

RCA

Electric Phonograph and Power Amplifier Equipment

MODEL AZ-774B

SERVICE NOTES

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RCA Victor Company, Inc.

FOREIGN DEPARTMENT

233 BROADWAY, NEW YORK CITY

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AZ-774B

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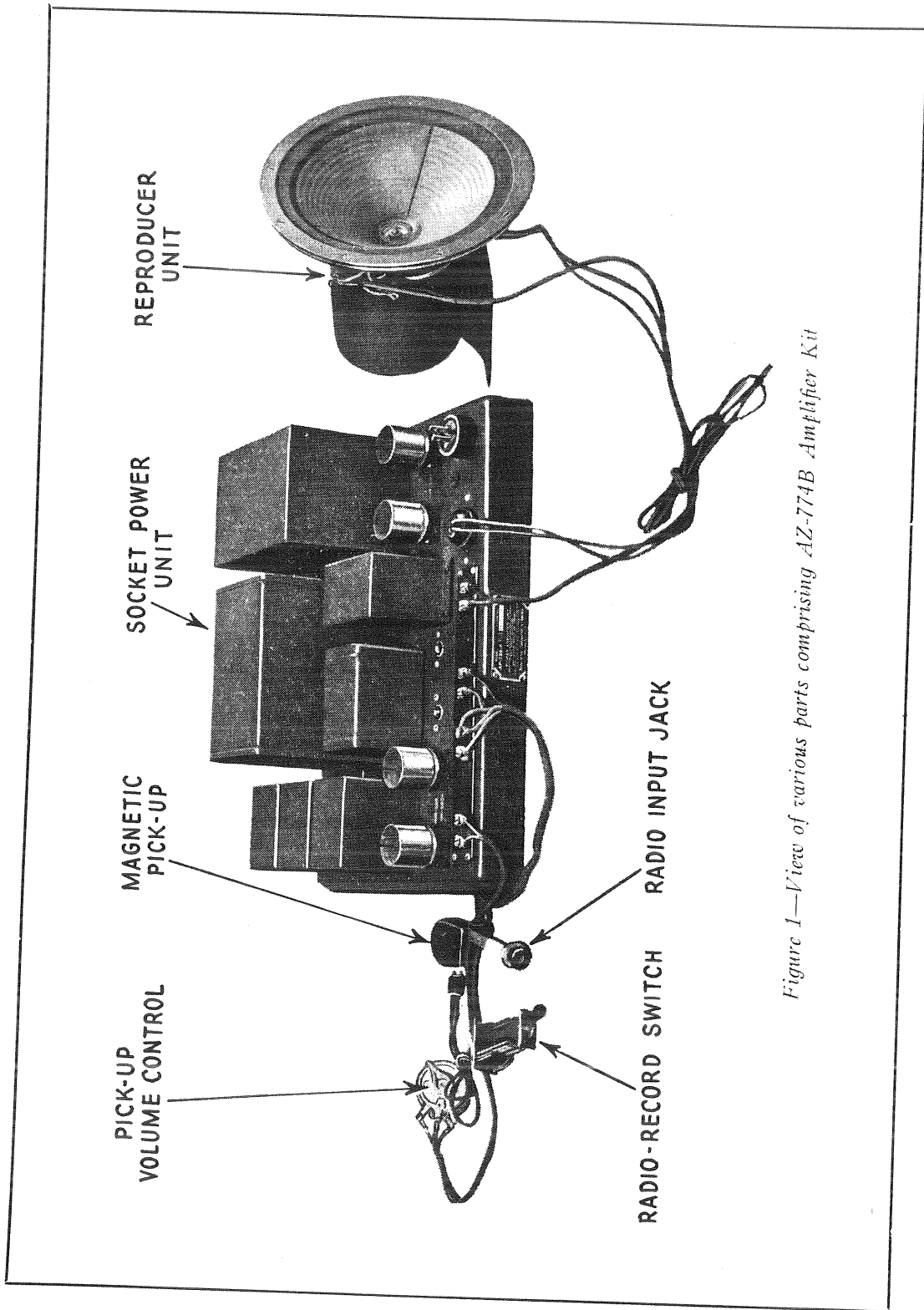


Figure 1—View of various parts comprising AZ-774B Amplifier Kit

RCA Model AZ-774B

Electric Phonograph and Radio

Power Amplifier Equipment

SERVICE NOTES

Prepared by Radiola Division, Technical Service Department

ELECTRICAL SPECIFICATIONS

Rating—as connected.....	Voltage 220-230, Frequency 50 to 60 cycles
Ratings—different connections provided. Voltage 230 to 250, 200 to 220, 112.5 to 125 and 100 to 112.5, Frequency 50 to 60 Cycles	
Power Consumption.....	140 Watts
Type of Circuit.....	Full wave, rectifying circuit providing plate and grid voltages to a two-stage A.F. power amplifier
Types and number of Radiotrons.....	2 UX-281, 1 UX-250 and 1 UX-226
Number of A.F. stages—Phonograph.....	2
Number of A.F. stages—Radio.....	1
Type of Rectifier.....	Full wave, using two UX-281 Radiotrons
Type of Pick-up.....	Low impedance, flexible armature

PHYSICAL SPECIFICATIONS

Dimensions of S.P.U.....	18" x 12½" x 6½"
Weight of S.P.U.....	47 lbs.
Dimensions of S.P.U. Packing Case.....	11" x 15" x 23"
Weight of S.P.U. Packing Case (All equipment included).....	72 lbs.
Dimensions of Reproducer Unit.....	10½" x 10½" x 8¾"
Weight of Reproducer Unit.....	28 lbs.
Dimensions of Reproducer Packing Case.....	12" x 12" x 13"
Weight of Reproducer Packing Case (All equipment included).....	45 lbs.

INTRODUCTION

The RCA Model AZ-774B Electric Phonograph and Radio Power Amplifier Equipment may be used for converting an old style phonograph to one using the electrical system of reproduction; or as a power amplifier to improve and increase the undistorted output of a radio receiver, or for providing both of these functions, with a switch for changing from one to the other. The undistorted output of the amplifier is approximately 4 watts. This provides an output of good quality in excess of the maximum requirements for home use. The additional power, however, gives a reserve that contributes to the quality of reproduction at any volume.

This equipment is supplied in kit form and consists of the following items:

- (1) **Power Amplifier** using two Radiotrons UX-281, one Radiotron UX-226 and one Radiotron UX-250.
- (2) **Reproducer Unit.** This is a large field (100 volts and 100 M.A.), 8-inch cone dynamic type reproducer. Leads and a female plug for connecting the field to the S.P.U. are provided.

- (3) **Magnetic Pick-up.** The magnetic pick-up is of the low impedance flexible armature type which gives excellent reproduction and causes a minimum amount of wear on the record.
- (4) **Phonograph Volume Control with Knob.** The volume control is a 60-ohm porcelain type potentiometer and gives a smooth control of volume from the phonograph.
- (5) **Radio-Record Change-over Switch.** A special switch is provided for making the transition from an external radio receiver to record reproduction.

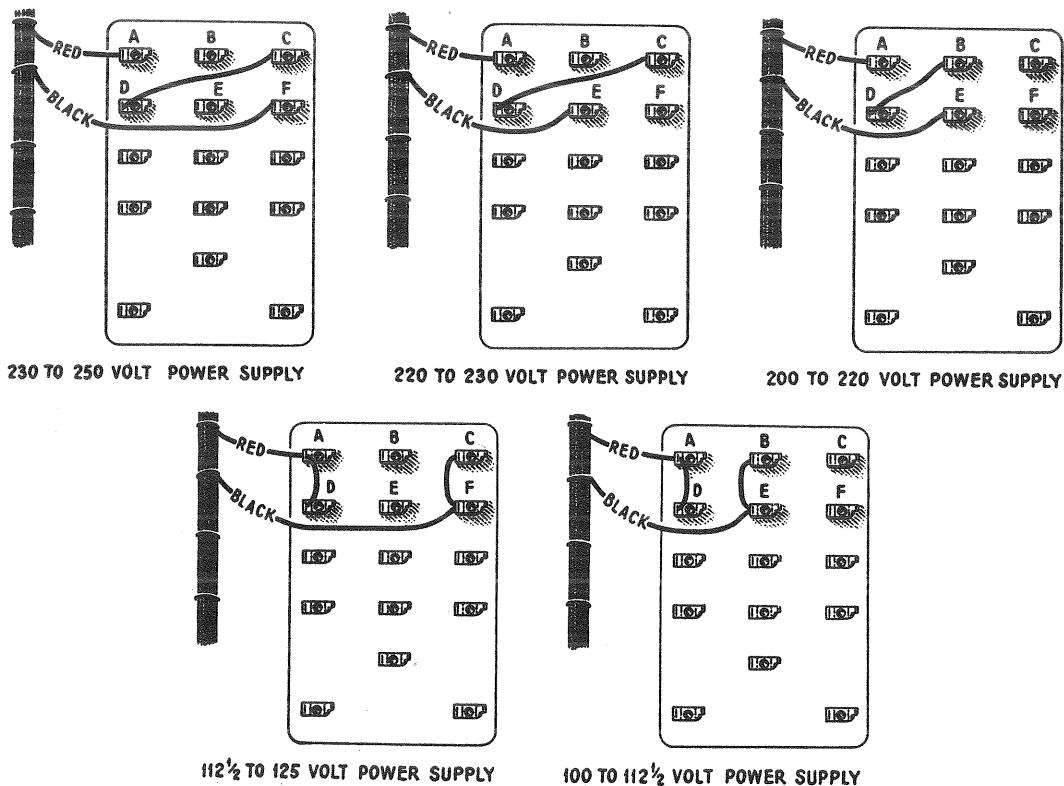


Figure 2—Connections to Primary of Power Transformer for different line voltages

- (6) **Radio Input Jack.** A jack is provided for connecting the output of the first audio stage of an external receiver to the power amplifier.
- (7) **Cable.** Connected to the "Radio-Record" switch and the radio input jack is a braided cable. One end of this cable has a four-terminal strip for connecting to the S.P.U. terminal board.
- (8) **Cables.** Three additional two-wire cables are provided. These are for connecting the pick-up to the volume control, the volume control to the S.P.U., and the cone coil of the reproducer unit to the S.P.U.
- (9) **Switch.** A single-pole, single-throw, tumbler-type switch is provided for connecting in series with the input A.C. circuit for complete control of the installation.
- (10) **Power Transformer Instruction Tag.** A tag is provided that shows the correct connections for the power transformer for various line voltages. These connections are also shown in Figure 2.

PART I—INSTALLATION

The actual installation of this equipment will vary with each individual case. However, the wiring, regardless of the location of parts, must be as shown in Figure 3. It is desirable that the parts be located within the radius of the various cables used for connecting purposes. However, if placing a unit beyond the radius of a particular cable is desirable, an extension cable or cord may be spliced to the cable. This may be of ordinary lamp cord or any other suitable conductor.

In the case of the loudspeaker, it is essential that it be placed directly behind a nine-inch hole in a baffle board at least 24 inches square, or a cabinet that constitutes a baffle of similar dimensions.

The S.P.U. is to be located in a place or position that will give adequate ventilation. Also a location that will provide accessibility to the Radiotrons is necessary.

PART II—SERVICE DATA

(1) POWER TRANSFORMER

The power transformer used in the S.P.U. has a split primary winding, each section of which may be connected in parallel for 110-volt lines and in series for 220-volt lines. Also taps are provided for small variations of the above voltages.

Figure 2 shows the terminals of the power transformer and the correct connection for various line voltages. It is important that the line voltage be measured and the transformer connections changed accordingly. Otherwise damage to the various parts and tubes may result.

(2) ADJUSTMENTS FOR MINIMUM HUM

Two potentiometers connected across the UX-226 and UX-250 power transformer filament windings are provided for adjusting the grid and plate returns to the exact electrical center of the filament winding. This is the position that gives the least amount of hum in the loudspeaker. To properly adjust these potentiometers proceed as follows:

- (a) Place the amplifier in operation with all tubes in place and the "Radio-Record" switch at the "Record" position.
- (b) With a screwdriver adjust the potentiometer marked "UX-226" Figure 3 until a point is found that gives the least amount of hum.
- (c) Now locate the potentiometer marked "UX-250" and with a screwdriver adjust this potentiometer until a point is found that gives a minimum amount of hum.

When both potentiometers are at the position of minimum hum, with the "Radio-Record" switch in the "Record" position, the adjustments have been correctly made.

(3) SOCKET POWER UNIT SERVICE DATA CHART

The following Service Data Chart gives the symptoms and remedies for failures that may be encountered during the operation of the AZ-774B amplifier kit. Troubles due to pick-up failure are listed under the Magnetic Pick-up Service Data Chart. Troubles in the radio receiver, or in the phonograph motor must not be confused with trouble in the amplifier unit and must be handled according to the requirements of the particular radio receiver or phonograph motor used.

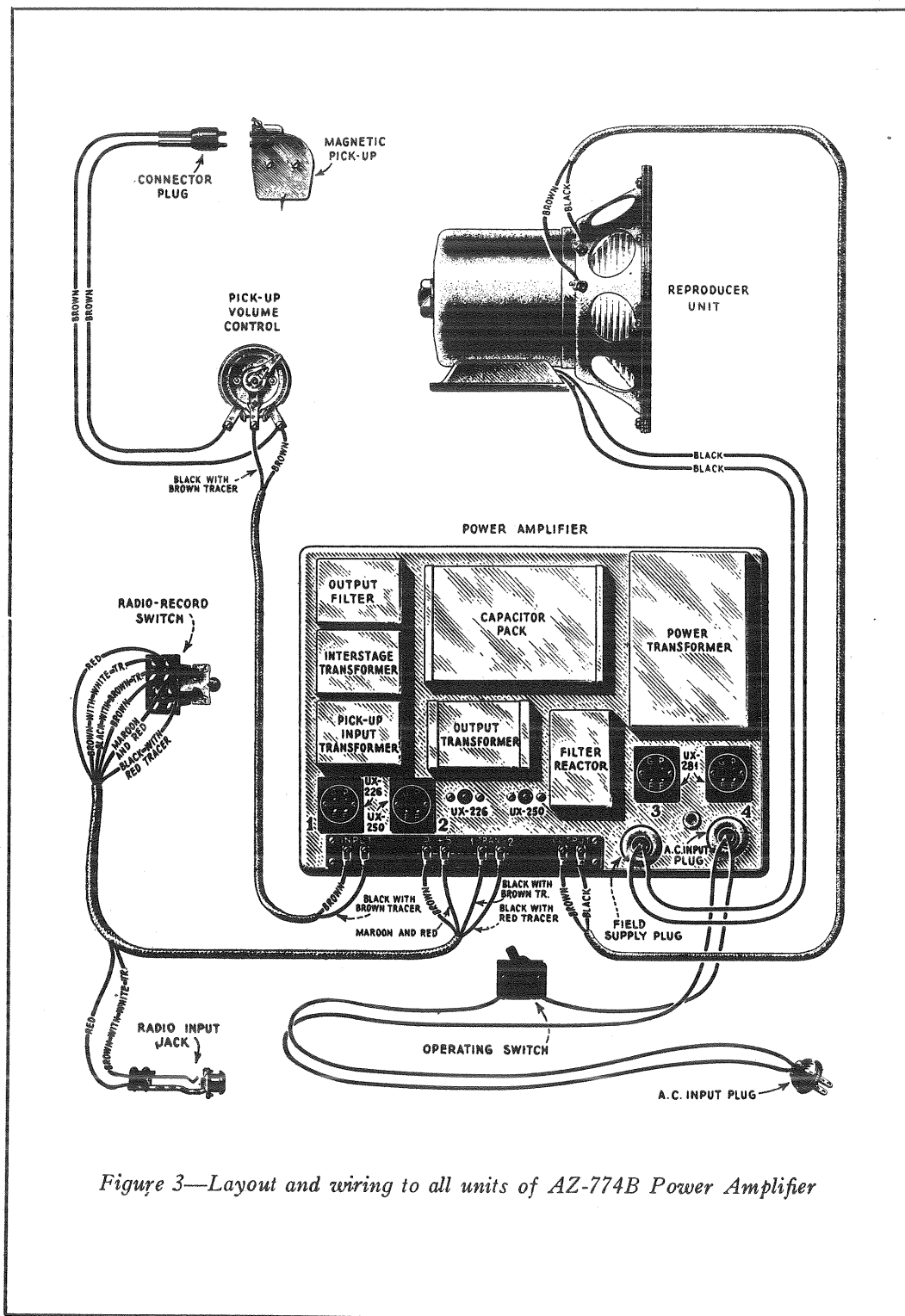


Figure 3—Layout and wiring to all units of AZ-774B Power Amplifier

Indication	Cause	Remedy
No reproduction ("Radio - Record" switch at either position)	<p>No supply voltage Defective operating switch</p> <p>Defective Radiotrons Defective "Radio-Record" switch. This will probably be evidenced by the amplifier functioning at one position of the switch</p> <p>Defective unit or part in S.P.U., or defective wiring</p> <p>Defective cables connecting various units Open cone coil</p>	<p>Turn supply voltage "On" Repair or replace defective operating switch</p> <p>Replace any defective Radiotron Repair and clean or replace defective "Radio-Record" switch</p> <p>Test all units and wiring according to the continuity test, Part III, Section 2 and make any repairs or replacements necessary</p> <p>Repair or replace any defective cable Replace reproducer cone as described in Part II, Section 5</p>
Low Volume ("Radio - Record" switch at either position)	<p>Defective Radiotrons Defective magnetic pick-up ("Record" position only) Low output from radio receiver ("Radio" only) Defective or open reproducer field Defective part in S.P.U.</p>	<p>Replace any defective Radiotrons Check magnetic pick-up according to Part IV, Section 1 Repair defective radio receiver</p> <p>Repair or replace field coil or connections Check according to continuity test and make any replacements necessary</p>
Distorted reproduction	<p>Defective Radiotrons Poor input from radio receiver ("Radio" only) Poor output from pick-up—"Record" only) Defective part in S.P.U.</p> <p>Cone not properly centered Wires on side of cone vibrating</p>	<p>Replace any defective Radiotron Repair any defect in radio receiver</p> <p>Check magnetic pick-up according to Part IV, Section 1 and make any repairs necessary Check S.P.U. according to continuity tests and make any repair or replacement necessary Center cone correctly according to Part II, Section 4 Fasten wires down with shellac or cement</p>
Hum	<p>Hum potentiometers not adjusted properly Loose laminations in power transformer</p> <p>Low emission Radiotrons UX-281 Shorted or open filter condenser in S.P.U. or shorted condenser across UX-250 bias resistor Open grounds in S.P.U. wiring Hum originating in Radio receiver</p>	<p>Adjust potentiometers as described in Part II, Section 2 Remove transformer from S.P.U., and place in slow oven bottom up for several hours. Cool for 24 hours and return to S.P.U. Replace a low emission Radiotron UX-281 Replace any defective condenser in S.P.U.</p> <p>Repair any opens in S.P.U. wiring Any hum present in the radio receiver will be amplified and reproduced through the loudspeaker. Remedy the hum in the receiver and it will not appear in the reproducer unit</p>

(4) CENTERING REPRODUCER CONE

To properly center a cone when making a replacement or repair, proceed as follows:

- (a) Remove reproducer to a position where the cone is accessible.
- (b) Loosen cone centering screw.
- (c) Place three small cardboard strips, about $1\frac{1}{2}$ " x $\frac{1}{4}$ " and the thickness of a visiting card, through the center web of the cone into the space between the pole piece and cone. This will give the cone coil the same clearance on all sides of the pole piece. Figure 4 shows this operation.
- (d) Tighten the center screw and the cone will be properly centered. Remove the three pieces of cardboard and return the reproducer unit to its normal position.

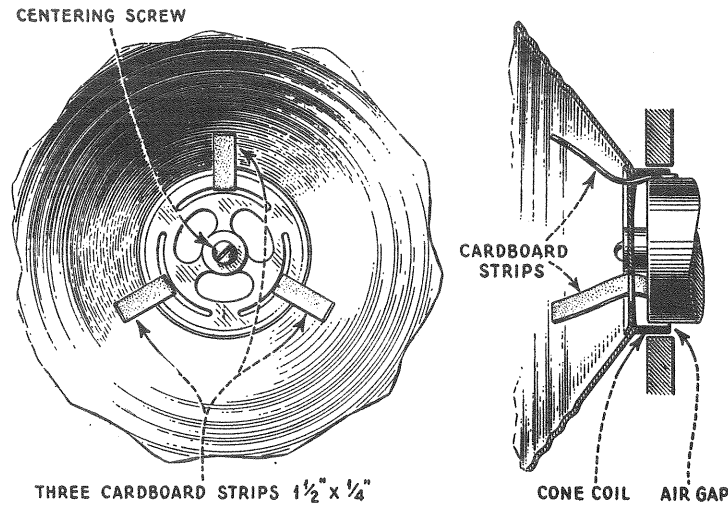


Figure 4—Location of cardboard strips for centering of cone

(5) TO REPLACE A CONE

Should it be necessary to replace a cone in the reproducer unit, proceed as follows:

- (a) Remove reproducer unit to a position where the cone is accessible.
- (b) Release the two cone leads from their terminal posts.
- (c) Remove the screw that holds the center of the cone to the pole piece.
- (d) Remove the nine screws, nuts and lock washers that hold the metal ring and cone to the cone support. The cone may now be removed and the new one placed in the position occupied by the old one. The parts removed should now be reassembled in the reverse manner of that used to remove them and the cone centered as described in Part II, Section 4.

PART III—ELECTRICAL TESTS

The following tests cover all the electrical circuits of the AZ-774B amplifier kit. The power transformer internal connections are shown in Figure 5 and the capacitor pack internal connections in Figure 6. The output filter connections are shown in Figure 7. Should the continuity tests show any unit to be defective, it is good practice to test the particular unit after disconnecting from the circuit. The values of D.C. resistance of all units are shown in Figure 8.

(1) VOLTAGE READINGS AT RADIOTRON SOCKETS

Socket voltage readings (which may be taken with a Weston Model 537 Set Analyzer or similar instrument) such as are given in the tables below are frequently helpful in locating trouble. It should be borne in mind, however, that it will be impossible in practice to duplicate these readings exactly, due to manufacturing tolerances, variations in line voltages and the use of leads and meters of different resistances.

The following measurements were made at a line voltage corresponding to the connections of the power transformer:

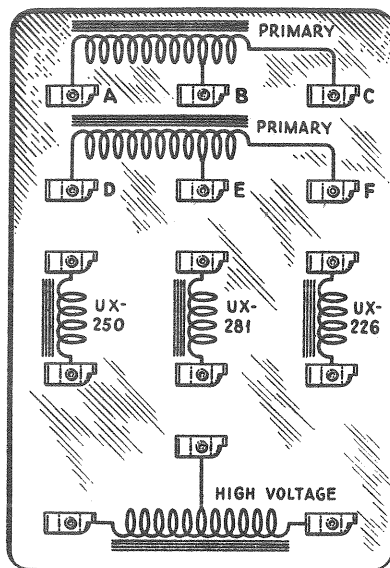


Figure 5—Internal connections of Power Transformer

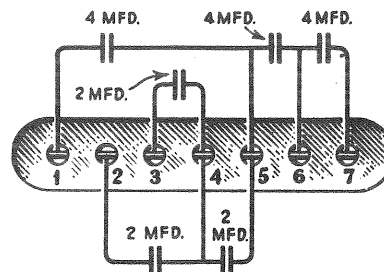


Figure 6—Internal connections of Capacitor Pads

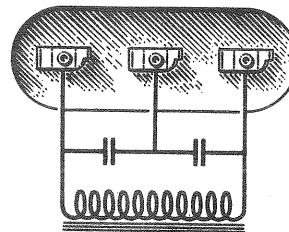


Figure 7—Internal connections of Output Filter

SOCKET VOLTAGE READINGS

	Filament Volts	Grid to Filament Volts	Plate to Filament Volts	Plate Current MA
UX-226	1.2	9	130	14
UX-250	7.2	70	420	55

(2) CONTINUITY TESTS

In making continuity tests of the entire S.P.U. or of an individual part, the following procedure is recommended:

Disconnect the A.C. input plug, the field supply plug and all connections to the terminal strip of the S.P.U.

A pair of headphones with at least $4\frac{1}{2}$ volts in series, or preferably a voltmeter with sufficient voltage to give a full scale deflection when connected across the battery terminals, should be used in making these tests. A direct reading "Ohmmeter" is also useful for circuit testing.

The socket contacts, numbers and terminals used in these tests are shown in Figures 3 and 9.

Test leads should be of the flexible insulated type with partially insulated testing points to prevent false readings, which otherwise may be caused by hand capacity effect. Similarly, the hands should not touch the chassis or the terminals across which a test is being made.

The resistance of the various circuits are indicated and any large deviation from this value will indicate a defective part.

The resistance of a circuit may be calculated from the formula:

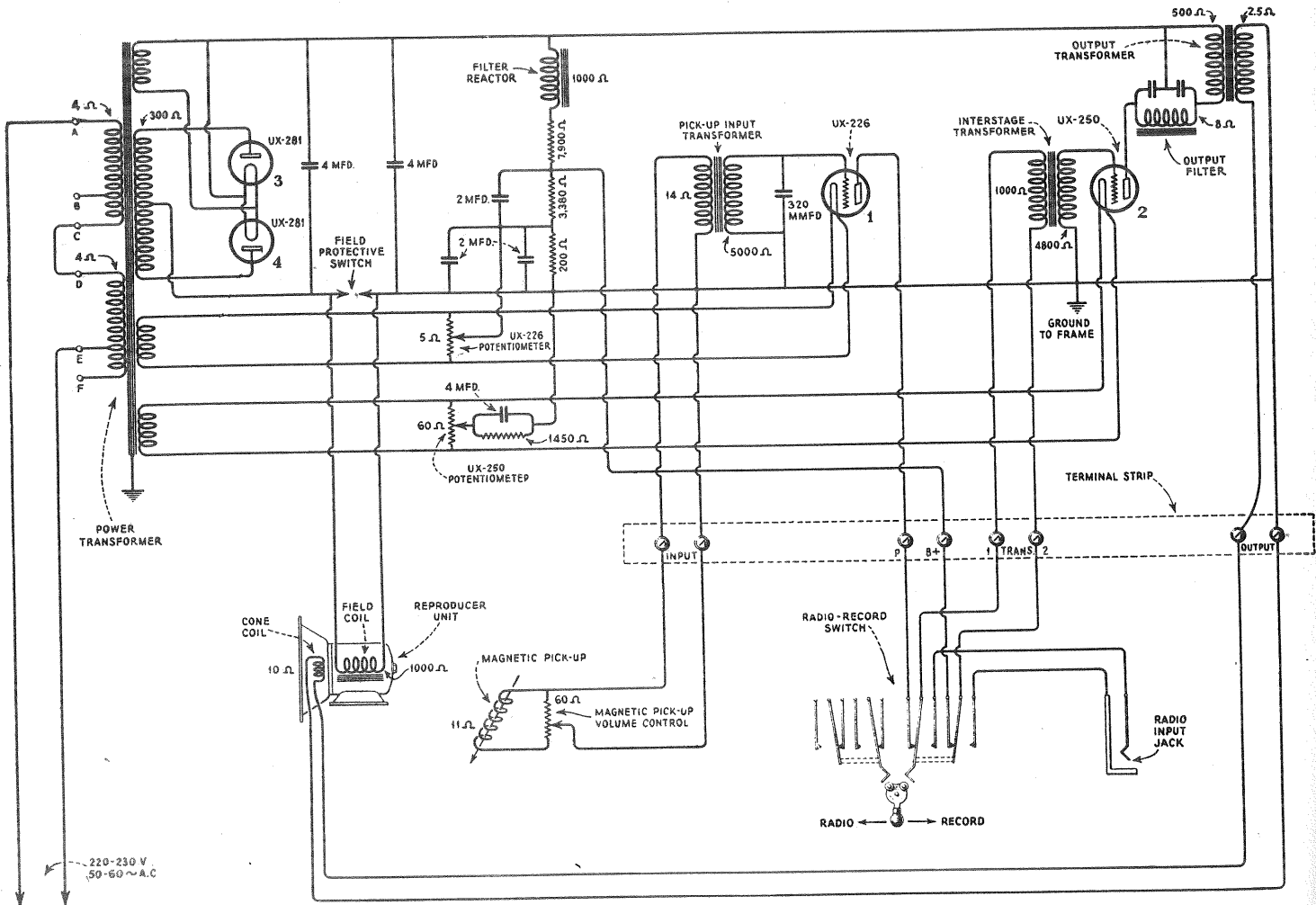


Figure 8—Schematic wiring diagram of RCA AZ-774B Amplifier and parts

$$\left(\frac{\text{Reading obtained of battery alone}}{\text{Reading obtained with resistor or coil in series}} - 1 \right) \text{ Resistance of meter} = \text{Unknown resistance}$$

Small condensers can best be checked by substituting one of known condition and like capacity. Large condensers, such as used in the capacitor pack, may be tested by charging with a D.C. voltage approximately the same as that used during normal operation and then discharged by short circuiting its terminals. An O.K. condenser will give a good spark, the size depending on the charging voltage and the capacity of the condenser. A leaky condenser will give no spark and a shorted condenser will give a spark when an attempt is made to charge it. Do not come in contact with a condenser charged with high voltage.

Test Terminals	Correct Effect	Incorrect Effect	
		Indication	Caused By
Across A.C. Input plug	Closed (2 or 8 ohms)	Open 2 ohms	Open primary winding of power transformer Open primary winding of power transformer
P contact of one UX-281 socket to P contact of other UX-281 socket	Closed (300 ohms)	Open	Open high voltage winding of power transformer
Across UX-226 filament contacts	Closed (.2 ohm)	5 ohms .2 ohm Open	Open UX-226 filament winding Open UX-226 potentiometer Open UX-226 filament winding and potentiometer
Across UX-250 filament contacts	Closed (.3 ohm)	60 ohms .3 ohm Open	Open UX-250 filament winding Open UX-250 potentiometer Open UX-250 filament winding and potentiometer
Across either UX-281 filament contacts	Closed (.2 ohm)	Open	Open UX-281 filament winding
One filament contact of either UX-281 socket to +B	Closed (9000 ohms)	Open	Open resistor R2 or filter reactor
+B to ground	Closed (3580 ohms)	Open	Open resistor R1
Either filament contact of UX-250 socket to ground	Closed (1480 ohms)	Open 30 ohms	Open 1450-ohm section of R1 or UX-250 potentiometer Shorted 4-mfd. condenser connected across 1450-ohm resistor
Across input terminals	Closed (14 ohms)	Open	Open primary of pick-up transformer
G contact of UX-226 socket to ground	Closed (5000 ohms)	Open Short	Open secondary of pick-up input transformer Shorted 320-mmfid. condenser connected across secondary of input transformer
Across terminals 1 and 2 of terminal strip	Closed (1000 ohms)	Open	Open primary of interstage transformer
G contact of UX-250 socket to ground	Closed (4800 ohms)	Open	Open secondary of interstage transformer
P contact of UX-250 socket to one filament contact of either UX-281 socket	Closed (508 ohms)	Open 500 ohms 8 ohms Short	Open filter coil or primary of output transformer Shorted condensers in filter unit Shorted condenser in filter unit Shorted condenser in filter unit
Across output terminals	Closed (2.5 ohms)	Open	Open secondary of output transformer
Across field supply plug	Closed (1000 ohms)	Open	Open field coil of reproducer unit
Across cone coil of reproducer unit	Closed (10 ohms)	Open	Open cone coil of reproducer unit
Across pick-up volume control (Pick-up disconnected)	Closed (60 ohms)	Open	Open pick-up volume control
Across magnetic pick-up	Closed (11 ohms)	Open	Open coil in magnetic pick-up

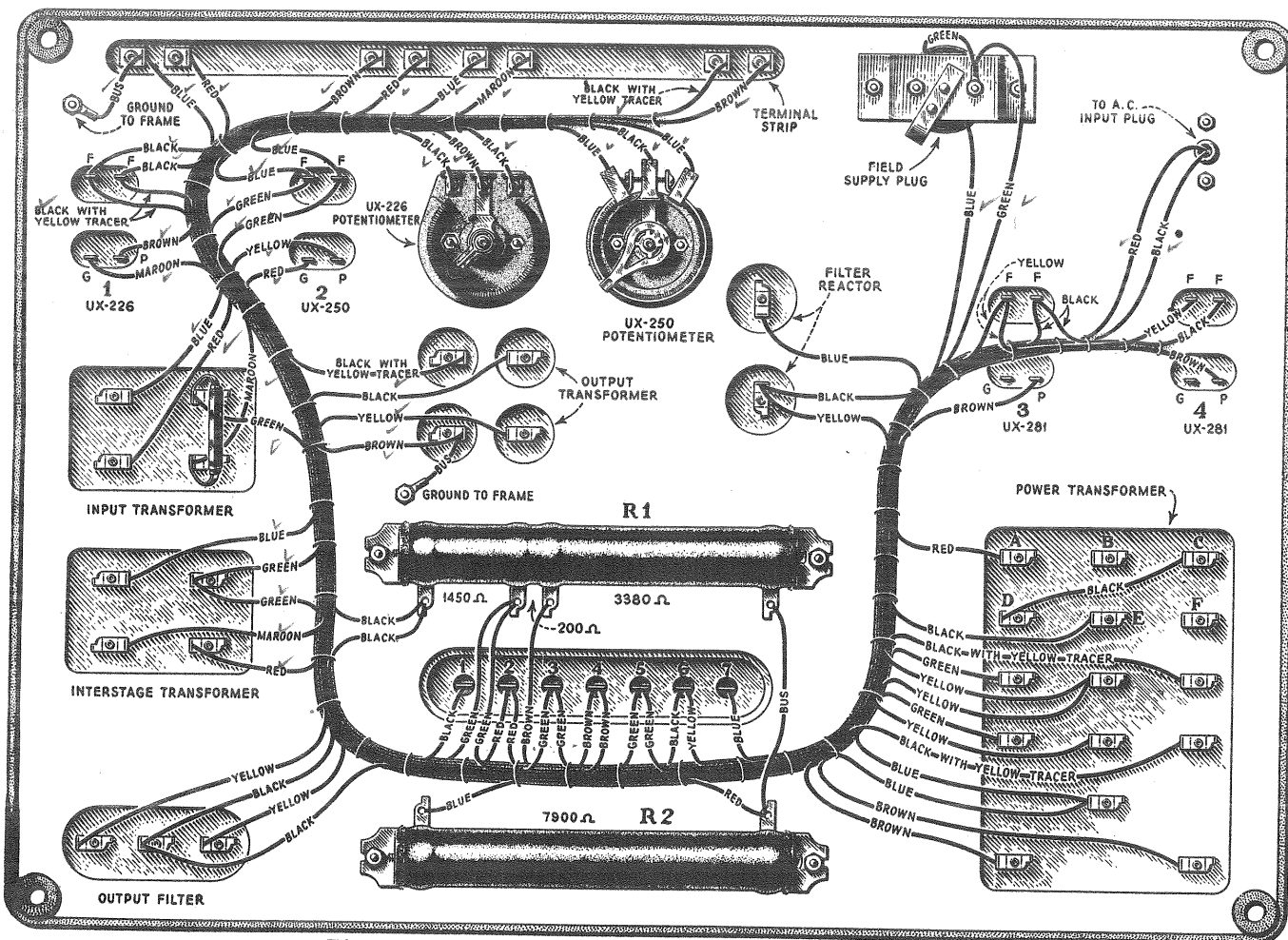


Figure 9—Wiring diagram of AZ-774B Socket Power Unit

PART IV—MAGNETIC PICK-UP SERVICE DATA

Weak, distorted or no reproduction at the "Record" position of the switch may be due to failure in the magnetic pick-up. This can be readily checked by throwing the switch to the "Radio" position. Normal reproduction of the radio input should be obtained. A further check can be made by connecting a pair of head telephones across the output of the pick-up while a record is being played. This can be done at the terminal strip across the terminals marked "input," and if no results are obtained there, across the two leads from the pick-up to the volume control, first disconnecting the volume control. If the pick-up is functioning normally the record will be heard in the phones playing softly. Any distortion present or lack of reproduction will be due to failure of some part or adjustment in the pick-up.

(1) NO REPRODUCTION

If no music can be heard in the phones when connected across the output leads of the pick-up look for:

- (a) Poor contact or open connections at volume control.—The volume control resistance strip can be cleaned with a little of one of the various cigarette lighter fluids applied with a pipe-cleaner, and the volume control arm should be adjusted to wipe firmly on the edge of the volume control resistance strip.

- (b) Open pick-up coil or connections.—Click test between the contacts in the pick-up contact plug. If no click is obtained the trouble is either an open coil or an open coil connection. If the first is true it will be necessary to replace the coil as outlined in Part V, Section 5. A loose connection may be resoldered. Before remounting the pick-up on the suspension arm, clean the contacts in the pick-up contact plug.
- (c) Poor contact or open connections at the swivel arm contact plug.—Remove the pick-up wires from the volume control and check for open circuit from these leads through the pick-up. If open circuit is indicated, see that the contacts in the swivel arm contact plug are clean; are capable of free movement and have sufficient spring pressure to enable them to make firm contact. Inspect also the connections of the pick-up leads to the swivel arm contact plug, click testing from the free ends of the leads to the contact points. To remove the swivel arm contact plug for inspection it is simply necessary to remove the contact plug set screw and to pull the plug out of the open end of the swivel arm, using a pair of long-nosed pliers to grasp one of the contact pins. It may also be necessary to unsolder the pick-up leads at the volume control.

(2) WEAK OR DISTORTED REPRODUCTION

Weak or distorted reproduction may be due to:—

- (a) Loose needle.—Noise will result if the needle is not clamped tightly in the armature needle socket. Before proceeding with any other service work tighten the needle set-screw and re-test operation.
- (b) Dirty or loose contacts in the jack, at the volume control arm, or at the swivel arm contact plug.—Loose contacts generally result in periods of inoperation interspersed with periods of either normal or noisy operation.
- (c) Armature out of adjustment.—If the vibrating armature is not in the electrical center of the air gap between the two pole pieces weak reproduction will result. For adjustment see Part V, Section 3.
- (d) Defective rubber.—After a considerable period of time the rubber damping block and pivot cushions may harden, causing weak reproduction. Rubber so aged as to cause weak reproduction usually loses so much of its elasticity that the armature will stick to one or the other of the pole pieces if moved against it by hand. In this connection it may be pointed out that frequent use of the pick-up increases the normal "life" of the rubber damping block and pivot cushions. Never allow the pick-up to rest on a record for any considerable time when not in use, as this tends to produce a permanent "set" in the pivot cushions and shortens their "life." Should the rubber become sufficiently hard to prevent the armature from vibrating properly or to cause it to stick, it should be replaced as described in Part V, Section 7.
- (e) Foreign material in the air gap.—Iron filings, rust or dirt in the air gap will cause weak reproduction usually accompanied by "raspy" noise. Filings or other loose material may be removed by an air blower, although it is sometimes necessary to disassemble the unit to clean it successfully. See Part V, Section 6. If the armature is rusty it should be replaced, but, as a temporary measure in case another armature is not immediately available, it may be removed, sand-papered smooth, and returned to the pick-up.
- (f) Weak magnet.—The importance of placing a soft iron "keeper" across the poles of the magnet immediately before the disassembly of the pick-up and of allowing it to remain in place until the pick-up is reassembled cannot be over-emphasized. Generally speaking, a pick-up magnet will not become weak except as the result of careless handling when service work is being performed. If the magnet does become weak, however, it should be taken to the nearest magneto repair shop and re-magnetized, care being taken to place

a "keeper" across the poles of the magnet before it is removed from the charging apparatus, and to leave it on the magnet until the magnet has been replaced against the pole pieces of the pick-up.

- (g) Needle holder rattle.—If the pole pieces and armature are not centered on the front of the pick-up housing, the needle holder will rattle against the edges of the aperture provided for it in the cover. This trouble may sometimes be corrected by loosening the pick-up cover screws and shifting the cover slightly. To do this it may also be necessary to remove the cover and, by loosening the magnet clamping screw, shift the magnet clamping plate. If the cover cannot be shifted so as to center its aperture around the needle holder it will be necessary to shift the pole pieces. See Part V, Section 4.

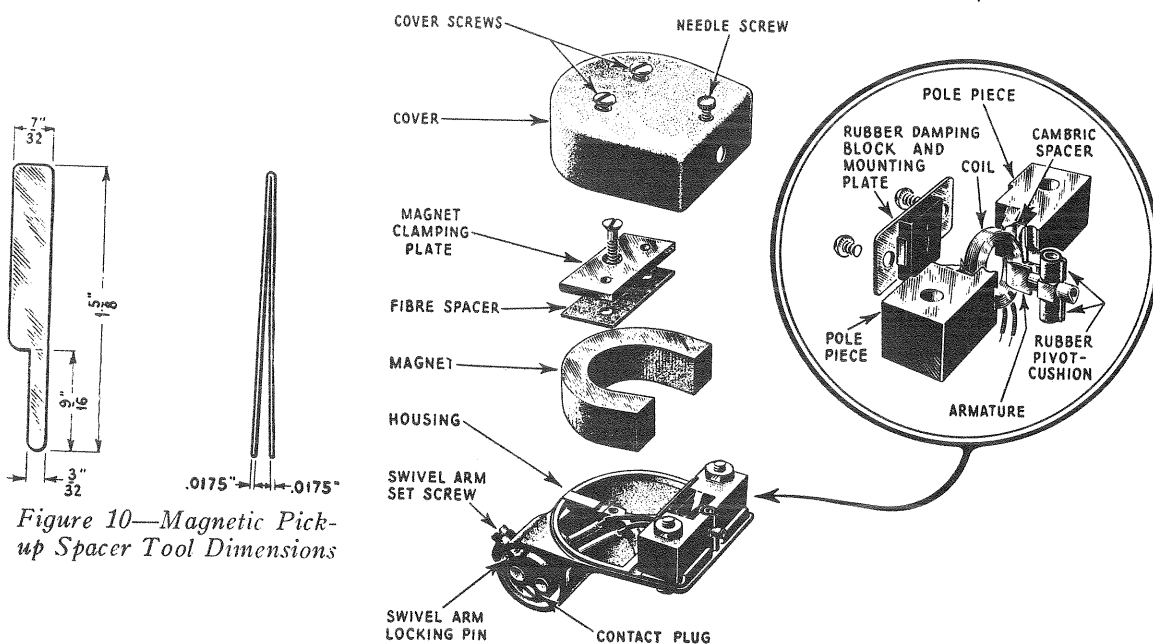


Figure 10—Magnetic Pick-up Spacer Tool Dimensions

Figure 11—Details of the Magnetic Pick-up

PART V—MAKING MAGNETIC PICK-UP REPLACEMENTS AND ADJUSTMENTS

(1) PICK-UP FEELER GAUGE

To adjust the magnetic pick-up, but one special tool is necessary—a feeler gauge, shown in Figure 10. This gauge may be made from 20 mil phosphor bronze stock according to the dimensions given. This gauge is not used to center the armature, but to obtain the correct total air-gap between the pole pieces of the pick-up, in which space the armature vibrates. Therefore, each tip need not be exactly the same thickness if the combined thickness of the two tips is 35 mils, although in filing down the tips each tip should be filed approximately the same. This gauge—carried as RCA Replacement Part No. 2677—may be obtained from RCA Victor Co., Inc., Radiola Division, Technical Service Department.

Before bending the phosphor bronze stock it should be annealed at the point where the bend is to occur and tinned very slightly about $\frac{1}{8}$ inch each way from the folding point. After bending it should be hammered together at the fold, and heated so as to "sweat" the two parts together at the tinned surfaces.

(2) TO OPEN THE PICK-UP FOR EXAMINATION

If the pick-up is located on a Victor tone arm, it may be removed in the following manner. If it has a special mounting or is mounted on some other tone arm, removing it will have to depend on the individual circumstances.

- (a) Loosen the pick-up swivel arm set screw (see Figure 11) until the threaded position of the screw just shows above the shoulder in the pick-up housing socket. This should bring the lower end of the screw flush with the inner surface of the socket wall.
- (b) Rotate the pick-up counter-clockwise (the needle holder traveling down and back) until the pick-up locking pin strikes the forward edge of the transverse portion of the slot in the swivel arm.
- (c) Slip the pick-up off the end of the swivel arm.
- (d) Remove the needle holding screw and the two cover screws.
- (e) Remove the pick-up cover pivoting it about the front edge of the pick-up housing so as to clear the needle holder.

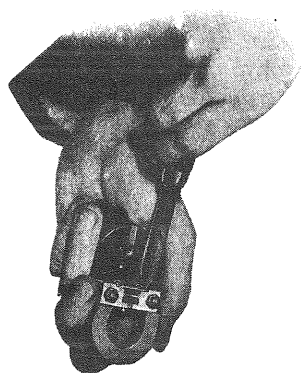
(3) TO CENTER THE ARMATURE

- (a) Remove the pick-up cover as described in Part V, Section 2.
- (b) Remove the magnet clamping screw, clamping plate and fibre spacer.
- (c) Transfer the magnet to the opposite side of the pole pieces as shown in Figure 12, sliding it over the top of the pole faces so as to keep it as much as possible in contact with a magnetic material during the transfer.
- (d) Loosen the screws holding the rubber damping block mounting plate just enough to make it possible to slip the plate back and forth under the screw heads.
- (e) Slip the point of a knife between the pole piece towards the smallest gap and an end of the damping block mounting plate. (Figure 12.) Twist the knife, thereby slipping the plate towards the other pole piece and centering the armature. The center may be judged by eye with sufficient accuracy.
- (f) Tighten the damping block mounting plate screws and examine the gap to see that the position of the plate is not changed.
- (g) Replace the magnet, fibre spacer, magnet clamping plate and screw. Draw the screw up snug, but not tight.
- (h) Replace the cover and observe which way it may be necessary to move the magnet clamping plate to line up the holes for the cover screws.
- (i) Remove cover, line up clamping plate, and tighten the clamping screw.
- (k) Replace the cover and cover screws, making sure that the needle holder is centered in the aperture provided for it in the pick-up cover. If the cover cannot be slipped sufficiently to center the needle holder aperture, put a full tone needle in the holder, replace the needle holding screw, tighten it and determine whether the pick-up will rattle against the case when in use by pulling the needle to either side with the fingers. If it is evident that rattle may result, the pole pieces must be slipped on the housing to center the needle holder in its aperture. See Part V, Section 4.
- (l) Replace the pick-up in its position on the swivel arm in the reverse manner of that used to remove it.

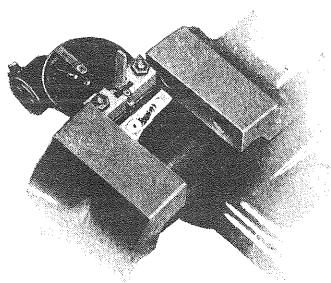
(4) ADJUSTMENT OF POLE PIECES

- (a) Remove the pick-up cover as described in Part V, Section 2.
- (b) Remove the magnet clamping screw, clamping plate, and fibre spacer.
- (c) Place a soft iron keeper such as a $\frac{1}{4}$ " carriage bolt (or a piece of iron having an equivalent cross-section) across the ends of the magnet and remove the magnet, first marking with a pencil one end of the magnet and the corresponding pole piece.

- (d) Remove the two screws holding the damping block mounting plate.
- (e) Remove the damping block and plate and test the air gaps at the end of the armature between it and the pole pieces by means of the feeler gauge. The gauge should be inserted by placing the long edges along each side of the tip of the armature and moving the gauge into the gap toward the coil, and not inserted tip first. See Figure 13. The end of the armature is tapered and the air gap should vary from 15 mils near the pick-up coil to 20 mils at the end of the armature. The gauge should therefore stick about half way in the gap. If the gauge fits at the bottom of the gap the spacing at the center will be 20 mils, and if the gauge will just enter the gap the spacing will be 15 mils at the center of the gap. The spacing should not be greater than 20 mils nor smaller than 15 mils at the center of the gap, as weak reproduction or rattle will result. If the air gap is not of the correct width it may be adjusted as follows:

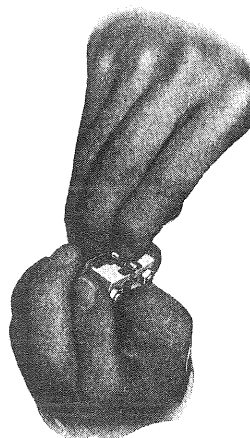


12—Centering the Armature



13—Adjustment of Pole Pieces

AZ-774B Magnetic Pick-up Adjustments



14—Replacing Pivot Cushions

- (f) After having removed the cover, magnet, and rubber damping block and plate, place the pick-up in a bench vise in such a manner that the vise grips **only** against the ends of the pole pieces (See Figure 13), the pick-up housing being free of the vise jaws. Tighten the vise just sufficiently to hold the unit. The feeler gauge should **not** be left in the air-gap while tightening the vise.
- (g) Slack up on the pole piece mounting screws, leaving the lock washers partly compressed.
- (h) Adjust the width of the air gap, using the feeler gauge as described above, making sure that the pole pieces are flush with the raised portion of the front edge of the pick-up housing.
- (i) When the correct gap has been obtained, slip the housing in the direction parallel to its front edge until the needle holder is centered over the notch in the raised portion of the edge of the housing.
- (k) Tighten the pole piece mounting screws. Make sure that the raised front edge of the pick-up housing is back against the pole pieces so as to line them firmly against this edge.
- (l) If the pole pieces do not grip the armature pivot firmly when the proper gap has been obtained, it will be necessary to replace the rubber pivot cushions. See Part V, Section 7.
- (m) Replace the rubber damping block, and with a screw driver press the rubber about the slot well down around the end of the armature.
- (n) Center the armature as outlined in Part V, Section 3, replacing the magnet so that the pencil marks, previously made, will coincide.

(5) TO REPLACE THE PICK-UP COIL

- (a) Remove the pick-up cover, magnet, and rubber damping block as described in Part V, Section 2.
- (b) Loosen both pole-piece mounting nuts, leaving the lock washers partly compressed.
- (c) Slip the pole pieces apart as far as the clearance around the mounting screws will permit and remove the armature.
- (d) Unsolder the coil leads and remove the coil.
- (e) Place the new coil in position, being sure that the cambric spacer is in place. See Figure 10. The spacer around the defective coil may be used. Clean the tips of the coil leads with fine sandpaper back to the outer ends of the protective sleeves and solder in place. It may be necessary when replacing a coil to replace the rubber pivot cushions also. See Part V, Section 4, paragraph (1), and Part V, Section 7.
- (f) Adjust the pole pieces and center the armature as described in Part V, Sections 4 and 3.

(6) TO REPLACE THE PICK-UP ARMATURE

- (a) Follow procedure outlined in Part V, Section 5, paragraphs (a) to (c) inclusive.
- (b) Insert the new armature and, if necessary, new pivot cushions. See Part V, Section 4, paragraph (1), and Part V, Section 7.
- (c) Adjust the pole pieces and center the armature as described in Part V, Sections 4 and 3.

(7) REPLACING THE RUBBER

Replacing the rubber damping block requires no further description than that given in Part V, Section 4. Replacing the pivot cushions is more difficult and requires the following procedure:

- (a) Follow the procedure outlined in Part V, Section 5, paragraphs (a) to (c) inclusive.
- (b) Aged rubber may stick to the armature or pole pieces. Scrape these parts clean with the point of a knife.
- (c) Slip the pole pieces (separated as far as possible) back on the housing and insert one rubber strip lengthwise between the two pole pieces and the raised front edge of the pick-up housing so as to bridge the lower pivot bearing surfaces. See Figure 14.
- (d) Slip the pole pieces forward to grip the lower pivot cushion between the pole pieces and the raised front edge of the pick-up housing.
- (e) With the front surfaces of the pole pieces in a horizontal position place the other rubber strip across the upper pivot bearing.
- (f) Carefully insert the armature tip between the cushions to rest the pivots against them, and press the armature into place, thereby folding the rubber cushions about the pivots.
- (g) The two ends of the lower pivot cushion will be held between the pole faces and the raised front edge of the housing. With the point of a knife or other sharp-pointed instrument pull out these two ends.
- (h) See that the armature is vertically centered in the oblong space appearing in the front of the two pole pieces and adjust the pole pieces as in Part V, Section 4.
- (i) With a pair of scissors or other sharp instrument cut off the excess rubber protruding from the pivot bearing.
- (k) Center the armature as in Part V, Section 2, and replace the pick-up on the swivel arm.

MAGNETIC PICK-UP SERVICE DATA CHART

Indication	Cause	Remedy
No Reproduction	Poor volume control contact between arm and resistance	Clean volume control resistance with a pipe cleaner and any of the various cigarette lighter fluids
	Open pick-up coil or connections	Repair any loose connections by resoldering or replace an open coil as described in Part V, Section 5
Weak or Distorted Reproduction	Loose needle	Tighten needle in socket with needle set screw
	Dirty contact in volume control	Clean volume control resistance and contact arm
	Armature out of adjustment	Center armature as described in Part V, Section 3
	Defective rubber damping block or pivot supports	Replace rubber damping block and pivot supports as described in Part V, Section 7
	Dirt in armature air gap	Clean all dirt from air gap by means of a blower or disassemble pick-up and clean. Remove rust from armature if necessary.
	Weak magnet	Remagnetize magnet by taking to magneto repair shop. Place keeper across pole faces until magnet is again in place in the pick-up. Making repairs without placing a keeper on the magnet is the easiest way of having the magnet lose its magnetism
	Needle holding screw rattle	If the needle hole of the pick-up cover touches the set screw that holds the needle, a rattle will result. Relocate the cover by shifting the magnet clamp