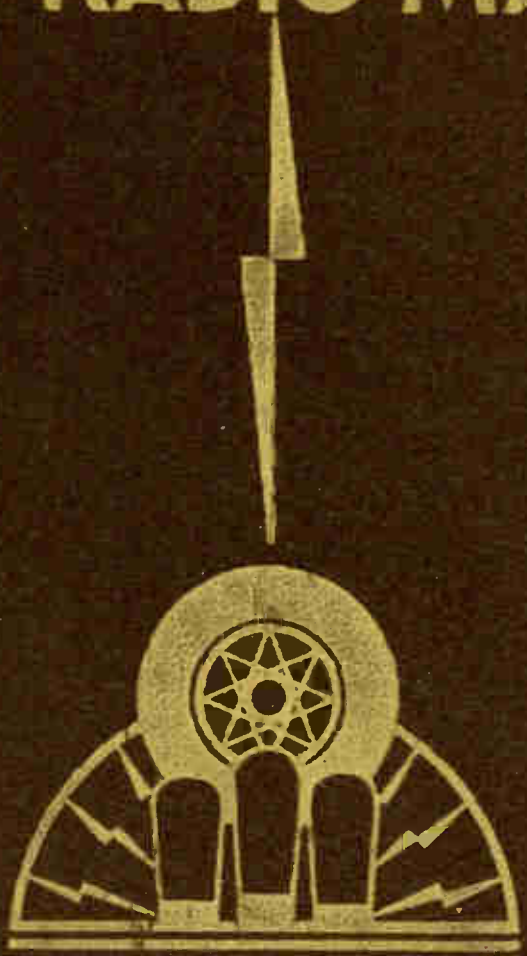
Specialized
AUTO RADIO MANUAL



JOHN F. RIDER

Volume II

Specialized

AUTO RADIO MANUAL

VOLUME II

by

John F. Rider

JOHN F. RIDER
Publisher
1440 Broadway New York City

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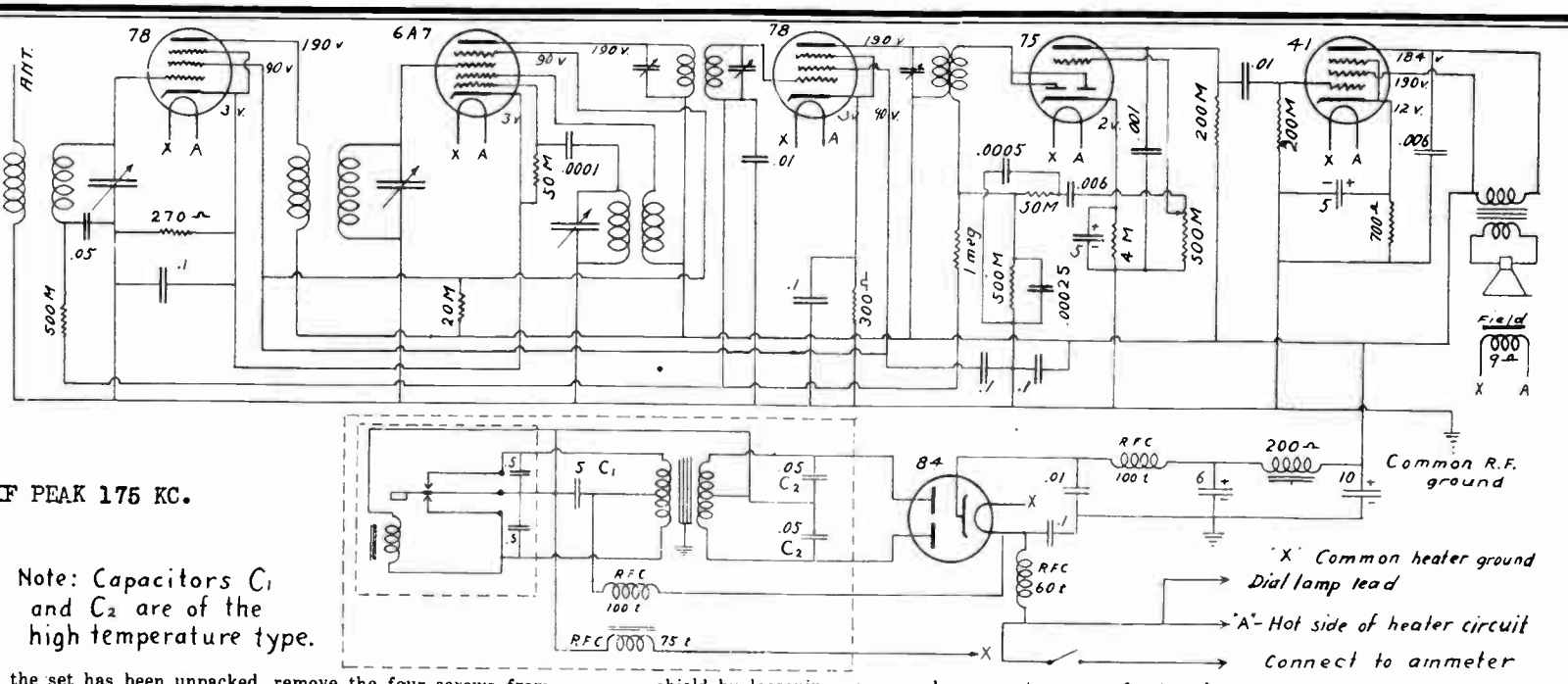


IF PEAK 175 KC.

Note: Capacitors C_1 and C_2 are of the high temperature type.

After the set has been unpacked, remove the four screws from bottom of cabinet, remove the front cover by carefully inserting screw driver at either side and exerting slight twisting pressure, slide chassis forward out of cabinet and inspect tubes to make sure if they are completely down in their sockets, after which replace chassis, front of cabinet and four screws as they were originally.

Determine most satisfactory mounting position on bulkhead which should be at the left hand side or directly in front of steering column. Spot the mounting bolt location and drill ½" diameter hole. Insert bolt through hole and assemble washer and nut on engine side. Hang receiver over bolt head and tighten nut.

Attach flexible shafts to control unit by first inserting shaft as far in as possible and then tighten set screws of shaft housing, being careful it is not so tight as to cause shaft to bind in housing.

Mount control unit on steering column in approximately correct position, set pointer to 530 on dial, turn upper control of receiver to extreme clockwise position, carefully place right hand shaft in position on upper receiver control and left hand shaft on lower control and tighten set screws securely.

Adjust control unit position so that shafts leave set with least amount of bend possible and fasten securely in this position. Trial of controls will show best location for smooth operation.

Attach heavy rubber covered lead to ammeter terminal.

Connect pilot light wire from control head to short black wire on set, making connection close to set, and tape up joint. Ground shield by loosening screw under nearest corner of set and connecting wire therefrom to end of shield and tighten up screw.

Disconnect ignition leads from spark plugs, attach one suppressor to top of each plug and reattach the ignition lead to free end of suppressor. Disconnect center wire from distributor head, and substitute distributor suppressor, then plug center wire into free end of suppressor.

Attach generator bypass condenser to generator frame by means of screw holding cut-out. Connect wire from condenser to generator side of cut-out switch.

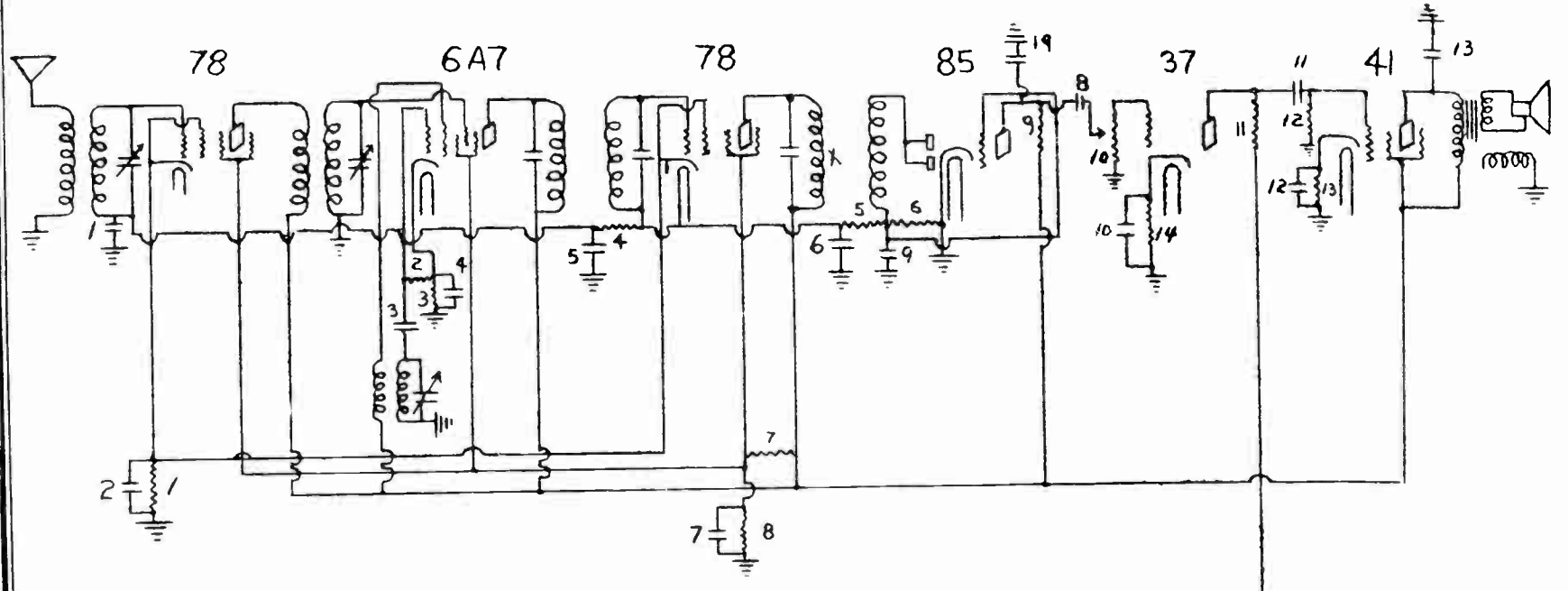
Turn left hand knob on control head to right. If connection directions have been correctly followed, dial should become illuminated immedately and the tubes reach correct operating temperature in approximately 30 seconds.

Balancing Intermediate Frequency Coils. These are peaked to 175 K. C. and are trimmed through the top of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Chassis must first be removed from cabinet and signal from test oscillator fed into grid cap of the 6A7 tube.

Balancing R. F. Coils. The tuning control must first be attached to tuning condenser shaft with pointer set to 530 when tuning condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car slightly readjust first trimmer through hole in top of cabinet.

MODEL F-9551
Schematic

ALLIED RADIO CORP.

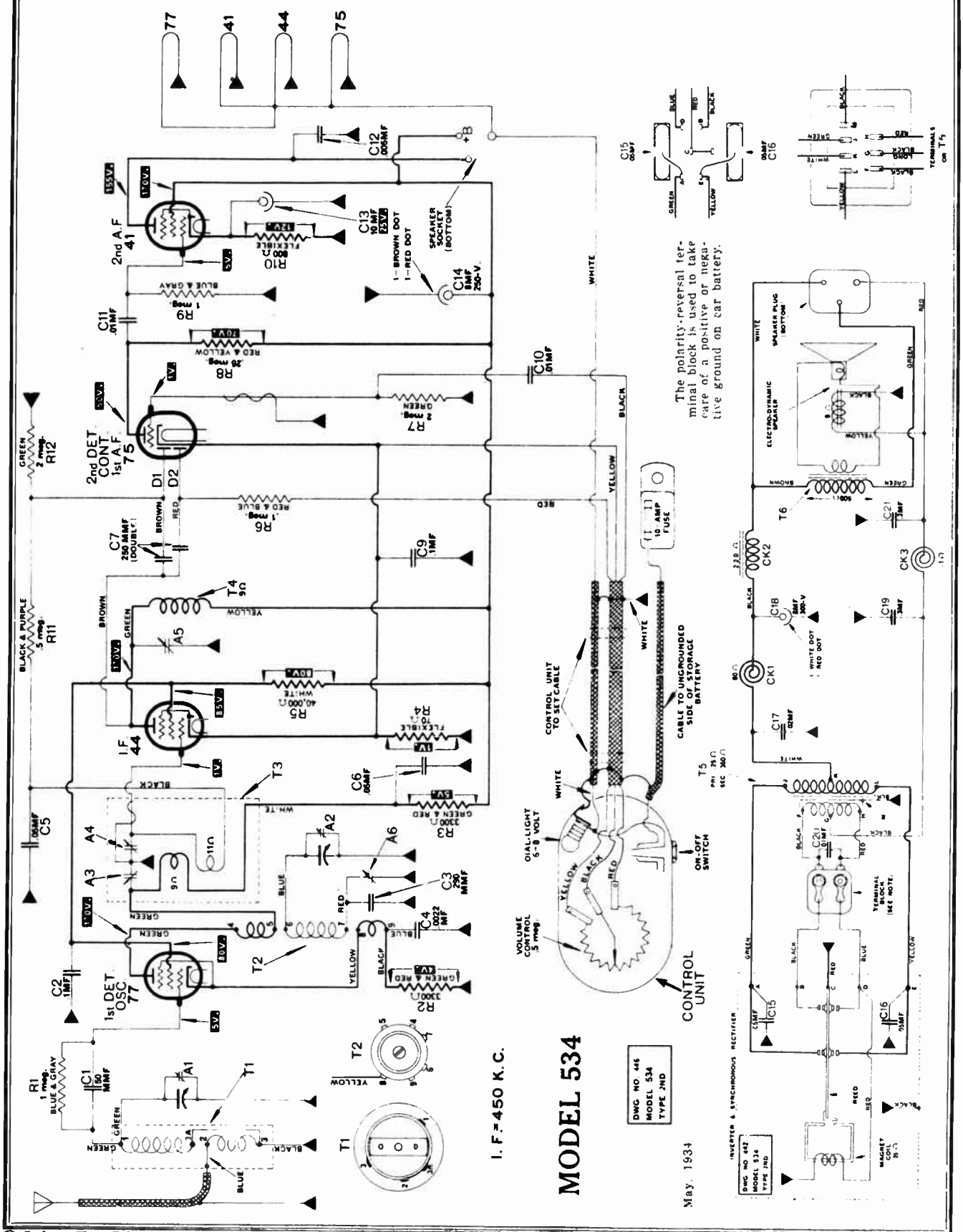


	Resistors	Condensers
1	250	.1
2	25000	.1
3	250	.0002
4	200 000	.1
5	500 000	.1
6	200 000	.1
7	25000	.1
8	25000	.01
9	100 000	.001
10	200 000	10 MFD.
11	100 000	.01
12	100 000	10 MFD.
13	1000	.01
14	2000	1. MFD.
15	1000	.1
16	50000	1. MFD
17		8 MFD
18		16 MFD
19		.0002

ALLIED RADIO
Engineering Division
DESIGNED BY PAR
DRAWN BY MB
APPROVED AR
DATE 12/26/33

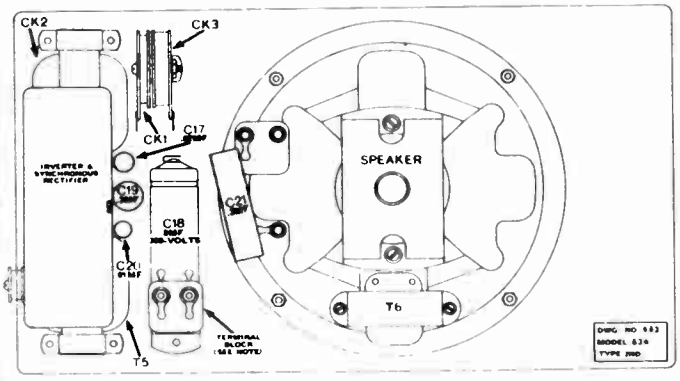
ATWATER-KENT MFG. CO.

MODEL 534 (2nd) Schematic



MODEL 534 (2nd)
Socket, Speaker, Parts
Trimmers

ATWATER-KENT MFG. CO.



MODEL 534

Part No.	Name of Part
25655	Set container
25653	Container cover
25475	Wire screen
25482	Set mounting bolt, 2½" x ⅜"
24486	Nut, ⅜"
24485	Lockwasher, ⅜"
21143	Plug suppressor
21144	Distributor suppressor
23260	Generator condenser, 1 MF, 200-V.
23520	Ignition filter
25609	Shield for No. 1 R. F. T.
25441	Shielded grid lead and cap
25287	Variable condenser assembly
25406	Station selector clamp
25519	Antenna cable, 24"
21126	Control pulley
21127	Control pulley spring
25851	Spring centering ring

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	33710	No. 1 R. F. T.
T2	33720	Oscillator T.
T3	25651	No. 1 I. F. T.
T4	33790	No. 2 I. F. T.
T5	25371	Power T.
T6	25606	Output T.

RESISTORS

Code No.	Part No.	Name of Part
R1	30360	Blue-gray, 1 U, 1/3-W.
R2	30380	Red-green, 3300 Ω, 1/3-W.
R3	30380	Red-green, 3300 Ω, 1/3-W.
R4	15820	Flexible, 70 Ω
R5	26160	White, 40,000 Ω, ½-W.
R6	30340	Red-blue, .1 U, 1/3-W.
R7	30370	Green, 2 U, 1/3-W.
R8	31970	Red-yellow, ¼ U, 1/3-W.
R9	30360	Blue-gray, 1 U, 1/3-W.
R10	20120	Flexible, 800 Ω
R11	30350	Bl'k-purple, .5 U, 1/3-W.
R12	30370	Green, 2 U, 1/3-W.

CONDENSERS

Code No.	Part No.	Name of Part
C1	30260	50 MMF, letter E stamped on washer, 450-V.
C2	31530	.1 MF, 100-V., NI
C3	33680	290 MMF, 100-V.
C4	33660	.0022 MF, 450-V., IND.
C5	31160	.05 MF, 100-V., NI
C6	26820	.05 MF, 200-V., NI
C7	33630	Double 250 MMF, 450-V., IND.
C9	31530	.1 MF, 100-V., NI
C10	23250	.01 MF, 450-V.
C11	27630	.01 MF, 200-V., IND.
C12	28040	.005 MF, 200-V., IND.
C13	25379	Dry electrolytic, 10 MF, 25-V.
C14	25385	Dry electrolytic, 8 MF, 250-V.
C15	33070	.05 MF, 450-V.
C16	33070	.05 MF, 450-V.
C17	29030	.02 MF, 450-V., NI
C18	25384	Dry electrolytic, 8 MF, 300-V.
C19	31150	.3 MF, 100-V., NI
C20	27630	.01 MF, 200-V., IND.
C21	31150	.3 MF, 100-V., NI

TRIMMER CONDENSERS

Code No.	Part No.	Name of Part
A3, 4	32880	Double I. F. trimmer
A5	24495	Single I. F. trimmer
A6	31870	Single trimmer

CHOKES

Code No.	Part No.	Name of Part
CK1	17015	R. F. "B" filter choke
CK2	33450	A. F. filter choke
CK3	23530	R. F. "A" filter choke

SOCKETS

Part No.	Name of Part
24493	5 prong
25196	3 prong
24494	6 prong
23147	Fuse

POWER UNIT SUPPLY

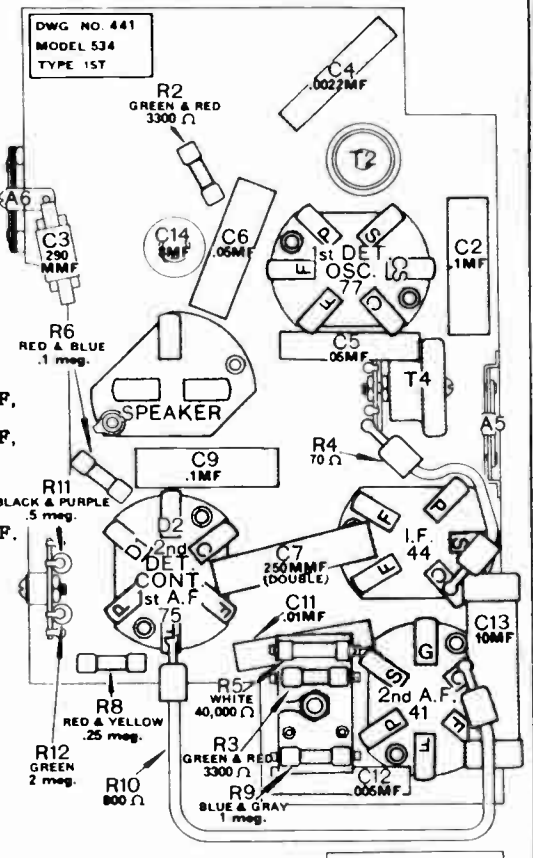
Part No.	Name of Part
25595	Vibrator assembly
25563	Connector card, female
25564	Connector card and bracket, male
25344	Insulator (fish paper)

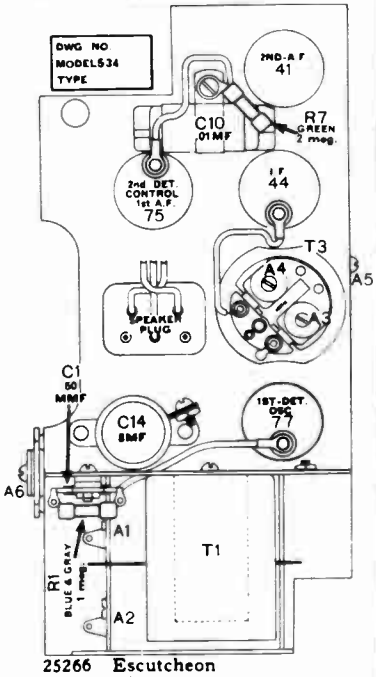
MISCELLANEOUS PARTS

Part No.	Name of Part
21406	Fuse, 10 amp.
25658	Shipping container
20976	Lockswitch key

REMOTE CONTROL UNIT

Part No.	Name of Part
33430	Remote control unit complete
21496	Volume control, .5 U
21325	Volume control knob
24169	Dial knob
21491	Lockswitch
21407	Dial lamp (6-8 volts, ¼ amp.)
25483	Remote control unit to set cable, 4'
26179	Station selector cable, 4' 11"
26181	Station selector cable sheathing, 4'
25492	Shielded lead to ungrounded side of battery, 6' 6"





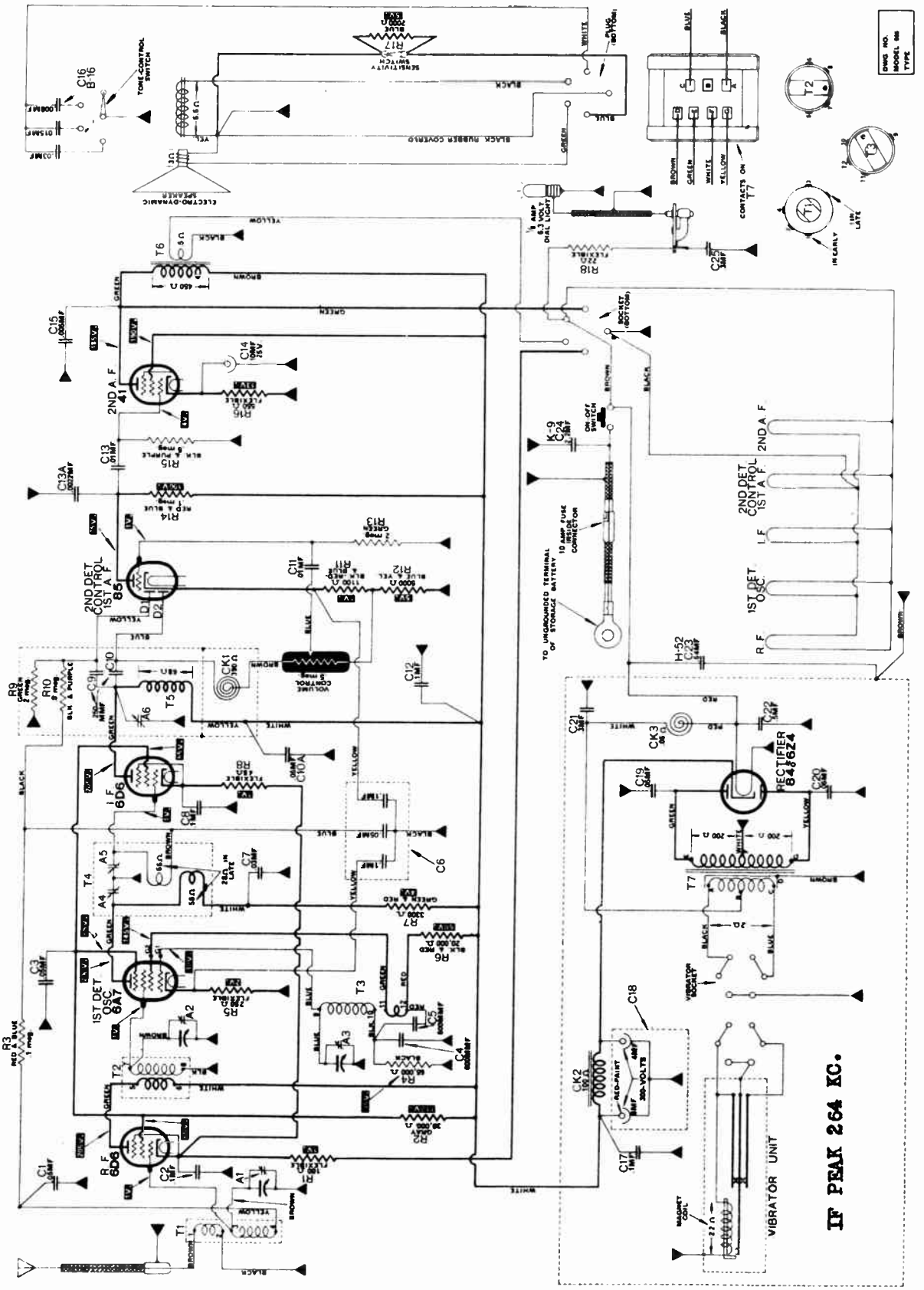
Part No.	Name of Part
25266	Escutcheon
26173	Dial

534 SPEAKER

Part No.	Name of Part
25534	Speaker complete
25603	Conehead assembly
25605	Field coil, 8 Ω
25606	Output transformer (T6)
25403	Speaker cable and plug
25652	Cloth cover

MODEL 666
Schematic

ATWATER-KENT MFG. CO.



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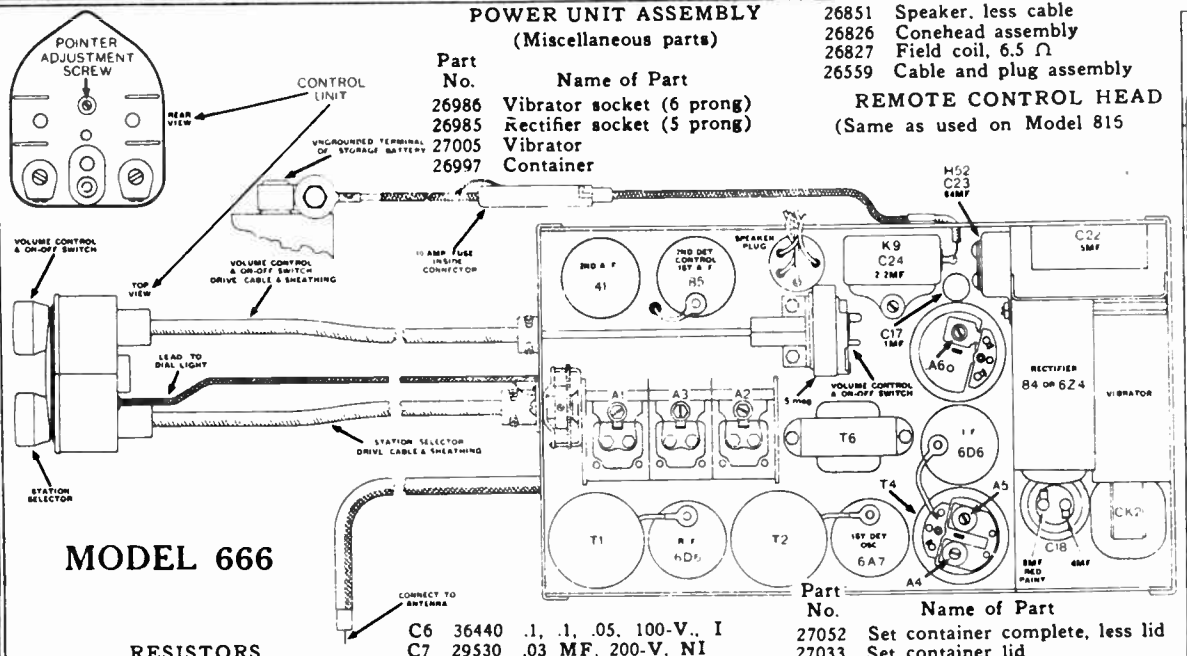


MODEL 666

POWER UNIT ASSEMBLY
(Miscellaneous parts)

Part No.	Name of Part
26986	Vibrator socket (6 prong)
26985	Rectifier socket (5 prong)
27005	Vibrator
26997	Container
26851	Speaker, less cable
26826	Conehead assembly
26827	Field coil, 6.5 Ω
26559	Cable and plug assembly

REMOTE CONTROL HEAD
(Same as used on Model 815

RESISTORS

R1	20040	Flexible, 100 Ω
R2	20970	Gray, 30,000 Ω, ½-W.
R3	30340	Red-blue, .1 U, 1/3-W.
R4	31980	Bl'k, 65,000 Ω, 1/3-W.
R5	31830	Flexible, 250 Ω
R6	30390	Red-bl'k, 20,000 Ω, 1/3-W.
R7	30380	Red-green, 3300 Ω, 1/3-W.
R8	19820	Flexible, 48 Ω
R9	30370	Green, 2 U, 1/3-W.
R10	30350	Bl'k-purple, .5 U, 1/3-W.
R11	31480	Bl'k-red-blue, 1100 Ω. 1/3-W.
R12	36430	Yel.-blue, 5000 Ω 1/3-W.
R13	30370	Green, 2 U, 1/3-W.
R14	30340	Red-blue, .1 U, 1/3-W.
R15	30350	Bl'k-purple, .5 U, 1/3-W.
R16	23780	Flexible, 550 Ω
R17	33250	Blue, 2000 Ω, 1/3-W.
R18	16840	Flexible, 22 Ω

CONDENSERS

Code No.	Part No.	Name of Part
C1	31160	.05 MF, 100-V., NI
C2	31520	.1 MF, 100-V., NI
C3	26820	.05 MF, 200-V., NI
C4	36460	600 MMF, 100-V.,
C5	36510	500 MMF, 500-V.
C6	36440	.1, .1, .05, 100-V., I
C7	29530	.03 MF, 200-V, NI
C8	31530	.1 MF, 100-V.
C9	33670	250 MMF, 500-V.
C10	33670	250 MMF, 500-V.
C10A	26820	.05 MF, 200-V., NI
C11	23250	.01 MF, 450-V.
C12	26660	.1 MF, 200-V., NI
C13	32810	.01, 450-V., NI
C13A	33660	.0022 MF, 450-V., IND.
C14	25379	10 MF, 25-V.
C15	28040	.005 MF, 200-V., IND.
C16*	30270	.008, .015, .03 MF (B16)
C17	26660	.1 MF, 200-V., NI
C18	26995	4 MF-8 MF, 300-V.
C19	36490	.05 MF, 450-V., NI
C20	36490	.05 MF, 450-V., NI
C21	31150	.3 MF, 100-V., NI
C22	31510	.5 MF, 100-V., NI
C23	36480	.64 MF, H 52, 200-V.
C24	37760	2.2 MF, 100-V., K9
C25	31150	.3 MF, 100-V., NI

* In late 666 this condenser is No. 38160, using clamps Nos. 27208 and 27209.

CHOKES

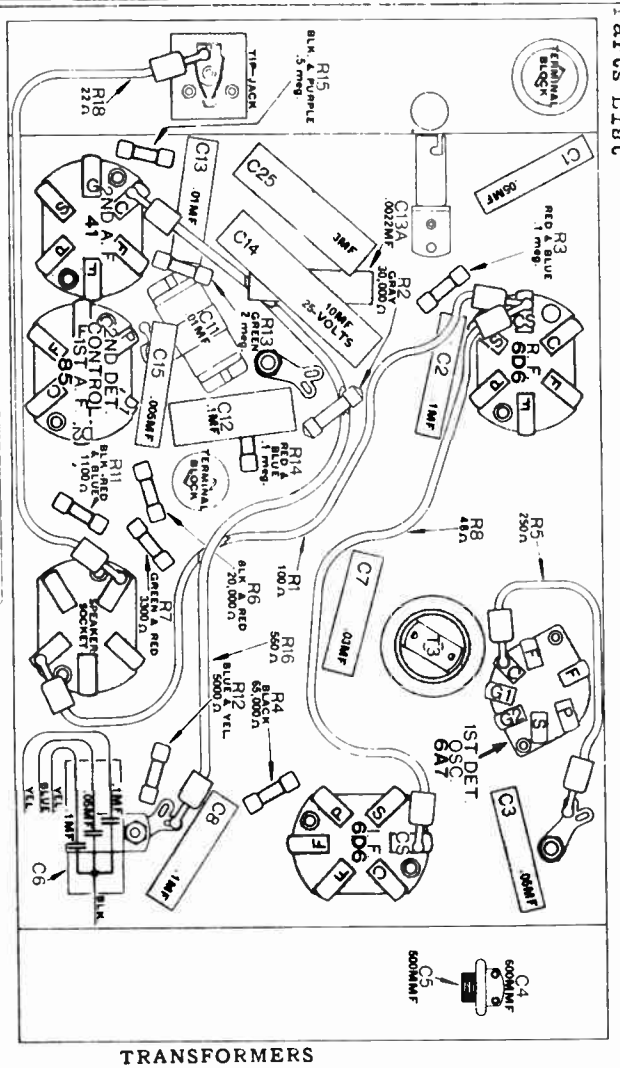
Code No.	Part No.	Name of Part
CK1	26594	2nd det. plate choke, 390 Ω
CK2	27011	"B" filter choke, 100 Ω
CK3	36630	"A" filter choke, .06 Ω

Part No.	Name of Part
27052	Set container complete, less lid
27033	Set container lid
26523	Rubber gasket
26549	Tuning cable bushing
26036	Inner plate for above
25482	Bolt 2½" x ⅜"
24485	Lockwasher ⅜"
24486	Nut ⅜"
26462	Variable condenser assembly
26589	Shield for No. 1 R. F. T. (early short)
27095	Shield for No. 1, 2 R. F. T. (late long)
26591	Shield for No. 2 R. F. T. (early short)
26072	I. F. T. shield
26505	Volume control, .5 U
26033	Volume control bracket
26039	Coupling
23260‡	Generator condenser
24540	Tone control switch complete
22297	Switch shaft and blade
13664	Sensitivity switch
26127	Knob (tone)
26598	Cloth
26983	Wire screen

‡ In late 666 a No. 38270 tubular condenser is supplied.

TRIMMERS

Code No.	Part No.	Name of Part
A4,5	32880	Double I. F. trimmer
A6	36570	Single I. F. trimmer



TRANSFORMERS

Code No.	Part No.	Name of Part
T1*	38010	No. 1 R. F. T. (late type)
T2*	38020	No. 2 R. F. T. (late type)
T3	37890	Oscillator T
T4*	27096	No. 1 I. F. T. (late type)
T5	26593	No. 2 I. F. T.
T6	26982	Output T.
T7	26291	Power T.

* Below Serial No. 8148331 T1 is part No. 35580, T2 is part No. 35690, T4 is part No. 26592.

ATWATER-KENT MFG. CO.

MODEL 776
Schematic, Socket
Installation Data

IMPORTANT

Model 776 is arranged for use WITHOUT CHANGE with either the positive or negative side of car storage battery grounded.

ANTENNA

Many new cars are equipped with antenna. For cars which do not have an antenna, we recommend use of either a roof-type or an under-car type. With a roof type antenna, bring the lead-in down the column nearest set, but avoid column containing dome-light wire.

GENERAL

Current Consumption: The set consumes six amperes from the car storage battery. The generator charging rate should be advanced to compensate for this, but should never be advanced beyond the maximum recommended by the manufacturer.

Fuse: A 10-ampere fuse is contained inside the connector plug on the end of the shielded lead which connects to car sturage battery. It should never be replaced with anything except a fuse of the same rating. If a fuse "blows," examine the installation to determine the cause.

Dial Lamp: The dial lamp inside the control unit is a Mazda T40, 6 to 8 volt, ⅛ ampere miniature base lamp. Use only the same type for replacement.

CONNECTING CONTROL UNIT TO SET

1. In the accessories packed with set, there are two flexible-drive cables with sheathing. *The drive cables must not be bent in less than a 3" radius.*

2. Loosen the set screws in sheath-clamping bushings A and D on control unit and loosen chucks E and B on set to permit free insertion of the cables and sheathing.

3. Insert male connector and sheathing of short drive cable into bushing A on control unit. Make certain that the connector fits into slot on end of station-selector-knob shaft. Push sheathing into bushing as far as possible, then withdraw it slightly (1/32") and tighten set screw in A. *Do not exert too much pressure in tightening the set screws that clamp the sheathing, as damage may result.*

4. Insert the connector of long drive cable into Bushing D. Make certain that the connector engages with the end of the volume-control-knob key. Push sheathing into bushing as far as possible, then withdraw it slightly (1/32") and tighten set screw in D.

5. Insert small plug on end of shielded lead from dial light into tip-jack on set. Ground the shielding of this lead by placing the solder lug (which is attached to shielding) under the lower screw of the flat plate of chuck B.

6. **Make certain that chuck B is centered with respect to coupling C.** If it is not centered, loosen the two screws in the flat plate of chuck B and adjust the position of B until its hole is exactly centered with the hole in C; then carefully tighten the two screws in the flat plate.

7. Insert the end of the short drive cable through chuck B and into coupling C. Make certain that it engages correctly with the coupling. Press the sheathing firmly into chuck B and tighten the chuck.

8. Insert the end of the long drive cable through chuck E and into coupling F. Make certain that it engages correctly with the coupling. Press the sheathing firmly into chuck E and tighten the chuck.

9. Rotate the control knobs to make certain that the controls are functioning easily.

INSTALLING SET AND CONTROL UNIT

Select best available space on dash for mounting the set container, and drill a 7/16" hole in dash for the mounting bolt. Place set in position and use the large washer, lockwasher, and nut to fasten securely to the dash.

Fasten the control unit to the right-hand or left-hand side of the steering column at a convenient height for tuning.

Special plates to mount the control unit on the instrument panel (in place of the ash receiver) are available for certain models of some cars. These special mounting plates may be secured through your distributor.

Fasten the drive cables securely to prevent motion when the car is in operation, then loosen the chucks B and E, push the drive-cable-sheathing firmly into the chucks and tighten.

CONNECTIONS

Place the 10-ampere fuse in female connector on end of long shielded lead furnished with accessories. Couple this connector into the male connector on end of short shielded lead on side of container. Connect lug on other end of this lead to the battery-side of the ammeter. This connection must be clean and tight.

Plug the male connector on end of short shielded cable into set, engaging it securely with the female section. Connect the other end of this shielded lead to the lead-in from antenna. Solder and tape this connection.

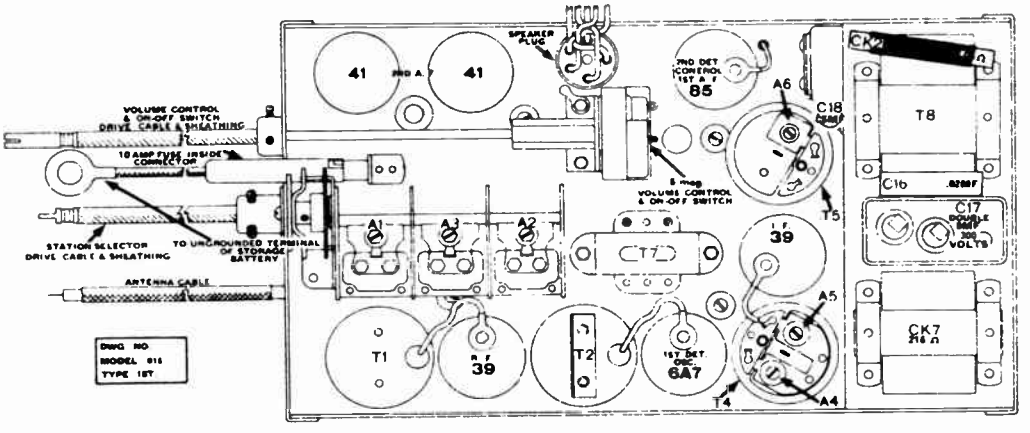
Fasten the antenna cable and the battery cable to prevent rubbing when car is in motion.

ADJUSTING DIAL POINTER

After set has been installed, and drive cables fastened, turn the set "on" and tune in a station of known frequency. Then turn the pointer-adjustment nut on the rear of control unit so that the pointer indicates this frequency. For example, if the station that has been tuned in operates at 760 kilocycles, turn the pointer-adjustment screw so that the pointer is at 76 on the dial.

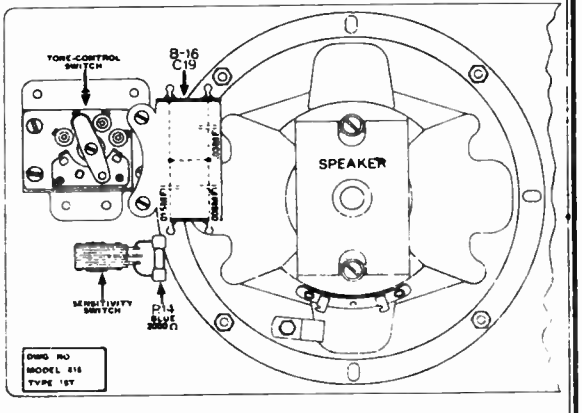
MODEL 816,926,936 (1st)
Socket,Trimmers,Parts,
Power Unit Schematic

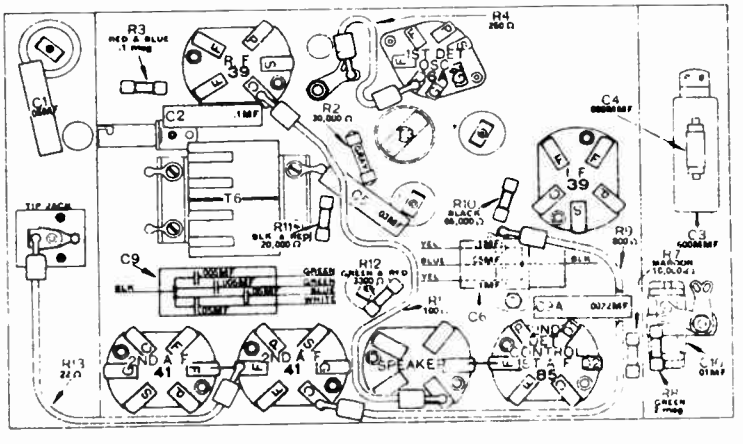
ATWATER-KENT MFG. CO.



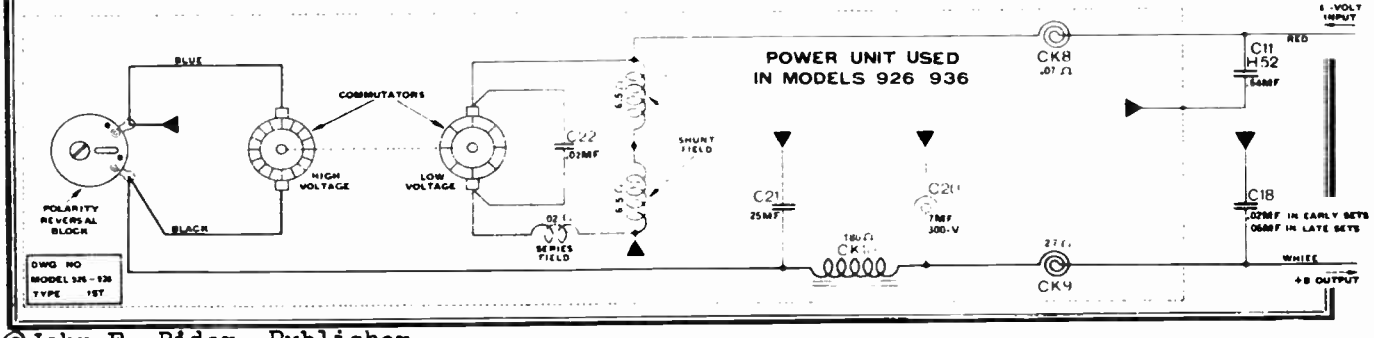
In late type sets, the "A" battery cable is brought out the top side, near the speaker plug.

1st TYPES OF MODELS 816, 926 AND 936



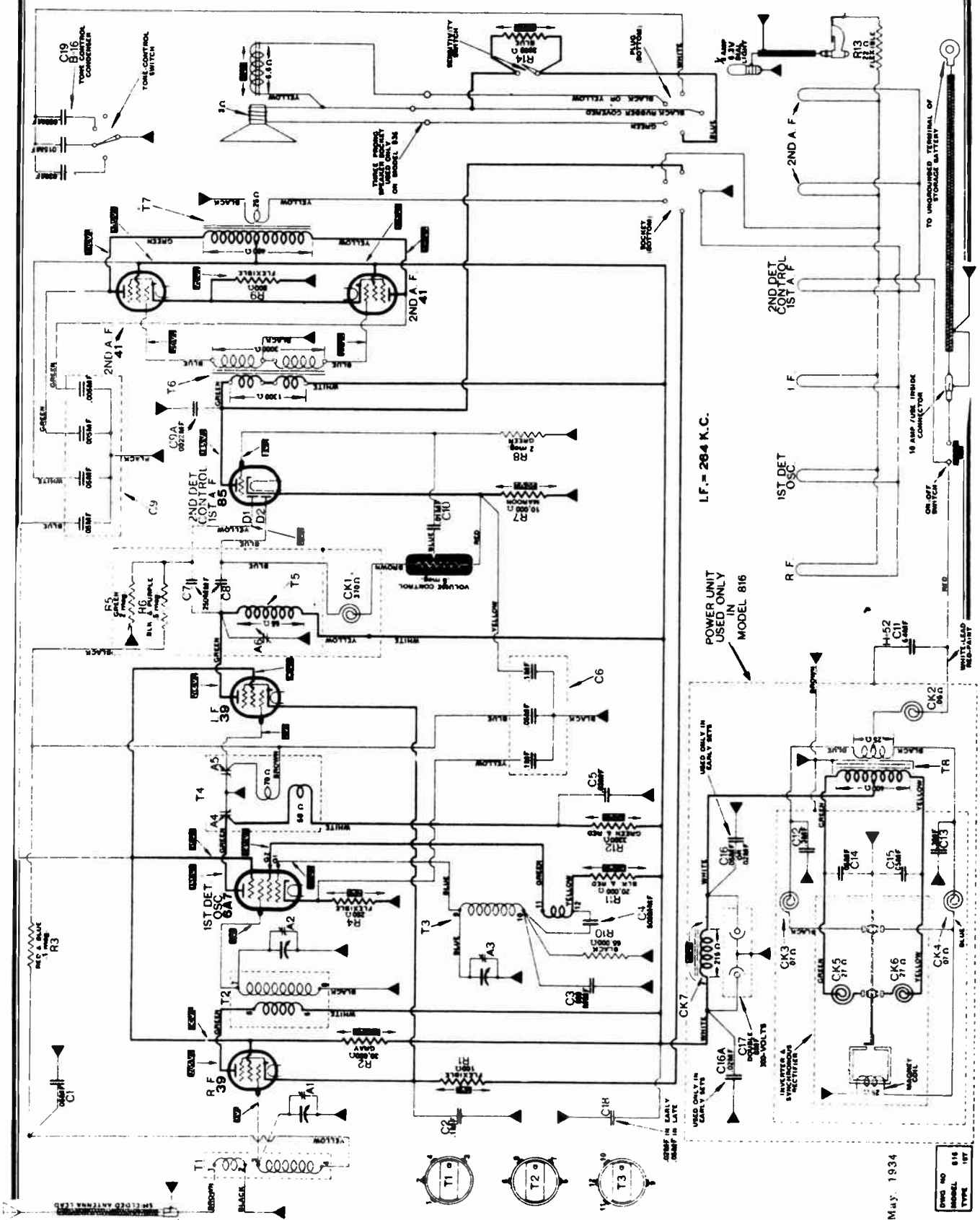


Model 936 has a separate speaker which plugs into a three-prong socket on the inside of lid of set container.



MODEL 816,926,936(1st)
Schematic

ATWATER-KENT MFG. CO.



MODEL 816,926,936 (1st)
Parts List

ATWATER-KENT MFG. CO.

MODEL 816

(Below Serial No. 1121818)

Part No.	Name of Part
26586*	Set container complete, less lid
26496	Set container lid (bl'k)
26549	Tuning cable bushing
26036	Inner plate for above
26102	Polarity reversal cover
26096	Sound insulators (felt)
26452	Lid mounting bracket
26128	Thumbscrew
19455	Mounting washer
26462	Variable cond. assembly
25478	Grommet for var. cond.
26072	Shield for No. 1 I. F. T.
26538	Insulator for above shield
26589	Shield for No. 1 R. F. T.
26591	Shield for No. 2 R. F. T.
25818	Clamp for No. 36440 cond.
26505	Volume control, .5 U
26033	Volume control bracket
26039	Volume control coupling
24540	Tone control switch
26127	Knob for above
13664	Sensitivity switch
21143	Plug suppressor
21144	Distributor suppressor
23260	Generator cond., 1 MF, 200-V

* When ordering cabinet, specify brown or black

TRANSFORMERS

Code No.	Part No.	Name of Part
T1	35680	No. 1 R. F. T.
T2	35690	No. 2 R. F. T.
T3	35710	Oscillator T.
T4	26592	No. 1 I. F. T.
T5	26593	No. 2 I. F. T.
T6	26606	Audio input T.
T7	26478	Audio output T.
T8	26291	Power T.

RESISTORS

Code No.	Part No.	Name of Part
R1	20040	Flexible, 100 Ω
R2	20970	Gray, 30,000 Ω, ½-W.
R3	30340	Red-blue, .1 U, 1/3-W.
R4	31830	Flexible, 250 Ω
R5	30370	Green, 2 U, 1/3-W.
R6	30350	Bl'k-purple, .5 U, 1/3-W.
R7	30320	Mar'n, 10 000 Ω, 1/3-W.
R8	30370	Green, 2 U, 1/3-W.
R9	20120	Flexible 800 Ω
R10	31980	Bl'k, 65.000 Ω, 1/3-W.
R11	30390	Red-bl'k, 20,000 Ω, 1/3-W.
R12	30380	Red-green, 3300 Ω, 1/3-W.
R13	16840	Flexible, 22 Ω
R14	33250	Blue, 2000 Ω, 1/3-W.

CONDENSERS

Code No.	Part No.	Name of Part
C1	31160	.05 MF, 100-V., NI
C2	31530	.1 MF, 100-V., NI
C3	36460	600 MMF, 100-V. (mica)
C4	36510	500 MMF, 500-V. (mica)
C5	29530	.03 MF, 200-V., NI
C6	36440	.1, .05, .1 MF, 100-V., IND.
C7	33670	250 MMF, 500-V.
C8	33670	250 MMF, 500-V.
C9	36450	.05, .05, .005, .005 MF, 200-V., IND.
C9A	33660	2200 MMF, 450 V., IND.
C10	23250	.01 MF, 450-V.
C11	36480	.64 MF, H-52, 200-V.
C12	31150	.3 MF, 100-V., NI
C13	31150	.3 MF, 100-V., NI
C14	36490	.05 MF, 450-V., NI
C15	36490	.05 MF, 450-V., NI
C16*	36490	05 MF 450-V., NI
C16A	29030	.02 MF, 450-V., NI
C17	26092	8 MF-8 MF, 300-V. (electrolytic)
C18**	36880	.02 MF, 450-V., NI
C19	30270	Tone control cond. (B-16)

* C16 is .02 MF, 450-V., NI 29030 in some of these sets.
** C18 is .05 MF, 200-V., NI 26820 in later sets.

TRIMMERS

Code No.	Part No.	Name of Part
A4, 5	37960	Double I. F. trimmer
A6	36570	Single I. F. trimmer

CHOKES

Code No.	Part No.	Name of Part
CK1	26594	2nd detector plate choke
CK2	36630	R. F. "A" filter choke
CK3	36610	R. F. "A" filter choke
CK4	36610	R. F. "A" filter choke
CK5	36620	R. F. "B" filter choke
CK6	36620	R. F. "B" filter choke
CK7	25416	A. F. "B" filter choke

POWER UNIT ASSEMBLY

Part No.	Name of Part
26863	Vibrator
26854	Rubber (2)
26855	Rubber (1)
26061	Inside vibrator container
26062	Lid for above
26521	Grommet
26085	Tubular condenser clamp
26663	Middle container body
26091	Middle container lid
26136	Vibrator lid insulator
26664	Outer container body
26665	Outer container lid

SPEAKER

Part No.	Name of Part
26851	Speaker less cable
26826	Cone head assembly
26827	Field coil, 6.5 Ω
26559	Speaker cable and plug

MISCELLANEOUS PARTS

Part No.	Name of Part
21878	Disc shield, No. 2 I. F. T.
26578	Disc (insul.) for No. 2 I. F. T.
21406	Fuse, 10 amp.

REMOTE CONTROL HEAD

26646	Remote control head complete with mounting parts (less cables)
26893	Pointer gear (fibre)
26894	Spring washer
26108	Mounting strap and bushing
26884	Head assembly
26892	Pointer and shaft
26886	Screw No. 4—36 x ¼
26888	Cork gasket
26889	Dial assembly
26891	Diffusing strip
26107	Mounting bracket
26528	Screw ¼—20 x ⅛
26104	Assem. vol. cont. cable, 35 in.
26105	Assembled tuning cable, 31 in.
26109	Key
26887	Glass
27118	Lamp (6-8-V., ⅛A), green
26895	Gear shaft assembly
26896	Tuning knob
27312	Tuning knob spring
26897	Key knob
26898	Screw No. 10—32 x ¼ F. H. cup pt.
26899	Shielded wire (dial lite lead)
26901	Wire clamp
26531	Screw ¼—20 x ⅜
24082	Wire tip
27059	Steering column mounting bracket assembly
26107	Mounting bracket (column type)
26531	Column clamp screw
26108	Column clamp
21141	Lockwasher
26528	Mounting screw
26943	Panel mounting bracket assem.
26944	Mounting bracket (panel type)
26945	Wing screws
26946	Flat head screws
26947	Felt pad

EXTRA LENGTH ASSEMBLED CABLES

27114	Assem. vol. cont. cable, 3½ ft.
27115	Assembled tuning cable, 3½ ft.
27016	Assem. vol. cont. cable, 11 ft.
27017	Assembled tuning cable, 11 ft.

MODEL 926

(Below Serial No. 8276401)

Model 926 speaker and chassis is identical to Model 816, but the 926 uses a genemotor power unit

POWER UNIT MODELS 926 and 936

Part No.	Name of Part
26093	Power unit container
26942	Lid for above
36610	R F "A" filter choke (CK8)
36620	R F "B" filter choke (CK9)
22359	A F "B" filter choke (CK10)
26864	7 MF, 300-V., dry electrolytic (C20)
35930	.25 MF, 200-V., NI (C21)
36420	.02 MF, 200-V., IND. (C22)

GENEMOTOR No. 26734

Part No.	Name of Part
26964	Motor end bracket assembly
26965	Generator end bracket assembly
26966	Generator brushes assembly
26967	Motor brushes assembly
26968	Field coils and field core assembly
26969	Field coils set
26971	Armature
26972	Ball bearing
26973	Motor mounting bracket
26974	Rubber bumpers
26975	Steel studs 4⅝" x 8/32 thd.
26976	Hex. iron nuts—cadmium plated
26977	Ground lug
26978	2⅝" long—No. 18 extra flexible bare ground lead
27043	Field core assembly
27044	Shunt field (2 leads)
27045	Shunt and series field (4 leads)

MODEL 936

(Below Serial No. 4542201)

Model 936 chassis is identical to Model 816, but the 936 uses a genemotor power unit (listed above), and a separate speaker (listed below).

Part No.	Name of Part
26806	Lid
25196	Socket (3 prong)
26831	Cable and plug assembly (5 wire)
21963	Tone control knob

936 SPEAKER No. 38900

Part No.	Name of Part
26822	Diaphragm
30710	Field coil
26823	Cable and plug assembly (3 wire)

Ω = ohms. U = megohms. IND. = inductive. NI = non-inductive. W. = watt.

MODEL 346, B-6
Schematic, Socket
Alignment

AUDIOLA RADIO CO.

Six Tube Auto Radio

This receiver is a six tube superheterodyne using the most modern circuit design and tubes. Tubes used are: one 6D6 R.F. Amplifier; one 6A7 combination 1st detector and oscillator; one 6D6 I.F. Amplifier; a 75 diode detector with delayed A.V.C. and one stage audio; one 41 power output tube; and one 84 rectifier tube.

In the installation of this receiver there are a few important fundamental principles to adhere to:

(1) Avoid having any battery wires in close relation to the high voltage spark coil or plug wires.

(2) The antenna must be routed over the most quiet location. Interference will often go through the antenna shielding if touching brake, accelerator, or steering column rods. The lead in must be shielded up to the antenna and the shield bonded to the set chassis. In many installations the antenna shield must also be bonded to the chassis of the car where the shield turns up to the top.

(3) If the chassis has to be removed from housing, be certain to tighten the three screws on the bottom when replacing the chassis.

(4) After installation is completed, adjust antenna trimmer on some distant station around 1400 to 1500 K.C. turn in either direction for loudest signal. The antenna trimmer is directly under the serial number on the top of the set. The front cover screws must always be tight.

(5) The gang condenser control (tuning) must run very freely and have not less than 1/32 of an inch end play.

Shield antenna lead-in and bond the shield to frame at center post. If antenna comes down front post, shield as high as possible and also ground the shield to dash.

In case of antenna pick-up, use heavy "A" choke and double condenser as in diagram #1.

In case of chassis pick-up, separate primary and high tension ignition wires, shield and ground the shield at both ends.

In Chevrolets, it is sometimes necessary to shield the floorboards on the right hand side and ground with floorboard screws.

In Ford V8 shield primary and "A" lead to generator separately and ground shields to spark plug housing brackets as in diagram #2.

In case of floating power, bond center bolt on Audiola set to motor block.

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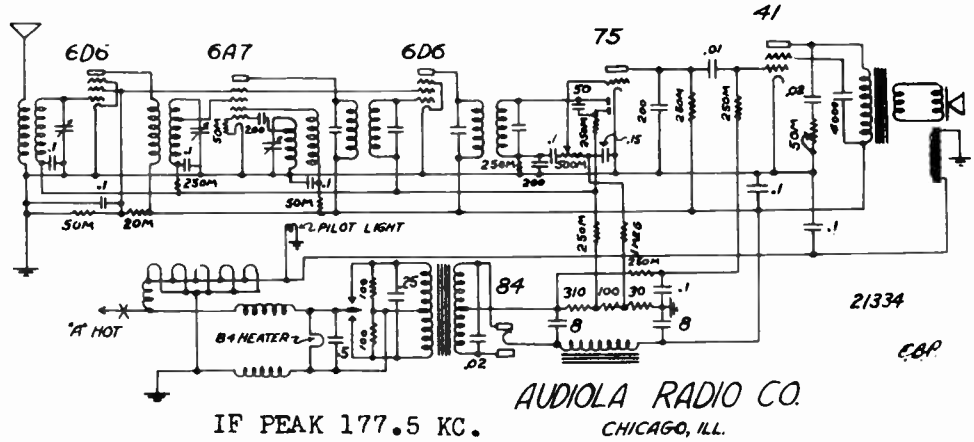
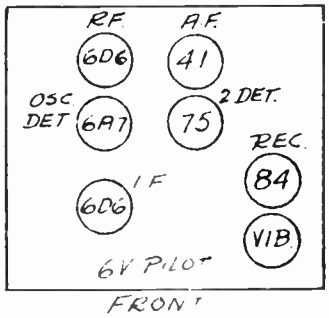


AUDIOLA RADIO CO.
CHICAGO, ILL.

IF PEAK 177.5 KC.

MODEL B-6 IS SAME AS 346 EXCEPT MODEL B-6 HAS NO TONE CONTROL

MODEL 346 1934



SPECIAL INSTRUCTIONS FOR ELIMINATING INTERFERENCE

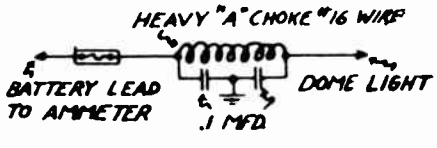
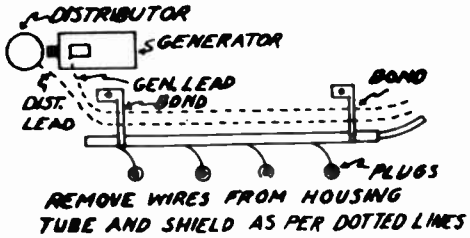


DIAGRAM #1



REMOVE WIRES FROM HOUSING TUBE AND SHIELD AS PER DOTTED LINES

DIAGRAM #2

MODEL 347
Schematic, Socket
Alignment

AUDIOLA RADIO CO.

Seven Tube Auto Radio

This receiver is a seven tube superheterodyne using the most modern circuit design and tubes. Tubes used are: one 6D6 R.F. Amplifier; one 6A7 combination 1st detector and oscilator; one 6D6 I.F. Amplifier; an 85 diode detector with delayed A.V.C. and one stage audio; two 41 power output tubes and one 84 rectifier tube.

In the installation of this receiver there are a few important fundamental principles to adhere to:

(1) Avoid having any battery wires in close relation to the high voltage spark coil or plug wires.

(2) The antenna must be routed over the most quiet location. Interference will often go through the antenna shielding if touching brake, accelerator, or steering column rods. The lead in must be shielded up to the antenna and the shield bonded to the set chassis. In many installations the antenna shield must also be bonded to the chassis of the car where the shield turns up to the top.

(3) If the chassis has to be removed from housing, be certain to tighten the three screws on the bottom when replacing the chassis.

(4) After installation is completed, adjust antenna trimmer on some distant station around 1400 to 1500 K.C. turn in either direction for loudest signal. The antenna trimmer is directly under the serial number on the top of the set. The front cover screws must always be tight.

(5) The gang condenser control (tuning) must run very freely and have not less than 1/32 of an inch end play.

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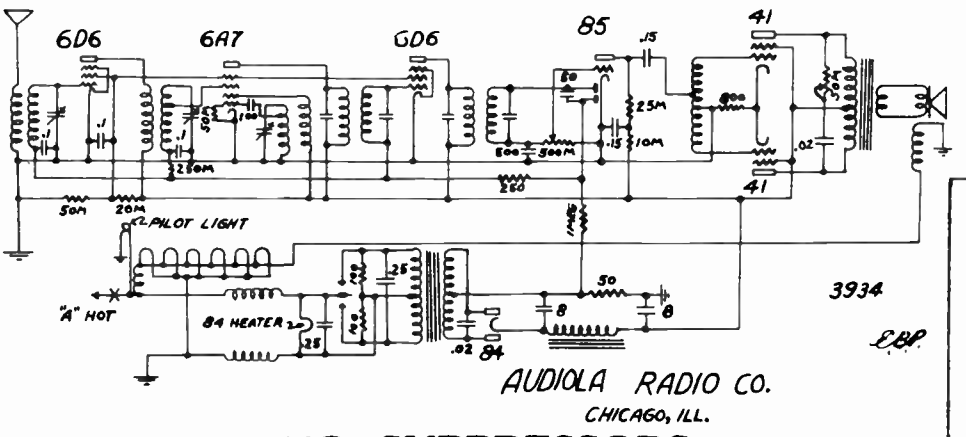
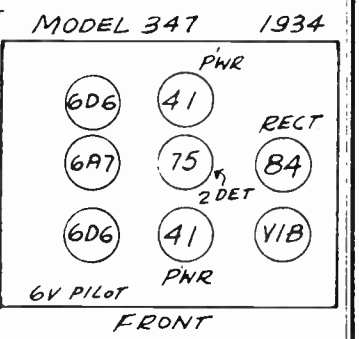




NO SUPPRESSORS

AudiolA is first to develop an auto radio that eliminates motor noise without the use of spark plug suppressors.

This is an important engineering advancement in the auto radio art. We are pleased to have made this contribution to the radio industry.

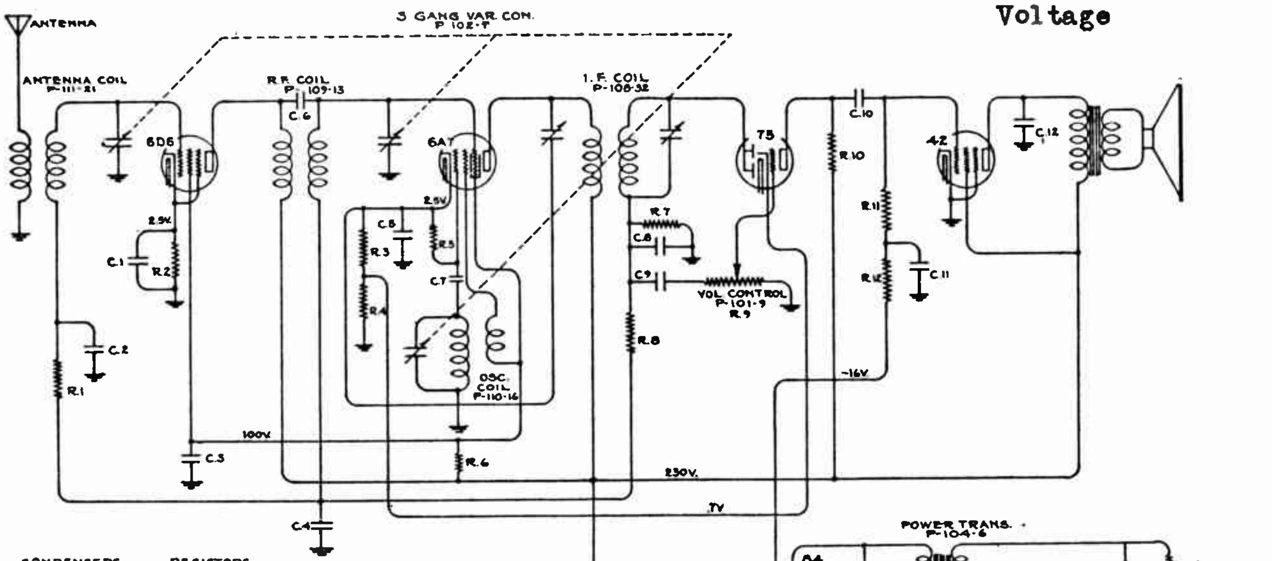
It is important that you understand this new pioneering development.

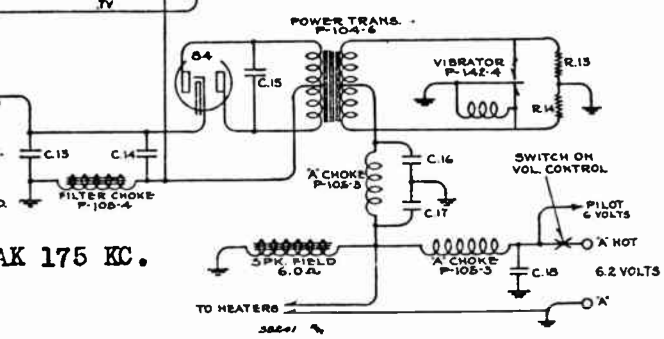
We have successfully installed the AudiolA auto radio without spark plug suppressors, and eliminated all motor noise and other noise, from every car that we have tried. This has covered almost every make and model of automobile.

For Elimination of Interference data, see Model 346.

MODEL 580
Schematic, Socket Voltage

BELMONT RADIO CORP.





CONDENSERS

Nº	VALUE
C.1	.1 X 200V.
C.2	.05 X 200V.
C.3	.1 X 200V.
C.4	.05 X 200V.
C.5	.03 X 200V.
C.6	15 mmf GIMMICK
C.7	100 mmf MICA
C.8	500 mmf MICA
C.9	.01 X 400V.
C.10	.01 X 400V.
C.11	.1 X 200V.
C.12	.006 X 600V.
C.13	4.0 MFD X 350V.
C.14	5.0 MFD. X 350V.
C.15	.01 X 1400V.
C.16	.5 MFD. X 120V.
C.17	.5 MFD. X 12 V.
C.18	.002 MICA

RESISTORS

Nº	VALUE	
R.1	100M	1/5W
R.2	250	1/5W
R.3	150	1/5W
R.4	50	1/5W
R.5	50M	1/5W
~~R.6~~	~~[illegible]~~	~~[illegible]~~
R.7	500M	1/5W
R.8	500M	1/5W
R.9	500M VOL. CONTROL	
R.10	250M	1/5W
~~R.11~~	~~250M~~	~~[illegible]~~
R.12	301M	1/5W
R.13	100	
R.14	100	

R6 - 2 [illegible] - 1 W

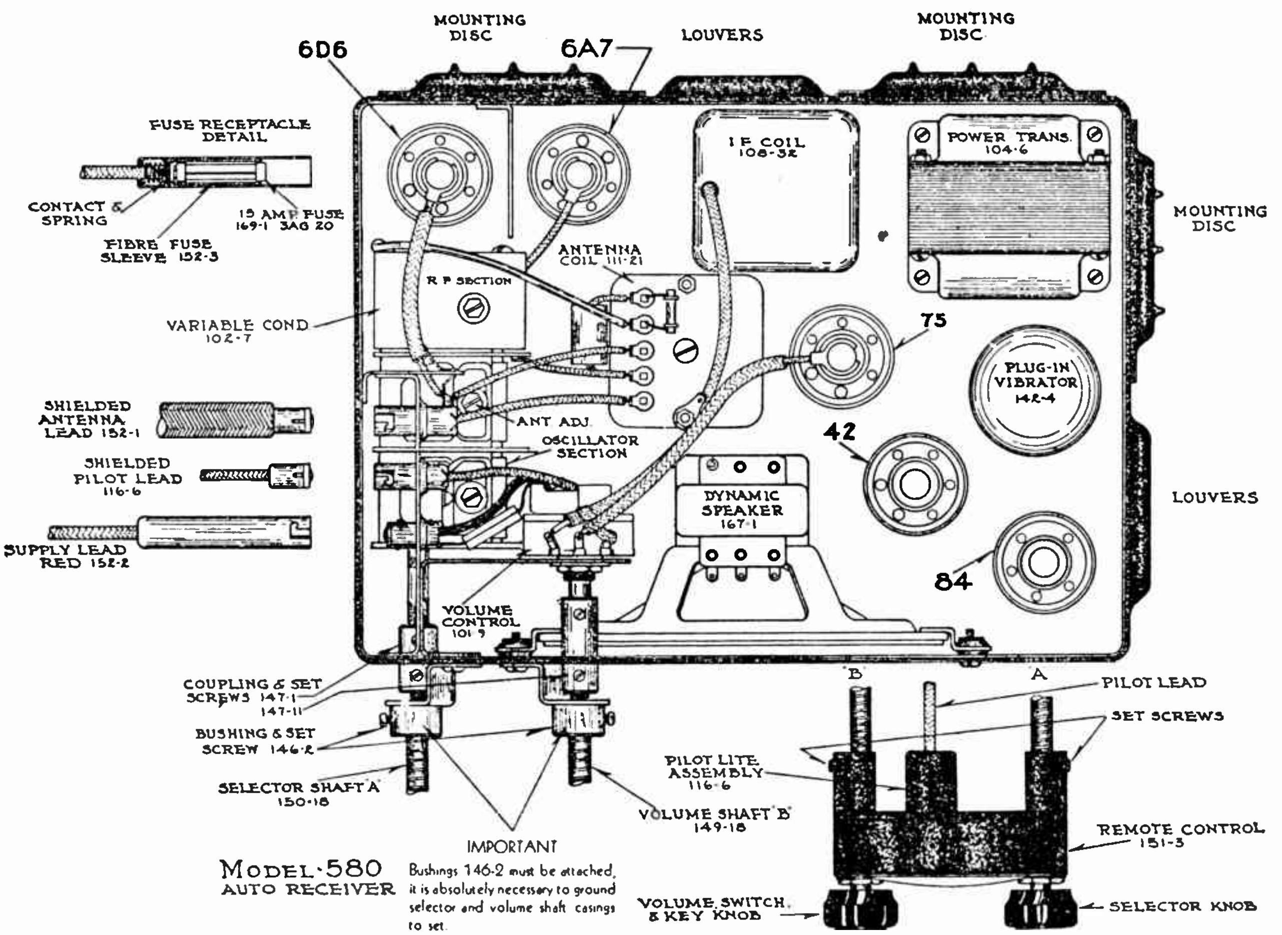
R11 - 50 [illegible] - 1/3

-NOTE:-
C.1, 3, 4, 5 IN ONE UNIT PART Nº 145-10
C.13, 14 IN ONE UNIT PART Nº 119-15
C.16, 17 IN ONE UNIT PART Nº 148-4
R.13, 14 IN ONE UNIT PART Nº 106-6

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

IF PEAK 175 KC.



IMPORTANT
Bushings 146-2 must be attached, it is absolutely necessary to ground selector and volume shaft casings to set.

MODEL·580
AUTO RECEIVER

INSTALLATION AND SERVICE INSTRUCTIONS

MODEL 580

FIVE TUBE-SUPERHETERODYNE AUTO RADIO

TUBE COMPLEMENT:

1—Type 6D6—remote cut-off pentode as an R. F. amplifier.
1—Type 6A7—pentode as an oscillator and first detector.
1—Type 75 —duplex diode triode second detector automatic volume control and first audio.
1—Type 42 —pentode output tube.
1—Type 84 —high vacuum full wave rectifier.

ACCESSORIES:

The carton of accessories packed with this set contains the following:
1—No. 152-1 shielded plug-in type antenna cable.
1—No. 152-2 plug-in battery cable.
1—No. 149-18 flexible volume control shaft (slotted fitting).
1—No. 150-18 flexible selector shaft (key fitting).
2—No. 146-2 brackets for anchoring flexible shafts to set container.
2—No. 135-5—3" x 3/8" carriage bolts and nuts for mounting set to bulk head.
2—No. 134-1—3/8" x 1" iron washers.
2—No. 134-2—3/8" lockwashers.
6—No. 154-2 set screws, 4 for attaching flexible cables to set, 2 for anchoring cables to brackets.
4—No. 155-6—No. 6 x 3/8" binding head self-tapping screws for attaching brackets (No. 146-2).
6—168-1—Spark plug type suppressors.
1—168-2—Distributor type suppressor.
1—No. 148-1 generator condenser.
1—No. 148-3 ammeter condenser.
1—No. 151-3 remote control head.
1—No. 116-6 pilot light assembly complete.
1—No. 146-8 Die cast mounting bracket.
1—No. 146-12 Steering column strap.
1—No. 116-5 6-8 volt bulb.
1—No. 169-1 15 amp. fuse.
1—No. 152-3 Fuse insulating sleeve.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the paper template included with these instructions and which is the same size as the set. Mark location for two mounting bolts if mounted on the long side and for one mounting bolt if mounted on the short side.

Then drill two (2) one-half inch (1/2") holes, making certain that the paint around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 146-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel or under dash (see illustrations).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. AVOID SHARP BENDS IN CABLES.

IMPORTANT—READ CAREFULLY:

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables, number 149-24 and 150-24. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DASH MOUNTING FOR THE REMOTE CONTROL HEAD:

The majority of the new 1935 model automobiles have provisions made for mounting the remote control head of an auto radio on the dash. We have available special escutcheon plates for this purpose which can be secured upon request at an additional cost of $1.00. *When requesting escutcheon plates specify make and model of the car, also the finish of the dash.*

Following is a list of 1935 model automobiles which contain removable ash tray receivers and which are able to accommodate the *remote control head of our model 580 auto receiver.*

Chrysler Airstream	Nash	Reo
Dodge	Packard	Ford V-8
Plymouth	Graham DeLuxe	
De Soto Airstream	Hupmobile	

Following is a list of 1935 model automobiles which do not contain ash tray receivers but with the aid of the special drilling dimensions furnished herewith the left hand panel on the dash may be drilled to accommodate our regular remote control head.

La Favette (Nash)	Graham (Standard)
Franklin	Studebaker

For installation of our remote control head on the following cars we recommend standard steering column or dash mounting with the aid of a bracket:

Auburn	Terraplane	De Soto & Chrysler Airflow
Buick	Pontiac	Hudson
Cadillac	Chevrolet—Standard & De Luxe	Lincoln
La Salle		Oldsmobile

Many of the 1931 model automobiles contain the same size ash tray receiver as the 1935 models and naturally installation of the remote control head can be made on these models.

We have found that our model 580 auto receiver will fit above the steering column on the fire wall of 75% of the late model automobiles and for dash mounting of the remote control head this location works out very satisfactorily.

The Cadillac, La Salle, Chevrolet, Pontiac and Oldsmobile 1935 automobiles have special blank escutcheon plates on the dash which are intended for remote control heads for auto receivers. The cut-out behind these blank escutcheons will not accommodate our remote control head and for installation in these models we recommend using standard steering column mounting for the remote control head or dash mounting using a bracket as illustrated in drawings contained herein.

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (red) wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before inserting in receiver (see illustration). All bypass leads should be as short as possible.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.

PILOT LIGHT:

Pilot light assembly, part number 116-6, a shielded cable, plugs into the set and to the rear of the remote control unit (see illustrations).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. De-tuning will very seriously affect the tone quality of this receiver.

MOTOR NOISE SUPPRESSION:

The ignition system of every automobile generates high frequency electrical interference. This high frequency interference arising from the ignition coil, the distributor and the spark plugs must be properly suppressed in order to obtain satisfactory reception. Each car will present more or less an individual problem but there is a definite procedure to follow which holds true in every case.

This first essential procedure is to disconnect the high tension leads to the spark plugs and attach the spark plug suppressors (168-1) (for V 8 Fords 168-4) the special distributor type suppressor (168-2) which is inserted in the center contact of the distributor as indicated in the illustration of a typical installation. (NOTE V 8 FORD USES NO DISTRIBUTOR SUPPRESSOR.) For cap type distributor, exchange the standard plug type distributor suppressor (168-2) for a special cable type suppressor (168-3) from your dealer. In some few cases, such as Buicks it is sometimes necessary to use cable type (168-3) suppressors. This type of suppressor is inserted in the leads running from the distributor to the spark plugs and which are concealed underneath the metal plate which covers the spark plugs.

After the spark and distributor suppressors have been properly fastened the next in importance is the generator condenser (148-1), this filters a high pitched whining noise which would otherwise be heard as the motor is accelerated.

It is sometimes necessary in cars where the ignition coil is located under the dash, to use an additional capacitor (148-1) obtainable from your dealer. It must be installed between the battery side of the ignition coil and the frame of the car. Next connect capacitor (148-3) from the battery side of ammeter to frame of car. This is necessary in practically every installation and a good connection to the frame of the car is of utmost importance.

After standard suppression has been applied and the hood clamped down to prevent radiation, the receiver should be turned on and the dial turned off a station, with the volume control at maximum. If motor noise is still objectionable the next step is to determine whether the interference is originating through chassis pickup or from the antenna.

To check for chassis pickup, disconnect the antenna from the antenna cable and ground the antenna lead to shield of cable, or remove antenna cable. Chassis pickup can be reduced by reducing the gap between plug contacts and the rotating arm in the distributor head. To do this, apply solder to the end of the rotor arm. Replace the rotor in the distributor and turn the engine over slowly with the crank in order to clean the excess solder. The rotor should not brush or wipe the contacts inside the distributor cap, but should just clear them. As an additional precaution check the breaker points. They should be thoroughly cleaned and adjusted or new points installed if they are badly worn. The ignition system of a car must be kept in good condition and leaky cracked high tension wires and bad spark plugs should be replaced. In many cars the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V 8 Ford as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads. It is also necessary on V 8 Fords to install a capacitor between the primary terminal of the coil and ground.

Cars with floating power must have the motor bonded to the bulk-head and again to the frame to provide a direct path for the high frequency interference developed in the ignition system. 3/8" copper braid will be necessary, SMALL DIAMETER WIRE WILL NOT DO. Bond flexible shaft leads, such as free wheeling, choke wires, etc., which pick up motor noise and reradiate it into the car. In extreme cases it has been found necessary to ground the steering column. Free wheeling cables should be grounded at the point at which they go through the fire wall of the car.

On cars which have a wooden bulkhead it is necessary to line the motor side with thin sheet metal and ground. This will prevent interference from entering the inside of the car and from there being picked up by the antenna. It is also necessary in some installations to connect a capacitor from the hot side of the dome light wire to frame of the car. This lead can usually be found by referring to the electrical wiring diagram of the car. If the ignition coil is mounted inside the driving compartment, it may be necessary to shield the high tension lead running from the coil to the distributor. This cannot be done effectively, however, if the wire has rubber insulation. Where the car is so equipped this wire should be replaced with a good quality high tension wire such as Packard cable. When applying the shield over this wire be sure that it terminates at least an inch from both ends of the lead and that the shield is grounded at both ends; one end under the dash and the other to the engine. It may be necessary to by-pass the electrical connections of all gauges such as oil, water, gas (Hudson-Terraplane).

The foregoing rules should remove any trace of chassis pickup. Now connect the antenna to the receiver and test for motor noise pickup. It is entirely probable that if any noise is present it will be very slight and only noticeable between stations.

No absolute rule for complete motor noise elimination can be specified inasmuch as many times two cars of the same make present entirely different problems and require bonding or shielding at different points.

A word or two concerning antennas; naturally the performance of any radio depends on the effectiveness of the antenna. The later model cars are coming through with very good Antennas, already installed and no trouble should be experienced from this angle with of course an occasional exception. The older cars present a more difficult problem and naturally the service man will have to take cases of this nature into consideration. Many of the older cars on the market today have a wire network in the roof which is nothing more than ordinary chicken wire.

This wire network acts as a support to the roof and is in the majority of cases grounded directly to the body of the car at the point at which the roof meets the sides of the body. Service men frequently tack antennas to the underside of the top material in these cars, this is not satisfactory. There are but two things to do. Either an underslung (plate or strap) antenna must be used or the wire network must be cut from all grounds to the car. If this is done this network will in itself make a very good antenna, but it will be necessary to cut the wire network back for a distance of at least three inches from all sides of the car.

When running the lead-in up the corner post of the car to the roof antenna ground it every few inches to the frame of the body of the car. If this is not possible insulate it, otherwise scratchy noises will result.

Shield high tension leads.

The ignition system of car must be kept in good condition.

It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery. THIS SHOULD BE DONE BY A COMPETENT SERVICE STATION.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

SERVICE NOTES:

Model 580 is a five tube superheterodyne receiver with an intermediate frequency of 175 kilocycles and a tuning range of from 530 to 1550 kilocycles.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable, any part is replaceable without removing the chassis from the cabinet. All adjustments are made without removing the chassis from the cabinet.

Should it ever become necessary or desirable to re-align this receiver, the proper method is as follows:

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6A7 tube.

2. Adjust trimming condensers of I. F. transformer, part number 108-32 (two adjustments) to resonance, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection of the meter indicates resonance.

Note: I. F. transformer adjustments are accessible from the bottom of the chassis—the bottom cover must be removed.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1400-1000-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.

4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip. Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

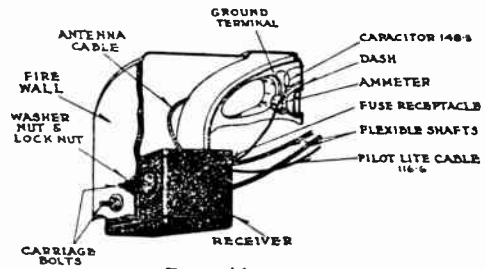
NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:

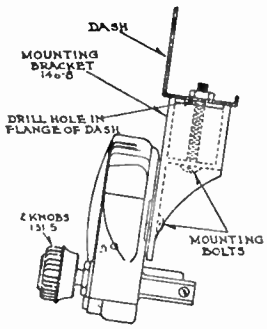
Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.

BELMONT RADIO CORP.

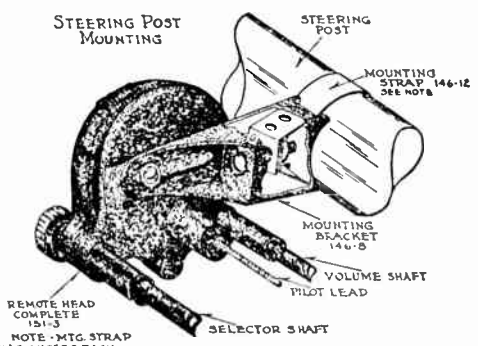
MODEL 580
Installation Details
Parts List

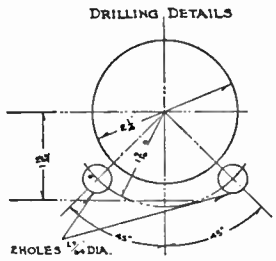


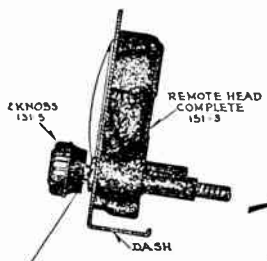
DASH MOUNTING

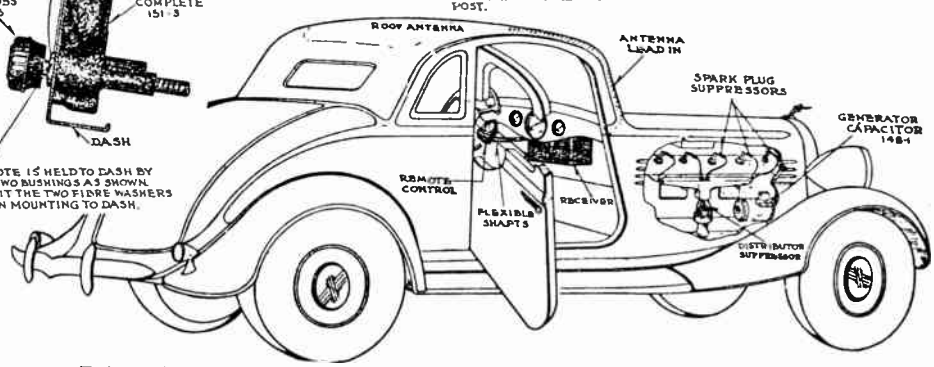


DASH MOUNTING USING BRACKET









PARTS LIST—MODEL 580
Serial No. 10001 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description
101-9	Volume Control with Switch
102-7	Three Gang Geared Variable Condenser
104-6	Vibrator Transformer
105-3	"A" Choke—40T—No. 16E—½" Dia.
105-4	380 Ohm Filter Choke
106-6	200 Ohm Center Tapped Resistor
108-32	Output I. F. Transformer Complete, less can and resistor and Condenser Assembly (175 K. C.)
109-13	R. F. Coil
110-16	Osc. Coil & bracket
111-21	Antenna Coil
115-18	Special partition shield
116-5	6-8 Volt T-50 pilot lamp
116-6	Pilot light assembly, complete, less bulb
119-15	6-3 Mfd. 350 Volt Electrolytic Filter Condenser
135-5	⅝x3" carriage bolt
140-4	Container complete with top and bottom
142-4	Plug-In Vibrator
145-10	By-Pass Block
146-1	Special bracket including battery, antenna, pilot light cable fittings, but less antenna coil volume control
146-2	Bushing and bracket complete
147-1	Selector Control Coupling
147-11	Volume control coupling
148-1	.5 Mfd. Generator Condenser
148-3	.5 Mfd. Ammeter Condenser
148-4	Dual .5 Mfd. x 120 Volt Condenser
152-1	Antenna cable
152-2	Battery cable
152-3	Fuse Insulating Sleeve
167-1	Dynamic Speaker
168-1	Spark-plug type suppressor
168-2	Distributor plug-type suppressor
168-3	Cable type suppressor
168-4	Special Ford spark-plug suppressor
169-1	15 Ampere Fuse (3AG-15)

REMOTE CONTROL PARTS

Part No.	Description
112-39	Selector Control Shaft
112-41	Idler Gear
112-42	Pointer Shaft
112-43	Volume Control Shaft
112-44	Pointer (Specify White or Black)
112-45	Dial Crystal Retainer
112-46	Celluloid Dial Crystal
112-48	Pointer Shaft Gear
112-89	Dial
131-5	Black bakelite remote control knobs
134-8	Black Fibre Washer for Volume and Selector Control Bushings
146-8	Die Cast Remote Control Mounting Bracket
146-12	Steering Column Strap
147-3	Selector Control Bushing
147-4	Volume Control Bushing
149-18	Volume Control Shaft—18"
149-24	Volume Control Shaft—24"
150-18	Selector Shaft—18"
150-24	Selector Shaft—24"
151-3	Remote Control Head, less flexible shafts, with pilot assemblies and with knobs and mounting hardware

Note: Part No. 145-10 consisting of four separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

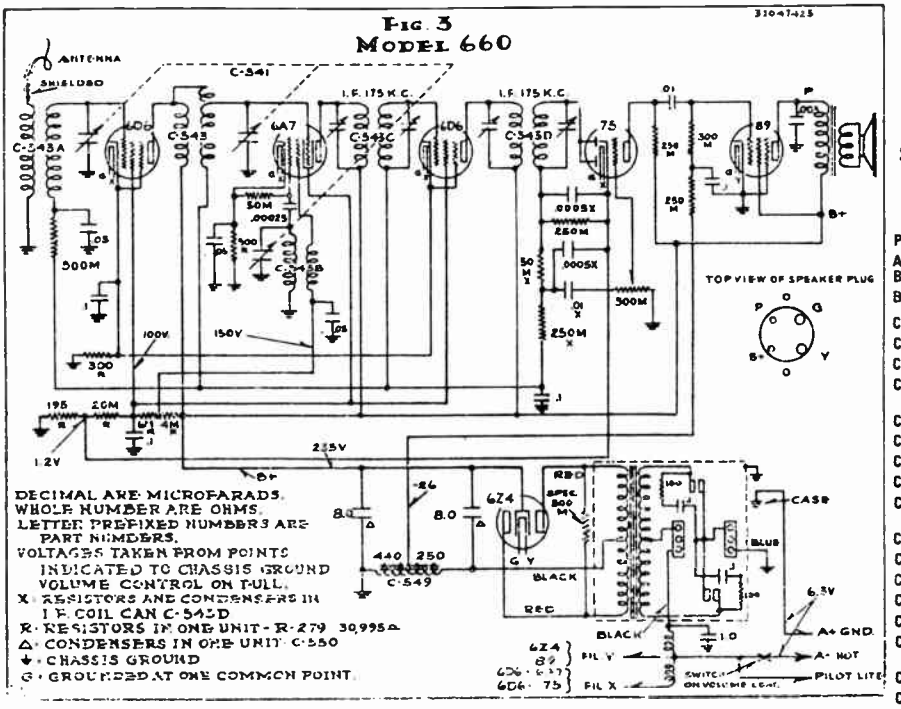
Vibrators can be reconditioned at a cost of $2.25 each, if the old unit is returned.

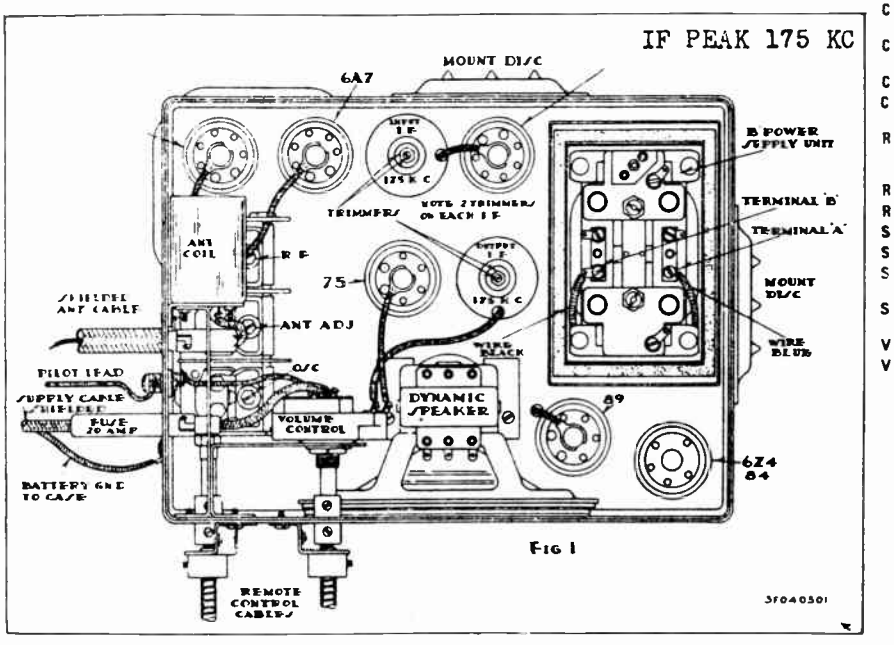
All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

MODEL 660
Schematic, Socket
Parts, Voltage

BELMONT RADIO CORP.





SCHEMATIC CIRCUIT DIAGRAM

MODEL 660 AUTORADIO

See instructions for serial notes etc.

PARTS LIST

Part No.	Description	List Price Each
A 660	Battery Cable—Plug Type.	1.75
B 104	Cable Shaft Brackets.....	.35
B 660	Antenna Cable—Plug Type	.80
C 106	Shaft Couplings	.35
C 117	"A" Choke—Small	.25
C 118	"A" Choke—Large	.35
C 144	Dual .1-200 Volt Condenser	.35
C 152	.00025 Mica Condenser...	.20
C 155	.0005 Mica Condenser....	.20
C 522	.01-400 Volt Condensers..	.25
C 531A	Dual .05 Condenser.....	.30
C 535	Dual .1—200 Volt Condenser	.35
C 541B	3 Gang Condenser	3.75
C 543	R.F. Coil	.80
C 543A	Antenna Coil	.80
C 543B	Oscillator Coil	.70
C 543C	Input I.F. Transformer...	1.25
C 543D	Output I.F. Transformer with Parts	2.50
C 547	.1-200 Volt Condenser....	.30
C 549	690 Ohm Choke	1.40
C 550	8-8 Mfd. Electrolytic Condenser	2.25
C 551	1 Mfd.—120 Volt Condenser	.35
C 553	.05-200 Volt Condenser...	.25
C 554	.5 Mfd. Generator Condenser	.50
R 232A	Special 500M Ohm Resistor Identified with 2 Yellow Dots	.35
R 279	30,995 Ohm Resistor.....	.60
R 281	100 Ohm Resistor.....	.20
S 338	18" Volume Control Shaft.	1.25
S 339	18" Selector Control Shaft	1.25
S 338S	Special 24" Volume Control Shaft	1.50
S 339S	Special 24" Selector Control Shaft	1.50
V 660	Complete "B" Unit—OAK	8.00
V 603	Volume Control	1.50
660	Remote Control Head Complete Less Shafts.....	5.00
	20 Ampere Fuses.....	.10
	Mounting Bolts	.10
	All carbon resistors.....	.20
	All sockets	.20
	Dynamic speakers	5.00

BELMONT RADIO CORP.
1257 Fullerton Avenue
Chicago, Illinois

Made in U. S. A.

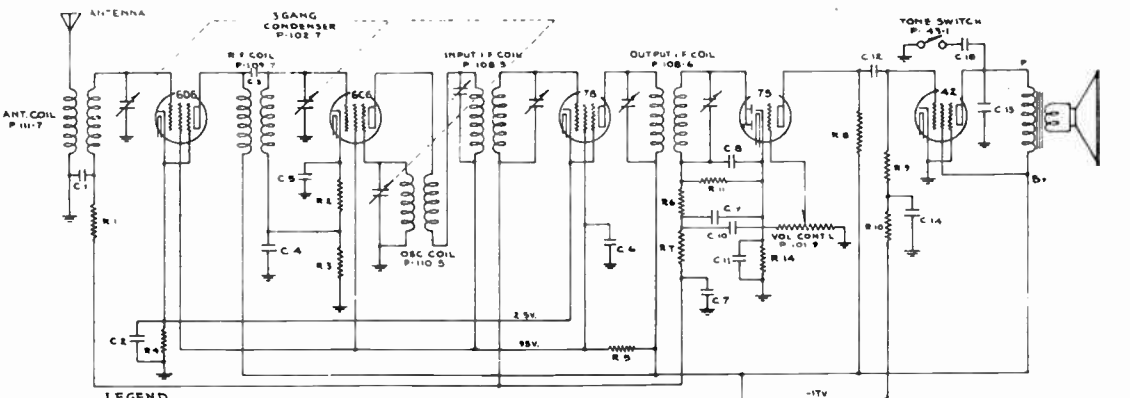
BELMONT RADIO CORP.

MODEL 670
Schematic, Socket
Trimmers, Voltage

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are EIA color coded - specify value and/or resistor number (per schematic diagram) and model number.

MODEL 670



LEGEND

RESISTORS

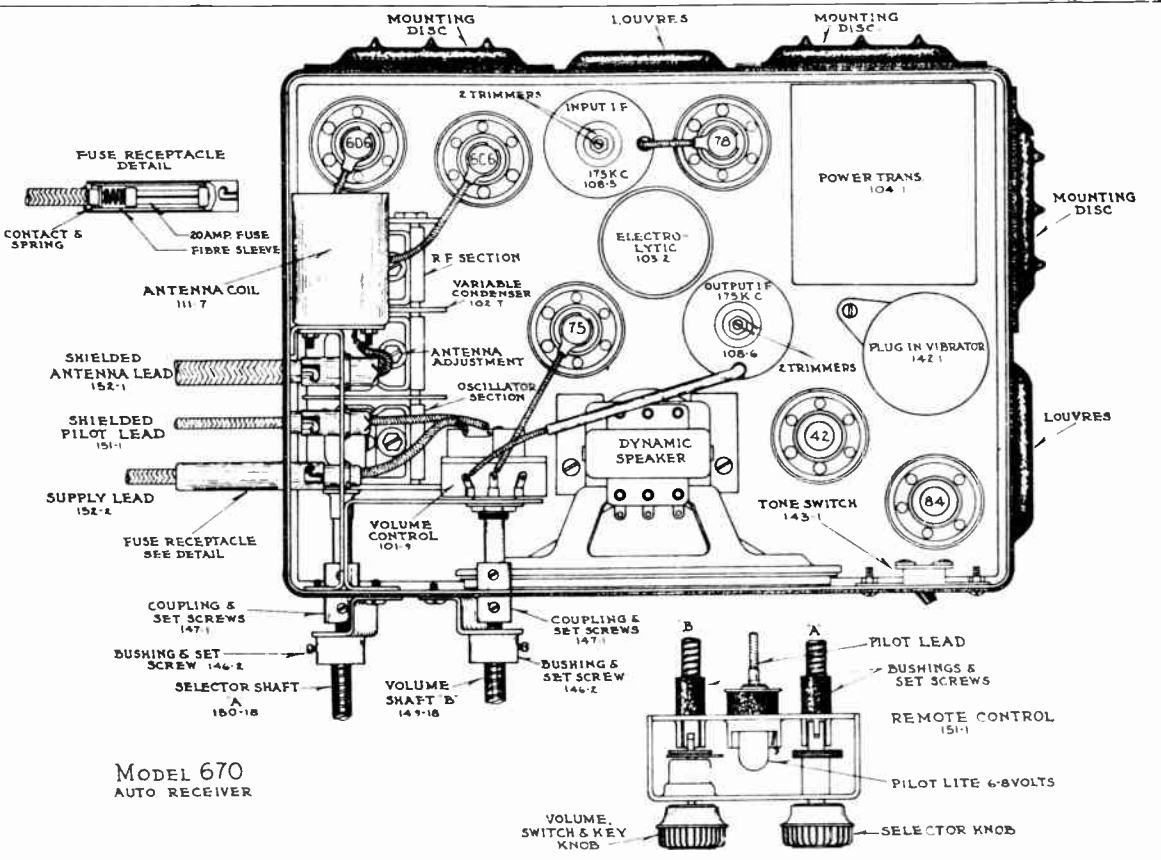
No	VALUE
R 1 -	250M 1/2W
R 2 -	450Ω
R 3 -	5M
R 4 -	150Ω
R 5 -	1 9M
R 6 -	50M 1/2W
R 7 -	250M 1/2W
R 8 -	250M 1/2W
R 9 -	200M 1/2W
R 10 -	300M 1/2W
R 11 -	250M 1/2W
R 12 -	100Ω
R 13 -	100Ω
R 14 -	4M 1/2W
VAR RESISTOR (VOL. CONT'L)	500M

CONDENSERS

No	VALUE
C 1 -	05 X 200V
C 2 -	1 X 200V
C 3 -	11 S mf GIMMICK
C 4 -	05 X 200V
C 5 -	05 X 200V
C 6 -	1 X 200V
C 7 -	1 X 200V
C 8 -	.0005 MICA
C 9 -	.0005 MICA
C 10 -	01 X 400V
C 11 -	.2 0MFD X 20V
C 12 -	.01 X 400V
C 13 -	005 X 600V
C 14 -	1 X 200V
C 15 -	1 MFD X 120V
C 16 -	8 MFD X 350V
C 17 -	8 MFD X 350V
C 18 -	01 X 400V
C 19 -	.02 X 1000V
C 20 -	1 MFD X 120V
C 21 -	002 MICA

NOTE -
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASS.S GROUND VOLUME CONTROL ON FULL
THE PHRASE GIMMICK MEANS A WIRE WOUND AROUND ANOTHER WIRE
RESISTORS IN ONE UNIT P-106-5 - R 2 3 4,5
CONDENSERS IN ONE UNIT P-105-2 C 16 17.
CONDENSERS IN DUAL UNIT - C 2 7
CONDENSERS IN DUAL UNIT - C 5 6
RESISTORS AND CONDENSERS IN OUTPUT I F CAN P-108-6 C 8,9,10 AND R 6,7,11
CONDENSER C 1 IN ANT COIL CAN P-111-7

IF PEAK 175 KC.



MODEL 670
AUTO RECEIVER

MODEL 670
Installation Data

BELMONT RADIO CORP.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the cardboard template which is the same size as set and mark location for two mounting bolts, if mounted on the long side and one bolt if on the short side.

Then drill two (2) one-half inch (1/2") holes, making certain that the paint around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 146-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel by means of special bracket, number 146-4 (see illustration).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. AVOID SHARP BENDS IN CABLES.

IMPORTANT - READ CAREFULLY

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables, number 149-24 and 150-24. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DIAL ADJUSTMENT:

After the control unit and cables have been connected to the set, the dial pointer must be adjusted. To do this, slowly rotate the tuning control knob to either right or left until a definite stop is reached, do not force the knob after the stop, as this will damage the control mechanism. Now rotate the knob slowly in the opposite direction until another stop is reached. The pointer will usually come to the end of the dial strip before the stop is reached. It is in this manner that the dial is automatically adjusted to indicate the correct frequency to which the receiver is tuned.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before inserting in receiver (see illustration).

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.

PILOT LIGHT:

The pilot light assembly, a shielded cable, plugs in to set and to the rear of the remote control unit (see illustration).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. Always adjust volume with volume control, never by de-tuning the selector control. De-tuning will very seriously affect the tone quality of this receiver. Select the desired tone with switch located in upper right hand front corner of receiver case. You will note that the base position of this control assists materially in reducing interference from static, street car lines and other high pitched disturbances.

ELIMINATION OF MOTOR NOISE:

Disconnect the high tension leads to spark plugs and connect a plug resistor to the top of each spark plug. Next remove the high tension lead from coil to distributor and insert distributor suppressor.

For cap type distributor, exchange the standard distributor suppressor from your dealer for special screw type.

BELMONT RADIO CORP.

MODEL 670
Alignment
Service Notes

ELIMINATION OF MOTOR NOISE: (Cont'd)

In some few cases, such as Buicks, it is necessary to use screw type suppressors. Cut lead about two inches from distributor and screw one end of suppressor into the wire attached to distributor, screw wire from coil into other end of suppressor.

Generator capacitor, number 148-1, is connected to generator side of cutout. The ground side of capacitor can be fastened to the generator housing under the same screw that holds the relay housing to generator. In some cases, an additional capacitor, number 148-1, (obtainable from your dealer) must be installed between the battery side of ignition coil and the car frame.

If after connecting suppressors and condensers as outlined above there is still motor noise, make the following tests:

Shield high tension leads.

Bond flexible shaft leads, such as free wheeling, which run close to distributor, radiating ignition interference which is picked up by the antenna inside of car.

Cars using wooden floor boards, place a grounded copper screen under toe board.

Excessive gap between distributor rotor and high tension contacts, replace with a special radio rotor arm or build up end with solder and dress end with file so that its original shape is retained. The rotor should not brush or wipe the contacts, but should just clear them.

In some cases, such as V-8 Ford, it is necessary to pull battery and primary leads out of special tube which houses high tension leads, shield and ground these leads. Also on V-8 Fords it is necessary to install a capacitor at primary terminal of coil housing.

Additional suppressors can be obtained from your dealer.

The ignition system of car must be kept in good condition.

Fouled plugs or plugs with improperly adjusted gaps will affect the operation of receiver as well as of the automobile. Burned or poorly adjusted breaker points will also impair the performance. It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery.

It is sometimes necessary to connect a condenser (148-3) between the hot side of the dome light switch and ground.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation, it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

SERVICE NOTES

Should it ever be necessary or desirable to re-align this receiver, the proper method is as follows:

Adjustments can be made with the receiver mounted in the cabinet, being necessary only to remove the top cover.

I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number 108-5 and 108-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable through the top of the can.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust oscillator trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1400-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a volt meter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

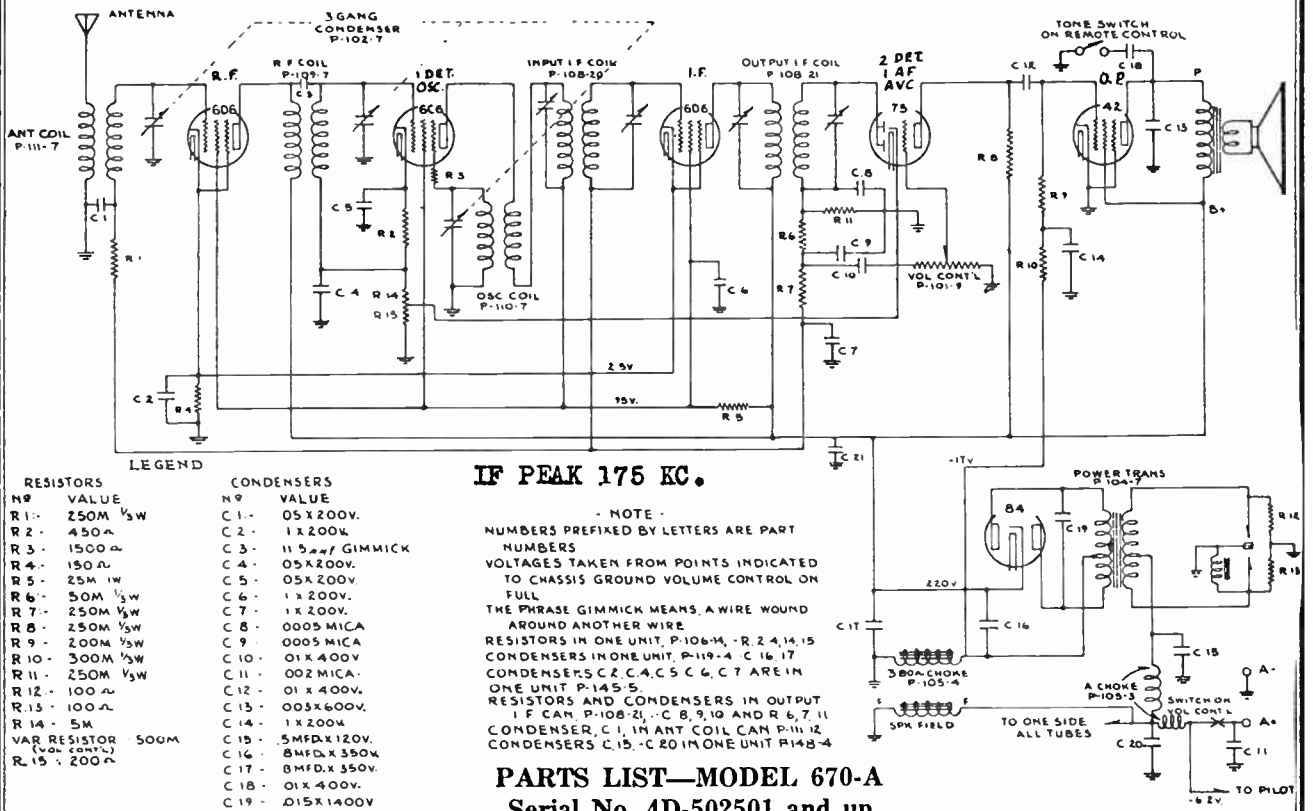
Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

MODEL 670-A
Schematic, Voltage
Parts List

BELMONT RADIO CORP.



LEGEND

RESISTORS		CONDENSERS	
No	VALUE	No	VALUE
R 1 -	250M 1/2W	C 1 -	05 X 200V.
R 2 -	450Ω	C 2 -	1 X 200V.
R 3 -	1500Ω	C 3 -	11.5 mmf GIMMICK
R 4 -	150Ω	C 4 -	05 X 200V.
R 5 -	25M 1W	C 5 -	05 X 200V.
R 6 -	50M 1/2W	C 6 -	1 X 200V.
R 7 -	250M 1/2W	C 7 -	1 X 200V.
R 8 -	250M 1/2W	C 8 -	0005 MICA
R 9 -	200M 1/2W	C 9 -	0005 MICA
R 10 -	300M 1/2W	C 10 -	01 X 400V
R 11 -	250M 1/2W	C 11 -	002 MICA
R 12 -	100Ω	C 12 -	01 X 400V.
R 13 -	100Ω	C 13 -	003 X 600V.
R 14 -	5M	C 14 -	1 X 200V.
VAR RESISTOR (VOL CONT'L) R 15 -	500M 200Ω	C 15 -	.5MFD X 120V.
		C 16 -	8MFD X 350V.
		C 17 -	8MFD X 350V.
		C 18 -	01 X 400V.
		C 19 -	.015 X 1400V
		C 20 -	5MFD X 120V.
		C 21 -	01 X 400V

IF PEAK 175 KC.

- NOTE -
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL
THE PHRASE GIMMICK MEANS A WIRE WOUND AROUND ANOTHER WIRE
RESISTORS IN ONE UNIT, P-106-14, - R. 2, 4, 14, 15
CONDENSERS IN ONE UNIT, P-119-4 - C. 16, 17
CONDENSERS C 2, C 4, C 5 C 6, C 7 ARE IN ONE UNIT P-145-5
RESISTORS AND CONDENSERS IN OUTPUT I F CAN, P-108-21, - C. 8, 9, 10 AND R 6, 7, 11
CONDENSER, C 1, IN ANT COIL CAN P-111-12
CONDENSERS C 19, - C 20 IN ONE UNIT P-148-4

PARTS LIST—MODEL 670-A
Serial No. 4D-502501 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description
101-9	Volume Control with Switch
101-12	Tone Control Assembly, complete
102-7	Three Gang Geared Variable Condenser
104-6	Vibrator Transformer
105-3	"A" Choke—40T—No. 16E—½" Dia.
105-4	380 Ohm Filter Choke
106-6	200 Ohm Center Tapped Resistor
106-14	5800 Ohm Metal Clad Resistor
108-20	Input I. F. Transformer completely assembled in can (175 K. C.)
108-21	Output I. F. Transformer complete with can, but less resistor and Condenser Assembly (175 K. C.)
	Resistor and Condenser Assembly for 108-21
109-7	R. F. Coil
110-7	Osc Coil & bracket
111-7	Antenna Coil
112-43	Volume Control Shaft complete with knob
115-18	Special partition shield
115-22	Tube shield
116-5	6-8 Volt T-50 pilot lamp
116-6	Pilot light assembly, complete, less bulb
119-4	8-8 Mfd. x 350 Volt Electrolytic Filter Condenser
142-1	Plug-In Vibrator
145-5	.4 Mfd. By-Pass Block
146-14	Special bracket including battery antenna, pilot light and tone control cable fittings, but less antenna coil volume control
148-4	Dual .5 Mfd. 120 Volt Condenser
161-1	20 Ampere fuse
147-1	Selector Control Coupling
147-2	Bushing and bracket complete
147-11	Volume control coupling
135-5	⅜x3" carriage bolt
140-3	Container complete with top and bottom
148-1	.5 Mfd. Generator Condenser
148-3	.5 Mfd. Ammeter Condenser
149-18	Volume Control Shaft—18"
149-24	Volume Control Shaft—24"
150-18	Selector Shaft—18"

Part No.	Description
150-24	Selector Shaft—24"
151-2	Remote Control Head, less flexible shafts, less tone control and pilot assemblies, but with knobs and mounting hardware
152-1	Antenna cable
152-2	Battery cable
131-5	Black bakelite remote control knobs
146-8	Die Cast Remote Control Mounting Bracket
146-12	Steering Column Strap
168-1	Spark-plug type suppressor
168-2	Distributor plug-type suppressor
168-3	Cable type suppressor
168-4	Special Ford spark-plug suppressor
	Unless otherwise listed, all Carbon Resistors
	Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers
	Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers
	Unless otherwise listed, all Molded Mica Condensers
	All Sockets
167-1	Dynamic Speakers
	Plate antenna (clamps to frame of car)

Note: Part No. 145-5 consisting of five separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

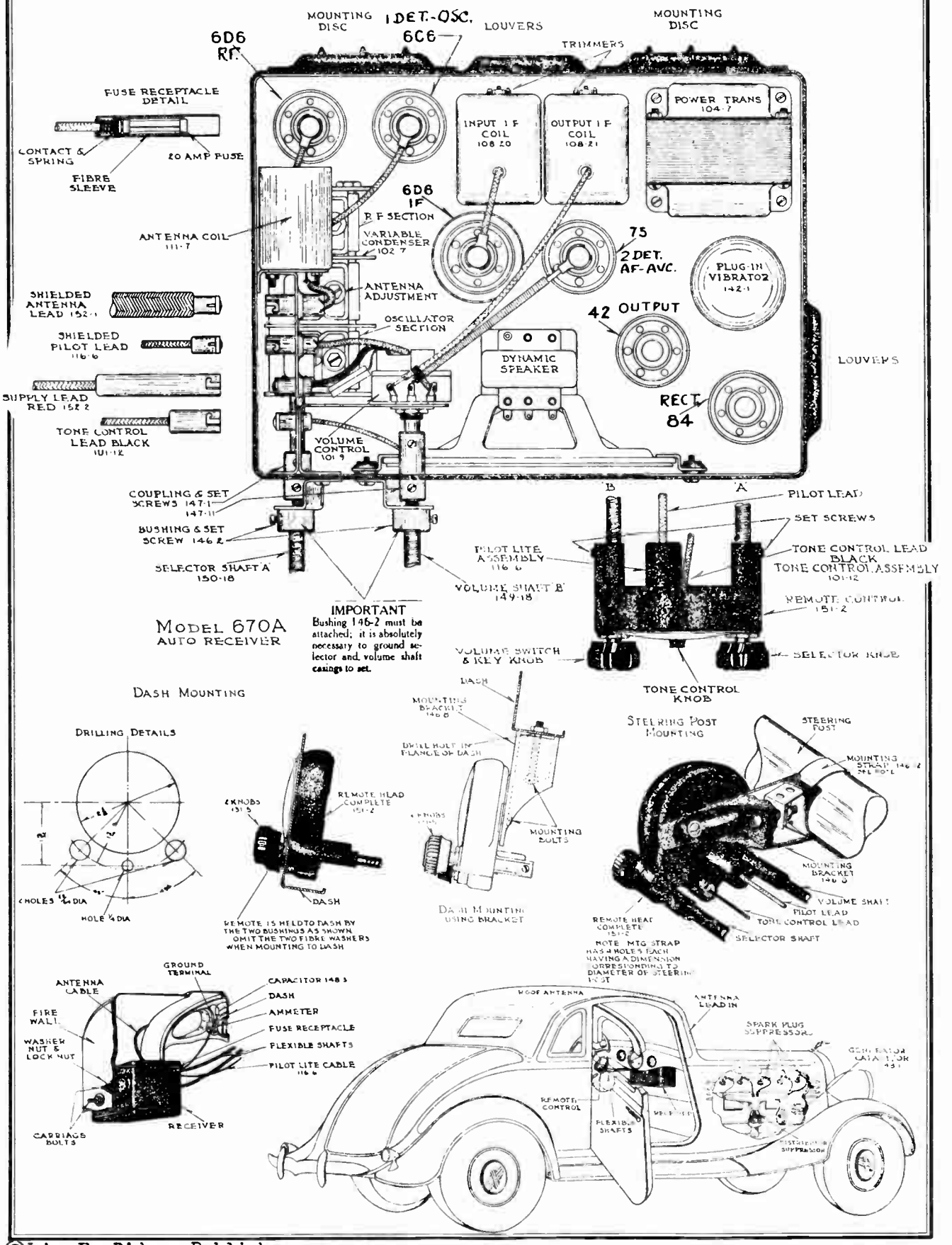
All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

We cannot supply speaker cones only. We can replace a speaker on which a cone has been damaged for $1.50, if defective speaker is returned, transportation charges prepaid.

BELMONT RADIO CORP.

MODEL 670-A
Socket, Trimmers
Installation Details



MODEL 670-A
Alignment
Installation Data

BELMONT RADIO CORP.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.

2. Adjust trimming condensers of both input and output I. F. transformers, parts number 108-20 and 108-21 (see top view of chassis) to resonance with an oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection on the output meter indicates resonance.

Note: Each I. F. transformer has two adjustments, both of these adjustments on both transformers are accessible through holes located in the back of the case between the two mounting plates and directly under the louvres.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1500-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.

4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:

Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the cardboard template which is the same size as set and mark location for two mounting bolts, if mounted on the long side and one bolt if on the short side.

Then drill two (2) one-half inch (½") holes, making certain that the paint around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 146-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel or under dash (see illustration).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. AVOID SHARP BENDS IN CABLES.

IMPORTANT—READ CAREFULLY:

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables, number 149-24 and 150-24. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before inserting in receiver (see illustration). All bypass leads should be as short as possible.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.

PILOT LIGHT:

Pilot light assembly, part number 116-6, a shielded cable, plugs into the set and to the rear of the remote control unit (see illustrations).

TONE CONTROL:

The tone control assembly, part number 101-12, attaches to the back of the remote control head by means of a special screw and plugs into the set (see illustrations).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. De-tuning will very seriously affect the tone quality of this receiver. Tone control knob located between two black knobs (see illustrations) is a BASS and TREBLE switch, it is not a variable tone control. Turning it to the right makes the BASS connection, turning it to the left makes the TREBLE connection. You will note that the BASS position assists materially in reducing interference from static, street car lines and other high pitched disturbances.

MOTOR NOISE SUPPRESSION:

The ignition system of every automobile generates high frequency electrical interference. This high frequency interference arising from the ignition coil, the distributor and the spark plugs must be properly suppressed in order to obtain satisfactory reception. Each car will present more or less an individual problem but there is a definite procedure to follow which holds true in every case.

This first essential procedure is to disconnect the high tension leads to the spark plugs and attach the spark plug suppressors (168-1) (for V 8 Fords 168-4) the special distributor type suppressor (168-2) which is inserted in the center contact of the distributor as indicated in the illustration of a typical installation. (NOTE V 8 FORD USES NO DISTRIBUTOR SUPPRESSOR.) For cap type distributor, exchange the standard plug type distributor suppressor (168-2) for a special cable type suppressor (168-3) from your dealer. In some few cases, such as Buicks it is sometimes necessary to use cable type (168-3) suppressors. This type of suppressor is inserted in the leads running from the distributor to the spark plugs and which are concealed underneath the metal plate which covers the spark plugs.

After the spark and distributor suppressors have been properly fastened the next in importance is the generator condenser (148-1), this filters a high pitched whining noise which would otherwise be heard as the motor is accelerated.

It is sometimes necessary in cars where the ignition coil is located under the dash, to use an additional capacitor (148-1) obtainable from your dealer. It must be installed between the battery side of the ignition coil and the frame of the car. Next connect capacitor (148-3) from the battery side of ammeter to frame of car. This is necessary in practically every installation and a good connection to the frame of the car is of utmost importance.

Cadillac and La Salle

MOTOR CAR RADIO

SERIES 06W — 1933-34

CADILLAC MOTOR CAR COMPANY — DETROIT, MICHIGAN

Description

The new 06W Series Auto Radio Receivers are made up in three units: the chassis unit, speaker—"B" eliminator unit and control unit. The control unit is mounted to the instrument panel, while the speaker—"B" eliminator unit and chassis are mounted on the dash. Current to operate the chassis and "B" eliminator is obtained from the automobile storage battery. Two flexible shafts mechanically connect the control unit to the chassis. One of these is for the volume control and switch, while the other is for the tuning mechanism. A roof antenna is used.

In this manual are covered detailed instructions for the installation of each part and information for completing and maintaining the installation. The following tools are required: portable electric drill, screw drivers, pliers, a heavy soldering iron, hack saw, files, small wrenches, and cutters.

Before making the installation it is suggested that this manual be completely read.

Mounting the Chassis

Before mounting the chassis read the articles on "Mounting the Control Unit" and "Attaching the Flexible Drive Shafts." Hold the control unit in position or mount it in place temporarily, so that the position of the flexible shafts can be determined.

The chassis is mounted in back of the dash at the left side, as shown in Fig. 1. It should be mounted in such a way that the tuning condenser flexible drive shaft to the control unit will be in substantially a straight line as shown in Figs. 1 and 2. The chassis is mounted with the anchor bushings in which the flexible shafts go, facing the control unit, and with the cover at the bottom. It is secured to the dash by means of the dash mounting plate, see Fig. 4. In some of the earlier models it will be necessary to move the cut-out box to a higher location in order to mount the chassis.

First drill the three mounting holes required for the dash mounting plate. The location and size of these holes is shown in Fig. 3. A template for drilling these holes is supplied with the set. Three 4" square head mounting bolts are supplied. Take two of these, which will be used for the upper part of the mounting plate and screw on nut "A" (see Fig. 4). The nut should be just far enough away from the head of the bolt to permit the bracket of the mounting plate to slip down as shown in the illustration. Then put on nut "B" and the washer, after which the two bolts can be put through the dash, with the shanks extending into the engine compartment, as shown in Fig. 4. A washer, lockwasher, and nut are then put on these bolts from the front of the dash to hold them in place.

The distance "X" between nuts "A" and "B" determines how far out the chassis is mounted from the dash. When there is a lot of apparatus in back of the dash, such as wires, tubing, etc., the chassis will have to set out far enough to clear it. However, in practically all models of Cadillac and LaSalle cars, there is no interfering apparatus and therefore the distance "X" will be zero.

Then put a washer on the third mounting bolt and put this bolt through the lower mounting hole with the head on the engine side of the dash, as shown in the illustration. Put on a washer, lockwasher, and nut "D" and tighten it up. Then put on nut "E" with a washer as shown. Nut "E" should be screwed down until it is about ¼" from nut "D," when distance "X," as explained above, is zero.

Next secure the dash mounting plate to the chassis box by means of the four chassis mounting screws. The four mounting screws on the broad side of the chassis box are used. As explained above the cover of the box is at the bottom.

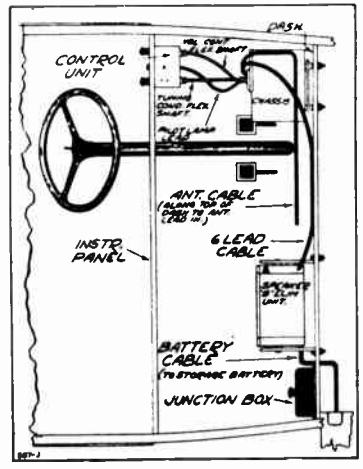


Fig. 1—General Installation—Top View

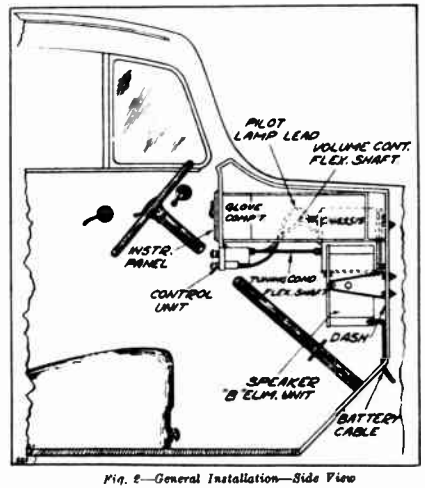


Fig. 2—General Installation—Side View

All the tubes should be in the sockets, the antenna trimmer adjusted (as explained later) and the flexible shafts connected before the chassis is permanently installed. Complete information on the latter procedure is contained in the article on attaching the flexible drive shafts.

The four mounting screws pass through the four slots in the mounting plate (Fig. 3). After they are in place and tight, the dash mounting plate with chassis attached is slipped over the three mounting bolts. The two upper brackets on the plate slip down in back of nut "A" as shown in Fig. 4 and the slot at the bottom of the plate slips over the shank of the lower mounting bolt in back of nut "E." The plate will then hang with the bottom farther away from the dash than the top. A washer, lockwasher, and nut "F" are then put on the lower mounting bolt. Nut "F" is screwed on until the mounting plate is tight up against the washer in back of nut "E." In this position, the bracket at the top of the mounting plate should butt up against nut "A" and be tight. Also the mounting plate will be approximately parallel with the dash.

Mounting the Control Unit

The control unit is mounted to the instrument panel as shown in Figs. 1 and 2. In the 1932 and 1933 models there are two holes on the flange at the bottom of the instrument panel on the left side, which line up with the two holes on the mounting lugs of the control unit. In the earlier models, it will be necessary to drill these holes. Two ¼" holes with centers 4⅞" apart are required. The best location for these holes is at a point where the tuning condenser flexible drive shaft to the chassis will be in substantially a straight line (see Figs. 1 and 2).

Before mounting the control unit permanently attach the flexible shafts, as explained in the next article, and attach the pilot lamp plate to the bottom of the unit, as explained in the article on "Completing the Wiring Connections."

Mounting the Speaker-"B" Eliminator

The speaker-"B" eliminator is mounted on the back of the dash by means of two brackets, as shown in Fig. 5. The best location is at the right side of the dash under the glove compartment as shown in Figs. 1 and 2. It should be mounted with the brackets at the side as shown in (A) Fig. 5, and with the inner bracket mounting holes as indicated in (B) Fig. 5. The box is mounted with the tone control knob at the upper left, as shown in Fig 1. The grilled portion of the box at the front should face the listener.

In some of the older models which have a hot water heater mounted at the right side of the dash, it will be necessary to mount the speaker-"B" eliminator unit at the center of the dash. In those models which have the coil mounted on the dash, it will be necessary to move the coil to the engine compartment, as explained in the article "Suppression of

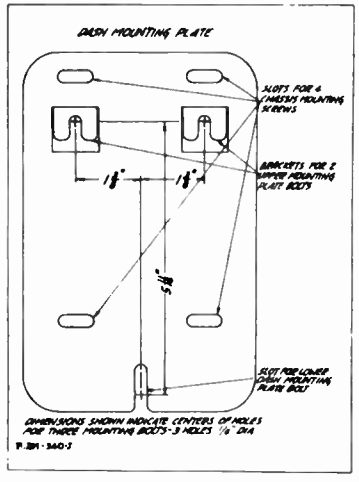


Fig. 3—Dash Mounting Plate

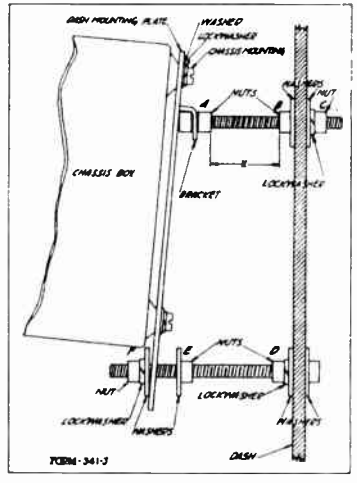


Fig. 4—Details of Chassis Mounting on Dash

Ignition and Generator Noise," before this can be done.

In Fig. 5 (B) is shown how the brackets may be mounted vertically if space does not permit their being mounted horizontally, as is the case in some cars.

After the position of the speaker is decided on, drill the four $\frac{1}{4}$" holes required for the bracket mounting bolts. A template for the mounting holes is supplied with the receiver. The holes are arranged in a rectangle. The centers of the holes, the small dimension are $2\frac{1}{2}$" apart and the long dimension 10" apart. Four $\frac{1}{4}$" x 3" mounting bolts, nuts and lock washers and two reenforcement plates are provided. The mounting bolts are put through the bracket and the dash with the shanks extending into the engine compartment. The reenforcement plates are then put on, one being used for each bracket, after which the lockwashers and nuts are then put on.

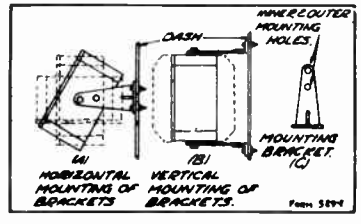


Fig. 5—Method of Mounting Speaker

Attaching the Flexible Drive Shafts

After the chassis is temporarily mounted and the position of the control unit is known, the flexible shafts may be attached. Remove the chassis from the mounting bolts to make the connection.

Two flexible shafts are supplied with the Cadillac and La Salle auto receiver, one 9" and one 12" long. The 9" shaft is the tuning condenser flexible shaft and is put on in substantially a straight line, as shown in Figs. 1 and 2. The 12" shaft is the volume control shaft. This shaft bends upward from the control unit, as shown in Fig. 2.

The distance between the instrument panel and the dash varies in Cadillac and La Salle cars. In some cars the flexible shaft lengths of 9" and 12" supplied with the receiver are too long. For that reason, these shafts (inside portion) are squared for a length of 3" at one end. The shaft may then be cut at any point along the squared portion to whatever length is required. It should be cut with a three-cornered file or the edge of a grinding wheel. *Do not use a hack saw.* The casing, which is $1\frac{1}{2}$" shorter, must be cut to correspond. This should be tinned first at the point to be cut and may then be cut with a hack saw.

After the length and position of the shafts is decided on, remove the chassis and mounting plate from the mounting bolts. As the shafts are already secured at the control unit (if they have not been taken out to cut), it is necessary only to secure them at the chassis end. Before attaching the shafts, see if the set is in working order. Put the 8-prong socket in place on the chassis and operate the set with the cover off.

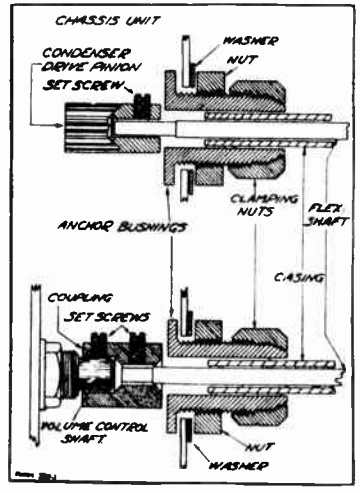


Fig. 6—Details of Flexible Drive Shaft Connections

In Fig. 6 is shown a cross-sectional view of the flexible drive shaft connections at the chassis end. First check the centering of the volume control anchor bushing by eye. The center of the bushing should be in a line with the center of the volume control coupling. In case the center of the bushing is not in line or the shaft turns hard, loosen the nut which holds the bushing in place. Then insert the shaft in the coupling and tighten the set screws as explained below. This will center the bushing and the nut may then be tightened.

Next, take the tube cover plate off. This is the large plate held on the chassis box by 5 screws. Extend the volume control flexible shaft and casing several inches through the hole in the anchor bushing of the tube cover plate so that the plate will be on the casing and out of the way. Turn the volume control coupling counter-clockwise until the switch is snapped to the off position. Lock the receiver on the control unit and turn the volume control knob counter-clockwise until it is in the locked position. Then loosen both set screws in the volume control coupling and insert the flexible shaft in the coupling (see Fig. 6). Tighten the outer set screw first on *one of the four flat faces* of the flexible shaft and then tighten the inner set screw. Then again temporarily hang the chassis on the mounting bolts. Next, check the operation of the switch, volume control and lock. The switch should be off when the volume control knob is in the locked position. It may be necessary to loosen the inner set screw and do a slight amount of adjusting until the proper setting is obtained.

Next, slide the tube cover plate into position and fasten it in place by means of the five screws. Then tighten down the clamping nut on the volume control shaft casing but *do not tighten this nut excessively.*

To attach the tuning condenser flexible shaft, first check the centering of the anchor bushing by eye as was explained above. Then extend the tuning condenser flexible shaft into the hole at the center of the tuning condenser drive pinion. With the rotor plates completely in mesh, turn the dial gear in the control unit until it is at the low frequency end stop. The set screw may then be tightened and the clamping nut secured on the casing as was explained above. In some instances, it may be necessary to loosen the set screw of the large gear on the tuning condenser rotor shaft and adjust the setting of this gear in order to get an accurate calibration.

Antenna

As the Cadillac and LaSalle cars come equipped from the factory with built-in antennas, the antenna portion of the installation is very simple. The lead-in wire from the antenna will be found behind the right cowl pad at the top edge.

If any installations are made in cars which do not have a roof antenna, one will have to be put in. The roof antenna is by far the most satisfactory type and should be used in all cases except in sport models, in which case a plate antenna under the car may be used.

Completing the Wiring Connections

Antenna Cable

Bring the antenna cable of the receiver in the most direct manner possible to the lead-in from the antenna and connect it to the latter. Keep it as high as possible and as far away from any car wiring as possible. Care should be taken not to have the antenna wire come in contact with the shield wires. Ground the pigtail of the antenna cable shield at the antenna end. The pigtail of this shield at the chassis end is grounded.

The shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. If motor noise is experienced, cover the exposed portion of the lead-in wire with loom and braided shield from the point where it leaves the column to the point of connection to the antenna lead of the receiver. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

CADILLAC

MODEL 06W
Schematic, Socket
Alignment

Battery Cable and Six Lead Cable

As shown in Figs. 1 and 2, the battery cable is brought down the dash, through a hole in the dash and thence over to the battery. It passes through the raised portion of the battery compartment cover.

The lug on the lead marked "positive" is connected to the positive side of the battery and the lug on the negatively marked lead is connected to the negative side of the battery. Ground the pigtail of the shield by screwing the No. 6 Parker Kalon screw through the end of the pigtail and through the hole in the lug which is grounded.

The six-lead cable between the chassis and the speaker—"B" eliminator is usually brought over along the dash as shown in Fig. 1.

Pilot Lamp

Before the control unit is permanently mounted, complete the pilot lamp connections. The pilot lamp cable is attached to the eight-prong socket. At the end of this cable is the pilot lamp socket and clip, the latter being attached to an angle bracket. This bracket is to be screwed to the pilot lamp plate which will be found in the bag of parts. A ¼" 6-32 binding head screw, nut and lockwasher are provided for this purpose. The bracket is put on the pilot lamp plate in such a way that the leads will come out at the back of the control unit. The pilot lamp plate is then screwed to the bottom of the control unit by means of the lug on each side of the plate.

Trying Out the Set and Adjusting

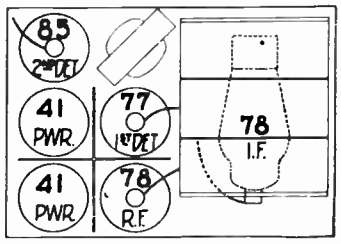


Fig. 7—Location of Tubes

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer condenser.

To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 KC with the volume control about three-quarters on. On one end of the chassis box is a small metal plate. Remove the two screws which hold this plate in place. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

The location of the tubes is shown in Fig. 7.

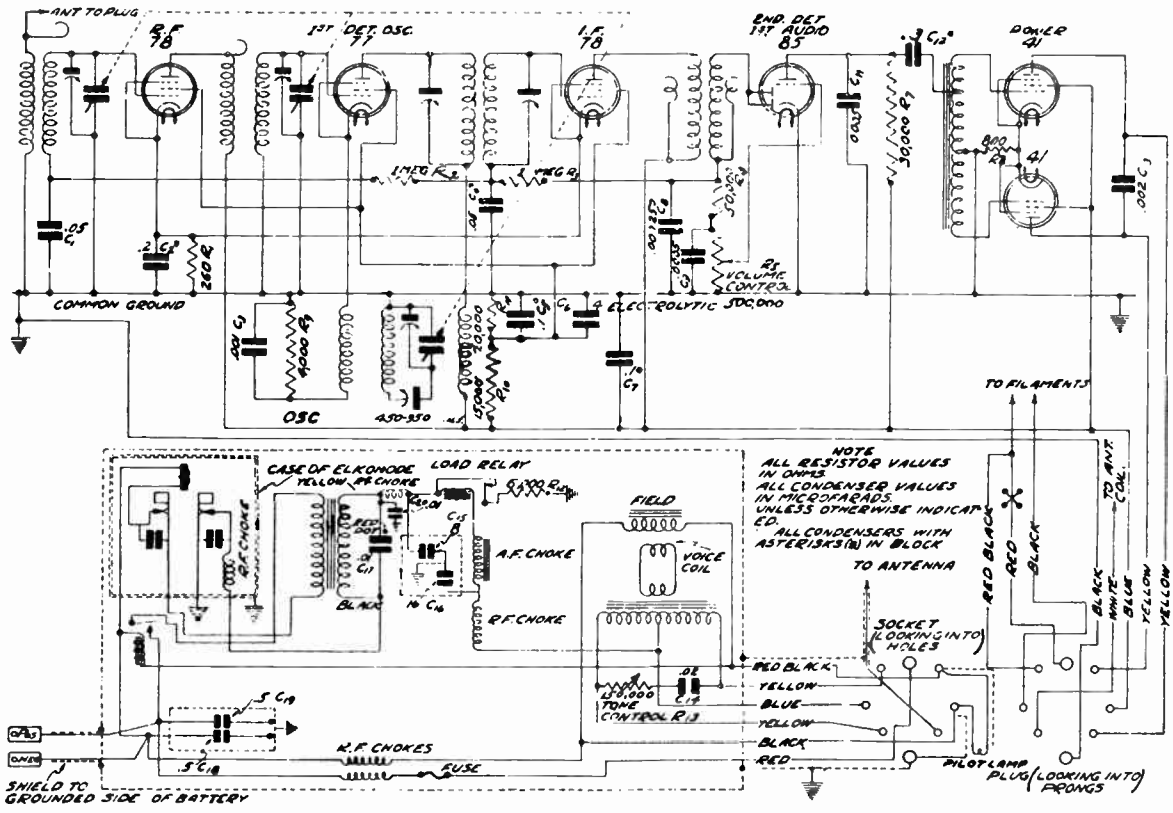


Fig. 9—Schematic Circuit Diagram

IF PEAK 262 KC.

MODEL 06W
Parts List

CADILLAC

Replacement Parts for Series 06W Receivers

"S" Type — Black Finish

"R" Type — Maroon Finish

CHASSIS PARTS

Part No.	Description
P-1763	No. 85 Tube Socket
P-1761	No. 77 Tube Socket
P-1762	No. 78 Tube Socket
P-1665	No. 41 Tube Socket
P-1760	8-Prong Male Plug
P-50581	Tuned Impedance Transformer
P 20546	Pinion Compression Spring
P-20544	Pinion Mtg. Bracket
P-20586	Cond. Drive Pinion
P-20585-A	Cond. Drive Gear
P-1568-A	Tube Shield Assembly
P-10263	⅜ Long Tube Bumper (Rubber)
P-10210	⅝ Long Tube Bumper (Rubber)
P-30417	Volume Control Coupling Unit
P-5094	2nd I. F. Coil and Can Assembly Complete
P-5063	1st I. F. and Oscillator Coil and Can Assembly Complete
P-5069	Complete R. F. Coil and Can Assembly
P-5064	Antenna R. F. Transformer only
P-5065	Interstage R. F. Transformer only
P-20516	6-32 Wing Nuts for Chassis Cover—Black
P-20737	6-32 Wing Nuts for Chassis Cover—Red

Resistors

(In Chassis)

Part No.	Code No.	Resistance	Type
P-B90962	R1	260 ohm	Carbon
P-A90948	R2	1 Megohm	Carbon
P-A90948	R3	1 Megohm	Carbon
P-A90941	R4	50,000 ohm	Carbon
P- 91061	R5	500,000 ohm	Volume Control and Switch
P-B91047	R7	30,000 ohm	Carbon
P-B90964	R8	800 ohm	Carbon
P-A90947	R9	4,000 ohm	Carbon
P-B91020	R10	15,000 ohm	Carbon
P-B90950	R11	20,000 ohm	Carbon

(In Speaker—"B" Eliminator)

P-98001	R12	6,000 ohm	Vit. Enamel
P-91013	R13	150,000 ohm	Tone Control

Condensers

(In Chassis)

Part No.	Code No.	Capacity	Voltage	Type
P-80946	C1	.05	mfd. 200 V.	Tubular
P-80821	C3	.001	mfd. 600 V.	Molded
P-80965	C6	4.0	mfd. 150 V.	Electrolytic
P-80919	C8	.00025	mfd. 600 V.	Moulded
P-80945	C9	.0005	mfd. 600 V.	Moulded
P-80855	C11	.0005	mfd. 600 V.	Moulded
P-80808-A	C13	.002	mfd. 600 V.	Moulded
P-80903-J	C2	0.2	mfd.	Block
	C4	.05	mfd.	
	C5	0.1	mfd.	
	C7	0.1	mfd.	
	C12	0.3	mfd.	
P-1539	600 K. C. Tracking Condenser			
P-80938	Three-Gang Variable Condenser			

(In Speaker—"B" Eliminator)

P-80940	C14	.02	mfd. 400 V.	Tubular
P-80939	C15	8.0	mfd. 225 V.	Electrolytic Block
	C16	16.0	mfd. 225 V.	
P-80953	C17	.01	mfd. 160 V.	Metal Case
P-80941	C18	0.5	mfd. 15 V.	Metal Case
	C19	0.5	mfd. 15 V.	
P-80872	C20	.01	mfd. 600 V.	Tubular

SPEAKER "B" ELIMINATOR PARTS

Part No.	Description
P-50582	Power Transformer Assembly
P-50583	"B" Choke Assembly—Iron Core
P-5089	"B" Choke—Air Core (2 Used)
P-5090	Dual "A" Choke—Air Core
P-1765	Dual Vibrator Elkonode
P-1766	Five-Prong Socket
P-1767	On-Off Relay
P-1768	Automatic Load Relay
P-70737	"A" Cable and Lugs
P-70748	Six-Lead Cable, Antenna Cable, Pilot Lamp Cable and Eight-Prong Socket Assembly, Complete
P-1624	10 Amp. Fuse—Size No. 3AG Fuse Block
P-1771	6-Inch Speaker—S Type Set
P-1772	8-Inch Speaker—R Type Set
P-1790	5-Lug Terminal Strip

CONTROL UNIT PARTS

Part No.	Description
P-20534	Dial Gear
P-20537	Dial Retaining Washer
P-30387-A	Worm Drive Gear
P-30378	Anchor Bushing
P-30384	Anchor Bushing Clamping Nut
P-30385	Anchor Bushing Hex. Nuts
P-1848	Lock Assembly
P-30435	Keys
P-20724-A	Lever
P-20725	Ribbon Tension Spring
P-1562	Knobs—S Type Set
P-1855	Knobs—R Type Set
P-1610	Flexible Shaft 9¾ Inch
P-1611	Flexible Shaft 12¾ Inch
P-1849	Dial Strip
P-30437	Volume Control Drive Shaft
P-30390	Drive Shaft
P-1563-A	6-8 Volt Pilot Lamp
P-1871	Pilot Lamp Socket and Clamp

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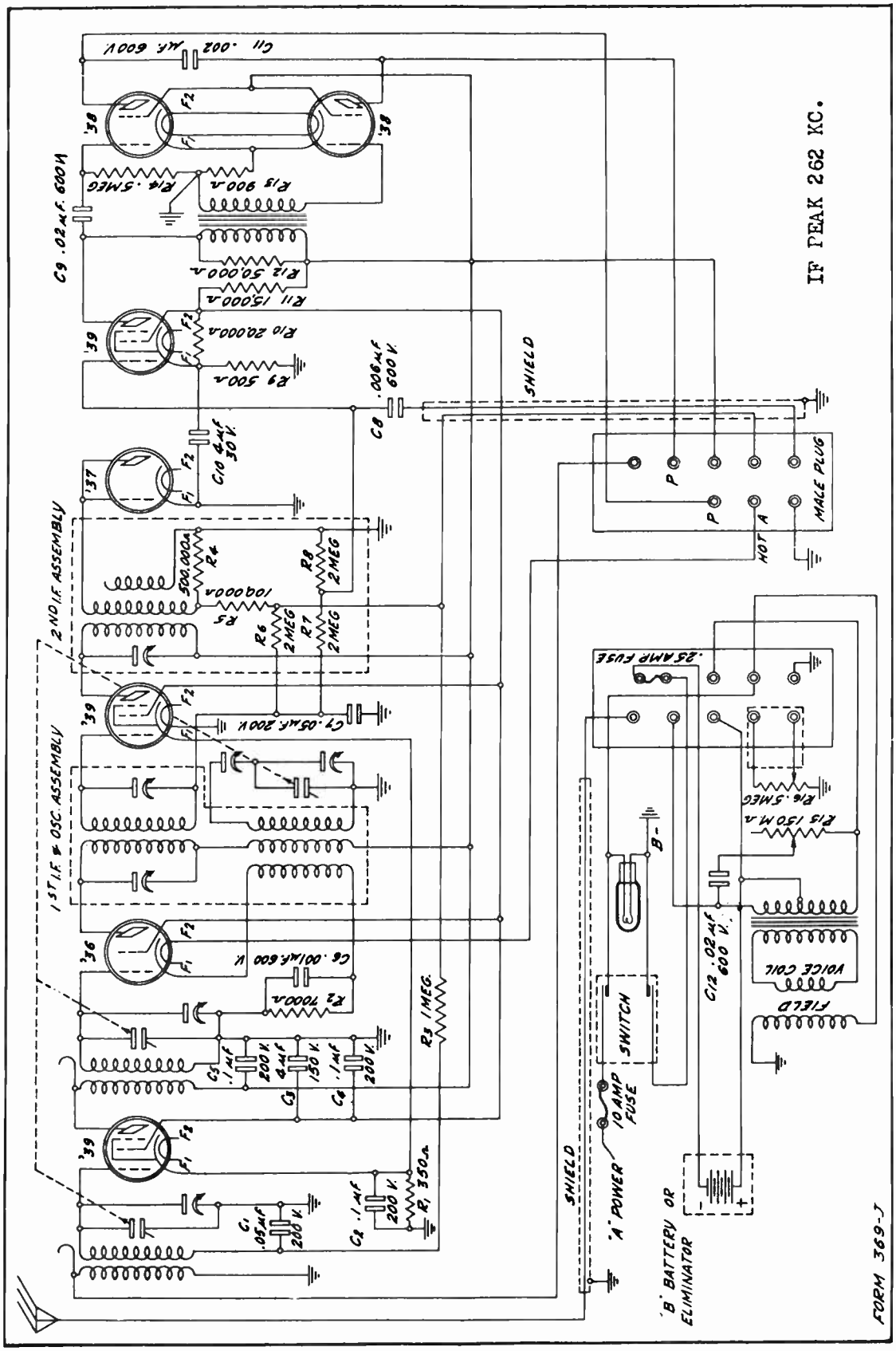
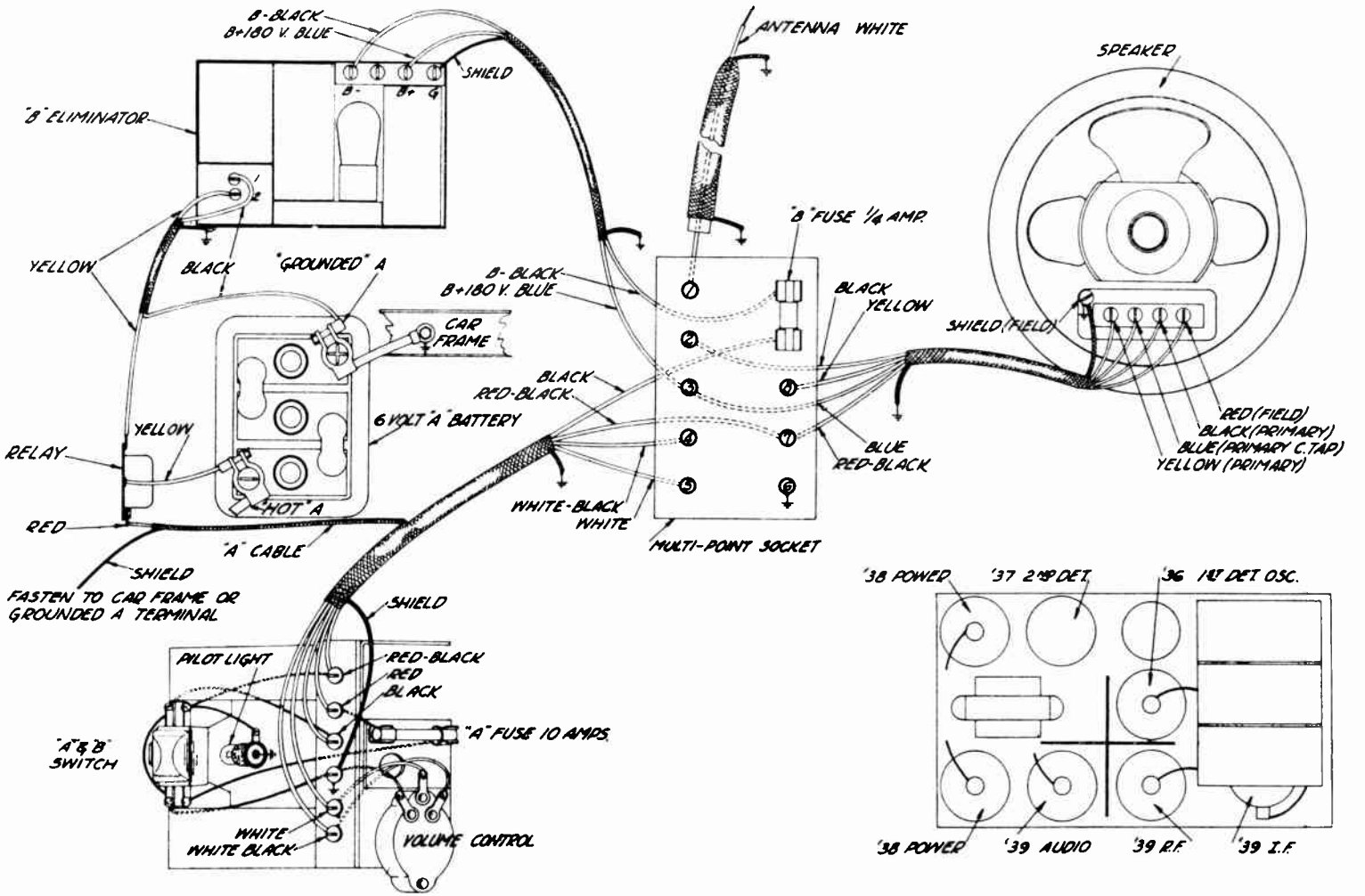
MODEL 2721 (072)
Schematic



MODEL 2721 (072)
Voltage, Socket
Assembly Diagram

CADILLAC



Type of Tube	*Function*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate MA*
'39	R. F.	6.	177	80	3	3.6
'36	1st Det.	6.	173	76	7(1)	.9(1)
'39	I. F.	6.	177	80	3	3.6
'37	2nd Det.	6.	0		0	0
'39	1st Audio	6.	157	77	3.7	3.0
'38	Output	6.	160	162	15.5	7.5

(1) Will vary with dial setting.
NOTE: All bias voltages must be read from cathode to ground.

Power Units

The "A" battery and "B" eliminator or "B" batteries may not be delivering the correct voltages to the set due to a defect in the units themselves, or to a defect in the wiring, connecting plug, or any of the associated apparatus.

CAUTION — In the installation manual it was stated that the voltages should not be read by removing the cable head and reading them at the multi-post socket. The reason for this is that when the lock switch is turned off with the cable head removed the inductive surge caused by the speaker field may burn out the pilot lamp.

Also, as the voltages are not read under load conditions, a true picture is not obtained of the actual operating voltages.

However, the service technician equipped with the proper apparatus can read the voltages at the cable head in accordance with the instructions as given below. By the method as explained, load conditions are simulated, thus permitting actual working voltages to be read.

If "A" or "B" voltages are not read at the multi-post socket, it will be necessary to check the voltages at the unit in question. If the voltages at the "A" battery and "B" eliminator or "B" battery are O. K., then there is an open in the wiring or connections at some point. Disconnect the wiring from the "A" or "B" unit and "ring through" the leads to the cable head with the continuity meter.

In the case of no "B" voltage, take off the cover of the "B" eliminator and see if the tube is lighted. If the tube is not lighted, see if there is voltage at the "A" supply terminal strip. Should there be no voltage at the latter point, it may be due to the fact that the relay is not contacting, thus causing no power to be supplied to the "B" eliminator.

To Read Power Supply Voltages at Cable Head

Turn off the lock switch and remove the cable head from the chassis.

The following parts are required:

3—Phone tips or prongs taken from an old tube base.

1—Resistor for the "A" circuit as indicated in Fig. 1.

1—Resistor for the "B" circuit as indicated in Fig. 1.

Place these resistors in a wooden box or insulated mounting of some kind, with rubber covered leads extending out of the box. Note that the ground leads of the two resistors are common.

Solder the phone tips to the ends of the three leads.

Then insert the tips in the multi-post socket as shown in Fig. 1.

Turn on the lock switch.

Read the "A" voltage between terminals 6 and 7.

Read the "B" voltage between terminals 3 and 6, using a high resistance voltmeter.

CAUTION—In all of the above procedure great care should be taken not to ground the A+ or B+ to the car frame, chassis, cable, or any other ground.

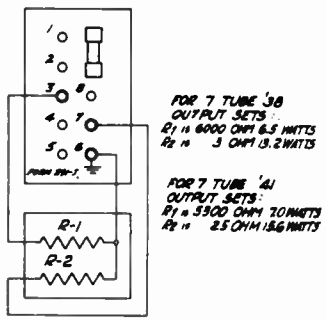


Fig. 1. Using Resistors for Load

The above readings are made under load conditions and indicate that proper power is being supplied to the receiver as far as the multi-post socket.

A very handy method of applying these resistors to the multi-point socket is to mount them in an insulated unit or plug with three prongs extending out and arranged in the shape of contacts three, six and seven in the above diagram. This unit could then be plugged in the correct terminals very easily.

TESTING AND REPAIRING CHASSIS

If all accessories are found, upon test, to be in working order, it will be necessary for the service technician to check the chassis over.

The most convenient place to test and repair a chassis is on a service shop bench. In the case of the auto set, however, it is advisable to do part of the testing in the car, due to the fact that the power units, speaker, control unit and cables are installed in the car and cannot be conveniently taken out for use in testing the receiver. Of course, if a duplicate set of parts are available, then all of the testing can be done on the bench.

Reading Voltages at Sockets

One of the first checks to be made is that of reading the voltages at the sockets. A good percentage of all the circuits in the chassis are involved, and a radically incorrect reading at any point will give a clue as to where the trouble may lie. In the installation manual and in this supplement there is a voltage chart showing all of the voltages and plate currents.

As stated above, the best place to check the voltages would be on a service shop bench, but as this involves removal of the other units and cables, it will be quickest in most cases to make the readings in the car.

In most cases, it will be necessary to remove the chassis either from its mounting on the steering column or from the mounting plate on the dash in order to satisfactorily check the voltages at the sockets. The procedure is as follows:

Turn off the lock switch.

Take off the cable head by removing the five screws.

Take the chassis off of the mounting and lay it on the floor board, on a board, or on a wood box, wherever is the most convenient. This can be done if sufficient slack was left in the wiring cables at the time of installation.

In some instances, it will be necessary to disconnect the flexible drive shaft and casing at one end in order to get the chassis out far enough. In other cases, it might be advisable to take off the control unit entirely to get the chassis off far enough.

It is advisable to take the chassis out of the box, although this is not absolutely necessary. If the chassis is taken out, an inspection of the wiring and parts can be made. If the chassis is not taken out, a long plug and external socket arrangement, such as is provided with a set analyzer, or the plug as described below, will be necessary.

In either case, re-insert the multi-point plug in the socket. Be sure to push the plug all the way in, to insure contact on all prongs.

Then turn on the lock switch.

CAUTION—If the chassis is taken out of the box, be sure to keep it on a dry wood or other insulated location in the front compartment of the auto. Great care should be taken to prevent an A+ or B+ point on the chassis from coming in contact with a ground, such as the car frame, levers, cable shields, etc.

A thousand-ohm-per-volt meter of 0—250 volt range is required for the plate and screen voltages. Lower ranges will be necessary for the grid and heater voltages. It is not necessary to have a high resistance meter for the heater or "A" battery reading.

Two of the sockets are partially covered under the chassis by the bypass condenser block. If the voltages are read under the chassis, at the bottom of the socket, by means of test leads and prods, it is necessary to make top socket contacts for these two tubes or else use the plug method as described.

A handy method of reading the voltages on an auto set is to make a plug about 5" long with an old five-prong tube base at the bottom and a five-prong socket at the top. The five lines are then brought out at the top to binding posts or other terminals which can be reached with the tips of the test prods on the leads from a voltmeter. By providing a link in the plate line, screen line, or other lines, as desired, the current flowing in these circuits can be easily read by opening the link and connecting a milliammeter in place of the link. An extension lead should be made for the control grid line.

Continuity Tests

The auto chassis is very compactly built and when "ringing it through" for servicing, considerable time might be spent in tracing through the wiring. For that reason, we are including in this supplement the complete wiring diagram.

After the chassis has been removed from the box and before making the continuity tests, make a careful inspection of all exposed wiring and soldered connections for opens, grounds, shorts and faulty connections. Then proceed to make continuity tests through the various circuits, using as a guide the wiring diagram, Fig. 3.

Make the continuity tests in an orderly manner, starting with the R. F. and working through the I. F. into the audio system. An exception to this is when there is an indication as to where the trouble is, in which case, time may be saved by starting the tests at the part or circuit in question.

In "ringing through" the various circuits in the chassis, take into consideration the amount of resistance in the circuit and also whether there is an external closed circuit around the one under test. Most service men at the present time use direct reading ohmmeters as continuity meters and in this way check for continuity while at the same time determining the resistance of the circuit. To see whether there is an external closed circuit, reference should be made to the schematic circuit diagram, in the installation manual.

When making continuity tests which are across the electrolytic condensers, the positive test prod must be on the positive lead. This is due to the fact that the anodes of the electrolytic condensers must be kept at a positive potential. If the anode is made negative, the condenser will pass current considerably more readily than if it is positive and the reading will be different than the standard reading which should be obtained.

Alignment of Tuning Condensers

The condensers are aligned at the factory with signal generators and output meters and the receiver will not, as a general rule, lose its alignment unless mishandled or tampered with. When the tuning condensers are out of alignment, the receiver may tune broadly, it may be low in volume all over the band, or a lack of volume on certain parts of the broadcast band may be noticed.

Broad tuning is most frequently caused by misalignment of the intermediate frequency tuning condensers. It may also be caused by mistracking between the oscillator and R. F. condensers.

Lack of volume at certain points of the dial is generally caused by mistracking between the R. F. and oscillator condensers. This occurs generally at the high frequency end and may be corrected by adjustment of the oscillator 1400 K. C. trimmer condenser. In a few instances, lack of volume at certain parts of the dial may be caused by R. F. condenser misalignment. If this occurs at the high frequency end, the condition may be corrected by the adjustment of the R. F. trimmer condensers. If the set is weak at both ends of the dial, mistracking between the R. F. and oscillator condensers is generally the cause and may be corrected by adjustment of both 600 K. C. and 1400 K. C. trimmers, as explained below.

Low volume all over the band is generally due to I. F. condenser misalignment.

CAUTION—We do not recommend that realignment be attempted unless other possible causes of faulty operation have first been investigated and unless the service technician has the proper equipment. Realignment by anyone other than a qualified radio service technician is not advisable, as one not experienced in the work is almost certain to get into difficulty and throw the set completely out of alignment.

A local and accurately calibrated signal generator as well as an output indicating meter are absolutely essential for correct alignment. This signal generator must provide a signal at the broadcast frequencies of 550 to 1500 K.C. and in addition a signal of 262 K.C. for the intermediate frequency. The broadcast band signals of the signal generator must be accurately known, as the dial scale of the receiver is calibrated in kilocycles. The intermediate frequency of the signal generator likewise must be accurate in order to align the I. F. stages at 262 K.C. A non-metallic screwdriver is necessary.

As in the case of reading the voltages at the sockets, the best place to realign the chassis would be on the service shop bench. However, to avoid removal of the other units and cables, realignment may be done in the car, in the front compartment, on a box, wood board, or other insulated location. The chassis must be removed from the box.

The complete procedure for realignment and retracking is as follows:

Aligning Intermediate Condensers—First align the intermediate condensers. The adjusting screws of the first I. F. primary and secondary trimmer condensers are on the porcelain base of this assembly at the side of the '39 I. F. socket. The adjusting screw of the second I. F. primary trimmer is reached through the hole near the base of the can of this assembly.

One of the best ways of reading the output is by means of a rectifier type meter. This meter, if of low range is connected across the secondary of the output transformer in the speaker. If it is of high range, it may be connected across the primary of the transformer in series with a large condenser to prevent the flow of D.C. plate current through the meter. In either method of connection, opening the voice coil of the speaker will give a better deflection on the output meter.

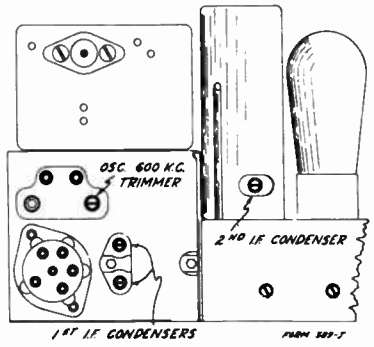


Fig. 2. Location of Intermediate and 600 K. C. Trimmer Condensers

First set the signal generator for a signal of exactly 262 K.C. The rotor of the tuning condenser should be completely out to avoid interference from the oscillator. Remove the grid cap from the grid connection of the '36 first detector tube. Connect the antenna lead from the signal generator to the grid of the '36 first detector. Connect the ground lead of the signal generator to the chassis sub-panel or ground at any convenient point.

Attenuate the signal from the signal generator so as to prevent the levelling-off action of the A. V. C. Using the non-metallic screwdriver, adjust the first I. F. primary and secondary trimmer condensers and the second I. F. trimmer condenser adjusting screws until maximum output is indicated on the output meter.

After all three have been adjusted the first time, go over them again and check the setting for maximum output.

If when alignment has been completed, the output is satisfactory at 600 K.C. and 1400 K.C., but is low in the center of the broadcast band, the intermediate condensers have probably been lined up at some frequency other than 262 K.C. Have the frequency of the 262 K.C. signal generator checked and if it is more than 3 K.C. off, either way, it should be re-calibrated.

Aligning R. F. and Oscillator Condensers—Before aligning and tracking the oscillator and R. F. condensers, connect the flexible drive shaft to the control unit and to the chassis. As explained in the service manual, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C. The tuning condenser will then be correctly set for the 1400 K.C. signal.

Set the signal generator for a signal of exactly 1400 K.C. The signal input from the signal generator should now be made to the antenna lead. Put the grid cap of the '36 first detector tube back in place.

Then adjust the three trimmer condensers on the tuning condenser for maximum output. Adjust the oscillator section trimmer first. (Section farthest from drive gear.)

The next step is to adjust the oscillator 600 K.C. trimmer condenser. The adjusting screw on this condenser will be seen over the '39 I. F. socket. Set the signal generator for a signal of 600 K.C. and turn the tuning condenser rotor until the output meter shows maximum deflection. Then, using the non-metallic screwdriver, adjust the 600 K.C. trimmer condenser screw, rocking the rotor back and forth at the same time, until maximum output is obtained.

Next, set the signal generator for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output. The tuning condenser should then be properly aligned.

Parts List for No. 072 Series Receivers (38 Output)

CHASSIS PARTS

Part No.	Description
P-1529	No. 37 Tube Socket (Long Lug)
P-1531	No. 39 Tube Socket (Long Lug)
P-1555	No. 36 Tube Socket (Short Lug)
P-1556	No. 39 Tube Socket (Short Lug)
P-1530	No. 38 Tube Socket (Long Lug)
P-1532	Multi-Point Plug
P-1543	Multi-Point Socket
P-5053	First I. F. & Oscillator Assembly, Complete with Trimmer Condensers and Can
P-5022	Second I. F. Transformer Assembly, Complete with Trimmer Condenser, Resistors and Can
P-5054	Antenna & Interstage R. F. Transformer, Complete with Can
P-5055	Antenna R. F. Transformer Only
P-5056	Interstage R. F. Transformer Only
P-1539	Oscillator 600 K. C. Tracking Condenser
P-1615	Condenser Drive Gear with Set Screw
P-30395	Drive Pinion Gear with Set Screw
P-20544	Bracket for Pinion Bearing
P-20545	Bearing for Drive Pinion
P-1092	Grid Cap and Wire
P-10232	Long Rubber Bumper for Tubes
P-10233	Short Rubber Bumper for Tubes
P-20516	6-32 Wing Nuts (for chassis cover)
P-20543	Chassis Box
P-20542	Chassis Box Cover
P-5055o	Audio Transformer

Resistors

Part No.	Code No.	Resistance	Type
P-A-90953	R-1	350 ohms	Carbon
P-A-90979	R-2	7,000 ohms	Carbon
P-A-90948	R-3	1 Megohm	Carbon
P-A-90929	R-4	500,000 ohms	Carbon
P-A-90912	R-5	100,000 ohms	Carbon
P-A-90949	R-6	2 Megohm	Carbon
P-A-90949	R-7	2 Megohm	Carbon
P-A-90949	R-8	2 Megohm	Carbon
P-A-91025	R-9	500 ohms	Carbon
P-B-90950	R-10	20,000 ohms	Carbon
P-B-91020	R-11	15,000 ohms	Carbon
P-A-90941	R-12	50,000 ohms	Carbon
P-A-91022	R-13	900 ohms	Carbon
P-A-90929	R-14	500,000 ohms	Carbon
P-91013	R-15	0-150,000 ohms	Tone Control
P-91026	R-16	0-500,000 ohms	Volume Control

Condensers

Part No.	Code No.	Capacity	Voltage	Type
P-80902-D	C-1	.05	mfd., 200 V.	Electrolytic Cond. Block
	C-3	4.0	mfd., 150 V.	
	C-10	4.0	mfd., 30 V.	
P-20909-D	C-2	.1	mfd., 200 V.	Bypass Cond. Block
	C-4	.1	mfd., 200 V.	
	C-5	.1	mfd., 200 V.	
	C-9	.02	mfd., 600 V.	
	C-7	.05	mfd., 200 V.	
P-80822	C-8	.006	mfd., 600 V.	Moulded
P-80821	C-6	.001	mfd., 600 V.	Moulded
P-80808	C-11	.002	mfd., 600 V.	Moulded
P-80907	C-12	.02	mfd., 600 V.	Metal Can (In Speaker Case)
P-80912-C	Three-Gang Condenser			

CONTROL UNIT PARTS

P-91026	R-16 Volume Control
P-1624	10 Ampere Fuse
P-1614	Lock Switch
P-1563	8 Volt Pilot Lamp
P-1562	Control Knob
P-1621	Pilot Lamp Socket & Cover Assembly
P-1618	Celluloid Dial Strip
P-20537	Dial Retaining Washer
P-20534	Dial Drive Gear
P-30390	Drive Shaft
P-30387	Worm Drive Gear

SHIELDED CABLES

P-70723	Shielded Antenna Cable
P-70730	Shielded Control Cable
P-70731	Shielded Speaker Cable
P-70732	Shielded "B" Supply Cable

CADILLAC

MODEL 2722 (072-A)
Voltage, Parts List
Special Notes

No. 072A Series Receivers (41 Output)

The form 375J Installation Manual and foregoing service supplement cover the 072 Series (38 output) receivers. The copy in general is applicable to the 072A Series (41 output) as the sets differ only in the audio amplifier.

In Fig. 4 is shown the schematic circuit diagram of the 072A set. The schematic circuit diagram of the 072 set is shown in Fig. 1 of the Form 375J Installation Manual. By looking at the two circuits the similarity as well as the points of difference can be noted.

On this page is given an explanation of the parts which are different in the 41 output set, a supplement to the chassis parts list covering the new parts used, and a complete voltage chart for the receiver.

Differences in 072A Chassis

In comparing the No. 072 Series (38 output) receivers with the No. 072-A Series (41 output) the following parts changes in the chassis have been made:

R-2 changed from 7,000 ohms to 6,000 ohms.
R12 changed from 50,000 ohms to 25,000 ohms.
R-13 changed from 900 ohms to 800 ohms.
R-14, as shown in the old schematic circuit diagram (Fig 1 in the installation manual) is not used in the new receiver.
C-9 is changed from a .02 mfd. condenser to a .25 mfd. condenser.
The No. 38 sockets are changed to No. 41 sockets.
A new audio transformer is used.
No. "B" fuse is used with the No. 072-A series receiver.

Voltage Chart for 072A Receivers

Type of Tube	*Function*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate MA*
'39	R. F.	6.	177	80	3	3.6
'36	1st Det.	6.	173	76	6	.7
'39	I. F.	6.	177	80	3	3.6
'37	2nd Det.	6.	0		0	0
'39	1st Audio	6.	88	88	4	3.0
'41	Output	6.	159	162	15	9

NOTE.—Read bias voltages from cathode to ground.

Supplementary Parts List for 072A Receivers

New Parts Used in the 072A (41 Output) Series Receivers

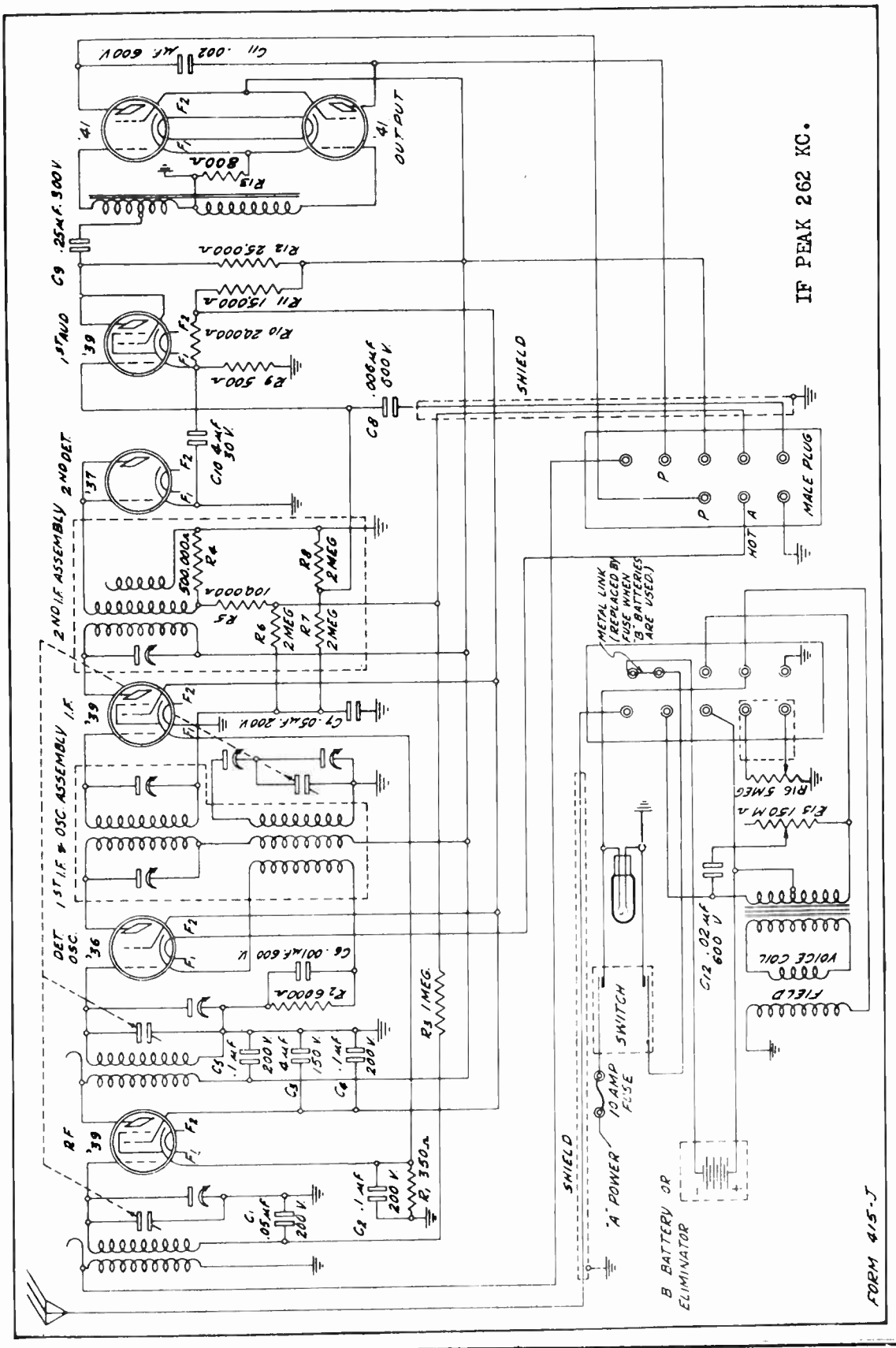
Part No.	Description
P-A-91029	R-2 — 6,000 ohm Carbon Resistor.....
P-A-91038	R-12—25,000 ohm Carbon Resistor.....
P-A-91023	R-13— 800 ohm Carbon Resistor.....
P-50559	Audio Transformer .....
P-1665	No. 41 Sockets .....
P-80903-F	C-2 — .1 mfd., 200 V. C-4 — .1 mfd., 200 V. C-5 — .1 mfd., 200 V. C-9 — .25 mfd., 600 V. C-7 — .05 mfd., 200 V. Bypass Cond. Block

Parts Shown in 072 List Not Used in 072A Series Receivers

Part No.	Description
P-A-90979	R-2 — 7,000 ohm Carbon Resistor....
P-A-90941	R-12— 50,000 ohm Carbon Resistor....
P-A-91022	R-13— 900 ohm Carbon Resistor....
P-A-90929	R-14—500,000 ohm Carbon Resistor....
P-50550	Audio Transformer .....
P-1530	No. 38 Socket .....
P-80903-D	C-2 — .1 mfd., 200 V. C-4 — .1 mfd., 200 V. C-5 — .1 mfd., 200 V. C-9 — .02 mfd., 600 V. C-7 — .05 mfd., 200 V. Bypass Cond. Block

MODEL 2722 (072-A)
Schematic

CADILLAC



CADILLAC

MODEL 2721,2722
Chassis wiring

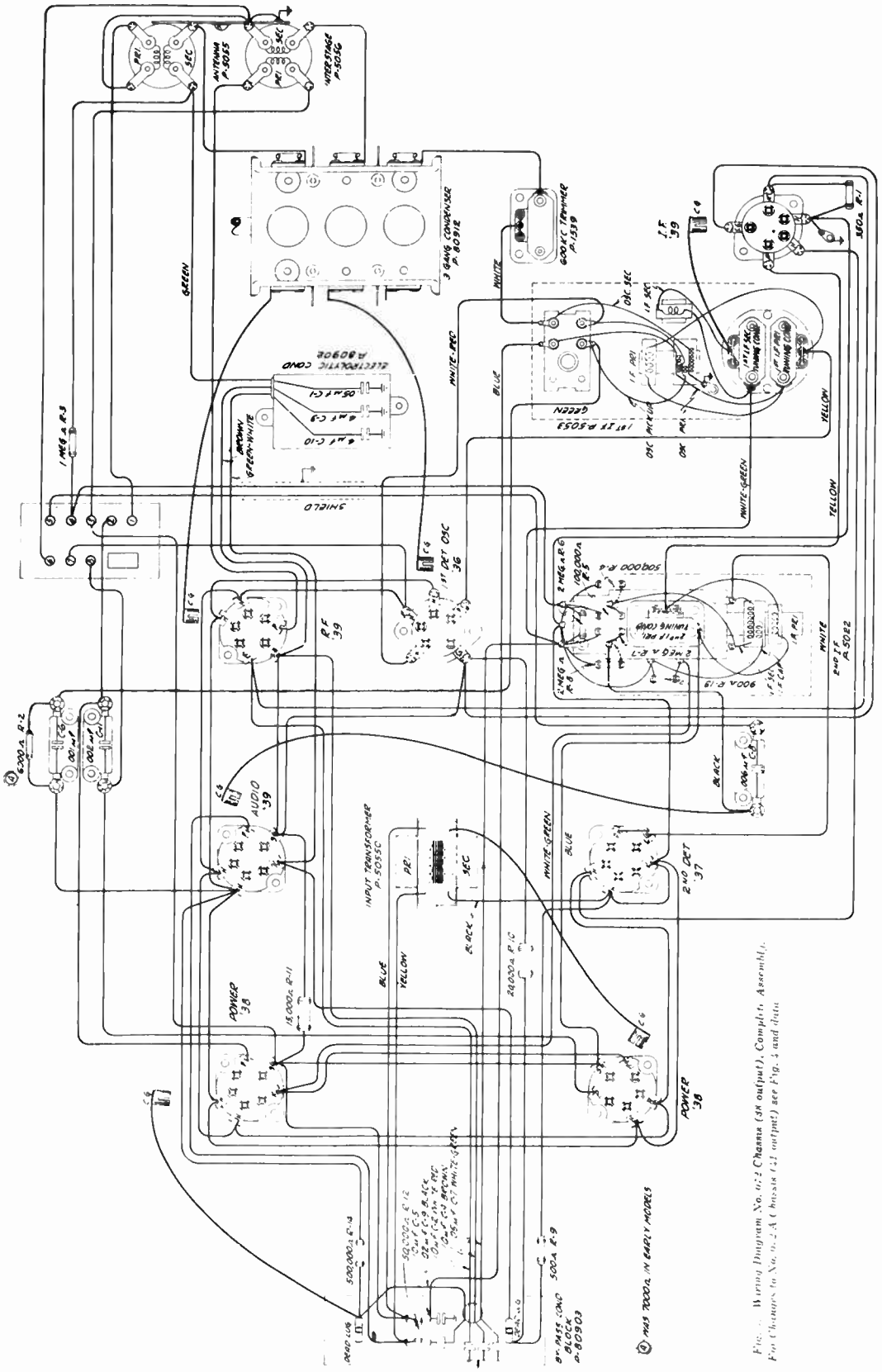
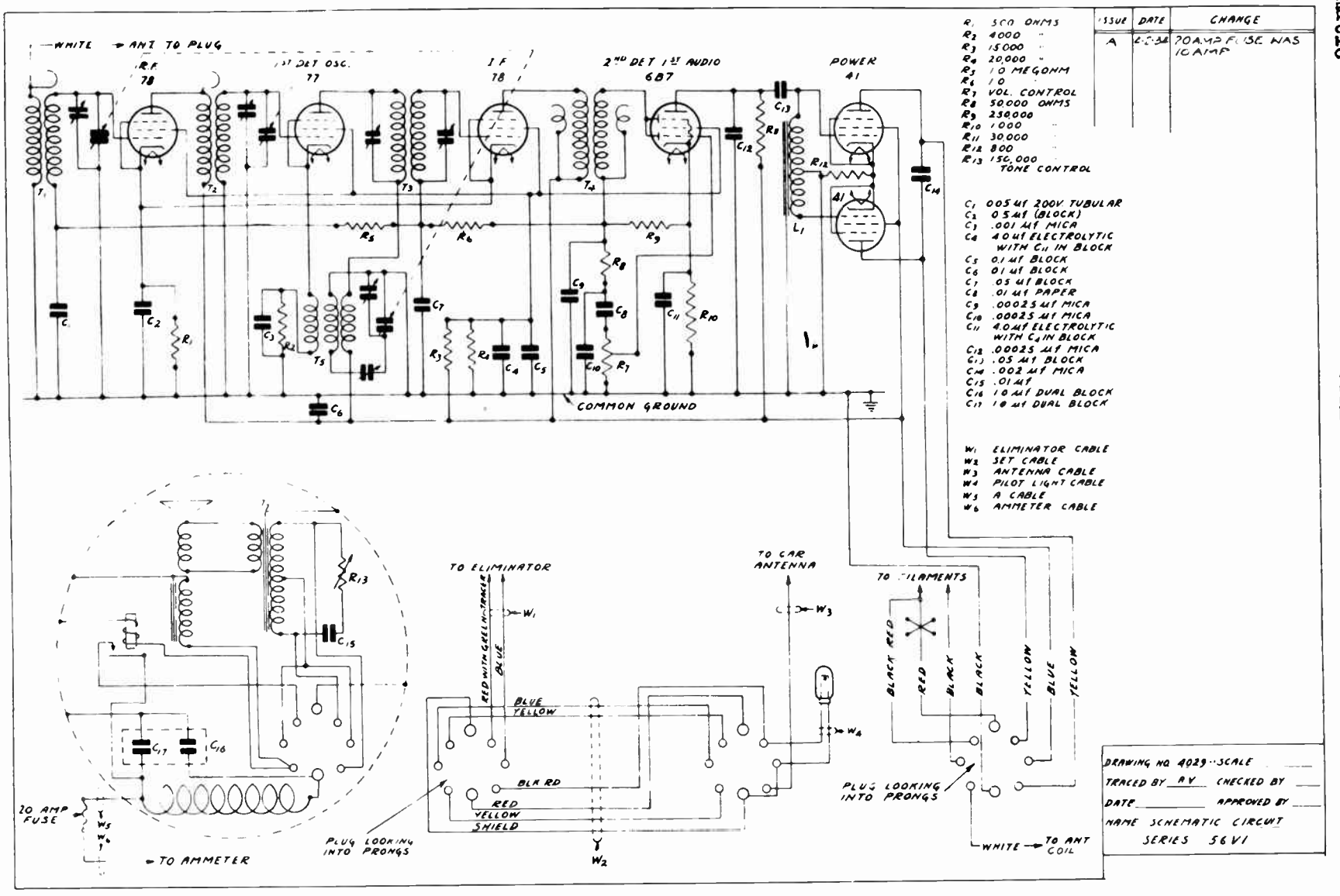


Fig. ... Wiring Diagram No. 6-2 Chassis (3# output). Complete Assembly. For Changes in No. 6-2 A chassis (4# output) see Fig. 4 and data

MODEL 56V1
Schematic

CADILLAC



R_1	500 OHMS
R_2	4000 "
R_3	15000 "
R_4	20,000 "
R_5	1.0 MEGOHM
R_6	1.0 "
R_7	VOL. CONTROL
R_8	50,000 OHMS
R_9	250,000 "
R_{10}	1,000 "
R_{11}	30,000 "
R_{12}	800 "
R_{13}	150,000 " TONE CONTROL

C_1	.005 Mf 200V TUBULAR
C_2	.05 Mf (BLOCK)
C_3	.001 Mf MICA
C_4	4.0 Mf ELECTROLYTIC WITH C_{11} IN BLOCK
C_5	.1 Mf BLOCK
C_6	.01 Mf BLOCK
C_7	.05 Mf BLOCK
C_8	.01 Mf PAPER
C_9	.00025 Mf MICA
C_{10}	.00025 Mf MICA
C_{11}	4.0 Mf ELECTROLYTIC WITH C_4 IN BLOCK
C_{12}	.00025 Mf MICA
C_{13}	.05 Mf BLOCK
C_{14}	.002 Mf MICA
C_{15}	.01 Mf
C_{16}	1.0 Mf DUAL BLOCK
C_{17}	1.0 Mf DUAL BLOCK

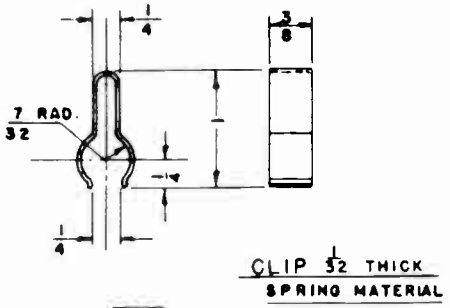
W_1	ELIMINATOR CABLE
W_2	SET CABLE
W_3	ANTENNA CABLE
W_4	PILOT LIGHT CABLE
W_5	A CABLE
W_6	AMMETER CABLE

ISSUE	DATE	CHANGE
A	2-2-32	20 AMP FUSE WAS 10 AMP

DRAWING NO. 4029 · SCALE ____
TRACED BY AV CHECKED BY ____
DATE ____ APPROVED BY ____
NAME SCHEMATIC CIRCUIT
SERIES 56V1

COLONIAL RADIO CORP.

MODEL 106-B
Drive Cable Data
Power Unit Data



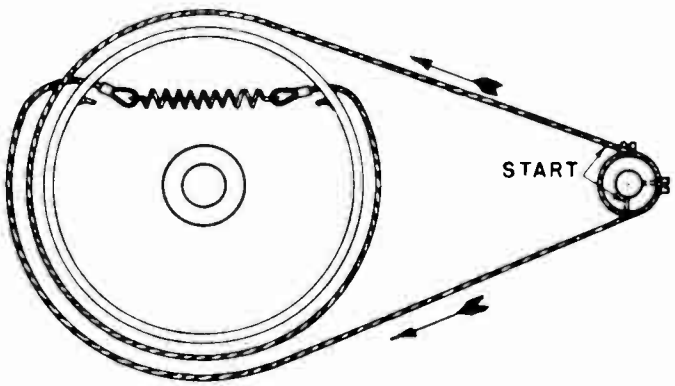
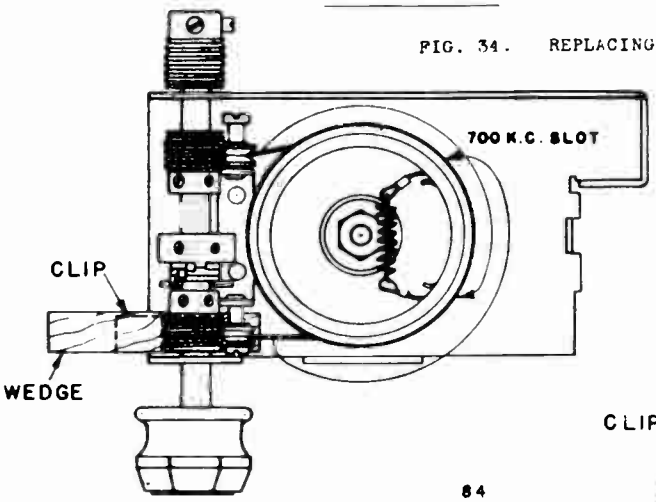
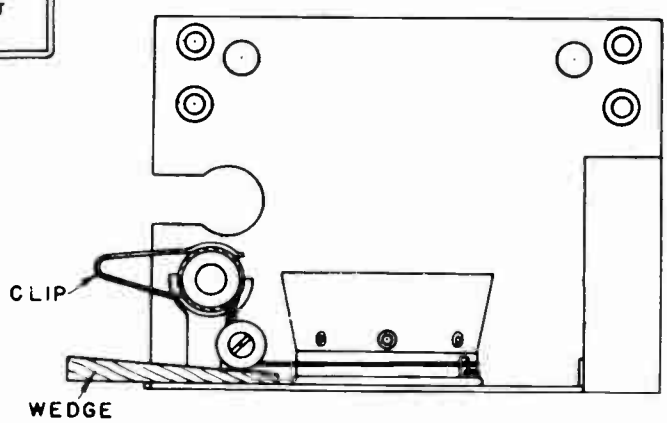
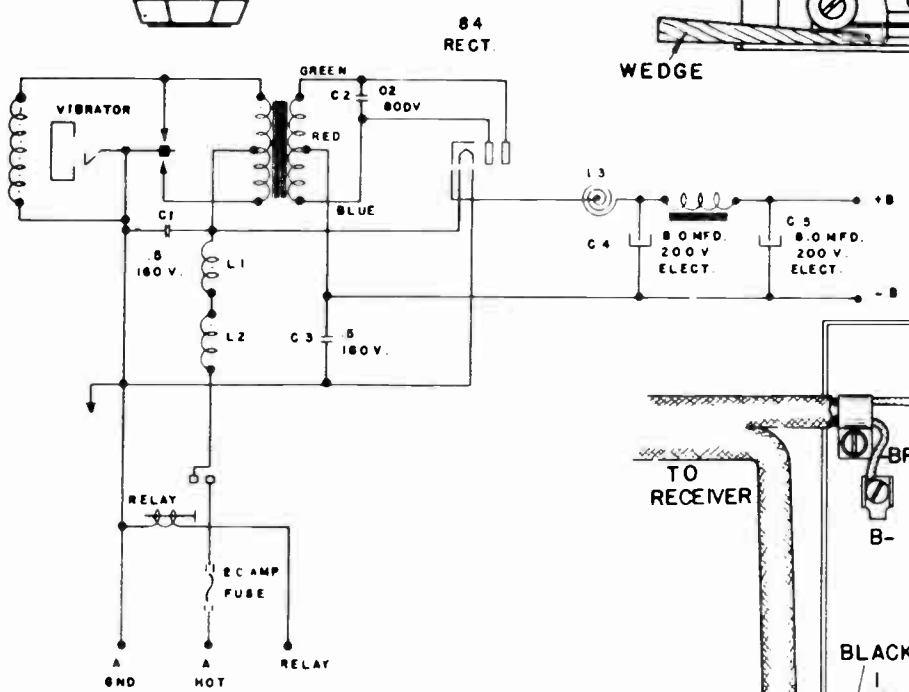


FIG. 34. REPLACING THE DRIVE CABLES







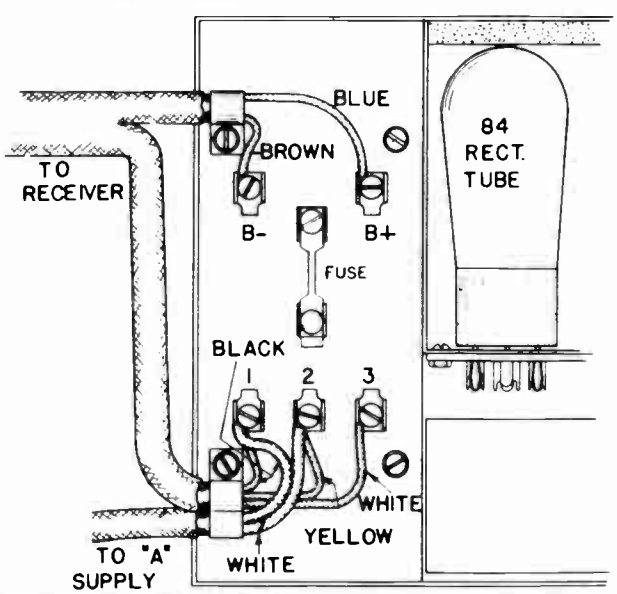


FIG. 36. SCHEMATIC - MODEL 106B POWER SUPPLY UNIT

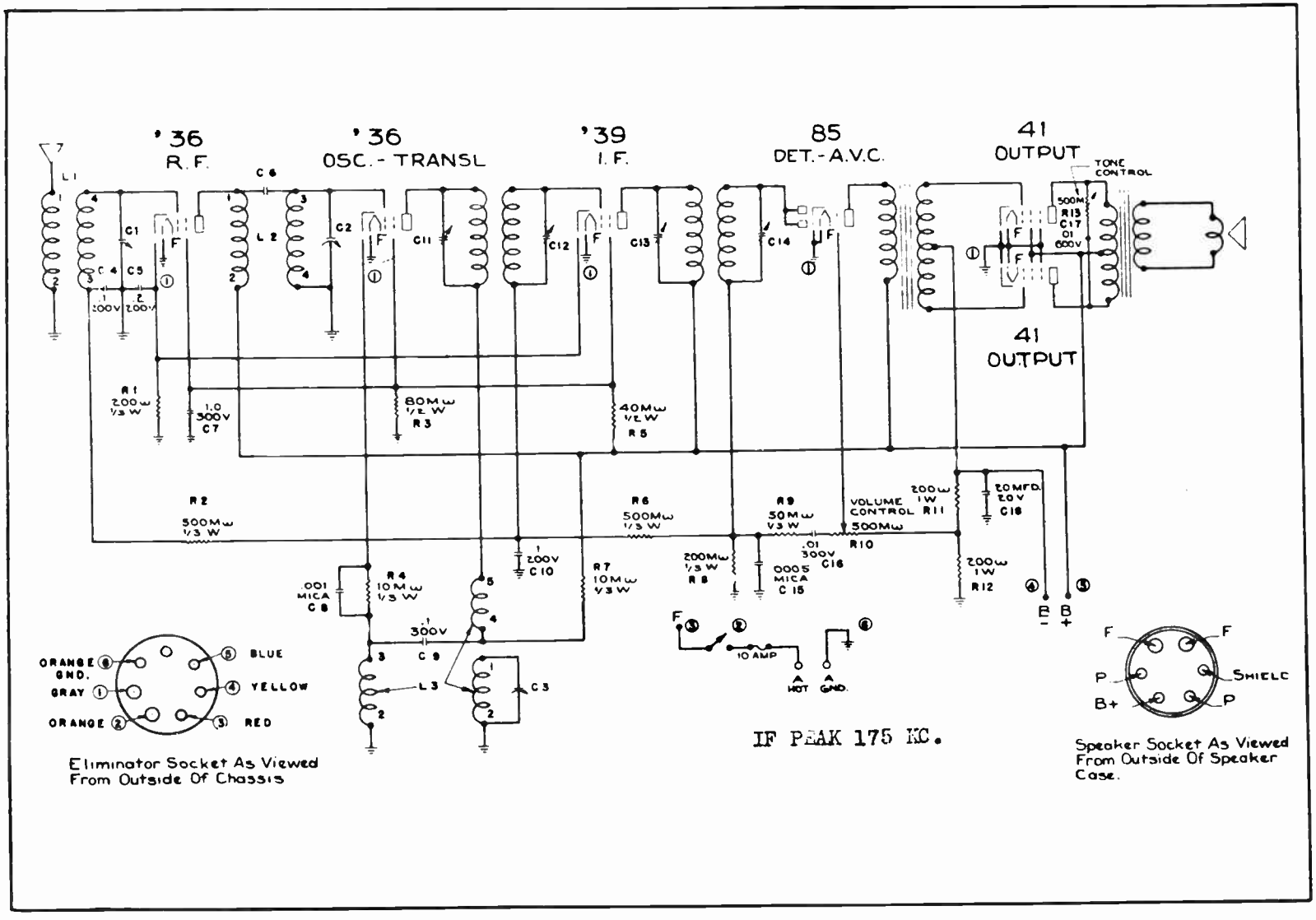
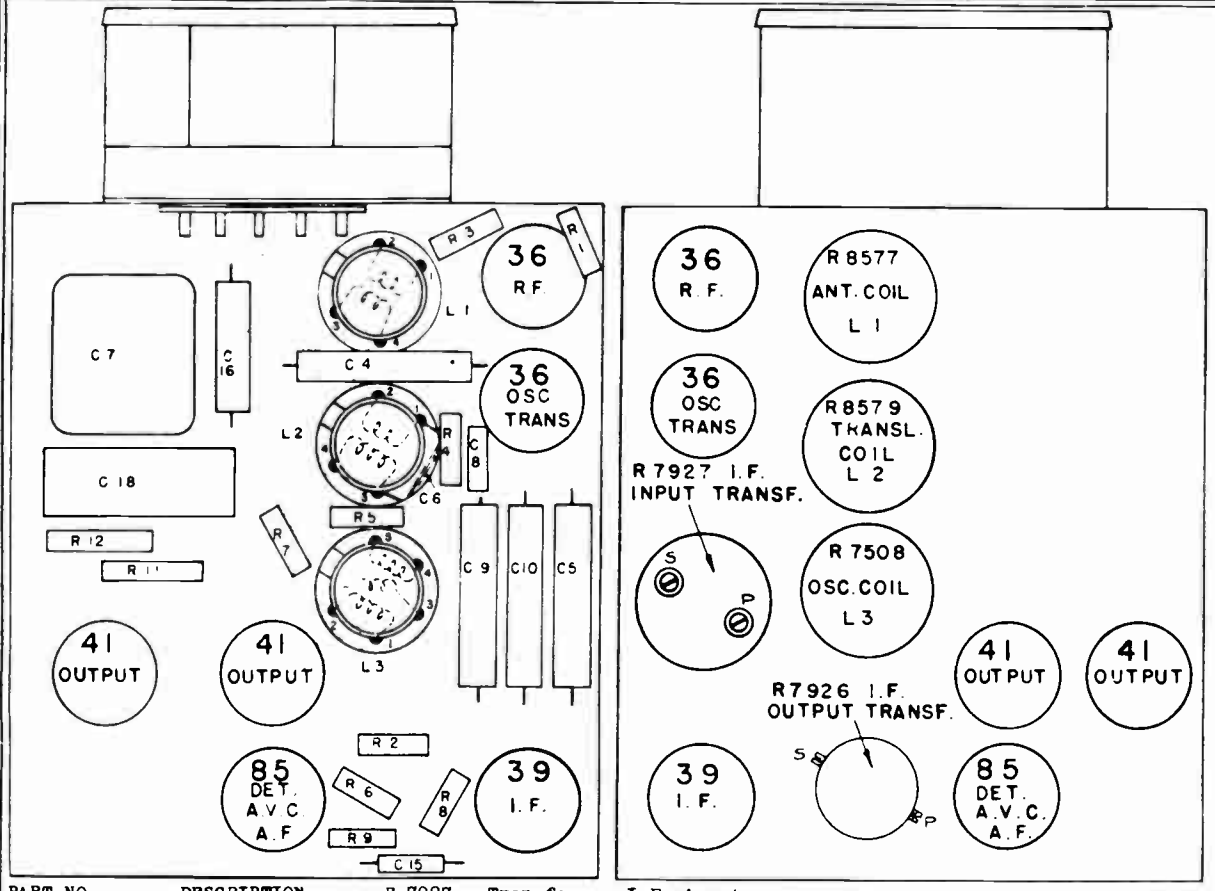


FIG. 37. SCHEMATIC - MODEL 106B



PART NO.	DESCRIPTION
R-7273	Resistor-200 ohm, 1 watt carbon
R-8291A	Shield-Antenna
R-7550A	Shield-Coil
R-7923A	Shield-2nd I.F.
R-7922A	Shield-Tube
R-8253	Socket-5 prong
R-8092	Socket-6 prong
R-8587	Socket-7 prong
S-8467A	Speaker-Complete
S-7776A	Speaker-cone and voice coil assembly
S-7969	Speaker-field coil
R-8592	Speaker-tone control
R-7070	Speaker-tone control cond. .01 mfd. 600v
S-8472AC	Speaker-transformer
R-7715	Switch
R-7927	Transformer-I.F. input
R-7926	Transformer-I.F. output
R-7926A	Transformer-I.F. output complete with tuning condensers
R-7915A	Transformer-PP input

POWER SUPPLY PARTS

PART NO.	DESCRIPTION
R-5509	Board-Terminal (small)
UE-107	Board-Terminal for vibrator connections
UE-108	Board-Terminal (five connection and fuse)
UE-120	Cable-Elim. to chassis
UE-121	Cable-"A" battery
UE-110	Choke-Filter
UE-111	Choke-R.F., solid
UE-112	Choke-R.F., hollow
UE-115	Condenser-8 mfd. 200v
UE-118	Condenser-.5 mfd. 200v, cartridge
UE-117	Condenser-.5 mfd. 200v, metal case
UE-116	Condenser-.02 mfd. 800v
UE-136	Fuse-20amp
R-7963	Plug-7 prong
UE-113	Relay
UE-106	Transformer-Power
UE-104	Vibrator-complete

PART NO.	DESCRIPTION
R-7901A	Board-Fuse
R-7902A	Bracket-Pulley
R-5330B	Cable-Drive, long
R-5330C	Cable-Drive, short
R-7957A	Cable-Chassis to speaker
R-6381	Clip-Screen grid
R-6381AA	Clip-Screen grid with shielded 13" lead
R-8577	Coil-Antenna
R-8577A	Coil-Antenna, complete with shield
R-7508	Coil-Oscillator
R-7508A	Coil-Oscillator, complete with shield
R-8579	Coil-Translator
R-8579A	Coil-Translator, complete with shield
R-8580	Condenser-Variable tuning
R-7917	Condenser-20 mfd. electrolytic
R-8030	Condenser-1 mfd. (suppressor)
R-7182	Condenser-1 mfd.
R-6380	Condenser-.2 mfd., 200v
R-8286	Condenser-.1 mfd., 200v
R-8581	Condenser-.1 mfd., 300v
R-8582	Condenser-.01 mfd., 300v
R-6759	Condenser-.001 mfd., mica
R-6760	Condenser-.0005 mfd. mica
R-7502A	Drum-Condenser drive
R-7907	Escutcheon
R-7688	Fuse-10 amp
R-7527	Grommet-Rubber
R-7692	Knob
R-2288	Lamp-Pilot
R-7514	Plug-Antenna
R-7588	Pulley-Idler
R-7589	Pulley-Dial drive (large)
R-7590	Pulley-Dial drive (small)
R-7589A	Pulley and cables (large)
R-7590A	Pulley and cables (small)
R1-8018	Resistor-Spark plug suppressor
R2-8018	Resistor-Distributor suppressor
R-7228	Resistor-500M ohm, 1/3 watt carbon
R-6538	Resistor-200M ohm, 1/3 watt carbon
R-8000	Resistor-80M ohm, 1/2 watt carbon
R-6637	Resistor-50M ohm, 1/3 watt carbon
R-6509	Resistor-40M ohm, 1/2 watt carbon
R-7587	Resistor-10M ohm, 1/3 watt carbon
R-7227	Resistor-200 ohm, 1/3 watt carbon

MODEL 106-B
Power Supply layout
Test data

COLONIAL RADIO CORP.

TEST	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
From B+ to rectifier cathode	Reading	Open RF or filter choke
From B+ to B-(with + of meter connected to B+ of unit)	No reading (except charging current)	Shorted filter condenser
From B- to either plate	Reading	Open power transformer
From B- to side of .02 condenser which has been disconnected from transformer	No reading	Shorted condenser
From terminal #3 to #2	No reading	Relay contacts shorted
From terminal #1 to #3	Reading	Relay coil open
From B- to terminal #3	No reading	.5 mfd condenser shorted
From H to H (with 84 tube out of socket)	No reading	.25 mfd condenser shorted or vibrator contacts stuck.

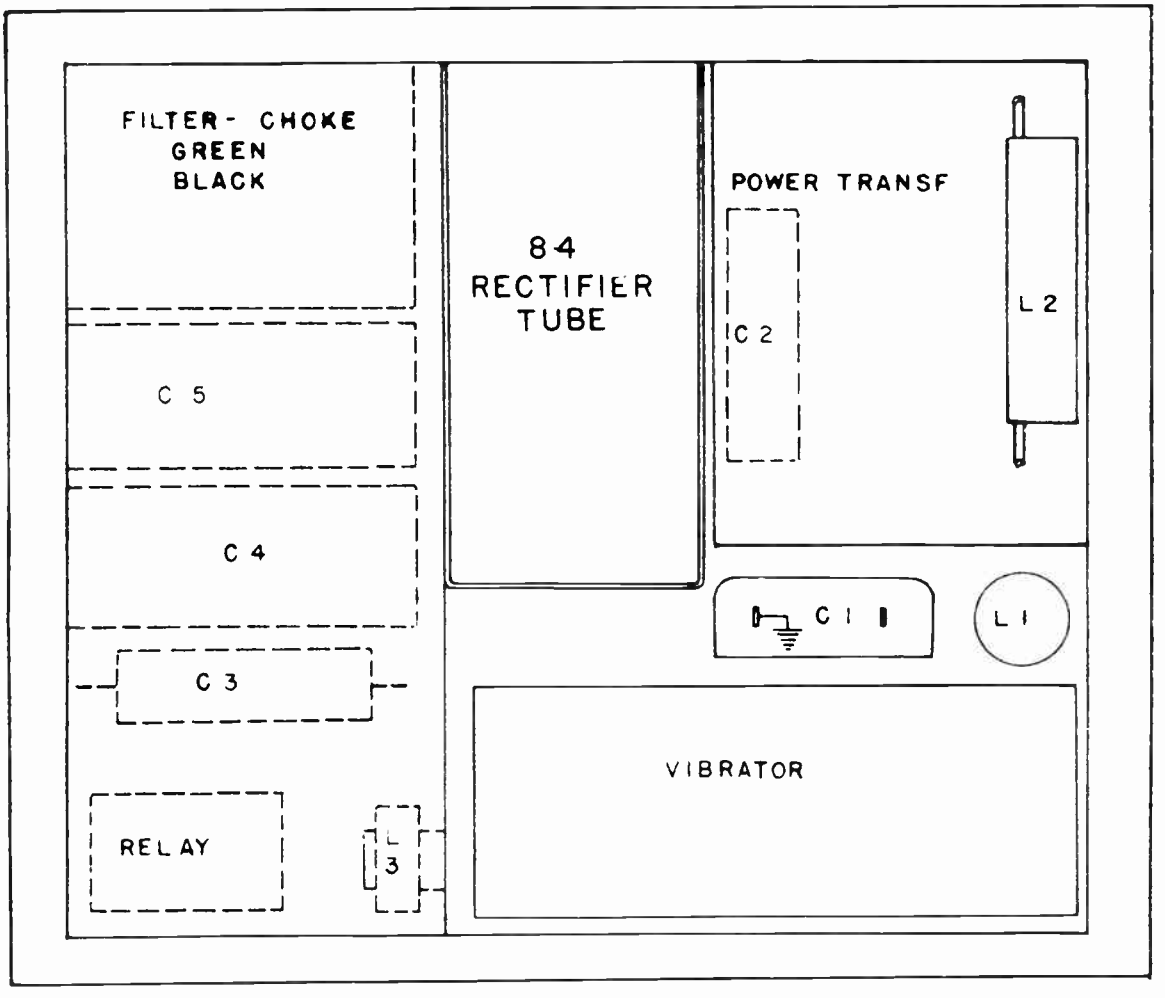


FIG. 35

The dc component of the rectified signal voltage across the 200M ohm resistor serves as the variable bias for the '36 RF and '39 IF tubes. Their fixed, residual bias is supplied by the 200 ohm resistor in their cathode circuit. The stronger the incoming signal, the greater becomes the dc drop due to rectified signal voltage across the 200M ohm resistor. This increased dc voltage drop biases the RF and IF tubes more negatively and cuts down their amplification. When the signal is weak, the dc drop across the 200M ohm resistor, is very low, the RF and IF bias is only that furnished by the 200 ohm fixed bias resistor, and amplification is made a maximum. The gain, then, varies inversely with the signal strength and the signal voltage at the input to the detector tends to remain at a constant value.

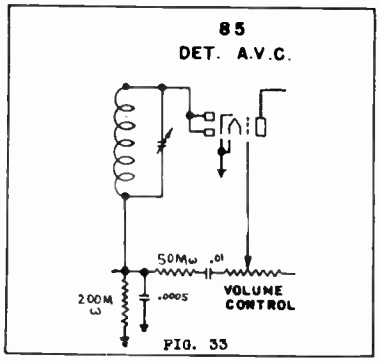


FIG. 33

ADJUSTING THE ANTENNA COMPENSATING CONDENSER

Although it is not necessary to do so, improved results sometimes can be had by adjusting the antenna compensating condenser to match the particular antenna used in the car.

Remove the chassis from its case and support it so that all cables can be plugged into their proper sockets, putting the receiver in playing condition.

Tune accurately to some station between 1000 kc and 1500 kc. Then adjust the antenna compensating condenser, (the one to which the '36 RF tube grid clip is connected), to the point of maximum value. Do NOT touch the other trimmer condensers. If the receiver oscillates, a piece of sheet metal placed over the '36 tubes and touching the dividing shield. will stop it.

REPLACING THE CABLES

There are two cable drives; one within the control unit box; the other, the drive from the box to the condenser drum. To replace the condenser drum drive, proceed as follows:

1. Remove the chassis from its mounting case, loosen the pulley set screws and remove the pulley. Unsolder the broken cable from the pulley.

2. Loosen ths condenser drum set screws.

3. Insert the new cable in the pulley and anchor it with solder in the same manner that the original cable was anchored.

4. Turn the Station Selector knob until the dial hits the "55" end stop.

5. Replace the pulley on its shaft, with one set screw facing up and the other facing the right side of the set. (See Fig.34). Wind the cable, which comes from the BOTTOM of the pulley by turning the knob for THREE turns in a counter clockwise direction. Then LOOP the cable around the pulley for one more turn, without turning the pulley.

6. With the condenser plates all the way out, turn the drum so that the slots face upward.

7. With a crochet needle, pull the cable under the drum and put the eye through the slot in the drum. (See Fig. 34). If necessary, turn the knob enough to permit the cable to reach the slot.

8. Loop the other cable around the pulley so that it comes off the top of the pulley. Then loop it around the condenser drum and into the other slot. (See Fig. 34).

9. Stretch the spring between the eyes of the two cables.

10. Turn the knob to the "55" end stop, fully mesh the condenser plates and tighten the drum set screws. Then tune in a station of known frequency of about 1000 kc. If the calibration is off, loosen the drum set screws and turn the knob until the dial reading corresponds to the station's frequency. Then tighten the drum set screws. Leave the station tuned in during the procedure in order to be sure that the drum does not turn.

TO REPLACE THE CABLES IN THE DRIVE UNIT CASE

1. Remove the chassis from its case; remove the knobs and the escutcheon.

2. Remove the three screws in the sides of the control unit case. Pull the lower half of the case down and around out of the way.

3. Loosen the set screws in the dial drive cables and in the stop collar. Pull the shaft either forward or backward far enough to slip off the pulley with the broken cable. If it is the rear pulley and the shaft must be pulled forward, it will be necessary to remove the condenser drum drive pulley. Wind string around the pulley so that the condenser drum cable will not slip off. Otherwise it will be necessary to go through the procedure, previously outlined, for replacing the condenser drum drive cable.

4. Insert the new cable in the pulley and anchor it with solder in the same manner that the original cable was anchored.

5. Slip the pulley and new cable back on the shaft. Be sure the shaft extends far enough back so that the condenser drum drive pulley can be fastened on.

6. Tighten the set screws in the pulley nearest the knob, leaving the other set screws loose.

7. Put a wedge shaped piece of wood under the front idler pulley so that the cable will not slip off of it. (See Fig. 34).

8. Put the clip shown in Fig. 34, which can be made of spring brass, over the pulley. See Fig.34 . Then wind the cable on the pulley by turning the knob.

9. The eye of the cable should be put into the slot which is at the "70" marking of the dial. Turn the dial drum far enough to take up the slack in the cable. Fasten the spring into the eye of the cable.

10. Clamp the shaft so that it can be turned, but will not turn of its own accord.

11. Loop the other cable around the dial drum (above the first cable) and into the other slot. Fasten its eye in the spring.

12. Then turn the pulley enough to take up the slack in the cable and to stretch the spring. Take care that the cables do not slip off of the drum. The job will be made easier if the stop collars are set so that the shaft will not turn as the cable is wound up.

13. After the slack is taken up and the spring stretched, tighten the pulley set screws.

14. Loosen the stop collar set screws and turn the knob to see that the cables ride freely. The cable which goes into the slot opposite the blank portion of the dial should be nearest the celluloid dial. The cable coming from the slot opnosite the "70" marking of the dial should be in the center when the dial is turned to 55.

15. Turn the knob until the dial is one division past the last marking on the 1500 kc and of the scale. Then turn the stop collars counter clockwise as far as they will go and tighten the set screws in the stop collar.

16. Re-assemble the unit. The calibration can be re-set as described in the instructions for replacing the condenser drum drive cables.

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
'36 - RF	160	65	*	2.5	.6
'36 - Osc-Transl	150	65	-3.75	.4 to 2(a)	0 to .5(a)
'39 - IF	160	65	*	1.3	.6
41 - Output	160	160	-15	8	1.25
85 - AVC-Det-AF	155		-7.5 volume control off		

* - High series resistance.
(a) - Dependent upon station selector setting.
Total current drawn by receiver, power supply and speaker - 5.4 amps. Total plate current - 40m.a. (180 volts) with 6.3 volt input.

MODEL 150
Schematic, Voltage

COLONIAL RADIO CORP.

TUBE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	PLATE M.A.	SCREEN M.A.
78 - IF	200	120	*	2	.8
75 - AVC-Det-AF	145		*	.3	
41 - Output	175	190	-2.5*	13	1.5
6A7- Osc-Transl	Ep=200v; Eg #1=-6.5v; Eg #2=205v; Eg #3&5=115v; Eg #4=*; Ip=4ma; Ig #2=2.5ma; Ig #3&5=1.8ma				

* - Indicates high series resistor.

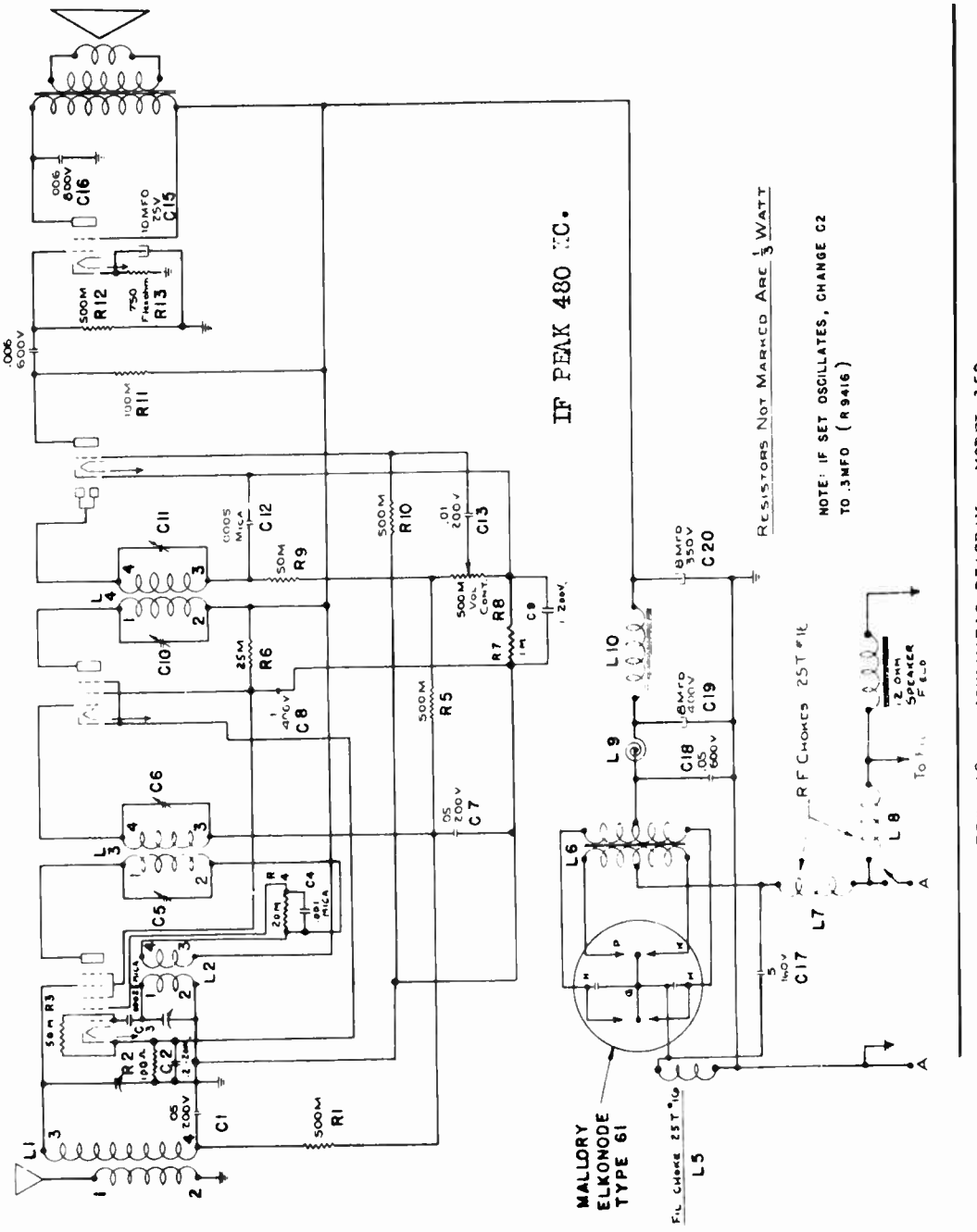
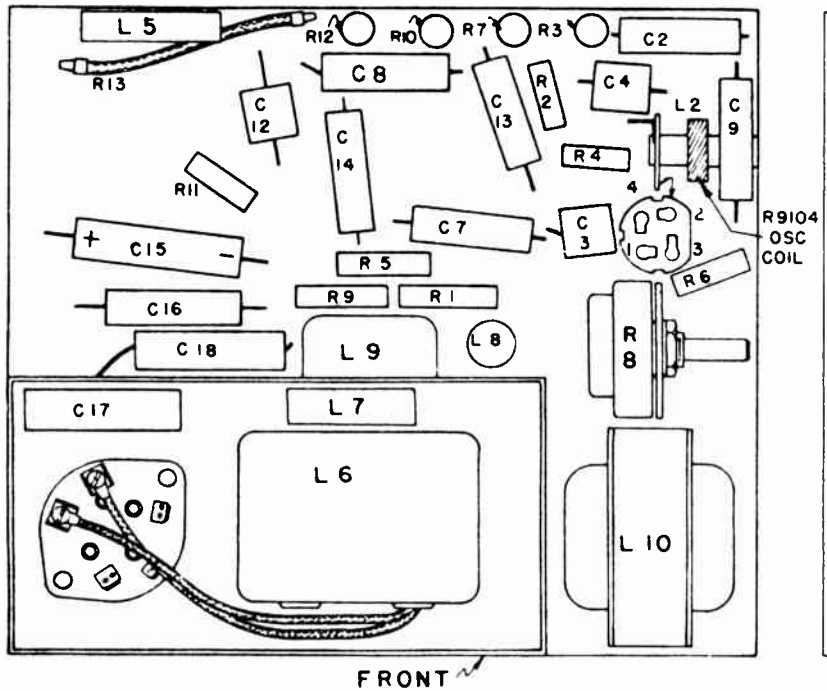


FIG. 42. SCHEMATIC DIAGRAM - MODEL 150

Readings taken with antenna disconnected and no signal received. Care should be used if readings are taken with an analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate will stop oscillation. If an analyzer is not used, voltage readings may be taken from the cathode to the respective element of each tube.

The power transformer is SOLDERED into the case which contains it and the Elkonode socket and associated apparatus. It is necessary to do this to secure the perfect electrical grounding needed for complete elimination of noise from the power supply. Should the power transformer need replacement, the entire case assembly should be ordered. (Part #R-9036 C). It is removed by taking out the four screws marked (A) in Fig.41 and unsoldering the necessary leads.

R-9047	Resistor - 750 ohm pigtail	R-6635	Resistor - 25M ohm, 1/3 watt carbon
R-7228	Resistor - 500M ohm,1/3 watt carbon	R-6640	Resistor - 20M ohm, 1/3 watt carbon
R-7586	Resistor - 100M ohm,1/3 watt carbon	R-6636	Resistor - 1M ohm, 1/3 watt carbon
R-6637	Resistor - 50M ohm, 1/3 watt carbon	R-8922	Resistor -100 ohm, 1/3 watt carbon



R-8831	Condenser - Variable tuning	R-9145	Condenser -.05 Mfd. 600 volt
R-8837	Condenser - Dry electrolytic	R-8921	Condenser -.01 Mfd. 200 volt
R-9144	Condenser - 10 Mfd. electrolytic	R-8930	Condenser -.006 Mfd. 800 volt
R-9032	Condenser - .5 Mfd. 160 volt	R-7244	Condenser -.006 Mfd. 600 volt
R-9227	Condenser - .2 Mfd. 200 volt	R-6759	Condenser -.001 Mfd. Mica
R-8931	Condenser - .1 Mfd. 400 volt	R-6760	Condenser - .0005 Mfd. mica
R-8286	Condenser - .1 Mfd. 200 volt	R-4592	Condenser - .00025 Mfd. Mica
R-8920	Condenser -.05 Mfd. 200 volt	R-8030	Condenser - 1 Mfd. noise suppressor

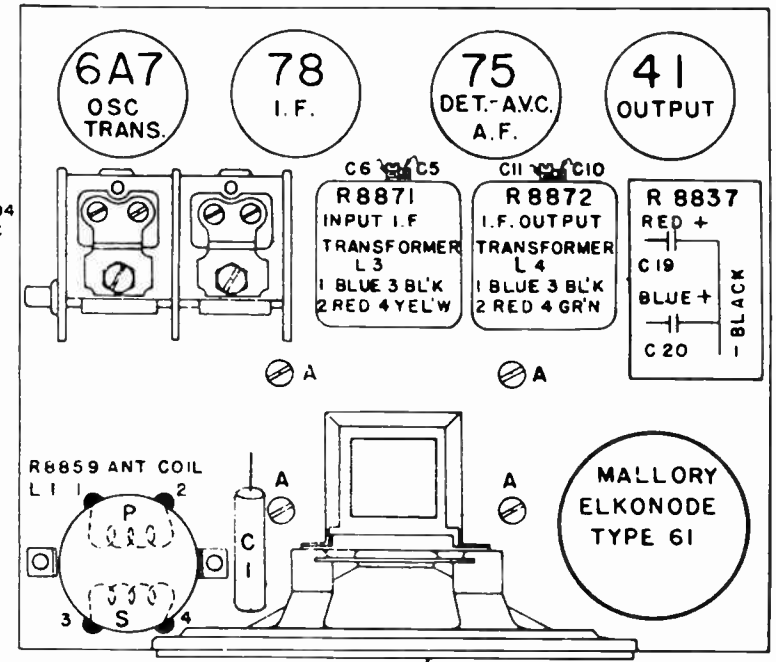


FIG. 41. SERVICE ILLUSTRATIONS - MODEL 150

MODEL 164
Remote Control Data
Alignment Data

COLONIAL RADIO CORP.

THE REMOTE CONTROL UNIT

As mentioned in the Instruction Booklet, the flexible drive shaft with the black, insulated tongue at its end, MUST be used for the condenser drive. The insulation is to prevent ignition noise pick up by the cable from being fed into the tuning condenser. Failure to observe these instructions will result in motor noise.

The pilot light switch, in the remote control unit, works coincidentally with the set switch in the chassis. Flickering of the pilot light may be due to poor contact between the phosphor-bronze spring and the rotating drum. Bending of the spring and sandpapering of the drum will correct the condition.

To gain access to the switch, procede as follows:

1. Disconnect the flexible cables from the remote control unit and remove the unit from the steering column.

2. Remove the outer shell from the unit by bending up the tabs.

3. Pull the pointer off of its shaft and then remove the dial.

4. Remove the three flat head screws holding the cover and remove the cover, exposing the mechanism.

The illustration shows how to replace the pointer drive cable. Note that the end of the cable coming from the clamped end of the spring passes OVER the other end of the cable. Also note that when the large pulley is set into place, the spring is diametrically opposite the drive pulley.

When replacing the pointer, turn the Station Selector shaft clockwise to its limit and set the pointer one division to the right of the bottom center line. Then when the shaft is turned all the way counter clockwise, the pointer will stop one division to the left of the center line.

Failure of the set switch and the remote control switch and lock to coincide in their operation will be caused by movement of the cables or of the control unit, after the synchronizing adjustment has been made. To secure simultaneous action of the two switches again, it will be necessary to disconnect the cable, turn the set switch to its "Off" position with a screw driver, turn the Volume Control knob in the control unit to its "Off" position with the key out, and then securely tighten the cable coupling and set screws. If the control unit is not moved then, the operation of the two switches will remain in synchronism.

The pilot light is accessible for replacement when the single screw at the back of the case is removed.

POWER SUPPLY UNIT

The plate supply unit is of the vibrating reed type with rectifier tube. No attempt should be made to repair the vibrator proper. Return it to your distributor for repair or replacement. The unit can be pulled out of its case when the five terminal screws are loosened.

It is very important that the proper polarity connection be made. For cars with the negative battery terminal grounded, the blue lead should be connected to the terminal nearest the outside of the case. For cars with grounded positive terminal, the positions of the blue and black leads are interchanged so that the black lead is connected to the outside terminal. Failure to observe these instructions will cause damage to the vibrator in a very few minutes of operation.

R17, R18, C22 and C23 are part of the assembly of the vibrator proper. C25, C26, C27, L6 and R19 are all mounted within the power supply case. R19 is a resistor whose value varies with the voltage applied to it. When the receiver is first turned on, the output voltage tends to become very high until the tubes heat sufficiently to draw their normal load. Under this condition, the value of R19 drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the resistance of R19 increases greatly so that it no longer constitutes a load on the power supply.

THE IF TUNING ADJUSTMENTS

When peaking the IF stages, use a low enough output from the test oscillator to render the AVC action inoperative. The screw adjusts the primary tuning condenser; the nut adjusts the secondary, as shown in the illustrations.

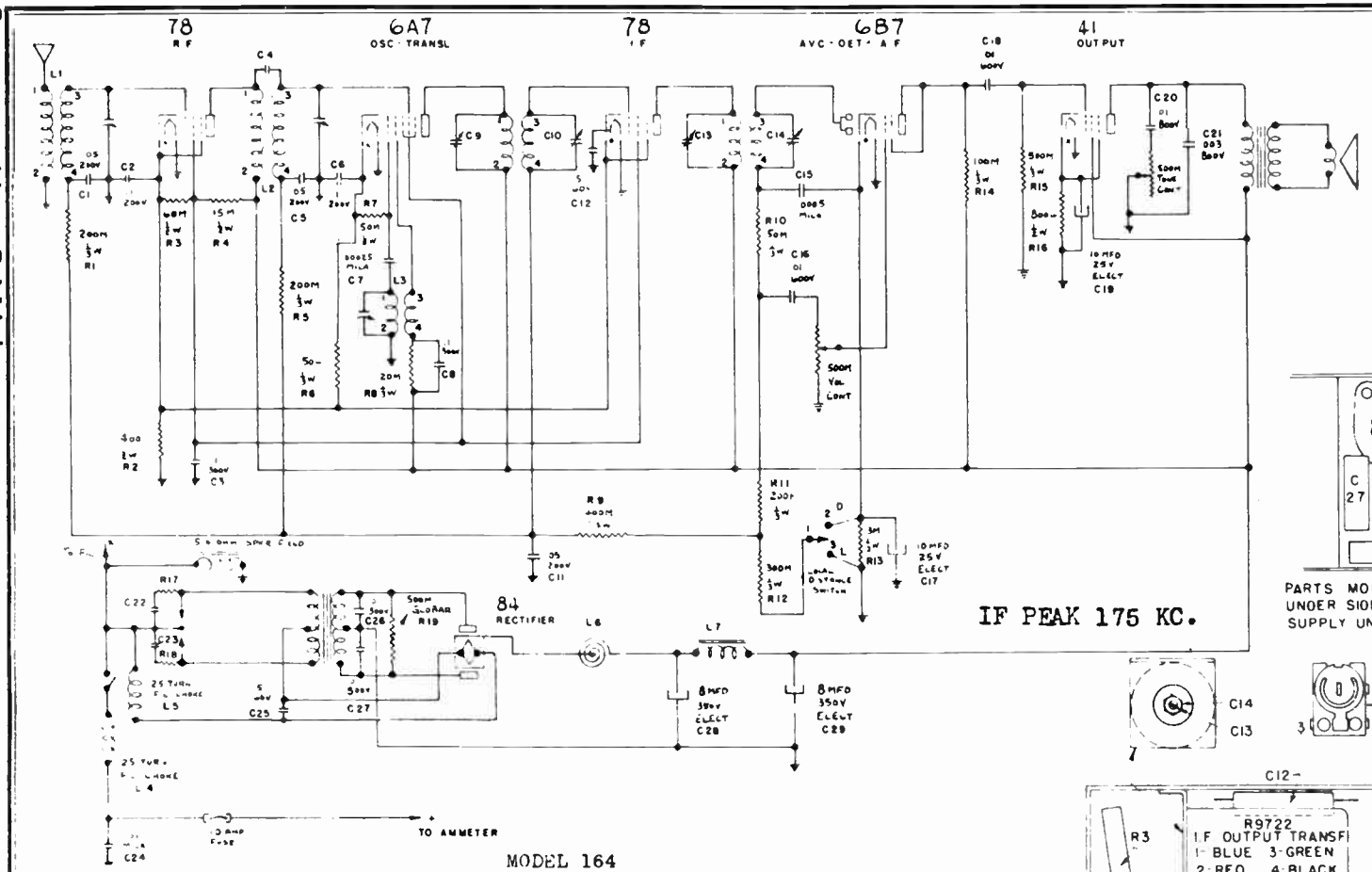
THE RF TUNING ADJUSTMENTS

There are three holes at the back of the chassis through which the condenser trimmers are accessible. The unit nearest the control end of the chassis is the RF unit. The next one is the translator and the last one the oscillator.

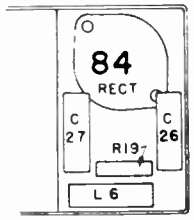
Any trouble with oscillation will be due to proximity between grid and plate leads of the RF and IF stages. Moving the leads apart will correct the trouble.

COLONIAL RADIO CORP.

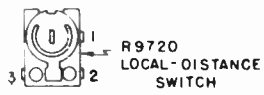
MODEL 164
Schematic, Voltage Parts Layout

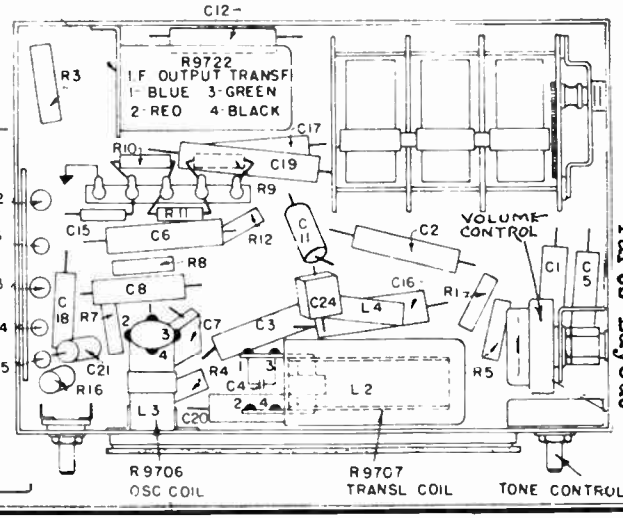


NOTE: This manual applies only to receivers having a serial number below 50600. Receivers with a serial number above 50600 are shown as Model 164B.



PARTS MOUNTED ON UNDER SIDE OF POWER SUPPLY UNIT CASE

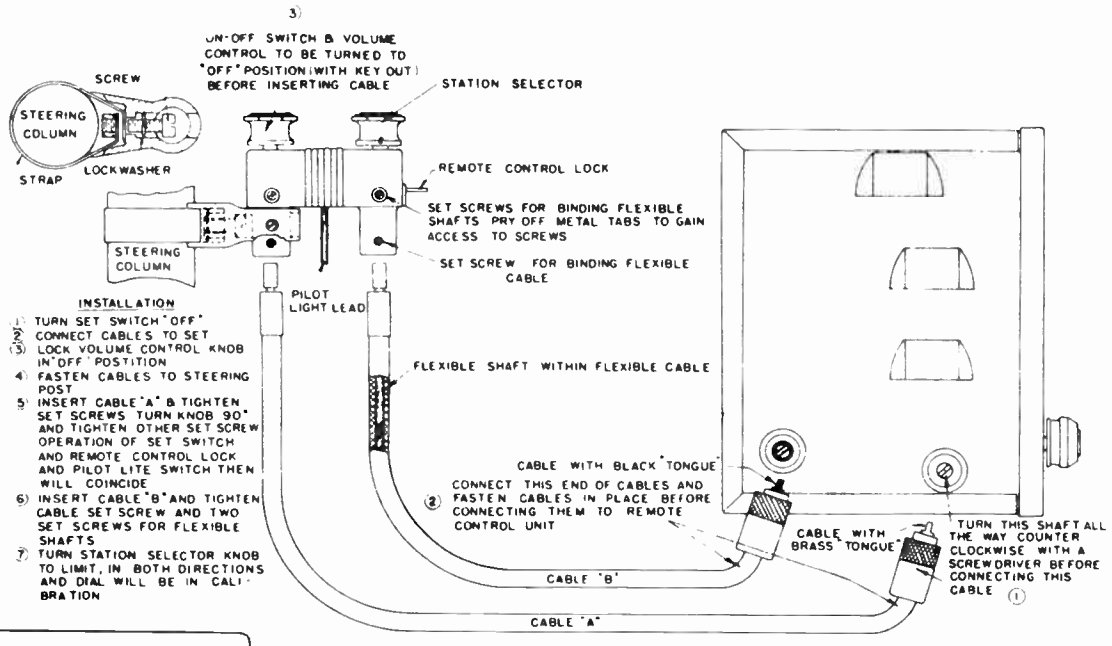




MODEL 164

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M.A.	SCREEN M.A.
78 - RF	230	100	4.5	1
78 - IF	230	100	4.5	1
6B7 - AVC-Det-AF	65	65	1.25	.4
41 - Output	205	215	20	3.25
6A7 - Osc-transl.	Ep=230v; Eg#2=135v; Eg#3&#5=100v; Ip=4ma; Ig#2=3ma; Ig#3&#5=3.2ma.			
84 - Rect.	20 m.a. per plate	Total battery drain=6.2 amperes.		

MODEL 164
Socket, Assembly, Speaker COLONIAL RADIO CORP.

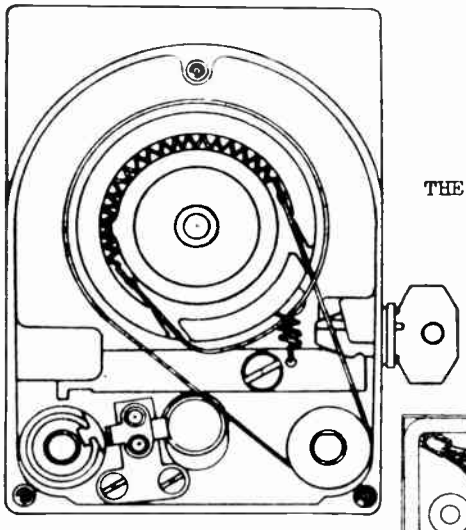


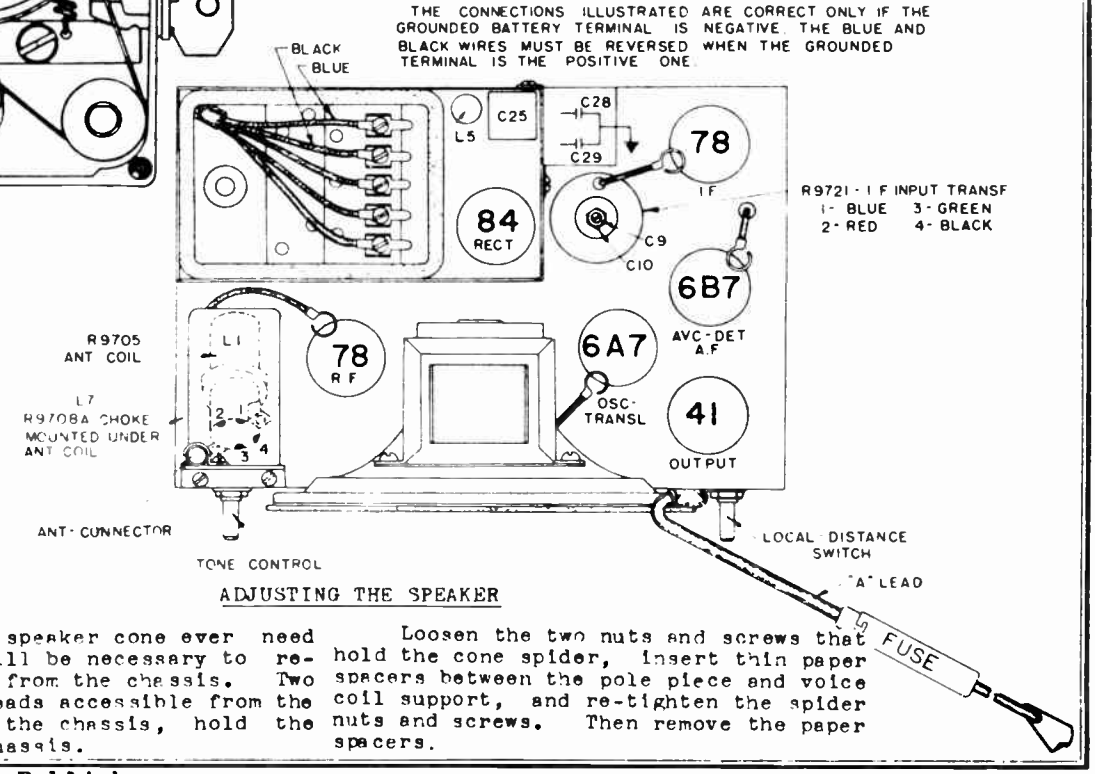
INSTALLATION

1) TURN SET SWITCH "OFF"
2) CONNECT CABLES TO SET
3) LOCK VOLUME CONTROL KNOB IN "OFF" POSITION
4) FASTEN CABLES TO STEERING POST
5) INSERT CABLE "A" & TIGHTEN SET SCREWS TURN KNOB 90° AND TIGHTEN OTHER SET SCREW OPERATION OF SET SWITCH AND REMOTE CONTROL LOCK AND PILOT LITE SWITCH THEN WILL COINCIDE
6) INSERT CABLE "B" AND TIGHTEN CABLE SET SCREW AND TWO SET SCREWS FOR FLEXIBLE SHAFTS
7) TURN STATION SELECTOR KNOB TO LIMIT, IN BOTH DIRECTIONS AND DIAL WILL BE IN CALIBRATION

IMPORTANT
IF THE REMOTE CONTROL UNIT IS MOVED AFTER THE CABLE ADJUSTMENTS HAVE BEEN MADE, IT WILL BE NECESSARY TO READJUST IN ORDER TO MAINTAIN PROPER CALIBRATION AND OPERATION OF THE PILOT LIGHT, SWITCH AND LOCK

THE REMOTE CONTROL MECHANISM





ADJUSTING THE SPEAKER

Should the speaker cone ever need centering, it will be necessary to remove the speaker from the chassis. Two screws, their heads accessible from the under side of the chassis, hold the speaker to the chassis.

Loosen the two nuts and screws that hold the cone spider, insert thin paper spacers between the pole piece and voice coil support, and re-tighten the spider nuts and screws. Then remove the paper spacers.

COLONIAL RADIO CORP.

MODEL 164
Vibrator Data
Noise Data

The following chart will be helpful for making tests of the power supply unit. A continuity meter or ohmmeter may be used.

VIBRATOR UNIT ONLY

TEST	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
Between brass contact adjusting screws. (With piece of paper inserted between contact points.)	Reading	Open transformer primary.
Grey lead to either red lead	Approx. 400 ohms	Open or shorted transformer secondary.
Blue and black leads, (with paper out.)	Reading	Contact points not making contact.
POWER SUPPLY (With Vibrator Disconnected)		
Fahnstock clip to switch	Reading	Open fuse or open L4
Fahnstock clip to ground (With tubes out of sockets.)	Approx. 5. ohms	Open field coil
84 cathode to ground	Approx. 75 M ohms	If low res. reading, shorted C28 or C29. If no reading, open L6, L7, R2 or R4

REMEDIES FOR UNUSUAL NOISE CONDITIONS

If a condition is met in which the installation of standard suppressor equipment still leaves objectionable noise, proceed as follows:

1. Ground the antenna shield to the case by jamming a Parker-Kalon screw between the shield and the case.

2. Bond the bulkhead to the nearest point on the motor.

3. Disconnect the high tension lead running from the coil to the center of the distributor. Disconnect it both at the coil end and at the distributor end. Turn the ignition switch on and turn the motor over with the hand crank. If clicks are heard as the distributor breaker makes and breaks contact, interference comes from this source.

Additional capacity should NOT be put across the breaker points as it will interfere with the proper operation of the coil. (A condenser, connected across the points, is built into all distributors.) Rewire the entire low tension ignition system, using shielded low tension ignition cable which must be well grounded. Do not run the wiring along side of other wiring, but keep it separate, and if possible, along the car chassis channels.

4. If the trouble still persists, it may be necessary to use shielded high tension cable from the distributor to the coil. The shielding must be well grounded.

5. Very often the interference is fed into the antenna through the dome light wiring. This can be determined by disconnecting the dome light lead from the ammeter. If an improvement results, by-pass the dome light at the point where it enters the corner post.

6. Metal windshield tubing, gas and oil lines sometimes have to be bonded to the bulkhead with heavy copper braid.

7. In some cars the high tension coil or leads come very close to the motor side of the floor board. As a result, interference is picked up by the occupant's body and transferred to the car antenna. Trouble of this sort is manifested by noisy reception ONLY when a person is sitting in the car. It can be remedied by tacking a grounded metal plate or screen to the motor side of the floor board, or by placing a grounded screen between the floor matting and the floor board.

It should be understood that it practically never is necessary to apply ALL these remedies. How many of them are needed will depend on the particular car and installation.

MODEL 164,182
Service Data

COLONIAL RADIO CORP.

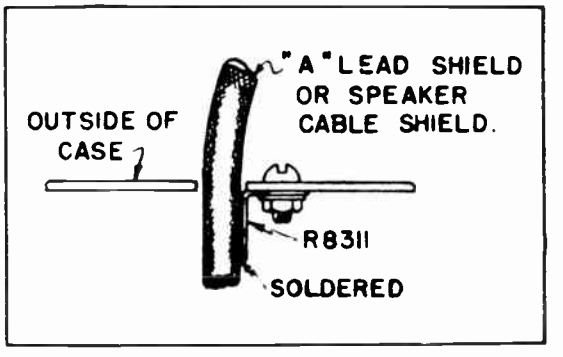
NOTES ON IGNITION INTERFERENCE ELIMINATION FOR MODELS 164 AND 182

The following changes should entirely eliminate ignition interference in instances where difficulty of this sort has been experienced.

SHORTENING THE SHIELD GROUNDING PIGTAIL

The Model 164 has a pigtail soldered to the "A" lead shield, with its other end clamped under one of the acorn nuts. The Model 182 has, in addition, a similar pigtail on the speaker cable shield. These pigtails should be removed and a shorter ground provided as follows:

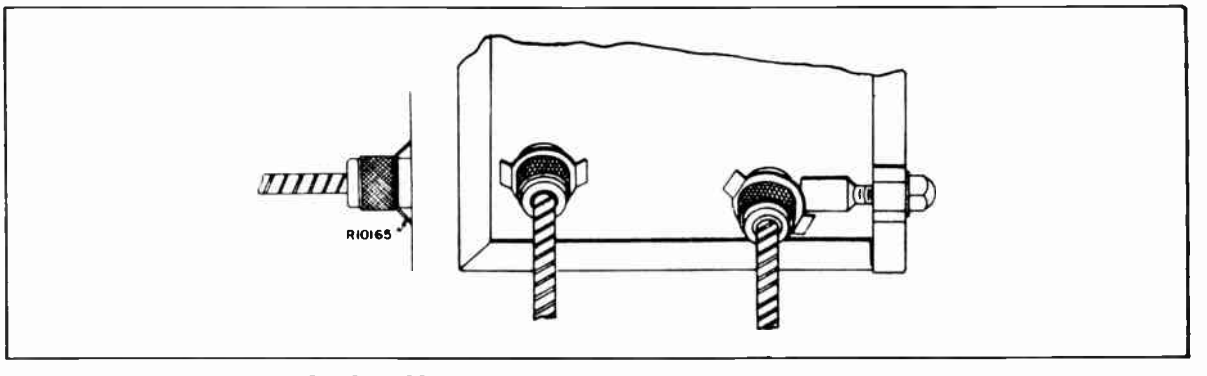
Drill a hole in the case immediately alongside the point where the shields come through the case. Fasten a large soldering lug (R-8311) to the inside of the case by means of a nut and screw passed through the drilled holes and solder the shields to the lugs.



GROUNDING THE SHIELD CABLES AND ANTENNA

To completely eliminate any pickup by the drive cables, grounding springs (Part R10165) are put between the collar on both flexible cable couplings and the case. It will be necessary to scrape away the paint on the case, under the springs, so that they can make good contact with the case.

In cars having an intense interference field near the antenna shield, further improvement can be had by soldering an Antenna Shield Grounding Clip to the antenna shield. (Part No. R-10186). The clip makes contact with the case at the point where the shield enters the case. Sandpaper the case to insure good contact.



INSTRUCTIONS FOR SHORTENING THE DRIVE CABLES

1. Remove the split sleeve from the chassis end of the cable casing.

2. Heat the chassis end of the cable until the solder melts, permitting removal of the brass sleeve. Then take the cable out of its casing.

3. Determine the point where the cable is to be cut and clean it thoroughly with fine sandpaper. Tin this point thoroughly.

4. Cut the casing 5/8"shorter than the length desired for the cable. Replace the split sleeve.

5. Put the cable back in the shortened casing. Slide the brass sleeve along the cable to the tinned portion and solder it there. Do not let it bind against the end of the casing. Then cut the cable at the end of the sleeve with a fine toothed hacksaw.

If the cables are cut in the foregoing manner, there can be no difficulty from unravelling of the strands since the soldered sleeve holds them.

MODEL 164-B
Above # 50600
Schematic, Parts

COLONIAL RADIO CORP.

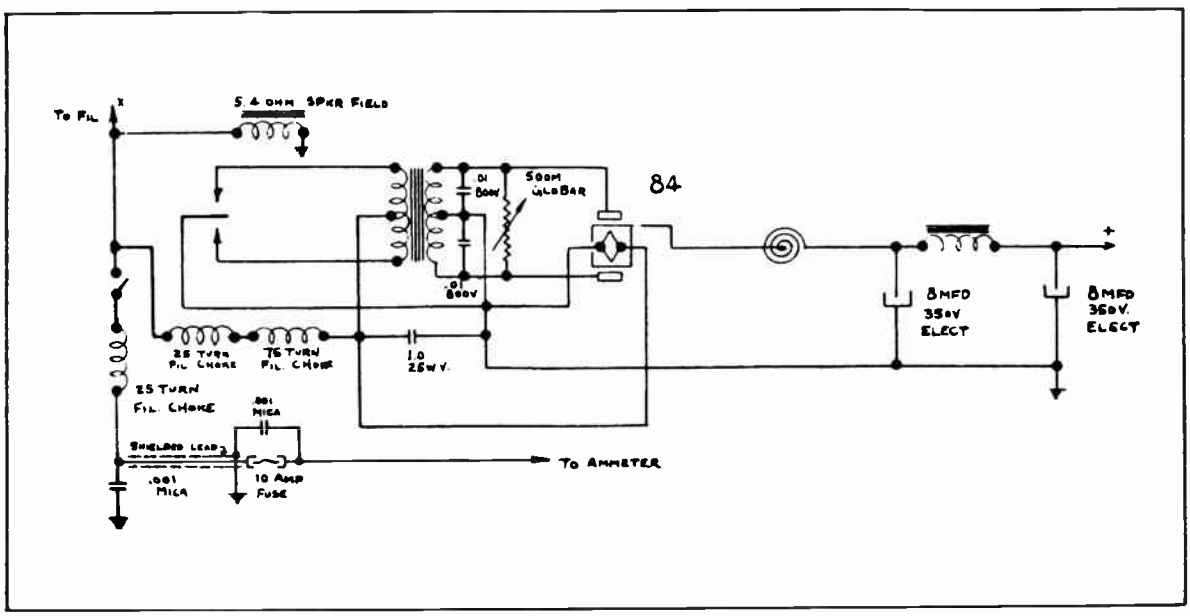
SERVICE NOTES

MODEL 164B

This manual applies to receivers having a serial number above 50600.

A different power supply unit is employed in these receivers, using a plug-in type of vibrator, making replacement of it very simple. Its construction is such that no attention need be paid to polarity. Accordingly, provision for changing polarity is omitted from this model.

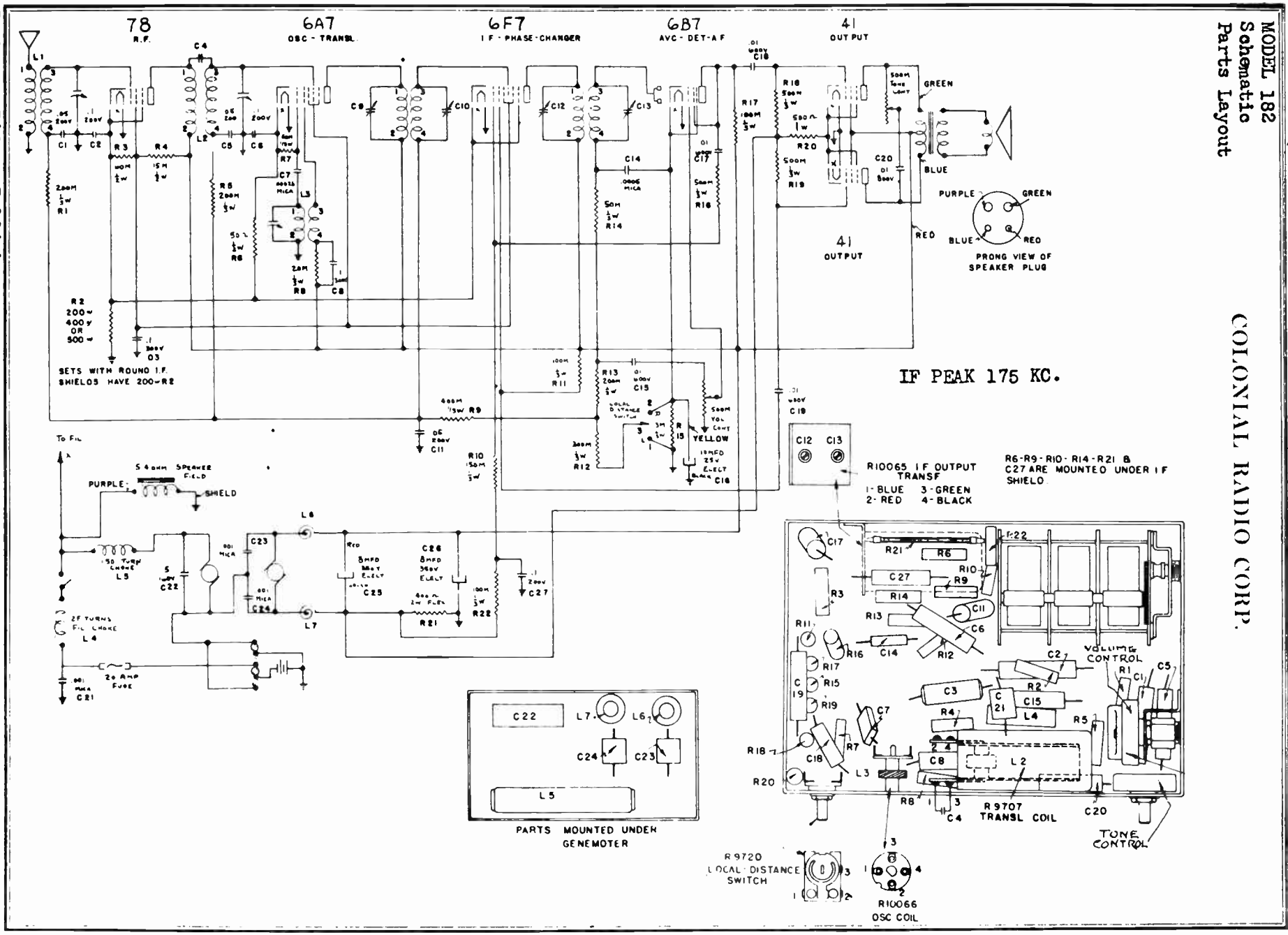
The schematic of the chassis is the same as that shown in Fig. 76, Page 136, for the Model 164. The revised schematic for the power supply unit is shown in Fig. 82.



PART NO.	DESCRIPTION
R-6381	Clip - Grid
R-6381-AR	Clip - Grid with shielded lead
R-9705	Coil - Antenna
R-9706	Coil - Oscillator
R-9707	Coil - Translator
R-9577-A	Condenser - Variable
R-9144	Condenser - 10 Mfd. 25 volt
R-9743	Condenser - Electrolytic, dual 8 Mfd.
R-9032	Condenser - .5 Mfd. 160 volt
R-8581	Condenser - .1 Mfd. 300 volt
R-8286	Condenser - .1 Mfd. 200 volt
R-8920	Condenser - .05 Mfd. 200 volt
R-7070	Condenser - .01 Mfd. 600 volt
R-9776	Condenser - .01 Mfd. 800 volt
R-6461	Condenser - .003 Mfd. 800 volt
R-6759	Condenser - .001 Mfd. Mica
R-6760	Condenser - .0005 Mfd. Mica
R-4592	Condenser - .00025 Mfd. Mica
R-8030	Condenser - 1 Mfd. noise suppressor
R-10025	Condenser - .5 Mfd. noise suppressor
R-9711	Control - Tone
R-9710	Control - Volume
R-9717	Connector - Fuse container
R-7688	Fuse - 10 Amp.
R-9733	Instruction leaflet
R-8870-A	Lead - Antenna shielded
R-9578-A	Lead - "A", with clip
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-6710	Resistor - 400 M ohms, 1/3 watt carbon
R-9777	Resistor - 300 M ohms, 1/3 watt carbon
R-6638	Resistor - 200 M ohms, 1/3 watt
R-7586	Resistor - 100 M ohms, 1/3 watt
R-9725	Resistor - 60 M ohms, 1/2 watt
R-6637	Resistor - 50 M ohms, 1/3 watt
R-6640	Resistor - 20 M ohms, 1/3 watt
R-7291	Resistor - 15 M ohms, 1/2 watt
R-8972	Resistor - 3 M ohms, 1/3 watt
R-7441	Resistor - 800 ohms, 1/2 watt
R-6436	Resistor - 400 ohms, 1/2 watt
R-6632	Resistor - 50 ohms, 1/3 watt
R-9745	Resistor - 500 M Globar (R 19)
R-9959	Ring - Felt (speaker)
R-9589-A	Shield - Ant. coil
R-9591	Shield - Translator coil
R-9360	Shield - Tube
R-8253	Socket - 5 Prong
R-8092	Socket - 6 Prong
R-8072	Socket - 7 Prong
S-9718-A	Speaker
R1-8018	Suppressor - Spark plug
R2-8018	Suppressor - Distributor
R-9720	Switch - Sensitivity
R-9721-A	Transformer - IF input
R-9722-A	Transformer - IF output
R-9581	Tube - Rubber, var. cond. mtg.
R-9723	Vibrator
R-9044-A	Choke (L4)
R-9044-B	Choke (L5)
R-9033	Choke (L6)
R-9708-A	Choke (L7)
R-9741	Clip - "A" lead

MODEL 182
Schematic
Parts Layout

COLONIAL RADIO CORP.



COLONIAL RADIO CORP.

MODEL 182

The COLONIAL Model 182 is a six tube superheterodyne automobile radio receiver. The circuit is shown in block form in Fig. 78 and schematically in Fig. 80.

A 78 RF tube feeds the incoming signal to the 6A7 translator-oscillator. The 175 kc output of this tube is amplified by the pentode portion of the 6F7 tube and then fed to the 6B7. This tube provides AVC, diode detection and, together with the triode portion of the 6F7, furnishes audio amplification for input of the 41 push-pull output stage. The speaker is a seperate 8" dynamic. A dynamotor furnishes the plate supply, drawing its power from the car's battery.

THE AVC AND SENSITIVITY CONTROL CIRCUITS

The 175 kc output of the 6F7 IF stage is impressed between the cathode and diode plates of the 6B7, in series with R12, R13, R14. The diode current flowing causes a voltage drop across these resistors. Only the drop across R12 is used for AVC. Since the grid returns of the 6A7, 78 and 6F7 are connected to R12, the negative bias across it is impressed upon the grids of these tubes. Increases in signal strength are offset by decreases in tube amplification resulting from this increased negative grid bias. The effect is to tend to maintain the output of the 6F7 IF at a constant value.

Residual bias for the tubes is furnished by R2. In addition, the residual bias and therefore the tube amplification is affected by the setting of the Local-Distance switch. When the switch lever is on contact #2, the drop across R15, due to the plate current of the 6B7, bucks the residual from R2, decreasing the total negative bias and increasing tube amplification. In the "Local" position, contact #1, only the residual from R2 is applied to the tube grids.

Be sure the sensitivity control is either FULL clockwise or FULL counter clockwise. If allowed to remain half way between the two positions, R 15 will be shorted, removing the 6B7 bias.

The volume control shunts R12 and R13 for audio frequencies. Accordingly, any desired amount of the audio component across R12 and R13 can be picked off by the moveable arm of the volume control and fed to the control grid of the pentode portion of the 6B7.

When peaking the IF transformers, use a low enough output from the test oscillator to render the AVC action inoperative.

THE RF TUNING ADJUSTMENTS

There are three holes at the back of the chassis through which the condenser trimmers are accessible. The unit nearest the control end of the chassis is the RF unit. The next one is the translator and the last one the oscillator.

THE 6F7 PHASE CHANGER CIRCUIT

In any push-pull circuit, the instantaneous voltage on the grid of one of the tubes must be opposite in polarity to the voltage on the other tube's grid. Ordinarily, this polarity difference or phase change is accomplished by the push-pull input transformer. In the Model 182, it is accomplished as follows:

At some particular instant the polarity of the signal voltage on the 6B7 plate will be negative. This negative voltage is coupled through C18 to the control grid of one of the 41's. This signal voltage on the 6B7 plate also causes a drop (audio frequency) across C17, R16, R10, and C27, with the polarities becoming increasingly negative toward C27. Accordingly, the control grid of the triode portion of the 6F7 is driven in a positive direction by the drop across R10 and C27. This causes the plate current to increase, which is to say that the plate becomes more positive. This positive potential is coupled through C19 to the grid of the other 41 tube. The result, then, is that the grid of one 41 is going in a positive direction while the other is going negative.

THE POWER SUPPLY UNIT

The plate supply unit is of the rotating dynamotor type. To remove it, take out the three Parker-Kalon screws at the bottom edge of the dynamotor housing and then take out the two screws holding the metal can type of condenser to the housing. The housing and dynamotor then can be loosened from the chassis. Unsoldering the leads under the dynamotor and removing the four screws that hold the dynamotor to the housing case permits complete removal of the dynamotor. After considerable use, the dynamotor commutator may need cleaning. Use the finest sandpaper. NEVER USE EMERY CLOTH.

If the receiver is set up on the bench, outside of its case, be sure to connect a wire from the speaker cable to the chassis, to complete the speaker field circuit.

MODEL 182
Remote Control Data
Parts List

COLONIAL RADIO CORP.

THE REMOTE CONTROL UNIT

As mentioned in the Instruction Booklet, the flexible drive shaft with the black, insulated tongue at its end, MUST be used for the condenser drive. The insulation is to prevent ignition noise pick up by the cable from being fed into the tuning condenser. Failure to observe these instructions will result in motor noise.

The pilot light switch, in the remote control unit, works coincidentally with the set switch in the chassis. Flickering of the pilot light may be due to poor contact between the phosphor-bronze spring and the rotating drum. Bending of the spring and sandpapering of the drum will correct the condition.

To gain access to the switch, procede as follows:

1. Disconnect the flexible cables from the remote control unit and remove the unit from the steering column.

2. Remove the outer shell from the unit by bending up the tabs.

3. Pull the pointer off of its shaft and then remove the dial.

4. Remove the three flat head screws holding the cover and remove the cover, exposing the mechanism.

The illustration shows how to replace the pointer drive cable. Note that the end of the cable coming from the clamped end of the spring passes OVER the other end of the cable. Also note that when the large pulley is set into place, the spring is diametrically opposite the drive pulley.

When replacing the pointer, turn the Station Selector shaft clockwise to its limit and set the pointer one division to the right of the bottom center line. Then when the shaft is turned all the way counter clockwise, the pointer will stop one division to the left of the center line.

Failure of the set switch and the remote control switch and lock to coincide in their operation will be caused by movement of the cables or of the control unit, after the synchronizing adjustment has been made. To secure simultaneous action of the two switches again, it will be necessary to disconnect the cable, turn the set switch to its "Off" position with a screw driver, turn the Volume Control knob in the control unit to its "Off" position with the key out, and then securely tighten the cable coupling and set screws. If the control unit is not moved then, the operation of the two switches will remain in synchronism.

The pilot light is accessible for replacement when the single screw at the back of the case is removed.

REPLACEMENT PARTS LIST

R-6552	Board - Resistor
R-10082	Book - Instruction
R-9588	Bushing - Rubber, Genemotor mtg.
R-9044-A	Choke - L4
R-9757	Choke - L6 & L7
R-10116-A	Choke - L5
R-9741	Clip - "A" Lead
R-6381	Clip - Grid
R-9705	Coil - Antenna
R-10066	Coil - Oscillator
R-9707	Coil - Translator
R-9577-A	Condenser - Variable
R-9780	Condenser - Triple electrolytic
R-8030	Condenser - 1 Mfd. noise suppressor
R-10025	Condenser - .5 Mfd. noise suppressor
R-9032	Condenser - .5 Mfd. 160 volts
R-8286	Condenser - .1 Mfd. 200 volts
R-8581	Condenser - .1 Mfd. 300 volts
R-7354	Condenser - .05 Mfd. 200 volts
R-7070	Condenser - .01 Mfd. 600 volts
R-9776	Condenser - .01 Mfd. 800 volts
R-6759	Condenser - .001 Mfd. Mica
R-6760	Condenser - .0005 Mfd. Mica
R-4592	Condenser - .00025 Mfd. Mica
R-9711	Control - Tone (500 M ohms)
R-9710	Control - Volume (500 M ohms)
R-9717	Connector - (and fuse container)
R-9751	Fuse - 20 Amp.
R-9587	Genemotor
R-9744	Grommet - "A" lead
R-7692	Knob - Tone & sensitivity controls
R-8870-A	Lead - Antenna
R-8219	Nut - Acorn cover
R-9719	Nut - Set mounting
R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-6710	Resistor - 400 M ohms, 1/3 watt carbon
R-9777	Resistor - 300 M ohms, 1/3 watt carbon
R-6638	Resistor - 200 M ohms, 1/3 watt carbon
R-9778	Resistor - 150 M ohms, 1/3 watt carbon
R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-9725	Resistor - 60 M ohms, 1/2 watt carbon
R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-6640	Resistor - 20 M ohms, 1/3 watt carbon
R-7291	Resistor - 15 M ohms, 1/2 watt carbon
R-8972	Resistor - 3 M ohms, 1/3 watt carbon
R-10142	Resistor - 500 ohms, 1/3 watt carbon
R-9779	Resistor - 500 ohms, 1 watt carbon
R-6632	Resistor - 50 ohms, 1/3 watt carbon
R-8419	Resistor - 400 ohms, flexible
R-10056	Screw - Polarity changer
R-9589-A	Shield - Antenna coil
R-9591	Shield - Translator coil
S-9590-AC	Speaker - Complete
S-7776-B	Speaker cone & voice coil
S-9767-A	Speaker terminal board
S-9770-A	Speaker cable & plug
S1-9768-AC	Speaker case

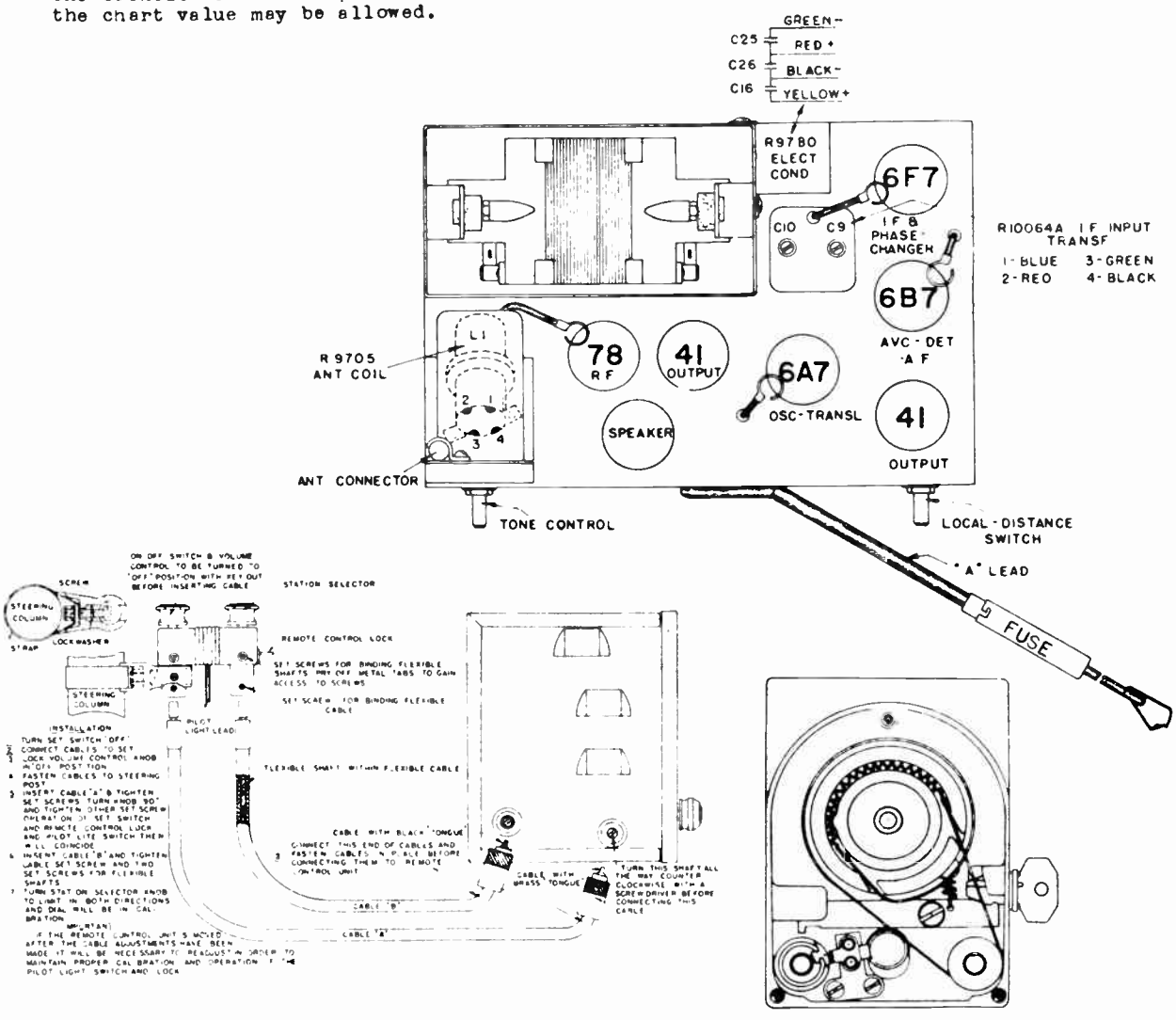
COLONIAL RADIO CORP.

MODEL 182
Voltage, Socket
Trimmer, Assembly

TUBE VOLTAGE AND CURRENT CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	PLATE M. A.	SCREEN M.A.
78 - RF	200	95	8	2.25
6B7 - AVC-Det-AF	60	60	1.25	.3
41- Output	205	208	14	2.5
6A7 - Osc-Transl.	Ep=200v; Eg#2=125v; Eg#3&#5=95v; Ip=3.5ma; Ig#2=3ma; Ig#3&#5=3.5ma;			
6F7 - IF & AF	Ep=200v; Eg#2=75v; Eg#3&#5=95v; Ip=5ma. Ig#2=3ma; Ig#3&#5=1ma.			

Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, the voltage readings can be taken with a 1000 ohms per volt voltmeter, from the cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.



THE REMOTE CONTROL MECHANISM - MODEL 182

MODEL 150,164,182
Supplementary Data

COLONIAL RADIO CORP.

SUPPLEMENTARY SERVICE NOTES

MODELS 150 - 164 - 182

MODEL 150

Certain improvements have been incorporated in the Model 150 auto receivers since the Instruction Booklets and Service Manuals for this model were printed. For the most part these improvements facilitate removal of the chassis from its case when necessary.

1. The permanently connected shielded antenna lead has been replaced with one using a bayonet and socket type of connection.

2. In order to eliminate the necessity for going through the operation of polarity changing in the field, some of the sets are shipped with the polarity connection correct for positive grounded batteries and others for negative grounded batteries. The shipping cartons are stencilled to indicate the polarity connection of the set.

3. The vibrator unit has been improved and it is suggested that a couple of them be carried in stock to replace any that may break down in service. Defective units should be returned to the Colonial Radio Corp., 254 Rano St., Buffalo, N.Y., for replacement.

4. Any letters appearing after Model 150, on the chassis or carton, have no significance. All changes and improvements were incorporated in all of the chassis before being shipped.

MODELS 164 AND 182

As mentioned the , drive cable grounding springs (Part #R-10165), were supplied in later production of Model 164 and 182. When these springs are used, it makes no difference whether an insulated or an uninsulated tip drive cable is used for the tuning condenser, and two brass tip cables are supplied when the grounding springs are included in the original package. Accordingly, if the grounding springs are used, all reference to the insulated tip drive cable may be disregarded.

Two types of speakers have been used on the Model 164. They can be told apart by the fact that one type has a patent notice sticker pasted under the output transformer. Should parts of this speaker need replacement, return the entire speaker. The list of replacement parts for the other type speaker follows:

Part No.	Description	Price
S-9967-A	Speaker - Complete	$8.28
S-9988-A	Speaker cone and voice coil	1.38
S-10152	Speaker field coil	1.65
S-9994	Speaker clamping ring	.05
S-9968	Speaker eyelets	10 for .03
S-10144-A	Speaker transformer	1.28

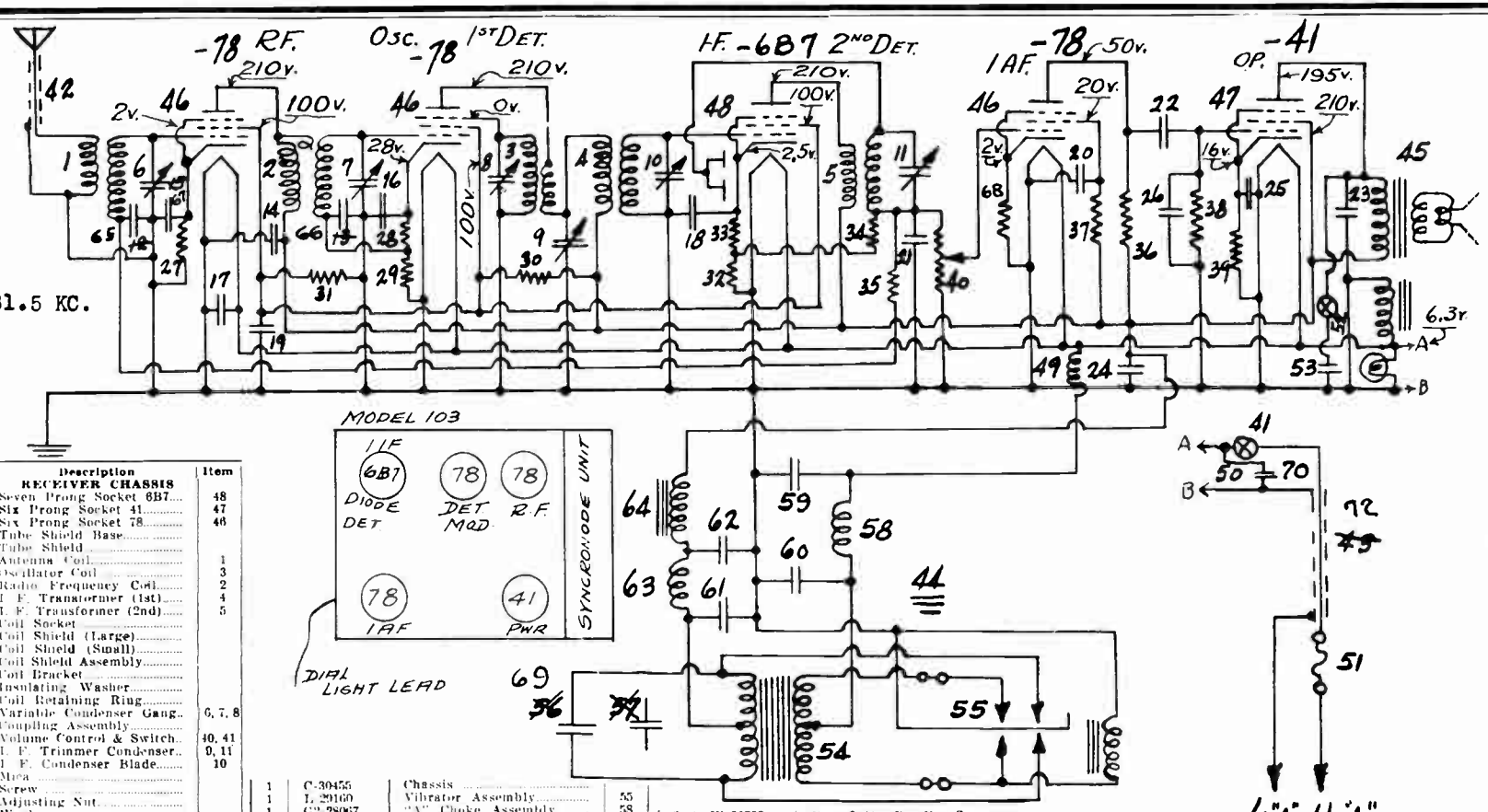
Two types of set screws for binding the flexible drive cables and casings have been used in the Model 164 and 182 remote controls. One is a 6/32 X 1/8" screw, Part #R-5386, price - .01. The other is 8/32 X 3/16", Part #R-6498, price - .02. It is suggested that a small stock of both of these screws be carried.

INTERFERENCE ELIMINATION

Occasionally a car is encountered in which the "dirt" at the ammeter is exceptionally great. To remedy a condition of this sort, solder a .001 mfd mica condenser, (Part #R-6759), from the fuse container shell to a point about an inch away, on the ammeter end of the "A" lead. Wrap tape around the condenser and lead to protect them.

CROSLEY RADIO CORP.

MODEL 103 Schematic, Socket Voltage, Parts



Qty.	Part No.	Description	Item
		RECEIVER CHASSIS	
1	G48-28807	Seven Prong Socket 6B7	48
1	G22-28807	Six Prong Socket 41	47
3	G39-28807	Six Prong Socket 78	46
1	W-27981	Tube Shield Base	
1	W-27328	Tube Shield	
1	G21-24905	Antenna Coil	1
1	G25-24906	Oscillator Coil	3
1	G7-25908	Radio Frequency Coil	2
1	G1-25444	I. F. Transformer (1st)	4
1	G3-25445	I. F. Transformer (2nd)	5
4	W-25200	Coil Socket	
3	W-25024	Coil Shield (Large)	
1	W-25025	Coil Shield (Small)	
1	G1-28551	Coil Shield Assembly	
1	W-29263	Coil Bracket	
5	W-24390	Insulating Washer	
5	W-21541B	Coil Retaining Ring	
1	L-29783	Variable Condenser Gang	6, 7, 8
1	G1-29302	Coupling Assembly	
1	W-30436	Volume Control & Switch	40, 41
2	G2-25048	I. F. Trimmer Condenser	9, 11
1	W-25008	I. F. Condenser Blade	10
1	W-25584	Mica	
1	B-80	Screw	
1	W-29039B	Adjusting Nut	
1	W-24865	Washer	
1	W-25450B	Insulating Washer	
1	W-25007B	Insulating Washer	
1	W-25446	Bakelite Washer	
1	O-4	Flat Washer	
1	M-20	Rivet	
1	G4-28007	"A" Choke	49
1	21454	Resistor 1 megohm	34, 35
1	23785	Resistor 500,000 ohm	37
1	21875	Resistor 100,000 ohm	36
2	23514	Resistor 750 ohm	39, 68
1	W-30127	Resistor 450 ohm	28
1	W-21237	Resistor 60,000 ohm	31
1	W-25357	Resistor 75 ohm	33
1	W-21455	Resistor 300,000 ohm	38
1	31094	Resistor 4,500 ohm	71
2	W-21064	Resistor 165 ohm	27, 32
1	23616	Resistor 15,000 ohm	30
1	W-26571	Condenser .005 Mfd	21
1	W-23142	Condenser .02 Mfd	22
1	W-30419	Condenser 8 8 Mfd	24, 25
1	W-23635	Condenser .06 Mfd	23
1	W-26389	Condenser .00005 Mfd	26, 70
1	W-23615	Condenser .05 Mfd	14
1	W-25438	Condenser .1-.1 Mfd	19, 20
2	W-24049A	Condenser .1 Mfd	17, 18
4	W-27203	Condenser .02 Mfd	16, 65 66, 67
		MODEL 409 SYNCRONODE	44
1	L-30424	Cover	
1	C-30455	Chassis	
1	L-29160	Vibrator Assembly	55
1	G2-28067	"A" Choke Assembly	58
1	G7-28065	Power Transformer	54
1	G1-24234	R. F. Choke Assembly	63
1	G7-28069	Filter Choke	64
1	W-29808	Condenser 12 Mfd	62
1	W-30367	Condenser .25 Mfd	60
1	W-30366	Condenser .5 Mfd	59
1	W-23142	Condenser .02 Mfd. (400 v.)	61
1	W-30984	Condenser .02 Mfd. (800 v.)	69
4	W-29314	Rubber Sleeve (to Mount Sync.)	
1	W-20264	Terminal Board	
		MODEL 353-3C SPEAKER	45
1	G2-29529	Cone Assembly	
1	W-29777	Field Coil	
1	G4-24628	Transformer Assembly	
		MISCELLANEOUS	
1	L-30452	Receiver Case	
1	C-30450	Cover	
1	C-30451	Bottom	
1	L-28034	Remote Control	
1	W-28102A	Clamp Spring	
8	W-20070	Suppressor (Spark Plug)	
1	W-20071	Suppressor (Dist. Head)	
3	W-29754	Elim. Condenser	
1	W-25784	Tennaflex	
1	W-29323	Mounting Bolt	
1	W-29324	Mounting Washer	
1	7961	Mntg. Shakeproof Washer	
1	W-29325	Mounting Nut	
2	W-30739	No. 8x1/4 P. K. Screw (Top & Bottom)	
4	W-30739	No. 8x1/2 P. K. Screw (Chassis to case)	
30	W-31050	No. 8x1/4 P. K. Screw (Case)	
4	W-31070	6-32x1/2 Screw (Speaker)	
4	W-24074	Elastic Stop Nut (Speaker)	
4	O-6	Flat Washer (Speaker)	
3	W-20800	Shakeproof Washer (Spr.)	
1	W-4562	Solder Lug (Speaker)	
1	G1-25891	Antenna Wire	
1	W-28010	Antenna Wire Shield	42
1	W-31100	"A" Cable & Fuse Assem.	72
1	W-31102	Fuse Carrier only	
1	W-20106	Fuse Carrier Cap	
1	W-20110	Spring	
2	W-20107	Washer	
1	W-31103	10 Ampere Fuse	
66"	W-31101	Wire	
1	W-31076	Lug	
1	W-26156A	Switch	52
1	W-23191	Condenser .01 Mfd	53
1	W-29298	Grill Cloth	
1	B-29309	Mounting Plate	
		REMOTE CONTROL	
1	G8-25868	Drive Shaft Assem. (V. C.)	
1	G9-25868	Drive Shaft Assem. (Dial)	
1	G1-28035	Strap Assembly	
1	W-28029B	Column Bracket	
1	G4-26317	Bracket Assem.	
1	W-29316A	Gear Dial	
1	W-4807	Spring Washer	
1	G5-23472	Knob	
1	G1-28036	Key Knob	
1	B-26307D	Housing	
1	W-28025C	Cover	

NOTE:
Tolerances of ±15% allowable on voltages given.
Voltages measured from tube contacts to chassis.

MODEL 4A1
Alignment, Voltage

CROSLEY RADIO CORP.

Alignment Procedure . . .

To align the receiver at intermediate frequency it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6F7 tube through an .02 mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. To make this adjustment it is necessary that a standard 5/16" (across flat) hexagon socket wrench be used for the upper condenser, and a small screw driver fitting inside of the nut hole for adjustment of the lower condenser. Always make this I. F. adjustment very carefully and go over the adjustment several times to be sure that the peak has been reached. To align a receiver at broadcast radio frequency, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 mfd. (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator shunt trimmer which is located on the front section of the gang condenser until the signal is heard best. Without changing the gang condenser setting, adjust the antenna trimmer located on the rear section of the gang condenser. It is necessary that these adjustments be gone over several times until no further improvements can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator at approximately 600 Kc. The approximate sensitivity of the receiver may be checked here and it is possible that by slight bending of the gang condenser plates some improvement may be made. It is very essential, however, that this bending of plates be done with extreme care and by someone who is experienced in this operation.

Automatic Volume Control Circuit . . .

Diode voltage is developed across resistor 34 which is the level control. This voltage is fed back through isolating resistor, part No. 26, to the grid return of the antenna coil, part No. 1, thereby exerting automatic volume control voltage on the pentode section of the 6F7 oscillator modulator. No AVC voltage is impressed on the 6B7 I. F. amplifier because in so doing serious distortion might result. AVC voltage is also impressed on the 6D6 A. F. amplifier by means of coupling resistor 57.

Method of Biasing . . .

Both the pentode and triode section of the 6F7 oscillator modulator obtain their bias from the cathode resistor, part No. 22. The 6B7 I. F. amplifier section obtains its bias from the cathode resistor, part No. 25. Bias for the 6D6 A. F. amplifier is also obtained from resistor No. 25, while the bias for the output type 42 is obtained from resistor part No. 30.

Analysis of Signal Channel . . .

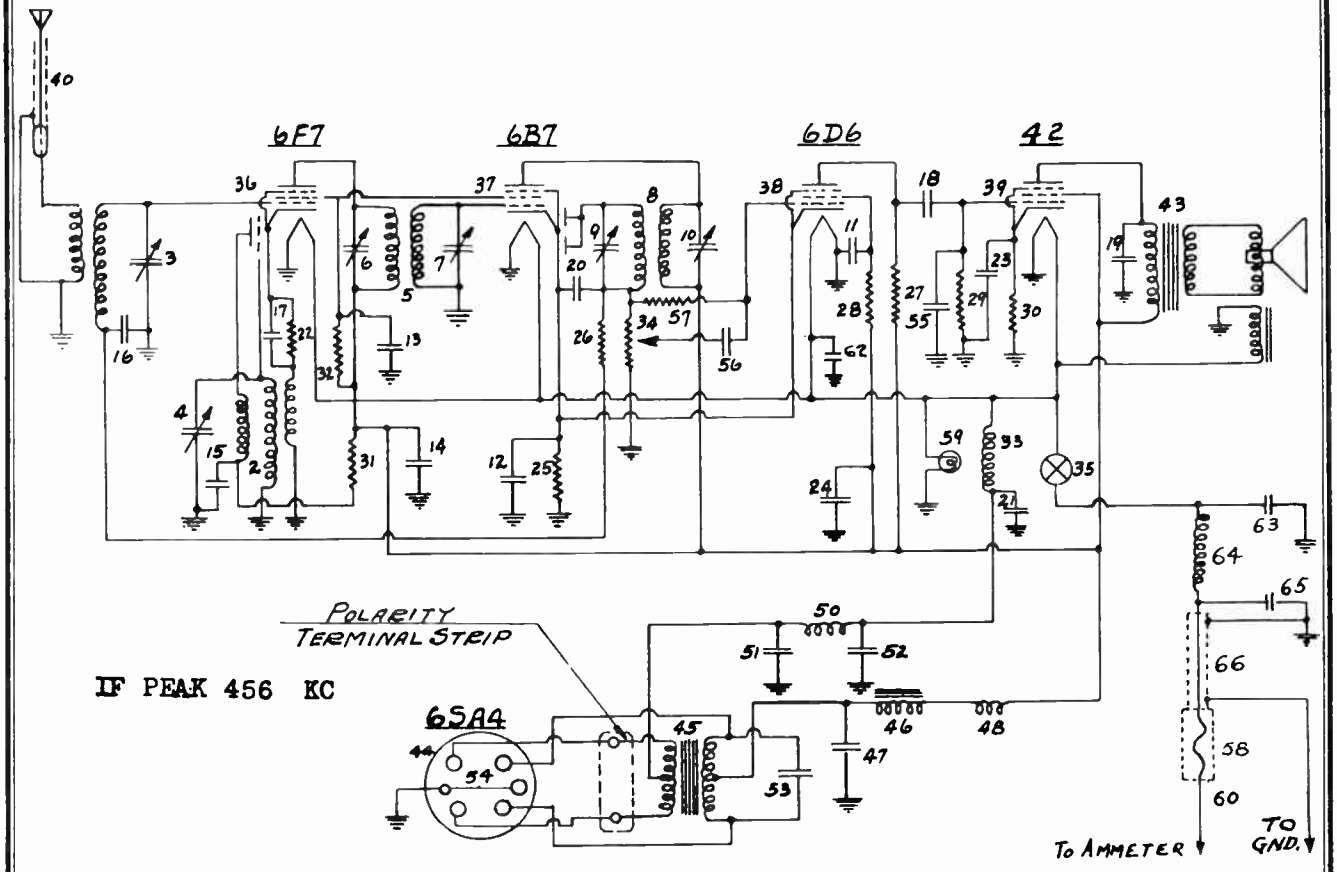
The signal enters at the antenna lead-in terminal through the bayonet socket and then goes to the antenna coil, part No. 1. There is optionally offered a wave trap to be used with this receiver when it is operated in the neighborhood of commercial code stations using frequencies in the region of 456. This wave trap prevents these code stations from riding on through and being amplified by the intermediate frequency amplifier. The signal is tuned by the rear section of the gang condenser, part No. 3, and then impressed on the pentode grid of the 6F7. The 6F7 triode section is equipped with a conventional oscillator circuit tuned by the front section of the gang condenser, part No. 4. The oscillator output is impressed on the cathode of the 6F7 through a pickup coil. The output therefore of the 6F7 pentode section is intermediate frequency which is impressed on the first I. F. transformer, part No. 5. This I. F. transformer is double tuned. The signal is then fed to the grid of the pentode section of the 6B7 I. F. amplifier which tube has a double tuned output I. F. transformer, part No. 8, in its plate circuit. This amplified output is impressed on the two diodes of the 6B7 in parallel and diode voltage is developed across level control, part No. 34. The DC component of this voltage is fed forward through resistor 57 to the grid of the 6D6 A. F. amplifier, but the audio frequency component is fed from the level control contact arm through coupling condenser 56 to the grid of the 6D6 A. F. amplifier. In this way a bias depending on the strength of the signal is impressed on the grid of the 6D6 A. F. amplifier while the actual audio frequency voltage is determined by the setting of the level control. The amplified audio frequency output of the 6D6 is fed through coupling condenser No. 18 to the grid of the 42 output tube and is then amplified and fed to the speaker part No. 43. Condenser No. 19 serves to keep the impedance of the output system more nearly constant.

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Eposc	Esup
6F7	Osc. Mod.	6.0	230	0	8	100	60	—
6B7	I.F. and Diode	6.0	230	0	3	100	—	—
6D6	A.F.	6.0	60	0	3	25	—	3
42	Output	6.0	220	0	16	230	—	—

All voltages are plus or minus 10% and measured to chassis with 500 volt 1000 ohm per volt voltmeter. Battery voltage 6 volts.

CROSLEY RADIO CORP.

MODEL 4A1
Schematic, Parts List



* Figures in 2nd last column refer to parts shown in wiring diagram of Model 4A1

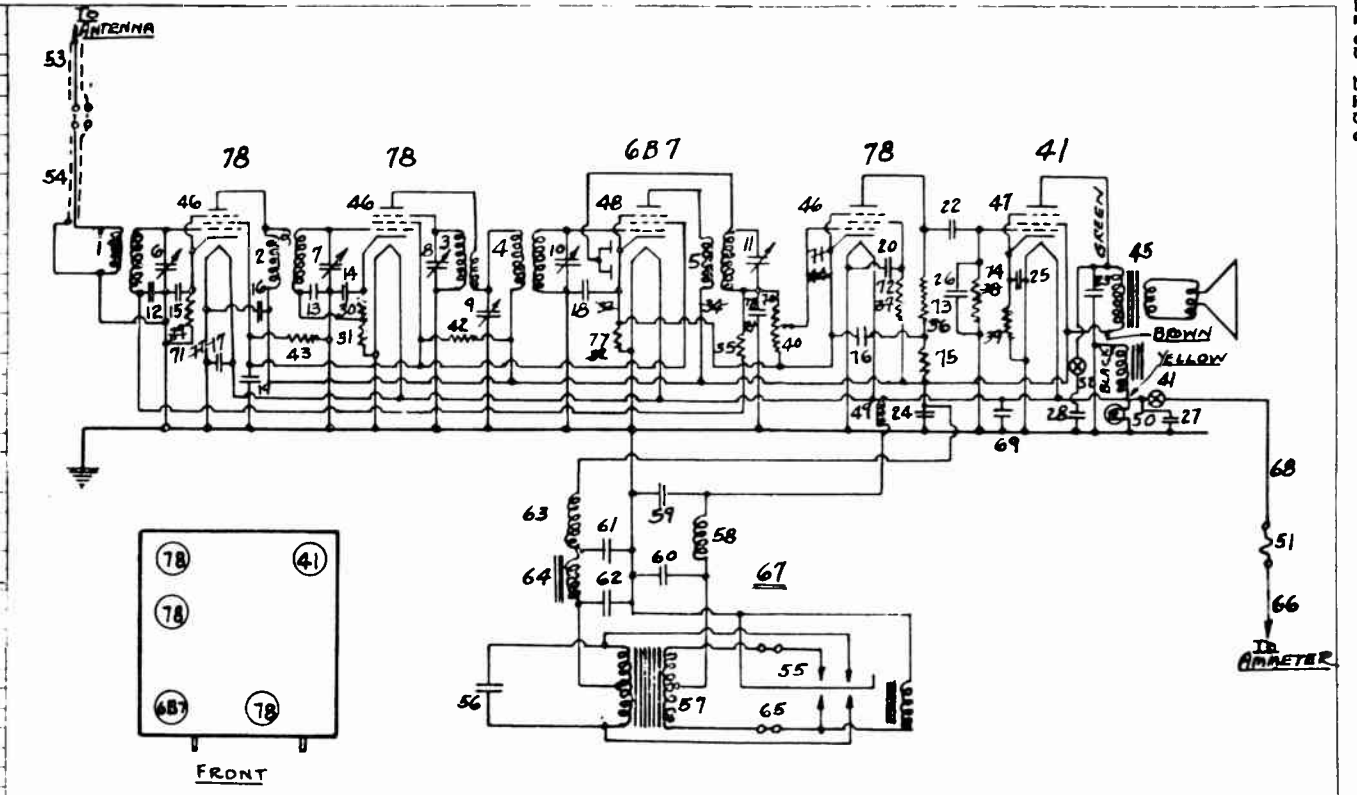
Qty.	Part No.	Description	* Item	List Each
1	G9-32000	Antenna Coil	1	.60
1	G8-32002	Osc. Coil		.45
1	W32728	Washer (Ant. Coil Shield Base)		.05
1	W30802	Coil Shield (Ant.)		.15
1	W30026	Retaining Ring (Ant.)		.05
1	W25200	Coil Socket (Osc.)		.05
1	W25025A	Coil Shield (Osc.)		.10
1	W26891	Insulating Washer (Osc.)		.05
1	W21541B	Retaining Ring (Osc.)		.05
1	L32698	Variable tuning Cond. Gang	3-4	5.50
1	G7-32004	1st I. F. Trans. Coil and Tuning Condensers	5-6-7	1.85
1	G8-32004	2nd I. F. Trans. Coil and Tuning Condensers	8-9-10	1.75
1	W32712B	Level Control and Power Switch	34-35	1.10
1	W32739A	Level Control Bracket		.10
1	G49-27975	6F7 Socket	36	.10
1	G48-27975	6B7 Socket	37	.10
1	G75-27975	6D6 Socket	38	.10
1	G25-27975	42 Socket	39	.10
1	G81-27975	6SA4 Socket	54	.10
1	LB32037	6SA4 Syncrotube	44	5.00
2	W27981A	Tube Shield Base		.05
2	W30004	Tube Shield (6B7 & 6F7)	36-37	.10
1	G1-32769	Power Transformer	45	2.75
1	G11-24628	"B" Filter Choke	46	1.10
1	G1-32755	R. F. "B" Choke	48	.15
1	G6-28067	R. F. "A" Choke	50	.30
1	G4-28067	"A" Choke	33	.35
1	B32783	Antenna Lead	40	.45
1	G1-25891	Antenna Wire		.90
1	G5-31701	"A" Cable Assem.	60	.25
1	G7-31701	"A" Lead Assem. & Choke Assem.	61	1.40
1	W32757	12 Amp. Fuse	58	.10
		BY-PASS & FILTER CONDENSERS		
1	W32711A	0.1-0.1-0.05-0.05 Mfd. 200 Volt	11-12 13-14	1.00
3	W32780A	0.05 Mfd. 400 Volt	15-18 56	.15
1	W32779A	0.02 Mfd. 200 Volt	16	.15

Qty.	Part No.	Description	* Item	List Each
2	W32781A	0.1 Mfd. 200 Volt	17-62	.15
1	W32782A	0.01 Mfd. 400 Volt	19	.15
3	W32741	.0005 Mfd. (Mica)	20-21 55	.15
2	W30366	0.5 Mfd. 160 Volt	51-52	.50
1	W32762	0.005 Mfd. 1000 Volt	53	.65
1	W30419A	8-8. Mfd. 25 Volt-250 Volt	23-24	1.80
1	W32759	8. Mfd. 300 Volt	47	1.50
		RESISTORS		
1	W21452	1100 Ohms	22	.15
1	W28589	350 Ohms	25	.10
2	21454	1 Megohm	26-57	.15
1	21875	100000 Ohms	27	.15
2	23785	500000 Ohms	28-29	.15
1	W25521	450 Ohms	30	.15
2	32331	55000 Ohms (½ Watt)	31-32	.15
		CASE		
1	L32730	Case		1.70
1	B32714A	Bottom Cover		.25
1	B32720B	Top Cover		.25
1	W32717A	Control Window		.10
1	B32718A	Control Window Cover		.30
1	W32724	Knob		.10
1	W32725A	Knob (Key)		.20
1	W32723A	Mounting Bracket (Front)		.10
1	C32742	Mounting Bracket (Rear or Bulkhaed)		.05
1	W32787A	3" Mounting Bolt		.05
				Doz. Ea.
1	W32788	7/16 Washer		.10 .05
1	W32789	7/16 x 14 Thr. Nut		.15 .05
5	W32734	5/16 x 24 Hex. Hd. Mtg. Bolt		.10 .05
5	W24235	5/16 Shakeproof Washer		.10 .05
1	W6849	5/16 Washer (Black Oxide)		.10 .05
4	W6133	5/16 x ¾ Washer		.15 .05
1	W12131	7/16 Std. Lockwasher		.15 .05
1	W33436	¼-20 x ¾ Rd. Hd. Screw		.15 .05
	W31625A	Distributor Suppressor		.40
	W33165	Spark Plug Suppressor		.40
	W29754B	.5 Mfd. Cond. (Eliminator)		.45
1	33-B	Speaker	43	4.00

MODEL 5A1
Schematic, Socket
Parts List

CROSLEY RADIO CORP.

1	G2-24995	ANTENNA COIL	
2	G7-25968	R.F. COIL	
3	G25-24996	OSCILLATOR COIL	
4	G1-25444	1ST I.F. COIL	
5	G3-25445	2ND I.F. COIL	
6	L-29783	ANT. TUNING COND.	
7		R.F. TUNING COND.	
8		OSC. TUNING COND.	
9	G2-25948	I.F. PRI. TUNING COND.	
10	W-25008-A	I.F. SEC. TUNING COND.	
11	G2-25948	DIODE TRANS. TUN. COND.	
12	W-27203	0.02 MFD.	200V
13	W-27203	0.02 MFD.	200V
14	W-27203	0.02 MFD	200V
15	W-27203	0.02 MFD.	200V
16	W-23615	0.05 MFD.	400V
17	W-24049-A	0.1 MFD	200V
18	W-24049-A	0.1 MFD.	200V
19	W-25438	0.1 MFD.	200V
20		0.1 MFD.	200V
21	~~[illegible]~~	~~0.0008 MFD.~~	~~200V~~
22	W-23142	0.02 MFD.	400V
23	W-23191-A	0.01 MFD.	400V
24	W-30419-A	8 MFD.	250V
25		8 MFD.	25V
26	W-20389	.00005	(MICA)
27	W-20389	.00005	(MICA)
28	W-23191-A	0.01 MFD.	400V
29	~~[illegible]~~	~~16 Ω~~	
30	W-30127	450 Ω	
31	W-27086	6400 Ω	
32	W-25937	275 Ω	
33	W-28357	75 Ω	
34	21454	1-MEG	
35	21454	1-MEG	
36	~~[illegible]~~	~~100,000 Ω~~	
37	~~[illegible]~~	~~500,000 Ω~~	
38	~~[illegible]~~	~~300,000 Ω~~	
39	W-23907	750 Ω	
40	W-30436	LEVEL CONTROL	
41		S.P.S.T. SWITCH	
42	W-26525D	15000 Ω	
43		25000 Ω	
44	~~W-22614~~	~~750 Ω~~	
45		353-3 SPEAKER	
46	539-28807	78 SOCKET	
47	528-28807	41 SOCKET	
48	548-28807	6B7 SOCKET	
49	54-28067	"A" CHOKE	
50	W-4099A	6V. DIAL LIGHT	
51	W-31103	10 AMP "A" FUSE	
52	W-26156-A	S.P.S.T. SWITCH	
53	D-31296-A	ANTENNA LEAD	
54	W-31702	ANTENNA LEAD CONNECTOR	
55	W-29160	VIBRATOR ASSEM.	
56	W-31632	0.01 MFD. 1000 V.	
57	G1-31618	POWER TRANS.	
58	2-28067	"A" CHOKE	
59	W-30366	0.5 MFD.	160 V.
60	W-30368	0.5 MFD.	160 V.
61	W-23142	0.02 MFD.	400 V.
62	W-31631-B	12 MFD.	300 V.



181.5 Kc I.F

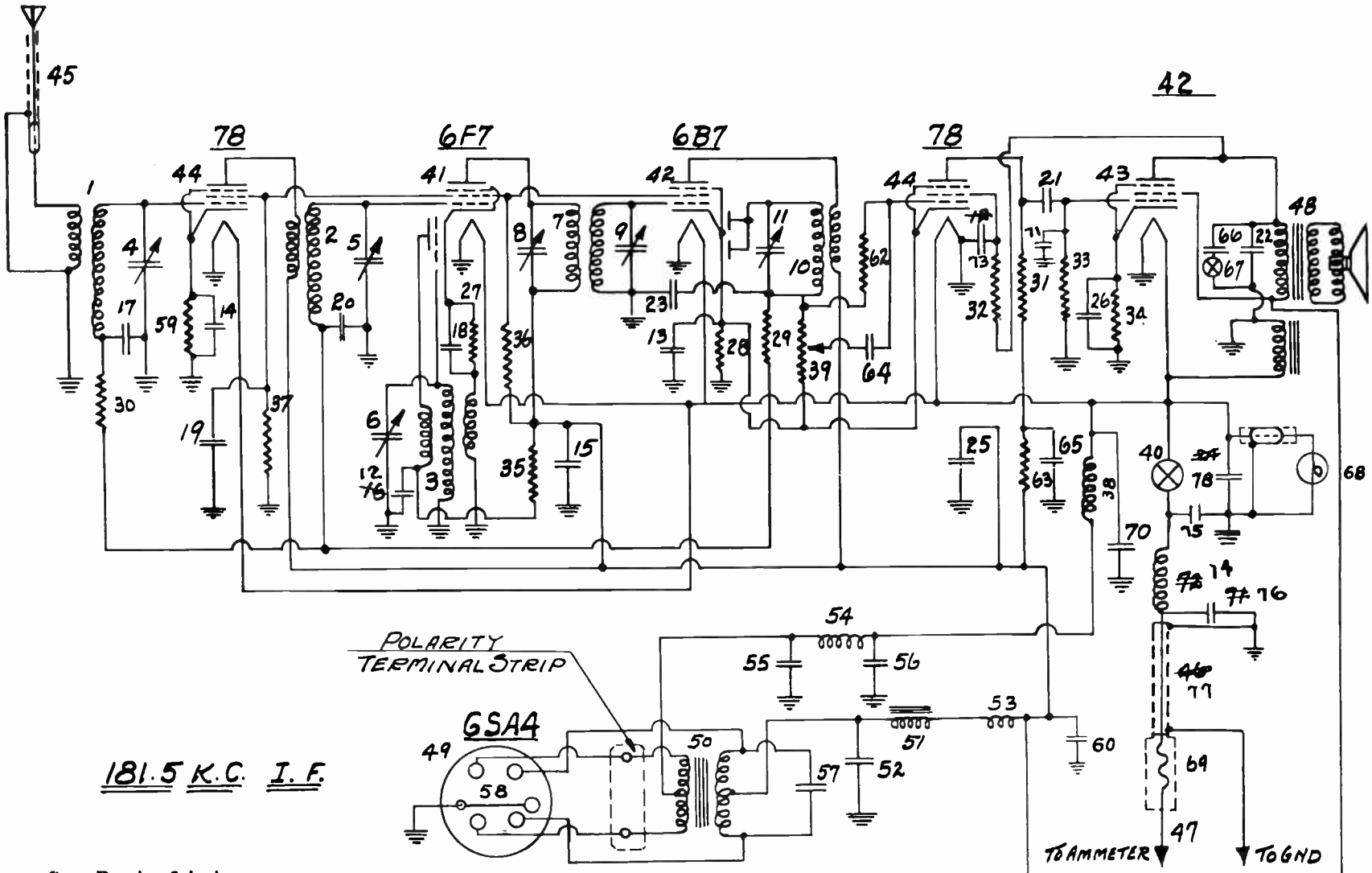
63	G1-24234	R.F. CHOKE ASSEM.	
64	G10-24628	FILTER CHOKE ASSEM.	
65	G11-26719	POLARITY REVERSING RELAY	
66	G1-31701	"B" CABLE ASSEM.	
67	L-31629	413 SYNCRONODE	
68	G2-31701	"A" CABLE ASSEM	
69	W-20389	.0005 MFD (MICA)	
70	~~W-20367~~	~~.0005 MFD (MICA)~~	~~200V~~
71	W-21452	1100 Ω	
72	21454	1 MEGOHM	
73	23403	150,000 Ω	
74	23785	500,000 Ω	
75	R1237-A	60,000 Ω	
76	W-23615	.05 MFD 400 VOLTS	
77	W-28889	250 Ω	
78	W-32607	.0005 MFD 200V.	

RECORD OF CHANGES

			Change No.
A	ITEM 69 ADDED. ITEM 62 CHGD TO "A"	1-2-34	
B	ITEM 21 REPLACED BY ITEM 78.	2-7-34 COF	3559
C	ITEMS 42 & 43 CHANGED TO "A"	2-24-34	3563
D	ITEMS 29-30-37-38-24 DELETED	3-7-34	3570
E	ITEMS 21-72-73-74-75-76 & 77 ADDED	4-11-34	3576
	ITEMS 42 & 43 TO "B"		
	ITEM 70 REPLACED WITH ITEM 78		3585

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

5A1		WIRING DIAGRAM	
APPROVED C G FELIX	DATE 1-24-33	DWG. BY SHARPER	DWG. NO. B-31760



See Parts List on next page for values.

MODEL 5A3
Parts List

CROSLEY RADIO CORP.

ITEM	PART NUMBER	DESCRIPTION
1	G19-32000	Antenna Coil
2	G11-32001	R.F. Coil
3	G14-32002	Osc. Coil
4	G2-33002	Ant. Tuning Cond.
5		R.F. Tuning Cond. Gang
6		Osc. Tuning Cond.
7	G6-32003	1st I.F. Coil
8		I.F. Primary Tuning Cond.
9		I.F. Secondary Tuning Cond.
10	G7-32003	2nd I.F. Coil
11		I.F. Secondary Tuning Cond.
12	W32711A	0.05 mf. 400 volts
13		0.1 mf. 200 volts
14		0.1 mf. " "
15		0.05 mf. 400 volts
16	Deleted	
17	W32779B	0.02 mf. 200 volts
18	W32781B	0.1 mf. " "
19	W32780B	0.05 mf. 400 "
20	W32779B	0.02 mf. 200 "
21	W32780B	0.05 mf. 400 "
22	W23635	0.006 mf. " "
23	W32741A	0.0005 mf. mica
24	Deleted	
25	W32802	8.0 mf. 300 volts
26		8.0 mf. 20 "
27	W21452	1100 ohms
28	W28589	350 ohms
29	21454	1 megohm .3 watt
30	21875	100,000 ohms
31	23403	150,000 "
32	21454	1 megohm
33	23875	500,000 ohms
34	W25521	450 "
35	32331	55,000 " .5 watt
36	W26525B	15,000 "
37		25,000 "
38	G4-28067	R.F. "A" choke
39	W30436A	Level control
40		Switch
41	G49-27975	6-F-7 socket
42	G48-27975	6-B-7 "
43	G25-27975	42 "
44	G39-27975	78 "
45	B32783	Antenna cable
46	Deleted	
47	G5-31701	"A" cable
48		33B Speaker
49	LB-32037	6SA4 Syncrotube
50	G132769	Power transformer
51	G11-24628	"B" filter choke
52	W32759	8.0 mf. 300 volts
53	G1-32755	R.F. "B" choke
54	G6-28067	R.F. "A" choke
55	W30366	0.5 mf. 160 volts
56	"	" " " "
57	W32762	0.005 mf. 1000 volts
58	G81-27975	6SA4 socket
59	W21452	1100 ohms
60	W30741	0.00025 mf. mica
61	-----	
62	W21454	1 megohm
63	21237A	60,000 ohms .25 watt
64	W32780B	0.05 mf. 400 volts
65	"	" " " "
66	W32782B	0.01 mf. " "
67	W26156A	S.P.S.T. switch
68		Dial light
69	W32757	12-amp. fuse
70	W32741A	0.0005 mf. mica
71	"	" " "
72	Deleted	
73	W24784	0.25 mf. 200 volts
74	G8-31701	"A" choke
75		0.00025 mf.
76		" "
77		"A" lead
78	W30741	0.00025 mf. mica

DETROLA RADIO CORP.

MODEL 6-A
Schematic
Parts Details

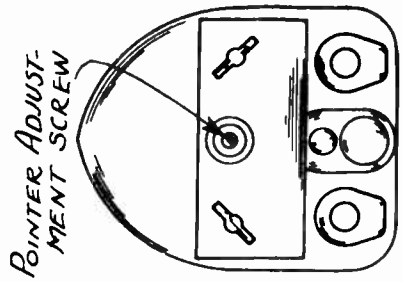


Figure 4

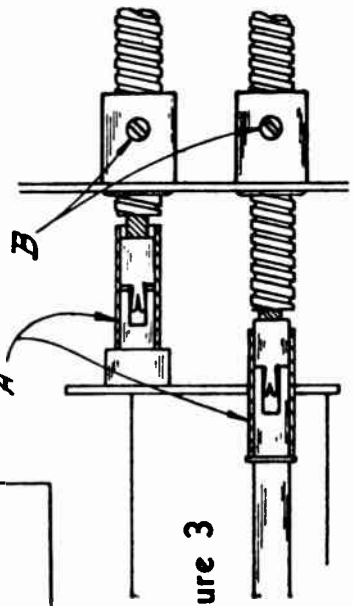
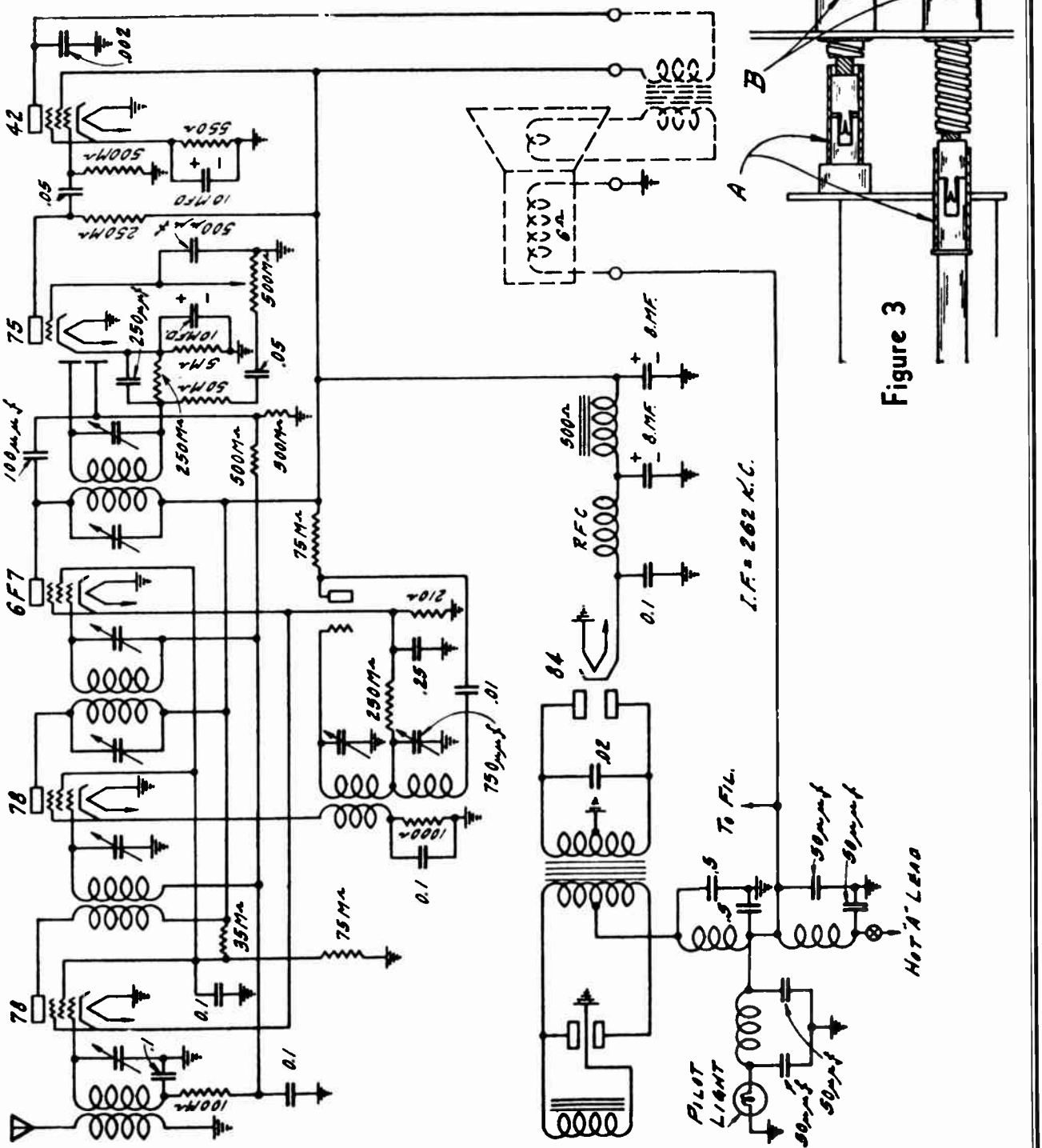


Figure 3



MODEL 6-A
Voltage
Alignment Data
Service Notes

DETROLA RADIO CORP.

Service Data

Type and Number of Tubes Used:
2 Type 78 1 Type 6f7 1 Type 75
1 Type 42 1 Type 84

Total Battery Current	6.5 Amps.
Undistorted Output	3 Watts
Speaker Field Current	1 Amp.
Rectifier Output Voltage	250
Total Plate Current	50 M.A.

Plate Supply Unit

This receiver uses a vibrator type inverter and tube rectifier to provide a source of direct current voltage as plate and grid supply for all the tubes. This unit is very accurately adjusted at the factory, and service adjustment should not be attempted.

Low Volume

Low volume may be caused by weak or defective tubes (replace with set of tubes known to be in good condition), or antenna grounded or shielded due to wire netting not cut loose from the metal construction of the top.

Low Voltage

Low voltage may be caused by 84 rectifier, shorted filter or bypass condenser, defective power transformer or vibrator unit.

Excessive Hum

Excessive hum may be caused by defective 84 tube, or defective vibrator unit. In cases where the vibrator unit proves to be defective no adjustment should be attempted, the unit should be replaced with a new or replacement unit.

Continuity Test

By referring to the schematic diagrams in figures 5 and 6 a complete continuity test for open and short circuits can be made for all parts of the receiver. A suitable continuity test can be made by using 0 to 50 volt voltmeter and a 45 volt B battery. More accurate readings can be obtained by using a calibrated ohm meter.

R. F. and I. F. Adjustments

The trimmers on the tuning condenser and the intermediate transformers are very accurately adjusted with a crystal control oscillator before the receiver leaves the factory and should need little or no attention; however, to check the adjustments the following procedure should be followed.

I. F. Adjustments

In order to make the I. F. adjustments it is necessary to remove the top and bottom cover of the receiver case and proceed as follows, adjust test oscillator at 262 kilocycles, place the receiver in operation and connect the oscillator output to the grid of the first detector tube and connect the output meter across the voice coil of the loud speaker. Then connect the antenna lead to the ground of the chassis and adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output coupling until a small deflection is obtained at the output meter. Unless this is done the action of the A. V. C. will make it impossible to obtain a correct adjustment. Adjust trimmers for maximum reading on output meter.

R. F. Adjustments

The trimmers on the tuning condenser should be adjusted at 1400 kilocycles, and the padder condenser adjusted at 600 kilocycles respectively. Proceed as follows, adjust the test oscillator at 1400 kilocycles and couple to the antenna off the receiver. Set tuning condenser at minimum capacity and adjust pointer to 1550 kilocycles, reset tuning control to 1400 kilocycles. Place oscillator and receiver in operation and adjust oscillator output so that a weak signal is obtained on the output meter, adjust trimmers for maximum reading. To adjust 600 kilocycle position readjust oscillator and tuning control to 600 kilocycles and adjust the 750 M. M. F. padder condenser (mounted on the chassis near the loud speaker) for maximum reading.

TUBE SOCKET VOLTAGES

6.3 Volt Battery

Tube No.	Cathode to Ground	Cathode to Screen Volts	Cathode to Plate Volts	Plate Current M. A.
78 R. F.	*3.5	100	250	6.0
78 First Detector	*5.	100	250	4.0
6F7 Pentode I. F.	*3.5	100	250	6.0
6F7 Triode OSC.		00	100	2.5
75 Second Detector A. V. C. First Audio	*1.7	00	**150	.3
42 Second Audio	*17.5	250	245	27.0
84 Rectifier				25 M.A. Per Plate

All the above voltage readings were taken by a high resistance volt meter (1000 ohms per volt) using test leads, all tubes in sockets no signal. (**750 volt scale) (*250 volt scale).

DETROLA RADIO CORP.

MODEL 6-A
Assembly Diagram

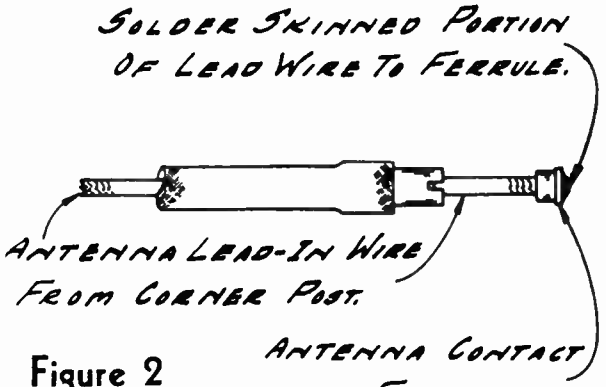


Figure 2

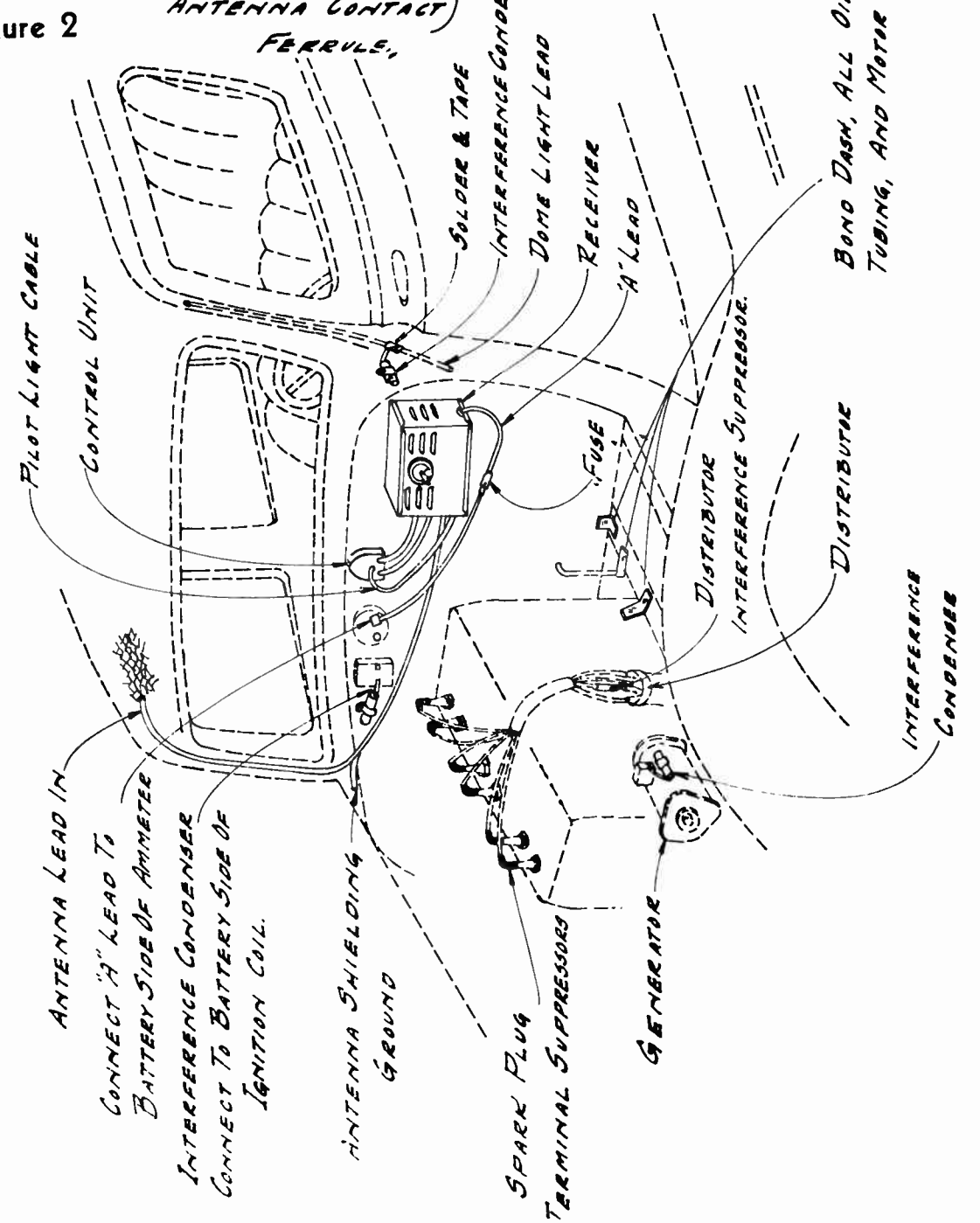
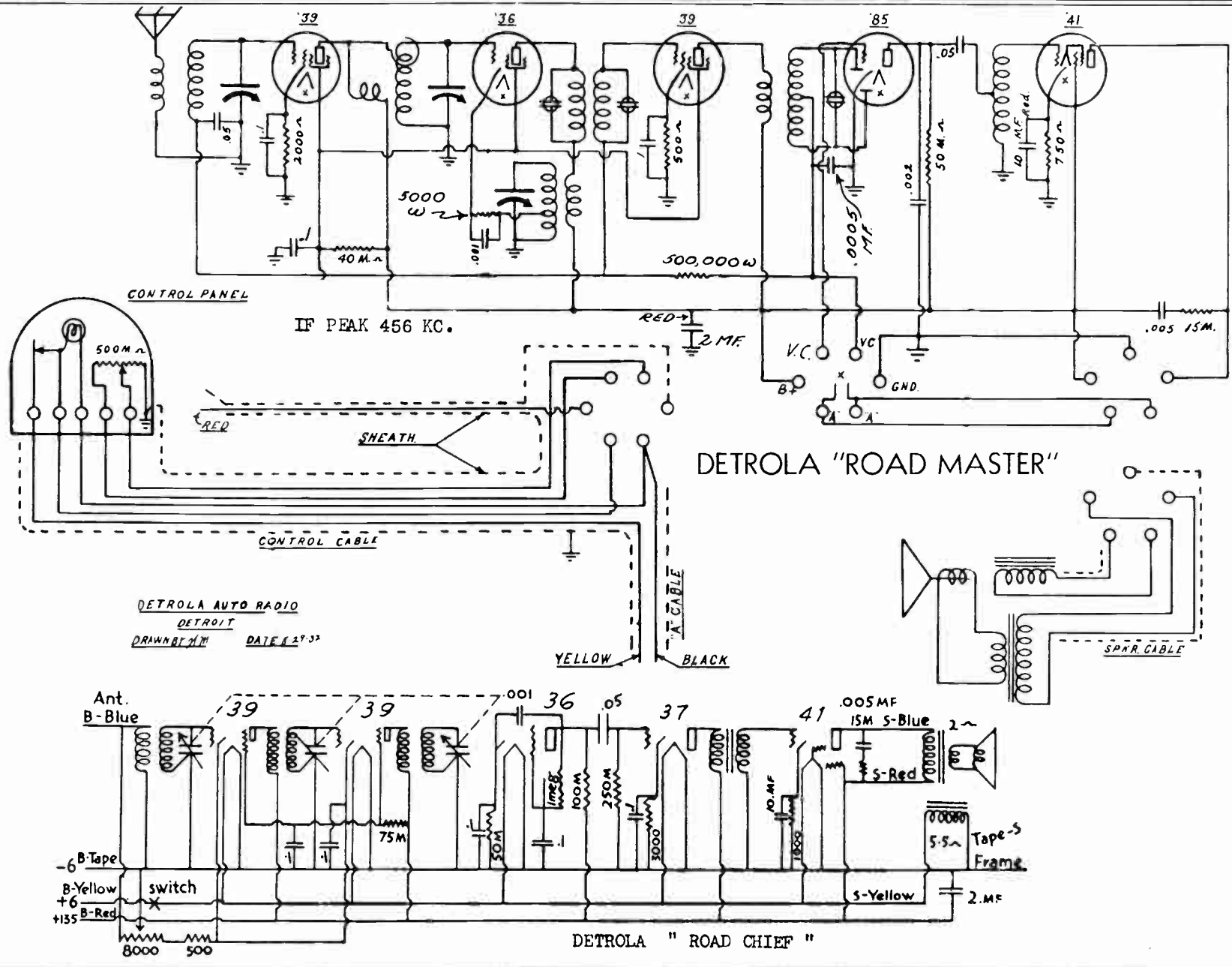


Figure No. 1

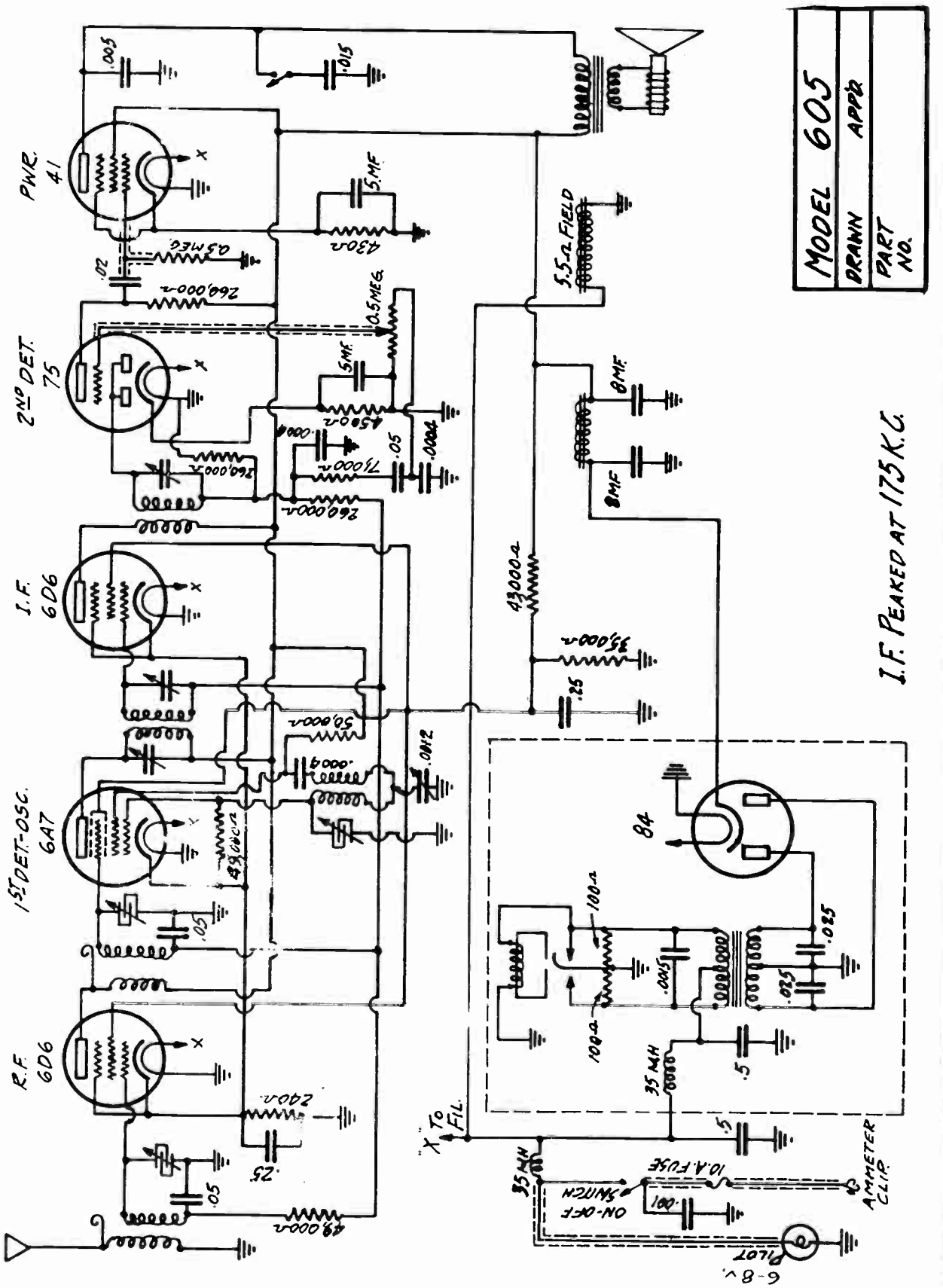
MODEL Roadmaster
MODEL Roadchief
Schematics

DETROLA RADIO CORP.



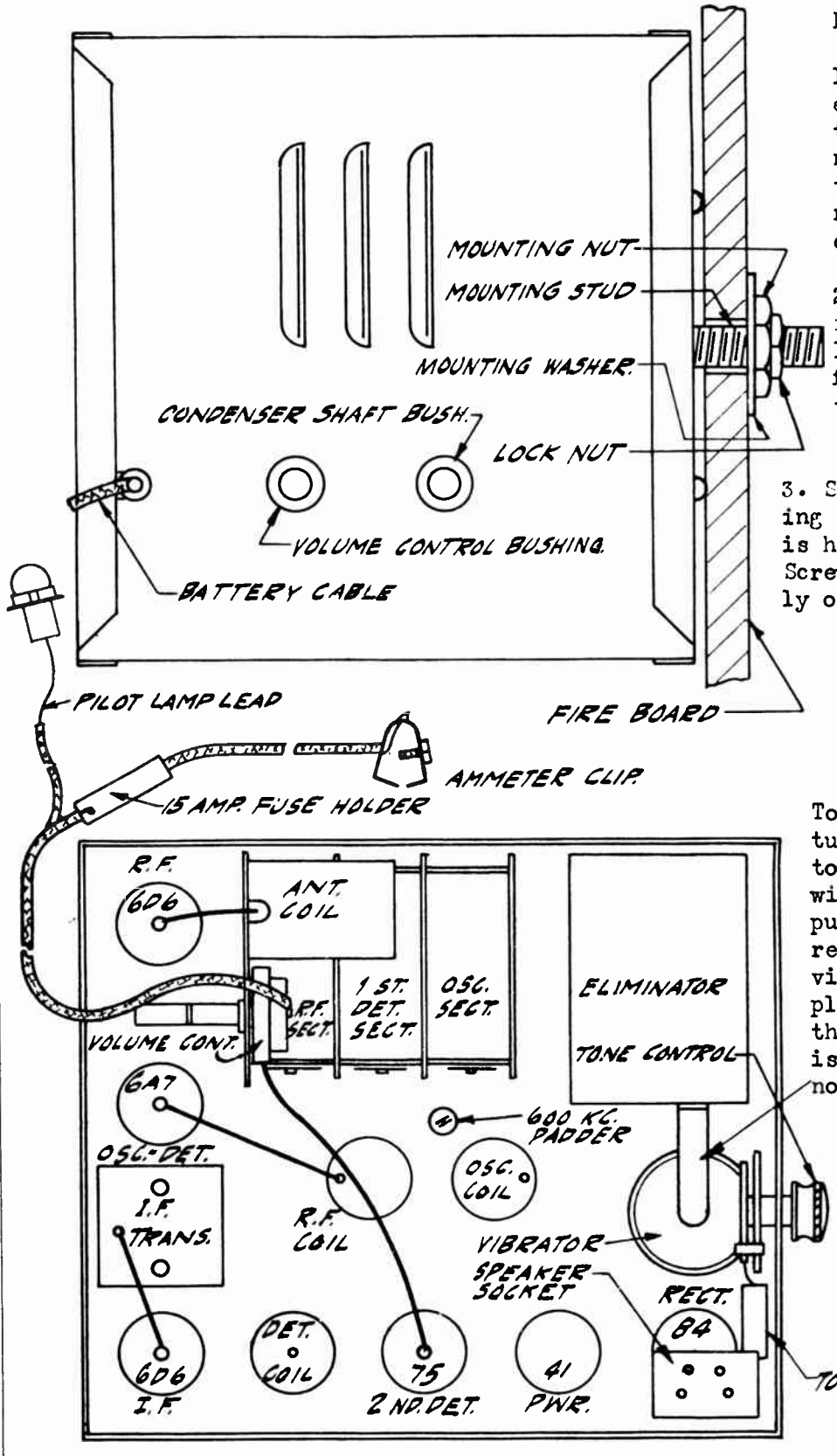
DEWALD RADIO

MODEL 605
Schematic



MODEL 605
Socket Layout
Mounting Data

DEWALD RADIO



MOUNTING DATA

1. Screw unslotted end of mounting bolt tightly (up to the nicks) into large threaded hole in the rear of receiver case.

2. Determine location of set and drill 1-2 inch hole in the fire-board to pass the mounting bolt.

3. Screw on the mounting nut so that the set is held firmly in place. Screw on lock nut firmly over mounting nut.

To replace vibrator, turn tension spring to the left 90°, then with a slight upward pull, vibrator can be removed. After the vibrator has been replaced, make certain that tension spring is returned to its normal position.

FIG. 1

DEWALD RADIO

MODEL 605
Alignment
Service Data

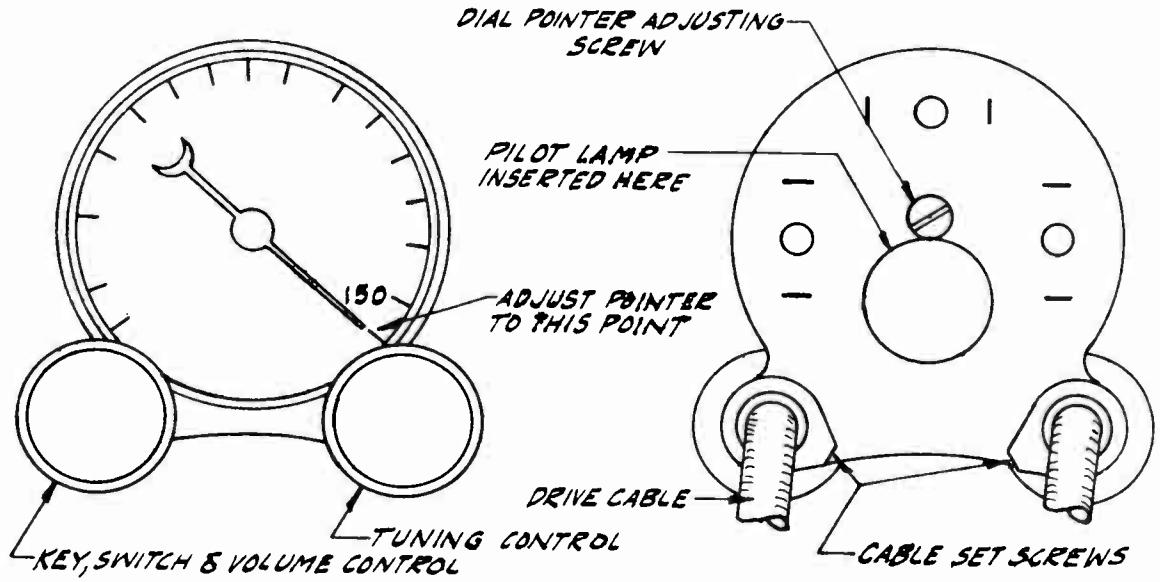


FIG. 2
REMOTE CONTROL UNIT

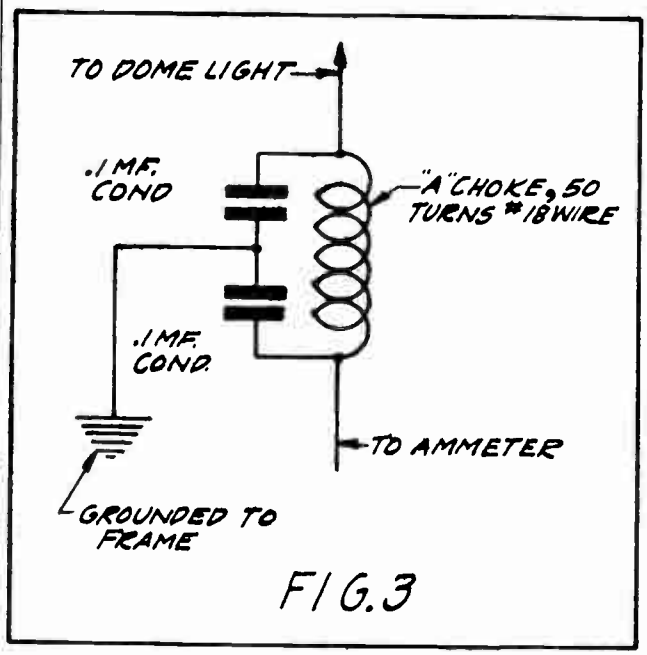


FIG. 3

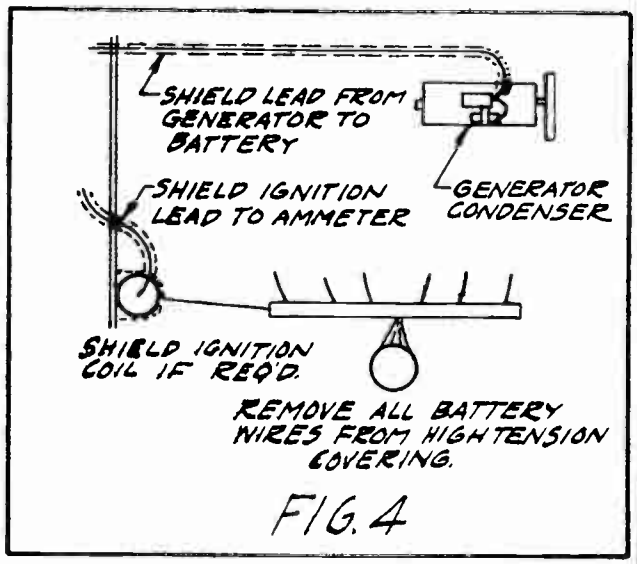


FIG. 4

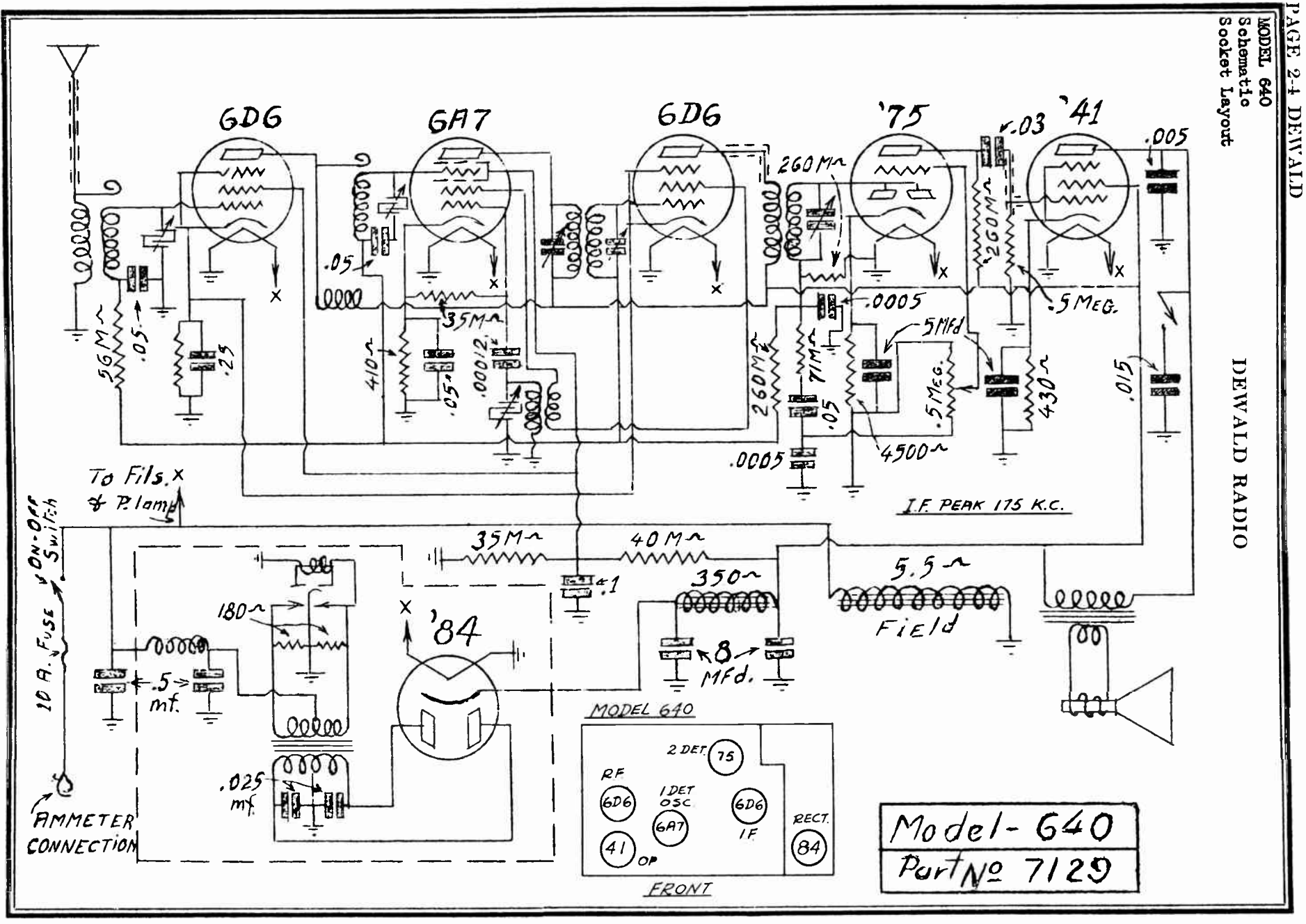
SERVICE NOTES

INT. FREQ. ALIGNMENT — Intermediate frequency peaked at 175 K.C. Connect test oscillator to grid of 6A7 and ground. (Ground stator of oscillator condenser during this operation)

R.F. ALIGNMENT — Connect test oscillator to antenna and ground. Set dial to 1500 K.C. and align trimmer condensers on variable condensers for maximum signal. For low frequency adjustment set dial at 600 K.C. and rock padder to match variable condenser setting of R.F. and 1st Detector.

MODEL 640
Schematic
Socket Layout

DEWALD RADIO



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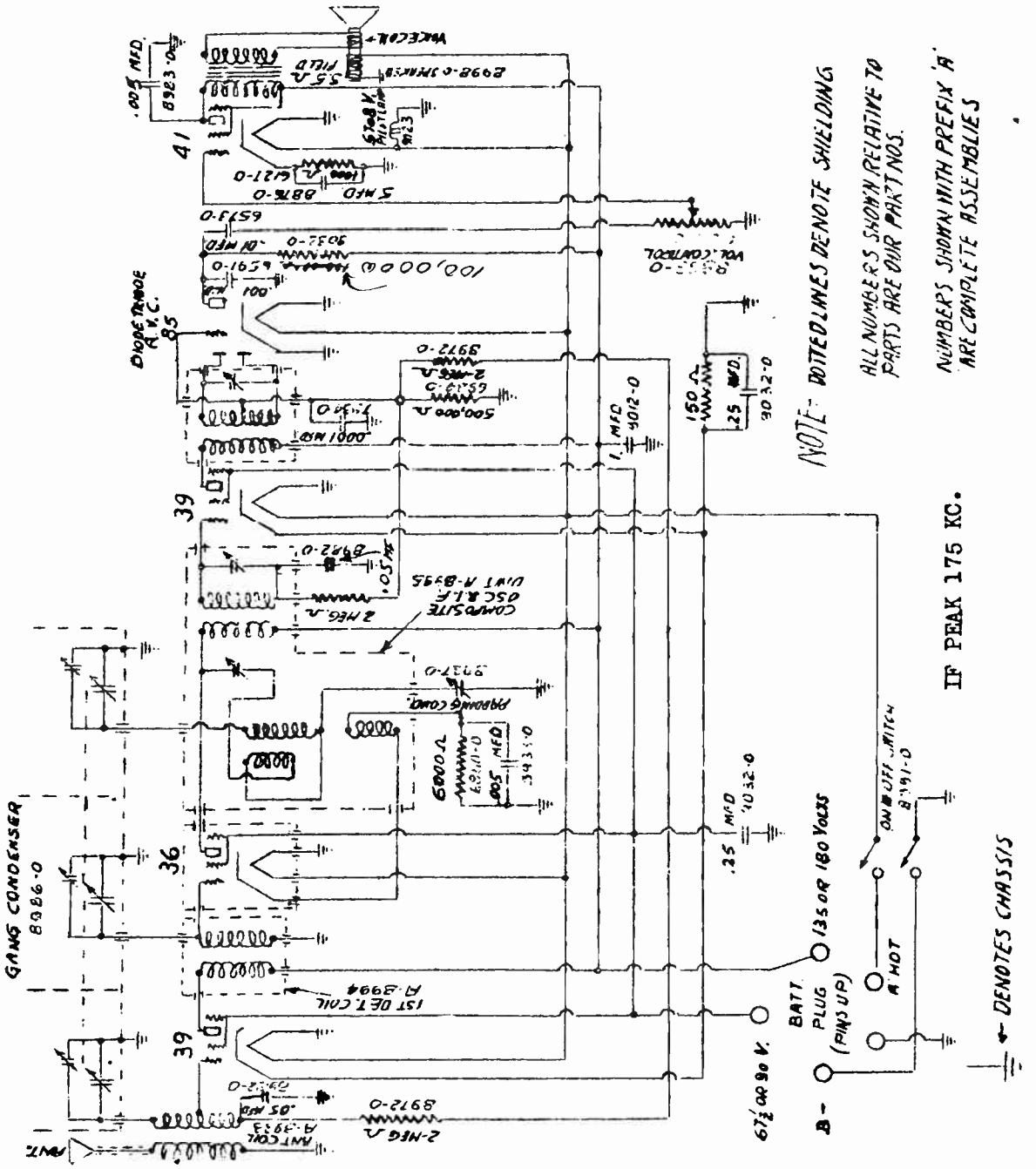
MODEL 261,521
Schematic

WIRING DIAGRAM

PART # 20040



The intermediate frequency transformers are tuned to 175 kilocyles. An oscillator which is accurately set to this frequency and which has an attenuator in its output to control the output can be used. It is of course best to start by retuning the intermediate stage before touching other adjustments. The output of the intermediate frequency generator is connected one side to the grid of the 1st detector (236 tube) after removing the grid cap from this tube. The ground of the oscillator is connected to the chassis base. With the frequency set at 175 K.C.(accurately) the tuning adjustments of the 1st and 2nd I.F. transformers are adjusted to peak resonance. It is very important to use a long bakelite screw-driver for these adjustments. In adjusting, the successive tuning condensers are gone-over several times readjusting the output of the oscillator or the receiver's volume control as required. With the I.F. transformers properly tuned and scaled, the R.F. and oscillator circuits may next be adjusted.

The grid cap of the 1st detector is replaced and a generator or oscillator having frequencies of 1400 and 600 kilocyles is set up and connected to the aerial and ground of the receiver.

Do not attempt to align condenser without a shield. It is extremely important that a shield corresponding to the can be placed around the antenna coil and gang condenser in making adjustments on the r.f. and oscillator circuits, otherwise due to the change in these circuits caused by this shielding a very inaccurate adjustment will be obtained. This shielding may consist of a piece of steel bent to the shape of the corner of the can fitting around the edge of the base from the speaker to the rear right hand corner and extending as high as the speaker with holes in it corresponding to the condenser trimmer locations or a regular can and cover with such holes provided. This shield or can and cover must be in secure and in proper location and not disturbed during these adjustments From this it is easily seen why if an attempt is made to check the alignment out of the can on this receiver a different or changed adjustment will be had as against the factory setting, which is made with the shielding in place.

With the above shielding in place and tubes which are to be used in chassis, the procedure of circuit alignment is as follows:

Set the generator frequency at 1400 K.C.Set the tuning dial to 15 on the scale, open trimmers slightly on antenna(top) and 1st detector(middle)sections of gang condenser. Then without disturbing dial setting adjust oscillator (bottom)trimmer on gang to greatest signal.After this has been properly set adjust one at a time the antenna and 1st detector trimmers for maximum signals.If these operations are properly set as above,the receiver circuits are correct for the high frequency adjustment. Next change the generator frequency to 600 kilocycles and turn the tuning dial of the receiver to resonate with this signal.. This will come in around 82 on the dial. When the 600 kilocycle point is located on the dial next adjust the oscillator low frequency padding condenser, which is at the bottom rear edge of chassis base in right corner. The screw on this condenser is adjusted in and out as the receiver dial is slowly moved across the 600 K.C. resonant point until greatest signal strength is obtained. The combination of the best padding condenser setting with the dial setting giving the greatest signal output is the correct padding condenser adjustment. No change in the gang condenser trimmers adjustment should be made during the 600 K.C. adjustment.

DIAL LIGHT. If the dial light burns out be sure and replace with one of same type 6.3 volts 1000 hrs.

In the first models of the automobile radio the B- and hot "A" leads were connected as shown in diagram "A". In the present model these leads are as shown in diagram "B". All other connections are identical, as shown on the schematic drawing. Connecting the black lead in the cable, designated as B- in the instruction sheet, to the hot 6 volt post of the eliminator will supply the hot 6 volts and provide an "off and on" switch for the B eliminator as well as the receiver itself In this way no other connection between the hot 6 volt lead of the eliminator and battery should be made and no switch for the hot lead to the eliminator is necessary; the set switch controlling both the B eliminator and receiver.

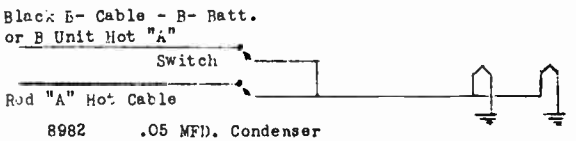
When using B batteries, the black lead should be connected to the B- of the batteries but under no circumstance should a separate lead from the B- terminal of the batteries be run to the chassis of the car or the shielded cable. In other words do not ground the B- terminal of the B batteries.

The only difference in the tube equipment between the early and present models is the output tube. The first model utilized a #41 output tube and the present model a #89 tube. Complete complement of tubes is:

One (1) Type 36	One (1) Type 85
Two (2) Type 39	One (1) Type 89

DIAGRAM "A"

DIAGRAM "B"



8982	.05 MFD. Condenser
8933	.005 MFD. 400 volt condenser
8927	Padding condenser
8961	.05 MFD. 400 volt condenser
7934	.0001 MFD. moulded condenser
6591	.0001 MFD. condenser 85 plate bypass
7860	.01 MFD. 400 volt coupling condenser
8876	5 MFD. dry electrolytic cathode bypass
9032	.25 MFD. 200 volt cathode 7 screen bypass
9012	1 MFD. condenser
8983	.003 MFD. plate bypass condenser
8972	2 megohm resistor
6880	6000 ohm resistor
9033	100,000 ohm 85 tube plate resistor
8065	1,000 ohm 41 tube cathode resistor
6924	500,000 ohm resistor
9018	150 ohm cathode resistor 1/3 watt

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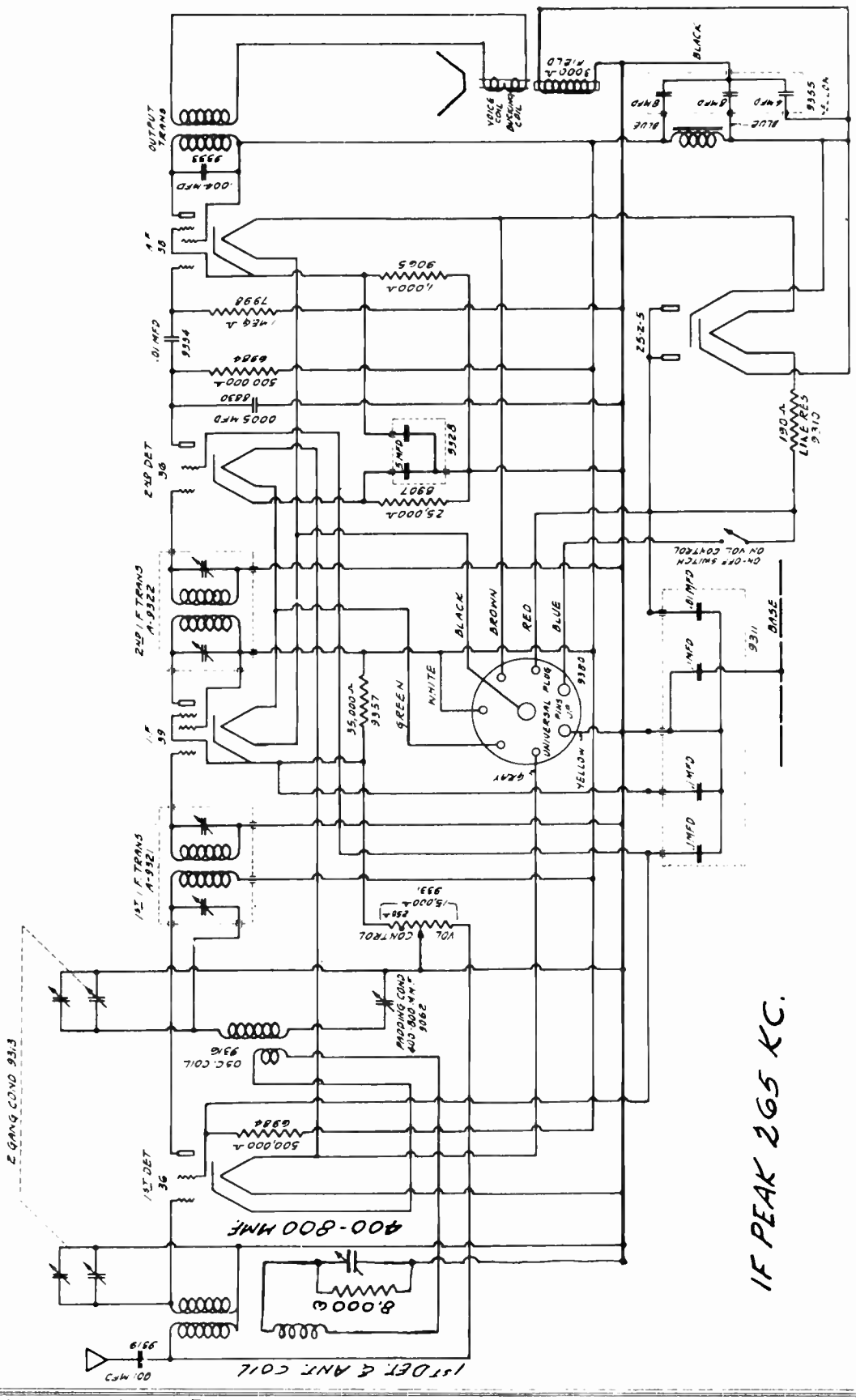
MODEL 550
Schematic



ELECTRO DYNAMIC SPEAKER: The speaker has a DC field resistance of 3000 ohms.

FIVE TUBE AC-DC SUPERHETERODYNE
(110 V. AC-DC, 6 V. Storage Batteries & 32 V. DC)

VOLTAGE TABLE: Never check voltages until all tubes are fully warmed up to proper operating condition The voltage table #1 is taken at 115 volts (AC) line with the volume control in the full on position. It must be remembered that the voltage readings vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10% plus or minus is permissible. THE VOLTAGES WILL BE APPROXIMATELY AS GIVEN FOR EITHER DC OR AC OPERATION.

TUBE VOLTAGES Table #1

Type of Tube	Position of Tube	Filament Volts	Plate Volts	Screen Volts	C Volts
36	Composite Oscillator & Modulator	5.5	108	21*	2.5
39	Intermediate Frequency	5.6	108	108	2.5
36	Detector	5.7	27*	21*	2.5
38	Output	5.8	108	108	1.5*
25z5	Rectifier	29.0	52.5 MA		

The voltage table #2 is for 6 volt battery operation with a B eliminator which is especially designed for the model #561 receiver. The voltages as given will be correct for 32 volt DC operation in conjunction with a B eliminator of the recommended factory type. It will be found that on certain types of eliminators which do not have sufficient output or a low 6 volt battery, the readings will be lower than that given in the voltage table.

TUBE VOLTAGES Table #2

Type of Tube	Position of Tube	Filament Volts	Plate Volts	Screen Volts	C Volts
36	Composite Oscillator & Modulator	5.8	112	25*	2.5
39	Intermediate Frequency	5.8	112	112	2.9
36	Detector	5.8	28*	25*	2.0
38	Output	5.8	108	112	1.5*
25z5	Rectifier	52.5 MA			

* These readings for both Table #1 and #2 are only comparative and are not true voltages applied. The voltmeter, when readings are taken at these points, is in series with a very high resistance.

IMAGE SUPPRESSION: Occasionally in some locations interference in the form of whistles or stations which are tuned in on dial settings other than the station's frequency may be encountered. This is a rare occurrence and is called image interference caused by two signals whose frequencies differ by twice the intermediate frequency. This should not be confused with heterodyne whistles which are caused by two stations being received whose frequencies are the same nor by local stations whose frequencies are close to some out-of-town stations frequency which might result in reception from both stations. To overcome this possibility of image interference an image suppression circuit is incorporated in the receiver. The image adjusting condenser is mounted on the back of the chassis below the first IF transformer shield and is accessible through the hole in the chassis. If a whistle or interfering station is received on a frequency other than its fundamental, tune the receiver to this interference and adjust the image suppression condenser until the interference disappears or until the interference is at the minimum point. UNLESS THERE IS AN ACTUAL IMAGE INTERFERENCE DO NOT ATTEMPT TO ADJUST THE IMAGE SUPPRESSION CIRCUIT.

INTERMEDIATE FREQUENCY ALIGNMENT: Only when an intermediate transformer has become defective, due to an open or burned out winding, should it be necessary to readjust the intermediate stages. Should this occur it is necessary that an oscillator be used with some type of output measuring device so as to correctly tune the transformers. To align the intermediate transformers connect the high side of the oscillator output to the control grid of the 36 oscillator modulator tube leaving the grid cap disconnected from the tube. The ground side of the test oscillator should be connected to the gang condenser frame and MUST NOT OTHERWISE BE GROUNDED. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. BE SURE THAT OUTPUT OF THE OSCILLATOR IS NOT SO HIGH AS TO OVERLOAD THE DETECTOR. IF DURING THE ALIGNMENT THE DETECTOR OVERLOADS REDUCE THE OUTPUT OF THE OSCILLATOR. Align the first intermediate transformer by turning the intermediate frequency trimmer screw up and down until maximum reading is obtained on the output motor. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate transformer. After both intermediate transformers are adjusted the alignment of the intermediate stage is complete and the trimmer should not be further disturbed, and the grid cap should be connected to the grid of the 36 tube.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if an antenna or oscillator coil requires replacement it will be necessary to realign the variable condenser. The front section of the variable condenser (looking at the front of the receiver) is the oscillator section, the other section tunes the antenna stage. Tune the receiver to 1720 kilocycles on the dial and set the oscillator at this frequency. BE SURE THAT OUTPUT OF THE OSCILLATOR IS NOT SO HIGH AS TO OVERLOAD THE DETECTOR. IF DURING THE ALIGNMENT THE DETECTOR OVERLOADS REDUCE THE OUTPUT OF THE OSCILLATOR. Next adjust the trimmer screws of the oscillator and antenna sections which are mounted on top of the variable condensers so as to obtain maximum output reading. It will be found that the oscillator section trimmer condenser will in most cases have to be adjusted to minimum capacity and in some instances it may be necessary to remove the trimmer screw entirely. After the trimmers have been correctly adjusted, at this frequency, tune the receiver to 600 kilocycles and adjust the oscillator to 600 K.C. Next, adjust the oscillator padding condenser (which is located directly below the variable condenser and accessible through the hole in the front of the chassis) to obtain maximum reading on the output meter. If the above is correctly followed the receiver will now track correctly over the entire band from 1720 KC to 550 KC. It is always advisable to align the receiver, whenever possible, with the tubes that are to be used in the set.

32 VOLT FARM LIGHTING SYSTEMS! When the current supply is DC, the 32 volt mains plug must be inserted correctly into the 32 volt DC mains receptacle, otherwise the set will not operate because of reversed polarity. If, after inserting the mains plug into the receptacle, the receiver does not operate for approximately one minute or one and a half minutes, remove the mains plug and turn it half way around and insert it into the receptacle. When operating the receiver on DC it will be found that in most instances the noise interference is greater than when the receiver is used on AC current. DC appliances such as motors, fans, etc., as a general rule cause more interference than similar AC equipment. Unfortunately this interference can only be eliminated at the source of the interference. When operating the receiver on 32 volt DC and using a B eliminator, be sure to keep the set aerial wire as far away from the DC line as possible, to avoid noise pick up from the 32 volt DC line. By connecting the antenna wire to an outside aerial in the event the noise interference is excessive, the interference can generally be minimized, as the increased volume obtained with the longer aerial permits lower minimum volume control setting and a consequent apparent reduction in noise interference. It is not recommended that the 6 volt cable and 6 volt B eliminator be used on the 32 volt system by tapping in at 6 volt as the current consumption will be too large, nor is it recommended that B batteries be used as the life of the battery will be limited. To reduce the drain on the batteries if they are used, it is recommended that only 90 volts of battery be connected to the receiver.

PARTS PRICE LIST

FOR THE

AC-DC FIVE TUBE SUPERHETERODYNE

PART NUMBER		PART NUMBER	
8923	39 Tube Socket	9357	35,000 " "
8922	36 " "	7998	1 Meg. Ohm Resistor
9307	38 " "	9337	8,000 Ohm Resistor
9308	Rectifier Tube Socket	9405	110-V Cable
9313	Gang Condenser	9342	Knobs
9062	Padding Condenser	9340	Cabinet less back
9316	Oscillator Coil	9423	Wood Cabinet
9317	Antenna and 1st Detector Coil	9369	Cabinet Back
9321	1st IF Transformer	9411	Antenna Wire and Spool
9322	2nd IF Transformer	7690	Rubber Feet Pads
9310	Wire Wound Resistance Strip 190 ohms	9399	6 Volt B Battery Eliminator
9312	Filter Choke	9408	32 Volt B Battery Eliminator
9315	Dynamic Speaker	9420	220 Volt Line Adapter
9311	By-pass Condenser Block (.1-.1-.1-01 M.F.D.)	9153	Car Antenna
9355	Elec. Condenser Block (8 x 8 & 4 M.F.D.)	9131	Spark Plug Suppressor
9328	" " " (3 x 5 M.F.D.)	9132	Generator Suppressor
9333	.004 M.F.D. Condenser	9133	Generator By-pass Condenser
9334	.01 M.F.D. Condenser	9412	23 Ohm Resistor for 32-Volt Cable
8830	.0005 M.F.D. Mica Condenser	9408	32 Volt Adapter Cable Complete
9319	.001 M.F.D. Mica Condenser	9397	6-Volt Adapter Cable Complete
9331	Volume Control	9380	Set Cable Plug
8907	25,000 Ohm Resistor	9402	Bkt. Assem. Complete
9065	1,000 " "	9393	Web Strap Buckle
8984	500,000 " "	9390	Long Web Strap Only

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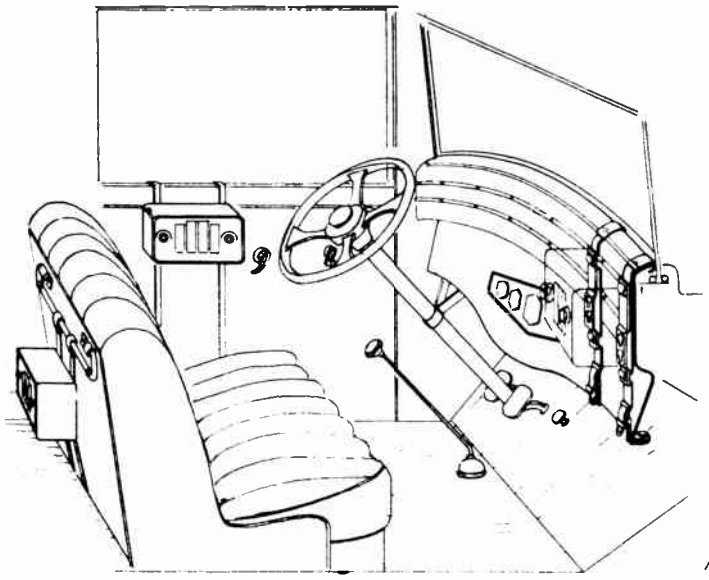
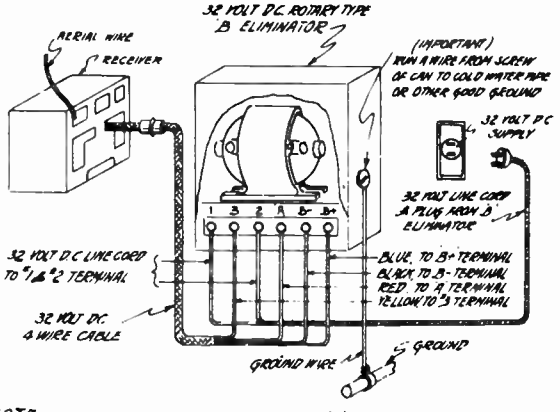
MODEL 550
Installation and Connection Details



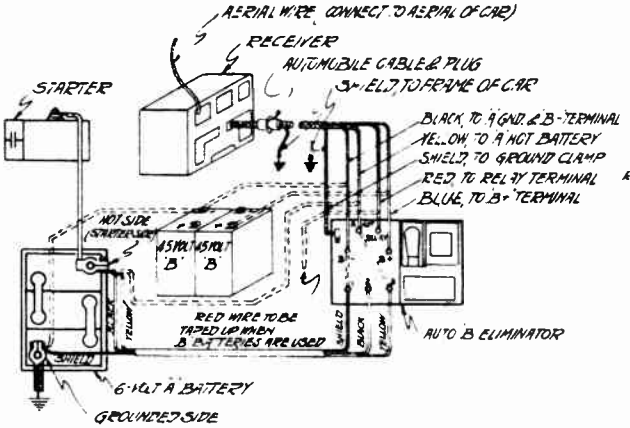
SKETCH SHOWING VARIOUS MOUNTING OF RECEIVER

FIG. 1



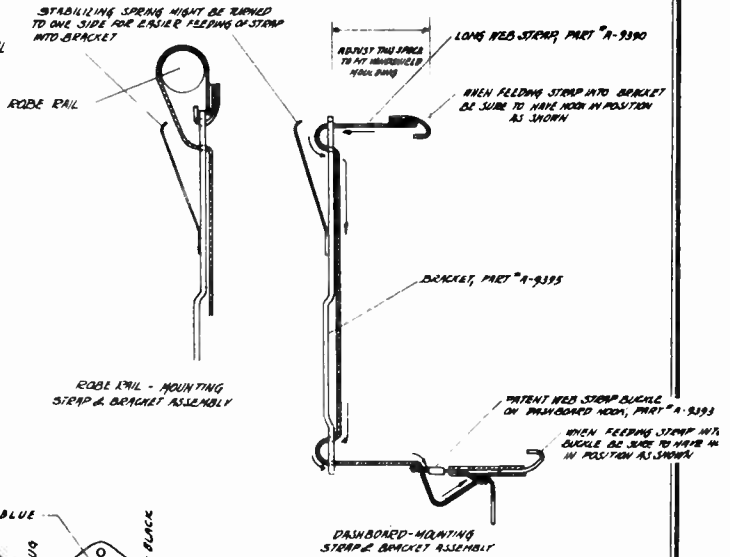
NOTE - IF B BATTERIES ARE USED INSTEAD OF 'B' ELIMINATOR, CONNECT THEM TO SET CABLE WIRES AS SHOWN IN DOTTED LINES IN FIG. 2. THE YELLOW AND BLACK CABLE WIRES ARE CONNECTED TO LINE CORD & PLUG FOR 32 VOLT SOCKET CONNECTION.

FIG. 3 SKETCH SHOWING CABLE CONNECTIONS TO 'B' ELIMINATOR FOR 32 VOLT D.C. OPERATION



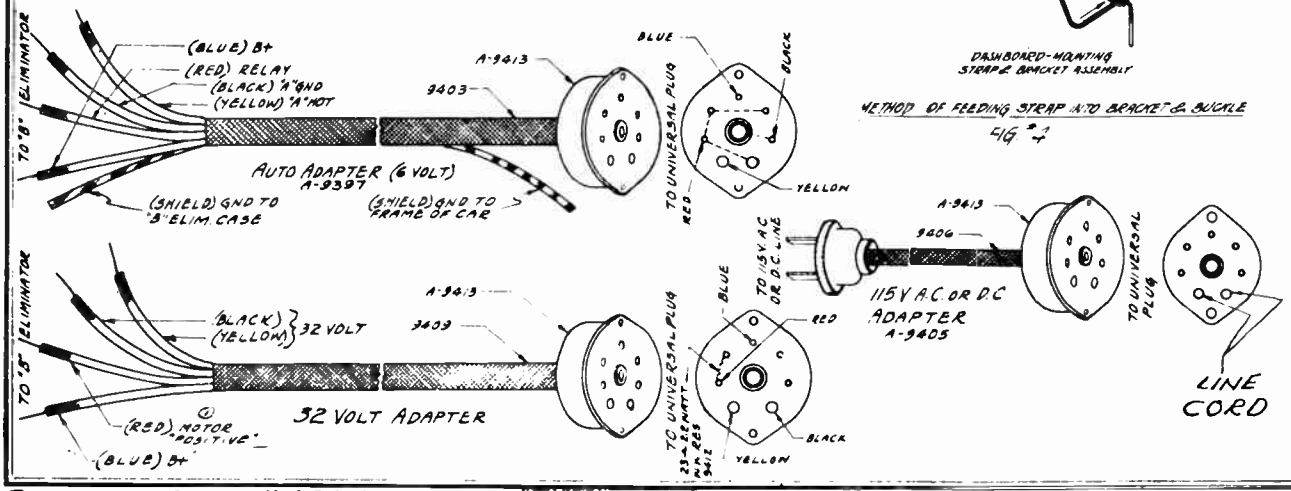
NOTE - DOTTED LINES SHOW CONNECTIONS TO B BATTERIES WHEN B ELIMINATOR IS NOT USED

FIG. 2 SKETCH SHOWING CABLE CONNECTIONS TO B ELIMINATOR OR B BATTERIES FOR 6 VOLT A AUTO OPERATION



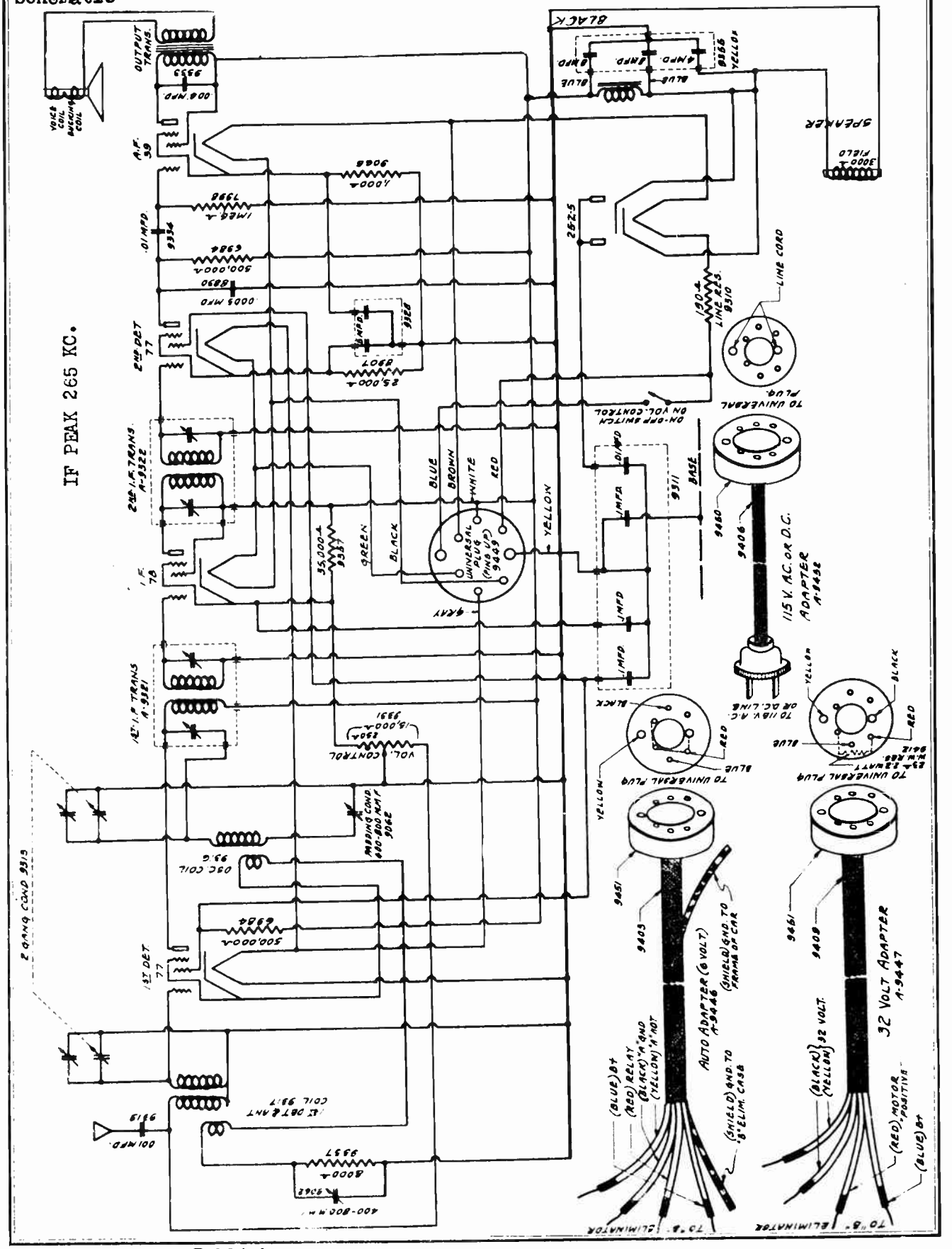
METHOD OF FEEDING STRAP INTO BRACKET & BUCKLE

FIG. 4



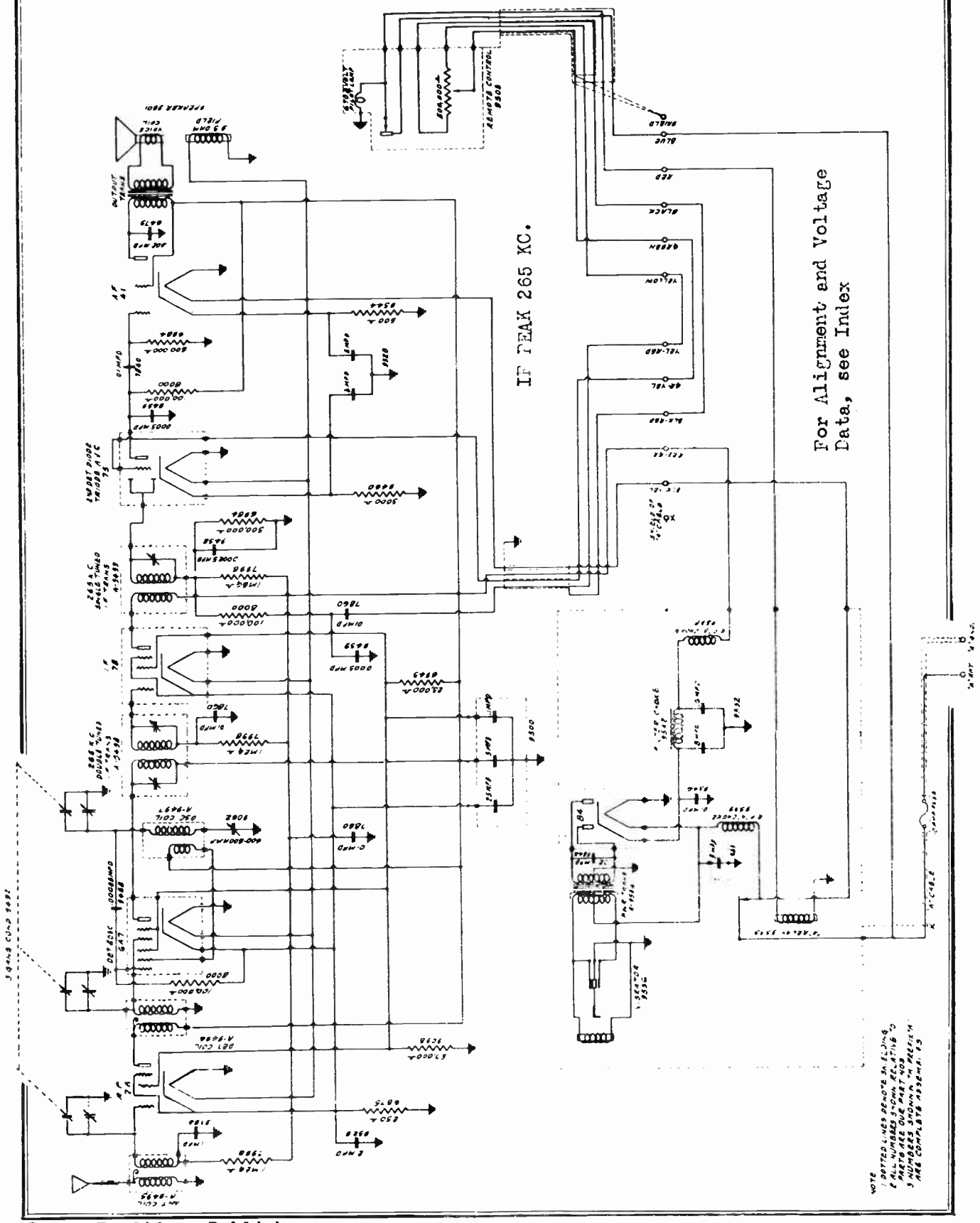
MODEL 560 (2nd Type)
Schematic

ELECTRICAL RESEARCH LABS.



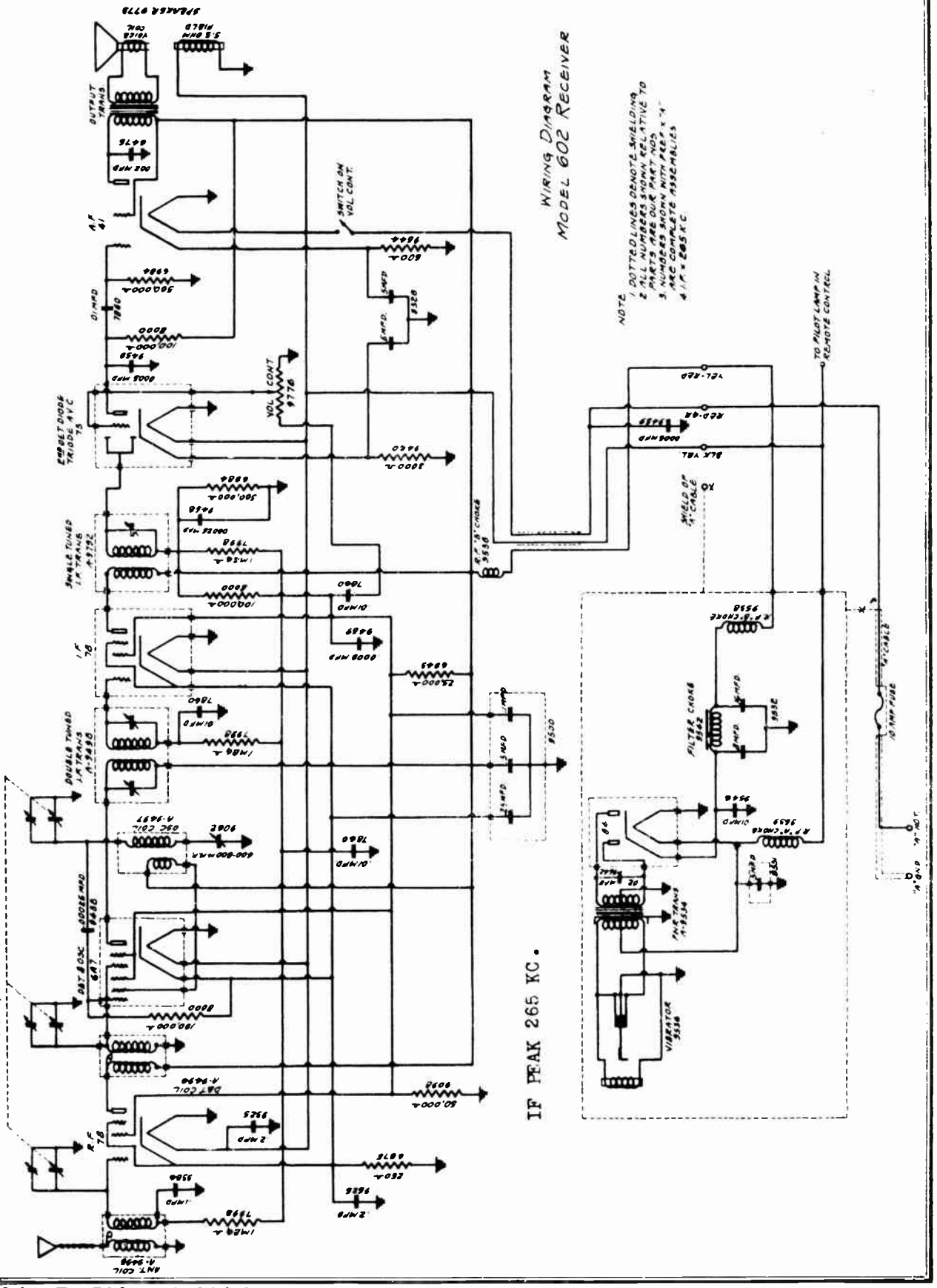
MODEL 600
Schematic

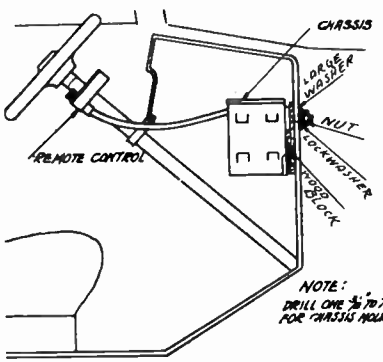
ELECTRICAL RESEARCH LABS.



MODEL 602
Schematic

ELECTRICAL RESEARCH LABS.





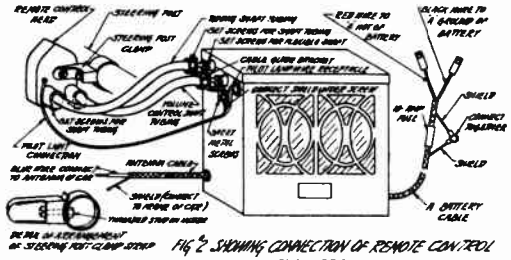


FIG 2 SHOWING CONNECTION OF REMOTE CONTROL AND CABLES

RECEIVER MOUNTING: The receiver, speaker and "B" eliminator are all contained in a single unit in one steel housing and requires the drilling of but one hole in the bulkhead for mounting. The receiver should be so mounted that the remote control shaft will reach the steering post in as straight a line as possible so as to eliminate any unnecessary bend in the cable. Care should be exercised in choosing the receiver location to avoid interference with the foot pedal, hand brake, clutch pedal and possible interference with the legs of the driver or passenger. A paper drilling template is provided to aid in finding the best location. When the location has been decided on, drill a 3/8" to 7/16" diameter hole in the motor bulkhead after which the wooden spacer block should be placed on the set mounting bolt and the bolt pushed through the hole in the bulkhead with the wooden spacer block on the driving compartment side. (Fig. No. 1). Place the steel washer, lockwasher and mounting bolt nut (in the order named) on the mounting bolt drawing up the nut loosely. Next, lift the receiver in position so that the square head of the mounting bolt will slip into the lower slotted end of the set mounting plate. Gently lowering the receiver will force the mounting bolt head to the top of the mounting plate slot. The receiver and the mounting bolt will be rigidly locked in position by drawing the mounting bolt up tight. On some installations because of insufficient room under the bulkhead it may be necessary to push the square head of the mounting bolt to the top of the mounting plate and then push the bolt through the hole drilled in the bulkhead.

REMOTE CONTROL: The remote control head, the steering post strap and clamp, the volume control and tuning control shaft tubing and the cable guide brackets are shipped unassembled. No difficulty will be had in properly assembling if the proper procedure is followed in the order given.

1. Mount the two cable guide brackets which are held in position with the two self tapping sheet metal screws, placing the pilot light shield lead under the head of one of these screws (see Fig. 2).

Push the flexible shaft of the volume control tubing through the volume control guide bracket into the volume control coupler mounted on the set until it touches the stop.

Then tighten the two flexible shaft set screws in the volume control coupler firmly.

Next, place the volume control shaft tubing so that it extends about 1/4" beyond the guide bracket. Do not permit tubing to touch the coupler. After correctly locating, screw the two guide bracket coupler set screws firmly, but do not force these set screws too tightly otherwise the drive shaft will bind. The tuning control flexible shaft should be mounted in the tuning coupler and the tuning control shaft tubing in the guide bracket in the same manner. Do not put the tuning control flexible shaft in the volume control coupler and vice-versa. Looking at the back of the remote control head the lefthand shaft tubing is the tuning control and the right hand one the volume control (Fig. 2). Looking at the side of the receiver the righthand coupler is the volume control and the lefthand coupler is the tuning control.

2. Loosen the two shaft tubing screws (Fig. 2) underneath the remote control head and insert the slotted end of each shaft tubing in their proper place in the remote control head, after which the set screw should be firmly tightened. If the shaft tubing is properly spaced from the couplers, the volume control and tuning control will move freely. If improperly spaced the shaft tubing may rub on the couplers or may rub in the remote control head thereby making the volume control and tuning control work hard.

3. The steering post clamp strap and clamp bracket should now be mounted on the steering post. The steering post clamp strap has four holes, one of which is threaded. The other three holes are provided so that the clamp may be used on any of the various size steering posts.

The remote control head may be located on the left or righthand side of the steering post column or on the dashboard by using the proper one of the three threaded clamp screw holes on the back of the remote control head. To mount on the lefthand side of the steering post use the lefthand threaded hole, for righthand mounting use the righthand threaded hole and for dashboard mounting the top threaded hole.

Form the clamp with the threaded stud on the inside by placing it around the steering post. Place the slotted end of the clamp against the clamp strap so that the hole in the clamp lines up with the two holes in the strap (Fig. 2.) Push the clamp strap through the hole in the clamp and screw the clamp screw into the threaded strap stud sufficiently tight so that it will be locked firmly in position. The remote control head may now be mounted on the steering post clamp by pushing the machine screw through the hole at the end of the clamp and screwing this machine screw through the threaded hole in the back of the remote control head.

4. The remote control drive is now completely mounted. It is possible that the dial calibration will not be correct. To properly align the dial turn the tuning control knob in the counter clockwise direction until the stop on the variable condenser is reached. This will be indicated by increased tension on the knob. Do not force the dial otherwise the dial needle will jump and the dial calibration will be inaccurate.

PILOT LIGHT: A six to eight volt Mazda type miniature size pilot light is used in the remote control head. The pilot light lead from the remote control head must be inserted in the pilot light receptacle located on the side of the set housing adjacent to the volume control shaft tubing guide bracket. The shielded lead of the pilot light lead should be connected underneath the head of one of the guide bracket mounting screws. To replace the pilot light remove the two control knobs by pulling outward on the knobs. Next, the three small head machine screws on the front of the remote control which hold the front cover of the control box in place should be removed. The cover of the remote control head may now be lifted off the control box and the pilot light socket then becomes accessible.

ANTENNA: A good antenna is very important. An inefficient or insufficient aerial will result in unsatisfactory reception. Most late model cars are factory equipped with an antenna built in the roof of the car. This is generally the most satisfactory type of aerial. If the car is not equipped with a roof type aerial, one may be installed or use may be made of the various aerial kits now available such as plates that are mounted underneath the running board or the strap type aerial which can be fastened between the front and rear axles. THE CLOSER TO THE GROUND THE STRAP OR PLATE TYPE ANTENNA IS SUSPENDED THE GREATER ITS EFFICIENCY.

"B" ELIMINATOR: The "B" eliminator unit which contains the No. 84 rectifier tube is mounted below the receiver and is held in position in the set housing by three machine screws which are accessible from the bottom of the set housing. To replace the rectifier tube it is necessary that the "B" unit be removed from the set housing. To do this unscrew the three "B" unit machine screws in the bottom and the six screws that hold the small detachable plate on the lower back of the set housing. After this plate is removed, the set cable wires which are now accessible should be disconnected from the "B" eliminator terminal strip mounted on the eliminator unit, after which the eliminator may be pulled out of the set housing. Next, remove the cover of the eliminator by unscrewing the six machine screws which hold this in place. After the cover has been taken from the top of the "B" unit the complete mechanism of the "B" eliminator can be lifted out of the eliminator housing and the "B" eliminator tube replaced. Care should be taken when reinstalling the "B" unit in the set housing so that the set cable wires are properly connected to the "B" eliminator terminal strip. Excessive vibration of the "B" unit may be corrected by substituting a new vibrator rubber cover. When changing the rubber cover be sure to place the vibrator unit back in the "B" unit with the vibrator leads toward the "B" eliminator transformer. Continuous blowing of the fuse is indicative of a possible defective "B" unit transformer, a defective vibrator or a defective No. 84 tube. UNDER NO CIRCUMSTANCES ATTEMPT TO ADJUST THE VIBRATOR UNIT. IF THE UNIT BECOMES DEFECTIVE IT SHOULD BE REPLACED WITH A GOOD ONE ONLY. R.F. hash indicated by a constant static-like background noise, which is apparent over the entire tuning range (with the set aerial disconnected) may be due to a defective No. 84 tube or a loose "B" unit cover. If the set antenna lead is run in close proximity with the set "A" leads or the battery "A" hot lead, it is possible to pick up this form of interference. Rerouting the set antenna lead will correct this.

TUBES: The receiver utilizes the following tubes:

One (1) Type 78 - Amplifier Tube
One (1) Type 6A7 - Detector & Oscillator Tube
One (1) Type 78 - I. F. Tube
One (1) Type 75 - Second Detector Diode & AVC Tube
One (1) Type 41 - Output Tube
One (1) Type 84 - Rectifier Tube

The tube locations are shown in the diagram attached to the set housing cover. Always be sure that the tubes and their tube shields are firmly pressed down in their sockets. The tubes are readily accessible for removal or for checking by taking off the cover of the metal cabinet. To do this it is only necessary to unscrew the six machine screws which hold the cover to the cabinet and lift the cover off the cabinet. NOTE: In some installations, because of the location of the receiver it may be necessary to remove the set from the motor bulkhead to check the tubes. The tubes used are sturdily constructed and especially designed for use in automobile receivers and under normal conditions will give satisfactory service for a long period of time. Occasionally a tube may become faulty shortly after being placed in service and is generally indicated by low volume or distorted tone. Whenever this condition exists the tubes should be tested and the defective tubes or tube replaced. If the receiver becomes microphonic it can generally be traced to the 6A7, 75 or 41 tube.

MODEL 600
MODEL 602
Alignment
Voltage

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TUBE VOLTAGES

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO.3	GRID NO.5
78	Radio Frequency	6	225	4	92				
6A7	Oscillator & Modulator	6	225	4		6.2	225	92	92
78	Intermediate Frequency	6	225	4	92				
75	2nd Detector Diode & AVC	6	135	1.5					
41	Output	6	218	13	225				
84	Rectifier	6	260*	235					

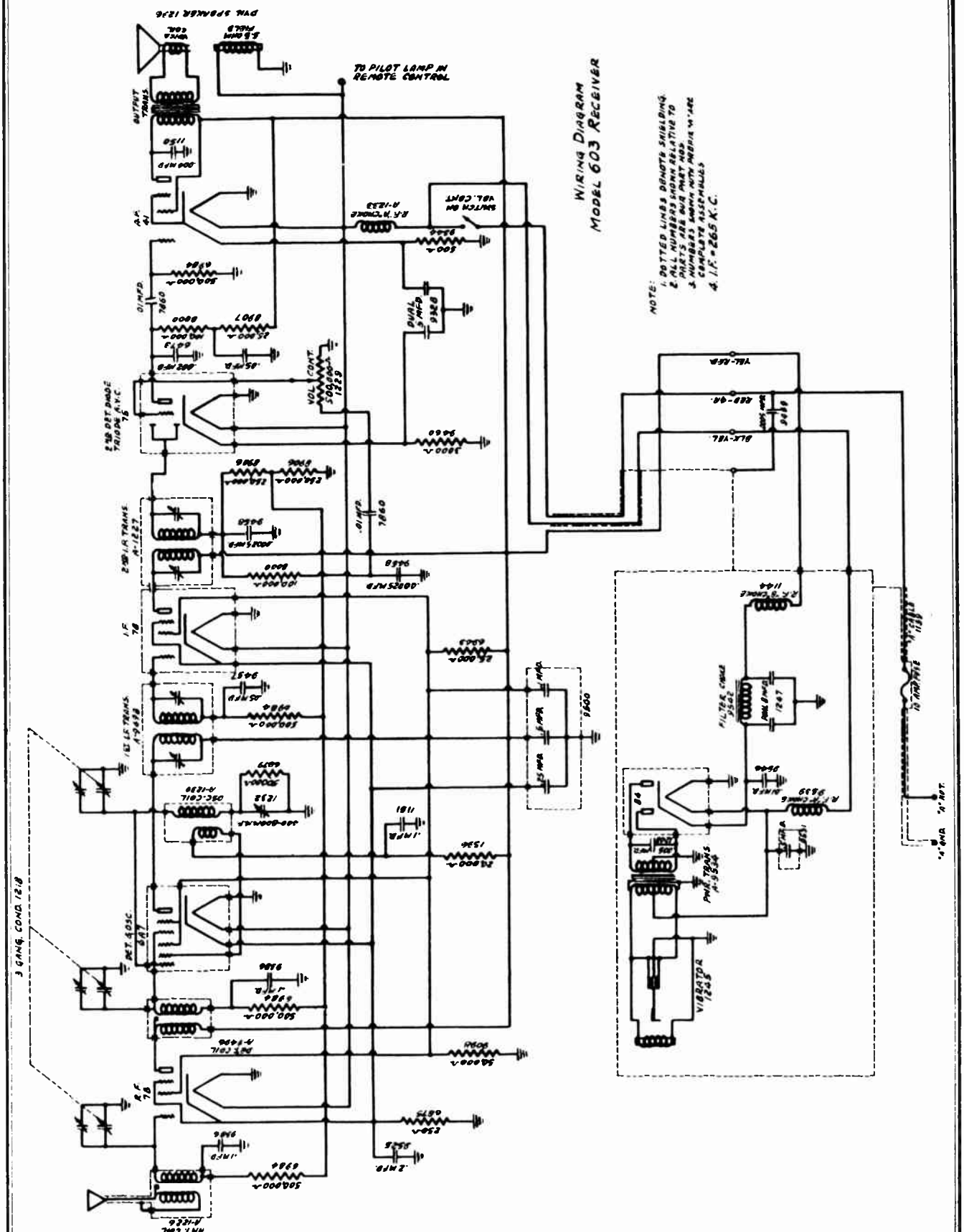
* A.C. each plate
Total "A" current - 6.2 amperes.

INTERMEDIATE FREQUENCY: Unless an intermediate transformer has become defective due to an open or burned out winding it should never be necessary to readjust the intermediate stage. Should this occur it is essential that an oscillator be used with some type of output measuring device to correctly tune the I.F. Transformers. Connect the high side of the oscillator output to the control grid cap (grid No. 4) of the 6A7 oscillator modulator tube leaving the grid cap disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. If the output of the oscillator is too great the value of this resistor may be reduced. The ground side of the tes oscillator should be connected to the chassis. Set the oscillator to 265 K.C. (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first I.F. transformer is double-tuned, the trimmers of which are accessible through the top of the I. F. can, one section of which is adjusted by turning the brass hex nut and the other section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible from the top of the intermediate transformer shield can. After both intermediate transformers are correctly adjusted the alignment of the intermediate stage is complete and the trimmers should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and 50,000 ohm resistor removed.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if the antenna, R.F. or oscillator coil have been replaced it will be necessary to realign the variable condensers. If the receiver is not mounted in the set housing it will be necessary to place a metal shield along side of the variable condenser and flush against the side of the set chassis nearest the variable condenser trimmers. It is necessary to do this otherwise when the receiver is placed in the set housing the metal housing will detune the receiver. Three holes should be made in the shield to correspond with the hole provided in the set housing which permits alignment of the receiver when the set is in the housing. Be sure the shield is properly grounded to the receiver chassis. NOTE: When the receiver and "B" unit is removed from the set housing be sure to set the receiver on top of the "B" unit, otherwise considerable R.F. and audio hash will be encountered. Regardless of whether the receiver is mounted in the set housing or not the alignment procedure is the same. Adjust the variable condenser to minimum capacity. Connect the high output side of the set oscillator to set antenna lead and the low side to antenna shield lead or chassis. Then adjust the test oscillator to 1500 K. C. Next, BRING THIS SIGNAL IN BY ADJUSTING THE VARIABLE CONDENSER OSCILLATOR SECTION TRIMMER. Looking at the front of the receiver, the variable condenser trimmers are mounted on the left side of the set on the variable condenser and reading from the bottom up the trimmers are, oscillator, R.F. and antenna. After the oscillator section has been properly peaked, adjust the antenna and R.F. trimmers in the order mentioned. After the variable condenser trimmers have been correctly adjusted at 1500 K.C. tune the receiver to 600 K.C. and adjust the oscillator to this frequency. Then adjust the oscillator padding condenser which is located on the lefthand side to the rear of the chassis, to obtain maximum reading on the output meter. If the set is mounted in the receiver housing the padding condenser is accessible through the small hole in the side of the set housing. It may be necessary to turn the variablecondenser slightly to the right and left to find the point where greatest output is obtained. If the alignment procedure is correctly followed the receiver will now track correctly over the entire tuning range. It is always advisable to align the receiver with the tubes to be used in the set whenever possible.

MODEL 603
Schematic

ELECTRICAL RESEARCH LABS.



MODEL 603
Voltage, Alignment
Parts List

ELECTRICAL RESEARCH LABS.

ALIGNMENT PROCEDURE: For properly aligning either the intermediate transformer or the variable condenser it is necessary that an accurately calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the oscillator frequency at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the intermediate transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two types of intermediate transformer trimmers have been used in this model receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one intermediate trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is not necessary to remove the receiver chassis from the set housing to align the gang condenser. Regardless of whether or not the receiver is or is not mounted in the set housing the alignment procedure is the same. Three holes are provided in the left hand side of the set housing for the gang condenser trimmers and one in the front of the set housing for the 600 kilocycle padding condenser.

1. Properly connect the remote control head and shafts and adjust the dial needle on the dial face so that the dial calibration is correct.

2. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

3. Tune the receiver to exactly 1400 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE OSCILLATOR GANG CONDENSER TRIMMER. Looking at the side of the receiver and reading from top to bottom the trimmer condensers are the antenna, R. F. and oscillator sections. Next, adjust the R. F. and antenna sections of the gang condenser for maximum sensitivity

4. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser, which is located on and accessible through the hole in the front of the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment using the position of greatest output.

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	TUBE VOLTAGES PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO.3	GRID No.5
78	Radio Frequency	6	210	4	80				
6A7	Oscillator & Modulator	6	210	4		35	140	80	80
78	Intermediate Frequency	6	210	4	80				
75	2nd Detector Diode & AVC	6	100	1.5					
41	Output	6	200	8	210				
84	Rectifier	6	260##	235					

A. C. each plate
Total "A" current - 6.0 amperes
Read all voltages from socket to chassis

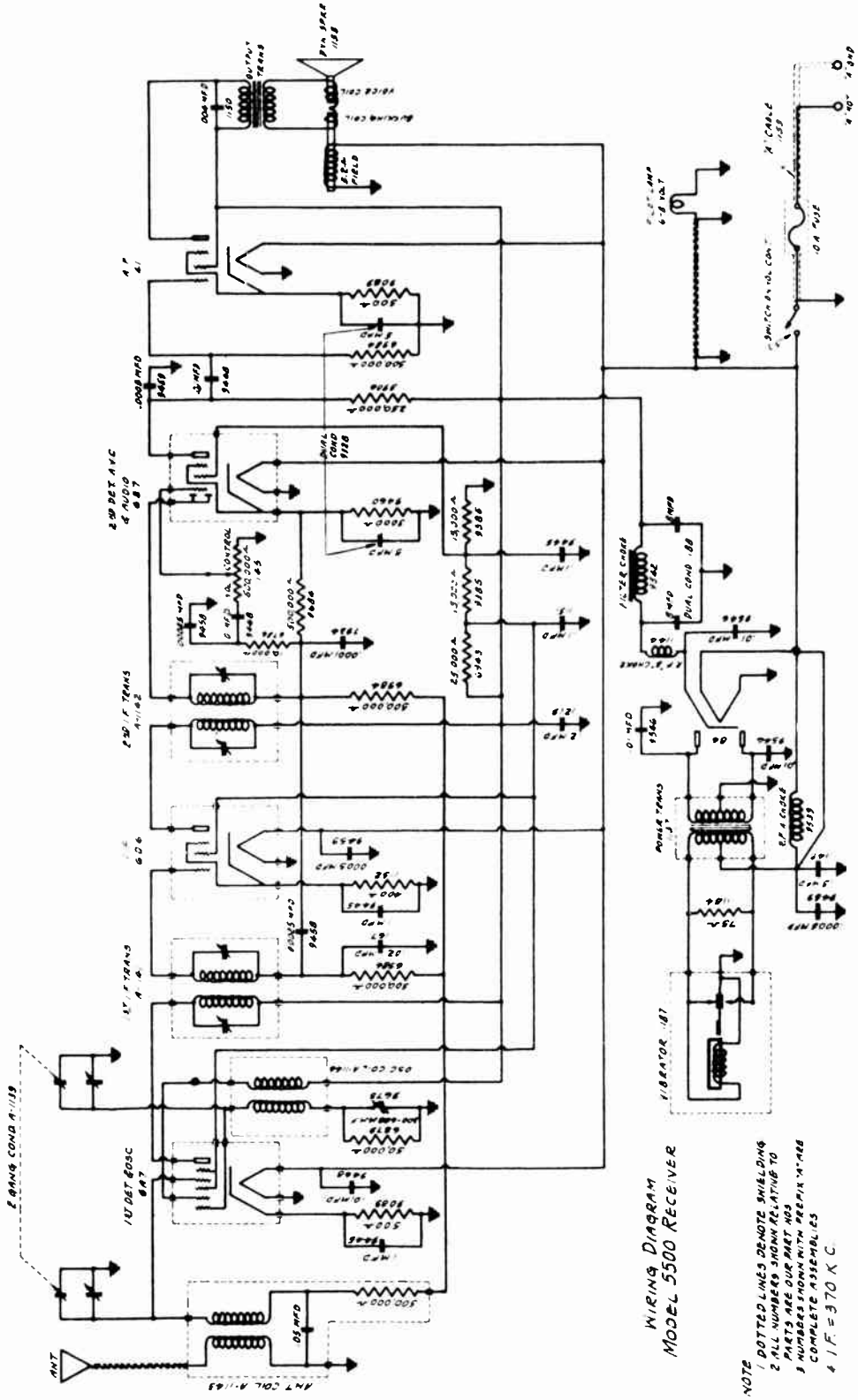
PART NUMBER		LIST PRICE
1226	Antenna Coil	$1.77
9496	Detector Coil	.99
1230	Oscillator	1.01
9498	1st I. F. Transformer	1.49
1227	2nd I. F. Transformer	2.03
1236	Dynamic Speaker	7.00
1188	Antenna Lead	.34
1244	Set Cable	.60
9098	50,000 Ohm 1/2 Watt Resistor	.19
6943	25,000 Ohm 1 Watt Resistor	.21
6984	500,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
9460	3,000 Ohm 1/3 Watt Resistor	.19
9544	500 Ohm 1 Watt Resistor	.21
6875	250 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
8907	25,000 Ohm 1/3 Watt Resistor	.19
1336	20,000 Ohm 1/2 Watt Resistor	.19
1232	Padding Condenser	.55
1218	Three Gang Condenser	4.10
9500	Bypass Condenser (1-.1,1-.25, 1-.5 Mfd.)	1.29
7860	.01 Mfd. 400 Volt Condenser	.17
9386	.1 Mfd. 200 Volt Condenser	.18
6473	.002 Mfd. 400 Volt Condenser	.17
9525	.2 Mfd. 200 Volt Condenser	.24
9203	.1 Mfd. 400 Volt Condenser	.20
1150	.004 Mfd. 400 Volt Condenser	.18
9328	Dry Electrolytic Condenser (2-5 Mfd.)	1.15
9133	Generator .5 Mfd. Condenser	.55
9597	Spark Plug Suppressor	.55
9598	Distributor Suppressor	.55
9600	Wood Mounting Block	.16
7717	Housing Carriage Bolt 3/8" x 3"	.10
7718	Hex Nut for 3/8" Carriage Bolt	.05
7716	Mounting Bolt Steel Washer	.10
9458	.0025 Mfd. Mica Condenser	.17
9463	No. 75 Tube Socket	.13
9422	No. 78 Tube Socket	.13
9493	No. 41 Tube Socket	.13

PART NUMBER		LIST PRICE
9453	6A7 Tube Socket	$ .13
1255	Set Housing Back	.25
1284	Set Housing Cover	.55
1223	Set Housing	3.52
9581	10 Ampere Fuse	.06
1159	"A" Battery complete with Fuse and Receptacle	.90
9063	Tube Shield Retainer Base	.05
1361	Tube Shield	.11
1253	R. F. "A" Choke	.28
1229	Volume Control with Switch	1.22
109	"B" Eliminator	15.00
1246	Vibrator Rubber Case	.40
1245	Vibrator	5.50
9534	Power Transformer	2.75
9542	Filter Choke	.85
9539	R. F. "A" Choke	.40
1144	R. F. "B" Choke	.32
1247	2x 8 Mfd. Condenser Block	2.75
9531	.5 Mfd. Bypass Condenser	.58
9546	.01 Mfd. 600 Volt Condenser	.18
1248	.005 Mfd. 1000 Volt Condenser	.23
9559	.0005 Mfd. Moulded Condenser	.21
9529	No. 84 Tube Socket	.13
9513	"B" Eliminator Housing Case	.55
9514	"B" Eliminator Housing Case Cover	.35
1249	"B" Terminal Strip with Screws	.60
1240	Remote Control Complete	9.00
1458	Tuning Control Ring	.77
1459	Volume Control Ring	.77
1460	Dial Light Assembly	.44
1460A	Pilot Light Bulb	.44
1461	Condenser Pulley Assembly	1.20
1462	Vol. Control Pulley Assembly	1.00
1463	Drive Cable Assembly	2.30
1464	Dial Glass & Sticker Assembly	.40
1465	Steering Post Clamp	.11
1466	Key	.17
1467	Dial Scale Assembly	.33
1468	Dial Glass Retaining Ring	.11

Prices are subject to change without notice.

MODEL 5500
Schematic

ELECTRICAL RESEARCH LABS.



MODEL 5500
Voltage
Alignment Data
Parts List

ELECTRICAL RESEARCH LABS.

VOLTAGE TABLE
Battery Voltage - 6 Volt
Volume Control - Full on

TYPE OF TUBE	POSITION OF TUBE	FIL. VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO. 2.	GRID NO. 3 & 5
6A7	Modulator & Oscillator	6	220	3	80	5	220	80
6D6	I. F. Amplifier	6	220	2.5	80			
6B7	Second Detector Diode AVC & 1st Audio Triode	6	35##	3.	40			
41	Output	6	215	13	220			
84	Rectifier	6	460-AC	230				

Triode Plate. Comparative voltage only . The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: It should rarely be necessary to realign the intermediate transformers or the variable condenser. As a matter of fact, this should only be necessary when an intermediate transformer, oscillator or R. F. coil has become defective and require replacement. For propedy aligning either the intermediate transformer or condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 370 kilocycle (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer which is accessible from the top of the I. F. transformer up and down until maximum reading is obtained on the meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER: To align the variable condenser and padding condenser it is necessary that the receiver chassis be removed from the set housing. After the receiver chassis has been removed connect the remote control flexible drive shafts in their respective couplers, and set the dial needle on the dial face so that the dial calibration is correct.

1. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

2. Tune the receiver to exactly 1500 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1500 KILOCYCLE SIGNAL (TO MAXIMUM OUTPUT) BY ADJUSTING THE OSCILLATOR VARIABLE CONDENSER TRIMMER MOUNTED ON TOP OF THE VARIABLE CONDENSER. THEN ADJUST THE OTHER VARIABLE CONDENSER TRIMMER FOR MAXIMUM OUTPUT. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency, then adjust the 600 padding condenser which is located on the right hand side and accessible through the hole in the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment, using the position where greatest output is obtained.

1143	Antenna Coil
1146	Oscillator Coil
1141	First I. F. Transformer
1142	Second I. F. Transformer
1277	Dynamic Speaker
9673	Padding Condenser
1139	Two Gang Condenser
1145	Volume Control
1128	Set Housing
1127	Set Housing Front Cover
1156	Set Housing Front Cover Grille
1163	Wood Mounting Block
7717	Carriage Bolt 3/8"
7708	Carriage Bolt Steel Washer
7716	Carriage Bolt Lock Washer
1171	Cable Guide Bracket Assembly
1158	Antenna Lead
1166	Tube Shield
9581	10 Ampere Fuse
1159	"A" Battery Cable compete with fuse
1187	Vibrator
1137	Power Transformer
1188	2 x 8 Mfd. Condenser Block
1276	R. F. "A" Choke
9598	.5 Mfd. Generator Condenser
1212	Spark Plug Suppressor
1214	Distributor Suppressor
1213	Six Cylinder Suppression Kit
1278	Remote Control Head Complete Assembly
9959	Remote Control Tuning Knob with Key
9958	Remote Control Volume Knob
9954	Remote Control Head Clamp
9955	Remote Control Clamp Strap
1210	Remote Control Tuning Shaft Tubing 18"
1209	Remote Control Tubing Flexible Drive Shaft 18"
1210	Remote Control Volume Shaft Tubing 18"
1211	Remote Control Volume Flexible Drive Shaft 18"
9961	Remote Control Head Glass
9328	Electrolytic Condenser 2 x 5 Mfd.
9456	.00025 Mfd. Moulded Condenser
9459	.0005 Mfd. Moulded Condenser
7934	.0001 Mfd. Moulded Condenser
9445	.1 Mfd. 200 Volt Condenser
1148	.5 Mfd. 200 Volt Condenser
9468	.01 Mfd. 400 Volt Condenser
1150	.004 Mfd. 600 Volt Condenser
1151	.1 Mfd. 400 Volt Condenser
1167	.02 Mfd. 400 Volt Condenser
1219	.2 Mfd. 400 Volt Condenser
1248	.005 Mfd. 1000 Volt Condenser
1184	75 Ohm Wire Wound 1 Watt Resistor
6943	25,000 Ohm 1 Watt Resistor
8000	100,000 Ohm 1/3 Watt Resistor
1280	35,000 Ohm 1/3 Watt Resistor
9089	500 Ohm 1/3 Watt Resistor
1152	400 Ohm 1/3 Watt Resistor
8907	25,000 Ohm 1/3 Watt Resistor
9460	3,000 Ohm 1/3 Watt Resistor
6786	10,000 Ohm 1/3 Watt Resistor
6984	500,000 Ohm 1/3 Watt Resistor
6943	25,000 Ohm 1 Watt Resistor

INSTRUCTIONS FOR INSTALLING ELECTRONIC "B" POWER SUPPLY

1. INSTALL ELIMINATOR IN MOST CONVENIENT POSITION IN CAR, BEING SURE THAT ELIMINATOR IS SECURELY GROUNDED TO SOME GROUNDED METAL PART OF THE CAR.
2. CONNECT "HOT" SET LEAD TO H.S. TERMINAL OF ELIMINATOR.
3. CONNECT "HOT" BATTERY LEAD TO A.H. TERMINAL OF ELIMINATOR.
4. CONNECT NEGATIVE RADIO SET LEAD TO B- TERMINAL OF ELIMINATOR.
5. CONNECT POSITIVE RADIO SET LEAD TO B + TERMINAL OF ELIMINATOR.
6. IF RADIO SET HAS AN INTERMEDIATE VOLTAGE TAP, CONNECT IT TO B_m TERMINAL OF ELIMINATOR. THIS INTERMEDIATE VOLTAGE SHOULD BE ADJUSTED IN ACCORDANCE WITH SET MANUFACTURER'S INSTRUCTIONS, THE VOLTAGE BEING MEASURED WITH A HIGH RESISTANCE VOLTMETER. IF THIS IS NOT AVAILABLE, THE SLOTTED ADJUSTING SHAFT IN THE CENTER OF THE B TERMINAL STRIP SHOULD BE TURNED TO ABOUT THE CENTER POSITION AND VARIED A LITTLE EITHER WAY UNTIL BEST RADIO RECEPTION IS OBTAINED.
7. IF RADIO SET B CABLE HAS SHIELDING, CONNECT IT TO THE G TERMINAL OF ELIMINATOR.

NOTE:-SOME RADIO SETS HAVE ONLY ONE B LEAD WHICH IS POSITIVE, THE NEGATIVE LEAD BEING THE SHIELDING. IN THIS CASE CONNECT THE SHIELDING TO THE B- TERMINAL AND TO THE G TERMINAL.

FIG. 1

FIG. 2

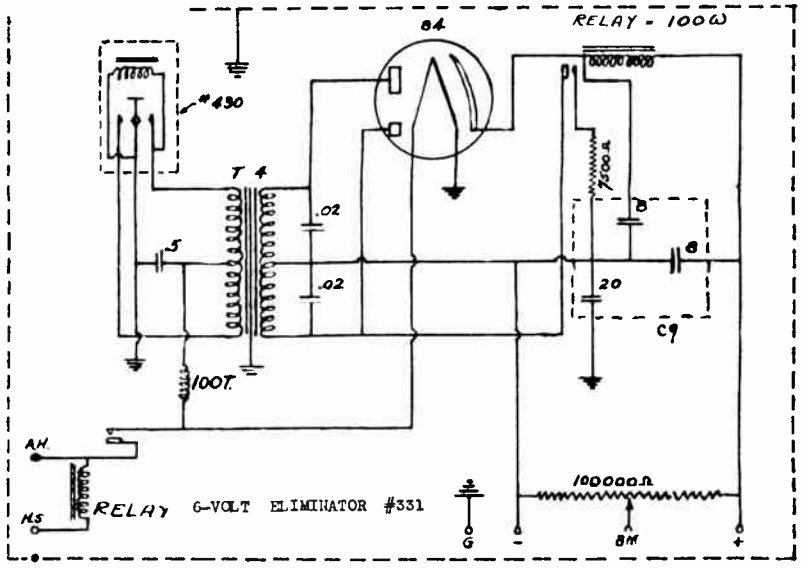
MODEL 331
MODEL 332
MODEL 338, 339
Schematics

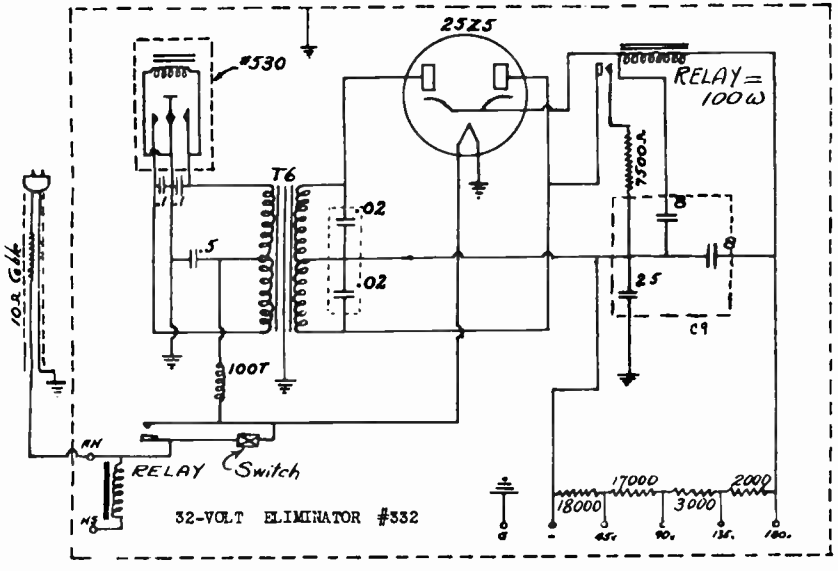
ELECTRONIC LABORATORIES, INC.

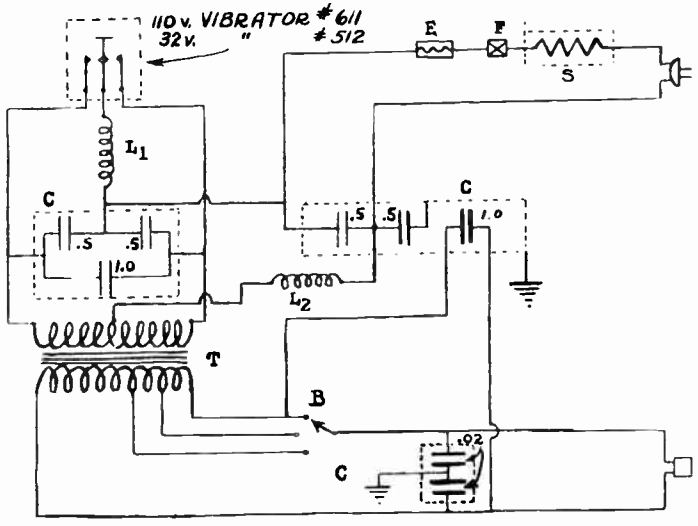
ENGINEERING SPECIFICATIONS | **PART NO.** F27A.

SUBJECT: CIRCUIT DIAGRAM OF 32 AND 110-VOLT D-C. CONVERTERS TYPES 338 AND 339

PARTS LIST	MATERIAL	FINISH







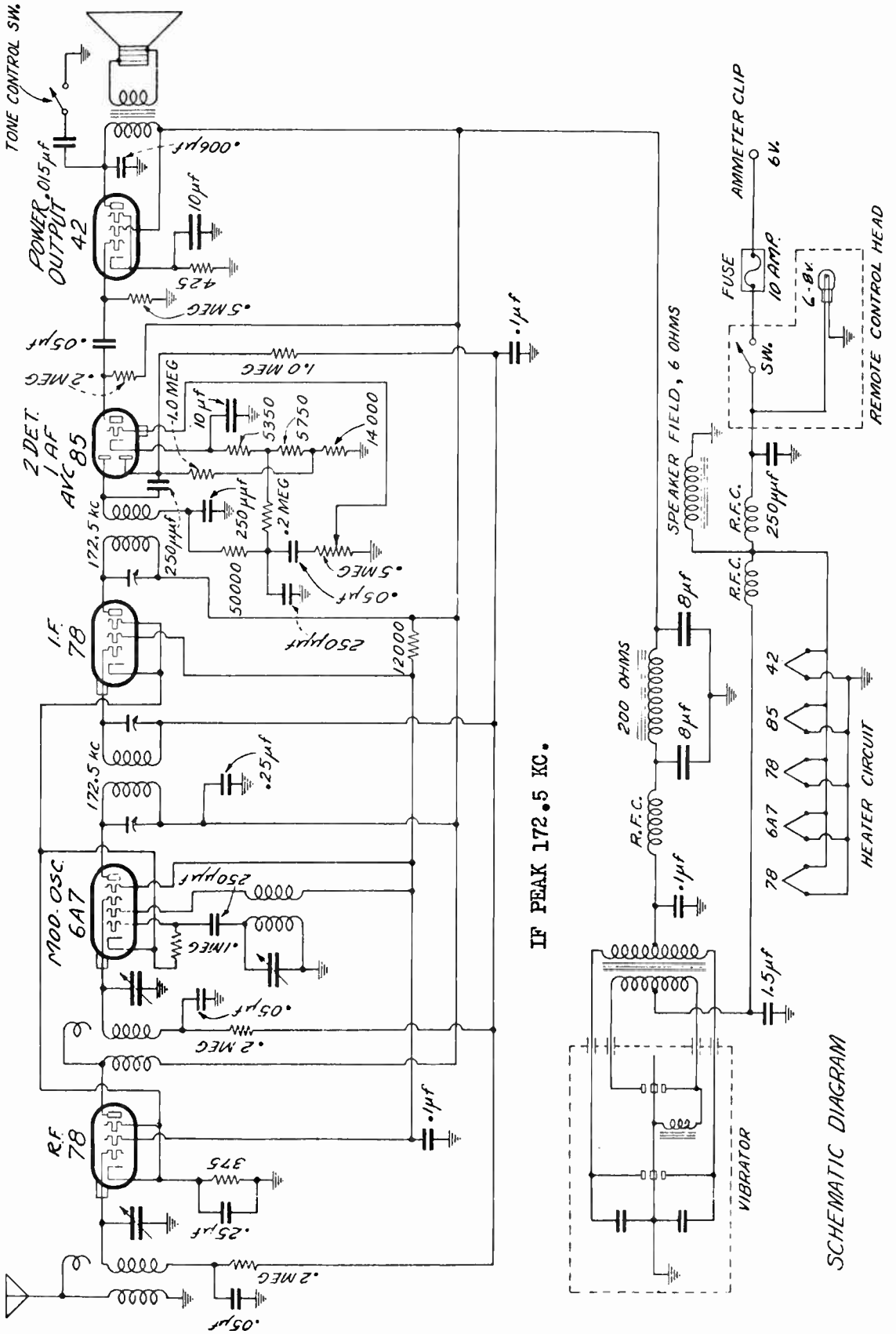
B Tap Switch
C Condenser Block
E Fuse
F Toggle Switch
L-1 Choke (32 volts, 10 turns)
L-2 Choke (100 turns)
S Resistance Cord (32 volts, 1 ohm; 110 volts, 10 ohms)
T Transformer

CHANGES	DATE	SUPPLIERS	THEIR PART NO.	PRICE
A CHOKES L1 & L2	11-22			
B				

ELECTRONIC LABORATORIES, INC.
122 W. NEW YORK ST., INDIANAPOLIS, IND.
DRAWN BY LK DATE 11-22-33
APPRD. BY DATE
USED ON SEE ADD. PART NO.

MODEL 5A
Schematic

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 5A
Alignment, Voltage
MODEL 6A
Alignment

EMERSON RADIO AND PHONOGRAPH CORPORATION

Remove bottom cover. See that all tubes are pushed down in their sockets, and that the grid clips are in place. Remove clamp holding vibrator in socket by removing screw fastening it to transformer case. Note whether vibrator is polarized correctly (i.e., if receiver is to be installed in car having the negative side of the battery grounded, the red arrow on transformer case should point to (—) on top of the vibrator). The polarity may be changed by removing the vibrator from socket, turning the complete unit until correct polarity sign is indicated by arrow, and then re-inserting into socket. The polarity must be correct, otherwise serious damage might be incurred to both vibrator and receiver. Replace the clamp over the vibrator after this has been checked.

Below is a list of cars and their correct polarization:

	Positive Ground	
Auburn	Ford	Nash
Austin	Graham	Packard
Cadillac	Hudson	Pierce Arrow
Chrysler	Hupmobile	Plymouth
De Soto	La Fayette	Studebaker
Dodge	La Salle	Terraplane
	Negative Ground	
Buick	Lincoln	Reo
Chevrolet	Oldsmobile	Stutz
Duesenberg	Pontiac	Willys

Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ kc. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer, or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two i.f. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

Radio Frequency and Oscillator

To align the r.f. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency near 1400 kc. Set the dial to the frequency selected. Adjust trimmers on the variable condenser, beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the r.f. sections may be aligned on broadcast signals. Tune in a weak station between 1350 and 1450 kc. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

Voltage Analysis:

NOTE: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

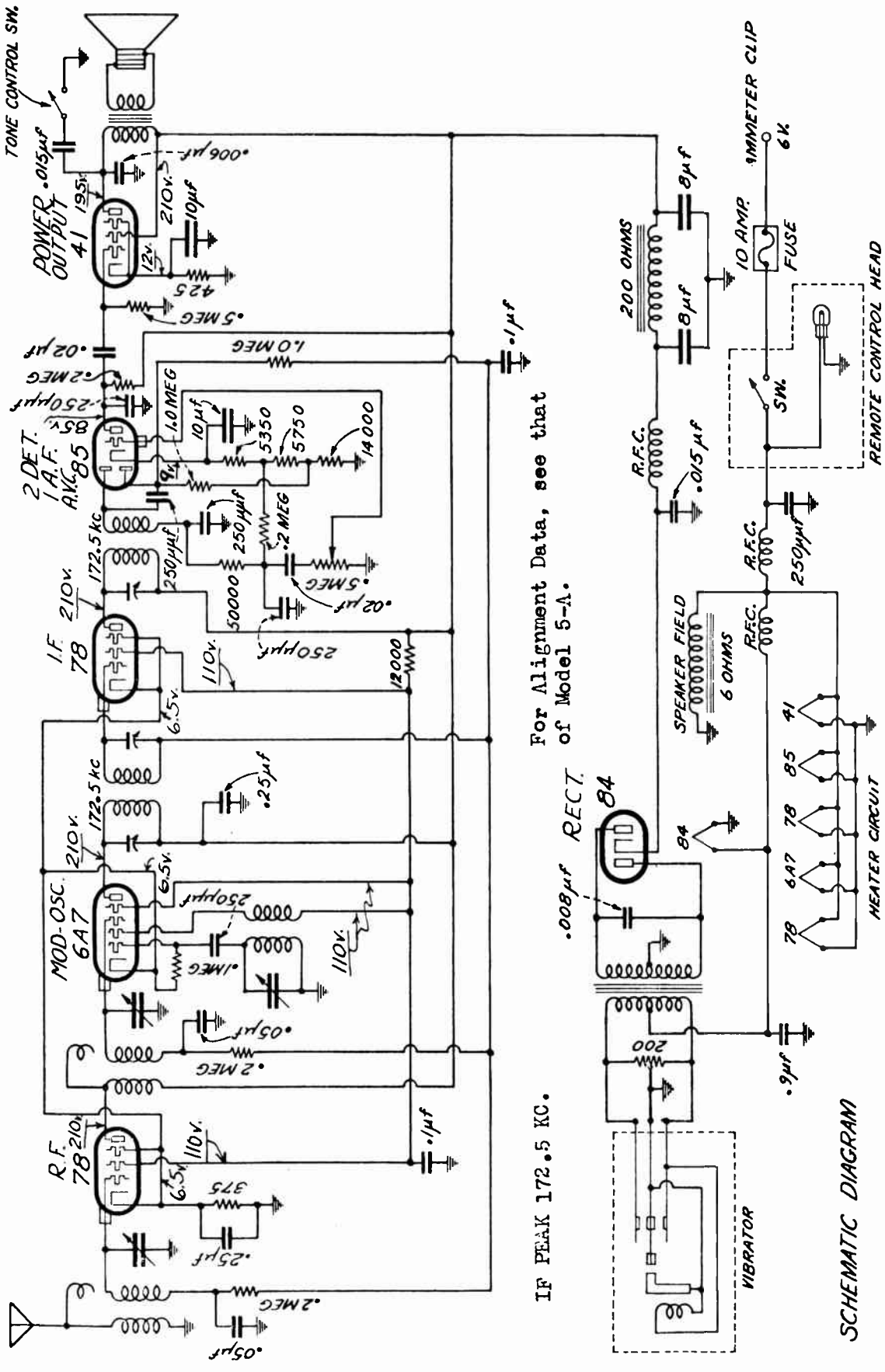
The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

Battery volts—6.3, voltage across heaters—5.5, voltage across speaker field—5.5:

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. Plate*
78	215	110	10	10	—
6A7	215	110	10	—	110
78	215	110	10	10	—
85	95	—	9.5	—	—
42	205	215	12.5	—	—

MODEL 6A
Schematic
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 420 (V-4)
Schematic, Voltage
Sooket layout, Notes

EMERSON RADIO AND PHONOGRAPH CORPORATION

Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC., and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

Chassis	*To— Plate*	*Screen*	*Cathode*
77—Detector	10- 15	9- 12	1- 2
78—R.F. Amplifier	105-115	105-115	2- 3
38—Output Pentode	105-115	105-115	——

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.

For Automobiles, Motorboats and Homes Not Wired for Electricity—Farms, etc.

Directions for 6-Volt (Automobiles, Motorboats, etc.)

Attachment required: 1-EMERSON 6-volt Type "B" Eliminator.

Remove the Antenna from its compartment and place as indicated for homes or, in the case of automobiles, connect to the automobile antenna system.

Remove the regular power cord and plug from the set.

Attach the 7-prong socket on the eliminator cable to the 7-prong plug in rear of the set. Attach the 2-conductor cable from the eliminator to the 6-volt battery.

Where 12-Volt "A" Battery is used in automobile, care should be exercised that cable is so connected that only 6 Volts is applied to the set.

Directions for 32-Volt Farm Lighting Systems—The only additional equipment required is one EMERSON 32-volt type "B" Eliminator. The regular Power Cord and plug are not used and should be removed.

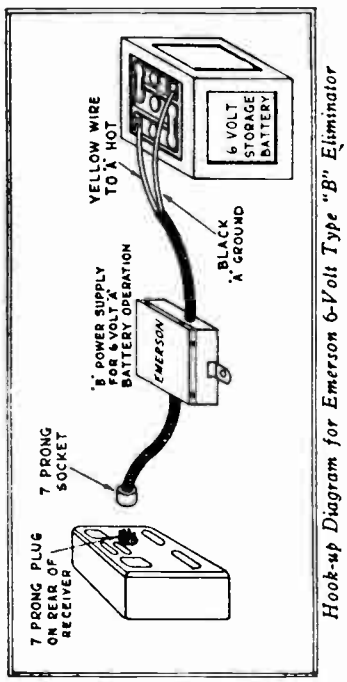
Attach the 7-prong socket on the eliminator cable to the plug in the rear of set. Connect the 2-prong plug to the 32-volt light socket and the set is ready for operation.

Directions for 220 Volt AC-DC—The 220-volt Ballast Adapter is required. Insert the 220-volt Ballast Adapter in the 220-volt supply and insert the two-prong set plug into the adapter socket; then follow instructions for operation for home use.

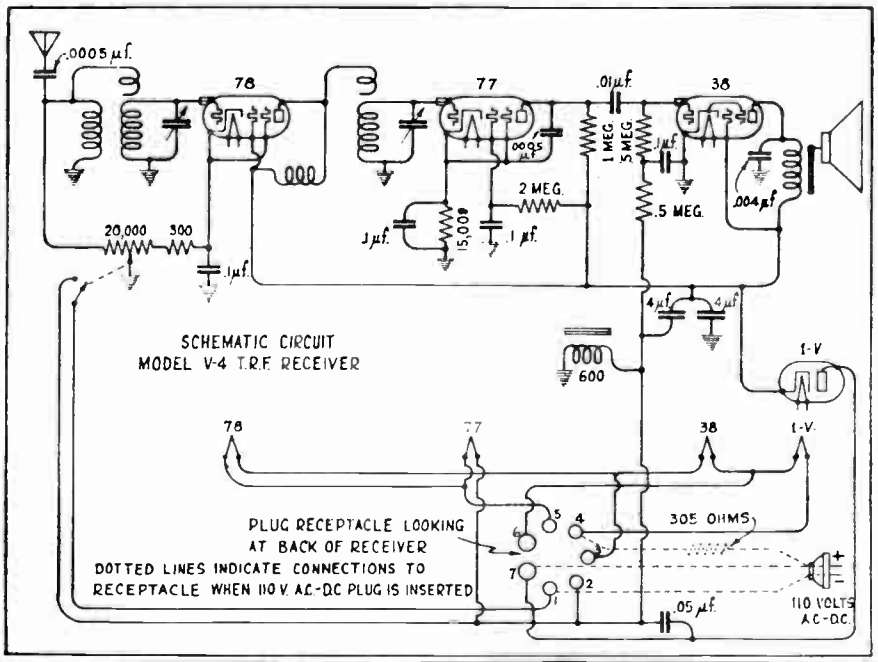
For List of Parts, see Index

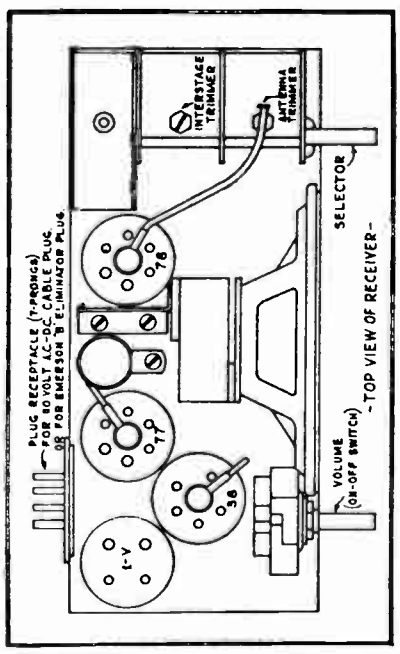
Model V4

For EITHER AC or DC—25 to 70 Cycles
100 to 135 Volts—Also 6 Volts, 32 Volts and 220 Volts



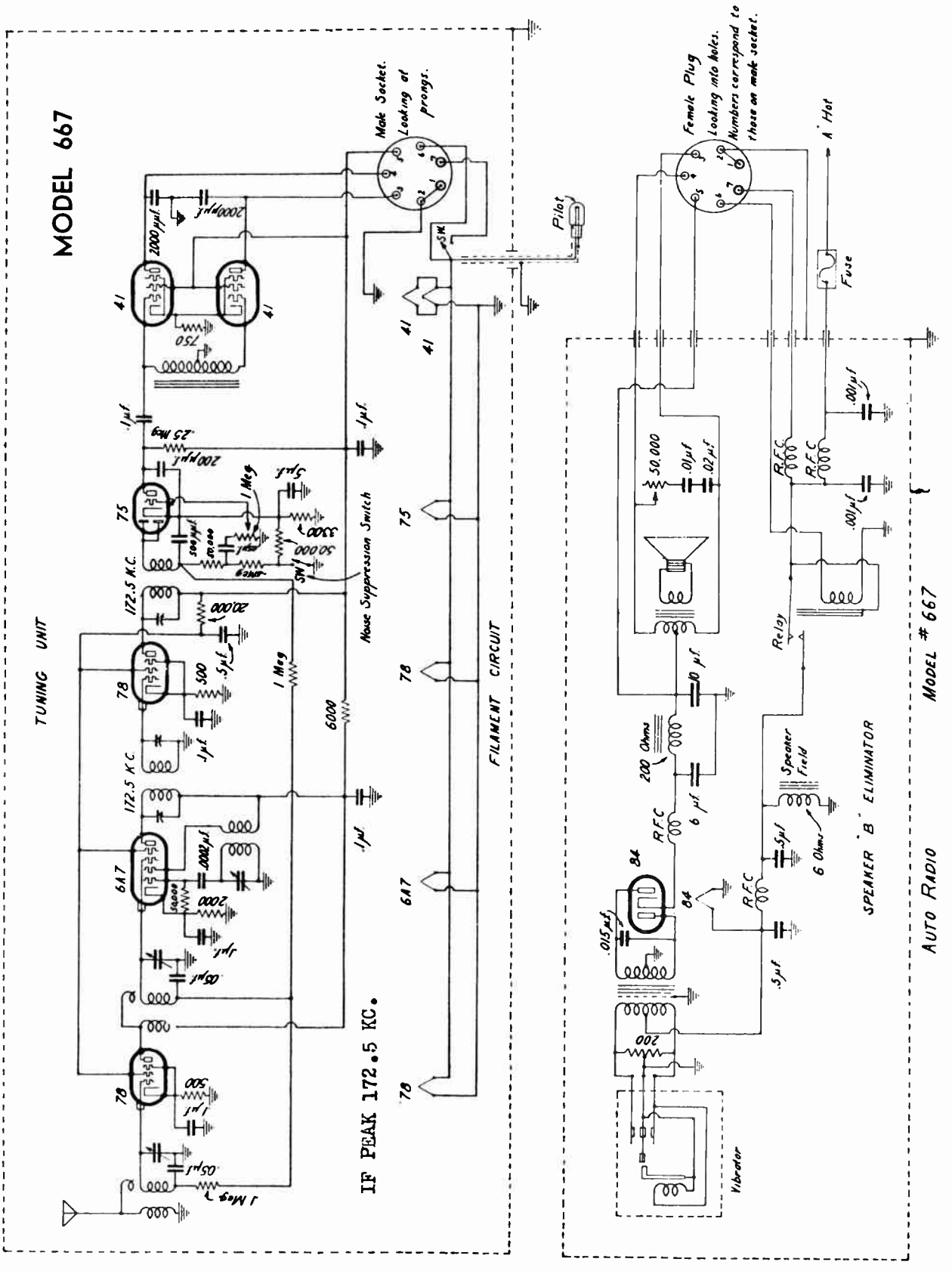
Hook-up Diagram for Emerson 6-Volt Type "B" Eliminator





MODEL 667
Schematic

EMERSON RADIO AND PHONOGRAPH CORPORATION



After unpacking the receiver and before starting to install it, a careful check of the parts furnished should be made.

The following is a list of the items:

1. The receiver proper, complete with six tubes in their places inside, and with front cover intact.
2. Receiver mounting bracket with plate, nut, and lockwasher.
3. Remote control head.
4. Two drive cables.
5. Speaker-eliminator complete with vibrator, tube, mounting bracket, battery cable and receiver connector cable with plug.
6. One distributor suppressor.
7. Six spark plug suppressors.
8. One generator condenser.
9. One ammeter condenser.
10. Four screws and four lock washers for securing bracket to receiver.
11. Two bolts, two nuts and two lockwashers for mounting speaker.

Make a general examination of the receiver. See that the tubes are pushed down in their sockets and that the grid caps are in place on the proper tubes. In order to do this it will be necessary to remove the cap nuts from the front cover plate and slide the receiver out of its housing by pulling out on the cover plate.

Mounting the receiver—while the receiver may be mounted in any available location, three recommended positions are listed below—

1. Mounted so that the control cables face right.
2. Mounted so that the control cables face front.
3. Mounted so that the control cables face left.

Positions 2 and 3 will be found best for most cars. It should be borne in mind that the controls will operate more smoothly if the cables are bent as little as possible. Select a position for the receiver that will allow the cables to fall in an easy sweep. There should be no sharp bends or kinks.

Hold the receiver up against the dash in the desired location with the cables in the direction chosen. Mark around it with a pencil, and in the center of the area bounded by the pencil lines drill a ½" hole through the dash.

Mount the bracket on the receiver using the four screws and lockwashers. Put a lockwasher under the head of each screw and insert the screws through the bracket holes and into the tapped holes in the case. Screw up tightly.

Now lift the receiver into place, pushing the bracket bolt through the hole in the dash. On the engine side of the dash put the mounting plate on the bolt, then the lockwasher and nut. After making certain that the receiver is straight, tighten the nut securely.

Mount the control head on the steering column and connect the cables to control head, following instructions given on the red tag.

To attach the control cables to the receiver insert the free end of the right hand cable into the upper chuck on the receiver. Push the cable in lightly while turning the right hand knob back and forth until the tongue on the drive cable engages with the slot in the condenser shaft. While holding the cable in place tighten the set screw in the chuck enough to prevent turning or withdrawal of the cable housing. If the set screws are too tight the cables will bind.

Proceed in the same manner to connect the other drive cable, inserting the key or key knob into the key hole at the left on the control head, and turning back and forth as before. On turning all the way to the left, the switch will snap to the "off" position.

Connect the pilot light leads to the control head, the black wire going to the insulated post.

Tie the control cables and pilot light lead to the steering column and the dash, using friction tape. Do this at as many points as is necessary to prevent swinging and vibration, always bearing in mind the fact that smooth operation of the controls depends on the manner in which the cables are run.

Now line up the dial pointer, following the instructions furnished on the red tag.

Install the speaker in any convenient location that the length of cable will allow. Drill two ⅜" holes and mount the bracket, using the ⅜" bolts.

Two cables extend from the speaker. On one of these cables is the female end of a detachable six prong plug, the male end of which is on the receiver. Connect the speaker to the receiver by means of this plug, observing that the two large pins on the male half of the plug engage with the two large holes in the female half of the plug. Do not try to force the plug together in any other manner.

A 10 ampere fuse is located in a small tubular holder in the battery lead. To replace the fuse, remove the cap, insert the fuse and replace the cap. The fuse is intended to protect the receiver, and in no case should one larger than 10 amperes be used.

The other cable terminates in a clip, designed for connection to the ammeter binding post. Before attaching this clip the remote control should be tested. See that the knob for the volume control and switch operates properly. When turned all the way to the left the switch should be heard to snap to the "off" position. On turning the knob to the right the switch first snaps on and then operates as the volume control.

The clip on the battery cable may now be attached. Squeeze the sides of the clip together so that the holes are in line, then push it over the battery post of the ammeter and release. If uncertain as to which post is on the battery side of the ammeter, connect the clip to either post and switch on the set by turning the left hand control knob to the right. The dial will immediately light up. Now notice the reading on the ammeter as the set is turned on and off. If when the set is on the ammeter shows discharge, turn off the set and move the clip to the other post.

At this point the antenna should be connected. Proceed as follows:

Assuming that the car is already equipped with a suitable antenna, see that the lead-in is shielded and kept away from the motor compartment and high tension ignition wires.

Check the antenna for a possible ground and if found satisfactory connect it to the inner wire extending through and beyond the shield of the antenna lead on the receiver. Be careful to make a good splice, soldering if possible. Make the splice close enough to both shields so that the portion of wire left unshielded will be short.

Cover the splice with several layers of friction tape and then connect both shields together, again soldering if possible. Ground the shield at one or more points to the dash or car body.

For installations in cars not equipped with built-in antennae, see the instructions given under "Antenna".

The installation of the receiver may now be considered complete, provided all the foregoing instructions were faithfully carried out. A preliminary test can now be made, after which the suppression of any motor noises that are present may be undertaken.

Intermediate Frequency.

To align the intermediate frequency transformers use a good modulated oscillator set for 172.5 k.c. Set the volume control for maximum volume and short circuit the rear section of the variable condenser.

Connect the oscillator output across the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two i.f. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

Radio frequency and oscillator stages.

To align the r.f. and oscillator sections, remove the short from the variable condenser, and couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350 and 1450 k.c. Set the dial to the frequency selected, following the pointer alignment instructions on the red tag. Adjust the trimmers on the variable condenser, beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the r.f. sections may be aligned by tuning in a weak station between 1350 and 1450 k.c. and aligning as before. If an output meter is not available, adjust for maximum volume from the speaker.

Voltage analysis:

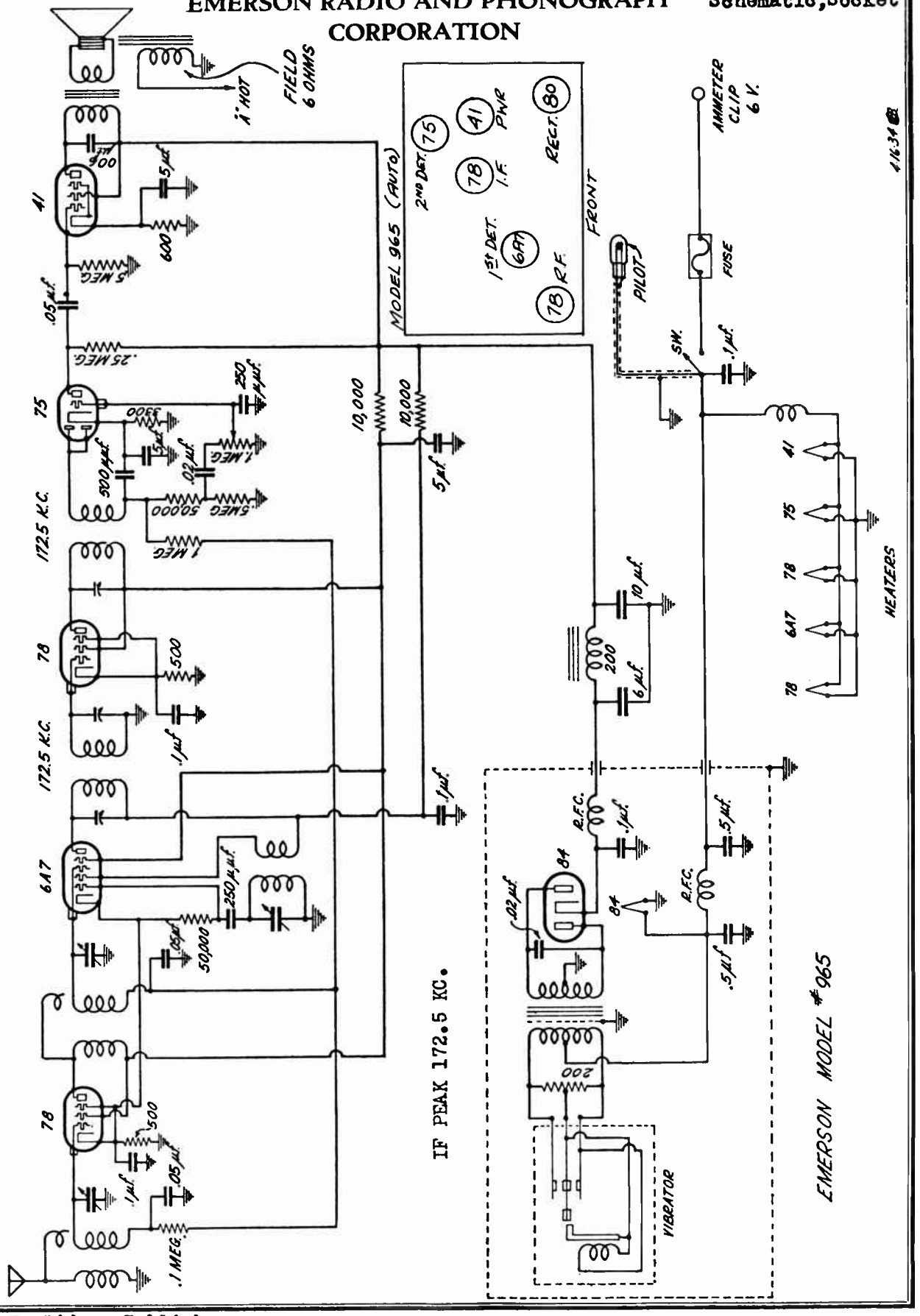
Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over. Voltages are measured from the chassis (ground) to the point indicated. Ground the antenna to the shield when taking readings.

Voltage across battery—6 volts.
Voltage across speaker field—6 volts scant.
Voltage across all heaters—6 volts scant.

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. Plate*
78 R.f.	135	90	3.5	3.5	.....
6A7	135	90	12.5	.....	140
78 I.f.	180	90	3.	3.	.....
75	75	.....	1.	.....	.....
41	185	192	16.5	.....	.....
41	185	192	16.5	.....	.....

MODEL 965
Schematic, Socket

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 965
Voltage, Alignment

EMERSON RADIO AND PHONOGRAPH CORPORATION

Tubes and their functions:

1—78 Radio frequency amplifier.

1—6A7 {Electron coupled oscillator. {First detector.

1—78 Intermediate frequency amplifier.

1—75 {Diode second detector. {Audio frequency amplifier. {Automatic volume control.

1—41 Output power tube.

1—84 Full-wave rectifier.

1—Non-synchronous vibrator inverter.

Voltage Analysis:

Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

Battery volts—6. Volts across heaters—6 scant. Volts across speaker field—6 scant.

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. plate*
78	110	110	6	6	—
6A7	170	110	6	—	170
75	110	—	1.3	—	—
78	110	110	3.5	3.5	—
41	210	220	15	—	—

If the set fails to operate look for some minor cause which might be one of the following:—

1. No "A" supply—"A" lead to set not making contact with ammeter post. Fuse blown.
2. Low "A" supply—The car battery needs recharging.
3. Tubes not in place in their sockets.
4. Grid caps not in place.
5. Defective tubes.
6. Antenna lead shorted to shield at splice, or otherwise grounded.

A 10-ampere fuse is located in a small tubular holder in the battery lead. To replace the fuse, unscrew the threaded cap, insert the fuse and replace the cap, screwing up firmly. The fuse is intended to protect the receiver and in no case should one larger than 10 amperes be used.

ADJUSTMENTS

Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ k.c. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two I.F. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

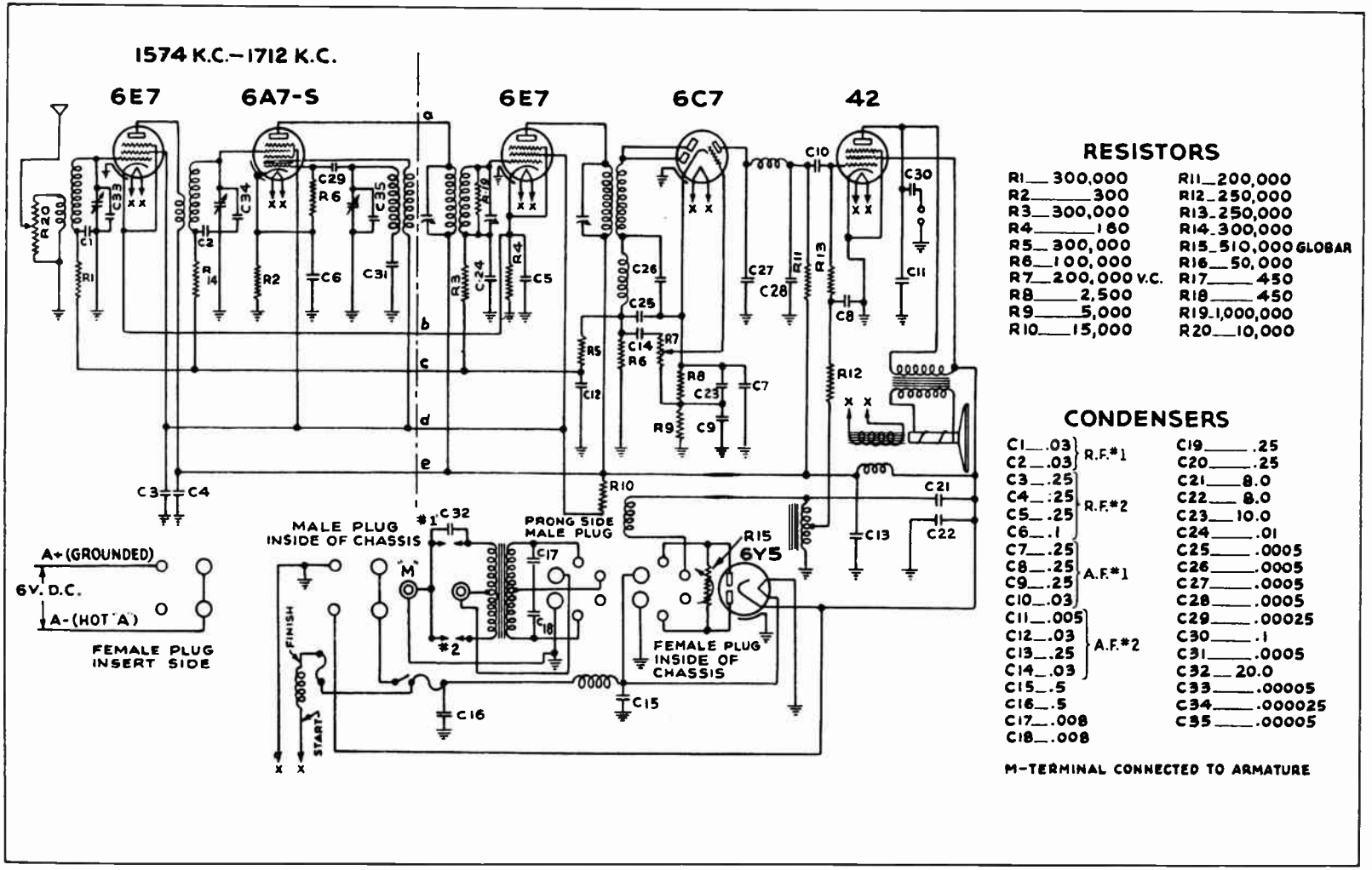
Radio Frequency and Oscillator

To align the R.F. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350-1450 k.c. Set the dial to the frequency selected. Adjust trimmers on the variable condenser beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the R.F. sections may be aligned on broadcast.

Tune in a weak station between 1350 and 1450 k.c. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

FORD MOTOR CAR CO.

MODEL Ford Glove Box
Type Police Radio
Built by Grigsby-Grunow
Schematic



RESISTORS

R1	300,000	R11	200,000
R2	300	R12	250,000
R3	300,000	R13	250,000
R4	180	R14	300,000
R5	300,000	R15	510,000 GLOBAR
R6	100,000	R16	50,000
R7	200,000 V.C.	R17	450
R8	2,500	R18	450
R9	5,000	R19	1,000,000
R10	15,000	R20	10,000

CONDENSERS

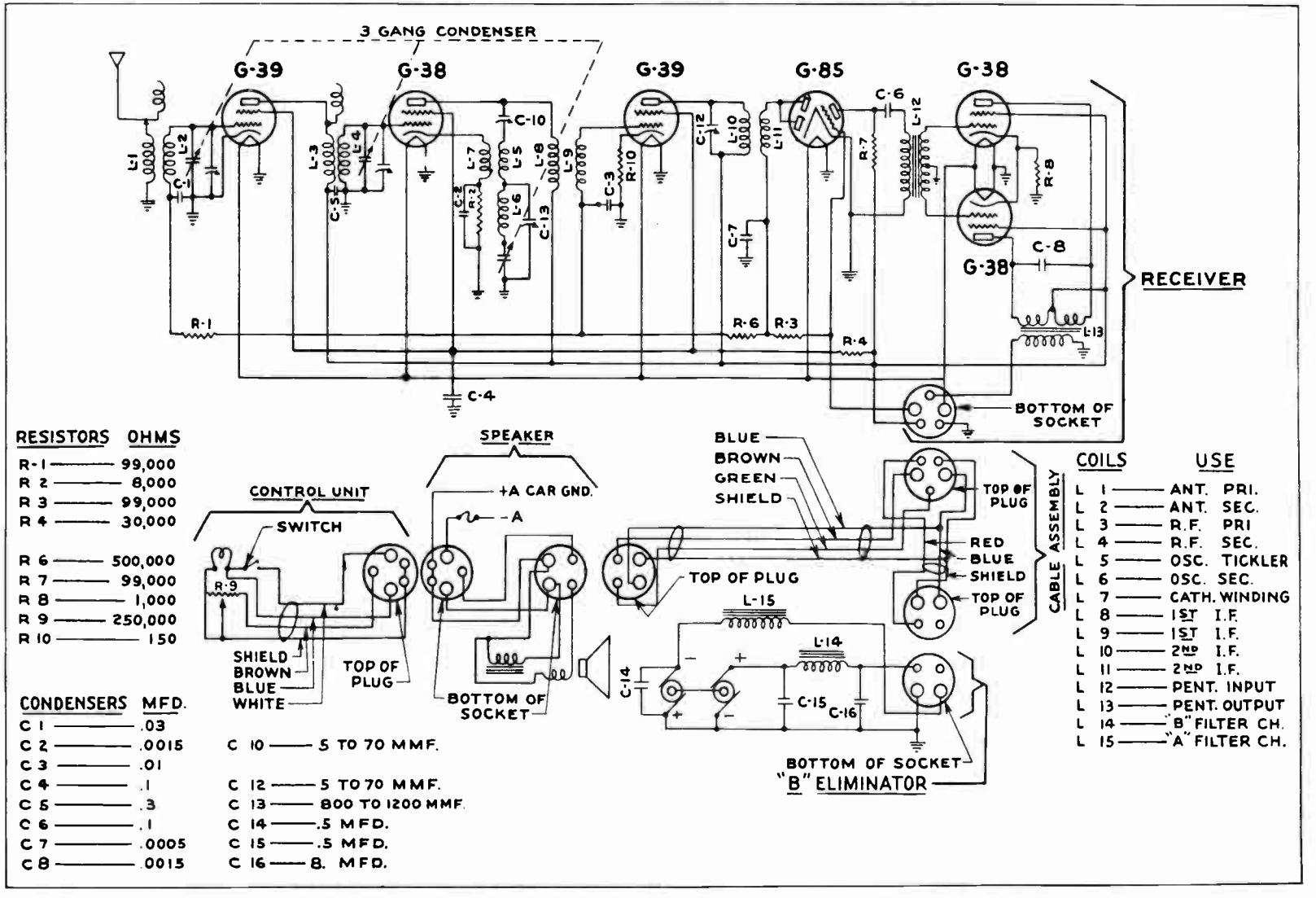
C1	.03 R.F.*1	C19	.25
C2	.03 R.F.*1	C20	.25
C3	.25 R.F.*2	C21	8.0
C4	.25 R.F.*2	C22	8.0
C5	.25 R.F.*2	C23	10.0
C6	.1	C24	.01
C7	.25 A.F.*1	C25	.0005
C8	.25 A.F.*1	C26	.0005
C9	.25 A.F.*1	C27	.0005
C10	.03 A.F.*1	C28	.0005
C11	.005 A.F.*2	C29	.00025
C12	.03 A.F.*2	C30	.1
C13	.25 A.F.*2	C31	.0005
C14	.03 A.F.*2	C32	20.0
C15	.5	C33	.00005
C16	.5	C34	.000025
C17	.008	C35	.00005
C18	.008		

M-TERMINAL CONNECTED TO ARMATURE

FORD GLOVE BOX TYPE POLICE AUTO RADIO RECEIVER (BUILT BY GRIGSBY GRUNOW CO.)

MODEL Ford B-18805
Auto Radio Built by
Grigsby-Grunow
Schematic

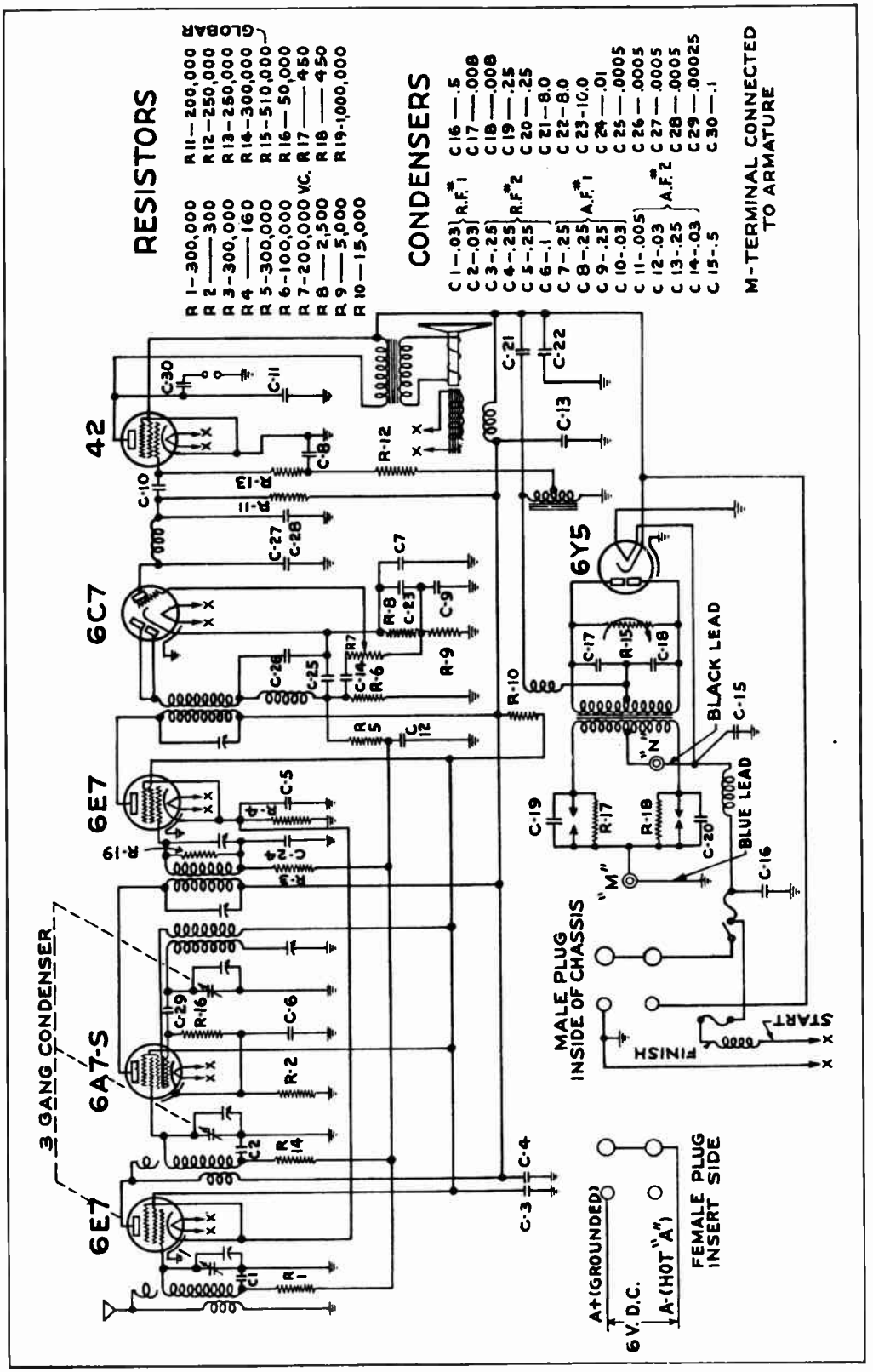
FORD MOTOR CAR CO.



FORD B-18805 AUTO RADIO RECEIVER WITH MOTOR-GENERATOR "B" SUPPLY

FORD MOTOR CAR CO.

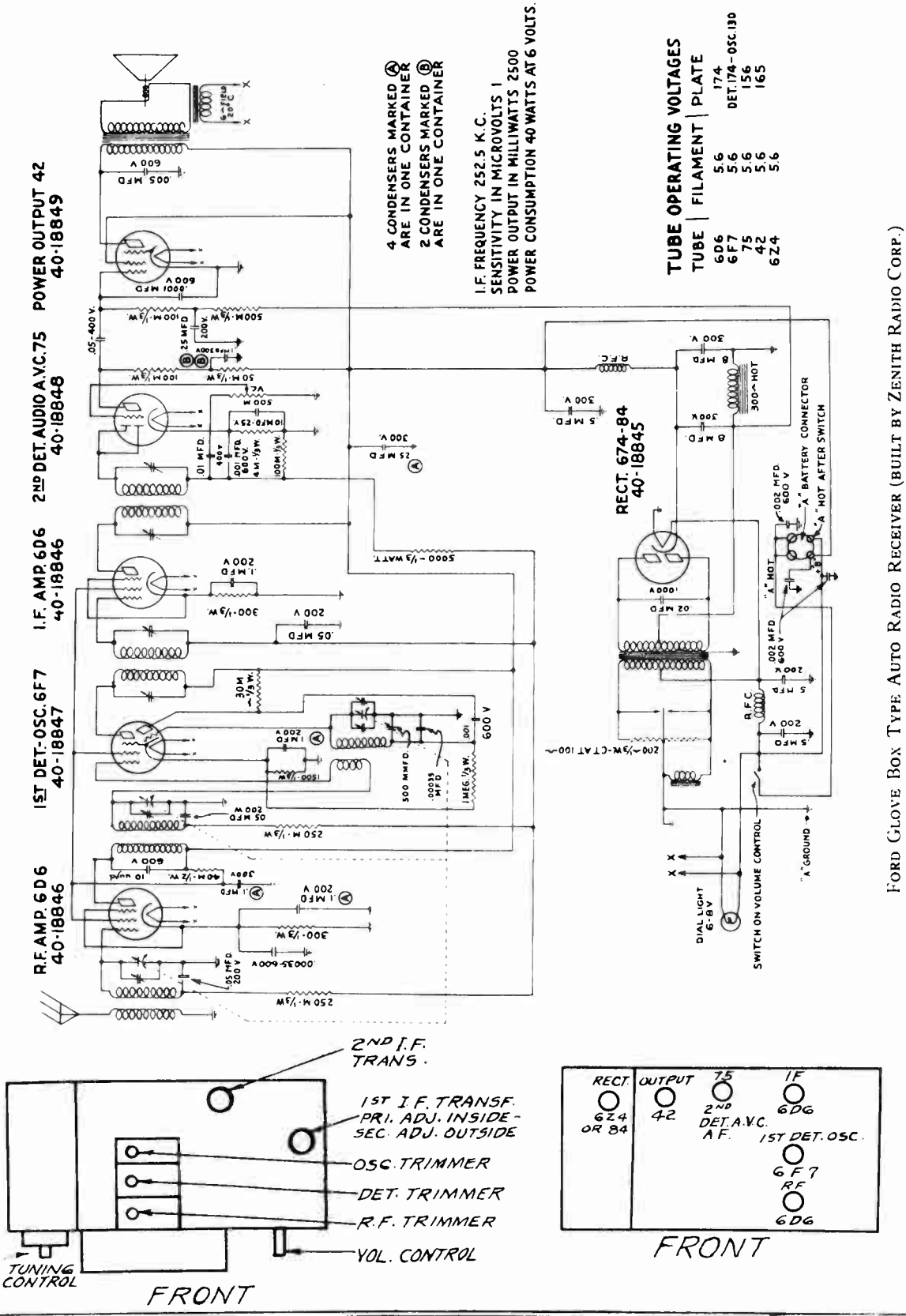
MODEL Ford 40-18805
Glove Box Auto Radio
Built by Grigsby-
Grunow
Schematic



FORD 40-18805-B GLOVE BOX TYPE AUTO RADIO RECEIVER (BUILT BY GRIGSBY GRUNOW CO.)

MODEL Ford-Lincoln
Auto Radio Built by
Zenith
Schematic

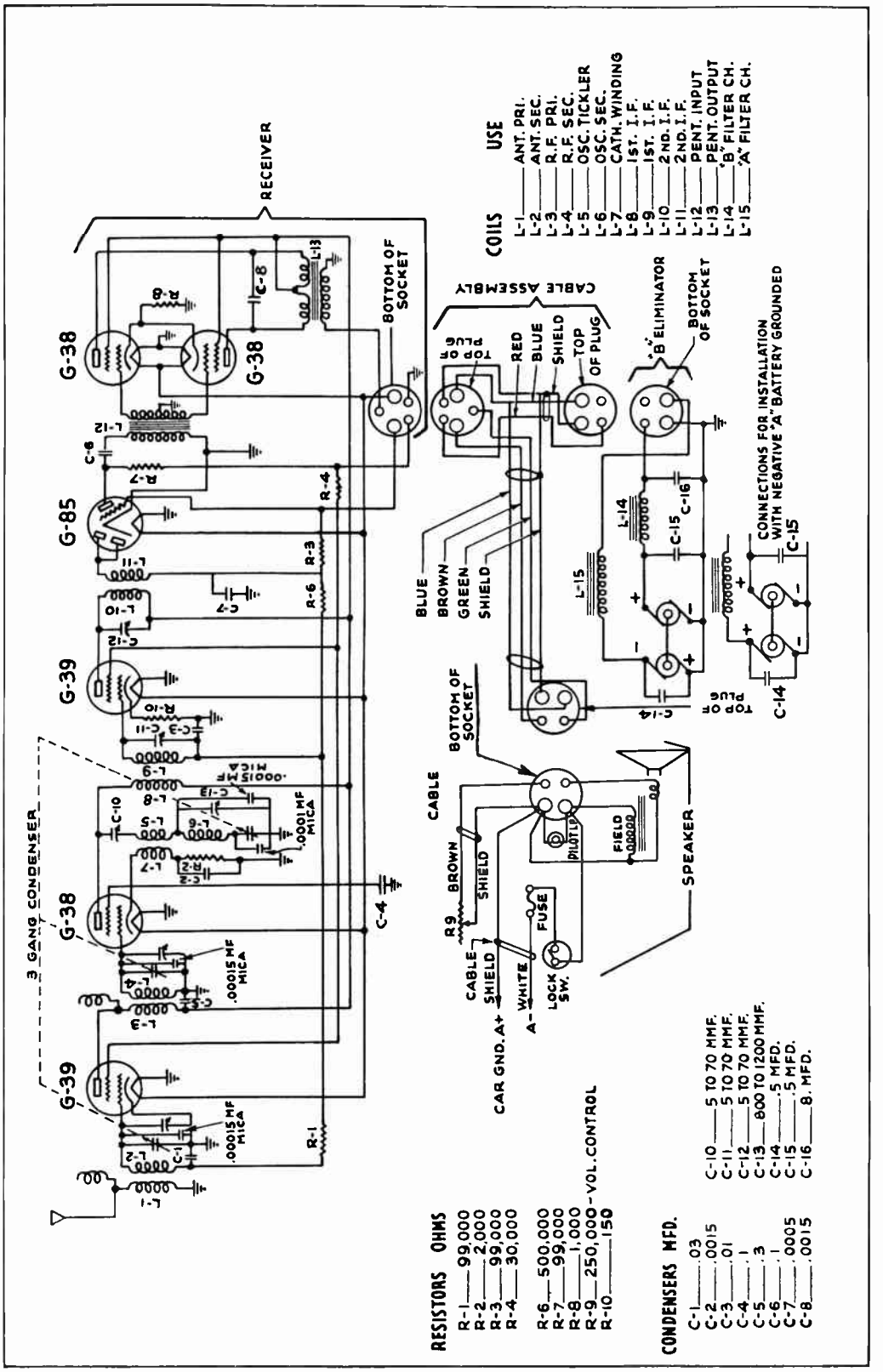
FORD MOTOR CAR CO.



FORD GLOVE BOX TYPE AUTO RADIO RECEIVER (BUILT BY ZENITH RADIO CORP.)

FORD MOTOR CAR CO.

MODEL Ford Police
Auto Radio
Built by Grigsby-Grunow
Schematic



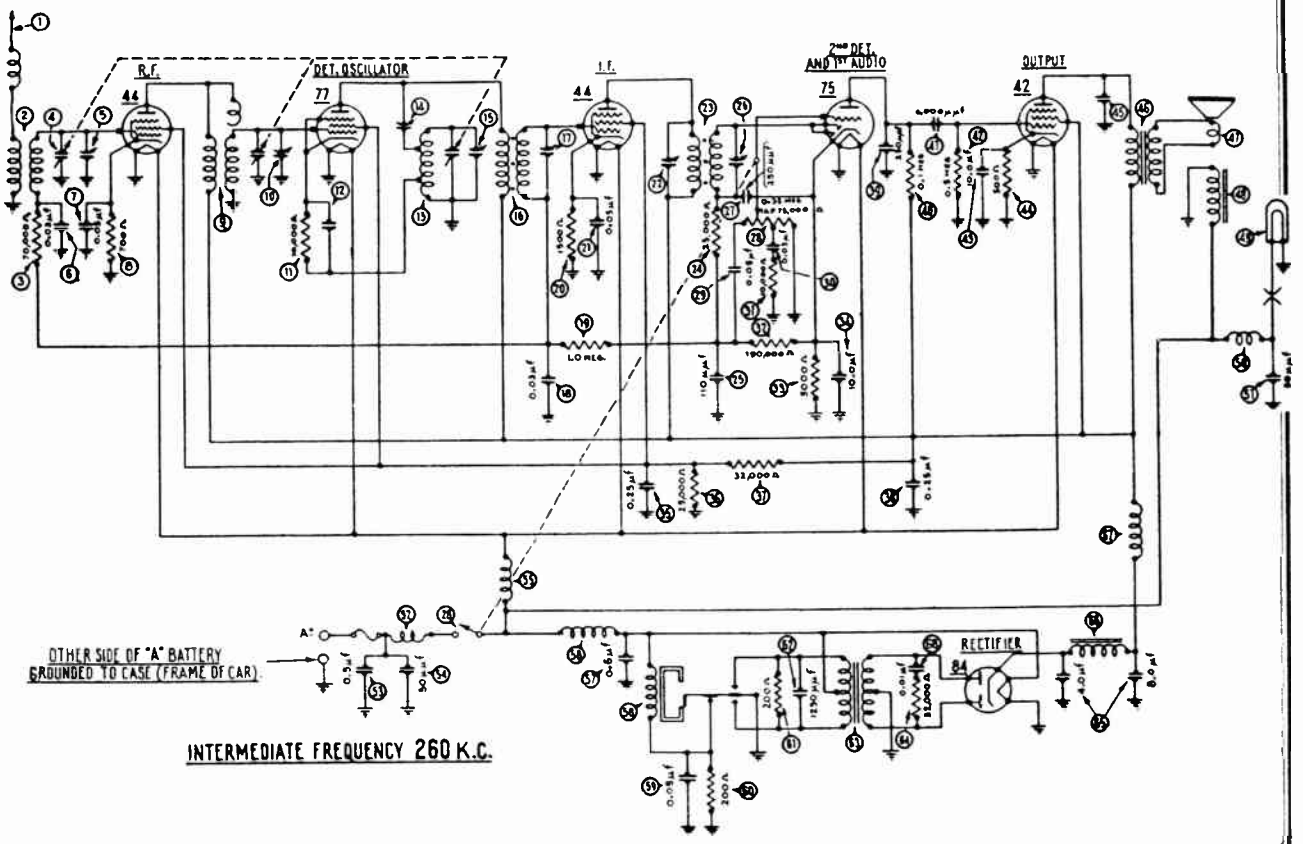
FORD TYPE POLICE AUTO RADIO RECEIVER WITH MOTOR-GENERATOR "B" SUPPLY

Model N, Center Control
Schematic
Parts List

FORD MOTOR CAR CO.

FORD CENTER CONTROL TYPE RADIO

Model N – Schematic Wiring Diagram



Model N Parts List

No Shown on Schematic	Description	Part No.
(1)	Antenna Choke	32-1372
(2)	Antenna Transformer	32-1331
(3)	Resistor (70,000 ohms)	33-1115
(4)	Tuning Condenser	31-1166
(5)	1st Padder (on tun. cond.)	
(6)	Condenser (.03 mfd.)	30-4025
(7)	Condenser (.05 mfd.)	30-4020
(8)	Resistor (700 ohms)	6443
(9)	R. F. Transformer	32-1332
(10)	2nd Padder (on tun. cond.)	
(11)	Resistor (10,000 ohms)	33-1000
(12)	Condenser (1000 mmfd.)	30-1007
(13)	Oscillator Transformer	32-1333
(14)	Padder (Prim. 1st I. F. Tran.)	
(15)	3rd Padder (on tun. cond.)	
(16)	First I. F. Transformer	32-1329
(17)	Padder (Sec. 1st I. F. Trans.)	
(18)	Condenser (.03 mfd.)	30-4025
(19)	Resistor (1,000,000 ohms)	33-1096
(20)	Resistor (2300 ohms)	33-3048
(21)	Condenser (.05 mfd.)	30-4020
(22)	Padder (Pri. 2nd I. F. Trans.)	
(23)	Second I. F. Transformer	32-1237
(24)	Resistor (25,000 ohms)	33-1013
(25)	Condenser (110 mmfd.)	30-1031
(26)	Padder (Sec. 2nd I. F. Trans.)	
(27)	Condenser (250 mmfd.)	30-1032
(28)	Vol. Con. & Switch Assm.	33-5067
(29)	Condenser (.05 mfd.)	30-4020
(30)	Condenser (.03 mfd.)	30-4025
(31)	Resistor (10,000 ohms)	33-1000
(32)	Resistor (190,000 ohms)	33-1116
(33)	Resistor (5000 ohms)	6096
(34)	Condenser (10 mfd.)	30-2076
(35)	Condenser (.25-.25 mfd.)	30-4126
(36)	Resistor (25,000 ohms)	3656
(37)	Resistor (32,000 ohms)	3525
(38)	Condenser (.25-.25 mfd.)	30-4126
(39)	Condenser (250 mmfd.)	30-1032
(40)	Resistor (100,000 ohms)	6099
(41)	Condenser (6000 mmfd.)	30-4125
(42)	Resistor (500,000 ohms)	6097
(43)	Condenser (10 mfd.)	30-2076
(44)	Resistor (500 ohms)	33-3031
(45)	Condenser (4000 mmfd.)	30-4185
(46)	Output Transformer	32-7019
(47)	Cone and Voice Coil	02861
(48)	Field Coil Assembly	36-3097
(49)	Pilot Lamp	34-2038
(50)	Interference Choke	32-1374
(51)	Condenser (50 mmfd.)	30-1029
(52)	Interference Choke	32-1374
(53)	Condenser (.5 mfd.)	30-4184
(54)	Condenser (50 mmfd.)	30-1029
(55)	"A" Choke	32-1368
(56)	Vibrator Choke	33-1367
(57)	Condenser (.5 mfd.)	30-4047
(58)	Vibrator	38-5036
(59)	Condenser (.05 mfd)	30-4039
(60)	Resistor (200 ohms)	7217
(61)	Resistor (200 ohms)	7217
(62)	Condenser (1250 mmfd.)	5886
(63)	Power Transformer	32-7232
(64)	Resistor (32,000 ohms)	3525
(65)	Condenser (4-8 mfd.)	30-2030
(66)	"B" Choke	32-7233
(67)	R. F. Choke	32-1078
(68)	Condenser (.01 mfd.)	30-4051
	4-prong Socket	27-6015

Description	Part No.
5-prong Socket	27-6014
6-prong Socket	6417
Spark Plug Resistor	33-1015
Spark Plug Terminal	28-6179
Interference Cond. (Gen.)	30-4181
Interference Cond. (Dist.)	30-4176
Dial Assembly	42-5166
Knobs	27-4124
Knob Springs	28-1738
Battery Cable	38-5749
Fuse	7227
Fuse Insulator	27-7131
Flex. Control Shaft (Tuning)	28-8241
" " " (Volume)	28-8242
Glass for Control	27-7325
Dial Assembly	42-5166
Pointer	28-1956
Antenna Lead	L-1741
"T" Bolt (set mounting)	28-6161
Nut (set mounting)	W-518A

The New Ford Auto Radio Incorporates: New, advanced principles of circuit and tube design. Six tube Superheterodyne with bass compensation. Rugged, compact, single unit Chassis. Built-in Electro-dynamic speaker. Highly developed automatic volume control. Illuminated, custom-built instrument panel control, mounting in ash tray opening.

Receiver mounts directly above steering column, out of sight and out of the way.

Controls go into ash tray opening. A special drilling template is furnished with each receiver by means of which the receiver can be mounted in cars without ash tray equipment.

These instructions have been carefully prepared for your use in installing the 40-18805-E receiver in Ford 1933 and 1934 cars. Read them carefully in every detail before attempting an installation.

Antenna

Antenna have been built in all closed Ford cars for some time with aerial lead coming down at the rear of the body or the right-hand windshield pillar. Closed cars of recent manufacture have aerial leads coming down the left-hand windshield pillar. (See Fig. 268.)

When installing this radio in a car having the antenna lead-in at the rear of the body, cut this lead-in (40-18812-AR) off as short as possible (taping the end and fastening it securely to prevent shorting the antenna through contact with the metal of the body) and install the new lead-in (40-18812-D). Loosen the front left-hand corner of the headlining sufficiently to pass the single end of the lead-in through the center of the front L.H. pillar and solder that portion of the lead-in which is stripped to the wire roof netting (after two turns of the lead-in have been made around the netting). See Figure 268 connection "X". The roof netting must be scraped clean of any paint where the lead-in is to be soldered. A braided "pigtail" which is soldered to the male connector at the receiver end of the aerial lead must be grounded to a body brace just at the base of the pillar. This can be soldered or fastened with a sheet metal screw. Scrape the surface of the brace clean with a file to insure a good connection. (See "S" Figure 268.)

The spare wheel antenna, Part No. 40-18812-C should be used on all open cars.

Antenna extension lead, Part No. 40-18818, will have to be used on some cars having lead-in coming down right-hand windshield pillar. For the majority of cars, the lead is long enough to reach without this extension. Connect lead below glove box, then slip up and over top of box. Plug the extension into receiver lead, place it over the top of the glove box and plug it into aerial lead socket at right-hand pillar.

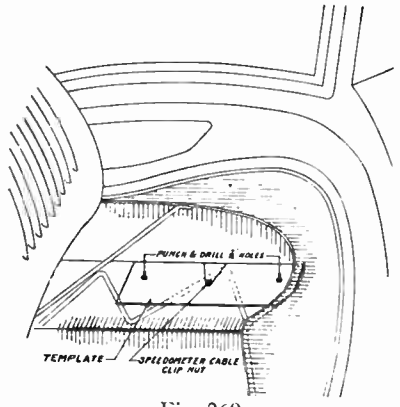


Fig. 269

Radio Location and Installation

Refer to Figure 269 for location of receiver mounting holes.

Place cardboard template on body ledge under left-hand hood as indicated in Figure 269 and prick punch hole locations. Drill 7 16" holes. Assemble T bolts loosely as shown in Figure 270.

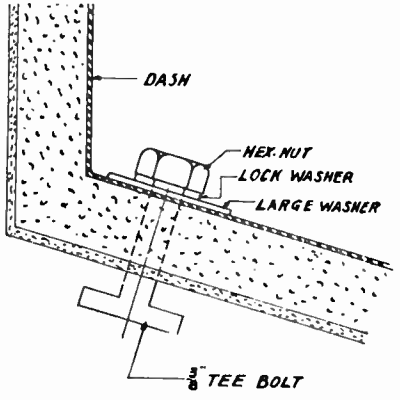


Fig. 270

Remove speedometer cable clip bolt and relocate speedometer cable to the left of the radio receiver. Relocate gas gauge line on the right of the radio receiver.

Install receiver above steering column with speaker facing towards driver and hook the T bolts into the brackets on top of the receiver. Tighten receiver into place. Bring aerial lead around rear of receiver and connect it into male plug on the end of the car antenna.

Ammeter Lead

Place the fuse and fuse insulator in the metal housing and assemble. Now connect the eyelet terminal to the hot (left) side of the fuse block.

Instrument Panel Control

Remove ash receptacle by dropping it forward and bending retaining clips toward the center. See Figure 271.

With a pair of pliers, bend upward ash receptacle back-stop to allow clearance for control head.

Assemble control head and cables in this hole by means of the U-clamp and two wing nuts. Draw up the wing nuts until the cover plate is against the instrument panel. See Figure 272.

The cowl ventilator handle should pass between the two flexible shafts. The shaft on the right with the male end is the station selector and is pushed into the right hand bushing on the receiver (closest to the dash). The left shaft is the switch and volume control. This has a female end and should be pushed into the bushing on the receiver nearest the instrument board. (See Figure 268.) After the shafts are properly seated, tighten the two shaft couplings. Plug the dial light wire into its receptacle close to the switch volume control bushing.

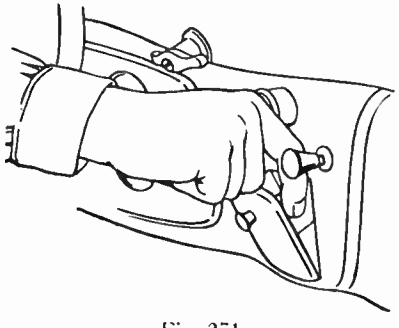


Fig. 271

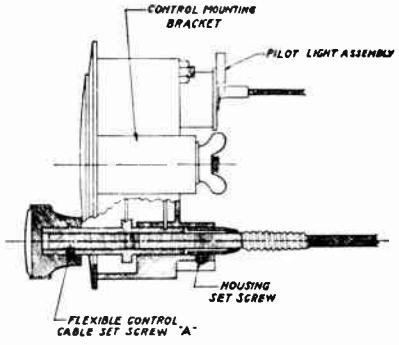


Fig. 272

Installing Dash Controls in Cars Without Ash Receptacle

Place the template on the instrument panel, as indicated in Figure 273.

Be sure that the throttle and choke rods come to the bottom of the slots in the top of the template and that the bottom of the template is flush with the bottom of the instrument panel. With a sharp-pointed instrument score the panel around the opening in the template. Cut out dash to these lines by drilling around inside of mark with a $\frac{1}{8}$" drill and filing. Care must be taken not to mar the instrument board or file beyond line during this operation.

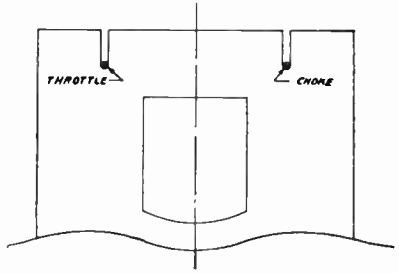


Fig. 273

MODEL N, Center Control
Socket, Alignment
Service Notes

FORD MOTOR CAR CO.

Dial Calibration

The receiver is calibrated in kilocycles with the last "0" omitted. Turn on receiver by rotating left-hand knob in clockwise direction. It will take a few moments for the tubes to heat up. Tune in a station of known frequency. Remove the right-hand knob by pulling it towards you. This is held in position by a spring clamp. Loosen the set screw on shaft (See "A" Figure 272) under knob until pointer moves freely. Now turn the pointer to the frequency of the station which is tuned in, tighten set screw and replace knob. Check accuracy of calibration on other stations at different points on the dial and adjust further if necessary.

Spark Noise Elimination

Cut off the eyelet terminals on all spark plug wires at the spark plug and screw on the angle resistors. See Figure 274.

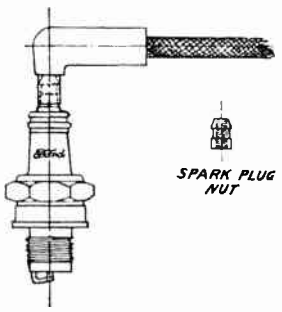


Fig. 274

Remove the round knurled nut and in its place use snap-type nut furnished. Press resistors on snap nuts.

The by-pass condenser with special coil bracket should be mounted on the ignition coil with the condenser wire on the terminal, as shown in Figure 275.

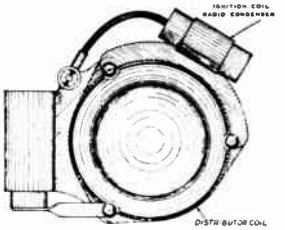


Fig. 275

These operations should reduce the interference to a satisfactory level. However, there may be an occasional car which will require an additional B 18827 condenser, either at the ignition switch or at the fuse block.

The condenser to be used at the fuse block can be mounted underneath the bolt which holds the fuse block adjacent to the fuse block. Connect the wire leading from the condenser to the terminal on either side of the fuse.

If this condenser is to be used at the ignition switch a small hole should be drilled in the instrument board flange just to the right of the steering column, using an 8-32 bolt, nut and lockwasher to mount the condenser. The wire from the condenser should be attached to either terminal at the ignition switch.

If the above operations do not reduce the electrical interference to a satisfactory point, it may be necessary to reduce the clearance between the distributor rotor and the terminal plate electrodes. Remove one distributor cap and terminal plate and clean electrodes with a small file or knife. Build up these contacts with **rosin core solder** about 1/32". Replace terminal plate and cap and revolve motor with crank, leaving ignition switch off. Remove terminal plate and inspect carefully, removing excess solder which may have sheared off.

Repeat this same operation on the other side of the distributor.

Operating Instructions

To turn on the receiver, turn the left hand knob slightly in a clockwise direction. The balance of the rotation of this knob controls the volume of the radio receiver. This receiver is equipped with a highly developed automatic volume control system which tends to maintain the volume at a constant level. However, there are some places, under viaducts, tunnels, bridges, etc., where the radio signal becomes so weak that it cannot be heard. When driving under trolley lines or in noisy locations, it is advisable to tune in on a strong local station.

Be sure the receiver is tuned in accurately, otherwise distorted reception will result and local electrical interference will be magnified.

When turning off the receiver be sure the left-hand knob is turned counterclockwise until a snap is heard and the dial light goes off; otherwise the receiver will continue to operate and discharge the battery.

Generator Interference

Remove generator relay mounting screw and slip condenser bracket under the generator cut-out mounting lug. Reinstall cut-out mounting screw and tighten down securely. Connect the condenser wire to the battery terminal of the cut-out. See Figure 276.

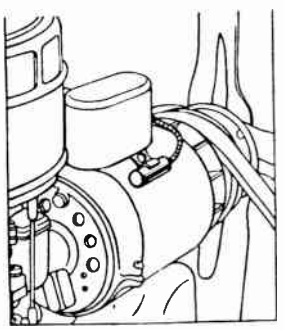
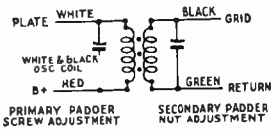


Fig. 276



1st I. F. Transformer

Fig. 277

The following instructions are intended for radio engineers only.

I. F. Transformers and Padders

A new type I. F. transformer complete with padders is used in the Ford center control radio receiver.

The padders are placed in the top of the shield can, one above the other.

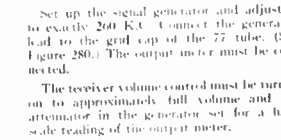
The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figure 280.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figures 277 and 278.

If replacements are ever necessary, replace the entire coil assembly for the first or second I. F. stage. Neither the coil nor the padders can be obtained separately.

Adjustments

All adjustments have been carefully checked at the factory. If, however, at any time it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter.



2nd I. F. Transformer

Fig. 278

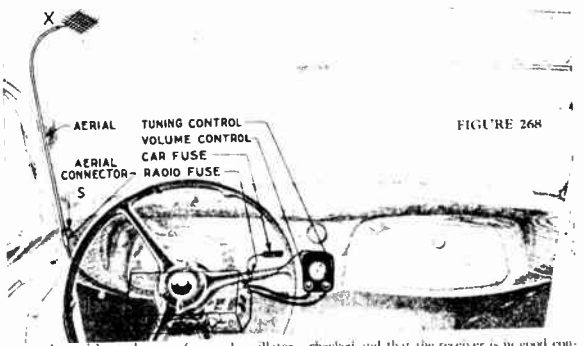


FIGURE 268

The receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the receiver is in good condition except for the padding adjustments.

Remove the lid from the receiver. Remove the grid cap terminal from the 77 tube (for location see Figure 280).

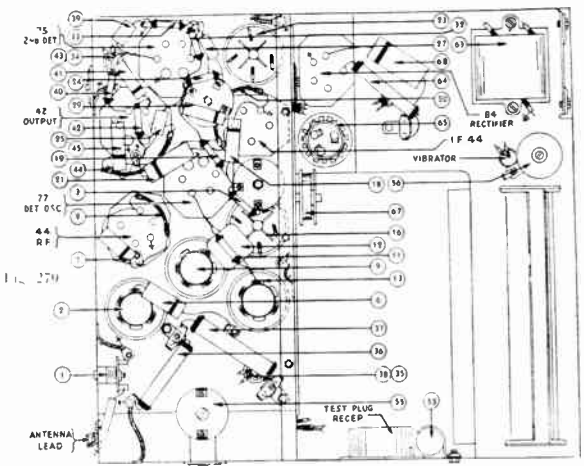


Fig. 279

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 77 tube. (See Figure 280.) The output meter must be connected.

The receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22 and 26) are adjusted first (Figure 280). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half scale reading, adjust the nut (26) with a fibre wrench for the maximum reading on the output meter. This applies to the sets to date, but sets of the future, with the broad tuning, the I. F. is close coupled and will have two peaks, and must be tuned between the two peaks. This requires good judgment and careful adjustment.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just losing the adjustment up to the maximum reading. Do not pass it and then back up.

Repeat the above procedure with the condensers (14) and (17).

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K.C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Figure 280.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high frequency padder (15) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K.C. (60 on the dial scale.

Next turn the condenser plates in, mesh to 140 on the dial scale, 1400 K.C., and set the signal generator for 1400 K.C. The R. F. padder (10) and the antenna padder (5) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the receiver is adjusted properly.

Schematic drawing of the center control type radio is given in Figure 281.

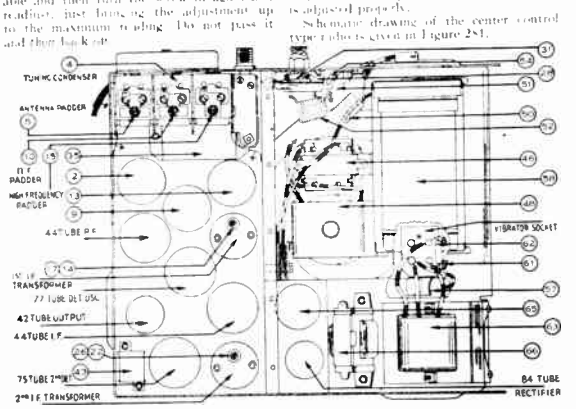


Fig. 280

GALVIN MFG. CO.

MODEL Twin "8"
Notes, Alignment
MODEL Dual "6"
Notes, Alignment

SERVICE NOTES

1934 Motorola Auto Radio

Twin "8" — Dual "6"

To assist you in gaining an understanding of the operation and servicing of the Dual "6" and Twin "8" we are outlining herein a brief description of the circuits employed together with the function of various units. For general installation instructions see the sheet enclosed with each Motorola set.

* * * * * * *

TWIN "8" ----The signal is fed into the primary of the antenna coil, which is of the aperiodic type and is induced into its associated secondary circuit, tuned by the 1st gang of the variable condenser. The signal is then fed to the 78 tube used as the first RF amplifier.

Reference to the circuit diagram (Fig. 3) will show that the 2nd RF stage is impedance coupled, feeding its energy into the grid of the 77 autodyne. In the aperiodic type of antenna coil the gain drops slightly near the 500 K.C. end, while in the impedance type coupling used in the 2nd RF coil rises slightly at this point. It will be seen then that by using these two in combination an overall flat sensitivity curve is obtained.

The type 77 autodyne tube is used because of its simplicity, performance and ability to withstand the vibration to which an auto set is subjected. The use of the padder system in the oscillator is used to allow greater accuracy in dial calibration.

In the 85 tube full wave rectification is used and A.V.C. bias is obtained by voltage drop across the 200M ohm resistance connecting the secondary of the diode feeder to ground. Full A.V.C. voltage is applied to the grids of the RF stage and IF stage and to the grid of the 85 tube. The audio component is amplified in the triode section of the 85, which is resistance coupled to the #37, 2nd audio used as a driver and is impedance coupled to the L.A. tubes operating in Push-Pull Class A Prime.

* * * * * * *

The DUAL "6" ----For all ordinary servicing of the RF section of the Dual "6" the above description will be sufficient.

Reference to the circuit diagram (Fig. 4) will show that a #75 is used as a diode detector resistance coupled to a single 42 output tube.

The manual volume control is in the grid of the 75 whereas in the Twin "8" it is in the grid circuit of the 37 tube.

Fixed bias is used on the 75 grid obtained through the voltage drop across the screen network.

* * * * * * *

SERVICING

In shooting trouble in an auto radio it is well to endeavor to isolate it to one particular section of the set.

The set may be divided into four parts for servicing. (1) Outer housing. (2) Power supply. (3) Speaker. (4) Set chassis.

The audio end of the chassis may be easily checked by removing the grid cap of the 85 or 75 tube and, if normal, a loud hum will occur.

Check the autodyne circuit by tuning the variable condensers to the minimum position and touching the oscillator stator plates. If a click is heard when touching them and also when removing the finger, it indicates that the autodyne is oscillating properly.

ALIGNMENT OF VARIABLE CONDENSERS

Because of the necessity of aligning the variable condensers with the chassis out of the housing it is important to use a definite point. Unless this is done the dial calibration will be incorrect when replacing the chassis in its housing. This point we may take as 1400 KC which is exactly 32° of angular rotation from minimum condenser setting.

Connect the oscillator feeder to the antenna pin of the chassis and set the oscillator to 1400 KC.

Carefully adjust the trimmers of the oscillator and RF variable condensers for maximum reading of output meter.

Next set the service oscillator to 600 KC rotating the variable condensers to a point 156 degrees 30 min. from minimum condenser setting.

Adjust the 600 KC padder condenser (accessible from the front of the chassis) for highest output reading.

The 600 KC setting may also be found by setting the service oscillator to 600 KC. Tune in the oscillator signal and rotate the variable condensers back and forth while adjusting the 600 KC trimmer condenser for highest reading of the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

ALIGNMENT OF THE IF TRANSFORMERS

The IF transformers and diode feeder in the Twin "8" and Dual "6" should always be aligned with a good calibrated service oscillator or signal generator.

Connect the feeder from the oscillator to the grid of the 77 autodyne tube. Remove the grid connection and connect a 500M ohm resistor from grid of the tube to the ground.

Rotate the variable condensers to the full open position.

Set the oscillator to a frequency of 262 KC and adjust the IF and diode feeder trimmers to obtain maximum reading on the output meter.

PART REPLACEMENTS

In the design of the Twin "8" and Dual "6" interchangeability of parts has been accomplished wherever possible. This greatly simplifies service. In these sets the complete power packs and their various parts along with the RF oscillator, IF coils and variable condenser are interchangeable.

Volume Control — (1) Remove rear set cover. (2) Disconnect volume control and switch leads (3) Remove hex head screws holding volume control mounting plate and remove complete assembly. (4) Replace with standard Motorola replacement control.

By-Pass Condensers — (1) Disconnect condenser and push upwards from bottom of chassis. (2) Insert new condenser from bottom of chassis and reconnect.

Tube Sockets — (1) Disconnect all wires at socket contacts, insert tube in socket, press down firmly and turn in counter-clockwise direction until released. (2) Place new socket on tube base, press it down firmly into chassis hole and turn in clockwise direction.

Coil and IF Transformer — (1) Each coil may be removed without disturbing any other units. (2) Remove mounting screws, disconnect its respective wires and insert new coil.

POWER PACK CONTINUITY TEST

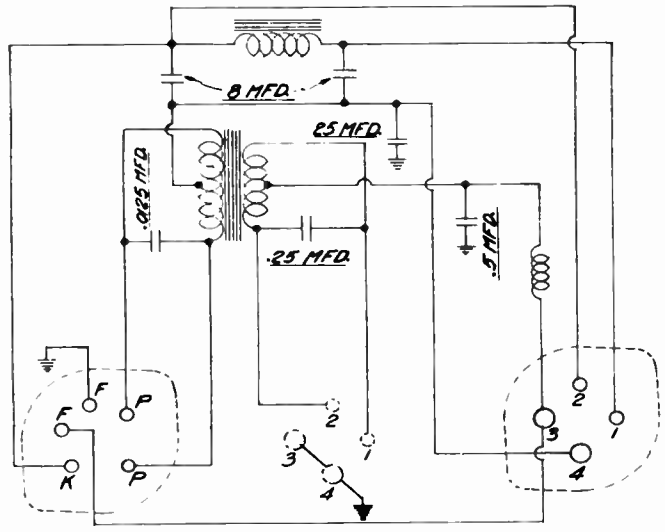


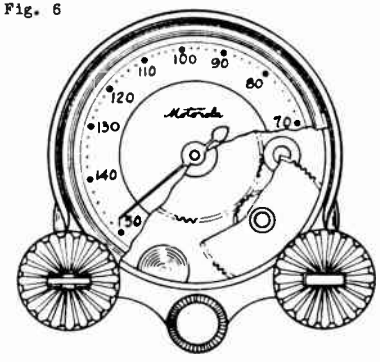
Fig. 5

CONTINUITY TEST ON POWER PACK

TEST	SHOULD TEST	IF OTHERWISE
1. Terminal #1 to K of 84 socket . .	300 ohm	Defective filter choke.
2. Terminal #1 to terminal #4 socket	Open *	Effective 8 mfd. cond.
3. Terminal #4 to ground socket. . .	Open *	Defective 25 mfd. cond.
4. Terminal #2 to terminal #4 socket	Open *	Defective 8 mfd. cond.
5. Terminal #3 to terminal #1 and 2 Elk. socket.	Closed	Loose connection.
6. Terminal #3 to ground	Closed through 84 fil.	Def. tube shorted .5 mfd. cond.
7. Terminal #4 to P and P of 84 socket	200 ohm	Def. sec. power trans.
8. P to P on 84 socket	400 ohm	Shorted buffer cond.
9. K to P and P of 84 socket	Open	Defective 84 tube.

* On tests #2, 3 and 4 allowance should be made for polarization, or normal leakage of electrolytic condenser.

Fig. 6



ADJUSTMENT OF MOTOROLA UNIVERSAL AIRPLANE TYPE CONTROL

The general construction of the control head is shown in the cut away view. (Fig. 6).

In connecting the flexible shafts to the control head:

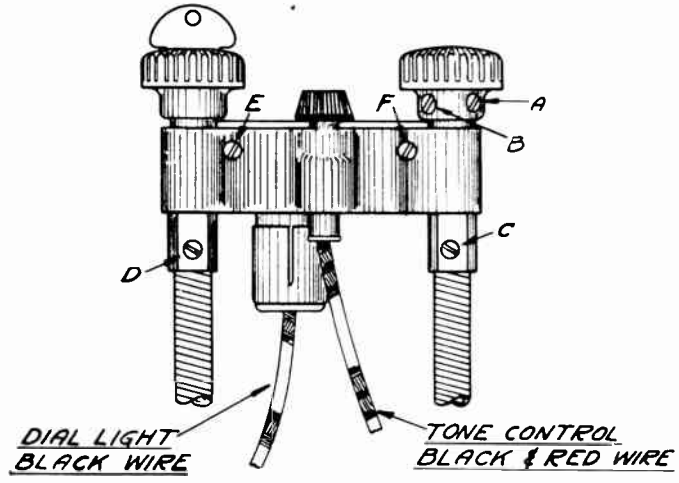
1. Insert the volume control shaft into the control head to its limit then release the shaft housing about 1/32 inch to relieve any binding. Tighten set screw (D) Fig. (7) against housing.

2. Insert condenser drive shaft into control head so that the shaft extends into the tuning knob. Tighten knob set screws A and B. Release shaft housing about 1/32 inch to relieve binding. Tighten set screw (C) against housing. The tuning knobs may be removed by completely removing the set screws E and F, Fig. (7). This is necessary when mounting control in instrument panel.

To adjust indicator arrow, tune in a station of known frequency preferably between 1000 KC and 1300 KC, then insert screw driver in rear center of control head and adjust indicator to correct frequency setting.

Special lengths of flexible shafts may be secured from your Motorola distributor or from the factory.

Fig. 7



GALVIN MFG. CO.

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MODEL Twin "8"
Resistance Test Data

TWIN 8 OUTER HOUSING CONTINUITY TEST.

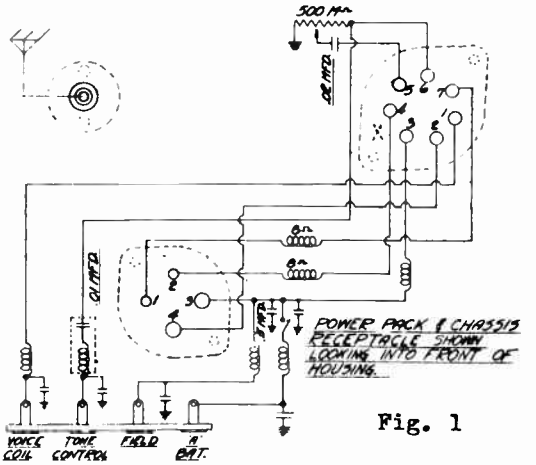

Fig. 1

TWIN "8" VOLTAGE AT BATTERY 6.2					
TUBE	PLATE	SCREEN	CATHODE	CONTROL GRID	FIL.
78 R.F.	220	55	.5	*	5.8
77 AUTODYNE	220	55	4.5	-	5.8
78 I.F.	220	55	1.5	*	5.8
85 DIODE	40			-	5.8
37 1st AUDIO	60			3.8**	5.8
LA POWER	222	220		-20**	5.8

* A.V.C. VOLTAGE APPLIED TO GRIDS.
** VOLTAGE MEASURED FROM GRID. RETURN TO GROUND.

CONTINUITY OF TWIN "8" CHASSIS

Refer to circuit diagram Fig. (3)

TEST	SHOULD TEST	IF OTHERWISE
Terminal #4 to P of LA.	400 ohm	Open output trans.
P of 37 tube to grid of LA . . .	Open	Shorted .05 cond.
Terminal #7 to P of 1st 78. . . .	25 ohm	Open prim. choke.
Terminal #7 to P of 77.	35 ohm	Open prim. I.F.
Terminal #7 to P of 2nd 78. . . .	110M ohm	Open resistor.
Terminal #7 to Screen of LA . .	Short	Loose connect.
Diode of 85 to Ground	200M ohm	AVC network shorted.
Terminal #2 to ground	500 ohm	Open 400 or 100 ohm resistor.
Terminal #2 to Grids of LA's. .	2000 ohm	Defective input Choke.
Terminal #7 to Ground.	200M ohm	Open bleeder or shorted plate bypass.
Screen of 78 to ground	100M ohm	Shorted .02 screen bypass condenser.

CONTINUITY OF TWIN "8" HOUSING AND SPEAKER

Readings taken from front of housing with chassis removed. Volume control full on position. "A" Battery disconnected. Speaker connected.

TEST	SHOULD TEST	IF OTHERWISE
Chassis receptacle terminal . .	#1 to Voice Coil terminal . . .Closed	Loose connections.
Chassis receptacle terminal . .	#2 to Power Pack #4 .Closed	Loose connections.
Chassis receptacle terminal . .	#3 to Power Pack #3 .Closed	Open fil. choke.
Chassis receptacle terminal . .	#4 to Power Pack #2 . 8 ohm	Open R.F. choke.
Chassis receptacle terminal . .	#6 to Ground . . . .500M ohm	Open volume control.
Chassis receptacle terminal . .	#6 to chassis recept. #5 Open	Shorted .02 coupling cond.
Chassis receptacle terminal . .	#7 to Power Pack Term. #1. . . . 8 ohm	Open R.F. choke.
Chassis receptacle terminal . .	#1 to ground . . . . . 2 ohm	Open voice coil.
Power Pack terminal . .	#3 to A Bat. terminal.Closed	Defective power switch.
Power Pack terminal . .	#3 to ground . . . . . .4½ ohm	Open speaker field.
Ant. receptacle . .	To ground Open	Shorted ant.

MODEL Dual "6"
Resistance Test
Data

GALVIN MFG. CO.

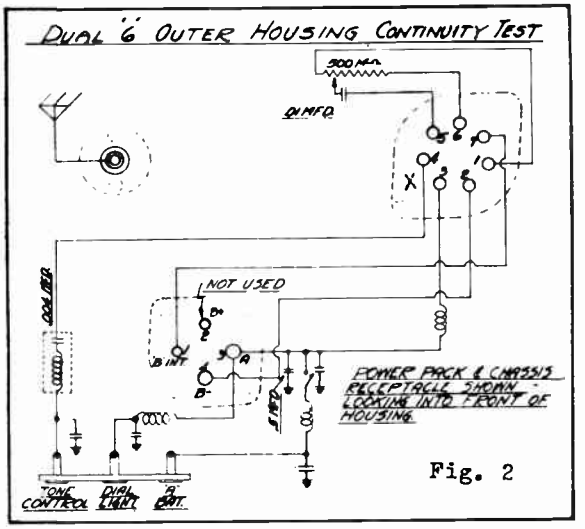

Fig. 2

DUAL "6"					
TUBE	PLATE	SCREEN	CATHODE	CONTROL GRID	FIL.
78 R.F.	210	70	.6	*	5.8
77 AUTODYNE	210	70	5.6	-	5.8
78 I.F.	210	70	2.5	*	5.8
75 DIODE	65		.6	-	5.8
42 POWER	200	205		-16	5.8

* A.V.C. VOLTAGE APPLIED TO GRIDS.

CONTINUITY OF CHASSIS DUAL "6"

Refer to circuit diagram Fig. (4)

	SHOULD READ	IF OTHERWISE
Terminal #5 to Grid 75	Short	Loose connect.
Terminal #2 to ground.	300 ohm	Open bias resistor.
Terminal #7 to ground.	60M ohm	Shorted plate or screen by-pass open resistor.
Terminal #6 to ground.	250 ohm	Def. 75 bias resistor.
Terminal #3 to ground.	Low resistance	Through tube fil.
Terminal #4 to P of 75 tube.	Short	Loose connect.
Terminal #6 to ground	200M ohm	AVC network short to ground.

CONTINUITY OF DUAL "6" SET HOUSING

Readings taken from front of housing with chassis removed. Volume control full on position "A" battery disconnected.

TEST	SHOULD TEST	IF OTHERWISE
Chassis recept. term. #1 to Term. #6.	500M ohm	Def. volume control.
Chassis recept. term. #2 to Power Pack term. #4.	Closed	Loose connect.
Chassis recept. term. #3 to Power Pack term. #3.	Closed	Def. fil. choke.
Chassis recept. term. #3 to "A" Bat. Term. board . . .	Closed	Def. power switch.
Chassis recept. term. #4 to tone control term.board.	Open	Shorted .004 term. cond.
Chassis recept. term. #5 to term. #6.	Open	Shorted .01 coupling cond.
Ant. receptacle to ground. . .	Open	Shorted antenna.

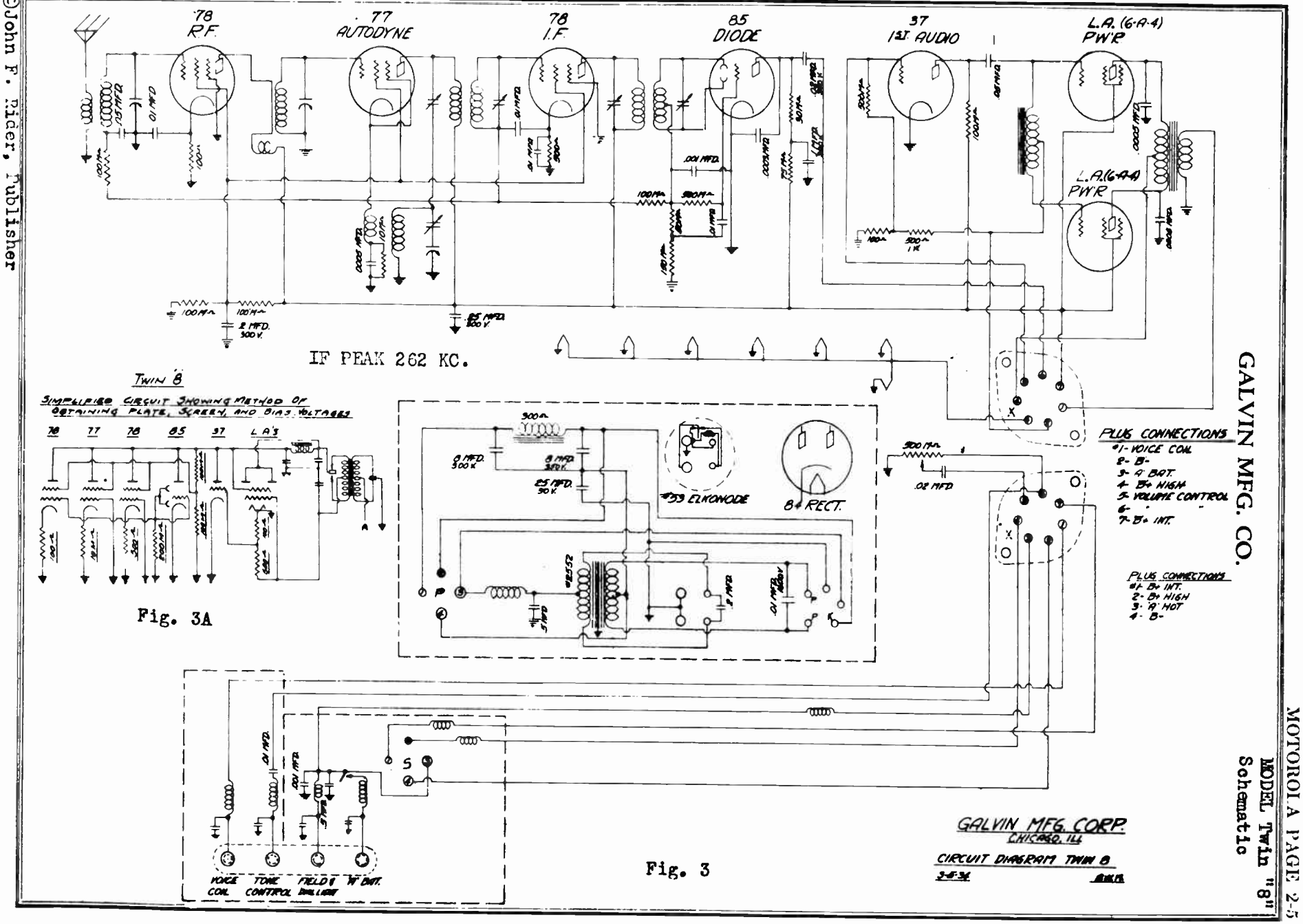

Fig. 3A

Fig. 3

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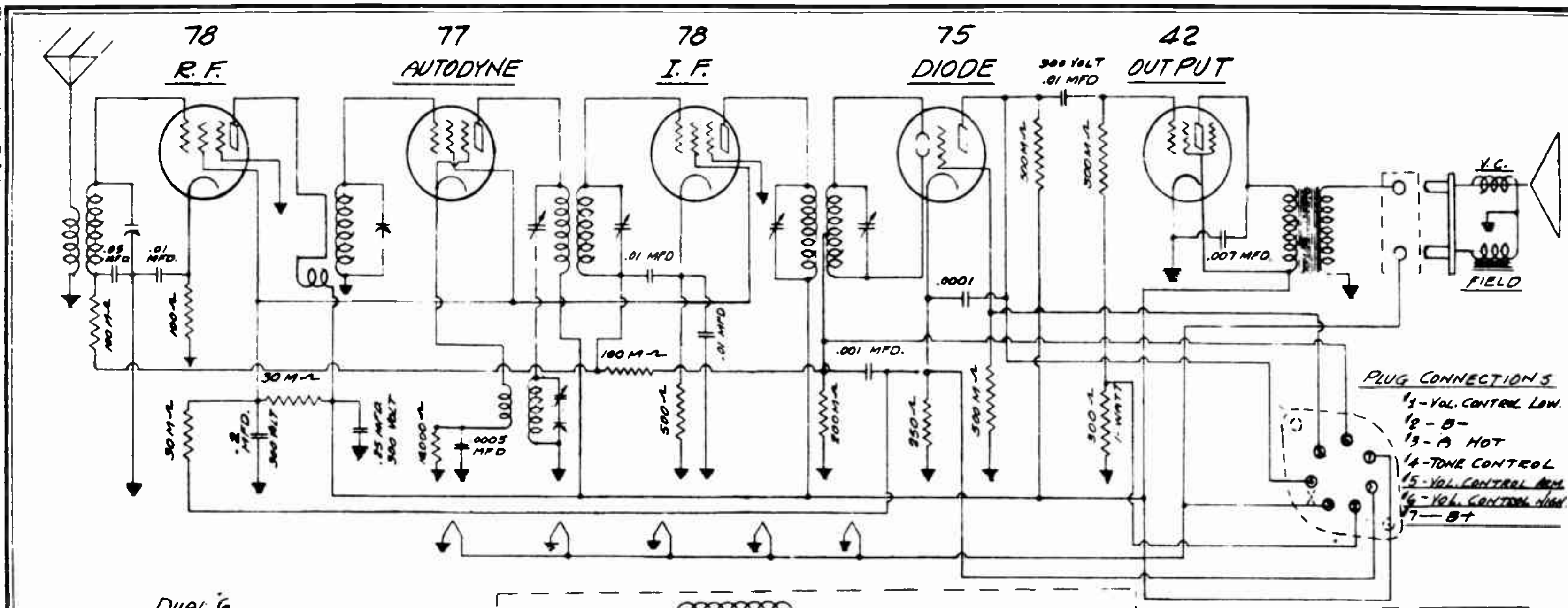
MODEL Twin "8"
Schematic

GALVIN MFG. CO.



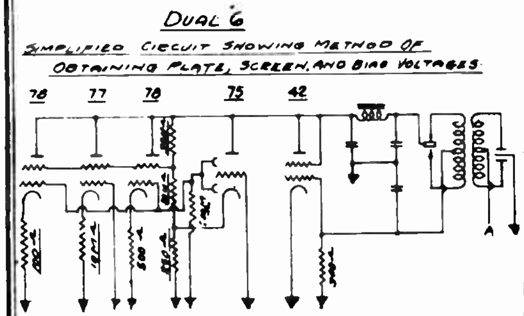


Fig. 4A

IF PEAK 262 KC.

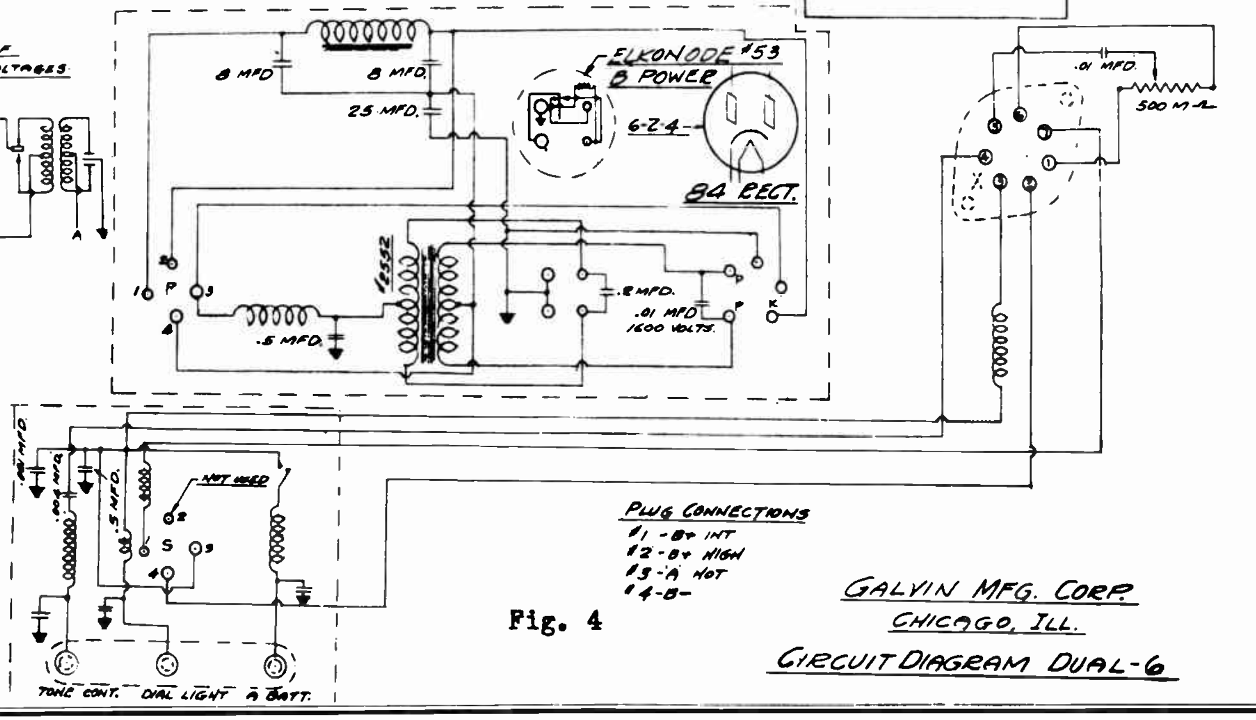
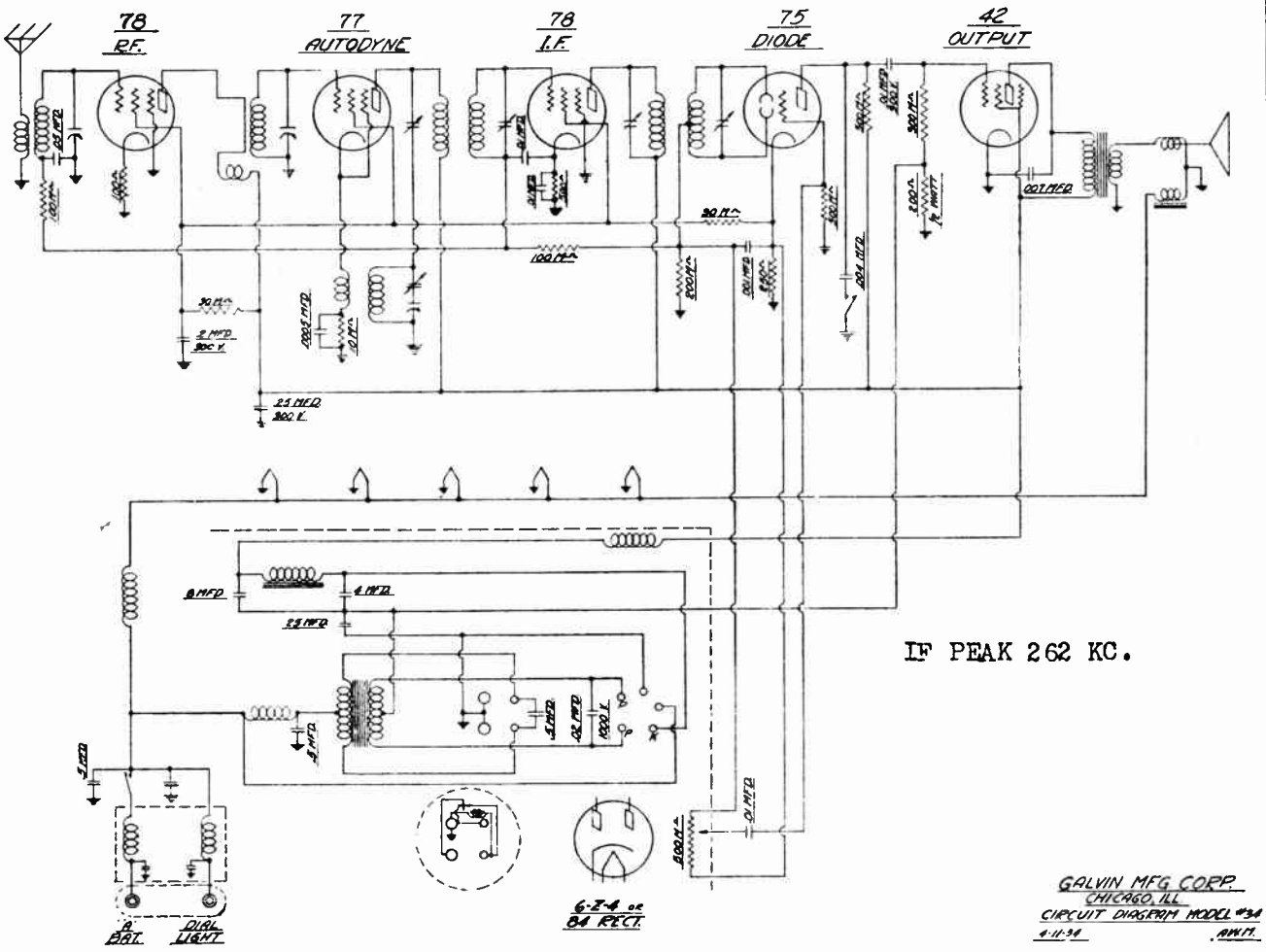


Fig. 4

GALVIN MFG. CORP.
CHICAGO, ILL.
CIRCUIT DIAGRAM DUAL-6

MODEL 34
Schematic
Adjustments

GALVIN MFG. CO.



ADJUSTMENT OF TUNING CONDENSER GEAR

The tuning condenser gear may be adjusted against its drive pinion by simply turning the cam screw, reaching through a hole in the left side of front cover. This hole is covered by button, easily pried upward with screwdriver. Turn screw to the left until slight drag is felt on the station selector knob, then back off slightly until free movement is obtained. After adjustment has been made tighten small locking screw located on face of cam screw.

BALANCING THE SET TO THE ANTENNA

After the set is installed ready for operation, it may be necessary to balance the set to the antenna. This is done by adjustment of the antenna trimmer, located under a 3/8" hole in the TOP of the set. This hole is covered by a button which is removed by simply prying upward with a screw driver.

In making this adjustment tune in a very weak station around 120 to 140 on the dial. Adjust the trimmer with a screw driver until the point of maximum volume is reached.

ADJUSTING THE STATION SELECTOR INDICATOR

Tune in a station of known frequency preferably between 1000KC and 1300 KC.

Insert a screw driver in the center rear of the control head and adjust indicator to the frequency of the station being received. (See Fig. 4).

Fig. 4

NOTES ON MAGIC ELIMINODE

THEORY OF OPERATION

The Magic Eliminode in the 1935 Motorola consists of a combination of an extremely efficient high frequency filter and balancing system.

In practically every car the Magic Eliminode will completely eliminate ignition interference when the installation of the set is made according to instructions and the intensity of the motor noise is not so great so as to be beyond the range of the Magic Eliminode.

The Magic Eliminode should not be expected to work miracles or to do the impossible, but after analyzing its operation you will find that it works on good, sound and fundamental principles.

The filter used in the Magic Eliminode operates most effectively at the lower broadcast frequencies, therefore, if when tuning the set from about 600 to 550 K.C. no motor noise is heard, it can be assumed that the noise level is within the range of the Magic Eliminode and the noise then heard when tuning toward 1500 K.C. may be easily balanced out with the movable eliminode coil and complete elimination of motor noise secured.

THE MAGIC ELIMINODE WILL WORK IN ANY CAR OF WELDED STEEL BODY CONSTRUCTION WHEN THE INSTALLATION IS MADE ACCORDING TO INSTRUCTIONS AND THE ACCESSORIES SUPPLIED WITH EACH SET ARE PROPERLY USED.

It is not guaranteed to work in extremely old cars in which the joints (not welded) between the various body sections have separated and rusted. It will not work when the interference level is so high as to be entirely beyond the range of the eliminode but if by proper shielding and bonding the level is reduced sufficiently so that the filter will handle it at 600 K.C., the balancer will take care of it over all other portions of the tuning range of the receiver.

In like manner there will be found many cars in which the filter is so effective that it alone completely eliminates all motor noise and balancing is not required. In that case IT IS UNNECESSARY TO EVEN CONNECT THE INTERFERENCE FEEDER TO THE MOTOROLA.

To further acquaint ourselves with the use and operation of the Magic Eliminode, let us follow a step-by-step procedure in the installation of a Motorola Model 100 in a 1934 V-8 Ford car.

The above combination is used because of the great sensitivity of the Model No. 100 and the fact that no distributor suppressor is used in the V-8 gives us a most extreme combination.

1st -- Mount the set near the right center of the dash with the control head if preferred in the instrument panel.

2nd -- Mount the speaker near the steering column on the left side of the dash.

3rd -- Connect the "A" lead to a convenient point on the 6 volt wiring as close to the starter switch as possible. Insert the speaker, dial light, tone control plugs in the receptacles at the right end of the receiver. Dress wires so that their position is remote to steering column and other wiring, control rods and pipes.

4th -- Connect the two flexible control shafts to the radio by inserting them in their respective sockets and turning each approximately a quarter turn to the right.

5th -- Take the small antenna lead-in junction box that has the short piece of shielded loom attached to it and fish the car antenna lead through this loom until the lead extends into the junction box. Now insert the set antenna lead-in through the ferrule in this box so that the two leads may be spliced together within the box and be totally shielded. SPOT THE SHIELD TO THE FERRULE WITH SOLDER TO SECURE A GOOD GROUND. Next mount the junction box on left side of cowl where paint has been removed and mount it up into the corner post. Bolt the box down firmly so as to secure a perfect ground (THIS IS EXTREMELY IMPORTANT).

6th -- Connect the dome light filter in the dome light circuit and ground its case thoroughly to the car body. Connect the generator condenser to the generator cutout. Connect the other condenser supplied, to the primary post of the ignition coil and ground it under a GEAR CASE COVER STUD or connect the armeter condenser to the ignition switch, ground it to the instrument panel and connect noise feeder to the point where condenser is grounded. Place the screen under the floor mat on the right side of the toe boards and ground it to car body. Ground both sides of the hood thoroughly at their rear edges.

7th -- Turn on the radio and the car motor and tune the dial across its tuning range to check for interference. IF NO INTERFERENCE IS ENCOUNTERED, the installation is complete and no further work is necessary. DO NOT CONNECT THE INTERFERENCE FEEDER AS IT IS NOT NEEDED.

IF, however, there is no interference at 600 K.C., but it appears when tuning toward 1500 K.C. it will be necessary to use the balancer.

Proceed as follows:

With the set turned on and tuned to about 1200 K.C. remove the volume control shaft bushing from its socket and insert it in the Magic Eliminode socket (located a little to the rear and above volume control socket), and turn volume knob all the way to the left. Next attach the clamp on the free end of the interference feeder to the choke rod, throttle rod or instrument panel. Now turn the volume control knob to the right until the noise is balanced out. If the balancing coil travels its full length before balance is reached, it will be necessary to move the feeder clamp to another spot on the choke or throttle rod or some other point on the car, such as instrument panel, dash, etc., until a point of balance is secured.

If, when the set was first checked for motor noise it was found that the noise could be heard at 600 K.C., it indicates that its level is too high for the filter and it will be necessary to reduce its intensity by a better grounding of all parts of the radio installation, CHANGING POSITION OF LEAD-IN LOOM, bonding instrument panel to dash, etc., or changing the mounting position of the antenna lead junction box to secure a better ground. THIS IS EXTREMELY IMPORTANT and should be determined by trial. As soon as the interference level is brought down within the range of the filter at 600 K.C., the balancer may be employed to eliminate all interference over the rest of the tuning range of the receiver.

When making an installation with the Magic Eliminode be sure to remember the following:

1st ... THAT A GOOD MECHANICAL INSTALLATION AND PERFECT GROUNDING OF EVERY PART OF THE SET IS VERY IMPORTANT. Do not expect a slip-shod installation to give good results.

2nd ... The Magic Eliminode will eliminate interference within reasonable limits only, as encountered in any standard automobile. It cannot be expected to work in cases when, special high voltage ignition coils, spark intensifier, ignition boosters, or ignition wiring changes have been made. Remember it does not work miracles.

3rd ... Use all accessories as supplied with each set and follow instructions carefully.

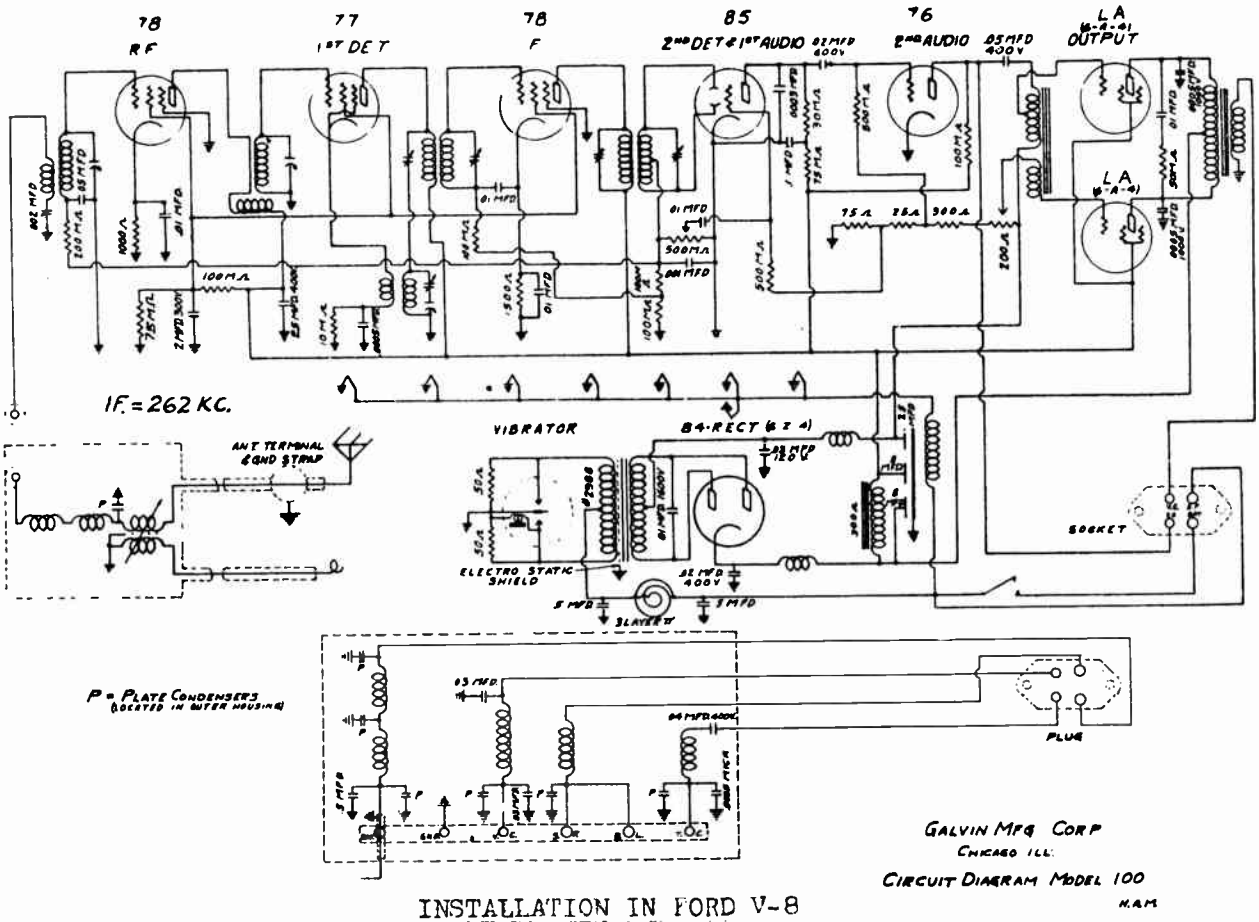
4th ... When balancing out interference keep the hood down and grounded and have the car doors closed.

5th ... Do not connect the interference feeder clamp to its point of interference pickup until after checking the filter only. If the filter is found to be sufficiently effective do not use the interference feeder.

In some cars there may exist a slight trace of interference when accelerating the engine. This may be overcome by connecting a Motorola dome light filter in series with the primary breaker point wire between the coil and distributor and ground it to the engine block.

MODEL 100
Schematic
Notes

GALVIN MFG. CO.



INSTALLATION IN FORD V-8

When mounting the Model #100 in the motor compartment of the V-8 Ford, be sure to mount it at least 5 inches above the rear spark plug of the left motor block.

If it is mounted too close to spark plugs, interference difficulties may occur.

A special accessory package carrying catalog number MF-37 for Ford motor compartment mounting may be secured from your distributor.

This package includes the following:

1 - Mounting bracket of heavy gauge steel
2 - 2/16" x 1½" bolts for fastening bracket to bulkhead
2 - 5/16" x 3/8" studs for fastening set to bracket
1 - Curved padding compression washer
1 - Drilling templet

FORD IGNITION COIL CONDENSER

A specially constructed condenser (catalog Number M-42) for Ford V-8's may be secured from your distributor.

This condenser should be connected to the primary terminal post of the ignition coil and is provided with a bracket for mounting under one of the engine gear case cover studs.
When installing #75 or #100 in V-8's, connect the interference feeder to the lower lip of the instrument panel - directly above the ignition switch, and at the point where the ignition switch by-pass condenser is grounded.

LOCATION OF THE RADIO SET

The Motorola model 100 should be securely bolted to the dash, and a position for mounting may be selected either in the driver's compartment or in the motor compartment. When selecting a location for the set, consideration should be given to freedom from obstruction and sharp bends in the control shafts that may affect their operation.

Also give consideration to the future servicing of this instrument and mount it in such a position that the chassis may easily be removed for servicing without removal of the complete set housing.

LOCATION OF THE UNIVERSAL AIRPLANE TYPE CONTROL

The Universal Airplane type control head may be mounted on either the right or left side of the steering column with the mounting bracket as in *figure 1*, or in those cases where an opening has been provided in the instrument panel for the radio controls it may be installed by using the special instrument panel medallion plates and mounting brackets as supplied for the various makes of cars. ***These medallion plates to match the design and finish of the instrument panel, may be secured from your Motorola dealer or distributor. BE SURE TO STATE MAKE AND MODEL OF CAR.***

Fig. 1


Fig. 2

MOUNTING OF THE SET

The Motorola model 100 can be mounted either in the motor or driver's compartment and the following instructions apply to mounting the set in the motor compartment. However, the same general instructions apply when mounting the set in the driver's compartment.

It is especially recommended that extreme care be taken and a good neat mechanical installation be made, particularly to the location of the antenna lead and A lead regarding their proximity to the high tension wire, ignition coils, etc., as this will later help immeasurably in the complete elimination of all ignition interference.

1. Place the cardboard drilling templet in position on the dash and mark the mounting holes for the set.
2. Mark the position for the holes for the shielded aerial lead and the two flexible control shafts, taking care that no sharp bends will occur in the shafts, as this will seriously effect their operation.
3. Locate a suitable position for the speaker, mark the position of the hole for the single speaker mounting stud.

NOTE: To secure the full high fidelity tone designed into this radio set, it is ***EXTREMELY IMPORTANT*** that the speaker be mounted at an angle in the car, as shown in *figure 3*. In every car there is a very definite position in which the speaker may be mounted to take full advantage of the cowl resonance and accoustical properties of the car. This position may be determined by trial, by so locating the position of the speaker mounting hole that the speaker may be revolved to any angle on its Universal mounting stud and then after the set has been placed in operation, tune to a radio station of good tonal quality and adjust the angle of the speaker until full bass note response is secured.

4. Drill all holes with a 3/8" drill.
5. Screw the set mounting studs into the tapped holes at the rear of the set.
6. Mount set and speaker in their respective positions, using the large washers to compress against the padding on the dash.

*NOTE: **Before placing the set in position on the dash it is EXTREMELY IMPORTANT that the point be cleaned around each hole and the sperini lock washers provided allowed to dig into the metal at these points.***

7. Mount the control head on the steering column or in the instrument panel, as shown in ***figures 1 and 2.***

INSTRUMENT PANEL MOUNTING OF CONTROL

To remove tuning shaft, loosen set screws A, B, and C, *figure 4*. To remove volume control shaft, loosen set screw D.

To remove knobs remove set screws E and F. When replacing shafts in control head, insert them to their limit, then release housing about 1/32" to relieve binding.

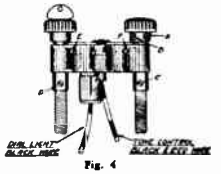


Fig. 4

8. Insert the *volume control* shaft in hole *(A) figure (8)* in the center of the left end of the receiver by placing the tongue of the flexible shaft into the slot in the volume control shaft, then insert the housing bushing. Insert the tuning control shaft in hole *C figure 8* on the left end of the receiver. The shaft fittings are of the self-locking type and may be rigidly secured by turning each approximately a quarter turn to the right. Tighten finger tight only. Do not use wrench or pliers.
9. Insert the plugs on the speaker wires, dial light wire, and tone control wire into their proper receptacles, *figure (5)* located at the rear right end of the receiver.

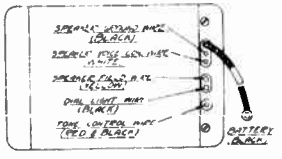
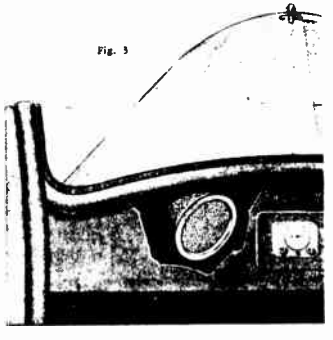


Fig. 5

(a) Insert black speaker wire into 1st receptacle at top marked (G. N. D.) ***"ground"***.
(b) White wire into 2nd receptacle marked (V. C.) ***"Voice Coil."***.
(c) Yellow wire into 3rd receptacle marked (S. F.) ***"Speaker Field"***.
(d) Dial light wire into 4th receptacle marked (D. L.) ***"Dial Light"***.
(e) Tone control wire into 5th receptacle marked (T. C.) ***"Tone Control"***.

10. Connect the A lead to any convenient 6 volt supply as close to the starter switch as possible. It is not necessary to run it directly to the battery.

Fig. 3



NOTE: Do not connect Interference feeder until after the set has been tried and the necessity for it is apparent.

11. Mount the antenna lead junction box to the car body or a welded member, and ***not to the instrument panel,*** then slip the car antenna lead-in through the shielded loom allowing the loom to extend up into the front corner post, as shown in *figure 6*. Insert the antenna lead of the receiver into the ferrule provided in the junction box, solder its shield to the box, splice and insulate the lead-in connection and replace cap on junction box.

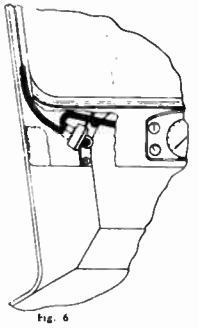


Fig. 6

NOTE: THIS IS THE MOST IMPORTANT POINT IN THE ENTIRE INSTALLATION.

ANTENNA

Practically all automobiles are now equipped with antennas. The lead-in wire will usually be found on the right or left-hand side, behind the instrument panel. If the car is not already equipped, an antenna of nine square feet of screen wire is recommended.

OPERATION

Insert the key in the left-hand control knob. Turn knob slightly to the right until the power switch snaps on. The balance of the revolution controls the volume. The right-hand knob is the station selector. The center knob is the variable tone control. Turn it to the right for bass and to the left for treble.

ADJUSTING THE STATION SELECTOR INDICATOR

Tune in a station of known frequency, preferably about 1000 K.C. Insert a small screw driver in the center rear of the control head and adjust indicator to the frequency of the station being received *Figure 7*.


Fig. 7

ADJUSTMENT OF TUNING CONDENSER GEAR

The tuning condenser may be adjusted against its drive pinion by simply turning the cam screw, reached through a hole in the left side of the set housing *figure (D) (8)*. This hole is covered by a plug button, easily pried off with a screw driver. Turn the screw to the left until a slight drag is felt on the station selector knob, then back off slightly until free movement is obtained and replace plug button.

BALANCING SET TO THE ANTENNA

After the set is installed ready for operation, it may be necessary to balance the set to the antenna. This is done by ajustment of the antenna trimmer, located under a plug button at the top of the set, which may be removed by prying upward with a screw driver. In making this adjustment, tune in a very weak station between 1400 and 1200 on the dial. Adjust the trimmer with a screw driver until the point of maximum volume is reached.

ELIMINATION OF IGNITION INTERFERENCE

Insert the distributor suppressor in the high tension wire not more than two inches from the distributor

Mount the generator condenser on the generator frame and connect the pigtail connection to the contact on the generator cut-out.

Connect the ***Motorola Dome Lite Filter*** in the dome light wire at the point where the wire enters the front corner post of the car, making sure that filter case is ***well grounded.***

Connect the Motorola ammeter condenser to one side of the ***Ignition Switch*** and to ground.

Place the Motorola floor board shield on the toe boards on the left side of the car under the floor mat and ground it by removing the toe board screws and replacing them through the screen. Except in those cases as noted on the interference chart.

At this point the set should be turned on, the motor started and checked for ignition interference. Tune the set across its tuning range and if no interference is encountered it is unnecesary to connect the interference feeder or to proceed with balancing.

CONNECTING THE INTERFERENCE FEEDER

The purpose of the interference feeder is to feed into the ***Magic Eliminode*** a sufficient amount of interference to counteract that interference being picked up by the car antenna. Therefore, it is necessary to connect it to some point on the motor or instrument panel, choke rod, oil pipe, electrolock cable, etc., that will give the required result. ***(Refer to first column of enclosed Interference Elimination chart).***

BALANCING PROCEDURE

The balancing of the ***Magic Eliminode*** is a very simple procedure. After the set is completely installed it is only necessary to turn the set on, tune it for greatest motor noise intensity, then remove the plug button from the side of the housing marked ***(B) figure (8).***

Remove volume control shaft housing from the set by turning its bushing a quarter turn to the left; remove and insert in hole from which plug button was removed. Turn volume control knob either to the right or left, but in the direction in which the interference decreases. Continue until the interference is entirely eliminated or reduced to its lowest point.

If you find that when turning the knob to the ***right*** the interference gradually decreases, but the end of travel is reached before the interference is eliminated, it indicates that there is ***NOT*** a sufficient amount of interference being fed in by the interference feeder. It will be necessary then to move or connect it to a different point on the engine or car body.

If this condition occurs when turning knob to the ***left,*** it indicates too much interference being fed in, and another pickup point should be selected that will supply a lower value within the range of the ***Magic Eliminode.***

It is always advisable when balancing out interference with the ***Magic Eliminode*** to clamp the car hood down tight with the hood hasps and to sit in the driver's position in the car, because in some extreme cases the interference may have been entirely balanced out but may again appear when the driver takes his position in the car.

After the interference has been eliminated, the volume control shaft should be returned to its original position and the plug button replaced over the ***Magic Eliminode*** balancing shaft ***(B) fig. (8).***

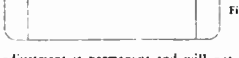
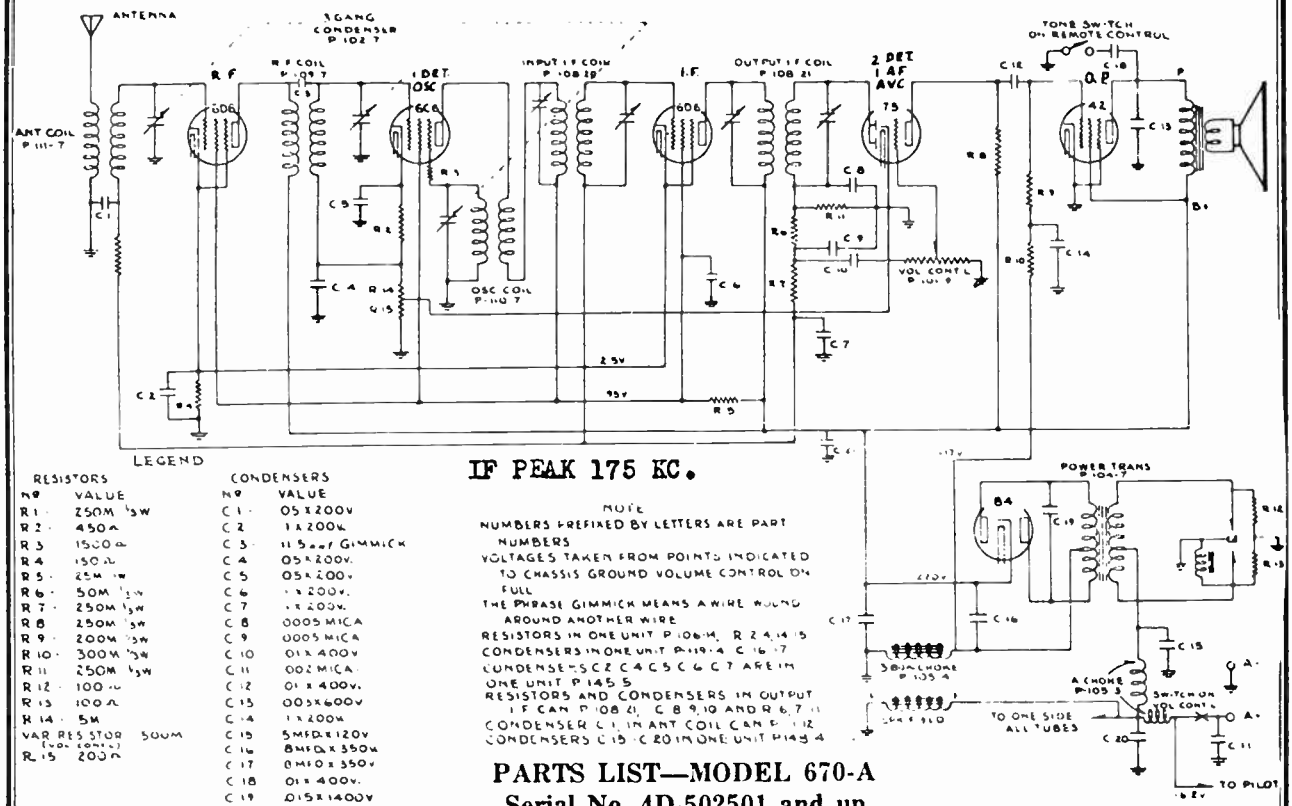


Fig. 8

This adjustment is permanent and will not change unless some change is later made in the car wiring, or the radio set is installed in another car.

HOWARD RADIO CO.

MODEL 670-A, HA-1
Schematic, Voltage
Parts List



IF PEAK 175 KC.

RESISTORS		CONDENSERS	
No	VALUE	No	VALUE
R 1	250M ½W	C 1	.05 x 200v
R 2	450Ω	C 2	1 x 200v
R 3	1500Ω	C 3	11.5 mmf Gimmick
R 4	150Ω	C 4	.05 x 200v.
R 5	25M 1W	C 5	.05 x 200v
R 6	50M ½W	C 6	1 x 200v.
R 7	250M ½W	C 7	1 x 200v.
R 8	250M ½W	C 8	.0005 MICA
R 9	200M ½W	C 9	.0005 MICA
R 10	300M ½W	C 10	.01 x 400v
R 11	250M ½W	C 11	.002 MICA
R 12	100Ω	C 12	.01 x 400v.
R 13	100Ω	C 13	.003 x 600v
R 14	5M	C 14	1 x 200v
VAR RES STOR (Vol. Cont'l) R 15	500M 200Ω	C 15	5 MFD x 120v
		C 16	8 MFD x 350v
		C 17	8 MFD x 350v
		C 18	.01 x 400v.
		C 19	.015 x 1400v
		C 20	5 MFD x 120v.
		C 21	.01 x 400v

NOTE
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL
THE PHRASE GIMMICK MEANS A WIRE WOUND AROUND ANOTHER WIRE
RESISTORS IN ONE UNIT P-106-14, R 2,4,14,15
CONDENSERS IN ONE UNIT P-119-4 C 16,17
CONDENSERS C 2 C 4 C 5 C 6 C 7 ARE IN ONE UNIT P-145-5
RESISTORS AND CONDENSERS IN OUTPUT I F CAN P-108-21, C 8,9,10 AND R 6,7
CONDENSER C 1 IN ANT COIL CAN P-111-7
CONDENSERS C 15 C 20 IN ONE UNIT P-145-4

PARTS LIST—MODEL 670-A
Serial No. 4D-502501 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description
101-9	Volume Control with Switch
101-12	Tone Control Assembly, complete
102-7	Three Gang Geared Variable Condenser
104-6	Vibrator Transformer
105-3	"A" Choke—40T—No. 16E—½" Dia.
105-4	380 Ohm Filter Choke
106-6	200 Ohm Center Tapped Resistor
106-14	5800 Ohm Metal Clad Resistor
108-20	Input I. F. Transformer completely assembled in can (175 K. C.)
108-21	Output I. F. Transformer complete with can, but less resistor and Condenser Assembly (175 K. C.)
	Resistor and Condenser Assembly for 108-21
109-7	R. F. Coil
110-7	Osc Coil & bracket
111-7	Antenna Coil
112-43	Volume Control Shaft complete with knob
115-18	Special partition shield
115-22	Tube shield
116-5	6-8 Volt T-50 pilot lamp
116-6	Pilot light assembly, complete, less bulb
119-4	8-8 Mfd. x 350 Volt Electrolytic Filter Condenser
142-1	Plug-In Vibrator
145-5	.4 Mfd. By-Pass Block
146-14	Special bracket including battery antenna, pilot light and tone control cable fittings, but less antenna coil volume control
148-4	Dual .5 Mfd. 120 Volt Condenser
161-1	20 Ampere fuse
147-1	Selector Control Coupling
147-2	Bushing and bracket complete
147-11	Volume control coupling
135-5	⅜x3" carriage bolt
140-3	Container complete with top and bottom
148-1	.5 Mfd. Generator Condenser
148-3	.5 Mfd. Ammeter Condenser
119-18	Volume Control Shaft 18"
119-24	Volume Control Shaft 24"
150-18	Selector Shaft 18"

Part No.	Description
150-24	Selector Shaft—24"
151-2	Remote Control Head, less flexible shafts, less tone control and pilot assemblies, but with knobs and mounting hardware
152-1	Antenna cable
152-2	Battery cable
131-5	Black bakelite remote control knobs
146-8	Die Cast Remote Control Mounting Bracket
146-12	Steering Column Strap
168-1	Spark-plug type suppressor
168-2	Distributor plug-type suppressor
168-3	Cable type suppressor
168-4	Special Ford spark-plug suppressor
	Unless otherwise listed, all Carbon Resistors
	Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers
	Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers
	Unless otherwise listed, all Molded Mica Condensers
	All Sockets
167-1	Dynamic Speakers
	Plate antenna (clamps to frame of car)

Note: Part No. 145-5 consisting of five separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

We cannot supply speaker cones only. We can replace a speaker on which a cone has been damaged for $1.50, if defective speaker is returned, transportation charges prepaid.

MODEL 670-A, HA-1
Alignment, Notes

HOWARD RADIO CO.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.

2. Adjust trimming condensers of both input and output I. F. transformers, parts number 108-20 and 108-21 (see top view of chassis) to resonance with an oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection on the output meter indicates resonance.

Note: Each I. F. transformer has two adjustments, both of these adjustments on both transformers are accessible through holes located in the back of the case between the two mounting plates and directly under the louvres.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1500-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.

4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:

Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the cardboard template which is the same size as set and mark location for two mounting bolts, if mounted on the long side and one bolt if on the short side.

Then drill two (2) one-half inch (½") holes, making certain that the paint around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 116-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel or under dash (see illustration).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. AVOID SHARP BENDS IN CABLES.

IMPORTANT—READ CAREFULLY:

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables, number 149-24 and 150-24. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before inserting in receiver (see illustration). All bypass leads should be as short as possible.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.

PILOT LIGHT:

Pilot light assembly, part number 116-6, a shielded cable, plugs into the set and to the rear of the remote control unit (see illustrations).

TONE CONTROL:

The tone control assembly, part number 101-12, attaches to the back of the remote control head by means of a special screw and plugs into the set (see illustrations).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. De-tuning will very seriously affect the tone quality of this receiver. Tone control knob located between two black knobs (see illustrations) is a BASS and TREBLE switch, it is not a variable tone control. Turning it to the right makes the BASS connection, turning it to the left makes the TREBLE connection. You will note that the BASS position assists materially in reducing interference from static, street car lines and other high pitched disturbances.

MOTOR NOISE SUPPRESSION:

The ignition system of every automobile generates high frequency electrical interference. This high frequency interference arising from the ignition coil, the distributor and the spark plugs must be properly suppressed in order to obtain satisfactory reception. Each car will present more or less an individual problem but there is a definite procedure to follow which holds true in every case.

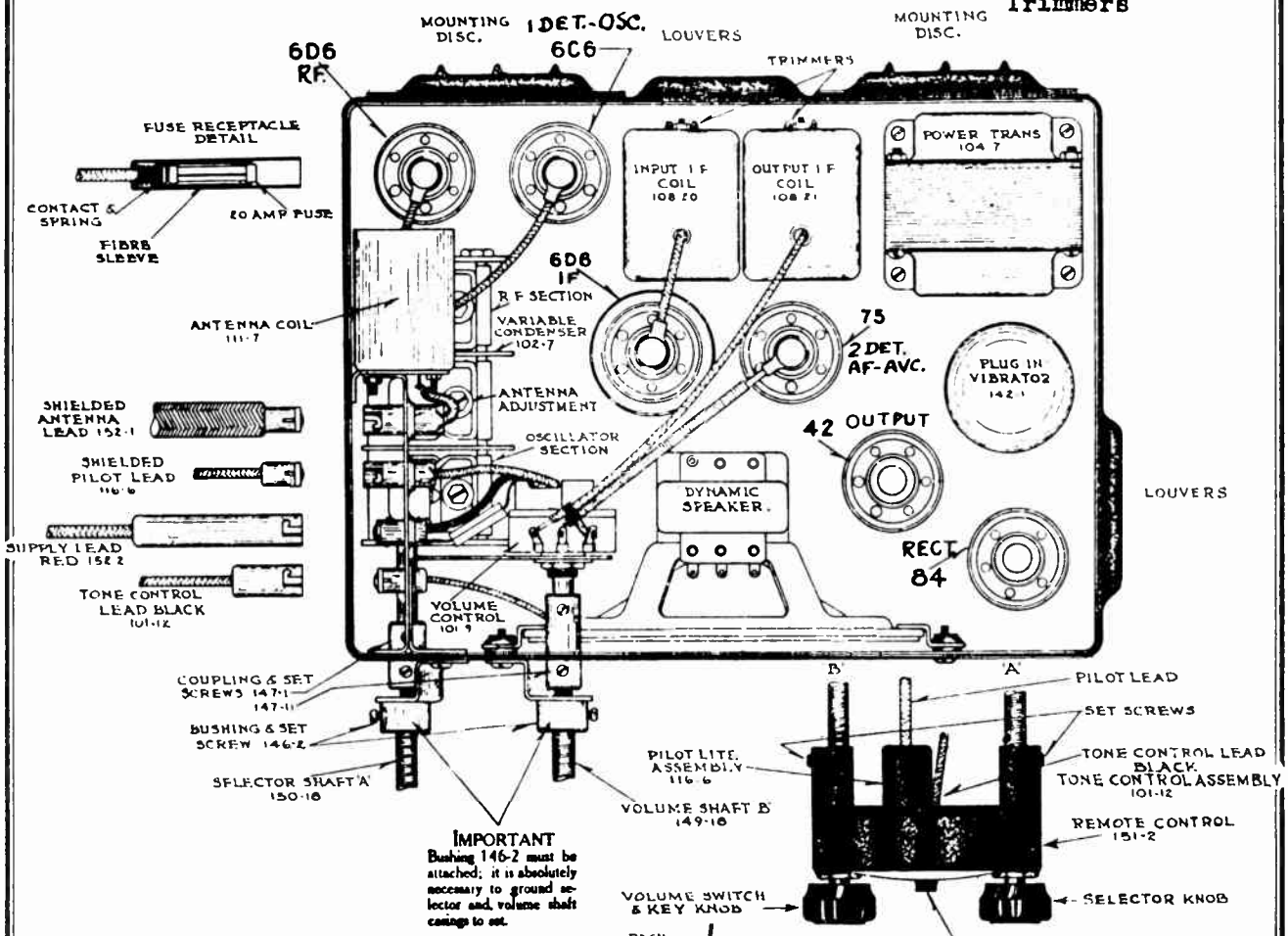
This first essential procedure is to disconnect the high tension leads to the spark plugs and attach the spark plug suppressors (168-1) (for V 8 Fords 163-4) the special distributor type suppressor (165-2) which is inserted in the center contact of the distributor as indicated in the illustration of a typical installation. (NOTE V 8 FORD USES NO DISTRIBUTOR SUPPRESSOR.) For cap type distributor, exchange the standard plug type distributor suppressor (165-2) for a special cable type suppressor (163-3) from your dealer. In some few cases, such as Buicks it is sometimes necessary to use cable type (168-3) suppressors. This type of suppressor is inserted in the leads running from the distributor to the spark plugs and which are concealed underneath the metal plate which covers the spark plugs.

After the spark and distributor suppressors have been properly fastened the next in importance is the generator condenser (148-1), this filters a high pitched whining noise which would otherwise be heard as the motor is accelerated.

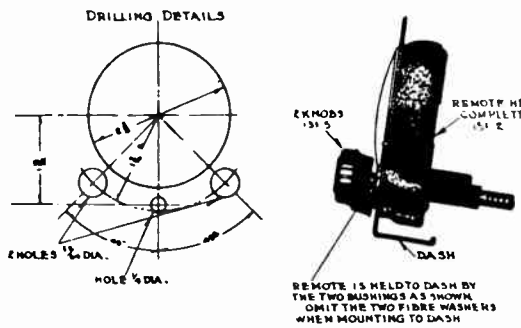
It is sometimes necessary in cars where the ignition coil is located under the dash, to use an additional capacitor (148-1) obtainable from your dealer. It must be installed between the battery side of the ignition coil and the frame of the car. Next connect capacitor (148-3) from the battery side of ammeter to frame of car. This is necessary in practically every installation and a good connection to the frame of the car is of utmost importance.

HOWARD RADIO CO.

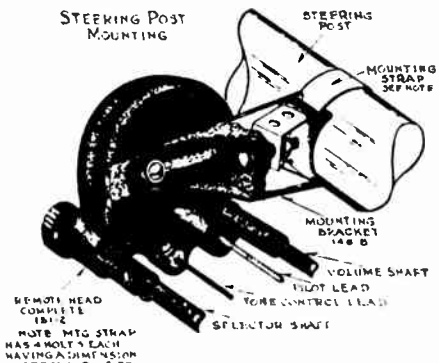
MODEL 670-A, HA-1
Socket Layout
Parts Details
Trimmers

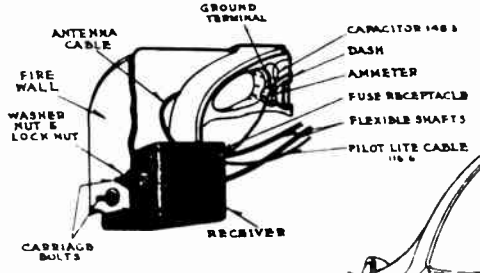


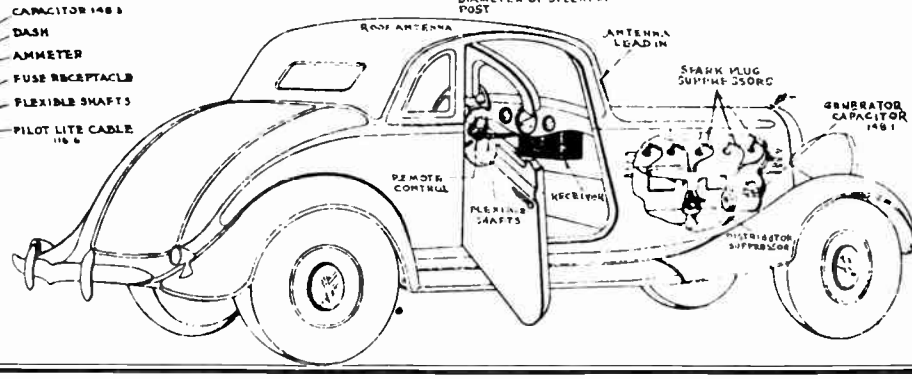
DASH MOUNTING



STEERING POST MOUNTING

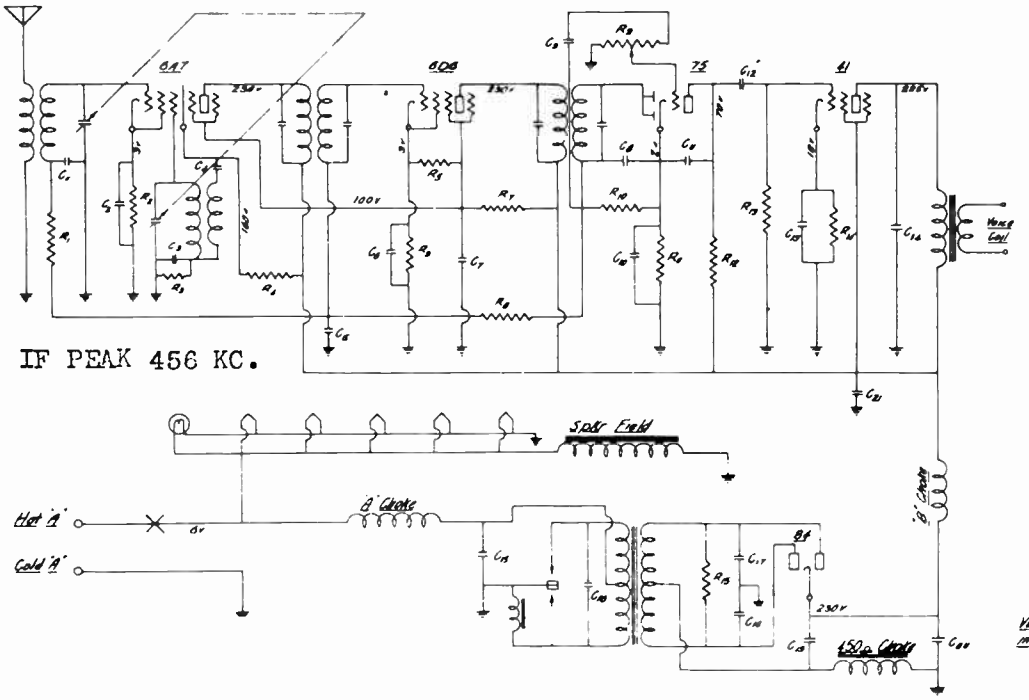






MODEL 52,502,HA-2
Schematic
Socket, Trimmers

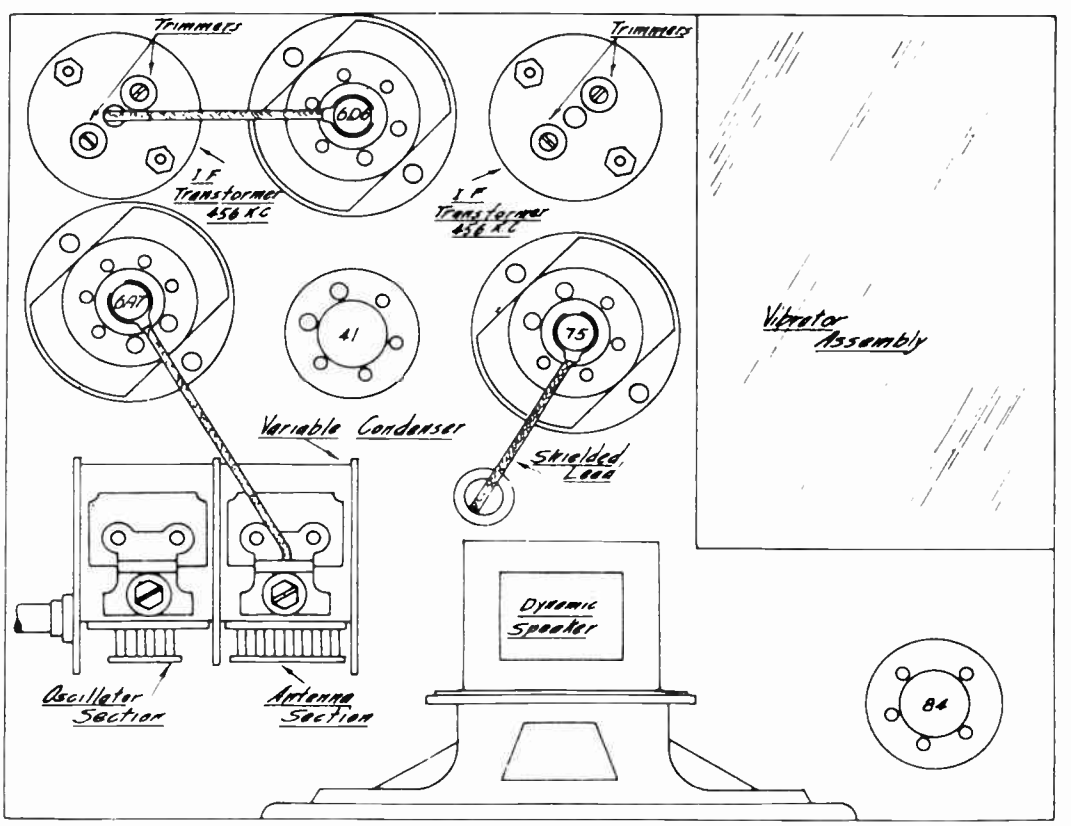
HOWARD RADIO CO.



CIRCUIT DATA			
	Ω	C.	MFD
1	500M	1	.05
2	250	2	1
3	50M	3	.01
4	15M	4	.002
5	35M	6	.05
6	250	6	1
7	15M	7	1
8	1 Meg	8	.0005
9	500M WC	9	.02
10	850M	10	100MF 25V
11	5M	11	.0005
12	250M	12	.02
13	250M	13	100MF 25V
14	750	14	.005
15	500M	15	5
		16	5
4-30-34		17	.002
		18	.002
Drawing		19	8
No 105		20	8
		21	.25

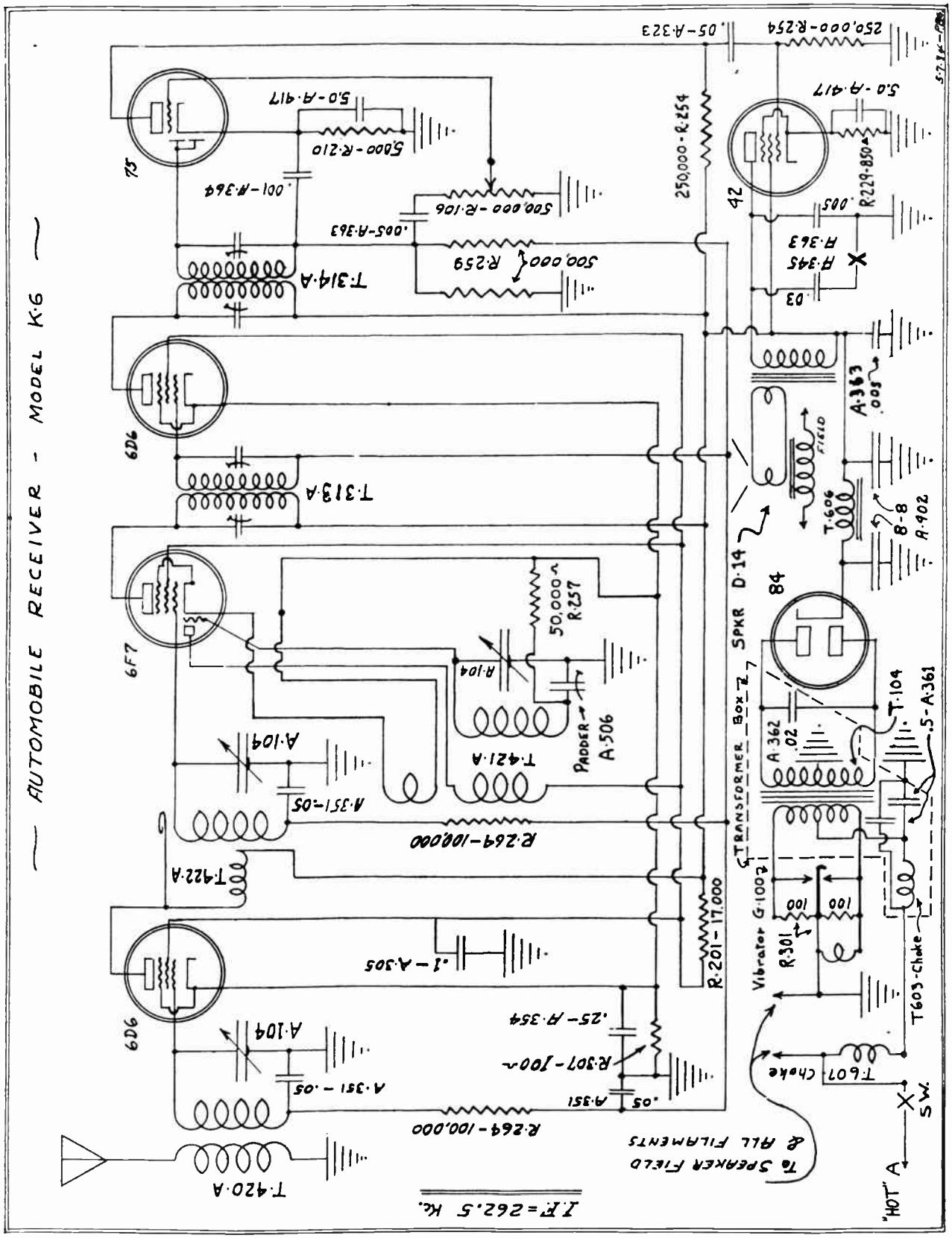
Model 502
Auto Receiver
Drawn By ___ Chkd By ___

Voltages taken from points indicated to chassis ground



INTERNATIONAL RADIO CORP.

MODEL K-60 (K-6)
(St. Regis)
Schematic



MODEL K-60 (K-6)
(St.Regis)
Voltage,Alignment

INTERNATIONAL RADIO CORP.

TO REPLACE DIAL LIGHT

Dial light socket assembly may be pried out from the rear of control head by using a small screw driver or knife blade.

AVERAGE TUBE VOLTAGES:

Measurements made from indicated points to chassis. Battery voltage 6 volts.

POSITION	TUBE	Ef	Ek	Eg_1	Eg_2	Eg_3	Ep
R. F. Amplifier	6D6	5.6	2	*	2	75	185
1st Det.-Osc.	6F7	5.6	3	Det. * Osc. —1	3	75	Det. 185 Osc. 75
I.F. Amplifier	6D6	5.6	2	*	2	75	185
2nd Det.-A.V.C.	75	5.6	2	0	0	—	75
Power Amp.	42	5.6	15	0	—	185	175
Rectifier	84	5.6	185	—	—	—	—

f—Filament; k—Cathode; g_1—Control Grid; g_2—Suppressor Grid; g_3—Screen Grid; p—Plate; *—Depends on applied signal strength.

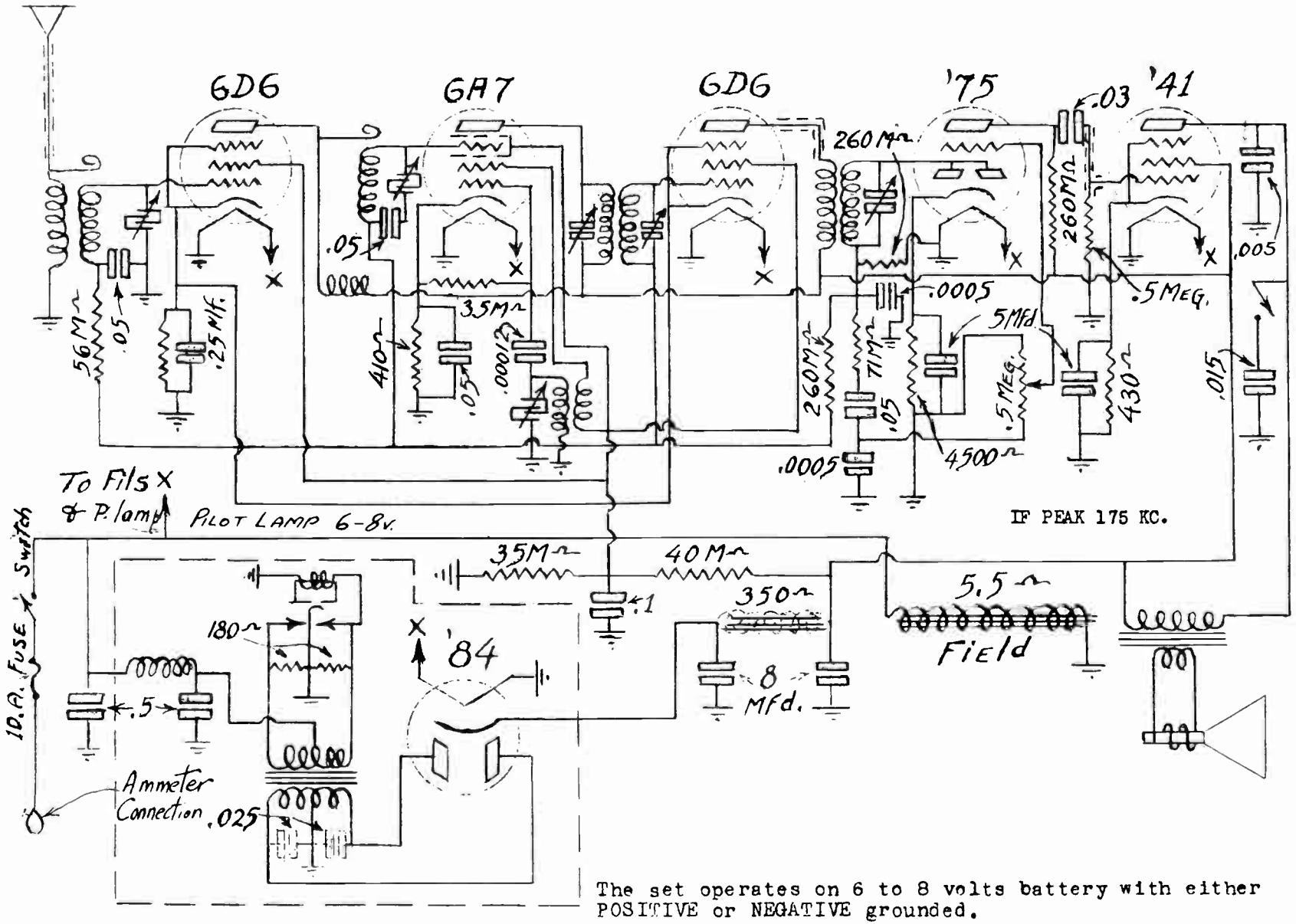
Balancing and Aligning

Each automobile radio is carefully balanced on accurate oscillators before leaving the factory. If it is necessary to rebalance because of part changes or other causes a good test oscillator capable of delivering modulated signals at 262½, 1500 and 600 Kc. will be needed. The customary audio out-put meter may be used IF the out-put of the test oscillator is weak enough to get below the A.V.C. action. Otherwise a microammeter will be needed to measure the A.V.C. voltage developed. It should be connected from ground to the junction of two 100M resistors and one condenser in the center bottom of the chassis.

To balance the I.F. circuits, attach the antenna wire to the test oscillator. Short out the oscillator section of the tuning condenser in the radio by inserting a thin piece of metal between the plates. Set the test oscillator to 262½ Kc. and adjust the trimmers on the I.F. transformers for maximum output. Go over all four adjustments at least twice for accuracy.

Next set the test oscillator at 1500 Kc. and open the tuning condenser until it is tuned to the test signal as indicated by maximum output. Adjust the small trimmers on top of the condenser gang for maximum output.

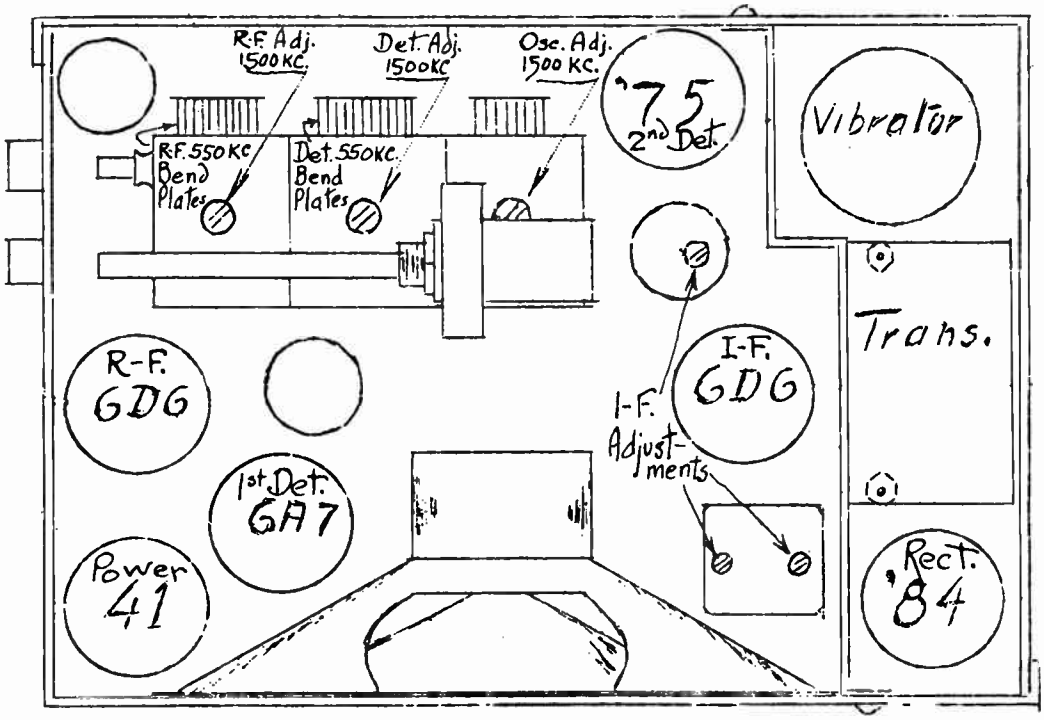
Set the test oscillator at 600 Kc. and, while rocking the tuning condenser slowly back and forth across this setting, adjust the padder condenser for maximum output. Go over the adjustments at least twice for accuracy.



The set operates on 6 to 8 volts battery with either POSITIVE or NEGATIVE grounded.

MODEL LW-10
Socket, Parts
Alignment

LAFAYETTE RADIO & TELEVISION CORP.



I-F. Alignment
Connect test oscillator, set at 175 KC. to Grid of 6A7 and Gnd. Ground stator of oscillator condenser during the adjustment.

R-F. Alignment
Connect test oscillator to antenna and ground. Adjust as shown above.

1233	Filter Choke.	
1234	Dual IF Transformer.	
1235	Single I.F.Transformer	
1236	Antenna Transformer	
1237	Oscillator Coil.	
1238	R.F. Transformer	
2206	Variable Condenser	
2213	Mica Condenser	.00012
2051	Mica Condenser	.0005
2215	Tubular Condenser	.005
2084	Tubular Condenser	.015
2190	Tubular Condenser	.02
2046	Tubular Condenser	.05
2022	Tubular Condenser	.1
2033	Tubular Condenser	.25
2209	Tubular Condenser	.5
2211	5 Mfd -25 Volt Electrolytic Condenser	
2212	5 Mfd. Electrolytic Strap	
2210	Dual 8 Mfd. Electrolytic Filter Cond	
2152	Generator Condenser	
2214	Ammeter Condenser	
3276	Distributor Suppressor	
3277	Spark Plug Suppressor	
5077	Antenna Cable	
5081	Pilot Light Cable less socket	
7128	Speaker	
9401	Volume Control & Switch	
8399	Fuse Retainer	
8403	Pilot Light Socket only	
8407	Pilot Light Bulb	
8405	Knob, Tone Control	
8404	Switch, Tone Control	
9392	Mounting Stud	
	Wing Nuts	

MODEL 640 ELIMINATOR

1239	Power Transformer	
2207	.5 120 Volt Metal Clad Cond. with Stud	
2208	.025 1000 Volt Metal Clad Cond.	
1163-C	R.F. Choke (A circuit)	

LAFAYETTE RADIO & TELEVISION CORP.

MODEL AM-20
Schematic
Alignment
Voltage

Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator output until a small deflection is obtained. Unless this is done the action of the AVC will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

The three R. F. trimming condensers are adjusted at 1400 K. C.. Proceed as follows:
Procure a modulated oscillator giving a signal at 1400 K.C..

Remove the chassis from case, couple the output of the oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 K.C..

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum pos ition.

Then adjust the trimming condensers starting with C 3, C 2 and then C 1 until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments.

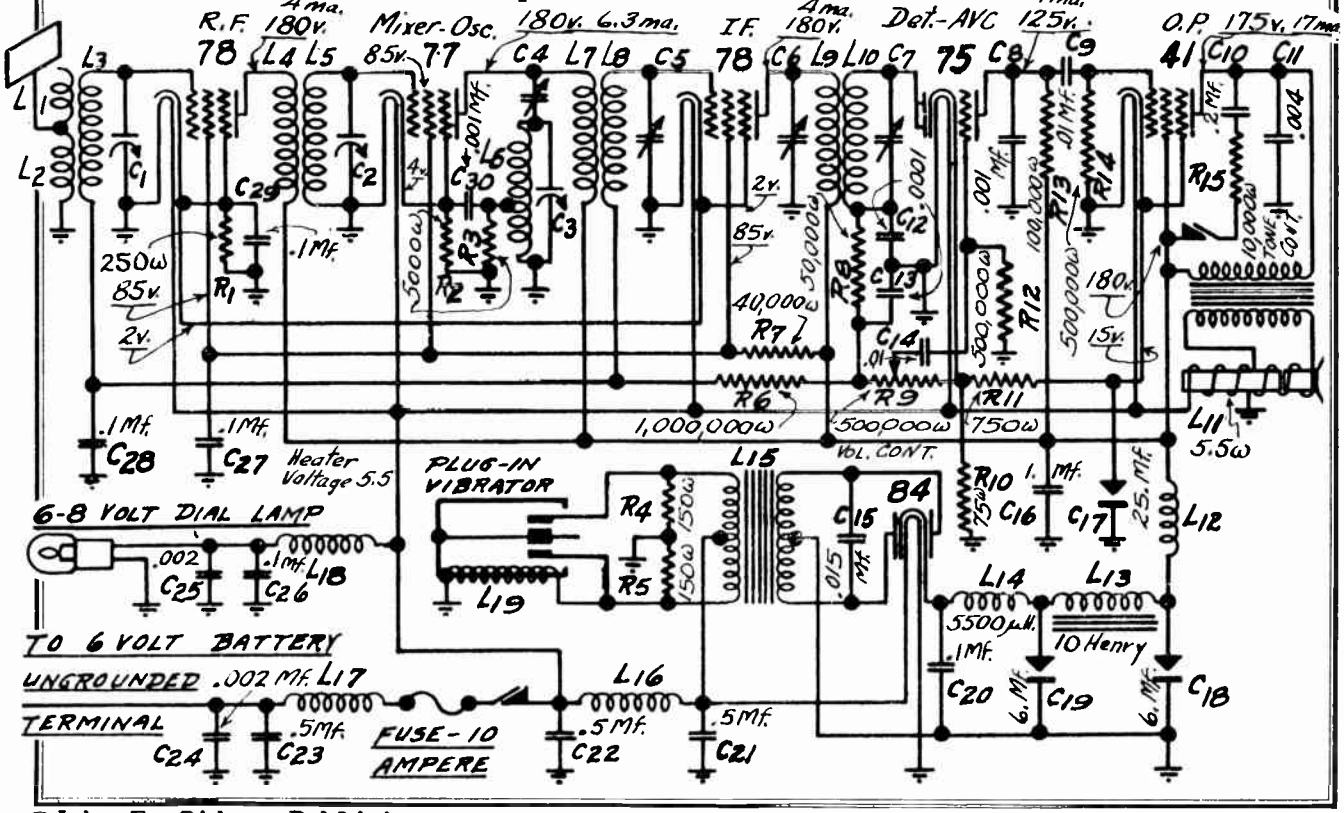
A more accurate adjustment can be made with an output meter.

I. F. Adjustment:

The four I. F. trimming condensers are adjusted at 175 K.C.. Proceed as follows:
Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

IF PEAK 175 KC.

Connect the oscillator output between the first detector grid and ground. Connect output meter.



MODEL L-30
Alignment

LAFAYETTE RADIO & TELEVISION CORP.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

Do not take the chassis out of the box. First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximum output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency mark. This is the large point, 5 points below the 55 mark. Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator R. F. and antenna trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first. See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser is mounted on the end of the gang condenser. See Fig. 2.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Remove the cover of he chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing "B" Unit From Box

Disconnect the "A" and "B+" leads at the terminal strip. On the end of the box at which the "B" unit is located will be found 9 screws around the edge. Remove these 9 screws. The "B" unit and end plate can then be lifted out.

Replacing the Vibrator

Note that vibrator unit is of the plug-in type. This unit can be inserted and removed in the same manner as a tube.

Replacing Chassis Unit

In replacing the chassis unit be sure that the ground spring near the output transformer makes a good contact with the chassis box. Reverse the procedure as given above for removing this unit.

Replacing "B" Unit

When replacing the "B" unit be sure that the ground spring makes a good contact to the partition wall in the chassis box. Reverse the procedure as given above for removing this unit.

Removing Speaker

If service work is required on the chassis, it is advisable in some cases to remove the speaker, as this will permit ready access to all of the units and wiring.

The pot magnet is secured to the vertical walls of the chassis base by means of 3 screws, 2 on one side and 1 on the other. Remove these screws. Then carefully lift out the speaker as far as the leads will permit. The yellow field lead and the black secondary lead may then be unsoldered.

Trouble Shooting and Service

Vibrator Unit

When servicing this receiver a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out. These units are plugged in in the same manner as a tube. One or more vibrator units should be kept on hand for replacement purposes.

"B" Unit

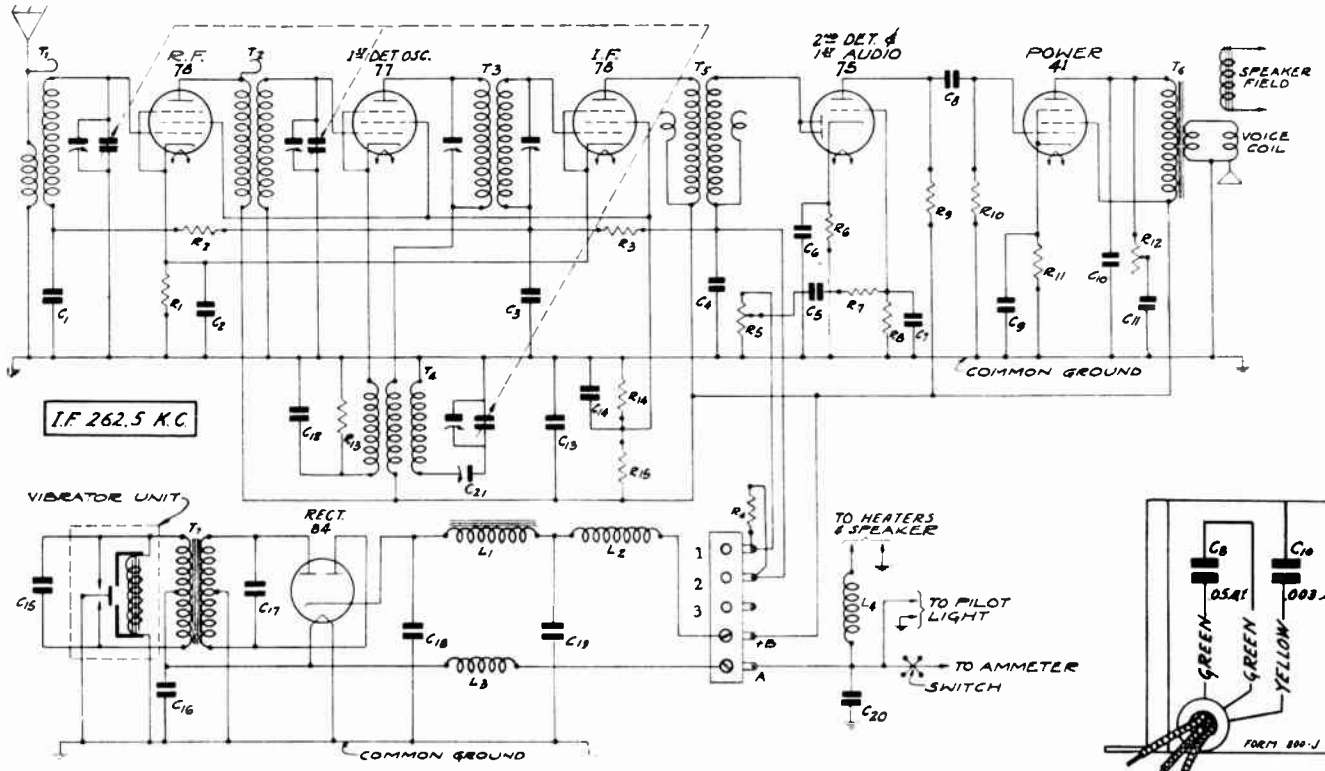
In case of failure in the "B" unit try out a new vibrator. If this does not remedy the difficulty and the "B" unit cannot be repaired locally it is not necessary to return the entire chassis. Remove the "B" unit from the chassis box as per the instructions in this manual after which this unit may be carefully packed and returned separately.

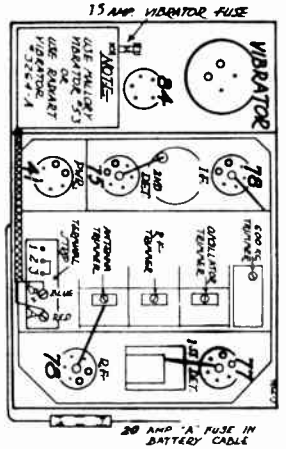
Weak Reception

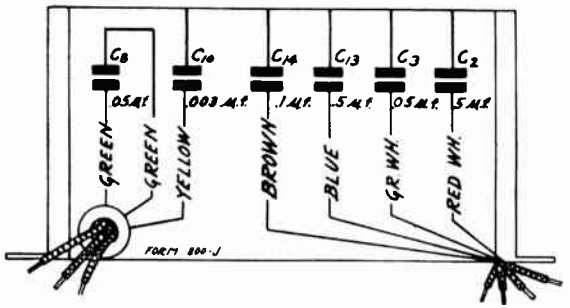
Defective Tubes—Try out a new set of tested tubes and note any difference in performance.

Poor Antenna—To try out the effectiveness of the antenna used, check the volume against the volume when using a straight length of wire about 15 feet long, run out of the car through one of the windows. If, upon test, the external wire is found to be much superior as far as volume is concerned, the antenna is not satisfactory and will have to be re-vamped or a new one installed. The antenna or lead-in may be too near grounded metal portions of the car frame or body resulting in a high capacity to ground. There may be grounded metal mesh in the car roof. There may be a poor soldered connection between the antenna, lead-in, or antenna lead from the set. The antenna system may be partially grounded at some point.

Antenna Trimmer not Adjusted—See Article "Adjusting Antenna Trimmer."







Voltages At Sockets

On the following chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the box, by means of an analyzer plug.

If the chassis unit is taken out of the box all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, the power unit must also be taken out. Connect a jumper from chassis base to the metal wall of unit to complete the ground circuit.

Connect the Hot side of battery to the battery cable on the chassis and the ground side of the battery to the metal chassis base.

The reading at the battery should be 6 volts with the set operating.

VOLTAGES AT SOCKETS

Antenna Disconnected—Battery 6 Volts Under Load

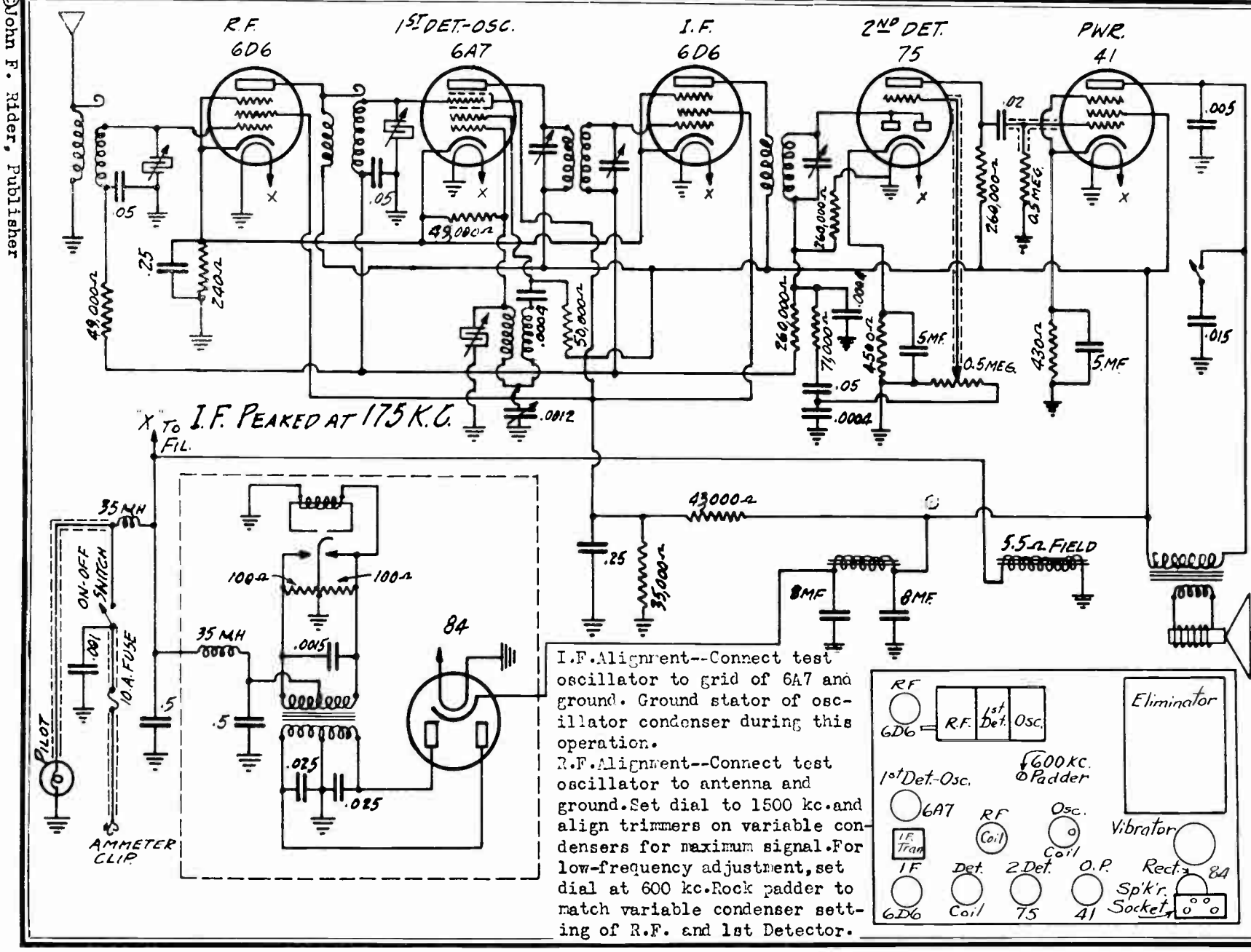
Type of Tube	Function	Across Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M.A.
78	R. F.	5.7	220	100	3.5	5.0
77	1st Det. and Osc.	5.7	220	100	8.0 (1)	1.1 (1)
78	I. F.	5.7	220	100	3.5	5.0
75	2nd Det.	5.7	140 (2)		1.0	0.3
41	Output	5.7	200	210	15.5	18.0
84	Rect.	5.7				20. per plate

(1) Subject to variation.
(2) Triode Plate to Cathode—as read with 1,000,000 ohm meter.

June, 1934

MODEL C-60
Schematic
Alignment
Socket Layout

LAFAYETTE RADIO & TELEVISION CORP.

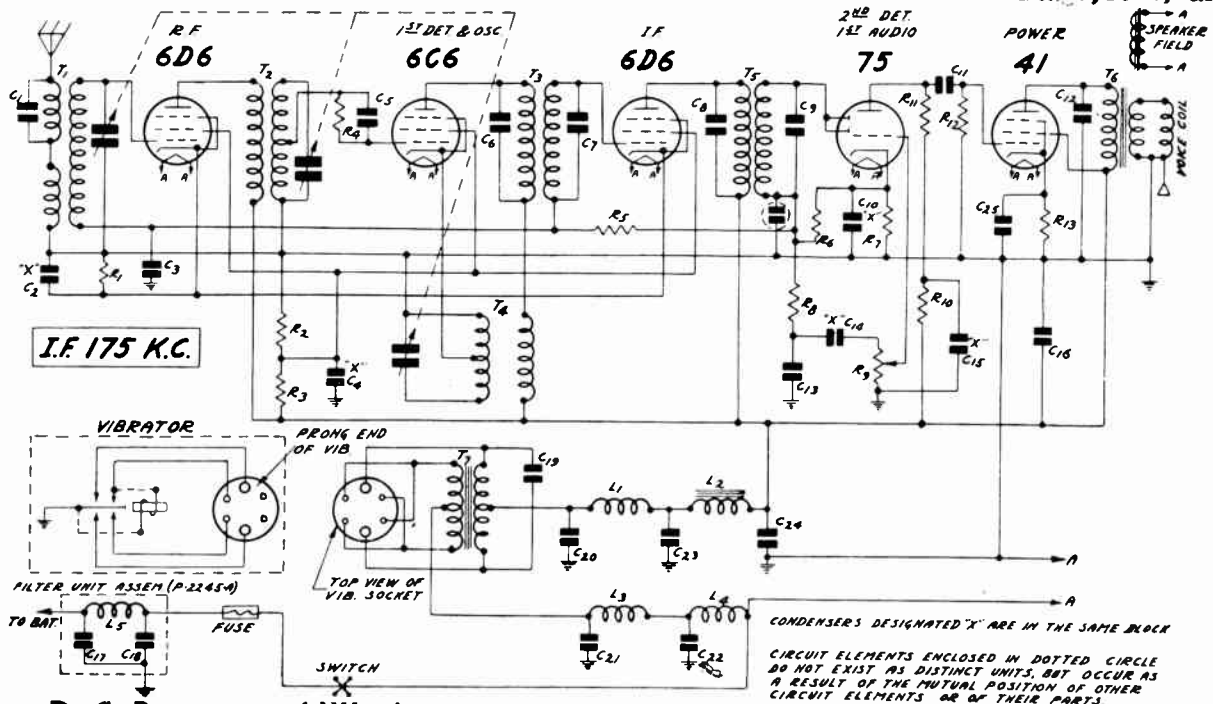


I.F. Alignment--Connect test oscillator to grid of 6A7 and ground. Ground stator of oscillator condenser during this operation.

R.F. Alignment--Connect test oscillator to antenna and ground. Set dial to 1500 kc. and align trimmers on variable condensers for maximum signal. For low-frequency adjustment, set dial at 600 kc. Rock padder to match variable condenser setting of R.F. and 1st Detector.

LAFAYETTE RADIO & TELEVISION CORP.

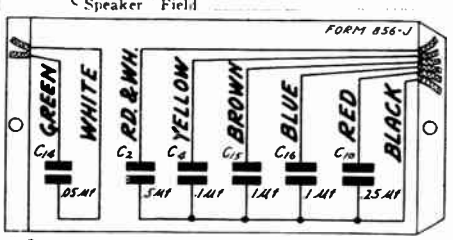
MODEL B-62
Schematic, Socket
Voltage, Test, Parts



D. C. Resistance of Windings

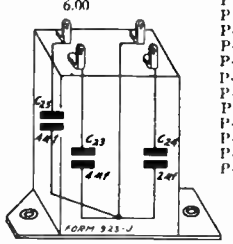
Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec. (Center Tap to Inside)	T2	3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	T6	690.00
	Output Trans. Sec. and Voice Coil in Par.		0.80
	Speaker Field		6.00



COND. C14 REMOVED FROM BLOCK IN LATER MODELS

Condenser Block Internal Wiring



COND. C24 WAS 8 MF IN EARLY MODELS

Electrolytic Block Internal Wiring

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

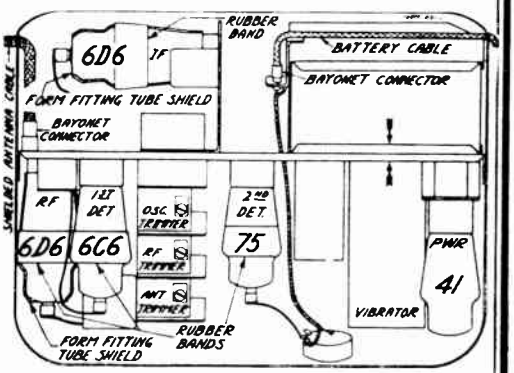
VOLTAGES AT SOCKETS
Input 6.3 volts
Antenna disconnected at connector.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	.250 mmf.		Part of Antenna Coil Assembly
P-82600D	C2	.50 mf.	200V.	Bypass Block
	C4	.10 mf.	140V.	
	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	200V.	Tubular
P-81815	C5	.35 mmf.		Part of Grid Leak Assembly
P-81806	C6	70 mmf.		Part of 1st I. F. & Osc. Coil Assembly
	C7	70 mmf.		
P-81806	C8	70 mmf.		Part of 2nd I. F. Coil Assembly
	C9	70 mmf.		
P-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	In Choke Condenser Unit
	C18	.01 mf.	120V.	
P-81130	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500	Gang Condenser			

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P- 96017	R9	2 Megohm		Volume Control and Switch
P-A95503	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound



Location of Tubes and Vibrator

MODEL S-17762
Socket
Alignment
Trimmers

LAFAYETTE RADIO & TELEVISION CORP.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

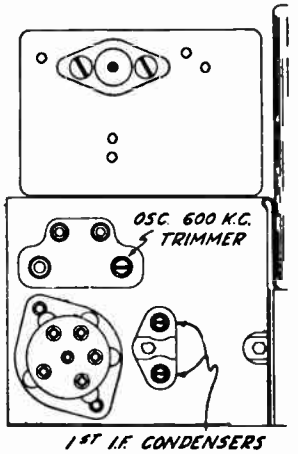


Fig. 12—Location of Trimmers

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. The location of the adjusting screws for these condensers is shown in Fig. 12.

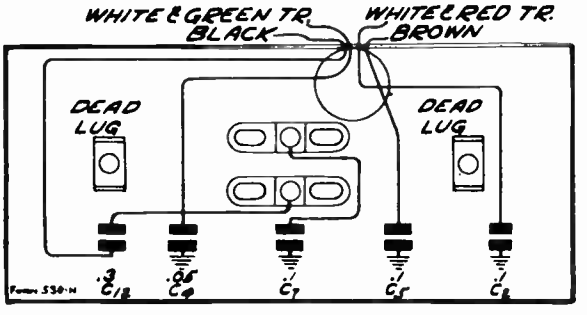
Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first (section farthest from drive gear).

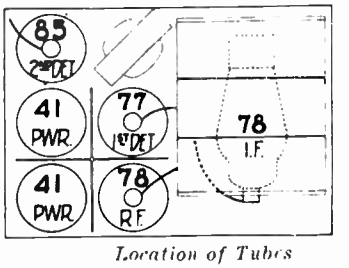
Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The location of this condenser is shown in Fig. 12.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.



Condenser Block—Internal Wiring



Location of Tubes

Trying Out the Set and Adjusting

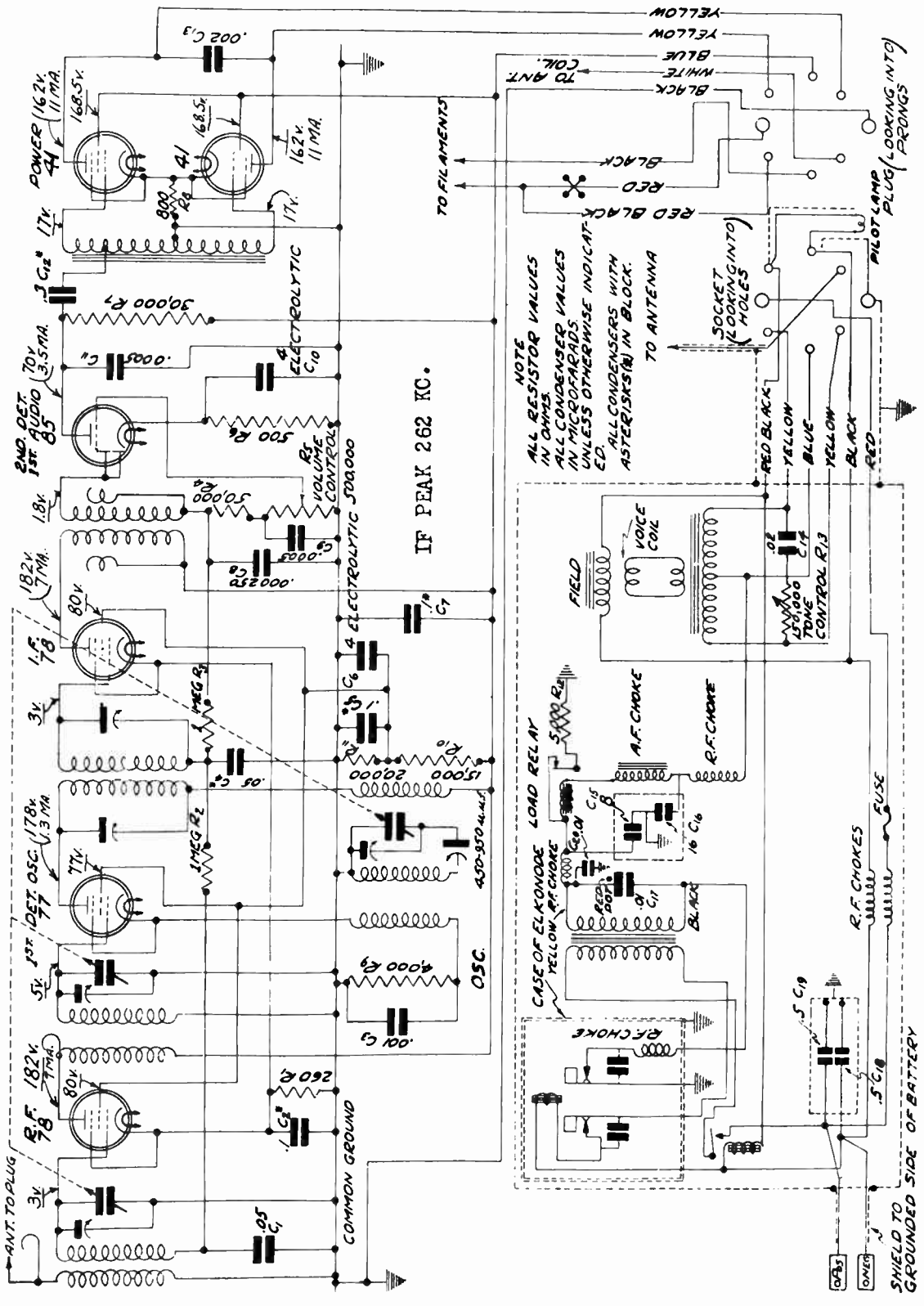
After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer condenser. The location of the tubes is shown in Fig. 8. Do not start the engine of the car yet.

To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 KC with the volume control about three-quarters on. On one end of the chassis box is a small metal plate. Remove the two screws which hold this plate in place. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

If the receiver fails to operate, check the items as given under the article by that name.

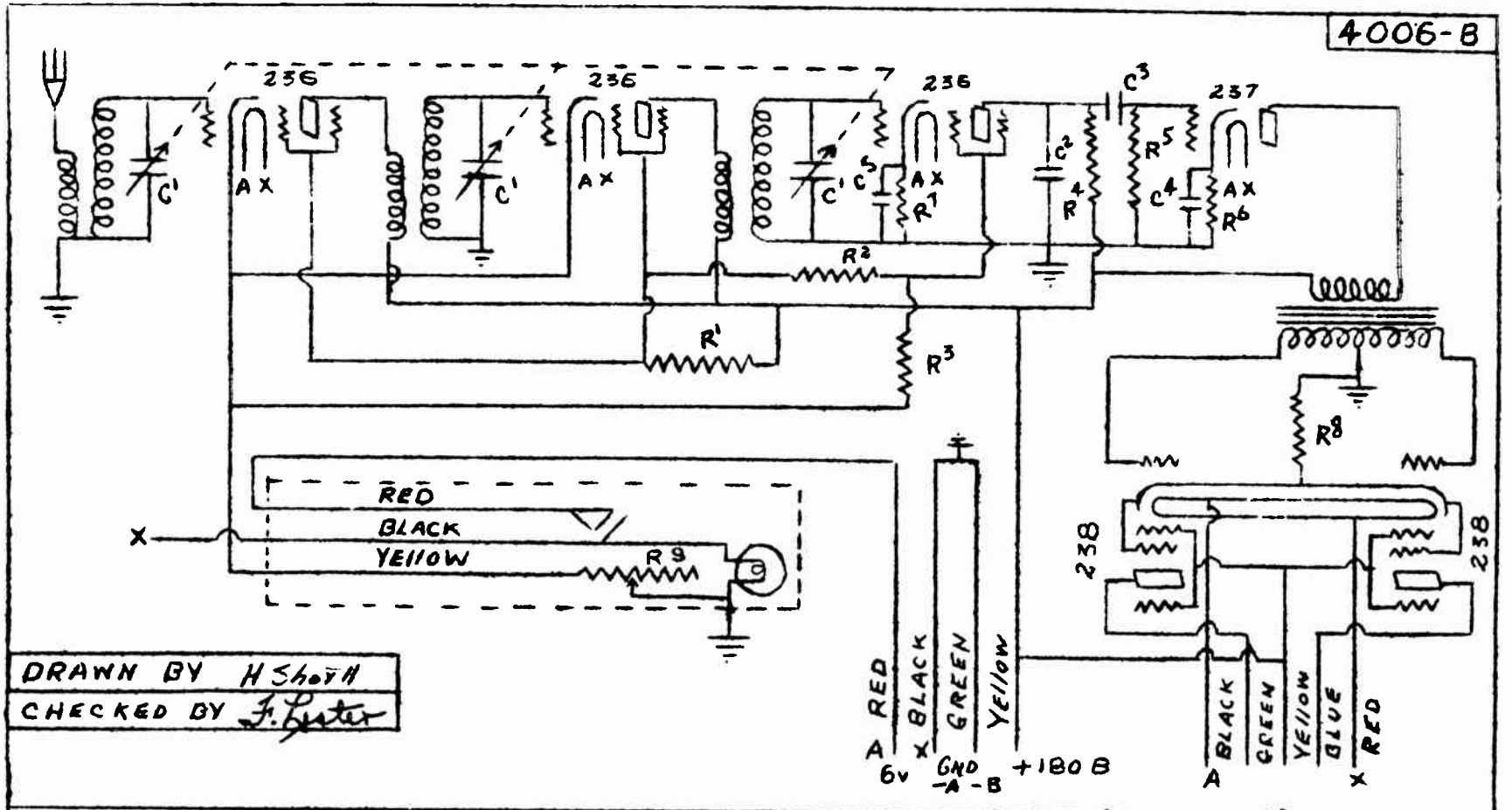
LAFAYETTE RADIO & TELEVISION CORP.

MODEL S-17762
Schematic
Voltage



MODEL Deluxe (1st)
Schematic

LAFAYETTE RADIO & TELEVISION CORP.



LAFAYETTE DELUXE AUTO RADIO (1ST model)				
C' GANG COND	C4 - .1 BY Pass	R1 - 50.000 Ω	R4 - 250 000 Ω	R7 - 2500 Ω
C2 - .00025 MICA	C5 - .1 BY Pass	R2 - 500,000 Ω	R5 - 500.000 Ω	R8 - 800 Ω
C3 - .006 MICA		R3 - 25000 Ω	R6 - 2500 Ω	R9 - 30000

MODEL 1932 Type
Single Reed
Elkonodes

P. R. MALLORY & CO.

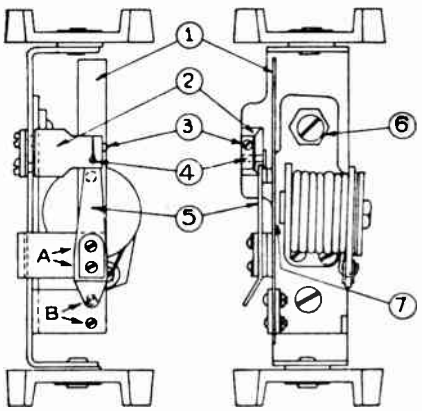
Directions for Servicing 1932 Type Mallory 'Single-Reed' Elkonodes

The 1932 type Mallory Elkonode is a half-wave, single-reed converter used with a BR Raytheon tube for rectification. This Elkonode is supplied in six standard types—from 1 to 6 inclusive—and modifications are supplied for special requirements, such as S101, S102, S103, T112, and S111. 12-volt single-reed Elkonodes are supplied in types G1 to G6 inclusive, and 32-volt Elkonodes in types from F1 to F6 inclusive.

The mechanical construction of the single-reed Elkonode is the same in all types with the exception of the size and number of turns of wire on the Elkonode coil. Following is a table of characteristics indicating the output obtainable from these standard Elkonodes:

Milli-amperes	12	15	17	20	22	25	27	30	32	35	37	40	42	45	47	50
Volts																
220	2	3	4	4	5	6	6									
210	2	3	3	4	5	5	6	6								
200	2	3	3	4	4	5	5	6								
190	2	3	3	4	4	5	5	6	6							
180	1	2	3	3	4	4	5	5	6	6						
170		2	3	3	4	4	5	5	6	6	6					
160		2	2	3	3	4	4	5	5	6	6					
150		2	2	3	3	4	4	4	5	5	6	6	6			
140		1	2	3	3	3	4	4	4	5	5	6	6	6		
135		1	2	2	3	3	3	4	4	5	5	5	6	6		

The following reproductions picture the Mallory single-reed Elkonode in two positions:



No. I

No. II

1. Reed Assembly
2. Stop Post mntg. block
3. Stop Post locking-screw
4. Stop-Post
5. Contact Spring Assm.
6. Cam-nut adjustment
7. Air-gap

(I) is a side view showing the Elkonode with cover and rubber cushion removed. (2) is a front view with can and cushion removed. Numbered arrows clearly indicate the position of the Elkonode parts involved in installing new contact spring assemblies and new reed assemblies.

Routine for Dismantling Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws which fasten outer housing or can to base.

(b) Hold can in upright position and tamp gently against hand permitting base and rubber housing inside of can to drop out gently. (CAUTION: Do not attempt to remove Elkonode assemblies from cans by pulling on the base.)

(c) Remove rubber cushion from Elkonode assembly in the same manner as entire assembly was removed from can.

TO REMOVE SPRINGS:

(d) Remove contact spring assembly by extracting screws at point marked "A" on above diagram.

(e) Remove reed assembly by extracting screws at point marked "B" on above diagram.

(f) Install reed assembly, using care to insure that metal blocks in which this reed is mounted are squarely aligned. NOTE: Use only Kester Resin Core Solder.

(g) Install contact spring assembly using care to properly align metal blocks in which this spring assembly is mounted.

(h) Inspect alignment of contact points to insure that contacts on both reed and contact springs are in proper alignment, and that their surfaces engage squarely and evenly. Alignment of these points is controlled by the position of the springs, and the screws mounting these springs should not be tightened firmly until the points are in alignment.

(i) With points in proper alignment, the air-gap or clearance between pole-piece of the coil and reed should be adjusted to approximately 1/32 inch. This adjustment is provided for by the cam nut and locking screw at point marked "6" in diagram 2. The reed should be in a perfectly perpendicular plane, and the surface of the pole-piece or core of the coil should be exactly parallel with surface of reed.

MODEL 1933-34 Type
Dual Reed Elkonodes

P. R. MALLORY & CO.

(j) Loosen the locking screw of the stop post (identified at point 3, on diagram 1) and adjust the stop post (identified at point 4, diagram 1) so that the tip of contact spring assembly engages screw-side of stop post head, allowing contacts to meet with a light pressure. This stop post is easily adjusted by turning to left until head of contact post pulls contact on left, or contact spring, away from contact on right, or reed contact. Then turn stop post screw to right about 1/8 to 1/4 turn, until contact points meet the light pressure. At this point, stop post locking screw should be firmly tightened down to hold stop post in this position.

(k) If the foregoing mechanical adjustment has been carefully followed out the Elkonode is now ready for Electrical Tests. These tests should be conducted with a master Eliminator, into which the Elkonode can be inserted while the can and rubber cushion are still removed, and with a "dummy" load on the Eliminator which will require 180 volts at 35 m.a. for Elkonode types 6, S101, S102, S103, S111, and T112. The output of the Elkonode is adjusted by increasing or decreasing the air-gap clearance between pole-piece of coil and surface of the armature reed. A cam nut and locking screw arrangement provide a flexible adjustment which sometimes must be supplemented by inserting thin metal shims between coil and bracket. NB—Shims are required only where construction of the unit will not permit air-gap clearance being decreased to point required, by adjustment of cam nut.

(l) Electrical adjustment for other types of Elkonodes, from 1 to 5 inclusive, must be conducted with "dummy" load to equal maximum output available from whichever type Elkonode is involved per characteristics shown in the foregoing table.

(m) Extreme care must be exercised to insure that no dirt or foreign matter is allowed to accumulate on contact points and that entire Elkonode assembly is kept thoroughly dry.

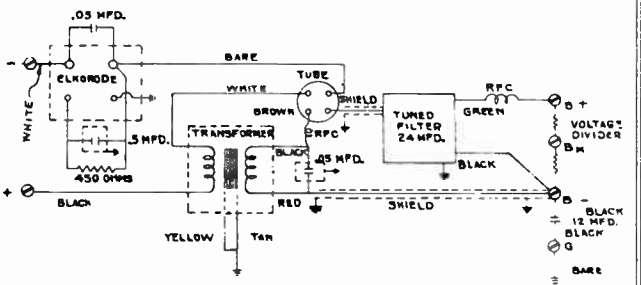
(n) Excessive sparking usually results from improper pressure between and alignment of contact points. If it is found necessary to bend the reed to secure a flat alignment of points, this should be done very carefully, using a pair of thin flat-nosed pliers, to grasp the reed firmly *at the base where it is mounted.* A very slight pressure at this point will be required to change the angle of contact for vibrator points. *No sparking* whatever results from improper adjustment of stop post, permitting contact springs to follow reed springs past the center of cycle of amplitude or arc of vibration. Contacts should be lightly touching when at rest so there is about .014 inch clearance between stop post and contact spring. Stop post will then break this contact at the center of cycle of amplitude.

If the foregoing instructions are followed carefully, and if reliable instruments are used to measure the output of the Elkonode when electrical adjustments are being completed, you should be able to install contact and reed spring assemblies without difficulty. When adjustments have been completed to your satisfaction, place vibrator assembly inside rubber cushion by holding cushion in inverted position, and allowing assembly to drop into place. Next, place entire assembly inside can, in same manner, and fasten can to base, using screws provided for that purpose.

Thorough instructions for servicing other parts of the Mallory Elkon "B" Eliminator are provided in the service and installation bulletin accompanying each unit,—copies of which may be had upon request.

The following equipment is recommended as being extremely useful in conducting repairs on Mallory-Elkon "B" Eliminators and Elkonodes:

1. High resistance volt-meter. Scale: 0 to 300. Resistance: Not less than 1000 ohms per volt.
2. One good quality milliammeter. Scale: 0 to 50.
3. One set feeler gauges.
4. One small screw-driver.
5. One pair thin, flat-nosed pliers (duck-bill type).
6. One 1932 Mallory-Elkon "B" Eliminator chassis.
7. One variable resistor—"dummy" load arrangement to duplicate maximum load for which each of six standard types of Elkonodes is designed.



Directions for Servicing 1933-34 Type Dual-Reed Mallory 'Self-Rectifying' Elkonodes

The 1933 Mallory Self-Rectifying Elkonode is a dual-reed converter which within itself sets up the essentially alternating current required, and likewise rectifies it to the form of direct current required for radio receiver plate supply. No rectifying tube is used with the 1933 Mallory Self-Rectifying Elkonode.

This Elkonode is supplied in five standard types—from 10 to 14 inclusive—and modifications are supplied for special requirements under such designations as Nos. 30, 31, 34, 35 (for Motorola Receivers), and Nos. 36 and 37. 12-volt types are supplied in types G10 to G14 inclusive, and 32-volt types from F10 to F14 inclusive. The mechanical construction of the dual-reed Self-Rectifying Elkonode is the same in all types with the exception of size and number of turns of wire on Elkonode coil.

Following is a table of characteristics indicating output obtainable from each standard Elkonode at storage battery terminal voltage of 6.6, for the 6-volt, 13.2 for 12-volt type.

ELKONODE RATING TABLE

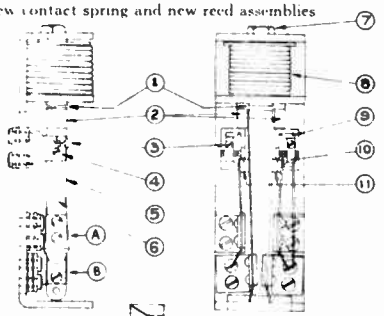
Elkonode Type	Volts Output	For Receivers Requiring the Following Current in Milliamperes in the B Minus Lead at 200 V. on Signal: Without Voltage Dividers in B lim	With 2 M A 100 000 Ohm Voltage Divider in B lim	Elkonode Rated Output Watts	Storage Battery Drain in Amps
10	200	40 45	38 43	8.4	2.1
11	200	35 40	33 38	7 4	1.9
12	200	30 35	28 33	6.4	1 6
13	200	25 30	23 28	5 4	1.4
14	200	20 25	18 23	4.4	1 2

Current at which Phantom Load Relay should be adjusted

Elkonode Type	No. 10	No. 11	No. 12	No. 13	No. 14
Current	20 M A	17.5M A	15 M A	12.5M A	10 M A

Special Types Should be Adjusted to SPECIFICATIONS (See Paragraph "N")

The following reproductions picture the Mallory dual-reed or self-rectifying Elkonode in two positions: (3) is a side view showing the Elkonode with cover and rubber cushion removed, and (4) is a front view with cover and cushion removed. Numbered arrows clearly indicate position of Elkonode parts involved in installing new contact spring and new reed assemblies



ENLARGED STOP POST ASSEMBLY

No. III
1 Air gap
2 Reed counter weights
3 Stop post locking screw
4 Stop post
5 Reed Spring Assm
6 Contact Spring Assm

No. IV
7 Coil mounting nut
8 Coil
9 Stop post mounting block
10 Position contact spring behind stop post head
11 Contact points

Routine for Dismantling Dual-Reed or Self-Rectifying Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws which fasten outer housing or can to base

(b) Hold can in upright position and tamp gently against hand, permitting base and rubber housing inside of can to drop out gently. (CAUTION Do not attempt to remove Elkonode assemblies from cans by pulling on base.)

(c) Remove rubber cushion from Elkonode assembly in the same manner as entire assembly was removed from can.

(d) With internal assembly in view, displace condensers by turning each outward from center carefully.

TO REMOVE SPRINGS AND REEDS:

(e) Remove contact spring assembly by extracting screws at point marked "A" on above diagram, No. III

(f) Remove reed assembly by extracting screws at point marked "B" on above diagram No. III.

(g) Install reed assembly, using care to insure that metal brackets in which these reeds are mounted are squarely aligned with reeds. (NB Use only Kester Rosin Core Solder.)

(h) Install contact spring assembly using care to properly align metal brackets and blocks with which this assembly is mounted

(i) Inspect alignment of contact points to insure that contacts on reed and contacts on springs are in proper alignment. Their surfaces must engage squarely and evenly. Alignment of points is controlled by the position of the springs. Screws mounting these springs should not be tightened firmly until points are in alignment

(j) With points in proper alignment, air gap or clearance between pole-piece of coil and counter weights on ends of reed assemblies should be adjusted to approximately 1/32 inch, when reeds are pulled in to *center position*. This adjustment is provided for by removing or inserting shims between the Elkonode frame and coil at top of coil

(k) Loosen locking screw of stop posts (identified at point 3, diagram III, above) so that tips of contact spring assembly engage screw-side of stop post head, allowing contacts to meet with contacts on reed assemblies at light pressure. Stop post is adjusted by turning to left until head of contact post pulls contact springs away from contact on reed assembly. Then turn stop post screw to right (about 1/8 to 1/4 turn) until contact points on both contact spring and reeds meet with light pressure. At this point, stop post locking screw should be firmly tightened to hold stop post in this position

(l) It is extremely important, if secondary reed and contact spring assembly show any sign of having been burned as a result of "arcing," that condenser No. 16611, rated at .01 mfd. 1600 V., used across the secondary side of the Elkonode be replaced with a new one.

(m) Elkonodes which have become inoperative through the breaking down of this condenser, or which show evidence of overload at contact points, should never be replaced in Eliminators or automotive radio receivers until the adjustment of the "phantom load" relay has been checked carefully. Following is an outline of the causes which may bring about Elkonode failure through no fault of the Elkonode, and the method for correcting them:

(n) Elkonode failure is usually the result of a "no load" operating condition, which ordinarily is due to (A) film of dirt between contact points of phantom load relay, (B) iron filings between core and clapper of phantom load relay, (C) insufficient tension in phantom load relay springs, (D) open phantom load resistor, (E) receiver output tube defective, (F) connections to output tube open.

Most prevalent of these difficulties are items (B) and (C) which invariably cause Elkonode failure through no fault of the Elkonode

Conditions (A) and (B) are corrected by thorough cleaning with strips of paper. Condition (C) is corrected by inserting milliammeter in coil circuit of phantom load relay, or in B + lead to receiver, and adjusting spring tension so that relay clapper will pull to core when current is equivalent to current rating for that type of Elkonode, as indicated in foregoing table. Conditions (D) and (F) are detected by continuity checks, while Condition (E) is detected by means of a tube tester.

(o) A choke coil is mounted within the rubber cushion in the base of the Elkonode can, and the continuity of this choke coil should be checked by continuity tests between mounting prongs and soldering terminal of the secondary contact spring assembly.

(p) If the foregoing mechanical adjustments have been carefully followed out, the Elkonode is now ready for electrical tests. These tests should be conducted with a master Eliminator, into which the Elkonode can be inserted while the can and rubber cushion are still removed. A "dummy" load to equal the output characteristics of whichever type dual-reed self-rectifying Elkonode is involved should be imposed, and all tests should be conducted with a battery terminal voltage of 6.6. Special types of Elkonodes designed for so-called "all-electric" automotive receivers may best be tested in this same manner, or with a "dummy" resistor load to match the output characteristics of that Elkonode

(q) Extreme care must be exercised to insure that no dirt or foreign matter is allowed to accumulate on contact points, and that the entire Elkonode assembly is kept thoroughly dry.

(r) "Excessive sparking" usually results from improper pressure between and alignment of contact points. If it is found necessary to bend reed assembly to secure flat alignment of points, this should be done by carefully grasping reed assembly at bracket where it is mounted with a pair of thin, flat-nosed pliers. A very slight pressure will be required to change the angle of contact for vibrator points. "No sparking" results from improper adjustment of stop post, permitting contact spring to follow reed spring past center of cycle of amplitude or arc of vibration. Contacts should be lightly touching when at rest, so a clearance of approximately .012 exists between stop post head and contact spring on interrupter side and .002 to .006 on rectifier side. Stop post will then break these contacts at center of cycle of amplitude.

If the foregoing instructions are followed carefully, and if reliable instruments are used to measure output of Elkonodes when electrical adjustments are being completed, you should be able to install these contact spring and reed assemblies without difficulty. When adjustments have been completed to your satisfaction, place vibrator assembly inside rubber cushion by holding cushion in inverted position and allowing assembly to drop into place. Next, place entire assembly inside can, in the same manner, and fasten can to base.

Thorough instructions for servicing other parts of the Mallory-Elkon "B" Eliminator are provided in Service and Installation Bulletin accompanying each unit, copies of which may be had upon request. A circuit diagram of the entire Eliminator is shown herewith for your convenience in making continuity tests.

It is important that Elkonodes be used only with Eliminators having same type numbers, and that phantom load relays and resistors are matched to type of Elkonode and Eliminator involved. Correct types of phantom load relays and resistors are shown in the parts list.

The following equipment is recommended as being extremely useful in conducting repairs on Mallory-Elkon "B" Eliminators and Elkonodes:

1. High resistance volt-meter. Scale: 0 to 300. Resistance. Not less than 1000 ohms per volt.
2. One good quality milliammeter. Scale: 0 to 50.
3. One set feeler gauges.
4. One small screw-driver.
5. One pair thin, flat-nosed pliers (duck-bill type).
6. One 1933 type 10 Mallory-Elkon "B" Eliminator chassis, with one each proper phantom load relay and resistor for types 10, 11, 12, 13 and 14. (A test-board switching arrangement to cut in whichever type phantom load relay is required for the Elkonode being repaired will be valuable in conducting these tests.)

Routine for Dismantling Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws holding cover on can.

(b) Loosen cover from can and hold in upright position, prongs down; gently shake the rubber sock and Elkonode from the can.

(c) Closely observe the manner in which the leads from the prong base to the Elkonode are placed in the outer slots of the rubber sock. This is important for correct placement of wires when replacing assembly in can.

(d) Observe the location of the various parts, especially the position of the reed Armature (2) with respect to the coil pole shoe of the Elkonode. (1).

(e) Unsolder the three leads at the Elkonode terminals, noting that the top lead (with Elkonode held as in diagram) crosses over the ground lead to the center connection at the plug. Unsolder the coil wire at the spring terminal.

(f) Loosen lock nuts A, and A2 and turn the adjusting screws B, and B2 counter clockwise until the insulating bushings (5) are against the frame, then remove screws and slide out bushings.

(g) Loosen stack screws (3) and remove. Press on the under side of the bakelite stack and reed so as to move the assembly out from between the frame. Save the insulating bushings (5), stack screws (3), connector plate (4), adjusting screws, and the lock nuts. Remove the bakelite stack spacers and insulating tubes from the assembly.

ROUTINE FOR REBUILDING THE ELKONODE:

(h) Rebuild the stack assembly, making sure to use the thicker of the four bakelite spacers on either side of the reed.

(i) Since the Elkonode is largely magnetic in operation, extreme care must be taken to prevent particles or filings of iron from attaching themselves to the iron parts of the Elkonode. Clean the pole shoe, frame, and reed thoroughly.

(j) Hold the assembly with the reed in the position shown in the illustration, place the frame under the assembly, as shown also, and insert the assembly from the top. It may be necessary to spread the frame slightly in order to make the insertion. Inspect the stack screws for signs of weakening, and if satisfactory, replace with the connector plate and tighten slightly.

(k) The reed should stand approximately in the center of the frame at rest. The end of the reed should be parallel to the face of the pole shoe and from .003" to .005" distant from it when the reed is pulled down opposite its center. This distance should be accurately set by feeler gauges. The reed may be adjusted because of play in the mounting holes.

(l) Insert the insulating bushings in the slots in the ends of the springs, thread the adjusting screws into place, together with the lock nuts. Adjust the screws to place the contacts close to the reed contacts. The springs should be moved so as to allow the contacts to strike the reed contacts without overlapping. The contacts should be fairly flat in making contact, and still not bind on the insulated adjusting bushing.

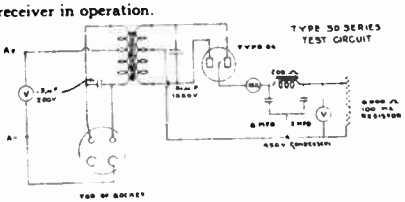
(m) Tighten the stack firmly without disturbing the adjustments. Hold the reed over a piece of white paper in the vertical position shown in the illustration. The end edge of the reed, on the opposite side from the armature should rest from flush with the edge of the pole piece to .003" above same. Any bending of the reed should be done at the extreme armature end, and only slight alterations should ever be necessary. Should the pole shoe not be parallel with the armature in a vertical direction, turn the pole shoe with a pair of long-nosed pliers; *do not attempt to twist the reed.* Check the air-gap spacing and tightness of coil mounting screws, if such adjustments are made, then recheck alignment.

(n) Solder the leads back as before, with the ungrounded heater terminal lead to the reed tail. The connector plate is soldered to the reed tail also, at the same time, and the coil wire to the near spring lug.

(o) Some method of exerting high pressure upon the stack end of the Elkonode while the final tightening of the clamping screws is taking place is essential. It is suggested that an arbor press, capable of exerting a total pressure of about 2000 pounds, be used. Pressure should be exerted directly over the stack, between the screws, while a large screw driver draws the screws down firmly. This prevents loosening of the stack in service and consequent failure.

(p) Turn the adjusting screw B-1 clockwise until the space between the contacts G and H is between .003" and .004", as measured carefully with a feeler gauge, with the lock nut A-1 tightened firmly. Proceed likewise with B-2 and A-2 until clearance between contacts E and F is between .004" to .006" Check lock nuts for tightness. The unit should then be ready for operation.

Following is a test circuit which may be set up for electrically testing and adjusting Elkonodes of the "50" Series. "Sound" tests may be obtained only with receiver in operation.



(Transformer should be the same as used in set from which the Elkonode was taken. The set itself may be used for test if an extension lead is made up. Do not expect quiet operation while set is open and unit is uncanned.)

(q) If test equipment is available, operate the Elkonode on this equipment before placing it in the Elkonode can. The unit should start operation at 4.4 volts (2 cells of 6-volt battery on charge), should provide correct output at 6.6 volts and should operate satisfactorily at 8.8 volts (4 cells on charge). Should any adjustment be necessary, adjust screw B-2 only. A very slight movement of the screw should permit final adjustment.

CAUTION

(r) Do not attempt to bend contact springs.
Use only Kester Rosin Core Solder.
Keep moisture from all parts of the Elkonode.
Keep metallic particles out of Elkonode.
Keep dust, moisture, grease and liquid from the contact surfaces. Clean contact surfaces with a dry, clean piece of linen paper.

(s) When inserting the Elkonode into the rubber sock, be very careful to turn the frame of the Elkonode parallel with the flat sides of the inside holes of the sock, so as to leave the air spaces at the open sides of the Elkonode. The single ground lead (from reed) is taken down the smaller of the two slots, while the other two leads are taken down the larger slots. Place the Elkonode in the sock, so that no wires need be bent to meet this arrangement. Draw the leads to the prong base, and fold under the lid. Insert the sock assembly into the can, with the large slot next to the seam of the can. Screw cover to can with screws provided.

"60-70-80" Series Units

The series 60, 70, and 80 Mallory Elkonodes are described as single-reed, full-wave inverters, with self-contained synchronous rectifiers. These units within themselves supply the direct current, high voltage for radio receiver plate supply. No tube rectifiers are required with these types. Inasmuch as the mechanical construction of all of the 60, 70 and 80 series units is the same, the following service information will apply to all such units:

The 60 series unit is no longer in production—having been replaced with the 70 series unit, and differs from the 70 series principally in that its self-contained point buffer condensers were of the wax impregnated paper type, rated at .008 mfd. 1600 volts DC. The 70 series is supplied with an oil-impregnated and immersed paper condenser of .01 mfd. capacity, rated at 1600 volts DC, and whenever occasion arises to replace contact spring and reed assemblies in the 60 series unit, advantage should be taken of that opportunity to replace the old unreliable paper condensers with the new type, described as our part A-18237.

The 80 series Mallory Elkonodes are identical with the 60 and 70 series except that no internal point condensers are supplied. These units are to be used only in cases where the original point buffer condensers in the type 60 Elkonodes have been removed, and suitable condensers installed permanently at the Elkonode socket prong. In some special cases, a manufacturer may have used external secondary buffer condensers in place of the internal point condensers, but such cases will be rare.

As with all other types of Mallory Elkonodes, the prefix letter G denotes 12-volt operation, and the prefix letter F denotes 32-volt operation. Differences in wire size and in the number of turns of the Elkonode driver coil distinguish the 6-, 12-, and 32-volt types, but the output ratings as set forth in the following table apply to 6-, 12-, and 32-volt types alike:

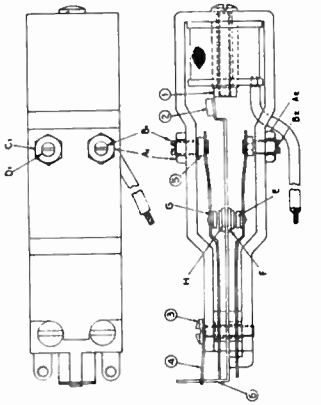
Elkonode Series No.	Maximum Watts Output
60 —70 —80	11
60B—70B—80B	18
61 —71 —81	11
63 —73 —83	18
65 —75 —83	11

SERVICE EQUIPMENT REQUIRED

1. High resistance volt-meter. Scale: 0 to 300 and 0 to 600. Resistance: Not less than 1000 ohms at 2 volts.
2. A good quality milliammeter. Scale: 0 to 50 and 0 to 100
3. One set feeler gauges.
4. One small screw driver and one large screw driver.
5. One pair thin long-nosed pliers.
6. One medium-sized arbor press.

The reed of the Elkonode is grounded to the can, and the receiver circuit ground is necessary for all types but the 60, 60B, 70, 70B, 80 and 80B units, in which cases the ground returns through the A Battery. The types 65, 75 and 85 are for use on household battery receivers, or similar applications where the battery is not on charge while the receiver is in operation. All ratings given are for operating battery voltages of 6.6, 13.2 and 33 volts, for the standard 6-volt, 12-volt and 32-volt series respectively. It is necessary that the Elkonodes be properly polarized in connecting the prong base and transformer, in order to prevent a reversal of output voltage.

The following reproduction pictures the Mallory type 80 Elkonode in both top and side views with covers and with point buffer condensers of course removed:



Explanation of Above Charts

A—A2 —Rectifier Lock Nut	1. Magnet Coil Pole Shoe
B1—B2 —Rectifier Adjusting Screw	2 Reed Armature
C1—C2 —Interrupter Lock Nut	3 Stack Clamping Screw
D1—D2 —Interrupter Adjusting Screw	4. Connector Plate
E, F, G, H—Rectifier Contacts	5. Insulating Bushing
E, F, G, H—Duplicate for Interrupter Side	6 Reed Tail

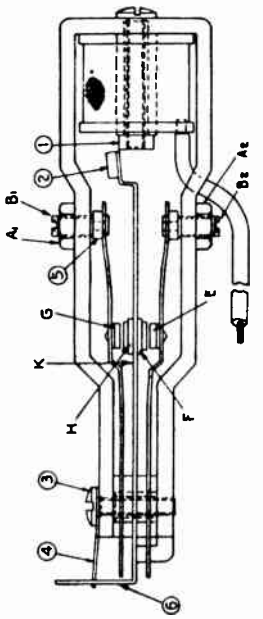
P. R. MALLORY & CO.

The 50 Series Mallory Elkonode is a single-reed full-wave inverter for use in supplying alternating-current voltage which in turn is rectified by a tube rectifier for supplying the high direct-current voltage needed for radio receiver plate supply.

This Elkonode is used in three standard types, Nos. 50, 51, and 53, and in certain modified forms for special requirements. For 12-volt operation, the type number is prefixed with the letter "G" to designate the change in construction. Likewise, for 32-volt operation, the letter "F" is used. The mechanical construction for all types is the same except for a change in the driver-coil windings for the 12-volt and again for the 32-volt types. The types 50 and 51 Elkonodes are adjusted and intended to carry output loads up to *11 watts*. The type 53 Elkonode is designed for loads from 11 to 18 watts. These types have an advantage over earlier types in not being limited to a narrow range of load conditions. Ratings are given, in every case, for operating battery voltages of 6.6, 13.2, and 33 volts, for the 50, G-50, and F-50 Series, respectively.

The following reproduction pictures the Mallory Type 50 Series Elkonode in a top view, with covers removed.

1. **Magnet coil pole shoe**
2. **Reed armature**
3. **Stack clamping screw**
4. **Connector plate**
5. **Insulating bushing**
6. **Reed foil**



A—lock-nut. B—adjusting screw.
E, F, G, H—contact points

Instructions For Adjusting Contact Springs When Such Springs Do Not Require Replacement

As with automobile ignition contacts, the tungsten contact points in Elkonodes will show some evidence of wear after they have been in service for a long period of time. This wear progresses gradually, and as long as the Elkonode is capable of operation, any amount of wear at the contact points will have no influence whatever on the performance of the radio set or on the voltage supplied to the tubes. However, after a long period of service the Elkonode may refuse to start, and when this point is reached it should be taken as indicative of excessively worn contact points. The Elkonode has been designed with a generous reserve of tungsten in its contact points, and this reserve may be utilized to give the Elkonode extended life, providing one simple adjustment is made. This adjustment is outlined as follows:

1. Remove the Vibrator unit from the can and rubber sock, by following closely the directions covered by paragraphs A, B, C and D in the procedure for dismantling Elkonode. Use care to avoid bending wires at the soldered connections.

2. Place the Elkonode on a piece of white paper, so that when viewed from above it appears exactly as in drawing above.

3. Loosen lock nut (A2) and turn screw (B2) clockwise until .005" of light can be seen between contacts (F) and (E). If the contact points are roughened, the light can not be seen across their entire diameter, even though they are correctly spaced (i. e., within .005" of touching each other).

4. A check on the accuracy of the spacing adjustment is obtained by pressing lightly against the center of the reed with a small pointed metal instrument in the direction and location shown by arrow (K). When the reed is thus moved, so as to just close contacts F and E, the weight (2) on the free end of the reed should move 1/64 inch from its "at rest" position. Check should be made after lock nut has been firmly tightened down.

5. DO NOT readjust spacing between contacts G and H, unless the tungsten is nearly all worn away. In this case, readjustment is obtained in exactly the same manner as for contacts F and E.

6. In reinserting the Elkonode into its rubber sock, be very careful to turn the "flats" of the sock hole so that they are in line with the lock-nuts. This provides ample space in the sock for the free movement of the reed. In reinserting the "socked" Elkonode into the can, be sure that the can seam lines up with the wider of the wire-carrying channels on the outside of the sock. This is important.

CAUTION: Inasmuch as the Elkonode mechanism is partially magnetic, extreme care should be observed while making adjustments to prevent iron filings or similar metallic matter from getting into the Elkonode.

Directions for Replacing Contact Spring and Reed Assemblies in the 1933 and 1934 '60,' '70,' and '80' Series Mallory Self-Rectifying Elkonodes

ROUTINE FOR DISMANTLING ELKONODE:

(a) Remove screws holding cover on can.

(b) Loosen cover from can and hold in upright position, prongs down; gently shake the rubber sock and Elkonode from the can.

(c) Closely observe the manner in which the leads from the prong base to the Elkonode are placed in the outer slots of the rubber sock. This is important for correct placement of wires when replacing assembly in can.

(d) Observe the location of the various parts, especially the position of the reed Armature (2) with respect to the coil pole shoe of the Elkonode (1).

(e) For your own protection, it will be well to make a pencil sketch of the manner in which the five leads are connected to the Elkonode terminals, before removing these leads. Do not cut them to remove, but carefully unsolder each one. In the 60 and 70 series units, where Condensers are supplied internally, remove them also and unsolder the coil wire at the spring lug.

(f) Remove coil mounting screw from end of frame, and remove coil and pole shoe from frame. Loosen lock nuts A-1, A-2, C-1 and C-2 and remove adjusting screws B-1, B-2, D-1 and D-2. Remove the insulating bushings from the slots in ends of springs.

(g) Loosen stack screws (3) and remove. Press on the under side of the bakelite stack and reed so as to move the assembly out from between the frame. Save the insulating bushings (5), stack screws (3), connector plate (4), adjusting screws, and the lock nuts. Remove the bakelite stack spacers and insulating tubes from the assembly.

ROUTINE FOR REBUILDING THE ELKONODE:

(h) Rebuild the stack assembly (unless you are using stack assembly complete as provided under our part Number A 18448), making sure to use the thicker of the four bakelite spacers on either side of the reed. Make sure that in assembling the springs, the lugs for soldering line up on the outside edge of the stack.

(i) Since the Elkonode is largely magnetic in operation, extreme care must be taken to prevent particles or filings of iron from attaching themselves to the iron parts of the Elkonode. Clean the pole shoe, frame, and reed thoroughly.

(j) Hold the assembly with the reed in the position shown in illustration, *see page 24*. Place the frame under the assembly, as shown also, and insert the assembly from the top. It may be necessary to spread the frame slightly in order to make the insertion. Inspect the stack screws for signs of weakening, and if satisfactory, replace with the connector plate and tighten slightly.

(k) Reinsert the driver coil and pole shoe and clamp in place with the screw removed previously. Draw the screw up tightly, and with long-nosed pliers, turn the pole shoe to a vertical position parallel with the reed surface. The coil wire should be inserted through the hole in the frame before the coil is inserted in the frame.

(l) The reed should stand approximately in the center of the frame at rest. The end of the reed should be parallel to the face of the pole shoe, and from .003" to .005" distant from it when the reed is pulled down opposite its center. This distance should be accurately set by feeler gauges. The reed may be adjusted because of play in the mounting holes.

(m) Insert the insulating bushings in the slots in the ends of the springs, thread the adjusting screws into place, together with the lock nuts. Adjust the screws to place the contacts close to the reed contacts. The springs should be moved so as to allow the contacts to strike the reed contacts without overlapping. The contacts should be fairly flat in making contact, and still not bind on the insulated adjusting bushing.

(n) Tighten the stack firmly without disturbing the adjustments. Hold the reed, over a piece of white paper in the vertical position shown in illustration, *see page 24*. The end edge of the reed, on the opposite side from the armature should rest from flush with the edge of the pole piece to .003" above same. Any bending of the reed should be done at the extreme armature end, and only slight alterations should ever be necessary. Should the pole shoe not be parallel with the armature in a vertical direction, turn the pole shoe with a pair of long-nose pliers, *do not attempt to twist the reed.* Check the air-gap spacing and tightness of coil mounting screws, if such adjustments are made, then recheck alignment.

(o) Solder the leads to the spring, and reed lugs after threading all into place first. If condensers are to be used, place them in position and solder the leads from them at the same time. Make sure that the insulation is over the "hot" condenser lead and that it does not "short" against the frame. Also make sure that the grounded lead does not touch the spring lug or wire. Solder the coil wire at the same time, and solder the connector plate lug to the reed tail. It is suggested that you use another Elkonode as a sample, since it is quite important that all wires be replaced exactly as removed.

(p) Some method of exerting high pressure upon the stack end of the Elkonode while the final tightening of the clamping screws is taking place is essential. It is suggested that an arbor press, capable of exerting a total pressure of about 2000 pounds, be used. Pressure should be exerted directly over the stack, between the screws, while a large screw driver draws the screws down firmly. This prevents loosening of the stack in service and consequent failure.

(q) Loosen lock nuts C, C-1 and C 2. Turn adjusting screw D-1 clockwise until clearance between contacts G and H is between .002" and .003" as measured with a feeler gauge. Lock nut C-1 should be drawn up firmly before this measurement is taken. Adjust C-2 similarly so that the clearance between contacts E and F is between .004" and .006" with the lock nut (C-2), drawn up firmly. This adjustment sets the interrupter section for correct operation.

(r) Turn the adjusting screw (B-1), until the clearance between contacts G and H is between .009" and .012". Adjust screw B-2 until the clearance between E and F is between .011" and .013". This sets the rectifier section in an approximately correct position for operation.

(s) If test equipment is available it is very advisable to inspect the operation of the Elkonode before assembling into the receiver. (A suitable test circuit is outlined later in this section.) The unit should start operating at 4.4 volts (2 cells of 6-volt battery on charge), should provide current output at 6.6 volts, and should operate satisfactorily at 8.8 volts both with load and at no load.

(t) Should the unit flare or spark excessively at higher voltages, adjust the rectifier contacts slightly to control this arcing. The contacts E and F should always have slightly wider clearance between them than contacts G and H.

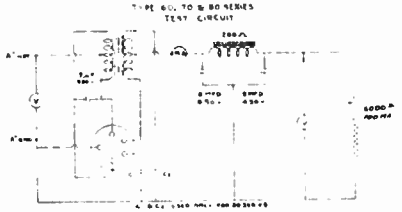
(u) *Do not adjust the interrupter contacts*, unless the unit will not start at 4.4 volts. Then adjust the B-2 screw only and do not make the clearance any smaller than is absolutely necessary. After any adjustment changes, always check the operation thoroughly at all voltages.

CAUTION

(v) Do not attempt to bend contact springs.
Use only Rosin Core Solder.
Keep moisture from all parts of the Elkonode.
Exercise extreme care to keep metallic particles out of Elkonode.
Keep dust, grease and liquid from the contact surfaces.
Clean with a clean, dry piece of linen paper.

(w) When inserting the Elkonode into the rubber sock, be very careful to turn the frame of the Elkonode parallel with the "flat" sides of the inside holes of the sock, so as to leave the air spaces at the open sides of the Elkonode. The tail of the reed should be pointing toward the narrower of the two slots in the outer surface of the rubber. Bring the two rectifier leads (smaller wire) down the smaller slot and the three interrupter and ground leads down the larger slot. One interrupter and one rectifier lead will have to be reversed to do this and enough slack must be left at the bend to prevent wire breakage at the soldered joint. Draw the remaining wires under the lid and fold down, seeing that the wires are not twisted in the slots.

(x) See that the rubber pad is in the can, insert assembly with the large slot adjacent to the seam of the can and screw the lid to the can with the screws provided.



The transformer should be the same as used in the set from which the Elkonode was taken. The set may be used for test if an extension cable is made up. Do not expect quiet operation while the set is open and unit is uncanned.

SERVICE EQUIPMENT REQUIRED

1. High resistance volt-meter. Scale 0 to 300 and 0 to 600. Resistance. Not less than 1000 ohms at 2 volts.
2. A good quality milliammeter. Scale 0 to 50 and 0 to 100.
3. One set feeler gauges.
4. One small screw driver and one large screw driver.
5. One pair thin long-nosed pliers.
6. One medium-sized arbor press.

Explanation of Descriptive Letters Used to Identify Special Types of Mallory-Elkon "B" Eliminators

The Mallory-Elkon "B" Eliminator is supplied in two basic types. Standard (no descriptive letter) and the "C" type. The standard unit is designed for receivers which employ a floating B minus circuit (B minus not grounded) and with a voltage divider composed of a 75,000 ohm, ½ watt carbon type resistor between B minus and BM and a 25,000 ohm ½ watt carbon type resistor between BM and B plus. The "C" type is designed for receivers having the B minus grounded and where only one high voltage lead is used. Therefore, no voltage divider is used in the "C" type, except in special cases where the Eliminator is built to be used with a particular type of radio set as shown below in PC –CA– and CD:

Type PC—Basic type "C." 50,000 ohm 1 watt carbon type resistor between B plus and BM; 50,000 ohm 1 watt carbon type resistor between BM and B minus.

Type CA—Basic type "C." 1500 ohm 3 watt wire wound resistor between B plus and BM. Connect wire from B plus Choke to BM terminal instead of to B plus terminal.

Type CD—Basic type "C." 25,000 ohm 1 watt carbon type resistor between B plus and BM; 75,000 ohm 1 watt carbon type resistor between BM and B minus; 1850 ohm wire wound 3 watt resistor between B plus terminal and radio frequency Choke (B plus).

Type P—Standard basic type. 50,000 ohm 1 watt carbon type resistor between B plus and BM; 50,000 ohm 1 watt carbon type resistor between BM and B minus.

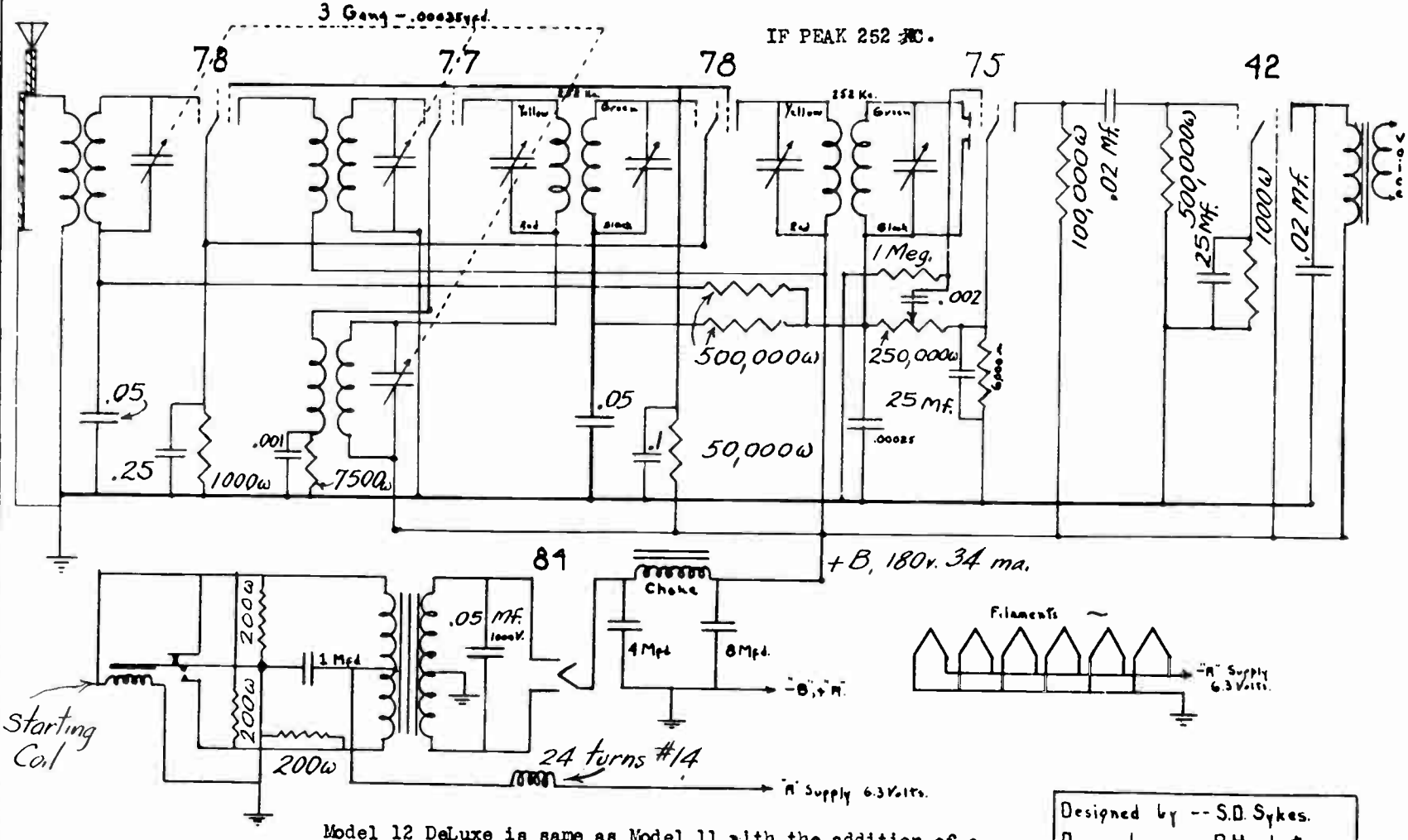
Type M—Standard basic type. Remove resistors between B plus and BM, and BM and B minus. Install 1250 ohm 1 watt resistor between B minus and G terminal. (It is necessary to provide screw for the G terminal point on terminal board.)

Type S—Standard basic type. Use 20,000 ohm ½ watt resistor between B plus and BM. Install 20,000 ohm ½ watt resistor from BM to G terminal. Install 5000 ohm 1 watt resistor from G terminal to B minus.

Type ST—Standard basic type. Install 20,000 ohm ½ watt resistor between B plus and BM. Install 20,000 ohm ½ watt resistor between BM and G terminal. Install 3500 ohm 1 watt resistor between B minus and G terminal.

MISSION-BELL RADIO CO.

MODEL 11 AUTO-RADIO.



Model 12 DeLuxe is same as Model 11 with the addition of a special 8-inch electro-dynamic speaker in wooden sound box.

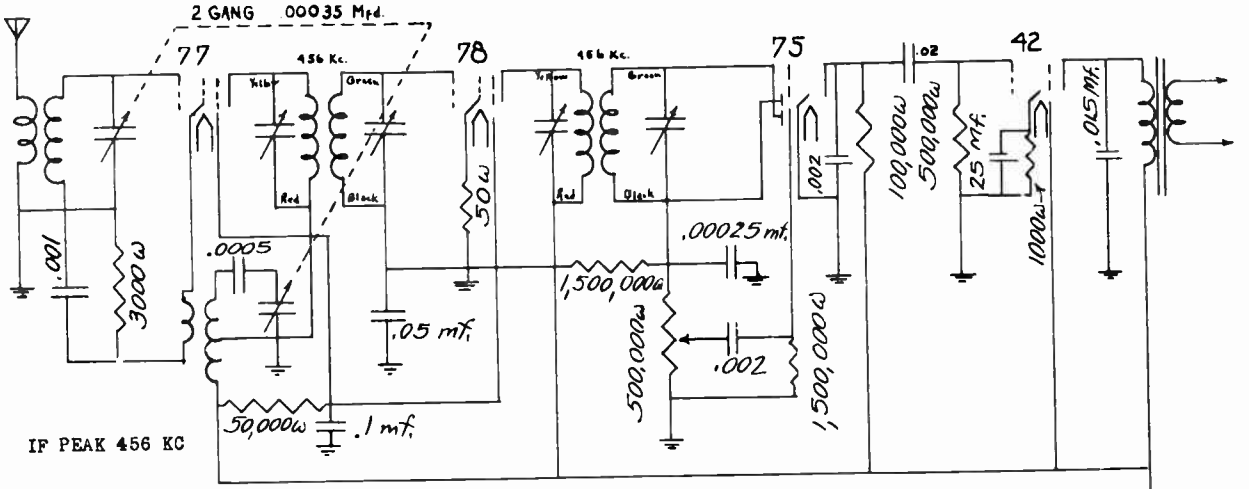
Designed by	S.D. Sykes.
Drawn by	R. Hardesty.
Date	5-7-34.

MISSION BELL RADIO MFG. CO., INC.

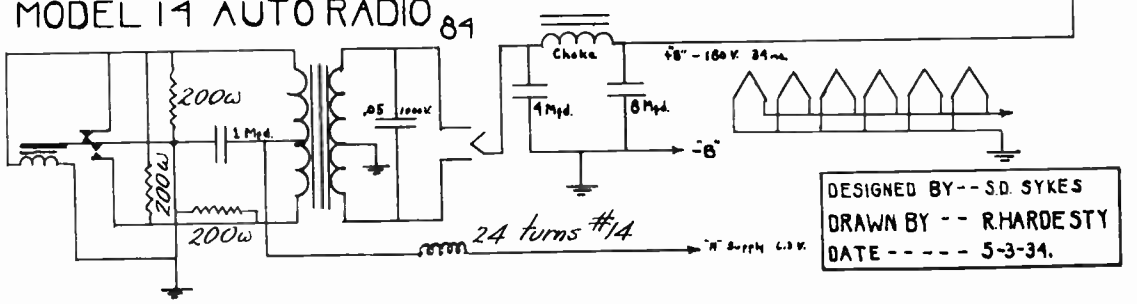
MODEL 11 Schematic

MODEL 14
MODEL 25-A
Schematics

MISSION BELL RADIO MFG. CO., INC.

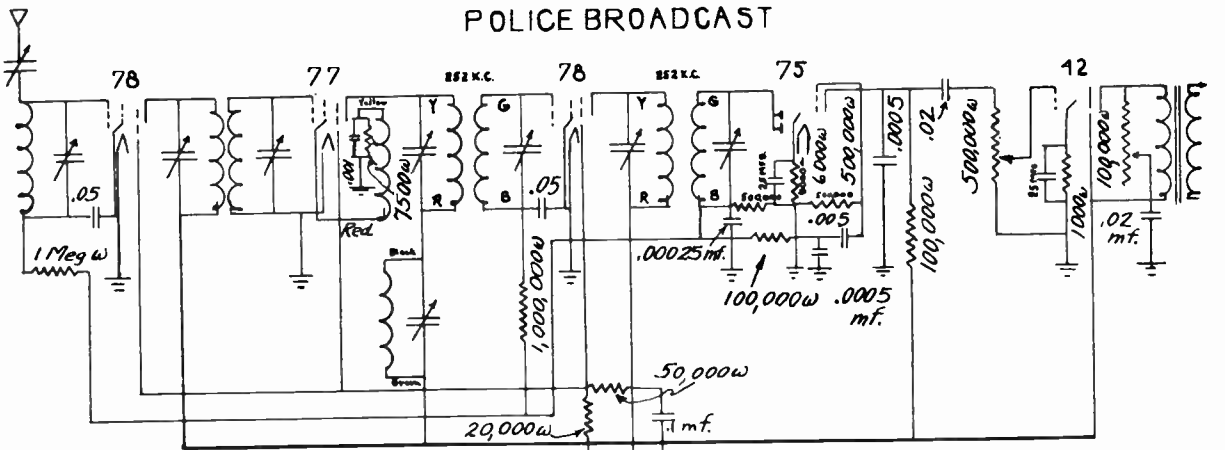


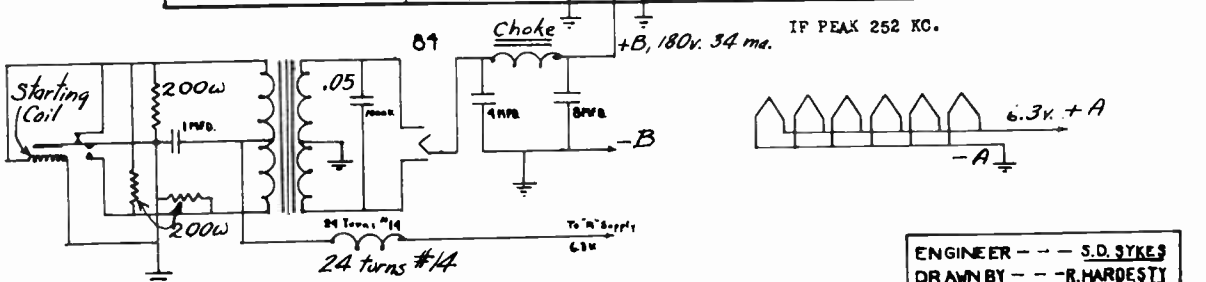
MODEL 14 AUTO RADIO



DESIGNED BY -- S.D. SYKES
DRAWN BY -- R.HARDESTY
DATE ----- 5-3-34.

MODEL 25-A 6-TUBE SUPER POLICE BROADCAST





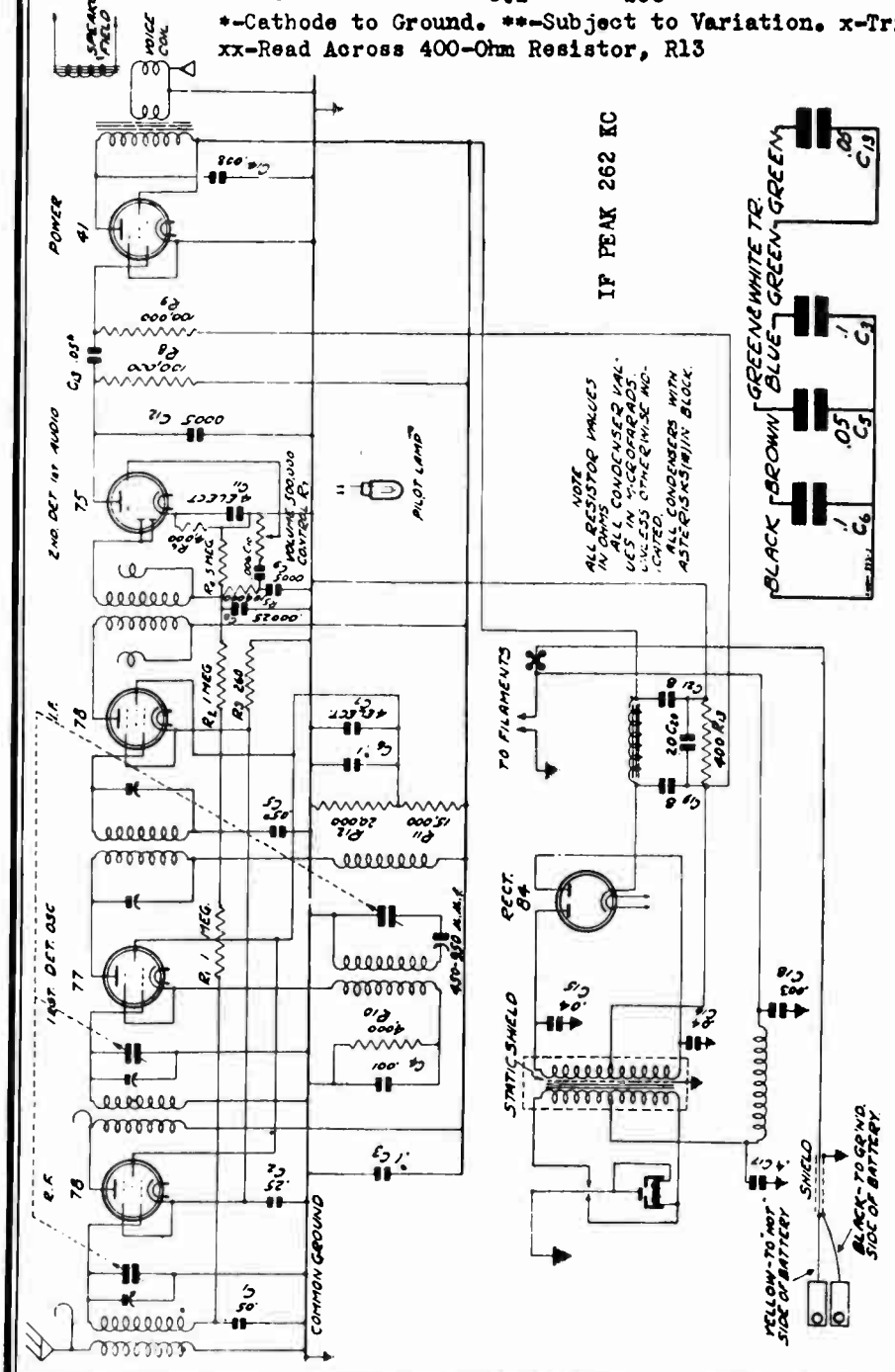
ENGINEER - - - S.D. SYKES
DRAWN BY - - - R.HARDESTY
1-25-'34 - - - - - - -

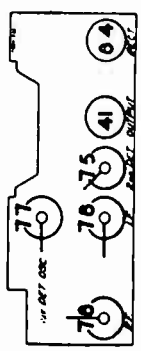
MONTGOMERY-WARD & CO.

MODEL 87
Schematic
Voltage
Socket

		Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78	R.F.	6.1	182	80	3*	7.0
77	1st Det. & Osc.	6.1	178	77	5**	1.3**
78	I.F.	6.1	182	80	3.*	7.0
75	2nd Det. 1st Audio	6.1	70x		1.4*	.35
41	Output	6.1	172.5	176.5	12.5xx	16.0
84	Rect.	6.1	205			17.5per plate

*-Cathode to Ground. **-Subject to Variation. x-Triode Plate to Cathode
xx-Read Across 400-Ohm Resistor, R13





Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer. The location of the tubes is shown in Fig. 8. To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. On one end of the chassis box are two small metal plates. Remove the smaller of these two plates. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

MODEL 87
Alignment
Wiring

MONTGOMERY-WARD & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Completing the Wiring Connections

Antenna Cable

Bring the antenna cable of the receiver in the most direct manner possible to the lead-in from the antenna and connect it to the latter. Keep it as high as possible and as far away from any car wiring as possible. Care should be taken not to have the antenna wire come in contact with the shield wires. Ground the pigtail of the antenna cable shield at the antenna end. The pigtail of this shield at the chassis end is grounded under one of the chassis mounting screws.

In some cases the shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. In a case of this kind, cover the exposed portion of the lead-in wire with loom and braided shield from the point where it leaves the column to the point of connection to the antenna lead of the receiver. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

Battery Cable

The battery cable should be brought over to the storage battery in the most convenient manner possible. In Figs. 4 and 5 it is shown passing through a hole in the dash, thence down and under the floor board to the battery. In other installations, it may be more convenient to bring this cable down in back of one of the side pads and thence to the battery. The lug on the yellow lead of this cable is connected to the "Hot" or ungrounded side of the battery (the "Hot" or ungrounded side may be positive or negative, depending on the make of car). The lug on the black lead is connected to the grounded side of the battery. The pigtail of the shield of this cable at the chassis end should be grounded under one of the chassis mounting screws.

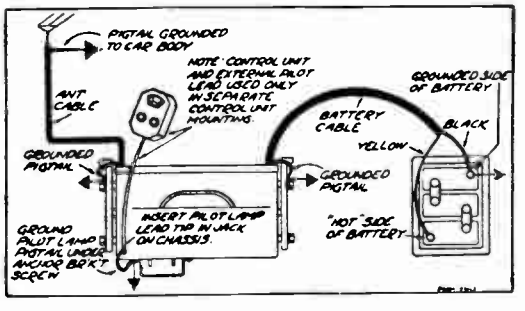


Fig. 7—External Wiring Connections

Pilot Lamp (For Separate Control Unit Only)

When a separate control unit is used connect the pilot lamp as follows:

The pilot lamp lead is in a shielded cable which extends out from the control unit box. On the rear wall of the chassis, near one of the ends, will be seen a tip jack. Insert the tip on the end of the pilot lamp lead into this jack. There is also a pigtail or shield extension at the end of this lead. Ground this pigtail with one of the anchor bracket screws (see Fig. 7). Double up the pilot lamp lead if it is too long—*Do not cut this lead.*

MONTGOMERY-WARD & CO.

MODEL 62-118

Schematic, Voltage
Socket, Parts

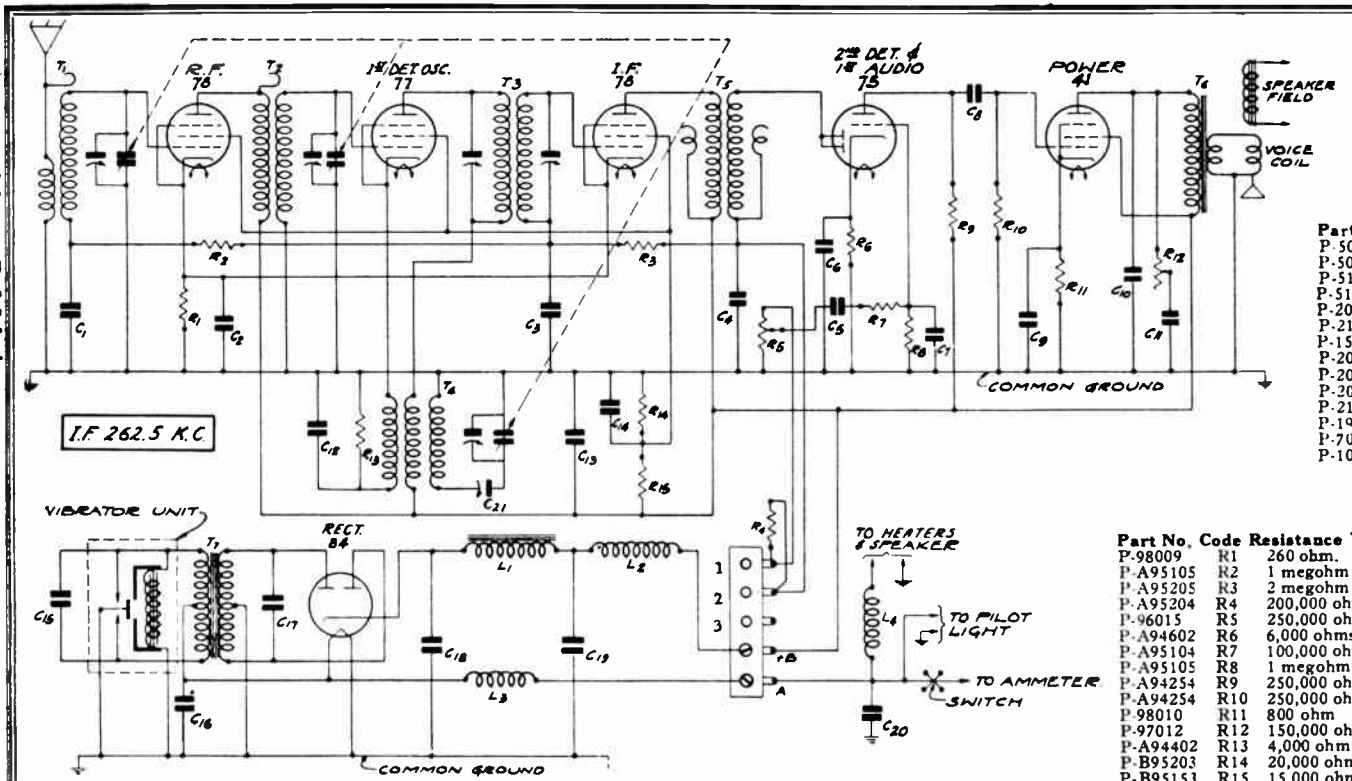


Fig. 1—Schematic Circuit Diagram.

"B" UNIT PARTS

Part No.	Item
P-50637	Filter Choke L1
P-50633	Power Transformer T7
P-5175	Eliminator "A" Choke L3
P-5174	R.F. "B" Choke L2
P-2080	Vibrator—Mallory Type 53
P-2110	Vibrator—Radiart Type 3264
P-1572	Fuse Clip Assembly
P-2024	No. 84 Tube Socket
P-2023	Vibrator Socket
P-2082	Two Lug Terminal Strip
P-2106	Single Insulated Terminal Strip
P-1924	15 Ampere Fuse
P-70765	Eliminator Cable
P-10322	Sponge Rubber Disc

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-98009	R1	260 ohm.	0.5	Wire-Wound
P-A95105	R2	1 megohm	0.2	Carbon
P-A95205	R3	2 megohm	0.2	Carbon (In 2nd I.F.)
P-A95204	R4	200,000 ohm	0.2	Carbon
P-96015	R5	250,000 ohm		Volume Control & Switch
P-A94602	R6	6,000 ohms	0.2	Carbon
P-A95104	R7	100,000 ohm	0.2	Carbon (In 2nd I.F.)
P-A95105	R8	1 megohm	0.2	Carbon (In 2nd I.F.)
P-A94254	R9	250,000 ohm	0.2	Carbon
P-A94254	R10	250,000 ohm	0.2	Carbon
P-98010	R11	800 ohm	0.5	Wire-Wound
P-97012	R12	150,000 ohm		Tone Control
P-A94402	R13	4,000 ohm	0.2	Carbon
P-B95203	R14	20,000 ohm	0.5	Carbon
P-B95153	R15	15,000 ohm	0.5	Carbon

CONDENSERS — IN CHASSIS

Part No.	Code	Capacity	Voltage	Type
P-81009	C1	0.050 mfd.	200 V.	Tubular
P-80919	C4	0.00025 mfd.	600 V.	Moulded (In 2nd I.F.)
P-80862	C5	0.050 mfd.	200 V.	Tubular
P-80919	C7	0.00025 mfd.	600 V.	Moulded (In 2nd I.F.)
P-81025	C11	0.020 mfd.	600 V.	Tubular
P-80821	C12	0.001 mfd.	600 V.	Moulded
P-81024	C20	0.500 mfd.	120 V.	Tubular
P-81026				Three Gang Condenser
P-1539	C21	600 K.C.		Trimmer Condenser
P-81022	C2	0.500 mfd.	200 V.	Condenser Block
	C3	0.050 mfd.	200 V.	
	C8	0.050 mfd.	300 V.	
	C10	0.003 mfd.	600 V.	
	C13	0.500 mfd.	300 V.	
	C14	0.100 mfd.	200 V.	
P-81021	C6	12.00 mfd.	25 V.	Electrolytic Block
	C9	12.00 mfd.	25 V.	

CONDENSERS — IN "B" UNIT

Part No.	Code	Capacity	Voltage	Type
P-81024	C15	0.500 mfd.	120 V.	Tubular
P-81031	C16	1.000 mfd.	120 V.	Tubular
P-81030	C17	0.010 mfd.	1600 V.	Tubular
P-81028	C18	10.00 mfd.	350 V.	Electrolytic Block.
	C19	10.00 mfd.	350 V.	

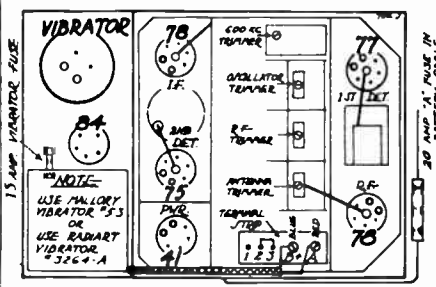


Fig. 2—Location of Tubes.

VOLTAGES AT SOCKETS

Antenna Disconnected—Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M.A.
78	R. F.	5.7	220	100	3.5	5.0
77	1st Det. and Osc.	5.7	220	100	8.0 (1)	1.1 (1)
78	I. F.	5.7	220	100	3.5	5.0
75	2nd Det.	5.7	140 (2)		1.0	0.3
41	Output	5.7	200	210	15.5	18.0
84	Rect.	5.7				20. per plate

(1) Subject to variation.
(2) Triode Plate to Cathode—as read with 1,000,000 ohm meter.

MODEL 62-118
Alignment, Data

MONTGOMERY-WARD & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

Do not take the chassis out of the box. First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximum output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency mark. This is the large point, 5 points below the 55 mark. Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator, R. F., and antenna trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first. See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser is mounted on the end of the gang condenser. See Fig. 2.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Remove the cover of the chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing and Replacing Units From Chassis Box

Removing Chassis Unit From Box

Disconnect the flexible shafts, antenna cable and pilot lamp lead at the chassis box. Pull off the tone control knob and disconnect the battery cable at the fuse receptacle. Remove the cover of the box and take off the black lead on the cover screw. Disconnect the "A" and "B+" leads at the terminal strip. Pull the battery cable inside of the box.

Take out the 4 screws around the speaker grill. Then pull the chassis out by means of the "A" choke and condenser block. Do not pull the chassis out by means of the gang condenser as this might injure the cushion mounting.

Removing "B" Unit From Box

Disconnect the "A" and "B+" leads at the terminal strip. On the end of the box at which the "B" unit is located will be found 9 screws around the edge. Remove these 9 screws. The "B" unit and end plate can then be lifted out.

Replacing the Vibrator

Note that vibrator unit is of the plug-in type. This unit can be inserted and removed in the same manner as a tube.

Replacing Chassis Unit

In replacing the chassis unit be sure that the ground spring near the output transformer makes a good contact with the chassis box. Reverse the procedure as given above for removing this unit.

Replacing "B" Unit

When replacing the "B" unit be sure that the ground spring makes a good contact to the partition wall in the chassis box. Reverse the procedure as given above for removing this unit.

Removing Speaker

If service work is required on the chassis, it is advisable in some cases to remove the speaker, as this will permit ready access to all of the units and wiring.

The pot magnet is secured to the vertical walls of the chassis base by means of 3 screws, 2 on one side and 1 on the other. Remove these screws. Then carefully lift out the speaker as far as the leads will permit. The yellow field lead and the black secondary lead may then be unsoldered.

Trouble Shooting and Service

Vibrator Unit

When servicing this receiver a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out. These units are plugged in in the same manner as a tube. One or more vibrator units should be kept on hand for replacement purposes.

"B" Unit

In case of failure in the "B" unit try out a new vibrator. If this does not remedy the difficulty and the "B" unit cannot be repaired locally it is not necessary to return the entire chassis. Remove the "B" unit from the chassis box as per the instructions in this manual after which this unit may be carefully packed and returned separately.

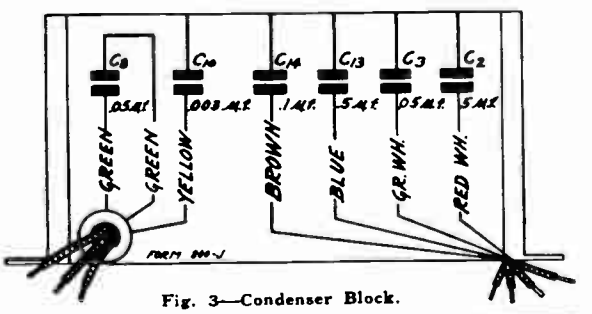


Fig. 3—Condenser Block.

MONTGOMERY-WARD & CO.

MODEL 62-199
Schematic, Voltage
Socket, Trimmers
Parts List

VOLTAGES AT SOCKETS

Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

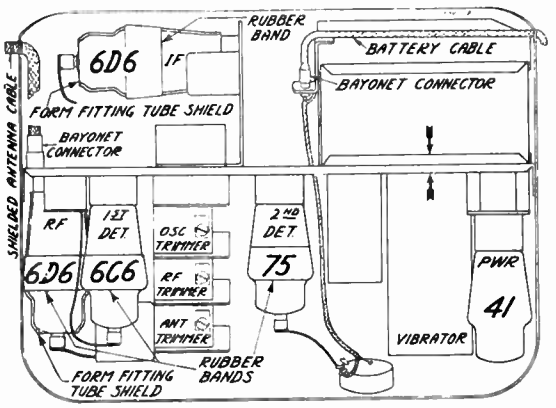


Fig. 2—*Location of Tubes and Vibrator*

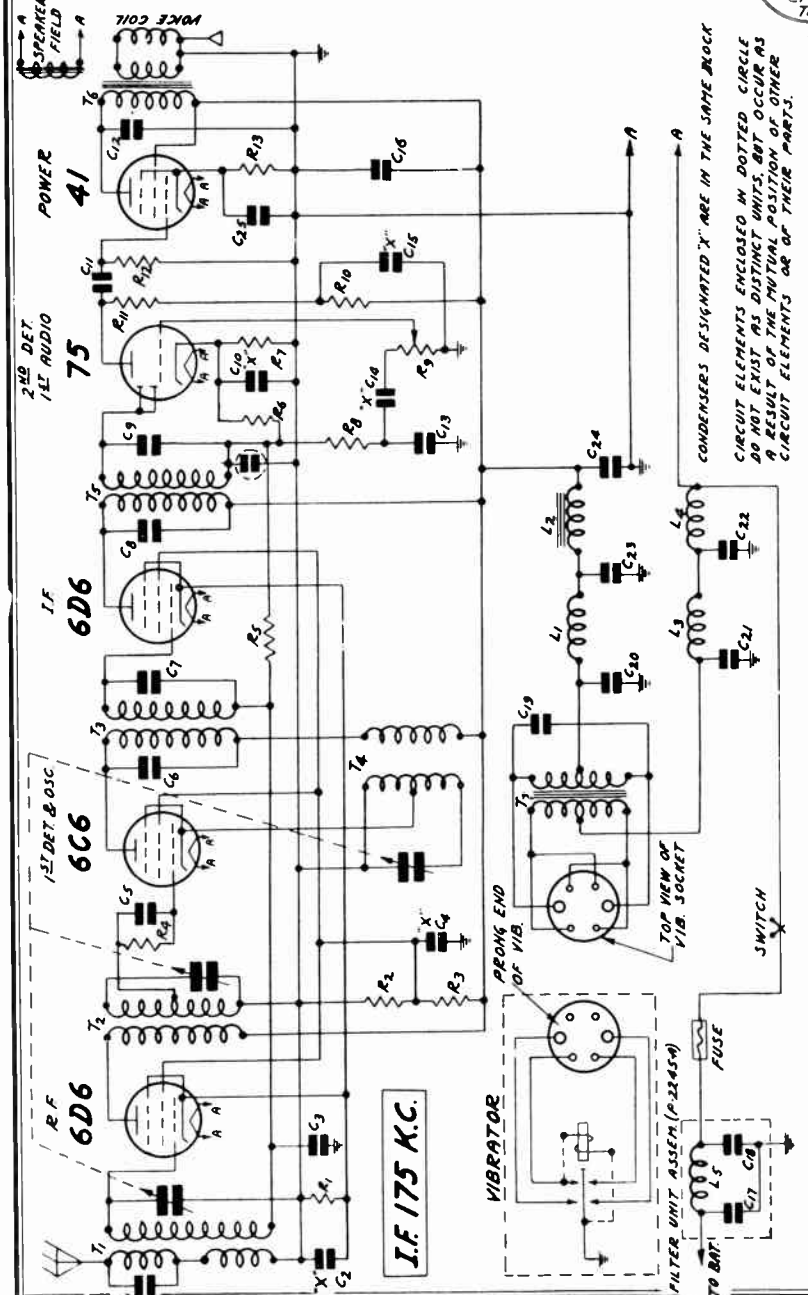


Fig. 1—*Schematic Circuit Diagram*

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mmf.	(Part of Antenna Coil Assembly)	
	C2	.50 mf.	200V.	Bypass Block
	C4	.10 mf.	140V.	
P-82001	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	Tubular	
P-81815	C5	35 mmf.	Part of Grid Leak Assembly	
	C6	70 mmf.		
P-81806	C7	70 mmf.	Part of 1st I. F. & Osc. Coil Assembly	
	C8	70 mmf.		
P-81806	C9	70 mmf.	Part of 2nd I. F. Coil Assembly	
P-81115	C11	.05 mf.	300V. Tubular	
P-81114	C12	.006 mf.	600V. Tubular	
P-81814	C13	250 mmf.	Moulded	
P-81132	C16	.10 mf.	300V. Tubular	
	C17	.01 mf.	120V. [In Choke Condenser Unit]	
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V. Tubular	
P-81122	C20	.10 mf.	300V. Tubular	
P-81121	C21	.50 mf.	140V. Tubular	
P-81816	C22	.002 mf.	Moulded	
	C23	4.0 mf.	250V.	Dry Electrolytic Block
P-82002	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500	Gang Condenser			

RESISTORS

Part No.	Code	Resistance	Watt-tage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P-96017	R9	2 Megohm	.2	Volume Control and Switch
P-A95503	R10	50,000 Ohm	.2	Carbon
P-A95304	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound

Condenser Alignment

Misalignment or mistracking of condenser generally manifests itself as broad tuning and lack of volume at a portion or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator, that will provide accurately calibrated signals over the standard wave band and an output meter are required for indicating the effect of adjustment.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the escutcheon plate and glass. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibrator unit. Next, notice the small length of braided shielding which is soldered to the solder lug that is secured to the chassis case between the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be readily replaced. CAUTION: Polarity, as explained in the label on the unit and in the label on the metal box in the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.

The old volume control and switch connections may now be unsoldered and the new unit put in its place and the leads resoldered.

Fasten the volume control to the case in the reverse order in which it was removed.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec. (Center Tap to Inside)	T2	3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"H" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
		T6	690.00
P-2228	Output Trans. Pri.		
	Output Trans. Sec. and Voice Coil in Par.		0.80
	Speaker Field		6.00

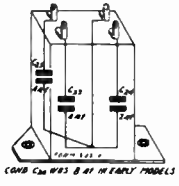


Fig. 7—*Electrolytic Block Internal Wiring*

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

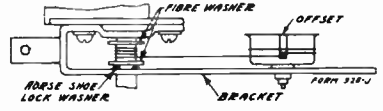


Fig. 3—*Cord Drive—Top View*

First remove the chassis from the case as explained on page 4.

Some of the first models did not have two fibre "end" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:

Separate and take off the horse shoe lock washer which holds the drive shaft in position. This may be done with a fine tooth long nose plier.

Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft back into place and replace the horse shoe lock washer.

Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum — see Fig. 4. The knot will then be on the inside of the drum.

Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from

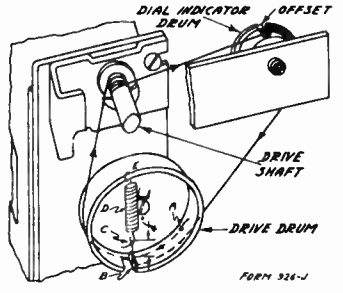


Fig. 4—*Cord Drive Replacement*

front) around the drive shaft three and one-quarter turns between the two fibre washers, progressing towards the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.

Wrap the cord from the drive shaft once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.

From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

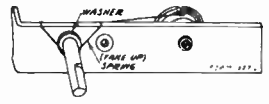


Fig. 5—*Drive "Take up" Spring*

Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".

Tie the drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between $\frac{1}{16}$" and $\frac{3}{16}$" from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about $\frac{1}{4}$".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.

After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

Slip the small fibre washer over the shaft and slip the "take-up" spring to the drive bracket as shown in Fig. 5.

The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

Changes In Later Models

In the first models of this receiver a bypass condenser block (P-82600) containing condensers C2, C4, C10, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-81132) while the other condensers remained in the block (P-82600-D).

A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

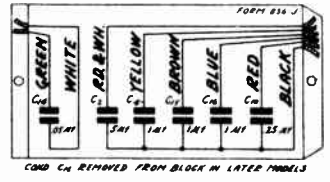
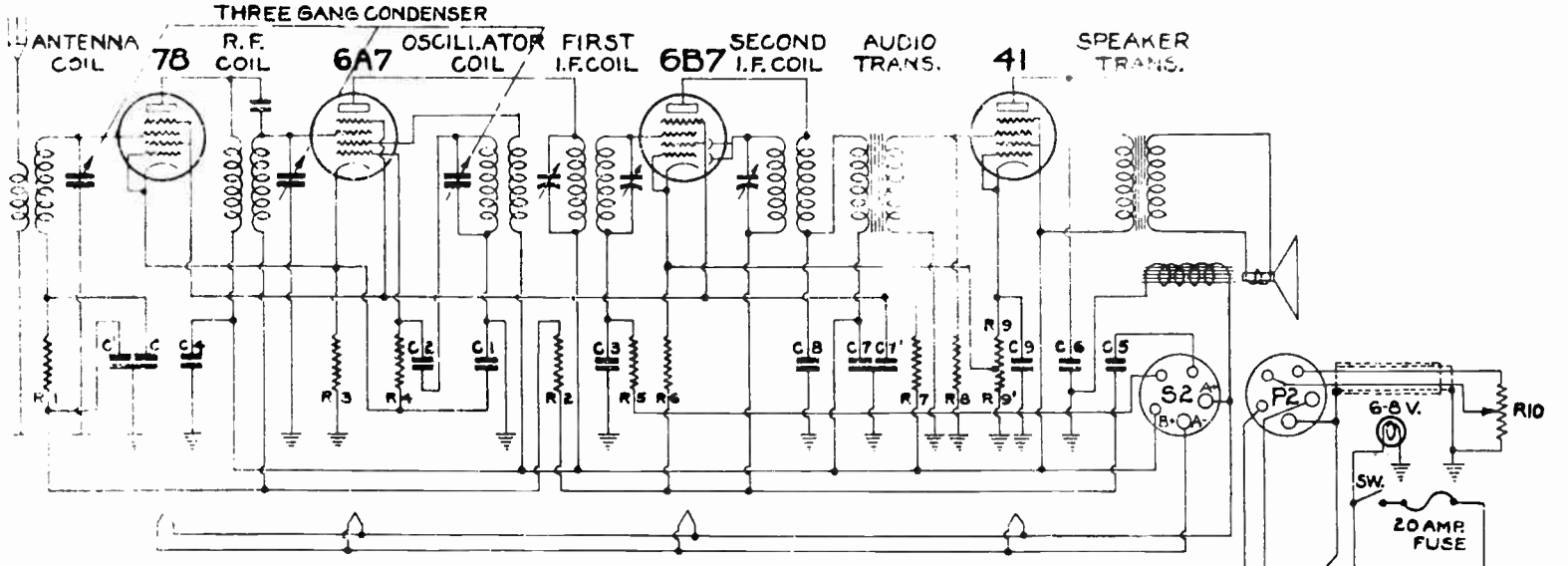


Fig. 6—*Condenser Block Internal Wiring*

SCHEMATIC CIRCUIT DIAGRAM
ARVIN CAR RADIO MODEL 10A

DIAGRAM	ISSUE NO.	DATE
		11-10-33



CONDENSERS

C	.05	TWIN
C'	.05	
C1	.10	
C2	.0001	
C3	.0001	
C4	.50	
C5	.01	
C6	.002	
C7	.05	TWIN
C7'	.05	
C8	.00075	
C9	12.0	
C10	.50	
C11	.10	
C12	TWO .02 CENTER TAP	
C13	16.0	DUAL ELECTROLYTIC
C13'	8.0	
C14	1.0	TRIPLE UNIT
C15	12.0	
C15'	12.0	

RESISTORS

R1	65,000	
R2	1,000,000	
R3	260	
R4	50,000	
R5	450,000	
R6	450,000	
R7	40,000	
R8	55,000	
R9	800	CANDOHM
R9'	80	
R10	200,000	

CHOKES

L1	R.F. CHOKE "A" HOT (166 T)
L2	R.F. CHOKE "A" HOT (166 T.)
L3	R.F. CHOKE "B+" (100 T.)

SOCKETS

S1	POWER UNIT OUTPUT
S2	REMOTE CONTROL CABLE

PLUGS

P1	INTER UNIT CABLE
P2	REMOTE CONTROL CABLE

For Alignment See Index

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS, INDIANA.

MODEL 10-A (2nd Type)
MODEL 15
Voltage, Test Data

NOBLITT SPARKS INDUSTRIES

MODEL 10-A SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	220	85	2.0	2.0	*1.8	—	—
6A7	6.3	220	85	2.0	—	*1.8	220	*6
6B7	6.3	220	85	1.75	—	*1.75	—	—
41	6.3	205	220	16.5	—	*16.5	—	—
84	6.3	255 (AC)	—	225	—	—	—	—

* Measured with vacuum tube voltmeter only.

MODEL 10-A POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

78
+ Heater ..... Inf.
— Heater 0
Cathode 260
Suppressor (No. 3) 260
Plate to B+ 100
Screen (No. 2) to B+ 40,000
Control Grid (No. 1) 1,515,080

6A7
+ Heater ..... Inf.
— Heater 0
Anode Grid (No. 2) to B+ 35
Osc. Grid (No. 1) 50,260
Screen (No. 3-5) to B+ 40,000
Plate to B+ 125
Cathode 260
Control Grid (No. 4) 1,450,080

6B7
+ Heater ..... Inf.
— Heater 0
Cathode 80
Plate to B+ 75
Screen (No. 2) to B+ 40,000
Diode 450,000
Control Grid (No. 1) to Grid Term S2 450,000

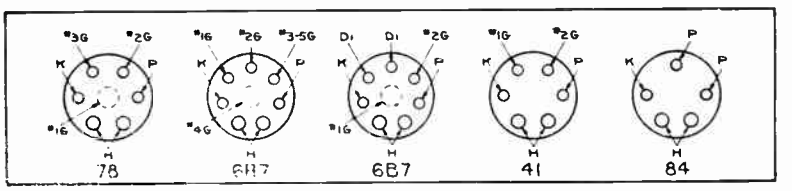
41
+ Heater ..... Inf.
— Heater 0
Screen (No. 2) to B+ 0
Plate to B+ 800
Cathode 800
Control Grid (No. 1) 1750

84
+ Heater ..... Inf.
— Heater 0
Plates 155
Plate to Plate 310
Cathode ..... Inf.†

†Reads leakage of electrolytic condenser.

COIL RESISTANCES
Ant. Primary 5
Ant. Secondary 5
R. F. Primary 100
R. F. Secondary 5
Osc. Primary 2.5
Osc. Secondary 3.5
First I. F. Primary 125
First I. F. Secondary 40
Second I. F. Primary 75
Second I. F. Secondary 75
Audio Transformer Primary 800
Audio Transformer Secondary 1800

LOOKING AT TOP OF TUBE SOCKETS



MODEL 15 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	250	50	2.2	2.2	2.0*	—	—
6A7	6.3	250	50	2.2	2.2	2.0*	150	5-10
6B7	6.3	245	50	2.0	—	1.8*	—	—
41	6.3	245	250	18	—	14.0*	—	—
84	6.3	275 (AC)	—	260	—	—	—	—

* Measured with vacuum tube voltmeter only.

MODEL 15 POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set.

78
+ Heater ..... Inf.
— Heater 0
Plate to B+ 100
Screen Grid to B+ 40,000
Suppressor Grid 200
Cathode 200
Control Grid 1,750,000

41
+ Heater ..... Inf.
— Heater 0
Plate to B+ ..... Inf.
Screen Grid to B+ 0
Control Grid 1733
Cathode 692

6B7
+ Heater ..... Inf.
— Heater 0
Plate to B+ 2000
Screen Grid to B+ 40,000
Diode 650,000
Diode 650,000
Cathode 52
Control Grid:
V. C. on 900,000
V. C. off 650,000

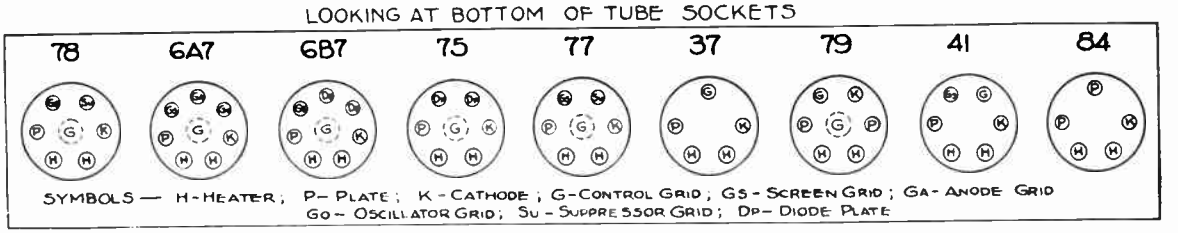
84
+ Heater ..... Inf.
— Heater 0
Plate 190
Plate 220
Plate to Plate 410
Cathode ..... Inf.†

†Reads leakage of electrolytic condenser.

6A7
+ Heater ..... Inf.
— Heater 0
Plate to B+ 104
Screen Grid to B+ 40,000
Anode Grid to B+ 20,000
Oscillator Grid 101,200
Cathode 200
Control Grid 1,650,000

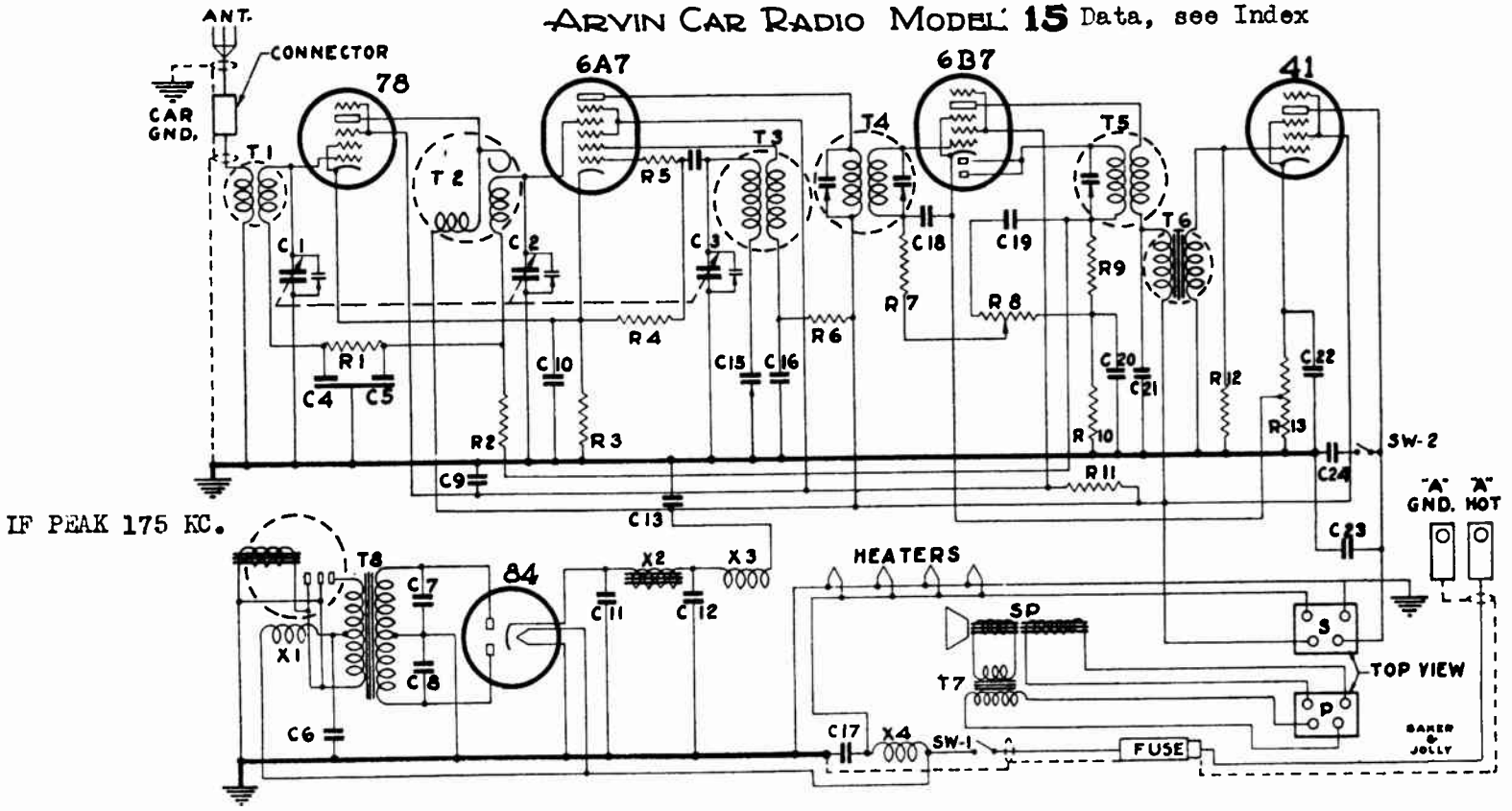
COIL RESISTANCES
Ant. Primary 13
Ant. Secondary 5
R. F. Primary 100
R. F. Secondary 5
Osc. Primary 2
Osc. Secondary 4
1st I. F. Primary 82
1st I. F. Secondary 82
2nd I. F. Primary 120
2nd I. F. Secondary 120
Primary Output Transformer 650
Voice Coil 35
Reflex Trans. Primary 1850
Reflex Trans. Secondary 1850

LOOKING AT BOTTOM OF TUBE SOCKETS



CIRCUIT DIAGRAM
—FOR—
ARVIN CAR RADIO MODEL 15

For Alignment, Voltage and Test Data, see Index



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4452
C 4, C 5	.015 *uf*	50 V. Twin	17-3004
C 6	.5	15 V.	29-4284
C 7, C 8	.02 *uf*	1000 V. Twin	29-4193
C 9	.1 *uf*	200 V.	17-2097
C10	.1 *uf*	200 V.	17-2097
C11, C12	12 *uf*, 4 *uf*	450 WVDC, 500 PVDC	Dual Elec. 17-4184
C13	.5 *uf*	300 V.	17-3037
C14	100 *uuf*	600 V. Mica	17-2064
C15	Padder		17-4181-1
C16	.001 *uf*	600 V. Mica	17-4292

CAPACITORS

	Description		Part No.
C17	.5	15 V.	17-4284
C18	500 *uuf*	600 V. Mica	17-2211
C19	.01 *uf*	160 V. Tiny	17-4291
C20	.5 *uf*	10 V.	29-2224
C21	500 *uuf*	600 V. Mica	17-2211
C22	12 *uf*	20 V. Elec.	17-2082
C23	.005 *uf*	600 V.	17-2252
C24	.02 *uf*	400 V.	17-2214

MISCELLANEOUS

		Part No.
SW-1	Switch (Integral with R8)	17-4152
SW-2	Switch	17-4445
SP	—Speaker	17-4226
S	—Socket, Connector	17-4447
P	—Plug, Connector	17-4448
V	—Vibrator Unit	29-4186

RESISTORS

	Description		Part No.
R 1	100,000 Ω	¼ W.	17-2068
R 2	1,000,000 Ω	¼ W.	17-2080
R 3	200 Ω	¼ W.	17-4287
R 4	100,000 Ω	¼ W.	17-2068
R 5	1,000 Ω	¼ W.	17-2065
R 6	20,000 Ω	¼ W.	17-2072
R 7	500,000 Ω	¼ W.	17-2070
R 8	250,000 Ω Volume Control		17-4152
R 9	500,000 Ω	¼ W.	17-2070
R10	150,000 Ω	¼ W.	17-4283
R11	40,000 Ω	¼ W.	17-4282
R12	50,000 Ω	¼ W.	17-2060
R13	Tapped Candohm		17-3031

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-3020-1
T2	Radio Frequency	00-3017-1
T3	Oscillator	00-3018-1
T4	1st Intermediate	00-2258-A
T5	2nd Intermediate	00-2259-2
T6	Audio	00-2261
T7	Output	00-4111
T8	Power	00-4102

CHOKES

		Part No.
X1	Center Tap Primary R. F.	00-4131-1
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	"A" Radio Frequency	00-4130-1

MODEL 16 SOCKET VOLTAGES

Make voltage tests with 1666 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltages. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.0	230	100	4.5	0	—	—
6A7	6.0	240	100	4.5	—	180	5-10
78	6.0	240	100	7.0	0	—	—
75	6.0	85	—	1.5	—	—	—
41	6.0	235	240	18.5	—	—	—
84	6.0	235 (AC)	—	235	—	—	—

MODEL 16 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit and R. F. chassis.

1st 6D6 78

+ Heater	Inf.
— Heater	0
Plate to B—	100
Screen Grid to B—	30,000
Suppressor Grid	0
Cathode	260
Control Grid	1,250,000

6A7

+ Heater	Inf.
— Heater	0
Plate to B—	82
Screen Grid to B—	30,000
Anode Grid to B—	20,000
Oscillator Grid	100,260
Cathode	260
Control Grid	1,150,000

2nd 6D6

+ Heater	Inf.
— Heater	0
Plate to B—	90
Screen Grid to B—	30,000
Suppressor Grid	0
Cathode	2,000
Control Grid	82

75

+ Heater	Inf.
— Heater	0
Plate to B—	250,000
Diodes	150,000
Cathode	5,000
Control Grid	0 to 250,000

41

+ Heater	Inf.
— Heater	0
Plate to B—	650
Screen Grid to B—	0
Control Grid	500,000
Cathode	800

84

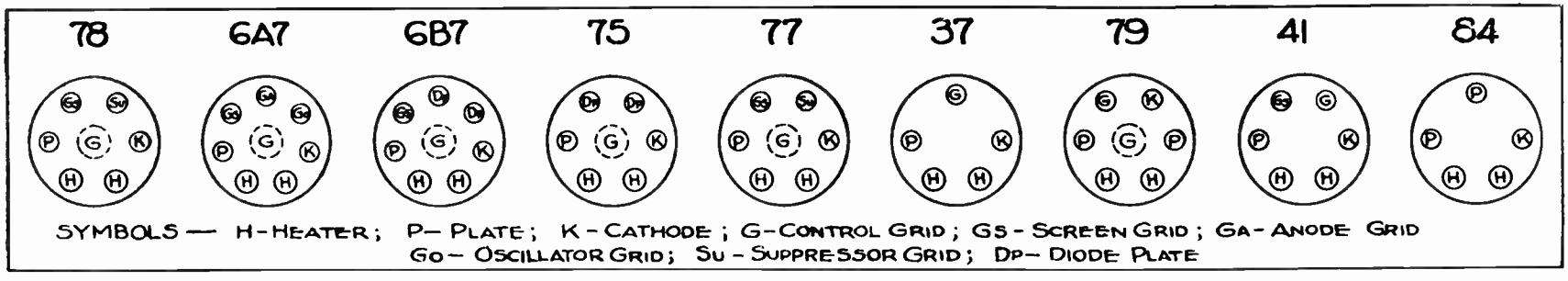
+ Heater	0
— Heater	0
Plate	190
Plate	220
Plate to Plate	410
Cathode	Inf.*

*Reads leakage of electrolytic condenser.

Coil Resistances Model 16

Ant. Primary	13 ohms
Ant. Secondary	5 ohms
R. F. Primary	100 ohms
R. F. Secondary	5 ohms
Oscillator Primary	2 ohms
Oscillator Secondary	3 ohms
First I. F. Primary	82 ohms
First I. F. Secondary	82 ohms
Second I. F. Primary	90 ohms
Second I. F. Secondary	90 ohms
Primary Output Transformer	650 ohms

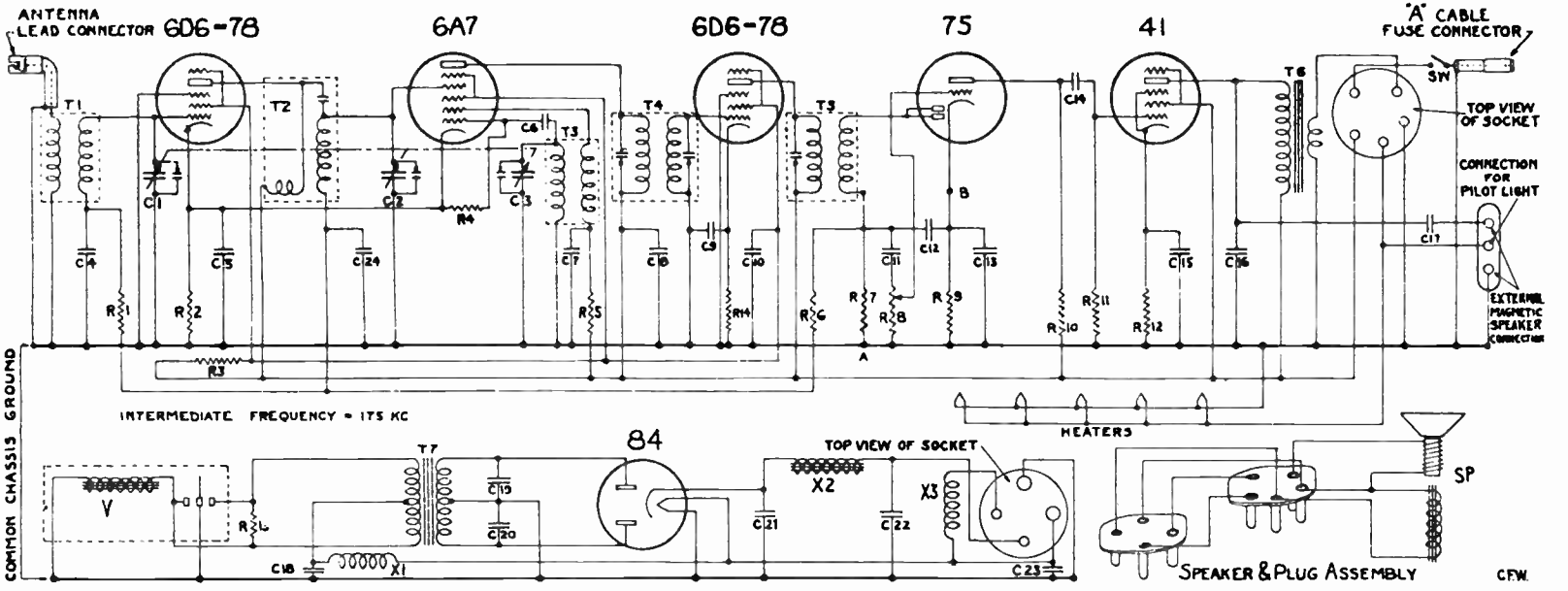
LOOKING AT BOTTOM OF TUBE SOCKETS



NOBLITT SPARKS INDUSTRIES

DIAGRAM	ISSUE NO.	DATE
B	1	7-23-34

CIRCUIT DIAGRAM
ARVIN CAR RADIO MODEL 16



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		19-2248
C 4	.05 *uf*	160 V.	17-4329
C 5	.1 *uf*	100 V.	17-4393
C 6	100 *uuf*	600 V.	17-2064
C 7	.001 *uf*	600 V.	17-4292
C 8	.25 *uf*	300 V.	29-4188
C 9	.02 *uf*	100 V.	17-4394
C10	.1 *uf*	200 V.	17-2097
C11	.05 *uf*	160 V.	17-4329
C12	500 *uuf*	600 V.	17-2211
C13	.5 *uf*	10 V.	29-2224
C14	.05 *uf*	300 V.	17-3006
C15	12. *uf*	25 V.	17-2082
C16	.007 *uf*	600 V.	17-4392
C17	.02 *uf*	400 V.	17-2214
C18	1. *uf*	10 V.	17-4395
C19, C20	.02 *uf* Twin	1000 V.	29-4193

CAPACITORS

	Description		Part No.
C21, C22	12. *uf* 4. *uf* Twin	450 V.	17-4201
C23	.5 *uf*	10 V.	29-2224
C24	.05 *uf*	160 V.	17-4329

MISCELLANEOUS

SP—Dynamic Speaker	17-4226
SW—Switch, Part of R8	17-4152-1
V—Vibrator Unit	29-2169C

In districts where signal strength is abnormally low, a slight increase in sensitivity may be obtained by removing the inter-channel noise suppression feature. Disconnect R7 at A and reconnect at B.

RESISTORS

	Description		Part No.
R 1	100,000 Ω	¼ W.	17-2068
R 2	260 Ω	¼ W.	17-2066
R 3	30,000 Ω	¼ W.	17-4276
R 4	100,000 Ω	¼ W.	17-2068
R 5	20,000 Ω	¼ W.	17-2072
R 6	1 Megohm	¼ W.	17-2080
R 7	150,000 Ω	¼ W.	17-4283
R 8	250,000 Ω	Pot.	17-4152-1
R 9	5,000 Ω	¼ W.	17-2071
R10	250,000 Ω	¼ W.	17-3011
R11	500,000 Ω	¼ W.	17-2070
R12	800 Ω	½ W.	17-4273
R13	200 Ω	¼ W.	17-4287
F.14	2,000 Ω	¼ W.	17-4202

R14 NOTE: This resistor may be varied to control sensitivity.

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-3020-1
T2	Radio Frequency	00-3017-1
T3	Oscillator	00-4482-1
T4	First I F	00-2258A
T5	Second I F	00-4476
T6	Output	00-4111
T7	Power	00-4102-2

CHOKES

X1	C T Primary	00-2178E
X2	Filter	00-4141
X3	Filament	00-2178F

NOTE: On orders for replacement parts, state part number and quantity desired.

GENERAL MECHANICAL PARTS

00-4213-1	Antenna Cable Assembly
00-4215	Battery Cable Assembly
00-4216	Pilot Light Wire Assembly
29-4525	Remote Control Assembly
29-4525-A	Remote Control Body Assembly
29-4525-B	Steering Column Bracket
29-4525-D	Steering Column Bracket Strap
29-4525-K	Pilot Light Bulb
29-4525-L	Control Knob and Set Screw
29-4525-M	Key
00-4333	24" Flexible Shaft Assembly
00-4330	12" Flexible Shaft Assembly (Special Order)
00-4331	15" Flexible Shaft Assembly (Special Order)
00-4332	18" Flexible Shaft Assembly (Special Order)
00-4334	30" Flexible Shaft Assembly (Special Order)
00-4335	36" Flexible Shaft Assembly (Special Order)
17-2228	Fuse
17-2262	4-Prong Mounting Plug (with cover)
17-2263	5-Prong Mounting Plug (with cover)
	Antenna & Battery Cable Connectors (complete set)
00-4371	Shielded Loom (yard)
17-4226	Speaker (6" Dynamic)
17-4294	Spark Plug Suppressor
17-4295	Distributor Suppressor
17-4152-1	Volume Control Switch
29-3026	Tube Shield Assembly
29-2169-C	Vibrator and (Rubber Casing .10)
17-2050	Tube Type 6D6
17-2052	Tube Type 78
17-2053	Tube Type 75
17-2054	Tube Type 41
17-2056	Tube Type 84
17-2057	Tube Type 6A7
	Case (complete)
	Accessories
	Set and Tubes
	Power Pack
17-2225	Generator Condenser
17-4296	Ammeter Condenser

CHOKES

00-2178E	See diagram for description
00-2178-F	See diagram for description
00-4141	See diagram for description

INSTALLATION OF AIRPLANE CONTROL IN ASH TRAY COMPARTMENT IN 1934 DODGES AND PLYMOUTHS

This control is designed to fit either on the steering column or in the ash tray compartment. A chromium-plated panel is furnished for this ash tray mounting.

On the 1934 Dodges and Plymouths there is a wide bracket directly behind this ash tray that interferes with the shafts of the remote control. It is impossible to run the shafts around the control, for that causes too sharp a bend in the cables and so they bind.

This condition can be easily remedied by locating the control with the chromium plate attached in the hole left by the ash tray on the panel. Remove the key from the control and mark through the key hole on to the bracket. With this center located, measure one-half inch above and three-sixteenths of an inch to the right of this first mark, and locate the center of the second hole.

Drill a three-eighths inch hole at both places. Run the two flexible shafts through these holes from the rear and fasten them onto the remote control. Then fasten the control on the dash with the bracket furnished and hook the other end of the shafts into the radio set as described in the instructions.

* * * * * * *

INSTALLATION OF TONE CONTROL ON ARVIN MODEL 16 RECEIVERS

When a customer desires a lower pitch in this set, connect together the two external speaker leads. Obtain two phone tips similar to the one on the dial light lead, and put one of these on each end of a 2.5 inch piece of wire. Slip a small piece of rubber tubing over each phone tip, or use tape. Then plug the two tips -- one into each of the external speaker connections.

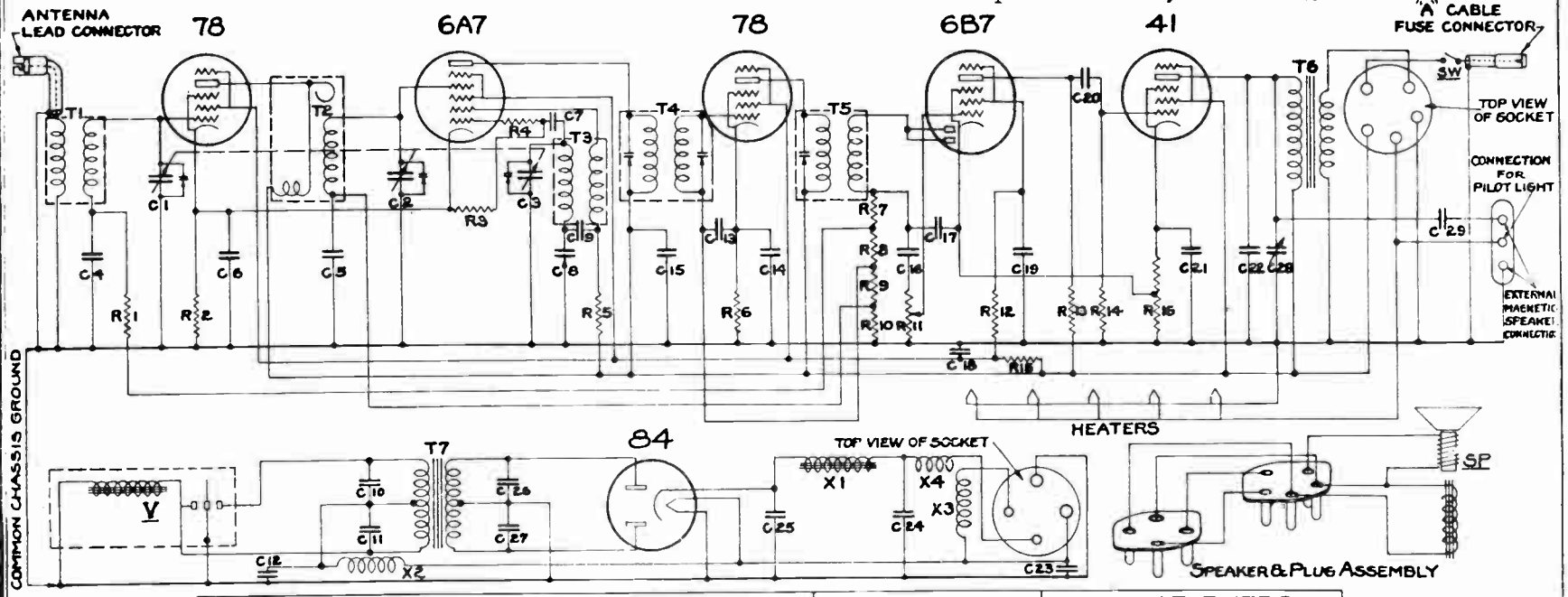
This will give the set's tone a greater depth, which is desirable in some cases.

CIRCUIT DIAGRAM OF ARVIN CAR RADIO MODEL 25.

DIAGRAM	ISSUE NO.	DATE
D	1	2-1534

IF PEAK 175 KC.

For Special Notes, see Index



For Alignment See Index

CONDENSERS

	DESCRIPTION	PART NO.
C1, C2, C3	THREE GANG VARIABLE	19-3019
C4, C5	.015 mf 50 V. TWIN	17-3004
C6	.10 mf 200 V.	17-2097
C7	100 mmf	17-2064
C8	SERIES PADDER (1400 mmf MAX)	17-4181
C9	.001 mf 600 V.	17-3005
C10	12 mf 15 V ELECTROLYTIC, TRIPLE UNIT	17-2253
C11	12 mf 15 V ELECTROLYTIC, TRIPLE UNIT	
C12	1. mf 15 V.	
C13	.02 mf 400 V	17-2214
C14	.10 mf 200 V	17-2097
C15	.25 mf 300 V	29-4188
C16	.05 mf 300 V	17-3006
C17	500 mmf	17-2211
C18	.10 mf 200 V	17-2097
C19	.10 mf 200 V	17-2097
C20	.05 mf 300 V.	17-3006
C21	12 mf 20 V. ELECTROLYTIC	17-2082
C22	.005 mf 600 V. SPECIAL	17-2252
C23	.50 mf 10 V.	29-2224
C24, C25	4 mf, 12 mf +450 V. DUAL ELECTROLYTIC	17-4201
C26, C27	.02 mf 1000 V. TWIN	29-4193
C28	.02 VARIABLE TONE CONTROL	17-4151
C29	.02 mf 400 V.	17-2214

NOTE: ON ORDERS FOR REPLACEMENT PARTS, STATE PART NUMBER AND QUANTITY DESIRED.

RESISTORS

	DESCRIPTION	PART NO.
R1	500000 Ω, ½ WATT	17-2070
R2	250 Ω, ½ WATT	17-2066
R3	100000 Ω, ½ WATT	17-2088
R4	1000 Ω, ½ WATT	17-2065
R5	20000 Ω, ½ WATT	17-2072
R6 *	2000 Ω, ½ WATT	17-4202
R7	250000 Ω, ½ WATT	17-3011
R8	100000 Ω, ½ WATT	17-2088
R9	100000 Ω, ½ WATT	17-2088
R10	50000 Ω, ½ WATT	17-4276
R11	250000 Ω, +	17-4152
R12	100000 Ω, ½ WATT	17-2068
R13	50000 Ω, ½ WATT	17-4276
R14	250000 Ω, ½ WATT	17-3011
R15	75000 Ω, ½ WATT	17-2067
R16	CANDOHM, 800 Ω TOTAL, TAPPED AT 100 & 120 Ω	17-4281

* THIS RESISTOR MAY VARY FROM 1000 Ω TO 3000 Ω, CONTROLLING SENSITIVITY.
+ VOLUME CONTROL

TRANSFORMERS

DESCRIPTION	PART NO.
T1 ANTENNA	00-3020-1
T2 RADIO FREQUENCY	00-3017-1
T3 OSCILLATOR	00-3018-1
T4 FIRST INTERMEDIATE FREQUENCY	00-2256-A
T5 SECOND INTERMEDIATE FREQUENCY	00-2259
T6 OUTPUT	00-4111
T7 POWER	00-4102

CHOKES

DESCRIPTION	PART NO.
X1 FILTER CHOKE	00-4141
X2 CENTER TAP PRIMARY R.F.	00-2178-E
X3 FILAMENT R.F.	00-2178-F
X4 PLATE R.F.	00-2181-1

MISCELLANEOUS

DESCRIPTION	PART NO.
V VIBRATOR UNIT	28-2169-B
SW SWITCH INTEGRAL WITH R-11	17-4152
SP DYNAMIC SPEAKER	17-4226

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS INDIANA

MODEL 25 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	250	70	2	2	1.8*	—	—
6A7	6.3	250	70	2	—	1.8*	150	5-10
78	6.3	250	70	2.5	2.5	2.3*	—	—
6B7	6.3	220	45	1.8	—	1.6*	—	—
41	6.3	245	255	20	—	20.0*	—	—
84	6.3	275 (AC)	—	255	—	—	—	—

* Measured with vacuum tube voltmeter only.

MODEL 25 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

1st 78

+ Heater	Inf.
— Heater	0
Plate to B+	104
Screen Grid to B+	75,000
Suppressor Grid	260
Cathode	260
Control Grid	730,000

6B7

+ Heater	Inf.
— Heater	0
Plate to B+	30,000
Screen Grid to B+	175,000
Diode	480,000
Diode	480,000
Cathode	100
Control Grid:	
V. C. clear on	250,000
V. C. and switch off	0-5

2nd 78

+ Heater	Inf.
— Heater	0
Plate to B+	75
Screen Grid to B+	75,000
Suppressor Grid	2,000
Cathode	2,000
Control Grid	130,000

84

+ Heater	Inf.
— Heater	0
Plate	190
Plate	220
Plate to Plate	410
Cathode	Inf.†

†Reads leakage of electrolytic condenser.

41

+ Heater	Inf.
— Heater	0
Plate to B+	650
Screen Grid	0
Control Grid	250,000
Cathode	800

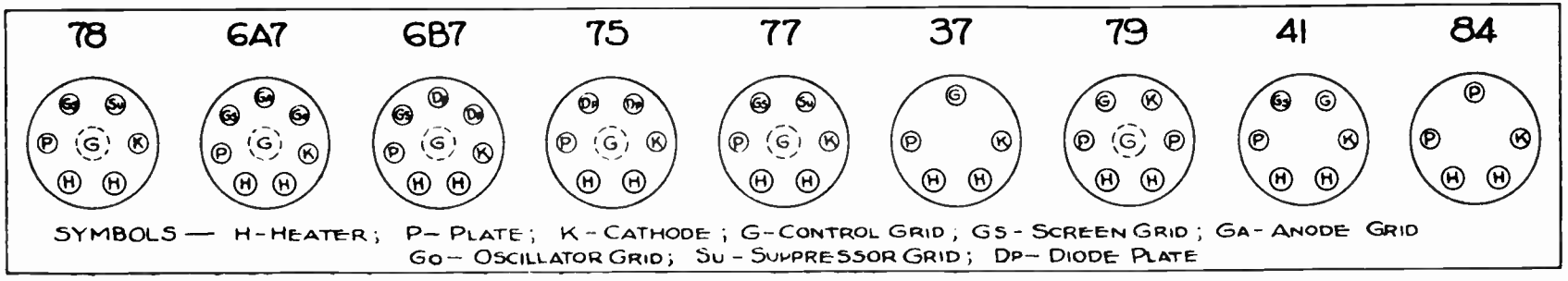
6A7

+ Heater	Inf.
— Heater	0
Plate to B+	104
Screen Grid to B+	75,000
Anode Grid to B+	20,000
Oscillator Grid	101,260
Cathode	260
Control Grid	30,100

COIL RESISTANCES

Ant. Primary	13	Osc. Primary	2
Ant. Secondary	5	Osc. Secondary	4
R. F. Primary	100	1st I. F. Primary	82
R. F. Secondary	5	1st I. F. Secondary	82
		2nd I. F. Primary	120
		2nd I. F. Secondary	120
		Primary Output Transformer	650
		Voice Coil	.35

LOOKING AT BOTTOM OF TUBE SOCKETS



SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

NOBLITT SPARKS INDUSTRIES

MODEL 20-A SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	180	60	0	0	*1.0
77	6.3	180	60	6	6	*5.8
78	6.3	180	60	2.4	2.4	*2.2
75	6.3	120	—	1.3	—	*1.3
41	6.3	175	180	16.0	—	*16.0
84	6.3	200 (AC)	—	190	—	—

* Measured with vacuum tube voltmeter only.

MODEL 20-B SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.3	220	90	2.2	2.2	*2.0	—	—
6A7	6.3	220	90	2.2	—	*2.0	220	*6
77	6.3	220	90	1.3	1.3	*1.1	—	—
75	6.3	100	—	1.3	—	*1.1	—	—
41	6.3	215	225	16.0	—	*16.0	—	—
84	6.3	240 (AC)	—	—	—	—	—	—

* Measured with vacuum tube voltmeter only.

MODEL 20-B POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

78

+ Heater	Inf.
— Heater	0
Cathode	500
Suppressor Grid (No. 3)	500
Plate to B+	100
Screen (No. 2) to B+	40,000
Control Grid (No. 1)	2,000,000

6A7

+ Heater	Inf.
— Heater	0
Anode Grid (No. 2) to B+	3.5
Osc. Grid (No. 1)	
Screen (No. 3-5) to B+	40,000
Plate to B+	125
Cathode	500
Control Grid (No. 4)	1,500,000

77

+ Heater	Inf.
— Heater	0
Plate to B+	75
Screen (No. 2) to B+	40,000
Suppressor Grid (No. 3)	1000
Cathode	1000
Control Grid (No. 1)	40

75

+ Heater	Inf.
— Heater	0
Plate	100,000
Diode	500,000
Diode	500,000
Cathode	52
Control Grid (No. 1) to Grid Term S2	250,000

41

+ Heater	Inf.
— Heater	0
Plate to B+	Inf.
Screen (No. 2) to B+	0
Cathode	692
Control Grid (No. 1)	250,000

84

+ Heater	Inf.
— Heater	0
Plate	155
Plate	155
Plate to Plate	310
Cathode	Inf.†

†Reads leakage of electrolytic condenser.

COIL RESISTANCES

Ant. Primary	5
Ant. Secondary	5
R. F. Primary	100
R. F. Secondary	5
Osc. Primary	2.5
Osc. Secondary	3.5
First I. F. Primary	125
First I. F. Secondary	40
Second I. F. Primary	75
Second I. F. Secondary	75

MODEL 15
Installation Notes
MODEL 25
Installation Notes

NOBLITT SPARKS INDUSTRIES

SPECIAL INSTALLATION BULLETIN FOR THE MODEL 25 ARVIN CAR RADIO

1934 Models Plymouth and Dodge

The model 25 Arvin Car Radio will install very satisfactorily on these model cars in an *inverted* position directly above the accelerator pedal, leaving the entire right hand side of the dash for mounting an Arvin Heater.

First: Disconnect the free wheeling cable at the bottom, drill another hole in the dash 5 or 6 inches to the right and relocate the cable back through this hole. Connect the freewheeling cable again, making sure that this is done correctly so that it will engage and disengage. The oil pressure gauge tube should be moved to the left by disconnecting it at both ends and relocating it through another hole 4 or 5 inches to the left of its present location. The water temperature gauge tube does not have to be moved. A groove should be cut in the dash insulation for this tube to run in and then the set can be mounted over this. Make sure, however, that the tube is not bent nor pinched by the mounting bracket when the set is pulled up tight.

Now, to mount the set upside down, the mounting bracket is inserted, with the two mounting bolts in place, in the *horizontal* tapered slots in the back of the case. This bracket will then be in a horizontal position on the bulkhead when the set is mounted.

Locate the set just to the left of the cowl vent lever and as high as it will go. The flexible shafts and Bowden wire then enter at the bottom of the set. The tubes will operate satisfactorily in an inverted position. A special socket prevents them from falling out.

1933 Models Plymouth and Dodge

The same installation as explained above may be used on the 1933 models Plymouth and Dodge cars in which case it will not be necessary to relocate the oil pressure gauge tube.

Another way to install the Arvin No. 25 on the 1933 Plymouth and Dodge is as follows:

Relocate the free wheeling cable to either side of its present location. Then attach the radio to the right hand side of the dash directly under (or just to the left of) the glove compartment. The set is mounted in normal position with remote control connections at the top.

This location of the radio leaves room for an Arvin Hot Water Heater just above and to the right of the brake pedal.

SPECIAL INSTALLATION BULLETIN FOR THE MODEL 15 ARVIN CAR RADIO

NOTE: All parts of the model 15 Arvin Radio mentioned in this bulletin are fully described in the regular installation instruction sheet furnished with each set.

All Model V-8 Ford Cars

The model 15 Arvin Car Radio can be installed very satisfactorily on Ford V-8 Cars directly below the glove compartment on the right hand side of the dash.

Remove the glove compartment by taking out the six screws around its front edge and also remove the door by taking the two screws out of the hinges which hold it. Now, by means of a hammer and anvil, flatten out the turned up lip at the rear of the instrument panel flange so as to provide a wider flange on which to mount the front end of the radio. Bend up the ears on either side of the front mounting bracket to conform to the contour of the bottom of the instrument panel. Also spread this bracket apart so that it forms about a 105 degree angle instead of a 90 degree angle.

Now, hold the front mounting bracket up against the instrument panel flange with its shorter leg butting up against the flange, and the longer leg extending upward behind the dash. Locate this bracket so that the right hand edge of its longer leg is just to the left of the loop in the door spring, or in other words, so that this spring will just clear the radio when the door is shut.

Mark the location of the holes to be drilled in the flange by inserting a pencil through the tapped holes in the mounting bracket. Drill a 9/32" hole at each of these two points. Now lift the bracket into place with the shorter leg underneath and against the instrument panel flange (the illustration in the model 15 installation instruction sheet erroneously shows this leg resting on top of the flange with the screw entering from the bottom) and insert the 1/4-20 oval head screw from the top, first through the flange and then into the tapped holes in the bracket by reaching through the glove pocket door opening. Draw these screws up tight with a short screw driver.

Next remove the main mounting plate from the radio as explained in the regular installation instruction sheet and install the rear mounting bracket onto this plate with its longer leg extending horizontally to the rear. Insert the threaded studs extending from the front end of this plate through the oval shaped holes in the bracket just mounted and fasten with the proper washers and nuts.

The rear end of the set is supported by one carriage bolt through the square hole in the center of the rear mounting bracket and clamped to the step plate in the dash. Mark the location of this hole and drill one 11/32" hole. Insert the carriage bolt and draw up tight with the proper washers and nuts.

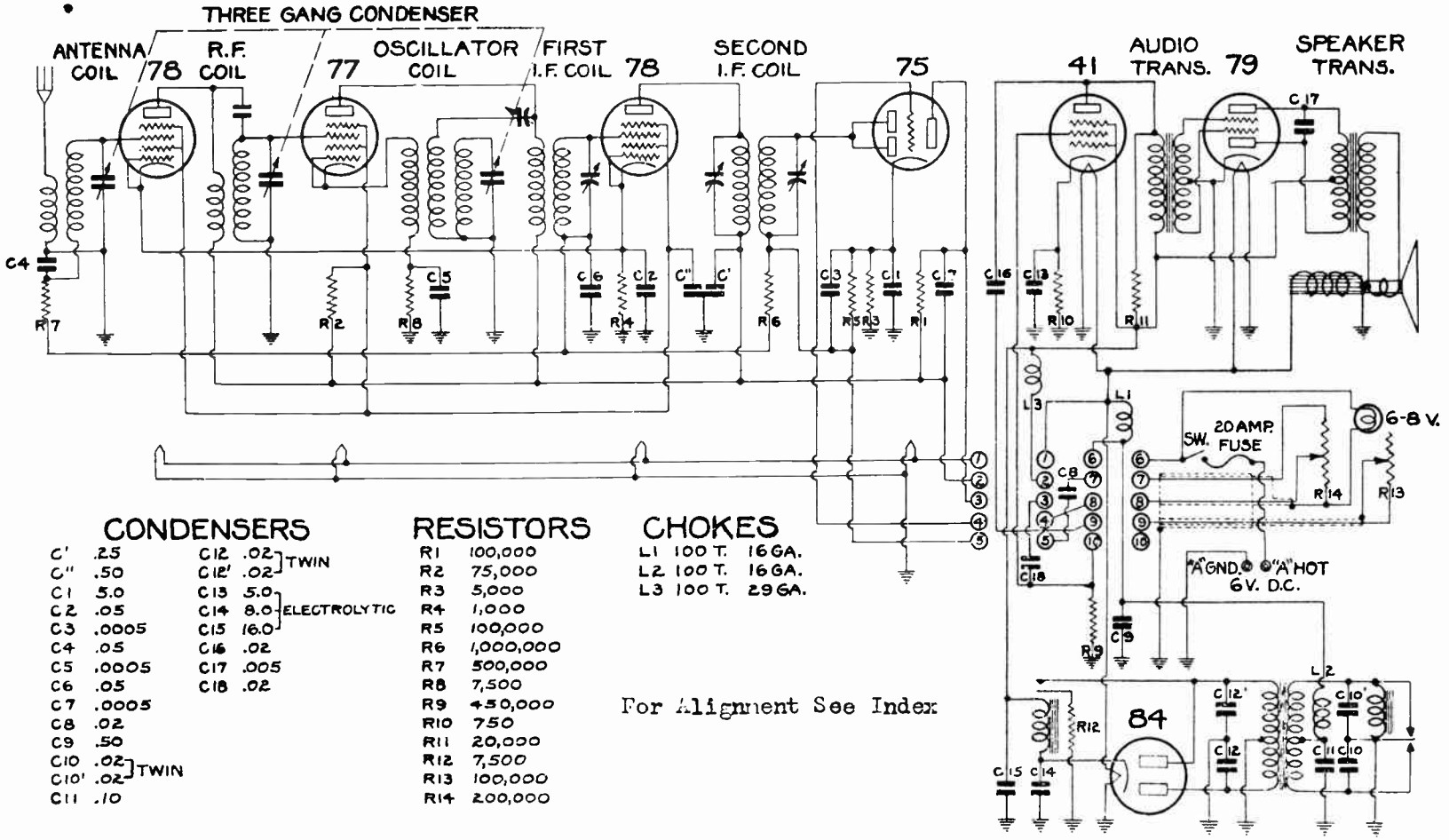
You are now ready to replace the glove compartment. This can be pushed through the door opening in the dash from the front and bolted into place in exactly the same manner as it came out. The lower front edge, of course, will have to be bent down around the top of the radio. However, this can be done without great difficulty. Now slip the radio chassis and outer cover, with speaker attached, up into place in the main mounting plate and complete the installation exactly as explained in the regular installation instruction sheet.

This procedure might appear to be a rather complicated and involved installation, however, it really is not at all difficult and in the end makes a very neat and workmanlike job.

DIAGRAM	ISSUE NO.	DATE
D	1	11-8-33

IF PEAK 175 KC.

SCHEMATIC CIRCUIT DIAGRAM
ARVIN CAR RADIO MODEL 30A



CONDENSERS

C'	.25	C12	.02] TWIN
C''	.50	C12'	.02]
C1	5.0	C13	5.0] ELECTROLYTIC
C2	.05	C14	8.0]
C3	.0005	C15	16.0]
C4	.05	C16	.02
C5	.0005	C17	.005
C6	.05	C18	.02
C7	.0005		
C8	.02		
C9	.50		
C10	.02] TWIN		
C10'	.02]		
C11	.10		

RESISTORS

R1	100,000
R2	75,000
R3	5,000
R4	1,000
R5	100,000
R6	1,000,000
R7	500,000
R8	7,500
R9	450,000
R10	750
R11	20,000
R12	7,500
R13	100,000
R14	200,000

CHOKES

L1 100 T. 16GA.
L2 100 T. 16GA.
L3 100 T. 29GA.

For Alignment See Index

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS. INDIANA.

MODEL 30-A SOCKET VOLTAGES—C SERIES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	180	60	2.4	2.4	*2.2
77	6.3	180	60	6	9	*5.8
78	6.3	180	60	2.4	2.4	*2.2
75	6.3	120	—	1.3	—	*1.3
41	6.3	175	180	16.0	—	*16.0
79	6.3	180	—	0	—	0
84	6.3	700 (AC)	—	190	—	—

* Measured with vacuum tube voltmeter only.

MODEL 30-A POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

1st 78
+ Heater ..... Inf.
— Heater 0
Cathode ..... 1000 some 500
Suppressor Grid (No. 3) .. 1000 some 500
Plate to B+ 35
Screen (No. 2) to B+ 75,000
Control Grid (No. 1) 2,005,000

77
+ Heater ..... Inf.
— Heater 0
Plate to B+ 50
Screen (No. 2) to B+ 75,000
Suppressor Grid (No. 3) 7,500
Cathode 7,500
Control Grid (No. 1) 8

2nd 78
+ Heater ..... Inf.
— Heater 0
Cathode ..... 1000 some 500
Suppressor Grid (No. 3) .. 1000 some 500
Plate to B+ 50
Screen (No. 2) to B+ 75,000
Control Grid (No. 1) 1,505,000

75
+ Heater ..... Inf.
— Heater 0
Plate to B+ 100,000
Diode 505,000
Diode 505,000
Cathode 5000
Control Grid (No. 1) ..... Inf.

41
+ Heater ..... Inf.
— Heater 0
Plate to B+ 590
Screen (No. 2) to B+ 0
Cathode 750
Control Grid (No. 1) 250,000

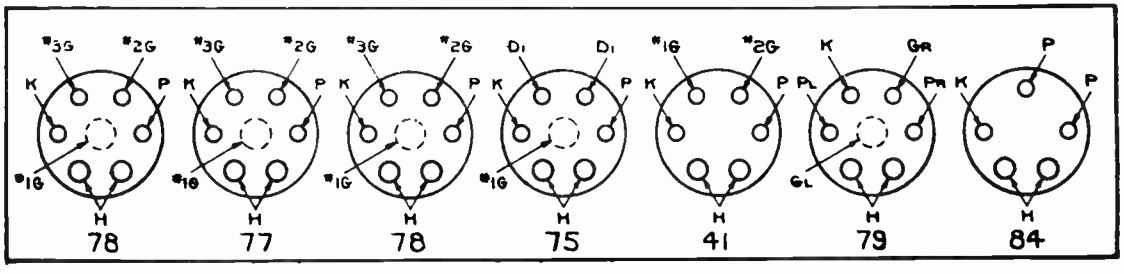
79
+ Heater ..... Inf.
— Heater 0
Plate (PL) to B+ 500
Control Grid (GR) 150
Cathode 0
Plate (PR) to B+ 500
Control Grid (GL) 150

84
+ Heater ..... Inf.
— Heater 0
Plate 125
Plate 140
Plate to Plate 265
Cathode ..... Inf.†

COIL RESISTANCES

†Reads leakage of electrolytic condenser.
Ant. Primary 2
Ant. Secondary 8
R. F. Primary 35
R. F. Secondary 8
Osc. Primary 11
Osc. Secondary 6
First I. F. Primary 50
First I. F. Secondary 50
Second I. F. Primary 50
Second I. F. Secondary 50
Audio Transformer Primary 600
Audio Transformer Sec. ..... 150 per half
Speaker Trans. Primary ..... 500 per half

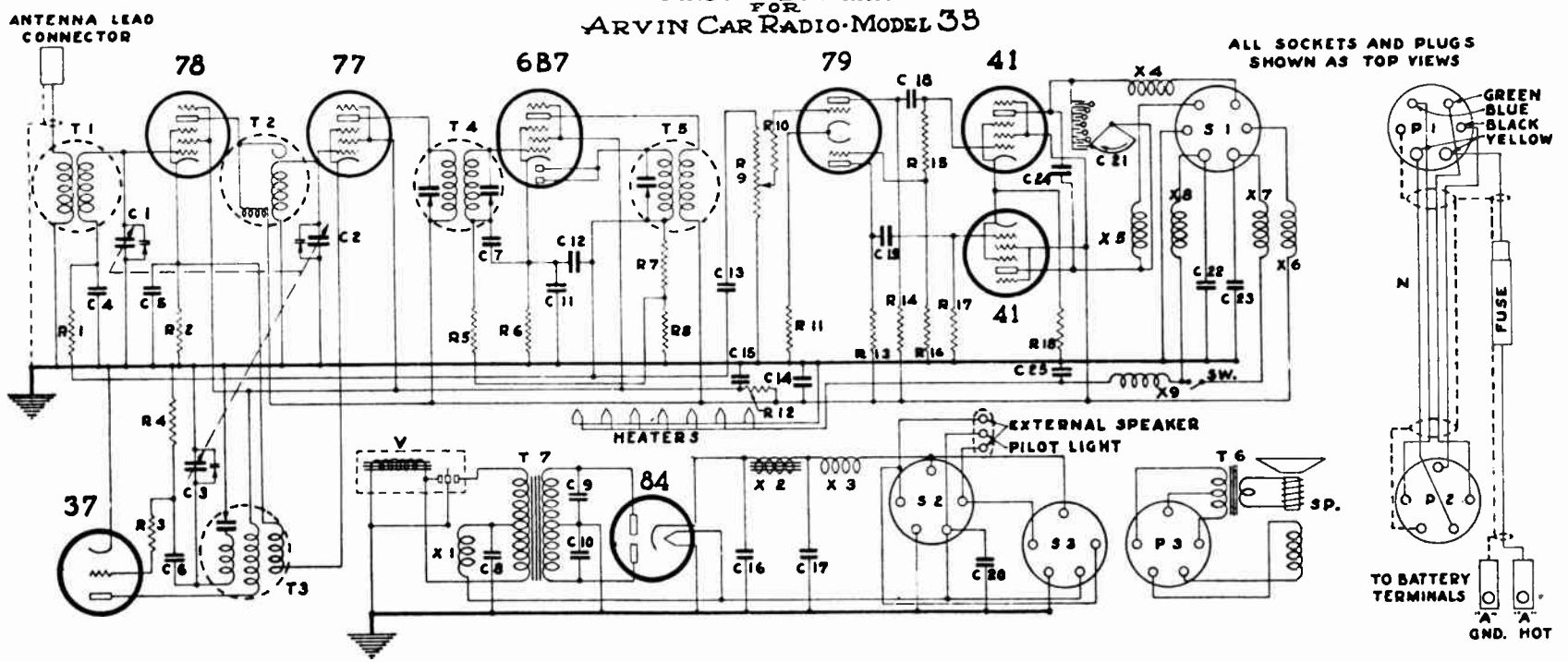
LOOKING AT TOP OF TUBE SOCKETS



For Alignment See Index

IF PEAK 175 KC.

CIRCUIT DIAGRAM FOR ARVIN CAR RADIO-MODEL 35



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.01 *uf*	160 V.	17-4291
C 5	.1 *uf*	200 V.	17-2097
C 6	100 *uuf*	600 V. Mica	17-2064
C 7	.01 *uf*	160 V.	17-4291
C 8	.5 *uf*	10 V.	29-2224
C 9, C10	.02 *uf*	1000 V. Twin	29-4193
C11	.1 *uf*	200 V.	17-2097
C12	500 *uuf*	600 V. Mica	17-2211
C13	.01 *uf*	160 V.	17-4291
C14	.5 *uf*	300 V.	17-3037
C15	.1 *uf*	200 V.	17-2097
C16	12 *uf*	450 WVDC, Dual Elec.	
C17	4 *uf*	500 PVDC	17-4184
C18	.01 *uf*	400 V.	17-2189
C19	.01 *uf*	400 V.	17-2189

CAPACITORS

	Description		Part No.
C25	.002 *uf*	600 V. Mica	17-2063
C20	.5 *uf*	10 V.	29-2224
C21	Tone Control		17-4151
C22	.5 *uf*	10 V.	29-2224
C23	.5 *uf*	10 V.	29-2224
C24	.005 *uf*	600 V.	17-2252

MISCELLANEOUS

N—Interconnecting Cable, Complete 00-4180
SP—Speaker 00-4227
SW—Switch (Integral with R9) 17-4152
V—Vibrator 29-4186
Socket S1 Receives Plug P1
Socket S2 Receives Plug P2
Socket S3 Receives Plug P3
NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	260 Ω	¼ W.	17-2066
R 3	10,000 Ω	¼ W.	17-4275
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	30,000 Ω	¼ W.	17-4276
R 8	500,000 Ω	¼ W.	17-2070
R 9	250,000 Ω Volume Control		17-4152
R10	250,000 Ω	¼ W.	17-3011
R11	1,000 Ω	¼ W.	17-2065
R12	60,000 Ω	½ W.	17-4190
R13	100,000 Ω	¼ W.	17-2068
R14	100,000 Ω	¼ W.	17-2068
R15	500,000 Ω	¼ W.	17-2070
R16	15,000 Ω	¼ W.	17-4191
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-4134-1
T2	Radio Frequency	00-4132-1
T3	Oscillator	00-4133
T4	1st Intermediate Freq.	00-2258-A
T5	2nd Intermediate Freq.	00-2259
T6	Output	00-4112
T7	Power	00-4101

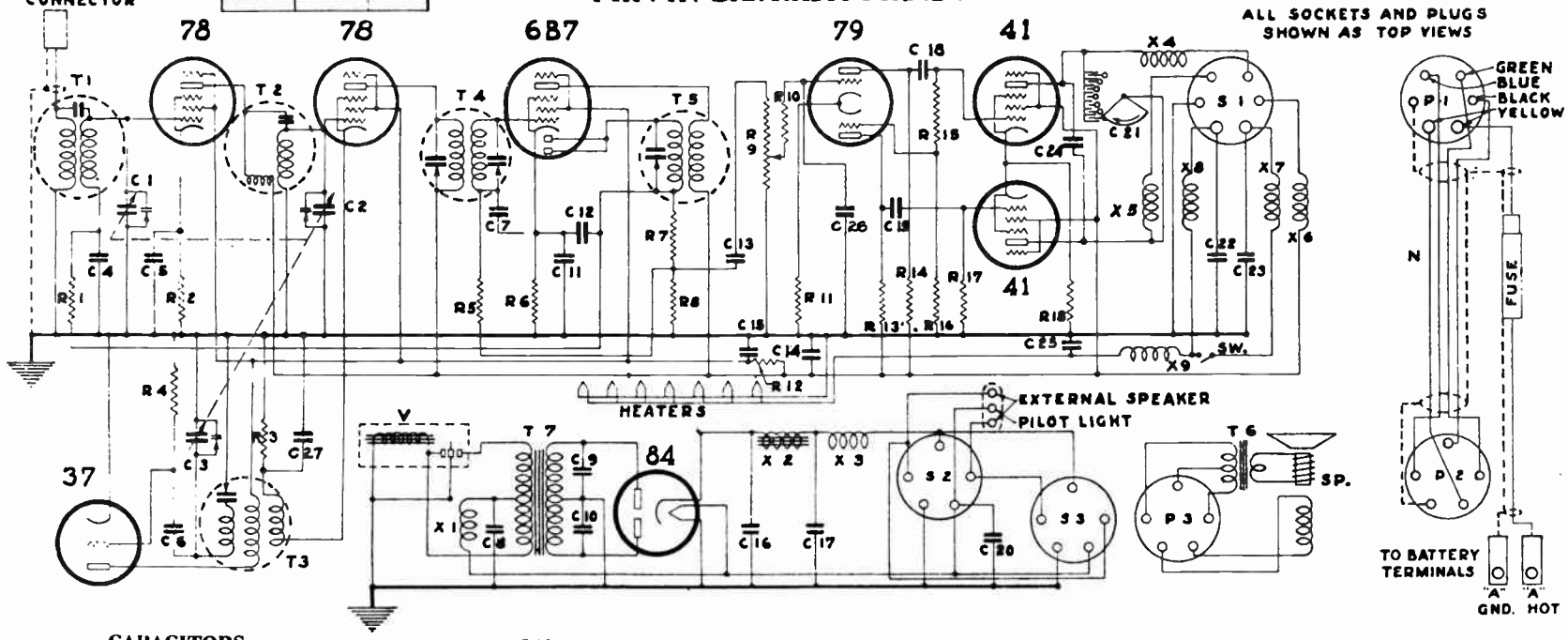
CHOKES

X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"B" Radio Frequency	00-2181-1
X7	"A" Radio Frequency	00-4130-1
X8	"A" Radio Frequency	00-4130-1
X9	"A" Radio Frequency	00-4131

DIAGRAM	ISSUE NO.	DATE
G	1	2-28-34
H	1	5-21-34

CIRCUIT DIAGRAM FOR ARVIN CAR RADIO-MODEL 35

IF PEAK 175 KC.



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.05 *uf*	160 V.	17-4329
C 5	.1 *uf*	200 V.	17-2097
C 6	100 *uuf*	600 V. Mica	17-2064
C 7	.01 *uf*	160 V.	17-4291
C 8	.5 *uf*	10 V.	29-2224
C 9, C10	.02 *uf*	1000 V. Twin	29-4193
C11	.1 *uf*	200 V.	17-2097
C12	500 *uuf*	600 V. Mica	17-2211
C13	.01 *uf*	160 V.	17-4291
C14	.5 *uf*	300 V.	17-3037
C15	.1 *uf*	200 V.	17-2097
C16	12 *uf*	450 WVDC	Dual Elec.
C17	4 *uf*	500 PVDC	17-4184
C18	.01 *uf*	400 V.	17-2189
C19	.01 *uf*	400 V.	17-2189

CAPACITORS

	Description		Part No.
C25	.002 *uf*	600 V. Mica	17-2063
C20	.5 *uf*	10 V.	29-2224
C21	Tone Control		17-4151
C22	.5 *uf*	10 V.	29-2224
C23	.5 *uf*	10 V.	29-2224
C24	.001 *uf*	600 V. Mica	17-4292
C25	.002 *uf*	600 V. Mica	17-2063
C26	100 *uuf*	600 V. Mica	17-2064
C27	.1 *uf*	200 V.	17-2097

MISCELLANEOUS

N—Interconnecting Cable, Complete	00-4180
SP—Speaker	00-4227
SW—Switch (Integral with R9)	17-4152
V—Vibrator	29-4186

Socket S1 Receives Plug P1
Socket S2 Receives Plug P2
Socket S3 Receives Plug P3

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	500 Ω	¼ W.	17-2088
R 3	3,000 Ω	¼ W.	17-2090
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	30,000 Ω	¼ W.	17-4276
R 8	500,000 Ω	¼ W.	17-2070
R 9	250,000 Ω Volume Control		17-4152
R10	250,000 Ω	¼ W.	17-3011
R11	1,000 Ω	¼ W.	17-2065
R12	25,000 Ω	1 W.	17-3010
R13	100,000 Ω	¼ W.	17-2068
R14	100,000 Ω	¼ W.	17-2068
R15	500,000 Ω	¼ W.	17-2070
R16	15,000 Ω	¼ W.	17-4191
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-4134-1S
T2	Radio Frequency	00-4132-1S
T3	Oscillator	00-4133S
T4	1st Intermediate Freq.	00-4489
T5	2nd Intermediate Freq.	00-4488
T6	Output	00-4112
T7	Power	00-4101

CHOKES

X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"B" Radio Frequency	00-2181-1
X7	"A" Radio Frequency	00-4130-1
X8	"A" Radio Frequency	00-4130-1
X9	"A" Radio Frequency	00-4131

For Alignment See Index

NOTE: The above circuit diagram is effective for all Model 35 Arvin Car Radios, beginning with and including that bearing the Serial No. E31577H.

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	2.2	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
6B7	6.3	250	60	1.6	—	*1.4
79	6.3	135	—	1.6	—	*1.6
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
37	6.3	60	—	0	—	*6—1500 KC
84	6.3	275 (AC)	—	255	—	—

* Measured with vacuum tube voltmeter only.

MODEL 35 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis disconnected from power pack unit.

78

+ Heater	Inf.
— Heater	0
Plate to B+	50
Screen Grid to B+	60,000
Suppressor Grid	260
Cathode	260
Control Grid	1,530,000

41

+ Heater	Inf.
— Heater	0
Plate to B+	Inf.
Screen Grid to B+	2
Control Grid	500,000
Cathode	400

77

+ Heater	Inf.
— Heater	0
Plate to B+	100
Screen Grid to B+	60,000
Suppressor Grid	260
Cathode	260
Control Grid	6

41

+ Heater	Inf.
— Heater	0
Plate to B+	Inf.
Screen Grid to B+	2
Control Grid	500,000
Cathode	400

6B7

+ Heater	Inf.
— Heater	0
Plate to B+	90
Screen Grid to B+	60,000
Diode	530,000
Diode	530,000
Cathode	500
Control Grid	1,500,000

79

+ Heater	Inf.
— Heater	0
Plate to B+	100,000
Control Grid	15,000
Cathode	1000
Plate to B+	100,000
Control Grid (Cap):	
V. C. on	500,000
V. C. off	250,000

37

+ Heater	Inf.
— Heater	0
Plate to B+	60,000
Control Grid	60,000
Cathode	0

84

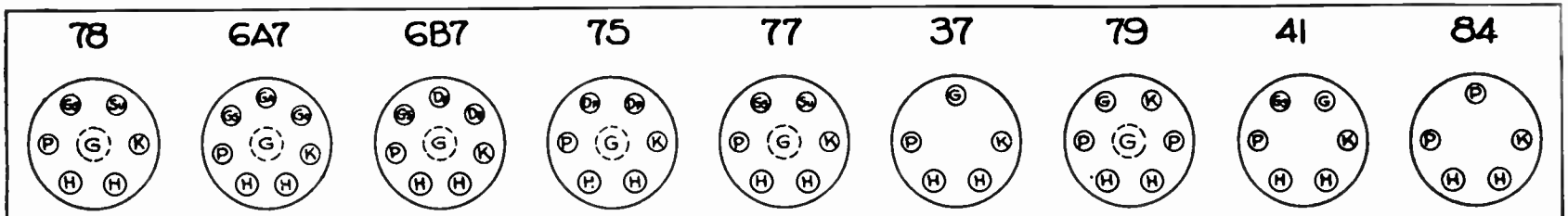
+ Heater	Inf.
— Heater	0
Plate	190
Plate	160
Plate to Plate	350
Cathode	Inf.†

†Reads leakage of electrolytic condenser.

COIL RESISTANCES

Ant. Primary	2	1st I. F. Primary	100
Ant. Secondary	6	1st I. F. Secondary	100
R. F. Primary	50	2nd I. F. Primary	82
R. F. Secondary	6	2nd I. F. Secondary	82
Osc. Primary	2	Primary Output Transformer	600
Osc. Secondary	7	Voice Coil	.35

LOOKING AT BOTTOM OF TUBE SOCKETS



MODELS 15,25,35,45
General Service Notes

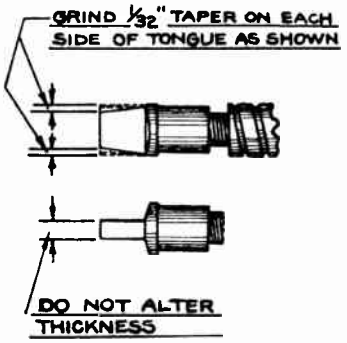
NOBLITT SPARKS INDUSTRIES

Method of adapting the Model 25, 35, and 45 flexible shafts for use with Airplane dial control on Model 16 Arvin Car Radio

The difference between these two types of flexible shafts lies in the fact that one end on the Model 16 shaft is narrower and shorter than the other end. This smaller end is the one that fits into the remote control itself, while the opposite end with the same type of fitting as on the Model 25, 35, and 45 shafts, fits into the radio proper.

In adapting the Model 25, 35, and 45 shafts to the Model 16, in such cases where a different length shaft is required than the one furnished with the radio, and the shafts in stock do not have this special type end on them, it is necessary to narrow the flange by filing or grinding as shown in the illustration below.

If this procedure is followed, any binding of the control caused by the wide flange will be entirely eliminated.



METHOD OF REMOVING SILENT TUNING FROM ARVIN CAR RADIO MODELS 15, 25, 35 AND 45

In certain localities where satisfactory day-time reception is difficult to obtain, it is sometimes desirable to remove the silent tuning or inter-channel noise suppression feature from these models. In doing this the set will be slightly more susceptible to motor and outside interferences, but in such cases the increase in sensitivity will more than offset this trouble.

MODEL 15

Locate the 150,000-ohm resistor, R-10. Disconnect the end of this resistor that is fastened to the chassis ground and re-connect this lead to the cathode of the 6B7 tube.

MODEL 25

Locate the miter resistor R-7, R-8, R-9 and R-10. Disconnect this resistor from chassis, and re-connect this same end to the cathode of the 6B7 tube.

MODEL 35

Locate a 500,000-ohm resistor, R-8. Disconnect this resistor from the chassis ground and reconnect this same end to the cathode of the 6B7 tube.

MODEL 45

Locate R-9, a 250,000-ohm resistor. Disconnect the end of this resistor from the chassis ground and connect this same end to the cathode of the first 75 tube.

How to remove microphonic howl on Model 25

This howl, which is sometimes noted when considerable volume is used on a strong station, can be eliminated by loosening the clamp holding the condenser control wire (Bowden Wire), then pulling very tightly on this control wire, refasten the clamp to the case.

MISCELLANEOUS GENERAL INFORMATION RELATIVE TO REMOVING MOTOR NOISE

When primary wires to the coil run through the same conduit as the secondary or spark plug wire run—remove this wire from the conduit and shield it if necessary, grounding the shielding at both ends to some part of the motor block or the bulkhead between the passenger's compartment and the motor.

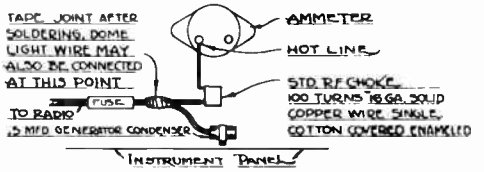
Also, be sure when shielding the secondary lead from the coil to the distributor to ground both ends of this shield, either to the motor or to the bulkhead. On some few cars the hood over the engine appears to be ungrounded or at least is a very high resistance ground and should be grounded with pigtails of shielding cable soldered to both sides of the hood and also to the motor bulkhead or motor block.

On cars equipped with co-incidental lock on the steering post an extra generator condenser should be installed from one switch terminal to ground. The exact terminal on which to install this condenser can be determined only by experiment. The condenser body should be grounded to the dash or to the motor bulkhead. On some Ford V-8's it is necessary to install an extra generator condenser on the generator to the other terminal of the cutout relay, thus making two condensers on the same relay—one on each terminal to ground.

On some Chevrolets, generally of the older models, it is necessary to install an extra condenser from the primary of the ignition coil to ground. The exact terminal to connect this condenser to can only be determined by experiment. Be sure that the grounding of this condenser is solid, preferably to the motor block or to the motor bulkhead.

On all cars equipped with "Electrolock" it may be found necessary to remove the primary return wire from the switch to the coil and replace it with a new wire run through a piece of shielding loom grounded near the switch and also to the metal bulkhead on the motor side of the dash. This lead should be brought out through the dash as far as possible from the rest of the electrical wiring of the car.

It may be pointed out that loose connections anywhere in the electrical circuit of the car will cause motor noise or what appears to be motor noise. If this condition exists it is wise to check the entire electrical circuit of the car and make sure that all connections are tight before trying any other extreme methods of motor noise elimination.

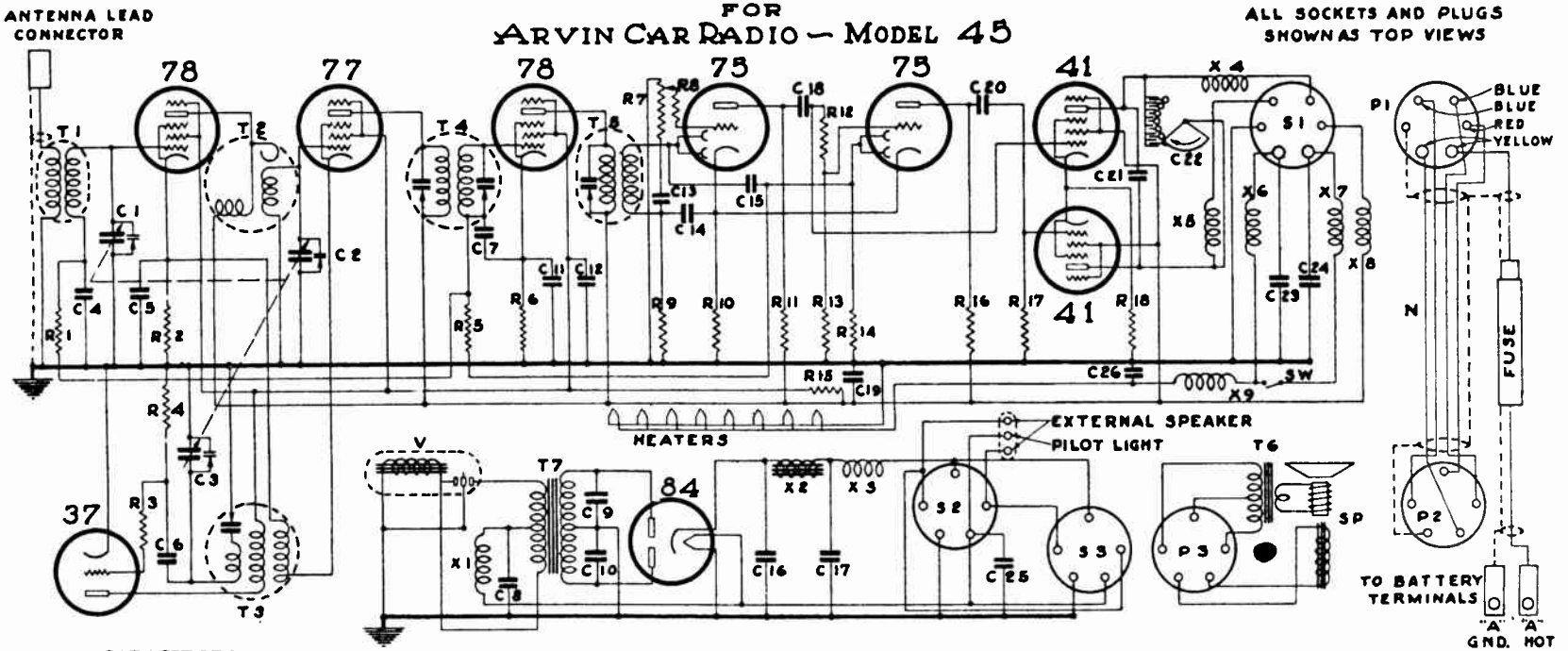


The use of a choke and condenser at the ammeter with the 10A has proven to be a great help in the elimination of motor noise. (See illustration above.)

For Alignment See Index

IF PEAK 175 KC.

CIRCUIT DIAGRAM FOR ARVIN CAR RADIO — MODEL 45



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.01 *uf*	160 V.	17-4291
C 5	.1 *uf*	200 V.	17-2097
C 6	100 *uuf*	600 V. Mica	17-2064
C 7	.01 *uf*	160 V.	17-4291
C 8	.5 *uf*	10 V.	17-2224
C 9, C10	.02 *uf*	1000 V. Twin	17-4193
C11	.1 *uf*	200 V.	17-2097
C12	.1 *uf*	200 V.	17-2097
C13	.01 *uf*	160 V.	17-4291
C14	500 *uuf*	600 V. Mica	17-2211
C15	500 *uuf*	600 V. Mica	17-2211
C16	12 *uf*	450 WVDC Dual Elec.	
C17	4 *uf*	500 PVDC	17-4184
C18	.01 *uf*	400 V.	17-2189
C19	.5 *uf*	300 V.	17-3037
C20	.01 *uf*	400 V.	17-2189

CAPACITORS

	Description		Part No.
C21	.005 *uf*	600 V.	17-2252
C22	Tone Control		17-4151
C23	.5 *uf*	10 V.	17-2224
C24	.5 *uf*	10 V.	17-2224
C25	.5 *uf*	10 V.	17-2224
C26	.002 *uf*	600 V.	17-2063

MISCELLANEOUS

N—Interconnecting Cable, Complete	00-4180
SP—Speaker	19-4228
SW—Switch (Integral with R7)	17-4152
V—Vibrator	29-4186

Socket S1 Receives Plug P1
Socket S2 Receives Plug P2
Socket S3 Receives Plug P3

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	260 Ω	¼ W.	17-2066
R 3	10,000 Ω	¼ W.	17-4275
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	250,000 Ω Volume Control		17-4152
R 8	250,000 Ω	¼ W.	17-3011
R 9	500,000 Ω	¼ W.	17-2070
R10	2,500 Ω	¼ W.	17-2087
R11	250,000 Ω	¼ W.	17-3011
R12	500,000 Ω	¼ W.	17-2070
R13	8,000 Ω	¼ W.	17-4290
R14	500,000 Ω	¼ W.	17-2070
R15	60,000 Ω	½ W.	17-4190
R16	250,000 Ω	¼ W.	17-3011
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-4134-1
T2	Radio Frequency	00-4132-1
T3	Oscillator	00-4133
T4	1st Intermediate Freq.	00-2258-A
T5	2nd Intermediate Freq.	00-2259
T6	Output	00-4112
T7	Power	00-4101

CHOKES

X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"A" Radio Frequency	00-4130-1
X7	"A" Radio Frequency	00-4130-1
X8	"B" Radio Frequency	00-2181-1
X9	"A" Radio Frequency	00-4131

NOBLITT SPARKS INDUSTRIES

MODEL 45 Below E40356L
Schematic, Parts List
Type 1

MODEL 45 Above E40356L
Schematic, Parts List
Type 2

NOBLITT SPARKS INDUSTRIES

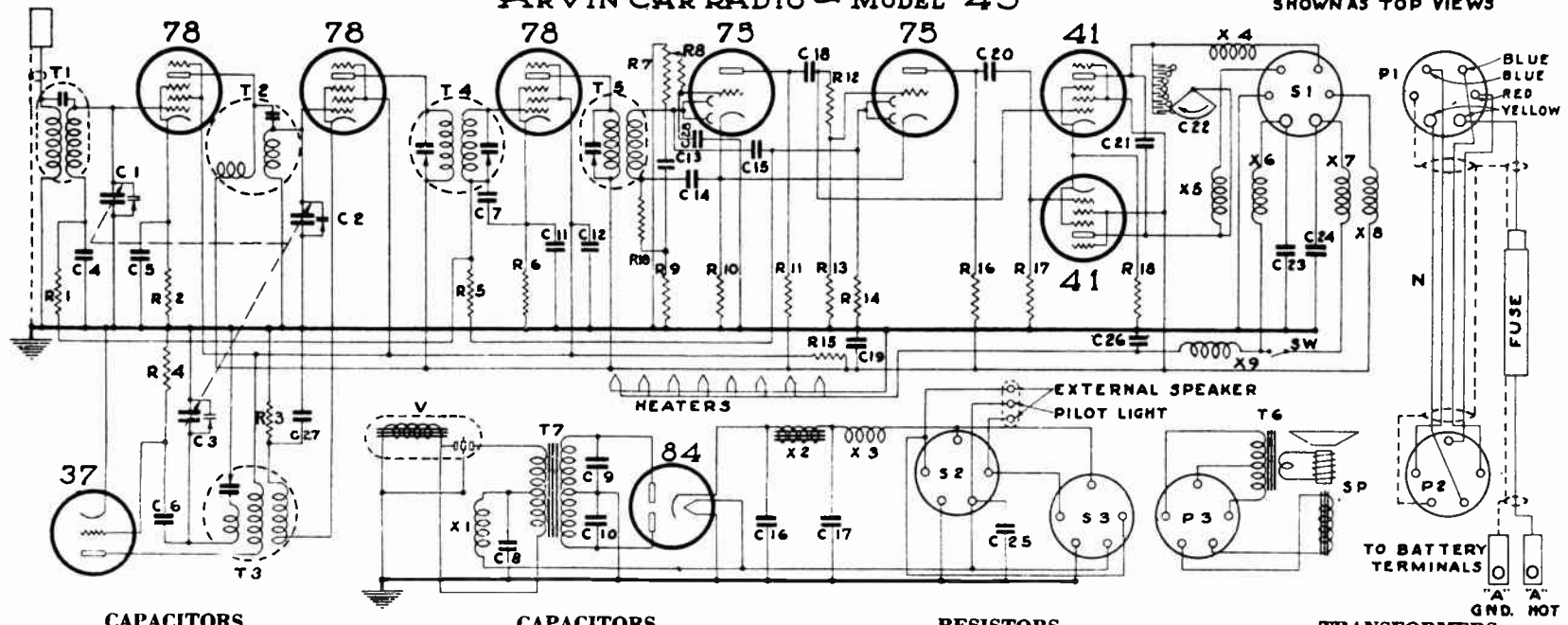
IF PEAK 175 KC.

DIAGRAM	ISSUE NO.	DATE
K	1	2-26-34
L	1	5-21-34

ALL SOCKETS AND PLUGS SHOWN AS TOP VIEWS

For Alignment See Index

CIRCUIT DIAGRAM FOR ARVIN CAR RADIO — MODEL 45



CAPACITORS

	Description		Part No.
C 1, C 2, C 3	3 Gang Variable		00-4182-1
C 4	.05 *uf*	160 V.	17-4329
C 5	.1 *uf*	200 V.	17-2097
C 6	100 *uuf*	600 V. Mica	17-2064
C 7	.01 *uf*	160 V.	17-4291
C 8	.5 *uf*	10 V.	17-2224
C 9, C10	.02 *uf*	1000 V. Twin	17-4193
C11	.1 *uf*	200 V.	17-2097
C12	.1 *uf*	200 V.	17-2097
C13	.01 *uf*	160 V.	17-4291
C14	500 *uuf*	600 V. Mica	17-2211
C15	500 *uuf*	600 V. Mica	17-2211
C16	12 *uf*	450 WVDC	Dual Elec.
C17	4 *uf*	500 PVDC	17-4184
C18	.01 *uf*	400 V.	17-2189
C19	.5 *uf*	300 V.	17-3037
C20	.01 *uf*	400 V.	17-2189

CAPACITORS

	Description		Part No.
C21	.001 *uf*	600 V. Mica	17-4292
C22	Tone Control		17-4151
C23	.5 *uf*	10 V.	17-2224
C24	.5 *uf*	10 V.	17-2224
C25	.5 *uf*	10 V.	17-2224
C26	.002 *uf*	600 V. Mica	17-2063
C27	.1 *uf*	200 V.	17-2097
C28	100 *uuf*	600 V. Mica	17-2064

MISCELLANEOUS

N—Interconnecting Cable, Complete	00-4180
SP—Speaker	19-4228
SW—Switch (Integral with R7)	17-4152
V—Vibrator	29-4186

Socket S1 Receives Plug P1
Socket S2 Receives Plug P2
Socket S3 Receives Plug P3

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

RESISTORS

	Description		Part No.
R 1	1,000,000 Ω	¼ W.	17-2080
R 2	500 Ω	¼ W.	17-2088
R 3	3,000 Ω	¼ W.	17-2090
R 4	50,000 Ω	¼ W.	17-2075
R 5	1,000,000 Ω	¼ W.	17-2080
R 6	500 Ω	¼ W.	17-2088
R 7	250,000 Ω Volume Control		17-4152
R 8	250,000 Ω	¼ W.	17-3011
R 9	500,000 Ω	¼ W.	17-2070
R10	2,500 Ω	¼ W.	17-2087
R11	250,000 Ω	¼ W.	17-3011
R12	500,000 Ω	¼ W.	17-2070
R13	8,000 Ω	¼ W.	17-4290
R14	500,000 Ω	¼ W.	17-2070
R15	25,000 Ω	1 W.	17-3010
R16	250,000 Ω	¼ W.	17-3011
R17	500,000 Ω	¼ W.	17-2070
R18	400 Ω	½ W.	17-4189
R19	30,000 Ω	¼ W.	17-4276

TRANSFORMERS

	Description	Part No.
T1	Antenna	00-4134-1S
T2	Radio Frequency	00-4132-1S
T3	Oscillator	00-4133S
T4	1st Intermediate Freq.	00-4489
T5	2nd Intermediate Freq.	00-4488
T6	Output	00-4112
T7	Power	00-4101

CHOKES

X1	Center Tap Primary R. F.	00-4131
X2	Filter	00-4141
X3	"B" Radio Frequency	00-2181-1
X4	Plate Radio Frequency	00-2181-1
X5	Plate Radio Frequency	00-2181-1
X6	"A" Radio Frequency	00-4130-1
X7	"A" Radio Frequency	00-4130-1
X8	"B" Radio Frequency	00-2181-1
X9	"A" Radio Frequency	00-4131

NOTE: The above circuit diagram is effective for all Model 45 Arvin Car Radios, beginning with and including that bearing the Serial No. E40356L.

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	2.2	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
78	6.3	250	60	1.6	1.6	*1.4
37	6.3	60	—	0	—	*6—1500 KC
75	6.3	135	—	1.3	—	*1.3
75	6.3	135	—	1.3	—	*1.3
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
84	6.3	275 (AC)	—	255	—	—

* Measured with vacuum tube voltmeter only.

MODEL 45 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis disconnected from power pack unit.

1st 78

+ Heater	Inf.
— Heater	0
Plate to B+	50
Screen Grid to B+	60,000
Suppressor Grid	260
Cathode	260
Control Grid	2,500,000

75

+ Heater	Inf.
— Heater	0
Plate to B+	250,000
Diode	500,000
Diode	500,000
Cathode	2500
Control Grid	8000

84

+ Heater	Inf.
— Heater	0
Plate	190
Plate	160
Plate to Plate	350
Cathode	Inf.†

†Reads leakage of electrolytic condenser.

77

+ Heater	Inf.
— Heater	0
Plate to B+	100
Screen Grid to B+	60,000
Suppressor Grid	260
Cathode	260
Control Grid	6

41

+ Heater	Inf.
— Heater	0
Plate to B+	Inf.
Screen Grid to B+	2
Control Grid	508,000
Cathode	400

2nd 78

+ Heater	Inf.
— Heater	0
Plate to B+	100
Screen Grid to B+	60,000
Suppressor Grid	500
Cathode	500
Control Grid	1,500,000

75

+ Heater	Inf.
— Heater	0
Plate to B+	250,000
Diode	500,000
Diode	500,000
Cathode	2500
Control Grid:	
V. C. on	500,000
V. C. off	250,000

37

+ Heater	Inf.
— Heater	0
Plate to B+	60,000
Control Grid	65,000
Cathode	0

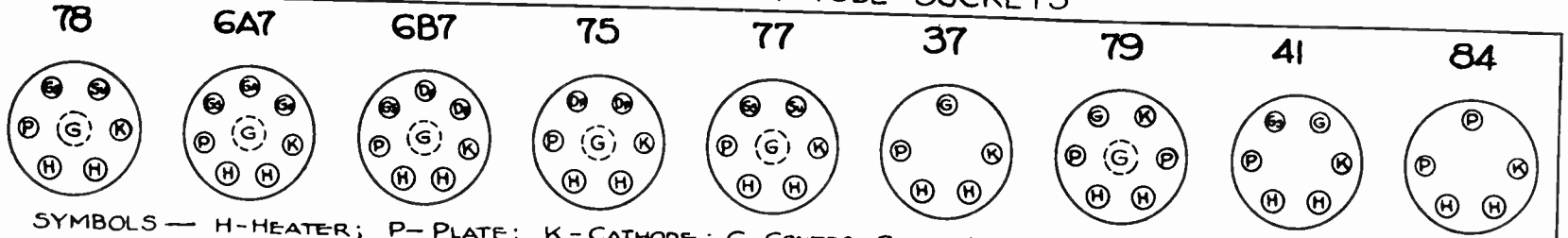
41

+ Heater	Inf.
— Heater	0
Plate to B+	Inf.
Screen Grid to B+	2
Control Grid	508,000
Cathode	400

COIL RESISTANCES

Ant. Primary	2	1st I. F. Primary	100
Ant. Secondary	6	1st I. F. Secondary	100
R. F. Primary	50	2nd I. F. Primary	82
R. F. Secondary	6	2nd I. F. Secondary	82
Osc. Primary	2	Primary Output Transformer	600
Osc. Secondary	7	Voice Coil	.35

LOOKING AT BOTTOM OF TUBE SOCKETS



SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

NOBLITT SPARKS INDUSTRIES

MODEL 45
Voltage, Test Data
Coil Resistance

MODELS 10-A,20-A,20-B,
30-A,15,25,35,45 NOBLITT SPARKS INDUSTRIES
Alignment Data
MODELS 35,45
Noise Suppression Data

ALIGNMENT PROCEDURE FOR ARVIN CAR RADIOS

Models 10-A. 20-A, 20-B and 30-A

NOTE: All adjustments in the following instructions should be made with an output meter or some indicating device connected with the output of the radio receiver to insure maximum sensitivity and selectivity.

Remove the radio chassis from the case. Connect grounding wire from the radio chassis to the power pack. Connect the output of the oscillator to the grid cap of the 77 or 6A7 tube after removing the grid clip and adjust the oscillator to 175 kilocycles. Set the output to the lowest amount giving a satisfactory deflection of the output meter. Adjust with a Bakelite screwdriver the first and second I. F. transformer for a maximum output. Replace the grid clip, connect the output of the oscillator to the antenna terminal of the radio set through a .0001 mfd mica condenser and set the oscillator to 1510 kilocycles. Rotate the variable condenser fully out of mesh, then back until the rotor plates begin to enter the stator. Adjust the oscillator padder condenser until the maximum signal is attained. Then readjust the oscillator input to 1400 kilocycles, rotate the variable condenser until the signal is again heard.

Now adjust the antenna and R. F. padders until the output is again at the peak. With the Model 10A, 20A and 30A Radios further adjustment is made at other frequencies by bending the split plates on the R. F. and antenna sections either in or out, depending upon whether more or less capacity is needed to bring the set into resonance.

On the 20B receiver, set the oscillator output to 600 kilocycles and rotate the variable condenser until a signal is heard and then adjust the oscillator series padder condenser located on the right hand condenser back and forth until a point is found where the setting of the padder gives maximum deflection on the output meter. Setting of the padder and variable condenser are both variable, each dependent upon the other, there being one point on the setting of the variable condenser where a maximum deflection will be obtained.

After the 600 kilocycle adjustment has been made return to the 1400 kilocycle position and recheck slightly the adjustment of the radio frequency and the antenna padders to insure no change has been made.

NOTE: After installation on some cars slight readjustment of the antenna padder on all Radios—except model 10A—materially improves the sensitivity of the receiver.

ALIGNMENT PROCEDURE FOR ARVIN

Models 15. 25. 35. and 45

NOTE: All adjustments in the following instructions should be made with an output meter or some indicating device connected with the output of the radio receiver to insure maximum sensitivity and selectivity: Output meter may be connected to external speaker jack on all models.

Remove the radio chassis from the case. Connect the output of the oscillator to the grid cap of the 78 detector (2nd tube in set) or 6A7 tube after removing the grid clip and adjust the oscillator to 175 kilocycles. Set the output of the oscillator to the lowest amount giving a readable deflection of the output meter. Adjust with a Bakelite screwdriver the first and second I. F. transformer for maximum output. Replace the grid clip, connect the output of the oscillator to the antenna terminal of the radio set through a .0001 mfd mica condenser and set the oscillator to 1530 kilocycles. Rotate the variable condenser fully out of mesh, then back until the rotor plates begin to enter the stator. Adjust the oscillator padder, which is the section opposite shaft end, until the maximum signal is attained. Then readjust the oscillator input to 1400 kilocycles, rotate the variable condenser until the signal is again tuned in.

Now adjust the antenna (shaft end) and R. F. (middle) padders until the output is again at maximum.

Then adjust the oscillator series padder condenser (located by the 6B7 tube in the Model 15; on the left-hand side in the Model 25; in the top of the oscillator coil can in the compartment with the 37 tube in the Models 35 and 45) until a maximum deflection is obtained at 550 to 600 kilocycles (condenser plates almost in full mesh). At 600 kilocycles the adjustment of the series padder condenser are both variable; each dependent on the other. However, there is only one point where the relation between their settings will give maximum sensitivity.

NOTE: After installation to car antenna slight readjustment of antenna padders, through holes provided on all models (see installation notes) will improve sensitivity and performance. Always adjust at about ten to twenty dial setting.

SPECIAL SERVICE BULLETIN

for Models 35 and 45

Motor Noise Elimination

The Model 35 and 45 Arvin Car Radios have been especially designed for ease of elimination of motor noise.

The Chassis case is well shielded to prevent chassis pick-up and a special motor noise suppression system has been built into the set to block out "feed-back" through the "A" line. With these two sources of entry of motor noise blocked any such interference present must be picked up by the antenna and carried into the set exactly as a station signal. This type of motor noise is the easiest to eliminate and can usually be suppressed by standard suppression.

In rare cases, however, where a car is exceptionally "hot" it has been found that a slight amount of "chassis-pick-up" is present in the Model 35 and 45 Arvin sets—and the purpose of this bulletin is to suggest a method of eliminating this.

Solder one end of a 3½" length of shielding to the underneath side of the condenser pulley mounting bracket directly between the two 6-32 screws which hold the Bowden wire housing clamp onto this bracket.

The other end of this piece of shielding is then hung over the edge of the chassis case on top of the copper case ground shim, and when the cover is put on the set, it automatically bonds the condenser pulley assembly to the outer case.

It has been found that this extra ground eliminates the last trace of "chassis-pick-up" motor noise interference from the Model 35 and 45 Arvin Car Radios.

PHILCO RADIO & TELEV. CORP.

MODEL FT-6
Schematic
Chassis View
Parts List

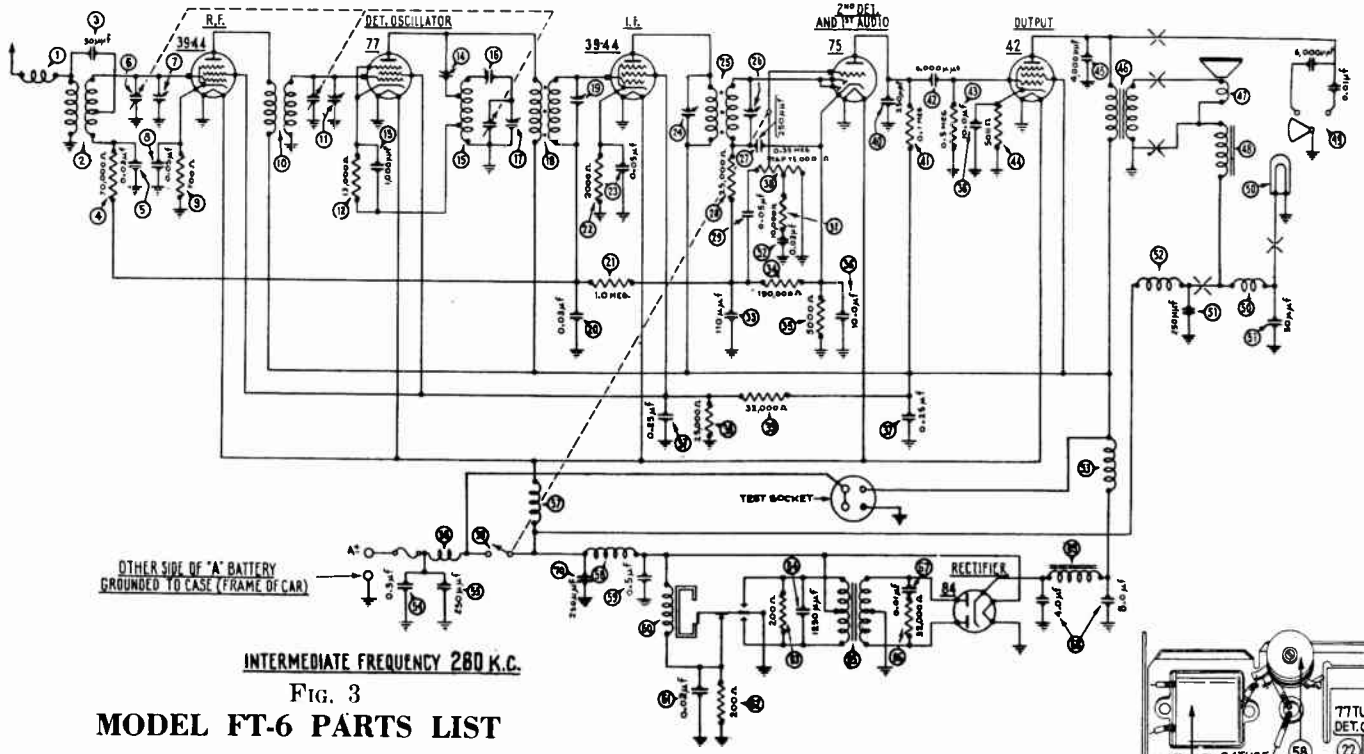


FIG. 3

4 prong Socket	27-6006
5-prong Socket	27-6014
6-prong Socket	27-6020
Spark Plug Resistor	33-1015
Spark Plug Terminal	28-6179
Interference Cond. (Gen.)	30-4181
Interference Cond. (Dist.)	30-4176
Face Assembly	42-5302
Glass for Control	27-7757
Knobs	27-4171
Pointer	28-2605
Flexible Shaft (Tuning)	28-8331
Flexible Shaft (Volume)	28-8332
Ammeter Cable	38-5749
Fuse	7227
Fuse Insulator	27-7131
Antenna Lead	L1741
"T" Bolt (set mounting)	28-8161
Nut (set mounting)	W518A
Speaker Cable	41-3125
Tow Strap	36-3432
"U" Clamp Control Mtg.	29-2699

MODEL FT-6 PARTS LIST

No. Shown on Schematic	Description	Part No.
(1)	Antenna Choke	32-1372
(2)	Antenna Transformer	32-1535
(3)	Condenser (50 mmfd.)	30-1029
(4)	Resistor (70,000 ohms)	33-1115
(5)	Condenser (.03 mfd.)	30-4025
(6)	Tuning Condenser	31-1459
(7)	1st Padder (on tun. cond.)	
(8)	Condenser (.05 mfd.)	30-4020
(9)	Resistor (700 ohms)	6443
(10)	R. F. Transformer	32-1536
(11)	2nd Padder (on tun. cond.)	
(12)	Resistor (11,000 ohms)	33-1194
(13)	Condenser (1000 mmfd.)	30-1007
(14)	Padder (Pri. 1st I. F. Trans.)	
(15)	Oscillator Transformer	32-1537
(16)	3rd Padder (on tun. cond.)	
(17)	4th Padder (on tun. cond.)	
(18)	First I. F. Transformer	32-1329
(19)	Padder (Sec. 1st I. F. Trans.)	
(20)	Condenser (.03 mfd.)	30-4025
(21)	Resistor (1.0 meg.)	33-1096
(22)	Resistor (2000 ohms)	33-3048
(23)	Condenser (.05 mfd.)	30-4020
(24)	Padder (Pri. 2nd I. F. Trans.)	
(25)	Second I. F. Transformer	32-1237
(26)	Padder (Sec. 2nd I. F. Trans.)	
(27)	Condenser (250 mmfd.)	30-1032
(28)	Resistor (25,000 ohms)	33-1013
(29)	Condenser (.05 mfd.)	30-4020
(30)	Vol. Con. & Switch Assm.	33-5067
(31)	Resistor (10,000 ohms)	33-1000
(32)	Condenser (.03 mfd.)	30-4025
(33)	Condenser (110 mmfd.)	30-1031
(34)	Resistor (190,000 ohms)	33-1116
(35)	Resistor (5000 ohms)	5096
(36)	Condenser (10-10 mfd.)	30-2076
(37)	Condenser (.25-.25 mfd.)	30-4126
(38)	Resistor (25,000 ohms)	3656
(39)	Resistor (32,000 ohms)	3525
(40)	Condenser (250 mmfd.)	30-1032
(41)	Resistor (.1 meg.)	6099
(42)	Condenser (6000 mmfd.)	30-4125
(43)	Resistor (.5 meg.)	6097
(44)	Resistor (500 ohms)	33-3031
(45)	Condenser (4000 mmfd.)	30-4185
(46)	Output Transformer	32-7347
(47)	Cone and Voice Coil	02861
(48)	Field Coil Assembly	36-3097
(49)	Tone Control	30-4243
(50)	Pilot Lamp	34-2039
(51)	Condenser (250 mmfd.)	30-1032
(52)	Choke	32-1374
(53)	R. F. Choke	32-1078
(54)	Condenser (.5 mfd.)	30-4018
(55)	Condenser (250 mmfd.)	30-1032
(56)	"A" Choke	32-1374
(57)	"A" Choke	32-1368
(58)	Vibrator Choke	32-1367
(59)	Condenser (.5 mfd.)	30-4227
(60)	Vibrator	38-5036
(61)	Condenser (.02 mfd.)	30-4039
(62)	Resistor (200 ohms)	7217
(63)	Resistor (200 ohms)	7217
(64)	Condenser (1250 mmfd.)	5886
(65)	Power Transformer	32-7232
(66)	Resistor (32,000 ohms)	3525
(67)	Condenser (.01 mfd.)	30-4051
(68)	Filter Condenser (4-8 mfd.)	30-2030
(69)	"B" Choke	32-7233
(70)	Condenser (110 mmfd.)	30-1031

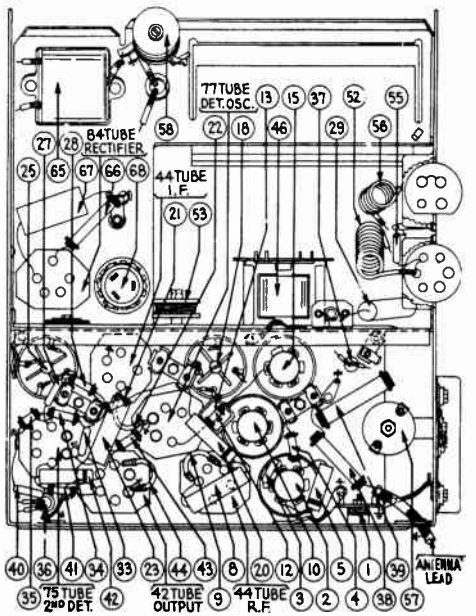


FIG. 4

JANUARY, 1935

MODEL FT-6
Alignment
Socket, Trimmers

PHILCO RADIO & TELEV. CORP.

MODEL FT-6 RECEIVER

THE new Ford auto radio incorporates new advanced principles of circuit and tube design. A totally new idea in sound distribution and musical fidelity is built into a dynamic speaker located above the occupants' heads in the header-bar of the car. Other features of the set are two-unit construction with separate speaker, highly developed Automatic Volume Control, illuminated custom-built instrument panel control, mounting in the ash receptacle opening.

The Receiver is mounted directly above the steering column out of sight and out of the way.

I. F. TRANSFORMER AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

1st I. F. Transformer 32-1329 — 2nd I. F. Transformer 32-1237

FIG. 1

MODEL FT-6 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 77 tube. (For location see Fig. 2.)

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 77 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 42 tube and the other lead to the receiver housing. The Receiver volume control must be turned to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The primary screw padders ㉔ and ⑭ must be screwed all the way in. (Figs. 2 and 3.) The secondary nut padders ㉖ and ⑯ must then be adjusted. These padders should be adjusted for maximum reading on the output meter.

The screw padders ㉔ and ⑭ must be adjusted next.

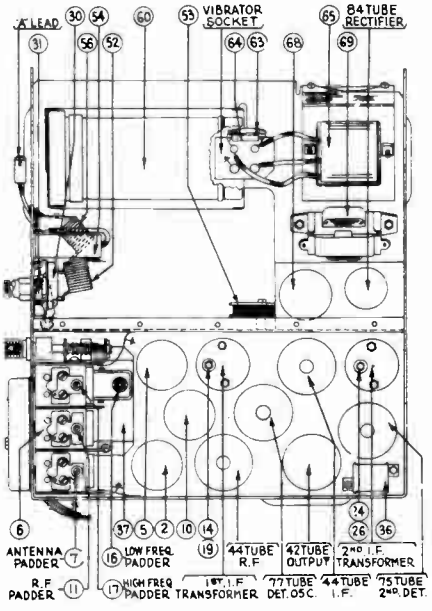


FIG. 2

Adjust the screw on each padder for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable. Turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

After padding the I. F. stages, remove the generator lead from the 77 tube and reconnect the grid clip to the 77 tube. Adjust the generator to 1580 K.C. and then connect the generator lead to the antenna lead. Ground the shield to the receiver housing.

Using a piece of paper approximately .006 inch in thickness, place it under the heel of the tuning condenser between the stator and rotor plates and turn the tuning condenser until the rotor plates strike this paper.

With the tuning condenser in this position, adjust the high-frequency padder ⑰ until the maximum reading is obtained in the output meter. This is the true setting for 1580 K.C., 158 on the dial scale. Adjust condensers ⑪ and ⑦ in the same manner.

Remove the paper and turn the tuning condenser plates in mesh to approximately 60 on the scale, and adjust the signal generator to 600 K.C. Roll the tuning condenser and adjust the series padder ⑲ for the maximum meter reading.

Readjust the padder ⑰ at 1580 K.C.

Tune the gang to 1400 K.C. and adjust padders ⑪ and ⑦ to maximum.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the receiver will be adjusted properly.

MODEL G,G(Code 122)
PHILCO RADIO & TELEV. CORP. Chrysler Models CA & CB
Dodge Models DR & DS
Plymouth Models PE & PF
Installation Data

CHRYSLER • DODGE • PLYMOUTH • CAR RADIO

The Model "CGD" is a custom built radio which is made exclusively for the Chrysler Corporation and its various car divisions and which is sold only through their dealer organizations.

The Receiver and controls are specially designed for installation in the 1934 Chrysler Six Models CA and CB, the Dodge Models DR and DS and the Plymouth Models PE and PF. Many of these cars will be equipped at the car factory with the Philco custom built radio. In many others, the installation will be made by you in your service stations.

Don't file this "Service Broadcast" in your Office. The men in your service station must know how to install and service these radios if you expect to get your share of this profitable installation and service work.

Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and compare them with illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

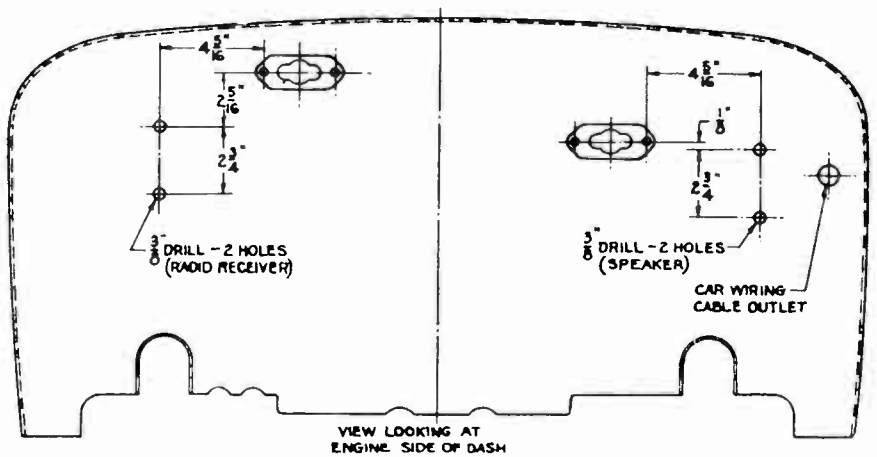


FIGURE 1

Receiver and Speaker Installation

Refer to Figure 1, which gives detailed dimensions for the location and drilling of the holes in the dash. Remove the paint from the dash for 3/4" from around the holes to insure good ground contact after drilling. All dimensions are shown from the engine side of the dash. After drilling the holes, bolt the two (2) mounting brackets to the inside of the dash, using both the flat and the lockwashers under the nuts. The left-hand bracket (over the steering column) is for the speaker unit; the right-hand bracket is for the Receiver.

Remove the car wiring cable outlet grommet cap on the left-hand side of the dash, so that the battery cable can be installed. Push the metal fuse housing end of the cable through the grommet from the engine side, leaving just enough slack so that the cable can be connected and fastened in place as shown in Figure 4. Route the cable through the clip that holds the car wiring harness and along under the floor boards to the battery. Replace the grommet and cap, but do not connect the cable terminal to the battery terminal at this time.

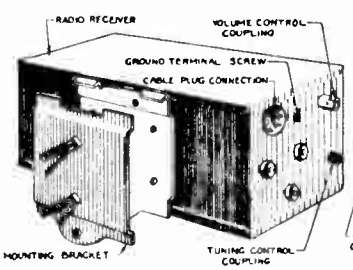


FIGURE 2

The Receiver mounting plate must be fastened to the Receiver housing, using the four (4) self-tapping screws. Four (4) holes are provided for these screws in the side of the housing. To fasten the speaker mounting plate to the speaker, first remove the four (4) hex-head machine screws from the back of the speaker. Use these same four (4) screws to fasten the mounting plate to the back of the speaker. Figures 2 and 3 show the correct positions of the brackets and mounting plates. Hang the Receiver on its bracket and fasten it securely with the hex-head retaining screw at the bottom of the plate.

Before installing the speaker, remove the car wiring fuse on ammeter. To get the speaker in place turn it sideways with the back against the left front kick pad. Then slide it in between the kick pad and the steering column. Push the clutch pedal down to get sufficient clearance and then turn the speaker around over the steering column with its back against the dash. Hang the speaker in place on its bracket and fasten it securely with the hex head retaining screw at the bottom of the plate. The battery cable must be placed over top of speaker.

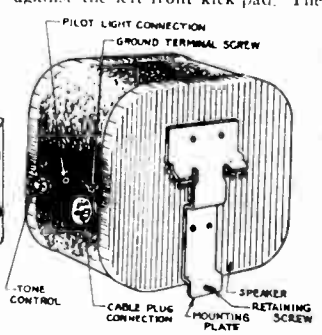


FIGURE 3

Connect the interconnecting cable to both the Receiver and the Speaker, the six (6) hole plug connecting to the Receiver and the four (4) hole plug to the Speaker. The shield terminals at the cable ends must be grounded under their respective ground terminal screws on the Receiver and Speaker housings, shown in Figures 2 and 3. Ground the pigtail in the center of the cable to the dash, using the hole that holds the dash lining retainer and the 8-32 screw.

The antenna lead branches out of the interconnecting cable near the Receiver. Place this lead over the top of the Receiver, splice, and tape it to the antenna lead-in as close as possible to where the lead-in leaves the front right windshield pillar. Cut off excess car

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lead-in. The shielding must be grounded to the cowl panel by drilling a ⅛" hole where the hood overlaps and as close to the A pillar as possible, using the 8-32 bolt and nut supplied for this purpose. (See Figures 4 and 5.) Remove paint from around hole.

Place the fuse and fuse insulator in the metal fuse housing of the battery cable and connect it to the small fuse connector which branches out of the interconnecting cable close to the Speaker. The two (2) shield terminals at the fuse housing must be connected under the same terminal screw that is used to ground the speaker cable shield at the speaker. Figure 4 shows the general lay-out of the cables and connections.

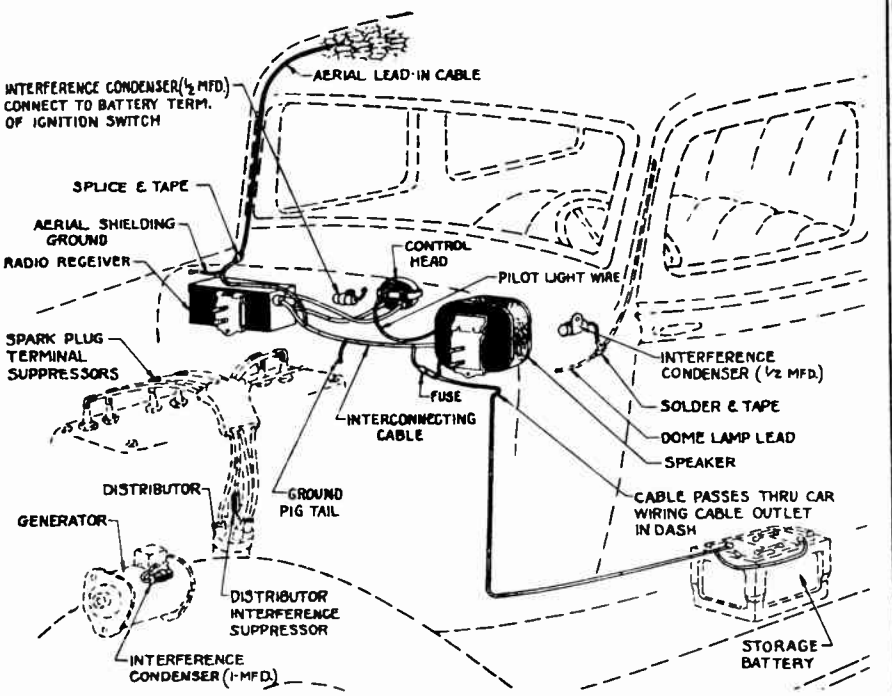

FIGURE 4

Instrument Panel Control

Remove the ash receiver from the panel with an upward pull. Remove the ash receiver bezel from the panel by compressing the retaining tabs at the bottom of the bezel assembly. This can be done best by using a screw-driver and working from in back of the instrument panel. While pushing up on an end tab, pull the bezel forward and it will come out.

Loosen the two (2) screws which secure the instrument board brace to the instrument board flange. The cradle assembly can then be slid forward. Next, loosen the bolts on the brace in back of the instrument panel and remove the toggle spring. Slide the entire assembly forward and remove. Figure 6 gives the details of the ash receiver assembly, while Figure 7 gives an enlarged view of the Section A in Figure 6. Be sure to tighten all bolts and screws that were loosened for this operation. (See Note 1.)

Loosen the car lighting switch to permit more working space. While this operation is not absolutely necessary, it makes the following operation easier.

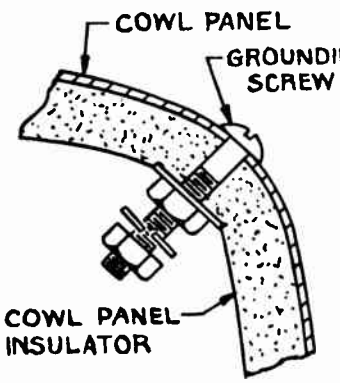

FIGURE 5

Push the flexible shafts of the control through the opening in the panel and install the control unit in this opening.

The "U" retaining clamp must be placed over the studs on the back of the control and the hex-nuts tightened to draw the control bezel flush with the instrument panel. (See Figure 8.) Replace and tighten the car lighting switch.

The flexible shafts must be placed around to the Receiver. The ends of the two (2) shafts are different so that they can only be installed in the proper couplings. The long shaft and housing is on the left of the control unit, while the short one is on the right.

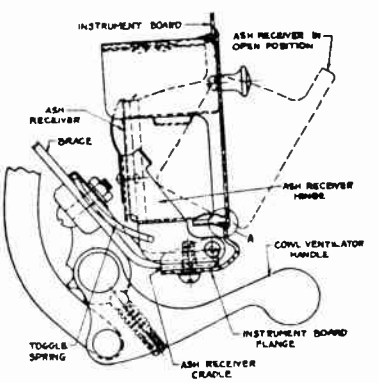

FIGURE 6

The set screws on the coupling bushings must be loosened sufficiently to allow the shaft housings and couplings to be properly seated. After the shafts have been coupled, tighten the set screws again.

Battery Connections

Connect the battery lead to the negative terminal of the storage battery. Be sure this connection is tight. The shield terminal must be connected to positive or ground terminal of the storage battery.

The black lead from the control unit must be connected to the pilot light terminal on the Speaker. (See Figure 3.)

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers.) Pull the knob from the right-hand control shaft and loosen the set screw found there. (See Figure 8.) Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob.

Motor Interference Suppression

Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay.

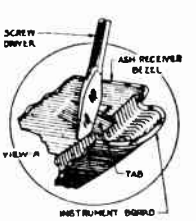

FIGURE 7

NOTE 1.—A hole large enough for the dash control has been provided in the center of the instrument panel in all standard Plymouth Model, Code PF. This hole is covered with a special Plymouth plate which can be removed easily by forcing it out from the rear with the fingers or with a screw-driver.

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(see Figure 4). Install a ½ microfarad by-pass condenser, splicing and soldering it to the dome light lead as close as possible to the point where it enters the windshield pillar. The condenser must be fastened to the cowl panel in front of the hood line by drilling a ⅛" hole where the hood overlaps and as close to the pillar as possible, using the 8-32 bolt and nut supplied for this purpose. (See Figures 4 and 5.) Remove paint from around hole. Replace the car lighting fuse—test the lights and horn.

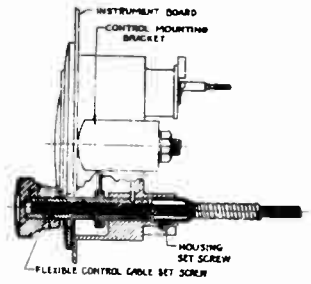

FIGURE 8

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed. Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinists' hammer. Replace the rotor and the cap, then turn the engine over by hand. After a couple of revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

In some stubborn cases, it may be necessary to solder a bond to the control wires and tubes where they enter the dash, grounding them securely under one of the dash grommet cap screws. No. 14 stranded and tinned copper wire can be used for this purpose, a length of which is provided (see Figure 9). Be sure that all the high tension wires are properly seated in their sockets in the distributor cap.

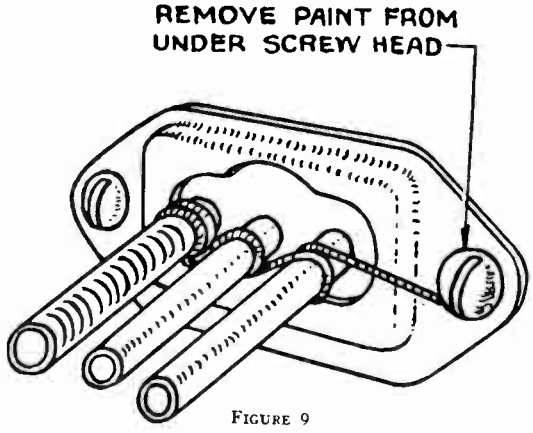

FIGURE 9

An additional ½ microfarad condenser may at times be used to advantage. This condenser should be mounted on the bottom edge of the instrument board and connected to one of the terminals on the ignition switch directly behind the instrument panel.

I. F. Transformer and Padders

The new style I. F. transformer complete with padders is used in the Model G.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figures 10 and 11.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 1.

If replacements are ever necessary, replace [illegible] the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

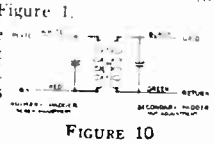
FIGURE 10

Model G Adjustments

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the lid from the Receiver. Remove the grid cap from the 6A7 tube (for location see Figure 11).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Figure 11.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

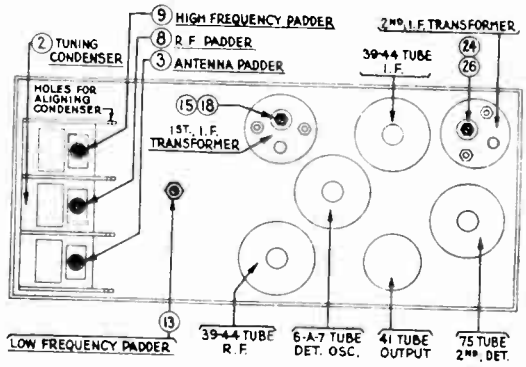

FIGURE 11

The padders (24) and (26) are adjusted first (Figures 11 and 12). Turn the adjusting screw (24) all the way in. A metal screw-driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (26) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (24) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers (18) and (19).

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Figure 11.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (9) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (8) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (13) for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

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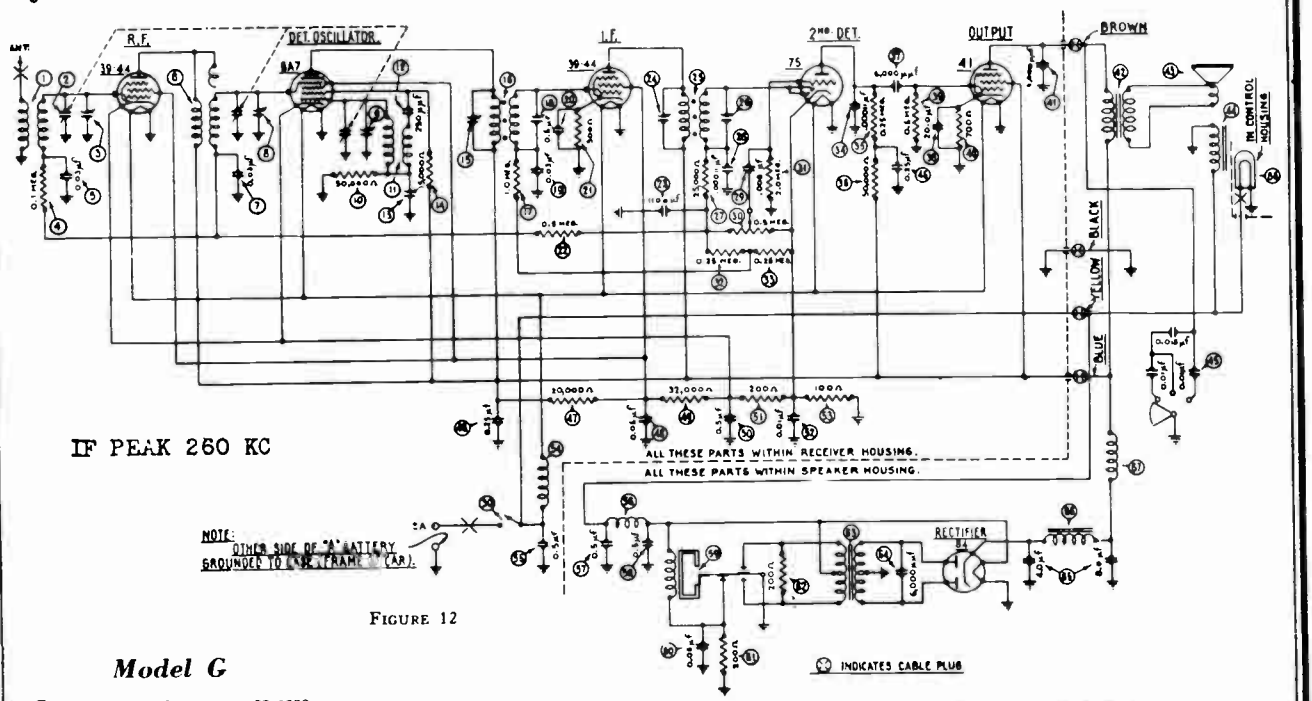


FIGURE 12

Model G

(1)	Antenna Transformer	32-1220
(2)	Tuning Condenser	31-1182
(3)	1st Padder (on tuning cond.)	
(4)	Resistor (99,000 ohms)	6099
(5)	Condenser (.03 mfd.)	30-4025
(6)	R. F. Transformer	32-1221
(7)	Condenser (.03 mfd.)	30-4025
(8)	2nd Padder (on tuning cond.)	
(9)	3rd Padder (on tuning cond.)	
(10)	Resistor (51,000 ohms)	6098
(11)	Oscillator Transformer	32-1222
(12)	Condenser (.00025 mfd.)	3082
(13)	Padder	31-6012
(14)	Resistor (15,000 ohms)	6208
(15)	Padder (Prim. 1st I. F.) part of 32-1236 assembly	
(16)	I. F. Transformer (1st)	32-1236
(17)	Resistor (1,000,000 ohms)	33-1096
(18)	Padder (Secondary 1st I. F.) part of 32-1236 assembly	
(19)	Condenser (.03 mfd.)	30-4025
(20)	Condenser (.5 mfd.)	30-4018
(21)	Resistor (500 ohms)	6977
(22)	Resistor (500,000 ohms)	6097
(23)	Condenser (.00011 mfd.)	30-1006
(24)	Padder (Prim. 2nd I. F.) part of 32-1237 assembly	
(25)	I. F. Transformer (2nd)	32-1237
(26)	Padder (Secondary 2nd I. F.) part of 32-1237 assembly	
(27)	Resistor (25,000 ohms)	33-1013
(28)	Condenser (.00011 mfd.)	30-1006
(29)	Condenser (.006 mfd.)	30-4125
(30)	Volume Control Assembly	34-5056
(31)	Resistor (2,000,000 ohms)	33-1025
(32)	Resistor (250,000 ohms)	33-1097
(33)	Resistor (250,000 ohms)	33-1097
(34)	Condenser (.00011 mfd.)	30-1006
(35)	Resistor (250,000 ohms)	33-1097
(36)	Resistor (51,000 ohms)	6098
(37)	Condenser (.006 mfd.)	30-4123
(38)	Condenser (.20 mfd.	30-2063
(39)	Resistor (500,000 ohms)	6097
(40)	Resistor (700 ohms)	6443
(41)	Condenser (.006 mfd.)	30-4024
(42)	Output Transformer	2598
(43)	Cone and Voice Coil	36-3159
(44)	Field Coil Assembly	36-3140
(45)	Tone Control	30-4127
(46)	Condenser (.25, .25 mfd.)	30-4126
(47)	Resistor (20,000 ohms)	5649
(48)	Condenser (.05 mfd.)	30-4020
(49)	Resistor (32,000 ohms)	3525

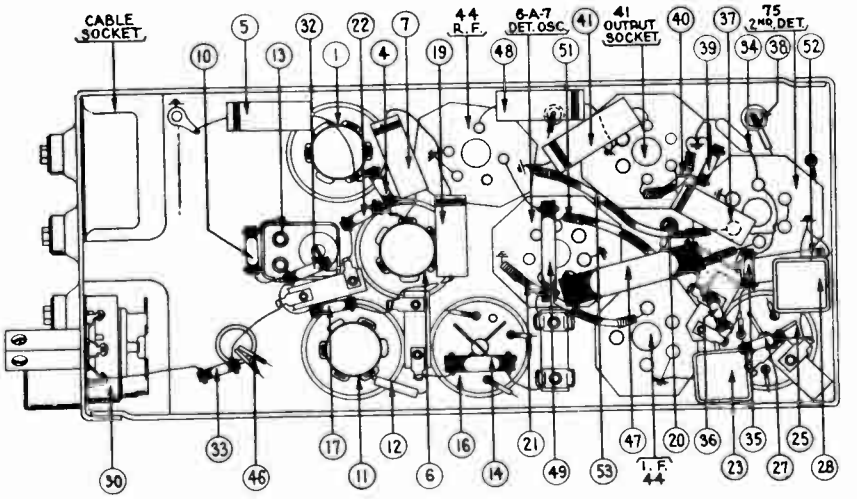


FIGURE 13

(50)	Condenser (.5 mfd.)	30-4018
(51)	Resistor (200 ohms)	7217
(52)	Condenser (.01 mfd.)	30-4124
(53)	Resistor (100 ohms)	33-3023
(54)	"A" Choke	32-1312
(55)	Condenser (.5 mfd.)	30-4015
(56)	Vibrator Choke	32-1260
(57)	Condenser (.5 mfd.)	30-4015
(58)	Condenser (.5 mfd.)	30-4015
(59)	Vibrator Unit	38-5036
(60)	Condenser (.05 mfd.)	30-4039
(61)	Resistor (200 ohms)	7217
(62)	Resistor (200 ohms)	7217
(63)	Power Transformer	32-7110
(64)	Condenser (.006 mfd.)	30-4024
(65)	Filter Condenser (4 mfd., 8 mfd.)	30-2030
(66)	"B" Chokes	32-7118
(67)	R. F. Choke	32-1260

(68)	Pilot Lamp	34-2031
	Spark Plug Resistor	33-1015
	Distributor Resistor	33-1113
	1 mfd. Condenser	4522-S
	½ mfd. Condenser	30-4007
	Glass for Control	27-7325
	Bezel Assembly	42-5115
	Dial (Plymouth)	42-5123
	Dial (Dodge & Chrysler 6)	42-5122
	Pointer (Dodge)	28-1764
	Pointer (Plymouth)	28-1763
	Pointer (Chrysler 6)	28-1825
	Control Assembly (Plymouth)	42-5113
	Control Assembly (Dodge)	42-5112
	Control Assembly (Chrysler 6)	42-5134
	Knobs (Plym.—tuning)	27-4083
	Knobs (Plym.—volume)	27-4084
	Knobs (Dodge—tuning)	27-4079
	Knobs (Dodge—volume)	27-4080
	Knobs (Chry. 6—tuning)	27-4071
	Knobs (Chry. 6—volume)	27-4072
	Knobs Springs	28-1738
	Interconnecting cable	41-3065
	Battery Cable	41-3073
	Flexible Shaft—tuning	28-8188
	Flexible Shaft—volume	28-8198
	Speaker Mounting Plate	28-1790
	Speaker Mounting Bracket	28-1791
	Receiver Mounting Plate	28-1792
	Receiver Mounting Bracket	28-1848
	Fuse	7227
	Fuse Insulator	27-7131
	"U" Control Bracket	29-1705
	5-Prong Socket	27-6014
	6-Prong Socket	7547
	7-Prong Socket	27-6005

Strip of Copper Braid...9446
Battery Cable.....38-5704
"A" Terminal(Plymouth)L-1626

PHILCO RADIO & TELEV. CORP.

MODEL G (Code 122)

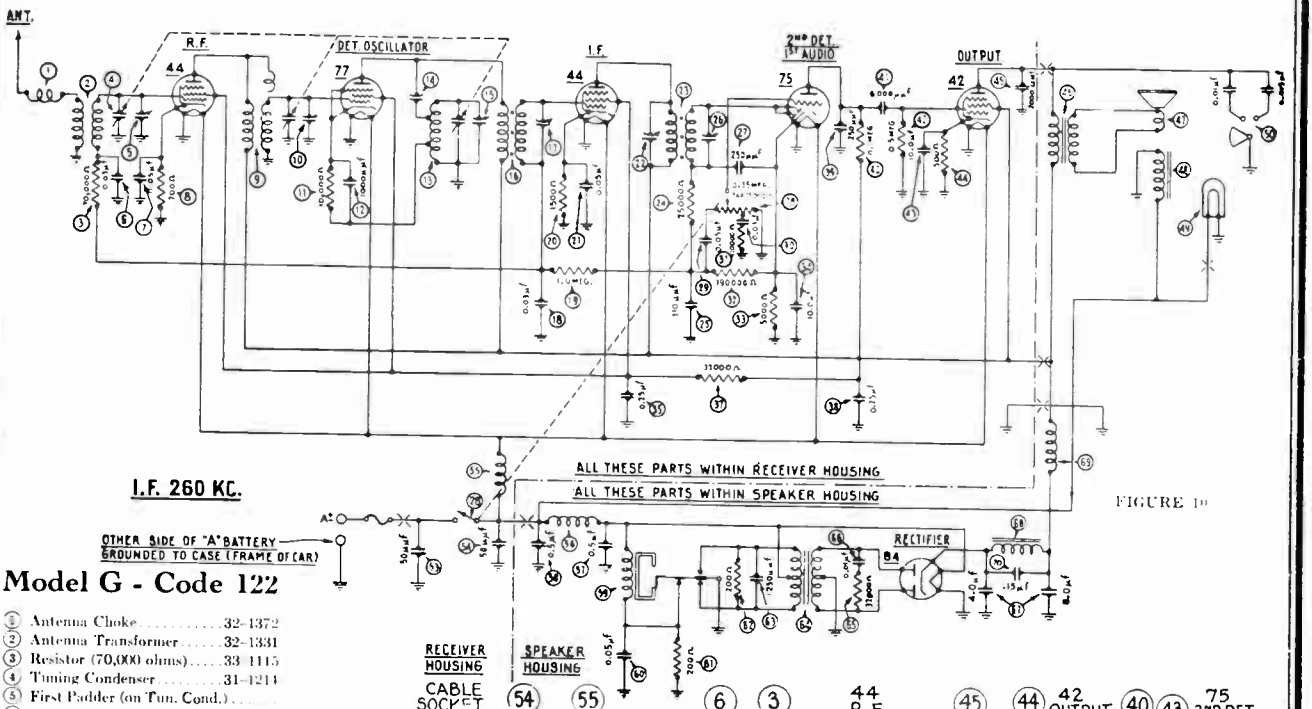


FIGURE 10

Model G - Code 122

1	Antenna Choke	32-1372
2	Antenna Transformer	32-1331
3	Resistor (70,000 ohms)	33-1115
4	Tuning Condenser	31-1214
5	First Padder (on Tun. Cond.)	
6	Condenser (.03 mfd.)	30-4025
7	Condenser (.05 mfd.)	30-4020
8	Resistor (700 ohms)	6443
9	R. F. Transformer	32-1332
10	Second Padder (on Tun. Cond.)	
11	Resistor (10,000 ohms)	33-1000
12	Condenser (1000 mmfd.)	33-1007
13	Oscillator Transformer	32-1333
14	Padder (Pri. 1st I. F. Trans.)	
15	Third Padder (on Tun. Cond.)	
16	First I. F. Transformer	32-1329
17	Padder (Sec. 2nd I. F. Trans.)	
18	Condenser (.03 mfd.)	30-4025
19	Resistor (1,000,000 ohms)	33-1096
20	Resistor (1500 ohms)	33-3047
21	Condenser (.05 mfd.)	30-4020
22	Padder (Pri. 2nd I. F. Trans.)	
23	Second I. F. Transformer	32-1237
24	Resistor (25,000 ohms)	33-1013
25	Condenser (.00011 mfd.)	30-1031
26	Padder (Sec. 2nd I. F. Trans.)	
27	Condenser (.00025 mfd.)	30-1032
28	Volume Control and Switch Assembly	33-5067
29	Condenser (.05 mfd.)	30-4020
30	Condenser (.03 mfd.)	30-4025
31	Resistor (10,000 ohms)	33-1000
32	Resistor (190,000 ohms)	33-1116
33	Resistor (5000 ohms)	6096
34	Condenser (10 mfd.)	30-2076
35	Condenser (.25 mfd.)	30-4126
37	Resistor (32,000 ohms)	3525
39	Condenser (.25 mfd.)	30-4126
39	Condenser (.00025 mfd.)	30-1032
40	Resistor (100,000 ohms)	6099
41	Condenser (.006 mfd.)	30-4125
42	Resistor (500,000 ohms)	6097
43	Condenser (10 mfd.)	30-2076
44	Resistor (500 ohms)	33 3031
45	Condenser (.004 mfd.)	30-4185
46	Output Transformer	32-7042
47	Cone and Voice Coil	36-3157
48	Field Coil Assembly	36-3097
49	Pilot Lamp	34-2031
50	Tone Control	30-4189
53	Condenser (.00005 mfd.)	30-1029
54	Condenser (.00005 mfd.)	30-1029
55	"A" Choke	32-1432
56	Vibrator Choke	32-1260
57	Condenser (.5 mfd.)	30-4047
58	Condenser (.5 mfd.)	30-4015
59	Vibrator	38-5036
60	Condenser (.05 mfd.)	30-4039
61	Resistor (200 ohms)	7217
62	Resistor (200 ohms)	7217
63	Condenser (.00125 mfd.)	5886
64	Power Transformer	32-7253
65	Resistor (3 2,000 ohms)	3525
66	Condenser (.01 mfd.)	30-4051
67	Filter Condenser (4-8 mfd.)	30-2030
68	Filter Choke	32-7254
69	R. F. Choke	32-1260
70	Condenser (.15 mfd.)	30-4191
71	Resistor (25,000 ohms)	3656
	Spark Plug Resistor	33-1015
	Distributor Resistor	33-1113E
	1 mfd. Condenser	45228
	½ mfd. Condenser	30-4007
	Glass for Control	27-7325

DODGE MODEL G-CODE 122
Above items are identical for Dodge Model G-Code 122. See following items for additional accessories:

Dial Assembly	42-5204
Pointer	28-1764
Control Assembly	42-5196
Knobs—Volume	27-4080
Knobs—Tuning	27-4079
Knob Springs	28-1738
Bezel Assembly	42-5115
Interconnecting Cable	41-3065

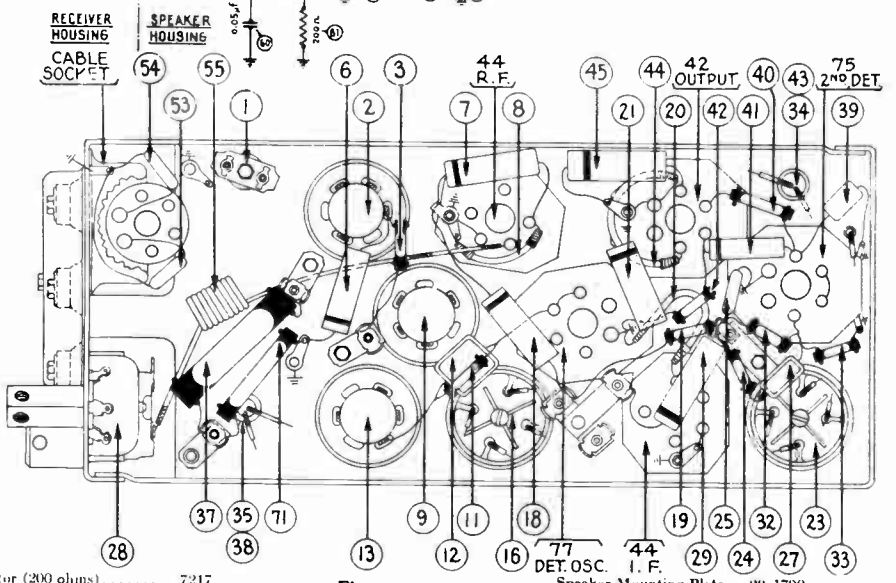


Figure 11

Ammeter Cable	38-5704
Terminal	L-1626
Flexible Shaft—Tuning	28-8188
Flexible Shaft—Volume	28-8198
Speaker Mounting Plate	29-1790
Speaker Mounting Bracket	29-1791
Receiver Mounting Plate	29-1792
Receiver Mounting Bracket	29-1848
Carriage Bolt	W-1316A
Fuse	7227
Fuse Insulator	27-7131

CHRYSLER MODEL G-CODE 122
Items 1 to 71 and next five are identical for Chrysler Model G, Code 122. See following items for additional accessories:

Dial Assembly	42-5204
Pointer	28-1825
Control Assembly	42-5194
Knobs—Volume	27-4072
Knobs—Tuning	27-4071
Knob Springs	28-1738
Bezel Assembly	42-5115
Interconnecting Cable	41-3065
Ammeter Cable	38-5704
Terminal	L-1626
Flexible Shaft—Tuning	28-8188
Flexible Shaft—Volume	28-8198
Speaker Mounting Bracket	29-1791
Speaker Mounting Plate	29-1790
Receiver Mounting Plate	29-1792
Receiver Mounting Bracket	29-1848
Carriage Bolt	W-1316A
Fuse	7227
Fuse Insulator	27-7131

PLYMOUTH MODEL G-CODE 122
Items 1 to 71 and next five are identical for Plymouth Model G-Code 122. See following items for additional accessories:

Dial Assembly	42-5205
Pointer	28-1763
Control Assembly	42-5197
Knobs—Volume	27-4084
Knobs—Tuning	27-4083
Knob Springs	28-1738
Bezel Assembly	42-5115
Interconnecting Cable	41-3065
Ammeter Cable	38-5704
Terminal	L-1626
Flexible Shaft—Tuning	28-8188
Flexible Shaft—Volume	28-8198
Speaker Mounting Plate	29-1790
Speaker Mounting Bracket	29-1791
Receiver Mounting Plate	29-1792
Receiver Mounting Bracket	29-1848
Carriage Bolt	W-1316A
Fuse	7227
Fuse Insulator	27-7131

Note 1. Adjust the High Frequency padders (15) at 1600 K. C.

Note 2. A 25,000 ohm resistor, part number 3656, (71) on the parts list and base view has been added to the receiver. One end is connected to the screen grid lead for the R. F. Osc. and I. F. tubes and the other end is grounded.

PHILCO RADIO & TELEV. CORP.

MODEL G (Code 122)
Chrysler Code CU & CV
Airflow Custom-Built
Installation Data.

Installation Instructions - Chrysler Model - Codes CU and CV

THESE instructions have been carefully prepared for your use in installing the Chrysler Airflow Custom Built Radio by Philco in the 1934 Chrysler Airflow Model — Code CU-CV cars. Read thoroughly, then follow the instructions carefully in every detail.

Speaker Installation

Refer to Figure 1. This gives detailed dimensions for the location and drilling of the holes in the instrument board reinforcing brace on which the speaker will be mounted. Dimensions shown are along the surface of the brace. The speaker mounting brackets must be bolted to the sides of the speaker. To do this, place the speaker on the bench face down with the tone control knob on the right-hand side, attaching the brackets as follows: The smallest angle bracket must be bolted to the side towards you, the longest angle bracket to the left side with the part having the elongated hole directed away from the speaker. The other bracket must be bolted to the right-hand side of the speaker with the part having the elongated hole turned under the speaker. Refer to Figure 2. The speaker should now be mounted in the car, placing it between the right-hand instrument board brace and the emergency brake control, locating the elongated holes in the speaker mounting brackets over the holes previously drilled in the braces. Bolt it securely in place with the three cadmium plated ¼—20 bolts and nuts supplied for this purpose. Be sure to use lockwashers under the nuts. The left, lower corner of the right cowl ventilator fly screen will interfere with the speaker. This may be remedied by bending this corner out of the way with a pair of pliers.

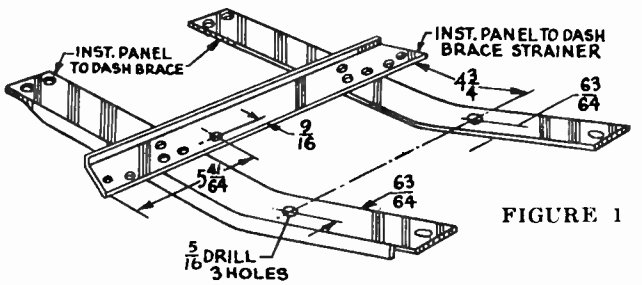


FIGURE 1

Instrument Panel Control

Remove the right hand ash receiver assembly.

Remove the knobs from the control assembly by pulling them off the control head shafts. Then loosen the set screws in front that secure the flexible control shafts in place and the set screws in the rear of the housing that secure the control shaft housings in place. Remove the shaft assemblies from the control head. Install the control head in the instrument panel and fasten securely, using the U-shaped clamp supplied for this purpose, together with the nut and lockwasher. See Figure 3.

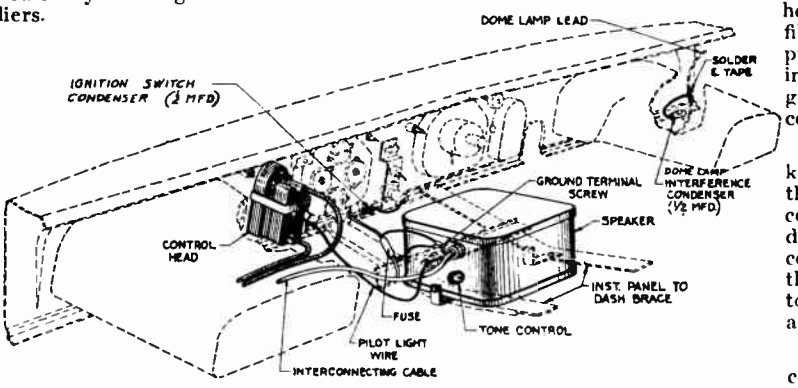


FIGURE 2

Receiver and Cable Installation

Before placing the Receiver in the under-carriage mounting box, the flexible cable housing set screws in the collars must be placed in position so they will be accessible from the top. Wrap the cardboard liner around the Receiver, bending it on the scored lines. Then place the Receiver in the undercarriage box with the shaft coupling collars and plug receptacle in line with their respective holes in the end of the box. The rectangular cardboard liner must be placed between the Receiver and the blank end of the box.

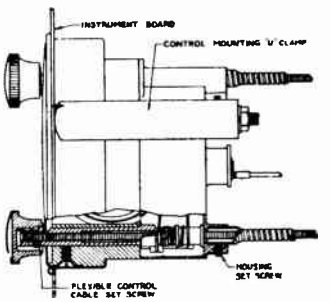


FIGURE 3

Connecting Remote Control Cables to the Receiver

1. Place the grommet caps and rubber grommets on the control shaft housings in the same manner in which they are assembled on the speaker cable. Insert the shafts in their respective couplings on the Receiver and tighten the housing retaining set screws. Secure the grommet caps to the mounting box with the 8-32 screws provided for this purpose. Be sure to use a fibre washer and a lockwasher under the head of each screw.

2. Install the six-hole plug in its receptacle in the Receiver, grounding the eye terminal on the end of the shield pigtail box with 8-32 screws, using a fibre washer and a lockwasher under the head of each screw. (The fibre washers are for the purpose of water-proofing). Then secure the grommet cap to the cable cover plate.

3. Place the rubber gasket around the edge of the box and then put the cover on, forcing it well down on the box, being certain that the ends of the gasket butt together to insure a water-tight assembly.

4. Remove the right cowl quarter-kick-pad. Then run the cables along the body side rail under the floor board and up through the opening in the floor board riser provided for the speedometer cable. See Fig. 4. In bodies where the hole in the toeboard riser is not large enough or obstructed and will not permit the passage of the plug on the speaker end of the cable it will be necessary to remove the floorboard and make a ½" slot in the toeboard riser into the speedometer cable channel to allow the cables to be assembled in place. Do not attempt to remove the plug from the end of the cable. Fasten them in the clips provided in the frame channel adjacent to the speedometer cable. Plug the four hole plug into its receptacle in the speaker. Place the volume control cable (with the red mark)

PHILCO RADIO & TELEV. CORP.

MODEL G (Code 122)
Chrysler Code CU & CV
Airflow Custom-Built
Installation Data, Part 2.
Parts List

INSTALLATION INSTRUCTIONS - CHRYSLER MODEL -

in the top of the control head and the tuning control cable (unpainted) in the bottom. Securely tighten the cable housing retaining set screws in the rear of the control head and then tighten the shaft retaining set screws in the control head shafts. Then replace the cowl quarter kick-pad.

5. Figure 5 shows the method of mounting the radio receiver under the right-hand front seat stool mounting bolt with the 1-¾" x 5/16" bolt provided in the radio package. The front bracket is secured to the floorboard using the bolt removed from where the rear bracket is mounted.

Before tightening the receiver in place, be sure that the cover is flush with the floorboard. If the wood shim that is between the floorboard and the frame mounting bracket interferes, the interfering part may be removed by the use of a wood chisel.

6. See Figure 6. Secure the control and speaker cables by means of the clip provided for this purpose.

7. The antenna lead wire from the roof will be found in the under body side rail and should be connected to the antenna lead branch of the speaker cable, as shown in Figure 5. Make a twisted splice, using plenty of tape to insure a water tight joint, grounding the eye terminal on the end of the antenna lead pigtail to the body side rail.

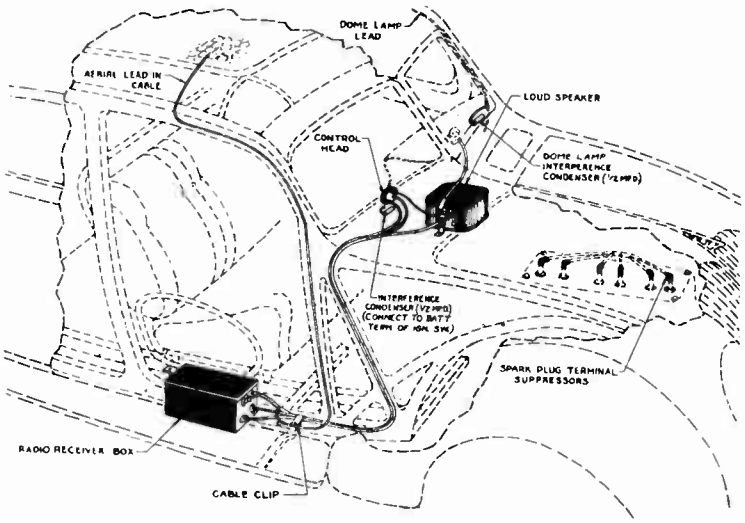


FIGURE 4

Battery Connections

Connect the battery lead to the fuse terminal of the ammeter. Place the fuse and fuse insulator in the metal fuse housing of the battery cable and connect it to the small bayonet fuse connector which branches out of the speaker cable close to the speaker. The three shield terminals must be connected under the grounding screw provided for this purpose near the speaker receptacle.

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which with the addition of a cipher become the frequency numbers). Loosen the set screw on the front of the tuning control shaft without detuning the Receiver. Turn the shaft until the indicator points to the correct number on the dial. Tighten the set screw securely and then replace the knobs on the shafts.

Motor Interference Suppression

Cut the elbow terminals from the spark plug cables and screw on the moulded bakelite elbow suppressors. Connect the suppressors to the spark plugs. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay. (See Figures 7 and 8).

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinist's hammer. Replace the rotor and the cap, then turn the motor over a few times, using the starter only. After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

Occasionally you may find a distributor cap which is out of round or with a short electrode. This condition does not affect the operation of the car, but sometimes makes satisfactory elimination impossible. If such a condition is found, take the defective cap to the nearest United Motors Service Station and exchange it for a new one.

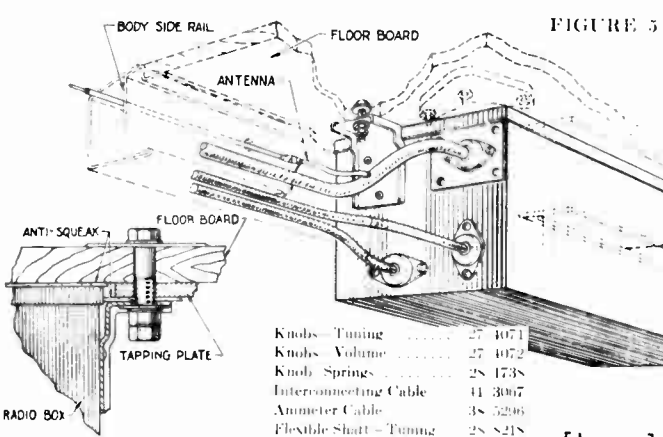


FIGURE 5

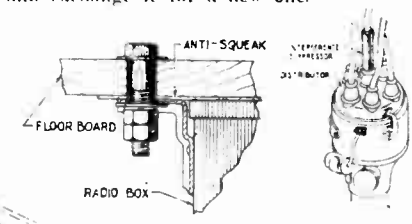


FIGURE 8

FIGURE 7

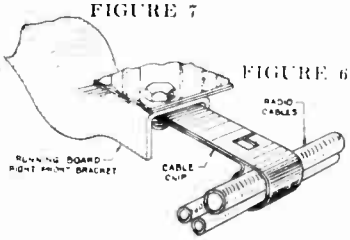


FIGURE 6

Spark Plug Resistor	33-1015	
Distributor Resistor	33 1113E	
½ mfd. Condenser	30-4007	
Front Cover	28 1767	
Dial and Drum Assembly	42-5202	
Control Assembly	42 5193	
Cable Spring	28 8203	
Knobs—Tuning	27 4071	
Knobs—Volume	27 4072	
Knob Springs	28 1738	
Interconnecting Cable	41 3067	
Ammeter Cable	38 5296	
Flexible Shaft—Tuning	28 8218	
Flexible Shaft—Volume	28 8219	
Fuse	7227	
Fuse Insulator	27 7131	
Speaker Mounting Bracket	29 1847	
Speaker Mounting Bracket	29-1846	
Speaker Mounting Bracket	29 1851	
"U" Clamp	29-1808	

Items 1 to 71 of the Parts List shown with the schematic diagram of Model G (Code 122) are identical for Model G (Code 122) Chrysler Code CU and CV. See items at left for additional accessories.

MODEL C (Code 122)
DeSoto Code SE
Airflow Custom-Built

PHILCO RADIO & TELEV. CORP.

Installation Instructions - DeSoto Model - Code SE

THESE INSTRUCTIONS have been carefully prepared for your use in installing the De Soto Airflow Custom-Built Radio by Philco in the 1934 De Soto Airflow Model — Code SE cars. Read thoroughly then follow the instructions carefully in every detail.

Carefully unpack the carton and check the contents with the material packing list. Examine the parts and compare with the illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

Speaker Installation

Refer to Figure 1. This gives detailed dimensions for the location and drilling of the holes in the instrument board reinforcing brace on which the speaker will be mounted. Dimensions shown are along the surface of the brace. The speaker mounting brackets must be bolted to the sides of the speaker. To do this, place the speaker on the bench face down with the tone control knob on the right-hand side, attaching the brackets as follows: The smallest angle bracket must be bolted to the side towards you, the longest angle bracket to the left side with the part having the elongated hole directed

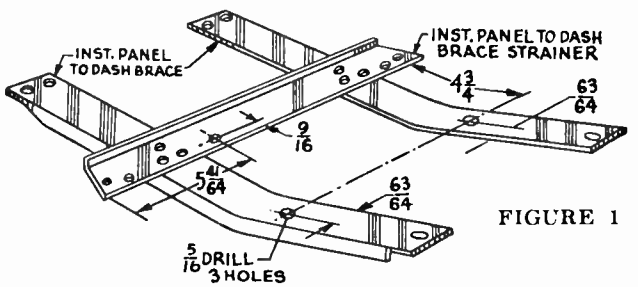


FIGURE 1

away from the speaker. The other bracket must be bolted to the right-hand side of the speaker with the part having the elongated hole turned under the speaker. Refer to Figure 2. The speaker should now be mounted in the car, placing it between the right-hand instrument board brace and the emergency brake control, locating the elongated holes in the speaker mounting brackets over the holes previously drilled in the braces. Bolt it securely in place with the three cadmium plated ¼—20 bolts and nuts supplied for this purpose. Be sure to use lockwashers under the nuts. The left, lower corner of the right cowl ventilator fly screen will interfere with the speaker. This may be remedied by bending this corner out of the way with a pair of pliers.

Instrument Panel Control

Remove the De Soto medallion plate from the center of the instrument panel. To do this, it is necessary to remove the two retaining nuts from the back of the instrument panel.

Remove the knobs from the control assembly by pulling them off the control head shafts. Then loosen the set screws in front that secure the flexible control shafts in place and the set screws in the rear of the housing that secure the control shaft housings in place. Remove the shaft assemblies from the control head. Install the control head in the instrument panel and fasten securely, using the U-shaped clamp supplied for this purpose, together with the nuts and lockwashers. See Figure 3.

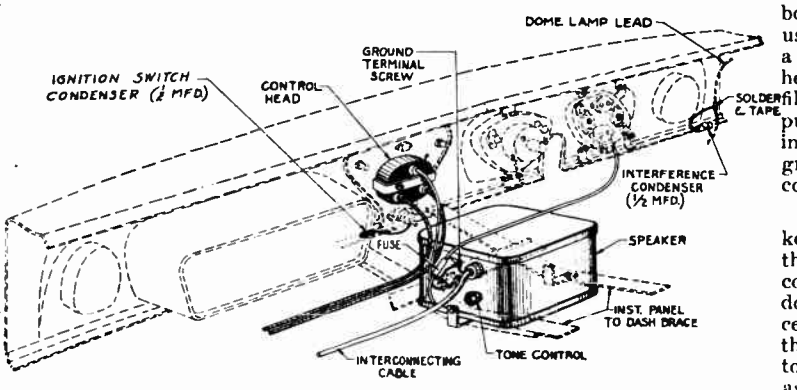


FIGURE 2

Receiver and Cable Installation

Before placing the Receiver in the under-carriage mounting box, the flexible cable housing set screws in the collars must be placed in position so they will be accessible from the top. Wrap the cardboard liner around the Receiver, bending it on the scored lines. Then place the Receiver in the undercarriage box with the shaft coupling collars and plug receptacle in line with their respective holes in the end of the box. The rectangular cardboard liner must be placed between the Receiver and the blank end of the box.

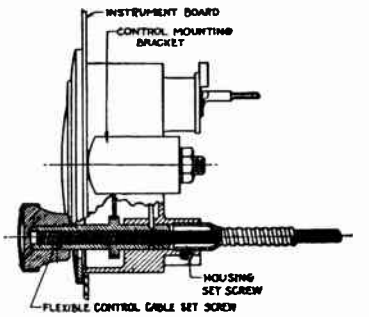


FIGURE 3

Connecting Remote Control Cables to the Receiver

1. Place the grommet caps and rubber grommets on the control shaft housings in the same manner in which they are assembled on the speaker cable. Insert the shafts in their respective couplings on the Receiver and tighten the housing retaining set screws. Secure the grommet caps to the mounting box with the 8-32 screws provided for this purpose. Be sure to use a fibre washer and a lockwasher under the head of each screw.

2. Install the six-hole plug in its receptacle in the Receiver, grounding the eye terminal on the end of the shield pigtail under one of the Receiver cover screws. Secure the cable cover plate to the box with 8-32 screws, using a fibre washer and a lockwasher under the head of each screw. (The fibre washers are for the purpose of water-proofing). Then secure the grommet cap to the cable cover plate.

3. Place the rubber gasket around the edge of the box and then put the cover on, forcing it well down on the box, being certain that the ends of the gasket butt together to insure a water-tight assembly.

4. Remove the right cowl quarter kick-pad. Then run the cables along the body side rail under the floor board and up through the opening in the floor board riser provided for the speedometer cable. See Fig. 4. In bodies where the hole in the toeboard riser is not large enough or obstructed and will not permit the passage of the plug on the speaker end of the cable it will be necessary to remove the floorboard and make a ½" slot in the toehoard riser into the speedometer cable channel to allow the cables to be assembled in place. Do not attempt to remove the plug from the end of the cable. Fasten them in the clips provided

PHILCO RADIO & TELEV. CORP.

MODEL G (Code 122)
DeSoto Code SE
Airflow Custom-Built
Installation Data, Part 2

in the frame channel adjacent to the speedometer cable. Plug the four-hole plug into its receptacle in the speaker. Place the volume control cable (with the red mark) in the left-hand side of the control head and the tuning control cable (unpainted in the right-hand side. Securely tighten the cable housing, retaining set screws in the rear of the control head and then tighten the shaft retaining set screws in the control head shafts. Then replace the cowl quarter kick pad.

5. Figure 5 shows the method of mounting the radio receiver under the right-hand front seat stool mounting bolt with the 1-3/4" x 5/16" bolt provided in the radio package. The front bracket is secured to the floorboard using the bolt removed from where the rear bracket is mounted.

Before tightening the receiver in place, be sure that the cover is flush with the floorboard. If the wood shim that is between the floorboard and the frame mounting bracket interferes, the interfering part may be removed by the use of

6. See Figure 6. Secure the control and speaker cables by means of the clip provided for this purpose.

7. The antenna lead wire from the roof will be found in the under body side rail and should be connected to the antenna lead branch of the speaker cable, as shown in Figure 5. Make a twisted splice, using plenty of tape to insure a water tight joint, grounding the eye terminal on the end of the antenna lead pigtail to the body side rail.

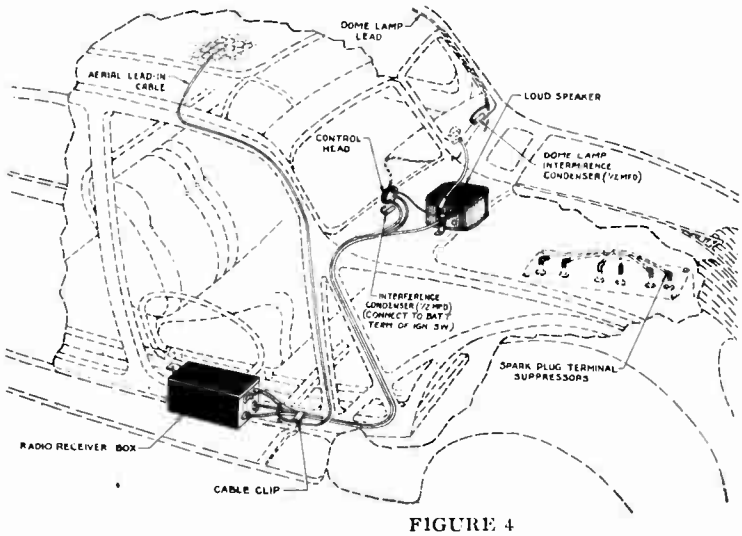


FIGURE 4

Battery Connections

Connect the battery lead to the fuse terminal of the ammeter. Place the fuse and the fuse insulator in the metal fuse housing of the battery cable and connect it to the small bayonet fuse connector which branches out of the speaker cable close to the speaker. The three shield terminals must be connected under the grounding screw provided for this purpose near the speaker receptacle.

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which with the addition of a cipher become the frequency numbers). Loosen the set screw on the front of the tuning control shaft without detuning the Receiver. Turn the shaft until the indicator points to the correct number on the dial. Tighten the set screw securely and then replace the knobs on the shafts.

Motor Interference Suppresston

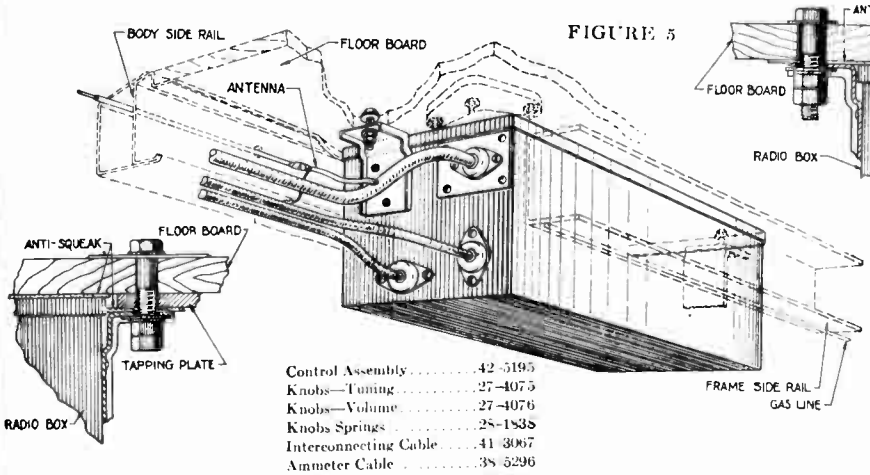
Cut the elbow terminals from the spark plug cables and screw on the moulded bakelite elbow suppressors. Connect the suppressors to the spark plugs. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay. (See Figures 7 and 8).

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinist's hammer. Replace the rotor and the cap, then turn the motor over a few times, using the starter only. After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

Occasionally you may find a distributor cap which is out of round or with a short electrode. This condition does not affect the operation of the car, but sometimes makes satisfactory elimination impossible. If such a condition is found, take the defective cap to the nearest United Motors Service Station and exchange it for a new one.

FIGURE 5



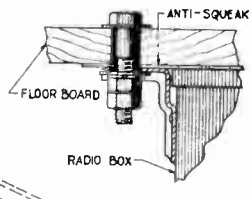


FIGURE 7

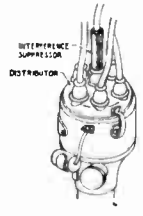
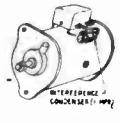


FIGURE 8



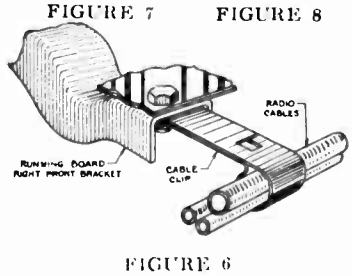
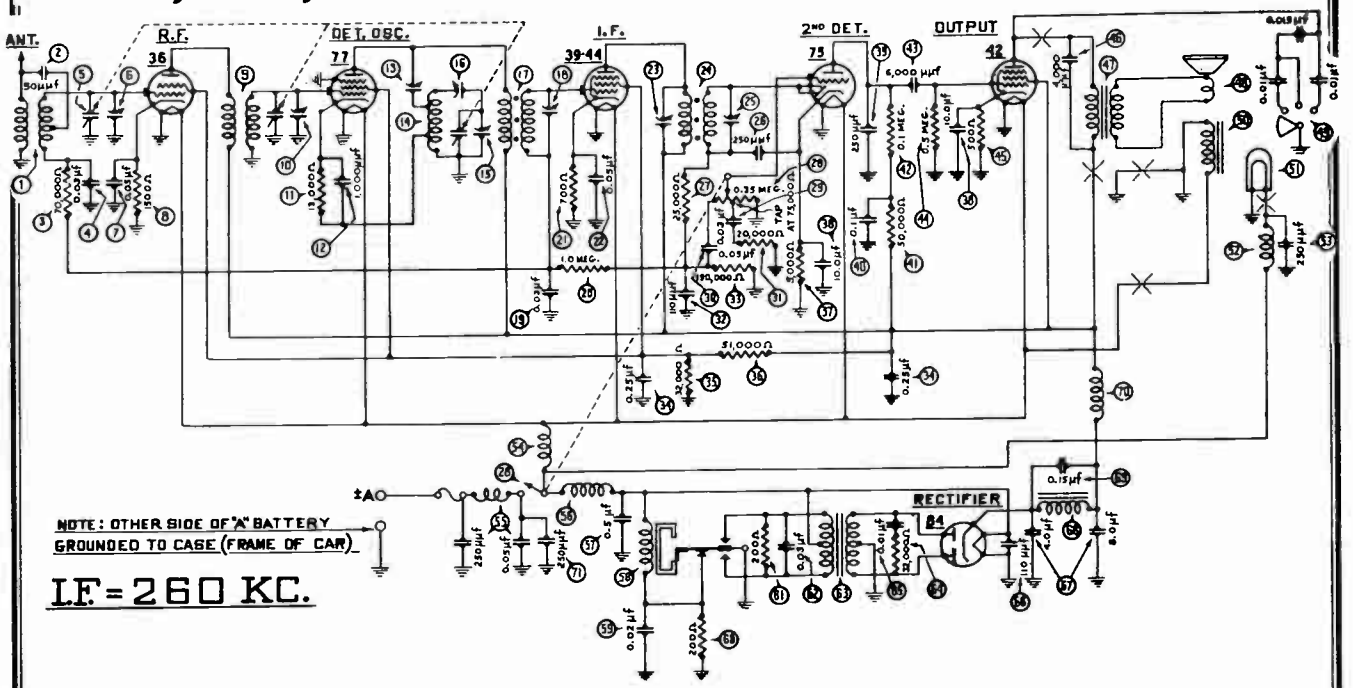


FIGURE 6

Spark Plug Resistor	33-1015
Distributor Resistor	33-1113E
½ mfd. Condenser	30-4007
Glass for Control	27-7325
Bezel Assembly	42-5115
Dial Assembly	42-5200
Pointer	28-2094
Control Assembly	42-5195
Knobs—Tuning	27-4075
Knobs—Volume	27-4076
Knobs Springs	28-1838
Interconnecting Cable	41-3067
Ammeter Cable	38-5296
Flexible Shaft—Tuning	28-8201
Flexible Shaft—Volume	28-8202
Fuse	7227
Fuse Insulator	27-7131
Speaker Mounting Bracket	29-1847
Speaker Mounting Bracket	29-1846
Speaker Mounting Bracket	29-1851
"U" Clamp	29-1705

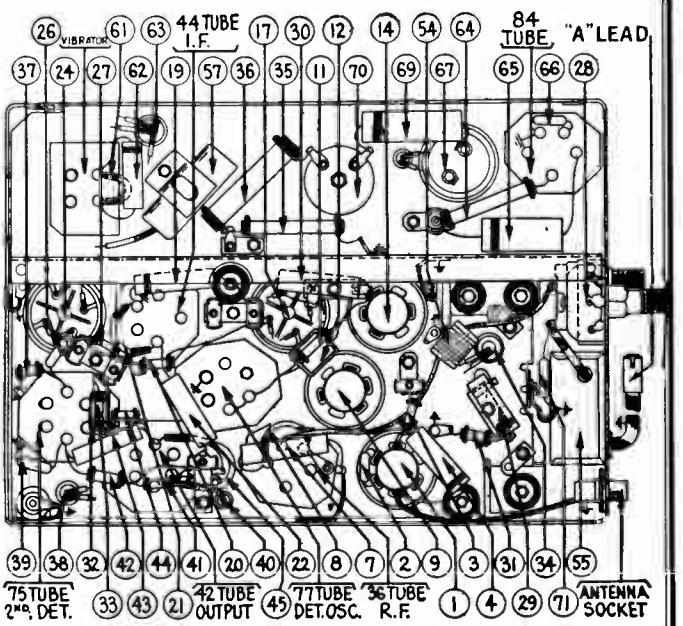
Items 1 to 71 of the Parts List shown with the schematic diagram of Model G (Code 122) are identical for Model G (Code 122) DeSoto Code SE. See items at left for additional accessories.

MODEL CT-2 Chrysler
MODEL CT-5 DeSoto SG, PHILCO RADIO & TELEV. CORP.
Plymouth Code PJ SF
Dodge Code DU
Chrysler Code CZ,C-6
Schematic,Chassis,Parts



Parts List - CT-2 Chrysler De Luxe Custom Built Radio

(1)	Antenna Transformer	32-1535	
(2)	Condenser (50 mmfd.)	30-1029	
(3)	Resistor (70,000 ohms)	33-1115	
(4)	Condenser (.03 mfd.)	30-4025	
(5)	Tuning Condenser	31-1425	
(6)	1st Padder (on tun. cond.)		
(7)	Condenser (.05 mfd.)	30-4020	
(8)	Resistor (1500 ohms)	33-3047	
(9)	R. F. Transformer	32-1536	
(10)	2nd Padder (on tun. cond.)		
(11)	Resistor (11,000 ohms)	33-1194	
(12)	Condenser (1000 mmfd.)	30-1007	
(13)	Padder (Pri. 1st I. F. Tran.)		
(14)	Oscillator Transformer	32-1537	
(15)	3rd Padder (on tun. cond.)		
(15)	4th Padder (on tun. cond.)		
(17)	First I. F. Transformer	32-1538	
(18)	Padder (Sec. 1st I. F. Tran.)		
(19)	Condenser (.03 mfd.)	30-4025	
(20)	Resistor (1 meg.)	33-1096	
(21)	Resistor (700 ohms)	6443	
(22)	Condenser (.05 mfd.)	30-4020	
(23)	Padder (Pri. 2nd I. F. Tran.)		
(24)	Second I. F. Transformer	32-1449	
(25)	Padder (Sec. 2nd I. F. Tran.)		
(26)	Condenser (250 mmfd.)	30-1032	
(27)	Resistor (25,000 ohms)	33-1161	
(28)	Vol. Con. & Switch Assm.	33-5088	
(29)	Condenser (.03 mfd.)	30-4025	
(30)	Condenser (.05 mfd.)	30-4020	
(31)	Resistor (20,000 ohms)	33-1130	
(32)	Condenser (110 mmfd.)	30-1031	
(33)	Resistor (190,000 ohms)	33-1116	
(34)	Condenser (.25-.25 mfd.)	30-4231	
(35)	Resistor (32,000 ohms)	3525	
(36)	Resistor (51,000 ohms)	5868	
(37)	Resistor (5,000 ohms)	6096	
(38)	Condenser (10-10 mfd.)	30-2076	
(39)	Condenser (250 mmfd.)	30-1032	
(40)	Condenser (.1 mfd.)	30-4170	
(41)	Resistor (50,000 ohms)	6098	
(42)	Resistor (.1 meg.)	6099	
(43)	Condenser (6000 mmfd.)	30-4125	
(44)	Resistor (.5 meg.)	6097	
(45)	Resistor (500 ohms)	33-3031	
(46)	Condenser (4000 mmfd.)	30-4185	
(47)	Output Transformer	2598	
(48)	Cone & Voice Coil	36-3159	
*(49)	Tone Control	30-4138	
(50)	Field Coil Assembly	02795	
(51)	Pilot Lamp	34-2036	
(52)	Choke	32-1374	
(53)	Condenser (250 mmfd.)	30-1032	
(54)	"A" Choke	32-1374	
(55)	Interference Filter	32-1534	
(56)	Vibrator Choke	32-1563	
(57)	Condenser (.5 mfd.)	30-4015	
(58)	Vibrator	38-5036	
(59)	Condenser (.02 mfd.)	30-4039	
(60)	Resistor (200 ohms)	7217	
(61)	Resistor (200 ohms)	7217	
(62)	Condenser (.03 mfd.)	30-4025	
(63)	Power Transformer	32-7315	
(64)	Resistor (32,000 ohms)	3525	
(65)	Condenser (.01 mfd.)	30-4051	
(66)	Condenser (110 mmfd.)	30-1031	
(67)	Filter Cond. (4-8 mfd.)	30-2107	
(68)	"B" Choke	32-7254	
(69)	Condenser (.15 mfd.)	30-4191	
(70)	R. F. Choke	32-1530	
(71)	Condenser (250 mmfd.)	30-1032	
	*Ground Clip	28-2488	
	Spark Plug Resistor	33-1015	
	Distributor Resistor	33-1113	
	Interference Cond. (1 mfd.)	4522	
	Interference Cond. (½ mfd.)	30-4007	
	*"T" Bolt (Set Mtg.)	28-6161	
	*Nut (Set Mtg.)	W518	
	Fuse	7227	
	Fuse Insulator	27-7729	
	*Antenna Lead	38-6355	
	*"A" Lead	38-6551	
	*"U" Clamp (Control Mtg.)	29-1705	
	*Nut (Control Mtg.)	W317A	



	Glass	27-7325	
	*Face Assembly (Chrysler)	28-2500	
	*Face Assembly (Plymouth)	28-2498	
	*Face Assembly (Dodge)	28-2496	
	*Face Assembly (DeSoto)	28-2497	
	*Pointer (Chrysler)	28-2503	
	*Pointer (Plymouth)	28-2505	
	*Pointer (Dodge)	28-2506	
	*Pointer (DeSoto)	28-2504	
	*Knob (Chrysler)	27-4163	
	*Knob (Plymouth Economy)	27-4156	
	*Knob (Plymouth DeLuxe)	27-4159	
	*Knob (Dodge)	27-4155	
	*Knob (DeSoto)	27-4153	
	*Flex. Shaft (Tun.) (Dodge)	28-8319	
	*Flex. Shaft (Vol.) (Dodge)	28-8320	
	*Flex. Shaft (Tun.) (Plym., DeSoto, Chrysler)	28-8317	
	*Flex. Shaft (Vol.) (Plym., DeSoto, Chrysler)	28-8318	

INSTALLATION INSTRUCTIONS

Plymouth Model Code PJ — **De Soto Model Code SF**
Dodge Model Code DU
Chrysler Model Code CZ — **Chrysler Model Code C-6**

THESE INSTRUCTIONS have been prepared for your use in installing the DeLuxe Custom-Built Rad Read thru thoroughly, then follow the instructions carefully in every detail when making the installation.

Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and co pare them with illustrations given in these instructions so that you may become familiar with them and thus mal the installation easily and quickly.

This new DeLuxe Custom Built radio mounts on the dash above the steering column.

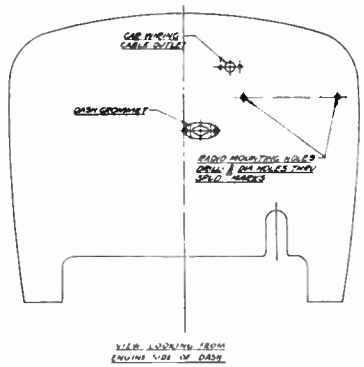


FIGURE 1

Receiver Installation

1. Remove the car lighting fuse from the back of the ammeter.

2. Drill two $\frac{1}{8}$" holes in the dash. Refer to Figure 1 for the location of the center punch marks on the dash. After drilling, remove the paint from the dash for a distance of $\frac{3}{4}$" around the holes to insure good ground contact.

3. The two $\frac{3}{8}$" "T" bolts supplied in the radio package must be placed in these holes in the dash from the inside of the car. Put the washers and nuts on the ends of the bolts, but do not tighten.

4. Pull forward on the knob of the ash receiver to remove it. It is also necessary to take out the ash receiver wind deflector. This can be done after removing the three retaining nuts.

5. The shielded antenna lead supplied in the radio package must be connected to the car antenna lead-in that comes down the front left-hand corner post. The bare ends of the two leads must be twisted together and taped. Make the splice as close as possible to the corner post.

The shield pig-tail of the antenna lead must be grounded to the cowl. To do this, drill a $\frac{1}{8}$" hole in the cowl in front of the hood line. Use an 8-32 bolt and connect the pig-tail eyelet under the nut. (See Figure 4).

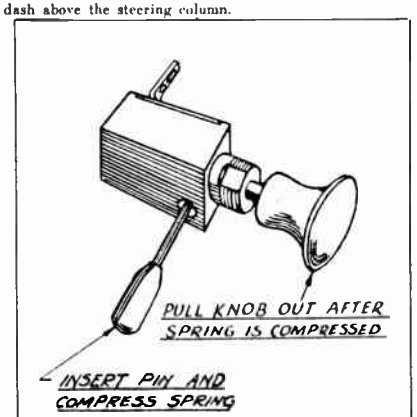


FIGURE 2

For Plymouth Model, Code PJ Only

1. Remove the short auxiliary brace from between the lower part of the instrument board and the brace that supports the cowl ventilator regulator mechanism.

2. Remove the head lamp switch. Pull the control knob out all the way. There is a small hole in the top of the switch, close to the instrument panel. Insert a nail or small screw driver in the hole and press down, at the same time pulling on the knob and thereby freeing the shaft. Remove the switch retaining nut on the front of the instrument panel. The switch can now be moved out of the way. DO NOT disconnect the wires attached to the switch.

6. Before installing the Receiver, place the gear shift lever in "LOW" and pull back the emergency hand brake lever as far as possible. Slide the Receiver into place above the steering column, hook the "T" bolts in the lugs on the side of the Receiver housing and then tighten the "T" bolt nuts on the engine side.

7. Connect the antenna lead in its receptacle on the end of the Receiver housing (See Figure 3)

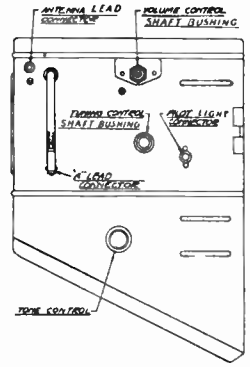


FIGURE 3

Control Installation

1. Install the control unit on the instrument panel, fitting it in the opening left by the removal of the ash receiver.

2. Fasten the control in place by means of the "U" clamp and nuts.

3. The volume control flexible shaft is on the left and must be coupled in the upper shaft bushing on the end of the Receiver housing (See Figure 3). The knurled shaft nut must be tightened securely.

4. Before connecting the tuning condenser flexible shaft, use a small screw driver and turn the variable condenser coupling in the Receiver in a counter-clockwise direction as far as it will go.

5. Turn the right-hand (tuning control) knob so that the pointer indicates "54" on the dial.

6. The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure 3). The knurled shaft nut must be tightened securely.

7. Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 3).

Power Connections

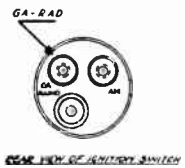


FIGURE 5

1. Connect the terminal end of the "A" lead to the switch terminal GA-RAD. Refer to Figure 5, showing the back of the ignition switch.

2. Place the fuse and fuse insulator in the small metal fuse housing on the end of the "A" lead and connect it to the short Receiver "A" lead (see Figure 3).

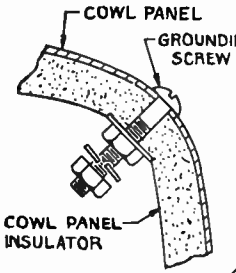


FIGURE 4

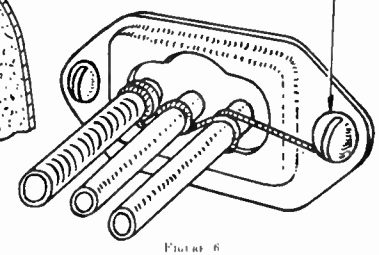


FIGURE 6

For Plymouth Model, Code PJ Only

Replace the auxiliary brace and the headlight switch referred to in the special Plymouth instructions under "Receiver Installation."

Motor Interference Suppression

1. Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals.

2. Screw the straight molded resistor on the end of the distributor center lead cable.

3. Plug this into the distributor cap.

4. Install a one mfd. by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the battery lead to the relay.

5. Connect a $\frac{1}{2}$ mfd. condenser to the dome light lead as close as possible to the point where it enters the right front corner post. This connection must be soldered and taped.

6. Drill a $\frac{1}{4}$" hole in the cowl in front of the hood line close to the corner post. Fasten the dome light condenser to the under side of the cowl using the 8-32 bolt and nut furnished for this purpose.

7. Ground the steering column to the dash. There is a hole in the steering column near the dash opening seal for a No. 8 — $\frac{1}{4}$" self-tapping screw. Scrape the paint off around this hole. Using the bare stranded wire with the two eye terminals, place one terminal under one of the screws that holds the steering column dash seal in place. The other end must be fastened to the steering column with a No. 8 — $\frac{1}{4}$" self-tapping screw.

8. If there is no hole in the steering column near the dash opening seal for a No. 8 - $\frac{1}{4}$" self-tapping screw, scrape the paint from the column near the dash opening seal, solder on a piece of the No. 14 bare stranded wire supplied and ground this wire under one of the screws that holds the steering column dash seal in place.

9. Ground the speedometer cable, oil line and temperature indicator tube where they enter the dash under one of the gromet cap screws with the No. 14 stranded wire provided. (See Figure 6).

10. Replace the car lighting fuse — test the lights and horn.

11. An additional $\frac{1}{2}$ mfd. condenser may at times be used to advantage. Mount this condenser on the bottom ledge of the instrument board and connect it to one of the terminals of the ammeter or ignition switch directly behind the instrument panel.

MODEL CT-5 DeLuxe
DeSoto Airflow Code SG PHILCO RADIO & TELEV. CORP.
Installation Data,

Installation Instructions - DeSoto Airflow Model - Code SG

THESE INSTRUCTIONS have been prepared for your use in installing the DeLuxe Custom-Built Radio. Read through thoroughly, then follow the instructions carefully in every detail when making the installation.

Carefully unpack the cartons and check the contents with the material packing lists so that you may become familiar with all the parts and thereby make the installation easily and quickly.

This new DeLuxe Custom-Built Radio is mounted on a special bracket under the cowl on the left hand side. The speaker is mounted on the "H" shaped instrument board to dash brace.

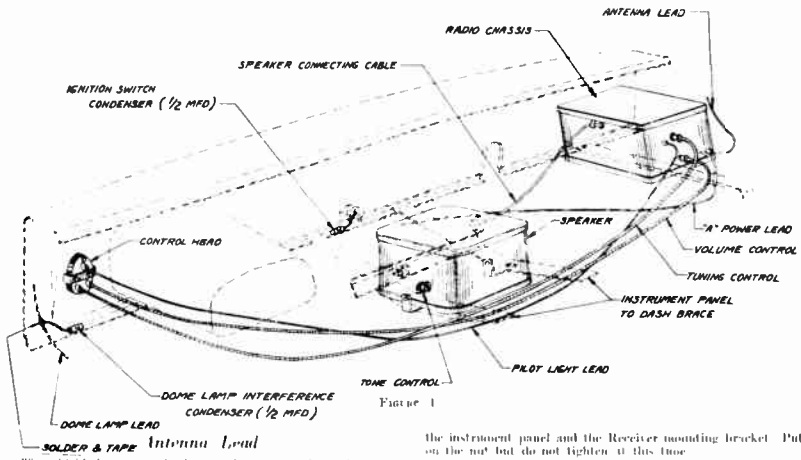


FIGURE 1

Antenna Lead

The shielded antenna lead must be connected to the car antenna lead in that comes down the front left-hand corner post. The bare ends of the two leads must be twisted together and taped. Make the splice as close as possible to the corner post. The shield pig tail of the antenna lead must be grounded.

Receiver Installation

(See Figure 1)

1 Remove the car lighting fuse from the back of the ammeter.

2 Bolt the Receiver fast to the special set mounting bracket so that when installed in the car, the control coupling end of the Receiver faces the dash of the car. The bracket, together with the nuts and lockwashers are provided in the accessory kits.

3 Drill a ¼" hole in the flange of the instrument board 6¾" to the left of the steering column opening in the instrument board.

4 Rest the flat part of the Receiver mounting bracket on the flange of the instrument board over the hole just drilled and place the ⅜" 10-32 bolt through the hole in the flange of the instrument panel and the Receiver mounting bracket. Put on the nut but do not tighten it this time.

5 Raise the Receiver as high as the switch lock to coil cable permits and mark the location for the bolt hole on the dash.

6 Drill a ¼" hole through the dash.

7 Using the 1¾" bolt and nut, fasten the mounting bracket securely to the dash. The nut must be on the engine side.

8 Tighten the bolt that fastens the mounting bracket to the instrument board.

Speaker Installation

(See Figures 1, 2 and 3)

1 Refer to Figure 2 which shows the location of the holes in the reinforcing brace on which the speaker is to be mounted.

2 The speaker mounting brackets must be bolted to the sides of the speaker before it is installed in the car.

3 Place the speaker on the work bench, face down with the tone control knob to the right. The small angle bracket with the cage nut must be bolted to the side nearest you. The longest angle bracket must be bolted to the left side of the speaker with the part having the elongated hole directed away from the speaker. The third bracket must be bolted to the right hand side of the speaker with the caged nut turned under the speaker.

4 Loosen the bolt on the right-hand bracket at the dash to which is attached the instrument board reinforcing brace. Slip the "U" shim (furnished in the accessory kit) between the bracket and the brace and then tighten the bolt. (See Figure 3.)

5 Place the speaker on the instrument board brace face down with the tone control to the right and securely fasten with the three (3) ¼" No. 20 bolts, nuts and lockwashers.

6 The Receiver connecting cable must be plugged into its receptacle in the speaker.

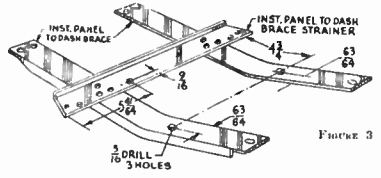


FIGURE 3

FIGURE 2

Control Installation

(See Figure 4)

1 Install the control unit on the instrument board, fitting it in the opening left by the removal of the ash receptacle.

2. Fasten the control head in place by means of the "U" clamp and nuts. (See Figure 4)

3. The volume control flexible shaft is on the left and must be coupled in the lower shaft bushing on the end of the Receiver housing (see Figure 1). The knurled shaft nut must be tightened securely.

4 Before connecting the tuning condenser flexible shaft, use a small screw driver and turn the variable condenser coupling in the Receiver in a counter-clockwise direction as far as it will go.

5. Turn the right-hand (tuning control) knob so that the pointer indicates "54" on the dial.

6. The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure1). The knurled shaft nut must be tightened securely.

7 Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 1)

8. Connect the antenna lead to its receptacle on the end of the Receiver housing (see Figure 1)

Power Connections

(See Figure 5)

1 Connect the terminal end of the "A" lead to the switch terminal GA-RAD. Refer to Figure 5 showing the back of the ignition switch.

2. Place the fuse and fuse insulator in the small metal fuse housing on the end of the "A" lead and connect it to the short Receiver "A" lead.

Motor Interference Suppression

1. Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals. Snap the resistors on the plug terminals.

2. Screw the straight molded resistor on the distributor end of the distributor center lead cable.

3. Plug this into the distributor cap.

4. Install a one mfd. by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the battery lead to the relay.

5 Connect a ½ mfd. condenser to the dome light lead as close as possible to the point where it enters the right front corner post. This connection must be soldered and taped. Drill a ⅛" hole in the flange of the instrument board 2" from where it joins the cowl on the right side. Remove the paint from around the hole and fasten the condenser to the flange with an 8-32 bolt and nut.

6 Ground the steering column to the dash. There is a hole in the steering column near the dash opening seal for a No. 8 – ¼" self-tapping screw. Scrape the paint off around this hole. Using the bare stranded wire with the two eye terminals, place one terminal under one of the screws that holds the steering column dash seal in place. The other end must be fastened to the steering column with a No. 8 – ¼" self tapping screw.

7. If there is no hole in the steering column near the dash opening seal for a No. 8 – ¼" self tapping screw, scrape the paint from the column near the dash opening seal, solder on a piece of the No. 14 bare stranded wire and ground this wire under one of the screws that holds the steering column dash seal in place.

8. Ground the oil line and temperature indicator tube where they enter the dash under one of the gromet cap screws with the No. 14 stranded wire (see Figure 6)

9. Replace the car lighting fuse – test the lights and horn.

10. An additional ½ mfd condenser may be used to advantage at times. Mount this condenser on the bottom ledge of the instrument board and connect it to one of the terminals of the ammeter or ignition switch behind the instrument board.

Ignition Switch

When the ignition switch key is in its center position all circuits are disconnected and locked.

When the switch key is turned to the left, the gas gauge registers and the battery supply is connected to the radio.

When the key is turned to the right, the gas gauge registers and the battery supply is connected to the ignition circuit and to the radio.

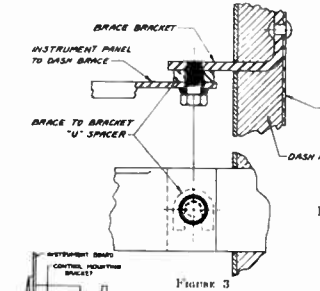


FIGURE 5

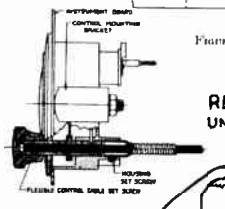


FIGURE 3

FIGURE 4

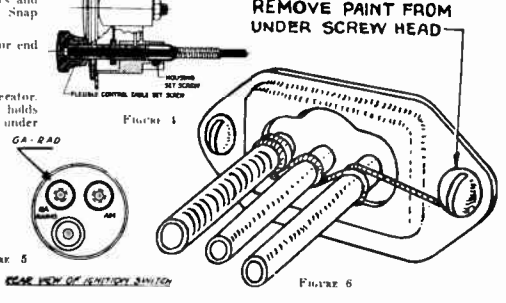


FIGURE 5

REAR VIEW OF IGNITION SWITCH

FIGURE 6

Items 1 to 71 of the Parts List for CT-2 Chrysler DeLuxe Custom Built Set are identical for DeSoto Airflow Code SG, Model CT-5. See the items on the right for additional accessories.

Terminal Clip	28-2488	*"U" Clamp (Control Mtg.)	28-1712	*Knob (DeSoto	27-4167
*Spark Plug Resistor	33-1011	*Nut (Control Mtg.)	W-611A	*Flex. Shaft Unit (DeSoto	28-8322
Distributor Resistor	33-1113	*Bolt (Set Mtg. Front	W-1131B	*Flex. Shaft (Val. (DeSoto	28-8323
Interference Cond. (1 mfd.)	4522	*Bolt (Set Mtg. Rear)	W-1340	*Speaker Cable	41-3126
Interference Cond. (½ mfd)	30-1067	*Nut (Set Mtg. Front)	W-95H	*Speaker Mtg. Brkt. (R. H.	36-3128
Fuse	7227	*Nut (Set Mtg. Rear	W-417B	*Speaker Mtg. Brkt. (L. H.	29-2587
Fuse Insulator	27-7140	Glass	27-7425	*Speaker Mtg. Brkt. (Rear	36-3129
*Antenna Lead	38-6355	*Base Assembly (DeSoto	28-2589	*Screw (Speaker Mtg.	W-63B
*"A" Lead	38-6362	*Bracket (DeSoto	28-2708	*Screw (Speaker Mtg.	W-253B

PHILCO RADIO & TELEV. CORP.

MODEL CT-5 DeLuxe
Chrysler Airflow,
Installation Data

Installation Instructions - Chrysler Airflow Models - Codes C-1, C-2 and C-3

THESE INSTRUCTIONS have been prepared for your use in installing the DeLuxe Custom-Built Radio. Read through thoroughly, then follow the instructions carefully in every detail when making the installation.

Carefully unpack the cartons and check the contents with the material packing lists so that you may become familiar with all the parts and thereby make the installation easily and quickly.

This new DeLuxe Custom-Built Radio is mounted on a special bracket under the cowl on the left-hand side. The speaker is mounted on the "H" shaped instrument board to dash brace.

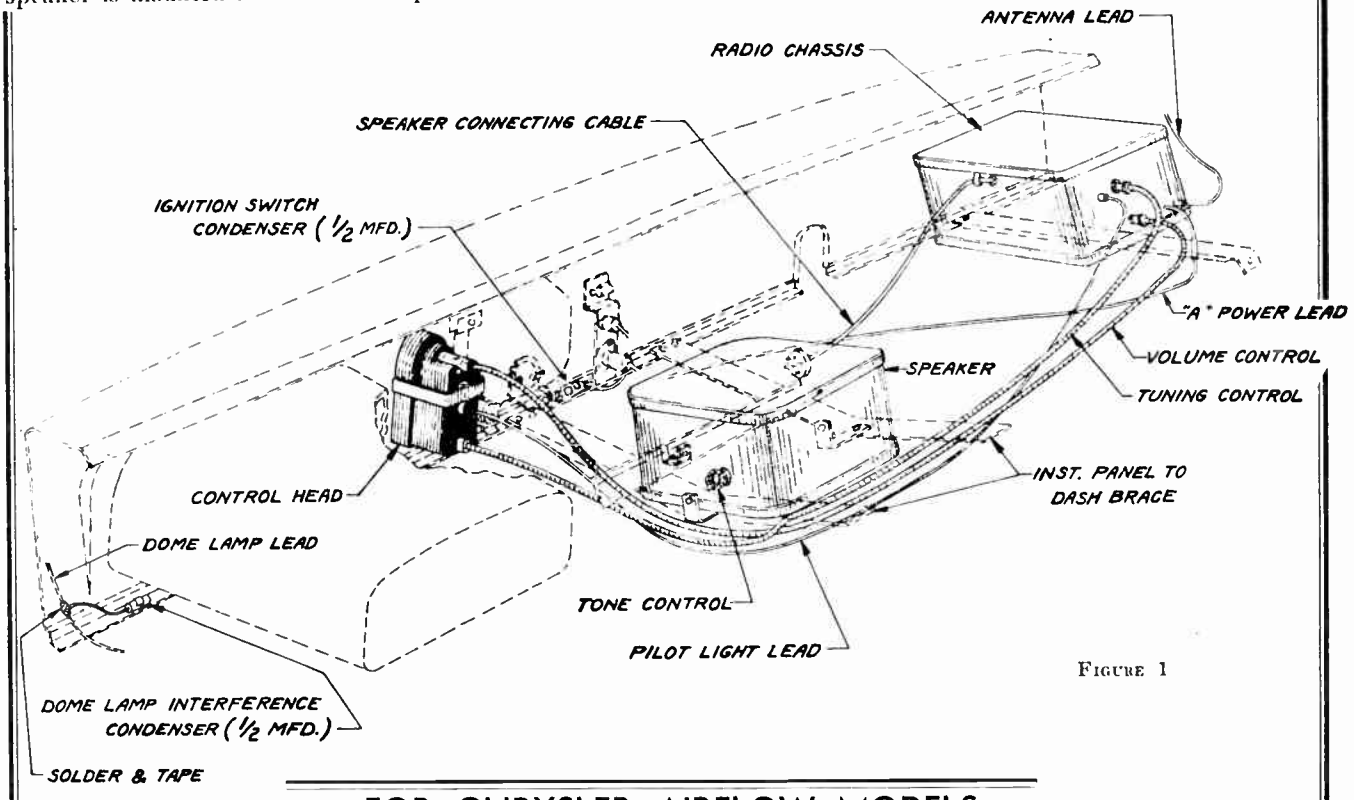


FIGURE 1

FOR CHRYSLER AIRFLOW MODELS
CODE C-2 and C-3 ONLY

Antenna Lead

The shielded antenna lead must be connected to the car antenna lead-in that comes down the front left-hand corner post. The bare ends of the two leads must be twisted together and taped. Make the splice as close as possible to the corner post. The shield pig-tail of the antenna lead must be grounded.

ReceiverInstallation

(See Figure 1)

1. Remove the car lighting fuse from the back of the ammeter.

2. Bolt the Receiver fast to the special set-mounting bracket so that when installed in the car, the control coupling end of the Receiver faces the dash of the car. The bracket, together with the nuts and lockwashers are provided in the accessory kits.

3. Drill a 1/4" hole in the flange of the instrument board 6 5/8" to the left of the steering column opening in the instrument board.

4. Rest the flat part of the Receiver mounting bracket on the flange of the instrument board over the hole just drilled and place the 3/4" 10-32 bolt through the hole in the flange of the instrument panel and the Receiver mounting bracket. Put on the nut but do not tighten at this time.

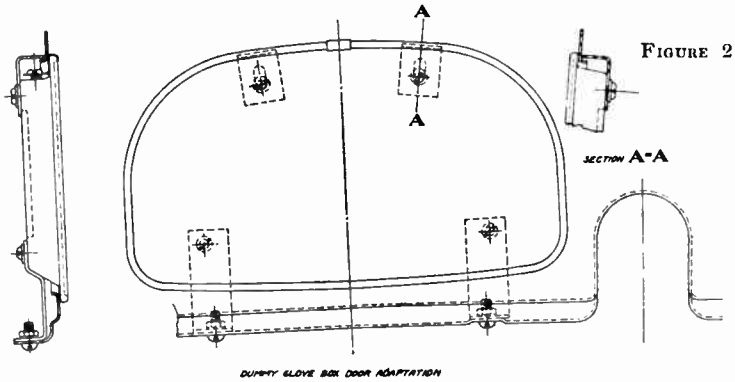


FIGURE 2

Remove the left hand glove compartment, door, hinge and fastener. Replace the glove compartment door and fasten with the four special adapter brackets. See Figure 2.

Installation Instructions — Chrysler Airflow Models — Codes C-1, C-2 and C-3

5 Raise the Receiver as high as the switch lock-to coil cable permits and mark the location for the bolt hole on the dash

6 Drill a 3/8" hole through the dash.

7 Using the 1 3/4" bolt and nut, fasten the mounting bracket securely to the dash. The nut must be on the engine side

8 Tighten the bolt that fastens the mounting bracket to the instrument board

Speaker Installation

(See Figures 1, 3 and 5)

1 Refer to Figure 3 which shows the location of the holes in the reinforcing brace on which the speaker is to be mounted.

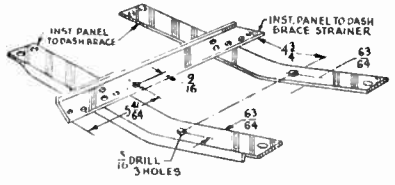
2 The speaker mounting brackets must be bolted to the sides of the speaker before it is installed in the car

3 Place the speaker on the work bench, face down with the tone control knob to the right The small angle bracket with the cage nut must be bolted to the side nearest you The longest angle bracket must be bolted to the left side of the speaker with the part having the elongated hole directed away from the speaker The third bracket must be bolted to the right hand side of the speaker with the caged nut turned under the speaker

4 Loosen the bolt on the right hand bracket at the dash to which is attached the instrument board reinforcing brace Slip the "U" shim (furnished in the accessory kit) between the bracket and the brace and then tighten the bolt (See Figure 5).

5 Place the speaker on the instrument board brace face down with the tone control to the right and securely fasten with the three 1/4" No. 20 bolts, nuts and lockwashers.

6 The Receiver connecting cable must be plugged into its receptacle in the speaker



Control Installation

1 Install the control unit on the instrument board, fitting it in the opening left by the removal of the ash receptacle

2 Fasten the control head in place by means of the "U" clamp and nuts (See Figure 6)

3 The volume control flexible shaft is at the top and must be coupled in the lower shaft bushing on the end of the Receiver housing (see Figure 1) The knurled shaft nut must be tightened securely.

4 Before connecting the tuning condenser flexible shaft, use a small screw driver and turn the variable condenser coupling in the Receiver in a counter-clockwise direction as far as it will go

5 Turn the bottom (tuning control) knob so that the indicator points to "54" on the dial

6 The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure 1) The knurled shaft nut must be tightened securely.

7 Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 1).

8 Connect the antenna lead to its receptacle on the end of the Receiver housing (see Figure 1).

Power Connections

For installations in Code C-1 cars, connect the terminal end of the "A" lead to the switch terminal GA-RAD Refer to Figure 4 showing the back of the ignition switch.

CODE C-2 and C-3 ONLY

In Code C-2 and C-3 cars, connect the terminal end of the "A" lead to the fuse terminal of the ammeter.

Place the fuse and fuse insulator in the small metal fuse housing on the end of the "A" lead and connect it to the short Receiver "A" lead

Com. C-1 Ignition Switch

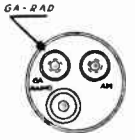


Figure 4

REAR VIEW OF IGNITION SWITCH

Motor Interference Suppression

1 Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals Snap the resistors on the plug terminals

2 Screw the straight molded resistor on the distributor end of the distributor center lead cable

3 Plug this into the distributor cap

4 Install a one mfd. by pass condenser on the generator Mount it on the generator frame under the screw that holds the generator relay in place Connect the condenser lead under the screw that connects the battery lead to the relay

5 Connect a 1/4 mfd condenser to the dome light lead as close as possible to the point where it enters the right front corner post This connection must be soldered and taped. Drill a 1/4" hole in the flange of the instrument board 2" from where it joins the cowl on the right side. Remove the paint from around the hole and fasten the condenser to the flange with an 8-32 bolt and nut.

6 Ground the steering column to the dash There is a hole in the steering column near the dash opening seal for a No. 8 - 1/4" self-tapping screw. Scrape the paint off around this hole Using the bare stranded wire with the two eye terminals, place one terminal under one of the screws that holds the steering column dash seal in place The other end must be fastened to the steering column with a No. 8 1/4" self-tapping screw

7 If there is no hole in the steering column near the dash opening seal for a No. 8 1/4" self-tapping screw, scrape the paint from the column near the dash opening seal, solder on a piece of the No. 14 bare stranded wire and ground this wire under one of the screws that holds the steering column dash seal in place

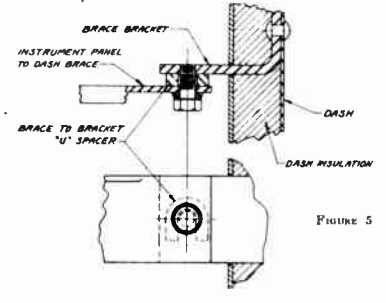


Figure 5

8 Ground the oil line and temperature indicator tube where they enter the dash under one of the grounct cap screws with the No 14 stranded wire (see Figure 7).

9 Replace the car lighting fuse — test the lights and horn.

10 An additinnal 1/2 mfd. condenser may be used to advantage at times. Mount this condenser on the bottom ledge of the instrument board and connect it to one of the terminals of the ammeter or ignition switch behind the instrument board.

CODE C-2 and C-3 ONLY

11 In case there is any motor interference in Code C-2 or C-3 cars, caused by an excessive gap between the distributor rotor and the high tension contacts in the distributor head, this can be overcome by extending the metal end of the rotor

Follow this procedure carefully: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block Peen or hammer the end carefully with a small machinists' hammer. Replace the rotor and the cap and then turn the motor over with the ignition turned off.

After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap If so, dress lightly with a fine file.

Ignition Switch

CODE C-1 ONLY

When the ignition switch key is in its center position all circuits are disconnected and locked

When the switch key is turned to the left, the gas gauge registers and the battery supply is connected to the radio

When the key is turned to the right, the gas gauge registers and the battery supply is connected to the ignition circuit and to the radio

Operating Instructions

To operate the Receiver, the ignition switch key must first be turned either to the right or to the left, as described above. The upper knob on the radio control is a combination switch and volume control Turn the volume control knob clockwise The first range of motion operates the Receiver switch. From there on, it is the manual volume control

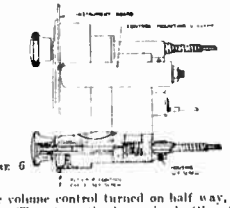


Figure 6

With the volume control turned on half way, allow the tubes to heat up. Then turn the lower knob (the station selector) to tune in the various programs. The numbers on the dial represent channel numbers which, with the addition of "0" to the number, correspond to the frequencies in kilocycles. Adjust the volume to a suitable level and recheck the tuning. The Receiver must be tuned so that the maximum signal is obtained. Since the Receiver is extremely selective, it is of the utmost importance that the Receiver be tuned right on the station. Careless tuning off to one side, even though the signal is still heard, results in very poor tone quality and very mushy reception.

The tone control knob is on the right hand side of the speaker housing (see Figure 1). It should be adjusted to the tone most pleasing. There are four (4) positions: brilliant, bright, mellow and deep. Speech is clearest when in bright or brilliant, while usually orchestras will sound best on bright or mellow.

Another use of the tone control is as a static modifier. When driving through extremely noisy locations, the tone control should be set on mellow or deep This will subdue the harsh, rasping static.

Except on very weak signals, the automatic volume control maintains the same volume level while driving along without continually manipulating the manual volume control, cuts out external interferences, counteracts fading and prevents blasting of local stations while tuning. It is virtually impossible, however, to maintain satisfactory reception while driving under bridges or in places which are totally shielded, known as dead spots.

IMPORTANT When turning off the Receiver, be sure the volume control is turned counter-clockwise until a click is heard and the dial light goes out, otherwise the Receiver will continue to operate and discharge the battery

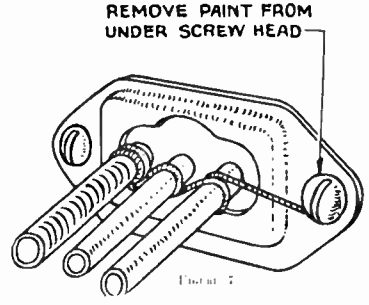


Figure 7

Items 1 to 72 of the Parts List for PT-5 Packard DeLuxe Custom Built Model 120 are identical for the CT-5 DeLuxe Custom Built Radio for Chrysler Airflow, Codes C-1, C-2 and C-3.

See the items listed below, for additional accessories.

*Terminal Clip	28-2488	*Glove Box Door Brkt. (Upper)	29-2621	*Knob	27-4161
Spark Plug Resistor	33-1015	*Glove Box Door Brkt. (Lower R. H.)	29-2622	*Flex. Shaft (Tun.)	28-8324
Distributor Resistor	33-1113	*Glove Box Door Brkt. (Lower L. H.)	29-2623	*Flex. Shaft (Vol.)	28-8325
Interference Cond. (1 mfd.)	4522	*Bolt (Set Mtg. Front)	W1441B	*Speaker Cable	41-3126
Interference Cond. (1/2 mfd.)	30-4007	*Bolt (Set Mtg. Rear)	W1233B	*Speaker Mtg. Brkt. (R. H.)	30-3428
Fuse	7227	*Nut (Set Mtg. Front)	W98B	*Speaker Mtg. Brkt. (L. H.)	29-2567
Fuse Insulator	27-7131	*Nut (Set Mtg. Rear)	W317B	*Speaker Mtg. Brkt. (Rear)	30-3429
*Antenna Lead	38-6355	*Brake Assembly	42-5263	*Screw (Speaker Mtg.)	W99B
"A" Lead	38-6552			*Screw (Speaker Mtg.)	W285B
*"U" Clamp (Control Mtg.)	29-1808			*Nut (Speaker Mtg.)	W98B
*Nut (Control Mtg.)	W98A				

PHILCO RADIO & TELEV. CORP.

MODEL G, Hupmobile For J, T, & W Cars Schematic, Chassis Parts List

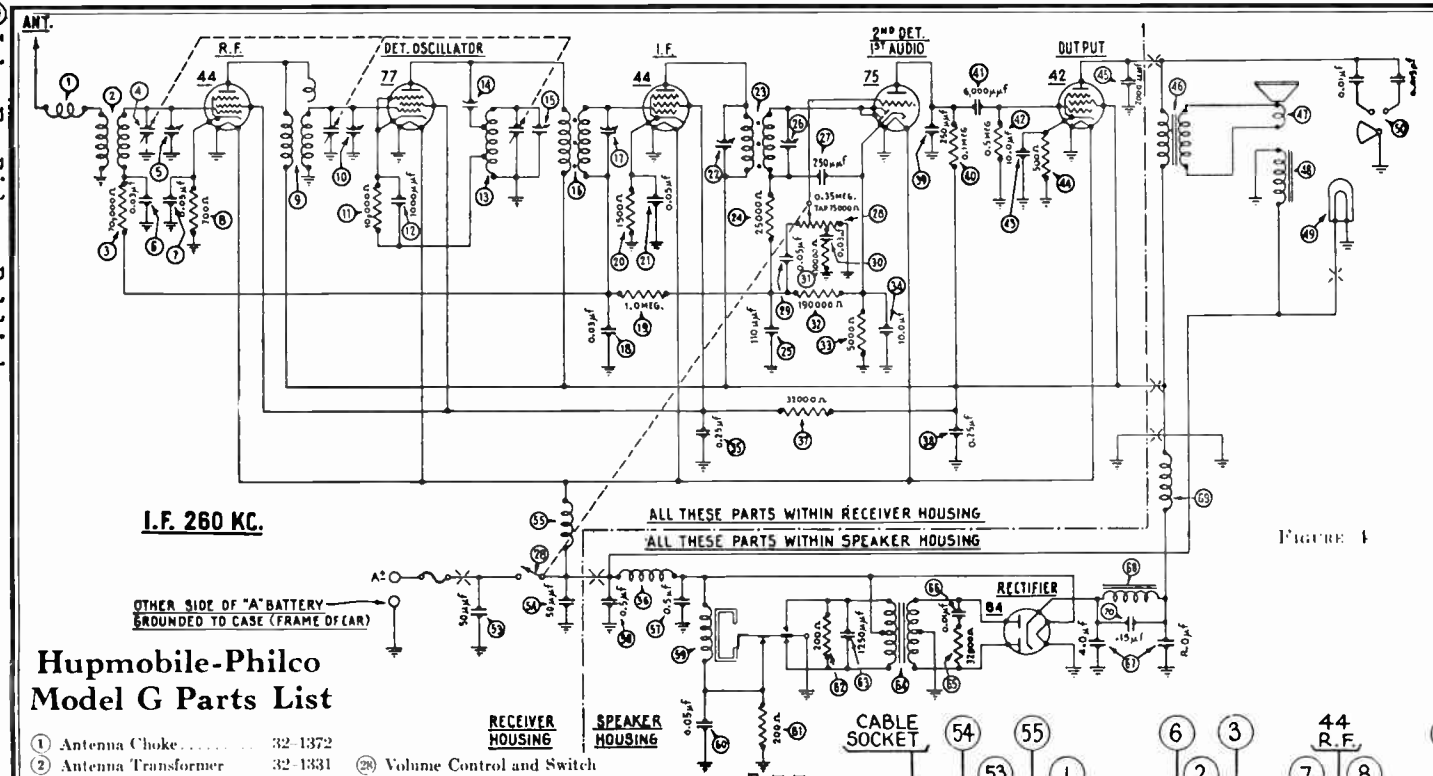


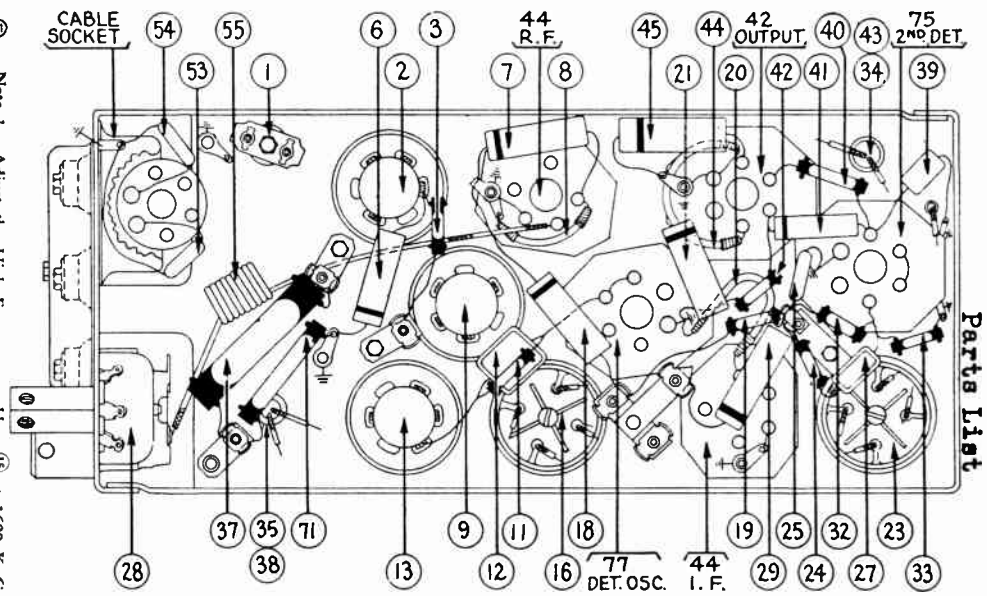
FIGURE 1

Hupmobile-Philco Model G Parts List

		RECEIVER HOUSING	SPEAKER HOUSING
(1)	Antenna Choke	32-1372	
(2)	Antenna Transformer	32-1331	
(3)	Resistor (70,000 ohms)	33-1115	
(4)	Tuning Condenser	31-1214	
(5)	First Padder (on Tun. Cond.)		
(6)	Condenser (.03 mfd.)	30-4025	
(7)	Condenser (.05 mfd.)	30-4020	
(8)	Resistor (700 ohms)	6443	
(9)	R. F. Transformer	32-1332	
(10)	Second Padder (on Tun. Cond.)		
(11)	Resistor (10,000 ohms)	33-1000	
(12)	Condenser (1000 mmfd.)	33-1007	
(13)	Oscillator Transformer	32-1333	
(14)	Padder (Pri. 1st I. F. Trans.)		
(15)	Third Padder (on Tun. Cond.)		
(16)	First I. F. Transformer	32-1329	
(17)	Padder (Sec. 2nd I. F. Trans.)		
(18)	Condenser (.03 mfd.)	30-4025	
(19)	Resistor (1,000,000 ohms)	33-1096	
(20)	Resistor (1500 ohms)	33-3047	
(21)	Condenser (.05 mfd.)	30-4020	
(22)	Padder (Pri. 2nd I. F. Trans.)		
(23)	Second I. F. Transformer	32-1237	
(24)	Resistor (25,000 ohms)	33-1013	
(25)	Condenser (.00011 mfd.)	30-1031	
(26)	Padder (Sec. 2nd I. F. Trans.)		
(27)	Condenser (.00025 mfd.)	30-1032	
(28)	Volume Control and Switch Assembly	33-5067	
(29)	Condenser (.05 mfd.)	30-4020	
(30)	Condenser (.03 mfd.)	30-4025	
(31)	Resistor (10,000 ohms)	33-1000	
(32)	Resistor (190,000 ohms)	33-1116	
(33)	Resistor (5000 ohms)	6096	
(34)	Condenser (10 mfd.)	30-2076	
(35)	Condenser (.25 mfd.)	30-4126	
(37)	Resistor (32,000 ohms)	3525	
(38)	Condenser (.25 mfd.)	30-4126	
(39)	Condenser (.00025 mfd.)	30-1032	
(40)	Resistor (100,000 ohms)	6099	
(41)	Condenser (.006 mfd.)	30-4125	
(42)	Resistor (500,000 ohms)	6097	
(43)	Condenser (10 mfd.)	30-2076	
(44)	Resistor (500 ohms)	33-3031	
(45)	Condenser (.004 mfd.)	30-4185	
(46)	Output Transformer	32-7042	
(47)	Cone and Voice Coil	36-3157	
(48)	Field Coil Assembly	36-3097	
(49)	Pilot Lamp	34-2031	
(50)	Tone Control	30-4189	
(53)	Condenser (.00005 mfd.)	30-1029	
(54)	Condenser (.00005 mfd.)	30-1029	
(55)	"A" Choke	32-1432	
(56)	Vibrator Choke	32-1260	
(57)	Condenser (.5 mfd.)	30-4047	
(58)	Condenser (.5 mfd.)	30-4015	
(59)	Vibrator	38-5036	
(60)	Condenser (.05 mfd.)	30-4039	
(61)	Resistor (200 ohms)	7217	
(62)	Resistor (200 ohms)	7217	
(63)	Condenser (.00125 mfd.)	5886	
(64)	Power Transformer	32-7253	
(65)	Resistor (32,000 ohms)	3525	
(66)	Condenser (.01 mfd.)	30-4051	
(67)	Filter Condenser (4-8 mfd.)	30-2030	
(68)	Filter Choke	32-7254	
(69)	R. F. Choke	32-1260	
(70)	Condenser (.15 mfd.)	30-4191	
(71)	Resistor (25,000 ohms)	3656	
	Glass for Control	27-7325	
	Face Assembly	42-5125	
	Pointer	28-1793	
	Knobs	27-4091	
	Interconnecting Cable	41-3087	
	Ammeter Cable	38-5833	
	Flexible Shaft—Tuning	28-8226	
	Flexible Shaft—Volume	28-8227	
	Receiver Mounting Plate	29-1792	
	Receiver Mounting Bracket	29-1848	
	Carriage Bolt	W-1316A	
	Fuse	7227	
	Fuse Insulator	27-7131	
	Stud (Speaker Mtg.)	6122	
	Screw (Speaker Mtg.)	W-1312A	

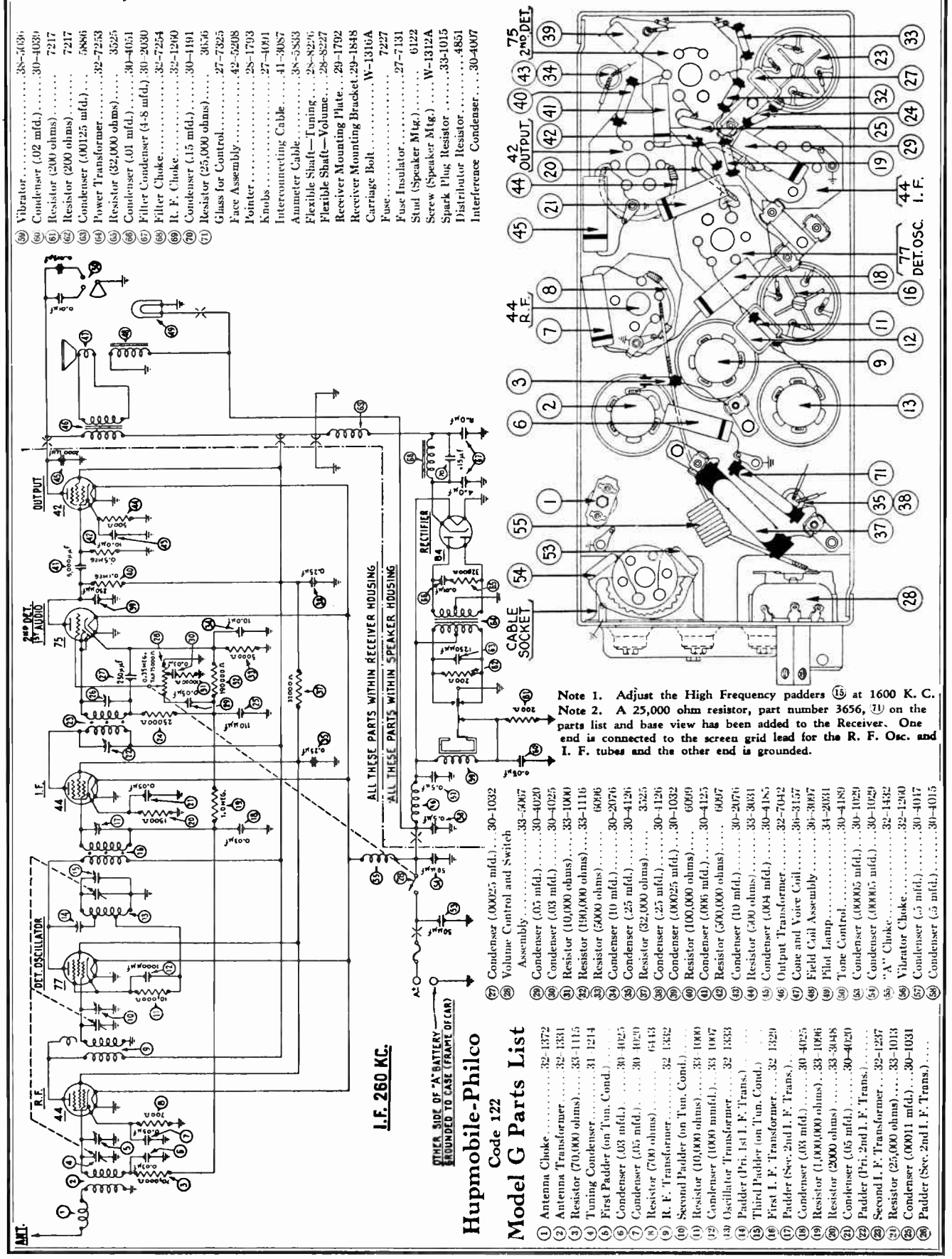
Note 1. Adjust the High Frequency padders (15) at 1600 K. C.

Note 2. A 25,000 ohm resistor, part number 3656, (71) on the parts list and base view has been added to the Receiver. One end is connected to the screen grid lead for the R. F. Osc. and I. F. tubes and the other end is grounded.



MODEL G (Code 122) Hup
For J,T, & W Cars
Schematic, Chassis

PHILCO RADIO & TELEV. CORP.

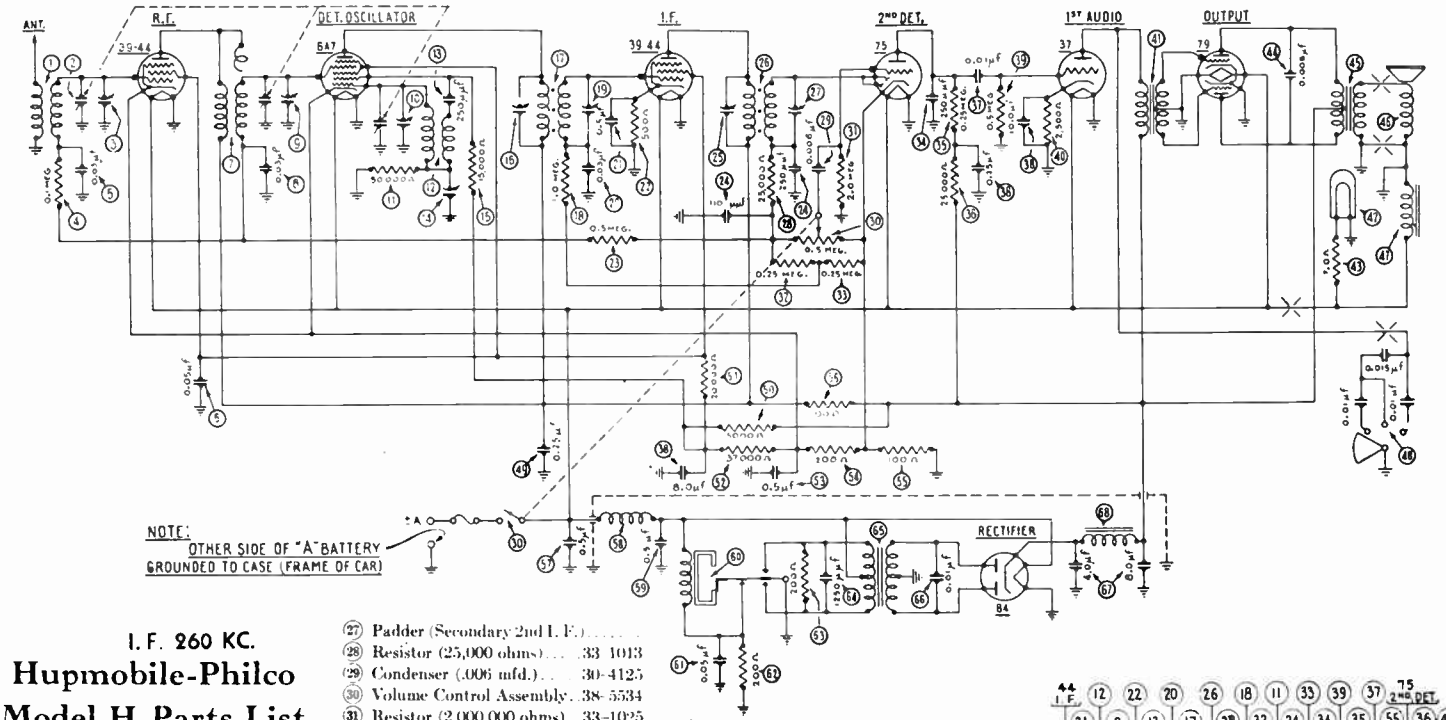


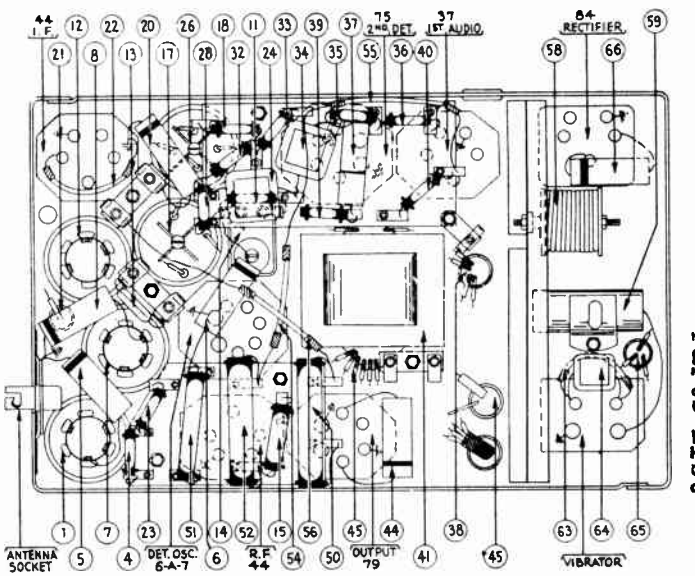
Note 1. Adjust the High Frequency padders (15) at 1600 K. C.
Note 2. A 25,000 ohm resistor, part number 3656, (71) on the parts list and base view has been added to the Receiver. One end is connected to the screen grid lead for the R. F. Osc. and I. F. tubes and the other end is grounded.

Hupmobile-Philco
Code 122
Model G Parts List

(1)	Antenna Choke	32-1372	
(2)	Antenna Transformer	32-1331	
(3)	Resistor (70,000 ohms)	33-1115	
(4)	Tuning Condenser	31-1214	
(5)	First Padder (on Tun. Cond.)		
(6)	Condenser (.03 mfd.)	30-4025	
(7)	Condenser (.05 mfd.)	30-4020	
(8)	Resistor (700 ohms)	6413	
(9)	R. F. Transformer	32-1332	
(10)	Second Padder (on Tun. Cond.)		
(11)	Resistor (10,000 ohms)	33-1009	
(12)	Condenser (1000 mmfd.)	33-1007	
(13)	Oscillator Transformer	32-1333	
(14)	Padder (Pri. 1st I. F. Trans.)		
(15)	Third Padder (on Tun. Cond.)		
(16)	First I. F. Transformer	32-1329	
(17)	Padder (Sec. 2nd I. F. Trans.)		
(18)	Condenser (.03 mfd.)	30-4025	
(19)	Resistor (1,000,000 ohms)	33-1096	
(20)	Resistor (2000 ohms)	33-3048	
(21)	Condenser (.05 mfd.)	30-4020	
(22)	Padder (Pri. 2nd I. F. Trans.)		
(23)	Second I. F. Transformer	32-1237	
(24)	Resistor (25,000 ohms)	33-1013	
(25)	Condenser (.00011 mfd.)	30-1031	
(26)	Padder (Sec. 2nd I. F. Trans.)		
(27)	Condenser (.00025 mfd.)	30-1032	
(28)	Volume Control and Switch Assembly	33-3067	
(29)	Condenser (.05 mfd.)	30-4020	
(30)	Condenser (.03 mfd.)	30-4025	
(31)	Resistor (10,000 ohms)	33-1000	
(32)	Resistor (190,000 ohms)	33-1116	
(33)	Resistor (5000 ohms)	6096	
(34)	Condenser (10 mfd.)	30-2076	
(35)	Condenser (.25 mfd.)	30-4126	
(36)	Resistor (32,000 ohms)	3525	
(37)	Condenser (.25 mfd.)	30-1126	
(38)	Condenser (.00025 mfd.)	30-1032	
(39)	Resistor (100,000 ohms)	6099	
(40)	Condenser (.006 mfd.)	30-4125	
(41)	Resistor (500,000 ohms)	6097	
(42)	Condenser (10 mfd.)	30-2076	
(43)	Resistor (500 ohms)	33-3031	
(44)	Condenser (.004 mfd.)	30-4185	
(45)	Output Transformer	32-7042	
(46)	Cone and Voice Coil	36-3157	
(47)	Field Coil Assembly	36-3097	
(48)	Pilot Lamp	34-2031	
(49)	Tone Control	30-4189	
(50)	Condenser (.00005 mfd.)	30-1028	
(51)	Condenser (.00005 mfd.)	30-1029	
(52)	"A" Choke	32-1432	
(53)	Vibrator Choke	32-1200	
(54)	Condenser (.5 mfd.)	30-4017	
(55)	Condenser (.5 mfd.)	30-4015	
(56)	Vibrator	38-3030	
(57)	Condenser (.02 mfd.)	30-4030	
(58)	Resistor (200 ohms)	7217	
(59)	Resistor (200 ohms)	7217	
(60)	Condenser (.00125 mfd.)	5886	
(61)	Power Transformer	32-7253	
(62)	Resistor (32,000 ohms)	3525	
(63)	Condenser (.01 mfd.)	30-4051	
(64)	Filter Condenser (4-8 mfd.)	30-2030	
(65)	Filter Choke	32-7254	
(66)	R. F. Choke	32-1200	
(67)	Condenser (.15 mfd.)	30-1191	
(68)	Resistor (25,000 ohms)	3656	
(69)	Glass for Control	27-7325	
(70)	Face Assembly	42-5208	
(71)	Pointer	28-1793	
	Knobs	27-4091	
	Intervonnecting Cable	41-3087	
	Ammeter Cable	38-3583	
	Flexible Shaft—Tuning	28-8276	
	Flexible Shaft—Volume	28-8227	
	Receiver Mounting Plate	29-1792	
	Receiver Mounting Bracket	29-1848	
	Carriage Bolt	W-1316A	
	Fuse	7227	
	Fuse Insulator	27-7131	
	Stud (Speaker Mtg.)	6122	
	Screw (Speaker Mtg.)	W-1312A	
	Spark Plug Resistor	33-1015	
	Distributor Resistor	4851	
	Interference Condenser	30-4007	

MODEL H, Hupmobile For J,T, & W Cars Schematic, Chassis Parts List

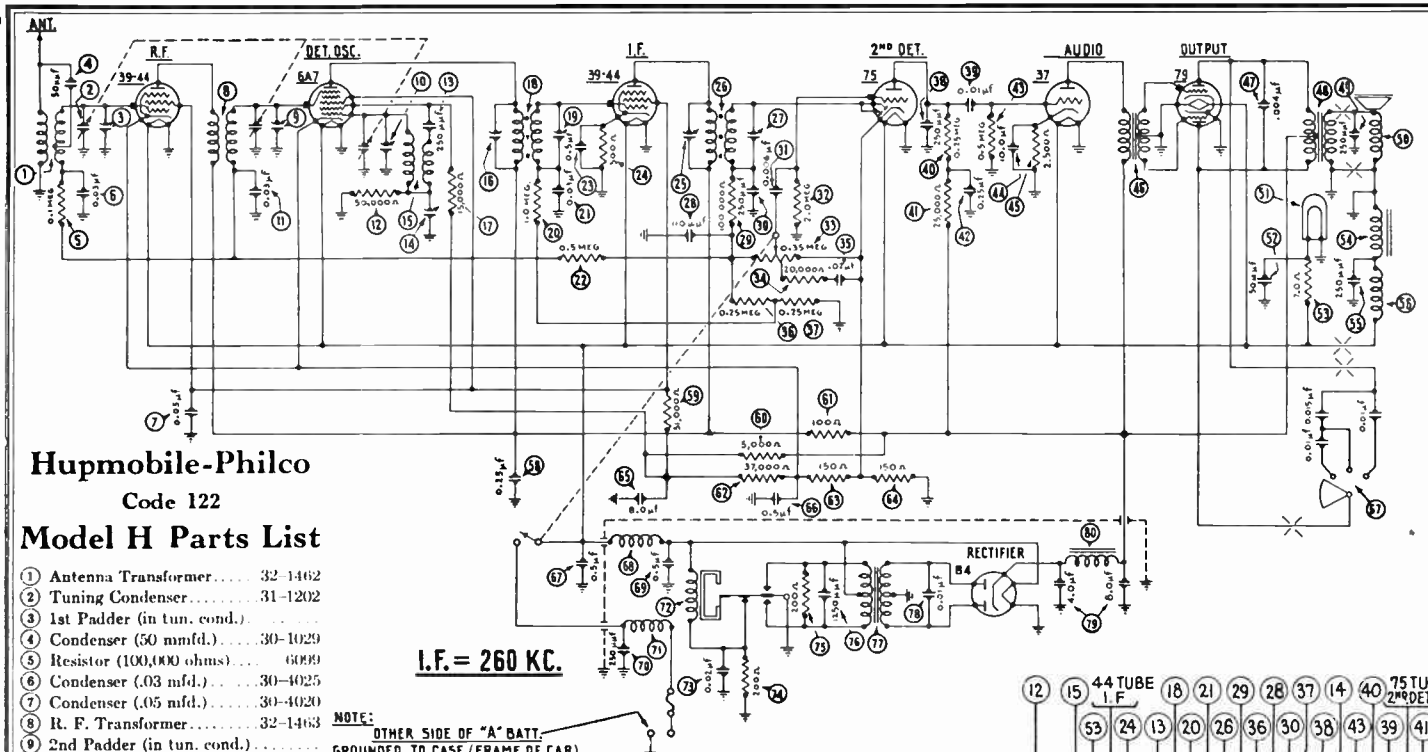




I. F. 260 KC.

Hupmobile-Philco Model H Parts List

(1)	Antenna Transformer	32-1220
(2)	Tuning Condenser	31-1202
(3)	1st Padder (in tun. cond.)	
(4)	Resistor (100,000 ohms)	6099
(5)	Condenser (.03 mfd.)	30-4025
(6)	Condenser (.05 mfd.)	30-4020
(7)	R. F. Transformer	32-1221
(8)	Condenser (.03 mfd.)	30-4025
(9)	2nd Padder (in tun. cond.)	
(10)	3rd Padder (in tun. cond.)	
(11)	Resistor (50,000 ohms)	6098
(12)	Oscillator Transformer	32-1222
(13)	Condenser (.00025 mfd.)	3082
(14)	Padder	31-6012
(15)	Resistor (15,000 ohms)	6208
(16)	Padder (Primary 1st I. F.)	
(17)	First I. F. Transformer	32-1236
(18)	Resistor (1,000,000 ohms)	33-1096
(19)	Padder (Secondary 1st I. F.)	
(20)	Condenser (.03 mfd.)	30-4025
(21)	Condenser (.5 mfd.)	30-4058
(22)	Resistor (500 ohms)	6977
(23)	Resistor (500,000 ohms)	6097
(24)	Condenser (.00011-.00025)	30-1020
(25)	Padder (Primary 2nd I. F.)	
(26)	Second I. F. Transformer	32-1237
(27)	Padder (Secondary 2nd I. F.)	
(28)	Resistor (25,000 ohms)	33-1013
(29)	Condenser (.006 mfd.)	30-4125
(30)	Volume Control Assembly	38-5534
(31)	Resistor (2,000,000 ohms)	33-1025
(32)	Resistor (250,000 ohms)	33-1097
(33)	Resistor (250,000 ohms)	33-1097
(34)	Condenser (.00025 mfd.)	5858
(35)	Resistor (250,000 ohms)	33-1097
(36)	Resistor (25,000 ohms)	33-1013
(37)	Condenser (.01 mfd.)	30-4145
(38)	Condenser (.25-8-10 mfd.)	30-4135
(39)	Resistor (500,000 ohms)	6097
(40)	Resistor (2500 ohms)	33-1100
(41)	Input Transformer	32-7206
(42)	Pilot Lamp	6608
(43)	Resistor (7 ohms)	33-3130
(44)	Condenser (.006 mfd.)	30-4024
(45)	Output Transformer	32-7205
(46)	Cone and Voice Coil	36-3159
(47)	Field Coil Assembly	36-3130
(48)	Tone Control	30-4142
(49)	Condenser (.25 mfd.)	30-4134
(50)	Resistor (5,000 ohms)	33-1070
(51)	Resistor (20,000 ohms)	6649
(52)	Resistor (37,000 ohms)	33-1098
(53)	Condenser (.5 mfd.)	30-4018
(54)	Resistor (200 ohms)	7217
(55)	Resistor (100 ohms)	33-3023
(56)	Resistor (100 ohms)	33-3023
(57)	Condenser (.5 mfd.)	30-4015
(58)	Vibrator Choke	32-1335
(59)	Condenser (.5 mfd.)	30-4115
(60)	Vibrator Unit	38-5036
(61)	Condenser (.05 mfd.)	30-4039
(62)	Resistor (200 ohms)	7217
(63)	Resistor (200 ohms)	7217
(64)	Condenser (.00125 mfd.)	5886
(65)	Power Transformer	32-7098
(66)	Condenser (.01 mfd.)	30-4051
(67)	Filter Condenser (4-8 mfd.)	30-2015
(68)	"B" Choke	32-7104
	Interference Condenser	4522S
	Studs	28-6036
	Nuts (mounting)	W55
	Battery Cable	38-5296
	Antenna Lead	38-5674
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27-7131
	Knob	27-4091
	Glass	27-7325
	Glass Gasket	27-7509
	Pointer	28-1793
	Shaft	28-8214
	Face Assembly	42-5125



Hupmobile-Philco

Code 122

Model H Parts List

(1)	Antenna Transformer	32-1462
(2)	Tuning Condenser	31-1202
(3)	1st Padder (in tun. cond.)	
(4)	Condenser (50 mmfd.)	30-1029
(5)	Resistor (100,000 ohms)	6099
(6)	Condenser (.03 mfd.)	30-4025
(7)	Condenser (.05 mfd.)	30-4020
(8)	R. F. Transformer	32-1463
(9)	2nd Padder (in tun. cond.)	
(10)	3rd Padder (in tun. cond.)	
(11)	Condenser (.03 mfd.)	30-4025
(12)	Resistor (50,000 ohms)	6098
(13)	Condenser (250 mmfd.)	3082
(14)	Padder	30-6012
(15)	Oscillator Transformer	32-1222
(16)	Padder (Pri. 1st I. F. Trans.)	
(17)	Resistor (15,000 ohms)	6208
(18)	First I. F. Transformer	32-1471
(19)	Padder (Sec. 1st I. F. Trans.)	
(20)	Resistor (1,000,000 ohms)	33-1096
(21)	Condenser (.03 mfd.)	30-4025
(22)	Resistor (500,000 ohms)	6097
(23)	Condenser (.5 mfd.)	30-4058
(24)	Resistor (500 ohms)	6977
(25)	Padder (Pri. 2nd I. F. Trans.)	
(26)	Second I. F. Transformer	32-1449
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Condenser (110 mmfd.)	30-1031
(29)	Resistor (100,000 ohms)	6099
(30)	Condenser (250 mmfd.)	30-1032
(31)	Condenser (.006 mfd.)	30-4125
(32)	Resistor (2,000,000 ohms)	33-1025
(33)	Vol. Cont. & Sw. Assembly	38-5851
(34)	Resistor (20,000 ohms)	33-1130
(35)	Condenser (.02 mfd.)	30-4215
(36)	Resistor (250,000 ohms)	33-1097
(37)	Resistor (250,000 ohms)	33-1097
(38)	Condenser (250 mmfd.)	30-1032
(39)	Condenser (.01 mfd.)	30-4145
(40)	Resistor (250,000 ohms)	33-1097
(41)	Resistor (25,000 ohms)	33-1013
(42)	Condenser (.25 mfd.)	30-4135
(43)	Resistor (500,000 ohms)	6097
	ondenser (10 mfd.)	30-4135
	Resistor (2500 ohms)	33-1100
(46)	Input Transformer	32-7206
(47)	Condenser (.004 mfd.)	30-4185
(48)	Output Transformer	32-7205
(49)	Condenser (250 mmfd.)	30-1032
(50)	Cone & Voice Coil	36-3159
(51)	Pilot Lamp	34-2040
(52)	Condenser (50 mmfd.)	30-1029
(53)	Resistor (7 ohms)	33-3130
(54)	Field Coil Assembly	02795
(55)	Condenser (250 mmfd.)	30-1032
(56)	Choke	32-1464
(57)	Tone Control	30-4208
(58)	Condenser (.25 mfd.)	30-4134
(59)	Resistor (51,000 ohms)	4237
(60)	Resistor (5000 ohms)	33-1070
(61)	Resistor (100 ohms)	33-3023
(62)	Resistor (37,000 ohms)	33-1098
(63)	Resistor (150 ohms)	33-3045
(64)	Resistor (150 ohms)	33-3045
(65)	Condenser (8 mfd.)	30-4135
(66)	Condenser (.5 mfd.)	30-4018
(67)	Condenser (.5 mfd.)	30-4015
(68)	Vibrator Choke	32-1474
(69)	Condenser (.5 mfd.)	30-4047
(70)	Condenser (250 mmfd.)	32-1466
(71)	"A" Choke	32-1466
(72)	Vibrator	38-5036
(73)	Condenser (.02 mfd.)	30-4039
(74)	Resistor (200 ohms)	7217
(75)	Resistor (200 ohms)	7217
(76)	Condenser (1250 mmfd.)	5886
(77)	Power Transformer	32-7098
(78)	Condenser (.01 mfd.)	30-4051
(79)	Filter Condenser (4-8 mfd.)	30-2015
(80)	"B" Choke	32-7104
	Interference Condenser	45228
	Studs (Rec. Mtg.)	28-6036
	Nuts (mounting)	W55
	Battery Cable	38-5296
	Antenna Lead	38-5674

Acorn Nut	W821
Fuse	7227
Fuse Insulator	27-7131
Knob	27-4091
Glass	27-7325
Glass Gasket	27-7509
Pointer	28-1793
Shaft	28-8214
Face Assembly	42-5125
Speaker Cable	41-3113
Pilot Lamp Assembly	38-5889

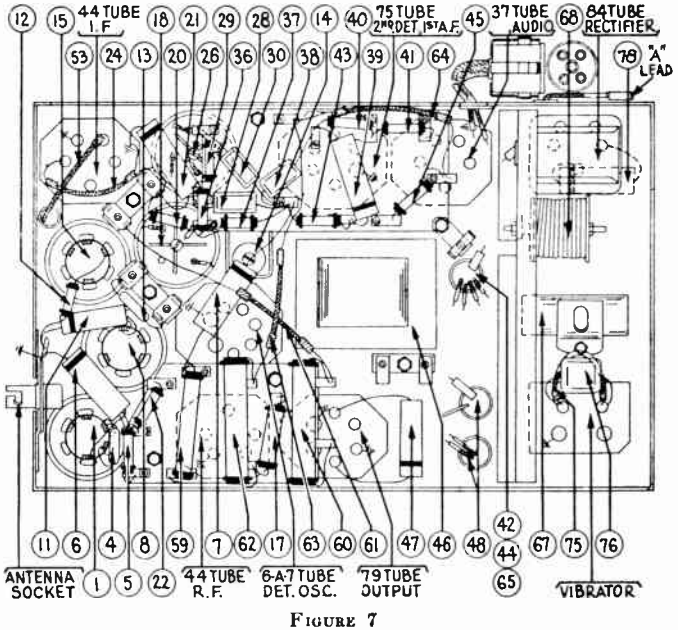


FIGURE 7

PHILCO RADIO & TELEV. CORP.

MODEL R Hupmobile
For J, T & W Cars
Schematic, Chassis
Parts List

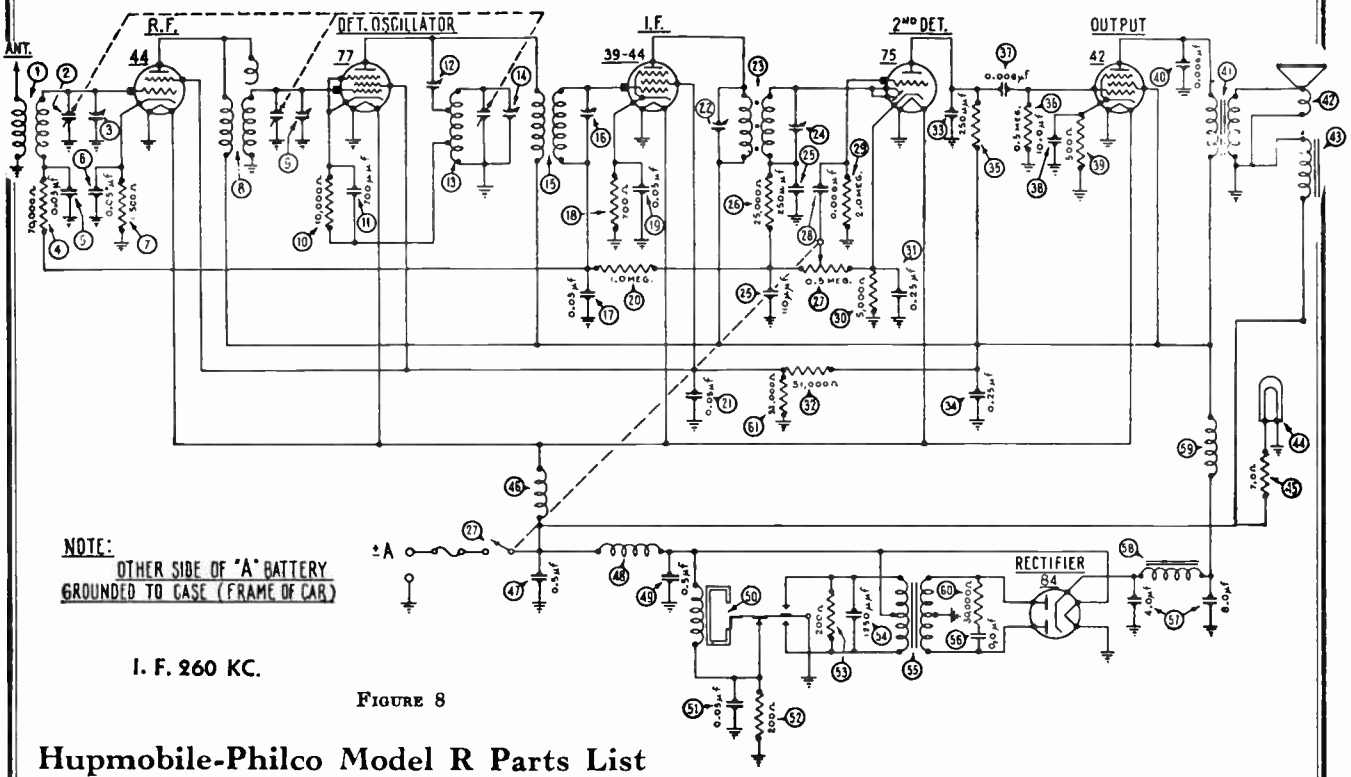


FIGURE 8

Hupmobile-Philco Model R Parts List

(1)	Antenna Transformer	32-1331	
(2)	Tuning Condenser	31-1164	
(3)	1st Padder (on tun. cond.)		
(4)	Resistor (70,000 ohms)	33-1115	
(5)	Condenser (.03 mfd.)	30-4025	
(6)	Condenser (.05 mfd.)	30-4020	
(7)	Resistor (1500 ohms)	33-3047	
(8)	R. F. Transformer	32-1332	
(9)	2nd Padder (on tun. cond.)		
(10)	Resistor (10,000 ohms)	33-1000	
(11)	Condenser (.0007 mfd.)	5863	
(12)	Padder (Pri. 1st I. F. Tran.)		
(13)	Oscillator Transformer	32-1333	
(14)	3rd Padder (on tun. cond.)		
(15)	1st I. F. Transformer	32-1329	
(16)	Padder (Sec. 1st I. F. Tran.)		
(17)	Condenser (.03 mfd.)	30-4025	
(18)	Resistor (700 ohms)	6443	
(19)	Condenser (.05 mfd.)	30-4020	
(20)	Resistor (1,000,000 ohms)	33-1096	
(21)	Condenser (.05 mfd.)	30-4020	
(22)	Padders (Prim. 2nd I. F.)		
(23)	2nd I. F. Transformer	32-1237	
(24)	Padder (Sec. I. F. Tran.)		
(25)	Cond. (.00011-.00025 mfd.)	30-1020	
(26)	Resistor (25,000 ohms)	33-1013	
(27)	Vol. Con. & Switch Assm.	38-5534	
(28)	Condenser (.006 mfd.)	$30\text{-}4125$	
(29)	Resistor (2,000,000 ohms)	$33\text{-}1025$	
(30)	Resistor (5000 ohms)	6096	
(31)	Condenser (.25 mfd.)	$30\text{-}4146$	
(32)	Resistor (51,000 ohms)	5868	
(33)	Condenser (.00025 mfd.)	3082	
(34)	Condenser (.25 mfd.)	04360	
	Stud	28-6036	
	Battery Cable	38-5833	
	Nut	W55A	
	Antenna Lead	38-5682	

(35)	Resistor (100,000 ohms)	6099	
(36)	Resistor (500,000 ohms)	6097	
(37)	Condenser (.006 mfd.)	30-4125	
(38)	Condenser (10 mfd.)	30-2072	
(39)	Resistor (500 ohms)	33-3031	
(40)	Condenser (.006 mfd.)	30-4024	
(41)	Output Transformer	32-7214	
(42)	Cone & Voice Coil	02861	
(43)	Field Coil Assembly	36-3097	
(44)	Pilot Light	6608	
(45)	Resistor (7 ohms)	33-3035	
(46)	"A" Choke	32-1286	
(47)	Condenser (.5 mfd.)	30-4047	
(48)	Vibrator Choke	32-1235	
(49)	Condenser (.5 mfd.)	30-4147	
(50)	Vibrator Unit	38-5036	
(51)	Condenser (.05 mfd.)	30-4039	
(52)	Resistor (200 ohms)	7217	
(53)	Resistor (200 ohms)	7217	
(54)	Condenser (.00125 mfd.)	5886	
(55)	Power Transformer	32-7216	
(56)	Condenser (.01 mfd.)	30-4051	
(57)	Condenser (4-8. mfd.)	30-2072	
(58)	"B" Choke	32-7215	
(59)	R F Choke	32-1281	
(60)	Resistor (30,000 ohms)	7836	
(61)	Resistor (32,000 ohms)	3525	
	[Spark Plug Resistor	33-1015	
	Distributor Resistor	4851	
	[Interference Cond. (½ mfd.)	30-4007	
	Face Assembly	42-5208	
	Glass for Control	27-7325	
	Pointer	28-1957	
	Knobs	27-4091	
	Fuse	7227	
	Fuse Insulator	27-7131	
	Shafts	28-8214	

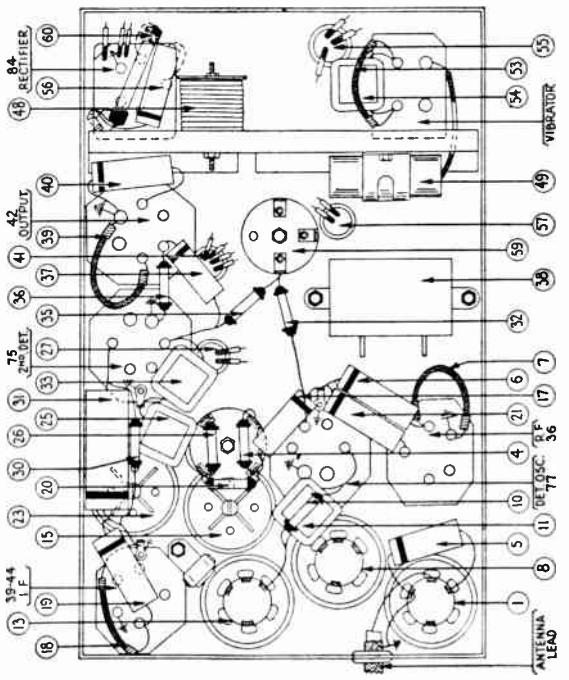


FIGURE 9

MODELS G,G (Code 122),H, H (Code 122),R PHILCO RADIO & TELEV. CORP.

Hupmobile For J,T & W

These Instructions have been carefully prepared for your use in installing the Models G, H, and R radio Receivers in Series W, J and T Hupmobile cars. Read these instructions carefully before beginning the installation.

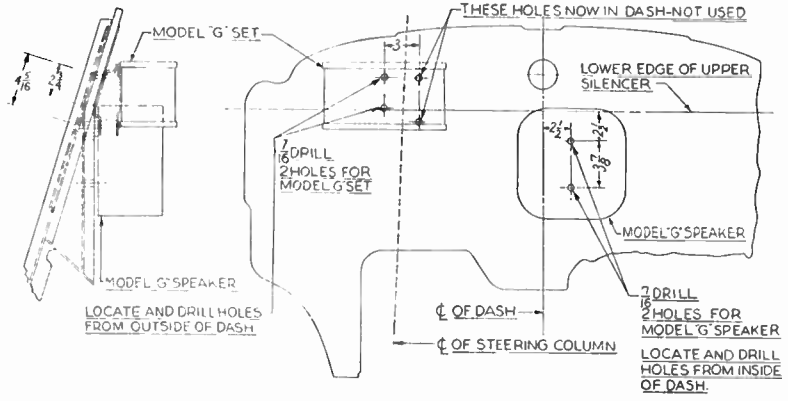


Figure 1

THESE DIMENSIONS ARE FOR "J" & "T" DASHES ONLY. "G" RADIO SET.

Antenna Lead

The antenna lead in all closed cars of Series W will be found at the base of the left hand windshield pillar. In all closed cars of the J and T Series, the antenna lead will be found at the base of the right pillar

Speaker Location (Models G and H)

In Series J and T Cars

The Model G speaker vibrator unit, and the Model H speaker must be mounted near the center of the car by means of two 5/16" studs which are screwed into two holes provided on the back of the speaker. Mount the Model G speaker with the tone control to the left (from driver's seat).

Refer to Figure 1 for the Model G and Figure 2 for the Model H speaker mounting hole locations. Cut the mounting studs to 2 3/8" overall before installing. Place the card board and felt baffle between the back of the H speaker and the dash.

In Series W Cars

Mount the Model G speaker vibrator unit over the steering column with the cable plug socket toward the right and the Model H speaker, with the plug socket on top. Cut the speaker mounting studs to 2 3/8" overall before installing. Place the cardboard and felt baffle between the back of the Model H speaker and the dash. Refer to Figure 3 for the location of the holes in the dash.

Receiver Location (Models G, H and R)

In Series J and T Cars

Figures 1 and 2 also show detailed dimensions for locating the mounting bolt holes for the Models G, H and R Receivers in the Series J and T cars. The Receiver must be mounted on the dash so that the control shafts enter from the right side

In Series W Cars

Figure 3 also shows detailed dimensions for locating the mounting bolt holes for the Models G, H and R Receivers in the Series W cars. The Receiver must be mounted on the dash so that the control shafts enter from the left side.

When installing the Model G, bend out the bottom lip of the dash mounting bracket before fastening the bracket to the dash. The top face of the Receiver, when installed, will then be parallel to the silencer pad and the long hold-down screw and spacer at the bottom of the bracket will be centered.

Fasten the Receiver mounting plate to the back of the Receiver with four hex-head sheet metal screws (one side of the bracket and part of the side of the Receiver housing have been left unpainted to insure good contact). After locating the holes for the dash mounting bracket, fasten it in place and then hook on the Receiver. Place the spacer between the dash and the Receiver brackets and tighten the long hold-down screw.

In order to obtain the maximum foot clearance in the series W cars, when installing the Models H and R, the Receiver must be mounted so that the top face is against the silencer pad. The Receiver must be tilted upwards and the full length of the bottom stud utilized as shown in Figure 3.

Connections

Model G

The connecting cable must be plugged into the outlets on both the Receiver and Speaker housings. The shield terminals on the cable ends must be grounded to the housings under hex-head screws close to the plug connectors.

The antenna lead which branches from the connecting cable close to the Receiver must be spliced, soldered and taped to the car lead-in wire at the base of the front pillar (left-hand in series W, right-hand in series J and T). Cut off all excess lead-in wire and ground the antenna lead shield terminal on the flange of the instrument board.

Models H and R

The speaker cable from the Model H Receiver must be plugged into the outlet on the speaker housing and the shield pigtail grounded to the rim of the speaker housing. The antenna lead (Models H and R) must be spliced, soldered and taped to the car lead-in at the base of the front pillar (left-hand in series W, right-hand in series J and T). Cut off all excess lead-in wire and ground the antenna lead shield terminal on the flange of the instrument board.

Models G, H and R Ammeter Lead

Place the fuse and fuse insulator in the metal fuse receptacle and connect to the Receiver battery lead. Connect the eyelet terminal of the lead to the ammeter.

Instrument Board Control

Remove the ash receiver. Loosen the two nuts behind the instrument board and take out the ash receiver bezel. Install the radio control from the front of the panel. Put the U clamp on the back of the control and tighten the wing nuts to hold the control in place. The cowl ventilator handle must pass between the flexible shafts on all Series W cars.

Connect the flexible shafts to the Receiver. The Model G shafts are equipped with male and female fittings. In series W cars, the male end must be coupled to the lower bushing and the female end to the upper bushing. In series J and T cars, the Model G Receiver is completely turned around so that the male shaft end connects to the upper bushing and the female end connects to the lower bushing.

Models H and R control shafts are both equipped with male fittings. The tuning or right-hand shaft must be coupled to the bushing nearest the small triangular shield on the end of the Receiver housing. The volume control or left-hand shaft must be coupled to the other bushing. The set screws on the coupling bushings must be loosened sufficiently to allow the shaft housing to be seated. After the flexible shafts have been properly coupled, tighten the set screws again. The dial light lead pin terminal must be connected in its socket which is on the side of the speaker on the Model G and on the control end on the Models H and R Receivers.

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers). Pull the knob from the right-hand control shaft and loosen the set screw. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob, and re-check with other stations for correct setting of the dial.

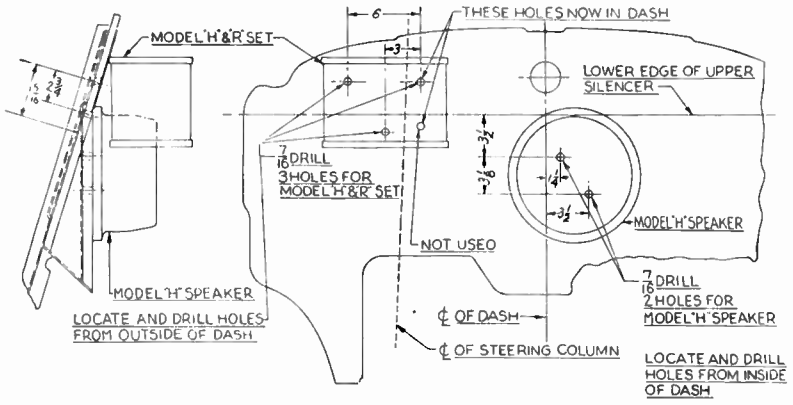


Figure 2

THESE DIMENSIONS ARE FOR "J" & "T" DASHES ONLY. "H" & "R" RADIO SET.

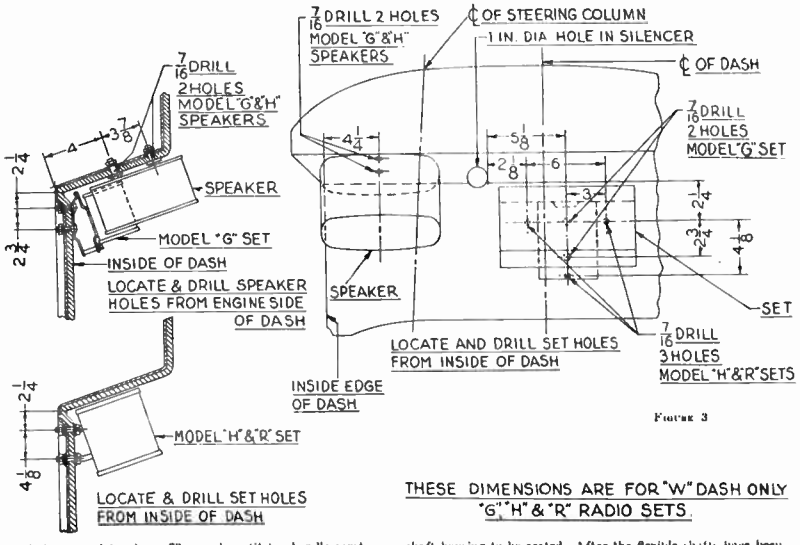


Figure 3

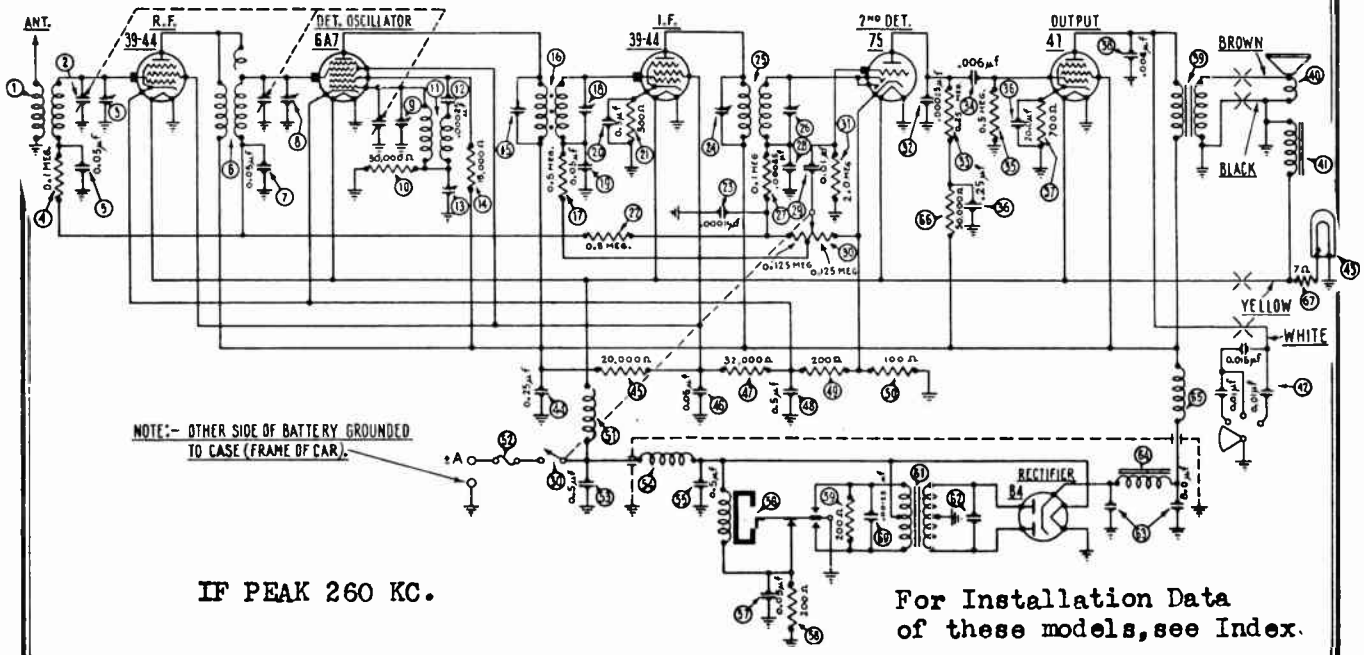
THESE DIMENSIONS ARE FOR "W" DASH ONLY "G", "H" & "R" RADIO SETS.

MODELS C & D Nash (AC-989)

MODEL AC-206 Studebaker

PHILCO RADIO & TELEV. CORP

MODEL ME Pierce-Arrow



IF PEAK 260 KC.

For Installation Data of these models, see Index.

(1)	Antenna Transformer	32-1220	(22)	Resistor (500,000 ohms)	6097	(43)	Pilot Lamp	6608
(2)	Tuning Condenser	31-1083	(23)	Condenser (.00011 mfd.)	4519	(44)	Condenser (.25 mfd.)	04360
(3)	1st Padder (in tuning cond.)		(24)	Padder (prim. 2nd I.F.)	31-6008	(45)	Resistor (20,000 ohms)	6649
(4)	Resistor (100,000 ohms)	6099	(25)	I.F. Transformer (2nd)	32-1237	(46)	Condenser (.05 mfd.)	30-4020
(5)	Condenser (.05 mfd.)	30-4020	(26)	Padder (secondary 2nd I.F.)	31-6008	(47)	Resistor (32,000 ohms)	3525
(6)	R.F. Transformer	32-1221	(27)	Resistor (100,000 ohms)	6099	(48)	Condenser (.5 mfd.)	30-4048
(7)	Condenser (.05 mfd.)	30-4020	(28)	Condenser (.00025 mfd.)	3082	(49)	Resistor (200 ohms)	7217
(8)	2nd Padder (in tuning cond.)		(29)	Condenser (.01 mfd.)	30-4051	(50)	Resistor (100 ohms)	7838
(9)	3rd Padder (in tuning cond.)		(30)	Vol. Control Assembly	38-5280	(51)	A Choke	32-1268
(10)	Resistor (50,000 ohms)	6098	(31)	Resistor (2,000,000 ohms)	33-1025	(52)	15 Amp. Fuse	7227
(11)	Oscillator Transformer	32-1222	(32)	Condenser (.00025 mfd.)	5858	(53)	Condenser (.5 mfd.)	30-4061
(12)	Condenser (.00025 mfd.)	3082	(33)	Resistor (250,000 ohms)	3768	(54)	Vibrator Choke	32-1259
(13)	Padder	04000S	(34)	Condenser (.006 mfd.)	30-4024	(55)	Condenser (.5 mfd.)	30-4061
(14)	Resistor (15,000 ohms)	6208	(35)	Resistor (500,000 ohms)	6097	(56)	Vibrator	38-5036
(15)	Padder (prim. 1st I.F.)	31-6007	(36)	Condenser (20 mfd.; 25 mfd.)	30-4065	(57)	Condenser (.05 mfd.)	30-4039
(16)	I.F. Transformer (1st)	32-1236	(37)	Resistor (700 ohms)	33-3019	(58)	Resistor (200 ohms)	7217
(17)	Resistor (500,000 ohms)	6097	(38)	Condenser (.006 mfd.)	30-4024	(59)	Resistor (200 ohms)	7217
(18)	Padder (secondary 1st I.F.)	31-6007	(39)	Output Transformer	32-7102	(60)	Condenser (.00125 mfd.)	5886
(19)	Condenser (.05 mfd.)	30-4020	(40)	Cone and Coil	36-3020	(61)	Power Transformer	32-7131
(20)	Condenser (.5 mfd.)	30-4058	(41)	Field Coil Assembly	36-3130	(62)	Condenser (.006 mfd.)	30-4024
(21)	Resistor (500 ohms)	6977	(42)	Tone Control	30-4056	(63)	Filter Condenser	30-2015
						(64)	B Chokes	32-7038
						(65)	R. F. Chokes	32-1078
						(66)	Resistor (50,000 ohms)	4237
						(67)	Resistor (7 ohms)	5110
							Spark Plug Resistors	4531
							Distributor Resistor	4546
							Screw Type Resistor	4851
							Interference Condenser	30-4007
							Dial	27-5022
							Studs—4½" Special	28-6102
							Nuts (mounting)	W55
							Knob	03064
							Battery Cable	38-5296
							Antenna Lead	38-5131
							Instrument Panel Control	42-5088
							Acorn Nut	W821
							De Luxe Control Assembly	42-5097
							Standard Control Assembly	42-5101
							Steering Col. Control Assem.	42-5096
							Gasket	27-7290
							Nash Control Plate	28-7025

Above is Model D Nash-Philco (AC-989). Model C Nash-Philco (AC-989) is similar except that a 42 output tube is used and resistor #37 is 550 ohms, part number 6977.

Studebaker Model AC-206.

This is same as above and is available with 42 output tube and resistor #37 changed to 550 ohms, part number 6977. Items 1 to 67 in above list are identical for Model AC-206. See following items for additional accessories

Spark Plug Resistors	4531
Distributor Resistor	4546
Screw Type Resistor	4851
Interference Condenser	30-4007
Dial	27-5027
Studs	28-6036
Nuts (mounting)	W55
Knobs	03064
Battery Cable	38-5296
Antenna Lead	38-5161
Instrument Panel Control	42-5088
Acorn Nut	W821
Steering Column Control	42-5087

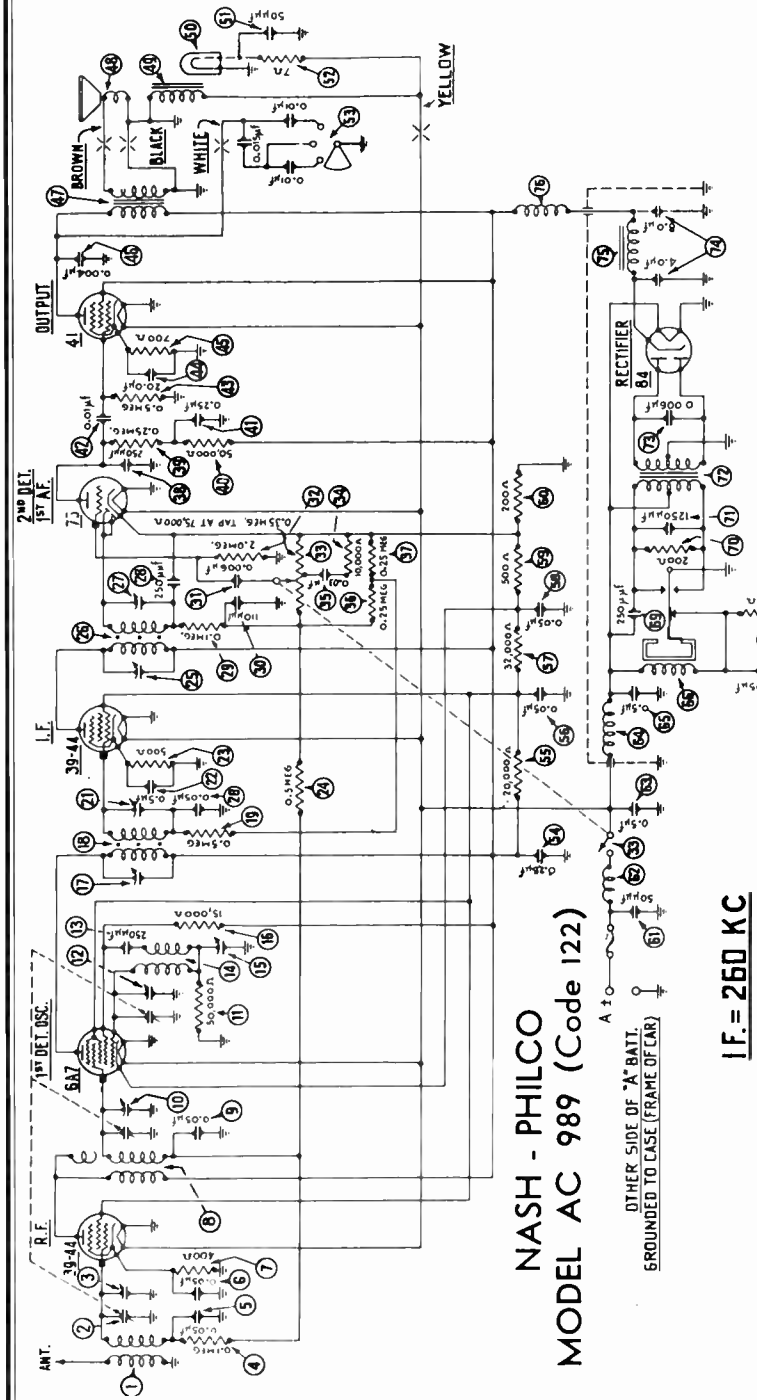
Pierce-Arrow Model ME

This is same as above except a 42 tube is used in the output and resistor #37 is changed to 550 ohms, part number 6977. Also volume control assembly's part number is changed to 38-5511. Other numbered items in above list are identical for the Model ME. See items below for additional accessories.

Spark Plug Resistors	33-1015	Right Hand Mtg. (Walnut)	42-5126
Distributor Resistor	33-1019	Left Hand Mtg. (Walnut)	42-5127
Screw Type Resistor	4851	Right Hand Mtg. (Black)	42-5128
Interference Condenser	4522	Left Hand Mtg. (Black)	42-5129
Studs (Set Mtg.)	28-6036	Knobs (Black)	27-4058
Nuts (Mounting)	W55A	Knobs (Walnut)	27-4098
Battery Cable	38-5296	Tuning and Volume Shaft Assembly, 28" Long	28-8206
Antenna Lead	38-5131	Face Assembly	42-5130
Fuse Insulator	27-7131	Pointer	28-1805
Speaker (Model A15)	36-1048	Face Gasket	27-7331
Stud (Model A15)	28-6132	Glass	27-7325
Wood Block (Spker. Mtg.)	27-7359	Glass Gasket	27-7327
Speaker Back Plate	27-7360	Gasket (Panel to Casting)	27-7346
Cardboard & Felt Assem.	2697A	Speaker Cable Assembly	41-3069
Control Unit Assembly			

MODEL D
Nash AC-989 (Code 122
Schematic, Parts List

PHILCO RADIO & TELEV. CORP.



1	Antenna Transformer	32-1229	21	Resistor (500,000 ohms)	6097	47	Output Transformer	32-7102	70	Resistor (200 ohms)	7217
2	Tuning Condenser	31-1083	25	Padder Pri. 2nd I. F. Trans.		48	Cone and Voice Coil	36-3139	71	Condenser (.00125 mfd.)	5886
3	First Padder (in tun. cond.)		26	Second I. F. Transformer	32-1237	49	Field Coil Assembly	36-3130	72	Power Transformer	32-7131
4	Resistor (100,000 ohms)	6049	27	Padder Sec. 2nd I. F. Trans.		50	Pilot Lamp	34-2039	73	Condenser (.006 mfd.)	30-4024
5	Condenser (.05 mfd.)	30-4020	28	Condenser (.00025 mfd.)	30-1032	51	Condenser (.00005 mfd.)	30-1029	74	Filter Condenser (4-8 mfd.)	30-2015
6	Condenser (.05 mfd.)	30-4020	29	Resistor (100,000 ohms)	6049	52	Resistor (7 ohms)	33-3035	75	Filter Choke	32-7104
7	Resistor (400 ohms)	33-3016	30	Condenser (.00011 mfd.)	30-1031	53	Tone Control	30-4056	76	R. F. Choke	32-1281
8	R. F. Transformer	32-1221	31	Condenser (.006 mfd.)	30-4125	54	Condenser (.25 mfd.)	04360		Spark Plug Resistors	33-1101
9	Condenser (.05 mfd.)	30-4020	32	Resistor (2,000,000 ohms)	33-1025	55	Resistor (20,000 ohms)	6049		Spark Plug Resistors	33-1102
10	Second Padder (in tun. cond.)		33	Vol. Control & Sw. Assembly	38-3035	56	Condenser (.05 mfd.)	30-4020		Distributor Resistor	33-1103
11	Resistor (50,000 ohms)	6208	34	Resistor (10,000 ohms)	33-1030	57	Resistor (32,000 ohms)	3525		Interference Condenser	30-4007
12	Third Padder (in tun. cond.)		35	Condenser (.03 mfd.)	30-4025	58	Condenser (.05 mfd.)	30-4020		Studs	28-6102
13	Condenser (.00025 mfd.)	30-1032	36	Resistor (250,000 ohms)	33-1097	59	Resistor (500 ohms)	6977		Nuts (mounting)	W55A
14	Oscillator Transformer	32-1222	37	Resistor (250,000 ohms)	33-1097	60	Resistor (200 ohms)	7217		Battery Cable	38-5286
15	Padder	0100085	38	Condenser (.00025 mfd.)	30-1032	61	Condenser (.00005 mfd.)	30-1029		Antenna Lead	38-5131
16	Resistor (15,000 ohms)	6208	39	Resistor (250,000 ohms)	3768	62	Choke	32-1374		Acorn Nut	W821
17	Padder (Pri. 1st I. F. Trans.)		40	Resistor (50,000 ohms)	4257	63	Condenser (.5 mfd.)	30-4061		Dial	27-5034
18	First I. F. Transformer	32-1236	41	Condenser (.25 mfd.)	30-4065	64	Vibrator Choke	32-1259		Knob (volume)	27-4045
19	Resistor (500,000 ohms)	6097	42	Condenser (.01 mfd.)	30-4169	65	Condenser (.5 mfd.)	30-4061		Knob (tuning)	03004
20	Condenser (.05 mfd.)	30-4020	43	Resistor (500,000 ohms)	6097	66	Vibrator	38-5036		Flexible Shaft (volume)	28-8182
21	Padder (Sec. 1st I. F. Trans.)		44	Condenser (20 mfd.)	30-4065	67	Condenser (.05 mfd.)	30-4039		Flexible Shaft (tuning)	28-8181
22	Condenser (.5 mfd.)	30-4038	45	Resistor (700 ohms)	33-3019	68	Resistor (200 ohms)	7217			
23	Resistor (300 ohms)	6977	46	Condenser (.004 mfd.)	30-4185	69	Condenser (.00025 mfd.)	5838			

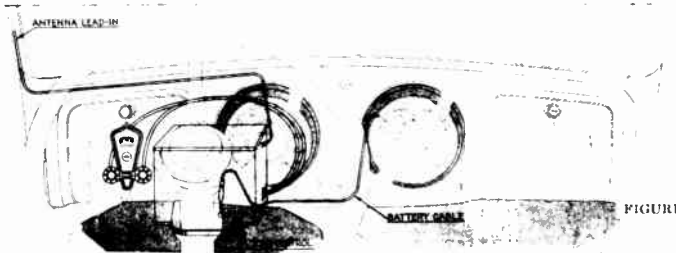


FIGURE 2

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Model D Nash Philco automobile radio Receiver in the 1934 model Nash cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1934 Nash closed cars is brought down the left front pillar post and is coiled behind the left cowl trim panels.

Receiver Location and Installation

Refer to Figure 1 which gives detailed dimensions for the location of the holes to be drilled in all models. These dimensions are shown from the engine side of the dash. On all current model cars, the carburetor air cleaner and silencer should be removed until the Receiver is bolted in place. This will facilitate drilling the holes in the dash.

On all 1290 models the Receiver must be spaced away from the dash approximately two inches to clear all pulleys and cables. On the 1220 and 1280 models the Receiver should be spaced far enough away from the dash to give ample clearance for the speaker cover flange and keep the Receiver in a vertical position.

In fastening the studs to the Receiver the lock washer is placed between the Receiver and the shoulder on the bolt. The large flat washer is used against the padding on the inside of the dash. Extra nuts are furnished to be used as spacers. Mount the Receiver with the control shaft couplings towards the center of the car and with the speaker facing down. See Figure 2. On the 1220 and 1280 models the throttle control wire should be disconnected to facilitate installation.

Instrument Board Control

A dummy door is provided with cutouts in which the control unit is mounted. Remove the standard door from the instrument board by taking out the two stove bolts at the bottom and loosening the nut on the rear of the cigar lighter. Disconnect the lighter wire at the fuse block. On cars not equipped with a cigar lighter the door is fastened in place with a knob and stove bolts. Install the control door on the instrument board. The greatest care must be used so as not to mar or scratch the finish.

When no provision is made in a car for instrument board mounting, a steering column control assembly may be secured from your distributor or the Nash Factory. This assembly is furnished with an adjustable strap and bracket and may be mounted to the right side or above the steering column. In assembling the strap and bracket be sure that the round nut clinched on the strap is against the steering column. This will prevent the round nut from being torn from the strap.

The black lead coming from the back of the control unit is the pilot light lead which must be connected under the pilot light terminal screw head on the speaker panel.

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right hand knob on the control is the tuning control the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the steering column dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. The volume control and switch in the Receiver must be turned all the way off (counter clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly aligned. Then tighten the casing clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections (SEE FIG. 2)

Connect the battery cable to the Receiver. The small end at the Receiver must be plugged into the fuse housing receptacle on the battery lead. The other end of the battery lead must be connected to the ammeter and the cable dressed up out of the way. Be sure the fuse and fuse insulator are placed in the fuse housing before connecting the cable to the Receiver.

Antenna Lead (SEE FIG. 2)

A shielded antenna lead is provided for connecting the Receiver to the roof antenna. This lead must be plugged into the bayonet type receptacle on the side of the Receiver. Splice to the antenna lead-in as close as possible to the left front pillar, cutting off all the excess car lead-in. The shield pig tail must be grounded to the flange of the instrument board.

Lining Up The Receiver

The dial in the control is calibrated in channel numbers, which with the addition of a cipher indicate the frequencies in kilocycles, i.e. 70 on the dial represents 700 kilocycles.

Tune in a broadcast station of known frequency and then loosen the coupling screws on the tuning shaft. Turn the dial to the proper number and tighten set screws again. Then recheck the dial setting.

Ignition and Generator Interference Suppression

Install spark plug resistors on all spark plugs. On the right side of the motor the spark plug porcelains are covered with a rubber sleeve. When the sleeves are replaced, make sure that they are pushed down far enough to completely cover the porcelain on the plugs. Dipping the rubber sleeves in gasoline will make this operation very easy.

Cut the coil to distributor high tension lead about one inch from the distributor head and install the screw type suppressor.

Install a by-pass condenser on the generator and connect the condenser lead to the generator side of the cutout relay. The condenser must be fastened in place under the relay mounting screw.

The other by-pass condenser must be mounted behind the instrument board and the lead connected to the ammeter. Fasten the condenser mounting bracket under one of the instrument mounting screws. On some cars, this condenser may be more effective when connected to the dome light wire. In such cases, the condenser lead must be spliced to the dome light wire at the right pillar post and the condenser mounted on the instrument board flange.

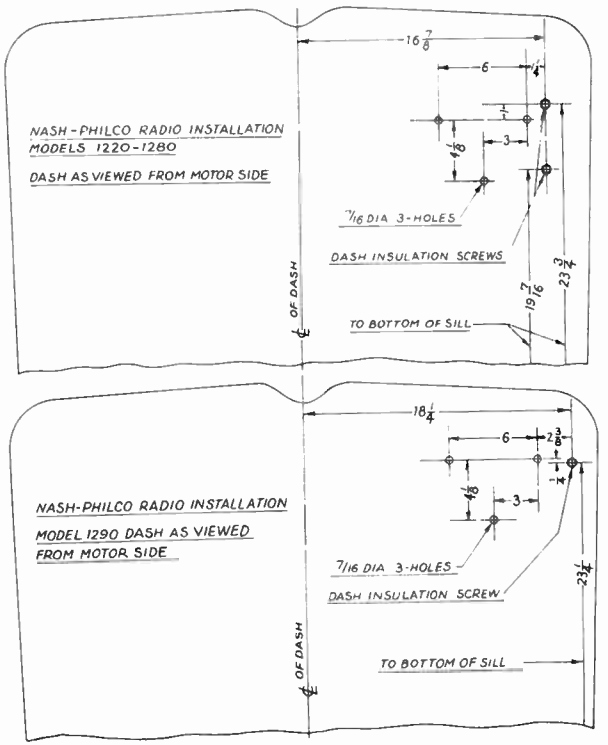


FIGURE 1

Ordinarily these operations will eliminate all ignition interference. Should there still be some objectionable interference, the distributor rotor arms must be peened out in order to minimize the sparking in the distributor head. Both ends of the rotor must be peened.

Peening the Rotor Arm

Place one end of the rotor on a steel block and peen with a small machinist's hammer, extending it for the first trial about .005 inch. Great care must be taken in performing the operation to make sure the rotor arm itself does not strike the stationary electrodes. Repeat this operation until there is just sufficient clearance (.002 inch to .005 inch) between the end of the rotor arm and the stationary electrodes in the distributor cap.

Dress the end of the rotor with a file to its original shape. Without turning on the ignition, press the starter and then examine the rotor arm and the stationary electrodes to be sure that the steel arm is not striking the stationary electrodes.

To judge whether or not the rotor has been lengthened sufficiently, place a thick layer of chalk on each of the stationary electrodes. If there is evidence of the rotor touching the stationary electrodes, file off about .001 inch and recheck.

After the one end of the rotor arm has been peened, repeat the procedure with the other end. When both ends of the motor have been properly peened, replace the rotor and distributor cap.

If there is a tendency for the motor to lope or roll at idling speed, remove the spark plugs and set the gaps to .030 inch. It may be necessary to change slightly the carburetor idle adjustment.

MODEL AC-206 Studebaker
MODEL AC-236 Studebaker PHILCO RADIO & TELEV. CORP.
Installation Data

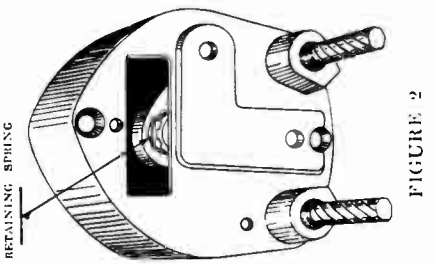


FIGURE 2

Receiver Location and Installation

Refer to Fig. 1 showing the location of the holes in the dash. Locate one of the holes and mark with a sharp punch; then use the template furnished with the Receiver to locate the remaining two holes. These holes should be drilled with a 7/16" drill.

Install the Receiver with the control connections to the left side of the car with the speaker facing down. (see Fig. 3)

Control Unit

The control unit is mounted on a panel which replaces the dummy door on the left side of the instrument board. These panels are held in place by means of four small metal tabs which pass through corresponding slots in the instrument board proper and are bent to one side. Care should be taken to fasten this panel securely so it does not rattle or mar the finish.

The control is furnished with a blank lock cylinder which must be crushed to match the car keys. This operation must be completed before the control is installed on the instrument board.

Instructions for Fitting Car Key to Control Lock

1. Remove the knobs and take off the control unit from the door.
2. Remove the hex-head screw in the rear and take out the pilot lamp bracket.
3. Reach in through the oblong opening in the back of the control unit with a medium size screw driver and press down on the brass retaining lock spring, at the same time working the lock cylinder forward. (See Fig. 2).
4. Insert the car key in the lock cylinder and crush in the same manner that you crush the standard lock, with pliers or vise.
5. Assemble the dial and spring on the cylinder. Push down the retaining spring and replace the lock in the same relative position that it had when removed. With the key in the lock push the lock back, working the lock pin in place in the slot in the lock bar in back of the lock. Push the lock in until the retaining spring snaps in place.
6. Ressemble the control on the panel.

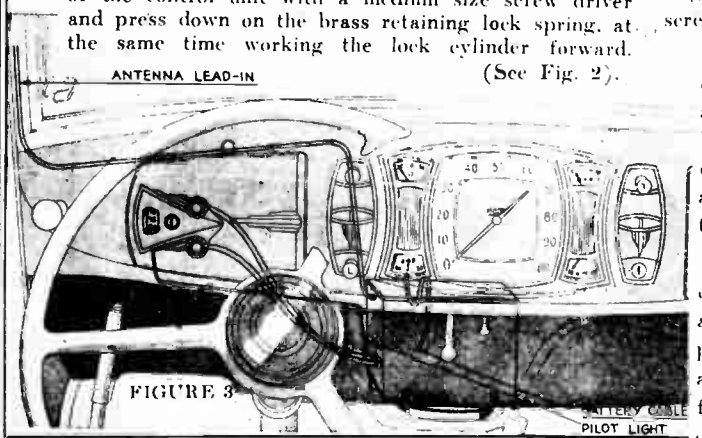


FIGURE 3

Steering Colu mn Control Unit

For installation in Studebaker cars prior to the 1934 models a special steering column control kit is available,

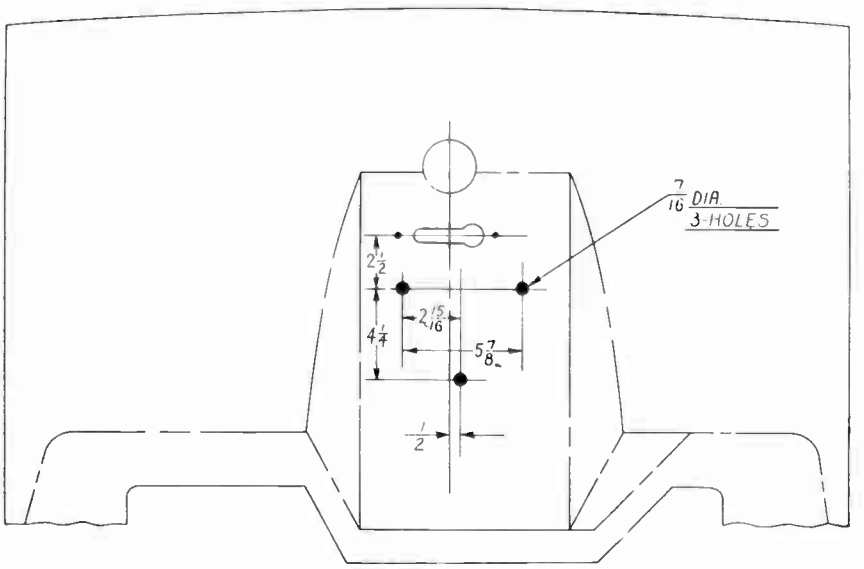


FIGURE 1

Studebaker Stock No. AC-207. This kit includes a steering column control unit with the proper length flexible shafts and all the necessary hardware for installation on the steering column.

Control Shaft Installation

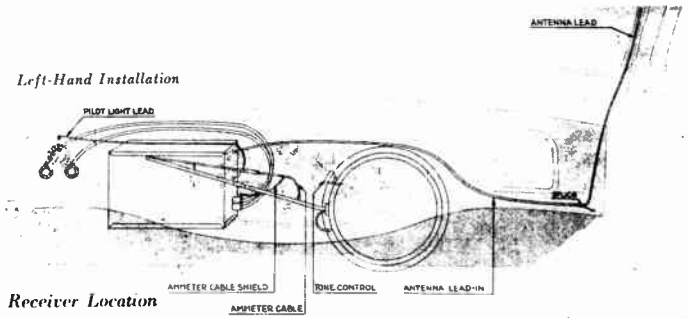
Turn the volume control (lower knob in panel mounting, left hand knob in steering column mounting) to a position where the key will lock it. Loosen the set screws in both shaft couplings and connect the volume control shaft to the rear coupling (nearest the dash). Then connect the tuning control shaft in the front coupling (nearest the front seat) and tighten all the set screws.

Battery Cable Connection (See Fig. 3)

Connect the battery cable to the Receiver by means of the fuse housing connector which fastens by inserting and making a slight turn clockwise, the other end must be connected to the right side of the ammeter and the cable dressed up behind the Receiver. Be sure the fuse and fuse insulator are placed in the fuse housing before the battery cable is connected to the Receiver.

The antenna cable must be plugged into the receptacle on the left side of the Receiver near the top and run along the instrument board to the left hand windshield post where it must be connected to the car antenna lead and the shielding grounded. Connect the black wire from the dial light on the control unit under the screw on the lower left side of the speaker face.

FIGURE 4. *Left-Hand Installation*



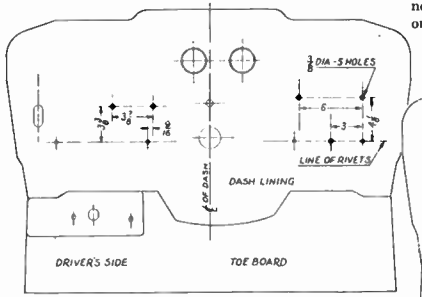
Receiver Location

If the installation of the Receiver is to be made on the right side of the car use the dimensions given in Figure 1. Refer to Figure 2 for the dimensions when the Receiver is to be mounted on the left side of the car.

Before locating and drilling the holes for the left-hand installation, remove the left glove box. The box is fastened at the instrument board by four short bolts and nuts, two at the top and two at the bottom. Those at the bottom are very easily removed, while those at the top can be removed by extending the hand up between the cowl and the box and holding the nuts while the bolts are removed. Two more bolts at the rear right side should also be removed and the bracket bent over to one side. Remove the left glove box door by loosening the two screws that fasten the door hinge to the instrument board. A similar procedure is used for removing the right glove box and door when making right-hand installations.

Locate and drill the three 7/16″ holes from the inside of the dash, in accordance with Figure 1 or Figure 2 as required. The holes must be located accurately, otherwise there is danger of drilling through the windshield wiper tube which is located between the inner

FIGURE 1. *Right-Hand Installation*



and outer dash. Fasten the three studs into the threaded holes on the Receiver and mount the Receiver as shown in Figure 3 for right-hand installation and Figure 4 for left-hand installation. By cutting 3/8″ from all three studs, the Receiver can be mounted without removing the bottom stud.

Use the large lockwashers between the stud shoulders and the Receiver. The large flat washers should be used against the padding behind the Receiver. The high-tension conduit should be bent slightly forward to prevent interference with the Receiver mounting studs.

Speaker Location

The speaker is mounted with the tone control towards the center of the car. Extra long bolts and a block of wood are provided so that the speaker can be mounted squarely on the dash. The hole locations are given in Figure 1 and Figure 2.

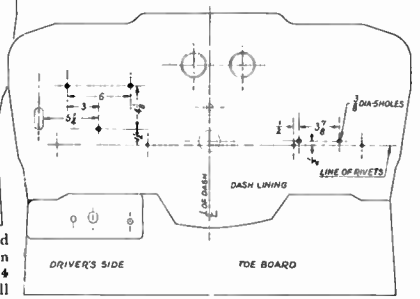
The felt edge on the round cardboard should be placed next to the rim of the speaker housing and the circular piece of fibre placed in back of cardboard with the cut-out toward the center of the car. The felt and fibre improve the tone of the speaker and keep out dust and must be used.

Wiring Connections

Refer to Figure 3 or 4 as Required

The antenna shielded lead-in should be soldered and taped to the car antenna lead. This lead-in is provided with a plug-in connection which fits into a female connector on the side of the Receiver. The shield pigtail on the end of this lead-in must be grounded to the

FIGURE 2. *Left-Hand Installation*



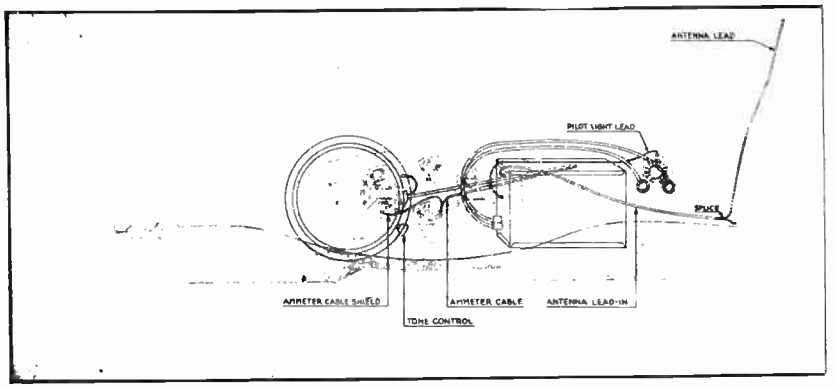


FIGURE 3. *Right-Hand Installation*

flange of the instrument board with a small bolt and nut close to the point where the antenna lead leaves the front pillar.

All excess antenna lead must be cut off or it will be difficult to eliminate ignition noise.

Connect the ammeter lead to the ammeter and the shielding on this lead (black wire) under a metal screw behind the speedometer. Insert the fuse insulator and fuse in the metal fuse housing and connect to the Receiver lead. The shield connection (black wire) on the Receiver end must be grounded under a sheet metal screw on the Receiver.

The speaker cable must be plugged into the socket in the speaker and the shield pigtail grounded under a nut on the rim of the speaker housing.

Glove Box Door Control

Since the glove box door has already been removed, attach the radio control and dress the flexible control shafts and dial light wire over the top of the Receiver. Refer to Fig. 3 or Fig. 4 as required.

Control Shaft Installation

The flexible shafts each have a split end which engages a pin in the bushing in the Receiver. The right-hand control knob is the station selector. The end of the station selector shaft must be coupled (plugged-in) to the bushing nearest the rubber mounting washers on the end of the Receiver housing. Line up the split end of the shaft with the pin and push it in as far as it will go. Tighten the set screws on the shaft housing bushings. The same procedure must be followed for the left-hand (Switch and Volume Control) shaft.

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers). Pull the knob from the right-hand control shaft and loosen the set screw found there. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob. A finer adjustment can be made if this is done on a station between 1000 and 1500 kilocycles.

Wind the dial light wire around the flexible shafts and insert the pilot light connector in the hole in the Receiver housing just above the flexible shaft bushings.

Ignition and Generator Interference Supression

Two interference condensers are supplied — one must be fastened under the inside generator relay leg and the lead connected to the battery side of the relay. The second condenser must be fastened under an ignition coil mounting screw and the lead connected to the *ammeter side* of the coil.

Cut the spark plug terminals from the spark plug wires and screw on the spark plug resistors and snap them in place. Cut each distributor-to-coil high-tension wire about 1″ from the distributor and screw into it a distributor resistor. Then screw the distributor end of the lead into the resistor and plug into the distributor cap again. Peen the distributor rotor to reduce sparking at this point. Place the end of the rotor on a flat steel block and peen with a machinists hammer. Both ends must be treated with a double coil system. The more care taken on this operation the better the interference elimination will be. Chalk the end of the rotor each time it is peened to gauge the clearance. See that all high-tension wires entering the distributor cap are seated properly.

These operations should give good elimination; however, in severe cases, all rods and tubes entering the dash should be bound together and grounded to the metal dash. Speaker, antenna and ammeter cables should be dressed and fastened in the position which gives the least motor interference.

MODEL Junior AC-236 Stud
MODEL J Nash (AC-1189 PHILCO RADIO & TELEV. CORP. Schematic, Parts List
Lafayette 110 Series

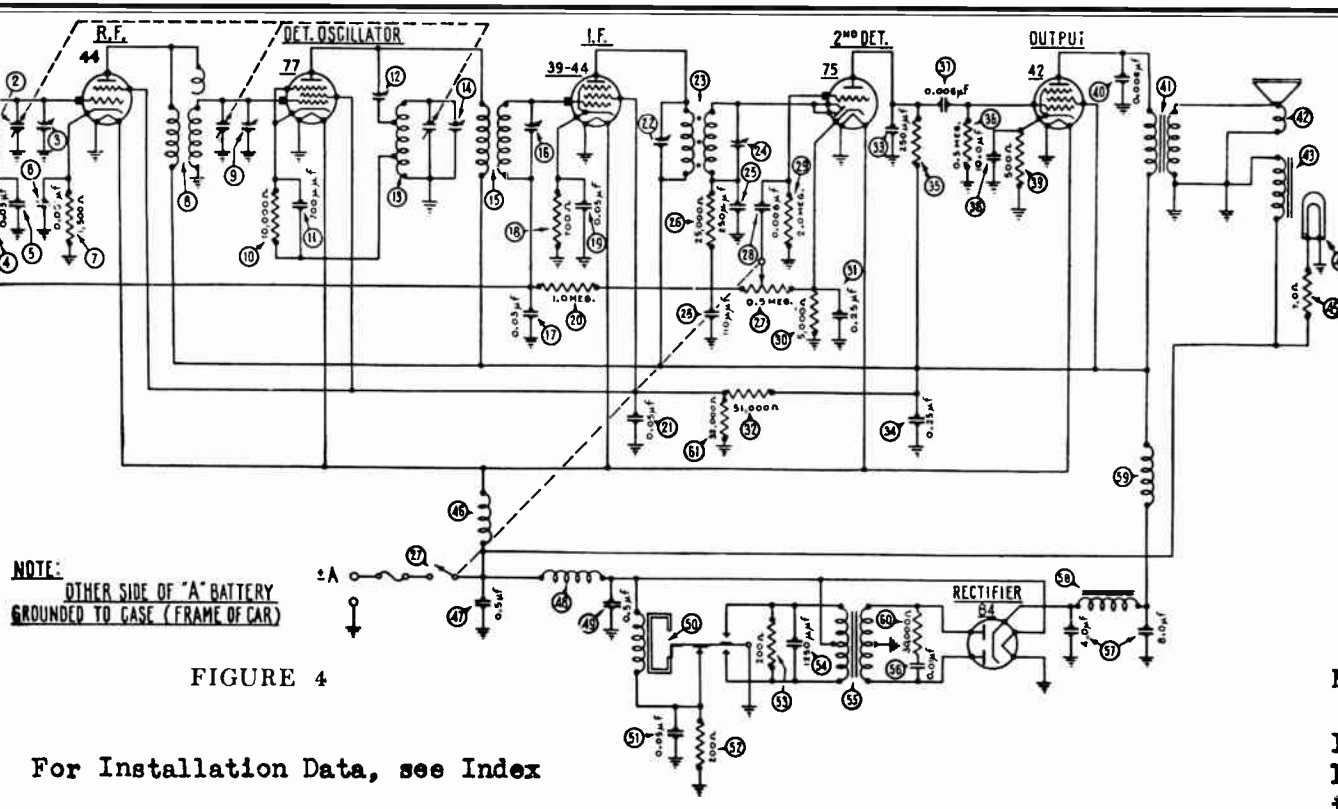


FIGURE 4

For Installation Data, see Index

STUDEBAKER JUNIOR MODEL AC-236 PARTS LIST

(1) Antenna Transformer	32-1331	(21) Condenser (.05 mfd.)	30-4020
(2) Tuning Condenser	31-1149	(22) Padders (Prim. 2nd I. F.)	
(3) 1st Padder (on tun. cond.)		(23) 2nd I. F. Transformer	32-1237
(4) Resistor (70,000 ohms)	33-1115	(24) Padder (Sec. 2nd I.F. Tran.)	
(5) Condenser (.03 mfd.)	30-4025	(25) Cond. (.00011-.00025 mfd.)	30-1020
(6) Condenser (.05 mfd.)	30-4020	(26) Resistor (25,000 ohms)	33-1013
(7) Resistor (1500 ohms)	33-3047	(27) Vol. Con. & Switch Assm.	33-5058
(8) R. F. Transformer	32-1332	(28) Condenser (.006 mfd.)	30-4125
(9) 2nd Padder (on tun. cond.)		(29) Resistor (2,000,000 ohms)	33-1025
(10) Resistor (10,000 ohms)	33-1000	(30) Resistor (5000 ohms)	33-1001
(11) Condenser (.0007 mfd.)	5863	(31) Condenser (.25 mfd.)	30-4146
(12) Padder (Pri. 1st I. F. Tran.)		(32) Resistor (51,000 ohms)	5868
(13) Oscillator Transformer	32-1333	(33) Condenser (.00025 mfd.)	3082
(14) 3rd Padder (on tun. cond.)		(34) Condenser (.25 mfd.)	04360
(15) 1st I. F. Transformer	32-1329	(35) Resistor (100,000 ohms)	6099
(16) Padder (Sec. 1st I. F. Tran.)		(36) Resistor (500,000 ohms)	6097
(17) Condenser (.03 mfd.)	30-4025	(37) Condenser (.006 mfd.)	30-4125
(18) Resistor (700 ohms)	6443	(38) Condenser (10 mfd.)	7440
(19) Condenser (.05 mfd.)	30-4020	(39) Resistor (500 ohms)	33-3031
(20) Resistor (1,000,000 ohms)	33-1096	(40) Condenser (.006 mfd.)	30-4024

(41) Output Transformer	32-7214	(61) Resistor (32,000 ohms)	3525
(42) Cone & Voice Coil	02861	Spark Plug Resistor	4531
(43) Field Coil Assembly	36-3097	Distributor Resistor	4546
(44) Pilot Light	6608	Screw Type Resistor	4851
(45) Resistor (7 ohms)	33-3035	Interference Condenser	30-4007
(46) "A" Choke	32-1268	Dial	27-5040
(47) Condenser (.5 mfd.)	30-4047	Studs	28-6036
(48) Vibrator Choke	32-1235	Nuts (mounting)	W55A
(49) Condenser (.5 mfd.)	30-4147	Knobs (tuning)	03334
(50) Vibrator Unit	38-5036	Knobs (volume)	06886
(51) Condenser (.05 mfd.)	30-4039	Battery Cable	38-5296
(52) Resistor (200 ohms)	7217	Acorn Nut	W821
(53) Resistor (200 ohms)	7217	Fuse	7227
(54) Condenser (.00125 mfd.)	5886	Fuse Insulator	27-7131
(55) Power Transformer	32-7216	4-Prong Socket	27-6006
(56) Condenser (.01 mfd.)	30-4051	5-Prong Socket	27-6014
(57) Condenser (4.—8. mfd.)	30-2072	6-Prong Socket	6417
(58) "B" Choke	32-7215	Instrument Panel Control	42-5164
(59) R. F. Choke	32-1281	Steering Column Control	42-5165
(60) Resistor (30,000 ohms)	7836		

Model J Nash-Philco Lafayette 110 Series Model AC-1189

Items 1 to 61 in the list at the left are identical for Model AC-1189. See following items for additional accessories.

Spark Plug Resistors	33-1101
Distributor Resistor	33-1103
Screw-Type Resistor	4851
Interference Condenser	30-4007
Dial	27-5041
4-Prong Socket	27-6006
5-Prong Socket	27-6014
6-Prong Socket	6417
Studs	28-6036
Nuts (Mounting)	W55
Knob	03064
Battery Cable	38-5296
Instrument Panel Control	42-5169
Fuse	7227
Fuse Insulator	27-7131
Keys	6091

Model J Nash-Philco Model AC-1289

Items 1 to 61 in the list at the left are identical for Model AC-1289. See following items for additional accessories.

Ins. Panel Control DeLuxe	42-5183
Ins. Panel Con. Standard	42-5182
Fuse	7227
Fuse Insulator	27-7131
Keys	6091
4-Prong Socket	27-6006
5-Prong Socket	27-6014
6-Prong Socket	6417
Spark Plug Resistors	33-1101
Distributor Resistor	33-1103
Screw-Type Resistor	4851
Interference Condenser	30-4007
Dial	27-5041
Studs	28-6102
Nuts (Mounting)	W55
Knob	03064
Battery Cable	38-5296

THE INSTRUCTIONS have been carefully prepared for your use in installing the Model "J" Nash-Philco automobile radio Receiver in the 1934 Model LAFAYETTE cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1934 Lafayette closed cars, is brought down the left front pillor post and is coiled behind the left cowl trim panel.

Instrument Board Control

The instrument board control can be installed more conveniently if this is done as the first operation.

Remove the left dummy ash receptacle door by removing the three nuts behind the instrument panel. Refer to Fig. 1 for dimensions. Paste a piece of paper 1½" wide, 2½" long, over the two lower holes. Pierce holes through the paper with a pencil and draw a center line between them. Drop a vertical line down 18/32" from the center of these holes and mark with a center punch. Drill a ⅜" hole. Remove the paper and elongate the hole horizontally with a round file, as shown on Fig. 1. The control shaft holes should now be enlarged with a ⅜" drill. With a round file, notch the top of the large hole, as shown on Fig. 1. Remove the burrs. Assemble the felt washer between the control head casting and the back of the instrument board. Mount the cover plate and assemble with the two flat-head machine screws. Dress the flexible control shafts over the top of the instrument board-to-dash bracket.

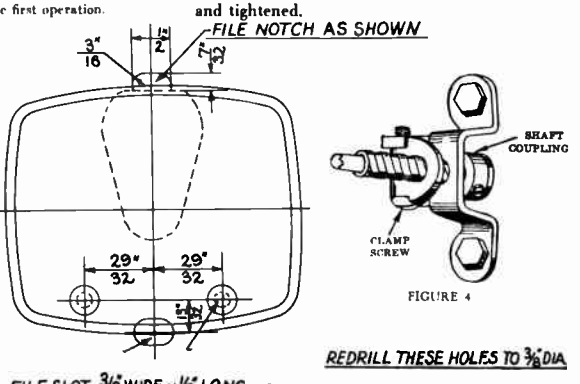


FIGURE 1

Receiver Location and Installation

Holes for the two top mounting studs are provided in the metal dash. The single hole on the bottom is occupied by a padding fastening bolt. The locations of these holes are shown in Fig. 2. On certain bodies these holes must be slotted downward a half inch.

Install the mounting studs in the dash holes. Drop the steering column to its lowest position by loosening the two bolts on the steering column bracket. This will facilitate the installation of the radio behind the steering column.

In fastening the studs to the Receiver, the lock washer must be placed between the Receiver and the shoulder on the bolt. The large flat washer must be placed against the padding on the inside of the dash. Mount the Receiver with the control shaft couplings toward the center of the car and with the speaker facing down. See Fig. 3.

Slip the radio in place, and screw the studs into the holes in the Receiver housing from the outside of the dash. This operation can be made easier if the end of the studs entering the set are slightly tapered.

After the radio is installed, the steering column must be returned to its original position and tightened.

FIGURE 4

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control—the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the instrument board-to-dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. See Fig. 4. The volume control and switch in the Receiver must be turned all the way off (counter clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly aligned. Then tighten the casing clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections

Insert the fuse and fuse insulator in the fuse receptacle and connect to the Receiver battery lead as shown in Fig. 3. Connect the black-white lead of the battery cable to the battery side of the ammeter.

The black lead at each end of the battery cable is the shield lead which must be grounded to the back of the instrument panel and under one of the nuts on the Receiver housing. Exercise care when making these connections. The cable must be dressed and secured in place.

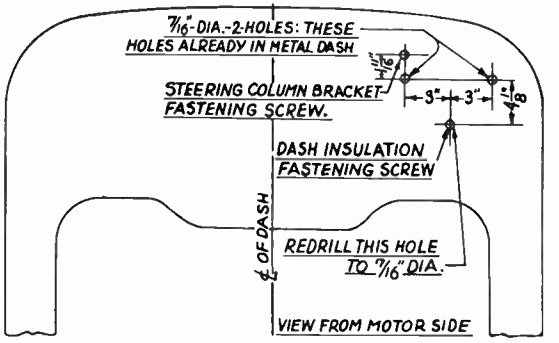


FIGURE 2

The black lead coming from the rear of the control unit must be plugged into the pilot lamp terminal on the speaker panel.

Antenna Lead

Splice the antenna lead to the antenna lead-in as close as possible to the corner post, dressing it in place above or in back of the Receiver. The shield on the lead must be grounded close to the corner post.

The dial in the control is calibrated in channel numbers, which with the addition of a cipher indicate the frequencies in kilocycles, i.e., 70 on the dial represents 700 kilocycles.

Tune in a broadcast station of known frequency and then loosen the coupling screws on the tuning shaft. Turn the dial to the proper number and tighten set screws again. Then re-check the dial setting.

Ignition and Generator Interference Suppression

A spark plug resistor must be installed on each spark plug. Cut off the angle snap-on terminal from the high-tension lead and screw the spark plug resistor into the lead as far as it will go. Snap the resistor on the spark plug. Cut the distributor-to-coil lead 2" from the distributor and screw distributor resistor into the lead. Then screw the end of the lead into the resistor and reconnect to the distributor.

Install a by-pass condenser on the generator and connect the condenser lead to the generator side of the cut-out relay. The condenser must be fastened in place under the relay mounting screw.

The second condenser must be fastened under the left coil mounting screw and the lead connected to the ammeter side of the coil primary.

In some cars it may be necessary to connect a condenser to the dome light wire. The condenser lead must be spliced to the dome light wire at the right pillar post and the condenser mounted on the instrument board flange.

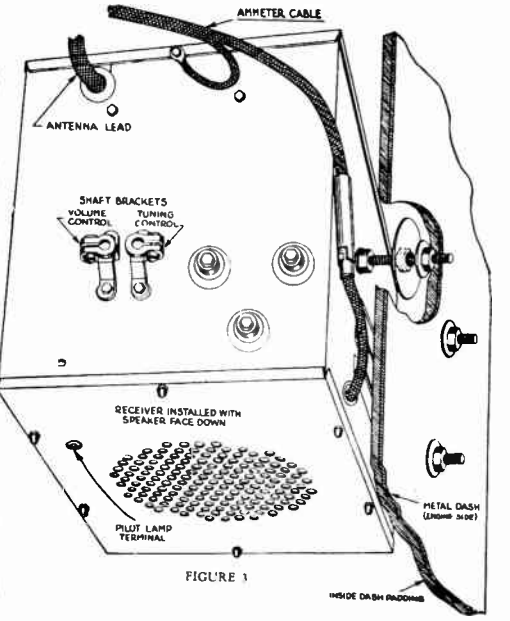


FIGURE 3

MODEL J Nash (AC-1289) PHILCO RADIO & TELEV. CORP.
Installation Data

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Model J Nash-Philco automobile radio Receiver in the 1934 model Nash cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1934 Nash closed cars is brought down the left front pillar post and is coiled behind the left cowl trim panels.

Receiver Location and Installation

Refer to Figure 1 which gives detailed dimensions for the location of the holes to be drilled in all models. These dimensions are shown from the engine side of the dash. On all current model cars, the carburetor air cleaner and silencer should be removed until the Receiver is bolted in place. This will facilitate drilling the holes in the dash.

On all 1290 models the Receiver must be spaced away from the dash approximately two inches to clear all pulleys and cables. On the 1220 and 1280 models the Receiver should be spaced far enough away from the dash to give ample clearance for the speaker cover flange and keep the Receiver in a vertical position.

In fastening the studs to the Receiver the lock washer is placed between the Receiver and the shoulder on the bolt. The large flat washer is used against the padding on the inside of the dash. Extra nuts are furnished to be used as spacers. Mount the Receiver with the control shaft couplings towards the center of the car and with the speaker facing down. See Figure 2. On the 1220 and 1280 models the throttle control wire should be disconnected to facilitate installation.

Instrument Board Control

A dummy door is provided with cutouts in which the control unit is mounted. Remove the standard door from the instrument board by taking out the two stove bolts at the bottom and loosening the nut on the rear of the cigar lighter. Disconnect the lighter wire at the fuse block. On cars not equipped with a cigar lighter the door is fastened in place with a knob and stove bolts. Install the control door on the instrument board. The greatest care must be used so as not to mar or scratch the finish.

When no provision is made in a car for instrument board mounting, a steering column control assembly may be secured from your distributor or the Nash Factory. This assembly is furnished with an adjustable strap and bracket and may be mounted to the right side or above the steering column. In assembling the strap and bracket be sure that the round nut clinched on the strap is against the steering column. This will prevent the round nut from being torn from the strap.

The black lead coming from the rear of the control unit is the pilot light lead which must be plugged into the pilot lamp terminal on the speaker panel.

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control — the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the steering column dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. (See Figs. 2 and 3). The volume control and switch in the Receiver must be turned all the way off (counter clockwise.) The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly aligned. Then tighten the casing clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections — (See Fig. 2)

Connect the battery cable to the Receiver. The small end at the Receiver must be plugged into the fuse housing receptacle on the battery lead. The other end of the battery lead must be connected to the ammeter and the cable dressed up out of the way. Be sure the fuse and fuse insulator are placed in the fuse housing before connecting the cable to the Receiver.

Antenna Lead

A shielded antenna lead is provided for connecting the Receiver to the roof antenna. Splice to the antenna lead-in as close as possible to the left front pillar, cutting off all the excess car lead-in. The shield must be grounded to the flange of the instrument board.

Lining Up The Receiver

The dial in the control is calibrated in channel numbers, which with the addition of a cipher indicate the frequencies in kilocycles, i.e., 70 on the dial represents 700 kilocycles.

Tune in a broadcast station of a known frequency and then loosen the coupling screws on the tuning shaft. Turn the dial to the proper number and tighten set screws again. Then recheck the dial setting.

FIGURE 1

FIGURE 2

FIGURE 3

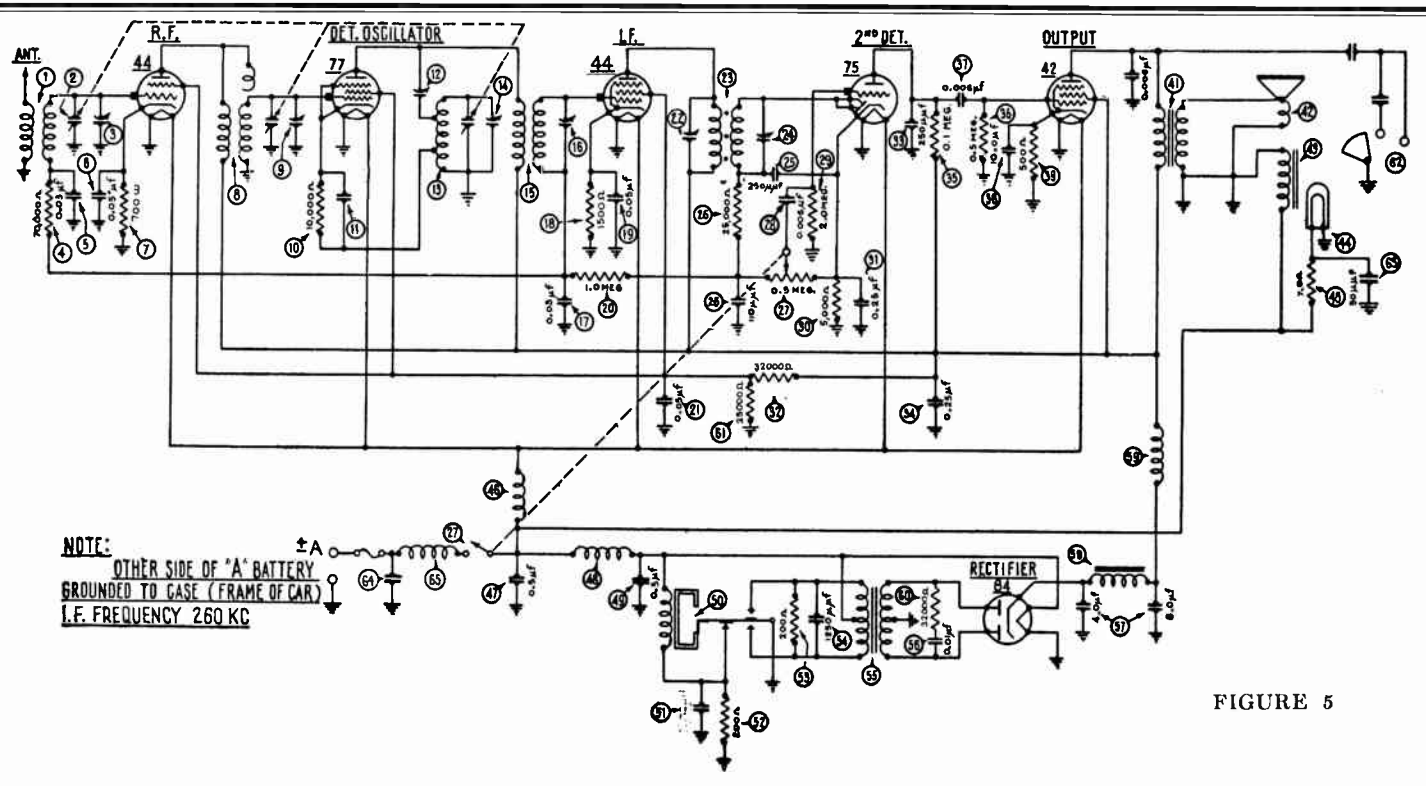


FIGURE 5

NASH - PHILCO MODEL AC 1089 PARTS LIST

(1) Antenna Transformer	32-1331	
(2) Tuning Condenser	31-1340	
(3) 1st Padder (in tun. cond.)		
(4) Resistor (70,000 ohms)	33-1115	
(5) Condenser (.03 mfd.)	30-4025	
(6) Condenser (.05 mfd.)	30-4020	
(7) Resistor (700 ohms)	6443	
(8) R. F. Transformer	32-1332	
(9) 2nd Padder (in tun. cond.)		
(10) Resistor (10,000 ohms)	33-1000	
(11) Condenser (.00025 mfd.)	30-1032	
(12) Padder (Pri. 1st I. F. Tran.)		
(13) Oscillator Transformer	32-1333	
(14) 3rd Padder (in tun. cond.)		
(15) 1st I. F. Transformer	32-1329	
(16) Padder (Sec. 1st I. F. Tran.)		
(17) Condenser (.03 mfd.)	30-4025	
(18) Resistor (2000 ohms)	33-3048	
(19) Condenser (.05 mfd.)	30-4020	
(20) Resistor (1,000,000 ohms)	33-1096	
(21) Condenser (.05 mfd.)	30-4020	
(22) Padder (Pri. 2nd I. F. Tran.)		
(23) 2nd I. F. Transformer	32-1237	
(24) Padder (Sec. 2nd I. F. Tran.)		
(25) Condenser (.00025 mfd.)	30-1032	
(25A) Condenser (.00011 mfd.)	30-1031	
(26) Resistor (25,000 ohms)	33-1013	
(27) Vol. Con. & Switch Assm.	38-5606	
(28) Condenser (.006 mfd.)	30-4125	
(29) Resistor (2,000,000 ohms)	33-1025	
(30) Resistor (5000 ohms)	6096	
(31) Condenser (.25 mfd.)	30-4146	
(32) Resistor (32,000 ohms)	3525	
(33) Condenser (.00025 mfd.)	3082	
(34) Condenser (.25 mfd.)	04360	
(35) Resistor (100,000 ohms)	6099	
(36) Resistor (500,000 ohms)	6097	
(37) Condenser (.006 mfd.)	30-4125	
(38) Condenser (10 mfd.)	30-2072	
(39) Resistor (500 ohms)	33-3031	
(41) Output Transformer	32-7245	
(42) Cone & Voice Coil	36-3157	
(43) Field Coil Assembly	36-3046	
(44) Pilot Lamp	34-2031	
(45) Resistor (7 ohms)	33-3035	
(46) "A" Choke	32-1402	
(47) Condenser (.5 mfd.)	30-4184	
(48) Vibrator Choke	32-1235	
(49) Condenser (.5 mfd.)	30-4015	
(50) Vibrator	38-5036	
(51) Condenser (.02 mfd.)	30-4039	
(52) Resistor (200 ohms)	7217	
(53) Resistor (200 ohms)	7217	
(54) Condenser (.00125 mfd.)	5886	
(55) Power Transformer	32-7216	
(56) Condenser (.01 mfd.)	30-4051	
(57) Condenser (4-8-10 mfd.)	30-2072	
(58) "B" Choke	32-7215	
(59) R. F. Choke	32-1281	
(60) Resistor (32,000 ohms)	3525	
(61) Resistor (25,000 ohms)	33-1013	
(62) Tone Control	30-4180	
(63) Condenser (.00005 mfd.)	30-1029	
(64) Condenser (.00025 mfd.)	30-1032	
(65) "A" Choke	32-1374	

Spark Plug Resistors	33-1101
	33-1102
Distributor Resistor	33-1103
Interference Condenser	30-4007
Nuts (mounting)	W55A
Battery Cable	38-5296
Acorn Nut	W821
Fuse	7227
Fuse Insulator	27-7131
Studs	28-6036
Knob	03064
Dial	27-5041
Antenna Lead	38-5131
4-prong Socket	27-6015
5-prong Socket	27-6014
6-prong Socket	27-6020
Shaft (volume)	28-8182
Shaft (tuning)	28-8181

General Installation Instructions
FOR 110 SERIES LAFAYETTE CARS

Custom Built by Philco — Sold Exclusively by Nash Dealers

THE INSTRUCTIONS have been carefully prepared for your use in installing the Model Q Nash-Philco automobile radio Receiver in the 1934 Model LAFAYETTE cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1934 Lafayette closed cars is brought down the left front pillor post and is coiled behind the left cowl trim panel.

Instrument Board Control

The instrument board control can be installed more conveniently if this is done as the first operation

Remove the left dummy ash receptacle door by removing the three nuts behind the instrument panel. Refer to Fig. 1 for dimensions. Paste a piece of paper 1½" wide, 2½" long, over the two lower holes. Pierce holes through the paper with a pencil and draw a center line between them. Drop a vertical line down 13/32" from the center of these holes and mark with a center punch. Drill a ⅜" hole. Remove the paper and elongate the hole horizontally with a round file, as shown on Fig. 1. The control shaft holes should now be enlarged with a ⅜" drill. With a round file, notch the top of the large hole, as shown on Fig. 1. Remove the burrs. Assemble the felt washer between the control head casting and the back of the instrument board. Mount the cover plate and assemble with the two flat-head machine screws. Dress the flexible control shafts over the top of the instrument board-to-dash bracket.

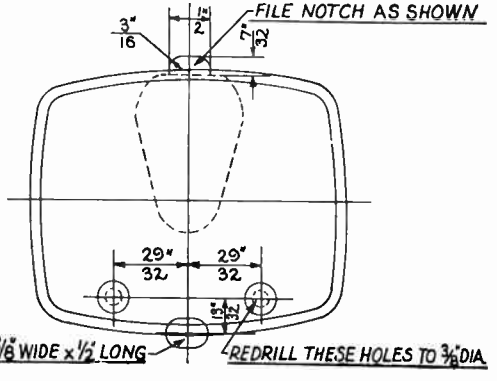


FIGURE 1

Receiver Location and Installation

Holes for the two top mounting studs are provided in the metal dash. The single hole on the bottom is occupied by a padding fastening bolt. The locations of these holes are shown in Fig. 2. On certain bodies these holes must be slotted downward a half inch.

Install the mounting studs in the dash holes. Drop the steering column to its lowest position by loosening the two bolts on the steering column bracket. This will facilitate the installation of the radio behind the steering column.

In fastening the studs to the Receiver, the lock washer must be placed between the Receiver and the shoulder on the bolt. The large flat washer must be placed against the padding on the inside of the dash. Mount the Receiver with the control shaft couplings toward the center of the car and with the speaker facing down. See Fig. 3.

Slip the radio in place, and screw the studs into the holes in the Receiver housing from the outside of the dash. This operation can be made easier if the end of the studs entering the set are slightly tapered.

After the radio is installed, the steering column must be returned to its original position and tightened.

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control—the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the instrument board-to-dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. See Fig. 4. The volume control and switch in the Receiver must be turned all the way off (counter clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly aligned. Then tighten the casing clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections

Insert the fuse and fuse insulator in the fuse receptacle and connect to the Receiver battery lead as shown in Fig. 3. Connect the black-white lead of the battery cable to the battery side of the ammeter.

The black lead at each end of the battery cable is the shield lead which must be grounded to the back of the instrument panel and under one of the nuts on the Receiver housing. Exercise care when making these connections. The cable must be dressed and secured in place.

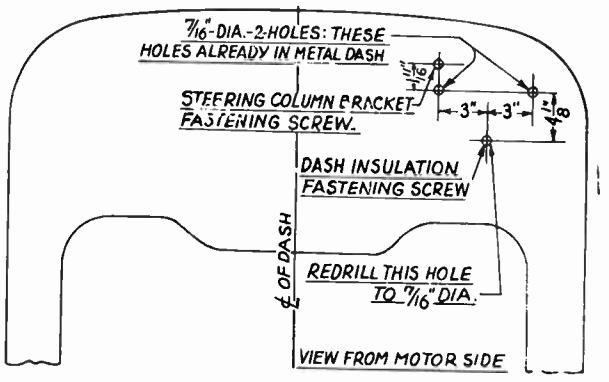


FIGURE 2

The black lead coming from the rear of the control unit must be plugged into the pilot lamp terminal on the speaker panel.

Antenna Lead

Splice the antenna lead to the antenna lead-in as close as possible to the corner post, dressing it in place above or in back of the Receiver. The shield on the lead must be grounded close to the corner post.

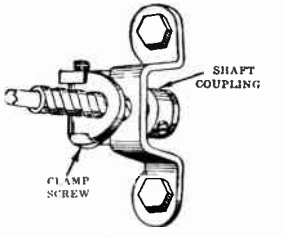


FIGURE 4

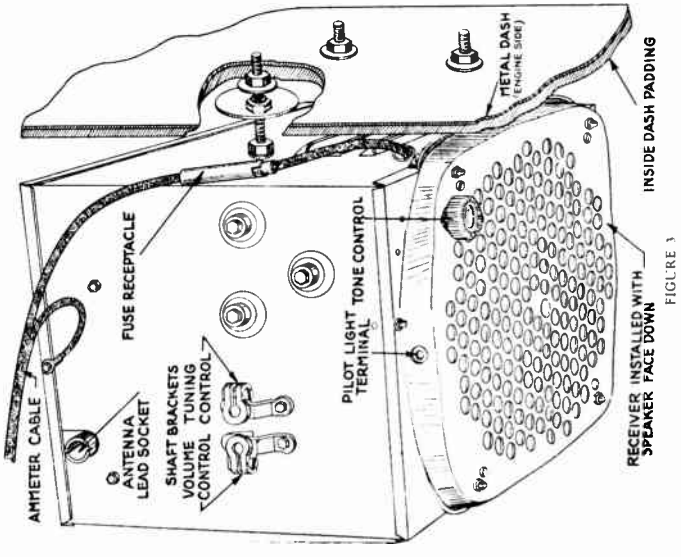


FIGURE 3

PHILCO RADIO & TELEV. CORP.

MODEL PA Packard Schematic, Chassis Wiring, Parts List

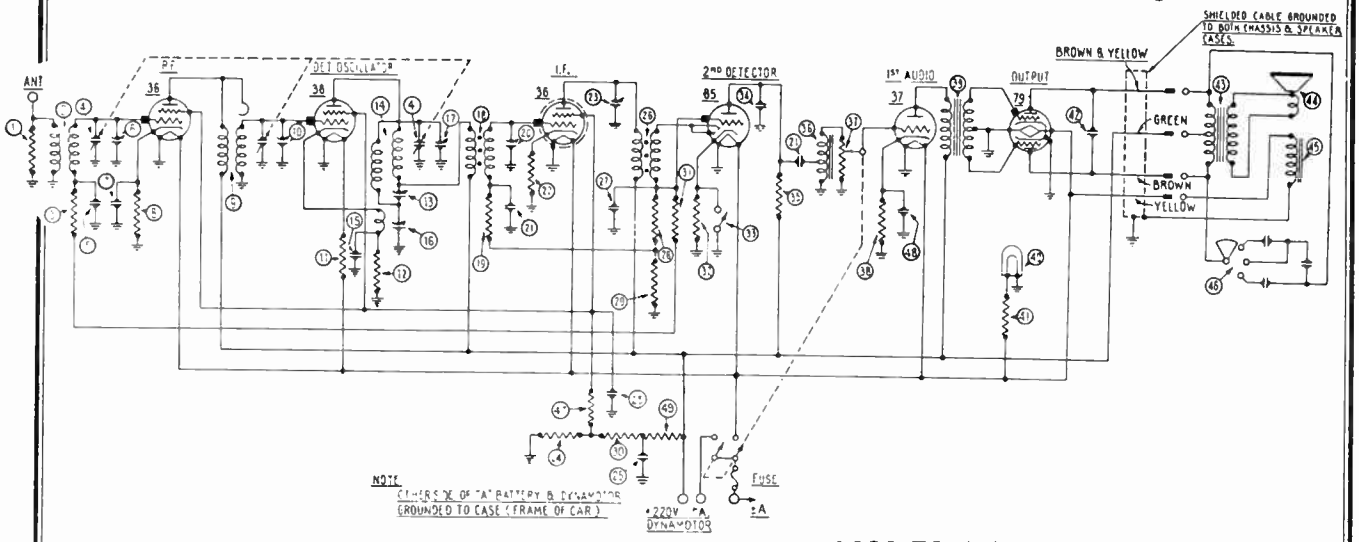


DIAGRAM C

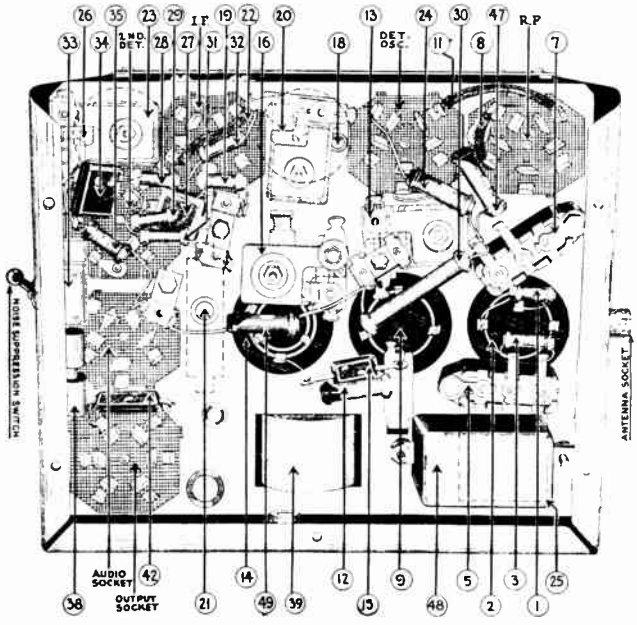


DIAGRAM D

MODEL PA PARTS LIST

No. in Figs. 1 and 2	Description	Part No.
(1)	Resistor (5,000 ohm)	6016
(2)	Antenna Coil	06914
(3)	Resistor (100,000 ohm)	6099
(4)	Tuning Condenser	04308
(5)	By-pass Condenser (.05 mfd.)	3615-AN
(6)	Compensator section on tuning condenser	
(7)	By-pass Condenser	3615-AY
(8)	Resistor (500 ohm)	6977
(9)	R. F. Transformer	06915
(10)	Compensator section on tuning condenser	
(11)	Resistor (2.7 ohm)	6511
(12)	Resistor (13,000 ohm)	8267
(13)	Compensator	04000-J
(14)	Oscillator Coil	06916
(15)	Condenser (.0007 mfd.)	4520
(16)	Compensating Condenser	04000-S
(17)	Compensator section on tuning condenser	
(18)	First I. F. Transformer	06632
(19)	Resistor (500,000 ohm)	6097
(20)	Compensating Cond.	04000-X
(21)	Condenser (.05 mfd. .15 mfd.)	.06091
(22)	Resistor (500 ohm)	6977
(23)	Compensating Cond.	04000-X
(24)	Resistor (20,000 ohm)	6650
(25)	Cond. (.5 mfd., .25 mfd.)	06088
(26)	Second I. F. Transformer	05970
(27)	Condenser (.00025 mfd.)	3082
(28)	Resistor (100,000 ohm)	6099
(29)	Resistor (100,000 ohm)	6099
(30)	Resistor (20,000 ohm)	6649
(31)	Resistor (500,000 ohm)	6097
(32)	Resistor (5,000 ohm)	6096
(33)	Switch	5462
(34)	Condenser (.00125 mfd.)	5886
(35)	Resistor (50,000 ohm)	4518
(36)	Audio Transformer	7552
(37)	Volume Control	7525
(38)	Resistor (2,500 ohm)	7775
(39)	Input Transformer	7652
(40)	Pilot Lamp	6608
(41)	Resistor (7 ohm)	5110
(42)	Condenser (.06 mfd.)	6359
(43)	Output Transformer	2515
(44)	Speaker Coil and Cone	02823
(45)	Speaker Field Pot	02795
(46)	Tone Control	05366
(47)	Resistor (25,000 ohm)	4516
(48)	Condenser	7774
(49)	Resistor (8,000 ohm)	7835
	Dial	8255
	Battery Cable	41-3035
	Antenna Lead	38-5161
	Packard Dynamotor	41-1005
	Key	6091
	Studs	28-6088
	Nuts (Studs)	W-55
	Spark Plug Resistor	33-1016
	Distributor Resistor	33-1017
	Spark Plug Terminals	28-6053
	Intereference Condenser	4522

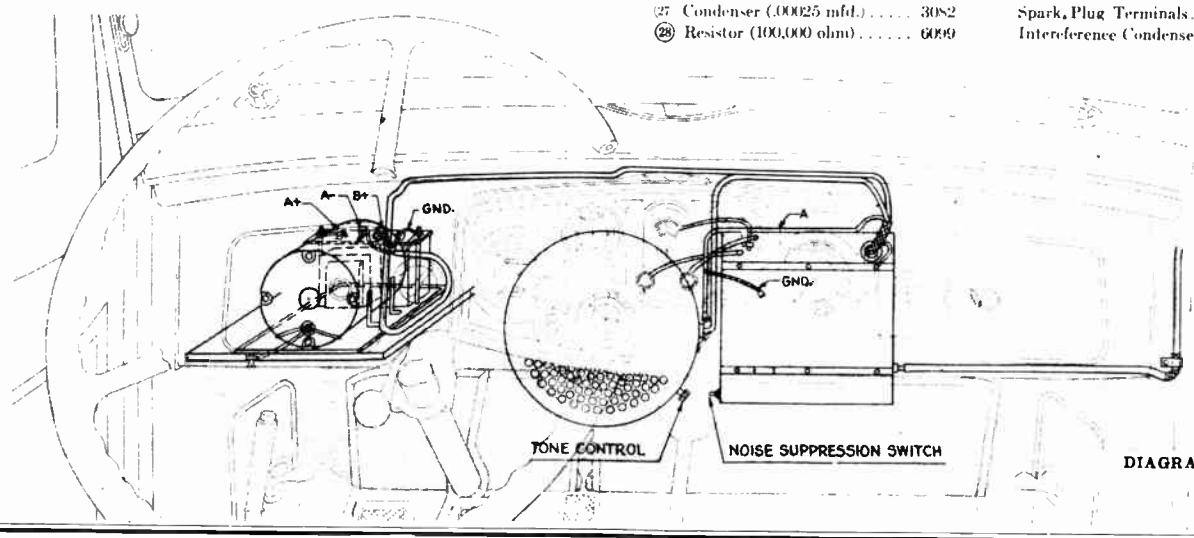


DIAGRAM B

MODEL PA Packard Installation Data

These instructions are intended to assist you when installing the Packard De Luxe Car Radio and should be carefully read before starting work. The installation is not complicated and no special troubles should be encountered if instructions are followed.

Antenna

All enclosed cars manufactured after January 1, 1933, are equipped with a roof type antenna, the lead-in from which is brought down inside the right front pillar post and coiled behind the cowl trim panel. Antennas suitable for open and convertible jobs can be secured from the Factory on special orders and are easily installed by snapping in place. Detailed information on these units can be secured by writing the Accessory Division of the Packard Motor Car Company.

On earlier cars that are not equipped with a roof antenna, the under-car type can be used with a reduction in efficiency of approximately 35 per cent.

Receiver and Speaker Location

Refer to the diagram "A", showing location of the holes to be drilled. Locate one of the receiver stud holes and mark with a sharp punch; then use the template furnished to locate the remaining two holes. Use this same procedure for the speaker, drilling with 7/16-inch drill. On Packard Twelve models you may find it difficult to locate and drill the speaker holes from the motor side of the dash, and if so, this work can be done from the body side, providing care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models the receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by placing two or three flat washers on the lower mounting stud before bolting in place, using the larger washer furnished, next to the insulating material.

Mount the speaker with the tone control to the right side of the car, which permits easy operation. The felt baffle should be mounted on studs between speaker and dash.

Control Unit

On cars where provision has been made to mount the control unit in the instrument panel a finish plate is used to fill the opening. Remove this plate by loosening the three hold down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket formerly provided for the plate) and secured by the three hold down clamps.

Note.—As the finish on instrument panels varies with different models of Packard cars, it may be desirable to match the finish plate of the radio control unit to the panel. The Packard Motor Car Company can supply control unit finish plates to match the various instrument panels.

When no provision has been made to mount the control unit in the instrument panel, it should be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right, approximately six inches below the steering wheel hub. Cut off the metal strap to proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on bracket in a vertical position.

Lining Up Receiver

As the tuning dial is calibrated in kilocycles, it may be necessary to line it up with the receiver, so stations may be tuned in at the proper point, this being accomplished as follows:

Set the tuning dial to line up with the extra division below 150 and insert a blunt pointed wire or match through the small hole located at the back of the control unit close to the tuning knob. Next carefully press the tuning dial out of mesh with the gear and while holding it so, turn the knob to the extreme counter-clockwise limit and release the tuning dial. It should now line up and can be checked by tuning in stations whose operating frequency is known.

Control Shaft Installation

Remove the front cover plate from the receiver. Turn the left-hand knob (volume control) to a point where the key will lock it firmly in position. Insert this shaft and conduit into the left-hand receptacle on the front of receiver and tighten set screw. Next turn the dial to line up with the extra division below 150 and turn the condenser unit so the plates are completely out of mesh, at which point the screw in the brass coupler should be accessible. Next insert the tuning shaft and conduit in the right-hand receptacle on front of receiver, locking them in position with their respective set screws.

When the control unit is mounted on the steering column, fasten the two flexible shafts to the bottom edge of the instrument panel with a small clamp, this being so located as to make the best appearance and provide the smoothest operation. Cover these flexible shafts and the dial light wire with the small piece of loom (supplied with set) to prevent the shafts coming in contact with the ammeter terminals in the instrument board.

Battery Cable Location and Connections
(See diagram "B")

Plug the cable into the receptacle at the front of the receiver and run the battery portion sharply upwards to the recess above the instrument board and follow this recess to the left-side glove compartment, where the dynamotor cable passes into the glove compartment through a hole located near the forward edge of the box. The "A" or two-wire cable should be run to the ammeter, keeping it as close to the instrument board as possible. Connect the feed wire (small closed terminal) to the discharge side of the ammeter and the shield (equipped with spade terminal—wire marked "GND") should be grounded under the lower clock clamp screw. Connect the black wire from the dial light on the control unit to the fahnstock terminal on the face of the receiver. The speaker cable is plugged into the receptacle on the speaker and the ground tabs on the cables are fastened under a screw head on the receiver and speaker. The antenna lead in should then be plugged into the receiver, the cable being carried along the dash in the rear of the right glove compartment, using the glove compartment rear bracket as a means of support. This lead in should be spliced to the antenna lead in, which will be found coiled and taped back of the cowl trim panel. Any excess cable should be cut off, using enough lead in to make a neat installation. The lead-in provided with the receiver is equipped with pigtail ground, which should be wrapped around the antenna lead in shield and carefully taped.

Operating Instructions

The receiver is placed in operation by turning the left hand knob on the control head in a clockwise position. After tubes have been warmed up a minute or so, resonance will be indicated by a rushing sound, and any station within range can be tuned in by manipulating the right-hand knob, after which the volume is set to the desired level with the left. The small snap switch on the left end of the receiver cabinet should be pulled to the rear (towards the front seat) for maximum sensitivity when operating in the country or quiet part of the city. When driving close to the broadcast station being received or in a noisy location, smoother operation and quieter tuning can often be obtained by throwing this switch forward.

Ordinarily the tone control (on the loud speaker) should be fully opened by tuning in a clockwise direction and then turned back (counter-clockwise) one or two notches, which will give the best compromise between tonal brilliancy and minimum noise. When operating extremely noisy parts of the city, however (as when following a street car), it will sometimes be advisable to turn this control in a clockwise direction as far as it will go. When operating in the immediate vicinity of a power line or car tracks, crackling or snapping noises are quite likely to be in evidence, due to leakage

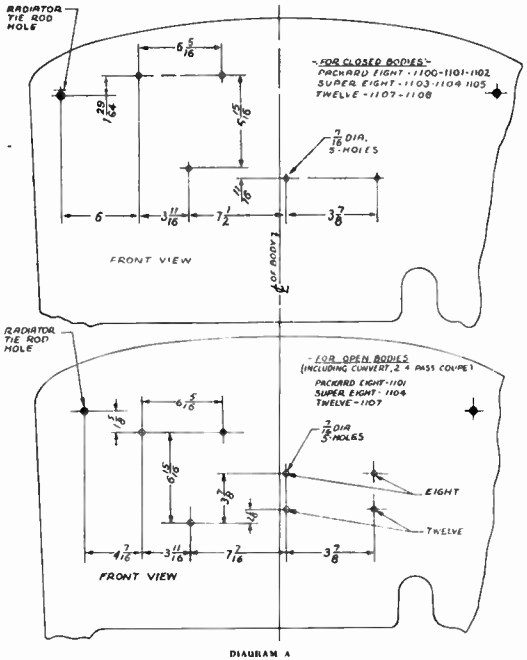


DIAGRAM A

PACKARD DE LUXE RADIO Installation Dash Layout for Packard Models 1100, 1101, 1102, 1103, 1105, 1107, 1108

of high voltage to ground. This man made static cannot be eliminated by any receiver, but its effects will be minimized if the dial is set to bring in the most powerful local station. Man-made as well as natural static is amplified along with the radio signal, and naturally the powerful local needs less amplification, thus enabling it to ride over unwanted noises.

When turning off the receiver be sure the left-hand knob is turned counter-clockwise until a definite click is heard, otherwise the receiver may continue to operate and run down the battery.

Dynamotor

The dynamotor is so designed that it can be installed in the left-hand glove compartment. Pull the dynamotor cable through the hole in the upper corner of the box and connect the white lead of this cable to the "A" terminal of the dynamotor. The blue lead must then be connected to the "B plus" terminal and the shield on the cable grounded under the left hand terminal strip nut. Slide the complete unit into the glove compartment, making sure that the rubber mat is not doubled up and that the cables are dressed neatly in place. The dynamotor grounding strip must be securely attached to the instrument board and a convenient mount is easily provided by replacing the left-hand screw that holds the glove compartment to the panel with a longer one.

On open models the rubber mat must be removed to permit the dynamotor to slide through the glove compartment door. Following the installation of the dynamotor as previously described, the rubber mat can be attached to the dynamotor in the glove compartment, replacing the rivets with small screws

Ignition and Generator Interference Suppression

On the twelve-cylinder cars provision has been made to mount a condenser in the coil bracket, using the right front coil mounting screw as a means of attachment. The condenser can be installed by passing the condenser lead through the hole provided in the coil bracket and attaching to one of the terminals on the lower side of the coil to which a brass strip is fastened. Replace the unit and tighten nuts, making certain that the condenser case is grounded through the enamel. Locate the second condenser under the outside generator relay mounting screw and connect wire to the battery terminal of relay.

On eight cylinder cars it will generally be best to locate the first condenser under the clock clamp screw with the wire fastened to the ammeter side of ignition switch. The generator condenser is then mounted as previously described.

Cut off the spark plug terminals from the high tension wires and screw on the resistor units, after which the small round nuts (furnished with set) can be screwed on to the spark plugs and the resistors snapped in place. Cut distributor to coil high tension wires about one inch from distributor head and insert "screw-in" type distributor resistors. When the rest of the installation is carefully made, the resistor between coil and distributor will sometimes be unnecessary, thus tending to improve throttling and idling. In all cases, however, spark plug gap should be increased from the standard .025" to .030". Spark plugs with built-in resistors can be used in place of the detachable type if desired, in which case the terminals on the spark plug wires are not cut off.

To check for ignition interference, disconnect the antenna lead in from set. Turn on receiver and start engine. If there is any noise coming through the speaker from the electrical system of the car when the volume control is about three fourths open and the local long distance switch pointing to rear of car, carefully relocate speaker cable and battery cable to a point where the noise is reduced to a minimum. If relocation of these two cables does not practically eliminate ignition interference, it will then be advisable to peen the distributor rotor arm.

Peening the Rotor Arm

Place the ends of the rotor on a steel block and peen with a small machinist hammer, extending them about .005". Both ends must be so treated with a double coil system

The greatest care must be taken in performing the operation to make sure the rotor arm itself does not strike the stationary contacts after the rotor and cap are replaced. Without turning on the ignition key, press the starter and then examine the rotor arm and the contact points to be sure that the steel part of the arm is not striking the stationary contacts.

Start the motor again and the volume of noise should now be down to a minimum. If not, relocate the speaker and battery cables slightly. If generator interference is encountered, it can usually be eliminated by cleaning the commutator and reseating the brushes. This noise can easily be isolated by speeding up the engine and cutting off ignition to make sure it is not responsible.

Connect the antenna lead to the receiver, recheck for noise and relocate speaker and battery cables if necessary.

PHILCO RADIO & TELEV. CORP.

MODEL PB Packard
Schematic, Chassis
Parts List, Socket

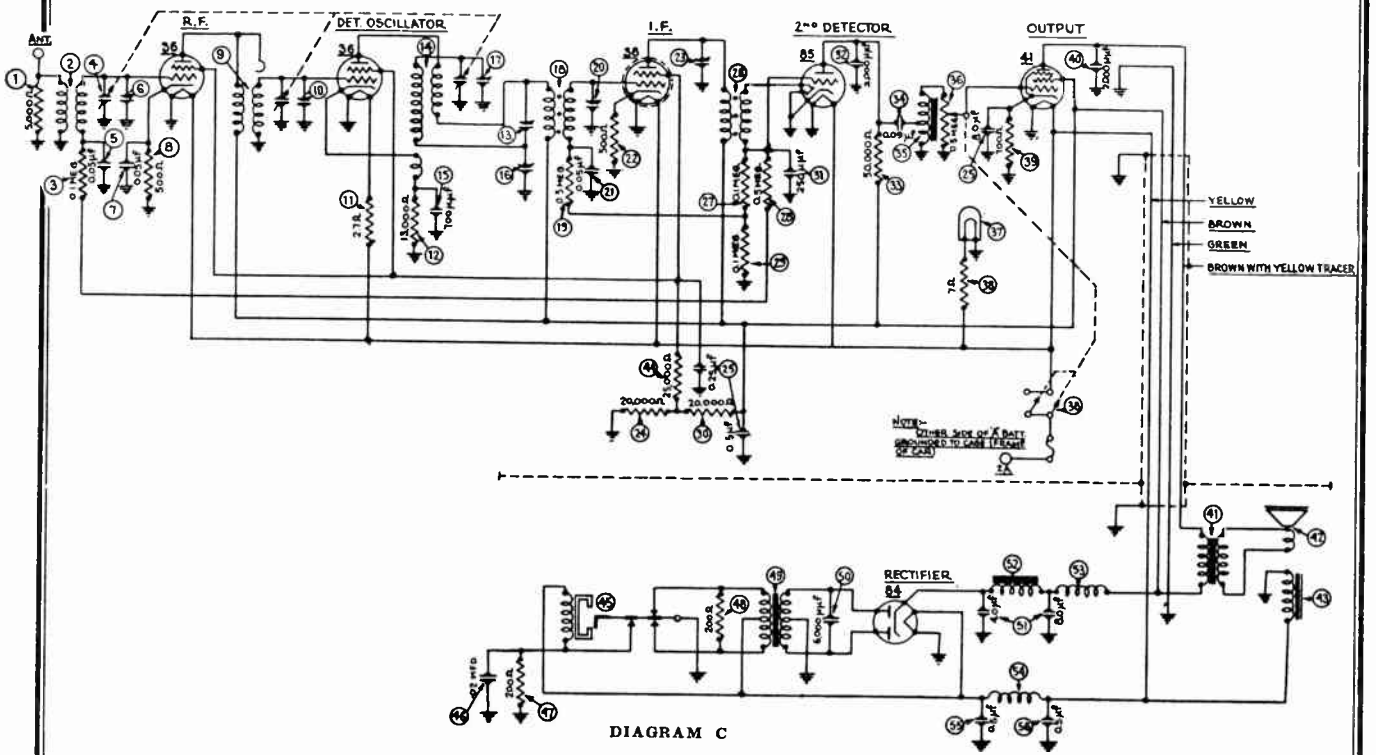


DIAGRAM C

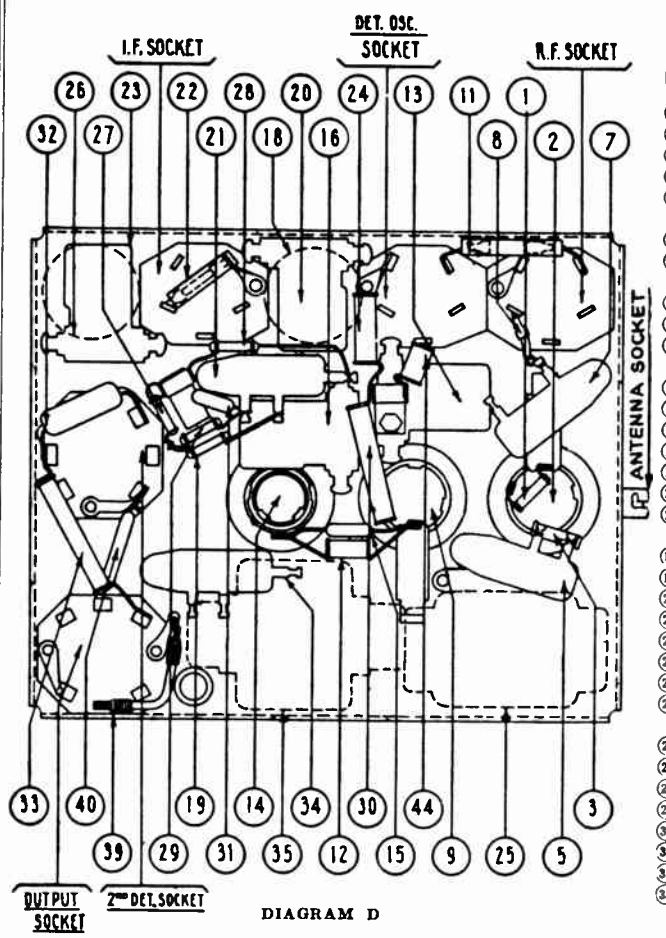


DIAGRAM D

MODEL PB PARTS LIST

No. in Diagrams C & D	Description	Part No.
(1)	Resistor (5,000 ohm)	6096
(2)	Antenna Transformer	32-1197
(3)	Resistor (100,000 ohm)	6099
(4)	Tuning Condenser	04308
(5)	By-pass Condenser (.05 mfd.)	3615-AN
(6)	R. F. Transformer	32-1198
(7)	By-pass Condenser (.05 mfd.)	3615-AT
(8)	Resistor (500 ohm)	6977
(9)	Detector Coil	03915
(10)	Compensator section on tuning condenser	
(11)	Resistor (2.7 ohm)	6511
(12)	Resistor (13,000 ohm)	8267
(13)	Compensating Cond.	04000-J
(14)	Oscillator Coil	06916
(15)	Condenser (.0007 mfd.)	4520
(16)	Compensating Cond.	04000-S
(17)	Compensator section on tuning condenser	
(18)	First I. F. Transformer	06932
(19)	Resistor (500,000 ohm)	6097
(20)	Compensating Cond.	04000-X
(21)	Condenser (.05 mfd.)	3615-AK
(22)	Resistor (500 ohm)	6977
(23)	Compensating Cond.	04000-X
(24)	Resistor (20,000 ohm)	6650
(25)	Condenser (.25 mfd., .5 mfd., 8 mfd.)	04354
(26)	Second I. F. Transformer	05970
(27)	Resistor (100,000 ohm)	6099
(28)	Resistor (500,000 ohm)	6097
(29)	Resistor (100,000 ohm)	6099
(30)	Resistor (20,000 ohm)	6649
(31)	Condenser (.00025 mfd.)	3082
(32)	Condenser (.0002 mfd.)	4059
(33)	Resistor (50,000 ohm)	4237

No. in Diagrams C & D	Description	Part No.
(34)	Condenser (.09 mfd.)	4989-Y
(35)	Audio Transformer	7535
(36)	Volume Control (500,000 ohm) and switch	7525
(37)	Pilot Lamp	6608
(38)	Resistor (7 ohm)	5110
(39)	Resistor (700 ohm)	6443
(40)	Condenser (.002 mfd.)	6853
(41)	Output Transformer	2598
(42)	Cone and Coil	36-3020
(43)	Field Coil	33-3140
(44)	Resistor (25,000 ohm)	4516
(45)	Vibrator	38-5036
(46)	Condenser (.05 mfd.)	30-4039
(47)	Resistor (200 ohm)	7217
(48)	Resistor (200 ohm)	7217
(49)	Power Transformer	32-7110
(50)	Condenser (.006 mfd.)	6359
(51)	Filter Condenser (4 mfd., 8 mfd.)	30-2030
(52)	Filter Choke	32-7118
(53)	R. F. Choke	32-1068
(54)	"A" Choke	32-1259
(55)	Condenser (.5 mfd.)	30-4015
(56)	Condenser (.5 mfd.)	30-4015
	Fuse (15A.)	7227
	Dial	8255
	"A" Battery Lead	41-3042
	Speaker Power Cable	41-3044
	Antenna Lead	38-5161
	Key	6091
	Studs	28-6088
	Nuts (Studs)	W-55
	Spark Plug Resistor	33-1016
	Distributor Resistor	33-1017
	Spark Plug Terminal	28-6053
	Interference Condenser	4522

PACKARD STANDARD CAR RADIO GENERAL INSTALLATION INSTRUCTIONS

Antenna

All closed cars manufactured after January 1, 1933, are equipped with a roof-type antenna, the lead-in from which is brought down inside the right front pillar post and coiled behind the cowl trim panel.

Antennas suitable for open and convertible jobs can be secured from the Factory on special orders and are easily installed by snapping in place. Detailed information on these units can be secured by writing the Accessory Division of the Packard Motor Car Company.

On earlier cars that are not equipped with a roof antenna, the undercar type can be used with a reduction in efficiency of approximately 35 per cent.

Installation Preparation

Although it is not really necessary to remove the right-hand glove compartment, some will find it an advantage to take it out until the installation is completed.

Receiver and Speaker Location

Refer to the cuts showing location of the holes to be drilled. Locate one of the receiver stud holes and mark with a sharp punch; then use the template furnished to locate the remaining two holes. Use this same procedure for the speaker, drilling with 7/16-inch drill. On Packard Twelve models, you may find it difficult to locate and drill the speaker holes from the motor side of the dash, and if so, this work can be done from the body side, provided care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models, the receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by placing two or three flat washers on the lower mounting stud before bolting in place, using the large washer furnished, next to the insulating material.

Instrument Board Control Unit

On cars where provision has been made to mount the control unit in the instrument panel, a finish plate is used to fill the opening. Remove this plate by loosening the three hold-down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket formerly provided for the plate) and secured by the three hold-down clamps.

NOTE.—As the finish on instrument panels varies with different models of Packard cars, it may be desirable to match the finish plate of the radio control unit to the panel. The Packard Motor Car Company can supply control unit finish plates to match the various instrument panels.

Steering Column Control Unit

When no provision has been made to mount the control head in the instrument panel, a special unit should be obtained from the Accessory Division. This should be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right approximately six inches below the steering wheel hub Cut off the metal strap to proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on bracket in a vertical position.

Fasten the two flexible shafts to the bottom edge of the instrument panel with a small clamp, this being so located as to make the best appearance and provide the smoothest operation. Cover these flexible shafts and the dial light wire with the small piece of loom (supplied with set) to prevent the shafts coming in contact with the ammeter terminals in the instrument board.

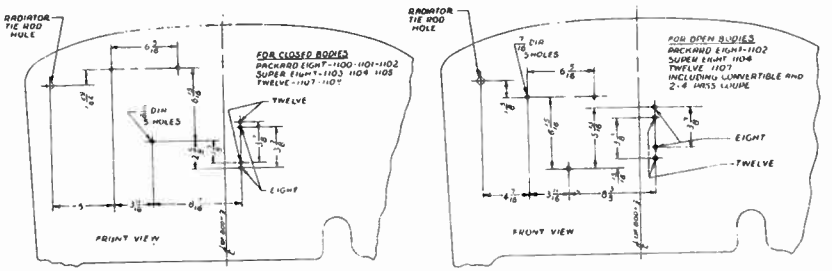
Control Shaft Installation

Remove the front cover plate from the receiver. Turn the left-hand knob (volume control) to a point where the key will lock it firmly in position. Insert this shaft and conduit into the left-hand receptacle on the front of receiver and tighten set screw. Next turn the dial to line up with the extra division below 150 and turn the condenser unit so the plates are completely out of mesh, at which point the screw in the brass coupler should be accessible. Next insert the tuning shaft and conduit in the right-hand receptacle on front of receiver, locking them in position with their respective set screws.

Battery Cable Location and Connections

Plug the cable into the receptacle at the front of the receiver and run the speaker cable over to that unit, plugging it in top. The "A" or two-wire cable should be run to the ammeter, keeping it as close to the instrument board as possible. Connect the hot wire (small closed terminal) to the discharge side of the ammeter and the shield (equipped with spade terminal) should be grounded under the lower clock clamp screw. Connect the black wire from the dial light on the control unit to the fahnestock terminal on the face of the receiver. The ground tab on the cable is fastened under a screw head on the receiver. The detachable part of the antenna lead-in should then be attached to the shielded wire that comes down through the right-hand pillar post after the latter has been cut to the proper dimension. Ordinarily the splice should be made fairly close to the pillar post, with one shield telescoping over the other and snugly connected after the splice has been properly taped to prevent any likelihood of short circuits. The lead is then carried up over the glove box and down on the left-hand side, where it is attached to the receiver lead by means of the bayonet lock.

NOTE.—On bodies where the antenna lead-in has not been provided with a grounded shield, it will be necessary to remove the cowl trim panel, so the shield of the detachable antenna lead-in can be grounded as close to the pillar post as possible.



RADIO INSTALLATION DASH LAYOUT FOR PACKARD MODELS 1100-1101-1102-1103-1104-1105-1107-1108

DIAGRAM A

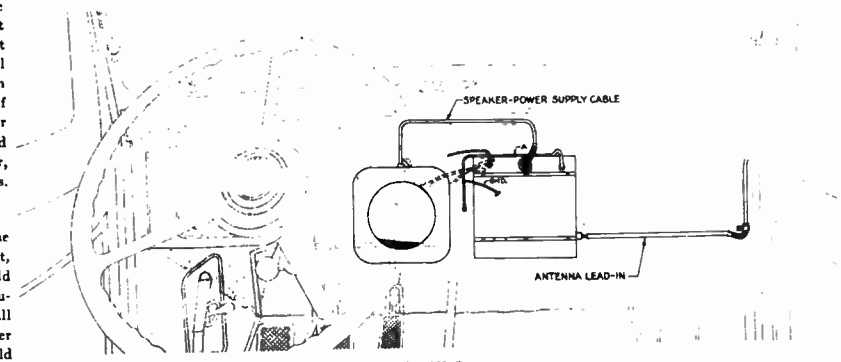


DIAGRAM B

Lining Up Receiver

As the tuning dial is calibrated in kilocycles, it may be necessary to line it up with the receiver, so stations may be tuned in at the proper point, this being accomplished as follows:

Set the tuning dial to line up with the extra division below 150 and insert a blunt-pointed wire or match through the small hole located at the back of the control unit. Next carefully press the tuning dial out of mesh with the gear, and while holding it so, turn the knob to the extreme counter-clockwise limit and release the tuning dial. It should now line up and can be checked by tuning in stations whose operating frequency is known.

Operating Instructions

The receiver is placed in operation by turning the left-hand knob on the control head in a clockwise position. After tubes have been warmed up, a minute or so, resonance will be indicated by a rushing sound, and any station within range can be tuned in by manipulating the right-hand knob, after which the volume is set to the desired level with the left.

When operating in the immediate vicinity of a power line or car tracks, crackling or snapping noises are quite likely to be in evidence, due to leakage of high voltage to ground. This man-made static cannot be eliminated by any receiver, but its effects will be minimized if the dial is set to bring in the most powerful local station. Man-made as well as natural static is amplified along with the radio signal, and naturally the powerful local needs less amplification, thus enabling it to ride over unwanted noises.

When turning off the receiver be sure the left-hand knob is turned counter-clockwise until a definite click is heard, otherwise the receiver may continue to operate and run down the battery.

DIAGRAM C

MODEL PHD PARTS LIST

(1)	Antenna Transformer	32-1462	
(2)	Tuning Condenser	31-1418	
(3)	1st Padder (in tun. cond.)		
(4)	Condenser (50 mmfd.)	30-1029	
(5)	Resistor (100,000 ohms)	6099	
(6)	Condenser (.03 mfd.)	30-4025	
(7)	Condenser (.05 mfd.)	30-4020	
(8)	R. F. Transformer	32-1463	
(9)	2nd Padder (in tun. cond.)		
(10)	3rd Padder (in tun. cond.)		
(11)	Condenser (.03 mfd.)	30-4025	
(12)	Resistor (50,000 ohms)	6098	
(13)	Condenser (250 mmfd.)	30-1032	
(14)	Padder	30-6012	
(15)	Oscillator Transformer	32-1222	
(16)	Padder (Pri. 1st I. F. Trans.)		
(17)	Resistor (15,000 ohms)	6208	
(18)	First I. F. Transformer	32-1471	
(19)	Padder (Sec. 1st I. F. Trans.)		
(20)	Resistor (1,000,000 ohms)	33-1096	
(21)	Condenser (.03 mfd.)	30-4025	
(22)	Resistor (500,000 ohms)	6097	
(23)	Condenser (.5 mfd.)	30-4058	
(24)	Resistor (500 ohms)	6977	
(25)	Padder (Pri. 2nd I. F. Trans.)		
(26)	Second I. F. Transformer	32-1449	
(27)	Padder (Sec. 2nd I. F. Trans.)		
(28)	Condenser (110 mmfd.)	30-1031	
(29)	Resistor (100,000 ohms)	6099	
(30)	Condenser (250 mmfd.)	30-1032	
(31)	Condenser (.006 mfd.)	30-4125	
(32)	Resistor (2,000,000 ohms)	33-1025	
(33)	Vol. Cont. & Sw. Assembly	38-6022	
(34)	Resistor (20,000 ohms)	33-1130	
(35)	Condenser (.02 mfd.)	30-4215	
(36)	Resistor (250,000 ohms)	33-1097	
(37)	Resistor (250,000 ohms)	33-1097	
(38)	Condenser (250 mmfd.)	30-1032	
(39)	Condenser (.01 mfd.)	30-4145	
(40)	Resistor (250,000 ohms)	33-1097	
(41)	Resistor (25,000 ohms)	33-1013	
(42)	Condenser (.25 mfd.)	30-4135	
(43)	Resistor (500,000 ohms)	6097	
(44)	Condenser (10 mfd.)	30-4135	
(45)	Resistor (2500 ohms)	33-1100	
(46)	Input Transformer	32-7205	
(47)	Condenser (.004 mfd.)	30-4185	
(48)	Output Transformer	32-7205	
(49)	Condenser (250 mmfd.)	30-1032	
(50)	Cone & Voice Coil	36-3159	
(51)	Pilot Lamp	34-2040	
(52)	Condenser (250 mmfd.)	30-1032	
(53)	Resistor (7 ohms)	33-3136	
(54)	Field Coil Assembly	02795	
(55)	Condenser (250 mmfd.)	30-1032	
(56)	Choke	32-1464	
(57)	Tone Control	30-4208	
(58)	Condenser (.25 mfd.)	30-4134	
(59)	Resistor (51,000 ohms)	4237	
(60)	Resistor (5000 ohms)	33-1070	
(61)	Resistor (100 ohms)	33-3023	
(62)	Resistor (37,000 ohms)	33-1098	
(63)	Resistor (150 ohms)	33-3045	
(64)	Resistor (150 ohms)	33-3045	
(65)	Condenser (8 mfd.)	30-4135	
(66)	Condenser (.5 mfd.)	30-4048	
(67)	Condenser (.5 mfd.)	30-4015	
(68)	Vibrator Choke	82-1474	
(69)	Condenser (.5 mfd.)	30-4047	
(70)	Condenser (250 mmfd.)	32-1466	
(71)	"A" Choke	32-1466	
(72)	Vibrator	38-5036	
(73)	Condenser (.02 mfd.)	30-4039	
(74)	Resistor (200 ohms)	7217	
(75)	Resistor (200 ohms)	7217	
(76)	Condenser (1250 mmfd.)	5886	

NOTE: OTHER SIDE OF "A" BATT. GROUNDED TO CASE (FRAME OF CAR)

(77)	Power Transformer	32-7098
(78)	Condenser (.01 mfd.)	30-4051
(79)	Filter Condenser (4-8 mfd.)	30-2015
(80)	"B" Choke	32-7104
	Dial	27-5022
	Antenna Lead	38-5131
	Mounting Studs	28-6231
	Mounting Nuts	W55A
	Spark Plug Resistor	33-1015E
	Distributor Resistor	4851E
	Interference Condenser	4522S
	Interference Condenser	30-4007
	Spark Plug Terminals	28-6053
	4 Hole Socket	27-6006
	5 Hole Socket	27-6014
	6 Hole Socket	27-6020
	7 Hole Socket	27-6005
	Knobs	27-4146
	Knob Springs	28-1738
	"A" Switch Assembly	38-6023
	"A" Switch	42-1080

DIAGRAM D

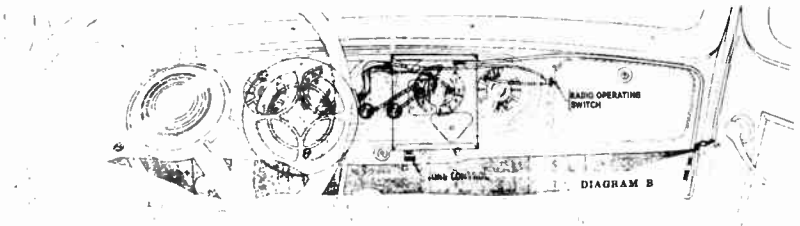


DIAGRAM B

Receiver and Speaker Location

Holes are provided in the dash for radio installation on all Twelfth Series Packard cars. These holes are plugged with snap buttons which can easily be removed with a screw driver. The inside dash liner is not punched and before making the installation corresponding holes should be cut through the cardboard dash liner with a knife.

For dash drilling information on cars previous to Twelfth Series, refer to the diagram "A", showing location of the holes to be drilled. Locate one of the receiver stud holes and mark with a sharp punch; then use the template furnished to locate the remaining two holes. Use this same procedure for the speaker, drilling with 7/16 drill. On Packard Twelve models you may find it difficult to locate and drill the speaker holes from the motor side of the dash and, if so, this work can be done from the body side, providing care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models the Receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by placing two or three flat washers on the lower mounting stud before bolting in place, using the larger washer furnished, next to the insulating material. The felt baffle should be mounted on the studs between the speaker and dash. On twelve cylinder cars previous to Twelfth Series it is necessary to cut away a portion of the speaker rim to provide clearance for the vacuum connection on the dash.

Control Unit

On Eleventh and Twelfth Series cars, where provision has been made to mount the control unit in the instrument panel, a finish plate is used to fill the opening. Remove this plate by loosening the hold-down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket provided for the plate) and secured by the same fastening clamps.

When no provision has been made to mount the control unit in the instrument panel, it should be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right, approximately six inches below the steering wheel hub. Cut off the metal strap to the proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on bracket in a vertical position.

The radio control locking switch on the Twelfth Series Receiver should be located in the right glove compartment, a hole for which is located in the wall of the compartment near the door. This provides a means of locking the radio when the occasion demands.

NOTE: As the shape of the instrument panel control units vary between Eleventh and Twelfth Series models, it is desirable to supply the proper control head for the car on which the installation is made. The Packard Motor Car Company can supply control units with the proper length control cables for Eleventh Series panel installations as well as previous models where the steering column control unit is required.

Control Shaft Installation

The tuning control knob is on the right of the control panel — the combination switch and volume control knob is on the left. The flexible control shafts are coupled to the short shafts in the control panel on which the knobs are placed.

Insert the flexible control cables into the proper shaft housing bracket on the Receiver. Turn the knobs until the slotted male coupling on the shaft is seated in the female coupling in the Receiver so that the pin in the female end is fully engaged in the slotted male end.

Tighten the shaft housing fastening nuts which hold the control cables in place on the Receiver.

IMPORTANT: Be sure the controls are attached to the proper couplings on the Receiver. The volume control shaft operated by left knob engages with the coupling nearest the Receiver and to the left.

On installing the control shafts on non-current models, where a special control head is used provided with a lock, insert the cables in their proper position in the Receiver as outlined above.

Remove the left-hand knob and loosen the set screw in the knob shaft. Turn this shaft to a point where the key will lock it firmly in position and retighten the set screw.

Battery Cable Location and Connections

(SEE DIAGRAM "B")

The "A" or two-wire cable should be run over the top of the set to the ammeter. NOTE: On Twelfth Series installations this lead is provided with a switch to be mounted in the wall of the right glove compartment with the control accessible from the inside.

Connect the feed wire (small eyelet terminal) to the discharge side of the ammeter. Connect the black wire from the dial light on the control unit to the small jack terminal on the end of the Receiver.

The speaker cable must then be plugged into the receptacle on the speaker. The antenna lead-in should be plugged into the Receiver, the cable being carried over the set and right glove compartment. This lead-in should be spliced to the antenna lead in which will be found coiled and taped back of the cowl trim panel. Any excess lead should be cut off, using just enough lead-in to make a neat installation. The lead in provided with the Receiver is equipped with a shield which should be wrapped around the antenna lead-in shield and carefully taped.

The radio fuse is located in the "A" cable in a small tubular housing and is very plainly marked.

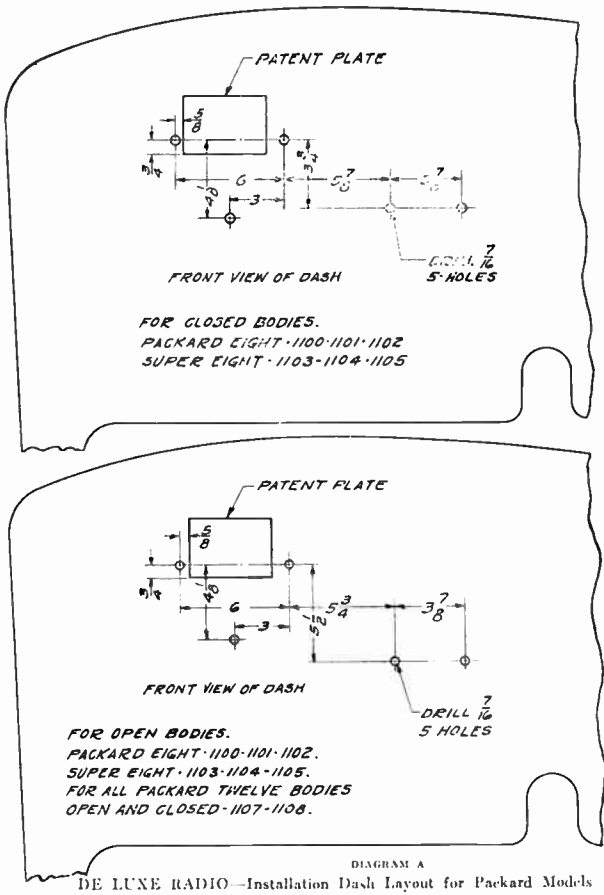


DIAGRAM A

DE LUXE RADIO—Installation Dash Layout for Packard Models 1100, 1101, 1102, 1103, 1105, 1107, 1108

On the twelve-cylinder cars, provision has been made to mount a condenser on the coil bracket, using the right front coil mounting screw as a means of attachment. The condenser can be installed by passing the condenser lead through the hole provided in the coil bracket and attaching to the terminal on the lower side of the coil to which a brass strip is fastened. Replace the unit and tighten nuts, making certain that the condenser case is grounded through the enamel. Locate the second condenser under outside generator relay mounting screw and connect the lead to the battery terminal of relay.

On eight-cylinder cars it will generally be best to locate the first condenser under the lower instrument light housing screw with the wire fastened to the ammeter side of the ignition switch.

The generator condenser is then mounted as previously described.

All Twelfth Series, twelve-cylinder cars are equipped with resistors as standard equipment, it being only necessary to install the two coil wire resistors provided with the set. On eight-cylinder models and non-current models, cut off the spark plug terminals from the high tension wires and screw on the resistor units, after which the small round nuts (furnished with the set) can be screwed onto the spark plugs and the resistors snapped in place. Cut distributor to coil high tension wires about one inch from distributor head and insert "screw in" type distributor resistors. When the rest of the installation is carefully made, the resistors will sometimes be unnecessary between the coil and distributor. In all cases, however, the spark plug gap should be increased from the standard .025" to .030".

To check for ignition interference, disconnect the antenna lead-in from the set. Turn on Receiver and start the engine. If there is any noise coming through the speaker from the electrical system of the car when the volume control is about three-fourths open and the dial set between stations, carefully relocate speaker and battery cables to a point where the noise is reduced to a minimum. If relocation of these cables does not practically eliminate the ignition disturbances, it will then be advisable to peen the distributor arm.

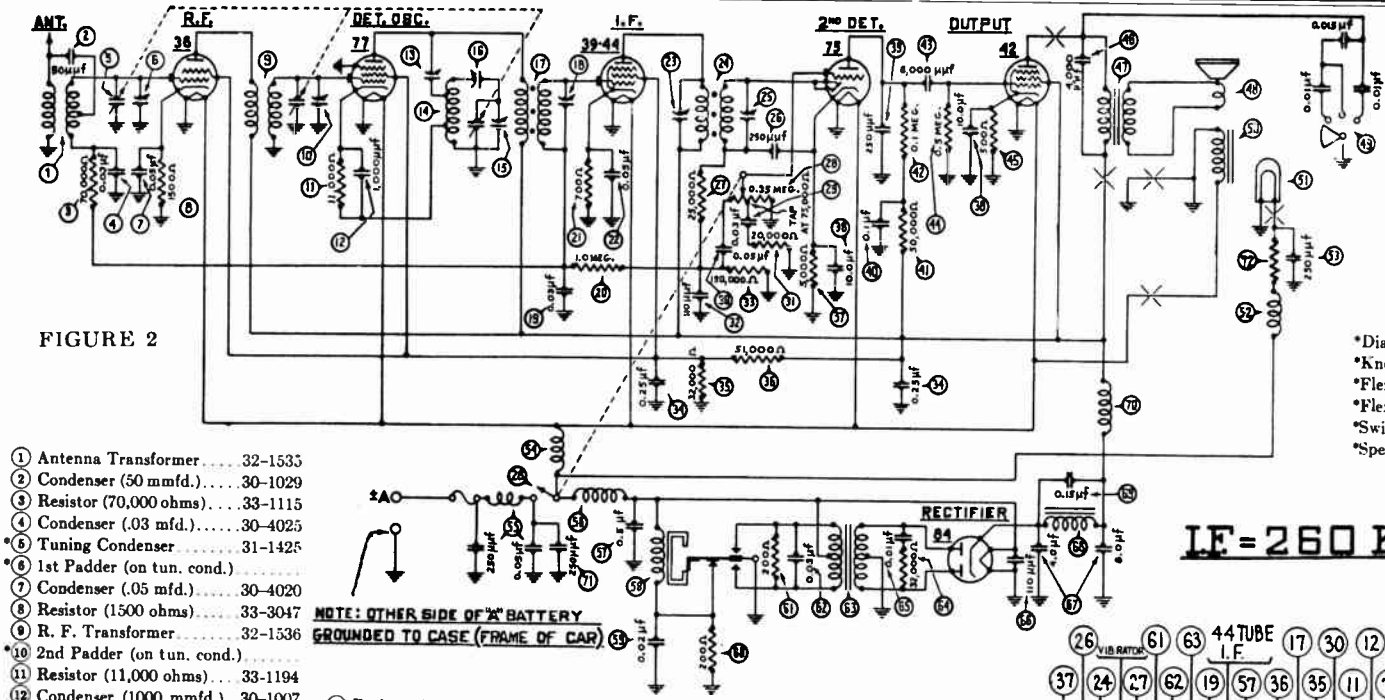


FIGURE 2

(1)	Antenna Transformer	32-1535
(2)	Condenser (50 mmfd.)	30-1029
(3)	Resistor (70,000 ohms)	33-1115
(4)	Condenser (.03 mfd.)	30-4025
*(5)	Tuning Condenser	31-1425
*(6)	1st Padder (on tun. cond.)	
(7)	Condenser (.05 mfd.)	30-4020
(8)	Resistor (1500 ohms)	33-3047
(9)	R. F. Transformer	32-1536
*(10)	2nd Padder (on tun. cond.)	
(11)	Resistor (11,000 ohms)	33-1194
(12)	Condenser (1000 mmfd.)	30-1007
(13)	Padder (Pri. 1st I. F. Tran.)	
(14)	Oscillator Transformer	32-1537
*(15)	3rd Padder (on tun. cond.)	
*(16)	4th Padder (on tun. cond.)	
(17)	First I. F. Transformer	32-1538
(18)	Padder (Sec. 1st I. F. Tran.)	
(19)	Condenser (.03 mfd.)	30-4025
(20)	Resistor (1 meg.)	33-1096
(21)	Resistor (700 ohms)	6443
(22)	Condenser (.05 mfd.)	30-4020
(23)	Padder (Pri. 2nd I. F. Tran.)	
(24)	Second I. F. Transformer	32-1449
(25)	Padder (Sec. 2nd I. F. Tran.)	
(26)	Condenser (250 mmfd.)	30-1032
(27)	Resistor (25,000 ohms)	33-1161
(28)	Vol. Con. & Switch Assm.	33-5088
(29)	Condenser (.03 mfd.)	30-4025
(30)	Condenser (.05 mfd.)	30-4020
(31)	Resistor (20,000 ohms)	33-1130
(32)	Condenser (110 mmfd.)	30-1031
(33)	Resistor (190,000 ohms)	33-1116
(34)	Condenser (.25-.25 mfd.)	30-4231
(35)	Resistor (32,000 ohms)	3525
(36)	Resistor (51,000 ohms)	5868
(37)	Resistor (5,000 ohms)	6096
(38)	Condenser (10-10 mfd.)	30-2076
(39)	Condenser (250 mmfd.)	30-1032
(40)	Condenser (.1 mfd.)	30-4170
(41)	Resistor (50,000 ohms)	6098
(42)	Resistor (.1 meg.)	6099
(43)	Condenser (6000 mmfd.)	30-4125
(44)	Resistor (.5 meg.)	6097
(45)	Resistor (500 ohms)	33-3031
(46)	Condenser (4000 mmfd.)	30-4185
(47)	Output Transformer	2598
(48)	Cone & Voice Coil	36-3159
*(49)	Tone Control	30-4127
(50)	Field Coil Assembly	02795
(51)	Pilot Lamp	34-2040
(52)	Choke	32-1374
(53)	Condenser (250 mmfd.)	30-1032
(54)	"A" Choke	32-1374
(55)	Interference Filter	32-1534
(56)	Vibrator Choke	32-1563
(57)	Condenser (.5 mfd.)	30-4015
(58)	Vibrator	38-5036
(59)	Condenser (.02 mfd.)	30-4039
(60)	Resistor (200 ohms)	7217
(61)	Resistor (200 ohms)	7217
(62)	Condenser (.03 mfd.)	30-4025
(63)	Power Transformer	32-7315
(64)	Resistor (32,000 ohms)	3525
(65)	Condenser (.01 mfd.)	30-4051
(66)	Condenser (110 mmfd.)	30-1031
(67)	Filter Cond. (4-8 mfd.)	30-2107
(68)	"B" Choke	32-7254
(69)	Condenser (.15 mfd.)	30-4191
(70)	R. F. Choke	32-1530
(71)	Condenser (250 mmfd.)	30-1032
(72)	Resister (7 ohms)	33-3130
	*Ground Clip	28-2488
	Spark Plug Resistor	33-1015
	Distributor Resistor	4851
	Interference Cond. (1 mfd.)	4522
	Interference Cond. (½mfd.)	30-4007
	*"T" Bolt (Set Mtg.)	28-6268
	*Nut (Set Mtg.)	W518A
	Fuse	7227
	Fuse Insulator	27-7729
	*Antenna Lead	38-5131
	*"A" Lead	38-6468

*Dial		27-5078
*Knob		27-4174
*Flex. Shaft (Tun.)		28-8338
*Flex. Shaft (Vol.)		28-8339
*Switch		42-1080
*Speaker Cable		41-3127

IF = 260 KC.

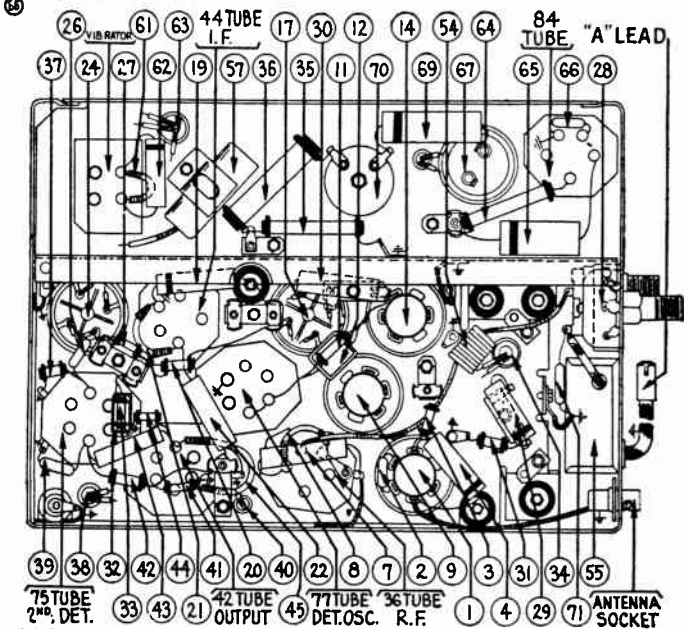


FIGURE 3

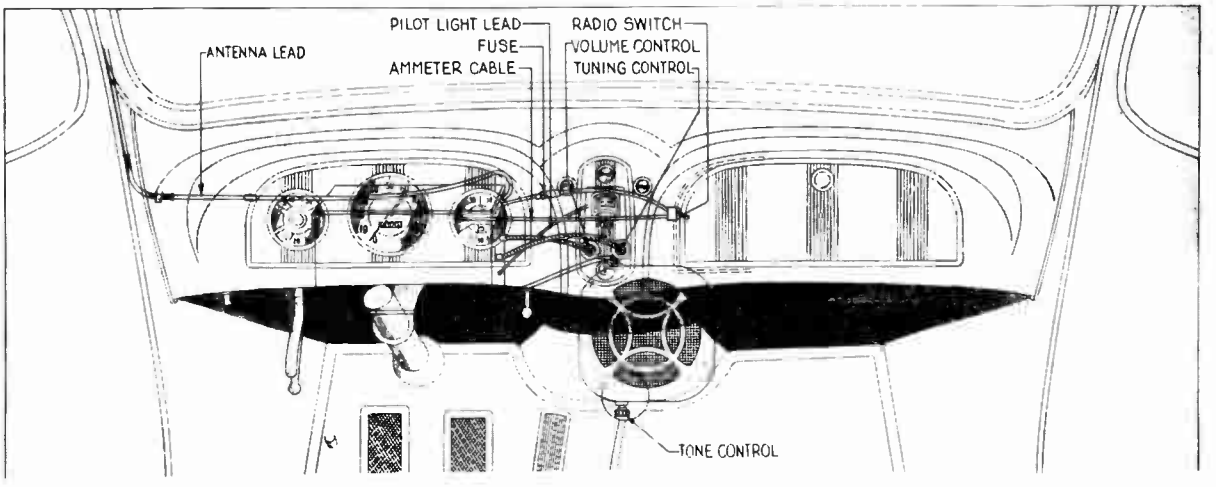
Parts List - PT-5 Packard De Luxe Custom Built Radio Model 120

For Installation Data, see Index

MODEL PT-5 Packard
Model 120 Cars
Installation Data

PHILCO RADIO & TELEV. CORP.

PACKARD CUSTOM CAR RADIO - - MODEL 120 GENERAL INSTALLATION INSTRUCTIONS



Receiver and Speaker Location

(SEE FIGURE 1)

Holes are provided in the dash for radio installation in all model 120 Packard cars. These holes are plugged with snap buttons which can be removed easily with a screw driver. The inside dash liner is not punched, so before making the installation, corresponding holes should be cut or drilled through the cardboard dash liner. Two T bolts are used to fasten the Receiver in place.

Install the Receiver above the steering column. Screw the two studs into the back of the speaker and locate it near the center of the dash, a few inches above the top of the toe boards, with the tone control down. NOTE: After the Receiver has been securely fastened in place be sure to dress the speedometer cable, avoiding all sharp bends.

Control Unit

On Model 120 cars, provision has been made to install the control unit in the ash receptacle opening. Remove the ash receptacle and cut the upper and lower wire hinges. This permits the removal of the wire hinge as well as the upper ash receptacle cover. Fasten the radio control unit in place, using the starter button and ignition switch fastening studs.

The black dial light lead coming from the rear of the control must be connected to the small jack terminal in the end of the Receiver housing.

Control Shafts

The flexible shaft on the left of the control is the volume control shaft and must be coupled in the shaft bushing nearest the dash, on the end of the Receiver housing. After the shaft has been properly seated, the knurled casing nut must be securely tightened.

Next couple the tuning control flexible shaft in the proper coupling on the Receiver and tighten the casing nut.

Cable Connections

There is a hole in the wall of the right glove compartment for installing the radio control locking switch. After installing the switch, place the "A" fuse and insulator in the fuse housing and connect it to the Receiver "A" lead. Connect the eyelet terminal of the lead to the discharge side of the ammeter. Locking the compartment provides a means of locking the radio when the occasion demands.

Connect the speaker cable plug in the receptacle on the side of the speaker housing.

The antenna lead must be spliced to the car antenna lead-in as close to the corner post as possible. All excess lead-in must be cut off and the splice taped. The shield pigtail must be wrapped around the lead-in shielding and carefully taped. Connect the antenna lead in its receptacle on the end of the Receiver housing.

Generator and Motor Interference Suppression

Cut the distributor-to-coil high tension lead about two inches from the distributor cap and insert the screw-in type resistor in the lead.

Using a piece of emery cloth, clean the speedometer and ignition coil cable at the dash where it enters the motor compartment. Solder the end of the braided strap to the oil pressure gauge line tubing and wind the braided strap tightly around each of the tubes and cables coming through the dash at this point. The braid must then be soldered to pressure gauge tubing again and the eyelet in the braided strap grounded to the dash. The toe board-to-dash fastening screw, directly above the point where these cables come through the dash, furnishes a convenient place to ground the braid

PHILCO RADIO & TELEV. CORP.

MODEL AC-266 Stud
MODEL MT-3 Pierce
MODEL RT-3 Reo DeLuxe
Schematic, Socket,

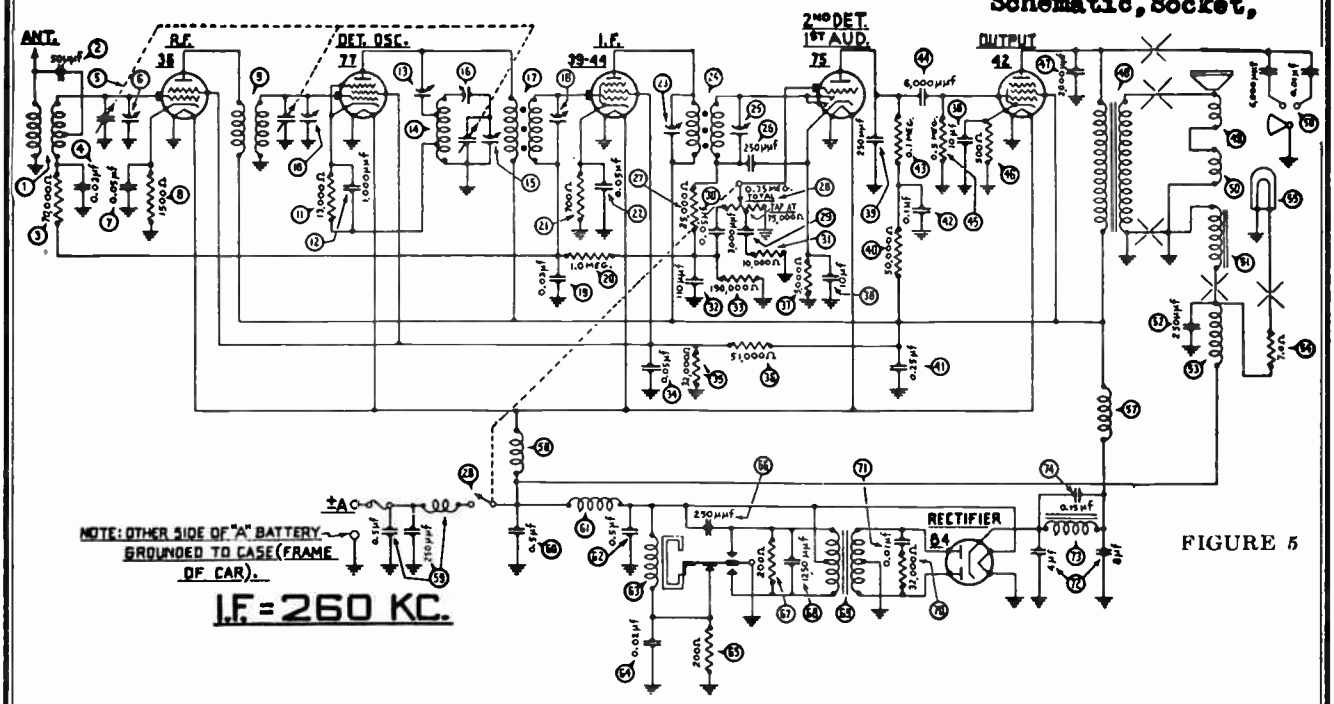


FIGURE 5

PARTS LIST ST3 - STUDEBAKER DE LUXE MODEL AC-266

(1) Antenna Transformer	32-1535	(41) Condenser (.25 mfd.)	04360
(2) Condenser (50 mmfd.)	30-1029	(42) Condenser (.1 mfd.)	30-4170
(3) Resistor (70,000 ohms)	33-1115	(43) Resistor (.1 meg.)	6099
(4) Condenser (.03 mfd.)	30-4025	(44) Condenser (6000 mmfd.)	30-4125
*(5) Tuning Condenser	31-1419	(45) Resistor (.5 meg.)	6097
(6) 1st Padder (on tun. cond.)		(46) Resistor (500 ohms)	33-3031
(7) Condenser (.05 mfd.)	30-4020	(47) Condenser (2000 mmfd.)	30-4177
(8) Resistor (1500 ohms)	33-3047	(48) Output Transformer	32-7318
(9) R. F. Transformer	32-1536	*(49) Cone & Voice Coil	45-2062
(10) 2nd Padder (on tun. cond.)		*(50) Bucking Coil	45-2066
(11) Resistor (11,000 ohms)	33-1194	*(51) Field Coil	45-2065
(12) Condenser (1000 mmfd.)	5215	(52) Condenser (250 mmfd.)	30-1032
(13) Padder (Pri. 1st I. F. Tran.)		(53) Choke	32-1374
(14) Oscillator Transformer	32-1537	(54) Resistor (7 ohms)	33-3035
(15) 3rd Padder (on tun. cond.)		(55) Pilot Lamp	34-2040
(16) 4th Padder (on tun. cond.)		(56) Tone Control	30-4243
(17) 1st I. F. Transformer	32-1538	(57) Choke	32-1539
(18) Padder (Sec. 1st I. F. Tran.)		(58) "A" Choke	32-1282
(19) Condenser (.03 mfd.)	30-4025	(59) Interference Filter	32-1544
(20) Resistor (1 meg.)	33-1171	(60) Condenser (.5 mfd.)	30-4210
(21) Resistor (700 ohms)	6443	(61) Vibrator Choke	32-1281
(22) Condenser (.05 mfd.)	30-4020	(62) Condenser (.5 mfd.)	30-4047
(23) Padder (Pri. 2nd I. F. Tran.)		(63) Vibrator	38-5036
(24) 2nd I. F. Transformer	32-1449	(64) Condenser (.02 mfd.)	30-4039
(25) Padder (Sec. 2nd I. F. Tran.)		(65) Resistor (200 ohms)	7217
(26) Condenser (250 mmfd.)	30-1032	(66) Condenser (250 mmfd.)	30-1032
(27) Resistor (25,000 ohms)	33-1161	(67) Resistor (200 ohms)	7217
(28) Vol. Con. & Switch Assm.	38-6297	(68) Condenser (1250 mmfd.)	5886
(29) Condenser (3000 mmfd.)	30-4042	(69) Power Transformer	32-7216
(30) Condenser (.05 mfd.)	30-4020	(70) Resistor (32,000 ohms)	3525
(31) Resistor (10,000 ohms)	33-1000	(71) Condenser (.01 mfd.)	30-4051
(32) Condenser (110 mmfd.)	30-1031	(72) Filter Cond. (4-8 mfd.)	30-2105
(33) Resistor (190,000 ohms)	33-1116	(73) Filter Choke	32-7215
(34) Condenser (.05 mfd.)	30-4020	(74) Condenser (.15 mfd.)	30-4191
(35) Resistor (32,000 ohms)	3525	(75) Antenna Choke	32-1372
(36) Resistor (51,000 ohms)	5868	*Spark Plug Resistor	33-1192
(37) Resistor (5000 ohms)	33-1155	Distributor Resistor	4851
(38) Condenser (10-10 mfd.)	30-2106	Interference Condenser	30-4007
(39) Condenser (250 mmfd.)	30-1032	4-prong Socket	27-6006
(40) Resistor (50,000 ohms)	33-1163	5-prong Socket	27-6014

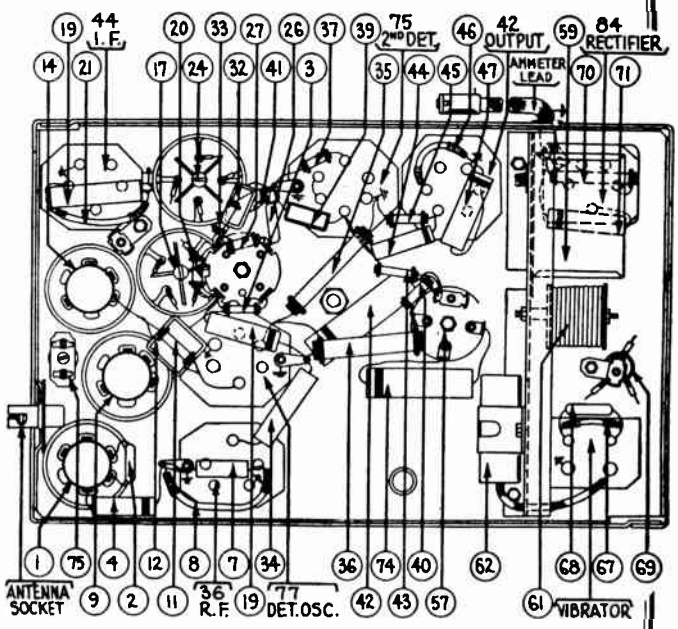


FIGURE 6

6-prong Socket	27-6020	*Knob	27-4098
Antenna Lead	38-5131	Knob (tone control)	03064
*Ammeter Lead	38-6339	*Lock (Less Keys)	28-8166
*Stud	28-6231	*Speaker Cable (speaker end)	36-3350
Nuts (set mtg.)	W55A	*Knob (President)	27-4058
*Flexible Shaft	28-8336	*Flexible Shaft (President)	28-8284
*Dial	27-5073		

An Antenna Choke, Part No. 32-1372 (75) on the Parts List and Base View has been added. This is connected in series with the Antenna Lead and the Antenna Transformer (1) and Condenser (2).

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Phila., Chicago, or San Francisco.

These instructions have been carefully prepared for your use in installing the Studebaker DeLuxe Radio (Stock No. AC-266) in the 1935 model Studebaker cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

All closed cars manufactured after July 1, 1931, are equipped with the roof-type antenna. The lead-in is brought down the left windshield post and is coiled up behind the left cowl trim panel. An antenna designed especially for convertible models can be secured from the Studebaker factory through the Accessory Division.

Receiver Location and Installation

Refer to Fig. 1 showing the location of the holes in the dash. Locate one of the holes and mark with a sharp punch; then use the template furnished with the Receiver to locate the remaining two holes. These holes should be drilled with a 7/16" drill.

Install the Receiver with the control connections to the left side of the car. (See Fig. 3)

Control Unit

The control unit is mounted on a panel which replaces the dummy door on the left side of the instrument board. This door is held in place by means of three bolts (one at each end and one at the bottom). Care should be taken to fasten the control panel securely so it does not rattle.

The control is furnished with a blank lock cylinder which must be crushed to match the car keys. This operation must be completed before the control is installed on the instrument board.

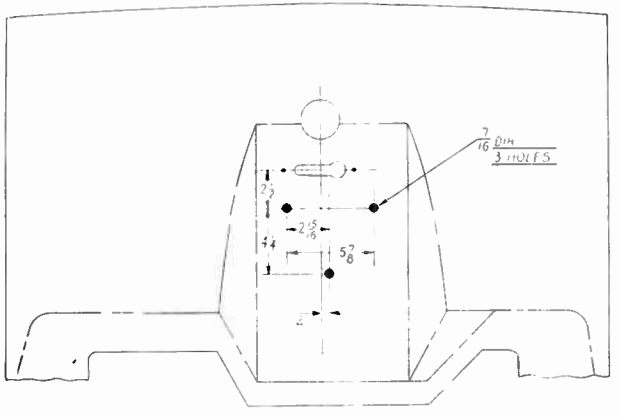


FIGURE 1

Instructions for Fitting Car Key to Control Lock

1. Remove the knobs and take off the control unit from the panel.

2. Remove the pilot lamp socket assembly in the rear of the control.

3. Reach in through the opening in the back of the control unit with a medium size screw driver and press down on the brass retaining lock spring, at the same time working the lock cylinder forward. (See Fig. 2).

4. Insert the car key in the lock cylinder and crush in the same manner that you crush the standard lock, with pliers or vise.

5. Assemble the dial and spring on the cylinder. Push down the retaining spring and replace the lock in the same relative position that it had when removed. With the key in the lock push the lock back, working the lock pin in place in the slot in the lock bar in back of the lock. Push the lock in until the retaining spring snaps in place.

6. Reassemble the control on the panel.

Control Shaft Installation

The control must be unlocked so that the volume control shaft is free. Then connect the volume control flexible shaft (left hand) to the rear coupling on the end of the Receiver. Be sure the coupling is properly seated and then tighten the knurled casing retaining nut. Next connect the tuning control shaft in a like manner to the front coupling.

The black lead coming from the back of control must be coupled to the short connector that branches from the speaker cable at the plug.

"A" Or Battery Cable (See Figure 4)

Connect the "A" or battery cable to the Receiver lead. The fuse housing connector couples by inserting the small end and making a slight turn clockwise. The other end of the cable must be connected to the right side of the ammeter. The shield pigtail at each end of the cable must be grounded under a convenient screw and the cable dressed up behind the Receiver. Be sure the fuse and fuse insulator are in place in the fuse housing before the cable is connected.

Antenna Lead

The antenna lead must be connected in the receptacle on the left end of the Receiver near the top and run along the instrument board to the left-hand windshield post. The lead must be spliced to the car antenna lead-in. Solder and tape the splice. The shield pigtail must be grounded. Cut off the excess lead-in before making the splice.

Speaker Cable and Speaker Installation (Fig. 3 and 4)

Determine the location of the metal frame for mounting the speaker in the center above the windshield. (See Fig. 4). This can be felt thru the headlining. Then slit the headlining vertically and horizontally inside the frame. Carefully cut away the headlining to within one inch of the frame. This will make a circular hole two inches smaller in diameter than the frame.

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the right windshield post. To do this, first feed a piece of iron or fish wire across the header and down the right windshield post. A piece of cotton sleeving is furnished with each set. This must be slipped over the end of the cable and then drawn tight with the fingers. Fasten to the wire and then carefully pull the wire and cable up the post, across the header and out the speaker opening.

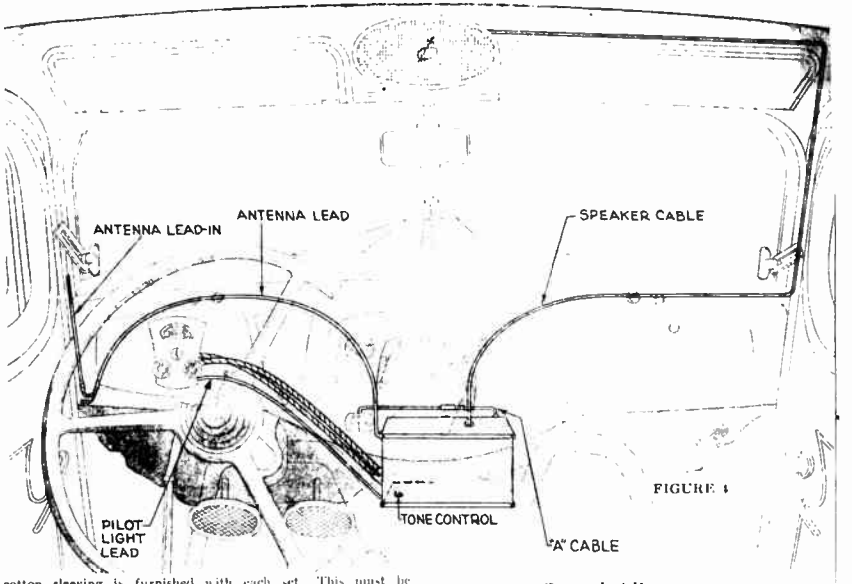


FIGURE 4

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and black paint to correspond with the colors of the speaker cable leads. The leads must be connected to the sockets of corresponding colors.

The speaker must be fastened in the opening provided with four self tapping screws (see fig. 3 and 4). The connections on the speaker must be down so that they cannot be pulled out by any strain on the cable.

The grille and bezel must next be fastened in place. The location of the four screw holes is shown in Fig. 3. The cardboard spacer must be placed between the grille and the headlining.

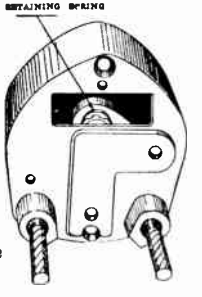


FIGURE 2

Control Adjustments

Turn the left-hand (volume control) knob counter-clockwise to the "off" position. Pull off the knob and loosen the set screw on the shaft. Then turn the shaft until it can be locked in place with the control lock. Tighten the set screw securely and replace the knob.

This adjustment must be made so that the radio can be turned "off" and the control locked.

The right hand knob is the tuning control knob. With the Receiver turned on, tune in a station whose frequency in kilocycles is known. The numbers on the dial represent the frequency in kilocycles with the last "0" omitted. With the known station accurately tuned in, pull off the knob and loosen the set screw. Then turn the shaft until the proper frequency is indicated on the dial. Tighten the set screw securely and replace the knob.

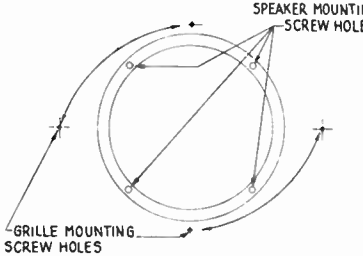


FIGURE 3

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Pierce-Arrow Philco Auto Radio, with EAR LEVEL RECEPTION, Model MT3, in the 1935 Series Pierce-Arrow cars. Read the instructions carefully and be sure you understand each step of the installation before proceeding with the work.

Antenna

All closed cars of the 1935 series are equipped with a roof-type antenna. The antenna lead-in is coiled behind the left cowl trim panel. In the 1935 series open cars, the antenna is in the roof and the lead-in coiled behind the rumble seat left side kick pad.

The shielded antenna lead must be connected to the car lead-in as close as possible to the corner post. Splice the bare ends together and then solder and tape the connection. Cut off all the excess lead-in, and ground the shield pigtail under a convenient screwhead.

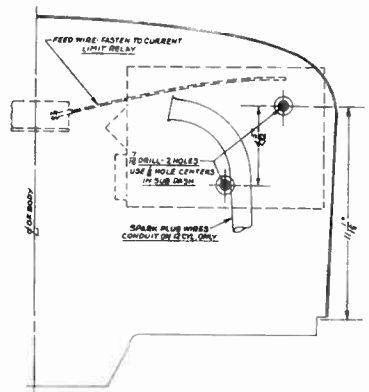


FIGURE 1

Receiver Location

Refer to Figure 1 for the location of the 1½" hole in the dash. These holes must be enlarged to 7/16". Fasten the studs to the Receiver housing and then mount it on the dash with the control end of the Receiver facing the center of the car.

Control Unit

Take off the two nuts and spacers and remove the medallion plate from the left side of the instrument board. Remove the knobs from the control unit and then install it in the opening. Fasten it in place, on the two studs on the back of the instrument board, using the medallion, nuts and washers. Replace the knobs on the control shafts. See Figures 2 and 3.

Items 1 to 75 of the Parts List for the Studebaker ST-3, DeLuxe Model AC-266 are identical Pierce-Arrow DeLuxe Model MT-3. See the items on the right for additional accessories.

Speaker Cable and Speaker Installation
(CLOSED CARS)

Determine the location of the opening for mounting the speaker in the center above the windshield. This can be felt through the headlining. Slit the headlining vertically and horizontally and carefully cut away the headlining to within one inch of the opening. This will make a circular hole two inches smaller in diameter than the opening.

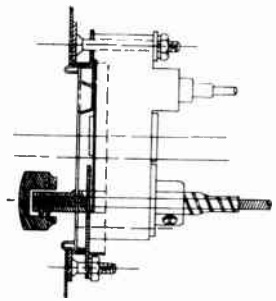


FIGURE 2

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the left windshield post. A fish cord is tacked to the headlining trim panel and is used to pull the speaker cable up the left pillar. A piece of cotton sleeving on tow strap is furnished with each set. This must be slipped over the end of the cable and then drawn tight with the fingers. Fasten to the cord and then carefully pull the cord and cable up the post, across the header and out the speaker opening.

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and black paint to correspond with the colors of the speaker cable leads. The leads must be connected to the sockets of corresponding colors. The connections on the speaker must be down so that they cannot be pulled out easily.

Fasten the speaker in the opening with wood screws and then install the speaker grille and bezel.

Spark Plug Resistor	33-1015		
Distributor Resistor	4851		
Interference Condenser	30-4037		
4-prong Socket	27-6036	*Flexible Shaft	28-8341
5-prong Socket	27-6014	*Dial	27-5084
6-prong Socket	27-6020	Knob	27-4088
Antenna Lead	38-5131	Knob (tone control)	03084
*Ammeter Lead	38-6545	*Speaker Cable (speaker end)	35-3350
Stud	28-4036	*Tow Strap	36-3403
Nuts, set mtg.	W35A		

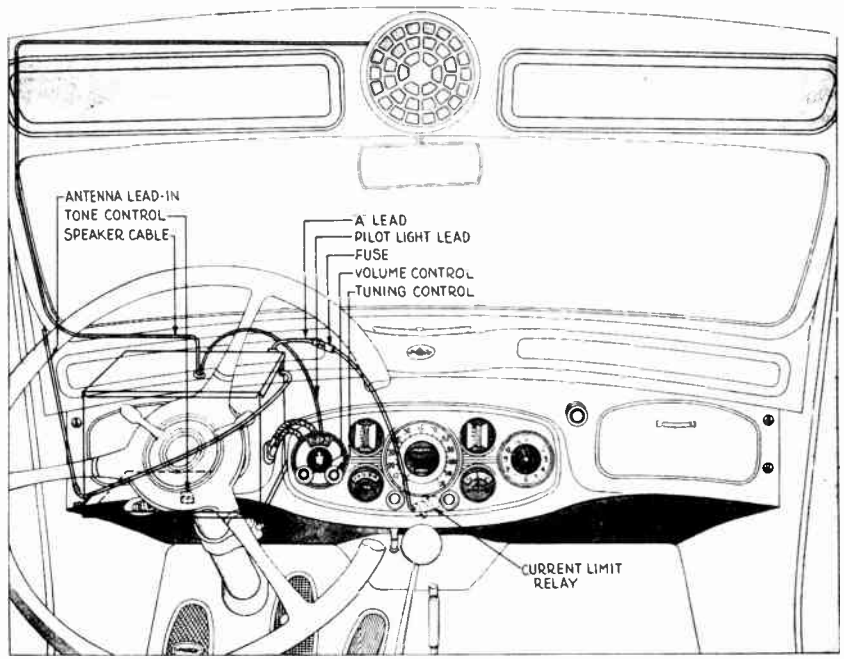


FIGURE 3

Speaker Cable and Speaker Installation
(OPEN CARS)

In open cars, the speaker location is in the right kick pad, under the cowl. The speaker mounting block can be felt thru the carpet of the kick pad. Cut the carpet vertically and horizontally inside the block and carefully trim the carpet to the edge of the cardboard circle under the carpet. Connect the speaker cable to the Receiver and then run the cable over and down inside the right kick pad.

Connect the cable to the speaker as described under Speaker Cable and Speaker Installation for closed cars.

Fasten the speaker to the mounting block with wood screws and then install the grille and bezel.

Connections

Connect the terminal end of the "A" lead to the left side of the current limit relay. Place the fuse and fuse insulator in the fuse housing and connect it to the Receiver lead.

The pilot light lead coming from the back of the control must be coupled to the short connector that branches from the speaker cable at the plug.

The antenna lead must be connected to its receptacle in the end of the Receiver housing and dressed in place.

Flexible Shafts

Connect the tuning control flexible shaft (right hand) to the rear coupling on the end of the Receiver. Be sure the coupling is properly seated and then tighten the knurled casing nut. Next connect the volume control shaft in a like manner to the front coupling.

Control Adjustments

The right-hand knob is the tuning control knob. With the Receiver turned on, tune in a station whose frequency in kilocycles is known. The numbers on the dial represent the frequency in kilocycles with the last "0" omitted. With the known station accurately tuned in, pull off the knob and loosen the set screw (See Fig. 2). Then turn the shaft until the proper frequency is indicated on the dial. Tighten the set screw securely and replace the knob.

Ignition and Generator Interference Suppression

Two interference condensers are supplied — one must be fastened under the inside generator relay leg and the lead connected to the battery side of the relay. The second condenser must be fastened under an ignition coil mounting screw and the lead connected to the *ammeter side* of the coil.

Cut the spark plug terminals from the spark plug wires and screw on the spark plug resistors and snap them in place on the spark plug terminals. Cut each distributor-to-coil high-tension wire about 1" from the distributor and screw into it a distributor resistor. Then screw the distributor end of the lead into the resistor and plug into the distributor cap again.

MODEL RT-3 Reo DeLuxe
(Part No.5485)
Installation Data.Parts

PHILCO RADIO & TELEV. CORP.

These instructions have been carefully prepared for your use in installing the Reo DeLuxe Radio **(Part No. 5485)** in the 1935 Reo cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

All Reo closed cars manufactured after January 1, 1933, are equipped with a roof type antenna. The lead-in is brought down the right-hand windshield post and is coiled behind the right cowl trim panel.

Receiver Location and Installation

Install the Receiver above the steering column on the left hand side of the car, allowing adequate foot clearance at the

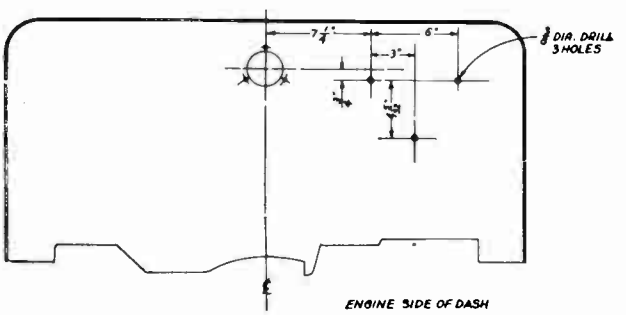


FIGURE 1

pedals. Refer to Figure 1 for the location of the bolt holes in the dash and drill three ⅜" holes. Assemble the bolts and fasten the Receiver securely to the dash. The control end of the Receiver must face the center of the car.

Control Unit

In 1935 cars, provision has been made to install the control unit in the ash receptacle opening in the instrument board. Unscrew the ash receptacle door knob to release the face plate. This exposes the two bolts which hold the two clamp brackets against the back of the instrument board. Remove these and take out the ash receptacle.

Fasten the radio control unit in place on the instrument board. Place the "U" clamp over the studs on the back of of the control and tighten the wing nuts to draw the control flush with instrument board. (See Figure 2).

Control Shafts

The flexible shaft on the right of the control is the tuning control shaft. This must be coupled in the shaft bushing nearest the dash, on the end of the Receiver housing. After the shaft has been properly seated, the knurled casing nut must be securely tightened.

Next couple the volume control shaft in the proper bushing on the Receiver and tighten the knurled casing nut.

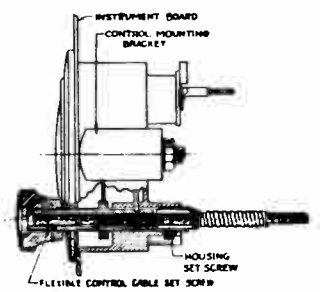


FIGURE 2

The black lead coming from the back of the control unit must be coupled to the short connector on the lead branching from the speaker cable plug.

"A" Lead

Place the "A" fuse and insulator in the fuse housing and connect it to the Receiver "A" lead. Connect the eyelet terminal of the lead to the right side of the ammeter.

Antenna Lead

The antenna lead must be spliced to the car antenna lead-in as close to the right corner post as possible. All excess lead-in must be cut off and the splice soldered and taped. Dress the lead along the instrument board and over the top of the glove compartment. The shield pigtail must be grounded under a

Speaker Cable and Speaker Installation

Determine the location of the opening for mounting the speaker in the center above the windshield. This can be felt through the headlining. Then slit the headlining vertically and horizontally inside the frame. Carefully cut away the headlining to within one inch of the opening. This will make a circular hole two inches smaller in diameter than the opening.

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the left windshield post. A fish wire is tacked to the headlining trim panel and is used to pull the speaker cable up the left pillar. A piece of cotton sleeving or tow strap is furnished with each set. This must be slipped over the end of the three wires on the cable and then drawn tight with the fingers. Fasten to the wire and then carefully pull the wire and cable up the post, across the header and out the speaker opening.

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and black paint to correspond with the colors of the speaker cable leads. *The leads must be connected to the sockets of corresponding colors.*

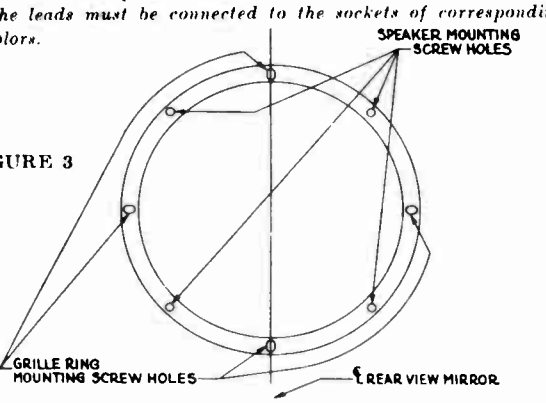


FIGURE 3

The speaker must be fastened in the speaker opening with wood screws. In mounting the speaker, be sure to mount it with the slotted holes in a vertical line with rear view mirror. The connections on the speaker must be down so that they cannot be pulled out by any strain on the cable. (See Figure 3).

The speaker grille and bezel must next be fastened in place, using four chrome plated oval head wood screws as furnished. The cardboard spacer must be placed between the grille and the headlining.

Items 1 to 75 of the Parts List for the Studebaker ST-3, DeLuxe Model AC-266 are identical for Reo DeLuxe Model RT-3. See the items below for additional accessories.

6 prong Socket	27-6020
Antenna Lead	38-5131
*Ammeter Lead	38-6595
Stud (Set Mtg.)	28-6231
Nuts (set mtg.)	W55A
•Flexible Shaft (Tuning)	28-8317
*Flexible Shaft (Volume)	28-8318
•Pointer	28-2510
Spark Plug Resistor	33-1101
Distributor Resistor	33-1113
Interference Condenser	30-4007
4-prong Socket	27-6006
5-prong Socket	27-6014
Knob	27-4182
Knob (tone control)	03064
*Speaker Cable (speakerend)	41-3128
*Tow Strap	36-3403
Glass	27-7325
*Face Assembly	28-2206
"U" Clamp	29-1705
Nuts (Control Mtg.)	W317A

(1)	An enna Transformer	32–1220
(2)	Tuning Condenser	31–1202
(3)	First Padder (in tun. cond.)	
(4)	Resistor (100,000 ohms)	6099
(5)	Condenser (.05 mfd.)	30–4020
(6)	Condenser (.05 mfd.)	30–4020
(7)	Resistor (400 ohms)	33–3016
(8)	R. F. Transformer	32–1221
(9)	Condenser (.05 mfd.)	30–4020
(10)	Second Padder (in tun. cond.)	
(11)	Resistor (50,000 ohms)	6098
(12)	Third Padder (in tun. cond.)	
(13)	Condenser (.00025 mfd.)	30–1032
(14)	Oscillator Transformer	32–1222
(15)	Padder	040008
(16)	Resistor (15,000 ohms)	6208
(17)	Padder (Pri. 1st I.F. Trans.)	
(18)	First I. F. Transformer	32–1236
(19)	Resistor (500,000 ohms)	6097
(20)	Condenser (.05 mfd.)	30–4020
(21)	Padder (Sec. 1st I. F. Trans.)	
(22)	Condenser (.5 mfd.)	30–4058
(23)	Resistor (500 ohms)	6977
(24)	Resistor (500,000 ohms)	6097
(25)	Padder (Pri. 2nd I. F. Trans.)	
(26)	Second I. F. Transformer	32–1237
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Condener (.00025 mfd.)	30–1032
(29)	Resistor (100,000 ohms)	6099
(30)	Condenser (.00011 mfd.)	30–1031
(31)	Condenser (.006 mfd.)	30–4125
(32)	Resistor (2,000,000 ohms)	33–1025
(33)	Vol. Control Sw. Assembly	38–5851
(34)	Resistor (10,000 ohms)	33–1000
(35)	Condenser (.03 mfd.)	30–4025
(36)	Resistor (250,000 ohms)	33–1097
(37)	Resistor (250,000 ohms)	33–1097
(38)	Condenser (.00025 mfd.)	30–1032
(39)	Resistor (250,000 ohms)	3768
(40)	Resistor (50,000 ohms)	4237
(41)	Condenser (.25 mfd.)	30–4065
(42)	Condenser (.01 mfd.)	30–4169
(43)	Resistor (500,000 ohms)	6097
(44)	Condenser (20 mfd.)	30–4065
(45)	Resistor (500 ohms)	6977
(46)	Condenser (.004 mfd.)	30–4185
(47)	Output Transformer	32–7102
(48)	Cone and Voice Coil	36–3159
(49)	Field Coil Assembly	36–3130
(50)	Pilot Lamp	34–2039
(51)	Condenser (.00005 mfd.)	30–1029
(52)	Resistor (7 ohms)	33–3035
(53)	Tone Control	30–4056
(54)	Condenser (.25 mfd.)	04360
(55)	Resistor (20,000 ohms)	6649
(56)	Condenser (.05 mfd.)	30–4020
(57)	Resistor (32,000 ohms)	3525
(58)	Condenser (.05 mfd.)	30–4020
(59)	Resistor (500 ohms)	6977
(60)	Resistor (200 ohms)	7217

FIG. 3

I.F. = 260 KC

MODEL 10 (Code 122)

JULY, 1934

OTHER SIDE OF "A" BATT. GROUNDED TO CASE (FRAME OF CAR)

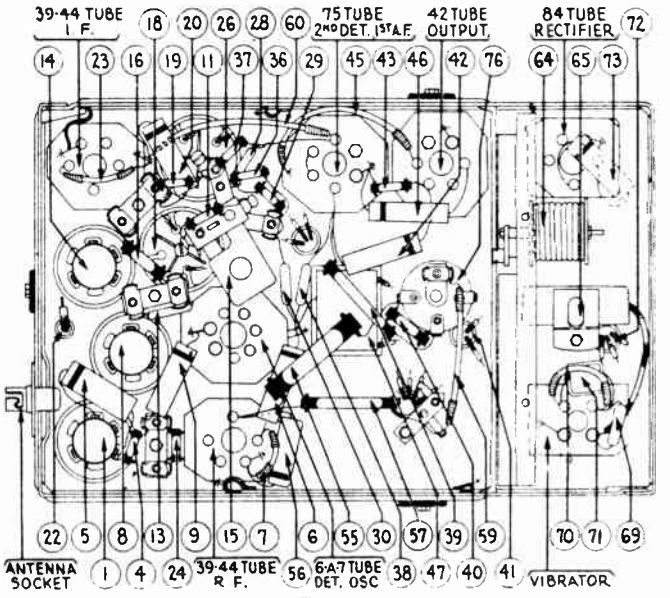


FIG. 4

(61)	Condenser (.00005 mfd.)	30–1029
(62)	Choke	32–1374
(63)	Condenser (.5 mfd.)	30–4061
(64)	Vibrator Choke	32–1259
(65)	Condenser (.5 mfd.)	30–4061
(66)	Vibrator	38–5036
(67)	Condenser (.05 mfd.)	30–4039
(68)	Resistor (200 ohms)	7217
(69)	Condenser (.00025 mfd.)	5858
(70)	Resistor (200 ohms)	7217
(71)	Condenser (.00125 mfd.)	5886
(72)	Power Transformer	32–7098
(73)	Condenser (.01 mfd.)	30–4051
(74)	Filter Condenser (4-8 mfd.)	30–2015
(75)	Filter Choke	32–7104
(76)	R. F. Choke	32–1281
	Spark Plug Resistors	33–1015
	Distributor Resistor	33–1113E
	Interference Condenser	30–4007
	Studs	28–6036
	Nuts (mounting)	W55A
	Battery Cable	38–5296
	Antenna Lead	38–5131
	Acorn Nut	W821
	Bracket	6035
	Strap	04344
	Strap Pad	6206
	Knob	27–4058
	Glass	27–7325
	Glass Gasket	27–7509
	Pointer	28–1957
	Shaft	28–8206
	Face Assembly	42–5173
	Control Assembly	42–5171

Studebaker DeLuxe Model AC-206 (Code 122)

Items 1 to 76, exclusive of #33, are identical for Model AC-206 (Code 122). See the following items for additional accessories:

(33)	Vol. Control & Sw. Assembly	38–5935
	Spark Plug Resistors	4531E
	Distributor Resistor	4851E
	Interference Condenser	30–4007
	Studs	28–6036
	Nuts (mounting)	W55A
	Battery Cable	38–5296
	Antenna Lead	38–5776
	Acorn Nut	W821
	Dial	27–5027
	Knob (volume)	27–4042
	Knob (tuning)	03064
	Flexible Shaft (volume)	28–8170
	Flexible Shaft (tuning)	28–8169

For Installation Data, See Index

MODEL 10 (Code 122)
MODEL AC-206 (Code 122) PHILCO RADIO & TELEV. CORP.
Studebaker DeLuxe
Alignment, Trimmers, Socket MODEL 10 (Code 122) RECEIVER

THE MODEL 10 (Code 122) represents the latest developments in single-unit automobile radio. Compact and easy to install, its performance is amazing.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a tremendous power output and is equipped with a full-size electro-dynamic speaker, the same type used in high-priced home radio Receivers.

Bass compensation gives full rounded tone at any volume. Four point tone control is provided to satisfy the individual preference. Greater sensitivity, a three-section tuning condenser giving improved selectivity and fidelity, inherently quiet circuits and all the other improvements, make this model the outstanding automobile radio.

The new interference filters and improvement in shielding, cut installation time to just a fraction of what it would be without these improvements. The ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) makes it the most desirable one to sell, install or own.

I. F. TRANSFORMER AND PADDERS

A new style I. F. transformer complete with padders is used in the Model 10. (Code 122.)

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. Stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

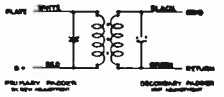


FIG. 1

A new type first I. F. transformer is used, but retains the same part no. 32-1236.

This transformer can be distinguished from the old type, since the bottom fibre spacer is painted green.

MODEL 10 (Code 122) ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders ㉕ and ㉖ must be adjusted first. These padders should be adjusted to peak. (Figs. 2 and 3.) First adjust the screw, then the nut.

The padders ⑰ and ㉑ must be adjusted next. (Figs. 2 and 3.) Turn the adjusting screw in all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut ㉑ with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw ⑰ for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid cap to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder ⑫ until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ⑩ and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder ⑮ for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

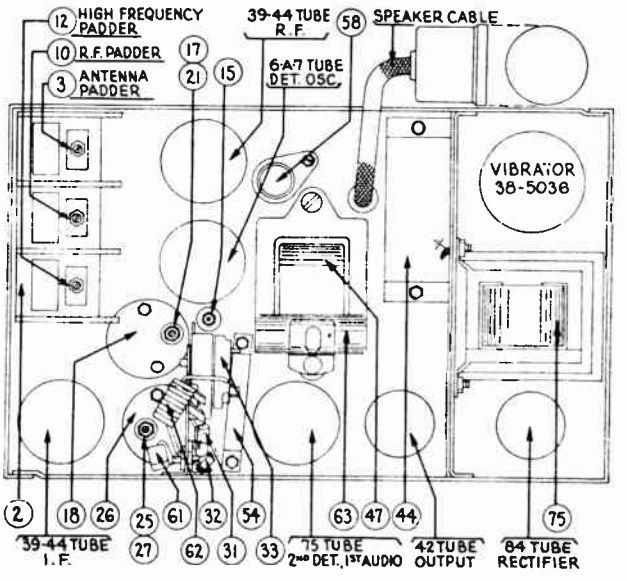


FIG. 2

PHILCO RADIO & TELEVISION CORP.

MODEL 11 RECEIVER

THE PHILCO auto radio Model 11 is a new Philco development in single-unit automobile radio. It is compact, easy to install and will give exceptional performance.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a genuine Philco electro-dynamic speaker, the same type that is used in many of the larger home radio Receivers. A three-section tuning condenser giving improved selectivity, remarkable sensitivity and tone, inherently quiet circuits and other improvements make this model one of the outstanding and most popular automobile radios.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) and the handy, attractive steering-column control which makes this model universal in its use are additional features which make the Model 11 a very desirable one for the dealer and for the owner.

I. F. TRANSFORMER AND PADDERS

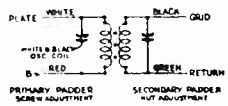
The new style I. F. transformer complete with padders is used in the Model 11.

The padders are placed in the top of the shield can one above the other.

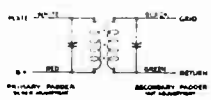
The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer
32-1329



2nd I. F. Transformer
32-1237

FIG. 1

MODEL 11 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22) and (24) are adjusted first (Figs. 2 and 3). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (24) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

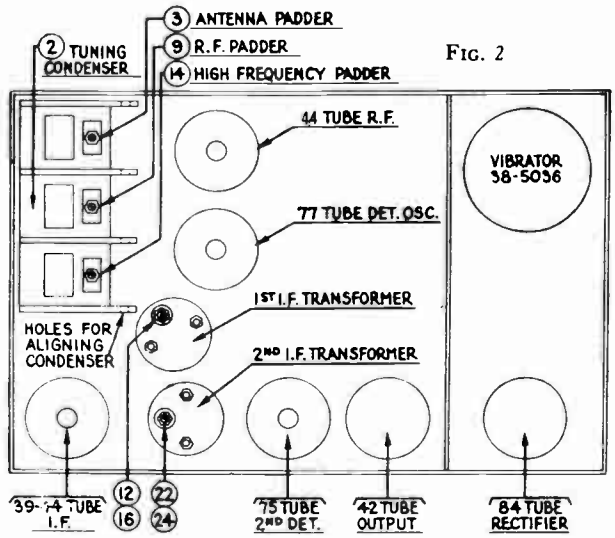


FIG. 2

Repeat the above procedure with the condensers (12) and (16).

After padding the first I. F stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (14) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

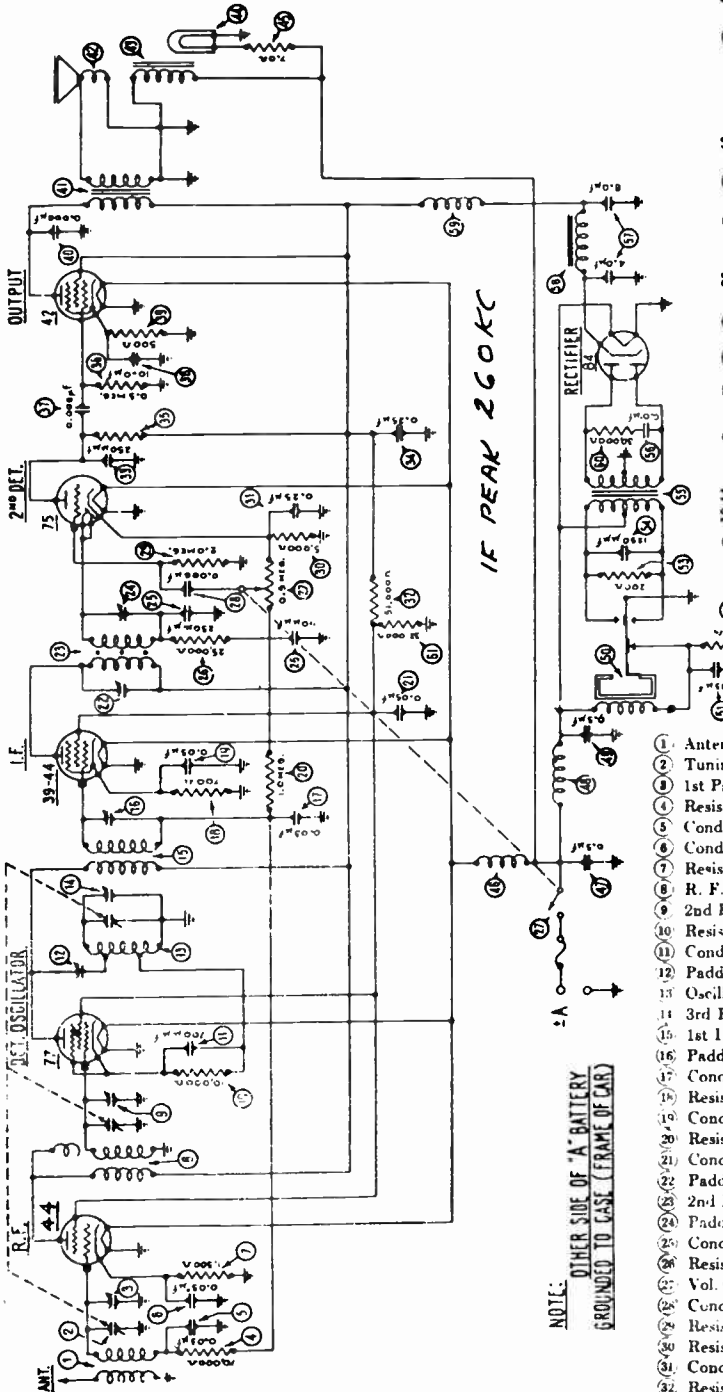
Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

APRIL, 1934

MODEL 11
Schematic
Chassis Layout
Parts List

PHILCO RADIO & TELEVISION CORP.



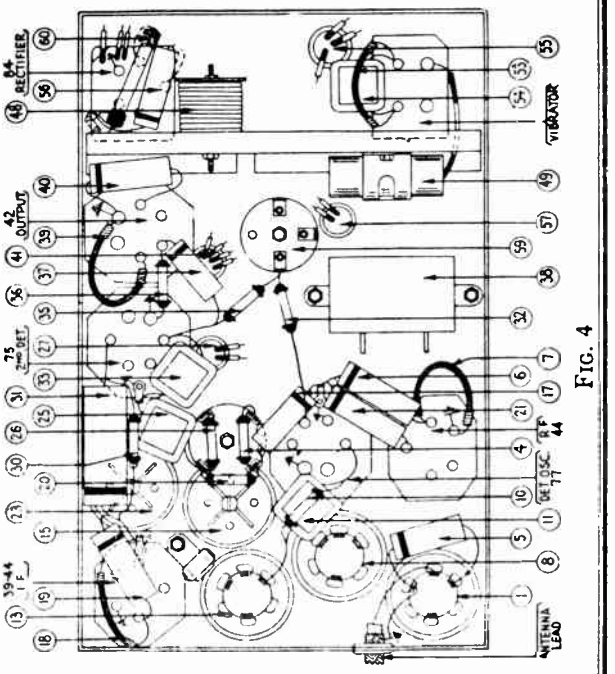
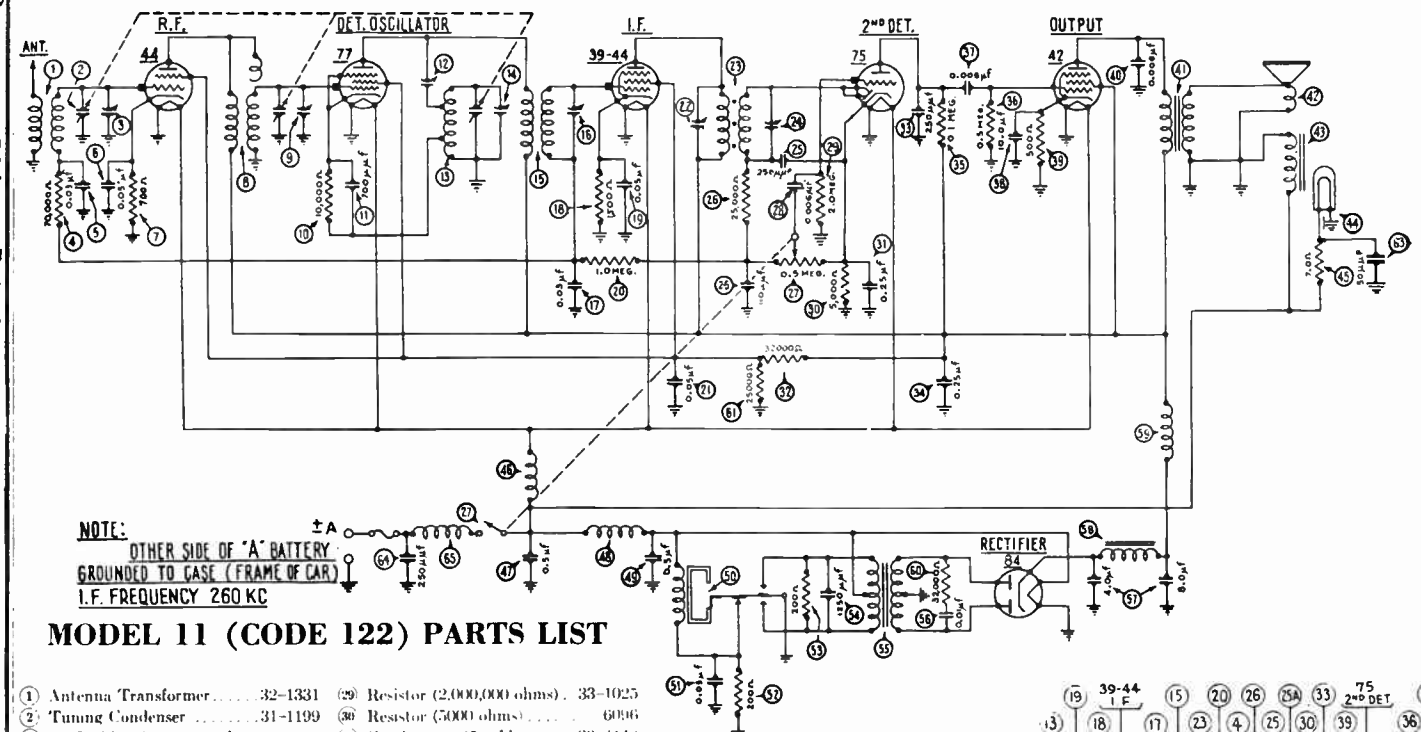


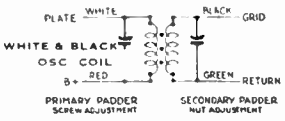
FIG. 4

MODEL 11 PARTS LIST

(1)	Antenna Transformer	32-1331	
(2)	Tuning Condenser	31-1149	
(3)	1st Padder (on tun. cond.)		
(4)	Resistor (70,000 ohms)	33-1115	
(5)	Condenser (.03 mfd.)	30-4025	
(6)	Condenser (.05 mfd.)	30-4020	
(7)	Resistor (1500 ohms)	33-3047	
(8)	R. F. Transformer	32-1332	
(9)	2nd Padder (on tun. cond.)		
(10)	Resistor (10,000 ohms)	33-1000	
(11)	Condenser (.0007 mfd.)	5863	
(12)	Padder (Prim. 1st I. F. Tran.)		
(13)	Oscillator Transformer	32-1333	
(14)	3rd Padder (on tun. cond.)		
(15)	1st I. F. Transformer	32-1329	
(16)	Padder (Sec. 1st I. F. Tran.)		
(17)	Condenser (.03 mfd.)	30-4025	
(18)	Resistor (700 ohms)	6443	
(19)	Condenser (.05 mfd.)	30-4020	
(20)	Resistor (1,000,000 ohms)	33-1096	
(21)	Condenser (.05 mfd.)	30-4020	
(22)	Padders (Prim. 2nd I. F.)		
(23)	2nd I. F. Transformer	32-1237	
(24)	Padder (Sec. 2nd I. F. Tran.)		
(25)	Cond. (.00011 .00025 mfd.)	30-1020	
(26)	Resistor (25,000 ohms)	33-1013	
(27)	Vol. Con. and Switch Assm.	33-5058	
(28)	Condenser (.25 mfd.)	30-4125	
(29)	Resistor (2,000,000 ohms)	33-1025	
(30)	Resistor (5000 ohms)	33-1001	
(31)	Condenser (.25 mfd.)	30-4146	
(32)	Resistor (51,000 ohms)	5868	
(33)	Condenser (.00025 mfd.)	3082	
(34)	Condenser (.25 mfd.)	04360	
(35)	Resistor (100,000 ohms)	6069	
(36)	Resistor (500,000 ohms)	6097	
(37)	Condenser (.006 mfd.)	30-4125	
(38)	Condenser (10 mfd.)	7440	
(39)	Resistor (500 ohms)	33-3031	
(40)	Condenser (.006 mfd.)	30-4024	
(41)	Output Transformer	32-7214	
(42)	Cone and Voice Coil	02861	
(43)	Field Coil Assembly	36-3097	
(44)	Pilot Light	6608	
(45)	Resistor (7 ohms)	33-3035	
(46)	"A" Choke	32-1268	
(47)	Condenser (.5 mfd.)	30-4047	
(48)	Vibrator Choke	32-1235	
(49)	Condenser (.5 mfd.)	30-4147	
(50)	Vibrator Unit	38-5036	
(51)	Condenser (.05 mfd.)	30-4039	
(52)	Resistor (200 ohms)	7217	
(53)	Resistor (200 ohms)	7217	
(54)	Condenser (.00125 mfd.)	5886	
(55)	Power Transformer	32-7216	
(56)	Condenser (.01 mfd.)	30-4051	
(57)	Condenser (4-8 mfd.)	30-2072	
(58)	"B" Choke	32-7215	
(59)	R. F. Choke	32-1281	
(60)	Resistor (30,000 ohms)	7836	
(61)	Resistor (32,000 ohms)	3525	
	Spark Plug Resistor	33-1015	
	Distributor Resistor	4546	
	Screw Type Resistor	4851	
	Interference Condenser	30-4007	
	Dial	27-5038	
	Studs	28-6036	
	Nuts (mounting)	W55A	
	Knobs (tuning)	03334	
	Knobs (volume)	06886	
	Battery Cable	38-5296	
	Acorn Nut	W821	
	Key	6091	
	Fuse	7227	
	Fuse Insulator	27-7131	
	4-Prong Socket	27-6006	
	5-Prong Socket	27-6014	
	6-Prong Socket	6417	
	Cont. Unit Assm. (Dir. Dr.)	42-5150	
	Shafts—Tuning	28-8139	
	Volume	28-8141	
	Cont. Unit Assm. (G- Dr.)	42-5157	
	Shafts—Tuning	28-8217	
	Volume	28-8217	

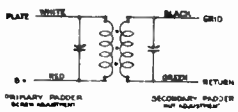
APRIL, 1934





1st I. F. Transformer
32-1329

FIG. 1



2nd I. F. Transformer
32-1237

MODEL 11 (CODE 122) PARTS LIST

(1)	Antenna Transformer	32-1331	(29)	Resistor (2,000,000 ohms)	33-1025
(2)	Tuning Condenser	31-1199	(30)	Resistor (5000 ohms)	6096
(3)	1st Padder (in tun. cond.)		(31)	Condenser (.25 mfd.)	30-4146
(4)	Resistor (70,000 ohms)	33-1115	(32)	Resistor (32,000 ohms)	3525
(5)	Condenser (.03 mfd.)	30-4025	(33)	Condenser (.00025 mfd.)	30-1032
(6)	Condenser (.05 mfd.)	30-4020	(34)	Condenser (.25 mfd.)	04360
(7)	Resistor (700 ohms)	6443	(35)	Resistor (100,000 ohms)	6099
(8)	R. F. Transformer	32-1332	(36)	Resistor (500,000 ohms)	6097
(9)	2nd Padder (in tun. cond.)		(37)	Condenser (.006 mfd.)	30-4125
(10)	Resistor (10,000 ohms)	33-1000	(38)	Condenser (10 mfd.)	30-2072
(11)	Condenser (.0007 mfd.)	5863	(39)	Resistor (500 ohms)	33-3031
(12)	Padder (Pri. 1st I. F. Tran.)		(40)	Condenser (.006 mfd.)	30-4024
(13)	Oscillator Transformer	32-1333	(41)	Output Transformer	32-7245
(14)	3rd Padder (in tun. cond.)		(42)	Cone & Voice Coil	36-3157
(15)	1st I. F. Transformer	32-1329	(43)	Field Coil Assembly	36-3046
(16)	Padder (Sec. 1st I. F. Tran.)		(44)	Pilot Lamp	34-2031
(17)	Condenser (.03 mfd.)	30-4025	(45)	Resistor (7 ohms)	33-3035
(18)	Resistor (1500 ohms)	33-3047	(46)	"A" Choke	32-1402
(19)	Condenser (.05 mfd.)	30-4020	(47)	Condenser (.5 mfd.)	30-4147
(20)	Resistor (1,000,000 ohms)	33-1096	(48)	Vibrator Choke	32-1282
(21)	Condenser (.05 mfd.)	30-4020	(49)	Condenser (.5 mfd.)	30-4015
(22)	Padder (Pri. 2nd I. F. Tran.)		(50)	Vibrator	38-5036
(23)	2nd I. F. Transformer	32-1237	(51)	Condenser (.05 mfd.)	30-4039
(24)	Padder (Sec. 2nd I. F. Tran.)		(52)	Resistor (200 ohms)	7217
(25)	Condenser (.00025 mfd.)	30-1032	(53)	Resistor (200 ohms)	7217
(26)	Condenser (.00011 mfd.)	30-1031	(54)	Condenser (.00125 mfd.)	5886
(27)	Resistor (25,000 ohms)	33-1013	(55)	Power Transformer	32-7216
(28)	Vol. Con. & Switch Assm.	38-5534	(56)	Condenser (.01 mfd.)	30-4051
(28)	Condenser (.006 mfd.)	30-4125	(57)	Condenser (4-8-10 mfd.)	30-2072

(58)	"B" Choke	32-7215
(59)	R. F. Choke	32-1251
(60)	Resistor (32,000 ohms)	3525
(61)	Resistor (25,000 ohms)	33-1013
(63)	Condenser (.00005 mfd.)	30-1029
(64)	Condenser (.00025 mfd.)	30-1032
(65)	"A" Choke	32-1374
	Spark Plug Resistor	33-1015
	Distributor Resistor	33-1113E
	Interference Condenser	30-4007
	Nuts (mounting)	W55A
	Battery Cable	38-5296
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27-7131
	Studs	28-6036
	Bracket	6035
	Strap	04344
	Strap Pad	6206
	Knob	27-4058
	Glass	27-7325
	Gasket (for glass)	27-7509
	Pointer	28-1957
	Face Assembly	42-5175
	Control Housing Cover	29-7064
	Control Unit Assembly	42-5107

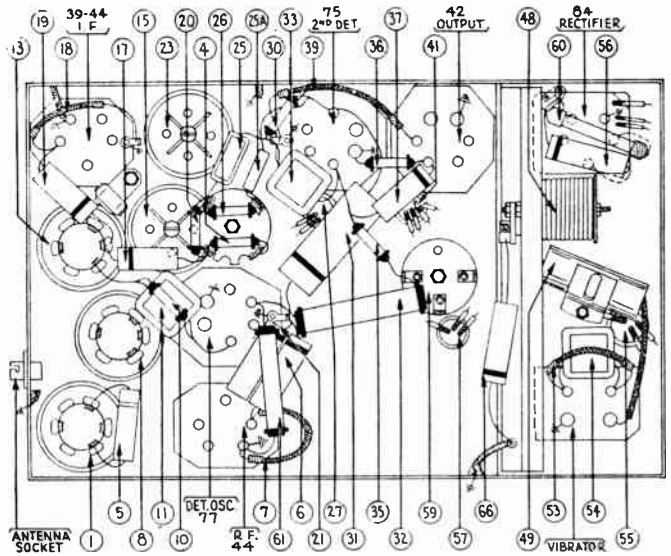


FIG. 4

MODEL 11 (Code 122)
Alignment, Socket Trimmers

PHILCO RADIO & TELEV. CORP.

MODEL 11 (CODE 122) RECEIVER

THE PHILCO auto radio Model 11 (Code 122) is a new Philco development in single-unit automobile radio. It is compact, easy to install and will give exceptional performance.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a genuine Philco electro-dynamic speaker, the same type that is used in many of the larger home radio receivers. A three-section tuning condenser giving improved selectivity, remarkable sensitivity and tone, inherently quiet circuits and other improvements make this model one of the outstanding and most popular automobile radios.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) and the handy, attractive steering-column control which makes this model universal in its use are additional features which make the Model 11 a very desirable one for the dealer and for the owner.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 11 (Code 122).

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

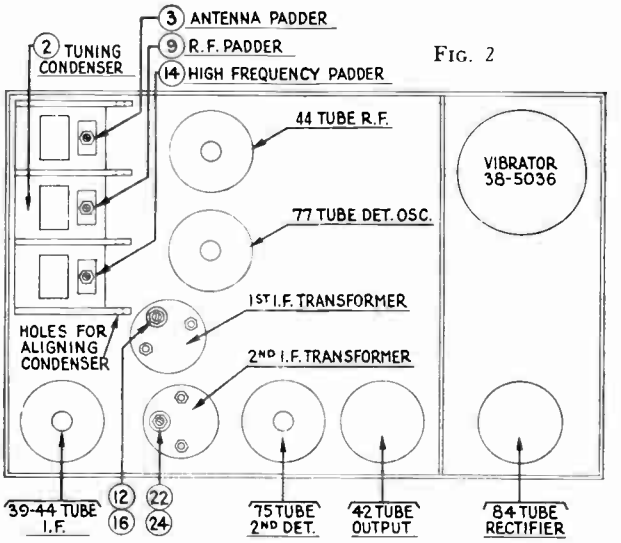


FIG. 2

MODEL 11 (CODE 122) ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22) and (24) are adjusted first (Figs. 2 and 3). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (24) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers (12) and (16).

After padding the I. F. stages, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (14) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

PHILCO RADIO & TELEV. CORP.

MODEL 700
Alignment Data
Socket Layout

MODEL 700 RECEIVER

THE latest Philco development in single-unit automobile radio is the new Model 700. This Receiver is compact, easier to install than ever before and will give exceptional performance.

It is a six-tube super-heterodyne with a genuine full-size Philco electro-dynamic speaker—the same type that is used in many of the larger home radio Receivers. It has remarkable sensitivity, a three-section tuning condenser, giving improved selectivity—wonderful tone, with a three-point tone control, and inherently quiet circuits. Interference filters in the "A" lead and in the pilot light lead greatly simplify motor interference suppression. In most installations standard suppression is sufficient.

Added to this, the ease of installation characteristic of this model (only one unit to install—one lead to the antenna, one lead to the ammeter) and the convenient, attractive airplane type steering column control, which makes this model universal in its application, are additional features of the Model 700 which appeal to both the dealer and the public.

I. F. TRANSFORMER AND PADDERS

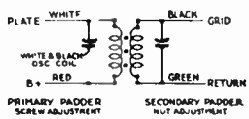
The new style I. F. transformer complete with padders is used in the Model 700.

The padders are placed in the top of the shield can one above the other.

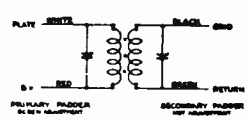
The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer
32-1329



2nd I. F. Transformer
32-1237

FIG. 1

MODEL 700 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22) and (24) are adjusted first (Figs. 2 and 3). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (21) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

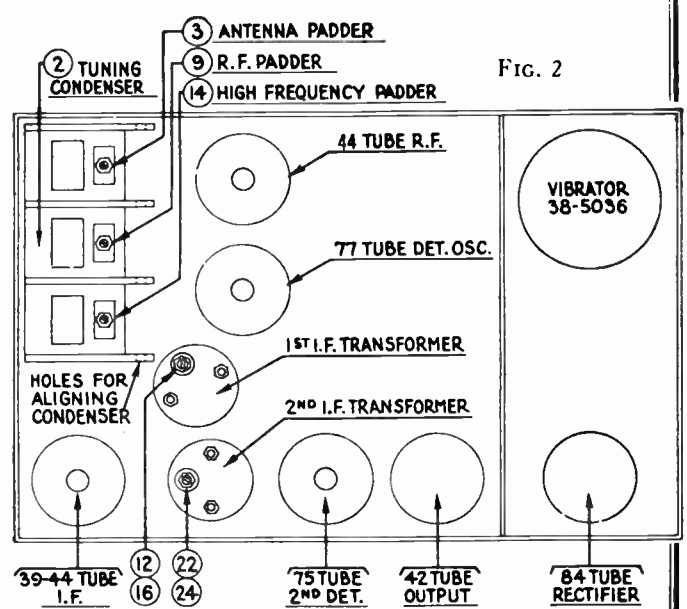


FIG. 2

Repeat the above procedure with the condensers (12) and (10).

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections

MODEL 700
Schematic
Chassis Layout
Parts List

PHILCO RADIO & TELEV. CORP.

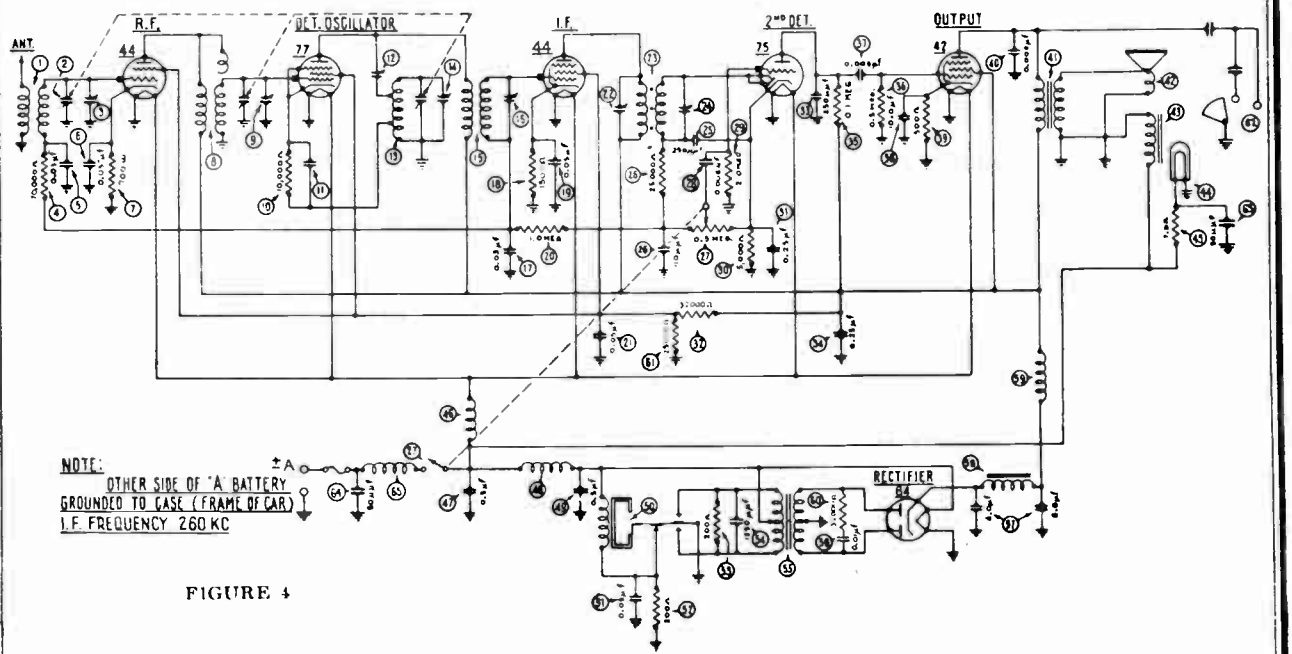


FIGURE 4

FIG. 3

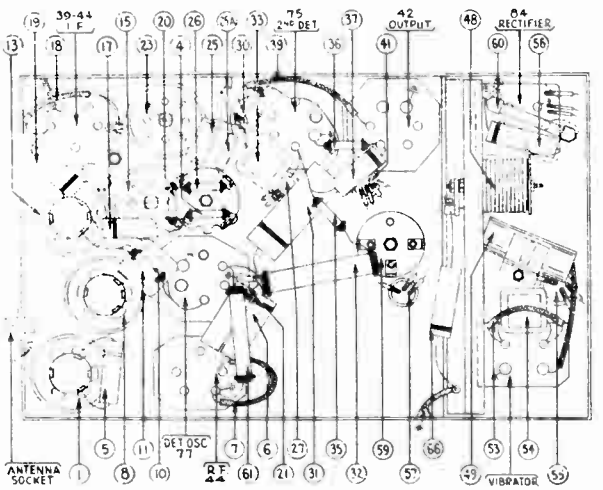


FIG. 4

of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder ⑫ until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ⑨ and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL 700 PARTS LIST

①	Antenna Transformer	32-1331
②	Tuning Condenser	31-1199
③	1st Padder (in tun. cond.)	
④	Resistor (70,000 ohms)	33-1115
⑤	Condenser (.03 mfd.)	30-4025
⑥	Condenser (.05 mfd.)	30-4020
⑦	Resistor (700 ohms)	6443
⑧	R. F. Transformer	32-1332
⑨	2nd Padder (in tun. cond.)	
⑩	Resistor (10,000 ohms)	33-1000
⑪	Condenser (.0007 mfd.)	5863
⑫	Padder (Pri. 1st I. F. Tran.)	
⑬	Oscillator Transformer	32-1333
⑭	3rd Padder (in tun. cond.)	
⑮	1st I. F. Transformer	32-1329
⑯	Padder (Sec. 1st I. F. Tran.)	
⑰	Condenser (.03 mfd.)	30-4025
⑱	Resistor (1500 ohms)	33-3047
⑲	Condenser (.05 mfd.)	30-4020
⑳	Resistor (1,000,000 ohms)	33-1096
㉑	Condenser (.05 mfd.)	30-4020
㉒	Padder (Pri. 2nd I. F. Tran.)	
㉓	2nd I. F. Transformer	32-1237
㉔	Padder (Sec. 2nd I. F. Tran.)	
㉕	Condenser (.00025 mfd.)	30-1032
㉖	Condenser (.00011 mfd.)	30-1031
㉗	Resistor (25,000 ohms)	33-1013
㉘	Vol. Con. & Switch Assm.	38-5534
㉙	Condenser (.006 mfd.)	30-4125
㉚	Resistor (2,000,000 ohms)	33-1025
㉛	Resistor (5000 ohms)	6096
㉜	Condenser (.25 mfd.)	30-4146
㉝	Resistor (32,000 ohms)	3525
㉞	Condenser (.00025 mfd.)	5082
㉟	Condenser (.25 mfd.)	04360
㊱	Resistor (100,000 ohms)	6099
㊲	Resistor (500,000 ohms)	6097
㊳	Condenser (.006 mfd.)	30-4125
㊴	Condenser (.10 mfd.)	30-2072
㊵	Resistor (500 ohms)	33-3031
㊶	Condenser (.006 mfd.)	30-4024
㊷	Output Transformer	32-7214
㊸	Cone & Voice Coil	36-3157
㊹	Field Coil Assembly	36-3046
㊺	Pilot Lamp	34-2031
㊻	Resistor (7 ohms)	33-3035
㊼	"A" Choke	32-1268
㊽	Condenser (.5 mfd.)	30-4147
㊾	Vibrator Choke	32-1235
㊿	Condenser (.5 mfd.)	30-4015
50	Vibrator	38-5036
51	Condenser (.05 mfd.)	30-4030
52	Resistor (200 ohms)	7217
53	Resistor (200 ohms)	7217
54	Condenser (.00125 mfd.)	5886
55	Power Transformer	32-7216
56	Condenser (.01 mfd.)	30-4051
57	Condenser (4-8 mfd.)	30-2072
58	"B" Choke	32-7215
59	R. F. Choke	32-1281
60	Resistor (32,000 ohms)	3525
61	Resistor (25,000 ohms)	33-1013
62	Tone Control	30-4180
63	Condenser (.00005 mfd.)	30-1029
64	Condenser (.00005 mfd.)	30-1029
65	"A" Choke	32-1374
66	Condenser (1 mfd.)	30-4122
	Spark Plug Resistor	33-1015
	Distributor Resistor	33-1113E
	Interference Condenser	30-4007
	Nuts (mounting)	W55A
	Battery Cable	38-5296
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27-7131
	Studs	28-6036
	Bracket	6035
	Strap	04344
	Strap Pad	6206
	Knob	27-4058
	Glass	27-7325
	Gasket (for glass)	27-7509
	Pointer	28-1957
	Face Assembly	42-5189
	Control Housing Cover	29-7064
	Control Unit Assembly	12-5184
	Shaft	28-8206
	Antenna Lead	38-5771
	4-Prong Socket	27-6006
	5-Prong Socket	27-6014
	6-Prong Socket	6417C

PHILCO RADIO & TELEVISION CORP.

MODEL 800
Schematic
Parts List
Chassis Layout

MODEL 800 PARTS LIST

(1)	Antenna Transformer	32-1220	
(2)	Tuning Condenser	31-1083	
(3)	1st Padder (in tuning cond.)		
(4)	Resistor (100,000 ohms)	6099	
(5)	Condenser (.03 mfd.)	30-4025	
(6)	Condenser (.05 mfd.)	30-4020	
(7)	R. F. Transformer	32-1221	
(8)	Condenser (.03 mfd.)	30-4025	
(9)	2nd Padder (in tuning cond.)		
(10)	3rd Padder (in tuning cond.)		
(11)	Resistor (50,000 ohms)	6098	
(12)	Oscillator Transformer	32-1222	
(13)	Condenser (.00025 mfd.)	3082	
(14)	Padder	31-6012	
(15)	Resistor (15,000 ohms)	6208	
(16)	Padder (prim. 1st I. F.)		
(17)	First I. F. Transformer	32-1236	
(18)	Resistor (1,000,000 ohms)	33-1096	
(19)	Padder (secondary 1st I. F.)		
(20)	Condenser (.03 mfd.)	30-4025	
(21)	Condenser (.5 mfd.)	30-4058	
(22)	Resistor (500 ohms)	6977	
(23)	Resistor (500,000 ohms)	6097	
(24)	Condenser (.00011-.00025)	30-1020	
(25)	Padder (prim. 2nd I. F.)		
(26)	Second I. F. Transformer	32-1237	
(27)	Padder (secondary 2nd I. F.)		
(28)	Resistor (25,000 ohms)	33-1013	
(29)	Condenser (.006 mfd.)	30-4125	
(30)	Volume Control Assembly	33-5058	
(31)	Resistor (2,000,000 ohms)	33-1025	
(32)	Resistor (250,000 ohms)	33-1097	
(33)	Resistor (250,000 ohms)	33-1097	
(34)	Condenser (.00025 mfd.)	5858	
(35)	Resistor (250,000 ohms)	33-1097	
(36)	Resistor (25,000 ohms)	33-1013	
(37)	Condenser (.01 mfd.)	30-4145	
(38)	Condenser (.25-8-10mfd.)	30-4135	
(39)	Resistor (500,000 ohms)	6097	
(40)	Resistor (2500 ohms)	33-1100	
(41)	Input Transformer	32-7206	
(42)	Pilot Lamp	34-2031	
(43)	Resistor (7 ohms)	33-3130	
(44)	Condenser (.006 mfd.)	30-4024	
(45)	Output Transformer	32-7205	
(46)	Cone and Voice Coil	36-3159	
(47)	Field Coil Assembly	36-3130	
(48)	Tone Control	30-4142	
(49)	Condenser (.25 mfd.)	30-4134	
(50)	Resistor (5,000 ohms)	33-1070	
(51)	Resistor (20,000 ohms)	6649	
(52)	Resistor (37,000 ohms)	33-1098	
(53)	Condenser (.5 mfd.)	30-4018	
(54)	Resistor (200 ohms)	7217	
(55)	Resistor (100 ohms)	33-3023	
(56)	Resistor (100 ohms)	33-3023	
(57)	Condenser (.5 mfd.)	30-4015	
(58)	Vibrator Choke	32-1335	
(59)	Condenser (.5 mfd.)	30-4115	
(60)	Vibrator Unit	38-5036	
(61)	Condenser (.05 mfd.)	30-4039	
(62)	Resistor (200 ohms)	7217	
(63)	Resistor (200 ohms)	7217	
(64)	Condenser (.00125 mfd.)	5886	
(65)	Power Transformer	32-7098	
(66)	Condenser (.01 mfd.)	30-4051	
(67)	Filter Condenser (4-8 mfd.)	30-2015	
(68)	"B" Choke	32-7104	
	Spark Plug Resistors	33-1015	
	Distributor Resistor	4546	
	Interference Condenser	30-4007	
	Dial	27-5022	
	Studs	28-6036	
	Nuts (mounting)	W55	
	Knobs	03334	
	Battery Cable	38-5296	
	Antenna Lead	38-5131	
	Control Unit Assembly	42-5077	
	Acorn Nut	W821	
	Key	6091	
	Flex. Shaft (28") Vol. Con.	28-8141	
	Flex. Shaft (28") Tun. Con.	28-8139	

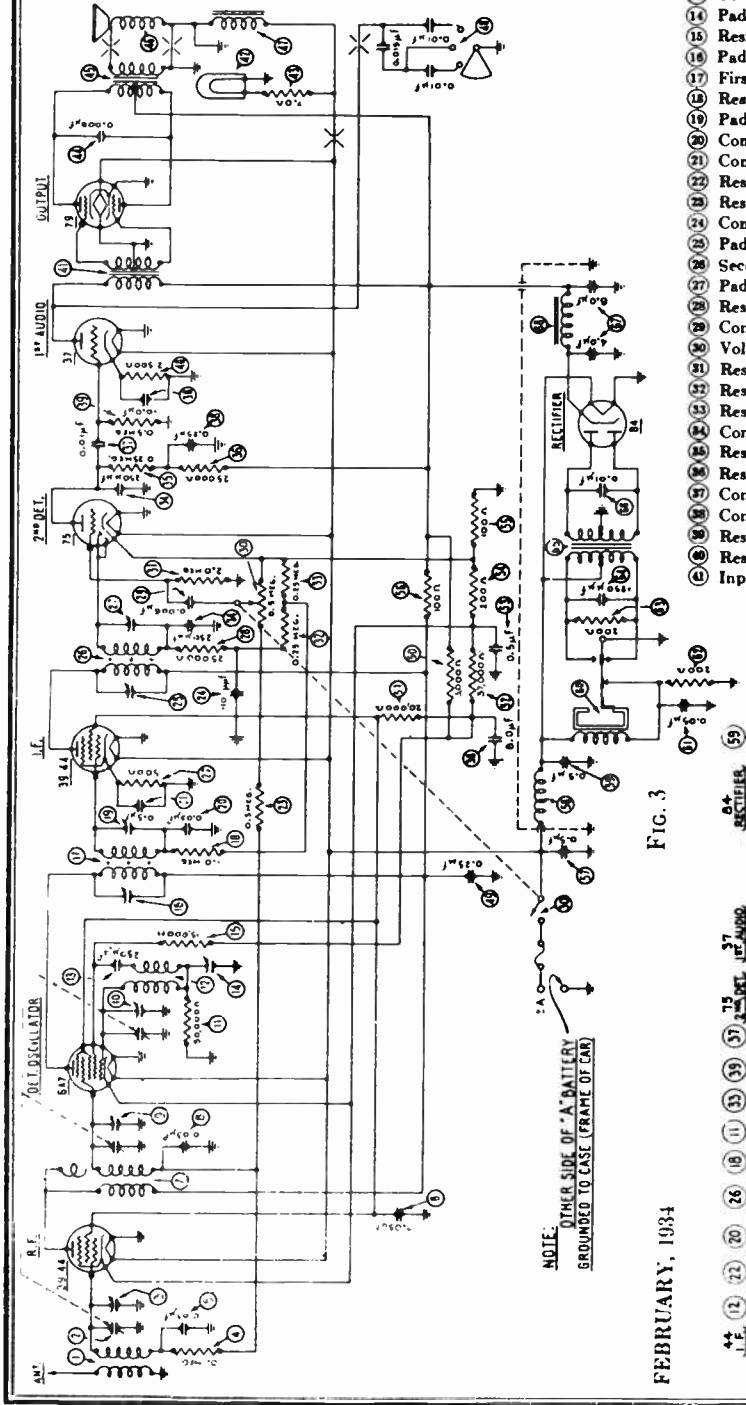


FIG. 3

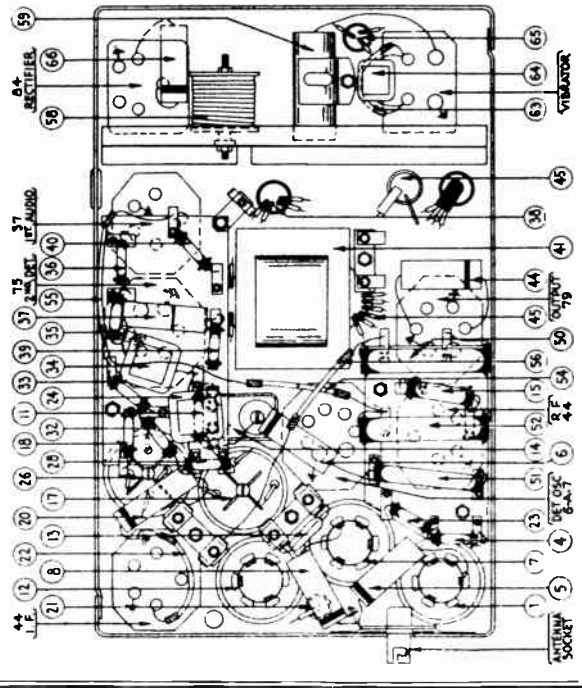


FIG. 4

FEBRUARY, 1934

MODEL 800
Layout
Notes

PHILCO RADIO & TELEVISION CORP.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 800.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

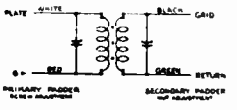


FIG. 1

MODEL 800 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders ㉖ and ㉗ are adjusted first (Figs. 2 and 3.) Turn the adjusting screw ㉖ all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut ㉗ with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw ㉖ for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers ⑯ and ⑲.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder ⑩ until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ⑨ and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder ⑭ for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

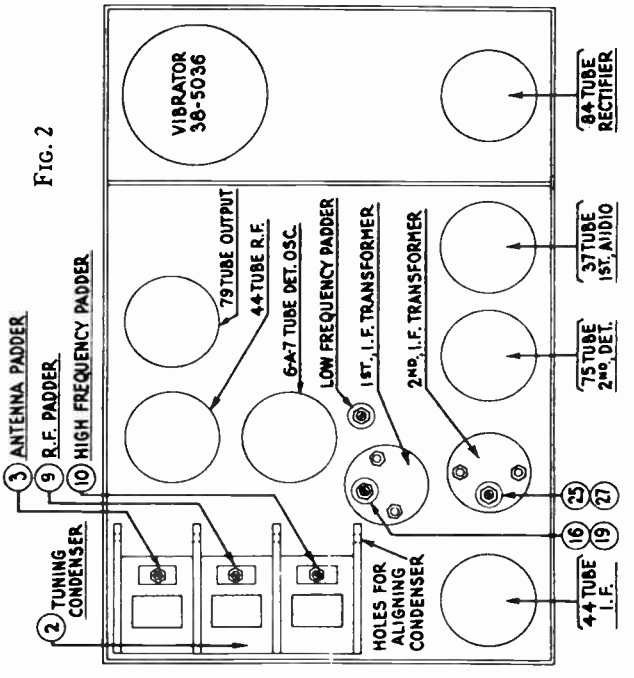


FIG. 2

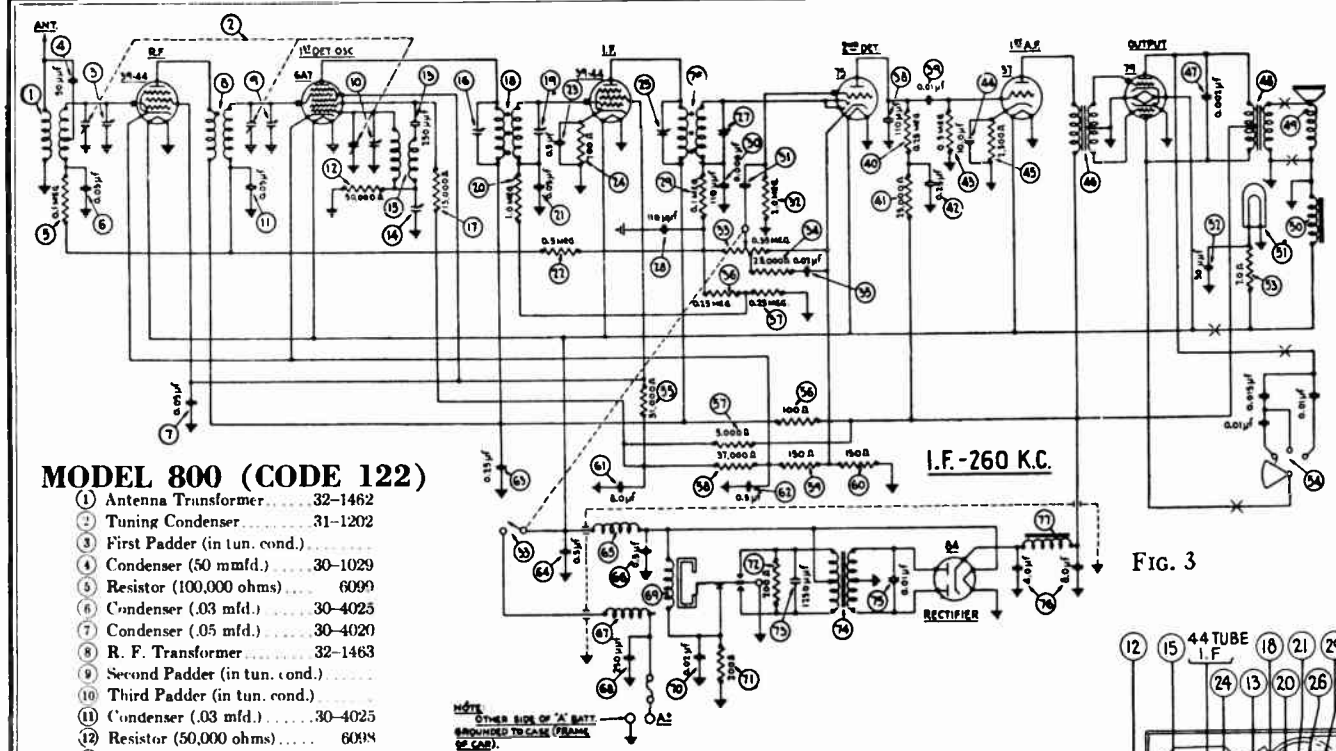


FIG. 3

MODEL 800 (CODE 122)

(1)	Antenna Transformer	32–1462
(2)	Tuning Condenser	31–1202
(3)	First Padder (in tun. cond.)	
(4)	Condenser (50 mmfd.)	30–1029
(5)	Resistor (100,000 ohms)	6099
(6)	Condenser (.03 mfd.)	30–4025
(7)	Condenser (.05 mfd.)	30–4020
(8)	R. F. Transformer	32–1463
(9)	Second Padder (in tun. cond.)	
(10)	Third Padder (in tun. cond.)	
(11)	Condenser (.03 mfd.)	30–4025
(12)	Resistor (50,000 ohms)	6098
(13)	Condenser (250 mmfd.)	30–1032
(14)	Padder	30–6012
(15)	Oscillator Transformer	32–1222
(16)	Padder (Pri. 1st I. F. trans.)	
(17)	Resistor (15,000 ohms)	6208
(18)	First I. F. Transformer	32–1471
(19)	Padder (Sec. 1st I. F. trans.)	
(20)	Resistor (1,000,000 ohms)	33–1096
(21)	Condenser (.03 mfd.)	30–4025
(22)	Resistor (500,000 ohms)	6097
(23)	Condenser (.5 mfd.)	30–4058
(24)	Resistor (700 ohms)	6443
(25)	Padder (Pri. 2nd I. F. trans.)	
(26)	Second I. F. Transformer	32–1449
(27)	Padder (Sec. 2nd I. F. trans.)	
(28)	Condenser (110 mmfd.)	30–1031
(29)	Resistor (100,000 ohms)	6099
(30)	Condenser (110 mmfd.)	30–1031
(31)	Condenser (.006 mfd.)	30–4125
(32)	Resistor (2,000,000 ohms)	33–1025
(33)	Volume control & switch assembly	38–5851
(34)	Resistor (25,000 ohms)	33–1013
(35)	Condenser (.02 mfd.)	30–4215
(36)	Resistor (250,000 ohms)	33–1097
(37)	Resistor (250,000 ohms)	33–1097
(38)	Condenser (110 mmfd.)	30–1031
(39)	Condenser (.01 mfd.)	30–4145
(40)	Resistor (250,000 ohms)	33–1097
(41)	Resistor (25,000 ohms)	33–1013
(42)	Condenser (.25 mfd.)	30–4135
(43)	Resistor (500,000 ohms)	6097
(44)	Condenser (10 mfd.)	30–4135
(45)	Resistor (2500 ohms)	33–1100
(46)	Input Transformer	32–7206
(47)	Condenser (.002 mfd.)	30–4177
(48)	Output Transformer	32–7205
(49)	Cone & Voice Coil	36–3159
(50)	Field Coil Assembly	02795
(51)	Pilot Lamp	34–2039
(52)	Condenser (50 mmfd.)	30–1029
(53)	Resistor (7 ohms)	33–3130
(54)	Tone Control	30–4220
(55)	Resistor (51,000 ohms)	4237
(56)	Resistor (100 ohms)	33–3023
(57)	Resistor (5000 ohms)	33–1070
(58)	Resistor (37,000 ohms)	33–1098
(59)	Resistor (150 ohms)	33–3045
(60)	Resistor (150 ohms)	33–3045
(61)	Condenser (8 mfd.)	30–4135
(62)	Condenser (.5 mfd.)	30–4018
(63)	Condenser (.25 mfd.)	30–4134
(64)	Condenser (.5 mfd.)	30–4015
(65)	Vibrator Choke	32–1474
(66)	Condenser (.5 mfd.)	30–4047
(67)	"A" Choke	32–1493
(68)	Condenser (250 mmfd.)	32–1493
(69)	Vibrator	38–5036
(70)	Condenser (.02 mfd.)	30–4039
(71)	Resistor (200 ohms)	7217
(72)	Resistor (200 ohms)	7217
(73)	Condenser (1250 mmfd.)	5886
(74)	Power Transformer	32–7098
(75)	Condenser (.01 mfd.)	30–4051
(76)	Filter Condenser (4–8 mfd.)	30–2015
(77)	"B" Choke	32–7104
	Spark Plug Resistors	33–1015
	Distributor Resistor	33–1113E
	Screw Type Resistor	4851
	Interference Condenser	30–4007
	Studs	28–603f
	Nuts (Mounting)	W55A
	Battery Cable	38–5296
	Antenna Lead	38–5131
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27–7131
	Control Assembly	42–5185
	Bracket	6035
	Strap	04344
	Knob	27–4058
	Knob Spring	28–1738
	Glass	27–7325
	Glass Gasket	27–7509
	Pointer	28–1957
	Shaft	28–8206
	Face Assembly	42–5191
	Cover	29–7064
	4-prong Socket	27–6006
	5-prong Socket	27–6014
	6-prong Socket	27–6020
	7-prong Socket	27–6005
	Auto Radio Lock Switch	42–1076

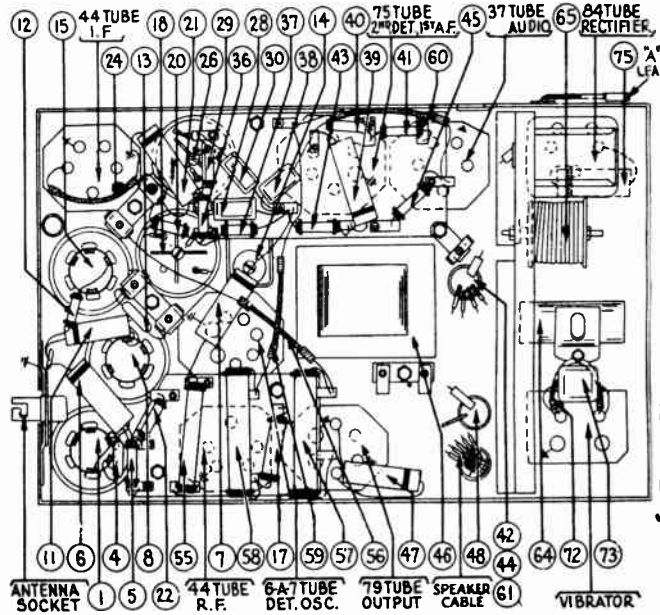


FIG. 4

MODEL 800(Code 122)
Alignment Data
Socket Layout

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 800 (Code 122).

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1471 for the first I. F. stage and 32-1449 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

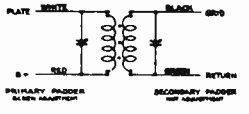


FIG. 1

MODEL 800 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube, grounding the shield. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (25) and (27) are adjusted first (Figs. 2 and 3). Turn the adjusting screw (25) all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (27) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (25) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

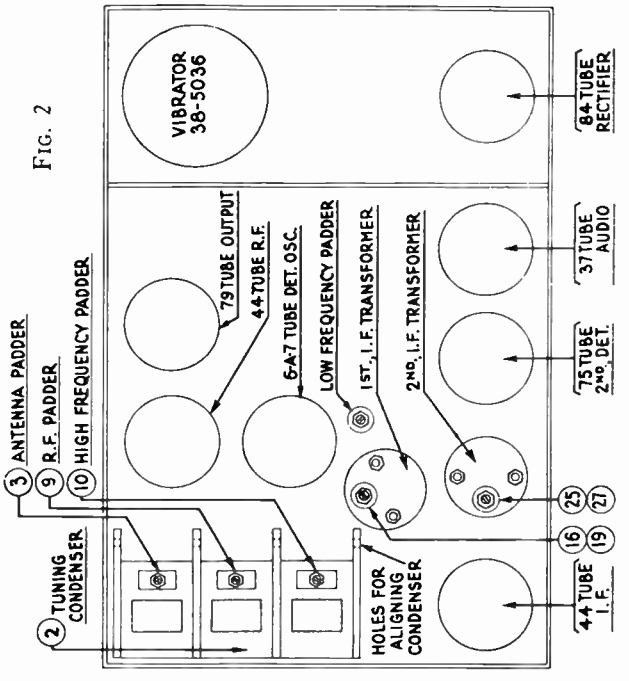


FIG. 2

Repeat the above procedure with the first I. F. condensers, (16) and (19).

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (10) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (11) for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

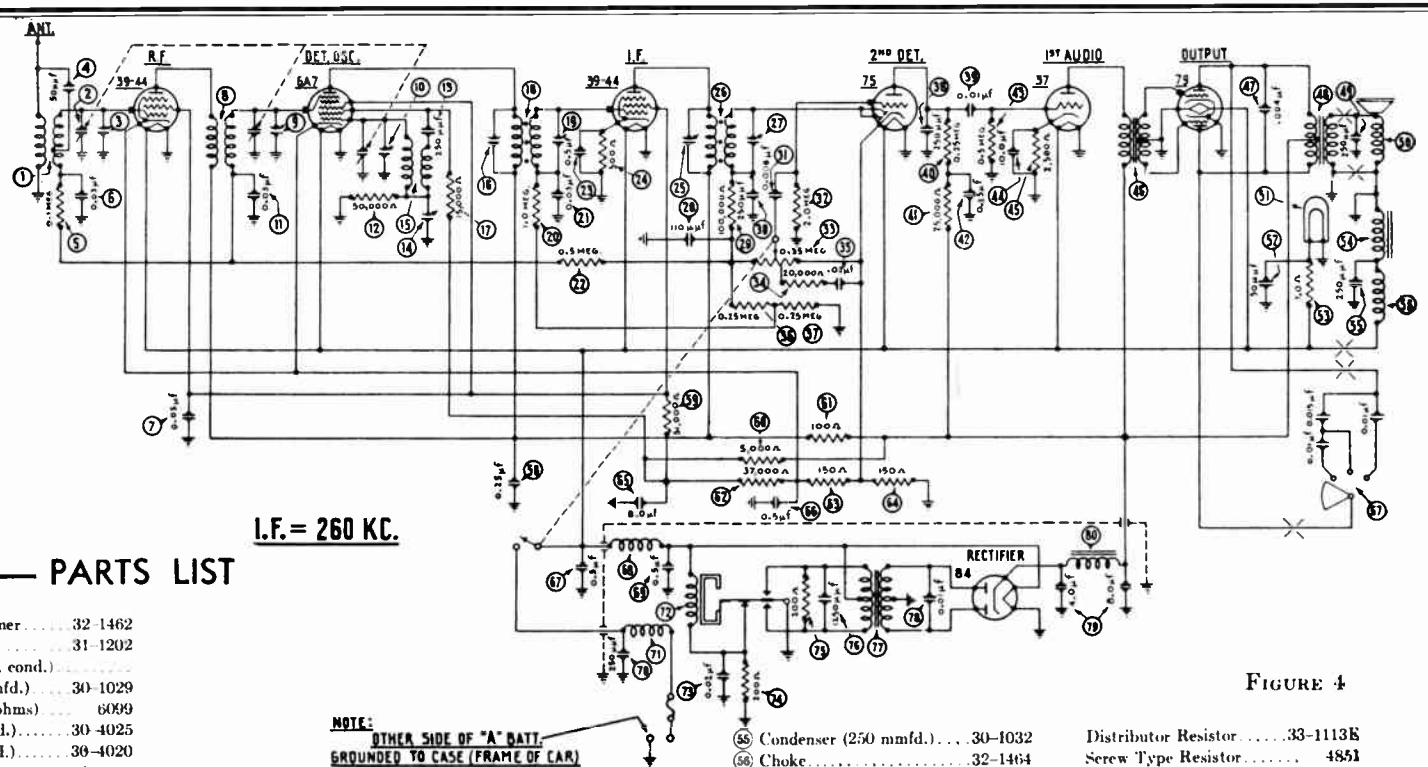


FIGURE 4

MODEL 802 — PARTS LIST

(1)	Antenna Transformer	32-1462
(2)	Tuning Condenser	31-1202
(3)	1st Padder (in tun. cond.)	
(4)	Condenser (50 mmfd.)	30-1029
(5)	Resistor (100,000 ohms)	6099
(6)	Condenser (.03 mfd.)	30-4025
(7)	Condenser (.05 mfd.)	30-4020
(8)	R. F. Transformer	32-1463
(9)	2nd Padder (in tun. cond.)	
(10)	3rd Padder (in tun. cond.)	
(11)	Condenser (.03 mfd.)	30-4025
(12)	Resistor (50,000 ohms)	6098
(13)	Condenser (250 mmfd.)	3082
(14)	Padder	30 6012
(15)	Oscillator Transformer	32-1222
(16)	Padder (Pri. 1st I. F. Trans.)	
(17)	Resistor (15,000 ohms)	6208
(18)	First I. F. Transformer	32-1471
(19)	Padder (Sec. 1st I. F. Trans.)	
(20)	Resistor (1,000,000 ohms)	33-1096
(21)	Condenser (.03 mfd.)	30-4025
(22)	Resistor (500,000 ohms)	6097
(23)	Condenser (.5 mfd.)	30-4058
(24)	Resistor (500 ohms)	6977
(25)	Padder (Pri. 2nd I. F. Trans)	
(26)	Second I. F. Transformer	32-1449
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Condenser (110 mmfd.)	30-1031
(29)	Resistor (100,000 ohms)	6099
(30)	Condenser (250 mmfd.)	30-1032
(31)	Condenser (.006 mfd.)	30-4125
(32)	Resistor (2,000,000 ohms)	33-1025
(33)	Vol. Cont. & Sw. Assembly	38-5851
(34)	Resistor (20,000 ohms)	33-1130
(35)	Condenser (.02 mfd.)	30-4215
(36)	Resistor (250,000 ohms)	33-1097
(37)	Resistor (250,000 ohms)	33-1097
(38)	Condenser (250 mmfd.)	30-1032
(39)	Condenser (.01 mfd.)	30-4145
(40)	Resistor (250,000 ohms)	33-1097
(41)	Resistor (25,000 ohms)	33-1013
(42)	Condenser (.25 mfd.)	30-4135
(43)	Resistor (500,000 ohms)	6097
(44)	Condenser (10 mfd.)	30-4135
(45)	Resistor (2500 ohms)	33-1100
(46)	Input Transformer	32-7206
(47)	Condenser (.004 mfd.)	30-4185
(48)	Output Transformer	32-7205
(49)	Condenser (250 mmfd.)	30-1032
(50)	Cone & Voice Coil	36-3159
(51)	Pilot Lamp	34-2040
(52)	Condenser (50 mmfd.)	30-1029
(53)	Resistor (7 ohms)	33-3130
(54)	Field Coil Assembly	02795
(55)	Condenser (250 mmfd.)	30-1032
(56)	Choke	32-1464
(57)	Tone Control	30-4208
(58)	Condenser (.25 mfd.)	30-4134
(59)	Resistor (51,000 ohms)	4237
(60)	Resistor (5000 ohms)	33-1070
(61)	Resistor (100 ohms)	33-3023
(62)	Resistor (37,000 ohms)	33-1098
(63)	Resistor (150 ohms)	33-3045
(64)	Resistor (150 ohms)	33-3045
(65)	Condenser (8 mfd.)	30-4135
(66)	Condenser (.5 mfd.)	30-4018
(67)	Condenser (.5 mfd.)	30-4015
(68)	Vibrator Choke	32-1474
(69)	Condenser (.5 mfd.)	30-4047
(70)	Condenser (250 mmfd.)	32-1466
(71)	"A" Choke	32-1466
(72)	Vibrator	38-5036
(73)	Condenser (.02 mfd.)	30-4039
(74)	Resistor (200 ohms)	7217
(75)	Resistor (200 ohms)	7217
(76)	Condenser (1250 mmfd.)	5886
(77)	Power Transformer	32-7098
(78)	Condenser (.01 mfd.)	30-4051
(79)	Filter Condenser (4-8 mfd.)	30-2015
(80)	"B" Choke	32-7104
	Spark Plug Resistors	33-1015E
	Distributor Resistor	33-1113E
	Screw Type Resistor	4851
	Interference Condenser	30-4007S
	Studs	28-6036
	Nuts (Mounting)	W55A
	Ammeter Cable	38-5296
	Speaker Cable	41-3112
	Antenna Lead	38-5131
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27-7131
	Control Assembly	42-5256
	Bracket (Control)	6035
	Strap (Control)	04344
	Knob	27-4058
	Knob Spring	28-1738
	Glass	27-7325
	Glass Gasket	27-7509
	Pointer	28-1957
	Flexible Shaft	28-8206
	Face Assembly	4.-5255
	Control Cover	28-7037
	4-prong Socket	27-6006
	5-prong Socket	27-6014
	6-prong Socket	27-6020
	7-prong Socket	27-6005
	Auto Radio Lock Switch	42-1076

MODEL 805
Schematic, Chassis
Parts List

PHILCO RADIO & TELEVISION CORP.

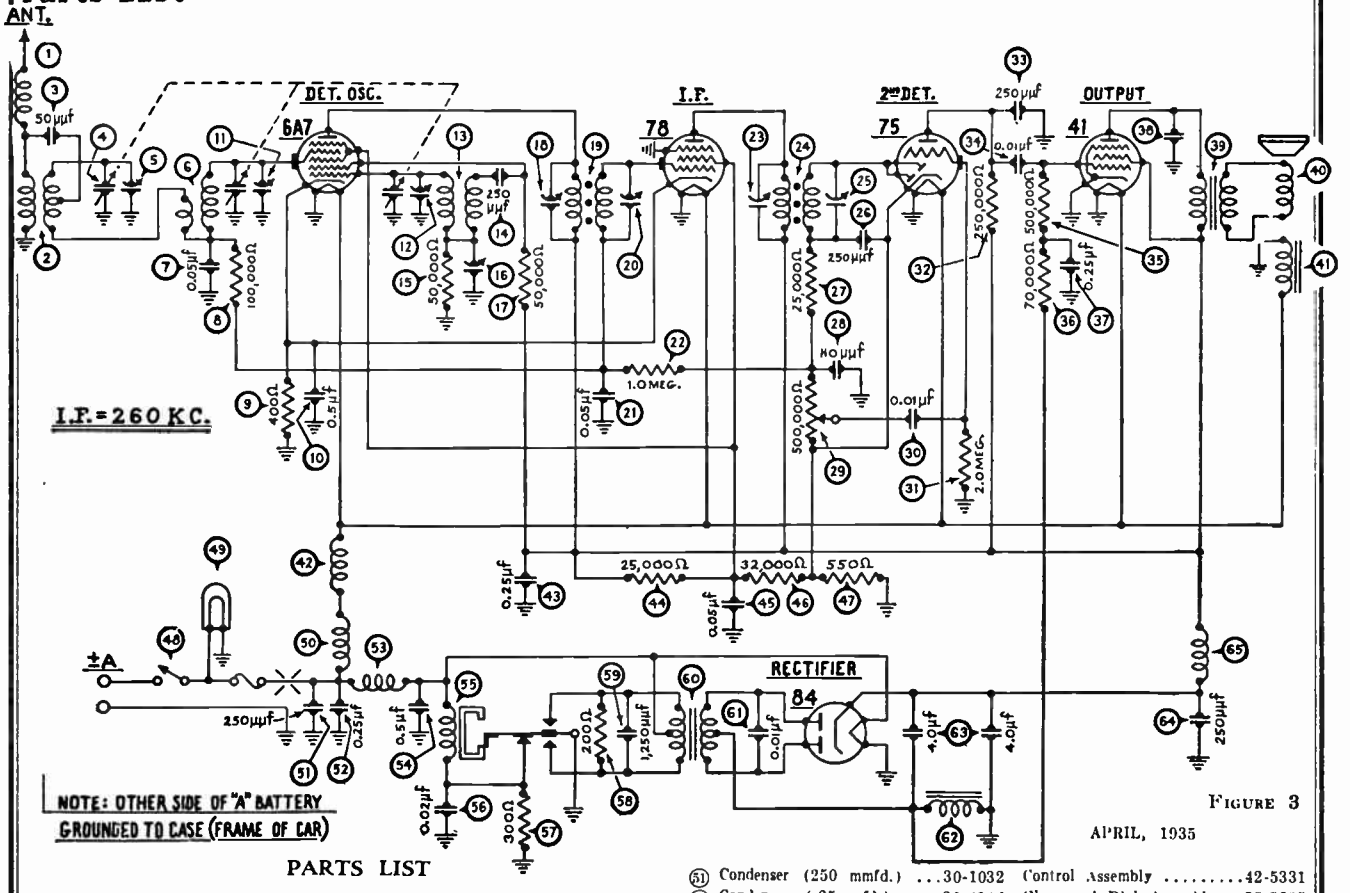


FIGURE 3

APRIL, 1935

PARTS LIST

No.	Description	Part No.
(1)	Antenna Choke	32-1372
(2)	Antenna Transformer	32-1655
(3)	Condenser (50 mmfd.)	7587
(4)	Tuning Condenser	31-1483
(5)	First Padder (on tun. cond.)	
(6)	R. F. Transformer	32-1656
(7)	Condenser (.05 mfd.)	30-4020
(8)	Resistor (100,000 ohms)	6099
(9)	Resistor (400 ohms)	33-3016
(10)	Condenser (.5 mfd.)	30-4227
(11)	Second Padder (on tun. cond.)	
(12)	Third Padder (on tun. cond.)	
(13)	Oscillator Transformer	32-1657
(14)	Condenser (250 mmfd.)	30-1032
(15)	Resistor (50,000 ohms)	33-1163
(16)	Fourth Padder (on tun. cond.)	
(17)	Resistor (50,000 ohms)	6098
(18)	Padder (Pri. 1st I. F. Transf.)	
(19)	First I. F. Transformer	32-1650
(20)	Padder (Sec. 1st I. F. Transf.)	
(21)	Condenser (.05 mfd.)	30-4020
(22)	Resistor (1,000,000 ohms)	33-1096
(23)	Padder (Pri. 2nd I. F. Transf.)	
(24)	Second I. F. Transformer	32-1651
(25)	Padder (Sec. 2nd I. F. Transf.)	
(26)	Condenser (250 mmfd.)	30-1032
(27)	Resistor (25,000 ohms)	33-1013
(28)	Condenser (110 mmfd.)	30-1031
(29)	Volume Control — (500,000 ohms)	38-6635
(30)	Condenser (.01 mfd.)	30-4124
(31)	Resistor (2,000,000 ohms)	33-1025
(32)	Resistor (250,000 ohms)	33-1097
(33)	Condenser (250 mmfd.)	30-1032
(34)	Condenser (.01 mfd.)	30-4169
(35)	Resistor (500,000 ohms)	6097
(36)	Resistor (70,000 ohms)	33-1115
(37)	Condenser (.25 mfd.)	30-4146
(38)	Condenser (8000 mmfd.)	30-4317
(39)	Output Transformer	32-7019
(40)	Cone and Voice Coil	36-3406
(41)	Field Coil Assembly	36-3405
(42)	"A" Choke	32-1377
(43)	Condenser (.25 mfd.)	30-4134
(44)	Resistor (25,000 ohms)	3656
(45)	Condenser (.05 mfd.)	30-4020
(46)	Resistor (32,000 ohms)	3525
(47)	Resistor (550 ohms)	33-3031
(48)	On-Off Switch Assembly	42-5336
(49)	Pilot Lamp	34-2039
(50)	"A" Choke	32-1644
(51)	Condenser (250 mmfd.)	30-1032
(52)	Condenser (.25 mfd.)	30-4146
(53)	Vibrator Choke	32-1625
(54)	Condenser (.5 mfd.)	30-4227
(55)	Vibrator	38-5036
(56)	Condenser (.02 mfd.)	30-4039
(57)	Resistor (300 ohms)	33-3010
(58)	Resistor (200 ohms)	7217
(59)	Condenser (1250 mmfd.)	5886
(60)	Power Transformer	32-7352
(61)	Condenser (.01 mfd.)	30-4051
(62)	Filter Choke	32-7351
(63)	Filter Condenser (4-4 mfd.)	30-2115
(64)	Condenser (250 mmfd.)	30-1032
(65)	"B" Choke	32-1281
	Fuse	7227
	Fuse Insulator	27-7729
	Antenna Lead	38-5131
	Flexible Shaft (21")	28-8354
	Flexible Shaft (28")	28-8355
	Lock Cylinder Assembly	42-5337
	Control Assembly	42-5331
	Glass and Dial Assembly	27-7835
	Pointer Assembly	42-5335
	Bezel Plate	28-7108
	Knobs	27-4187
	Keys	28-2782
	Control Mtg. Bracket (dash)	29-2773
	Control Mtg. Bracket (steering)	6035
	Steering Mtg. Kit (28")	45-1133
	Studs (Set Mtg.)	28-6272
	Nuts (Set Mtg.)	W98A
	Spark Plug Resistor	33-1193
	Distributor Resistor	33-1196
	Interference Condenser	30-4007

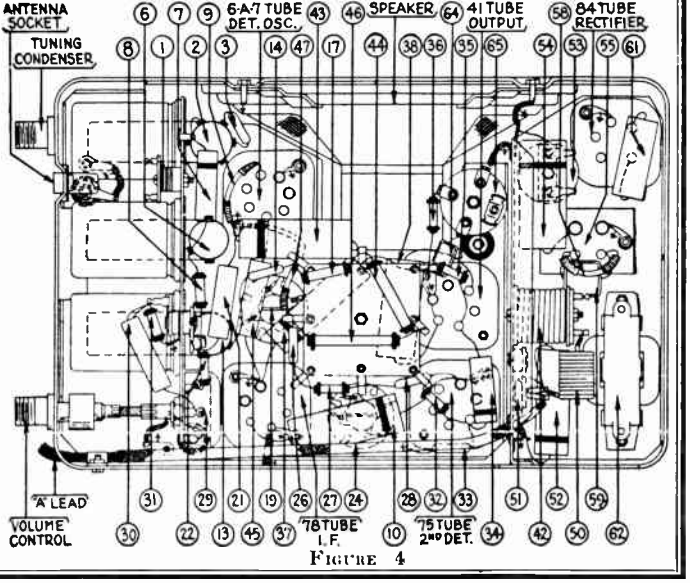


FIGURE 4

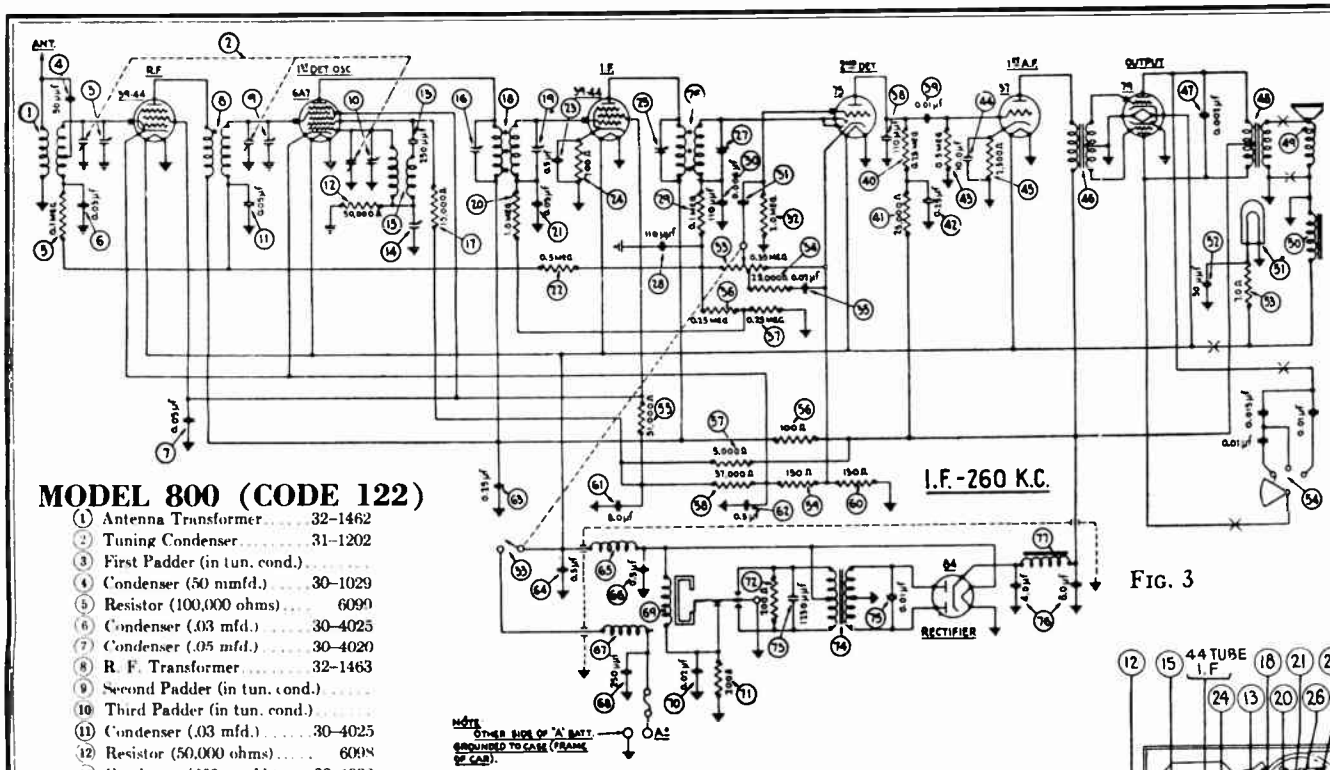


FIG. 3

MODEL 800 (CODE 122)

(1)	Antenna Transformer	32–1462
(2)	Tuning Condenser	31–1202
(3)	First Padder (in tun. cond.)	
(4)	Condenser (50 mmfd.)	30–1029
(5)	Resistor (100,000 ohms)	6090
(6)	Condenser (.03 mfd.)	30–4025
(7)	Condenser (.05 mfd.)	30–4020
(8)	R. F. Transformer	32–1463
(9)	Second Padder (in tun. cond.)	
(10)	Third Padder (in tun. cond.)	
(11)	Condenser (.03 mfd.)	30–4025
(12)	Resistor (50,000 ohms)	6098
(13)	Condenser (250 mmfd.)	30–1032
(14)	Padder	30–6012
(15)	Oscillator Transformer	32–1222
(16)	Padder (Pri. 1st I. F. trans.)	
(17)	Resistor (15,000 ohms)	6208
(18)	First I. F. Transformer	32–1471
(19)	Padder (Sec. 1st I. F. trans.)	
(20)	Resistor (1,000,000 ohms)	33–1096
(21)	Condenser (.03 mfd.)	30–4025
(22)	Resistor (500,000 ohms)	6097
(23)	Condenser (.5 mfd.)	30–4058
(24)	Resistor (700 ohms)	6443
(25)	Padder (Pri. 2nd I. F. trans.)	
(26)	Second I. F. Transformer	32–1449
(27)	Padder (Sec. 2nd I. F. trans.)	
(28)	Condenser (110 mmfd.)	30–1031
(29)	Resistor (100,000 ohms)	6099
(30)	Condenser (110 mmfd.)	30–1031
(31)	Condenser (.006 mfd.)	30–4125
(32)	Resistor (2,000,000 ohms)	33–1025
(33)	Volume control & switch assembly	38–5851
(34)	Resistor (25,000 ohms)	33–1013
(35)	Condenser (.02 mfd.)	30–4215
(36)	Resistor (250,000 ohms)	33–1097
(37)	Resistor (250,000 ohms)	33–1097
(38)	Condenser (110 mmfd.)	30–1031
(39)	Condenser (.01 mfd.)	30–4145
(40)	Resistor (250,000 ohms)	33–1097
(41)	Resistor (25,000 ohms)	33–1013
(42)	Condenser (.25 mfd.)	30–4135
(43)	Resistor (500,000 ohms)	6097
(44)	Condenser (10 mfd.)	30–4135
(45)	Resistor (2500 ohms)	33–1100
(46)	Input Transformer	32–7206
(47)	Condenser (.002 mfd.)	30–4177
(48)	Output Transformer	32–7205
(49)	Cone & Voice Coil	36–3159
(50)	Field Coil Assembly	02795
(51)	Pilot Lamp	34–2039
(52)	Condenser (50 mmfd.)	30–1029
(53)	Resistor (7 ohms)	33–3130
(54)	Tone Control	30–4220
(55)	Resistor (51,000 ohms)	4237
(56)	Resistor (100 ohms)	33–3023
(57)	Resistor (5000 ohms)	33–1070
(58)	Resistor (37,000 ohms)	33–1098
(59)	Resistor (150 ohms)	33–3045
(60)	Resistor (150 ohms)	33–3045
(61)	Condenser (8 mfd.)	30–4135
(62)	Condenser (.5 mfd.)	30–4018
(63)	Condenser (.25 mfd.)	30–4134
(64)	Condenser (.5 mfd.)	30–4015
(65)	Vibrator Choke	32–1474
(66)	Condenser (.5 mfd.)	30–4047
(67)	"A" Choke	32–1493
(68)	Condenser (250 mmfd.)	32–1493
(69)	Vibrator	38–5036
(70)	Condenser (.02 mfd.)	30–4039
(71)	Resistor (200 ohms)	7217
(72)	Resistor (200 ohms)	7217
(73)	Condenser (1250 mmfd.)	5886
(74)	Power Transformer	32–7098
(75)	Condenser (.01 mfd.)	30–4051
(76)	Filter Condenser (4–8 mfd.)	30–2015
(77)	"B" Choke	32–7104
	Spark Plug Resistors	33–1015
	Distributor Resistor	33–1113E
	Screw Type Resistor	4851
	Interference Condenser	30–4007
	Studs	28–603C
	Nuts (Mounting)	W55A
	Battery Cable	38–5296
	Antenna Lead	38–5131
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27–7131
	Control Assembly	42–5185
	Bracket	6035
	Strap	04344
	Knob	27–4058
	Knob Spring	28–1738
	Glass	27–7325
	Glass Gasket	27–7509
	Pointer	28–1957
	Shaft	28–8206
	Face Assembly	42–5191
	Cover	29–7064
	4-prong Socket	27–6006
	5-prong Socket	27–6014
	6-prong Socket	27–6020
	7-prong Socket	27–6005
	Auto Radio Lock Switch	42–1076

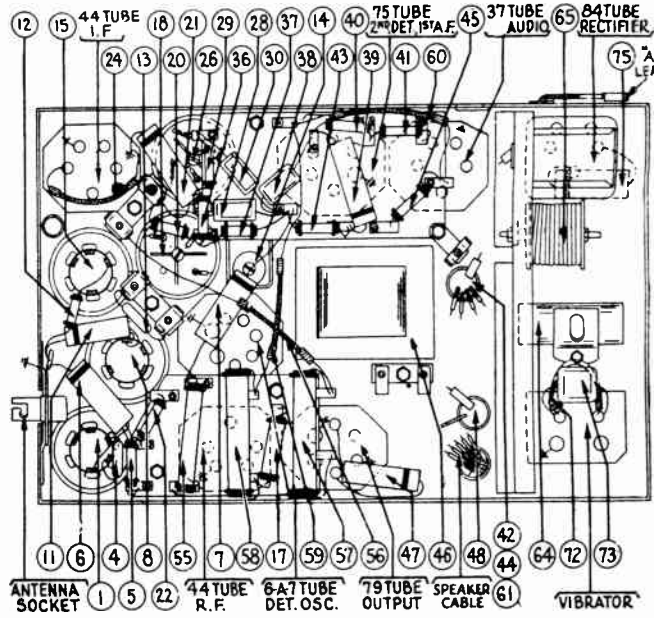


FIG. 4

MODEL 800(Code 122)
Alignment Data
Socket Layout

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 800 (Code 122).

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1471 for the first I. F. stage and 32-1449 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

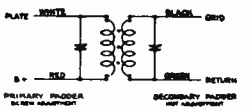


FIG. 1

MODEL 800 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube, grounding the shield. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders ㉕ and ㉗ are adjusted first (Figs. 2 and 3). Turn the adjusting screw ㉕ all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut ㉗ with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw ㉕ for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

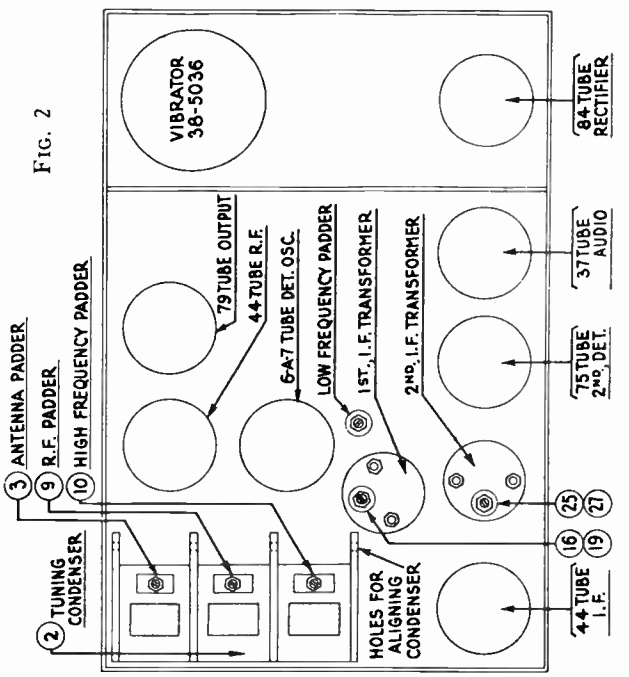


FIG. 2

Repeat the above procedure with the first I. F. condensers, ⑯ and ⑲.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder ⑩ until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ⑨ and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder ⑭ for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

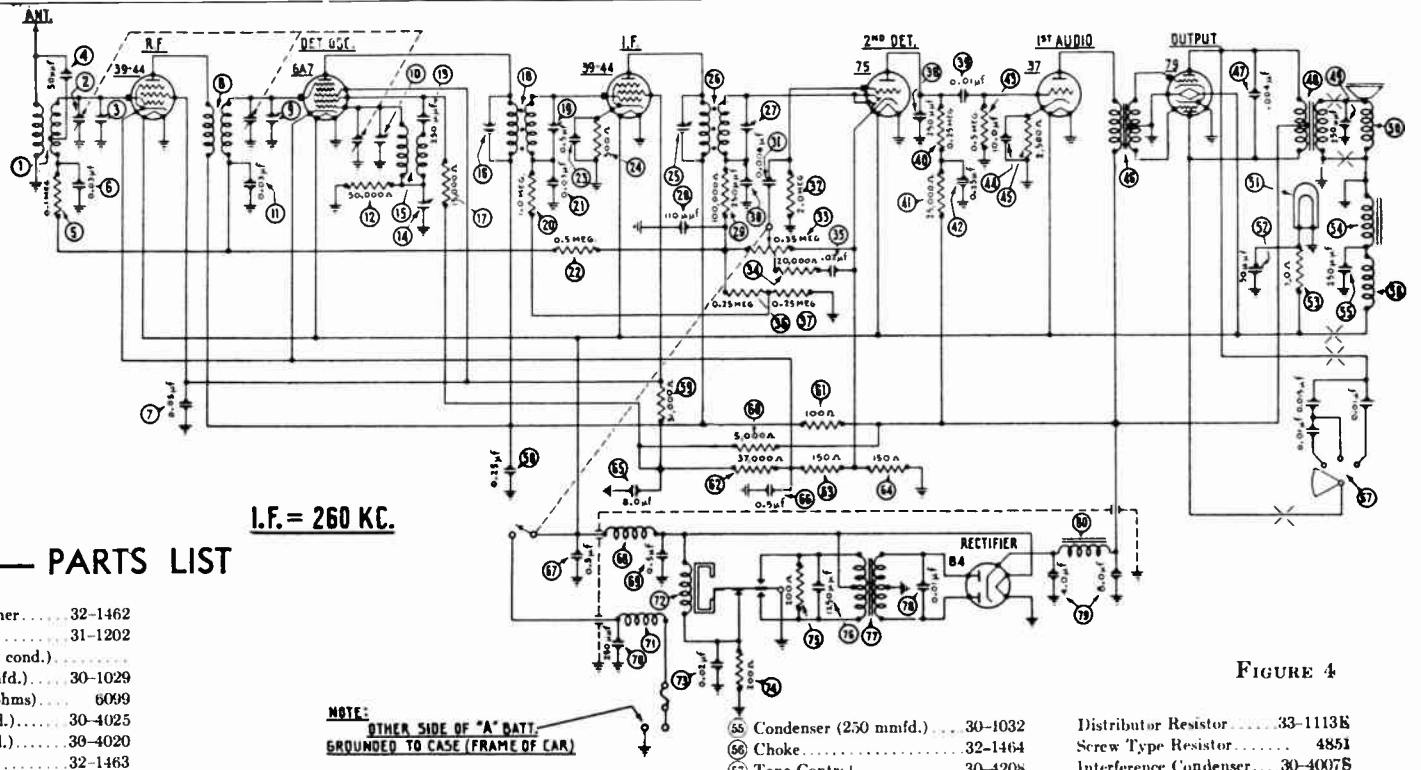


FIGURE 4

MODEL 802 — PARTS LIST

(1)	Antenna Transformer	32-1462
(2)	Tuning Condenser	31-1202
(3)	1st Padder (in tun. cond.)	
(4)	Condenser (50 mmfd.)	30-1029
(5)	Resistor (100,000 ohms)	6099
(6)	Condenser (.03 mfd.)	30-4025
(7)	Condenser (.05 mfd.)	30-4020
(8)	R. F. Transformer	32-1463
(9)	2nd Padder (in tun. cond.)	
(10)	3rd Padder (in tun. cond.)	
(11)	Condenser (.03 mfd.)	30-4025
(12)	Resistor (50,000 ohms)	6098
(13)	Condenser (250 mmfd.)	3082
(14)	Padder	30-6012
(15)	Oscillator Transformer	32-1222
(16)	Padder (Pri. 1st I. F. Trans.)	
(17)	Resistor (15,000 ohms)	6208
(18)	First I. F. Transformer	32-1471
(19)	Padder (Sec. 1st I. F. Trans.)	
(20)	Resistor (1,000,000 ohms)	33-1096
(21)	Condenser (.03 mfd.)	30-4025
(22)	Resistor (500,000 ohms)	6097
(23)	Condenser (.5 mfd.)	30-4058
(24)	Resistor (500 ohms)	6977
(25)	Padder (Pri. 2nd I. F. Trans.)	
(26)	Second I. F. Transformer	32-1449
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Condenser (110 mmfd.)	30-1031
(29)	Resistor (100,000 ohms)	6099
(30)	Condenser (250 mmfd.)	30-1032
(31)	Condenser (.006 mfd.)	30-4125
(32)	Resistor (2,000,000 ohms)	33-1025
(33)	Vol. Cont. & Sw. Assembly	38-5851
(34)	Resistor (20,000 ohms)	33-1130
(35)	Condenser (.02 mfd.)	30-4215
(36)	Resistor (250,000 ohms)	33-1097
(37)	Resistor (250,000 ohms)	33-1097
(38)	Condenser (250 mmfd.)	30-1032
(39)	Condenser (.01 mfd.)	30-4145
(40)	Resistor (250,000 ohms)	33-1097
(41)	Resistor (25,000 ohms)	33-1013
(42)	Condenser (.25 mfd.)	30-4135
(43)	Resistor (500,000 ohms)	6097
(44)	Condenser (10 mfd.)	30-4135
(45)	Resistor (2500 ohms)	33-1100
(46)	Input Transformer	32-7206
(47)	Condenser (.004 mfd.)	30-4185
(48)	Output Transformer	32-7205
(49)	Condenser (250 mmfd.)	30-1032
(50)	Cone & Voice Coil	36-3159
(51)	Pilot Lamp	34-2040
(52)	Condenser (50 mmfd.)	30-1029
(53)	Resistor (7 ohms)	33-3130
(54)	Field Coil Assembly	02795
(55)	Condenser (250 mmfd.)	30-1032
(56)	Choke	32-1464
(57)	Tone Control	30-4208
(58)	Condenser (.25 mfd.)	30-4134
(59)	Resistor (51,000 ohms)	4237
(60)	Resistor (5000 ohms)	33-1070
(61)	Resistor (100 ohms)	33-3023
(62)	Resistor (37,000 ohms)	33-1098
(63)	Resistor (150 ohms)	33-3045
(64)	Resistor (150 ohms)	33-3045
(65)	Condenser (8 mfd.)	30-4135
(66)	Condenser (.5 mfd.)	30-4018
(67)	Condenser (.5 mfd.)	30-4015
(68)	Vibrator Choke	32-1474
(69)	Condenser (.5 mfd.)	30-4047
(70)	Condenser (250 mmfd.)	32-1466
(71)	"A" Choke	32-1466
(72)	Vibrator	38-5036
(73)	Condenser (.02 mfd.)	30-4039
(74)	Resistor (200 ohms)	7217
(75)	Resistor (200 ohms)	7217
(76)	Condenser (1250 mmfd.)	5886
(77)	Power Transformer	32-7098
(78)	Condenser (.01 mfd.)	30-4051
(79)	Filter Condenser (4-8 mfd.)	30-2015
(80)	"B" Choke	32-7104
	Spark Plug Resistors	33-1015E
	Distributor Resistor	33-1113E
	Screw Type Resistor	4851
	Interference Condenser	30-4007S
	Studs	28-6036
	Nuts (Mounting)	W55A
	Ammeter Cable	38-5296
	Speaker Cable	41-3112
	Antenna Lead	38-5131
	Acorn Nut	W821
	Fuse	7227
	Fuse Insulator	27-7131
	Control Assembly	42-5256
	Bracket (Control)	6035
	Strap (Control)	04344
	Knob	27-4058
	Knob Spring	28-1738
	Glass	27-7325
	Glass Gasket	27-7509
	Pointer	28-1957
	Flexible Shaft	28-8206
	Face Assembly	4[illegible]-5255
	Control Cover	28-7037
	4-prong Socket	27-6006
	5-prong Socket	27-6014
	6-prong Socket	27-6020
	7-prong Socket	27-6005
	Auto Radio Lock Switch	42-1076

MODEL 805
Schematic, Chassis
Parts List

PHILCO RADIO & TELEVISION CORP.

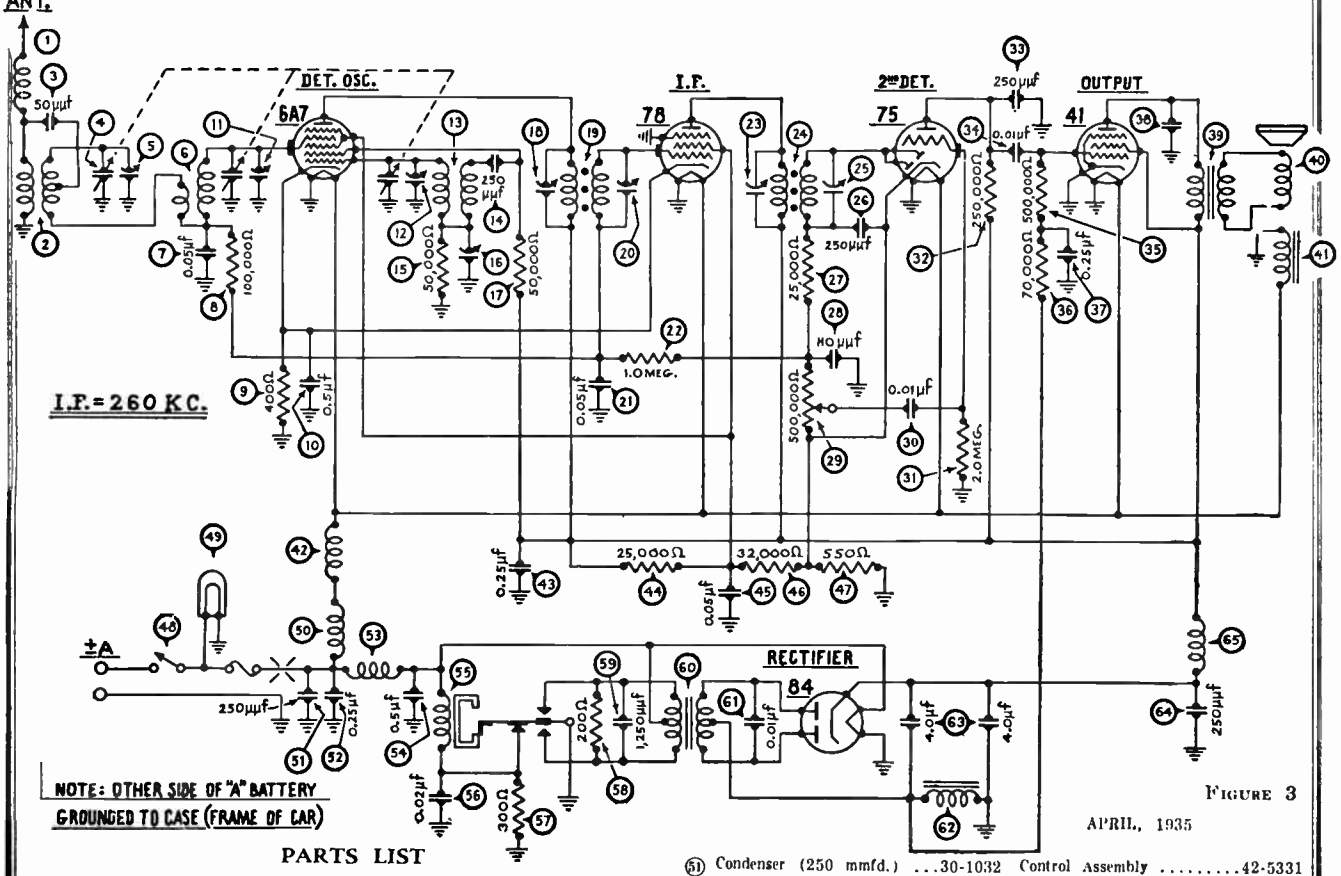


FIGURE 3

APRIL, 1935

PARTS LIST

No.	Description	Part No.
(1)	Antenna Choke	32-1372
(2)	Antenna Transformer	32-1655
(3)	Condenser (50 mmfd.)	7587
(4)	Tuning Condenser	31-1483
(5)	First Padder (on tun. cond.)	
(6)	R. F. Transformer	32-1650
(7)	Condenser (.05 mfd.)	30-4020
(8)	Resistor (100,000 ohms)	6099
(9)	Resistor (400 ohms)	33-3016
(10)	Condenser (.5 mfd.)	30-4227
(11)	Second Padder (on tun. cond.)	
(12)	Third Padder (on tun. cond.)	
(13)	Oscillator Transformer	32-1657
(14)	Condenser (250 mmfd.)	30-1032
(15)	Resistor (50,000 ohms)	33-1163
(16)	Fourth Padder (on tun. cond.)	
(17)	Resistor (50,000 ohms)	6098
(18)	Padder (Pri. 1st I. F. Transf.)	
(19)	First I. F. Transformer	32-1650
(20)	Padder (Sec. 1st I. F. Transf.)	
(21)	Condenser (.05 mfd.)	30-4020
(22)	Resistor (1,000,000 ohms)	33-1096
(23)	Padder (Pri. 2nd I. F. Transf.)	
(24)	Second I. F. Transformer	32-1651
(25)	Padder (Sec. 2nd I. F. Transf.)	
(26)	Condenser (250 mmfd.)	30-1032
(27)	Resistor (25,000 ohms)	33-1013
(28)	Condenser (110 mmfd.)	30-1031
(29)	Volume Control — (500,000 ohms)	38-6635
(30)	Condenser (.01 mfd.)	30-4124
(31)	Resistor (2,000,000 ohms)	33-1025
(32)	Resistor (250,000 ohms)	33-1097
(33)	Condenser (250 mmfd.)	30-1032
(34)	Condenser (.01 mfd.)	30-4169
(35)	Resistor (500,000 ohms)	6097
(36)	Resistor (70,000 ohms)	33-1115
(37)	Condenser (.25 mfd.)	30-4146
(38)	Condenser (8000 mmfd.)	30-4317
(39)	Output Transformer	32-7019
(40)	Cone and Voice Coil	36-3406
(41)	Field Coil Assembly	36-3405
(42)	"A" Choke	32-1377
(43)	Condenser (.25 mfd.)	30-4134
(44)	Resistor (25,000 ohms)	3656
(45)	Condenser (.05 mfd.)	30-4020
(46)	Resistor (32,000 ohms)	3525
(47)	Resistor (550 ohms)	33-3031
(48)	On-Off Switch Assembly	42-5336
(49)	Pilot Lamp	34-2039
(50)	"A" Choke	32-1644
	Fuse	7227
	Fuse Insulator	27-7729
	Antenna Lead	38-5131
	Flexible Shaft (21")	28-8354
	Flexible Shaft (28")	28-8355
	Lock Cylinder Assembly	42-5337
(51)	Condenser (250 mmfd.)	30-1032
(52)	Condenser (.25 mfd.)	30-4146
(53)	Vibrator Choke	32-1625
(54)	Condenser (.5 mfd.)	30-4227
(55)	Vibrator	38-5036
(56)	Condenser (.02 mfd.)	30-4039
(57)	Resistor (300 ohms)	33-3010
(58)	Resistor (200 ohms)	7217
(59)	Condenser (1250 mmfd.)	5886
(60)	Power Transformer	32-7352
(61)	Condenser (.01 mfd.)	30-4051
(62)	Filter Choke	32-7351
(63)	Filter Condenser (4-4 mfd.)	30-2115
(64)	Condenser (250 mmfd.)	30-1032
(65)	"B" Choke	32-1281
	Control Assembly	42-5331
	Glass and Dial Assembly	27-7835
	Pointer Assembly	42-5335
	Bezel Plate	28-7108
	Knobs	27-4187
	Keys	28-2782
	Control Mtg. Bracket (dash)	29-2773
	Control Mtg. Bracket (steering)	6035
	Steering Mtg. Kit (28")	45-1133
	Studs (Set Mtg.)	28-6272
	Nuts (Set Mtg.)	W98A
	Spark Plug Resistor	33-1195
	Distributor Resistor	33-1196
	Interference Condenser	30-4007

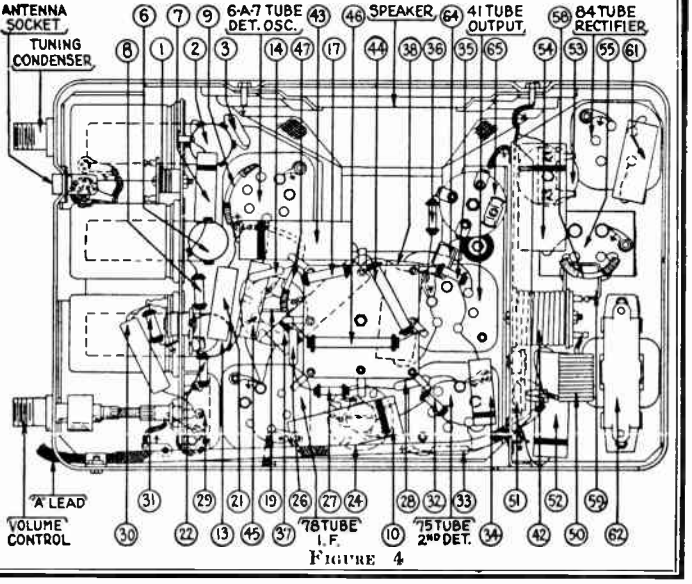


FIGURE 4

PHILCO RADIO & TELEV. CORP.

MODEL 805
Alignment, Socket Trimmers

I. F. TRANSFORMER AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1650 for the first I. F. stage and 32-1651 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 805 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 78 tube, I. F. stage. (For location see Fig. 2)

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 41 tube and the other lead to the Receiver housing. The Receiver volume control must be turned to approximately full volume, and the attenuator in the generator set for a half-scale reading of the output meter.

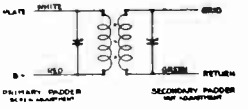


FIGURE 1

The secondary nut padder ㉕ must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder ㉓ for maximum reading.

Remove the generator lead from the 78 tube and reconnect the grid clip.

Disconnect the grid clip from the 6A7 tube, and connect the generator lead to the grid cap of this tube. The secondary nut padder ⑳ must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder ⑱ for maximum reading.

Readjust padders ㉕ and ㉓ for maximum reading on the output meter.

After padding the second I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid clip. Adjust the generator to 1600 K. C., and then connect the generator lead to the antenna lead, using a 150 mmfd. condenser in series between the two leads. Ground the shield to the Receiver housing.

Turn the Tuning Condenser Plates fully out of mesh.

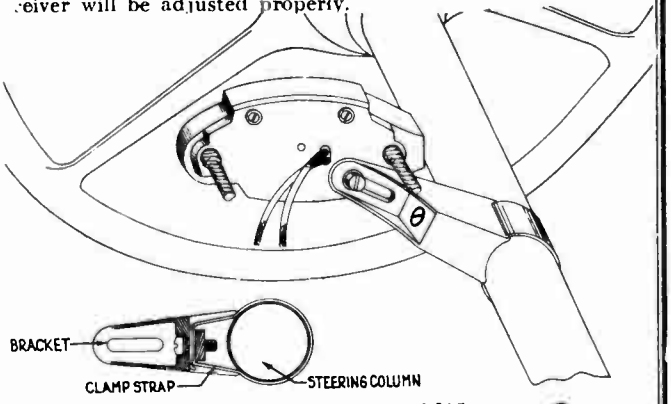
With the tuning condenser in this position, adjust the high-frequency padder ⑫ until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale. Adjust the padders ⑪ and ⑤ in the same manner.

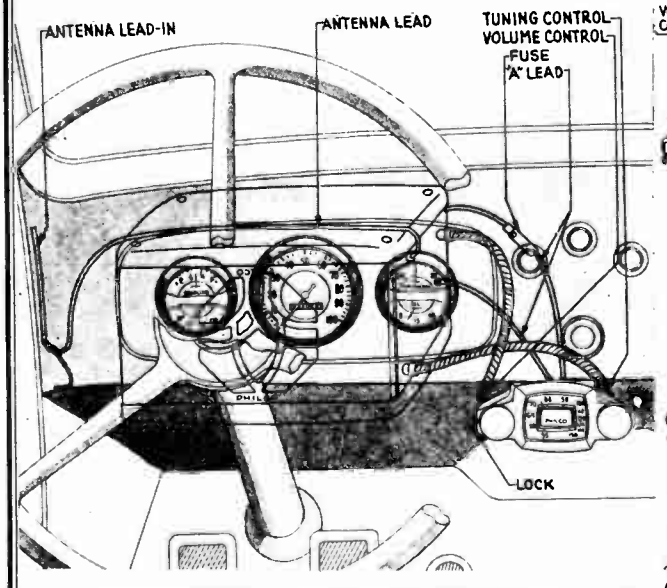
Turn the tuning condenser plates in mesh to approximately 580 on the dial scale, and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the series padder ⑯ for the maximum meter reading.

Readjust the padder ⑫ at 1600 K. C.

Tune the condenser to 1400 K. C. and adjust the padders ⑪ and ⑤ for the maximum reading.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver will be adjusted properly.





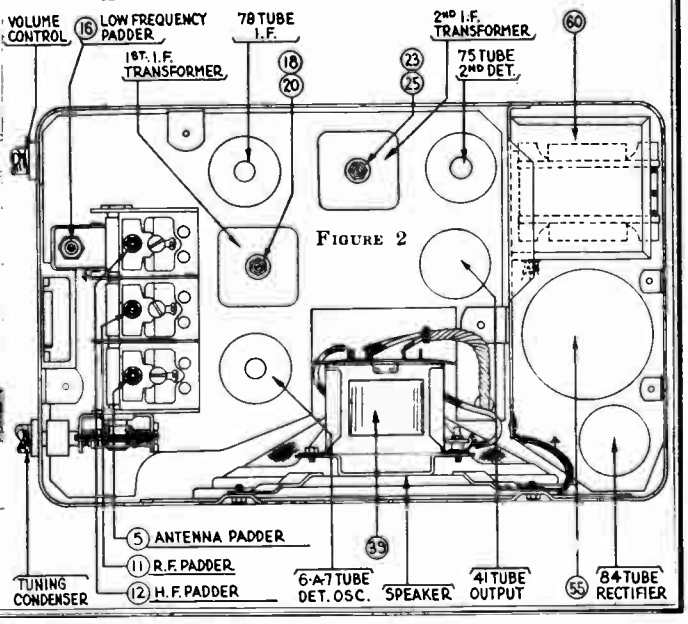


FIGURE 2

MODEL 806
Alignment, Socket
Trimmers

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMER AND PADDERS

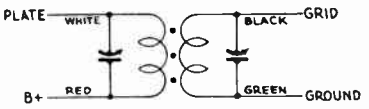
The first I. F. transformer is assembled complete with padding condensers. The second I. F. transformer is assembled complete with a padding condenser, two resistors and two mica condensers.

The padders are placed in the top of the shield can, one above the other.

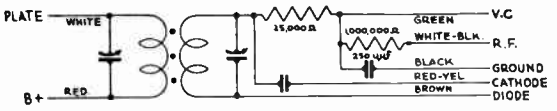
The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1621 for the first I. F. stage and 32-1622 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer 32-1621



2nd I. F. Transformer 32-1622

FIG. 1

MODEL 806 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 78 tube, I. F. stage. (For location see Fig. 2.)

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 78 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 41 tube and the other lead to the Receiver housing. The Receiver volume control must be turned to approximately full volume, and the attenuator in the generator set for a half-scale reading of the output meter.

The secondary nut padder (25) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (23) for maximum reading.

Remove the generator lead from the 78 tube and reconnect the grid clip.

Disconnect the grid clip from the 6A7 tube, and connect the generator lead to the grid cap of this tube. The secondary nut padder (21) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (19) for maximum reading.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid clip. Adjust the generator to 1580 K.C., and then connect the generator lead to the antenna lead, using a 200 mmfd. condenser in series between the two leads. Ground the shield to the Receiver housing.

Turn the tuning condenser plates fully out of mesh. Place a slip of paper, .006 inch thick between stator plates and the heel of the rotor plates. Turn the rotor plates back until they just strike the paper.

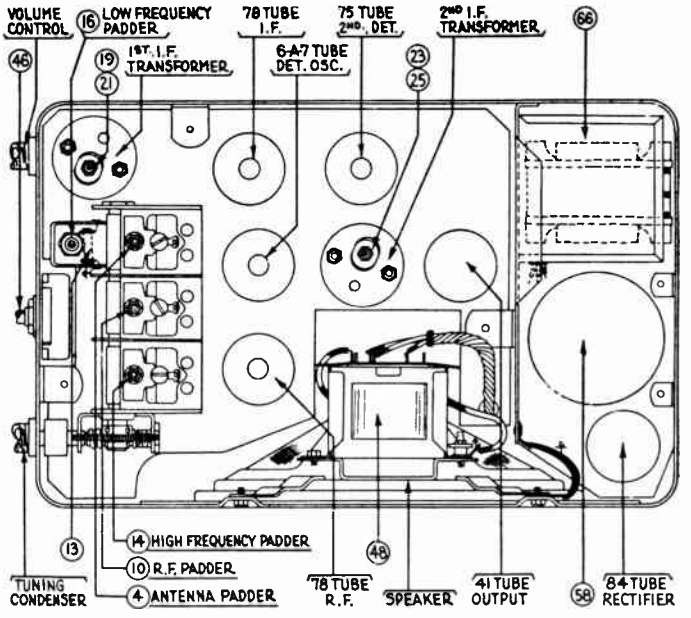


FIG. 2

PHILCO RADIO & TELEV. CORP.

MODEL 806
Schematic, Chassis
Parts List

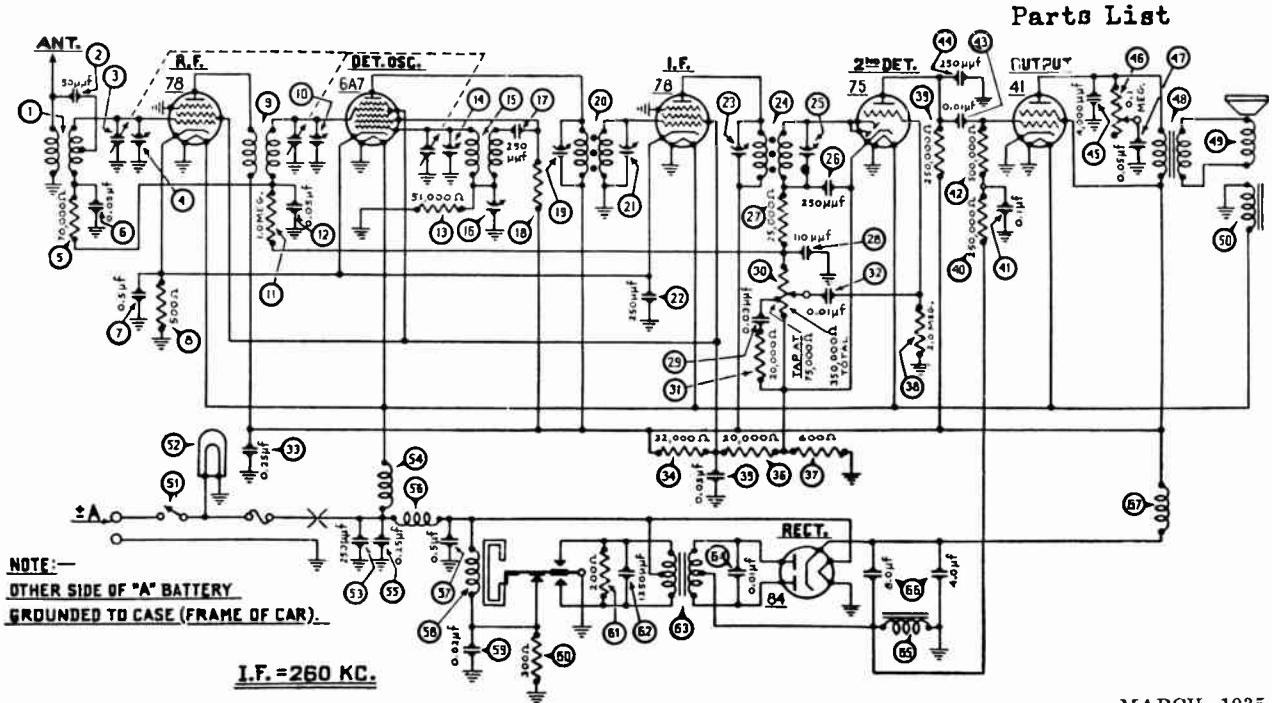


FIG. 3

MARCH, 1935

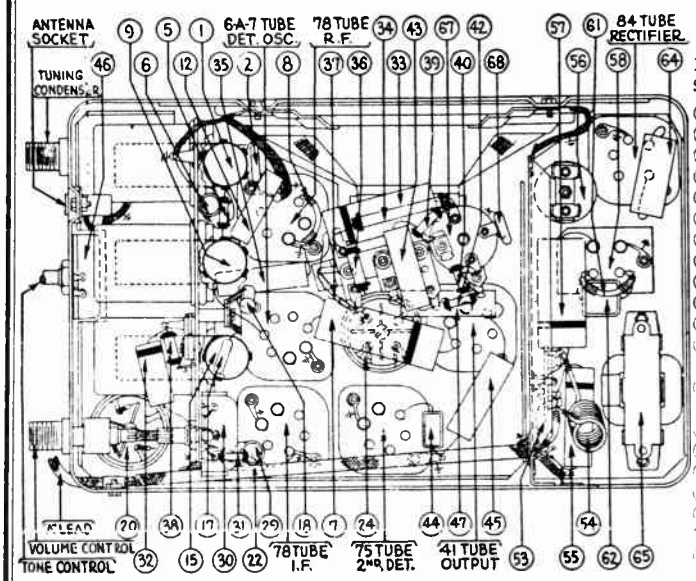


FIG. 4

With the tuning condenser in this position, adjust the high-frequency padder (19) until the maximum reading is obtained in the output meter. This is the true setting for 1580 K.C., 158 on the dial scale. Adjust the padders (10) and (4) in the same manner.

Remove the paper and turn the tuning condenser plates in mesh to approximately 60 on the dial scale, and adjust the signal generator to 600 K.C. Roll the tuning condenser and adjust the series padder (16) for the maximum meter reading.

Readjust the padder (19) at 1580 K.C.

Tune the condenser to 1400 K.C. and adjust the padders (10) and (4) for the maximum reading.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver will be adjusted properly.

NOTE.—A condenser, (68), Part No. 30-1032 (250 mmfd.), has been added to the Receiver. One side is connected between the choke (67) and the 4 mfd. section of (66), and the other side to ground.

MODEL 806 PARTS LIST

No. Shown on Schematic	Description	Part No.
(1)	Antenna Transformer	32-1618
(2)	Condenser (50 mmfd.)	4587
(3)	Tuning Condenser	31-1483
(4)	First Padder (on tun. cond.)	
(5)	Resistor (70,000 ohms)	33-1115
(6)	Condenser (.05 mfd.)	30-4020
(7)	Condenser (.5 mfd.)	30-4227
(8)	Resistor (600 ohms)	33-3209
(9)	R. F. Transformer	32-1619
(10)	Second Padder (on tun. cond.)	
(11)	Resistor (1,000,000 ohms)	33-1096
(12)	Condenser (.05 mfd.)	30-4020
(13)	Resistor (51,000 ohms)	6098
(14)	Third Padder (on tun. cond.)	
(15)	Oscillator Transformer	32-1620
(16)	Fourth Padder (on tun. cond.)	
(17)	Condenser (250 mmfd.)	30-1032
(18)	Resistor (51,000 ohms)	33-1163
(19)	Padder (Pri. 1st I. F. Tran.)	
(20)	First I. F. Transformer	32-1621
(21)	Padder (Sec. 1st I. F. Tran.)	
(22)	Condenser (250 mmfd.)	30-1032
(23)	Padder (Pri. 2nd I. F. Tran.)	
(24)	Second I. F. Transformer	32-1622
(25)	Padder (Sec. 2nd I. F. Tran.)	
(26)	Condenser (250 mmfd.)	30-1032
(27)	Resistor (25,000 ohms)	33-1013
(28)	Condenser (110 mmfd.)	30-1031
(29)	Condenser (.03 mfd.)	30-4025
(30)	Vol. Con. & Coupling Assm.	38-6605
(31)	Resistor (20,000 ohms)	33-1178
(32)	Condenser (.01 mfd.)	30-4169
(33)	Condenser (.25 mfd.)	30-4134
(34)	Resistor (32,000 ohms)	3525
(35)	Condenser (.05 mfd.)	30-4020
(36)	Resistor (20,000 ohms)	6650
(37)	Resistor (600 ohms)	33-3207
(38)	Resistor (2,000,000 ohms)	33-1025
(39)	Resistor (250,000 ohms)	33-1097
(40)	Resistor (250,000 ohms)	33-1097
(41)	Condenser (.1 mfd.)	30-4122
(42)	Resistor (500,000 ohms)	6097
(43)	Condenser (.01 mfd.)	30-4145
(44)	Condenser (250 mmfd.)	30-1032
(45)	Condenser (4000 mmfd.)	30-4185
(46)	Tone Control	33-5101
(47)	Condenser (.05 mfd.)	30-4012
(48)	Output Transformer	32-7019
(49)	Cone & Voice Coil	36-3406
(50)	Field coil Assembly	36-3405
(51)	"On" & "Off" Switch Assm.	42-5336
(52)	Pilot Lamp	34-2039
(53)	Condenser (250 mmfd.)	30-1032
(54)	"A" Choke	32-1644
(55)	Condenser (.25 mfd.)	30-4146
(56)	Vibrator Choke	32-1625
(57)	Condenser (.5 mfd.)	30-4227
(58)	Vibrator	38-5036
(59)	Condenser (.02 mfd.)	30-4039
(60)	Resistor (300 ohms)	33-3010
(61)	Resistor (200 ohms)	7217
(62)	Condenser (1250 mmfd.)	5886
(63)	Power Transformers	32-7352
(64)	Condenser (.01 mfd.)	30-4051
(65)	Filter Choke	32-7351
(66)	Filter Condenser	30-2109
(67)	R. F. Choke	32-1348
(68)	Condenser (250 mmfd.)	30-1032
	Control Assembly	42-5331
	Glass and Dial	27-7835
	Pointer Assembly	42-5335
	Bezel Plate	28-7108
	Knobs	27-4187
	Control Mounting Bracket	29-2773
	Keys	28-2782
	Studs (Set Mtg.)	28-6272
	Nuts (Set Mtg.)	W98A
	Spark Plug Resistors	33-1195
	Distributor Resistor	33-1196
	Interference Condensers	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Antenna Lead	38-5131
	Flexible Shaft (21")	28-8354
	Flexible Shaft (28")	28-8355
	Lock Cylinder Assembly	42-5337
	28" Shaft Kit	45-1133

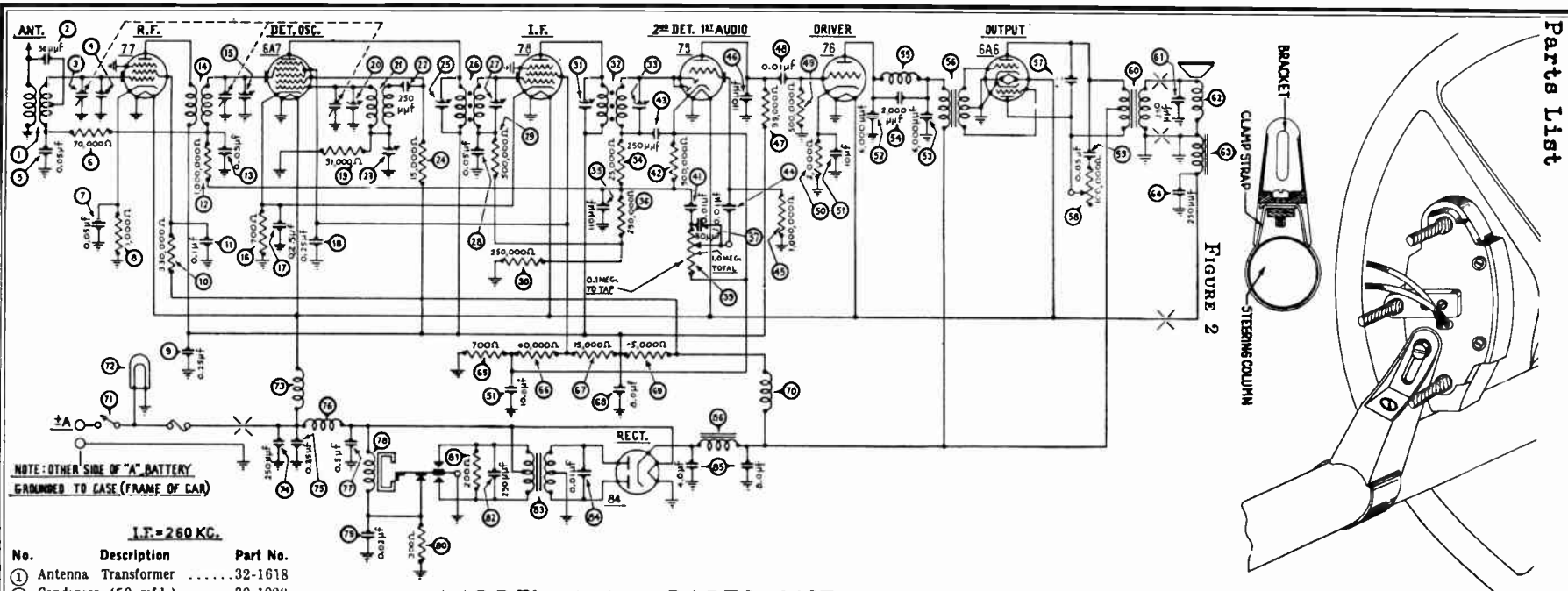


FIGURE 2

MODEL 808 — PARTS LIST

No.	Description	Part No.
(1)	Antenna Transformer	32-1618
(2)	Condenser (50 mfd.)	30-1029
(3)	Tuning Condenser	31-1490
(4)	First Padder (on tun. cond.)	
(5)	Condenser (.05 mfd.)	30-4020
(6)	Resistor (70,000 ohms)	33-1115
(7)	Condenser (.05 mfd.)	30-4020
(8)	Resistor (1000 ohms)	33-3017
(9)	Condenser (.25 mfd.)	30-4134
(10)	Resistor (330,000 ohms)	33-1200
(11)	Condenser (.1 mfd.)	30-4170
(12)	Resistor (1,000,000 ohms)	33-1096
(13)	Condenser (.05 mfd.)	30-4020
(14)	R. F. Transformer	32-1619
(15)	Second Padder (on tun. cond.)	
(16)	Resistor (700 ohms)	6443
(17)	Condenser (.25 mfd.)	30-4146
(18)	Condenser (.25 mfd.)	30-4146
(19)	Resistor (51,000 ohms)	4518
(20)	Third Padder (on tun. cond.)	
(21)	Oscillator Transformer	32-1620
(22)	Condenser (250 mmfd.)	30-1032
(23)	Fourth Padder (on tun. cond.)	
(24)	Resistor (15,000 ohms)	33-1177
(25)	Padder (Pri. 1st I. F. Transf.)	
(26)	First I. F. Transformer	32-1621
(27)	Padder (Sec. 1st I. F. Trans.)	
(28)	Condenser (.05 mfd.)	30-4020
(29)	Resistor (500,000 ohms)	6097
(30)	Resistor (250,000 ohms)	33-1097
(31)	Padder (Pri. 2nd I. F. Trans.)	
(32)	Second I. F. Transformer	32-1630
(33)	Padder (Sec. 2nd I. F. Trans.)	
(34)	Resistor (25,000 ohms)	33-1013
(35)	Condenser (110 mmfd.)	30-1031
(36)	Resistor (250,000 ohms)	33-1097
(37)	Condenser (50 mmfd.)	30-1029
(39)	Volume Control (1,000,000 ohms)	38-6636
(41)	Condenser (.01 mfd.)	30-4124
(42)	Resistor (500,000 ohms)	6097
(43)	Condenser (250 mmfd.)	30-1032
(44)	Condenser (.01 mfd.)	30-4169
(45)	Resistor (1,000,000 ohms)	33-1096
(46)	Condenser (110 mmfd.)	30-1031
(47)	Resistor (99,000 ohms)	6099
(48)	Condenser (.01 mfd.)	30-4124
(49)	Resistor (500,000 ohms)	6097
(50)	Resistor (2000 ohms)	33-1029
(51)	Condenser (10 — 10 mfd.)	30-2111
(52)	Condenser (6000 mmfd.)	30-4125
(53)	Condenser (6000 mmfd.)	30-4125
(54)	Condenser (2000 mmfd.)	30-4177
(55)	Choke	32-1281
(56)	Input Transformer	32-7356
(57)	Condenser (4000 mmfd.)	30-4185
(58)	Tone Control (100,000 ohms)	33-5096
(59)	Condenser (.05 mfd.)	30-4025
(60)	Output Transformer	32-7355
(61)	Condenser (250 mmfd.)	30-1032
(62)	Cone and Voice Coil	36-3441
(63)	Field Coil Assembly	36-3454
(64)	Condenser (250 mmfd.)	30-1032
(65)	Resistor (700 ohms)	6443
(66)	Resistor (40,000 ohms)	33-1044
(67)	Resistor (15,000 ohms)	5278
(68)	Condenser (8 mfd.)	30-2110
(69)	Resistor (5000 ohms)	3526
(70)	R. F. Choke	32-7368
(71)	On and Off Switch	42-5336
(72)	Pilot Lamp	34-2039
(73)	"A" Choke	32-1644
(74)	Condenser (250 mmfd.)	30-1032
(75)	Condenser (.25 mfd.)	30-4146
(76)	Vibrator Choke	32-1607
(77)	Condenser (.5 mfd.)	30-4227
(78)	Vibrator	38-5036
(79)	Condenser (.02 mfd.)	30-4039
(80)	Resistor (300 ohms)	30-3010
(81)	Resistor (200 ohms)	7217
(82)	Condenser (1250 mmfd.)	5886
(83)	Power Transformer	32-7352
(84)	Condenser (.01 mfd.)	30-4051
(85)	Filter Condenser (4-8 mfd.)	30-2112
(86)	Filter Choke	32-7104
(87)	Antenna Choke	32-1372
(88)	"A" Choke	32-1438
(89)	Condenser (250 mmfd.)	30-1032
	Control Assembly	42-5332
	Glass and Dial	27-7835
	Pointer Assembly	42-5335
	Bezel Plate	28-7108
	Knobs	27-4187
	Control mtg. Bracket (Dash)	29-2773
	Control mtg. Bracket (Steering)	6035
	Strap	04344
	Strap Pad	6206
	Keys	28-2782
	Studs (set mtg.)	28-6272
	Nuts (set mtg.)	W98A
	Stud (speaker mtg.)	6122
	Nut (speaker mtg.)	W55A
	Spark Plug Resistors	33-1195
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Antenna Lead	38-5131
	Lock Cylinder Assembly	42-5337
	Control Shaft 21"	28-8354
	Control Shaft 28"	28-8355
	Tone Control Shaft (21")	28-8356
	Tone Control Shaft (28")	28-8358

NOTE: An antenna choke (89) Part No. 32-1372 has been added to the Receiver. This is connected in series with the antenna lead, and the antenna transformer (1) and condenser (2).

A Filter Choke (88) Part No. 32-1438 has been added to the Receiver. This is connected in series with one side of Choke (73) and the tube filaments.

A Condenser (89) Part No. 30-1032 has been added to the Receiver. One side is connected between this new Choke and Choke (73), and the other side to ground.

GENERAL INSTALLATION

ANTENNA—In cars equipped with a top antenna, the antenna lead-in is usually brought down one of the windshield pillars and coiled behind the cowl trim panel. In such cases, the antenna lead (Receiver) must be spliced to the antenna lead-in as close as possible to the corner post and the shield pigtail on the lead grounded.

In cars having an all metal top, the Philco special under-car antenna should be installed (Part No. 45-1128 Kit). The shielded lead-in must be spliced to the shielded antenna lead and the shielding grounded. In all cases, cut off all excess lead-in, tape the splice and keep the lead-in out of the motor compartment.

RECEIVER AND SPEAKER INSTALLATION—The Receiver and Speaker must be installed under the cowl on the dash. Be sure that in the location selected, there is ample foot room and that they do not in any way interfere with the operation of the control pedals and ventilators. The Receiver can be installed on the right side of the dash, in the center or on the left side, above the steering column, while the Speaker can be installed on one side of the Receiver. Fig. 3 shows a typical installation with the Receiver on the left side.

The standard mounting for the Receiver is with three studs. Figure 1 shows a detailed view of the Receiver installed on the right side of the dash, using three studs for mounting the Receiver. When installed on the right side or the left side, the control coupling end of the Receiver must be towards the center of the dash. When installed in the center of the dash, the control coupling end must be towards the control unit. Cardboard templates are furnished so that the mounting bolt hole locations can be easily and accurately marked on the dash.

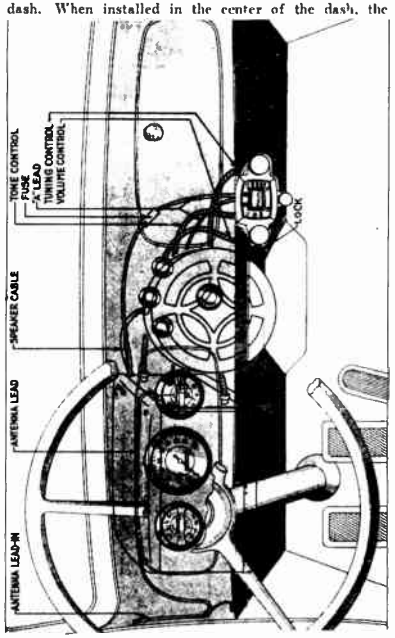


FIGURE 3

The dash on some 1935 cars is drilled for two Receiver mounting bolts. An extra set of bolt holes is provided in the Receiver housing for installation in these cars.

Before installing the Receiver, turn the volume control coupling counter-clockwise as far as it will go.

CONTROL UNIT—The control unit can be fastened to the bottom edge of the instrument board or on the steering column. Figure 2 shows how the control and the mounting bracket must be assembled on the steering column. Figure 3 shows a typical installation of the control on the instrument board. When used in this manner, bolt the "L" bracket to the rear of the control. Drill two holes in the instrument board flange in the desired location and fasten the bracket securely to the instrument board.

Unlock the control unit and turn the volume control knob clockwise half a turn. Seat the volume control shaft end in the proper coupling on the Receiver housing and fasten the shaft casing nut securely. The volume control must be turned counter-clockwise as far as it will go. Then remove the knob and loosen the set screw in the shaft end. Turn the shaft counter-clockwise until the switch in the control head snaps "off." Tighten the set screw and replace the knob.

The tuning control and tone control flexible shafts must be coupled in their respective bushings on the Receiver housing. The knurled casing nuts must be securely tightened. Fig. 1 and Fig. 3 show the locations of the shaft bushings on the Receiver housing.

In case the control unit is mounted on the steering column and the Receiver is installed at the extreme right of the dash, it will be necessary to replace the standard 21" flexible shafts with 28" shafts and extend the "A" lead. A special kit, Part No. 45-1183 can be obtained in exchange for the standard shafts.

CABLE CONNECTIONS—Place the fuse and fuse insulator in the metal fuse housing in the control "A" lead. Couple this to the short Receiver lead and then connect the other "A" lead to the ammeter stud on the rear of the instrument board.

The speaker cable must be connected into the socket on the speaker housing. The antenna lead must be connected in its socket on the end of the Receiver housing. (See Figures 1 and 3).

FLEXIBLE SHAFT ADJUSTMENTS—With the Receiver turned on for operation, tune in a broadcast station of known frequency. Remove the knob and loosen the set screws on the shaft end. Turn the shaft until the control pointer indicates the proper channel (add 0 to the channel number for frequency in kilocycles). Tighten the set screws and replace the knob.

STANDARD SUPPRESSION—The standard spark plug resistors (83-1195) can be installed on the spark plugs of practically all cars. Likewise the distributor resistor (83-1196) can be connected in the high tension center lead to the distributor.

Disconnect the high tension leads to the spark plugs. Cut off the terminal end of the lead and screw the small elbow-type resistor on the lead. The resistor can then be snapped on the terminal of the spark plug. To avoid confusion when the leads cannot be identified easily, install the resistor and make all connections on one lead at a time.

Remove the coil to distributor high tension lead from the distributor head and cut the lead two inches from the end. Screw the resistor to the short end and then screw the resistor into the main lead. Reconnect the terminal end of the lead to the distributor.

In case the spark plugs are not equipped with a suitable terminal, the standard ferrules can be obtained and placed on the plugs. Cars equipped with twin ignition require a spark plug resistor on each plug. Cars equipped with two ignition coils require two distributor resistors.

Two interference condensers are furnished — one must be connected to the generator side of the cut-out, the other to the battery side of the primary of the ignition coil or to the ignition switch. The condenser bracket must be fastened securely to a grounded metal part of the car. The condenser on the generator usually can be fastened to the generator housing under the same screw that holds the cut-out, while the coil condenser can usually be fastened under the coil mounting bolts.

In some cases, it may be necessary to connect an additional condenser to the ammeter or to the dome light lead at the corner post.

There may be some interference caused by an excessive gap between the distributor rotor and the high-tension contacts. This can be overcome by lengthening the contact end of the rotor. Place the metal end of the rotor on a steel block and peen or hammer it with a small machinist's hammer. Dress the end with a file so that it retains its original shape. The rotor should not brush or wipe the contacts, but should just clear them.

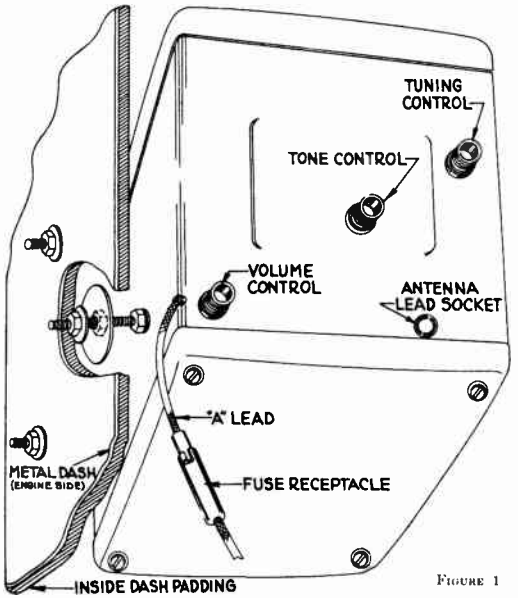


FIGURE 1

OPERATION

To operate the Receiver, the control must first be unlocked. The left-hand knob on the control is a combination switch and volume control. Turn the volume control knob clockwise. The first range of motion operates the Receiver switch; from there on it is the manual volume control.

With the volume control turned on half-way, allow the tubes to heat up. Then turn the right-hand knob (the station selector) to tune in the various programs. The numbers on the dial are channel numbers which, with the addition of "0" to the number correspond to the frequency in kilocycles. Adjust the volume to a suitable level and recheck the tuning. The Receiver must be tuned so that the maximum signal is obtained. Since the Receiver is extremely selective, it is of the utmost importance that the Receiver be tuned right on the station. Careless tuning off to one side even though the signal is still heard, results in very poor tone quality and very mushy reception.

The full range tone control knob is on the control unit. Adjust this control to the tone most pleasing. Speech is clearest when the control is set for "brilliant" — while orchestras will usually sound best when the control is set for a deeper tone.

Another use of the tone control is as a static modifier. When driving through an extremely noisy location, the tone control should be set for mellow or deep. This will subdue the harsh, rasping static.

Except on very weak signals, the automatic volume control maintains the same volume level while driving along without continually manipulating the manual volume control, cuts out external interference, counteracts fading and prevents blasting of local stations while tuning. It is virtually impossible, however, to maintain satisfactory reception while driving under bridges or in places which are totally shielded, known as dead spots.

The Receiver should be turned off by turning the volume control knob counter-clockwise until the switch clicks "off". The control can then be locked with the key.

Adjusting the Philco Superheterodyne Auto Radio Receivers

MODEL 5

The intermediate frequency used is 460 K. C. Set up the signal generator for this frequency.

Disconnect the grid lead from the 6A7 tube. Then connect the test lead to the grid of this tube and ground the shield on the Receiver housing. Use the fibre adjusting wrench for all adjustments.

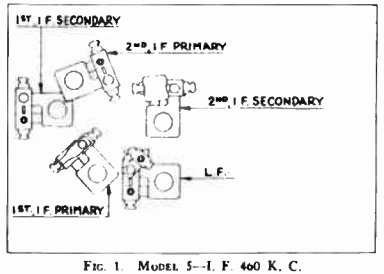


FIG. 1. MODEL 5—I. F. 460 K. C.

Padder "LF" Turn the adjusting nut in until tight. Then back off one full turn. Leave this condenser in this position until the last step.

Now adjust the first I. F. primary condenser. With the Receiver and signal generator turned on and the signal generator set for 460 K. C., turn the Receiver volume control on full and adjust the attenuator. Then adjust the padder for maximum reading on the output meter.

Next adjust the first I. F. secondary condenser. Adjust the attenuator so that a half scale reading is obtained. This should be repeated with each adjustment if necessary. Adjust the padder for maximum reading. Repeat this procedure in the next two adjustments.

The next adjustment in order is the second I. F. primary condenser. This is then followed by the second I. F. secondary condenser. These are indicated on the illustration. (Fig. 1.)

Remove the signal generator connections from the 6A7 tube and reconnect the Receiver grid lead to this tube. The signal generator setting must now be changed to 1500 K. C.

The Receiver volume control must be turned on full, the oscillator lead connected to the antenna lead-in and the shield to the Receiver housing. To obtain the correct setting of the tuning condenser, open the plates as wide as possible. Place a piece of paper on the stator plates and then turn the rotor out until it strikes the paper.

Oscillator Adjustment. This is the padder on the second section of the tuning condenser (section nearest drive mechanism). Adjust for maximum reading.

Antenna Adjustment. This is the remaining padder on the tuning condenser. Remove the paper from the tuning condenser and set the condenser and signal generator for 1400 K. C. Adjust the padder for maximum reading.

Low Frequency Adjustment. Set the signal generator for 600 K. C. and tune the Receiver to this frequency. Adjust the padder for maximum reading. After completing these operations, readjust the antenna padder at 1400 K. C.

MODELS 6, 9 AND 12 (CODE 122)

I. F. Stages. Remove the grid clip from the detector-oscillator tube and connect the output of the signal generator to the control grid. The detector-oscillator is the second tube from the right.

With the Receiver and signal generator turned "on," set the signal generator for 260 K. C. and adjust the attenuator so that a half-scale reading is obtained on the output meter, with the Receiver volume control turned on full.

Using a Philco fibre wrench, adjust the second I. F. condenser. The correct adjustment is obtained when the maximum reading is secured on the meter.

Next adjust the secondary and primary I. F. condensers. These are the right-hand ones on Fig. 2.

Disconnect the signal generator and reconnect the clip to the control grid.

High Frequency Adjustments. Connect the output of the signal generator to the antenna lead and the housing of the Receiver. With the Receiver turned on and the signal generator set for 1400 K. C., tune the Receiver to 1400 K. C. and adjust the third padder on the tuning condenser for maximum signal. This is the one on the extreme left of the housing. The purpose of this adjustment is to line up the condenser so that 1400 K. C. is tuned in at 140 on the scale when the scale is set properly.

It may be necessary to adjust the first two compensators on the tuning condenser at 1400 K. C. in order to get a strong enough signal through.

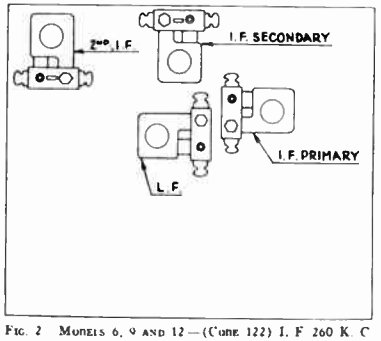


FIG. 2. MODELS 6, 9 AND 12—(CODE 122) I. F. 260 K. C.

R. F. Adjustments. After the detector-oscillator has been padded at 1400 K. C. adjust the first and second R. F. Condensers on tuning condensers at 1400 K. C.

Low Frequency Adjustment. Now tune the Receiver and signal generator to 700 K. C., and adjust the condenser (LF) on Fig. 2. During this operation the tuning condenser must be shifted and the compensator must be adjusted to bring in the maximum signal.

After this has been done, check the adjustment of the high-frequency condenser at 1400 K. C. again.

MODELS 7, 8 AND 12 (CODE 121)

Intermediate Frequency or I. F. Stages. Remove the grid clip from the detector-oscillator tube and connect the output of the signal generator to the control grid. The detector-oscillator is the second tube from the right.

With the Receiver and signal generator turned "on," set the signal generator for 175 K. C. Adjust the attenuator so that a half-scale reading on the output meter is obtained with the Receiver volume control turned on full.

Using a Philco fibre wrench, adjust the second I. F. condenser. This is the one in the upper left-hand corner of Fig. 3.

The correct adjustment is obtained when the maximum reading is secured on the meter.

Next adjust the secondary and primary I. F. condensers. These are the two shown at right on Figs. 3 and 4.

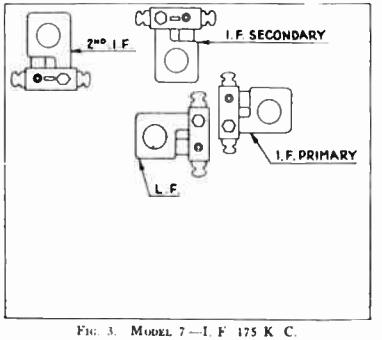


FIG. 3. MODEL 7—I. F. 175 K. C.

Disconnect the signal generator lead and reconnect the clip to the control grid.

High Frequency Compensator. Connect the output of the signal generator to the antenna lead and the housing of the Receiver. With the Receiver turned on and the signal generator set for 1400 K. C., tune the Receiver to 1400 K. C. and adjust the third padder on the tuning condenser for maximum signal. This is the one on the extreme left of the housing. The purpose of this adjustment is to line up the condenser so that 1400 K. C. is tuned in at 140 on the scale when the scale is set properly.

It may be necessary to adjust the first two compensators on the tuning condensers at 1400 K. C. in order to get a strong enough signal through.

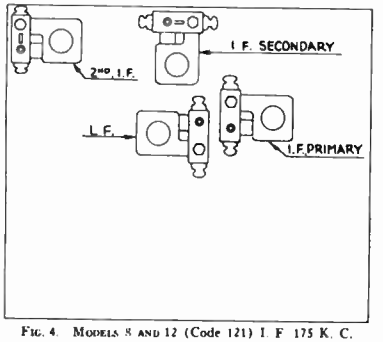


FIG. 4. MODELS 8 AND 12 (Code 121) I. F. 175 K. C.

R. F. Compensators. After the detector-oscillator has been padded at 1400 K. C., adjust the first and second R. F. Condensers on tuning condenser at 1400 K. C.

Low Frequency Condenser. Set the signal generator to 700 K. C. Now tune the Receiver sharply. Adjust the L. F. condenser shown near the center of Figs. 3 and 4. During this operation the tuning condenser must be shifted and the compensators must be adjusted to bring in the maximum signal.

After this has been done, check the adjustment of the high-frequency condenser at 1400 K. C. again.

MODEL 10

I. F. A new style I. F. transformer complete with adjusting condensers is used in the Model 10.

The condensers are placed in the top of the shield can, one above the other.

The primary I. F. condenser is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube. (For location see Fig. 5.)

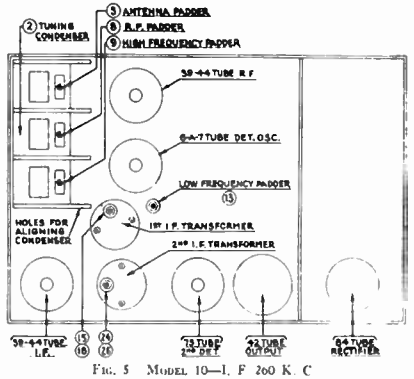


FIG. 5 MODEL 10—I. F. 260 K. C.

Set up the signal generator and adjust it to exactly 260 K. C. Connect signal generator lead to the grid cap of the 6A7 tube (See Fig. 5.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half scale reading of the output meter.

The condensers 24 and 26 are adjusted first (Fig. 5). Turn the adjusting screw all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers 15 and 18.

After adjusting the first I. F. stage, remove signal generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set signal generator to 150 K. C. and then connect signal generator lead to the antenna lead.

H. F. There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 5.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency condenser until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

R. F. and Ant. Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. Adjust R. F. condenser and the antenna condenser for maximum reading on the output meter.

L. F. Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency condenser for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

PHILCO RADIO & TELEVISION CORP.

MODEL Transitone
Vibrator data
Steering Column

HOW OLD IS A VIBRATOR?

THIS question often comes up. Nobody can afford to give Vibrators away free indefinitely. There must come a time when the customer is no longer entitled to a free Vibrator replacement.

The Vibrator, like all other radio parts, is covered by our Standard Warranty, which, interpreted liberally, means that the warranty is in force for a period of ninety days from the date of the original sale and installation.

Installation records should furnish this information, but in the absence of these records, the code date of manufacture stamped on the top of the Vibrator can be used. Under average conditions the warranty period expires four months after the date of manufacture. This allows thirty days for distribution and consummation of the retail sale, and then ninety days from the sale date.

The code number is built up by using the last number of the year as the first digit—(3 for 1933, 4 for 1934). The remainder of the code number is the number of the day in the year. For example, January 28, 1933, is 328. The following list shows the code numbers for the first of each month in 1933:

Date	*Code Number*
January 1, 1933	31
February 1, 1933	332
March 1, 1933	360
April 1, 1933	391
May 1, 1933	3121
June 1, 1933	3152
July 1, 1933	3182
August 1, 1933	3213
September 1, 1933	3244
October 1, 1933	3274
November 1, 1933	3305
December 1, 1933	3335

CAR BATTERY CONNECTIONS

THE following list shows the polarity of the ground connection in American automobiles and will prove useful in service work:

(A—) GROUNDED

Buick	Durant	Pontiac
Chevrolet	Essex	Reo
DeVaux	Hudson	Stutz
Dusenburg	Nash	Willys
	Oldsmobile	

(A+) GROUNDED

Auburn	Franklin	Packard
Cadillac	Graham	Peerless
Chrysler	Hupmobile	Pierce Arrow
Cord	LaSalle	Plymouth
DeSoto	Lincoln	Rockne
Dodge	Marmon	Studebaker
Ford	*Nash	

*(Twin Ignition)

STEERING COLUMN CONTROL HOUSINGS

THERE are 50 or more control assemblies for Philco automobile radio, many of which you probably will never be called upon to service. It is important, however, that you have a complete record of the controls—what they are used for and the important parts that enter into the construction of the various controls.

Since there is little wear to the parts that go to make up the control, your replacement parts stock for servicing controls can be limited chiefly to dials, knobs, keys, locks, pilot lamps and the hardware necessary for mounting a control on a steering column. A spare control unit for the current model Receivers should also be stocked for quick replacement.

There are two basic type controls. The type used the most has direct drive and is shown in Fig. 3. The control knobs fasten on to the control ends of the flexible shafts. The control shown in Fig. 4 uses a gear type drive for the volume control shaft. In this type control, the knobs fasten on to short shafts or stubs in the control head and the shafts are coupled to these stubs. The volume control is connected through a gear train, while the tuning control shaft is coupled direct.

The early controls of this type had smaller openings in the rear for coupling the shaft casings, since the casings were straight ended (without the usual swelled or bell end.) These holes were enlarged later on to take the large bell end casing, as shown in Fig. 4., but the same part number was retained for the control housing. When ordering a control housing of the gear type and the one with the small casing holes is required, be sure to note this on the order.

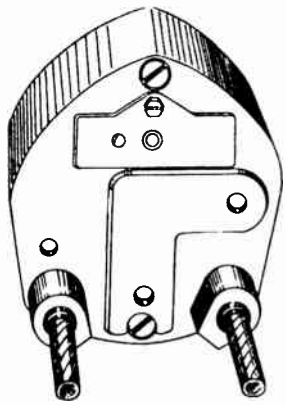


FIG. 3

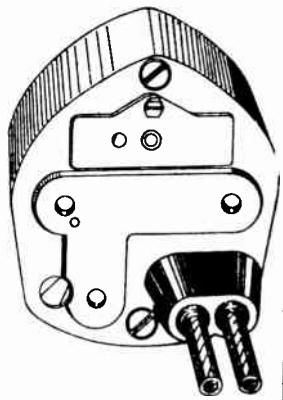


FIG. 4

DIRECT DRIVE CONTROLS—(See Fig. 3)

Control Assembly No. 42-5006	Consists of
Control Housing Only 6029	
Lock Retainer 6031	Lock Retainer Assembly No. 42-5006
Lock Plate 6039	
Lock Spring (coil) 6111	
Washer W-442	
Screw W-145	
Screw (shaft end retaining) 6042	
Set Screw (shaft casing) W-481	
Screw (lock assembly mounting) W-523	

Continued on next page

MODEL Transitone
Drive controls

PHILCO RADIO & TELEVISION CORP.

This assembly has no shafts, lock, dial, pilot lamp, front plate, etc. It is the basic control assembly that can be used for Models 5, 6, 7, 8, 9, 10 and 12 controls and can be used with P, R, W, X and Y type shafts.

GEAR DRIVE CONTROLS—(See Fig. 4)

Control Housing Assembly No. 42-5027 Consists of

Control Housing Only	28-7011	No. 42-5026
Shaft Retaining Screws	6042	
Set Screws	W-481	
Lock Retainer	29-7006	No. 42-5024
Lock Plate	29-1442	
Lock Spring	28-1403	
Stud	28-6048	
Tuning Control Shaft (with set screw)	42-5016	
Volume Control Shaft Driven (with set screws)	42-5017	
Volume Control Shaft Driver	28-7009	
Intermediate Gear	28-7010	
Intermediate Gear Sleeve	28-6075	
Intermediate Gear Spring Washer	28-1456	
Intermediate Gear Mounting Screw	W-849	
Lock Retaining Mounting Screw	W-833	

This assembly has no external shafts, lock, dial, pilot lamp, front plate, etc. It is the basic control assembly that is used for Models 5, 6, 9 and 12 gear type controls and can be used with T, U and V type shafts.

The pilot lamp bracket assembly 38-5091 is fastened to the above control assemblies with a W-745 mounting screw.

The standard cover plate, which is used alike on both the direct and gear drive controls, is part No. 6030. The screws for fastening the cover plate to the controls are W-611B.

Special cover plates used with the various car manufacturer special Receivers can only be purchased through the car manufacturer organizations.

The standard knobs are 03334 for the tuning control shaft and 06886 for the volume control shaft.

The dials used in the various steering column controls are:

Model	*Part No.*
7 and 8	6043
6 and 9	8255
B6 and B9	8257
5	27-5006
10	27-5022
12 (121)	6043
12 (122)	8255

The lock used in the direct drive control is 6036. The lock in the gear drive control is 28-8014. These are not interchangeable.

The dial which fits over the dial hub is firmly held in place by means of a spring spider, 6644. The same spider is used in both type controls.

The various types of flexible shafts are shown in the October issue of "Service Broadcast."

The controls for the various models are assembled by using the basic control and adding the following parts:

Pilot Lamp Bracket and Mounting Screw
Dial with Spider
Lock
Cover Plate with Screws
Flexible Shafts
Knobs

A partial list of the direct drive controls in common use is given below:

Receiver Model	Control Part No.	Flex. Shaft Part No.	Shaft Type	Special Note
7-8-12	04343	6128	Z	Also early 6-9.
		6129	Z	
B6-B9	06262	7739	Z	Early B6-B9.
		7740	Z	
B6-9	06918	7739	Z	
		7740	Z	
6-9	06941	6128	Z	
		6129	Z	
B6	42-5003	7739	Z	Without cover or knobs. These furnished by car manufacturer.
		7740	Z	
S6-S9	42-5004	6351	Z	With special 7887 cover plate.
		6352	Z	
5	42-5008	28-8006	R	
		28-8007	R	
P5	42-5010	28-8006	R	
		28-8007	R	
5 Chrysler	42-5011	28-8006	R	Without cover or knobs. These furnished by car manufacturer.
		28-8007	R	
B6	42-5052	28-8064	W	Without cover or knobs. These furnished by car manufacturer.
		28-8065	W	
5 Studebaker	42-5057	28-8113	Y	With special 7887 cover plate.
		28-8114	Y	
Auburn 5	42-5058	28-8113	Y	With special 28-7013 cover plate.
		28-8114	Y	
Nash 5	42-5059	28-8113	Y	With special 28-7015 cover plate.
		28-8114	Y	
Hupp 5	42-5060	28-8113	Y	With special 28-7014 cover plate.
		28-8114	Y	
6-9-12 Chrysler	42-5063	28-8099	X	Without cover or knobs. These furnished by car manufacturer.
		28-8102	X	
6-9-12 Studebaker	42-5064	28-8100	X	With special 7887 cover plate.
		28-8103	X	
6-9-12 Hupp	42-5065	28-8133	Y	With special 28-7014 cover plate.
		28-8134	Y	
6-9-12 Auburn	42-5066	28-8129	Y	With special 28-7013 cover plate.
		28-8130	Y	
6-9-12 Nash	42-5067	28-8129	Y	With special 28-7015 cover plate.
		28-8130	Y	
B6-9	42-5068	28-8098	Y	Without cover or knobs. These furnished by car manufacturer.
		28-8101	Y	
5 Chrysler	42-5069	28-8113	Y	Without cover or knobs. These furnished by car manufacturer.
		28-8114	Y	
5 Packard	42-5070	28-8137	Y	
		28-8138	Y	
9F Studebaker	42-5075	28-8129	Y	With special 7887 cover plate.
		28-8130	Y	
B6-B9	42-5076	28-8135	Y	Without cover or knobs. These furnished by car manufacturer.
		28-8136	Y	
10	42-5077	28-8139	P	
		28-8141	P	
6-9-12	42-5079	28-8099	X	
		28-8102	X	
B6	42-5080	28-8098	X	Furnished with couplings on end of shafts for connecting to Receiver volume and tuning control shafts.
		28-8101	X	
6-9	42-5081	28-8099	X	Furnished with couplings on end of shafts for connecting to Receiver volume and tuning control shafts.
		28-8102	X	
5 Hupp	42-5083	28-8155	Y	With special 28-7014 cover plate.
		28-8156	Y	
PAS-PBS	42-5084	28-8099	X	With special 7765 cover plate.
		28-8102	X	
5	42-5085	28-8113	Y	
		28-8114	Y	
6-9	42-5086	28-8129	Y	
		28-8130	Y	
SCS-SDS	42-5087	28-8139	P	With special 7887 cover plate.
		28-8141	P	
9 Studebaker	42-5089	28-8099	X	With special 7887 cover plate.
		28-8102	X	
CDS	42-5090	28-8139	P	Without cover or knobs. These furnished by car manufacturer.
		28-8141	P	
9 Hupp	42-5091	28-8109	X	With special 28-7014 cover plate.
		28-8110	X	
HDS	42-5094	28-8157	P	With special 28-7014 cover plate.
		28-5158	P	
NCS-NDS	42-5096	28-8139	P	With special 28-7015 cover plate.
		28-8141	P	
10X	42-5103	28-8186	P	No lock.
		28-8187	P	

Gear Drive Controls (using basic control 42-5027)

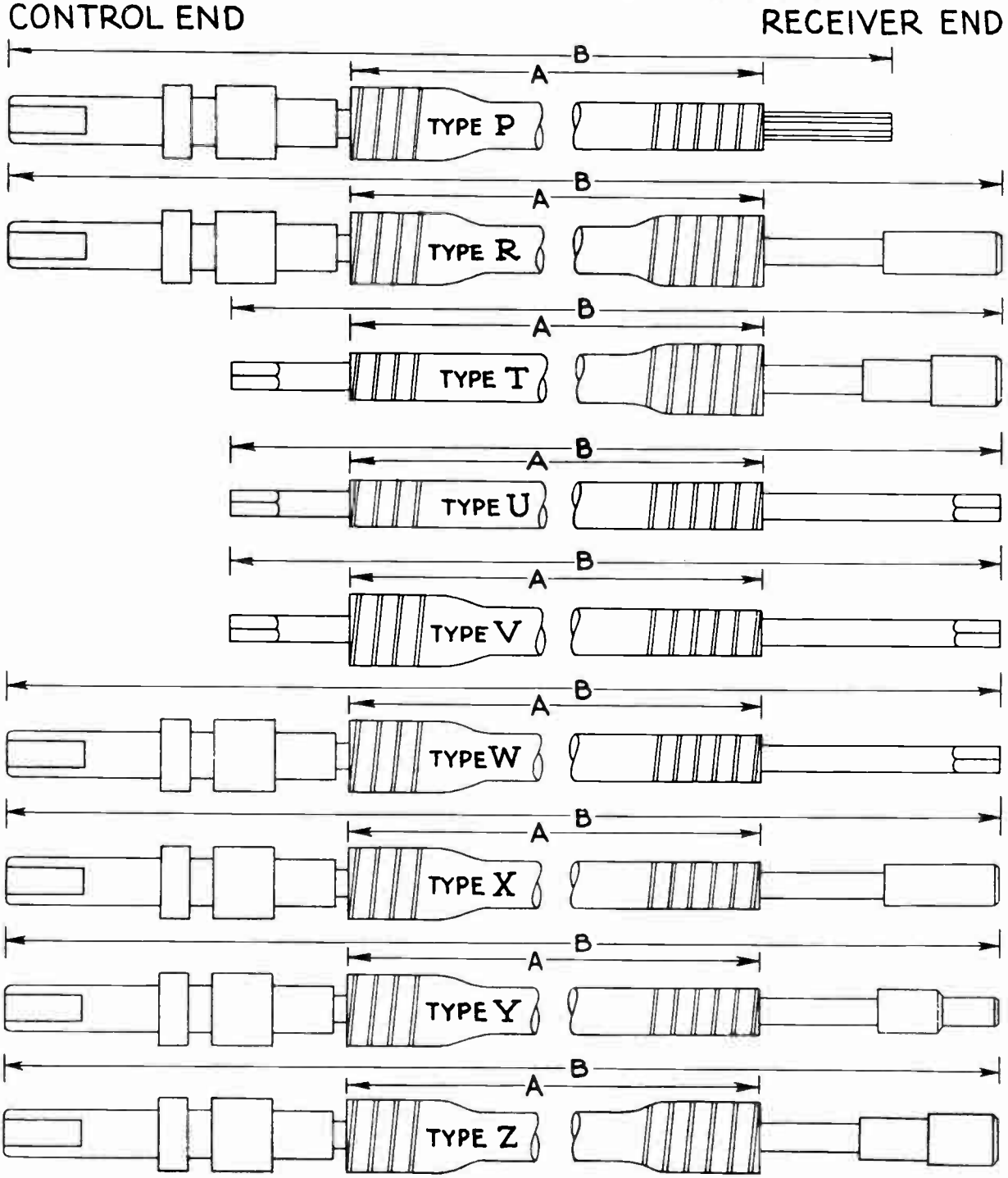
Receiver Model	Control Part No.	
5	42-5012	Without cover or knobs. These furnished by car manufacturer.
B6	42-5014	
6-9-12	42-5015	With special 7765 cover plate.
P5	42-5021	

NOTE—Shafts are shipped separately.

PHILCO RADIO & TELEVISION CORP.

MODEL Transitone
Drive controls

FLEXIBLE CONTROL SHAFTS—MODELS 5, 6, 7, 8, 9, 10, 12



MODEL Transitone
Control shafts

PHILCO RADIO & TELEVISION CORP.

FLEXIBLE CONTROL SHAFT GUIDE LIST

Type	TUNING CONTROL Dimension A	B	Part No.	VOLUME CONTROL Dimension A	B	Part No.	Used With Model
P	12″	14⅝″	28-8161	12″	14⅝″	28-8162	10
	18″	20⅝″	28-6163	18″	20⅝″	28-8164	10
	19″	21⅝″	28-8157	19″	21⅝″	28-8158	10
	28″	30⅝″	28-8139	28″	30⅝″	28-8141	10
R	12″	14⅝″	28-8010	12″	17⅛″	28-8011	5
	18″	20⅝″	28-8012	18″	23⅛″	28-8013	5
	24″	26⅝″	28-8022	24″	29⅛″	28-8023	5
	32″	34⅝″	28-8006	32″	37⅛″	28-8007	5
	84″	86⅝″	28-8020	84″	89⅛″	28-8021	5
T	18″	—	28-8054	18″	—	28-8054	6-9
	—	20⅛″	38-5218	—	20⅛″	38-5218	
	24″	—	28-8052	24″	—	28-8052	5
	—	25⅝″	38-5210	—	27⅞″	38-5211	
	28″	—	28-8036	28″	—	28-8036	5
	—	29⅝″	38-5159	—	31⅞″	38-5160	
	32″	—	28-8038	32″	—	28-8038	6-9
	—	34⅛″	38-5170	—	34⅛″	38-5170	
	120″	—	28-8043	120″	—	28-8043	B6-9
	—	121⅝″	38-5184	—	121⅝″	38-5184	
U	18″	—	28-8055	18″	—	28-8055	6-9
	—	20⅛″	28-8081	—	20⅛″	28-8081	
	24″	—	28-8053	24″	—	28-8053	P5
	—	25⅞″	28-8077	—	27¾″	28-8079	
	28″	—	28-8037	28″	—	28-8037	5
	—	29⅞″	28-8073	—	31¾″	28-8075	
	32″	—	28-8039	32″	—	28-8039	6-9
	—	34⅛″	28-8083	—	34⅛″	28-8083	
	120″	—	28-8045	120″	—	28-8045	B6-9
	—	121⅞″	28-8085	—	121⅞″	28-8085	
V	10″	—	28-8072	10″	—	28-8072	P9
	—	12⅛″	28-8087	—	12⅛″	28-8087	
	18″	—	28-8054	18″	—	28-8054	S6
	—	20⅛″	28-8081	—	20⅛″	28-8081	
	24″	—	28-8052	24″	—	28-8052	P5
	—	25⅞″	28-8077	—	27¾″	28-8079	
	28″	—	28-8036	28″	—	28-8036	5
	—	29⅞″	28-8073	—	31¾″	28-8075	
	32″	—	28-8038	32″	—	28-8038	6-9
	—	39⅛″	28-8083	—	34⅛″	28-8083	
	120″	—	28-8043	120″	—	28-8043	B6-9
	—	121⅞″	28-8085	—	121⅞″	28-8085	

Type	TUNING CONTROL Dimension A	B	Part No.	VOLUME CONTROL Dimension A	B	Part No.	Used With Model
W	10″	14″	28-8091	10″	14″	28-8094	PA
	18″	22″	28-8090	18″	22″	28-8093	S6
	24″	26⅝″	28-8089	24″	28⅛″	28-8092	P5
	28″	30⅝″	28-8062	28″	32⅛″	28-8063	5
	32″	36″	28-8068	32″	36″	28-8069	6-9
	120″	122¾″	28-8064	120″	122¾″	28-8065	B6-9
X	10″	14″	28-8100	10″	14″	28-8103	PA
	28″	30⅝″	28-8106	28″	32⅛″	28-8107	5
	32″	36″	28-8099	32″	36″	28-8102	6-9
	120″	122¾″	28-8098	120″	122¾″	28-8101	B6-9
Y	10″	14″	28-8131	10″	14″	28-8132	PA
	18″	22″	28-8133	18″	22″	28-8134	S6-9
	19″	21⅝″	28-8155	19″	23⅛″	28-8156	H5
	24″	26⅝″	28-8137	24″	28⅛″	28-8138	P5
	28″	30⅝″	28-8113	28″	32⅛″	28-8114	C5
	32″	34⅝″	28-8127	32″	36⅛″	28-8128	5
	32″	36″	28-8129	32″	36″	28-8130	6-9
	120″	122¾″	28-8135	120″	122¾″	28-8136	B6-9
Z	8″	11⅜″	6617	8″	11⅜″	6616	6-7-8-9-12
	11″	14⅜″	28-8003	11″	14⅜″	28-8004	6-7-8-9-12
	18″	21⅜″	6352	18″	21⅜″	6351	6-7-8-9-12
	32″	35⅜″	6128	32″	35⅜″	6129	6-7-8-9-12
	48″	51⅜″	6298	48″	51⅜″	6299	6-7-8-9-12
	—	—	—	48″	50⅜″	8289	3PX
	72″	75⅜″	7289	72″	75⅜″	7290	6-7-8-9-12
	84″	87⅜″	7443	84″	87⅜″	7444	6-7-8-9-12
	120″	123⅜″	6356	120″	123⅜″	6355	6-7-8-9-12
	—	—	—	120″	122⅜″	8293	3PX
	120″	122⅞″	7739	120″	122⅞″	7740	B6-9
	132″	135⅜″	7071	132″	135⅜″	7072	6-7-8-9-12
	144″	147⅜″	8201	144″	147⅜″	8292	6-7-8-9-12
	186″	189⅜″	28-8024	186″	189⅜″	28-8025	6-7-8-9-12

C—Chrysler H—Hupmobile P—Packard S—Studebaker
B6—B9—Special Chrysler PA—Special Packard

FLEXIBLE CONTROL SHAFTS

THE different types of flexible control shafts are pictured on the front page. They all differ in construction from each other, although some are interchangeable. Consulting the front page to identify the type of shaft and then using the guide list will enable anyone to pick the proper part number for the shafts, and *vice versa*.

Types P, R, W, X, Y and Z are used only with the so-termed "old style" control heads where the knobs fasten onto the ends of the shafts which protrude through the control head. Types T, U and V are used with the so-termed "new style" control head, in which both shafts are terminated side by side and the volume control shaft is actuated through a gear train.

Types T, U, V and W have one or more square swedged ends. Type P has an octagon swedging on the Receiver end.

The part numbers given for the T, U and V type shafts are the "A" or casing numbers and the "B" or shaft numbers. All other numbers given are for the completely assembled parts.

The A dimensions are the casing lengths, the B dimensions are the overall lengths. When referring to a particular length shaft as given in our parts lists, the casing dimension is always used. For instance, the standard 28-inch shaft for the Model 10 is actually 30⅝ inches long overall, but the casing which really represents the distance from the control to the Receiver is only 28 inches long.

Tuning control and volume control shafts can easily be identified in all but the T, U and V types by the difference in the stubs at the control end of the shaft. All Model 5 volume control shafts are longer than the tuning control shafts.

There are three different brass tips in use on the shafts. They can be identified by referring to the cuts on the front page.

OCTOBER, 1933

PHILCO RADIO & TELEV. CORP.

MODEL R
Schematic
Parts List

FIGURE 9

FIGURE 10

1	Antenna Transformer	32–1331
2	Tuning Condenser	31–1164
3	1st Padder (on tun. cond.)	
4	Resistor (70,000 ohms)	33–1115
5	Condenser (.03 mfd.)	30–4025
6	Condenser (.05 mfd.)	30–4020
7	Resistor (1500 ohms)	33–3047
8	R. F. Transformer	32–1332
9	2nd Padder (on tun. cond.)	
10	Resistor (10,000 ohms)	33–1000
11	Condenser (.0007 mfd.)	5863
12	Padder (Pri. 1st I. F. Tran.)	
13	Oscillator Transformer	32–1332
14	3rd Padder (on tun. cond.)	
15	1st I. F. Transformer	32–1329
16	Padder (Sec. 1st I. F. Tran.	
17	Condenser (.03 mfd.)	30–4025
18	Resistor (700 ohms)	6443
19	Condenser (.05 mfd.)	30–4020
20	Resistor (1,000,000 ohms)	33–1096
21	Condenser (.05 mfd.)	30–4020
22	Padders (Prim. 2nd I. F.)	
23	2nd I. F. Transformer	32–1237
24	Padder (Sec. I. F. Tran.)	
25	Cond. (.00011–.00025 mfd.)	30–1020
26	Resistor (25,000 ohms)	33–1013
27	Vol. Con. & Switch Assm.	33–5058
28	Condenser (.006 mfd.)	30–4125
29	Resistor (2,000,000 ohms)	33–1025
30	Resistor (5000 ohms)	6096
31	Condenser (.25 mfd.)	30–4146
32	Resistor (51,000 ohms)	5868
33	Condenser (.00025 mfd.)	3082
34	Condenser (.25 mfd.)	04380
35	Resistor (100,000 ohms)	6099
36	Resistor (500,000 ohms)	6097
37	Condenser (.006 mfd.)	30–4125
38	Condenser (10 mfd.)	7440
39	Resistor (500 ohms)	33–3031
40	Condenser (.006 mfd.)	30–4024
41	Output Transformer	32–7214
42	Cone & Voice Coil	02861
43	Field Coil Assembly	36–3097
44	Pilot Light	6608
45	Resistor (7 ohms)	33–3035
46	"A" Choke	32–1268
47	Condenser (.5 mfd.)	30–4047
48	Vibrator Choke	32–1235
49	Condenser (.5 mfd.)	30–4147
50	Vibrator Unit	38–5036
51	Condenser (.05 mfd.)	30–4039
52	Resistor (200 ohms)	7217
53	Resistor (200 ohms)	7217
54	Condenser (.00125 mfd.)	5886
55	Power Transformer	32–7216
56	Condenser (.01 mfd.)	30–4051
57	Condenser (4.—8. mfd.)	30–2072
58	"B" Choke	32–7215
59	R F Choke	32–1281
60	Resistor (30,000 ohms)	7836
61	Resistor (32,000 ohms)	3525

Spark Plug Resistor	33–1015
Distributor Resistor	33–1113E
Screw Type Resistor	4851
Interference Cond. (½ mfd.)	30–4007
Interference Cond. (1 mfd.)	4522
Face Assembly	42–5176
Glass for Control	27–7325
Pointer	28–1991
Control Assembly	42–5174
Knobs	27–4058
Knob Spring	28–1738
Bezel Assembly	42–5115
Battery Cable	38–5704
Stud	28–6036
Nut	W55
4-prong Socket	27–6006
5-prong Socket	27–6014
6-prong Socket	6417
Antenna Lead	38–5703
Fuse	7227
Fuse Insulator	27–7131
Shafts	28–8234

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Installation Instructions - Standard Model - Part No. 628808

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Standard Custom-Built Model R Radio, by Philco. Read thoroughly, then follow the instructions carefully in every detail.

Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and compare them with illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

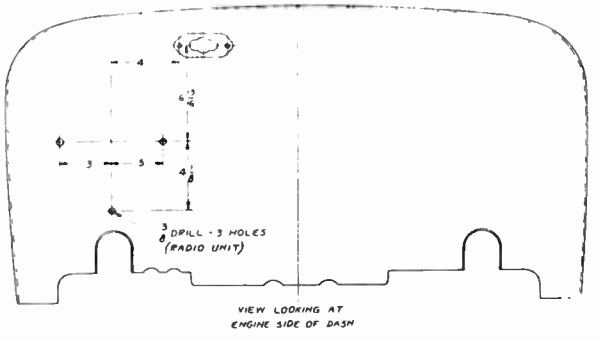


FIGURE 1

Receiver Location

Refer to Figure 1, which gives detailed dimensions for the location and drilling of the holes in the dash. All dimensions are shown from the engine side of the dash. Remove the paint from the dash for 3/4" around the holes to insure good ground contact. After drilling the holes, install the three mounting studs in the back of the Receiver so that when the Receiver is mounted in the car, the control cables will come out toward the center and the speaker will face toward the toe boards. Before installing, the three spacing nuts should be put on the mounting studs, so that there will be 3/4" spacing between the Receiver and the dash lining (See Figure 2 and 3).

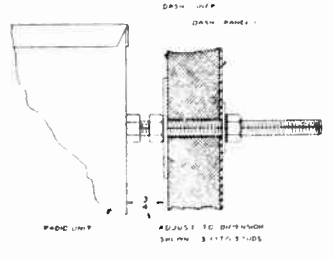


FIGURE 2

Antenna Lead

Splice the shielded Receiver antenna lead to the car lead-in as close as possible to windshield pillar post, cutting off all excessive lead-in. Tape this connection securely. All unshielded lead must be pushed back up the windshield pillar. The shielding pigtail must be grounded to the body cowl panel as close as possible to the "A" pillar. Drill a 1/8" hole where the hood overlaps and use the 8-32 bolt, washers, and nuts supplied for this purpose. Remove the paint from around the hole, to secure a good ground connection. (See Figure 1)

Ammeter Lead

Place the fuse and fuse insulator in the metal fuse holder and connect it to the black and white wire coming from the back of the Receiver. Determine the correct length for connection to the ammeter output terminal, cut the wire and strip the insulation, then solder on the eye terminal and connect it to the ammeter output terminal.

Instrument Panel Control

Remove the ash receiver from the panel with an upward pull

Remove the ash receiver bezel from the panel by compressing the retaining tabs at the bottom of the bezel assembly. This can be done best by using a screwdriver and working from in back of the instrument panel. While pushing up on an end tab, pull the bezel forward and it will come out.

Loosen the two (2) screws which secure the instrument board brace to the instrument board flange. The cradle assembly can be slid forward then. Next, loosen the bolts on the brace in back of the instrument panel and remove the toggle spring. Slide the entire assembly forward and remove. Figure 5 gives the details of the ash receiver assembly while Figure 6 gives an enlarged view of the section A in Figure 5. Be sure to tighten all bolts and screws that were loosened for this operation.

Loosen the car lighting switch to permit more working space. While this operation is not absolutely necessary, it makes the following operation easier.

Push the flexible shafts of the control through the opening in the panel and install the control unit in this opening.

The "U" retaining clamp must be placed over the studs on the back of the control and the hex-nuts tightened to draw the control bezel flush with the instrument panel. (See Figure 7). Replace and tighten the car lighting switch.

The knob on the left of the control is the switch and volume control. Its cable should be installed in the flexible cable coupling bushing on the Receiver nearest the dash. The right-hand knob is the tuning control. The flexible cable from this point should be installed in the other control coupling bushing

The set screws on the coupling bushings must be loosened sufficiently to allow the shaft housings and couplings to be properly seated. After the shafts have been coupled, tighten the set screws again. The dial light connector should now be pushed into its receptacle on the speaker panel.

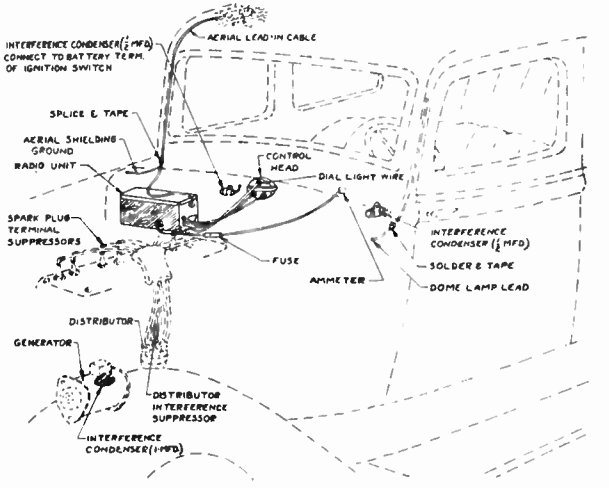


FIGURE 3

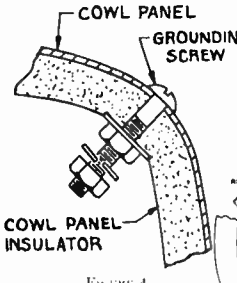


FIGURE 4

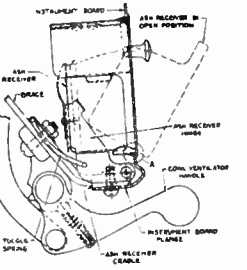


FIGURE 5

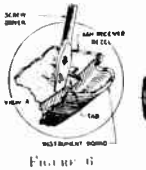


FIGURE 6

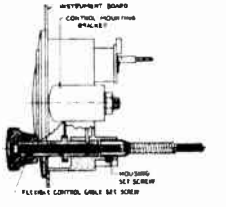


FIGURE 7

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers.) Pull the knob from the right-hand control shaft and loosen the set screw found there. See Figure 7. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob.

RCA MFG. CO., INC.

MODEL M-101
Schematic
Transformer Data

IF PEAK 175 KC.

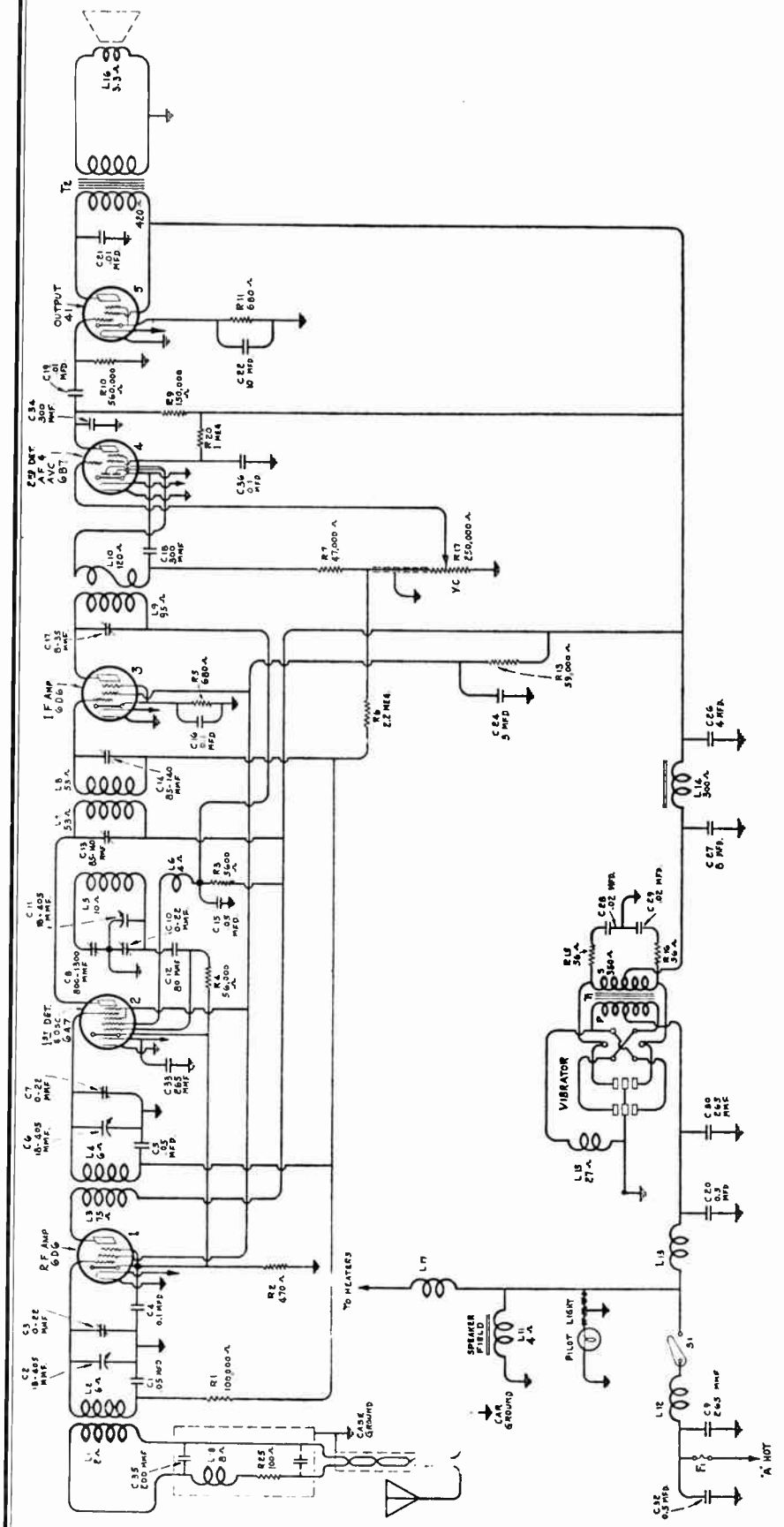
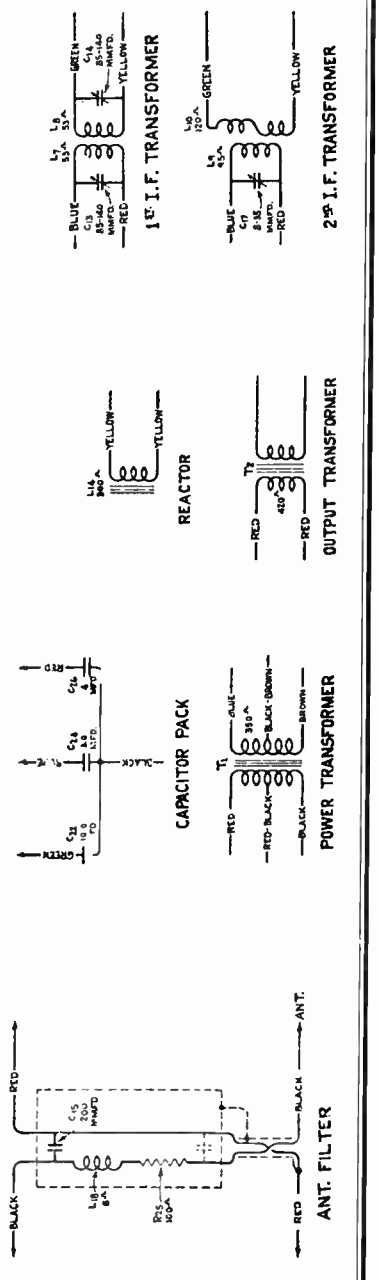


Figure 2—Schematic Circuit Diagram



LINE-UP ADJUSTMENTS

As in all standard receivers, this instrument must be in correct electrical alignment in order to obtain maximum efficiency and best quality of performance. The circuits should be re-aligned after each major servicing or repair operation, and whenever there are positive indications that the adjustments have deviated from normal by ordinary usage. These indications will be present together and will have the nature of low sensitivity, poor tone quality, and irregular double-peaked tuning.

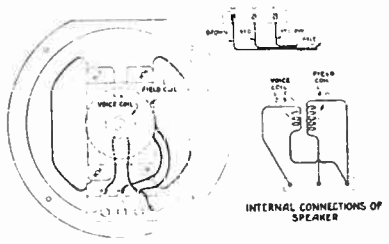


Figure 1—Loudspeaker Wiring

The important requirements in re-adjusting the line-up trimmers are the use of proper oscillator and indication equipment and adherence to a definite procedure.

(1) PREPARATORY DETAILS

(a) Dial Calibration—The tuning-condenser flexible shaft operates the dial pointer through a gear mechanism within the control unit. To adjust their mechanical relations so that accurate scale calibration obtains:—Rotate the station selector knob until the variable tuning capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the last radial line at the low frequency end of the scale. (The line referred to is the second one counter-clockwise of the 550 kc. mark.)

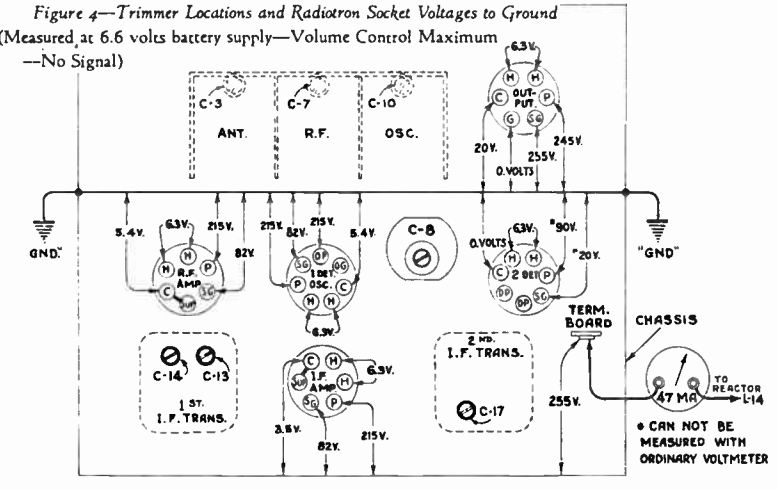
(b) General Procedure—The "Output Indicator" should be attached to the voice coil circuit of the loudspeaker, and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control set at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

(2) I. F. ADJUSTMENTS

Three trimmers are provided in the i-f system, two on the first transformer and one on the second transformer. The locations of the adjustment screws are shown in Figure 4.

(a) Tune the "Full Range Oscillator" to 175 kc. and connect its output to the first detector control grid and chassis ground. Tune the station selector to a point where no signals are received.

Figure 4—Trimmer Locations and Radiotron Socket Voltages to Ground
(Measured at 6.6 volts battery supply—Volume Control Maximum —No Signal)



(b) Tune each of the trimmer capacitors, C17, C14 and C13, in order. C17 should be set for maximum (peak) output. C14 and C13 should be roughly adjusted for maximum output and then carefully "trimmed" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of 175 kc. and noting whether or not the receiver output remains substantially constant.

(3) R. F. DETECTOR AND OSCILLATOR ADJUSTMENTS

Three high-frequency adjusting capacitors are provided for alignment at 1400 kc., and one trimmer is used for the low frequency line-up at 600 kc. The "Full Range Oscillator" should be connected to the antenna-ground input at the outer end of the lead-in shield through a 300-ohm series resistance in the antenna side.

(a) Tune the external oscillator to a frequency of 1400 kc. and turn the station selector knob until the dial pointer is at the 1400 kc. scale marking.

(b) Adjust the oscillator trimmer, C10; the detector trimmer, C7; and the r-f trimmer, C3, for maximum (peak) receiver output.

(c) Set the external oscillator to a frequency of 600 kc. and rotate the station selector until this signal is accurately tuned on the receiver. Adjust the oscillator trimmer C8, simultaneously rocking the tuning condenser slowly through the signal until the maximum obtainable output results from the two combined operations. This adjustment should be made irrespective of dial calibration.

(d) Recheck the adjustment of the 1400 kc. oscillator trimmer, as in (b), to correct any reflective errors caused by the procedure of (c).

RADIOTRONS

Under ordinary usage within the ratings specified for voltage supply, tube life will be consistent with that obtained in other applications. Their deterioration and approach to failure is usually evidenced by noisy or intermittent operation, loss of sensitivity and distorted tone quality.

It is not feasible to test the Radiotrons in the receiver sockets, due to likelihood of errors being caused by the associated circuits. Their removal and check with standard tube-testing apparatus is therefore advisable.

In this receiver the Radiotrons are compactly placed and snugly fitted into tight-gripping sockets to protect against vibration and to insure positive electrical connections. They should be withdrawn by exerting a direct pull on the tube.

To replace the tubes having the form-fitting shields, attach the shield to the tube and orient the grid lead opening in proper relation to the tube base, and insert the tube into its socket so that the shield clamps slide into their correct position on the outer surface of the shield.

CIRCUIT VOLTAGES

The voltages indicated at the socket contacts on Figure 4 will serve to assist in analyzing defective circuit conditions. The values specified should hold within ±20% when the receiver is normally operative. They are actual operating values and do not take into account inaccuracies due to voltmeter resistance. A meter having a multiplier of at least 1000 ohms per volt should be used, and the amount of circuit resistance shunted by the meter resistance duly considered when the two are comparable.

SYNCHRONOUS RECTIFIER-VIBRATOR

The vibrator power unit used in this receiver is of rugged design and construction. It has been carefully adjusted by means of special equipment to insure quiet operation over an extensive period of life. No adjustments should be attempted on a vibrator suspected to be in defective condition, but a renewal installed. A convenient plug-in base is provided for effecting a quick replacement.

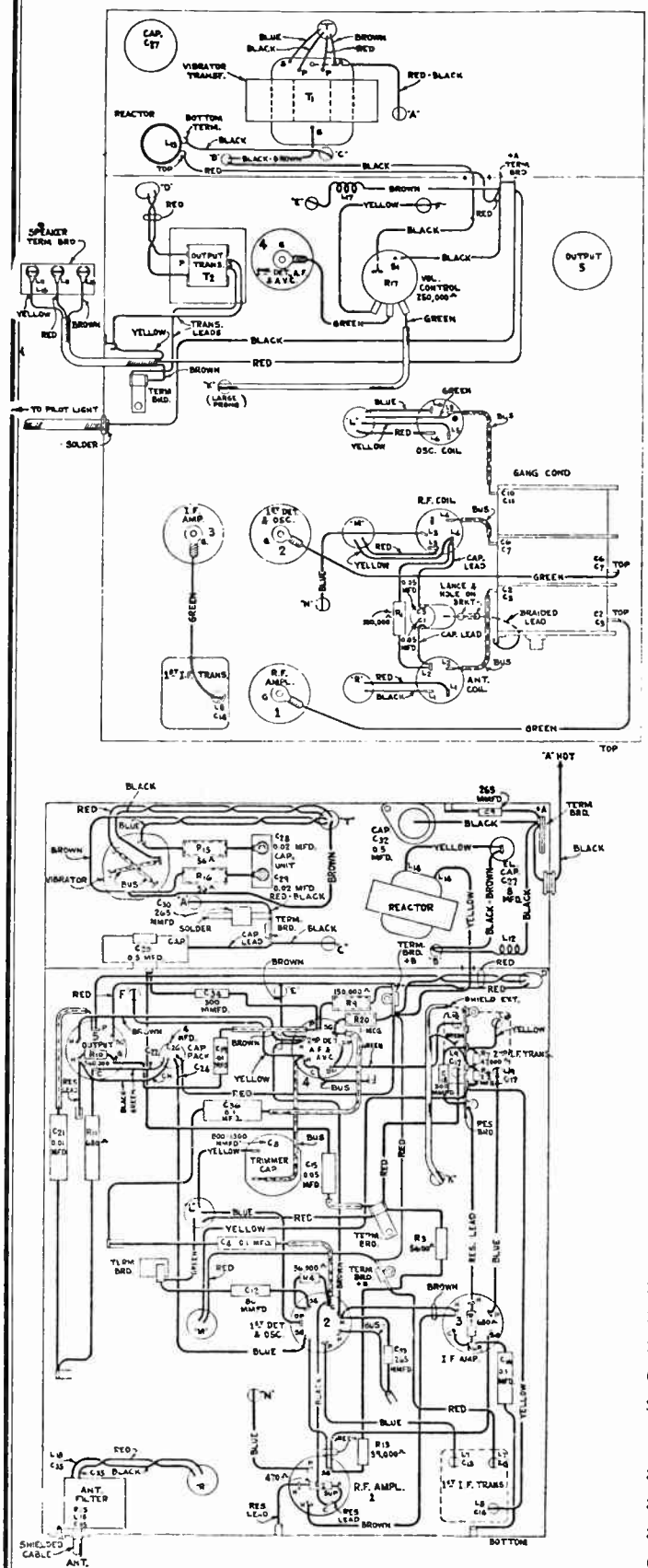
SPEAKER CONE ALIGNMENT

In the event the cone coil becomes misaligned, it will be necessary to correct its position by an adjustment provided on the speaker assembly. A small round-head brass screw installed on pole piece adjacent to the terminal strip is used to clamp the cone coil mounting. To center the cone, loosen the screw and insert a small 1/16" rod or nail into the hole next to the screw and pry the coil mounting into the position giving normal speaker operation. The screw should then be retightened.

TUNING CONDENSER DRIVE

Smooth control should be obtained over the entire tuning range of the variable condenser. If there is any irregularity noticed, the following corrective steps should be taken:

Check the action of the gear mechanism for presence of binding or backlash at every point within the



tuning range. A bind may be due to improper mesh between the small pinion gear and large gears on the rotor shaft. To correct such a condition, remove the coupling on the pinion of the tuning gear, insert a screw-driver through the hole in the case and loosen the two screws holding gear plate. The mesh of the gears should be adjusted to a position which gives smooth operation.

Gear back-lash is prevented by the compression spring between the large gears on the rotor shaft. To check for this back-lash, rotate the pinion slowly in both directions, observing the free gear (on rotor shaft) carefully to determine if it shifts without turning the rotor.

MISCELLANEOUS SERVICE HINTS

If back-lash is apparent, the large gear assembly should be removed and the free gear moved (against the spring compression) 2 to 3½ teeth in relation to the fixed gear and the assembly slid in place on the shaft and in mesh with the pinion. The set screws should then be securely tightened.

(a) The grounding of the outer end of the antenna lead shield is quite critical, in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

(b) In some cars, ignition interference may be introduced through lack of antenna lead shielding. In such cases, a shield should be placed over the exposed section of antenna lead and carried as near as possible to the actual antenna. It should be solidly grounded.

(c) Interference in the form of a grating scratch may arise from static collecting on the front wheels of some cars due to road surface friction in dry weather. The insulation caused by the grease of the wheel hub enables this action to develop. A number of devices are available through automotive supply dealers which are designed to eliminate this type of trouble. They all serve to form a grounding tie between the hub and the axle, and thus drain the static to the frame of the car (ground).

(d) If the flexible tuning shaft is installed so that it protrudes through the insulating coupling at the receiver end and makes intermittent contact with the metal of the pinion gear, some r-f disturbance will result. The shaft should therefore be inserted into the coupling just far enough to be properly secured by the set screw.

(e) The screws holding the chassis to the case must all be in place and tightly installed, inasmuch as they appreciably affect the ground resistance of the assembly and will consequently have a bearing on the amount of ignition noise received.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4993	Bumper—Rubber bumper—Used under variable condenser bracket assembly—Package of 5	$0 25
4244	Cap—Grid contact cap—Package of 5	.20
4955	Capacitor—Adjustable capacitor (C8)	.48
5021	Capacitor—80 mmfd. (C12)	.22
5078	Capacitor—265 mmfd. (C9, C30, C33)	.24
4248	Capacitor—300 mmfd. (C18, C34)	.22
4882	Capacitor—.01 mfd. (C21)	.20
4858	Capacitor—.01 mfd. (C19)	.25
4791	Capacitor—0.1 mfd. (C4, C16)	.24
4885	Capacitor—0.1 mfd. (C36)	.28
4886	Capacitor—.05 mfd. (C15)	.20
5019	Capacitor—.5 mfd. (C32)	.42
4960	Capacitor—.5 mfd. (C20)	.46
4961	Capacitor—8.0 mfd.	1.28
4964	Capacitor pack—Comprising two .02 mfd capacitors (C28, C29)	1 02
5016	Capacitor pack—Comprising two .05 mfd capacitors (C1, C5)	.26
4958	Capacitor pack—Comprising one 3. mfd., one 10. mfd. and one 4. mfd. capacitors (C22, C24, C26)	1 34
5020	Clamp—Metal clamp with screw—For antenna filter shielded cable—Package of 5	.14
5074	Clamp—Radiotron shield clamp	.14
4930	Coil—Antenna coil (L1, L2)	.74
4968	Coil—Choke coil (L12)	.14
4969	Coil—Choke coil (15 turns—approximately 23 inches—length) (L17)	.14
6967	Coil—Oscillator coil (L5, L6)	.52
6956	Coil—R. F. coil (L3, L4)	.80
4948	Condenser—3 section variable tuning condenser (C2, C3, C6, C7, C10, C11)	3.81
4954	Filter—Antenna filter (L18, C35, R25)	1.46
4972	Lead—Power lead with male section of connector—Chassis end	.20
7766	Lead—Power lead with clip and female section of fuse connector	.30
4966	Lead—Single connector dial lamp lead—With female section of connector—Chassis end	.30
4962	Reactor (L14)	.88
4963	Reactor (L13)	.38
5034	Resistor—56 ohms—Carbon type—½ watt (R15, R16)—Package of 5	1.00
5030	Resistor—470 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
5031	Resistor—680 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
5026	Resistor—680 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
5175	Resistor — 5600 ohms — Carbon type — ½ watt (R3)—Package of 5	1.00
5176	Resistor — 39 000 ohms — Carbon type — 1 watt (R13)	.22
5132	Resistor — 47,000 ohms — Carbon type — 1/10 watt (R7)—Package of 5	$0.75
5029	Resistor — 56,000 ohms — Carbon type — ¼ watt (R4)—Package of 5	1.00
3118	Resistor — 100,000 ohms — Carbon type — ¼ watt (R1)—Package of 5	1 00
5027	Resistor — 150,000 ohms — Carbon type — ¼ watt (R9)—Package of 5	1.00
5035	Resistor — 560,000 ohms — Carbon type — ¼ watt (R10)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R20)—Package of 5	1.00
5131	Resistor—2,200 000 ohms—Carbon type—1/10 watt (R6)—Package of 5	.75
5129	Ring—Radiotron shield ring—Package of 5	.10
3584	Ring—Retaining ring for antenna, r-f, or oscillator coils—Package of 5	.40
3623	Shield—Antenna, r-f, or oscillator coil shield	.30
4953	Shield—First intermediate frequency transformer shield	.24
4956	Shield—Second intermediate frequency transformer shield	.30
5037	Shield—Radiotron shield	.15
4946	Socket—6-contact Radiotron socket	.18
4959	Socket—6-contact vibrator socket	.18
4947	Socket—7-contact Radiotron socket	.18
4951	Transformer—First intermediate frequency transformer (L7, L8, C13, C14)	1.26
4952	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.76
4957	Transformer—Output transformer (T2)	1.18
7859	Transformer—Vibrator transformer (T1)	2.02
7857	Vibrator—Complete (L15)	5.64
5018	Volume control (R17, S1)	1.00
	CONTROL BOX ASSEMBLIES	
4987	Bezel—Station selector dial bezel	.42
7865	Box—Control box—Complete	3 86
7864	Bracket—Mounting bracket and rear section of control box housing	.30
4988	Crystal—Station selector dial crystal	.38
4989	Dial—Station selector dial	.20
4981	Gear—18 tooth intermediate drive gear	.15
4978	Gear—Indicator drive gear and shaft	.42
7862	Housing—Front section of control box housing	.28
7863	Housing—Center section of control box housing	.32
4990	Indicator—Station selector (pointer) indicator	.10
4985	Knob—Station selector or volume control knob—Package of 5	.62
4991	Lamp—Dial lamp—Package of 5	.74
7866	Plate—Bearing plate assembly—Comprising plate gear and shaft, volume control shaft, station selector shaft, pinion and spring	1.22
4986	Screw—Oval fillister head machine screw—Fastens bracket and center section of control box housing—Package of 5	.25

REPLACEMENT PARTS (Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
5042	Screw—No. 8-32-¼-inch headless set screw for station selector or volume control shaft—Package of 10	$0.25
4983	Shaft—Station selector drive shaft	.16
4979	Shaft—Volume control drive shaft	.16
4984	Socket—Dial lamp socket	16
4982	Spring—Holding spring for station selector or volume control knob—Package of 10	.26
4980	Spring—Tension spring—Package of 5	.15
	FLEXIBLE SHAFT ASSEMBLIES	
5000	Bracket—Volume or tuning condenser flexible shaft bracket—Bracket mounted on housing	.30
4994	Nut—Knurled locking nut for condenser drive or volume control flexible shafts	.10
7854	Shaft—Tuning condenser—Flexible (steering column) drive shaft—31⅜ inches long	1.08
7856	Shaft—Volume control or tuning condenser—Flexible (dash mounting) drive shaft—9⅜ inches long	.58
7855	Shaft—Volume control—Flexible (steering column) shaft—28¾ inches long	1.00
	REPRODUCER ASSEMBLIES	
4970	Cable—3-conductor reproducer cable	1.02
9602	Cone—Reproducer cone (L16)	.75
9576	Housing—Reproducer housing—Top cover of receiver	1 08
9577	Reproducer—Complete (L11, L16)	4.32
4995	Screw—Reproducer mounting screw—Package of 10	15
	HOUSING ASSEMBLIES	
7868	Case — Receiver housing assembly — Complete	1.76
7869	Cover—Bottom cover of receiver housing assembly	$0.32
4999	Screw—No. 8-¼-inch slotted hex head self-tapping screw—Used to assemble housing—Package of 5	.12
	MISCELLANEOUS PARTS	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
5188	Cable—Two conductor antenna cable approximately 40¼ in. long with male section of connector	.40
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
5025	Capacitor—0 5 mfd. generator capacitor	.40
6516	Connector—Fuse connector complete	.16
4973	Coupling—Tuning condenser shaft coupling	.30
4974	Coupling—Volume control shaft coupling	.36
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
5023	Fuse—15-ampere—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4975	Lead—Dial lamp lead—Control box end	.38
3903	Screw—No. 8-32-3/16-inch headless set-screw for couplings—Package of 20	.36
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
4992	Stud—Receiver mounting stud and nuts—Package of 3	.22
5064	Stud—Variable condenser bracket mounting assembly comprising one stud, one bushing, one washer, and one lockwasher	.12
5024	Suppressor—Distributor suppressor	.38

RCA MFG. CO., INC.

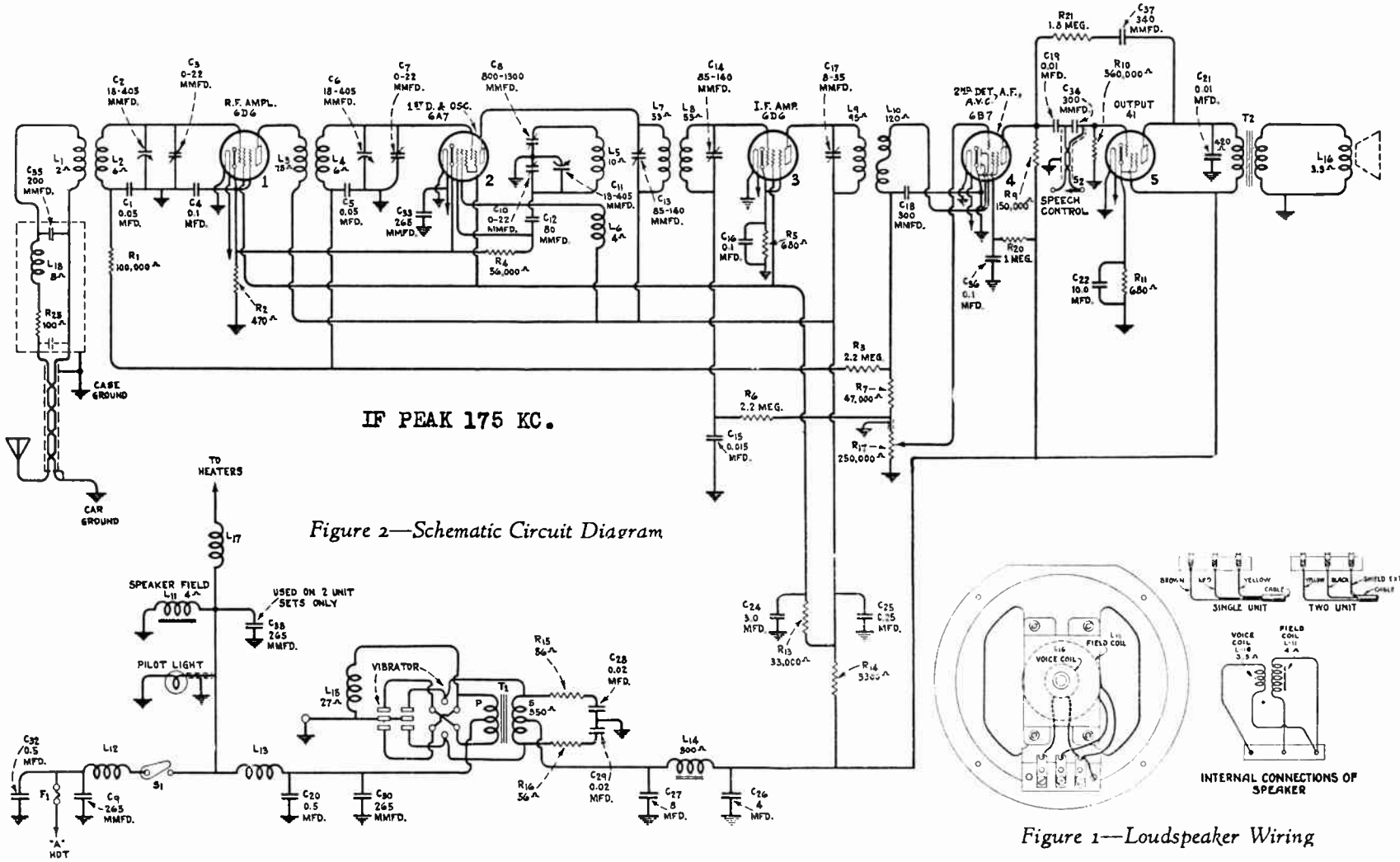


Figure 2—Schematic Circuit Diagram

Figure 1—Loudspeaker Wiring

RCA Model M-104 and G.E. Model D-51 are single-unit receivers, containing the radio chassis, power conversion adjunct and loud speaker in one housing. RCA Model M-108 and G.E. Model D-52 are double-unit receivers, utilizing a chassis and its power conversion equipment similar to those above, assembled in one case, but with the loud speaker mounted individually in a separate case.

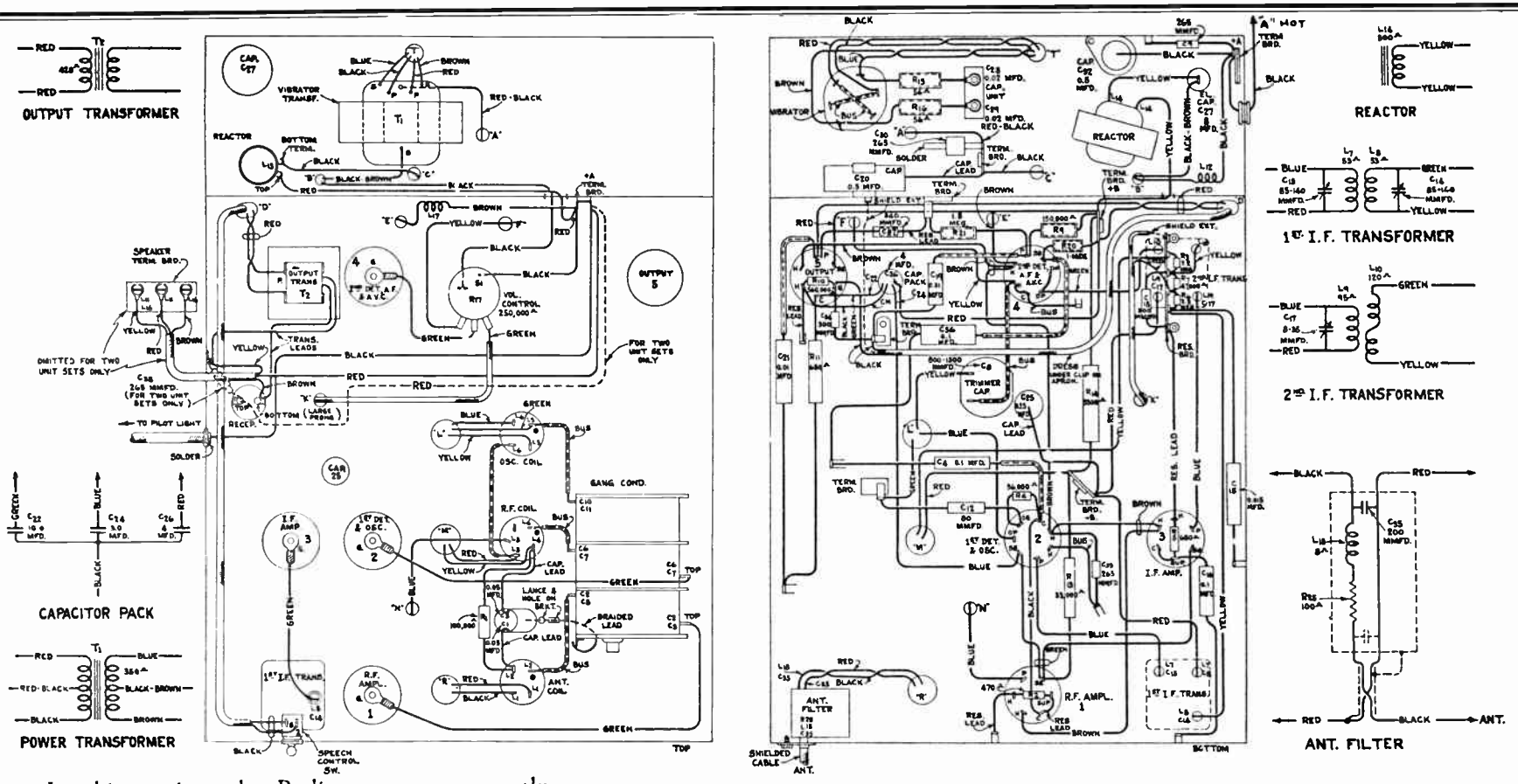


Figure 3—Chassis Wiring Diagram

In this receiver the Radiotrons are compactly placed and snugly fitted into tight-gripping sockets to protect against vibration and to insure positive electrical connections. They should be withdrawn by exerting a direct pull on the tube.

To replace the tubes having the form-fitting shields, attach the shield to the tube and orient the grid lead opening in proper relation to the tube base, and insert the tube into its socket so that the shield clamps slide into their correct position on the outer surface of the shield.

Heater connections of the Radiotrons are wired multiple, and supplied through a carefully filtered system. One heater terminal of each tube is grounded.

High voltage for plate and bias supply is generated by inversion, transformation and mechanical rectification; these three functions occurring in the "synchronous rectifier-vibrator." This vibrator is adapted for convenient removability by having its base constructed for "plug-in" mounting. Simple means are provided for correcting the vibrator input to agree with the ground polarity of the car by having the vibrator reversible. The vibrator may be inserted in two possible positions. As normally shipped, it is plugged in to operate with "positive" car ground. On a car having "negative ground," it will be necessary to withdraw the vibrator, rotate the unit 180 degrees and re-insert into the new position.

(1) PREPARATORY DETAILS

(a) Dial Calibration –The tuning-condenser flexible shaft operates the dial pointer through a gear mechanism within the control unit. To adjust their mechanical relations so that accurate scale calibration obtains:—Rotate the station selector knob until the variable tuning capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the last radial line at the low frequency end of the scale. (The line referred to is the second one counter-clockwise of the 550 kc. mark.)

(b) General Procedure—The "Output Indicator" should be attached to the voice coil circuit of the loudspeaker, and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control set at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

(2) I. F. ADJUSTMENTS

Three trimmers are provided in the i-f system, two on the first transformer and one on the second transformer. The locations of the adjustment screws are shown in Figure 4.

(a) Tune the "Full Range Oscillator" to 175 kc. and connect its output to the first detector control grid and chassis ground. Tune the station selector to a point where no signals are received.

(b) Tune each of the trimmer capacitors, C17, C14 and C13, in order. C17 should be set for maximum (peak) output. C14 and C13 should be roughly adjusted for maximum output and then carefully "trimmed" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of 175 kc. and noting whether or not the receiver output remains substantially constant.

(3) R. F. DETECTOR AND OSCILLATOR ADJUSTMENTS

Three high-frequency adjusting capacitors are provided for alignment at 1400 kc., and one trimmer is used for the low frequency line-up at 600 kc. The "Full Range Oscillator" should be connected to the antenna-ground input at the outer end of the lead-in shield through a 300-ohm series resistance in the antenna side.

(a) Tune the external oscillator to a frequency of 1400 kc. and turn the station selector knob until the dial pointer is at the 1400 kc. scale marking.

(b) Adjust the oscillator trimmer, C-10; the detector trimmer, C7; and the r-f trimmer, C3, for maximum (peak) receiver output.

(c) Set the external oscillator to a frequency of 600 kc. and rotate the station selector until this signal is accurately tuned on the receiver. Adjust the oscillator trimmer C8, simultaneously rocking the tuning condenser slowly through the signal until the maximum obtainable output results from the two combined operations. This adjustment should be made irrespective of dial calibration.

(d) Recheck the adjustment of the 1400 kc. oscillator trimmer, as in (b), to correct any reflective errors caused by the procedure of (c).

CIRCUIT VOLTAGES

The voltages indicated at the socket contacts on Figure 4 will serve to assist in analizing defective circuit conditions. The values specified should hold within ±20% when the receiver is normally operative. They are actual operating values and do not take into account inaccuracies due to voltmeter resistance. A meter having a multiplier of at least 1000 ohms per volt should be used, and the amount of circuit resistance shunted by the meter resistance duly considered when the two are comparable.

SYNCHRONOUS RECTIFIER-VIBRATOR

The vibrator power unit used in this receiver is of rugged design and construction. It has been carefully adjusted by means of special equipment to insure quiet operation over an extensive period of life. No adjustments should be attempted on a vibrator suspected to be in defective condition, but a renewal installed. A convenient plug-in base is provided for effecting a quick replacement.

SPEAKER CONE ALIGNMENT

In the event the cone coil becomes mis-aligned, it will be necessary to correct its position by an adjustment provided on the speaker assembly. A small round-head brass screw installed on pole piece adjacent to the terminal strip is used to clamp the cone coil mounting. To center the cone, loosen the screw and insert a small 1/4" rod or nail into the hole next to the screw and pry the coil mounting into the position giving normal speaker operation. The screw should then be retightened.

TUNING CONDENSER DRIVE

Smooth control should be obtained over the entire tuning range of the variable condenser. If there is any irregularity noticed, the following corrective steps should be taken:

Check the action of the gear mechanism for presence of binding or backlash at every point within the tuning range. A bind may be due to improper mesh between the small pinion gear and large gears on the rotor shaft. To correct such a condition, remove the coupling on the pinion of the tuning gear, insert a screw-driver through the hole in the case and loosen the two screws holding gear plate. The mesh of the gears should be adjusted to a position which gives smooth operation.

Gear back-lash is prevented by the compression spring between the large gears on the rotor shaft. To check for this back-lash, rotate the pinion slowly in both directions, observing the free gear (on rotor shaft) carefully to determine if it shifts without turning the rotor.

If back-lash is apparent, the large gear assembly should be removed and the free gear moved (against the spring compression) 2 to 3½ teeth in relation to the fixed gear and the assembly slid in place on the shaft and in mesh with the pinion. The set screws should then be securely tightened.

MISCELLANEOUS SERVICE HINTS

(a) The grounding of the outer end of the antenna input lead is quite critical, in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

(b) In some cars, ignition interference may be introduced through lack of antenna lead shielding. In such cases, a shield should be placed over the exposed section of antenna lead and carried as near as possible to the actual antenna. It should be solidly grounded.

(c) Interference in the form of a grating scratch may arise from static collecting on the front wheels of some cars due to road surface friction in dry weather. The insulation caused by the grease of the wheel hub enables this action to develop. A number of devices are available through automotive supply dealers which are designed to eliminate this type of trouble. They all serve to form a grounding tie between the hub and the axle, and thus drain the static to the frame of the car (ground).

(d) If the flexible tuning shaft is installed so that it protrudes through the insulating coupling at the receiver end and makes intermittent contact with the metal of the pinion gear, some r-f disturbance will result. The shaft should therefore be inserted into the coupling just far enough to be properly secured by the set screw.

(e) The screws holding the chassis to the case must all be in place and tightly installed, inasmuch as they appreciably affect the ground resistance of the assembly and will consequently have a bearing on the amount of ignition noise received.

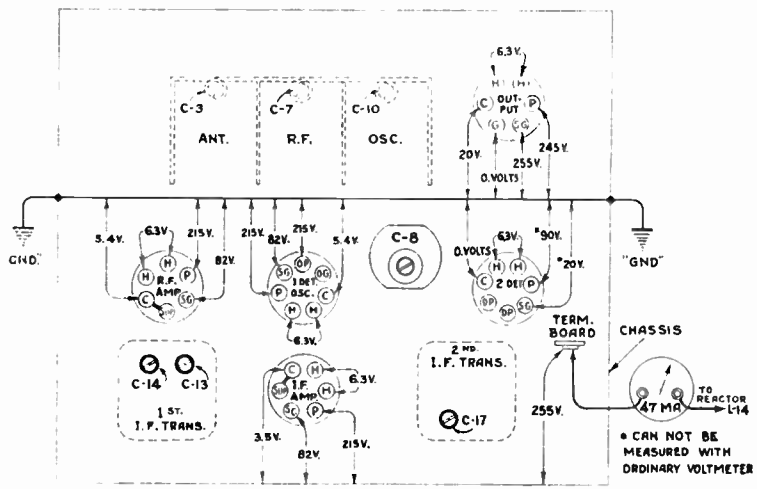


Figure 4 – Trimmer Locations and Radiotron Socket Voltages to Ground
(Measured at 6.6 volts battery supply –Volume Control Maximum—No Signal)

MODEL E-104,E-108
Circuit Notes

RCA MFG. CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The electrical arrangement of the receiver is pictured in the schematic of Figure 2. A corresponding wiring layout is shown in Figure 3, where the actual physical relations of parts and coding of conductors are given.

Five Radiotrons are used, forming the total tube complement around which the superheterodyne circuit is built. In sequence, there is an r-f stage, a dual first detector–oscillator stage, a single i-f stage, a second detector–audio amplifier–a.v.c. stage, and a pentode output stage. Five tuned circuits operate upon the desired signal to strengthen its magnitude and reject the undesired signals and interference.

Current for operation of the receiver is obtained from a standard 6.3 volt storage battery. This current is filtered through several chokes and by-passed to ground by a number of capacitors before being applied to the Radiotron filaments and the high voltage conversion unit. The number and arrangement of the filter elements is such as to gain a very great reduction in the amount of interference conducted into the r-f circuits by the current supply wiring.

The following details elaborate the functions and features of the various stages of the receiver:

Starting at the antenna, an r-f signal is impressed across a special transmission line, which in conjunction with a "noise filter," acts selectively to the entire standard broadcast range and drastically attenuates signals and interference outside the limits of the band (540–1600 kc.). Instead of the ground for the antenna input coil appearing at the usual point on the chassis frame, the low end of the coil is extended as part of the transmission line to the outer termination of the antenna lead-in shield, where it grounds to the frame of the car. With this arrangement, the r-f disturbances circulating in the car frame (ground) do not become mutual to the receiver input. The transmission line section of the antenna lead-in also has characteristics favorable to the operation of the "noise filter." Its length, conductor sizes, insulation, etc., are precisely designed to have a critical capacitance (represented by dotted lines on schematic), which resonates with the inductance of the input system to produce a band-pass filter having an acceptance band between 540 kc. and 1600 kc., and sharply defined cut-off below and above these two limits. By using this antenna filter system and minimizing capacity coupling between primary and secondary of antenna coupling transformer, it is generally possible to dispense with the usual spark plug and distributor suppressors, without encountering serious interference on latest types of cars.

The signal is passed from the input coil by transformer action to the r-f stage control grid. An RCA-6D6 at this point performs the function of an r-f amplifier, its super-control property being adapted as means of preventing cross-modulation and securing a wide range of automatic volume control. The first (front) section of the tuning condenser is connected to sharply tune the secondary of the antenna coupling transformer.

A second r-f coupling transformer transmits the signal to the following receiver stage, which comprises a combination first detector and local oscillator. The secondary inductance of this transformer is tuned by the second (center) section of the variable capacitor and connects to the detector grid of the RCA-6A7 Radiotron. By proper arrangement of the several elements within this tube, a local oscillator system is established, which generates the correct frequency and causes it to mix with the incoming signal. The difference frequency beat (i-f) of these two combined signals is detected by the tube and transferred by a closely coupled transformer to the intermediate frequency amplifier tube, an RCA-6D6. Both windings of this i-f transformer are tuned by trimmers. The second i-f transformer which joins the RCA-6D6 tube to the second detector stage has only one trimmer, that being in shunt with its primary winding.

The RCA-6B7 second detector stage receives the i-f signal on its diode plates. Detection takes place as a result of the rectifying action of the diodes and develops a current through resistors R7 and R17. The d-c voltage drop in the resistance R7 plus R17 is used for automatically regulating the control grid bias of the r-f and first detector stage, and thus the amplification becomes dependent upon the signal strength. This process (a.v.c.) compensates for fading signals and reduction of signals due to change of antenna direction and shielding effects of buildings, bridges, etc. A smaller portion of the d-c voltage obtained by detection is tapped from the juncture of R7 and R17 and carried to the control grid of the i-f stage. This likewise furnishes automatic volume control.

The audio and d-c components of the detected signal are selected from the manual volume control resistor (R17) by its movable arm, and applied to the control grid of the RCA-6B7; amplification results and the signal passes on to the power output stage. The variable d-c applied to the grid prevents overload. A resistance-capacitance coupling system conveys the signal from the second detector stage to the RCA-41 output tube. In this coupling arrangement, a "speech" control is used for shorting capacitor C34, the effect in the open position being attenuation of the lower frequencies and consequent improvement of speech intelligibility. The circuit composed of R21 and C37 effects the proper fidelity balance.

The power amplifier stage delivers to the loudspeaker a high level audio signal. Correct matching relations between the speaker and output stage are maintained by the output transformer.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4903	Bumper—Rubber bumper—Used under variable condenser bracket assembly—Package of 5	$0.25
4965	Cable—2-conductor shielded—Approximately 17 inches long—To speech control switch	.36
4244	Cap—Grid contact cap—Package of 5	.20
4955	Capacitor—Adjustable capacitor (C8)	.48
5021	Capacitor—80 mmfd. (C12)	.22
5078	Capacitor—265 mmfd. (C9, C30, C33, C38)	.24
3981	Capacitor—300 mmfd. (C34)	.30
4248	Capacitor—300 mmfd. (C18)	.22
5022	Capacitor—340 mmfd. (C37)	.20
4882	Capacitor—.01 mfd. (C21)	.20
4883	Capacitor—.01 mfd. (C19)	.20
4791	Capacitor—0.1 mfd. (C4, C16)	.24
4885	Capacitor—0.1 mfd. (C36)	.28
4792	Capacitor—.015 mfd. (C15)	.22
4967	Capacitor—.25 mfd. (C25)	.46
5019	Capacitor—.5 mfd. (C32)	.42
4960	Capacitor—.5 mfd. (C20)	.46
4961	Capacitor—8.0 mfd. (C27)	1.28
4964	Capacitor pack—Comprising two .02 mfd. capacitors (C28, C29)	1.02
5016	Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5)	.26
4938	Capacitor pack—Comprising one .3 mfd., one .10 mfd. and one .4 mfd. capacitors (C22, C24, C26)	1.34
5020	Clamp—Metal clamp with screw—For antenna filter shielded cable—Package of 5	.14
4950	Coil—Antenna coil (L1, L2)	.74
4958	Coil—Choke coil (L12)	.14
4969	Coil—Choke coil (15 turns—approximately 23 inches—length) (L17)	.14
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—r-f coil (L3, L4)	.80
4948	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	3.81
4954	Filter—Antenna filter (L18, C35, R25)	1.46
4972	Lead—Power lead with male section of connector—Chassis end	.20
7766	Lead—Power lead with clip and female section of fuse connector	.30
4966	Lead—Single connector dial lamp lead—With female section of connector—Chassis end	.30
4962	Reactor (L14)	.88
4963	Reactor (L13)	.38
5034	Resistor—56 ohms—Carbon type—½ watt (R15, R16)—Package of 5	1.00
5030	Resistor—470 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
5031	Resistor—680 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
5026	Resistor—680 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
5032	Resistor—3,300 ohms—Carbon type—2 watts (R14)	.22
5033	Resistor—33,000 ohms—Carbon type—1 watt (R13)—Package of 5	1.10
5132	Resistor—47,000 ohms—Carbon type—1/10 watt (R7)—Package of 5	$0.75
5029	Resistor—56,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
5027	Resistor—150,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
5035	Resistor—560,000 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—½ watt (R20)—Package of 5	1.00
5028	Resistor—1.8 megohm—Carbon type—½ watt (R21)—Package of 5	1.00
5131	Resistor—2,200,000 ohms—Carbon type—1/10 watt (R3, R6)—Package of 5	.75
5129	Ring—Radiotron shield ring—Package of 5	.10
3584	Ring—Retaining ring for antenna, r-f, or oscillator coils—Package of 5	.40
3623	Shield—Antenna, r-f, or oscillator coil shield	.30
4953	Shield—First intermediate frequency transformer shield	.24
4956	Shield—Second intermediate frequency transformer shield	.30
5037	Shield—Radiotron shield	.15
4946	Socket—6-contact Radiotron socket	.18
4959	Socket—6-contact vibrator socket	.18
4947	Socket—7-contact Radiotron socket	.18
5001	Switch—Speech control switch (S2)	.66
4951	Transformer—First intermediate frequency transformer (L7, L8, C13, C14)	1.26
4952	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.76
4957	Transformer—Output transformer (T2)	1.18
7859	Transformer—Vibrator transformer (T1)	2.02
7857	Vibrator—Complete (L15)	5.64
5018	Volume control (R17, S1)	1.00
	CONTROL BOX ASSEMBLIES	
4987	Bezel—Station selector dial bezel	.42
G7866	Box—Control box—Complete	3.86
7864	Bracket—Mounting bracket and rear section of control box housing	.30
4988	Crystal—Station selector dial crystal	.38
G7083	Dial—Station selector dial	.20
4981	Gear—18 tooth intermediate drive gear	.15
4978	Gear—Indicator drive gear and shaft	.42
7862	Housing—Front section of control box housing	.28
7863	Housing—Center section of control box housing	.32
4990	Indicator—Station selector (pointer) indicator	.10
4985	Knob—Station selector or volume control knob—Package of 5	.62
4991	Lamp—Dial lamp—Package of 5	.74
7866	Plate—Bearing plate assembly—Comprising plate, gear and shaft, volume control shaft, station selector shaft, pinion and spring	1.22
4986	Screw—Oval fillister head machine screw—Fastens bracket and center section of control box housing	.25

Stock No.	Description	List Price
5042	Screw—No. 8-32-¼-inch headless set-screw for station selector or volume control shaft—Package of 10	$0.25
4983	Shaft—Station selector drive shaft	.16
4979	Shaft—Volume control drive shaft	.16
4984	Socket—Dial lamp socket	.16
4982	Spring—Holding spring for station selector or volume control knob—Package of 10	.26
4980	Spring—Tension spring—Package of 5	.15
	FLEXIBLE SHAFT ASSEMBLIES	
5000	Bracket—Volume or tuning condenser flexible shaft bracket—Bracket mounted on housing	.50
4994	Nut—Knurled locking nut for condenser driv or volume control flexible shafts	.10
7854	Shaft—Tuning condenser—Flexible (steering column) drive shaft—31⅜ inches long	1.08
7856	Shaft—Volume control or tuning condenser—Flexible (dash mounting) drive shaft—9⅜ inches long	.58
7855	Shaft—Volume control—Flexible (steering column) shaft—28¾ inches long	1.00
	REPRODUCER ASSEMBLIES	
4970	Cable—3-conductor reproducer cable (M104)	1.02
5079	Cable—2-conductor shielded—With pin tips for M108	.86
9602	Cone—Reproducer cone (L16)	.75
9576	Housing—Reproducer housing—Top cover of Receiver for M104	1.08
7873	Housing—Reproducer housing complete for M108	2.10
5133	Pin—Large and small contact pins for reproducer cable—Package of 10	.35
9577	Reproducer—Complete (L11, L16)	4.32
4995	Screw—Reproducer mounting screw—Package of 10	$0.15
4977	Socket—Reproducer cable pin socket	.18
	HOUSING ASSEMBLIES	
7868	Case—Receiver housing assembly—Complete (M104)	1.76
7869	Cover—Bottom cover of receiver housing assembly (M104 and M108)	.32
7870	Cover—Top cover of receiver housing assembly (Model M108)	.26
4999	Screw—No. 8-¾-inch slotted hex head self-tapping screw—Used to assemble housing—Package of 5	.12
	MISCELLANEOUS PARTS	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—0.5 mfd. ammeter capacitor	.60
5025	Capacitor—0.5 mfd. generator capacitor	.40
6516	Connector—Fuse connector complete	.16
4973	Coupling—Tuning condenser shaft coupling	.30
4974	Coupling—Volume control shaft coupling	.36
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
5023	Fuse—15-ampere—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4976	Lead—Antenna lead assembly	.16
4975	Lead—Dial lamp lead—Control box end	.38
3903	Screw—No. 8-32-3/16 inch headless set-screw for couplings—Package of 20	.36
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
4992	Stud—Receiver mounting stud and nuts—Package of 3	.22
5024	Suppressor—Distributor suppressor	.38

MODEL M-105
Chassis Wiring

RCA MFG. CO., INC.

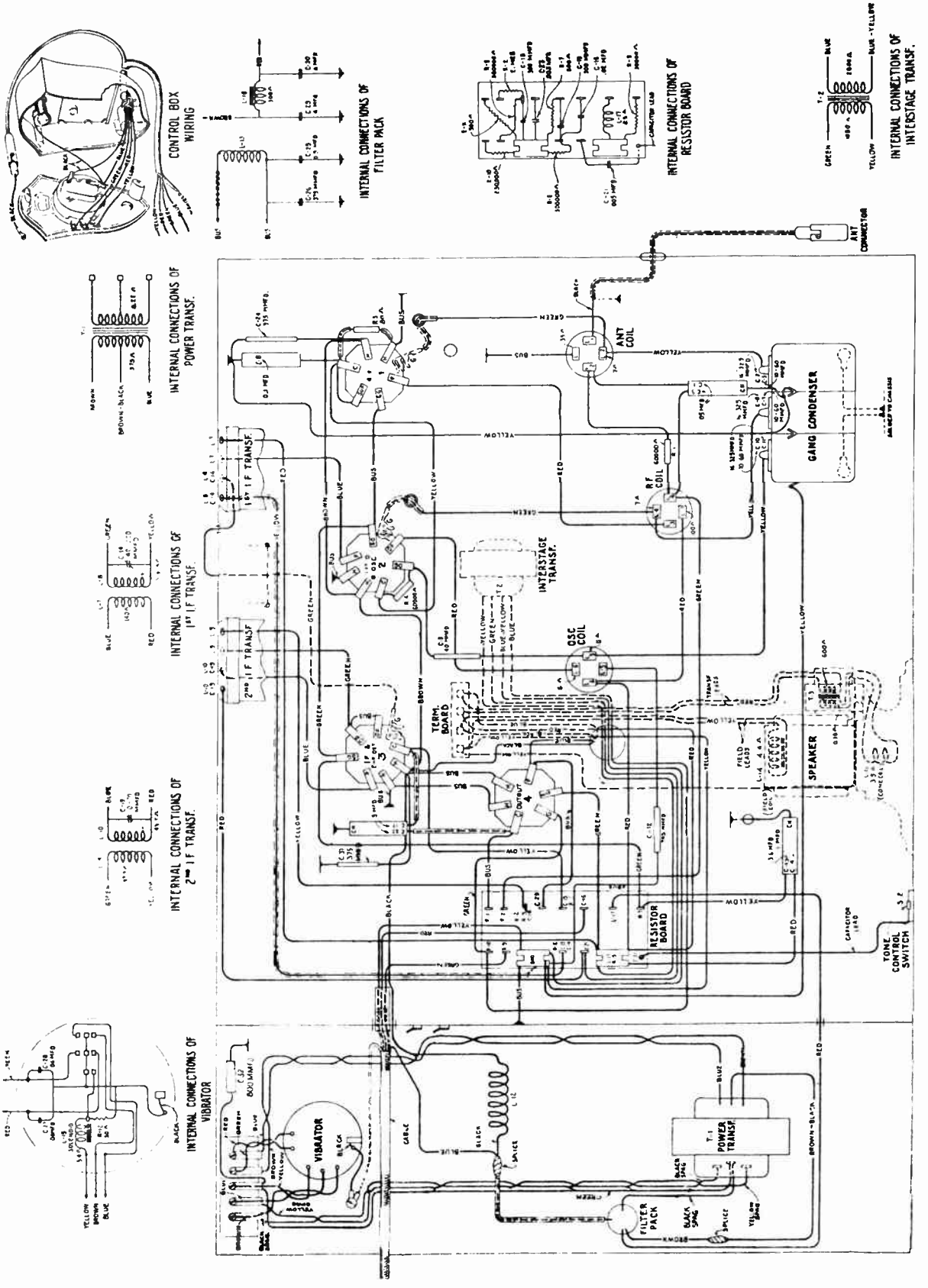


Figure B– Wiring Diagram

RCA MFG. CO., INC.

MODEL M-105
Schematic
Installation Details

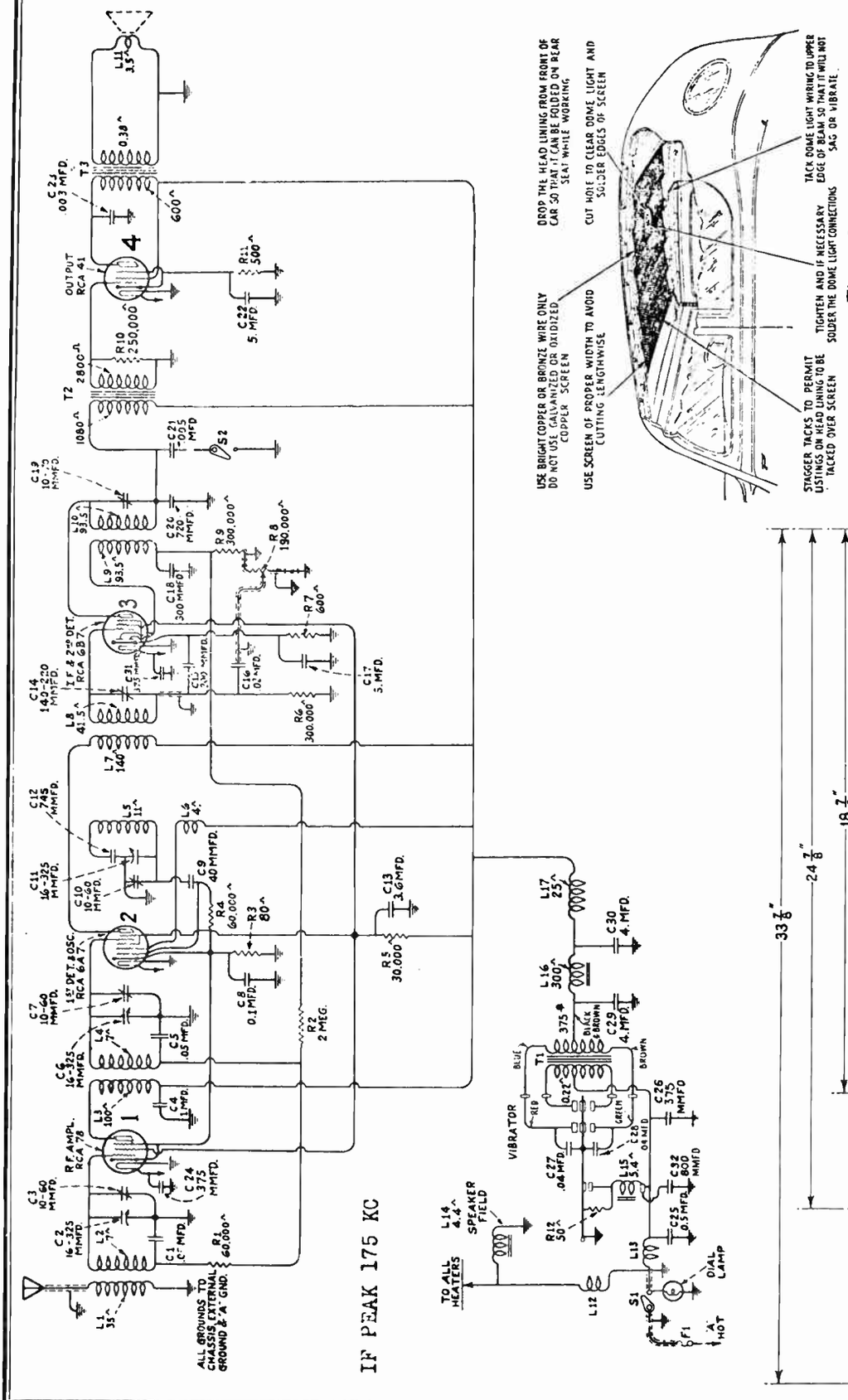


Figure 2

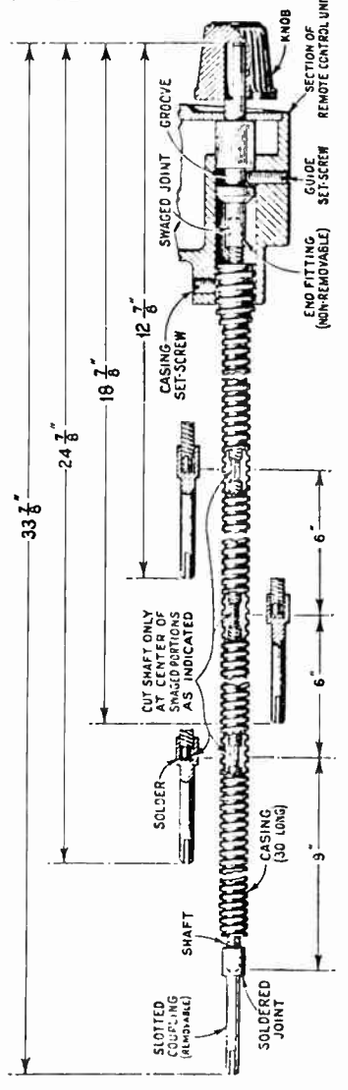


Figure 3

light fixture. The possibility of subsequent shifting may be eliminated by tacking the screen to one or more of the ribs and by lacing the sides with cord. Where no support screen is used, a copper screen having a total area of at least ten square feet should be inserted. It should be located as far to the rear as possible and insulated from all metallic parts grounded to the frame of the car. The antenna finally should be tested for grounds (see the foregoing "NOTE" for test procedure). If satisfactory, attach the lead-in wire and replace the head-lining of the car.

NOTE—Since a degree of skill—only acquired by experience—is necessary in removing and replacing the top fabric material, such work should be allotted to a competent "trim" man.

(b) *Roof (Interior) Type*—The accessory interior-type roof antenna also will provide very satisfactory performance and, in addition, is extremely simple to install. It may be quickly attached to the head-lining inside the car (preferably as far to the rear as possible) by means of piu-hooks, thereby precluding removal of the fabric. An antenna of this type, however, should not be used in any automobile having a *grounded* top material support screen since the proximity of that screen would seriously reduce its efficiency. Before purchase, therefore, it will be advisable to check this possibility, following the test procedure described under "*Roof (Built-in) Type.*"

As furnished, the interior-type antenna is equipped with a sufficient length of lead-in wire ready-attached. The effective antenna wire is enclosed by long-wearing paper procurable either in "gray" or "tan" finish as desired to harmonize with the car upholstery.

(c) *Plate Type*—For those cases where the installation of a built-in roof antenna is considered too costly and the interior roof antenna impractical, good reception from local or semi-distant powerful stations may be procured with the special plate-type antenna also obtainable as an accessory. This unit should be clamped to the frame of the chassis as far to the rear as possible. It is adjustable in length and may be mounted either lengthwise or crosswise of the chassis, which position should be selected with due regard to the prevention of overcrowding. The plate must be placed as close to the ground as possible, but not below the lowest portion of the chassis at the desired location, as sufficient road clearance must be retained. It is also important to avoid any position in which the plate will impede free motion of chassis parts such as springs, drive shaft, or axles in order to prevent damage to the antenna.

Mounting of Units

Details of mounting the various units are shown in Figure 1. The following procedures are recommended:

Receiver Unit—It is necessary first to determine the electrical polarity of the storage battery supply. This may be done most conveniently by making an examination of the battery connections and ascertaining which terminal is grounded (that is, connected to the frame of the car). The positive terminal is usually marked (+) and tends to form corrosion far more rapidly than the negative (—). If the positive terminal is grounded, no change in the electrical connections of the receiver unit will be required. However, if the opposite is true, the cover of the receiver case must be removed and the *red* and *green* leads (attached by spade-type connectors to the two terminals nearest the bottom of the chassis terminal board) shown in Figure 1 must be reversed.

Now replace the case cover and support the assembled unit against the dash in the chosen position. Allowing a clearance of at least two inches above the top surface, where possible, to permit subsequent removal of the case from the mounting bolt head, mark with a pencil or crayon on the dash four points corresponding to the corners of the adjacent case surface. Then determine the exact center of the area bounded by those four points (by drawing diagonal lines between opposite corners) and mark that position with a center-punch. Next drill a ½ inch hole at the center-punch mark and insert the mounting bolt. The support plate and the two nuts then should be assembled upon the bolt from the engine side of the dash as shown but should not be tightened. Attach the four rubber bumpers, by means of the washers and self-tapping screws, at the four small holes on the selected mounting surface of the case. Finally hang the receiver over the bolt head, align sides vertically and tighten the nuts in place.

Remote Control Unit—In attaching the remote control unit to the steering column of the car, it will be advisable first to examine the detailed view (in Figure 1) showing the assembly of its mounting bracket. Four small holes are contained in the associated flexible strap at distances proper for use with steering columns of the most common diameters (1½, 1⅝, 1¾, 1⅞ inches) but the strap length will be found sufficient to permit the insertion of an additional hole if necessary to accommodate a 2 inch column. The proper hole may be determined by wrapping the clamp strap tightly around the column, inserting the machine screw furnished through that hole found to be nearest in alignment with the tapped hole in the clamp bracket. Three tapped holes are provided in the back of the remote control unit, permitting support of that unit either at the right- or left-hand side or above the steering column.

Flexible Shaft—Insert that end of the flexible shaft to which is attached the slotted coupling through the bushed opening in the left side of the receiver unit. Then rotate the shaft from the free end until the coupling slot is felt to engage over the pin contained in the tuning mechanism and slide the shaft forward to the full depth of the slot. With the shaft held in this position, insert the opposite end of the shaft through the bushing at the rear of the remote control unit and push forward until the flatted portion of the shaft protrudes through the front cover. Then proceed to tighten the external set-screw (located at the bottom of the case—see Figure 3) adjusting the shaft position as necessary until the screw is felt to engage in the groove. Tighten the screw fully to the bottom of the slot and then loosen it approximately one-quarter of a turn. Finally, secure the flexible casing in place by tightening the set-screws at each end *firmly*, so as to provide good electrical contact as well as solid mechanical support.

NOTE—In many installations it will be found necessary or desirable to use a flexible shaft of shorter length than 33⅞ inches. While it is simplest to procure a shaft of proper length from the dealer as mentioned heretofore, very little difficulty should be experienced in shortening the original part if deemed expedient. To shorten the shaft, refer to Figure 3 and proceed as follows:

1. Determine the minimum shaft length permissible for the installation.
2. Remove the slotted coupling (using a soldering iron) and withdraw the shaft from its casing.
3. Cut the shaft only at the center of a swaged joint, selecting that joint which allows at least the required length.
4. Cut from the shaft casing a length equal to the amount of shaft removed. (This operation may be simplified by placing the casing between wooden blocks in a vise so that the block ends will serve to guide the hack saw blade.)
5. Replace the shaft in its casing and solder the slotted coupling to the end of the shaft.

Connections

Refer to Figure 1 and make connections as follows:

Antenna to Receiver—For least ignition interference, any portion of the antenna lead-in wire which extends behind the instrument panel or into the engine compartment of the car should be fully shielded and cut to eliminate excessive slack when attached to the receiver antenna connector. Before connecting the antenna to the receiver, the following comments applying to the particular type of antenna adopted should be observed:

(a) *Roof Antenna* (Built-in Type)—The lead-in wire from a factory-installed built-in roof antenna usually is unshielded and often is of insufficient length to reach the receiver. If necessary, an extra length of insulated wire may be spliced to the existing lead-in, in which case the joint must be soldered and wrapped with tape. In general, it will be advisable to shield the exposed length of lead-in wire, procuring for this purpose from your dealer a length of shield braid and an equivalent length of insulating loom (or rubber tubing) sufficient to extend between the end of the lead-in wire and its point of entrance from the body pillar post. Slip the loom over the lead-in wire and the shield braid over the loom.

(b) *Roof Antenna* (*Interior Type*)—If an interior type antenna is used, the lead-in wire should be brought down the outside of that front pillar post nearest the receiver.

(c) *Plate Type Antenna*—With the plate type antenna, the full-shielded end of the special cable should be brought into the automobile driving compartment through a ½ inch hole drilled in the toe-board (if no other opening is available). This end is to be connected to the receiver unit antenna lead (as explained in following paragraphs) and the opposite (unshielded) end then cut off as required to eliminate excessive slack upon connection to the plate. The pigtail extension from the end of the shield must be soldered or bonded to the frame of the car.

Refer to the detailed view of the antenna connector shown in Figure 1 and proceed to attach the lead-in wire (if shielded) as follows: First, cut the end of the lead-in so that the internal insulated wire and loom (if present) are flush with the end of the shield covering and push back the shield approximately 1½ inches. Cut the loom to the end of the shield and then remove sufficient insulation to expose one inch of clean bare-conductor. Now disconnect the female portion of the connector attached to the receiver antenna lead and remove the small internal bushing and spring.

To assemble, slip the bared conductor through the female portion of the connector and then through the spring and bushing, making certain that the insulation enters the end of the connector. Bend over and spread the strands of the conductor against the forward end of the bushing and then force one of the eyelets (packed in small envelope in outfit package) into the bushing to hold the conductor in position. Cut off the ends of the conductor strands approximately ⅛ inch beyond the edge of the eyelet and bend the strands over toward the center of the eyelet. The assembly may be now attached to the receiver portion of the connector and the shield covering on the lead-in wire pushed forward to cover the adjacent end of the female portion. Finally, bond the shield to the connector by means of the small clamp furnished. No soldering operations are required.

NOTE—An unshielded lead-in wire (as in the case of the interior-type antenna) may be attached to the antenna connector as described above except that all references to the shield braid and loom may be neglected.

SERVICE DATA

Type and Number of Radiotrons Used	1 RCA-41, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7 —Total, 4
Total Battery Current (With 6.3 volts between chassis and A (hot) terminal)	5.35 Amperes
Undistorted Output	1.35 Watts
Loudspeaker Field Current	1.35 Amperes
Filtered D. C. Voltage from Rectifier	227 Volts
Total Plate Current	47.5 M. A.

This four tube Superheterodyne Automobile Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, "B" battery eliminator and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

"B" Battery Eliminator

This receiver uses a vibrator-type Inverter-Rectifier that provides a source of direct current voltage for use as plate and grid supply for all Radiotrons. *This unit is accurately adjusted and sealed at the factory and service adjustments should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for these adjustments.

R. F. Adjustment

A satisfactorily accurate and rapid adjustment of the three R. F. line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and Radiotron sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and a non-metallic screw driver.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound i.e. the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10" to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 33¾" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932 or 1933—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.42	83	227	5.25	6.0
RCA-6A7	First Detector	4.42	83	222	11.0	6.0
	Oscillator	4.42	—	223	Total	
RCA-6B7 Second Detector		3.22	84	218	5.25	6.0
RCA-41 Power		13.0	214	200	26.0	6.0

Equipment

A. Equipment Furnished:

1. *Receiver Package*—Includes the receiver and remote control units joined by the wiring cable:

(a) The receiver contains one each of the following Radiotrons installed in sockets: RCA-78, RCA-6A7, RCA-6B7, RCA-41.

(b) The remote control unit contains one dial lamp (6-8 volts).

(c) The wiring cable includes one fuse (20 amperes) installed in attached fuse receptacle.

2. *Outfit Package*—Containing:

(a) Flexible shaft (33¾ inches long).

(b) Receiver unit mounting bolt (¼ inch diameter), dash support plate, and nuts (2).

(c) Self-tapping screws, washers and rubber bumpers (4 each).

(d) Steering column bracket for remote control unit with strap, screws (2), plain washer (1) and lockwasher (1).

(e) Shield clamp for antenna lead-in wire with screw (1), lockwasher (1) and nut (1).

(f) Key (1) and knob (1) for remote control unit and eyelets (2) for antenna connector packed in small envelope.

(g) Ignition Interference Suppression Equipment:

6 Spark plug type suppressors (additional obtainable from your dealer).

1 Distributor type suppressor.

2 Capacitors.

(h) Instruction Book

B. Additional Equipment Required:

1. *Antenna*—One of the following types:

(a) Roof (built-in) type—recommended.

(b) Roof (interior) type for attachment to head-lining inside car—also recommended. A special antenna of this type complete with pin-hooks and lead-in wire may be purchased from your dealer.

(c) Plate (sub-mounted) type for attachment to channel members of car chassis—alternative. An efficient plate antenna completely equipped for mounting and a specially-designed shielded lead-in wire also are obtainable from the dealer.

Location of Units

Receiver and Remote Control Units—The arrangement of units shown in Figure 1 is recommended and will be found applicable to the majority of automobiles. Consideration should be given to the possibility of interference of the receiver with other equipment beneath the instrument panel or of the mounting bolt with apparatus on the engine side of the dash. By placing the receiver unit toward the right-hand side of the dash, the flexible shaft will be of correct length as furnished in practically all cases. This position, however, may be considered impractical because of its universal preference for heating devices, necessitating installation of the receiver unit either near the center or at the extreme left-hand side of the dash and the use of a shorter flexible shaft. In such cases, the shaft may be either shortened (as described under "Mounting of Units") or exchanged for one of proper length by the dealer.

NOTE—Two support brackets are attached to the receiver case, one on the rear surface and the other on the right-hand side viewing the loudspeaker opening. The side bracket must be used when the unit is mounted at the extreme left-hand end of the dash in order to avoid sharp bends in the flexible shaft and resultant unsatisfactory operation.

As furnished, the remote control unit is equipped for attachment to the steering column of the car. Its clamp bracket is so designed that the driver may select from a wide variety of possible mounting positions for maximum accessibility. The associated bracket strap will be found to accommodate practically any diameter steering column. If considered desirable, however, the remote control unit may be supported upon the instrument panel by means of an accessory bracket procurable from the dealer.

Antenna:

(a) *Roof (Built-in) Type*—Best results will be obtained by use of a built-in roof antenna. The majority of modern automobiles (closed body types only) are already equipped with such an antenna installed at the factory, the lead-in wire from which will usually be found coiled-up beneath the instrument panel. Many other earlier cars employ a piece of metallic screen—for top material support—which, if ungrounded (not in electrical contact with the metallic frame), may be readily utilized as an antenna.

NOTE—The presence of a top support screen and of grounds in that screen may be determined without removing any portion of the inside fabric (head-lining). First procure any sharp-pointed metallic tool, push the point through the fabric (at several points if necessary) and feel around in an attempt to scrape the screen surface—being careful not to puncture the weather-proof top. If a screen is found, connect an ordinary dash or head-lamp between either terminal of the automobile ammeter and the tool, re-insert the tool through the head-lining and make contact with the screen. If the lamp lights, however dimly, it shall be assumed that the screen is grounded.

In order to use an ungrounded support screen, first release the head-lining at the front corner nearest the receiver. Then connect a flexible rubber-insulated lead to the corner of the screen and solder the joint. Feed the free end of the lead down the adjacent pillar-post of the car into the driving compartment and replace the head-lining.

If the top support screen is grounded, or if no screen is present, it will be necessary to drop the entire head-lining (see Figure 2). In the former case, the screen may be insulated by removal of a strip several inches from all edges and from the dome

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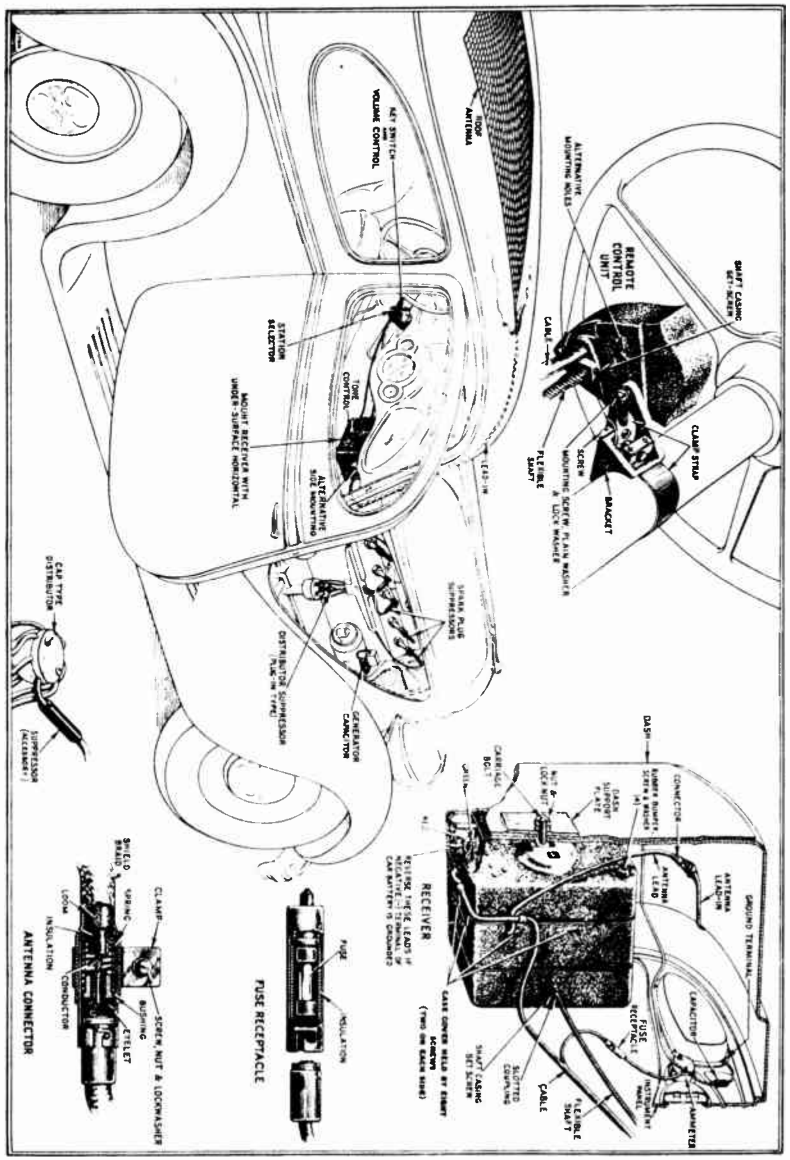


REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3536	Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22)	1.10
3572	Socket—Radiotron 7-contact socket	.38
3584	Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5	.40
3602	Resistor—60,000 ohms—Carbon type—½ watt (R1, R4)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C15, C18)	.34
3617	Capacitor—0.005 mfd. (C21)	.38
3618	Capacitor—0.02 mfd. (C16)	.38
3621	Coil—Choke coil—Located on resistor board (L17)	.35
3623	Shield—Antenna R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3636	Transformer—First intermediate frequency transformer (L7, L8, C14)	1.74
3637	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.65
3641	Capacitor—0.1 mfd. (C8)	.35
3645	Knob—Tone control knob—Package of 5	.90
3695	Capacitor—375 mmfd. (C24, C31)	.22
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3714	Resistor—250,000 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
3715	Capacitor—745 mmfd. (C12)	.34
3746	Capacitor—800 mmfd. (C32)	.34
3920	Capacitor—.003 mfd. (C23)	.25
3921	Mounting screws, washer and bushing assembly—For 3-gang variable tuning condenser—Comprising three spacers, three screws, three washers and three lockwashers	.34
3922	Resistor—300,000 ohms—Carbon type—½ watt (R6, R9)—Package of 5	1.00
4091	Resistor—80 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—½ watt (R2)—Package of 5	1.00
6298	Cord—Tuning condenser drive cord—Package of 5	.60
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6490	Tone control switch	.35
6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitor (C4, C13)	1.08
6493	Drum—Tuning condenser drive drum	.40
6514	Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5)	.28
6515	Cable—Shielded cable with antenna connector	.32
6516	Connector—Fuse connector	.16
6517	Cable—Main cable complete with fuse connector	1.40
6540	Coil—R. F. coil assembly (L3, L4)	.94
6731	Coil—Antenna coil (L1, L2)	.88
6732	Transformer—Interstage audio transformer (T2)	2.00
7485	Socket—Radiotron 6-contact socket	.40
7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30)	4.06
7601	Condenser—3-gang variable tuning condenser	2.84
9049	Transformer—Power transformer (T1)	3.75
	CONTROL BOX ASSEMBLIES	
3649	Key—Volume control and switch key	$0.18
3650	Screw—Self locking No. 10-32 3/16" fulldog point set screw—Package of 10	.32
3651	Screw—Self locking No. 10-32-3/16" cupped point set screw—Package of 10	.32
3652	Screw—Self locking No. 10-32-¼" cupped point set screw—For flexible drive shaft—Package of 10	.32
3690	Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
3718	Bracket—Control box dash mounting bracket	.25
3757	Coupling—Slotted coupling for end of flexible drive shaft—Package of 5	.40
3758	Connector—For control box end of flexible drive shaft—Package of 5	.68
6161	Knob—Station selector knob—Package of 5	.90
6496	Shaft—Flexible drive shaft complete with connectors—Approximately 24¾" long	1.60
6497	Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33¾" long	1.75
6499	Volume control—Combination volume control and switch (R8)	1.36
6500	Nut—Volume control and switch lock nut	.24
6531	Shaft—Flexible drive shaft complete with connectors—Approximately 12¼" long	.85
6532	Shaft—Flexible drive shaft—Complete with connectors—Approximately 18¼" long	1.24
6784	Scale—Dial scale	.58
7695	Box—Control box complete	3.70
7698	Cover—Control box cover	.44
	MISCELLANEOUS PARTS	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
3647	Nut—Cap nut and lock washer—Package of 10	.35
3648	Screw—No. 10-32-3/16" cap screw and lockwasher—Package of 10	.32
3689	Bracket—Receiver mounting bracket, bolt and nut assembly—One set	.30
3791	Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case	.30
3827	Cable—From fuse connector to ammeter	.10
3856	Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10	.30
3884	Clamp—Cable clamp—Package of 10	.20
4051	Bumper—Rubber bumper used in mounting receiver chassis—Package of 4	.20
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor splice-in suppressor	.56
6194	Capacitor—Ammeter capacitor—0.5 mfd.	.46
6495	Capacitor—Generator capacitor—0.5 mfd.	.72
6670	Suppressor—Spark plug suppressor—"Elbow type"	.56
7065	Screw-driver—For R. F. and I. F. adjustments	.80
7621	Antenna—Roof antenna—Paper type (Brown)	1.50
7622	Antenna—Roof antenna—Paper type (Gray)	1.50
7686	Housing—Front section of housing complete with mounting screws	3.48
7689	Vibrator Complete	7.84
7699	Housing—Rear section of housing complete with mounting screws	1.92
9050	Oscillator—Test oscillator—150-25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
3688	Transformer—Output transformer (T3)	1.50
7607	Screen—Metal screen	.44
7608	Coil assembly—Comprising field coil, magnet and cone support (L14)	2.40
9023	Cone—Reproducer cone complete (L11)—Package of 5	5.00

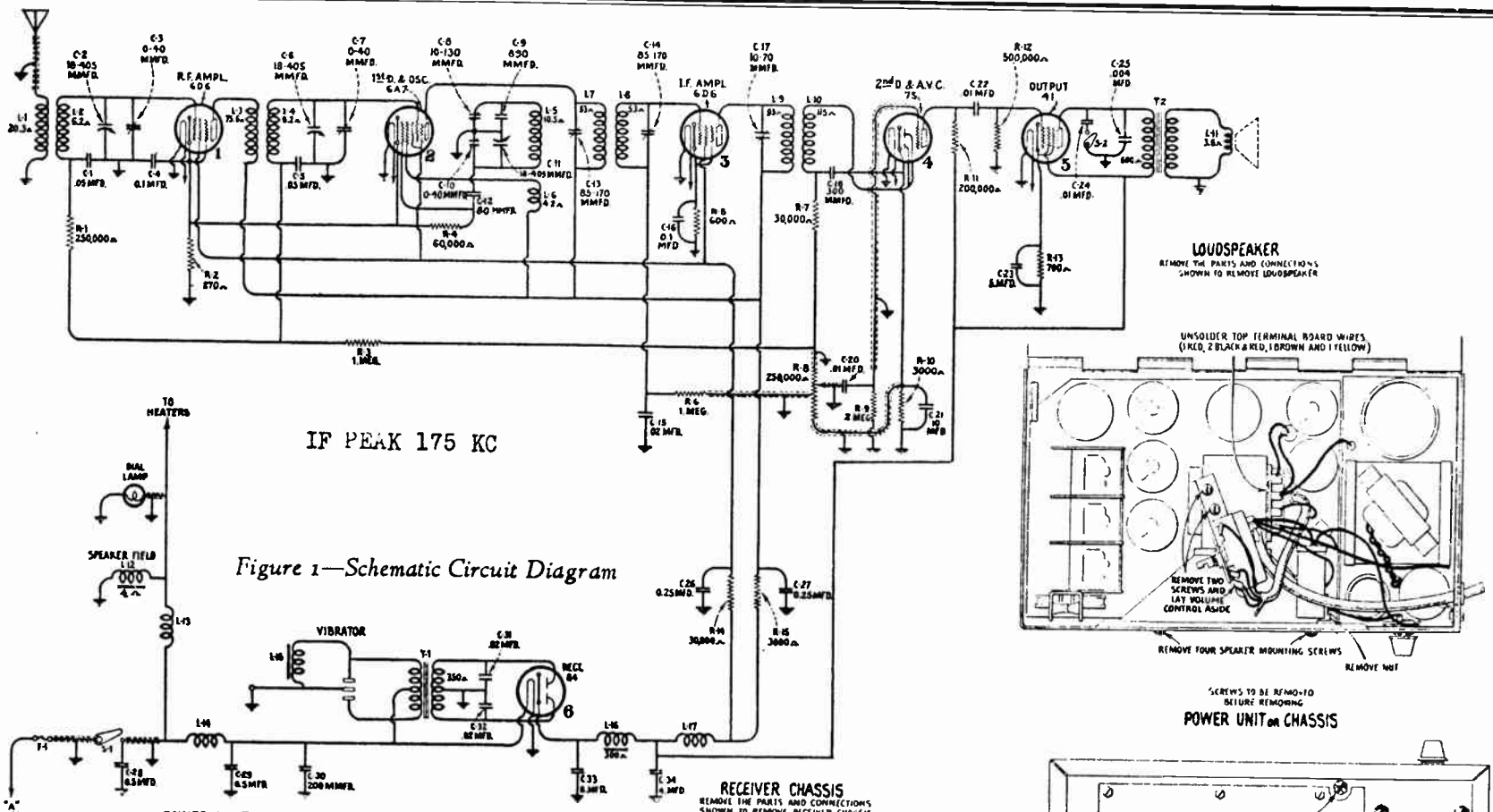


Figure 1—Schematic Circuit Diagram

Figure 2

Details of Removing Units from Chassis

MODEL M-107
Chassis Wiring

RCA MFG. CO., INC.

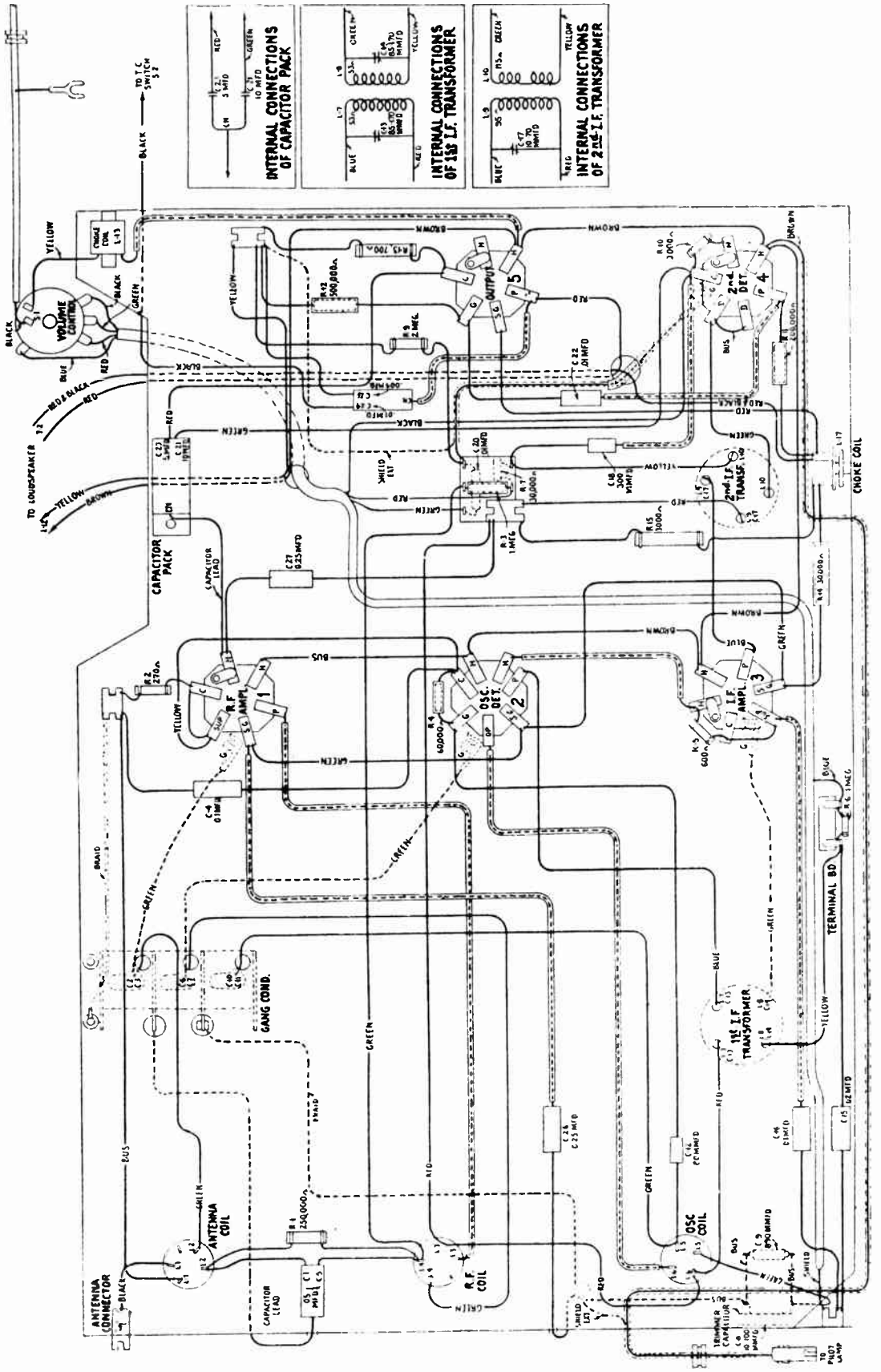


Figure 5—Receiver Assembly Wiring Diagram

SERVICE DATA

(1) Removing Units from Chassis:

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver and soldering iron are the only tools required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

(2) Line-Up Capacitor Adjustments:

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full-Range Test Oscillator, type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the primary and secondary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments:

The three-gang capacitor trimmer screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

(4) R. F. Interference from Vibrator with Shielded Lead-In Disconnected from Antenna:

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The various by-pass capacitors, such as C-28, C-29 and C-30 and chokes L-13, L-14 and L-16, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with one of similar mechanical as well as electrical construction.

(5) Voltage Readings:

The following voltages are those at the tube socket while the receiver is in operating condition. No allowance has been made for currents drawn by the meter and if low resistance meters are used, such allowances must be made.

(6) Vibrator Inverter:

The Vibrator Inverter unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by ... cement, not by attempted adjustment.

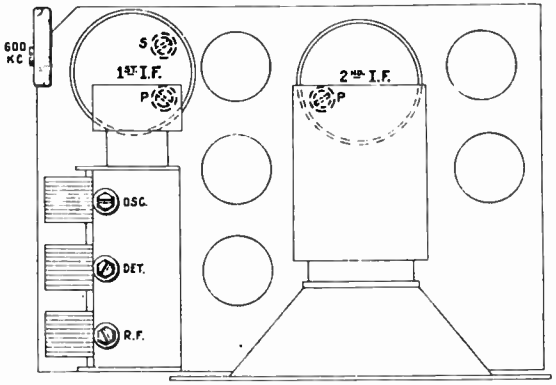


Figure 3—Location of Line-Up Capacitors

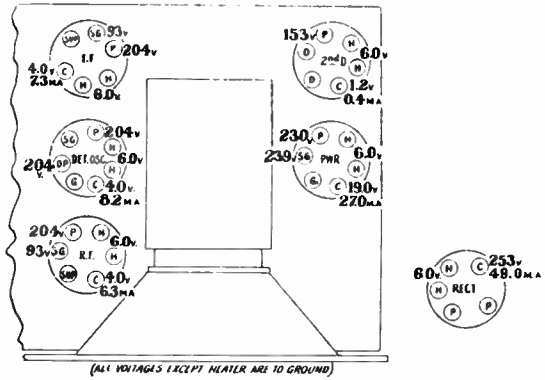


Figure 4—Voltages at Individual Socket Contacts

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	REPRODUCER ASSEMBLIES	
4305	Bracket—Tuning condenser drive bracket assembly	$0.45
6981	Cable—4-conductor shielded volume control cable	.42
4300	Cable—Single-conductor—Power input cable	.56
4301	Cable—Single-conductor—Dial lamp cable	.38
3861	Capacitor—Adjustable trimmer capacitor (C8)	.78
4246	Capacitor—80 mmfd. (C12)	.24
4248	Capacitor—300 mmfd. (C18)	.22
4245	Capacitor—890 mmfd. (C9)	.26
3639	Capacitor—.02 mfd. (C15)	.25
3701	Capacitor—.01 mfd. (C20, C22)	.30
3877	Capacitor—0.1 mfd. (C4, C16)	.32
3597	Capacitor—.25 mfd. (C26, C27)	.40
4304	Capacitor—0.5 mfd. (C28)	.72
6979	Capacitor pack—Comprising one .01 and one .004 mfd. (C24, C25)	.28
6963	Capacitor pack—Comprising one 5. mfd. and one 10 mfd. capacitor (C21, C23)	1.10
4243	Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5)	.35
6965	Coil—Antenna coil (L1, L2)	.70
4299	Coil—Choke coil (L13)	.35
4298	Coil—Choke coil (L17)	.28
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—R. F. coil assembly (L3, L4)	.80
7768	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	4.75
4306	Cord—Tuning condenser drive cord—Package of 10	1.05
6493	Drum—Tuning condenser dial drum and hub with set screws	.40
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
4307	Roller—Tuning condenser idler roller—Package of 5	.25
6135	Resistor—270 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3218	Resistor—600 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
4242	Resistor—3,000 ohms—Carbon type—¼ watt (R10)—Package of 5	1.00
3152	Resistor—30,000 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R11)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R12)—Package of 5	1.00
3033	Resistor — 1 megohm — Carbon type — ¼ watt (R3, R6)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R9)—Package of 5	1.00
4302	Resistor—700 ohms—Carbon type—1 watt (R13)—Package of 10	$2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R14)	.22
4239	Resistor—3,000 ohms—Carbon type—3 watt (R15)	.25
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
4233	Shield—Detector oscillator or output Radiotron shield	.22
4236	Shield—I. F. or R. F. amplifier Radiotron shield	.22
4232	Socket—6-contact Radiotron socket	.35
3572	Socket—7-contact Radiotron socket	.38
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6960	Transformer—First intermediate frequency transformer (L7, L8, C13, C14)	1.80
6962	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.85
6978	Volume control (R8)	1.20
	CONTROL BOX ASSEMBLIES	
6976	Back—Control box back	.75
7769	Box—Control box complete	3.90
3690	Bracket and strap assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
7770	Cover—Control box front cover	.86
4259	Cover—Station selector dial cover—Transparent celluloid—Package of 5	.92
4261	Dial—Station selector dial	.15
4258	Key—Volume control key	.20
4256	Lamp—Dial lamp	.30
4260	Pointer—Station selector indicator	.18
4257	Ring—Station selector dial cover ring (escutcheon)	.75
4262	Screen—Dial light screen—Package of 5	.26
4255	Screw—No. 4-40-¾ inch oval head machine screw for holding cover to control box back—Package of 10	.16
4252	Screw—No. 10-32-11/16-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10	.32
3652	Screw—No. 10-32-¼-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10	.32
4254	Shaft—Volume control coupling shaft	.36
4250	Shaft and gear—Station selector pointer shaft and gear	.56
4251	Shaft and gear—Station selector drive shaft and pinion gear	.20
4253	Spring—Volume control key holding spring—Package of 10	.32

REPLACEMENT PARTS—Continued

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	FLEXIBLE SHAFT AND CABLE ASSEMBLIES	
7762	Cable—Dial lamp cable with socket and section of connector	$.76
4264	Clamp—Metal clamp for holding flexible shafts—Package of 10	.35
4295	Screw—No. 10-32-¼-inch cupped point set screw—Fastens flexible shaft housing to metal case—Package of 10	.20
7771	Shaft—Station selector flexible drive shaft approximately 28 inches long	1.44
7773	Shaft—Station selector flexible drive shaft approximately 23 inches long	1.32
7772	Shaft—Volume control flexible drive shaft approximately 32 inches long	1.68
7774	Shaft—Volume control flexible drive shaft approximately 27 inches long	1.56
4265	Sleeve—Coupling sleeve for volume control shaft—Package of 5	.15
4263	Socket—Dial lamp socket	.20
	POWER SUPPLY UNIT	
4013	Capacitor—200 mmfd. (C30)	.30
4293	Capacitor—0 5 mfd. (C29)	.60
7779	Capacitor—Comprising two .02 mfd. capacitors (C31, C32)	.96
7776	Capacitor—Comprising one 8. mfd. and one 4 mfd. capacitors (C33, C34)	1.90
3956	Clamp—Capacitor mounting clamp—Package of 5	.32
7778	Coil—Filter reactor choke coil (L14)	.45
7777	Reactor—Filter reactor (L16)	1.14
4308	Screw—Binder head No. 6-32-¼-inch screw for mounting capacitor pack—package of 10	.18
6980	Socket—4-contact vibrator socket	.20
7484	Socket—5-contact Rectifier socket	.35
7775	Transformer—Vibrator transformer (T1)	3.78
7780	Vibrator complete (L15)	4.96
	REPRODUCER ASSEMBLIES	
9496	Coil—Field coil, magnet and cone support (L12)	2.95
9492	Cone—Reproducer cone (L11)—Package of 5	3.70
6982	Transformer—Output transformer (T2)	1.35
9494	Reproducer complete	5.65
4277	Screw—No. 8-32-⅜-inch binder head reproducer mounting screw—Package of 10	.22
	HOUSING ASSEMBLIES	
4322	Bracket assembly—Station selector drive shaft bracket and bushing	.28
4321	Cloth—Grille cloth	.22
7781	Housing—Front section of housing complete—Less hinge pin	3.38
7782	Housing—Rear section of housing complete—Less hinge pin	$2.68
4320	Nut—Wing nut—Package of 10	.38
4266	Pin—Hinge pin—Package of 5	.42
4318	Screw—Wing screw—Package of 10	.98
4319	Screw—No. 6-¼-inch slotted hex head self tapping—Fastens case bottom to front section of housing—Package of 10	.50
4295	Screw—No. 10-32-¼-inch headless set screw—Used to fasten drive shafts to housing—Package of 10	.20
	MISCELLANEOUS ASSEMBLIES	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
3689	Bracket—Receiver mounting bracket, bolt and nut assembly	.30
4283	Cable — Antenna lead-in cable — Approximately 35 inches long	.80
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—Ammeter capacitor—.5 mfd.	.60
4292	Capacitor—Generator capacitor—.5 mfd.	.90
4291	Clip—"A" supply clip—Package of 10	.70
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
3646	Fuse—20 ampere (F1)—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4323	Knob—Tone control switch knob—Package of 5	.70
4282	Knob—Station selector knob—Package of 5.	.65
7766	Lead—Power lead with female section of fuse connector—From power cable to battery	.30
4492	Plate—Ornamental plate located on housing front—Package of 2	.58
4494	Plate—RCA Victor name plate	.94
4493	Screw—No. 4 self-tapping screw for mounting ornamental plates—Package of 10	.56
4495	Screw—No. 8 self-tapping screw for mounting station selector drive shaft and bushing—Package of 10	.52
4294	Screw—No. 10-32-⅜-inch hex head used to mount receiver chassis to housing—Package of 10	.45
4303	Screw—No. 10-32-⅞-inch hex head used to mount power unit to housing—Package of 10	.22
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
6152	Suppressor—Distributor suppressor	.56
6151	Suppressor—Spark plug suppressor	.56
6669	Switch—Tone control switch (S2)	.50
4285	Washer—Antenna or fuse connector insulating washer—Package of 10	.22

RCA MFG. CO., INC.

MODEL M-107
Voltage
Chassis Wiring

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal—Minimum Volume

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, D. C.
RCA-6D6—R. F.		4.0	93	204	6.3	6.0
RCA-6A7	1st Det.	4.0	93	204	8.2	6.0
	Osc.	—	—	204		
RCA-6D6—I. F.		4.0	93	204	7.3	6.0
RCA-75—2nd Det.		1.2	—	153*	0.4	6.0
RCA-41—Pwr.		19.0	239	230	27.0	6.0
RCA-84—Rect.		253	—	—	49.0	6.0

* Voltage impossible to measure with ordinary voltmeter.

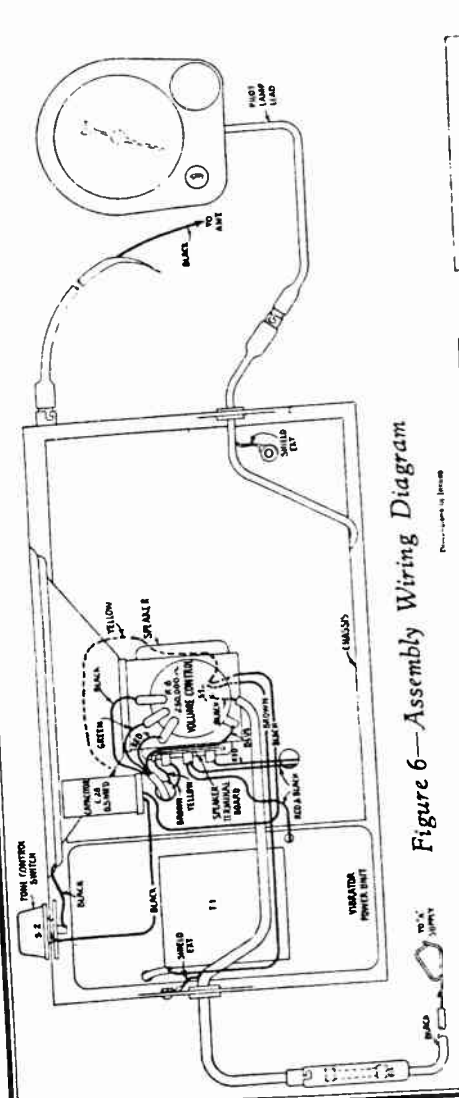


Figure 6—Assembly Wiring Diagram

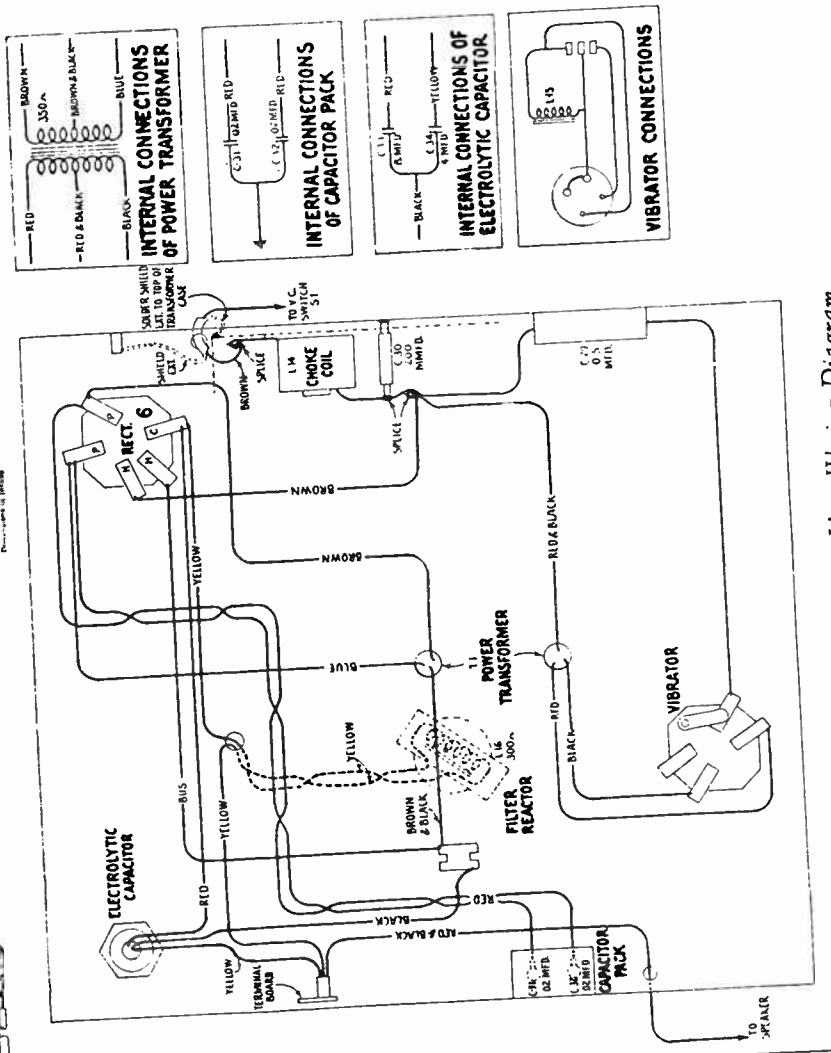


Figure 7—Power Unit Wiring Diagram

DESCRIPTION OF ELECTRICAL CIRCUIT

The electrical arrangement of the receiver is shown in the schematic of Figure 3. A corresponding wiring layout is shown in Figure 4, where the actual physical relations and coding of conductors are given.

The tube line-up in the superheterodyne circuit consists of seven Radiotrons. In sequence, there is an r-f stage, a dual first detector and oscillator stage, a single i-f stage, a combined second detector-audio amplifier-a.v.c. stage, an audio driver stage, a push-pull power output stage, and a full-wave rectifier. There are five circuits which are tuned to the signal desired, to strengthen its magnitude and reject undesired signals and interference.

The following describes the functions of the various stages of the receiver: Beginning at the antenna circuit, there is a special transmission line and "noise filter" circuit, which, in conjunction with the tuned input system, acts selectively to the entire broadcast range and drastically attenuates signals and interference outside the limits of the band (540-1600 kc.). These properties of the filter circuit and minimizing of primary to secondary capacity coupling in first r-f transformer cause a very great reduction of the ignition noise present when the car is in operation. The ground of the input coil does not appear at the usual point on the chassis frame, but instead is extended as part of the antenna transmission line lead-in to the outer termination of the shield, where it grounds to the frame of the car. This arrangement prevents r-f disturbances which are circulating in the car frame (ground) from becoming mutual to the receiver input. The characteristics of the transmission line section of the antenna lead-in are such as to favor the operation of the noise filter. Its distributed capacitance due to length, conductor sizes, insulation, etc., is of such value as to operate with the inductance and capacitance elements of the input system to obtain a "band-pass" filtering effect. The filter has an acceptance band between 540 kc. and 1600 kc., and sharply defined cut-off below and above these two limits. It is generally possible, because of this input arrangement, to dispense with the usual spark-plug and distributor suppressors without encountering substantial ignition interference on latest types of cars.

After passing through the input filter the signal is applied by transformer action to the control grid of the r-f stage. An RCA-6D6 at this point performs the function of an r-f amplifier, its super-control property being adapted as means of preventing cross-modulation and securing a wide range of volume control. The first (front) section of the tuning condenser is connected to sharply tune the secondary of the antenna coupling transformer.

A second r-f coupling transformer transmits the signal to the following receiver stage, which comprises a combination first detector and local oscillator. The secondary inductance of this transformer is tuned by the second (center) section of the variable capacitor and connects to the detector grid of the RCA-6A7 Radiotron. The local oscillator circuit is established by mutual arrangement of the several elements within this tube. Here the incoming signal is mixed with the local oscillator frequency. The difference frequency beat (i. f.) of these two combined signals is detected by the tube and transferred by a closely coupled transformer to the intermediate-frequency amplifier tube, an RCA-6D6. Both windings of this i-f transformer are tuned by trimmers. The second i-f transformer which joins the RCA-6D6 to the second detector stage has only one trimmer, that being in shunt with its primary winding.

The RCA-6B7 second detector stage receives the i-f signal on its diode plates. Detection takes place as a result of the rectifying action of the diodes and develops a current through the resistors R7 and R10. The d-c voltage drop across the resistance R7 plus R10 is used for automatically regulating the control grid bias of the r-f and first detector stages. The amplification thus becomes dependent upon the signal strength. This process (a.v.c.) compensates for fading signals and tendency toward reduction of signals due to change of antenna direction and shielding effect of buildings, etc. A smaller portion of the d-c voltage obtained by detection is tapped from the juncture of R7 and R10 and is carried to the control grid of the i-f stage. This likewise furnishes automatic volume control, but in a smaller degree.

The audio and d-c components of the detected signal are selected from the resistor R10 by its movable arm and applied to the control grid of the RCA-6B7. The d-c obtained from the signal and applied to the grid prevents overload as the volume control is advanced. Amplification results and the signal passes on to the audio-driver stage. The RCA-76 Radiotron used as an a-f amplifier is resistance-capacitance coupled to the detector stage output. Its plate is matched to the power output stage by a transformer.

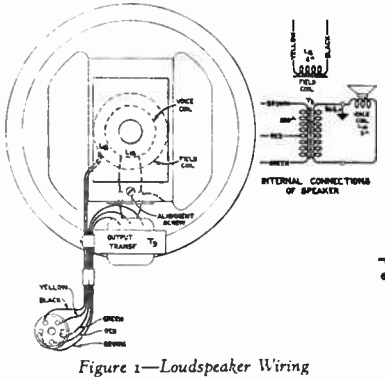


Figure 1—Loudspeaker Wiring

The output stage utilizes an RCA-6A6 tube which performs as a push-pull type. It delivers a high level-high quality signal to the remote loudspeaker unit.

The power supply system consists of a mechanical vibrator for interrupting the d-c from the battery in order to transform the current to high voltage, which in turn is rectified by a full-wave tube, an RCA-84. The vibrator used is adapted for convenient removability by having its base constructed for "plug-in" mounting.

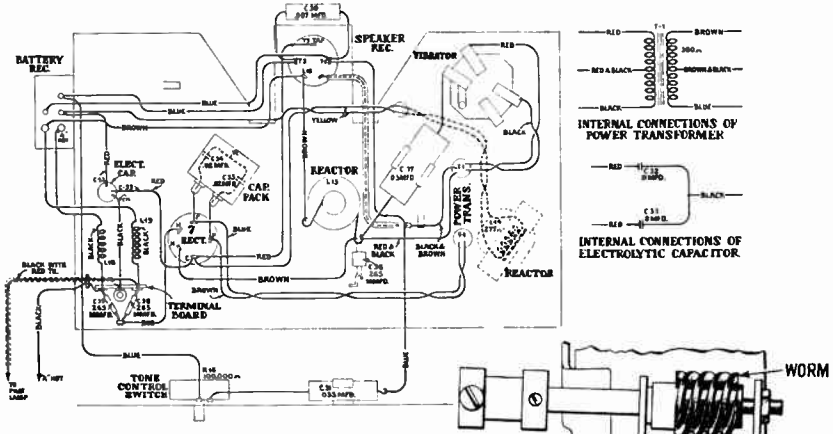


Figure 2—Power Unit Wiring

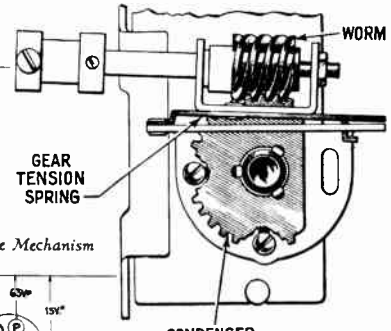


Figure 6—Condenser Drive Mechanism

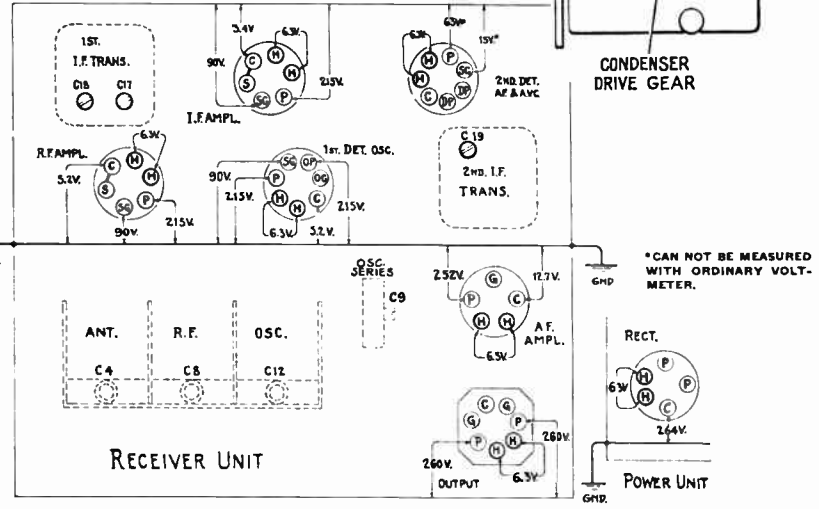


Figure 5—Trimmer Locations and Radiotron Socket Voltages to Ground
(Measured at 6.6 volts battery—Volume Control Maximum—No Signal)

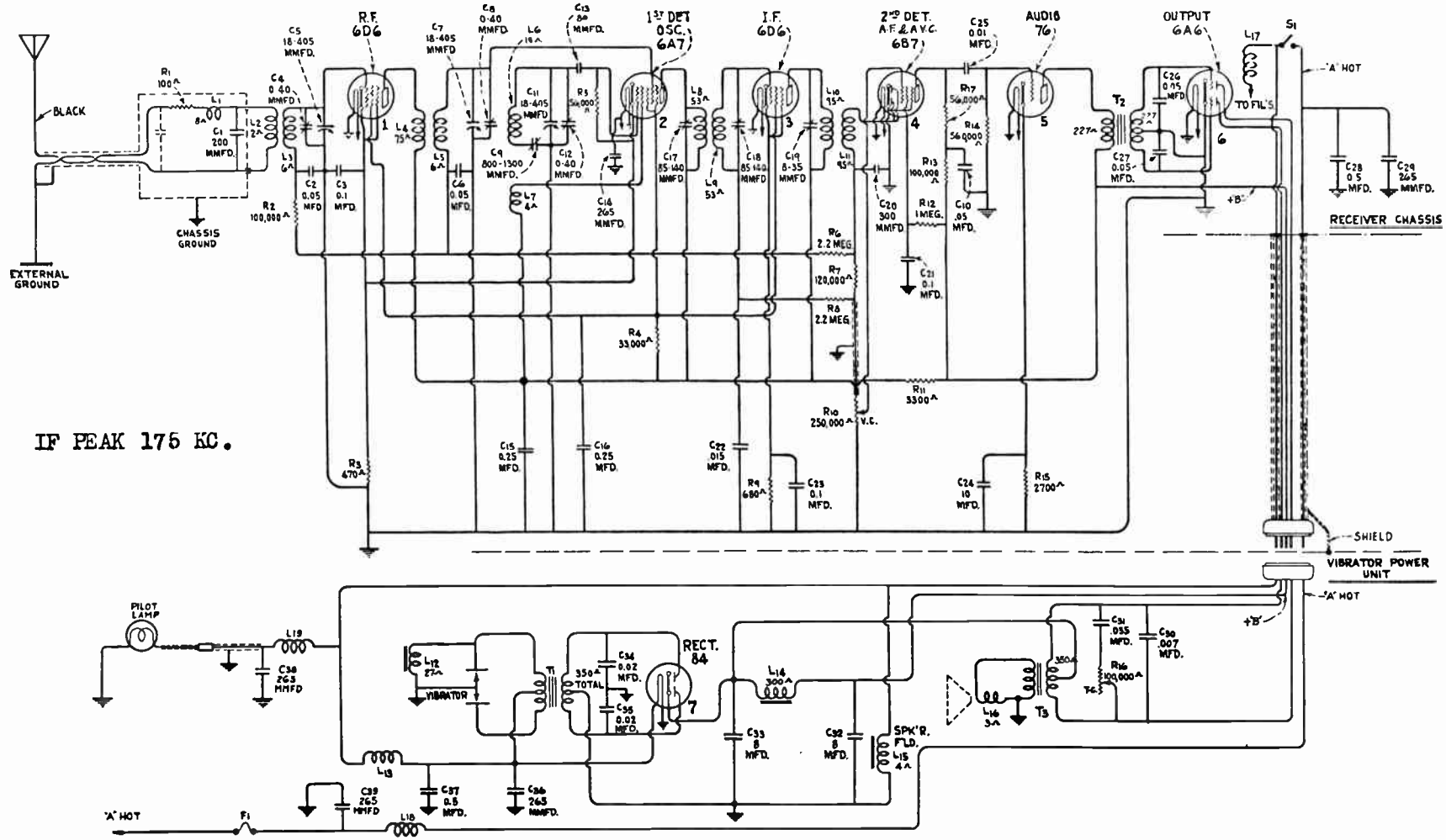


Figure 3—Schematic Circuit Diagram

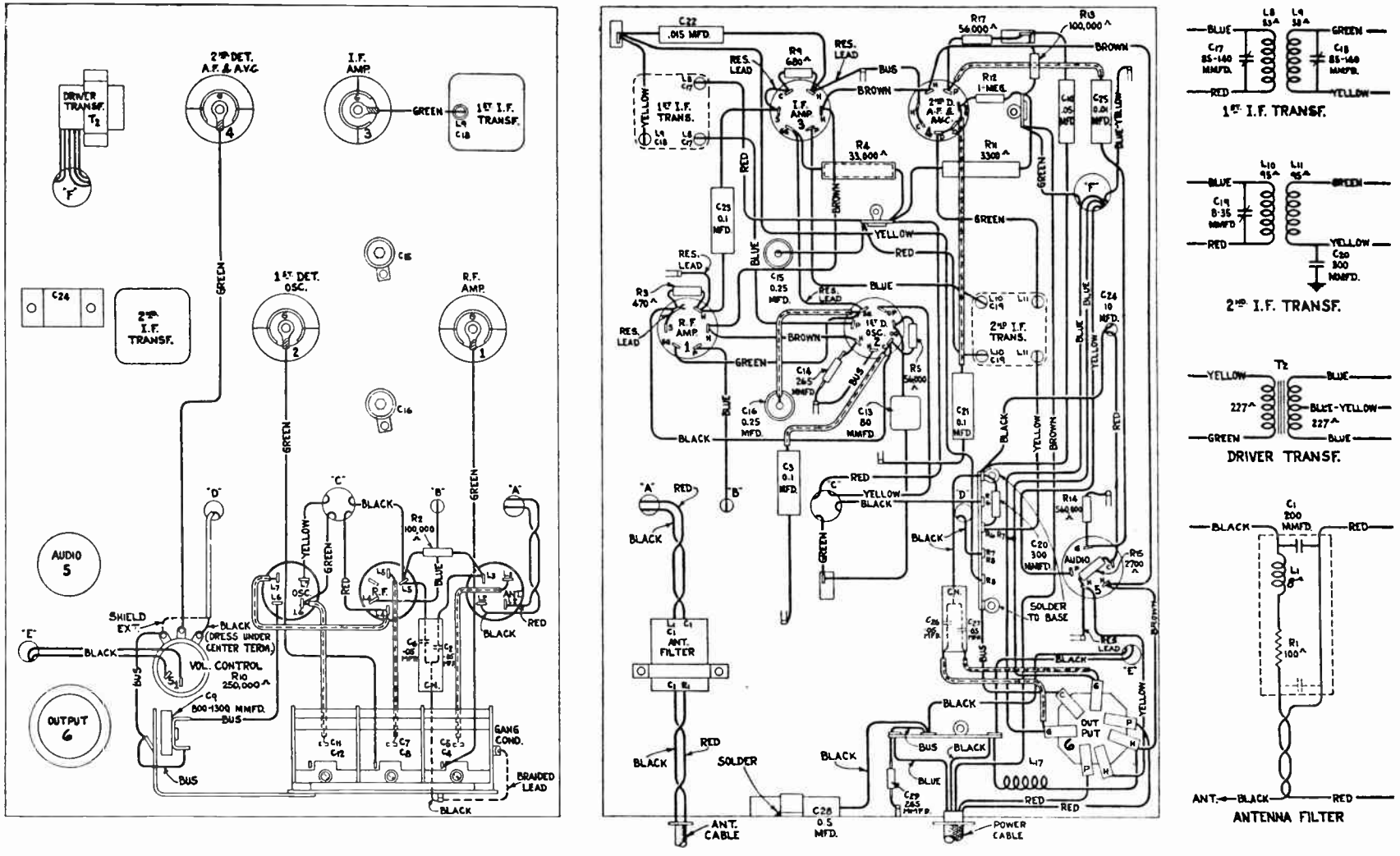


Figure 4—Chassis Wiring Diagram

Preparatory Details

(a) **Dial Calibration**—The tuning condenser flexible shaft engages a gear system within the control unit which actuates the dial pointer. To adjust the mechanical relations of the variable condenser and the dial pointer so that accurate calibration is obtained:—rotate the station selector knob until the variable capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the last radial line at the low-frequency end of the scale. (The line referred to is the second one counter-clockwise of the 550 kc. marking.)

(b) **General Procedure**—The "Output Indicator" should be attached to the voice coil or speaker input circuit; and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

I-F Adjustments

Three trimmers are provided in the i-f system. Two are located on the first i-f transformer, and one on the second i-f transformer. Their physical positions are shown in Figure 5. To correct their alignment proceed as follows:

(a) Connect the output of the "Full Range Oscillator" to the first detector grid and ground, and adjust its frequency to 175 kc. Tune the station selector to a point where no signals are received.

(b) Tune each of the trimmer capacitors C19, C18 and C17 in order. C19 should be set for maximum (peak) output. C18 and C17 should be roughly adjusted for maximum output and then carefully "trimmed" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of the 175 kc. and noting whether or not the receiver output remains substantially constant.

R. F., Detector and Oscillator Adjustments

Three adjustments are used at the high-frequency end of the tuning range. They are located on the gang condenser as shown by the diagram of Figure 5. One trimmer (C9) is used in the oscillator circuit for alignment at 600 kc., it being located as shown in Figure 5.

The external oscillator should be connected to the antenna-ground input at the outer end of the lead-in shield through a 300-ohm resistor in the antenna side. Tuning should be done as follows:

(a) Adjust the frequency of the external oscillator to 1400 kc. and turn the station selector until the dial pointer is at the 1400 kc. marking.

(b) Tune the oscillator high-frequency trimmer, C12, the detector trimmer C8 and the r-f trimmer C4 for maximum receiver output.

(c) Set the external oscillator to a frequency of 600 kc. and rotate the station selector until this signal is accurately tuned. Then adjust the oscillator trimmer C9, simultaneously rocking the tuning condenser slowly through the signal until maximum obtainable output results from the two combined operations. This adjustment should be made irrespective of dial calibration.

(d) Recheck the adjustment of the 1400 kc. oscillator trimmer (C12) as in (b) to correct any reflective errors caused by the procedure of (c).

Tuning Condenser Drive

The coupling of the flexible drive shaft to the variable tuning condenser is through a worm-gear arrangement. Figure 6 shows the two gears and their positions. Smooth operation should be obtained over the entire tuning range. The presence of binding or backlash may cause irregularity in the tuning. To correct these conditions, it will be necessary to remove the chassis from the case and the following procedure applied:—Loosen the two screws behind the condenser drive gear which clamp the worm-gear support plate, and shift the plate upward or downward to change the degree of gear mesh and tension of the spring as required for smooth operation. The screws should then be carefully re-tightened.

Pilot Lamp

A novel type of mounting is provided for the pilot lamp. It consists of a miniature socket attached to a heavy screw which threads into the case of the control unit. The head of this screw is accessible from the underside of the control unit and may be removed with a large screwdriver whenever it becomes necessary to replace the pilot lamp. The power switch should be turned to "off" in order to prevent blowing the fuse if the lamp socket should come in contact with the grounded control case.

Power Unit Interrupter

The mechanical interrupter used in combination with a tube rectifier in the power unit is constructed so as to be conveniently exchanged. Its base is of the "plug-in" type. The adjustments of this device have been correctly set during manufacture by means of special equipment. They should therefore be left undisturbed. In cases of faulty operation, a renewal should be installed.

Speaker Cone Alignment

In the event the cone coil becomes mis-aligned, it will be necessary to correct its centering by an adjustment provided on the speaker assembly. The coil is supported by an external spider. Two round-head brass screws secure its mounting. To center the cone, loosen these two screws and insert a small rod or nail into the hole adjacent to one of these screws and pry the cone mounting into the position which gives normal operation.

Miscellaneous Service Hints

1. The grounding of the outer end of the antenna lead shield is quite critical in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

2. In some cars, ignition interference may be introduced through lack of sufficient shielding on the antenna lead-in. In such cases, a shield should be placed over the exposed section of lead and carried as near to the antenna as possible. It should be solidly grounded.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4993	Bumper — Rubber bumper for condenser mounting bracket—Package of 5	$0.25
4955	Capacitor — Adjustable trimmer capacitor (C9)	.48
4246	Capacitor—80 mmfd. (C13)	.24
5078	Capacitor—200 mmfd. (C14, C29)	.24
4248	Capacitor—300 mmfd. (C20)	.22
4792	Capacitor—0.015 mfd. (C22)	.22
4882	Capacitor—0.01 mfd. (C25)	.20
4886	Capacitor—0.05 mfd. (C10)	.20
4885	Capacitor—0.1 mfd. (C21)	.28
4841	Capacitor—0.1 mfd. (C3, C23)	.22
4967	Capacitor—0.25 mfd. (C15, C16)	.46
4011	Capacitor—0.5 mfd. generator capacitor	.60
5054	Capacitor—10 mfd. (C24)	1.80
4243	Capacitor pack—Comprising two 0.05 mfd. capacitors (C2, C6, C26, C27)	.35
5074	Clamp—Radiotron shield clamp	.14
4950	Coil—Antenna coil (L3, L4)	.74
5142	Coil—Choke coil (L17)	.15
6967	Coil—Oscillator coil (L6, L7)	.52
6966	Coil—R.F. coil (L4, L5)	.80
5061	Condenser—3-gang variable tuning condenser (C4, C5, C7, C8, C11, C12)	3.68
5018	Volume control (R10)	1.00
5163	Filter—Antenna filter (R1, C1, L1)	1.45
5062	Gear—Condenser drive gear—Located on condenser drive shaft	.12
5030	Resistor—Carbon type—½ watt—470 ohms (R3)—Package of 5	1.00
5031	Resistor—680 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
5144	Resistor — 2700 ohms — Carbon type — ½ watt (R15)—Package of 5	1.00
5147	Resistor — 3300 ohms — Carbon type — 1 watt (R11)	.22
5033	Resistor — 33,000 ohms — Carbon type — 1 watt (R4)—Package of 5	1.10
5029	Resistor—56,000 ohms—Carbon type—½ watt (R5, R17)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—½ watt (R2, R13)—Package of 5	1.00
5035	Resistor—560,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—½ watt (R12)—Package of 5	1.00
3584	Ring—Antenna, r-f, or oscillator coil retaining ring—Package of 5	$0.40
5129	Ring—Radiotron shield ring—Package of 5	.10
4953	Shield—First intermediate frequency transformer shield	.24
4956	Shield—Second intermediate frequency transformer shield	.30
5037	Shield—Radiotron shield	.15
5058	Socket—5-contact Radiotron socket	.18
4946	Socket—6-contact Radiotron socket	.18
4947	Socket—7-contact Radiotron socket	.18
5060	Socket—7-prong Radiotron output socket	.20
5064	Stud—Variable condenser bracket mounting assembly—Comprising one stud, one bushing, one washer and one lockwasher	.12
5057	Transformer—Driver transformer (T2)	1.00
5055	Transformer—First intermediate frequency transformer (L8, L9, C17, C18)	1.32
5056	Transformer—Second intermediate frequency transformer (L10, L11, C19)	1.42
5063	Worm—Condenser drive worm gear	.54
	POWER UNIT ASSEMBLIES	
5078	Capacitor—200 mmfd. (C36, C38, C39)	.24
5148	Capacitor—0.007 mfd. (C30)	.20
5073	Capacitor—0.035 mfd. high-frequency tone control capacitor (C31)	.44
4490	Capacitor—0.5 mfd. (C37)	.62
5070	Capacitor pack—Comprising two 0.02 mfd. capacitors (C34, C35)	.74
5069	Capacitor pack—Comprising two 8 mfd. capacitors (C32, C33)	1.76
5075	Clamp—Mounting clamp for capacitor—Stock No. 4490	.08
5068	Cup—Grounding cup	.10
4693	Clamp—Mounting clamp for capacitor—Stock No. 5069	.15
5143	Coil—Choke coil (L18, L19)	.15
5072	Tone control (R16)	.82
4085	Knob—Tone control knob—Package of 5	.60
7778	Reactor—Filter reactor (L13)	.45
5066	Reactor—Filter reactor (L14)	.88
5071	Receptacle—Power cable plug female receptacle—5-contact—Female section	.20
6980	Socket—4-contact vibrator socket	.20
5058	Socket—5-contact Radiotron socket or reproducer plug receptacle	$0.18
5065	Transformer—Power transformer (T1)	2.48
5067	Vibrator—Complete (L12)	3.66
	CABLE ASSEMBLIES	
4976	Cable—Antenna lead assembly—Single-conductor with male section of antenna connector	.16
7766	Cable—Power lead with clip and female section of fuse connector—To ammeter	.30
5059	Cable—Main power cable—Complete—With male section of connector plug, fuse connector and fuse, ammeter clip and female section of pilot light cable connector	1.50
5150	Cap—Cap for power cable plug	.22
5149	Plug—Power cable plug—Less cap	.20
	FLEXIBLE SHAFT ASSEMBLIES	
5000	Bracket—Flexible drive shaft connection bracket—Mounted on housing	.30
4973	Coupling—Tuning condenser flexible drive shaft coupling	.30
5141	Coupling—Volume control flexible drive shaft coupling	.36
3903	Screw—No. 8-32-3/16" headless set screw for flexible drive shaft coupling—Package of 20	.36
7855	Shaft—Tuning condenser or volume control flexible drive shaft—Approximately 28 3/4" long	1.00
	CONTROL BOX ASSEMBLIES	
4987	Bezel—Station selector dial bezel	.42
7865	Box—Control box—Complete	3.86
7864	Bracket—Mounting bracket and rear section of control box housing	.30
4988	Crystal—Station selector dial crystal	.38
4989	Dial—Station selector dial	.20
4981	Gear—18-tooth intermediate drive gear	.15
4978	Gear—Indicator drive gear and shaft	.42
7862	Housing—Front section of control box housing	.28
7863	Housing—Center section of control box housing	.32
4990	Indicator—Station selector (pointer) indicator	.10
4985	Knob—Station selector or volume control knob—Package of 5	.62
4991	Lamp—Dial lamp—Package of 5	$0.74
7866	Plate—Bearing plate assembly—Comprising plate, gear and shaft, volume control shaft, station selector shaft, pinion and spring	1.22
4986	Screw—Oval fillister head machine screw—Fastens bracket and center section of control box housing	.25
5042	Screw—No. 8-32-1/8" headless set screw for station selector or volume control shaft—Package of 10	.25
4983	Shaft—Station selector drive shaft	.16
4979	Shaft—Volume control drive shaft	.16
4984	Socket—Dial lamp socket	.16
4982	Spring—Holding spring for station selector or volume control knob—Package of 10	.26
4980	Spring—Tension spring—Package of 5	.15
5011	Strap—Control box mounting strap	.25
	REPRODUCER ASSEMBLIES	
9597	Coil—Field coil (L15)	2.62
9598	Cone—Reproducer cone (L16)—Package of 5	3.90
9596	Reproducer—Complete	8.00
4995	Screw—Reproducer mounting screw—Package of 10	.15
5090	Transformer—Output transformer (T3)	2.62
	MISCELLANEOUS ASSEMBLIES	
4244	Cap—Grid contact cap—Package of 5	.20
4293	Capacitor—0.5 mfd. ammeter capacitor	.60
5025	Capacitor—0.5 mfd. generator capacitor	.40
7871	Case—Complete—With top and bottom cover—Less screws	3.28
7952	Cover—Bottom cover of receiver case—Less screws	.35
7953	Cover—Top cover of receiving case—Less screws	.35
5023	Fuse—15-ampere—Package of 5	.40
4985	Knob—Package of 5	.62
4999	Screw—No. 8-¼" slotted hex-head self-tapping screw—Package of 5	.12
5037	Shield—Radiotron shield	.15
4992	Stud—Receiver mounting stud, nut and washer—Package of 3	.22
5024	Suppressor—Distributor suppressor	.38
5067	Vibrator—Complete	3.66

MODEL M-116
Schematic

RCA MFG. CO., INC.

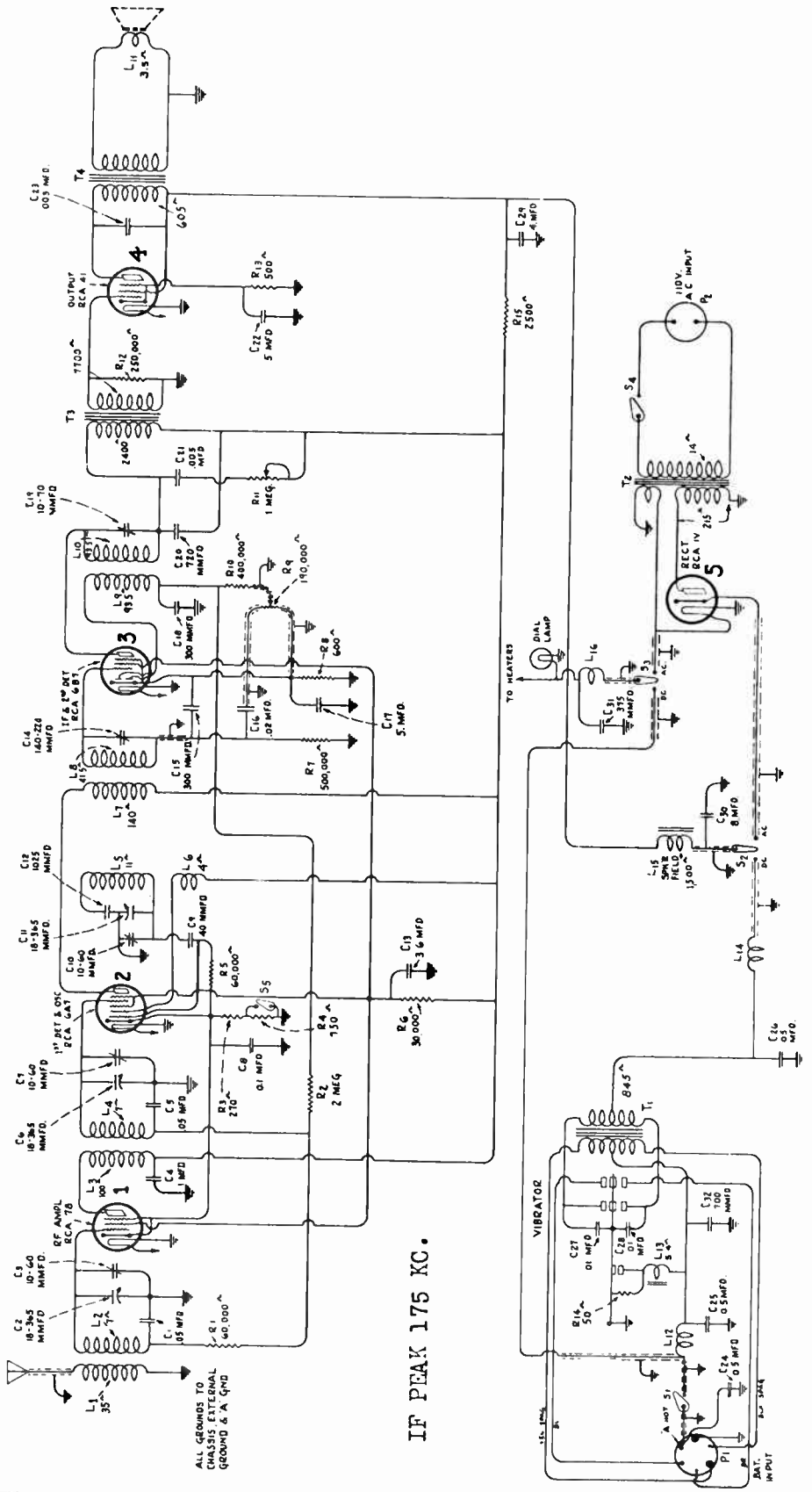


Figure A—Schematic Circuit Diagram

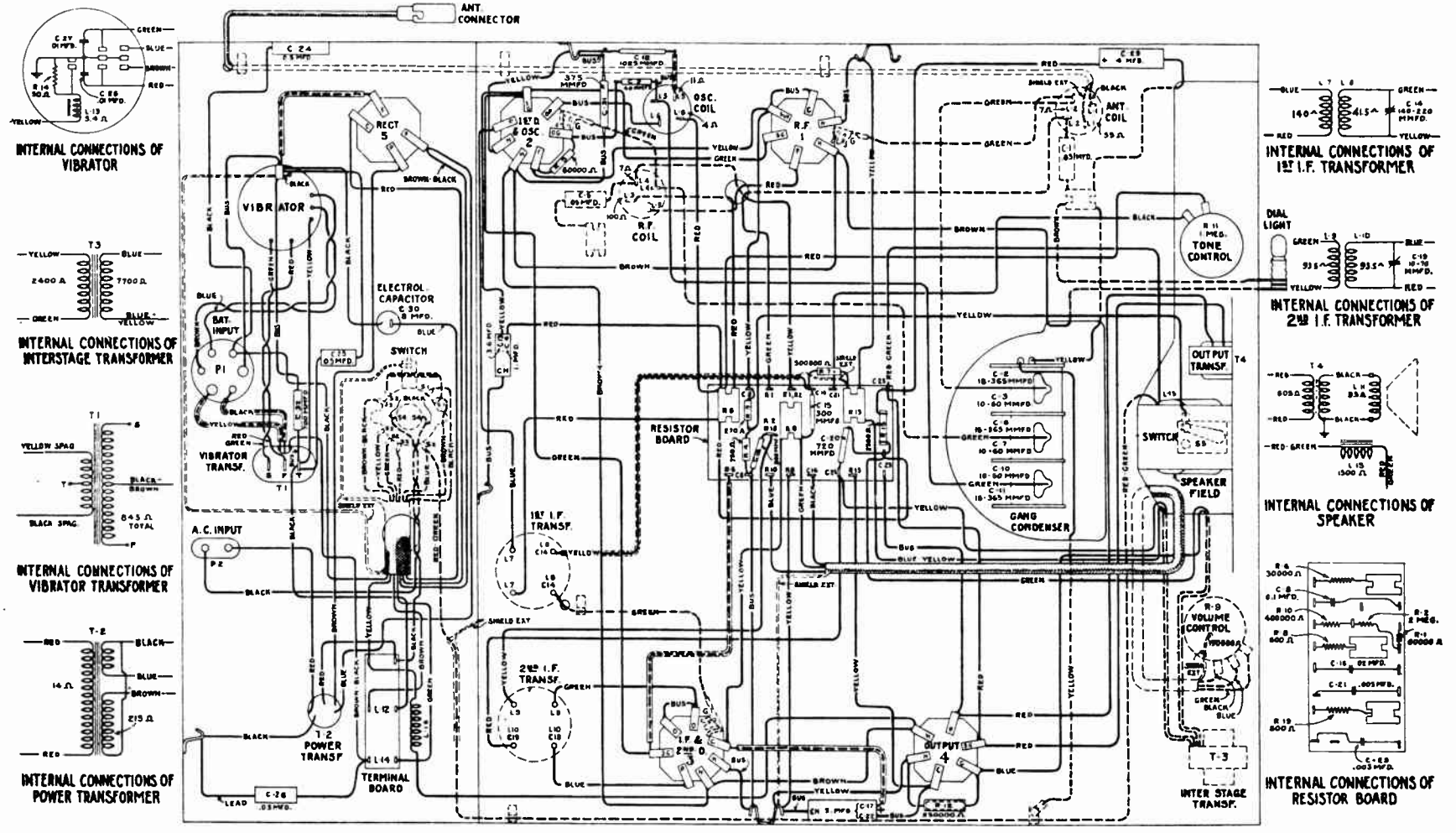


Figure B—Wiring Diagram

RCA MFG. CO., INC.

MODEL M-116
Voltage
Alignment Data

Power Requirements.....105–125 volt, 50–60 Cycle A. C. or 6-volt Storage Battery
Power Consumption..115 Volts, 60 Cycles A. C.—40 Watts, Battery—5.7 Amperes at 6.3 Volts
Number and Types of Radiotrons.....1 RCA-78, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-41, 1 RCA-1-V—Total 5
Maximum Undistorted Power Output.....1.8 Watts
Maximum Output.....3.6 Watts
Type of Rectifier.....A. C.—Radiotron RCA-1-V Battery—Vibrator Inverter-Rectifier
Tuning Frequency Range.....540 K. C.–1500 K. C.

This automobile receiver is of unique design and construction. Among its many features is its adaptability to either battery or 110-volt alternating current operation. This is accomplished by having a separate power transformer and a

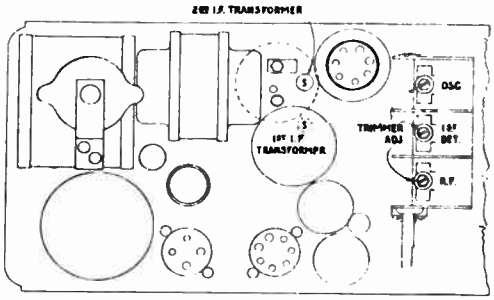


Figure C—Location of Line-up Capacitors

tube rectifier for alternating current, while the conventional vibrator inverter-rectifier with its associated transformer is used for battery operation.

Other important features include its compact portable size, full vision "airplane" type dial, tone control, sensitivity switch, electro-dynamic loudspeaker and the inherent sensitivity, selectivity and tone quality characteristic of the superheterodyne.

Figure A shows the schematic diagram, Figure B the wiring diagram, Figure C the location of the line-up capacitors and Figure D the wiring of the battery cable. A brief description of the circuit follows:

Radio Circuit—The radio circuit consists of four Radiotrons; namely, an RCA-78 R. F. stage, an RCA-6A7 first detector-oscillator, an RCA-6B7 intermediate frequency amplifier, second detector and A. V. C. and an RCA-41 output amplifier.

Power Circuit—The power circuit for battery operation consists of a vibrator inverter-rectifier with its associated transformer and filter circuits. The heaters of the various Radiotrons are powered direct from the car storage battery. The operating switch is so arranged that at one position battery operation is obtained, while at the other position, proper connections are made for A. C. operation.

When the switch is at the A. C. position, the A. C. input current is connected to the primary of the A. C. transformer. Two secondaries are provided, one for furnishing power to the Radiotron heaters and the dial lamp, the other for plate supply to Rectifier RCA-1-V. The output of the rectifier is then filtered by the same filtering system as that used for battery operation. The loudspeaker field is used as a filter reactor.

Inverter-Rectifier Adjustments

This receiver uses a vibrator inverter-rectifier for supplying all plate and grid voltages when operated from a battery source. *This unit is accurately adjusted and sealed at the factory and service adjustment should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. In order to make these adjustments, it is first necessary to remove the cover of the instrument. The following procedure should be used:

R. F. Adjustment:

(a) Check the position of the dial pointer. It should be aligned with the low-frequency end graduation, as indicated by the small arrow marked "Max. Cap." when the tuning capacitor rotor is fully meshed with the stator.

(b) Procure a modulated oscillator giving a signal at 1400 K. C. (Stock No. 9080), a non-metallic screw driver (Stock No. 7065) and an output meter. Connect the output meter across the cone coil of the loudspeaker.

(c) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(d) Place the oscillator and receiver in operation and adjust the oscillator output so that a small deflection is obtained in the output meter when the volume control is at its maximum position.

(e) Then adjust the three line-up capacitors until a maximum deflection in the output meter is obtained. Readjust these capacitors a second time, as there is a slight interlocking of adjustments.

I. F. Adjustments:

(a) Procure a modulated oscillator giving a signal at 175 K. C. (Stock No. 9080), a non-metallic screw driver (Stock No. 7065) and an output meter.

(b) Connect the oscillator between the control grid of the first detector and ground.

(c) Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(d) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output. At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

RADIOTRON SOCKET VOLTAGES

115 Volts A. C. or 6.3 Volt Battery—No Signal—Max. Sensitivity

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.2	86	216	5.5	5.9
RCA-6A7	First Detector	4.2	86	216	10.0 Total	5.9
	Oscillator		—	216		
RCA-6B7 Second Det.		2.7	87	207	4.5	5.9
RCA-41 Power		15.0	255	235	30.0	5.9
RCA-1-V		—	—	325 RMS	50.0	5.9

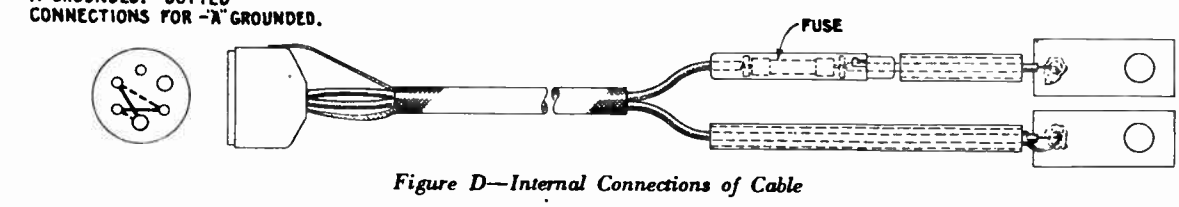


Figure D—Internal Connections of Cable

INSTALLATION

Automobile Installation

A typical installation of this receiver in an auto is accomplished in the following manner: Lift the seat upon which the instrument will rest, lay the battery cable and antenna shielded lead-in wire in position and then replace the seat. In cases where the automobile battery is mounted beneath that seat, however, it will be necessary to connect the battery cable to the battery (as described in the subsequent paragraph entitled "Connection to Battery") before replacing the seat. Finally, mount the receiver on the seat, attach the connector of the lead-in wire to the short (antenna) lead extending from the rear of the instrument and, with the power switch "off" (in AC position), insert the battery cable plug in the receptacle located adjacent to the antenna lead entrance.

Connection to Antenna—Feed the antenna lead-in wire beneath floor mat to the side of car nearest the wire extending from the antenna. The wire from a factory-installed roof antenna ordinarily is brought down one of the front pillar posts and left in a coil behind the instrument panel. In such cases, therefore, the lead-in wire after leaving the floor mat should be concealed behind the kick-board, then soldered to the wire extending from the antenna at the lower end of the body pillar post, after cutting the necessary length from each wire to eliminate excessive slack. Insulate the joint with tape and then solder or bond the pig-tail extension from the lead-in shield braid to the car frame.

A similar procedure is followed when either alternative form of antenna ("interior" roof or plate type) is employed except that the lead-in wire probably will follow a different route in each case. Such antennas should be mounted as far to the rear of the car as possible to insure minimum ignition interference. The lead-in wire for the interior type unit thus may be carried down the rear quarter of top and then behind the back cushion of seat in open and convertible models or may be anchored to any convenient pillar post in closed models. With the plate antenna, the lead-in wire should be fed through any opening in the floor board.

Connection to Battery—Since, in most cars, the storage battery is located below the floor boards of the driving compartment, the battery cable has been made sufficiently long to reach the battery after passing beneath the driver's seat (see note concerning longer cable available for rear seat operation—Equipment, "Battery Cable Package"). Run the cable under the floor mat and through the floor opening provided above the battery and connect the cable lugs to the battery terminal clamps as illustrated. The lug stamped "BATT. GROUND" must be connected to that side of the battery grounded to the car frame and the remaining lug (on lead with fuse receptacle) attached to the supply side of the battery. Finally, replace the floor cover, notching the side of the opening if necessary to provide clearance for the battery cable.

Suppression of Ignition Interference—

1. Disconnect all wires from the spark plugs. Fasten one spark-plug suppressor to the top of each plug and re-attach the wires to the free ends of the suppressors. These suppressors may be mounted either in line with or at right angles to the plugs in order to avoid interference with metallic parts grounded to the engine or frame.

2. If the distributor is of the plug-in type, disconnect the center wire from the head. Plug the distributor suppressor into the distributor head and insert the wire in the free end of the suppressor.

NOTE—For cap-type distributors, exchange the distributor suppressor at your dealer's for one of a special type. Cut the wire leading from the distributor to the coil and screw the suppressor into the end attached to the distributor. Screw the other end of the wire (leading to the coil) into the opposite end of the suppressor.

3. Clamp the generator capacitor against the generator frame. The screw holding the cut-out ordinarily may be utilized for securing this unit. Connect the capacitor lead to the terminal on the generator side of the cut-out switch. (In some cases, however, less interference will be encountered with this lead connected to the opposite side of the cutout; the most suitable position therefore should be determined by trial.)

4. The ignition capacitor (unit with two leads) must be connected between the battery terminal of the ammeter and any convenient screw on the instrument panel. In certain cars, interference will be reduced still further by connecting an additional capacitor (obtainable from your dealer) between the battery side of the ignition coil and the car frame.

Home Installation

The circular insert on the frontispiece illustrates a typical installation of this receiver on lighting-circuit operation. Simply place the instrument upon a table or other level surface, attach the antenna lead-in wire (using the small connector furnished) and, with the power switch "off" (in "AUTO" position), connect the power cord to an electrical outlet supplying *alternating current* at the voltage and frequency (cycles) specified on the rating label inside the case.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—½ watt (R6)	80.22
2734	Capacitor—745 mfd. (C-36)—Package of 5	1.50
2747	Cap—Contact cap—Package of 5	.50
2917	Washer—"C" washer for condenser drum and shaft assembly—Package of 10	.25
3218	Resistor—600 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3469	Resistor—2,500 ohms—Carbon type—1 watt (R15)—Package of 5	1.10
3536	Capacitor—Comprising two 5.0 mfd. (C17, C23)	1.10
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5	.40
3597	Capacitor—0.25 mfd. (C33)	.40
3602	Resistor—60,000 ohms—Carbon type—½ watt (R1, R5)—Package of 5	1.00
3619	Resistor—600,000 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
3621	Coil—Choke coil—Located on terminal board (L14)	.35
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type (R13)—Package of 5	1.10
3639	Capacitor—0.02 mfd. (C16)	.25
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3744	Resistor—250,000 ohms—Carbon type—½ watt (R12)—Package of 5	1.00
3751	Capacitor—0.5 mfd. (C25)	.40
3877	Capacitor—0.1 mfd. (C8)	.32
3888	Capacitor—0.05 mfd. (C1, C5)	.25
3920	Capacitor—0.003 mfd. (C23)	.35
3937	Capacitor—300 mmfd. (C15, C18)	.34
3950	Shield—Radiotron shield	.36
3954	Screw—Chassis mounting screw and washer assembly—Package of 10	.32
3955	Coil—Choke coil—Located on terminal board (L12)	.68
3956	Clamp—Capacitor mounting clamp—Package of 5	.32
3957	Indicator—Station selector indicator pointer—Package of 5	.42
3958	Plug—3-contact "AC" connection plug	.50
3959	Plug—4-contact "DC" connection plug	.60
3968	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
3969	Cord—Tuning condenser drive cord—Package of 10	1.22
3970	Drum and shaft assembly—Small—For tuning condenser drive	.24
3971	Escutcheon—Switch escutcheon engraved "AC-DC"	.24
3972	Drum and bushing assembly—Large—For tuning condenser drive	34
3993	Screw—Set screw for tuning condenser drive drum—Package of 10	.25
4001	Capacitor—1.02 5mmfd. (C12)	.32
4002	Capacitor—375 mmfd. (C31)	.30
4003	Capacitor—700 mmfd. (C32)	.30
4020	Resistor—750 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
4089	Capacitor—Two 0.05 mfd. (C34, C35)	.60
6135	Resistor—270 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
6165	Lamp—Station selector dial lamp—Package of 5	1.75
6186	Resistor—500,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—½ watt (R2)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6513	Capacitor—0.005 mfd. (C21)	.28
6738	Capacitor—8.0 mfd (C30)	1.54
6739	Condenser—3-gang variable tuning condenser assembly (C2, C3, C6, C7, C10, C11)	5.16
6740	Transformer—First intermediate frequency transformer (L7, L8, C14)	2.16
6741	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.78
6742	Coil—Antenna coil assembly (L1, L2)	.88
6743	Coil—R. F. coil assembly (L3, L4)	98
6744	Capacitor—0.05 mfd. (C26)	.30
6745	Coil—Oscillator coil assembly (L5, L6)	.68
6746	Volume control (R9)	1.20
6747	Tone control (R11)	1.20
6748	Switch—Noise suppressor switch (S5)	.60
6749	Switch—AC-DC switch (S1, S2, S3, S4)	2.14
6759	Transformer—Interstage transformer (T3)	2.55
6781	Capacitor—Comprising one 3.6 mfd and one 1.0 mfd (C4, C13)	1.10
6782	Capacitor—4.0 mfd. (C29)	1.10
7485	Socket—6-contact Radiotron socket	.60

Stock No.	DESCRIPTION	List Price
9456	Transformer—Power transformer—105-125 volts, 50-60 cycles (T2)	$4.60
9457	Transformer—Power transformer—9 volts (T1)	4.78
	CABLE ASSEMBLIES	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 ampere—Package of 5	.40
4008	Shield—Metal shield for cable plug—Package of 5	.58
4009	Terminal—Metal terminal (plain) for battery connection—Package of 5	.44
4010	Terminal—Metal terminal engraved "Batt-Ground"—For battery connection—Package of 5	.44
6150	Plug—Battery cable plug	.50
6516	Connector—Fuse connector	.16
6760	Cable—7-conductor shielded—Switch cable	.60
6761	Cable—2-conductor shielded—Approximately 10½ inches long, from resistor board to volume control	.26
6762	Lead—Antenna lead-in—Approximately 15½ inches long—With connector	.44
6772	Cable—Battery cable—Plus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
6774	Cable—Battery cable—Minus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal	2.36
6775	Cable—Battery cable—Plus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.30
6776	Cable—Battery cable—Minus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.30
6777	Cable—Antenna lead-in cable—Shielded—Approximately 98 inches long—With connector	1.36
6778	Cable—7-conductor shielded cable	.42
6779	Cable—2-conductor shielded cable—Approximately 58 inches long	1.10
6780	Cable—2-conductor shielded cable—Approximately 102 inches long	2.04
6834	Cable—Battery cable—Minus "A" grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.92
6835	Cable—Battery cable—Plus "A" grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal	3.92
6836	Lacquer—Touch up lacquer (1 part of lacquer and 1 pint of thinner)	2.25
	MISCELLANEOUS PARTS	
3960	Handle—Carrying handle	.44
3961	Knob—Tone control, volume control or suppressor switch knob—Package of 5	.60
3962	Knob—Station selector knob—Package of 5	1.00
3963	Knob—"AC-DC" switch knob—Package of 5	.60
3964	Bezel—Metal bezel for station selector dial glass	.54
3965	Glass—Station selector dial glass	.22
3966	Spring—Contact spring—Grounds vibrator shield to case—Package of 10	.92
4011	Capacitor—0.5 mfd (C24)	.60
6017	Scale—Station selector dial scale—Package of 5	1.38
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor suppressor—Splice-on type	.56
6494	Capacitor—0.5 mfd.—Ammeter capacitor	.46
6495	Capacitor—0.5 mfd.—Generator capacitor	.72
6670	Suppressor—Spark plug suppressor—"Elbow" type	.56
6763	Cord—Power cord with connectors	.94
7694	Vibrator—Complete (C27, C28, L13, R16)	10.04
7696	Housing—Metal housing—Top section	5.44
7697	Base—Housing base	.90
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6750	Screen—Dust screen	.28
6751	Screen—Metal screen	.46
6764	Transformer—Output transformer (T4)	1.42
6772	Ring—Felt ring—Used between speaker and metal housing—Package of 5	1.20
8987	Cone—Reproducer cone (L11)—Package of 5	5.00
9458	Reproducer complete	5.30
9459	Coil—Comprising field coil, magnet and cone support (L15)	3.34

SERVICE DATA

Electrical Specifications

Type and Number of Radiotrons Used—2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-41, 1 RCA-79—Total, 6

Battery Current (6.3 Volt Battery):

Speaker Field (Cold)	1.35 Amperes
Tubes	2.2 Amperes
Dial Lamp	0.15 Ampere
Power Supply (No Signal)	2.8 Amperes
Total (No Signal)	6.5 Amperes
Total (Maximum Output)	8.0 Amperes (Average)
Tuning Frequency Range	540 K. C.–1600 K. C.
Maximum Undistorted Output	4.2 Watts
Maximum Output	6.8 Watts
Line-up Frequencies	175 K. C., 600 K. C., 1400 K. C.

(1) Removing Units from Chassis:

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver is the only tool required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

(2) Loose or Tight Tuning Action:

An adjustment screw is provided at the worm drive unit, so that proper tension may be provided for the particular worm being used. The instruction book accompanying the instrument describes the proper manner of turning the drive assembly when using either right or left hand drives. However, whenever this change is made, the adjusting screw located on the front of the drive unit should be loosened or tightened until a satisfactory amount of tension and elimination of backlash is obtained.

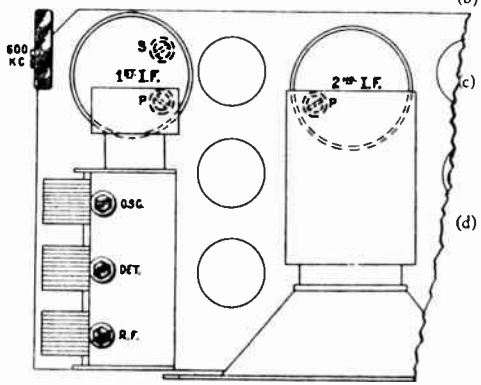


Figure 3—Location of Line-up Capacitors

(3) Line-up Capacitor Adjustments:

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full Range Test Oscillator, Type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments:

The three-gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

(4) R. F. Interference from Vibrator:

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The clip from the top of the R. F. tube shield to the gang-capacitor must be in place.

(c) The various by-pass capacitors, such as C-29, C-30, C-31, C-34, C-37, and chokes L-16 and L-14, L-13, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with ones of similar mechanical as well as electrical construction.

(5) Voltage Readings:

The following voltages are those at the tube socket while the receiver is in operating condition. No allowance has been made for currents drawn by the meter and if low resistance meters are used, such allowances must be made.

(6) Vibrator Inverter-Rectifier:

The Vibrator Inverter-Rectifier unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by replacement, not by attempted adjustment.

(7) Stiff Tuning Mechanism:

In event the station selector turns hard or stiff, it is probably due to excessive pressure between the worm and drive gear. Proper tension between these units exists when the gear is pushed ⅛" beyond the point of contact with the worm, before being tightened.

(8) Antenna Lead Clamp

A clamp has been provided for holding the antenna lead securely to the side of case. This clamp is held by one of the chassis mounting screws and prevents the antenna lead from interfering with the operation of the brake pedal or starter button. When making an installation it is important to see that this lead is securely clamped.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal—Maximum Sensitivity

Radiotron No.		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, D. C.
RCA-6D6—R. F.		3.9	76	192	4.5	5.9
RCA-6A7	1st Det.	3.9	76	192	7.5	5.9
	Osc.		—	192		
RCA-6D6—I. F.		3.6	76	192	5.3	5.9
RCA-75—2nd Det.		1.25	—	165	46	5.9
RCA-41—A. F.		22.0	—	235	14.5	5.9
RCA-79—Pwr.		0	—	256	10.5	5.9

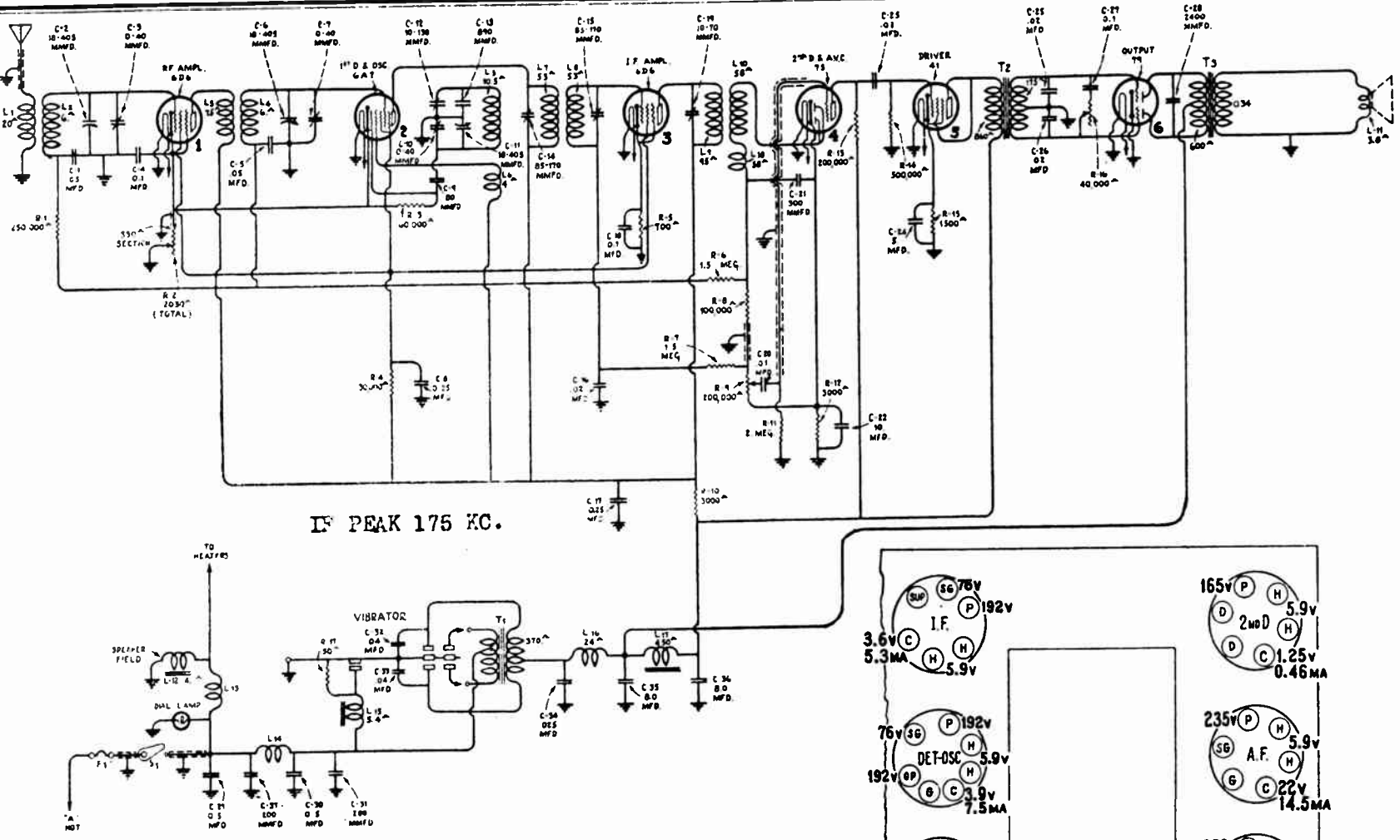


Figure 1—Schematic Circuit Diagram

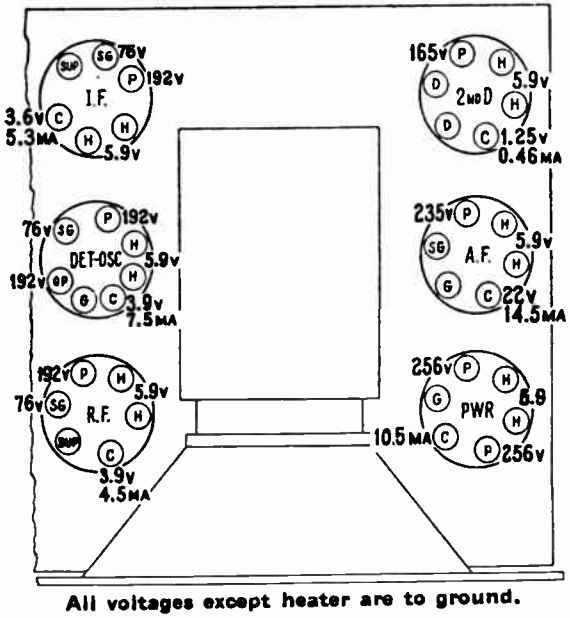


Figure 4—Voltages at Individual Socket Contacts

RCA VICTOR MODEL M-123

Six-Tube "DeLuxe" Automobile Receiver

[First Edition
Copyright June, 1934]

RCA MFG. CO., INC.

MODEL M-123
Service Details
Assembly Wiring
Power Unit Wiring

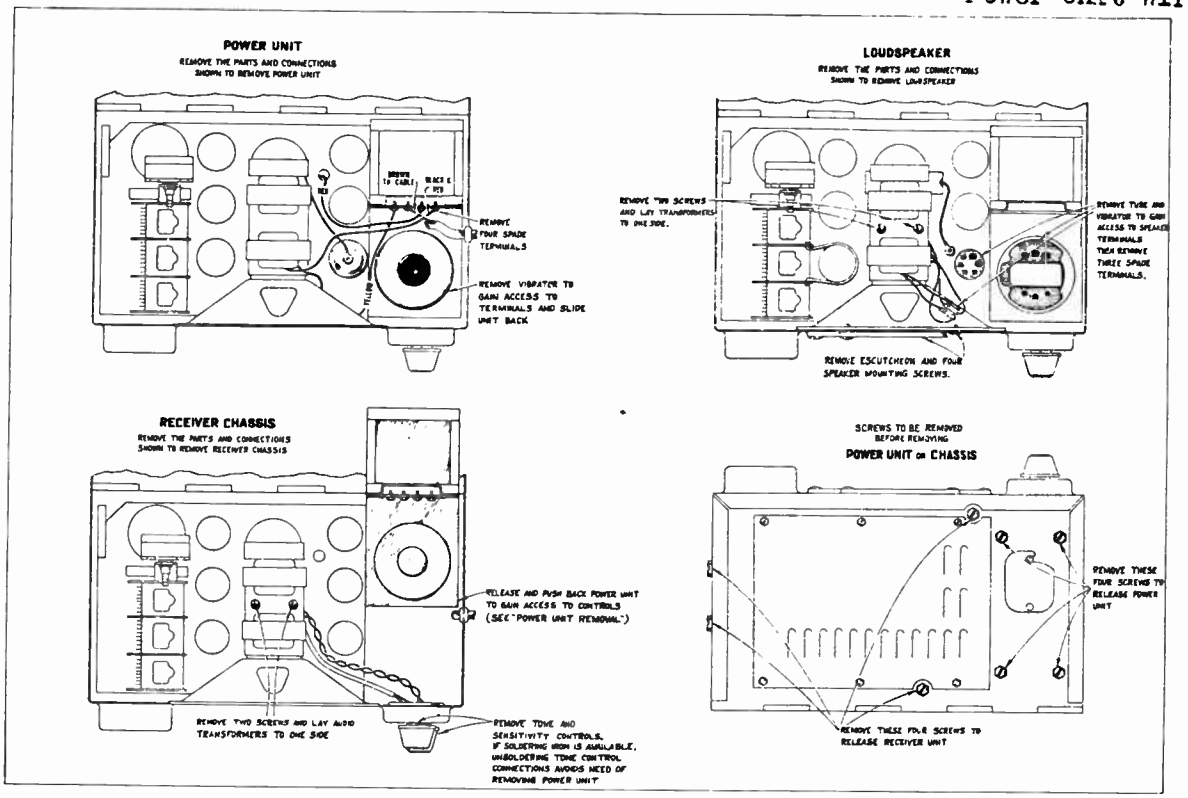


Figure 2—Details of removing units individually from chassis

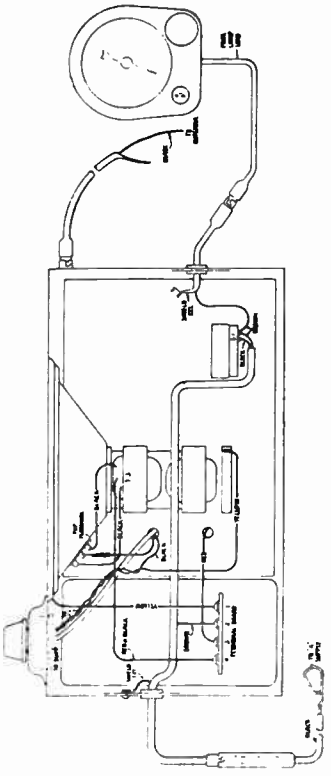


Figure 6—Assembly Wiring Diagram

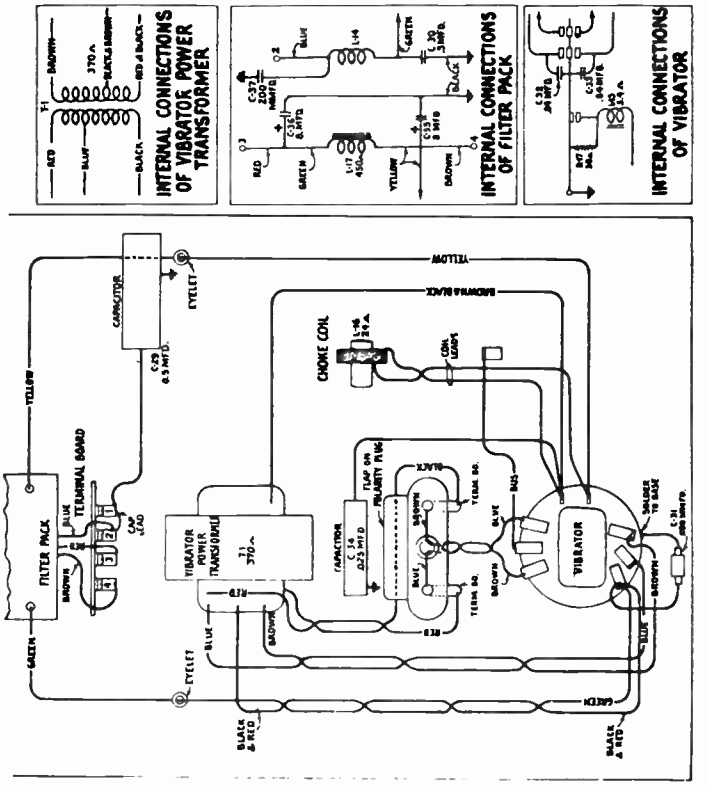


Figure 7—Vibrator Inverter-Rectifier Unit Wiring

MODEL M-123
Chassis Wiring

RCA MFG. CO., INC.

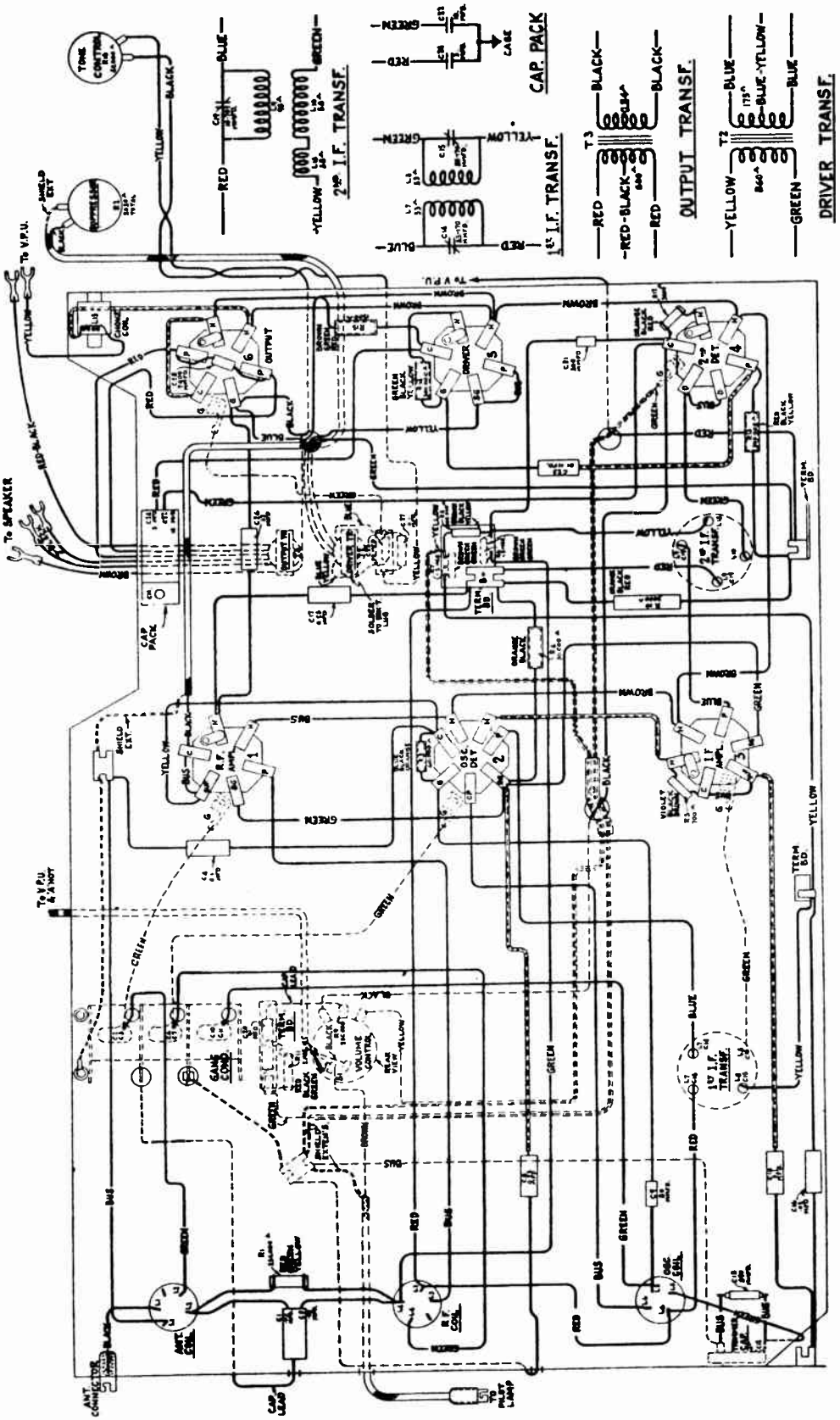


Figure 5—Receiver Assembly Wiring Diagram

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4237	Cable—Single-conductor shielded cable with female section of connector—From volume control switch to pilot lamp cable	$0.35
4238	Cable—Two conductor power cable from S1 to power lead connector	.95
4244	Cap—Contact cap—Package of 5	.20
3861	Capacitor—Adjustable capacitor (C12)	.78
4246	Capacitor—80 mmfd. (C9)	.24
4248	Capacitor—300 mmfd. (C21)	.22
4245	Capacitor—890 mmfd. (C13)	.26
4247	Capacitor—2,400 mmfd (C28)	.34
3702	Capacitor—0.25 mfd. (C8)	.42
3639	Capacitor—.02 mfd. (C16, C25, C26)	.25
3701	Capacitor—.01 mfd. (C20, C23)	.30
3641	Capacitor—0.1 mfd. (C27)	.35
3877	Capacitor—0.1 mfd. capacitor (C4, C18)	.32
3597	Capacitor—0.25 mfd. (C17)	.40
4243	Capacitor pack—Comprising two 0.05 mfd capacitors (C1, C5)	.35
6963	Capacitor pack—Comprising one 10. and one .5 mfd capacitors (C22, C24)	1.10
6965	Coil—Antenna coil (L1, L2)	.70
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—R. F. coil (L3, L4)	.80
6961	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	3.85
6973	Drive assembly—Variable tuning condenser drive assembly	.40
4249	Drive bracket and worm assembly—For variable tuning condenser drive	1.20
6968	Reactor (L13)	.35
4240	Resistor—700 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
4242	Resistor—3,000 ohms—Carbon type—½ watt (R12)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
4241	Resistor—1.5 megohms—Carbon type—¼ watt (R6, R7)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R11)—Package of 5	1.00
3047	Resistor—1,500 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R4)	.22
4239	Resistor—3,000 ohms—Carbon type—3 watts (R10)	$0.25
6972	Rheostat—Noise suppressor rheostat (R2)	.90
3584	Ring—Retaining ring for antenna, radio frequency or oscillator coils—Package of 5	.40
3993	Screw—No. 6–32–⅜ inch square head set screw—For mounting condenser drive assembly to shaft—Package of 10	.25
3623	Shield—Antenna, radio frequency or oscillator coil shield	.30
4233	Shield—Oscillator or second detector Radiotron shield	.22
4235	Shield—Intermediate frequency Radiotron shield	.24
4236	Shield—Radio frequency Radiotron shield	.22
4232	Socket—6-contact Radiotron socket	.35
3572	Socket—7-contact Radiotron socket	.38
6971	Tone control (R16)	.90
6969	Transformer—Audio driver transformer (T2)	1.50
6970	Transformer—Audio output transformer (T3)	1.52
6960	Transformer—First intermediate frequency transformer (L7, L8, C14, C15)	1.80
6962	Transformer—Second intermediate frequency transformer (L9, L10, L18, C19)	1.85
6964	Volume control (R9, S1)	1.20
	CONTROL BOX ASSEMBLIES	
6974	Box—Control box complete	3.80
6976	Back—Control box back	.75
6975	Cover—Control box front cover	.86
4259	Cover—Station selector dial cover—Transparent celluloid—Package of 5	.92
4261	Dial—Station selector dial	.15
4258	Key—Volume control key	.20
4256	Lamp—Dial lamp	.30
4260	Pointer—Station selector indicator	.18
4257	Ring—Station selector dial cover ring	.75
4262	Screen—Dial light screen—Package of 5	.26
4252	Screw—No. 10–32–11/32-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10	.32
3652	Screw—No. 10–32–¼-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10	.32
4255	Screw—No. 4–40–¼-inch oval head machine screw for holding control box cover—Package of 10	.16
4254	Shaft—Volume control coupling shaft	.36
4250	Shaft and gear—Station selector pointer shaft and gear	.56
4251	Shaft and gear—Station selector drive shaft and pinion gear	.20

REPLACEMENT PARTS—(Continued)

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
4253	Spring—Volume control key holding spring—Package of 10	$0.32
3690	Strap and bracket assembly—For mounting control box to steering column—Comprising one bracket, two screws, one lockwasher and one strap	.40
	FLEXIBLE SHAFT AND CABLE ASSEMBLIES	
7762	Cable—Dial lamp cable with socket and section of connector	.76
4264	Clamp—Metal clamp—Package of 10	.35
4295	Screw—No. 10–32–¼-inch cupped point set screw—Fastens flexible shaft housing to shaft bushing—Package of 10	.20
7760	Shaft—Station selector flexible drive shaft—Approximately 31½ inches long	1.60
7764	Shaft—Station selector flexible drive shaft—Approximately 27 inches long	1.55
7761	Shaft—Volume control flexible shaft—Approximately 29 inches long	1.60
7763	Shaft—Volume control flexible drive shaft—Approximately 24 inches long	1.55
4265	Sleeve—Coupling sleeve for volume control shaft—Package of 5	.15
4263	Socket—Dial lamp socket	.20
	REPRODUCER ASSEMBLIES	
9493	Coil—Field coil magnet and cone support (L12)	2.70
9492	Cone—Reproducer cone (L11)—Package of 5	3.70
9491	Reproducer complete	4.16
	VIBRATOR ASSEMBLIES	
4280	Board—Terminal board—Located on filter pack	.35
4013	Capacitor—200 mmfd. (C31)	.30
4274	Capacitor—.025 mfd. (C34)	.80
4273	Capacitor—0.5 mfd. (C29)	.90
4275	Coil—Choke coil (L16)	.30
7758	Filter pack—Comprising one reactor, one choke coil, two 8. mfd. capacitors, one 0.5 and one 200 mmfd. capacitors (C30, C35, C36, C37, L14, L17)	6.00
4276	Plug—2-prong plug	.25
4279	Screw—Binder head No. 6–32–¼-inch screw—Fastens shield to cover—Package of 10	.22
4278	Socket—Vibrator mounting socket	.26
7759	Transformer—Vibrator transformer (T1)	3.95
7757	Vibrator assembly complete (R17, C32, C33, L15)	8.50
	HOUSING ASSEMBLIES	
4272	Bracket—Volume control shaft bracket—For left-hand mounting located on front of receiver housing	.28
4270	Cover—Tuning condenser drive bracket and worm assembly cover	$0.25
7755	Housing—Front section of housing complete—Less hinge pin	.80
7756	Housing—Rear section of housing complete—Less hinge pin	.54
4267	Nut—Wing nut—Package of 10	.46
4266	Pin—Hinge pin—Package of 5	.42
4268	Screw—Wing screw—Package of 10	.68
4269	Screw—No. 6 self-tapping screw for fastening front and bottom sections of housing—Package of 10	.50
4271	Screw—Self-tapping No. 6 screw for fastening tuning condenser drive bracket and worm cover to housing—Package of 10	.50
4295	Screw—No. 10–32–¼-inch headless set screw—Located in worm gear cover and bracket used to fasten drive shafts—Package of 10	.20
	MISCELLANEOUS ASSEMBLIES	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
4283	Cable—Antenna lead-in cable—Approximately 35 inches long	.80
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—Ammeter capacitor—0.5 mfd.	.60
4292	Capacitor—Generator capacitor—0.5 mfd.	.90
4291	Clip—"A" supply clip—Package of 10	.70
7767	Escutcheon—Grille escutcheon and name plate	1.06
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
3646	Fuse—20 ampere—Package of 5	.40
7765	Grille—Baffle board and grille cloth	.38
4290	Insulator—Fuse connector insulator—Package of 10	.35
4132	Knob—Noise suppressor or tone control knob—Package of 5	.55
4282	Knob—Station selector knob—Package of 5	.65
7766	Lead—Power lead with female section of fuse connector—From power cable to battery	.30
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
6152	Suppressor—Distributor suppressor	.56
6151	Suppressor—Spark-plug suppressor	.56
4277	Screw—No. 8–32–⅜-inch binder head screw used to mount escutcheon—Package of 10	.22
4294	Screw—No. 10–32–5/16-inch hexagon head screw—Used to mount chassis to housing—Package of 10	.45
4285	Washer—Antenna or fuse connector insulating washer—Package of 10	.22

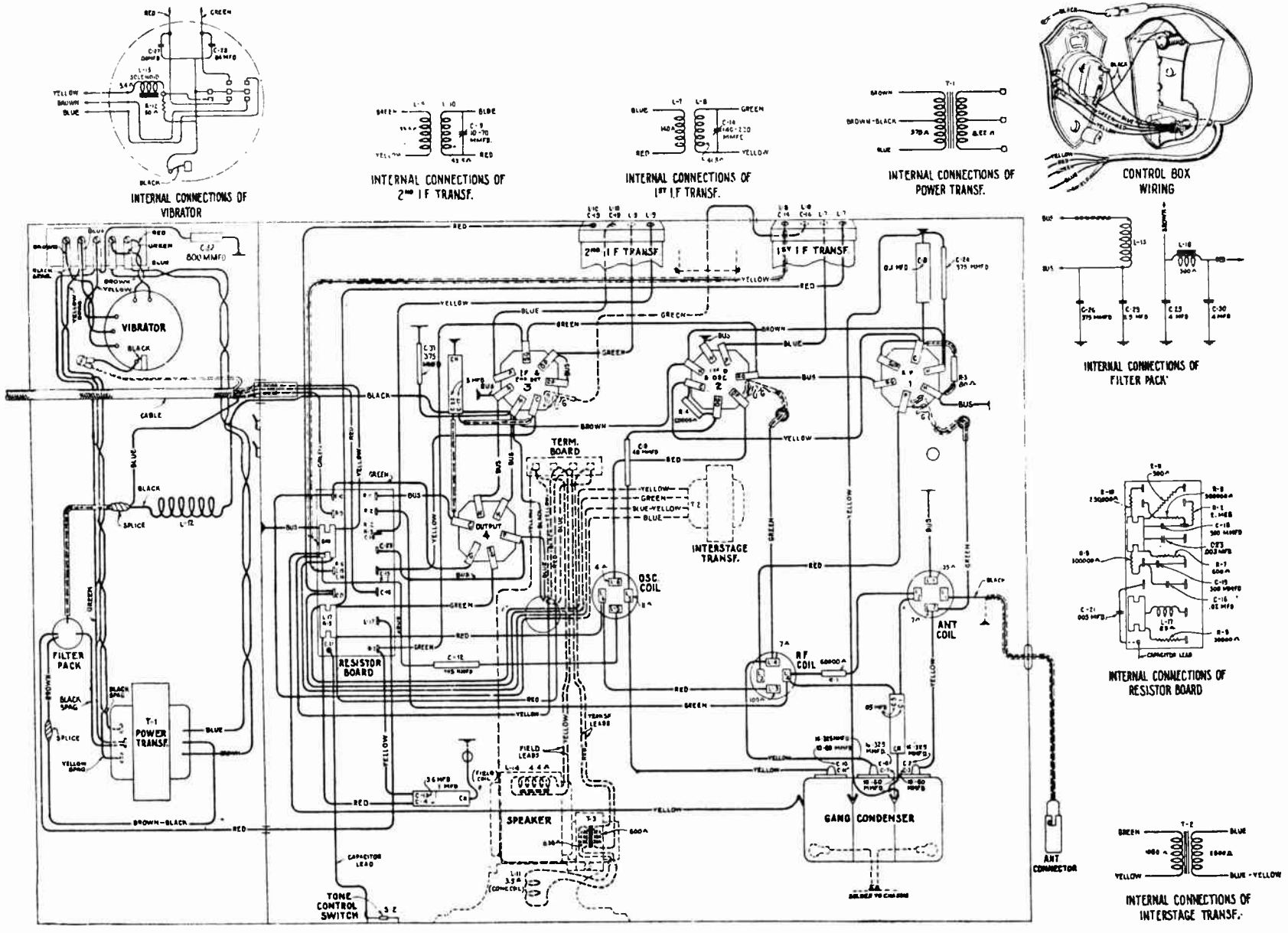
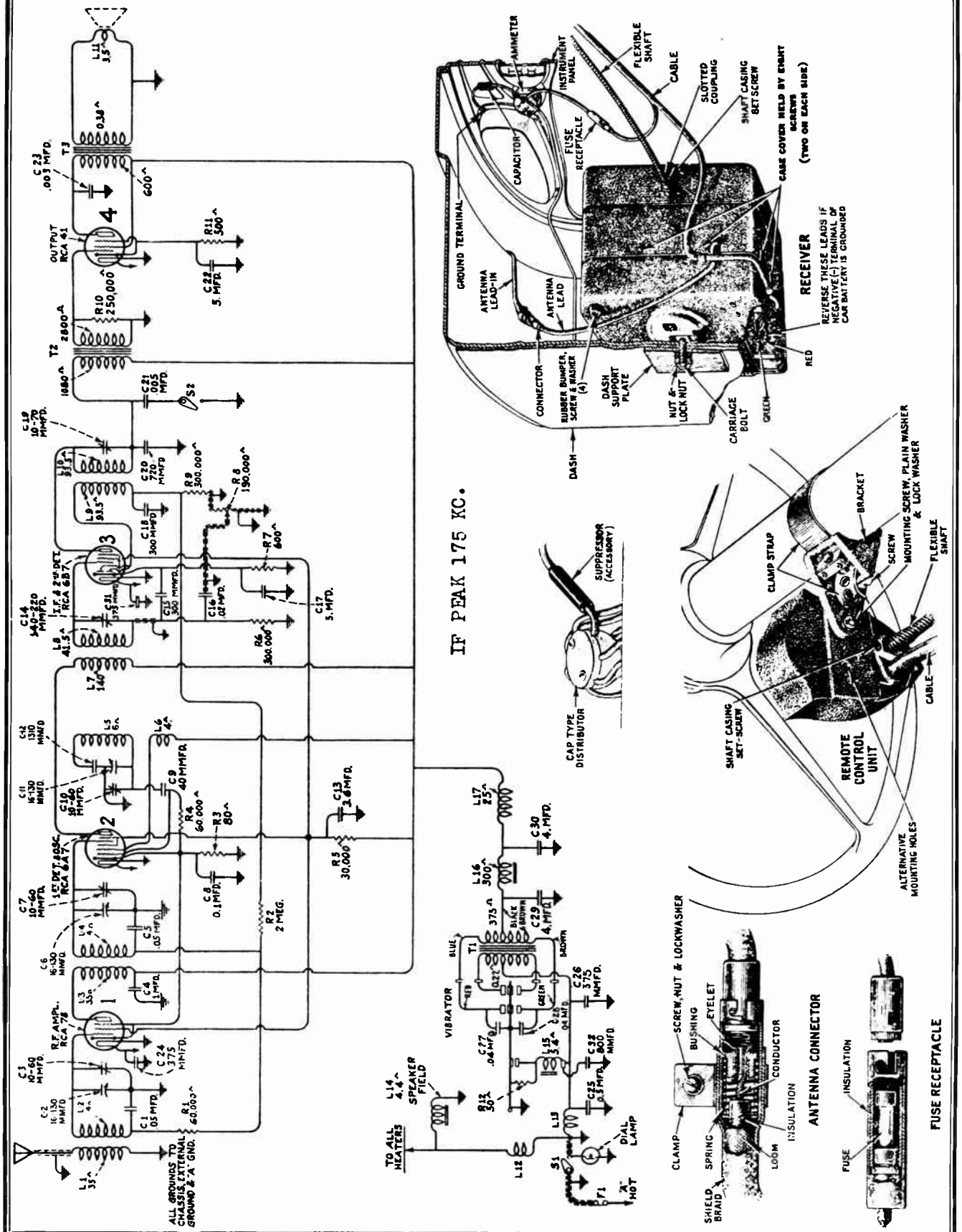


Figure B—Wiring Diagram

RCA MFG. CO., INC.

MODEL AR-4229
Schematic
Chassis Details



PART IV—SERVICE DATA

Type and Number of Tubes Used	1 RCA-41, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7 —Total, 4
Total Battery Current (With 6.3 volts between chassis and A (hot) terminal)	5.35 Amperes
Undistorted Output	1.35 Watts
Loudspeaker Field Current	1.35 Amperes
Filtered D. C. Voltage from Rectifier	227 Volts
Total Plate Current	47.5 M. A.

This four tube Superheterodyne Police Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, "B" battery eliminator and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

"B" Battery Eliminator

This receiver uses a vibrator-type Inverter-Rectifier that provides a source of direct current voltage for use as plate and grid supply for all tubes. *This unit is accurately adjusted and sealed at the factory and service adjustments should not be attempted.*

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 2508 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for these adjustments:

R. F. Adjustment

A satisfactorily accurate and rapid adjustment of the three R. F. line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and tube sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 2508 K. C. and a non-metallic screw driver. Stock No. 9050 oscillator and 7065 screw driver are suitable.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 97, and the oscillator at 2508 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound in the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and tubes as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10" to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 33¼" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932 or 1933—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install right spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

TUBE SOCKET VOLTAGES

6.3 Volt Battery—No Signal

Tube No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M. A.	Heater Volts
RCA-78 R. F.		4.42	83	222	5.25	6.0
RCA-6A7	First Detector	4.12	83	222	11.0	6.0
	Oscillator	4.12		223	Total	
RCA-6B7 Second Detector		3.22	84	218	5.25	6.0
RCA-41 Power		13.0	214	200	26.0	6.0

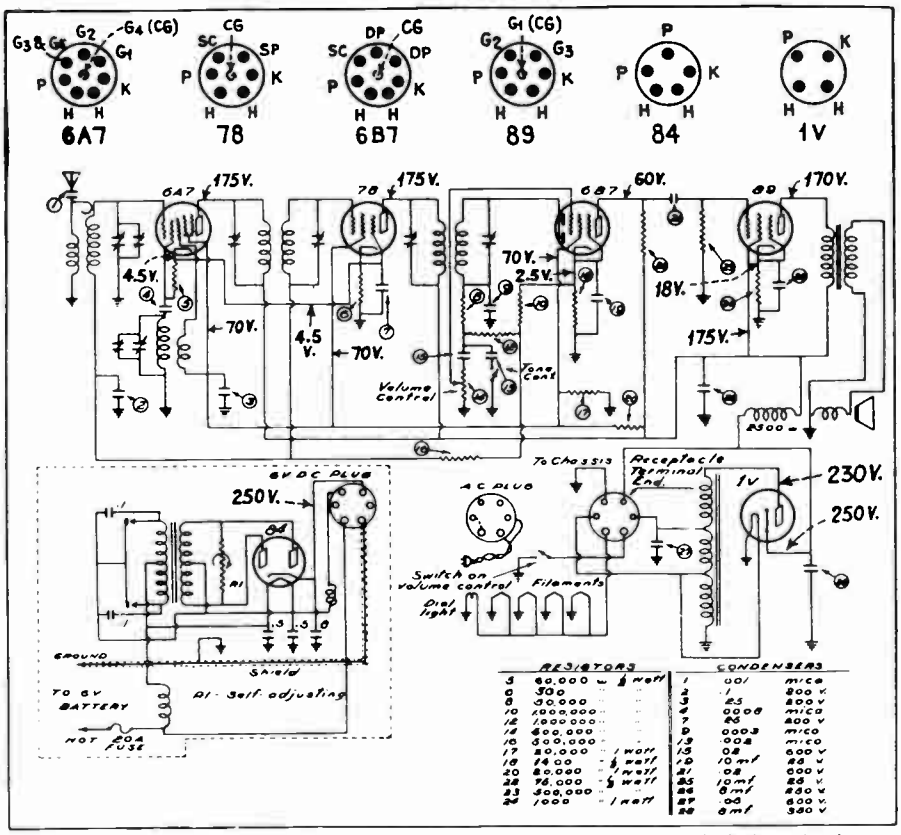
REPLACEMENT PARTS

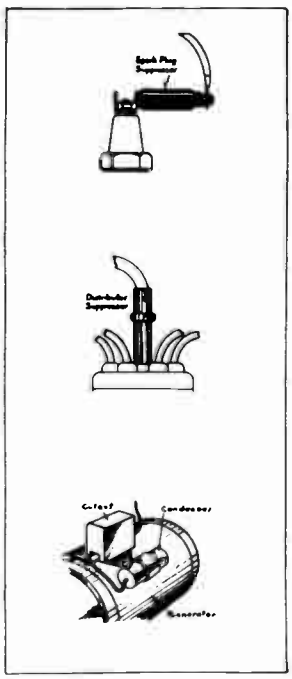
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3218	Resistor—600 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3536	Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22)	1.10
3572	Socket—Radiotron 7-contact socket	.38
3584	Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5	.40
3602	Resistor—60,000 ohms—Carbon type—½ watt (R1, R4)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C15, C18)	.34
3617	Capacitor—0.005 mfd. (C21)	.38
3618	Capacitor—0.02 mfd. (C16)	.38
3621	Coil—Choke coil—Located on resistor board (L17)	.35
3623	Shield—Antenna R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3636	Transformer—First intermediate frequency transformer (L7, L8, C14)	1.74
3637	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.65
3641	Capacitor—0.1 mfd. (C8)	.35
3645	Knob—Tone control knob—Package of 5	.90
3695	Capacitor—375 mmfd. (C24, C31)	.22
3696	Capacitor—40 mmfd. (C9)	.22
3699	Capacitor—720 mmfd. (C20)	.40
3744	Resistor—250,000 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
3745	Capacitor—745 mmfd. (C12)	.34
3746	Capacitor—800 mfd. (C-32)	.34
3920	Capacitor—.003 mfd. (C23)	.25
3921	Mounting screws, washer and bushing assembly—For 3-gang variable tuning condenser—Comprising three spacers, three screws, three washers and three lockwashers	.34
3922	Resistor—300,000 ohms—Carbon type—½ watt (R6, R9)—Package of 5	1.00
6135	Resistor—270 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—½ watt (R2)—Package of 5	1.00
6298	Cord—Tuning condenser drive cord—Package of 5	.60
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6490	Tone control switch	.35
6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitor (C4, C13)	1.08
6493	Drum—Tuning condenser drive drum	.40
6514	Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5)	.28
6515	Cable—Shielded cable with antenna connector	.32
6516	Connector—Fuse connector	.16
6517	Cable—Main cable complete with fuse connector	1.40
6540	Coil—R. F. coil assembly (L3, L4)	.94
6731	Coil—Antenna coil (L1, L2)	.88
6732	Transformer—Interstage audio transformer (T2)	2.00
7485	Socket—Radiotron 6-contact socket	.40
7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30)	4.06
7601	Condenser—3-gang variable tuning condenser	2.84
9049	Transformer—Power transformer (T1)	3.75
	CONTROL BOX ASSEMBLIES	
3649	Key—Volume control and switch key	.18
3650	Screw—Self locking No. 10-32-⅛" fulldor point set screw—Package of 10	.32
3651	Screw—Self locking No. 10-32-⅛" cupped point set screw—Package of 10	.32
3652	Screw—Self locking No. 10-32-¼" cupped point set screw—For flexible drive shaft—Package of 10	$0.32
3690	Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
3718	Bracket—Control box dash mounting bracket	.25
3757	Coupling—Slotted coupling for end of flexible drive shaft—Package of 5	.40
3758	Connector—For control box end of flexible drive shaft—Package of 5	.68
G5021	Knob—Station selector knob—Package of 5	.90
6496	Shaft—Flexible drive shaft complete with connectors—Approximately 24¼" long	1.60
6497	Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33¼" long	1.75
6499	Volume control—Combination volume control and switch (R8)	1.36
6500	Nut—Volume control and switch lock nut	.24
6531	Shaft—Flexible drive shaft complete with connectors—Approximately 12⅛" long	.85
6532	Shaft—Flexible drive shaft—Complete with connectors—Approximately 18⅛" long	1.24
6784	Scale—Dial scale	.58
G7850	Box—Control box complete	3.70
G7851	Cover—Control box cover	.44
	MISCELLANEOUS PARTS	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
3647	Nut—Cap nut and lock washer—Package of 10	.35
3648	Screw—No. 10-32-⅜" cap screw and lockwasher—Package of 10	.32
3689	Bracket—Receiver mounting bracket, bolt and nut assembly—One set	.30
3791	Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case	.30
3827	Cable—From fuse connector to ammeter	.10
4051	Bumper—Rubber bumper used in mounting receiver chassis—Package of 4	.20
3856	Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10	.30
3884	Clamp—Cable clamp—Package of 10	.20
G5046	Escutcheon—Metal label for control box—Package of 10	.70
G5047	Escutcheon—Metal label for receiver—Package of 10	.50
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor splice-in suppressor	.56
6494	Capacitor—Ammeter capacitor—0.5 mfd.	.46
6495	Capacitor—Generator capacitor—0.5 mfd.	.72
6670	Suppressor—Spark plug suppressor—"Elbow type"	.56
7065	Screwdriver—For R. F. and I. F. adjustments	.80
7621	Antenna—Roof antenna—Paper type (Brown)	1.50
7622	Antenna—Roof antenna—Paper type (Gray)	1.50
7686	Housing—Front section of housing complete with mounting screws	3.48
7689	Vibrator complete	7.84
7699	Housing—Rear section of housing complete with mounting screws	1.92
G9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
3688	Transformer—Output transformer (T3)	1.50
7607	Screen—Metal screen	.44
7608	Coil assembly—Comprising field coil, magnet and cone support (L14)	2.40
9023	Cone—Reproducer cone complete (L11)—Package of 5	5.00

REMLER COMPANY, LTD.

MODEL 27
Schematic
Voltage
Alignment





MODEL 27 SUPERHETERODYNE

This radio receiver is of the superheterodyne type with automatic volume control; and is intended for use on 110 to 125 volt, 50 - 60 cycles A.C. or from a 6 volt battery, using the power box.

INSTALLATION IN AUTOMOBILE:

Supplied with the radio receiver are the power box, eight spark plug type suppressors, one distributor suppressor and one generator condenser.

The power box may be mounted under the dash high enough up to leave room for the feet on the toe board; or it may be placed under the front seat by those who do not care to permanently attach the box to the car. The metal shielded cable terminating in two connecting lugs is the battery cable. The lug connected to the metal shield should be connected to the car chassis, or the grounded side of the battery. The lug terminating the insulated wire may be connected to a terminal of the ammeter, or to the "hot," or ungrounded side of the battery.

After making the above connections, run the black thick cotton covered cable under the floor mat, or under the seat, and plug into radio receiver.

Later model automobiles have antennas built in the tops with a lead in wire usually brought down the right front door post. An extension may be made to this wire and connected to the antenna wire extending from the radio receiver. Older model cars may be equipped with either a top antenna or a running board type at slight cost.

In order to reduce the noise from the ignition system in the car, a spark plug suppressor should be connected in series with each spark plug wire at the plug, and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached.

Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

The on-and-off switch operated by the volume knob controls both the six volt battery supply and the 110 - 125 volt AC supply when used in the home with AC line cord supplied.

SERVICE DATA:

When operated from 110 - 125 volt A.C. source, an auto-transformer in the receiver is used to provide the high voltage for the plate and field supply, and the filament supply for the tubes. The chassis is directly connected to the power source, and contact between chassis and ground should be avoided.

On battery operation, the cable plug connects the six volt supply to the filaments of the tubes, and the plate and field supply from the power box to the filter in the set. Neither the auto transformer nor the 1v rectifier is in use when the set is battery operated.

To take the chassis out of the cabinet, first, remove the knobs then the back, and finally the hold down screw in the base of the cabinet. To replace tubes it is only necessary to remove the back. The back may be plugged on the chassis after removal from the cabinet for testing and aligning.

The mixer coil is in the aluminum shield can in back of the variable condenser.

The oscillator coil is inside the chassis and is trimmed with the front section trimmer on the variable condenser.

Mounted with the oscillator coil is the first I.F. coil which is trimmed by the condensers accessible from the back of the chassis.

The second I.F. transformer is also located within the chassis and may be trimmed by the condensers located under the holes in the chassis bottom.

The power box contains a vibrator type interrupter and transformer, and a rectifier tube with necessary filter system. A 20 ampere auto type fuse is provided for protection to battery and wiring system. The cover of the power unit may be removed for servicing by taking out the four screws around the edge of the base. After several hundred hours' use, the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in the plate supply voltage.

On account of the action of the A.V.C., when aligning the set, use a weak signal or oscillator input; and an output meter to indicate resonance.

The following tubes are used:

6A7 as oscillator-mixer,
78 as I.F. amplifier,
6B7 as detector and amplifier,
89 as power amplifier,
1v as rectifier,
6.3 volt dial lamp.

An 84 rectifier is used in the power box.

A.C. VOLTAGE READINGS:

Line	120 volts
Filaments	6 "
Plate 1v rectifier to chassis	230 "

D. C. VOLTAGE READINGS:

From chassis to:

1v	Rectifier tube	cathode	250 volts
89	Power "	plate	170 "
89	" "	screen grid	175 "
89	" "	cathode	18 "
6B7	Detector Amp. "	plate	60 "
6B7	" " "	screen grid	70 "
6B7	" " "	cathode	2.5 "
78	I.F. " "	plate	175 "
78	I.F. " "	screen grid	70 "
78	I.F. " "	cathode	4.5 "
6A7	Mixer Osc. "	plate	175 "
6A7	" " "	screen grid	70 "
6A7	" " "	cathode	4.5 "
84	Rectifier "	cathode	250 "

Voltage across field 75 volts.

Total current from battery 4.5 amperes.

MODEL 35
Schematic, Socket
Voltage, Installation

REMLER COMPANY, LTD.

The receiver unit is intended to be mounted on the bulkhead of the car by the single mounting stud which requires the drilling of one 1/2 inch hole through the bulkhead. When locating the position of this hole consideration should be given to possible interference of the set with the position of control cables and other apparatus between the dash and the bulkhead and also of the mounting stud with apparatus on the motor side of the bulkhead. Preferably the receiver should be mounted so as to allow long easy curves of the flexible control cables and a short lead connection to the antenna.

The location of antenna leads from factory installed antennas depends on the make and model of the car. Usually this lead is brought down one of the front body pillar posts and will be found coiled up at the end of the dash. Connect this lead to the shielded lead from the receiver and tape the joint. Where the car is not factory equipped with antenna, a roof type or plate type may be installed with lead brought to a convenient place for connection to the set. The lead and antenna should be kept as far as possible from wiring circuits and the metal body.

The flexible control cables for the tuning and volume control are fitted with special ends to lock in the control head. Insert the cable with the slotted end into the left or volume control bushing, and the cable with keyed end into the right, or tuning control bushing. Be sure the cable housing extends into the head at least three-eighths of an inch, then tighten the set screws on the bushings. Next insert the cables into the brackets and couplings on the set. The volume control cable in the lower coupling and the tuning cable in the upper coupling, but do not tighten the set screws on the shafts. Next clamp the control head to the steering column, tape the control cables to the column bracket or some solid object under the dash and tighten the clamps on the cable housings at the set. Now turn the volume knob to the position where it is removable from the key slot, and turn the tuning knob to the left till the pointer is on the white line at the low frequency end of the dial. Rotate the couplings projecting from the set to the left till the condenser is against the stop and the switch on the volume control is in the off position. Now the set screws on the shaft couplings may be tightened.

Plug the dial light into the opening at the rear of the control head. Connect the battery wire, the shielded wire with fuse holder and terminal, to the battery side of the ammeter. This terminal on the ammeter usually has only one wire attached.

IGNITION NOISE SUPPRESSION:

The spark plug suppressors should be connected in series with the plugs at each plug and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached. Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

OPERATION:

The left hand knob on the control head operates both the power switch and the volume control. Turn the knob clockwise to increase volume. The dial should become illuminated when the power is on.

Rotate the station selector, or tuning knob until the desired program is heard, reduce the volume, and readjust the selector to the position where quality is the best. The volume control may now be advanced to the desired volume level. The knob on the right side of the set is the tone control. This may be adjusted to modify the tone or to reduce noise and static disturbances.

SHORT WAVE:

The short wave switch is on the left of the speaker. When this knob is turned to the left the regular broadcast band is covered by the station selector dial as well as the lower frequency police band as noted on the dial. When the switch is turned to the right the selector dial covers from 2200 to 6500 K. C. The positions of the higher frequency police band, the 49 meter short wave broadcast band and the major airport and amateur bands are noted on the inner portion of the dial. Many automobile antenna installations are not suitable for receiving these short wave stations from any great distance. When better results or increased range is desired with the car parked, a fifty or sixty foot portable antenna wire, with the far end raised at least fifteen feet from the ground, may be used.

SERVICE DATA:

Tubes:

- 6A7 Converter (mixer-oscillator)
- 78 Super-control amplifier, 1st I.F. stage
- 78 Super-control amplifier, 2nd I.F. stage
- 75 Diode-detector-A F amplifier, A.V.C.
- 41 Power amplifier
- 84 Full wave rectifier
- T-40 Dial light 6.3 v.

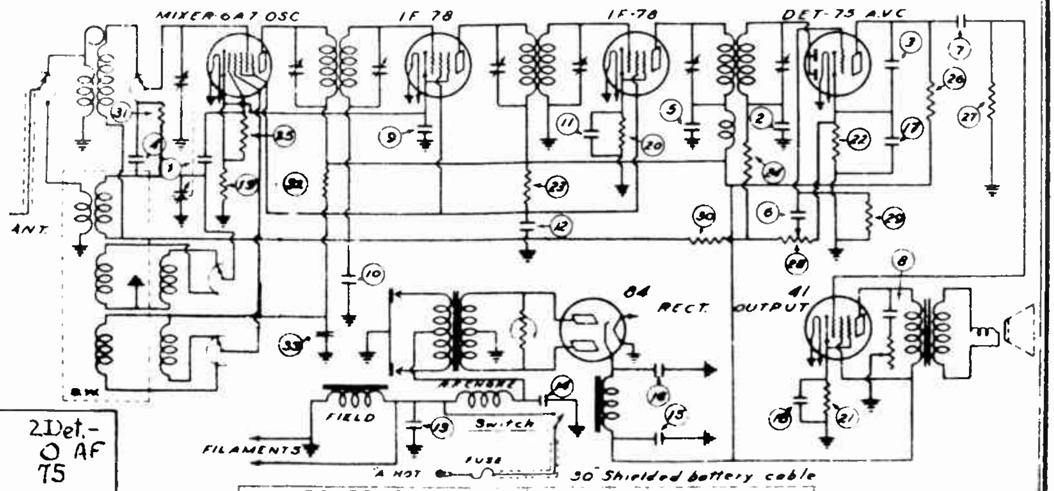
The antenna and mixer coils for the broadcast band are in the shield at the left side of the set. The short wave coils are mounted directly on the short wave switch with the oscillator coil for the broadcast band at the end of the switch. The I.F. transformers are in the aluminum shields adjacent to the antenna-mixer shield. These transformers are peaked at 450 K.C. by the trimmers located at the tops of the shields. Use a weak signal, or oscillator input, and an output meter when aligning the set.

The vibrator type interrupter and transformer are enclosed in the metal box at the right of the receiver. After several hundred hours use the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in plate supply voltage. Vibrator servicing should be done only by a service man with instructions and experience in this work.

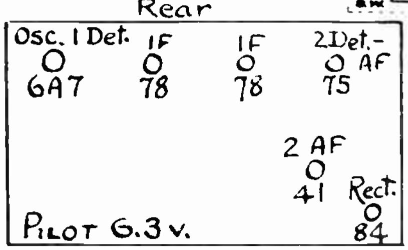
Voltages: To chassis - No signal.

Battery, hot side	6 volts
84 Rectifier cathode	250 "
41 Power screen grid	230 "
41 " plate	220 "
41 " cathode	16 "
75 Detector amplifier plate	125 "
75 " " cathode	1.5 "
78 2nd I.F. " plate	230 "
78 2nd I.F. " screen grid	100 "
78 2nd I.F. " cathode	3.5 "
78 1st I.F. " plate	230 "
78 1st I.F. " screen grid	100 "
78 1st I.F. " cathode	5 "
6A7 Mixer plate	230 "
6A7 Mixer screen grid	100 "
6A7 Oscillator plate	200 "
6A7 Mixer-oscillator cathode	5 "

Battery current - 6 amperes



IF PEAK 450 KC.



CONDENSERS				RESISTORS			
1	.00008	10	.1 mfd	19	300 ohm	28	500,000
2	.0003	11	.1	20	600	29	500.000
3	.001	12	.25	21	800	30	1 Meg.
4	.002	13	.5	22	5000	31	25,000
5	.02	14	.5	23	12.000	32	2000
6	.02	15	4	24	50.000		
7	.02	16	8	25	60,000		
8	.02	17	10	26	200000		
9	.1	18	10	27	500.000		
		33	.02				

1934

SEARS-ROEBUCK & CO.

MODEL 1730
Schematic
Voltage

TUBE		PLATE VOLTS	SCREEN VOLTS	PLATE M.A.	SCREEN M.A.
78	RF	190	95	7	2.5
78	IF	190	95	6	4
85	AVC-Det-AF	30*		2	
41	Output	200	205	15	2.25
6A7	Osc-Transl	Ep=190v.	Eg#2=130v.	Eg#3&#5=95v.	
		Ip=4.75ma.	Ig#2=2.5ma.		
		Ig#3&#5=3.5ma.			

* indicates high series resistance

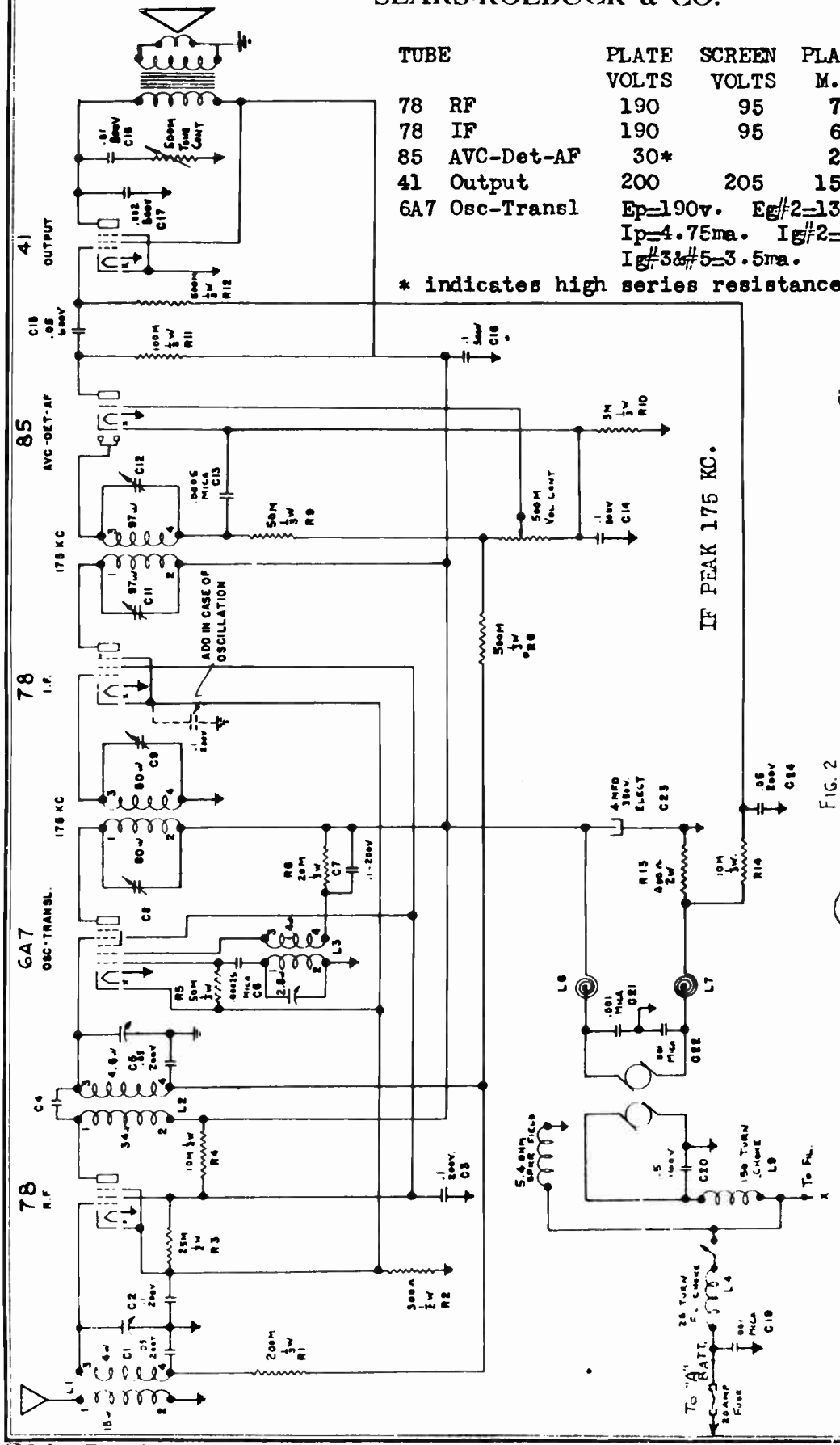


FIG. 2

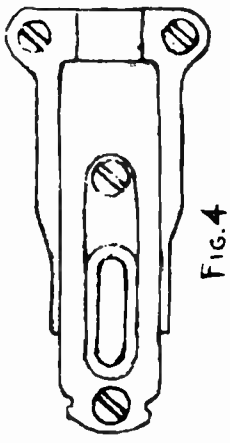


FIG. 4 R10190

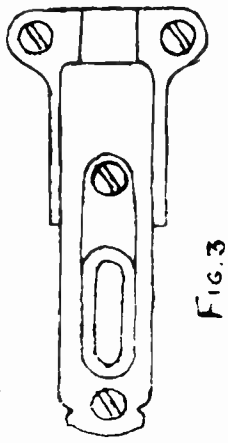


FIG. 3 R10189

MODEL 1730
Socket, Trimmers
Adjustments
Parts List

SEARS-ROEBUCK & CO.

SPECIAL NOTE

When peaking the IF transformers, use a low enough output from the test oscillator to render the AVC action inoperative.

THE RF TUNING ADJUSTMENTS

There are three holes at the back of the chassis, giving access to the variable condenser trimmers. The hole nearest the drive end of the condenser is for the RF section trimmer. The next hole is for the translator, and the third one is for the oscillator.

OSCILLATION

Any trouble from oscillation can be cured by connecting a .1 Mfd. 200 volt condenser, (Part #R-8286), from the IF cathode to ground.

THE REMOTE CONTROL UNIT

A few of the first production remote control units used the type clamp shown in Fig. 3. Later production used the type illustrated in Fig. 4. Should trouble be experienced with controls having the type clamp shown in Fig. 3, due to the volume control cable's jumping out of the control head, the type of clamp shown in Fig. 4 should be substituted, (Part #R-10190).

The following procedure will improve the action of the on-off switch, where necessary.

Remove the volume control drum and turn the volume control counter clockwise to its off position. Then turn it clockwise just enough to take up all of the play, so that any further rotation would tend to turn the switch on. Remove the key from the remote control unit and turn the volume control knurled ring to its locked position. Then turn it, as though to switch it on, the slight amount necessary to take up the play. Then replace the volume control drum on the volume control shaft, maintaining a clockwise tension on the rotatable portion of the drum and tighter the set screws. Study of this operation will reveal that its purpose is to take advantage of all of the play in the mechanism in such a way that an increased length of movement is provided for turning the switch off.

It is of vital importance that no twists occur in the cable during the installation. Careful inspection for this point is necessary because in a cable of this type twists are not very obvious. Also, bends should be as gradual as practicable. Sharp bends greatly increase the stiffness of operation.

If, having followed the foregoing suggestions, trouble still is experienced with the remote control, the unit should be considered defective. Return the entire remote control unit, including the cables and the chassis pulleys, for replacement, to the Colonial Radio Corp., 254 Hano St., Buffalo, N.Y.

ADJUSTING THE STATION SELECTOR DRIVE DRUM

1. Fully mesh the variable condenser plates.

2. Turn the Station Selector knurled ring to its low frequency limit.

3. Place the condenser drive drum on the variable condenser shaft and screw the binding strip to the condenser end plate. If necessary, bend the binding strip in such a way that the drive cable runs in as straight a line as possible from the drum to the point where it emerges from the chassis. However, care must be taken that the cable clamp does not touch any part of the chassis. Should it do so, it would render the rubber mounting of the variable condenser ineffective and microphonics would result. Then tighten the drum set screws.

4. After the set has been installed, and the remote control mounted, the calibration can be set more accurately in the following manner. Tune in a station of known frequency. Remove the dial glass retaining spring and set the dial pointer to the station's frequency. Then replace the retaining spring, making sure that the glass does not shift during the operation.

THE JEN-E-MOTOR

The plate and screen voltages for the receiver, are supplied by a Gen-E-Motor. No attempt should be made to repair this unit. It should be returned to the Pioneer Gen-E-Motor Corp., 466 West Superior St., Chicago, Ill. Return only the unit itself. Do not return the complete housing assembly. To remove the Gen-E-Motor from its housing, proceed as follows.

1. Remove the two screws under the chassis, that mount the loud speaker.

2. Remove the three Parker-Kalon screws from the bottom of the Gen-E-Motor housing, and the two screws that hold the electrolytic condenser can to the housing. The Jen-E-Motor and its housing can then be tipped back from the chassis.

3. Unsolder the leads at the base of the housing, so that the Gen-E-Motor and housing can be completely removed from the chassis.

4. Removal of the two screws in each side of the housing, and unsoldering of the Gen-E-Motor leads under the housing, will permit the Gen-E-Motor to be taken from its housing.

POLARITY CHANGING

The receivers are shipped with the polarity changing screws in the proper position for cars having the negative battery terminal grounded. If the car is one with a grounded positive terminal, the positions of the two screws must be changed, as indicated by the sticker on the case, and as shown in Fig. 5.

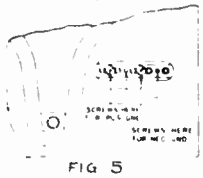
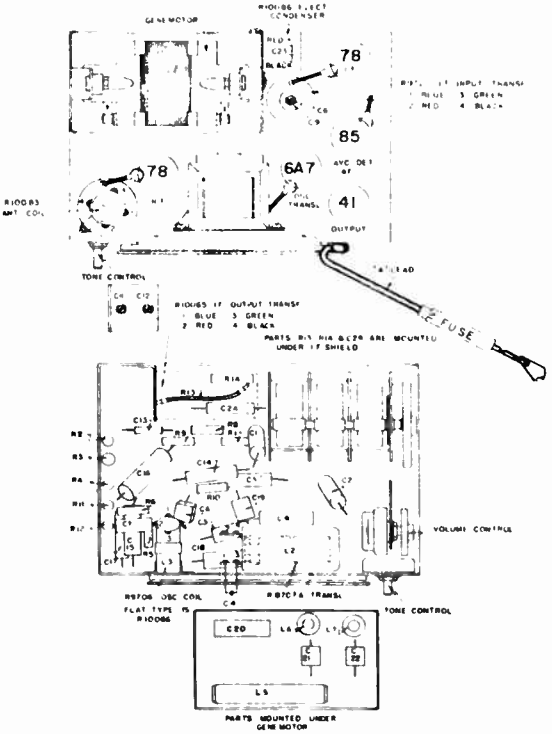


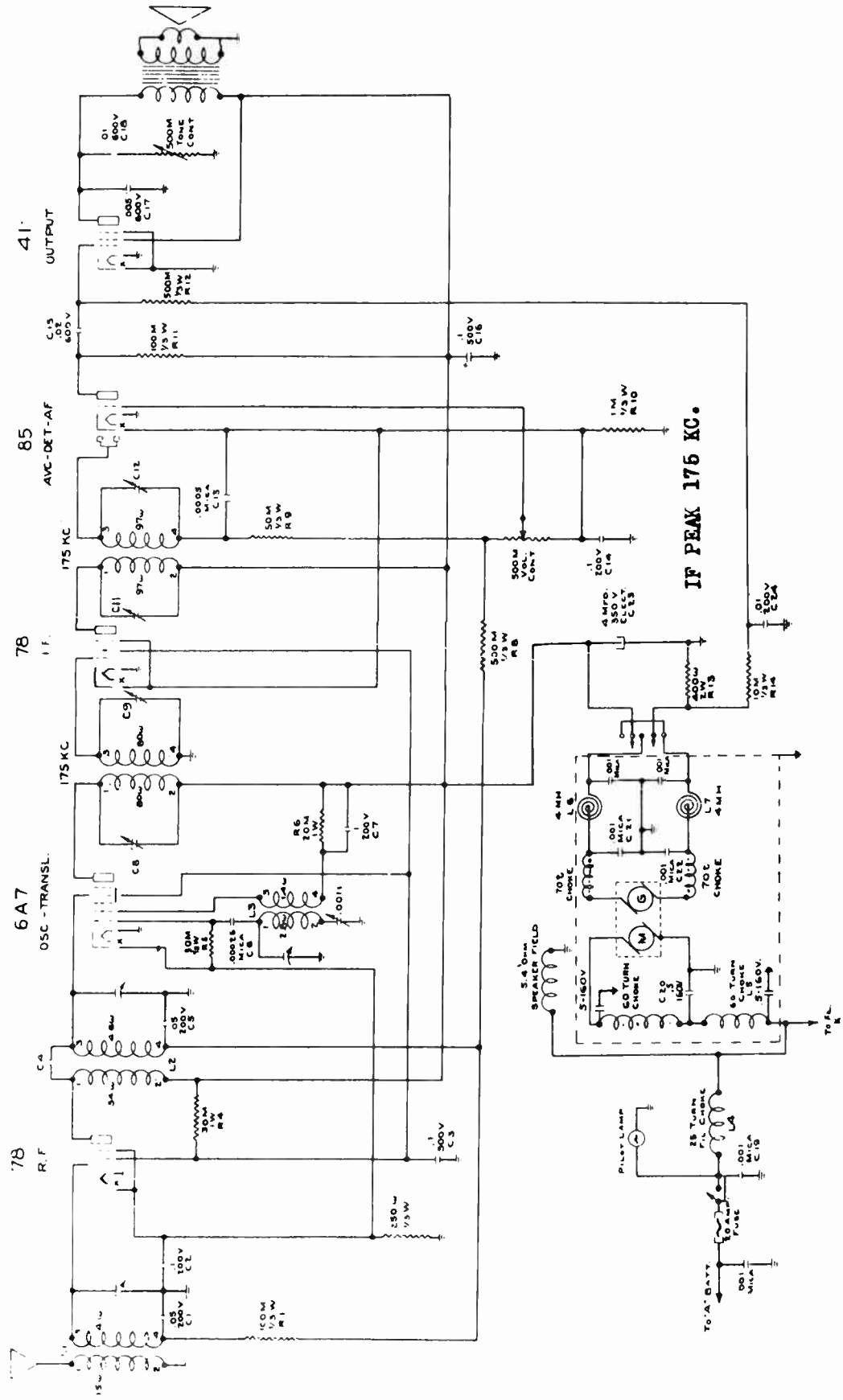
FIG 5

Part No.	Description	Part No.	Description
R-8977A	Board - Terminal, double	R-7085	Resistor - 25 M ohms, 1/2 watt carbon
R-8978A	Board - Terminal, triple	R-6640	Resistor - 200 M ohms, 1/3 watt carbon
R-8980A	Board - Terminal, 5 terminals	R-6152	Resistor - 10 M ohms, 1/2 watt carbon
R-9753A	Board - Terminal, 6 terminals	R-7587	Resistor - 10 M ohms, 1/3 watt carbon
R-6552E	Board - Resistor	R-8977	Resistor - 5 M ohms, 1/3 watt carbon
R-9754A	Board - Polarity Changing	R-15070	Resistor - 400 ohms, 1/3 watt carbon
R-10089	Book - Instruction	R-6447	Resistor - 400 ohms, 1/2 watt carbon
R-9508	Bushing - Rubber, Genemotor Mounting	R-6419	Resistor - 400 ohms, flexible
R-9044A	Choke - L4	R-10057	Screw - Polarity changer
R-10116A	Choke - L5	R-10084A	Shield - Antenna Coil
R-9757	Choke - L6 & L7	R-9591	Shield - Translator Coil
R-6581	Clip - Grid	R-9866	Shield - Tube
R-9741	Clip - "A" lead	R-7582	Socket - 6 Prong
R-10083	Coil - Antenna	R-10072	Socket - 7 Prong
R-10096	Coil - Translator	R-9967	Speaker - Complete
R-9707	Condenser - Variable	R-9966A	Speaker - Cone & Voice Coil Assembly
R-9990	Condenser - Electrolytic	R-9994	Speaker - Clamping ring
R-10086	Condenser - 1 Mfd. Generator	R-10152	Speaker - Field Coil
R-8030	Condenser - .5 Mfd - Ammeter	R-9966	Speaker - eyelets
R-10025	Condenser - .5 Mfd 160 volt	R-9959	Speaker - Felt ring
R-9032	Condenser - .1 Mfd 400 volt	R-10144A	Speaker - Transformer
R-10164	Condenser - .1 Mfd 530 volt	R-9960	Sticker - Polarity Changer
R-8286	Condenser - .1 Mfd 200 volt	R1-10032	Suppressor - Spark Plug
R-9145	Condenser - .05 Mfd 600 volt	R2-10033	Suppressor - Distributor
R-8920	Condenser - .05 Mfd 200 volt	R-9729	Stud - Set Mounting
R-7354	Condenser - .05 Mfd 200 volt	R-7986	Template - set mounting
R-9076	Condenser - .002 Mfd 400 volt	R-10044A	Transformer - 1 P. input
R-10063	Condenser - .002 Mfd Mica	R-10065A	Transformer - 2nd. output
R-6759	Condenser - .001 Mfd Mica	R-9709	Washer - Flat, set mounting
R-6760	Condenser - .0005 Mfd Mica	R-9740	Washer - Lock, set mounting
R-4592	Condenser - .00025 Mfd Mica	R-9719	Nut - Acorn
R-10091	Control - Remote, Complete with Pulleys & Cables	R-9718	Nut - Set Mounting
R-9711	Control - Tone (500 M ohms)	R-7228	Resistor - 500 M ohms, 1/3 watt carbon
R-10172	Control - Volume (500 M ohms)	R-6638	Resistor - 200 M ohms, 1/3 watt carbon
R-9717	Connector - "A" lead & fuse container	R-7586	Resistor - 100 M ohms, 1/3 watt carbon
R-9751	Fuse - 20 amp	R-6637	Resistor - 50 M ohms, 1/3 watt carbon
R-9687	Genemotor "A" lead		
R-9744	Grommet - Rubber		
R-8870A	Lead - Antenna		
R-9679R	Lead - "A" Ammeter end		
R-9678A	Lead - "A" Chassis end		
R-10153	List - check		



MODEL 1858
Schematic

SEARS-ROEBUCK & CO.



MODEL 1858
Alignment, Voltage
Socket, Trimmers
Parts List

SEARS-ROEBUCK & CO.

SILVERTONE - - MODEL 1858

• • •

The Silvertone Model 1858 is a five tube automobile radio receiver almost identical with the Model 1730 described in Service Manual Supplement #25. As an examination of the schematic will show, practically the only circuit difference is in the filtering of the Genemotor. The chief mechanical difference is that the pilot light lead of the Model 1858 is contained in the same covering as the drive cables. The mechanical and general information contained in the Model 1730 manual will apply equally as well to the Model 1858.

The tubes and their functions are:

78 - RF
6A7 - Oscillator-Translator
78 - IF
85 - AVC-Detector-AF
41 - Output

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis. The location of its tuning adjustments is shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment:

1. Connect the test oscillator to the antenna lead through a .00025 mfd. condenser.

2. Open the variable condenser plates to the point where the rotor plates just mesh with the stator plates.

3. Set the test oscillator to exactly 1500 kc and adjust the oscillator trimmer for maximum output.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time adjust the padder until maximum output is obtained.

5. Repeat operations 1 to 4.

6. Set the test oscillator to 1400 kc and tune in its signal.

7. Adjust the antenna and translator trimmers for maximum output.

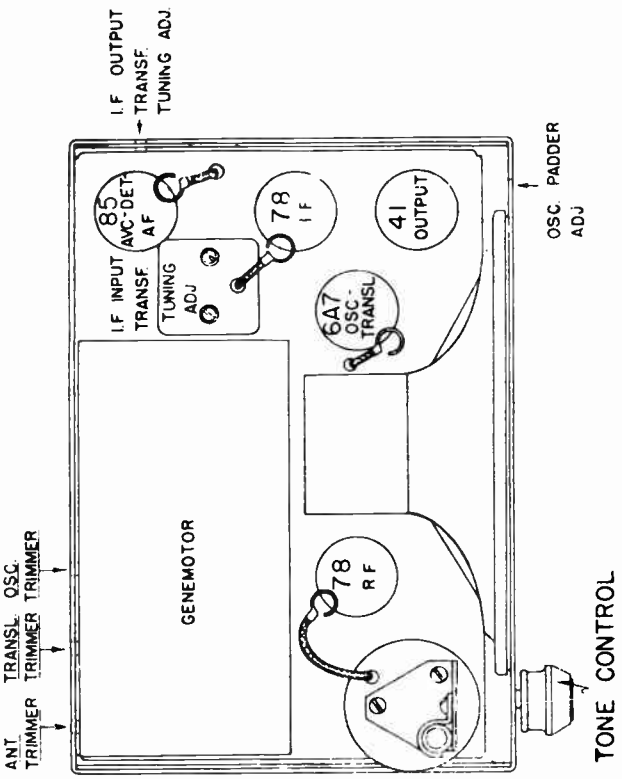
TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE	PLATE	SCREEN	OSC. SECTION GRID	OSC. SECTION PLATE	CONTROL GRID	CATHODE
78 - RF	- 210	77			.1	3.7
6A7- Osc-Transl	- 210	77	-.2	155	.1	3.7
78 - IF	- 210	77			0	4.8
85 - AVC-Det-AF	- 38				.1	4.8
41 - Output	- 200	210			-.5e	

e - Extremely low reading due to high series resistance in circuit.

Part No.	Description	Price per 100
R7587	Resistor - 10 M ohms, 1/3 watt carbon	5.25
R6636	Resistor - 1 M ohms, 1/3 watt carbon	5.25
R10268	Resistor - 250 ohms, 1/3 watt carbon	5.25
R6066	Resistor - 400 ohms, 2 watt, flexible	4.60
R10C56	Screw - Polarity changer	.72
R10084A	Shield - Antenna coil	6.89
R9691	Shield - Translator coil	7.70
R9360	Shield - Tube	2.63
R8092	Socket - 6 prong	2.46
R8072	Socket - 7 prong	2.78
S9967A	Speaker - Complete	235.96
S9966A	Speaker cone and voice coil assembly	57.48
S9964	Speaker clamping ring	1.36
S10215	Speaker field coil	56.89
S9968	Speaker eyelets	.09
S9959	Speaker felt ring	.93
S10144A	Speaker transformer	43.17
S9963	Sticker - Polarity changer	.99
R1-10032	Suppressor - Spark plug	9.85
R2-10032	Suppressor - Distributor	9.85
R9729	Stud - Set mounting	1.64
R9726	Template - Set mounting	.99
R10435A	Transformer - IF input	46.01
R10965A	Transformer - IF output	52.53



REPLACEMENT PARTS AND PRICE LIST

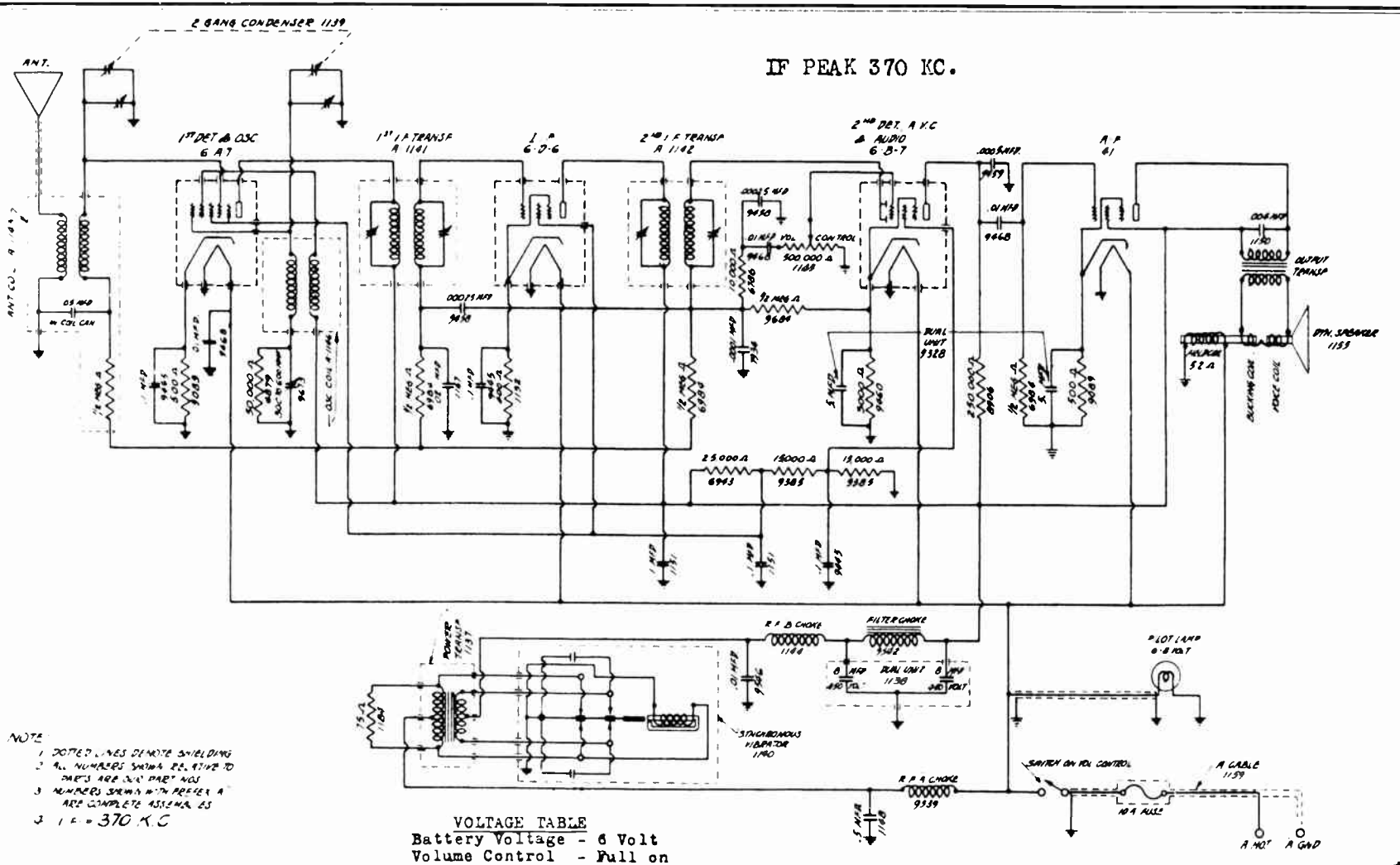
FOR

SILVERTONE - MODEL 1858

Part No.	Description	Price per 100
R8297A	Board - Terminal, double	1.34
R10134A	Board - Terminal, 4 terminals	1.70
R9753A	Board - Terminal, 6 terminals	2.70
R9754A	Board - Polarity changing	4.73
R11018	Book - Instruction	9.06
R9698	Bushing - Rubber, Genemotor mounting	1.28
R10862A	Choke - Primary of Genemotor	8.77
R9044A	Choke - Filament circuit	8.93
R9757	Choke - Pancake type, Genemotor secondary	5.74
R2179A	Choke - RF, 70 turn, Genemotor secondary	9.81
R11043	Clip - Grid	.19
R9741	Clip - "A" lead	2.04
R10314	Coil - Antenna	17.30
R10346	Coil - Oscillator	9.33
R10344	Coil - Translator	24.74
R10211	Condenser - Variable	11.55
R10086	Condenser - Electrolytic	32.55
R9426	Condenser - Padding	13.78
R8030	Condenser - 1 mfd. generator	19.90
R10025	Condenser - .5 mfd. ammeter	16.74
R9032	Condenser - .5 mfd. 160 volts	5.04
R10164	Condenser - .1 mfd. 600 volts	5.05
R8286	Condenser - .1 mfd. 200 volts	4.80
R8020	Condenser - .05 mfd. 200 volts	4.50
R6761	Condenser - .02 mfd. 600 volts	5.06
R8070	Condenser - .01 mfd. 600 volts	4.50
R8921	Condenser - .01 mfd. 200 volts	3.38
R10822	Condenser - .005 mfd. 600 volts	3.48
R6759	Condenser - .001 mfd. mica	5.69
R6760	Condenser - .0005 mfd. mica	4.56
R4592	Condenser - .00025 mfd. mica	8.28
R10091	Control - Remote, with 32" cables	200.33
R10680	Control - Remote, with 22" cables	198.05
R9711	Control - Tone, 500 M ohms	19.69
R10172	Control - Volume, 100 M ohms	26.93
R9717	Connector - "A" lead and fuse container	1.74
R10423A	Cover - Power supply case	19.34
R9587	Genemotor	470.76
R9744	Grommet - "A" lead	1.15
R7692	Knob	3.20
R8870A	Lead - Antenna	13.85
R9578B	Lead - "A", ammeter end	12.72
R9578A	Lead - "A", chassis end	25.07
R9719	Nut - Set mounting	.49
R8219	Nut - Acorn	1.45
R7228	Resistor - 500 M ohms, 1/3 watt carbon	5.25
R7566	Resistor - 100 M ohms, 1/3 watt carbon	5.91
R6637	Resistor - 50 M ohms, 1/3 watt carbon	5.25
R6689	Resistor - 30 M ohms, 1 watt carbon	6.58
R5095	Resistor - 20 M ohms, 1 watt carbon	6.58
R9735	Washer - Lock, set mounting	.16
R9740	Washer - Flat, set mounting	1.52

SEARS-ROEBUCK & CO.

MODEL 1859-A, 7117
Schematic
Voltage



VOLTAGE TABLE
Battery Voltage - 6 Volt
Volume Control - Full on

TYPE OF TUBE	POSITION OF TUBE	FIL. VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO. 3 & 5
6A7	Modulator & Oscillator	6	250	2.5	100	10	250	100
6D6	I. F. Amplifier	6	250	1.	100			
6B7	Second Detector Diode AVC & 1st Audio Triode	6	35##	3	50			
41	Output	6	230	16	250			

##Triode Plate. Comparative Voltage only. Thevoltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

MODEL 1859-A,7117

Alignment Data

Installation,Parts List

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE: It should rarely be necessary to realign the intermediate transformers or the variable condenser. As a matter of fact, this should only be necessary when an intermediate transformer, oscillator or R. F. coil has become defective and require replacement. For properly aligning either the intermediate transformer or condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 370 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer which is accessible from the top of the I. F. transformer up and down until maximum reading is obtained on the meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner.

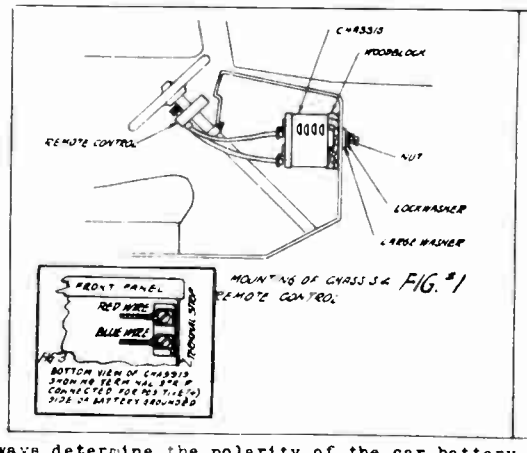
4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER: To align the variable condenser and padding condenser it is necessary that the receiver chassis be removed from the set housing. After the receiver chassis has been removed connect the remote control flexible drive shafts in their respective couplers, and set the dial needle on the dial face so that the dial calibration is correct.

1. Connect the high output side of theoscillator to the antenna and the ground to the receiver chassis.

2. Tune the receiver to exactly 1500 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1500 KILOCYCLE SIGNAL (TO MAXIMUM OUTPUT) BY ADJUSTING THE OSCILLATOR VARIABLE CONDENSER TRIMMER MOUNTED ON TOP OF THE VARIABLE CONDENSER. THEN ADJUST THE OTHER VARIABLE CONDENSER TRIMMER FOR MAXIMUM OUTPUT. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency, then adjust the 600 padding condenser which is located on the right hand side and accessible through the hole in the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment, using the position where greatest output is obtained.



MOUNTING OF CHASSIS & REMOTE CONTROL FIG. #1

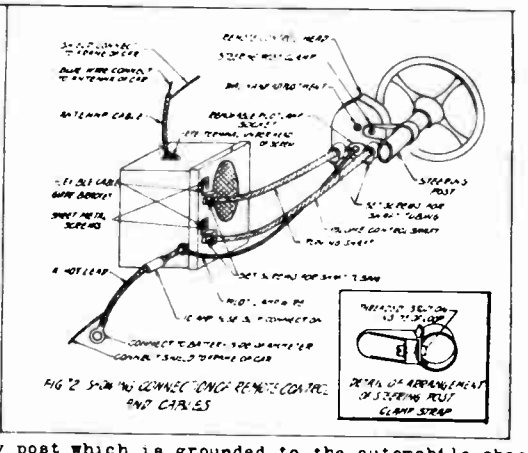


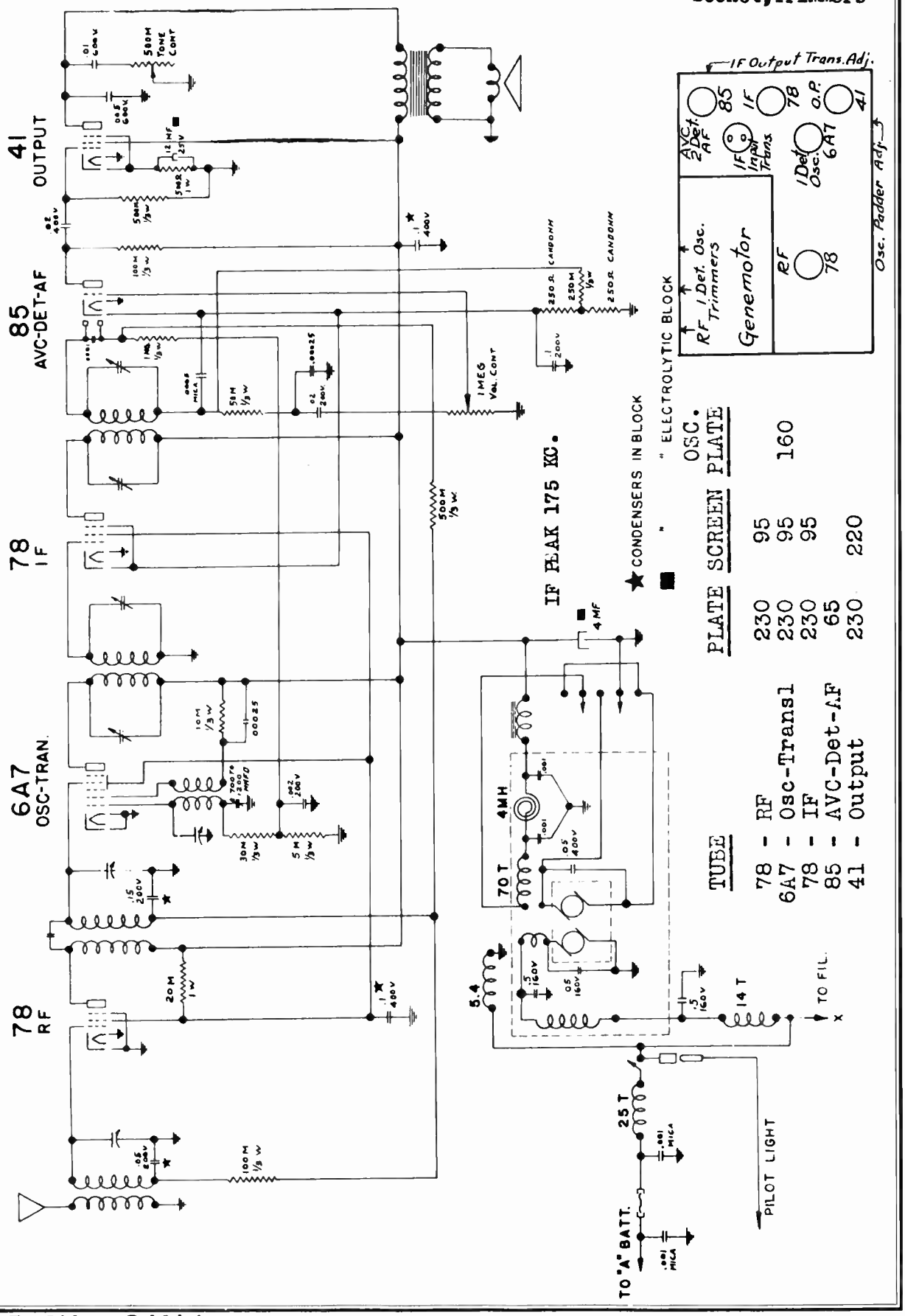
FIG #2 SHOWING CONNECTIONS REMOTE CONTROL AND CABLES

Always determine the polarity of the car battery post which is grounded to the automobile chassis before installing the receiver. When shipped from the factory the receiver is properly connected as illustrated (Fig. 3) for installation in automobiles which have the positive (+) battery post grounded to the car frame. If the negative (-) battery post is grounded, the position of the red and blue leads as shown on the terminal strip diagram must be reversed. As the terminal strip is located underneath and toward the right front corner of the receiver chassis it is necessary to remove the chassis from the set housing to make this change. This is accomplished by removing the sheet metal screw that grounds the antenna shield lead to the housing top, the twelve (12) machine screws around the edge of the housing front, the single machine screw on the bottom of the housing and then grasping the front panel of the housing and pulling outward. Using the receiver in an automobile with improper terminal strip polarity connections will result in damage to the vibrator unit, transformer or electrolytic condenser.

PART NUMBER			
1143	Antenna Coil	1184	75 Ohm Wire Wound 1 Watt Resistor
1146	Oscillator Coil	6943	25,000 Ohm 1 Watt Resistor
1141	First I. F. Transformer	6879	50,000 Ohm 1/3 Watt Resistor
1142	Second I. F. Transformer	9385	15,000 Ohm 1/3 Watt Resistor
1155	Dynamic Speaker	9089	500 Ohm 1/3 Watt Resistor
9073	Padding Condenser	1152	400 Ohm 1/3 Watt Resistor
1139	Two Gang Condenser	6875	250 Ohm 1/3 Watt Resistor
1145	Volume Control	9460	3,000 Ohm 1/3 Watt Resistor
9328	Electrolytic Condenser 2 x 5 Mfd.	6786	10,000 Ohm 1/3 Watt Resistor
9458	.00025 Mfd. Moulded Condenser	6984	500,000 Ohm 1/3 Watt Resistor
9459	.0005 Mfd. Moulded Condenser	8906	250,000 Ohm 1/3 Watt Resistor
7934	.0001 Mfd. Moulded Condenser	9581	10 Ampere Fuse
9445	.1 Mfd. 200 Volt Condenser	1159	"A" Battery Cable complete with fuse
1148	.5 Mfd. 200 Volt Condenser	1140	Vibrator
9468	.01 Mfd. 400 Volt Condenser	1137	Power Transformer
9546	.01 Mfd. 600 Volt Condenser	1138	2 x 8 Mfd. Condenser Block
1150	.004 Mfd. 600 Volt Condenser	9539	R. F. "A" Choke
1151	.1 Mfd. 400 Volt Condenser	1144	R. F. "B" Choke
1167	.02 Mfd. 200 Volt Condenser	9598	.5 Mfd. Generator Condenser

SEARS-ROEBUCK & CO.

MODEL 1864
Schematic, Voltage
Socket, Trimmers



The Genemotor assembly is held to the chassis by three screws. The removal of these three screws and of the ones that hold the electrolytic condenser to the Genemotor case permits the Genemotor assembly to be demounted from the chassis. The two connecting leads can be clipped. The entire Genemotor assembly should be returned to the Colonial Radio Corporation, should repair or replacement be necessary.

The receivers are shipped with the polarity changing screws in the proper position for cars having the negative battery terminal grounded. If the car is one with a grounded positive terminal, the positions of the two screws must be changed, as indicated by the sticker on the case.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis and its adjustments are accessable through the hole in the right end of the chassis, as indicated in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. The volume control of the receiver should be turned to its full "on" position and the output from the test oscillator kept as low as possible in order to render the AVC action of the set inoperative.

RF Alignment:

1. Connect the test oscillator to the antenna lead through a .0002 mfd. condenser.

2. Set the test oscillator to 1520 kc. Open the variable condenser plates all the way and adjust the oscillator trimmer for maximum output.

3. Set the test oscillator to 1400 kc and adjust the RF and translator trimmers.

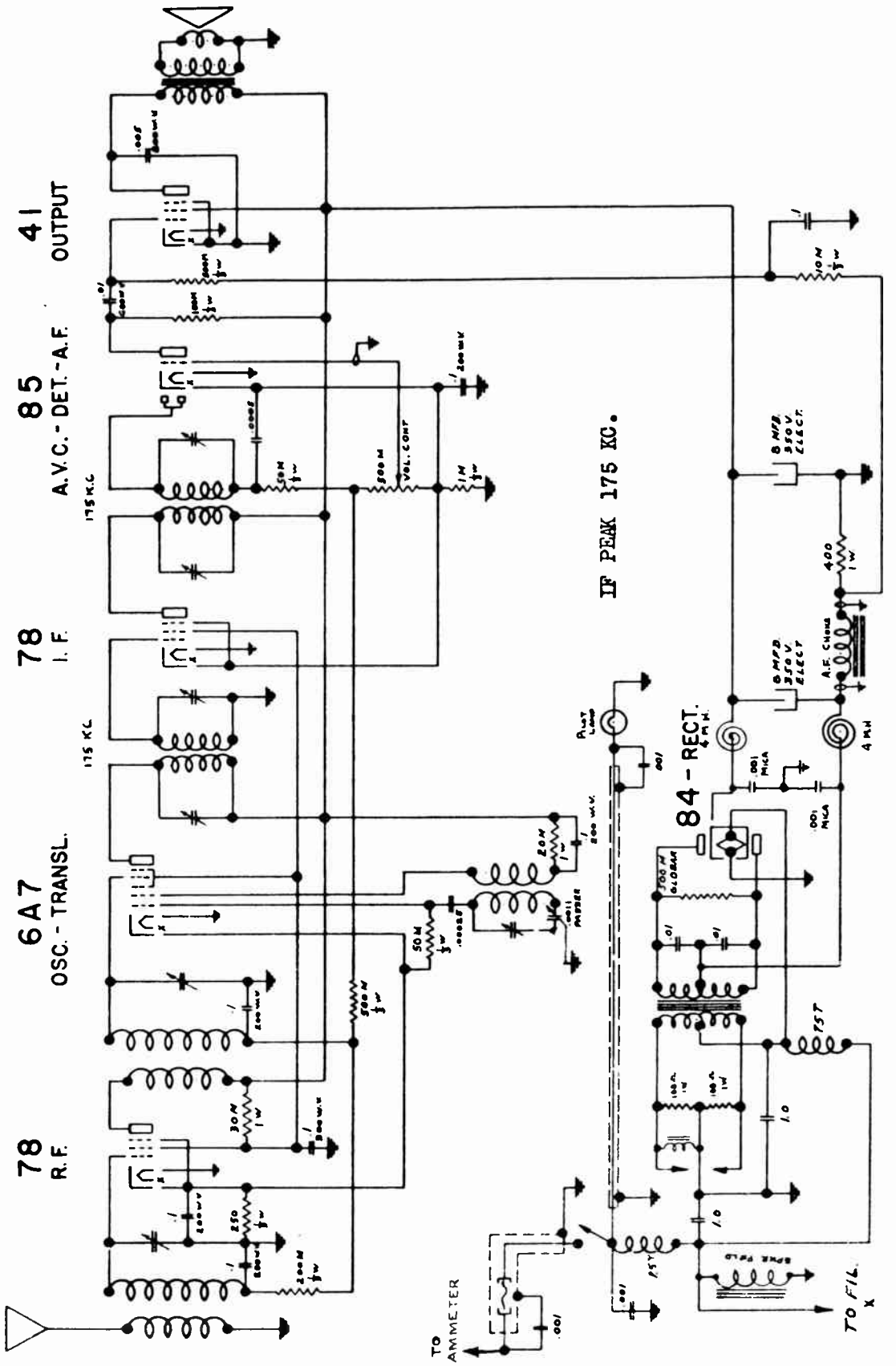
4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

5. Repeat the 1520 kc and 1400 kc adjustments. Always leave the receiver's volume control on full and the test oscillator's output at the lowest possible value.

PART NO.	DESCRIPTION
R9540	Connector - Antenna
R8308F	Board - Terminal, triple
R8308A	Board - Terminal, triple
R9446A	Board - Terminal, 4 terminals
R9754A	Board - Polarity changing
R11651	Book - Instruction
R11487B	Bracket - With pilot light connector assembly
R9970A	Bracket - Variable condenser
R9734G	Cable - Variable condenser drive, complete
R9734H	Cable - Volume control drive, complete
R10862A	Choke - Genemotor input
R2179A	Choke - 70 turn
R9044A	Choke - Mounted on top of speaker
R5220BX	Choke - 14 turn
R9757	Choke - Genemotor
R12029	Choke - Filter
R11043	Clip - Grid
R9741	Clip - "A" lead
R11634	Coil - Antenna
R10348	Coil - Oscillator
R10344	Coil - Translator
R11637	Condenser - Variable
R11637A	Condenser - Variable with bracket assembly
R11909	Condenser - Electrolytic
R9426	Condenser - Padding
R11631	Condenser - Block
R9032	Condenser - .5 mfd. 160 volts
R8286	Condenser - .1 mfd. 200 volts
R9818	Condenser - .02 mfd. 400 volts
R6629	Condenser - .02 mfd. 200 volts
R7070	Condenser - .01 mfd. 600 volts
R10322	Condenser - .005 mfd. 600 volts
R11645	Condenser - .002 mfd. 200 volts
R6759	Condenser - .001 mfd. mica
R6760	Condenser - .0005 mfd. mica
R4592	Condenser - .00025 mfd. mica
R4303	Condenser - .0001 mfd. mica
R11910	Condenser - .5 mfd. ammeter
R10025	Condenser - .5 mfd. generator
R9711	Control - Tone
R11638	Control - Volume
R7585	Resistor - 1 megohm, 1/3 watt carbon
R7228	Resistor - 500 M ohms, 1/3 watt carbon
R7584	Resistor - 250 M ohms, 1/3 watt carbon
R7586	Resistor - 100 M ohms, 1/3 watt carbon
R6637	Resistor - 50 M ohms, 1/3 watt carbon
R6110	Resistor - 30 M ohms, 1/3 watt carbon
R5995	Resistor - 20 M ohms, 1 watt carbon
R7587	Resistor - 10 M ohms, 1/3 watt carbon
R7226	Resistor - 5 M ohms, 1/3 watt carbon
R11647	Resistor - 500 ohms, flexible
R11639	Resistor - Candohm
S11628	Speaker
S11628A	Speaker - With cover and filter assembly
R10435A	Transformer - IF input
R10635A	Transformer - IF output
R11644	Control - Remote, head only
R11644-1	Remote control mounting bracket
R11644-2	Remote control mounting strap
R11644-3	Remote control mounting bolt and washer
R11632A	Genemotor complete with case and filter assembly
R10980	Grommet - "A" lead
R11567	Grommet - Variable condenser mounting
R7692P	Knob - Tone control
R9540B	Lead - Antenna with connector
R8870A	Lead - Antenna, complete with shielding
R9675AE	Lead - "A", set end
R9578F	Lead - "A", ammeter end
R5112AA	Lead - Pilot light connector assembly
R9719	Nut - 5/16"-18. set mounting
R10165	Spring - Flexible cable grounding
R9960	Sticker - Polarity changing
R9729	Stud - Set mounting
R9786	Template - Set mounting

SEARS-ROEBUCK & CO.

MODEL 7128
Schematic



MODEL 7128
Alignment, Voltage
Socket, Trimmers
Parts List

SEARS-ROEBUCK & CO.

SILVERTONE - MODEL 7128

The SILVERTONE Model 7128 is a six tube superheterodyne automobile radio receiver. It uses a full wave vibrator and tube rectifier to supply the "B" voltage.

The tubes and their functions are:

78 - RF
6A7 - Oscillator-Translator
78 - IF
85 - AVC-Det-AF
41 - Output
84 - Rectifier

The resistor marked "Globar" in the schematic, is a special voltage regulating resistor. Its value varies with the voltage applied to it. When the receiver is first turned on, the output voltage from the power supply tends to become very high until the tubes heat sufficiently to draw their normal load. Under these conditions, the Globar resistance drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the Globar resistance increases greatly so that it no longer constitutes a load on the power supply.

The voltage drop across the volume control, due to the 85 diode current, is used for AVC voltage.

The general information given in Service Manual Supplement #25, for the Model 1730, will apply as wellfor the Model 7128.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis. The location of its tuning adjustments is shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment:

1. Connect the test oscillator to the antenna lead through a .00025 mfd. condenser.

2. Set the test oscillator to exactly 1500 kc.

3. Turn the variable condenser plates all the way out. Then slip a piece of card about the thickness of a postal card between the stator and the short end of the rotor plates in such a way that the plates cannot be meshed. Turn the rotor plates sufficiently to clamp the piece of paper between them and the stator. With the plates in this position, adjust the oscillator trimmer for maximum output.

4. Adjust the antenna and translator trimmers for maximum output.

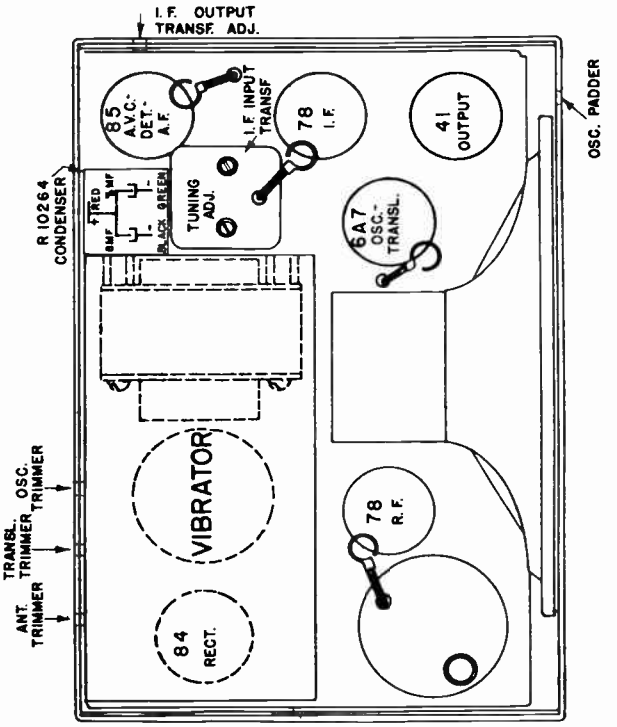
5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator padder until maximum output is obtained.

6. Repeat the trimmer adjustments at 1500 kc.

TUBE VOLTAGE CHART

All readings are to be taken between chassis and the respective element of each tube.

TUBE	PLATE	SCREEN	OSC.SEC. PLATE	CATHODE
78 - RF -	205	75		3.7
6A7 - Osc-Transl -	205	75	140	3.7
78 - IF -	205	75		4.5
85 - AVC-Det-AF -	35			
41 - Output -	195	205		
84 - Rectifier -				205



REPLACEMENT PARTS AND PRICE LIST

PART NO.	DESCRIPTION	PRICE PER 100
R8297A	Board - Terminal, double	1.34
R8308B	Board - Terminal, double	1.26
R8306A	Board - Terminal, triple	1.78
R9765B	Board - Terminal, 6 terminals	3.05
R10273	Booklet - Instruction	2.40
R9734A	Cable - Flexible, drive	26.82
R9734E	Cable and casing - Variable condenser drive	71.43
R10064A	Transformer - IF input	44.27
R10065A	Transformer - IF output	52.53
R10263A	Transformer - Power supply	116.31
R9044A	Choke - Single layer	8.93
R10095B	Choke - Triple layer	10.41
R11043	Clip - Grid	.19
R9741	Clip - "A" lead	2.04
R10314	Coil - Antenna	17.30
R10348	Coil - Oscillator	9.33
R10344	Coil - Translator	24.74
R9757	Coil - Choke, pancake type	5.74
R10272A	Coil - Choke, audio	24.90
R10349A	Condenser - Variable, assembly	153.57
R10264	Condenser - 8 mfd. dual, electrolytic	68.25
R10069	Condenser - 1 mfd. 25 volts	13.34
R8030	Condenser - 1 mfd. Generator	19.90
R10025	Condenser - .5 mfd. Ammeter	16.74
R6444	Condenser - .1 mfd. 200 volts	5.74
R8286	Condenser - .1 mfd. 200 volts	4.80
R8581	Condenser - .1 mfd. 300 volts	4.40
R7070	Condenser - .01 mfd. 600 volts	4.50
R9776	Condenser - .01 mfd. 800 volts	4.46
R10431	Condenser - .005 mfd. 800 volts	3.73
R6759	Condenser - .001 mfd. mica	5.68
R6760	Condenser - .0006 mfd. mica	4.56
R4592	Condenser - .00025 mfd. mica	8.28
R9426	Condenser - Padding	13.75
R9710	Control - Volume, 500 M ohms	30.19
R10274	Control - Remoto, head	119.46
R7228	Resistor - 500 M ohms, 1/3 watt carbon	5.25
R6638	Resistor - 200 M ohms, 1/3 watt carbon	5.91
R7586	Resistor - 100 M ohms, 1/3 watt carbon	5.91
R6637	Resistor - 50 M ohms, 1/3 watt carbon	5.25
R6689	Resistor - 30 M ohms, 1 watt carbon	6.58
R5095	Resistor - 20 M ohms, 1 watt carbon	6.58
R7587	Resistor - 10 M ohms, 1/3 watt carbon	5.25
R6636	Resistor - 1 M ohms, 1/3 watt carbon	5.25
R8522	Resistor - 400 ohms, 1 watt carbon	5.25
R10268	Resistor - 250 ohms, 1/3 watt carbon	5.25
R8436	Resistor - 100 ohms, 1 watt, flexible	5.25
R9745	Resistor - 500 K ohms, Globar, voltage regulating	10.60

The intermediate frequency transformers are tuned to 175 kilocycles. An oscillator which is accurately set to this frequency and which has an attenuator in its output to control the output can be used. It is of course best to start by retuning the intermediate stage before touching other adjustments. The outpnt of the intermediate frequency generator is connected one side to the grid of the 1st detector (236 tube) after removing the grid cap from this tube. The ground of the oscillator is connected to the chassis base. With the frequency set at 175 K.C.(accurately) the tuning adjustments of the 1st and 2nd I.F. transformers are adjusted to peak resonance. It is very important to use a long bakolite screw-driver for these adjustments. In adjusting, the successive tuning condensors are gone—over several times readjusting the output of the oscillator or the receiver's volume control as required. With the I.F. transformers properly tuned and scaled, the R.F. and oscillator circuits may next be adjusted.

The grid cap of the 1st detector is replaced and a generator or oscillator having frequencies of 1400 and 600 kilocycles is set up and connected to the aerial and ground of the receiver.

Do not attempt to align condenser without a shield. It is extremely important that a shield corresponding to the can be placed around the antenna coil and gang condenser in making adjustments on the r.f. and oscillator circuits, otherwise due to the change in these circuits caused by this shielding a very inaccurate adjustment will be obtained. This shielding may consist of a piece of steel bent to the shape of the corner of the can fitting around the edge of the base from the speaker to the rear right hand corner and extending as high as the speaker with holes in it corresponding to the condensor trimmer locations or a regular can and cover with such holes provided. This shield or can and cover must be in secure and in proper location and not disturbed during these adjustments From this it is easily seen why if an attempt is made to check the alignment out of the can on this receiver a different or changed adjustment will be had as against the factory setting, which is made with the shielding in place.

With the above shielding in place and tubes which are to be used in chassis, the procedure of circuit alignment is as follows:

Set the generator frequency at 1400 K.C.Set the tuning dial to 15 on the scale, open trimmers slightly on antenna(top) and 1st detector(middle)sections of gang condensor. Then without disturbing dial setting adjust oscillator (bottom)trimmer on gang to greatest signal.After this has been properly set adjust one at a time the antenna and 1st detector trimmers for maximum signals.If these operations are properly set as above,the receiver circuits are correct for the high frequency adjustment. Next change the generator frequency to 600 kilocycles and turn the tuning dial of the receivor to resonate with this signal.. This will come in around 82 on the dial. When the 600 kilocycle point is located on the dial next adjust the oscillator low frequency padding condensor, which is at the bottom rear edge of chassis base in right corner. The screw on this condensor is adjusted in and out as the receiver dial is slowly moved across the 600 K.C. resonant point until greatest signal strength is obtained. The combination of the best padding condenser setting with the dial setting giving the greatest signal output is the correct padding condenser adjustment. No change in the gang condensor trimmers adjustment should be made during the 600 K.C. adjustment.

DIAL LIGHT. If the dial light burns out be sure and replace with one of same type 6.3 volts 1000 hrs.

In the first models of the automobile radio the B- and hot "A" leads were connected as shown in diagram "A". In the present model these leads are as shown in diagram "B". All other connections are identical, as shown on the schematic drawing. Connecting the black lead in the cable, designated as B- in the instruction sheet, to the hot 6 volt post of the eliminator will supply the hot 6 volts and provide an "off and on" switch for the B eliminator as well as the receiver itself In this way no other connection between the hot 6 volt lead of the eliminater and battery should be made and no switch for the hot lead to the eliminator is necessary; the set switch controlling both the B eliminator and receiver.

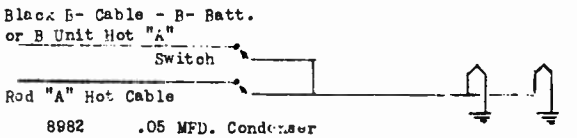
When using B batteries, the black lead should be connected to the B- of the batteries but under no circumstance should a separate lead from the B- terminal of the batteries be run to the chassis of the car or the shielded cable. In other words do not ground the B- terminal of the B batteries.

The only difference in the tube equipment between the early and present models is the output tube. The first model utilized a #41 output tube and the present model a #89 tube. Complete complement of tubes is:

One (1) Type 36	One (1) Type 85
Two (2) Type 39	One (1) Type 89

DIAGRAM "A"

DIAGRAM "B"



8982	.05 MFD. Condenser
8933	.005 MFD. 400 volt condenser
8927	Padding condenser
8961	.05 MFD. 400 volt condenser
7934	.0001 MFD. mouldod condenser
6591	.0001 MFD. condenser 85 plate bypass
7860	.01 MFD. 400 volt coupling condenser
8876	5 MFD. dry electrelytic cathode bypass
9032	.25 MFD. 200 volt cathode 7 screen bypass
9012	1 MFD. condenser
8983	.003 MFD. plate bypass condenser
8972	2 megohm resistor
6880	6000 ohm resistor
9033	100,000 ohm 85 tube plate resistor
8065	1,000 ohm 41 tube cathode resistor
6924	500,000 ohm resistor
9018	150 ohm cathode resistor 1/3 watt

FIVE TUBE AC-DC SUPERHETERODYNE
(110 V. AC-DC, 6 V. Storage Batteries & 32 V. DC)

VOLTAGE TABLE: Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table #1 is taken at 115 volts (AC) line with the volume control in the full on position. It must be remembered that the voltage readings vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10% plus or minus is permissible. THE VOLTAGES WILL BE APPROXIMATELY AS GIVEN FOR EITHER DC OR AC OPERATION.

TUBE VOLTAGES — Table #1

Type of Tube	Position of Tube	Filament Volts	Plate Volts	Screen Volts	C Volts
36	Composite Oscillator & Modulator	5.5	108	21*	2.5
39	Intermediate Frequency	5.6	108	108	2.5
36	Detector	5.7	27*	21*	2.5
38	Output	5.8	108	108	1.5*
25z5	Rectifier	29.0	52.5 MA		

The voltage table #2 is for 6 volt battery operation with a B eliminator which is especially designed for the model #561 receiver. The voltages as given will be correct for 32 volt DC operation in conjunction with a B eliminator of the recommended factory type. It will be found that on certain types of eliminators which do not have sufficient output or a low 6 volt battery, the readings will be lower than that given in the voltage table.

TUBE VOLTAGES — Table #2

Type of Tube	Position of Tube	Filament Volts	Plate Volts	Screen Volts	C Volts
36	Composite Oscillator & Modulator	5.8	112	25*	2.5
39	Intermediate Frequency	5.8	112	112	2.9
36	Detector	5.8	28*	25*	2.0
38	Output	5.8	108	112	1.5*
25z5	Rectifier	52.5 MA			

* These readings for both Table #1 and #2 are only comparative and are not true voltages applied. The voltmeter, when readings are taken at these points, is in series with a very high resistance.

IMAGE SUPPRESSION: Occasionally in some locations interference in the form of whistles or stations which are tuned in on dial settings other than the station's frequency may be encountered. This is a rare occurrence and is called image interference caused by two signals whose frequencies differ by twice the intermediate frequency. This should not be confused with heterodyne whistles which are caused by two stations being received whose frequencies are the same nor by local stations whose frequencies are close to some out-of-town stations frequency which might result in reception from both stations. To overcome this possibility of image interference an image suppression circuit is incorporated in the receiver. The image adjusting condenser is mounted on the back of the chassis below the first IF transformer shield and is accessible through the hole in the chassis. If a whistle or interfering station is received on a frequency other than its fundamental, tune the receiver to this interference and adjust the image suppression condenser until the interference disappears or until the interference is at the minimum point. UNLESS THERE IS AN ACTUAL IMAGE INTERFERENCE DO NOT ATTEMPT TO ADJUST THE IMAGE SUPPRESSION CIRCUIT.

INTERMEDIATE FREQUENCY ALIGNMENT: Only when an intermediate transformer has become defective, due to an open or burned out winding, should it be necessary to readjust the intermediate stages. Should this occur it is necessary that an oscillator be used with some type of output measuring device so as to correctly tune the transformers. To align the intermediate transformers connect the high side of the oscillator output to the control grid of the 36 oscillator modulator tube leaving the grid cap disconnected from the tube. The ground side of the test oscillator should be connected to the gang condenser frame and MUST NOT OTHERWISE BE GROUNDED. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. BE SURE THAT OUTPUT OF THE OSCILLATOR IS NOT SO HIGH AS TO OVERLOAD THE DETECTOR. IF DURING THE ALIGNMENT THE DETECTOR OVERLOADS REDUCE THE OUTPUT OF THE OSCILLATOR. Align the first intermediate transformer by turning the intermediate frequency trimmer screw up and down until maximum reading is obtained on the output motor. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate transformer. After both intermediate transformers are adjusted the alignment of the intermediate stage is complete and the trimmer should not be further disturbed, and the grid cap should be connected to the grid of the 36 tube.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if an antenna or oscillator coil requires replacement it will be necessary to realign the variable condenser. The front section of the variable condenser (looking at the front of the receiver) is the oscillator section, the other section tunes the antenna stage. Tune the receiver to 1720 kilocycles on the dial and set the oscillator at this frequency. BE SURE THAT OUTPUT OF THE OSCILLATOR IS NOT SO HIGH AS TO OVERLOAD THE DETECTOR. IF DURING THE ALIGNMENT THE DETECTOR OVERLOADS REDUCE THE OUTPUT OF THE OSCILLATOR. Next adjust the trimmer screws of the oscillator and antenna sections which are mounted on top of the variable condensers so as to obtain maximum output reading. It will be found that the oscillator section trimmer condenser will in most cases have to be adjusted to minimum capacity and in some instances it may be necessary to remove the trimmer screw entirely. After the trimmers have been correctly adjusted, at this frequency, tune the receiver to 600 kilocycles and adjust the oscillator to 600 K.C. Next, adjust the oscillator padding condenser (which is located directly below the variable condenser and accessible through the hole in the front of the chassis) to obtain maximum reading on the output meter. If the above is correctly followed the receiver will now track correctly over the entire band from 1720 KC to 550 KC. It is always advisable to align the receiver, whenever possible, with the tubes that are to be used in the set.

32 VOLT FARM LIGHTING SYSTEMS: When the current supply is DC, the 32 volt mains plug must be inserted correctly into the 32 volt DC mains receptacle, otherwise the set will not operate because of reversed polarity. If, after inserting the mains plug into the receptacle, the receiver does not operate for approximately one minute or one and a half minutes, remove the mains plug and turn it half way around and insert it into the receptacle. When operating the receiver on DC it will be found that in most instances the noise interference is greater than when the receiver is used on AC current. DC appliances such as motors, fans, etc., as a general rule cause more interference than similar AC equipment. Unfortunately this interference can only be eliminated at the source of the interference. When operating the receiver on 32 volt DC and using a B eliminator, be sure to keep the set aerial wire as far away from the DC line as possible, to avoid noise pick up from the 32 volt DC line. By connecting the antenna wire to an outside aerial in the event the noise interference is excessive, the interference can generally be minimized, as the increased volume obtained with the longer aerial permits lower minimum volume control setting and a consequent apparent reduction in noise interference. It is not recommended that the 6 volt cable and 6 volt B eliminator be used on the 32 volt system by tapping in at 6 volt as the current consumption will be too large, nor is it recommended that B batteries be used as the life of the battery will be limited. To reduce the drain on the batteries if they are used, it is recommended that only 90 volts of battery be connected to the receiver.

PARTS PRICE LIST

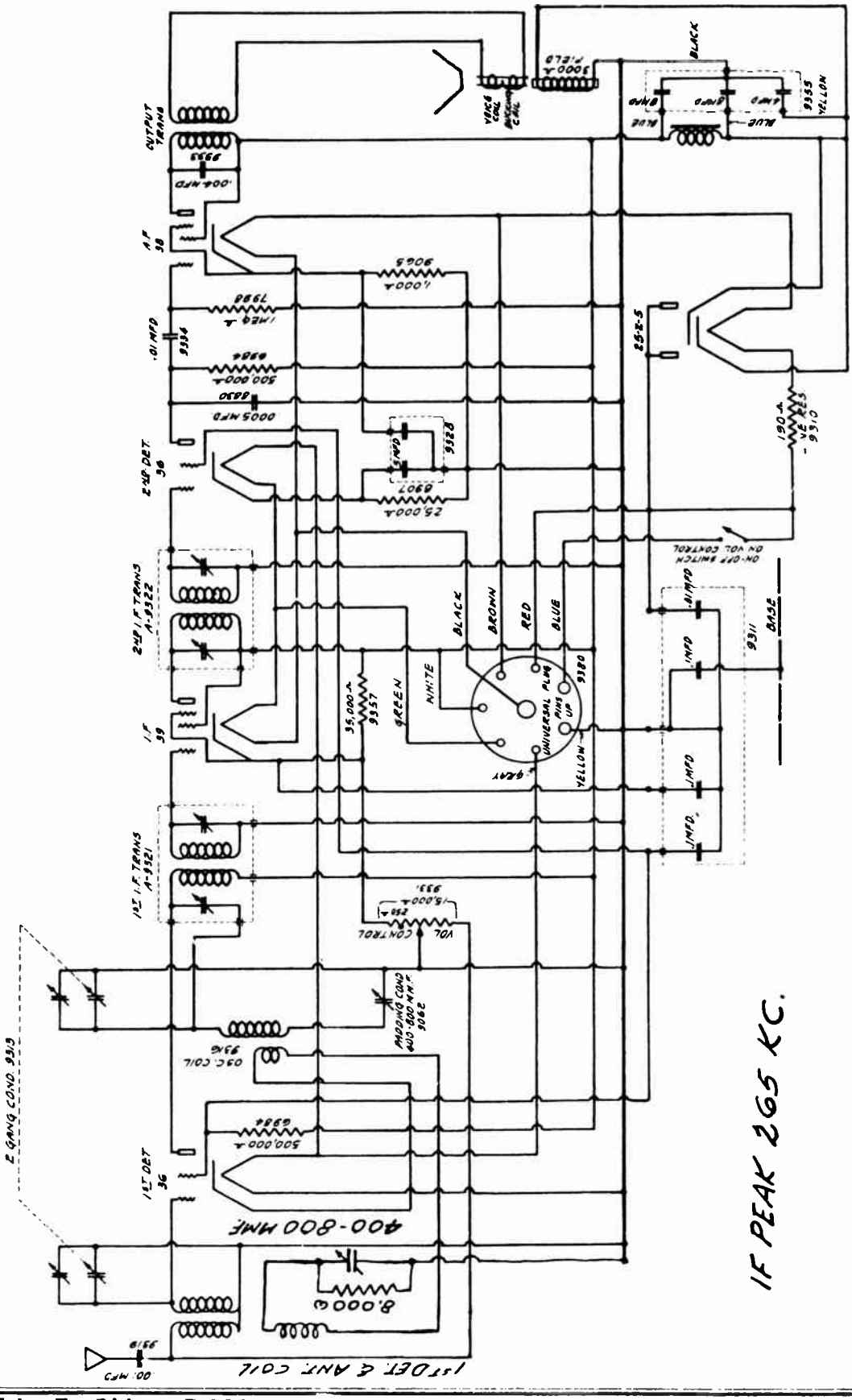
FOR THE

AC-DC FIVE TUBE SUPERHETERODYNE

PART NUMBER		PART NUMBER	
8923	39 Tube Socket	9357	35,000 " "
8922	36 " "	7998	1 Meg. Ohm Resistor
9307	38 " "	9337	8,000 Ohm Resistor
9308	Rectifier Tube Socket	9405	110-V Cable
9313	Gang Condenser	9342	Knobs
9062	Padding Condenser	9340	Cabinet less back
9316	Oscillator Coil	9423	Wood Cabinet
9317	Antenna and 1st Detector Coil	9369	Cabinet Back
9321	1st IF Transformer	9411	Antenna Wire and Spool
9322	2nd IF Transformer	7690	Rubber Feet Pads
9310	Wire Wound Resistance Strip 190 ohms	9399	6 Volt B Battery Eliminator
9312	Filter Choke	9408	32 Volt B Battery Eliminator
9315	Dynamic Speaker	9420	220 Volt Line Adapter
9311	By-pass Condenser Block (.1-.1-.1-01 M.F.D.)	9153	Car Antenna
9355	Elec. Condenser Block (8 x 8 & 4 M.F.D.)	9131	Spark Plug Suppressor
9328	" " " (3 x 5 M.F.D.)	9132	Generator Suppressor
9333	.004 M.F.D. Condenser	9133	Generator By-pass Condenser
9334	.01 M.F.D. Condenser	9412	23 Ohm Resistor for 32-Volt Cable
8830	.0005 M.F.D. Mica Condenser	9408	32 Volt Adapter Cable Complete
9319	.001 M.F.D. Mica Condenser	9397	6-Volt Adapter Cable Complete
9331	Volume Control	9380	Set Cable Plug
8907	25,000 Ohm Resistor	9402	Bkt. Assem. Complete
9365	1,000 " "	9393	Web Strap Buckle
6984	500,000 " "	9390	Long Web Strap Only

SENTINEL RADIO CORP.

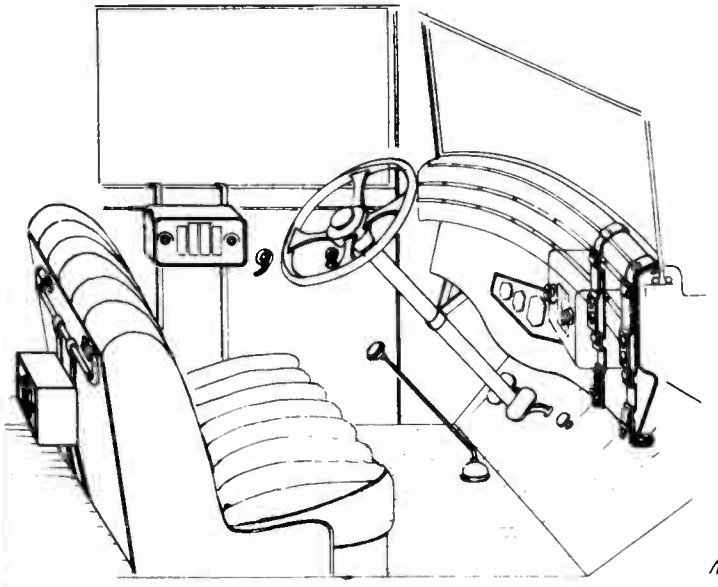
MODEL 550
Schematic



ELECTRO DYNAMIC SPEAKER: The speaker has a DC field resistance of 3000 ohms.

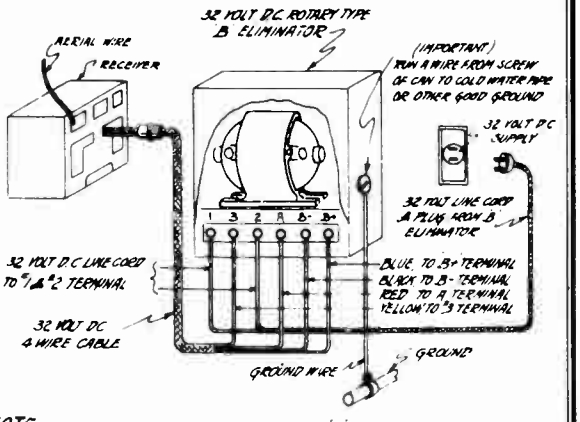
MODEL 550
Installation and Connection Details

SENTINEL RADIO CORP.



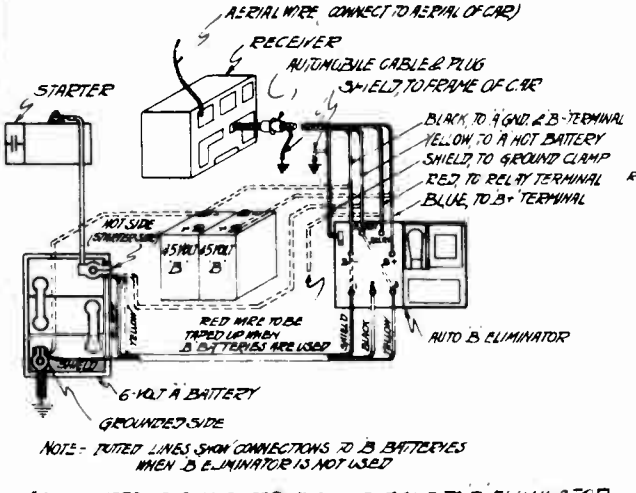
SKETCH SHOWING VARIOUS MOUNTING OF RECEIVER

FIG. 1



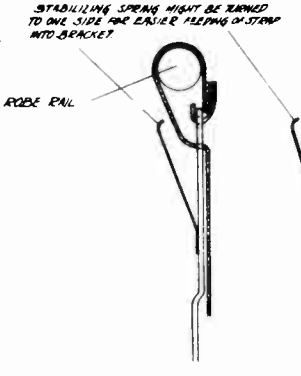
NOTE - IF B BATTERIES ARE USED INSTEAD OF B ELIMINATOR, CONNECT THEM TO SET CABLE WIRES AS SHOWN IN DOTTED LINES IN FIG "2". THE YELLOW AND BLACK CABLE WIRES ARE CONNECTED TO LINE CORD & PLUG FOR 32 VOLT SOCKET CONNECTION.

FIG "3 SKETCH SHOWING CABLE CONNECTIONS TO B ELIMINATOR FOR 32 VOLT D.C. OPERATION

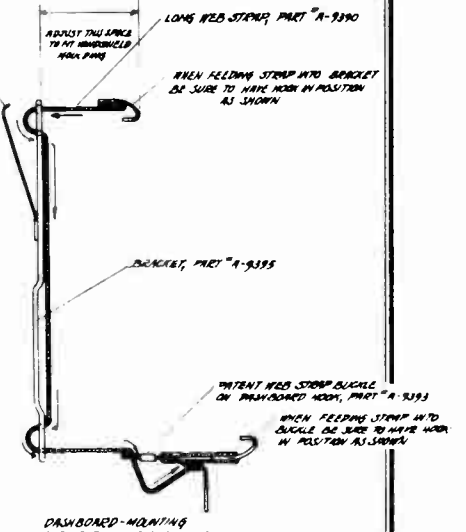


NOTE - DOTTED LINES SHOW CONNECTIONS TO B BATTERIES WHEN B ELIMINATOR IS NOT USED

FIG "2 SKETCH SHOWING CABLE CONNECTIONS TO B ELIMINATOR OR B BATTERIES FOR 6 VOLT A AUTO OPERATION



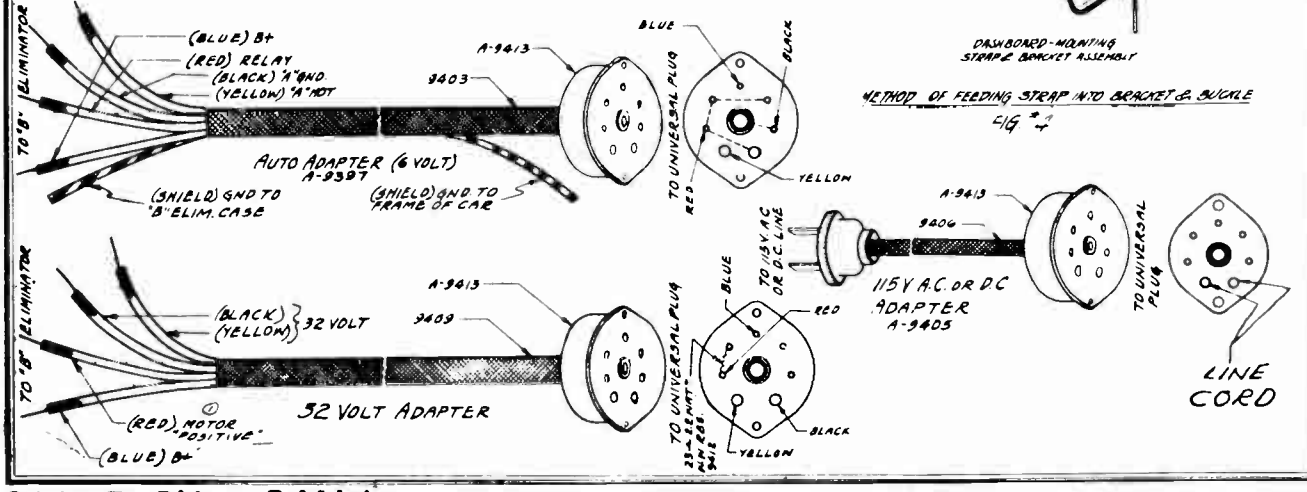
ROBE RAIL - MOUNTING STRAP & BRACKET ASSEMBLY



DASHBOARD - MOUNTING STRAP & BRACKET ASSEMBLY

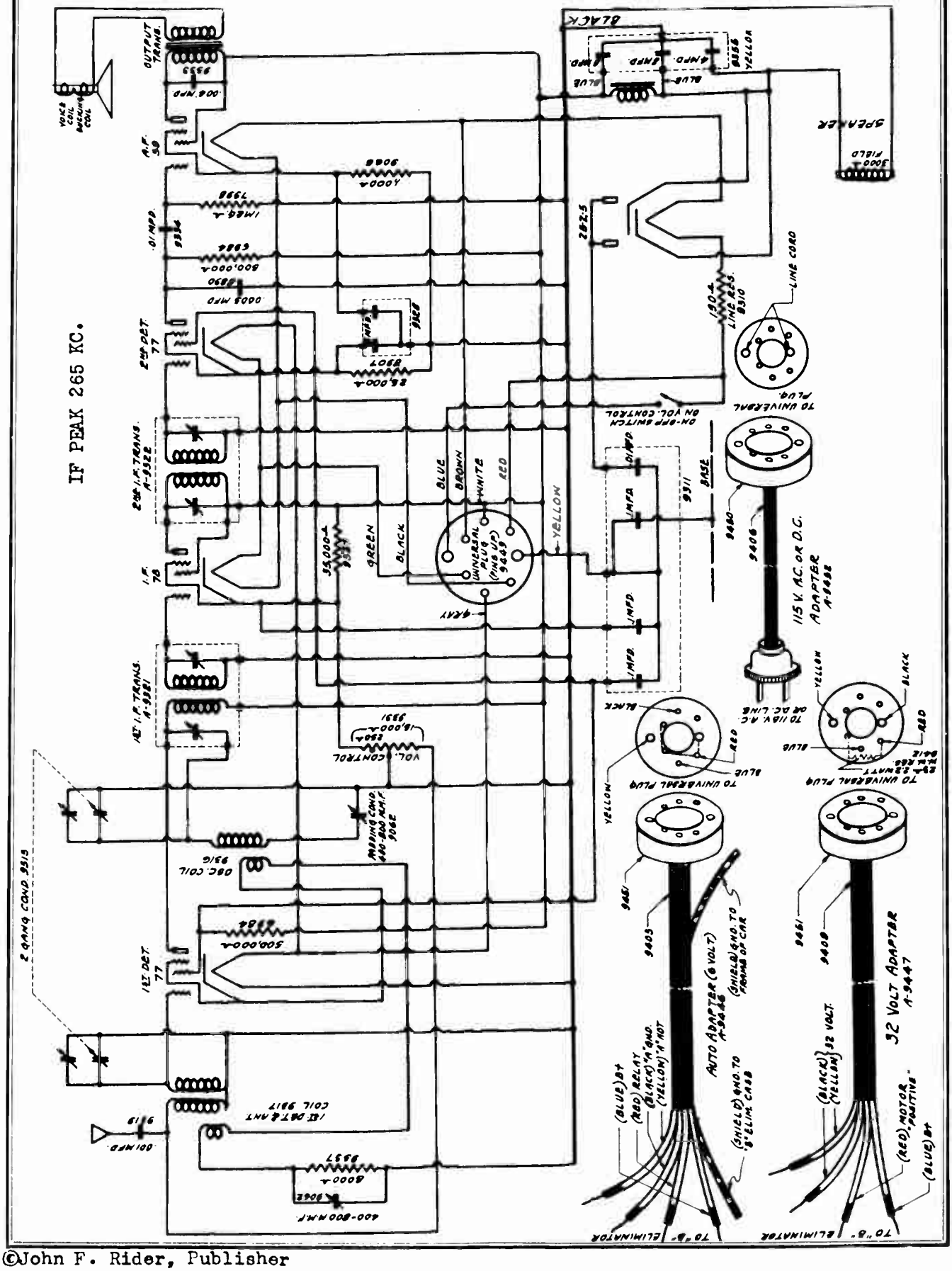
METHOD OF FEEDING STRAP INTO BRACKET & BUCKLE

FIG "4



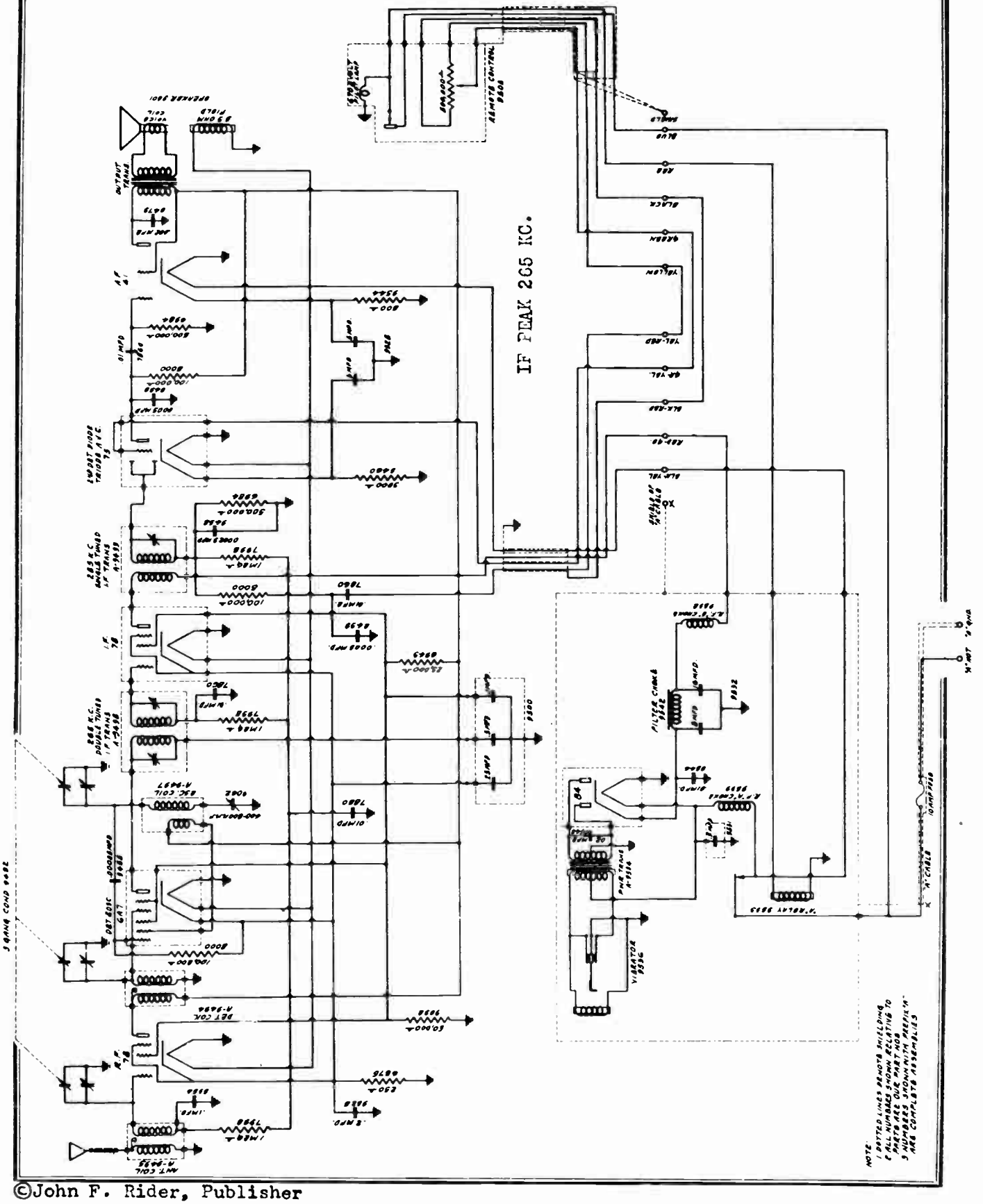
SENTINEL RADIO CORP.

MODEL 560 (2nd Type)
Schematic



MODEL 600 Auto
Schematic

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 600
MODEL 602
Voltage
Alignment

TUBE VOLTAGES

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO.3	GRID NO.5
78	Radio Frequency	6	225	4	92				
6A7	Oscillator & Modulator	6	225	4		6.2	225	92	92
78	Intermediate Frequency	6	225	4	92				
75	2nd Detector Diode & AVC	6	135	1.5					
41	Output	6	218	13	225				
84	Rectifier	6	260*	235					

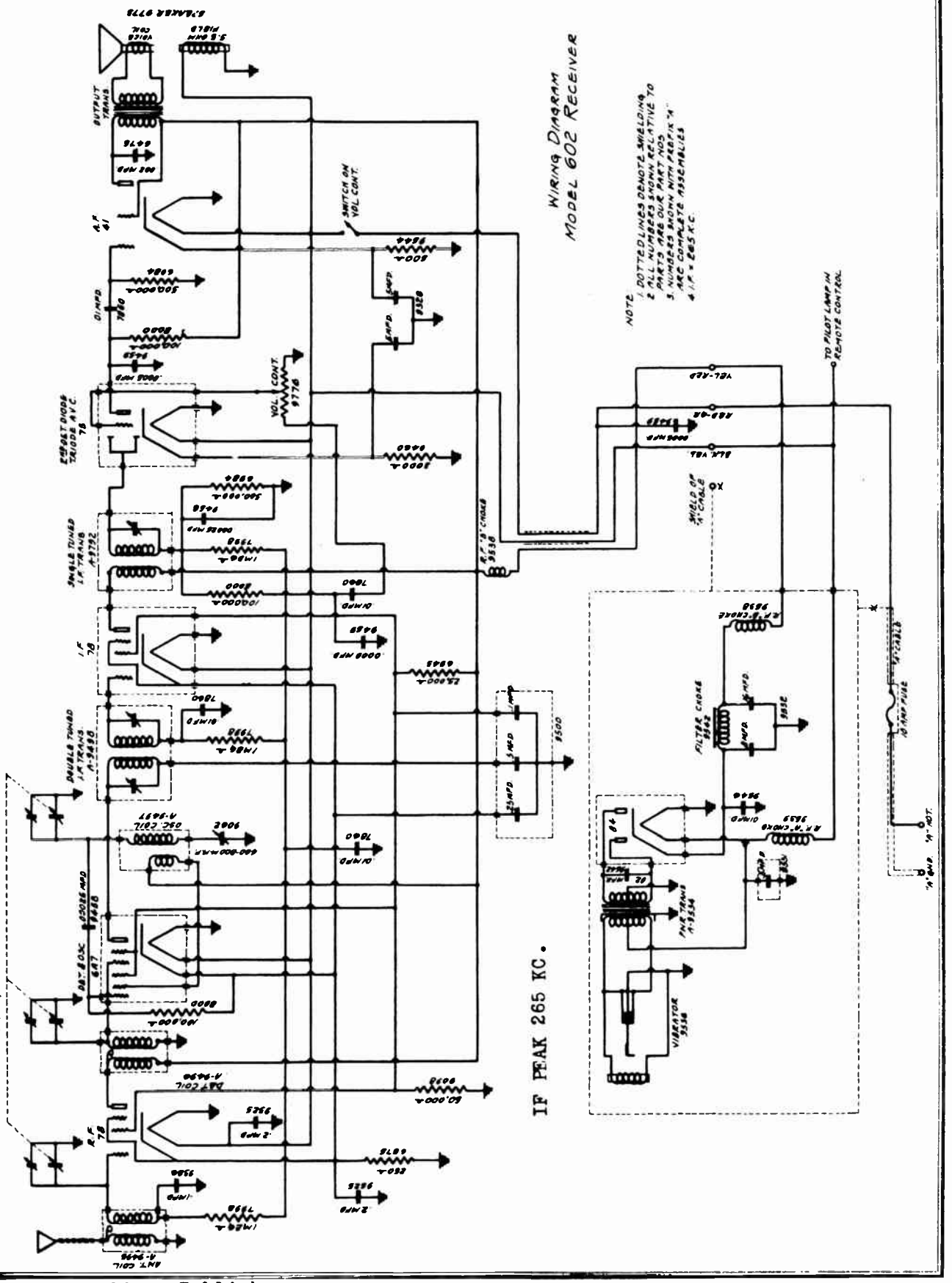
* A.C. each plate
Total "A" current - 6.2 amperes.

INTERMEDIATE FREQUENCY: Unless an intermediate transformer has become defective due to an open or burned out winding it should never be necessary to readjust the intermediate stage. Should this occur it is essential that an oscillator be used with some type of output measuring device to correctly tune the I.F. Transformers. Connect the high side of the oscillator output to the control grid cap (grid No. 4) of the 6A7 oscillator modulator tube leaving the grid cap disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. If the output of the oscillator is too great the value of this resistor may be reduced. The ground side of the tes oscillator should be connected to the chassis. Set the oscillator to 265 K.C. (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first I.F. transformer is double-tuned, the trimmers of which are accessible through the top of the I. F. can, one section of which is adjusted by turning the brass hex nut and the other section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible from the top of the intermediate transformer shield can. After both intermediate transformers are correctly adjusted the alignment of the intermediate stage is complete and the trimmers should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and 50,000 ohm resistor removed.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if the antenna, R.F. or oscillator coil have been replaced it will be necessary to realign the variable condensers. If the receiver is not mounted in the set housing it will be necessary to place a metal shield along side of the variable condenser and flush against the side of the set chassis nearest the variable condenser trimmers. It is necessary to do this otherwise when the receiver is placed in the set housing the metal housing will detune the receiver. Three holes should be made in the shield to correspond with the hole provided in the set housing which permits alignment of the receiver when the set is in the housing. Be sure the shield is properly grounded to the receiver chassis. NOTE: When the receiver and "B" unit is removed from the set housing be sure to set the receiver on top of the "B" unit, otherwise considerable R.F. and audio hash will be encountered. Regardless of whether the receiver is mounted in the set housing or not the alignment procedure is the same. Adjust the variable condenser to minimum capacity. Connect the high output side of the set oscillator to set antenna lead and the low side to antenna shield lead or chassis. Then adjust the test oscillator to 1500 K. C. Next, BRING THIS SIGNAL IN BY ADJUSTING THE VARIABLE CONDENSER OSCILLATOR SECTION TRIMMER. Looking at the front of the receiver, the variable condenser trimmers are mounted on the left side of the set on the variable condenser and reading from the bottom up the trimmers are, oscillator, R.F. and antenna. After the oscillator section has been properly peaked, adjust the antenna and R.F. trimmers in the order mentioned. After the variable condenser trimmers have been correctly adjusted at 1500 K.C. tune the receiver to 600 K.C. and adjust the oscillator to this frequency. Then adjust the oscillator padding condenser which is located on the lefthand side to the rear of the chassis, to obtain maximum reading on the output meter. If the set is mounted in the receiver housing the padding condenser is accessible through the small hole in the side of the set housing. It may be necessary to turn the variablecondenser slightly to the right and left to find the point where greatest output is obtained. If the alignment procedure is correctly followed the receiver will now track correctly over the entire tuning range. It is always advisable to align the receiver with the tubes to be used in the set whenever possible.

MODEL 602
Schematic

SENTINEL RADIO CORP.



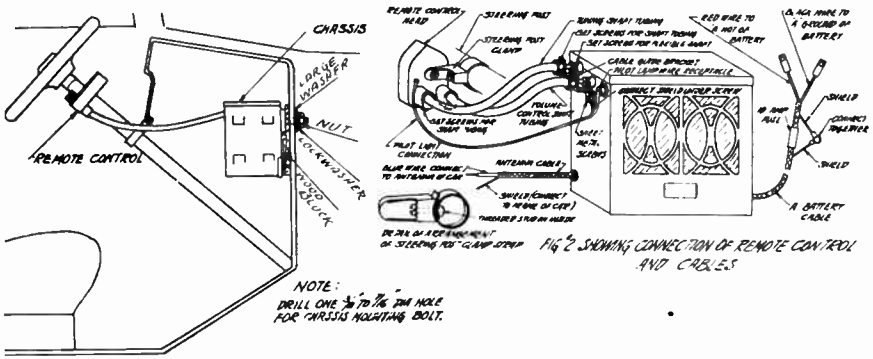


FIG 2 SHOWING CONNECTION OF REMOTE CONTROL AND CABLES

RECEIVER MOUNTING: The receiver, speaker and "B" eliminator are all contained in a single unit in one steel housing and requires the drilling of but one hole in the bulkhead for mounting. The receiver should be so mounted that the remote control shaft will reach the steering post in as straight a line as possible so as to eliminate any unnecessary bend in the cable. Care should be exercised in choosing the receiver location to avoid interference with the foot pedal, hand brake, clutch pedal and possible interference with the legs of the driver or passenger. A paper drilling template is provided to aid in finding the best location. When the location has been decided on, drill a 3/8" to 7/16" diameter hole in the motor bulkhead after which the wooden spacer block should be placed on the set mounting bolt and the bolt pushed through the hole in the bulkhead with the wooden spacer block on the driving compartment side. (Fig. No. 1). Place the steel washer, lockwasher and mounting bolt nut (in the order named) on the mounting bolt drawing up the nut loosely. Next, lift the receiver in position so that the square head of the mounting bolt will slip into the lower slotted end of the set mounting plate. Gently lowering the receiver will force the mounting bolt head to the top of the mounting plate slot. The receiver and the mounting bolt will be rigidly locked in position by drawing the mounting bolt up tight. On some installations because of insufficient room under the bulkhead it may be necessary to push the square head of the mounting bolt to the top of the mounting plate and then push the bolt through the hole drilled in the bulkhead.

REMOTE CONTROL: The remote control head, the steering post strap and clamp, the volume control and tuning control shaft tubing and the cable guide brackets are shipped unassembled. No difficulty will be had in properly assembling if the proper procedure is followed in the order given.

1. Mount the two cable guide brackets which are held in position with the two self tapping sheet metal screws, placing the pilot light shield lead under the head of one of these screws (see Fig. 2).

Push the flexible shaft of the volume control tubing through the volume control guide bracket into the volume control coupler mounted on the set until it touches the stop.

Then tighten the two flexible shaft set screws in the volume control coupler firmly.

Next, place the volume control shaft tubing so that it extends about 1/4" beyond the guide bracket. Do not permit tubing to touch the coupler. After correctly locating, screw the two guide bracket coupler set screws firmly, but do not force these set screws too tightly otherwise the drive shaft will bind. The tuning control flexible shaft should be mounted in the tuning coupler and the tuning control shaft tubing in the guide bracket in the same manner. Do not put the tuning control flexible shaft in the volume control coupler and vice-versa. Looking at the back of the remote control head the lefthand shaft tubing is the tuning control and the right hand one the volume control (Fig. 2). Looking at the side of the receiver the righthand coupler is the volume control and the lefthand coupler is the tuning control.

2. Loosen the two shaft tubing screws (Fig. 2) underneath the remote control head and insert the slotted end of each shaft tubing in their proper place in the remote control head, after which the set screw should be firmly tightened. If the shaft tubing is properly spaced from the couplers, the volume control and tuning control will move freely. If improperly spaced the shaft tubing may rub on the couplers or may rub in the remote control head thereby making the volume control and tuning control work hard.

3. The steering post clamp strap and clamp bracket should now be mounted on the steering post. The steering post clamp strap has four holes, one of which is threaded. The other three holes are provided so that the clamp may be used on any of the various size steering posts.

The remote control head may be located on the left or righthand side of the steering post column or on the dashboard by using the proper one of the three threaded clamp screw holes on the back of the remote control head. To mount on the lefthand side of the steering post use the lefthand threaded hole, for righthand mounting use the righthand threaded hole and for dashboard mounting the top threaded hole.

Form the clamp with the threaded stud on the inside by placing it around the steering post. Place the slotted end of the clamp against the clamp strap so that the hole in the clamp lines up with the two holes in the strap (Fig. 2.) Push the clamp strap through the hole in the clamp and screw the clamp screw into the threaded strap stud sufficiently tight so that it will be locked firmly in position. The remote control head may now be mounted on the steering post clamp by pushing the machine screw through the hole at the end of the clamp and screwing this machine screw through the threaded hole in the back of the remote control head.

4. The remote control drive is now completely mounted. It is possible that the dial calibration will not be correct. To properly align the dial turn the tuning control knob in the counter clockwise direction until the stop on the variable condenser is reached. This will be indicated by increased tension on the knob. Do not force the dial otherwise the dial needle will jump and the dial calibration will be inaccurate.

PILOT LIGHT: A six to eight volt Mazda type miniature size pilot light is used in the remote control head. The pilot light lead from the remote control head must be inserted in the pilot light receptacle located on the side of the set housing adjacent to the volume control shaft tubing guide bracket. The shielded lead of the pilot light lead should be connected underneath the head of one of the guide bracket mounting screws. To replace the pilot light remove the two control knobs by pulling outward on the knobs. Next, the three small head machine screws on the front of the remote control which hold the front cover of the control box in place should be removed. The cover of the remote control head may now be lifted off the control box and the pilot light socket then becomes accessible.

ANTENNA: A good antenna is very important. An inefficient or insufficient aerial will result in unsatisfactory reception. Most late model cars are factory equipped with an antenna built in the roof of the car. This is generally the most satisfactory type of aerial. If the car is not equipped with a roof type aerial, one may be installed or use may be made of the various aerial kits now available such as plates that are mounted underneath the running board or the strap type aerial which can be fastened between the front and rear axles. THE CLOSER TO THE GROUND THE STRAP OR PLATE TYPE ANTENNA IS SUSPENDED THE GREATER ITS EFFICIENCY.

"B" ELIMINATOR: The "B" eliminator unit which contains the No. 84 rectifier tube is mounted below the receiver and is held in position in the set housing by three machine screws which are accessible from the bottom of the set housing. To replace the rectifier tube it is necessary that the "B" unit be removed from the set housing. To do this unscrew the three "B" unit machine screws in the bottom and the six screws that hold the small detachable plate on the lower back of the set housing. After this plate is removed, the set cable wires which are now accessible should be disconnected from the "B" eliminator terminal strip mounted on the eliminator unit, after which the eliminator may be pulled out of the set housing. Next, remove the cover of the eliminator by unscrewing the six machine screws which hold this in place. After the cover has been taken from the top of the "B" unit the complete mechanism of the "B" eliminator can be lifted out of the eliminator housing and the "B" eliminator tube replaced. Care should be taken when reinstalling the "B" unit in the set housing so that the set cable wires are properly connected to the "B" eliminator terminal strip. Excessive vibration of the "B" unit may be corrected by substituting a new vibrator rubber cover. When changing the rubber cover be sure to place the vibrator unit back in the "B" unit with the vibrator leads toward the "B" eliminator transformer. Continuous blowing of the fuse is indicative of a possible defective "B" unit transformer, a defective vibrator or a defective No. 84 tube. UNDER NO CIRCUMSTANCES ATTEMPT TO ADJUST THE VIBRATOR UNIT. IF THE UNIT BECOMES DEFECTIVE IT SHOULD BE REPLACED WITH A GOOD ONE ONLY. R.F. hash indicated by a constant static-like background noise, which is apparent over the entire tuning range (with the set aerial disconnected) may be due to a defective No. 84 tube or a loose "B" unit cover. If the set antenna lead is run in close proximity with the set "A" leads or the battery "A" hot lead, it is possible to pick up this form of interference. Rerouting the set antenna lead will correct this.

TUBES: The receiver utilizes the following tubes:

One (1) Type 75 - Amplifier Tube
One (1) Type 6A7 - Detector & Oscillator Tube
One (1) Type 78 - I. F. Tube
One (1) Type 75 - Second Detector Diode & AVC Tube
One (1) Type 41 - Output Tube
One (1) Type 84 - Rectifier Tube

The tube locations are shown in the diagram attached to the set housing cover. Always be sure that the tubes and their tube shields are firmly pressed down in their sockets. The tubes are readily accessible for removal or for checking by taking off the cover of the metal cabinet. To do this it is only necessary to unscrew the six machine screws which hold the cover to the cabinet and lift the cover off the cabinet. NOTE: In some installations, because of the location of the receiver it may be necessary to remove the set from the motor bulkhead to check the tubes. The tubes used are sturdily constructed and especially designed for use in automobile receivers and under normal conditions will give satisfactory service for a long period of time. Occasionally a tube may become faulty shortly after being placed in service and is generally indicated by low volume or distorted tone. Whenever this condition exists the tubes should be tested and the defective tubes or tube replaced. If the receiver becomes microphonic it can generally be traced to the 6A7, 75 or 41 tube.

MODEL 602
Parts List

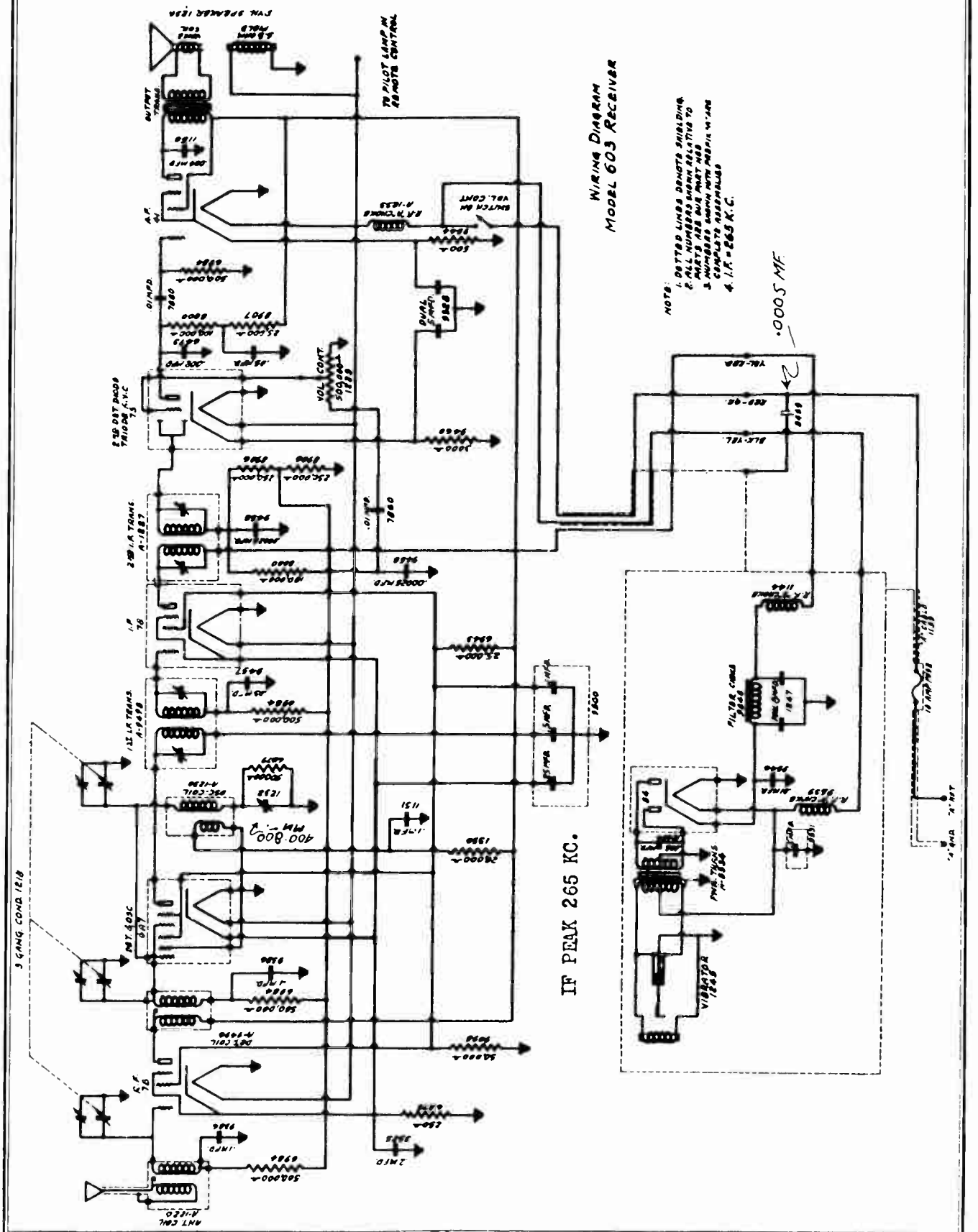
SENTINEL RADIO CORP.

PARTS AND PRICE LIST
for the
ALL ELECTRIC SIX TUBE SUPERHETERODYNE
AUTO RADIO
with
AIRPLANE TYPE DIAL

PART NUMBER		LIST PRICE
9495	Antenna Coil	$ 1.38
9496	Detector Coil	.99
9497	Oscillator Coil	.99
9498	Double Tuned I. F. Transformer	1.49
9792	Single Tuned I. F. Transformer	1.39
9501	Dynamic Speaker	7.00
9521	Dynamic Speaker Baffle Board	.24
9504	Antenna Lead	.34
9785	Set Cable	.66
9098	50,000 Ohm 1/2 Watt Resistor	.22
6943	25,000 Ohm 1 Watt Resistor	.23
6984	500,000 Ohm 1/3 Watt Resistor	.22
7998	1 Meg Ohm 1/3 Watt Resistor	.22
8000	100,000 Ohm 1/3 Watt Resistor	.22
9460	3,000 Ohm 1/3 Watt Resistor	.22
9544	500 Ohm 1 Watt Resistor	.23
6875	250 Ohm 1/3 Watt Resistor	.22
9062	Padding Condenser	.50
9778	Three Gang Condenser	4.13
9500	Bypass Condenser (1-.1, 1-.2, 1-.5 Mfd.)	1.29
7860	.01 Mfd. 400 Volt Condenser	.17
9386	.1 Mfd. 200 Volt Condenser	.18
6473	.002 Mfd. 400 Volt Condenser	.17
9525	.2 Mfd. 200 Volt Condenser	.24
9328	Dry Electrolytic Condenser (2-.5 Mfd.)	.72
9133	Generator .5 Mfd. Condenser	.55
9597	Spark Plug Suppressor	.55
9598	Distributor Suppressor	.55
9600	Wood Mounting Block	.16
7718	Hex Nut for 3/8" Carriage Bolt	.05
7708	Mounting Bolt Washer	.10
9458	.0025 Mfd. Mica Condenser	.17
9459	.0005 Mfd. Mica Condenser	.17
9463	#75 Tube Socket	.13
9422	#78 Tube Socket	.13
9493	#41 Tube Socket	.13
9453	6A7 Tube Socket	.13
9509	Set Housing Back	.15
9508	Set Housing Cover	.55
9772	Set Housing	3.63
7717	Housing Carriage Bolt 3/8" x 3"	.10
9581	10 Ampere Fuse	.06
9793	"A" Battery complete with fuse and receptacle	1.46
9063	Tube Shield Retainer Base	.05
8980	Tube Shield	.11
9538	R.F. "B" Choke	.21
9776	Volume Control with Switch	1.33
9783	Pilot Light Receptacle	.25
105	"B" Eliminator	17.50
9537	Vibrator Rubber Case	.40
9536	Vibrator	6.00
9534	Power Transformer	2.75
9542	Filter Choke	.85
9538	R.F. "B" Choke	.21
9532	8 Mfd. and 16 Mfd. Condenser Block	2.70
9531	.5 Mfd. Bypass Condenser	.58
9546	.01 Mfd. 600 Volt Condenser	.18
9542	.02 Mfd. 1000 Volt Condenser	.25
9529	No. 84 Tube Socket	.13
9513	"B" Eliminator Housing Case	.55
9514	"B" Eliminator Housing Case Cover	.35
9787	"B" Terminal Strip with Screws	.33
9782	Remote Control Complete	10.00
9954	Remote Control Head Clamp	.45
9955	Remote Control Clamp Strap	.44
9956	Remote Control Shaft Tubing	.73
9957	Remote Control Drive Shaft	.78
9958	Remote Control Tuning Knob	.22
9959	Remote Control Tuning Knob with Key	.39
9960	Remote Control Key	.25
9961	Remote Control Head Glass	.35

SENTINEL RADIO CORP.

MODEL 603
Schematic



MODEL 603

Alignment, Voltage

SENTINEL RADIO CORP.

Parts List

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the oscillator frequency at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the intermediate transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two types of intermediate transformer trimmers have been used in this model receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one intermediate trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is not necessary to remove the receiver chassis from the set housing to align the gang condenser. Regardless of whether or not the receiver is or is not mounted in the set housing the alignment procedure is the same. Three holes are provided in the left hand side of the set housing for the gang condenser trimmers and one in the front of the set housing for the 600 kilocycle padding condenser.

1. Properly connect the remote control head and shafts and adjust the dial needle on the dial face so that the dial calibration is correct.

2. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

3. Tune the receiver to exactly 1400 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE OSCILLATOR GANG CONDENSER TRIMMER. Looking at the side of the receiver and reading from top to bottom the trimmer condensers are the antenna, R. F. and oscillator sections. Next, adjust the R. F. and antenna sections of the gang condenser for maximum sensitivity

4. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser, which is located on and accessible through the hole in the front of the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment using the position of greatest output.

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	TUBE VOLTAGES PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO.2	GRID NO.3	GRID No.5
78	Radio Frequency	6	210	4	80				
6A7	Oscillator & Modulator	6	210	4		35	140	80	80
78	Intermediate Frequency	6	210	4	80				
75	2nd Detector Diode & AVC	6	100	1.5					
41	Output	6	200	8	210				
84	Rectifier	6	260##	235					

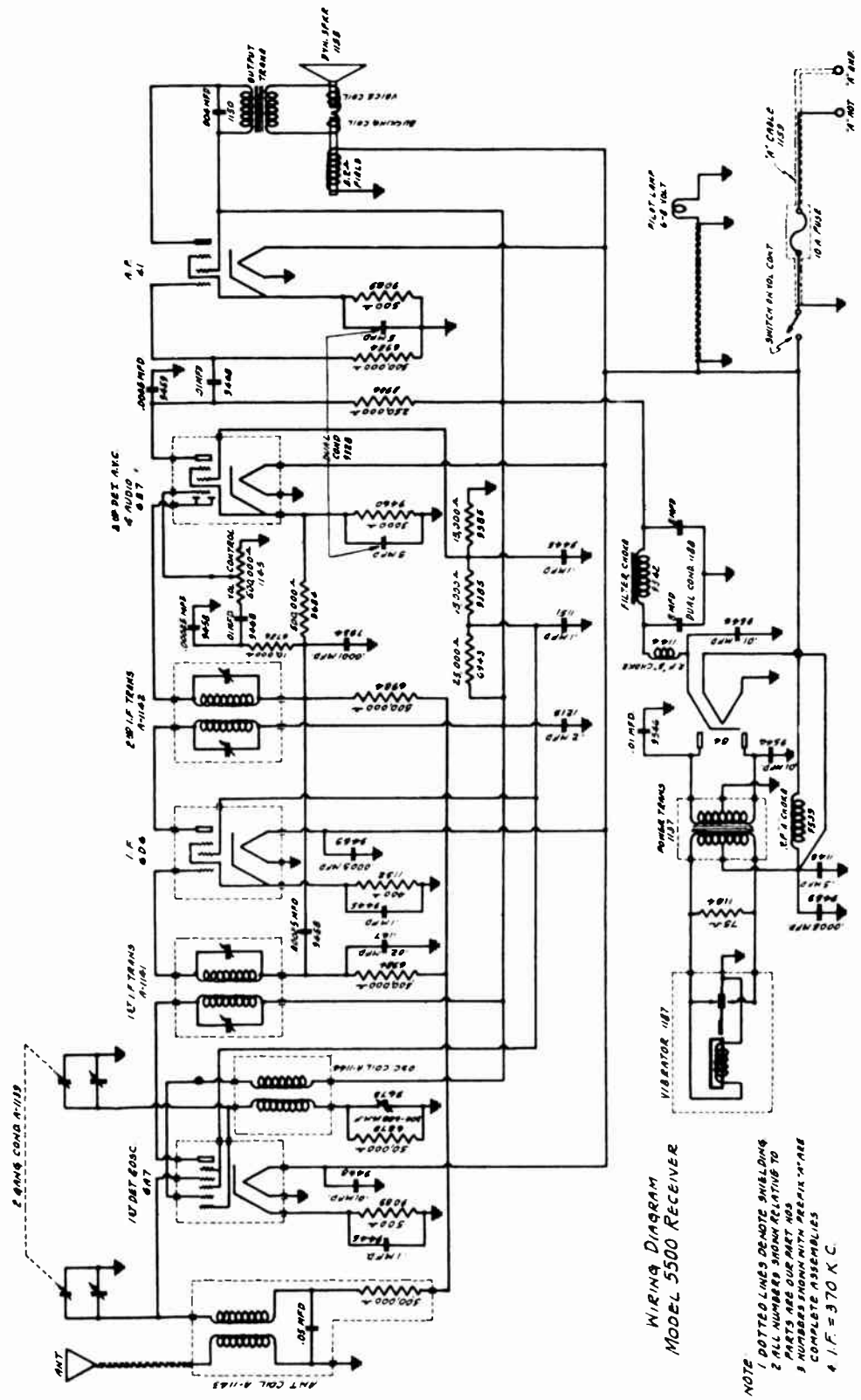
A. C. each plate
Total "A" current - 6.0 amperes
Read all voltages from socket to chassis

PART NUMBER		LIST PRICE
1226	Antenna Coil	$1.77
9496	Detector Coil	.99
1230	Oscillator	1.01
9498	1st I. F. Transformer	1.49
1227	2nd I. F. Transformer	2.03
1236	Dynamic Speaker	7.00
1158	Antenna Lead	.34
1244	Set Cable	.60
9098	50,000 Ohm 1/2 Watt Resistor	.19
6943	25,000 Ohm 1 Watt Resistor	.21
6984	500,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
9460	3,000 Ohm 1/3 Watt Resistor	.19
9544	500 Ohm 1 Watt Resistor	.21
6875	250 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
8907	25,000 Ohm 1/3 Watt Resistor	.19
1336	20,000 Ohm 1/2 Watt Resistor	.19
1232	Padding Condenser	.55
1218	Three Gang Condenser	4.10
9500	Bypass Condenser (1-.1,1-.25, 1-.5 Mfd.)	1.29
7860	.01 Mfd. 400 Volt Condenser	.17
9386	.1 Mfd. 200 Volt Condenser	.18
6473	.002 Mfd. 400 Volt Condenser	.17
9525	.2 Mfd. 200 Volt Condenser	.24
9203	.1 Mfd. 400 Volt Condenser	.20
1150	.004 Mfd. 400 Volt Condenser	.18
9328	Dry Electrolytic Condenser (2-5 Mfd.)	1.15
9133	Generator .5 Mfd. Condenser	.55
9597	Spark Plug Suppressor	.55
9598	Distributor Suppressor	.55
9600	Wood Mounting Block	.16
7717	Housing Carriage Bolt 3/8" x 3"	.10
7718	Hex Nut for 3/8" Carriage Bolt	.05

PART NUMBER		LIST PRICE
9453	6A7 Tube Socket	$ .13
1255	Set Housing Back	.25
1284	Set Housing Cover	.55
1223	Set Housing	3.52
9581	10 Ampere Fuse	.06
1159	"A" Battery complete with Fuse and Receptacle	.90
9063	Tube Shield Retainer Base	.05
1361	Tube Shield	.11
1253	R. F. "A" Choke	.28
1229	Volume Control with Switch	1.22
109	"B" Eliminator	15.00
1246	Vibrator Rubber Case	.40
1245	Vibrator	5.50
9534	Power Transformer	2.75
9542	Filter Choke	.85
9539	R. F. "A" Choke	.40
1144	R. F. "B" Choke	.32
1247	2x 8 Mfd. Condenser Block	2.75
9531	.5 Mfd. Bypass Condenser	.58
9546	.01 Mfd. 600 Volt Condenser	.18
1248	.005 Mfd. 1000 Volt Condenser	.23
9559	.0005 Mfd. Moulded Condenser	.21
9529	No. 84 Tube Socket	.13
9513	"B" Eliminator Housing Case	.55
9514	"B" Eliminator Housing Case Cover	.35
1249	"B" Terminal Strip with Screws	.60
1240	Remote Control Complete	9.00
1458	Tuning Control Ring	.77
1459	Volume Control Ring	.77
1460	Dial Light Assembly	.44
1460A	Pilot Light Bulb	.44
1461	Condenser Pulley Assembly	1.20
1462	Vol. Control Pulley Assembly	1.00
1463	Drive Cable Assembly	2.30

SENTINEL RADIO CORP.

MODEL 5500
Schematic



MODEL 5500
Voltage
Alignment Data
Parts List

SENTINEL RADIO CORP.

VOLTAGE TABLE
Battery Voltage - 6 Volt
Volume Control - Full on

TYPE OF TUBE	POSITION OF TUBE	FIL. VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO. 2.	GRID NO. 3 & 5
6A7	Modulator & Oscillator	6	220	3	80	5	220	80
6D6	I. F. Amplifier	6	220	2.5	80			
6B7	Second Detector Diode	6	35##	3.	40			
	AVC & 1st Audio Triode							
41	Output	6	215	13	220			
84	Rectifier	6	460-AC	230				

Triode Plate. Comparative voltage only . The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: It should rarely be necessary to realign the intermediate transformers or the variable condenser. As a matter of fact, this should only be necessary when an intermediate transformer, oscillator or R. F. coil has become defective and require replacement. For propedy aligning either the intermediate transformer or condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 370 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer which is accessible from the top of the I. F. transformer up and down until maximum reading is obtained on the meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER: To align the variable condenser and padding condenser it is necessary that the receiver chassis be removed from the set housing. After the receiver chassis has been removed connect the remote control flexible drive shafts in their respective couplers, and set the dial needle on the dial face so that the dial calibration is correct.

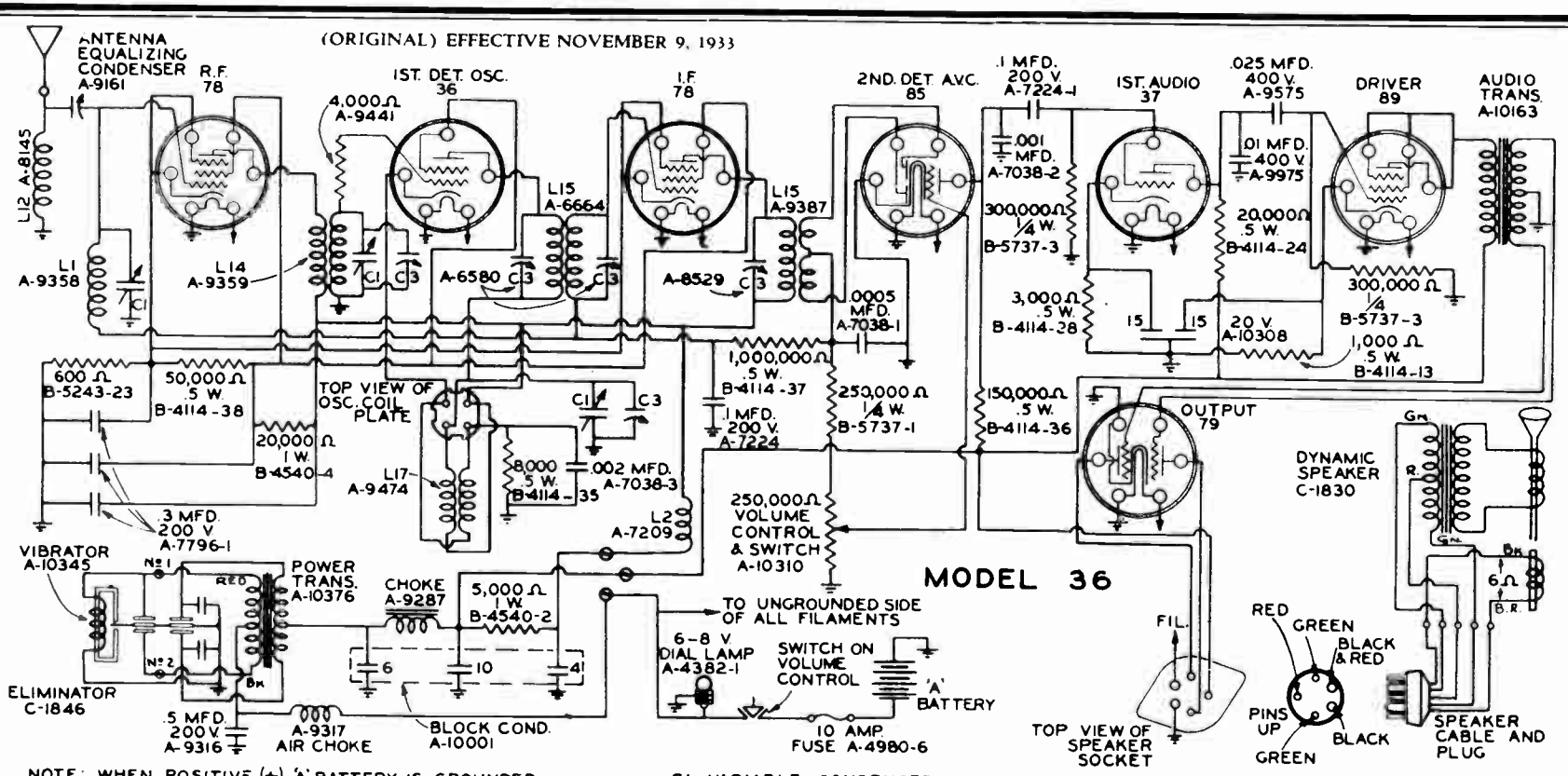
1. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

2. Tune the receiver to exactly 1500 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1500 KILOCYCLE SIGNAL (TO MAXIMUM OUTPUT) BY ADJUSTING THE OSCILLATOR VARIABLE CONDENSER TRIMMER MOUNTED ON TOP OF THE VARIABLE CONDENSER. THEN ADJUST THE OTHER VARIABLE CONDENSER TRIMMER FOR MAXIMUM OUTPUT. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency, then adjust the 600 padding condenser which is located on the right hand side and accessible through the hole in the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment, using the position where greatest output is obtained.

1143	Antenna Coil
1146	Oscillator Coil
1141	First I. F. Transformer
1142	Second I. F. Transformer
1277	Dynamic Speaker
9673	Padding Condenser
1139	Two Gang Condenser
1145	Volume Control
1128	Set Housing
1127	Set Housing Front Cover
1156	Set Housing Front Cover Grille
1163	Wood Mounting Block
7717	Carriage Bolt 3/8"
7708	Carriage Bolt Steel Washer
7716	Carriage Bolt Lock Washer
1171	Cable Guide Bracket Assembly
1158	Antenna Lead
1166	Tube Shield
9581	10 Ampere Fuse
1159	"A" Battery Cable compete with fuse
1187	Vibrator
1137	Power Transformer
1188	2 x 8 Mfd. Condenser Block
1276	R. F. "A" Choke
9598	.5 Mfd. Generator Condenser
1212	Spark Plug Suppressor
1214	Distributor Suppressor
1213	Six Cylinder Suppression Kit
1278	Remote Control Head Complete Assembly
9959	Remote Control Tuning Knob with Key
9958	Remote Control Volume Knob
9954	Remote Control Head Clamp
9955	Remote Control Clamp Strap
1210	Remote Control Tuning Shaft Tubing 18"
1209	Remote Control Tubing Flexible Drive Shaft 18"
1210	Remote Control Volume Shaft Tubing 18"
1211	Remote Control Volume Flexible Drive Shaft 18"
9961	Remote Control Head Glass
9328	Electrolytic Condenser 2 x 5 Mfd.
9456	.00025 Mfd. Moulded Condenser
9459	.0005 Mfd. Moulded Condenser
7934	.0001 Mfd. Moulded Condenser
9445	.1 Mfd. 200 Volt Condenser
1148	.5 Mfd. 200 Volt Condenser
9468	.01 Mfd. 400 Volt Condenser
1150	.004 Mfd. 600 Volt Condenser
1151	.1 Mfd. 400 Volt Condenser
1167	.02 Mfd. 400 Volt Condenser
1219	.2 Mfd. 400 Volt Condenser
1248	.005 Mfd. 1000 Volt Condenser
1184	75 Ohm Wire Wound 1 Watt Resistor
6943	25,000 Ohm 1 Watt Resistor
8000	100,000 Ohm 1/3 Watt Resistor
1280	35,000 Ohm 1/3 Watt Resistor
9089	500 Ohm 1/3 Watt Resistor
1152	400 Ohm 1/3 Watt Resistor
8907	25,000 Ohm 1/3 Watt Resistor
9460	3,000 Ohm 1/3 Watt Resistor
6786	10,000 Ohm 1/3 Watt Resistor
6984	500,000 Ohm 1/3 Watt Resistor
6943	25,000 Ohm 1 Watt Resistor

(ORIGINAL) EFFECTIVE NOVEMBER 9, 1933



NOTE: WHEN POSITIVE (+) 'A' BATTERY IS GROUNDED, CONNECTIONS TO ELIMINATOR TERMINALS ONE (1) AND TWO (2) ARE AS SHOWN (MODEL 36 SHIPPED FROM FACTORY WITH THESE CONNECTIONS).

WHEN NEGATIVE (−) 'A' BATTERY IS GROUNDED, REMOVE ELIMINATOR COVER AND REVERSE CONNECTIONS TO TERMINALS ONE (1) AND TWO (2).

C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL
L2 CATHODE CHOKE
L12 ANTENNA CHOKE COIL
L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER 172.5 K.C.
L17 OSCILLATOR COIL

All heater voltages: 6.3.

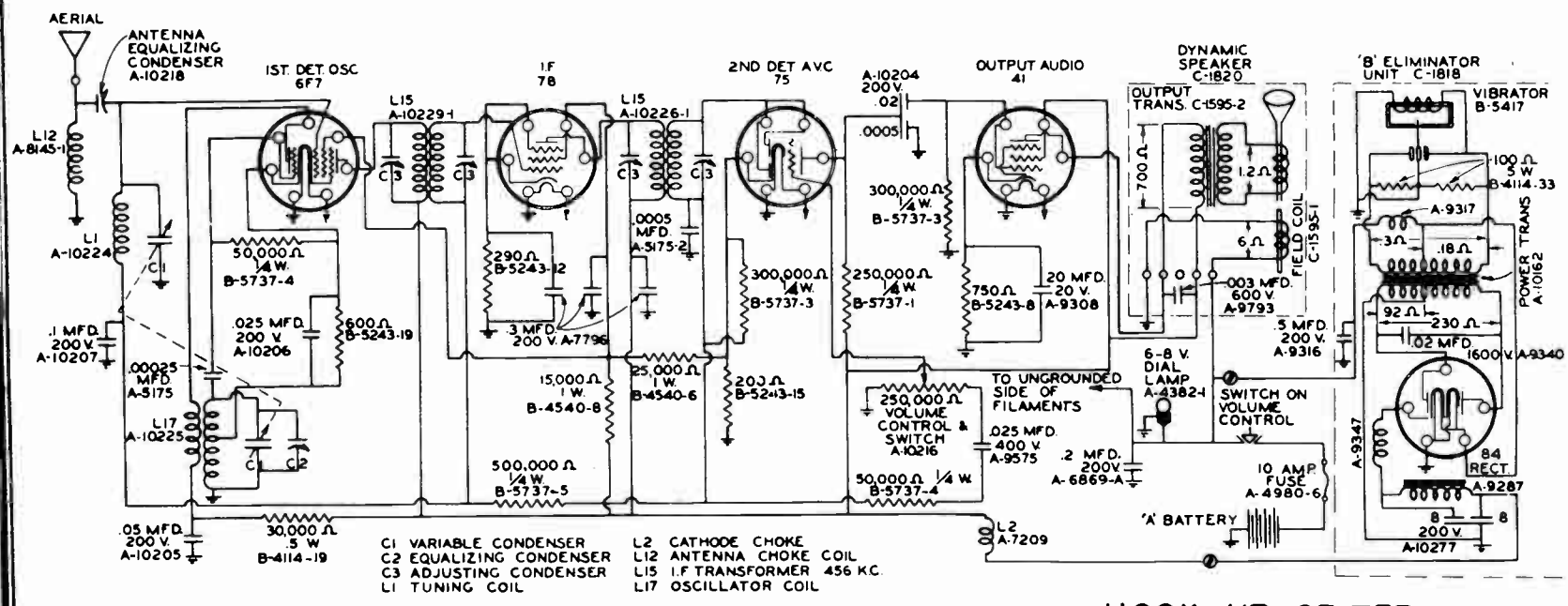
Tube	Location	PLATE Volts	PLATE Ma	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS) Plate	Screen	C. Grid	Cathode
78	R-F Stage	200	4.2	100	—3.	—	70,000	50,000	1,250,000	600
36	1st Det.-Osc.	200	1.5	100	—12.	80,000	70,000	50,000	4,000	8,000
78	I-F Stage	200	4.2	100	—3.	1,500,000	70,000	50,000	1,250,000	600
85	2nd Det.-AVC	50	1.5	—	0	325,000	225,000	—	250,000	0
37	1st Audio	170	3.5	—	—10.	575,000	95,000	—	300,000	3,000
89	Driver Stage	240	20.0	240	—20.	495,000	75,000	75,000	300,000	1,000
79	Power Stage	240	34.0	—	0	75,000	75,000	—	300	0

CHANGES IN MODEL 36 SCHEMATIC DIAGRAM

Effective November 16, 1933

Condenser part #A-4434 .006 mfd added across primary of output transformer between green and green lead.
Condenser part #A-5175-1, .00005 mfd added from ground to eliminator terminal connection which continues through Cathode Choke L-2

Volume Control—Full with Antenna Disconnected

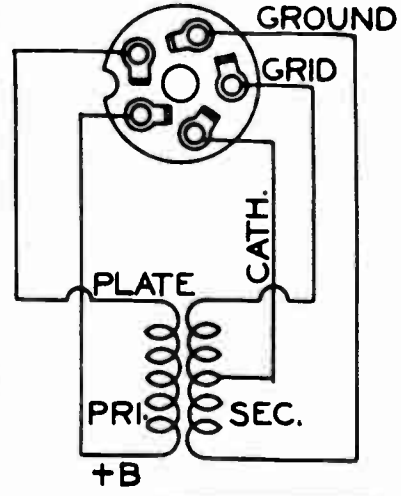


C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L1 TUNING COIL
L2 CATHODE CHOKE
L12 ANTENNA CHOKE COIL
L15 I.F TRANSFORMER 456 KC.
L17 OSCILLATOR COIL

SPARTON MODEL 333
AUTOMOBILE RADIO RECEIVER
SUPERHETERODYNE

(ORIGINAL) EFFECTIVE OCTOBER 24, 1933

HOOK UP OF TERMINALS ON OSCILLATOR COIL A-10225



Condition of "A" Battery—Good

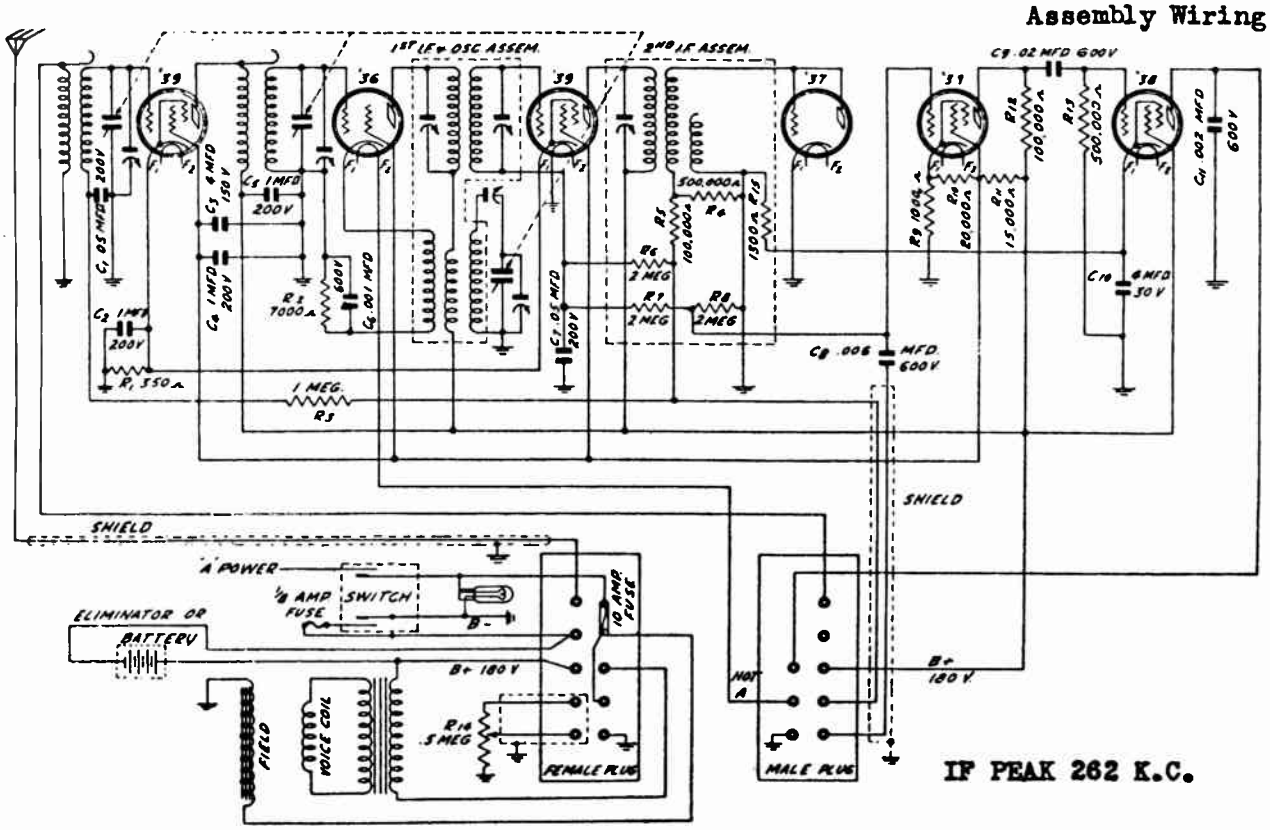
Position of Volume Control—Full with Antenna Disconnected

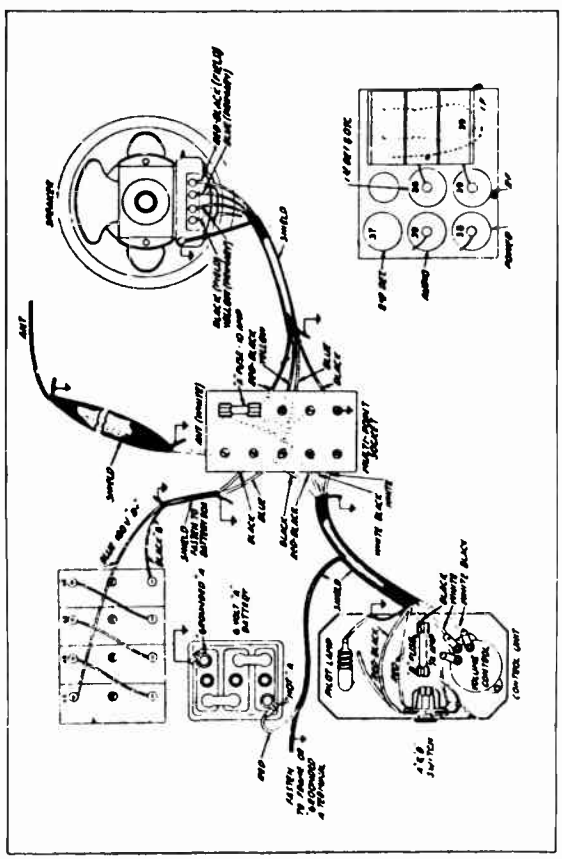
Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6F7	Triode Osc.	100	3.5	—	—3.0	—	70,000	—	50,000	600
	Pent. Mixer	200	6.	100	—2.5	850,000	40,000	25,000	800,000	
78	I-F Stage	200	6.	100	—2.5	840,000	40,000	25,000	800,000	290
75	Diode Det.-AVC	0	0	—	—	—	300,000	—	—	200
	A-F Triode	200	1.	—	—1.2	550,000	290,000	—	250,000	
41	Power Stage	185	18.	200	—16.0	590,000	40,000	40,000	300,000	750
84	Rectifier	250	25.	—	—	—	92	—	—	40,000

NOTES: Allow 15% + or — on all measurements.
All heater voltages: 6.3.
"A" battery drain: 5.7 amperes.

STAR

MODEL 062
Schematic
Voltage
Assembly Wiring





VOLTAGE DATA

Tube	Plate	Screen	Grid	Plate MA.
R-F.	177	80	3	3.6
1st Det.	173	76	7*	.9*
I-F.	177	80	3	3.6
2nd Det.	0	0	0	0
1st A-F.	54	77	6	1.2
Output	159	165	15.5	10.0

* Will vary with dial setting.

MODEL 6-U
Schematic

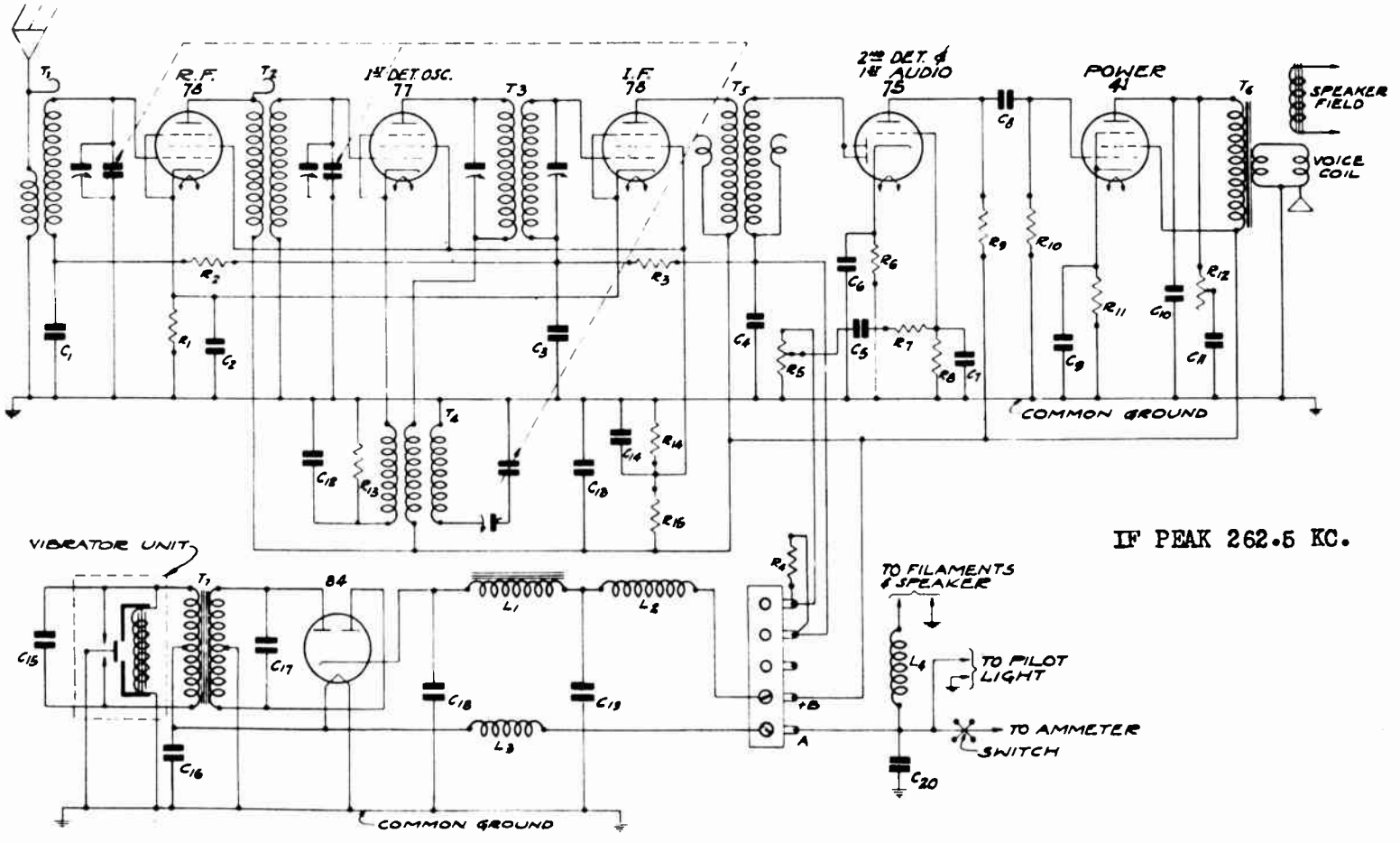
STAR

T_1 ANTENNA COIL (P-5099)
T_2 R.F. INTERSTAGE COIL (P-5065)
T_3 } 1ST I.F. & OSCILLATOR
T_4 } COIL (P-5063)
T_5 2ND I.F. COIL (P-5022)
T_6 OUTPUT TRANS. (P-50632)
T_7 POWER TRANS. (P-50633)

L_1 FILTER CHOKE (P-50637)
L_2 R.F. "B" CHOKE (P-5174)
L_3 ELIMINATOR "A" CHOKE (P-5175)
L_4 R.F. "A" CHOKE (P-5167)

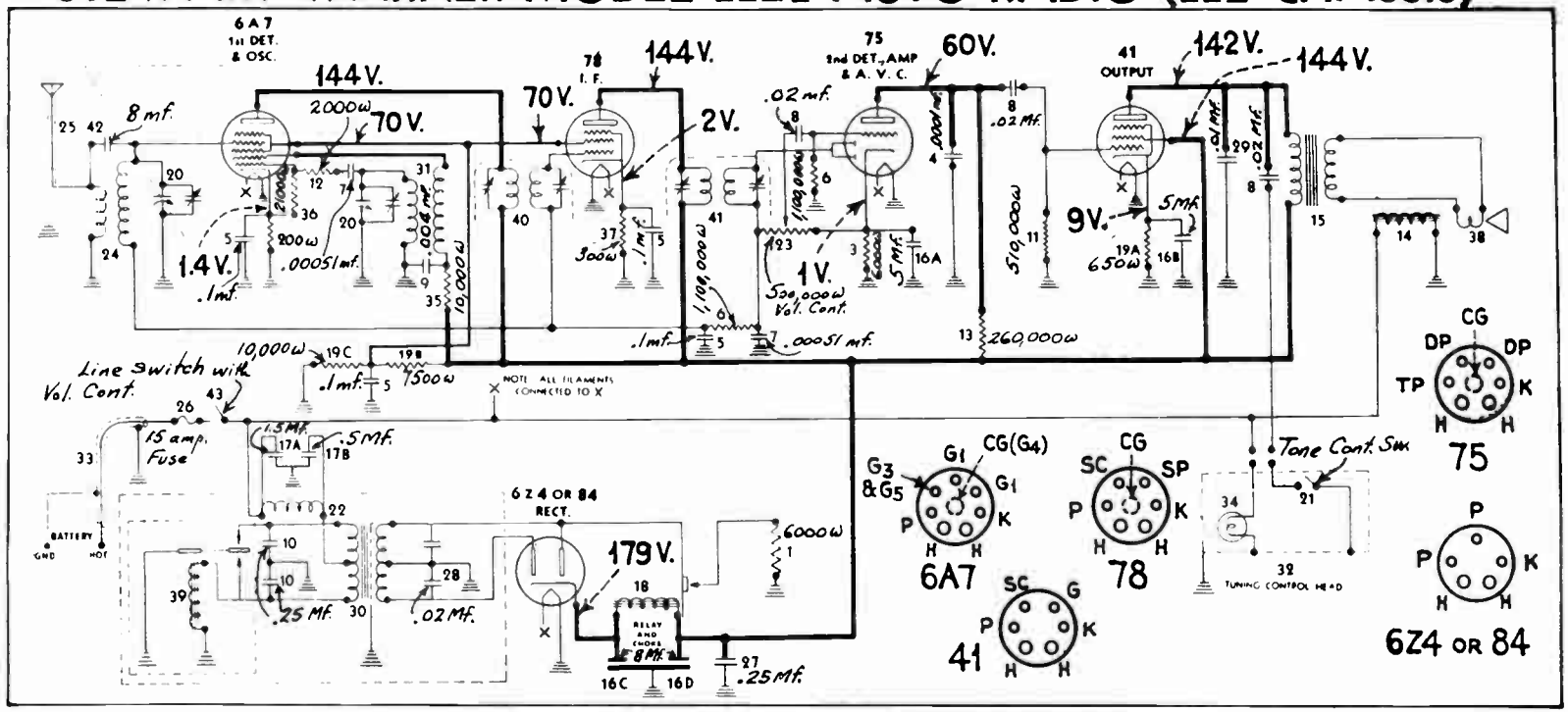
R_1	260 OHMS	R_{10}	250,000 OHM	C_1	0.050 M.F. 300V. TUBULAR	C_9	12.000 M.F. ELECTROLYTIC IN BLOCK WITH C_6
R_2	1.0 MEGOHM	R_{11}	800 OHM	C_2	0.500 M.F (BLOCK RED-WH)	C_{10}	0.003 M.F (BLOCK YELLOW)
R_3	2.0 "	R_{12}	150,000 OHM TONE CONTROL	C_3	0.050 M.F (BLOCK GR-WH)	C_{11}	0.020 M.F 600V. TUBULAR
R_4	200,000 OHM	R_{13}	4,000 OHM	C_4	0.00025 M.F MICA	C_{12}	0.001 M.F MICA
R_5	250,000 OHM VOL. CONTROL	R_{14}	20,000 OHM	C_5	0.050 M.F. 200V. TUBULAR	C_{13}	0.500 M.F (BLOCK BLUE)
R_6	6,000 OHM	R_{15}	15,000 OHM	C_6	12,000 M.F ELECTROLYTIC IN BLOCK WITH C_9	C_{14}	0.100 M.F (BLOCK BROWN)
R_7	100,000 OHM			C_7	0.00025 M.F. MICA	C_{15}	0.500 M.F 120V TUBULAR
R_8	1.0 MEGOHM			C_8	0.050 M.F (BLOCK GR)	C_{16}	1.000 M.F. 120V. TUBULAR
R_9	250,000 OHM					C_{17}	0.010 M.F 1600V TUBULAR
						C_{18}	18.000 M.F BLOCK WITH C_{19}
						C_{19}	18.000 M.F BLOCK WITH C_{18}
						C_{20}	0.500 M.F 120V TUBULAR

COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK



IF PEAK 262.5 KC.

STEWART-WARNER MODEL 1121 AUTO RADIO (112 CHASSIS)



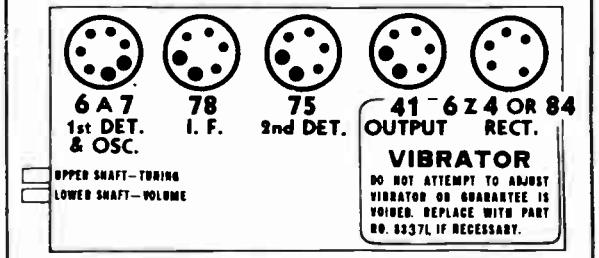
VOLTAGE TABLE

Battery Voltage 6.0 — Volume Control Full On

Tube Type	Position in Circuit	Filament Voltage	Plate Voltage	Screen Grid Voltage	Cathode (Bias) Voltage
6A7	1st Det. and Osc.	5.5	144	70	1.4
78	I. F.	5.5	144	70	2.0
75	2nd Det.	5.5	60	—	1.0
41	Output	5.5	142	144	9.0
84	Rect.	5.5	—	—	179

All D. C. voltages measured with respect to ground, using high resistance voltmeter of 1000 ohms per volt. Readings will vary, depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltages.

TUBE LOCATIONS



I. F. FREQUENCY 456 K.C.

STEWART-WARNER CORP.

MODEL 112 (1121)
Schematic, Voltage
Socket

MODEL 112,(1121)
Alignment
Notes

STEWART-WARNER CORP.

STEWART-WARNER SERVICE MANUAL MODEL 1121 AUTO RADIO

CIRCUIT DESCRIPTION

The Model 1121 Stewart-Warner Auto Radio makes use of a five-tube superheterodyne circuit (chassis model R-112). The action of the set is as follows:

An incoming signal is fed to the 6 A 7 combination detector and oscillator, where it is amplified and its frequency is converted to 456 K. C. This 456 K. C. intermediate frequency signal is amplified by the 78 tube I. F. stage and fed to the diode section of the 75 tube where it is rectified. This rectified signal appears across the 500,000 ohm potentiometer (No. 23 in the diagram) as an audio voltage, any desired portion of which is picked up by the sliding arm of the potentiometer and fed to the triode section of the 75 tube, which functions purely as an A. F. amplifier. Thus the potentiometer is made to act as a volume control.

The necesary A.V.C. voltage is obtained by virtue of the rectified radio frequency drop across the potentiometer resistance. This potential is smoothed out by an appropriate resistance-capacity filter and applied as a bias to the grids of the first detector and I.F. tubes. Thus as the incoming signal increases or decreases in strength, the bias is raised or lowered proportionately and the audio output of the set maintained at a constant level.

The audio circuit is an extremely simple yet efficient one and needs no special explanation.

A unique and important feature of the Model R-112 Radio chassis is the protective relay (No. 12 in the diagram). When the set is first turned on, the relay is arranged to connect a load of 6000 ohms across one half of the high voltage winding of the transformer, thus holding down the voltage peaks to a safe value until the heater type tubes warm up and start drawing plate current. This plate current flows thru the relay, causing it to open the 6000 ohm load. Incidentally the field winding of the relay is used as a choke to filter the rectified B voltage.

ALIGNING THE R-112 CHASSIS

In aligning the Model R-112 Radio chassis it is essential to use a high grade oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. circuit to function, making correct alignment impossible. The output meter must be sufficiently sensitive to give a satisfactory reading with this low signal.

Before starting the alignment procedure see that the volume control is full on and the output meter connected either between the pentode plate and ground thru a .25 mfd condenser or across the voice coil, depending upon its sensitivity.

Now proceed with alignment as follows:

1. Set up the oscillator and tune it to 456 K. C. This frequency can be determined by tuning in a station at 910 K. C. and beating the second harmonic of the oscillator 456 K. C. signal against it. Altho this will give an I. F. of 455 instead of 456, the difference is negligible.

Do not use the oscillator calibration curve to determine this intermediate frequency.

If the oscillator cannot tune to 456 K. C., it may be set to 228 or 152 K. C. and either the second or third harmonic of this signal used.

2. Connect the oscillator output between the grid cap of the first detector tube and chassis.

3. Align the I. F. trimmer condensers located on the front of the chassis just below the speaker so as to produce the maximum output. In some chassis, instead of four separate trimmers, each I. F. transformer has a double trimmer adjustment, a slotted screw for one trimmer and a hex nut around it for the other. If a suitable aligning tool is not available, an aligning tool T-79800, priced at 50c net can be purchased from Stewart-Warner.

Calibrating and Aligning the R. F. Circuits

1. Turn the variable condensers of the chassis all the way out of mesh.
2. Connect the tuning dial drive and set the red arrow of the tuning control to the first mark below 15 on the dial (this represents 1550 K. C.).
3. Tune the set to 14 on the dial (this corresponds to 1400 K. C.).
4. Connect the test oscillator to the antenna lead of the set and adjust it accurately to 1400 K. C.
5. Carefully adjust the trimmer on the rear of the variable condenser until the 1400 K. C. signal is brought in with maximum output. This calibrates the set.
6. Adjust the front trimmer of the variable condenser for maximum output, taking care to retune the set several times during the adjusting process. The set is now in correct alignment and calibration.

Note: When installing the set in the car, it will be necessary to re-calibrate the tuning head, since any bending of the flexible control shafts changes the dial reading.

This is done after the installation is made in the car as follows:

1. Mount the tuning head with its shafts on the steering column or dash.
2. Turn the volume control shaft (the lower one on the set) all the way to the left until the switch clicks.
3. Lock the volume control knob by turning the key of the tuning head to the left and turning the left hand knob to the left until it locks in place.
4. Turn the variable condenser shaft (the upper one on the chassis) all the way out (to the right).
5. Set the arrow on the tuning head to the first mark below 15 on the dial (1550 K. C.).
6. Attach the flexible shafts to their respective controls, making sure that the small coupling is shoved as far onto the shaft as possible. Make sure the set screws are well tightened.
7. Mount the tuning dial bracket and tighten the set screws holding the shaft casings in place. The casings should be pulled out as far as possible, allowing just enough to project into the bushing on the mounting bracket, to be held by the set screw.

ELIMINATING VIBRATOR HASH

Occasionally an early production model 112 auto radio chassis may be found in which the vibrator creates electrical interference known as "vibrator hash". This type of interference is similar in character to that caused by the ignition system but can be readily distinguished from the latter since it is present when the engine is not running. Vibrator hash may be eliminated as follows:

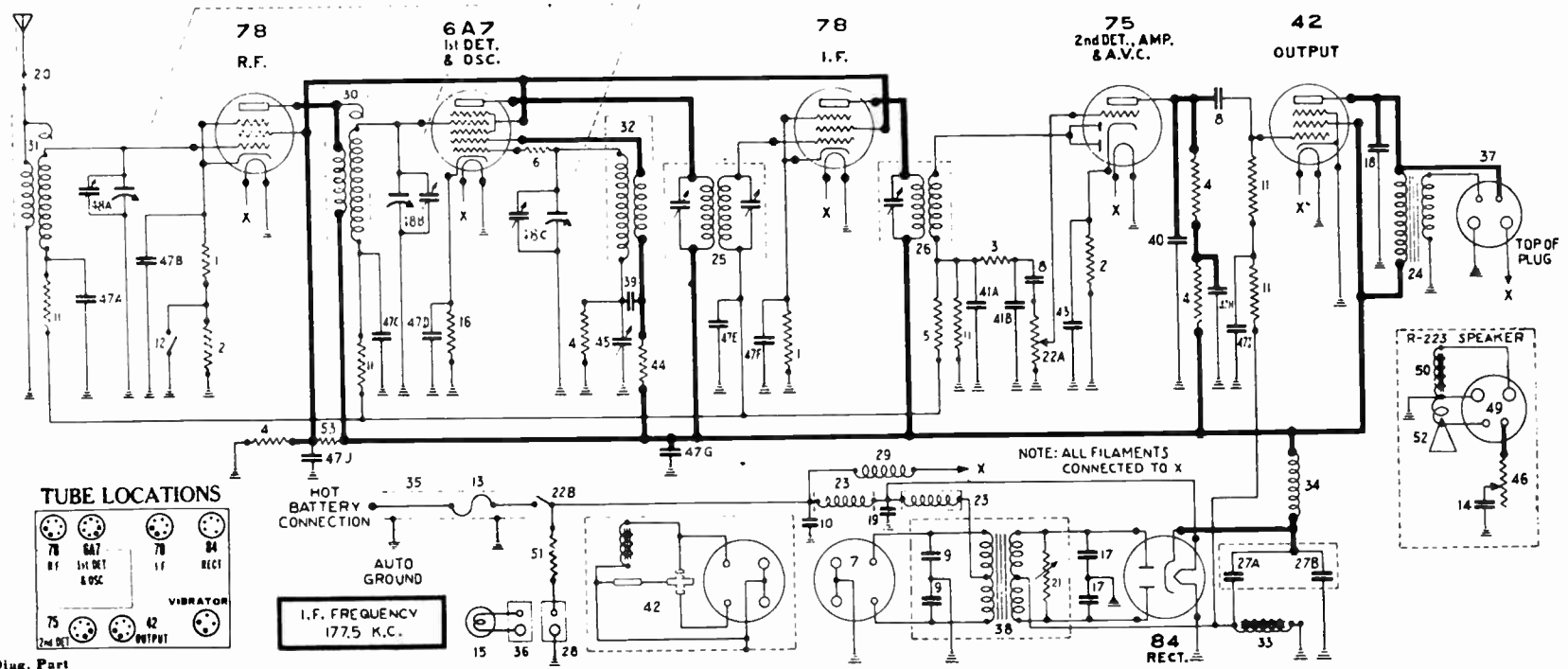
1. Remove the chassis from the metal cabinet.
2. With a heavy soldering iron, solder the top of the transformer-vibrator housing to the sides, making sure that you run a complete ring of solder clear around all four sides. If the top cover is already soldered, the set is probably of later production.
3. Check to see that the bottom cover is soldered to the side at least at one point.

Special Instructions

Earlier production Model 1121 Auto Radio Receivers are somewhat more subject to motor interference than later sets. This condition can be rectified by:

(1) Shielding the pilot light and tone control lead running from the tuning control head to the set. Ordinary metal braiding may be used, altho our part 83382 shield, listing at 20c, will be found more satisfactory.

STEWART-WARNER 1171 & 1172 AUTO RADIO (R-117 CHASSIS)



TUBE LOCATIONS

Diag. No.	Part No.	Description
1	67257	500 ohm ½ watt carbon resistor
2	67580	6000 ohm ½ watt carbon resistor
3	81152	10,000 ohm ½ watt carbon resistor
4	81645	50,000 ohm ½ watt carbon resistor
5	81682	1.1 megohm ½ watt carbon resistor
6	81727	1000 ohm ½ watt carbon resistor
7	81837	Vibrator socket (Standard 4 prong)
8	83007	.02 Mfd. 600 volt paper condenser
9	83058	.25 Mfd. 100 volt paper condenser
10	83063	.5 Mfd. 100 volt paper condenser
11	83082	260,000 ohm ¼ watt carbon resistor
12	83179	Local-distance switch (SPST)
13	83207	15 ampere fuse
14	83217	.04 Mfd. 600 volt paper condenser
15	83278	6 volt pilot light bulb (1171 only) (See No. 84058 for Model 1172)
16	83293	300 ohm ¼ watt carbon resistor
17	83352	.015 Mfd. 600 volt paper condenser
18	83706	.006 Mfd. 600 volt paper condenser
19	83714	1.5 Mfd. 100 V. shielded paper condenser
20	83723	Antenna lead and plug
21	83725	0-500,000 ohm special Globar resistor
22-A, 22-B	83728	500,000 ohm volume control with On-Off Switch — In one unit.
23	83730	Vibrator R.F. Choke
24	83731	Output Transformer
25	83732	First I.F. Transformer
26	83733	Second I.F. Transformer
27-A, 27-B	83734	Dual 8 Mfd. 350 Volt Dry Electrolytic Condenser
28	83739	2 prong Pilot Light Socket
29	83742	Filament R.F. Choke
30	83746	R.F. (B) Coil and shield
31	83747	Antenna (A) coil and shield
32	83748	Oscillator (O) coil and shield
33	83760	Filter Choke
34	83770	B supply R.F. Choke
35	83777	Battery Lead and Fuse Housing
36	83778	Pilot Light Cable and Plug
37	83779	Speaker Cable and Plug
38	83780	Power Transformer
39	83783	.00011 mfd. Molded Mica Cond
40	83784	.0011 mfd. Molded Mica Condenser
41A, 41B	83785	Dual .0005 mfd. Molded Mica Condenser
42	83800	Plug-in Vibrator
43	83803	12 mfd. 25 V. Dry Electrolytic Condenser
44	83804	40,000 ohm, ½ watt Carbon Resistor
45	83805	Oscillator Padding Trimmer
46	83812	35,000 ohm Tone Control Variable Resistor
47A	83831	.05 mfd. 100 volt Paper Condenser — In one Unit. Common terminal grounded to can.
47B		.05 mfd. 100 volt Paper Condenser
47C		.05 mfd. 100 volt Paper Condenser
47D		.05 mfd. 100 volt Paper Condenser
47E		.05 mfd. 100 volt Paper Condenser
47F		.05 mfd. 100 volt Paper Condenser
47G		.1 mfd. 400 volt Paper Condenser
47H		.1 mfd. 400 volt Paper Condenser
47I		.25 mfd. 100 volt Paper Condenser
47J		.25 mfd. 300 volt Paper Condenser
48A, 48B, 48C	83834	Three gang Variable Condenser with mtg. Plate and Shaft Coupling
49	83845	Male Speaker Plug and Bracket
50	83850	Speaker Field Coil and Housing (5.5 ohms)
51	84175	35 ohm Flexible Resistor. Note: Early Model 1171 sets used 15 ohm Resistor. No Resistor used in Model 1171
52	84021	Diaphragm & Shell Assem. (R-223 Spkr.)
53	84058	6 to 8 volt Dial Light Bulb (1172 only)
	84095	15,000 ohm, 2 watt Carbon Resistor (See other side for other parts)

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description
83144	Spark Plug Suppressor
83145	Distributor Suppressor
83242	Back Cover and Casing Bracket Screws
83727	Back Cover
83836	Front Cover and Speaker Grill Cloth
83838	Case Assembly, less Covers
83861	Tuning Knob (1171 only)
83862	Volume Control Key (1171 only)
83904	Generator and Ammeter Condenser
84106	Volume Control Knob (1172 only)

MODEL 1171,1172
Voltage Data
Alignment Data

STEWART-WARNER CORP.

The Stewart-Warner 6 Tube Superheterodyne Model No. R-117 Chassis is used in the Model 1171 and 1172 Auto Radio receivers. These two sets are identical with the exception of the remote control head and the flexible shafts.

The Model 1171 remote control uses a key to operate the volume control and a knob for tuning while the 1172 control uses a different type of head with knobs for both the volume control and tuning. Sets with serial numbers below 15000 are Models 1171's, while those above 15000 are 1172's.

The only difference in the chassis used is the omission of the dial light dimming resistor (diagram No. 51) in the 1172 sets.

DIAL CALIBRATION

In the Model 1171, the dial can be calibrated by tuning in a station of known frequency and then setting the pointer to give the correct reading by turning the adjusting screw which is located on the middle of the back of the remote control head. In the Model 1172, the dial is calibrated by turning the tuning knob after the pointer has stopped at the last dial division. Turning the knob in a clockwise direction, after the pointer reaches 15.4, will lower the dial reading, while turning it counter clockwise after the pointer is at 5.3, will increase the dial reading.

CIRCUIT DESCRIPTION

In the R-117 Chassis, the incoming signal is tuned and amplified by the 78 R. F. amplifier tube and then it is further amplified and its frequency is converted to 177.5 K. C. in the 6A7 combination first detector and oscillator tube.

The 177.5 K. C. signal is amplified by the I. F. stage, using a 78 type tube and is then rectified by the diodes of the 75 second detector tube. The rectified current produces a modulated D. C. voltage drop across the diode load resistor No. 11. The audio frequency modulation is impressed across the 500,000 ohm volume control from where is goes to the triode section of the 75 which acts as an audio amplifier.

The modulated drop across resistor No. 11 is filtered and applied to the grids of the 78 and 6-A-7 tubes to provide A.V.C. action.

LOCAL-DISTANCE SWITCH

A local-distance switch is provided in the R. F. stage to reduce the sensitivity in locations where there is excessive noise in tuning between stations. When this switch is in the open or "local" position, a high bias is placed on the 78 R. F. tube by means of the 6000 ohm resistor No. 2. This resistor is shorted out when the switch is thrown to the distance position (with white dot showing) thus reducing the bias to its normal value.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 21 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer and keeps the voltage below the danger point until the tubes warm up and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper alignment of the R. F. and I. F. stages of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A. V. C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 42 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect to the 42 plate is the terminal of the tone control which is wired to the speaker plug.

During all alignment adjustments, keep the volume control full on and the local-distance switch in the "distance" position.

I. F. ALIGNMENT

The I. F. trimmers are located on the top of the I. F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K. C. and connected from the 6-A-7 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Adjust all three I. F. trimmers to give maximum output reading.

The first I. F. transformer has a double trimmer consisting of a slotted screw for one trimmer and a hex nut around it for the other. In adjusting the second I. F. transformer single trimmer, it is desirable to use a bakelite screwdriver or one having only a small metal tip. After the I. F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

R. F. ALIGNMENT

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage. Adjust the receiver to approximately 1400 K. C. and carefully tune the service oscillator to give maximum receiver output. Adjust the output of the oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading. The trimmer on the other condenser section (oscillator section) should not be touched unless the set does not calibrate properly.

ALIGNING THE PADDING CIRCUIT

The low-frequency oscillator padding trimmer located on the side of the chassis does not require adjustment in most cases. However, if the set does not align properly at the low frequency end proceed as follows: Remove the chassis from the case. To do this it is necessary to unsolder the braided shield from the outside of the case at the antenna plug opening and then remove the screws holding the chassis to the case. Set the test oscillator to exactly 600 K. C. and tune the set to the signal. Adjust the padding trimmer which is mounted on the side of the chassis while turning the gang condenser back and forth over a small range. The correct setting is the one which gives maximum output. If the pointer is not exactly at 6.0 (600 K. C.) for maximum output, re-adjust the pointer calibration to get the proper reading. After adjusting the padding trimmer check up the alignment and calibration at 1400 K. C.

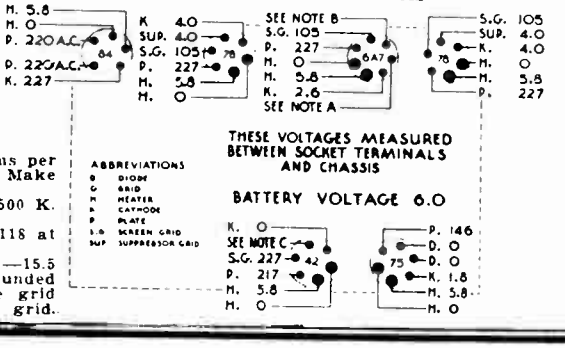
ADJUSTMENT OF OSCILLATOR TRIMMER

If the receiver is badly out of calibration, particularly at the high frequency end, the following procedure should be followed.

Set the test oscillator to **exactly 1400 K. C.** Turn the tuning knob until the dial pointer indicates 14.0 (1400 K. C.) and then adjust the oscillator trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R. F. alignment.

SOCKET VOLTAGES

LOCAL-DISTANCE SWITCH IN DISTANCE POSITION
BOTTOM VIEW OF CHASSIS



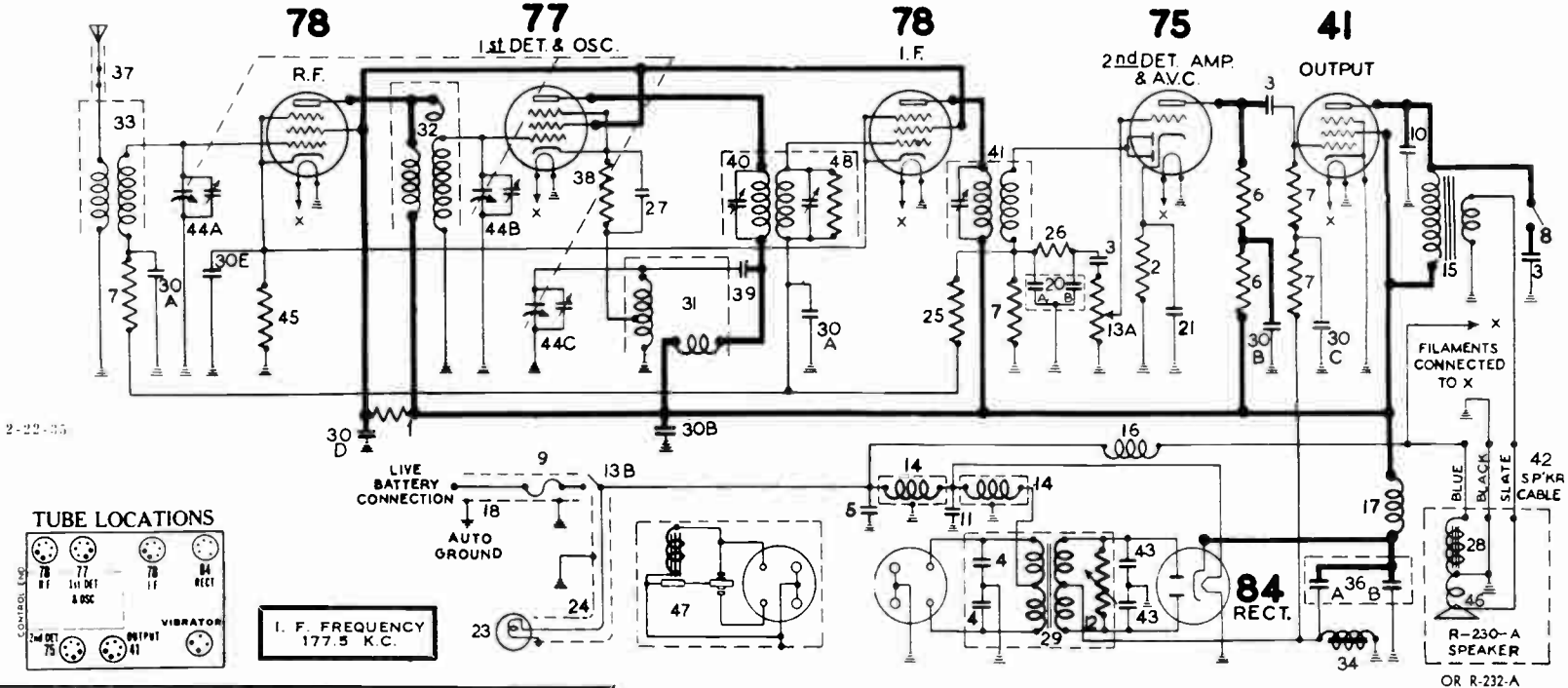
7-18-34

IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The oscillator grid voltage varies from 0 at 1500 K. C. to —5.0 at 530 K. C.

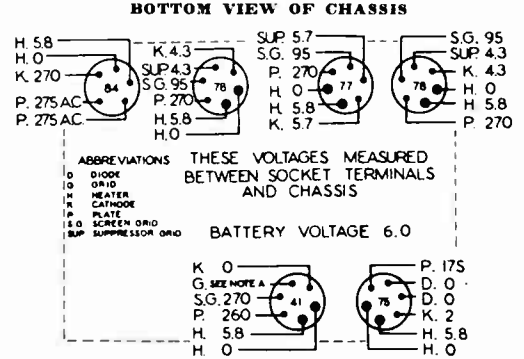
NOTE B: The oscillator anode voltage may vary from 118 at 1500 K. C. to 128 at 530 K. C.

NOTE C: The actual bias on the grid of the 42 tube is —15.5 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.



SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS



IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

MODEL R-131 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67580	6,000 ohm ½ watt carbon resistor	.25
3	83007	.02 mfd. 600 volt paper condenser	.35
4	83058	.25 mfd. 100 volt paper condenser	.35
5	83063	.5 mfd. 100 volt paper condenser	.45
6	83080	51,000 ohm ½ watt carbon resistor	.20
7	83082	260,000 ohm ½ watt carbon resistor	.20
8	83179	Tone control switch	.30
9	83207	15 ampere fuse	.05
10	83706	.006 mfd. 600 volt paper condenser	.35
11	83714	1.5 mfd. 100 volt shielded condenser	.80
12	83725	Special Globar resistor	.45
14	83730	Vibrator R.F. Choke	.25
15	83731	Output transformer	2.00
16	83742	Filament R.F. choke	.16
13A, 13B	83728	500,000 ohm volume control; Line Switch	1.20
17	83770	"B" supply R.F. choke	.40
18	83777	Battery lead and fuse housing	.50
20	83785	Dual .0005 mfd. molded mica condenser	.32
21	83803	12 mfd. 25 volt dry electrolytic condenser	.80
23	84058	6 - 8 volt dial light bulb	.15
24	84099	Dial light cable	.35
25	84235	1.1 megohm carbon resistor	.20
26	84238	11,000 ohm ½ watt carbon resistor	.20
27	84282	.001 mfd. molded mica condenser	.25
28	84791	Field coil and housing (R-230A only) (Part 85118 for R-232A)	2.50
29	84798	Power transformer	3.50
30A, 30B, 30C, 30D, 30E	84806	.05 mfd. 300 volt paper cond. (green-white); .1 mfd. 400 v. paper cond. (red or red-white); .25 mfd. 100 volt paper cond. (green lead); .25 mfd. 300 volt paper cond. (white lead); .5 mfd. 100 volt paper cond. (orange lead)	2.50
31	84814	Oscillator (O) coil and shield assembly	1.50
32	84822	R.F. (B) coil and shield assembly	1.50
33	84825	Antenna (A) coil and shield assembly	1.40
34	84827	"B" supply filter choke	1.25
36A, 36B	84829	4 mfd.—400 volt dry electrolytic condenser; 8 mfd.—400 volt dry electrolytic condenser	2.50
37	84831	Antenna lead and plug	.10
38	85051	8000 ohm ¼ watt carbon resistor	.20
39	84833	.00007 mfd. molded mica condenser	.20
40	84838	1st. I.F. transformer assembly	2.75
41	84842	2nd. I.F. transformer assembly	2.60
42	84845	Speaker cable	.50
43	84850	.03 mfd. 750 volt paper condenser	.25
44A, 44B, 44C	84866	Three gang variable condenser with mounting plate and shaft coupling	6.00
45	84888	300 ohm. ½ watt flexible wire resistor	.20
46	84891	Diaphragm, voice coil, and shell assembly (R-230A only) (Part 85119 for R-232A)	2.10
47	84904	Vibrator	5.00
48	83072	510,000 ohms ¼ watt resistor	.20
38	85051	8000 ohm ¼ watt carbon resistor	.20
28	85118	Field coil and housing (R-232A only)	2.50
46	85119	Diaphragm, and shell assembly (R-232A only)	2.10

MODELS 1311 to 1319
Alignment, Parts List
Circuit Data,

STEWART WARNER CORP.

SERVICE DATA FOR STEWART-WARNER R-131 CHASSIS

CIRCUIT DESCRIPTION

In the R-131 Chassis, the incoming signal is tuned and amplified in the 78 R.F. stage. Further amplification and frequency conversion to 177.5 KC. take place in the 77 combination first detector and oscillator tube.

The 177.5 KC. signal is amplified in the I.F. stage, using a 78 type tube, and then rectified in the diode section of the 75 second detector tube. The rectified current produces a modulated D.C. voltage across the diode load resistor No. 7. The audio component of this voltage appears across the 500,000 ohm volume control. Any part or all of this audio signal may be impressed on the triode section of the 75 tube where amplification takes place.

The modulated drop across resistor No. 7 is filtered and applied to the grids of the 78 R.F. and I.F. tubes to provide A.V.C.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 12 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect the 41 plate is the terminal of the tone control switch.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K.C. and connected from the 77 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles, except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the dial can be calibrated as follows:

Tune in a station of known frequency between 800 and 1100 K.C. Insert a screw driver in the slotted shaft on the rear of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the station frequency.

If the set is badly out of calibration such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below.

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage.

Set the test oscillator to exactly 600 K.C. Tune the radio set to maximum volume. Calibrate the dial at the low frequency end by setting the pointer to read exactly 6.0 (600 K.C.).

Set the test oscillator to exactly 1400 K.C. Turn the tuning knob until the dial pointer indicates 14.0 (1400 K.C.) and then adjust the oscillator shunt trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 K.C., tune the set very carefully for maximum output.

Adjust the output of the oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

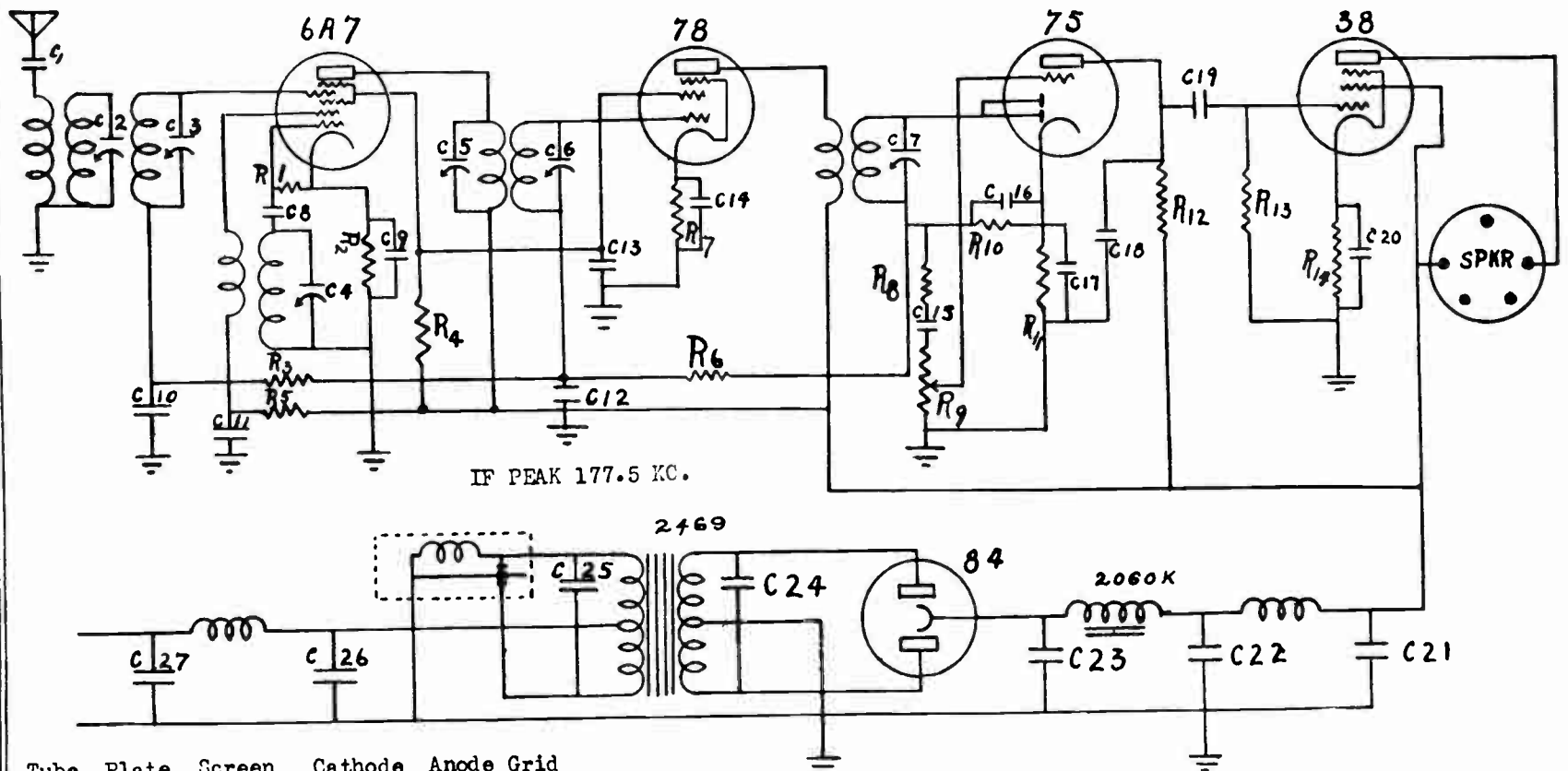
Part No.	Description	List Price
12606	Receiver mtg. nut (5/16—18 hex.)	$0.02
17166	Single hole mtg. nut	.05
81346	1 lug terminal strip	.04
83144	15,000 ohm spark plug suppressor	.35
83145	10,000 ohm distributor suppressor	.35
83242	No. 8 x ¼" self tapping screws (dark finish for mtg. back cover and casing brackets)	.02
83319	Fuse insulating tube	.02
83624	No. 8 x ¼" self tapping screw (Cad. plate, for mtg. power transformer)	.01
83711	8 lug terminal strip	.12
83719	Front cover mtg. spade bolt (8-32)	.01
83720	4 lug terminal strip	.08
83721	Battery lead plug rubber grommet	.02
83727	Back cover	.90
83737	Front cover knurled nuts	.06
83771	Receiver mounting stud	.08
83772	Receiver mounting dash support washer	.04
83806	Speaker grill cloth	.12
83892	Variable condenser shaft coupling	.10
83893	Volume control shaft guide bushing	.05
83904	Generator condenser	.70
84853	Front cover assembly	1.00
84855	Dial Face (Model 1311)	.20
84869	Case assembly, less covers	3.75
84941	Aluminum vibrator shield assembly	.50
84990	Single hole mtg. plate	.80
85012	Single hole mtg. bolt	.06
85021	Case assembly (less covers) (1314 only)	4.00
85022	Back cover (model 1314)	1.00
85024	Front cover assembly (model 1314)	1.25
85037	Dial face (model 1314)	.20

REMOTE CONTROL HEAD PARTS

Part No.	Description	List Price
15214	Long mtg. strap screw (10/32 x 1¼" R.H.M.S.)	.01
84059	Case screw (4-40 x 3/16") Per hundred	.80
84060	Flexible casing set screw	.02
84067	Steering post mtg. bracket	.25
84068	Steering post mtg. strap	.15
84075	Bezel and glass	.50
84076	Dial light button and socket	.25
84106	Volume control knob	.25
84309	Instrument panel mounting accessories	.15
84854	Complete accessories for installation	5.00

FLEXIBLE SHAFTS

Part No.	Description	List Price
84871	Tuning shaft, 24 inches long	1.50
84873	Volume control shaft, 24 inches long	1.50
84882	Tuning shaft, 36 inches long	2.00
84883	Volume control shaft, 36 inches long	2.00
84886	Tuning shaft, 30 inches long	2.00
84887	Volume control shaft, 30 inches long	2.00



Tube	Plate	Screen	Cathode	Anode Grid
75	108	...	1.05	...
38	158	165	15.5	...
78	163	100	3.0	...
6A7	163	100	2.9	120

Readings taken between chassis and points indicated with 1000-ohm-per-volt meter. Filament, 6.3-6.4 volts.

Circuit Diagram "L'Tatro" Radio

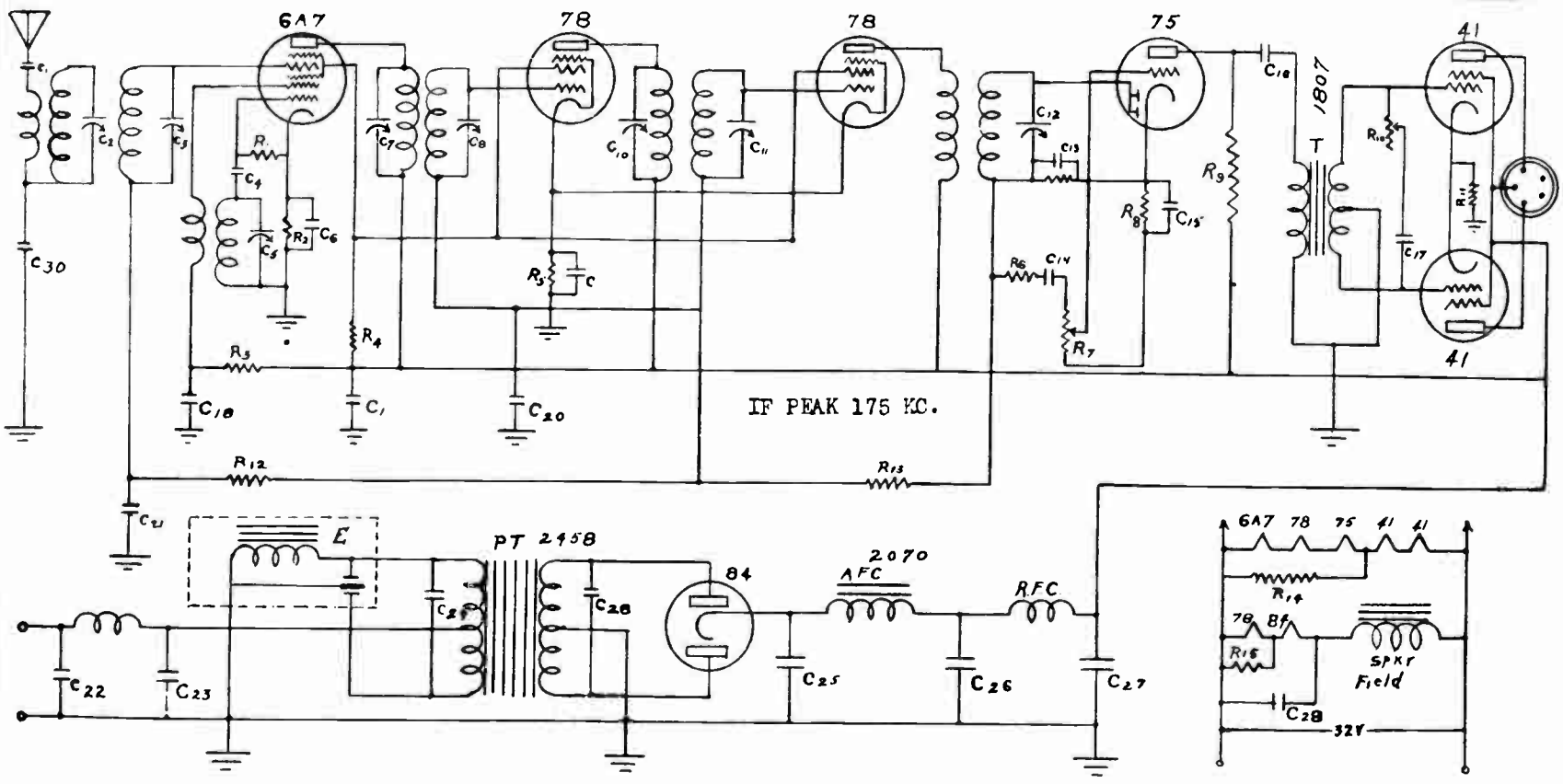
Model P54 [Recorder]

C2, C3 and C4 are tuning condensers; C5, C6 and C7 I. F. trimmers; C1 .0025 Mfd; C8 100 MMfd; C9, C11, C12, C13, C14 and C21 .1 Mfd; C10 and C19 .05 Mfd; C15 .015 Mfd; C16 and C18 .0005 Mfd; C17 and C20 10 Mfd. electrolytic; C22 and C23 8 Mfd. electrolytic; C24 and C25 special buffer condensers; C26 1 Mfd. high frequency; C27 10 Mfd. non-polarized electrolytic.

R1 50,000 ohms; R2 250 ohms; R3 1 meg; R4 38,000 ohms; R5 20,000 ohms; R6 ¼ meg; R7 450 ohms; R8 100,000 ohms; R9 ½ meg volume control; R10 ¼ meg; R11 5000 ohms; R12 500.000 ohms; R13 1 meg; R14 1250 ohms.

L. TATRO PRODUCTS CORP.

MODEL P-54
(Recorder)
Schematic
Voltage



Tube	Plate	Screen	Cathode	Anode Grid
6A7	198	80	2.4	140
78*	198	80	7.0	...
75	194	..	1.5	...
41*	193	198	16.5	...

Circuit Diagram "L'Tatro Radio

Models L74 - - N74 [Lieut. Governor and Governor]

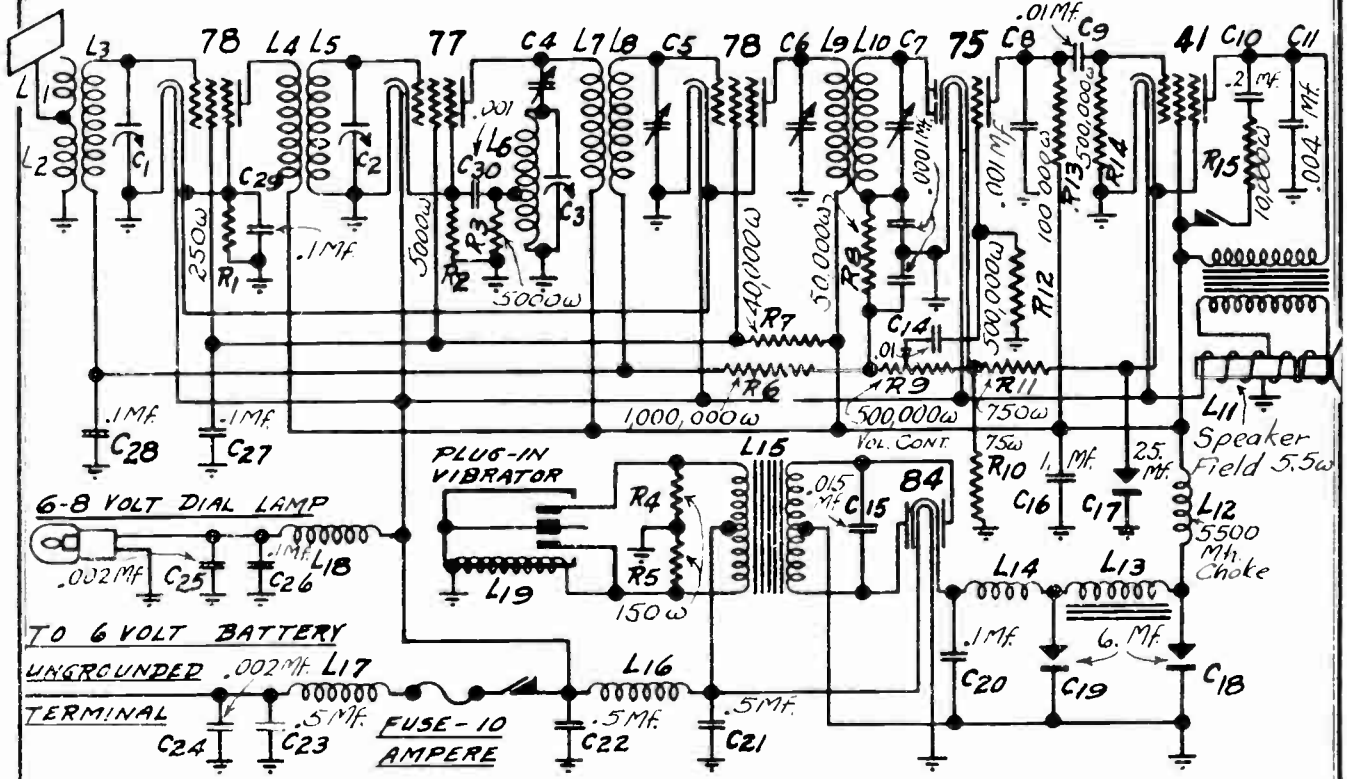
*Two tubes used; same reading on both.

C2, C3 and C5 tuning condensers; C7, C8, C10, C11 and C12 I. F. trimmers; C1, C17 .0025 Mfd; C4 100 Mmfd; C13 .0005 Mfd; C14 .015; C15 10 Mfd; C16, C18, C19 .1 Mfd; C20, C21 .05 Mfd; C22 20 Mfd. 40 volt non-polarized; C23 1 Mfd. special high frequency; C24, C28 special high frequency condensers; C25 8 Mfd; C26 16 Mfd; C27 .1 special; C28 10 Mfd. 14 volt non-polarized; C30 .1 omitted on late models. Note: C19 in above diagram is located between C18 and C20 and should be connected above R4.

R1 50,000 ohms; R2 250 ohms; R3 20,000 ohms; R4 38,000 ohms; R5 2500 ohms; R6 100,000 ohms; R7 ½ meg volume control; R8 5000 ohms; R9 100,000 ohms; R10 ½ meg tone control; R11 450 ohms; R12 250,000 ohms; R13 1 meg; R14 200 ohms 10 watt; R15 30 ohms 10 watt. R9 and C10 are omitted on late models, with primary of transformer to high potential. Resistor parallel to C13 is ¼ meg.

TRANSFORMER CORP. OF AMER. (New Co.)

MODEL TC-50
Schematic
Alignment
Voltage



IF PEAK 175 KC.

R-F. ADJUSTMENT: Remove chassis from case, couple the output of a modulated oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 KC.

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Adjust trimming condensers, starting with C3, C2 and then C1, until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments. Greater accuracy can be obtained with an output meter.

I-F. ADJUSTMENT: The four I-F. trimming condensers are adjusted at 175 KC.

Connect a modulated oscillator set at 175 KC. between the first detector grid and ground. Connect output meter.

Adjust the tuning condenser so that no signal except the I-F. oscillator is heard at maximum volume, With the volume control set at maximum, reduce the output of the oscillator until a small deflection is obtained. Unless this is done, the AVC action will make correct adjustments impossible.

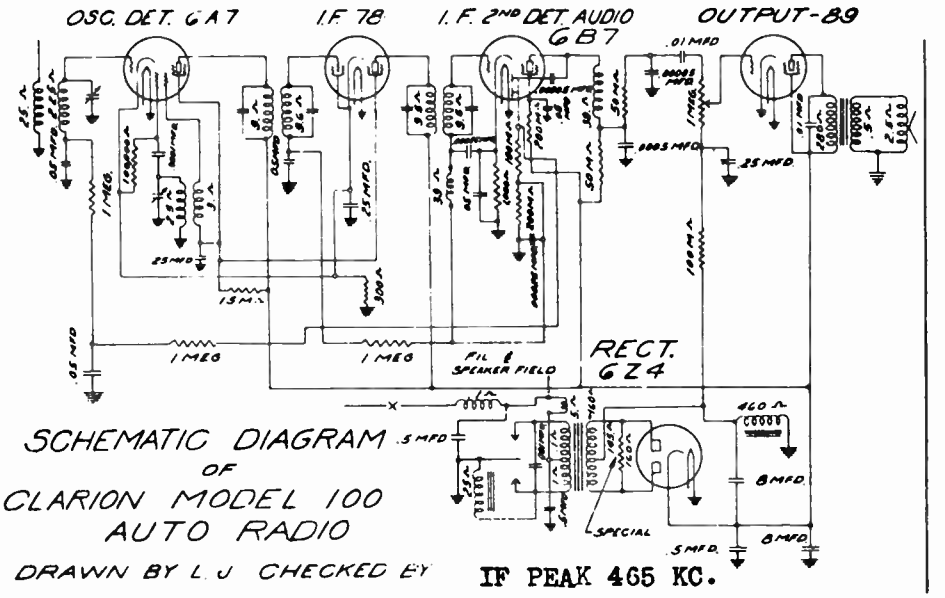
Trim in order C4, C5, C6 and C7. Repeat adjustments and then follow with the R-F. adjustments.

		SOCKET VOLTAGES			
	TUBE	CATHODE-PLATE	CATHODE-SCREEN	CATHODE-GRND.	PLATE CUR.
R-F.	78	180	85	2	4 MA.
Det-Osc.	77	180	85	4	6.3 "
I-F.	78	180	85	2	4
2Det.AVC.	75	125	--	2	1
Output	41	175	180	15	17

Heater Voltage 5.5 volts.

MODEL 100-AR
Schematic
Voltage
Parts List

TRANSFORMER CORP. OF AMERICA



SCHEMATIC DIAGRAM
OF
CLARION MODEL 100
AUTO RADIO

DRAWN BY L. J. CHECKED BY
APPROVED DATE: 7-11-33

IF PEAK 465 KC.

No.	Stage	Tube	Ef	Ep	Eg	Ek	Esg	Esug	Ip	Ep-0	Eg-0	Ip-0
1	Osc.- Det . .	6A7	6	185	.1	3	83		4.6	81	.05	1.7
2	I. F.	78	6	185	.1	3	102	0	7.5			
3	I. F. 2nd Det. Audio .	6B7	6	58	.05	2.3	45		2.2	d .1		
4	Output. . . .	89	6	190	.05	0	194	0	18			
5	Rectifier . .	6Z4	6	P_{208}		185			P_{18}			

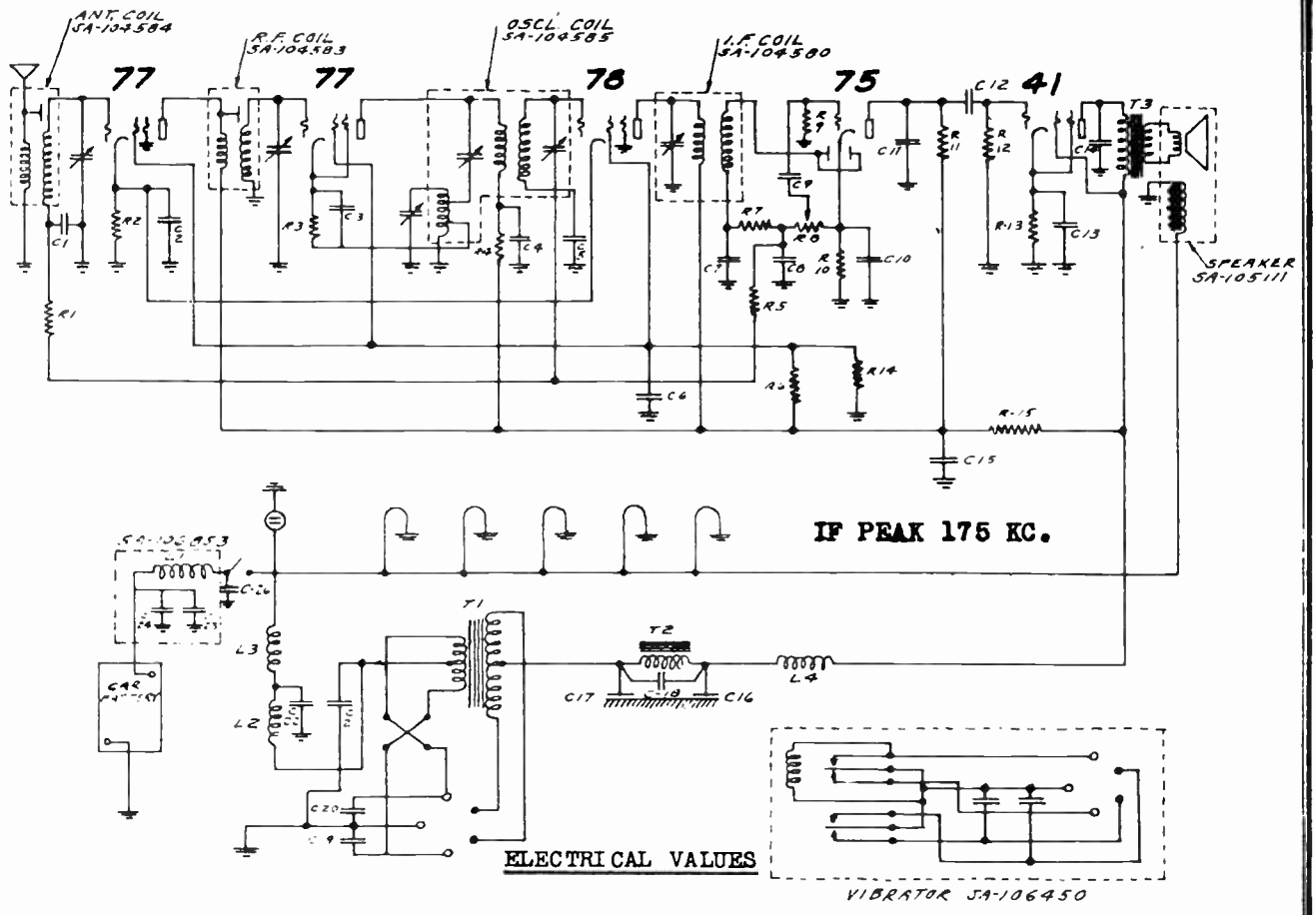
0 - Oscillator.
Volume Control - Full On.
Battery Voltage - 6 Volts.

p - Per Plate.
d - Diode Plate.

G-1705	Speaker Complete
G-1727	"B" Choke
G-1746	Vibrator Complete
G-1748	Output Transformer
G-1751	Voice Coil and Cone
G-1753	Dial Drive and Head
G-1754	Male Cable Tuning
G-1755	Female Cable Tuning
G-1756	Perforated Mtg. Strap for Control Head
G-1756-C	Threaded Mtg. Strap for Control Head
G-1763	1. F. Transformer (1st and 2nd)
G-1788	Key Knob and Shaft
P-1083	Lock Washer, Small
P-1381	.0005 Condenser
P-1728	.00005 Mfd. Condenser
P-1756	Threaded Mounting Strap
P-4372	.00025 Condenser
P-4446	.001 Mfg. Condenser
P-4504	1,000 Ohm Resistor
P-4590	.0001 Condenser
P-4595	1 Megohm Resistor
P-4602	Grommet, Small
P-4640	.25 Mfd. Condenser
P-4644	.05 Mfd. Condenser
P-4645	.01 Mfd. Condenser
P-4659	50,000 Ohm Resistor
P-4662	100,000 Ohm Resistor
P-4664	200,000 Ohm Resistor
P-4713	15,000 Ohm Resistor
P-4732	Socket 6a7
P-4733	Socket 78
P-4744	Tuning Condenser
P-4761	.5 Mfd. Condenser
P-4763	Vibrator - Unit only
P-4764	Rubber Vibrator Box and Cover
P-4765	Vibrator, Special Resistor
P-4767	Electrolytic Condenser
P-4769	Volume Control
P-4771	Socket 6B7
P-4772	Socket 89
P-4773	Socket 6Z4
P-4774	Generator Condenser
P-4775	Spark Plug Suppressor
P-4776	Distributor Suppressor
P-4777	Mounting Studs
P-4778	Mounting Nuts
P-4787	Bushing and Drive Set Screws
P-4788	Shaft Bushings
P-4791	Wing Nuts
P-4792	Chassis Mounting Screw
P-4793	Grommet, Large
P-4795	Fuse Assembly
P-4796	Fuse - 10 Ampere
P-4797	Mounting Washers
P-4799	"A" Choke
P-4804	Untuned Choke
P-4807	Terminal Strip
P-4811	Vibrator Transformer
P-4812	Choke (Unshielded)
P-4822	Dial Bezel
P-4823	Dial Pointer
P-4826	Dial Light Bracket
P-4829	Dial Scale
P-4832	Knob Tuning
P-4833	Knob Springs
P-4835	Dial Glass
P-4843	Antenna Oscillator Coil
P-4849	Mounting Strap Nuts
P-4855	150 Ohm Resistor

UNITED AMERICAN BOSCH CORP.

MODEL 45-A,45-C
Schematic
Color Code



R-1	100,000 ohms 1/4 watt	R-19	---	C-16	8 mfd. electrolytic
R-2	750 ohms 1/4 watt	R-20	---	C-17	8 mfd. electrolytic
R-3	7500 ohms 1/4 watt	C-1	.05 - 2 ply	C-18	.1 mfd. - 2 ply
R-4	2000 ohms 1/4 watt	C-2	.25 - 2 ply	C-19	.05 mfd. - 2 ply
R-5	1/2 meg. 1/4 watt	C-3	.002 - 4 ply	C-20	.05 mfd. - 2 ply
R-6	40,000 ohms 1/4 watt	C-4	.05 - 3 ply	C-21	.5 mfd. 200 V. in can
R-7	50,000 ohms 1/4 watt	C-5	.05 - 2 ply	C-22	.5 mfd. 200 V. in can
R-8	1/2 meg. Volume Control	C-6	.05 - 3 ply	C-23	.5 mfd. mica
R-9	1 meg. 1/4 watt	C-7	.0001 mfd. mica	C-24	.001 mfd. mica
R-10	5,000 ohms 1/4 watt	C-8	.0001 mfd. mica	C-25	---
R-11	1/4 meg. 1/4 watt	C-9	.005 - 3 ply	C-26	.0001 mica
R-12	1/2 meg. 1/4 watt	C-10	.25 - 2 ply	L-1	R.F. Choke coil
R-13	600 ohms 1/2 watt	C-11	.003 - 4 ply	L-2	Choke coil
R-14	75,000 ohms 1/4 watt	C-12	.005 - 3 ply	L-3	R.F. Choke coil
R-15	4,000 ohms 1 watt	C-13	10 mfd. electrolytic	L-4	R.F. Choke coil
R-16	---	C-14	.005 - 3 ply	T-1	Power Transformer
R-17	---	C-15	.05 - 3 ply	T-2	Choke coil
R-18	---			T-3	Output Transformer

STANDARD WIRE COLOR CODE

Plate	Blue
"B" plus	Red
Grid	Green
Screen	Green and White
Cathode	Black
A.V.C.	Red & Yellow or White
"B" minus	Black and White
Ground	Black and Red
Overhead grid	Green rubber

STANDARD VOLUME CONTROL WIRING

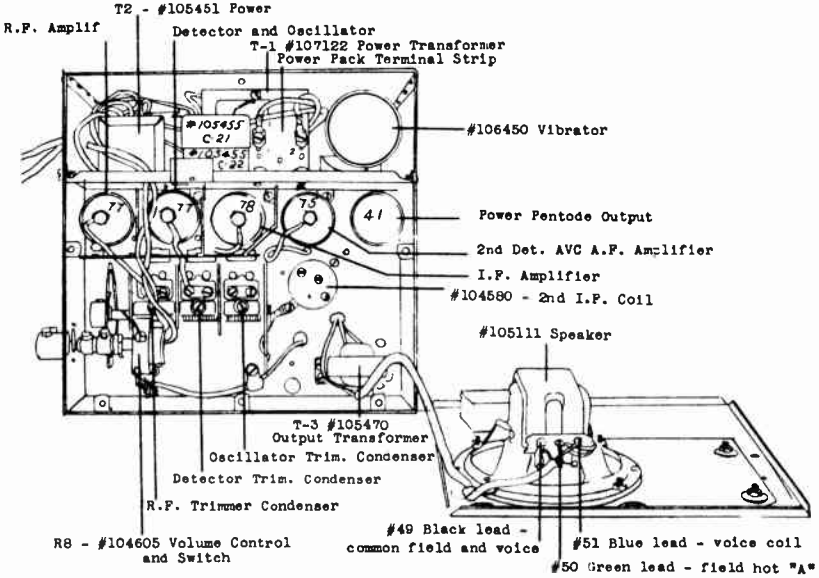
Arm	Green
Low Side	Black
High	Red and White

R.M.A. RESISTOR COLOR CODE

BODY	TIP	DOT
0 - BLACK	0 - BLACK	.0 - BLACK
1 - BROWN	1 - BROWN	0 - BROWN
2 - RED	2 - RED	00 - RED
3 - ORANGE	3 - ORANGE	000 - ORANGE
4 - YELLOW	4 - YELLOW	0000 - YELLOW
5 - GREEN	5 - GREEN	00000 - GREEN
6 - BLUE	6 - BLUE	000000 - BLUE
7 - PURPLE	7 - PURPLE	
8 - GREY	8 - GREY	
9 - WHITE	9 - WHITE	

MODEL 45-A, 45-C
Alignment
Socket, Trimmers
Test Data, Parts

UNITED AMERICAN BOSCH CORP.



ADJUSTING AND ALIGNING INSTRUCTIONS

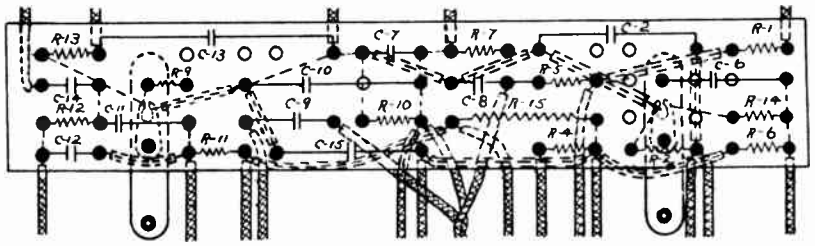
All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless a coil or I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows:

1. Connect output meter across voice coil of speaker terminals #49 and #51 (Fig. #1).
2. Set test oscillator at 175 kilocycles (using .1 mfd. antenna condenser).
3. Connect test oscillator lead to grid of the first I. F. tube.
4. Adjust condenser on primary of second I. F. transformer on top of set to peak on output meter.
5. Connect test oscillator lead to grid of first detector tube.
6. Adjust condenser on primary of first I. F. transformer (under set) to peak.
7. Adjust condenser on secondary of first I.F. transformer to peak. (There are two small holes on side of housing for adjustment #6 and #7.)

The above procedure lines up the I. F. stages properly and our attention can now be turned to the oscillator and R. F. adjustments, which are made as follows:

1. Set test-oscillator at 1500 kilocycles (using .1 mfd. antenna condenser).
2. Connect test-oscillator lead to grid of first detector.
3. Set gang condenser at 1500 kilocycles as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to thickness of approximately .015".
4. Peak oscillator trimmer on end of condenser gang.
5. Set test-oscillator at 1400 kilocycles.
6. Connect test-oscillator to antenna lead (using .0002 mfd. antenna condenser).
7. Peak other two condensers on gang.
8. Do not touch oscillator trimmer at 1400 kilocycles setting of gang.

This set should now be fully aligned and normal sensitivity prevail.



TESTING

(d) SPEAKER: Check field supply with voltohmmeter at speaker, reading between points #49 and #50 (Fig. #1) on speaker terminals (5.8 volts or over). Unsolder blue lead from speaker (#51) and test across terminals #49 and #51 for continuity of voice coil. (Reading full scale ohmmeter.)

(e) SECONDARY OUTPUT TRANSFORMER: After unsoldering blue lead from terminal (#51 Fig. #1), test with ohmmeter between blue lead and terminal #49 (full scale reading - ohmmeter).

(f) CHASSIS: After checking the components listed above, test the voltages as they appear on voltage chart and Fig. #4. The resistance measurements as found in "Resistance Chart" and Fig. #5. If any particular reading obtained is very different from the chart reading, the trouble is located in the portion of the circuit associated with the points at which this discrepancy occurs. Referring to circuit diagram and location drawings (Figs. #1, #2, #3), each part making up the circuit may be individually tested until the faulty part is specifically located.

RESISTORS

	Ohms	Body	Tip	Dot
106879	Resistor strip assembly			
105247	7,500	Purple	Green	Red
105265	750	Purple	Green	Brown
101211	600	Blue	Black	Brown
105249	5,000	Green	Black	Red
105278	100,000	Brown	Black	Yellow
105245	2,000	Red	Black	Red
105246	1/2 meg.	Green	Black	Yellow
105251	40,000	Yellow	Black	Orange
105276	50,000	Green	Black	Orange
105281	1 meg.	Brown	Black	Green
105279	1/4 meg.	Red	Green	Orange
105277	75,000	Purple	Green	Orange
105531	4,000	Yellow	Black	Red
104605	Volume control with switch			

CONDENSERS

105300	Suppressor condenser for generator
102495	Condenser .1 mfd - 2 ply
105386	Condenser .05 mfd - 2 ply, short
106844	Variable condenser, complete
103852	Condenser .002 - 4 ply
102493	Condenser .05 - 2 ply
102492	Condenser .05 - 3 ply
106917	Condenser assembly
106078	Electrolytic condenser
106853	Condenser and choke coil assembly
105455	Condenser for assembly 106853
103775	Condenser .001 mica
105568	Condenser .5 - 2 ply
105000	Variable condenser
102497	Condenser .25 - 2 ply
102492	Condenser .05 - 3 ply
106417	Condenser .001 mica
103659	Condenser .005 - 3 ply
105743	Condenser .003 - 4 ply
105741	Electrolytic condenser 10 mfd.

MAIN ASSEMBLIES

106836	Chassis and power pack assembly
106891	Control unit for Model 45A

CONTROL UNIT PARTS (45A)

104986	Dial plate
105090	Knob (volume control)
104977	Knob (tuning)
105088	Frame assembly
106893	Flexible shaft (volume control)
106892	Flexible shaft (tuning)
104892	Thumb screw - dial light assembly
104997	Dial scale
105114	Set screw - flexible cable
105151	Spring
78692	Felt washer
105179	Stud - dial scale and bracket
108	Lock washer for thumb screw
104337	Screw - mounting
81809	Nut - mounting
104392	Washer - mounting
62872	Lock washer - mounting
105958	Dial light cable assembly
106809	Lamp

COILS

105452	R.F. Choke coil (power pack)
105854	R.F. Choke coil (power pack)
104580	I.F. Coil complete (chassis)
104583	R.F. Coil complete (chassis)
104584	Antenna coil
104585	Detector and oscillator coil complete
105451	Choke coil assembly
106853	Condenser and choke coil assembly
105824	Choke coil for condenser and choke assembly

CABLES AND CABLE ASSEMBLIES

106544	Dial light cable assembly
105432	Antenna cable
106543	Battery cable assembly
105160	Speaker cable

TRANSFORMERS

105470	Output transformer
107122	Power transformer

UNITED AMERICAN BOSCH CORP.

MODEL 45-A, 45-C
Voltage
Resistance Chart

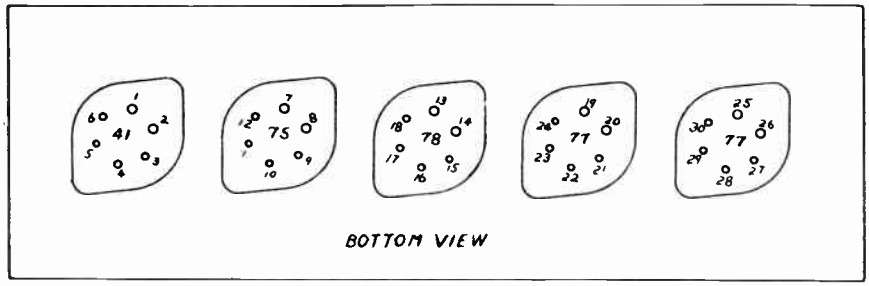


Figure #4

41 Power	75 2nd Det. Audio Amplifier & AVC.	78 IF Amplifier	77 Det. Osc.	77 RF Amplifier
1 - Fil.	7 - Fil.	13 - Fil.	19 - Fil.	25 - Fil.
2 - Fil.	8 - Fil.	14 - Fil.	20 - Fil.	26 - Fil.
3 - Plate	9 - Plate	15 - Plate	21 - Plate	27 - Plate
4 - Screen	10 - Di Plate	16 - Screen	22 - Screen	28 - Screen
5 - Grid	11 - Di Plate	17 - Suppressor	23 - Suppressor	29 - Suppressor
6 - Cathode	12 - Cathode	18 - Cathode	24 - Cathode	30 - Cathode

VOLTAGE CHART

Voltages read from ground to following points with Weston Model 564 Voltohmmeter (six volt storage battery used).

2 - 5.5 V.	8 - 5.5 V.	14 - 5.5 V.	20 - 5.5 V.	26 - 5.5 V.
3 - 178 V.	9 - 112 V.	15 - 155 V.	21 - 155 V.	27 - 155 V.
4 - 187 V.	12 - 1.1 V.	16 - 62 V.	22 - 62 V.	28 - 62 V.
6 - 1.3 V.		18 - 3.5 V.	24 - 42 V.	30 - 3.5 V.

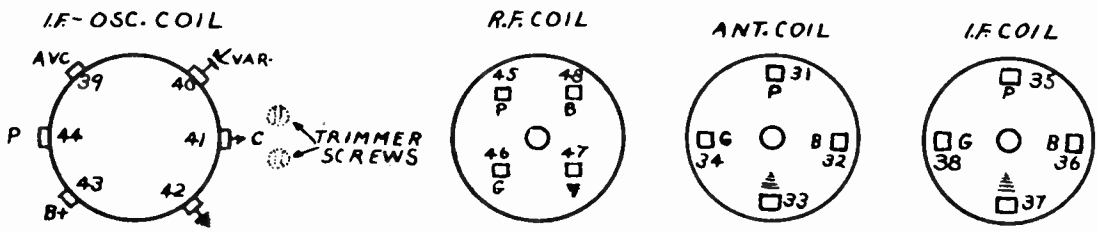


Figure #5

RESISTANCE CHART

Antenna Coil

#31 - 32 Primary - 22 ohms
#33 - 34 Secondary- 3 ohms

Output Transformer

Primary - 400 ohms

I. F. Coil

#35 - 36 Primary - 95 ohms
#37 - 38 Secondary- 85 ohms

R. F. Coil

#45 - 48 Primary - 70 ohms
#46 - 47 Secondary- Full scale

Socket Readings to Ground

6 - 600 ohms
12 - 5400 ohms
24 - 8000 ohms
30 - 750 ohms

"B" Plus Terminal

#4 to ground about 100,000 ohms (shows kick of cond. discharge on contact).

Det. Osc. Coil

(#39 to grid cap 78) I.F. Primary - 75 ohms
(#43 - #44) I.F. Secondary - 70 ohms
(40-42) Oscillator

"B" voltage 185 under set load (with 6 V. storage battery).
Total drain on car battery 4.5 amps.
Output 2.5 watts.
Intermediate frequency 175 K.C.

MODEL 45-A,45-C
Chassis View
Data

UNITED AMERICAN BOSCH CORP.

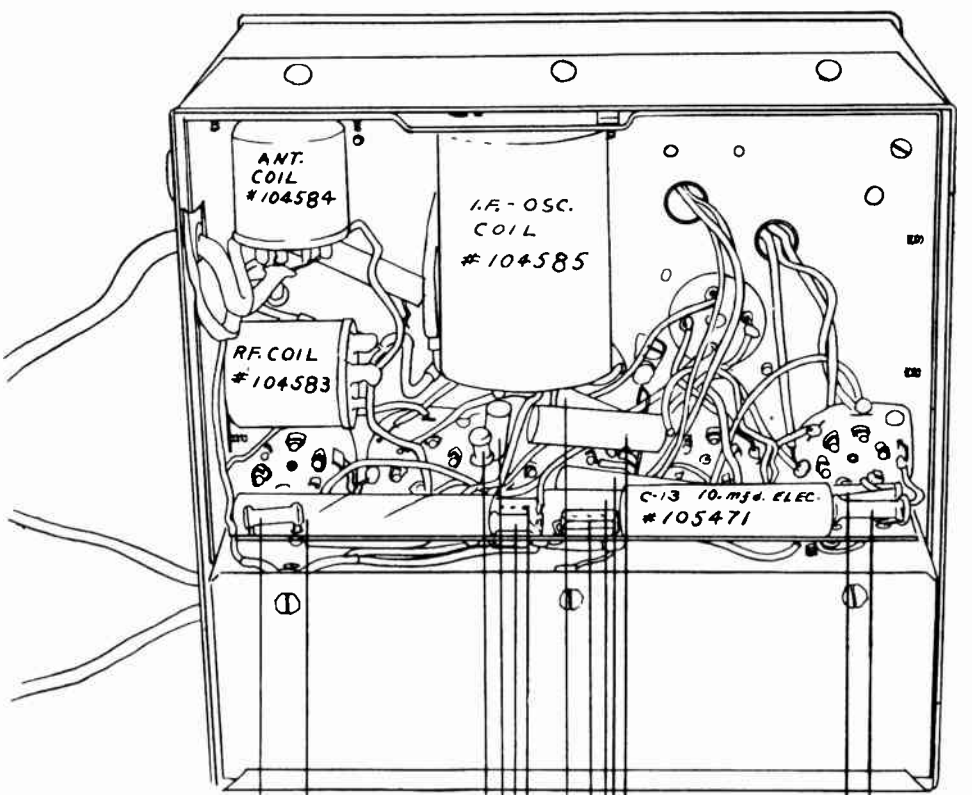
The tubes employed in this circuit are as follows:

1 type 77 radio frequency amplifier.
1 type 77 detector oscillator.
1 type 78 intermediate frequency amplifier.
1 type 75 second detector, A.V.C. and audio amplifier.
1 type 41 output tube.

The antenna is coupled to the first stage by means of a transformer. The R.F. stage is coupled to the oscillator by means of a transformer. Resistance coupling is employed between the audio portion of the type 75 tube and the output tube. The first I.F. transformer is doubly tuned and the second I.F. transformer has a tuned primary.

Automatic volume control is provided by utilizing the potential drop in the collector circuit of the type 75 tube. The A.V.C. is made a part of the D.C. grid circuits of the R.F. amplifier and the I.F. amplifier. The intermediate frequency employed is 175 kilocycles.

An electro-dynamic speaker is used with this set. This speaker has a field resistance of 4 ohms and a voice coil resistance of 3.9 ohms.



R-1 - 100,000 ohms #105278
C2 - .25 mfd. #102497

R3 - 7500 ohms #105247
C3 - .002 mfd. #103852

R7 - 50,000 ohms #105276
C8 - .0001 mfd. #106417

C5 - .05 mfd. #102493

C4 - .05 mfd. #102492
C-15 - .05 mfd. #192492

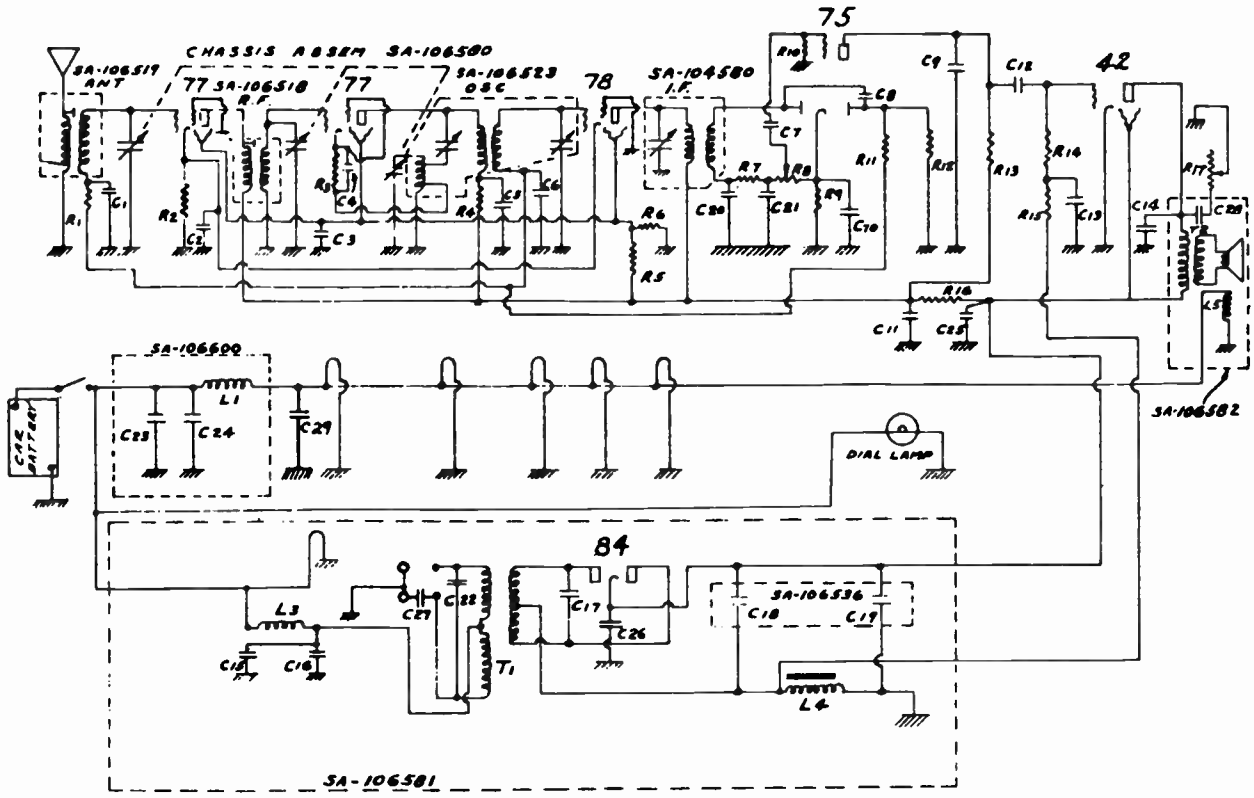
C-10 - .25 mfd. #102497
C7 - .0001 mfd. #106417

R-13 - 600 ohms #101211
C-14 - .005 mfd. #103659

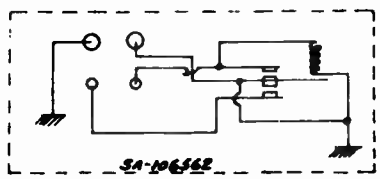
Figure #2

UNITED AMERICAN BOSCH CORP.

MODEL 79-C
Schematic Notes



IF PEAK 175 KC.



ELECTRICAL VALUES

R-1	100,000 ohms 1/4 watt	C-1	.05 - 2 ply	C-19	10 mf. (450)
R-2	500 ohms 1/4 watt	C-2	.25 - 2 ply	C-20	100 mmf. mica
R-3	7500 ohms 1/4 watt	C-3	.25 - 2 ply	C-21	100 mmf. mica
R-4	2000 ohms 1/4 watt	C-4	.002 - 4 ply	C-22	.5 - 2 ply
R-5	40,000 ohms 1/4 watt	C-5	.05 - 3 ply	C-23	.001 mica
R-6	75,000 ohms 1/4 watt	C-6	.05 - 2 ply	C-24	.5 - 2 ply
R-7	50,000 ohms 1/4 watt	C-7	.005 - 3 ply	C-25	.001 mica
R-8	.5 M. volume control	C-8	100 mmf. mica	C-26	.1 - 3 ply
R-9	5000 ohms 1/4 watt	C-9	.002 - 4 ply	C-27	.001 mica
R-10	1 meg. 1/4 watt	C-10	.5 - 2 ply	C-28	.05 - 3 ply
R-11	.5 meg. 1/4 watt	C-11	.25 - 3 ply	C-29	100 mmf. mica
R-12	.5 meg. 1/4 watt	C-12	.005 - 3 ply	T-1	Power Transformer
R-13	100,000 ohms 1/4 watt	C-13	.1 - 2 ply	T-2	Output Transformer
R-14	1/4 meg. 1/4 watt	C-14	.005 - 3 ply	L-1	Filter Choke
R-15	1/4 meg. 1/4 watt	C-15	.5 - 2 ply	L-3	Filter Choke
R-16	4000 ohms 1 watt	C-16	.5 - 2 ply	L-4	Power Choke
R-17	500,000 ohms Tone Control	C-17	.008 - 1600 V.	L-5	Field Coil
		C-18	6 mf. (450)		

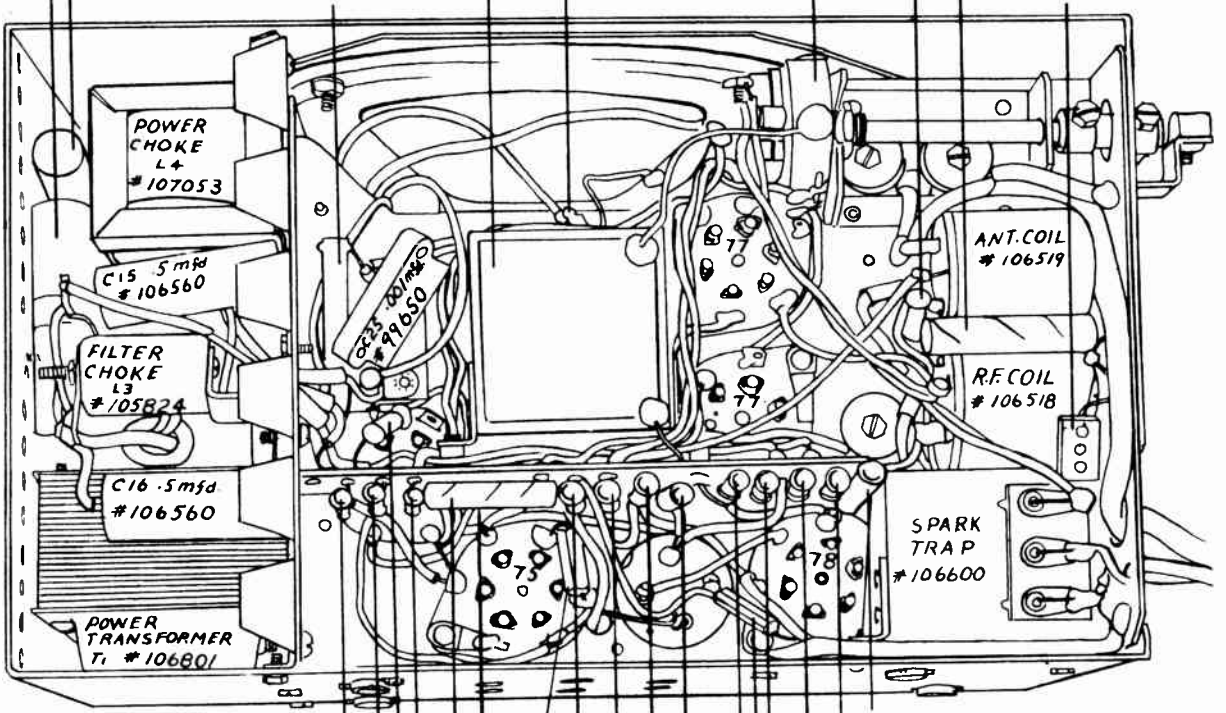
Automatic volume control is provided by utilizing the potential drop in the collector circuit of the type 75 tube. The A.V.C. is made a part of the D.C. grid circuits of the R.F. and I.F. amplifiers.

An electro-dynamic speaker is used with this set. This speaker has a field resistance of 5.6 ohms and a voice coil resistance of approximately 3 ohms.

A tone control is provided in the plate circuit of the output tube. This consists of a condenser and variable resistor in series.

MODEL 79-C
Parts Location

UNITED AMERICAN BOSCH CORP.



Condenser Block Assy.#106526

C2 - .25 #102497 (Black)
C3 - .25 #102497 (Black & White)
C5 - .05 #102492 (Red & White)
C9 - .002 #103852
C10 - .5 #102499 (Black & Red)
C11 - .25 #102496 (Red)
C12 - .005 #103659 (Blue)
C13 - .1 #102495 (Green & White)
C14 - .005 #103659
(See Fig. #3)

R8 Volume & Switch #106514

R1 - 100,000 #105278

C1 - .05 #102493

C29 - 100 Mmf. #106417

C22 - .5 #107001

C26 - .1 #106805

R16 - 4000 #106531

C4 - .002 #103852

R3 - 7500 #105247

R4 - 2000 #105245

R5 - 40,000 #105251

C20 - 100 Mmf. #106417

R6 - 75,000 #105277

R2 - 500 #105264

R12 - 500,000 #105246

R11 - 500,000 #105246

R7 - 50,000 #105276

C8 - 100 Mmf. #106417

R15 - 250,000 #105279

R9 - 5000 #105249

R14 - 250,000 #105279

R10 - 1 Meg. #105281

C7 - .005 #103659

R13 - 100,000 #105278

Fig. #2

ALIGNMENT INSTRUCTIONS

All the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows and refer to Fig. #1.

(A) I.F. ADJUSTMENT

(Use .1 mfd. antenna condenser)

1. Connect test oscillator to grid of 1st I.F. (78) tube.
2. Adjust small I.F. coil (between 78 and 75 tube) to maximum output.
3. Connect test oscillator to grid of 1st detector (77) tube.
4. Adjust condensers on coil in left hand corner of receiver for maximum output.
5. Repeat the above operations for accuracy.

(B) OSCILLATOR ADJUSTMENT

(Use .1 mfd. condenser on grid - .002 mfd. on antenna)

1. Connect test oscillator to grid of 1st detector (77) tube. Set at 1500 K.C.
2. Set gang to 1500 K.C. as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to thickness of approximately .015 of an inch.
3. Peak oscillator condenser on end of gang.
4. Connect test oscillator to antenna lead.
5. Peak other two condensers on gang.
6. Check sensitivity at several points on dial scale.

The set is now fully aligned and normal sensitivity prevails.

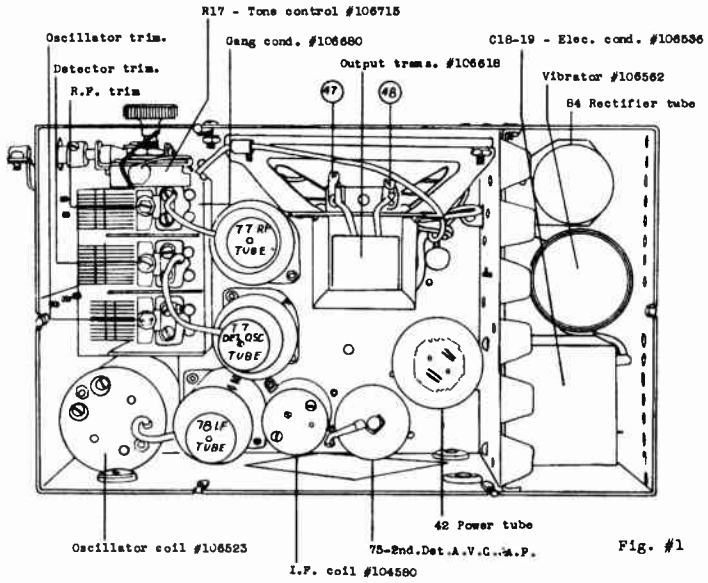


Fig. #1

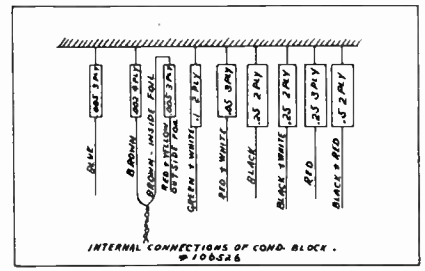


Fig. #3

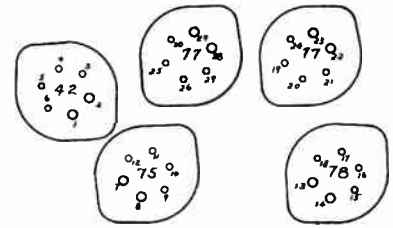


Fig. #4

42 Power	75 2nd Det. AVC	78 I. F.	77 Det. Osc.	77 R. F.
#1 - Fil.	#7 - Fil.	#13 - Fil.	#19 - Suppressor	#25 - Suppressor
#2 - Fil.	#8 - Fil.	#14 - Fil.	#20 - Screen	#26 - Screen
#3 - Cathode	#9 - Cathode	#15 - Cathode	#21 - Plate	#27 - Plate
#4 - Grid	#10 - Di Plate	#16 - Suppressor	#22 - Fil.	#28) - Fil.
#5 - Screen	#11 - Di Plate	#17 - Screen	#23 - Fil.	#29)
#6 - Plate	#12 - Plate	#18 - Plate	#24 - Cathode	#30 - Cathode

VOLTAGE CHART

Voltage readings from ground to following points with Weston Model 564 Voltohmmeter (.6 volt storage battery used).

42 A.F.	75 2nd Det.	78 I. F.	77 Det. Osc.	77 R.F.
#1 - 5.5 V.	#7 - 5.5	#13 - 5.5	#20 - 81	#26 - 81
#5 - 225	#9 - 1.3	#15 - 3.0	#21 - 183	#27 - 185
#6 - 205	#12 - 116	#17 - 81.	#23 - 5.5	#29 - 5.5
"B" - 12.5		#18 - 187	#24 - 4 to 6	#30 - 3.1

RESISTANCE CHART

(All measurements made with ohmmeter)

Antenna Coil	I. F. Coil	R. F. Coil
42-44 Primary - 21 ohms	31-34 Primary - 100 ohms	49-50 Primary - 80 ohms
43-45 Secondary- 2.5 ohms	32-33 Secondary- 85 ohms	51-52 Secondary- Full scale

"B" Plug Terminal to Ground

About 130,000 ohms (shows kick of condenser discharge on contact).

Output Transformer

Primary -- 500 ohms

Detector Osc. Coil

(37-39) - Osc. grid coil - 5 ohms
(40 to grid cap of 78) - Primary I.F. - 70 ohms
(35 to 36) - Secondary I. F. - 70 ohms

Sockets (All readings to ground)

9 - 5500 ohms
24 - 7500 ohms
30 - 550 ohms

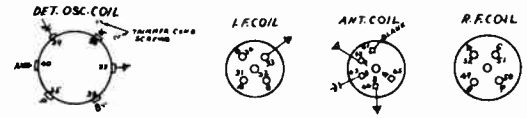


Fig. #5

MODEL 119,129
Installation Data UNITED AMERICAN BOSCH CORP.

INSTALLATION

In order to mount this receiver on a motorcycle, certain fittings are required. The fittings recommended are contained in a kit supplied by the Indian Motorcycle Company and known as the "Indian Radio Support and Antenna Kit Assembly" (#92344).

Contained in this kit are complete instructions covering the mounting of this receiver on a motorcycle, using the parts in the kit.

When installing the receiver, the shielded cable must be passed in front of the handlebars, (this is very important), then downward past the front head lug and along the frame front tube under the tank to the battery. The cable should be attached to the tubes of the frame by clips.

CONNECTIONS

The power supply unit contained in the receiver is arranged for operation on a motorcycle where the negative side of the battery is grounded. In cases where the receiver is to be used on a motorcycle where the positive side of the battery is grounded, it will be necessary to reverse the red and black wires inside of the power supply unit. With the negative side of the storage battery grounded, the red wire should be connected to the "+" terminal and the black wire should be connected to the "-" terminal. With the positive side of the storage battery grounded, the red wire should be connected to the "-" terminal and the black wire should be connected to the "+" terminal.

The terminal of the battery cable marked "hot" should be connected to the ungrounded side of the storage battery. The other terminal should be connected to the grounded side of the storage battery. A fuse is contained in a spring-bayonet cartridge located in the battery cable near the receiver. The fuse is the standard type used for automotive purposes and is rated at 10 amperes. To replace the fuse, force the rubber tube covering the fuse container along the cable toward the receiver until the end of the fuse cartridge can be grasped and removed. The rubber tube should be held firmly to keep the cartridge from receding into the tube while the fuse is being replaced so that the two halves of the cartridge can be conveniently refitted.

All screws, nuts, and washers must be firmly set and all electrical connections are to be tight and clean even to the possible necesitty of removing a slight amount of paint to accomplish this.

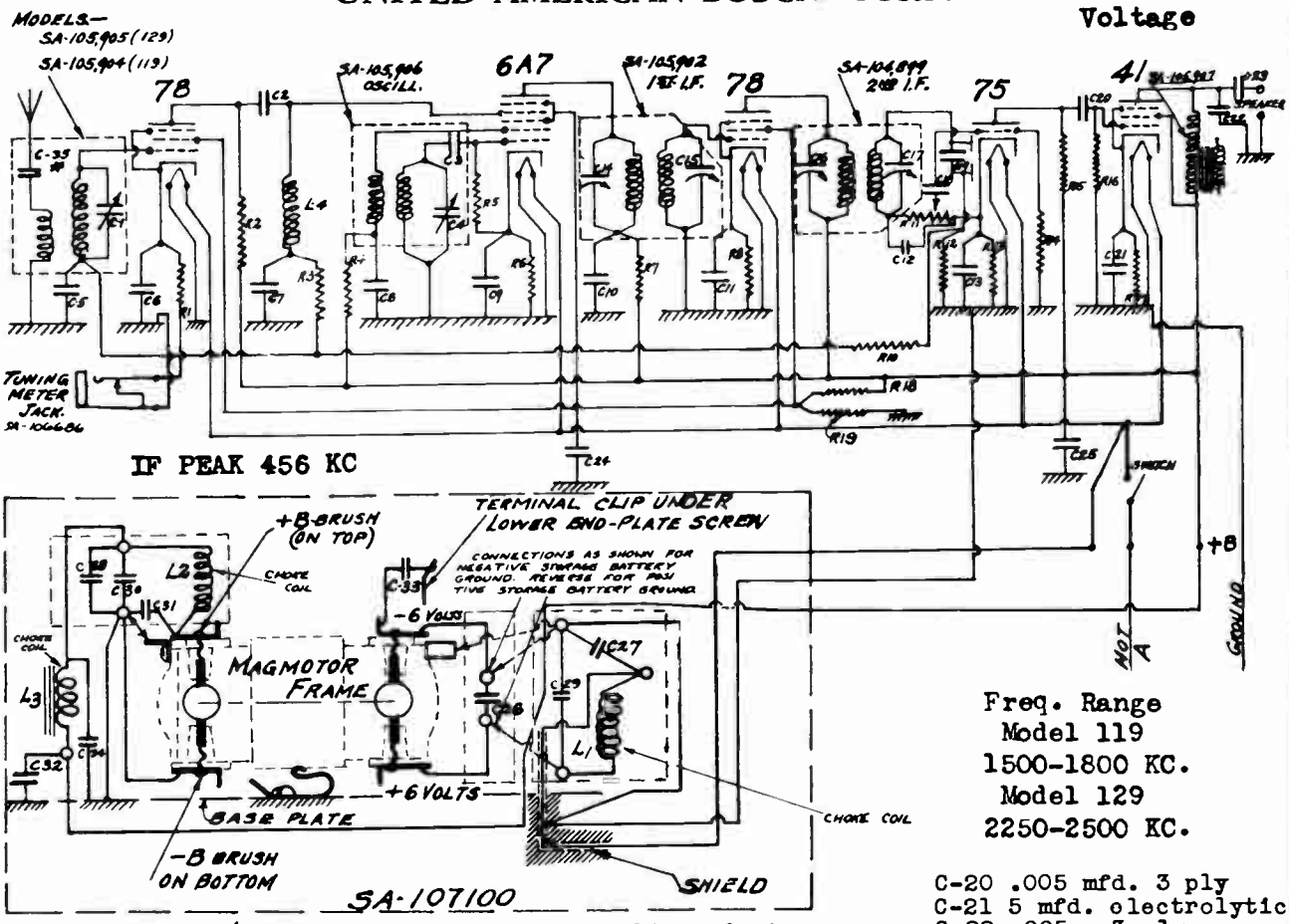
"B" POWER SUPPLY UNIT

The "B" power for operation of the receiver is supplied by the American-Bosch magmotor. This magmotor unit is turned on and off simultaneously with the receiver and receives its energy from the storage battery of the motorcycle.
The magmotor is essentially a dynamotor, the armature having two windings, one to supply the driving force for rotating the armature and the other for generating the desired "B" power. The armature is fitted with a commutator at each end. The brushes which contact the commutators look alike, but the material of those operating at the 6-volt end is quite different from that of those operating at the high voltage end. If, for any reason, the brush holders are removed from the frame, they must be returned to their original positions when re-assembled. Failure to do this will cause shortened commutator life and improper operation of the magmotor unit.
The magmotor is provided with a permanent magnet, rather than field coils, for excitation. This makes possible the extreme compactness of the unit and also conserves the battery energy. Should it be necessary to remove the magnet during service operations, some marking should be made on adjacent sides of the frame and magnet so that the magnet can be returned to its original position and not inverted. If it is assembled in an inverted position, the polarity of the output will be reversed and the radio receiver will not function. A large soft iron "keeper" should be placed across the poles of the magnet when it is removed in order to conserve the magnetism. It is well to remagnetize the magnet after re-assembling the magmotor in order that it may give completely satisfactory service. If the magnet is not remagnetized, the output of the magmotor will be reduced.
The armature shaft rotates in ball bearings which are carried in the endplates. An oil cup is provided in the top edge of each of the endplates. Six (6) drops of Bosch Oil US-506, or a light mineral oil should be put in each cup at the expiration of each 1000 hours use. The term "light mineral oil" applies to the so-called household oils sold in small spout cans by the large refiners of petroleum products. This light mineral oil should not be confused with the light household oils of the "sperm" variety so widely advertised. These "sperm" oils must not be used on the light ball bearings of the magmotor - to do so will gum the bearings and cause unsatisfactory operation.

Police Motorcycle Radio

UNITED AMERICAN BOSCH CORP.

MODEL 119,129
Schematic
Voltage



SA-107100

Freq. Range
Model 119
1500-1800 KC.
Model 129
2250-2500 KC.

R-1	300 ohms 1/4 watt	C-1	70-140 mmf air	C-20	.005 mfd. 3 ply
R-2	20,000 ohms 1/2 watt	C-2	.0001 mfd. mica	C-21	5 mfd. electrolytic
R-3	100,000 ohms 1/4 watt	C-3	.0001 mfd. mica	C-22	.005 - 3 ply
R-4	20,000 ohms 1/4 watt	C-4	70-140 mmf air	C-23	.25 mfd. 3 ply
R-5	100,000 ohms 1/4 watt	C-5	.05 - 2 ply	C-24	.25 mfd. 2 ply
R-6	300 ohms 1/4 watt	C-6	.05 - 2 ply	C-25	.25 mfd. 3 ply
R-7	2000 ohms 1/4 watt	C-7	.05 - 2 ply	C-26	.0001 mfd.
R-8	300 ohms 1/4 watt	C-8	.05 - 2 ply	C-27	.001 mfd.
R-9	-----	C-9	.05 - 2 ply	C-28	.05 mfd. 3 ply
R-10	.5 meg. 1/4 watt	C-10	.05 - 2 ply	C-29	.1 mfd. 2 ply
R-11	.5 meg. volume control	C-11	.05 - 2 ply	C-30	.001 mfd.
R-12	2 meg. 1/4 watt	C-12	.0001 mfd mica	C-31	.001 mfd.
R-13	5000 ohms 1/4 watt	C-13	5 mfd electrolytic	C-32	4.0 mfd.
R-14	1 meg. 1/4 watt	C-14	7-80 mmf mica	C-33	.001 mfd.
R-15	.25 meg. 1/4 watt	C-15	7-80 mmf mica	C-34	4.0 mfd.
R-16	.5 meg. 1/4 watt	C-16	7-80 mmf mica	C-35	.0004 mfd. mica
R-17	750 ohms 1/4 watt	C-17	7-80 mmf mica		
R-18	10,000 ohms 1/2 watt	C-18	.005 mfd. 3 ply	L-1	-----
R-19	100,000 ohms 1/2 watt	C-19	.0001 mfd. mica	L-2	.15 milli-henry
				L-3	200 ohms D.C.
				L-4	Choke coil

OPERATING VOLTAGES AND TUBE COMPLEMENT

Tube Type	Tube Function	Plate Voltage	Screen Voltage	Voltage Cathode to Ground	Heater Voltage
78	R.F. Amp.	45	95	2.3	6.0
6A7	Det., Osc.	170	95	2.3	6.0
78	I.F. Amp.	175	95	2.3	6.0
75	Det., A.V.C., A.F. Amp.	73		0.6	6.0
41	A.F. Amp.	165	175	13	6.0

NOTE: The above readings were taken from the various socket points to ground using a Weston Model 663 volt-ohmmeter which has a resistance as a voltmeter of 1000 ohms per volt full scale. For meters of other ratings, these voltages may not be as indicated.

TUNING

The receiver as delivered will be tuned to the station frequency requested. Due to unavoidable differences between the frequency adjustment made at the factory and that of the station, it will be necessary to re-align the tuning condensers slightly. One of the following methods of procedure should be followed depending on whether or not a tuning meter is available. The method of tuning using a tuning meter is preferable since more accurate adjustment is possible.

A. With Tuning Meter: With the receiver installed on the motorcycle and turned on, plug the tuning meter into the jack provided for the purpose. If the station desired is not heard, drive the motorcycle (with the radio set in operation), toward the broadcasting station. When the station is heard stop the motorcycle and proceed as follows:

(1) Remove both small circular cover plates from the top of the receiver housing, thus exposing the tuning adjustment screws.

(2) Loosen the brass lock nuts (which can be seen through the two holes), using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(3) Insert a screw driver into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control is toward the operator), and adjust this condenser until maximum deflection of the tuning meter in the direction indicated by the arrow on the dial is obtained for the station being heard.

(4) Repeat operation "3" with the right hand condenser.

(5) Lock the condensers with the 7/16" socket wrench and replace the circular cover plates.

B. Without Tuning Meter: With the receiver installed on the motorcycle and turned on, drive the machine toward the broadcasting station. When the station is heard faintly, stop the motorcycle and proceed as follows:

(1) Remove both small circular cover plates from the top of the receiver housing, thus exposing the tuning adjustment screws.

(2) Loosen the brass lock nuts (which can be seen through the two holes), using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(3) Insert a screw driver into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control knob is toward the operator), and adjust this condenser until the station is heard loudest.

(4) Reduce the volume with the volume control.

(5) Repeat operations "3" and "4" with the right hand condenser.

(6) Lock the condensers with the 7/16" socket wrench and replace the circular cover plates.

Alignment by the above operations will be approximate only. To obtain the exact alignment required for successful operation, proceed as follows:

Drive the motorcycle with the receiver operating at maximum volume to a "dead" spot, or to a place sufficiently remote from the transmitter to produce a weak signal. In such a location repeat operations "1", "2", "3", "5" and "6" under "B". Under no circumstances should the volume of the signal be reduced by adjusting the volume control knob. Keep the volume control in its maximum position. Do not neglect to lock the condensers with the socket wrench after alignment and before replacing the cover plates.

When these tuning operations have been properly executed, the receiver installation on the motorcycle is then ready for suppression of ignition interference and subsequently ready for service.

IGNITION NOISE SUPPRESSION

Shielded ignition cable, spark plug suppressors, spark plug shields, and bypass condensers are furnished as auxiliary equipment with the Models 119 and 129 receivers. These items are necessary for the suppression of ignition interference.

In attempting to suppress ignition interference, the following must be observed:

(1) Damp the oscillations at the spark plugs and across distributor caps by putting resistors (suppressors) in the cables at these points.

(2) Prevent the cables, spark plugs, etc., from radiating to the antenna by enclosing them in grounded metal shields.

(3) Minimize the effect of auxiliary or secondary radiating systems by a judicious choice of grounding points and by making ground connections in the proper way. A ground connection for high frequency currents cannot be made by running wires between the cable shield to be grounded and the engine block or the frame of the machine. The cable shield to be grounded must be brought down against the surfaces of the frame and clamped or soldered in place as required by the circumstances. The choice of ground points is commonly accomplished by trial and error-experience with the phenomena governing such circuits being extremely helpful.

Before proceeding with the work of suppressing ignition noise, the ignition system of the motorcycle should be checked thoroughly to make certain that all high-tension leads make good connections at their terminals, that the spacing of the spark plug electrodes is the minimum amount consistent with good motor performance, that the gap between the distributor electrode and the rotor electrode is a minimum, that all leaky high-tension cables are replaced, etc.

The specific procedure for suppressing ignition noise with either two or four cylinder motorcycles and with either battery or magneto ignition is as stated below:

A. Two-Cylinder Motorcycle - Battery Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Connect .5 mfd. bypass condenser from the generator to ground.

(4) Disconnect the lead between coil and breaker and replace with a shielded lead running directly from the coil to the breaker (length approximately 10").

(5) Ground the housing of the ignition coil to the frame.

(6) Install a spark plug shield on each spark plug whenever possible.

B. Two-Cylinder Motorcycle - Magneto Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Connect .5 mfd. bypass condenser from the generator to ground.

(4) Install a spark plug shield on each spark plug whenever possible.

C. Four-Cylinder Motorcycle - Battery Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Install suppressor in series with the lead to the center contact of the distributor as close as possible to the distributor.

(3) Replace each spark plug lead with a shielded cable.

(4) Ground the spark plug cables in the tube which carries them over the motor.

(5) Connect .5 mfd. bypass condenser from the generator to ground.

(6) Install a spark plug shield on each spark plug.

(7) Connect .5 mfd. bypass condenser from the "hot" side of the ignition coil to ground.

D. Four-Cylinder Motorcycle - Magneto Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

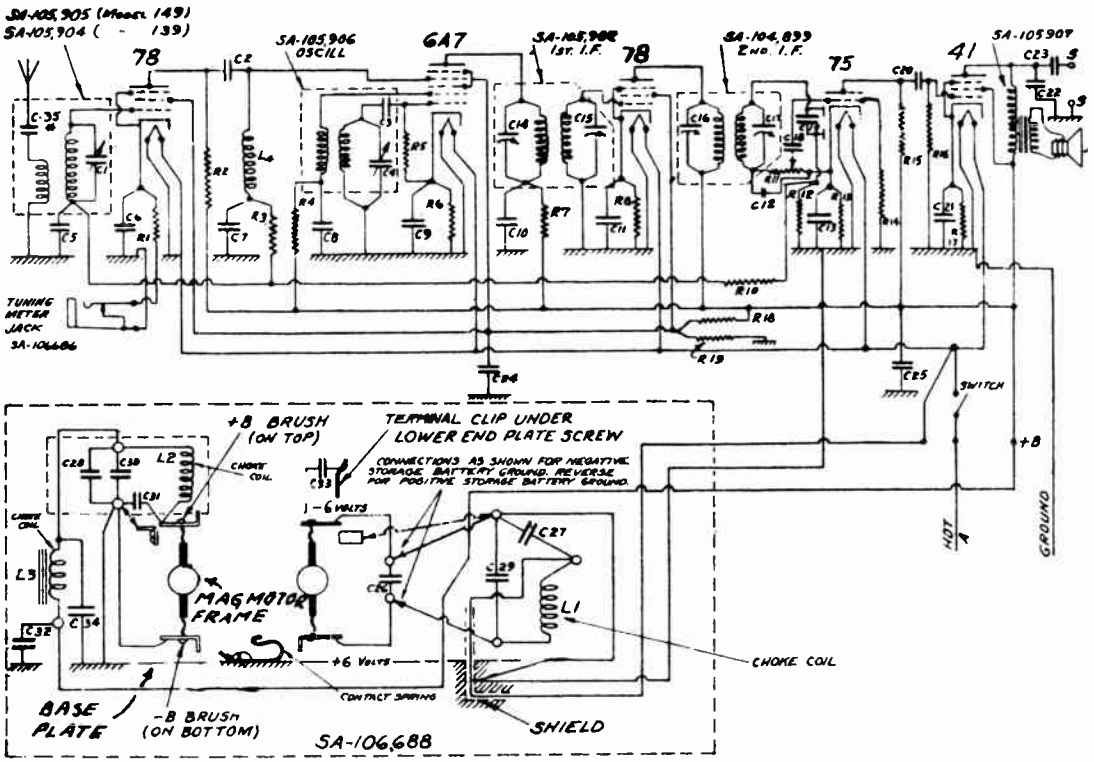
(3) Ground the spark plug cables in the tube which carries them over the motor.

(4) Connect .5 mfd. bypass condenser from the generator to ground.

(5) Install a spark plug shield on each spark plug.

UNITED AMERICAN BOSCH CORP.

MODEL 139,149
Schematic
Voltage



Frequency range:

Model 139 - 1500 to 1800 kilocycles
Model 149 - 2250 to 2500 kilocycles

IF PEAK 456 KC

ELECTRICAL VALUES

C-1	70-140 mmf. air	C-21	5 mfd. electrolytic	R-1	300 ohms 1/4 watt
C-2	.0001 mfd. mica	C-22	.005 mfd. 3 ply	R-2	20,000 ohms 1/2 watt
C-3	.0001 mfd. mica	C-23	.25 mfd. 3 ply	R-3	100,000 ohms 1/4 watt
C-4	70-140 mmf. air	C-24	.25 mfd. 2 ply	R-4	20,000 ohms 1/4 watt
C-5	.05 mfd. 2 ply	C-25	.25 mfd. 3 ply	R-5	100,000 ohms 1/4 watt
C-6	.05 mfd. 2 ply	C-26	.0001 mfd.	R-6	300 ohms 1/4 watt
C-7	.05 mfd. 2 ply	C-27	.001 mfd.	R-7	2,000 ohms 1/4 watt
C-8	.05 mfd. 2 ply	C-28	.05 mfd. 3 ply	R-8	300 ohms 1/4 watt
C-9	.05 mfd. 2 ply	C-29	.1 mfd. 2 ply	R-9	----
C-10	.05 mfd. 2 ply	C-31	.001 mfd.	R-10	.5 meg. 1/4 watt
C-11	.05 mfd. 2 ply	C-32	4 mfd.	R-11	.5 meg. volume control
C-12	.0001 mfd. mica	C-33	.001 mfd.	R-12	2 meg. 1/4 watt
C-13	5 mfd. electrolytic	C-34	4 mfd.	R-13	5,000 ohms 1/4 watt
C-14	7-80 mmf. mica	C-35	.0004 mfd. mica	R-14	1 meg. 1/4 watt
C-15	7-80 mmf. mica	C-38	.001 mfd.	R-15	.25 meg. 1/4 watt
C-16	7-80 mmf. mica			R-16	.5 meg. 1/4 watt
C-17	7-80 mmf. mica	L-1	Magmotor choke coil	R-17	750 ohms 1/4 watt
C-18	.005 mfd. 3 ply	L-2	.15 milli-henry	R-18	10,000 ohms 1/2 watt
C-19	.0001 mfd. mica	L-3	200 ohms D.C.	R-19	100,000 ohms 1/2 watt
C-20	.005 mfd. 3 ply	L-4	Choke coil		

SOCKET VOLTAGES

Tube Type	Tube Function	Plate Voltage	Screen Voltage	Voltage Cathode to Ground	Heater Voltage
78	R.F. Amp.	45	95	2.3	6.0
6A7	Det., Osc.	170	95	2.3	6.0
78	I.F. Amp.	175	95	2.3	6.0
75	Det., A.V.C., A.F. Amp.	73		0.6	6.0
41	A.F. Amp.	165	175	13	6.0

NOTE:- These readings were taken from the various socket points to ground using a Weston Model 663 volt-ohmmeter which has a resistance as a voltmeter of 1000 ohms per volt full scale. For meters of other ratings, these voltages may not be as indicated.

MAGMOTOR SERVICE INFORMATION

LUBRICATION

The armature shaft rotates in ball bearings which are carried in the end plates. An oil cup is provided in the top edge of each of the end plates. Six drops of 3osch oil US-506, or a light mineral oil should be put in each cup at the expiration of each 1000 hours of use. See Fig. 5 for the location of the oil cups. The term "light mineral oil" applies to the so-called household oils sold in small spout cans by the large refiners of petroleum products. This light mineral oil should not be confused with the light household oils of the "sperm" variety so widely advertised. These "sperm" oils must not be used on the light ball bearings of the magmotor - to do so will gum the bearings and cause unsatisfactory operation.

BALL BEARINGS

The ball bearings are held in place by means of set screws located in the top of each end plate. There are two set screws in each end plate, the top one locking the lower one in place. Extreme care must be observed when these set screws are tightened since screwing them down too tighgly will distort the ball bearings sufficiently to increase the friction in the bearings with a resultant increase in current drain from the storage battery. The set screws should be carefully tightened while the magmotor is connected to the receiver and while the armature is rotating. An ammeter should be inserted in the battery circuit so that the current drain may be observed. When the set screws have been properly tightened with the magmotor connected to the receiver, the current drain should be approximately 3.0 amperes. Both of the set screws must be removed when dismantling the unit.

BRUSHES

The magmotor has four brushes, two in the input or motor end and two in the output or generator end. The brushes in the input or motor end are made of copper graphite and can be distinguished by their copper color from the brushes in the output or generator end which are made of pure carbon. Under no circumstances must these brushes be interchanged. The brushes should be replaced after 3000 hours of operation. To use the brushes more than 3000 hours will result in their wearing down so that they make intermittent contact with the commutators, producing excessive sparking and resulting in damage to the commutators. To remove the brushes, first remove the brush holder by removing the screws which fasten the holders to the magmotor frame. Then melt the solder on the brush holder terminal clip so that the flexible wire connection to the brush is loosened and while the solder is molten pull the brush out of the holder. It is very important that the proper grade of brushes are used and no brushes should be used except those furnished by the United American Bosch Corporation.

DISMANTLING AND ASSEMBLING THE MAGMOTOR

In order to inspect and service the armature it is necessary to remove the armature from the magmotor frame. To do this the following procedure should be observed:

(a) Disconnect the red and black wires connected to the polarity terminal plate and also the two green wires connected to the brushes on the sides of the magmotor.

(b) Remove the filter assembly mounted on the brass plate fastened to the top of the magmotor by removing the two screws #38 and #39 in Fig. #5.

(c) Remove the other filter assembly fastened to the top of the magmotor by removing the two self-tapping screws #40 and #41 shown in Fig. #5.

(d) Remove the filter assembly on the end of the magmotor by removing the four end plate fastening screws.

(e) Remove the two upper ball bearing set screws and loosen the two lower set screws in the end plates.

(f) Remove the end plate to which the filter assembly is attached.

(g) Withdraw the armature.

All parts of the power unit are now available for inspection.

To assemble the unit, reverse the sequence of operations given above. Make certain that the wires to the low voltage side are connected as they were originally and use extreme care in tightening the ball bearing set screws (see the special instructions for adjusting the ball bearing set screws).

MAGNETIZING

The magnet should retain its original magnetic strength for an indefinite period but there are factors that may cause dissipation of the magnetism as, for example, the removal of the armature. A reduction in the magnetism will cause the magmotor to operate at a higher speed to deliver the same voltage which will result in a greatly reduced life. For this reason it is well to remagnetize the magnet after any work has been done on the power unit especially if the armature has been removed.

The unit should be completely assembled when the magnetizing is done in order to obtain the proper field excitation. This can be done on a standard Bosch or American-Bosch magnetizing stand.

Should it be necessary to remove the magnet during the service operations, some marking should be made on adjacent sides of the frame and magnet so that the magnet can be returned to its original position and not inverted. If it is assembled in an inverted position, the polarity of the output will be reversed and the receiver will not function.

CONDENSERS AND CHOKE COILS

The position in which the condensers and choke coils are placed has a direct bearing on the efficiency of the magmotor and if it is necessary to replace any of these parts, it is of the utmost importance that they be placed in exactly the same positions as the parts removed. The leads must also be of the same length and gauge, or larger and must be placed in the same position as the ones removed.

COMMUTATORS

When the armature has been removed for inspection, and the commutators are found to be dirty, they may be cleaned by using a clean cloth saturated with gasoline or if necessary, by using very fine sandpaper. If the commutators are badly worn and pitted, it will be necessary to turn them down in a lathe. Extreme care should be observed in performing this operation, removing only enough material to provide a good surface.

TESTING

(Refer to Figs. 4 and 5)

With voltage of 6.6 volts measured between point #33 and ground, the "B" voltage, measured between Point #34 and ground with the receiver connected, should be approximately 175 volts.

If the magmotor armature fails to rotate when the cable connections have been made properly and the switch in the chassis has been turned on, the continuity of the circuit through the motor portion of the magmotor should be checked with an ohmmeter in accordance with the following resistance chart:

If the magmotor armature rotates but no "B" voltage is obtained between #34 and ground, the continuity of the circuit through the generator portion of the magmotor and the associated filters, should be checked with an ohmmeter in accordance with the following resistance chart:

MAGMOTOR RESISTANCE CHART

All measurements made with Weston Model 663 Volt-ohmmeter. (Refer to Figs. 4 & 5)

SECTION OF CIRCUIT	MEASURE BETWEEN POINTS	OHMMETER READING
Complete Motor Circuit	#33 and GND	1 ohm
"A" circuit R.F. choke	#33 and #35	Full scale
Complete Generator Circuit	#34 and GND	800 ohms
"B" Circuit A.F. Choke	#34 and #36	220 ohms
"B" Circuit R.F. Choke	#36 and #37	Full scale

Whenever possible, a direct comparison should be made with a magmotor which is definitely known to be in good operating condition in order to avoid the misinterpretation of variations of readings due to variations in storage battery voltages, load conditions, meter accuracies. etc.

UNITED AMERICAN BOSCH CORP.

MODEL 139,149
Resistance Test
Parts Location

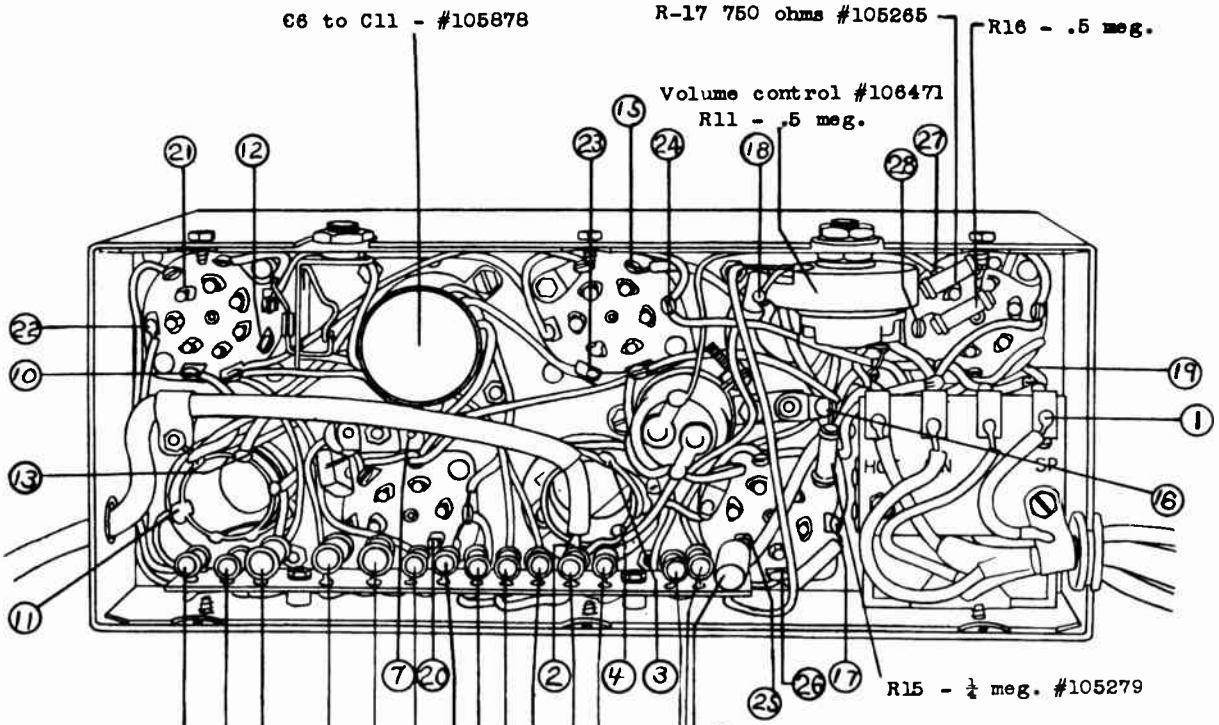


Fig. 3

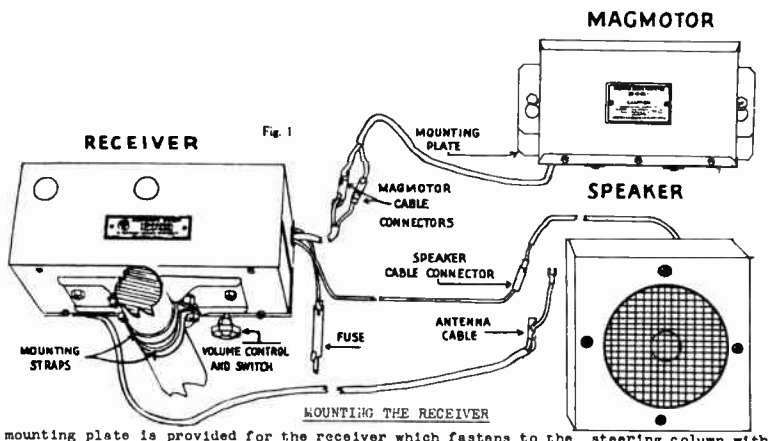
CHASSIS RESISTANCE CHART

All measurements made with Weston Model 663 volt-ohmmeter.

(Refer to Figs. 2 and 3)

SECTION OF CIRCUIT	MEASURE BETWEEN POINTS	OHMMETER READING
Antenna Coil - Primary	#2 & #3	0.5 ohms
Antenna Coil - Secondary	#4 & #5	2 ohms
R.F. Choke Coil	#6 & #7	3 ohms
Oscillator Coil - Primary (Grid)	#9 & GND	1 ohms
Oscillator Coil - Secondary (Plate)	#10 & #11	2 ohms
First I.F. Transformer - Primary	#12 & #13	23 ohms
First I.F. Transformer - Secondary	#14 & GND	23 ohms
Second I.F. Transformer - Primary	#15 & #16	23 ohms
Second I.F. Transformer - Secondary	#17 & #18	23 ohms
Output Transformer - Primary	#19 & #16	580 ohms
*R.F. Amplifier - Type 78 - Cathode to Ground	#20 & GND	300 ohms
Det.-Oscillator - Type 6A7 - Cathode to Ground	#21 & GND	300 ohms
Det.-Oscillator - Type 6A7 - Osc. Grid to Ground	#22 & GND	100,000 ohms
I.F. Amplifier - Type 78 - Cathode to Ground	#23 & GND	300 ohms
I.F. Amplifier - Type 78 - Screen Grid to Ground	#24 & GND	100,000 ohms
Second Det. & Amp. - Type 75 - Cathode to Ground	#25 & GND	5,000 ohms
Second Det., & Amp.-Type 75-A.V.C. Collector to Ground.	#26 & GND	2,000,000 ohms
Second Det., & Amp.- Type 75 - Collector to Ground	#17 & GND	500,000 ohms
Power Amplifier - Type 41 - Cathode to Ground	#27 & GND	750 ohms
Power Amplifier - Type 41 - Grid to Ground	#28 & GND	500,000 ohms
B+ Terminal to Ground	#16 & GND	110,000 ohms

* This measurement should not be made with the tuning meter connected in the circuit.



MOUNTING THE RECEIVER

A mounting plate is provided for the receiver which fastens to the steering column with two large straps. This plate should be placed on the upper side of the steering column below the instrument panel with the large ends of the keyhole slots at the top. The nuts on the small carriage bolts fastening the straps to the mounting plate should be securely tightened so that the mounting plate will not slip on the steering column. The two screws in the bushings in the receiver housing should then be loosened and the receiver placed on top of the mounting plate with the heads of the screws entering the keyhole slots in the mounting plate. The screws should be allowed to engage the narrow portions of the keyhole slots and the screws should then be tightened securely so that the receiver is held rigidly in place. (See Figure #1).

For cases where mounting on the steering column is not feasible, a bulkhead mounting plate has been provided which is fastened to the bulkhead with three carriage bolts. The adapter plate which is provided for use in conjunction with the mounting plate should be attached with screws to the opposite side of the receiver housing from that through which the volume control shaft projects. It should be placed so that the small ends of the keyhole slots are at the top. The receiver should then be placed on the mounting plate so that the screws in the bushings on the mounting plate enter the keyhole slots in the adapter plate. When the screws engage the small portions of the keyhole slots they should be tightened so that the receiver unit will be held securely

MOUNTING THE MAGMOTOR

The magmotor or the "a" power supply unit is provided with a mounting plate which is fastened to the operator's side of the bulkhead with three carriage bolts. The two screws in the bushings in the mounting plate should be loosened and the power supply unit placed so that these screws enter the keyhole slots in the bracket fastened to the back of the housing. When the screws engage the small portions of the keyhole slots, they should be tightened so that the unit will be held securely in place.

MOUNTING THE SPEAKER

Two studs are provided on the speaker unit which fasten it to the bulkhead in a position where it will not interfere with the operation of the vehicle but where it will permit a good signal to be heard.

CONNECTIONS

The power supply unit, as provided, is arranged for operation in a motor car where the negative side of the battery is grounded. In cases where this unit is to be used in a motor car where the positive side of the battery is grounded, it will be necessary to reverse the red and black wires inside of the unit. With the negative side of the storage battery grounded, the red wire should be connected to the "+" terminal and the black wire should be connected to the "-" terminal. With the positive side of the storage battery grounded, the red wire should be connected to the "-" terminal and the black wire should be connected to the "+" terminal.

A duplex cable is provided between the receiver and the power supply unit. The two sections of this cable should be connected together. A battery cable containing a fuse is provided. The terminal marked "hot" should be connected to the ungrounded side of the storage battery. The other terminal should be connected to the grounded side of the storage battery. The other shielded cable which enters the receiver housing at the same point as the battery cable and the power supply cable should be connected to the loud speaker. At the other end of the receiver housing a black cotton covered cable is provided which should be connected to the antenna lead-in. Refer to Figure #1 for these cable connections. The antenna lead-in should be shielded and the shield soldered to the bayonet connection beyond the junction.

TUNING

The radio receiver as delivered will be tuned to the station frequency requested. Due to unavoidable differences between the frequency adjustment made at the factory and that of the station, it will be necessary to realign the tuning condensers slightly. One of the following methods of procedure should be followed depending upon whether or not a tuning meter is available. The method of tuning using a tuning meter is preferable since more accurate adjustment is possible.

A. With Tuning Meter.

With the receiver in the motor car, and connected to the car antenna and battery, turn the receiver fully on and allow it to get into operation which will be indicated by a slight hum heard in the speaker. Plug the tuning meter into the jack in the receiver housing. If the station desired is not heard, drive the machine (with the radio set in operation), toward the broadcasting station. When the station is heard, stop the motor car and proceed as follows:

(a) Loosen the brass condenser lock nuts (which can be seen through the two holes in the top cover of the housing) using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(b) With a screw driver inserted into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control is toward the operator), adjust this condenser until maximum deflection of the tuning meter in the direction indicated by the arrow on the dial is obtained on the station being heard.

(c) Repeat operation "b" with the right hand condenser.

(d) Lock the condensers with the 7/16" socket wrench.

B. Without Tuning Meter.

With the receiver in the motor car, and connected to the car antenna and battery, turn the receiver fully on and allow it to get into operation which will be indicated by a slight hum heard in the speaker.

If the station desired is not heard, drive the machine (with radio set in operation) toward the broadcasting station. When the station is heard faintly, stop the motor car and proceed as follows:

(a) Loosen the brass condenser lock nuts (which can be seen through the two holes in the top cover of the housing) using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(b) With a screw driver inserted into the slot in the shaft of the left hand condenser, when the receiver is in a position such that the volume control knob is toward the operator, adjust this condenser until the station is heard loudest.

(c) Reduce the volume by rotating the volume control knob on the face of the receiver housing counter-clockwise.

(d) Repeat operations (b) and (c) with the right hand condenser.

(e) Lock the condensers with the 7/16" socket wrench.

Alignment by the above operations will be only approximate. To attain the exact alignment required for successful operation proceed as follows:

(a) Drive the motor car (with radio operating with volume control on full) to a "dead" spot or to a place sufficiently remote from the transmitter to produce a weak signal. In such a location repeat operations "a", "b", "d" and "e". In this case under no circumstances should the volume of the signal be reduced by adjusting the volume control knob. Keep the volume control in its maximum position. Do not neglect to lock the condensers with the socket wrench after alignment and before replacing cover plates.

UNITED AMERICAN BOSCH CORP.

MODEL 139,149

Alignment

Chassis Views

Test Data

Fig. 4

Fig. 5

Fig. 2

TESTING

(a) ANTENNA: Substitute a piece of insulated wire 6 to 8 feet long and lay on ground; if reception is normal, the regular antenna is at fault and should be checked for grounds, opens, etc. (Somewhat better reception should be expected with wire antenna than with car antenna.)

(b) TUBES: Remove and test, or substitute known good tubes, one at a time.

(c) SPEAKER: Disconnect speaker cable from chassis by means of bayonet connector. Test across terminals of speaker with volt-ohmmeter for continuity of voice coil. Reading of 4.5 ohms should be obtained on ohmmeter.

(d) SECONDARY OF OUTPUT TRANSFORMER: With speaker cable disconnected, test with ohmmeter between terminal #1 and ground. Reading of 0.5 ohms should be obtained on ohmmeter.

(e) CHASSIS: After checking the components listed above, test the voltages as they appear on voltage chart and the resistance measurements as found in "Chassis Resistance Chart". If any particular reading obtained is very different from the chart reading, the trouble is located in the portion of the circuit associated with the points at which this discrepancy occurs. Referring to the circuit diagram and location drawings, each part making up the circuit may be individually tested until the faulty part is specifically located.

f) MAGNETOR: See section giving complete magmotor service information.

ALIGNMENT INSTRUCTIONS

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless an I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows: See Fig. #2.

1. Connect output meter across terminals of speaker voice coil.
2. Set test oscillator at 456 kilocycles.
3. Connect test oscillator lead to grid of I.F. amplifier tube, type 78. (Point #14).
4. Adjust condenser on primary of second I.F. transformer, (Point #31) to peak on output meter.
5. Adjust condenser on secondary of second I.F. transformer, (Point #32) to peak on output meter.
6. Connect test oscillator lead to grid of detector-oscillator tube, type 6A7 (Point #6)
7. Adjust condenser on primary of first I. F. transformer (Point #29) to peak on output meter.
8. Adjust condenser on secondary of first I. F. transformer, (Point #30) to peak on output meter.

The above procedure lines up the I. F. stages properly, so that all that remains is to tune the oscillator and preselector circuits to the frequency of the station it is desired to receive. This has been covered in the section headed - TUNING

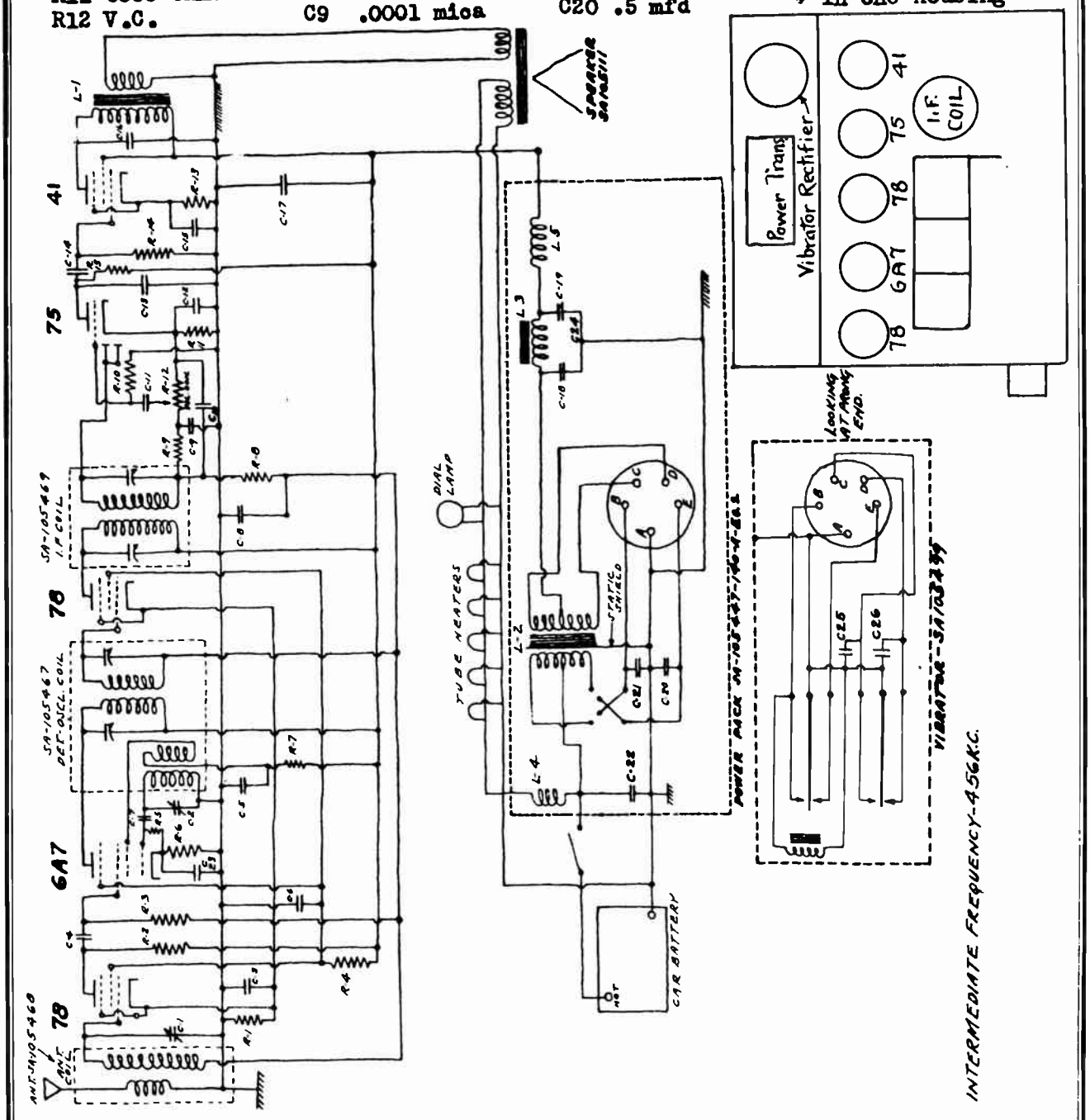
MODEL 140-A
Schematic

UNITED AMERICAN BOSCH CORP.

R1	250 ohms	R13	600 ohms	C10	.0001 mica
R2	20000 ohms	R14	500000 ohms	C11	.005 mfd
R3	100000 ohms	R15	250000 ohms	*C12	.25 mfd
R4	20000 ohms	C1	Gang	C13	.003 mfd
R5	100000 ohms	C2	Gang	*C14	.005 mfd
R6	500 ohms	*C3	.5 mfd	C15	10. mfd
R7	20000 ohms	C4	.0001 mica	*C16	.005 mfd
R8	500000 ohms	*C5	.01 mfd	C17	.05 mfd
R9	50000 ohms	*C6	.05 mfd	C18	8. mfd
R10	1 megohm	C7	.0001 mica	C19	8. mfd
R11	5000 ohms	C8	.05 mfd	C20	.5 mfd
R12	V.C.	C9	.0001 mica		

C21	.5 mfd
C22	.5 mfd
*C23	.05 mfd
C25	.01 mfd
C26	.01 mfd

* In one housing

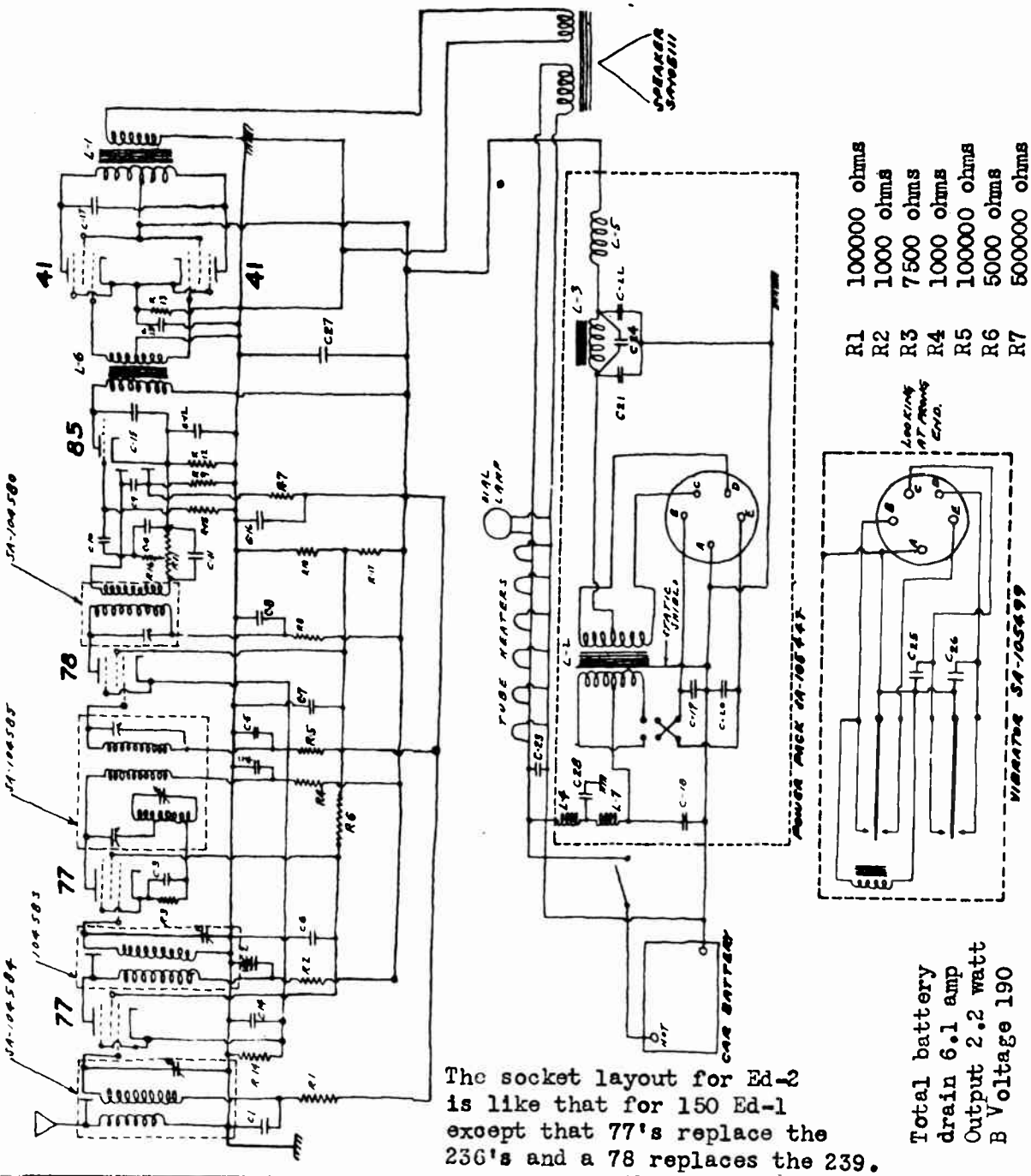


UNITED AMERICAN BOSCH CORP.

MODEL 150 Type 2
Schematic

R11	500000 ohms	C0	.0001 mfd
R12	1800 ohms	C1	.05 mfd
R13	600 ohms	C2	.05 mfd
R14	500 ohms	C3	.002 mfd
R15	1. megohm	C4	.05 mfd
R16	50000 ohms	C5	.05 mfd
R17	40000 ohms	C6	.1 mfd
R18	75000 ohms	C7	.05 mfd
		C8	.05 mfd
		C9	.0001 mfd
		C10	.01 mfd
		C11	.0001 mfd
		C12	.5 mfd
		C13	.5 mfd
		C14	.25 mfd
		C15	.002 mfd
		C16	.05 mfd
		C17	.002 mfd
		C18	.5 Comm. in can
		C19	.5 Comm. in can
		C20	.5 Comm. in can
		C21	8.0 mfd
		C22	8.0 mfd
		C23	.002 mfd
		C24	.1 mfd
		C25	.01 mfd
		C26	.01 mfd
		C27	.25 mfd
		C28	.5 mfd
		C29	.5 mfd

R1	100000 ohms
R2	1000 ohms
R3	7500 ohms
R4	1000 ohms
R5	100000 ohms
R6	5000 ohms
R7	500000 ohms
R8	1000 ohms
R9	500000 ohms

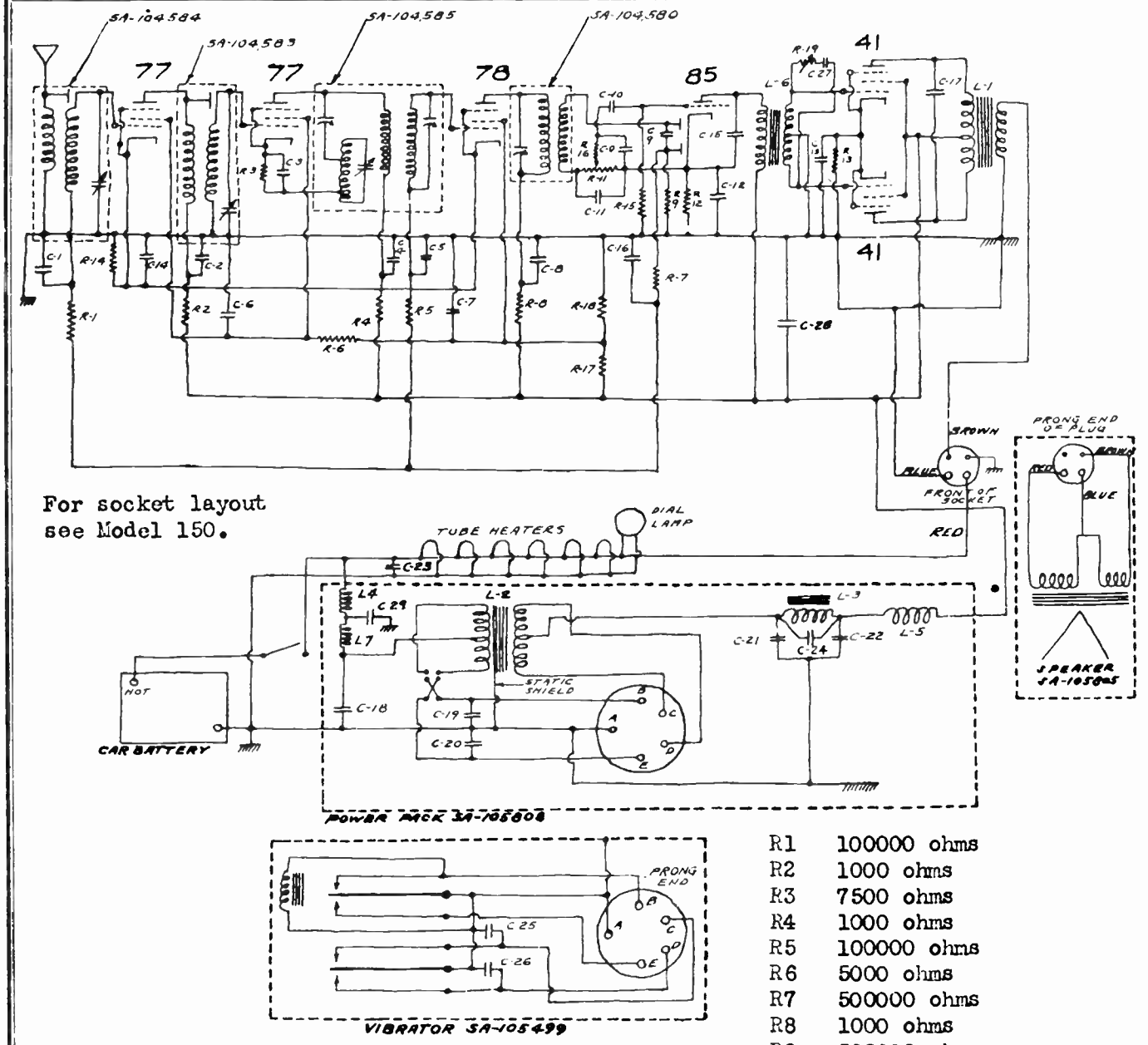


The socket layout for Ed-2 is like that for 150 Ed-1 except that 77's replace the 236's and a 78 replaces the 239.

Total battery drain 6.1 amp
Output 2.2 watt
B Voltage 190

MODEL 160
Schematic

UNITED AMERICAN BOSCH CORP.

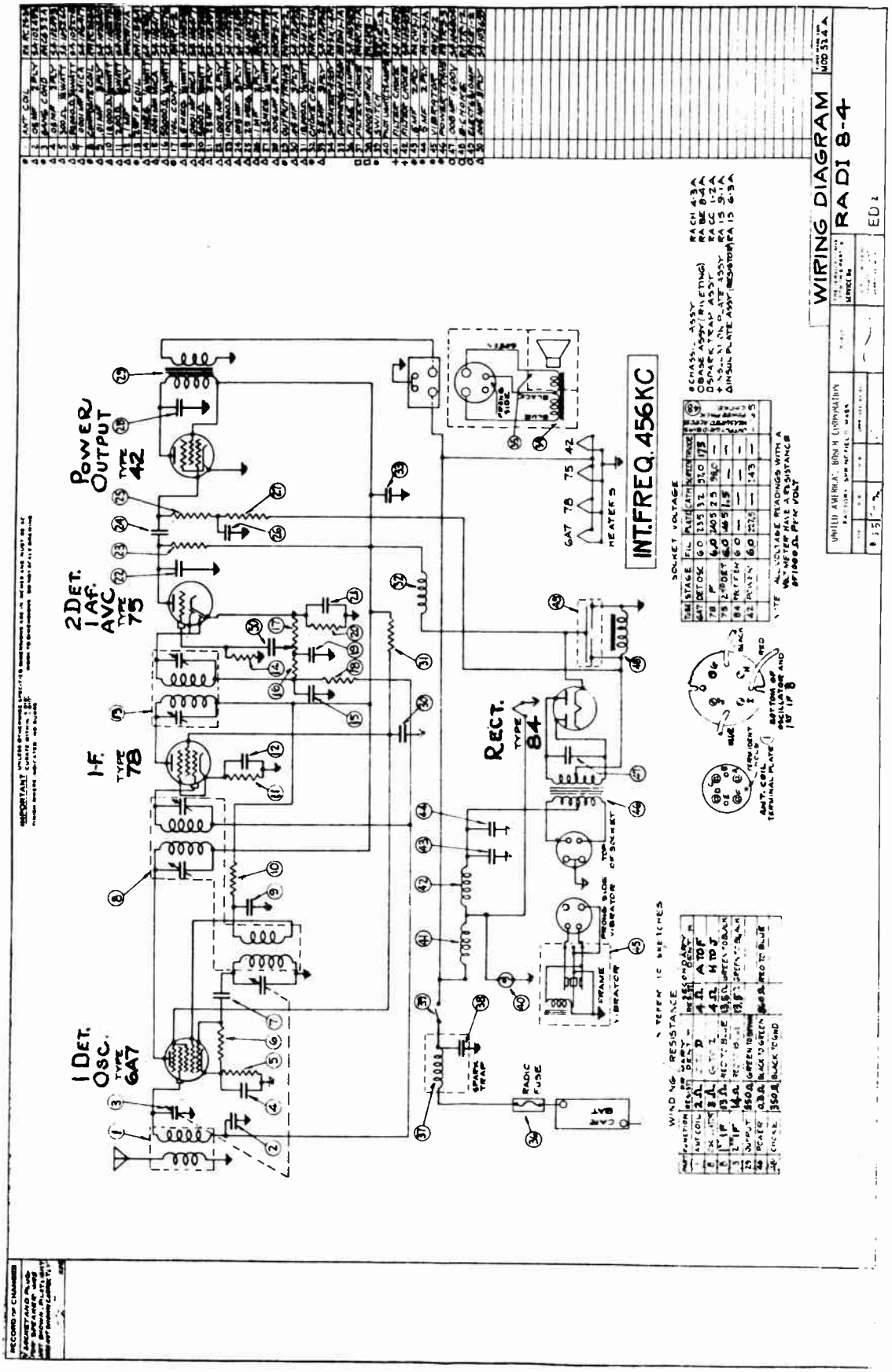


R1	100000 ohms
R2	1000 ohms
R3	7500 ohms
R4	1000 ohms
R5	100000 ohms
R6	5000 ohms
R7	500000 ohms
R8	1000 ohms
R9	500000 ohms
R11	500000 ohms
R12	1800 ohms
R13	600 ohms
R14	500 ohms
R15	1. megphm
R16	50000 ohms
R17	40000 ohms
R18	75000 ohms
R19	Tone Control

C0	.0001 mica
C1	.05 mfd
C2	.05 mfd
C3	.002 mfd
C4	.05 mfd
C5	.05 mfd
C6	.1 mfd
C7	.05 mfd
C8	.05 mfd
C9	.0001 mfd
C10	.01 mfd
C11	.0001 mica
C12	.5 mfd
C13	.5 mfd
C14	.25 mfd
C15	.002 mfd
C16	.05 mfd
C17	.002 mfd
C18	.5 mfd in can
C19	.5 mfd in can
C20	.5 mfd in can
C21	8.0 mfd
C22	8.0 mfd
C23	.002 mfd
C24	.1 mfd
C25	.01 mfd
C26	.01 mfd
C27	.005 mfd
C28	.25 mfd
C29	.5 mfd in can

UNITED AMERICAN BOSCH

MODEL 524-A
Schematic



1. DETERMINE THE LOCATION OF THE RECEIVER ON THE BULKHEAD: In locating the set on the bulkhead, the paper template should be used to determine a space of suitable size free from mechanical interferences on both the interior and motor side of the bulkhead. Care should be exercised to observe the relative position of the set and the control head which is mounted on the steering column, and also to see that adequate clearance is available between the set and other possible interferences such as brake lever, cowl, ventilator rods, and projections from the dash. The set should be so located that the flexible shafts and pilot light cable may be attached to the receiver after it is mounted on the bulkhead.

2. DRILL THE MOUNTING HOLES. The locations of the mounting holes are designated on the template and the information necessary for drilling the holes is also on the template. The set may be mounted on the bulkhead by means of either two or three mounting bolts. The three bolt mounting is preferred whenever possible as this provides additional support to the bulkhead and minimizes the vibration of the set. When it is impractical to provide a three bolt mounting, the two bolt mounting should be used as marked on the template.

3. INSERT THE FLEXIBLE SHAFTS IN THE CONTROL HEAD: Back off the set screws in the shaft receptacles on the rear of the control head and insert the small ends of each of the drive cables. These shafts are identical and no attention need be paid to their respective locations. Turn the knob and the key as the shafts are pushed into the head. This is necessary to properly engage the shafts. Now turn the knob and the key to be sure that each shaft at the far end turns freely. The set screws should then be tightened thereby securing the outer drive cable casing to the control head. If the set screws are tightened too much, the shafts will bind inside the casing.

4. MOUNT THE CONTROL HEAD: The steering column control head with shafts attached should be mounted in such a position as to provide easy operation from a standpoint of reaching the control knob, seeing the dial, and allowing the flexible shafts to extend between the control head and chassis without sharp bends in the shafts. The control head unit is attached to the steering column by means of a bracket and metal strap which are contained in the bag with the mounting bolts. Remove the screw and lock washer from the flat metal strap, and form this piece around the steering column with the threaded part of the strap next to the column. This strap has a number of holes in it so as to be adjustable for different diameters. Adjust this for the steering column and then screw the control head bracket to it by placing the long screw with the lock washer through the hole in the bracket and the clearance hole in the strap, and finally threading into the strap bushing. The bracket can be adjusted to the desired angle before tightening. The control head should be attached to the bracket by means of the screw and washer which will be found threaded into one of the two mounting holes in the rear of the control head.

5. MOUNT THE SET ON THE BULKHEAD: After drilling the mounting holes as described in item "2" above, the set is mounted on the bulkhead by means of mounting screws, washers, lock washers and nuts provided for the purpose in the bag containing the installation accessories. At stated before, all cables are attached to the set with the exception of the pilot light cable which is furnished with the control head and may be assembled to the receiver at the time the flexible shafts are attached.

NOTE: At this point the location of the pilot light cable entrance to the receiver should be observed to make sure that it can be reached when the set is mounted on the bulkhead, otherwise the pilot light cable should be attached to the receiver at this time.

The short end of the mounting bolts should first be screwed into the receiver until they are tight. One of the large washers should then be placed over each mounting bolt. The set should then be hung on the bulkhead by passing the mounting bolts through the bulkhead. One plain washer, one lock washer, and one nut should then be tightened on each mounting bolt on the motor side of the bulkhead.

6. ATTACH THE CONTROL HEAD SHAFTS TO THE RECEIVER: Inside the receiver, tongued ends are provided on the gang condenser and volume control, and grooved insulators are provided on the ends of the flexible shafts attached to the control head. The flexible shaft which controls the volume of the set should be inserted in the round bushing on the radio receiver next to the bulkhead. The shaft should be rotated slightly from the control key so that the tongue and groove will properly engage. The round thumb nut on the flexible shaft should then be tightened with the fingers to bind the flexible casing to the set. The flexible shaft which controls the tuning should likewise be attached to the gang condenser through the other bushing provided on the receiver.

The flexible shafts should be taped securely to some fixed part of the car under the dash to prevent movement of the casings. Displacement of the flexible casing changes the calibration and should be avoided.

7. ATTACH THE PILOT LIGHT CABLE TO THE RECEIVER: The pilot light cable which is attached to the control head has the male portion of the bayonet locking device attached to its free end. This should be pushed into the receptacle adjacent to the fuse container on the receiver (the only remaining unused connector).

8. INSTALL GENERATOR CONDENSER AND DISTRIBUTOR SUPPRESSOR: The distributor suppressor should be inserted in series with the center lead of the distributor (high tension lead from coil) as close as possible to the distributor. This is done by first cutting the lead to the center of the distributor about 1-1/2 inches above the distributor cap, then remove the short end of this lead from the distributor and screw the suppressor into this short end. Next screw the other end of the suppressor into the long end of the ignition wire to the coil. Plug the lead assembly thus completed back into the distributor. If the weight of the suppressor causes excessive vibration of the wire, it should be taped to some mechanical support to prevent the strands of the wire from breaking. This wire should not be placed close to any metal part.

The generator condenser should be mounted mechanically on the generator so that its housing is well grounded and the condenser lead should be securely attached to the battery side of the cutout relay. (Further details of motor noise suppression will be found in a later section.)

9. CONNECT THE BATTERY CABLE TO THE AMMETER AND CHECK BATTERY SUPPLY TO VARIOUS COMPONENTS: The battery cable should be connected to the ammeter or the ammeter side of the automobile fuse. This connection should be made so that the current drawn by the receiver will be registered on the ammeter.

IMPORTANT: Make sure that the nut located between the two flexible control shaft bushings on the receiver is absolutely tight. This nut establishes important ground connections for the entire receiver.

When the set is turned on, the pilot lamp should light, the vibrator should buzz and a slight sound indicating that the set is turned on should be heard in the speaker.

10. CONNECT THE FREE END OF THE ANTENNA CABLE TO THE ANTENNA PROVIDED ON THE CAR: The free end of the set antenna cable should be soldered to the antenna lead provided in the car and the connection then insulated with tape. The pigtail on the shield of the antenna cable should be grounded to the best substantial ground on the car body, within reach of this pigtail. This ground connection on the car should be carefully cleaned. (See detailed instructions relative to installing antenna in another section of these instructions.)

11. ADJUST THE CALIBRATION OF THE CONTROL HEAD: Tune in a station of known frequency in the high frequency range (high readings on scale) of the receiver. Then by using pliers or a wrench on the small hex nut located in the center of the back of the control head, adjust the pointer on the control head to the frequency of the station to which you are listening.

12. TEST THE COMPLETE INSTALLATION: Check installation for general sensitivity by tuning in stations known to be weak. Repeat this at different frequencies (or settings of the dial). If this result is not relatively good, the trouble is probably due to an inefficient antenna or lead-in, or poor connections. Check the set for normal volume, tone quality and free motion of controls over the full range of the dial.

Loose parts rattling on the dash or bulkhead of the car due to speaker tone vibrations are sources of annoyance which should be corrected. These are sometimes mistaken for rattles in the receiver.

With the volume control turned on full and the engine of the car running, test the set for motor noise at various frequencies in between stations.

If objectionable motor noise is heard in the receiver proceed with the installation of the standard suppressors.

13. INSTALL THE SPARK PLUG SUPPRESSORS: Six spark plug suppressors are provided with each set and also one distributor suppressor, and one generator condenser. Remove the nuts which secure the ignition wires to the spark plugs and screw a suppressor on each plug. The top of the suppressor is a stud and push type clip arrangement which can be removed, thereby making the suppressor universally adaptable to all types of spark plug wire connectors.

OPERATION OF SET

The set is turned on by clockwise rotation of the key in the center of the knob on the control head. The rotation of this key also regulates the volume of output from the set.

The black knob on the control head regulates the station selector, or in other words, adjusts the frequency to which the set is tuned.

To operate the set proceed as follows:

a. Rotate the key in the center of the knob on the control head to about three-quarters of its full rotation.

b. Wait for the set to warm up. When the set has warmed up a slight crackling sound will be heard in the speaker.

c. Tune to the desired station by rotating the black knob on the control head until the indicator is directly over the frequency marking corresponding to the station which you desire to hear.

d. Listen carefully to the speaker output and adjust the tuning very slowly until the most pleasing tone quality is obtained.

e. Adjust the volume to the desired level with the key on the control head.

f. When you desire to turn the set off, turn the key in center of the knob to the complete counter clockwise rotation. If you desire to lock the set, withdraw this volume control key.

CHANGING TUBE OR VIBRATOR: These components may be changed without removing the set from the car. Remove the three thumb screws around the side of the housing. Pull cover off perpendicular to the bulkhead. The speaker is attached to the set by means of a plug and should be detached. Withdraw defective tube or vibrator and replace with similar component. (See label inside of the cover for location.)

Replace the cover being careful not to allow the speaker cable to get in a position which might interfere with the rotation of the gang condenser. In replacing the cover, the guide on the rim of the cover should be engaged in the slot which is directly over the flexible shafts on the housing, and the cover should be pressed on to the housing. The three thumb screws are then replaced, care being taken not to strip the threads and yet to provide a secure attachment of the cover to the housing.

If it is necessary to remove the chassis for servicing, proceed as follows:

1. Disconnect cables at receiver.

2. Remove receiver from bulkhead.

3. Remove the four screws and lock washers which hold the chassis in the housing.

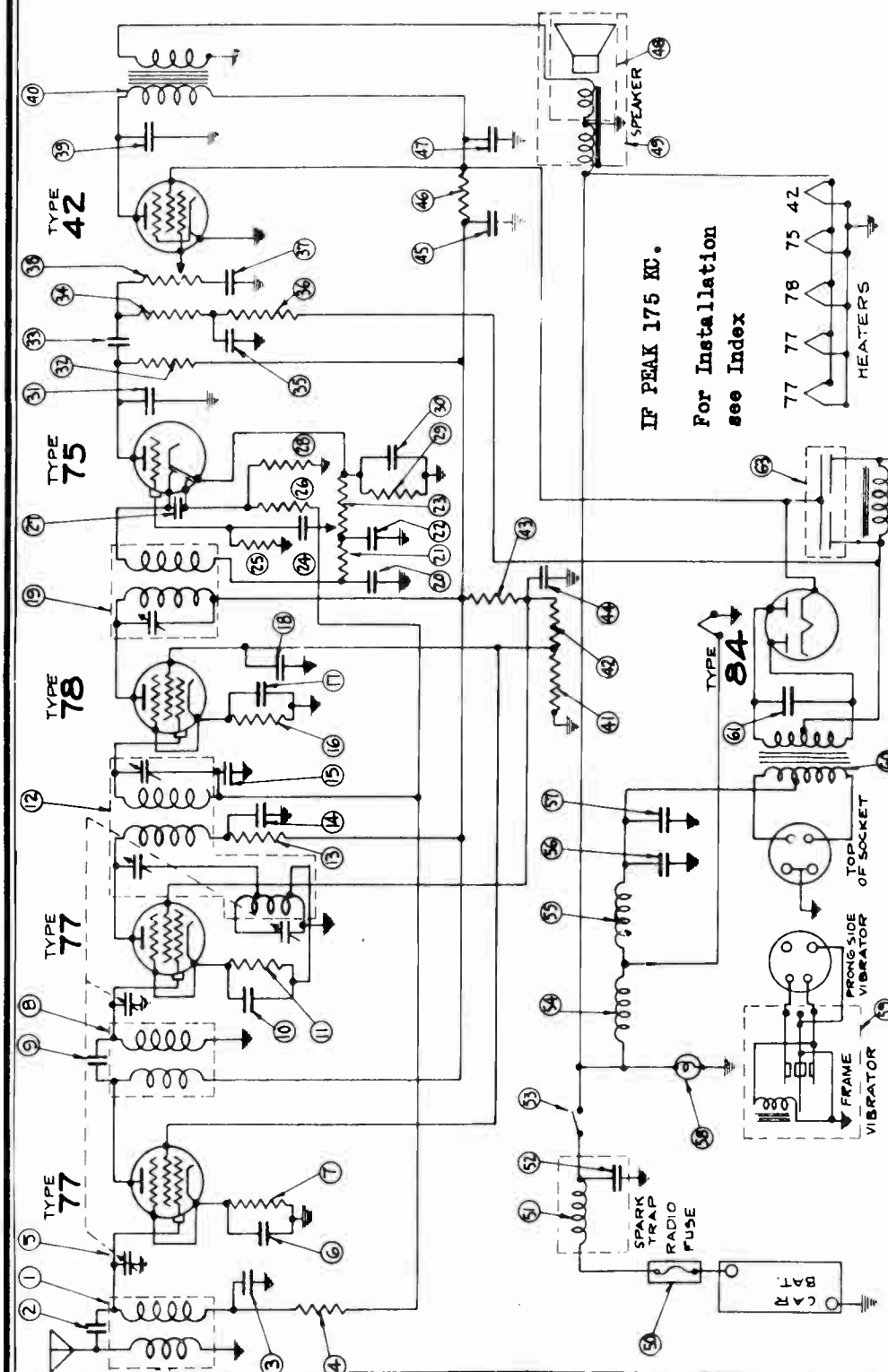
4. Turn the receiver upside down and remove the housing from its position around the set.

5. After making necessary repairs, replace the chassis in the set and tighten screws securely.

UNITED AMERICAN BOSCH CORP.

MODEL 634-A (Type 1)
Schematic

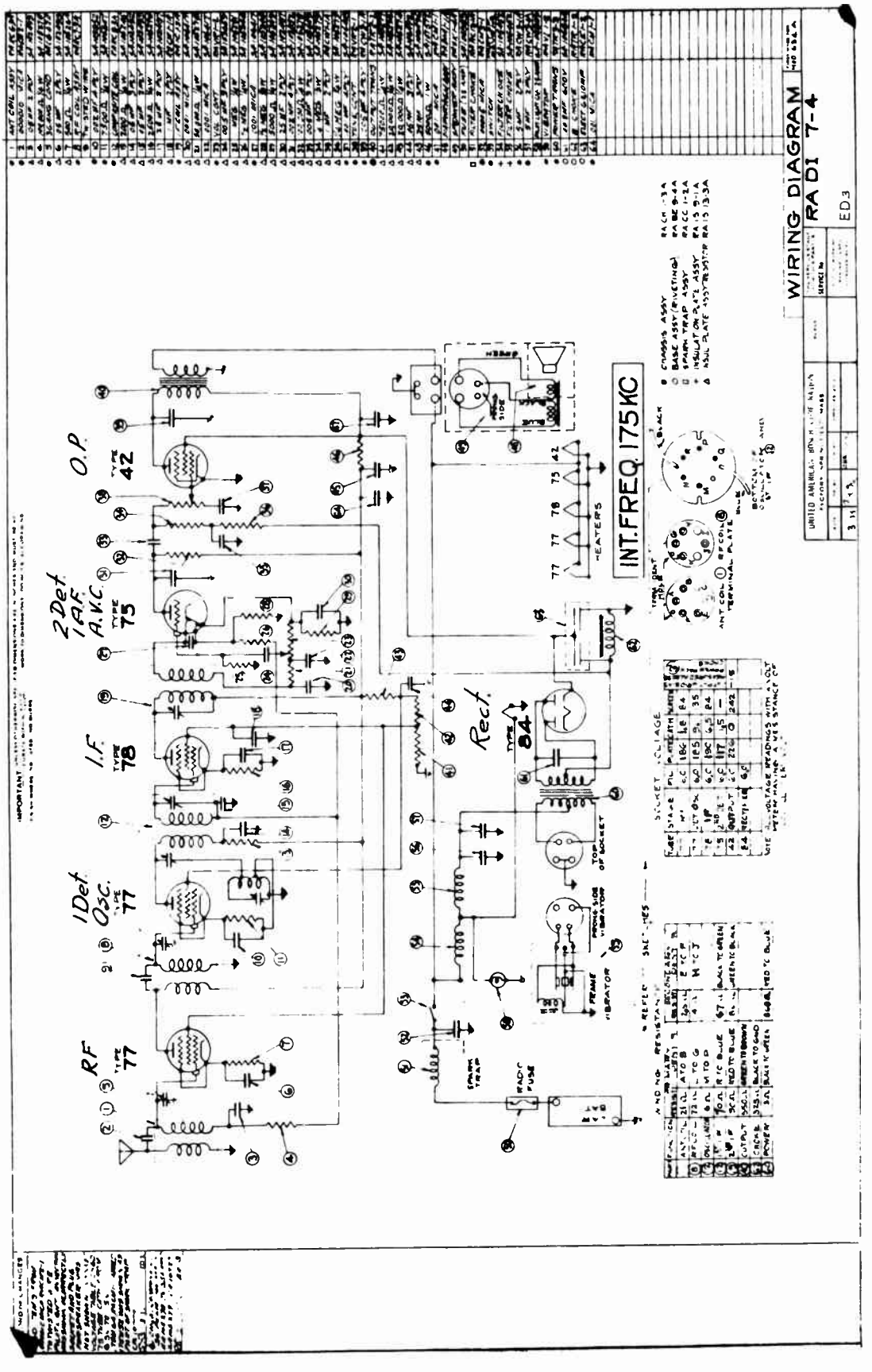
Part No.	Dia. #	Description of Parts
CM-951	47	.001 mica condenser
LM-951A	48	Speaker diaphragm assembly
SK-951A	49	Speaker assembly
106983	50	Fuse (25. amp.)
RC-9512A	51	Filter choke
CM-953	52	.00005 mica condenser
	53	Switch (part of VR-951)
105452	54	Filter choke
105452	55	Filter choke
CW-953A	56	.5 mfd. 200 V. condenser
CW-953A	57	.5 mfd. 200 V. condenser
106809	58	Pilot light (6 V.-.25 amp.)
VI-951	59	Vibrator
TR-953	60	Power transformer
106804	61	.008 mfd. 1600 V. condenser
TR-951	62	B. choke
CE-951	63	6 & 10 mfd. electrolytic cond.



Part No.	Dia. #	Description of Parts
RC-956A	1	Antenna coil assembly
CM-952	2	.000010 mica condenser
102493	3	.05 mfd. 200 V. condenser
105278	4	100,000 ohms ½ W. resistor
CC-954A	5	3-Gang variable condenser
102493	6	.05 mfd. 200 V. condenser
105264	7	500 ohms ½ W. resistor
RC-957A	8	R.F. coil assembly
CM-952	9	.000010 mica condenser
103852	10	.002 mfd. 500 V. condenser
105247	11	7500 ohms ½ W. resistor
RC-958A	12	Composite coil (osc.-I.F.)
105245	13	2000 ohms ½W. resistor
102492	14	.05 mfd. 350 V. condenser
102493	15	.05 mfd. 200 V. condenser
105270	16	2500 ohms 1/4 W. resistor
102497	17	.25 mfd. 200 V. condenser
CW-951A	18	.1 mfd. 200 V. condenser
IC-951A	19	I.F. coil assembly
106417	20	.0001 mica condenser
105276	21	60,000 ohms 1/4 W. resistor
106417	22	.0001 mica condenser
VR-951	23	Volume control
103659	24	.005 mfd. 350 V. condenser
105281	25	1 meg. 1/4 W. resistor
105246	26	1/2 meg. 1/4 W. resistor
106417	27	.0001 mica condenser
105246	28	1/2 meg. 1/4 W. resistor
105249	29	5000 ohms 1/4 W. resistor
102497	30	.25 mfd. 200 V. condenser
103852	31	.002 mfd. 500 V. condenser
105278	32	100,000 ohms ½ W. resistor
103659	33	.005 mfd. 350 V. condenser
105279	34	1/4 meg. 1/4 W. resistor
CW-951A	35	.1 mfd. 200 V. condenser
105278	36	100,000 ohms ½ W. resistor
106403	37	.001 mfd. 500 V. condenser
VR-952	38	Tone control
CW-952A	39	.005 mfd. 500 V. condenser
TR-952	40	Output transformer
105277	41	75,000 ohms ½ W. resistor
105274	42	20,000 ohms ½ W. resistor
105274	43	20,000 ohms ½ W. resistor
102492	44	.05 mfd. 350 V. condenser
102496	45	.25 mfd. 350 V. condenser
107572	46	5000 ohms 1 W. resistor

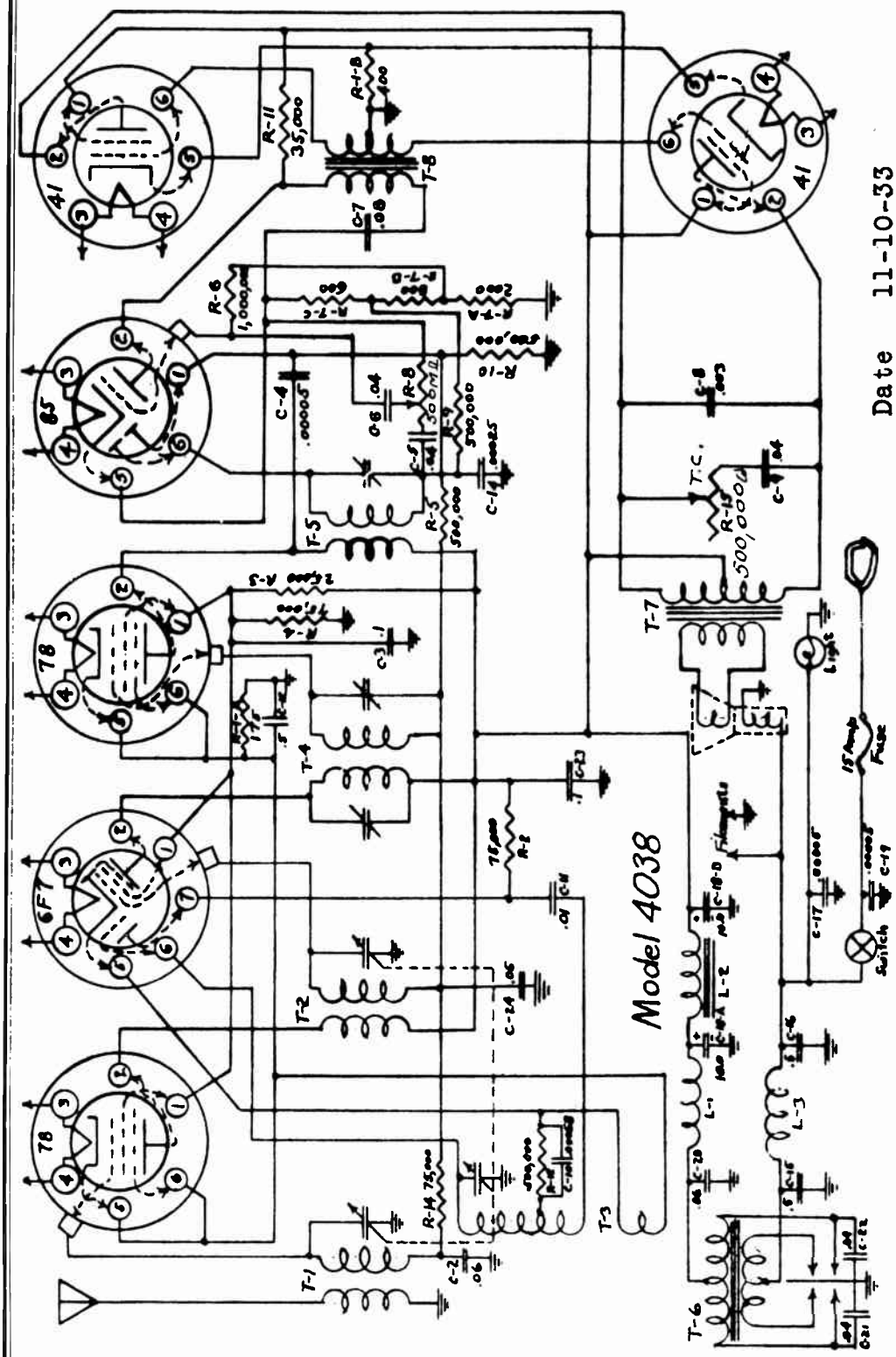
MODEL 634-A (Type 2)
Schematic

UNITED AMERICAN BOSCH



UNITED MOTORS SERVICE

MODEL 4038
Schematic, Voltage



Date 11-10-33

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Cond.	#7 Triode Plate
78	85	210	5.9	0	3.2	3.2	
6F7	85	210	0	5.9	3.2	0	90
78	85	210	5.9	0	3.2	3.2	
85	0	85	0	5.9	8.0	0	
41	210	205	5.9	0	16	0	
41	210	205	5.9	0	16	0	

MODEL 4038
Service Notes

UNITED MOTORS SERVICE

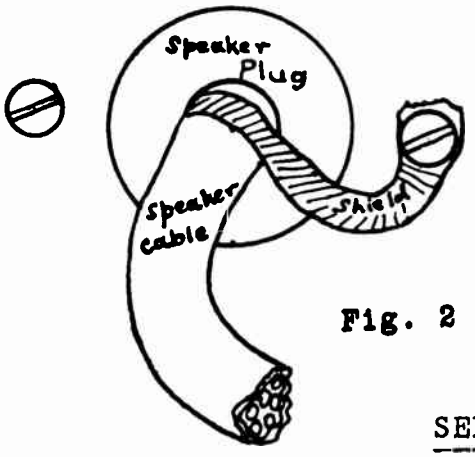


Fig. 2

Fig. 3

SERVICE HINTS

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R.F. noise due to the vibrator may result if a good ground of the receiver to the car chassis is not provided.

CHASSIS PICK-UP: Spark noise which occurs in the receiver when the antenna lead is disconnected.

Chassis pick-up may occur if the receiver is mounted on a car which has the ignition coil in the cowl compartment. This chassis pick-up can, in most cases, be traced to the speaker cable. Some of the first speakers have speaker cables which do not have shield pig-tails on the plug end of the cable. These cables have a bare copper lead soldered to the shield and to a filament prong of the plug. Make sure that the shield is soldered to the bare lead at a point as close to the plug prong as possible.

If chassis pick-up still exists, solder one end of a short shield pig-tail to the cable at a point near the plug and ground the other end to the chassis under the nearest Parker-Kalon screw. (See Fig. 2.)

If grounding the speaker cable at the chassis as indicated above does not eliminate chassis pick-up, ground the speaker cable to the speaker case by slitting the cable covering at a point just inside the speaker case and soldering a short pig-tail lead to the cable and case as shown in Figure 3.

VOLUME CONTROL: Some of the first Model 4038 receivers were wired as shown in Figure 4. This circuit may result in too loud a minimum volume from high powered local stations. A condenser and a resistor have been added to this circuit (see wiring Figure 5) to allow the volume control to cut a powerful local station to a Point of no signal output.

MODEL 4038
Alignment
Changes

UNITED MOTORS SERVICE

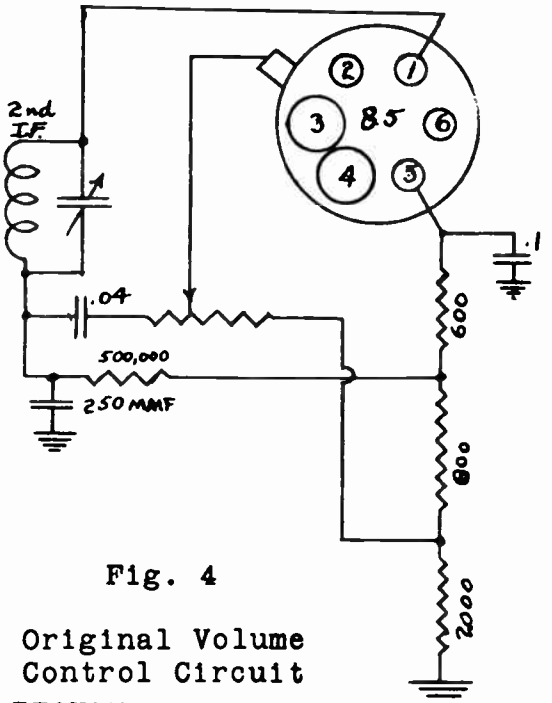


Fig. 4

Original Volume
Control Circuit

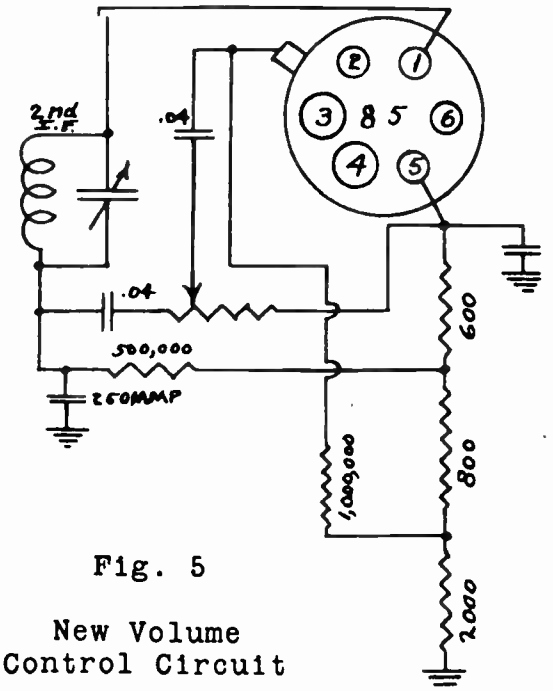


Fig. 5

New Volume
Control Circuit

PEAKING: The peaking operation for this receiver is exactly the same as the peaking operation for the model 4037, as described below. The I.F. stages should be peaked at 262 K.C. Peak the I.F. trimmer, which is in the I.F. coil can having only one adjusting screw, first.

Obtain the 1400 K.C. Tuning Condenser setting by means of the red wood calibration block part #1208073, as follows:

1. Insert the block under the middle section of the tuning condenser so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket (See Figure A.)

2. Open the condenser blades until they stop solidly against the bevel edge of the block.

3. Peak the trimmers on the tuning condenser, adjusting the oscillator section (neares volume control) first.

4. Remove calibration block.

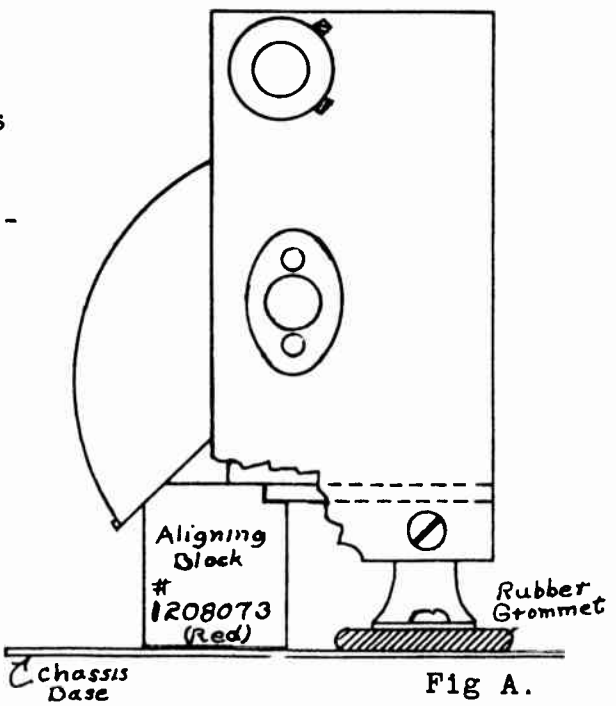


Fig A.

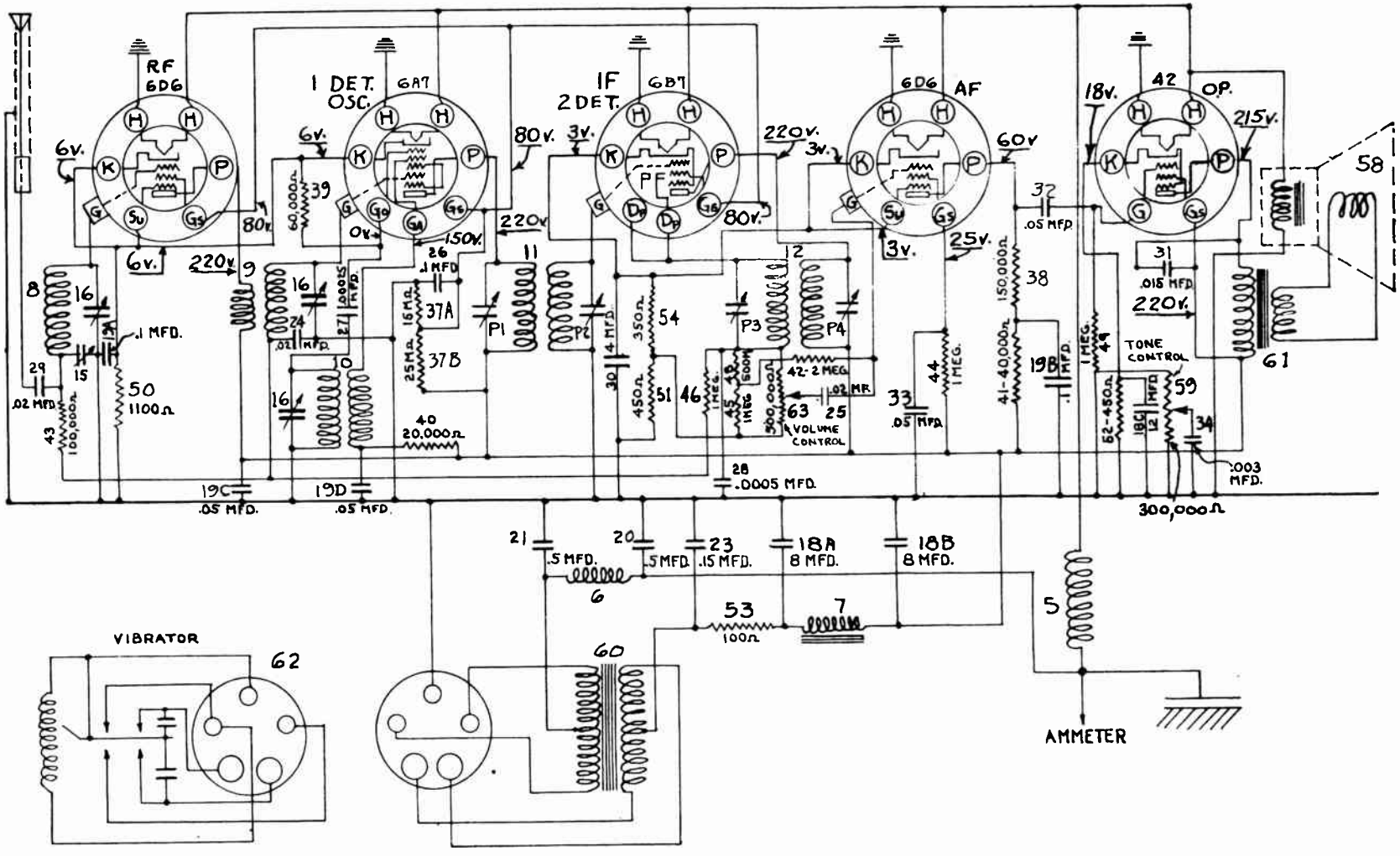


FIG. 1 DELCO MODEL 626 CIRCUIT DIAGRAM

UNITED MOTORS SERVICE

MODEL Delco 626
Socket, Trimmers
Chassis Layout

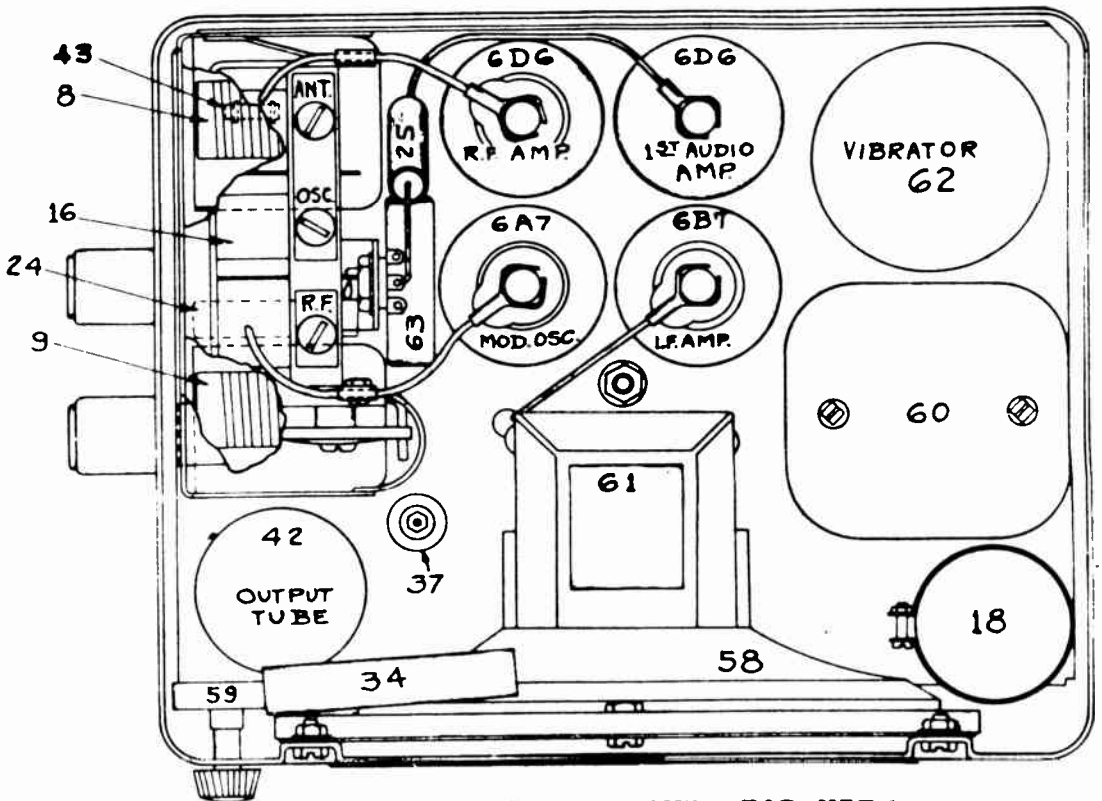


FIG. 2 PARTS LAYOUT--TOP VIEW

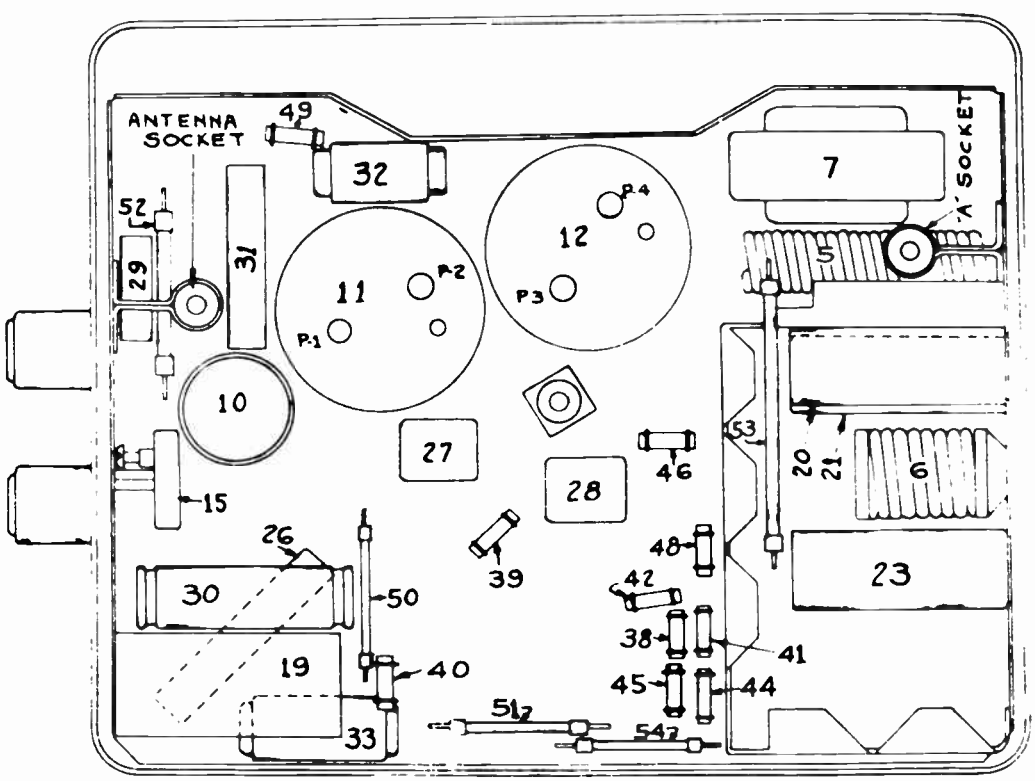


FIG. 3 PARTS LAYOUT--BOTTOM VIEW

MODEL Delco 626
Alignment
Circuit Notes

UNITED MOTORS SERVICE

PEAKING PROCEDURE

The only way the circuits of this receiver can be peaked properly is with the use of a calibrated test oscillator and an output meter. The circuits are very carefully adjusted at the factory and do not need any further adjustment unless tampered with in the field or a defective coil has been replaced. It is, therefore, advisable not to attempt any adjustments unless it is definitely known that an adjustment is necessary. This is especially important in connection with the Syncro-Tuning circuit.

Connecting Output Meter

Connect one of the output meter leads to the plate prong of the type 42 output tube. (The plate prong is the first prong to the left of the filament when looking at the bottom of the tube with the filament prongs toward you.) Connect the other output meter lead to the receiver chassis, making sure that the meter is protected with a D.C. blocking condenser connected in series to prevent damage to the meter.

IMPORTANT

Due to the high sensitivity of these receivers, the receiver chassis must be in its case before making any adjustments. This is necessary in order to obtain accurate adjustments and to prevent oscillation due to lack of the shielding effect of the receiver case. Also, the following procedure should be followed closely if the "Syncro-Tuning" circuit is to function properly.

1. Peaking I.F. Stages at 262 K.C.

   (a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. (The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.)

   (b) Set the test oscillator on 262 kilocycles.

   (c) Turn the volume control of the receiver on full.

   (d) Peak each of the I.F. trimmers on the 2nd I.F. coil, Illustration #12 on Fig. 3.

   (e) Then peak each of the trimmers on the 1st I.F. coil, Illustration #11 on Fig. 3.

   NOTE: In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

2. Peaking Oscillator Section of Gang Condenser at 1540 K.C.

   (a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. (Do not use the .5 mfd. condenser that was required in aligning the I.F. stages.)

   (b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

   (c) Set the test oscillator on exactly 1540 kilocycles.

   (d) Adjust the parallel trimmer for the "OSC." section (middle section) CAREFULLY for maximum output. Then adjust the trimmers for the other two sections of the gang condenser, also for maximum output.

3. Peaking "ANT". and "R.F." Sections of Gang Condenser at 1400 K.C. and Compensating Condenser at 600 K.C.

   (a) Set the test oscillator on 1400 kilocycles.

   (b) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output

   (c) Readjust the parallel trimmers for the "ANT." and "R.F." sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT DISTURB the setting of the oscillator trimmer as this is adjusted at 1540 K.C. only and any adjustment at this point will affect both the tuning range of the receiver and the tracking of its circuits.

   NOTE: In order to accurately set the "ANT." trimmer of the condenser gang at 1400 K.C. it will be necessary to make a preliminary adjustment of the "antenna compensating condenser" (Illustration #15 on Fig. 3) before installing the receiver on a car.

   (d) Set the test oscillator on 600 kilocycles.

   (e) Turn the condenser rotor plates until the 600 K.C. signal from the test oscillator is tuned in with maximum output.

   (f) Peak the "antenna compensating condenser," (Illustration #15 on Fig. 3) for maximum output, rocking the rotor plates of the condenser gang back and forth and adjusting the "antenna compensating condenser" alternately until no further improvement in output can be obtained.

   (g) Reset the test oscillator on 1400 kilocycles.

   (h) Turn the condenser rotor plates until the 1400 K.C. signal is tuned in with maximum output.

   (i) Adjust the trimmer for the "ANT." section of the gang condenser CAREFULLY for maximum output.

4. Adjusting Compensating Condenser to Car Antenna

   After the "ANT." section of the gang condenser has been correctly adjusted according to preceding information it will be necessary to reset the "antenna capacity compensating condenser" to the car antenna when installing the receiver in a car in order to compensate for the wide range of antenna capacities being used. This is done in the following manner:

   (a) Tune the receiver to a weak broadcast station between 570 to 640 K.C.

   (b) Peak the "antenna capacity compensating condenser" for maximum output, rocking the receiver dial back and forth and adjusting the compensating condenser alternately until no further improvement in output can be obtained.

   CAUTION: Do not touch the adjustment of the parallel trimmer for the "ANT." section of the gang condenser after the receiver is installed a car.

Delco Syncro-Tuning

The outstanding circuit feature of this receiver is the specially designed antenna circuit which provides more than four times the stage gain of conventional circuits, making it particularly suitable for under car antenna systems required on several 1935 Model cars. Syncro-Tuning differs from other circuits in that the antenna system is actually tuned to resonance at all frequencies instead of just one point in the broadcast band as is the case in other circuits. This results in a greatly increased efficiency and a lower noise level. Syncro-Tuning is accomplished through the use of specially shaped stator plates in the "ANT." section of the condenser gang in collaboration with a very carefully designed antenna circuit which in reality is very simple. The capacity of the antenna system with which the receiver is to be used is immaterial insofar as the tuning of the antenna circuit is concerned. This is because of the use of an "antenna capacity compensating condenser" that can be adjusted for any deficiency or excess of antenna capacity so that the sum total capacity the receiver works with is always the same. It is therefore important that this condenser be adjusted to the car antenna when installing the receiver in a car.

A spark noise filter is employed to prevent ignition interference from affecting the receiver circuits. The elimination of chassis pickup in this manner should make possible the installation of this receiver in the majority of cars without the use of spark plug suppressors.

The receiver may be connected for operation on a car battery with the positive side grounded by simply reversing the two wires connected to the terminal strip located on top of the power transformer.

The "B" power supply utilizes a full wave self-rectifying vibrator of the plug-in type.

A slight voltage delay is used on the detector circuit to assist materially in reducing background noise.

Circuit Operation

Referring to the circuit diagram Figure 1. The antenna is capacity coupled to the antenna coil, which is tuned by the "ANT." section of the gang condenser, and feeds the grid of the 6D6 R.F. amplifier tube. The plate circuit of this tube is inductively coupled to the grid winding feeding the 6A7 tube and tuned by the "R.F." section of the gang condenser. (The 6A7 tube is used as the conventional detector oscillator or pentagrid converter.) The oscillator frequency which is produced due to the reaction between the oscillator grid, plate, and associated circuit constants is tuned by the "OSC." section of the gang condenser. The incoming station frequency and the oscillator frequency are mixed in the 6A7 tube and the resultant frequency which is 262 kilocycles is transformer coupled to the grid of the pentode section of the 6B7 tube and the output of this section of the tube is impressed on the diode plates of this tube for detection and developing A.V.C. voltage. The A.V.C. voltage controls the grid bias of the 6D6 R.F. tube, the control grid of the 6A7 tube and also a part of the developed voltage is used to control the 6D6 audio tube. The audio output of the detector circuit is coupled to the grid of the 6D6 audio amplifier tube and the grid voltage swing is controlled by the volume control. The output of this audio tube is resistance coupled to the grid of type 42 power output pentode.

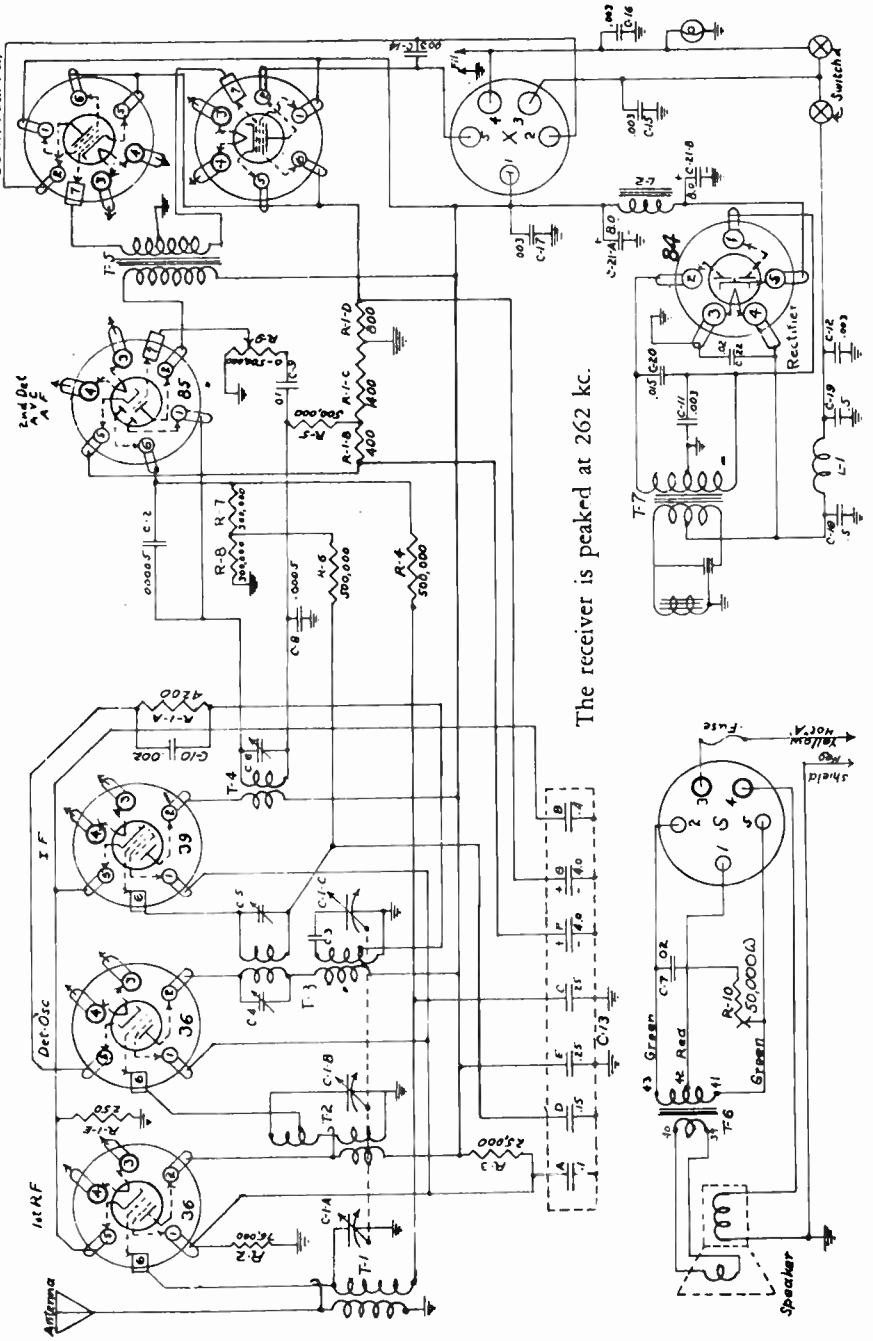
CHASSIS PARTS

Part No.	Part Name	Description	Illus. No.
1208767	Base	Tube shield grounding	
1209334	Bolt	Chassis cover retaining stud	
1209335	Bracket	Volume control mounting	
1209336	Case	Chassis (less covers)	
1209337	Case	Transformer	
1209340	Clamp	Vibrator grounding	
1209341	Clamp	Condenser mtg. (4 mfd.)	
1209342	Clamp	Elect. cond. mtg.	
1209636	Cloth	Speaker grille	
1209338	Coil	"A" supply filter choke	5
1209339	Coil	Vibrator "A" choke	6
1209291	Coil	"B" power filter choke	7
1209343	Coil	Antenna	8
1209344	Coil	R.F.	9
1209345	Coil	Oscillator	10
1209304	Coil assy.	1st I.F.	11
1209305	Coil assy.	2nd I.F.	12
1209633	Condenser	Antenna compensating	15
1209346	Condenser	3 gang tuning	16
	Sec. A	Antenna	
	Sec. B	R.F.	
	Sec. C	Oscillator	
1209285	Condenser	Electrolytic block	18
	Sec. A	8 mfd., 450 volt	
	Sec. B	8 mfd., 450 volt	
	Sec. C	12 mfd., 25 volt	
209321	Condenser	By-pass block	19
	Sec. A	.1 mfd., 200 volt	
	Sec. B	.1 mfd., 200 volt	
	Sec. C	.05 mfd. 400 volt	
	Sec. D	.05 mfd. 400 volt	
1209299	Condenser	Metal case .5 mfd. 160 volt	20
1209299	Condenser	Metal case .5 mfd. 160 volt	21
1209300	Condenser	Metal case .15 mfd .400 volt	23
1209307	Condenser	Tubular .02 mfd. 200 volt	24
1209307	Condenser	Tubular .02 mfd. 200 volt	25
1209306	Condenser	Tubular .1 mfd. 200 volt	26
1209220	Condenser	Molded .00025 mfd.	27
1209612	Condenser	Molded .0005 mfd.	28
1209510	Condenser	Tubular .02 mfd. 200 volt	29
1209324	Condenser	Metal case 4 mfd. 10 volt	30
1209325	Condenser	Tubular .015 mfd. 400 volt	31
1209313	Condenser	Tubular .05 mfd. 400 volt	32
1209308	Condenser	Tubular .05 mfd. 400 volt	33
1209627	Condenser	Tubular .005 mfd. 200 volt	34
1209726	Connector assy.	"A" power on chassis	
1836869	Cap	Ferrule holder	
1838476	Ferrule	Contact	
1209727	Connector assy.	Antenna on chassis	
1838476	Ferrule	Contact	
1836878	Spring	Tension	
1845713	Washer	Fiber	
1209347	Cord	Speaker	
1209348	Cover	Chassis bottom	
1209349	Cover	Chassis tube lid	
1209350	Cover	Transformer bottom	
1209351	Cover	Transformer top	
1209352	Cover	Vibrator filter shield	
1209639	Grille	Speaker front (nickel ed)	
1209354	Plug	Antenna trimmer cover	
1209355	Resistor	Voltage divider "ohmite"	37
Sec. A		15,000 ohms, 2 watt	
Sec. B		25,000 ohms, 2 watt	
1208292	Resistor	Carbon 150,000 ohms 1/3 watt	38
1208320	Resistor	Carbon 60,000 ohms 1/4 watt	39
1209405	Resistor	Carbon 20,000 ohms 1/3 watt	40
1208296	Resistor	Carbon 40,000 ohms 1/3 watt	41
1209356	Resistor	Carbon 2 megohms, 1/3 watt	42
1208854	Resistor	Carbon 100,000 ohms 1/3 watt	43
1208232	Resistor	Carbon 1 megohm 1/3 watt	44
1208232	Resistor	Carbon 1 megohm 1/3 watt	45
1208232	Resistor	Carbon 1 megohm 1/3 watt	46
1204138	Resistor	Carbon 500,000 ohms 1/3 watt	48
1208232	Resistor	Carbon 1 megohm 1/3 watt	49
1209357	Resistor	Flexible 1100 ohms 1/2 watt	50
1208110	Resistor	Flexible 450 ohms 1/2 watt	51
1209358	Resistor	Flexible 450 ohms 1½ watt	52
1209359	Resistor	Flexible 100 ohms 3 watt	53
1208802	Resistor	Flexible 350 ohms 1/2 watt	54
1209607	Speaker	Complete unit 6½"	58
1209614	Term. assy.	Polarity reversing	
1209217	Term. assy.	Single lug	
1209611	Term. assy.	Fire lug	
1209747	Term. assy.	Four lug-on speaker	
1209628	Tone control	Res. 300,000 ohms	59
1209282	Transformer	Vibrator power	60
1209613	Transformer	Output-speaker	61
5039661	Vibrator	Plug-in synchronous	62
1209330	Volume control	Res. 500,000 ohms	63

MODEL Chevrolet 364441
Schematic, Voltage
Service Notes

UNITED MOTORS SERVICE

OSCILLATOR CIRCUIT. If set fails to oscillate entirely or oscillates on one end of the dial only, a new 36 tube should be tried in the oscillator socket. If this does not remedy the trouble, check resistor R-1-A and condensers C-3, located below section C-1-C of the gang condenser, and C-10, located on the resistor strip. Due to the capacity values of C-3 and C-10 being rather critical, they should be tested by replacement. If the above does not remedy the trouble, it may be necessary to replace the oscillator coil.



It is significant to note the following changes which have been made: In receivers below serial number 1,255,182, either the old or new C-13 condenser block may be used for service; in receivers above serial 1,255,182, condenser block number 1,207,901 MUST be used exclusively. When a new condenser block number 1,207,901 is used for replacement in a receiver below serial 1,255,182, the connecting wire from the cathode of the i-f. tube socket to the cathode of the r-f. tube socket should be removed. The new block has two white leads, both connected to the same section inside the condenser, and one of these leads should be connected to the i-f. cathode and the other to the r-f. cathode. Either lead may be connected to either cathode.

All receivers bearing serial numbers higher than 1,292,774 have a five-ampere fuse in the 6-volt side of the vibrator circuit, between the switch and the L-1 choke. The fuse block is mounted on the trans-vibrator assembly.

Voltage Chart

The voltage readings given herewith are measured between the respective tube contacts upon the sockets and the chassis.

Tube	Screen #1	Plate #2	Heater #3	Heater #4	Cathode #5	Suppressor Grid #6
RF	100	175	0	6	2.5	
Osc.	100	150	0	6	7.5	
I-F	100	175	0	6	2.5	
Det	2 Det	165	6	0	10.5	O-AVC
AF	175	175	0	6	19.5	19.5
AF	175	175	0	6	19.5	19.5
Rect.			0	6	190.0	

UNITED MOTORS SERVICE

MODEL Chevrolet 364441
Socket, Trimmers
Chassis Views

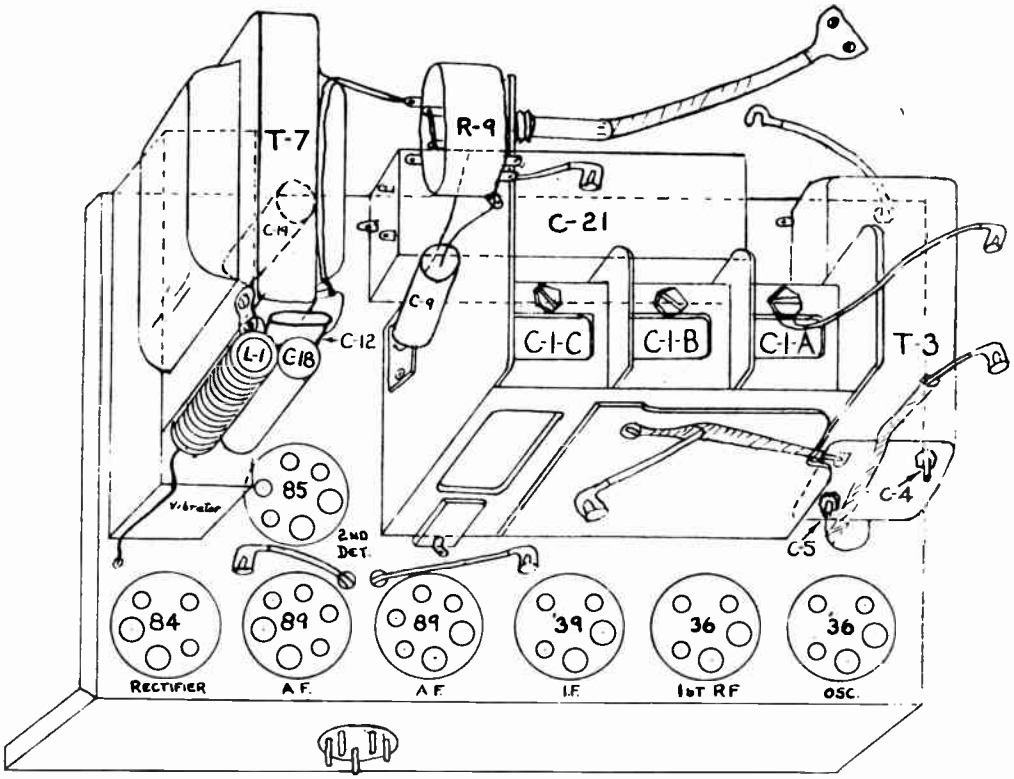


Fig. 3 PARTS LOCATING DIAGRAM

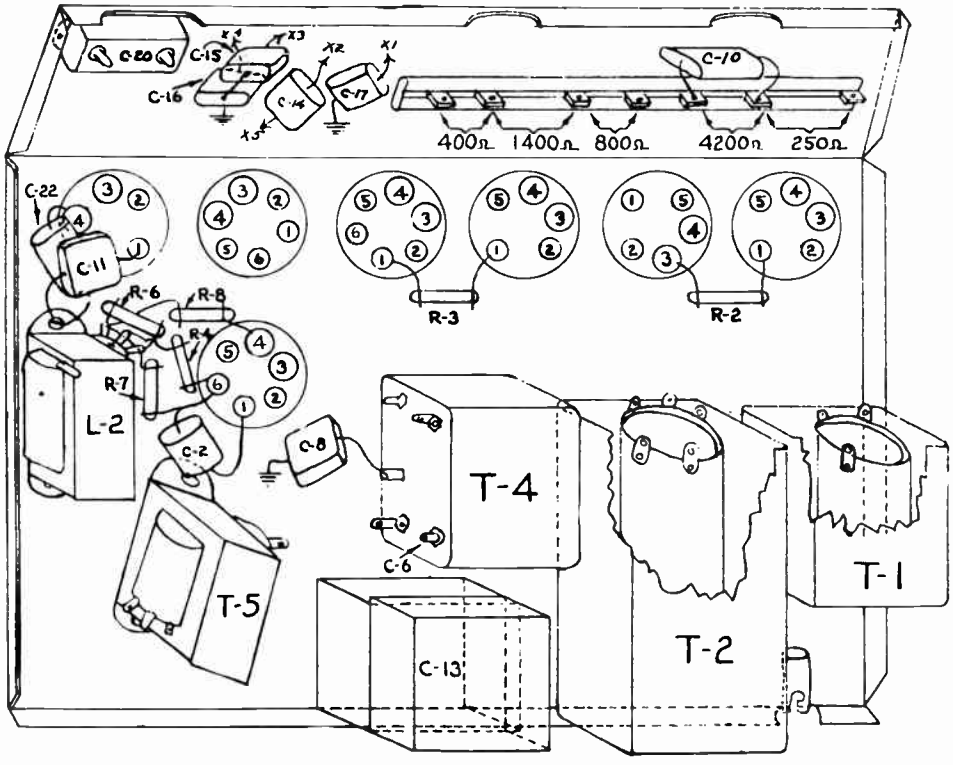


Fig. 4 PARTS LOCATING DIAGRAM

Peaking I.F. Stages at 262 KC

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the type 89 output tubes.

(a) Connect the output of the oscillator to the grid cap of the type 36 Detector--Oscillator tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 KC and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. condenser (C-6 on Fig. 4) which is on the I.F. coil located on the bottom of the chassis. Then peak the two condensers (C-4 and C-5 on Fig. 3) located on front of the Oscillator I.F. coil, peaking the plate coil condenser C-4 first.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. It should be less than one third of the maximum output available.

(f) Make all trimmer condenser adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 KC

(a) Set the oscillator on 1400 KC and connect its output to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 KC can be properly determined a metal aligning strip (part #1206431) should be used. This strip is placed over the top edge of the condenser gang as shown in figure 1.

(c) The condenser plates should be turned until they stop against the aligning strip.

(d) Place the tube shield (part #1206419) in position around the detector-oscillator tube.

(e) Peak the parallel trimmers on the top of the condenser gang. The oscillator section (C-1-C figure 3) located next to the volume control should be peaked first.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale, in order to prevent the A.V.C. from leveling out the output.

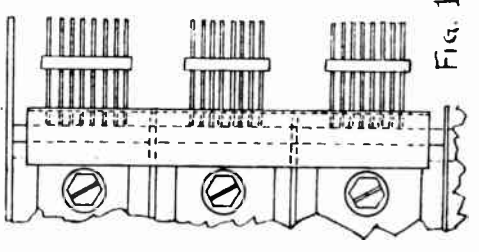


Fig. 1

1207686	Coil	Antenna	T-1
1207496	Coil	RF - 1st Det.	T-2
1207751	Coil	Oscillator--1st I.F.	T-3
1207752	Coil	2nd I.F.	T-4
1207755	Coil (choke)	R.F. choke	L-1
1207687	Coil (choke)	Power filter	L-2
1207688	Condenser	3 Gang tuning	C-1,A,B,C
1207625	Condenser	Molded .00005 Mfd.	C-2
1207626	Condenser	Molded .000735 Mfd.	C-3
1207799	Condenser	Tubular .02 Mfd.	C-7
1207636	Condenser	Molded .0005 Mfd.	C-8
1207628	Condenser	Tubular .01 Mfd.	C-9
1207690	Condenser	Paper .002 Mfd.	C-10
1207893	Condenser	Molded .003 Mfd.	C-11
1207617	Condenser	Molded .003 Mfd.	C-12
1207901	Condenser	By-pass block	C-13 A to G
	Sec. (A) .1 Mfd., (B) .4 Mfd. (C) .25 Mfd. (D) .15 Mfd. (E) .25 Mfd. (F) 4.0 Mfd. (G) 4.0 Mfd.		
*1207689	Condenser	Capacity values same as 1207901	
1207617	Condenser	Molded .003 Mfd.	C-14
1207617	Condenser	Molded .003 Mfd.	C-15
1207617	Condenser	Molded .003 Mfd.	C-16
1207617	Condenser	Molded .003 Mfd.	C-17
1207691	Condenser	Metal case .5 Mfd.	C-18
1207693	Condenser	Metal case .5 Mfd.	C-19

* See paragraph on "CIRCUIT and PART CHANGES"

1207694	Condenser	Metal Case	C-20
1207625	Condenser	Electrolytic block	C-21 A,B
Sec. (A) 8.0 Mfd., (B) 8.0 Mfd.			
1207692	Condenser	Paper .02 Mfd.	C-22
1849014	Condenser	Generator .5 Mfd.	
1849161	Condenser	Ammeter .5 Mfd.	
1207720	Resistor	Candohm	R-1A,B,C,D,E
(Sec. (A) 4200, (B) 400, (C) 1400, (D) 800, (E) 250 ohms.			
1208044	Resistor	Res. 75,000 ohms	R-2
1204135	Resistor	Res. 25,000 ohms	R-3
1204138	Resistor	Res. 500,000 ohms	R-4
1204138	Resistor	Res. 500,000 ohms	R-5
1204138	Resistor	Res. 500,000 ohms	R-6
1204139	Resistor	Res. 300,000 ohms	R-7
1204139	Resistor	Res. 300,000 ohms	R-8
1207821	Resistor	Spark plug 20 M ohms	
1201277	Resistor	Distributor 25 M ohms	
1207566	Coil	6 volt field	
1207799	Condenser	Tone control .02 Mfd	C-7
1207567	Cone assembly		
1207744	Cover	Case back	
1207745	Knob	Tone control	
1207682	Plug	Speaker cord	
1208257	Screw	Ornamental head	
1207798	Tone control	0-50,000 ohms	R-10
1207602	Transformer	Output	T-6

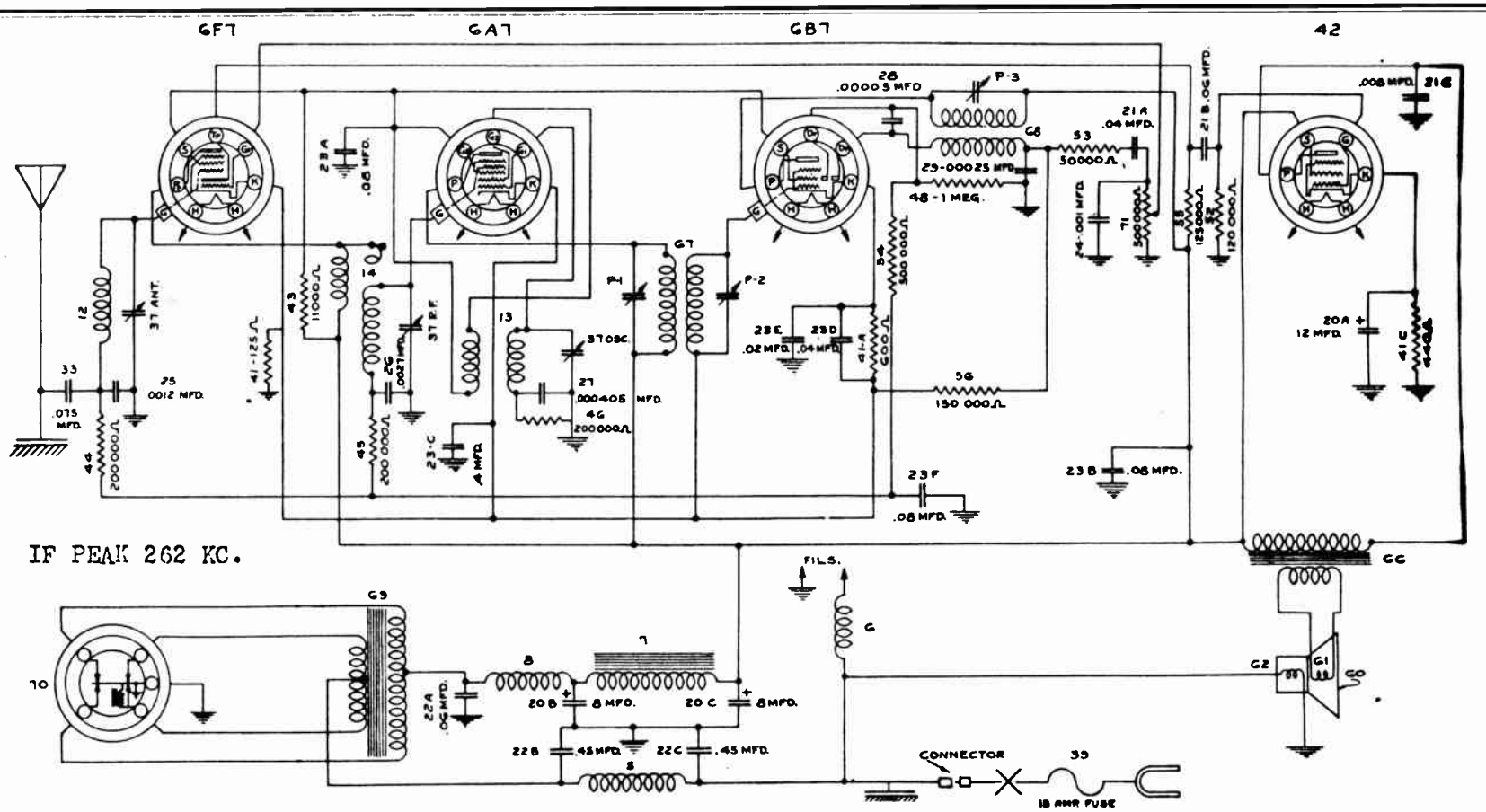


FIG. 1 CIRCUIT DIAGRAM--Below Serial #1748809
(For Buick, Pontiac Model 544245 and Olds Model 393884)

TUBE BASE DIAGRAM SYMBOLS

TYPE	FUNCTION	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
6F7	R.F.	6	250	135	80	0	0	-	-	-	6.2
6A7	Det-Osc.	6	250	-	-	-	0	0	120	135	6.2
6B7	2nd Det-AVC	6	250	135	-	-	**0	-	-	-	8.5
42	Output	6	240	250	-	-	0	-	-	-	16.0

** 6.2 Volts for sets below serial No. 1748809

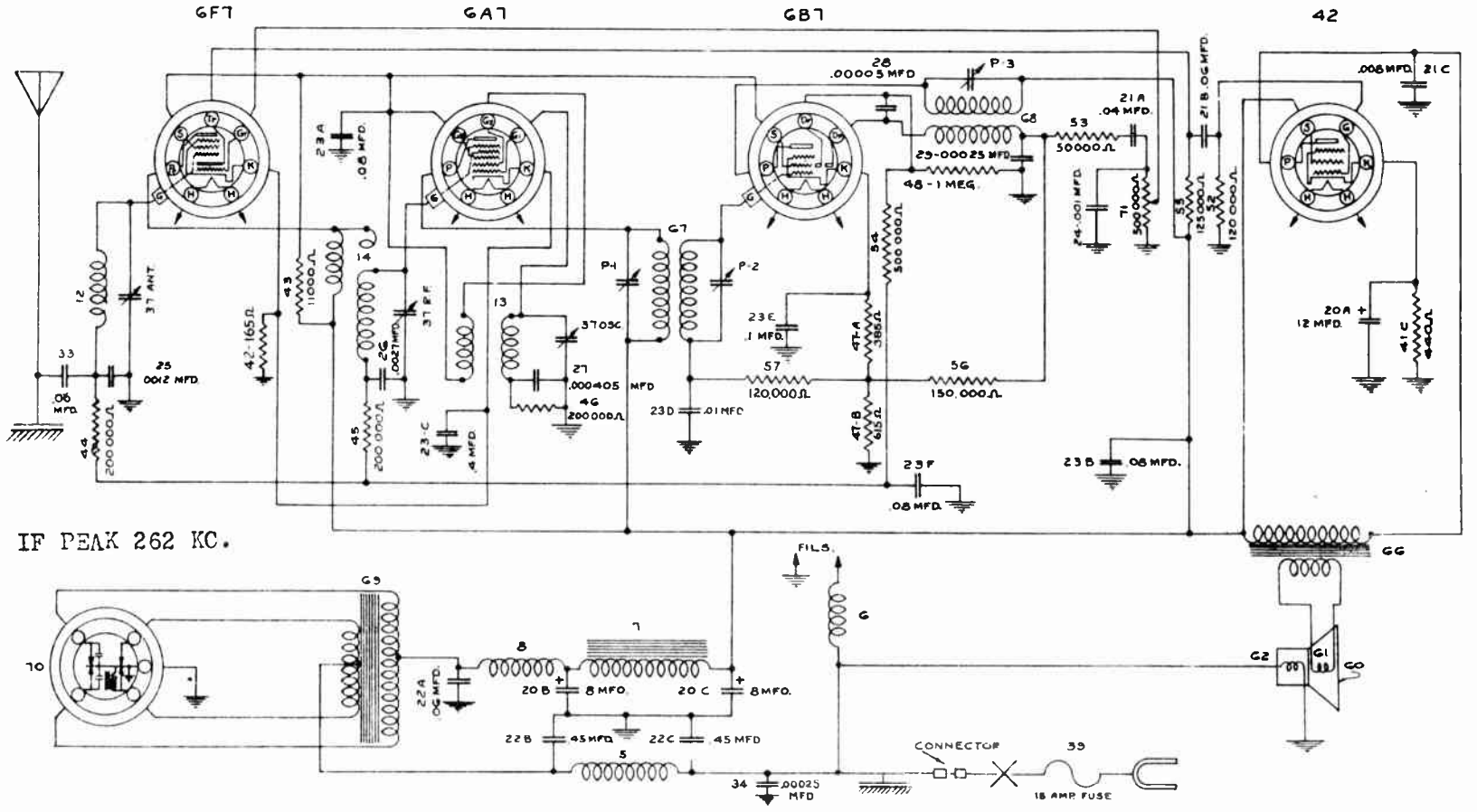


FIG. 1A CIRCUIT DIAGRAM--Above Serial #1748809
(For Buick, Pontiac Model 544245 and Olds Model 393884)

CIRCUIT CHANGES.-- The capacity of two sections of the part #1209050 condenser block (23A to F) were changed at serial #1748809 along with other changes. The "D" section, which was originally .04 mf., was changed to .01 mf. and the "E" section changed from .01 mf. to .1 mf. All the service replacement stock of the part #1209050 condenser blocks are of the new type, incorporating the above changes and should be used in the service replacement of all part #1209050 blocks used below serial #1748809.

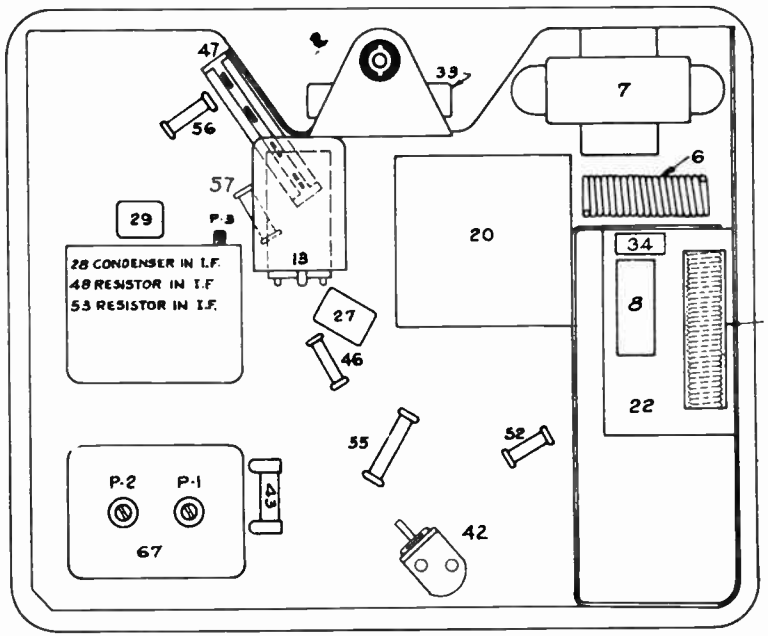


FIG.2 PARTS LAYOUT - Bottom View
For sets above serial #1748809

For sets below serial #1748809, the following changes should be noted:
Parts 34,42 and 57 are omitted;
Part 41 used instead of 47.

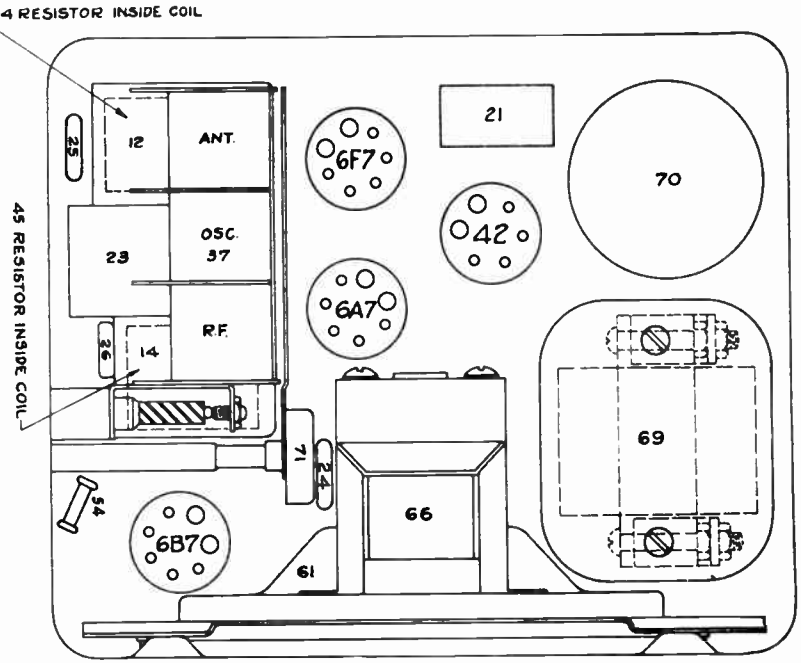


FIG.3 PARTS LAYOUT - Top View
This layout is the same for sets having serial numbers above and below #1748809.

CIRCUIT CHANGES.-- Several circuit changes were made starting at serial #1748809. See Figs.1,1A,2 and 3. It will be noted on some sets that the .008-mf. section (21C) of part #1209048 condenser block has its lead cut off close to the block and a .008-mf. tubular condenser connected from the plate of the 42 tube to ground in its place. This change was made because it was found necessary to change the voltage rating of the .008-mf. section of the condenser block after production started and the tubular condenser used until a new block could be manufactured. The tubular condenser used is part #1209212 and is located beside the filter choke. All the service replacement stock of #1209048 condenser blocks have a .008-mf. section of a higher voltage rating and in installing these blocks in a set where the tubular condenser was used, it will be necessary either to remove the tubular condenser or clip the lead off the .008-mf. section of the block.

MODEL Buick-Pontiac 544245
Oldsmobile 393884 UNITED MOTORS SERVICE
Alignment, Circuit Notes
Parts

Connecting Output Meter

Connect one of the terminals of the output meter to the plate prong of the type 42 output tube which can be determined by looking at the bottom of the tube with the filament prongs toward you. The plate prong is the first prong to the right of the filaments. Connect the other terminal of the output meter to receive chassis, making sure that the meter is protected with a series condenser.

Peaking I.F. Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a 1 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The 1 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak the I.F. trimmer P-3 for the 2nd I.F. coil shown on Figure 2.

(e) Then peak trimmers P-2 and P-1 of the first I.F. coil also shown on Figure 2.

(f) In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 and 1400 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. Do not use the 1 mfd. condenser that was required in aligning the I.F. stages.

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the oscillator section (middle section) of the gang condenser CAREFULLY for maximum output. Then adjust the trimmers for the "R.F." and "ANT" sections of the gang condenser.

(e) Set the test oscillator on 1400 kilocycles.

(f) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K.C. on this set.)

(g) Readjust the parallel trimmers for the "R.F." and "ANT" sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K.C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

CAUTION: Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer, in order to prevent the A.V.C. from leveling out the output as the adjustments are made.

Parts List

Part No.	Part Name	Description	Illus. No.
1207683	Cap	Grid connector	
1209080	Case	Chassis (Buick-Pontiac)	
1209081	Case	Chassis (Olds)	
1209045	Clamp	Vibrator holding	
1208077	Clip	Tube shield grinding	
1209039	Coil	R.F. "A" choke	5
1209040	Coil	Tube filament choke	6
1207999	Coil	Power filter choke	7
1209041	Coil	R.F. "B" choke	8
1209042	Coil assy.	Antenna	12
1209043	Coil	Oscillator	13
1209044	Coil assy.	R.F.-1st Det.	14
1209047	Condenser	Electrolytic block	20A,B,C
		Sec. (A) 12 mfd., (B) 8 mfd., (C) 8 mfd.,	
1209048	Condenser	By-pass block	21A,B,C
		Sec. (A) .04 mfd., (B) .06 mfd., (C) .008 mfd.	
1209049	Condenser	By-pass block	22A,B,C
		Sec. (A) .06 Mfd., (B) .45 Mfd. (C) .45 Mfd.	
†1209050	Condenser	By-pass block	23AtoF
		Sec. (A), (B), (F), .08 mfd., (C) .4 mfd., (D) .01 mfd., (E).1 mfd.	
1207904	Condenser	Molded .001 mfd.	24
1209051	Condenser	Molded .00012 Mfd.	25
1209052	Condenser	Molded .0027 Mfd.	26
1209053	Condenser	Molded .000405 Mfd.	27
1209054	Condenser	Molded .00005 Mfd.	28
1209055	Condenser	Molded .00025 Mfd.	29
*1209056	Condenser	Tubular .075 Mfd.	33
‡1209213	Condenser	Tubular .06 Mfd.	33
1209055	Condenser	Molded .00025 Mfd	34
1209058	Condenser	3 Gang tuning	37
1209212	Condenser	Tubular .008 Mfd.	
1209059	Coupling	Condenser drive	
1209090	Cover	Chassis top (Buick-Pontiac)	
1209094	Cover	Chassis top (Olds)	
1209091	Cover	Tube lid (Buick-Pontiac)	
1209095	Cover	Tube lid (Olds)	
1209046	Cover	Vibrator trans.	

* Used below serial #1748809 † See "CIRCUIT CHANGES"
‡ Used above serial #1748809

The "A" supply to the receiver is filtered to prevent any spark interference from affecting the receiver circuits and also makes possible the installation of this receiver without the use of spark plug suppressors.

Delayed automatic volume control is used so that it will not have any effect on the volume of weak stations. A slight delay is also used on the detector circuit to assist materially in reducing background noise.

The vibrator circuit is permanently connected to operate on a car battery with the negative side grounded, as is the case on Buick, Olds and Pontiac automobiles.

The antenna of this receiver is capacity coupled to the grid winding of the antenna coil tuned by the first section of the gang condenser and feeding into the grid of the pentode section of the 6F7 tube, which in this case is used as an R.F. pentode and audio amplifier. The plate circuit of the pentode section of this tube is inductively coupled to the grid winding feeding the 6A7 tube and tuned by the third section of the gang condenser. The 6A7 tube is used as the conventional detector-oscillator. The oscillator frequency which is produced due to the reaction between the oscillator grid and plate and associated circuit constants is tuned by the middle section of the gang condenser. The incoming frequency and the oscillator frequency are mixed in the 6A7 tube and the resultant frequency which is 262 kilocycles is transformer coupled to the grid of the R.F. pentode section of the 6B7 tube and the output of this section of tube is impressed on one of the diode plates of this tube for detection. A.V.C. voltage is produced in the other diode plate circuit and controls the grid bias of the R.F. section of the 6F7 and 6A7 tubes. The audio output of the detector circuit is coupled to the grid of the triode section of the 6F7 tube and the grid voltage swing is controlled by the volume control. The output of this section of the tube is resistance coupled to the grid of the type 42 power output pentode. The plate circuit of this tube is coupled through the output transformer to the speaker voice coil.

*1209062	Resistor	Candohm	41A,B,C
	Sec. (A) 600 ohms, (B) 125 ohms, (C) 440 ohms		
‡1209210	Resistor	Candohm 165 ohms	42
1209063	Resistor	"Ohmite" 11,000 ohms	43
1204136	Resistor	Carbon 200,000 ohms	44,45,46
‡1209211	Resistor	Candohm	47A,B,C
	Sec. (A) 386 ohms, (B) 615 ohms, (C) 440 ohms		
1208144	Resistor	Carbon 1 megohm	48
1209016	Resistor	Carbon 120,000 ohms	52
1204140	Resistor	Carbon 50,000 ohms	53
1204138	Resistor	Carbon 500,000 ohms	54
1209064	Resistor	Carbon 125,000 ohms	55
1207905	Resistor	Carbon 150,000 ohms	56
‡1209016	Resistor	Carbon 120,000 ohms	57
1209071	Speaker assy.	Complete 6 1/2" (G.H.U.)	60
1209072	Speaker assy.	Complete 6 1/2" (Rola)	60
1209073	Transformer	Output (G.H.U.)	66
1209202	Transformer	Output (Rola)	66
1209074	Transformer	1st I.F.	67
1209075	Transformer	2nd I.F.	68
1209076	Transformer	Vibrator	69
5037400	Vibrator	Plug-in type	70
1209076	Volume control	500,000 ohms	71
1209138	Washer	Rubber tuning cond.	
1208513	Washer	Osc. coil mtg.	
1207608	Washer	Rubber I.F. trans. mtg	

BUICK INSTALLATION PARTS (Special)

1209193	Bracket	Control unit (40 Series only)
1208568	Spring	Static collector
1207821	Suppressor	Distributor
1208557	Tube	Brass-ant. lead

PONTIAC INSTALLATION PARTS (Special)

1208562	Shield	Spark coil
1207821	Suppressor	Distributor

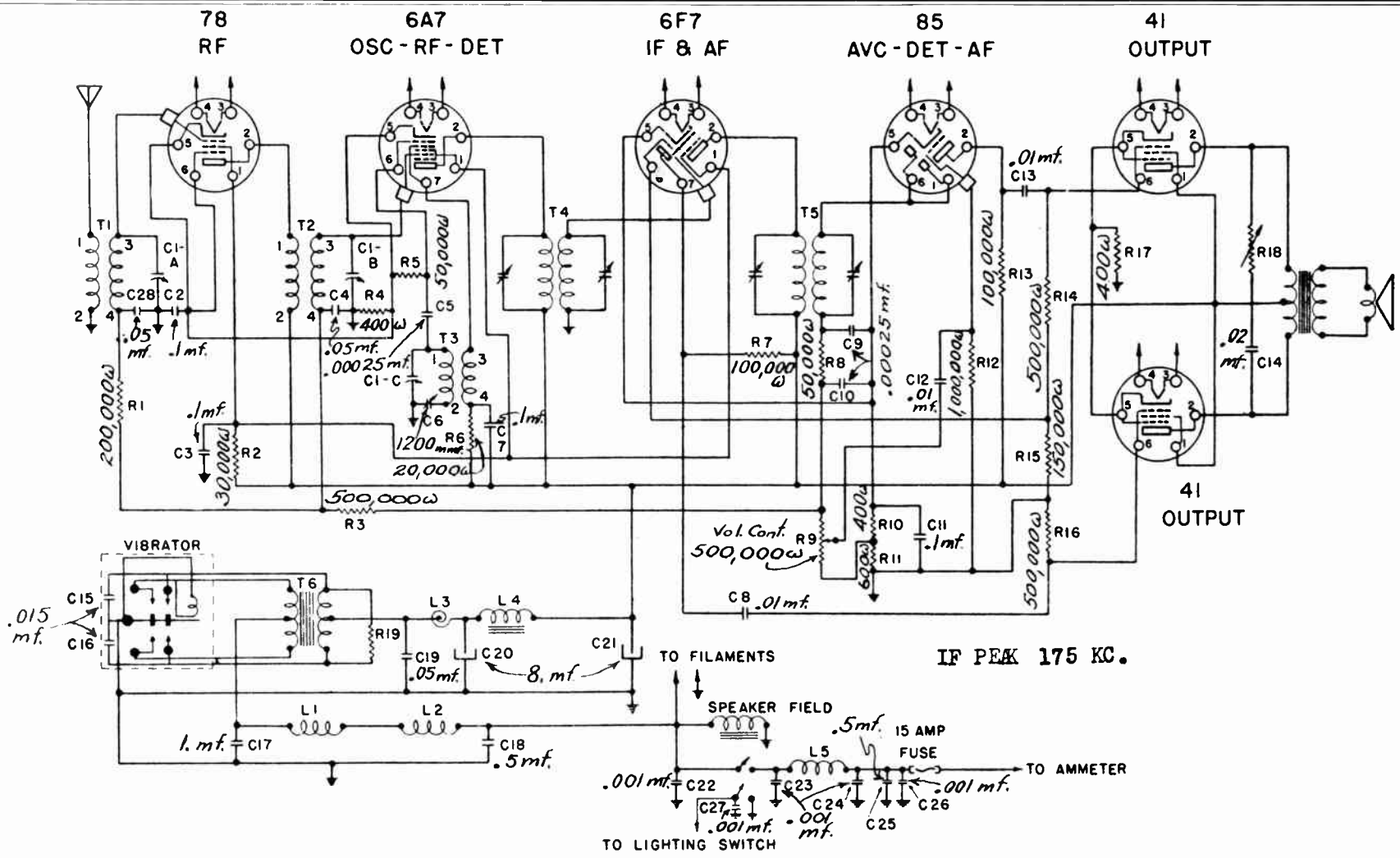
* Used below serial #1748809
‡ Used above serial #1746809

OLDS INSTALLATION PARTS (Special)

1206561	Clip	Replacement lead
1856907	Lead	Primary replacement
1208562	Shield	Spark coil
1208576	Spring	Static collector
1208559	Strip	Bonding
1208560	Strip	Bonding
1208544	Suppressor	Distributor
29353	Terminal	Replacement lead

INSTALLATION PARTS--COMMON ALL SETS

1853686	Adapter	Suppressor
1849161	Condenser	Ammeter by-pass
1849014	Condenser	Generator by-pass
1850429	Condenser	Domelight by-pass
120375	Nut	Chassis mtg.
1207790	Screw	Control unit
1208542	Shield assy.	Antenna lead
1208054	Stud	Chassis mtg.
1208565	Washer	Chassis stud
1208566	Washer	Speaker stud



All voltage readings taken from chassis to indicated tube prong. 6 volts at tube prongs, which usually requires 6.2 volts at ammeter lead clip.

TUBE	PRONG NUMBER						
	#1	#2	#3	#4	#5	#6	#7
78	75	195	6	0	5	5	
6A7	75	195	6	0	5	-2	125
6F7	75	195	6	0	5	0	70
85	0	60	6	0	5	0	
41	195	190	6	0	16	0	

Important: The speaker cable plug plate must be connected to the chassis to complete the circuit.

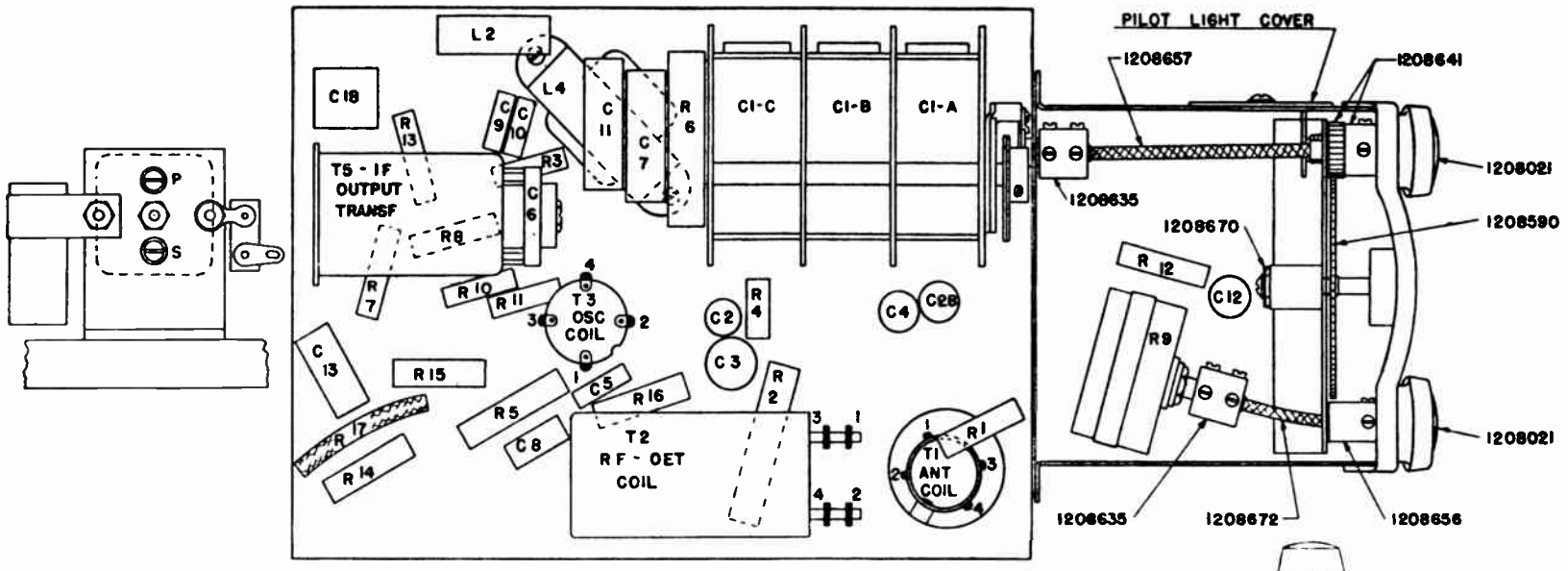


Fig. 7. Location of Parts Under Chassis.

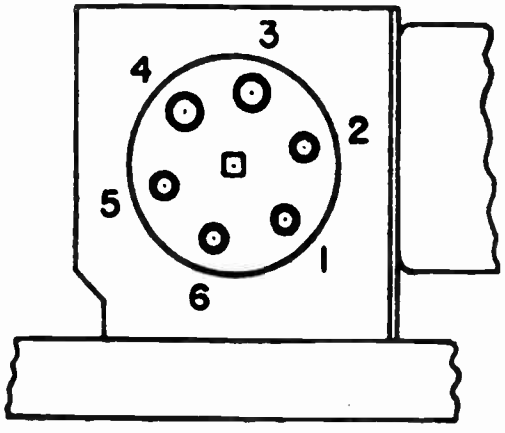
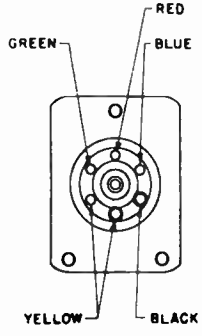


Fig. 4. Speaker Plug in Chassis.



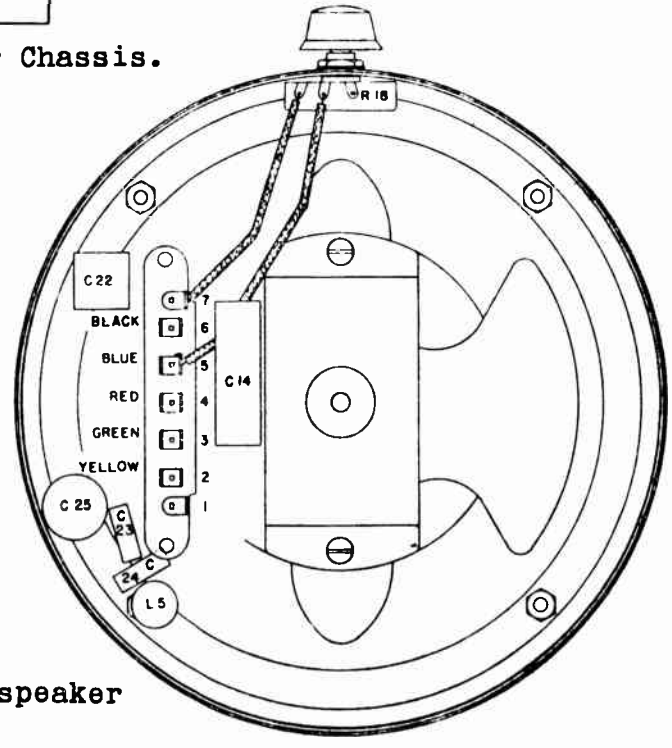


Fig. 5. The Loudspeaker

UNITED MOTORS SERVICE

MODEL Chevrolet 601038
Alignment, Test Data

THE POWER SUPPLY UNIT.

The power supply unit is of the vibrating reed, synchronous mechanical rectifier type. The vibrator is of the plug-in type. It is sealed and no attempt should be made to repair it. Defective ones should be returned for replacement.

To gain access to the vibrator, remove the five Parker Kalon screws from around the power supply unit case top cover. The cover should then be pulled straight up. Do not attempt to pry up one end. Contacting fingers are riveted around the edges of the cover. These fingers must make tight contact with the power supply unit case in order to prevent radiation of interference from the power supply. The Parker Kalon screws in the top and the bottom covers of the case must be tightened securely to prevent noise radiation.

R19 is a special resistor whose value varies with the voltage applied to it. When the receiver is first turned on, the output voltage tends to become very high until the tubes heat sufficiently to draw their normal load. Under this condition, the value of R19 drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the resistance of R19 increases greatly so that it no longer constitutes a load on the power supply.

The power supply unit may be removed from the chassis by taking out the four screws that hold it to the chassis plate and unsoldering the red and orange wires that pass through the fibre grommet near the left edge of the set.

The following chart will be helpful in making tests of the power supply unit. A continuity meter or ohmmeter may be used.

Power Supply Unit Test Chart

Note: Tests are to be made with the speaker plugged into the chassis, and the vibrator unit removed. Be sure the speaker plug plate makes contact with the chassis.

TEST (see Fig. 1)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
#4 to #5	400 ohms.	Defect in power transformer secondary or in R19.
#1 to #3	Very low resistance reading	Defect in power transformer primary
From [redacted] prong [redacted] of 41 output tube to #4 or #5 prong of vibrator socket	Approximately 425 ohms.	Defective L3 or L4.
From [redacted] prong [redacted] of 41 output to chassis	Open	Shorted C19, C20, or C21.
#2 to chassis	0 resistance	Open ground connection to prong
From #1 or #3 to ground, with speaker plug removed from chassis, tubes removed from sockets, and pilot light removed.	Open	Shorted C17 or C18.

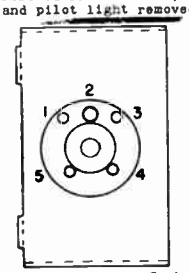


Fig. 1. Vibrator Socket

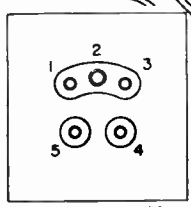


Fig. 2. Vibrator Plug

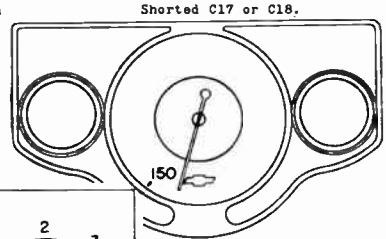


Fig. 3.

Vibrator Test Chart

TEST (see Fig. 2)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
#2 to #4	Open	Shorted C15. Defective vibrator
#2 to #5	Open	Shorted C16. Defective vibrator
#2 to #3	42 ohms	Defective vibrator
#1 to #2	Open	Defective vibrator
#2 to case	Closed	Defective vibrator

PILOT LIGHT REPLACEMENT

The pilot light can be made accessible for replacement by removing the two screws in the left side of the control unit housing. The small plate, with the pilot light socket attached, can then be removed. Be sure to turn the set off before attempting to remove the plate

ALIGNMENT

The IF Stages:

1. Connect a low voltage output meter across the transformer secondary in the speaker, or a high voltage meter between the plate prongs of the 41 tubes.

2. Set the test oscillator at 175 kc and connect its output between the control grid of the 6F7 tube and the chassis. Leave the tube shield in place and the grid connection attached to the cap. Adjust the two adjusting screws in T5 for maximum output meter deflection. The output of the test oscillator should be kept at as low a value as possible, in order to rendef the AVC action inoperative

3. Connect the test oscillator between the 6A7 control grid and the chassis. Adjust the two screws in T4 for maximum output meter deflection. As the meter reading is brought up due to peaking, reduce the test oscillator output so that it is kept at as low a value as possible.

The RF Stages:

(a) Adjusting the Calibration:

1. Loosen the four set screws in the variable condenser coupling (1208635 in Fig. 7).

2. Fully mesh the condenser plates.

3. Turn the Station Selector knob to its low frequency limit, keeping the condenser fully meshed.

4. Tighten the set screws in the coupling.

5. Turn the Station Selector knob to its high frequency limit. The dial pointer then should barely overlap the lower corner of the Chevrolet insignia on the dial, as shown in Fig. 3. If it does not, remove the knobs and the two bearing inserts that are screwed in the escutcheon. The escutcheon can then be removed, the dial pointer mounting screw loosened and the dial pointer set correctly. In its correct setting, the dial pointer position coincides with the stop on the large gear.

(b) Peaking the Trimmers:

1. Set the test oscillator to exactly 1500 kc and connect its output between the antenna socket contact and the chassis, in series with a .0002 mfd. mica condenser. No other value of condenser should be used.

2. With the Station Selector left at its high frequency limit, adjust the three trimmers on the variable condenser for maximum output meter deflection.

3. Readjust the test oscillator to 600 kc and tune in its signal.

4. Adjust the oscillator padder, C6, by slowly rotating the variable condenser back and forth a degree or two, adjusting the padder at the same time, until maximum output is obtained.

5. Since the adjustments are inter-acting to an extent, it is advisable to repeat the entire operation.

CHASSIS UNIT TEST CHART

Note: Tests are to be made with the speaker plug removed from the chassis, the vibrator removed, the tubes removed, and the pilot light bulb removed.

TEST (see Fig. 4)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
Lighting switch lead to chassis	Open with set switch off; closed with set switch on.	Defect in connector or switch.
#3 to chassis	Open	Short in filament circuit.
#4 to chassis	Open	Short in filament circuit.
#3 to #4	Open with set switch off; closed with set switch on.	Defect in switch or wiring.
#1 to #1 prong of 41 tubes	Reading	Open circuit
#1 to #2 prong of 6F7	100 ohms	Defective IF output Transformer, T5.
#1 to #2 prong of 6A7	100 ohms	Defective IF input Transformer, T4.
#1 to #2 prong of 78.	7 ohms	Defective RF-Detector coil.
#1 to #2 prong of 85 tube	100 M ohms	Defective R13.
#1 to #7 prong of 6F7	100 M ohms	Defective R7.
#1 to #7 prong of 6A7	20 M ohms	Defective R6 or defective oscillator coil, T3.
#1 to #1 prong of 78, 6A7, 6F7	30 M ohms	Defective R2
Antenna socket contact to chassis	18 ohms	Defective antenna coil
Control grid of 78 to ground	Open	Shorted C28 or shorted tuning condenser (01-A).

MODEL Chevrolet 601038
Socket, Test Data, Parts UNITED MOTORS SERVICE

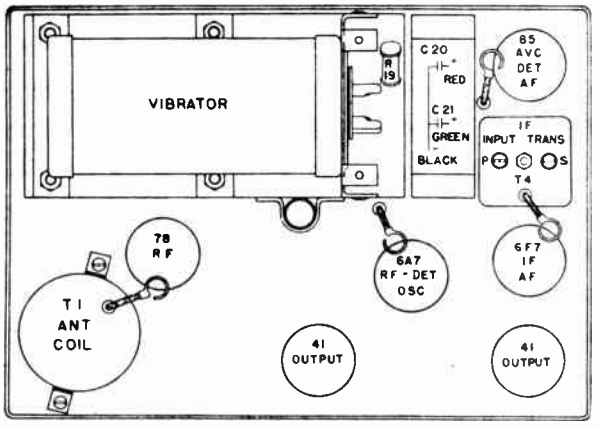


Fig. 8. Tube Positions and Functions.

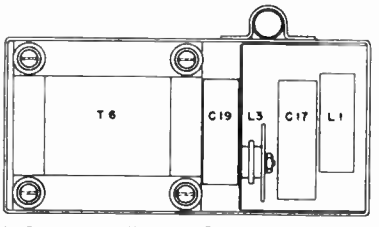


Fig. 9. Location of Parts in Base of Power Supply Unit.

SPEAKER TEST CHART

Note: These tests are to be made with the speaker plug removed from the chassis.

TEST (see Fig. 5).	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
Case to #6	5 ohm reading	Defective field coil
#5 to #7	0-500 M ohms as Tone Control is turned	Defective Tone Control
"A" clip to #2	Reading	Open L5
"A" clip to shield	Open	Shorted C23, C24, C25, or C26.
#3 to #4	300 ohms	Defect in transformer secondary.
#4 to #5	275 ohms	Defect in transformer secondary.
#3 to #7 with Tone Control in "Brilliant" position	500 M ohms	Shorted C14.

1208684	Choke	RF	L-1
1208685	Choke	RF	L-2
1208630	Choke	RF	L-3
1208587	Choke	Audio	L-4
*1208686	Choke	RF	L-5

*Indicates part mounted in speaker.

1208624	Clamp	Instrument panel, removable part	
1208625	Clamp	Lead lighting switch	
1208626	Clamp	To make dual condenser units	
1208629	Clip	Grid connection	
1208585	Coil	Antenna	T-1
1208586	Coil	RF-Detector	T-2
1208631	Coil	Oscillator	T-3
1208583	CONDENSER	Variable tuning	C-1 (A-B-C)
1208675	* Bearing	Drive pinion	
1208678	* Bracket	Drive pinion bearing	
1208676	* Clamp	Drive pinion bearing retaining	
1208679	* Gear assembly	Rotor driving	
1208674	* Pinion and Shaft	Drive	
1208677	* Screws	Drive pinion bearing retaining clamp	
1208680	* Spring	Coil, rotor driving gear	
1208627	SHIELD	Antenna lead-in	
1838476	Ferrule	Antenna contact	
1208592	Shield	RF-Detector coil, includes speaker plug and bracket	
1208658	SHIELD	Tube, both halves	
1208660	Base mounting member	For 1208658	
1208659	Clamping ring	For 1208658	
1208623	SOCKET	Antenna (includes bracket)	
1838476	Ferrule		
1836876	Spring		
1843713	Washer		

PARTS LIST -- Cont'd.

Part No.	Part Name	Description	Code
1208599	Condenser	.1 mfd. 200 volts	C2
1208598	Condenser	.1 mfd. 30 volts	C3
1208673	Condenser	.05 mfd. 200 volts	C4
1208605	Condenser	.00025 mfd. mica	C5
1208597	Condenser	1200 mmf. oscillator padder	C6
1208599	Condenser	.1 mfd. 200 volts	C7
1208600	Condenser	.01 mf. 600 volts	C8
1208605	Condenser	.00025 mfd. mica	C9
1208605	Condenser	.00025 mfd. mica	C10
1208599	Condenser	.1 mfd. 200 volts	C11
1208601	Condenser	.01 mfd. 200 volts	C12
1208600	Condenser	.01 mfd. 600 volts	C13
1208682	Condenser	.02 mfd. 800 volts	C14
	Condenser	.015 mfd. 1200 volts (enclosed in vibrator unit).	C15
	Condenser	.015 mfd. 1200 volts (enclosed in vibrator unit).	C16
1208604	Condenser	1 mfd. 25 volts	C17
1208603	Condenser	.5 mfd. 160 volts	C18
1208602	Condenser	.05 mfd. 600 volts	C19
1208584	Condenser	8 mfd. dual electrolytic	C20
1208584	Condenser	8 mfd. dual electrolytic	C21
*1208683	Condenser	.001 mfd. mica	C22
*1208683	Condenser	.001 mfd. mica	C23
*1208683	Condenser	.001 mfd. mica	C24
*1208669	Condenser	.5 mfd. 200 volts	C25
1208606	Condenser	.001 mfd. mica (built into ammeter lead).	C26
1208606	Condenser	.001 mfd. mica in metal case	C27
1208673	Condenser	.05 mfd. 200 volts	C28
*1208693	Control	Tone, 500 M ohms, with nut and washer	R18
1208589	Control	Volume	R9
1208635	Coupling	Flexible shaft to volume control and variable condenser	
1208636	Cover	Power supply bottom	
1208637	Cover	Power supply top	
1208632	Dial glass		
1208633	Dial	Station selector	
1208596	Escutcheon		
120151	Fuse	15 amp.	
1208642	Pointer	Dial	
1208634	Power Supply unit	Complete less vibrator	
1208645	Resistor	200 M ohm, 1/3 watt carbon	R1
1208652	Resistor	30 M ohm, 1 watt carbon	R2
1208644	Resistor	500 M ohm, 1/3 watt carbon	R3
1208650	Resistor	400 ohms, 1/3 watt carbon	R4
1208648	Resistor	50 M ohm, 1/3 watt carbon	R5
1208653	Resistor	20 M ohm, 1 watt carbon	R6
1208647	Resistor	100 M ohm, 1/3 watt carbon	R7
1208648	Resistor	50 M ohm, 1/3 watt carbon	R8
1208650	Resistor	400 ohms, 1/3 watt carbon	R10
1208649	Resistor	600 ohms, 1/3 watt carbon	R11
1208651	Resistor	1 megohm, 1/3 watt carbon	R12
1208647	Resistor	100 M ohms, 1/3 watt carbon	R13
1208644	Resistor	500 M ohms, 1/3 watt carbon	R14
1208646	Resistor	150 M ohms, 1/3 watt carbon	R15
1208644	Resistor	500 M ohms 1/3 watt carbon	R16
1208654	Resistor	400 ohms 2 watts, Flexible	R17
1208643	Resistor	Globar, 1 watt, voltage regulator	R19
1208549	Screen	Toe Board	
1208639	Screw	Case clamping	
1208658	Shaft	Volume control, knob end	
1208657	Shaft	Station selector	
1208672	Shaft	Flexible, volume control	
1208591	Shield	Antenna coil	
1208614	Socket and bracket	Vibrator	
1208615	Socket and bracket	Dial light	
1208661	Socket	7 prong	
1208662	Socket	6 prong	
1208663	Socket	Vibrator	
601105	SPEAKER	Complete with case and cable	
1208666	* Cable, plug and * plate		
1208689	* Case	Back cover	
1208690	* Case	Less cover	
1208688	* Plug		
1208691	* Screw	Mounting, ornamental head	
1208687	* Speaker only	Less transformer and case	
1208688	* Transformer	Includes mounting bracket	T-7
1208552	Static collector	Universal	
1207900	Suppressor	Distributor	
1208593	Transformer	IF INPUT	
1208594	Transformer	IF output	T-4
1208568	Transformer	Power	T-5
1207424	Lamp	Pilot, 6 to 8 volts	T-6
1208694	LEAD	Lighting switch, complete	
1838869	* Cap	For connector of 1208655	
1838476	* Ferrule	For connector of 1208628 and 1208655	
1208628	* Lead	Chassis end only	
1208655	* Lead	Lighting switch end only	
1208697	* Lead	With lug and rubber sleeve for 1208655	
1836876	* Spring	For connector of 1208628	
1843713	* Washer	For connector of 1208628	

UNITED MOTORS SERVICE

MODEL Chevrolet 601574
Schematic
Voltage

TUBE BASE DIAGRAM SYMBOLS

Type	Function	H	P	S	PT	GT	G1	G2	K
6F7	R.F.	6	245	100	70	-	-	-	2.5
6A7	Det-Osc.	6	245	100	-	-	-0	170	2.5
6B7	I.F.,--2nd Det-AVC	6	245	100	-	-	-	-	10.0
41	Output	6	230	245	-	-	-	-	16.0

NOTE: Ampere drain of set at 6 volts is 6.0 amperes
Milliampere drain from "B" supply is approximately 55 M.A.

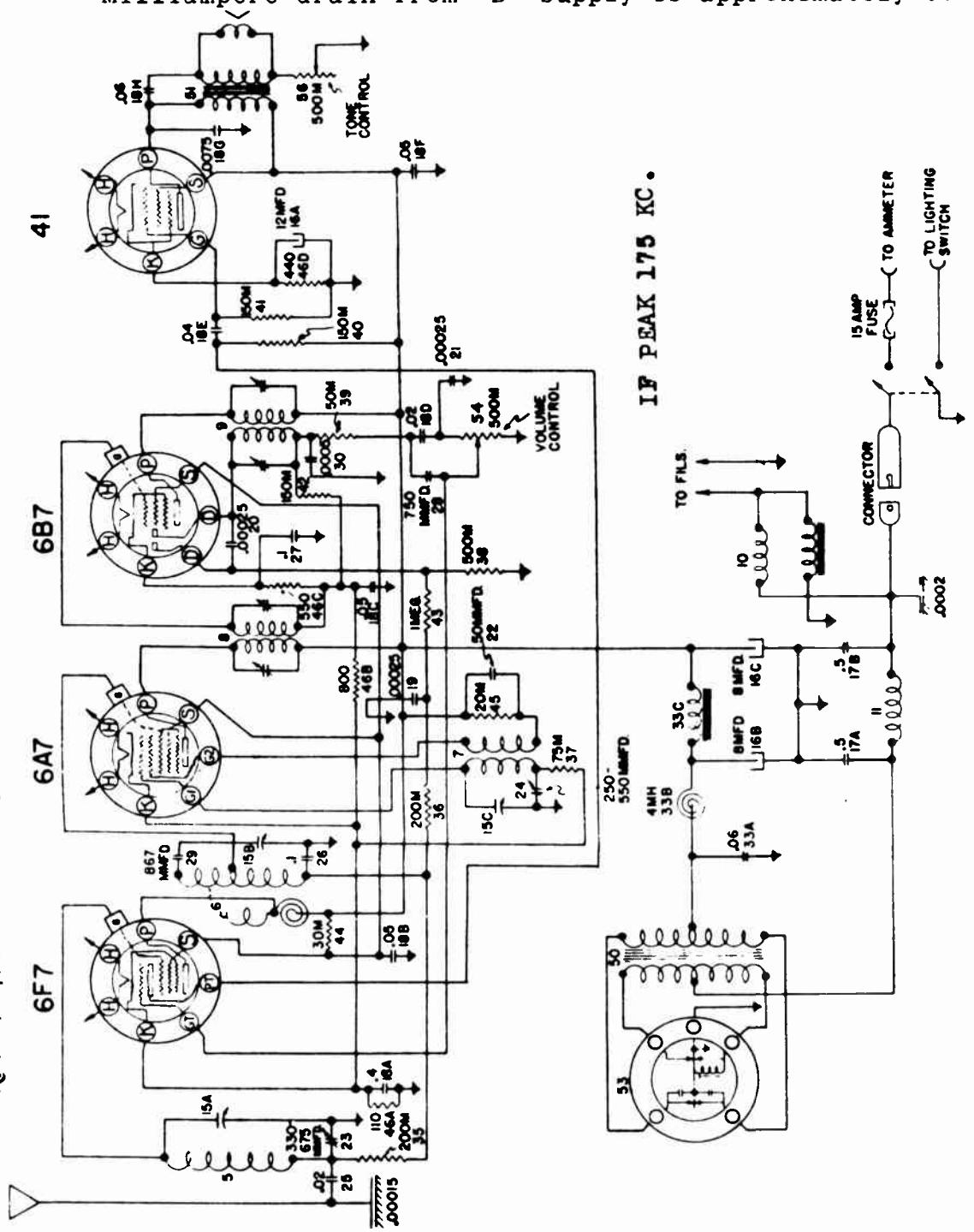


FIG. 1--CHEVROLET 601574 CIRCUIT DIAGRAM

MODEL Chevrolet 601574
Parts Layouts

UNITED MOTORS SERVICE

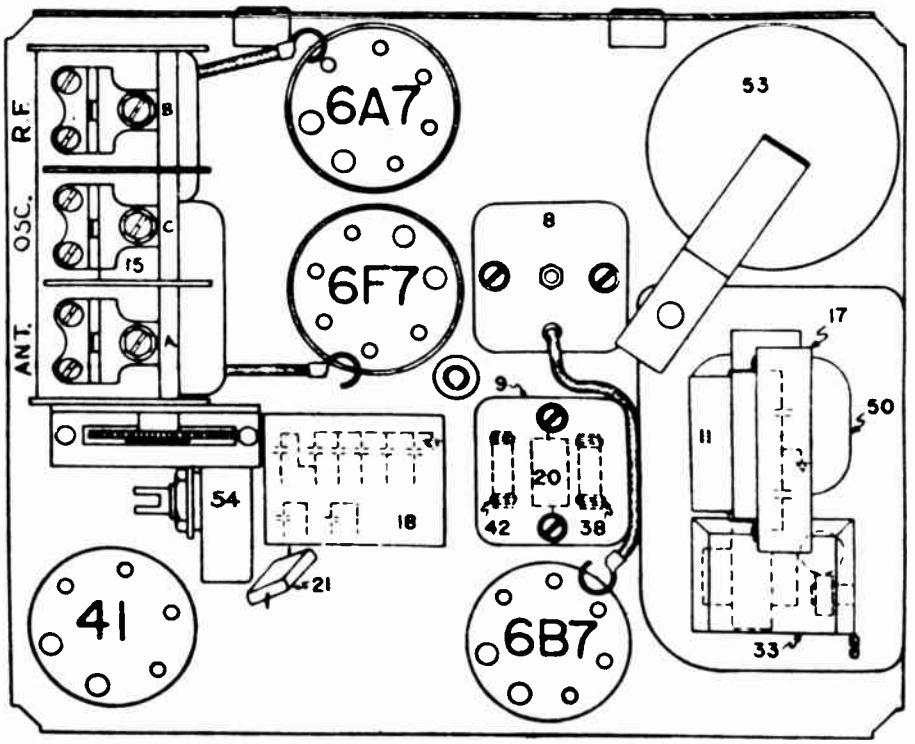


FIG.2--PARTS LAYOUT--Top View

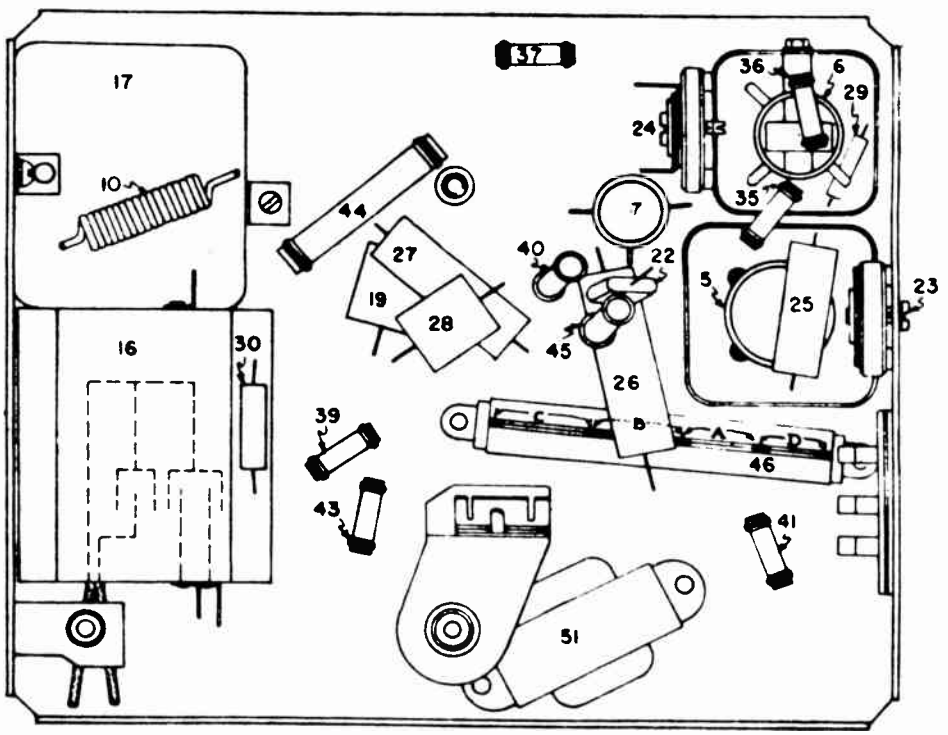


FIG. 3--PARTS LAYOUT--Bottom View

The antenna circuit of this receiver is capacity coupled to the antenna system. This results in exceptionally high gain in the antenna stage and serves to make up for the relative inefficiency of the under-car antennas which are necessary on the all steel top cars. A separate adjustment is provided on the receiver to permit an accurate alignment to the car antenna.

The audio output of the detector circuit is coupled to the triode portion of the 6F7 tube for audio frequency amplification. The pentode section of the same tube is used as a radio frequency amplifier.

The "A" supply to the receiver is filtererd to prevent any spark interference from affecting the receiver circuits and makes possible the installation of this receiver without the use of spark plug suppressors.

A plug-in vibrator is used of the full wave self-rectifying type. Its circuit is permanently connected for operation on a car battery with the negative side grounded as is the case on Chevrolet automobiles.

Tone control action is obtained in a unique manner in that one of the voice coil leads present in the speaker cable is also used as a conductor for the tone control circuit. This is done to reduce the number of wires in the speaker cable and has no effect on the voice coil circuit because of the great differences in impedance between the voice coil circuit and the output tube plate circuit.

The output transformer of this receiver is an integral part of the chassis. This is necessary because of space limitations in a "header" speaker.

Circuit Operation

Referring to the Circuit Diagram Figure 1: The antenna system used with this receiver is capacity coupled to the antenna coil. The antenna capacity is accurately matched to the receiver antenna stage, greatest efficiency through the use of an adjustable padding condenser. The antenna coil is tuned by the "ANT" section of the condenser gang and feeds the pentode grid of the 6F7 tube. The output of the pentode portion of the 6F7 tube is capacity coupled to the grid coil tuned by the "R.F." section of the condenser gang feeding the control grid of the 6F7 detector-oscillator tube. The incoming station frequency is then mixed in this tube with the frequency produced by the receiver oscillator circuit which is tuned by the "OSC." section of the condenser gang. A resultant frequency is produced of 175 kilocycles and is inductively coupled to the pentode grid of the 6B7 tube. The output of the pentode section of the 6B7 tube is then impressed on one of the diode plates of this tube for detection purposes through the 2nd I.F. coil. A.V.C. voltage is produced in the other diode plate circuit and controls the grid bias on both the pentode section of the 6F7 tube and the control grid of the 6A7 tube. The audio output of the detector circuit is coupled to the grid of the triode portion of the 6F7 tube and the grid voltage swing is controlled by the volume control. The plate circuit of this section of the tube is resistance coupled to the grid of the 41 output tube. The output of the 41 tube is coupled to the speaker voice coil through the output transformer. Tone control action is obtained by feeding some of the higher frequencies to ground using the voice coil circuit as a conducting medium.

MODEL Chevrolet 601574
Alignment,Parts List

UNITED MOTORS SERVICE

Connecting Output Meter

Connect one of the output meter leads to the plate prong of the type 41 output tube. The plate prong is the first prong to the left of the filament when looking at the bottom of the tube with the filament prongs toward you. Connect the other output meter lead to the receiver chassis, making sure that the meter is protected with a D.C. blocking condenser connected in series to prevent damage to the meter.

IMPORTANT

Due to the high sensitivity of these receivers, the receiver chassis must be in its case before making any adjustments. This is necessary in order to obtain accurate adjustments and to prevent oscillation due to lack of the shielding effect of the receiver case.

Peaking I.F. Stages at 175 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) Set the test oscillator on 175 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the I.F. trimmers on the 2nd I.F. coil, Illustration #9 on Fig. 2.

(e) Then peak each of the trimmers on the 1st I.F. coil, Illustration #8 on Fig. 2.

NOTE: In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. (Do not use the .5 mfd. condenser that was required in aligning the I.F. stages.)

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Ajdust the trimmer for the oscillator section of the gang condenser (middle section CAREFULLY for maximum output. Then adjust the trimmers for the "R.F." and "ANT." sections of the gang condenser also for maximum output.

Tracking Oscillator at 540 K.C.

(a) Turn the condenser plates until they are COMPLETELY IN MESH.

(b) Set test oscillator at 540 kilocycles. (Leave test oscillator leads connected to antenna and ground of receiver.)

(c) Adjust the oscillator tracking condenser (Illus. #24 on Fig. 3) located on the bottom of the chassis until the 540 K.C. signal is tuned in with maximum output.

Peaking Gang Condenser at 1400 K.C.

(a) Set the test oscillator at 1400 kilocycles.

(b) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output.

(c) Readjust the parallel trimmers for the "R.F." and "ANT." sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT DISTURB the setting of the "OSC." section of the gang condenser as this is adjusted at 1530 K.C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

Adjusting Receiver to Car Antenna

NOTE: An antenna compensating condenser is provided in the antenna circuit of this receiver that must be adjusted to the particular car antenna the receiver is to be used on. The test oscillator cannot be used for this adjustment due to the fact that capacity of its output circuit will not match the wide range of antenna capacities being used. Therefore, it is necessary that the adjustment be made after the receiver is installed on the car and is done in the following manner:

(a) Tune the receiver to a weak broadcast station on the low frequency end of the dial 550 to 700 K.C.

(b) Adjust the antenna compensating condenser for maximum response from the broadcast station. This condenser is shown as Illustration #23 on Fig. 3 and is located immediately to the rear of the speaker plug on the side of the receiver case.

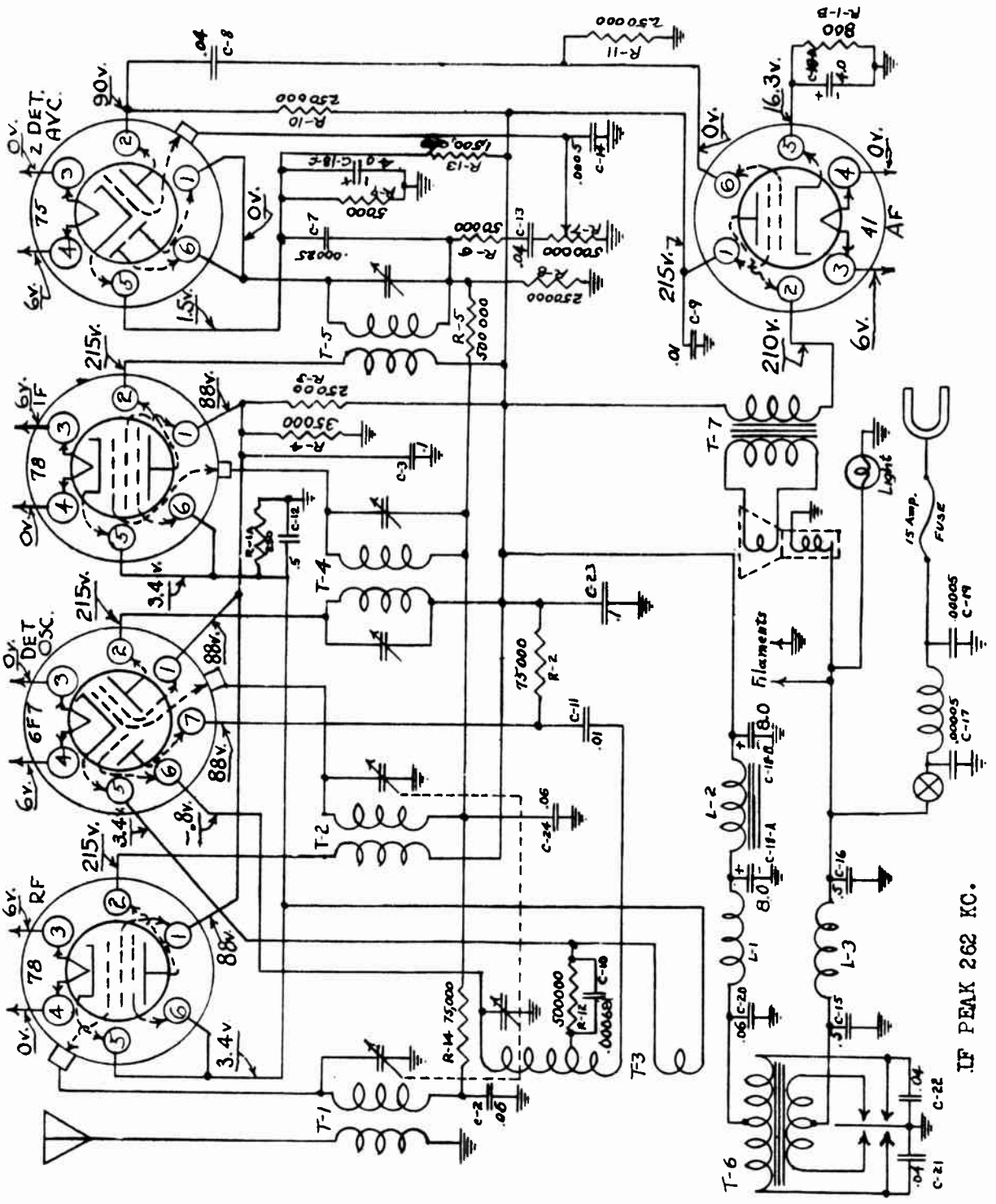
CHASSIS PARTS

Part No.	Part Name	Description	Illus. No.
1809573	Case	Chassis	
1209574	Case	Power transformer	
1207683	Clip	Grid connector	
1209527	Coil	Antenna	5
1209528	Coil	R.F.	6
1209529	Coil	Oscillator	7
1209544	Coil assy.	1st I.F.	8
1209544	Coil assy.	2nd I.F.	9
1209571	Coil	Tube filament choke	10
1209572	Coil	Vibrator "A" choke	11
1209530	Condenser	3 gang tuning	15
	Sec. A	Antenna	
	Sec. B	R.F.	
	Sec. C	Osoillator	
1209531	Condenser	Electrolytic block	16
	Sec. A	16 mfd.	
	Sec. B	8 mfd.	
	Sec. C	8 mfd.	
1209532	Condenser	By-pass block	17
	Sec. A	.5 mfd., 160 volt	
	Sec. B	.5 mfd., 160 volt	
1209533	Condenser	By-pass block	18
	Sec. A	.4 mfd., 160 volt	
	Sec. B	.05 mfd., 200 volt	
	Sec. C	.05 mfd., 160 volt	
	Sec. D	.02 mfd., 160 volt	
	Sec. E	.04 mfd., 200 volt	
	Sec. F	.05 mfd., 400 volt	
	Sec. G	.0075 mfd., 800 volt	
	Sec. H	.06 mfd., 400 volt	
1209055	Condenser	Molded .00025 mfd.	19,20,21
1207625	Condenser	Molded .00005 mfd.	22
1209535	Condenser	Antenna compensating	23
1209536	Condenser	Oscillator tracking	24
1207729	Condenser	Tubular .02 mfd., 200 volt	25
1207306	Condenser	Tubular .1 mfd., 160 volt	26,27
1209537	Condenser	Molded .00075 mfd.	28
1209538	Condenser	Molded .000867 mfd.	29
1209556	Condenser	Molded .0005 mfd.	30
1209577	Connector assy.	"A" power on chassis	
1836869	Cap	Ferrule holder	
1838476	Ferrule	Contact	
1209578	Connector assy.	Antenna on chassis	
1838476	Ferrule	Contact	
1836876	Spring	Antenna connector	
1843713	Washer	Antenna connector	
1209557	Connector	Condenser gang shaft	
1209565	Cup	Cond. gang mounting	
120151	Fuse	15 ampere	
1209525	Filter assy.	"B" power	33
	Sec. A	.06 mfd. condenser	
	Sec. B	R.F. choke	
	Sec. C	Audio choke	
1209568	Grommet	Cond. gang mounting	
1209599	Nut	Hex. #4-36 nickle plated	
110922	Nut	Hex. #8-32 nickle plated	
	Nut	Hex. #6-32 nickle plated	
1209581	Pad	Vibrator clamp	
1204136	Resistor	Carbon 200,000 ohms 1/3 watt	35,36
1207943	Resistor	Carbon 75,000 ohms, 1/3 watt	37
1204138	Resistor	Carbon 500,000 ohms, 1/3 watt	38
1204138	Resistor	Carbon 500,000 ohms, 1/3 watt	39
1207905	Resistor	Carbon 150,000 ohms, 1/3 watt	40,41,42
1208232	Resistor	Carbon 1 megohm, 1/3 watt	43
1208959	Resistor	Carbon 30,000 ohms, 1 watt	44
1209405	Resistor	Carbon 20,000 ohms, 1/3 watt	45
1209542	Resistor	Candohm strip	46
	Sec. A	Res. 110 ohms	
	Sec. B	Res. 800 ohms	
	Sec. C	Res. 550 ohms	
	Sec. D	Res. 440 ohms	
1209570	Transformer	Vibrator power	50
1209546	Transformer	Speaker output	51
5039661	Vibrator	Plug-in synchronous	53
1209540	Volume control	Res. 500,000 ohms	54
1209543	Speaker unit	6" Dynamic	55
1209539	Tone control	Res. 500,000 ohms	56

UNITED MOTORS SERVICE

Fig. 2 MODEL 980455 CIRCUIT DIAGRAM

(BUICK, PONTIAC, OLDS.)



MODEL B-O-P 980455
Alignment, Service Notes UNITED MOTORS SERVICE
Parts List

MOTOR NOISE

In sets of previous designs the use of suppressors was necessary in order to eliminate chassis pickup and had but little effect on the interference picked up by the antenna. The Buick, Pontiac and Olds models 980455 are equipped with special filters for the elimination of chassis pickup, (interference with the antenna disconnected from the set) which makes possible the installation of the set with out the usual spark plug suppressors. Care should be taken to keep the ammeter lead away from any high tension cables because of the intense interference field that exists around them. This lead must be by-passed with a ½ mfd. condenser at the point where it connects to the ammeter.

VIBRATORS

Sometimes a small amount of dirt will lodge between the contacts and result in such high contact resistance that the vibrator will not start. If such is apparently the case, remove the transformer-vibrator from the chassis. Disconnect ONLY the red B plus lead from the iron core choke. Turn the receiver "on" (there must be a connection between the vibrator case and the chassis) and start the vibrator by snapping the reed back and forth with a pencil. If the vibrator starts to function, allow it to run without stopping until the dirt has been burned out as indicated by the cessation of brilliant sparking. The vibrator should now start under its own power and should continue to function properly. If the vibrator still fails to start properly, replace the vibrator unit.

Vibrator Noise

Examination of the mechanical construction of the transformer-vibrator assembly will show that the bottom plate of the vibrator case is riveted to the chassis. The transformer-vibrator assembly is fastened to the bottom plate with two Parker Kalon screws through each end of the lid. For complete elimination of vibrator noise it is necessary that the bottom plate of the vibrator assembly make good contact with the vibrator case at all points. Placing screws on all four sides of the bottom plate would make the servicing of the vibrator rather difficult, consequently screws were placed in the ends only. The press fit of the bottom plate must be depended upon to eliminate the vibrator noise.

Do not change a vibrator that is noisy electrically before checking the grounding of the vibrator assembly to its bottom plate. Use a pair of pliers to bend the longest sides of the bottom plate inward just enough to insure a pressure contact with the vibrator assembly at all points.

FAILURES IN TRANSFORMER-VIBRATOR ASSEMBLY

In addition to the actual failure of the vibrator, due to the shorting of the vibrator condensers, or burned or poorly adjusted contacts, there are several other defects, which may occur in the transformer-vibrator assembly, which may seemingly point toward the vibrator as the seat of the trouble.

Defective Tubes. A tube, which has shorted internally, may draw an abnormal amount of "B" current. This high current drain on the "B" supply will make the vibrator operate irregularly, and may make it spark, eventually damaging the vibrator by burning the points.

Defective Condensers. The .06 mfd. (C-20) condenser, connected between the power transformer side of the "B" R.F. choke and ground, may become shorted and cause a high current drain which will, in time, ruin the vibrator points. High current drain causes irregular operation of the vibrator.

Defective R.F. "B" Choke. The R.F. "B" choke may become grounded to the transformer case causing high current drain. Such a short circuit will cause irregular operation of the vibrator.

Less Apparent Defects. Some defects occur which point toward the vibrator and which may be cleared by changing the vibrator although the vibrator is not defective. Vibrators which are replaced due to such defects may be turned down by the factory for warranty replacement as the points and vibrator may be in perfect condition. If the vibrator is irregular in operation, check the points for abnormal wear or burning. Check for shorts in the "B" circuit if the points do not show abnormal burning.

6 Volt Terminal Screws on the transformer terminal board occasionally short against the sliding cover.

Broken Strands in the vibrator leads sometimes occur and the frayed end may come in contact with ground or some other terminal causing irregular operation of the vibrator or blown fuses.

Peaking I.F. Stages at 262 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prong of the 41 output tube and to the chassis frame. Make sure that the output meter is protected with a series condenser internally. If not, connect a 1/10 mfd. condenser in series with the ground lead to the chassis. The Dayrad #875 Universal Test Meter and Series #51 Volt-Ohmeter have this protective condenser included in them.

(a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the U.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."

(c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

(d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Figure (1).

(e) Peak the parrallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

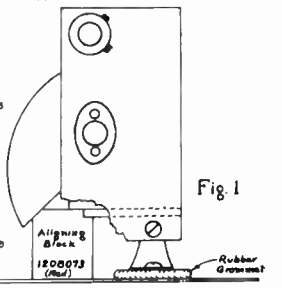


Fig. 1

NOTE--Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to determine the 1400 K.C. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be re-set.

SERVICE HINTS

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R. F. noise due to the vibrator will appear if good ground connections are not made at the dash.

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

1207990	Antenna	T-1	1207986 (a)	250 ohms (b) 800 ohms	R-1A&B
*1208468	Antenna	T-1	1208044	75,000 ohms	R-2
1207989	R.F.--1st Det.	T-2	1208045	25,000 ohms	R-3
*1208469	R.F.--1st Det.	T-2	1208046	35,000 ohms	R-4
1208023	Oscillator	T-3	1204138	500,000 ohms	R-5
*1208470	Oscillator	T-3	1204140	50,000 ohms	R-6
1207998	1st I.F.	T-4	1208047	250,000 ohms	R-8
1207997	2nd I.F.	T-5	1208048	5,000 ohms	R-9
*1208547	2nd I.F.	T-5	1208047	250,000 ohms	R-10
1207999	Filter	L-2	1208047	250,000 ohms	R-11
1208156	3 Gang tuning	C-1A	1204138	500,000 ohms	R-12
1208028	Tubular .06 mfd.	C-2	1208069	1,500,000 ohms	R-13
1207908	Tubular .1 mfd.	C-3	1204141	75,000 ohms	R-14
1207760	Tubular .00025 mfd.	C-7	1208557	Tube (brass) Ant. lead shield	
1207930	Molded .04 mfd.	C-8	1208157	Volume control Includes switch	
			1208204	TRANSFORMER-VIBRATOR ASSEM.	
1207628	Tubular .01 mfd.	C-9	1208187	Bag (small) Cellophane (to cover vib.)	
1208026	Molded .00069 mfd.	C-10	1208188	Bag (large) Cellophane (to cover vib.)	
*1208472	Molded .000569 mfd.	C-10	1208484	Case & brkt Vibrator	
1207626	Tubular .01 mfd.	C-11	1208431	Coil (choke R.F. "A" L-3	
1208242	Tubular .5 mfd.	C-12	1208058	Coil (choke R.F. "B" L-1	
1207930	Tubular .04 mfd.	C-13	1853060	Condenser Metal case .5 mfd. C-15	
			1853060	Condenser Metal case .5 mfd. C-16	
1207636	Molded .0005 mfd.	C-14	1208028	Condenser Tubular .06 mfd. C-20	
1853060	Metal case .5 mfd.	C-15	1208563	Container Vibrator (rubber)	
1853060	Metal case .5 mfd.	C-16	1208060	Insulator Terminal	
1207625	Molded .00005 mfd.	C-17	1208064	Terminal Transformer	
1207995	Elect. block (Sec. a,b 10 mfd., c,d 4 mfd.)	C-18A,B,C&D	1208153	Transformer Vibrator power	
			5035120	Vib. (large) Inc. C-21 & C-22	
**1207625	Molded .00005 mfd.	C-19	1208063	Shield assem. Transf (inc. C-15 & C-16,	
1208028	Tubular .06 mfd.	C-20	*1208522	LEAD ASSEMBLY Ammeter (10 amp. fuse)	
1207908	Tubular .1 mfd.	C-23	1208151	LEAD ASSEMBLY Ammeter (10 amp. fuse)	
1208028	Tubular .06 mfd.	C-24	1208441	DRIVE ASSEMBLY Buick (complete)	
1208550	Molded .0007 mfd.	C-25	1208442	DRIVE ASSEMBLY Pontiac "	
1849014	Generator by-pass		1208443	DRIVE ASSEMBLY. Olds "	
1849161	Ammeter by-pass				
1850429	Dome light				

* Used on sets above Serial No. 1557000

** Not required when No. 1208562 coil shield is used

UNITED MOTORS SERVICE

MODEL B-O-F 980459
Schematic

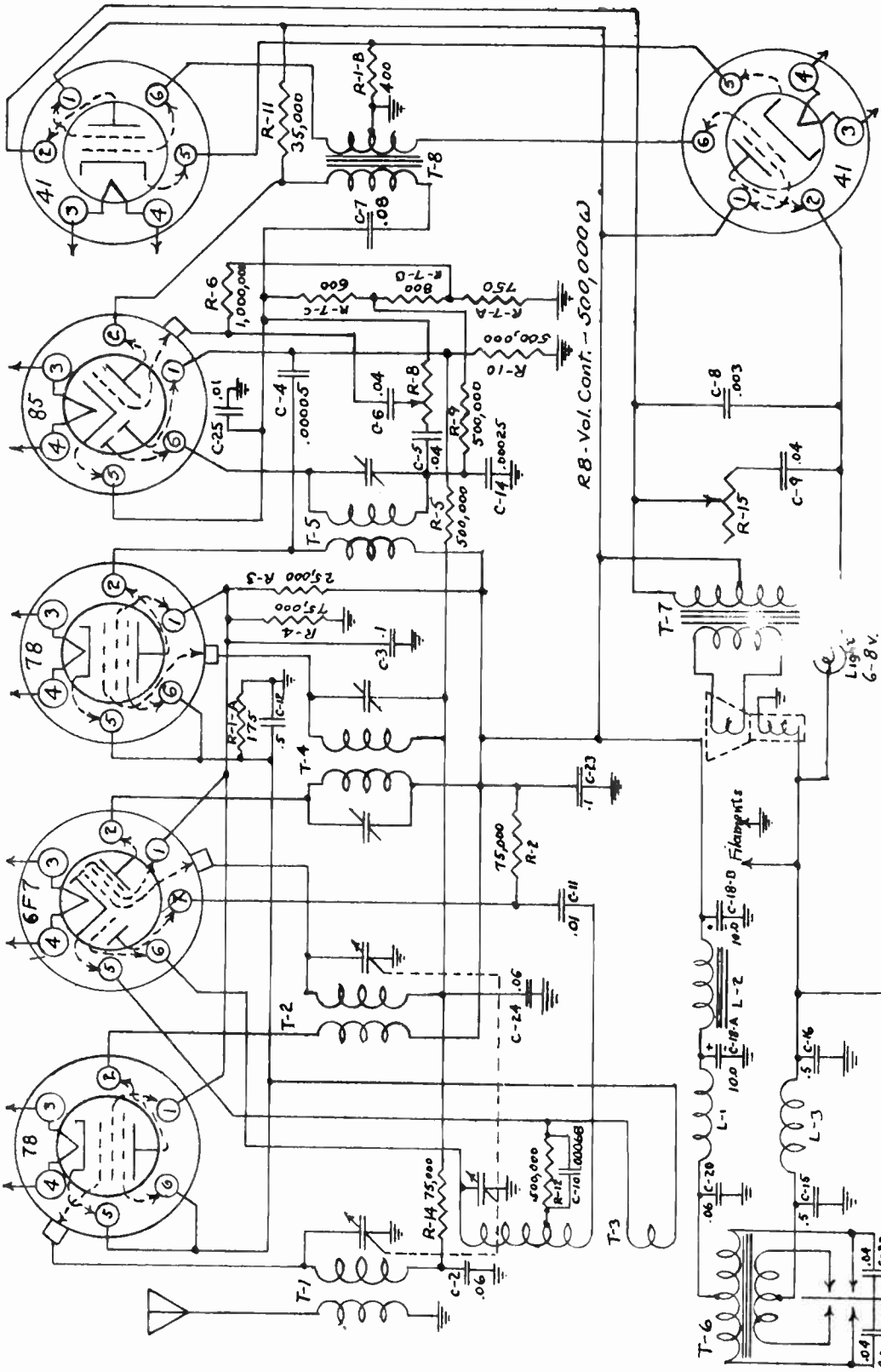


Fig. 2 MODEL 980459 CIRCUIT DIAGRAM
(BUICK, PONTIAC, OLDS.)

MODEL B-O-P 980459
Alignment, Voltage
Parts List

UNITED MOTORS SERVICE

Peaking I.F. Stages at 262 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the two 41 output tubes. Make sure that the output meter is protected with a series condenser internally, if not, connect a 1/10 mfd. condenser in series with one of the meter leads The Dayrad #678 Universal Test Meter and Series #51 Volt-Ohmeter have this protective condenser included in them.

(a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassi ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the oscillator to the antenna connetcion of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the U.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."

(c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

(d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Fig. (1).

(e) Peak the parallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.

PEAKING--Cont'd.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

NOTE: Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to find the 1400 kc. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be reset.

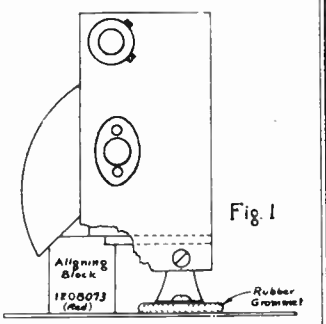


Fig. 1

VOLTAGE CHART

Note: ALL readings are taken from indicated tube prong to chassis frame. Volume control on full. Battery supply voltage at exactly 6 volts.

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Cond.	#7 Triode Plate
78	85	210	5.9	0	3.2	3.2	
6F7	85	210	0	5.9	3.2	0	90
78	85	210	5.9	0	3.2	3.2	
85	0	85	0	5.9	8.0	0	
41	210	205	5.9	0	16	0	
41	210	205	5.9	0	16	0	

SERVICE HINTS

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R. F. noise due to the vibrator may result if a good ground of the receiver to the car chassis is not provided

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

Part No.	Part Name	Description	Code
1207990	Coil	Antenna	T-1
*1208468	Coil	Antenna	T-1
1207989	Coil	R.F.--1st Det.	T-2
*1208469	Coil	R.F.--1st Det.	T-2
1208023	Coil	Oscillator	T-3
*1208470	Coil	Oscillator	T-3
1207998	Coil	1st I.F.	T-4
1207997	Coil	2nd I.F.	T-5
*1208503	Coil	2nd I.F.	T-5
1207999	Coil (choke)	Filter	L-2
1208156	Condenser	3 Gang tuning	C-1A,B,C
1208028	Condenser	Tubular .06 mfd.	C-2
1207908	Condenser	Tubular .1 mfd.	C-3
1207995	Condenser	Molded .00005 mfd.	C-4
1207930	Condenser	Tubular .04 mfd.	C-5
1207930	Condenser	Tubular .04 mfd.	C-6
1208021	Condenser	Tubular .08 mfd.	C-7
1207993	Condenser	Molded .003 mfd.	C-8
1207930	Condenser	Tubular .01 mfd.	C-9
1208026	Condenser	Molded .000068 mfd.	C-10
*1208472	Condenser	Molded .000569 mfd.	C-10
1207928	Condenser	Tubular .01 mfd.	C-11
1208242	Condenser	Tubular .5 mfd.	C-12
1208550	Condenser	Molded .0007 mfd.	C-13
1207996	Condenser	Molded .00025 mfd.	C-14
1853060	Condenser	Metal case .5 mfd.	C-15
1853060	Condenser	Metal case .5 mfd.	C-16
**1207925	Condenser	Molded .00005 mfd.	C-17
1201141	Condenser	Electrolytic (a) 10 mfd.	C-18 A
		(b) 10 mfd.	C-18 B
1207925	Condenser	Molded .00005 mfd	C-19
1208028	Condenser	Tubular .06 mfd.	C-20
1207908	Condenser	Tubular .1 mfd.	C-23
1208028	Condenser	Tubular .06 mfd.	C-24
1208930	Condenser	Tubular .01 mfd.	C-25
1849014	Condenser	Generator by-pass	
1843161	Condenser	Ammeter by-pass	
1850429	Condenser	Dome light	
1208442	SPEAKER ASSEMBLY (complete)		
1208581	Speaker unit--8" dynamic		
1208420	Cardboard ring & muslin cloth assem.		
1207930	Condenser	Tone control .04 mfd.	C-9

* Used on sets above Serial No. 1557025

** Not used on sets having No. 1208539 spark filter plate

Part No.	Part Name	Description	Code
1208244	Resistor (candohm)	(a) 375 ohms (b) 400 ohms	R-1 A,B
1208044	Resistor	75,000 ohms	R-2
1208045	Resistor	25,000 ohms	R-3
1208044	Resistor	75,000 ohms	R-4
1204138	Resistor	500,000 ohms	R-5
1208232	Resistor	1,000,000 ohms	R-6
1208426	Resistor (candohm)	(a) 750 ohms (b) 800 ohms (c) 600 ohms	R-7 A,B,C
1204139	Resistor	500,000 ohms	R-9
1204138	Resistor	500,000 ohms	R-10
1208046	Resistor	35,000 ohms	R-11
1204138	Resistor	600,000 ohms	R-12
1208044	Resistor	75,000 ohms	R-14
1207821	Resistor	Distributor (Buick,Pontiac)	
1208544	Resistor	Distributor (Olds)	
1208204	TRANSFORMER-VIBRATOR ASSEM.		
1208187	Bag (small)	Cellophane (to cover vib.)	
1208188	Bag (large)	Cellophane (to cover vib.)	
1208484	Case & brkt.	Vibrator	
1208431	Coil (choke)	R.F. "A"	L-3
1208058	Coil (choke)	R.F. "B"	L-1
1208153	Transformer	Vibrator power	T-1
5035120	Vib. (large)	Inc. C-21 & C-22	
1208557	Tube (brass)	Ant. shield (Buick)	
1208157	Volume control	500,000 ohms	R-8
1208441	DRIVE ASSEMBLY	Buick (complete)	
1208442	DRIVE ASSEMBLY	Pontiac "	
1208443	DRIVE ASSEMBLY	Olds "	
1208161	Drive cables, brkt. & shaft assembly--Buick & Olds		
1208447	Drive cables, brkt. & shaft assembly--Pontiac		
1208444	Escutcheon plate	Buick) NOTE: These plates can be	
1208445	Escutcheon plate	Pontiac) supplied only by	
1208446	Escutcheon plate	Olds) B-O-P dealers	
	Parts common to Buick, Pontiac & Olds drive assemblies		
1208444	Drive case	Includes bracket	
1208537	Dial chart		
1207424	Dial light	6-8 volt	
1208021	Knob	Black bakelite--Buick	
1208459	Knob	Brown bakelite--Olds	
1208548	Knob	Brown bakelite--Pontiac	
1208549	Shield	Ant. coil	
*1208554	Shield	Ant. coil	
1208049	Shield	R.F. coil	

* Used on sets above Serial No. 1557000

Part No.	Part Name	Description
1207918	Shield	Osc. coil
1208027	Shield assembly	High tension (Pontiac)
**1208535	Shield assembly	High tension (Olds)
1208562	Shield assembly	Ignition coil (Olds)
1208534	Shield assembly	Ignition coil (Pontiac)

** Not required when No. 1208562 coil shield is used

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and an output meter are required for indicating the effect of adjustments.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the escutcheon plate and glass. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1100 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibrator unit. Next, notice the small length of braided shielding which is soldered to the solder lug that is secured to the chassis case between the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be readily replaced. CAUTION: Polarity, as explained in the label on the unit and in the label on the metal box in the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.

The old volume control and switch connections may now be unsoldered and the new unit put in its place and the leads resoldered.

Fasten the volume control to the case in the reverse order in which it was removed.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	12.50
	Antenna Trans. Sec.	T1	0.5
P-5248	R. F. Interstage Trans. Pri.	T2	2.0
	R. F. Interstage Trans. Sec. (Center Tap to Inside)	T2	1.5
	(Center Tap to Outside)		3.5
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T4	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	T6	600.00
	Output Trans. Sec. and Voice Coil in Par.	T7	0.80
	Speaker Field		600

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No.

Part No.	Item
P-1866	6D6 Tube Socket
P-1906	6L6 Tube Socket
P-1725	75 Tube Socket
P-1911	41 Tube Socket
P-5247	Antenna Coil Assembly Less Can
P-50415B	Can for above assembly Part of Gang Condenser Assembly
P-5248	R. F. Interstage Coil Assembly Less Can
P-50420	Can for above assembly Part of Chassis Assembly
P-5249	1st I. F. and Oscillator Coils and Can Assembly
P-5250	2nd I. F. Coil and Can Assembly
P-2228	Dynamic Speaker
P-30159	Cardboard Baffle for Speaker
P-2229	Vibrator Unit
P-2030	Vibrator Socket
P-50656	Power Transformer
P-5251	R. F. "A" Choke Coil
P-5174	R. F. "B" Choke Coil
P-50657	Power Choke Coil Assembly
P-5253	Equipment Choke Coil
P-2220	2 Half Tube Shields with Damping Ring
P-2240	Grid Leak and Condenser Assembly
P-2224	Knobs
P-30960	Thumb Screws
P-10356	Glass, Crystal
P-10361	Gasket for Glass Crystal
P-30342A	Grid Clip only
P-10211	Wide Rubber Bands for Tubes
P-70774	Shielded Antenna Cable
P-70781	"A" Battery Cable
P-1421	Single Lug Terminal Strip
P-2082	Double Insulated Terminal Strip
P-2232	Five Lug Terminal Strip
P-1933	Cinch Terminal Lug
P-30703	Drive Tension Spring
P-30963	Horse-shoe Lock (Washer)
P-2227	Dial Strip
P-30954	Dial Pointer

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

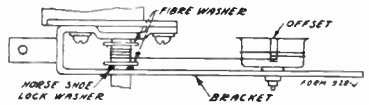


Fig. 3—Cord Drive—Top View

First remove the chassis from the case as explained on page 1.

Some of the first models did not have two fibre "oval" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:

Squeeze and take off the horse shoe lock washer which holds the drive shaft in position. This may be done with a fine nosed long nose plier.

Next pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft back into place and replace the horse shoe lock washer.

Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum (see Fig. 4). The knot will then be on the inside of the drum.

Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from front) around the drive shaft three and one-quarter turns between the two fibre washers, progressing towards the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

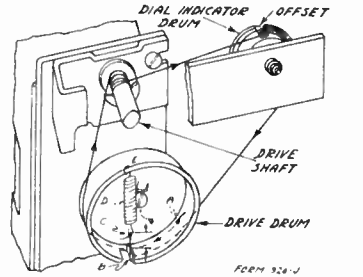


Fig. 4—Cord Drive Replacement

Set the dial indicator drum so that the offset is at the top or a little to the right of the center (see Fig. 4).

Wrap the cord from the drive shaft once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.

From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

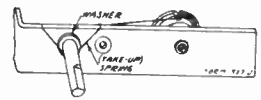


Fig. 5—Drive "Take up" Spring

Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".

Tie the drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between $\frac{1}{8}$" and $\frac{3}{8}$" from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about $\frac{1}{4}$".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.

After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

Slip the small fibre washer over the shaft and slip the take-up spring to the drive bracket as shown in Fig. 5.

The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

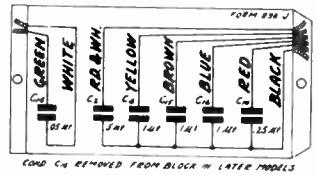


Fig. 6—Condenser Block Internal Wiring

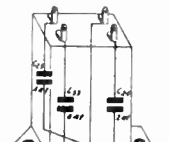


Fig. 7—Electrolytic Block Internal Wiring

MODEL 25Y1 WELLS-GARDNER & CO.

5Y Series

Schematic, Voltage

Socket, Trimmers

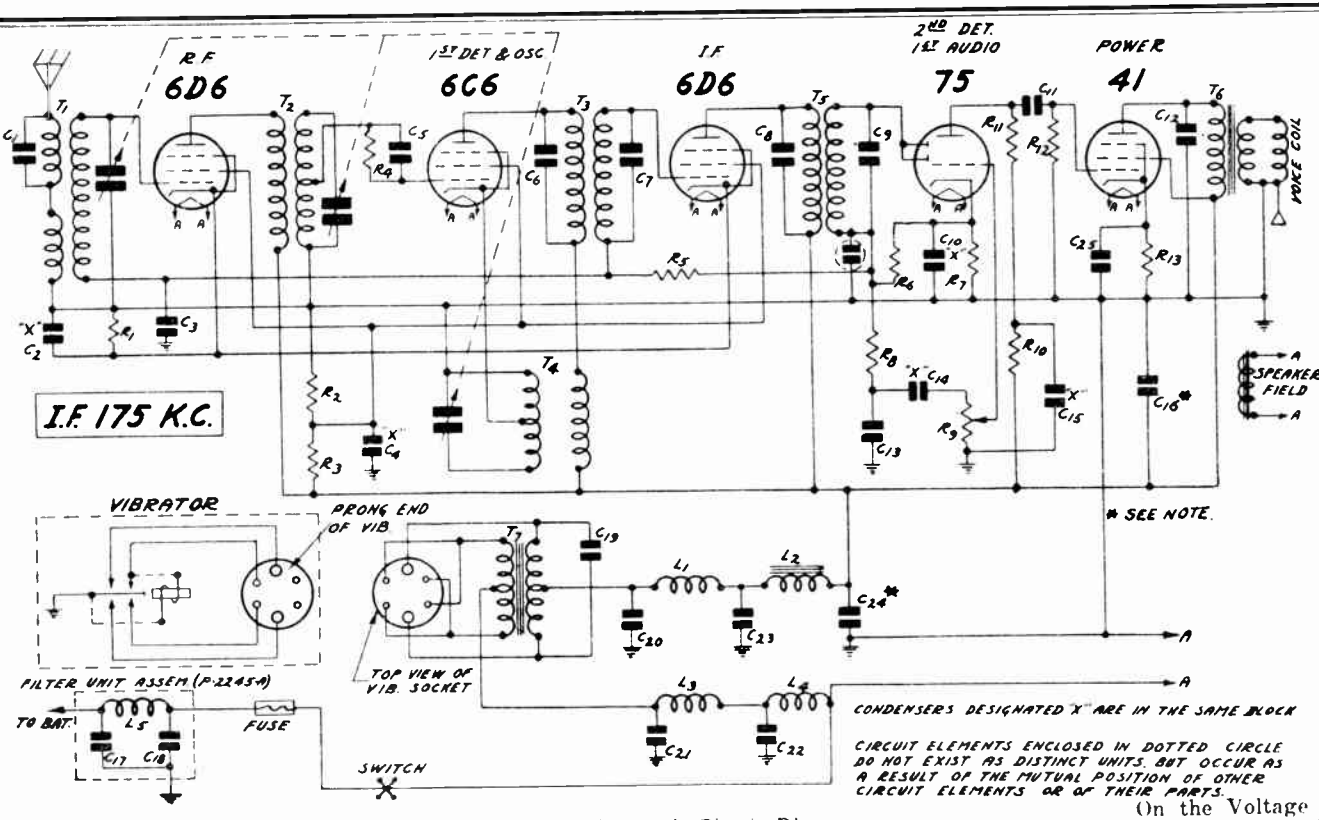


Fig. 1—*Schematic Circuit Diagram*

VOLTAGES AT SOCKETS

Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

Dec, 1934

On the Voltage Chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected at the bayonet connector.

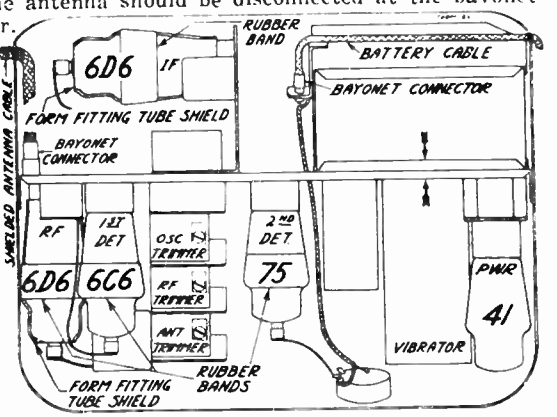


Fig. 2—*Location of Tubes and Vibrator*

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	.250 mmf.		Part of Antenna Coil Assembly
P-82600D	C2	.50 mf.	200V.	Bypass Block
	C4	.10 mf.	140V.	
	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	200V.	Tubular
P-81815	C5	.35 mmf.		Part of Grid Leak Assembly
P-81806	C6	70 mmf.		Part of 1st I. F. & Osc. Coil Assembly
	C7	70 mmf.		
P-81806	C8	70 mmf.		Part of 2nd I. F. Coil Assembly
	C9	70 mmf.		
P-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	In Choke Condenser Unit
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500		Gang Condenser		

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P- 96017	R9	2 Megohm		Volume Control and Switch
P-A95503	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound

In the first models of this receiver a bypass condenser block (P-82600) containing condensers: C2, C4, C10, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-81132) while the other condensers remained in the block (P-82600-D).

A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

WELLS-GARDNER & CO.

MODEL 25Y1
5Y Series
Mounting Notes

Mounting the Receiver

The receiver is mounted by first securing the cover to the car body. The two slots in the chassis box proper are then slipped over the two hooks on the cover (see Figs. 2 and 3) and the chassis is then secured to the cover by means of the four screws provided.

The complete receiver should be held in position in the tentative locations to determine if there is space available. After a location is chosen, the cover may be removed and held in position to see if it can be attached to the car supports.

Top Mounting

The top mounting or securing of the receiver to the roof of the car is the method of attachment for which this receiver is primarily designed (see Fig. 1 (A). The receiver is very low in height and will mount in back of the car header without obscuring front or rear vision. Less difficulty will be experienced with ignition noise when the set is mounted in this position.

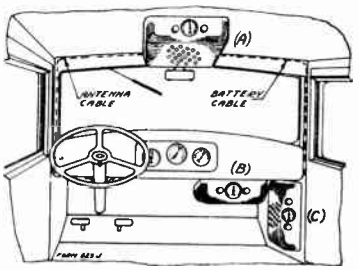


Fig. 1—General Mounting Positions

The best position for the receiver is at the center of the header as shown in the illustration, as the controls will then be accessible to the person in either front seat. If mounted at the left side of the header (facing forward) the controls will, of course, be more accessible to the driver. The best position on the header at which to mount the set will be determined in many cases by car devices, including sun visor, rear vision mirror mounting, windshield wiper control, etc.

In Figs. 2 and 3 are shown the details of the roof mounting.

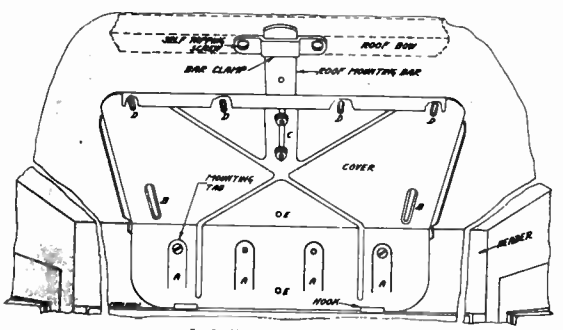


Fig. 2—Mounting Cover to Car Roof

First remove the cover from the box by taking out the four cover screws. The cover may then be removed from the chassis box.

In most cases the cover will be secured to the header of the car and one of the roof bows. The method of fastening it to the bow will depend on the location of the bow. In general it will be necessary to attach the roof mounting bar to the cover at slot C, as shown in Fig. 2. Two 8-32 screws, nuts and lockwashers are provided for this.

Use the holes in the bar which allow it to extend only to the roof bow. As shown in the illustration, the bar is held in position at the bow by means of the bar clamp which is screwed to the bow. If the bar extends beyond the clamp, it may, in some cases, have to be cut off. Two No. 8 screws and lockwashers are provided with the bar clamp. These are self tapping and may be used in either wood or metal. Drill 7/64 inch holes (No. 35 drill) for these screws. Do not deviate more than .005 inch. *Care should be taken not to drill through the car roof.*

If there is a roof bow over slots C or D, it will not be necessary to use the roof mounting bar. Any two of the slots D may be used. If the roof bow is curved, do not tighten the screws through slots D enough to bend the cover. Should it be necessary to use slot C, only one screw is then used.

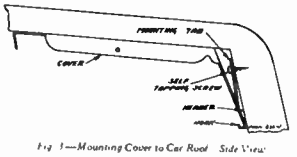


Fig. 3—Mounting Cover to Car Roof Side View

For attachment to the header, two or more of the mounting tabs A shown in Fig. 2 may be employed. If the angle of the header from the perpendicular is less than the angle of the back of the cover, the mounting tab may be bent as shown in Fig. 3 to fit tightly against the header. No. 8 screws and lockwashers are provided. These are self tapping screws and may be used in either wood or metal. Drill 7/64 inch holes (No. 35 drill) for these screws.

In some cases it may be desirable to mount the set away from the header in order to clear car devices. This can be done if there is a roof bow near the header which coincides with slots B. Use the self tapping screws and lockwashers mentioned above. If the header is of cardboard construction it may be necessary to secure the set in this manner.

Before reassembling the receiver to the cover, refer to the articles, "Attaching the Cables" and "Trying Out the Set and Adjusting."

Instrument Panel Mounting

If top mounting cannot be used the receiver may be mounted to the instrument panel as shown in Fig. 1 (B). In general it will be mounted at the right side (facing forward) in order to clear car controls.

Details of this method of mounting are shown in Fig. 4. First remove the cover as explained under "Top Mounting." Then attach the curved bracket to the cover as shown in Fig. 4. Holes E are used (see Fig. 2). Two 8-32 machine screws, nuts and lockwashers are provided. Reassemble the cover to the chassis box.

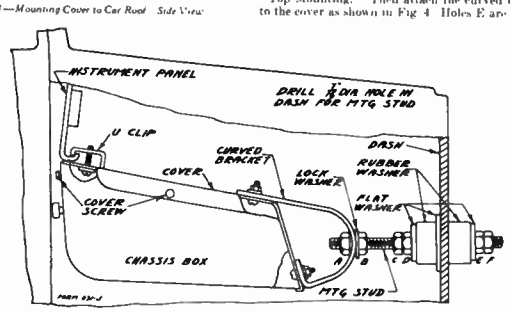


Fig. 4—Details of Instrument Panel Mounting

Next hold the complete receiver in position under the instrument panel and determine the best mounting position. Consideration should be given to leg room and interference with car controls, including gear shift and hand brake levers, cowl ventilator, glove compartment hinges, etc. Consideration should also be given to whether a hole can be drilled in the dash for the mounting stud at the location chosen.

Another matter to consider is the angle of the front of the box. In general this angle will be less than the angle of the instrument panel (see Fig. 4). The angle of the front of the box should be such that the dial scale can be easily seen. On the other hand the box should not be down so far at the back that leg room will be materially reduced.

The next step is to locate the mounting stud hole. The vertical position of this hole can vary because of the curved bracket. The horizontal position, however, must be more accurately determined. Place a short pencil or pointed tool through the slot in the curved bracket and mark the dash at the point closest to the bracket. This point should line up with the center line of the chassis box.

Drill a 7/16 inch hole through the dash at this point, care being taken not to drill through any car apparatus, such as vacuum tanks, etc.

Then, again remove the cover. Next, assemble the mounting stud to the curved bracket and to the dash loosely, putting the parts on as shown in Fig. 4.

Most cars of the later models have a bead or upturned edge at the back of the flange on the bottom of the instrument panel, as illustrated. If this is the case the front end of the cover is secured to the flange by means of holes D (see Fig. 2) and two U clips, as shown. Two 1 inch 10-32 machine screws and lockwashers are provided. The U clips are tapped.

If the bottom of the instrument panel is straight, the two outer holes D may be used. If the bottom is curved or offset, use any two of the holes D which will not bend the cover. In some cases spacers may be necessary.

In some cars the flange of the instrument panel is flat. In a case of this kind it will be necessary to drill the flange. The front of the cover is then held in position by extending the two No. 10-32 machine screws through holes D and through the two holes drilled in the flange. The same conditions as mentioned above govern the choice of the two holes D. If the set is mounted at the extreme right, it may be necessary to tap the holes in the flange as it is difficult to hold a nut in position.

Next, tighten up the stud mounting. First raise the cover to the desired position. Turn down nut D (see Fig. 4) until it is snug. Then tighten nut C with a wrench. Next tighten down nuts E and F in the same manner. Make final adjustment of the cover position and tighten nuts A and B.

Before reassembling the receiver to the cover, refer to the articles, "Attaching the Cables" and "Trying Out the Set and Adjusting."

Side Mounting

In extreme cases it may be necessary to use side mounting as shown in Fig. 1 (C). In most cars the receiver will be mounted on the right side but can also be mounted on the left if it clears the clutch pedal or other car devices.

The cover is secured to the corner post by using two of the D holes (see Fig. 2). Two self tapping screws and lockwashers are provided. Drill two 7/64 inch holes (No. 35 drill). Longer wood screws may be used if the screws supplied with the receiver are not of sufficient length to get a secure hold in the wood.

The mounting stud is secured to the dash as explained in "Instrument Panel Mounting." In this method of mounting it will be necessary to turn the dial scale 90 degrees as explained in the article on adjustments.

Miscellaneous Mounting

Certain other positions may be used for this receiver, depending on the space available and the construction of the car body. Among these may be mentioned: back of the front seat, between the two front seats, and the shelf in back of the seat in a Coupe.

Attaching the Cables

Top Mounting

Five foot antenna and battery cables are supplied. These may be cut to length if they are too long.

Antenna Cable—This cable is connected at the chassis by means of a bayonet connector in the chassis box as shown in Fig. 5. If the car has a built-in antenna, the lead-in is usually brought to a point under the cowl and it will be most convenient to bring the antenna cable from the receiver down to this location to make the connection.

As illustrated in Fig. 1 (A), this cable is secured along the edge of the car roof, and then brought down the corner post. In many cars it can be concealed behind the header or under the trim and may be run down inside of the corner post, if the latter is hollow.

In Fig. 1 the antenna cable is shown on the left side as it is brought out of this side of the chassis and the antenna lead in is usually on this side. However, if the latter is on the right side, the antenna cable can be crossed over the top of the chassis and brought down the right corner post.

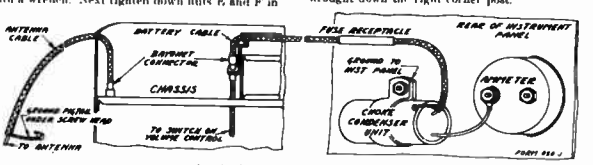


Fig. 5—External Wiring Connections

Connect the antenna wire to the lead in wire from the antenna. *Ground the pigtail of the antenna cable shield at the antenna end to a nearby convenient ground.* Keep the antenna cable as high as possible and as far away from any car wiring as possible.

The unshielded portion of the antenna lead-in may be responsible for interference pick up, and it may, therefore in some instances, be necessary to extend the antenna shield as shown in Fig. 6. Any coiled up and excess length of the lead-in from the car antenna should be cut off, and after it is connected to the shielded lead from the receiver, should be tucked back into the corner post so that only the shielded portion will be exposed.

When it is necessary to install an antenna in the car roof, the antenna cable can be connected directly to the roof antenna without being brought down the corner post.

Battery Cable—The battery connection is made at the ammeter. The battery cable is secured to the edge of the car roof and brought down the front corner post in the same manner as described above for the antenna cable. In Fig. 1 this cable is shown on the right side. If the ammeter is on the left side, this cable may be crossed over the top of the chassis and brought down the left corner post.

The battery cable is made up of two portions which are joined together by the fuse receptacle. The long portion of the cable is connected by the bayonet connector at the chassis as shown in Fig. 5. The short portion of this cable has a choke condenser connected to it. This unit is mounted on the back of the instrument panel and is grounded by means of its mounting clamp under a convenient screw-head or nut. *Clean the contact surfaces before attaching the clamp as this must be a good ground.*

When the receiver is top mounted, the battery cable shield should also be grounded to the car body at a point as close to the chassis as possible. Use a small piece of braided shielding for this.

If the battery cable is not long enough, extend the unshielded lead between the choke condenser unit and the ammeter.

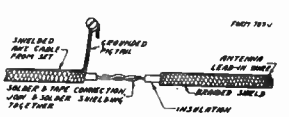


Fig. 6—Extension of Antenna Cable Shield

Instrument Panel Mounting

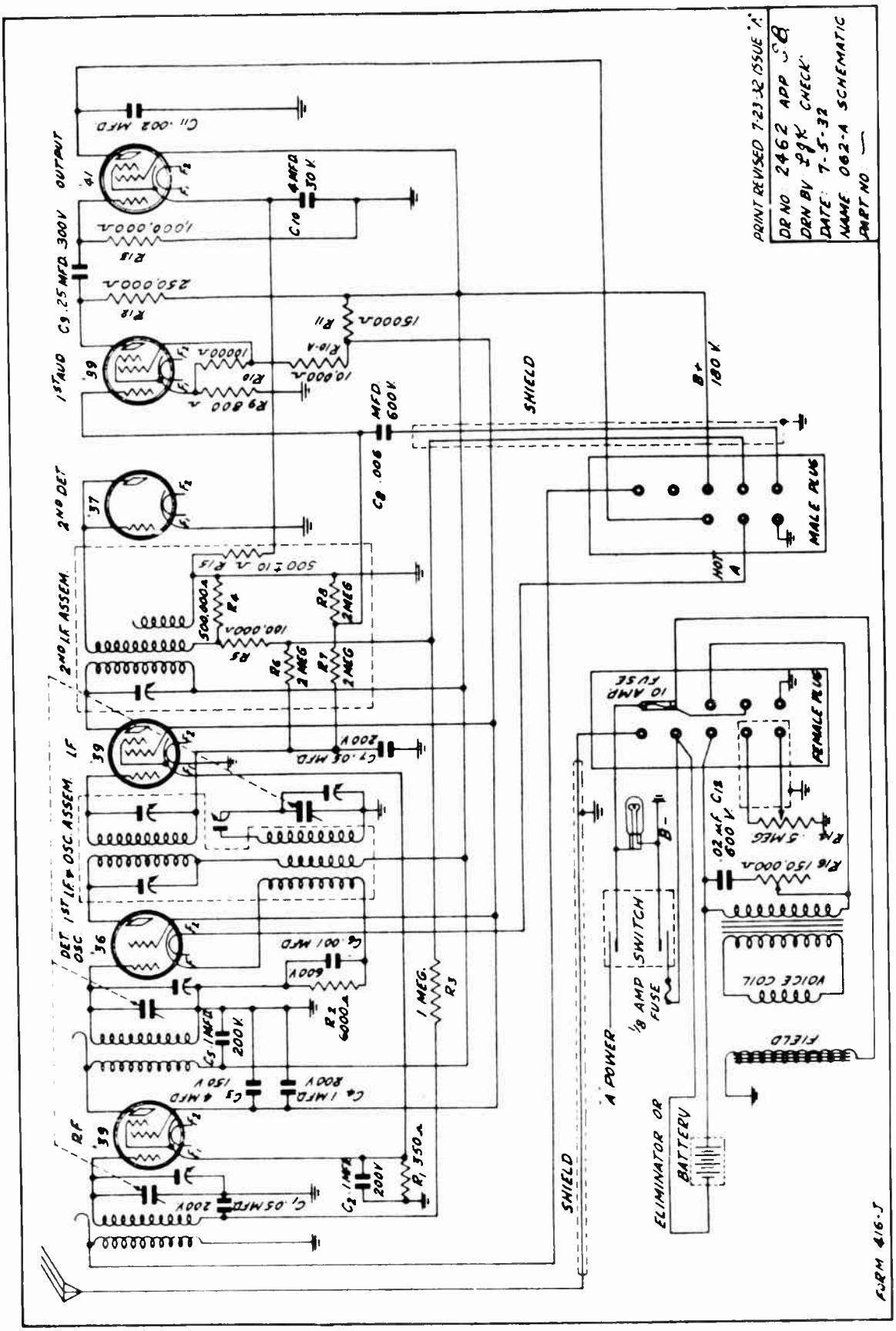
Antenna Cable—Connect the cable lead to the lead-in from the antenna in the same manner as described for top mounting. Keep this cable as high as possible and as far away from car wiring as possible. *Ground the pigtail of the antenna cable shield at the antenna end.*

In some cases the shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. Ignition interference may be picked up by the unshielded portion and it may be necessary to extend the shielding of this lead. To do this, cover the lead from the antenna with braided shielding and push this shielding as far up in the corner post at which this lead comes down, as possible. The antenna lead wire should be covered with heavy insulation such as loom to properly separate the shielding from the wire. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire (see Fig. 6).

Battery Cable—This lead is connected in the same manner as described for top mounting.

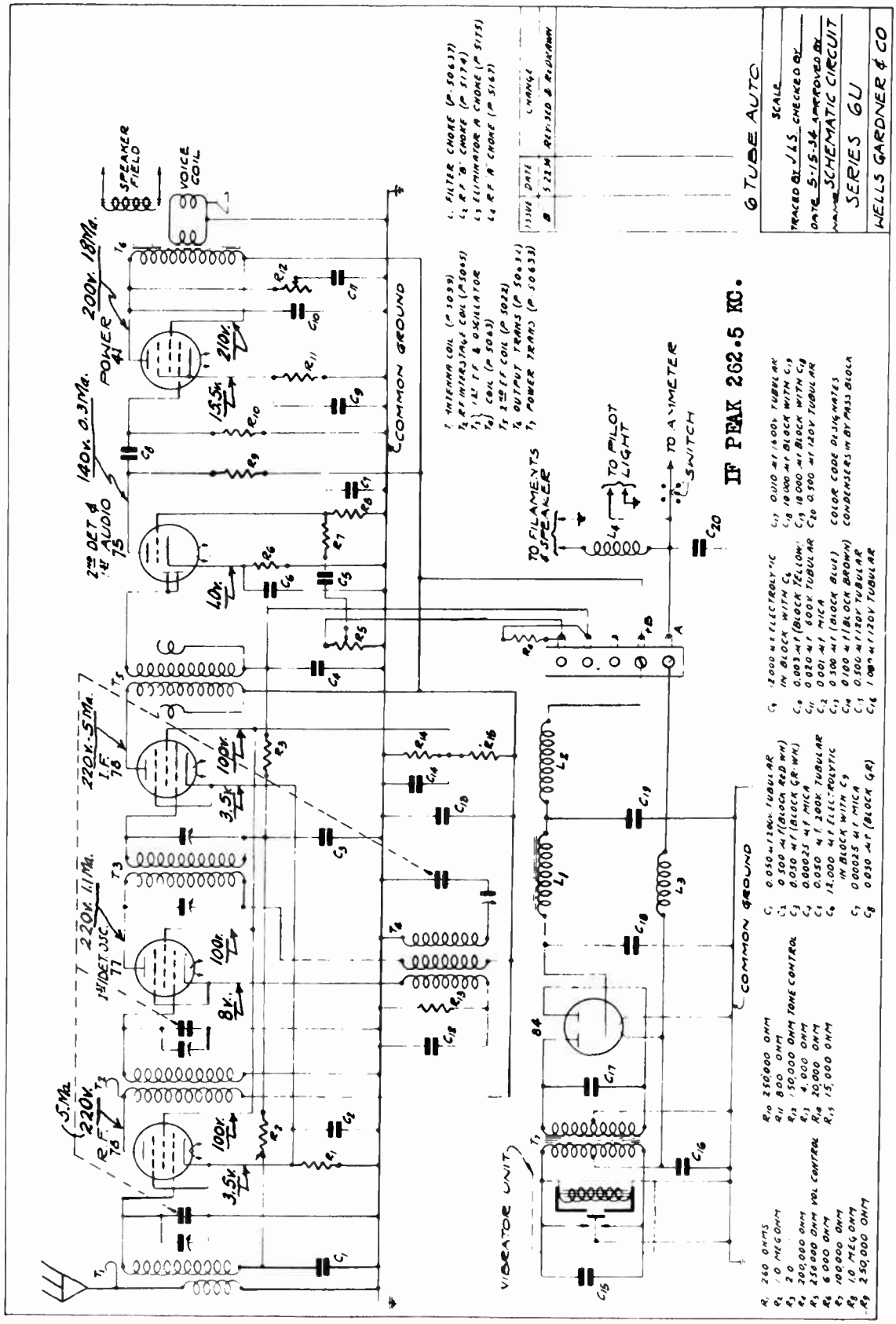
MODEL 062-A
Schematic

WELLS-GARDNER & CO.,



WELLS-GARDNER & CO.

MODEL 26U1
6U Series
Schematic



Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

Do not take the chassis out of the box. First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximun. output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency mark. This is the large point, 5 points below the 55 mark. Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator R. F. and antenna trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first. See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser is mounted on the end of the gang condenser. See Fig. 2.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

Completing the Wiring Connections

Battery Cable

The battery connection is made at the ammeter. In the case of vibrator equipped sets no attention need be paid to polarity. The connection at the end of this cable is secured to one of the posts at the back of the ammeter in the instrument panel. This cable should preferably be connected to the post which will not show the discharge caused by the receiver.

The battery cable is made up in two pieces which are joined together by the fuse receptacle. The latter houses the fuse and fuse shield. The two parts of the cable are connected together by a bayonet pin connection.

Dynamotor "B" Unit Sets

In sets equipped with Dynamotor "B" Units there is a connection which may have to be changed depending on which side of the car battery is grounded. This unit is shipped from the factory correctly wired up for cars that have the positive side of the battery grounded, as shown in Fig. 9. If the negative side of the car battery is grounded, the connections to the terminal strip on the Dynamotor unit must be reversed, as shown in the same illustration.

Sensitivity Control Jumper

Referring to Figs. 8 and 9 it will be noted that there is a terminal strip in the chassis with terminals marked Nos. 1, 2 and 3 as shown. The receiver is shipped from the factory with a wire jumper in terminals Nos. 2 and 3. When connected in this manner, the sensitivity of the receiver is correct for ordinary conditions of reception as met with in a city or at reasonable proximity to the broadcasting stations. If the receiver is used in the country or at a great distance from the broadcasting stations, this jumper should be inserted in terminals Nos. 1 and 2. This connection increases the sensitivity of the receiver, providing for better reception of distant stations. However, at the same time the receiver will appear to be somewhat noisier owing to the fact that the pickup of noise signals will also be increased.

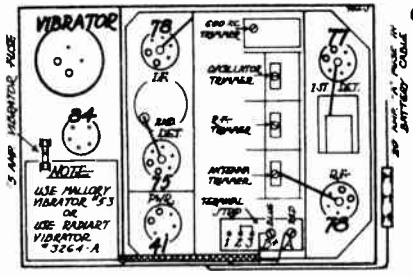


Fig. 8—Location of Tubes—Vibrator Sets

After the wiring has all been completed and the chassis and cables are permanently installed try out the set and adjust the antenna trimmer. The location and types of the tubes are shown in Figs. 8 and 9. The types of vibrators in vibrator equipped sets are also shown.

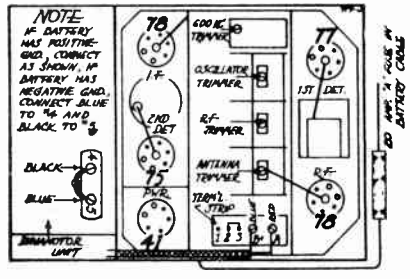


Fig. 9—Location of Tubes—Dynamotor Sets

Adjusting Antenna Trimmer

To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. Remove the cover of the chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Figs. 8 and 9. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws as these have all been properly set at the factory with precision instruments.

Calibrating the Receiver

To calibrate the receiver, tune in a station of known frequency. At the back of the control unit is the calibration screw—see Fig. 5. Insert a screw driver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

WELLS-GARDNER & CO.

MODEL 26U1
6U Series
Installation Data

Mounting the Chassis

The chassis is mounted in back of the dash as shown in Figs. 1 and 2. The first step is to inspect the dash to determine at which point there is space available. Lift the chassis box up and temporarily hold it in the proposed position. In Figs. 1 and 2 is shown the position at which the chassis is generally mounted. However, there are many other possible locations, depending on the considerations as mentioned below and the space available.

In general, the chassis will be mounted in the vertical position, that is, with the long dimension vertical as illustrated and as mentioned above, since this method of mounting is the most convenient. It may, however, be mounted horizontally. If mounted in this manner, the speaker must face downward. *Never install a chassis with the speaker facing upward due to the fact that dirt and water may get in and ruin the speaker.*

Other points to consider in choosing the chassis location are as follows. Mount the chassis box in such a way that the cover may be readily removed for inspection of tubes. Mount the chassis box as high as possible to avoid interference with the feet of the people in the front compartment. If mounted at the extreme left or right of the dash, the speaker should face inward for acoustical reasons. Mount the chassis box in such a way as to avoid interference with the car controls, including pedals, gear shift lever, cowl ventilator, etc. If there is a great deal of room available on the dash, consideration should also be given to the length and position of the flexible shafts.

Next secure the dash mounting plate to the chassis box by means of the four screws provided. Note that there are six tapped holes on the chassis box for this purpose. For vertical mounting use the four tapped holes which permit the slot at the bottom of the mounting plate to extend below the chassis box—see Figs. 3 and 4. For horizontal mounting the mounting plate may be secured to the right hand set of four tapped mounting holes or the left hand set of four, whichever is the most convenient. As indicated in Fig. 3, for vertical mounting, holes "A" in dash mounting plate shall be used, and for horizontal mounting, holes "B" shall be used.

Now place the chassis box, with plate attached, in position on the dash and with a center punch locate the lower mounting hole at approximately the position in the slot as shown in Fig. 3. Then remove the box and by means of the template provided, or by using the dimensions shown in Fig. 3, locate the two upper mounting holes. Next drill the three ¼" holes required.

Three 4" square head mounting bolts are supplied. Take two of these, which will be used for the upper part of the mounting plate and screw on nut "A" (see Fig. 4). The nut should be just

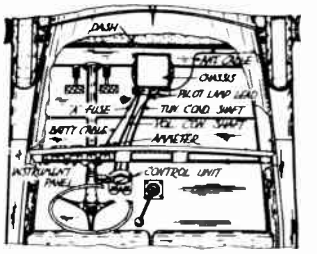


Fig. 1—General Installation—Top View

far enough away from the head of the bolt to permit the bracket of the mounting plate to slip down as shown in the illustration. Then put on nut "B" and the washer, after which the two bolts can be put through the dash, with the shanks extending into the engine compartment, as shown in Fig. 4. A washer, lockwasher, and nut are then put on these bolts from the front of the dash to hold them in place.

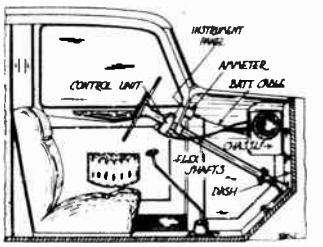


Fig. 2—General Installation—Side View

The distance "X" between nuts "A" and "B" determines how far out the chassis is mounted from the dash. When there is a lot of apparatus in back of the dash, such as wires, tubing, etc., the chassis will have to set out far enough to clear it. However, in most cars, there is no interfering apparatus and therefore the distance "X" will be zero.

Then put a washer on the third mounting bolt and put this bolt through the lower mounting hole *with the head on the engine side of the dash*, as shown in the illustration. Put on a washer, lockwasher, and nut "D" and tighten it up. Then put on nut "E" with a washer as shown. Nut "E" should be screwed down until it is up against nut "D," when distance "X," as explained above, is zero.

All tubes and the vibrator (vibrator equipped sets) should be in the sockets and the flexible drive shaft brackets should be attached to the chassis box before the chassis is mounted—see article on Attachment of Flexible Shafts.

The dash mounting plate with chassis attached is slipped over the three mounting bolts. The two upper brackets on the plate slip down in back of nut "A" as shown in Fig. 4 and the slot at the bottom of the plate slips over the shank of the lower mounting bolt in back of nut "E." The plate will then hang with the bottom farther away from the dash than the top. A washer, lockwasher, and nut "F" are then put on the lower mounting bolt. Nut "F" is screwed on until the mounting plate is tight up against the washer in back of nut "E." In this position, the bracket at the top of the mounting plate should butt up against nut "A" and be tight. Also the mounting plate will be approximately parallel with the dash.

Mounting the Control Unit

The control unit is mounted on the steering column under the steering wheel as shown in Figs. 1 and 2. It is generally mounted in the right hand position, as shown in Figs. 1 and 2. It may also be mounted in the left hand or top position at the preference of the customer, see Fig. 5 (A).

For right hand mounting the supporting arm is screwed to the back of the control unit as shown in Fig. 5 (C). For left hand and top mountings use the correct tapped hole as indicated in the same illustration.

To attach the control unit, first remove the supporting arm by taking out the supporting arm screw—see Fig. 5 (C). Now note that there are several holes in the strap. These are for different sizes of steering columns. Wrap the strap around the column and put the strap screw through the strap nut as shown in Fig. 5 (C). Do not tighten up the screw until the flexible shafts are attached.

Next attach the two flexible shafts to the control unit as explained in the next article. Then reattach the supporting arm to the control unit proper.

Attaching the Flexible Drive Shafts

After the chassis is mounted and the control unit is temporarily mounted, the flexible drive shafts may be attached. Two 30" shafts are supplied unless otherwise specified. These shafts may also be had in 14" and 20" lengths. *These shafts are provided with special ends and cannot be cut to length.*

The flexible drive shafts should always be installed with a minimum amount of bending. Always keep the radius of the bend as large as possible. The larger the radius of the bend, the easier the shaft will turn.

If the shafts are not already secured to the control unit proceed as follows. First loosen the set screw in the volume control shaft housing at the back of the control unit. The volume control shaft may be identified by a brass fitting at both ends. The longer of these two fittings has a key slot and is inserted into the control unit as shown in Fig. 5 (B). Insert the shaft far enough so that the key knob engages and may be inserted all the way. The set screw in the housing at the back of the control unit is then tightened down on the shaft casing.

To insert the tuning condenser shaft in the control unit, first remove the station selector knob. Then loosen the two set screws on the shank extending from the front of the control unit. Also loosen the set screw in the tuning shaft housing at the back of the control unit. Then insert the end of the flexible shaft with no fitting into the tuning condenser shaft housing until the end of this shaft is flush with the end of the shank and tighten the two set screws. The knob may then be replaced, the set screw tightened down and the set screw in the housing tightened down on the shaft casing.

To secure the flexible shafts to the chassis, first attach the two brackets to the chassis box by means

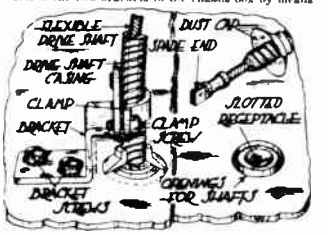


Fig. 6—Details of Flexible Shaft Attachment

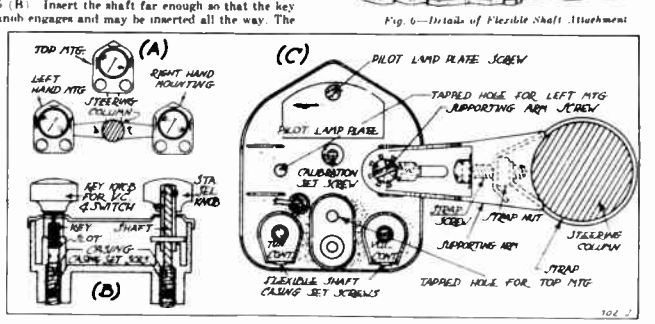


Fig. 5—Details of Control Unit Mounting

Both shafts are provided with spade ends which are readily inserted into the slotted receptacles provided in the chassis—see Fig. 6. Before inserting the flexible shafts, slip the rubber dust caps with ⅜" holes over the shaft casings. After the shafts are inserted the clamps are tightened down on the shaft casings by means of the clamp screws as shown in the illustration.

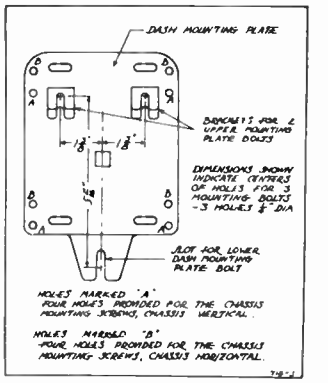


Fig 3—Dash Mounting Plate

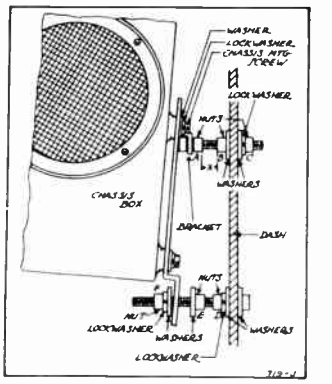


Fig. 4—Details of Chassis Mounting on Dash

MODEL 7C Series
Schematic, Voltage Socket, Trimmers Parts List

WELLS-GARDNER & CO.

Fig. 1. Schematic Circuit Diagram

Fig. 2. Location of Tubes and Battery Connections

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95104	R1	100,000 Ohm	.2	Carbon
P-A93303	R2	30,000 Ohm	.2	Carbon
P-A95104	R3	100,000 Ohm	.2	Carbon
P-A93602	R4	6,000 Ohm	.2	Carbon
P-B93902	R5	9,000 Ohm	.5	Carbon
P-A95505	R6	5 Megohm	.2	Carbon
P- 96012	R7	1 Megohm		Volume Control
P-A95505	R8	5 Megohm	.2	Carbon
P-A94603	R9	60,000 Ohm	.2	Carbon
P-A95104	R10	100,000 Ohm	.2	Carbon
P-A95104	R11	100,000 Ohm	.2	Carbon

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	0.050 Mf.	200V	Tubular
P-80862	C2	0.050 Mf.	200V	Tubular
P-80862	C3	0.050 Mf.	200V	Tubular
P-80864	C4	0.100 Mf.	200V	Tubular
P-81801	C5	35 Mmf.		Cap. Part of Osc. Coil Assem.
P-80888	C6	0.250 Mf.	200V	Tubular
P-80862	C7	0.050 Mf.	200V	Tubular
P-80988	C8	1.500 Mf.	140V	Tubular
P-1965	C9	70-140 Mmf.		Trimmer
P-81800	C10	50 Mmf.		Cap. Part of 2nd I.F. Coil As.
P-80981	C11	0.010 Mf.	400V	Tubular
P-80888	C12	0.250 Mf.	200V	Tubular
P-80945	C13	500 Mmf.		Moulded
P-80862	C14	0.050 Mf.		Tubular
P-80888	C15	0.250 Mf.	200V	Tubular
P-81014	C16	16.00 Mf.		Electrolytic Block
	C17	16.00 Mf.		
P-80914	C22	0.002 Mf.	600V	Tubular
P-80914	C23	0.002 Mf.	600V	Tubular
P-81812	C24	200 Mmf.		Cap. Part of Ant. Assem.
P-81807	C25	70 Mmf.		Cap. Part of 1st I.F. Coil As.
P-81805	C26	45 Mmf.		Cap. Part of 1st I.F. Coil As.
P-81015		Three Gang Conden		

Voltages at Sockets
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Filament Volt.	Plate to Neg. Filament	Screen to Neg. Filament	Grid to Neg. Filament	Normal Plate M. A.
34	1st Detector	2.0	135	55	3.0 av.	1.90
30	Oscillator	2.0	75		0.0	3.70
34	I. F.	2.0	135	70	3.0 av.	3.00
30	2nd Detector	2.0	2			
34	1st A. F.	2.0	140	65	4.0	2.30
30	2nd A. F.	2.0	135		8.0	3.10
19	Output	2.0	137		6.0	1.00 per plate

Oct., 1934

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 KC. Connect the antenna lead of the lead generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 KC. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 KC and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

The use of the cut plate type of condenser eliminates the necessity of a 600 KC padder and no adjustment at this frequency, therefore, is required.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and Off-On switch collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately $\frac{3}{4}$" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

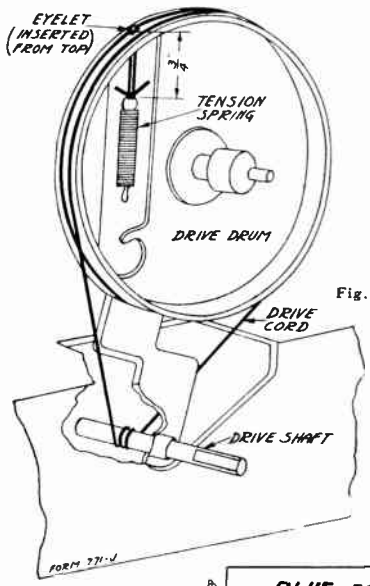


Fig. 4 Drive Cord Replacement.

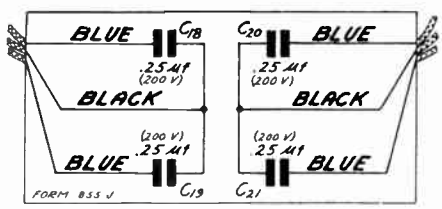


Fig. 3. Four Section Condenser in Power Unit Box

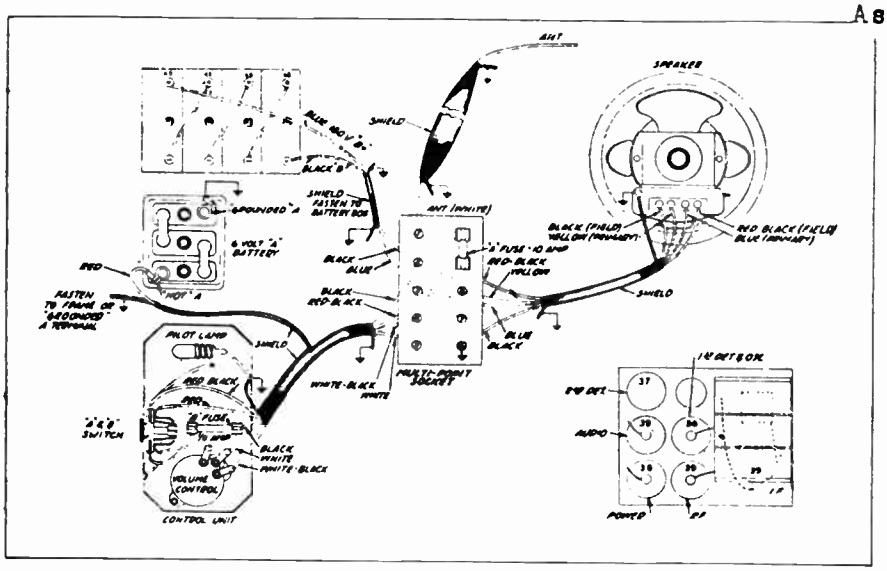
D. C. Resistance of Windings

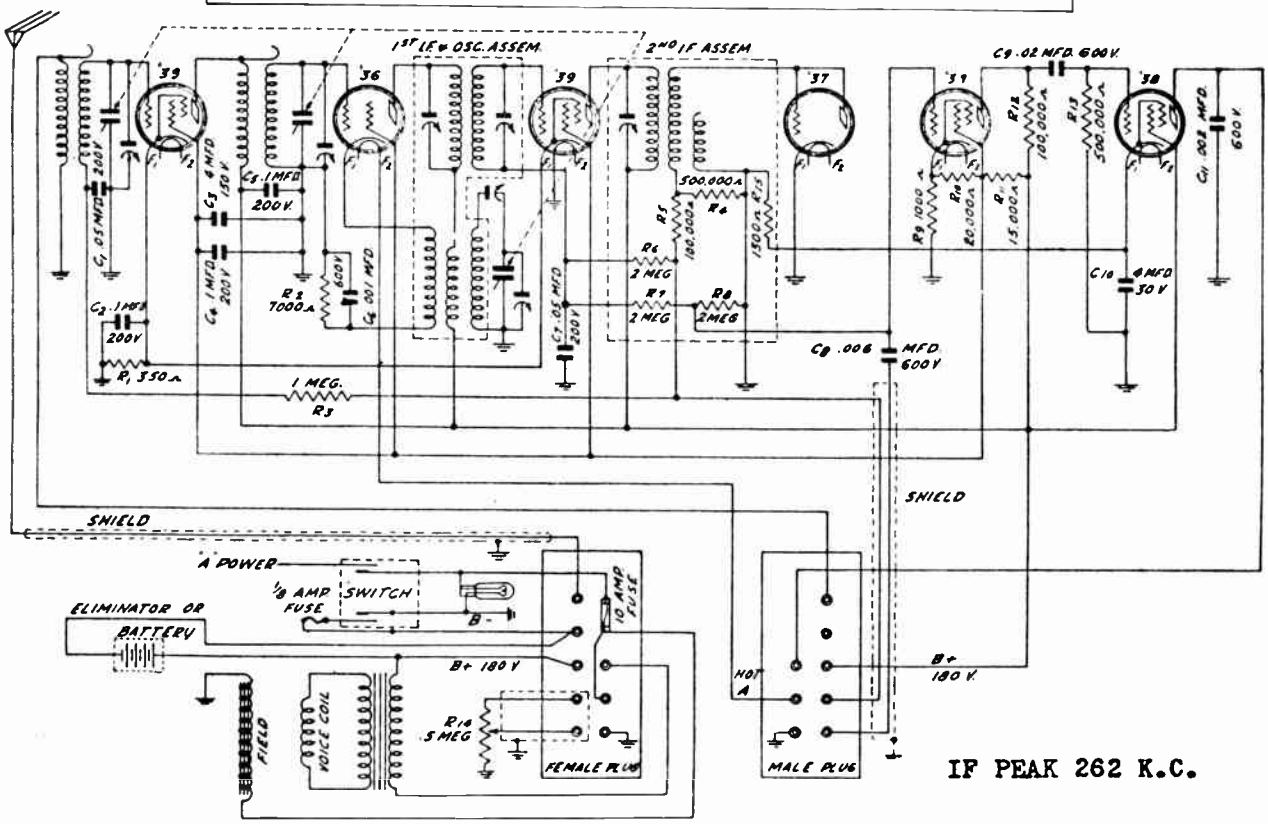
Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5200	Double Tuned Antenna Transformer, Primaries in series	T1	20.1
	Double Tuned Antenna Transformer Secondary Preselector	T1	3.3
	Double Tuned Antenna Transformer Secondary Detector	T1	3.1
P-5169	Oscillator Grid Coil	T4	3.6
	Oscillator Plate Coil	T4	1.6
P-5170	I. F. Coil Primary	T2	89.
	I. F. Coil Secondary	T2	126.
P-5171	I. F. Reactor Coil Plate Winding	T3	99.
	I. F. Reactor Coil Grid Winding	T3	429.
P-5172	Double Filament Reactor Assembly each section	L1, L2	Small
P-5173	Combined Filament Reactor Assembly each section	L3, L4	Small
P-50621	Audio Plate Reactor	L5	4940.
P-50622	Iron Core Isolating Reactor	L6	Small
P-5222	Filament Reactor	L10	Small
P-50625	Audio Transformer Primary	T5	1066.
	Audio Transformer Secondary (center tap to inside)	T5	614.
	Audio Transformer Secondary (center tap to outside)	T5	666.
P-2010	6" Magnetic Speaker (center tap to inside)		260.
	6" Magnetic Speaker (center tap to outside)		300.

WESTERN AUTO SUPPLY CO.

MODEL S-690
Schematic
Voltage
Assembly Wiring





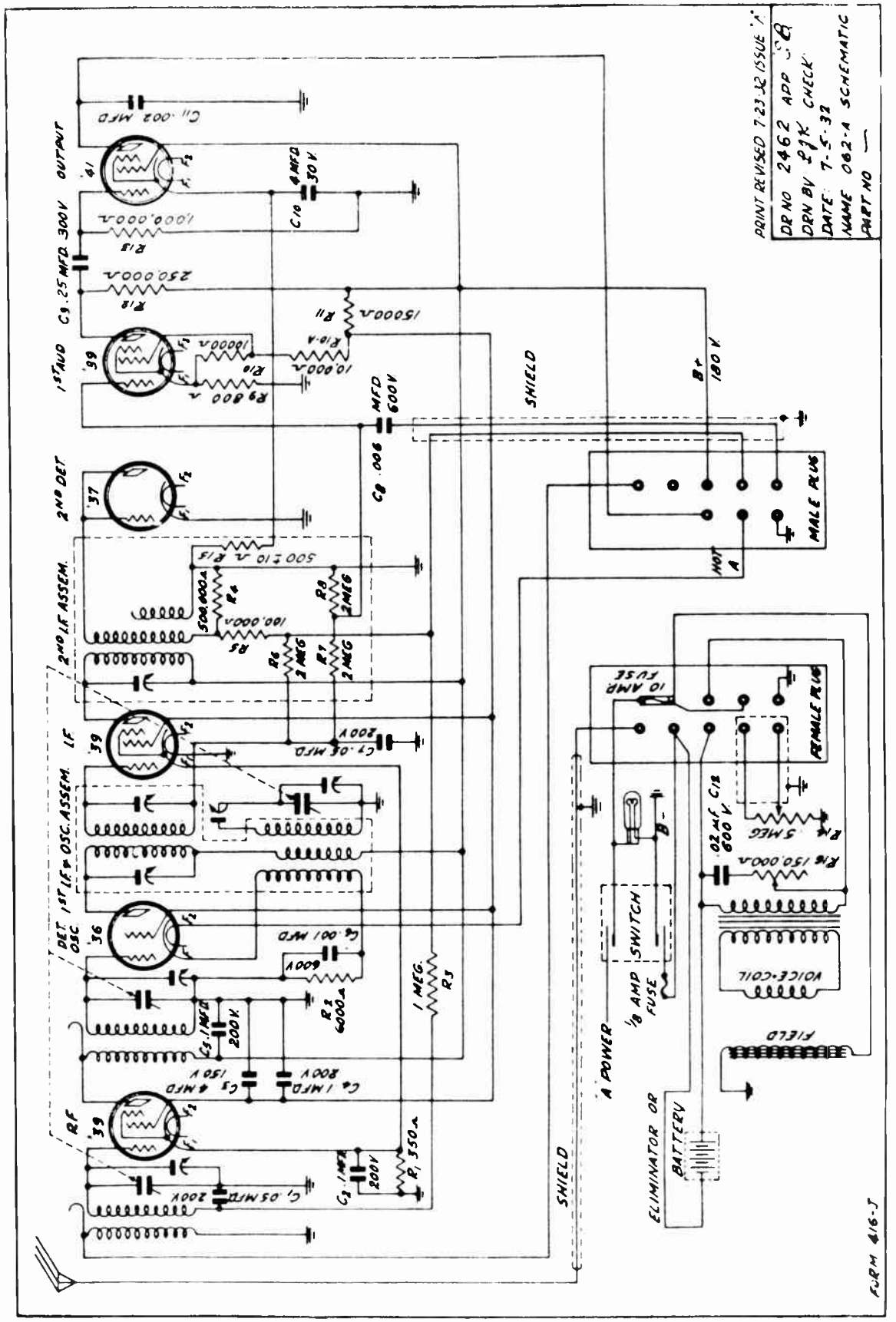
VOLTAGE DATA

Tube	Plate	Screen	Grid	Plate MA.
R-F.	177	80	3	3.6
1st Det.	173	76	7*	.9*
I-F.	177	80	3	3.6
2nd Det.	0	0	0	0
1st A-F.	54	7-	6	1.2
Output	159	165	15.5	10.0

* Will vary with dial setting.

MODEL S-691
Schematic

WESTERN AUTO SUPPLY CO.



Circuit

The circuit consists of an antenna stage, a 78 R.F. stage, a 77 1st detector-oscillator stage, a 78 I.F. stage, a 75 dual diode-triode tube, which functions as a diode 2nd-detector and triode 1st audio stage, and a single 41 output stage. An 84 full wave rectifier is used in the power unit. The intermediate frequency is 262 K.C. The diode current establishes a drop across a resistor which is used as additional bias voltage for the R.F. and I.F. tubes giving automatic volume control action. Noise suppression between stations is obtained by the resistor in the cathode circuit of the 75 tube, the drop across which must be overcome before rectification in this tube begins. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

A vibrator interrupts the current through the primary of the power transformer in the power unit. This, together with the turns ratio in this transformer, results in the high voltage AC being present in the secondary of the transformer. The full wave rectifier tube, filter choke, and filter condensers convert this high voltage AC into high voltage DC for the plate and screen circuits.

Current for the receiver is obtained from the car storage battery. In Fig. 11 is shown the condenser block internal wiring.

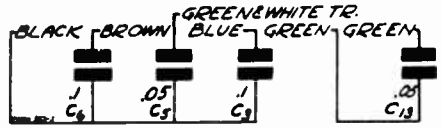


Fig. 11—Condenser Block—Internal Wiring

Voltages at Sockets

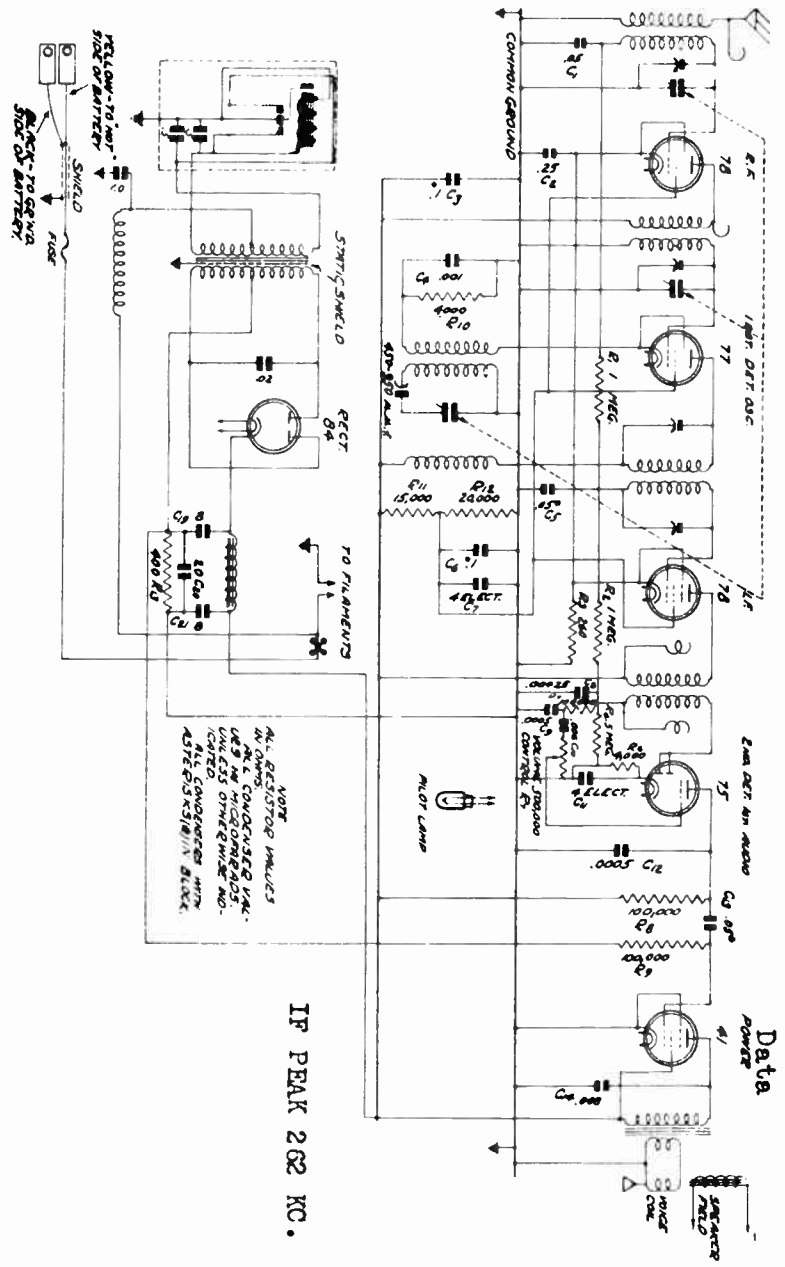
In the following chart are given the voltages at the sockets with all the tubes in, all units connected, and the set in operating condition, but with no signal being received. The antenna should be grounded.

A thousand ohm-per-volt meter of 0-250 volt range is required for the plate and screen voltages. Lower ranges will be necessary for the grid and heater voltages. It is not absolutely necessary to have a high resistance meter for the heater or "A" battery reading.

These voltages will vary with variations in receivers, tubes, test equipment used, and "B" eliminator output voltage.

Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78	R. F.	6.1	182	80	3.(1)	7.0
77	1st Det. and Osc.	6.1	178	77	5.(2)	1.3(2)
78	I. F.	6.1	182	80	3.(1)	7.0
75	2nd Det. 1st Audio	6.1	70(3)		1.4(1)	.35
41	Output	6.1	172.5	176.5	12.5(4)	16.0
84	Rect.	6.1	205			17.5 per plate

(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode
(4) Read Across 400-Ohm Resistor, R13



Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Rattle

If rattle is experienced when a signal is being received, it is, in practically all cases, due to mechanical vibration at some point in the chassis. Inspect the chassis and look for a loose tube shield or a loose part at some point which can rattle against another part. When the vibrating part is found, secure it in place in some manner. This can generally be done with a wedge made of a piece of paper, cardboard or wood. Rattle may, in some instances, be due to a loose cover. If this is the case, remove the cover and bend the edge of the chassis box outward between the screw holes so that the cover will fit tightly when it is put on.

If the Receiver Fails to Operate

"A" Fuse—Check the "A" line fuse in the cable.

"A" Line Open—See if power is being supplied to the speaker, tube heaters, and "B" eliminator.

"B" Eliminator Not Working—See if the "B" eliminator is in proper working order by checking the high voltage points at the tube plate terminals (see Fig. 10).

Antenna and Lead—See if antenna is properly connected to lead-in wire and antenna lead from set. Be sure antenna system is not grounded at any point.

All Tubes Not Inserted—See if all tubes are inserted as per Fig. 8.

Defective Tubes—Try out a new set of tested tubes.

Grid Caps Not Connected—See if all grid caps are properly connected to top of top grid connection tubes.

Variable Condenser Plates Shorted—Check condenser sections in chassis carefully for foreign particles or rotor stator rubbing.

CHASSIS PARTS

Part No.	Description	List Price
P-1780	No. 75 Tube Socket	$0.10
P-1761	No. 77 Tube Socket	.10
P-1762	No. 78 Tube Socket	.10
P-1665	No. 41 Tube Socket	.10
P-1803	No. 84 Tube Socket	.10
P-1805	Single Pin Jack	.10
P-1799	Tube Shield Assembly	.25
P-20636	Chassis Box	4.00
P-20657	Chassis Box Cover	1.10
P-70740	Shielded Antenna Lead	.40
P-70744	Shielded "A" Battery Lead	1.15
P-1926	Interrupter with Condensers in Rubber Boot and Metal Case	6.35
P-10260	Cardboard Baffle	.20
P-1924	15 Amp. Fuse	.10
P-1774	Electrodynamic Speaker	3.75
P-20585	Cond. Drive Gear	.25
P-1801	Volume Control and Drive Bracket	.30
P-20635	Cond. Drive Pinion	.15
P-20677	Pinion Adjustment Plate	.10
P-20614	Lock Lever	.10
P-20658	Tension Spring	.10
P-30419	Entry Plate Assembly	.10
P-1830	Dial Gear and Strip Assembly	.40
P-1816	Celluloid Dial Strip only	.15
P-1810	Pilot Lamp Socket and Spring Clip	.10
P-1563	6-8 Volt Pilot Lamp	.25
P-10263	Rubber Tube Bumper—Square	.10
P-10210	Rubber Tube Bumper—Round	.10
P-10213	Rubber Band for Tube	.10
P-50569	Filter Choke Assembly	1.60
P-50595	Power Trans. Assembly	2.90
P-5099	Antenna R. F. Transformer—Less Can	1.20
P-5065	Interstage R. F. Transformer—Less Can	1.00
P-5105	Second I. F. Transformer and Can Assembly	.95
P-5096	First I. F. and Oscillator Transformer and Can Assembly	2.70
P-5097	Single Solenoid "A" Choke	.25
P-40431	Antenna R. F. Can	.15
P-1826	Interstage R. F. Can	.10

Resistors

Part No.	Code No.	Resistance	Type	List Price
P-A95105	R-1	1 Megohm	Carbon	$0.25
P-A95105	R-2	1 Megohm	Carbon	.25
P-B94261	R-3	260 ohm	Carbon	.25
P-A95504	R-4	.5 Megohm	Carbon	.25
P-A95104	R-5	100,000 ohm	Carbon	.25
P-A94402	R-6	4,000 ohm	Carbon	.20
P-91066	R-7	0-500,00 ohm	Volume Control and Switch	$1.15
P-A95104	R-8	100,000 ohm	Carbon	.25
P-A95104	R-9	100,000 ohm	Carbon	.25
P-A94402	R-10	4,000 ohm	Carbon	.20
P-B94153	R-11	15,000 ohm	Carbon	.25
P-B94203	R-12	20,000 ohm	Carbon	.25
P-C94401	R-13	400 ohm	Carbon	.20

Condensers

Part No.	Code No.	Capacity	Voltage	Type	List Price
P-80962	C-1	.05 mfd.	200 V.	Tubular	$0.30
P-80888	C-2	.25 mfd.	200 V.	Tubular	.35
P-80821-B	C-4	.001 mfd.	600 V.	Molded	.25
P-80937	C-7	4.0 mfd.		Electrolytic Block in can	1.25
	C-11	4.0 mfd.			
P-80919	C-8	.00025 mfd.	600 V.	Molded	.20
P-80945	C-9	.0005 mfd.	600 V.	Molded	.15
P-80898	C-10	.006 mfd.	600 V.	Tubular	.15
P-80945	C-12	.0005 mfd.	600 V.	Molded	.15
P-80966	C-14	.008 mfd.	600 V.	Tubular	.20
P-80962A	.02 mfd.	600 V.	Tubular Condenser		.25
P-80978A	1. mfd.	120 V.	Tubular Condenser		.45
P-80976A	Dual .5 mfd.	120 V.	Tubular Condenser In Paper Box		.80
P-80956	C-19	8.0 mfd.	225 V.	Electrolytic Block in Can	2.25
	C-20	20.0 mfd.	25 V.		
	C-21	8.0 mfd.	225 V.		
P-80955	C-3	.1 mfd.	300 V.	Bypass Block in Can	1.35
	C-5	.05 mfd.	200 V.		
	C-6	.1 mfd.	200 V.		
	C-13	.05 mfd.	300 V.		
P-1539	600 K. C. Trimmer Condenser				.45
P-80957	Three-Gang Variable Condenser				3.00

CONTROL UNIT PARTS

(When Separate Control Unit Is Used)

Part No.	Description	List Price
P-1816	Celluloid Dial Strip	$0.15
P-1825	Dial Gear and Strip Assembly	.40
P-20509B	Control Unit Swivel	.15
P-20510A	Steering Post Apron	.30
P-20511	Steering Post Clamp	.15
P-20693	Control Box Cover	.35
P-20635	Cond. Drive Pinion	.15
P-70746	Pilot Lamp Cable only	.40
P-1415A	Pilot Lamp Socket and Clip	.15
P-1563A	6-8 Volt Pilot Lamp	.25
P-30426	Ornamental Plug	.10
P-30414	Key	.15

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

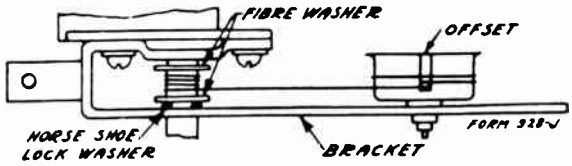


Fig. 3—*Cord Drive—Top View*

First remove the chassis from the case as explained on page 4.

Some of the first models did not have two fibre "end" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:

Separate and take off the horse-shoe lock washer which holds the drive shaft in position. This may be done with a fine jawed, long nose plier.

Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft back into place and replace the horse-shoe lock washer.

Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum — see Fig. 4. The knot will then be on the inside of the drum.

Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from

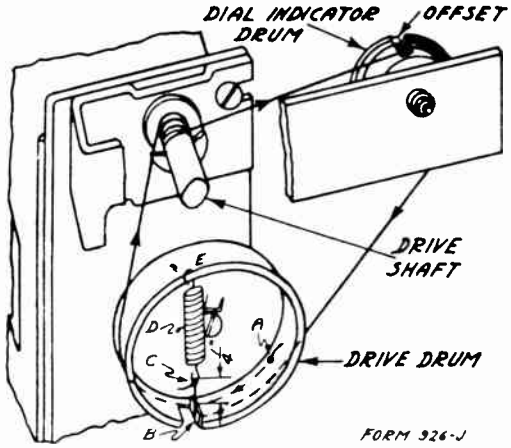


Fig. 4—*Cord Drive Replacement*

front) around the drive shaft three and one-quarter turns between the two fibre washers, progressing towards the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.

Wrap the cord from the drive shaft once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.

From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

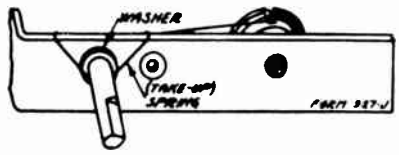


Fig. 5—*Drive "Take-up" Spring*

Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".

Tie the drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between ⅛" and ⅜" from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about ¼".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.

After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

Slip the small fibre washer over the shaft and clip the "take-up" spring to the drive bracket as shown in Fig. 5.

The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

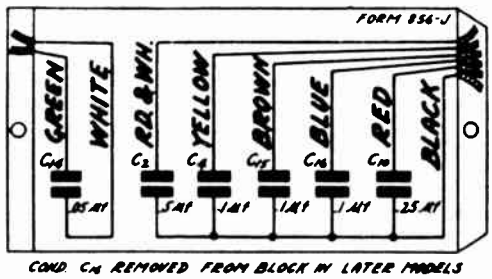


Fig. 6—*Condenser Block Internal Wiring*

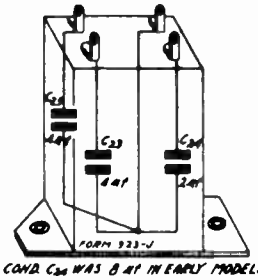


Fig. 7—*Electrolytic Block Internal Wiring*

MODEL S-735 WESTERN AUTO SUPPLY CO.

Schematic, Voltage Socket, Trimmers, Parts

Fig. 1—*Schematic Circuit Diagram*

VOLTAGES AT SOCKETS

Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

Dec, 1934

On the Voltage Chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected at the bayonet connector.

Fig. 2—*Location of Tubes and Vibrator*

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mmf.	Part of Antenna Coil Assembly	
P-82600D	C2	.50 mf.	200V.	Bypass Block
	C4	.10 mf.	140V.	
	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	200V.	Tubular
P-81815	C5	.35 mmf.	Part of Grid Leak Assembly	
P-81806	C6	70 mmf.	Part of 1st I. F. & Osc. Coil Assembly	
	C7	70 mmf.		
P-81806	C8	70 mmf.	Part of 2nd I. F. Coil Assembly	
	C9	70 mmf.		
P-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	In Choke Condenser Unit
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500	Gang Condenser			

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P- 96017	R9	2 Megohm		Volume Control and Switch
P-A95503	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound

In the first models of this receiver a bypass condenser block (P-82600) containing condensers: C2, C4, C10, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-81132) while the other condensers remained in the block (P-82600-D).

A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

WESTERN AUTO SUPPLY CO.

MODEL S-735
Alignment, Notes
Test Data, Parts

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attemped unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and an output meter are required for indicating the effect of adjustments.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the escutcheon plate and glass. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibratur unit. Next, nutice the small length of braided shielding which is soldered to the solder lug that is secured to the chassis case between the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be readily replaced. CAUTION—Polarity, as explained in the label on the unit and in the label on the metal box in the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.

The old volume control and switch connections may now be unsoldered and the new unit put in its place and the leads resoldered.

Fasten the volume control to the case in the reverse order in which it was removed.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec.	T2	
	(Center Tap to Inside)		3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	T6	690.00
	Output Trans. Sec. and Voice Coil in Par		0.80
	Speaker Field		6.00

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No.

Part No.	Item
P-1885	6D6 Tube Socket
P-1886	6C6 Tube Socket
P-1775	75 Tube Socket
P-1911	41 Tube Socket
P-5247	Antenna Coil Assembly Less Can
P-40415B	Can for above assembly Part of Gang Condenser Assembly
P-5248	R. F. Interstage Coil Assembly Less Can
P-40447C	Can for above assembly Part of Chassis Assembly
P-5249	1st I. F. and Oscillator Coils and Can Assembly
P-5250	2nd I. F. Coil and Can Assembly
P-2228	Dynamic Speaker
P-10359	Cardboard Baffle for Speaker
P-2229	Vibrator Unit
P-3030	Vibrator Socket
P-50656	Power Transformer
P-5251	R. F. "A" Choke Coil
P-5174	R. F. "B" Choke Coil
P-50657	Power Choke Coil Assembly
P-5253	Filament Choke Coil
P-2220	2 Half Tube Shields with Clamping Ring
P-2240	Grid Leak and Condenser Assembly
P-2224	Knobs
P-20960	Thumb Screws
P-10356	Glass Crystal
P-10361	Gasket for Glass Crystal
P-30342A	Grid Clip only
P-10213	Wide Rubber Bands for Tubes
P-70774	Shielded Antenna Cable
P-70781	"A" Battery Cable
P-1421	Single Lug Terminal Strip
P-2082	Double Insulated Terminal Strip
P-2232	Five Lug Terminal Strip
P-1933	Cinch Terminal Lug
P-20701	Drive Tension Spring
P-20953	Horseshoe Lock (Washer)
P-2227	Dial Strip
P-20754	Dial Pointer

MODEL S-740
Schematic

WESTERN AUTO SUPPLY CO.

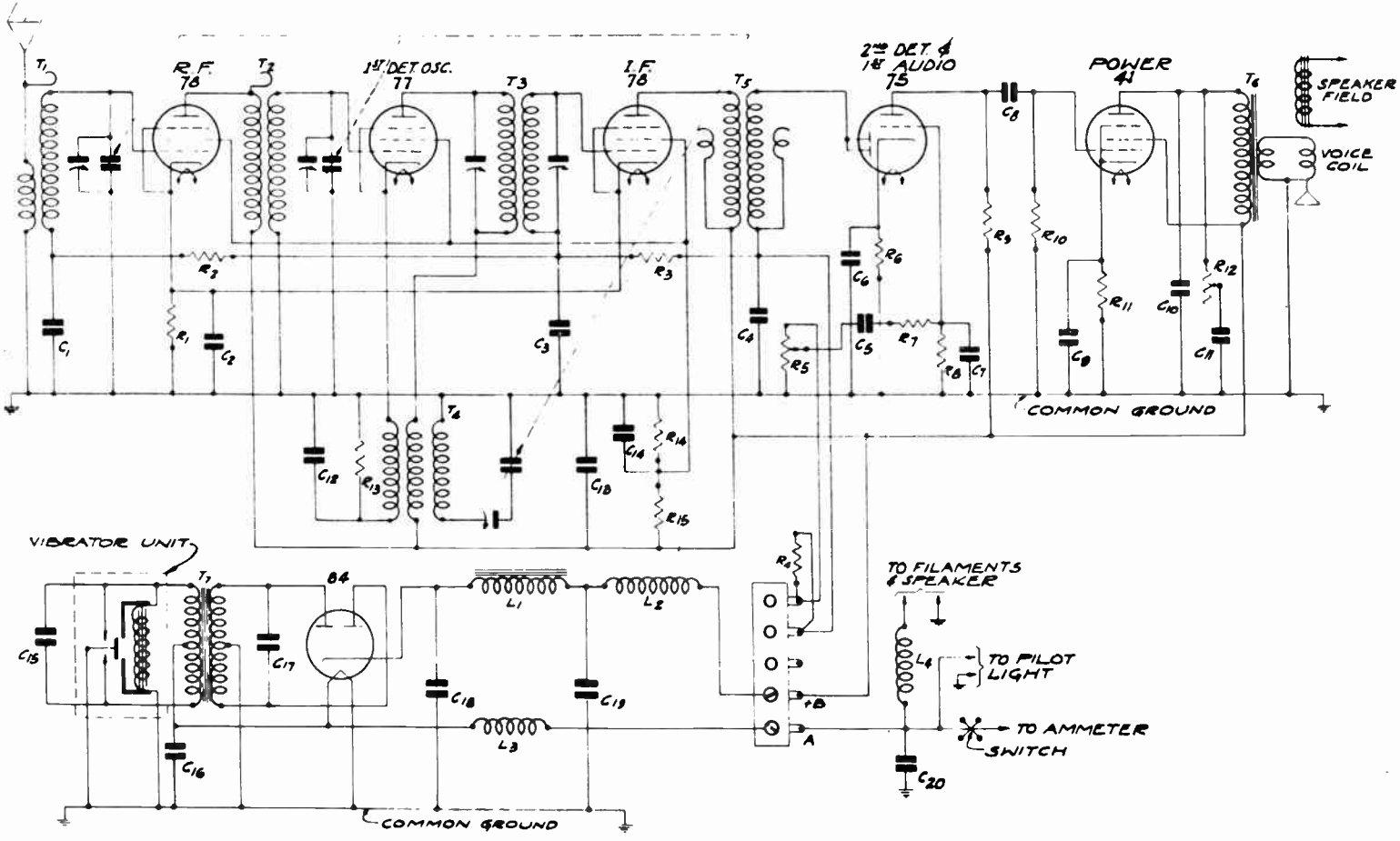
C_1 0.050 M.F 1200V. TUBULAR
C_2 0.500 M.F (BLOCK RED-WH)
C_3 0.050 M.F (BLOCK G.R.-WH.)
C_4 0.00025 M.F MICA
C_5 0.050 M.F. 200V. TUBULAR
C_6 12.000 M.F ELECTROLYTIC IN BLOCK WITH C_9
C_7 0.00025 M.F. MICA
C_8 0.050 M.F (BLOCK G.R.)
C_9 12.000 M.F ELECTROLYTIC IN BLOCK WITH C_6
C_{10} 0.003 M.F (BLOCK YELLOW)
C_{11} 0.020 M.F 600V. TUBULAR
C_{12} 0.001 M.F MICA
C_{13} 0.500 M.F (BLOCK BLUE)
C_{14} 0.100 M.F (BLOCK BROWN)
C_{15} 0.500 M.F. 120V. TUBULAR
C_{16} 1.000 M.F. 120V. TUBULAR
C_{17} 0.010 M.F 1600V. TUBULAR
C_{18} 18.000 M.F. BLOCK WITH C_{19}
C_{19} 18.000 M.F BLOCK WITH C_{18}
C_{20} 0.500 M.F 120V. TUBULAR
COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK

T_1 ANTENNA COIL (P-5039)
T_2 R.F. INTERSTAGE COIL (P-5065)
T_3 } 1ST I.F. & OSCILLATOR
T_4 } COIL (P-5063)
T_5 2ND I.F. COIL (P-5022)
T_6 OUTPUT TRANS. (P-50632)
T_7 POWER TRANS. (P-50633)

L_1 FILTER CHOKE (P-50637)
L_2 R.F. "B" CHOKE (P-5174)
L_3 ELIMINATOR "A" CHOKE (P-5175)
L_4 R.F. "A" CHOKE (P-5167)

R_1 260 OHMS
R_2 1.0 MEGOHM
R_3 2.0 "
R_4 280,000 OHM
R_5 250,000 OHM VOL. CONTROL
R_6 6,000 OHM
R_7 100,000 OHM
R_8 1.0 MEGOHM
R_9 250,000 OHM
R_{10} 250,000 OHM
R_{11} 800 OHM
R_{12} 150,000 OHM TONE CONTROL
R_{13} 4,000 OHM
R_{14} 20,000 OHM
R_{15} 15,000 OHM

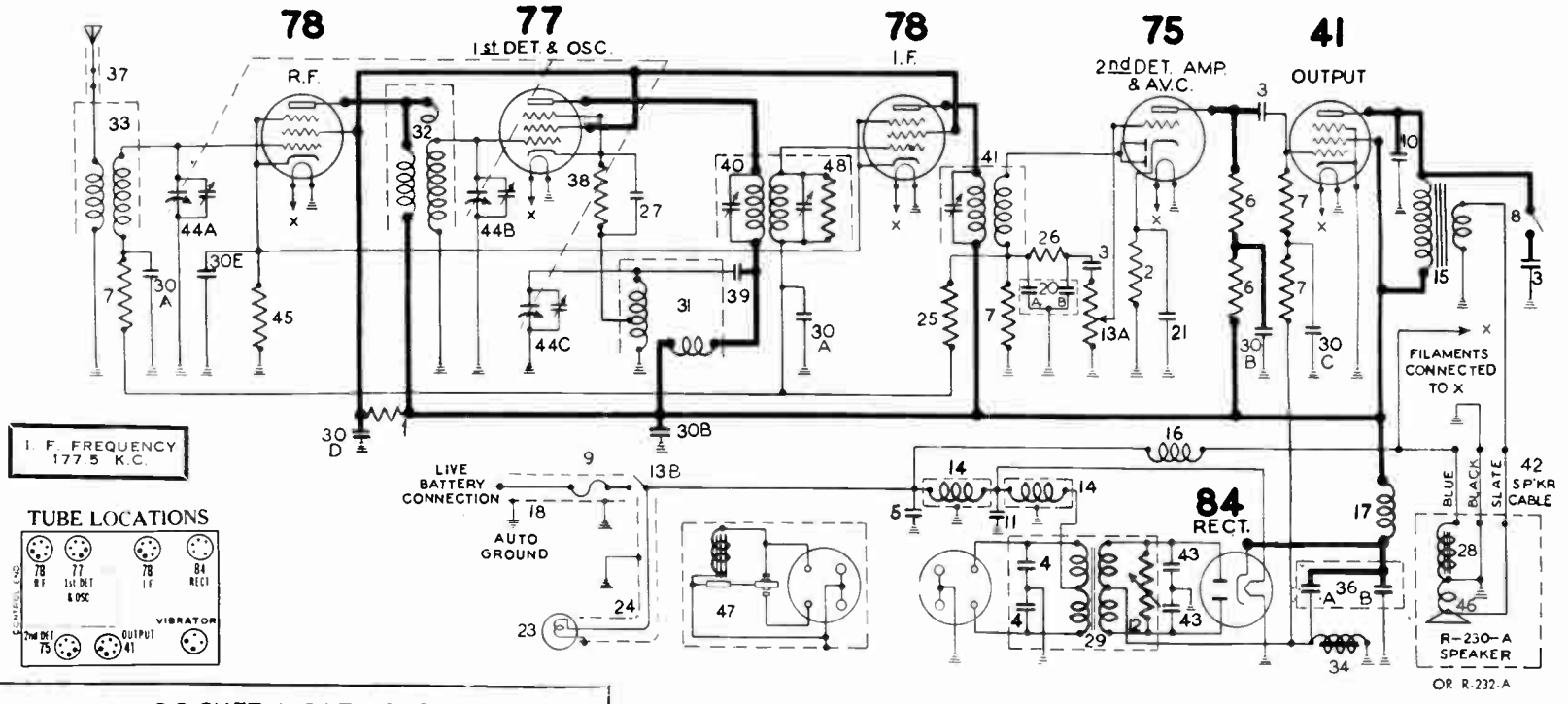
IF PEAK 262.5 KC.



TRUETONE MODEL 1312

WESTERN AUTO SUPPLY CO.

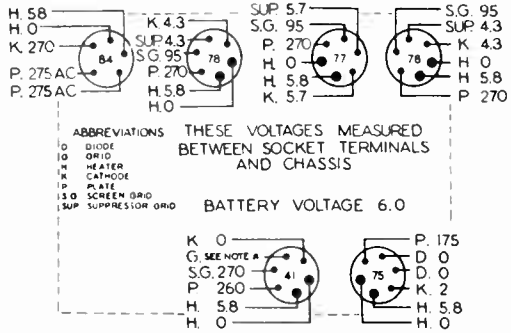
MODEL S-743,1312
Schematic,Voltage
Socket,Parts List



TUBE LOCATIONS

SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS



ABBREVIATIONS: D DIODE; G GRID; H HEATER; K CATHODE; P PLATE; S.G. SCREEN GRID; SUP. SUPPRESSOR GRID

THESE VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

BATTERY VOLTAGE 6.0

IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

MODEL R-1312 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67580	6,000 ohm ¼ watt carbon resistor	.25
3	83007	.02 mfd. 600 volt paper condenser	.35
4	83058	.25 mfd. 100 volt paper condenser	.35
5	83063	.5 mfd. 100 volt paper condenser	.45
6	83080	51,000 ohm ¼ watt carbon resistor	.20
7	83082	260,000 ohm ¼ watt carbon resistor	.20
8	83179	Tone control switch	.30
9	83207	15 ampere fuse	.05
10	83706	.006 mfd. 600 volt paper condenser	.35
11	83714	1.5 mfd. 100 volt shielded condenser	.80
12	83725	Special Globar resistor	.45
14	83730	Vibrator R.F. Choke	.25
15	83731	Output transformer	2.00
16	83742	Filament R.F. choke	.16
13A, 13B	83728	500,000 ohm volume control; Line Switch	1.20
17	83770	"B" supply R.F. choke	.40
18	83777	Battery lead and fuse housing	.50
20	83785	Dual .0005 mfd. molded mica condenser	.32
21	83803	12 mfd. 25 volt dry electrolytic condenser	.80
23	84058	6 - 8 volt dial light bulb	.15
24	84099	Dial light cable	.35
25	84235	1.1 megohm carbon resistor	.20
26	84238	11,000 ohm ¼ watt carbon resistor	.20
27	84282	.001 mfd. molded mica condenser	.25
28	84791	Field coil and housing (R-230A only) (Part 85118 for R-232A)	2.50
29	84798	Power transformer	3.50

Diag. No.	Part No.	Description	List Price
30A, 30B, 30C, 30D, 30E	84806	.05 mfd. 300 volt paper cond. (green-white); .1 mfd. 400 v. paper cond. (red or red-white); .25 mfd. 100 volt paper cond. (green lead); .25 mfd. 300 volt paper cond. (white lead); .5 mfd. 100 volt paper cond. (orange lead)	2.50
31	84814	Oscillator (O) coil and shield assembly	1.50
32	84822	R.F. (B) coil and shield assembly	1.50
33	84825	Antenna (A) coil and shield assembly	1.40
34	84827	"B" supply filter choke	1.25
36A, 36B	84829	4 mfd.—400 volt dry electrolytic condenser; 8 mfd.—100 volt dry electrolytic condenser	2.50
37	84831	Antenna lead and plug	.10
38	85051	8000 ohm ½ watt carbon resistor	.20
39	84833	.00007 mfd. molded mica condenser	.20
40	84838	1st. I.F. transformer assembly	2.75
41	84842	2nd. I.F. transformer assembly	2.60
42	84845	Speaker cable	.50
43	84850	.03 mfd. 750 volt paper condenser	.25
44A, 44B, 44C	84866	Three gang variable condenser with mounting plate and shaft coupling	6.00
45	84888	300 ohm. ½ watt flexible wire resistor	.20
46	84891	Diaphragm, voice coil, and shell assembly (R-230A only) (Part 85119 for R-232A)	2.10
17	84905	Vibrator	5.00
48	85072	510,000 ohms ¼ watt resistor	.20
38	85051	8000 ohm ½ watt carbon resistor	.20
28	85118	Field coil and housing (R-232A only)	2.50
46	85119	Diaphragm, and shell assembly (R-232A only)	2.10

(See reverse side for other parts.)

MODEL S-743,1312
Alignment,Parts
Circuit Data

WESTERN AUTO SUPPLY CO.

SERVICE DATA FOR TRUETONE MODEL 1312

CIRCUIT DESCRIPTION

In the R-131 Chassis, the incoming signal is tuned and amplified in the 78 R.F. stage. Further amplification and frequency conversion to 177.5 KC. take place in the 77 combination first detector and oscillator tube.

The 177.5 KC. signal is amplified in the I.F. stage, using a 78 type tube, and then rectified in the diode section of the 75 second detector tube. The rectified current produces a modulated D.C. voltage across the diode load resistor No. 7. The audio component of this voltage appears across the 500,000 ohm volume control. Any part or all of this audio signal may be impressed on the triode section of the 75 tube where amplification takes place.

The modulated drop across resistor No. 7 is filtered and applied to the grids of the 78 R.F. and I.F. tubes to provide A.V.C.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 12 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect the 41 plate is the terminal of the tone control switch.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K.C. and connected from the 77 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles, except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the dial can be calibrated as follows:

Tune in a station of known frequency between 800 and 1100 K.C. Insert a screw driver in the slotted shaft on the rear of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the station frequency.

If the set is badly out of calibration such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below.

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage.

Set the test oscillator to exactly 600 K.C. Tune the radio set to maximum volume. Calibrate the dial at the low frequency end by setting the pointer to read exactly 6.0 (600 K.C.).

Set the test oscillator to exactly 1400 K.C. Turn the tuning knob until the dial pointer indicates 14.0 (1400 K.C.) and then adjust the oscillator shunt trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 K.C., tune the set very carefully for maximum output.

Adjust the output of the oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description	List Price
12606	Receiver mtg. nut (5/16—18 hex.)	$0.02
83116	1 lug terminal strip	.04
83114	15,000 ohm spark plug suppressor	.35
83115	10,000 ohm distributor suppressor	.35
83212	No. 8 x 1/4" self tapping screws (dark finish for mtg. back cover and casing brackets)	.02
83319	Fuse insulating tube	.02
83024	No. 8 x 1/4" self tapping screw (Cad. plate, for mtg. power transformer)	.01
83711	8 lug terminal strip	.12
83719	Front cover mtg. spade bolt (10-32)	.01
83720	4 lug terminal strip	.08
83721	Battery lead plug rubber grommet	.02
83727	Back cover	.90
83737	Front cover knurled nuts	.06
83774	Receiver mounting stud	.08
83772	Receiver mounting dash support washer	.01
83806	Speaker grill cloth	.12
83092	Variable condenser shaft coupling	.10
83093	Volume control shaft guide bushing	.05
83901	Generator condenser	.70
81869	Case assembly, less covers	3.75
81893	Front cover and speaker grill cloth	1.00
81911	Aluminum vibrator shield assembly	.50

REMOTE CONTROL HEAD PARTS

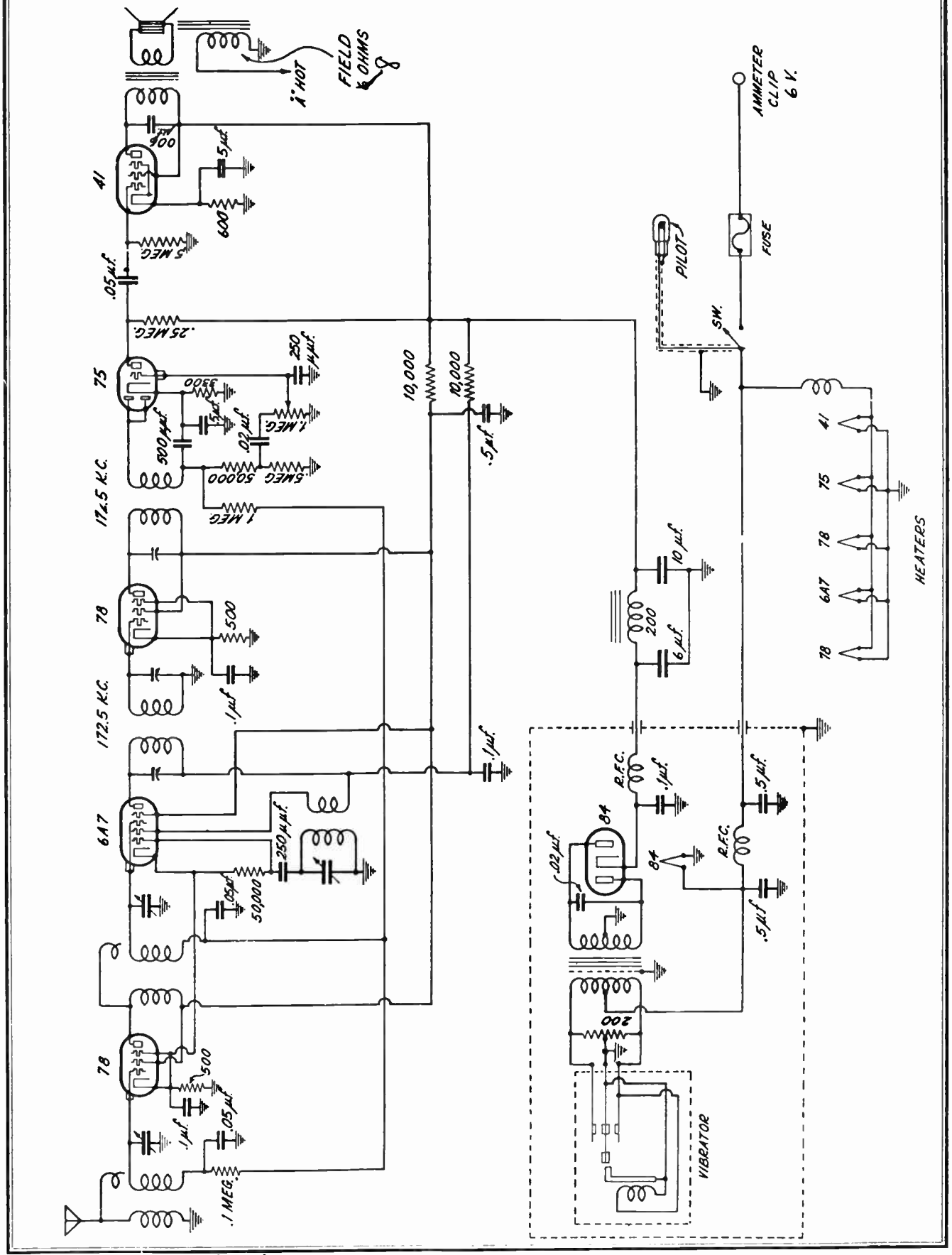
Part No.	Description	List Price
15214	Long mtg. strap screw (10-32 x 1 1/4" R.H.M.S.)	.01
81059	Case screw (4-40 x 3/16") Per hundred	.80
81060	Flexible casing set screw	.02
81067	Steering post mtg. bracket	.25
81068	Steering post mtg. strap	.15
81075	Bezel and glass	.50
81076	Dial light button and socket	.25
81106	Volume control knob	.25
81309	Instrument panel mounting accessories	.15
81851	Complete accessories for installation	5.00

FLEXIBLE SHAFTS

Part No.	Description	List Price
81071	Tuning shaft, 24 inches long	1.50
81073	Volume control shaft, 24 inches long	1.50
81082	Tuning shaft, 36 inches long	2.00
81083	Volume control shaft, 36 inches long	2.00
81086	Tuning shaft, 30 inches long	2.00
81087	Volume control shaft, 30 inches long	2.00

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR-26
Schematic



MODEL WR-25
Alignment
Voltage, Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

ADJUSTMENTS

The receiver was carefully adjusted and tested by experts at the factory, and should reach the customer in perfect condition. Under no circumstances should these adjustments be disturbed unless it is absolutely necessary as in the repairing of a damaged set. This should be done by an experienced Auto Radio Service man only.

Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ k.c. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two I.F. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

Radio Frequency and Oscillator

To align the R.F. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350-1450 k.c. Set the dial to the frequency selected. Adjust trimmers on the variable condenser beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the R.F. sections may be aligned on broadcast.

Tune in a weak station between 1350 and 1450 k.c. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

Voltage Analysis:

Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

Battery volts—6. Volts across heaters—6 scant. Volts across speaker field—6 scant.

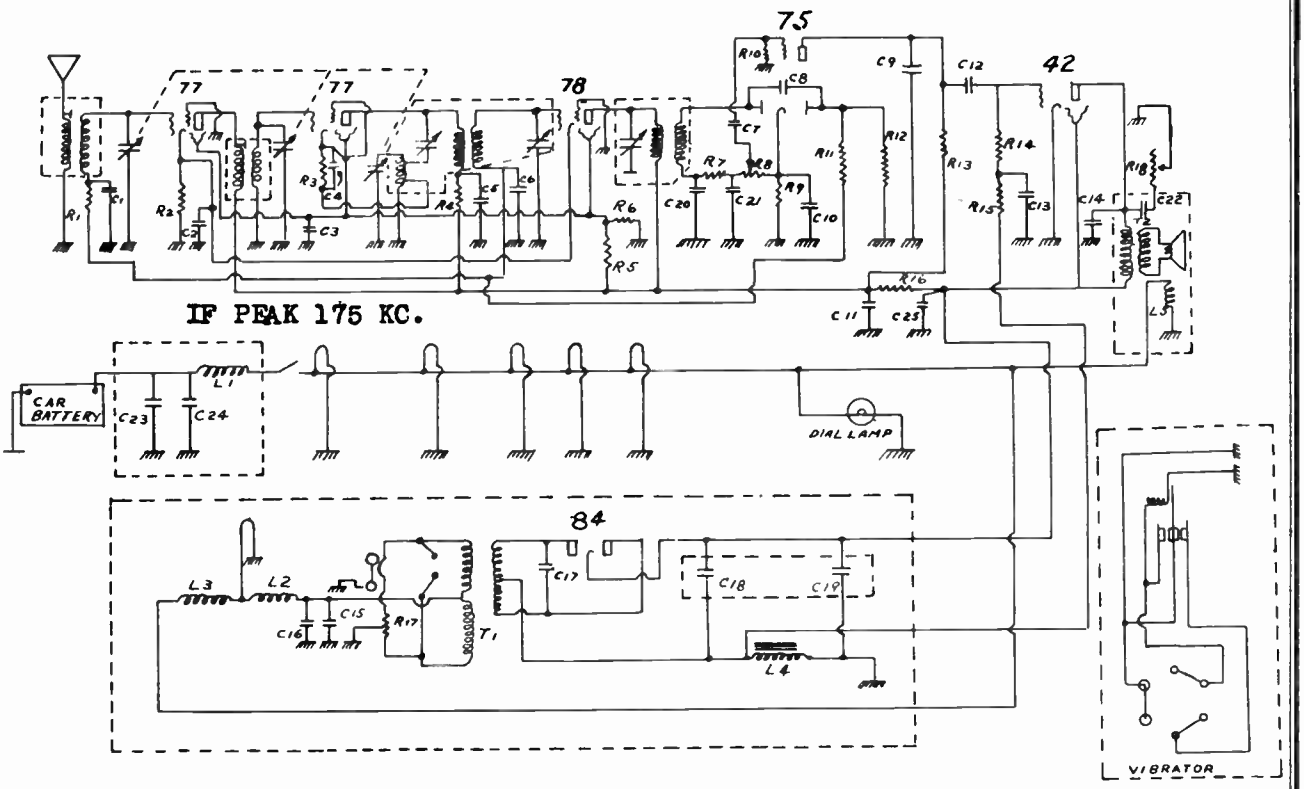
Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. plate*
78	110	110	6	6	—
6A7	170	110	6	—	170
75	110	—	1.3	—	—
78	110	110	3.5	3.5	—
41	210	220	15	—	—

Part No.	*Description*
ZT-92	Antenna Coil
ZT-93	Interstage Coil
ZT-94	Composite I.F. and Oscillator Coil
ZT-95	Output I.F. Coil
ZT-99	Power Transformer
ZT-96	"B" Filter Choke
NT-53	"B" R.F. Choke
ZT-98-A	"A" R.F. Choke, multiple layer
ZC-123	Filter Condenser, 10 x 6 mfd.
IC-43	5 Mfd. Electrolytic Condenser
EC-19	.5 Mfd. Tubular Condenser
ZR-104	10,000 Ohm 2 Watt Wire Wound Resistor
	Any Carbon Resistor
	Any Mica Condenser
	Any Socket
KL-6	Pilot Light Bulb
WR-92	Volume control, complete with switch
ZV-3	Vibrator
ZS-66	Speaker
NZ-54	Spark Plug Suppressor
NZ-54-A	Distributor Suppressor
NZ-55	Generator Condenser

MODEL WR-26
Schematic
Voltage

WESTINGHOUSE ELEC. SUPPLY CO.

SERVICE INSTRUCTIONS
WESTINGHOUSE MOTOR CAR RADIO
MODEL WR-26



ELECTRICAL VALUES

C1	.05 mfd. 2 ply	C14	.005 mfd. 3 ply	R1	100,000 ohms 1/4 W.	R14	250,000 ohms 1/4 W.
C2	.25 mfd. 2 ply	C15	.5 mfd. 2 ply	R2	500 ohms 1/4 W.	R15	250,000 ohms 1/4 W.
C3	.25 mfd 2 ply	C16	.5 mfd. 2 ply	R3	7500 ohms 1/4 W.	R16	4,000 ohms 1 W.
C4	.002 mfd. 4 ply	C17	.02 mfd. 4 ply	R4	2000 ohms 1/4 W.	R17	200 Center tapped
C5	.05 mfd. 3 ply	C18	6. mfd.	R5	40,000 ohms 1/4 W.	R18	1/2 meg. Tone Control
C6	.05 mfd. 2 ply	C19	10. mfd.	R6	75,000 ohms 1/4 W.	T1	Power Trans.
C7	.005 mfd. 3 ply	C20	10 mmfd. mica	R7	50,000 ohms 1/4 W.	T2	Output Trans.
C8	100 mmfd. mica	C21	100mmfd. mica	R8	1/2 meg. Vol. Control	L1	Filter Choke
C9	.002 mfd. 4 ply	C22	.05 mfd. 3 ply	R9	5000 ohms 1/4 W.	L2	Filter Choke
C10	.5 mfd. 2 ply	C23	.001 mica	R10	1 meg. 1/4 W.	L3	Filter Choke
C12	.005 mfd. 3 ply	C24	.5 mfd. 2 ply	R12	1/2 meg. 1/4 W.	L4	Power Choke
C13	.1 mfd. 2 ply	C25	.001 mica	R13	100,000 ohms 1/4 W.	L5	Field Coil

MODEL WR-26 SOCKET VOLTAGES
(Car Battery 6 Volts Under Load)

Tube	Use	Fil.	Plate	Screen	Cathode	Bias
77	RF	5.3	179	79	2.9	
77	Det. Osc.	5.3	178	79	4.3 to 8.4	
78	IF	5.3	179	79	2.9	
75	2nd Det. AVC	5.3	113			
42	AF	5.3	201	217	1.2	13.0

The above readings were taken from ground or metal of chassis to socket terminals and will vary slightly with different types of voltmeters used.

MODEL WR-26
Socket, Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

Alignment Data

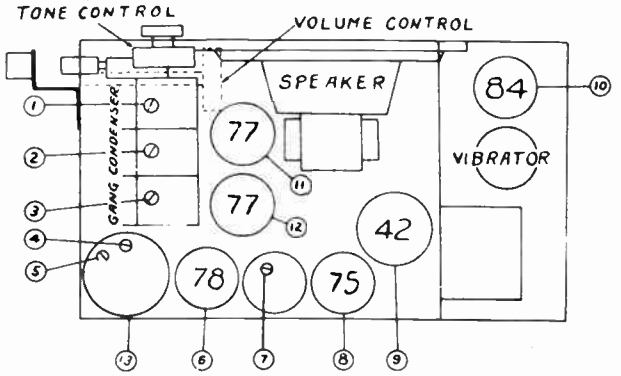


Fig. #2

#1 RF Trimmer Condenser
#2 1st Det. Trimmer Cond.
#3 Osc. Trimmer Condenser
#4) 1st IF Trimmer Cond.
#5)
#6 IF Amplifier
#7 2nd IF Trimmer Cond.
#8 2nd Det. AVC & AF Amplifier
#9 Power Output
#10 Rectifier
#11 RF Amplifier
#12 Det. and Osc.
#13 1st IF & Osc.Coil

All of the adjustable condensers commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless a coil or I. F. transformer is changed or the adjustments have been tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a high-grade test oscillator and output meter is available, then proceed as follows:

1. Connect output meter across voice coil of speaker.
2. Set volume control on full.
3. Set tone control to bass position.
4. Connect dial light.

(A) I. F. Adjustment

1. Connect a .1 mfd. condenser in series with antenna lead of test oscillator.
2. Set test oscillator to 175 K. C.
3. Connect test oscillator to grid of 1st I. F. tube #6 (see Fig. #2) and adjust #7 to maximum output.
4. Connect test oscillator to grid of 1st Det. #12 and adjust condensers #4 and 5 to maximum output.
5. Repeat the above adjustments for accuracy.

(B) Oscillator Adjustment

1. Set test oscillator to 1500 K. C.
2. Connect test oscillator leads to grid of 1st Det. #12.
3. Set gang condenser to 1500 K. C. as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to the thickness of a thin cardboard strip or approximately .015".
4. Peak oscillator condenser #3 on end of gang.

(C) R. F. Adjustment

1. Set test oscillator to 1400 K. C.
2. Change antenna condenser in oscillator lead from .1 mfd. to .0002 mfd., and connect test oscillator to antenna lead of set.
3. Set condenser gang at 1400 K. C.
4. Peak condensers #1 and 2 on gang.
5. Do not touch oscillator trimmer #3 at 1400 K. C. setting of gang.

SERVICE PARTS LIST WR-26 MOTOR CAR RADIO

RESISTORS

	Ohms	Body	Tip	Dot
WR-05277	75,000	Purple	Green	Orange
WR-05251	40,000	Yellow	Black	Orange
WR-05245	2,000	Red	Black	Red
WR-05247	7,500	Purple	Green	Red
WR-05279	250,000	Red	Green	Yellow
WR-05249	5,000	Green	Black	Green
WR-05281	1 meg.	Brown	Black	Green
WR-05278	100,000	Brown	Black	Yellow
WR-05276	50,000	Green	Black	Orange
WR-05246	500,000	Green	Black	Yellow
WR-05264	500	Green	Black	Brown
WR-06531	4,000	Yellow	Black	Red
WR-06527	Resistor strip assembly			
WR-06537	Mid tap resistor			

CONDENSERS

WR-06558	Electrolytic cond.-power pack.
WR-06680	Variable condenser assembly...
WR-06536	Condenser- power pack base ...
WR-06526	Condenser assembly block .....
WR-06560	Condenser in can .....
WR-06600	Condenser & choke assembly ...
WR-02493	Condenser .05 - 2 ply .....
WR-06417	Condenser .0001 mfd. mica ....
WR-99650	Condenser .001 mfd. mica .....
WR-03659	Condenser .005 - 3 ply .....

Part No.	Description of Parts
WR-03852	Condenser .002 4 ply .....
WR-02497	Condenser .25 2 ply .....
WR-02499	Condenser .5 2 ply .....
WR-02496	Condenser .25 3 ply .....
WR-02495	Condenser .1 2 ply .....
WR-03775	Condenser .001 mica .....
WR-02492	Condenser .05 3 ply- speaker .
WR-06560	Condenser- power pack base ...
WR-03864	Condenser .002 4 ply .....
WR-03660	Condenser .005 3 ply .....
WR-02303	Condenser .05 3 ply .....
WR-02508	Condenser .1 3 ply .....
WR-01883	Condenser .25 2 ply .....
WR-02322	Condenser .5 2 ply .....
WR-02386	Condenser .25 3 ply .....

COILS

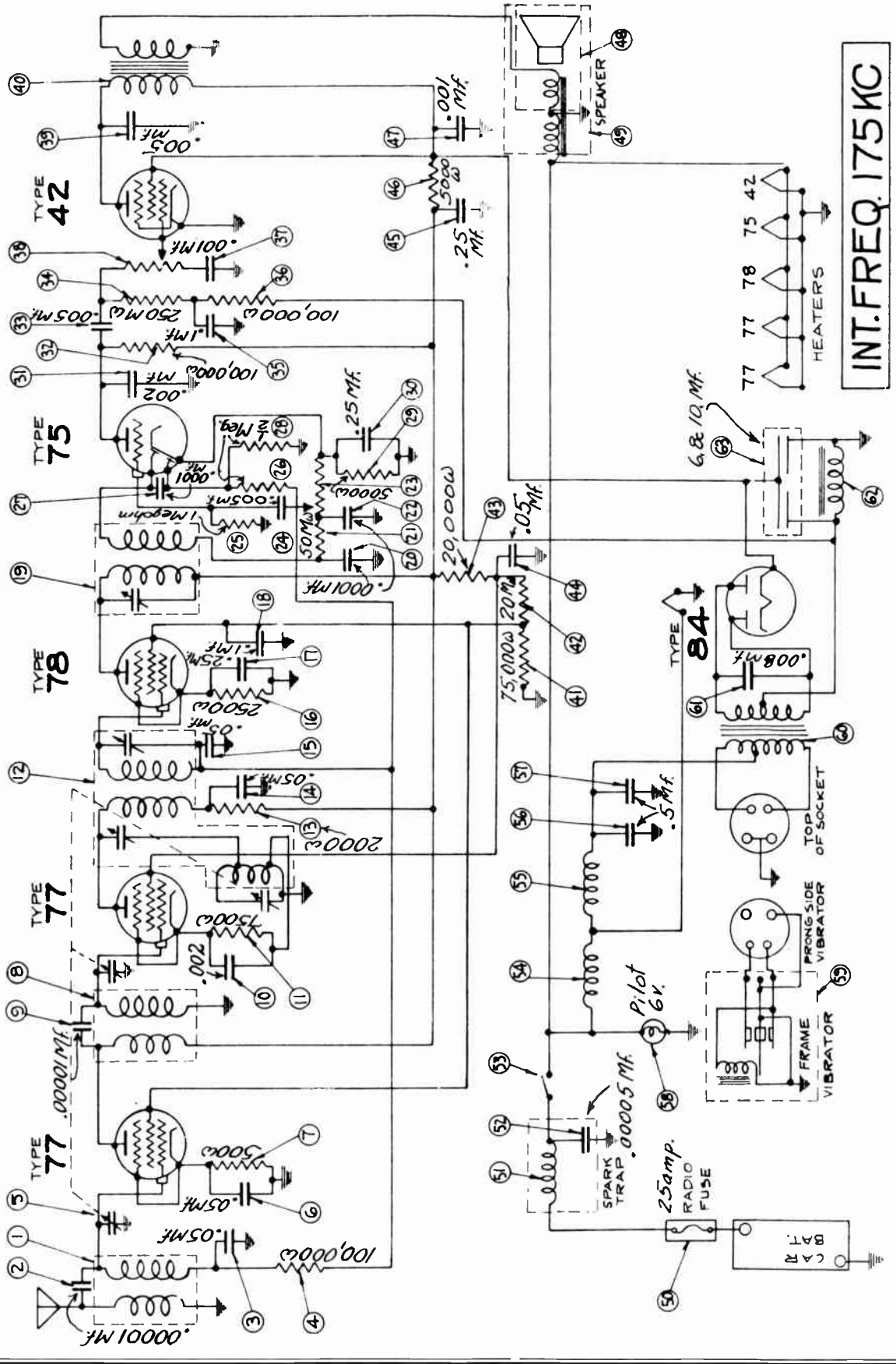
WR-05824	Choke coil- power pack .....
WR-05452	R.F. choke coil - power pack..
WR-06523	Oscillator coil assembly .....
WR-04580	I. F. coil assembly-chassis ..
WR-06519	Antenna coil assembly .....
WR-06518	R.F. coil assembly .....
WR-06713	Speaker field coil .....

TRANSFORMERS

WR-06535	Transformer- power pack .....
WR-06618	Output transformer .....
WR-07053	Iron core filter choke .....

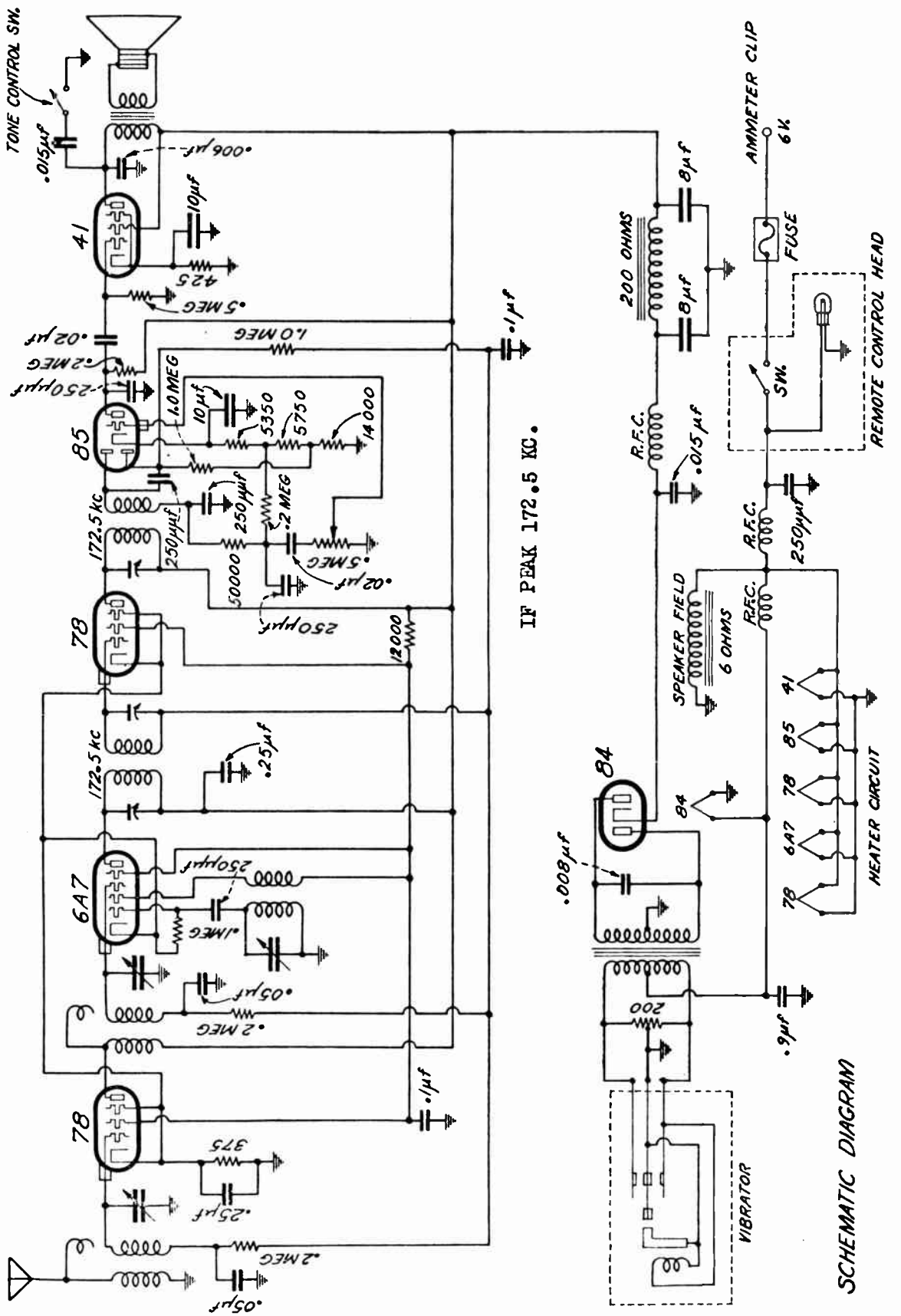
MODEL WR-500
Schematic

WESTINGHOUSE ELEC. SUPPLY CO.



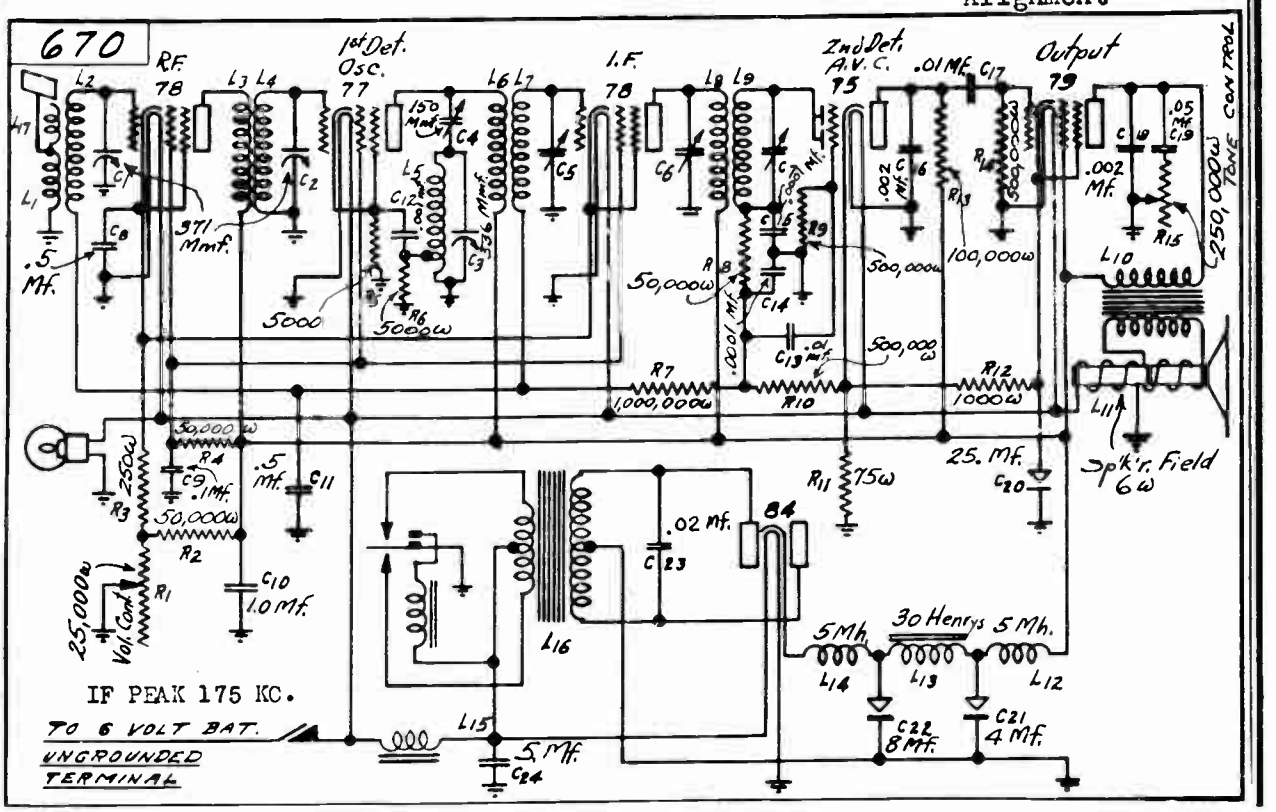
MODEL WR-501
Schematic

WESTINGHOUSE ELEC. SUPPLY CO.



WILCOX-GAY CORP.

MODEL 3-R-C
Schematic, Voltage
Alignment



	Cath. to Plate	Cath. to Screen	Cath. to Ground	Plate Current MA	Heater Volts
78	180	80	2	4	6.3
77	180	80	4	58	6.3
78	180	80	2	4	6.3
75	120	—	2	1	6.3
89	180	180	17	20	6.3

R. F. Adjustment:

The three R. F. trimming condensers are adjusted at 1400 K. C. Proceed as follows:

Procure a modulated oscillator giving a signal at 1400 K. C.

Remove the cover of the case, couple the out-put of the oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 K.C.

Place the oscillator and receiver in operation and adjust the oscillator out-put so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Then adjust the trimming condensers starting with C 3, C 2 and then C 1 until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments.

A more accurate adjustment can be made with an out-put meter.

I. F. Adjustment:

The four I. F. trimming condensers are adjusted at 175 K. C. Proceed as follows:

Procure a modulated oscillator giving a signal at 175 K. C., a non-metalic screw driver and an out-put meter.

Volume Control full on.

Remove the bottom, top, cap, drive pulley and the speaker leads and remove the chassis.

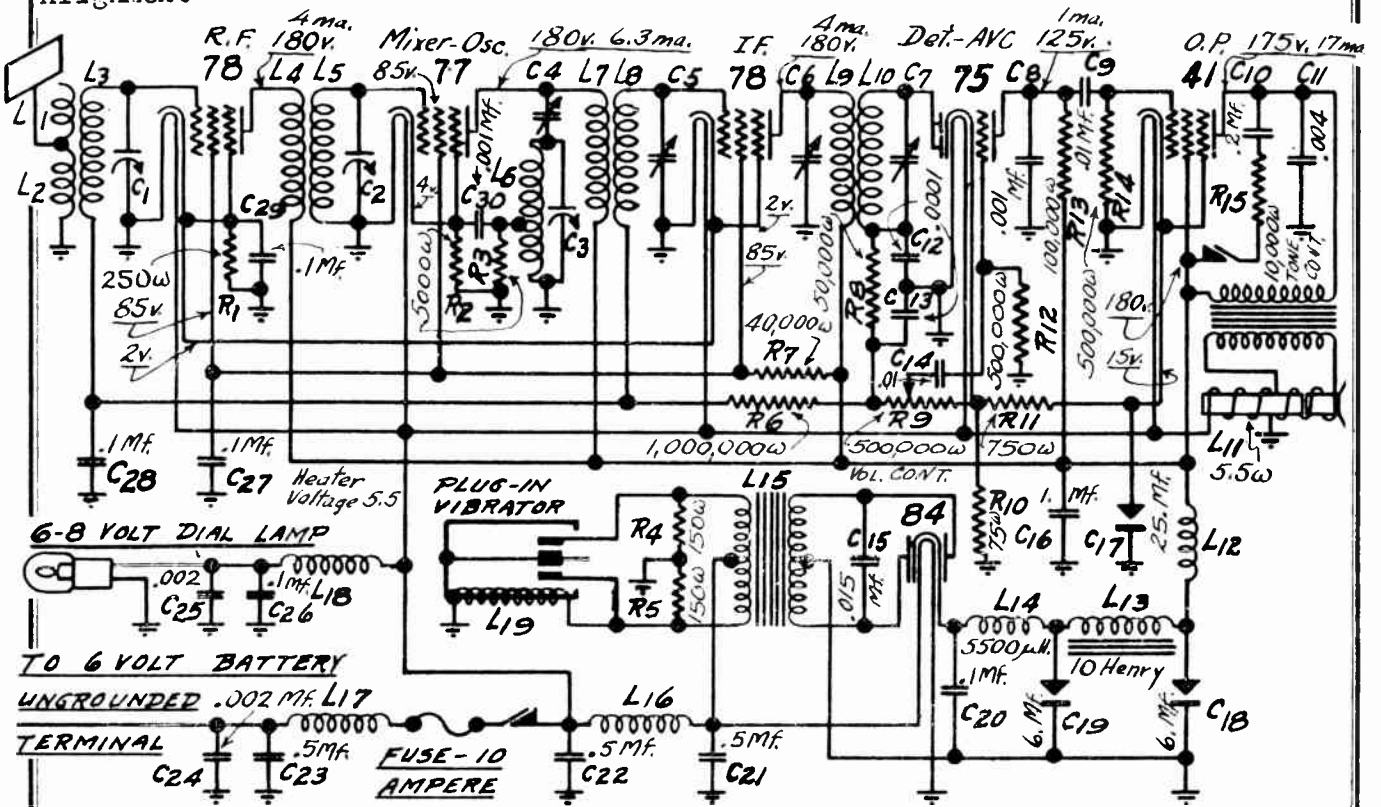
Reconnect the speaker. Connect the oscillator out-put between the first detector grid and ground. Connect out-put meter.

Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator out-put until a small deflection is obtained. Unless this is done the action of the A.V.C. will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

MODEL 4-B-6, Road Mate
Schematic, Voltage
Alignment

WILCOX-GAY CORP.



The three R. F. trimming condensers are adjusted at 1400 K. C.. Proceed as follows:
Procure a modulated oscillator giving a signal at 1400 K.C..

Remove the chassis from case, couple the output of the oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 K.C..

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Then adjust the trimming condensers starting with C 3, C 2 and then C 1 until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments.

A more accurate adjustment can be made with an output meter.

I. F. Adjustment:

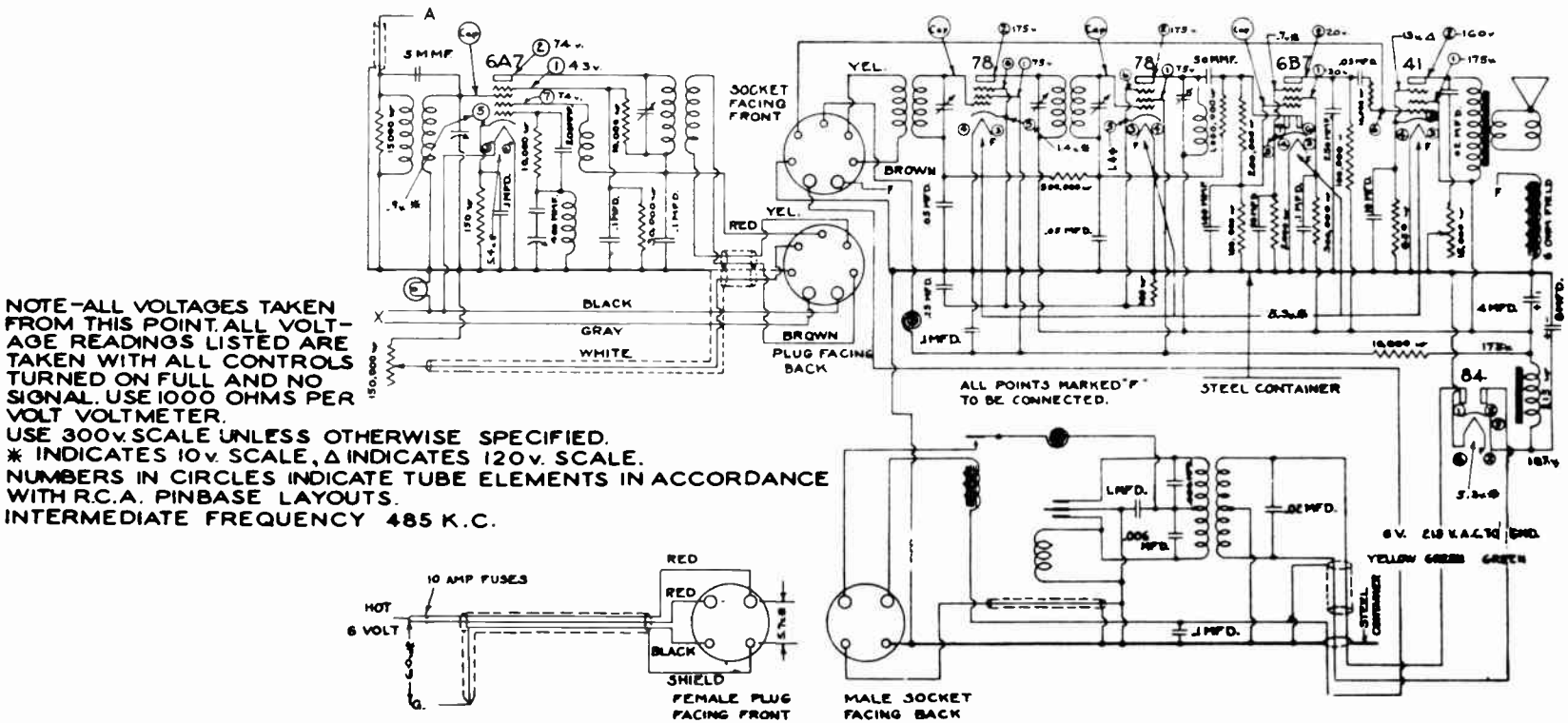
The four I. F. trimming condensers are adjusted at 175 K.C.. Proceed as follows:
Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

Connect the oscillator output between the first detector grid and ground. Connect output meter.

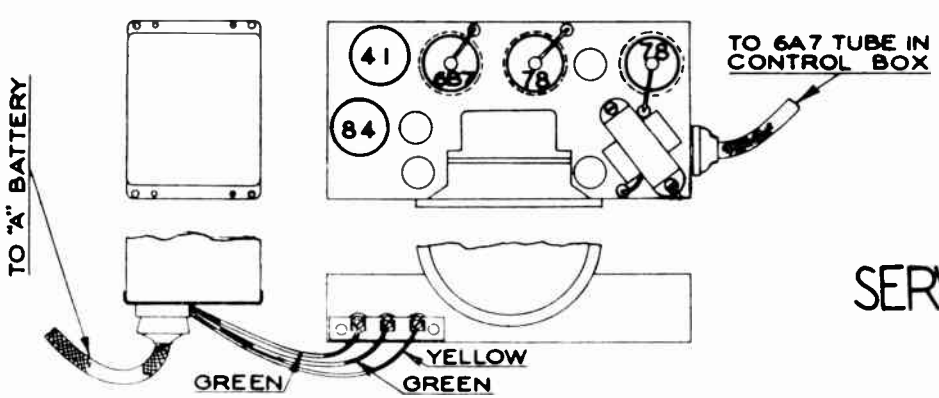
IF PEAK 175 KC.

Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator output until a small deflection is obtained. Unless this is done the action of the AVC will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.



NOTE-ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
USE 300v. SCALE UNLESS OTHERWISE SPECIFIED.
* INDICATES 10v. SCALE, Δ INDICATES 120v. SCALE.
NUMBERS IN CIRCLES INDICATE TUBE ELEMENTS IN ACCORDANCE WITH R.C.A. PINBASE LAYOUTS.
INTERMEDIATE FREQUENCY 485 K.C.



SERVICE SCHEMATIC MODEL A-60

SERIAL NO. SERIES 3,400,001

DWO. NO. 73

The Model 460 is a 6 tube superheterodyne, completely self-contained, for operation from a 6 volt d.c. source. A cable drive remote control head is used, one cable operating the volume control and switch and the other cable operating the tuning condenser.

The circuit comprises a stage of R.F. amplification, an oscillator-modulator, and a stage of I.F. amplification at 175 kc., each using a 6D6 tube. A 6B7 is used as a diode second detector-A.V.C. and first audio stage and a 41 is used in the audio output stage. The power supply,an integral part of the chassis, uses an 85 or a 6Z4 as a full wave rectifier for the B supply. The filter choke is in the negative side of the B supply, and the voltage drop across it, after being filtered, furnished the C supply for the set.

The pentode section of the 6B7 is used as the first audio stage, resistance coupled into the 41. One of the diode plates of the 6B7 is used for the diode second detector and the other diode plate is used in the diode A.V.C. circuit. An inspection of Drawing #86 will indicate that under no-signal conditions, the cathode of the 6B7 is considerably more positive than the A.V.C. diode plate. As a result no current will flow through the A.V.C. diode until the signal applied to this diode plate is greater than the bias on the 6B7 cathode. The advantage of the circuit is two--fold, greater volume on weak signals and more uniform volume on all signals than straight diode A.V.C. provides.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER and turn both the volume and tone controls to their maximum positions (clock-wise).

TO ALIGN (or gang) THE I.F. CIRCUITS

(1) Attach the output meter from screen to plate of the 41 tube.
(2) Feed the signal from the local oscillator tuned to exactly 175 kc. into the receiver at the control grid of the oscillator-modulator 6D6.
(3) Adjust the I.F. trimmers for maximum indication on the output meter, ALWAYS KEEPING THE SIGNAL INPUT LOW.
(a) The first I.F. trimmers are mounted in the end of the first I.F. transformer located between the gang condenser and the chassis pan. The nut adjusts the primary trimmer.
(b) The second I.F. trimmers are mounted in the end of the second I.F. transformer, located under the chassis pan directly below the speaker field. The nut adjusts the primary trimmer.

TO CALIBRATE THE OSCILLATOR

(1) Set the dial pointer to 53 with the plates entirely enmeshed.
(2) Set the dial pointer to the position where a station or (oscillator) of known frequency, about 1500 kc., should be received and adjust oscillator trimmer (screw adjustment, top of gang condenser, inside end) until the desired signal is heard.
(3) Set the dial pointer to the position where a station(or oscillator) of known frequency, about 1100 kc., should be received and correct calibration (if necessary) by bending the rotor plates of the inside gang condenser section.
(4) Repeat operation 3 at, or near, 850 kc.
(5) Repeat operation 3 at, or near, 700 kc.
(6) Repeat operation 3 at, or near, 580 kc.

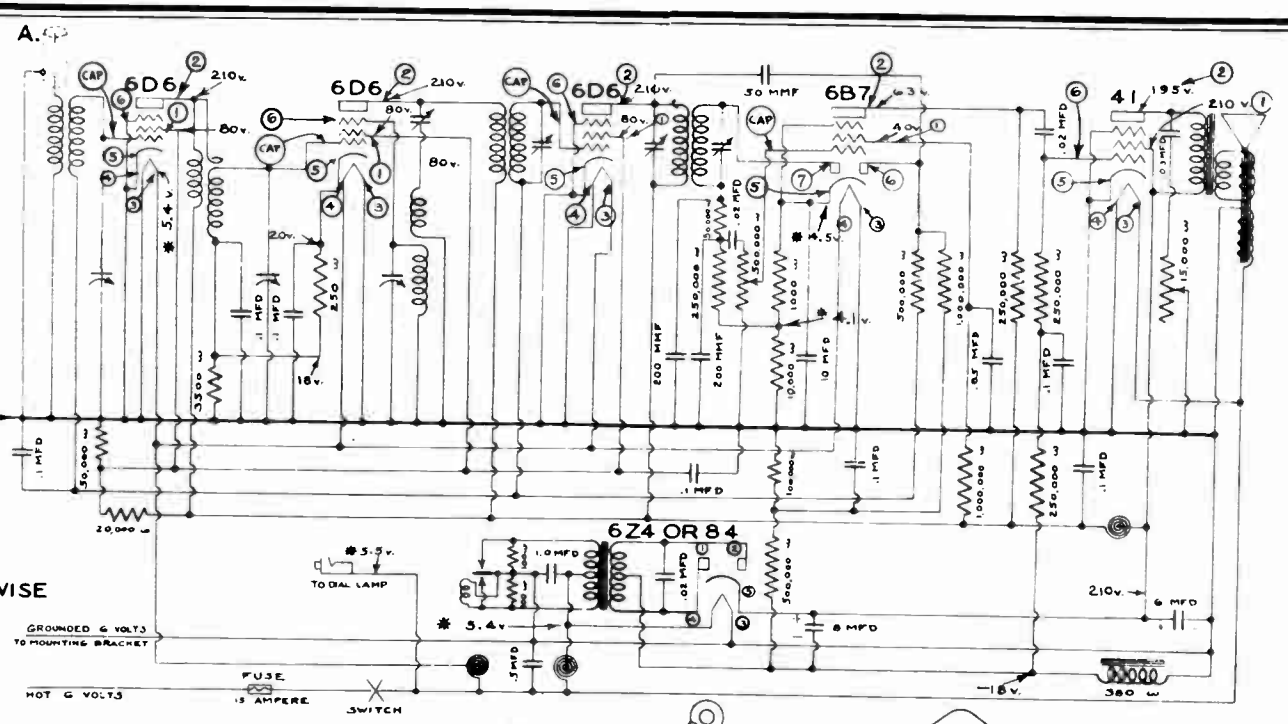
TO ALIGN (or gang) THE R.F. CIRCUITS

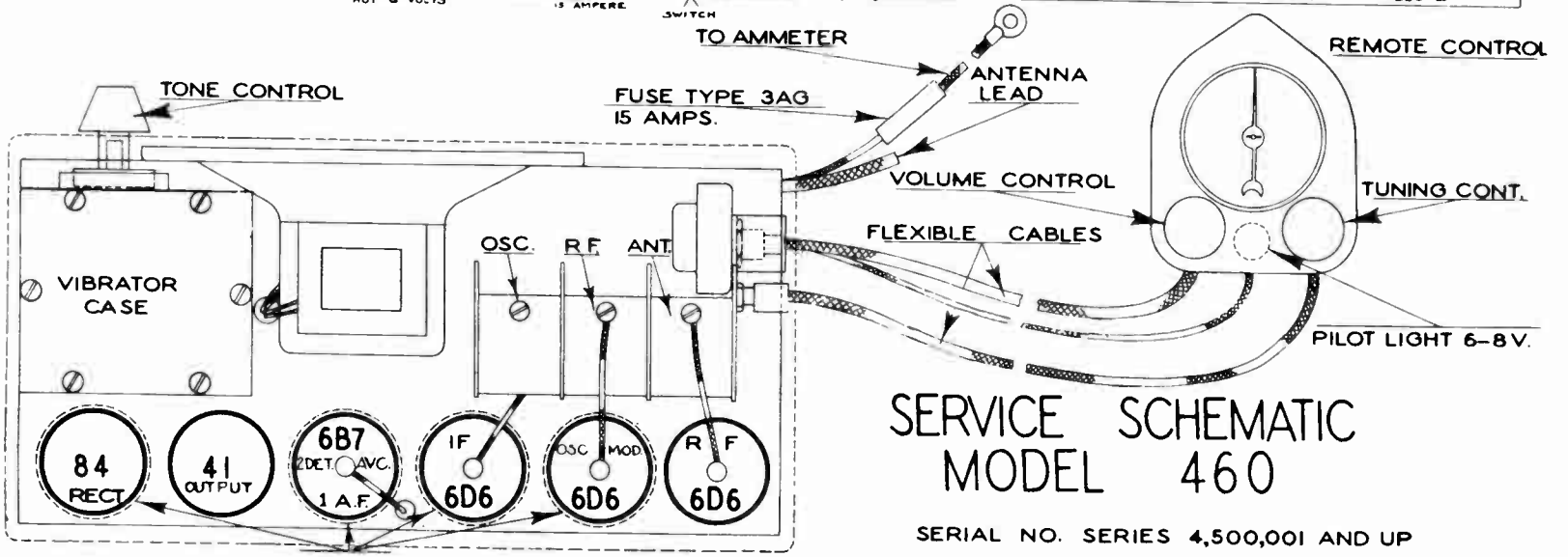
(1) Attach the output meter from screen to plate of the 41 tube.
(2) Attach the local oscillator to the antenna lead and KEEP THE SIGNAL INPUT LOW.
(3) With the receiver and oscillator tuned to resonance at, or near, 1500 kc. adjust the antenna and R.F trimmers(screw adjustments, top of gang condenser, outside and middle sections) until maximum output is obtained.
(4) With the receiver and oscillator tuned to resonance at, or near, 1100 kc. bend the rotor plates of the outside and middle gang condenser sections to obtain maximum output.
(5) Repeat operation 4 at, or near, 850 kc.
(6) Repeat operation 4 at, or near, 700 kc.
(7) Repeat operation 4 at, or near, 580 kc.

NOTE--RE OPERATION 2, CALIBRATION PROCEDURE: If more than one position of the oscillator trimmer enables the desired signal to be received REDUCE THE INPUT TO THE RECEIVER until one, and only one position of the oscillator trimmer will enable the desired signal to be received.

NUMBERS IN CIRCLES INDICATE TUBE ELEMENTS IN ACCORD-ANCE WITH R.C.A. RADIOTRON PINBASE LAYOUT.

NOTE-ALL VOLTAGES TAKEN FROM THIS POINT ALL VOLT-AGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER. 300v. SCALE UNLESS OTHERWISE SPECIFIED.
* INDICATES 10v. SCALE
INTERMEDIATE FREQ. 175 K.C.





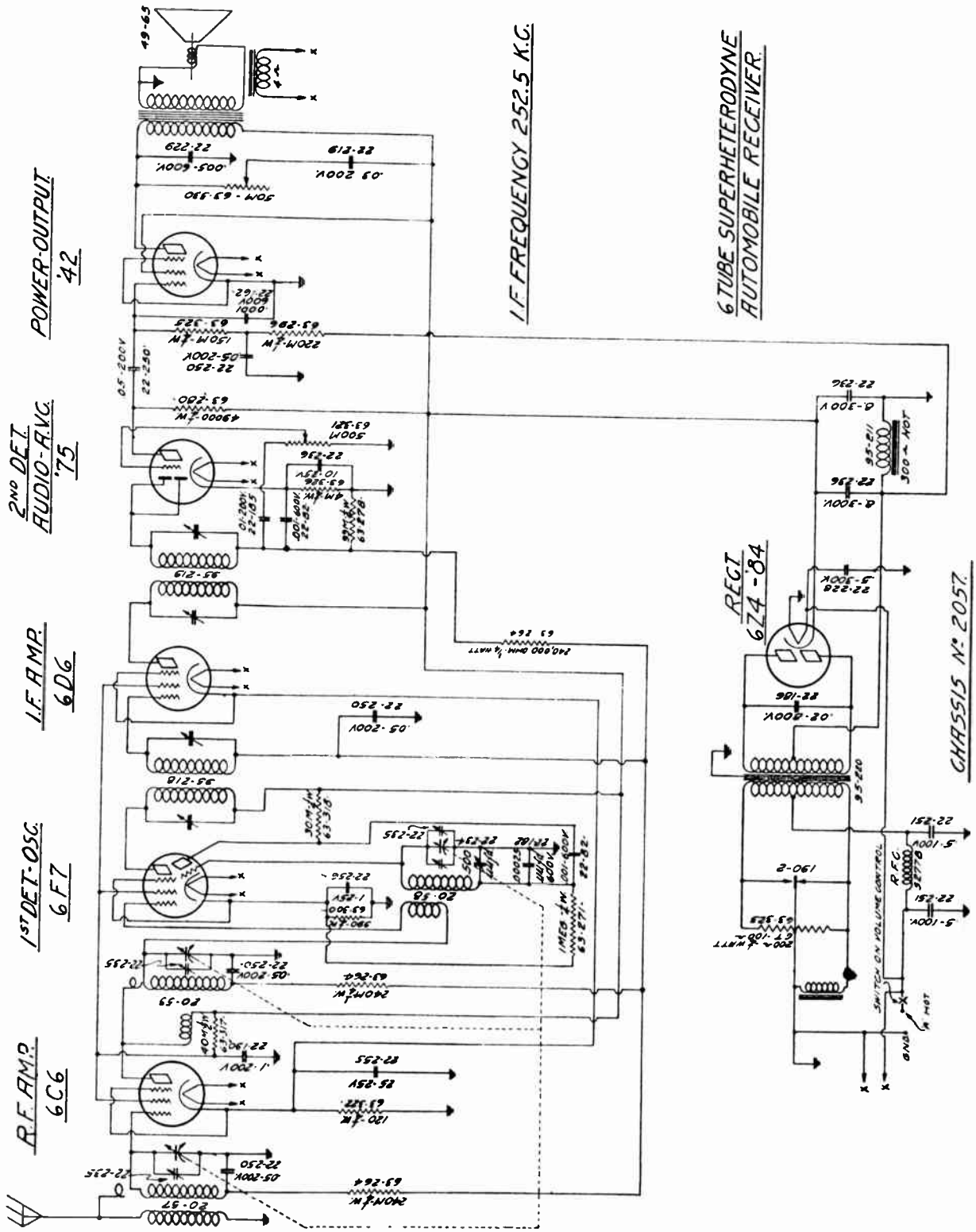
SERVICE SCHEMATIC MODEL 460

SERIAL NO. SERIES 4,500,001 AND UP

DWG. NO. 86

ZENITH RADIO CORP.

MODEL 462
Chassis 2057
Schematic



Intermediate Frequency—252½ K.C.
Sensitivity in Microvolts—1
Power Output in Milliwatts—2500
Power consumption—40 watts at 6 volts.

February 8, 1934

MODEL 462
Chassis 2057
Voltage, Socket
Alignment Data

ZENITH RADIO CORP.

Position	Tube	Ef	Ek	Eg^1	Eg^2	Eg^3	Ep
R. F. Amplifier	6C6	5.6	1.5	*	1.5	72	174
1st Det.-Osc.	6F7	5.6	3.5	0	3.5	72	Det. 174 Osc. 130
1. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
2nd Det. A. V. C.	75	5.6	1.2	0	0	—	156
Power Amp.	42	5.6	0	—11.5	0	174.6	165
Rectifier	6Z4	5.6	174.6	—	—	—	—

f—Filament; k—Cathode; g^1—Control Grid; g^2—Suppressor Grid; g^3—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts.

Alignment

Every Zenith automobile receiver is balanced on an accurate crystal controlled oscillator before leaving the factory; and, unless a part is changed or the calibration has shifted, the adjustments should never be tampered with. Where it is absolutely necessary, however, a good test oscillator capable of delivering a modulated signal at 1500, 600 and 252½ K. C. will be essential.

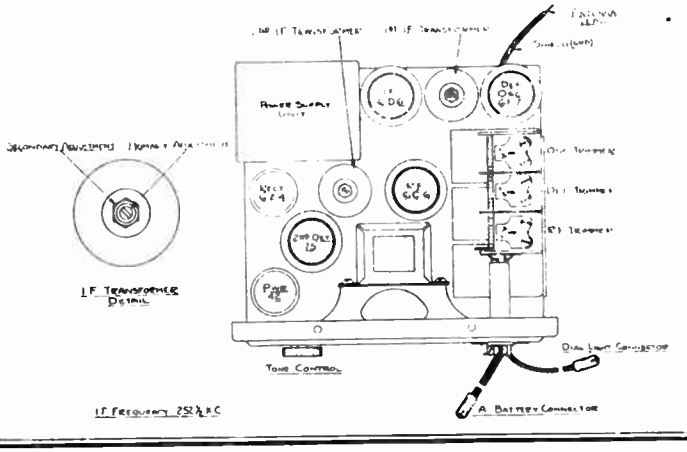
Before attempting to make any adjustments, the dial indicator must be set to 540 K. C. with the tuning condenser plates in full mesh. This is done as follows:

1. Turn control knob toward the left until the stop is reached.
2. Remove tuning knob.
3. Loosen two set screws in tuning shaft bushing (under knob).
4. Turn bushing until dial reads 540 K. C.
5. Tighten set screws and replace tuning knob.

The receiver may now be aligned and will dial accurately when the operation is completed.

To balance the I.F. circuit, remove the grid lead from the 6F7 and connect the 252½ K.C. test oscillator signal to the grid of the tube and to ground. Adjust the 1st I.F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I.F. transformer. This completes the I.F. circuit. Place the grid lead back on the 6F7 tube.

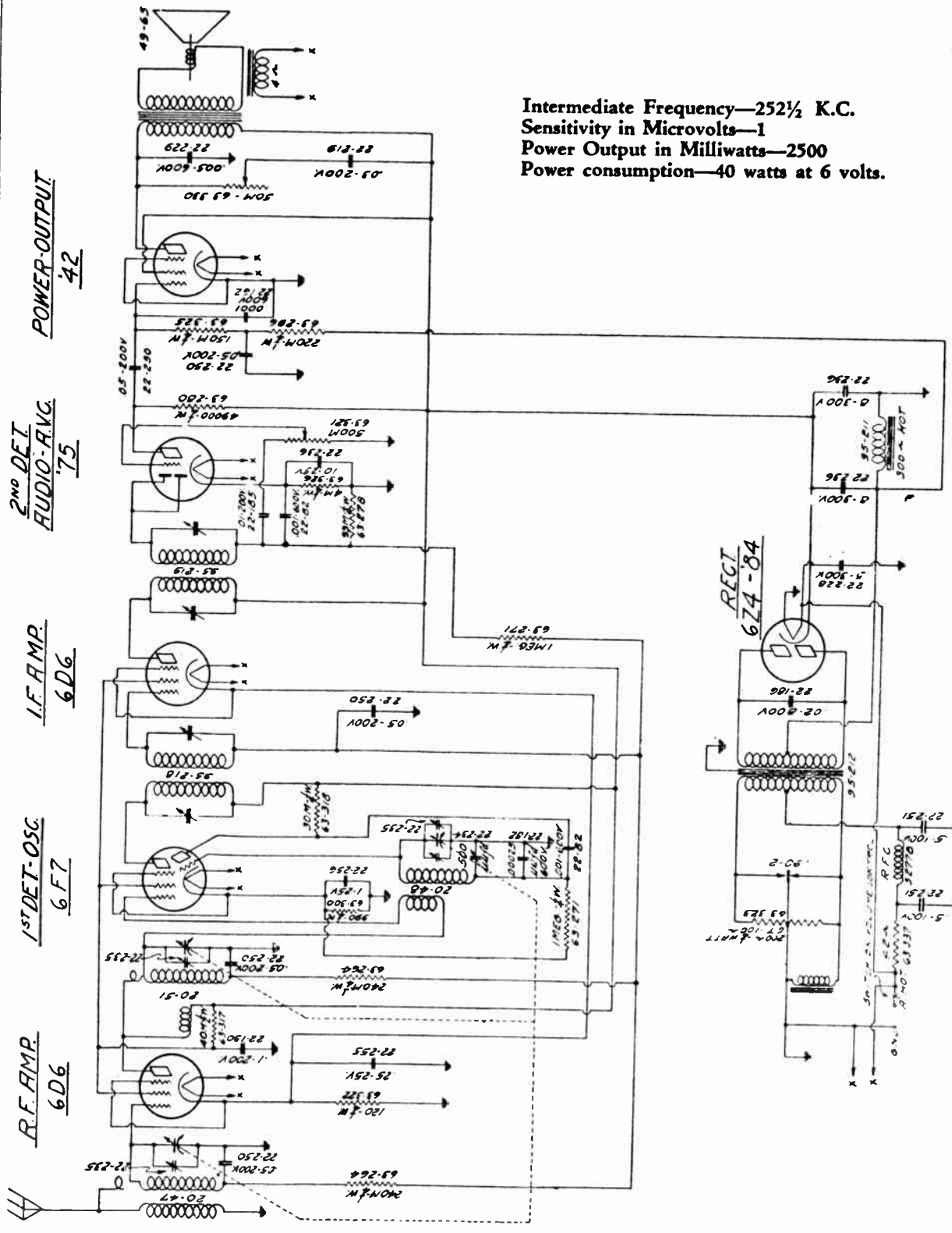
Next attach the test oscillator to the antenna and ground leads and set it to 1500 K.C. Turn the dial indicator to 1500 and adjust the oscillator, detector and R.F. trimmers, on the condenser gang, for maximum output. Set the test oscillator to 600 K.C. and rock the pointer slowly over the same frequency on the dial at the same time adjust the padder condenser for greatest signal strength. All adjustments should be gone over twice—at least twice—to insure greatest accuracy.



ZENITH RADIO CORP.

MODELS 650-HD, 651-HE,
660-TD, 661-TE
Terraplane Hudson
Schematic

Intermediate Frequency—252½ K.C.
Sensitivity in Microvolts—1
Power Output in Milliwatts—2500
Power consumption—40 watts at 6 volts.



January 2, 1934

MODELS 650-HD, 651-HE,
660-TD, 661-TE
Terraplane Hudson
Voltage, Socket, Alignment

ZENITH RADIO CORP.

Position	Tube	Ef	Ek	Eg^1	Eg^2	Eg^3	Ep
R. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
1st Det.-Osc.	6F7	5.6	3.5	0	3.5	72	Det. 174 Osc. 130
1. F. Amplifier	6D6	5.6	1.5	*	1.5	72	174
2nd Det. A. V. C.	75	5.6	1.2	0	0	—	156
Power Amp.	42	5.6	0	—11.5	0	174.6	165
Rectifier	6Z4	5.6	174.6	—	—	—	—

f—Filament; k—Cathode; g^1—Control Grid; g^2—Suppressor Grid; g^3—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts.

Alignment

Every Zenith automobile receiver is balanced on an accurate crystal controlled oscillator before leaving the factory; and, unless a part is changed or the calibration has shifted, the adjustments should never be tampered with. Where it is absolutely necessary, however, a good test oscillator capable of delivering a modulated signal at 1500, 600 and 252½ K. C. will be essential.

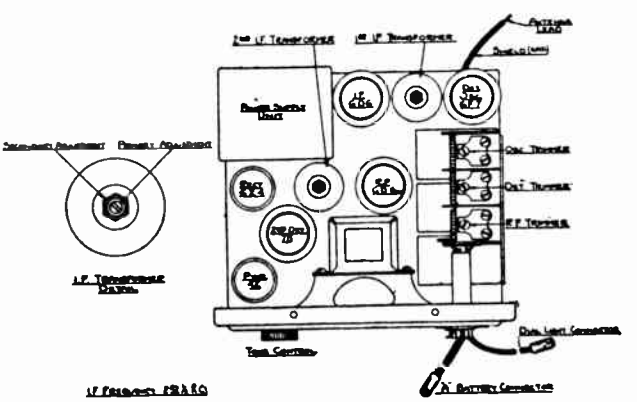
Before attempting to make any adjustments, the dial indicator must be set to 540 K. C. with the tuning condenser plates in full mesh. This is done as follows:

1. Turn control knob toward the right until the stop is reached.
2. Remove pilot lamp from rear of control head.
3. Reach through pilot lamp hole with a small screwdriver and turn indicator screw until indicator points to 540 K.C.

The receiver may now be aligned and will dial accurately when the operation is completed.

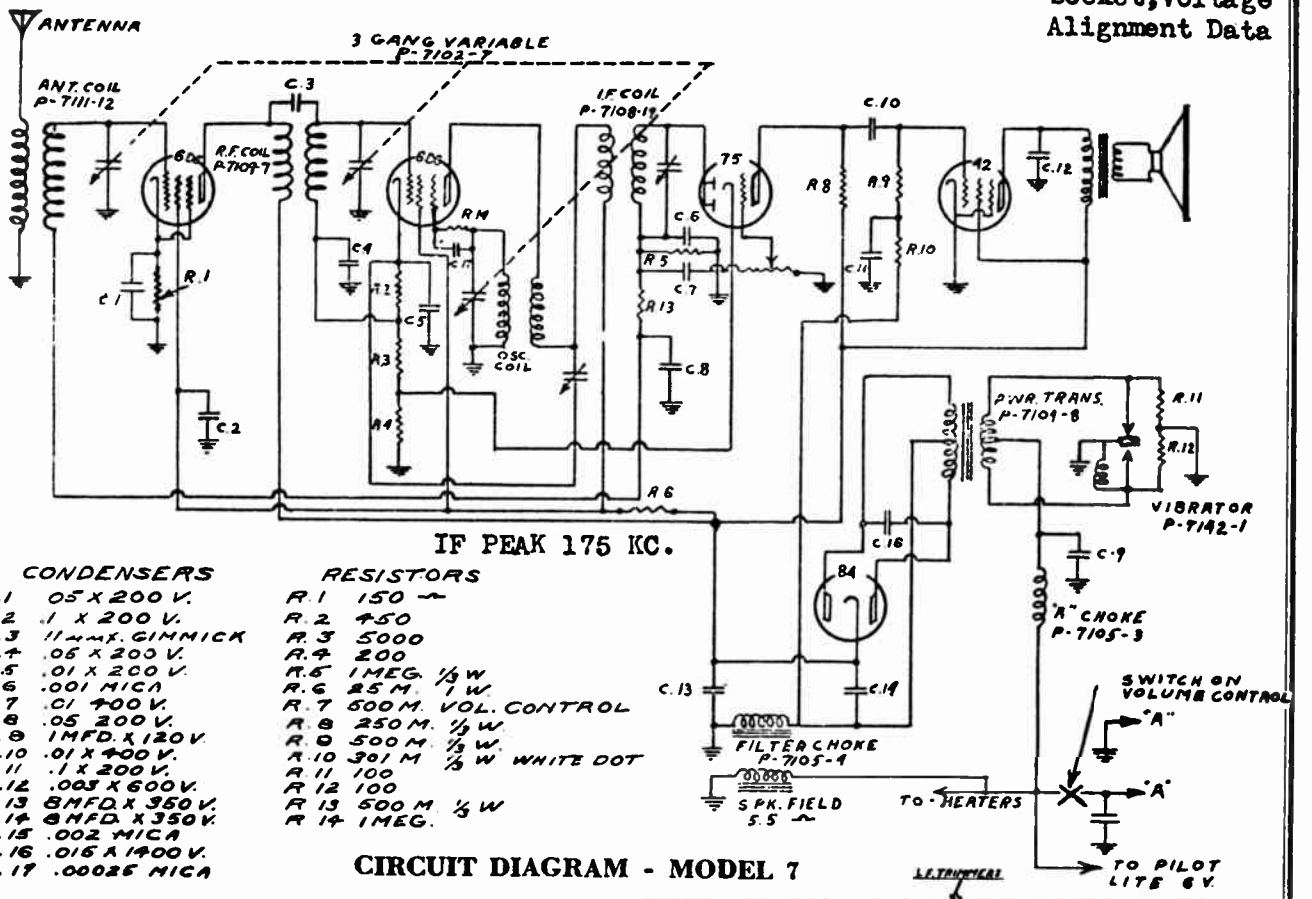
To balance the I.F. circuit, remove the grid lead from the 6F7 and connect the 252½ K.C. test oscillator signal to the grid of the tube and to ground. Adjust the 1st I.F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I.F. transformer. This completes the I.F. circuit. Place the grid lead back on the 6F7 tube.

Next attach the test oscillator to the antenna and ground leads and set it to 1500 K.C. Turn the dial indicator to 1500 and adjust the oscillator, detector and R.F. trimmers, on the condenser gang, for maximum output. Set the test oscillator to 600 K.C. and rock the pointer slowly over the same frequency on the dial at the same time adjust the padder condenser for greatest signal strength. All adjustments should be gone over twice—at least twice—to insure greatest accuracy.



ZENITH RADIO CORP.

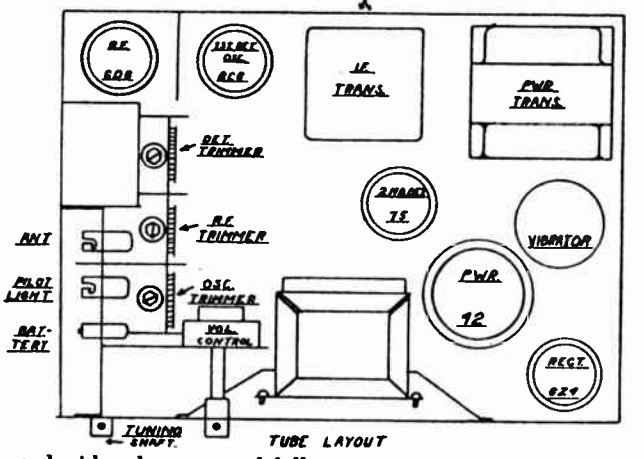
MODEL 7
Schematic
Socket, Voltage
Alignment Data



CIRCUIT DIAGRAM - MODEL 7

CONDENSERS		RESISTORS	
C.1	.05 X 200 V.	R.1	150 Ω
C.2	.1 X 200 V.	R.2	450
C.3	11 mmf. GIMMICK	R.3	5000
C.4	.05 X 200 V.	R.4	200
C.5	.01 X 200 V.	R.6	1 MEG. ½ W
C.6	.001 MICA	R.6	25 M. 1 W.
C.7	.01 400 V.	R.7	500 M. VOL. CONTROL
C.8	.05 200 V.	R.8	250 M. ½ W.
C.9	1 MFD. X 120 V.	R.9	500 M. ½ W.
C.10	.01 X 400 V.	R.10	301 M ½ W WHITE DOT
C.11	.1 X 200 V.	R.11	100
C.12	.003 X 600 V.	R.12	100
C.13	8 MFD. X 350 V.	R.13	500 M ½ W
C.14	8 MFD. X 350 V.	R.14	1 MEG.
C.15	.002 MICA		
C.16	.015 X 1400 V.		
C.17	.00025 MICA		

NOTE:
C.1, C.2, C.4, C.5 IN ONE UNIT. PART 7145-4
C.13, C.14 IN ONE UNIT PART. 7119-4
R.1, R.2, R.3, R.4 IN ONE UNIT. PART 7106-14
R.11, R.12, IN ONE UNIT. PART 7106-6



TUBE LAYOUT

TUBE	POSITION	Ef	Ek	Eg^1	Eg^2	Eg^3	Ep
6D6	R.F.	5.9	1.5	0.	98	1.5	240
6C6	DET.-OSC.	5.9	17.	15.	98	—.5	98
75	1st AUD.	5.9	.5	0	—	—	80
42	PWR.	5.9	0	—5	240	0	220
84	RECT.	5.9	240	—	—	—	—

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers I. F. transformer, part number 7108-19 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.

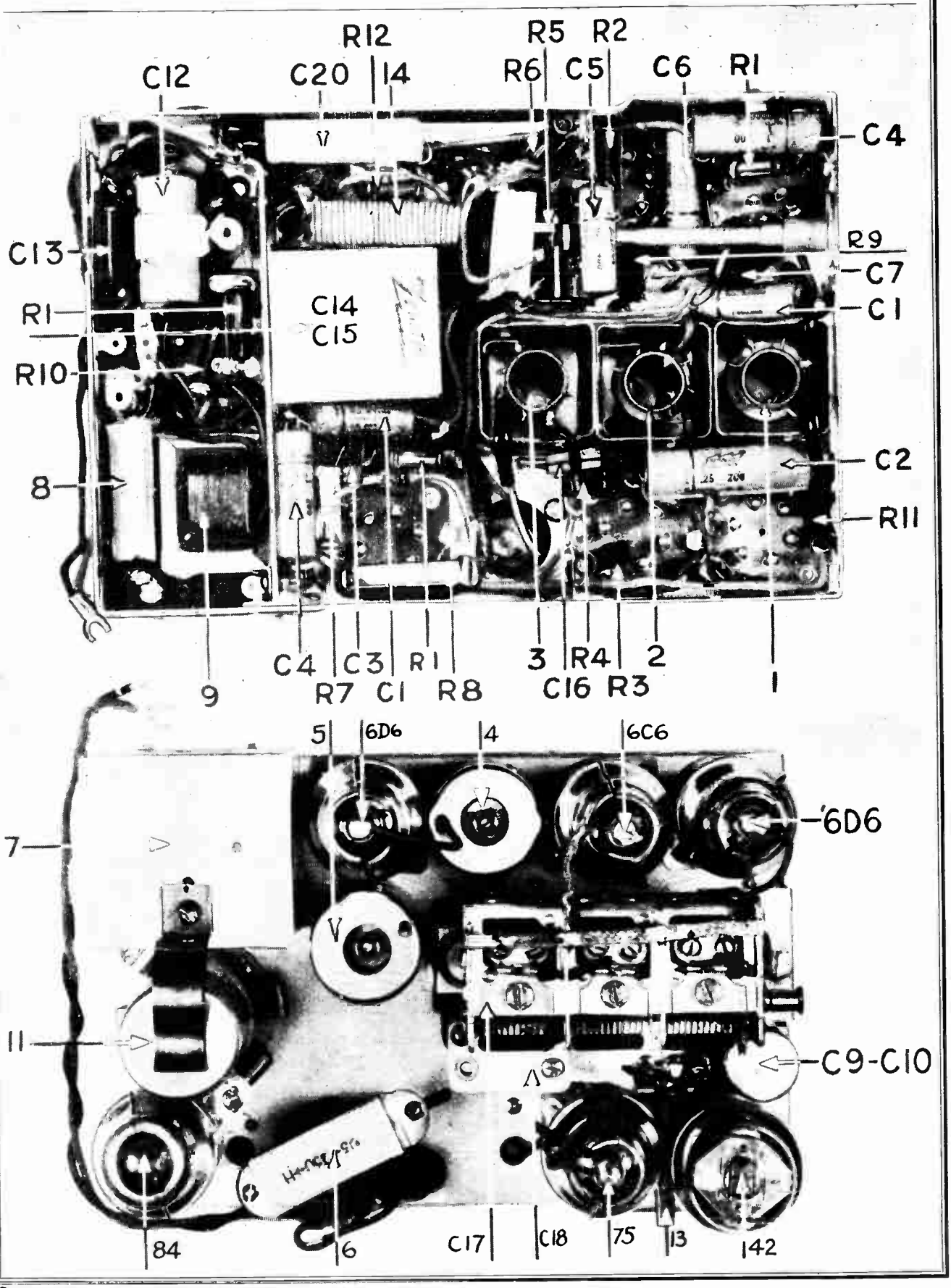
Note: The I. F. transformer has two trimmers, both of which are adjustable through the rear of the case.

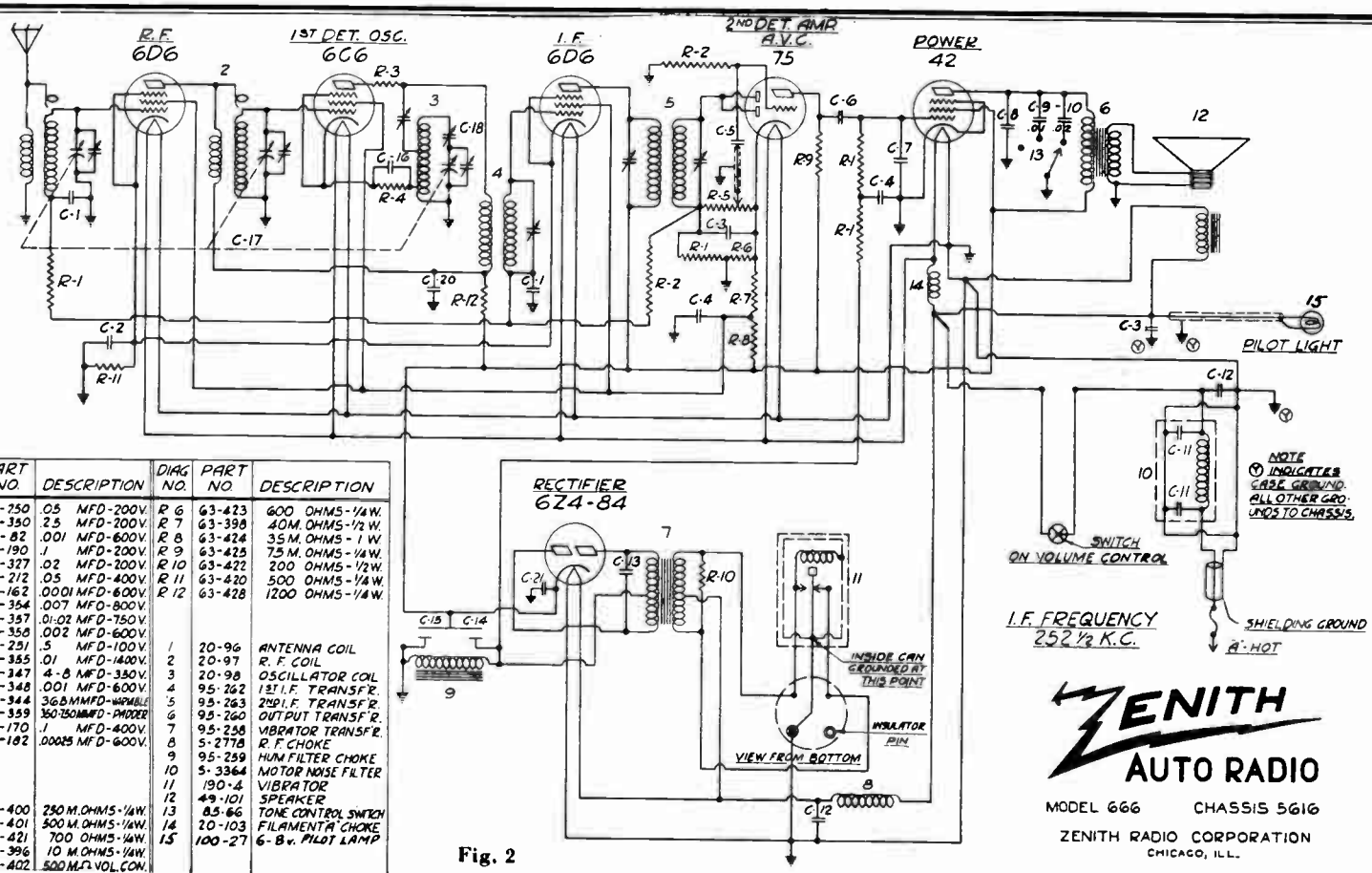
FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R. F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

MODEL 666
MODEL 680 Hudson
Chassis Views

ZENITH RADIO CORP.





DIAG. NO.	PART NO.	DESCRIPTION
C 1	22-350	.05 MFD-200V.
C 2	22-350	2.5 MFD-200V.
C 3	22-82	.001 MFD-600V.
C 4	22-190	.1 MFD-200V.
C 5	22-327	.02 MFD-200V.
C 6	22-212	.05 MFD-400V.
C 7	22-162	.0001 MFD-600V.
C 8	22-354	.007 MFD-800V.
C 9-10	22-357	.01-.02 MFD-750V.
C 11	22-358	.002 MFD-600V.
C 12	22-251	.5 MFD-100V.
C 13	22-355	.01 MFD-1400V.
C 14-15	22-347	4-8 MFD-330V.
C 16	22-348	.001 MFD-600V.
C 17	22-344	368 MMFD-VARIABLE
C 18	22-359	150-750 MMFD-PADDER
C 20	22-170	.1 MFD-400V.
C 21	22-182	.00025 MFD-600V.
R 1	63-400	250 M.OHMS-1/4W.
R 2	63-401	500 M.OHMS-1/4W.
R 3	63-421	700 OHMS-1/4W.
R 4	63-396	10 M.OHMS-1/4W.
R 5	63-402	500 M.Ω VOL.CON.
R 6	63-423	600 OHMS-1/4W.
R 7	63-398	40M. OHMS-1/2 W.
R 8	63-424	35 M. OHMS-1 W.
R 9	63-425	7.5 M. OHMS-1/4W.
R 10	63-422	200 OHMS-1/2W.
R 11	63-420	500 OHMS-1/4W.
R 12	63-428	1200 OHMS-1/4W.

DIAG NO.	PART NO.	DESCRIPTION
1	20-96	ANTENNA COIL
2	20-97	R. F. COIL
3	20-98	OSCILLATOR COIL
4	95-262	1ST I.F. TRANSF'R.
5	95-263	2ND I.F. TRANSF'R.
6	95-260	OUTPUT TRANSF'R.
7	95-258	VIBRATOR TRANSF'R.
8	5-2778	R. F. CHOKE
9	95-259	HUM FILTER CHOKE
10	5-3364	MOTOR NOISE FILTER
11	190-4	VIBRATOR
12	49-101	SPEAKER
13	85-66	TONE CONTROL SWITCH
14	20-103	FILAMENT A' CHOKE
15	100-27	6-8 v. PILOT LAMP

Fig. 2

I. F. Alignment:

To balance the I. F. Circuit, connect the 252½ K. C. test oscillator signal to the grid of the 6C6 tube through a 0.5 mfd. condenser and to ground. Adjust the 1st I. F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I. F. transformer. This completes the I. F. circuit adjustment.

R. F. Alignment:

1. Next attach the test oscillator thru a 150 mmf. condenser to the antenna and ground leads.
2. Turn condenser plates completely out of mesh.
3. Set test oscillator to 1600 K. C.
4. Adjust the oscillator condenser trimmer (see fig. 1) to approximate resonance at 1600. Disregard dial setting for this operation.
5. Set test oscillator to 1400 K. C. and turn gang condenser to resonance and peak the three trimmers accurately. Now set pointer on dial to 1400 K. C. by turning indicator screw in rear center of head.
6. Set test oscillator to 600 K. C. and tune set to pick up the signal. Rock the dial over this point while adjusting the padder condenser (see fig. 1) for greatest output.

If the dial is off calibration at the low frequency end after this is done the indicator may be moved slightly in either direction to give a uniform accuracy over the entire scale.

MODEL 666
Voltage, Socket
Trimmers, Parts

ZENITH RADIO CORP.

Tube Operating Voltages:

Position	Tube	EF	EK	EG[1]	EG[2]	EG[3]	EP
R. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
1st Det.-Osc.	6C6	5.6	4.5	0	4.5	76	200
I. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
2nd Det. A. V. C.	75	5.6	1.3	0	0	—	165
Power Amp.	42	5.6	0	3	0	200	192
Rectifier	6Z4	5.6	200	—	—	—	—

f—Filament; k—Cathode; g[1]—Control Grid; g[2]—Suppressor Grid; g[3]—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts. (Check voltages with condenser gang in full mesh.)

RESISTORS (CHASSIS ONLY)

Part Number	Description
63-396	10M Ohm ¼ Watt
63-398	40M Ohm ½ Watt
63-400	250M Ohm ¼ Watt
63-401	500M Ohm ¼ Watt
63-402	500M Ohm Vol. Control & Switch Ass'mbly
63-420	500 Ohm ¼ Watt
63-421	700 Ohm ¼ Watt
63-422	200 Ohm ½ Watt
63-423	600 Ohm ¼ Watt
63-424	35M Ohm 1 Watt
63-425	75M Ohm ½ Watt
63-428	1200 Ohm ¼ Watt

CONDENSERS (CHASSIS ONLY)

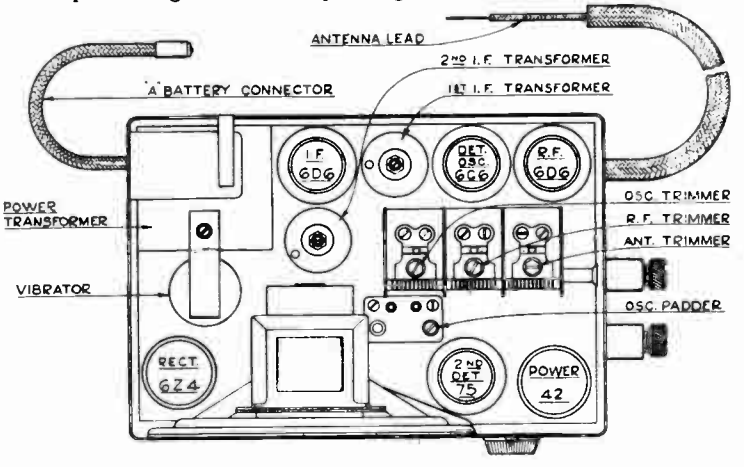
22-82	.001 Mfd. 600 V
22-182	.0001 Mfd. 600 V
22-170	.1 Mfd. 400 V
22-190	.1 Mfd. 200 V
22-182	.00025 Mfd. 600 V
22-212	.05 Mfd. 400 V
22-250	.05 Mfd. 200 V
22-251	.5 Mfd. 100 V
22-327	.02 Mfd. 200 V
22-344	Three-Gang Variable
22-347	4. x 8. Mfd. 350 V.
22-348	.001 Mfd. 600 V
22-350	.25 Mfd. 120 V
22-354	.007 Mfd. 750 V
22-355	.01 Mfd. 1400 V
22-357	.01 x .02 Mfd. 750 V
22-358	.002 Mfd. 600 V
22-359	Padder

MISCELLANEOUS CHASSIS PARTS
COILS AND CHOKES

20-96	Antenna Coil Assembly
20-97	R. F. Coil Assembly
20-98	Oscillator Coil Assembly
20-103	Filament "A" Choke
95-262	1st I. F. Transformer
95-263	2nd I. F. Transformer
S-2778	R. F. Choke
S-3364	Motor Noise Filter
46-101	Tone Control Knob (Knob Spring only, see 80-107)
52-44	"A" Battery Cable
52-59	Antenna Cable
54-76	¼ x 20 Knurled Coupling Shaft Nuts
78-100	Socket 6D6
78-101	Socket 75
78-102	Socket 42
78-113	Socket 6D6
78-114	Socket 6Z4
78-115	Socket Vibrator
80-107	Tone Control Knob Spring
85-66	Tone Control Switch

SPEAKER

*49-100	6" Dynamic Speaker (with output transformer
	Cone & Voice Coil Assemb.
	Field Coil



MISCELLANEOUS CHASSIS PARTS (Contd.)

Part Number	Description
93-125	No. 6 Lock Washers
93-220	Bakelite Washer for Chassis Mtg. Screws
94-185	Rubber Bushing for Chassis Mtg. Screws
95-258	Power Transformer
95-259	Hum Filter Choke
97-75	10/32 x ⅜ Wing Screw for Box Cover
114-27	No. 8 x ¼ Chassis Box Screws
190-4	Vibrator
MS-350	Chassis Box Top Cover and Clip Assem.
24-88	Chassis Box Bottom
MS-256	Chassis Box Body Less Cover and Top

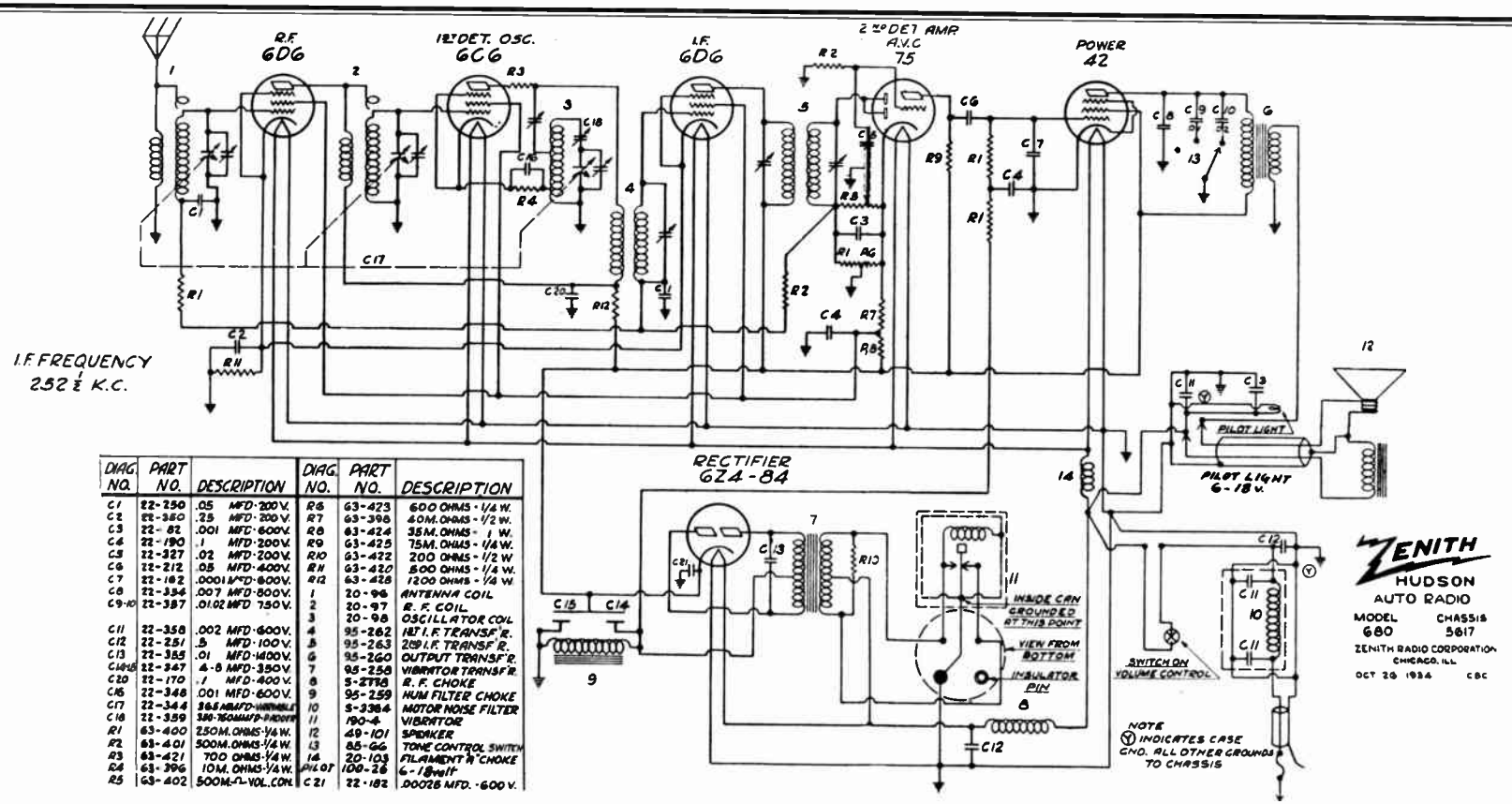
REMOTE CONTROL UNIT

170-12	Zenith Control Unit (with knobs and mounting brackets—less cable)
7-5	Control Unit Bezel
26-83	Zenith Dial Scale Assembly
46-117	Volume and Tuning Knobs
52-63	Pilot Lamp Cable and Socket Assemb.
76-156	24" Tuning Control Cables
26-157	24" Volume Control Cables
80-110	Knob Springs
100-27	6-8 V. Pilot Lamp
192-7	Unbreakable Dial Glass

SUPPRESSOR AND MOUNTING PARTS

22-193	.5 Mfd. Ignition Coil Condenser
22-194	.5 Mfd. Generator Coil Condenser
52-44	"A" Battery Cable
57-478	Set Mounting Plate
63-336	15 M Ohm Dist. Suppressor
67-107	10/32 x ⅜ RHM Screws (8 used)
93-127	No. 10 Lock Washer (8 used)
93-222	7/16 Lock Washer
93-223	Mounting Bolt Washer
130-6	15 Ampere Fuse
144-14	Mounting Bolt and Nut
198-1	Mounting plate Gasket

*Speakers are numbered 49-100U, 49-100-R, 49-100-M designating three different types. Therefore, when ordering speaker or speaker parts refer to the number on speaker at all times and order by that part number accordingly.



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	22-250	.05 MFD·200 V.	R6	63-423	600 OHMS - 1/4 W.
C2	22-260	.25 MFD·200 V.	R7	63-398	40M. OHMS - 1/2 W.
C3	22-82	.001 MFD·600 V.	R8	63-424	35M. OHMS - 1 W.
C4	22-190	.1 MFD·200 V.	R9	63-425	75M. OHMS - 1/4 W.
C5	22-327	.02 MFD·200 V.	R10	63-422	200 OHMS - 1/2 W
C6	22-212	.05 MFD·400 V.	R11	63-420	500 OHMS - 1/4 W.
C7	22-182	.0001 MFD·600 V.	R12	63-428	1200 OHMS - 1/4 W
C8	22-334	.007 MFD·600 V.	1	20-96	ANTENNA COIL
C9-10	22-387	.01-.02 MFD 750 V.	2	20-97	R. F. COIL
			3	20-98	OSCILLATOR COIL
C11	22-358	.002 MFD·600 V.	4	95-262	1ST I. F. TRANSF'R.
C12	22-251	.5 MFD·100 V.	5	95-263	2ND I.F. TRANSF'R.
C13	22-355	.01 MFD·1400 V.	6	95-260	OUTPUT TRANSF'R.
C14&15	22-347	4-8 MFD·350 V.	7	95-258	VIBRATOR TRANSF'R.
C20	22-170	.1 MFD·400 V.	8	5-2778	R. F. CHOKE
C16	22-348	.001 MFD·600 V.	9	95-259	HUM FILTER CHOKE
C17	22-344	3&5 MMFD·VARIABLE	10	5-3384	MOTOR NOISE FILTER
C18	22-339	380-350 MMFD·PADDER	11	190-4	VIBRATOR
R1	63-400	250M. OHMS·1/4 W.	12	49-101	SPEAKER
R2	63-401	500M. OHMS·1/4 W.	13	85-66	TONE CONTROL SWITCH
R3	63-421	700 OHMS·1/4 W.	14	20-103	FILAMENT R'CHOKE
R4	63-396	10M. OHMS·1/2 W.	PILOT	100-26	6 - 18 volt
R5	63-402	500M.Ω VOL.CON.	C21	22-182	.00028 MFD. · 600 V.

Fig. 2

I. F. Alignment:

To balance the I. F. Circuit, connect the 252½ K. C. test oscillator signal to the grid of the 6C6 tube through a 0.5 mfd. condenser and to ground. Adjust the 1st I. F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I. F. transformer. This completes the I. F. circuit adjustment.

R. F. Alignment:

1. Next attach the test oscillator thru a 150 mmf. condenser to the antenna and ground leads.
2. Turn condenser plates completely out of mesh.
3. Set test oscillator to 1600 K. C.
4. Adjust the oscillator condenser trimmer (see fig. 1) to approximate resonance at 1600. Disregard dial setting for this operation.
5. Set test oscillator to 1400 K. C. and turn gang condenser to resonance and peak the three trimmers accurately. Now set pointer on dial to 1400 K. C. by turning indicator screw from rear of head through pilot light socket hole.
6. Set test oscillator to 600 K. C. and tune set to pick up the signal. Rock the dial over this point while adjusting the padder condenser (see fig. 1) for greatest output.

If the dial is off calibration at the low frequency end after this is done the indicator may be moved slightly in either direction to give a uniform accuracy over the entire scale.

MODEL 680 Hudson
Voltage, Socket
Trimmers, Parts Voltages:

ZENITH RADIO CORP.

Position	Tube	EF	EK	EG¹	EG²	EG³	EP
R. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
1st Det.-Osc.	6C6	5.6	4.5	0	4.5	76	200
I. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
2nd Det. A. V. C.	75	5.6	1.3	0	0	—	165
Power Amp.	42	5.6	0	3	0	200	192
Rectifier	6Z4	5.6	200	—	—	—	—

f—Filament; k—Cathode; g¹—Control Grid; g²—Suppressor Grid; g³—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts. (Check voltages with condenser gang in full mesh.)

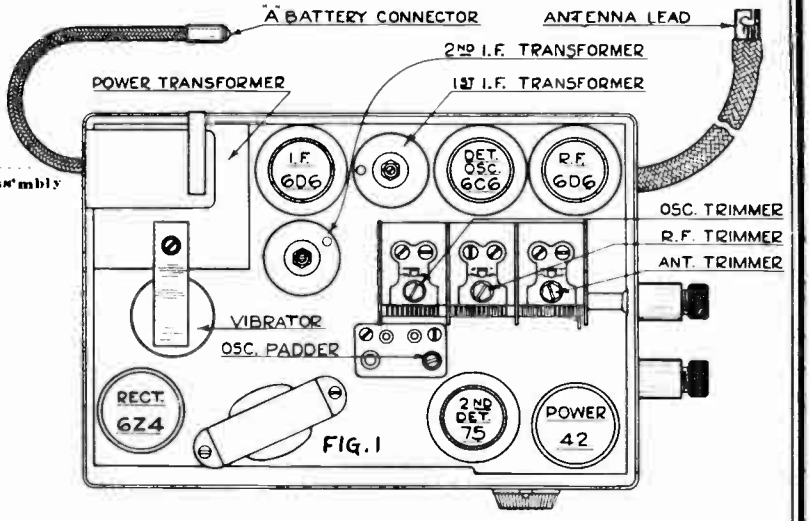


FIG. 1

RESISTORS (CHASSIS ONLY)

Zenith Number	Hudson Number	Description
63-306	48013	10M Ohm ¼ Watt
63-308	48015	40M Ohm ½ Watt
63-400	48017	250M Ohm ¼ Watt
63-401	48018	500M Ohm ¼ Watt
63-402	48019	500M Ohm Vol. Control & Switch Ass'mbly
63-420	48009	500 Ohm ¼ Watt
63-421	48010	700 Ohm ¼ Watt
63-422	48011	200 Ohm ½ Watt
63-423	48012	600 Ohm ¼ Watt
63-424	48014	35M Ohm 1 Watt
63-425	48016	75M Ohm ¼ Watt
63-428	48084	1200 Ohm ¼ Watt

CONDENSERS (CHASSIS ONLY)

22-82	46375	.001	Mfd.	600 V
22-162	46378	.0001	Mfd.	600 V
22-170	46370	.1	Mfd.	400 V
22-190	48021	.1	Mfd.	200 V
22-182	46953	.00025	Mfd.	600 V
22-212	48020	.05	Mfd.	400 V
22-250	46372	.05	Mfd.	200 V
22-251	46774	.5	Mfd.	100 V
22-327	48022	.02	Mfd.	200 V
22-344	48023	Three-Gang Variable		
22-347	48024	4. x 8.	Mfd.	350 V.
22-348	48025	.001	Mfd.	600 V
22-350	48026	.25	Mfd.	120 V
22-354	48027	.007	Mfd.	750 V
22-355	48028	.01	Mfd.	1400 V
22-357	48029	.01 x .02	Mfd.	750 V
22-358	48030	.002	Mfd.	600 V
22-359	48031	Padder		

MISCELLANEOUS CHASSIS PARTS
COILS AND CHOKES

20-96	48032	Antenna Coil Assembly
20-97	48033	R. F. Coil Assembly
20-98	48034	Oscillator Coil Assembly
20-103	48035	Filament "A" Choke
95-262	48036	1st I. F. Transformer
95-263	48037	2nd I. F. Transformer
S-2778	46773	R. F. Choke
S-3364	46052	Motor Noise Filter
46-101	48038	Tone Control Knob (Knob Spring only, see 80-107)
52-54	48040	"A" Battery Cable
52-55	48041	Antenna Cable
54-76	48042	¼ x 20 Knurled Coupling Shaft Nuts
78-100	48043	Socket 6D6
78-101	48044	Socket 75
78-102	48045	Socket 42
78-113	48046	Socket 6D6
78-114	48047	Socket 6Z4
78-115	48048	Socket Vibrator
80-107	48049	Tone Control Knob Spring
85-66	48050	Tone Cootrol Switch

SPEAKER

*49-101	48062	6" Dynamic Speaker (less output transformer
	48063	Cone & Voice Coil Assemb. (for 48062 Speaker)
	48064	Field Coil (for 48062 Speaker)
S-3328	48065	Speaker Box and Grill Cloth

Zenith Number	Hudson Number	Description
93-125	48051	No. 6 Lock Washers
93-220	48052	Bakelite Washer for Chassis Mtg. Screws
94-185	48053	Rubber Bushing for Chassis Mtg. Screws
95-258	48054	Power Transformer
95-259	48055	Hum Filter Choke
95-260	48056	Speaker Output Transformer
97-75	48057	10/32 x ¾ Wing Screw for Box Cover
114-27	48058	No. 8 x ¾ Chassis Box Screws
190-4	48075	Vibrator
MS-246	48059	Chassis Box Top Cover and Bushing Assem.
MS-247	48060	Chassis Box Bottom Cover and Bushing Assem.
MS-253	48061	Chassis Box Body Less Cover and Top

REMOTE CONTROL UNIT

170-11	48066	Hudson Remote Control (less cables)
7-3	45738	Control Unit Bezel & Glass Assembly
26-77	48067	Hudson Dial Scale and Pointer Bushing Assembly
46-72	45740	Volume Control Knob
46-73	45741	Toning Control Knob (for Spring only, see 80-109)
52-62	48068	Pilot Lamp Cable & Socket Assembly
76-155	48069	Volume Control Coupling & Shaft Assem.
76-154	48070	Tuning Control Coupling & Shaft Assem.
80-108	46563	Tuning Knob Spring only
100-26	48071	6 V. - 18 V. Pilot Lamp

SUPPRESSOR AND SPEAKER MOUNTING PARTS

22-260	45023	.5 - 120 V. Coil Condenser
22-262	45090	.5 - 120 V. Generator Condenser
22-282	47074	.05 - 120 V. Condenser
54-77	48072	Hex Nut for Speaker Mtg. Bolt
63-403	47068	1500 Ohm Distributor Suppressor
97-73	48073	Speaker Mtg. Stud
147-21	48074	Wood Spacer Block for Speaker Mtg.

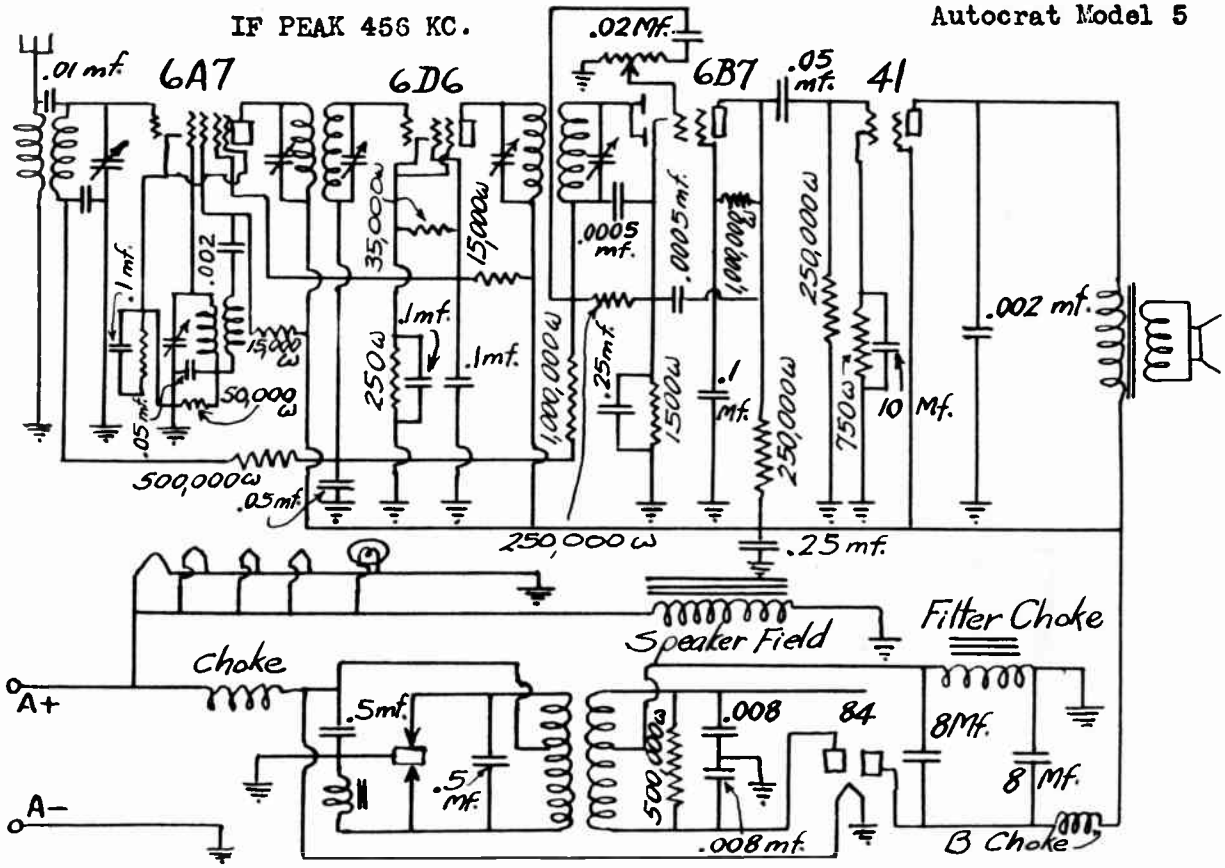
*Speakers are numbered 49-101-U, 49-101-R, 49-101-M designating three different types. Therefore, when ordering speaker or speaker parts refer to the number on speaker at all times and order by that part number accordingly.

AUTOCRAT RADIO CORP.
HERBERT H. HORN

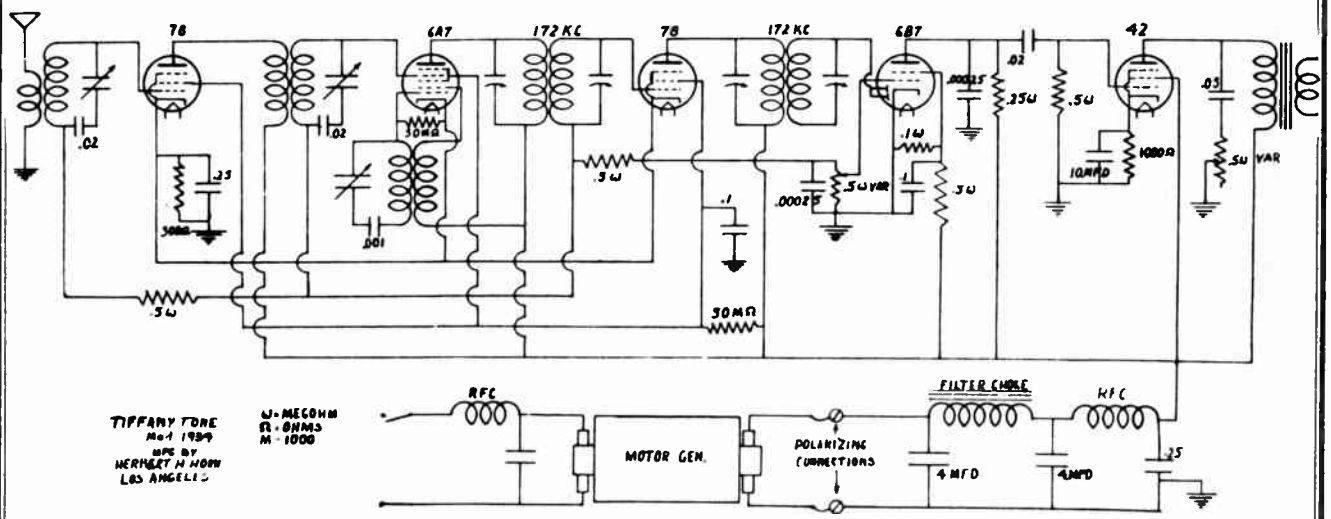
MODEL 5 Autocrat
MODEL 1934 Horn
Schematics

IF PEAK 456 KC.

Autocrat Model 5

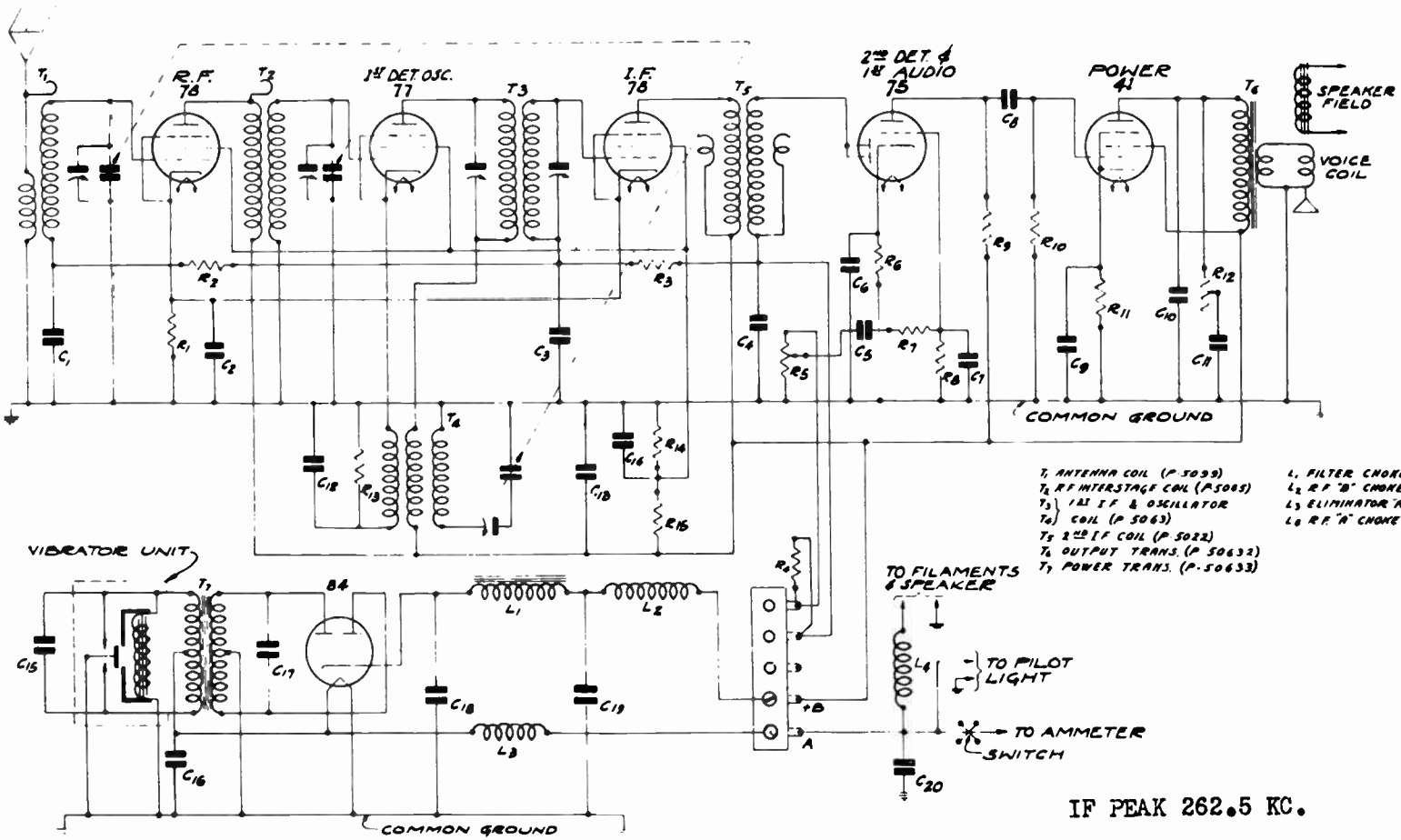


IF PEAK 172 KC.



MODEL 6-U
Schematic

BLACKHAWK



T_1 ANTENNA COIL (P-5099)
T_2 R.F. INTERSTAGE COIL (P-5005)
T_3 } 1st I.F. & OSCILLATOR
T_4 } COIL (P-5063)
T_5 2nd I.F. COIL (P-5022)
T_6 OUTPUT TRANS. (P-50632)
T_7 POWER TRANS. (P-50633)

L_1 FILTER CHOKE (P-50637)
L_2 R.F. "B" CHOKE (P-5174)
L_3 ELIMINATOR "A" CHOKE (P-5175)
L_4 R.F. "A" CHOKE (P-5167)

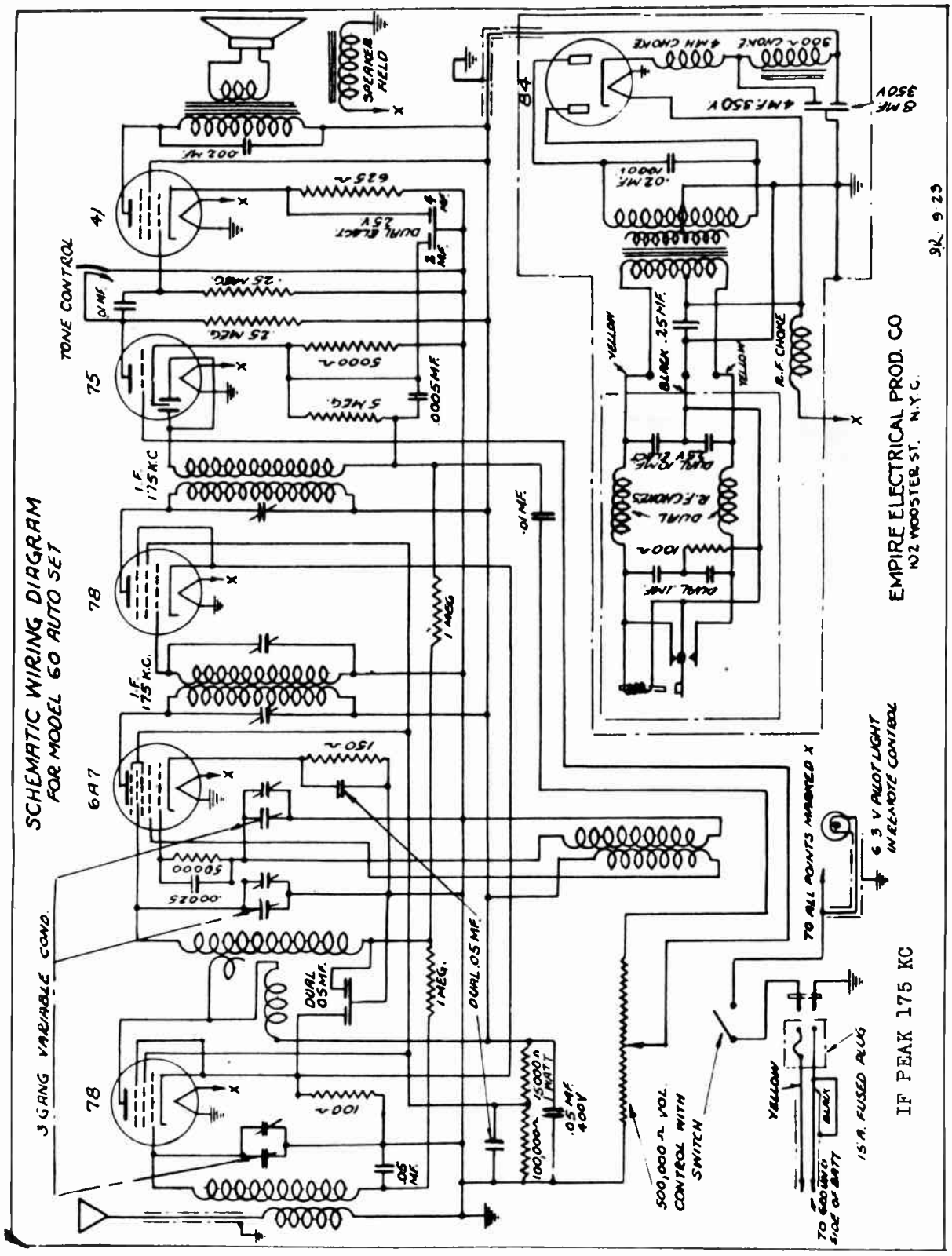
IF PEAK 262.5 KC.

R_1	260 OHMS	R_{10}	250,000 OHM	C_1	0.050 Mf 1200V. TUBULAR	C_9	12,000 M.F ELECTROLYTIC IN BLOCK WITH C_6	C_{17}	0.010 Mf 1800V TUBULAR
R_2	1.0 MEG OHM	R_{11}	800 OHM	C_2	0.500 Mf (BLOCK RED-WH)	C_{10}	0.003 Mf (BLOCK YELLOW)	C_{18}	18,000 Mf. BLOCK WITH C_{19}
R_3	2.0 "	R_{12}	150,000 OHM TONE CONTROL	C_3	0.050 Mf (BLOCK GR-WH)	C_{11}	0.020 Mf 600V. TUBULAR	C_{19}	18,000 Mf BLOCK WITH C_{18}
R_4	200,000 OHM	R_{13}	4,000 OHM	C_4	0.00025 Mf MICA	C_{12}	0.001 Mf MICA	C_{20}	0.500 Mf 120V TUBULAR
R_5	250,000 OHM VOL. CONTROL	R_{14}	20,000 OHM	C_5	0.050 Mf. 200V. TUBULAR	C_{13}	0.500 Mf (BLOCK BLUE)		
R_6	6,000 OHM	R_{15}	15,000 OHM	C_6	12,000 Mf ELECTROLYTIC IN BLOCK WITH C_9	C_{14}	0.100 Mf (BLOCK BROWN)		COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK
R_7	100,000 OHM			C_7	0.00025 Mf. MICA	C_{15}	0.500 Mf 120V TUBULAR		
R_8	1.0 MEG OHM			C_8	0.050 Mf (BLOCK G.R)	C_{16}	1.000 Mf 120V. TUBULAR		
R_9	250,000 OHM								

6 TUBE AUTO
SCALE
TRACED BY J.L.S. CHECKED BY
DATE 5-15-34 APPROVED BY
NAME SCHEMATIC CIRCUIT
SERIES 6U

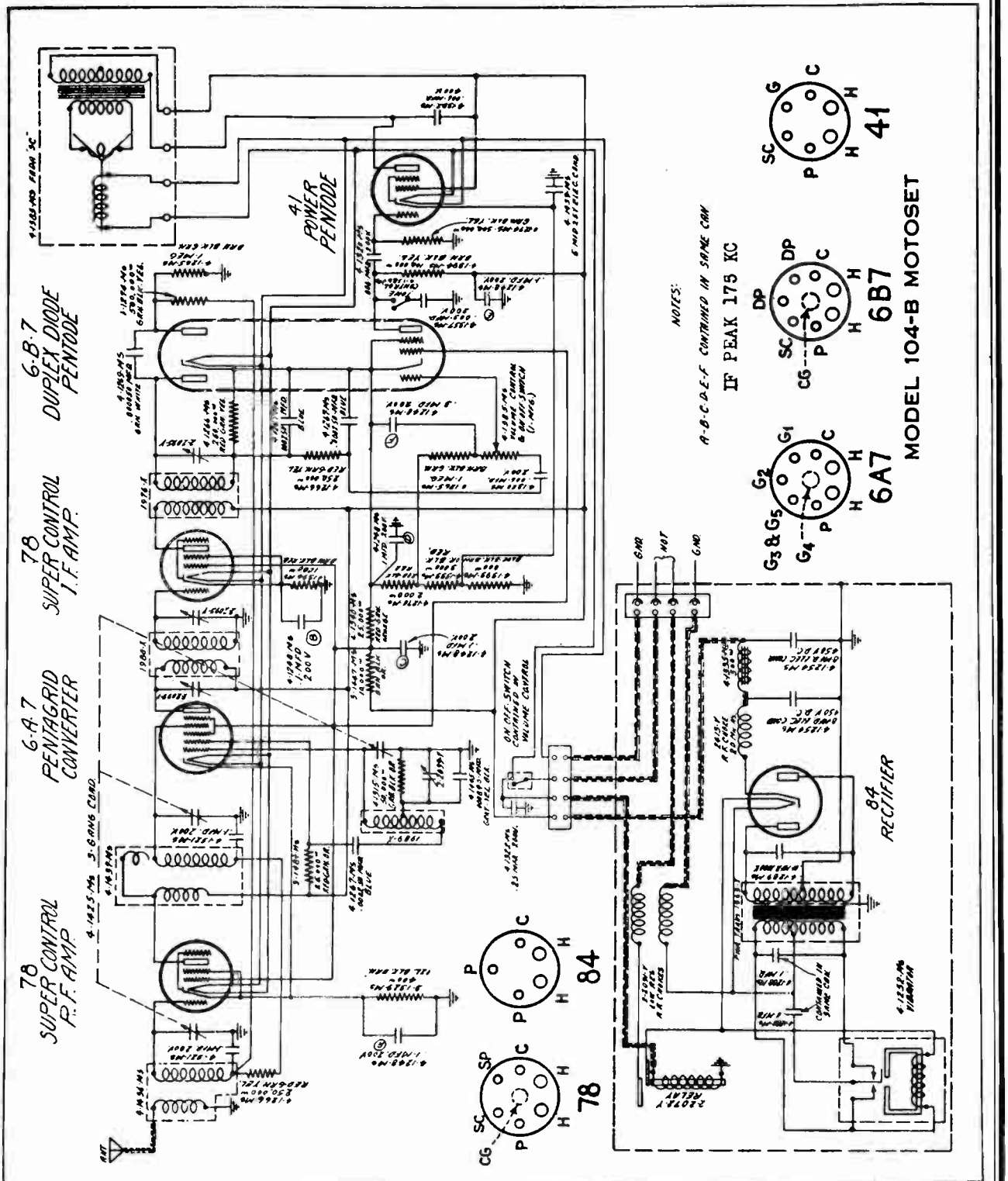
EMPIRE ELECTRICAL PRODUCTS

MODEL 60
Schematic



MODEL "RV" (104-B)
Schematic

FADA RADIO & ELECTRIC CORP.

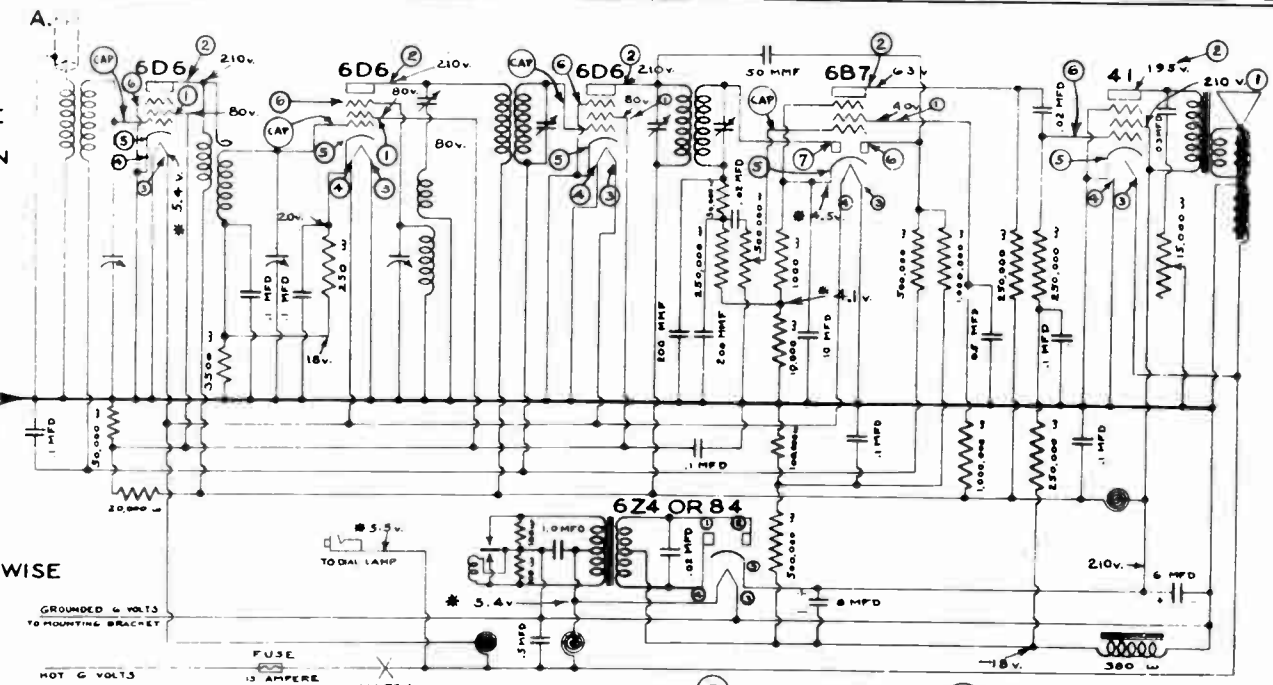


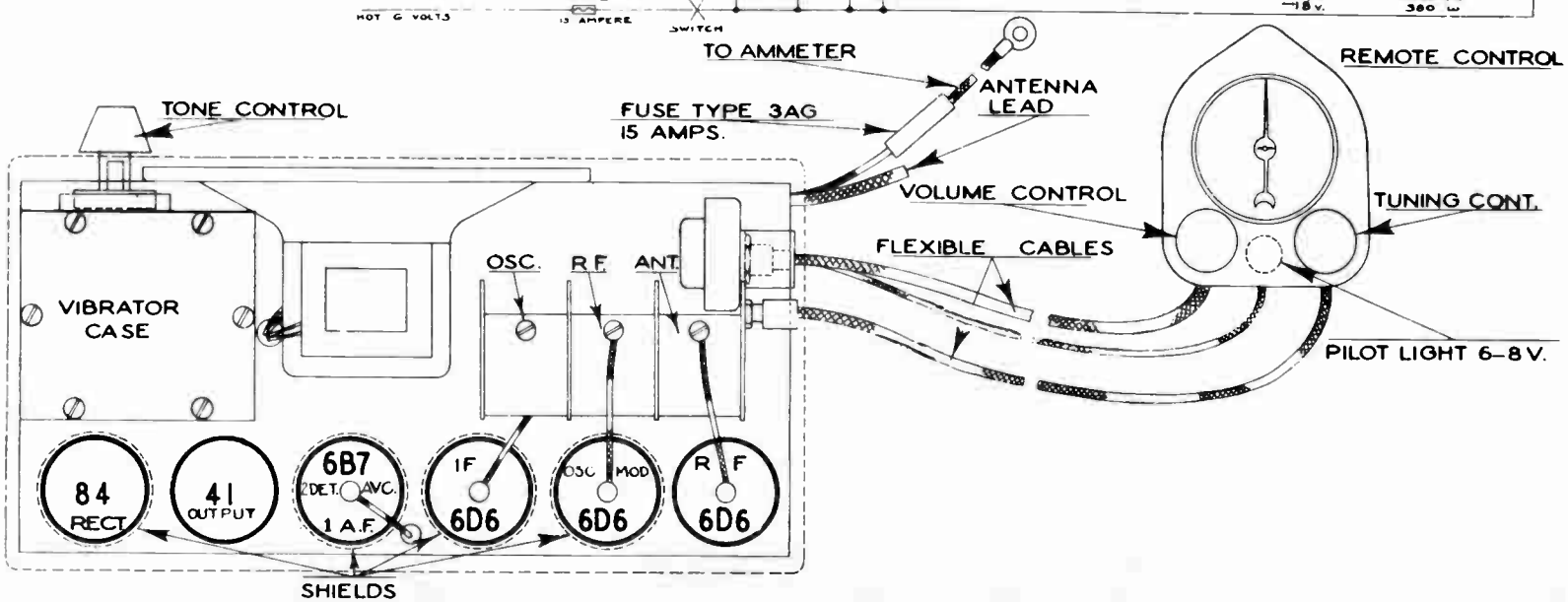
FEDERATED PURCHASER

MODEL 92
Schematic, Voltage
Socket Layout

NUMBERS IN CIRCLES INDICATE TUBE ELEMENTS IN ACCORDANCE WITH R.C.A. RADIOTRON PINBASE LAYOUT.

NOTE—ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
300v. SCALE UNLESS OTHERWISE SPECIFIED.
* INDICATES 10v. SCALE
INTERMEDIATE FREQ. 175 K.C.

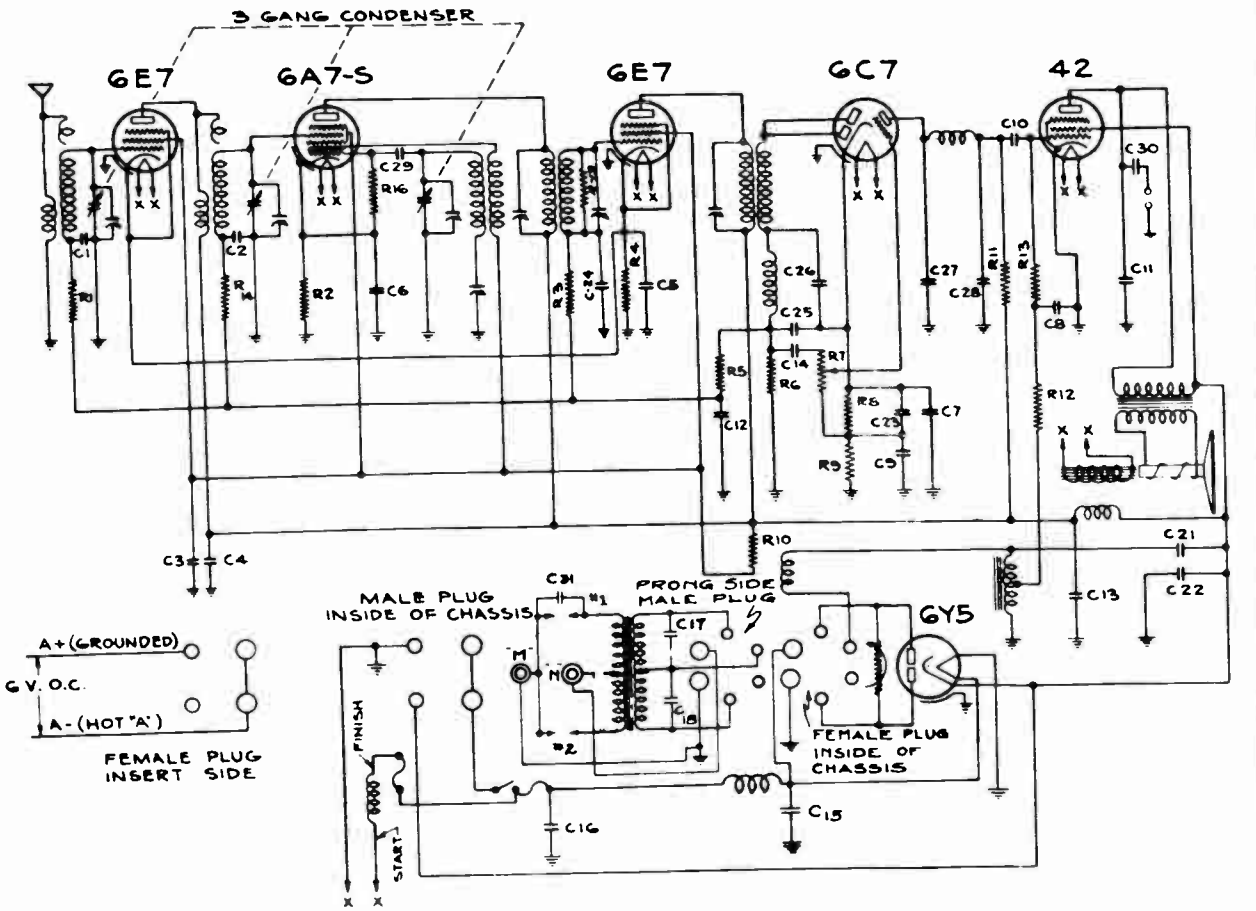




MODEL 118
Schematic

GRIGSBY - GRUNOW CO.

SCHEMATIC DIAGRAM OF MAJESTIC MODEL 118 AUTOMOBILE RECEIVER



RESISTORS

R1 — 300,000
R2 — 300
R3 — 300,000
R4 — 160
R5 — 300,000
R6 — 100,000
R7 — 200,000 V.C.
R8 — 2,500
R9 — 5,000
R10 — 15,000
R11 — 200,000
R12 — 250,000
R13 — 250,000
R14 — 300,000
R15 — 510,000 GLOBAR
R16 — 50,000
R19 — 1,000,000

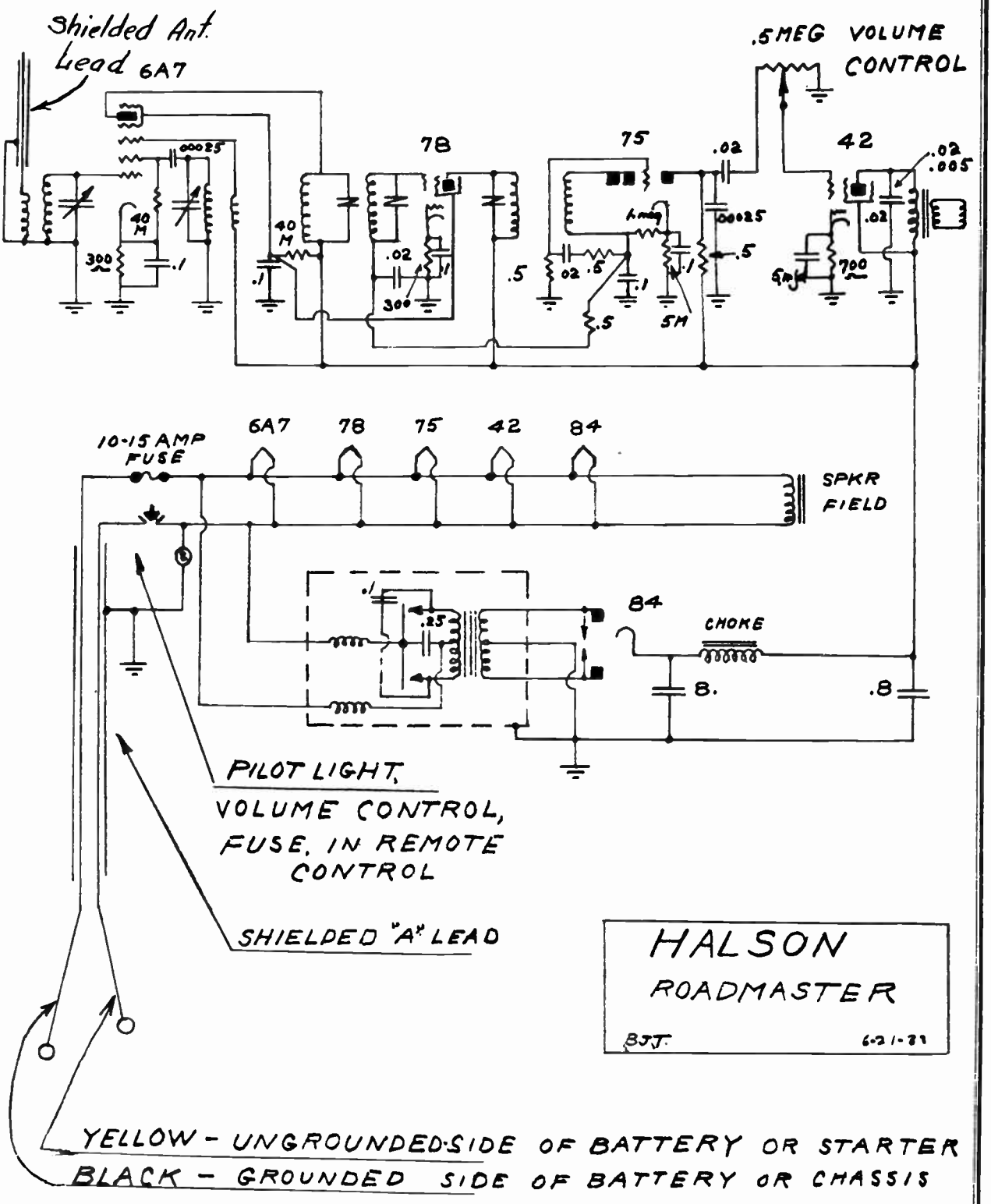
CONDENSERS

C1 — .03 } R.F. #1
C2 — .03 }
C3 — .25 }
C4 — .25 } R.F. #2
C5 — .25 }
C6 — .1 }
C7 — .25 }
C8 — .25 } A.F. #1
C9 — .25 }
C10 — .03 }
C11 — .005 }
C12 — .03 } A.F. #2
C13 — .25 }
C14 — .03 }
C15 — .5
C16 — .5
C17 — .008
C18 — .008
C21 — 8.0
C22 — 8.0
C23 — 10.0
C24 — .01
C25 — .0005
C26 — .0005
C27 — .0005
C28 — .0005
C29 — .00025
C30 — .1
C31 — 20.0

M - TERMINAL CONNECTED TO ARMATURE

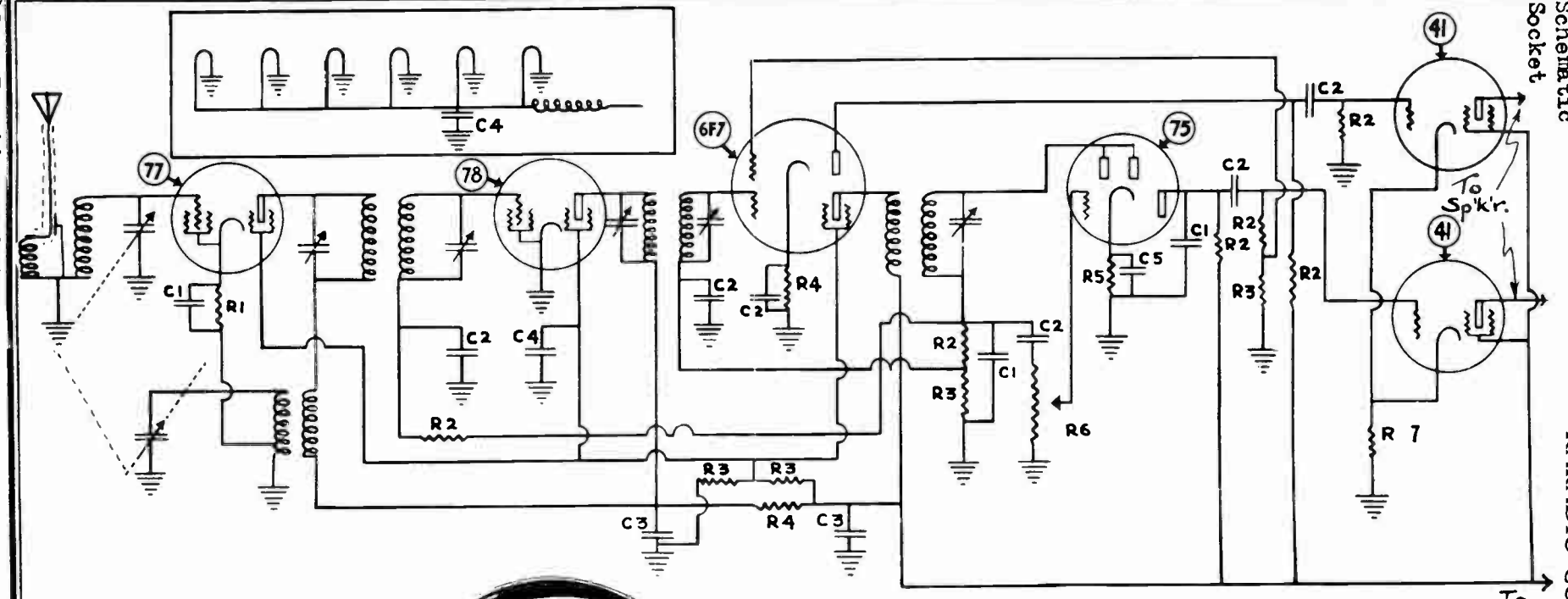
HALSON RADIO CORP.

MODEL "Roadmaster"
Schematic



MODEL 56
Schematic
Socket

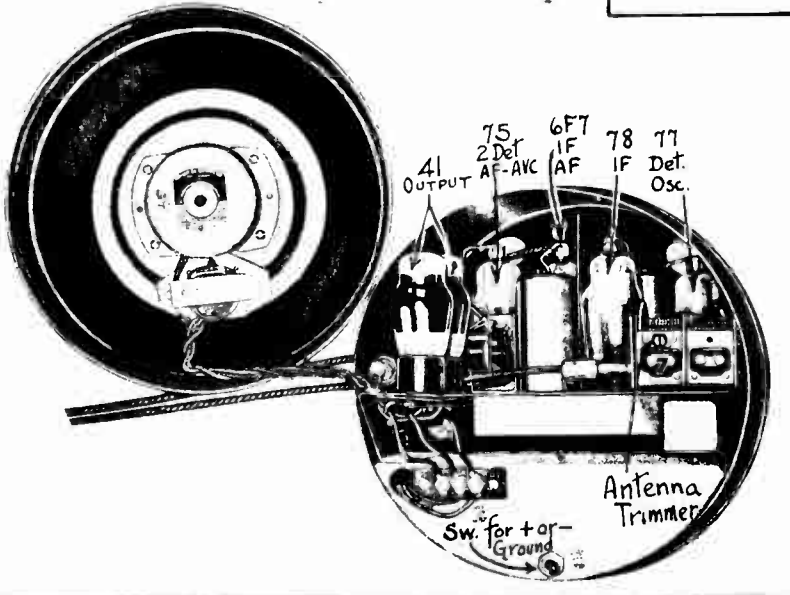
KARADIO CORP.



Tube 75 can be replaced with an 85 if greated delayed A V C is desired—Audio Amplification will be decreased when 85 is used.

R-1— 7,000 ohms—¼ watt
R 2—200,000 ohms—¼ watt
R 3— 50,000 ohms—¼ watt
R 4— 250 ohms—¼ watt
R 5— 2,000 ohms—¼ watt
R 6—250,000 ohms Potentiometer
R 7— 700 ohms—½ watt

C 1—.001 Mfds.—200 V.
C 2—.1 Mfds.—200 V.
C 3—.1 Mfds.—400 V.
C 4—.25 Mfds.—200 V.
C 5— 25 Mfds.— 8 V.

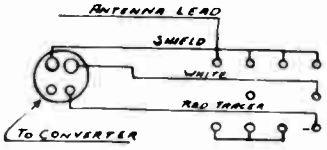


Model 56 KARADIO

KINGSTON PRODUCTS CORP.
PACKARD RADIO CO.

MODEL Gypsy
MODEL 6 Tube Auto Radio
Schematics

GIPSY AUTO KIT CABLE & PLUG

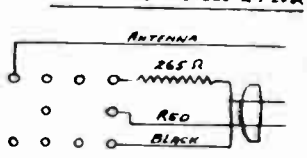


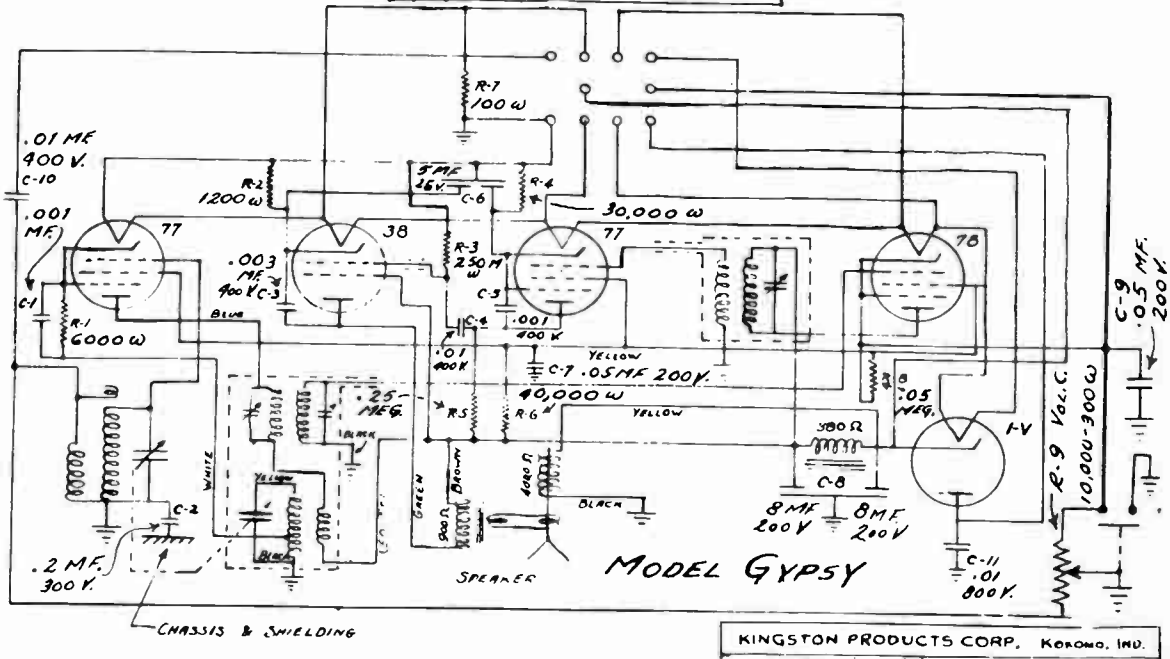
CHANGE NOTES

ITEM	WAS	SERIAL #
R-1	1200 Ω	A-189
R-4	30,000 Ω	A-189
R-2	1100 Ω	A-189
C-2	.1 MFD.	A-189
C-9	.1 "	A-189
C-7	.1 "	A-189

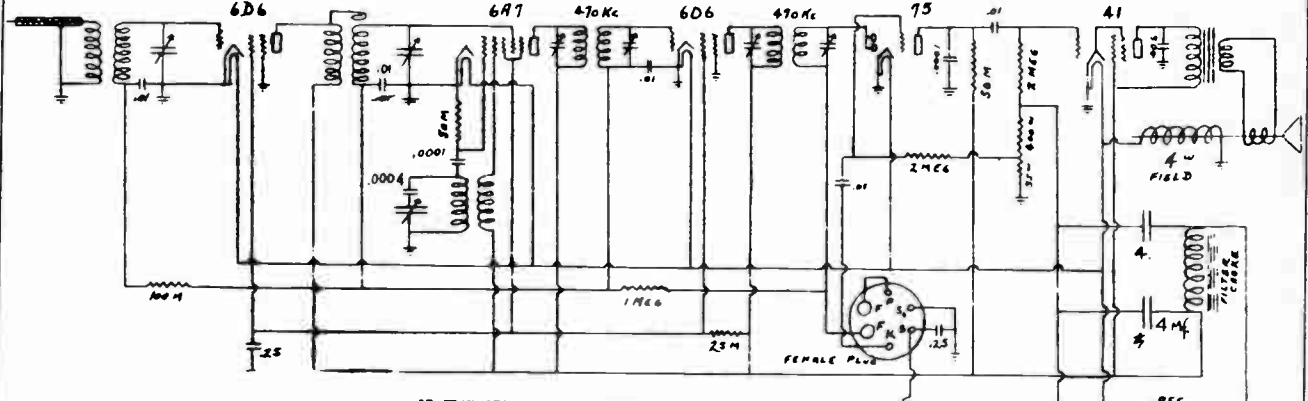
ITEM	WAS	SERIAL #
OSC. COIL	TRANS. CHANGE	A-189
R-7	ADDED	
C-11	.02 - 400V	

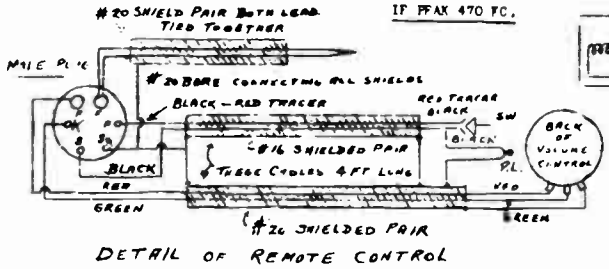
110 V. AC-DC CABLE & PLUG





KINGSTON PRODUCTS CORP. KOKOMO, IND.	
DRAWN BY FBO	SUBJECT WIRING DIAGRAM
TRACED BY	
CHECKED BY GWS	GYPSY MODEL RADIO
DATE 9-22-33	
MATERIAL	
SCALE FULL SIZE	DRG'D No. E-8726



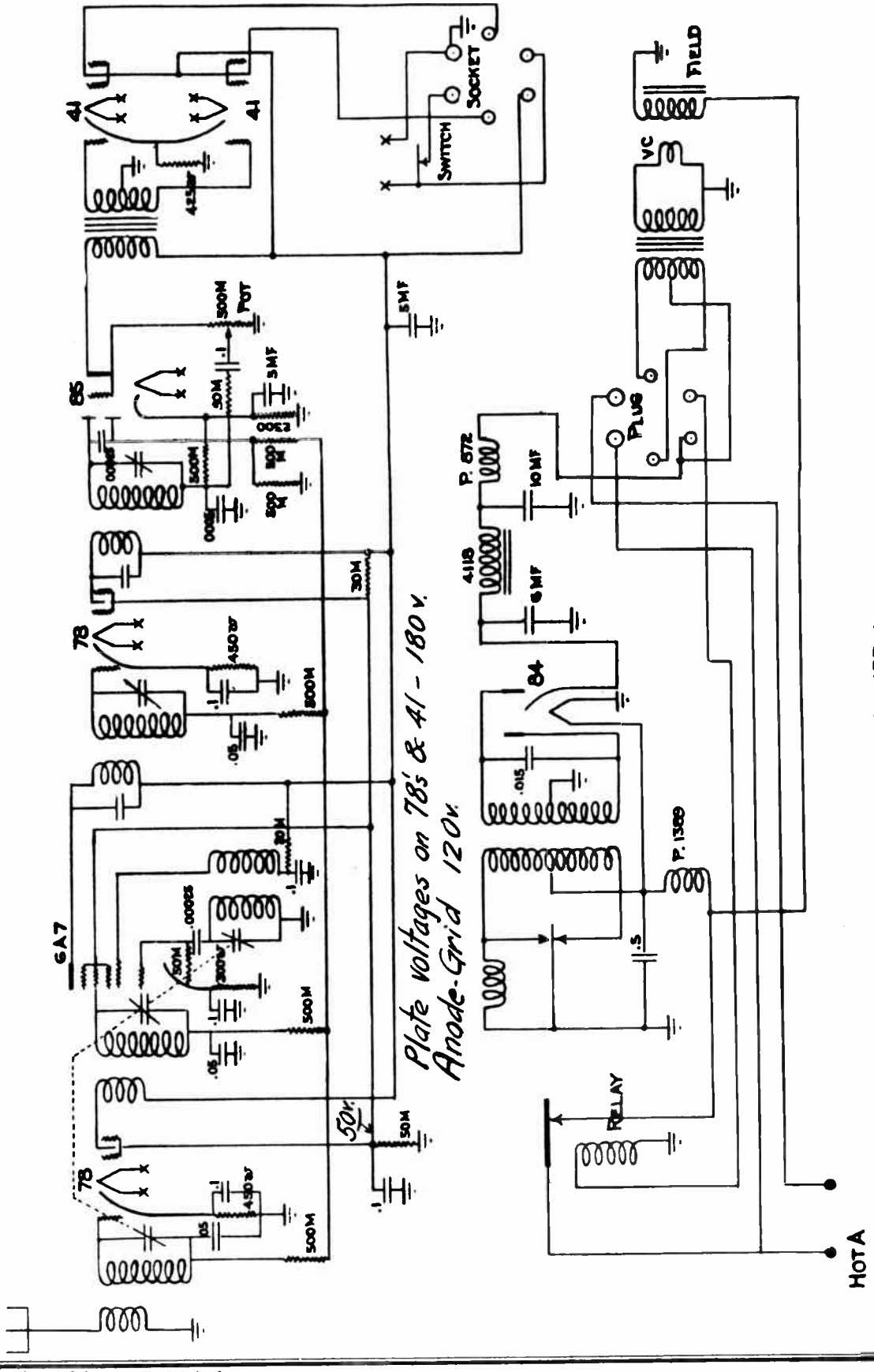


DETAIL OF REMOTE CONTROL

Packard 6 Tube Auto Radio

MODEL 91
Schematic

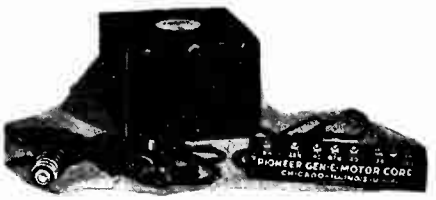
LARKIN CO., INC.



MODEL Gen-E-Motor
Converters
Data

PIONEER GEN-E-MOTOR CO.

Operate battery sets from 32 volt light system or 6 volt battery



"B" batteries may be eliminated by using these 32-volt or 6-volt Pioneer Gen-E-Motors for plate voltage supply to battery operated receivers.

The Pioneer Gen-E-Motor plugs into the 32-volt light socket and connects directly to the old battery leads of the receiver. No change or rewiring of the receiver is necessary. Taps are provided for intermediate voltages. Have built-in filter units.

The Model 3280-AT operates from any 32-volt farm lighting system and has a 180-volt maximum output with taps at 22½, 45, 67½, 90, and 135 volts, amply providing all potentials necessary for battery operated receivers. Additional models are listed in the table.

32 VOLTS

Code No.	Volts	Intermediate Tap	Retail Price
3280-AT	180	22½, 45, 67½, 90, 135	25.00
3280-A	180	90 Volts	23.00
3235-A	135	67½ Volts	23.00
7320	300	(100 Mils output)	40.00

FOR 6 VOLTS FOR FARM USE

6280-AT	180	22½, 45, 67½, 90, 135	25.00
6280-A	180	90 Volts	23.00
6235-A	135	67½ Volts	23.00

All of the above units are equipped with 8 foot cord, plug, and switch ready for use.

Pioneer Gen-E-Motor D. C. to A. C. Converters

32 volt D. C. to 110 volt A. C. and 110 volt D. C. to 110 volt A. C.

The metal case on which the converter is mounted contains complete filter to assure noise-free operation of radio receivers. A heavy rubber-covered cord and appliance plug are provided with the unit. The base has a standard plug-in outlet for the A.C. voltage output.

PIONEER GEN-E-MOTOR CONVERTERS

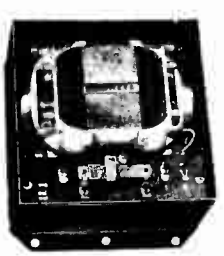
INPUT D.C. Voltage	INPUT D.C. Current	OUTPUT A.C. Voltage	OUTPUT Volt-Amps	Type No.	LIST PRICE Less Filter	LIST PRICE With Filter
6	13.3 amps.	110	40	640	$47.50	$51.50
6	19 "	110	60	660	55.00	59.00
12	11.8 "	110	80	1280	47.50	51.50
12	17.5 "	110	120	1212	55.00	59.00
32	4.7 "	110	80	3280	36.50	41.50
32	5.6 "	110	110	3211	39.95	44.95
32	7.8 "	110	150	3215	44.95	49.95
32	10.0 "	110	200	3220	51.95	59.95
32	13.0 "	110	250	3225	55.95	64.95
32	15.0 "	110	300	3230	59.95	69.95
110	1.30 "	110	80	1180	36.50	41.50
110	1.78 "	110	110	1111	39.95	44.95
110	2.23 "	110	150	1115	44.95	49.95
110	2.80 "	110	200	1120	51.95	59.95
110	3.55 "	110	250	1125	55.95	64.95
110	3.85 "	110	300	1130	59.95	69.95
220	.65 "	110	80	2280	38.50	45.50
220	.89 "	110	110	2211	43.95	48.95
220	1.11 "	110	150	2215	48.95	53.95
220	1.40 "	110	200	2220	55.95	63.95
220	1.77 "	110	250	2225	59.95	66.95
220	1.92 "	110	300	2230	61.95	71.95

CONVERTERS FOR ELECTRIC APPLIANCES

Pioneer Gen-E-Motor Converter is also supplied without the filter system, which is not needed when operating ordinary electric appliances, such as Neon signs or other A.C. devices

Auto Radio Receivers

New Compact Models



Pioneer Gen-E-Motors, complete with built-in filter units, are available as battery eliminators for auto receivers using "B" batteries, and for installation in auto sets where it is desired to remove the filter system used with the old vibrator unit. They quickly pay for themselves in saving the cost of frequent battery replacements.

The Model 5180-AT, listed below, has an output of 180 volts at 30 m.a. with a 90 volt tap. Models with 135 volt to 250 volt maximum output are also listed. Higher voltage outputs are available on special order.

The entire unit is housed in a sturdy metal case measuring 2¾" x 5¼" x 5½".

The Pioneer Gen-E-Motor is floated in rubber, assuring complete freedom from vibration. The armature is supported by two sets of ball bearings, having a sufficient store of lubricant sealed in to last the entire life of the unit without need of lubrication. No other adjustments are necessary in service. Mountings provide for quick and easy installation.

Once installed, the Pioneer Gen-E-Motor may be forgotten, since no adjustments or servicing are necessary. Every unit is unconditionally guaranteed for one year. See table below for complete listing of models.

Code No.	Drain on "A" Battery	Output Volts	Milli-Amps.	Intermediate Tap	Retail Price
5180-A	1.94	180	30	None	18.00
5180-AT	1.94	180	30	90	18.50
5135-AT	1.42	135	30	67½	18.50
5200-A	2.75	200	40	None	18.00
5225	3.80	225	50	None	18.00
5250	4.20	250	50	None	18.00

Police Radio and Sound Systems

Pioneer Gen-E-Motors for sound truck application are available in standard units with outputs up to 300 volts at 100 m.a., (complete with all necessary filter to supply D.C. for direct application to tube circuits). Higher voltages and current ratings are available on special order. The 6-volt input is standard, although 12, 32, and 110 volt D.C. inputs are furnished on special order. For supplying A.C. power to sound truck installations, from 6, 32, and 110 volt D.C. sources, see listing of Pioneer Gen-E-Motor Converters.

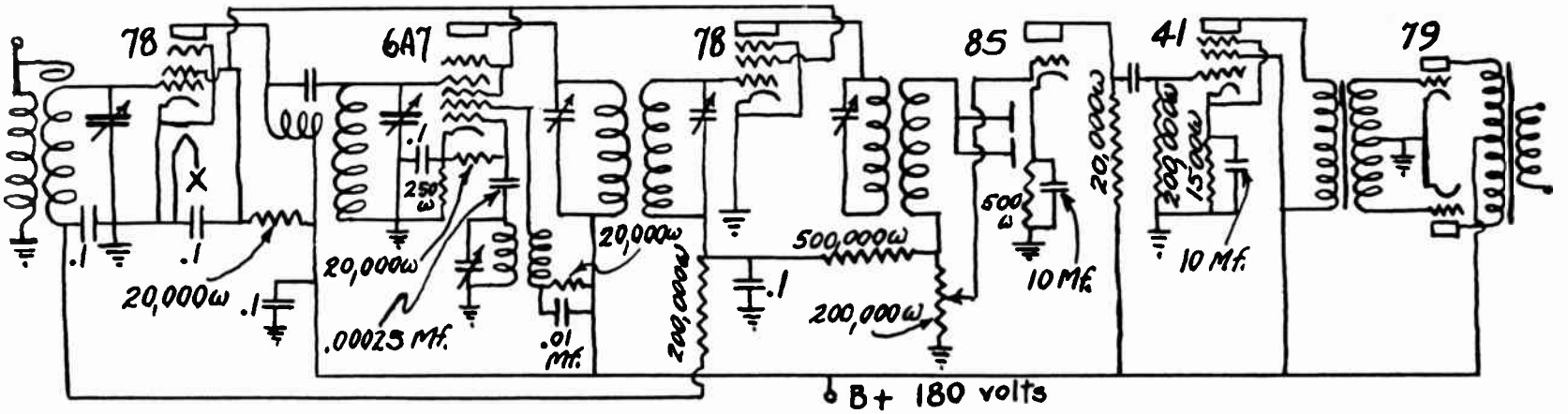
Special high efficiency Pioneer Gen-E-Motors are offered for use in police car receivers or other applications where continuous service makes desirable the very highest possible efficiency to keep battery drain to a minimum. The low price of these units affords exceptional economy of operation cost over the use of battery power. See table below for listing.

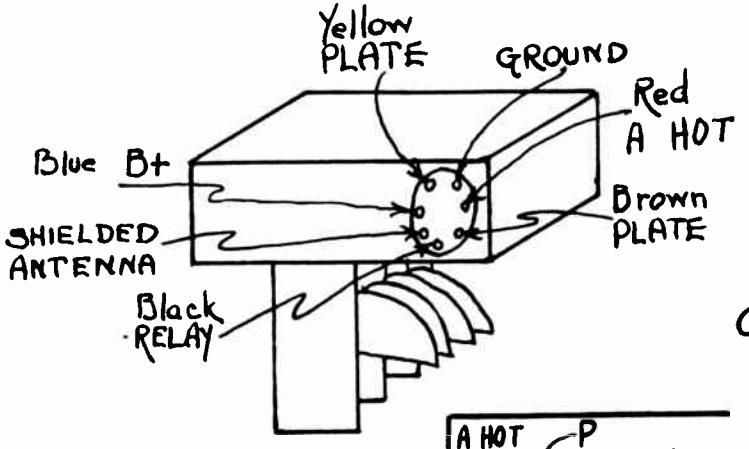
FOR POLICE SQUAD CARS

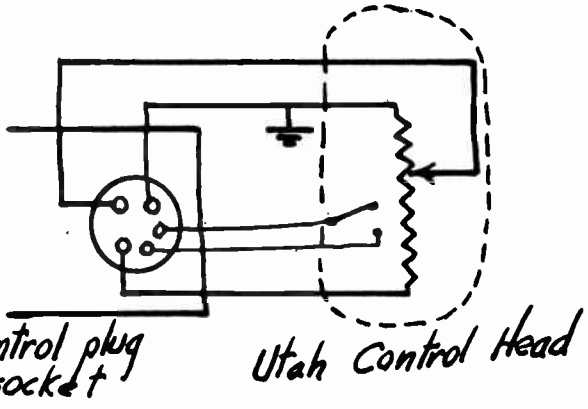
Code No.	Drain on "A" Battery	Output Volts	Milli-Amps.	Intermediate Tap	Retail Price
6180-T	1.65	180	30	90	25.00
6135-T	1.1	135	30	67½	25.00

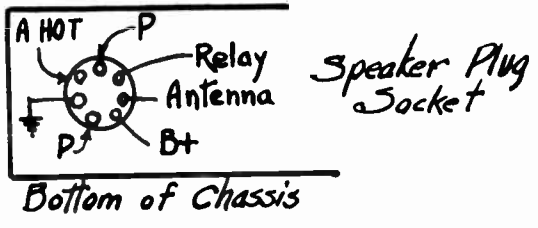
"SPECIAL" FOR SOUND TRUCK EQUIPMENT

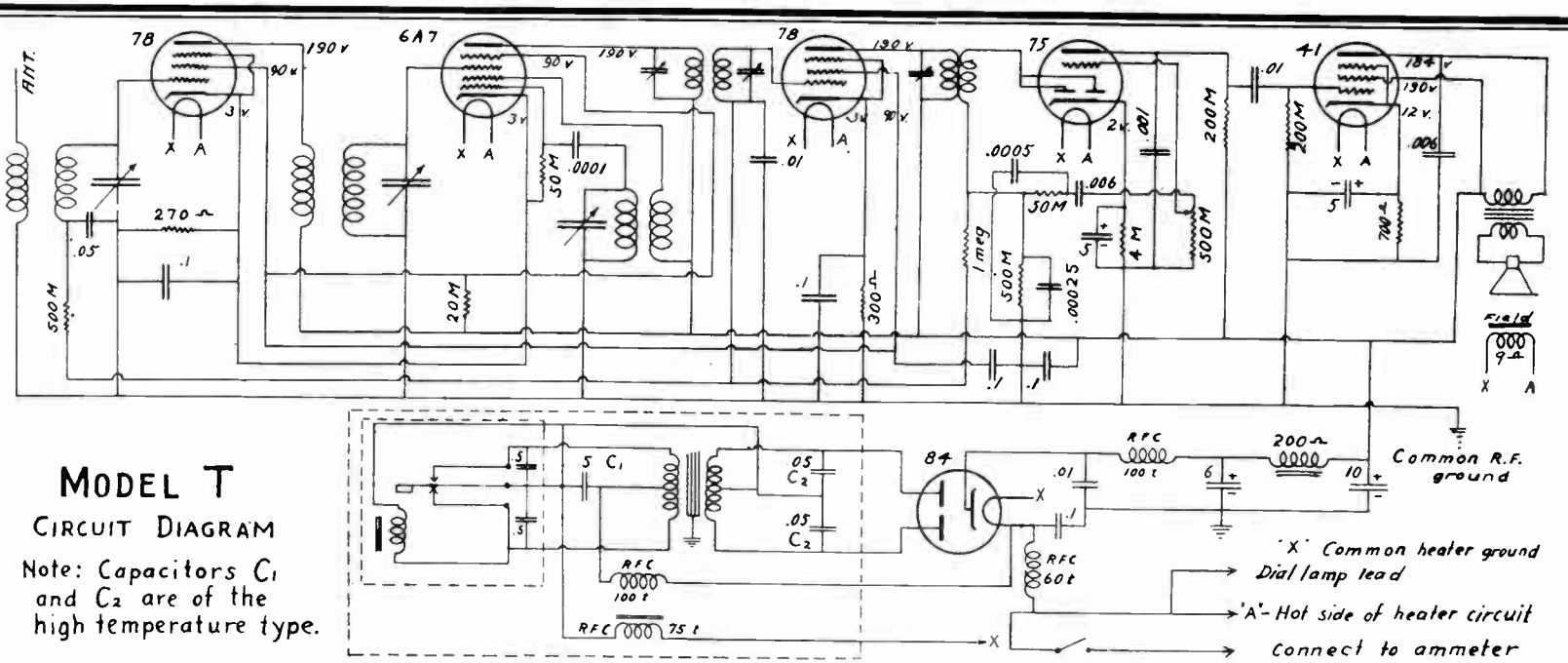
7565	5.00	265	75	None	31.00
7300	8.75	300	100	None	34.00











MODEL T

CIRCUIT DIAGRAM

Note: Capacitors C_1 and C_2 are of the high temperature type.

BALANCING I-F. COILS. These are trimmed through the tops of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Remove chassis from cabinet and feed signal from test oscillator into grid cap of the 6A7.

BALANCING R-F. COILS. Tuning control must be attached to tuning condenser shaft with pointer set to 530 when condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting, carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car, slightly readjust the first trimmer through hole in top of cabinet.

Determine most satisfactory mounting position on bulkhead which should be at the left hand side or directly in front of steering column. Spot the mounting bolt location and drill ½" diameter hole. Insert bolt through hole and assemble washer and nut on engine side. Hang receiver over bolt head and tighten nut.

Attach flexible shafts to control unit by first inserting shaft as far in as possible and then tighten set screws of shaft housing, being careful it is not so tight as to cause shaft to bind in housing.

Mount control unit on steering column in approximately correct position, set pointer to 530 on dial, turn upper control of receiver to extreme clockwise position, carefully place right hand shaft in position on upper receiver control and left hand shaft on lower control and tighten set screws securely.

Adjust control unit position so that shafts leave set with least amount of bend possible and fasten securely in this position. Trial of controls will show best location for smooth operation.

Attach heavy rubber covered lead to ammeter terminal.

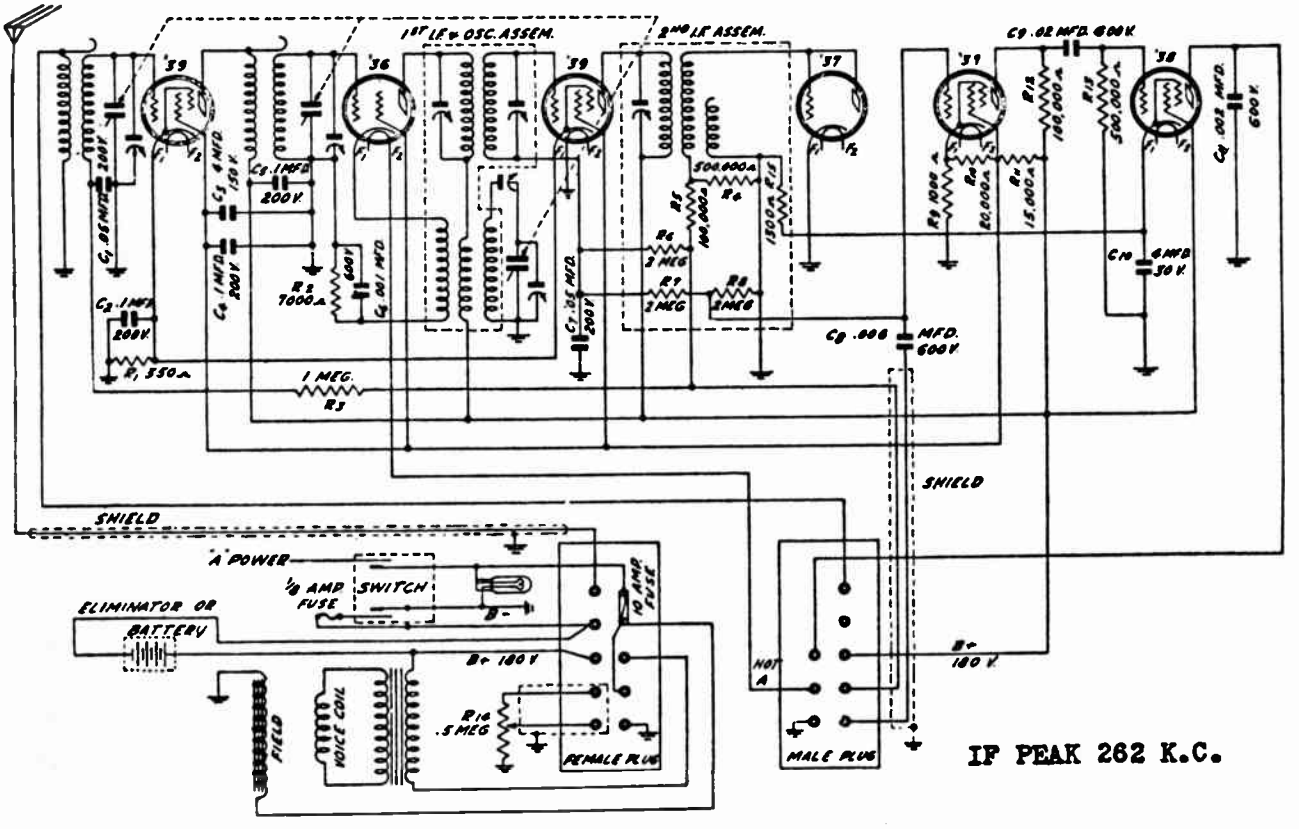
Connect pilot light wire from control head to short black wire on set, making connection close to set, and tape up joint. Ground shield by loosening screw under nearest corner of set and connecting wire therefrom to end of shield and tighten up screw.

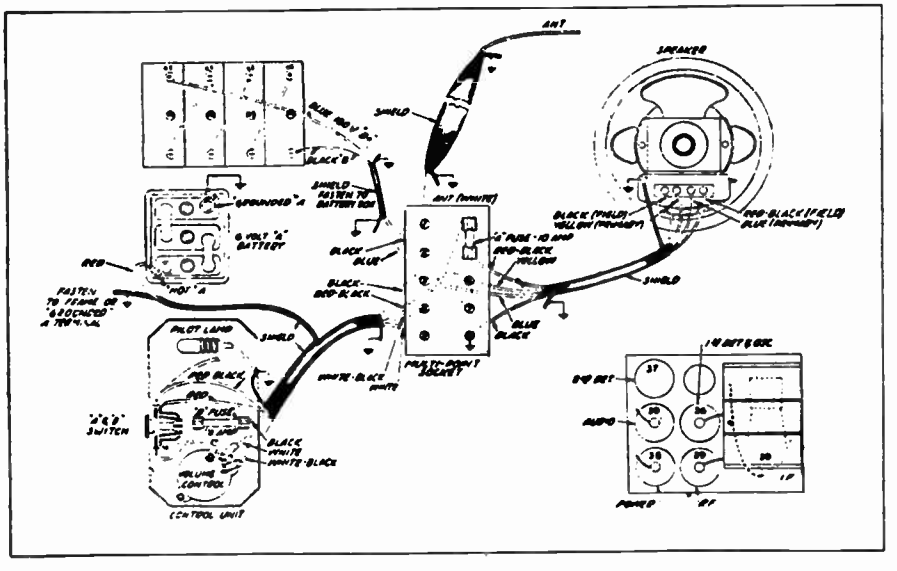
Disconnect ignition leads from spark plugs, attach one suppressor to top of each plug and reattach the ignition lead to free end of suppressor. Disconnect center wire from distributor head, and substitute distributor suppressor, then plug center wire into free end of suppressor.

Attach generator bypass condenser to generator frame by means of screw holding cut-out. Connect wire from condenser to generator side of cut-out switch.

MODEL 062
Schematic
Voltage
Connections

SOLAR





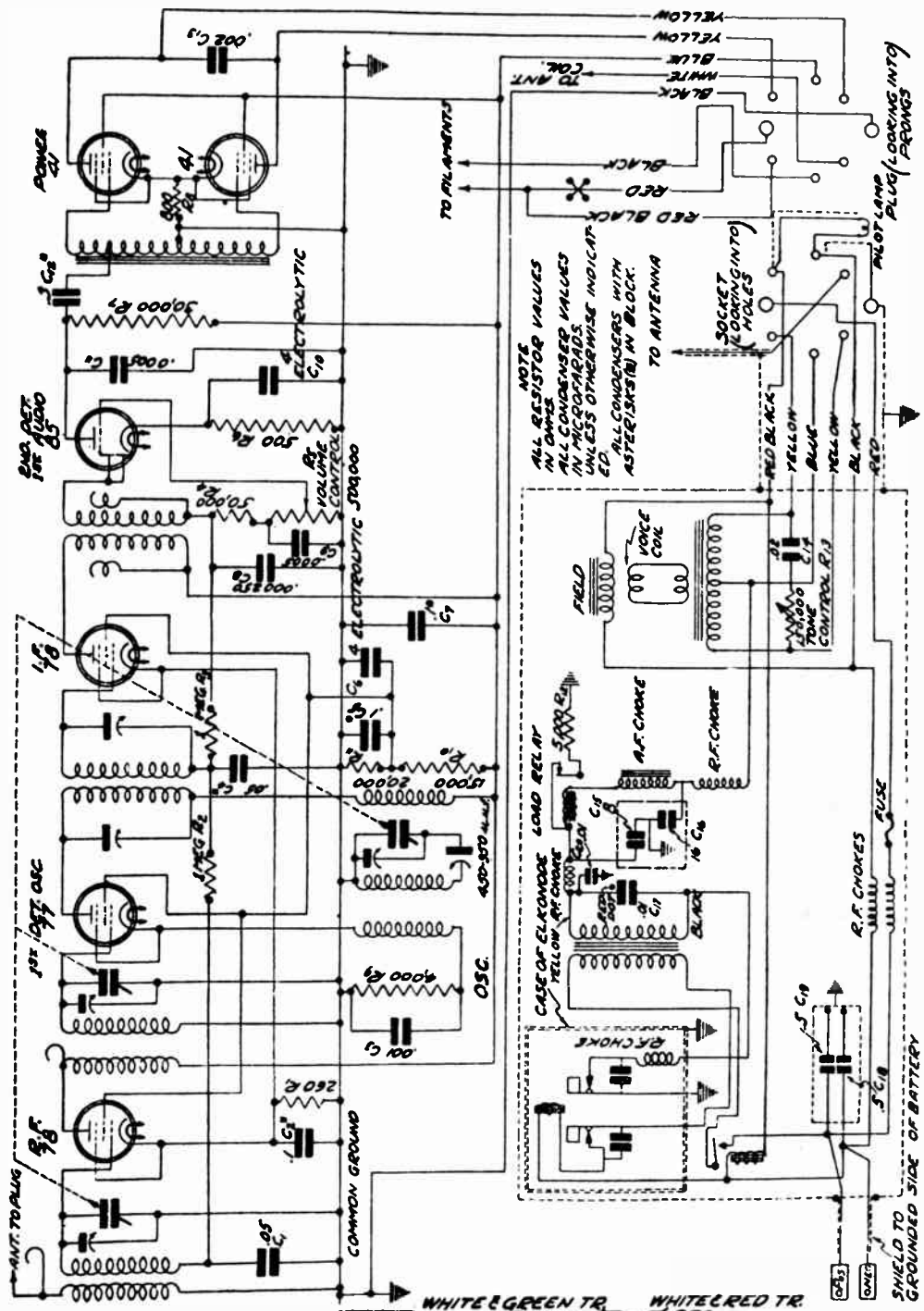
VOLTAGE DATA

Tube	Plate	Screen	Grid	Plate MA.
R-F.	177	80	3	3.6
1st Det.	173	76	7*	.9*
I-F.	177	80	3	3.6
2nd Det.	0	0	0	0
1st A-F.	54	77	6	1.2
Output	159	165	15.5	10.0

* Will vary with dial setting.

TROPIC-AIRE

MODEL 06-W
Schematic,
Voltage
Socket



	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78 R.F.	6.1	182	80	3**	7.0
77 1st Det.& Osc.	6.1	178	77	8 x	1.3 x
78 I.F.	6.1	182	80	3**	7.0
85 2nd Det.& 1st A.F.	6.1	70*		1.8**	3.5
41 Output	6.1	162	168.5	17	11.0

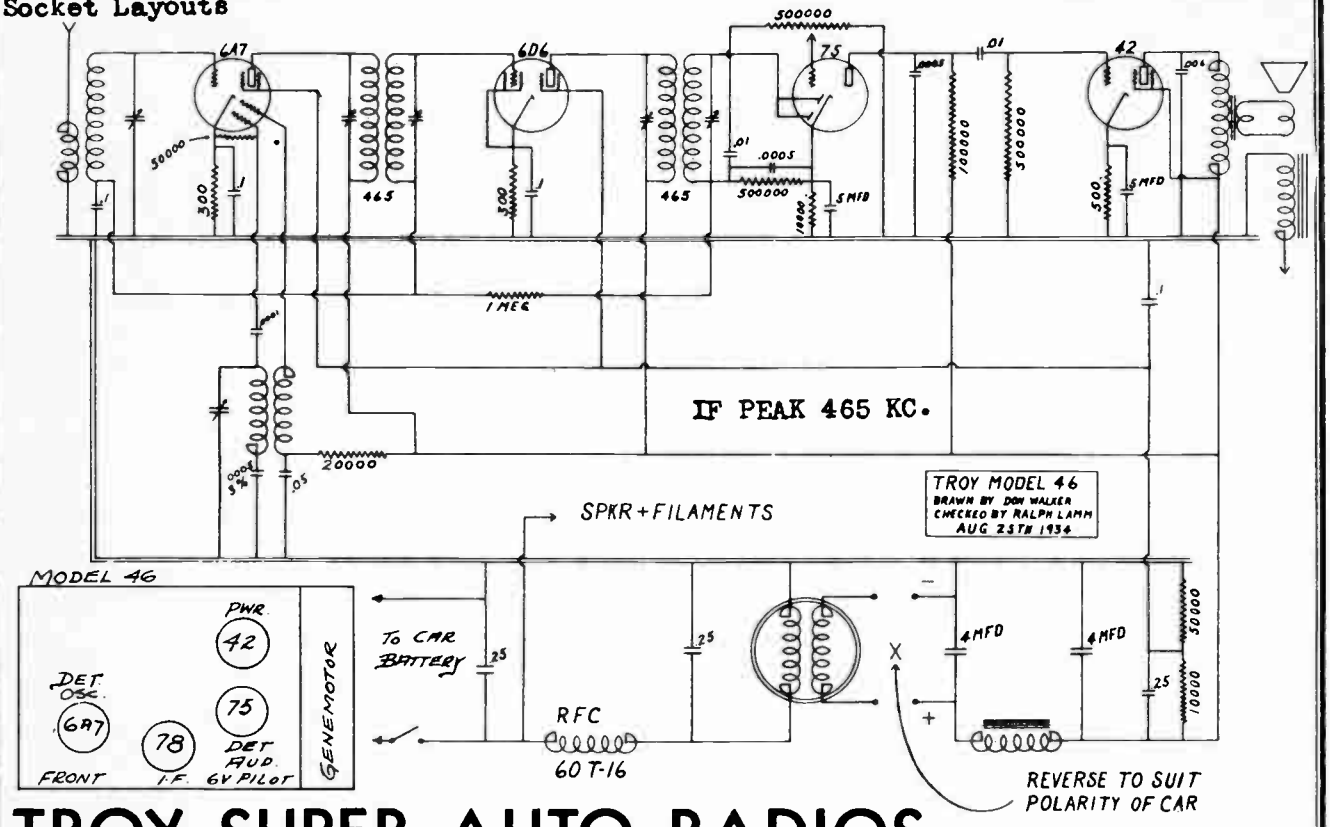
*-Triode Plate to Cathode. **-Cathode to Ground x-Subject to variation
NOTE:- All voltages are at 185 volts input from "B" Eliminator

Condenser Block—Internal Wiring

Location of Tubes

MODEL 46
MODEL 56
Schematics
Socket Layouts

TROY RADIO MFG. CO.



TROY SUPER AUTO RADIOS

(Gen-E-Motor, "B" Supply)