

PHILCO SERVICEMAN



RADIO • MANUFACTURERS • SERVICE • NEWS



JANUARY, 1942

EDITORIAL

PROFIT INSURANCE

In the September, 1932, issue of the Philco Serviceman we printed the following:

PROFIT INSURANCE

Before Delivery

1. Check chassis.
 - a. Tubes and tube shields.
 - b. Speaker plug.
 - c. Pilot lamp.
 - d. Performance.
2. Inspect and polish cabinet.

Installation

1. Insist on good aerial and ground.
2. Loosen chassis hold down bolts.
3. Check performance.
4. Instruct owner by demonstrating correct tuning, automatic volume control and general operation.

Basically the information contained in this profit insurance box is applicable today just as much as it was in 1932. Careful checking of the chassis and inspection of the cabinet before delivery is most important. Further checking and customer instruction after delivery is equally as important today as it was in 1932.

Customer Instruction

Many dealers have lost sales because they neglected these important points. Customers cannot be expected to know how to operate some of the new complicated radios and radio phonograph combinations, and unless the dealer or his salesmen instruct these owners carefully, there are naturally going to be some dissatisfied customers. On the other hand, a knowledge of how a set is intended to be operated and the ability on the part of the customer to get the most out of the radio means greater satisfaction with the purchase and fewer complaints back to the dealer.

(Continued on Page 4)

New Philco Tube Types

30 more tube types have now been added to the Philco list.

Type	Type
0A4G	7N7
1C5EGT/G	7V7E
1G4GT/G	7Z4
1G6GT/G	12SF5GT
1H5GT	12SQ7GT/G
1LB4E	12SR7
1LE3	14B6
5W4GT/G	35/51E
6AE6G	35L6EG
6F7E	35Z5GT/G
6H4GT	45Z5GT
6SA7EGT	50Z7G
6SK7EGT	117Z6GT/G
6SQ7GT/G	182B
7B4	183

A new Philco Parts Catalogue page, giving the prices of these and all other Philco tubes, has just been mailed to all R.M.S. members, together with a Vest Pocket Philco Tube Price Card. If you have not received your copy, you can secure one from your Philco Distributor.



*Executives and Radio Division Staff of Anthony Foster & Sons Limited, Toronto
Philco Distributors for Central and Northern Ontario*

FRONT ROW (left to right): G. LeFeaver, Sec. Treas.; W. R. Watkins, Gen. Mgr.; H. W. D. Foster, Director; W. L. Moncur, Sales Mgr.; Miss Hickman, Miss Chadbourne, J. W. Dean, Office Staff.
BACK ROW: (left to right): B. Boves, W. R. Johnston, H. Sipprell, W. Ross, outside salesmen. W. S. Davis, A. Meadows, Servicemen. W. Ball, Jr., G. Bottomley, inside salesmen. J. Statham, Receiver.

PHONOGRAPH TONE IMPROVED BY CORRECT LIGHT BEAM PICKUP ADJUSTMENT

Phonograph tone quality on the '42 Philco models can be greatly affected by the various adjustments in the light beam pickup. Such items as vertical and horizontal tone arm friction, pickup wire dress, and placement of light beam all have a definite relation to proper tone.

If the weight of the jewel on the record exceeds $1\frac{1}{4}$ ozs. when measured with the postalette type scale, the jewel will not track the record groove properly and distortion in the music will result. The counter-weight is one of the factors which affects the jewel weight on the record surface. In the aluminum pickup arms, the counter-weight should be $1\frac{1}{2}$ ozs. In the plastic type arm, this counter-weight should be 3 ozs. and in the zinc die cast arm, the counter-weight should be 5 ozs. A coil spring will be noticed at the vertical tilt point of the pickup on the underside of the tone arm. With the adjustment for this spring completely loose so that there is no spring tension, the maximum jewel weight on the record should not exceed $1\frac{5}{8}$ ozs. on all types of arms.

When the jewel is viewed down the groove, it should be vertical. When viewed across the groove toward the spindle, the jewel angle should be 13 degrees with one record on the turntable and 26 degrees with a stack of records on the turntable.

As in the case of vertical drag, any lateral drag which restricts the free motion of the tone arm and hence the needle or jewel movement will likewise affect tone quality. This lateral drag can be measured with a pendulum type scale by lifting the needle off the record and moving it first to one side and then the other. The amount of lateral drag should not exceed $\frac{1}{8}$ oz. in either direction. If this amount is in excess of $\frac{1}{8}$ oz., the condition is usually caused by the lift pin on the trip arm assembly, being too low and dragging on the large cam gear.

Lateral drag can also be caused by friction in the tone arm swivel assembly because of no vertical end play in the assembly. The tone arm should be free so that it can be moved up and down very slightly in its assembly, thus assuring freedom from friction at this point. A burr or dirt on the ball bearing retainer or the ball race washers can be a possible cause of friction at this point, also the shaft can be tight in its bushing so that it is not free to turn. The dress or arrangement of the wires coming out of the back of the pickup has a definite effect on tone quality. These wires should be toward the tone arm and not away from it.

The proper lubricant for the tone arm swivel is a mixture of 30% Rislon

and 70% No. 20 SAE oil. Ordinary oil or lubricant should not be used at this point.

If the jewel is loose in its setting or if there is a stiff jewel assembly bearing, mistracking in the record grooves will take place. The only thing to do in this case is to replace the jewel assembly.

The position of the light beam on the cell inside the pickup head is most important from a tone quality standpoint. The light should be half on and half off the dark portion of the cell and should be toward the turntable spindle side of the cell rather than away from it. This adjustment is made by means of the adjusting screw on the side of the pickup. The width of the light beam should be $\frac{5}{32}$ ". To make this adjustment, push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot on the light is $\frac{5}{32}$ " in width. The socket assembly is now rotated so that the spot light is vertical.

Careful attention to the details of adjustment on the light beam pickup will always result in superior phonograph tone quality.

USING HEAD- PHONES ON PHILCO SETS

Every month many letters are received in the Philco Service Department in Toronto, asking how to connect headphones to a Philco radio. In practically all of these cases the letters come from Philco radio owners. Judging from the large number of such requests, it is evident that there is a tremendous amount of business available for servicemen who want to go after work of this kind.

There are many people who would like to have headphones installed on their radios so that they can listen late at night without disturbing other members of the household. This is particularly true of those people who live in apartments where the rulings are rather strict in this respect.

The only materials required are the headphones, two small tubular condensers, an on-off switch and a headphone jack and plug. The condensers which should be preferably 600 volts .06 mfd. type are connected from each side of the output transformer primary. The other sides of these condensers then connect to the headphone jack which can be mounted on the inside of the cabinet at some convenient point. In most cases it will be desirable to have an arrangement so that the set speaker can be turned off at the time headphones are being used. This can be accomplished by installing the switch in the speaker voice coil circuit.

New Philco Auto Radio Panel Plate Kits for 1942 Cars

Philco Panel Plate Kits are now available for the installation of Philco Model 804, 805, 807, 808 and 809 auto radios in 1942 automobiles:

Part No.	Car
P421	Buick Model 40
P421A	Buick 50, 70
P422	Cadillac
P423	Chevrolet
P424	Chrysler
P425	De Soto
P426	Dodge
P427	Ford
P428	Hudson
P429	Mercury
P4212	Lincoln Zephyr
P4213	Nash
P4214	Oldsmobile
P4215	Packard Clipper
P4216A	Plymouth DeLuxe
P4216B	Plymouth Special DeLuxe
P4217	Pontiac
P4218	Studebaker

All above kits list at \$2.75 and are available from your Philco Distributor.

NEW --- DE LUXE R.M.S. Metal Plaque

With Standard Labour Charges

Philco has available a limited quantity of a de luxe metal plaque imprinted with the R.M.S. Standard Labour Charges. This plaque is 12" x 16", and is more durable than the cardboard one. The quantity is strictly limited—no more will be available after the present stock is exhausted.

The DeLuxe R.M.S. Standard Labour Charge Plaque has a net dealer price of only 75 cents.

New Rider's Manual Now Available

Volume II of John F. Rider's Manual "Aligning Philco Receivers" is now available through Philco Distributors at the R.M.S. net price of \$1.65.

This volume picks up where Volume I left off, and contains alignment information, chassis layouts, etc., for all U.S. Philco home and auto radios from 1938 to 1941. There are 192 pages in all, including information on the adjustment of the Philco Mystery Control frequency amplifier and other valuable notes. Active radio servicemen will find this information of very great value.

INTERPRETATION OF TUBE RATINGS

An Engineering News Letter gave the text of R.M.A. Standard M8-210 on "Interpretation of Tube Ratings" which was originally adopted in November 1939. In November 1940 extensive additions and minor revisions were made and approved as standard by the R.M.A. Engineering Department. As indicated previously, adherence to the new standard should prevent recurrence of misinterpretation of ratings and result in uniform commercial practice. The complete text of the revised standard is as follows:

The standard engineering practice is to interpret the ratings on receiving tube types according to the following conditions. These are R.M.A. Standards.

1. Cathode

The heater or filament voltage is given as a normal value unless otherwise stated. This means that transformers or resistances in the heater or filament circuit should be designed to operate the heater or filament at rated value for full-load operating conditions under average supply-voltage conditions. A reasonable amount of leeway is incorporated in the cathode design so that moderate fluctuations of heater or filament voltage downward will not cause marked falling off in response; also, moderate voltage fluctuations upward will not reduce the life of the cathode to an unsatisfactory degree.

A. 1.4-Volt Battery Tube Types

The filament power supply may be obtained from dry-cell batteries, from storage batteries or from a power line. With dry-cell battery supply the filament may be connected either directly across a battery rated at a terminal potential of 1.5 volts, or in series with the filaments of similar tubes across a power supply consisting of dry cells in series. In either case, the voltage across each 1.4-volt section of filament should not exceed 1.6 volts. With power-line or storage-battery supply, the filament may be operated in series with the filaments of similar tubes. For such operation, design adjustments should be made so that, with tubes of rated characteristics, operating with all electrode voltages applied and on a normal line voltage of 117 volts or on a normal storage-battery voltage of 2.0 volts per cell (without a charger) or 2.2 volts per cell (with a charger), the voltage drop across each 1.4-volt section of filament will be maintained within a range of 1.25 to 1.4 volts with a nominal center of 1.3 volts. In order to meet the recommended conditions for operating filaments in series from dry-battery, storage-battery, or power line sources it may be necessary to use shunting resistors across the individual 1.4-volt sections of filament.

B. 2.0 Volt Battery Tube Types

The 2.0-volt line of tubes is designed to be operated with 2.0 volts across the filament. In all cases the operating voltage range should be maintained within the limits of 1.8 volts to 2.2 volts.

2. Positive Potential Electrodes

The power sources for the operation of radio equipment are subject to variations in their terminal potential. Consequently, the maximum ratings shown on Tube Data Sheets have been established for certain Design Center Voltages which experience has shown to be representative. The Design Center Voltages to be used for the various power supplies together with other rating considerations are as given below:

A. AC or DC Power Line Service

The design center voltage for this type of power supply is 117 volts. The maximum ratings of plate voltages, screen-supply voltages, dissipations, and rectifier output currents are design maximums and should not be exceeded in equipment operated at a line voltage of 117 volts.

B. Storage-Battery Service

When storage-battery equipment is operated without a charger, it should be designed so that the published RMA maximum values of plate voltages, screen-supply voltages, dissipations and rectifier output currents are never exceeded for a terminal potential at the battery source of 2.0 volts per cell. When storage-battery equipment is operated with a charger it should be designed so that 90 % of the same RMA values are never exceeded for a terminal potential at the battery source of 2.2 volts.

C. "B"-Battery Service

The design center voltage for "B" batteries is the normal voltage rating of the battery block, such as 45 volts, 90 volts, etc. Equipment should be designed so that under no condition of battery voltage will the plate voltages, the screen-supply voltages, or dissipations ever exceed the recommended respective maximum values shown in the data for each tube type by more than 10%.

D. Other Considerations

a. Class A1 Amplifiers

The maximum plate dissipation occurs at the "Zero-Signal" condition. The maximum screen dissipation usually occurs at the condition where the peak-input signal voltage is equal to the bias voltage.

b. Class B Amplifiers

The maximum plate dissipation theoretically occurs at approximately 63% of the "Maximum-Signal" condition, but practically may occur at any signal voltage value.

c. Converters

The maximum plate dissipation occurs at the "Zero-Signal" condition and the frequency at which the oscillator-developed bias is a minimum. The screen dissipation for any reasonable variation in signal voltage must never exceed the rated value by more than 10%.

d. Screen Ratings

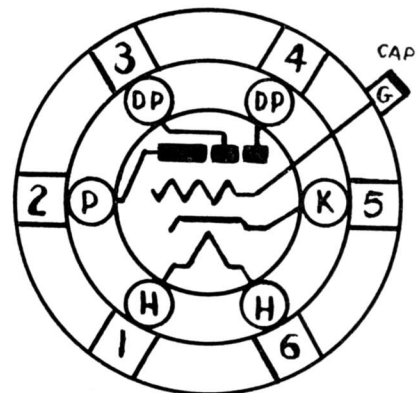
When the screen voltage is supplied through a series voltage-dropping resistor, the maximum screen voltage rating may be exceeded, provided the maximum screen dissipation rating is

not exceeded at any signal condition, and the maximum screen voltage rating is not exceeded at the maximum-signal condition. Provided these conditions are fulfilled, the screen-supply voltage may be as high as, but not above, the maximum plate voltage rating.

3. Typical Operation

For many receiving tubes, the data show typical operating conditions in particular services. These typical operating values are given to show concisely some guiding information for the use of each type. They are not to be considered as ratings, because the tube can be used under any suitable conditions within its rating limitations.

Characteristics of Philco Type 75 Tube



6G

Philco Type 75 is a high mu triode having two diodes also in the same bulb. The diode units are independent of each other and of the triode, excepting for the use of a common cathode sleeve, having a separate emitting surface for the diodes, and another for the triode. In circuit application it is commonly used as a second detector (with automatic volume control) and first A.F. tube.

Characteristics

Heater Voltage AC or DC..... 6.3 volts
 Heater Current 0.3 ampere
 Cap Small Metal
 Base—Small 6 pin..... 6G

Interelectrode Capacitances (Triode Unit)

Grid-Plate 1.7 Micromicrofarads
 Input 1.7 "
 Output 3.8 "

Ratings

Maximum Plate Voltage..... 250 volts

Class "A" Amplifier (Triode Unit)

Plate Voltage 250 volts max.
 Grid Voltage -2 volts
 Plate Current 0.9 M.A.
 Plate Resistance 91,000 ohms
 Mutual Conductance, 1,100 micromhos
 Amplification Factor 100

Questions and Answers

1. Q. I have an A.C. operated Signal Generator, and find that when I want to connect it to small AC-DC receivers for alignment, the instant that the ground side of the lead from the generator is connected, a hum starts which I cannot overcome.

A. The difficulty in using A.C. operated signal generators to align AC-DC receivers is common to all A.C. operated signal generators which employ condensers to properly by-pass the A.C. line. The solution is simply not to connect the shield of the signal generator output lead directly to an AC-DC receiver at any point. A small mica condenser between 100 and 200 Mmfd of capacity should be inserted in series with the shielded lead from the signal generator.

Still another and better way of accomplishing this same result is to use a Philco Set Transformer, Part No. 32-2763, in place of isolating condensers. Connect the two output terminals of the signal generator to the primary of this transformer, and then connect the AC-DC set to the secondary of the transformer. Increased signal input and greater stability is obtained by using a transformer in this manner as against the method of using the series condensers.

2. Q. What is the probable cause of low frequency drift with Philco Model 38-3116 Code 125? Sometimes the 550 K.C. station comes in at 580, 550 or 530. Tube and voltages check O.K.

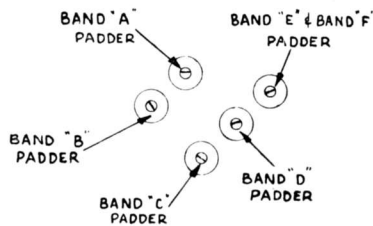
A. There may be a defect in the low frequency padder (43A in the diagram). Replace it with Philco Part No. 31-6124 padder.

3. Q. On Philco Model 715P Radio Phonograph model, the radio works O.K. but records will not come through. There is a loud hum on phono position, and as the volume control is advanced, the light in the beam of light reproducer dims and the hum increases. What is the cause of this?

A. An extra audio stage of pre-amplification is employed in the phonograph position of the selector switch. It is quite possible that the pre-amplifier tube, type 7C6, may be inoperative or defective in such a manner as to cause this hum.

4. Q. What may cause an objectionable flutter, or A.C. modulation, particularly on high notes when playing records on the Philco Model 715P phono radio model? On radio the tone is perfect. All centering adjustments have been made in the pick-up head,

Padder Adjustments Model 070 Signal Generator



The location of the padding condensers used for adjusting each band of the Model 070 Philco Signal Generator is shown in the sketch above.

and the light beam has been correctly positioned.

A. This condition might be caused by having the sapphire jewel contacting the record groove at an improper angle. Looking at the side of the pick-up, the jewel should be maintained at an angle not greater than 26 degrees with reference to a vertical line drawn to the record surface. Excessive wear of the jewel will cause this angle to increase beyond 26 degrees, causing imperfect tracking at high frequency.

The same condition might be caused by a very stiff mirror and jewel bearing assembly. Any excessive mechanical vibration transmitted to the jewel will be heard in the loudspeaker as a flutter or A.C. modulation of the musical tone.

5. Q. Philco phono radio Model 715P has about one-half the volume that it should have on the phonograph. The radio has plenty of volume. What is the cure for this trouble?

A. Check the adjustment for the brilliancy of the special pilot lamp in the pick-up head. This adjustment is located to the right of the tuning condenser (looking at the back of the set), and is the one of the three in a line that is nearest to the front of the cabinet. If this fails, the next step would be a comparison of voltages throughout the receiver using the tabulation given in the service bulletin for this model. Notice that there is an appreciable difference between the voltages in the radio and in the phonograph position. Assuming that the voltages are correct, and that no obvious fault is noticed, either the photo cell of the pick-up or possibly the matching transformer is at fault.

R.M.S. Correspondence

We are very pleased again to quote a few excerpts from the many letters which have been received during the past month both by R.M.S. headquarters in Toronto, and by our distributors. We are certainly glad to know that our mailings and the Serviceman are being so well received:

From Mr. James Adams, of 276 Grooms Avenue, Oshawa, Ontario—"I take this opportunity of thanking you for services rendered through R.M.S. service bulletins. You are doing more along these lines than any other radio manufacturer I know of. These bulletins have been very helpful to me. Allow me to again thank you, and wish you a successful and prosperous New Year.

From Mr. William Oliver, of 94 Keith Street, Hamilton, Ontario—"I have been a member of R.M.S. for about five years, and wish to take this opportunity to express my many thanks for all the help and information this service has given me."

From Mr. C. H. McCall, of McCall's Radio Service, 543 Sixth Avenue, Niagara Falls, Ontario—"Radio Manufacturers Service is doing the finest possible job, both for Philco, and the otherwise 'forgotten man', the Radio Serviceman. One of the highlights of the month is the receipt of the R.M.S. mailings and the Philco Serviceman, to which I always look forward. Keep up the good work, Philco. It is more than appreciated by all of the R.M.S. members."

PROFIT INSURANCE

(Continued from Page 1)

Factory Sealed Cartons

Frankly, no radio manufacturer, Philco included, recommends unpacking a new radio or a radio phonograph in the customer's home from the original factory sealed carton. Philco builds sets as well as they know how to construct them, but there are going to be some occasions because of transportation and other factors wherein the set will require some minor adjustments before it is ready for operation in the home. This is particularly true with respect to the radio phonographs which are much more complicated than the straight radio set. If the customer insists upon seeing a set taken out of an original factory carton, then our suggestion is that the dealer obtain some sealing tape from the distributor so that a preliminary inspection in the store can be made before the set is actually delivered. The customer's first impressions are his lasting ones and it is important that they be the most satisfactory impressions of his new Philco.

PHILCO CORPORATION of Canada Limited

PARTS AND SERVICE DIVISION

TORONTO

The Philco Serviceman reaches you free of charge
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