
No. 1
How Radio Receivers Are Serviced
RADIO SERVICING METHODS

FOREWORD

As you open this Booklet, you may well ask: "What is the purpose of these Radio Servicing Methods Booklets?" In a nutshell, we can answer: "The purpose of these Booklets is to give you what amounts to apprenticeship training—the kind of knowledge that most people believe can be obtained *only* by working for months or years at a trade!" And, this training is planned to "fit in" with your regular Course, so that your theoretical and practical training will go along hand-in-hand.

Your Lessons in Fundamental Radio Principles and the Lessons for Specializing will give you all the necessary radio theory—the how-and-why-it-works knowledge. In these Lessons, you will learn what breakdowns may occur and how they affect the operation of the radio; you need this knowledge to find troubles when they occur.

Then, you will get the actual "feel" of working with radio parts in the Experimental Kits. The experiments you carry out will supplement your technical knowledge and give you practice in constructing and testing radio circuits.

Finally, these Radio Servicing Methods Booklets will show you how to use the methods actually followed by professional servicemen. You will learn how to remove the set from its cabinet, make tests, replace defective parts, and make adjustments on the complete radio. Yes, these Booklets are your *shop training*. In them, you will learn as an apprentice does—by following the tested, proven methods used by professional servicemen. You will learn *what* to do, and even more important, you will learn *why* to do it that way!

To get the most from these Booklets, plan to read one after each of your regular Lessons. Study a Lesson, then read the Radio Servicing Methods Booklet having the same number. Then, from time to time, review the Booklets to keep fresh in your mind all the details of how to service receivers.

J. E. SMITH.

NATIONAL RADIO INSTITUTE
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RADIO servicing is an ideal field—an interesting, profitable occupation that will give you real professional standing in your community. Almost everyone owns a radio, but relatively few people know how to fix one. The man who has this knowledge is sure of a comfortable living and the respect of his fellows.

► When you are an expert radio serviceman, what will your life be like? Well, you'll certainly find it to be varied! In a typical day, you may repair a half-dozen radios—ranging in size from a tiny midget to a large phono-radio combination—with each of them having entirely different defects. You may make service calls at several homes, meeting all sorts of people. Each day will be different from the one before it—new work to do, new people to meet—a vast improvement over the humdrum, monotonous days of which the average job consists.

Your working conditions and hours, too, will be better than those most jobs offer. You will find that radio servicing is an enjoyable combination of brain work and mechanical work-with-your-hands. The physical work almost always will be light and non-fatiguing—a pleasant relaxation, in fact, from your thinking—and generally will be carried out in a clean, well-lighted place. Your hours you will set for yourself if you have your own full-time radio business, or work part-time to get additional income. Of course, if you prefer regular hours, you may work for someone else.

All in all, being a radio serviceman is a wholly satis-

fying and *profitable* way of earning your living.

► What do you need to know to get into this field? How does the successful serviceman fix radios? Why are some radio men more successful than others?

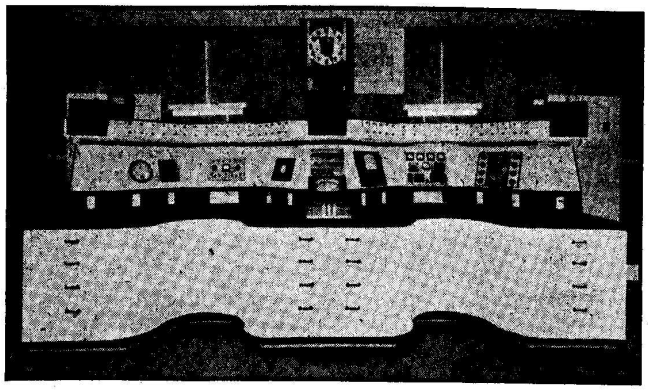
These RSM (Radio Servicing Methods) Booklets are going to answer these questions by giving you the *practical,* step-by-step procedures followed by expert radio servicemen. You may be familiar with some of these procedures—you may have tinkered with radio at some time in the past, or you may have had experience as a serviceman. However, here at NRI we do not take anything for granted. We are going to build on a rock-bottom foundation of radio knowledge, leaving nothing to your imagination. Let's start now, and see how radio troubles develop and how radio servicemen find and correct these troubles.

WHAT A SERVICEMAN DOES

To the eye of the average person, a radio chassis is a jumble of strange-looking objects. However, the radio man doesn't worry about how the radio *looks.* Whether the set is a large phono-radio combination, a television set, or a tiny midget—whether it is an a.m. (amplitude modulation) or an f.m. (frequency modulation) type—the serviceman knows that it contains only a few general types of parts. He knows that these parts are connected in certain ways to produce certain desirable operations.

In other words, the serviceman recognizes a radio receiver as an electrical device that operates according to well-known electrical rules. To him, there is nothing mysterious about a radio that operates improperly, or goes dead altogether. He knows that some part or connection has become defective, and that he is to find and repair the fault.

Repairing a defect is simply a mechanical procedure of mending a poor connection or substituting a good part for a bad one. Almost any handyman can repair a radio, once he is shown the trouble. But it takes real knowledge of radio to locate the defect with reasonable speed. It is this *specialized knowledge* that sets the ex-



Can you imagine yourself working at a modern, fully-equipped service bench like this? Here you see an excellent example of a well-designed two-man service bench, built for an NRI graduate. This man started in business using a small desk-like bench and a limited stock (a picture of this is shown later in this Booklet). In just two or three years his business grew to such an extent that this larger bench was necessary.

pert serviceman apart from ordinary "fixers"—and it is for this knowledge that he is paid.

The quicker a serviceman can find the trouble, the more receivers he can service and the more profit he can make. Hence, you should have *two* goals as you start on your radio career: first, to learn *how to service;* and second, to learn how to service *more quickly.*

This *second* goal is the one that makes the difference in the earnings of servicemen. Many are "stuck" in a rut, having learned just enough to get by, and then having stopped their radio education before reaching the point where it would really pay dividends. Remember, it's *knowledge* for which you are paid!

Let us begin now to build up your knowledge of radio servicing by giving you some facts about the parts found in radio receivers and how they become defective.

HOW RADIO PARTS BREAK DOWN

The basic parts of a radio receiver are tubes, coils, condensers, and resistors. Any one of these parts can become defective. Two of your first steps on the road to becoming a serviceman will be to learn to recognize

these various parts and to understand what may go wrong with each of them. Let's take a few examples, and preview some of the parts you will study in detail in your Lessons in Fundamental Radio Principles.

Radio Coils. Several typical coils are shown in Fig. *1*. As the name implies, each consists of a coil of copper wire wound around a form. It may be wound in a single layer, or it may be wound in layers, like thread on a spool. The coil may be wound on a bakelite or fiber cylinder, or it may be wound on a cardboard bobbin. In some cases, thin sheets of iron may be inserted inside the bobbin, so that the coil is around the iron. Frequently two or more coils are wound on a single core of iron, bakelite, or fiber. Such a combination of coils is called a "transformer." It is used to transfer power from one circuit to another.

The wire is made of copper because copper is a good "conductor" of electricity. (Little electrical power is lost in the wire.) Silver would be slightly better, but its high cost rules it out except for special applications.

Open Circuits. Regardless of its appearance, a radio coil is a continuous piece of wire through which an electrical current can flow. If this coil wire breaks, the current no longer can flow through the coil. Then we say that the coil has *opened,* because the circuit is broken and no longer has "continuity."

A break of this kind may occur sometimes because the coil wire (which usually has a very small diameter) was pulled too tightly when it was first fastened to a terminal lug connector, and stretching or expansion of the coil form has snapped the wire. A more likely reason for a break in the wire is electrolysis—a kind of corrosion that attacks and eventually eats through wire that is carrying a current. Also, if too much current flows through a wire, it will overheat and melt.

Whatever the cause of the break, the circuit is opened and the radio no longer can perform normally, or it may be dead altogether. We may be able to see this break if it has occurred at a terminal. However, it is quite likely that the break is underneath several layers of wire, in some position where we cannot possibly see it. If so,

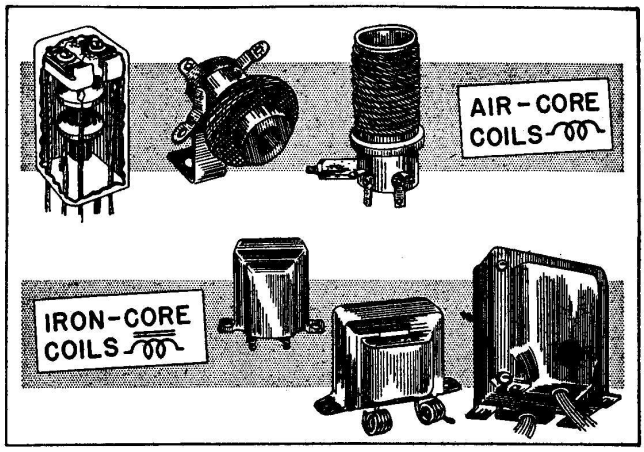


FIG. 1. Coils are called "iron-core" or "air-core" depending on whether or not the cores on which they are wound contain iron. The symbols that follow the names in the above illustration are used to represent the two types on circuit diagrams.

to find the trouble, we either have to substitute parts until the radio comes back to normal or have to make electrical tests to determine just which part is defective. (Servicemen make these tests by using indicating devices that show just what is happening electrically within the circuit. In your regular study Lessons, future RSM Booklets, and the Experimental Kits, you will learn all about the different methods of testing radio parts and circuits.)

Short Circuits. An open circuit is not the only trouble that can occur in a coil. The turns of wire in a coil may be wound close together, or there may be many layers of turns. It is important that the wire-turns be electrically separated so that there is no copper-to-copper contact between wires or layers. To prevent contact, the wire is covered by "insulation." This insulation may be a varnish, or it may be a silk or cotton "sleeve," either of which has the property of blocking the flow of current, thus forcing the current to stay within the wire.

Should this insulating material become defective, it will be possible for electric current to flow through the break to some adjacent wire, or to an adjacent layer,

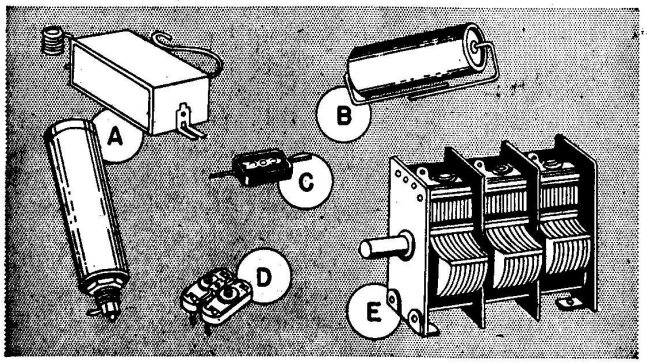
without having to follow the turns of wire. Any such path through a break in the insulation is called a *short circuit,* so named because the current is following an undesirable (and usually shorter) path. Thus, it is not flowing at its full intensity through a portion of some electrical device. Again we have a defect that probably will not be visible.

Part Value Changes. When you study coils in your Lessons in Radio Fundamentals, you will learn that certain electrical properties of the coil depend on the spacing between the turns of wire. Should this spacing change ever so slightly, the coil will not have exactly the same properties. Also, you will find that if moisture is absorbed by the form on which the coil is wound, another electrical value of the coil will be affected. Consequently, it is possible for the electrical characteristics of the coil to change, and for the operation of the receiver to be affected thereby, without any visible alteration in the appearance of the coil.

Radio Condensers. As you can see, coils are subject to a variety of possible defects. This is true also of other radio parts. Let us see how some of the condenser types, shown in Fig. *2,* can become defective.

One kind of condenser is made of two metal plates

FIG. 2. The name by which a condenser is called sometimes indicates what it is made of, sometimes what it is used for. Two kinds of electrolytic condensers are shown at A, a paper condenser at B, a mica condenser at C; these names come from the materials used in making them. The trimmer condenser (D) and the tuning condenser (E) get their names from their uses.



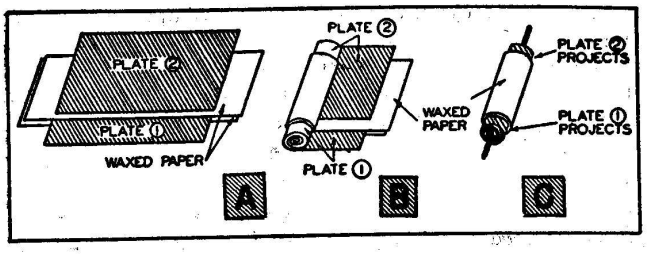


FIG. 3. This is how a paper condenser is made. Sheets of metal foil and waxed paper are stacked (A) and rolled up (B). Then leads are pressed against the ends of the foil sheets (C).

separated by an electrical insulator, as shown in Fig. *3.* The plates are strips of tin foil, separated by an insulator made of waxed paper. The condenser is rolled up in the form of a cylinder, and a wire is pressed against each foil plate. The condenser then is dipped in wax. On hardening, this wax holds the wires against their plates. These wires are used to connect the condenser to other parts of the circuit in which it is installed.

Should one of these wires pull away from its plate, the connection between other parts and that particular plate of the condenser will be broken, which *opens* the circuit. Since the contacts between the wires and the plates are sealed within the condenser housing, you can't see whether a wire has pulled away or not.

If the insulation between the plates breaks down, an electrical circuit will be completed between them. This *short circuit* will ruin most types of condensers. (The excess current flow may also ruin other parts as well, so more than one part may have to be replaced.)

► Another class of condenser has plates with variable spacing. One plate is made of a spring material and can be moved either closer to or farther from the other plate by a controlling screw. These condensers are used to adjust circuits so that they are exactly in step with each other. Once they are adjusted properly, the radio performance will be at its best. However, the spring tension of such a condenser may change with age so that the spacing between the plates alters. When this occurs, the *electrical value* will change also. The actual amount of space variation may be so small that it cannot be de-

tected by the eye, but it will affect the operation of the circuit.

► Another kind of condenser contains a chemical solution that causes a film to form on an aluminum plate. The film acts as an insulator between this plate and the solution. As the condenser ages, evaporation of water from the solution will reduce the amount of liquid in contact with the insulating film, which will change the *electrical value* of the condenser. Also, the liquid may become a poorer conductor of electricity, which will reduce the usefulness of the condenser. These changes will not be visible, although sometimes the escaping moisture will deposit some of the chemical in a whitish crust around the vent holes of the condenser housing.

Resistors. Lengths of special wire or carbon material that have the property of opposing the flow of current, but not of stopping it altogether, are known as resistors. Their electrical effects are in between those of conductors, which carry current with ease, and insulators, which prevent current flow.

Several types of resistors are shown in Fig. *4*. Various defects may appear in them. For example, the wires used to connect them to the rest of a circuit may pull away from the resistance material inside the resistor, or the resistance material may break; either of these defects will *open* the circuit. *Short circuits* may occur within the resistor housing. And, as you will learn, heat may alter the characteristics of the resistance material so that it *changes in electrical value.*

Radio Tubes. A tube is perhaps the most familiar of all the parts in the radio. As shown in Fig. *5*, it consists essentially of a glass or metal bulb, inside of which are a number of pieces of metal and wire. Heat is necessary for the operation of radio tubes, so one of the pieces of wire is arranged in the form of a filament, somewhat similar to the filament in a lamp bulb or light globe. An electric current flowing through this filament produces heat, and this heat makes it possible for the tube to operate. If too much current flows through the filament, the heat may become so great that the filament wire will melt. This breaks or *opens* the filament circuit, and the tube will no longer work.

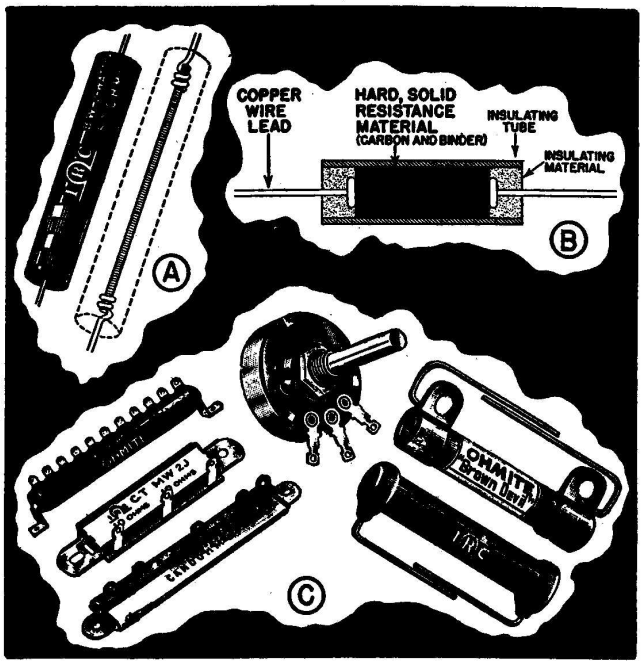


FIG. 4. Typical resistors. A and B show how some are made.

The various pieces of wire and metal within the tube must not touch each other except as intended—otherwise, a *short circuit* will exist within the tube. Should the position of some of these parts change, the *tube characteristics* will be altered.

Connections. Radio parts must be connected to one another by pieces of wire. Each connection is soldered to produce a good electrical contact. Although a connection is not a radio "part," a broken connection can *open* a circuit just as well as a defective part. Excess solder may drop from a connection and cause a *short circuit* to the set chassis or to another terminal or part. If dirty wires are connected, or if improper soldering lets chemical actions occur at a connection, then the resulting poor contact will oppose the flow of current like an unwanted resistor.

The manufacturer of the radio is careful to see that the proper soldering techniques are followed to avoid these troubles. However, servicemen frequently either do not know how to solder properly, or grow careless. Thus they may make defective connections which can cause much trouble later.

When you receive the Experimental Kit giving instructions and practice in soldering, *be sure to learn all you can* about this important service step. You will have to unsolder connections either to test parts or get them out for replacement; you will have to resolder the connections to the new part, so you will constantly be using a soldering iron in your radio work.

Summary. We have barely touched upon *some* of the types of radio parts with which you are going to become familiar. However, you can see a pattern repeating itself over and over—*regardless of the part, you know that you always look for a mechanical defect that has opened a circuit, caused a short circuit, or resulted in a change in the electrical characteristics of some part.*

It is rare to find a part that *looks* bad, although occasionally one will be found that has been overloaded so severely that it is actually burned or is otherwise visibly defective. Generally, the mechanical trouble will be inside some sealed container or will be of such a nature that it cannot be seen. *The only way we then have of finding the trouble is to observe the electrical effects produced by that particular trouble.* From a thorough knowledge of radio theory and of service procedures, it is possible to localize troubles by reasoning. However, in most cases, the test procedures soon reach a point where test equipment is needed.

As you can see, radio servicing is basically easy—you already know just what the serviceman looks for!

TEST EQUIPMENT

To do service work, you will need only three pieces of test equipment—known as a multimeter, a tube tester, and a signal generator. Later RSM Booklets will describe these devices in detail and show you just how to use them. For now, let's see briefly what their uses are.

Multimeter. This device is a combination instrument that can be used to measure resistance, voltage, or current. It is the most useful test instrument any serviceman has, for with it, he can locate open or short circuits in any part or connection. In addition, he can sometimes use it to determine whether a part has changed its electrical characteristics.

Tube Tester. As the name implies, this device is used to test tubes. It is a very handy instrument, since faulty tubes are one of the most frequent causes of service complaints.

Signal Generator. The circuits of a set must be adjusted from time to time to produce maximum performance. The signal generator is used to supply an electrical signal that allows the receiver to be adjusted properly. The instrument also proves very useful in tracking down certain kinds of defects.

► These three items are the basic pieces of test equipment that all servicemen must have and use. It is possible to carry on a large servicing business with no other

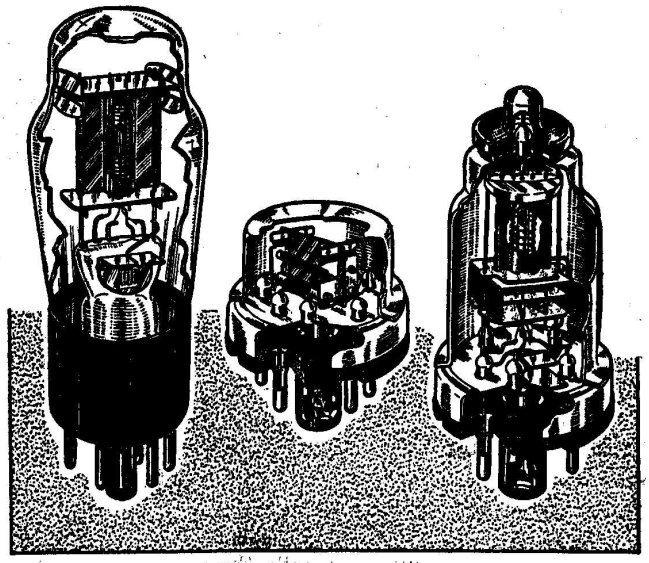


FIG. 5. Cut-away views showing the elements within typical radio tubes.

equipment. However, a serviceman who has a large volume of business usually acquires additional kinds of specialized testers that help him to service faster. This supplementary equipment will be described in later Booklets and in your Course.

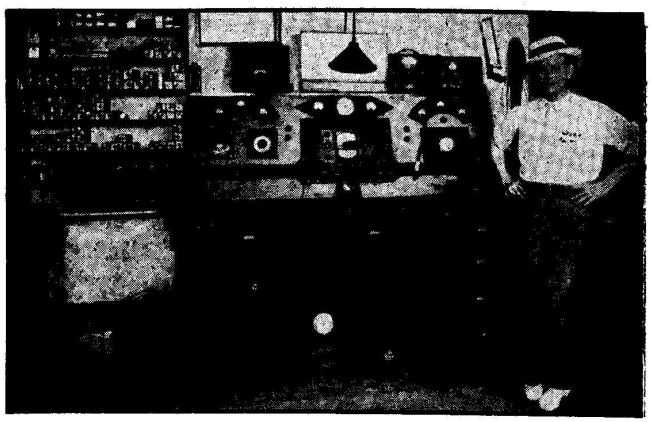
CLASSES OF RADIO SERVICEMEN

We cannot classify servicemen as beginners or experts solely from the length of time that they have been in the service business, because an absolute beginner may use advanced techniques that are unknown to some servicemen who have been in business for years. Instead, it is better to classify servicemen according to the methods that they use in servicing. We might split them into three classes—the radio mechanic, the semi-professional serviceman, and the professional servicemen. Let's see which methods each class of serviceman uses to locate the mechanical troubles we have just described.

The Radio Mechanic. The most elementary way of servicing is to test each and every radio part, in turn, until the defective part is located. The only requirements for servicing in this manner are: 1, a knowledge of the appearance and characteristics of radio parts; 2, the three basic pieces of test equipment; and 3, a lot of patience. The procedure is so mechanical that we apply the name "Radio Mechanic" to such a serviceman. He uses only his hands and his test equipment, and does not yet have the radio knowledge to "use his head."

► While this is not the *only* way to service radio receivers—nor the best or quickest way—it does require the least radio knowledge and allows one to start servicing the soonest. It is the way many servicemen start out, and it was once the way of even the expert.

In the early days of radio, even the large receivers contained no more than twenty or thirty parts. When something went wrong, it was practical to test each and every part and thus localize the trouble. Of course, if the radio man was unlucky, the defective part might be the last one tested, but eventually the trouble would be found.

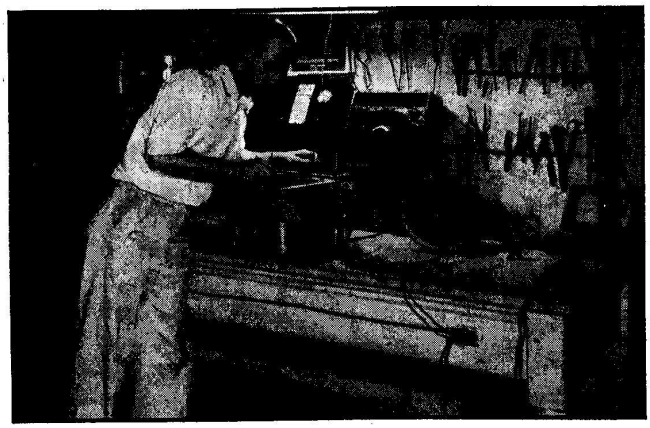


Here is the man who now owns the fine bench shown on page 3. Even here, his few pieces of test equipment are arranged for convenience and good appearance. The latter is particularly important when customers can see the workbench.

It is still possible to test radio receivers this way—but now you have seventy or eighty parts in the average seven-tube receiver, so the problem of testing all parts or trying others in their places is too time-consuming to be profitable. Obviously, if one man can service five or six receivers in the time it takes another man to service one, then the first man will have the greater income. This need for greater speed in service led to the modern, professional servicing techniques that take full advantage of a thorough knowledge of radio parts and the circuits in which they are used.

Before we describe the procedures of the real expert, however, let us discuss those of the intermediate servicemen—those men between the mechanic and the expert. We might call these the semi-professional servicemen.

The Semi-Professional Serviceman. The next step up the ladder to becoming a true professional serviceman is to learn the *purpose* of radio parts—why they are used in certain combinations, and what they are supposed to do. With this knowledge, it is possible to see why certain troubles are common to certain receivers, and why certain troubles produce certain defi-



A good example of how most men get started. A sturdy table for a bench, a few tools neatly held on a board, a multimeter, a signal generator, and a tube tester are all this man needs now. These basic test instruments are all many servicemen ever get for spare-time or small one-man businesses. However, it is a good idea to set aside some of your earnings to purchase additional equipment when such equipment can speed up your work.

nite symptoms of operation. For example, the semi-professional serviceman knows that a particular condenser (called a "coupling condenser") is used to pass signals from one stage of a receiver to another. Coupling condensers very frequently open, thus blocking the path for signals; this causes the signals to be extremely weak or even makes the set dead altogether. Hence, when called to service a receiver that operates in this manner, it is logical to check the coupling condensers to be sure that they are in good condition.

Or a receiver might have a loud hum or buzzing sound mixed with the desired signal. The serviceman knows that certain condensers are used as filters in the radio to remove this hum. It is natural to assume that excessive hum is caused by a failure in one of the filter condensers, so he would check the filter condensers first.

► A semi-professional serviceman, then, is able to work more rapidly than a radio mechanic. He understands the *purpose* of radio parts when used in certain particular combinations, so he can start at once to check those parts that are most likely to cause the trouble.

The semi-professional still must use the three pieces of basic test equipment, and must know how to test these parts. In addition, he has to know what purpose is served by the parts, and should pay careful attention to the way in which the receiver operates. This last often gives clues that can guide him directly to the defect.

► Parts break down more frequently in certain sections of a receiver than in others. The coil in one circuit of the radio may be subject to frequent breakdowns, while the coil in another circuit in the same kind of radio may never give trouble. There is, of course, a reason for this —radio parts in some circuits are required to handle more power than in others. The fact that certain troubles occur frequently in radios has led to the development of service charts that describe the different ways in which receivers may act and list a number of possible causes for each kind of abnormal behavior.

The difficulty with using these charts is that you must either memorize them or refer to them constantly. As soon as you develop a complete knowledge of the function of radio parts, you'll *know* what can cause the trouble, without having to memorize a list of troubles.

The Professional Serviceman. The ability of the semi-professional serviceman to locate defects rapidly is limited. As soon as he is out of ideas on what may be wrong with a receiver, he must revert to the "test everything" methods of the radio mechanic.

The true professional serviceman, however, has a thorough knowledge of radio parts and circuits. From this knowledge, he first tries to reason out the most probable faults, much in the manner of the semi-professional. However, if this step fails, he does not have to test all seventy or eighty parts in the radio receiver, because he knows methods of *isolating* the trouble to a small group of parts. These processes of isolation allow him to concentrate on just the three or four items that could be causing that particular trouble; this limits the amount of testing he has to do. This excludes the element of luck, and makes it possible for him to service receivers in a minimum of time.

► The professional knows that radio parts are grouped

in arrangements called circuits. Each circuit is a complete path for an electrical current flow. Then, he knows that these circuits are grouped in units called stages, and that stages are grouped into subdivisions called sections of the radio receiver.

Even the most elaborate radio consists of only three sections, as shown in Fig. *6*. Sections usually contain from one to five stages, and each stage may have five or six circuits. However, by making a few simple tests, the expert is able to isolate the trouble to a section, then to a stage, next to a circuit, and, finally, to the defective part.

For example, a test can be made at the input of the audio section that will show at once whether the a.f. (audio frequency) and power sections are working. If they are O.K., then the trouble must be in the r.f.-i.f. (radio frequency-intermediate frequency) section, so we can ignore all the parts in the a.f. and the power supply sections. A few tests in the r.f.-i.f. section will lead to the defective stage, then to the defective circuit in that stage.

Before it will be possible to isolate troubles in this time-saving professional manner, one must have a thorough understanding of the operation of radio parts and their combinations in circuits, stages, and sections. Only then is it possible to take full advantage of observable symptoms and to reason back to the probable cause of the condition.

Even the professional still has to know how to test radio parts. It is true that he tests fewer of them while locating the trouble, but he must know all about radio parts and their particular weaknesses.

To Sum Up: We group the methods of radio servicing according to the manner of finding the trouble. We have: *1*, the radio mechanic's method of testing everything; *2*, the semi-professional method whereby logical reasoning, service charts, or practical experience leads to the testing first of parts most likely to cause the defect; and *3*, the professional method of reasoning, then of localizing the trouble.

► **The first method requires a knowledge of radio parts,**

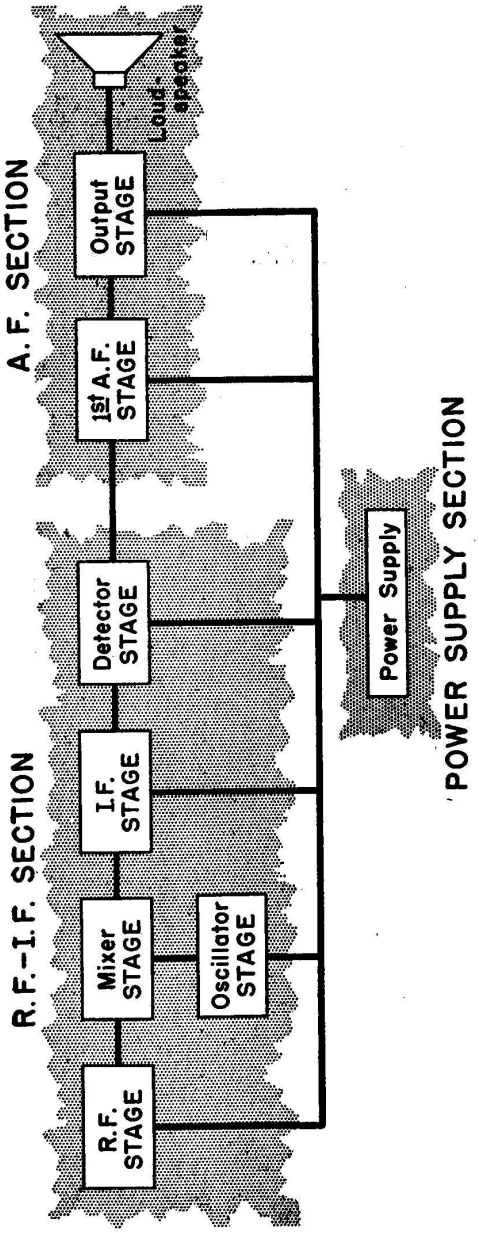


FIG. 6. This diagram gives the basis for the quick professional methods used in the isolation of troubles. Notice that the radio stages are grouped into sections. A single test (or a simple series of tests) will show in which section the trouble exists. Then, other tests will further localize the trouble to the defective stage. There are a number of systems of localization, and you will study them all. Some are better for one kind of trouble than for another; you would follow a different procedure when working on a "dead" receiver than you would when working on one with distortion, for example. All the systems require that you know how the radio should function—in fact, the more you know (and the better you know it) the faster you can service receivers.

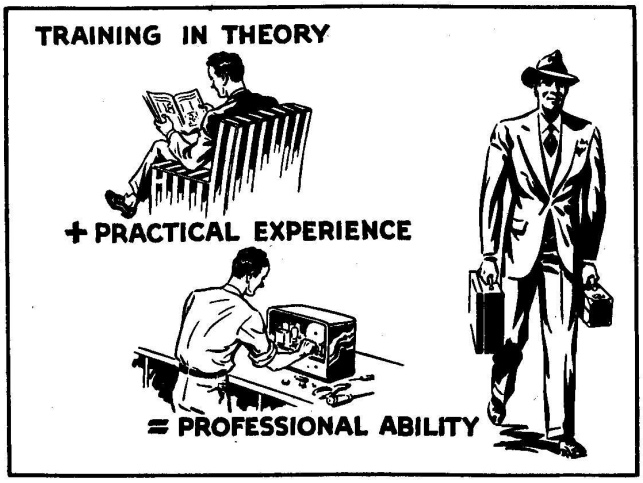
how they fail, and their weaknesses; it also requires knowledge of the testing methods that will permit you to determine when a part is defective.

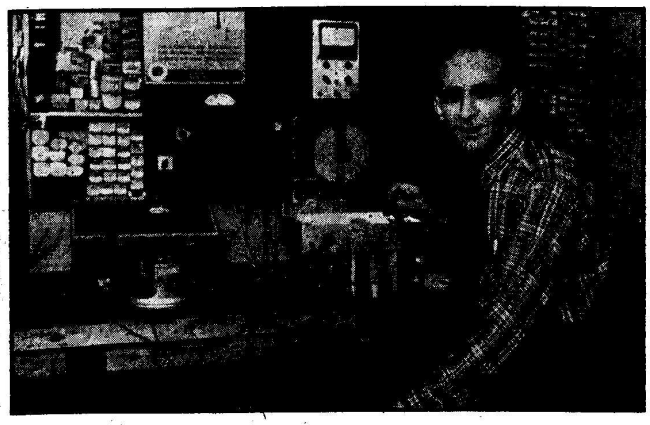
► The second method requires the same knowledge as the first and, in addition, makes use of some knowledge of the functions of radio parts.

► The professional method requires the same knowledge as the other methods, plus a thorough knowledge of how radio stages and sections function. If you ever watch an expert work, you will find that he touches or pulls out a tube over here, or makes a simple test over there and, from two or three such tests, locates the source of the trouble. Remember, the tests themselves are very simple—the knowledge required is used in properly *interpreting* the results of these tests.

A GUIDE TO THE FUTURE

As you may know, part-time servicing has allowed many an NRI student to earn more than the cost of his Course before graduation. One of the chief purposes of these RSM Booklets is to get you started in spare-time servicing very quickly. They are designed to give you both the training and the experience you need to be a successful serviceman.





Another graduate, and his simply constructed bench. There is no need for an elaborate bench while you are getting yourself established. Later, you can construct as elaborate and as decorative a bench as you desire. You will soon receive an RSM Booklet giving detailed plans for simple workbenches that you can build.

Students sometimes believe that the only way to get experience is just to start servicing, accepting any jobs they can get. Well, you can get experience this way—but it will certainly be a long time before you get the well rounded experience on all sorts of defects that you need to be a professional serviceman. Furthermore, right at the start, you will undoubtedly suffer the embarrassing experience of accepting jobs that prove to be too tough for you to handle.

How, then, are you to get the experience you need in a reasonable time? You will find the answer later on; a whole series of your RSM Booklets will contain sections devoted to giving you practical training in locating and repairing specific defects in an actual receiver. This NRI Practical Training Plan will give you as much all-around servicing experience as you might get from fixing hundreds of sets—and give it to you in a matter of weeks, instead of the months or even years the other way would take.

Yes, your NRI training is going to be both *thorough* and *fast*. Your RSM Booklets will concentrate first on giving you the knowledge you need to be a radio mechanic. Once you have learned this, your Booklets will

lead you by easy stages to semi-professional and professional servicing methods. In addition to strictly service instruction, the Booklets will give you other information of a related nature—such as how to build a workbench, how to set up a shop, how to get business, and so forth. Throughout, the emphasis will be on practical, how-to-do-it information. At the same time, your Lessons in Radio Fundamentals will be teaching you the theory of radio circuits and stages. The Course and Booklets are so planned that you will always have the theoretical knowledge you need to understand the servicing methods you learn. Our experience in teaching thousands of Radiotricians has been that this system of instruction, tying theory and practice closely together, is by far the most satisfactory way to give you professional training.

Your step-by-step training begins in the next RSM Booklet, in which we describe the few simple tools you will need to start servicing. You may be surprised to learn that common tools, such as you probably already have around the house, will do for most of your service work.