

## SERVICE NOTES FOR MODEL 800-B

### SCOTT DEALERS:

To enable you to maintain the Model 800-B Radio Phonographs in the optimum operating condition and to correct difficulties which have arisen in the field "Service Notes" will be issued from time to time. The material is based on investigations made at the Laboratories to determine the best procedure for rectifying service difficulties which have been brought to our attention by Scott dealers and users. Of course, we offer this material for use by the dealer or service man when he deems it fully necessary to take action and it is not recommended that any modifications be made to the equipment as long as the customer is satisfied with the operation.

This data is prepared in loose-leaf form for insertion in a binder, so that we can send you information on our findings relative to the most pressing problems immediately without waiting for the preparation of a complete service manual. In the near future we plan to issue several additional notes and in a short time we expect to deal with all of those problems which are so important to you.

## THE REDUCTION OF HUM OUTPUT

In a high fidelity instrument such as the Model 800-B a very wide range of audio frequencies are reproduced and the hum problem is of special significance. Any hum voltages which reach the loudspeaker will be reproduced to a considerably greater degree than in the case of ordinary receivers having only a limited bass response. Thus, it becomes quite important that every effort be made to keep this hum at an absolute minimum. The several possibilities for hum pickup are treated in these notes. When customer complaints of an excessive hum level are experienced the following corrective measures are suggested. If the service man does not have an adequate stock of parts to make the changes which may be required, the additional parts may be procured from the Service Department, Scott Radio Laboratories, Inc., 4541 N. Ravenswood Avenue, Chicago, Ill.

Before taking any corrective measures check the wiring of the power supply, particularly the receiver receptacle J-3, to make sure that it conforms fully with the circuit diagram as furnished by the Scott Laboratories.

CONDITIONS FOR ELECTRICAL HUM  
AND SUGGESTED MEASURES

- A. Hum present when receiver is switched on but Volume Control is adjusted for minimum output.

## Elimination of Defective Components

The first step in locating the cause of hum under these conditions is to remove the 3rd audio amplifier tube V-19 (6SL7GT, located in the power supply chassis). If the hum disappears or is greatly reduced, the indicated fault lies in or ahead of this tube. If ahead of this tube it is, undoubtedly, caused by the 1st or 2nd audio amplifier tubes, V-9 (6J5) or V-10 (6J5), or their associated circuits located on the receiver chassis. If this source of hum is indicated, replace these tubes one at a time with a tube of known good quality, preferably one with a reversed coil heater which has the lowest hum pickup. If these tube replacements do not reduce the hum the 6L6 output tubes should also be replaced. If none of these tube replacements affect the hum the electrolytic capacitor C-33 which is used as a filter for the plate supply of the 1st and 2nd audio stages should be checked. It may be checked in a simple manner by bridging it temporarily with another 20 mfd., 300 to 450 volt rated capacitor, making certain that the correct polarity is observed.

If the hum is still present when the 3rd audio amplifier tube, V-19 (6SL7GT), is removed the fault may lie in a defective electrolytic filter capacitor in the high voltage supply; that is, C-93 or C-94. By shunting each capacitor with another unit of the same capacity and voltage rating, the defective unit can be easily located.

Also check the d. c. potential on each audio grid to determine whether it is excessive. A high d. c. voltage at any grid point indicates a leaky coupling condenser.

IMPROVEMENT OF FILTERING ACTION  
IN POWER SUPPLY

If the occasion arises where the above measures fail to improve the hum situation sufficiently to satisfy the customer, the only alternative is to provide additional filtering in the power supply. Such filtering may be essential in those localities where the A. C. power supply has a bad waveform. If the 60 cycle supply is distorted, the higher harmonics will appear particularly objectionable and may demand a greater degree of filtering. The circuit is arranged so that the additional choke serves to filter the entire supply and therefore, reduces hum from the output tubes as well as the other points of the audio amplifier. In the new arrangement two chokes part no. 17B492 are used instead of one as used in earlier layout. This additional filtering may be installed by relocating L-17 on the power supply chassis and mounting the second choke adjacent to it. The suggested arrangement and wiring diagram are shown on an attached sheet.

The following additional components are required for making this installation:

- 1 - Insulated wire - 4 1/4" long
- 1 - Single lug terminal - Part No. 90B711
- 1 - Filter choke - Part No. 17B492
- 4 - Screws - 8/32 x 3/8" long - Part No. 77A382
- 4 - Lockwashers - #8 - Part No. 95A251
- 4 - Nuts - #8 - Part No. 59A178
- 1 - Screw - 6/32 x 1/8" long - Part No. 77A202

The following steps may be taken for ease of installation: (Refer to Diagrams on Wiring and Schematic for Installation of Additional Filter Reactor - Model 800-B).

1. Remove 6/32 mounting screws of C-88 and R-82.
2. Remount terminal strip holding C-87 and R-80 under mounting foot of C-89.
3. Unsolder leads of L-17 and remove choke.
4. Remove one of the red leads of C-94 from #2 terminal point and connect this lead to the new single terminal point #3.
5. Drill 11 holes.
  - 8 - Clearance holes, #22 drill, for choke mtg.
  - 1 - Tapped hole for 6/32 screw.
  - 2 - 3/8" clearance holes for choke leads.
6. Mount chokes (L-17 and additional one).
7. Mount C-88 using 1/8" 6/32 screw and one of the old 6/32 screws, securing the ground lug under the unit.

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8. Wire new yellow cathode lead from point #4, (the positive terminal) on C-88 to #6 pin on 6SL7 tube socket.
  9. Wire short lead from 1st choke to #2 pin on 5Y3 socket. Wire long lead on 1st choke to #3 lug - also short lead from 2nd choke to #3 lug
  10. Wire long lead from 2nd choke to #2 terminal lug.
- B. Excessive hum with Volume Control in an advanced position and receiver switched into "Phono" or "Television" position.

A considerable improvement in the higher pitched hum level will be realized by rearranging the wiring of the "phono" and "television" input circuits and the high level audio lead running to the volume control. These leads are placed in cables in the wiring of earlier receivers, and have to be routed separately and generally isolated from other circuits to achieve the desired result. However, to avoid excessive dismantling of the receiver in the field the leads now running in the cables should be cut off and may be left in the cable while additional isolated leads are connected between the points concerned.

The following additional components are required for making this installation:

3 - Cable Clamps	- Part No.	18A312
3 - Shielded leads	- Part No.	96B962
1 - Screw - 6/32 x 1/8" long	- Part No.	77A202
3 - Lockwashers - #6	- Part No.	95A255
2 - Screws - 6/32 x 5/16" long	- Part No.	77A374
2 - Spacers - 1 1/8"	- Part No.	84A211
2 - Screws - 5/40 x 1 3/4" long	- Part No.	77B957
1 - Single lug terminal	- Part No.	90B711
2 - Nuts - 6/32	- Part No.	59A177

The following steps should be taken:

1. Disconnect ground braids and wires leading to the "phono" and "television" terminals.
2. Disconnect the other ends of these two shielded leads from switch C-3.
3. Disconnect shielded lead from C-30 coupling condenser.
4. Disconnect shielded lead from the high potential terminal of the volume control.
5. Remove short spacers from switch C-3 and substitute long spacers and screws. Reassemble using all washers and lockwashers which were used previously.
6. Add terminal #1 to chassis, mounting it under one foot of condenser C-30, or if possible drill #22 hole under C-30 as this will make wiring simpler as per diagram.
7. Add shielded lead to connect from volume control to C-30, connecting shields together at the volume control. Route lead across chassis toward the bottom edge which adjoins the bottom plates. Fasten lead under new cables clamps instead of the ones used previously. Insert one cable clamp with a short mounting screw on the left side of the chassis near the treble control.
8. Do not ground shield braid at terminal of C-30. Connect it to the added ground terminal mounted under one foot of C-30. Use this point also for connecting shields of leads coming from "phono" and "television" terminals.
9. Add new shielded leads from "phono" and "television" terminals. Connect shield braids of these leads to the "ground" terminals at these points, but do not make a connection between either of these "ground" terminals and the chassis. Route leads along the lower edge of the chassis to switch C-3 using a cable clamp, fastened under one foot of the bathtub condenser C-29 to secure the cable.

C. Hum present only when a station carrier is tuned in and volume advanced.

Hum present under these conditions is generally caused by a defective tube. The most common fault being found in the second detector V-6 (6H6) when AM signals are being received or the discriminator V-18 (6H6) when FM signals are being received. The fault can be easily corrected by replacing these tubes with tubes of known good quality preferably of the metal type.

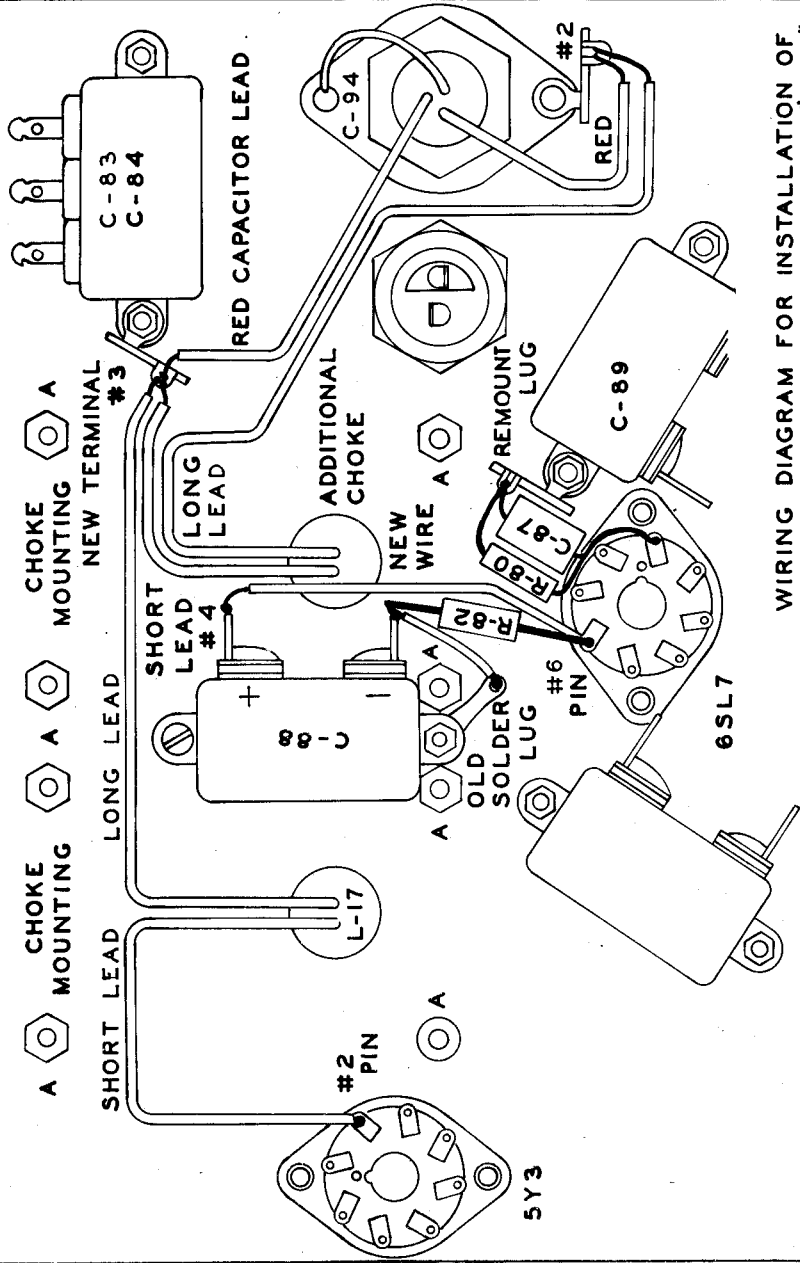
In some cases hum may be induced into the receiver from the power line. This form of pickup can usually be eliminated by employing a good ground connection between the receiver chassis and a cold water pipe or a pipe driven into the ground. Do not attempt to use the house wiring conduit or BX as a ground connection. Such an arrangement usually results in increased noise or hum pickup.

### CONDITIONS FOR VIBRATIONAL OR MECHANICAL HUM AND SUGGESTED REMEDIES

A. Receiver hums when power is switched off.

In the 800-B, push-button tuning is accomplished by means of a motor driven mechanism. The transformer supplying the power for the drive motor, FM-AM changeover relay and the "power on-off" relay, is connected to the power circuit at all times. Therefore, a mechanical vibration may be heard even though the receiver is switched off. This form of hum is caused by transformer laminations vibrating against the bottom cover plate of the power amplifier.

To remedy this condition, remove the bottom plate of the power supply and apply strips of masking or adhesive tape along the bottom edge of the transformer so that the bottom plate cannot make metal to metal contact with the transformer case. In some extreme cases it may be necessary to mount the power supply on sponge rubber strips or felt bumpers in order to entirely eliminate this trouble.



WIRING DIAGRAM FOR INSTALLATION OF  
ADDITIONAL FILTER REACTOR-MODEL "800B".

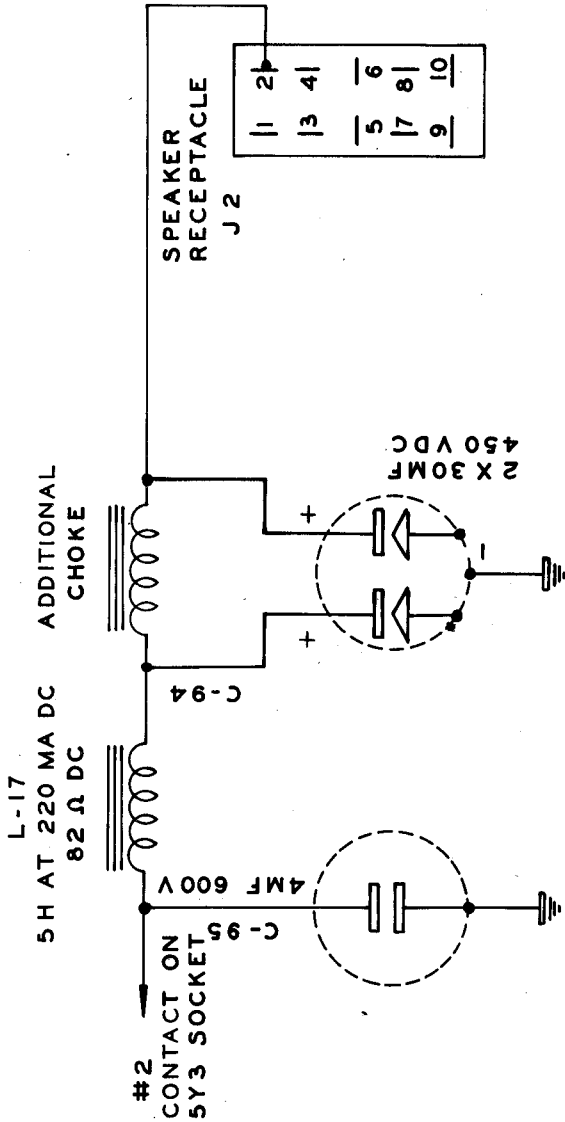
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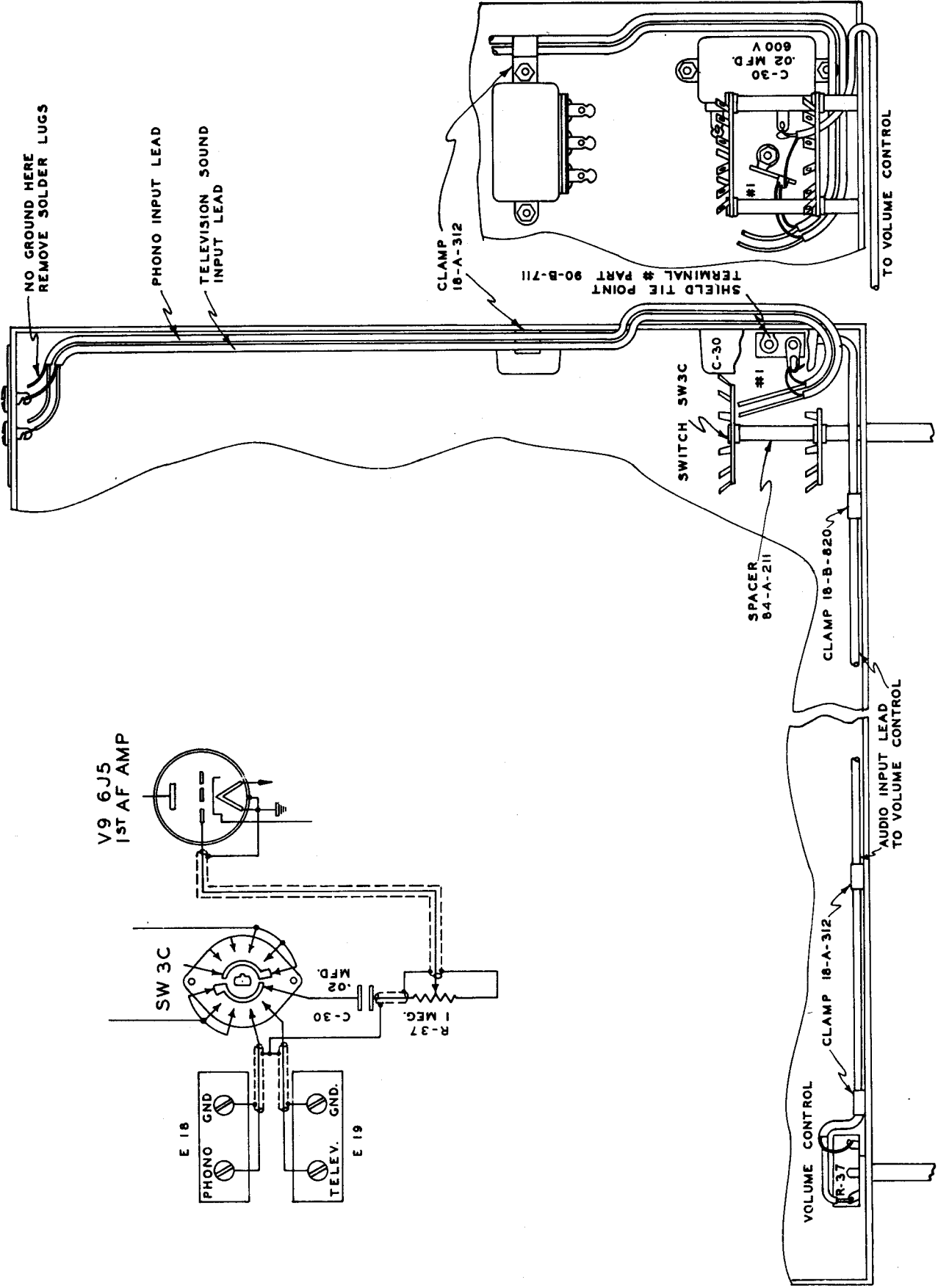
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SCHEMATIC DIAGRAM FOR INSTALLATION OF ADDITIONAL FILTER REACTOR-MODEL 800 B



WIRING DIAGRAM FOR REDUCTION OF  
 AUDIO INPUT HUM LEVEL MODEL 800 B  
 FULL  
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 2-B-842-A

## ANTENNA NOTES

Now that Scott Model 800-B Radio Phonographs have been in operation in many parts of the country we feel that we should remind you of certain points about the antenna systems in order that you may obtain optimum performance. Of course, as we have mentioned in the past an outdoor installation is essential if the best performance is to be realized. In the very near future we will make available a complete built-in antenna system for AM broadcast, short-wave and FM. However, we recommend its use only in those instances where an outdoor installation is impossible. The purpose of these notes is to point out certain aspects of the outdoor antenna problem. The complete details of the built-in installation will be made available in a separate report.

## Use of the Antenna Coupling Transformer

Our experience up to this time indicates that the antenna coupling transformer 2B922 should be used with all installations of the Scott Super Double Doublet to obtain full signal strength on all stations. This necessity is particularly true for those installations which are located in the more remote parts of the country where the listener must depend on many distant stations. At first it appeared that the use of the coupling transformer might result in signals which were too strong when the set was located near a powerful transmitter. However, in those cases it is best to install the coupling transformer and in addition a series resonant trap circuit across the antenna terminals to reduce the signal from the one strong station in question. For those listeners who are located near very powerful transmitters we can furnish series resonant trap circuits suitable for use in conjunction with the antenna coupling transformer, if you will advise us regarding the frequency of the nearby station. Of course, the trap is not required if the strong local station produces no undesirable effects in the reception of other stations.

## Direction of Antenna Installations

Another point to remember in installing the Super Double Doublet is that it should be run broadside to the direction of the desired short-wave stations, if possible. In this country many listeners may wish to listen to European transmitters. In that event the Double Doublet should run between points North and South so that the signals arriving from the East cut across it broadside. If the listener is particularly interested in South American stations the Double Doublet should be run between points East and West, so that signals arriving from South America cut across it at right angles. Of course, one could compromise and run the antenna between points North-East, South-West or North-West, South-East with some loss in signals from either Europe or South America but without complete discrimination against either. However, most English speaking short wave stations should be received best with the antenna running from North-South, thus providing the proper broadside for Europe and the Pacific Area. We know that trees and other objects around a house will influence the location and direction of the antenna system but a special effort should be made to place it in the proper direction particularly for those listeners who are confirmed DX fans.

### The FM Antenna and Its Reflector Elements

The FM Dipole and Reflector Installation is particularly desirable for the best reception of FM signals with freedom from noise and fading. It should be located in a position which is relatively clear and unobstructed, preferably not behind trees or buildings in the direction of the FM stations. An important point to remember is that the reflector elements (the dipoles which are not connected to the lead-in) should be on the side opposite to the desired stations.

The FM antenna is used with the reflector to provide a high degree of directivity on the side opposite the reflector unit. So if it should happen that you have desired FM stations in either direction it may help to remove the reflector elements and install the antenna as a simple dipole. On the other hand when more FM stations are installed and in operation you will find that in many instances they will appear to be very closely spaced on the dial. Then you will find the reflector elements to be very helpful in selecting signals from the desired direction, but always remember that the reflector elements must be located on the side of the antenna opposite to the direction of the stations. Also just as in the case of the Super Double Doublet the dipoles must be broadside to the direction of the desired stations. That is, the dipoles must point North-South for stations located to the East or West of the installation.

The main point to remember about the installation of outdoor antennas is that one can't just throw them up in the most convenient spot or with no regard to the stations which the listener might most logically prefer to hear. Here is a real opportunity to do the customer a service which will give the Scott that extra touch of performance which means so much to the critical listener.



SETTING UP PUSHBUTTON TUNING SYSTEM

The pushbutton tuning system in the 800-B Receiver has been designed to provide maximum flexibility in order to permit setting up for 6 or more AM stations and 1 to 6 FM stations, the only limitations being the spacing of the stations on the tuning dial or the setting for an AM station falling on the same spot as that for an FM station. At the factory the receivers are wired so that 4 buttons on the left side of the panel and the 5 top buttons on the right side are wired for AM stations and the lower button on the right side with the two top buttons on the left side are wired for FM stations as shown in Figure 9. No attempt should be made to set up the pushbutton tuning system for weak distant stations as poor results will be obtained because of background noise.

The switch over from AM to FM reception is done automatically in the receiver, that is, with the receiver adjusted for pushbutton tuning, when any AM button is pushed the receiver is automatically set for AM reception and when any FM button is pushed the receiver is automatically switched for FM reception.

The pushbutton tuning drive unit is located at the rear of the receiver chassis. This unit has 12 adjustable knobs which are numbered 1 to 12. These knobs are set to the desired position by turning them clockwise or counter-clockwise with a rotary motion. They are locked in position by means of a small screw, adjacent to the knob. These small lock screws should never be tightened more than one turn past the point where the screw touches the backplate. If tightened more the setting of the knob will be changed. Two calibrated scales located below the two rows of knobs, are provided to enable setting the knobs in conjunction with the logging scale at the top of the front dial scale. Each of the pushbuttons on the front panel is wired to the corresponding knob on the backplate in the sequence shown in Figure 9. The following procedure should be followed in setting up the pushbutton tuning system.

1. Set the Selectivity control to "M" position and the AM-Band control to "BC" position.
2. Select the lowest frequency AM station to be set up and insert the tab for this station in pushbutton No. 1.
3. Tune in the desired station manually and note the setting of the dial pointer on the logging scale at the top of the dial.
4. Set knob No. 1 on the backplate to the corresponding number noted on the logging scale, and lock the knob in place by means of the small screw directly above it. CAUTION: Never tighten the small locking screw more than one turn past the point where it touches the backplate; if tightened more the setting of the knob will be changed.
5. As a check to ascertain that the knob is set correctly, manually set the dial pointer to a higher frequency, then push button No. 1 until the pointer stops

and check this setting against the original reading on the log scale. Repeat this operation after setting the dial to a lower frequency. If the both readings are higher or both readings lower than the original log scale reading for this station then the No. 1 knob must be moved slightly to correct for the error in reading. If the two readings are spaced equally one-half a division or less on both sides of the original station setting, as read on the log scale, the adjustment has been correctly made.

6. The above operation should be repeated for each pushbutton to be set up, starting with button No. 1 for the lowest frequency station and working up consecutively to button No. 12 for the highest frequency station. Push-buttons 5, 6 and 7 can be used only for FM reception and when any of these buttons are pushed the receiver will automatically switch over to FM reception.

NOTE: The pushbutton tuning system will work only when the Selectivity control is set at "M" or "B" positions and the AM-Band control is set at "BC" position. If the pushbutton system does not work when the controls are set as above, replace the 1 amp fuse in the power supply. Refer to Figure 21 for location.

#### CONNECTING PUSHBUTTON SWITCHES FOR AM OR FM OPERATION

When more than 3 FM stations or more than 9 AM stations are desired, by connecting the pushbutton switches as outlined below, any of the 12 pushbuttons may be set up for either an AM or FM station.

On the first Model 800-B Radio-Phonographs produced, the pushbutton switches were connected as shown in Figure 11. It will be noted that on the left hand switch gang, one side of switches 1-2-3-4-8-9 are all connected to the black AM-common lead, therefore, all these switches will operate on AM stations. If it is desired to connect one or more of the switches on the left hand side for FM stations, it will be necessary to disconnect the switch or switches required from the black AM common lead and connect them over to the white FM common lead on the right hand switch.

On the right hand switch gang, one side of switches 5-6-7 are connected to the white FM common lead, therefore, these three switches are used to set up FM stations. One side of switches 10-11-12 are connected to the white-red dot AM common lead and are used to set up AM stations. In order to use anyone of these switches for an FM station, disconnect that switch from the AM common lead and connect it to the FM common lead. In this manner any one of the twelve pushbutton switches may be connected for operation on either AM or FM.

On the later Model 800-B Radio-Phonograph, the switch gangs have been provided with 2 dummy lugs on each section; one row of dummy lugs are connected to the AM common lead, the other row of dummy lugs are connected to the FM common lead and all that is necessary to connect any pushbutton for operation on AM, is to connect that switch to the AM common lug and for FM operation connect it to the FM lug. It will be noted by observing Figure 12 that the pushbuttons are now numbered in sequence 1 to 12 starting at the bottom pushbutton on the left side of the panel.

SCOTT RADIO LABORATORIES, INC.  
CHICAGO, ILLINOIS

SERVICE NOTES FOR MODEL 800-B

AUGUST 9, 1946

CONTINUED NOTES ON REDUCTION  
OF HUM OUTPUT AND AUDIO NOISES

Further investigations of hum problems have revealed that additional steps can be taken if satisfactory hum level is not accomplished by changes recommended in previous Service Notes.

We wish to repeat that tubes are often the cause of hum. Here at the Laboratory individual tubes have developed excessive hum output after the sets passed all our tests. Therefore, be sure to select tubes having the lowest hum level by trying several 6J5 and 6SL7 tubes. Carry spare tubes with you when installing the set as some may go bad from jolting received during delivery. If the receiver has incorporated the changes covered in previous Service Notes the following additional steps may be taken:

- (1) Check to determine whether the lead from muting relay K3 is connected to the 6SL7 grid pin No. 1 or the 6L6-V20 grid. If it is connected to the 6SL7 input grid, move it to the 6L6-V20 input grid. This change prevents hum in the relay lead from being amplified by the 6SL7 tube.
- (2) To reduce hum to the lowest possible level the following steps may be taken:
  - (a) Add a 5600 ohm resistor (our Part No. 70A50, or equivalent) to the bass control circuit between the yellow leads and their terminal of the control R46. This resistor may be supported by a single lug terminal strip (our Part No. 90E711 or equivalent.) which can be mounted by a screw and nut already available near the bass control. The new resistor will be designated by the symbol R94.
  - (b) Remove the direct ground lug connection from contact #2 of the 1st audio socket X9 and add a  $6\frac{1}{4}$ " insulated wire between the common connection of pins #1 and #2 on the 1st audio socket and the same points on the 2nd audio socket X10. This change simply grounds the 1st audio shield and filament at the 2nd audio socket instead of at the 1st audio socket.
  - (c) The 1st audio shielded grid lead may be shortened from  $10\frac{1}{2}$ " to 7" and run directly across the sockets to the volume control, instead of routing it around the chassis.
  - (d) Dress R80 and C87 as far as possible from heater pin #7 of the 6SL7 socket to prevent hum pickup in these components.

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CHICAGO, ILLINOIS

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- (3) Check the wiring of capacitor (C34), 25 mfd. 25 volt electrolytic condenser, to determine whether it is connected correctly. The positive end of this capacitor should be connected to the cathode of the 6J5 and the negative end to the junction of R42 and R47. Some sets may have gone through our inspection with this capacitor wired backwards. An incorrect connection will not show initially on electrical tests, but some hum and noise may develop from it after a period of a few weeks operation.

Items Nos. 1 and 2 will be incorporated in sets numbering Serial 3,000 up to eliminate possible trouble from these sources.

