

## WHAT DOES IT COST TO RENDER SERVICE?

### Part I. You Must Know Your Costs

by John F. Rider

*(Editor's Note: This series of articles is an elaboration upon the series of talks titled "Cost Accounting in the Radio Service Business," which the author has been delivering at various service meetings. The next meeting at which the subject will be discussed will be the Regional Convention of the Cleveland Chapter of the I. R. S. M. at Cleveland on November 4, 1934.)*

WE have made mention of the fact that small business in general is extremely lax in the administration and financial control of the enterprise. In this category, we can place practically every radio service business. Recognizing the marvelous progress made in the radio service profession during the past few years, it would be logical if you asked yourself—why all this agitation about costs? It is true that servicing has advanced in calibre and organization without consideration of the cost problem, but that does not mean that it is correct procedure.

It is vital that you know your costs for the same reason that every successful commercial enterprise considers its cost

records as one of the most vital, if not the most influential file of information determining the conduct of the business. . . . Because your cost determines your profit. These six words encompass a tremendous expanse. The service industry has progressed along educational lines, efficiency of operation and organization effort—but it is dubious if it has progressed along financial lines—at least in step with the other forms of advancements. We grant that the financial status has improved somewhat during the past two years, because of organization and improved economic condition of the nation, but infinitely more is to be gained by proper business administration.

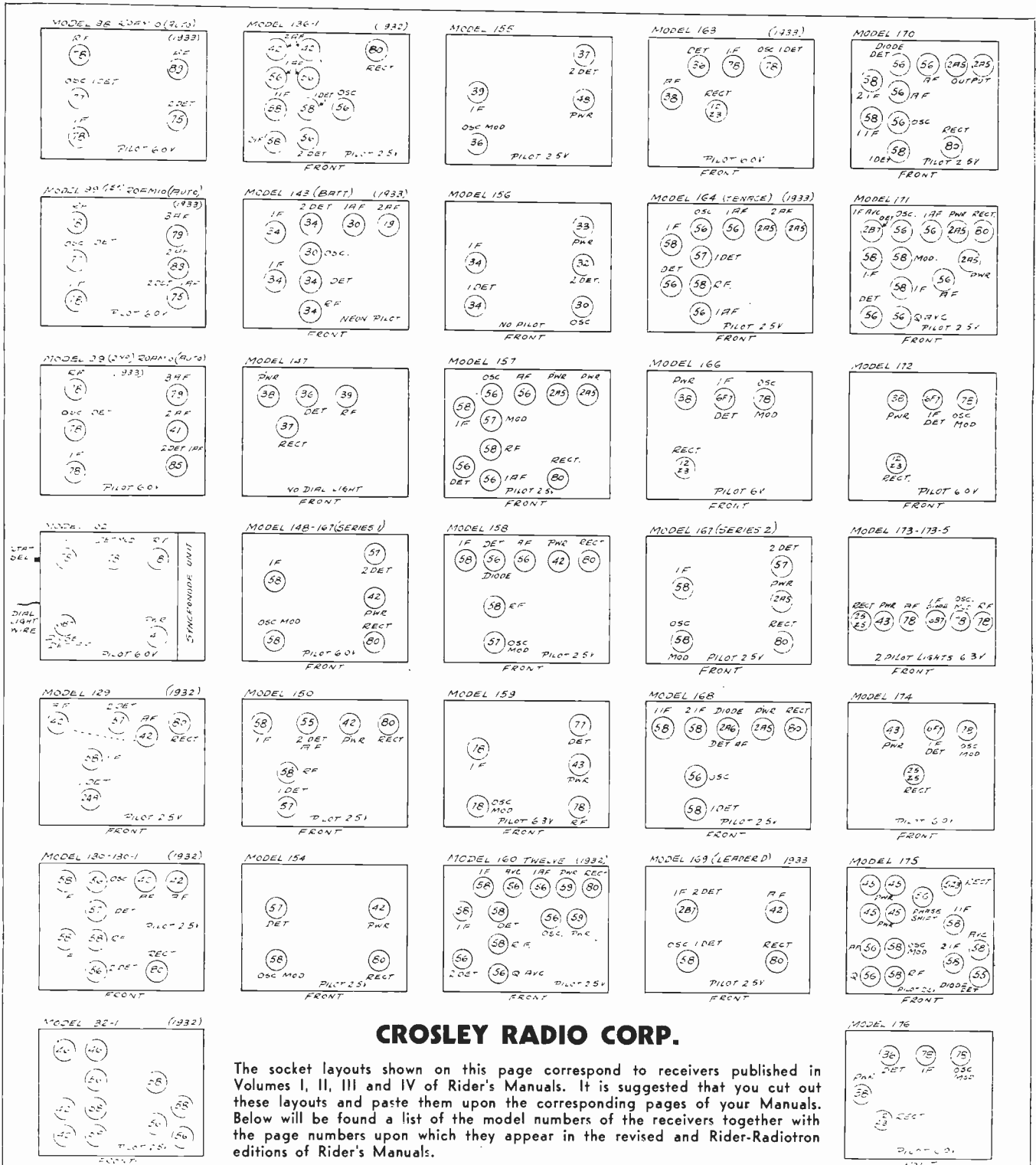
Why should you know your costs? . . . There are numerous reasons. The first is that it is impossible to establish a sales price without knowing the cost price. You as the owner of a service establishment sell your time. . . . But how can you sell your time at the correct figure, if you do not know what your time costs you? . . . How can you establish the proper service charge for the time spent completing a service call, if you do not know how much that time costs you. . . .

How can you tell how much business you must do each week or month if you do not know your costs for that month?

#### Cost of Time

Too many owners of service organizations employing one or more men are prone to believe that the employee's time is worth the salary paid. They forget that if a service man is paid the equivalent of 80 cents per hour for a 40-hour week, his time is worth very much more than 80 cents for each hour. Each hour this man spends working or traveling must be productive of a reasonable amount in excess of 80 cents. The reason for this is that the other costs of the business, for each hour of existence during a working week or month, must be added to that man's time. To fail to consider ALL costs, when tabulating the value of the man's time or, for that matter, your own time, is poor business policy. . . . Such incorrect procedure is still in effect and has been for a long time. Because of such methods, service establishments have been busy for years, yet have shown no advancement in cash

Please turn to page 3



### CROSLY RADIO CORP.

The socket layouts shown on this page correspond to receivers published in Volumes I, II, III and IV of Rider's Manuals. It is suggested that you cut out these layouts and paste them upon the corresponding pages of your Manuals. Below will be found a list of the model numbers of the receivers together with the page numbers upon which they appear in the revised and Rider-Radiotron editions of Rider's Manuals.

Model	Revised Page	Rider-Radiotron Page	Model	Revised Page	Rider-Radiotron Page	Model	Revised Page
98	4-2		148*	3-26	750	166	4-12
99 (1st)	4-3		150	3-27	751	167 (series 2)	4-10
99 (2nd)	4-3		154	3-24	758	168	4-13
102	4-4		155	3-28	752	169	4-14
129	3-13	737	156	3-29	753	170	4-15
130	4-5		157	3-30	754	171	4-16
130-1	4-6		158	3-31	755	172	4-12
132-1	3-15	739	159	4-8		173, 173-5	4-17
136-1	3-20	744	160	3-32	756	174	4-18
143	4-7		163	3-33	757	175	4-19
147	3-25	749	164	4-11		176	4-11

\* Make a notation on page 4-9, that the layout for Model 167, (Series 1) is like that for Model 148.

**Service Cost**

*(Continued from page 1)*

position. The owners have been earning meagre livelihoods and still carried the responsibilities of a business. With the trend in receiver design, a change in financial administration is imperative. This is made necessary by the fact that the time required to service modern receivers is increasing as a result of the more intricate circuits used. . . . There is no doubt about the fact that receivers will be even more complicated—that service routine will become more complex—that more expensive servicing equipment will be necessary. . . . This combination of circumstances makes knowledge of costs essential in order to enable the establishment of profitable service charges.

The one-man service establishment, namely the owner-worker deserves special mention. This is the man who, because he felt responsible to no one but himself, considered it wasted effort to establish costs so as to establish correct sales prices. His time was his own and whatever income was derived from that time was considered sufficient, assuming that it furnished home and sustenance. This is the man who felt that once a test unit was bought and paid for, all further consideration the life of that testing unit was unnecessary. This is the man, who has oftentimes complained about the high cost of testing units and of the necessity of replacing testing units, because new designs were required to cope with the new innovations incorporated in radio receivers.

Proper business administration and correct, profitable service charges, based upon costs, would provide for replacement. It would obviate that distressing moment when the service business owner realizes, after what has appeared to be a satisfactory season, that replacement of equipment, be it testing unit or the automobile, is necessary, but the bank balance is not great enough to allow the purchase.

**Costs Must Be Apportioned**

By properly apportioning the various costs associated with the business, the successful service-station operator provides for all emergencies. He establishes

sales prices or service charges, which will show a profit over and above all expenses, including his salary. He apportions this profit to provide for replacement of equipment. He sets aside a part of the profit to compensate for service calls which cannot be charged for at the usual rate, because it is necessary to spend more than the normal amount of time in analysis. This is quite common. A condition such as an intermittent condenser may require hours to locate and only a few moments to replace. It is illogical to expect to charge for the time required to locate the defect. Then again, an average over a period may show that 90 per cent. of inspection calls, made at a nominal rate, result in service work. It is necessary to set aside a portion of the profit made on these 90 per cent. of the total calls to compensate for the loss involved in the remaining 10 per cent, which are not productive of further service work. (It should be understood that this ratio of productive and non-productive calls is purely illustrative. Some men may experience a greater number of non-productive calls and others may experience less. He who is confronted with a greater number of calls, has so much more reason for administering his business properly, to be certain of staying in business.)

It is necessary that you appreciate that the difference between the basic cost and the gross income from a service call is not net profit. You must set aside a portion of the gross profit to take care of bad debts and dull periods . . . to provide for expansion . . . to replace the original capital . . . to improve the cash position. All of these reserve funds are related to your costs, because by considering these items when establishing

the service charges, you provide for whatever may happen.

**Know Your Costs**

From what has been said so far, you can readily see that knowledge of your costs is paramount. You cannot provide for the maintenance of the various phases of your business unless you are aware of your costs. You cannot plan ahead—project your business effort—an operation which is vital to all business—without knowing what your costs are and from these costs and probable sales, estimate how you will take care of your obligations.

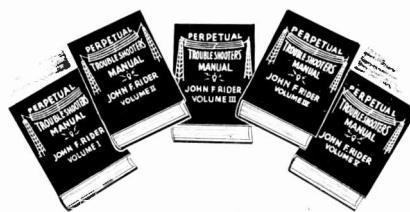
After all is said and done, the commercial world has considered cost accounting a very important branch of commercial control. And only because they considered it important—not because of lack of other items of interest. It is because of the close similarity between everyday commercial organizations and the service industry, that we claim only a distant relationship to the professional man. Call the service man an engineer, a professional or whatever you will—the *service man who runs a business must be a business man*. Naturally, technical ability is essential—but the most perfect service man is unsuited to be in business for himself unless he is a business man as well. There have been many millions of men in business—in many different fields—who were thoroughly versed in their individual arts—yet failed in business because they were not business men—basically, because they did not figure costs. We are, of course, speaking about concerns who did a reasonable amount of business.

We feel that the time is opportune, to say that this series of articles is not being written to advocate special service charges—specific service charges. . . . Neither are we advocating low or high priced inspection calls. . . . What you will charge is up to you. . . . What we do advocate is that you should charge in accordance with your costs, so that you will earn a legitimate profit, which is so vital to the existence of your business.

*You must know your costs!* . . . Without them you are lost. . . . As a small

*Please turn to page 7*

**MORE THAN  
5100 Pages**



### Best Seller

We admit that we will never sell as many copies of Rider's "Servicing Superheterodynes" as were sold of "Anthony Adverse," but we're certain that this book covering the superheterodyne receiver is the fastest selling radio book in many a year. The first printing of 10,000 copies delivered from the printer on August 3, 1934, is exhausted and the second printing is on the presses, to be delivered soon. . . . And it is selling on its merits! . . . Here is an idea of what E. L. Bragdon, Radio Editor of the *N. Y. Sun* said in his book review of September 1, 1934:

" . . . No two sets are alike, although today the difficulties are lessened by the almost universal use of one basic circuit—the superheterodyne. This fact makes Mr. Rider's book of untold value to the man who must analyze radio sets, detect faults and replace with proper parts.

" 'Servicing Superheterodynes' is the most complete volume of its kind which has ever come across this reviewer's desk. . . . Its 270 pages are crammed with detailed data, figures, sketches, and analyses of the different components of the modern set. Automatic volume controls, tone compensating systems and oscillator circuits are a few of the vital units that are discussed at great length by the author. Unlike so many technical writers, Mr. Rider has the ability, backed by an intense desire, to describe his topics technically without at the same time being scientifically vague. . . . Service men who are not always graduate engineers appreciate this gesture.

" . . . Of the many volumes prepared by Mr. Rider, this one on superheterodynes is undoubtedly the finest, the best written and the most useful to the field for which it is written."

### Stewart-Warner 112 Improvements

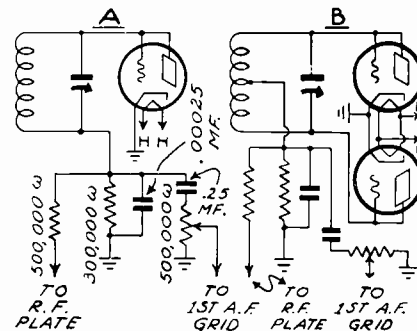
To improve the tone quality and volume in the Stewart-Warner 112 chassis (1121 and 1122), increase the plate voltage applied to the output tube. This is done by disconnecting the B plus (yellow and red lead) side of the output transformer from the screen grid terminal of the output tube and connecting it to the high voltage side of the combi-

nation relay and filter choke. The most convenient point to do this is at the cathode terminal of the rectifier tube. This should raise the plate potential by about 40 volts.

Then change the grid resistor of the 41 tube, from 510,000 ohms to 250,000 ohms. This resistor is enclosed in a piece of large spaghetti and is connected from the grid of the 41 tube to ground.

Then change the tone control condenser, which is connected to the plate of the output tube, from 0.01 mfd (600 volts) to 0.006 mfd (600 volts). This condenser is identified as number 29 on the schematic shown on page 4-7 of Rider's Manual in the Stewart-Warner section.

After these changes, it may be necessary to readjust the spring on the relay. The pull of the springs which tends to keep the contact points closed, should be reduced by slightly stretching the spring so that the relay will now both open and close at the reduced currents.



Two types of 2nd detector circuits used in the Sentinel Model 114.

### Sentinel 114 Variations

The Sentinel model 114 receiver was made with two types of 2nd detector. The early type employed a circuit such as shown above as A. The later type employed a push-pull demodulator circuit and is shown as B. Another tube has been added and the position of the grid return lead has been changed. The remainder of the circuit is unchanged.

### "Servicing Superheterodynes"

by John F. Rider

288 Pages Price \$1.00

### Philco Dial Adjustments

In the new Philco receivers, which have a scale reading up to 1720 on the police-broadcast band, a new method is used for setting the dial in the proper position on the shaft. This requires the use of a flat steel shim, .006" thick, Philco part No. 45-2051. The adjustment is made according to the following directions: With the chassis connected to the power supply and switch turned "on," revolve the dial toward the 170 position, which is the equivalent of 1,700 kc. Insert the shim under the heel of the oscillator section of the tuning condenser, and bring the heel down on the shim. Loosen the set screw in the front hub of the tuning shaft and adjust the dial until the last full length line, past the 170 mark, coincides with the center of the flowing arrow indicator. Tighten the set screw. The dial now is correctly adjusted.

### Philco Model 38 Change

Effective with July 1, 1934, the model 38 receivers, made after that day will use a 20 ohm ballast tube shunt resistor, in place of the 30 ohm unit originally employed in that manner. This receiver is shown on page 4-22 of Rider's Manual.

### Philco 60 Change

Starting with run No. 7, which announcement is dated August 1, 1934, this receiver incorporates an i-f wave trap circuit, in series with the antenna post. Obviously, this wave trap circuit is missing from the diagram of the receiver, shown on page 4-32, which page was printed in March, 1934. Additional changes in this receiver will be found in Rider's Volume V.

### Thank You, Kind Sirs

"Have just read SUCCESSFUL SERVICING and I think it's great."

"I found it very interesting and will appreciate receiving it each month."

"If continued on its present basis, it is going to fill a long felt need in the service shop."

"It is like my Rider Manuals and I wouldn't be without them."

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Published monthly by

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Vol. I October, 1934 No. 2

## Your Distributor

Your distributor depends upon your patronage just as much as you depend upon the customers, whom you have served efficiently and honestly. Before you start shopping around among distributors, in the effort to save a penny here and a penny there, remember that your time is worth money. Do not misunderstand us. We advocate thrift, but sensible thrift—not false economy. Oftentimes, service men go out of their way to spend an extra half hour plus gasoline or carfare, to save 20 cents on a \$6.00 purchase. . . . Is it really worth it? . . . In addition, they change from one distributor to another without rhyme or reason.

Continued patronage builds good will. Maybe you will need that good will in the near future. Continued trade and prompt payment means the establishment of a credit rating. . . . Maybe you will need all the credit you can secure. . . . All of these factors should influence your trading habits. From the viewpoint of the distributor, the success of his business depends upon your patronage. If he treats you fairly and honestly—cooperate with him. . . . Help him build a solid clientele. . . . You as the customer will profit in the long run.

Treat your purchases like business transactions. . . . Don't chisel. . . . Don't quote fictitious competitive prices, in the attempt to reduce the price to you. . . . If the price asked by your distributor is fair and enables you to make an

honest profit—be satisfied. . . . Don't be a profit hog. . . . Live and let live. . . . Help the distributor organization to live and prosper. . . . Don't drive it into the ground. . . . If once you develop the reputation of being a bargainer—you will find that distributors will ask, in anticipation of your bargaining, a higher than normal price. The ultimate sale price will not be a saving for you.

**Do Unto Others As You Would Want Them To Do Unto You.**

*John F. Rider.*

## Bosch 79-C Noise Reduction

This receiver has a bayonet type of connector on the antenna lead, which is attached to the antenna lead of the car. This particular receiver is so wired that an inch or more of the lead-in wire is left unshielded. My idea is to slip a piece of shielding over the down lead in the car. Make the shielding about 5 or 6 inches long and long enough to extend beyond the connector plug. Make the junction and spread the shielding so that it extends beyond the connector plug, actually covering the plug. Make a good ground and bond the shielding to the shielding upon the receiver antenna lead. Ground the other end of the shielding. (Editor's Note—The Bosch 79-C receiver will be shown in Rider's Volume V.) *From H. L. Wilson.*

## What Is It?

Good salesmanship or ambition. A field representative sells an 84-year-old lady, a course in sound engineering!

## Discovered!

Do you remember the service man shown in the last issue, who complained that he had failed to repair three receivers in one week? We now know his identity. He is "Hap Hazard," discovered a few days ago, by Cholly Farrell, radio's most aggressive advertising salesman. Watch future issues of SUCCESSFUL SERVICING for the experiences of Hap Hazard and "Doc" Manual.

## O.P.

If you see the letters O.P. associated with socket layouts, the tube or tubes so indicated, are output tubes.

## Believe It Or Not

Some one called a few days ago and asked which of Rider's Manuals, contained suitable instructions for a person who had taken a few lessons in horse-back riding.

## Did You Know?

Rider's Manuals, Volumes I, II, III and IV list about 4,300 models of radio receivers, power amplifiers and associated equipment. This number is about 1,500 more than are to be found in any other group of four service manuals offered to the service industry. . . .

That is one reason why we claim that Rider's Manuals afford the greatest coverage of the radio receiver industry.

## What Is Water?

H<sub>2</sub>O, say you. . . . Well, according to Robert E. Wilson, Director of Research of the Standard Oil Company of Indiana, pure water actually contains about one part in five thousand of a heavy variety of water, the properties of which are quite different, due to the presence in its molecules of a newly discovered kind of hydrogen atom, twice as heavy as ordinary hydrogen. This heavy water freezes at 39 degrees F. . . . instead of 32 degrees F. . . . Maybe heavy water is what causes the "burp."

## Majestic 400 Series

Later production of this receiver, the original being shown upon page 3-42 of Rider's Manual, Volume III, and upon page 1234 of the Rider-Radiotron "Complete" Manual, contains an additional condenser. This unit of 0.10 mfd. is connected across the power supply circuit on the rectifier side of the power supply switch. These chassis (400) are used in the models 411 and 413.

## Electric Autolite

The chassis model 072-A, shown on page 4-2 in Rider's Manual, Volume IV, is also known as the 3722-A. The model 062-A shown on page 4-1 in the same volume, is also known as the 3622-A.

### I-F Peaks

We suggest that you make note of the i-f peaks given in the accompanying table upon the correct pages in the Rider Manuals. These peak frequencies were not available when the schematic wiring diagrams were first published and we trust that you were not greatly inconvenienced. We are constantly on the search for additional data and hope that this form of presentation is satisfactory to you. Thanks for your patience and co-operation.

Concerning the page numbers given in the table, the first number under the heading "Other Rider Manual Page," denotes the Volume number. The second figure or figures following the dash, indicate the page number in that manufacturer's section. For example, page 4-2 under the DeWald heading, means page 2 in Volume IV under the DeWald heading.

Model	I-F Peak	Radiotron Cunningham Complete	Other Rider Manual Page
<b>Audiola Radio Corp.</b>			
23-S-8	177.5	342	3-2
23-S-8Q	177.5	343	3-3
23-S-10	177.5	344	3-4
<b>Crosley Radio Corp.</b>			
121-A	175	724	2-8
121-B	175	724	2-8
167	456		4-9
164	181.5		4-11
176	456		4-11
<b>DeWald Radio (Pierce-Airo)</b>			
50	175	787	4-2
51	175	787	3-12
52	175		4-3
55	456	789	
55-R	456		7-7
56	455		1-1
80	456		4-5
100	456		4-14
BAG	175	791	4-15
KAF	175	793	3-9
<b>Halsion Radio</b>			
20-B	456		4-1
NS-50	456		4-3
Roadmaster	456		4-5
<b>Freed Telev. &amp; Radio</b>			
FE-98	175	1028	3-10
354	456		4-3
<b>Howard Radio</b>			
EX	140	1324	3-2
35-A (AVO)	175	1335	3-11

### Atwater-Kent

At the time we published Volume IV, some of the A-K data arrived at the very last minute. Rather than leave it out of the manual, we published the schematics and voltage data. Socket layouts and other pertinent service infor-

mation will appear in Rider's Volume V. This material covers models 165-Q, 525-Q, 217, 427, 667, 217-D, 247-D, 667-D, 275, 310, 510, 425, 665, 711 and 808-A. Of course, all A-K data released since March, 1934, will also be in Volume V.

### Stewart-Warner R-117 (1171)

An occasional customer may complain that the intensity of illumination of the dial light interferes with night driving. To remedy such complaints S-W suggests that the 15 ohm pilot light resistor, No. 51, on the temporary 1171 circuit (to be shown in Rider's Volume V) be removed and a 35 ohm resistor, be substituted in its place. The factory makes the suggestion that this resistor be ordered from them and credit will be

## WANTED

John F. Rider, Publisher, will pay \$1.00 per chassis model to anyone who will send in service data on sets manufactured by the following companies:

**Calvert Motors Associates, Baltimore, Md.**

**Peter Pan, Los Angeles.**

**Capitol Radio Corp., Chicago.**

**Golden Bear, Los Angeles.**

**El Rey Radio Mfg. Co., Los Angeles.**

**Karadio Corp., Minneapolis.**

We will purchase only *original* schematic diagrams, voltage tables, condenser adjustment data, etc., as supplied by the manufacturer. Copies will not be accepted. If more than one person sends in data for the same receiver, the first one to be received at the publisher's office will be accepted.

Your cooperation will be appreciated—thanks.

issued on return of the resistor which was removed.

### There'll Be No Charge

Don't hit him. He meant well. . . . Furthermore, we're glad to note such sincere interest. Mr. Fredrick R. Vogt of the Bronx, N. Y., says, ". . . kindly continue sending SUCCESSFUL SERVICING and if there is any subscription fee connected with same, let me know, as I can't see any reason for your sending it gratis. You know, mail isn't delivered gratis."

*Thanks, F. R. V., but there will be no charge. We want you to have the information we are gathering so that your Rider Manuals will be even more valuable to you. This is the best way we know to supply you with additional data for your manuals. As far as "S. S." is concerned, we are going to make each issue better than the one previous—at least we'll try . . . the greater the co-operation between us, the greater the success we'll attain, so we want you to think of "S. S." as your paper as well as ours.*

### Sentinel Models 620 and 630 Chassis

Sentinel models 622 and 623 employ the 620 chassis. Models 634 and 635 employ the 630 chassis. Mark this information upon the correct pages in Rider's Manuals so that you will be able to identify the receivers according to chassis and cabinet models.

### Tricky and How!

When you get your Rider Volume V, examine the circuit of the RCA Duo 381, which is also the G.E. M-129 receiver. Pay particular attention to the change in the AVC controlled tubes in accordance with the tuning range being used. When operating upon certain wavebands, some of the tubes receive AVC. When operating upon other wavebands, other tubes receive AVC. The entire description as furnished by the manufacturer is printed in Volume V. It's extremely interesting and vital to understand.

**Service Cost**

(Continued from page 3)

business man you are very apt to overlook the many leaks in your business—the many vulnerable points in your business. . . . Only when it is too late will you awaken to the fact that you can no longer carry on. Then it is too late. Now is the time to make the change—while you are still a going concern—as small or large as you may be.

We trust that the reasons given why you should know your costs will have created sufficient interest so that you will await the next article in November SUCCESSFUL SERVICING. We shall consider the subject "What Is Cost."



**Sentinel 590 Also 599**

The Sentinel model 599 receiver, shown on pages 4-6 and 4-7 in Rider's Manual, Volume IV, employs the 590 chassis. Make this notation upon the proper pages and you might also make the notation in the index which accompanies that manual.



**10 Miles Per Page**

It's a Friday morning just before dawn—that period of the night when the pulse is at an ebb—when every minute seems an hour.—The container of hot coffee has turned cold and the leakage through the soggy cardboard has moistened the table top. There is only one desire—to recline and shut one's eyes for just a moment—a moment which is a night. . . . But the job's done!

Volume V is finished. The last page has been checked and okayed for delivery to the printer at 9 in the morning—five hours hence. . . . By this time, most of Rider's Volume V has been printed. If the fates are kind to us and protect us against adversity, finished volumes will be in the hands of our distributors on November 20th.

For a while there will be a lapse of correspondence—but not for long. Now that Volume V is done, it is time to start on Volume VI to be published sometime in the fall of 1935. . . . In the meantime—there is some rest. . . . 12,000 miles have been covered among manufacturers and set jobbers securing service data. . . . East, North, South and West—wherever service data was available. Letters written in connection with commercial receiver service data during 1934 total many thousands. . . . Almost one thousand telegraphic communications have been forwarded in connection with Rider's Volume V. . . . Strange as it may seem, most of the correspondence concerned service data other than the actual schematic. . . . Very special effort was made to secure i-f peak data, socket layouts, voltage data, trimmer data. . . . In fact, we believe that we have hit almost 100 per cent, as far as i-f peaks are concerned and that is a new record. Volume IV attained about 86 per cent. As far as the field is concerned, Rider's Volume V sets another new record by including the products of more than 100 manufacturers, many of which have never before appeared in print and constitute those names which are difficult

to locate and whose diagrams are quite elusive.

We have tried hard to present the complete alignment picture. What with 16, 18, 20 and even 25 tube receivers on the market, with almost as many trimmers, alignment data is vital. . . . This we realize and you will find more alignment data than ever before. . . . Whatever data the receiver manufacturer supplied, you will find published. No skimping of pages—no deletion of information—everything is there—1,200 pages of it.

We're proud of Rider's Volume V. . . . Added to the other Rider Manuals, this means that the Perpetual Trouble Shooter's Manual series, now totals more than 5,000 pages.

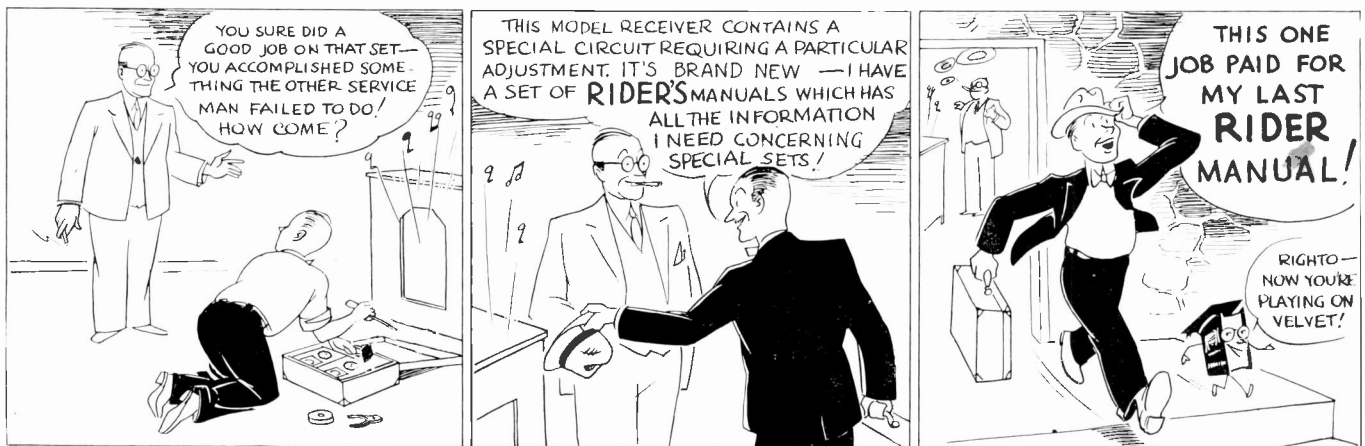
## Notice

Drop us a line if you are interested in receiving "Successful Servicing." "Successful Servicing" is mailed FREE each month.

**Stewart-Warner R-116**

The schematic is shown on page 4-10 and 4-11 in Rider's Volume IV. If the trouble appears to be a short in the high-voltage circuit, examine the lead connecting the 2A5 plate with the tone control. This wire frequently shorts to the chassis. *From H. L. Wilson.*

**EFFICIENT JOE!**



# VOLUME V

## Rider's Manuals

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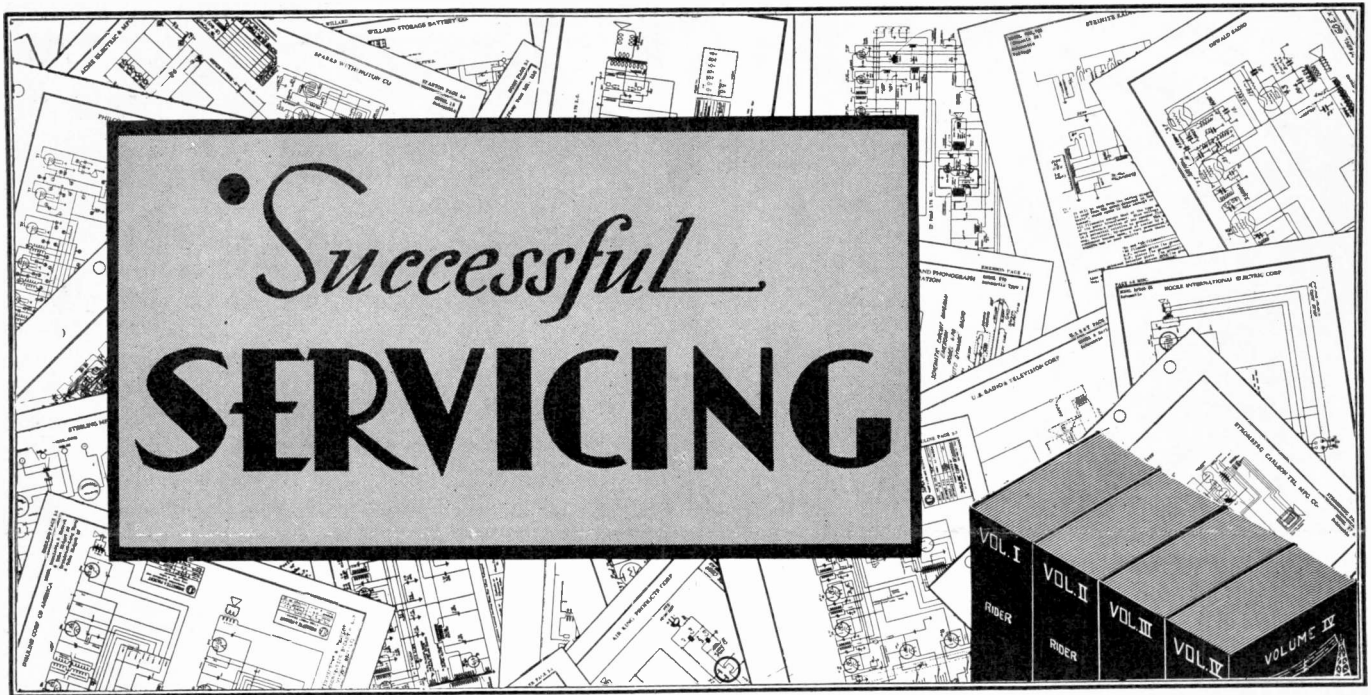
Volume IV. . . . . 1060 pages. . . . . \$7.50  
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Servicing Superheterodynes. . . . . \$1.00



**JOHN F. RIDER, PUBLISHER** 1440 BROADWAY  
NEW YORK, N. Y.







## WHAT DOES IT COST TO RENDER SERVICE?

### Part 2. What Is Cost?

by John F. Rider

*(Editor's Note:—This series of articles is an elaboration upon the series of talks titled "Cost Accounting in the Radio Service Industry" which the author has been delivering at various service meetings. The following schedule covers such talks during November and December: November 20th, in Scranton, Pa.; on November 26th at Pittsburgh, Pa.; on December 3rd at Bridgeport, Conn.; on December 17th at Youngstown, Ohio, and on December 18th at Binghamton, N. Y.)*

WHAT is cost? . . . Basically, cost is the price you pay for what you acquire. On this basis, everything which you have to sell has some original cost valuation, because that which you have to sell was acquired at one time or other. It may appear as if your time does not come under this category—yet it most certainly does. This is so because your time is valued as time without regard of the fact that you are owner as well as worker. That which you are selling is the time of the worker and the value of that time is calculated at the price which would have to be paid, if some-

one were hired to do the work which you are doing. Consequently, your time has a cost value and as such has a sales value.

The modern day service establishment trades essentially in the sale of time and knowledge. In this industry, time and knowledge must be considered as synonymous, for it is the knowledge which permits the sale of the time, so that a separate valuation of cost cannot be applied against knowledge. In other words, it is not possible in the administration of the service establishment to set up a cost for the time and another cost representing the valuation of the knowledge possessed. It is possible, however, as a result of superior workmanship, which is the dividend of knowledge, to seek suitable compensation by valuing the time at more than the normal figure.

We stated that the service establishment sells time primarily. The determination of the cost of this time is a very interesting subject. We have made the statement that ever so many service-station operators confuse the actual valuation of this time with the salary paid the

hired technician or the salary they allot themselves, as owner-worker. It is imperative that the station operator realize that the total cost of each hour of time is not just the dollar and cents value of the salary paid each hour. The salary paid *is but a part* of the actual cost of the time sold. The cost of the time you sell is the salary paid, *plus all* of the expenses incurred in the administration of the business. That this be realized is of utmost importance.

#### Items Constituting Cost

At this stage you may wonder about the items which constitute cost. Allow us to present these items for your consideration. Check through these lists and note if you have recognized the existence of all of them in your own business. It is possible that you may have considered items which we have omitted. If so, we certainly desire hearing about them. This list is offered as food for thought. It is our intention in the concluding installment of this series, which will appear in the December issue, to show how cost figures are determined. Consider the following:

Associated with the shop, you have certain basic and fixed costs, which occur each week or month, irrespective of the amount of business you do. Good business—bad business—rain or shine—these costs exist.

- |              |                                   |
|--------------|-----------------------------------|
| 1. Salary    | 7. Testing equipment depreciation |
| 2. Rent      | 8. Servicing data                 |
| 3. Light     | 9. Radio library                  |
| 4. Telephone | 10. Stationery                    |
| 5. Fixtures  | 11. Incidentals*                  |
| 6. Insurance | 12. Taxes                         |

\* Incidentals would cover minor expenditures, such as association dues, etc.

We want to call to your attention that the cost of the stock purchased for resale is not included. This subject, while not classed as being of great earning power, will receive attention later. However, let it be understood that the 40 per cent discount normally extended to service establishments is not all profit. This will be shown.

Associated with the service car, if one is owned, are the following costs:

- |                 |  |
|-----------------|--|
| 1. Depreciation | 6. Insurance                           |
| 2. Garage       | 7. License fee                         |
| 3. Gas-Oil      | 8. Service equipment depreciation (?)* |
| 4. Tires        |  |
| 5. Repairs      |  |

\* Equipment for outside work is a debatable point.

Associated with the effort to do business, that is, sales effort, are the following items:

- |                   |                  |
|-------------------|------------------|
| 1. Circulars      | 6. Stamps        |
| 2. Stickers       | 7. Display cards |
| 3. Novelties (?)* | 8. Free calls    |
| 4. Advertising    | 9. Commissions   |
| 5. Telephone      | 10. Leaders      |

\* Novelties in display or give-aways, if used.

Associated with labor are items which tend to increase costs, because certain time spent during working hours is non-productive. These are:

- |                               |   |
|-------------------------------|---|
| 1. Lost motion                | 6. Calls not completed because customer is absent |
| 2. Waste of time              |   |
| 3. Repeat calls (free)        | 7. Nature of defect very hard to analyse          |
| 4. Inspection at a loss       |   |
| 5. Incorrect routing of calls |   |

Finally, associated with the administrative effort, are the following items:

- |   |  |
|---|--|
| 1. Credit losses  | 5. Reserve fund for replacement of car |
| 2. Commissions  | 6. Replacement of capital—reserve      |
| 3. Reserve fund for replacement of equipment            | 7. Profit                              |
| 4. Time spent for bookkeeping, recording, billing, etc. | 8. Bank charges (?)*                   |
|   | 9. Interest on loans (?)**             |
|   | 10. Repayment of loan (?)              |

\* If the account is not of sufficient proportion.  
\*\* If money has been borrowed.

Perhaps it might be well to say a few words about some of the items listed in connection with administrative efforts. Naturally, credit losses will be kept to a minimum, but at the same time, the service organization doing work for dealers will be confronted with this problem. To anticipate such losses is at all times better than to regret them. Consequently, it is a wise move to allow for the possibility of such losses.

Concerning commissions, many service station operators have made contact with building superintendents in the effort to get business by means of leads furnished by these men. It is quite the rule to pay commissions. These commissions represent an additional cost item. Concerning the reserve fund for the replacement of testing and mobile equipment, these references are self-explanatory. As to the time spent in bookkeeping, billing, etc., it is necessary to realize that this work is not productive in actual income for the amount of labor entailed. Consequently, the cost of this time must be added as if it were non-productive time similar to the non-productive items listed in connection with labor. Bank charges and interest on loans are also items which must be appreciated and included if they exist.

It is possible that the business was founded on borrowed capital, upon which interest must be paid. It matters not if this borrowed money was secured from someone in the family. Interest must still be paid. This item of interest is additional cost.

Concerning item 10 under administrative effort, very many men who have founded their business upon borrowed capital and which capital was secured on a basis which does not have a definite time limit, are prone to overlook the fact that it is most advantageous to repay this loan at the earliest possible moment, or at least in a definite manner. Such money, while it must come from profits, represents additional cost of operation. Accordingly, it must be included in cost considerations.

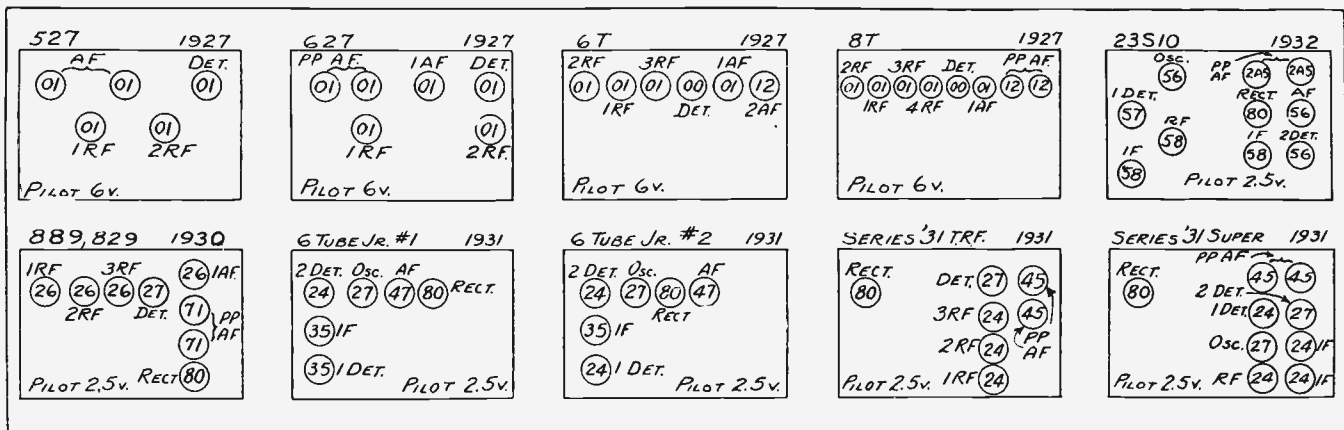
With these items as a background, we will devote the final installment to the determination of the various costs under different conditions.

(Concluded in next issue)

### Audiola Socket Layouts

Below will be found a list of the pages in Rider's Manuals on which the schematic diagrams corresponding to the socket layouts in the accompanying illustration will be found. It is suggested that these layouts be cut out and pasted on the pages noted below.

Model	Revised Page	Early Page	Radiotron Complete Page
527	1-1	*115	325
627	1-1	*115	325
6-T	1-2	*116	326
8-T	1-2	*116	326
23-S-10	3-4		344
889-829	1-10	*119	328
6 Tube Jr. No. 1	2-6	120-A-2	334
6 Tube Jr. No. 2	2-6	120-A-2	334
Series '31 T.R.F.	1-5	*120	329
Series '31 Super	1-6	*120-A	330



## Majestic Reactance Resonance Indicator

SEVERAL models of the Majestic receivers (Grigsby-Grunow) made use of a variable reactance type of resonance indicator. These receivers used the models 300, 320, 340 and 360 chassis. The principle of operation involves the control of the brilliancy of the tuning light indicator by a variation of the reactance of a transformer winding by the plate current limiting action of the AVC voltage.

A general idea of the system can be had by reference to the illustration. The transformer is of the shell type. The middle winding is so connected into the receiver circuit that during the no-signal state, the maximum amount of plate current flows through it. This current is sufficiently great to saturate the core, so that the reactance of the other two windings is very low and the current flow through the tuning light indicator circuit is maximum and the light glows with greatest intensity. The original voltage for the tuning light is secured from one winding of the power transformer used in the receiver.

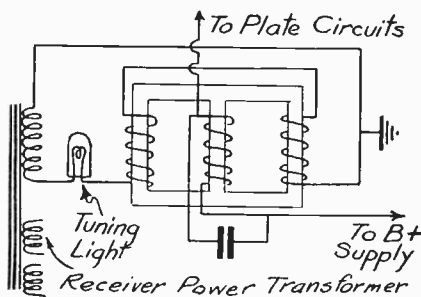
Now, when a signal is fed into the receiver, the AVC action starts and it functions by increasing the negative control grid bias upon several tubes, the plate current flowing through the middle winding of the resonance indicating transformer is reduced. This relieves the state of core saturation and the reactance of the other two windings increases. The greater the signal strength and AVC action, the greater the reduction of the plate current and the higher the reactance of the two outside windings. Since these windings are connected in series with the tuning light, the greater the reactance, the less the current flow in that circuit and the brilliancy of the tuning light diminishes. At maximum resonance, the flow of the tuning light is minimum.

By suitable balance of the two outside windings and their electrical connection in such manner that the fields buck, there is no AC voltage induced in the middle winding, as a result of the presence of the other two windings and their connection to an AC source. To eliminate further any AC in the middle winding, an electrolytic condenser of

suitable capacity is connected across this winding.

### Possible Troubles and Causes

As is to be expected troubles will develop in all systems. Hence it might be of interest to consider possible troubles and causes in this system. In this connection it is essential to remember that the reactance resonance indicator is independent of the actual AVC circuit components, so that proper operation of the AVC circuit is possible during the period that the tuning indicator system is faulty in operation. On the other hand if the AVC system within the receiver is imperfect, the resonance tuning indicator will not operate. With this in mind, let us proceed.



Circuit diagram of reactance resonance indicator used in Majestic receivers.

If the tuning light does not dim, although the receiver performs normally in all other respects, check for a short circuit across the condenser which shunts the middle winding. Also for a short circuit across the terminals of the middle winding or a short in the same winding; also for a short between one side of the tuning light and ground or between the outer windings and ground, bearing in mind that one terminal of one of these outside windings connects to ground. Also for a short across one of the outside windings or a grounded circuit.

If the tuning light does not glow at all, at any time, check for an open circuit in the various windings located in the system or for an open filament. Also for a possible short across the power

transformer winding which feeds the tuning light.

Excessive hum due to some defect in the resonance indicator circuit, may be due to an open bypass condenser across the middle winding. A connection between one of the resonance indicator transformer windings and the core. Incorrect polarity connection between the two outside windings. A short between some of the turns in one of the outside windings.

We wish to remind you that the faults presented are related only to the resonance indicating circuit and assume perfect operation on the part of the balance of the receiver.

### Here Is Proof!

We said that Rider's Manuals are the "standard" in the radio service industry. We claim that this position is more firmly established today than ever before.

There are no service manuals which are the equal of Rider's Manuals in coverage of receiver models, number of manufacturers, number of pages of service data of profitable value to the service man and accuracy of information.

These points are proved by the fact that the following tube manufacturers, who constitute the world's leaders, use or have used Rider's Manuals in their tube deals with the service industry. These manufacturers are:

- National Union Radio Corp.
- E. T. Cunningham, Inc.
- RCA Radiotron
- Raytheon Products Corp.
- Arcturus Radio Corp.
- Hygrade Sylvania

A situation without precedent. No doubt you realize that if suitable competitive manuals were available, at least one of these companies would have made use of these manuals. Realizing that the service industry desired the most complete coverage of radio receivers, these manufacturers, after investigation, found that only one set of manuals, namely, Rider's Manuals, provided such coverage.

You Can't Go Wrong With a Rider Manual!

**Silvertone 1806, 1823, 1829**

Failure of the tuning meter to change its reading as a station is tuned in, together with failure of the AVC may be due to the following cause:

The lock washer under the screws that mount the No. 3 and No. 4 band short-wave coils to their trimmers may short to the stator plate of these trimmers. Although the likelihood is less, it is also possible for the lock washer to short to the movable plate of the trimmer, in which case the receiver will not operate.

If the tuning meter fails to function properly in these models (except 1806 which has no meter) or if the AVC fails to operate, examine the mounting of these coils to their condensers under the chassis. The trouble can be eliminated by loosening the screw, pushing the lock washer away from the condenser and then tightening the screw while holding the lock washer in this position. Service data covering these receivers appears on pages 5-35 and 5-36 in the Sears-Roebuck section in Rider's Volume V.

**Philco Model 45 Change**

Effective as of November 1, 1934, the cathode resistor of the 6A7 Detector-Oscillator tube will be restored to its original value of 25,000 ohms (part No. 4516) instead of 51,000 ohms (part No. 4578). This cancels a change dated October 15, 1934. The schematic diagram is shown on page 5-26 of Rider's Manual.

Starting with Run No. 15 the 0.1-mf. condenser (No. 41) will be changed from part No. 30-4170 (tubular) to part No. 3615 BM (bakelite block type).

**Philco Model 66 Change**

Effective as of November 1, 1934, the 0.1 mf. tubular condenser (No. 27 in schematic diagram on page 5-32 of Rider's Manual) will be replaced by a bakelite block type, part No. 3615 BM, which is a twin 0.05 mf.

**The NEW Rider Volume V**

We are gazing upon the first copy of Rider's Volume V. It is in full view as we write these lines. It arrived at the editor's desk about an hour ago. In all sincerity, we admit a thrill. Being so closely associated with the actual makeup and production of the manual, we did not fully realize the expansiveness of the volume. We were so close that we could not see.

But now that it is finished—the completed book has been placed before us. . . . Now we see all that we did not see before. The legibility of the pages was only a hope before, now it is an accomplishment. Frankly we were worried about how some of the strip-in pages would reproduce. These are the pages where two, three and four normal sized illustrations and compilations of text are crowded on to one page. Such strip-ins are quite numerous. They have enabled us to cram about 1,500 pages into 1,200 and to keep the physical dimensions of Volume V in conformity with the preceding volumes and to keep the price at previous levels, although the strip-in operations involve additional costs. These strip-in pages are perfectly legible and contain a tremendous amount of data.

**Only by looking through this volume can you appreciate the great coverage of the receiver industry. As the pages unfold you note the names of manufacturers never before in print of this kind—the numerous models included—the extensive presentation of various kinds of information which service men have asked for. . . . Truly, it is the greatest Rider Manual ever published. . . . We know you'll agree with us.**

**Weston 664**

A change was made in the value of the fixed resistor used in the variable lead of the 4,000-ohm rheostat. See Weston, page 4-1 in Rider's Volume IV. Subsequent to March 30, 1933, the 1,500-ohm unit was changed to 800 ohms.

**Chevrolet 364,441**

We had been advised from fairly reliable sources that this receiver was similar to the 2035 United Motors. However, several men who have had the occasion to work upon this job say that such is not the case. Information received from United Motors states that this receiver employs the same number of tubes as the 2035 and the 4036 and that the circuit is practically the same. However, the tube layout of the 364,441 and the 2035 and 4036 are different.

**Garage Door Opener**

A new way of opening garage doors without stirring from the driver's seat has been demonstrated out in Ohio. A poised compass needle that is housed in a non-magnetic box is buried in the driveway. The steel mass of the car deflects the needle and the swing of which interrupts a light beam on a photoelectric cell, which through relays, opens the doors.—*Electronics*.

**Sparton 80, 83, 84, 85-X, 86-X**

In some of the early receivers of this model, the resistor R-13, designated as 5,000 ohms, was 3,000 ohms. If this resistor burns out, check the condenser C-8, located in the plate-voltage supply lead to the r-f. tube. The early production used a 200-volt, .2-mfd. unit for C-8. If replacement is necessary, replace with a 600-volt unit. This receiver is shown on page Sparton 5-15 in Rider's Volume V.

**Sparton 16-AW, 26-AW, 60, 28**

The intermediate frequency of the converter used in these receivers is 900 kc. This data is omitted from the schematic shown on pages 2-10, 2-11 and 2-16 in the Sparton section in Rider's Volume II. The same frequency applies to the model 60 converter shown on page 2259 of the Rider-Radiotron Combination, page 2-39 in the revised Rider II, and on page 568-X-8 of the early Rider II. The model 28 employs 172.5 kc.

# Successful SERVICING

**Dedicated to financial and technical advancement of the radio service man.**

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Vol. I November, 1934 No. 3

## ARE YOU THANKFUL?

Along in this season of the year when chilly dawns reveal frost on the pumpkins and Nature has discarded her brilliant wardrobe, our thoughts turned to those things for which those of us in the radio servicing industry should give thanks. Perhaps some of you read that last sentence with raised eyebrows, questioning the truth of the statement that there is anything to be thankful for, but we believe that there is.

Within the last two or three years technical information has been made available for the radio serviceman that has enabled him to do his job thoroughly and so has established him in a business that is recognized and respected in the community. Of course, it is through the cooperation of the manufacturers of radio receivers that such distribution of information is possible and this cooperation is increasing all the time. Not only the manufacturers of receivers, but the general public as well have come to recognize the importance of the radio serviceman and his part in the scheme of things. Should you not be thankful for those things?

Then consider this phase of the relations between the manufacturer and the serviceman: In past days the serviceman was a repair man in the eyes of the manufacturer, while now he is considered a salesman for the products of the manufacturer. We know of many, many cases where servicemen's

advice has been requested as to what make of new set should be purchased or where the serviceman by a few words let fall where they did the most good, has directly influenced a person to buy a certain receiver. These facts are recognized by the manufacturer and, as a consequence, the serviceman has assumed a new standing—that of a real salesman.

Now look within the servicemen's ranks. During the last two or three years an effort has been made to organize servicemen into a group that will cooperate in many ways. We need not mention the enormous benefits that will be the result of this organization and because of this cooperation the work and life of the serviceman will be made easier and fuller. We think these are things to be thankful for.

In closing, may we add a word of personal thanks? We are grateful to our many friends among the manufacturers who have cooperated with us in the past and to the many thousands of servicemen who have found our publications of use in their daily work.

John F. Rider.

## Walk in Your Sleep?

Prevention of sleep-walkers from injuring themselves has been developed through the use of a photoelectric cell and attendant apparatus. One or more beams of dim blue or red light are directed across the bed from special lamps like small searchlights. These beams converge on one or more light-sensitive cells, which emit a current as long as the light is uninterrupted. If the sleeper's body crosses one of the beams, the failure of the photoelectric cell's output operates a relay, which in turn sets off an alarm, thus waking the person.—*Electronics*.

(EDITOR'S NOTE: Think I'll rig up one for the baby when she gets uncovered.)

Knowledge is proud that he has learned so much;  
Wisdom is humble that he knows no more.

—Cowper.

## Did You Know That

The first balloon ascension was made by *Montgolfier* of France in 1783. This balloon was filled with hot air secured from a burning brazier, which was kept in operation during the flight.

*Leonardo de Vinci*, the most versatile man the world ever knew, who lived in the fifteenth century, left plans of a flying machine which he conceived. Incidentally Leonardo was also a painter, philosopher, astronomer, mathematician and was accomplished in so many other arts and sciences that a list would take this entire paragraph.

*Gutenberg* set up the first printing press which used movable type in Mainz, Germany, in 1450. Prior to then, type printing was done from wooden blocks. These blocks were engraved with the matter to be printed. The earliest wood cut known in Europe is dated 1423.

The earliest newspaper which was known by name is the German *Frankfurter Zeitung*, founded in 1615 and the first newspaper in the United States was known as *Publick Occurrences*, introduced in Boston during the year 1690.

## The Adventures of HAP HAZARD



### Short Wave Police Reception Prohibited

It has come to our attention that the reception of police broadcasts on auto radio receivers is prohibited in certain states. However, we do not know just what states have such regulations. Since SUCCESSFUL SERVICING circulates in the entire 48 states of the Union, we feel that some of the readers of these pages will be able to supply us with specific information. Please drop us a postcard, if you are located in one of the states where short-wave police broadcast reception is prohibited.

Such information is of interest in as much as it may be necessary, if already not actually a practice, for receiver manufacturers to design receivers in such manner that the short-wave band can be made inoperative by the dealers who sell the receivers. Since it is against the law to listen in, it may be necessary for service men who work upon these receivers to make certain that the band is inoperative, otherwise they may become involved. In this connection we seek information.

*Your co-operation in securing this data will be greatly appreciated.*

### Howard Model Corrections

The index to Rider's Volume IV mentions receivers X-2, X-3, and X-8 as being upon pages 4-5 and 4-5. These model numbers should be X-2, X-8 and Y-3. Please make these changes. All pertain to the same chassis.

### 92.1% Complete

With 100 per cent as the maximum, spelling perfection, 92.1 per cent is a pretty high figure to reach. This is the percentage of superheterodyne receivers shown in Rider's Volume V, which also bear the i-f peak specification. The difference of 7.9 per cent represents receivers for which it was impossible to secure the i-f peak specifications. We assure you that we tried. . . . Being so close to perfection in this connection, we did strive to convert the touchdown for a goal.

### The Acorn in Receivers

The acorn 955 tube has been spoken about as being ideally suited for use as an oscillator in transmitters. What about this tube used in receivers—yes—present-day receivers? It is not a far-fetched idea that the future receiver will contain a number of such tubes actually soldered into place. As an oscillator, it would be ideally suited to today's receiver needs.

### Midwest 16 Tube 1935 Receiver

The schematic of this receiver is shown in Rider's Volume V, page 5-1 in the Midwest Radio section. From information received, this receiver bears the model numbers J-16, L-16, M-16, S-16 and EP-16. It might be well if you marked these model numbers upon the index to this manual. This data was received subsequent to the printing of the manual index.

### NOTICE

Every owner of Rider's Manuals should be receiving SUCCESSFUL SERVICING, so that he can keep these important servicing tools up to the minute. There are other servicemen who have not yet bought Rider's Manuals and who would like to be abreast of the times. Inquire among your friends to see if they receive SUCCESSFUL SERVICING. Tell them to let us know about sending it to them. Remember, it costs them nothing and we will be only too glad to see that it is mailed to them monthly. Thanks for your cooperation.

### "Servicing Superheterodynes"

Rider's new, revised edition of "Servicing Superheterodynes" is an entirely rewritten book and is the best-selling radio book available. Out of the 288 pages contained in the volume about 58 pages are devoted to practical trouble shooting data and to the application of test oscillators to the superheterodyne receiver. No other volume covers superheterodyne receivers as thoroughly and in as practical a fashion as Rider's "Servicing Superheterodynes," which sells for \$1.00 postpaid.



### Right Back at 'Em

A serviceman just finished a tough repair job about 11:15 p.m. and the owner of the set asked him to turn it on full, so he could tell how the volume was.

"But look at the time," said the serviceman. "Isn't it too late to disturb your neighbors?"

"Never mind the neighbors," answered the owner. "They poisoned our dog yesterday."

*Women are said to have cleaner minds than men, because they change them so often.*

*Wife (looking at new dress in box): George, my heart just isn't in this gown. The Poor Goof: Migosh! Can you wear it as low as that?*

### After the Opera

*First Gallery God: How did you like her Salome?*

*Second Ditto: Why, she fairly outstripped herself.*

*Hizzoner: You heard the witness say that you and your wife had words?*

*Prisoner: Well, yer honor, I had some, but didn't get a chance to use them.*

### Give the Engineer a Hand

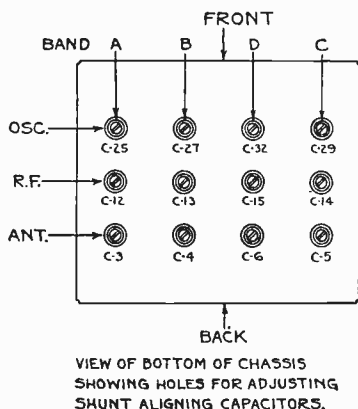
The engineer in the locomotive shown is up against a tough problem. The freight car A should be where car B is, and vice versa. The bridge over which the siding runs is too weak to support the weight of the locomotive, but it will carry the cars. The bridge is equal in length to a freight



car. The siding is on flat ground, so the cars can not be given a shove and run along—they have to be pulled or pushed. The engineer wants to do as little shifting as he can, so he can get home and make the first show at the movies. How many moves will it take to get the cars' positions reversed with the engine back where it is now?

**Stromberg-Carlson 68, 68-X**

Since Volume V of Rider's Manual has gone to press, we have learned of the production of what is known as the Stromberg-Carlson 68-X. Basically, this receiver is the same as the model 68, which is shown in Rider's Volume V, pages 5-5 to 5-10, inclusive. However, the X models, which can be identified by an "X" following the serial number, incorporate certain changes. First, the secondary winding of the oscillator band A transformer contains a .00045-mfd. fixed condenser in shunt with the series trimmer, or in shunt with C-26.



Second, a 10,000-ohm fixed resistor is inserted into the common lead joining the band B and band C secondary windings in the r-f. tube grid circuit. Third, a fixed condenser has been added between the common lead connecting the band A and band B secondaries of the r-f. input transformer, and ground. Fourth, the fixed condenser C-24, located between the common lead joining all of the oscillator primary windings and ground has been changed from .1 mfd. to .05 mfd. The location of the twelve shunt aligning condensers is shown in the accompanying illustration. The numbers correspond to the designating numbers shown upon the schematic and selector chassis wiring.

**Brunswick 14 and 21**

Data concerning these two models is shown in Rider's Volume III on pages 3-9 and 3-10. Add this data to your index, because these two items have been omitted from the Volumes III, IV and V index.

**Philco Model 38, Code 123 Changes**

In Run No. 7 a 0.1 mf. condenser (part No. 30-4122) was connected between the plus terminal of the 30 tube (1st A-F.) socket and ground. In Run No. 8 and thereafter, this becomes a 0.25 mf. tubular condenser (part No. 30-4146). This condenser acts as a by-pass and prevents oscillation. The schematic diagram of Model 38 will be found on page 4-22 of Rider's Manual.

**Philco Model 29 Changes**

Starting with Run No. 13, the 400-ohm resistor in the cathode circuit of the 6A7 tube (see Philco page 5-14 in Rider's Manual) will be changed to 200 ohms, part No. 7217.

Starting with Run No. 14 the 0.25-mf. condenser (No. 40) will be changed from part No. 30-4134 (tubular) to part No. 30-4258 (metal case type). This will be mounted on top of the chassis and has a larger safety factor than the other one used.

**How Do You Feel About It?**

We have been requested to enclose with a mailing of **SUCCESSFUL SERVICING** a description of a new product of a manufacturer. The Editor hesitated before answering, because he wished to find out how **You** would feel about it. This description would not be any sort of a catalogue, but a general technical description of some manufacturer's new product that would be of interest to you. Only one would be sent with a single mailing and such an enclosure would not necessarily be included every month . . . perhaps every other month or only three or four times annually. Frankly, we do not know.

However, we *do* want to ascertain what you think of the idea. Will you be kind enough to drop the Editor a postal saying whether or not you favor the plan and your reasons. We are letting you decide, because **SUCCESSFUL SERVICING** is your paper.

**Fordson Voltage Data**

We want to call to your attention that the Fordson schematics contained in Volume V of Rider's Manuals also carry the voltage data, marked adjacent to the tube elements.

**We mention this fact because the index does not state this information.**

**Cost Accounting**

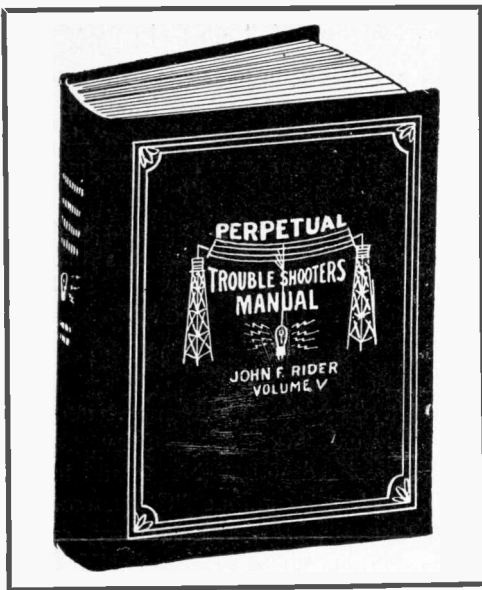
" . . . Would appreciate receiving your "SUCCESSFUL SERVICING." Just received Vol. 1, No. 2, and like it. Be sure to continue "Cost Accounting in the Radio Service Industry," and don't bother about reasons **WHY** we should know our costs but concentrate on **HOW** to estimate them. . . ."—K. Cutler, Myrtle Point, Oregon.

*A man after our own heart. However, cost accounting is a new thought in radio servicing. To make the industry realize its value, it is necessary to show **WHY** definite attention must be paid the subject. Be patient and we'll soon be through with the **WHY** and we promise you to concentrate on the **HOW**. . . . In the meantime, thanks for your comments. We trust you will think as favorably of future issues.*

**We Start a Lab.**

About the time that this issue reaches you, we will have our laboratory under way. This laboratory will be the source of technical information pertaining to service work, which will be released during the year 1935 and thereafter. It is our intention to dedicate this "Lab" to the technical advancement of the service industry. A great deal of our attention during the months to come will be focused upon the cathode ray tube as a serviceman's tool. In addition, we intend to investigate various modes of attacking the problem of servicing and hope to arrive at some conclusions which will benefit the industry.

Our findings concerning the application of the cathode ray tube, will be presented in a series of articles, the first of which will appear in the December issue of **SUCCESSFUL SERVICING**. The results of other investigations will likewise appear in our house organ.



# Rider's Manual Volume V IS READY!

## JUST AN IDEA

of how extensively Volume V covers the field. This is a partial list of the manufacturers in Volume V.

Name	Quantity of Models	Name	Quantity of Models
Acratest	9	Insuline	6
Air King	5	International	19
Allied	21	Kingston	10
Ansley	5	Lafayette	26
Atwater-Kent	36	Lang	5
Audiola	11	Larkin	3
Autocrat	6	Lewol	5
Balkeit	7	Mission Bell	6
Belmont	16	Montgomery Ward	13
Colonial	16	Noblitt-Sparks	11
Crosley	25	Philco	19
Detrola	7	Pilot	10
DeWald	24	RCA-Victor	63
Echophone	6	Radolek	13
Edison-Bell	7	R. K. Labs.	4
Erla	12	Sears Roebuck	56
Elec. Spec. Export	5	Sentinel	26
Emerson	13	Spartan	16
Empire	8	Stewart Warner	38
Fairbanks-Morse	22	Supreme Inst.	9
Federated Purchaser	27	Tatro	5
Ford Motor	4	T.C.A.	12
Fordson	7	Bosch	19
General Electric	40	Webster	8
Grunow	19	Wells Gardner	12
Gilfillan	13	Westinghouse	11
Halson	6	Wilcox Gay	13
Horn	5	Weston Inst.	20
Hudson Ross	5	Wurlitzer	8
		Zenith	21

**N**EVER before in the history of Radio has such a stupendous compilation of technical servicing material been collected between two covers. ❑ No details were too minute—nothing was deemed too trivial to be omitted if the information would aid in any way whatsoever a Serviceman in doing his job. ❑ No expense was spared in making Rider's Volume V all-embracing in its scope and coverage. ❑ All the essential servicing details of over 940 models are presented in a way that demands superlatives in its description. ❑ Receivers of 1935 have complications galore incorporated—not only in their circuits but in the mechanical features as well and, because of that, it is absolutely necessary to have every bit of available information at your finger tips when you need it. ❑ Never before has any single manual been presented to the radio servicing fraternity that contained 1200 pages and that covered the products of 112 manufacturers. ❑ These facts mean something when you are in the market for a manual. ❑ Don't take our word for anything—step into your dealer's today and prove to yourself that Rider's Volume V is without doubt the servicing sensation of the year—better than any other manual—THE ABSOLUTE PEER.

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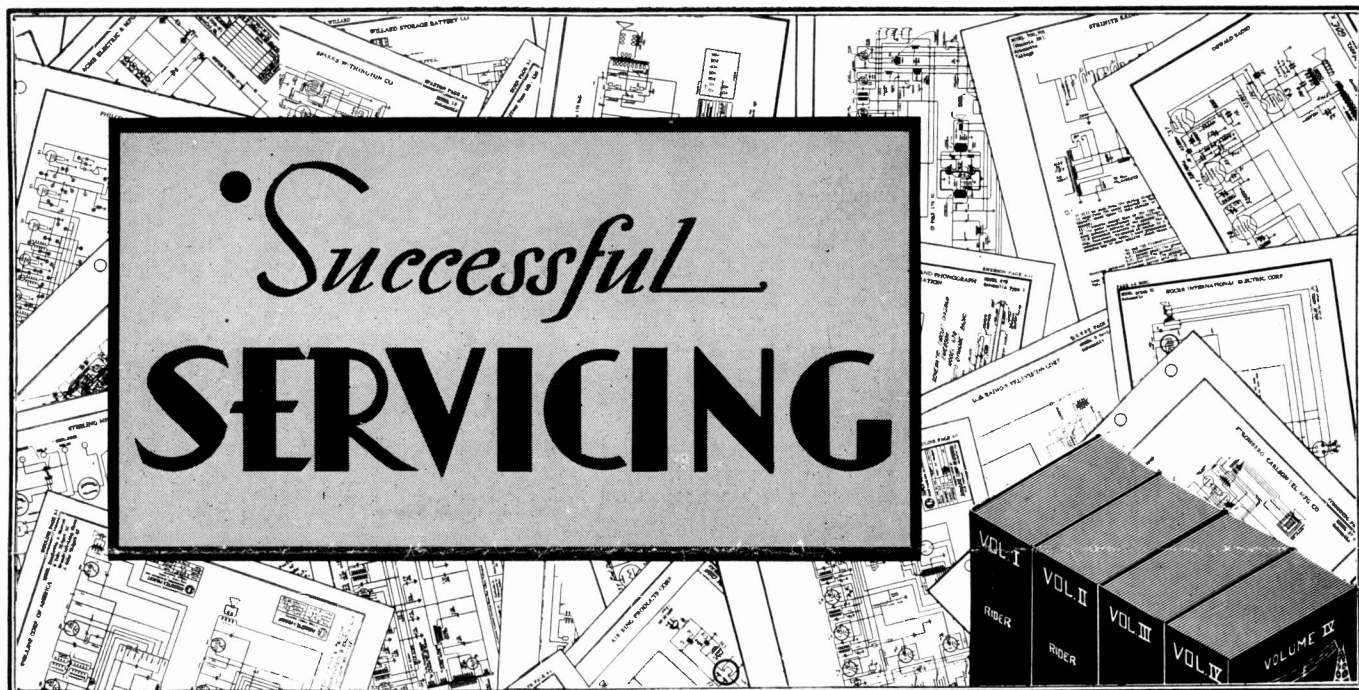
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NEW YORK, N. Y.







## WHAT DOES IT COST TO RENDER SERVICE?

### Part 3, Determining Operating Costs

by John F. Rider

**H**OW do we determine the total cost of running a service business so as to learn cost or expense figures required to establish sales quotas, profitable service charges, etc.?

The first step is to determine just how much money is being spent for the various items which involve operating expense. Men in business can determine what they are spending, if they have kept a record of their expenditures on the stubs of checks, etc. It is possible to have such records, but still fail to correlate the figures and establish operating costs. We classified the various forms of expense which constitute the total operating cost, in the preceding installment. Let us now combine these items so that we have the fewest number of tabulations, yet have a full picture of what must receive attention.

The dollar values which we shall quote actually represent average amounts of expenditure, as stated by operating service organizations located in different parts of the country. The man first starting in the service business can use these dollar items as a guide to show what expenses he can expect to have over a period of a year. The man in business can use these lists as the guide in establishing the expenses he must

determine. Both classifications of men can use the summation, relating to total operating costs and cost per hour, to determine what their service charges must be in order that they earn suitable profits. The figures to be quoted are based upon service organizations doing an average minimum business of about \$5,000.00 per year. (We published similar figures in other publications. If you see any of the other articles and note changes in the amount of expenditure, please note that these differences are occasioned by further investigation and the development of the figures quoted in SUCCESSFUL SERVICING. For example, we ascertained that those men who carry the required amount of car insurance expend about \$60.00 per year, rather than the \$30.00 per year as originally quoted.)

#### Fixed Expenses

Although numerous items of the classified list (given in November issue of SUCCESSFUL SERVICING) are grouped, we still classify the expenditure of money in three ways. One is as a "fixed" or "recurrent" expense. By this is meant the amount of money which must be spent each month, irrespective of the amount of business done. Expressed differently, the recurrent expenses are

the expenses of known amount, repetitive each week or month, and necessary in order to keep the business in running shape. These items do not influence sales, but they enable occupancy of the space, keep the lights burning and power available, keep the car running and equipment in operating shape, provide the salary, or wages, each week, etc.

#### Fixed or Recurrent Expenses

Item	Expense	
	Per Month	Per Year
Shop Insurance .....	\$ 1.00	12.00
Car Insurance .....	5.00	60.00
Rent .....	22.50	270.00
Light, Heat, Power .....	4.00	48.00
Garage .....	6.00	72.00
Dues .....	1.00	12.00
Subscriptions .....	.50	6.00
Service Data .....	.75	9.00
Depreciation on car .....	10.50	126.00
Depreciation on tools.....	1.50	18.00
Depreciation on Testing Units.....	5.00	60.00
Depreciation on Tubes for Test.....	1.00	12.00
Salary or Wages.....	125.00	1,500.00
Telephone (shop use).....	3.00	36.00
Car License .....	1.00	12.00
Interest on investment.....	3.75	45.00

Total Fixed Expenses.....\$193.50 \$2,322.00

It might be well to state that in connection with depreciation, the life of the car is classed as 5 years, the life of the testing units and tools is 3 years and the life of the tubes used for testing is 1 year. Furthermore, with the exception of tubes, the scrap or trade-in value of these devices at the end of their useful

life is 10 percent of the original cost. The original cost of the car is figured at \$700.00 and for testing units it is \$200.00 and for tools is \$60.00. The interest on the investment is figured at 3% and the capital invested is figured at \$1,500.00.

We want to stress that these are average figures for going concerns. Check your expenditures for the various items noted. The depreciation listed is the amount of money set aside for replacement of the equipment after it has completed its normal span of useful operating life. Depreciation is figured by deducting the scrap or trade-in value of the device from its original cost and by dividing the remainder by the number of estimated years of useful life, to determine the depreciation per year and by twelve times the number of years, to determine the depreciation per month. Thus, the car has a scrap or trade-in value of \$70.00. The depreciation over the five year period is \$630.00, which amounts to \$126.00 per year and \$10.50 per month.

You may have to renovate depreciation figures according to the equipment you have on hand, the amount of life already used, the cost, etc. Your check book, or whatever financial records you keep, should furnish you with the amount of money you spent in connection with the other items.

Without being able to help it, a certain amount of the funds listed here as being fixed expenses are related to replacement parts sold during the performance of service work. Now, in order not to confuse service costs and expenses with replacement parts' costs and expenses and in order to have a better picture of what is taking place, we must deduct from the \$2,322.00, representing fixed costs for a year, about \$49.00 as being fixed costs related to replacement parts. Just what these costs are will be shown later in connection with replacement parts items. You will be able to arrive at these figures just as we have, if you have your total fixed expense figures and allow about 10 percent of total expenses for replacement part expenses. By doing this you do not tax service work with money which really should be derived from replacement part sale profits.

Deducting \$49.00 from the \$2,322.00 total, we have left, \$2,271.00 as the fixed expense per year.

### Variable Expenses

The second of the expense classification is known as "variable" expense and signifies expenditures of varying character, which are related to the sale of service time or to the effort to do business—to develop the income—to get the money from the customers—to circularize and make the existence of the business known to the public in general to get sales. Variable expenses, as the term denotes, are not of fixed amount, but it is still possible to approximate what they are on a monthly basis, by dividing the yearly outlay, by twelve. The man already in business can get his figures by checking his check book stubs, providing that he has classified his expenses. The man who has no such records can use the following figures, which, as has been stated, are average figures for concerns doing a gross business of about \$5,000.00 per year, consisting of \$3,000.00 received for the sale of service time and labor

and about \$2,000.00 income from the sale of replacement parts.

### Variable Expenses

Item	Expense Per Month	Expense Per Year
Circulars, Stickers .....	\$ 3.00	\$ 36.00
Advertising .....	5.00	60.00
Display Signs .....	1.50	18.00
Postage .....	4.00	48.00
Telephone (Sales) .....	1.00	12.00
Repair on Car .....	2.00	24.00
Repair of equipment.....	2.00	24.00
Tires .....	2.00	24.00
Gas and oil .....	16.00	192.00
General shop supplies.....	2.00	24.00
Credit losses .....	2.50	30.00
Miscellaneous Office Expense..	1.67	20.00
	\$42.67	\$512.00

Of this \$512.00 about \$56.00 is set aside as being expenses related to the sale of replacement parts, as against the balance of the expenses, which are associated with the sale of service time and labor. Thus, for example, we would say that about 10 percent of the repairs on the car are chargeable to replacement part sales, because the car is used to travel to jobbers to purchase replacement parts. The same applies to gas and oil, credit losses, office expense, postage, telephone, etc. Thus the net amount of variable expense, chargeable to service time and labor income, is \$456.00 per year.

The net total of fixed and variable expense therefore is \$2,271.00 plus \$456.00, aggregating \$2,727.00 for the year. This is the amount of money paid out with respect to the time sold or labor sold, which, of course, includes traveling time, productive time, non-productive time, etc. Knowing the expense, let us now check the time available in which to derive the income from the sale of the time so as to determine the cost of each hour sold. Having the total expense does not give us the cost per hour, unless we know the number of productive hours available.

Bills and expenses accrue on a basis of 365 days in the year, but service operations are not carried on over a like period. There are 365 days in the year, but there are also 52 or 53 Sundays and about 12 national, legal holidays and about 48 state legal holidays. The state holidays we do not count. The Sundays and national holidays aggregate 65 days, so that we have available 300 working days. Now, if members of the service industry are to live like human beings, a 48-hour week is sufficient and we predicate this entire series upon an 8-hour day. Time for rest, leisure, study and entertainment is as vital to the welfare of the radio serviceman as to any other worker. Particularly the time required for study. If study time is not available, how is one to keep up to date with respect to technical developments and changes? This all means that there are available 2,400 working hours per year.

However, the serviceman, like every other individual, does not spend a full 8 hours per day in productive effort. Time is lost because customers are not home, because repeat calls must be made, because there may not be sufficient business during the slack summer months, because time off is required to smoke a cigarette, because one job may take longer than normal to diagnose, because data is not available, because tools are not handy, because time is lost on free inspection calls, etc. All in all, a safe estimate of the amount

of non-productive time is fully 30 percent of the total hours available. This means that of the basic 2400 hours available, earning ability is limited to 1680 hours. These 1680 hours must earn sufficient return to pay the expenses accruing as a result of the existence of the business during the 365 days of the year.

### Basic Cost of Operation

With what figures have been determined, we can ascertain the basic cost of operation per hour productive effort. We know that the available productive hours are 1680. The yearly cost of keeping the establishment open without any sales is \$2,271.00, which means that the basic cost per hour is \$1.35. If we now consider the cost per year, inclusive of expenses related to doing business, that is, sale of service time, the total cost is \$2,727.00 or \$1.62 per hour. Here you have definite cost figures covering the service man's time. Some of you, who may have expenses such as named herein and who are not charging rates as high as these costs, wonder why you are still in business. One reason is that you are using up the sinking fund, which should have been set aside for the replacement of the car, equipment, and tools. You are spending the sum which should be set aside as interest on the investment. You do not carry car insurance. You can stay in business for a while, but eventually you will find yourself against the wall—no more money with which to carry on and no money for replacement of defective or obsolete equipment.

It is possible that your costs are not as high as those shown here. . . . Be they what they may—*know them* and see to it that the charges you make are not less than the actual cost of your time. . . . Maybe you are under the impression that your profits on replacement parts compensate for loss accrued in the service end. Let us see.

### Replacement Parts Costs and Profits

The example being considered assumes \$2,000.00 sales per year. This is quite in line with a large number of estimates of the total volume of business done by the service technicians of the United States. The discount to service men is 40%, so that the cost of this merchandise is \$1,200.00. This means a gross profit of \$800.00. However, do we really earn this profit? . . . No, not by a long shot. Here is why!

It is estimated that the service-station operator spends about 150 hours of his time per year going to jobbers to secure replacement parts, speaking to jobber's salesmen who call on him, discussing replacement parts prices with customers, etc. This is about 30 minutes per day in a 300-day year. The cost of this time at \$1.62 per hour is about \$243.00. It should be known that this time is not considered in the 30 percent non-productive time, previously mentioned. It cannot be classed as such, because it is related directly to replacement parts and if it were charged up to service time, it would increase the service costs unjustly. In addition to the time lost, we have fixed and variable expenses related to replacement parts, such as equipment purchased to house these parts and which equipment will have to be replaced; rent,

(Continued on page 4)

**Auto Radio Data**

We are indebted to Mr. Walter E. Peek, of the Engineering Department of Noblitt-Sparks Industries for the following suggestion concerning auto radio noises:

"For the majority of automobile receivers there is supplied equipment consisting of a generator condenser and an ammeter condenser. The ammeter condenser is intended to filter out the noises which occur at the terminal of the ammeter to prevent them from radiating underneath the edge of the panel.

However, the dome light wire running from the ammeter over to the door post of the automobile many times picks up considerable interference. This can be eliminated by connecting the condenser, supplied for the ammeter, to the dome-light wiring as close to the point of entry to the door post as possible, grounding the opposite end to the instrument panel.

This does not in any way lessen the ability of the condenser to filter out the noises which are occurring in the primary portion of the circuit, and serves to block thoroughly any noise going up this door post except in a few extreme cases where it is sometimes also necessary to add a choke in series with the line."

Our suggestion in this case is that more perfect attention be paid to suggested methods of eliminating auto radio noise.

**Incidentally, we would like to hear from men who have wound filter chokes for use in dome-light wiring and other associated electrical circuits in connection with auto radio noise**

elimination procedure. . . . How many turns? . . . What size wire? . . . What size winding form did you find most successful?

**Philco 200, 200-X Addition**

An 8,000-ohm resistor (No. 33-3016) gray-black-red has been added across the 2,000-ohm section of resistor No. 24. This schematic is shown on page Philco 5-45 in Rider's Volume V. The section of the resistor referred to is the variable resistor in the cathode circuit of the 1st detector-oscillator tube.

**NOTICE**

Every owner of Rider's Manuals should be receiving **SUCCESSFUL SERVICING**, so that he can keep these important servicing tools up to the minute. There are other servicemen who have not yet bought Rider's Manuals and who would like to be abreast of the times. Inquire among your friends to see if they receive **SUCCESSFUL SERVICING**. Tell them to let us know about sending it to them. Remember, it costs them nothing and we will be only too glad to see that it is mailed to them monthly. Thanks for your cooperation.

**Superheterodyne Schematics**

If you are interested in the servicing of superheterodyne receivers only, and desire schematics of these receivers, the Rider Manuals you require are Volumes III, IV and V. These three manuals contain more superheterodyne circuits of commercial receivers than all other similar manuals offered by other organizations.

**Arvin Car Radio Notes**

In certain localities where satisfactory day-time reception is difficult to obtain, it is sometimes desirable to remove the silent tuning or inter-channel noise suppression feature from models 15, 25, 35 and 45.

When working on the model 15, locate resistor R-10, a 150,000-ohm unit. Disconnect the end of this resistor that is fastened to the chassis ground and re-connect this same lead to the cathode of the 6B7 tube. Diagram on page 5-3, Noblitt-Sparks.

On the model 25, locate the muter resistor R-7, R-8, R-9, R-10. Disconnect this resistor from the chassis and re-connect this same end to the cathode of the 6B7 tube. Diagram on page 5-6 Noblitt-Sparks in Volume V.

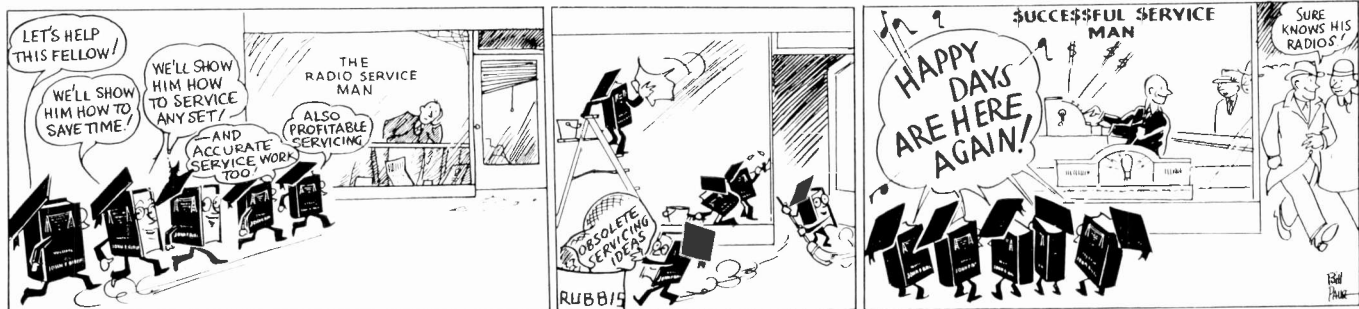
When working on model 35, page 5-11 and 5-12 in Rider's Manual, locate resistor R-8 of 500,000 ohms. Disconnect this resistor from the chassis ground and re-connect this end of the resistor to the cathode of the 6B7 tube.

When working on model 45, shown on pages 5-15 and 5-16 in Rider's Manual, locate resistor R-9, 250,000 ohms. Disconnect the end of this resistor from the chassis ground and connect this same end of the resistor to the cathode of the first type 75 tube.

**Crosley 705**

The original schematic of this receiver contained a short circuit which we did not detect when the plates were made for printing. The short is located across the input to the two filter chokes. See revised page 1-13, early page \*229, and page 691 in the Rider-Radiotron Combination Manual.

**The QUINTUPLETS Go To Work!**



## DETERMINING OPERATING COSTS

(Continued from page 2)

because a portion of the space in the shop is used for replacement parts; postage required to order these parts; stationery, etc. These expenses, chargeable directly against replacement parts, total about \$348.00 per year. This reduces the gross profit of \$800.00 to a net profit of \$452.00.

If you recall, we said that the total revenue from the sale of service time was \$3,000.00 and from the sale of replacement parts, \$2,000.00. The expenses chargeable against the sale of service time was \$2,727.00, so that the profit from this branch of the business is

\$3,000.00  
2,727.00

\$273.00

and the profit on the sale of replacement parts is

\$2,000.00  
1,548.00\*

\$452.00

\* This sum includes the cost and expenses.

thus making the total net profit for the year \$725.00, which is the equivalent of about \$15.00 per week over and above the weekly wage or draw.

Whether or not you consider this net profit satisfactory is up to you. However, you can very readily see that if this operator was working the number of hours herein stated, his service charge was slightly below \$2.00 per hour. Further, that if he was predicating his service charge upon working 2400 hours

### Here's an Ideal

J. R. Quinlivan, Jr., of Mobile, Alabama, writes as follows: "The writer wishes to express his appreciation for 'Successful Servicing,' and looks forward to receiving this interesting little publication regularly. As a suggestion, what do you think of conducting a question and answer department in S. S.? Such a department would prove of value to servicemen and would save individual correspondence."

(Thanks much. We hope that you'll continue expressing such sentiments. As to the Q & A column, we've been thinking about such a column. However, we want the readers to answer the questions, so that practical data is always included. In other words, one service technician answers the other. Some such column will be inaugurated in the near future. . . . What's your reaction to our idea?)

per year, his basic fee would have to be \$1.00 per hour and he would have to work 2400 hours; which really means more than 3000 hours, because those items, which constitute the 30 percent non-productive hours exist, whether you like it or not.

Here are figures showing costs. You can readily see that you cannot determine what your service charge should be without knowing what it costs you to sell that hour or two of time to a customer. . . . You can readily see that you cannot establish a profitable service charge unless you know your costs. . . . You can readily see how you can operate for a period of time, although you charge losing prices—but it will eventually catch up with you. You can readily see that the profits from the sale of replacement parts are not as great as one is led to believe. As a general rule, the 40 percent gross profit on replacement parts sales shrinks to about 20 to 22 percent. . . . All of this you will learn if you know your costs. . . . *Know your costs if you mean to stay in business. Only by knowing your operating costs, can you establish profitable operation.*

### WE APOLOGIZE

It was with deep regret that we were forced by illness to break our engagements to speak before the servicemen of Youngstown and Binghamton on December 17th and 18th. We trust that the servicemen of these cities will accept our apology and we hope to meet them sometime in the future.  
*John F. Rider.*

### Rider Combination Manuals

We introduced the Rider "Combination 3 in 1" manual several months ago. This manual contained Volumes I, II and III of Rider's Manuals. We are in a position to supply such combination manuals consisting of any grouping. We solicit inquiries from our distributors and our service technician customers.

### RCA R-28

The i-f peak indicated on the schematic diagram of the RCA R-28 on page 3-4 of Rider's Manual and on page 1,822 of the combination Rider-Radio-tron-Cunningham should be 175 kc. instead of 40 kc. If you will examine the remaining pages relating to this receiver, you will note the reference to 175 kc. as the i-f peak.

### Slippage in Planetary Drive (Sparton)

In case any planetary drives, such as are used on the Sparton models 65, 67, 83, 104, etc., are found to slip, the condition may be remedied by pinching, very carefully, the lugs which hold the planetary drive assembly together. Extreme care must be exercised when doing this. Use a small pair of pliers and do not pinch the lugs too much as the planetary drive action will then be too rough.

## WANTED

John F. Rider, Publisher, will pay \$1.00 per chassis model to anyone who will send in service data on sets manufactured by the following companies:

Universal Auto Radio,  
Chicago.

Peter Pan, Los Angeles

Capitol Radio Corp., Chi-  
cago.

Golden Bear, Los Angeles

El Rey Radio Mfg. Co.,  
Los Angeles.

Karadio Corp., Minne-  
apolis.

We will purchase only *original* schematic diagrams, voltage tables, condenser adjustment data, etc., as supplied by the manufacturer. Copies will not be accepted. If more than one person sends in data for the same receiver, the first one to be received at the publisher's office will be accepted.

Your cooperation will be appreciated—thanks.

### "Servicing Superheterodynes"

by John F. Rider

288 Pages

Price \$1.00

# Successful SERVICING

**Dedicated to financial and technical advancement of the radio service man.**

Published monthly by

**John F. Rider, Publisher  
1440 Broadway New York City**

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

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**Vol. I December, 1934 No. 4**

## Servicemen and Manufacturers

Some time ago we attended an anniversary banquet of radio servicemen at which time, a visiting serviceman was called upon to make an address. This man arose and after making several interesting remarks, his zeal carried him beyond his domain and he made the statement that servicemen should be independent of receiver manufacturers so that servicemen could tell manufacturers "where to get off." We realize fully that this man did not mean just what the words seem to indicate—for if he did, it certainly is the wrong idea. For fear that these words may have traveled to other association meetings via grape-vine channels we hasten to warn service men that progressive growth of the servicing industry cannot be predicated upon such thoughts. The closest possible co-operation between the servicing industry and the receiver manufacturers is essential to the benefit of both.

Servicemen can be of aid to the receiver manufacturers and the receiver manufacturers can be of definite aid to the servicemen. Cordial relations—the friendliest of feelings—between servicemen and manufacturers is imperative.

*John F. Rider.*

### Once More a Warning

Some time ago we voiced a warning against buying manuals from a man by the name of J. H. Brown, who has been illegally representing himself as being our agent. We have received two letters from men living in Nevada advising that they had been contacted by this imposter Brown. One of the servicemen was fortunate enough not to fall for the gag and saved his money. The other service man unwittingly paid this man Brown a deposit on Rider manuals and waited to hear from us. We warn you that this man Brown has no connection with us. We do not employ agents. If you buy any Rider Manuals from any one, see to it that he either makes delivery on the spot or can establish his identity.

**We warn you that we employ no agents. Further, that we do not have any special deals which involve paying a deposit to a man and paying the balance C.O.D, when the manual is shipped. . . . HEED THIS WARNING . . . IT WILL SAVE YOU MONEY.**

*At Christmas play, and make good cheer,  
For Christmas comes but once a year.*

—Tusser.

### Did You Know That

There are some Chinese books made with leaves of **Jade**, the inscriptions of which are run in with **Gold**. (*Book-binding Magazine, December, 1934.*)

*Vanadium* in greatest quantities is mined at one of the highest points in the world, 15,500 feet above sea level, in the Andes of Peru, S. A.

*Bessemer*, responsible for the production of steel from iron, introduced the process in England in 1856. Incidentally, the full name of the gentleman was Sir Henry Bessemer.

**As a solvent, water ranks first and alcohol second.**

*Hydrogen* was discovered by a titled Englishman, Sir Henry Cavendish, in 1766.

*Millikan* said that a cubic centimeter of air contains 27.05 billions of billions of molecules.

*Collodion* was invented by two Swiss chemists, Schönbein and Böttcher, in 1847. Dipping cotton into nitric and sulphuric acids, they made "gun-cotton," soluble in ether and alcohol. The solution is collodion.

### Wanted

Self-healing milliammeters.  
Band pass filters which will not pass crooners.

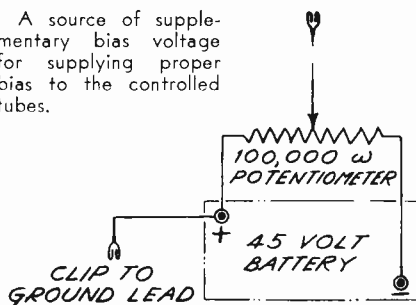


### Aligning AVC Superhets

The following suggestion, concerning the alignment of superheterodyne receivers equipped with AVC, has been received from J. Reynolds, Mgr. of the Radio Dept. of the Larkin Co., Inc.

It is a well recognized fact that the leveling action of AVC usually complicates alignment. Since the AVC tends to keep the demodulator tube signal output at a constant level, irrespective of the input signal level, assuming a predetermined minimum, it is difficult to establish the exact state of resonance in the circuits being trimmed. For simplest alignment, the controlled tubes must receive a fixed bias and the AVC action must be removed from the tubes normally thus controlled. To deliberately cut the AVC tube out of the circuit is not always possible, because it

A source of supplementary bias voltage for supplying proper bias to the controlled tubes.



may also be functioning as the demodulator. Hence, the solution lies in interrupting the AVC voltage distribution system. This break is made in the AVC voltage supply circuit, in that lead which picks off the AVC voltage from the AVC circuit and distributes the voltage to the controlled tubes. See illustration.

The circuit shown herewith is the supplementary bias voltage source whereby the proper fixed bias is applied to the controlled tubes. The lead which has been disconnected from the AVC tube circuit is connected to the moving arm of the 100,000-ohm potentiometer. The other clip of the variable bias device is connected to the chassis or ground as stated. By means of the 100,000-ohm potentiometer, the proper fixed bias is applied to the r-f., mixer, i-f. or whatever tubes are normally AVC controlled and alignment progresses in normal fashion.

It should be understood that interrupting the AVC voltage supply circuit as stated does not impair the operation or circuit continuity of the AVC tube.

### Compare Rider Manuals!

Look at these figures and you will understand why it is said that Rider's Manuals afford the greatest coverage of radio receiver production in the United States. Here are some figures illustrating the quantity of different models listed under these manufacturers. There are more than 240 manufacturers in the five Rider manuals.

Manufacturer	Quantity of Models
Atwater-Kent	231
Bosch	106
Crosley	162
Montgomery-Ward	121
Philco	137
RCA	299
Sears-Roebuck	141
Spartan	112
Stewart-Warner	132
Stromberg-Carlson	77
Supreme	27
Weston	56

Compare this quantity of models as contained in Rider's Volumes I, II, III, IV and V, with any other five manuals. You will find that Rider's Manuals contain not only more manufacturers, but, by far, more models produced by the various manufacturers, than any other manuals. The coverage shown in this list is representative of the excellent coverage available for the remainder of the manufacturers listed in the five Rider Manuals.

**You Can't Go Wrong With a Rider Manual.**

### G.E. M-106 Changes

A change is recorded in the G.E. M-106 receiver. The type 76 tube originally used as the 2nd detector and AVC, has been replaced by a type 1-V tube. R-16 in the diagram, originally 1,000,000 ohms, now is 1,100,000 ohms. The G.E. M-106 is referred to in Rider's Manual Volume V, as the RCA 262, shown on page 5-103 in the RCA section.



### Is He Kidding Us?

Someone writes us a letter asking about the musical range of our house-organ. Please don't suggest an electrically-driven pumping device.

### A Problem in Arithmetic

If the sum and difference of two numbers is known, how can you determine the two numbers?

### How the Engineer Shifted Freight Cars

"Just Nuts," in November included a problem in railroading. Here is the solution:

1. Locomotive, L, couples to car B and pushes it on bridge via left switch.
2. L couples to car A and puts it to right of B via right switch.
3. L to left of B and pulls A and B across bridge to straight track via left switch.
4. Pushes A to required position at right.
5. Puts B on bridge via left switch.
6. Goes to right of B via right switch, backs up to straight track and pushes B to required position.

### A Stern Chase?

"How did you like her singing?" asked the star's agent after an audition at a broadcast studio.

"Perfectly awful," was the director's reply. "That's queer," said the agent. "She had the longest run on record in Chicago."

"That's tough," remarked the director.

"What's tough about that?"

"Tough that her audience abandoned the chase so soon."

### Tough, Eh?

*Bill:* My uncle's got a wooden leg.

*Tom:* That ain't nothing. My sister's got a cedar chest.

*Lawyer (for automobile accident victim):* The driver of the car stated he was traveling only four miles per hour. Think of it! The long agony of the victim, as the car drove slowly over his body.—By-Stander.

### Colonial Model 657

In later production runs, the pilot light circuit has been changed. See schematic diagram on Colonial page 5-40, Rider's Volume V. In place of the two 115-volt pilot lamps, a 50-ohm center-tapped resistor has been connected in the heater circuit between the 25Z5 and the 6A7. A 6.3-volt lamp (part No. R-2288) is connected across each half of this resistor. The sockets for these lamps with brackets are parts numbers R-10373-A and R-10363-F and are mounted on the variable condenser and volume control brackets respectively.

### Colonial Pilot Light Troubles

Some trouble has been encountered with short circuits between the pilot lamp socket and the chassis. In the all-wave models this ground occurs most frequently at the point where the socket protrudes through the reflector. In other models, the socket terminals may touch the mounting bracket.

To eliminate this trouble, see that the rubber tubing that covers the socket in the all-wave models is in such a position that it prevents contact between the socket and the reflector or other grounded parts. Socket terminals must be bent so that they cannot become grounded. Arrange the connecting wires in such a way that they will not pull the socket into a position that might create a ground.

Since the transformer winding that supplies the pilot light often has a grounded center tap, a short from either side of the pilot light to ground will merely decrease the light's brilliancy and it will not go out. Also the set may continue to function satisfactorily. However, the transformer will become overheated. Therefore, if a complaint is received about the power transformer heating, investigate the possibility of a grounded pilot lamp socket.

### Colonial Model 659

An error was made in the data supplied by the manufacturer, which you will find reproduced on Colonial page

5-46 of Rider's Volume V. The I-F peak was designated as 480 kc. This should be 175 kc. Also mark this correction on the schematic diagram on page 5-45.

### Colonial Models 651, 655, 657

In the sketches supplied by the manufacturer showing locations of the trimmers which will be found reproduced on Colonial pages 5-27, 5-35 and 5-40 for models 651, 655 and 657 respectively, the coil marked "Short Wave Antenna Coil" should in each case be marked "Broadcast Antenna Coil."

### Colonial Model "A" Designations

The suffix "A" after a model number indicates that a 10-inch speaker is used instead of an 8-inch cone. For instance, Model 603 uses an 8-inch speaker and Model 603-A one of 10 inches.

### Colonial Model 654

If difficulty is experienced in sufficiently reducing the volume from local stations with the set shown on Colonial page 5-33 of Rider's Volume V, the condition can be remedied as follows: Connect a lead from the unused lug of the Volume Control to the point where the 0.001-mf. condenser is connected to the primary of the antenna coil. In its off position the volume control will then short-circuit the antenna coil primary.

### International ES-30

Rider's Manual Volume V, International page 5-8, shows models ES-19 and ES-20. These receivers are also known as ES-30.

### Philco 14

The model U-3 speaker used in the Philco 14 receiver shown on page 4-2 of Rider's Manual, Volume IV, now is rated at 1140 ohms for the field coil. The original field coil resistance rating was 1420 ohms.

### Philco 35, 36

The Philco model 35 receiver is also model 36. Please make this change upon your index.

### Oscillation in Sparton 65, 66

In case the metal braid shielding on the control-grid lead to either of the type 78 tubes becomes pushed down on the leads, these receivers may oscillate or otherwise operate improperly. This shielding may be pushed down accidentally when removing or installing the tube packing or changing tubes. Therefore, always pull these shields up to their full length in case of oscillation in these models. Sparton models 65 and 66 are shown upon Sparton page 5-7, 5-8, and 5-9 in Rider's Volume V.

### Microphonic Howls in Sparton Sets

Sparton receivers equipped with aeroplane type dials may be subject to microphonic howls if the dial assembly is permitted to touch the cabinet. These models are designed to permit a clearance between the dial assembly and the cabinet. However, rough handling may result in the dial touching the cabinet and transfer of speaker vibration to the chassis, resulting in the howl.

It may be advisable to put a coat of clear lacquer on the wires which pass through the oscillator coil. The lacquer prevents vibration of the wires, which can also cause howling.



# Give Your Business A Christmas Present



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