



# **Type 70-D**

## **Transcription Turntable**

**RADIO CORPORATION OF AMERICA**  
**RCA VICTOR DIVISION** **CAMDEN, N. J.**

**INSTRUCTIONS**

**Type 70-D**  
**Transcription Turntable**

**MI-11801, Umber Gray, 60 Cycles**

**MI-11801-A, Black, 60 Cycles**

**MI-11802, Umber Gray, 50 Cycles**

**MI-11802-A, Black, 50 Cycles**

**RADIO CORPORATION OF AMERICA**  
**RCA VICTOR DIVISION** **CAMDEN, N. J.**



*Figure 1—Type 70-D Transcription Turntable.*

## DESCRIPTION

### General

1. The Type 70-D Transcription Turntable is designed for high-fidelity reproduction from records and transcriptions. Mounted on the turntable is a universal pickup-and-arm assembly for use in reproducing both lateral- and vertical-cut records. An MI-4975 Reproducing Filter is mounted inside the cabinet. To record, a Type 72-DX (MI-11900) or Type 72-D (MI-11901) Recording Attachment may be easily added to the turntable.

2. The arrangement of the turntable components is such that the cabinet may be placed against a wall. A hinged door on the front of the cabinet permits easy access to the motor, filter and terminal boards. There is sufficient space within the cabinet to mount a booster amplifier of the BA-2 Series.

### Motor and Turntable

3. The motor is a high-torque synchronous type, cushion-mounted on the bottom shelf of the equip-

ment. The turntable has associated with it a separate flywheel to insure excellent speed regulation.

### Power Switch

4. The a-c power switch is a mercury-tube of the tumbler type. This silent type of power switch, mounted atop the cabinet, permits the turntable to be operated near a microphone.

### Turntable Speeds

5. A speed-change switch near the edge of the turntable plate is used to select either 78- or 33 1/3-rpm for the turntable speed.

### Pickup and Filter

6. The universal pickup and filter reproduces the various types of records (Orthacoustic, Victor, RCA, Columbia, World and others) with a response characteristic which is considered an ideal play-back response. The filter unit is designed so that this response is obtained by turning a switch to one of six positions.

## TECHNICAL DATA

### TURNTABLE AND MOTOR DATA

#### Power Supply Required

105 to 125 volts  
60 cycles (MI-11801, -A)  
50 cycles (MI-11802, -A)  
35 watts

#### Turntable Diameter

16 inches

#### Turntable Speeds

33 1/3 and 78 rpm

#### Finish

MI-11801, MI-11802, Umber Gray  
MI-11801-A, MI-11802-A, Black

#### Turntable Speed Regulation

0.6% (peak to peak) at 33 1/3 rpm  
(0.25% approximate rms value)  
0.4% (peak to peak) at 78 rpm  
(0.2% approximate rms value)

These peak values are the difference between maximum and minimum speeds expressed as a percentage of the average speed.

#### Dimensions and Weight

Width—24 inches  
Depth—24 inches  
Height—28 inches  
Weight—150 pounds

### PICKUP AND FILTER DATA

#### Pickup Type

Universal: May be used for reproducing either lateral- or vertical-cut records.

#### Frequency Response

See figures 7, 8, 9 and 10

#### Output Level

—60 VU at lateral positions  
—68 VU at vertical positions  
(Average output with transcription input)

#### Output Impedance

250 ohms

#### Load Impedance of Filter

Output of the pickup filter should be connected to the unloaded input transformer of an amplifier having a flat response and designed for operation from a 250-ohm source.

#### Noise Level

Less than -120 dbm

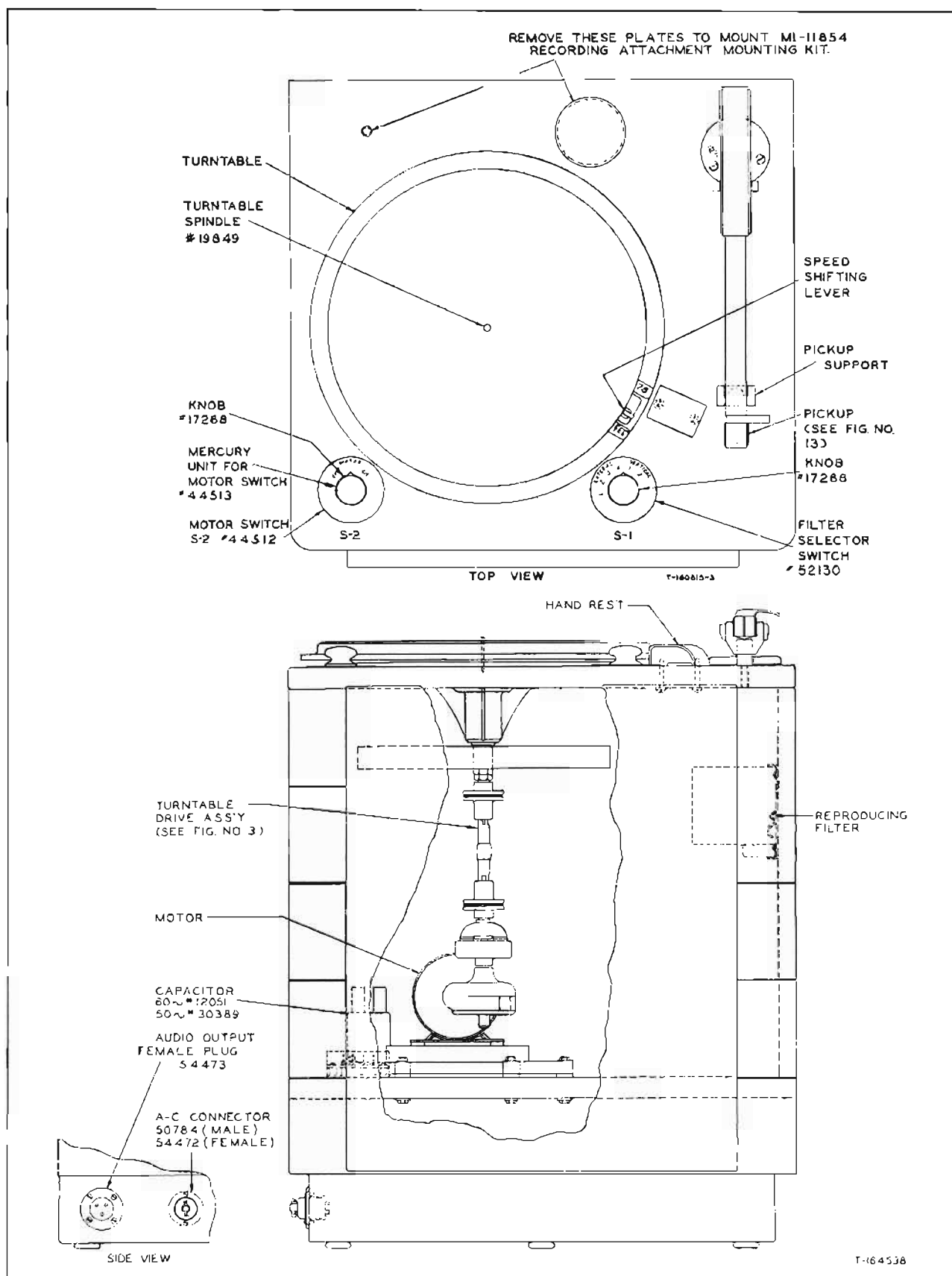


Figure 2—Top and front views of Type 70-D Turntable.



7. The pickup head is of the moving-conductor type in which two ribbons are free to vibrate in their respective magnetic fields. The phase relation of the voltages generated in the ribbons reverses 180 degrees when changing from reproducing lateral records to vertical records. The filter unit in the output circuit selects the proper circuit so that the output voltages will be additive for either type of record.

8. Since any vertical modulation will be cancelled out when playing lateral-cut records, the "pinch-effect" in lateral reproducing is cancelled out. (The pinch-effect is due to cutting a record with a plane and reproducing with a spherical surface. This produces second-harmonic frequencies which would seriously affect the quality of reproduction if not cancelled out by the pickup filter circuit.)

9. The pickup head contains a diamond-point stylus to eliminate the necessity of changing styli.

## INSTALLATION

### Unpacking

10. When unpacking the equipment, extreme care should be exercised in removing the crating which is used to protect the top of the turntable in shipping. The packing that covers the turntable should be removed carefully, and in such a manner that the turntable is not raised or disturbed in any way. Remove any shipping wedges that may be under the turntable.

*CAUTION: Do not at any time, whether during unpacking, assembly or operation, lift the turntable or remove the spindle from its bearing except as noted in "Maintenance."*

11. All wrappings should be carefully removed from the pickup arm.

12. The flywheel is packed by securing with bolts under the cabinet. Inside the cabinet will be found a box containing the flexible couplings, shaft assembly, and small hardware. These items should be unpacked and handled very carefully.

13. When dusting the equipment, subsequent to unpacking, and also at all other times, take particular care that dust is not brushed or blown underneath the turntable and thus conveyed to the turntable bearings. The use of an oiled cloth for dusting purposes is recommended.

### Assembly

14. Refer to figure 3. Open the door of the cabinet by using the hand grip provided at the

bottom-left-edge of the door, thereby gaining access to the driving mechanism. The motor and base are fastened to the cabinet floor by means of wooden clamps and carriage bolts for protection during shipping. Remove and discard these wooden clamps and bolts before proceeding further.

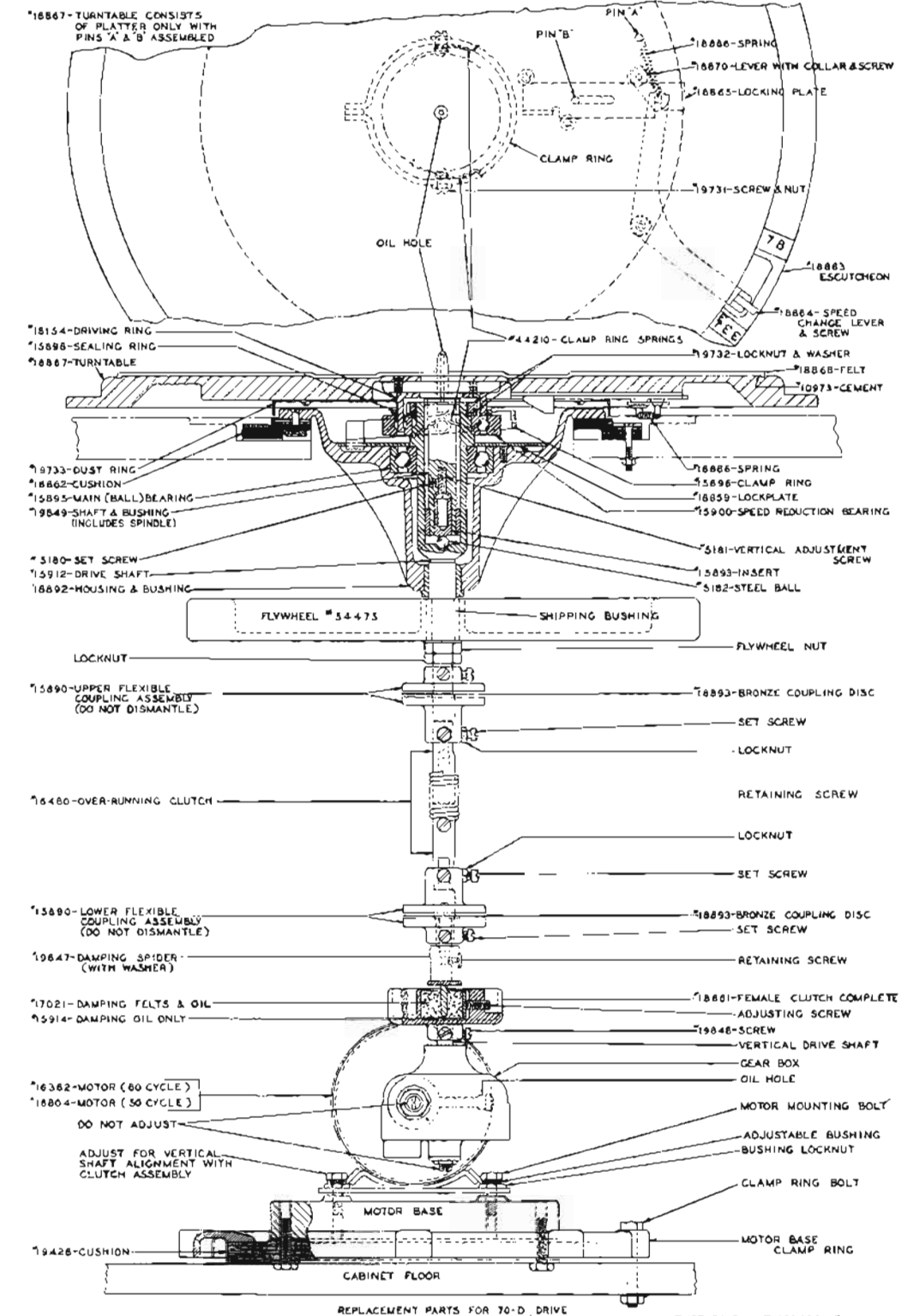
*CAUTION: The motor and the entire drive shaft assembly are carefully aligned at the factory. Under no circumstances attempt to realign the assembly by loosening the motor mounting bolts in the motor mounting ring. The horizontal and the vertical shaft thrust bearing adjustment screws in the motor gear box are likewise carefully adjusted at the factory, and under no circumstances should they be disturbed.*

15. Remove the two hexagon nuts and the shipping bushing from the flywheel shaft. Place the flywheel, the recessed side up, on the flywheel shaft and secure it in position by means of the two hexagon nuts removed in the previous operation, and make sure that it is securely clamped. The flywheel should slip on the shaft easily when placed in position and it must not be forced or damage to the shaft may result.

16. The turntable drive assembly is shipped partly unassembled.

*CAUTION: Exercise extreme care when handling the shaft and flexible couplings to avoid forcing the couplings in such a way as to cause injury to the bronze discs that form a part of their assembly.*

17. Refer to figure 3. With the set screws and locknuts loosened, place the coupling shaft and flexible coupling assemblies in position at the drive assembly, slide the upper flexible coupling up on the flywheel shaft, and the lower flexible coupling down on the drive shaft. Space the couplings equally on the shafts and then tighten the set screws and locknuts. Note that the flywheel shaft and the short shaft projecting upward from the mechanical filter are "spotted" for the cone point set screws and that both ends of the coupling shaft are provided with "flats" for the accommodation of their respective set screws in the collars of the flexible couplings. Observe also that the coupling shaft consists of two members (male and female), the joint of which is concealed by the spring of the over-running clutch. The shaft should be replaced in such a manner that the retaining screw of this spring is toward the bottom of the shaft. Be sure that the two members



**Figure 3—Turntable-drive assembly.**

of the shaft are completely engaged, one with the other. Do not force the shaft assembly on the flexible couplings when replacing the assembly.

18. See that all set screws in the foregoing operation are properly seated and tightened.

19. The mechanical filter (cup-like receptacle above the motor) includes two adjusting screws which, when tightened, cause movable plates to compress the felt cushions which form a part of this filter. As shipped from the factory, these adjusting screws are loosened an amount such that proper pressure is obtained when the screws (see figure 3) are tightened six turns. At this point the felt cushions should be firm but not hard.

**NOTE:** When the turntable is used primarily for recording, these screws should be tightened to compress the felts snugly without undue squeezing. This eliminates excessive backplay and gives a more positive drive for recording work.

### Lubrication

20. Pour the entire contents of the bottle of oil shipped with the equipment into the oil well, which is the cup-like receptacle of the mechanical filter. The purpose of this oil is to saturate the felt cushions accommodating the two driving vanes and thus lubricate the assembly. Under normal conditions it is not necessary to replace this oil. If, however, circumstances arise making such replacement necessary, use a similar quantity of Vacme "AA" oil or its equivalent (SAE-60). Two oil pipes are provided, one in each end-bell, for the lubrication of the motor bearings, and an oil hole is provided in the top turntable spindle for lubrication of the spindle bushings. Use a light (SAE-20) high grade non-gumming machine oil, and apply six or seven drops to the motor bearings and a few drops to the turntable spindle oil hole at intervals of one month. Before oiling the turntable spindle remove the pin stopper, and after oiling replace the stopper to prevent dust and dirt from clogging this hole.

### Location

21. Be sure the turntable is installed on a level surface. Three adjustable glides are provided on the bottom of the cabinet. If the floor is uneven, adjust the height of these glides to level the cabinet.

### Mounting Base

22. To increase the overall height of the cabinet to 30 inches, an MI-11803 Mounting Base may be added. This base is supplied complete with mounting hardware and holes for re-mounting the glides.

The single spacer included with the MI-11803 should be placed at the rear mounting hole between the mounting base and cabinet base.

### Recommended Associated Equipment

23. The pickup filter is designed to work directly into the primary of an unloaded input transformer of amplifiers such as the RCA Types 82, 84, 85, 87, BA-1, BA-2 and BA-4 series, and may be used with other amplifiers having a low-impedance input, unloaded input transformer, and a flat frequency-response characteristic.

24. The pickup filter may also be used with the Type BA-3 series of amplifiers. Instructions for modification of the input circuit of any of the BA-3 series of amplifiers for use with the filter used in the turntable are given in the instruction book covering the amplifier.

25. This turntable may also be used with the Type 76-B or 76-C series of Consolettes. When used with the 76-B series of Consolettes it is necessary that a preamplifier (such as mentioned above) be connected between the turntable and the Consolette.

26. Any of the Type BA-2 series of Booster Amplifiers may be mounted inside the turntable cabinet as specified in the instruction book covering the amplifier.

### A-C Power Connections

**CAUTION:** Be sure that the motor switch is OFF when making connections.

27. Remove the a-c plug from its receptacle (fig. 2). Connect an a-c power supply of the voltage and frequency specified under *Technical Data* to this plug. Fit the plug into the receptacle.

### Audio Output Connections

28. A standard 3-terminal Cannon female plug (fig. 2) is intended for output connections. A suitable male receptacle should be used for connection to this plug. Use shielded leads for the connections to this receptacle. Connect the output leads to terminals number 1 and 2, and the shield lead to terminal number 3.

## OPERATION

### Frequency Response

29. The filter switch dial has six positions, four for lateral reproducing and two for vertical reproducing. Refer to figures 7 through 10 for the various response curves using record and oscillator inputs. Figure 11 illustrates the connections to be made to secure the oscillator curves.



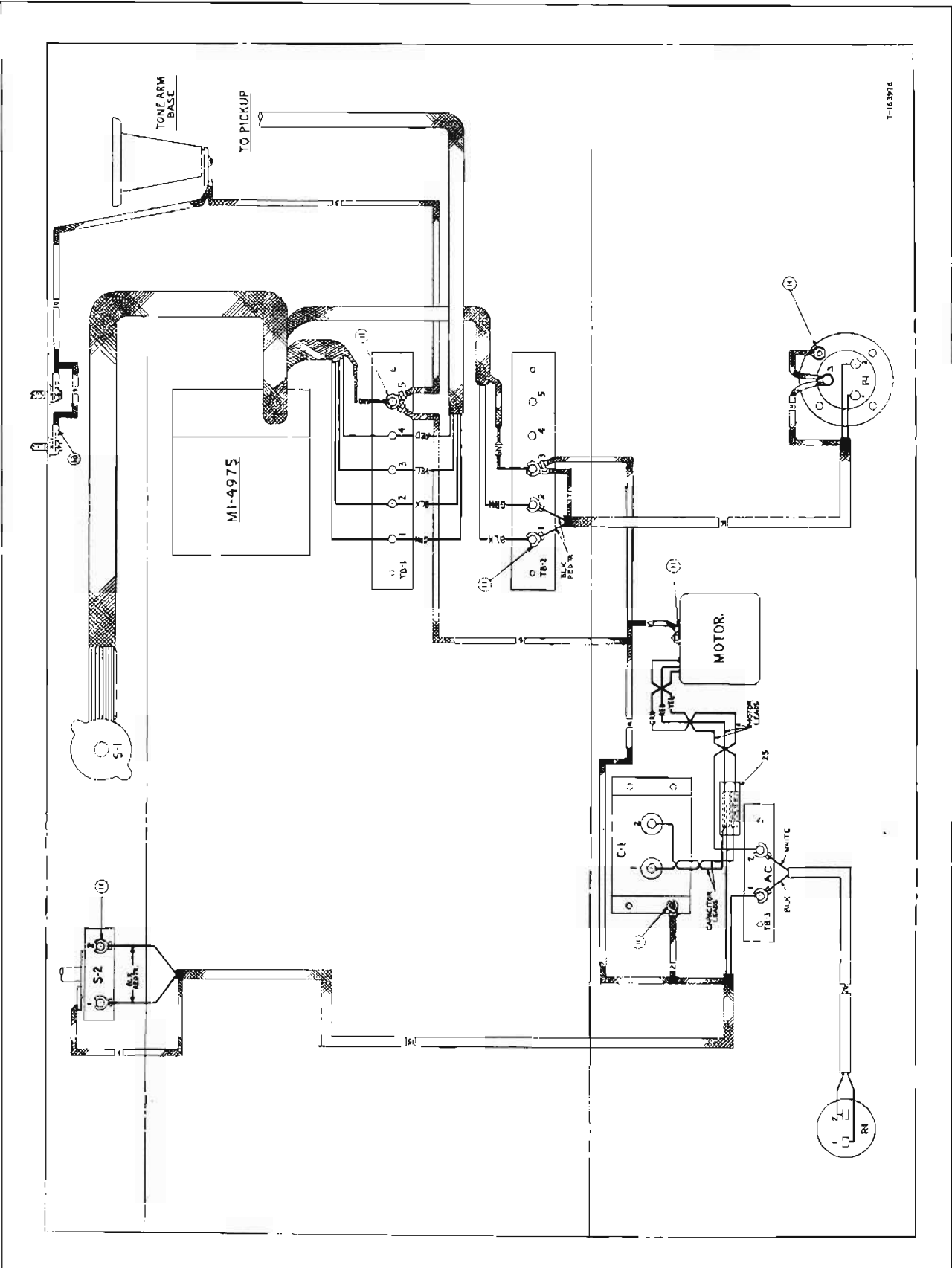


Figure 4—Wiring diagram of Turntable.

NOTE: The absolute level corresponding to 0-db response depends on a number of factors, an important one being the level employed in recording. However, it is probable that a good average is about the same as that accepted for the velocity microphone, on program pickup, namely, -62 VU.

### Switch Positions

30. The switch positions are to be used as follows:

Switch Position L-1: Lateral transcriptions, for reproduction of transcriptions recorded according to the NAB standard lateral characteristic.

Switch Position L-2: Phonograph records, for reproduction of records and transcriptions which have been recorded with a cross-over frequency of 500 cycles, such as Victor.

Switch Position L-3: Phonograph records, for reproduction of records and transcriptions which have been recorded with a cross-over frequency of 300 cycles.

Switch Position L-4: Flat response, for reproduction of lacquer recordings cut flat, especially when using the automatic equalizer to raise the high-frequency level at the inside of the record. This position may also be used for test purposes.

Switch Position V-1: Vertical transcriptions, for reproduction of transcription recordings cut in accordance with the NAB standard vertical characteristic.

Switch Position V-2: Vertical transcriptions, same characteristic as V-1 except less high-frequency response.

31. In order to insure stability of operation, turn the motor switch ON and allow the turntable to run for at least five minutes before playing a record. This should be done especially when the instrument has been idle for an appreciable period (such as overnight or when the instrument has been exposed to the cold), but it is not essential between operations separated by intervals of short duration.

32. After setting the speed-shifting lever, rotate the turntable platter slowly by hand until the mechanism is heard to engage. Avoid engaging the mechanism by holding the turntable platter and starting the motor.

### Cueing

33. For close cueing of records it is satisfactory to hold the record by finger pressure on the rotating platter and to release the record just prior to opening the fader for the turntable channel. This practice

may shorten the life of the turntable felt, but a new turntable felt may be ordered which is easily installed.

34. Another common cueing practice is to locate the pickup in a starting groove and rotate the record until the program is heard to start either by direct "talk-back" from the record or through an electrical cue system. Without lifting the pickup stylus from the record, move the disc back by a portion of a revolution to permit the turntable to come up to speed before the program starts after the motor switch is turned on. This may be over  $\frac{1}{4}$  revolution for 78 rpm records and over  $\frac{1}{2}$  revolution for 33  $\frac{1}{3}$  rpm recordings.

## MAINTENANCE

### Lubrication

35. Lubricate the equipment in accordance with the instructions given under *Installation*. Do not oil the over-running clutch. This clutch is lubricated at the factory.

### Cleaning

36. Do not blow dust from beneath the record plate. (The speed-reduction bearing is protected from the normal accumulation of the dust from above, but is liable to contamination if dust is blown upward from the recess in the cabinet in which the bearing is mounted.) Wipe the dust from beneath the record plate with a lint-free and slightly oily cotton cloth.

### Parallel Adjustment of Pickup Arm

37. The pickup arm should be parallel to the record face and is so adjusted at the factory. Should this at any time not be the case, proceed as follows: Determine the amount of deviation from the parallel. Then disconnect the pickup leads from the terminal board and remove the pickup cable from the clamp above the terminal board. Remove the pickup arm assembly from the cabinet top. Remove the two machine screws ("A", figure 13). Pull out the two pins and remove the spacers at the pivot. Lift the pickup arm from the base casting. This exposes the upper fulcrum screw (see figure 13). Loosen the locknuts on both upper and lower fulcrum screws and adjust the screws to raise or lower the pivot casting as required. A complete turn of the screw produces a vertical motion of  $\frac{1}{32}$  inch. Retighten the locknuts so that the pivot casting does not bind and there is no side or end play in the bearings. Install the arm and cable in their former positions (see figure 12).

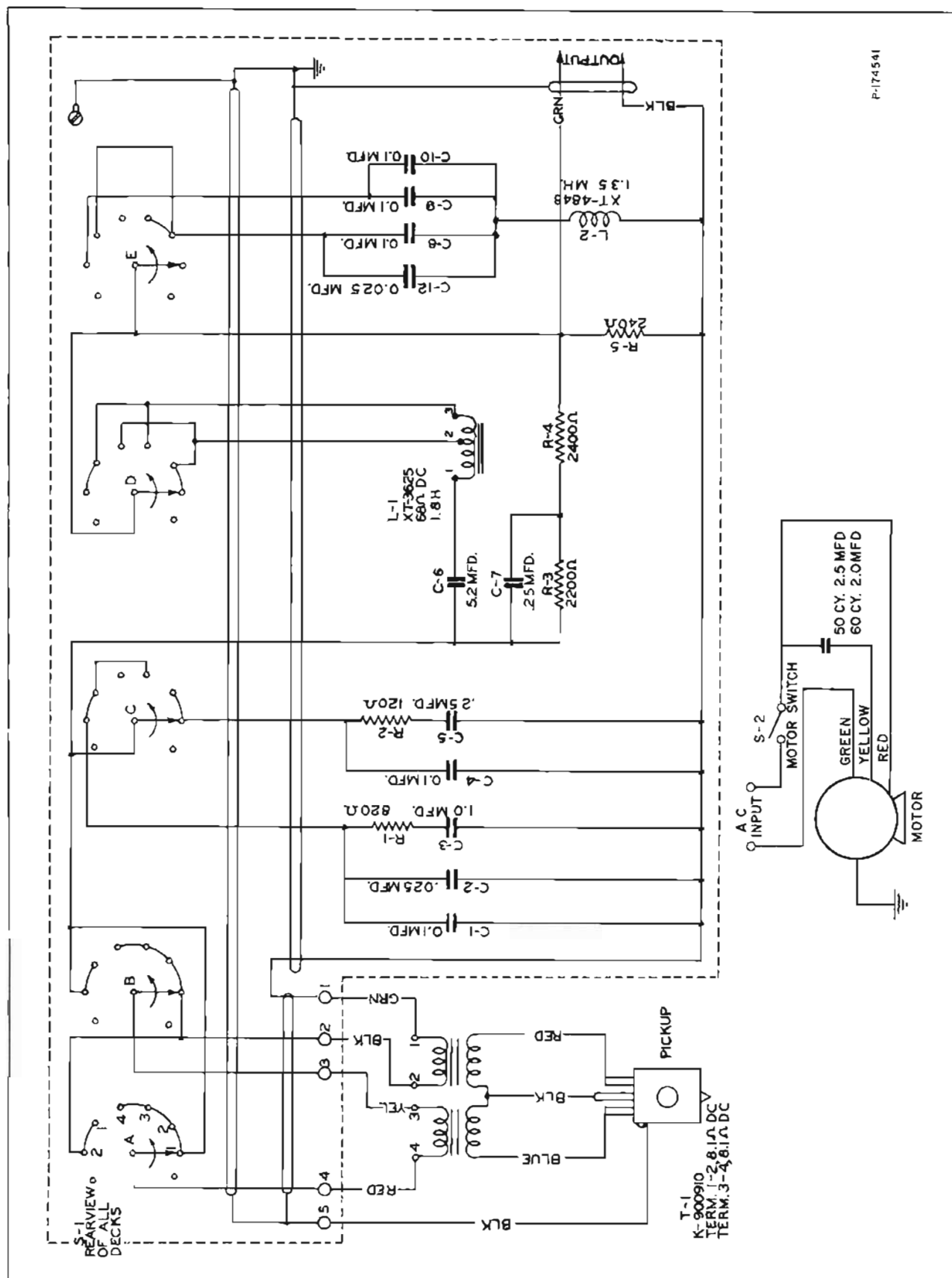


Figure 5—Schematic diagram.

### Horizontal Adjustment

38. A horizontal-stop screw and locknut are mounted on the side of the base casting (see figure 13). This screw has been adjusted at the factory to prevent the needle from reaching the inner diameter on which the record driving holes are placed. This is to prevent possible damage to the stylus if it were to drop into these driving holes. If necessary, adjust the screw and nut to prevent excessive horizontal movement of the arm.

### Weight Adjustment

39. The pickup arm is adjusted at the factory for a weight on the record of  $28 \pm \frac{1}{2}$  grams at the needle point. The high-frequency response of the pickup is somewhat dependent on this weight. If at any time it is found that the weight is otherwise, proceed as follows: Loosen the screw which holds the lead counterweight in place under the rear of the arm. To increase the weight, move the counterweight forward. To decrease the weight, move the counterweight toward the rear. Retighten the screw.

### Vertical Adjustment

40. A vertical adjusting screw and locknut with a rubber cushion or stop on the end of the screw is placed in the pivot casting. (See figure 13.) The height of this cushion is adjusted at the factory so as to allow the needle just to graze the felt at the top of the turntable. If necessary, adjust this screw to obtain the correct pickup arm height.

### Care of Turntable

41. As a result of the continued demand for higher and higher quality in the reproduction of broadcast transcriptions, the transcription turntable has been developed, through engineering refinements, into a device in the class with precision instruments and should be treated as such. With reasonable care and proper lubrication, as outlined below, it should give years of constant service without noticeable increase in speed variation. Therefore, do not tamper with, or alter in any way, any part of the turntable drive assembly or record plate (except as described under *Installation*) or change any adjustments of this mechanism, unless it is absolutely necessary because of a known defect.

### Clutch Adjustment of Speed Changing Mechanism

NOTE: Do not remove the turntable unless this adjustment (or that described in 44 below) is necessary.

42. The distance from the top of the turntable to the top of the cabinet should be approximately 1-5/32 inches. If this distance should ever vary, scraping and speed variation might result. If at any time it becomes necessary to reset this distance, the turntable may be removed from its bearing and readjustment of the clutch mechanism may be made in the following manner:

a. Grasp the turntable with the hands at diametrically opposite points on its circumference and withdraw it from its bearing by exerting a straight, upward pull. When doing this be sure to hold the turntable in a level position until its spindle is entirely clear of the bearing. Otherwise, damage to the bearing may result.

b. The steel ball which serves as a thrust bearing under the end of the turntable spindle may adhere to the grease on the spindle and be removed from its seat. Be careful not to lose this ball.

c. Place the turntable, face down, on a clean level surface.

d. Remove the cylindrical plug in the end of the turntable spindle.

e. A vertical bearing adjustment, slotted to accommodate a screwdriver, will be found at the bottom of the hole from which the plug has been removed. A set screw in the side of the shaft serves to clamp this adjustment.

f. Loosen this set screw, back out or screw in the adjustment and insert the plug.

g. See that the steel ball thrust bearing is in its seat in the turntable spindle bearing, and test for correct adjustment, the conditions for which are given in sub-paragraph "h" below.

h. The clamp ring engagement should be accomplished in the first revolution of the turntable, and the equipment must not be operated if it slips.

### Cleaning the Speed Reduction Bearing

43. If the equipment is not kept clean or is improperly cleaned, dust may become lodged in the speed reduction bearing. If the dust is permitted to remain and accumulate, excessive wear and possible speed variation will result. Dust in the speed reduction bearing will be indicated by a faint knocking or grinding noise, heard directly from the mechanism when running at 33 1/3 rpm. This dust will cause a rumble in the output of the system. This rumble will be detected most easily by playing a silent record and listening to the monitoring speaker. To eliminate this rumble it is necessary to remove

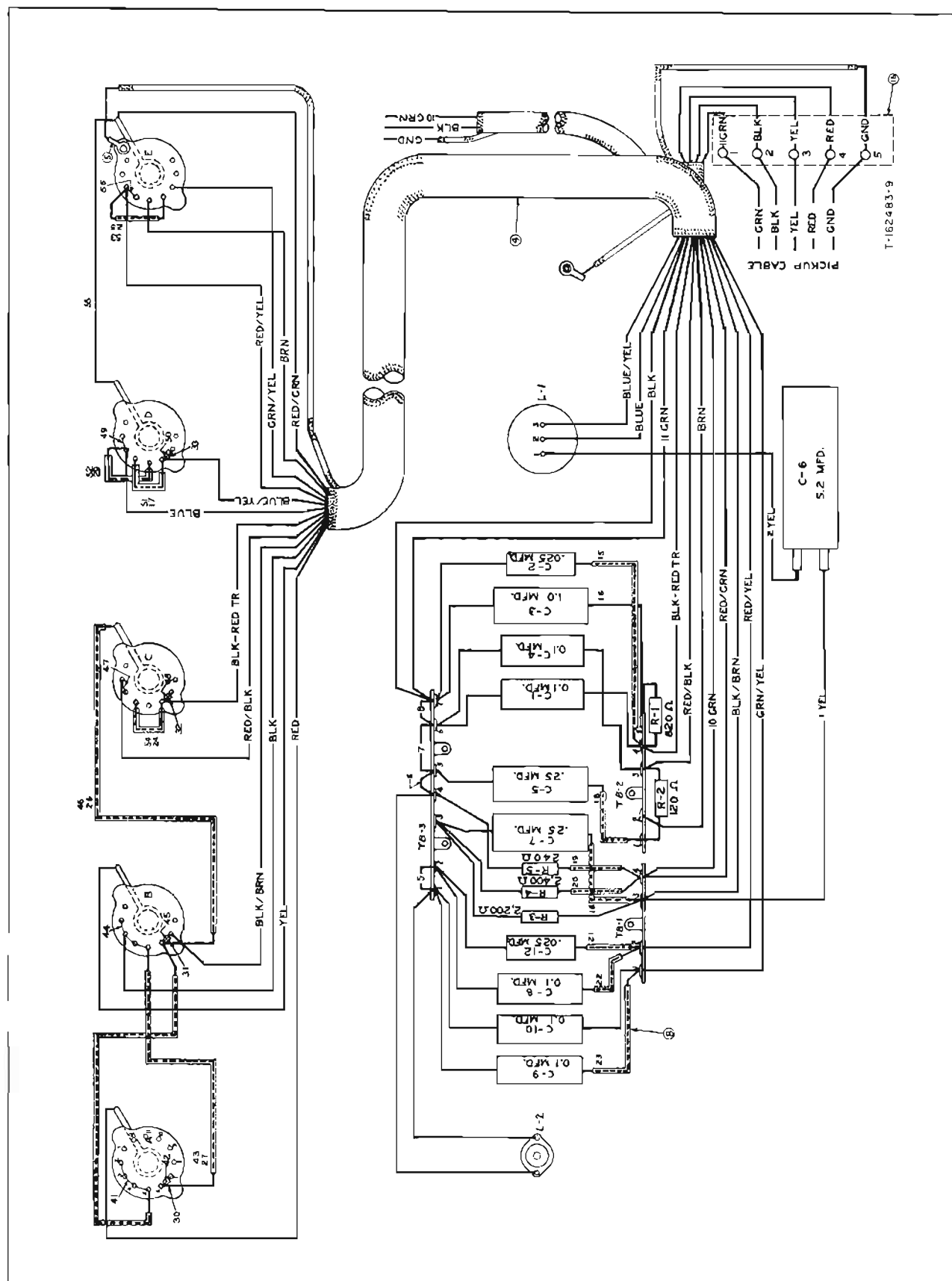


Figure 6—Wiring diagram of pickup filter

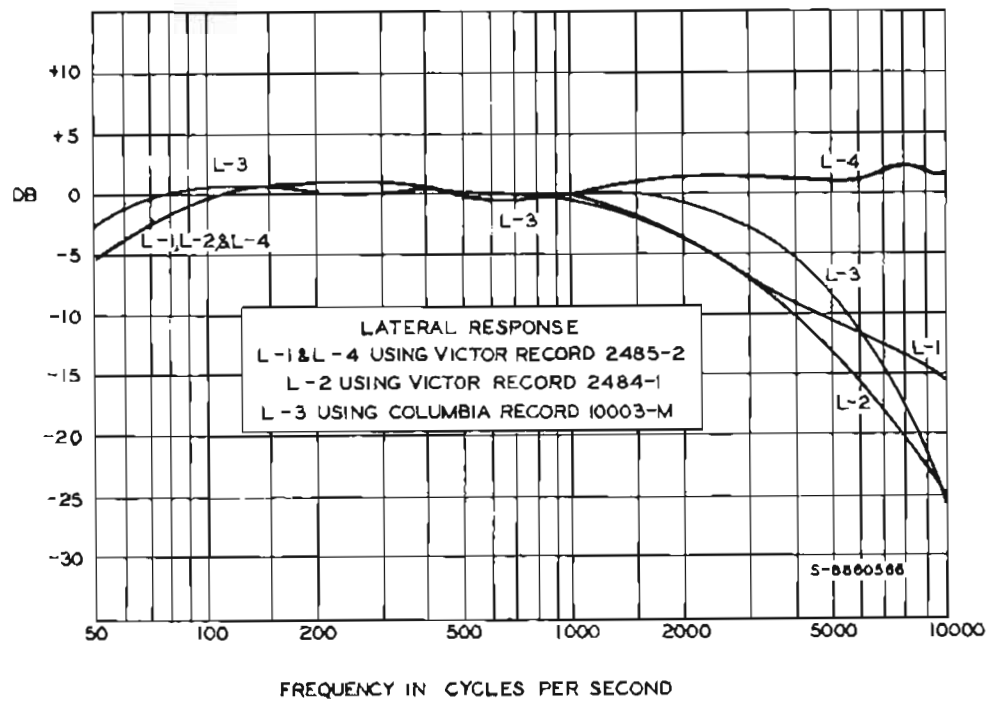


Figure 7—Overall frequency response for lateral switch positions using test records.

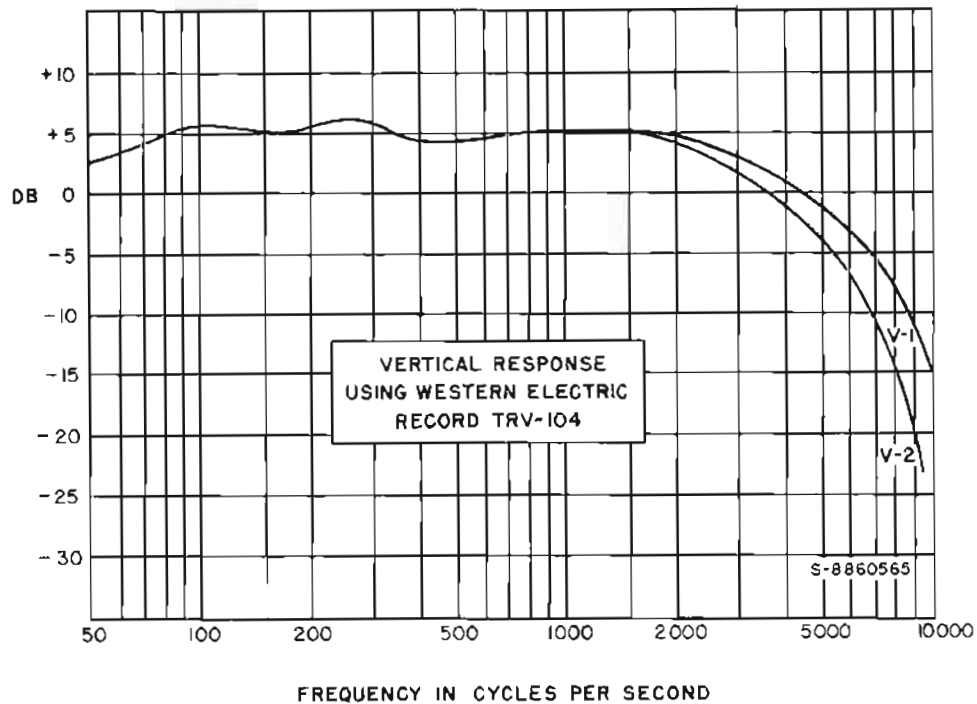


Figure 8—Overall frequency response for vertical switch positions using test record.



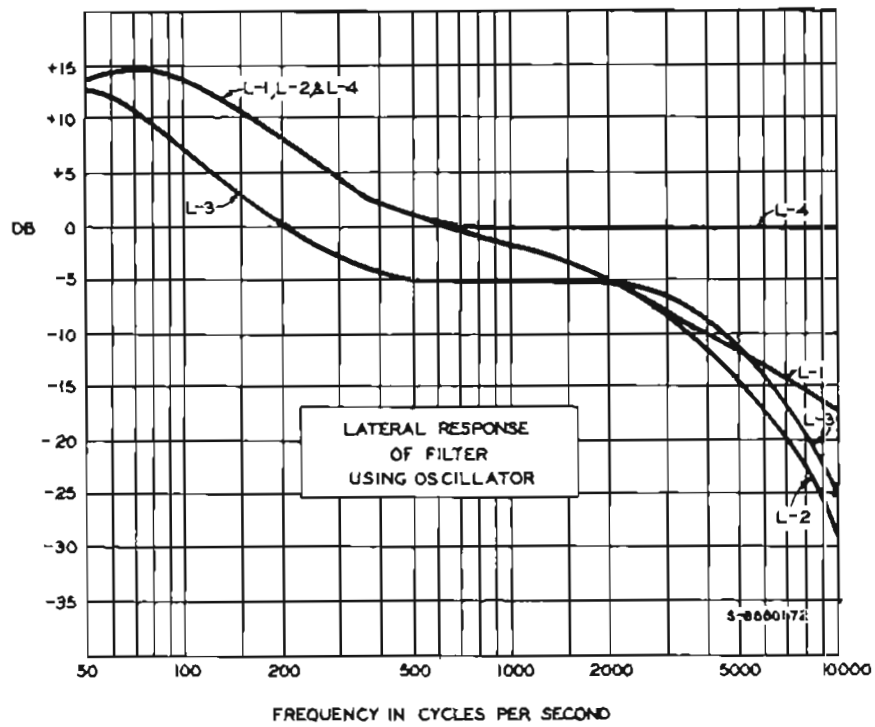


Figure 9—Frequency response of filter for lateral switch positions using oscillator.

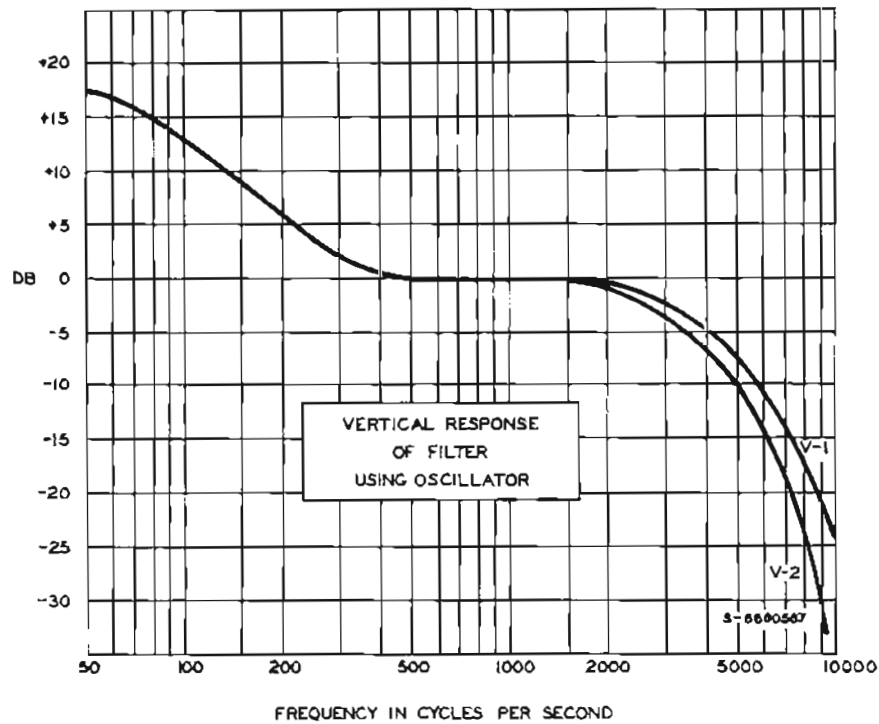


Figure 10—Frequency response of filter for vertical switch positions using oscillator.

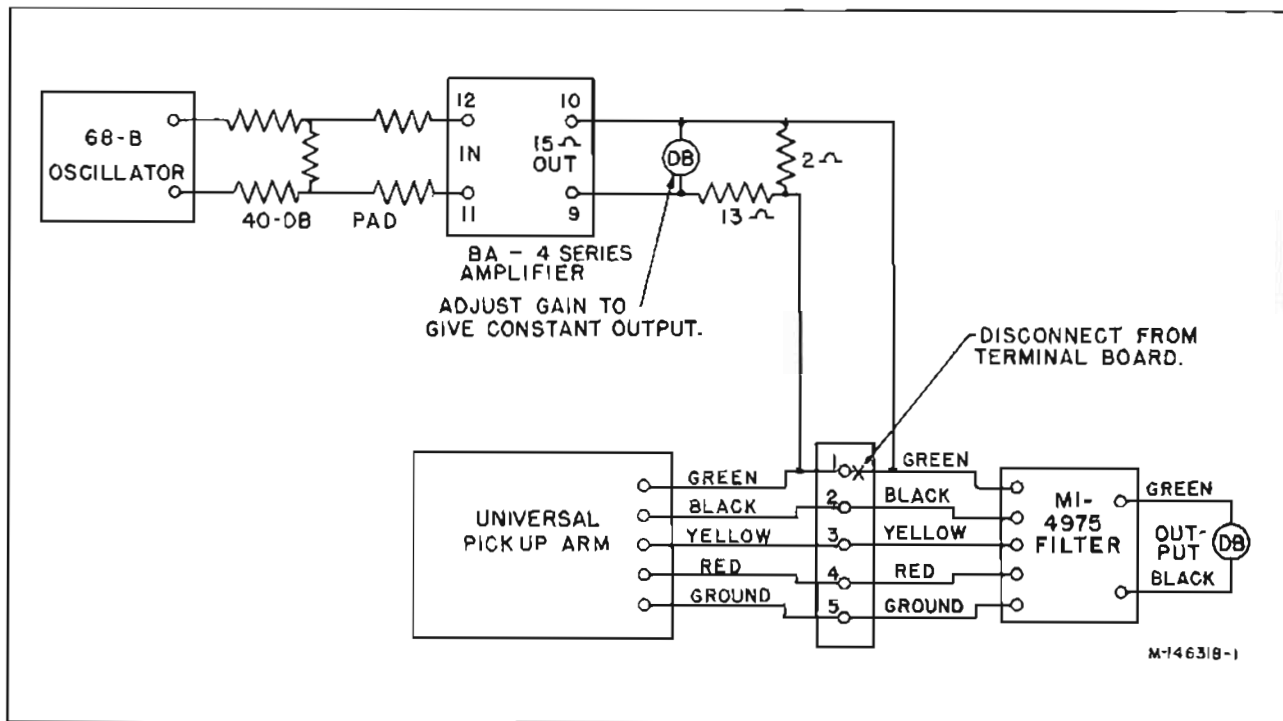


Figure 11—Circuit for checking frequency response with oscillator signal.

the bearing and clean it thoroughly.

44. Do not raise the turntable or remove the bearing unless it is necessary to perform this work (or that described in paragraph 42 above). The procedure is as follows:

a. Remove the turntable as described above (paragraph 42).

b. Unlock the bearing locknut by bending the lockwasher tabs outward and away from the notches in the nut.

c. Remove the bearing nut, being careful not to damage the bearing. A spanner wrench is recommended for this purpose.

d. Remove the lockwasher and sealing rings.

e. Lift the speed reduction bearing clear of the bearing housing without removing the clamp ring.

f. Clean all parts on the top of the housing of the mechanism and remove all dust from the top of the cabinet.

g. Soak the speed reduction bearing thoroughly in clean kerosene oil, turning the steel balls and ball races to be sure that no dirt or lint remains on the assembly.

h. Wash the bearing in a second rinse of clean kerosene and shake off all kerosene possible. Do not

attempt to dry the bearing with a cloth, as this operation may reintroduce lint to the bearing parts and cause a repetition of the trouble.

i. Apply a thin coating of pure, clean, white petroleum jelly to the ball race. Petroleum jelly sold in a tube type container is suggested, since there is almost no possibility of its becoming contaminated or dirty.

j. Replace the bearing on the bearing shaft. See that the notch in the clamp ring is uppermost when the assembly is in position.

k. Place the lockwasher on the bearing shaft.

l. Place over the lockwasher a clean piece of paper, having in its center a round hole the size of the bearing shaft, and large enough to protect the ball race.

m. Screw the nut in place and tighten it with a spanner wrench.

n. Lock the nut by bending a lockwasher tab into a notch in the bearing nut.

o. Remove the paper mentioned in "l" above.

p. Place the sealing ring in position on top of the speed reduction bearing and center it.

q. Clean the underside of the turntable and replace the spindle in the bearing as described below (paragraph 45).

## Replacement of Turntable

45. If, for any reason, the turntable has been removed from its bearing in the main drive spindle, replace it in the following manner:

a. Engage the turntable spindle with the female bearing of the drive, align the spindle, and lower the turntable slowly until the upper member of the ball race, which is attached to the turntable, comes into contact with the balls. When performing this operation make certain that the dust ring, which rests on the top of the spindle, is concentric with the bearing.

b. While still holding the turntable, rotate it slowly until the slotted openings in the driving ring engage the balls, and then lower it slowly and carefully into position. Be sure to avoid causing flats on the balls.

## Speed Variation

46. A variation in the speed of rotation of the turntable, sometimes referred to as "wows," can be caused by any of the following:

a. Grease on the over-running clutch. This may be removed by any usual cleaning means, such as cleaning thoroughly with carbon tetrachloride.

b. A loose clamp on the speed-reduction bearing. Loosen the clamp nuts and tighten the two screws which hold the clamp in place. Retighten the nuts.

c. Worn gears in the motor gear box. This is corrected by replacing the motor as described below in paragraph 47.

d. Improper alignment of motor shaft and spindle. In general, the optimum position is that which gives minimum undulation of the bronze coupling discs in the flexible coupling assemblies. See paragraph 47 (beginning with sub-paragraph "m") below for the method of adjustment.

e. Loose flywheel. Be sure the flywheel nut and locknut are well tightened.

## Changing the Motor

47. To replace the drive motor, disconnect electrically and proceed as follows:

a. Loosen the lock nuts and set screws on the upper and lower flexible coupling units and loosen the retaining screw on the spider of the mechanical filter.

b. Remove the four motor mounting bolts.

c. Raise the entire spider and coupling assem-

bly to clear the vertical drive shaft and set the flexible coupling set screws and spider lock screws so as to hold the assembly clear of the vertical drive shaft.

d. Carefully lift out the motor.

e. Remove the mechanical filter from the vertical drive shaft and place it in the same position on the vertical drive shaft of the new motor.

NOTE: A washer in the mechanical filter is shown in figure 3, *Turntable Drive Assembly*. This washer can easily be forgotten or lost before the reassembly is started. Therefore, be sure to locate this washer and set it safely aside at the time of removing the old motor.

f. Place the new motor carefully on the motor base and lock the mechanical filter to the vertical drive shaft. Flats are provided on the shafts for the set screws.

g. Align the vertical shaft with the coupling shaft and start, but do not tighten, the motor mounting bolts.

h. Loosen the upper flexible coupling and spider set screws and lower the coupling unit assembly into place so that the spider engages the female section of the mechanical filter.

i. Space the couplings evenly on the shafts.

j. Lock the lower and upper flexible coupling lock screws to the flats of the shafts to which they fit.

k. Make electrical connections to the new motor. See figure 4.

l. Oil the new motor as described previously.

m. Start the motor and observe the bronze coupling spring in the lower flexible coupling unit. The spring will run horizontally between the coupling unit sections and will appear as a plane surface when the motor is properly aligned. If the motor is not correctly in line, the bronze spring will show a definite undulation as it turns.

n. Adjustable motor base bushings with lock nuts are supplied on the motor. These bushings permit the raising or lowering of any corner of the motor and must be adjusted for the alignment of the vertical drive shaft and clutch assembly. The bushings should be locked after they have been set for alignment as described.

o. Tighten the motor mounting bolts while watching the bronze coupling spring with the motor running. Any variation in the bronze coupling spring movement will indicate that further adjustment of the motor base bushings will be necessary.

p. When the adjustable bushings are set so that the tightening of the motor mounting bolts does not throw the vertical drive shaft and clutch assembly shaft out of line, they are correctly set.

NOTE: The over-running clutch must be absolutely free to turn in the clockwise direction and must not bind. It must lock when turned counterclockwise.

### Replacement Parts

48. The following parts list is included to provide identification when ordering replacement parts. Order from *RCA Replacement Parts Department, Camden, New Jersey*, giving the *Stock Number* and *Description* of the parts wanted. Replacement parts supplied may be slightly different in form or size from the original parts, but will be completely interchangeable with them.

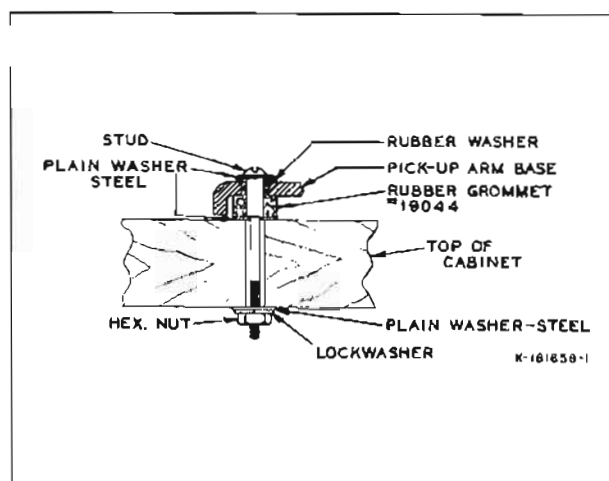


Figure 12—Pickup arm mounting details.

## LIST OF PARTS

Description	Stock No.
<b>CABINET ASSEMBLY</b>	
Capacitor, 2 mf, 1000 v, for 60-cycle motor	12051
Capacitor, 2.5 mf, 1000 v, for 50-cycle motor	30398
Connector, male, 2 contacts	50784
Connector, female, 2 contacts	54472
Connector, male, 3 contacts	54473
Knob assembly, for motor and filter switches	17268
Switch, motor, less mercury unit	44512
Unit, mercury, for motor switch	44513
<b>DRIVE EQUIPMENT</b>	
Ball, steel, at base of turntable spindle	5182
Bearing, speed reducing	15900
Bearing, main	15895
Clamp ring, assembly	15896
Clutch, over-running; with shafts	16480
Clutch, female, complete with plates, adjusting screw and felts	18861
Cushion, housing and bushing	18862
Cushion, motor	19428
Coupling, flexible, assembly	15890
Disc, for flexible coupling	18893
Felts, with oil, for damping coupling	17021
Flywheel	54475
Housing and bushing assembly	18892
Insert, thrust bearing	15893
Motor, 110 v, 60 cycle	16362
Motor, 110 v, 50 cycle	16804
Oil, for damping coupling	15914
Plate, lock, for clamp ring	18859
Ring, bearing seal	15898

<i>Description</i>	<i>Stock No.</i>	
Screw, flat head, 10-32 x 3/8, adjusting, in turntable spindle, for speed reduction mechanism	5181	
Screw, pivot	19731	
Screw, set, 12-24 x 3/16, for clamping adjusting screw	5180	
Screw, 10-32 x 3/8 lg. fillister head, cone point, for clutch	19848	
Shaft, turntable drive	15912	
Spider, damping, with screw and washer	19847	
Springs, clamp ring	44210	
<b>TURNTABLE ASSEMBLY</b>		
Cement, turntable felt	10973	
Escutcheon, for speed indicator	18863	
Felt, turntable	18868	
Lever assembly, with screw and collar	18870	
Lever, speed shifting, with screw	18864	
Plate, locking	18865	
Ring, drive, with screws for turntable	18154	
Ring, turntable dust	19733	
Shaft and bushing assembly (includes spindle)	19849	
Spring, coil, for shift lever	18866	
Turntable, less felt	18867	
<b>REPRODUCING FILTER ASSEMBLY</b>		
<i>Symbol No.</i>	<i>Description</i>	<i>Stock No.</i>
C-1, C-4, C-8, C-9, C-10	Capacitor, 0.1 mf, 200 v	70617
C-2, C-12	Capacitor, 0.025 mf, 200 v	70612
C-3	Capacitor, 1.0 mf, 200 v	70620

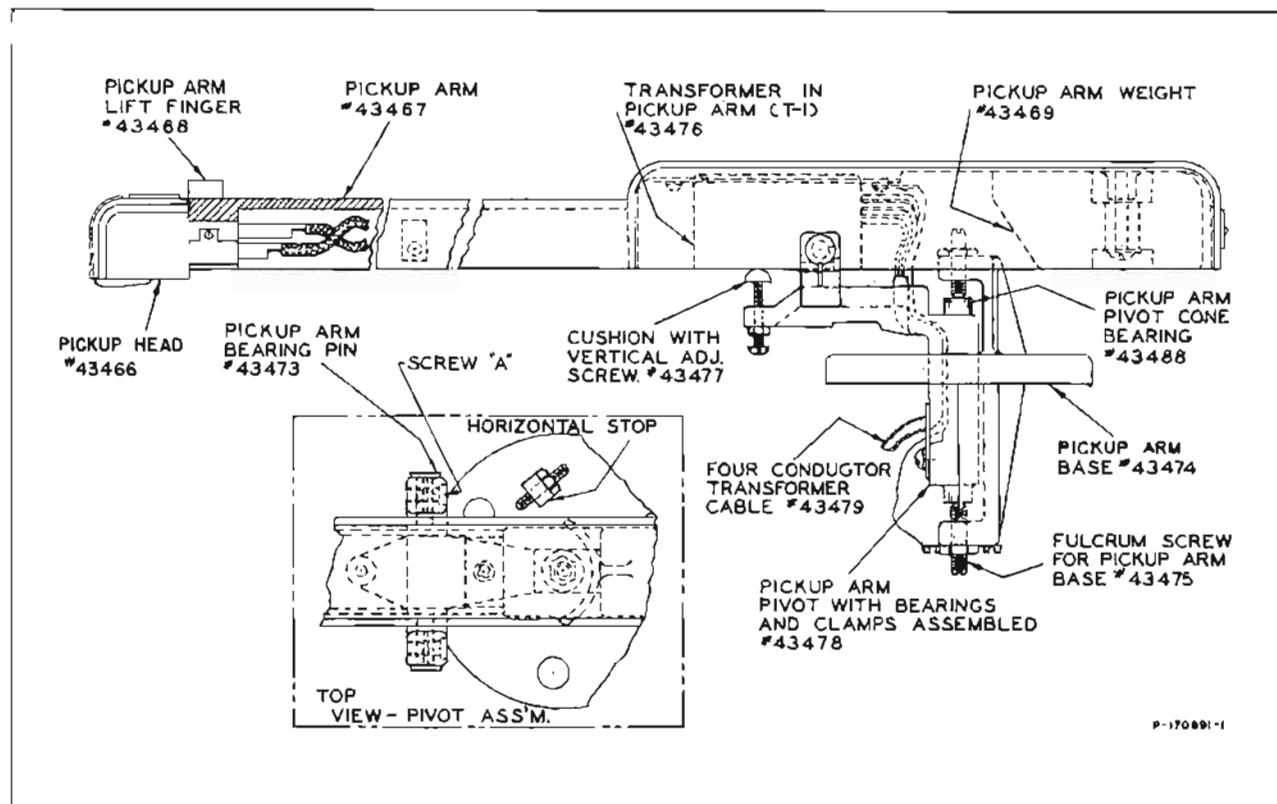


Figure 13—Pickup arm assembly.

## LIST OF PARTS (Cont'd)

<i>Symbol No.</i>	<i>Description</i>	<i>Stock No.</i>
C-5, C-7	Capacitor, 0.25 mf, 200 v	70618
C-6	Capacitor, 5.2 mf, 50 v	51711
L-1	Reactor, iron core, inductance 0.8 hy term 1-3 and 0.9 hy term 1-2 at 1 v, 60 cycles, 0 amp, resistance 68 ohms	43967
L-2	Reactor, air core, inductance .00135 hy at 1 v, 1000 cycles, resistance 8.2 ohms	52070
R-1	Resistor, 820 ohms, 1 w	55137
R-2	Resistor, 120 ohms, 1 w	55135
R-3	Resistor, 2,200 ohms, 1 w	55138
R-4	Resistor, 2,400 ohms, 1 w	55139
R-5	Resistor, 240 ohms, 1 w	55136
S-1	Switch, rotary, 5 decks, 8 positions	52130
<b>PICKUP ARM ASSEMBLY</b>		
<i>Description</i>		<i>Stock No.</i>
Base, pickup arm		43474
Bearing, pivot cone		43488
Cable, 4-conductor, transformer		43479

Description	Stock No.
Cushion, with vertical adjusting screw	43477
Grommet, base mounting	19044
Lift, finger	43468
Pickup arm assembly	43467
Pivot casting, pickup arm, with bearings and cable clamp	43478
Pin, bearing	43473
Screw, fulcrum; No. 10-32 x 15/16"	43475
Support, rubber, for pickup arm	44088
Transformer	43476
Weight, lead	43469
<b>PICKUP HEAD</b>	
Armature	43480
Base, pickup	48272
Clamp, armature	43484
Clamp, armature clamp assembly, rear	43487
Clamp, magnet	43485
Damper block	43482
Magnet, armature	48270
Pickup head, complete	43466
Pin, lead	43486
Pole piece	48273
Seal, dust	43483
Stylus, diamond	43481