

# PHILCO SERVICEMAN



RADIO • MANUFACTURERS • SERVICE • NEWS

OCTOBER, 1940

## Operation of Light Beam Pickup Described

### EDITORIAL

#### HOW TO GET A RAISE

Just about the most important subject in the world to a radio serviceman is his personal income. Certainly it has a greater effect on his well being than does his technical knowledge of radio.

#### Supply and Demand

The rewards for his services are governed largely by the old law of supply and demand, and today this law has reduced the amount of money that a serviceman can collect for his work. If he is extremely good technically and is unusually fast on a job, he can repair more sets in a day and thus make up for the relatively low amount he must charge for each. Most servicemen do not have this many calls coming to them each day with the result that their income from actual service work is relatively low.

#### Higher Income Bracket

There are two things these men can do to get into a higher income bracket. The first is to do more advertising and promotional work to get more service business. Advertising in the local paper, signs placed in various stores and public garages, handbills or letters distributed in the neighborhood; co-operation on public address work with various civic societies and organizations — all of these things are sure-fire business-getters.

#### \$7.40 Weekly Raise

Secondly, the serviceman can very easily cash in on the profits that are to be made from accessory selling while in the home on service work. Every home in the country uses furniture polish. Why not ask your customer if he cares to buy a bottle of the Philco Furniture Polish which you use to wipe off the cabinet after your service work is finished? Twenty of such "accommodation" sales will add four dollars to your weekly income. There is scarcely a home where there isn't at least one interference-producing appliance that could be corrected by using a Philco noise eliminator. Ten of such sales is another \$3.40 on your income. Larger dollar unit sales items such as quick-release ice cube trays, extension speakers, or even portable radios sell almost as easily as the smaller items — it is simply a matter of letting a number of people know what you have to offer and asking a number of people to buy.

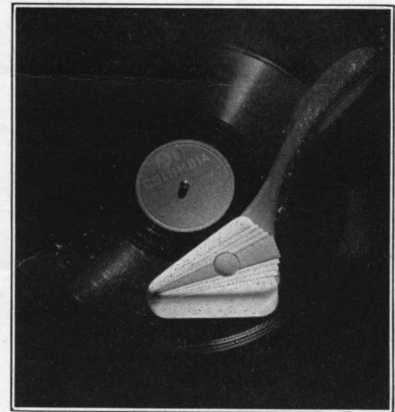
### Greatest Phonograph Development Exclusive Philco

The light beam pick-up — another of Philco's great inventions — is a constant source of wonderment to the public and to radio dealers alike. The universal acceptance of this new contribution to home entertainment is a real tribute to the genius of Philco engineers.

The light beam pick-up differs from the ordinary phonograph pick-up in that the mechanical movement or work done in translating the sound vibrations of the record grooves into electrical vibrations is practically all eliminated. This means that the tone is far superior, the surface noise or scratch is a minimum, and the wear on records is greatly reduced. By employing a special jewel instead of an ordinary phonograph needle, the necessity for changing needles is eliminated.

#### Method of Operation

The jewel, which is the contact point with the record, is secured to a small metal arm, extremely flexible vertically and light in weight. This arm in turn is fastened to a tiny mirror of thin glass and of almost negligible weight. A constant light source within the pick-up head is focused on the mirror and this light in turn is reflected into a photo-electric cell. The cell has the property of producing minute electrical currents when the surface of the cell is exposed to light. When the jewel is lowered onto the revolving record, the vibrations cause the mirror to vibrate in the beam of light. The light which is reflected onto the photo-electric cell is thus vibrating in exactly the same manner as the mirror. The degree of movement or the actual amount of motion of the mirror determines the loudness of the musical reproduction. The frequency of vibration or the number of times



per second the mirror vibrates back and forth determines the frequency or pitch of the reproduced sound.

Thus it is seen that the only work done by the jewel or "needle" is to move the extremely light-weight mirror. This is contrasted with the ordinary crystal pick-up in which the needle must actually twist and distort a comparatively rigid crystal in order to reproduce the sound.

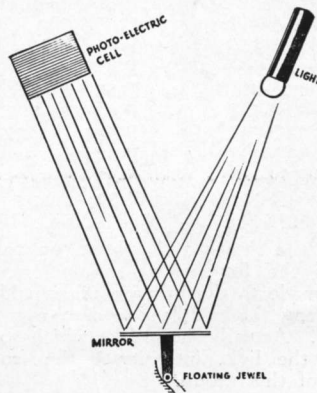
#### H. F. Light Source

Obviously, if the source of light in the light beam pick-up were from the 60 cycle A. C. current used in the ordinary tube filaments and pilot lights, there would be a strong 60 cycle hum on phonograph. The light reaching the photo-electric cell would be changing at the rate of 60 times per second. On the other hand, if the light were illuminated by a high frequency alternating current such as that produced by an R. F. oscillator tube, the ear would be unable to detect these rapid vibrations and the effect would be that of a constant light. This is exactly what is done in the light beam pick-up. The light is illuminated by an R. F. current vibrating at 1800 K.C. (1,800,000 vibrations per second) taken from the oscillator tube in the radio circuit.

#### Location of Padders

The brightness of this light determines the volume of phonograph reproduction. This brightness is adjusted at the factory by means of a padding condenser located on the top of the radio chassis. In Models 41-608 and 41-609 there are three padders in line to the right of the tuning condenser, looking at the chassis from the back of the cabinet. The one nearest the

*Continued on Page 4*

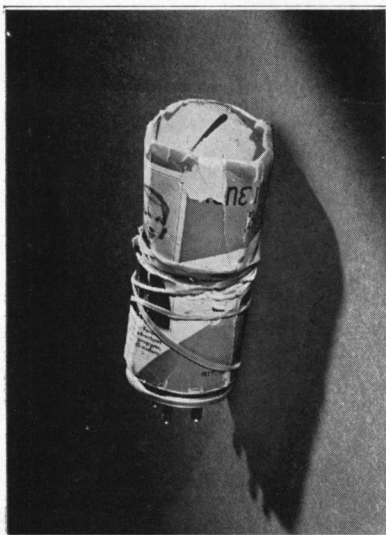


## Cheap Vibrator Causes Serious Auto Radio Complaint

Philco's attention was recently called to a customer complaint on the performance of a Philco custom built auto radio. This customer had gone to an auto radio service station where he was told that it was necessary to install a new vibrator in order to effect correct performance of the radio. The vibrator was installed and after the set was in operation for a week it again failed to perform. The customer was somewhat disturbed, and this time he went to another service station. They examined the vibrator which had been placed in his Philco set and found that it was a cheap brand of vibrator which was sold to servicemen and auto radio service stations at "bargain" prices. The vibrator was not good to begin with, and naturally the set could not be expected to perform. The criticism, however, as far as the customer was concerned, was of the set and not of the vibrator, inasmuch as he knew nothing of the quality of this replacement.

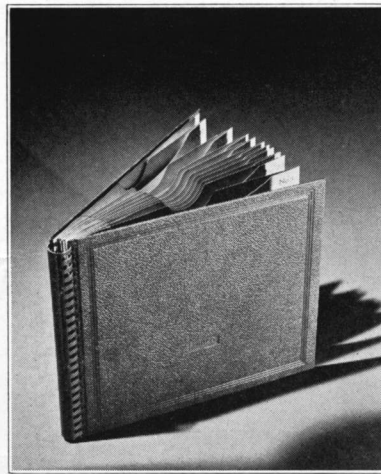
Incidentally, the vibrator which was installed was too small in diameter since it was a substitute, and the first service station had accordingly wrapped a blotter around the case so as to fill up the space inside the housing. Needless to say the replacement of the vibrator with the correct Philco unit restored normal operation of the radio and the customer was again pleased with his Philco.

Here is just another example of the folly of trying to save a few pennies by giving the customer inferior quality on replacements.



THE NON-GENUINE TROUBLE MAKER

## Philco Record Albums Available



The new phonograph record albums which have recently been announced by Philco have met with a most favorable acceptance by dealers all over the country. The new albums are particularly desirable because they can be opened easily without the binding which is so characteristic of record albums in the past. A special type of hinge along the edge of the album makes it possible to open the entire album at one time just as easily as opening a single leaf.

The new Philco record albums are finished in maroon leatherette. The 10-inch album sells at a list price of \$1.50 and the 12-inch album sells at a list price of \$1.75. Both of these items are subject to regular parts discount and are now available at all Philco distributors.

## Corrections

In the September issue of the Philco Serviceman, there was an error in the listing of Philco dry batteries on page 3. This error was confined entirely to the column on the right hand side of the page. The correct listing of this column is shown below:

- |           |       |           |
|-----------|-------|-----------|
| P-816     | P-602 | P-60D-11L |
| P-816     | P-602 | P-60D-11L |
| P-41A-4FL |       | P-60D-11L |
| P-41A-4FL |       | P-60B-6L  |
| P-60A-110 |       | P-41A-4G  |
| P-41A-4FL |       | P-41A-4G  |
| P-60A-4L  |       | P-60A-8F4 |
| P-60D-11L |       | P-60A-8F4 |
| P-60D-11L |       | P-841     |
| P-60D-11L |       | P-841     |
| P-60D-11L |       | P-87      |
| P-60D-11L |       | P-89      |
| P-60D-11L |       |           |

In the right hand column on page 4 of the September issue reference was made to the location of a padder as being the middle one of a row of three. Actually the padder which controls the light intensity is the front one of this group.

## Philco Merchandisers for Plus Sales



For the dealer who wants plus sales and plus profits, the new Philco Merchandise Display is a sure-fire winner. The display is rigidly constructed of standard steel shelving welded together with heavy corner angles. It is an expensive and attractive construction and yet it costs the dealer nothing since it is supplied with the complete line of Philco products illustrated on this page.

Every customer who comes into your store is a prospect for at least one item on this valuable merchandise display. Repeat business with its added floor traffic will in itself pay the dealer many times over.

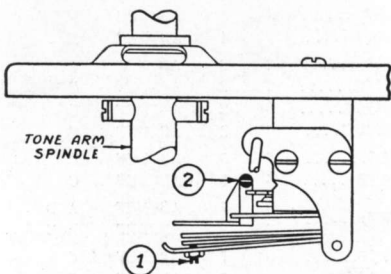
For the serviceman who wants to carry out this same merchandising plan, Philco has made available the Serviceman's Merchandise Sample Kit. This is a handy leatherette carrying case equipped with adequate samples of various items in the Philco merchandise line such as, furniture polish, household cement, pilot lamps, phonograph needles, etc. These items will sell themselves if they are displayed in the customer's home when the serviceman is making a service call.

Both of the above items are profit-builders which cannot afford to be overlooked.



## Adjusting Automatic Trip Operation in Model 41-608

The automatic record changers used on the Model 608 are carefully adjusted and checked in the factory before they are shipped. On the early production record changers, however, the adjustment of the trip mechanism is so critical that the setting may be disturbed during shipment and it may be necessary to readjust this part of the mechanism.



The tone arm, when placed on a record, travels in toward the center, and this movement toward the center would normally operate the "trip" mechanism after 3 or 4 revolutions of the record, except that provision has been made to prevent this. A clutch on the tone arm is released after every two revolutions of the turntable, permitting the trip rod to drop back to normal. When the tone arm reaches the end of the record and engages in the eccentric groove, the tone arm travels toward the center so much faster that the trip mechanism is operated before the clutch has a chance to release it.

The difficulty that may be experienced on the early production record changers is that the jar of the records dropping down when changing, or the movement across the record in the starting groove, might cause the trip to operate and trip itself continuously.

The readjustment procedure is simple. First determine that the clutch is being released momentarily every two revolutions of the turntable. The clutch collar should clear the plate on the tone arm spindle sufficiently to allow the trip mechanism to drop back while playing across a record. If the clutch does not actually disengage, screw in the adjusting screw (No. 1 on illustration) on the bottom plate to give a longer thrust from the clutch operating roller. The roller and its mechanism should pulse by hitting the small bumps on the main cam, but the roller should not continuously ride on the main cam.

If the clutch is operating satisfactorily, but the trip mechanism is tripping itself prematurely, screw in the adjusting screw on the "U" shaped trip arm, until the proper adjustment is made (No. 2 on illustration).

Both adjustments are simple and are very easy to make from the back of the radio phonograph.

## New Auto Radio Announced By Philco

Philco's new 8-tube deluxe auto radio has just been announced—the new Model AR-75.

This model is representative of the finest in auto radio performance, tone, and quality appearance. The AR-75 is a 2-piece unit having a separate dynamic speaker which is mounted on the fire wall of the car. The large radio unit is mounted under the dash and the new control fits on the bottom flange of the instrument board or in the space provided for radio control in the instrument board. Custom plates are available for installation in practically any type of car.

One of the outstanding features of this fine new model is the push-pull beam power output audio circuit which operates into the large 8-inch dynamic speaker. The finest tone quality with full depth of bass is thus obtainable. Such tone has never before been heard in an automobile radio.

The single push-button automatic tuning control provides reception for 5 pre-selected stations. This control is also combined with a manual control for standard dial tuning. The push-button adjustments in setting up stations can easily be made with the radio installed in the car.

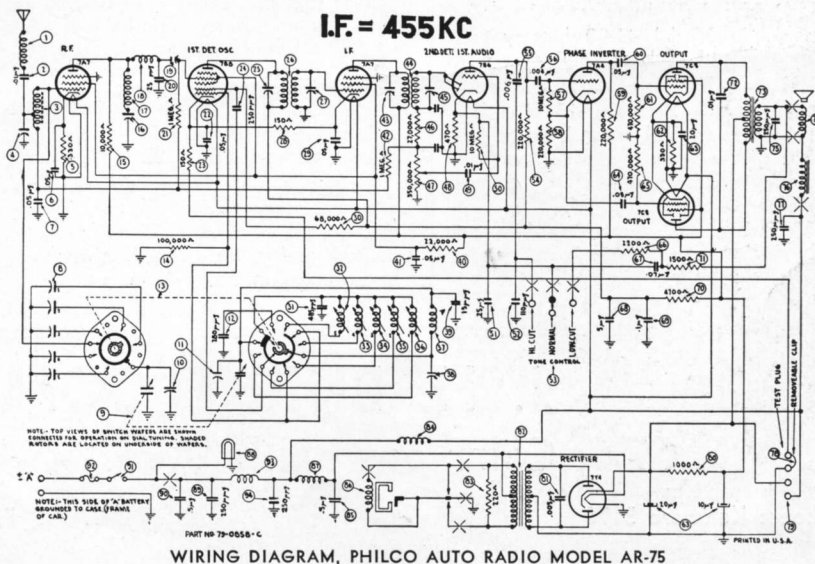
The sensitivity and selectivity of this new model are outstanding. The antenna circuit is made adjustable so that maximum performance can be obtained on any desired type of Philco auto radio aerial.

Both the radio unit and the speaker housing are finished in a new material of Ludington green. This affords a rich appearance which is consistent with the high quality of this model. A large metal "Philco Radio" is finished in chrome on the front of the set. The grille on the speaker is likewise finished in chrome so that the effect is one of unusual brilliance and quality appearance.

## Complete Wiring Diagram Information For All Philcos



Wiring diagrams are available to servicemen for every Philco radio which has ever been built. These have been published as manuals and year books and there are now four volumes available. Volume No. 1 includes all of the Philco home set models up to the 1937 line. Volume No. II covers all models in the 1937 and 1938 line. The 1939 R. M. S. Year Book contains diagrams on all home and auto radio sets of the 1939 series. Likewise, the 1940 R. M. S. Year Book contains complete diagrams and alignment instructions on all of the home sets and auto radio sets of the 1940 series. Volumes No. I and No. II are available complete with R. M. S. binder at \$1.25 net. The 1939 Year Book is available at 75 cents net in a self-bound cover. The 1940 Year Book sells at \$1.00 net. All of these wiring diagram books are obtainable from the Philco distributor.



WIRING DIAGRAM, PHILCO AUTO RADIO MODEL AR-75

### Questions & Answers

1. Q. How can station tabs be installed when the bezel openings are not moulded cleanly at the corners?

A. The ends of the tabs can be fitted simply by clipping the corners, tapering them gently just enough to clear the moulded fin or edge at the top and bottom of the opening.

2. Q. How can the gear train assembly of the Philco Home Recording Kit be installed on Model 41-611?

A. On the early production of this model it is necessary to drill out the screw hole in the boss on the gear train assembly. The assembly is then fastened to the record changer base with a bolt, lockwasher, and nut. Also in this model, the bolts fastening the record changer base plate to the mounting board must be removed and the record changer lifted up on the one end. The worm drive mechanism is then slid in between the record changer and the mounting board. The worm drive can then be fastened securely in place.

3. Q. What is the most common cause of rumble or low pitched microphonics in the new Philco phonograph combination models?

A. Contact between the record changer unit and the mounting board of the cabinet is the most frequent cause of this trouble. New rubber supports, Part No. 54-4048, are used for mounting the record changer in the cabinet. These supports permit complete freedom of motion of the changer, allowing the unit to float freely on the rubber.

4. Q. In the Model 608 what is the cause of blades failing to cut between records when playing a stack of 12-inch records?

A. This condition, which usually causes the record changer to stall, is due to insufficient spring tension against the blades. Heavier springs are now used under the caps on the changer posts. These new springs are known as Philco Part No. 35-2218.

5. Q. Has the volume control switch assembly in Model 41-90 battery set been improved in later production?

A. Yes. The later sets use Philco volume control, Part No. 33-5428 instead of the original control, Part No. 33-5407. On some of the earlier production controls, moisture caused the switch mechanism to fail, but on the later controls, the construction is entirely different and there is no possibility of trouble of this kind.

### OPERATION OF LIGHT BEAM PICK-UP

*Continued from Page One*

front is for adjusting the brilliance of the lamp. In Models 41-610 and 41-611, there are two padders at the extreme left of the chassis near the front. The one nearer the front is the lamp-adjusting padder.

The lamp itself, although in appearance like an ordinary pilot lamp, is specially constructed for its purpose. Since the lamp must emit a bar shaped beam of light, a specially shaped hand-assembled filament is used. The finished bulb contains argon gas to ensure long filament life. The lamp must be free from microphonics and it is sometimes necessary to replace one of these lamps because of such microphonic filament vibration.

#### Correct Focusing of Light

The focusing of the reflected light on the photo-electric cell is accomplished by means of the adjusting screw on the side of the pick-up head. This adjustment is made at the factory and should not ordinarily have to be changed. The adjustment is correct when the brilliant spot of the reflected light is half on and half off the photo-electric cell. The reason for such a setting is that there must be an allowance for variation due to the mirror movement. If the light were over the entire surface of the cell, there could be no such variation.

Should it ever become necessary to replace the light, care should be exercised in adjusting the focus properly. The bakelite lugs on the back of the socket assembly can be rocked to move the light toward or away from the lens. The correct adjustment is to move the light forward until the image of the filament is exactly focused on the photo-electric cell and then continue moving forward beyond this focus point until the image is 5/32" wide, including the halo. The image should be vertical and exactly centered on the mirror. If it is not vertical, it can be straightened by slightly rotating the lamp by means of the bakelite lugs on the back of the socket assembly. This correct focusing then makes it possible to adjust the screw on the side of the pick-up head so that the brilliant reflected spot will be half on and half off the photo-electric cell.

Unlike a radio tube, there is no apparent depreciation of the photo-electric cell with use. The life is unlimited and there should, therefore, be no occasion for replacement.

### Revised Settings for Model 050 Tube Checker

The following tube tester settings should be used in place of the original settings given in the instruction sheet of the early production Model 050.

Tube Type	Fil. Cont.	Load Cont.	Toggle Switch Settings	
			Short Test	Quality Test
1R5.....	1	6	ABCD F	E
2W3.....	3	4	AB DEF	M
2W3GT....	3	4	AB DEF	M
6K7.....	6	2	ABCDEF	C
6K7G.....	6	2	ABCDEF	C
6K7GT....	6	2	ABCDEF	C
6K7MG....	6	2	ABCDEF	C
6L6.....	6	5	ABCDEF	C
6L6G.....	6	5	ABCDEF	C
6N7.....	6	7	ABCDEF	ACD
			ABCDEF	BCE
6P5.....	6	7	ABCDEF	C
6P5GT....	6	7	ABCDEF	C
6SQ7.....	6	8	AB DEF	ACDES
			AB DEF	ABCD
			AB DEF	ABCE
6SQ7GT....	6	8	AB DEF	ACDES
			AB DEF	ABCD
			AB DEF	ABCE
6X5.....	6	7	ABCDEF	AC
			ABCDEF	CE
6X5G.....	6	7	ABCDEF	AC
			ABCDEF	CE
6X5GT....	6	7	ABCDEF	AC
			ABCDEF	CE
6X5MG....	6	7	ABCDEF	AC
			ABCDEF	CE
7B6.....	6	8	AB EF	CDEF
			AB EF	ABCDE
			AB EF	ABCDF
7C6.....	6	8	AB EF	CDEF
			AB EF	ABCDE
			AB EF	ABCDF
12SQ7....	8	8	AB DEF	ACDES
			AB DEF	ABCD
			AB DEF	ABCE
12SQ7GT....	8	8	AB DEF	ACDES
			AB DEF	ABCD
			AB DEF	ABCE
44.....	6	6	ABCDEF	C
117Z6G....	11	3	ABCDE	CPG
			ABCDE	DPG

Note: P & G must be thrown throughout short test.

117Z6GT.... { 11 3 ABCDE CPG  
 { 11 3 ABCDE DPG

Note: P & G must be thrown throughout short test.

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