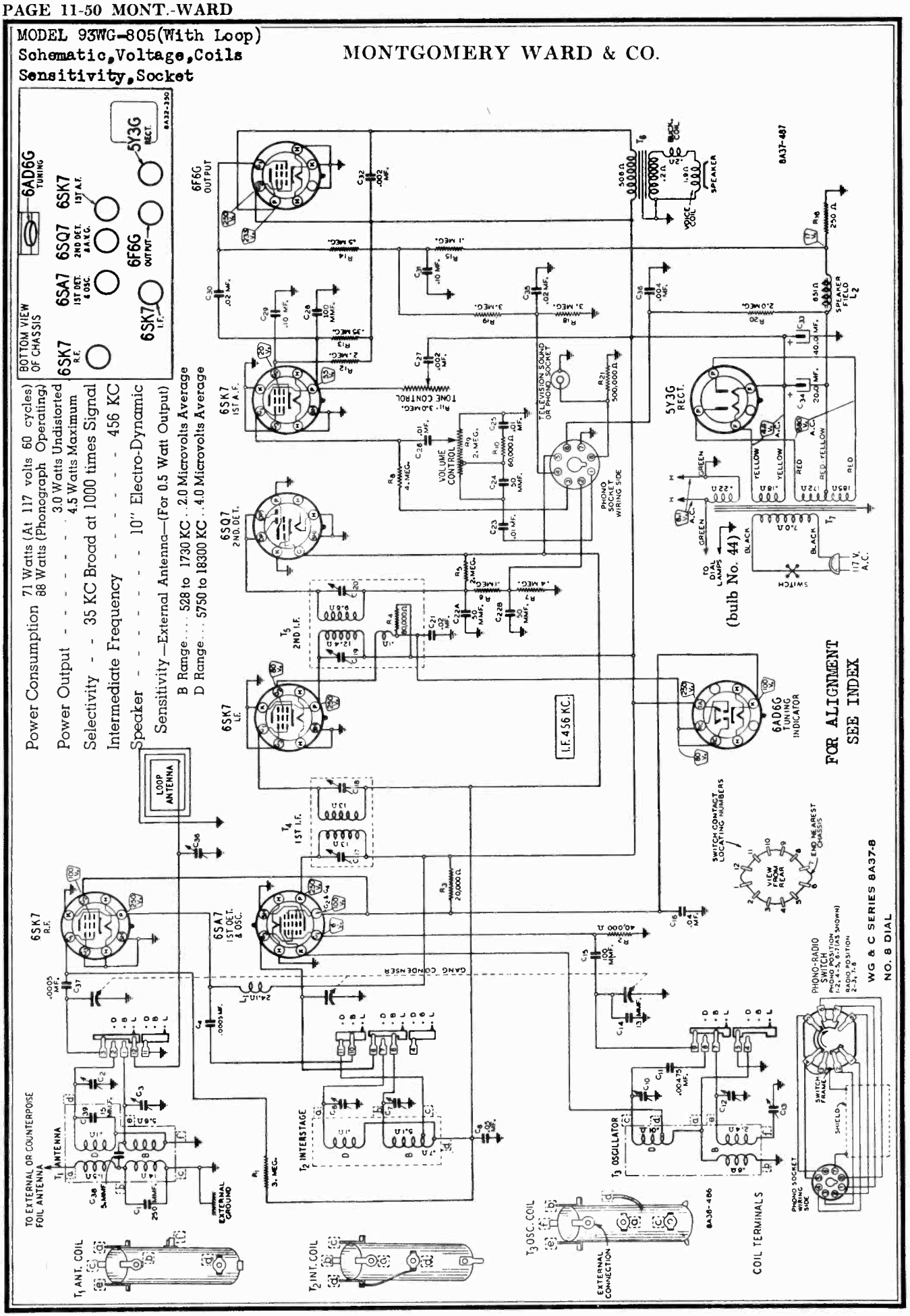
Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.



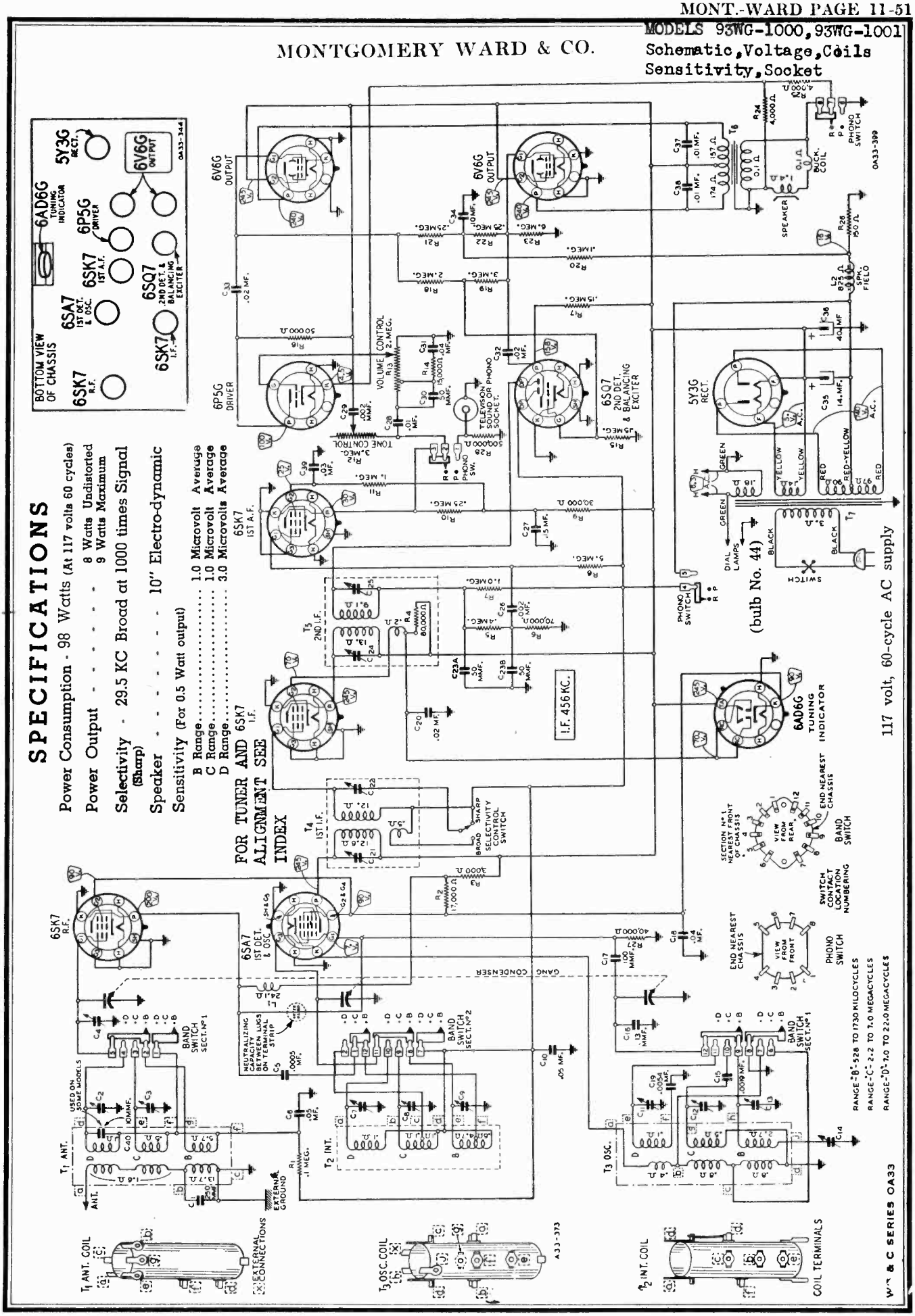
MODEL 93WG-805(With Loop)
Schematic,Voltage,Coils
Sensitivity,Socket

MONTGOMERY WARD & CO.



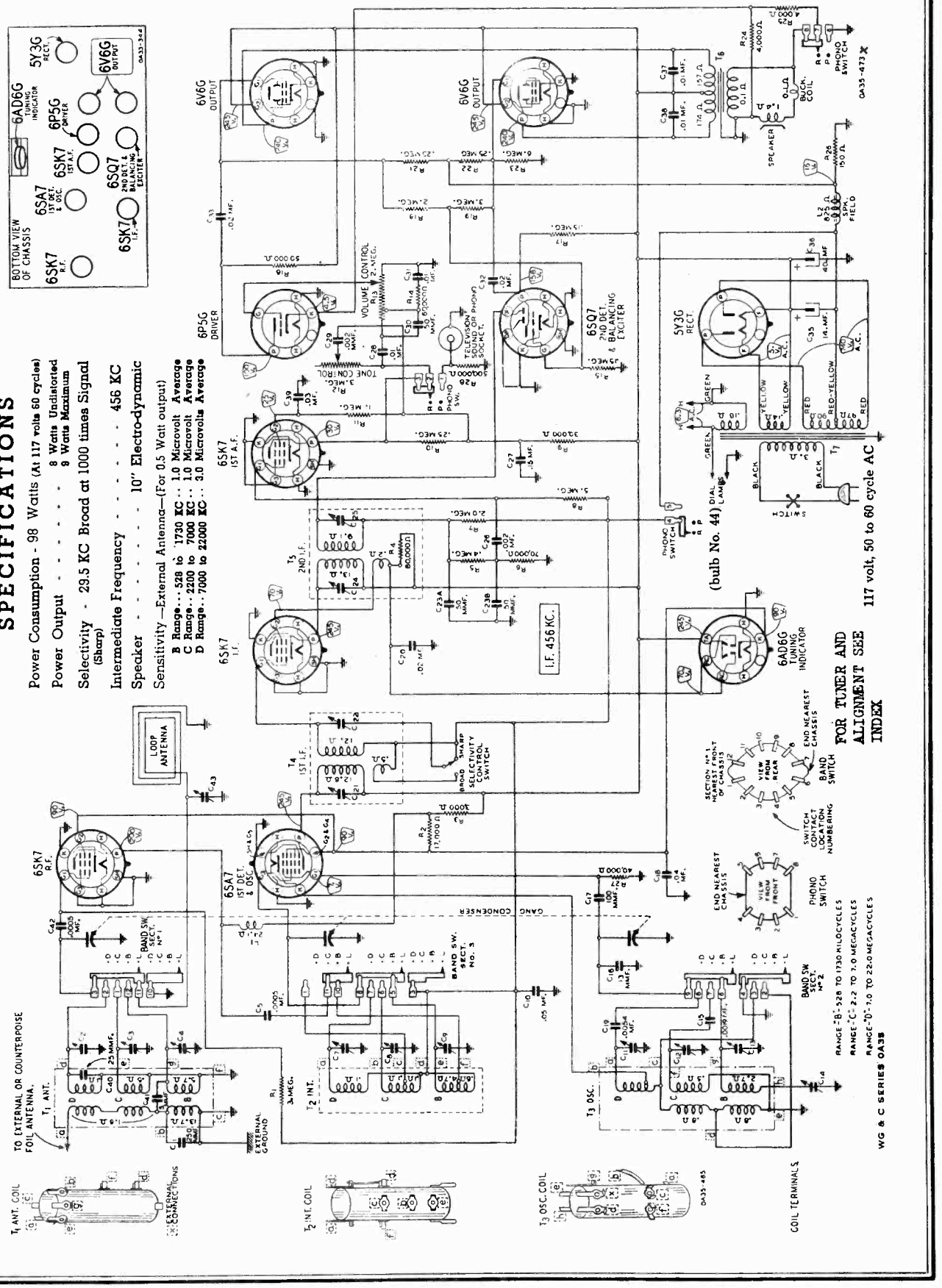
MONTGOMERY WARD & CO.

MODELS 93WG-1000, 93WG-1001
Schematic, Voltage, Coils
Sensitivity, Socket



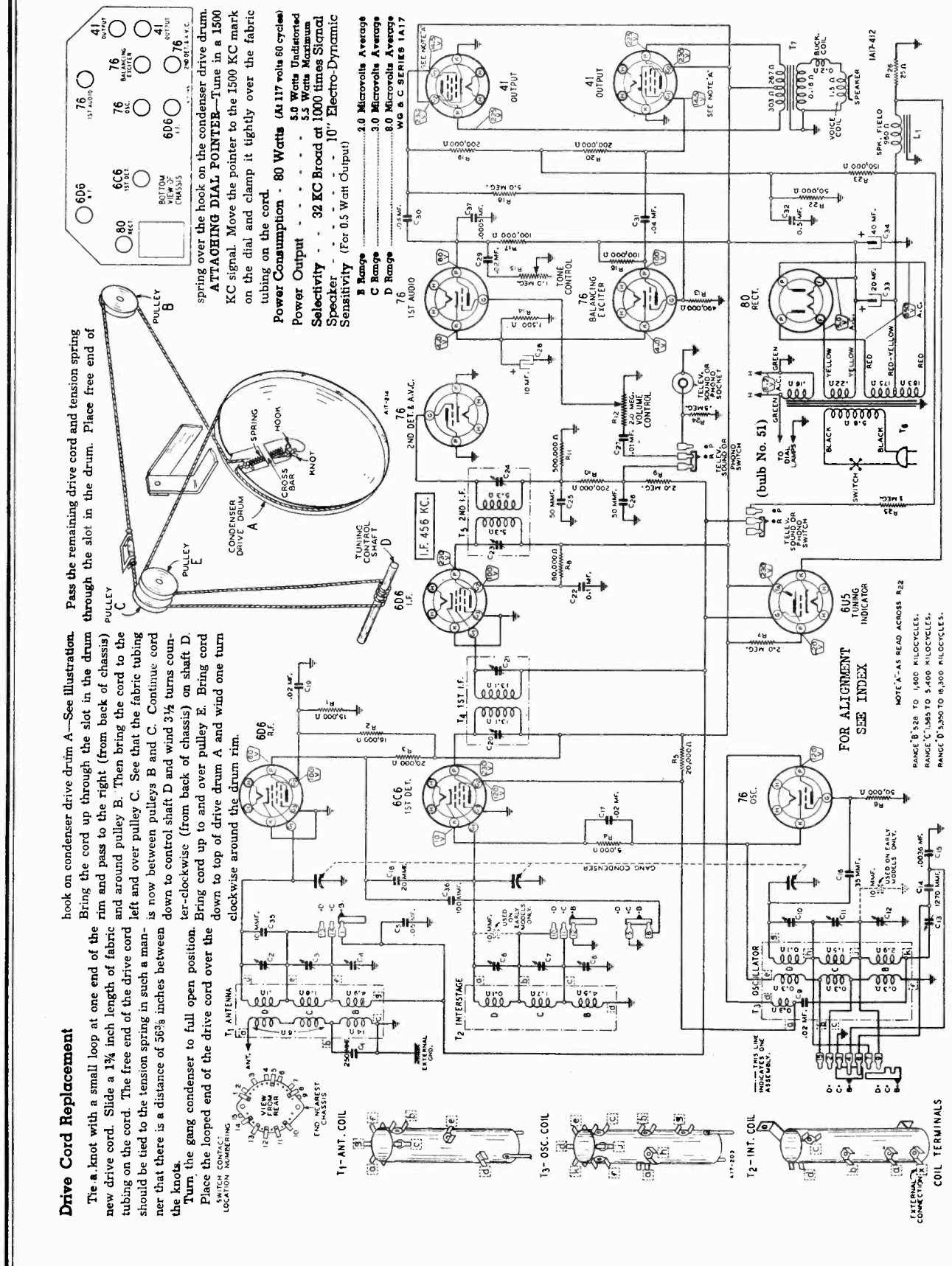
MODELS 93WG-1000, 93WG-1001
(With Loop)
Schematic, Voltage, Coils
Sensitivity, Socket

MONTGOMERY WARD & CO.



MONTGOMERY WARD & CO.

MODELS 93WG-1103, 93WG-1104
Schematic, Voltage, Coils
Socket, Sensitivity
Drive Cord Replacement



Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾ inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 5⅝ inches between the knots.

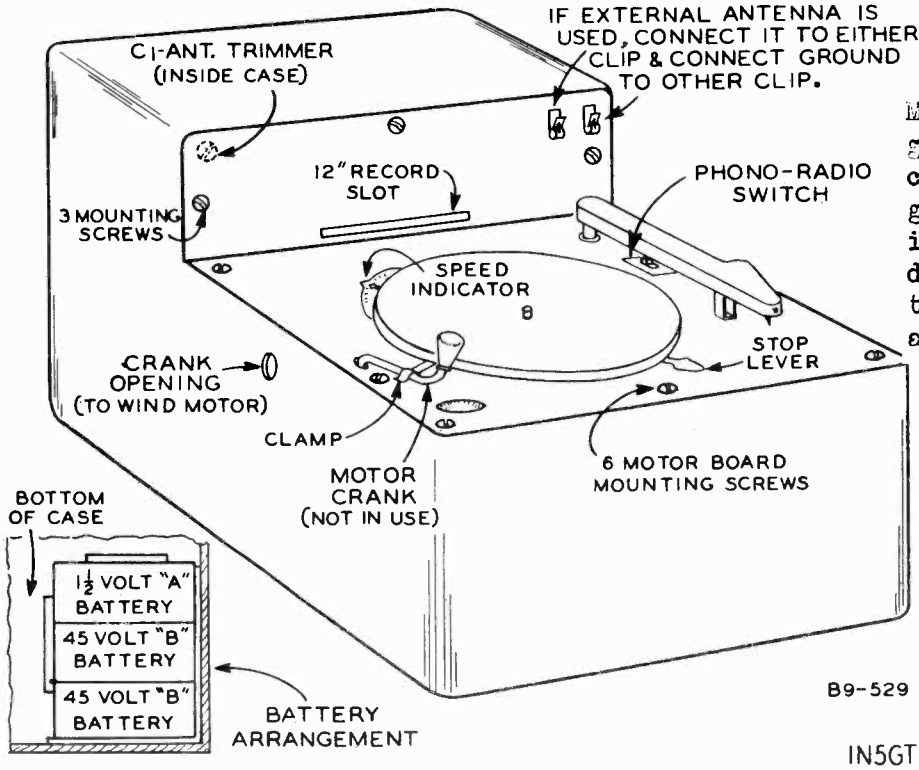
Turn the gang condenser to full open position. Place the looped end of the drive cord over the

MODEL 93WG-2208
Schematic, Chassis
Parts

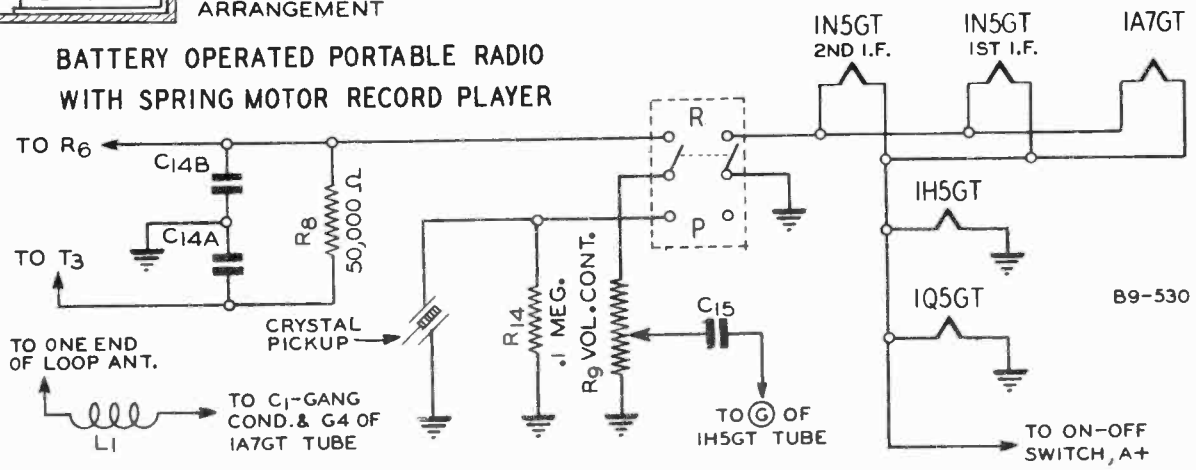
MONTGOMERY WARD & CO.

MODEL 93WG-2208 consists of receiver Model 93WG-565A and the record player shown here. See Index for data on receiver.

Most of the information given for 93WG-565A is correct for this phonograph combination. The information that is different is given on this page with changes and additions.



BATTERY OPERATED PORTABLE RADIO WITH SPRING MOTOR RECORD PLAYER



PARTS USED ON MODEL 93WG-565A ARE USED ON THIS MODEL EXCEPT AS FOLLOWS:-

The following NEW PARTS not shown on MODEL 93WG-565A ARE USED

Bin No.	Part No.	Code	Description	Selling Price
	2A161		Radio-Phono Switch	$0.16
	4X351		Escutcheon for Phono-Radio Switch	.12
	17A131	C1	1-12 mmf. Trimmer Condenser	.10
	14A115		2 Section Gang Condenser complete with Tuning Control Shaft	2.05
	A85104	R14	100,000 Ohm 0.2 Watt Carbon Resistor	.06
	28A3		Needle Cup	.06
	28A7		Cover for Needle Cup	.06
	9A1218		Loading Coil for Loop Antenna	.18

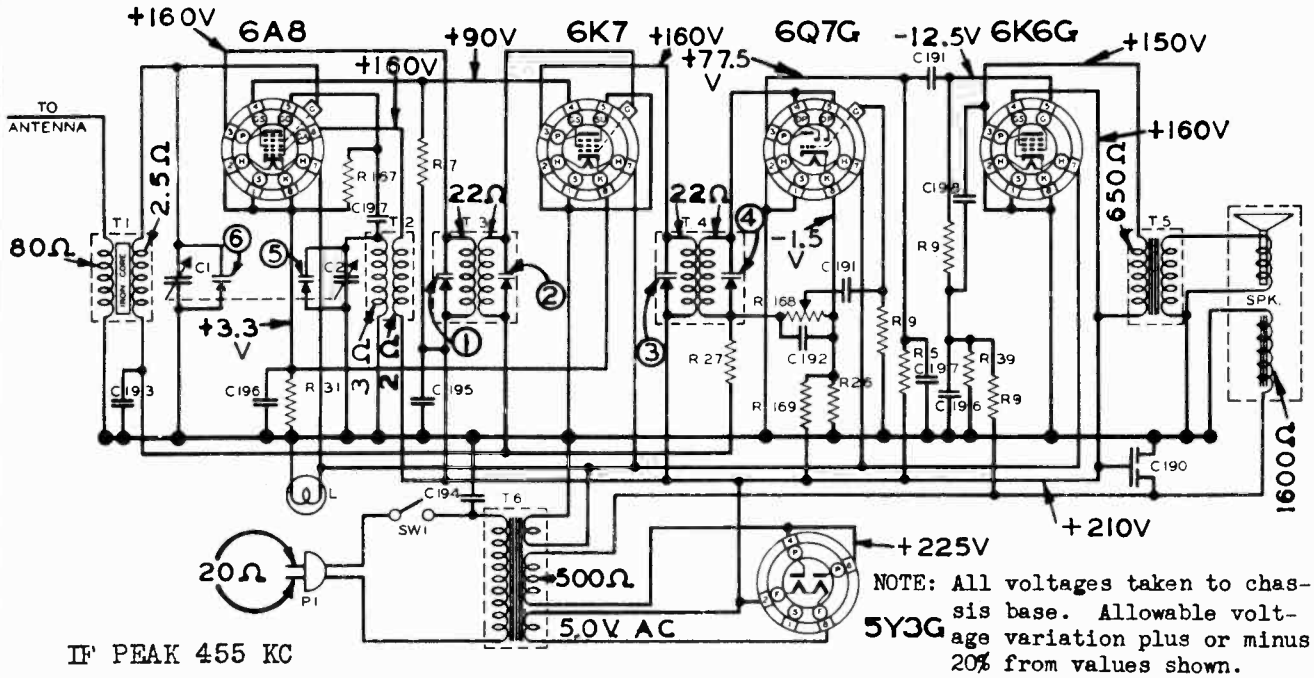
The following parts shown on MODEL 93WG-565A ARE NOT USED

Bin No.	Part No.	Code	Description	Selling Price
	9A1191		Loop Antenna Assembly	$0.54
	4A139		Fibre Strip (Loop Antenna Leads)	.04
	17A110	C1	2.5-35 mmf. Loop Antenna Trimmer Condenser	.06
	14A114		2 Section Gang Condenser complete with Tuning Control Shaft	1.20

Prices Subject to Change Without Notice.

NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 71
Chassis RE-43
Schematic, Voltage
Alignment, Sensitivity



NOTE: All voltages taken to chassis base. Allowable voltage variation plus or minus 20% from values shown.

BALANCING INSTRUCTIONS

Operation No.	Connect Bal. Oscillator to	Bal. Oscillator Frequency	Adj. Padder No.	Dial Setting	Sens.
1.	* 6A8 Grid	455	1,2,3 & 4	550 kc	75 mv.
2.	Ant. Lead Through 200 uuf.	1720	5	1720 kc	
3.	Ant. Lead Through 200 uuf.	1400	6	1400 kc	30 mv.

* I.F. Sensitivity should be 150 microvolts minimum for 200 milliwatts output

RESISTORS

Ref. No.	Part No.	Description	Price
R5	17-2070	500,000 ohms 1/4 watt	.20
R7	17-2072	20,000 ohms 1/2 watt	.20
R9	17-2080	1,000,000 ohms 1/4 watt	.20
R27	17-4788	2,000,000 ohms 1/4 watt	.20
R31	17-2066	260 ohms 1/2 watt	.20
R39	17-14051	300,000 ohms 1/4 watt	.20
R167	17-14281	60,000 ohms 1/4 watt	.20
R168	17-16166	500,000 ohms volume control	.75
R169	17-14282	150,000 ohms 1/4 watt	.20
R26	17-4781	600 ohms 1/4 watt	.20

CONDENSERS

Ref. No.	Part No.	Description	Price
C1 & 2	17-16147	Tuning condenser	3.00
C190	17-14271	10-10 mfd. 300 v.d.c.	1.50
C191	17-14272	.01 mfd. 400 v.d.c.	.35
C192	17-14273	.00025 mfd. 600 v.d.c.	.25
C193	17-14274	.05 mfd. 200 v.d.c.	.30
C194	17-14275	.01 mfd. 400 v.d.c.	.40
C195	17-14276	.05 mfd. 400 v.d.c.	.35
C196	17-14277	.1 mfd. 200 v.d.c.	.35
C197	17-14278	.0001 mfd. 600 v.d.c.	.25
C198	17-14279	.005 mfd. 400 v.d.c.	.30

MISCELLANEOUS

Part No.	Description	Price
17-13905	Dial light bulb(Mazda #44)	.15
17-15791E	Line cord and plug assembly	.40
17-16133	Speaker Assembly	4.00
17-15926A	Volume control and switch	1.00

COILS AND TRANSFORMERS

Ref. No.	Part No.	Description	Price
T1	00-16141	Antenna Coil	.75
T2	00-16142	Oscillator coil	.50
T3	00-16161	First I.F. Transformer	1.50
T4	00-16162	Second I.F. Transformer	1.50
T5	00-16160	Output transformer	1.50
T6	00-16140	Power transformer	3.00

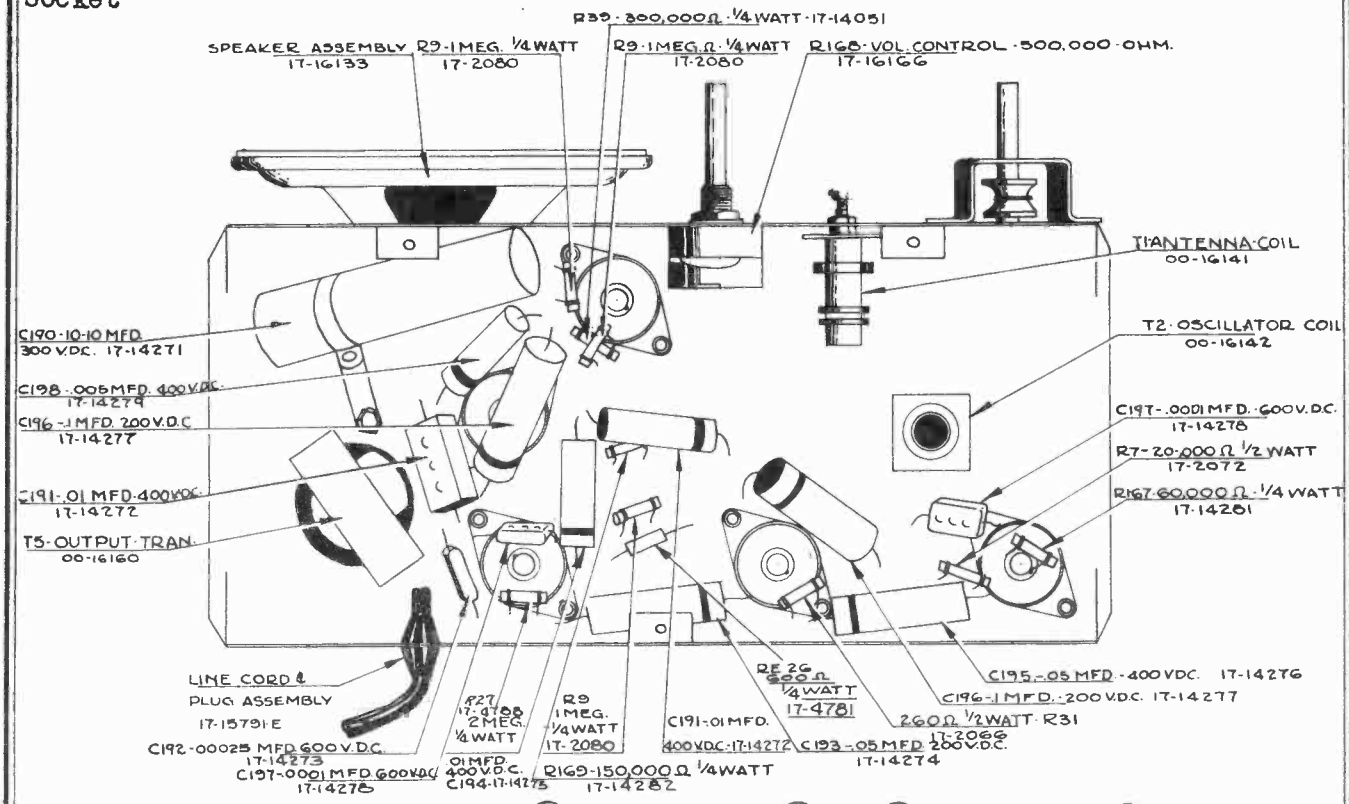
ELECTRICAL and MECHANICAL SPECIFICATIONS

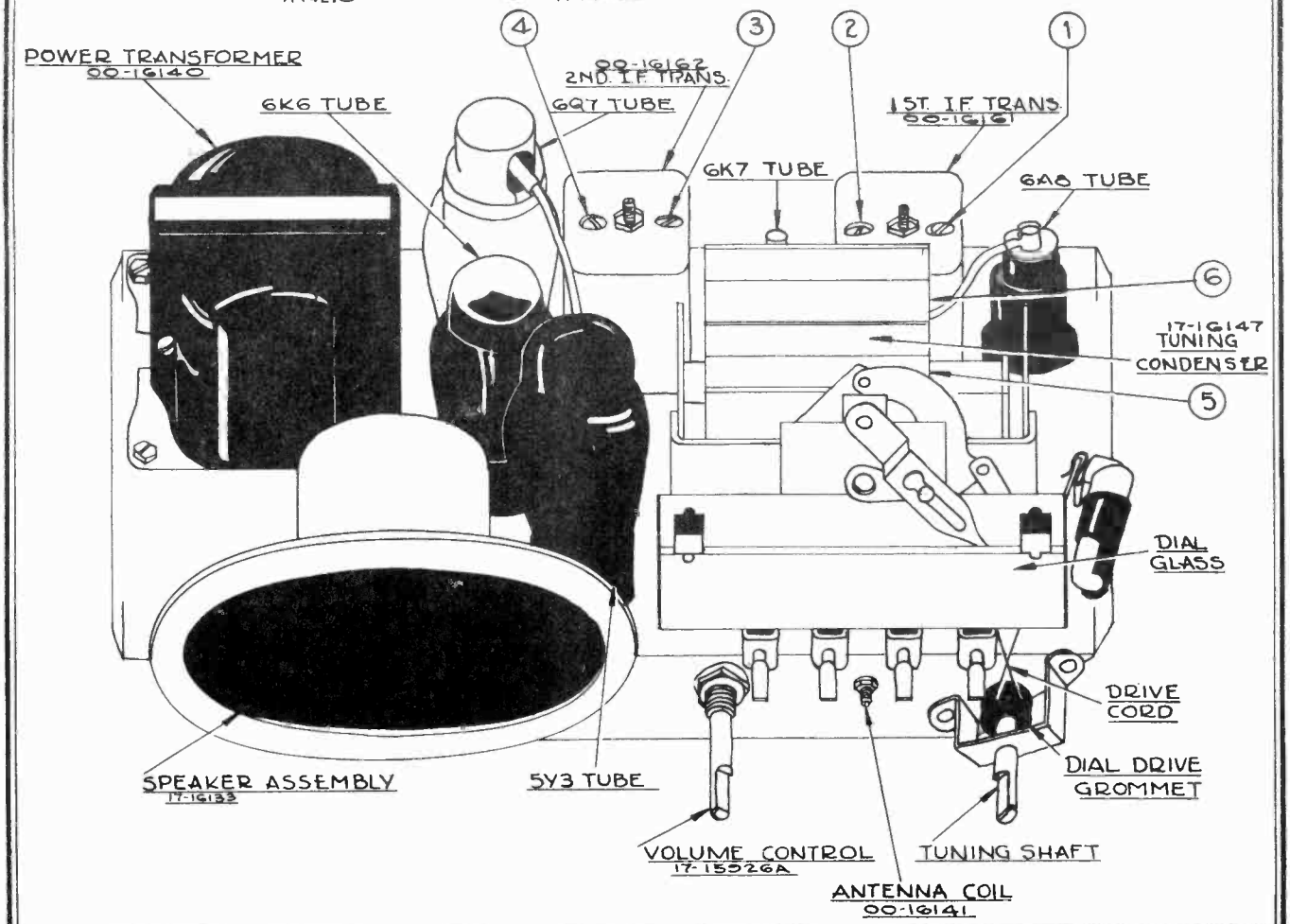
TUBES: 6A8--1st Detector Oscillator
6K7--I.F. Amplifier
6Q7G--2nd Detector, A.V.C. Audio Amplifier
6K6G--Power output Amplifier
5Y3G--Rectifier

Dial Light: Mazda #44
Frequency Range: 1725 to 540 K.C.
Power Output: 1.8 watts
Speaker: 5" Electro Dynamic, 3 ohm voice coil
1600 ohms field.
Voltage & Frequency: 117 V. 60 cycles AC only
Watts Power Consumption: 45 Watts
Sensitivity: 50 microvolts for 200 milliwatts output
Approved by: Underwriters
Licensed under: R.C.A. and Hazeltine patents
Chassis Dimensions: Width 10 3/4"; height 6 3/4"; depth 6 3/4"
Cabinet dimensions: Width 11 1/2"; height 8"; depth 6 1/4"
Mechanical Push-button Tuning: 4 push-buttons

MODEL 71
Chassis RE-43
Chassis, Trimmers
Socket

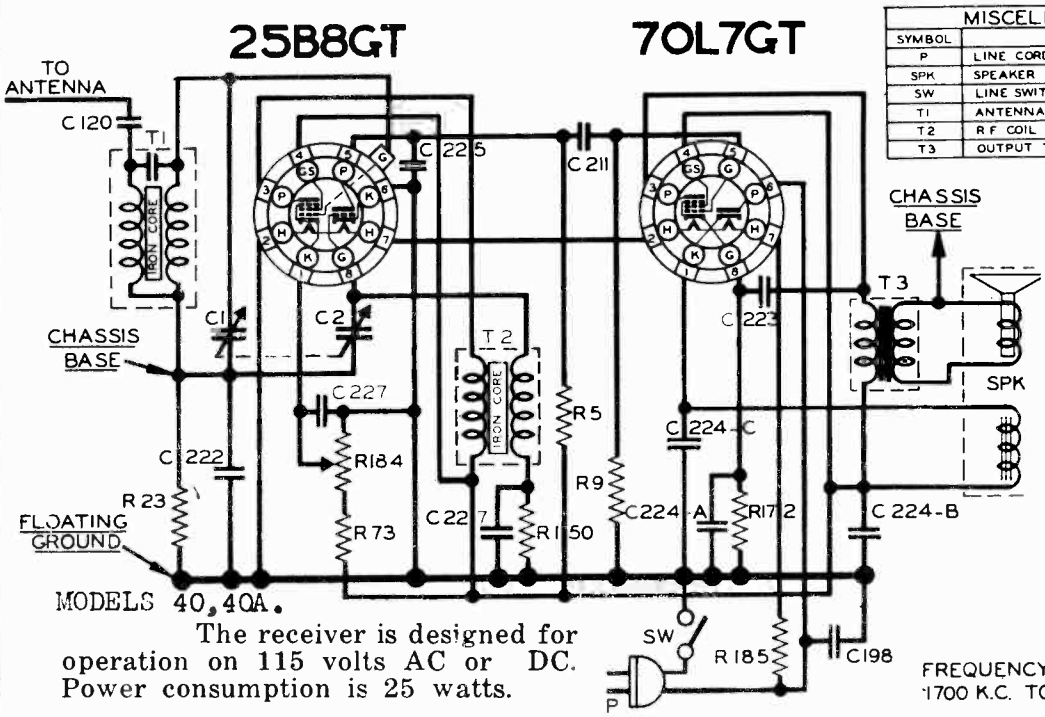
NOBLITT-SPARKS INDUSTRIES, INC.





NOBLITT-SPARKS INDUSTRIES, INC.

MODELS 40,40A
MODELS 402,402A
Ch.RE-55
Schematics



MODELS 40,40A.

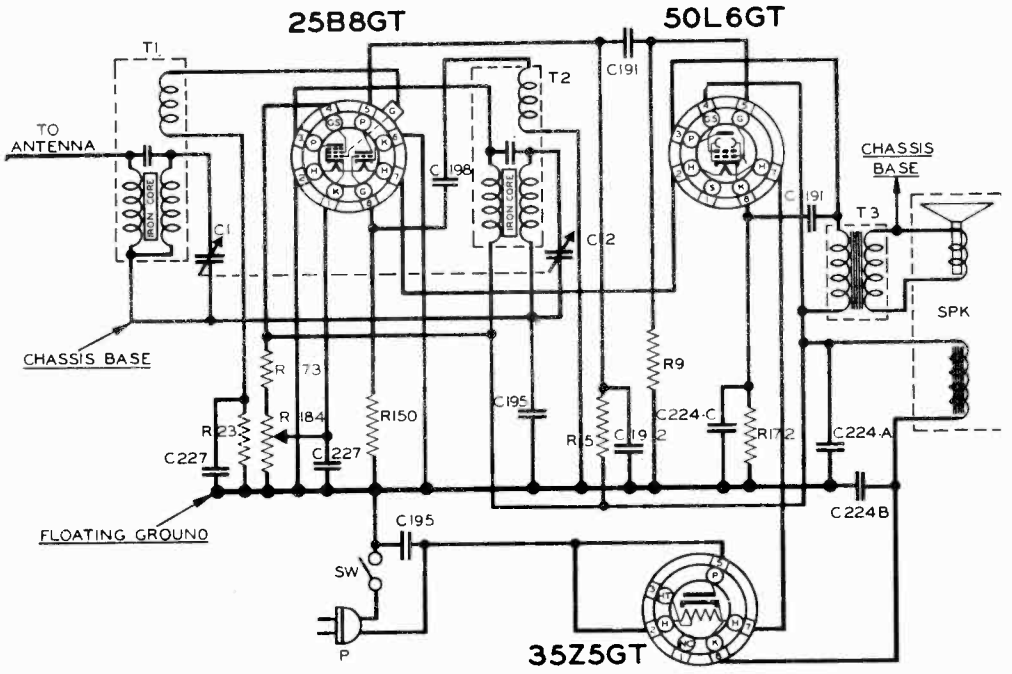
The receiver is designed for operation on 115 volts AC or DC. Power consumption is 25 watts.

FREQUENCY RANGE
1700 K.C. TO 540 K.C.

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO.
P	LINE CORD & PLUG ASSEMBLY	17-16336
SPK	SPEAKER ASSEMBLY	17-16314
SW	LINE SWITCH	17-14320
T1	ANTENNA COIL	00-16315
T2	R.F. COIL	00-16316
T3	OUTPUT TRANSFORMER	00-16317

RESISTORS			
R	OHM	W	PART NO.
5	500K	1/4	17-2070
9	1M	1/4	17-2080
23	250K	1/4	17-3011
73	30K	1/4	17-4278
150	5M	1/4	17-14242
172	100	1/4	17-14289
184	10K	V.C.	17-14320
185	170	3	17-14324

CONDENSERS			
C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-16318
2	VARIABLE		
120	.001	400	17-4286
198	.005	400	17-14279
211	.01	200	17-14306
222	.2	400	17-14317
223	.002	400	17-14318
224A	10 MFD.	15	17-14319
224B	10 MFD.	150	
224C	20 MFD.	150	
225	.0005	600	17-14321
227	.05	200	17-14323



RESISTORS			
R	OHM	W	PART NO.
5	500K	1/4	17-2070
9	1M	1/4	17-2080
23	250K	1/4	17-3011
73	30K	1/4	17-4278
150	5M	1/4	17-14242
172	100	1/4	17-14289
184	10K	V.C.	17-14320

CONDENSERS			
C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-16318
2	VARIABLE		
191	.01	400	17-14272
192	.00025	600	17-14273
195	.05	400	17-14276
198	.005	400	17-14279
224A	10 MFD.	150	17-14319
224B	20 MFD.	150	
224C	20 MFD.	25	
227	.05	200	17-14323

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO.
P	LINE CORD & PLUG ASSEMBLY	17-16336
SPK	SPEAKER ASSEMBLY	17-16489
SW	LINE SWITCH	17-14320
T1	ANTENNA COIL	00-16508
T2	R.F. COIL	00-16509
T3	OUTPUT TRANSFORMER	00-16510

FREQUENCY RANGE
1700 K.C. TO 540 K.C.

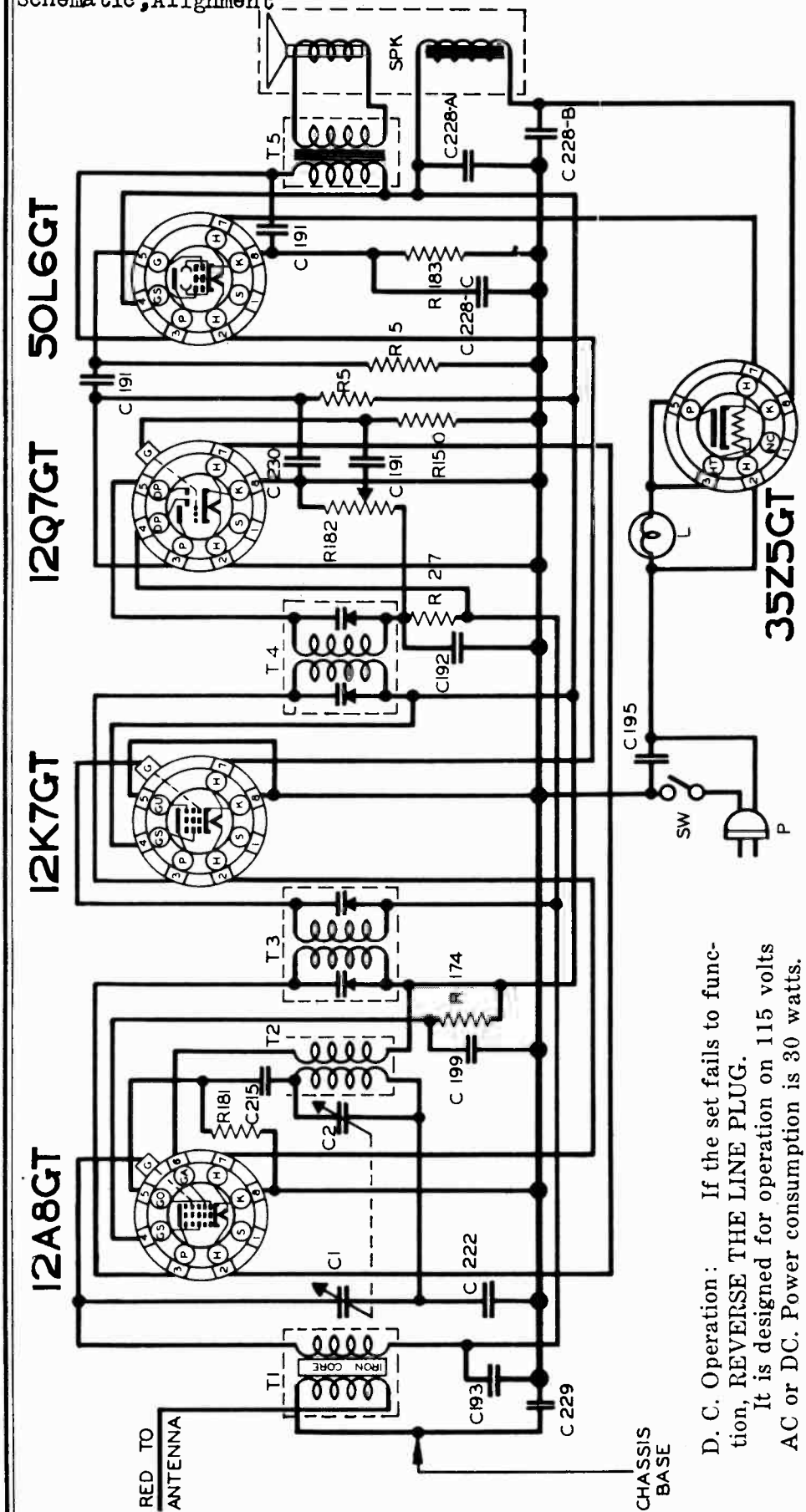
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA.

MODELS 402,402A CHASSIS RE-55.

The receiver is designed for operation on 115 volts AC or DC. Power consumption is 25 watts.

MODELS 502,502A
Chassis RE-48
Schematic, Alignment

NOBLITT-SPARKS INDUSTRIES, INC.



D. C. Operation: If the set fails to function, REVERSE THE LINE PLUG.

It is designed for operation on 115 volts AC or DC. Power consumption is 30 watts.

RESISTORS

R	OHM	W	PART NO
5	500K	1/4	17-2070
27	2M	1/4	17-4786
150	5M	1/4	17-14242
174	20K	1/4	17-14291
181	100K	1/4	17-14303
182	1M	V.C.	17-14315
183	150	1/4	17-14316

CONDENSERS

C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-18328
2	VARIABLE		
191	.01	400	17-14272
192	.00025	600	17-14273
193	.05	200	17-14274
195	.05	400	17-14278
199	.02	200	17-14283
215	.0001	600	17-14310
222	.2	400	17-14317
228A	10 MFD.	150	
228B	20 MFD.	150	17-14326
228C	20 MFD.	25	
229	.02	400	17-14327
230	.0005	400	17-14328

TRANSFORMERS

T	TYPE	PART NO.
1	ANTENNA COIL	00-16320
2	OSCILLATOR COIL	00-16321
3	FIRST I.F. COIL	00-16322
4	SECOND I.F. COIL	00-16323
5	OUTPUT TRANS.	00-16324

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.
L	DIAL LIGHT BULB - MAZDA NO. 51	17-13904
P	LINE CORD & PLUG ASSEMBLY	17-16371
SPK	SPEAKER ASSEMBLY	17-16314A
SW	LINE SWITCH	17-14315

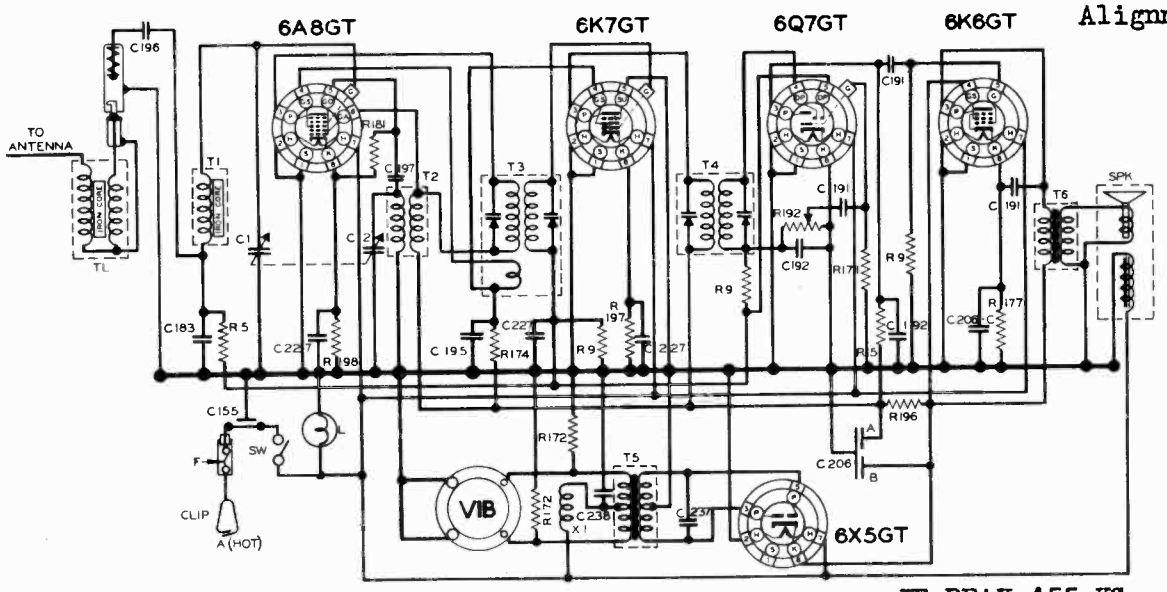
I.F. PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600K.C.

NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA

MODEL 502, 502A CHASSIS RE-48.

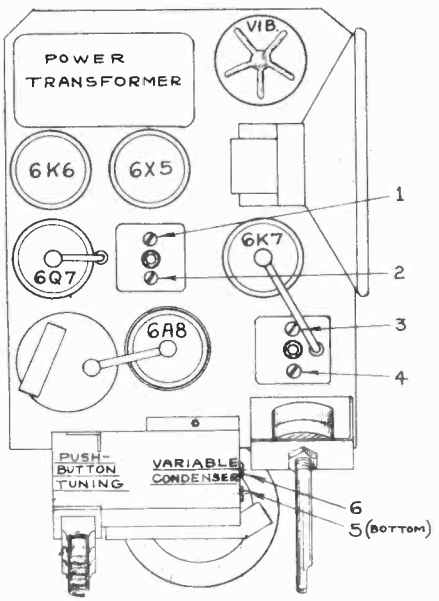
Model 610
Tuner Data

MODELS 510, Chassis RE-54
NOBLITT-SPARKS INDUSTRIES, INC. 610, Chassis RE-58
Schematic, Socket, Trimmers
Alignment



IF PEAK 455 KC
FREQUENCY RANGE 1575 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA

ARVIN CAR RADIO
CHASSIS RE 54, RE 58.



MODEL 610

RESISTORS

R	OHMS	W	PART NO.
5	500M	1/4	17-2070
9	1M	1/4	17-2080
171	15M	1/4	17-14288
172	100	1/4	17-14289
174	20K	1/4	17-14294
177	850	1/4	17-14298
181	100K	1/4	17-14303
192	1M	1/2	17-18422
196	700	1	17-14340
197	800	1/4	17-14342
198	400	1/4	17-14343

CONDENSERS

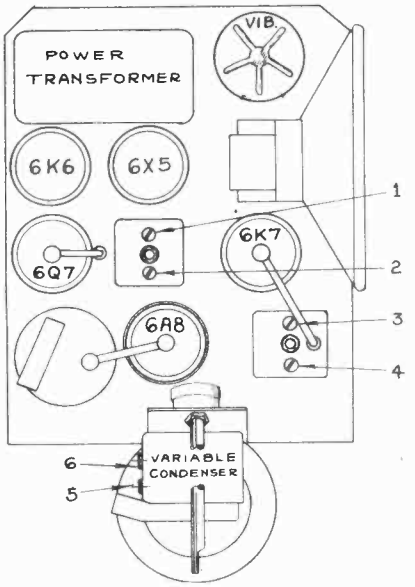
C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-1643
2	VARIABLE		
155	.0002	200	17-14217
237	.005	1200	17-14345
208A	10 MFD.	300	
208B	10 MFD.	300	17-14297
208C	20 MFD.	25	
181	.01	400	17-14272
192	.00025	600	17-14273
183	.003	600	17-14294
195	.05	400	17-14278
198	.1	200	17-14277
197	.0001	600	17-14276
238	.5	150	17-14348
227	.05	200	17-14325

CHOKES & TRANSFORMERS

T-#	TYPE	PART NO.
1	ANTENNA COIL	00-18441
2	OSCILLATOR COIL	00-18442
3	FIRST I.F. COIL	00-18443
4	SECOND I.F. COIL	00-18444
5	POWER TRANS.	00-18448
8	OUTPUT TRANS.	00-18445
X	CHOKE	
-	SUPPRESSION CHOKE	29-18457

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.
F	FUSE - 20 AMP.	17-2278
L	DIAL LIGHT BULB - MAZDA NO. 44	17-3905
SPK	SPEAKER ASSEMBLY	17-18458
SW	POWER SWITCH	17-18422
TL	TRANSMISSION LINE	00-18456
VIB	VIBRATOR	17-1747



MODEL 510

Model 610 PUSH BUTTON ADJUSTMENT:

Any button may be set to any station desired. First, tune in the desired station by means of the thumb wheel. Second, turn the push button counter-clockwise two full turns. Then depress this button the full length of its stroke, and while depressed, tighten the button again by turning it clockwise. The button may now be released. To check the correct setting for this button, turn the thumb wheel to some other point and depress the push button. This will return the tuning mechanism to the station just set up. If it does not, repeat the foregoing sequence of operations more carefully. Each of the remaining buttons may be set to other stations in a like manner.

BALANCING INSTRUCTIONS:

All sensitivities given for ½ watt output = 1.4 V. across Voice Coil

Operation No.	Connect Bal. Oscillator to	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1	6A8 Grid	455	1, 2, 3 & 4	550 KC	50 uv
2	Ant. Coupler Through 20 uuf	1400	5	1400	
3	"	1400	6	1400	10 uv

IMPORTANT-SEE NOTE BELOW.

DESCRIPTION:

The Arvin Model 510 is a five-tube single unit Car Radio Receiver. This receiver is designed to mount under the lower edge of the instrument panel on all makes of cars.

Tuning is accomplished by rotating the calibrated thumb wheel on the lower front of the radio. Directly above the thumb wheel is located the volume control knob which also serves as the On-Off switch.

ANTENNA:

Arvin Antennas A25, A26, A27 and A28 are recommended for use with the Model 510 Arvin

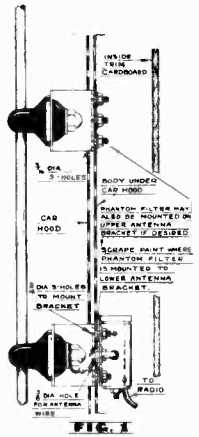


FIG. 1

Car Radio. If either the A25 or A26 antenna is selected the installation of the Phantom Filter to the antenna should be made as illustrated in Figure 1. If a side cowl type (A27 or A28) is selected the installation should be made as shown in Figure 2. Each antenna package has included in it detailed information as to the size and location of mounting holes.

INSTALLATION:

This receiver may be installed by securing it to the instrument panel of the car with the screws supplied in the hardware package. The rear end of the radio is supported by a perforated mounting bracket which may be bent to fit any installation requirement.

Illustrations in Figure 3 are representative of an average installation. Precaution should be taken, however, that the radio, when installed, does not interfere with the operation of the brake, clutch, cowl vent or emergency brake lever, and ample room for future installation for an Arvin Hot Water Heater should be allowed.

Ford V8 automobiles built in 1938 and 1939 require a special installation which is illustrated in Figure 4. The necessary spacer for this installation is included in the packing list. In installations other than the Ford V8 this spacer may be found useful in spacing away from the lip of the instrument panel one side of the radio (where the

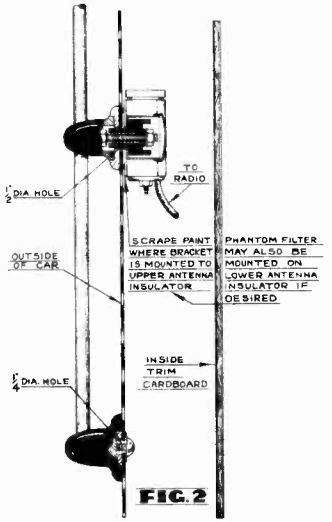


FIG. 2

lip of the instrument panel is not horizontal). In this case the spacer may be cut to the proper length with a hack saw. The spacer may also be cut into two equal lengths and used to space the entire front portion of the radio down from the lip of the instrument panel in order to avoid a projection of some sort such as a toggle switch.

The two front mounting bolts are 1¼ inches long to permit the Ford V8 installation shown in Figure 4. For other installations such as shown in Figure 3 these bolts may be cut down to ⅝ inches if desired to facilitate installation.

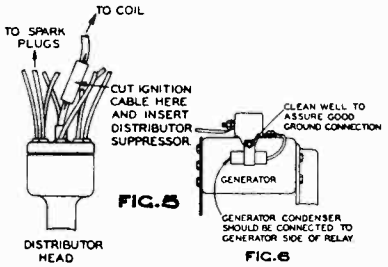


FIG. 5

FIG. 6

MOTOR INTERFERENCE ELIMINATION:
(See Fig. 5 & 6)

If after following the installation instructions in detail objectionable motor noise is encountered the following interference elimination procedure should be followed.

A standard distributor suppressor must be installed in series with the center high tension coil lead as close to the distributor as possible. This suppressor is not used with Ford V8 automobiles.

The generator condenser should be installed on the car generator as illustrated and the ammeter condenser should be connected between the ammeter or ignition switch terminal and the grounded metal instrument panel.

This interference elimination material can be obtained from your local Arvin Jobber.

The "A" lead from the receiver should be connected to the ammeter terminal of the car or to some other convenient point such as the ignition switch terminal in the Ford V8.

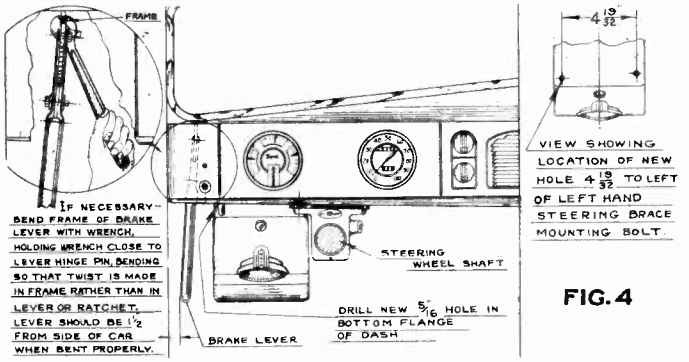


FIG. 4

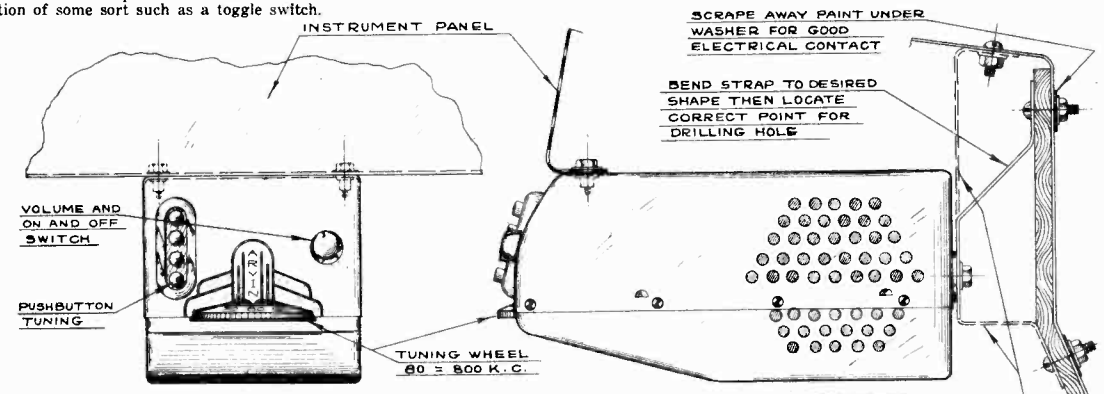
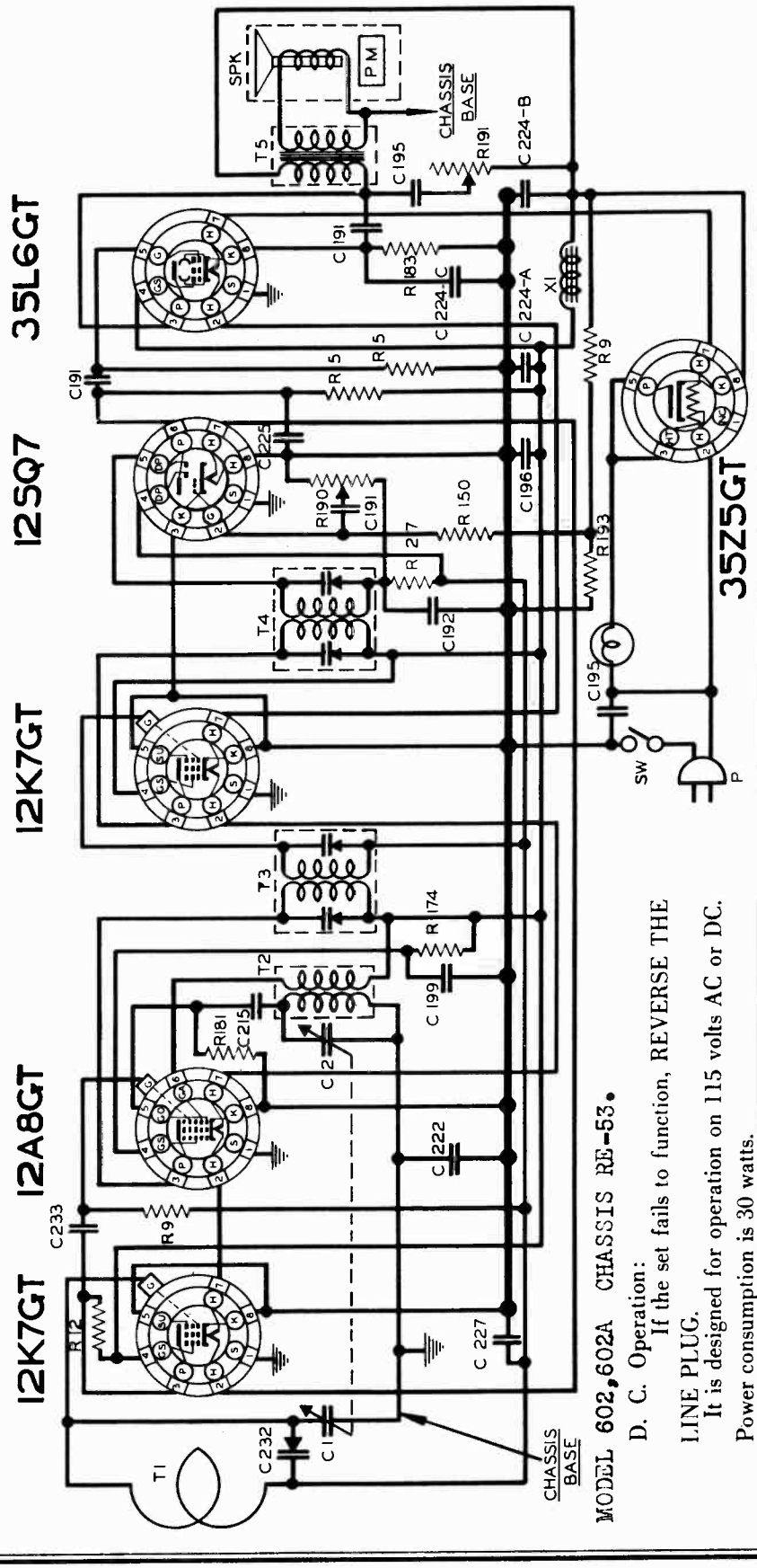


FIG. 3

NOTE:-This data also applies to the PUSH BUTTON MODEL 610 CHASSIS RE-58. ANTENNA DATA ALSO APPLIES TO MODELS 710,810.

NOBLITT-SPARKS INDUSTRIES, INC

MODELS 602,602A
Chassis RE-53
Schematic,Alignment



MODEL 602,602A CHASSIS RE-53.

D. C. Operation:
If the set fails to function, REVERSE THE LINE PLUG.
It is designed for operation on 115 volts AC or DC.
Power consumption is 30 watts.

RESISTORS

R	OHM	W	PART NO
5	500K	1/4	17-2070
9	1M	1/4	17-2080
12	10K	1/4	17-4275
27	2M	1/4	17-4788
150	5M	1/4	17-14242
174	20K	1/4	17-14291
181	100K	1/4	17-14303
183	150	1/4	17-14316
190	1M	VC.	17-14333
191	100K	T.C.	17-14334
193	2K	1/4	17-14337

CONDENSERS

C	CAPACITY	VOLT	PART NO
1	TWO-GANG		17-16411
2	VARIABLE		
191	.01	400	17-14272
192	.00025	600	17-14273
195	.05	400	17-14276
196	.1	200	17-14277
199	.02	200	17-14283
215	.0001	600	17-14310
222	.2	400	17-14317
224A	10 MFD.	150	
224B	20 MFD.	150	17-14319
224C	10 MFD.	15	
225	.0005	600	17-14321
227	.05	200	17-14323
232	2-20 UUF	PAD	17-14335
233	.000035	600	17-14336

TRANSFORMERS & CHOKES

T	TRANSFORMER	PART NO.
1	ANTENNA LOOP	17-16428
2	OSCILLATOR COIL	00-16404
3	FIRST I.F. COIL	00-16405
4	SECOND I.F. COIL	00-16406
5	OUTPUT TRANS.	00-16470
X	CHOKE	
I	IRON CORE CHOKE	00-16424

MISCELLANEOUS UNITS

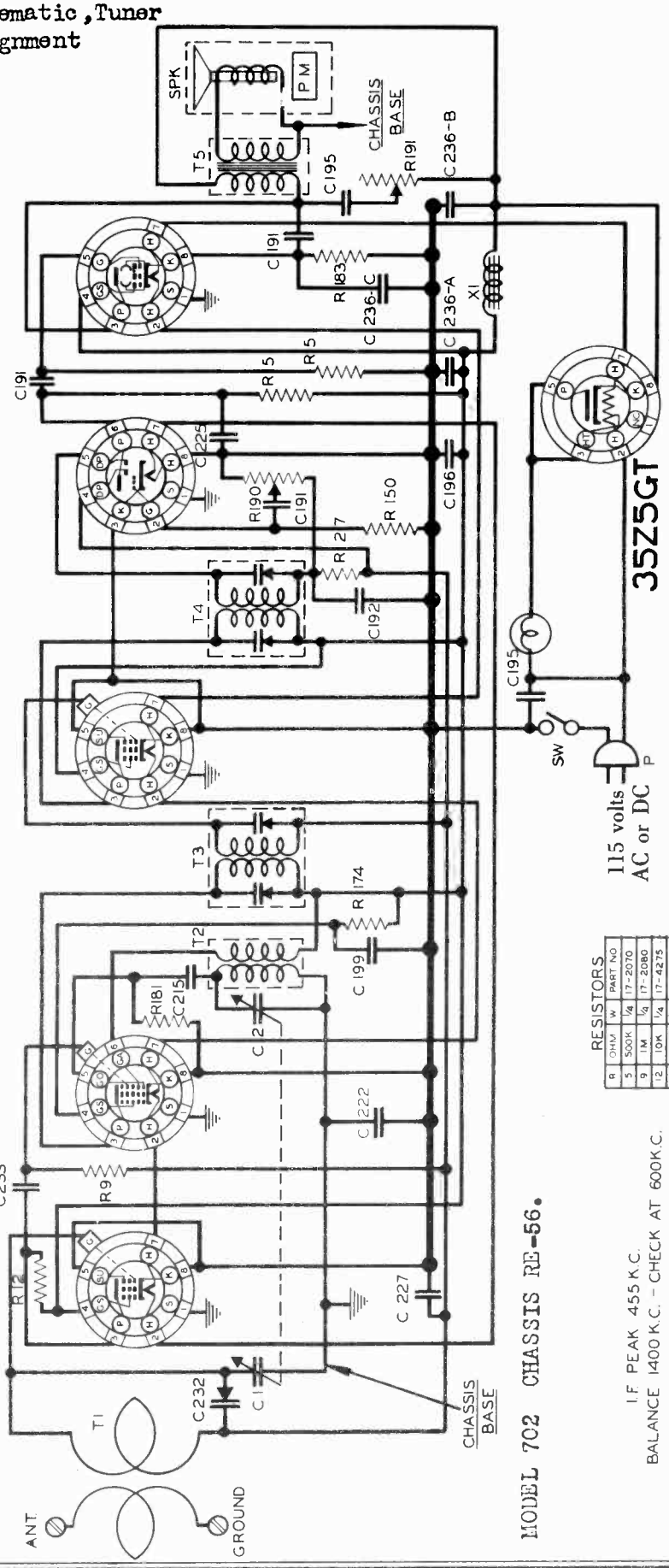
SYMBOL	MISCELLANEOUS UNITS	PART NO
L	DIAL LIGHT BULB - MAZDA 47	17-16376
P	LINE CORD & PLUG ASSEMBLY	17-16336
SPK	PERMANENT MAGNET SPEAKER	17-16408
SW	LINE SWITCH (SEE VOLUME CONTROL)	17-14333

I.F. PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600K.C.
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA

Part No. 29-3278

MODEL 702
Chassis RE-56
Schematic, Tuner
Alignment

NOBLITT-SPARKS INDUSTRIES, INC.



MODEL 702 CHASSIS RE-56.

I.F. PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.

Power consumption is 30 watts.

Push Button Adjustment:

Any button may be set up for any station desired. First, tune in the desired station by means of the manual tuning control. Second, turn the push button counter-clockwise two full turns. Then depress this button the full length of its stroke, and while depressed, tighten the button again by turning it clockwise. The button may now be released. To check the correct setting for this button, turn the manual control to some other point and depress the push button. This will return the tuning mechanism to the station just set up. If it does not, repeat the foregoing sequence of operations more carefully. Each of the remaining buttons may be set to other stations in a like manner.

MISCELLANEOUS UNITS

SYMBOL	MISCELLANEOUS UNITS	PART NO.
L	DIAL LIGHT BULB - MAZDA 47	17-16376
P	LINE CORD & PLUG ASSEMBLY	17-16336
SPK	PERMANENT MAGNET SPEAKER	17-16516
SW	LINE SWITCH (SEE VOLUME CONTROL)	17-16521

RESISTORS

R	OHM	W	PART NO.
5	500K	1/4	17-2070
9	1M	1/4	17-2080
12	10K	1/4	17-4275
27	2M	1/4	17-4788
150	5M	1/4	17-14242
174	20K	1/4	17-14291
181	100K	1/4	17-14303
183	150	1/4	17-14316
190	1M	VC	17-16521
191	100K	T.C.	17-16520

CONDENSERS

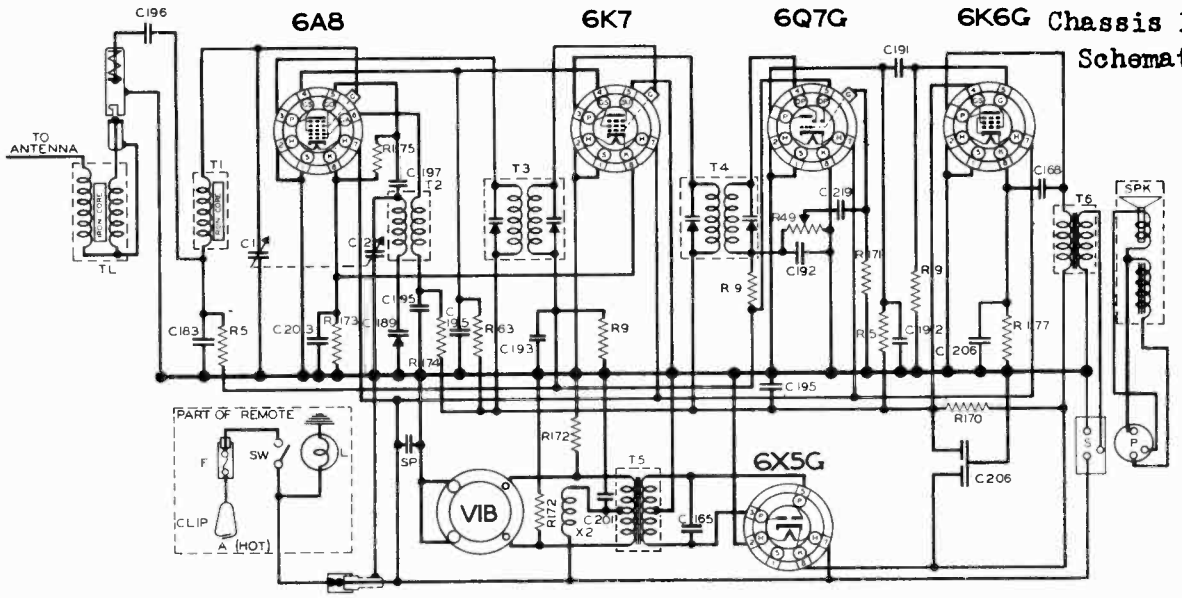
C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-16513
2	VARIABLE		
191	.01	400	17-14272
192	.00025	600	17-14273
195	.05	400	17-14276
196	.1	200	17-14277
199	.02	200	17-14283
215	.0001	500	17-14310
222	.2	400	17-14317
236A	20 MFD.	150	17-14344
236B	40 MFD	150	
236C	20 MFD.	25	
225	.0005	600	17-432
227	.05	200	17-14323
232	2-20 UUF	PAD	17-14335
233	.000035	600	17-14336

TRANSFORMERS & CHOKES

T	TRANSFORMER	PART NO.
1	ANTENNA LOOP	00-16530
2	OSCILLATOR COIL	00-16404
3	FIRST I.F. COIL	00-16531
4	SECOND I.F. COIL	00-16532
5	OUTPUT TRANS.	00-16533
X	CHOKE	
I	IRON CORE CHOKE	00-16534

MODEL 710, Chassis RE-59
MODEL 810, Chassis RE-60
Schematics

NOBLITT-SPARKS INDUSTRIES, INC.
ARVIN CAR RADIO CHASSIS RE59



ARVIN MODEL 710 CAR RADIO

RESISTORS			
R	OHMS	W	PART NO.
5	500K	½	7-2070
9	1M	½	17-2080
49	500K	½	17-4536
83	25K	½	17-4091
170	800	½	17-14287
171	1.5M	½	17-14288
172	100	½	17-14289
173	200	½	17-14290
174	20K	½	17-14291
175	40K	½	17-14292
177	650	½	17-14296

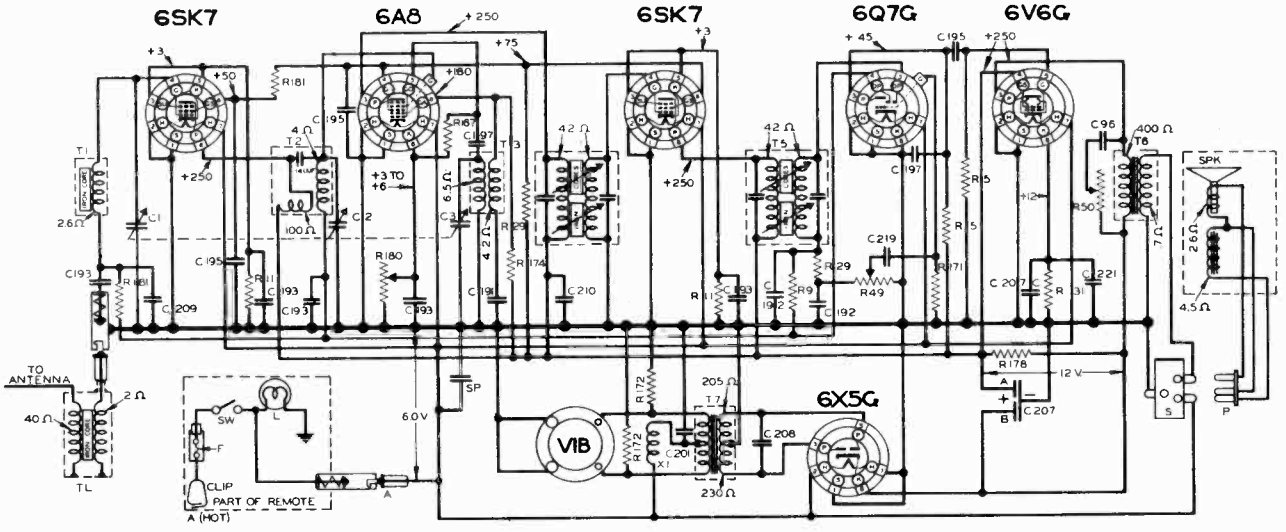
CONDENSERS			
C	CAPACITY	VOLT	PART NO
1	TWO-GANG VARIABLE		29-8234
165	.005	1200	17-14230
183	.003	600	17-14294
189	.0005	MID	17-14266
191	.01	400	17-14272
192	.00025	600	17-14273
193	.05	200	17-14274
195	.05	400	17-14278
196	1	200	17-14277
197	.0001	600	17-14278
219	.003	200	17-14312
201	5	150	17-14285
203	2	250	17-14942
206	10-10 MFD	300	
208	20 MFD	15	17-14291
86	.002	400	17-14234

CHOKES & TRANSFORMERS		
T-X	TYPE	PART NO
1	ANTENNA COIL	00-16219
2	OSCILLATOR COIL	00-16220
3	FIRST I.F. COIL	00-16283
4	SECOND I.F. COIL	00-16284
5	POWER TRANS.	00-16285
6	OUTPUT TRANS.	00-16286
X	CHOKES	
2	SUPPRESSION CHOKE	29-13459

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO
F	FUSE - 20 AMP	17-2228
L	DIAL LIGHT BULB - MAZDA NO 51	17-13904
P	SPEAKER PLUG	17-14760
S	SPEAKER SOCKET	17-1583
SPK	SPEAKER ASSEMBLY	17-15517
SW	POWER SWITCH	
TL	TRANSMISSION LINE	00-16233
SP	SPARK PLATE	
VIB	VIBRATOR	17-14747

I.F. PEAK 455 K.C.
FREQUENCY RANGE 1575 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA

ARVIN CAR RADIO CHASSIS RE-60



ARVIN MODEL 810 CAR RADIO

NOTE - ALL VOLTAGES GIVEN FOR "A" INPUT OF 6 VOLTS. ALLOW ± 10% ON ALL VOLTAGES & RESISTANCES OF WINDING.

RESISTORS			
R	OHMS	W	PART NO
5	500K	½	7-2070
9	1M	½	17-2080
11	2M	½	17-4262
29	50K	½	17-2060
31	280	½	17-2068
49	300K	½	17-4536
50	100K	½	17-4503
167	80K	½	17-4781
173	5M	½	17-14288
174	20M	½	17-14291
176	1200	1	17-14286
178	100	½	17-14289
180	2200	MIL	17-14302
181	100K	½	17-14303

CONDENSERS			
C	CAPACITY	VOLT	PART NO
1	THREE-GANG VARIABLE		17-15726
93	.05	600	7-4121
101	.01	200	17-4205
19	.01	400	7-14272
192	.00023	600	7-1273
193	.05	200	17-4274
95	.05	400	7-14278
97	.0001	600	17-14278
201	5	50	17-14285
20 A	10 MFD	400	
20 B	10 MFD	400	17-14289
207C	20MFD	25	
208	.003	600	17-4300
209	.00125	600	17-14303
210	.1	400	17-14304
221	.0002	600	17-14314
218	.003	200	17-4312

CHOKES & TRANSFORMERS		
T-X	TYPE	PART NO
1	TRANSFORMERS	
1	ANTENNA COIL	00-16400
2	R.F. COIL	00-16401
3	OSCILLATOR COIL	00-16302
4	FIRST I.F. COIL	00-16303
5	SECOND I.F. COIL	00-16404
6	OUTPUT TRANS	00-16305
7	POWER TRANS	00-6306
X	CHOKES	
1	SUPPRESSION CHOKE	29-16308

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO
F	FUSE - 20 AMP	17-2228
L	DIAL LIGHT BULB - MAZDA NO 51	17-3904
P	SPEAKER PLUG	17-4760
S	SPEAKER SOCKET	17-1583
SPK	SPEAKER ASSEMBLY	17-16310
SW	POWER SWITCH	
SP	SPARK PLATE	
TL	TRANSMISSION LINE	00-16307
VIB	VIBRATOR	17-14747

INTERMEDIATE FREQUENCY 170 K.C.
FREQUENCY RANGE 1570 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA

MODEL 710
MODEL 810
Socket, Trimmers
Alignment

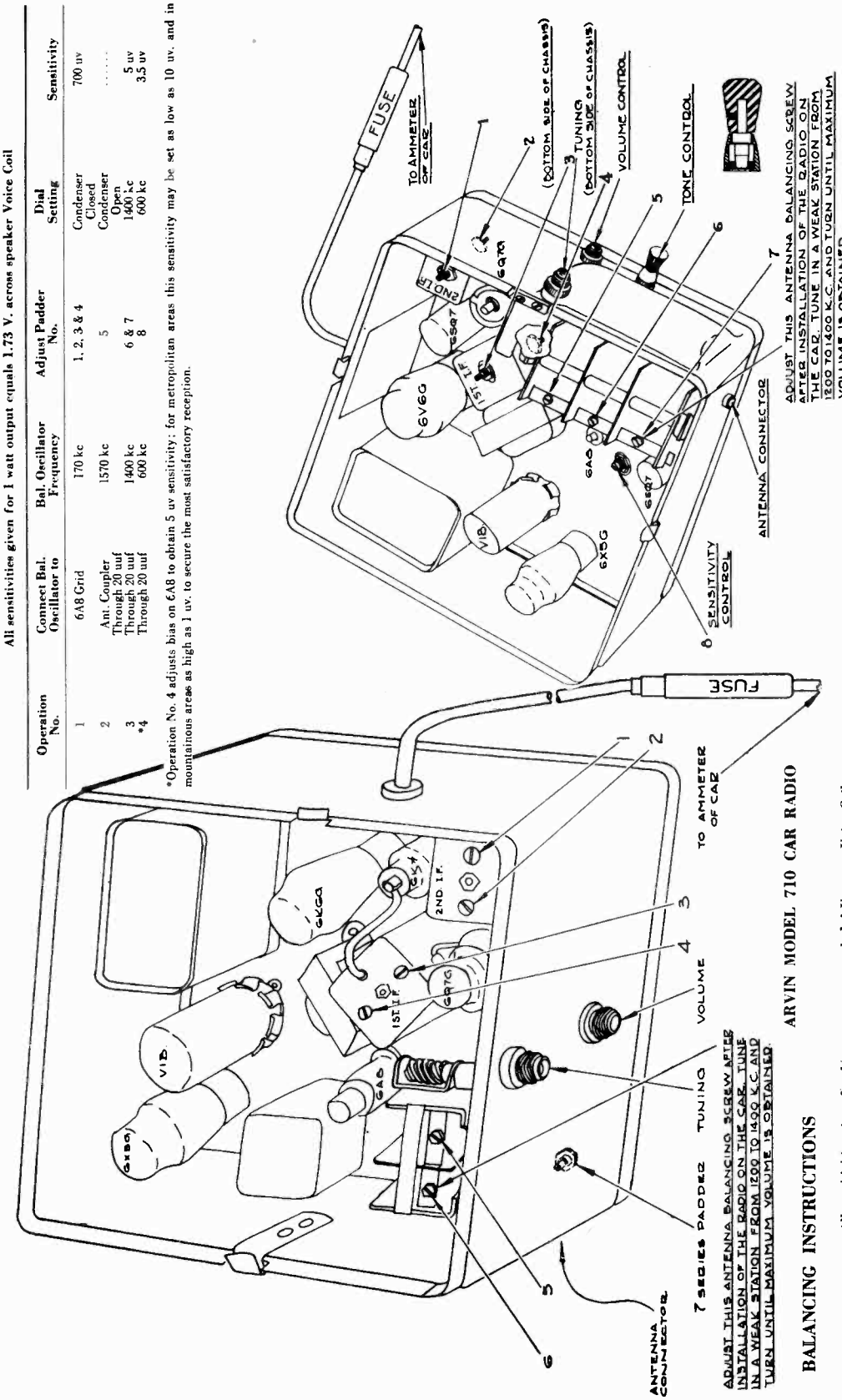
NOBLITT-SPARKS INDUSTRIES, INC.

ARVIN MODEL 810 CAR RADIO

All sensitivities given for 1 watt output equals 1.73 V. across speaker Voice Coil

Operation No.	Connect Bal. Oscillator to	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1	6A8 Grid	170 kc	1, 2, 3 & 4	Condenser Closed	700 uv
2	Ant. Coupler	1570 kc	5	Condenser Open	.....
3	Through 20 uuf	1400 kc	6 & 7	1400 kc	5 uv
*4	Through 20 uuf	600 kc	8	600 kc	3.5 uv

*Operation No. 4 adjusts bias on 6A8 to obtain 5 uv sensitivity; for metropolitan areas this sensitivity may be set as low as 10 uv. and in mountainous areas as high as 1 uv. to secure the most satisfactory reception.



FOR ANTENNA DATA
SEE INDEX

ARVIN MODEL 710 CAR RADIO

BALANCING INSTRUCTIONS

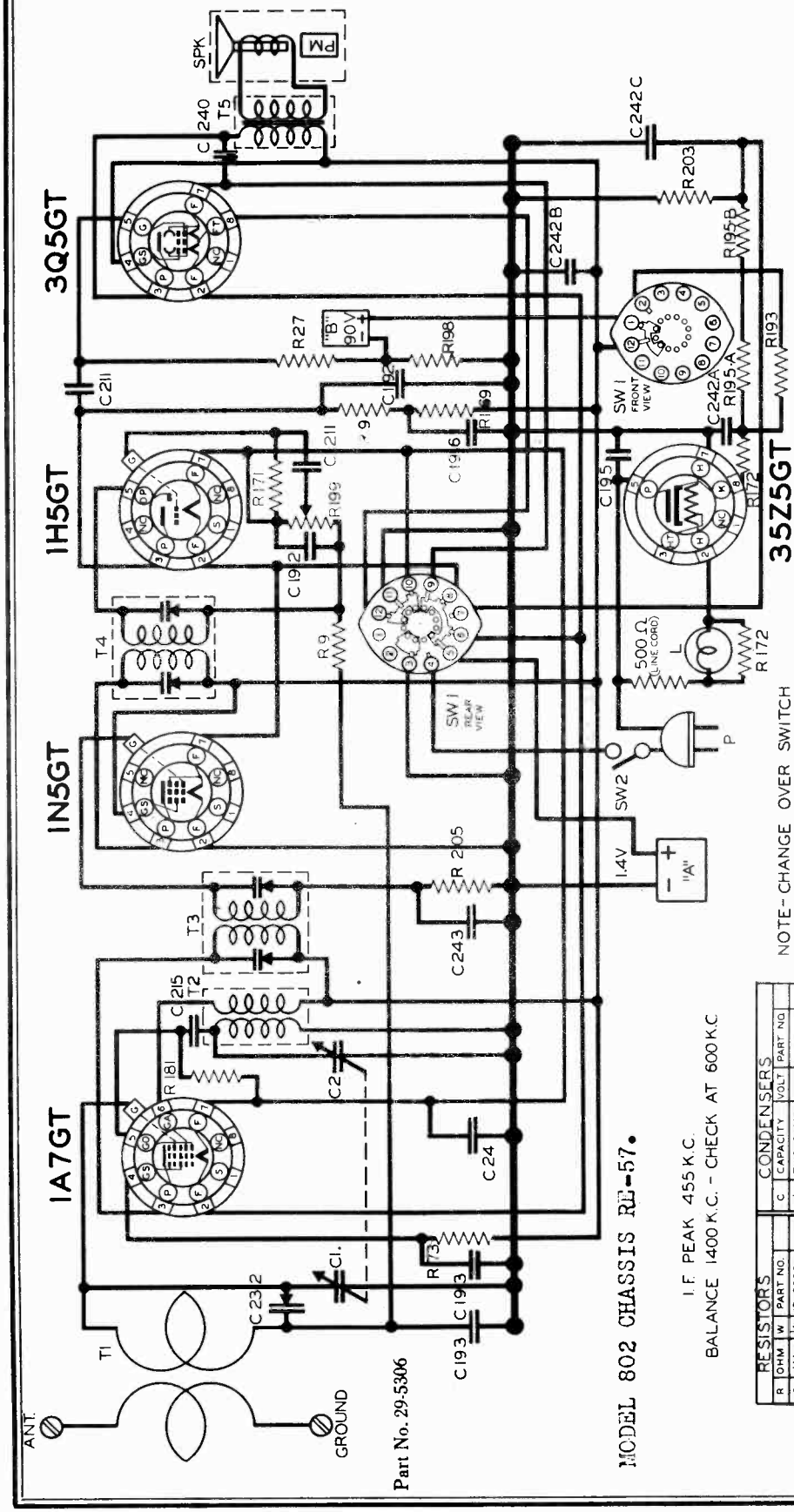
All sensitivities given for ½ watt output equals 1.4 V. across Voice Coil

Operation No.	Connect Bal. Oscillator to	Bal. Oscillator Frequency	Adjust Padder No.	Dial Setting	Sensitivity
1	6A8 Grid	455 kc	1, 2, 3 & 4	550 kc	50 uv
2	Ant. Coupler	1400 kc	5	1400 kc	
3	Through 20 uuf	1400 kc	6	1400 kc	10 uv
4	Through 20 uuf	600 kc	7	600 kc	10 uv

Alignment

NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 802
Chassis RE-57
Schematic,



MODEL 802 CHASSIS RE-57.

I.F. PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.

NOTE- CHANGE OVER SWITCH SHOWN IN BATTERY OPERATION POSITION.

Part No. 29-5306

The Arvin Model 802 is a five-tube Portable Radio Receiver designed to receive its operating power from either the self contained batteries in the receiver or a 115 volt AC or DC circuit.

All sensitivities given for 50 milliwatts output = .4 volts across Voice Coil.

BALANCING INSTRUCTIONS

Operation No.	Connect Bal. Oscillator to	Balance Oscillator Frequency	Adjust	Dial Setting
1	1A7 Grid	455 kc	1st & 2nd I.F. Trimmers	550 kc
2	Ant Post Through 20 uuf	1400 kc	Osc. Trimmer	1400 kc
3	Ant Post Through 20 uuf	1400 kc	Ant Trimmer	1400 kc

RESISTORS

R	OHM	W	PART NO.
9	1M	1/4	17-2080
27	2M	1/4	17-4788
73	30K	1/4	17-4276
169	150K	1/4	17-14282
171	15M	1/4	17-14286
172	100	1/4	17-14289
181	100K	1/4	17-14303
195A	460	2 3/4	17-14351
195B	1500	5 1/4	
198	400	1/4	17-14343
199	1M	VC.	17-14350
203	450	1/4	17-14354
193	2K	1/4	17-14337
205	3M	1/4	17-14356

CONDENSERS

C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-1641
2	VARIABLE		
192	.0025	600	17-14273
193	.05	200	17-14274
195	.05	400	17-14276
196	.1	200	17-14277
211	.01	200	17-4306
215	.0001	600	17-14310
24	.5	200	17-14040A
232	2-20 UUF	PAD	17-14335
240	.003	400	17-14348
242A	40	150	
242B	20	150	17-14353
242C	100	150	
243	.002	200	17-14357

TRANSFORMERS

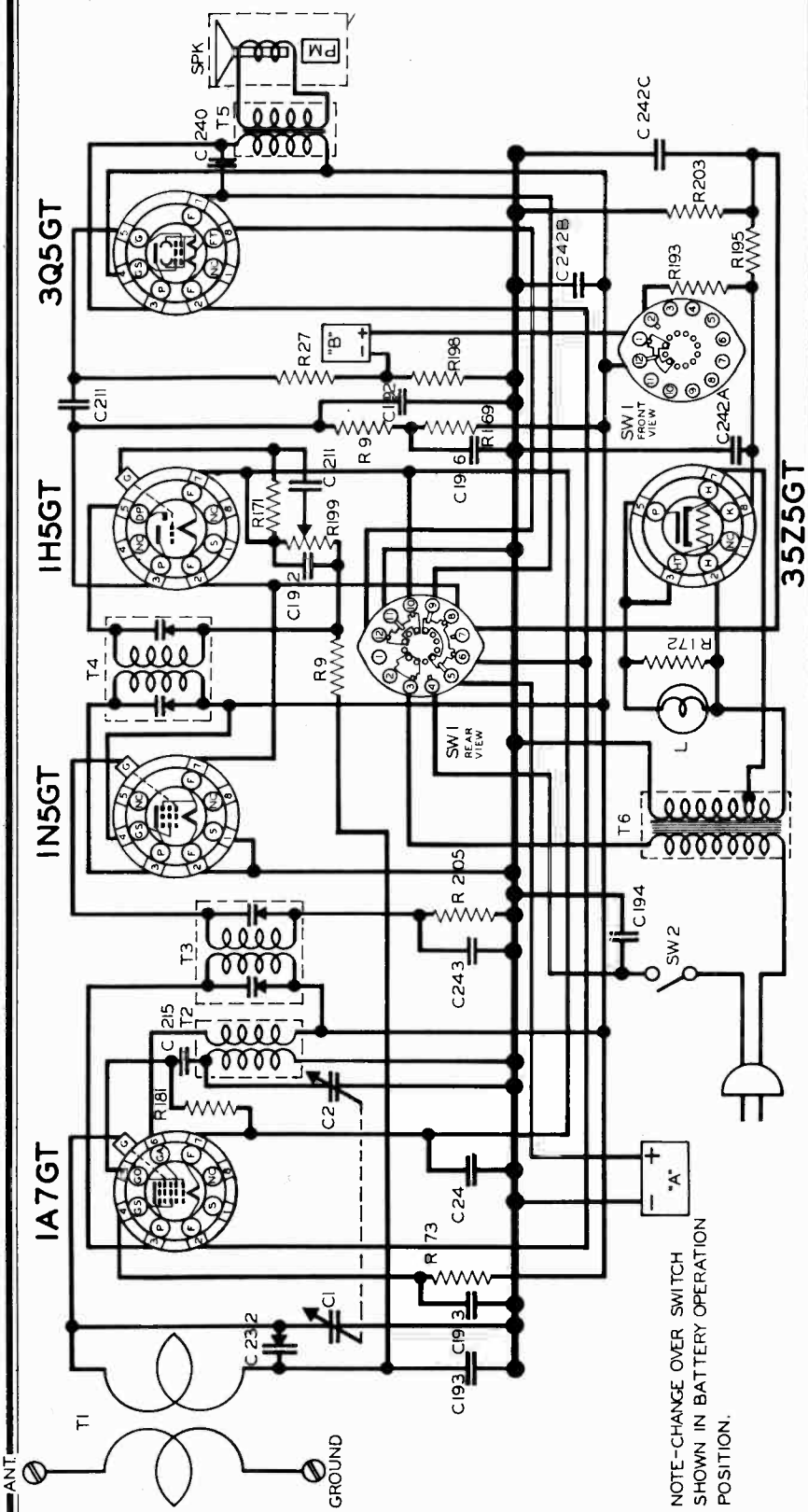
T	TYPE	PART NO.
1	ANTENNA LOOP	17-16551
2	OSCILLATOR COIL	00-16404
3	FIRST I.F.	00-16578
4	SECOND I.F. COIL	00-16579
5	OUTPUT TRANS.	00-16586

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.
A	1.5 VOLT "A" BATTERY	17-16563
B	TWO 45 VOLT "B" BATTERIES	17-16562
L	DIAL LIGHT BULB - MAZDA 47	17-16378
P	LINE CORD & PLUG ASSEMBLY	17-16492
SPK	SPEAKER ASSEMBLY - 5" PERMANENT MAGNET	17-16502
SW1	AC-DC-BATTERY SWITCH	17-16584
SW2	VOLUME CONTROL & LINE SWITCH	17-14350

MODEL 803
Chassis RE-63
Schematic, Alignment

NOBLITT-SPARKS INDUSTRIES, INC.



I.F. PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA.

TRANSFORMERS

T	TYPE	PART NO
1	ANTENNA LOOP	17-1655
2	OSCILLATOR COIL	00-16404
3	FIRST I.F. COIL	00-16578
4	SECOND I.F. COIL	00-16579
5	OUTPUT TRANS.	00-16615
6	POWER TRANS.	00-16606

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO
A	1.5 VOLT "A" BATTERY	17-16563
B	TWO 45 VOLT "B" BATTERIES	17-16562
L	DIAL LIGHT BULB - MAZDA 47	17-16378
P	LINE CORD & PLUG ASSEMBLY	17-16623
SPK	SPEAKER ASSEMBLY - 5" P.M.	17-1663
SW1	AC-DC BATTERY SWITCH	17-16564
SW2	VOLUME CONTROL & LINE SWITCH	17-14350

RESISTORS

R	OHM	W	PART NO
9	1M	¼	17-2080
27	2M	¼	17-4788
73	30K	¼	17-4278
169	150K	¼	17-14282
171	1.5M	¼	17-14286
172	100	¼	17-14289
181	100K	¼	17-14303
193	2K	¼	17-14337
195	1960	8	17-14351
198	400	¼	17-14343
199	1M	V.C.	17-14350
203	450	¼	17-14354
205	3M	¼	17-14356

CONDENSERS

C	CAPACITY	VOLT	PART NO
1	TWO-GANG		17-16549
2	VARIABLE		
24	.5	200	17-14040A
192	.00025	600	17-14273
193	.05	200	17-14274
194	.01	400	17-14275
196	.1	200	17-14277
211	.01	200	17-14306
215	.0001	600	17-14310
232	2-20 U.U.F.	PAD	17-14335
240	.003	400	17-14346
242A	40 MFD.	150	
242B	20 MFD.	150	17-14353
242C	100	25	
243	.002	200	17-14357

BALANCING INSTRUCTIONS

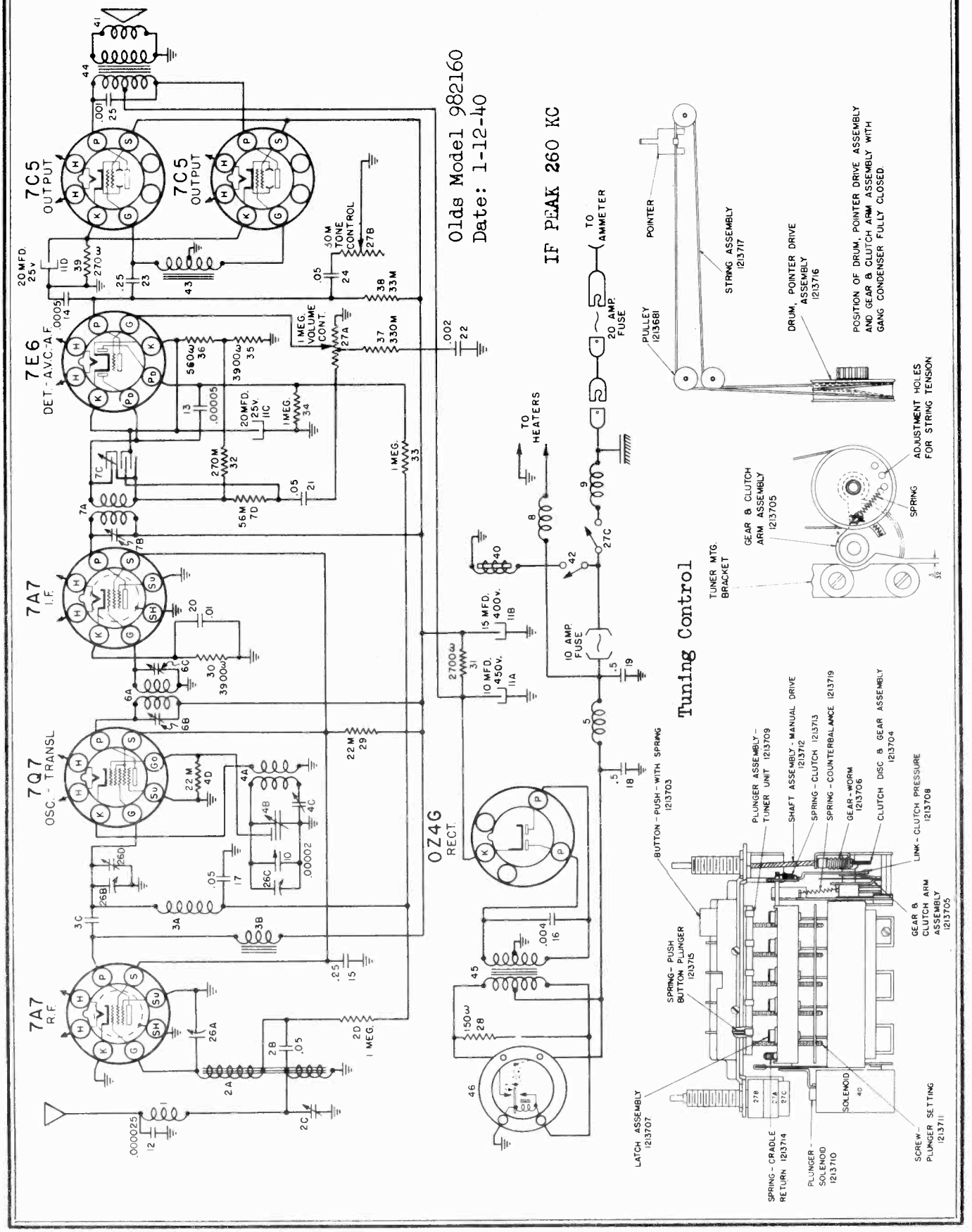
All sensitivities given for 50 milliwatts output = .4 volts across Voice Coil.

Operation No.	Connect Bal. Oscillator to	Balance Oscillator Frequency	Adjust	Dial Setting
1	1A7 Grid	455 kc	1st & 2nd I.F. Trimmers	550 kc
2	Ant Post Through 20 uuf	1400 kc	Osc. Trimmer	1400 kc
3	Ant Post Through 20 uuf	1400 kc	Ant Trimmer	1400 kc

MODEL 982160

OLDSMOBILE DIV.—GEN. MOTORS Schematic

Tuning Cont. Assembly



MODEL 982160 OLDSMOBILE DIV—GEN. MOTORS
Alignment, Trimmers
Chassis, Voltage

CIRCUIT ALIGNMENT

1. (a) Turn volume control to the maximum position.
(b) Connect the signal lead of the test oscillator to terminal X which is the grid prong of the 7Q7 tube through a .1 mfd. condenser.
(c) Connect the ground lead of the test oscillator to the chassis frame.
(d) Connect the output meter across the speaker voice coil at the terminal board mounted on the speaker.
(e) Set the test oscillator to exactly 260 kilocycles.
(f) Adjust trimmers "A", "B", "C" and "D" on the I-F transformers for maximum output.

2. (a) Leave the test oscillator leads connected as for aligning the I-F circuits.
1520 KC (b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.
(c) Set the test oscillator to 1520 kilocycles.
(d) Adjust the condenser "F" (Fig. 2) for maximum output. (It is very important that this frequency be set accurately as a slightly improper setting will cause the receiver to be out of track over the high frequency end of the dial).

3. (a) Leave the test oscillator leads connected the same as before.
540 KC (b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.
(c) Set the test oscillator to 540 kilocycles.
(d) Adjust the oscillator padding condenser "G" (Fig. 2) for maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.).

4. (a) Remove the signal lead of the test oscillator from the grid terminal of the 7Q7 tube (Terminal marked X, Fig. 2) and connect to the antenna receptacle of the receiver THROUGH a .00007 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00007 mfd. mica condenser be used when aligning the antenna stage of this receiver in order that the circuit can be made to track properly.)
1400 KC (b) Set the test oscillator to 1400 kilocycles.
(c) Turn the condenser rotor plates until this frequency is tuned in with maximum output.
(d) Adjust the R-F parallel trimmer "E" (Fig. 2) on the gang condenser and the antenna compensating condenser "H".

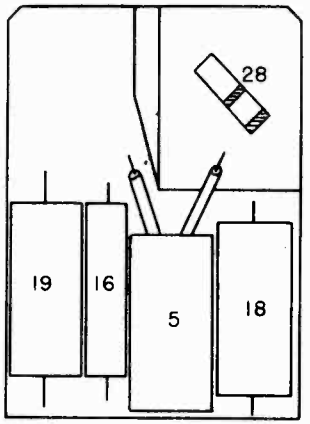
5. (a) Set the test oscillator at 600 K.C.
600 KC (b) Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.
(c) Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser "C" (Fig. 2) while rocking the variable condenser gang tuning shaft back and forth through the signal.
(d) This operation should be continued until no further increase in output can be obtained.

6. Adjusting Receiver to Car Antenna.

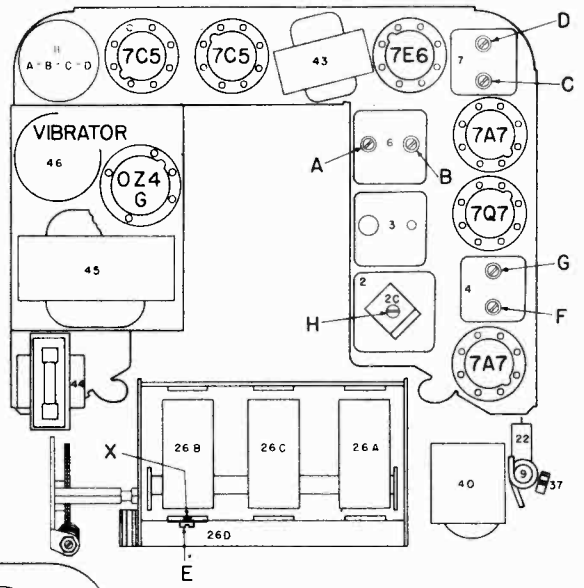
When the receiver leaves the factory the antenna circuit is closely aligned to match the capacity of the car antenna. However, due to variations in antenna capacity, it will be necessary with set installed in car, to adjust the antenna trimmer to match the car antenna. This should be done as follows:

(a) Make sure antenna lead is connected properly.
(b) Be sure the antenna is fully extended (all the way out).
(c) Turn set on and tune in a very weak station between 120 and 150 (near 150). Adjust the antenna trimmer "F" for maximum volume. Do not disturb the oscillator or the R-F trimmers in making this adjustment.

NOTE: If the entire alignment procedure has been accomplished accurately, the receiver should be very nearly uniformly sensitive over the entire frequency range.

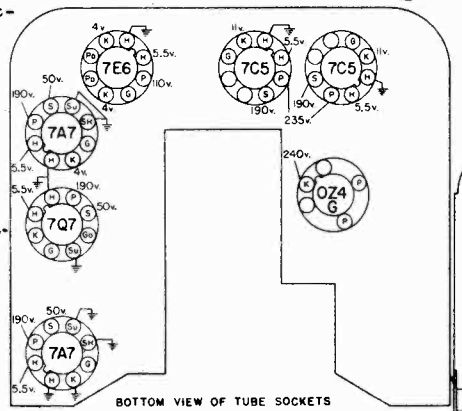


Bottom of Power Pack



Chassis Parts Layout - Top

Olds Model 982160
Date: 1-12-40

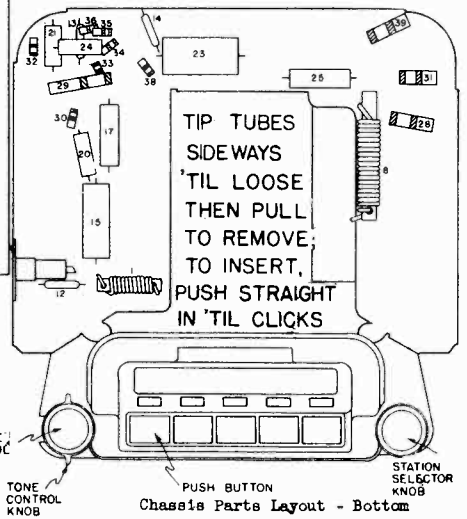


BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6.0 VOLTS. CURRENT DRAIN 6.5 AMPERES. "B" SUPPLY DRAIN APPROXIMATELY 50 M.A.

RADIO DATA

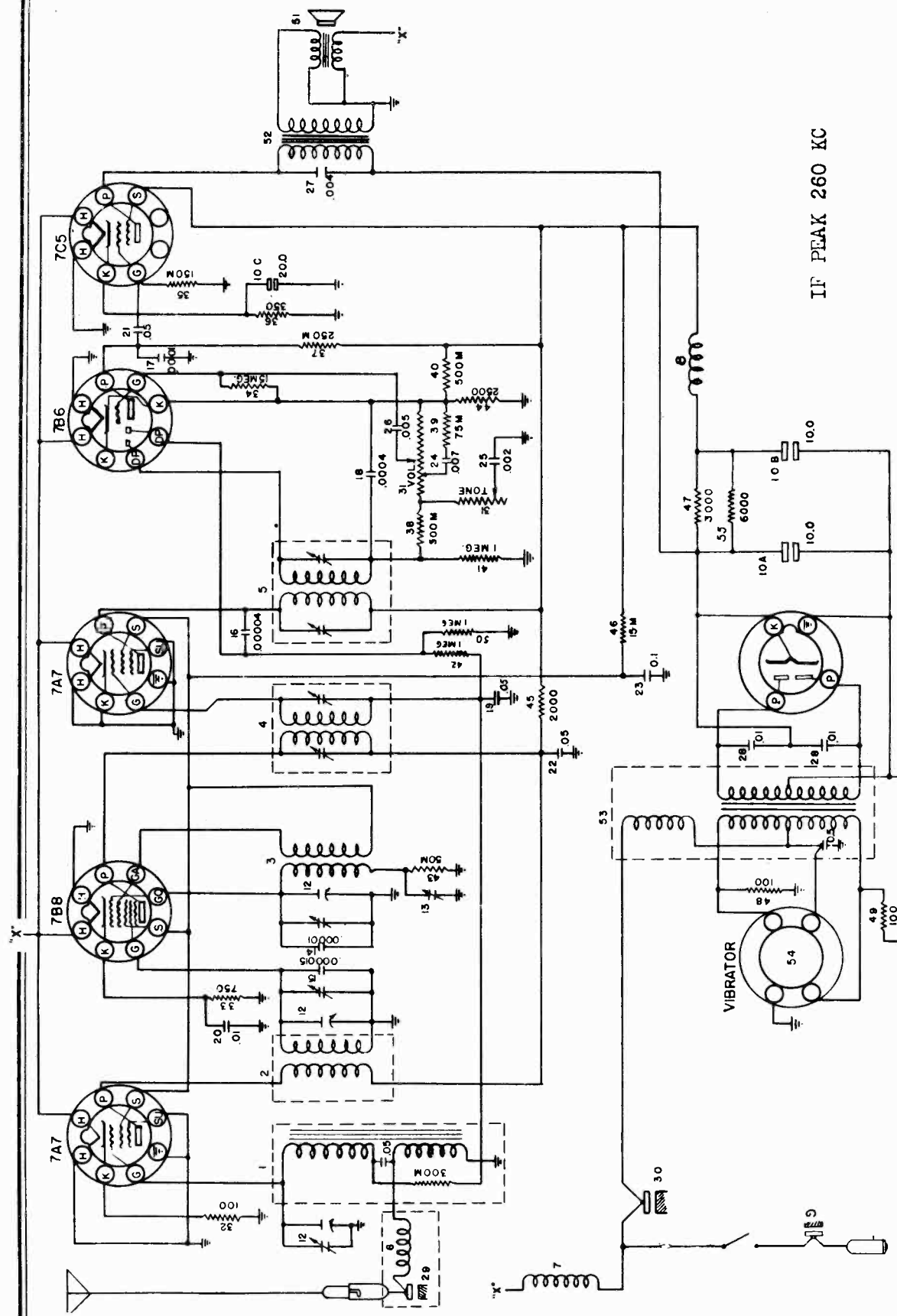
MODEL NUMBER - 982160
SERIAL NUMBER - 580 C001 & UP
TUBE COMPLEMENT - 7A7, 7Q7, 7A7, 7E6, 7C5, 7C5, 0Z4G
BATTERY CURRENT - 6.5 AMPERES
B+ VOLTS - 240
I.F. K.C. - 260
R.F. K.C. - 1520 - 540
VIBRATOR TYPE NON SYNCHRONOUS
YEAR - 1940



Chassis Parts Layout - Bottom

OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982161
Schematic



CIRCUIT ALIGNMENT

An accurately calibrated test oscillator or signal generator and an output meter must be used to align the receiver circuits correctly. To make all alignment adjustments, the back cover must be removed. All trimmers except the oscillator series trimmer are readily accessible (See "A", "B", "C", "D", "F", Fig. 2). The oscillator series trimmer ("J2" Fig. 3) is adjusted through a hole in the side of the case.

1. I-F Alignment at 260 Kilocycles.

   (a) Connect an output meter across the speaker field coil, leaving speaker connected.
   (b) Connect the signal lead of the test oscillator to the gang condenser terminal to which condenser No. 15 is connected (Fig. 2).
   (c) With the test oscillator set at exactly 260 K.C. adjust the I-F trimmers "A", "B", "C", and "D" until a maximum output is obtained. Recheck alignment several times with oscillator output signal low as possible for suitable output readings.

2. Alignment at 1560 Kilocycles.

   (a) Connect the test lead of the test oscillator to the receiver antenna connection through a .00005 mfd. condenser.
   (b) Turn the rotor plates of the gang condenser all the way out against the high frequency stop.
   (c) Set the test oscillator to 1560 K.C.
   (d) Adjust the oscillator trimmer "E" (Fig. 2) until a maximum output is obtained.

3. Alignment at 1400 Kilocycles.

   (a) Leave the test oscillator leads connected the same as for alignment at 1560 Kilocycles. Set the test oscillator frequency at 1400 kilocycles.
   (b) Tune the set to this signal.
   (c) Adjust the R-F trimmer "H" and the antenna trimmer "F" (Fig. 2) for maximum output.

4. Alignment at 600 Kilocycles.

   (a) Leave the test oscillator leads connected the same as for alignment at 1400 K.C. Set the test oscillator frequency at 600 K.C.
   (b) Tune set to this signal.
   (c) Adjust the oscillator series trimmer "J" (Fig. 3) through the side of the case for maximum output, while rocking the tuning dial back and forth through the signal.

5. Realignment at 1560 and 1400 Kilocycles.

Repeat alignment of R-F and antenna sections of the gang condenser as outlined under paragraphs 2 and 3.

6. Adjusting Receiver to Car Antenna.

When the receiver leaves the factory the antenna circuit is closely aligned to match the capacity of the car antenna. However, due to variations in antenna capacity, it will be necessary with set installed in car, to adjust the antenna trimmer to match the car antenna. This should be done as follows:

   (a) Make sure antenna lead is connected properly.
   (b) Be sure the antenna is fully extended (all the way out).
   (c) Turn set on and tune in a very weak station between 120 and 150 (near 150). Adjust the antenna trimmer "F" for maximum volume. Do not disturb the oscillator or the R-F trimmers in making this adjustment.

Olds Model 982161
Date: 1-12-40

Fig. 2 Chassis Parts Layout - Top

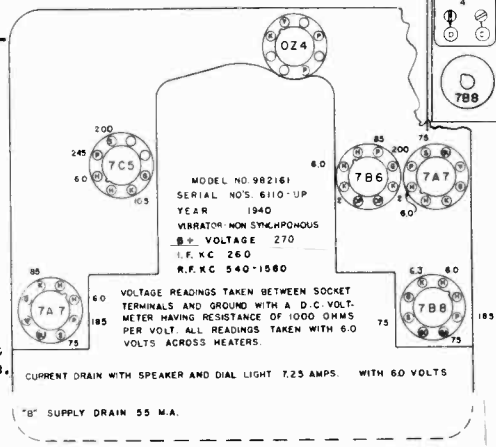
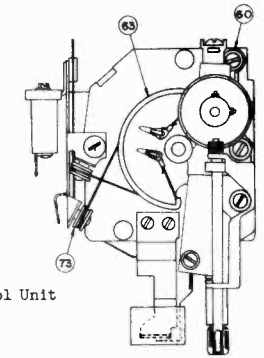


Fig. 4 Chassis Tube Voltage Chart



Tuning Control Unit

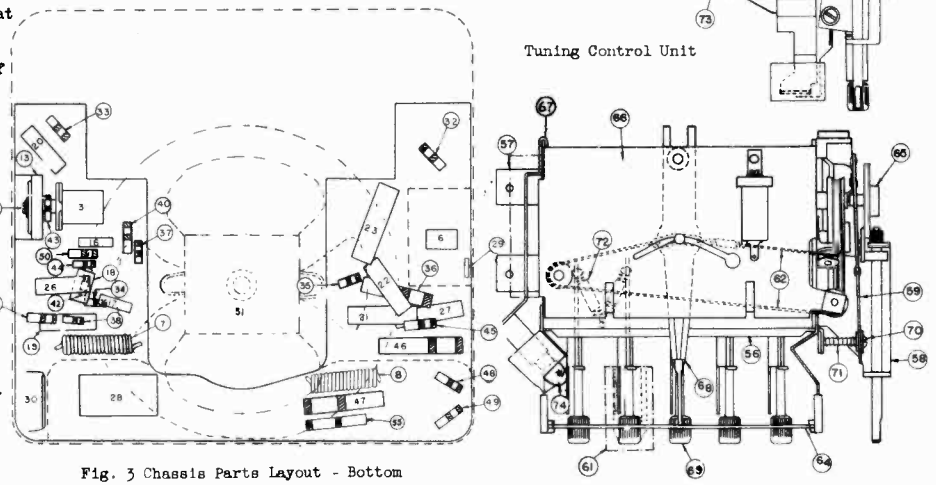


Fig. 3 Chassis Parts Layout - Bottom