

Radiola Super-VIII

INTRODUCTION

RADIOLA SUPER-VIII is a radio broadcast receiving instrument, utilizing the Super-Heterodyne principle which provides unusual simplicity of operation, selectivity and sensitivity. The cabinet contains the operating mechanism, a loud speaker, and the battery equipment, as well as a loop antenna, making the set *completely self-contained*. It is designed for reception over the broadcast wavelength band 220 to 550 meters (approximately 550 to 1350 kilocycles).

EQUIPMENT

Under the above name there is included the following apparatus:

- 1 Radiola Super-VIII, as described
- 6 Radiotrons, Model UV-199

BATTERIES REQUIRED

In addition, there are required the following "A," "B" and "C" batteries which may be obtained from the dealer:

A—Six standard dry cells, 1½ volts each, such as those listed below, for lighting the filaments. These are connected in two groups, each of three cells in series, both groups being connected in parallel.

6 Eveready Dry Cell Radio "A" Batteries.....	2½ by 6½ in.	or
6 Manhattan Red Seal Dry Cells.....	2½ by 6½ in.	or
6 Burgess No. 6 Dry Cells.....	2½ by 6 in.	or
6 Burgess Super Six Dry Cells.....	2½ by 6 in.	or
6 Ray-O-Vac No. 1211 Dry Cells.....	2½ by 6½ in.	or
6 Ace No. 6 Dry Cells.....	2½ by 6½ in.	or
6 Columbia Ignitor No. 6 Dry Cells.....	2½ by 6½ in.	

OR EQUIVALENT*

B—Four 22½-volt plate batteries connected in series, such as:

4 Eveready No. 766 Plate Batteries.....	6½ by 4 by 3 in.	or
4 Burgess No. 2156 Plate Batteries.....	6½ by 4 by 3 in.	or
4 Burgess No. 2158 Plate Batteries.....	6½ by 4 by 3 in.	or
4 Ray-O-Vac No. 2151 Plate Batteries.....	6½ by 4 by 3 in.	or
4 Kwik-Lite No. 225 Plate Batteries.....	6½ by 4 by 3 in.	or
4 Ace No. 115 Plate Batteries.....	6½ by 4 by 3 in.	or
4 Yale No. 1512-V Plate Batteries.....	6½ by 4 by 3 in.	or
4 Bright Star No. 15-90 Plate Batteries.....	6½ by 4 by 3 in.	or
4 Novo No. 268 Plate Batteries.....	6½ by 4 by 3 in.	

OR EQUIVALENT

*A 4-volt storage battery, such as Philco Type UD-44, may be used instead of the six dry cells, if desired.

Two 45-volt plate batteries may be used instead of four 22½-volt blocks if desired, such as:

2 Eveready No. 767 Plate Batteries (45 Volts).....	8 by 6½ by 3 in.	or
2 Burgess No. 2306 Plate Batteries (45 Volts).....	7¾ by 6½ by 3 in.	or
2 Ray-O-Vac No. 2301 Plate Batteries (45 Volts).....	8½ by 6½ by 3¼ in.	or
2 Novo No. 276 Plate Batteries (45 Volts).....	8 by 6½ by 3 in.	or
2 Kwik-Lite No. 245 Plate Batteries (45 Volts).....	8¾ by 6½ by 3 in.	or
2 Yale No. 3045-V Plate Batteries (45 Volts).....	8 by 6½ by 3 in.	

OR EQUIVALENT

C—One 4½-volt Negative Grid Bias or "C" Battery, such as:

1 Eveready No. 771 Negative Grid Bias Battery.....	4 by 3 by 1¾ in.	or
1 Ray-O-Lite No. 251-R Negative Grid Bias Battery.....	4 by 3 by 1¾ in.	or
1 Burgess No. 2370 Negative Grid Bias Battery.....	4 by 3 by 1¾ in.	or
1 Yale No. 313 Negative Grid Bias Battery.....	4 by 3 by 1¾ in.	or
1 Bright Star No. B-34-17 Negative Grid Bias Battery.....	4 by 3 by 1¾ in.	or
1 Novo No. 288 Negative Grid Bias Battery.....	4 by 3 by 1¾ in.	

OR EQUIVALENT

INSTALLATION

Installing Batteries. Access to the battery rack is secured by removing the two screws B (Fig. 1) (found at the center on the left- and right-hand sides of the upper panel A, on the rear of the cabinet)—which releases the panel. Place two fingers in the thumb holes C, raise the rear panel, pushing it farther into the slot in the top of the cabinet, then pull on the panel releasing the lower end, which permits the panel to drop down free from the set.

In the middle and top compartments will be found six UV-199 Radiotrons, two long red jumper connectors, and four short yellow connectors. Remove these from the rack and proceed with the battery installation.

(A) Place the six dry cells in the lower compartment, three in the back row and three in the front row, taking care that the outer binding posts of all cells point in the same direction. Connect the batteries in two parallel groups, each of three cells in series, as shown in Fig. 1, using the four short yellow connectors E.

Before connecting these batteries to the set, make certain that the desk fall G (Fig. 2 and 3) in the front of the set is closed.* Connect the lead marked "+A" (yellow), coming through the hole in the left-hand side of the rack, to the two center binding posts (not yet connected), and connect the other lead marked "-A" (black with yellow tracer) to the two outside binding posts.

*After the set is in operation, closing the desk fall G shuts off the operation of the set completely. When the user has finished with the set, he need not turn any of the other controls, but merely close the desk fall.

(B) Locate two each of the "B" or plate batteries in both the middle and upper compartments; or if 45-volt blocks are used, place one in each compartment.

Connect the two batteries in the upper compartment in series by using one of the long red jumper connectors D, fastening one end onto the "+22½ V." terminal of one battery, and the other end onto the "-" terminal of the other battery. (Should the large size 45-volt blocks be used, the two jumper connectors will not be needed.) Do similarly with the two batteries in the middle compartment.

Connect these batteries to the set, fastening the lead marked "+B" (red in upper compartment, maroon in middle) onto the battery terminal marked "+22½ V.", not yet connected (or onto

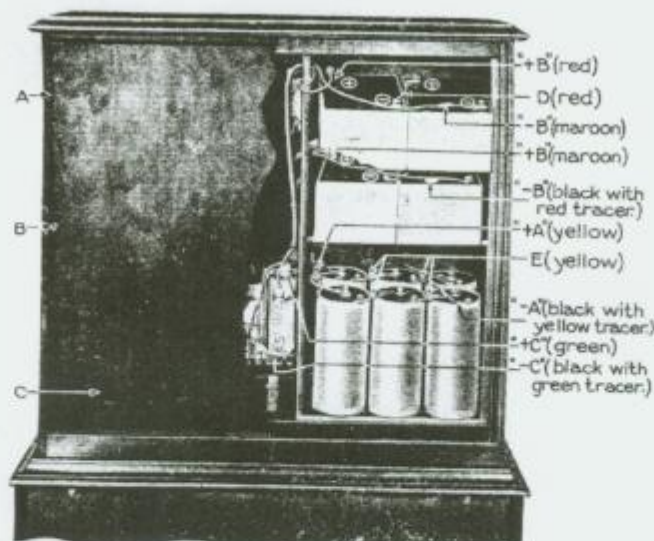


Fig. 1. Rear View, Showing Battery Connections

- A—Upper Rear Panel
- B—Screws Holding Upper Rear Panel
- C—Thumb-hole in Upper Rear Panel
- D—Two "B" Battery Connectors (red)
- E—Four "A" Battery Connectors (yellow)

the "+45 V." terminal of the 45-volt battery, if one is used). Connect the other lead marked "-B" (maroon in upper compartment, black with red tracer in middle) onto the "-" terminal of the other battery.

(C) Place the "C" or grid bias battery in the compartment built on the left side of the battery rack, with the "+" binding post uppermost. Connect the lead marked "+C" (green) to the "+" terminal of the battery; and connect the other lead marked "-C" (black with green tracer) to the "-4½ V." terminal of the battery.

Location of Set. With the batteries installed and connected, replace the rear panel. Radiola Super-VIII may now be located in any part of the home, convenient and desirable to its owner. It need not be located in any particular place or turned in any particular direction with respect to the room or to the received signal.

Placing Radiotrons in Sockets. Radiola Super-VIII utilizes six Radiotrons, Model UV-199, which should be handled with due care.

After pulling the desk fall G down to the horizontal (Fig. 2), the radio panel F should be pulled forward to the half open position shown in the figure, allowing it to rest against the stay joint J.

Before inserting the Radiotrons, turn the "BATTERY SETTING" knob to "OFF." Remove the six Radiotrons from their individual cartons. Insert one in each of the six tube sockets H, by placing it in the socket, turning the tube until the pin in the base drops into the slot, and then turning slightly to the right.

Swing the panel back in place carefully, noting that there is no binding of the gears just before the panel goes in place. Should the gears bind at this point, slowly rotate the "LOOP" knob until the gears mesh and then let the panel drop back.

OPERATION

Filaments. Turn the "VOLUME CONTROL" knob U (Fig. 3) clockwise to 100. Turn the "BATTERY SETTING" knob K clockwise up to the arrow mark near 47 on the dial. **WITH FRESH BATTERIES, DO NOT TURN THE POINTER PAST THAT POINT. THIS IS EXTREMELY IMPORTANT,** as you will otherwise shorten the useful life of the Radiotrons and batteries, and little will be gained in ease of tuning, signal strength or otherwise. As the batteries grow older with use, this should be *gradually* advanced from week to week toward "100." Push in the amplifier switch S, which gives the full amplification of the receiver.

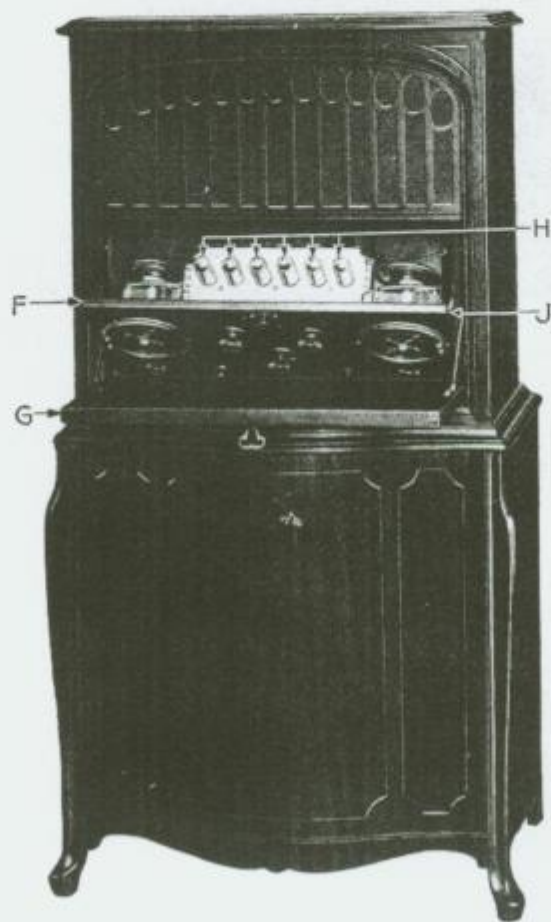


Fig. 2. Front View, Slowing Radiotrons in Place

- F—Control Panel
- G—Desk Fall
- H—Six Radiotrons UV-199 in Sockets
- J—Stay Joint

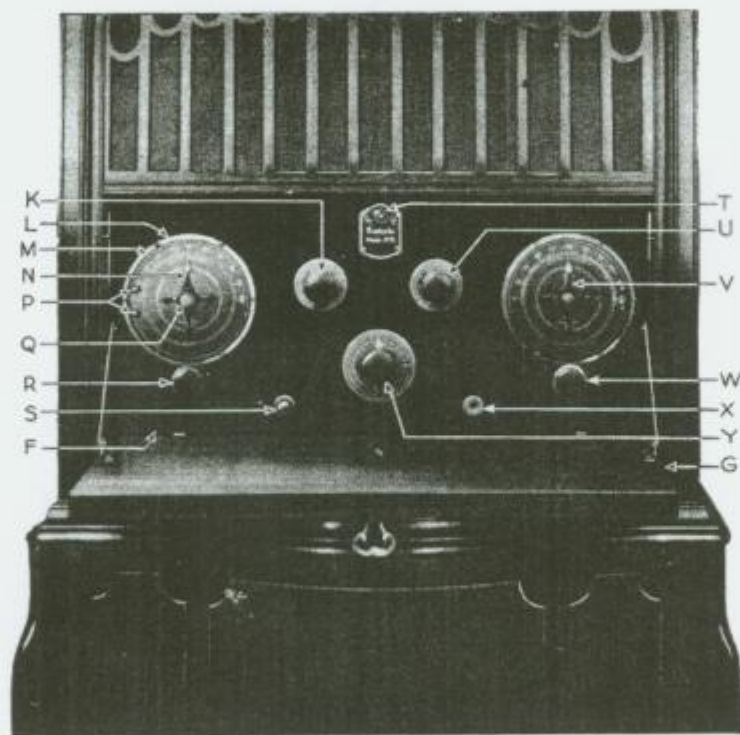


Fig. 3. Front View of Control Panel

- F—Control Panel
- G—Desk Fall
- K—"BATTERY SETTING" Knob
- L—Retaining Ring for "STATION SELECTOR" Dial
- M—Clamp Wire for "STATION SELECTOR" Dial
- N—"STATION SELECTOR I" Pointer
- P—Knobs on Clamp Wire
- Q—Thumb Nut for Pointer
- R—"STATION SELECTOR I" Knob
- S—Amplifier Switch
- T—Control Panel Knob
- U—"VOLUME CONTROL" Knob
- V—"STATION SELECTOR II" Pointer
- W—"STATION SELECTOR II" Knob
- X—Telephone Jack
- Y—"LOOP" Knob

Tuning. The tuning of Radiola Super-VIII involves only the manipulation of the two "STATION SELECTOR" knobs R and W—a simple operation if the principle described below becomes thoroughly understood.

The two gold-tipped pointers have approximately the same setting, i.e., if one is set at 10 or 30, etc., the other is at or near 10 or 30, etc.

When searching for stations, the settings of which are not known, proceed as follows: Set "STATION SELECTOR 1" gold-tipped pointer N at, say, 10 (referring to the metal dial scale under the paper scale). Move "STATION SELECTOR 2" gold-tipped pointer V slowly over the scale near 10, say, from 5 to 15. If no signals are heard, there is no station working on that wavelength. Then set "STATION SELECTOR 1" pointer at, say, 12, and slowly move "STATION SELECTOR 2" from about 7 to 17. If again no signals are heard, set "STATION SELECTOR 1" gold-tipped pointer at, say, 14, and move "STATION SELECTOR 2" slowly from about 9 to 19. If still no signals, repeat this process increasing the setting of "STATION SELECTOR 1" in small steps until the whole scale has been covered. It will be noted after the first few trials that when "STATION SELECTORS 1 and 2" are in resonance, a slight breathing sound is heard indicating that the set is working properly and in resonance.

After hearing a signal, carefully adjust both "STATION SELECTORS 1 and 2" for the clearest reproduction. To decrease the volume of signal, turn the "VOLUME CONTROL" knob U towards the "SOFT" position.

If no stations are heard, the "LOOP" knob Y should be turned 90 degrees from where it was during the preceding adjustments, and the tuning process just described should be repeated.

Control of Volume. As Radiola Super-VIII is a very sensitive receiver, it is often found advisable to reduce the loud speaker volume. This may be accomplished by employing one or all of the methods described below.

- (1) Turn the "VOLUME CONTROL" knob U away from "100" toward "SOFT."
- (2) Pull out the amplifier switch S.
- (3) Turn the "LOOP" knob Y.

Interference. Signals from an interfering radio station may be eliminated or at least minimized by either of the following methods:

- (1) Turn "STATION SELECTOR 2" pointer V either to the right or left, by approximately $\frac{3}{4}$ inch to 1 inch, to find another position of this control, where the desired station will be again heard. The setting of "STATION SELECTOR 2" nearer the left end of the scale is technically called the "lower wavelength peak," and the other the "upper wavelength peak." Two settings of this nature will be found for all broadcast stations, and the separation between them becomes greater and greater for the higher end of the scale, i.e., nearer the right-hand end. It is recommended that "STATION SELECTOR 2" be consistently set on the "lower peak" in the usual manipulation of the set. When interference is encountered, shift to the upper peak, and use whichever one at which minimum interference occurs.

There are certain wavelengths (greater than 440 meters) where four tuning positions, instead of the usual two positions, can be found on "STATION SELECTOR 2," when the receiver is located close to a powerful broadcasting station. This does not

however, interfere with reception either from the local station or from a distant one. In the case of the local station, the user should, under such circumstances, turn "STATION SELECTOR 2" to either of the two positions which correspond most nearly to the setting of "STATION SELECTOR 1" for the local station. In the case of the distant station, shift "STATION SELECTOR 2" to the other "wavelength peak" either "upper" or "lower," as the case may be, where interference (if present) will probably not be encountered.

- (2) Turn the "LOOP" knob Y on the panel from zero toward "360." For every transmitting station, there are two positions at which the signal strength will rise to a maximum, and two others at right angles where it is at a minimum. Set the "LOOP" knob where best results are secured, trying to locate the position where the interference does not come in, but the desired signals do.

GENERAL INFORMATION

Paper Dials. Four paper dials for each of the "STATION SELECTORS" will be found with the set, three each in the envelope for the Instruction Book, and one each in place on the panel. To put another "STATION SELECTOR 1" dial in place, grasp pointer N with the left hand, turn and remove the knurled nut Q which holds it in place. Grasp the two knobs P on the end of the clamp wire M, pinch the knobs together, and pull the clamp wire free from its retaining ring L. Remove the old dial, and place a "STATION SELECTOR 1" dial on the panel, taking care to locate properly the central hole and the notch on the left-hand side. Replace clamp wire M, pointer N, and knurled nut Q in the order mentioned.

Follow the same process for "STATION SELECTOR 2" dial.

Calibration of Set. The paper dials provide a means of recording the settings of the "SELECTORS" for the various stations. Once recorded, the pointers may be reset at any later time to these positions, and if the station is broadcasting, it will be heard. After a station is tuned in as above, mark the positions of one of the tips of each of the "STATION SELECTORS" as well as the call letters of the station. It is suggested that only the "lower peak" of "STATION SELECTOR 2" be recorded.

Note that in a few places throughout the country, particularly in the metropolitan areas, there may be two or more stations assigned to the same wavelength or frequency, but apportioned different hours of the day so that they will not be "on the air" at the same time. For example, Philadelphia, Pa., has two stations, WOO and WIP, working on the same wavelength, but dividing time. Other examples will be found in the "Partial List of Class 'B' Broadcasting Stations" in the rear pages of this booklet. Under such conditions, the "STATION SELECTOR" settings should be the same for both stations.

Each of the "STATION SELECTORS" is provided with four pointers, in order that stations of nearly the same setting may be recorded on the dials without crowding the markings. It is suggested that the gold-tipped pointers be reserved for wavelength or frequency markings, and that the station settings be recorded on the three remaining pointers in the following order: long black pointer, right short pointer and left short pointer. Mark as many stations as possible on the long black pointer. When a new station is tuned in, quite close to one already recorded, then use the short pointers for the markings.

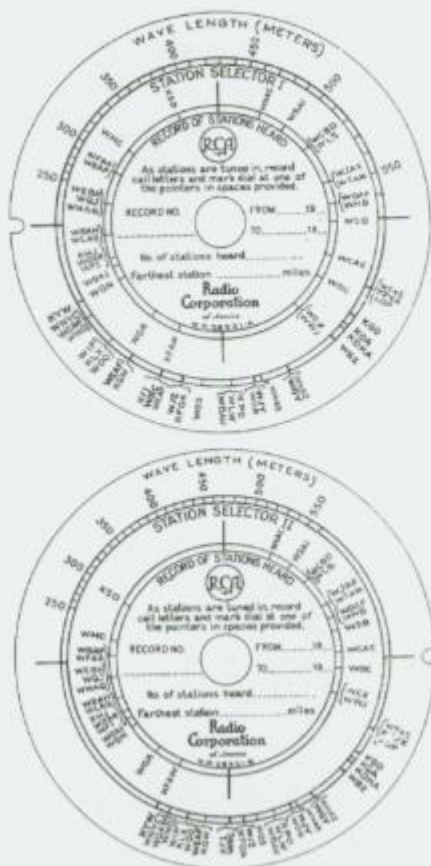


Fig. 4. "STATION SELECTOR" Dials, Showing Approximate Markings of Principal Broadcasting Stations

The only precaution to be observed when making these markings is to see that the set is not located near any large metal objects, such as a steam radiator, or that it is not near any aeri-als or electric wiring. Such positions may cause changes in the settings of "STATION SELECTOR I."

In order to facilitate the tuning process, and to give an approximate idea of where stations should come in, Fig. 4 shows a reproduction of both dials, with the average markings of the principal broadcasting stations, marked in accordance with the method described.

Batteries and Radiotrons. The only parts ordinarily needing replacement will be the batteries and Radiotrons.

It is important to adjust the "BATTERY SETTING" and "VOLUME CONTROL" knobs properly. With fresh batteries, turn the "BATTERY SETTING" knob up to the arrow on the dial, but no farther. Turn the "VOLUME CONTROL" to 100. Then search for stations as described on page 8. Having located a station, turn the "VOLUME CONTROL" knob to the left, if it is desired to decrease the volume of the signal.

The accuracy of the setting of the filament voltage may be checked by a good filament voltmeter (of the high resistance type). Turn the "VOLUME CONTROL" to 100. Turn the "BATTERY SETTING" to the arrow. Touch the positive (+) voltmeter terminal to the case of the tube socket unit which holds the tube sockets H, and touch the negative (-) terminal to the movable blade of the "VOLUME CONTROL" on the rear of the panel. If the voltmeter reads greater or less than 3 volts, adjust the "BATTERY SETTING" knob until a reading of 3 volts is obtained.

With the filaments burning too brightly ("BATTERY SETTING" knob too close to 100), the active material in the filaments is rapidly driven off, and the useful life of the Radiotrons and batteries is shortened. Should this occur, the Radiotron life may be restored, provided they have not been too seriously abused.

This process of "reactivation," as it is called, may be accomplished by turning the "VOLUME CONTROL" knob to 100, and the "BATTERY SETTING" knob to approximately 47 (or to 3 volts), and by removing either one of the two "B" battery connectors D in the upper or middle battery compartments which are shown in Fig. 1. Keep the Radiotrons lighted for about thirty minutes, replace the connector and then try tuning.

Maintenance. Very little maintenance will be required on Radiola Super-VIII, outside of an occasional oiling of a few of the parts. The oiling operation is important, and should be done about once every six months. To oil the moving parts, turn both "STATION SELECTOR" pointers as far to the right as possible, and open the panel of the set half way as in Fig. 2. Then place one drop of good grade oil, such as typewriter oil, on each of the following parts of both "STATION SELECTORS":

- (1) On the front and rear bearings of the shafts, where the shafts pass through the black moulded sub-panels.
- (2) On the bushings in the panel which hold the "SELECTOR" knobs.
- (3) On the universal or ball joint just back of the "SELECTOR" knob shaft.
- (4) On the spring bearing of the slanting knob shaft (which spring bearing presses against the black insulation collar).

Polishing the Exterior. If finger marks result from handling the cabinet, a little rubbing or polishing with furniture polish will restore the finish. The polish chosen should be of a grade which will leave the cabinet free from an oily appearance. Use a soft piece of cotton cloth or cheesecloth, free from lint. Saturate the rag lightly with a small quantity of the polish and rub

it on the surface to be restored. Wipe thoroughly dry with clean, dry cheesecloth, making sure that all crevices are dry and clean. The surface should be rubbed until the finish is restored to a dull gloss.

Storage Battery. If the user desires to use a 4-volt storage battery, such as that recommended on page 3, it should be located in the lower battery compartment, in place of the six dry cells shown in Fig. 1. Connect one of the terminals on the "+A" lead to the "+" battery terminal (red) and wrap the other terminal on this lead with some insulating tape. Connect one of the terminals on the "-A" lead to the "-" battery terminal (black), and similarly wrap the other terminal on this lead with tape. When operating the set with storage battery, turn the "BATTERY SETTING" knob to 65, but no farther. It will be possible to leave this knob set at this point when operating the receiver. The battery should be kept well charged, but it is recommended that it be removed from the cabinet during this process to prevent damage to the set.

POSSIBLE DIFFICULTIES

Should any trouble develop in the use of Radiola Super-VIII, it will in all probability be due to loss of life of the Radiotrons or to the exhaustion of the batteries. As the batteries grow old, they decrease in voltage, and increase in resistance. After the Radiotrons have been used for a long time, their filaments tend to lose emission. If the difficulty appears to be elsewhere, it is recommended that the services of the dealer from whom the set was purchased, be enlisted.

If the set becomes inoperative, try interchanging the Radiotrons. The second tube from the right (when facing the front of the set) is the important one and it is well to determine first whether this tube is working properly. This may be done by

touching the moistened finger to the stationary condenser plates of "STATION SELECTOR II," on the rear of the panel. A sharp click should be heard in the loud speaker. If none is heard, try interchanging this tube with either the third, fourth, or fifth Radiotrons, applying the click test each time. Use for the second Radiotron from the right (when facing the front of the set), the one which gives the sharpest click in the loud speaker. If the set is still not operative, push in the amplifier switch S, and remove the Radiotron on the extreme left-hand end, from its socket. Try substituting this tube for the first, third, fourth and fifth Radiotrons, operating the set each time, to ascertain if reception has been improved. If no improvement is noted, an examination of the batteries and their connections should be made. It is of advantage to keep a spare Radiotron UV-199 on hand, to meet emergencies.

There are several indications by which the user may determine that the filament or "A" batteries are becoming exhausted. These are low filament brilliancy, weak signals, and distortion, the signals becoming less and less recognizable. When it is found necessary to turn the "BATTERY SETTING" knob up to "100," and the operation of the set is still unsatisfactory (or when it is necessary to turn the "BATTERY SETTING" knob to 100 to get 3 volts on the filament, if a voltmeter is used), it is a definite indication that the filament batteries are exhausted.

When fresh batteries are installed for the first time, listen to the loud speaker, while pushing the amplifier switch in and out. Sharp "clicks" will be heard in the loud speaker. Do this sufficiently to learn just how loud the click should be. If the

"B" batteries have become fairly well exhausted, these clicks will become practically imperceptible—an indication that they need replacement. A better method of test is, of course, to use a volt-

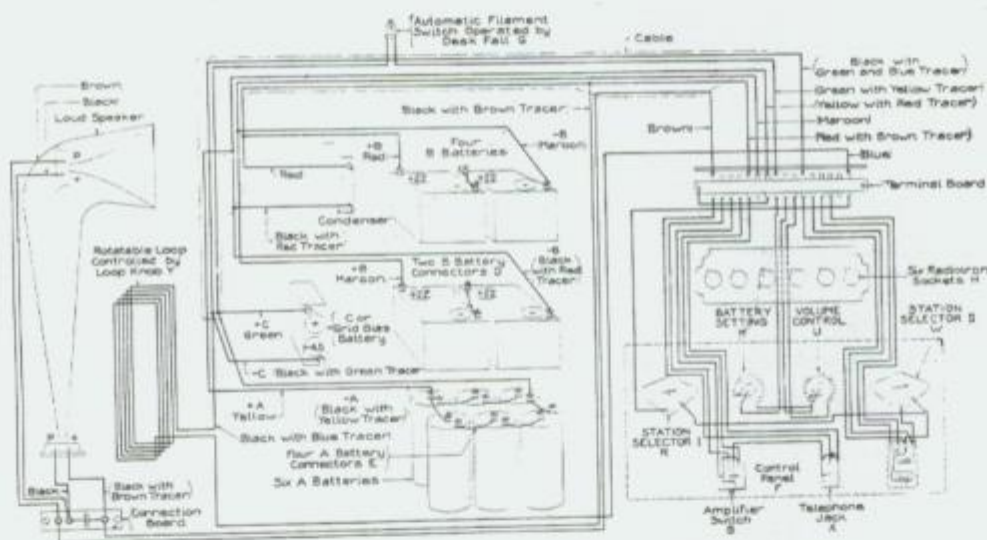


Fig. 5. Connection Diagram of Radiola Super-VIII

meter of suitable range (100- or 150-volt scale), for measuring the "B" battery voltage. Connect the positive (+) voltmeter terminal to the "+B" lead in the upper battery compartment (Fig. 1) and the negative (-) terminal to the "-B" lead in the middle battery compartment. When the voltage has dropped to 68 volts total, or to 17 volts per battery, the batteries should be replaced.

An indication of exhausted "C" batteries may be had by listening to the loud speaker with no stations tuned in. If the loud speaker gives forth a continuous noise, the battery needs renewal. The noise may be either a high pitched whistle, a high cackling sound or a low gurgling murmur. Frequently the whistle is so high as to be above the range of audibility for some persons, but, in any case, the noise becomes more audible as the batteries age.

Instructions for Using Model UR-556 Adapter

The Model UR-556 Adapter is designed for using Radiotron UX-120 in the *last audio stage only* of radio receiving sets originally using Radiotrons Model UV-199, and more particularly in Radiola Super-VIII or Radiola Super-Heterodyne (Second Harmonic). The use of this Radiotron as the last audio amplifier will provide greater volume of signal along with increased quality of reproduction. The Adapter takes care of the difference in size and arrangement of the contact pins in the bases of the two Radiotrons, and provides terminals for making ready connection to the additional plate and grid bias batteries required for the new Radiotron.

APPLICATION TO RADIOLA SUPER-HETERODYNE SECOND HARMONIC

Additional Batteries Required. Radiotron UX-120 with its Adapter will require the following batteries, in addition to those already installed:

B—Two 22½-volt plate batteries connected in series. Approximate size, 4½ in. by 2¼ in. by 2½ in. such as: 2 Burgess No. 5156 BP plate batteries, or 2 Eveready No. 768 Plate Batteries, or 2 Ray-O-Vac No. 5151-BP Plate batteries, OR EQUIVALENT

Or, One 45-volt battery may be used instead of two 22½-volt batteries. Approximate size 2½ in. by 4½ in. by 5½ in., such as 1 Burgess No. 5308 plate battery, OR EQUIVALENT.

C—One 22½-volt "B" battery used as a grid bias or "C" battery, such as those listed as follows:

Horizontal		Vertical
1 Burgess No. 5156 BP or		No. 5158 plate battery or
1 Eveready No. 768 or		No. 764 plate battery or
1 Ray-O-Vac No. 5151 BP or		No. 1153 plate battery OR EQUIVALENT.

Installation of Equipment in Radiola Super-Heterodyne (Second Harmonic).

Remove the control panel C by turning the control panel latch T, pulling the panel forward, unhooking the stay joint D, lifting the panel off its hinges and laying it face down in front of the set, all as shown in Fig. 2 of the Instruction Book 86963. Remove the six UV-199 Radiotrons from their sockets.

Place a block of wood (6 in. long by 3 in. wide by ½ in. thick) in the rear left-hand corner of the compartment behind the panel, laying it on the loop frame. Make the connections described in the next paragraph for the two "B" batteries, and stand them on end, facing each other, on top of the block as shown in Fig. 1. (If one 45-volt block is used lay it on its side.) Make the connections required for the "C" battery, and place it on top of the two batteries just put in place, also as shown in Fig. 1.

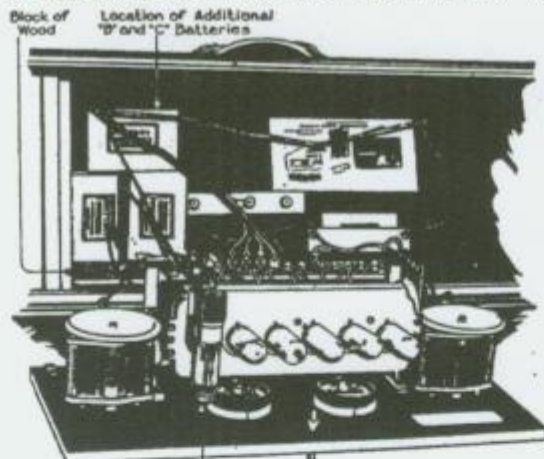
The connections referred to above are made as shown in Fig. 3. The two "B" batteries are connected in series by fastening the "+ 22.5" (red) lead of the first battery to the negative "-" binding post of the second. The negative "-" binding post of the first battery is connected by a flexible lead (a 20-inch length of No. 18 rubber covered lamp cord, or equivalent) to the Adapter terminal marked "-45B." The "+22.5" (red) lead of the second battery is connected by a second flexible lead to the "+45B" Adapter terminal. The junction between the battery and flexible lead may be made by using a machine screw (say No. 8-32 by ½ in. long) with nut and lock washer, or by soldering, if convenient. In any case, make the joint secure and cover it with friction tape. (In case a 45-volt "B" battery is used in place of the above, connect the negative "-" and "+45" binding posts to the "-45B" and "+45B" Adapter terminals respectively.) On the "C" battery, connect the "-" binding post and the "+22.5" (red) lead to the "-22C" and "+22C" Adapter terminals, respectively. Use the screw or soldered joint on the battery lead, as described above, and insulate it with friction tape.

While making the above connection, take care to avoid permitting any wires on battery terminals (or the terminals themselves) to come into contact with other wires, battery terminals or metal parts of the set. Make and keep all connections secure. Check the connections with the diagram when they have been completed and before inserting the Radiotrons. It is very important that the batteries be connected to the Adapter in the proper way.

Insert the Adapter UR-556 in the *left-hand socket* (see Fig. 1) letting the bayonet pin drop into the slot, pressing the Adapter down and giving it a twist to the right. Push the Radiotron UX-120 into the Adapter. It will be noticed that Radiotron UX-120 has two small and two large diameter pins in the base. The Radiotron should point toward the panel, with the large pins in the lower holes. Replace five of the UV-199 Radiotrons in the remaining sockets (1 to 5 counting from the right). Replace and latch the panel.

Operation. The operation of Radiola Super-Heterodyne will not be changed by the substitution of the new Radiotron, except for the position of the "BATTERY SETTING" knob. This will have to be advanced slightly to the right (about 4 dial graduations) beyond the setting when the six UV-199 Radiotrons were being used. Set it at 55 instead of at 47 or the arrow mark, when batteries are fresh. The most desirable method of setting this control is to measure the filament voltage, as described on pages 11 and 12 of Instructions 86963, setting the voltage at 3.0 volts.

Push in the amplifier switch (S in Instructions 86963), when using the second audio stage. In case the signal is too loud, and it is desired to operate on the first audio stage, interchange the Adapter (with Radiotron UX-120 in place) with the Radiotron UV-199 in socket 2, counting from the left. Then pull out the amplifier switch.



Location of UR-556 Adapter and UX-120 Radiotron

Fig. 1

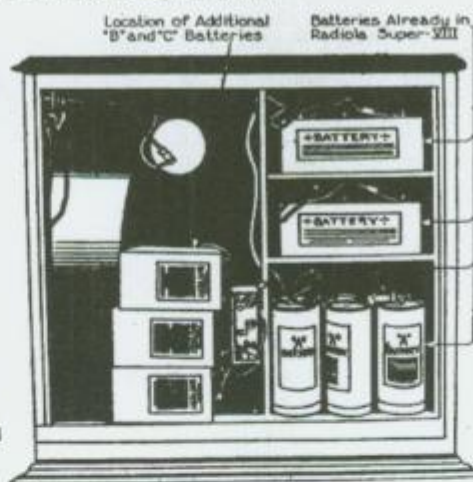


Fig. 2

APPLICATION TO RADIOLA SUPER-VIII

Additional Batteries Required. The batteries required are as follows:

B—Two 22½-volt plate batteries, connected in series. Approximate size 2¾ in. by 3¼ in. by 6 in., such as 2 Eveready No. 764 or 2 Ray-O-Vac No. 1153, OR EQUIVALENT

C—One 22½-volt plate battery, used as a grid bias or "C" battery. Size as above, such as 1 Eveready No. 764 or 1 Ray-O-Vac No. 1153, OR EQUIVALENT

Installation of Equipment in Radiola Super-VIII. Remove the upper rear panel as described on page 4 of the Instruction Book 86962 for that set. Remove the control panel and place it face down on the desk top of the set, using the same method as described in the foregoing for Radiola Super-Heterodyne. Remove the six Radiotrons from their sockets.

Connect the batteries as shown in Fig. 3, and as described for Radiola Super-Heterodyne. In this case, however, no screw joints are needed, as all the batteries listed have binding posts and terminals, but no flexible leads. Place the batteries on the loop bearing plate as shown in Fig. 2.

Insert the Adapter and Radiotrons, replace the control and back panels and operate the receiver as under the instructions for Radiola Super-Heterodyne.

APPLICATION TO OTHER RECEIVERS

Additional Batteries Required. When substituting a UR-556 Adapter and UX-120 Radiotron for a UV-199 Radiotron in the last stage of other receiving sets, it will be necessary to provide additional "B" and "C" batteries to give 135 volts for the plate and 22½ volts for the grid of this Radiotron only, instead of the 90 volts plate and 4½ volts grid usually employed with the UV-199 Radiotron.

The user should determine what plate voltage was being used on the plate of the Radiotron being replaced. If 90 volts were being used by connecting four 22½-volt or two 45-volt blocks in series, the additional 45 volts will be obtained by connecting two 22½-volt or one 45-volt block to the "B" terminals of the Adapter, similar to the manner described above. The actual size and arrangement of contacts on the batteries may be as required by the particular set, but no batteries smaller than those listed for Radiola Super-Heterodyne above should be used.

The "C" battery should be a 22½-volt block, of size at least as large as those listed above, and should be connected in a way similar to that already described.

If the Radiotron UV-199 was being used with plate and grid voltages other than those mentioned, the user should provide sufficient additional "B" battery voltage so that this voltage plus that already used equals 135 volts. Then provide an extra 22½-volt block for "C" battery.

Rheostat. The UX-120 Radiotron will require the same "A" battery voltage as the UV-199 being replaced,—three dry cells connected in series, giving a total voltage of 4½ volts. Sufficient of these groups should be connected in parallel to provide the needed current.

The value of the rheostat used to control UX-120 Radiotron depends upon the set used and its connections. Radiotron UX-120 may be used with a UV-199 rheostat (usually 33 ohms), although a rheostat of only 15 ohms resistance is all that is required. For other conditions follow the table below:

Number of Radiotrons Controlled by Rheostat	Value of Rheostat (Ohms)
1 UX-120 alone	15 ohms
1 UX-120 and 1 UV-199	10 ohms
1 UX-120 and 2 UV-199	7½ ohms
1 UX-120 and 3 UV-199	6 ohms*
1 UX-120 and 4 UV-199	5 ohms*
1 UX-120 and 5 UV-199	4 ohms*

*NOTE.—These combinations generally use same rheostat as in the radio receiver, and the proper filament terminal voltage for all the Radiotrons may be secured by advancing the rheostat pointer slightly beyond the position usually required when UV-199 Radiotrons were being used throughout.

The rheostat should be set to prevent overvoltage on the Radiotrons. To do this, measure the filament voltage with a high-grade, high-resistance voltmeter, and adjust the filament terminal voltage of all the Radiotrons to 3.0 volts. Aside from the readjustment of the filament voltage, there will be no difference in the operation of the set.

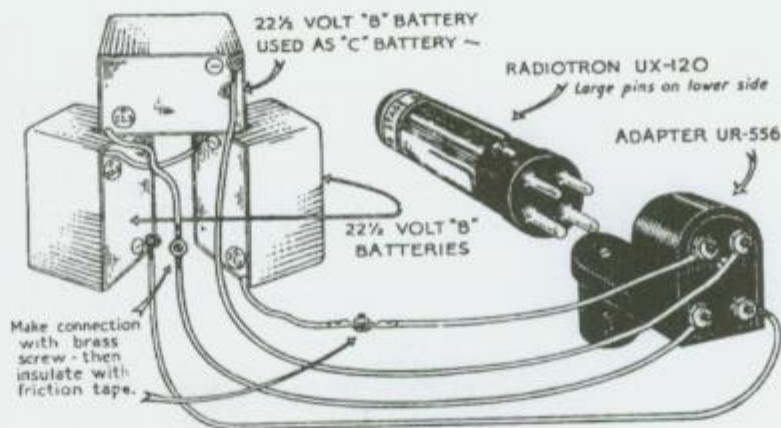


Fig. 3

NOTICE

The apparatus and devices which, or the use of which, are covered by patents, are sold only under certain specified licenses set forth in a notice attached permanently to the said apparatus and devices, or if this is impracticable on account of size, then on tags or wrappers attached to the said apparatus and devices or on the cartons containing the same. This license notice is as follows:

"In connection with devices it sells, Radio Corporation of America has rights under patents having claims: (a) on the devices themselves and (b) on combinations of the devices with other devices or elements, as, for example, in various circuits and hook-ups.

"The sale of this device carries a license under the patent claims of (a), but only for (1) talking machine uses, (2) radio amateur uses, (3) radio experimental uses and (4) radio broadcast reception; and only where no business features are involved.

"The sale does not carry a license under patent claims of (b) except only (1) for legitimate renewals and repairs in apparatus and systems already licensed for use under such patent claims on combinations, (2) for assembling by amateurs and experimenters, and not by others, with other licensed parts or devices, or with parts or devices made by themselves, but only for their own amateur and experimental radio uses where no business features are involved, and not for sale to or for use by others, and (3) for use with licensed talking machines and licensed radio broadcast receiving devices; and only where no business features are involved."