Model 40

Automobile Radio Receiver

Specifications

Frequency Range:

Broadcast 540-1500 K.C.

I.F.:

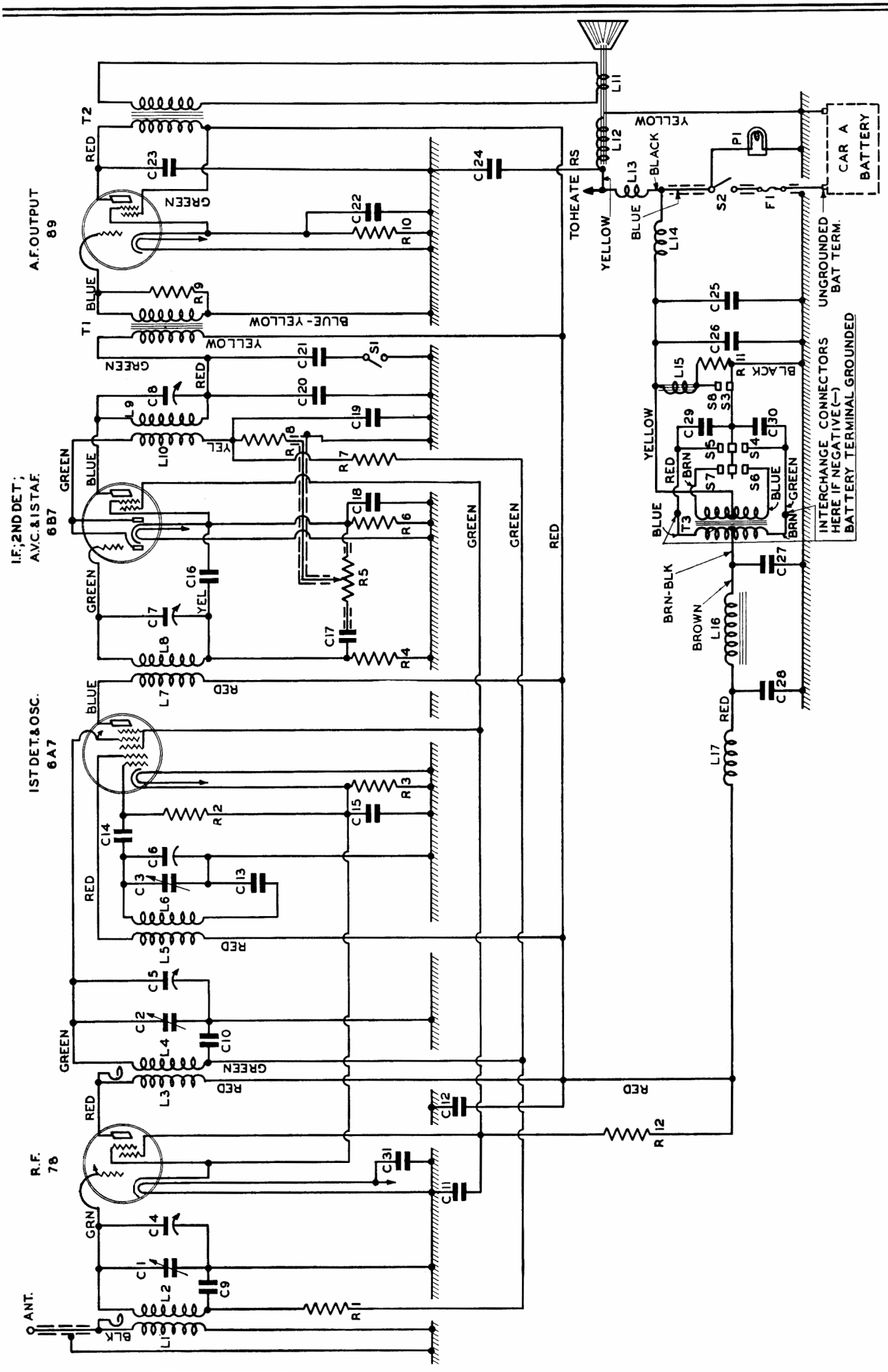
175 K.C.

Tubes:

Type	Position
78	R.F. Amplifier
6A7	1st Detector and Oscillator
6B7	2nd Detector
89	Power Amplifier

Power Supply:

6.3 volt automobile storage battery.



Schematic Diagram—Model 40—Automobile Receiver.

NOMENCLATURE

CONDENSERS:—		Part No.
C-1	R.F. Tuning—16-325 mmf. ganged	
C-2	R.F. Tuning—16-325 mmf. ganged	
C-3	Oscillator Tuning—16-325 mmf. ganged	R-7601
C-4	Trimmer for R.F. Tuning—10-60 mmf	
C-5	Trimmer for R.F. Tuning—10-60 mmf	
C-6	Oscillator Parallel Trimmer (1400 K.C. align.)	
C-7	Trimmer First I.F. Trans. Secondary	Part of R-3636
C-8	Trimmer Second I.F. Trans. Secondary	Part of R-3637
C-9	R.F. Filter By-Pass—.05 mfd. 150 volts	R-6514
C-10	R.F. Filter By-Pass—.05 mfd. 150 volts	R-6514
C-11	R.F. Screen By-Pass—3.6 mfd. 100V. D.E.	R-6492
C-12	Plate By-Pass—1 mfd. 240V. Dry Elec.	
C-13	Fixed Lagging (series)—770 mmf. Mica	S-1317
C-14	Grid Blocking—40 mmf. Mica	R-3696
C-15	Cathode Bias By-Pass—.1 mfd. 150 Volts	R-3641
C-16	I.F. By-Pass Condenser—300 mmf. Mica	R-3616
C-17	Blocking— 02 mfd. 200 volts	R-3618
C-18	Cathode Bias By-Pass—5 mfd. 35 volts	R-6513
C-19	Plate Filter By-Pass—300 mmf. Mica	R-3616
C-20	I.F. By-Pass—770 mmf. Mica	S-1317
C-21	Tone Control—.005 mfd. Mica	R-3617
C-22	A.F. Cathode Bias By-Pass—5 mfd. 35 volts	R-6513
C-23	A.F.* Plate By-Pass—.005 mfd. Mica	R-3617
C-24	R.F. Filter—375 mmfd. Mica	R-3695
C-25	Vibrator R.F. Filter—.5 mfd. 150 volts	R-7600
C-26	Vibrator R.F. Filter—375 mmf. Mica	Block
C-27	Power Filter—4 mfd. 250V. Dry Elect.	Filter
C-28	Power Filter—4 mfd. 250V. Dry Elect.	
C-29	Vibrator Base (Sparking)—.03 mfd. Mica	R-6480
C-30	Vibrator Base (Sparking)—.03 mfd. Mica	Ass'bly
C-31	R.F. Filter—375 mmfd. Mica	R-3695
R-1	Filter—60,000 ohms ±10%—¼ watt	R-3602
R-2	Oscillator Grid—60,000 ohms ±10%—¼ w.	R-3602
R-3	1st Det Cathode—270 ohms ±10% watt	R-6135
R-4	Grid Leak—.5 meg. ±10%—¼ watt	R-6186
R-5	Volume Control—0-180000 ohm variable (with S-2)	R-6499
R-6	2nd Det. Cathode—600 ohms + 10%—¼ w.	R-3218

RESISTORS:—		Part No.
R-7	Filter—2 megohm ±10%—¼ watt	R-6242
R-8	A.V.C. Load—.4 megohm ±10%—¼ watt	R-3619
R-9	A.F. Grid—60,000 ohms, ±10%—¼ watt	R-3602
R-10	A.F. Bias—1000 ohms. ±10%, 1 watt	R-2816
R-11	Buzzer Contact Spark Suppressor—50 ohms, ½ watt	R-3614
R-12	Screen—30,000 ohms, ±10%, 1 watt	R-2240
L-1	Antenna R.F. Transformer Primary	R-6489
L-2	Antenna R.F. Transformer Secondary	
L-3	Second R.F. Transformer Primary	R-6472
L-4	Second R.F. Transformer Secondary	
L-5	Oscillator Plate Coil	R-6471
L-6	Oscillator Grid Coil	
L-7	First I.F. Transformer Primary	R-3636
L-8	First I.F. Transformer Secondary	
L-9	Second I.F. Transformer Primary	R-3637
L-10	Second I.F. Transformer Secondary	
L-11	Voice Coil and Diaphragm Assembly	R-8987
L-12	Field Coil (Resistance 4.4 ohms) and Field-A.	R-7608
L-13	R.F. Choke (wire turns only; no part number)	
L-14	R.F. Choke (part of Filter Block)	R-7600
L-15	Vibrator Energising Coil	R-6479
L-16	Filter Reactor (part of Filter Block)	R-7600
L-17	R.F. Choke Coil	R-3621
T-1	Interstage Audio	R-6488
T-2	Audio Output	R-3688
T-3	Power	R-9430
F-1	20 amp. Fuse	R-3646
P-1	Pilot Lamp, 6 volts	K-1024-2
S-	Tone Control Switch	R-6490
S-2	Battery Switch and Key	Part of R-5
S-1	Armature Assembly (including spring & contact)	R-6478
S-4	Contact & Spring (Secondary rectifier)	R-3613
S-5	Contact & Spring (Secondary rectifier)	R-3613
S-6	Contact & Spring (Primary circuit)	R-3613
S-7	Contact & Spring (Primary circuit)	R-3613
S-8	Contact & Spring (Buzzer circuit)	R-3611

REALIGNING DETAILS

R.F. Adjustments:—

(a) Connect output meter to plate and screen terminals of type 89 output tube.
(b) Set external oscillator to 1400 K.C. and connect to antenna lead of radio receiver and ground shield of oscillator lead to chassis of receiver.
(c) Set radio receiver dial to 140 and radio receiver volume control to maximum, and oscillator output to minimum so that only a small deflection is shown on meter.
(d) Align C-4, C-5, and C-6.
(e) Recheck adjustments second time as a slight interlocking exists between them.

I.F. Adjustments:—

(a) Remove rear cover.
(b) Connect output lead of external oscillator to control grid terminal of type 6B7 second detector tube, and replace rear cover. Connect shield of oscillator output lead to chassis and ground set antenna lead.
(c) Set external oscillator to 175 K.C.
(d) Connect output meter to plate and srceen prongs of type 89 output tube or shunt across voice coil of loudspeaker.
(e) Turn volume to maximum and reduce external oscillator output until only small deflection is obtained on meter.
(f) Align C-7 and C-8, adjusting for maximum output.

NOTE:—At the time I.F. adjustments are made, it is advisable to realign the R.F. trimmers. The reverse of this does not necessarily apply however.

SOCKET VOLTAGE AND CURRENT READINGS

	Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Plate Current M.A.	Heater Volts
Type 78—R.F. Amplifier	2.7	92	253	7.0	6.06
Type 6A7—First Detector & Oscillator	3.7	92	253	12.0	6.06
	0	..	253	Total	
Type 6B7—Second Detector	3.2	92	236	6.0	6.06
Type 89—Power Amplifier	26.5	230	217	27.5	6.06

Battery pressure, 6.3 volts; Total battery drain, 5.5 amps; Undistorted output, 2.0 watts; Loudspeaker field current, 1.35 amperes; Maximum output of D.C. voltage from rectifier, 250 volts; Total plate current, 53 M.A.

SERVICE DATA FOR VIBRATOR UNIT

The vibrator unit used in this receiver is of excellent design and sturdy construction. It functions as a combined A.C. generator and mechanical rectifier. Principally it consists of a transformer with a primary and secondary coil which are center tapped. By connecting the outside of each winding to the contacts of the vibrator and using the arms and centre taps of the windings as sources of input and output voltage, a combined generating and rectifying action is obtained.

When the switch is turned "on" the vibrator makes and breaks contact at the centre contact. This constitutes the driving action of the unit, and is in no way connected with the other circuits. The primary vibrator functions to connect the input low voltage current first across one-half and then across the other half of the primary of the transformer. This results in a pulsating direct current applied to the primary in an alternating direction. The result is an A.C. voltage emanating from the secondary of the transformer; as the transformer has a step-up ratio, the A.C. secondary voltage is considerably greater than the primary. The secondary vibrator functions in a similar manner as that on the primary side, so that by reversing the alternations applied to the load, a pulsating D.C. is obtained. After filtering, this is used as plate and grid supply to all tubes

(3) Check alignment of armature support. Armature should be parallel with pole pieces and supports straight. Avoid a bow on shaft.

(4) Clearance between edge of armature and pole pieces should be tested with five mil. paper strip. Make adjustment by loosening core retaining nuts and adjusting position of coil.

(5) At normal position of armature, tension should be the same on both sides with armature touching lightly against front contact. Contacts 6-1 and 2-7 should just be making as centre contacts 9-4 are breaking. If necessary, make readjustment by means of hex. head adjusting screw and lock nut, indicated at "11" on Fig. 2.

(6) A normal condition of sparking is indicated when the sparking at contacts 6-1 and 3-8 is equal. Similarly contacts 7-2 and 10-5 should show equal sparking 6-1 or 3-8 will not adjust to equal 7-2 or 10-5 however, and no attempt should be made to obtain such a condition; each pair is adjusted independently

The following information on vibrator adjustment should be carefully noted and preserved for future reference.

(1) Make sure that coil is tight on core. If it is not, tie string around end of core. Tighten all retaining screws holding contact armature shafts on basework. The nuts holding the core to framework should also be tight. Do not loosen or tighten adjustment screw or locknut once adjustment has been set.

(2) Stationary contacts must be tight against bakelite. If tightening screw does not remedy, bend until brought lightly against bakelite. Referring to left-hand sketch, Fig. 2, the following spring tensions are correct for the three contacts and two gaps.

As indicated on spring type balance scales reading 0-100 grams, which can be purchased at any hardware store:

(a) The two left side stationary contacts (6 and 8) and the two right side stationary contacts (7 and 10) should make contact at 33 grams and should open up at 47 grams.

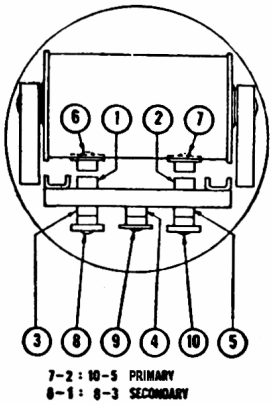
(b) The stationary centre contact (number 9) should make contact at 50 grams and open up at 70 grams.

(7) (a) Excessive sparking at all contacts which reduces after a minute of operation indicates low value of condensers C-29 and C-30.

(b) Normal sparking when turned on, increasing after one minute operation, indicates excessive value of condensers C-29 and C-30.

(c) Either condition can be remedied by replacing vibrator base containing these condensers.

(8) To reduce contact sparking for instance, at contacts 1 and 6: Bend armature spring as indicated on right hand sketch, Fig. 2, away from "6" and towards "8." If bend is insufficient, negligeable change will be obtained. If bend is excessive, sparking will be transferred from 6-1 to 8-3. The same method should be applied to any pair of contacts. Only a slight bend will be necessary, and that of such a degree that little change, if any, in the position of the armature contacts can be seen.



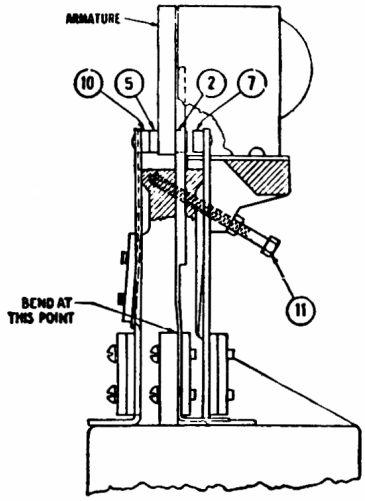


Figure 2.