



Courtesy of Columbia Broadcasting System

JANUARY-FEBRUARY, 1941

## A NEW FEATURE IN RIDER'S XII

**F**OR the past several years design engineers in the radio field have been striving to incorporate in receiver chassis such features that will carry them further along the road to ultimate perfection of reception and reproduction. Many of their efforts have borne fruit and there is little doubt in anybody's mind today that every year has shown an improvement of some kind or another.

But to the radio serviceman, these improvements more often than not are a very definite headache inasmuch as nearly every new feature incorporated in a receiver means some sort of a complication which he has to untangle when the set comes into his shop. Also it does not necessarily mean that a circuit to present a series of problems has to have ten or a dozen tubes or

cover three or more wavebands. On the contrary, we have seen receivers wherein only a few tubes were employed and that covered only the broadcast band, in which there were special circuits galore along with the regular superheterodyne line-up that were among some of the most complicated that can be imagined.

Heretofore in Rider's Manuals we have endeavored to give all available assistance to servicemen by publishing whatever data were released by the manufacturer, especially that information that pertained to complicated circuits. But in view of the increasing complexity of circuits and the resulting difficulty of finding out just how they function, it was felt that some new method of presentation was needed by which a serviceman could understand,

practically at a glance, the whys and wherefores of the questions that might arise in connection with some of these new receivers, whose data we are preparing for Rider's Volume XII.

We have studied this problem for a long time — seeking a solution for the best presentation of the data — and now we are glad to announce that we have evolved something that will mean a great deal to the users of Rider's Manuals in the future.

First of all, let us see what some of these different things are that are time-consuming and a source of possible trouble to a serviceman. . . . In a multi-band receiver one or more band switches are employed to shift different components in and out of the several circuits. Unfortunately, there is no uniformity in the make-up of these

switches in that different manufacturers have their own individual specifications to fit their specific requirements. Moreover, no standard symbolic representation of these band switches has ever been adopted and so they have been represented in many different ways on schematics.

Now while we can not think of a serviceman as being unable to understand just how these switches function in any one particular circuit, yet it must take an appreciable amount of time for anyone, first, to comprehend just how the switch works and, second, what components are involved when the switch is thrown to the different positions. Of course, ordinarily it is unnecessary for a man to find out how all the different positions of the switch affect the functioning of the receiver, inasmuch as he is interested generally in but one waveband to which he has already traced the trouble, this being a relatively simple job. . . .

Therefore, in order to eliminate just one of those factors which now and then take up quite a bit of a man's time, we are going to draw out in schematic form, in Volume XII of Rider's Manual, just what components are connected to the tubes involved for each position of the band switches on

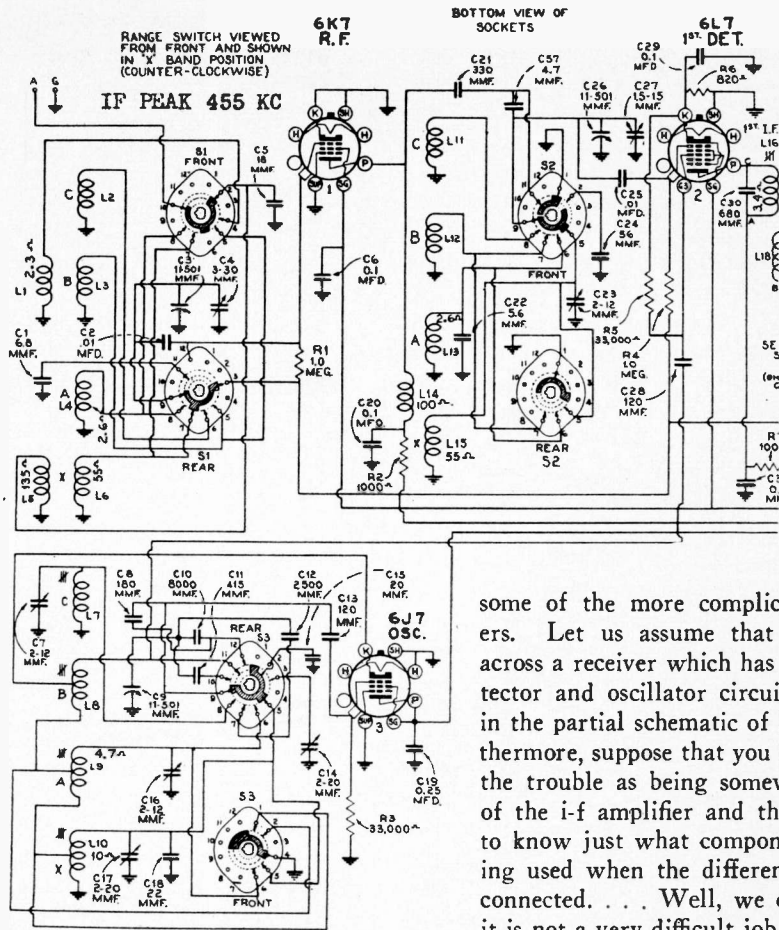


Fig. 1. Partial schematic of RCA multi-band receiver showing waveband switches and parts they control.

some of the more complicated receivers. Let us assume that you come across a receiver which has r-f, first detector and oscillator circuits as shown in the partial schematic of Fig. 1. Furthermore, suppose that you have located the trouble as being somewhere ahead of the i-f amplifier and that you have to know just what components are being used when the different bands are connected. . . . Well, we concede that it is not a very difficult job to trace out the connections for Band X, for that is the one for which the switches are set

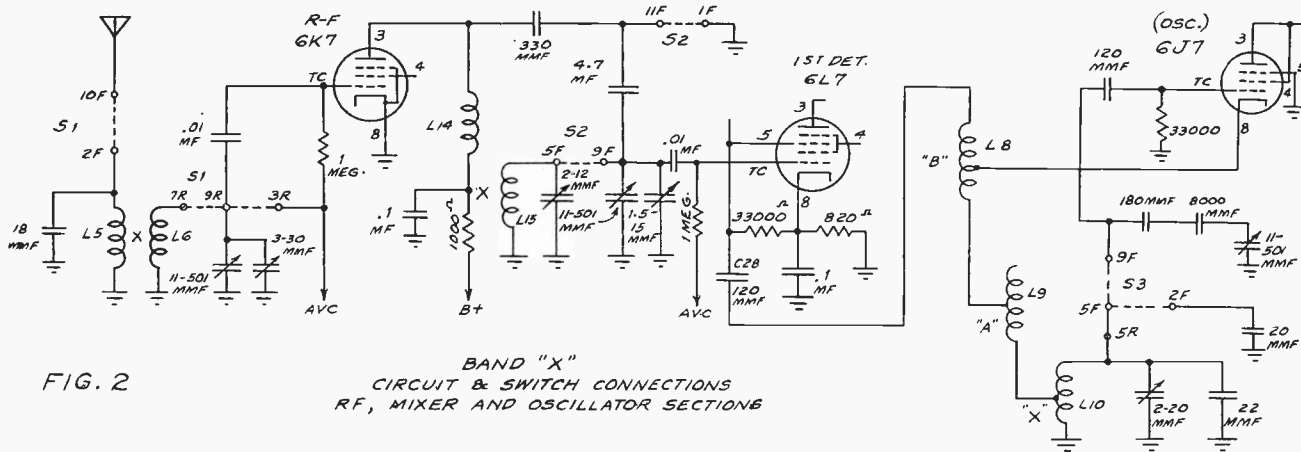


FIG. 2 BAND "X" CIRCUIT & SWITCH CONNECTIONS R-F, MIXER AND OSCILLATOR SECTIONS

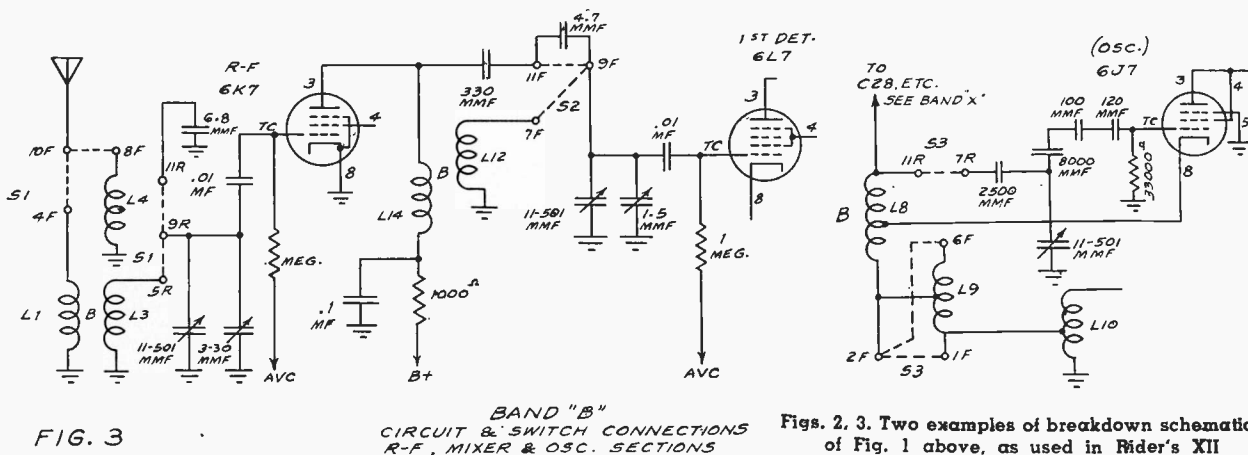


FIG. 3 BAND "B" CIRCUIT & SWITCH CONNECTIONS R-F, MIXER & OSC. SECTIONS

Figs. 2, 3. Two examples of breakdown schematics of Fig. 1 above, as used in Rider's XII

in the schematic, but suppose that it becomes necessary for you to find what coils and condensers are being used when Band B is covered. That indeed is a horse of another color, for in each instance you have to move in your imagination the front and rear of each switch around past so many switch points so that you know just what trimmers are connected to which coils. Most likely you know from experience just how long a thing like that takes.

Now turn to Fig. 2. Here are shown the settings of the three band switches when Band X is covered; in other words, the same settings as those in the partial schematic of Fig. 1. We have had to adopt one or two new symbolic representations for these "break-down" schematics and, in order to explain these, let us trace through some of Fig. 1. Starting at the antenna, we go to point 10 on the front of switch S1, through the switch to point 2 and thence to coil L5, across which is shunted to ground an 18-mmf condenser. Then beginning at L6, coupled to L5, we go to switch point 7 on the rear of switch S1, thence to point 9, which goes to the two trimmers, the 0.01-mf condenser and also to switch point 3. This last-mentioned point goes to both the avc line and the top grid cap of the 6K7 through a 1-megohm resistor, which is shunted by the 0.01-mf condenser mentioned above.

If you will now look at Fig. 2 you will see these same connections in simplified form. Notice that the switch connection between points 10 and 2 on the front of switch S1, marked "10F" and "2F," are the two small circles which are connected by a dotted line. At the top of L6 you will note similar circles designated "7R," "9R" and "3R," which are connected by another dotted line. The letter "R" means that these three points are on the rear of switch S1 and, as before, the dotted line means a connection through the switch. In other words, points on the front of a switch are marked with their numbers and the letter "F" and those on the rear of the switch are marked with their numbers and "R" together with the number of the switch as designated on the main schematic.

Notice too that standard symbols for the several tubes have been adopted in these schematics. We have added to the regular tube symbols, as recommended by the I.R.E., the numbers of the socket terminals and the letters

"TC," designating the top grid cap. It can be easily seen that this will be another time-saver, as having these terminal numbers around the circle enclosing the tube elements will eliminate the necessity for looking them up in a tube manual.

Now turn to Fig. 3. This shows how the condensers and coils are connected when the three switches, S1, S2 and S3, are turned to the B Band. It goes without saying that such a diagram is much simpler to follow than that of Fig. 1. In this schematic when the switches are turned to some other band than the one shown, you have to turn them in your imagination and remember what switch points make contact—something that is easily forgotten when you are going from the rear of one switch to the front of another. Here, in Fig. 3, only those components that are involved in the functioning of that particular band are shown—something that makes for simplicity. Furthermore, in order to simplify the diagram to the greatest extent, we have shown the lead from the upper end of coil L8 terminating in an arrow with the notation "To C28, See Band X." This refers to the condensers and resistors in the cathode and oscillator grid circuits of the 6L7 first detector which are common to each of the four bands. In other words, whenever we can simplify anything without the loss of clarity we are planning to do it so that everything will be easier for you.

But this is not all that we are planning to do. . . . It was mentioned

above that some circuits have some unusual aspects—that along with the regular superheterodyne circuit with its avc, tone control, tuning eye, etc., some new or unusual circuit may be incorporated that on first sight may pass unnoticed and if seen, might well prove to be difficult to understand. This, in the main, is generally due to its being drawn as a component part of the receiver circuit as a whole. In order to make such circuits easier for you, we plan to include along with the regular schematic a skeleton schematic showing those parts that are involved in the functioning of the unusual part of the circuit. Such a breakdown, along with a few words of explanation concerning the skeleton circuit, will make for easier and quicker comprehension of the functioning of the chassis as a whole.

Let us take a specific case. In Fig. 4 is shown the complete schematic of an eight-tube receiver which can also be used as a p-a system, a phonograph, and a recorder for either or both radio and microphone. These different functions are controlled by a three-section switch shown at A, B and C in the schematic. It will be noted that a 6E5 tuning eye is used, but if you will examine the circuit closely and trace it through the switch section which controls it, you will find it terminates in the output circuit of the power tube. In other words, here is a tuning eye that has an uncommon use.

Perhaps you might never have occasion to inspect just that particular portion of the receiver, but if you did, you

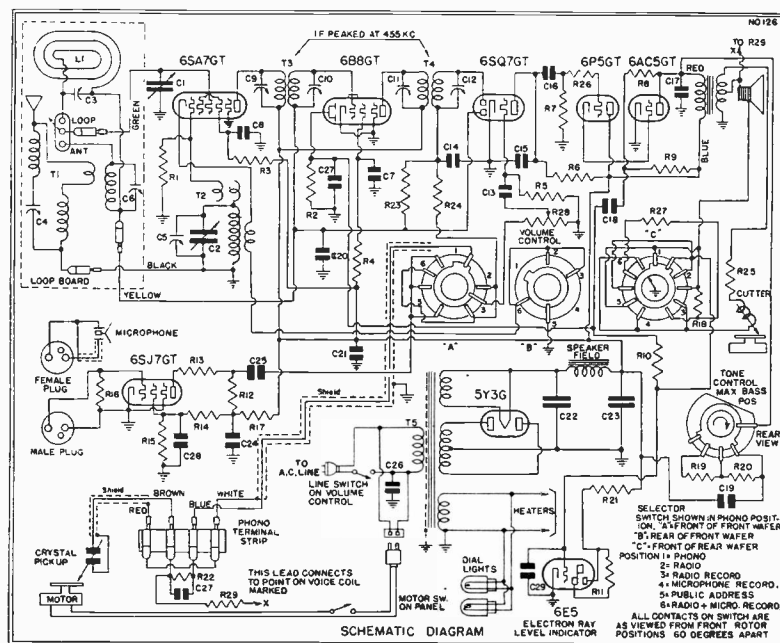


Fig. 4. Three breakdown schematics of this Emerson combination receiver are shown on the next page.

can see that tracing down the fact that the 6E5 is actuated by rectified a.f. would be quite a task. Would a skeleton schematic, such as that shown in Fig. 5, be of assistance? We are inclined to believe that it would help and that is an example of what was meant in the above paragraph. . . .

Not only is the use of the 6E5 just mentioned out of the ordinary, but the multiple switching arrangements controlled by the three-section switch is also off the beaten track. Because of that, we are planning to show in Rider's Volume XII simplified circuits similar to those shown for the different wavebands in Figs. 2 and 3. For example, in Fig. 6 are shown the connections for radio operation of the chassis and in Fig. 7 what components are

in use when the switch is set for microphone recording. (Of course, there are four more settings that will be shown in the Manual, but we show only these two here to give you an idea of what the others will be.) Circuits such as these, together with a few words of explanation, will be added to the regular servicing data that are usually published.

Now you can see from the schematics shown in Figs. 2, 3, 5, 6, and 7 that a great amount of work is represented and yet, as we said above, these schematics are not all that would be published in connection with these two models. . . . Two more schematics would complete the group of the first three figures and four more needed to complete the second group. All this

extra work involves a great amount of time—time for selecting which schematics should be broken down in this way—time for an engineer to trace out and draw the circuits through the various switches—time for a draftsman to make the finished drawings for reproduction in the Manual—time for checking all this work and preparing it finally for the printer.

According to the plans made last Summer, the approximate date for the publication of Rider's Volume XII was sometime in February, but that date was fixed before it was decided to amplify some of the schematics as explained above. Furthermore, if we amplified all the more than ordinarily complicated receivers that will be run

(Please turn to page 7)

FIG. 5

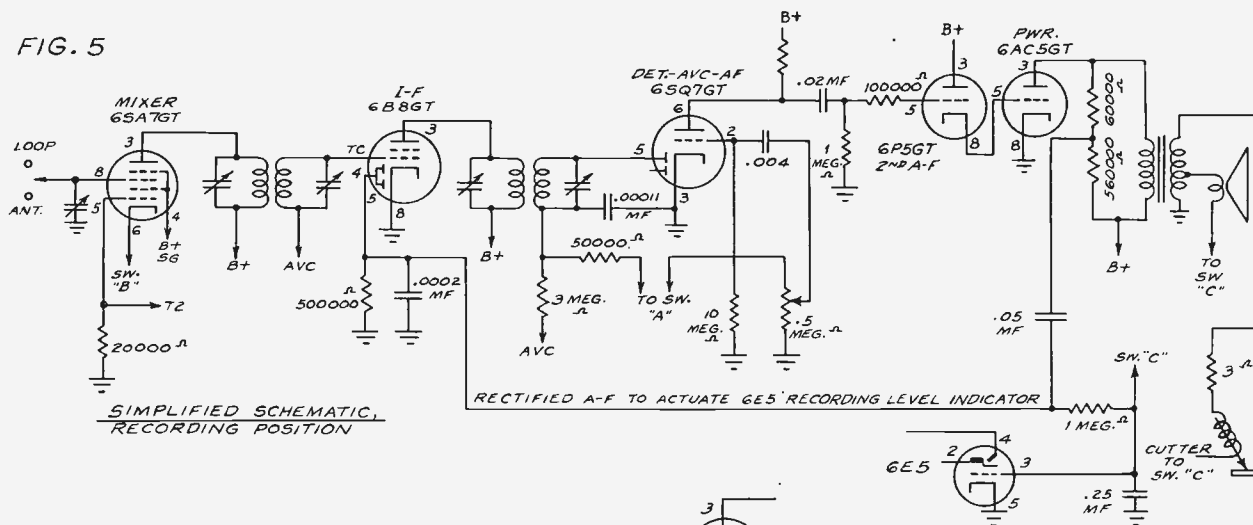
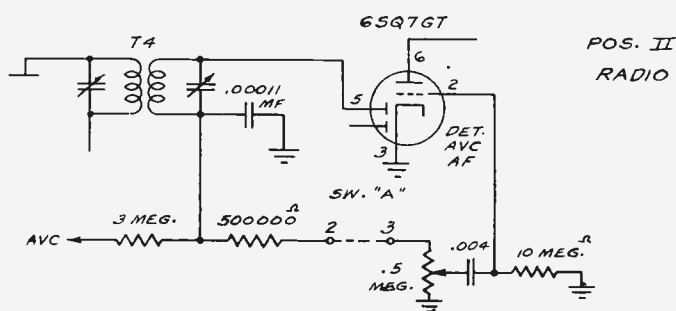


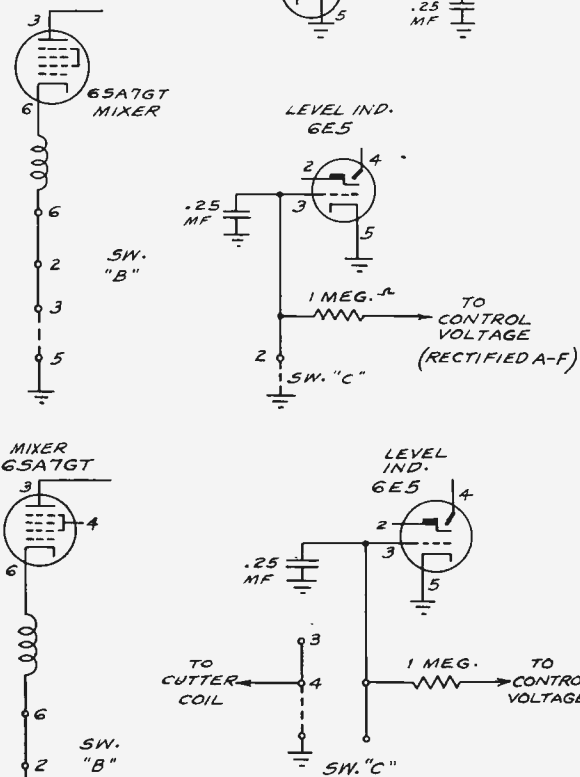
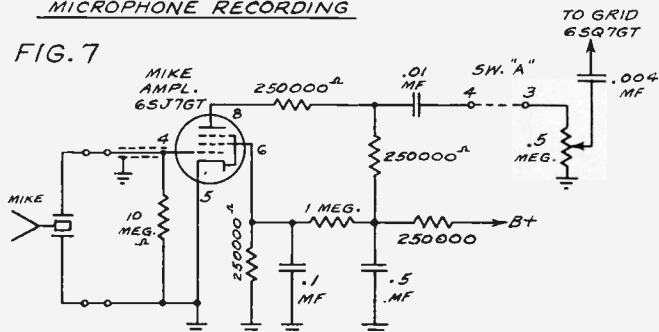
FIG. 6

CIRCUIT CONNECTIONS FOR RADIO RECEPTION



POS. IV MICROPHONE RECORDING

FIG. 7



Breakdown schematics taken from Fig. 4 on page 3 as used in Rider's XII

# Successful SERVICING

Reg. U. S. Pat. Off.

Vol. 7

JANUARY-FEBRUARY, 1941

No. 3

Dedicated to the financial and technical advancement of the  
Radio Serviceman

Published by  
JOHN F. RIDER PUBLISHER, INC.

404 Fourth Avenue

New York City

JOHN F. RIDER, Editor

G. C. B. Rowe, Associate Editor

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the push buttons of a receiver that this action on the part of the F.C.C. is indirectly putting a good many dollars in the pockets of servicemen all over the country and if for no other reason, you should bend every effort to leave your customers satisfied that this re-allocation is a good thing for the listening public. . . .

JOHN F. RIDER.

### The Cover

The photograph on page 1 shows the pickup camera for the color television system developed by Dr. Peter C. Goldmark of the Columbia Broadcasting System, to which company we are indebted for the use of the picture. This direct pickup of the subject was "piped" across the street to a receiver in one of the large studios, where it was seen in natural colors. It is possible to play tricks with the image on the screen, for at one point in the demonstration Dr. Goldmark changed the young lady's picture so that she appeared as if moonlight was the source of illumination.

### Servicemen Want—

Want to communicate with anyone who has experimented with electronic instrument of Novachord or Solovox type. Edw. Sujak, 5321 West 30 Place, Cicero, Ill.

For Sale, complete radio business; latest test equipment, parts, magazines, etc. A. Ochstein, 335 East Lewis St., Fort Wayne, Ind.

Wanted communication receiver: state model, year, make and condition: top offer \$25.00. E. L. Roney, 819 Eleventh St., Modesto, Calif.

For Sale: Supreme 590 DeLuxe, \$24; Triplet 1177 Oscillator and Analyzer, \$14.50; V-T Voltmeter, \$21; Tube Tester, 9-inch meter, \$20; Oscilloscope, \$21; meters, books, etc. 138 Vine St., Plymouth, Pa.

The manufacturer who asked us to obtain servicemen—representatives for him, assures us SUCCESSFUL SERVICING did a good job. Just thought you'd be interested. . . .

## REALLOCATION — MARCH 29th

In the September-October, 1940 issue of SUCCESSFUL SERVICING, we published a notice concerning the proposed reallocation of several hundred broadcast stations' carrier frequencies. On January 31, 1941 the F.C.C. issued what amounts to preliminary orders to 795 stations to make the change-over at 3 a.m., E.S.T., March 29, 1941. It is expected that the final orders will be issued soon after March 1st.

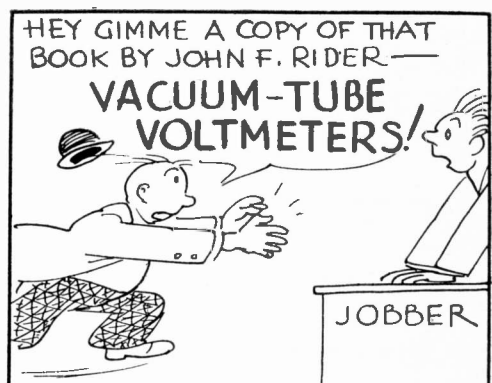
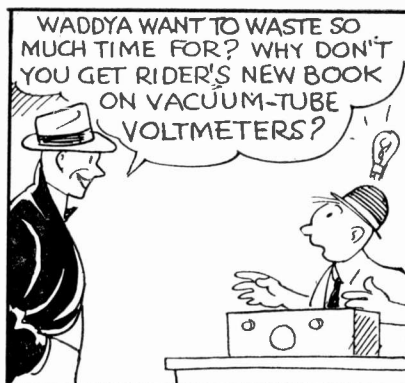
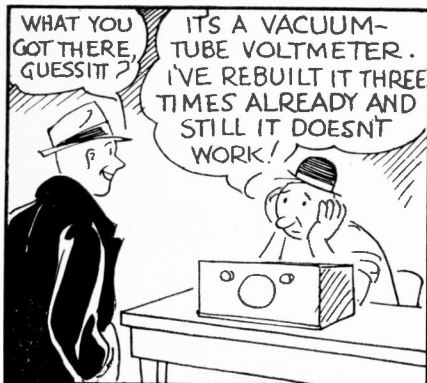
Now these changes will affect hundreds of thousands of receivers in which push-button tuning is incorporated throughout the country and it will be up to you to see that these sets are prepared for the new frequencies. But that is not the only job you have to do in connection with this allocation of frequencies: you will undoubtedly have to explain to Mr. and Mrs. Public just why these changes were made. . . .

Your business experience will tell you that whenever anything occurs that is as sweeping and wide-spread as this, a great number of people want to know the reason for it—why the F.C.C. orders a change that makes the individual dig down and hand you out some cash

to fix his set when nothing was wrong with reception in his case, etc., etc. And that is your cue to assume the role of good-will ambassador for the F.C.C.

If you are located in the southern part of the country or along the Canadian border, you will not have so much difficulty in explaining that these international changes are for the purpose of reducing interference and so improving overall reception. On the other hand, if you are in a locality that is unaffected by Mexican, Cuban or Canadian stations, you will have to explain that these reallocations are a necessity to eliminate interference just as it was necessary back in the middle 1920s—that these changes in frequencies are the result of more than three years of study on the part of broadcast engineers of the United States, Canada, Mexico, Cuba, Haiti—that these changes were made with an eye to future expansion of the number of stations in these countries so that interference will be reduced or eliminated altogether.

It should be remembered by every serviceman who is called in to readjust



# V-T VOLTMETERS

THE vacuum-tube voltmeter is one of the most important measuring devices for the radio engineer and serviceman. While this fact is recognized by nearly every man, it is well known that relatively few of the many users of the instrument fully realize its immense capabilities, the many different types in existence and their varied applications.

Rider's latest book, "Vacuum Tube Voltmeters" covers all phases of the subject—not only the very necessary theoretical explanations of the different types of v-t voltmeters, how they function and why, but also you will find the practical end covered as well. Just to give you an idea of the book's contents, we have chosen a small portion of the second chapter in which *contact potential* effect in diode v-t voltmeters is discussed, and have printed it below:

IN the preceding description of diode v-t voltmeters we deferred a discussion of the action taking place when small voltages are measured by means of a diode rectifier. This action is complicated by the fact that the initial speed with which the electrons leave the cathode is sufficient to carry them to the plate even when no external voltage is applied. And even when the circuit is incomplete, the speed with which the electrons arrive at the plate is sufficiently great so that the plate assumes a potential or voltage which is about 1 volt negative with respect to the cathode. Both of these interrelated effects will now be described.

**Zero-Signal Current**—When the plate and cathode of a diode are connected together through a resistor, Fig. 1a, it is found that a small current flows because of the high speed with which many of the electrons leave the cathode. (The arrow is shown toward the plate because the conventional direction of current flow is taken to be opposite to the direction of electron flow.) For the type 6H6 diode, a current of about 300 microamperes flows when the plate and cathode are connected together directly; the exact current depends to a great degree upon the heater voltage and the condition of the cathode.

The manner in which this zero-signal current varies as the load resistance is increased is shown in Fig. 1b. Starting with a resistance value of 100 ohms, the curve shows that the current decreases from about 300 microamperes for a resistance of 100 ohms, to about 0.1 microampere for a resistance of 10 megohms.

When a diode rectifier is used in a v-t voltmeter circuit, a current will thus flow even when no voltage is applied; the magnitude of the current which can be expected is given by the curve at (b). In high-range v-t voltmeters this initial or zero-signal current is ordinarily so small that it is negligible. However, in low-range diode v-t voltmeters, it is necessary either to balance out the initial current or to make allowance for it in some other way.

**"Contact" or Zero-Signal Potential**—Depending upon the value of load

resistance connected to a diode, the zero-signal plate current will cause a voltage drop to take place between the cathode and the plate. This drop is in such a direction as to make the plate negative with respect to the cathode. This effect is illustrated by the curve shown in Fig 1c. For values of load resistance less than about 100 ohms the contact potential is effectively short-circuited, so that the voltage difference between plate and cathode is reduced to practically zero. As the load resistance is increased, however, the plate becomes steadily more negative until it reaches a potential of about 1 volt negative with a load resistor of about 10 megohms. For still higher values of load resistance, the potential at the plate becomes only slightly more negative than the 1-volt value for a 10-megohm load.

With the circuits which have been thus far described, the zero-signal current is of greater interest than the contact potential. Later, however, we shall describe rectifier-amplifier types of v-t voltmeters in which the voltage developed at the plate is taken as a measure of the input voltage. In this type of v-t voltmeter, the zero-signal voltage or contact potential curve is of primary interest.

The curves which we have shown are for the representative 6H6 receiving-type diode. Other tubes, such as triodes used as diodes, also show the same effect. In high-voltage diodes, such as those of the 2X2 type, the same effect is present but to a much smaller degree. Thus in the type 2X2, the zero-signal current with zero load resistance is only about 0.1 microampere as against 300 microamperes for the type 6H6. This tremendous difference is due to the much wider spacing between the cathode and plate in the high-voltage diode. Although the zero-signal current of high-voltage rectifiers is much smaller, the contact potential is still appreciably large because of the high diode resistance. Thus the contact potential of the type 2X2 is about 0.4 volt as against about 1 volt for the type 6H6."

Now there's a sample of what the book is like. The next time you're in your jobber's, ask him to show you the book itself and we are sure that you'll find it another of Rider's books that you can't afford to miss. . . . Your jobber will have these books after March 1st.

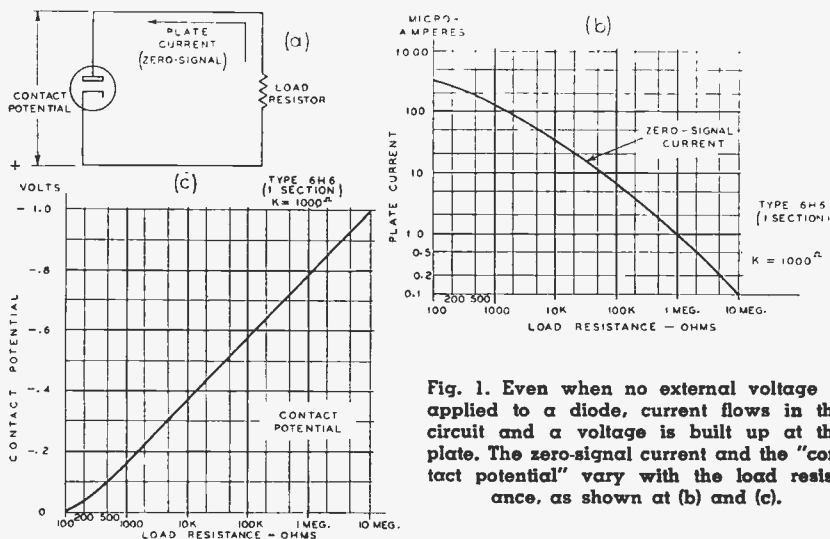


Fig. 1. Even when no external voltage is applied to a diode, current flows in the circuit and a voltage is built up at the plate. The zero-signal current and the "contact potential" vary with the load resistance, as shown at (b) and (c).

# Rolling REPORTER



## THANX

Well, youse guys wot wrote in your thoughts about "The Meter at Work" sure did start the Noo Year off right for us . . . By and large, the majority of them as wrote in on the cards we put in the books, slapped a BIG OK on the split-book idea that's as HIGH as the Empire State Bldg. . . . That sure was a lotta good news to us and we wish we could tell you about who started asking about *getting that book by the dozen!!!!* We sure 'nuf got us a kick outa that . . .

## MORE FMers

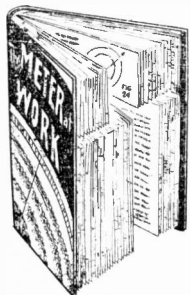
We heard a whisper going round and about that some more f-m stations got the green light from the F.C.C. That brings the score up to around 40 and we'd like to remind yuh that FM is sumpin you should get a load of because it's spreadin'—boy, how it's spreadin'!!!! An' if yuh wanta get the real inside low-down on FM, *get yourself a copy of J.F.R.'s book by the same name.* . . .

## WOTTA CARRIER!

Even though the Signal Corps of the U. S. Army uses radio from here to tomorrow and back, yet for some messages they do say that you can't beat the old-fashioned carrier pigeon . . . Wot brings that there observation down on paper is a squib we saw in this a.m.'s *Trib.* . . . Seems as to how they got a pigeon down at Fort Monmouth, the Signal Corps School, which was captured in the Argonne back in '18 and the old boy is *still goin' strong* . . . Back about 3 yrs ago when 'twas thought that he was gettin' too old and all that sorta thing, they figgered mebbe a little female company might do the old feller good. *And they sure had him doped out right!!!!* His mate laid a nice mess of eggs and every year since then he's been handing out cracked corn instead of the cigars, such as you would pass around . . .

## SURPRISE—SURPRISE

'Tain't gonna be an awful long time, mebbe within the next month, that youse guys are gonna get notice of something the Boss has in mind that'll make yer eyes pop . . . At this here writin' we can't give yuh the whole low-down, but we don't want yuh to come around later and yelp that we didn't at least tell yuh that *a surprise is on the way* . . . And it's NOT gonna be a book!



**YOU USE METERS EVERY DAY—**  
Here's where you can learn to get the most out of them!  
**138 Illustrations**  
**152 Pages, \$1.25**

## SWAP ADS

Don't forget to give a gander at the Swap Ads we're running on page 5 . . . Mebbe you'll be able to do yourself a favor and somebody else too . . . If anyone missed getting the dope on these ads, see p. 6 of the last issue of "S.S." . . . Remember, 25,000 of your fellow servicers read these pages . . .

## F.C.C. LOOKS

Before the hearings on television started, members of the F.C.C. came up to the Big Town and gathered an eyeful or two on what had been done these last few months to make television bigger and better . . . And from wot we hear tell of, *they sure saw pul-lenty!* There was the new RCA home receiver which gives yuh pix 13½" x 18" projected on a screen—the DuMont system using 625-lines and 15-frames—the C.B.S. system of colored television—the RCA theatre system with pix 15 x 20 FEET, etc. ETC. . . . Who said anything about no progress in television, huh?????

## RIDER TO TALK

Plans are in the making for J.F.R. to speak on his own in Peoria, Chicago, Columbus and Ann Arbor . . . Dates are uncertain right now, but youse guys in them towns will be told . . .

## 6 WEEKS MORE

Yow-suh—that's all there's left of winter, in Noo Yawk, enyhoo . . . 'Cause on accounta last Sunday was a nice gloomy morning and *Old Man Groundhog had no chance of seein' his shadow a-tall!!!!* Sooo-o-o-oo, boys and gals, 'twon't be long now till we get our annual attack of spring fever . . . In the meantime, did anyone see them galoshes wot belong to

## THE ROLLING REPORTER

## New Feature in Rider's Vol. XII

(Continued from page 4)

in Volume XII, it would be necessary to postpone the publication of this Manual several more months; therefore, we have selected only certain schematics—perhaps about seventy-five or one hundred—to break down so we can get Volume XII to you as soon as possible. In following volumes the number of schematic breakdowns will be increased, for then our organization will be geared up accordingly.

Of course, we will want to know how you like these new ideas which we are going to incorporate in Rider's Volume XII. If you like them and consider that having similar breakdowns for volumes already published will help you in your work, we might publish a volume of such amplifications covering, say, the last three or four Manuals. . . . Of course, that is something that you have to tell us that you want. . . .

With such amplifications as those explained above, we feel that Rider's Volume XII will be even more valuable than its predecessors . . . valuable in the sense that we have incorporated these new features which will save you time—make servicing easier and eliminate some of your most annoying problems. . . .

# PREPARE NOW!

It's Easier to Keep Abreast Of These New Developments Than It Will Be To Catch Up With Them!



## FREQUENCY MODULATION

Frequency Modulation is becoming more and more important with the advent of more f-m stations in all parts of the country. This book explains the transmission and reception of f-m signals.

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You should know how your oscillator functions and what you can do with it. . . . With the trend towards higher frequencies in multi-range receivers, your signal source assumes even greater importance than ever before.

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The theory underlying the functioning of the cathode-ray tube oscillograph and its accompanying circuits for practical applications are fully explained in this book that has become a standard in the radio servicing industry.

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In order to service these receivers with profitable speed, you must be able to analyze the different portions of the circuit quickly and this is fully explained in this book.

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Everything from the simplest type of AFC circuit to the most complicated push-pull control circuit is explained.

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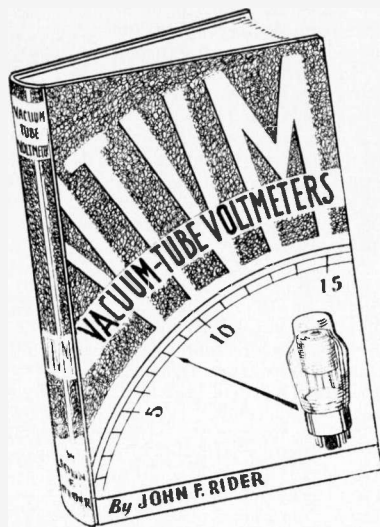
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MARCH 1st



## VACUUM TUBE VOLTMETERS

By John F. Rider

180 Pages

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**T**HE vacuum-tube voltmeter is rapidly forging to the front as a favorite tool of engineers, experimenters, radio servicemen and research workers. . . . By its proper use, dynamic measurements can be made under any and all conditions with a minimum expenditure of effort and time. . . .

Here is a book that is a perfect mine of information for everybody who wants to know all about these important instruments. Not only is the theory explained upon which the functioning of the different types of v-t voltmeters is based, but the practical applications of these instruments is completely described. . . . This combination of theory

and practice has always been a feature of Rider books, for it is a proven fact a man can only get the utmost use from an instrument if he understands its underlying principles. . . . Like nearly all types of voltmeters, multipliers and shunts are employed with vacuum-tube voltmeters to extend their ranges. These and their uses are explained, as is the calibration of the different types.

For those men who are interested in the construction of v-t voltmeters, adequate information will be found in that v-t voltmeters were built in our laboratory and constants are given for the components of many types, as well as a wealth of other useful data. . . .

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Chapter XI—Applications of the V-T Voltmeter  
Commercial V-T Voltmeters, Bibliography

*They're a Year  
Old Now*

—AND THEY'RE YOUR PROBLEM!



Those 1939 and 1940 models are now beginning to squawk and act up—they're starting to come now to your shop for your diagnosis and cure. . . . Some of these modern babies have complicated "innards" and it's up to you to find what's wrong and fix them up *quickly*. . . . There's just one sure way to do this. Have Rider's Volume XI on the shelf where you can grab it and turn to

the data you want in a hurry — the data on those late models. . . .

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## Successful SERVICING

MARCH-APRIL-MAY, 1941

### AUTOMATIC RECORD CHANGERS

ONE of the most complicated problems with which the radio serviceman is confronted is the automatic record changer that refuses to function as it should. . . . Many men steer clear of these devices simply because repairing them is a mechanical job—one they consider to be too involved and too costly from the point of view of the time spent locating the elusive troubles. . . .

Yet, like any other mechanical device, the record changer is fairly simple, once the functions of its various parts are understood. If the movements and duties of each gear and cam and spring are understood—what relation each one bears to the working of the mechanism as a unit—then if certain symptoms develop, it is a relatively simple task to put your finger on the source of trouble.



Photo by U. S. Army Signal Corps

In several volumes of Rider's Manuals descriptions of the operations of various automatic record changers have been published together with service hints, precautions and adjustments. While such data have answered their purpose to some extent, it was felt that something more was needed and we are

**I**n the past few months, we have found it impossible to publish as many production changes in these columns as usual and in our last issue, we even had to omit the usual technical lead story. This month we are devoting as much space as possible to "changes," but in the following issues we are planning to return to our usual make-up.—EDITOR.

now preparing to give you that "something more." . . .

At the present writing, material from receiver manufacturers, in whose sets are incorporated record changers, and from the manufacturers of the record changers themselves is being gathered. . . . All these data are being grouped and rearranged in a form from which we feel you will have little or no trouble getting the information you want when published.

From experience we have found that first-hand information is the best. To that end we have bought representative types of automatic record changers and are studying them and analyzing the operation of their component parts. Thus we will be able to give you the most complete picture yet of just how a changer functions. We are also plan-

(Please turn to page 6)

**RCA Transformer Color Code**

Recently changes have been made in the color coding of power transformers to conform with R.M.A. standards. Such transformers are interchangeable, inasmuch as no change has been made in their electrical characteristics. Transformers for replacement are supplied without covers, which should be removed from the original transformer and used on the new. If the lower shield is of the bent-lug type, it need not be removed from the chassis.

	Old Color Code	New Color Code
Rectifier filament	yellow	yellow
Amplifier filament	blue	brown
High-voltage secondary	brown	red
High-voltage center tap	brown & black	red & yellow
There are three different types of primaries as follows:		
Single 110 v. primary	red	black
Double primary, 110-220 volts:		
No. 1 primary—		
Start	red	black
Finish	red & black	black & yellow
No. 2 primary—		
Start	red & yellow	black & green
Finish	black & red tr.	black & red
Tapped primary—		
110-125-150-210-240 volts.		
Start	red	black
110-volt tap	red & black	black & yellow
Finish	black & red tr.	black & red

**RCA 14BT Series**

In the event that excessive regeneration occurs in Models 14BT-1, 14BT-2 or 14BK, the following procedure will remedy the trouble:

Check the grounding finger for the shield of the 1N5GT tube. It should be fastened to the tube pin No. 1, which in turn is grounded to the chassis. Make certain that the metal rim of this tube socket is soldered to the chassis.

Realign the i-f transformers, using the stage-by-stage procedure as specified in the data given on page 11-149 of *Rider's Volume XI*. Do not "touch-up" individual trimmers.

Unusually high-gain 1N5GT or 1A7GT tubes should be replaced with tubes having normal gain.

**RCA 15X and 16X Series**

Hum in receivers of these series may be due to the fact that the ground return of the volume control (see schematics on page 12-25 of *Rider's Volume XII*) is made to a lug on the power switch. This lug is grounded to the chassis through a lead that is several inches long, which means that the

ground lead of the volume control has a mutual path to the chassis with the power circuit, which may well introduce hum into the input of the first a-f stage. Hum due to this cause can be remedied by removing the present grounding lead of the volume control from the switch lug mentioned and connecting it directly to the chassis.

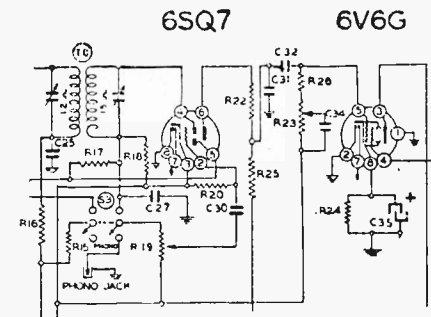
**Wells-Gardner 6B7-3D, 6B7-4D**

In the Issue D of these receivers, the resistor R-26, which is shown grounded on one side in the schematic on page 11-17 of *Rider's Volume XI*, should have this side connected to B-, which is indicated on the diagram by "X".

Instead of the condenser C-8 being shown grounded on one side, this side should be shown connected to the junction of socket terminals 2 and 7 of the 1A7GT and 1N5GT tubes respectively.

**Belmont Export Chassis 708, Series C**

Several changes have been made in the Series C models starting with serial 0C375300. No push-buttons are employed in the Series C and the partial schematic shows the circuit changes, which should be compared with the complete schematic on page 11-23 of *Rider's Volume XI*.



Partial schematic of Belmont 708 chassis showing changes.

The following changes in the values of components should be noted: C32 was 0.05 mf and is now 0.02 mf; the part number of the radio-phonograph switch, S3, is now 12570; R22 was 200,000 ohms and is now 50,000 ohms. Two resistors have been added; R25 is 75,000 ohms and R26 is 10,000 ohms.

**Philco Model Numbers**

The servicing data for the following "38" receivers are identical to those bearing the same "37" number after

the hyphen. Please make these notations in your *Index for Rider's Volume X*, and in the index of "Aligning Philco Receivers."

Data for	Same as	Rider Manual Page	Philco Receivers' Page
38-623	37-623	7-55	41
38-624	37-624	8-23	41
38-630	37-630	7-57	42
38-640	37-640	7-61	43
38-643	37-643	8-27	46
38-665	37-665	8-30	52

**Montgomery-Ward Changes**

Starting with the factory issue designations as indicated below, a vernier tuning control and a local-distance switch have been added to the following receivers whose schematics will be found in *Rider's Volume XI* on the pages indicated:

Model	Factory Issue	Page
93 WG-805	D	11-50
93 WG-1000,		
93 WG-1001	D	11-52

A vernier tuning control will be mounted on the escutcheon plate. This control consists of a rubber pinion on the end of a plunger, which, when depressed, the pinion engages the bakelite manual tuning control drum.

The local-distance switch is connected between the cathode of the 6SK7 r-f tube and ground so that it will short a 4000-ohm resistor and a 0.04-mf condenser when closed. Such a circuit is also employed in Model 93 WG-801, which is shown on page 11-46 of *Rider's Volume XI*. Notice also the 15-megohm resistor, R-22, that is connected from B+ through a local-distance switch, the secondary of the second i-f transformer to the diodes of the 6SQ7 second detector.

The r-f tube is biased in order to reduce sensitivity. The positive voltage secured from the B+ line through R-22 is applied to the diode circuit. Under no signal conditions, this loads this circuit, effectively shorting it. When a signal of a certain strength is received, the voltage developed in the diode circuit offsets this positive voltage mentioned above. The signal is amplified in the i-f transformer and normal reception is obtained.

The effect of these circuits with the switch in the quiet position, is to reduce sensitivity and to "squench" all signals—noise and station—until a signal of a certain intensity or greater is received.

**Mission Bell 417**

The adjustment for the automatic tuning settings has just been received from the manufacturer and is given below. The schematic for this model will be found on page 11-5 of *Rider's Volume XI*.

The adjusting screws are available from the rear of the receiver and are located in the center of the chassis. They are arranged in the same sequence as the push buttons controlling them, i.e. No. 1 button from the front left controls No. 1 screw from the rear right, etc.

First turn the band switch to the broadcast position. Depress No. 1 button, then turn No. 1 adjusting screw until the desired station is clearly heard. It will be seen that each trimmer has a large and a small adjusting screw. The former is the main adjustment and should be turned to locate the desired station within the range stated below. The smaller screw is adjusted to a position that affords maximum volume with the least background noise. Similar adjustments are made on the remaining buttons.

The ranges of the tuning buttons are as follows:

No. 1	.....	540-900	kc
No. 2	.....	540-900	kc
No. 3	.....	800-1300	kc
No. 4	.....	1000-1300	kc
No. 5	.....	1200-1750	kc

**Philco 39-71, 39-72T**

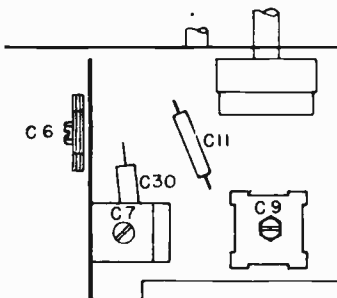
Several changes have been made in the circuit of Model 39-71, Code 121, and receivers in which they are incorporated have the code number 122. This revised circuit is also used in Model 39-72T.

The schematic in which the following changes have been made, will be found on page 10-22 of *Rider's Volume X*. These changes to increase sensitivity were made starting with Run No.2: Resistor No. 4 changed from 2 to 4 megohms; the second i-f transformer was changed to Part No. 32-3176 and its trimmer, No. 12C, was changed from 100 mmf to 110 mmf; resistor No. 14 was increased from 2 to 4 megohms and No. 17, from 2 to 4 megohms; the volume control, No. 15 changed from 0.5 megohm to 1 megohm; and condenser No. 16 from 0.01 mf to 0.004 mf.

The alignment and other data remain the same as for Code 121.

**Silvertone 6152, 6153**

Chassis identified as 101.537-1 have had circuit changes to stabilize the band spread. A 0.00014-mf silver mica condenser has been shunted across the trimmer C7. See schematic on



This shows the new location of C7 in the Silvertone 6152.

page 10-82 of *Rider's Volume X*. The position of C7 has been changed from that shown in the layout on page 10-84 and may be seen in the accompanying illustration. The i-f peak has also been changed from 465 kc to 455 kc.

**Philco 39-30, 39-31, 39-35**

The following condenser changes were made in the receivers carrying these model numbers, the schematic for which appears on pages 10-13 and 11-25 of *Rider's Volumes X and XI*:

Run 1-1. Condenser No. 8, 4500 mf, replaced by two condensers, Part Nos. 30-1068 and 30-1094 wired in parallel. Electrolytic condenser No. 17 changed to Part No. 30-2134, 8-4 mf and electrolytic condenser No. 18 changed to Part No. 30-2270, 8-12 mf. The two sections of these two dual-capacity condensers are wired in parallel and connected in the circuit as a single capacity as shown in the schematic.

**Philco RP-1, Code 121**

The circuit of the wireless record player RP-1, Code 121 is the same as RP-1, Code 122 with the following exceptions:

The control frequency (at which the signal is sent to the receiver) in the case of Code 121 is 1500 kc instead of 540 kc used in Code 122.

Refer to the schematic of Code 122 on page 10-12 in *Rider's Volume X* for the following circuit differences:

Only one 0.01-mf condenser, No. 4, is used, that one being from the switch side of the line to ground. Condenser No. 15 in Code 121 was 0.05 mf. The

250-mmf condenser across the lower portion of the oscillator coil, No. 18, was not used in the earlier circuit.

**Philco RP-2, Code 121**

Make a notation in your *Index to Rider's Volume X* that the wireless record player Model RP-2, Code 121 is the same as Model RP-1, Code 122, servicing and adjustment data being identical and appearing on page 10-12 of *Rider's Volume X*.

**RCA Q-24**

Under certain conditions the local oscillator of this receiver will oscillate at a parasitic frequency causing the set to be "dead" on one or more of the short-wave bands. If this occurs, it can be corrected by connecting a 10-ohm, 1/4-watt resistor in series with the oscillator grid. (See schematic on page 12-33 and clarified schematics on *C.S. pages 12-3 and 12-4 in Rider's Volume XII*). This resistor should be mounted directly at the tube socket.

**RCA VA-24**

Make a note in your *Index to Rider's Volume XII* that Model VA-24 is the combination of the VA-22 automatic record changer and OSC-22 wireless oscillator, data on the latter appearing on page 11-61 of *Rider's Volume XI*.

**RCA QB-2**

The "A" supply that is in the CV-112 power unit employed with the Model QB-2, is supplied through a copper-oxide dry-disc rectifier. If the receiver will not operate or drops off in its performance, it may be due to a chemical change in the rectifier, which causes the "A" voltage to drop low enough to affect the performance of the set. The normal voltage is 1.5 volts.

This condition is more likely to arise when the power unit has not been used for four or more months.

In order to reactivate the rectifier it is merely necessary to short the plus and minus "A" terminals of the socket by connecting them with a piece of wire for FOUR MINUTES only. The high temperature developed in the rectifier during these *four minutes* has the tendency to restore the discs to their normal rectifying property.

# RIDER'S VOLUME XII

**D**OES your radio experience go back to those early days—twenty years or so ago—when whatever gadget that was in the plate circuit of the last tube of a set to transfer electricity to sound was called a “loud talker”? And do you remember when your neighbor asked you to come in and see what was wrong with his set, your first question generally was, “Did you get this hook-up from ‘Popular Radio’ or ‘Radio Broadcast’?” and then “Well, let’s look over the circuit and see what’s called for.” . . .

Do you remember?

Yes, even in those days, two decades ago, when tubes were eight dollars each, servicing information was in demand. True, a schematic and sometimes a parts layout were the only data to be had, but even so, they were consulted before you moistened a finger and started touching the grid terminals. . . .

And as receiver circuits increased in complexity, the demand likewise increased for more comprehensive data that would enable a serviceman to do his job more quickly and more thoroughly. Some receiver manufacturers at first were rather reluctant about making their circuits available to everybody, but that short-sighted policy lasted but a very short time: early in the 30’s servicing information was available on practically every receiver on the market. Manufacturers realized it was to everybody’s advantage to supply to men in the maintenance end of the industry the data which would insure the keeping of their products in efficient operating condition.

And in order to gain this end, more and more servicing information became

a necessity. . . . As mentioned above, first only the schematic and now and then, a parts layout were released, but demand on the part of the service industry was met with the cooperation of the receiver manufacturers, resulting in their supplying voltage and alignment data, point-to-point resistance values, special notes and adjustments, etc.

**Y**OU who have been using Rider Manuals from their first appearance more than ten years ago, can trace through their pages this gradual growth of the servicing data covering individual models. For instance, when the old-time dials were removed from the shafts of the variable condensers and more or less complicated dial drives were substituted, data for their adjustment and repair appeared. When it was found that the cathode-ray oscillograph was an aid in aligning, reproductions of the oscillograph patterns and similar material were included in the manufacturers’ service bulletins. Then came signal tracing and the need for gain-per-stage data from the manufacturers’ engineers was at once apparent; shortly it was made available.

Furthermore, not only have the manufacturers been issuing more and more excellent service data, but a great deal of thought has been given to its preparation and presentation. Compare the columns of paragraphs of alignment instructions for a multi-band set of 1935 with the tabular form which is almost universally used today. . . . The same thing holds practically throughout the whole servicing industry—a streamlining of facts to help you.

And what does all this boil down to? Just this:

**Y**OU who are interested in putting and keeping receivers in first-class operating condition, need the sort of technical material that is authentic, easily used and quickly found when wanted. The servicing industry being what it is today is no place for anyone who is not at least abreast of the times—in fact, it were a lot better for him if he is a step or two ahead! That means there must be available in a compact form every bit of information concerning a receiver chassis that will assist you as a serviceman. Moreover this material must be easy to read and follow so that as little time as possible need be spent. . . .

It goes without saying that some circuits that have come out of the research laboratories in recent years must seem as if they had been designed with the sole purpose of making life miserable for any serviceman who might have the misfortune to work on them. There is little doubt that it is a man’s size job to find out just what coils, trimmers, condensers and resistors are switched in and out of the r-f, mixer and oscillator circuits when the waveband switch of a multi-range job is turned from one band to another. Of course, that’s only one of the headaches of servicing today, but inasmuch as we saw a way open to save you that particular trouble, we did so. When you get your *Rider’s Volume XII*, you’ll find in the rear of the binder a group of yellow pages which are headed “Clarified Schematics” and we feel positive that the data you’ll find in that

(Please turn to page 6)

## Knowitt CLARIFIES for Guessitt



# Successful SERVICING

Reg. U. S. Pat. Off.

Vol. 7

MARCH-APRIL-MAY, 1941

No. 4

Dedicated to the financial and technical advancement of the  
Radio Serviceman

Published by  
JOHN F. RIDER PUBLISHER, INC.

404 Fourth Avenue

New York City

JOHN F. RIDER, Editor

G. C. B. Rowe, Associate Editor

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## PRODUCTION DOWN— SERVICING UP

WHEREVER we go we hear frequent comments concerning the curtailment of new set production during 1941. From all appearances, it seems pretty definite that the National Defense requirements will impose such limitations upon home-broadcast set manufacturers that the number of new models which they will release during 1941, and perhaps even the number of new receivers, will be much less than in previous years. In plainest language, this means that there will be a reduction in the amount of replacement of old receivers by new receivers during the balance of this year and most certainly during 1942. From what we hear, this curtailment of new set production, beginning in about two or three months, will be from 30 to 50 percent.

Of course, we cannot speak officially but if conditions existing in other fields can in any way be accepted as a barometer of what is to be expected, then it is a safe guess to say that if manufacturing facilities are available in radio receiver production plants, they will be put to use in manufacturing needs for National Defense. This may be communication receivers intended for military purposes and just as readily devices required by government agencies other than of a radio nature.

Much of this curtailment of receiver production is brought about by the diversion of these metal parts which normally go into a radio receiver and which today are needed for the production of other, more important devices.

Putting all of these together it sums up to a definite increase in the amount

of servicing which will come into the hands of those men who are still carrying on in the servicing industry. After all, the importance of radio communication—particularly that associated with the public—is daily becoming greater and if old receivers are not being replaced by new receivers, there will be a greater demand for maintenance operations upon those receivers already in the hands of the public.

It is true that the modern receiver is a more scientifically produced device than the receiver of years ago, and as such should last longer before service becomes necessary than those produced years ago. However, there are in use many millions of receivers which are three, four, and five years old—if not older—and as such would normally be subject to replacement rather than repair. But in view of the conditions created by the present National Emergency, such replacements will be at a minimum whereas repair, in other words servicing, will be at a maximum.

It is also of significance to remember that the shortage-of-material problem, now an item of consequence to the parts jobber, will eventually become the same to servicemen as well. This statement is not made so that servicemen will flock to jobbers and buy supplies beyond their normal financial capacity, but it would not be bad for those servicemen who can afford to maintain a stock, to look ahead and acquire a sufficient amount of those materials which they have found to be fast movers, as far as servicing operations are concerned. It is difficult to

enumerate just what these parts are, for only each serviceman knows his own requirements.

The items which deserve greatest consideration are those which employ substantial amounts of metal: chokes and transformers may be subject to a definite shortage; field windings of speakers are in a like category, as are metal cans for r-f and i-f transformers, which therefore means those parts which use aluminum and like materials. Since the output transformer is one of the very popular replacement items, servicemen should try, if possible, to have a few on hand. Concerning the other items, it all depends upon what each man can afford.

JOHN F. RIDER.

### English Problem

In the current issue of *Radio Retailing* appears a letter from an English radio magazine which contains food for thought. It seems that the English publication received a letter from the proprietor of a radio shop in a London suburb stating that the last serviceman in the shop had left to join the Army and that it was difficult, if not impossible to fill the position. Furthermore, since the output of English receiver manufacturers has been curtailed to the utmost, most of the radio sales organizations were being turned more and more towards the maintenance end of the industry.

This dealer asks the very pertinent question: would it be practical or possible to import American servicemen to fill the ever-increasing gaps in the ranks of English servicemen? Radio being of such prime importance as it is today in the warring countries and with the decided cut in number of new receivers being made available to the listening public, the repair of sets now in the hands of the public is becoming almost an alarming problem. As time goes on, this decreasing number of servicemen will be missed more and more and this dealer thinks that many radio businesses in England would be willing to pay the transportation costs of Americans who could take over the servicing of English receivers.

Well?

**PLEASE COOPERATE**  
Mail the Questionnaire Today

### F.C.C. Okays Television for July 1st

The bars on commercial television were let down by the F.C.C. on May 2, 1941! The Commission on that date adopted the standards proposed by the National Television System Committee at the March 20th hearing, as well as the rules and regulations that were submitted at the same time.

The standards adopted are: 525 lines, which provide for greater picture detail than the 441 lines which were advocated last year; 30 frames per second; and frequency modulation is required for the sound accompanying the pictures, which will assure a higher signal-to-noise ratio. These standards are going to be tried out for six months, at the conclusion of which further changes may be considered, with particular reference to color television. Furthermore, the Commission fixed 15 hours per week as a reasonable minimum for program service and also made eleven upper channels available as well as the seven lower channels in the present television band.

### Questionnaire. . . Important!

In this issue of **SUCCESSFUL SERVICING** you will find a questionnaire card. The answers to which are of importance to us and may be of much importance to you in the future. Please look for it now.

You will note that the first questions pertain to how you use your Rider Manual pages. Is it customary for you to remove the pages covering the receiver on which you are working from the Manual binder and take them to the customer's home, if you work on the set there? Do you usually take the data on a certain job from its Manual binder when you are in your shop and keep those pages on the bench while you work? Or do you take the pages from their binder because another man in your shop is using another section of the same volume?

The reason we are requesting this information is that we are trying to look ahead. As you know quite a bit of steel is used in the binders for Rider's Manuals: the posts on which the pages fit—the space bar and its posts—and some of the locking mechanism are of steel. While we have not encountered any very great difficulty so far in obtaining binders of this type, we have been told by reliable sources that by the time Volume XIII is ready it may be extremely difficult to get steel

for this particular use. This is, of course, due to the National Defense priorities.

If this does happen, we might have to publish Rider Manuals permanently bound—just like a regular book, i.e., the pages sewed, glued, and fastened to a backbone as in the case of any of our other books you have. You can see that having the answers to the questions on the card will help both you and us.

Then the next question. . . As we stated elsewhere in this issue we have in preparation at the moment several books. They may cover subjects in which you are interested, but on the other hand, it may be that you would like more information on a subject which has never been covered or covered from some particular angle. Just note briefly any preference you may have in the space provided at the bottom of the card. Perhaps you know of some technical subject that some of your servicemen friends are finding difficult as well as yourself. Please tell us about it. You will assist us and yourself at the same time. . .

Notice that you do not need a stamp for this questionnaire. Just fill it out and send it to us as quickly as you can. And please do it NOW. These times are out of the ordinary and we have to be as far-seeing as we can. We have to anticipate today so that we'll be ready tomorrow. . .

### RCA BP-10

In some of these "Personal" receivers, elliptical loudspeakers are used and in the event that complaints are received that the output is low, it may be due to the 1S4 output tube being too close to the magnet of the loudspeaker. This proximity of the tube to the magnet causes a disturbance of the space charge within the tube, thus influencing the plate current.

This can be remedied by the insertion of a felt pad between the tube and the frame of the loudspeaker so that the tube will be maintained upright in its socket and away from the magnet. The servicing data on this receiver will be found on *page 12-11* and some installation notes on *page 12-83* in *Rider's Volume XII*.

**Please Mail Your  
Questionnaire TODAY**

### Automatic Record Changers

*(Continued from page 1)*

ning to photograph the mechanisms at different stages of the various cycles and these pictures, together with the analysis, will prove a combination hard to beat. . . .

It is impossible to say at present just when this book will be ready for publication. . . . Nor can we tell you the number of pages or the price, but one thing we can say is that it will be a book you will find invaluable. It will be the first time that a book exclusively on automatic record changers has been made available to the radio industry. . . . *It's another Rider first!*

### Rider's Volume XII

*(Continued from page 4)*

section of the book will give you many a lift over some tough spots. . . .

**A**ND that, in short, is just the reason for being of all of Rider's Manuals. There is no doubt that any serviceman worth his salt, has the ability to trace through the different band switches of a multi-band receiver and find out what components are used on the several bands, but—that takes up valuable time. And it is to save you this time—those relatively few minutes perhaps—that we have gone to the expense and trouble of providing this new feature of Rider Manuals, the "Clarified Schematics." Even though Rider's Volume XII has been off the presses less than two weeks as this is written, already we have received quite a few letters from men about these circuit breakdowns. The consensus of opinion is that they are an enormous help—they save time—they're easily followed—in short, they are liked!

Furthermore, we are led to believe from these letters that the "Clarified Schematics" should be a permanent feature of all future Rider Manuals. However, that is something for you who use the Manuals to decide. . . . It's decidedly up to you and, as always, we shall abide by your decision. If after you have used the "Clarified Schematics" and found them a real assistance, tell us about it; on the other hand, if you have any suggestions as to how they might be improved, let us know your suggestions. Remember, we're not mind readers—you'll have to tell us about your ideas. . . .

# Rolling REPORTER



## THEATRE TELEVISION

Well, we've seen another television "first". . . . **Theatre television—New Yorker Theatre—May 9th.** For the record: the pix on that 15' x 20' screen was as good, if not a lot better than many so-called movies—the sound excellent—the brand of entertainment and the possibilities, *wonderful*. . . . An' doin' a Pearson-and-Allen prediction, we're sayin' that when folks get a load of spot sports and news events via this coaxial television, they're gonna demand it *loud and vociferous*. . . . Wanter bet?

## APROPOS VOL. XII

By the time you're perusin' these here lines, most of you will have added the latest Manual to the lengthening row of 'em. How *diya* care for them thar "*Clarified Schematics*"??? We had 'em printed on yaller paper so's you can spot 'em easy and be sure to read the **first coupla pages in that section.** That'll give yuh the low-down on the break-downs and show yuh how it's less work to scoop up the dope from them than 'tis to lean over and pick up 10 bux offen the side-walk.

## F.M. STEPS OUT—AND HOW!

Just saw in one of the public prints that the Army liked FM so much it was gonna give it a whirl for talkin' between tanks when they're doin' their stuff. . . . Seems as to how they figger that kinda transmission oughter come through okay without bein' messed up by the various electrical disturbances that run around loose in a tank when it's bustin' down a tree or climbin' up the side of a barn. . . . Can't see why it wouldn't

perk ok in a plane too????? Also saw that when the F.C.C. gave television the commercial green light they specified **FM had to be used for the sound instead of AM.** . . . And just in case you've forgotten—yuh know we did publish a book last year called "F M" . . . And thar's where yuh kin get the dope you're after. . . .

## TALKS AND TRAVELS

That's what the Boss did for a few days last month and this. He talked to servicers out in *Ann Arbor, Dayton and Columbus* about how electronics was gettin' to be **more and more important in general industry,** and how the serviceman would have to branch out into things other than radio. . . . Then back here in town he addressed the gas and electric associations givin' 'em the low-down on radio servicin'. . . . Just after Easter he went down to Charleston, West Va., and told the boys there some things that they say didn't hurt 'em a bit to know. . . .

## SPRING PUBLICATION

Yuh know, every publisher likes to have a book or two ready in the Spring so that it can grow up with the flowers and the Boss he ain't no exception to the rule. On page 1 of this issue you was told about the book on *record changers* (which orter be just what the MDs ordered if we got the right dope), *but that ain't all.* . . . Right now the gang of Raphaels and van Goghs back in the Art dept. are slingin' the ink on the illustrations for **Vol. II of "Aligning Philco Receivers"** and the engineers are gatherin' the technical alignment dope, gettin' it ready for the printer. . . . Dunno when it'll be off the press, but it won't be such a long time. . . . An' then there's another tome in the works and that's one that's gonna knock a lotta folks loose from some funny old-time ideas they've been harborin'. . . . 'Tain't gotta title yet, but it's gonna be about just what does make a (*Ed's. note: Say, can't you keep anything out of that col. of yours?*) (*By chowder, it's news, ain't it? How about freedom of the press?*) (*The Ed. again: I'm playing censor. NO!!!*) (*Aside to our readers, well, we tried to tell you but yuh see what happened.*) Enyhooso, we're bettin' more folks is goin' after that thar book about the tannedflumas fo doira than any other book yet. . . . (*Ed's. note: What's that tannedflumas business?*) (*Ever work cryptograms?*)

## WE'RE ASKIN' P P P P P P S

In this issue you'll find a questionnaire that we wish you'd fill out and drop it in the mail-box right a-way. Never mind about a stamp—we'll take care of the postage, but pul-lease **FILL IT OUT NOW—AND MAIL IT!!!** You can see it's important. . . .

## THEY'RE OFF!!!

Well, at long last the F.C.C. *green-lighted television for sponsors* and so for a while mebbe things will settle down a bit and let us catch up. . . . Looks as to how the lines were froze at 525 and the frames at 30—at least for six months—but *there's always color television in the offing.* . . . And of course the entrance of FM into the picture to make life merrier. . . . Mebbe a few of you guys will recollect wot we've been sayin' loooo these many moons—*better gather yerselves some dope on television while ye may.* . . .

## COUPON

In yer new Vol. XII you'll see a coupon on the first page for S.S. Now if you've been receivin' your magazines right along, *don't* bother sending us that coupon—**give it to some servicer who isn't getting S.S.** We heard tell of some guys who borrow copies. . . . For the lova mud, if you hear of such goin's-on, tell the borrowers we'll send 'em S.S., but we ain't mind-readers—*they gotta send us their names—AND ADDRESSES.* . . .

## SPRING FEVER

Yep, that dee-pepped feelin' that sneaked up on us a week or so ago was our annual attack of longin' for the wide-open spaces. . . . And to make matters even worse that friend of ours who lives on the Mohave Desert drove into town last Sat. nite and spent an hour trying to sell us on the idea of ridin' out to Calif. with him. . . . (*Aside to Van: that beavertail cactus is gonna bloom!*) Mebbe we could sell the Boss on the idea that we should order take a swing around and about to see wot the news is . . . soooo-o-o-o-o if you see a weary lookin' guy on a bicycle pushin' it along some highway, *don't* run him down as you pass in your Cadillac or Rolls Royce—it might be

THE ROLLING REPORTER

## THIS YEAR YOUR PROFITS DEPEND UPON YOUR SPEED

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# A SERVICEMAN SPEAKS TO

Successful  
SERVICING

## HIS CUSTOMERS

I HAVE been accused by *The Reader's Digest* in no uncertain terms of being a dishonest man—a "gyp." With me have been accused many thousands of other radio servicemen in America—a blanket indictment. I have never met my accuser, nor did I have the opportunity of defending myself before I was judged guilty.

Two people conduct a test among 304 radio servicemen and as a result of this test I and thousands of others are judged dishonest and placed under suspicion, although, mind you, none of us took any part in this test. I, as many thousands of other radio men in this country, have been making my living repairing America's radio receivers, and for a number of reasons—frankly, most of which are not of my doing—this living has been a pretty meager one. I have not been able to afford the luxuries of many of the people who brought their sets to me, but the fascination and lure of radio, as radio, has been a sort of compensation for the fact that I have been in this business for so many years without ever having had the hope of becoming, as people know the term, an influential citizen. However, I have always tried, and can substantiate the fact that I am accepted in my community as a respectable citizen.

The principles of this Government give me the inalienable right of making an honest living. To have someone brand me as a thief—to have someone cast suspicion upon every act I carry out in my effort to earn my living, is decidedly unfair and un-American. For, being forced to deal with people who do not have a knowledge of what I am doing and can judge only by the final results which I produce, having doubt cast upon the manner in which these results are accomplished and the fairness of the compensation, takes away from me every opportunity I have of retaining the confidence of my customers.

I can prove to a man who is familiar with radio that a definite defect does exist in a receiver, for he knows where-

of I speak, and knowing the myriad defects which may occur in a radio system—simple or complex—he can appreciate what knowledge I must have in order to be able to find the fault, in order to correct it and what efforts I must make to get my basic knowledge, and to keep abreast of the developments which the radio manufacturers introduce into their receivers. When I work with the public at large, which is not familiar with radio, then my technical knowledge has to be taken on faith. When an investigator or an author presents to the public a basis by which my efforts are to be judged—which basis discounts completely all of the money spent to secure the technical education I need, the money spent to maintain my establishment, the roof over my head, the equipment I must procure in order to do my work properly, the money I must have in order to feed my family—then I say, that person is guilty of presenting misleading facts to the public. He has done specifically that which he has accused me of doing. In order to become sensational he has taken advantage of the public's lack of knowledge of the subject about which he speaks.

I HAVE been judged dishonest because a number of men tested were judged dishonest. Is there any field of activity wherein human beings earn their living which is wholly free of dishonest practices and the uses of subterfuge? I do not condone either or both of these, but if I am guilty purely because a test of 1% of my total number has shown a number of men to practice "gyppery," to quote the word of the author, and if, because of this, every person who brings a radio set into a radio repair shop must watch out in order not to be robbed, then every doctor in America is under suspicion because of those who have been judged guilty in the past for malprac-

tices of various kinds. If I am judged guilty because of such findings, then there can be no justice in the courts of this nation, for here and there those who render judgment have been found guilty. If I am guilty because of subterfuge employed by others, then every man better be wary when he takes his case to a lawyer, for records of our courts show that there are dishonest lawyers as well as dishonest clients.

If my livelihood is placed in jeopardy because the man I deal with is not familiar with the work I do, then the average human being is continually in jeopardy—for unless he has specialized knowledge relating to every possession he has, the construction and the maintenance thereof, then he is at a continual disadvantage whenever he deals with those who sell to him, buy from him, or do work for him. But we know that people are not always in such jeopardy, for the world has made progress despite the fact that each man is not a specialist in all things. The world has made progress because people have faith in each other. True, there are numerous cases where faith and trust are misplaced, but by and large the number of times when faith and trust are rewarded greatly outnumber those when it is misplaced.

Twenty years of radio broadcasting—the growth of the radio servicing industry during these twenty years—the growth of the radio industry itself during this past generation is testimony that the industry has served the public and served it well. It is mute witness of the fact that the statements of this author who has accused me and the industry which I represent as being predominantly dishonest, are wrong.

The public at large for twenty years past has had faith in the servicing industry, as it has had faith in its doctors, lawyers, druggists, and public servants. Man has had faith in man despite the fact that he has made laws to protect himself against his fellow man. Penal institutions are full of in-

JUNE, JULY, AUGUST

1941

(Please turn to page 3)

# AN OPEN LETTER

Editor, *The Reader's Digest*,

DEAR SIR:—

It has been our understanding for many years that the editorial integrity of any worthwhile publication is its most jealously guarded asset. Furthermore, such integrity must be based on broad-minded, humane principles. It is our firm belief that no publication can long endure the critical scrutiny of its readers and still prosper, unless its editorial honesty is above reproach.

We believe these facts to be axiomatic. . . .

We came to the conclusion that your publication must have been based upon such principles to have arrived at the position it now enjoys.

Taking these facts for granted, when questions concerning Mr. Riis' article, "The Radio Repair Man Will Gyp You If You Don't Watch Out," in your August, 1941 issue, were brought to our attention, they seemed far-fetched. But upon a close reading of this article, certain questions did arise and persisted—not only in our mind but in the minds of many others—men who know the radio servicing industry. So being a lover of fair play, we deem it only sportsmanlike to give you the opportunity of answering some of these questions in your columns.

Before undertaking a survey of the nature described, we assume that you sought a man to conduct it who was thoroughly familiar with the radio servicing field—a man who knew the serviceman's problems, technical and financial—a man who was experienced in the gathering of such statistical data—and that Mr. Patric filled these requirements. As automotive servicing was also to be investigated on the same tour, we assume that you sought someone who was familiar to the same extent with the garage worker and his problems. Was this Miss May's province or is Mr. Patric so versatile that he is considered an authority in both fields? For, certainly, only authoritative sources of information could be considered, if the editorial integrity of your magazine was to be upheld. . . .

We would indeed be very much interested in learning how long Mr. Patric has been in the radio field—the

school or college wherein he gained his radio education—his radio experience in general, particularly in connection with radio servicing.

Then to clear up a question or two that arose. . . .

What make of receivers and model numbers were used in the tests?

Was the receiver circuit of such a type that the "loosening" of a tube in its socket affected the rest of the circuit so that the finding of the trouble would be a real problem?

What tests were made on the sets so that the investigator could say, "The set was playing perfectly" before it was submitted to a serviceman? Were gain and similar tests made each time?

How much was the "charge so trifling" mentioned on page 6 of the article?

What percentage of the 304 men "tested" had a minimum service charge?

Did the investigators consider 1% of the servicemen in the country a fair percentage to test in such a survey?

Was the Madison, Wisconsin shop, whose proprietor is quoted on page 9 as saying only "a voltmeter and a few other little things" were needed for testing, totally devoid of all other test equipment, "Rube Goldberg" or otherwise?

What question was asked the Madison, Wisconsin serviceman to which he gave the answer referred to in the previous paragraph?

Was the "instructor" quoted on pages 9 and 10 a person in authority in the radio school so that his word would carry weight?

Why was the radio school instructor quoted to such an extent when his state-

ments are in many instances obviously false, misleading, and ridiculous?

Was there but one school investigated? What school was it?

Did the investigators ascertain how often the average family calls in a serviceman, in order to justify their statement on page 10 that receiver manufacturers would sell more and better sets if the cost of their maintenance were less?

Was the cost of annual service charges for a fair number of families ascertained?

Was a study made of the economic conditions in which the American serviceman has to work and the financial problems encountered in his business?

Were the so-called dishonest men asked why they resorted to such practices?

Finally, were the findings of the investigators and the final article by Mr. Riis checked by competent authorities—by men who were familiar with the radio servicing field and the proper presentation of statistical data?

If *The Reader's Digest* can truthfully answer these questions to the satisfaction of unbiased and competent judges and still show that its blanket indictment of the American serviceman is fully justified, we will donate \$500 to any charity they may select, but if Mr. Patric must admit he has no radio service background or radio experience—if the set was not thoroughly checked each time so it could be truthfully described as "playing perfectly" on each occasion it was submitted to a serviceman—if the Wisconsin serviceman was not quoted in entirety and accurately—if the radio instructor was not someone in authority—if no attempts were made to ascertain the reasons why the allegedly dishonest men resorted to the practices attributed to them—then we are forced to the conclusion that *The Reader's Digest* has been guilty of editorial irresponsibility, because under the guise of spreading sweetness and light, it has besmirched the good name of thousands of men, put in jeopardy their inalienable American right of earning a decent living, and has judged them guilty without a fair trial.

JOHN F. RIDER.

**The Reader's Digest took to task the garage man in July—the radio man in August—the watch repairman in September, and we understand the typewriter man is due to get "his" in October. Who's next? And next? Don't the editors of that publication have confidence in anybody? Is every industry full of dishonest men?**

**A Serviceman Speaks***(Continued from page 1)*

mates, each of whom has, no doubt, practiced some form of dishonesty; but the fact that man has made laws to protect himself against thieves has not killed the faith that man has in his fellows.

**I** ACKNOWLEDGE the specific facts presented in the August issue of *The Reader's Digest*, but I dispute the conclusions reached, and the manner in which they are reached. I am an honest man, and there are hundreds of millions like me, but I cannot say for a certainty that I may never fall into a trap set for me, or that I may not succumb to a temptation which is placed before me. This *Reader's Digest* test was unfair and not a test of workmanship or craftsmanship. Who upon this earth gives a man the right to set a trap for me, and condemn me in the eyes of the world if I succumb, and disregard me entirely if I show my strength of character and resist the temptation?

I acknowledge that dishonest people are among those of us who repair radio receivers, and it is right to condemn them, but it is also true that there are to be found extenuating circumstances surrounding any condition or act of man, and it is not right to disregard them entirely when rendering judgment. It is true that our moral code does not condone dishonesty no matter what the motive or reason, as demonstrated by the fact that men have gone to jail for many years for stealing a loaf of bread in order to feed hungry mouths. I'll hazard the statement that among those accused of being dishonest in this *Reader's Digest* article there are many who are fundamentally honest, but who, having experienced certain reactions on the part of the public as I have, realized that they would not get what is a rightful charge for the remedy of the simple defects which existed in these receivers. It has been my experience over many years that the public rebelled against paying such charges. Yet the servicemen investigated felt that a charge was due, for their livelihood was obtained from the diagnosis and repair of defective radio receivers, and irrespective of what may have been wrong in these sets, basically they represented defects. Their existence depended upon monies derived from radio repair work. I am in that same class. Does honesty depend upon

self-sacrifice? Am I honest if I charge nothing for this repair, and dishonest if I make more than the "trifling charge"?

Every year there come into my shop hundreds of receivers in which the defects are minor. Have I been dishonest all along because I charged for service rendered—because I charged in accordance with what I rightfully felt was due me, based upon the expenses which I must bear in order that I remain in business and serve the public? If I am dishonest, then every commercial organization which sells knowledge, every professional man who sells knowledge, is dishonest. I, as a radio repairman, charge for what I know as well as for what I do, for some of the most elusive defects existing in radio receivers are due to the most minor of faults. Unlike an enterprise wherein an article is manufactured by hand or machine labor, in the radio repair business it is knowledge, and knowledge alone, which enables the proper diagnosis of a defect; the repair is secondary. To have an individual create a picture for the public to view, wherein my knowledge is presented as being secondary and the important item, that which I do with my hands, is definitely erroneous and false.

**I** HAVE been accused of being guilty in this article by people who have set themselves up as being my peers—not a jury of twelve, but two people who obviously are not qualified, and who take it upon themselves to condemn me still further by colorfully quoting others who likewise are not qualified, or are not authorities, and in such a manner as to fortify their position without giving me the opportunity of speaking in my self-defense.

My reputation, gained as a result of years of honest, conscientious effort, is impugned. The more forceful I am in rebuttal, the more precarious my situation. My very livelihood is threatened.

By whom? Is it by people who are accepted as capable of judgment? No! By a few people who wish to become sensational—who wish to provide reader interest and who set out to prove people dishonest by setting traps.

In this article are statements which are grossly incorrect. The investigator, posing as a student, is instructed about practices of the radio servicing trade. He is told about hiring servicemen on a commission basis rather than paying a salary. He is told about earning \$300 per week and paying his employee \$100

per week in commission. He talks about 6 or 8 sets being repaired per hour. All of these statements are not only ridiculous, but downright stupid to anyone familiar with radio servicing conditions and operations.

If, as this author states, dishonesty in the radio business brings high remuneration, where is it? I can show my books and financial records to prove that the income which people associate with dishonesty does not exist in the radio repair industry. I can substantiate my claims by official U. S. Department of Commerce figures. With more than 50,000,000 receivers in the hands of the public, the gross revenue for about 11,000 established shops like my own was about \$20,000,000, which, for each of us, means about \$1,800 per year. From that \$1,800 must be deducted all operating expenses, the cost of all the parts we sell, the various taxes which we must pay. The net result, and these figures too can be proved, is a final net income of between \$15 and \$20 per week. Is that income compatible with the statement that I am dishonest and take advantage of the public or that I earn such a fabulous income?

To say that a group of people like myself—technical people—who earn less per week than shoemakers—take advantage of their customers, is an insult to the intelligence of the American public.

The author ridicules my testing apparatus. He casts doubts upon its utility and presents it as being of value to the dishonest man. He supplements this by stating that its greatest value is purely that of display. This proves a total lack of knowledge concerning the requirements of my profession.

My testing apparatus serves the same purpose to me as the stethoscope, the fluoroscope, and X-ray apparatus do to the medical man. It is the means of diagnosis or location of the defect. Of course, equipment such as mine can be of value to the dishonest man; that I cannot deny, but it is of much greater value to the honest man, and is of value to the public, for it is the application of such apparatus which makes possible economical servicing of radio receivers. It is the very fact that such equipment is sold to the servicing industry by the nation's leading manufacturers of radio apparatus which makes it possible for the public to continue receiving radio broadcasts at ridiculously low maintenance costs.

*(Please turn to page 8)*

# RIDER'S ABRIDGED VOLS. I TO V

**I**N every detective story you've ever read, one thing has been common: the search for clues that will lead to the necessary facts that will convict the thief of the secret papers or the murderer of the unfortunate victim. Of course, each detective has his own method of tracing down clues. . . . Nero Wolfe sits at home, drinks beer, and lets the people involved in the crime tell him facts that turn out to be clues, but in most cases, the detective hustles to the scene of the crime and searches for facts there.

Now the time-honored method of solving any crime is to build up a complete picture—how and when the deed was done and with what—who would profit by the victim's death and so on. In other words, the detective must get all the facts he can and fit them into the scheme of things, if he is to be successful in the last pages of the book. . . .

And to a certain extent that is the way of the radio serviceman. . . . First of all he must get a clear idea in his

mind of the scene where he must hunt for clues. . . . Of course, he can question the owner of the receiver as to what the trouble may be, but more often than not the information he gets from this source is as unreliable as when the story-book detective asks the murderer if he is the guilty person. No, he has to depend on his own efforts to get the necessary facts that will enable him to solve the problem.

What is the information he needs?

**F**IRST, he must know the type of circuit with which he has to deal—trf or superhet. . . . Perhaps like the miracle-working super-sleuth, he can tell all about the circuit by the color of the cabinet, but the chances are that he has to dig out the information some other way. Of course, there is the hard way: starting at the antenna post or loop antenna and trace the path of the signal from there to the output, noting what tubes, transformers, resistors, etc. are in the circuit. Or he

can obtain the same information in a comparatively few moments by consulting a schematic of the receiver. . . .

The next step in the tracking down of the trouble is to note the various refinements that are incorporated in the circuit and how they affect the passage of the signal through the tubes and other components. . . . Then comes the questioning and, as in every detective story, this is the essential part. Does the signal get through to the mixer plate? Is the oscillator functioning at the correct frequency? Does the necessary plate voltage appear at this element of the tubes? Is the gain within the specified limits throughout the several circuits? And how is the serviceman-detective to know when the answers he gets are true or false? Again he has to rely on data—on *facts* so that he can put his findings all together and determine just where the trouble is or again reverting to detective yarns, he has found his clues and made his deductions. . . .

(Please turn to page 8)

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# Successful SERVICING

Reg. U. S. Pat. Off.

Vol. 7

JUNE-JULY-AUGUST, 1941

No. 5

Dedicated to the financial and technical advancement of the  
Radio Serviceman

Published by  
JOHN F. RIDER PUBLISHER, INC.

404 Fourth Avenue

New York City

JOHN F. RIDER, Editor

G. C. B. Rowe, Associate Editor

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## " 'TIS AN ILL WIND—"

"T IS an ill wind that blows no good."

The much discussed article in the August issue of *The Reader's Digest* was most certainly an ill wind in that it has cast an undeserved blot on the good names of thousands of servicemen in this country, yet it should prove of inestimable value to the service industry as a whole in the long run. . . . The fact can not be ignored that the only way this stigma can be erased—the confidence and good will of millions of customers restored, is for every honest serviceman who is determined to remain in this business to give his whole-hearted cooperation to a mass effort to attain this end.

Before going into the suggestions we want to lay before you, we want to make a couple of points clear. First of all, we firmly believe that a grave injustice has been done to many thousands of radio servicemen through no fault of their own. When a publication adopts a Sir Galahad attitude and starts out on a crusade to crush the evils inherent in our modern society or commerce, it should exercise the utmost care that nothing it publishes could be construed to the detriment of innocent parties. The investigators should be thoroughly familiar with all the phases of the industry they are checking—the number of cases investigated should be such that a true picture can be obtained—the write-up of the findings of the investigators should be such that both sides of the picture are given equal weight—quotations of persons investigated should be given in their entirety, not partial phrases which can be easily distorted to different meanings from what the person had in mind, and above all, in order for such a survey to have

any real meaning, the tests should involve craftsmanship first and other factors after.

Mind you, we are not condoning dishonesty nor are we seeking an excuse for those men who tried to gain an easy dollar through the supposed ignorance of a customer, *but we do take exception to a blanket indictment of an industry wherein we are positive the majority of the members are as honest as those men in any other legitimate line of work.* Here indeed is a case where innocent men have been declared guilty—charges that are contrary to our American way of thinking that a man is innocent until it is proved otherwise.

THE honest men of this service industry—and we write this with no fear of contradiction—the *thousands* of honest men would like nothing better than to see the wholesale expulsion from the industry's ranks of any so-called "gyps." . . . (And with the exodus of such from the ranks, there would still be more than enough servicemen to take care of all the receivers in America which need their attention.) We have no hesitancy in making such a statement for working with servicemen for fifteen years and knowing thousands of them, has proved to us beyond the shadow of a doubt that the majority of servicemen want to conduct their business legitimately.

And because we are convinced that such is the case, we are offering the suggestions below. . . . Before going into them we want to impress this upon you: you as an individual must realize that immediate and drastic action is necessary if you are going to remain in the radio servicing business and have your business prosper. Here is no case

for procrastination or passing the buck. . . . Every man of you has to get up on his hind legs and fight these charges and *you can't do it alone—you must get the cooperation of every serviceman in your community.* . . .

Let us also bring this home to you: an indictment such as this article in *The Reader's Digest* is so important and urgent a matter to the servicing industry that individual, petty differences and politics will have to be tossed aside and the closest sort of mass cooperation adopted. It has taken 15 years for radio servicemen to reach the point they have today—15 years of hard work and honest dealings *on the part of the majority* (we will never concede anything else!) and all this has been staggered by a blow to the solar plexus. You must realize this fact. No matter what the size of your community, every man of you must give his fullest assistance to clearing up the good name of one and all. For remember this: even though *you* have conducted your business on the fair-and-square policy of giving your customers a dollar's worth of work for every dollar you charged—even though you have your customers' good will—even then, we say, human nature being what it is, some such question as this is bound to arise in some of your customers' minds, "Did he charge me too much for that job?" or "Did I really need that new tube he said I did?" . . . Put yourself in their places. You know right well you would think the same thing. . . .

SO as we said, every one of you has to exert the greatest possible effort to combat these very natural reactions on the part of the public. It is suggested that you call a meeting of every serviceman in your community. Somebody with sufficient guts and foresight must take this first step in case there is no serviceman's organization in your locality. Of course, if there is, then it is up to the officers to take this initial step. No matter how or where, gather as many servicemen as you can and show them just what they are up against. Keep these main points foremost: every man must do everything possible to remove this bad taste from the public's mouth and *steps must be taken to restore the general good will and confidence.*

Consider the first—the clearing away these charges of dishonesty. We admit it is repugnant for any honest

(Please turn to next page)

"'Tis An Ill Wind——"

(Continued from page 5)

man to undertake such a task, but don't forget being in the servicing business as you are, you have been indicted along with the rest. We suggest that committees be appointed and set to work to

1. contact the local newspapers
2. contact businessmen's organizations

Now consider what these two committees can do. . . .

*The Newspapers.* Men should be chosen on this committee who have an entrée to the executive personnel of the local papers. It is up to this committee to convince the editors of their sincerity in combating these charges and to form some sort of a publicity campaign directed at set owners that will tend to re-establish whatever good will that has been injured. Any newspaper worth its salt will welcome a chance to clean up a misunderstanding that tends to undermine any business in the community it serves. . . . This committee should also arrange for group advertising in the papers which will inform your customers of the group's policies, discussed below.

*Businessmen's Organizations.* This committee should be formed of men who know the officers of the local businessmen's clubs like the Rotary, Kiwanis, Lions or the Chamber of Commerce. . . . The aims and policies of your servicemen's group should be explained to them and the club's cooperation requested in every way. For example, some member of your group who isn't afraid to talk on his feet, might address a luncheon meeting of the club taking as his subject the advance of radio broadcasting, radio's uses in the war, etc. and bringing in the very special part that is played by the serviceman. Such a time would be excellent to tell about the policies adopted by local servicemen, but this need only be tossed out as a passing thought. Another request that could be made of the businessmen is to get them to serve on a committee of say three of their members and three of yours. This joint committee would investigate any complaints that might be made by any of the group's customers.

**N**OW a third committee should be appointed and while the two just mentioned are important in that they are to deal with the relations between your group and the public, this one is the most important of all. It must

formulate the policies upon which the future dealings of your group with its customers are based. We realize that here again difficulties are bound to arise, for everyone has his own pet theories on how to run a business, but there are broad lines of policy upon which any successful enterprise is based, be that business large or small. These policies must be outlined for the group, they must be adopted *and observed*.

Now let's see in general what the points of the group policy should be.

First: the set owner must get value for his money. He is entitled to know what he is buying and so should be given a bill of particulars of the work done. If new parts have been necessary, the defective parts that were removed should be given to him.

Second: all dealings of the group's membership are guaranteed by the group as to workmanship and charges. Any complaints of irregularities are to be taken up by the joint committee of businessmen and servicemen, mentioned above, and the members of the group are bound to abide by the findings of this joint committee.

Third: a minimum inspection charge must be adopted. We have advocated such a step for a long time and those groups of servicemen who have adopted such a policy *and observed it*, have told us it has proved most successful. We do not pretend to say just what this charge should be, for there are many factors that would influence the amount, but some fixed minimum inspection charge there must be!

We are well aware of all the arguments raised against such a procedure, but if you get right down to cases, is the calling in of a serviceman to look over an ailing receiver any different than a physician's visit to a sick person? People don't quibble over paying a doctor's fee, even though his visit lasts but a few minutes and his statement is "Nothing serious—he'll be all right to-morrow." To our way of thinking, set owners have every bit as much obligation to pay a radio serviceman for his time and diagnosis as they have in the case of a physician or any other individual whose knowledge and advice is sought. And when servicemen pass up this fee to which they are justly entitled, they are not only taking the money out of their own pockets, but are keeping it from others. . . .

Fourth: each member of the group must identify in some way the work he has done on a receiver on some permanent record—perhaps a card—that

is attached to the receiver. Perhaps identification of every part installed.

Fifth: each member of the group is to be furnished with some means of identification so that his customers will know that the prestige of the group is behind the individual with all that it implies. Such identification can be in the form of a display card for the shop window, a pocket card, a statement on his letterhead, etc.

Sixth: the failure of any member to abide by the servicing policies of the group, will result in his expulsion from membership and all it entails. Naturally, some means will have to be set up for hearing both sides of the story—perhaps it could be the joint businessmen-servicemen committee—but if a man does not live up to the policies adopted by the group, he should not expect to share in its advantages.

**A**ND let us say this: don't just dismiss with a disdainful wave of the hand the above suggestions with the thought that they can't be made to work. . . . We know of several communities where the servicemen have formed such groups; where these groups have adopted similar working agreements, and where they have been successful to the Nth degree.

We do not intend to convey that the suggestions we have set forth above are the ultimate ideal by any means. Every group will have variations that will suit their own particular requirements, but the basic ideas are there upon which you can build a solid foundation. If we can be of assistance in any way, please let us know and we also would like to learn of the progress made towards a greater cooperation among servicemen in your community. If you have any ideas that will make for the betterment of conditions in general, let us have them and we will pass them on to any group which requests help.

There is absolutely no sense in assuming that all this will affect someone else and not you. We don't care how careful you have been in your business dealings and how good your reputation may be, such thoughts as we mentioned above on the part of your customers are bound to crop up and sooner or later—they will react in some degree on you. No one man now can put himself above his fellows in the servicing industry—this is the time for a mass effort and it's got to be gone into now—and not to-morrow for that will be too late. . . . **ACT TODAY!**

JOHN F. RIDER

# Rolling Reporter



## ROBOT REVERE

(Robot signal flashed over WJZ in Civilian Defense Test automatically turns on a radio set, rings bell, turns off set with an all-clear signal.—*News item*)

Listen, my kiddies, and you shall hear Of the modern ride of Robot Revere. His prototype, Paul, back in '75 Did his stuff with a one-horse drive. He got his start with an oil lamp's flash And galloped along at a 10 M.P.H. dash; He woke up the folks—"The red coats are comin'—"

Bust out yer gats—start things a'hummin' That he did his job well, you've read that in history— That he did it a-tall—gosh, that is the mystery.

But today 10 M.P.H. is almighty slow To warn of air raids or enemy blow, So Robot Revere comes forth from the lab— Tubes in his innards, antennas that grab The signal that's shot at light's speed through the air That starts up alarm bells or bright lights that glare.

So now a few seconds leaves no room for doubt That danger is near when you hear Robot's shout.

## NO ADS

Muzak, a NY corp, is figgerin' on pushin' out f-m programs without ads to those folks who are fed up with listenin' to moosick, etc. liberally larded with droolings about the new chewin' gum wot don't stick to yer shoes or the latest men's combination pith helmet—tin derby with ear muffs that auto-

matically flap in the summer and cool yer fevered brow. . . . Of course, those folks wot ain't advertising-minded has gotta *shell out shekels* for the privilege of gatherin' up earfuls of sponsorless programs. And so that us guys, wot can take ads in our stride, won't be able to tune in on this pure stuff, they're gonna shovel in some assorted freqs that will come outa ordinary f-m receivers with squeals and yelps and various blats. So, if you're workin' on an f-m job and pick-up such goin's on, dinna worra—it'll just be Muzak's adless antics.

## C.T.C.

Gotta yen to go to England and give a hand to *increasin'* the air risks run by Hitler, Goering & Co's pilots???. Well, we got it from the well-known "good authority" that about 6000 boys (AND gals) over here have been askin' about gettin' over there to do their stuff on the *radiolocator*. . . . If yuh do have such a hankerin', we can tell yuh that the *38 bux per wk* is practically gravy, for they give you just about everything a guy would want. . . . Incidentally, it might interest yuh to know that these here radiolocators are operated by gals which are serviced by the C.T.C. technicians. . . .

## ABRIDGED I-V

By the time you'll be readin' these here results of our so-called typin', the presses will be coolin' off from running the 2000 pages of the latest Rider Manual—it's an *Abridged Manual*—pages taken from Vol. I and II and III and IV and V and it's gonna fill the w.k. loooo-o-ong-felt want of a lotta fellows who needed the dope on *sets of the vintage of the early 30's*. . . .

## THANX

The Boss asted us to tell youse guys *THANX* fer sending in those questionnaire cards the way you did. . . . *The way you all cooperate with us is sure gratifyin'*. . . .

## ADD SIMILES

As unpopular as Mr. Ickes is with a man who has run outa gas at 7:01 p.m.

## PHILCO—II

Next time you stop in at yer jobber's, look on his shelves for a book with a *silver and white striped jacket*. . . . Yassuh, that'll

be the *latest* Rider book offen de press—VOL. II of *ALIGNING PHILCO RECEIVERS*. . . . You and you and YOU know how handy Vol. I has been, doncha? This one's just like it and it's right up to the *minute*—*Need we say more?????*

## NO FLOPPIN'

Just heard tell of a new automatic record changer phono that plays both sides of a record without floppin' it over. . . . Yep, it's got two pickups—one for playin' the top and t'other for playin' the under side. . . . Then when both sides of the platter have been played, it's shoved offen the spindle and another drops into place. . . . And speakin' of changers, we nosed around and found out that our new book on that subject is comin' apace. . . . *'Twill be quite a job of work*. . . . Dunno yet when she'll be ready. . . .

## DIT DIT DIT DAH

Whoever gave birth to the idea of this "*Y For Victory*" campaign sure did kill *three* birdies with one rock. . . . leastwise to our way of thinkin'. . . . Not only did he give Britain a swell nuisance weapon, but he's gonna make millions of folks all over the world conscious that there is a code used in radio communication (. . . —) and also that there is such a hunka moosic—Beethoven's *Fifth!* (If we remember correctly the opening notes of that are three eighth notes and a half note alla same like. . . —) Giva look at the decorations we'll be using from now on in S.S. between paragraphs and articles. . . . By the way, why don't you adopt this same idea in your advertising????

## CHEERIO

Yep, it's about time for our trek to the open spaces. . . . Last Sat. we spent the afternoon with the ed. of another radio sheet out paintin' on the shore of as nice a little lake as we've ever tried to get down on paper. . . . It gave us the *urge* all right and yesterday we checked up on our pastels and paper supply and every boat that passed up or down the East River gave us more ideas—even the tugs. . . . Soooo-o-o, we've found that there's just one thing to do when we get feelin' this way—Right you are. . . . *Be seein' yuh anon!!!*

THE ROLLING REPORTER

# THIS YEAR YOUR PROFITS DEPEND UPON YOUR SPEED

**T**HIS year your biggest problem lies—not in getting sufficient work—but in getting your jobs out faster. The Rider Books shown here are designed to increase your speed in troubleshooting—*increase your profits per hour.*

### CHECK THIS LIST

Automatic Frequency Control Systems, 144 pages, hard covers, \$1.00. The Cathode Ray Tube at Work, 336 pages, over 450 illustrations, \$2.50. Hour-A-Day-with-Rider Books on Resonance and Alignment—on Automatic Volume Control—on D.C. Voltage Distribution in Radio Receivers—on Alternating Currents in Radio Receivers. Stiff covers—only 60¢ each.

### SERVICING BY SIGNAL TRACING

Book explains this fundamental method of servicing that is free from every limiting factor heretofore encountered. 380 pages, 188 illus., \$2.00.

### FREQUENCY MODULATION

Frequency Modulation is here! This book explains transmission of F-M signals as well as discussing the new F-M sets. 136 pages, illustrated, \$1.00.

### OSCILLATOR AT WORK

Protect your investment in oscillator equipment. Make any future investment in the light of the knowledge this book gives you. 256 pgs., 167 ill., \$1.50.

### VACUUM TUBE VOLTMETERS

Explains practical aspects as well as principles underlying functioning of various classifications of v-t voltmeters. 180 pages, \$1.50.

### METER AT WORK

If you want to get the most from your present meter or want to buy the proper one for your needs, you should have this informative book. Only \$1.25.



JOHN F. RIDER Publisher, Inc., 404 Fourth Ave., New York City

Export Division: Rocke—International Elec. Corp., 100 Varick St., N.Y.C. • Cable: ARLAB

## What's the Matter?

ALL through this issue you will find material in defense of the serviceman. Well, here is something which is not in defense of the serviceman. In fact, it is nothing but criticism of the serviceman, and if you read it, you will find that the view we take is correct. In the February to May issues of *Radio Service-Dealer* for 1941—and in mentioning the name of this magazine we fully recognize that some people may criticize us for giving it a plug—four ads were published which were aimed at the public and intended to be used by radio servicemen. In other words, the magazine prepared the copy, printed it, and made provisions for reprints which could be sent out by the servicemen to their customers.

The writing of advertising copy is no easy task and it is a well-known fact that the servicing industry at large is not capable of writing the proper type of advertising copy, especially institutional copy such as this. It was thought that servicemen would take advantage of this opportunity to consolidate their position with the public.

### Rider's Abridged I to V

(Continued from page 4)

Of course, at this point, it's all over but the shouting, for the hardest work has been accomplished. The repair or substitution of the ailing part is just a matter of routine, like sending out the cops to bring in the suspect to whom all the evidence leads. The main thing in all this is the evidence and the knowledge of the truth of the answers to the questions asked. The credulity of these silent witnesses in the tracking down of trouble in a receiver is established by the technical data that have been released by manufacturers and gathered in one place for the serviceman's convenience—in the twelve volumes of Rider's Manuals. . . .

SINCE the publication of Rider's first Manual back in 1929, thousands of men have entered and many have left the servicing business. Men have come to rely solely on the information they have at their finger-tips in the Rider Manuals, because they have found it authentic and easy used. However, some of the newcomers—say those who have entered the industry within the last two or

Copies of these ads were offered to the readers of the magazine at a very nominal figure—without any strings attached to the offer. Did the servicing industry do anything about this opportunity? *Absolutely nothing!* With a circulation of 15,000 per month and with four such insertions over a period of four months, there were conveyed to the servicing industry about 60,000 appeals. What was the result? About 6 or 7 people made requests for reprints and of these 6 or 7 two were for one copy each.

To our way of thinking, this is one of the saddest commentaries that can be made about the servicing field. Is it possible that such apathy exists in the bodies of servicemen as to refuse to take advantage of the various opportunities which are presented to them? Is it possible—and this is really hard to believe—that servicemen just don't give a damn? We refuse to believe this to be the case; for if this is really so, then the status of the industry is pretty hopeless.

Maybe someone can give us the answer—and it better be good.

three years—have not gotten around to buying the earlier volumes, those covering sets released prior to 1935. . . . Now in the light of the future curtailment of receiver production, receivers of this period are going to assume more and more importance for their owners are going to have them fixed up because of their inability, for one reason or another, to buy a more modern set.

There are doubtless many servicemen who have those volumes of Rider's Manuals covering the later receivers and who want to get the earlier volumes, but consider that it is too great an outlay right now with the cost of everything on the upswing. It is for these men that we have compiled an *Abridged Rider Manual* containing data covering the more important receivers that appeared on the market between 1930 and 1935.

In order to select the servicing material for this new Manual, we consulted the service managers of the companies whose products will be covered. First of all, we discarded the data on those receivers which were on sale prior to 1930, because it was felt that seldom, if ever, will any of these come into a service shop today for repair. Then, through the kind cooperation of

the service managers of the radio receiver manufacturers, we found out which models of the receivers of the companies represented had had the widest distribution—in other words, those receivers which are most likely to come into your shop because more of them were sold. . . . Furthermore, we selected those makes of sets which were most widely distributed between 1930 and 1935, the general period covered by the new abridged Manual.

Naturally it is our desire to publish as much data on as many different sets as we can and to that end we have revised a number of pages, following an editorial technique that has been developed since the publication of those early Manuals. In some cases we are publishing just the schematic with no supplementary data, for if you have the schematic with the parts values, you can gain a sufficient knowledge of how the receiver functions. . . . In other instances, we have included all the data that were ever published because of the complexities of certain circuits.

As you know ever since the start of *SUCCESSFUL SERVICING*, we have published changes made by manufacturers in their products. Naturally these changes did not appear with the original data, but now they do. We have gone through the back issues of this magazine, clipped those articles pertaining to the various sets and have incorporated them along with the data originally published. Now, in this *Abridged Rider Manual Volumes I to V*, you have all the data in the 2000 pages that you require for the servicing of these older models.

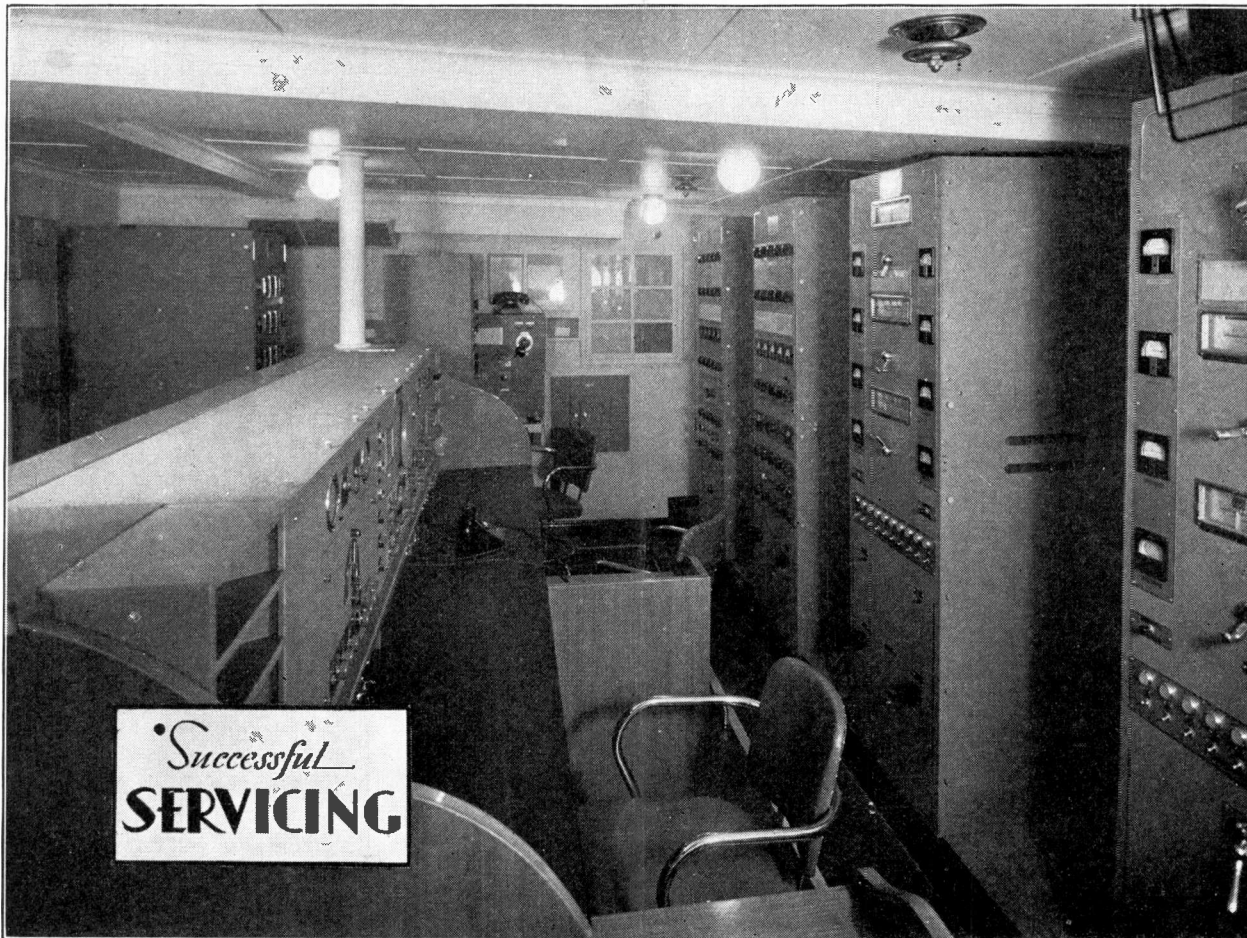
### A Serviceman Speaks

(Continued from page 3)

If, as the author implies, my tube tester is a means of taking advantage of the public's ignorance of radio, then the electrocardiograph and X-ray serve the same purpose in the medical field, for the public in general knows as little about medical equipment as they do about radio apparatus.

The radio servicing industry is no racket! I, as a serviceman, have had to struggle for my existence and overcome many handicaps. Right now my livelihood is placed in jeopardy. I will have to overcome the aspersions cast upon me by William Roger Riis, whoever he may be, in *The Reader's Digest*. I know this will be done because the American public has a real sense of fair play and will render honest judgment.





Courtesy of United States Lines

JULY - AUGUST, 1940

## CLIPPING ACTION IN LIMITER CIRCUITS

### *Further Notes on Limiter Action in F-M Receivers*

**T**HE function of the limiter in f-m receivers, insofar as it serves to flatten peaks in amplifying stages preceding it, was discussed in detail in a previous issue of **SUCCESSFUL SERVICING**.<sup>\*</sup> When the limiter is performing properly, the signal fed to the discriminator detector is made substantially uniform in amplitude so that only the frequency variations in the modulated wave serve to actuate the detector.

Such a signal characteristic is essential for the high-fidelity reproduction for which f-m receivers are noted. Limiter action also serves to reduce amplitude variations of the signal due to noise modulation, though when the phase relations between the carrier and the noise pulse are such as to result in frequency variations in the signal, the noise is not eliminated. So we see that the primary function of the limiter is to remove amplitude variations in the signal resulting from non-uniform am-

plification in the receiver, which would cause distortion if they reached the detector.

During the course of an investigation of limiter action in our **SUCCESSFUL SERVICING Laboratory**, many facts concerning its operation were discovered which, so far as we know, have not previously been discussed. Since a knowledge of just how the limiter works will be of aid in trouble-shooting in f-m receivers, we know you will be interested in these findings.

The manner in which the limiter functions is more complex than is generally realized, particularly with respect to the way flattening of peaks is obtained and the change in the operating grid bias when a signal is being received.

In the small insert diagram, Fig. 1A, a typical limiter circuit is shown. The tube employed is the 6SJ7 sharp cutoff pentode and the plate and screen are operated at a relatively low d-c voltage, 90 volts, so that the tube eas-

ily overloads. The circuit used is standard with one manufacturer; in other f-m receivers, even lower plate and screen voltages are employed, usually in the neighborhood of 60 volts. In all receivers with which we are familiar, sharp cutoff pentodes are employed.

In the control-grid circuit you will note the grid resistor R and the blocking condenser C. In other makes of receivers, R and C are in parallel and are connected in the grid return circuit. Regardless of the method of connecting these components, their functions are substantially the same as that in the circuit shown.

The plate current-grid voltage curve shown in Fig. 1 was plotted directly, using the 6SJ7 tube in the circuit shown in Fig. 1A with 90 volts d-c on the screen and plate. Note that the plate current becomes zero when a bias of approximately 8 volts negative is applied to the grid. This means

(Please turn to page 3)

<sup>\*</sup>February—March—April, 1940.

**Emerson DB, DL, DW, DB1, DL1 Chassis**

Please make a note in your Index to Rider's Volume XI that several new model numbers have been assigned to the chassis whose data appear on page 11-22 in Rider's Volume XI. These new numbers are: DB-315 and DB-327. Also note that the DW chassis is similar to the DB and DL chassis and the model numbers are DW-330A, DW-330B and DW-358.

On page 11-30 of Rider's Volume XI will be found the servicing data for model DL1-330. Make a note in your Index that these notes also apply to model DB1-301, chassis DB1, a new addition.

In the DB and DB1 chassis having serial numbers below 2,817,946 the resistor R2, having a value of 15 megohms, is not used.

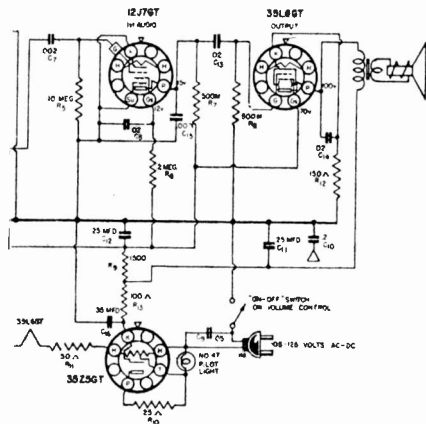
**Belmont 601—Series C**

The values of several components have been changed in this series, and the schematic of Series A and B, see page 7-10 in Rider's Volume VII, applies also to the series C. R4, the volume control, has been changed from 1 megohm to 500,000 ohms; R7 which was 100,000 ohms, now is 500,000 ohms; and R9, which was 2 megohms, now is 500,000 ohms. The value of C7 has been changed from

0.0005 mf to 0.0001 mf. It is suggested that you notice the differences between the series A and B chassis, as noted on the above-mentioned Manual page.

**Silvertone Chassis 110.989-1A**

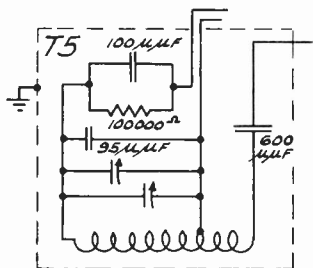
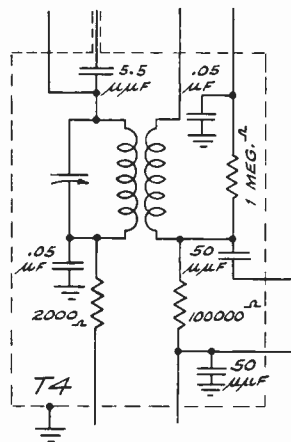
The addition of -1A to the chassis number 110.989 indicates that a change has been made in the filter circuit of the circuit shown on page 11-76 of Rider's Volume XI. A partial schematic



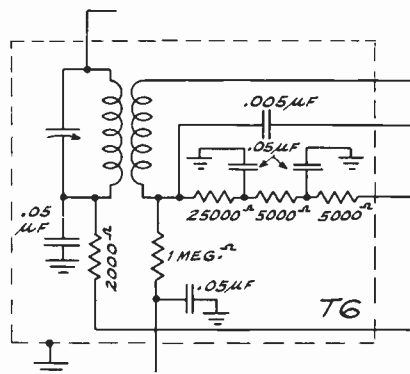
New filter circuit of the Sears-Roebuck chassis 110.989-1A

of this receiver, incorporating the changes, is shown herewith. A new model number has also been given to this new chassis; it is R-1021.

Note the changes made in the filter condensers. C11 and C12 are now 25



Parts values for coil assemblies in Hammarlund 200 series chassis.



**Hammarlund 200 Series**

A request for the values of the components with the plate coil, beat oscillator coil, and avc plate coil assemblies, T4, T5, and T6 respectively, was recently received. The values, which had been omitted from the manufacturer's schematic and parts list, shown on pages 11-1, 2 and 11-6 of Rider's Volume XI, are indicated in the accompanying drawing of the three assemblies. These are numbered to correspond with the assembly numbers on the schematic.

mf instead of 40 and a third condenser, C16, 35 mf, has been added. Resistor R9 has been changed from 2500 ohms to 1500; R11 from 25 ohms to 50, and R13, 100 ohms, has been added.

The other servicing data for Chassis 110.989 apply to this changed chassis.

**WANTED**

In our last issue we ran a notice requesting any of our readers who wished to dispose of certain copies of the English magazine "Television" to advise us of the fact. You will find below a list of certain issues of several other publications which are needed to complete our files, which we plan to have bound for our library. If you have any of these copies in good condition and would like to dispose of them, will you please list them and the price and let us hear from you soon, as we are anxious to get our library completed. Thank you.

RADIO NEWS—1922, Jan. to Oct. inclusive; 1923, Jan.-Feb.-Apr.-June-July-Aug.-Sept.-Dec.; 1924, Aug.-Nov.-Dec.; 1925, Jan.-Feb.-Mar.-May-July; 1926, Aug.-Sept.-Dec.; 1927, Aug.-Sept.-Nov.-Dec.; 1928, Nov.; 1929, Feb.-Mar.-June-Oct.; 1930, Feb.; 1931, Dec.; 1932, Jan.; 1933, May; 1935, June-Oct.; 1936, Jan.-Feb.-Aug.-Dec.; 1937, Jan.

POPULAR RADIO—1923, Mar.-May-June-July-Aug.; 1924, Feb.-Mar.-Apr.-May-June-July-Aug.-Dec.; 1925, Jan.-Mar.-Apr.-May-June-Aug.-Oct.-Nov.; 1926, Jan.-Feb.-Mar.-May-June-Dec.; 1927, Feb.-July-Aug.-Dec.; 1928, Apr.-May-June to Dec. inclusive.

RADIO BROADCAST—1923, Feb. to July inclusive; 1924, Mar.-June-July-Aug.-Sept.-Nov.-Dec.; 1925, Jan. to Oct. inclusive; 1928 and 1929, Jan. to Dec. inclusive.

GENERAL RADIO EXPERIMENTER—1926, Sept. to Nov. inclusive; 1927, Nov.; 1928, Feb.; 1929, Mar.-Apr.-May-June; 1930, Aug.-Dec.

QST—1922, Jan. to Sept. inclusive. Nov.-Dec.; 1923, Feb.-Mar.-Aug.-Dec.; 1924, Jan. to Sept. inclusive. Nov.-Dec.; 1925, Jan. to July and Sept. to Dec. inclusive; 1926, Jan.-June-July-Nov.

PROJECTION ENGINEERING — 1929, Oct.; 1930, Feb.-Apr.-Dec.; 1931, Mar.-Apr.-May-July to Dec.; 1932, Jan.-Feb.-Mar.-July-Dec.; 1933, Apr. to Dec. inclusive.

RADIO ENGINEERING—1926, Jan. to Mar. inclusive; 1927, Jan.-Dec.; 1928, Dec.; 1931, Jan.-Feb.-Oct.-Nov.; 1932, Jan.-Feb.-July-Nov.; 1933, Nov.-Dec.; 1936, Aug.; 1937, Aug.

ELECTRONICS—1930, Apr.-May-July.

Cipping Action

(Continued from page 1)

that any signal the negative peak voltage of which goes beyond 8 volts will place a momentary negative bias on the grid sufficient to drive the plate current to zero. Consequently, since no plate current flows when the nega-

nal. Over the negative half-cycle, therefore, any signal peaks higher in voltage than the difference between the bias at point (a) and cutoff (-8 volts) are clipped in the plate circuit.

Clipping of the positive signal peaks takes place in the grid circuit. This is proved not only by the static curves but also by oscillographic measurements. In contradiction to the usual theory

R serves to provide increasing negative bias, which permits a further excursion of the positive half cycle. If the negative voltage thus developed were exactly equal to the positive peak voltage, no clipping could result. Actually, the operating bias thus developed is less; consequently clipping results. The portion of the positive half cycle thus clipped is shown in the dotted lines of Fig. 1.

To check these results, the oscillograms shown in Figs. 2 to 5 were made, suitable values of R and C being chosen so that operation at audio frequencies could be obtained. An audio signal of 1000 cycles was used, rather than an r-f signal, in order that satisfactory sweep operation could be obtained from the cathode-ray oscillograph. While the results at high frequencies may be somewhat modified, these oscillograms serve to illustrate how the limiter operates.

For the oscillogram, Fig. 2, the oscillograph vertical amplifier input was connected across the grid circuit of the limiter. Note that the positive peak is clipped, as was predicted from the theoretical analysis, while the negative peak remains unaffected.

To obtain the oscillogram, Fig. 3, the oscillograph was connected across the plate circuit. The wave is now reversed in phase so that the upper peak represents the negative swing while the lower flattened peak represents cutoff in the grid circuit. The signal level at the grid is not sufficiently great to cause cutoff in the plate circuit of the negative peak.

Fig. 4 was made with the oscillograph connected as for Fig. 3, but the input signal amplitude has been increased so that cutoff of the negative peak just begins to take place. Note that both the upper and lower peaks are now rounded off.

(Please turn to page 4)

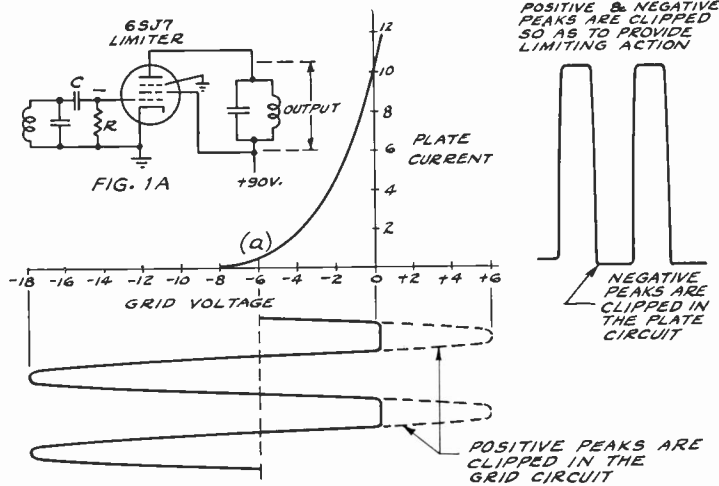


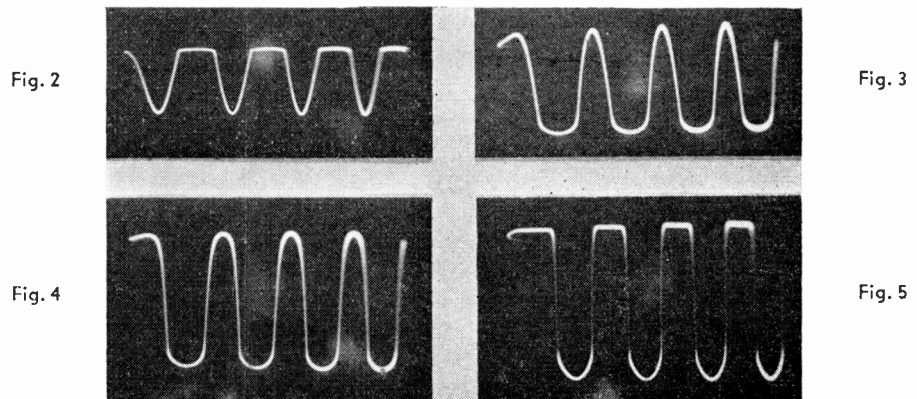
Fig. 1. The plate current-grid voltage curve obtained with the limiter circuit of Fig. 1-A with 90 volts on the plate and screen.

itive grid voltage exceeds 8 volts, the negative half of the wave is cut off in the plate circuit. This clipping of the negative peak is illustrated in the diagram.

This does not mean that the applied signal voltage must exceed 8 volts on the negative peak to produce clipping in the plate circuit, though such would be the case if the effective grid bias, under operating conditions, were zero. Actually, when a signal voltage is applied the control grid draws current over the positive half cycle. This grid current flows through the resistor R in such direction as to apply a negative voltage to the grid which is constantly increased as the signal increases to a peak over the positive half of its swing.

As a result of the voltage developed across R, the condenser C becomes charged during the positive half cycle of the grid voltage swing. Since the time constant of the combination of R and C is long compared with time interval of a single cycle of the signal, the condenser keeps a large portion of its charge over the negative half cycle of the signal wave. Therefore, most of the negative voltage developed over the positive half cycle is retained. This results in a shift in the operating bias of the grid from zero to some point, such as (a) in Fig. 1, which depends upon the magnitude of the applied sig-

that the grid is driven several volts positive, our tests show that the grid never became more than very slightly positive. At the start of the positive swing, when the grid draws current, the circuit becomes, heavily loaded, with the result that the peak becomes flattened. The positive peak does not drive the grid several volts positive, as might be assumed, with a strong signal input. In fact, the grid becomes only slightly positive and the only reason that practically all of the positive half cycle is not clipped is because at each instant over the positive half cycle, when grid current is produced, a corresponding negative voltage drop due to the grid current voltage drop across



Oscillograms showing limiter clipping action in the circuit of Fig. 1A. See text for descriptions.

**Philco 38-35**

To correct excessive hum in the Model 38-35 Philco, the following change was made, beginning with Run No. 3: The red wire which connects the filament of the 6Q7G tube to the on-off switch has been lengthened. This wire now follows the rear, side and front channels of the chassis near the base instead of being connected directly from the switch to the socket contact. This receiver is shown on pages 9-7 and 9-8 of *Rider's Volume IX*.

**New Spiegel Model Numbers**

We have been advised that this company has added new model numbers to some of their chassis, the servicing data for which have already been published in *Rider's Manuals, Volumes IX, X and XI*. It is suggested that the new model numbers shown in the accompanying table be written in your Manual Indexes, the proper entries being identified by the chassis designation and page number.

New Model Numbers	Chassis No.	Page
T2014, T2015, T2016	5A	11-11
T2000, T2050	6W	9-12
T2064	745	10-23
T2154	6Q	9-17
T2216	6A	11-10
T2100, T2150	109B	10-25
V1200, V1208, V1212, V1220, W304	128B	11-3
V1204	80B	11-7
V1010	216	10-9
V1100, V1112, V1160, V1164	202	10-11
V1052, V1066, V1070, V1074	218	10-10
V1104, V1154, V1170	220	10-12
V1108	211	10-13

**G.E. GME-11**

This wireless record player is the same as the GM-11, servicing data for which were published on page 10-1 in

*Rider's Volume X*, with the exception that in this new model provision is made for 210-250 volt, 50-60 cycle operation. For operation at this higher voltage, the phonograph motor circuit is slightly changed. Instead of R2 being connected directly to the line plug, it is connected by means of a yellow lead to a tap on the coil of M-1.

**The Cover**

On page 1 is a photograph showing the radio shack of this country's largest liner *America* of the United States Lines. The installation was for the most part designed for the *America* and so was custom built. It includes eight transmitters, nine receivers, a radio compass, a radio alarm and equipment necessary for linking the ship to ports and other ships.

The emergency equipment consists of a 50-watt transmitter operated from emergency generators with two sets of storage batteries in reserve; two receivers, one covering from 15 to 500 kc and the other being a type B crystal receiver. (Yes—we said crystal receiver.) The radio auto alarm is always tuned to the emergency distress signals of other ships and automatically sounds a bell in the radio room and on the bridge when such signals are picked up.

A 75-watt radiotelephone outfit, operating on 2 to 3 mc, is installed in the chart room. This is used for communicating with tugs while the *America* is being docked and with the pier and home office when the ship is in port. When a signal is picked up on this receiver, it is fed into a selective signaling device which responds to certain audio frequencies and when the proper sequence is sent out by the shore station, a bell rings in the chart room indicating an incoming call.

Five operators are in the radio room, which is open 24 hours a day for telegraphic messages and from 9 a.m. to midnight for ship-to-shore telephone communication.

**New Kadette Model Numbers**

We have been advised that the servicing data for Model L-25, which you will find on *Miscellaneous page 11-4* in *Rider's Volume XI*, also applies to the following model numbers: L-24, L-26, L-27, and L-28. Please add these numbers in your Volume XI Index.

**NOTICE**

If you are receiving **SUCCESSFUL SERVICING** regularly, please do not send in your name again if you come across a coupon in a *Rider Manual* or on a book jacket. Such coupons are only for new readers. If you change your address, advise us on a postcard, giving your old address as well as your new one. Thank you.

**Clipping Action**

(Continued from page 3)

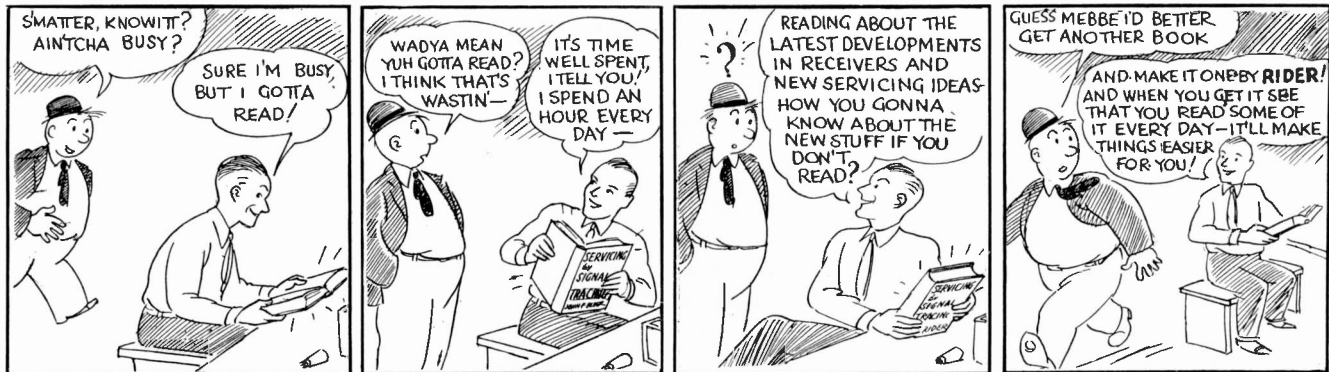
Fig. 5 illustrates what happens in the plate circuit when, with connections as for the two preceding oscillograms, the signal level is increased so that plate current cutoff is obtained. The negative peak is thoroughly flattened out, while the positive peak is also rounded off due to grid circuit cutoff.

Note that, in all the measurements in the plate circuit, the image size remains substantially the same, showing that the amplitude of the signal remains practically constant at the plate even though the signal level at the grid has been varied over a wide range.

All the above tests were made at a single frequency. In f-m operation, the signal frequency will vary when modulated. Under such conditions, the overall response curve will be modified by the characteristics of the discriminator transformer, as was described in our previous article concerning limiter action.

As these tests and oscillograms indicate, clipping of the negative peaks occurs in the plate circuit of the limiter while clipping of the positive peaks takes place in the grid circuit—not, as generally supposed, in the plate circuit.

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John F. Rider Publisher, Inc.  
404 Fourth Ave. New York City

John F. Rider.....Editor  
G. C. B. Rowe.....Assoc. Editor

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Vol. 6 July-Aug., 1940 No. 6

## PREPAREDNESS

IN the July issue of "The Texas Broadcaster," published by the Dallas Radio Service Association, appeared an editorial which we are reprinting below, as we feel that every serviceman should give the ideas set forth therein his very earnest consideration.

### WAR!

What will be the status of the serviceman if this country ever engages in armed conflict? Just where and how will he fit into the picture? We suspect that the authorities well know the answers, all we can do is speculate.

Let's set our imagination dial down around ten or twelve megacycles and see what we can imagine. The first thing that strikes us is that every mobile unit will use some kind of radio communicator, possibly two-way jobs; compact, interchangeable transceivers. That means that thousands upon thousands will be manufactured and used, and they will have to be serviced. And then there will be larger semi-portable affairs installed in trucks. Installation possibly along the lines of the exploration trucks of the geophysical companies, housing several transmitters and receivers and lots of spare parts with several operators and maintenance men living right alongside the instruments. Such units would follow the advancing lines of the battle front.

Then we will find permanent in-

stallation of all sizes and kinds at bases, airports, concentration points, key cities, zone headquarters, etc. Every official automobile will have two-way communication, every airplane will have the same. In fact we can shut our eyes and see millions of radio sets in use, and each one of them will have to pass through the ministering hands of some serviceman. And the serviceman will have to be something besides a solder-slinger. Patched-up jobs will not go, it will be *produce* or else.

It seems to us that the serviceman should be about his business of learning more and more about servicing and how it will apply to national needs. We were never more uncertain in our national life than now. What with the ominous storm brewing in the east no man can say what will happen in a month or ten months or ten years. Every man who has a knowledge of radio repair and maintenance will be required and can be used. There will be no question of organization or long hours or whose test equipment is the best; nor will he be able to reach over and pick up Rider to see if the non-oscillating, double-jumped - up right and left angle "IF" fits in here or there. Brains will have to be used and the men who are prepared will be the ones who will be needed.

We should immediately get serious about this, and individually and collectively begin at once to do our part in preparing for the defense. Let us be able when the time comes to answer the roll call, to say, "Here we are, ready, able, and willing."

PORTER T. BENNETT

Heretofore we have been reluctant to give expression to similar thoughts inasmuch as some of our readers might get the impression that we were "waving the flag" to further our own ends, but now that Mr. Bennett has broken the ice the way he has, we are only too glad to pass his words on to you.

Needless to say, we are heartily in accord with the above editorial. No one can foretell what the future holds for us but if you would make that future as bright as it can be made, you will avail yourself of every opportunity to learn as much about your chosen job as you possibly can. Bear in mind: we do not care from what source you get this knowledge—*just get it!*

JOHN F. RIDER

## ALIEN REGISTRATION

As part of the National Defense program, a nationwide registration of aliens will be conducted from August 27 through December 26, 1940, by the Immigration and Naturalization Service of the Department of Justice. Registration will take place in the post offices of the nation. It is expected that more than three and one-half million aliens will be registered during the four-month period.

Registration is made compulsory by a specific act of Congress, the Alien Registration Act of 1940, which requires all non-citizens to register during the four-month official registration period. The law requires that all aliens 14 years or older are to be registered and fingerprinted. Alien children under 14 years of age will be registered by their parents or guardians. When alien children reach their fourteenth birthday, they will be required to register in person and be fingerprinted.

A fine of \$1,000 and imprisonment of six months is prescribed by the Alien Registration Act for failure to register, for refusal to be fingerprinted, or for making registration statements known to be false.

As part of its educational program to acquaint non-citizens with the registration requirements, the Alien Registration Division is distributing more than five million specimen forms listing the questions that will be asked of aliens at registration time. Besides the usual questions for establishing identification, the questionnaire asks the alien to tell how and when he entered the country, the method of transportation he used to get here, the name of the vessel on which he arrived. He is also asked to state the length of time he has been in this country and the length of time he expects to stay. He must also describe any military or naval service he has had, and list the names of any organizations, clubs, or societies in which he participates or holds membership. In addition, he is required to describe his activities in any organization, and to affirm whether or not the organization furthers the interests or program of a foreign government.

To make their registration easier, aliens are being asked to fill out sample forms, which will be available prior to registration, and take them to post offices where they will be registered and fingerprinted. Every registered alien will receive by mail a receipt card which serves as evidence of his registration. Following registration, the Act requires all aliens, as well as parents or guardians of alien children, to report changes of residence address within five days of the change.

The Alien Registration Act was passed so that the United States Government may determine exactly how many aliens there are, who they are, and where they are. *Both President Roosevelt and Solicitor General Biddle have pointed out that registration and fingerprinting will not be harmful to law-abiding aliens.* The Act provides that all records be kept secret and confidential. They will be available only to persons approved by the Attorney General of the United States.

The Immigration and Naturalization Service asks for the cooperation of all citizens in carrying out the Alien Registration program in a friendly manner so that our large foreign population is not antagonized. It is suggested that citizens may be of great help to their non-citizen neighbors or relatives by explaining to those who do not speak English well what the registration is, where aliens go to register, and what information they must give.

# Next—METERS

IT would be a stupendous task even to try to estimate the number of electrical meters that are in use in the radio service field and if all the fields wherein electrical meters are employed were to be considered, the task would be practically impossible. Now when we think about this great number of meters and all the different conditions which they are capable of interpreting, the question naturally arises, "How completely has the subject been covered in the past? Are the users of all kinds of meters getting the most out of their instruments?"

In the first place—and we have made this statement before on more than one occasion—unless a man understands the theory underlying the instrument with which he is working, he is unable to get the maximum use out of that particular piece of equipment. Consequently, he should know the reasons why the pointer travels along the scale when a meter is connected into a live circuit. Naturally in order to understand those reasons he must have at his fingertips a thorough knowledge of the relationship that exists between the current flowing through a coil, the magnetic field set up, the interaction of two magnetic fields, etc.

If you were to look through the catalog of meters, you would find many, many different models. However, if you were to analyze the theory underlying all these types, you would find that from that point of view they could be classified under a comparatively small number of groups. This simplifies matters to a great extent, because a man should know how each meter differs in its functioning from the other on his bench.

Next in importance to knowing the reasons why and how a meter operates are the uses to which it can be put—its applications to the problems that arise every day—which meter can be used to measure which currents and voltages. Now just because the scale of a meter covers a certain range, and is calibrated in certain units, does not necessarily mean that this is the only use to which it can be put. On the contrary—many meters can be employed in different ways that expand their usefulness enormously and this expansion can be made with only a slight effort on your part. A shunt resistor in the meter circuit,

for instance, will give you essentially another meter, but what resistance should it be and what must be its power rating? What corrections must be made in reading the scale of the meter with such a resistor in the circuit? How many different ways can a meter be used? What are the limits within which accurate readings can be made? What type of meter is best for any given test?

You realize that these are all pertinent questions and their answers should be a part of every serviceman's technical knowledge; that is, if he is getting the greatest possible use out of his meters. Naturally the question follows, if a man does not have the answers to these questions, where can he find them? Where can he find the necessary data that he needs covering both the underlying principles involved and the practical application of his instruments?

With these questions in mind we made a survey of the meter articles that have been published in various radio periodicals and found that there was a dearth of information on meters in general—totally inadequate for the needs of the serviceman working on present-day receivers. We decided to fill those needs and in "The Meter at Work" we are undertaking to give you what you require—to incorporate within the covers of one book all the essential information—technical and practical—that you require now in your daily work and that which you might need in the future.

We used those last few words advisedly. We believe in looking ahead as far as we can. Radio, being in the constant state of change and development that it is, nobody can foretell with any degree of certainty just what will come about tomorrow, but it is safe to say that with television, frequency modulation and other developments in the offing, the serviceman will have to look to other meters to provide him with the information he will need in his work. That is why you will find in "The Meter at Work" instruments explained that might seem foreign in their applications today but tomorrow will more than likely be commonplace.

The date of publication of "The Meter at Work" has not yet been set nor has its number of pages, but one fea-

ture of the book will come as a surprise to everyone. *This will be an innovation in radio publishing* and we feel sure that you will like it and appreciate it more and more every time you open the book. More about "The Meter at Work" in the very near future.

## I.R.E. About Signal Tracing

IN the March, 1940, issue of *The Proceedings of the Institute of Radio Engineers* a comprehensive report entitled "Radio Progress During 1939" was published. Under the sub-head of "Measuring Apparatus and Technique" appeared the following:

"Service equipment, more convenient and reliable to use, was made available employing radio frequencies for receiver testing and checking of components. Several such instruments enable checking of radio-frequency and audio-frequency circuits *by tracing the passage of the signal either through or around each stage thereby greatly assisting in identifying the nature and location of the fault.*" (Italics ours.)

Here is another instance where signal tracing has been recognized as something quite worthwhile and this time by a group of the country's foremost radio engineers who prepared the report for the *Proceedings*. From time to time, book reviews of "Servicing by Signal Tracing" have appeared in technical and popular radio magazines and each and every one have been unsparing in their praise not only of the book, but of the system which it describes.

And final evidence is offered by the fact that already several receiver manufacturers have included signal-tracing data in their servicing bulletins and that in the near future other manufacturers are planning to do the same. Such evidence should be sufficient to convince even the hardest-boiled skeptic. . . . If you have not seen a copy of "Servicing by Signal Tracing," get one the next time you're at your jobber's. . . . Try out the system yourself and see how you can do servicing the easy way. . . .

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# Rolling REPORTER



*Meanderin' thoughts on a super-torrid day. . . .*

"Double, double toil and trouble  
Boil pot and cauldron bubble"

It musta been this kind of a day when W. Shakespeare batted out those lines for the horrid sisters in *Macbeth*. I feel as tho I was parked on a bubblin' cauldron or *mebbe would it be cooler????* And wot do you think oughter be done to a guy who starts out a phone conversation with "Well, is it hot enuf for you?" Me, I think he should be doomed to ride the East Side subway during rush hour for the next few thousand years and have the temperature AND humidity just like it was comin' over from Brooklyn this a.m. . . . Let's see—wot did I have for this here col.????? Oh yeah. I remember . . . **W2XBS**, the NBC television station top-side of the Empire State Bldg., is planning to increase the number of its frame lines from 441 to 507 following the F.C.C.'s suggestion that some more skull work be done before standards are adopted. There's also whispers about vertical polarization instead of horizontal. The Don Lee station, **W6XAO** out Cal. way, is goin' to play around with 525 lines. . . . Here's hopin' things get ironed out **SOON**. . . . Just got news that **WCAU** over in Philly got the green light to build a television station there. They're goin' to play around with 441 to 729 lines—vertical vs. horizontal polarization—and see if FM is better'n AM to get the moosick over. . . . An' speakin' of FM (*as who ain't these days?*) more'n more mfrs. are gettin' set to push out sets that will unravel either FM or AM. . . . *An' an F-M loop already in sets!* Yep, the dope on these and others will be in Vol. XII. . . . An' speakin' of a vol. number, reminds me that our library of radio and other inagazines is gettin' bound and that some back copies are missin'. *Give a gander at the box in this issue and let us know if you got any of those needed.* Look around up in the attic behind Gran'ma's trunk or Uncle Bill's high-wheeler or under that old Infradync and mebbe you'll come across an ancient issue that will fill out a vol. for us. . . . Thanx. . . . By the way, have any of youse guys gotta copy of John Mills' book "Letters of a Radio Engineer to his Son"? And if you have, wouldja like to sell it? Or mebbe we could get together on a little high-class swappin', huh? That goes for the magazines too—we gotta lotta doops if you're wantin' some. . . . Lenuem know about 'em as the Boss gave me the job of gettin' the issues together. . . . We're gonna have *some* library when we get through collectin'. Mebbe we'll take some pix of the offices and lab. and run 'em in here so you can see where Rider books are put together. . . . That reminds me, J.F.R. asked me to say that he has a Skyrider Diversity, Model DD-1, that he'd like to swap for some folding money or a check. . . . It's in A-1 shape

and he'll let it go for a century and a half. F.O.B. Noo Yoick. . . . There's a bargain for somebody!!! I suppose that I should oughter stick sumpin' in here about all the opportunities there are for cashin' in on political speeches—especially for you who have sound trucks or their equivalent—but I won't. . . . Every radio sheet I pick up these days has got that sorta stuff plastered all over it, and you must have gathered in the idea by now. . . . An' while the subject of ideas is round and about, here's sumpin' to paste in yer bonnet. . . . Been readin' about conscription and other Home Defense measures? Didja ever do much thinkin' about the receivers the armed forces use? They're close relatives to the communication jobs sold by quite a few of the mfrs. and if you go thru your Rider Manuals, you'll find several. Wouldn't be a bad idea if you noted some of the features in those jobs and how they are different from those that park on your bench every day and then get yourself some workin' dope. An' don't forget that messages have to be sent out before they're received, so give a thought to X-mitters too. . . . Remember, it's the fellow who knows his stuff that goes places. . . . *An' don't be sayin' that you weren't warned.* . . . An that reminds me of that friend who sent me a box of cacti plants from the Mo-have Desert for my garden. He wrote: "Warning—Open Carefully—Cactus plants inside", as though they would bite. **P.S.**

**They did!!** Them thar desert babies sure are the toughnecks of plant life—I'll back mine against all comers—no holds barred, *if you can get a hold*. . . . Well, they sure are thrivin' in this weather, the which I ain't! Gotta note from **Bert Wehmeyer of Webster Groves, Mo.** answering our request for back issues of "Television". Thanks, Bert, for your offer but we're after the magazine published in London. Thanks to you, **Glen Smith of Watertown, N. Y.** for the nice things you say about our books. Certainly, we are working on some new stuff. You'll be readin' about 'em right soon. . . . **Henry Burwen** up in **Wakefield, Mass.** hands "*Servicing by Signal Tracing*" a whole field of roses when he says it conveys more basic information as to circuits and what happens to radio currents than anything else he has seen. . . . Thank YOU, sir. . . . **James Hill, down in Bahia, Brazil,** wants to know if the Boss would like some Brazilians for his stamp collection. The answer is in the affirmative and, Mr. Hill, if you would like to do some swappin', here I am. . . . How about some U.S. commems???? Well, it's time to blow the whistle—just got to the end of this in time—now I gotta hit the subway for Brooklyn, but believe you me, I *won't* be like old Massa in the song. . . . It's anything but cold down in those traveling Turkish baths. . . . Yours for shorter and cooler heat waves.

THE ROLLING REPORTER



**WHAT HAS  
HE GOT THAT  
I HAVEN'T  
GOT?**

**D**ID you ever stop to wonder how some servicemen get more business and make more money than you? Here, perhaps, is the answer. The most successful men in any business are those who have learned never to pass up anything that will help them to accomplish an important job in less time.

This practice of taking advantage of every aid to better work in less time is often the only thing that stands between success and failure. In the radio service business, the man who uses all the information he can get to make trouble-shooting quicker and surer is the one who forges ahead. He's the man who has always had a complete set of RIDER MANUALS. He knows how foolish it is to depend on his own memory or intuition when complete, authoritative data can be at his fingertips for only 3c a day.

RIDER MANUALS give you, in the most convenient form, complete data on every set you may be called upon to service . . . data on alignment, I-F peaks, operating voltages, gain data, parts lists,

voltage ratings of condensers, wattage rating of resistors, coil resistance data, etc.

If you don't have a complete set of eleven RIDER MANUALS, you are overlooking one of the surest ways of speeding up your trouble-shooting and increasing your profits.

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### VOLUME XI HAS MANY NEW FEATURES

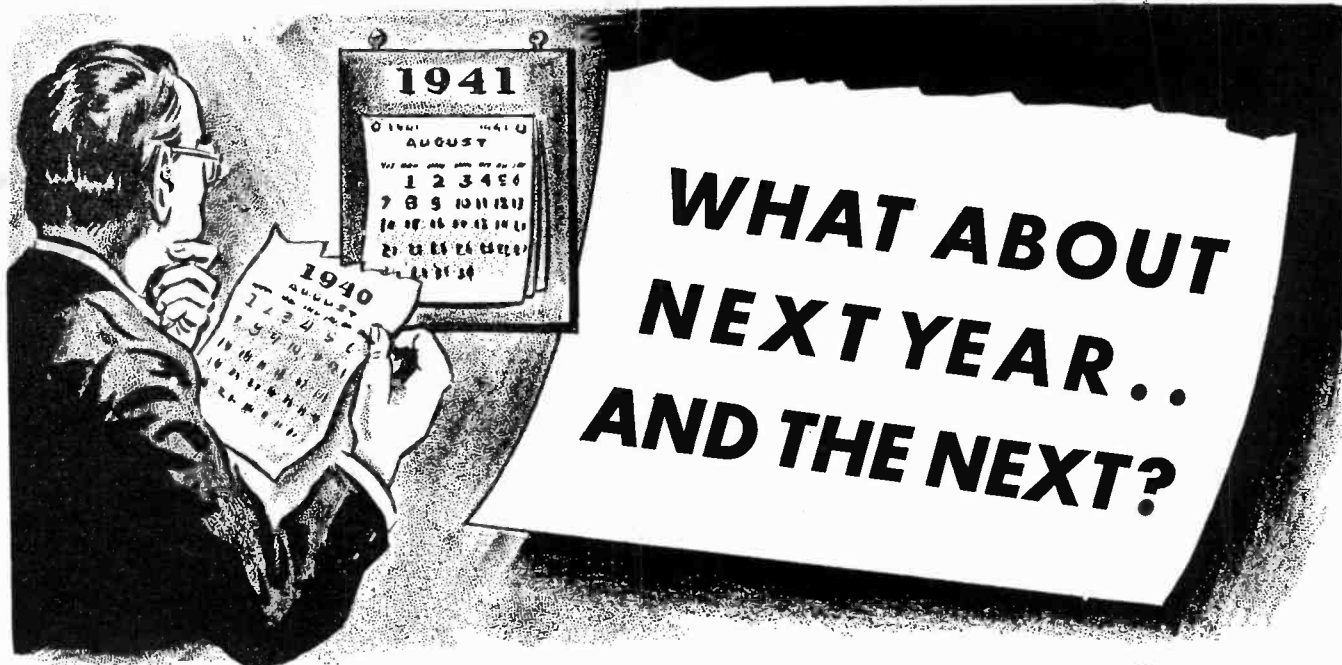
Includes data on FM receivers released up to press time.

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