THE

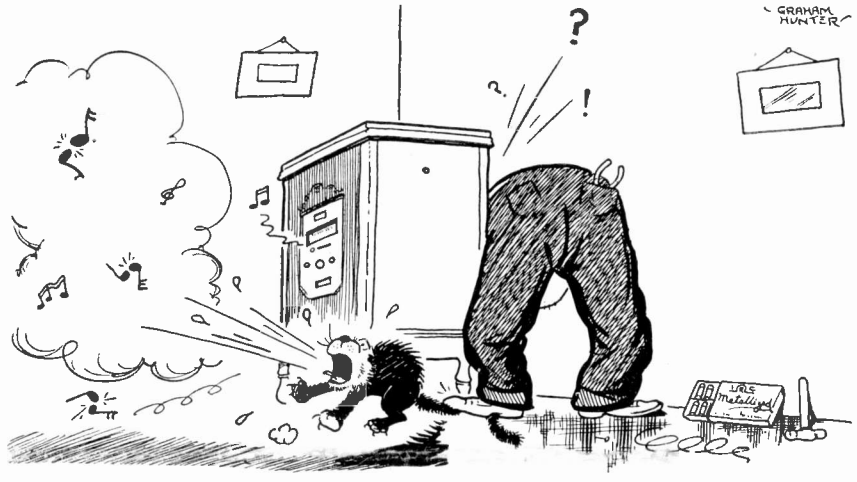
The International Resistance Company's Monthly Bulletin Published in Furtherance of its Program of Helping Radio Servicemen Do Better Work — and Make More Money Doing it . . . .

IRC SERVICER

VOL. I JUNE, 1933 NO II

"If a man preach a better sermon, write a better book or make a better mousetrap than his neighbor, the World will beat a path to his door even though he make his home in the trackless forest." Old Adage.

"Bunk!" says Service Sam. "The Serviceman who only sits around and waits for business will get little of it. Besides being able to fix sets and fix 'em right, he's got to SELL people on the idea of having HIM do it."



Serviceman: "Doggone! Just when I thought I had everything fixed something else has to go flooey!!"

I R C RESISTOR INDICATOR A "TEN STRIKE"

THE Resistor Indicator recently introduced by I. R. C. offers a quick and easy means for determining the correct value for *any* resistor, defective or otherwise. It may also be used as a temporary voltage divider.

So popular has this handy service tool proved that, believe it or not, the I. R. C. factory has been working overtime to meet the rapidly growing demand from all parts of the country.

The Indicator is a substantially made, pocket-size variable wire wound resistor equipped with scale and test prods. It quickly gives the correct rating for any resistor without the necessity for ohmmeter or circuit information. And it is built to last.

Merely turn on the set until the tubes are heated. Then connect the Indicator in place of the resistor to be tested. Start with the test prod at 100,000 ohms gradually working down the scale until the set produces maximum volume and tonal quality from several stations. Then you can read the proper resistance value from the Indicator scale.

The whole operation is quick, easy and decidedly accurate. In addition to testing burned out resistors, many servicemen are using the Indicator for testing *all* of the resistors in sets brought in for repair, thus making sure that they are of the proper unchanged value for the job they are to do.

The I. R. C. Resistor Indicator sells for only $2.40. Each one is individually packed in a box containing complete instructions for use.

IRC MOVES

By the time this issue of the "Servicer" arrives, the International Resistance Company will be installed in new and larger quarters at 2100 Arch Street, Philadelphia, only a few squares away from the old location at 2006 Chestnut. Here general offices and the engineering department will be combined.

SERVICE DOPE

Mention here of trouble on any particular make of equipment should not be construed as a reflection on the quality of those products. The best of radios will require attention from time to time. Thus, makes are mentioned only as a means of expediting prompt, efficient service on the wide variety of jobs confronting the average radio man.

Readers are cordially invited to contribute their own service kinks to this department.

Substituting 45 Tubes for 71-A's

45 tubes are easily substituted for push-pull 71-A tubes in receivers which employ this latter tvpe. To use 45 tubes, it is only necessary to wire the filament circuit in series and to change the bias resistor to about 750 ohms.

Brunswick 15

Low volume with low screen grid voltage will sometimes be found in the Brunswick 15. In many cases, plate voltage will also be excessively high. This trouble is caused by a defective 35,000 ohm orange resistor at the front of the chassis. A replacement resistor is all that is necessary.

Kolsters K-90 and K-92

Both of these models have a 1 megohm resistor connected from the control grid of the a. v. c. tube to the rotating part of resistor R12. If turning resistor R12 to the right or left does not affect the operation of the receiver, then examine this 1 megohm resistor which sometimes opens and causes considerable annoyance.

Fadas 25-25Z and Zeniths 52-61

C. H. Ramm of Chicago submits these as his contribution toward helping other servicemen who may experience similar trouble:

"Hissing and frying noises on low volume on Fada Models 25-25Z 110 v. 60 cycles can be remedied by means of two I. R. C. 50,000 ohm 1-watt (F-1) Metallized Resistors, one being connected to each of the 45 grids to ground. This does the trick—and with very little loss in volume."

Mr. Ramm continues:

"When dealing with fading on Zenith models 52 and 61 we found that the trouble was caused by an open r. f. choke. Be sure and check all chokes for opens when working on these models. Load

(*Continued on page 4*)

Three Servicemen Tell About Their Most

UNUSUAL SERVICE CALLS

"YOU were right in saying last month that a fellow has to keep his eyes open in this servicing business," writes Ralph V. Harrison in describing his most unusual call. "Text books and publications such as the I. R. C. Servicer can tell you a lot—but they can't tell it all. Often it's just up to the serviceman to make his own 'think tank' do a little overtime."

Called to repair a Crosley Show Box, Mr. Harrison found that it showed no plate voltage on any of the tubes. He promptly proceeded to check the high voltage winding of the power transformer and the condensers but without results. When the set was turned on the voltage would surge up. Then there would be an arc and the voltage would drop back. Judging this arc to be near the speaker field jack, Mr. Harrison investigated and found the fibre washer which fits in the chassis had carbonized and caused a ground. All that was then necessary was to replace the washer.

A STRANGE CASE

Another tough job is described by J. M. Hoef of Cobden, Illinois. This had to do with a Clarion Jr. on which another serviceman had been unable to locate the trouble. The set had fair volume at low frequencies but would fall off rapidly when tuned from 850 to 1100 KC. Between 1200 and 1500 KC reception wasn't much louder than a whisper.

The condensers were in good alignment, tubes checked OKay and socket voltages were found to be normal. Resistance measurements on the primary and secondary of each r. f. transformer were also right.

"After checking everything," says Mr. Hoef, "I connected my oscillator, cut in on the second r. f. stage and in this way discovered that I had a fair output clear across the scale. Then I knew the trouble was in the first r. f. stage but another check of all parts showed them to be all right. Finally, however, I removed the shield from the first r. f. transformer and here, by a close examination, discovered that the primary winding had burned out just enough to permit a short on the higher frequencies although the winding tested out on the ohmmeter. After I had rewound this winding with new wire the set operated perfectly across the entire scale."

AND THE SET CAME BACK

Trouble with a Philco 77 is described by W. I. and Floyd W. Trantham of the Radio Service Company, West Asheville, N. C. This set was brought back "dead" to the store two days after being sold. Before it was touched, however, it started playing again, and after being tested thoroughly was taken back to the customer. That night the set went "dead" again and this time it was exchanged.

"Once more we tested it," write the Trantham brothers "and suddenly it started operating normally. In our ensuing search for trouble we even went over the chassis thoroughly for sometimes a metal shaving will curl up around the sockets and short out one side of the filament but none was found. We kept the set playing for a couple of days and then, when nothing happened, placed it on the sales floor where it was soon sold. But a few days later back it came—"dead" again.

THE PLOT THICKENS

"This time we changed every condenser and resistor but still the set would stop and start in a manner almost mysterious. Well, to make a long story short, we at last discovered that the pilot light wires were twisted together and came up through the chassis and around the power transformer. They looked all right but we finally found that the power transformer shield had pinched one of the wires under one end and was shorting out the filament when the set was moved."

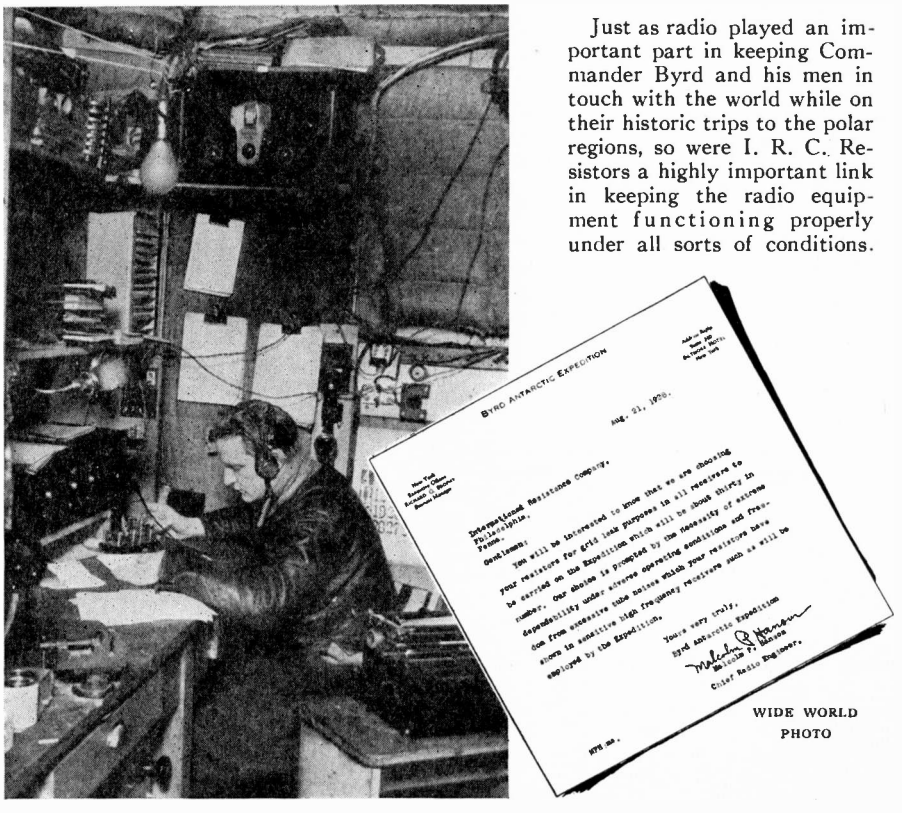
Lack of space prohibits our printing any more of many interesting unusual calls received in response to last month's request. These range all the way from complicated technical jobs to one from Serviceman Ed Coffey who found that a lady's pet squirrel had chewed a ragged hole through a speaker cone and another from Sam H. Kramer of Sam's Radio Shop, Trenton, N. J., who had to fix a receiver for a customer whose children had playfully thrown sphagetti and cheese into the cabinet, thus luring a whole family of mice to make a home there. Many more will be printed in following issues, however, and as previously announced, we will award a Kit of I. R. C. Resistors to the writers of the three "strangest call" stories which, in our estimation, are the most interesting and most helpful published during the month. Honorable mention stories will also be printed as space permits. Address them to: I. R. C. Servicer, 2100 Arch Street, Philadelphia, Pa.

Advise Us If You Move

In order to be sure of receiving the I. R. C. Servicer regularly, be sure and advise us of any change of address.

Another thing: Look at the envelope which carried this month's issue to you. If the original address is wrong and the envelope has been *forwarded* to you by the post office, this means that your address as carried in our files is wrong and should be corrected immediately. Please advise us accordingly.

IRC's with Byrd in the Antarctic



Just as radio played an important part in keeping Commander Byrd and his men in touch with the world while on their historic trips to the polar regions, so were I. R. C. Resistors a highly important link in keeping the radio equipment functioning properly under all sorts of conditions.

WIDE WORLD PHOTO

Photo shows Carl Peterson, radio operator of the Byrd Antartic Expedition in the radio shack at expedition quarters in Little America. The accompanying letter from Malcolm P. Hanson, chief radio engineer, states that I. R. C.'s were chosen for grid leak purposes in all of the expedition's thirty receivers due to their "extreme dependability under adverse operating conditions and freedom from excessive tube noises in sensitive, high frequency receivers." This, of course, was in 1928-30, and thanks to a program of constant refinement and improvement, I. R. C.'s remain pre-eminent today—the choice of discriminating operators, manufacturers and servicemen alike.

BUSINESS ANGLES OF RADIO SERVICING

What Equipment to Have, How to Use it and Point-to-Point Servicing versus Set Analyzer Technique are But a Few of the Problems Discussed Here

By F. L. SPRAYBERRY
(*Sprayberry Data Sheet Service*)

THE radio servicer is just as much a business man as the owner of a grocery store, machine shop or other establishment and should make it just as much a point to conduct his business according to modern methods.

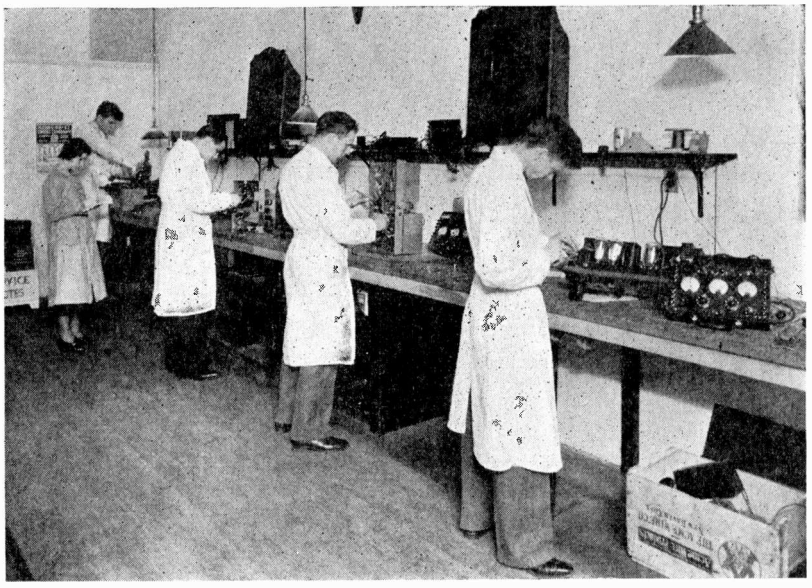
First and foremost, of course, come such factors as appearance, courtesy and service. Because much of his work is done in the home where he comes in closest possible contact with his customers, the serviceman needs to give even greater thought to these things than those behind the counters in modern stores—and that is saying a lot.

Another equally important point is servicing technique. Nearly every one has his own methods of doing things and likes to follow these wherever possible. All of which is well and good providing strict adherence to old ideas and an unwillingness to study new developments do not lead us into ruts.

IMPROVING YOUR METHODS

Among other things, a serviceman may find that, with a little more effort in setting up a certain piece of test apparatus and using a new system, he can make measurements and locate trouble quicker and with much less difficulty. Also, it is possible that he may re-arrange his method of checking a set in the home to advantage. For instance, one serviceman will first listen to the characteristic hum before making any measurements. Another man, working on the same job, might make his measurements first and another might start out by testing the tubes. Still another may not even turn on the receiver until he has given the aerial and ground a thorough check. Whatever system you follow, however, be sure that you overlook nothing and that your methods are constantly up-to-date. Constant change and improvement have long been the order of the day in building radios and the men who service them must face their work with the same willingness to change and learn.

Recently, we have read much about the resistance method of servicing radio receivers, or the "point-to-point" method. It is possible that a serviceman may develop a point-to-point servicing technique which is superior to the old set analyzer system. The writer believes, however, that the "point-to-point" method is advantageous in making an analysis only with the chassis removed from the cabinet. Certainly, a good test of all circuits can be made by this method but it requires a comprehensive knowledge of resistances in parallel and series networks, not to mention mathematics and general circuit structure. Undoubtedly, the "point-to-point" method is decidedly useful in isolating the trouble, in determining the condition of individual units and tracing a circuit for opens, shorts or grounds.



An attractive, modern service shop such as this denotes servicemen who are alert, skilled and well equipped for every job. In servicing, as in any other business, it pays to keep up with the times.

VOLT-OHMMETER IMPORTANT

A good volt-ohmmeter will enable the average serviceman to make measurements quickly and find if voltage, resistance and current of circuits are normal—"normal" meaning voltage and current values which would be measured with the meters, taking into consideration the resistance of the circuit. For instance, plate voltage for a resistance coupled detector tube may show 20 volts at the plate of the tube whereas the voltage applied to the resistance network may be 200 volts or more. Voltage actually measured at the tube sockets should be considered "normal" for that stage.

After removal of the chassis, a set analyzer is of little use in isolating the trouble unless an ohmmeter or continuity tester is used. The usual ohmmeter or continuity tester has several scales and the meter is necessarily small, making it difficult in some cases to read actual resistance values. Therefore, it is wise to have a good *long scale ohmmeter covering several resistance ranges*. Practically every part in the receiver can then be given an individual test for breakdowns, opens, shorts, grounds and other defects. Then, by using a continuity tester or ohmmeter, you can trace through the doubtful circuit and locate the exact seat of the trouble without difficulty.

In these days of modern superheterodyne receivers with trick automatic volume controls and noise suppressor circuits, a serviceman is lost without an oscillator—especially when working with frequencies. He cannot know too much about the behavior of frequencies and how they can be changed to suit his purpose. Many men attempt to make fine tuning adjustments on a modern receiver by ear alone. Some do surprisingly well but certainly a skilled man using an oscillator can do infinitely better.

Aside from its use in adjusting tuning circuits, an oscillator may be used to test tubes, to match transformers, to find the correct value of grid bias resistors, to get the proper coupling of circuits, to determine the number of primary turns on a r. f. transformer, to find the best value of voltage and current and for many other things. Thus, whether the serviceman buys a "ready built" oscillator or builds one himself, it is a piece of equipment he should, by all means have.

MAKING AN OUTPUT METER

Without a proper output meter, however, an oscillator is not of much use although it is not always necessary to purchase a manufactured output meter in order to get an output indicator. Practically any low-range DC voltmeter, milliammeter or AC voltmeter can be arranged to act as an output meter if it is connected properly and interpreted correctly.

Although experience is a serviceman's most valuable asset it may not get him very far with the complicated new circuits unless he has a good technical background—education which may be had from numerous sources by those willing to devote the time and effort necessary to obtain it. While it is not impossible to solve many problems without a broad technical education, it is certainly necessary to know the action of current, voltage, capacity, inductance, resistance and other fundamental units as well as

(*Continued on page 5*)

Service Dope

(*Continued from Page 1*)

hum can be remedied by replacing the electrolytic condenser, making sure that the same capacities are used."

Silver Marshall Super-Het

Have you ever been puzzled by low volume on all stations on a Silver Marshall Super-Het using a 27 a. v. c. tube? If so the following advice from Dale Funk of Beach City, Ohio, might prove helpful:

"These sets seem to require an unusually good a. v. c. tube," states Mr. Funk. "I have found that, even though some tubes show up OKay on a tester, they do not function properly in this stage although, nine times out of ten, they'll work satisfactorily in another socket as an oscillator or detector."

The answer is of course to try a number of tubes in the a. v. c. stage until one is found which gives satisfactory volume.

Tube Trouble that Doesn't Show up on Testers

An experience recounted by C. H. Steeger of Hall's, jobbers of Harrisburg, Pa., indicates that it is not always safe to regard careful use of a tube checker as the last word on tube reliability.

Not long ago, Mr. Steeger had an Atwater Kent Model 86 which would develop a slow ticking noise after operating about ten minutes. A check-up on tubes, by-pass and resistors indicated that all were in good condition. Finally, after considerable puzzling, another 35 tube was substituted for the one in the i. f. stage and the set functioned perfectly.

Serviceman Edward Coffey of Mooseup, Conn., sounds a similar warning:

"Sometimes," he writes, "a serviceman is baffled by what I call a '5-second buzz' which will make a set interfere with other receivers in the neighborhood. All tubes may test out but the thing to do regardless is to replace the 224's one at a time until you strike the bad one which will almost invariably be found."

G. E. Model H-91

There is a .1 mfd. condenser across the 170-ohm resistor in the cathode circuit of the r. f. tube of this model. Between the cathode and screen grid circuits there is an 18,000 ohm resistor. If the condenser shorts, the minimum grid bias for the r. f. tube will be decreased to zero and screen grid voltage will be low. This condenser shorting may cause excessive current to flow through the 18,000 ohm resistor and result in its opening. When this happens, screen grid voltage will be high.

RCA Victor R-12's

In these sets you may occasionally notice oscillation which cannot be stopped by adjusting the tuning system. The answer is to try another condenser in place of C14 which has a value of 1 mfd.

Send in your Service Dope stories. We give a FREE Kit of I. R. C. Resistors for the best one published each month.

Business Angles

(*Continued from page 3*)

the theory of operation of each of the units with which you must deal. Moreover, this theory must be obtained by extensive study rather than by a mere handling of the parts in question.

Perhaps the best way to learn a new principle is to set up a circuit of that particular type and work with it until you find out all you want to know about the problem. It is not difficult to duplicate most developments by simple experimental circuits which will give you a sound insight into the principle in question.

DON'T "KID" YOURSELF

And now for a brief word with regard to service charges: Briefly stated, our advice is simply this: *Unless you can make a profit on a job and do it as it should be done in a business-like way, don't handle it.* In some cases there may be perfectly valid reasons for taking work on which you know there is going to be a loss such as pleasing an unusually important "key" customer or paving the way for a nice radio or electrical equipment sale. The point is to make sure you are fully justified in doing it—that, in cutting the price, you are not just "kidding" yourself.

Most people realize that, to do the work right, a business man has to make a reasonable profit. Consequently, when customers become obstinate regarding price, it is up to you to point out the cost of good materials, the quality of your work, and in general, work your sales ability overtime. Then, if you still can't get the job, let some one else have it.

Cost of parts is another important factor in connection with the business side of servicing. It is, of course, possible to buy all sorts of radio materials at all sorts of prices. In general, however, unusually low prices usually indicate questionable quality—parts that are often really high in price because they are a constant source of trouble and customer dissatisfaction. With "gyp" material, you cannot give a guarantee of any worth and it is evident that real, lasting success in servicing can only be attained through doing good work consistently. Those who rely largely on the price appeal seldom last long. Good parts and sound workmanship *at the right price* are enduring keynotes of success.

"CHEAP" VS. QUALITY PARTS

A high standard cannot be maintained without price being held at a certain minimum. Anything below this smacks strongly of inferior quality. Sometimes, however, a well-known manufacturer, by long and constant research work, by new equipment or lower cost of raw materials, is able to lower the cost of his product. In such cases, the lowered cost is legitimate and the serviceman can rely on a continuance of high quality. I. R. C. resistors, for instance, have recently been reduced while being improved in quality, thanks to exclusive new processes which render them more desirable to discriminating servicemen than ever before.

The point is that, considering his servicing from a sound business angle, the serviceman cannot afford to rely solely on the price appeal in selling his work any more than he can rely on parts which he may buy on a price appeal basis.

HOW TO JUDGE RESISTORS

Factors for Consideration in Choosing These All-Important Replacement Parts

BY SERVICE SAM

IN the early days of radio, fixed resistors were more or less taken for granted. If they showed resistance values of approximately the desired rating, chances are they would be used. Little real thought was given to other characteristics which have since been recognized as all-important.

Almost every circuit in a modern receiver now contains a resistor and, from the standpoint of the discriminating serviceman, the mere resistance rating is but one of several very important factors about which he wants to be fully informed. Before risking his reputation for good work on a resistor he wants to know whether it will retain its rated value through thick and thin; he wants to know about its voltage coefficient, how much it will deteriorate with age or under conditions of high heat or humidity and he wants to know about other factors all of which have a very direct bearing on its ability to deliver satisfactory reception over a long period of time.

Accuracy of rated resistance value can be taken for granted on units which bear the stamp of a reliable manufacturer who makes them not down to a price but who builds them up to a standard of quality. For instance, the standard tolerance of stock values of I. R. C. Resistors is 10%. This is decidedly satisfactory for daily service requirements although, if desired for some particular purpose, resistors with a tolerance of only 5% can be furnished at a slightly higher price.

LOW VOLTAGE COEFFICIENT

Voltage coefficient is another highly important resistor factor. Good resistors will measure up to the same resistance values as long as their voltage ratings are not exceeded. However, this point will bear watching in cheap resistors for, obviously, if a unit measures 1 megohm at 10 volts and 800,000 or 900,000 ohms at 200 volts it may cause the serviceman no end of trouble when placed in a set.

Low voltage coefficient as featured in I. R. C.'s simply means that there need be no hesitancy about using the same value of resistor at different voltages. A 500,000 ohm grid leak, for instance, may have only a few volts across it whereas a 500,000 ohm coupling resistor may carry as much as 200 volts and certainly no serviceman will want to be bothered with having to select different types of 500,000 ohm resistors to use on these different jobs.

Next comes the factor of resistor ageing characteristics. Even wire wound resistors show a certain deterioration with age and this is why, when making resistors for extremely high precision work, the wire is first aged. Ageing tests over a long period of time on I. R. C. stock resistors have shown a deterioration of less than 2% over a period of years of use.

Humidity characteristics also warrant careful consideration. Humidity tends to increase the value of resistors. Poorly constructed units under test have shown an increase of as much as 50% or 100% as compared to only 10% for quality resistors. In the I. R. C. laboratory these tests are made in a "humidity chamber" which is kept at 40° C. with 90% relative humidity, the latter being obtained by means of a saturated solution of sodium tartrate. Resistors are kept in the chamber for 100 hours and results clearly show the danger of using inferior resistors for it is well known by servicemen that humidity is one of the most potent causes of resistor failure.

THE HEATING AND COOLING CYCLE

It is characteristic of a good resistor that, when its normal rated load is removed and it is allowed to cool, the unit will return to within one or two per cent of the rated value. Some resistors show this permanence of load characteristic under brief tests but fail in longer tests. In the designing of I. R. C.'s, the resistors are given a "life test" of at least 1,000 hours with load being applied intermittently, 1½ hours on and half an hour off. This simulates the heating and cooling cycle encountered in actual set operation and which has caused many cheap resistors to fail.

On good resistors, the change under load averages about 3½%, units returning to within 1% of their original value upon cooling. An overload of from 50% to 100% applied continuously for 100 hours will not cause them to change permanently more than 10%.

All radio resistors emit a certain amount of microphonic noise. When heard over a simple circuit set up made for this purpose, this sounds like a hiss or a rush. The noise is not objectionable when continuous but trouble comes when it changes to an erratic crackle—and it is this crackling that high-grade resistors are designed to eliminate. The accompanying diagram gives a circuit set-up which will give the serviceman an easy means of testing resistor for noise—a test which will supply convincing evidence in favor of quality units designed and constructed under modern, scientific engineering methods.

Thus it becomes evident that the true quality of a resistor cannot be judged by any single test and further that excellence in a single characteristic is not sufficient to recommend a unit for general use. The high-grade resistor built on quality lines *throughout* will meet *all* of the requirements of the discriminating serviceman and not just a few of them.

Visit I. R. C. Headquarters

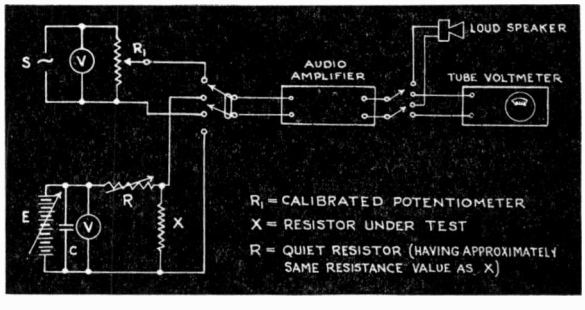
Among the month's visitors to I. R. C. headquarters in Philadelphia were H. Jappe and W. L. Brothers of the H. Jappe Co., of Boston, Mass. All three visitors reported improved business conditions throughout the New England territory and a steadily increasing demand for I. R. C. products.

Speaking of visits to I. R. C., Sales Manager Kalker extends a cordial invitation to all jobbers to make it a point to drop in whenever they are in the vicinity of the Quaker City. There's "Welcome!" on the door mat and it means just what it says.

The Servicer Helped Him

After reading the first issue of the "I. R. C. Servicer" published last month, Serviceman Ernest Gray of Baltimore waxes enthusiastic: "It's a great help to the serviceman," he writes. "Already one little item in this first issue has saved me the time and expense of buying a new volume control. Here's wishing you continued success."

Testing Resistors for Microphonic Noise



THIS simple testing circuit utilized an audio amplifier having an overall voltage amplification 1,000 or over, with a V. T. Voltmeter reading up to 3 volts on its output. A battery supplies the rated load to resistor under test (X) which is in series with a quiet wire wound resistor of about the same value (R). X is connected to the input of the amplifier (E) by means of a condenser. The noise developed can then be heard on the speaker or measured by the V. T. Voltmeter. If the needle fluctuates mildly, the resistor is very noisy. The actual reading is also a measure of the noise developed under load. A high-grade resistor will give a continuous hissing noise when listened to while a poor one will emit a series of erratic crackles. The potentiometer (R1), switch, etc., are used when it is desired to measure the noise by comparison with a known source of voltage (S).

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Bargain, Bargain-

By HARRY KALKER

Sales Manager, International Resistance Company

There is an old saying to the effect that, no matter how cheap you make an article, some one can make it cheaper and poorer and sell it for less.

This holds just as true of radio replacement parts as it does of anything else.

In buying parts, however, the serviceman need not consider the manufacturer's problems. His own are much nearer to him and far more important as far as he is concerned.

All of us are tempted from time to time to try cheap parts. That is only natural—and it has also been natural to learn again in almost every case that we invariably get exactly what we pay for. Bargain prices invariably mean cheaper merchandise. There are no if's, and's or but's about it. If there is a cheaper way to make good goods leading manufacturers of known reputation will probably discover it first and pass it along to you as a matter of course.

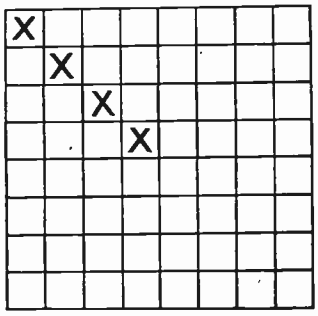
But, leaving this consideration aside, next time you are tempted to buy cheap parts, stop a moment and figure out just how little you can possibly save through an occasional bargain of this sort. A few pennies here, a few there and at the end of the year you've got a total "saving" of only a very few dollars to show for all your bargain hunting. Worst of all, it probably isn't a saving at all. One or two bargain parts so obviously inferior that you're afraid to use them will kill all the so-called savings on many cheap purchases. But the customer angle is even more important.

Cheap parts mean call-backs for which the serviceman does not get paid and which are decidedly annoying both to him and the customer. Worst of all are the customers who don't bother to call back at all—who call another serviceman because they're afraid to take a second chance with you.

After all, the greatest possible difference between the price of fine, well-made replacement parts and inferior bargain goods is so small that few servicemen who think it over carefully will risk taking a chance. Their reputations for good work, their chances for future business are infinitely more important than the small amount of money which is the most they can possibly hope to save.

At best, no serviceman can make much money buying parts at a price. But he can make it by pleasing customers consistently, thus building a real and enduring reputation for the finest work—work which calls for the finest parts obtainable for every job.

BRAIN TWISTER



Here's one that should keep you busy for a long time between service calls: Divide this box of 64 squares into four equal parts, all parts to be exactly the same shape and each part to contain one of the squares marked with an "X".

Answer will appear in next issue.

ANSWER TO LAST MONTH'S "TARGET" PUZZLE

Four shots are required to score 100. This can be done several ways such as—one shot in the 35 spot; two shots on 24 and one on 17.

Service Sam's Buddy Says:

Sam found two Scotchmen crying their hearts out because they'd spent their youth together.

* * *

The bosses' wife says that some husbands have a den. Others growl all over the house.

* * *

A professor reports that the average woman has a vocabulary of only three or four hundred words. But, boy, what a turnover!

* * *

Times don't change much, after all. The drunk who now complains because he can't get Australia on a $12.50 radio isn't so much different from his predecessor of ten years back who got mad because he couldn't get music out of a waffle when he played it on the phonograph.

* * *

Bill's wife is so dumb she used to think a hemlock was an attachment for a sewing machine. Now she thinks a by-pass is a new move in contract bridge.

* * *

Servicemen are like doctors. They say they're "paying a call" when what they're really doing is leaving a call to be paid for.

* * *

"You look much better without your glasses," said Mary to the boy friend.
"Yeh," he replied, "So do you."
Now the engagement is broken off.

* * *

Serviceman: "What's good for my wife's fallen arches?"
Chiropodist: "Rubber heels."
Serviceman: "Yeh, but what will I rub 'em with?"

* * *

Here lies the ashes
Of poor Pete Lank
He kissed his girl
By an open gas tank.

* * *

We know a serviceman who died of a misprint. He tried to doctor himself with the aid of a medical book.

* * *

A serviceman by the name of Stone met a jobber by the name of Wood on the Atlantic City boardwalk.
"Well, Stone," said Wood, "How are all the little pebbles?"
"Fine, thanks," replied Stone, "and how is Mrs. Wood and all the little splinters?"
Just then a girl in a new one-piece backless bathing suit strolled by. Wood turned to Stone; Stone turned to Wood, and both turned to rubber.

* * *

Talk about being absent-minded: We know a fellow who thought he had left his watch at home. Then he took it out of his pocket to see if he had time to go home and get it.

HOUSE-WARMING AT BURSTEIN-APPLEBEE'S

As the photographer saw a portion of the 850 servicemen, radio amateurs and salesmen who attended the recent house-warming in the attractive new 4-story building of the Burstein-Applebee, hustling radio supply house and I. R. C. jobbers of Kansas City, Mo. Half of this concern's second floor has been given over as a permanent Club Room for servicemen. The "B-A Co." reports good business and adds that its new catalog will be bigger and better than ever.

Wholesale Radio Service Co. Offers Helpful Advice

Expert technicians whose job it is to help servicemen with their problems play a prominent part on the staff of the Wholesale Radio Service Co., well-known jobbers of 100 Sixth Avenue, New York City. Their advice is available without charge and customers of the concern who get "stuck" with difficult or unusual jobs are always sure of finding real help waiting for them here.

It is interesting to note that Wholesale Radio has the distinction of being the oldest I. R. C. distributor. Thus, it is almost needless to state that I. R. C. products have been given prominent space in the comprehensive new catalog supplement just issued and which servicemen may obtain upon request.

Incidentally, this concern's show rooms are among the most attractive in the country and will be pictured in a forthcoming issue of the Servicer.

Popular Western Jobber

Geo. A. Wedel whose photo appears here is known to many servicemen and "hams" as head of the Wedel Company, Inc., radio jobbers and I. R. C. distributors of Seattle, Washington. This concern was founded ten years ago and has had a steady growth consistent with the handling of good lines on an ethical basis. Its mail order business brings orders from all parts of the country and many foreign lands as well.

"The only competition we have," writes Mr. Wedel, "comes from chiselers and unethical distributors of many lines who buy at so-called 'manufacturers' prices! But this does not refer to I. R. C. products. More power to you!"

An Antenna Inspection Hint

Francis Dunn of Indianapolis recommends opera or field glasses as an easy means of inspecting hard-to-get-at antennae installations.

"Very often," he says, "I can make a detailed inspection without difficulty, the antennae connections apparently being brought up to within a few feet of my eyes."

SWAP or SELL SECTION

These classified advertisements are run free of charge for servicemen. Make your copy short and to the point, addressing it to I. R. C. SERVICER, 2100 Arch Street, Philadelphia, Pa. The right is reserved to edit advertisements or elimnate any that are deemed unsuitable.

FOR SALE—Jewel 444 analyzer with all adapters for new sets. Also Jewell 560 oscillator and Jewell 209 tube tester. Make cash offer on one or all. Clark Bros. Radio Co., c-o I. R. C. Servicer.

WILL SWAP complete outfit for learning wireless code: automatic code transmitter, one sending key and complete code instructions. Cost $25. Need late model tube checker or what have you? W. E. Kibler, c-o I. R. C. Servicer.

WANTED—110-V. a. c. 250 watt generator or 32-110 volt converter. Will give ¾ h. p. Maytag gasoline motor in trade. Make offer. Clayton B. Smith, c-o I. R. C. Servicer.

WANTED—A used set analyzer with a. c. and d. c. meters. Write stating what you have to offer. H. G. D'Arcus, Jr., c-o I. R. C. Servicer.

FOR SALE—R. N. Ear-Aid in carrying case, complete with $20 DeForest Audiphone microphone less batteries. $18. Dale Funk, c-o Servicer.

WILL TRADE silver-plated C melody trumpet with quick change to A or B flat for good radio servicing equipment. Trumpet in case cost $60 new. Floyd A. Roberts, c-o I. R. C. Servicer.

WANTED—RCA 230's old style and other tubes. Will swap long list of service equipment including Readrite 245 tester; W. E. mike; parts for Radiolas III, 20, 25 and 28; RCA 100 speakers, etc. Write for list stating what you have for trade. E. Carter, c-o I. R. C. Servicer.

WILL TRADE microscope, electrical engineering course, trombone, etc., for television equipment. Fred Madlinger, c-o I. R. C. Servicer.

WILL TRADE a Mod. Universal single button mike on desk stand and new Elkon rectifier for Majestic A eliminator for service equipment. What have you? R. P. Helfrich, c-o Servicer.

SELL OR SWAP—number of parts including vol. controls; A-K parts, transformers, condensers, etc. Write listing what you offer. Prefer tubes. W. T. Green, Jr., c-o I. R. C. Servicer.

WILL SWAP Flewelling short wave adapter; condensers; 5 amp. Tungar a. c. charger; West. auto ¾ amp. trickle charger, a. c.; power trans and other parts for tubes. Can use a turntable and pick-up, electric or spring. Chas. R. Ziegler, c-o I. R. C. Servicer.

WILL TRADE Eastman Premo No. 9 Kodak, 3¼" x 5½", with Optimo shutter and F6.3 lens for radio test equipment. Camera cost $78 new. Carrying case, extra view finder, plate and film pack holders, etc. R. E. James, c-o I. R. C. Servicer.

WILL TRADE—Gold-plated musical saw with lessons, 600 amp. lighting switch and RCA magnetic modulator for filter condensers or what have you? A. L. Hissong, c-o I. R. C. Servicer.

FOR SALE—Weston 565 set analyzer in excellent condition. Has oscillator and tube checker —tests nearly all new tubes. Cost $187.50 new, will sell for $60 cash. F. W. Trantham, c-o I. R. C. Servicer.

WILL TRADE—Miles two button microphone (carbon type). Cost $75. Would be willing to sell for $25 cash or $35 in trade. State what you have to offer. R. E. B. Service Corp., c-o I. R. C. Servicer.

WILL TRADE OR SELL—Used test equipment for RCA mantel set model R7 or similar machine. N. J. Lux, c-o I. R. C. Servicer.

Send in Your Swap or Sell Ad!

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