MODELS A-4B & A-4CB

Four-Tube Battery Receivers

ELECTRICAL SPECIFICATIONS

Type and number of Radiotrons	1 G.E.-1A6, 1 G.E.-34, 1 G.E.-32, 1 G.E.-33—Total, 4
Total "A" Battery Current	0.45 Ampere
Total "B" Battery Current	15 M.A.
Batteries Required: "A"	Eveready Air Cell A-600 or 2-volt storage cell
"B"	Two 45-volt "B" batteries
Tuning Frequency Range	540 K.C.–1600 K.C.
Maximum Undistorted Output	160 Milliwatts
Line-up Frequencies	I. F., 460 K. C. Osc.–Det. 1400 K. C. and 600 K. C.

This four tube battery operated superheterodyne receiver incorporates the latest refinements of receiver construction that permits excellent and economical operation. Outstanding features include a permanent magnet type loudspeaker, Class "A" output stage and high I. F. frequency for reducing image frequency response. The chassis is characterized by compact construction and accessibility of parts. Suitable electrical protection of tubes is provided by placing a fuse in "B" battery lead.

DESCRIPTION OF ELECTRICAL CIRCUIT

The circuit is of the superheterodyne type and consists of a combined oscillator-detector stage, an I. F. amplifying stage, a second detector, and a class "A" output stage. A two-pole switch opens the battery leads at the off position. Figure 1 shows the schematic wiring diagram, while Figure 2, shows the chassis wiring. The signal enters the receiver through the antenna transformer and is applied through a tuned circuit to the grid of the first detector. Combined with the signal is the local oscillator signal, which is at a constant frequency difference (460 K. C. higher) at all positions of the dial. The combined signals after passing through the first detector produce the I. F. signal. The G.E.-1A6 is the combined detector and oscillator.

The I. F. amplifier consists of two transformers having four circuits, two of which are tuned by means of trimmer capacitors. The tube used is a G.E.-34, which is a super control screen grid amplifying tube of the two-volt variety. The high I. F. frequency (460 K. C.) is used to reduce the image frequency response which would occur if a lower I. F. frequency were used in a receiver not including an R. F. stage. The output of the I. F. amplifier is applied to the second detector, a G.E.-32 which extracts the A. F. component of the I. F. signal and applies it to the grid of the output stage, which is a G.E.-33. Grid leak detection is used in order to obtain maximum sensitivity.

The A. F. component thus extracted from the I. F. signal, is applied to the grid of the output stage, which is a G.E.-33, by means of a 1:1 ratio interstage transformer. The output of the G.E.-33 is directly connected to a high impedance magnetic speaker.

The output tube is operated with a 9.5 grid bias, obtained through a drop in a resistor in the negative "B" lead. The grid voltages on the R. F. and I. F. stages are supplied through the drop in the same resistor, which is a potentiometer that varies the grid bias on these tubes, and is the volume control of the set.

This method of obtaining the grid bias permits the "B" batteries to remain in operation longer than they normally would, if bias were supplied by means of "C" batteries.

SERVICE DATA

(1) Important

Always disconnect the batteries before attempting to remove the chassis from the cabinet. Always turn the operating switch "off" before changing tubes, batteries or fuses.

(2) Line-up Capacitor Adjustments

Line-up capacitors are provided in the first detector, oscillator and intermediate 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), and a non-metallic screw driver, such as alignment wrench (Stock No. 4160) are required for properly aligning this receiver. Refer to Fig. 4, for the location of the line-up capacitors.

I. F. Adjustments

Two transformers comprising four circuits, two of which have trimmer capacitors, are used in the I. F. amplifier. Proceed as follows:

(a) Short circuit the antenna and ground terminals, and connect the output oscillator between the control grid cap of the first detector (Type-1A6) and ground. Place the oscillator in operation at 460 K. C. and adjust its output and the receiver volume control until an appreciable output is noted.

(b) Adjust the secondary and then the primary of the first I. F. transformer (see Fig. 4) until the maximum signal is obtained.

This completes the I. F. adjustments. It is good practice to always follow the I. F. adjustments with the detector and oscillator adjustments, as there is an interlocking of adjustments that always occurs.

Detector-Oscillator Adjustments

The two gang capacitor trimmer screws are accessible at the top of the chassis. The series (600 K. C.) trimmer is accessible from the rear. Proceed as follows:

(a) Connect the oscillator between the antenna and ground terminals of the receiver.

(b) Place the oscillator in operation at 1400 K. C., set the dial at 140 and adjust the oscillator output and receiver volume control until an appreciable signal is reached.

(c) Adjust each trimmer on the gang capacitor until maximum signal is obtained.

(d) Set the oscillator at 600 K. C. and tune in the signal on the receiver. Then adjust the series trimmer, located on the rear of the chassis, until maximum output is obtained. While making this adjustment, rock the tuning capacitor back and forth through the signal. Then again check the adjustment in (b).

(3) Voltage Readings

The following voltages are those at the tube sockets while the receiver is in operating condition. No allowance has been made for current drawn by the meter and if low resistance meters are used, such allowances must be made.

RADIOTRON SOCKET VOLTAGES

90-Volt "B" Supply—No Signal—Maximum Volume Control

Radiotron No.		Control Grid to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Plate M. A.	Filament Volts, D. C.
Type-1A6	1st Det.	*3.0	60	80	1.8	2.0
	Osc.	—	—	80	1.3	
Type-34—I. F.		*3.0	60	80	2.4	2.0
Type-32—2nd Det.		0	*35	78	1.0	2.0
Type-33—Output		9.5	80	78	4.0	2.0

*These voltages cannot be measured with ordinary voltmeter, as they are obtained through a high resistance.

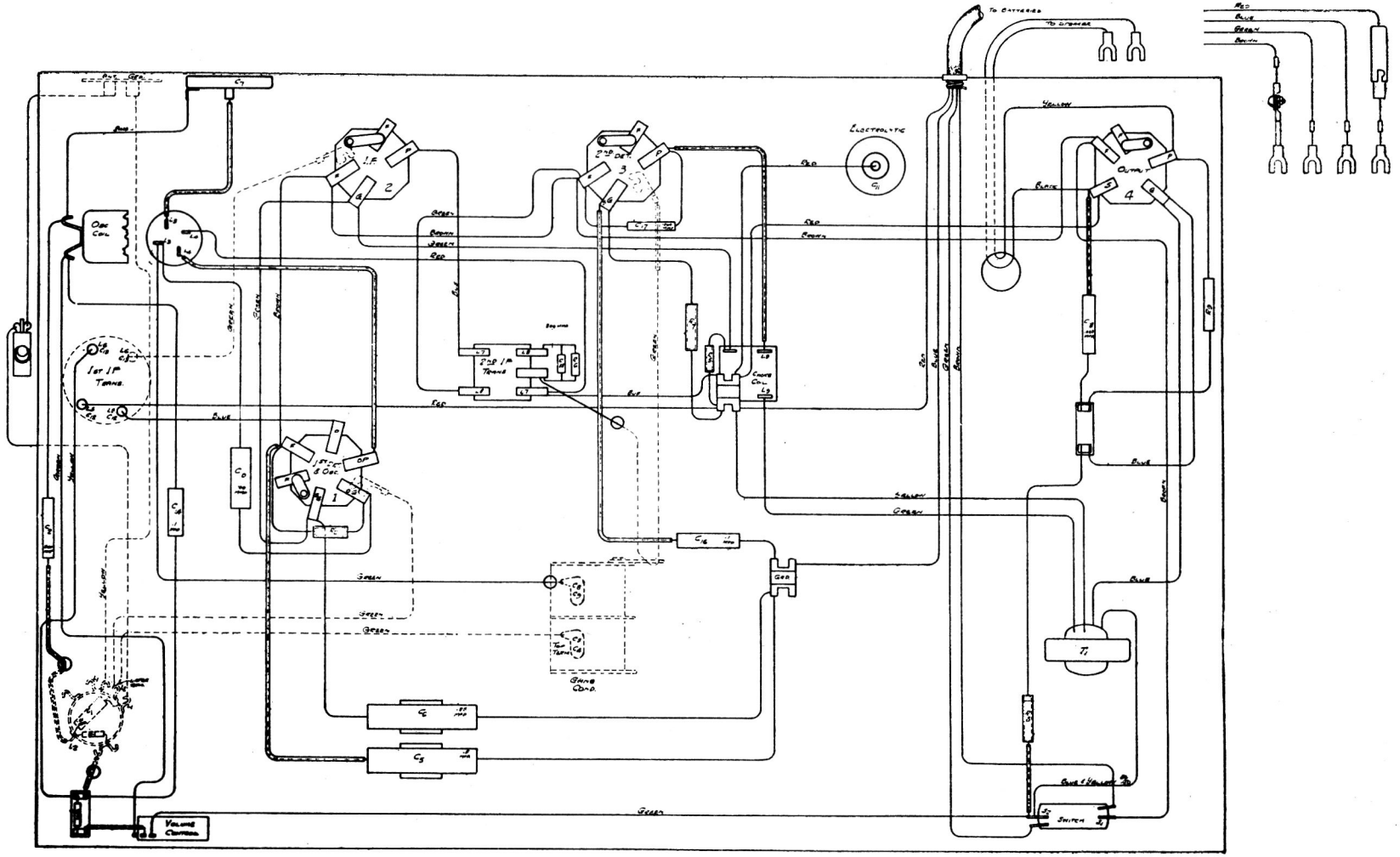

Figure 2—Chassis Wiring Diagram

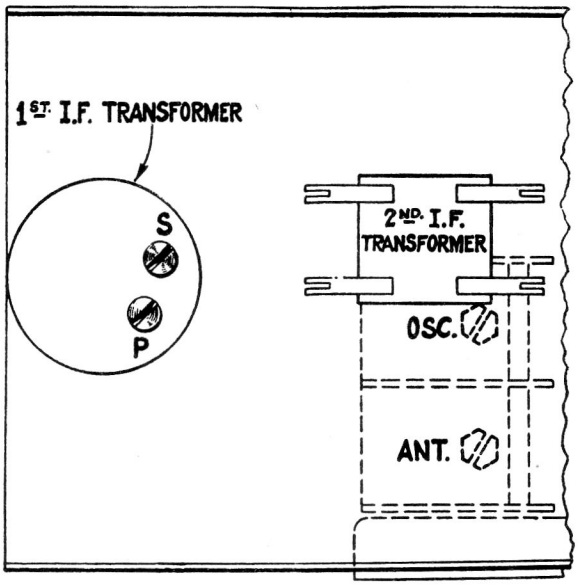

Figure 3—Location of Line-up Capacitors

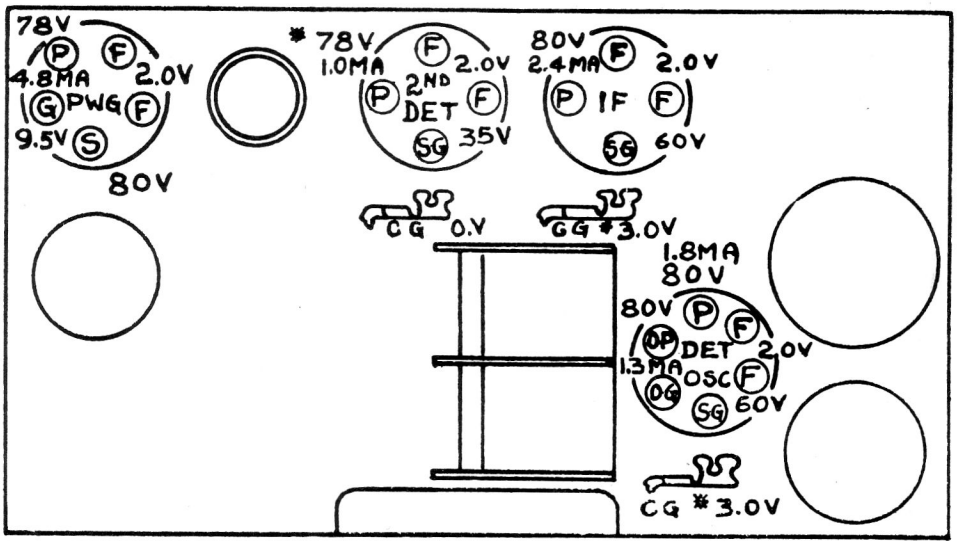

Figure 4—Socket Voltage Readings

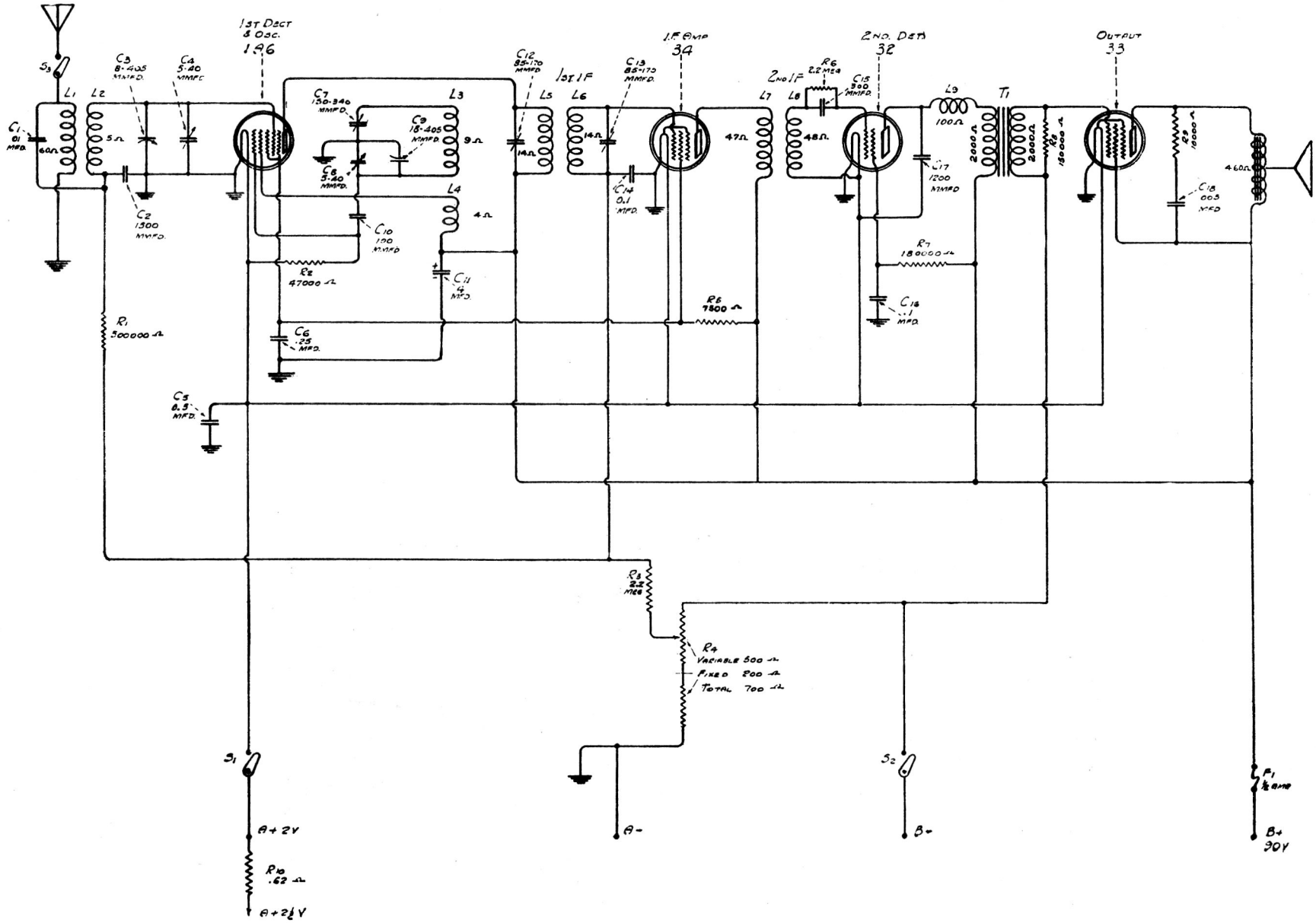

Figure 1—Schematic Circuit Diagram

REPLACEMENT PARTS—Models A4B & A4CB

Key No.	Stock No.	DESCRIPTION
		RECEIVER ASSEMBLIES
R-2	23,432	Resistor — 47,000 ohms — Carbon type—1/4 watt
R-3, R-6	S-1536	Resistor — 2.2 megohm — Carbon type—1/4 watt
R-5	S-1537	Resistor — 7,500 ohms — Carbon type—1/2 watt
R-7	S-1538	Resistor — 180,000 ohms—Carbon type—1/4 watt
R-8	5027	Resistor — 150,000 ohms—Carbon type—1/4 watt
R-9	3078	Resistor — 10,000 ohms — Carbon type—1/2 watt
R-10	S-1520	Resistor—.62 ohms—Flexible type
R-4	S-1521	Volume Control
C-2	4354	Capacitor—1500 mmfd
C-3, C-4, C-8, C-9	6660	Condenser—2 gang variable tuning condensers
C-5	6604	Capacitor—0.5 mfd
C-6	6648	Capacitor—0.25 mfd
C-7	4000	Capacitor — Adjustable trimmer capacitor—150-340 mmfd
C-10	4353	Capacitor—100 mmfd
C-11	S-1533	Capacitor — Dry electrolytic 4 mfd
C-15	S-1522	Capacitor—300 mmfd
C-16	4791	Capacitor—0.1 mfd
C-17	3460	Capacitor—1200 mmfd
C-18	4868	Capacitor—0.005 mfd
L-5, L-6, C-12, C-13	6993	Transformer — First intermediate frequency transformer
L-7, L-8	S-1523	Transformer—Second intermediate frequency transformer
T-1	6488	Transformer — Interstage transformer
L-1, L-2, C-1, R-1	6992	Coil—Antenna coil
L-3, L-4	6664	Coil—Oscillator coil
L-9	4343	Coil—Choke coil
	4232	Socket—6 contact tube socket for 1st detector and oscillator
	3859	Socket—4 contact tube socket for intermediate frequency and second detector
	S-1524	Socket—5 contact tube socket for output
	4104	Shield — First detector and oscillator tube shield
	4351	Shield—I. F. Radiotron socket-shield
	3056	Shield—2nd-detector tube shield
	6665	Shield—Oscillator coil shield and bracket
	3584	Ring—Oscillator coil retaining ring ring—Package of 2
	S-1429	Cap—Contact cap—Package of 2
	4686	Terminal Strip—Engraved "Ant.-Gnd."
		TABLE MODEL REPRODUCER ASSEMBLIES
	S-1530	Cone—Reproducer Cone
	S-1531	Coil—Reproducer Coil
	S-1535	Reproducer Assembly complete
		CONSOLE MODEL REPRODUCER ASSEMBLIES
	S-1532	Cone—Reproducer cone
	S-1531	Coil—Reproducer coil
	S-1534	Reproducer assembly complete
		MISCELLANEOUS ASSEMBLIES
	4075	Knob—Tuning knob—Package of 2
	S-1525	Knob—"On and Off" Knob
	4449	Knob — Volume control knob — Package of 2
S-1, S-2	S-1526	Switch—Operating switch
S-3	3224	Switch—Long and short Antenna
	2737	Escutcheon — Operating switch escutcheon—Package of two
	S-1528	Dial—Station selector dial
	S-1529	Cable assembly—For Table Model
F-1	3748	Fuse—0.5 ampere—Package of 2
	4284	Spring—Fuse connector spring—Package of 2
	4285	Washer—Fuse connector insulating washer—Package of 10
	4286	Ferrule — Fuse connector ferrule and bushing—Package of 4
	4288	Cap—Fuse connector cap—Package of 4
	4289	Body — Fuse connector body — Package of 4
	4290	Insulator Fuse—Connector insulator—Package of 5
	6516	Connector—Fuse connector complete