Distribution of This Issue — 33,000 Copies

Courtesy of RCA

AUGUST, 1947

Rider's Volume XVI and Other New Books

NOW that we are beginning to see some daylight in our plans for the future—although as you can readily understand, forces beyond our control may dictate some changes—we are ready to tell you just what is in the offing from our organization. Here are the texts and manuals now in work. After you read these lines, you'll know as much about what is listed as we do.

Rider's Manual Volume XVI

With this volume we are inaugurating a new policy in the production of Rider Manuals. Whereas we used to publish a Rider Manual ten to twelve months apart, we are now embarking upon a sequence of a new volume every four or five months. What dictated the change? . . .

Suggestions from some of the receiver manufacturers' service managers that they would like to see their data get into the hands of servicemen somewhat more rapidly. . . . A few suggested publication twice a year and others suggested publication three times a year. . . .

After much consideration and analysis, it was felt that three times a year was the ideal from a number of viewpoints. Foremost was the fact that new receivers are covered for the first 90 days by the factory warranty; then that a survey among 24,000 radio servicemen indicated that in some areas of the nation only about 3 to 5 percent of the receivers coming in for service are less than 6 months old; whereas in other areas, about 10 percent of the receivers coming in for service are between 6 months and 1 year old. . . . Under the circumstances, a publication schedule of approximately three times a year will serve everybody's needs best.

Rider's Manual Volume XVI will be in jobbers' hands by October 1947 and will contain 768 pages, not including the "How It Works" book, which will be a separate publication. . . . In these 768 pages will be found data from between 90 and 95 manufacturers, covering many brand-name products. Securing such data is the bugaboo of manual publication, because in many instances, the number of receivers released is comparatively few and data very hard to get. . . . You'll find them in this volume, with more to come in Volume XVII.

As to the "clarified schematics," they are plentiful in Volume XVI. . . . In fact, the number of multiband receivers being released to the public is on the increase at a fast pace. . . . Every—and we repeat EVERY—one of these receivers is broken down into its respective bands—a practice which is destined to be followed by the receiver manufacturers in the preparation of their data. . . . We realize that the service industry desires the greatest coverage of names and models; therefore the handling of the "clarified schematics" has been altered somewhat. . . . We have crowded them

Please turn to page 4

RCA 56X5, 56X10

In some of these models the 15-megohm resistor R5 has been omitted. This does not affect the basic operation of the set, the primary effect being to make the set more sensitive. The schematics for the RCA Models 56X5 and 56X10 appear on *pages 15-32* and *15-34* respectively of *Rider's Volume XV*. Resistor R5 appears in both of these schematics.

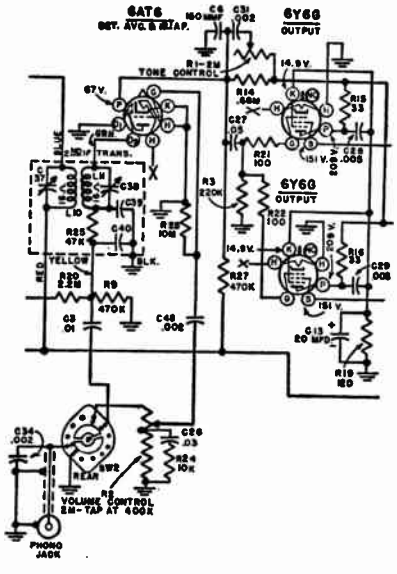
RCA 55F, 66-1

Service Hint: Failure of the 1A7GT converter to operate may be due to a short circuit in C21, the grid coupling capacitor. This will make itself evident as a high positive voltage on the signal grid of the 1A7GT tube.

Westinghouse H-104A, H-105A, H-107A, H-108A

These models are modified versions of the same model numbers without the suffix A, the service data for which appears on *page 15-1 of Rider's Volume XV* and changes in the June, 1947 issue of SUCCESSFUL SERVICING. The chassis number of the models carrying the suffix A is V-2102-2.

The major difference in this latest chassis is the substitution of a 6AT6 tube for the 6SF7 detector, avc, and first a-f amplifier. This necessitates the introduction of C48, (0.002 μf, 600 volts) between the control-grid of the 6AT6 and the movable arm of the volume control. The cathode and one end of the heater are connected to ground and to a 10,000-ohm resistor, R28, the other side of which goes to C48. R27, a 470,000-ohm, 0.25-watt resistor has been substituted for R12 and R13, thus eliminating C9 (0.1 μf). These changes are shown in the accompanying partial schematic, in which it should also be noted that now there is 67 volts on the plate of the 6AT6 instead of 51.5 as in the case of the 6SF7.



Modified Westinghouse chassis V-2102-2, showing changes due to use of 6AT6.

Zenith 6D0 Series

Variations in the tube line-up of this chassis 6C05 will be found; a single chassis may contain octal, lock-in, and miniature button tubes. If an original tube is replaced with an alternate, the socket must also be replaced. Alternates that may be found are as follows:

Original	*Alternate*
12SA7GT	12BE6 or 14Q7
12SQ7GT	12AT6
35Z5GT	35W4

In case the oscillator shifts, replace the 220-ohm resistor (R3) with a 1000-ohm resistor, and if the oscillator drops out at the low end of the band, disconnect R1 (10,000 ohms) from the negative return and connect it to the cathode of the converter. See the schematic on *page 15-28 of Rider's Volume XV*.

If audio oscillation occurs, disconnect the 0.0005-μf capacitor (C14) from the negative return and connect it to the cathode of the 35L6GT output tube. Take out C21 from the plate to the cathode of the 35L6GT. If oscillation occurs at 910 kc, change the capacitor C5 in the negative return to the chassis from 0.05 μf to 0.1 μf. In the event that there is hum, oscillation, or poor sensitivity, check for grounded tuning capacitor frame. This can be corrected by inserting cork or rubber pad between rear capacitor frame and chassis; this pad should be cemented in place.

The letter "V" (6C05V) indicates that an aluminum chassis is used.

Hallicrafters S-38

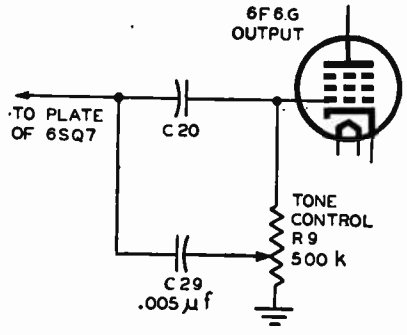
In the event that an a-c hum develops in this receiver, the schematic of which appears on *page 15-59 of Rider's Volume XV*, it has been found that the 35Z5GT is the cause of the trouble, even though the tube passes a normal test. Also, other tubes in this set have been known to cause hum. Try replacement tubes.

Another cause is a high resistance ground between the chassis and the case. This usually develops through the rubber mounting grommets or through the switch mounting rivets. Occasionally it may be a defective 25-μf capacitor (C36), which should be replaced if defective. It is possible that C36 is not of the correct value. Check this point.

If this set loses sensitivity after being in use for approximately a half hour, replace the 12SA7GT/G tube, as an investigation has revealed that this condition is due to a certain percentage of Hytron tubes of this type, of a particular production run marked 1/6, 2/6, 1A6, or 2A6. The replacement should have any other marking than those listed previously.

RCA 5Q5, Q18

In the second production of the RCA Models 5Q5 and Q18 a tone control was



Tone control in second production of RCA 5Q5, Q18.

inserted in the control-grid circuit of the 6F6G output tube. The revision for this change is shown in the accompanying diagram; the original schematic is shown on *page 11-15* of *Rider's Volume XI*.

Farnsworth ET-061

The following information is of use to those who have experienced finding turned-up edges in the cabinet of the Farnsworth model ET-061:

The Dynox or simulated wood wrap-around has a tendency to curl at the edge on early shipments of some table models. This can usually be firmly recemented by applying a heated dull knife blade between the Dynox and the cabinet. The heated blade should then be applied to the outside surface of the Dynox pressing it firmly against the cabinet. It will help to stroke the blade toward the edge of the Dynox while applying firm pressure. Care must be used to see that the knife blade is not hot enough to burn or discolor the finish of the Dynox.

RCA Record Changers

The motors of the RCA record changers Nos. 960001-1, 960001-2, 960001-3, and 960015 will not operate properly from a 50-cycle source. Information about these record changers will be found in the record changer section of *Rider's Volume XV*.

RIDER MANUAL CONTEST

ENTRIES to the RIDER MANUAL CONTEST are flooding in. . . . Daily the number received is increasing. . . . Servicemen all over the United States—those in Canada—others in Hawaii, Alaska, the Philippines—have an eye on one of those big cash prizes.

Just to refresh your memory, here are the amounts that will be paid to the writers of the ten letters which rate highest in the judges' opinion.

CASH PRIZES

1st Prize	$500
2nd Prize	$300
3rd Prize	$200
4th Prize	$100
5th Prize	$ 75
6th to 10th Prizes ($50 each)	$250

In the last issue of SUCCESSFUL SERVICING the 11th to the 40th prizes were announced and described. Each of these 30 letter writers will be awarded a Portable Electric Drill and a Bench Stand for it, the combination being worth $25.00. The prizes for the next best 40 letters were also announced. The winners of the 41st to 80th prizes will each be awarded a Soldering Gun with 32 tips, each of these modern quick-heating soldering irons combinations being worth $15.00.

In addition to the prizes mentioned above, there are 144 more. . . .

Winners of the 81st to 140th prizes of $10.00 value—that is 60 lucky contestants—will each be awarded a

De Luxe Speedex Stripper Kit Complete with Automatic Model Tool and Blades

This wire stripper kit is manufactured by the General Cement Mfg. Co. of Rockford, Ill., who manufactures products for electronic and industrial maintenance.

This handy Speedex wire stripper kit comes complete with the wire stripper and seven different size blades to fit it, packed in a steel box, as shown in the accompanying illustration. You can strip any size of wire from No. 8 to No. 30 with this tool and the appropriate blade. Just clamp the wire in the tool, put the part to be stripped in the proper groove, squeeze—and off comes the insulation leaving a clean wire. It's a far cry from a quick operation like this back to the penknife or pliers method.

Here's a prize that any man who does even a small amount of wire stripping a day will value. . . . And the more wire he has to strip, the more valuable will this tool become. Each blade has provision for stripping at least two different sizes of wire so that there is no necessity for changing blades very often.

DeLuxe Speedex Stripper Kit for winners of the 81st to 140th prizes.

This is a piece of equipment which belongs in every serviceman's tool box and if you already have such a tool, then you can leave one back on the bench in your shop and keep the other in your tool box. . . . After using one for a day or so, you'll wonder how you ever got along without it. . . .

The $7.50-value prizes for the 141st to the 224th prizes will each be awarded a

Midget Wrench Set with eight "Supersockets" and four "Superrenches" with a Sliding T Handle and Extension-Driver with Lock-Grip.

This kit of wrenches is manufactured by J. H. Williams & Co., of Buffalo, N. Y., makers of drop-forged tools of all types.

This No. 1285 Midget Set is a handful of assistance on those fussy, troublesome little jobs that ordinary wrenches cannot handle. This combination of "Supersockets" and "Superrenches" is ideal for all delicate adjustments on receivers and any other equipment with hard-to-get-at nuts.

These chrome-plated tools are drop-forged from selected Alloy Steel, that has been heat-treated for maximum strength, and come packed in a strong steel case, 5½ by 3 by 1 inch, as shown in the accompanying illustration. The set consists of 8 Midget "Supersockets": 4 hex openings, 3/16, 7/32, ¼, and 9/32; and 4 twelve-point openings, 5/16, 11/32, ⅜, and 7/16; 4 Midget "Superrenches" (3 to 3½ inches long) with openings 13/64, 7/32, 15/64, ¼, 9/32, 5/16, 11/32, and ⅜ inches; a sliding T Handle, 4½ inches long; and an extension driver, 5⅜ inches, with revolving, lockable grip.

Here is a set of wrenches that will gladden any serviceman's heart, for it seems as though the part that has to be

Midget Wrench Set for winners of the 141st to 224th prizes.

replaced in a set always is fastened to the chassis by a bolt that is in the most inaccessible place. And even if a similar set is already on your bench, the chances are that one or more of the sockets have been mislaid. If you get one of these kits, see that everything is returned to its box when you're through with it.

These are the prizes that 224 lucky contestants are going to win.

Have you sent in *your* entry yet? You've used Rider Manuals—you know what a help they've been to you—how they've saved you time—earned increased profits for you—how they have strengthened your business in so many ways. . . . Put *your* thoughts on the Manuals in 100 words on an entry blank that you can obtain from your jobber or by writing to us—and send in your entry to the big Rider Manual Contest right away. . . . *A few minutes writing may pay you big dividends.* . . .

All Entries Must Be Postmarked Before Midnight September 15, 1947

Engineers Join John F. Rider Publisher

GEORGE BERNSTEIN
Electronic Engineer

Born in Brooklyn, N. Y. in 1924. Attended Cooper Union, New York, from which he was graduated in 1947 with the degree of B.E.E. In 1944 he enlisted in the U. S. Navy. He attended the Electronic Technicians Mate training school, receiving instruction in radio, radar, and loran equipments. While stationed aboard a cruiser, his duties included the maintenance of the radio equipment. He joined the John F. Rider Laboratories in the summer of 1947.

WILLIAM BOUIE
Electronic Engineer

Born in San Juan, Puerto Rico in 1908 and has been in this country since 1919. After graduating from high school in New York, he spent several years playing with various musical organizations in different parts of the country. Became interested in radio while broadcasting in 1924 and attended night school to gain a knowledge of radio principles. Entered the radio servicing field in 1930 and had his own business in New York, which he closed when the Nation went to war, becoming an instructor in radar at the Signal Corps school at Fort Hancock, N. J. After a year, he was transferred to the publications section at Belmar, N. J., writing instruction books on the principles and operation of radar equipment. He continued this work at the Signal Corps Publications Agency at Fort Monmouth and then for two years wrote technical manuals and reports for the Army Air Forces. He became connected with John F. Rider Publisher in the summer of 1947. He is a member of I.R.E. and an associate member of A.I.E.E.

WILLIAM HOLLANDER
Electronic Engineer

Born in New York City, November, 1918. While attending Cooper Union, he was called into the Army. Attended the Radar Schools at Massachusetts Institute of Technology and Camp Davis, from which he graduated in 1942. He was assigned to Fort Hancock, N. J., where he was battalion communication and radar officer, and later was assigned to the Fourth Army as radar officer at Presidio of Monterey. He held the same assignment with the Ninth Army in the E.T.O., until the end of 1945, when he was discharged. Major Hollander was awarded the Bronze Star. In 1946, he resumed his communication studies at Cooper Union, from which he was graduated in 1947 with the degree of B.E.E. He joined the Rider organization in 1947.

MURRAY WEINGARTEN
Electronic Engineer

Born February 8, 1925 in New York City. After graduating from Morris High School in 1942, he worked for the Signal Corps as a radio technician, while taking Army radio courses. After graduating from the pre-radar school at the American Tel. Labs. in Chicago, he enlisted in the Navy in 1943. After serving aboard the *U.S.S. Constellation,* he was appointed to the Navy V-12 program, studying electrical engineering at Stevens Tech. and Bucknell. After receiving his discharge in 1946, he attended Rensselaer Polytechnic Institute at Troy, N. Y. majoring in communications and electronics, and receiving his degree of B.E.E. in January, 1947. He joined the Rider organization in the spring of this year. He is a member of I.R.E. and A.I.E.E.

NEW RIDER BOOKS

Continued from page 1

much more in Volume XVI than was done in Volume XV, although not at a sacrifice of legibility. . . . These diagrams are just as readable as before. . . . The secret lies in the layout of the schematic so as to enable the largest possible lettering. . . . In this way we furnish maximum coverage of manufacturers and models—AND these very valuable and time-saving "clarified schematics". . . .

In compliance with requests from Rider Manual owners we have increased the number of photographs of the small table models in Volume XVI. . . .

Some of the television receivers released to the public will be found in Volume XVI. . . . Also wiring diagrams of the Transvision television kit being sold to the public.

The construction of Rider's Volume XVI is the same as all previous volumes. . . . The same type of paper, binding, and binder. . . . The price set for Volume XVI is the lowest possible which nationwide costs permit, being slightly more than ¾ of one cent per page. . . . If we consider the number of pages in the "How It Works" book, then the price for the volume is just about ¾ of one cent per page. . . .

If current prices of production continue, at the end of a year we will have released a total of more than 2300 pages in Volumes XVI, XVII and XVIII for a total price of $19.80—without anything extra being charged for the three "How It Works" books, one each for each Manual. . . . Let's all keep our fingers crossed that we have seen the end of price increases—that if anything at all happens, it will be a decrease in living costs and operating expenses. . . .

New Frequency Modulation Book

We are just completing a new book, "FM Transmission and Reception." We say without fear of contradiction that this book will be received with favor by all who read its contents. . . . It is without question the very latest in detail and embraces all the manufacturers' products both in transmitters and receivers. . . . Accordingly it will be of interest to all who have occasion to work with such equipment or who, because of the nature of their activity, will in the future work with FM. . . . Regular broadcasting, railroad equipment, police equipment, "ham" equipment—in other words, wide-band, medium-band and narrow-band equipment is considered.

This book will be of special interest to not only the radio servicemen for whom the theory and servicing of f-m receivers is explained, but also to the radio amateur, to every student who is studying electronics, and to engineers. . . . A year has been spent preparing this book and the time was worth-while! As it looks at this time, the book will total between 275 and 325 pages. Just what the price will be is difficult to set at this moment, but it is our plan to print it with two types of binding. . . . One will be the economical paper cover, using a special, sturdy, very long-life type of paper. . . . The other will be cloth binding—that is, made for libraries and other institutions who do not favor paper covers. Prices will be announced in September.

The publication date for "FM Transmission and Reception" will be late October or early November, 1947. . . .

Broadcast Operator's Handbook

In late October or early November, we shall release the "Broadcast Operator's Handbook," a volume intended for the broadcast station operator and for all persons who are studying this branch of electronics. Written by a well-known broadcast station operator, Harold E. Ennes of Station WIRE, it is a practical book written by a man who knows whereof he writes, and he speaks the language of his readers. . . . With years of experience behind him—he knows what

Please turn to page 6

Successful SERVICING
REG. U. S. PAT. OFF.

Vol. 8 **AUGUST, 1947** **No. 7**

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

Published by

JOHN F. RIDER PUBLISHER, INC.

404 Fourth Avenue **New York 16, N. Y.**

JOHN F. RIDER, Editor **G. C. B. Rowe, Associate Editor**

Servicing in the Hobby Field

THERE was a time when radio as we know it today was considered a hobby. Some who were not so far-sighted considered "wireless" a passing fancy and doomed to a quick oblivion. How about electronics in the hobby field? . . . It does not require much imagination to envision numerous hobbies like model trains and planes making use of radio control. These comments are not offered as completely new, since radio control of model planes and trains has already been accomplished, although not at any major basis.

What interests us is the servicing of these transmitters and receivers. What with the increased use of the hearing-aid types of tubes, equipment suitable for such operations can be made in sufficiently small size and of comparatively little weight and reasonable economy. If such is done, their popularity is sure to increase, but like all other devices of similar character, service is a problem. . . .

As to service operation, there is nothing out of the ordinary in the kinds of equipments which are recommended for such duty and which have been described in numerous magazines. . . . The equipment now possessed in the average good radio service shop is entirely satisfactory for this type of work. Nothing new will be required. . . . How about looking into this field by contacting the hobby shops in your area? What can you lose?

Thanks for Cooperating

Approximately 3000 replies have been received in response to the questionnaire inclosed in the June, 1947 issue of SUCCESSFUL SERVICING. First of all, thanks sincerely for this enthusiastic response of almost 15 percent. The data are being tabulated by an organization who specializes in such work and we hope to have the facts in the next thirty days. The spot checks indicate that a complete story of the radio servicing industry now is in our hands, and while some new trends are evident, in many respects things have not changed very much. To us this means a great deal, for if after a lapse of almost ten years, certain modes of operation remain stable, it means that the industry is stable. Not that any one can visualize the radio servicing industry at its zenith, far from it —but it is taking definite shape. . . .

Many men have been in it a long time —have suffered numerous trials and tribulations staying in it. . . . To say the least every sign points to their effort having been justified. . . . They are the ones who will remain and progress with it. . . . They are the ones who acquire whatever must be known to keep apace. . . . Say what any one will—the servicing industry is healthier today than it ever has been. . . . Not only is it healthy physically, but it has acquired the courage of its convictions. . . . It says what it thinks and means what it says. . . .

JOHN F. RIDER

The Cover

Throughout the land thousands of men are getting prepared for television work —some will sell TV receivers—others will install them—and others will shoot trouble. The photograph on page 1 shows an engineer testing an RCA television receiver in one of the company's laboratories.

TO LIBRARIES

Special announcement mailings will be sent you from time to time as our books come off the press, so that you will be acquainted with our publications and be enabled to have them available for your readers at the earliest possible moment.

The Publisher.

RCA Universal Power Transformers

RCA models equipped with a universal power transformer, such as RCA Models Q34 and QU61 found on *pages 15-17* and *15-55* respectively of *Rider's Volume XV*, have a covered link switch on top of the transformer. These models are shipped with the link in the 240-volt position. To change, remove the round cover on top of the transformer case and move link to required position. The maximum and minimum line voltages for the various link positions are as follows:

Position	Min.	Max.
110	100	115
125	115	135
150	135	165
210	190	230
240	220	260

CAUTION: Remove power cord from line receptacle before changing link position.

A Word to the Wise

New Rider Books

Continued from page 4

is needed in that field. . . . .Watch for more details in September. . . .

The Rider 99ers

Here is a new series of technical text books of astounding value. . . . Every step in manufacturing—except the preparation—is planned for greatest economy to the customer. . . . *The Rider 99ers will be sold for 99 cents each.* . . . That is what "99er" means. . . . These books will be 5¼ x 7¼ inches in size—actually pocket size, printed on a very good quality paper and with specially bound paper covers. . . . The number of pages will total between a minimum of 128 and a maximum of 160, depending on the number of pages required to cover the subject. . . .

We feel that the subject of radio as a branch of electronics has expanded so tremendously that coverage of the field in any one text is virtually impossible. . . . Accordingly, we have decided to break down the subject of radio and allied fields for the radio servicing industry into a variety of specialized subjects. . . . These books are planned for the radio serviceman, the radio amateur station operator, and the radio student. . . . Among the titles in the Rider 99er series, which we shall release this fall, are the following:

1. Installing and Servicing of Low Power Public Address Systems

Here is a book which will furnish the answers on *what to do* and *what not to do* when making low-power public address installations. Highly informative and all embracing in its scope, it will prove a boon to all who have occasion to work with such equipment.

2. The Signal Generator At Work

Perhaps you have been working with test oscillators and signal generators for a long time, but do you really appreciate just what you have—how it works—and how you can get your money's worth from such a device? All the commercial signal generators and test oscillators produced and sold in the radio servicing and other industries are discussed in detail. . . . If you are going to buy new equipment of this kind or continue using the old equipment—this handy book will be worth its weight in gold to you. . . .

3. Understanding Vectors and Phase in Radio Work

Much very valuable knowledge is lost to many readers of radio periodicals and texts because vector and phase representations are not understood. Considering the importance of vector presentations as a short-hand method of conveying technical information in the radio field, also the gradually increasing complexities of the developments being offered for public consumption, it behooves every man who plays a part in the technical branch of the radio industry to possess a general appreciation of the significance of vectors. . . . This book develops the subject step by step, finally illustrating its application to everyday radio problems. . . . It is a must for every student and serviceman who is desirous of keeping pace with and understanding the advances in the radio art.

4. Understanding Low-Power Transmitters

There is no doubt about the use of transmitters by the public in the not-too-far-distant future—perhaps a year or two. . . . At any rate, the time is rapidly approaching when the transmitter, whether amplitude or frequency modulated, will be worked on by the radio servicing industry. Today point-to-point communication, in fields other than commercial communication, is increasing by leaps and bounds. . . . Private aircraft, private marine, taxi service, and other fields are demanding the services of personnel who know both transmitters and receivers. . . . Knowledge concerning receivers is widespread, but knowledge concerning transmitters is quite limited. . . . This is the text which will familiarize you with the basic details of such equipment. . . . Here is a book for the ham as well as the radio serviceman and the student.

5. Adjusting Transmitters With the Oscilloscope

This book of pictures and text shows how transmitter troubles can be diagnosed by means of the cathode-ray oscilloscope. . . . Accompanying each picture which shows proper and improper operation are the technical details which explain the action taking place in the transmitters. All types of transmitters are covered from very low-power jobs of 20 watts input to as high as an 1-kw "ham" rig. . . . While prepared especially for the ham rig operator, it will be found valuable by the student and the radio serviceman.

6. R-F and I-F Selectivity

If you examine modern service data on both home and communication receivers. more and more frequently you will find reference made to selectivity, image ratio, and the like. These are fast becoming very important service items which must be checked after a service job is finished and before the receiver can be considered as suitable for return to the customer. . . . What do these terms mean? . . . How are they employed? . . . When are conditions right and when are they wrong? . . . How can a bad condition be recognized and what can be done to remedy the defect? . . . These are questions which must be answered by the repair industry. . . . This book has the answers —contains the means whereby these operating factors will become known and understandable to you. . . . Are you familiar with the numerous tricky coupling methods used in receivers? You will be after you read this book! . . .

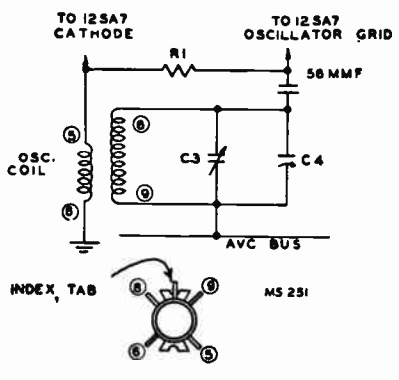
These Rider 99ers herald a new approach in technical radio books. . . . Authentic—up-to-the-minute—modern in every respect—yet above all economical to buy, they are the forerunners of a complete library. . . . Eventually there will be many titles—a sufficient number to cover the field and help prepare the maintenance branch of the radio industry for the technical future to come.

RCA 61-6, 61-7

A change has been made in the dial drive cord of these models, the dial drive mechanism of which appears on *page 15-53* of *Rider's Volume XV*. Stock No. 32634 cord-drive cord (about 37 inches long) should be approximately 34¾ inches long.

RCA 65X Series

Some models may use a No. 71406 oscillator coil in place of the one shown in the schematic which appears on page *15-62* of *Rider's Volume XV*. When No. 71406 oscillator coil is used, there will be a No. 39622 mica capacitor (56 $\mu\mu$f) used in place of the "gimmick" capacitance winding shown in the schematic. The accompanying drawing illustrates the necessary circuit changes.



Alternate oscillator coil in RCA 65X.

This being the kind of a super-steam-heated day that calls for a swim or a shower at regular and frequent intervals and as we have to fill this space, we are gonna let you who made with the pen and ink help us out by answerin' some of your letters that you wrote the Boss when you sent in your questionnaires and which we swiped off his desk. . . . Mebbe you can get an idea or two from some of the following. . . .

Chas. A. Constantine, Stockton, Cal.—That idea of a movable bookcase for your Rider Manuals is good, if the shop is extensive; that would save lifting alright. The brainthrob is a bookcase about 2 feet square, 2 shelves high, on casters with a sloping top for an open Manual. *There's room for 20 Rider Manuals and Index!!!!*

Buckley Radio Doc, Kansas City, Kan.—We can't blame you a bit for having a pet gripe like that. . . . But you're not the only one—far from it. We'd like to have a buck for every letter that has come in during the last ten years shouting for better model and chassis identification. The Boss has asked and asked *and* ASKED the manufacturers to help out. Well, the only thing we can do is to try again.

D. John Smith, Milford Center, Ohio—We are making a special drive to have "brand" sets in Vol. XVI and we're sure you'll be satisfied with the coverage.

Don Blair, Franklin, Pa.—"About 10 years ago, we put in a breast-high shelf at one end of our bench to hold your books, and arranged the lighting so that an opened Manual received about one-fourth as much light as that which shone on the defective chassis. We can glance from Manual to chassis and back without squinting at a bright page under a strong light. It's been unchanged for 10 years except for lengthening the shelf several times to accommodate new books." That's a good thought, Mr. Blair, to save your eyesight. Thanks for writing.

Joseph Czapracki, Nanticoke, Pa. — Sorry we couldn't fulfill your request for all those questionnaires that you wanted to give to the members of your servicemen's association. Why don't you tell them to send in their names and addresses to us so we can put them on the "S.S." mailing list or have the association secretary do it. It's theirs for the asking.

Will the broadcast station operator of Colorado who wrote an anonymous letter in which he punned that the Boss had the signal honor *of originating signal tracing, please identify himself so that his letter can be properly answered. Your letter was most interesting and deserves a reply.*

Angelo J. Pinto, West Sacramento, Cal.—Thanks for your letter and your offer of answering more questions, "because" (and we quote) "in doing so, I am only repaying information received in your Rider's Manuals that I use on every job in my shop".

Eugene Hughes, Chehalis, Wash. — The reason that the Boss hasn't followed your suggestion is that comparatively few newly purchased receivers are in a serviceman's hands. Remember that most sets are covered by a 90-day guarante : and after that period, only a comparatively small percentage of them develop trouble within a year. . . . See the lead story!

Krah's Radio Service, Manchester, Conn.—The reason we ran the fundamentals in the "How It Works" book was to provide a source of review for those who desired the background of the theory of a new development; those readers like you who feel that they know the underlying principles, can always skip over the fundamentals. But don't forget, hundreds of men have not your advanced knowledge and want to know the reasons why and how a circuit functions.

Paul W. Streeter, known as Radio Slim in Fallon, Nevada—Your idea of consistent newspaper advertising certainly has paid off from all the facts you gave. . . . And we consider your work with the local newspaper and power company tracing down sources of man-made static, is a good angle, not only from the viewpoint of service to the community but also as swell publicity for your shop. . . . We're glad you consider Rider's Manuals "worth their weight in good Nevada silver." . . . Thanks, Slim!

John F. Casey, Washington, D. C.—We're quite sorry that you don't care for the manner in which this column is usually written. We'll try to do better in the future. but we can't help what Aloysius Winenwiski does to the galley proofs—he's the gent that does the so-called correcting. *(Aside to the R.R.—Thanx for callin' me a gent, but you gotta nerve blamin' me four yer lousy speling. A.W.)* See what we mean, Casey?

William E. Lehman, Jr., Cumberland, Md.—Thanks for letting us know about beauty-parlor apparatus being a source of man-made static and also its repair being a source of profit. And thanks for your kind words to your reporter. . . . Don't worry you'll always find us in this spot as long as we can push Qwerty's keys. . . .

Max Soultanian, Riverside, R. I.—Thanks for your most interesting letter; we wish we had the space to run all of it, for it would be good for a lot of younger men to read and they could profit from your experiences. Briefly, Mr. Soultanian, born in Turkey, was a barber in various cities in Africa, Europe, and Canada and came to the U.S.A. when he was 34 back in 1910. He has run a photographic studio in addition to his barber shop and in 1923 began making crystal receivers for some of his customers Ever since then he has progressed along with the radio servicing field and now shoots trouble along with the best of them. *Our hat's off to a man who can do all those jobs well. . . .*

Alfredo Damien, Santiago de Cuba, Cuba—We certainly wish you loads of luck in starting your new shop. . . . Tell us specifically what books you have in mind and we'll be glad to help. . . .

Harry H. Simmons, Athens, Ohio and to several other writers—Your requests for a Master Index have been fulfilled. You can get one at your jobbers. . . .

Howard L. Luce, Convalescent Center, Orland Park, Ill.—Thanks very much for the kind remarks about our books. We trust that they will continue to give you the same "helpful service" in the future. . . .

There are a lot more letters which we would like to acknowledge, but that's impossible as space does not permit and many wrote anonymously. However, we appreciate your ideas and suggestions and if we can, those suggestions will be adopted. . . . And speakin' of suggestions, a very large percentage of you fellows who sent in the Rider Questionnaire asked that we give with some of *the newest dope on FM.* . . . Read the lead story and you'll see that we anticipated your wants. . . . **That's what we try to do—keep a jump ahead of you.** . . . And speakin' of jumpin', often we've been told to do that in a lake—well, sir, if someone said that to us this torrid day, anyone standin' on the shore could say, "That splash was

The Rolling Reporter

Notice to Servicemen

The following Rider Manuals are in stock and are available on order to your distributor:

Volume VII — Volume X
Volume VIII — Volume XI
Volume IX — Volume XII
Volume XV

The "Master Index" to the first fifteen Rider Manuals is also available to and through your distributor.

Other Rider Manuals are being reprinted. The tentative dates of availability of these volumes are:

Abridged Volumes I-V . October
Volume VI . . . . . October
Volume XIII . . . . . September
Volume XIV . . . . . September

And remember that the new Rider Manual, Volume XVI will appear in October. By November, we will be current on all Manuals which can be ordered from your distributor.

RCA 5Q12

The RCA Model 5Q12 is the same as the Model 6Q8 except that in the 5Q12 the 6U5/6G5 tuning indicator tube and its associated resistance R11 are omitted. The schematic for Model 6Q8 is found on *page 11-33* of *Rider's Volume XI.*

RCA 112A

The RCA Model 112A is the same as the Model 112 except that resistor R15 in Model 112A is rated at 205 ohms. This resistor is located in the filament circuit of the RCA-12Z3 rectifier tube. The circuit diagram for Model 112 is found on *page 4-58* of *Rider's Volume IV.*

RCA 85T2

The RCA Model 85T2 is the same as the Model 85T except that in the former model either of two loudspeakers may be employed with the numbers stamped as follows: 84128-1 or 84128-2.

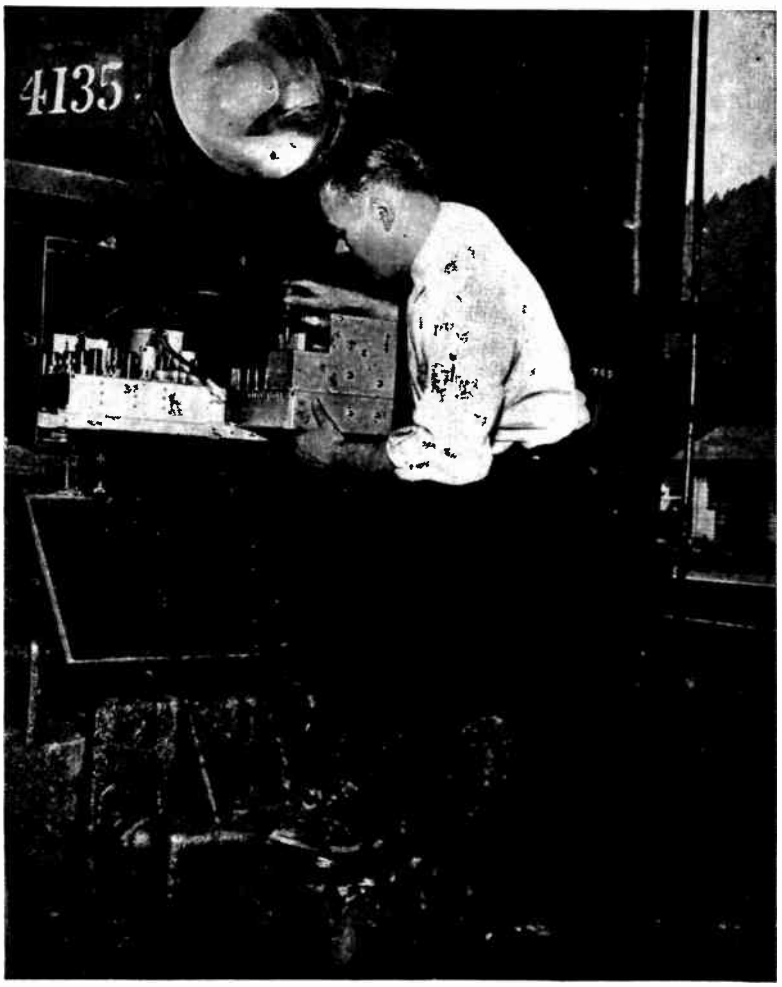
Distribution of This Issue — 27,500 Copies

Successful SERVICING

JULY, 1947

PICKUP RESONANCE EFFECTS

By Seymour D. Uslan



Courtesy of Westinghouse Elec. Corp.

IN the multitude of phonographs in use today, both in home receivers and professional phonograph amplifiers, two principal types of pickup are used: the magnetic and the crystal. The mechanical design of either type pickup is the most important factor in obtaining good reproduction of the recorded audio frequencies that are cut into the record. Let us consider the basic principle involved in reproducing the original sound from the record.

The phonograph needle, while traveling in the grooves of the record, is moved from side to side or up and down in varying degrees, and in such a manner that the mechanical energy resulting from these motions is changed into electrical energy by the pickup device employed (whether crystal or magnetic) and sent through the audio amplifying system of the unit. In order to obtain a good frequency response from the play-back of the record, the pickup device must have the correct mechanical design. The primary reason for this is that mechanical systems are exactly the same as electrical systems in that *resonance effects* exist in both. Since resonance effects are prevalent in mechanical systems, if the mechanical design is poor, the components of the system may produce undesired mechanical oscillations which may impair the proper operation of the equipment. In other words, certain features relative to mechanical systems have their exact counterpart in electrical systems. Consequently, any type of mechanical arrangement, no matter how intricate, can be illustrated as an electrical circuit.

Mechanical to Electrical Counterpart

In an electrical system the four primary features relative to circuit analysis are inductance, capacitance, resistance, and electromotive force. Almost everyone is familiar with these electrical circuit characteristics and the relationships among them as given by Ohm's Law and other such fundamental relations. In mechanical systems the four main properties that are the basic representations of such systems are the mass (weight) of the system, the damping effect or the opposition to movement, the displacement of the system due to some external force, and the external force applied at regular intervals.

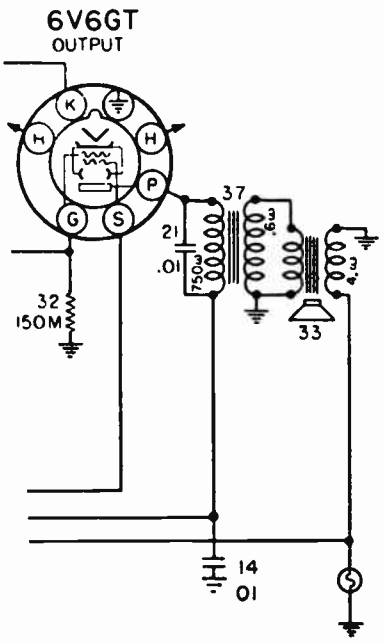
A simple mechanical "circuit" is illustrated in Fig. 1. The mass of the system, *M*, is represented by the weight immersed in oil. The thickness of the oil, which impedes the movement of the weight and is therefore in opposition to this movement, is the damping factor represented by *D*. The displacement of the system is represented by the stretching of the spring because of the action of some external force, *F*. The displacement caused by this force, *F*, is determined by the *compliance, K*, of the system. The compliance of a system, or in this case of the spring, is the characteristic which determines the degree or extent to which the spring will stretch because of some external force applied to it at intervals.

Inductance *L* in an electrical system is analogous to mass *M* in a mechanical system. That is, the weight of the mass offers a certain amount of opposition to any change of motion in the mass, and the quantity of inductance offers a certain amount of opposition to change of current flow. Similarly, the damping factor, *D*, in the mechanical system is equivalent to resistance *R* in an electrical system.

Please turn to page 12

Chevrolet 985792

In the production of this model between serial numbers B46-130000 and B46-136522 the following changes have been made: the 22,000-ohm resistor, 24, has been changed to 33,000 ohms; and the 0.01 μf capacitor, 14, has been moved



Partial schematic of Chevrolet 985792 showing changes.

from between the 33,000-ohm resistor, 25, and ground to the primary of the output transformer, 37, which is connected through the capacitor to ground, as shown in the accompanying illustration.

In the production of this model starting upward with serial number B46-136523, the 6SA7GT oscillator-translator tube has been changed to a type 7Q7. The voltages shown in the bottom view of the sockets on *page 13-2 of Rider's Volume XIII* are the same for the 7Q7 as for the 6SA7GT, except that the socket prong designations have been shifted.

Starting upward with serial number B47-1001, the tube complement is changed with the exception of the 7Q7 and the 0Z4G tubes. The i-f tube is changed from a 6SK7GT to a 7A7; the 6SQ7GT detector is changed to a 7B6; and the output tube is changed from a 6V6GT to a 7C5. The voltage readings on these tubes are the same as those noted above with the exception of the reading on the cathode of 7C5 which is 4.5 instead of 9.5 volts.

The early production schematic appears on *page 13-1 of Rider's Volume XIII.*

Watterson 4582

The alignment instructions for this receiver, the schematic of which appears on *page 15-2 of Rider's Volume XV,* were unavailable when the Manual went to press. They are as follows:

I-F Alignment: Set signal generator to 455 kc; connect its high side with a 0.1 μf capacitor in series to the grid of the 1A7 tube and the grounded side to the chassis. Tune the iron cores of the perm tuner so they are completely out of the coils. Use a small generator output. First, adjust the second i-f transformer for maximum output and then the first i-f transformer. Check to see that both transformers are adjusted for maximum output.

R-F Alignment: Connect the high side of the signal generator (with the capacitor removed) to the antenna lead (blue) and the ground lead of the generator to the chassis (black) lead. Set volume control to maximum and see that the iron cores on perm tuner are all the way out of the coils. Set generator to 1650 kc and peak oscillator trimmer. *See page 15-2* for trimmer locations. Then peak antenna trimmer for maximum output.

Turn dial drive shaft until iron cores are completely inside coils; set generator to 540 kc and adjust tracking core for maximum output.

Recheck alignment at 1650 kc, making sure of maximum output.

Zenith Chassis 5C01

A single chassis may contain octal, lock-in, and miniature button tubes. The following alternates may be found:

Original	*Alternate*
12SA7GT	12BE6 or 14Q7
35Z5GT	35W4
12SK7	12BA6
12SQ7	12AT6
50L6GT	50B5

In the event that the oscillator shifts, replace the 220-ohm resistor, R8, with one of 1000 ohms. If the oscillator drops out at the low end of the band, remove resistor R1 (10,000 ohms) from common return and connect it to the cathode of the converter. The schematic of this chassis will be found on *page 15-8 of Rider's Volume XV.*

If hum and microphonics are found in this chassis, check for a grounded tuning capacitor frame to the cabinet ventilator plate. Distortion and poor sensitivity are usually caused by a short circiut between turns on the loop. Sometimes poor sensitivity and failure to operate on the low-frequency end of the dial is due to the oscillator coil, which should be replaced. If uncontrolled oscillations occur, solder a 470,000-ohm resistor across the secondary of the first i-f transformer.

Majestic 8S473

In the late production of this chassis 4810, above serial number A235000, the two capacitors, C30 and C32 (each 0.001 μf), have been removed from the cathode circuits of the two 6K6GT output tubes. The schematic for the early production of this set is on *page 15-28 of Rider's Volume XV.*

RCA QU51C, QU51M, QU55

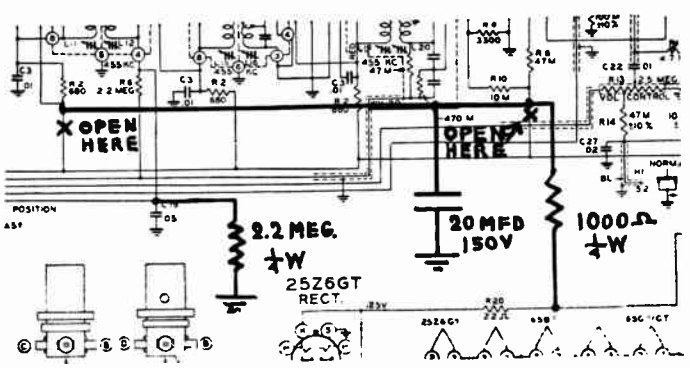
The value for capacitor C15 shown as 2-8 μμf, in the schematic found on *page 14-37* of *Rider's Volume XIV,* should be 2-12 μμf.

Zenith Chassis 8C01

If flutter is experienced when the set is on f.m., it can be eliminated by installing a 20-μf 150-volt capacitor (Part No. 22-1635) and two 0.25-watt resistors, one 2.2 megohms (Part No. 63-600) and the other 1000 ohms (Part No. 63-583), as shown in the accompanying partial schematic. The complete schematic of this receiver will be found on *page 15-71, 72 of Rider's Volume XV.*

A rushing noise when the volume control is turned to minimum is caused by a poor connection from the grid element to the grid cap of the 6S8GT discriminator tube. A hot iron and a little flux on the grid cap will remove the high-resistance solder joint.

If the f-m oscillator drifts, check for a red dot on the oscillator tuning slug wire. If the wire is unmarked, replace with one which has a red dot.



F.m. flutter may be eliminated in the Zenith Chassis 8C01 if the indicated changes are made.

RIDER MANUAL CONTEST

THE Rider Manual Contest is off to a flying start!

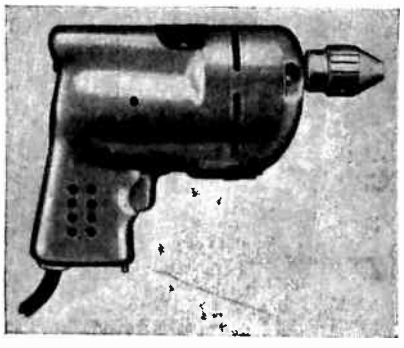
Already the early-bird contestants after those big cash and equipment prizes are sending in their entry blanks telling how "Rider Manuals mean successful servicing". . . . Those are smart boys for they now can go off on their vacations with nothing on their minds—nothing except which of the big prizes they are going to win. . . .

CASH PRIZES

1st Prize	$500
2nd Prize	300
3rd Prize	200
4th Prize	100
5th Prize	75
6th to 10th Prizes ($50 each)	250

Then there are 214 more prizes!

These are equipment prizes and they have been chosen with the thought in mind that they will be useful in any



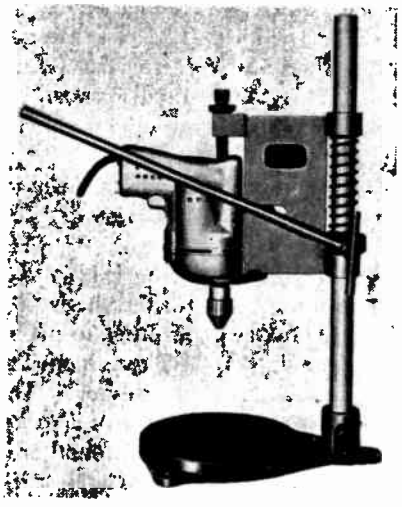
A portable electric drill—part of the 11th to 40th prizes.

service establishment. When the different types of equipment were chosen, a canvas of the field was made, and the best equipment of its kind was purchased. So if you are one of the equipment winners, you will be assured that you have something that will give tops in service. . . .

Because of the lack of space, it is impossible to tell about all the different equipment that will be awarded. . . . In the next issue of SUCCESSFUL SERVICING, you will find further descriptions. . . . But here is what will be awarded to the winners of the 11th to the 40th prizes, each worth $25.00. Each winner in this group will receive a

Portable Electric Drill—¼-inch Capacity—and a Bench Stand

This double-feature equipment is manufactured by the Black & Decker Mfg. Co. of Towson, Md., one of the world's largest makers of portable electric tools.



The electric drill mounted on the bench stand.

This drill and its stand, shown in the accompanying illustrations, has some remarkable features. . . . The drill, having a universal motor, will operate on either 110-volt a.c. or d.c. It is equipped with a fast-operating Jacobs hex-key chuck—capacity from 0 to ¼-inch shank; it has an instant-release "trigger" switch, easy and safe to operate, which can be locked "On" if desired; three-wire electric cord, the third being used for a ground connection to protect from shock; the sturdy gears, pinions, and bearings are in strong, light die-cast aluminum housings, which are shaped to fit the hand; and last but far from least, it is double-duty: *it can be used as a portable drill or in the bench stand.* The drill is only 7⅝ inches long, weighs 3¼ pounds, and has a no-load spindle speed of 2250 rpm.

If you add up all the uses for the ¼-inch portable drill—in the shop—in the home—these can be *doubled* by using this drill in the bench stand. The drill fits into the stand easily and quickly; it takes only a few seconds to have a smooth, accurate drill press—and just as quickly the drill can be removed for portable use. Merely place the hand drill in the yoke at the bottom of the drill bracket, screw the adjustable clamp into the socket on the handle end of the drill housing—and your drill press is ready to use. The base of the stand is screwed to the bench, the supporting column is rigid, the bracket can be adjusted to any height from the base and swung around to any desired position. The feed-handle leverage gives extra force for tough drilling and feeds smoothly for delicate work. The weight of the stand is 11¾ pounds and it is 19⅞ inches high.

Isn't that equipment that any repairman will be proud to have in his place? Surely thirty letter-writers are going to be happy over their prizes.

Now for the next group of winners—those whose letters are graded by the judges as being in the 41st to 80th class and whose prizes are worth $15.00 each. . . . Each winner in this group will be awarded a

Speed Iron—Model B—and 32 Extra Tips

This modern Soldering Gun is manufactured by the Weller Mfg. Co. of Easton, Pa. and operates from the 115-volt 60-cycle a-c line, with a power consumption of 100 watts.

The Speed Iron saves time—is always ready to use, as it needs but 5 seconds to heat to operating temperature. As may be seen in the illustration on page 14, the small tip enables the heat to be applied in close quarters where a larger point would be awkward to use. As the tip is only heated when the trigger switch

Please turn to page 14

$4325.00

Worth of Prizes in Cash and Equipment

Truetone D1645, Issue C

The following changes appear in receivers of this issue, the original issue being on *page 15-1 of Rider's Volume XV*:

The 68-μμf capacitor C22 is now connected from the junction of R7 and R8 to ground and a 100-μμf capacitor, C34, is connected from the other end of R8 to ground. The value of C32 is now 470 μμf instead of 330 μμf. C31, 0.004 μf is now connected from the plate of the 6V6GT output tube to terminal 8, the cathode of this same tube, instead of between the plate and terminal 3 of the speaker socket. A 0.2-μf tubular capacitor, C35, part #D67204 has been added from the screen-grid of the 6V6GT output tube to ground.

The following parts are used in some receivers only. Check part number on old part before ordering and order part originally used in the set. 40X281 tone control (substitute for 40X276); 25X1539 radio-phono switch lever, when 40X281 is issued; 2A161 d.p.d.t. switch when 40X281 is used.

Sonora RDU-209

The service data appearing on *page 15-2 of Rider's Volume XV* also applies to this model.

Ansley 32A

The model 32A is the same as the model 32, shown on *page 15-1, 2 of Rider's Volume XV*, with the following exceptions: the 240-ohm resistor connected to prong 5 of the plug is deleted as is also the 12-ohm resistor connected to the one just mentioned. The 10,000-ohm resistor that was in series with the deleted 12-ohm resistor is now connected to ground.

A permanent-magnet loudspeaker has replaced the dynamic speaker and the following changes have been made in this circuit: as there is now no field or bucking coils, the leads to these coils from terminals 1, 5, and 8 have been removed. Instead of the bucking coil (B.C. in the schematic), the voice coil is connected directly across the secondary of the output transformer.

PHILCO 80

In the Philco Model 80 the correct voltage on the screen grid of the 36 oscillator-detector tube is about 80 volts and not 165 volts as shown on *page 3-25* of *Rider's Volume III* and *page 113* of *Rider's Abridged Volumes I—V.*

Farnsworth Models

The parts shortage has resulted in the substitution of various types of tuning capacitors without change in part numbers stamped on them. In ordering replacement tuning capacitors for ET-060, 061, 063, 064, 065, 066, 069; EK-263, 264, and 265 the following suggestions should be observed:

Gang Capacitor with 21 plate oscillator section requires the removal of trimmer from t-f section of gang if the loop antenna has a r-f trimmer located on it. This capacitor used B.C. oscillator coil #38483 and, if an S.W. oscillator coil is used requires S.W. oscillator coil #38549. Both of these coils have a white dot to indicate finish lug.

A #26239 gang capacitor with 19 plate oscillator section (identified by red dot on rear) may require the removal of r-f trimmer as explained above. This capacitor requires B.C. oscillator coil #38706 and S.W. oscillator coil (if used) #38709. These oscillator coils are marked with a yellow dot at the finish lug.

The following is an alignment hint for the Farnsworth models with respect to the use of the antenna:

The antenna should be held in a vertical position, ⅝ inch from the back side of the radio chassis in order to maintain the maximum output of the antenna after being installed in the cabinet. Therefore, we suggest some type of a jig to be made out of scrap material found around the service department to hold said antenna in the proper position while the serviceman is realigning the radio out of the cabinet. This suggestion is very helpful in getting the best operation out of the radio and, in addition, saving expense and time.

Hallicrafters S-40

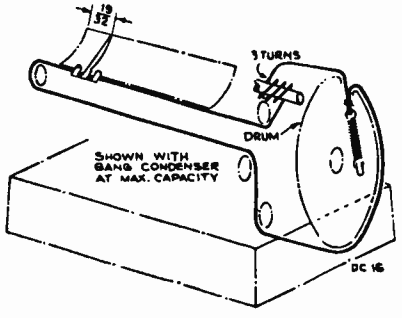
In the event that band 4 (15.7 to 43 mc) fails to operate at all times, but reception on other bands is normal, trouble is indicated in the oscillator circuit of this band, which in most cases can be traced to a weak 6SA7 oscillator tube or low line voltage. In those few cases where trouble persists, even though all voltages are normal and the tube has been replaced, this trouble can be remedied by replacement of the oscillator coil T9 and capacitor C18, as follows:

Replace T9 oscillator coil, part #51B791 containing 7 primary turns, with part #51B791B, having 10 primary turns. Change capacitor C8 (100 μμf) to part #CC25UK680K, 68 μμf. Connect the cathode lead from terminal 6 of the 6SA7 (V2) to T9 direct to the secondary winding where it leaves the coil form rather than to terminal lug "A" on the top of the coil form. (See sketch of coil form on *page 15-67, 68 in Rider's Volume XV.*) Replacement coils are furnished without the iron cores, as they are interchangeable. If new cores are needed, due to loss or breakage, they can be ordered under part #77A068.

If the receiver cannot be placed in "break-in" operation, apply the following remedy: Notice on the schematic of the receiver on *page 15-67, 68 in Rider's Volume XV* that the grid of V6 the output 6F6G tube is connected to the power switch S7, so that when the switch is in the "send" position the grid of this tube is grounded. Many operators wish to leave this switch in the "send" position and connect from terminal 5 on the plug PL2, through the transmitter relay to ground. In order to do this, the lead between S7 and V6 should be removed. On later production runs, this lead has been eliminated. See notes on "Power Requirements" and "Preparation for Use" on *page 15-71 of Rider's Volume XV.*

RCA 66BX

The dial cord drawing for this model is shown on *page 15-87* of *Rider's Volume XV;* this is slightly in error and the correct drawing is shown in the accompanying figure.



The dial cord drawing for RCA 66BX.

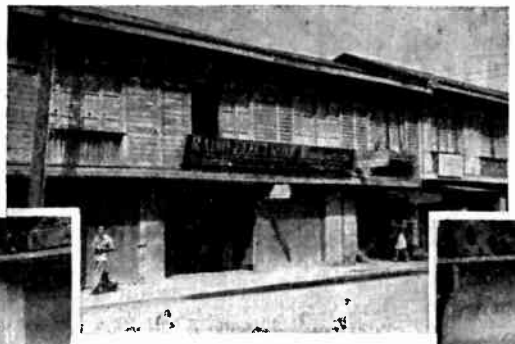
RCA 59VI

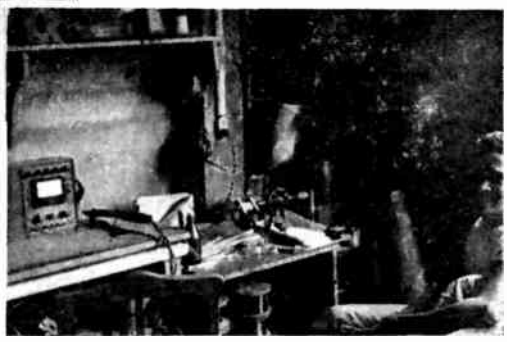
A speaker substitution has been made in some of the RCA Models 59VI, the circuit diagram of which appears on *page 15-54* of *Rider's Volume XV.* Speaker 92567-1 has been substituted for speaker 92513-1K. For replacement of speakers stamped 92567-1, order Stock No. 36330.

RCA Receiver Drive Cords

A small amount of beeswax rubbed lightly over a *rayon* drive cord will prolong the life of the cord. Nylon cord does not require this treatment.

A Long Way from Home





Andres Grimalt (left) and his Rider Manuals in the service department on the second floor of his Manila radio store (above). A coil winder (right) is a "must" in the Philippines.

While hunting around Manila for a store where he could get some radio parts, Bill Knapp, erstwhile technical writer on the Rider editorial staff and now doing some Army radar work in the Far East, spotted the sign on the building shown in one of the accompanying photographs. When he entered and told Andres Grimalt, one of the partners, his troubles, he was invited to go upstairs to the service shop. There, right handy on the bench, was a row of Rider Manuals, which Bill said yanked him right back to New York.

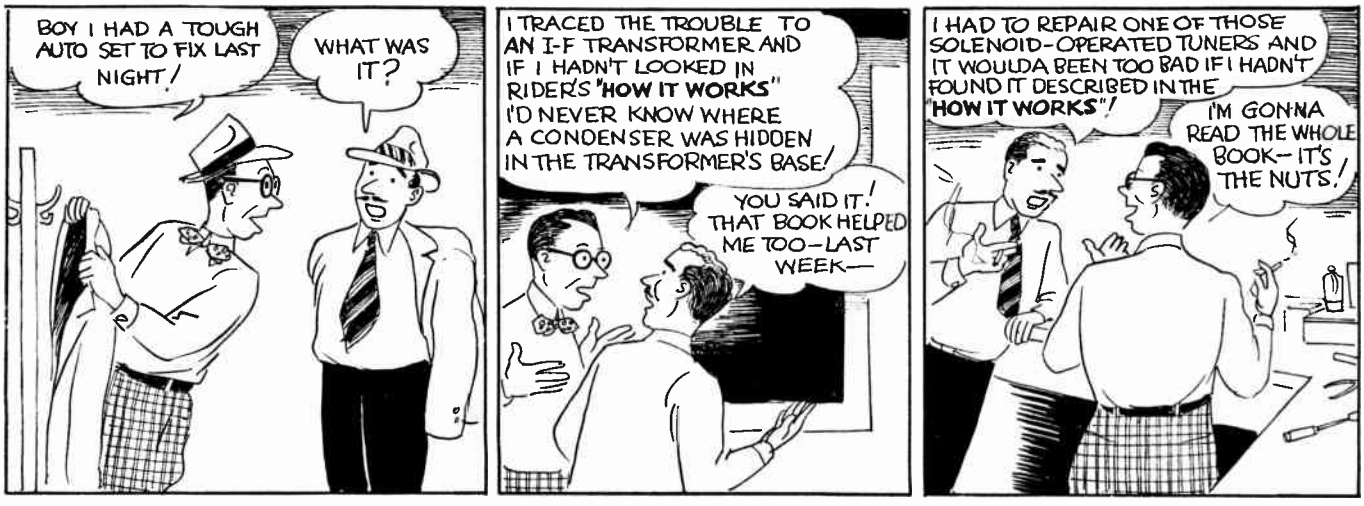
Radio servicing in the tropics is far from being a cinch. It's a long way to parts manufacturers and if a choke or transformer goes haywire, they rewind it right on the spot. One of the biggest headaches is getting the moisture out of the various components and they have to resort to all sorts of dehydrating stunts. Space does not permit telling all the trials and tribulations Senor Grimalt and his men underwent before the Japs were urged to go back home, but we are assured they were plenty tough. . . .

The Cover—Railroad Radio

F. W. Beichley, Westinghouse district engineer, is shown on page 1 making final adjustments on Westinghouse Type MR radio transmitting and receiving equipment on the front end of one of Southern Pacific's big cab-ahead freight locomotives used in recent communications experiments in the Cascade Mountains of southern Oregon. The compactness and ease of accessibility of the shock-mounted slide-in type mobile unit are readily apparent. Note, at the right side of the photograph, the co-axial line leading from the apparatus to the antenna (not shown) atop the locomotive cab.

This railroad radio equipment provides for communication between moving trains and stations along the route and between the engine and the rear of long freight trains, enabling the conductor and engineer to receive and exchange information while moving. Southern Pacific communications engineers reported test use of the equipment in the experimental area very often enabled a material saving of time in train handling.

It's the Nuts



Subminiature Triode

A triode four-tenths of an inch in diameter and one and a half inches long has been announced by the Raytheon Mfg. Co. This is a high mutual conductance triode with a 200-milliampere 6.3-volt heater and has an output of about one watt at approximately 25% efficiency on the Citizens' Radio Band of 460 to 470 megacycles. With a reduced output, the tube will operate up to 800 megacycles or more.

When employed as an oscillator, the type CK608CX subminiature triode has sufficient output working at about 465 mc to light a 150-ma 6.3-volt pilot lamp to full brilliance when it is used as a load, as indicated in Fig. 1. In the event that some readers might wish to experiment with this circuit, the following constants are given: C1 and C2, 500-$\mu\mu$f feed-through Ceramicons; R1, 4000-ohms 0.5-watt carbon resistor; RFC1, 2, 3, and 4, 36 turns No. 30 enamel wire on BT ½, 0.5-watt 1-megohm resistor or on a form 3/16-inch diameter and 5/8-inch long; L1 and L2, ¼-inch-O.D. 7/32-inch-I.D. silver-plated brass tubing, threaded 12/28 to receive Ceramicon condenser. The lamp

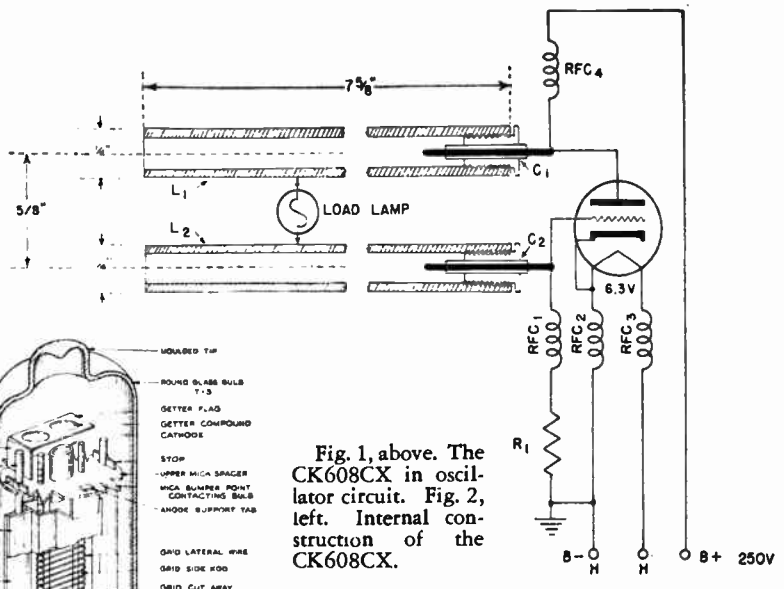


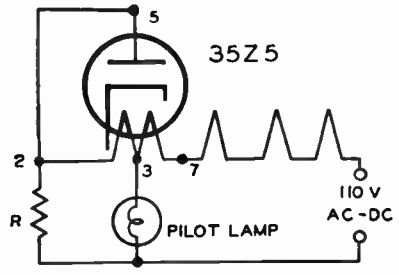
Fig. 1, above. The CK608CX in oscillator circuit. Fig. 2, left. Internal construction of the CK608CX.

load is the pilot light mentioned above. The tube voltages are as indicated.

The CK608CX is used with a subminiature socket similar to those commercially available, but the tube may be soldered into the socket with some increase in operating efficiency at these high frequencies. Fig. 2 is a cut-away drawing that shows the construction of the tube.

Pilot Lamp Burnouts

In certain types of ac-dc receivers in which a 35Z5 rectifier is used as shown in the accompanying schematic, trouble is sometimes encountered by the pilot lamp burning out. The pilot lamp is connected from pin 3 of the rectifier to the other side of the 110-volt line, thus connecting the lamp in parallel with the series combination of resistor, *R*, and that portion 2-3 of the 35Z5 heater, which is rated at 7.5 volts. The other portion of the heater is rated at 27.5 volts.



Burnout of pilot lamps is sometimes caused by the burnout of a portion of the 35Z5 in ac-dc sets.

In the event that the portion 2-3 of the heater burns out, resistor *R* is no longer in the circuit, resulting in a sudden increase of current through the remainder of the circuit. As the pilot lamps generally used in this type of circuit are rated at 6.3 volts, 150 ma, this surge of current is too great and the pilot lamp filament burns out. The pilot lamp will burn out before any of the tubes in the circuit because generally the tube

Please turn to page 14

SYMBOL STANDARDIZATION QUESTIONNAIRE

The Radio Manufacturers Association Service Committee has embarked upon a project of standardizing the symbols used in the radio receiver and allied equipment manufacturers' service manuals. Accordingly, they are interested in determining which symbols for radio components are most readily understood by members of the radio servicing fraternity. As a part of this project, the R.M.A. Service Committee has approved the use of John F. Rider Publisher facilities in the form of this questionnaire, to establish preferences for the various symbols shown.

As you realize, various attempts at standardization have been made during the years past. Moreover, engineers have individual preferences, with the net result that more than one kind of symbol is used to represent any one component. This questionnaire contains the most commonly used symbol representations, as may be found in service literature published in the past and being published today. It may become evident to you as you read the questionnaire that several items, as, for example, some resistors and plugs have been omitted. This is deliberate, inasmuch as there exists only one representation for a fixed resistor, whereas for volume controls, potentiometers, or adjustable resistors, there may be representations for tapered units.

It is hoped that, after this survey is completed and the manufacturers have made their selections, the information will be conveyed to the educational institutions where prospective personnel who intend to be active in the radio industry are trained, to the various publishers of magazines and textbooks, and to other organizations which, by virtue of their activity, employ symbol representations of components. In this way it is anticipated that all will follow the same type of representation, thereby fostering better recognition and increased understanding of what is being shown.

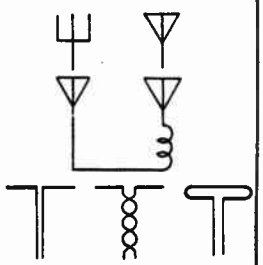
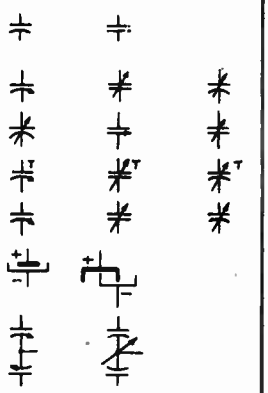
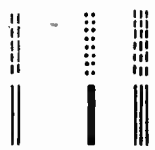
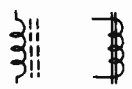
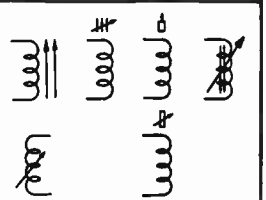
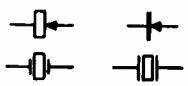
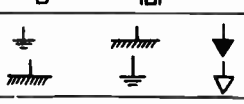
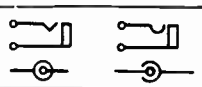
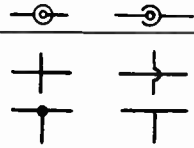
You will note that comparatively few television items are shown, except those which are common to regular a-m and f-m receivers. The reason for this is that, since the radio servicing industry as a whole has not as yet worked with television equipment, it seems needless to complicate the questionnaire. Moreover, the majority of the components used in television equipment are the same as those used in the regular receivers, so that the omission of a comparatively few symbols will have no effect upon the value of the answers received from the radio servicing industry.

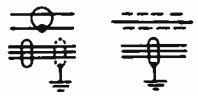
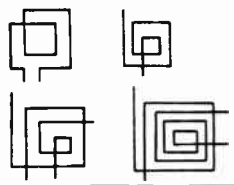
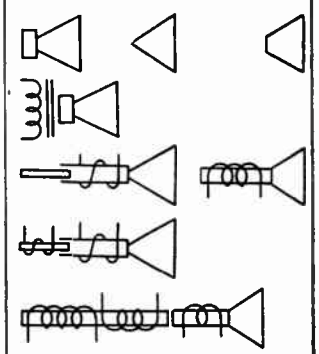
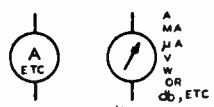
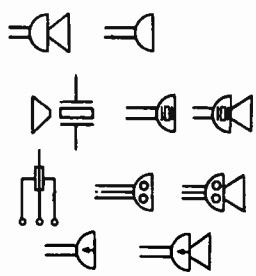
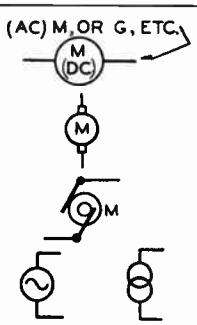
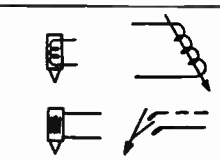
As a last and final thought, the matter of circuit representation is also important, although this is not being queried at this time. However, in the event that you have any ideas concerning circuit representation whereby you feel that increased comprehension could be accomplished, please submit your thoughts on page 4 of this questionnaire, which purposely has been left blank under the heading, "Comments," after you have checked your preferences.

Please accept our sincere thanks and the thanks of the Radio Manufacturers Association Service Committee for your cooperation. A postage-paid envelope is enclosed for your convenience. If you will use this envelope, it will not be necessary for you to affix postage when you send in your questionnaire, consisting of pages 7 to 10 inclusive, which can be removed.

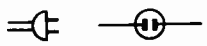
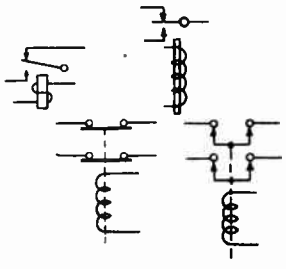
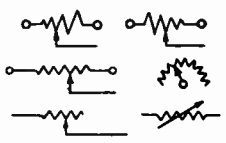
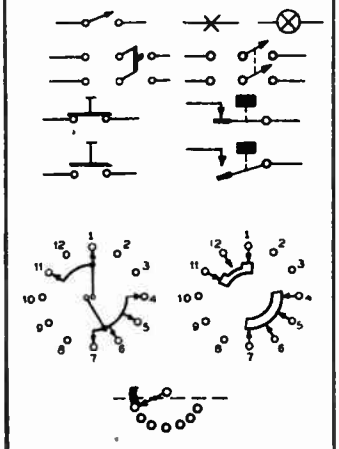
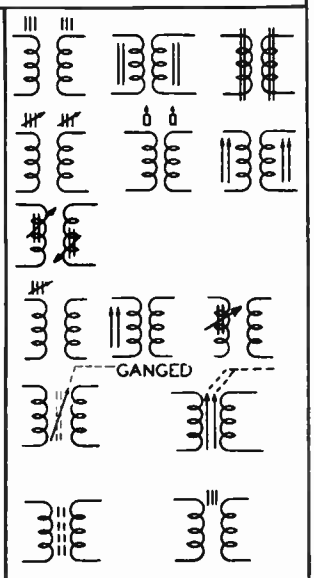
Again — thank you.

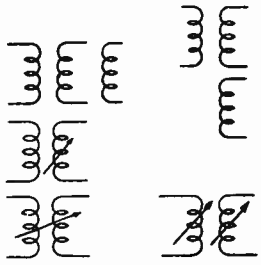
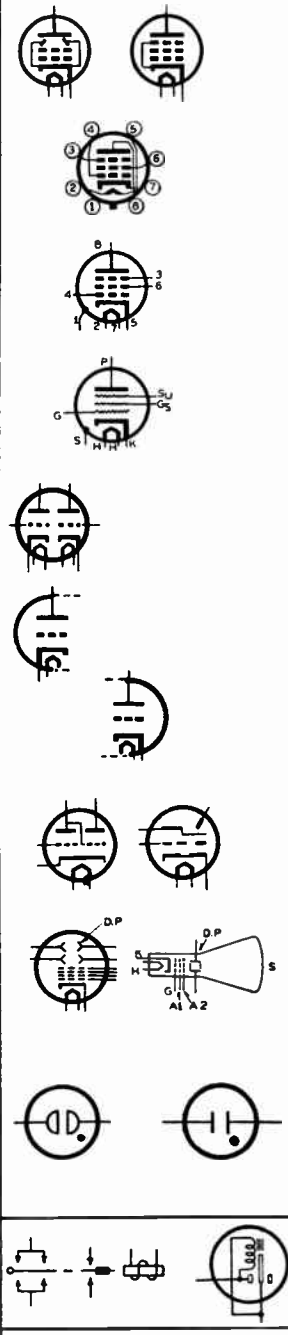
JOHN F. RIDER

ELECTRONIC COMPONENT	SCHEMATIC CONVENTION
ANTENNA AMPLITUDE MODULATION (SINGLE) " " (DOUBLET) FREQUENCY MODULATION, TELEVISION, ETC.	
BALLAST RESISTOR	
CAPACITOR FIXED VARIABLE:- MAIN TUNING TRIMMER (WITHOUT ROTOR) TRIMMER (WITH ROTOR) " " ELECTROLYTIC SPLIT-STATOR	
CORE MATERIAL POWDERED SOLID OR LAMINATED	
CHOKE POWDERED OR SOLID (WITH APPROPRIATE CORE MATERIAL SYMBOL)	
COIL SINGLE CORE PERMEABILITY TUNING (WITH APPROPRIATE CORE MATERIAL SYMBOL) VARIABLE INDUCTANCE	
CRYSTAL DETECTOR OR RECTIFIER PIEZO-ELECTRIC	
GROUND CHASSIS B-	
JACK TELEPHONE PIN	
LEADS CROSSING CONNECTED (CON'T.)	

ELECTRONIC COMPONENT	SCHEMATIC CONVENTION
LEADS (CON'T.) COAXIAL CABLE CABLE WITH SHIELDED GROUND	
LOOP SINGLE DOUBLE	
LOUDSPEAKER GENERAL MAGNETIC P M DYNAMIC ELECTRODYNAMIC "	
METER CURRENT, VOLTMETER, DECIBEL, ETC.	
MICROPHONE GENERAL CRYSTAL DOUBLE BUTTON VELOCITY	
MOTORS & GENERATORS USE ONLY WITH IDENTIFYING NOTATION (GENERAL) DIRECT CURRENT ALTERNATING CURRENT A-C SIGNAL SOURCE	
PICK-UP (REPRODUCER) ELECTROMAGNETIC CRYSTAL	

✓ CHECK YOUR PREFERENCE

ELECTRONIC COMPONENT	SCHEMATIC CONVENTION
PLUG OUTLET	
RELAY CLAPPER TYPE PLUNGER "	
RESISTOR TAPERED POTENTIOMETER VOLUME CONTROL	
SWITCH ON-OFF DOUBLE POLE DOUBLE THROW PUSH-BUTTON CLOSED " " OPEN BAND-SWITCH (ROTARY) (WITH OR WITHOUT SHAPE OUTLINE) " " "	
TRANSFORMER DOUBLE CORE UNTUNED (WITH APPROPRIATE CORE MATERIAL SYMBOL) DOUBLE CORE PERMEABILITY TUNED (WITH APPROPRIATE CORE MATERIAL SYMBOL) " " " SINGLE CORE P. T. (WITH APPROPRIATE CORE MATERIAL SYMBOL) SINGLE CORE P. T. GANGED (WITH APPROPRIATE CORE MATERIAL SYMBOL) SINGLE CORE UNTUNED (WITH APPROPRIATE CORE MATERIAL SYMBOL) (CONT.)	

ELECTRONIC COMPONENT	SCHEMATIC CONVENTION
TRANSFORMER (CONT.) TRIPLE WINDING VARIABLE COUPLING " "	
TUBE BEAM POWER, SUPPLEMENTED BY CHOICE BELOW BOTTOM VIEW SCHEMATIC-PINS IN THEIR EXACT LOCATION, AND WIRING CROSSOVERS IN ENVELOPE. SCHEMATIC-PIN NUMBERS NOT IN THEIR EXACT LOCATION, NO WIRING CROSSOVERS. SCHEMATIC-ELEMENT DESIGNATION, NO PIN NUMBERS. DUAL TRIODE, OR OTHER COMBINATIONS, SHOWN AS ONE ENVELOPE PIN NOS. OR OTHER DESIGNATIONS SUPPLEMENTED BY CHOICE ABOVE OR DUAL TRIODE (SPLIT) PIN NOS. OR OTHER DESIGNATIONS SUPPLEMENTED BY CHOICE ABOVE TUNING EYE, WITH DESIGNATIONS SUPPLEMENTED BY CHOICE ABOVE CATHODE RAY TUBE (ELECTROSTATIC) NEON	
VIBRATOR TYPICAL	

✓ CHECK YOUR PREFERENCE

COMMENTS

Pertaining to the Radio Manufacturers' Association Symbol Standardization Questionnaire

I have been in the radio business for ..... years.

Please check your classification: Serviceman ☐ "Ham" ☐

Engineer ☐ Student ☐

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Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

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JOHN F. RIDER, Editor **G. C. B. Rowe, Associate Editor**

NEW OPPORTUNITIES

TODAY the vacuum tube is utilized in still another way in filling an otherwise silent world with everyday sounds for thousands of persons who have difficulty in hearing. This extension of the versatility of the vacuum tube to hearing aids makes them a far cry from the "ear trumpet" of a half-century ago, but like all man-made devices, the hearing aid does require some attention of one who understands the functioning of its components—tubes, microphone, receiver, etc.—to repair any troubles.

Up to the present time almost all the manufacturers of hearing aids have placed the maintenance of their products in the hands of their representatives and jobbers. It is evident on the face of it that this practice works a certain amount of hardship on hearing-aid users who live where repair facilities are not readly available, inasmuch as their instruments have to be sent away and in many cases they are deprived of their use for more or less long periods. It has seemed to be the consensus of nearly all the manufacturers that the test, diagnosis, and repair of hearing aids was an intricate art in itself and that only a comparatively small number of men were capable of handling maintenance properly. It is our opinion, however, that this is a debatable attitude, because undoubtedly there are many men in the radio-repair field who can do this work—and do it well. We are referring to men who are technically competent, financially responsible, with well-equipped and well-located stores.

It does not seem reasonable that anything as vitally necessary as a hearing aid to the person dependent upon it in his daily business and social life, should be taken from him for relatively long periods because repair facilities are not available in his community. Such penalties might necessarily have been exacted at one time, but we cannot believe that such conditions are existent now. Surely, out of the 25,000 odd radio repairmen in this country, 700 or 800 could be found easily who have the required qualifications and who would be glad to expand their endeavors in the electronic field in order to help users of hearing aids to have uninterrupted use of their instruments.

With the electronic business in the fluid state that exists today, new ideas and policies are being established to keep the trade abreast of the times. That such thinking is prevalent is evidenced by the fact that one manufacturer of hearing aids is interested in contacting competent repairmen throughout the country to maintain his instruments. If you are interested in branching out, write us giving all pertinent information—your educational background, electronic experience, available equipment—and we will forward your letter to the manufacturer. (As a matter of fact, the service material of this manufacturer will appear in the next Rider Manual.) Here's an opportunity to expand your activities—let us hear from you.

JOHN F. RIDER

Service Net For Ham Receivers

The matter of ham communication receiver servicing is receiving appreciable attention and no doubt the following will be of interest to many men who are operating well-equipped service shops. Hallicrafters is setting up a net of radio service shops to perform regional maintenance on their receivers and transmitters. According to Bruce Lafferty, who is in charge of the operation, about 50 or more such service stations spanning the nation, is the goal. In passing, it might be well to mention that other manufacturers of similar communication equipment have expressed an interest in using the same service shops as factory-approved service stations.

Just which areas are still open is not known to us, although we have been told that the net is still very far from being complete, as a matter of fact more men are being sought than have already been accepted. As to the qualifications, character recommendation from a Hallicrafters distributor is essential and the more the better. As to technical requirements, obviously the applicants must be familiar with communication receivers and transmitters. This no doubt will tend to restrict the number of service shops who will request factory approval, but the stipulation that the service shops be familiar with such apparatus is easily understandable.

As to testing equipment necessary for such work, good scopes, vacuum-tube voltmeters, and *accurate* signal generators are essential, especially the latter. In view of the frequency range covered by this manufacturer's receivers, signal generators providing frequencies as high as 175 megacycles are matters of moment. Naturally, the more complete the service-shop equipment, the better the prospects for acceptance.

The establishment of such service nets for ham equipment has been a vital need for a long time. And when one realizes that many communication type receivers are getting into the hands of persons who are not full-fledged amateurs, but rather short-wave listeners, the need for competent service is becoming even greater. At first thought it may seem that such service activity cannot support a shop, but when it is realized that any one parts jobbers sells a number of different brands of such equipment, such a net may serve more than one manufacturer. This means increased income—without the restriction that only communication receivers may be serviced.

Please turn to page 14

Pickup Resonance Effects

Continued from page 1

The reason for this is that damping factor D (due to the viscosity of the oil) reduces the amplitude of the movement of the mass by absorbing mechanical energy from the system and resistance R reduces the amplitude of the alternating current flow by absorbing electrical energy or power from the electrical system. Likewise capacitance C is equivalent to compliance K in that there is electrical energy stored in a capacitor which is a determining factor in the amount of current flow, and that mechanical energy is stored in the spring which is a determining element in the amount of displacement of the mass. Finally, the external force, F, acting on the mechanical system is equivalent to the electromotive force, E, of the electrical system since both of these forces start the systems into vibration or oscillation.

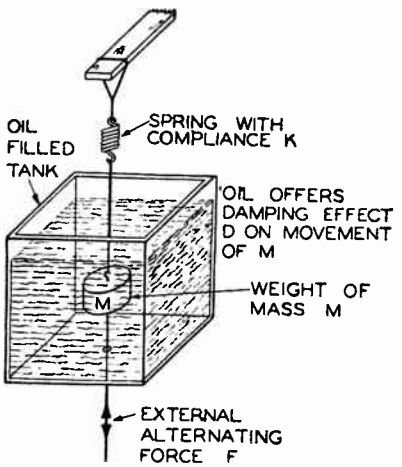


Fig. 1. A simple mechanical system represented by a spring, a weight immersed in oil, and an external alternating force. This system is equivalent to a series resonant circuit in the electrical system.

A typical electrical system analogous to the mechanical system of Fig. 1 is illustrated in Fig. 2. This diagram consists of nothing more than a series resonant circuit containing R, L, C, and an electromotive force, E. From the foregoing discussion it follows that Figs. 1 and 2 are analogous to each other in that R is equivalent to D, L is equivalent to M, C is equivalent to K, and E is equivalent to F.

It is known that the frequency of oscillations in a series resonant circuit is equal to $\frac{1}{2\pi\sqrt{LC}}$, where L is the inductance measured in henrys, C is the capacitance measured in farads, π is numerically equal to 3.14, and the frequency of oscillations is in cycles per second.

Since M is equivalent to L, and K equivalent to C, it follows that a resonant frequency also exists in the mechanical system and is equal to $\frac{1}{2\pi\sqrt{MK}}$. Of course, the correct units of M and K must be inserted in order to obtain the frequency of oscillations in cycles per second. For the purpose of this article the values of M and K are of no consequence; here the primary purpose of showing that a mechanical system can be represented by an electrical system and that the mechanical system also has resonance effects is of importance to us. In other words, in all the different mechanical arrangements used in today's receivers, a relation exists between the units comprising each arrangement such that mechanical resonance will occur at some specific frequency, such frequency being determined by the aforementioned mechanical units.

Some of the more common mechanical systems in radio receivers where mechanical resonance may occur are found in phonograph pickup arms, loudspeakers, and recording heads. Mechanical resonance is undesirable because it interferes with the normal operation of the set. That is, the arrangement of the different mechanical parts comprising the system is such that the combined mass, in conjunction with the total compliance, produces mechanical resonance effects that interfere with the operation of the set. Consequently, if improper design and arrangement of the mechanical system of a pickup arm exist, there is the possibility that mechanical resonance may occur within the audio-frequency range and that it will interfere with the reproduction of the audio frequencies (music, speech, etc.) from the record.

Reducing Resonance Effects

If it is found that the pickup arm produces undesired resonance effects, several methods of correction may be applied. First, if it is desired that only the *amplitude or strength* of the mechanical resonant frequency be changed (in this case, *reduction* of the amplitude), all that need be done is to introduce some factor that will damp the amplitude of this resonant frequency. This is equivalent to introducing resistance in a resonant circuit. Therefore, if a damping factor is inserted into the mechanical system, the amplitude of the unwanted mechanical resonant frequency, and not the frequency of oscillations, will be changed (reduced).

However, if the frequency of mechanical oscillations is to be changed, either the mass of the system or the compliance must be changed. This is analagous to the electrical system where either a change in the inductance or capacitance of a resonant circuit will shift its resonant frequency, and this is readily seen from the foregoing equation for the resonant frequency of a series circuit. (If the resistance of a parallel resonant circuit is not too high as compared to the reactance of either the coil or capacitor, the equation for the resonant frequency of a parallel tuned circuit is considered the same as that for the series tuned circuit.)

From the analogous equation for the frequency of mechanical resonance it is found that, if either the mass or compliance is increased, the frequency of oscillations will decrease accordingly; and, on the other hand, if the mass or compliance is decreased, the frequency of oscillations will increase. In other words, if the product of MK is increased, the frequency of oscillations will decrease; and if the product is decreased, the frequency of oscillations will increase.

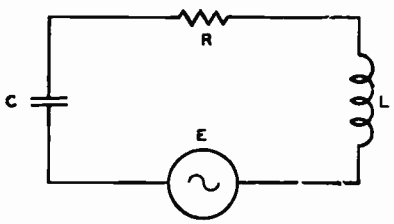


Fig. 2. This series tuned circuit is the electrical equivalent of the mechanical system in Fig. 1.

The methods of changing the parameters M, K, and D to accomplish some means of *reducing the effect* of the mechanical resonance in phonograph pickup arms are as follows:

1. Introduction of, or removal of, some weight of the system. With this method, great care must be taken in order that the other parameters are not changed.

2. Introduction of, or removal of, some compliance of the system. This is usually accomplished by either tightening or loosening certain springs or wires in the unit such that the movement of the mass will be more or less restrained according to the elasticity of the springs or wires.

3. The most common method of reducing the effect of mechanical resonance is to damp the frequency of oscillations. In other words, the mass and compliance of the system should be kept more or less constant while a damping factor, D, is introduced in the proper place.

One method of introducing a damping factor is to apply a special kind of viscous liquid on various moving parts of the pickup arm. In other pickups the damp-

ing may be accomplished by changing the material in the pivots or bearings so that at these points there is dissipation of the mechanical resonant energy, and the amplitude of the oscillations thus are reduced. Introduction of some material that slows down the ready movement of the system at resonance, such as rubber strips in the correct places, will also help to damp the unwanted oscillation.

When a mechanical system, such as a pickup arm, is changed by the introduction of damping effects, some undesirable factors may be introduced. For example, if a rubber sleeve is placed around a particular piece of wire to damp mechanical oscillations, this also would add some weight to the pickup arm and consequently increase the force of the needle onto the record. That is, the mass of the system would change by becoming heavier and this would mean an increase in the needle pressure on the record. In this respect an additional change in the mechanical arrangement of the pickup arm is necessary to prevent increased needle pressure on the record.

Mechanical Impedance

From the foregoing analysis of how the effects of mechanical resonance may be reduced, it is readily seen that it is by no means a simple procedure. The design and manufacture of magnetic and crystal pickup devices are indeed a delicate operation. The development and design of such mechanical systems are more readily accomplished from the understanding that most mechanical systems, no matter how complex, can be represented by an equivalent electrical system. The simple case for this was shown with reference to Figs. 1 and 2 and an explanation of mechanical resonance.

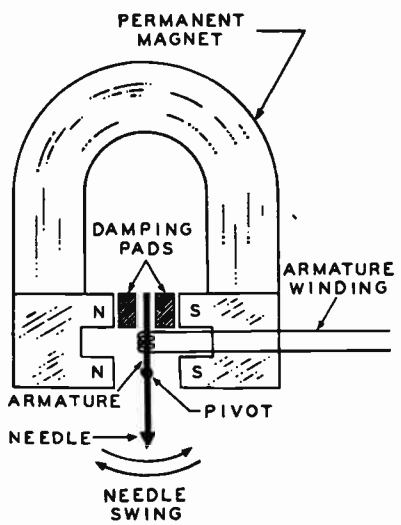


Fig. 3. Pickup assembly showing damping pads which absorb the strong vibrations of the armature, thereby reducing the effect of mechanical resonance.

It follows that if resonance exists in a mechanical system, mechanical impedance must likewise exist, which consists of mechanical reactance and the damping of the system. The mechanical reactance is simply a combination of the reactance due to the mass and the reactance due to the compliance of the system. Whichever has the greater mechanical reactance will be the dominating influence in the total amount of impedance and the actual movement of the mechanical system. In other words, the combination of the mechanical reactance with the damping (i.e. both together being the total effective mechanical impedance) affects the complete system in such a manner that any mechanical movement is retarded according to the magnitude of the mechanical impedance.

Magnetic Pickup

For the moment, picture a simple magnetic reproducer similar to that used in the phonograph pickups of today's radio receivers. The phonograph needle is inserted in its hole and fastened in place. The needle plus the remainder of the magnetic pickup device now function as a complete unit in reproducing the audio variations that are cut into the record.

A diagrammatic view of a typical electromagnetic pickup is illustrated in Fig. 3. The operation of the pickup is such that it converts mechanical energy into electrical energy in this way: As the needle moves from side to side (a lateral movement) in the process of following the groove walls, the armature in turn is forced to vibrate in the magnetic field created by the permanent magnet. The coil wound around the armature moves in accordance with the movement of the armature, which in turn varies in agreement with the needle swing. Under the circumstances that the armature follows the needle swings, the flux cutting the armature winding varies in accordance with these needle swings. This sets up a voltage across the terminals of the armature winding, which is connected to an a-f amplifying system. Since the armature is compelled to vibrate at an audio-frequency rate, the voltage at the terminals of the armature coil is an audio-frequency voltage which, after amplification, may be delivered to a loudspeaker. The resulting sound is a reproduction of the original sound which was recorded on the groove of the record.

The complete mass of the system consists of all mechanical parts in this pickup, such as the permanent magnet, the armature, the coil, and numerous other parts not necessarily shown in Fig. 3. This mass in conjunction with whatever parts offer compliance to the system are so arranged that at some frequency within the audio range the system will break into mechanical oscillations, and the armature will vibrate vigorously. In other words, the total mass of the system, being electrically equivalent to an inductor and the compliance of the system being electrically equivalent to a capacitor, has a resonant frequency within the audio range. In an electrical circuit if the amplitude of the oscillations is desired to be subdued, a resistance would be inserted. This is equivalent to inserting some damping factor in the pickup arm. In order to damp out the strong vibrations caused by mechanical resonance, *damping pads* are inserted on either side of the armature as seen in Fig. 3. These pads absorb the strong vibrations of the armature and thus reduce the effect of mechanical resonance.

The pickup assembly shown in Fig. 3 only includes those parts necessary to describe its basic operation. In reality it is much more intricate. The method of damping as applied to the typical problem just discussed is only one of the many ways damping is accomplished.

Since the mechanical arrangement of pickups is quite intricate, it is advisable that the serviceman not try to introduce any damping effect. Instead, he should contact the manufacturer of the particular pickup on which he is working.

RIDER CONTEST

Continued from page 3

is closed, no power is wasted—no time is wasted waiting for the iron to get hot—and as no current flows when the trigger switch is released, the point cools off almost at once, so there is a minimum danger of burns.

This new idea of quick heat where it is needed, makes the Speed Iron a good tool for working wherever soldered joints are necessary in radio or general electronic construction. The heat produced in the soldering tip of the Speed Iron comes from the high current—approximately 400 amperes—and low voltage delivered by the air-cooled transformer in the rectangular portion of the tool—this is the same principle as the transformer welder. When the trigger switch is closed, the current flows through the soldering tip that is connected across the secondary of the transformer. The small radiating surface of the wire makes sure that the heat is transferred by conduction to the solder and the joint. New tips are easily inserted and tinned and as 32 extra tips are given along with the iron as a prize, 40 contestants are going to have long periods of easy soldering. . . .

The Speed Iron is ideal to take on a job in the customer's home. As the point cools off quickly, no soldering iron stand has to be carried along. There is no

The modern soldering gun with 32 extra tips awarded as the 41st to 80th prizes.

chance of an iron slipping off its stand and burning a rug or floor—when the Speed Iron is set aside for a moment, the switch opens, and the point cools.

These are the first 80 prizes. . . . In the next issue of SUCCESSFUL SERVICING the prizes for the other two groups—the 81st to 140th winners and the 141st to 224th winners—will be described.

Before you mail your entry blank, *be sure it is filled out completely.* Please *print* your name and address. Be sure to indicate by a check if you are a serviceman, engineer, etc. in the lower left-hand corner. Also write in the name of your preferred parts jobber, so that he too may profit if you are a winner of one of the first ten cash prizes.

If you haven't already obtained your entry blank to the RIDER MANUAL CONTEST, *get one today from your jobber.* Remember—no more than 100 words in your letter. . . . It's easy, especially if you are one of the tens of thousands of servicemen who have benefited during the past 17 years, from the time-saving and money-making information provided by Rider's Manuals. *Do it now!*

SERVICE NET

Continued from page 11

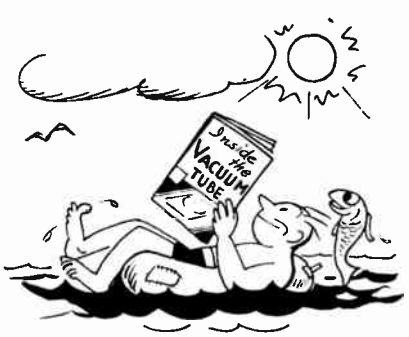
Of course, the applicants must appreciate the servicing requirements for such receivers. They are much more rigid than for the conventional run of broadcast sets. Alignment is much more critical—for the ham is vitally concerned with that old adage, "If you can't hear 'em, you can't work 'em." Those who are interested should communicate with Bruce Lafferty at The Hallicrafter's Co., 4401 West Fifth Ave., Chicago, Ill.

PILOT LAMP BURNOUTS

Continued from page 6

heater voltage varies from 12 to 50 volts; therefore they can withstand the momentary current surge until the circuit is opened when the pilot light burns out.

If such a burnout of a pilot lamp is experienced, it is suggested that both portions of the 35Z5 heater be checked separately with an ohmmeter to see if one is open. Although the 2-3 portion of the 35Z5 may be open, when checked with a tube checker, the rectifier will indicate "good." If such a rectifier is returned to the receiver and another pilot lamp is inserted, the latter will burn out as the first one did. Therefore a check of the 35Z5 with an ohmmeter will save pilot lamps.



Sixteen (16) Count 'Em!

Didja have a tough time locatin' this here fount of information, wisdom, and drivel? Well, we was shoved offen p. 7 on accounta the Boss decided there was *so much brainfood* that he thought you should know about that we just hadta have more area to spread it out on . . . So we ordered us double our usual dose of commas, periods, colons, and asperin and here we are with double your usual dose. *We hopes yuh find it easy to take.* . . .

Excusit

With our usual belief in all that we see in the public prints, we passed on to youse guys the fact that there's 52,000,000 receivers in 36,000,000 homes. Well, that much was true, but *'tain't the whole story.* Another 8 million sets are in *automobiles, stores, and places wot ain't called home.* Soooo—accordin' to the "World Almanac" there's a few million other sets that mebbe some day will need a goin' over . . . *Better'n and better, huh?* And most likely there's gonna be another few million sets out in the field, at the rate the mfrers are pushin' 'em out to the folks. . . .

$$$$ and Sense

Have yuh taken a few minutes off and sent in your entry to the BIG Rider Manual Contest???? It sure doesn't make *sense* to say that you ain't got the time to make wid de pencil just 100 words and mebbe *grab yourself off a flocka $ $ $.* . . . So unlimber some of that good sense you have and win a prize. . . .

Thanks

As this issue of "S.S." goes to press, we've already gotten in a flocka the questionnaires that went out to yuh in the June issue. *Thanks lots for helpin'* and if yuh ain't sent in yours yet—please do it now. . . . And then—thanks to *you.* . . .

Revamp

The next time you pay us a visit, don't be surprised. . . . We needed more space here on the 3rd floor and so a gang were let loose on the place pushin' out walls, rippin' out lighting fixtures, tearin' up floors and then—puttin' 'em all back *in different places.* . . . So mebbe you won't recognize the old place with its face lifted. . . .

Radar Navigating

Just so's you'll know wot's goin' on in the super-high-freq field (3.2 cm), the Army Engineers are doin' some river chartin' *by radar plus an automatic camera.* They go chuggin' along the Ohio in the survey ship, the *Cherokee,* with the narrow-beamed radar waves bouncin' offen buoys, bridges, the shore line, buildings, etc. Every little while a photo of the pips on the 12-inch scope is taken automatically. When all these photos are fitted together. they got a chart of the river which shows the pilot exactly wot he should see in his scope at any minute. With this RCA job boats, channel markers, and other objects *as close as 80 yds* show up on the scope. By the way, if you'd like to get some more dope on this radar stuff, didja know we gotta book "Radar — What It Is" that gives it to yuh right painlessly? Well, we have. . . .

Still At It

Yep, it's a *never-endin' job*—this gatherin' of the service info wot gets put in the Rider Manuals. Right now, the boys and gals in the Art Dept. are slingin' ink on schematics wot the technical lads have clarified. . . . So many of youse guys have told us how much you like them thar clarifieds that you're gonna get 'em again in Vol. XVI. And we heard tell that there's a *BIG surprise* about XVI that you're gonna like *pul-lenty.* . . .

TV

For a loo-o-o-ong time you've been havin' advice handed you by the Boss about wisin' up on the ins and outs of television and he's not only been to bat for yuh, *but runnin' bases as well.* . . . Lissen—and this is a quote from wot the Boss said in Oct. '46 before the Television Broadcasters Assoc. TV Receiver Servicing Panel—"There is no technique in television receivers which is so complicated that it cannot be assimilated by the better grade of serviceman intelligence. . . . Instead of condemning the servicing industry to justify factory participation at the advent of television, it would be infinitely better to permit independent serviceman participation if the organization is found capable. The entire industry as a whole would benefit greatly if it fostered the technical advancement of the radio-repair group. Manufacturers spend unlimited funds teaching their dealers how to sell merchandise. *Similar efforts—or at least sponsoring of programs whereby the radio repairmen of this nation could become more proficient technically —would reap untold benefits to the advantage of all concerned.*'" There yuh are. . . . And we can slip yuh this, which we've got on the w.k. good authority: the independent service organization is being given its chance! *Contracts are signed!!* And more will be signed!!! Soooo-o-o-o, any servicer who doesn't do *some extry special skull-jammin' on TV* is gonna miss the boat. There's gonna be TV all over the American map but soon and we sure don't haveta draw yuh pichures wot that means, do we?

Questionnaire

Guess mebbe you think we wanter know an awful lotta things when yuh get two questionnaires one right after t'other, doncha? Well, we wouldn't bother yuh like this 'cept that there is a chance to get this matter of *schematic symbols standardization really under way* and we're sure that this is of such vital interest to yuh, that all of yuh will wanter have a voice in it. So willya please look over those symbols very carefully, indicate by a check mark those which you prefer, and if you have any comments or suggestions, you'll find the last page of the questionnaire blank. *Make with the brain-throbs there.* Yuh kin urge the questionnaire outa this magazine by bending up the two staples, removing the center pages, and then pushin' down the staples. . . . *Mail it to us in the enclosed envelope.* Yuh don't need to put a stamp on it. T'anks fer yer help. . . .

Outa De Male Bag

George W. Gardner, East Milton, Mass.—An orchid to you for spottin' that extra connection in "V.T.V.M." We've had quite a lotta guys tell us they understood limiters and discriminators in f-m sets better after readin' "Frequency Control Systems". Glad you like the other books. . . . Frank H. Coxson, Greenville, Pa.—Your niftie "Without a rule a carpenter is lost and that is about how a serviceman feels without "Rider's" is quite okay. Thanx. . . . G. F. Johnson, Bristol, Va.—We're sure glad you like all our books so much. Thanx to *you.*

4325

Those figgers mean anything to yuh? Well, they should oughter on accounta they stand for *the value of the prizes* that will be given to the lucky winnahs of the BIG RIDER MANUAL CONTEST!!! Wot! You ain't gone round to yer jobber yet and got *your* entry blank? Wassamatta? You ain't gonna pass up a chance like this to grab yourself off a nice hunka change, are yuh? Git right on down to yer jobber now, collect an entry blank, oil up yer Qwerty or unlimber the old pen, and give with 100 words—or less—on "Rider Manuals *mean* successful servicing, because . . . " Didja notice we gave yuh a runnin' start with them six words? Soooooooo, all you gotta do is put together 94 more that tell your idea of Rider Manuals—and you're in. . . . O' course, yuh gotta mail it in so the judges can give it the once-over. . . . *get yourn in early and offen yer mind.* . . .

Hoooo-hum

Yeah, this is the kinda weather wot gives us them I-wanter-git-out-in-the-open blues. . . . And we don't mean to git out and do violent exercise neither. . . . Or *any* exercise, for that matter. . . . Well, mebbe we'd compromise and move our right arm enuf to sip outa a well-iced container of our favorite anti-ulcer medecine. . . . This torrid weather's hit Aloysius W. too—we've quit sendin' him on errands 'specially if the Dodgers are battlin' in the neighborhood. . . . Hey, that reminds us—*where is that nogood redhead?????* He left here Tue. to take some galleys to the printer and we ain't seen the guy since. . . . Lookit, if any youse guys see a little runt with the loudest sport shirt on this side of Florida, out to Ebbets Field, bop him, willya, and send the body to

The Rolling Reporter

Help Wanted

We have been requested to run the following:

The Fisher Radio Corp., makers of the Fisher Radio-Phonograph, are seeking to establish contact with financially responsible servicemen with well-equipped facilities throughout the United States for field maintenance and installation of their equipment. If interested, write immediately to Avery R. Fisher, President, Fisher Radio Corp., 41 East 47 Street, New York 17, N. Y.

And when you write, please mention that you saw this notice in SUCCESSFUL SERVICING.

RCA QB12

This is the same chassis as used in model QB11, which will be found on *page 15-8 of Rider's Volume XV.*

Erratum

In Fig. 7-2 on page 91 of "Vacuum Tube Voltmeters," the line denoting a connection between the plate lead of the 6J7 tube and the junction of R1 and A should be deleted.

RIDER MANUALS ALWAYS SHOW MANUFACTURERS' ORIGINAL SERVICE DATA

RIDER'S Manuals were founded in 1929 to accomplish one purpose: to make available to the radio repair industry in the most effective, most economical, and most complete way the radio-receiver and allied equipment manufacturers' *original data* pertaining to their products. Nobody knows his equipment better than its designer and manufacturer . . . He built it! His original technical data covering his equipment is the last word and giving the repair industry this original information is the cardinal principle upon which the entire history of Rider's Manuals is founded.

That the radio repair industry must have original material is especially true in the case of voltage, sensitivity, gain-per-stage, and other measurements which are furnished in Rider's Manuals. These figures are the *average of many measurements* made by the manufacturer on *many samples* of the same model as they come off the production line; they are not the findings of just one set selected at random. This means that when a set has undergone a test at the hands of a repairman, he knows that if its performance falls within a certain tolerance of the figures in Rider's Manuals, it conforms with the manufacturer's specifications.

John F. Rider Publisher has always taken pains to eliminate possible discrepancies which may be in the original data as a courtesy to the manufacturers and to avoid publishing any inaccuracies. We have recommended certain techniques and other servicing matters to the manufacturers, who are thus given the opportunity to test and apply them, and in many cases they have been adopted. Thus we still follow our basic idea of conveying to the radio repair industry those techniques, practices, and ideas which the manufacturer has found best applicable to his products.

Rider Manuals have served the radio repair industry for nearly two decades. Those years of experience in the compilation and preparation of manufacturers' original service data for publication have made Rider Manuals what they are today . . . *the accepted standard of the radio repair industry the world over.*

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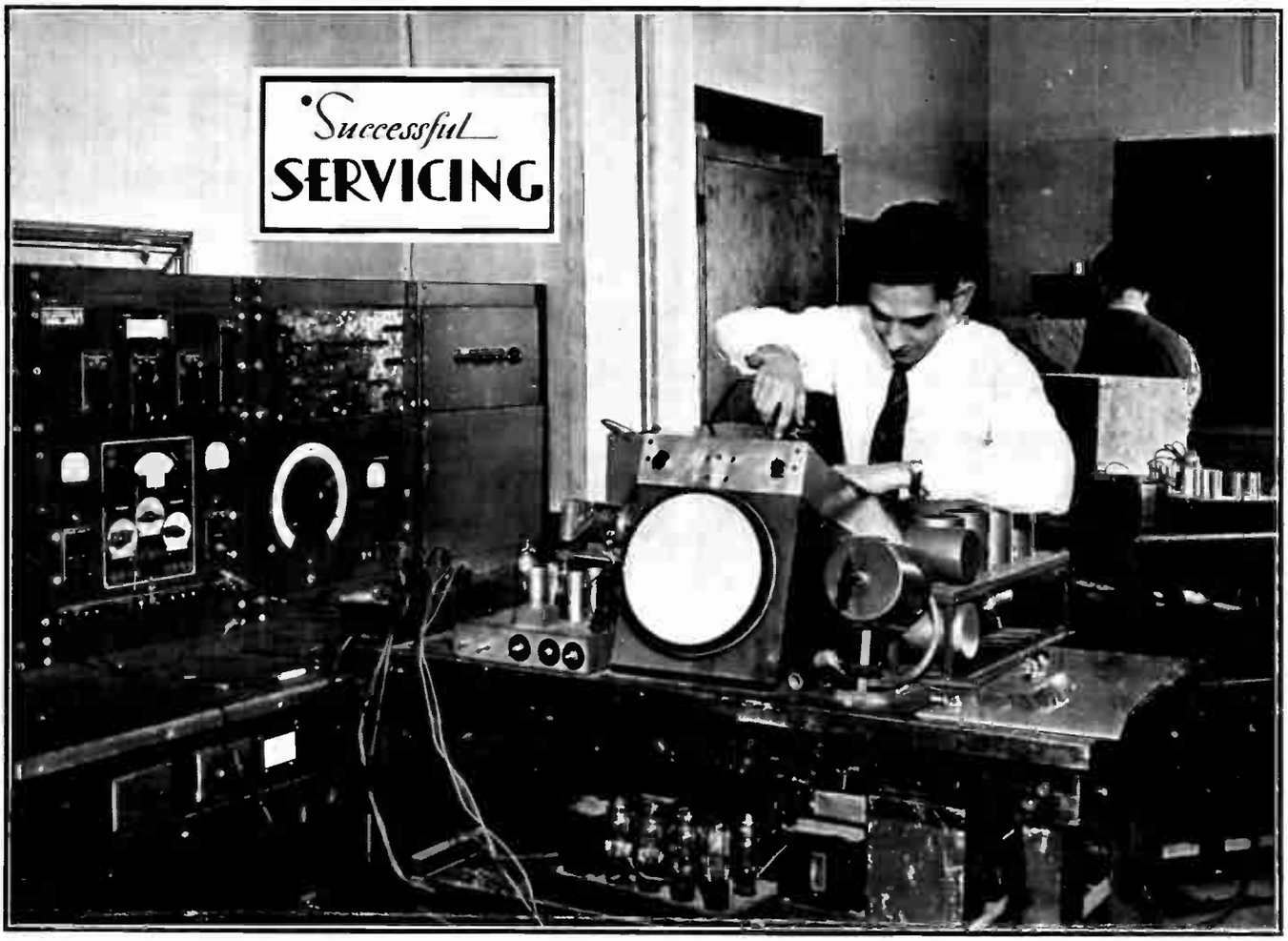


Courtesy of RCA Institutes, Inc.

JUNE, 1947

THE B. C. I. PROBLEM

By JOHN F. RIDER

IN the last issue of SUCCESSFUL SERVICING we raised a question concerning the possible employment of radio service shops by the radio amateur in connection with the alignment of communication receivers. This month we are going to raise another question, namely, the B. C. I. problem. The meaning of B. C. I. is known to perhaps 20% of the repairmen in the country and, for the benefit of the remainder, it means "broadcast interference." In turn, by broadcast interference we mean the undesired reception of amateur transmissions on broadcast receivers while being used to listen to broadcast programs on the regular broadcast bands.

To say the least, situations of this type are annoying to the broadcast set owner and the usual procedure is to report the complaint to the F. C. C. The result is a greeting from the Federal Communications Commission with the request that the case be investigated by the offending ham and a report of both station operation and the remedy applied to the receiver be sent to the Commission. Considering the general increase in the use of "midget" or small table model receivers, the possibility of more and more complaints of this character is very great.

When discussed over the air, many hams expressed the opinion that the problem is easily solvable by the manufacturer of the receiver, for in almost every case the cure is accomplished by the installation of a comparatively inexpensive component such as a resistor, bypass condenser, or wave trap. It so happens — and we speak as a ham — that such is not the case. Anyone who has had experience with B. C. I. — and we acknowledge that dubious honor — the remedies are not always alike. As a matter of fact, one of a dozen different methods may be found to be necessary, all being dependent upon the exact conditions. Consequently, any attempt by the set manufacturer to incorporate possible remedies would mean that they would have to install *all* which have been found effective in order to solve the problem completely, and even then a reasonable doubt for 100% success exists. At any rate, the installation of so many components would very materially increase the cost of the receiver to the manufacturer and to the public. This leads us to the possible part which the radio repairman could play; although we realize that while our suggestion herein may not be the final solution, it may lead to additional thinking on the part of those who read these lines and possibly bring forth the proper answer.

Since the matter of B. C. I. is one which can never definitely be said as being impossible in the area surrounding an amateur station, we suggest the following to be tossed around among various amateur groups: Depending upon the number of hams in an area, is it not conceivable

Please turn to page 4

RCA 55U, 56X, 56X5, 65X

On these models, the data for which appear in *Rider's Volume XV*, the lead coloring on the output transformer may not correspond with the coloring given on the schematic in the service notes. It is therefore necessary to rely on resistance measurements to determine lead connections, rather than the color coding given in the schematic.

•

MONTGOMERY WARD 54WG-2700A 64WG-2700A,—B, 74WG-2700A,—

These models are similar to the 54WG-2500A, shown on *pages 15-31 to 15-35 of to 15-96 of Rider's Volume XV* except for the following changes:

Ref. No.	*Part No.*	*Description*
C-7	D67501	.0005 mf 400 V Tubular
	12A455	10" Electro dynamic speaker
	28X113	Drive cord tension spring

The frequency range has been very slightly compressed to 540 kc-1600 kc. The issue "B" receivers incorporate a 10-inch electrodynamic speaker, part number 12A455.

•

RCA 56X5, 56X10, 61-5, 61-10

Changes in the schematic should be made on RCA Model 56X5, *page 15-32;* Models 56X10, *page 15-35;* and Models 61-5 and 61-10, *page 15-51, all in Rider's Volume XV.*

Change the location of C9 from the grid of the 12SQ7 to ground, so that it is connected from the plate of the 12SQ7 to ground.

Earlier models may still have C9 connected from grid to ground; in these sets an increase in sensitivity will be obtained by reconnecting C9 in accordance with the above change in the schematic.

R6 has been changed from 3.3 to 2.2 megohms.

•

HOWARD 901-A

The following is a list of changes made in Howard Model 901-A above serial number 40575:

1. The 0.05-μf capacitor in the avc filter network, instead of going to ground, goes to B minus.
2. The 300-$\mu\mu$f capacitor that has one end connected to the variable arm of the volume control, has the other end connected to B minus instead of ground.
3. The 0.01-μf capacitor that has one end connected to the plate of the 50L6GT tube has the other end connected to the cathode of the same tube instead of to the low side of the output transformer.
4. There is inserted in series with the cathode of the 35Z5GT rectifier tube a 50-ohm 1-watt wire-wound resistor.

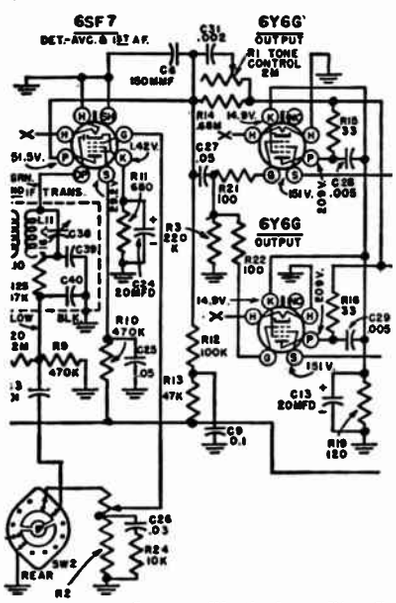
The schematic diagram for the original production runs is found on *page 15-2* of *Rider's Volume XV.*

•

WESTINGHOUSE H-104, H-105, H-107, H-108

In later productions of Westinghouse Models H-104, H-105, H-107, H-108 the tone-control circuit was modified to provide greater tonal range. In chassis incorporating this change, the chassis number was changed from V-2102 to V-2102-1. This change is shown in the accompanying diagram. The same two components that comprised the tone-control circuit in the early production models, C31 (0.002-μf) and tone control R1 (2 megohms), are also used in the later revised models. The former tone-control circuit was removed from the connection it had to the volume control, R2, and wired to the plate circuit of the 6SF7 first audio tube as follows:

One end of capacitor C31 is connected to the plate of the 6SF7 tube and the other end to the variable arm of the tone control, R1. One end of the tone control is connected between resistors R14 and R15, or between resistors R14 and R16, (since R14 is tied to one end of either of the other resistors), and the other end of the tone control left open. The schematic with the original tone control circuit is found on *page 15-1* of *Rider's Volume XV.*



Courtesy Westinghouse Elec. Corp.

Tone-control circuit in Westinghouse chassis V-2102-1 showing changes.

FARNSWORTH P-51 RECORD CHANGER

In the Farnsworth P-51 record changer a number of changes have been made in the parts numbers which are listed below:

561321	Shelf Post part number changed to 04050.
59166	Escutcheon part number changed to 04051.
37067	Flat Washer is obsolete in later production changer.
36845	#10 Flat Washer is obsolete.
561312	Spring is obsolete.
2017-005	Flat Washer is obsolete.

The following is a list of parts that were not originally identified:

36347	Drive screw fastens escutcheon to baseplate.
36847	Drive-lock pin is used in record shelf crank assembly.
36849	Hairpin cotter is used at bottom of stationary spindle.
36934	H. P. Cotter is used on A-C switch shaft.
561348	Spacer is used under stud mounting tone arm return lever No. 561355 and mounting nut.
561349	Spacer used with rejector lever.
64324	Small tension coil spring used to keep the tone arm from moving back over the record after last record has finished playing.

The original parts list for this record changer is found on *RCD. CH. page 15-12* of *Rider's Volume XV.*

•

MAGNAVOX CR 190

Points of information relative to the differences between the CR 190 chassis carrying various suffix letters are as follows:

The CR 190 A and B, which are found in *Rider's Volume XV on pages 15-43 to 15-50,* and CR 190 D are alike electrically.

The CR 190 C and CR 190 E differ from the models previously mentioned, in that item 22, 0.01-μf 600-volt paper capacitor, and item 47, 15,000-ohm 1-watt resistor, which are connected in series from the plate to ground on the first audio, are omitted.

The CR 190 F is the same as CR 190 A, B, and D except that a 220,000-ohm resistor is connected from grid to ground on the first audio tube.

The CR 190 A, B, and D were used in the Magnavox Georgian, Model 151 series, the Contemporary 148 series, and the Magnavox Provincial Model 152 series.

The CR 190 C and E were used in the Magnavox Duette Model 138 series.

The CR 190 F is used in only the Magnavox Duette Model 138 series.

This information should be added to *pages 15-43 to 15-50* in *Rider's Volume XV.*

•

OSCILLATOR STABILITY

By Seymour D. Uslan

THE frequency generated by an oscillator approximates the resonant frequency of the oscillator tank circuit, but such factors as the reactance and resistance of the load coupled into the tank circuit, the harmonics generated by the oscillator, and the effective *Q* of the resonant circuit influence the frequency generated. The B+ supply voltages for the oscillator also influence the frequency generated, the degree of such influence being a function of the type of circuit employed and the measures taken to minimize the effect of tube voltages.

The oscillators of some home receivers incorporate in their design various methods of minimizing the effect of tube voltages on the frequency generated. These methods make use of various circuit features such as resonant oscillator circuits having a high effective *Q*, reactances in series with oscillator plate and grid, and close coupling between the sections of tapped oscillator coils.

One relatively simple method of stabilizing the oscillator frequency against voltage changes is to use a *voltage regulated B+ supply* for the oscillator tube.

The overwhelming number of home receivers do not incorporate in their design any method of stabilizing the power-supply output voltage except for whatever regulation is inherent in the power supply. Thus the B+ voltage available for the plates and screens of tubes varies, sometimes considerably, as a result of voltage fluctuations in the a-c power line and changes in the current drain on the power supply caused by variation of receiver controls and operation of the avc circuit.

The Majestic Models 8S452 and 8S-473 that appear in Rider's Volume XV make use of a gas-filled cold-cathode voltage-regulator tube (glow-discharge type), the VR 105-30, to regulate the B+ voltage on the oscillator anode. This type of a tube requires no filament voltage to start it working properly. The anode (or plate) of this tube requires a d-c voltage of 115 volts to start it operating. After the tube begins to glow its d-c operating voltage will drop down to 105 volts and remain almost constant at this voltage with a possible slight variation of about 1 to 2 volts. When the tube is operating, the current drawn by it can be from 5 to 30 ma and still maintain a constant potential of 105 volts. If more than 30 ma is drawn by the regulator tube it may become impaired.

Fig. 1 illustrates the voltage-regulator circuit together with the broadcast-band oscillator circuit used in these models. The plates of the receiver output tubes take their B+ voltages directly following the power supply filter, while the B+ line for the other tubes passes through a jumper in the base of the voltage-regulator tube.

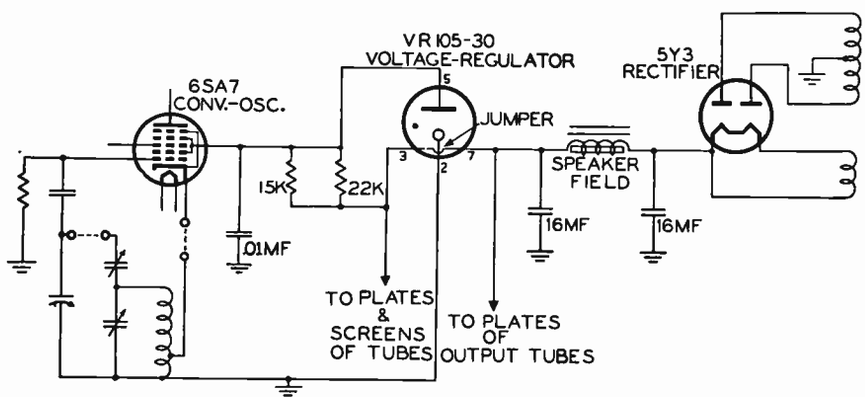


Fig. 1. The voltage-regulator circuit with the broadcast-band oscillator circuit used in Majestic Models 8S452 and 8S473.

This arrangement of having the B+ line pass through the regulator tube base is designed to prevent operation of the receiver when the regulator tube is removed from its socket because such removal will open the B+ line to all the circuits except the plates of the output tubes.

The B+ line, still at the potential existing at the output of the power-supply filter, is fed to the plate of the voltage-regulator tube through a series dropping resistance network (consisting of the 15,000-and 22,000-ohm resistors in parallel).

This resistance network serves two purposes. First, its chief function is to prevent the voltage-regulator tube from being destroyed by excessive current. Second, this network acts as a d-c return path for the oscillator anode and converter screen-grid of the 6SA7 tube. Its combined action is described as follows:

These resistors, besides being a d-c return path for the oscillator anode and converter screen, are also a series voltage dropping network for the VR-105-30 tube (see Fig. 2). The 15,000- and 22,000-ohm resistors are in series with the VR 105-30 tube through the power supply. If the two resistors were not in series with the VR tube, this tube would be effectively across the B+ network and an excessive amount of current may be drawn through the tube which will destroy it. The two resistors and the VR tube offer a voltage dividing load to the 6SA7 oscillator anode and converter screen. The two 15,000- and 22,000-ohm resistors in parallel are approximately equal to 9000 ohms, which acts as a limiting agent of the current that flows through the VR tube.

For any normal current drain, the voltage at the anode of the regulator tube will be 105 volts. This same voltage will be constantly maintained at the converter screen and oscillator anode, because these two tube elements, internally connected in the converter tube, are at the same potential point as the anode of the regulator.

This type of circuit, commonly used in broadcast and laboratory equipment, provides voltage regulation of about one per cent, and in this receiver assures that the oscillator frequency will be maintained constant. As a result of the oscillator not shifting frequency, when a station is tuned in sharply this sharpness of tuning will be maintained and it will not be necessary to turn the station selector slightly to one side or the other constantly to achieve this desired effect. Further, because the station carrier frequency is extremely stable and the receiver oscillator frequency is stabilized, the output of the converter will always be at the exact intermediate frequency. This results in eliminating distortion in the i-f amplifiers. That is to say, if the oscillator frequency was not stable,

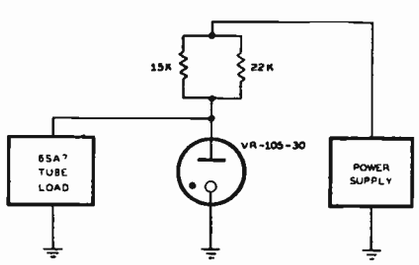


Fig. 2. The 15,000- and 22,000-ohm parallel resistors form a return path for the oscillator anode and converter screen as well as a series voltage dropping network for the VR-105-30 tube.

Please turn to page 6

THE B. C. I. PROBLEM

Continued from page 1

that if an amateur radio club exists — and even if it does not exist, it be formed under the proper sponsorship — that all members make a monthly contribution into a B. C. I. elimination fund, regardless of whether or not all stations are offenders? The latter statement is made because a station which is perhaps free of such a condition today, may become an offender tomorrow. In turn the club as a whole can make arrangements with repairmen who have demonstrated their fitness to cope with the problem, to handle such B. C. I. complaints, and to be paid by the amateur radio club.

The charges for such work made by the repair group can be nominal for a number of reasons. First of all, it furnishes an entree into a home and, upon successful completion of the job, may lead to other business. The second reason is that actually the receiver is not defective; hence the work can be done right in the home since the receiver is very small and access to its innards can be accomplished very easily. The third is that a comparatively short period of operation will lead to definite data concerning the required cure for repairs by types and manufacturers.

Inasmuch as information is usually required about the receiver before the repairman makes a visit, it is logical that, upon receipt of a notice from the F. C. C., offending station owners would communicate with the complainant and determine the exact model and make of the receiver. This information would be relayed to the club or to the serviceman so that he would be familiar with the type of receiver in question and perhaps be guided in the part or parts he might be expected to install.

There are possible modifications to this plan, but we feel reasonably certain that even a modified program would prove beneficial to the ham, the public, and the serviceman.

•

Individual Diagram Service

For the benefit of those located in the New York area, we shall renew the over-the-counter service for diagrams and data. As some of you know, this was stopped because of personnel problems, but it is again available.

The prices of this service are as follows: for data covering one model employing up to and including eight pages (four sheets), the price is 35¢; for data covering one model using more than eight pages, the price is 5¢ for each additional page above eight.

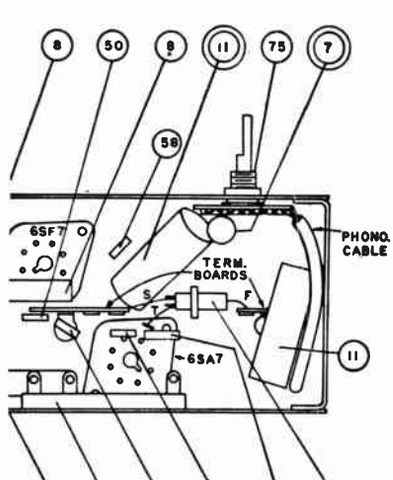
As far as national distribution is concerned, we are now opening up our individual diagram service by mail for all who desire it. Send a self-addressed envelope with your order. Prices as above.

•

WESTINGHOUSE H-122, H-130

The following changes have been made in Westinghouse Models H-122 and H-130 that bear serial numbers higher than 1500:

1. The capacitor, item No. 7, was changed in value from 0.002-μf to 0.01-μf and its item number was also changed from 7 to 10. This capacitor connects across the phono-input cable at the radio-phono switch.
2. The 0.1-μf capacitor, item No. 11, which was previously connected between the shield of the phono-input cable and ground, now connects between the phono-input cable and the common negative line. Its physical location, looking at the bottom view of the chassis, was moved from the right side of the radio-phono switch to the left side. The diagram for this physical change is shown in the accompanying diagram.



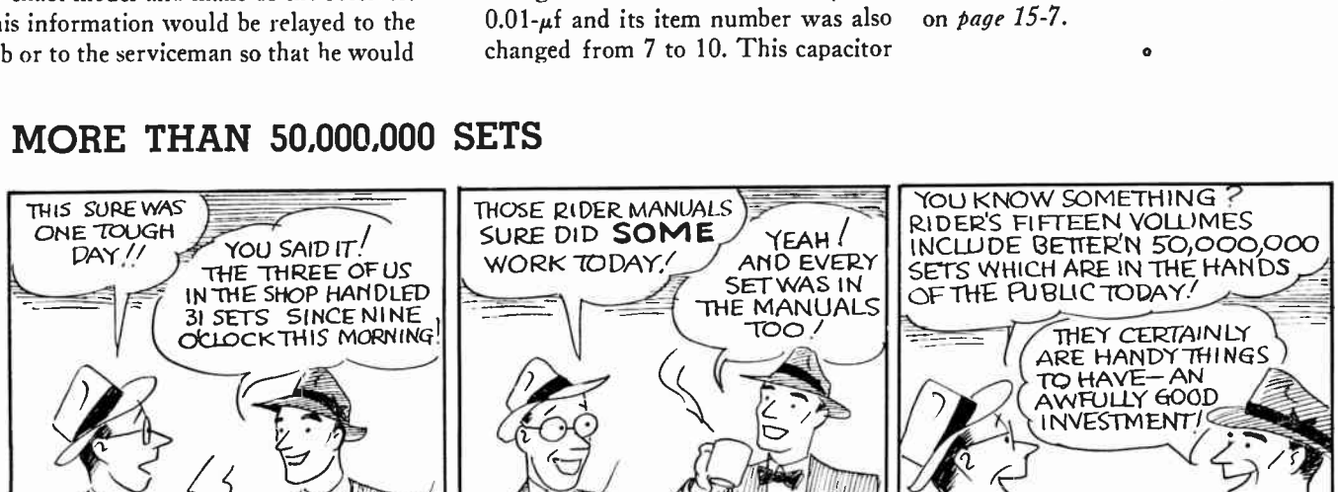
Courtesy Westinghouse Elec. Corp.

Bottom view of the chassis of Westinghouse Models H-122 and H-130 showing new location of capacitor No. 11.

The original schematic for these models is illustrated on *page 15-5* of *Rider's Volume XV* and the chassis layout is shown on *page 15-7*.

•

MORE THAN 50,000,000 SETS



I Want Your Help

I am sending you this questionnaire because I believe that our relations have been mutually beneficial and that you will be willing to grant me some of your time. If you do this, I promise that you will be amply repaid for the effort which you put forth.

Although the Radio Service industry is more than twenty years old, only one other comprehensive survey has been made to establish conditions within it. And that was made by the writer more than eleven years ago. The information gained from that survey improved to a great extent the relations between members of the radio service industry and the set manufacturers, parts manufacturers, and jobbers. Today we know that there are many glaring faults in the industry as a whole and we know equally well that they can be ironed out if a thorough understanding of the existing conditions is obtained . . . We believe that if you cooperate with us, we will be able to build up a true picture of the industry as it is today and this picture will point the way to the means of eliminating abuses—remedying the faults—and elevating the industry to the financial level it so justly deserves.

Receiver manufacturers, parts manufacturers, parts jobbers, and others who cater to the radio service industry, desire information which will guide them in their future activities. We want your help, so that we can give these groups this information and at the same time secure facts which will assist us in our own efforts towards the betterment of the radio service industry as a whole.

You know that drastic changes are taking place in the radio service industry. We need definite information so that we can supply to those interested, data that will combat any changes or trends that will be injurious to the best interest of the radio service industry. We know that we will be able to do this if you will cooperate by furnishing us with the answers to the questions on the following pages.

In order to do this, we need accurate information . . . we need the truth, but it is NOT necessary for you to give us your name and address. Your answers will be valuable to us because we secure a cross section of activities in your industry.

By filling in the answers to these questions, you will be helping others as well as yourself . . . Please do it today and mail your filled-in questionnaire at once in the enclosed postpaid envelope . . . Thanks for your cooperation.

Sincerely,

JOHN F. RIDER

THE RIDER SURVEY

Please Print Answers — No Signature Needed
Please Fill Out and Mail in the Postpaid Envelope . . . Today!

(1) Are you an independent serviceman? ☐ YES ☐ NO

(1a) How long have you been in the servicing business? ..... yrs.

(2) Are you a full-time serviceman? ☐ Part-time serviceman? ☐ (Check one)

(3) Do you employ servicemen? ☐ YES ☐ NO

(3a) If "YES," indicate numbers: ..... Full Time ..... Part Time

(4) Do you have a store? ☐ YES ☐ NO Work from your home? ☐ YES ☐ NO

(5) Of the following items, check those you service:

☐ Home receivers ☐ Combination receivers ☐ Record changers
☐ Home electrical appliances ☐ Industrial electrical appliances ☐ Auto sets
☐ PA equipment ☐ Police sets ☐ Aircraft equipment
☐ Marine equipment ☐ "Ham" equipment

(6) What percentage of your shop's time is spent in servicing:

Home receivers .....% Combination receivers .....% Record changers .....%
Auto sets .....% Home electrical appliances .....% Industrial electrical appliances .....%
Marine equipment .....% Police sets .....% Aircraft equipment .....%
"Ham" equipment .....% PA equipment .....%

(7) Do you SELL radio receivers? ☐ YES ☐ NO

(7a) If "YES," please check the following:

☐ Working arrangement with the dealer on commission basis. ☐ Carry a stock of new receivers.
☐ Secure receivers through manufacturer's distributor.

(8) Do you sell:

Record players ☐ YES ☐ NO Electrical appliances ☐ YES ☐ NO
PA equipment ☐ YES ☐ NO

(9) Do you have a rental service of PA equipment? ☐ YES ☐ NO

(10) Do you install PA systems? ☐ YES ☐ NO

(10a) If "YES," up to what power output? .....

(11) Do you specialize in servicing certain makes of sets? ☐ YES ☐ NO

(12) Do you do service work for jobbers or dealers? ☐ YES ☐ NO

(12a) If "YES," how many? .....

(13) Do you do any service work for radio amateurs or "Hams"? ☐ YES ☐ NO

(14) To the best of your knowledge, what percentage of dealers and jobbers in your vicinity maintain their own service departments? .....%

(15) How many dealers in your vicinity established service departments in the last six months? .....

(16) Do you notice a trend toward radio dealers operating their own service departments? ☐ YES ☐ NO

(17) Give an estimate of the percentage of sets you service in the following groups:

10 years or older.....% 5 to 10 years old.....%

1 to 5 years old.....% 6 months to 1 year old.....%

(18) How did you receive your radio education?

- ☐ Resident radio school
- ☐ Armed forces school
- ☐ Correspondence school

(19) If none of No. 18, indicate how your radio knowledge was gained.....

.....

.....

(20) Did you graduate from grammar school? ☐ YES ☐ NO; High school ☐YES ☐ NO; College ☐ YES ☐ NO

(21) Check how you are now keeping abreast of technical advances in radio:

- ☐ Attend manufacturers' meetings
- ☐ Attend association meetings
- ☐ Attend vocational school
- ☐ Resident technical school
- ☐ Read technical magazines
- ☐ Read text books
- ☐ Postgraduate correspondence course

(22) Do you depend solely upon practical experience for your technical progress?..... ☐ YES ☐ NO

(23) To which of the following periodicals do you subscribe:

- ☐ CQ
- ☐ Communications
- ☐ Electronics
- ☐ FM
- ☐ QST
- ☐ Radiocraft
- ☐ Radio Maintenance
- ☐ Radio News
- ☐ Radio Retailing and Television
- ☐ Radio Service Dealer
- ☐ Service
- ☐ Tele-Tech

(24) From what two magazines in each case do you get the best:

Service data ....

Engineering data ....

General news of the industry ....

(25) Upon what technical subjects would you like more information?.....

.....

.....

(26) Please check the following items which you now own:

- ☐ Tube checker
- ☐ Voltmeter
- ☐ RF-IF oscillator
- ☐ Audio oscillator
- ☐ Cathode-ray oscilloscope
- ☐ Set analyzer
- ☐ Ohmmeter
- ☐ Capacity meter
- ☐ Frequency-modulated oscillator
- ☐ Vacuum-tube voltmeter
- ☐ Signal-tracing equipment
- ☐ RIDER'S MANUALS Volumes I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, Abgd. Volume I-V (Please check those you have)
- ☐ Other manuals

(27) Please check equipment you expect to purchase within the next year:

- ☐ Tube checker
- ☐ Voltmeter
- ☐ RF-IF oscillator
- ☐ Audio oscillator

Continued on next page

☐ Cathode-ray oscilloscope
☐ Set analyzer
☐ Ohmmeter
☐ Capacity meter
☐ Frequency-modulated oscillator
☐ Vacuum-tube voltmeter
☐ Signal-tracing equipment
☐ RIDER'S MANUALS Volumes Abgd. I-V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV (Please check volumes)
☐ Other manuals

(28) Do you own an automobile? ☐ YES ☐ NO

(28a) If "YES," what make? What year? Commercial? Pleasure?

(29) Do you expect to buy an automobile in 1947, if you can get one? ☐ YES ☐ NO

(30) Do you buy your replacement parts and tubes from:

Local jobbers ☐ YES ☐ NO

Mail order houses ☐ YES ☐ NO

Receiver manufacturer's local distributor ☐ YES ☐ NO

(If all, please indicate approximate percentage of purchases from each.)

(31) Do you belong to a serviceman's association? ☐ YES ☐ NO

(31a) If "YES," please state which one

(31b) If "NO," please state your reasons for not joining one

(32) Please state the approximate number of receivers ACTUALLY serviced during 1946

(33) Please state the average charge per repair job $

(We suggest you add up the total charges during February, 1947, and divide the total by the number of jobs.)

(34) What percentage of the average job is represented by PARTS? %

(35) Please check which form of sales promotion effort you employ:

☐ Direct mail
☐ Telephone directory advertising
☐ Newspaper advertising
☐ Personal solicitation
☐ Handbills
☐ Posters, signs, etc.

(36) What is the average amount of your tube purchases monthly? $

(37) What is the average amount of your replacement parts purchases monthly? $

(38) Do you use genuine replacement parts? Exact duplicates? Or any part that fits and is suitable?

(38a) What influences you most in buying parts? Price? ☐ Manufacturer's reputation? ☐

(39) Are you a licensed amateur radio operator? ☐ YES ☐ NO

(40) Are you studying television technique? ☐ YES ☐ NO

(41) Are you capable of servicing television receivers? ☐ YES ☐ NO

(42) What is the population of your town or city?

(43) What state do you live in?

THANK YOU VERY MUCH

Please return this questionnaire in the postpaid envelope to

JOHN F. RIDER PUBLISHER, INC., 404 FOURTH AVENUE, NEW YORK 16, N. Y.

•Successful
SERVICING
REG. U. S. PAT. OFF.

Vol. 8 JUNE, 1947 No. 5

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

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JOHN F. RIDER, Editor G. C. B. Rowe, Associate Editor

TELEVISION SERVICING EDUCATION — A NECESSITY

THE matter of television servicing has received a great deal of attention among the probable receiver manufacturers as well as the repair and distribution industry. Many conflicting opinions have been heard relative to the manner in which the problem will be handled. For a while it looked as if the serviceman would in general be frozen out of the operations. Several manufacturers did entertain the idea of employing the services of independents, but by and large the general consensus was that the nature of the beast demanded factory service activity.

It is indeed with pleasure that we can comment to the effect that the thinking is changing. It is acknowledged by all that factory participation in service operations is a requirement during the first year of installation. But it can be said that the serviceman will not be frozen out. He will have an opportunity to compete. Parts will be available for purchase and installation by him.

Of course, the matter of advancing the level of technical knowledge in the service shop remains as important as ever before, but from what can be picked up here and there, it is almost certain that manufacturers who are interested in the distribution and service of television equipment will make every effort through the institution of a number of different programs, to convey the necessary technical knowledge by appropriate educational means to the independent repairman.

Although it may not appear so, this change in thinking is an extremely important development for the future of the independent repairman. It does not, of course, remove all possible threats to his continued operation. However, it does tend to minimize the disadvantages which would have developed, had the matter of television servicing been restricted to factory and set dealer personnel. If television servicing had been kept from the independent repairman, he would have been placed in a distinctly unfavorable position relative to the distinction between a facility capable of doing all repair work and a facility which was presented as being capable of handling home radio receivers, record players, and the like — but not television equipment.

The servicing industry as a whole recognizes its need for continued technical study and we cannot help but repeat a comment which we have made time and again in the years passed, namely, that service shop operators who are technically-minded and their men will be called upon to take what might be considered as post-graduate courses in television and f-m servicing. The future looks very much brighter than it did three months ago, but it can be successful only by recognition of the opinions presented and the responsibilities involved. The pathway for continued success is up the steps of education.

JOHN F. RIDER

•

THE SECOND RIDER SURVEY

More than eleven years ago, the first survey ever to be made of the radio service industry was made by Rider. A questionnaire was sent out with the January, 1936 issue of SUCCESSFUL SERVICING to more than 15,000 readers. In this issue, you will find a copy of the second Rider Survey.

The response to that first Survey was tremendous! There was no doubt that our readers were only too anxious to cooperate with us. They realized that with a compilation of the data furnished by their answers to the questions, we could go to the receiver and parts manufacturers and jobbers and present facts and figures that really had authority and weight. *And this is just what we did.*

Here is one example of how the results of his first Survey were used. Manufacturers often asked us if the servicemen really did have a desire to extend their technical knowledge — to continue with their technical radio education. By asking the question as to the method they intended to pursue to keep abreast of the technical advances in radio, we were able to tell manufacturers and others that 64% of the readers would attend manufacturers' meetings; 95% would read technical magazines; 41% would attend association meetings; and about 25% would get further technical education at schools. Thus we were able to show the manufacturers that whatever they spent in connection with sending their engineers to speak at meetings and having them write technical articles in magazines was fully justified and appreciated by the servicing industry.

Today the servicing industry has expanded, and with this expansion numerous and varied problems have arisen. We do not pretend that the answers to this second Rider Survey will provide *all* the answers to *all* the problems with which you are faced, but we do declare that some of them can be overcome successfully if we know the right answers to make when we are questioned. And we are always being questioned!

We also want to know in what subjects you are interested. Are you more interested, for instance, in public-address systems than in f-m receivers? Do you want further information on the use of various test instruments as applied to present-day apparatus and receivers? Or just what can we do for you in the way of new books?

As we have told you many times, we are in business to help you. Tell us your

Please turn to page 6

OSCILLATOR STABILITY

Continued from page 3

side-band cutting by the i-f transformers may occur, which would result in frequency distortion of the signal. Thus:

Let us assume that the i-f design of a certain receiver is 455 kc and that the i-f transformers are perfectly aligned to this frequency. If, for the sake of argument, the set is tuned to an incoming r-f signal of 1000 kc, the oscillator frequency should be 1455 kc if the set is so designed that the oscillator tracks the incoming r-f signal *above* the i.f. However, if the oscillator is unstable and shifts in frequency 5 kc *below* what it should be, then instead of being tuned to 1455 kc, the oscillator would be tuned to 1450 kc. This 1450-kc oscillator frequency would then beat with the incoming 1000-kc r-f signal to produce an i.f. of 450 kc. Now, the bandwidth requirements of i-f transformers are such that they accept a band 10 kc wide, or 5 kc on either side of their resonant frequency, for the proper acceptance of the side-band intelligence. With the oscillator unstable, as mentioned, the i.f. is 450 kc and it requires a band between 445 and 455 kc. However, the i-f transformers are still tuned to 455 kc and would only pass frequencies 5 kc on either side of their tuned frequency. As they are tuned to 455 kc, they would pass frequencies between 450 and 460 kc. Because the bandwidth of the operating i.f. is 445 to 455 kc, as a result of the aforementioned oscillator instability, and because the i-f transformer will only pass frequencies between 450 and 460 kc, the only frequencies that can be accepted with the proper strength by the i-f transformer are those between 450 and 455 kc. This accepted range of frequencies is only the upper 5-kc sideband of the operating i.f. put out by the conversion system of the receiver. Consequently, the lower sideband (between 445 and 450 kc) is not passed as it should be and distortion of the signals results. The actual discrimination against these frequencies is not really as sharp as might be indicated. The curve of Fig. 3 makes this clearer.

The curve represents a typical selectivity curve of an i-f transformer. The shaded area under the curve represents the bandwidth of the i-f transformer. It is shown as being between 450 and 460 kc, for the i-f transformer under discussion. The

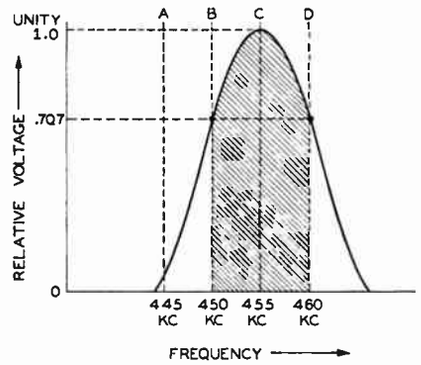

Fig. 3. The shaded area under this selectivity i-f transformer curve indicates portion where full reproduction of sidebands occurs.

points on the curve where the bandwidth requirements start are called the half-power points and these values are approximately 0.7 of the maximum value of voltage, which occurs at the peak of the curve. This is primarily a principle of design and it is accepted by most companies. Consequently, the unshaded area under the curve represents those frequencies which are not part of the bandwidth requirements, but are still passed as the weak signals representing the high- and low-frequency ends of the selectivity curve. Points *B* to *D* represent the i-f transformer bandwidth requirements, whereas points *A* to *C* represent the actual 10-kc bandwidth of the i.f. that was produced with the oscillator becoming unstable and being tuned 5 kc below where it should be. Therefore it can be seen that only the upper sideband of the operating i.f. falls into the shaded area under the selectivity curve.

•

RCA 55U

This change refers to RCA Model 55U, which appears on *page 15-16 of Rider's Volume XV*. Models having serial numbers B62201 will use transformer part number 922246-7 (Stock No. 70386). In this transformer, C21 is 100 $\mu\mu$f, rather than 110 $\mu\mu$f, as in previous transformers.

•

FARNSWORTH ET-069

The Farnsworth Model ET-069 is the same as the Farnsworth Model ET-066 except that Model ET-069 uses cabinet No. H-247 and knob No. 59423. The schematic for the ET-066 is found on *page 15-5* of *Rider's Volume XV*.

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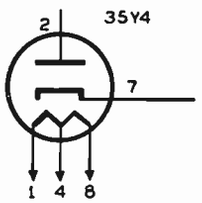
TELETONE 117, 117A, 118, 119

In the Teletone Models 117, 117A, 118, 119 (chassis series D) found on *page 15-4* of *Rider's Volume XV*, the pin num-



Correct pin numbers for the 35Y4 tube in the Teletone Model 117 schematic.

bers for the 35Y4 rectifier are shown incorrectly. The correct pin numbers for this tube are illustrated in the accompanying figure.

•

THE SECOND RIDER SURVEY

Continued from page 5

needs and we will endeavor to give you whatever assistance we can. But before we can help, we must know these needs, so we are asking your co-operation in answering this second Rider Survey promptly. Please fill out the form as soon as you can and mail it back to us in the postpaid envelope, which needs no stamp. *Thanks once more for your co-operation.*

NOTICE

In case you believe that your copy of SUCCESSFUL SERVICING has failed to reach you, please do not write to us until you have checked the number of the issue and volume always found on the masthead on page 5. The issue numbers run consecutively, even though the date of the issue may be one or more months behind the one you received previously. This is the fifth number of Vol. 8, the first issue having been in July, 1946.

"Mine's Older'n Yourn!"

Recently the ch. engineer at WALA in Mobile, Ala. wrote to RCA that a modulator tube in his Xmitter had been perkin' *for 22,464.5 hours!* When that fact was told to the Ch. Eng. of WBNS, in Columbus, O., he wrote RCA that one of *his* tubes was "an energetic youngster that is working 20 hours daily, 7 days per week" and had **50,154 hours to its credit. . . .**

This Make Her Fog-Eyed?

T'other mornin' as we were inhalin' the mornin's black coffee, we heard the familiar basso of the *Queen Elizabeth* somewhere off the Battery. As is our wont, we rushed to the window to see the *Queen,* but we couldn't even see the ships tied up at the docks on our side of the river, 'twas that thick — *a regular pea-souper.* Here was news indeed — the *Lizzie* pushin' through a fog like *that.* Well, we found out how her skipper did that trick. You're right — **radar!** The Cossor (British) job they have shows up every buoy and landmark on the PPI scope and the cost of the outfit was written off by that early mornin' trip through the fog, for that's what it would have cost 'em to feed their passengers if they'd had to lay to for a day. . . .

Clarified Schematics

We were trying to get through that thick head of Aloysius Winenwiski how to file away the service data we get from mfrers, when we saw sumpin *NEW* — new that is, as far as mfrers' data go. RCA had included in the data on a multiband job — you guessed it — **clarified schematics.** We certainly are flattered and we hope that the gents who have the say-so in other companies, will follow RCA's example. Remember way back when the alignment instructions used to be spread over cols and cols insteada in the tabular form that the Boss started in "Aligning Philco Receivers" *10 yrs ago? ? ? ?* Well, the mfrers have been using it for a long time and now here's another that we hope they'll use to make things easier for youse guys!

A New One

Ever on the alert, q.v., and all that sorta thing to give yuh the latest doin's around and about, we're slippin' yuh this. . . . Just t'other day the Boss signed up a brand new author — Leonard Crow. He shot one MS at the Boss, said he had another on deck, and a third in the hole. . . . We dunno when the first is comin' out, how many pages, how much, or nawthin' else, but we'll tell yuh as soon as we know. *What's it about?* Can you imagine us fergettin' *that!* It's about saturable-core reactors — how they work and why, how they control things, etc., etc. All we can tell you now is **they're sumpin yuh want to know about for the well-known future reference.** *More anon about all this. . . .*

Radarburger

Yep, believe it or not — that's sumpin to eat. The Raytheon Mfg. Co., which produced lots and lotsa "maggies" for radar sets during the war, has put out a "Radarange", which will cook a *radarburger* (hamburger to you) **with onions** in 35 seconds — a warm pup in 8 or 10 seconds — and bake a bisquit in 29 seconds. . . . The magnetron in the Radarange pushes out the cookin power somewhere between 2400 and 2500 mc and *cooks the food from the inside out* instead of vice versa, as Mother used to cook that pie. . . .

We're Askin' Yuh

Do yuh remember waaa-a-a-ay back in '36, we asked some questions of yuh? Now we're doin' it again. In this issue you'll find a four-page questionnaire which yuh can remove easy by bending up the staples that hold these here pages of wisdom together without damagin' these pages. . . . When yuh git it out, answer the questions and willya *please* use a typewriter, or if yuh ain't gotta Querty handy, **pul-lease write plain.** We might hafta read your answers and honest-tuh-pete, *we ain't a mind-reader.* Do that job today willya, huh, and git it offen yer mind. . . . **Thanks. . . .**

The Show at Chi

Well, it's too bad we couldn't make the show this year, but mebbe you had a chance to talk to the Boss or one of our two Bills (Hynes or Marcus) that were holdin' down the booth. What, you weren't there either? Well, then you just ain't heard that we're workin' on that Master Index that you were told about in these pages awhile ago. Yep, *every model* and *every chassis* in *every one of your Rider Manuals will be there.* . . . And it won't make any difference whether you have the Early or Revised editions or the Radiotron giant (that one came out in 1933!) or the Abridged 1-to-V **— everything will be there between one cover.**

Didya Know????

According to the C.B.S. lads who like to juggle around figures and toss out all sortsa facts, *93% of the homes in the U.S.A.* have at least one radio set — **that means about 52,000,000 sets in 36,000,000 homes.** Not all of them sets can be perkin' all the time, *so there's a good many million sets that need your attention.* . . . And didya know that last year 20% of the American families bought a new set? ? ? ? And *that* means future biz for yuh. . . .

We're Huntin'

This bein' Noise Abatement Week here in Noo Yoick, the subway engineers gathered all the noisiest tools they could find and are usin' 'em full blast right under our window. To get away from the noise-that-should-oughter-be-abated (AND HOW!!), we wended our way to our favorite spot where a guy named Joe masterpieces a martini. Joe's usually a placid guy, but today he was sorta bug-eyed all on accounta his boss had put in one of those big television jobs and bein' a Dodger fan, Joe was havin' troubles tryin' to keep up with the Bums goin' 'round the bases and the soothin' syrups goin' in the glasses. . . . Guess mebbe we gotta hunt 'round and about for a new place to get our ulcer medicine. If yuh know of a nice quiet — *and we mean QUIET* — place, willya please notify

The Rolling Reporter

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MASTER INDEX

A master index covering all fifteen volumes of Riders Manuals, as well as all other special editions prepared during the past years, is now in the process of being printed.

The selection of the means of producing this text which will contain somewhat more than 40,000 items, cross-indexed with respect to chassis and model number, posed a problem. First because we desired to offer it for sale at the lowest possible price; second because tabular copy is very much more expensive to set than straightforward text. In this connection it might be mentioned that estimates received for typesetting by means of monotype ran as high as six times more than if set by varitype; and linotype, while somewhat less expensive than monotype, still presented a financial obstacle. Accordingly, the pages of the index will be set by varityper and will be reproduced by offset.

The final result will be a very readable volume of about 220 to 230 pages, 8½x11 inches, employing very durable paper for the pages. Whether or not the book will be paper bound or cloth bound is still a matter of securing the lowest possible production prices. It is hoped that the finished product will be available for sale sometime around the second week in August.

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2. Mail entry on the official contest entry blank obtainable from parts jobbers, or write direct to John F. Rider Publisher, Inc. for blank.
3. Entries must be postmarked no later than Sept. 15, 1947.
4. Entries will be judged on completeness, compactness and originality of expression of reasons. Judges will be John L. Stoutenburgh, Executive Editor of "Radio Retailing"; Herman L. Finn, C.P.A.; Lansford F. King, Advertising Agent. The decision of the judges will be final. Duplicate prizes will be awarded in case of a tie. All entries become property of John F. Rider Publisher, Inc.
5. Contest open to anyone interested in radio servicing, living in continental U.S., its possessions and Canada, except employees (and their families) of John F. Rider Publisher, Inc., its advertising agency, accounting company, the principals and executives of Rider jobbers, or Caldwell-Clements, Inc., publishers of "Radio Retailing."

LOOK AT THESE PRIZES!

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4th Prize	Cash	100
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6th to 10th Prizes ($50 each)	Cash	250
11th to 40th	(30 equipment Prizes worth $25 each)	750
41st to 80th	(40 equipment Prizes worth $15 each)	600
81st to 140th	(60 equipment Prizes worth $10 each)	600
141st to 224th	(84 equipment Prizes worth $7.50 each)	530

For Jobbers of Winning Contestants

1st Prize	Cash	$100
2nd Prize	Cash	75
3rd Prize	Cash	50
4th Prize	Cash	25
5th Prize	Cash	20
6th to 10th Prizes ($10 each)	Cash	50
	Total	$4,325

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Courtesy Bell Telephone Laboratories

MAY, 1947

CAN THE SERVICEMAN SERVE THE "HAM"?

By John F. Rider

NOW is as good a time as ever to discuss a subject which should have been dealt with a long time ago. What we have in mind is the manner in which some radio repair shop operators can be of service to the amateur radio operator. We realize that some amateurs will look askance at the suggestion, but we feel that the subject can well be discussed because the repair industry can use income from all sources and the radio amateur group can make good use of the repair facilities.

As a starting point, let us examine the matter of ham receivers, otherwise known as communication receivers. Ham circles have an axiom which states, "You can't work 'em, if you can't hear 'em"; consequently, every effort is expended in a ham station to improve receiving capabilities to the utmost. Many parts of a ham installation contribute to this facility, but our interest lies in the receiver. It is the belief of this writer that numerous radio service shops in different parts of the nation can be of service to active hams. It is simply a matter of getting together and making the wants of the latter known to the former, and the facilities of the former made known to the latter.

It is difficult to determine the number of hams who also are radio servicemen or who are engaged in some branch of the radio industry so that they are capable of carrying out the necessary repair and readjustment operations upon their receivers. However, there is a sufficient number of men who do not combine this vocation with their avocation of ham radio, to justify the suggestion that competent radio repairmen in this nation do the work now being done by receiver manufacturers' distributors and by the plants themselves. Work done by both of these outfits represents some delay to the receiver owner, caused by the respective locations between the ham station and the aforementioned manufacturers' service facilities, time lost in transit as well as the natural delay caused by the hectic conditions of the radio industry as a whole, which includes personnel, production requirements, and the like.

On the other hand, competent radio repair shops are to be found in all parts of the country. By this we do not mean that all shops are equally competent technically or equally well equipped with the necessary testing and calibrating apparatus. Moreover, all radio repair shop personnel are not fully aware of the performance required of a communication receiver, or the conditions under which it is used; therefore, we are not suggesting

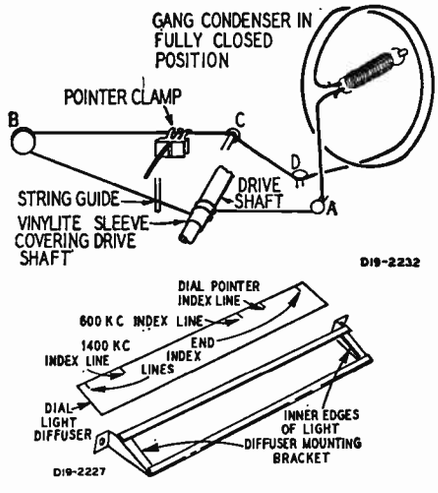
Please turn to page 6

MONTGOMERY WARD 64WG-1804C, 74WG-1804C

These two models are similar to the 64WG-1804A receiver, shown on *pages 15-88 to 15-90 of Rider's Volume XV*, except for the following changes:

The frequency range has been slightly contracted to 540-1600 kc. A 470-ohm dropping resistor (R-20) has been inserted in the circuit between B+ and the following points: primary winding of the first i-f transformer (T-3), the screengrids of the 12SA7 mixer, the screengrid of the 12SK7 r-f amplifier, and resistor R-1. A 0.05-μf bypass capacitor (C-28) is connected from the junction of these points to the point marked "X" in the filament line of the schematic on *page 15-88 of Rider's Volume XV*.

The drive cord length has been increased for these models and the following drive cord replacement instructions should be followed.



Revised dial stringing diagram and diffuser strip for Montgomery-Ward Models 64WG-1804C, 74WG-1804C.

Turn the gang condenser to the fully closed position. Use a new drive cord 42 inches long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley, pass the cord through the slot on the drive pulley rim, under stud A and wind two turns clockwise (from front of chassis) around the tuning shaft as shown in the accompanying illustration. Turns must progress away from chassis. Pass cord over pulley B and stud C and under stud D. Pass cord under drive pulley and wind 1¾ turns counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess cord.

Attach the dial pointer to the cord and position as instructed on *page 15-89 of Rider's Volume XV*.

The low end of the dial on these models is opposite to that used on the 64WG-1804A model so that the diffuser strip appears as shown in the accompanying illustration.

The components used in the 64WG-1804C and 74WG-1804C models are the same as those used in 64WG-1804A enumerated on *page 15-90 of Rider's Volume XV* except for the following:

Ref. No.	*Part No.*	*Description*
C-1	D67102	.001 mf 400 V Tubular
C-3A, C-3B	26A402	Gang condenser and pulley assembly
C-14	B67403	.04 mf 200 V Tubular
C-15	B67602	.006 mf 200 V Tubular
C-22	B67204	0.2 mf 200 V Tubular
C-23	D67104	.1 mf 400 V Tubular
C-24	17A123	1.5-12 mmf Trimmer
C-28	B67503	.05 mf 200 V Tubular
R-20	B85471	470 ohms 0.5 watts Carbon
T-1	26A445	"B" Range loop antenna assembly
	58X667	Dial
	26A446	Pointer bracket assembly 42" drive cord
	28X95	Drive cord tension spring
	41X81	Dial light diffuser

•

RCA 56 SERIES, 61 — SERIES

On some models of these series, which appear in *Rider's Volume XV*, the 500,000-ohm volume control is not furnished with a stop 50,000 ohms from the high end of the control. Volume controls having no stop can be identified by a dot of red lacquer on the left side of the control, viewing the shaft end with terminals up. In models using this control, a 56,000-ohm ½-watt resistor, completely covered with spaghetti tubing, is connected between the high end of the control and the yellow lead on the second i-f transformer.

Replacement controls equipped with a stop do not need this external 56,000-ohm resistor, so when replacing a volume control, check the resistance between the arm and the high end of the replacement control with the arm turned fully clockwise. A reading of 50,000 ohms will indicate that the control is equipped with a stop, and that the 56,000-ohm resistor in the set should be removed before installing the new control.

•

SCOTT 800-B

The instructions below are for installing an antenna coupling transformer for this receiver, data for which are shown on *pages 15-30 to 15-90 in Rider's Volume XV*.

For better reception of weak signals on the standard broadcast band in remotely located areas or in locations where the noise level is extremely high, an antenna coupling transformer is furnished which provides maximum signal input to the receiver for reception of stations on the standard broadcast band.

The coupling transformer should be installed as follows:

1. Loosen the large screw in the lower left hand corner of the pushbutton tuning backplate at the rear of the receiver. This screw is located on the square backplate just above and to the left of the antenna terminals.
2. Slide the coupling transformer mounting bracket under the screw head and tighten down. The transformer should face toward the center of the backplate and will cover up the license plate.
3. Fasten the white wire from the transformer to the outside AM antenna terminal on the receiver.
4. Connect a short piece of wire between the center AM antenna terminal and the GND terminal and connect the black wire from the coupling transformer to the GND terminal of this strip.
5. Connect the antenna lead-in to the two terminals provided on the coupling transformer, clamping the wires between the two flat washers provided.

•

MONTGOMERY WARD 64WG-2009B, 74WG-2009B

These models are similar to the 64WG-2009A, shown on *pages 15-95 and 15-96 of Rider's Volume XV* except for the following changes:

A 470-ohm dropping resistor (R-20) has been inserted in the circuit between B+ and the following points: the primary winding of the first i-f transformer (T-3), the screen grids of the 12SA7 mixer tube, and resistor R-2. A .05-mf bypass capacitor (C-28) is connected between the junction of these points and the point marked "X" in the filament line of the schematic on page 15-95.

The components used in these models are the same as those used in 64WG-2009A enumerated on *page 15-94 of Rider's Volume XV* except for the following changes and additions:

Ref. No.	*Part No.*	*Description*
C-1	D67102	.001 mf 400 V Tubular
C-3, C-4, C-5	B67102	.001 mf 200 V Tubular
C-14	B67403	.04 mf 200 V Tubular
C-15	B67602	.006 mf 200 V Tubular
C-19	B67253	.025 mf 200 V Tubular
C-23	D67104	0.1 mf 400 V Tubular
C-28	B67503	.05 mf 200 V Tubular
R-20	B85471	470 ohms 0.5 watts Carbon
	26A426	Tube socket and shield assembly

•

A STUDY OF INVERSE FEEDBACK

By Seymour D. Uslan

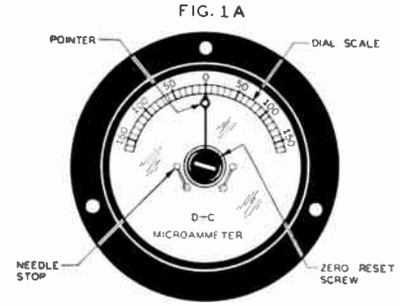
IN the August issue of SUCCESSFUL SERVICING, an article was published on an experiment of regenerative feedback that was performed in the John F. Rider Laboratories. The type of regenerative feedback was very simple; some of the output from the plate circuit of an audio power-amplifier tube was fed back to the grid input circuit of the preceding audio amplifier. The unique feature about this experiment was the method of employing special microammeters and a low-frequency oscillator to show *visually* how the feedback was regenerative.

Beside the experiment on regenerative feedback, another experiment was performed on degenerative or inverse feedback. The type or inverse feedback employed in this experiment is also quite simple. In fact, the type of circuit chosen for the experiment is found in many of the receivers appearing in Rider's Volume XV. The interesting part about the experiment was the method used to illustrate visually that inverse feedback was occurring. Similar to the experiment on regenerative feedback, the same type of microammeters was used as well as the special low-frequency oscillator, as designed in the John F. Rider Laboratories. Before discussing the circuit arrangement employed, it would be best to understand the type of meters used.

Fig. 1A shows the type of d-c microammeters used. The face of the meter is 3.5 inches in diameter, and therefore affords quite a large visual range. The meters are calibrated 150 microamperes on either side of their zero point. The — and + marks as illustrated in Fig. 1B are the respective negative and positive terminals of the d-c microammeter. If current, designated as *I*, flows into the negative terminal, the meter needle of Fig. 1A will swing to the right, indicated by the solid arrow in Fig. 1B. However, if current, designated as *I'*, flows into the positive terminal, then the meter needle will swing toward the left, indicated by the dashed arrow in Fig. 1B.

Therefore, with direct current, the meter needle will swing in only one direction according to the direction of this current flow, and it will remain fixed, thus indicating the value of direct current. If a very low-frequency a-c signal (in this experiment, a sine wave that is oscillating below one cycle per second) were to be injected into this meter, it would be possible to watch the actual movement of the pointer following this signal. In other words, on the positive half-cycle of the low-frequency input signal, the meter needle will swing in one direction, and, on the negative half-cycle, the meter needle will swing in the other direction.

FIG. 1A



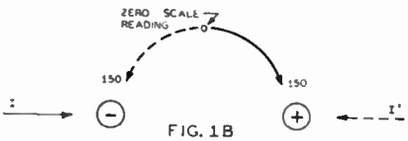


FIG. 1B

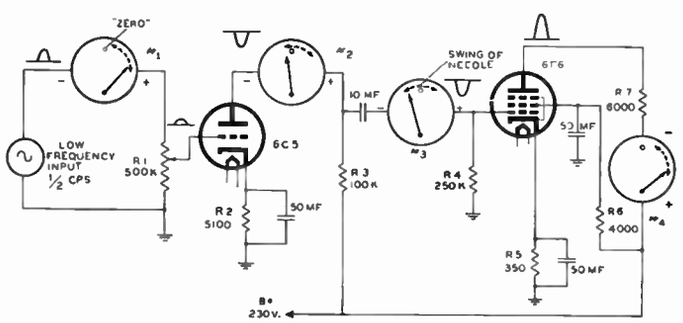
Fig. 1A. Face of the meters used in circuits below. Fig. 1B. Arrows indicate direction of needle swing for different polarities.

Using a simple 2-stage audio system consisting of a 6F6 power amplifier and a 6C5 voltage amplifier, a number of microammeters (as that previously discussed) are inserted in the circuit as shown in Fig. 2. (This circuit is similar to that used in the experiment on regenerative feedback.) The same circuit with the inverse feedback is shown in Fig. 3. If a pure sine wave with no d-c component were to be impressed across one of these meters, the needle would swing equally on either side of the zero mark. If a sine wave with a d-c component were impressed across one of these meters, the swing of the meter needle would be predominantly to one side of the meter scale. (The side that the swing would favor is dependent upon the polarity of the hookup, and direction of current flow.) This is the case in meters *1* in both Figs. 2 and 3. The low-frequency signal generator puts out a sine wave, but the sine wave has a d-c component and the needles of the meters do not swing evenly on either side of the zero scale.

As the meters are calibrated to 150 microamperes, it was necessary to supply shunts across the terminals of most of them in order to limit the amount of current to no more than 150 microamperes. In other words, much more than a 150-microampere current flows in different parts of the circuit where the meters are placed.

Before further considering the individual circuit arrangements, a feature inherent to the type of vacuum-tube amplifiers used in this experiment should be known; this feature is the phase inversion quality. That is to say, the control-grid and plate of an amplifier function in such a manner that when a positive signal (or one of a zero-degree phase angle) exists on the control-grid of a tube, then a negative signal (or one 180 degrees out of phase with the zero-degree signal on the control-grid) exists on the plate of the tube. In other words, this positive going signal on the control-grid makes the grid more positive with respect to the cathode of the tube and more plate current will flow. This increase in plate current naturally causes a greater drop in voltage in

Please turn to page 4



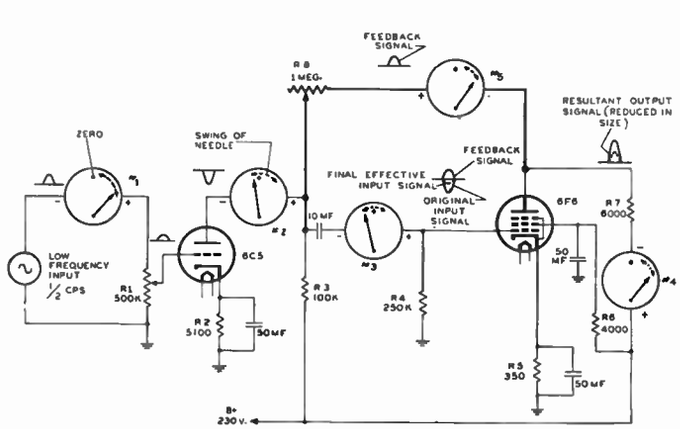


Fig. 2, above. Two-stage a-f amplifier without feedback showing current phase relationships. Fig. 3, right. The same circuit with degenerative feedback indicated on meter 5.

INVERSE FEEDBACK

Continued from page 3

the plate load. Consequently, with this larger drop in plate voltage, less voltage is available at the plate of the tube. It is therefore readily seen that, when the signal on the control-grid increases, the signal appearing at the plate of the tube decreases, and the relation between these two signals is such that they are 180 degrees out of phase.

Let us now refer to Figs. 2 and 3, the two basic schematics relative to this experiment on inverse feedback. The frequency of the a-c signal input is ½ cycle per second, and, consequently, the values of the coupling and bypass capacitors must be quite large. The output of the signal generator is controlled in such a manner that it would not drive the grids of the 6C5 tube positive, but simulate a typical value of the a-c signal input. The input circuits of both Figs. 2 and 3 function the same way. The output signal from the generator is indicated on meter *1*. Analyzing the situation at one particular half-cycle, namely on the positive half-cycle, the output sine wave for this half-cycle is shown near meter *1*. This signal appears across the 500,000-ohm potentiometer, and a portion of it is tapped off and impressed onto the grid of the 6C5 tube. This is illustrated by a positive half-cycle sine wave of smaller amplitude near the grid of this tube. By virtue of the amplifying nature of the tube and its phase inverting qualities, there exists a negative half-cycle signal on the plate of the 6C5 tube, but increased in amplitude. The proof that the input signal and the output signal of the 6C5 tube are out of phase is given by meters *1* and *2*. At the particular instant when meter *1* swings all the way to the right, meter *2* swings all the way to the left, indicating an *out-of-phase* relationship between these two signals. At this point, the similarity between the two circuits ends because the inverse feedback takes place in the other half of this circuit, as shown in Fig. 3.

Let us consider the rest of the two circuits independently, and start with Fig. 2, the circuit without feedback. The input to the 6F6 tube is naturally of the same phase and amplitude as that existing on the plate of the 6C5 tube because there is really no circuit element between these two tubes that appreciably shifts the phase of the signal or causes much of a voltage drop. Because there is no d-c component of the signal that is impressed across the grid of the 6F6 tube, the swing of meter *3* is the same on either side of the zero mark. As the phase of the signal currents passing through this meter is the same as that registered by meter *2*, both meters *2* and *3* swing in the same direction at the same instant of time, indicating *in-phase* relationships. Meter *4* indicates the relative strength of the output signal from the system and the swing of its needle is opposite in direction to that of meter *3*, again indicating the phase reversing qualities of an amplifier. As there are shunts across the individual meters, the actual strength of signals as registered by the swing of the needles cannot be compared. However, in order to show comparison, the relative strength of the signals at different points in the circuit is illustrated by sine waves of half-cycles (as mentioned before). Consequently, the strength of the signal appearing on the plate of the 6F6 tube is shown to be greater in amplitude and opposite in phase to that existing at the control-grid of the same tube.

Remembering the features relative to the circuit of Fig. 2, let us now refer to the same type of circuit with the inverse feedback arrangement, as shown in Fig. 3. The feedback circuit can be traced from the plate of the 6F6 tube through meter *5*, though the feedback coupling potentiometer *R8*, to the 10-μf coupling capacitor, and then back to the control-grid of the same 6F6 tube. (*R8* controls the amount of voltage that is fed back.) From what has been said in reference to amplifier tubes, the signals existing on the plate and grid of this tube (as well as any other amplifier of this type) are opposite in phase and therefore, with this type of feedback, the output of the system should be reduced. This is precisely what happens, and may be readily seen when the appropriate meters are examined.

The amount of feedback is indicated by meter *5*, and, because there is no phase displacement from the point of insertion in the circuit of this meter to that of meter *4*, the swing of both of these meters should be in the same direction, as illustrated in Fig. 3. The swings of meters *3* and *5* are opposite in direction indicating an *out-of-phase* relationship between them, and, consequently, the signal fed back and the signal already existing on the control-grid of the 6F6 tube *oppose* each other. This results in a *decrease* in the value of the *effective* signal input to the 6F7 tube. The half-cycle of feedback signal is illustrated next to meter *5* and the combination of this signal and that existing on the 6F6 control-grid is illustrated by the resultant half-cycle signal (in dashed lines) near the control-grid of the 6F6 tube. Notice the reduction in amplitude of the resultant signal as compared to the original input signal. The reduction of signal input to the control-grid of the 6F6 tube is readily evidenced by the decrease in the needle swing of meter *3* in the feedback circuit, as compared to meter *3* in the circuit without feedback.

With this reduction in effective input signal, the output of the 6F6 tube decreases. This reduction in output is indicated by meter *4*. Compare the needle swings of meter *4* in the circuits with and without feedback, and the reduction in output will be noticed immediately.

THE TIME SAVER—RIDER'S VOLUME XV

Successful
SERVICING
REG. U. S. PAT. OFF.

Vol. 8 MAY, 1947 No. 4

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

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JOHN F. RIDER, Editor G. C. B. Rowe, Associate Editor

TEST EQUIPMENT PRICES

REPORTS from jobbers indicate that radio repairmen are seeking test equipment on a basis of price. That such should happen is quite understandable, but it also seems in order that some comments be made concerning the weakness in such reasoning.

It is shortsighted frugality to buy anything of such nature on a price basis. Inasmuch as test equipment is an investment in a facility it is important to appreciate that the best is the cheapest in the long run. One of the important and highly desired conditions associated with such apparatus is that it remain operative at all times; that it be reliable in performance, stable in its characteristics, and dependable in its findings. To accomplish these operating features requires more than average workmanship, the application of ample safety factors, and a critical selection of the components which comprise the unit. All of these tend to indicate a trend towards an increase rather than a decrease in price with respect to what has existed heretofore.

The wide range of frequencies represented by the devices which will come within the operating province of the nation's radio repair shops will call for either more elaborate design to embrace these requirements in a single unit, or will make necessary the construction of more than one device. In either case, the production costs will be higher and it is only a natural consequence that the selling prices will be higher.

Although announcements of apparatus made since the termination of the war and intended for use in the conventional radio repair field do not seem to indicate radical departures from prewar design, it is our opinion that these do not reflect future trends—and the future we are speaking about is not too far distant. Wartime developments will appear in test equipment. They are inevitable if rapid and effective maintenance of the electronic equipment being sold to the public and commercial institutions exclusive of industry will be accomplished rapidly and profitably.

Industry wise, the trend is toward the use of miniature tubes and smaller finished receivers. The pocket receiver is on its way. The "midget" receiver destined to be smaller in size is here to stay. To create maximum sales on such receivers, every effort will be made by the manufacturer to cut corners in cost of production. Every artifice known to the designing as well as the production engineers will be employed. Compactness without question will be the essence of physical design. Evidence of extreme mechanical ingenuity so as to achieve lowest production cost and smallest dimensions of the finished product are already in evidence.

Be that as it may, the fact remains that test-equipment design engineers must recognize the conditions surrounding the production of radio equipment for private consumption and the repair of this equipment. That which may be the 6000th receiver produced during the day on the production line, developing from a bare chassis into the finished product by a series of additions and connections, will always be an individual receiver in the repair shop. It is as if no other similar receiver had ever been produced—it requires individual handling throughout.

Somewhere along the line, some means of equalizing this unbalanced state must be devised. It is certainly within the realm of possibility, as evidenced by the great amount of highly specialized and complicated gear which was developed to fill myriad needs during the war. When it comes . . . to say the least, it will not be cheap. For that matter, no test equipment of good quality produced in the future will be cheap.

JOHN F. RIDER

•

The Cover

The ice-incrusted parabolic antennas, shown on page 1, were photographed on top of the Zugspitze, Germany's highest mountain. They formed a link in the telephone communication network which the U. S. Signal Corps set up and maintained during our invasion of the continent. This communication system permitted eight telephone conversations to be conducted simultaneously over the same 5000-mc carrier, using the pulse-time-modulation method. Distances between relay points depend upon the elevation of the antennas and the terrain, since the ultra-high frequency employed limits the line-of-sight "jumps", which, in the case of the installation shown, was over 100 miles. This system of communication was developed by the Bell Telephone Laboratories, and, despite the adverse weather conditions encountered, gave continuous reliable service.

•

ARE YOU MOVING?

If you wish your copies of SUCCESSFUL SERVICING sent to another address, please let us know at least one month ahead. And be sure to send us your former address, as well as the new one. Please type or print all the necessary information — we're not mind-readers. Thank you.

RCA 65X1, 65X2

The following items should be added to the precautionary lead dress for RCA Models 65X1 and 65X2 shown on *page 15-62 of Rider's Volume XV*:

1. Dress blue lead from output transformer against front apron and away from i-f leads.
2. Dress contact on oscillator section of gang condenser back away from oscillator coil adjustment.

MONTGOMERY WARD 64BR-1051A

The trimmer diagram in this model on *page 15-62 of Rider's Volume XV* has an error. The capacitor numbers on the input and output i-f transformers are wrong. The input i-f capacitors should be C8 and C9 and the output i-f capacitors should be C12 and C13.

•

TRUETONE D1180 B

This model is similar to model D1180A, shown on *pages 13-69 and 13-79 of Rider's Volume XV* except for the following changes: The antenna trimmer (C2), part number 17A123, mounted on the loop aerial assembly in the Issue "A" model, has been replaced by a "Gimmick" fixed capacitance, consisting of two wires, one wrapped around the other. The 1400-kc adjustment as given in the alignment procedure is omitted; this adjustment is made at the factory and need not be made in the field.

•

REMLER MP5-5-3

In the schematic of this model, which appears on *page 15-1 of Rider's Volume XV*, the cathode of the 6V6GT output tube, pin 8, should be connected to ground.

•

RCA 61-1, 61-2, 61-3

The schematic shown on *page 15-49 of Rider's Volume XV* shows a 12J5GT oscillator tube in chassis RC-1011. In the second production the 12J5GT tube was replaced with a 12SR7 tube (as shown in Fig. 1) and the chassis changed to RC-1011A. In the third production, the 12SR7 tube was replaced with a 12-

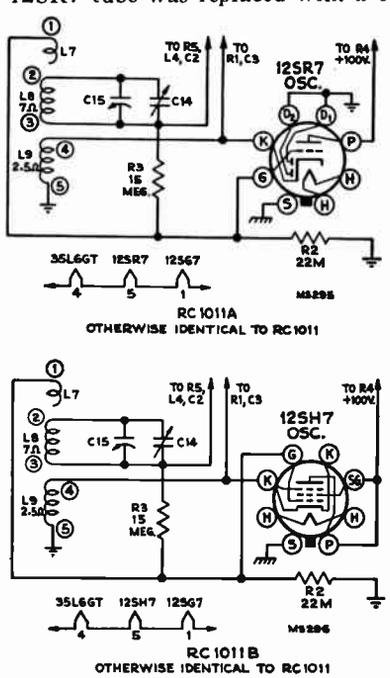
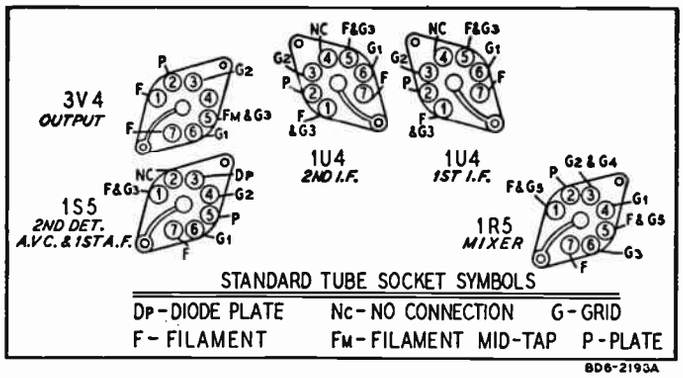


Fig. 1, above. Revised circuit with 12SR7 oscillator. Fig. 2, below, Second revision with 12SH7 oscillator.



Revised tube layout for the Montgomery Ward Model 74WG-1054A in which a 3V4 output tube has been substituted for a type 3Q4 tube.

SH7 tube (as shown in Fig. 2) and the chassis number is now RC-1011B.

•

MONTGOMERY WARD 74WG-1054A

This receiver is the same as the 64WG-1054A, shown on *pages 15-82 to 15-84 of Rider's Volume XV* except for the following changes: A 3V4 is used for the output tube so that in the final step of the receiver stage sensitivity measurements the signal generator should be connected through the 0.05-μf coupling capacitor to pin 6 of this tube. A 2.2-volt input will be required for a 50-milliwatt output for this stage. The schematic shown on page 15-82 holds true for this model without any changes since the 3V4 tube has the same wiring as the 3Q4. The changed socket layout is shown in the accompanying sketch. The C-1 trimmer capacitor in this model has a value of 1.5-12 $\mu\mu$f, and its part number is 17T123.

•

GALVIN DIAL CORD SLIPPAGE

Dial slippage encountered in 1946 home sets using slide rule type dials can easily be remedied by restringing using two dial cords.

Formerly, a single cord and tension spring was used for both driving the tuning capacitor and moving the pointer. It is recommended that two cords and tension springs be used; one for driving the tuning capacitor and one for moving the pointer.

Before removing the old cord, make a sketch showing the old cord layout. This will assist greatly in restringing.

First install the drive cord between the tuning shaft and tuning capacitor pulley. It is to be routed in exactly the same manner as the old cord was, except run it only between the tuning shaft and tuning capacitor pulley. Be sure to wind 3 turns around the tuning shaft. The old tension spring is used to provide tension on the cord by hooking in exactly as before. Use the cord originally on the set for this purpose, except cut it down to the required length.

Install the pointer cord supplied by routing it in the same fashion as before except that it does not go to the tuning shaft. Simply run it to the tuning capacitor pulley and apply light tension to it with the attached tension coil spring. There are several holes in the tuning capacitor pulley through which the tension spring may be hooked and/or adjusted.

To calibrate pointer, simply turn the tuning capacitor to the fully meshed position and set pointer to "V" notch or calibration mark provided.

Use a drop of household cement to fix pointer to cord. A drop of cement on all knots will secure them.

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CAN THE SERVICEMAN SERVE THE "HAM"?

Continued from page 1

that every or any radio repair shop can do the work. There is, however, a goodly number of well-equipped repair shops; places where each man takes personal pride in his daily accomplishment — each job being a challenge to knowledge and careful application of the necessary techniques. The owners of these shops should make their presence known to the ham community and after having proved their competency, solicit communication receiver repair or adjustment business.

To do a good job in this field requires an understanding of a communication receiver, how it is used, and the complete appreciation of how the owner feels toward his receiver. It is necessary for the repair man to realize that whatever business he gets is due to lack of facilities rather than lack of knowledge; that a ham knows when his receiver is "hot" and when it is performing in a mediocre fashion. This is somewhat different from the relationship between the home broadcast receiver owner and his possession. If this relationship is fully realized and a local repair shop can prove its unqualified competency, it would be a windfall to many hams in this nation and a source of added revenue to the radio repair industry.

That Reminds Us

T'other day we had to look up sumpin in a copy of a radio magazine that was *23 years old* and some of the ads sure brought the memories gallopin' back . . . Them wuz the days when only sissies paid out good foldin' money for a receiver that was all wired up and all you had to do was connect up a flock of batteries, a headset, string up an antenna on the roof, etc., etc. *And the PRICES!!!!* One nice little 5-tube job sold for 85 bux and it featured "simplicity of operation *(people have but two hands to use in tuning)*" . . . A 6-tuber with built-in loudspeaker could be had for a mere $350 **(exclusive of tubes and batteries)**!! Most of the ads were aimed at the gents who rolled their own . . . You could pick up a nice speaker with a 14-inch horn for 36 smackers—a .001-mf condenser for 5 and a ½—a *noiseless* battery charger "with nothing to adjust, break, or get out of order for $19.50 — a vernier rheostat "6 ohms for most tubes, 25 ohms for 201A and 301A tubes, and 40 ohms for 199 and 299 tubes" for 2 bux each — a-f transformers could be had for *"only* $6.00" — and one full page ad urged you to "take a peek into radio fan's set — and you know what to give him for Christmas" and there was a pic of a WD-11, "the ideal dry cell tube".

They're Everywhere

We got a letter not so long ago from Ira Barenblut, once in our shipping dept. and now repairin' radio equipment for the Army in Livorno, Italy. He went into an office recently and saw in a bookcase a set of Rider's Manuals and he says "that brought back plenty of memories of old times. For all I know, I may have packed those very books . . . *It sure gave me a swell feeling to see them again."*

"How It Works"

Even though some of you did have to wait a little while for your copy of the "How It Works" book, we are willing to wager a nickel or two that you found it was well worth waitin' for. At least, that's wot several of the lads around these parts have told us. Gettin' right down to cases, did you ever hear of a better investment than the 2000 pages of **Volume XV??** And when you think of all that *EXTRA INFORMATION* in the "How It Works" book—well, that's a *dividend paid on your investment as soon as you've made it* . . . And wot's more, that investment will go on paying you dividends for years and years to come — **just like all your other volumes of Rider's Manuals have been doing.**

Getting Smaller

Time was when the bigger anything was, the sooner it hit the news . . . Now it's the opposite, leastwise as far as tubes go . . . We hear tell that the G. E. engineers have developed a tube that is about an inch long, half an inch thick, and weighs less than an ounce!! Mebbe these are fore-runners of tubes for a wrist radio like Dick Tracy uses . . . Then there's the 1P42 phototube that RCA says is about the size of a .22 rifle cartridge and that's gonna open up a bunch of new uses for these light-into-electricity tubes in places where their size formerly made 'em impractical . . . We're tellin' you these things just so's you won't be surprised when you see one of these little giants. . . .

Better'n A Slap

Not so long ago a friend of ours was on the receiving end of an unjust bawlin' out by a very irate female. He stood the tirade — well, not very long and then, "Notice, madam, I put on my hat. This is something I *never* do **in the presence of a lady!!!"** In our opinion, this is second only to the classic which a famous authoress hurled at an insulting male heckler, "When you get home, toss your mother a bone". . . .

Suggestion Dept.

We're always glad to get new ideas and suggestions to turn over to the rest of you guys. Here's one that came in from **Edgar O'Rourke, Bear Lake, Mich.** He claims he saves plenty of time in his service shop by *printing RIDER'S MANUAL volume and page numbers on the back of the chassis when a set comes into his shop.* Thereafter, the next time the set is returned for a repair job, it is only necessary to glance at the chassis insteada thumbin' thru the index all over again. *Here's a guy who's friendly to the rest of the world!*

Feedback

Sure felt good gettin' all those letters thankin' us for that article on feedback in the August SUCCESSFUL SERVICING. Si Uslan blossoms forth again in this issue with some more stuff on feedback.

"Ah Blissful Spring!"

Somebody decided the outside of our building needs a spring cleaning too . . . just when, withdrawin' from hibernation, we open our windows and try to sweep in some balmy spring breezes. And what happens?? Steam hisses forth and puts a damper *(but actually!)* on any of our spring yearnin's. To top all that off, the boys who collect our nickels are puttin' 'em to good use (I guess) makin' the 28th Street subway station longer or some such thing *(for our convenience??)*. That'd be O. K. if it were underground, but if the bangin' away right outside our windows doesn't stop soon, we're gonna unlimber our trusty mount and go pedalin' out to where speed is measured by how fast a guy walks. Soooo, if you see a hungry lookin' male pushin' along a road. don't run him down — it may be

THE ROLLING REPORTER

"HOW IT WORKS" VOLUME XV

If you received a Temporary Index with your Rider's Volume XV, you should fill out and mail AT ONCE the post card that is on the lower portion of the front cover of the Index. Do NOT request it by letter. Your free "How It Works" and permanent Index will be sent ONLY if you mail us the orange card.

VOLUME XV DIVIDEND

When you receive your copy of the "How It Works" book and Volume XV Index, you will also find the servicing data on Philco Model 46-1213 on three double-spread and two single pages. You will note that these pages are numbered from Philco Page 15-47, 48 to Philco Page 15-62 and are punched so that they can be inserted in your Volume XV after Philco Page 15-46.

We are sorry that these pages were not ready to go out with your Volume XV, but the great amount of engineering work involved and the drawing of the clarified schematics delayed the final preparation of these pages; if we had waited for their completion, the delivery of Volume XV would have been delayed a matter of weeks. We wanted you to have the use of Volume XV at the earliest possible moment and so we are sending you these Philco pages later on, thus causing you a minimum of inconvenience.

This Philco combination receiver is a multiband a.m.-f.m. set and the five clarified schematics on the double-spread pages show what components are functioning when the switch is set at broadcast (manual or push-button tuning), a-m short wave, f-m broadcast, and phonograph operation. No composite schematic has been included in these pages, for it was felt that with a set of such complexity as this one, the breakdowns of the circuits would prove of greater value to the users of Volume XV than a schematic of everything. We would appreciate your telling us what you think of this.

These pages are not included in your Volume XV Index and it is suggested that you clip the following and paste it somewhere in your index, making reference to its whereabouts at the end of the Philco listing.

PHILCO RADIO & TELEVISION CORP.

46-1213
Code 121

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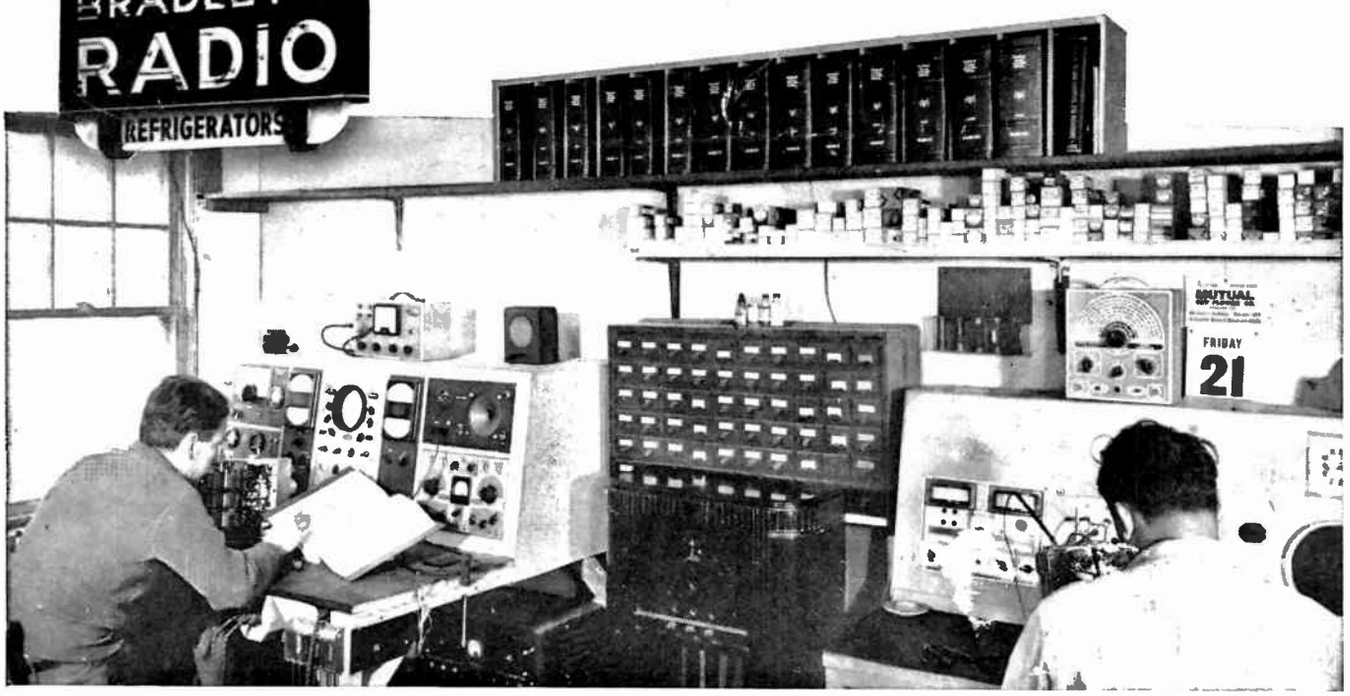
Parts list, dial data 15-62

•

RCA 59V1

In RCA Model 59V1, found on *page 15-44 of Rider's Volume XV,* field coils stamped 94136-501A will have a minimum resistance of 1300 ohms at 25° C.

A SIGN OF SUCCESSFUL SERVICING



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A leading radio publication recently featured Bradley's of Red Bank, N. J. on an editorial spread, which told of the profitable efficiency of its service department. Characteristically, Bradley's has all fifteen RIDER MANUALS, depending upon them for authoritative information supplying all necessary servicing data on American-made receivers issued from 1930 to 1947.

From no other single source is this information available, in no other way can you have at your fingertips the information you need to diagnose troubles in any and all radio receivers that come to your shop for repair; receiver schematics, voltage data, alignment data, resistance values, chassis layouts and wiring, and trimmer connections.

Volume XV, covering sets issued during 1946, includes the exclusive Rider "clarified-schematics" which break down the composite diagrams of hundreds of complicated multiband receivers into individual schematics of each circuit as it exists with each turn of the wave band or equipment switch.

Also with each copy of Volume XV is included the 150 page "How It Works" book, a practical guide to the theory of operation of the new technical features in the latest receivers. These exclusives are but two of the many important features in Volume XV, which also includes all popular "Ham" communication receivers, Scott receivers, Magnavox RA combinations and record player combinations.

RIDER MANUALS provide a systematic, compact, indexed data service, always in order, always ready with the information you must have for efficient, time-saving, profitable servicing. Year after year, after year, RIDER MANUALS keep pouring out profits for servicemen. Owners of Volume I, who bought it 17 years ago are still deriving benefits from it.

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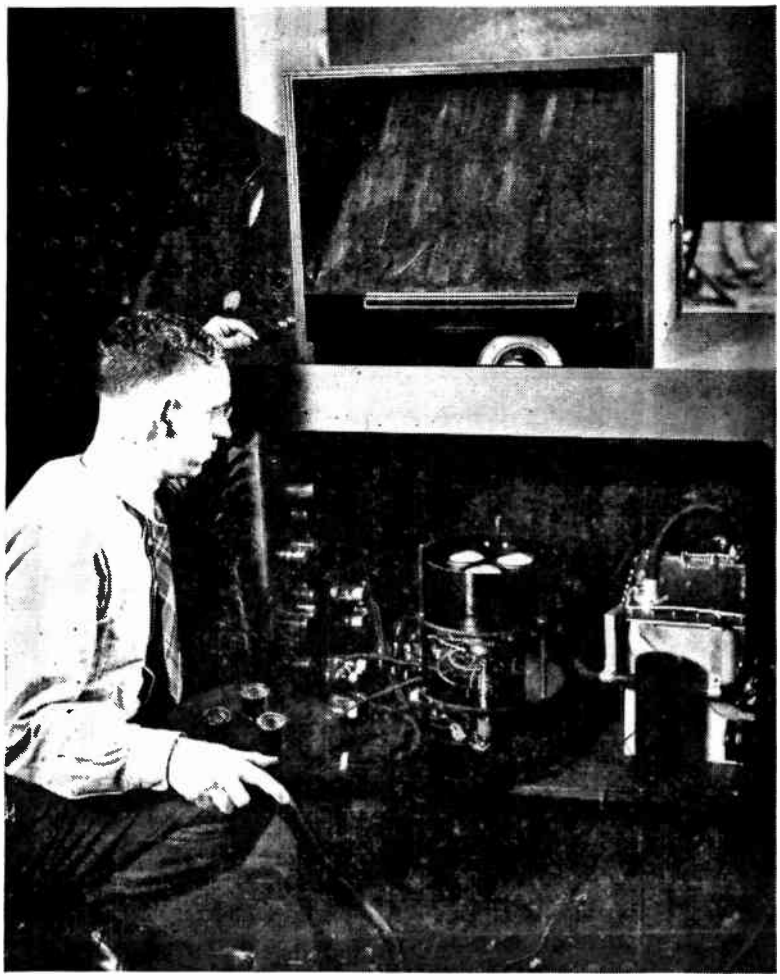
SEPTEMBER, 1948

SCHEMATIC DIAGRAMS AND P-A SERVICING

By

William Bouie



Courtesy RCA

AT first thought it might appear that a public-address system is a more or less standardized arrangement, one system not differing by very much from another system. This, however, is not the case, and no one system can be considered as representing a standard. Of course, certain features and functions are common to all p-a systems, just as in other electronic equipments used for the transmission and reception of speech and music. Some of these common features are that the signal (speech or music) must be applied to some sort of an input system; it must undergo a required amount of amplification; and it must be made to provide sufficient power to operate the loudspeaker(s) with the desired efficiency. These features plus a source of operating power are the common denominator in all p-a systems, but at this point the similarities cease. The manner in which the above results are obtained and the types of circuits used differ widely from one system to another.

Consider the input circuits of the p-a system. There are p-a arrangements wherein there is only one input circuit — either for a phonograph or a microphone and there are others with provision for as many as six or eight input circuits. These circuits may be simple or complex depending upon the specifications of the system. For example, the signal may be applied directly to the grid of an input stage or it may be coupled to the stage through a transformer to satisfy impedance requirements. On other occasions, cathode coupling may be used, necessitating an entirely different circuit arrangement. Provision may be made for control of volume in the input stage, or a pre-emphasis network may be incorporated to provide the desired frequency response. In addition, mixing networks may be included in the outputs of individual input circuits so that signals from several sources may be combined. When more than one input is used in an amplifier, quite often considerable differences exist in the circuit arrangement, each one being intended for a specific purpose.

Considerable differences exist between mixer circuits. Some use a resistance-type mixer network while others employ electronic mixing, and still others use a combination of these two. Master volume controls are often used in either the input or the output of these stages. Quite often more or less complex tone-compensation networks exist in either the input or output of the mixer stages, requiring specific circuit arrangements. Different-type tubes, requiring different values of circuit components, are employed depending upon the specific design of the amplifier.

Such added features as expander circuits, which compensate for the compression of loud passages in recorded music, require separate circuits, usually consisting of two stages, which operate in conjunction with a voltage amplifier stage. Variations of these circuit arrangements will be encountered in different amplifiers depending upon the design specifications. In addition to the expander a type of compression circuit to limit the intensity of loud passages may be included in the amplifier, or some sort of automatic gain control may be incorporated to maintain a constant level of sound output. The audio stage may include an equalizer network to provide more uniform frequency response. One or all of these circuits may be included in an amplifier and the tubes and circuit-component values will differ with the particular circuit arrangement, which in turn is dependent upon the design.

No exclusive coupling system has been made standard for audio amplifiers. In some circuits transformer coupling is used, others feature impedance-capacitor coupling arrangements, direct coupling where d-c operating potentials are applied to the control grid as well as the other elements of a tube, is a feature in the audio amplifiers of at least one manufacturer. Resistance-capacitor coupling, which may be encountered most frequently in audio amplifiers, uses no standard value for the plate-load resistor, the coupling capacitor, or the following grid resistor. For example, the plate-load resistor in a voltage amplifier stage will be found to vary from a low value of 50,000 ohms to a high of 500,000 ohms, and for specific arrangements even exceeding these limits. The coupling capacitor may have a value from 0.01 μf to 0.5 μf. Grid resistors vary in value from 100,000 through 10 megohms. Since the values of the coupling components are more or less interdependent upon each other, it can be seen that numerous variations in the above values will be encoun-

Please turn to page 4

RCA 54B1, Chassis RC-589, 54B1-N, Chassis RC-589D, 54B2, Chassis RC-589A, 54B3, Chassis RC-589B, Second Production, Chassis RC-589U, RC-589UA, RC-589UB

These models are the same as Model 54B1, Chassis RC-589, appearing on *pages 15-22 through 15-24 of Rider's Volume XV*, except for the following changes. These models have been produced with loops of two types of construction: "taped"—the coil is fastened to the loop cover with scotch tape; and "cemented"—the coil is fastened to the loop cover with coil cement. The models with the "cemented" loops have been produced with and without the 2—15-$\mu\mu$f antenna trimmer capacitor C2. Receivers with the "taped" loop all have C2. The three combinations are listed below with the correct alignment procedure specified. CAUTION: A "taped" type loop should never be used as a replacement on those models which do not have antenna trimmer capacitor C2.

Loop Construction	*C2 Ant. Trimmer*	*Alignment Procedure*
Taped	With	As given on page 15-22
Cemented	With*	See following alignment table
Cemented	Without	See following alignment table

*Remove antenna trimmer capacitor C2 by removing C2 alignment screw and cut off C2 capacitor plate.

*Steps 3, 4, and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the lid. This loop should be approximately one turn of 6x3½ inches coupled to the signal generator through a 200-$\mu\mu$f capacitor, and loosely coupled to the receiver loop antenna at about 1¾ inches distances, so as not to disturb the receiver loop inductance. Ground test oscillator through 0.1-μf capacitor to receiver chassis.

Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Connection lug of C1 located on rear of gang in series with .01 mf.	455 kc	Quiet point near 1,600 kc	C11, C12 2nd I-F trans.
2		455 kc	Quiet point near 1,600 kc	C8, C9 1st I-F trans.
3	*Antenna coupling loop thru 200 mmf. capacitor	1,500 kc	Rock gang	C5 (osc.)
4		600 kc	Rock gang	L2 (osc.)
5	Repeat steps 3 and 4 for final adjustments.			

The second production of these models use a type 1U5 tube in place of the type 1S5 (second detector, a-f, avc). They may be identified by the letter U in the chassis number which is stamped on the tuning capacitor or chassis. The accompanying diagrams show a partial schematic and a parts layout and wiring diagram for this tube. The replacement parts for these models are the same as those for the first production, with the exception of the following.

Stock No.	*Description*
72230	Support—tube support less tube sockets and transformers

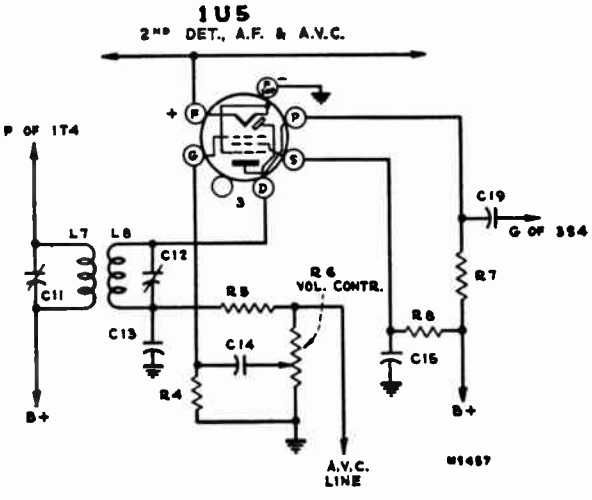
The following changes should be made in the parts list shown on *page 15-24 of Rider's Volume XV* to conform to all first production models.

Delete:

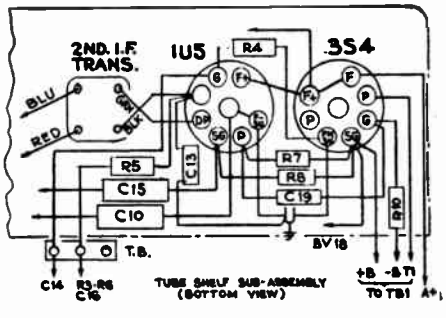
Stock No.	*Description*
60954	Capacitor—ceramic, 56$\mu\mu$f (C4)
65405	Capacitor—ceramic, 82$\mu\mu$f (C13)

Add:

Stock No.	*Description*
70448	Fastener—push fastener to hold loop (two required)
71563	Hinge—lid hinge—Model 54B3, —Red (two required)
71565	Lid—case lid complete with lid support less loop—Model 54B3—Red
71564	Loop—antenna loop complete with connectors less lid — Model 54B3—Red
71562	Plate—backing plate for mounting hinge on lid—Model 54B3—Red (two required)
71725	Screw—case cover mounting screw (one set)—Model 54B3
71567	Bottom—case bottom—Model 54B3—red
71566	Center—case center—Model 54B3—red
71568	Handle—carrying handle—Model 54B3—red
71569	Link—handle link—Model 54B3—red (two required)



Alignment instructions for sets with cemented loop are shown in the table. The wiring changes for the type 1U5 tube used in the second production are shown on the right.



Hallicrafters S-40A

This model is the same as Model S-40, second revision, on *pages 15-67 to 15-86 of Rider's Volume XV*, except for the following changes. C18 has been changed in value from 100$\mu\mu$f to 68$\mu\mu$f. A 10-ohm resistor (R30) has been connected between the center tap of oscillator coil T10 and terminal C. R30 has been removed from its previous position between C16 and the junction of C26, C6C, C7C, and switch S1F. C55 has been changed in value from 100$\mu\mu$f to 47$\mu\mu$f, and is now connected to the top of the 470-$\mu\mu$f capacitor (C54). The coil T17 is connected directly across C54, with one end going to ground. The center tap of this coil is connected to the cathode of the 6J8 tube. The 0.01-μf capacitor (C53) is connected from the plate of the 6J8 tube directly to ground.

The parts list should be changed to read as follows:

Ref. No.	*Description*	*Hallicrafter's Part No.*
C18	68$\mu\mu$f, ±10%, 500 vdcw; neg. temp. coeff. 0.0075$\mu\mu$f/$\mu\mu$f/deg.C; ceramic	CC25UK680K
C55	47$\mu\mu$f, ±20%, 500VDC, Mica	CM20A470M
T17	BFO coil; 455 kc; shielded	54B033-2

General Electric 260

This model appears on *pages 16-7 to 16-12 of Rider's Volume XVI*. It has been found that late production 1LC6 tubes, coded H7E, will oscillate at another frequency in addition to the desired frequency, causing unsatisfactory operation. To remedy this condition, the oscillator grid capacitor, C17, should be changed from 100$\mu\mu$f to 56$\mu\mu$f.

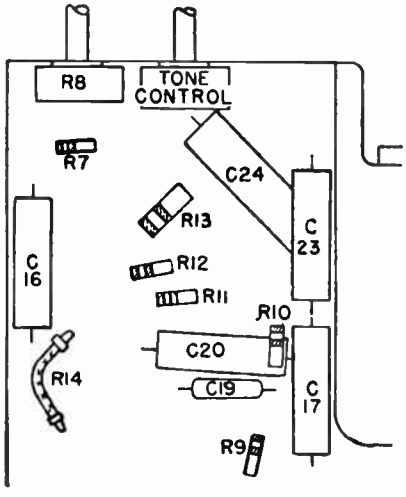
National Union Presentation

This model is the same as Model G-619 appearing on *pages 15-1 and 15-2 of Rider's Volume XV*. This company's Presentation Deluxe is the same as Model G-613 appearing on *pages 16-1 and 16-2 of Rider's Volume XVI.*

●

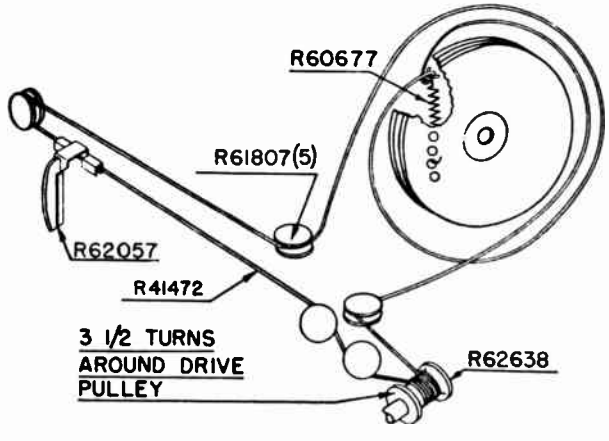
Sears Roebuck 8052, Chassis 101.808-1C, and 8053, Chassis 101.808-1D

These models are similar to Model 7054, Chassis 101.808, appearing on *pages 16-1 to 16-3 of Rider's Volume XVI*, except for the appearance of some of the parts and the addition of a variable tone control circuit. This circuit, consisting of a 0.001-μf capacitor (C23) in series with a 2-megohm variable resistor (R15), has been connected from the plate of the 7C6 tube to the B minus line. The location of these parts is shown in the accompanying illustration.



The variable tone control consisting of capacitor C23 and resistor R15 in Models 8052 and 8053.

The dial stringing diagram for these models is shown in the accompanying diagram and is the same for both Models 8052 and 8053 except that part No. R62057 is part No. R62187 for Model 8053.



Part number R62057 shown here is for Model 8052. Model 8053 uses part number R62187.

Hallicrafters SX-42

This model appears on *pages 17-6 to 17-16 of Rider's Volume XVII*. It has been found that there is unsatisfactory image ratio on the 10-meter band. This can be corrected in two ways, one of which provides for the change or replacement of four parts and the other provides for no change in the oscillator coil.

The first method is as follows:

1. The band 4 oscillator coil should be removed and replaced with a new coil, part number 50-837D.
2. Resistor R24, now 56 ohms, should be removed and replaced with a 22-ohm resistor, part number RC20AE220M.
3. Remove the main tuning dial scale, part number 83C265, and replace with new scale, part number 83C325.
4. Remove antenna coil, part number 51B827-C, and replace it with antenna coil, part number 51B827-D.
5. Align the receiver in the normal manner, making certain that the image falls on the high-frequency side of the signal frequency.

The second method is as follows:

1. Remove the oscillator trimmer capacitor C-42.
2. Calibrate the main tuning dial at 28 megacycles, with slug S-33, making certain that the image falls on the high-frequency side of the fundamental.
3. Calibrate the bandspread as outlined on *page 17-15 of Rider's Volume 17*, except that slug S-33 should be used instead of trimmer C-42.

It will be noticed that in this method the calibration of the low-frequency end of the number 4 band has been neglected entirely, since this cannot be accomplished without the use of trimmer C-42. The oscillator coil would have to be replaced to allow the use of this trimmer.

Belmont 6D127

This model is the same as Model 5D128 appearing on *pages 15-4 and 15-5 of Rider's Volume XV.*

Majestic 8FM783, Chassis 8B07D

This model is the same as Model 8FM776, Chassis 8B07D, appearing on *pages 17-17 to 17-22 of Rider's Volume XVII*, except that "solid doors" are used instead of metal grilled frame doors. The parts list should be changed to read as follows:

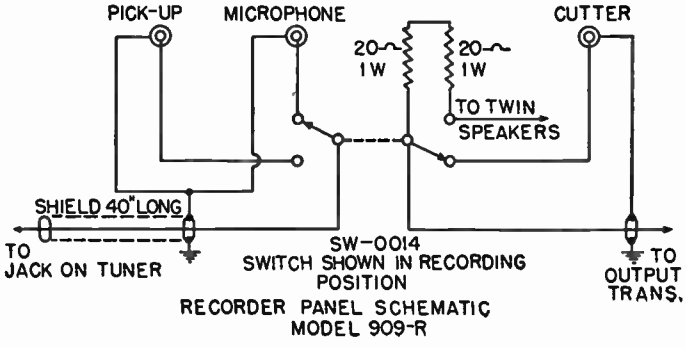
Part No.	*Description*
115-48	Cabinet, console combination, mahogany or walnut (state color)

●

Howard 909MR

This model is similar to Model 909M appearing on *pages 17-34 to 17-37 of Rider's Volume XVII*, except that recording units were added. The General Industries Model GI-RC130 recorder and record changer combination was used to make this change. The recorder unit was added without disturbing the wiring of the radio chassis. The wiring necessary for the addition is shown in the accompanying diagram.

The wiring in the Howard Model 909-MR to accomodate the GI-RC130 recorder and record changer.



RECORDER PANEL SCHEMATIC MODEL 909-R

P-A Schematics

Continued from page 1

tered in audio circuits. From this it can be seen that just any value of component part cannot be used as a replacement if the audio system is to provide optimum operation. An understanding of the circuit requirements by a reference to the schematic diagram of the unit will go far to establish the relationship existing between the various components thereby enabling the p-a serviceman to restore the system to its original state of efficiency.

If a single output tube is used to feed a speaker, the problem is not too involved; however, in the great majority of audio systems, push-pull output is employed and these circuits vary from one system to another. Some may employ a single push-pull output stage, while others may have a number of these stages in series or in parallel. Phase inversion of the signal must be accomplished to feed the two push-pull inputs which are 180 degrees out-of-phase with each other. This phase inversion is accomplished in different ways and an understanding of the method employed in a particular amplifier is a requirement in proper service. A reference to the schematic diagram of the unit in question will quickly determine the type of circuit used without resort to laborious and time-wasting circuit tracing. All that has been said here as regards phase inverter and output stages applies equally well to driver stages which are usually employed in the larger systems to provide power to the output stages.

Usually, the output load on an amplifier is a loudspeaker or series of loudspeakers. Where a single speaker is connected to an output transformer having but one value of impedance, no problem is involved; however, most small p-a systems employ at least two speakers, and the larger units many more, usually arranged in banks. Multiple tap arrangements on output transformers, and even multiple output transformers are required to feed the proper value of electrical energy to these various speakers. A schematic diagram presentation of the circuit arrangement and the method of connecting the various loud speakers to the amplifier output, including values of impedance taps, switching arrangements, pad attenuator circuits, cross-over networks for "woofer-tweeter" speaker systems, is mandatory to the proper maintenance and servicing of these systems.

The economic factor in any business is a function of time. If it takes more time than is necessary to complete any specific operation, the business suffers a loss. This holds just as true in the servicing industry as in any other phase of commercial activity. If the serviceman spends more time than he should upon any particular repair or service job, the result is a decrease in his potential income. This has only to occur a few times and its effect begins to be felt. On the other hand, finishing a job in less than the required time provides the serviceman with monetary gain besides promoting in the customer a certain confidence in the serviceman's ability to do a job quickly and efficiently.

By now it should be perfectly obvious that the fastest and most efficient method of becoming familiar with a particular audio system, thereby insuring a surer, more rapid repair service is by reference to the particular schematic diagram when service is required on the system. A brief reference to the diagram in question will usually save hours of tedious testing for defective parts, and the time saved can be applied economically to the next job. It cannot be stressed too emphatically that next to the actual test equipment, the serviceman's most important tool is the schematic diagram. It can mean the difference between profit and loss.

P.A. MANUAL

Due to the fact that a trucking strike held up delivery of paper to our printer, Rider's PA Manual will not be ready for distribution until November. . . . It's an ill wind that doesn't blow somebody some good—this gives you a chance to still get your order in to your jobber so you'll get your PA Manual as soon as it's off the press. Thanks for waiting.

Montgomery Ward 62-690

This model is the same as Model 14WG-690A appearing on *pages 13-61 and 13-62 of Rider's Volume XIII.*

General Electric H639AC-DC

The r-f alignment instructions of these models found on *page 11-80 of Rider's Volume XI,* should read as follows: With gang condenser plates completely meshed, set dial to the first mark at the left end of scale. Then set dial to 1500 kc. Apply a 1500-kc signal either through a standard I.R.E. dummy to the antenna terminal or through an additional loop connected to the generator output which can be magnetically coupled to the receiver Beam-a-Scope. Align C2 and C1 at 1500 kc for maximum output. Set dial to 580 kc and peak C3 on 580 kc while rocking the gang condenser. Retrim at 1500 kc.

Montgomery Ward 14WG-635B

This model is the same as Model 14WG-624A appearing on *pages* 13-53 *and* 13-54 *of Rider's Volume XIII.*

Successful
SERVICING
REG. U. S. PAT. OFF.

Vol. 10 SEPTEMBER, 1948 No. 1

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

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JOHN F. RIDER, Editor G. C. B. Rowe, Associate Editor

CURTAIN TIME

TV

WABD the Dumont TV station serving metropolitan N. Y., announces that beginning in October they will start broadcasting at 7 A.M. Up to 6 P.M. the programs will be slanted at the women — naturally with sports exceptions . . . Then from 6 P.M. to 11 P.M. the programs will serve the family . . . How long will the other TV stations in this area permit Dumont to steal the show? . . . All-day TV transmission will really throw a monkey wrench into "ham" activity — especially 10 meters . . . *That means us too!*

It's astounding to note the interest in TV in the fringe areas . . . *It's getting so that maybe soon there will be no fringe.* Our home was a guinea pig for some receiving tests for the new Sentinel a-c TV portable . . . It uses a 7-inch tube and the set is pyramid shaped, about 11 x 15 x 17 inches — weighed about 35 pounds. Using an indoor area of the tunable dipole variety, it sure did *a swell job on all channels.*

A new TV net is scheduled for October. It will take in Chicago, Cleveland, Toledo and Buffalo . . . So it will not be too long before Richmond, Washington, Baltimore, Philly, New York, Boston, New Haven, Albany will be tied in with the mid-west . . . This area is highly industrialized and has a high percentage of the nation's population . . .

Just Wondering . . .

There was a time when everybody felt that the TV servicing problem would be specialized — that it would call for a complete turn-over in the servicing industry . . . With the totally unexpected rocket pace of TV expansion it is just about impossible to do anything else than what has been the practice in years past — namely to train servicemen — to produce the best service manuals, thereby giving the service industry the maximum amount of reference data and to open the activity up to all who can handle it . . . We are convinced that such will be the case and do not hesitate to say so . . .

Back in 1939 when we introduced Signal Tracing, we declared that the signal is the common denominator for all communication systems . . . *This includes TV!* . . . In fact our book *Servicing by Signal Tracing* shows the application of signal tracing equipment to TV receivers . . . After working with the TV receivers of modern vintage we are more certain than ever that what was said then is true today . . . Every convenience which ST offered for conventional receiver servicing, can be attained with TV receivers . . . Maybe the necessary equipment is not yet available — *but it will be* . . . Who will be the first to produce a small mixer system which will enable tracing of signals in TV equipment using the ST equipment which has been available? Who will produce the first ST equipment for TV receivers? We used such equipment during 1943 to trace signals in the SCR 268 receivers which functioned at a carrier frequency of about 200 megacycles and intermediate frequencies which approximate the present pix channels. . . . *and the equipment worked well!* . . . The same thing *can be done* with TV . . . Don't sell signal tracing short! . . . The higher the frequency of operation, the more effective the system.

Don't Forget . . .

That while TV is hot, the conventional radio receivers *still require service* . . . There is no doubt about the fact that the pendulum has swung wide in the direction of TV — but blind radio is still here and will be with us for a long time to come . . . Don't develop the belief that all of your interests will be in connection with TV . . . Don't disregard the requirements of blind radio . . . maybe the sales of blind radio receivers have slowed up — but people are still buying and sets will need service . . . Many tens of millions of such receivers are still in use and will require service . . . It makes sense to prepare for television — to increase your capabilities — *but don't sacrifice your regular radio activities* . . . It can still provide the butter for the bread . . .

Did You Know

That a 1-pound weight at the equator weighs more at either the south or north pole . . . in fact the weight increases as one moves away from the equator. . . . Shellac comes from an insect . . . the human body has more than 500 muscles . . .

Play in One Act

Scene — radio service shop in industrial area . . . Actors — Charlie the owner; Harry, his assistant, and Susie, Charlie's wife . . .

(*Charlie*) . . . "Harry, what can we do to get work out faster — to reduce our expenses — to do a better job for our customer?"

(*Harry*) . . . "That's easy Charlie,— see those vacant spaces in your Rider Manual library . . . You're shy Volumes 9, 11 and 14 . . . Many of the sets which have come in for service during the past three months were in those volumes . . . We had to labor over those sets — tracing circuits . . . That's why we lose much time . . . Complete your Rider Manual library and save money . . . Am I right Susie?— Remember, I mentioned that to you."

(*Susie*) . . . "Right! . . . Charlie, I told you so . . . In fact, I didn't tell you but I ordered *Rider's Volume* 18 and his *TV How it Works Book* . . . We'll get his *TV Manual* when TV gets here . . . Let's get those missing Rider volumes today . . . Okeh?"

Curtain comes down midst tumultous applause

Peace — It's Wonderful

About the PA Manual scheduled for September . . . It will be November because the recent local trucking strike prevented the removal of the necessary paper from the warehouse . . . the book requires several carloads of paper . . . All of it cannot be stored at the printer at one time . . . The printing was under way — then — Came September 1st and the trucking strike — no paper pickup and delivery . . . Thank heaven it's over and things are back to normal . . . Our apologies for something which is not our fault. . . .

JOHN F. RIDER

The Cover

On page 1 is shown an RCA research engineer checking the component parts of one of that company's new all-electronic sets for reception of television signals that result in colored pictures. Appearing in the center of the lower part of the cabinet is the "Trinoscope" projection assembly, which consists of three 3-inch kinescopes that separately receive signals representing red, blue, and green images and project them optically as a composite color picture on the 15 x 20-inch screen at the top and front of the cabinet.

Test Loop Antenna

In response to the many letters that have been received concerning the Hazeltine test loop antenna, if anyone is desirous of obtaining one, get in touch with Mr. W. F. Woodbury, Commercial Department, Hazeltine Electronics Corp., 58-25 Little Neck Parkway, Little Neck, L. I., N. Y.

WE MOVE

By the time you receive this issue of SUCCESSFUL SERVICING, we will have moved all departments to our new plant at 480 Canal Street, New York 13, N. Y. Hereafter please send all mail to this address.

We Take a Bow

Have you seen the 6th edition of the Mallory Radio Service Enclopedia? Or the C-D Capacitor Manual for Radio Servicing, 1948 edition No. 4? If you have, you certainly noticed that Rider Manuals — *and Rider Manuals only* — were given as a reference source for complete schematic diagrams. These companies have recognized, as have hundreds of others, that the technical information in Rider Manuals can be trusted as it is the greatest compilation of authentic service data in existence.

And we want you to know that the data in Rider Manuals are not just put on the dummy make-up sheets and sent to the printer. Far from it. . . . Every schematic is checked to see if it must be clarified and while this is being done, one of our technical editors looks over the circuit to see if there is anything new — of possible interest for inclusion in the "How It Works" book for that Manual. Now and then something arises about which the manufacturer must be consulted and as a result, we have received many letters — hundreds of them in the course of years — such as these:

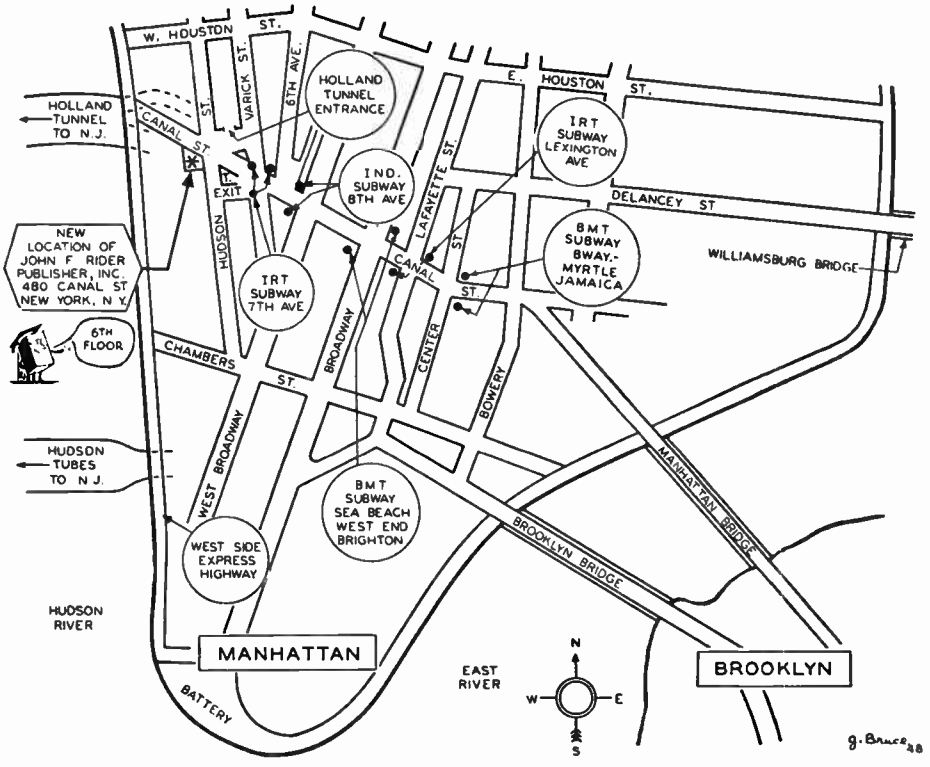
"Your observations relative to the schematic of our 182TFM, chassis RE237, are correct. Your vigilance certainly speaks well for the accuracy of Rider publications and doubtless explains in part the fact that Rider's Manuals hold their eminent place as the radio serviceman's Bible".

R. A. Chestnut, Service Manager
Noblitt-Sparks Industries, Inc.

"These days of very complicated circuits require a considerable amount of checking, and we have begun to think of the John F. Rider organization as another link in our chain of check and double check to give the radio technician information that will help him, rather than hinder his work".

Charles A. Nichols, Asst. Chief Engineer
Packard-Bell Co.

Here are two more of the numerous reasons why thousands of servicemen all over the world have been buying Rider Manuals throughout the years. They have proven invaluable in providing that knowledge that assists a serviceman to save precious minutes in diagnosing defects in a set and repairing them. . . . And those saved minutes soon add up to hours in the course of a month. . . . See to it that you have all 17 Rider Manuals. . . . They are a gilt-edge investment that will pay dividends as long as you are in business.



This is where we are now — and this is how you can get here. Take the elevator to the sixth floor.

TELETONE 139, 140, 141, 149, 157, 163, 164, Chassis H

These models are the same as Model 135, Chassis H, appearing on *Misc. Page 16-11 of Rider's Volume XVI.*

Hotelevision

Yeah, you guessed it — that means *television reception in hotel rooms.* . . . As of now, the Hotel New Yorker here in town has 100 of its rooms and the Roosevelt a flocka theirs equipped with a screen and push-buttons so you can select the prancin' pix comin' from any one of the six N.Y. stations. There's a central monitor with six complete receivers and the outputs are carried down to the rooms on co-ax cable. . . . Olympic is makin' this equipment and from the way the hotel managers are grinnin', this outfit done a bang-up job in their design for seein'. . . . *Wanta bet we'll have the dope in TV Vol. 2? ? ? ?*

Electronic Music

When Vol. VIII was published back in '37 it had the dope on an electronic piano and you were told then that here was a new field that some day would blossom out and be worth your while. Well, *that's come true all right* . . . In Rider's PA Manual, you'll find not only piano amplifiers but all sortsa amplifiers that are used with various stringed musical instruments. Were we right or were we when we advised you to go after this end of the service field????

Printed!!!

This morning Si ("FM") Uslan (remember he worked with the Boss on "FM Transmission and Reception"?) came out to where we were drippin' all over Qwerty's keys and he was bustin' with "somethin' new". . . . He'd been goin' over the schematics that are goin' in Vol. XVIII to see what was new and unusual for 18's "How It Works" and he came across this Majestic job. The two resistor and capacitor symbols forming the coupling ckt between the 1st a.f. and output tubes were enclosed with a dotted line. Wondering why, he consulted the parts list and found **"Printed Circuit Plaque"**. Well, boys and gals, *that's the start!* There yuh are — two resistors, two capacitors all connected up ready to be slapped into place. . . . *and everything printed!*

Flanellmouth

Knowing our love for the ridiculous and the unusual, Ida Kaplan, whos sees that "S.S." gets to you each month, told us this one: It seems as to how she was riding home from a wedding with the bride's parents in a chartered automobile that was equipped with 2-way radio. There had been the usual (*and futile*) efforts to find out where the happy couple was going to spend their first night of honeymooning and Ida was still trying to find out (and unsuccessfully) from the bride's mama. Suddenly the loudspeaker up beside the chauf came to life with this "Car 14. Car 14. When you deliver your passengers to their destination, return to the hall and pick up the bride and groom and *take them to the St. George Hotel*". P.S. Ida did her stuff and reports a happy ending to the day — for the wedding party NOT the newlyweds.

TV Scannin's

Up near Lake Placid in N. Y. there's an inn at the top of Whiteface Mt., said inn being about 120 miles from WRGB in Schenectady as the pigeon flies (we don't like crows so we ain't givin' 'em no publicity). G. E. Co. engineers figgered an antenna on that mile-up inn would give 'em line-of-sight reception from the GE TV antenna, instead of the usual 50-mile limitation. Moral: If you want faraway TV sigs, move up, young man, move up — *to the highest mountain you can find.* . . . We hear tell that Motorola is doing some very successful TV receivin' in taxis. . . . Aug. 29 marks the day that the Navy and N.B.C. made the *first experimental TV broadcast of a simulated air attack* on the U.S.S. Leyte, 26 miles from the Empire State Bldg. The successful hour and three-quarters telecast was made from the Empire State Bldg. for this area and sent by co-ax cable to network stations in Boston, Philadelphia, Washington, Richmond, Va., Baltimore, and Schenectady.

August, 1946

Any of youse guys gotta an extra copy of SUCCESSFUL SERVICING of August, 1946?? We've been asked for that issue by the New York Public Library and also by the University of Illinois library. . . . If you'd like to give either of these libraries a hand, send your extra copy to us and we'll see that it gets into the proper hands so their files of S. S. can be complete. . . . Thanks—*a lot.* . . .

144 Months

Yep, it was just *that long ago* that we took over the pedalin' of the chariot that gave us our title and we'll bet you were surprised when you saw the new model that now graces the head of the col. The Boss decided that in this day of streamlinin', new looks, and all, we should oughter get us a *new buggy*, soooooo-o-o-o-ooo, how do yuh like it, huh?

New 1/4's

Naw, we ain't talkin' about two-bit pieces, we're referin' to the new address you'll use when/if you write us or come see us. . . . *It's* 480 *CANAL ST., NEW YORK* 13, *N.Y.* Right down at Canal and Hudson, Sou'west corner. . . . We gotta swell layout on the 6th floor. . . . Well, yuh remember May West's famous sayin', don't cha?

Change of Scene

Yassuh, that's what gonna happen. . . . We're takin' us outa here for a coupla weeks and are on the search for some place that's cool — that's got some nice paintable scenery—that's *cool*—that's got good food —**that's COOL**! . . . After this tussle with superheated streets, subways, and everything else in N. Y. that's burned to a crisp, we'll compromise on practically anything *as long as it's cool!* . . . So, if you happen to live in a place that *ain't* hot and if you see a guy supposed to be paintin' a pic in a nice shady place and a thermos bottle from which he's gettin' inspiration, *you guessed it* — that'll be the vacationin'.

Rolling Reporter

●

Omission

On page 187 of Rider's Television "How It Works" credit lines were omitted from Figs. 12-4 and 12-5. These two illustrations were supplied by the Radio Corporation of America, to whom we apologize.

●

Automotic 127

This model is the same as Model 120, appearing on *page 12-7 of Rider's Volume XII.*

●

General Electric L604

This model is the same as Model L600 appearing on *page 13-40 of Rider's Volume XIII.*

●

International Detrola 339, 340, 340-1

These models appear on *page 12-4 of Rider's Volume XII.* The 30-ohm resistor used in these models is the resistor with 5% tolerance, part number 8158.

Farnsworth GK-140

Slippage of the dial-drive cable on the early production sets can be corrected by replacing the cable with part number 05096. This cord is softer and smaller than the one used previously.

If the push buttons bind on the front panel of the cabinet, the ganged capacitor may not be properly positioned. This may be corrected by installing a flat metal washer under each of the mounting grommets. This may be done without removing the gang from the chassis.

Oscillation or low sensitivity on f.m. may be due to poor ground connections from the gang to the r-f shelf. When aligning the f-m band, oscillation may occur with certain signal generators. Changing the value of the resistor in series between the generator and the chassis will prevent oscillation. With some generators more than 400 ohms are required, with others less.

In some preliminary sets a 200-$\mu\mu$f capacitor was placed in series with the short-wave converter-trimmer. If for any reason this trimmer requires replacement, removal of the capacitor is suggested. This capacitor is not shown on the schematic.

In some of the preliminary 14-tube sets, Belden braid was used to ground the ganged capacitor to the r-f shelf. In certain instances too much solder flowed into the braid and as a result some joints break loose or the set becomes microphonic. This braid should be replaced with soft copper strips.

The Rider Diagram Service

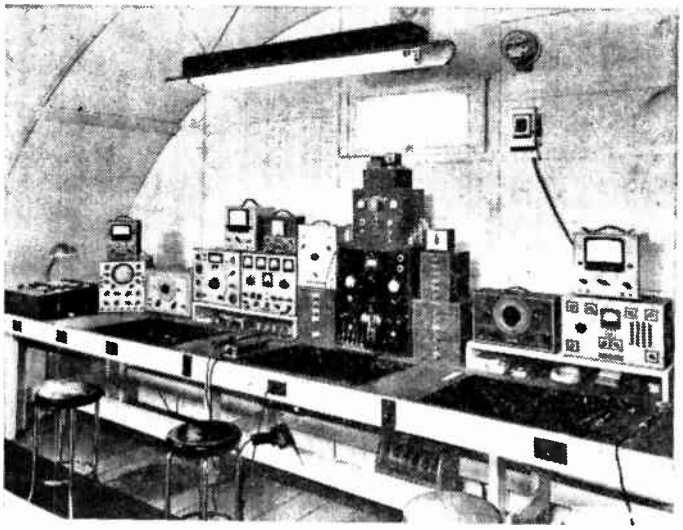
Are you taking full advantage of the Rider Diagram Service?

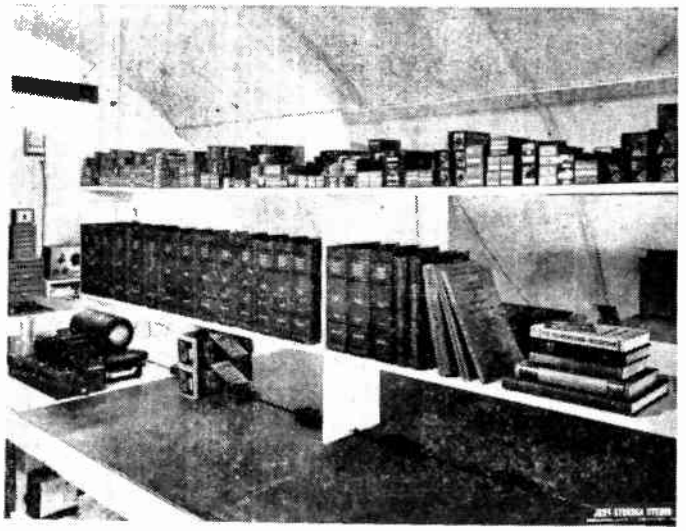
If you require the service data on a new receiver, you can obtain the information from us. Naturally, a time lag exists between the publication of the volumes of Rider Manuals and it is to fill this gap that we have this service, so that you may have whatever you need in the way of service data as yet unpublished. The charges for this service are as follows:

1. 35 cents is the charge for all the available data on any radio receiver model up to and including six pages. Each page thereafter will cost 10 cents.
2. If additional money is required to cover the data requested, you will be notified. We cannot forward data without receiving your remittance.
3. Service data on television receivers may be obtained at costs varying from 35 cents to $1.50. It is suggested that you inquire the cost before sending us a remittance for television data.
4. Be sure to enclose a self-addressed envelope bearing a 3-cent stamp.

If you will follow these rules, it will simplify matters for both of us and you will receive the data you need with a minimum of delay.

Distribution of This Issue -- 41,000 Copies





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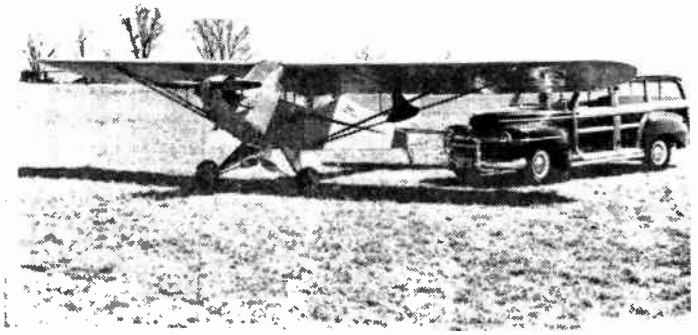
JULY, 1948



SYNTHESIS OF COMPLEX WAVES

By JOHN F. RIDER

IT is a simple matter to present a complex wave on the screen of a cathode-ray oscilloscope, which type of display is a very important function of the cathode-ray tube. However, the analysis of complex waves, that is, the determination of the phase and amplitude of the different components which comprise the wave, is much more complex, and to say the least, quite tedious. Granted that harmonic analyzers enable a comparatively easy analysis of the amplitude of the component frequencies present in the complex wave, still the determination of the phase of these components as well as their amplitude is much more troublesome.

Back in 1935 when the first edition of our "Cathode-Ray Tube At Work" was being prepared, the presentation of complex waves with certain definite component amplitudes and relative phase proved extremely bothersome. Set phase conditions did not remain constant, and a great deal of time was spent in an effort to photograph these patterns. The timing of the camera shutter to coincide with the proper phase conditions in the sine-wave voltages being mixed to produce the resultant complex pattern resulted in so much waste of time that it was impossible to present in that book a number of illustrations which might prove of value as a guide in the analysis of complex waves.

When the revised edition of Rider's "Cathode-Ray Tube At Work" was first discussed almost a year ago, the subject of complex wave presentation again reared its ugly head. The method used more than a decade ago was known to be inadequate and a new arrangement for producing these waves was considered vital. A development project was started on a device which would synthesize complex waves by mixing a number of sine waves. Moreover each of these component waves would be controllable in phase individually through 360 degrees and also in amplitude from 0 to 100 percent. Finally, each of the components would be so synchronized in frequency and phase that the synthesized resultant would remain stationary on the screen even when the phase of the individual components was varied. Such a synthesizer was developed and the results obtained with it are shown in some of the accompanying photographs of complex waves which were synthesized on this device. The composition of each complex wave is described in the accompanying caption.

Of significant interest is the fact that this device enables the generation of a wide variety of complex waves, which when arranged photographically in groups based upon the component frequencies, can serve as a reference source of complex wave composition for anyone working with such waves. Naturally a limit must be set on the number of waves presented in this manner, because the combinations possible with a fundamental and twelve harmonics are myriad. Maybe some day a book devoted to such waves will be published by us; in the meantime the forthcoming text on cathode-ray tubes will show complex waves up to and including the seventh harmonic for such reference purposes.

An interesting sidelight on the utility of such a synthesizer is its possible use for instruction in the development of complex waves, showing the effect on the resultant of a change in amplitude and phase of the respective components.

For those who may be interested in the general plan of the synthesizer, each component frequency is generated individually, then amplified and fed into a phase inverter; from the phase inverter the signal is fed to a continuous phase shifter, and the output of these units is fed into a mixer system. This is shown in Fig. 1.

In passing we might mention that the upper limit of frequencies in such a system is not confined to the twelfth harmonic of the fundamental; it can be carried much higher; but for many purposes, such as ours, or for that matter, instruction in communication schools, a higher order of harmonics is not necessary. This is

Please turn to page 3

Allied Radio 6A-127 Revised, 6B-127, 6C-127

This model is the same as Model 6A-127 appearing on *pages* 15-4 *and* 15-5 *of Rider's Volume XV,* except for the following changes. Part 36 has been changed in value from one megohm to 220,000 ohms and the bottom side of this resistor has been moved from the negative filament line (junction of parts 34 and 17 and 47) to the avc bus (junction of parts 33, 34, 14, and 35). Part 40 has been changed in value from 220,000 ohms to 100,000 ohms. Part 13 is now connected from the junction of resistor 39 and the secondary of the first i-f transformer to the positive side of the filament of the IN5GT tube instead of from the junction to the common negative as previously.

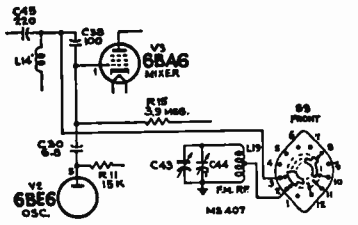
Part 28 is now connected from the negative side of the filament of the 1H5GT tube to the grid of that tube instead of from the center arm of the volume control to the common negative. The bottom side of part 19 is now connected to the junction of part 48 and the center tap of the filament of the 3Q5GT tube, and thence to the left-hand side as shown on the schematic) of capacitor 10. This part was formerly connected directly to the right-hand side of the same capacitor. The connection from the negative side of the filament of the IN5GT tube to the left-hand side of capacitor 10 has been removed. A 68-ohm resistor has been inserted in the high side of the 45-volt battery lead.

The following changes have been made in the parts list.

Illus. No.	*Part No.*	*Description*
36	27E224	Carbon, 220,000 Ohm, ½ W.
40	27E104	Carbon, 100,000 Ohm, ⅓ W.

RCA 711V1, 711V2, 711V3, CHASSIS RK-117, RS-123

Models 711V1 and 711V3 are the same as Model 711V2 shown on *pages* 17-44 *to* 17-55 *of Rider's Volume XVII* except for the cabinets. The following changes apply to all models. Resistor R6 is 1200 ohms instead of 680 ohms as indicated on the schematic of the RK-117 chassis. The



The revised V3 mixer circuit.

mixer (V3) input circuit of this chassis has been revised. C28 is omitted, the connections to terminals #2 and #3 of the range switch (S3 front) have been reversed, the plate circuit of the r-f amplifier (V1) is coupled to the grid circuit of the mixer (V3) through C38 instead of C28. Capacitor C1B on Chassis RS-123 has been changed from 15μf to 50μf. The following change should be made in the parts list for for this chassis. Stock number 36599 should be deleted, and number 72955 added.

Stock No.	*Description*
72955	Capacitor—Electrolytic, comprising 1 section of 30μf, 450 volts, 1 section of 50μf 400 volts, and 1 section of 40μf 25 volts. (C1A, C1B, C1C.)

●

Magnavox FM Chassis

We have been requested by The Magnavox Company to state that all of their models as sold have the chassis pan already installed to accomodate their f-m chassis CR-189, 2 band, or CR-192, 1 band. The only exceptions to this are the 138 series Duette and the 132 series chairside.

●

Setchell Carlson 416

This model appears on *Misc. page* 15-19 *of Rider's Volume XV.* The i-f transformers were coated with a low melting point wax (yellow wax). If this wax runs, the trimmers will not stay adjusted. The only remedy is to replace the transformer.

●

RCA 612V1, 612V3, AND 612V4

These models appear on *pages* 17-31 *to* 17-43 *of Rider's Volume XVII.* The alignment tabulation should be corrected to read as follows.

Step No. 12—Repeat steps 10 and 11 for exact calibration.

Step No. 18—Repeat steps 16 and 17 for maximum output.

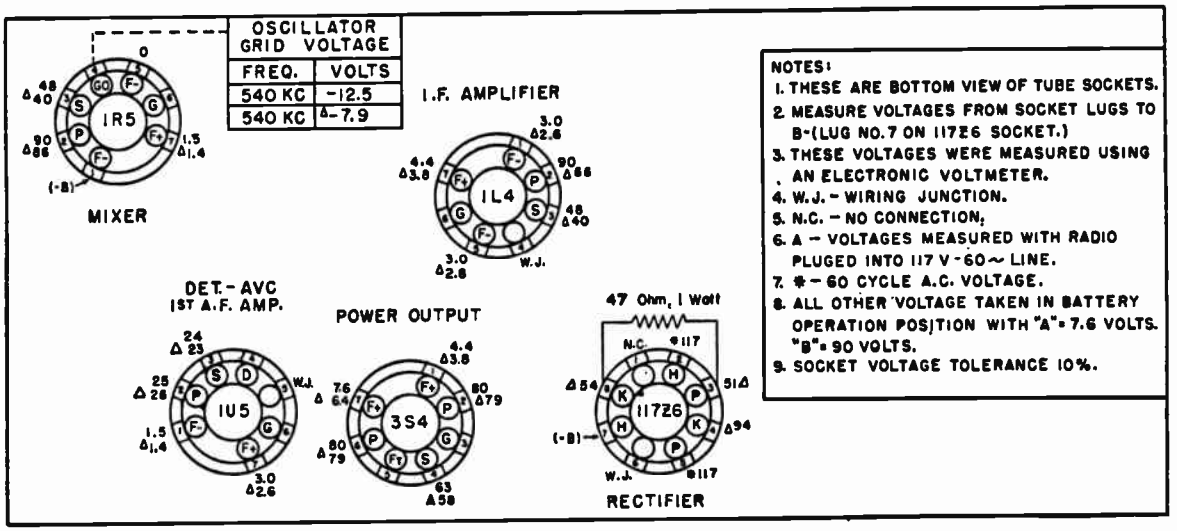
On chassis RS-123, the electrolytic capacitor C1B has been changed from 15μf to 50μf.

●

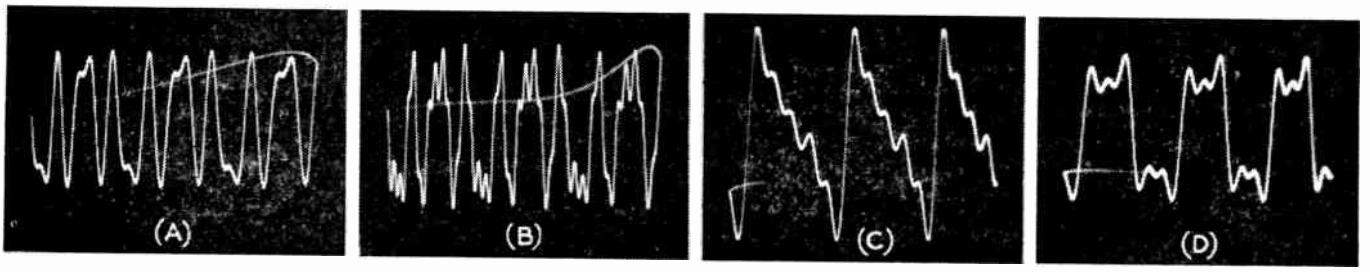
Crosley 56PA, 56PB

These models appear on *pages* 15-29 to 15-31 *of Rider's Volume XV.* It has been found that the 3S4 tube used in these models has a tendency to burn out. The following change should be made to prevent this. Remove the wire that connects the plate lug 3 to the cathode lug 8 of the 117Z6 tube socket. In its place solder one end of a 47-ohm, 1-watt resistor (part number 39373-119) to the plate lug. The 1S5 Det.—AVC—1st A-F Amplifier tube has been changed to a 1U5 tube. The characteristics of the tubes are the same but the socket connections are different.

The accompanying socket voltage chart includes both changes.



Socket voltage chart for Crosley models 56PA and 56PB showing new socket connections.



COMPLEX WAVES. The composition of a complex wave consists of a fundamental frequency with the addition of certain harmonics of various amplitudes which are in certain phase relationships to the fundamental.

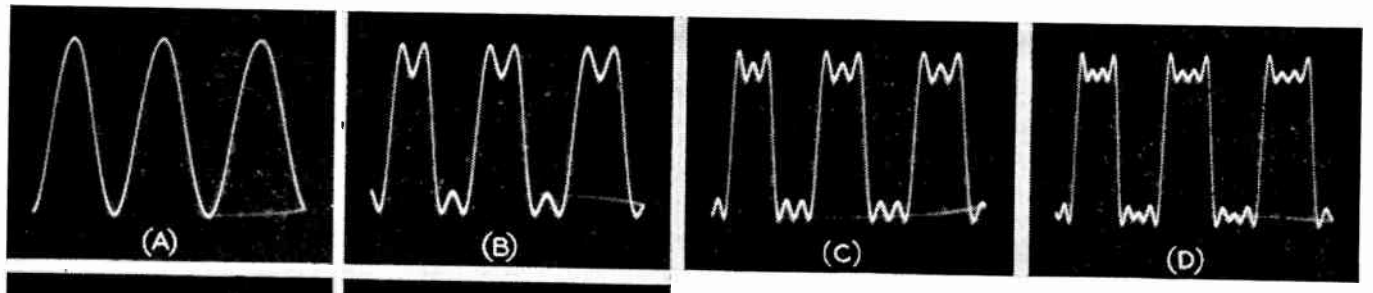
(A) Fundamental — 100% Amplitude
3rd Harmonic — 215% „ Leading 170°
5th Harmonic — 122% „ Leading 45°

(B) The fundamental and harmonics of (A) with 12th Harmonic — 66% Amplitude Lagging 65°

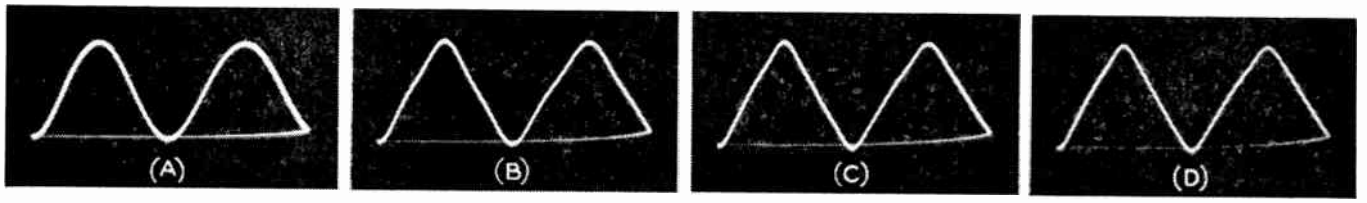
	Amplitude
(C) Fundamental	100%
2nd Harmonic	65%
3rd Harmonic	40%
4th Harmonic	30%
5th Harmonic	25%

	Amplitude
(D) Fundamental	100%
3rd Harmonic	50%
5th Harmonic	20%

NOTE: All harmonics in (C) and (D) are in phase with fundamental.



SQUARE WAVE. A square wave is developed by adding to the fundamental cosine wave (A) its odd harmonics with amplitudes equal to the reciprocals of the harmonics with the 3rd, 7th, and 11th 180° out of phase and the 5th and 9th in phase with the fundamental. (B) The fundamental *F* plus the 3rd harmonic. (C) *F* plus the 3rd and 5th harmonics. (D) *F* plus the 3rd, 5th, and 7th harmonics. (E) *F* plus the 3rd, 5th, 7th, and 9th harmonics. (F) *F* plus the 3rd, 5th, 7th, 9th, and 11th with the 5th and 9th harmonics in phase and the others 180° out of phase with *F*.



TRIANGULAR WAVE. A cosine wave (A) of fundamental frequency *F* and an amplitude *V*, can be made into a triangular wave by adding its odd harmonics all in phase having amplitudes equal to the reciprocals of the square of the harmonics. (B) The fundamental *F* plus the 3rd harmonic. (C) *F* plus the 3rd and 5th harmonics. (D) *F* plus the 3rd, 5th, and 7th harmonics; note the slight change made by adding the 7th harmonic.

Synthesis of Complex Waves

Continued from page 1

evident from the illustration of the square wave synthesized by using the fundamental and the five odd harmonics, including the eleventh. Of course the higher the number of odd harmonics is the square wave, the more closely it approaches the ideal. But even these few harmonics enable the synthesis of a wave which is definitely square in character.

Our laboratory has not explored the full gamut of possible applications of this device, and we solicit inquiries from individuals and organizations who may be interested in such equipment or in further development of this apparatus for varied uses. In this respect we desire to announce that the John F. Rider Laboratories are available for electronic development of all types. The organization is well manned and if we say so with pardonable pride—provided with the very finest type of laboratory equipment.

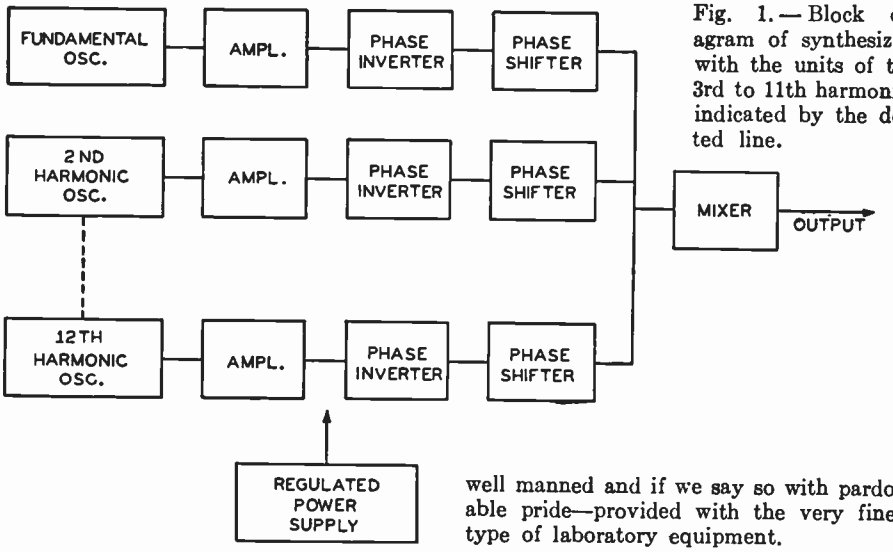


Fig. 1. — Block diagram of synthesizer, with the units of the 3rd to 11th harmonics indicated by the dotted line.

Orchids to TV Manual

We wish to express our gratification to the writers of the following letters and their opinions of the Rider Television Manual and the accompanying "How It Works" book....

"...was particularly interested in the accompanying 'How It Works' book which covers the operation of television in a very complete manner. This little book should be particularly useful to radio servicemen who are entering the television field." *S. F. Patten, Allen B. Du Mont Laboratories, Inc.*

".....The book is all that might be expected of it. The giant pages are especially practical from the view of limited work area on some benches.... The "How It Works" is excellent." *Fred W. Progner, Service Dept. Transvision Inc.*

"For the past few weeks our engineering group, production staff and service division have had occasion to study the Manual and we find it extremely helpful in that it presents in one volume all the information that is available today in connection with circuit design and other features of instruments manufactured by all the leading manufacturers. Particularly interesting to us is the "How It Works" book.

"We are faced with the problem of training our present production personnel in the intricacies and characteristics of television production and testing... While our personnel are experienced and have good backgrounds in the manufacture, production, and servicing of conventional radio receivers, television—particularly pulsing circuits—are new to most of them. Your new book will provide basic material for a course of instruction to this group which is planned for the immediate future." *George M. Solomon, Manager Service Dept., Olympic Radio and Television, Inc.*

Admiral Chassis 9A1

This chassis is shown on *pages 16-6 to 16-8 of Rider's Volume XVI.* It has been found that the dial windows of these chassis build up a small electrostatic charge, thus causing the plastic to attract fine dust particles. These are so fine that the dial windows appear milky or foggy.

Treating the windows with a solution called Hexco Dust-Ded reduces the amount of fine dust that collects on them. The dial window should be removed from the cabinet to apply the solution properly. Remove the knobs and the screws holding the escutcheon to the cabinet. Clean the window by wiping off the dust thoroughly on both sides with a damp (not wet) cloth or chamois skin. Apply the Hexco Dust-Ded according to the directions on the bottle.

Part No.	*Description*
98A11-2	Hexco Dust-Ded

Goodrich R655W

In the June issue of SUCCESSFUL SERVICING, we stated that the Goodrich model R565W, which appears on *pages* 15-7 *and* 15-8 *of Rider's Volume XV,* uses the International Detrola Model 550 record-changer. This note should be corrected to read that this model uses the Admiral record-changer model RC161 or RC161A, which are to be found on Admiral RCD. CH. pages 17-1 to 17-7 of Volume XVII.

Emerson BF-169, BF-204, And BF-207

These models are the same as Model BF-191 appearing on *pages* 9-1 *and* 9-2 *of Rider's Volume IX.*

Successful SERVICING
REG. U. S. PAT. OFF.

Vol. 9 JULY, 1948 No. 6

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

Published by
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JOHN F. RIDER, Editor G. C. B. Rowe, Associate Editor

CURTAIN CALL

Television, Wow! . . .

If you're on the Atlantic seaboard and lucky enough to be a TV viewer—*LIFE IS GRAND*. . . The best of talent—the best of speakers—the prettiest of gals—the funniest of comedians. . . TV receivers in the East are a boon to the power company—not because of the power they use—but because the families stay home to watch it. . . *It's Telific*. . . What a treat is in store for America when the span of the TV nets will cover the nation!

Education . . .

Lest we forget—TV will be as important an educational medium as it is an entertainment facility. . . The TV serviceman will get into the schoolhouse—if only to repair the receiver—*if not as a student*. . . . Is it silly to imagine the local television station broadcasting an educational program to the serviceman of the area? Possibly two hours a week—or more. . . . *THAT WOULD BE A REAL PUBLIC SERVICE* . .

Are you willing to aid several vocational schools where radio is taught? They are shy parts—such as resistors and capacitors and chokes and transformers. . . . If you are kindly disposed—send a couple of items to our personal attention. . . . They don't have to be new—*but they must be in good condition*. . . . We'll accumulate them and turn them over to the proper authorities in the name of the American radio serviceman. . . . *Thanks for whatever you'll send.*

Mr. Radio Magazine Editor . . .

If you want a *good* story about a modern day radio service facility which will make interesting reading, contact the guy who owns the airport radio shop pictured on our cover. . . . *HE HAS A LOT TO SAY AND SAYS IT WELL.*

Pollen . . .

People talk about the radio serviceman—what he does and doesn't do. . . . Well, we had a contract for typewriter service and a visiting serviceman . . . Now we have no contract *but we still have the bad machines* . . . Then there is the outfit that is *supposed* to clean these offices every morning . . . They arrive all right—but judging by the results—*all they do is keep out of the rain or the sun*—depending on the kind of day it is.

Gadgets . . .

And now *the radio paging system*. . . You buy a set—pocket-size with pull-out antenna and tiny loudspeaker. . . You are assigned a code call letter. . . At stated intervals you listen to the broadcasts. . . If you hear your code number, you call the station on the land-line and get your message. . . This mobilfone business of dispatching cabs, trucks, repair wagons, *and even diaper deliveries*, is spreading like a flood. . . Due to shortage of frequencies some interference problems exist, but by proper cooperation and the display of friendship all traffic is cleared. . . Is it true what they say about the new Bell Lab crystal—*THAT IT MAY EVENTUALLY REPLACE THE VACUUM TUBE AS AN AMPLIFIER?* It takes us back to the first DeForest Audion we owned. . . When we accidently burned it out—*we shed tears for the rest of the day*. . . 11 bucks was a fearful amount of money back in the very early 1900's. . .

Half and Half . . .

Do you ever get to New York City? . . Try to see *Mr. Roberts*. . . That's the name of a play about the Navy. . . It's the best thing we have ever seen. . . Try and see it. . . *just try!*—A pair of seats in the first three rows dead center can be had for about $6.60 apiece *AND A CADILLAC CAR* (Fleetwood body only). . . Six o'clock on New York's West Side Highway going north. . *One is just as well off starting out* 90 *minutes later*. . . There must be a conspiracy between Dame Nature and the tailors—otherwise it would not rain just as everybody is ready to leave the office at 5:30.

Mr. Jobber . . .

The control of inventory is the display of good judgment—but *ultra*conservatism in this respect can prove costly. . . The too-frequent handling of purchase orders—the increase in the number of small item billings—means unnecessary increases in the cost of doing business. . . Carried to extremes, it results in the loss of customers to those vendors who can deliver most rapidly. . . *Even conservatism must be tempered by conditions of good business*. . . *MR. JOBBER, WHAT DOES IT COST TO MAKE OUT A PURCHASE ORDER?*

Television Interference . . .

Don't always blame the radio amateur. . . The "ham" is conscious of the television problem—but the diathermy and X-ray machine user *IS NOT*. . . The "ham" is a good *buyer* of TV receivers and most of those located in TV areas are off the air during the operating periods. . .

Radio Servicing . . .

Fully 70 percent of the receivers which come into the service shop for repair were made before April 1942. . . Did you see the new *CORNELL-DUBILIER* capacitor replacement parts catalog? . . *It was just released*. . . *The ONLY source of radio service schematic data mentioned is RIDER'S MANUALS*. . . We're proud of that! The same is true about the Mallory Encyclopedia 6th Edition released this past April. . . *Again we're proud!* . . Give yourself a break—get the most out of your scope. . . It's interesting to note that on the 1000-volt range a 20,000 ohms-per-volt voltmeter has a greater imput resistance than the usual vacuum-tube voltmeter. . . Do you read the "How It Works" books which accompany the Rider Manuals? *They're an education in theory and practice*. . . And don't forget to make use of the manufacturers' changes that you'll find in this and every issue of SUCCESSFUL SERVICING. . .

John F. Rider

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What the Reviewers Say About—

BROADCAST OPERATORS HANDBOOK

"This text is the first of its kind we have seen, describing some of the actual mechanics of broadcast engineering operations. His discussions of piano pickups in particular, was found to be interesting and helpful. The entire text bridges the usual gap in the literature covering the engineering design and development of broadcast equipment, and its practical operation and use.

"The text covers studio control room and master control operation, and transmitter operation. The most pertinent book on 'broadcasting for the broadcaster' that we have seen and obviously worth $3.30."—*The Broadcast Engineers Journal.*

"The author has assembled available data and techniques connected with radio broadcasting and arranged them in book form. In general, the book is good reading for the technician starting out in the field. . .

"The opening chapters describe the reproduction of sound electrically and define the methods of measurement of the sound levels. Control room operations are outlined and the various operating pitfalls are well covered. . . A description of

Please turn to page 6

Another Rider First—The PA Manual

We asked you if you wanted a manual covering the public-address field. By an overwhelming plurality—5 to 1—you answered YES.

We asked you how far back you wanted us to go—two years, five years, ten years. By the same vote, you answered that you wanted us to cover the p-a equipment manufactured from 1938 to date.

And that's what you're going to get in the 2000-page Rider PA Manual that's on its way to the printer's now. . . . And you'll get it in September. . . .

Its contents? You will find every type of public-address system that is manufactured today in the United States—high-powered jobs—jobs with low output—and jobs in between. . . . There are amplifiers for outdoor announcing systems—musical instruments and phonographs—sound systems used in schools, hotels, hospitals, wherever speech and music are to be distributed — intercommunication systems — hearing aids that are used in churches and theatres—the sound systems used in home and theatre movies—mobile and portable p-a systems—the data from 145 manufacturers. We originally advertised 135, but due to our desire to give maximum coverage, we are including data just received that increases the total.

Twenty years of publishing experience have gone into the make-up of the PA Manual—we know what you need to service an amplifier or an entire system and that is the information you will get. . . . Schematics—tube and chassis layouts—installation notes and instructions—operational notes and hints—voltage and resistance tables—instructions for the impedance matching of mikes, phonographs, or radio receivers to the input and the matching of one, two, or more speakers to the output—parts lists—everything you require for time-saving servicing. . . .

It was stated above that the products of 145 amplifier manufacturers were covered in the PA Manual. . . . Just to give you an idea of the coverage of a few manufacturers, there are 159 pages of David Bogen, Inc., covering 124 models—34 pages of the Amplifier Corp. of America with data on 24 models—58 pages of Electro-Acoustic Products Division of Magnavox covering 40 models—more than 100 pages of Rauland's products—about 200 of RCA—more than 100 of Operadio. . . .

And there will be a PA "How It Works" book that will accompany the PA Manual. . . . We cannot tell you at this writing how many pages it will contain, for our writers are still going over some of the schematics and data—gathering those unusual or interesting circuits for explanation—getting new ideas for installing or operating different equipment—in short, preparing to give you that tie-up between the theoretical and practical that is the whole idea behind every Rider "How It Works" book. . . . that comes to you as an extra dividend. . . .

The 2000 pages of the Rider PA Manual will be in the Rider Manual type of loose-leaf binder. . . . Every page will be indexed in the usual way.

That's the story as of this moment. . . . We'll give you more complete details later on. . . . In the meantime, you've told us you wanted a PA Manual—now tell your jobber—tell him to order yours so you'll have it when it comes off the press in September. . . . Do that today—*now!*

What Reviewers Say

Continued from page 5

studio setups with microphone placement and accompanying explanation is of value to the newcomer.

"A section on preventive maintenance is especially valuable to the operator of any radio station. . . ."—*Electronics.*

THE RADIO AMATEUR'S BEAM POINTER GUIDE

"Twenty two tables showing the direction (in degrees clockwise from north) that an antenna should be oriented in order to beam a signal along a great-circle route. The tables are designed for use in 19 cities of the U.S. and three foreign cities, and directions are given for making the slight corrections that may be necessary for locations other than those listed."—*Electronics.*

The Cover

The illustrations on page 1 are of the repair shop and the means of transportation of Lyman A. Abbott of Oskaloosa, Iowa. The Oskaloosa Airport provides an easily designated spot in advertising, ample space for parking, and an on-the-spot radio repair shop for aircraft sets. Mr. Abbot says,

"I have been in the radio business more than 15 years and have learned to appreciate time-saving shop methods. The use of your Manuals has proved to be not only a wonderful time-saving element, but a source of indispensable information. . . . We enjoy a state-wide business of tube replacement, repair, and rebuilding of electronic units used by the medical profession.

"The most effective advertising has been with the Cub airplane and the public address; the same plane is used for service calls throughout the state of Iowa. Instead of directly advertising my shop, the P.A. is used more to serve local organizations such as the JayCees, Farm Bureau, in conducting safety drives, Cancer Fund, etc. This creates a community feeling toward my service that could not be gained by merely advertising my shop."

Rolling REPORTER

Video Stuff

A coupla weeks ago we attended a showing of a bunch of TV sets—the last word as of that minute, so we were told. Some of them had big screens and a couple projected the pix on a screen that *could be measured in feet.* . . That's our idea of the way TV should be. . . And is that *a looooooong jump* from the idea we had when we saw Dr. Alexanderson's television demonstration in his Schenectady lab about 20 years ago! We looked into a hooded hole in the end of a box and saw a 2-in. plate of a neon tube and on that was a pic of a gal smoking a cigarette and *the picture moved!!!!* And there across the lab was the gal with streaks of light across her face. Yahsuh—that was sumpin'—in them days. . . . .

History Repeats

When we batted out the 20-year-ago stuff just above, we were reminded about the new Pilot portable TV receiver. . . . The history part comes into it via the size of the tube in this new set—it's a 3 incher, which gives yuh a pic that's a bit smaller. . . And just this morning we gotta release from Ravtheon-Belmont telling about their new TV universal receiver which *operates on a.c. of any frequency as well as direct current!!!!* Remember the hollobaloo when ac-dc broadcast sets were first trotted out? Did we hear someone ask if those TV sets would be in Rider's TV Manual Vol. 2? *Certainly,* they will and a lotta others as well . . . .

Editorial Drippin'

The other day we wandered by mistake into the editorial dept and of all the busy guys and gals we've ever laid eye to that gang were the mostest busiest—and that's pul-lenty rushed. . . They're puttin' together **the new PA manual** and purty soon they'll start feedin' pages to the printer. . . . It's gonna be 2000 pages all sortsa amplifiers—big uns. little uns and the in-betweeners. . . . Is it gonna have a "How It Works" book? Say, waddya wanter ask foolish questions like that on a 90° day like this. huh? Of course, there's gonna be a "H.I.W." book and as per usual, *we bet you'll like it lots.* . . .

Like Father, Like Son

A letter came to us a couple days ago from *George Kuhn of Weehawken, N. J.,* who said," I just purchased the complete set of your Trouble Shooters Manuals and am well satisfied. I've been using the manuals for some time as my father also has a radio repair business and also has a complete set of your manuals." Well, George, your Father sure set you on the right track when he started you off in fixin' sets. And if you'll take a look at pages in your Manuals from Vol. XV on, you'll see that we do refer *you to the page now instead of the index. Thanx for your swell letter.*

TV and the Conventions

Do yuh remember that in last month's col, we made with a warning that this political year was gonna be a lulu as far as the air waves are concerned? Well, if you happened to be swelterin, in Philly during the nominatings, maybe you got a rough idea of how the old home town went TV-minded in a **BIG WAY!!!** We never saw *so many TV sets per city block* as when we pedaled down Chestnut St. and Market St. Some of the dept. stores had a set workin' madly away in every one of their show windows. . . *And wot some of the jobbers report on their increase in sales!!!* One of 'em gave with the figger of a 250% increase over his previous week's biz and another made the place more humid by weepin' that he'd sold every TV set in his place. . . And wot's all that mean to you? Gwan—you guess. . . . .

More per Page

Didja notice *the new look* that's been given some of the pages in this issue? Well, the reason 'twas done was so we could get more words on a page and that means more honest-to-gosh information to you per issue. . . . We do our best to give you the dope so that you'll be up to the minute in what's going on throughout the whole industry—especially the servicing angle. . . . *Got any suggestions??????*

In de Lab

We was lookin' for the Boss t'other day and tracked him down out in de lab. He was up to his elbows in all sortsa apparatus the main thing bein' a scope an' over its screen were slowly wanderin' a pair o' spots that usually are dashin' thither and yon so fast they look like solid lines. . . . *It's a new gizmo and mebbe we'll give you the low-down later on.* . . . .

And Now — The Transitor

Does your radio memory go back to the crystal detector days—when the only way you could get a signal was to search patiently for a sensitive spot? Well, if it does, you'll be interested as we are in the lastest from the Bell Labs—the *Transistor.* It's a device about the size of a shoe-lace tip—works as a amplifier and an oscillator, but has no glass envelope, filament, or vacuum. The "works" of the gadget is a hunk of germanium about the size of a pinhead with a pair of thin wires spaced two thousandths of an inch apart. When power is fed to one of the wires, it's amplified 100 times over the surface of the germanium and carried to an output circuit by the other catswhisker. Now don't go askin' us questions—we don't know no more'n that about it, but we aims to give yuh the latest dope we get a-hold of. . . . .

Where Are You?

The other day the Boss gotta letter from Howard Christian erstwhile of Fort Monmouth and now of Fort Worth in which he suggests that the Boss call for a muster of the Radar Division of SCPA (1943-1945) in these cols and when we get answers run the names and addresses in S.S. so the old Fort Monmouth gang will know one another's whereabouts. . . . So if you were one of that outfit, please write to the Boss and tell him where you are now, what you're doing, etc., etc. . . . NOTE: This is NOT inserted herein at any military request—it's just to give youse guys a bit of aid and comfort. . . .

Hot Time in the Old Town

Remember last month we thought that our back-porch thermometer didn't go to high temps on accounta 'twas a Xmas present? *Boy, were we wrong!!!* Just a coupla days after we batted that out, did that thermo make a liar outa us—85°—90° and **last night 92°+ !!** But while we dislike such heat here in town (*Editor's note: where do you like it? Remember Florida?*) (*Ok, Boss, you win. . . I don't like it PERIOD*). we know it's swell for our Conn. garden. Yep, last Friday night when we measured (by flashlight) how much our tomatoes had grown in a week, we were astounded. But, dammit, the weeds had grown even more!!! (*That* round in the **Battle of the Weeds vs Us** was *NOT* won by the undersigned.) Just got us a brainthrob, to wit and viz: we're gonna catch us a flocka Japanese beetles and tell 'em flowers and our tomatoes ain't good for 'em to eat and that weeds are. Get the idea? *Ain't that a dilly?* Sooooo, insteada us wearily tryin' to pull out the weeds insteada flowers, we'll be off to some place we've been wantin' to paint. . . . Yessuh! so when yuh see a gardener parked in the cool shade of a big tree paintin' a pic of some easy-to-look-at scenery, that'll be

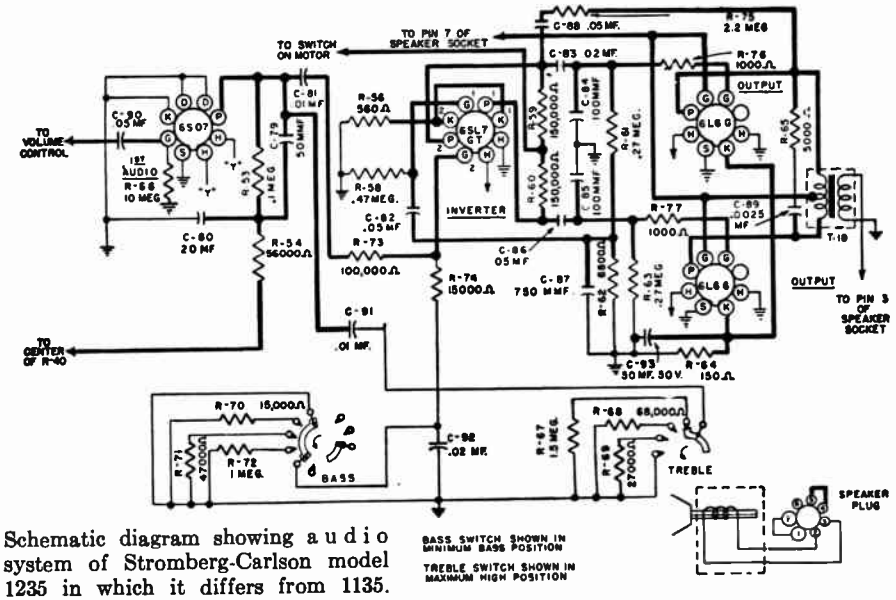
The Rolling Reporter

Stromberg-Carlson 1235

This model is similar to Model 1135, appearing on *pages 16-8 to 16-10 and 16-16 to 16-19 of Rider's Volume XVI*, except for the following changes. The audio system has been changed and is shown in the accompanying diagram. Connections have been omitted from pins 1, 2, 3, 4, and 7 of the wire record socket. Pin 6 is grounded and the 17,000-ohm resistor, R-79, has been removed. Pin 5 is still connected to the junction of R46 and R47. A 1000-ohm resister, R-41, has been added to the top of the bleeder. There is no connection to the junction of R-41 and R-40.

The following additional parts are used on the Model 1235.

149246	R-64	150 ohm, 5 watt
28155	R-56	560 ohm, ½ watt
149247	R-41	1000 ohm, 5 watt
28158	R-76, 77	1000 ohm, ½ watt
28168	R-62	6800 ohm, ½ watt
28172	R-70	15000 ohm, ½ watt
28179	R-68	68000 ohm, ½ watt
28191	R-72	1 megohm, ½ watt
28193	R-67	1.5 megohm, ½ watt
149121	R-75	2.2 megohm, ½ watt
149125	R-66	10 megohm, ½ watt
25485	C-81	0.01 μf
29891	C-86, 88	0.05 μf
110494	C-90	0.05 μf
111012	Electrolytic	50 uf
41489		6SL7 tube
30224		Plug
161230		Output transformer
33964		Bull's eye socket assembly



Schematic diagram showing audio system of Stromberg-Carlson model 1235 in which it differs from 1135.

Phillips Petroleum 3-62A

This is the same as Model 3-61A, appearing on *pages 17-9 to 17-12 of Rider's Volume XVII.*

IMPORTANT NOTICE
PRICE INCREASE

We have tried to hold the line as far as Rider Manual prices are concerned. We instituted a price increase on Rider Manuals in March, 1946, and we have held to the line as long as possible. As you know, many items have increased in price since 1946, and circumstances dictate that we increase our prices because we can no longer buck the tide. You can readily appreciate that many price increases have been put into effect by our suppliers since that time.

We regret that prices must be increased, and with our fingers crossed, we hope that the approximate 10 percent increase we are putting into effect, will not be washed out by the third round of increases now sweeping the nation. Effective August 10, 1948, all existing magazine advertising notwithstanding, the following new prices prevail on the Rider publications listed in the adjoining column. All publications in the Rider line not listed therein remain unaffected by the price change. All orders received up to midnight. August 10th will be honored at the old prices; all orders received after midnight August 10th will be at the new prices.

Sonora KBU-168

This model is the same as Chassis KB, appearing on *page 12-5 of Rider's Volume XII.*

●

Montgomery Ward 74BR-2003C

This model is the same as Model 74BR-2003B appearing on *pages 17-29 to 17-31 of Rider's Volume XVII*, except for the following changes. The 100-μμf capacitor in the external antenna lead C1 has been changed to 820-μμf capacitor, C22. The 820-μμf capacitor, C2, which was connected from terminal 2 of the antenna socket to ground, has been removed. The 220,000-ohm resistor, R1, that was connected from terminal 2 of the antenna socket to the low side of capacitor C6 has been removed A 1000-ohm resistor, R17, has been inserted between terminal 2 of the antenna socket and C22. On some sets a 100,000-ohm resistor has been added in series with the high side of the volume control. The loop has been changed and the loops of series B and series C are not interchangeable.

Ref. No.	Part No.	Description
	C-13E-15103	Loop antenna assembly
R17	C-9B1-62	1000 ohms, ½ watt

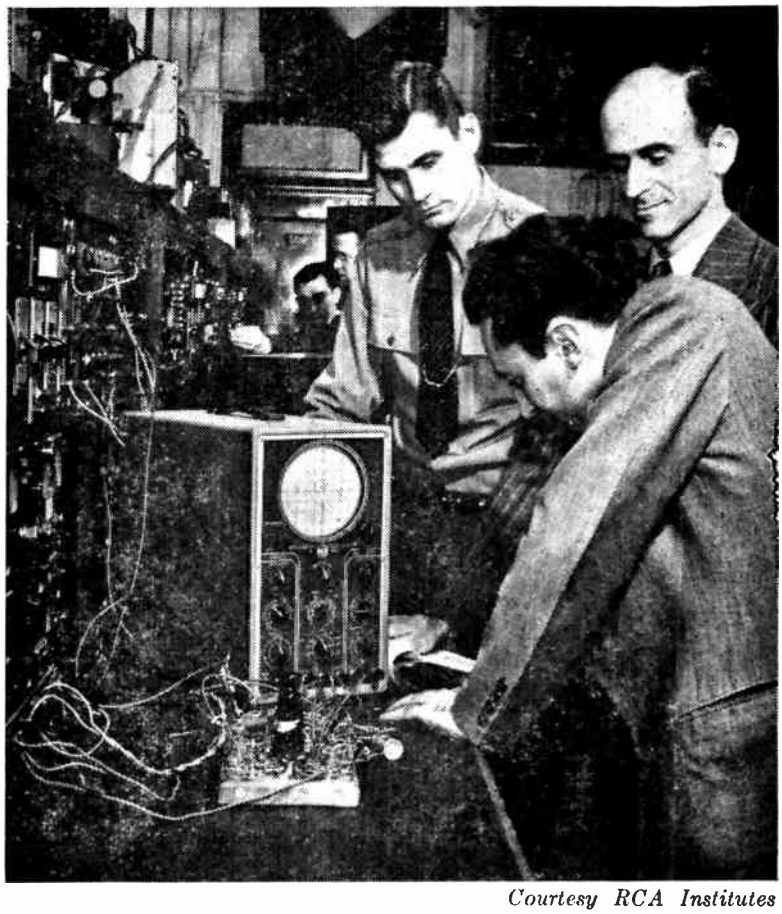
Distribution of This Issue -- 43,500 Copies

Successful SERVICING

AUGUST, 1948

TYPICAL RESTAURANT P-A INSTALLATIONS

By JOHN F. RIDER



Courtesy RCA Institutes

IT makes little difference to what part of this country you travel today, the chances are good that you will find most of the better restaurants, night clubs, country clubs, hotels, etc. equipped with public-address systems of one sort or another. Even though this use of sound amplification has become increasingly widespread, yet there is an enormous number of installations yet to be made. To that end we are presenting here three typical p-a installations with the thought that they may give those who are starting out in this field of electronics, an idea of how installations are made to fit different conditions.

Raffaele's Italian Restaurant at 100 West 57th Street in New York City is a medium-size restaurant seating 200 people with a pianist and phonograph with autpmatic record changer as entertainment. The layout of the area served by the installation shown in Fig. 1, indicates that it is about three times as long as it is wide. It has six tables along one wall behind semicircular archways upon which are mounted three loudspeakers which face the opposite side of the room. Five columns are in a line down the length of the plaster-walled room, the rear part of which is served by a fourth speaker mounted in the wall behind grillwork matching the wall decoration. The speakers are mounted near the 10-foot ceiling, except the one in the rear which is mounted about a foot below the ceiling to match the height of a ventilator on the same wall.

The piano music is picked up by a Shure Unidyne (cardioid type) microphone using a floor stand with an on-off switch and it is suspended over the keyboard from a gooseneck. Although two of the speakers face the microphone directly, there is no feedback problem because of the type of microphone used and the low level operation of the system. The microphone has a multi-impedance output and the 250-ohm tap is used. A shielded line is fed from the microphone to the Shure A86A line-to-amplifier transformer (250-ohm primary, high-impedance secondary) located about 4 feet from the amplifier to prevent hum pickup in this transformer from the amplifier power transformer. The microphone line is run at low impedance to prevent pickup from the many neon lights. The additional cost of the step-up transformer is offset by the superior reproduction without hash due to the pickup of neon-light noise. One microphone outlet is at the base of a structural column; another is situated at the base of the first column at the end of the room near the bar so that music from a piano can be picked up from there. The second microphone input on the amplifier is used for this latter outlet.

THE contents of this article are from the author's book, "Installation and Servicing of Low-Power Public-Address Systems" which will be published in the near future. Credit is extended to those establishments mentioned which have cooperated by providing the details of their p-a installations.

The 14-watt Bogen model E-14 amplifier is mounted on a shelf on the office wall so that it can be reached only by someone standing on a chair; this was done to discourage tampering with the controls which are set for optimum performance. An amplifier on-off switch hangs from an extension cord. A Webster automatic record

Please turn to page 3

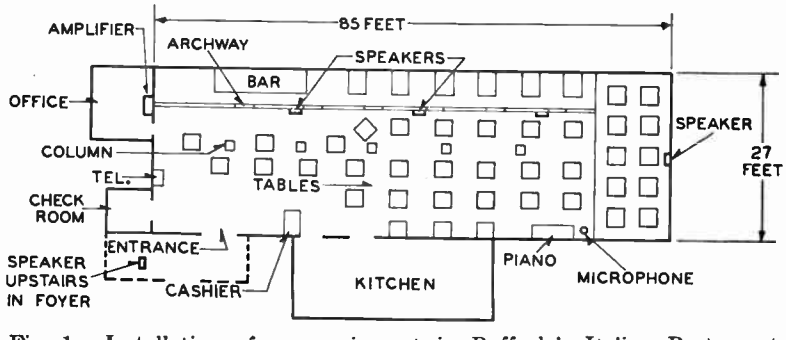


Fig. 1. Installation of p-a equipment in Raffaele's Italian Restaurant

Emerson 567, Chassis 120016

This model is the same as Model 560, Chassis 120016, appearing on *pages 17-31 to 17-32 of Rider's Volume XVII.*

●

Sears Roebuck 3351, 3451, 3551, Chassis 132.802-2C, -2D, -2E

These models are the same as Model 3351, Chassis 132.802 on *page 12-34 of Rider's Volume XII,* except for the following changes. A pilot-light shield and snubber assembly has been added, replacing the dial-light shield which was assembled to the dial-pointer shaft bracket. The push-button caps are permanently cemented to the push buttons at the time the set is built.

●

Zenith 12H090, 12H091, 12H092, 12H093, 12H094, Chassis 11C21Z

These models are similar to Model 12H090, Chassis 11C21, on *pages 15-87 to 15-94 of Rider's Volume XV.* The difference between these chassis appears in the power supply and the audio section. Chassis 11C21 uses an electro-dynamic speaker and the field of the speaker is used as a choke in the power-supply filter circuit. Chassis 11C21Z uses a permanent magnet speaker. To convert Chassis 11C21 to 11C21Z, it is necessary to replace the speaker field with a 200-ohm, 5-watt resistor (R8 in the accompanying diagram). A 40-μf capacitor must be connected from the center tap of the power transformer to pin number 6 of the power-supply cable plug, as shown in the diagram. C40 and C41 must be changed from 30μf to 40μf (they appear as C5 and C6 in the 11C21Z chassis). A 1000-ohm, 3-watt resistor (R9) must be connected between the screen grid of the first beam-power output tube and the center tap of the output transformer. The capacitor shown as C3 in the accompanying diagram is capacitor C39 in the schematic on *page 15-87, 88 of Rider's Volume XV.*

RCA 66X11, 66X12, 66X13, Chassis RC-1046C, RC-1046D, RC-1046E, Second Production

These models are similar to Model 66X11, chassis RC-1046A, on *pages 17-29 and 17-30 of Rider's Volume XVII.* They incorporate the changes listed in the June 1948 issue of SUCCESSFUL SERVICING, in addition to the following changes. The parts list should be amended as follows:

CHASSIS ASSEMBLIES

Change: 72896 Plate—to read
72896 Plate—dial back plate complete with drive cord pulleys for Model 66X11.

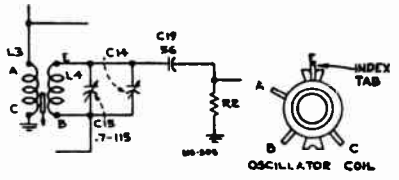
Add: 72601 Plate—dial back plate complete with drive cord pulleys for Model 66X12.

MISCELLANEOUS

Change: 73169 Back—to read
73169 Back—cabinet back for Model 66X13—walnut

Add: 73278 Back—cabinet back for Model 66X13 mahogany
71893 Decal—trade mark decal

The stock number of the dial cord should be 72953 instead of 72913. This cord is supplied in 250 foot reels. Approximately 56 inches are required for the first production and approximately 49 inches for the second production.



Oscillator Circuit RC-1046C, RC-1046E

Schematic otherwise identical to RC-1046,-A,-B except ant. tuning cond. C12 is 10-398 mmfd., only one dial lamp used on RC-1046E.

The differences between these various chassis are as follows. Chassis RC-1046C uses oscillator coil without capacity winding, L5. Capacitor C19 is used and a tuning capacitor without C16 is used. Two dial lamps type number 1490 are used. Chassis RC-1046E is the same as RC-1046C, except that only one dial lamp, Type 47, is used. For oscillator circuit see accompanying diagram.

73172 Capacitor—ceramic, 56$\mu\mu$f (C19)
73163 Coil—Oscillator coil complete with adjustable core and stud (L3, L4)
73164 Capacitor—Variable tuning capacitor (C12, C13, C14, C15)

Radio Wire Television M72 and M73

These models are the same as Model M70A which appears on *pages 17-6 to 17-11 of Rider's Volume XVII,* with the following exceptions. The 22K resistor (R51) in the grid circuit of the first audio stage has been removed. The 0.02-μf capacitor (C19) which was connected from the top of R51 to one side of the tone control (R14) now is connected from the bottom of R13 to ground.

●

Television Change

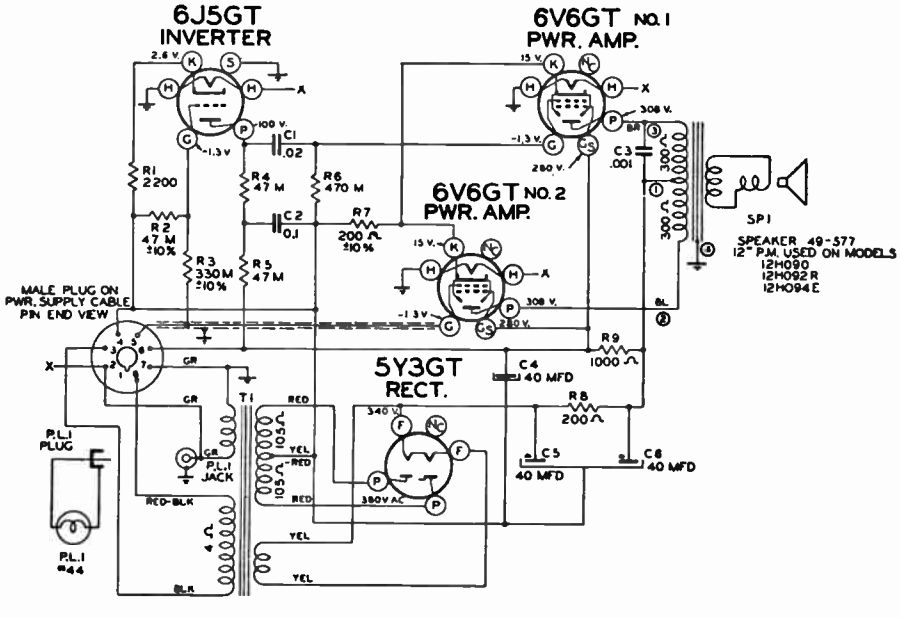
Philco Television 48-2500, Code 122

This model appears on *TV pages 1-23 to 1-44 of Rider's TV Volume I.*

During early runs of Code 122, the projection tube was modified so that the high-voltage-anode snap terminal was placed closer to the front of the tube to prevent arc-over to the deflection yoke and picture-tube mounting assembly. When this was done, the anode snap terminal was too close to the keystone-magnet clamp band. The clamp band was modified temporarily by using a plastic strip at the top of the band, with the band cut out for the anode terminal clearance. In later runs of Code 122, a new all-plastic band was added. This band is to be used with old, modified, or new tubes. When replacing tubes, use the new tube (TP400A) and the new magnet clamp band, Part No. 76-3298. When making keystoning adjustments on tubes employing the new band, be sure to ground each magnet before touching, in addition to attaching the ground to the band clamp screw.

During run two of Code 122, the 1000-$\mu\mu$f high-voltage filter capacitors, C100, C101, and C102, Part No. 30-1229-1 were replaced by 500-$\mu\mu$f capacitors with the same voltage rating, Part No. 30-1229. Only the 500-$\mu\mu$f capacitors are available as replacement parts.

The deflection-yoke assembly has been changed slightly. The new deflection-yoke assembly is Part No. 32-9613 and it has the two 100,000-ohm resistors mounted on the outside of the yoke instead of the inside. Because of this change, it is necessary to drill a hole in the optical housing, adjacent to the deflection-yoke cable, if a new yoke assembly is used with an early type optical-housing assembly. The hole must be large enough to pass the deflection-yoke cable connector. The new aluminum-backed projection tube TP400A, Part No. 34-2614, is interchangeable with the old tube.



The audio section and power supply of the Zenith chassis 11C21Z

P-A Installations

Continued from page 1

changer with intermixing and automatic stop-at-last-record feature is mounted below the amplifier. The record player has its own volume control which is set for maximum volume. The amplifier tone control is set for best reproduction of the piano and an Astatic scratch filter is at the output of the phonograph pickup to permit scratch elimination without changing the tone control setting; this filter has bass, medium, high, and on-off positions.

The four loudspeakers are heavy-duty, 12-inch Utah PM type mounted in wooden wall cabinets, the three along the side being of the inclined type. The four 8-ohm voice coils are each matched to the 250-ohm line (250-ohm amplifier transformer tap) by means of individual Jensen impedance-matching transformers connected in parallel and having 1000-ohm primaries.

Another loudspeaker is mounted in the upstairs foyer at the street entrance. A Jensen 8-inch PM speaker is used connected to a Utah 8-ohm L-pad mounted on the office wall near the amplifier, this pad being connected to the 8-ohm tap. In winter when the street door in the foyer is closed, the attenuator dissipates most of the power in the load, but in summer when this door is open considerably more power is needed to override street noises. Since the amplifier output is more than adequate for the installation, this mismatch (the simultaneous use of two amplifier transformer taps fully loaded) does not affect reproduction in any way.

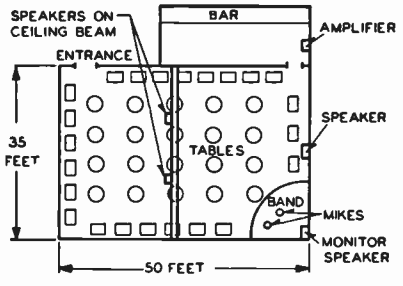


Fig. 2. A 25-watt amplifier is used in the p-a installation at Le Ruban Bleu.

Le Ruban Bleu, 4 East 56th Street, New York City has an area to be covered by its p-a system that is 50x35 feet as indicated in Fig. 2, with tables for 150 persons. Drapery and mirrors cover the walls and the ceiling is 10 feet high. One Shure cardioid microphone is used for the band pickup and another of the same type is often used for soloist or piano. Separate lines are run for each one at 30 ohms impedance and step-up matching transformers are used to match the high-impedance tube inputs. A 25-watt Stromberg-Carlson amplifier mounted on a shelf in the bar, is used with the microphone gain controls usually at the low-level position.

The loudspeaker line is run at 500 ohms feeding four 12-inch PM inclined wooden-cabinet loudspeakers, each having a matching transformer, which are in parallel. The loudspeaker mounted behind the band is a monitor for the performers to hear themselves, the matching transformer being of such high impedance with respect to the impedances of the other loudspeaker transformer primaries, that the output is at a very low level and no acoustic feedback results, even though the speaker directly faces the microphones.

As may be seen in Fig. 2 one speaker is at the middle of the front of the room near the ceiling; the other two are mounted on a constructional beam which runs across the middle of the ceiling. This arrangement of the speakers is such that the sound will not be uncomfortably loud at the front of the room and can be clearly heard in the rear.

The walls of the Hawaiian Room at the Hotel Lexington, 48th Street and Lexington Avenue in New York City are decorated with mats and other material that provide a high degree of absorption; the ceiling is also acoustically treated. Even though a certain amount of glass is used in the room, there is no problem of acoustic feedback although the microphones are somewhat ahead of the loudspeakers, as shown in Fig. 3. The room holds 350 persons and has two wing terraces where the ceiling is 10 feet high; the ceiling of the dance floor is 18 feet high.

Three Amperite velocity microphones are connected by means of twist-lock plugs to the front of the bandstand, these being used for band pickup and are series connected. One of the pickup sides of each microphone faces the band so that the insensitive sides are toward the loudspeakers. A Shure Unidyne (cardioid) microphone is used for the band leader or soloist.

There are two microphone channels: one for the three series-connected bi-directional microphones and one for the single unidirectional microphone. Each channel has an on-off switch and a 200-ohm variable T pad. Each of the three series microphones has a 50-ohm secondary winding on the microphone transformer, while the cardioid microphone has a 200-ohm output impedance. The 200-ohm microphone lines run from the Hawaiian Room, that is one floor below the street level, to the radio and sound control room on the 27th floor of the hotel.

The console type amplifier (and a spare in case of failure) was custom-made and these are located in the control room. The channel controls in the amplifier are set at the optimum point (close to a maximum setting) and the pads at the microphone are varied for volume control. The amplifier has four 2A3 triode output tubes in push-pull parallel, operated class AB2, and delivers 40 watts.

The loudspeaker line is run at 500 ohms impedance feeding two 8-ohm Stromberg-Carlson 18-inch PM loudspeakers through two matching transformers in parallel, each having a 1000-ohm primary impedance. The cone-type speakers, on either side of the band, are mounted in exponential baffles beneath the ceiling so that the baffles fit with the ceiling design. The baffle grillwork facing the room is 10 inches high by 42 inches wide so that very wide coverage is obtained.

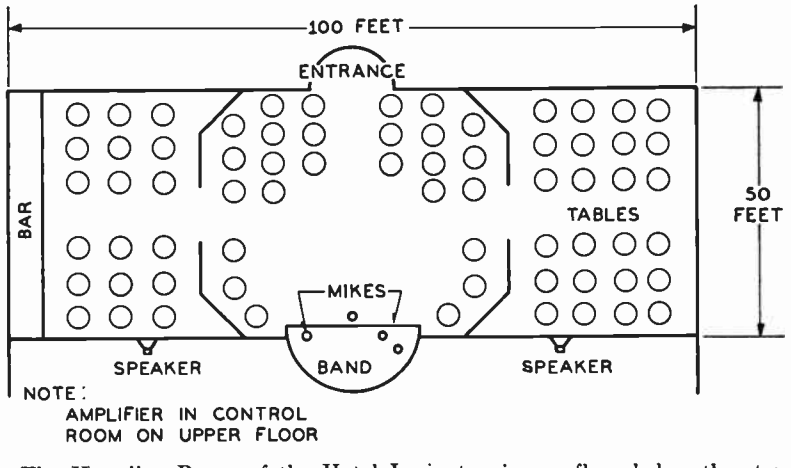


Fig. 3. The Hawaiian Room of the Hotel Lexington is one floor below the street level and the 40-watt amplifier is in the control room on the 27th floor.

New Name

When you get your Rider's Manual Volume XVIII next Fall, a new name will be found at the top of those pages which contain the simplified break-downs of three-band, four-band, etc. schematics. Heretofore, we have called these "clarified schematics", but hereafter the name at the top of these pages will be

CLARI-SKEMATIX
Registered Trademark

This is a registered trademark of John F. Rider Publisher, Inc. and when you see it on a schematic page you will know that it is another part of that service that Rider is giving the industry in an endeavor to make radio servicing successful.

●

Automatic Tom Thumb

Please change the listing in your Rider's Volume XVII Index for Automatic page 17-8 from Models 660, 662, 666 to Model Tom Thumb.

●

Teletone 161, 167, 168, 171, 174, Chassis T

These models are all the same as Model 150, Chassis T, appearing on *pages 17-2 and 17-3 of Rider's Volume XVII.*

RIDER'S PA MANUAL

By the time you read these lines Rider's PA Manual (or to give it its official title, *Rider's Public Address Equipment Manual*) will be nearly ready for the bindery. And that means that in about a month, copies will be on their way to jobbers throughout the country.

This has been one of the toughest Manuals that we have ever prepared for the printer. You indicated that you wanted to have included the service data on amplifiers that had been on the market since 1938, which we have done. That meant asking the manufacturers to dig far down deep in their files and some of the technical material that came to light was in pretty poor condition, as far as reproducing it went. So, schematics, wiring diagrams, chassis layouts had to be redrawn and voltage and resistance tables, circuit descriptions, and notes on installation, impedance matching at the input and output circuits, parts lists etc. had to be retyped. All this beside the usual amount of editing and dummying of the pages, but even with all this extra cost of preparation we have maintained the price of the PA Manual as it was originally announced —at least for the present. . . .

Several months ago when we made our count of the number of manufacturers who supplied us with servicing material, we found there would be more than 135 names. Following our usual procedure of sending out a last-minute call to those manufacturers from whom we had received no replies, resulted in our obtaining service information from them that brought the total number of names up to 147! And that's the final count—147 *manufacturers' products in Volume 1 of Rider's PA Manual.* . . .

Just so that you will get an idea of the coverage — and that's what you need in a Manual like this — you will find below a list of the manufacturers whose products of the past 10 years are covered in this newest Rider "first".

Admiral
Air King
Alamo
Allied
Altec Lansing
American Comm.
American Sound
Amplifier Corp.
Ansley
Apex
Assoc. Electric
Atomite
Audar
Audio Comm.
Audio Development
Automatic Musical
Automatic Projection
Aviola
Beam Radionics
Bell
Belmont
Bogen
Brook
Brown Ebinger
Caltron
Cavalcade
Challenger
Clark
Collins
Continental
Commun-A-Phone
Concord
Crosley
Dalmo Victor
Decca
DeVry
Dual Engineering
Dynavox
Eastern Amplifier
Eckstein
Electro Acoustic
Electromatic
Electronic Design
Electronic Devices
Electronic Labs.
Electronic Trading
Ellinwood
Emerson
Epiphone
Espey
Fada
Federal Mfg. & Electronics
Federated Purchaser
Gamble Skogmo
Garod
General Electric
General Television
General Transformer
Gentleman Products
Gibbs
Goodrich
Grant
Greene
Hamilton Electronics
Hammond
Inter-Communication
Jackson
Jefferson
Jewel
Langevin
Laurohk
Lewyt
Lyman
Lyon & Healy
Magna
Meck
Mectron
Mellaphone
Meissner
Mercury
Mills
Minnesota
Montgomery Ward
Morlen
Motiograph
Motorola
Movie Mite
Musitron
National Dobro
National Filben
Neill
Nelge
Newark Electric
Operadio
Optron
Packard Bell
Philco
Philmar
Pickering
Pilgrim
PortoMatic
Precision
Presto
RCA
Radio Craftsmen
Radio Parts
Radio Wire
Radolek
Rauland
Regal
Remler
Rock-Ola
Scott
Sears Roebuck
Seeburg
Setchell-Carlson
Sheridan
Mark Simpson
Sonora
Sonotone
Sound, Inc.
Speak-A-Phone
Spiegel
Steelman
Story & Clark
Stromberg Carlson
Sundt Engineering
Symphonic
Talk-A-Phone
Tele-Tone
Telequip
Teletran
Templetone
Thordarson
Trav-Ler
United Scientific
Valco
Walker Jimieson
Walsh Engineering
Watterson
Webster Chicago
Webster Electric
Western Auto
Wilcox Gay
Worner Electronic
Wurlitzer
Zenith

Well, that's the story on Volume 1 of Rider's PA Manual . . . Service data on the products of 147 manufacturers—schematics, chassis layouts, wiring diagrams, voltage and resistance charts, circuit descriptions, installation instructions, impedance-matching notes and tables for the input and output circuits, service and trouble-shooting notes, parts lists — in short, everything you need for the servicing of amplifiers.

You told us you wanted the data on manufacturers' products from 1938 to date; we have given them to you. We told you you were going to get more than 135 manufacturers; you will get 147. We stated that Rider's PA Manual would have 2000 pages; actually you will find 2024 pages in the big loose-leaf Rider binder. And, of course, there will be the usual "How It Works" book with the valuable tie-up between theory and practice and the complete Index to those 2024 pages. . . .

You have told us you wanted this PA Manual . . . Now tell your jobber the same thing . . . Do that today — NOW — so you can be sure of getting yours as soon as it is off the press . . . *Order it now!*

RIDER MANUALS *Mean* SUCCESSFUL SERVICING

Allied 6C-122

This model is the same as Model 6B-122 appearing on *pages 16-3 and 16-4 of Rider's Volume XVI.*

●

Radio & Television (Brunswick) 4000, 4000½, 6000, 6000½, 6876

These models are the same as Model SF-6810 on *pages 16-1 to 16-5 of Rider's Volume XVI.*

Successful SERVICING
REG. U. S. PAT. OFF.

Vol. 9 AUGUST, 1948 No. 7

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

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JOHN F. RIDER, Editor G. C. B. Rowe, Associate Editor

CURTAIN TIME

Television . . .

WJZ-TV of the American Broadcasting Company is inaugurating TV service tonight — the 10th of Aug. . . . A 5-hour program is in store for the viewers . . . This is the sixth of the seven stations allocated to this area . . . There is gnashing of teeth already because the number of channels allocated to an area is not sufficient to permit all who have $500,000.00 to spend to become TV broadcasters . . . There is the rub in the present allocation system.

Is it conceivable that TV service will be made available to those who are far removed from major centers but who are within the range of relay stations? A high-frequency converter ahead of the conventional TV receiver? . . . Is it possible? . . . We just completed a vacation at a resort 75 miles from New York. The owner assembled a TV kit and on Tuesday nights hundreds of people gather on his lawn to watch the Texaco Star Theatre program . . . He moves the set onto the porch . . . The viewing habit sure is strong!

Polite Police . . .

Our respects to the PD of Chicago . . . Recently we were being driven to a golf course by Ascher Cole of ATI in that town . . . It was a pleasure to be witness to the reprimand . . . It was polite yet firm . . . To the point and all inclusive . . . At no time was he abusive but he sure got his point across . . . I don't know about Ascher, but if ever I drive in Chicago, I'll be sure to observe the traffic laws . . . Again congrats to all the Chicago Police from the top man down.

Just Wondering . . .

Why is it that phase is so difficult for the average student to understand? . . . Is it because imagination must be used to visualize it — or is it because the lab presentation is not as lucid as it might be? More and more we see signs of the printed circuit making its commercial debut to the public . . . What has happened to Citizens Radio? . . . Channels are assigned and several manufacturers were supposed to have equipment ready for approval by the FCC . . . Wot hopponed?

When will the test equipment industry get a shot in the arm? . . . TV servicing tactics call for minor repairs in the home . . . Will this trend influence the repair of small receivers — repair in the home instead of the shop? Will this trend tend to produce miniature test equipment? . . . The pocket scope was a huge success . . . Unlike any other maintenance industry, the radio sericeman who has a shop and test equipment is in a position to do much experimental work for self-education . . . Are we nuts for making such a suggestion? . . . Can radio shops adjacent to summer resorts — beaches and other places where visitors gather for a day or week or more, increase income by renting battery-operated portables? . . . Some are doing just that!! There is room for more such activity . . . *ATTENTION RADIO SERVICE ASSOCIATION SECRETARIES* . . . We are preparing a list of radio service associations to receive gratis file copies of our new text books for use in their libraries . . . *Send your name and address on association stationery* . . . Obviously we cannot send Rider Manuals gratis . . . They cost too much . . . Ready for mailing is our "Television — How It Works!"

Radio Servicing . . .

The condition which strikes us most strongly about TV servicing — is that all the troubles which exist in the receiver are not taken care of during the service call . . . This makes the customer wild! . . . Reading instructions is something the average human being is very reluctant to do . . . This applies to the technical circuit descriptions which are found in Rider Manuals and in the accompanying "How It Works" Books . . . These data are extremely important! . . . They furnish technical knowledge in general — special information about the specific receiver. Time and again they contain clues to possible defects and if known before the repair is made — will save a great deal of time and effort . . . But it has ever been thus and always will be . . . The serviceman on the West Coast averages $1.00 more per service charge than those on the Atlantic seaboard . . . Why? . . . The receivers are the same—the test equipment is the same . . . Is it possible that a better selling job is done?? Incidentally, percentagewise radio service shops on the West Coast are more completely equipped with test equipment than radio service shops elsewhere in the nation . . . Of course, this is on the average . . . Specific shops all over the nation may be more completely equipped than most Pacific Coast shops.

Town Meeting of Radio Technicians

The Radio Industry is sponsoring a 3-day Town Meeting in New York City, at the Hotel Astor to be specific, on Sept. 27, 28 and 29 for the radio servicing industry . . . Leading technical personalities will deliver papers during the 3-day session . . . These will cover all pertinent phases of radio servicing, specializing in TV — but taking care of such things as business practices, advertising, public relations and other seldom discussed matters . . . The Associated Radio Serviceman of New York City are working in close cooperation with the Coordinating Committee of the Electrical Parts and Equipment Mfgrs., the RMA, The Sales Managers Club and the West Coast Electronic Mfgrs. Assoc.

Please turn to page 8

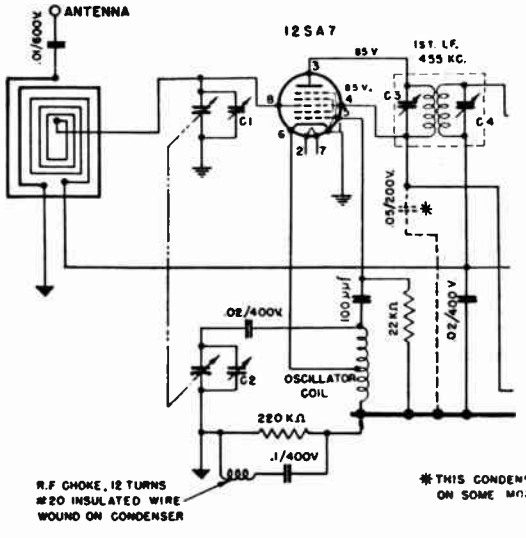
Olympic Radio 6A-501W-U, 6A-501V-U, 6A-502-U

These models are the same as Model 6-501W-U on *page 15-2 of Rider's Volume XV*, except for the following changes. The tube lineup may be 12BE6, 12BA6, 12AT6, 50B5, and 35W4, instead of the lineup shown on page 15-2. The 330-$\mu\mu$f capacitor in the oscillator feed-in line has been changed to 100$\mu\mu$f. The 8200-ohm resistor connected from the top of this capacitor to B minus is now 22,000. A 220,000-ohm resistor is connected from B minus to the ground side of C2 and the trimmer capacitor across it. A 0.1-μf capacitor and an r-f choke are connected in series across the 220,000-ohm resistor. The choke consists of 12 turns of #20 insulated wire wound on the capacitor. In some models, a 0.05-μf capacitor is connected from the primary of the first i-f transformer to B minus.

A 47,000-ohm resistor has been placed inside the can of the second i-f transformer and two 100-$\mu\mu$f capacitors are connected across it. The resistor is connected between the secondary of the i-f transformer and the avc line. There is a connection from the cathode of the 12SQ7 (or 12AT6) tube to the junction of the capacitors.

The parts list has been changed as follows:

Part No.	*Description*
CA-327W	Cabinet—walnut bakelite cabinet
CA-327V	Cabinet—ivory bakelite cabinet
CL-575	Coil—oscillator coil
REB223M	Resistor—22,000 ohms, ±20%, 1/2 watt
ST-255-1	Back—cardboard back (for 6A-501U only)
TR-707	Transformer—first i-f transformer (shielded)
TR-708	Transformer—second i-f transformer with built in diode filter (shielded)



Changes in the mixer-oscillator circuit of the Olympic models 6A-501-W-U, 6A-501V-U, and 6A-502-U.

RIDER MANUALS Mean SUCCESSFUL SERVICING

Another Orchid for the TV Manual

We are indeed gratified with the opinion expressed in the following letter and thank the writer for taking the trouble to send it to us.

"During the past two weeks I have had the opportunity to thoroughly look through your Television Manual and its "How It Works" . . .

Since I am engaged in the production of technical manuals for Link Radio Corp., I realize the tremendous undertaking this book represents.

Congratulations on a splendid job and I most sincerely hope the service fraternity will give the "How It Works" the attention it deserves".

George E. Conner
Link Radio Corp.

General Electric Musiphonic 41 Through 45

These models appear on *pages 17-1 through 17-15 of Rider's Volume XVII*. To improve the high-frequency response on phonograph a-m and f-m reception, a change has been made in the power supply which appears on *page 17-4 of Rider's Volume XVII*. A 0.1-μf capacitor in series with a 220-ohm resistor has been placed between the cathode (pin 6) of the 6SN7GT driver tube, V201, and ground in the power-unit chassis. These components are already listed in the replacement parts list as Cat. Nos. UCC-048 and URD-033.

Add catalogue No. RSU-001, Symbol S2J, On-Off Switch to the parts list. This item is now stocked separately from RSP-004, a pushbutton switch. This power switch may be replaced in case of failure by merely bending its metal tabs to detach it.

Rolling REPORTER

Dear R. R. —

Your the mostest lucky guy that ever pushed a typewriter key. You go out of N.Y. on a so called bizness trip and what happens? The top blows off Grandmas thermometer and she baked me some cookys *without lighting the gas in the oven.* She was kicking at the heat but I told her i was going to rent one end of the subway platform out where I get my face pushed in every day and start a turkish bath. My grandma thinks Im a smart businessman. . . . Yeah, youre lucky alrite like wen you left town last Dec. just befour we had the big blizard of 47. Remember that? And could I use some of that snow rite now? *Yes!*

There was a guy in here the other day from Phila looking for you—he said he wanted to pay you some money he owed you. thats almost as big a news story as the man biting the dog — *someone who owes you money!!!!!* Wat a sucker he must be. . . . Anyhow he told me a good story about TV during the conventions in your old home town. it seems that somewear on Market St theres two big dept stores cattycornered across the st. from each other. Know where I mean? I forget the names. Well each store has a TV set in every one of there windows showing the doings at the convention. Your friend was looking in one stores window and along comes a commercial with a good-looking doll making with the cheesecake and telling about the bargins in ladys dresses *at the other store across the street!* Sounds like the Miracle on 34 St. dont it?

Now that youve been out of our way we got *ALL* the pages of the PA manual down to Jack and yesterday i took a mess of the index copy up to be set, so we are getting along swell without you. Maybe wen you go on your vacation we can get out vol. 18 wich I herd the boss say wood be out this fall. You better tell any guys you call on to *get their orders in but fast for that PA manual* or they may get left just like sum of em did on the TV manual cause they didnt order soon enough.

Say did you know that *THREE more service depts of TV set mfrers* are using the TV How It Works book as a text for training there repairmen? If you see any other service managers you might tell them that Rider's TV "H.I.W." is the one place where they can find all the dope on TV sets in one batch of pages and between one cover and **they can find it NOW!** Oh i forgot to tell you that the mfrers are *Emerson, Admiral and Zenith.* . . .

And wile Im talking about the TV "H.I.W." book, if any guys start yipping to you that they cant pry a copy loose from their jobber, tell em the first press run went byebye out of here so fast our stock was nothing before we could tell the printer to get going again. When you get this letter the next run will be off and books on their way out to your boy friends. . . .

The huskies of the shipping dept have been shipped downtown to the new place at *480 Canal st.* No, the Boss aint told me if and when me and you is going to move. Gee itll be tough on you if we move wont it for you to find another artist that builds gin rickities the way you like em. But youll find someone—*Id bet your last buck on that!*

Do you remember *M. L. Hart* who is a servicer out in Alhambra, Cal? Well, he wrote you that he *likes the GIANT pages in the TV manual.* He says as to how hes still 100% on our manuals and seems to be panting for the one on PA. . . .

Hey do you want I should make reservations for you at the radio show in L.A. next month? How are you going out there —on your chariot? Dont forget what happened to you the last time you went on a trip like that and how embarassed you was when you went to that lady doctor with **where** you had them callouses. . . .

You should have ought to seen the BIG dalias that Emily brought in. She said one was formal and others was informal. I never knew you had to be introduced to flowers or that some just didnt care. . . . And speaking of flowers and a garden, your wife called me up and asked WHEN you was going back up to Conn. to take care of your patch of weeds? She said you sure pulled the wrong line on them Jap beetles—you should have told them *weeds* wasnt good for them instead of flowers for theyve been eating your marigolds for the main course with zinnias for dessert ever since you made with the big brainthrob. Your wife said youd better get headed that way soon for there were funny looking green worms headed for your tomato patch and *she wasnt going to touch the nasty things.* Boy oh boy—*you can have the life of a farmer!!!* Me Im just a sucker for things like water you get when you turn a faucet, light when you turn a switch, ice from a refrigerator, and warm water in a shower. Well, have fun when you get back home and see that you get out all them weeds. . . .

Yours for life in a big city,
Aloysius Winenwiski
Head Officeboy

●

WANTED—TV Installation Service

A well-known manufacturer of television receivers wishes to contact reliable service companies to assume complete television installation and service of their products. When you write give full particulars as to the territory you cover, your facilities, equipment, and number of road men, trucks, etc., together with financial standing. Address your letter to TV Installation, Care of John F. Rider Publisher, Inc. 404 Fourth Ave., New York 16, N. Y. and we will forward it to the manufacturer..

MR. RADIO JOBBER

Bear in mind that we are not printing an unlimited quantity of the Rider PA Manual. If you delay in sending in your order, you may experience the same condition that existed when the Rider Television Manual Volume I was published. Approximately six weeks existed between the delivery of the first printing and the delivery of the second printing.

Get your order in today—thereby making certain that you will be able to make delivery to your customers from the first run. If you are lax in sending in your order, you will find some other jobber in town who is more wide-awake, is making deliveries.

Montgomery Ward 04BR-420B

This model is the same as Model 93BR-420A appearing on *pages 11-25 and 11-26 of Rider's Volume XI.*

●

Arvin 664 and 664A, Chassis RE-206-1

These models appearing on *pages 15-10 and 15-5 and 15-6 of Rider's Volume XV,* have been changed as follows to reduce the a-c hum. The 0.1-μf capacitor (C12) connected from B+ to the cathode of the 35L6 tube has been changed to 0.03μf. The resistance of R12 connected from B+ to the cathode of the 35L6 tube has been changed from 12,000 to 15,000 ohms .Making this change will reduce the a-c hum of many of the sets with the previous circuit.

The parts list should be changed as follows:

Delete:

Ref.No.	*Part No.*	*Description*
R12	C20070-123	Resistor 12,000 ohms, 1 watt
C12	C20068-104	Capacitor, 0.1μf, 400 v. p. t.

Add:

Ref.No.	*Part No.*	*Description*
R12	C20070-153	Resistor, 15,000 ohms, 1 watt
C12	C20068-303	Capacitor, 0.03μf, 400 v. p. t.

RIDER MANUALS *Mean* SUCCESSFUL SERVICING

The Cover

The photograph on page 1 shows students in the RCA Institutes laboratory investigating the characteristics of an audio amplifier by the use of an oscilloscope. Signals of various frequencies and amplitudes are fed into the amplifier from the oscillator in the test panel on the left, wherein are also located the power supply and the necessary meters for experimental work. The cathode-ray tube oscilloscope is across the output of the amplifier, which being built on a breadboard, can have different components substituted in the circuit, showing different output effects on the 'scope screen.

●

Curtain Time

Continued from page 5

who are the sponsoring groups . . . Attendance is free to all and sessions will be held afternoon and evenings . . . It is hoped that ALL radio servicemen within a 50 or 75 mile radius of NYC will see their way clear to attend this Town Meeting.

For the benefit of those men who are new in TV receiver servicing, remember that peculiar tube problems develop in these units. Tubes may not work well in certain parts of the receiver, yet function perfectly in other parts,—so—don't discard a tube which seems inoperative in one place, without trying it in other stages which employ like tubes . . . Very frequently an interchange of like tubes solves the problem . . . Save time and money by inquiring if the customer has permission to erect an antenna on the roof before you attempt to do so . . . We're speaking about TV antennas . . . In too many instances the customer is derelict in procuring permission and the serviceman is the sufferer.

The Spanish Main . . .

About 400 years ago the most fabulous city in the Western World was Cartagena in Colombia, South America . . . It was the warehouse and shipping point for all the treasures coaxed from the Incas and others in S.A. by the Spanish Conquistadores . . . Overlooking the harbor of this city was the hill of La Popa, on top of which was the monastery of La Santa Cruz . . . At the foot of the hill were fortifications which cost 100 million dollars in the 16th and 17th centuries . . . Imagine their cost today!

JOHN F. RIDER

Distribution of This Issue -- 40,000 Copies

JUNE, 1948

Courtesy Raytheon Mfg. Co.

SOME NOTES ON TELEVISION RECEIVING ANTENNAS

IF there is one factor that makes for a good television installation, it is the receiving antenna . . . Its importance cannot be emphasized sufficiently. It is impossible in the space available to enter into all the various factors that are involved in a television antenna installation; only a relatively few can be considered here, but they should be of assistance to men who are doing television work now or who will be in the near future.

One of the most important things to bear in mind is that an antenna for the reception of television signals should be as high above the ground as it is possible to have it. Due to the nature of the high-frequency signals, the distance they can travel is determined by line-of-sight paths, which are indicated by *AB* and *CD* in Fig. 1. Assume that the transmitting antenna is at a height *A* above the ground and the receiving antenna is at a height *B*. Signals radiating from *A* will be received at *B* as each is far enough above the ground as the line-of-sight path is tangent to the earth at X. If the height of the transmitting antenna were increased to *C*, the length of the path will also be increased so that it is tangent to the earth at *Y* and the signals can be received at an antenna *D* of the same height as *B* but at a greater distance.

Fig. 1. The line of sight is shown between the antennas at A and B. If A were raised to position C, the line of sight would be increased to D.

The distance or horizon range from the transmitting antenna to *X* or *Y* can be found from the formula, $Distance = 1.23\sqrt{h}$, where the distance is measured in miles; *h*, the antenna height above the ground, in feet; and 1.23 is a constant which takes into account the curvature of the earth. Assume that the transmitting antenna is 1000 feet above the ground; substitute this for *h* in the above formula and we have

$$Distance = 1.23\sqrt{1000} = 1.23 \times 10\sqrt{10}$$
$$= 1.23 \times 31.62$$
$$= 38.9 \text{ miles.}$$

Now if the receiver installation is within this horizon range of the

Please turn to page 4

Automatic 640, Series B

The schematic of this model is the same as the 640 shown on *page* 15-7 *of Rider's Volume XV* except for the change from octal type to loctal type tubes.

This model uses the 14Q7, 14A7, 14B6, 50A5, and 35Y4 in place of the 12SA7GT, 12SK7GT, 12SQ7GT, 50L6GT, and 35Z5GT tubes.

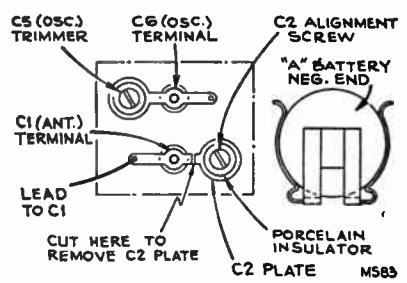
●

RCA 54B Series

These receivers have been produced with loops of two types of construction: "taped," in which the coil is fastened to the loop cover with Scotch tape; and "cemented," wherein the coil is fastened to the loop cover with coil cement. Receivers using "cemented" loop have been produced with and without the antenna trimmer capacitor, C2. Receivers using the "taped" loop have only been produced with antenna trimmer C2, and they are to be aligned according to the instructions on *page* 15-22 *of Rider's Volume XV*. In the case of those receivers using the "cemented" loop which has the trimmer C2, this capacitor is removed before alignment. Trimmer C2 is removed by removing the C2 alignment screw and cutting off the C2 capacitor plate as shown in the accompanying illustration.

Removal of the trimmer necessitates changes in the alignment for sets using the "cemented" loop. Refer to the alignment instructions on *page* 15-22. Steps 1 and 2: connect the high side of the test oscillator to the connection lug of C1 located on rear of gang in series with 0.01-μf capacitor. Step 3: test oscillator tuned to 1500 kc; the gang capacitor is rocked instead of being set to 1600 kc. Step 4: omitted. Step 5: the gang capacitor is rocked instead of being set to 600 kc. All other instructions are the same with the foregoing exceptions.

If there is distortion and low volume in the RCA 54B series, check the coupling capacitor C19 (0.002 μf) for leakage. This capacitor couples the audio signal from the 1S5 tube to the 3S4 output tube. This capacitor has only a 150-volt rating and it should be replaced with one that has a 200-volt rating.



Before aligning the RCA model 54B with a "cemented" loop, C2 is removed, as indicated.

The following is a list of changes for the parts lists for these models:

1. Delete Stock No. 70454—Capacitor-Tubular, 0.002 μf, 150 volts (C14, C19)
2. Add Stock No. 72315—Capacitor-Tubular 0.002 μf, 200 volts (C14, C19).
3. Delete Stock No. 70453—Capacitor-Tubular, 0.02 μf, 100 volts (C10, C15).
4. Add Stock No. 71928—Capacitor-Tubular, 0.02 μf, 200 volts (C10, C15).

NOTE: C15 (Stock No. 71928) should be located adjacent to the output transformer instead of under the socket subpanel, since its physical size is slightly larger than C15 (Stock No. 70453).

●

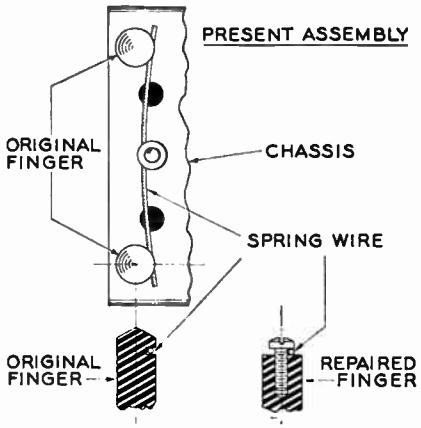
Hallicrafters SP-44 AND SX-42

These models appear on *pages* 17-1 *to* 17-5 *and* 17-6 *to* 17-16 *respectively of Rider's Volume XVII*. When the SX-42 is used with the SP-44 Panadaptor on the low-frequency band, it appears to motor boat. To correct this condition, do the following.

The connecting cable between the SP-44 and the SX-42 is shielded and the shield is connected to the SX-42 ground. Disconnect the shield from the SX-42 ground and place a 50-μμf capacitor between the shield and the SX-42 chassis. Be sure that the SX-42 chassis is well grounded. A shielded antenna lead, or a balanced antenna, on the SX-42 may also help.

The following modifications should be made on the SP-44 unit. A strip of bonding braid, ⅜ inch wide, may be connected to the No. 1 grounded pin of the 6AC7 tube, going around the choke coil and connecting to the right side of the chassis. The braid should be insulated with a piece of spaghetti and should lie parallel to the front panel. Two pieces of braid ¼ inch wide, or a copper strap may also be used.

A piece of copper or steel sheet about 2½ inches wide may be screwed or soldered across the bottom so that it is attached to both edges of the chassis. This plate should be centered over the bottom of the 6AC7 tube.



A machine screw can be substituted for the broken head of the finger which catches the spring wire holding chassis of Setchell Carlson 427 in cabinet.

Setchell Carlson 427

This model appears on *page* 16-1 *of Rider's Volume XVI*. If the line voltage is extremely low, the 50L6 tube should be replaced with a 35L6 tube. The chassis is held in the cabinet by means of a spring wire caught in slots which are near the top of a finger built into the cabinet. If the head of this finger breaks off, repair can be made by drilling and tapping for an 8/32 machine screw. The accompanying illustration shows this method.

●

Sears-Roebuck 6200A, Chassis 101.800-1; 6203, Chassis 101.800-A

These models are the same as Model 6200, chassis 101.800, shown on *pages* 15-13 *and* 15-2 *of Rider's Volume XV*, except for the following changes. A phono socket has been added to Model 6200A. An ivory cabinet, instead of a brown one, is used on Model 6203.

Part Number	Description
R61010	Cabinet, Ivory (101.800-A)
R44897	Socket, phono (101.800-1)

●

Sears-Roebuck 7025, Chassis 132.807-2

This model is the same as that shown on *page* 13-63 *of Rider's Volume XVIII*, with the following exceptions. The electromagnetic speaker (Part No. N17258) has been replaced by a permanent magnet speaker (Part No. N16993.) The oscillator coil (Part No. 17233) has been rotated 180 degrees and the mounting lug soldered to the back of the chassis to provide a better mounting. This change does not involve any circuit changes.

Goodrich R655-W

This model, appearing on *pages* 15-7 *and* 15-8 *of Rider's Volume XV*, uses the International Detrola Model 550 Record Changer. The Model 550 may be found on Int. Det. RCD.CH. *pages* 15-1 *to* 15-10 *of Rider's Volume XV*.

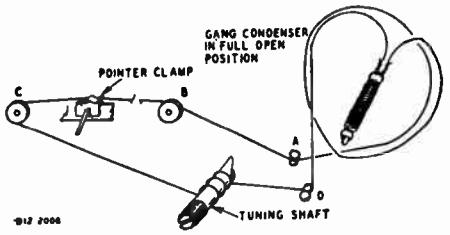
●

Montgomery Ward 64WG-1804B, 74WG-1804B

These two models are similar to Model 64WG-1804A shown on *pages* 15-88 *to* 15-90 *of Rider's Volume XV*, except for the following changes.

The frequency range has been slightly contracted to 540-1600 kc. A 47-ohm dropping resistor (R-20) has been inserted between B+ and the junction of the primary winding of the first i-f transformer (T-3), the screen grids of the 12SA7 mixer, the screen-grid of the 12SK7 r-f amplifier, and resistor R-1. A 0.05-μf bypass capacitor is connected from this junction to the point marked "X" in the filament line of the schematic shown on *page* 15-88 *of Rider's Volume XV*.

The drive cord length has been increased for these models and the following drive cord replacement instruc-



Winding for the new longer drive cord for Models 64WG-1804B and 74WG-1804B.

tions should be observed. Turn the gang capacitor to the fully open position. Use a new drive cord 42 inches long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley rim and continue around pulley ½ turn counterclockwise. Pass cord around stud D and wind three turns clockwise (from front of chassis) around the turning shaft. Turns must progress away from chassis. Pass cord around pulleys C and B and stud A. Pass cord under drive pulley and wind 1½ turns counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess string. Attach the dial pointer to the cord and position as instructed on *page* 15-89 *of Rider's Volume XV*.

The components used in the Models 64WG-1804B and 74WG-1804B are the same as those enumerated on *page* 15-90 *of Rider's Volume XV*, except for the following.

Ref. No.	*Part No.*	*Description*
C-1	D67102	0.001μf, 400 v. tubular
C-14	B67403	0.04μf, 200 v. tubular
C-15	B67602	0.006μf, 200 v. tubular
C 19	B67253	0.025μf, 200 v. tubular
C-22	B67204	0.2μf, 200 v. tubular
C-24	17A123	1.5—12$\mu\mu$f, trimmer
C-28	B67503	0.05μf, 200 v. tubular
R-14	B84274	270,000Ω, 0.5 watt, carbon L L
R-20	B85471	470Ω, 0.5 watt, carbon
	20X329	Capacitor cushion stud in gang capacitor mounting
	28X95	Drive cord tension spring

●

Truetone D-696

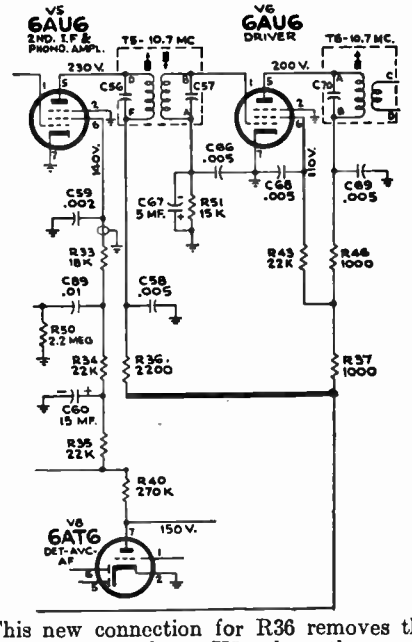
This model is the same as Model D-727, which appears as Model 175 on *Detrola page* 9-1 *of Rider's Volume IX*.

●

RCA 612V1, 612V3, 612V4, Chassis RK-121

These models, appearing on *pages* 17-31 *to* 17-43 *of Rider's Volume XVII*, have been changed as follows. R36 is no longer connected to the junction of R35-R40-R22-R25. It is now connected to R37 and terminal #11 of S5. This change removes the plate voltage from V5 (6AU6) when the range switch is in the "Phono" position, and is illustrated here.

If the shielded lead of the power cable touches the speaker frame, noise will be caused. The power cable should be clamped in such a position to prevent contact with the speaker frame.



This new connection for R36 removes the plate voltage from V5 when the range switch is in the "Phono" position.

Television Change

Garod 3915 TVFMP

This model is the same as Model 3912 TVFMP on *TV pages* 1-1 *to* 1-6 *of Rider's Television Volume* 1, except for the following changes.

A 100-μf 25-volt tubular capacitor has been connected across the cathode resistor (F31) of the fourth picture i-f stage. Items marked R-78, R-79, R-80, R-83 and C-70 and C-71 are matched pairs±1%. Replace as matched pairs only. Should parasitic oscillation occur when replacing the 6B6G tube (V20), a 100-ohm ¼-watt resistor should be connected in series with pin 5. The second series of tuners are supplied with two wave traps connected between antenna and ground.

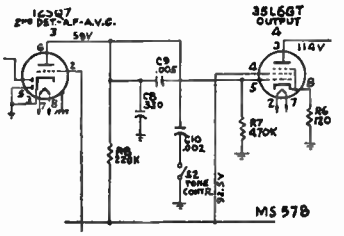
The Model 11FMT radio receiver used in conjunction with the Model 3912 TVFMP has been changed to the Model 9FMT. Full information on this receiver will be included in Rider's Television Manual, Volume 2,

The video alignment has been changed as follows. The bottom peak of T1, T3, and T5 has been changed to 22.0 mc.

• • •

RCA 66X11, 66X12, 66X13, Chassis RC-1046C, RC-1046D, RC-1046E

These models are the same as Model 66X11, chassis RC-1046A, on *pages* 17-29 *and* 17-30 *of Rider's Volume XVII*, except for the following change. The capacitor C10 (tone-control circuit) which was connected



Capacitor C10 is here connected to the plate of the 12SQ7 a-f amplifier tube.

to the grid of the 35L6GT output tube, is now connected to the plate of the 12SQ7 a-f amplifier tube, as shown.

●

International Detrola 2744

This model is the same as Model 274 appearing on *page* 10-9 *of Rider's Volume X*.

TV Receiving Antennas

Continued from page 1

transmitter, the antenna should be as high as possible in order to avoid local obstructions, but its height is not of paramount importance as it is when the antenna is beyond the range, as *B* or *D* in Fig. 1. In this case, the height above ground of both antennas must be taken into consideration and the following formula is used.

$$H, \text{ height of receiving antenna} = \left(\frac{Distance}{1.23} - \sqrt{h}\right)^2$$

Assume that you wish to know how far above the ground a receiving antenna should be installed at a location, say 50 miles from the transmitter with an antenna height of 1000 feet, as in the above example. Substitute 50 for the distance and 1000 for *h* in the above equation. Thus we have

$$H = \left(\frac{50}{1.23} - \sqrt{1000}\right)^2 = (40.6 - 31.6)^2$$

$$H = (9)^2 = 81 \text{ feet}$$

You will find that this height *H* increases quite rapidly with an increase in the line-of-sight distance; for example, at 55 miles, a receiving antenna would have to be 171 feet above ground with a 1000-foot transmitting antenna, and at 60 miles, *H* would be 294 feet above ground.

It should be clear from the foregoing that if you perform similar calculations, you should know accurately the line-of-sight distance of the location where the receiving antenna is to be installed, because just a few miles means such a great difference in the height.

Multiple Receiver Connections

It may happen that you will want to have more than one television receiver connected to a single antenna; this might easily occur if the installation is to be in an apartment house, a store, a dealer's display room, etc. This can be done if the relative signal strength of the signals is sufficient in the locality. It is necessary to know this, because the number of sets which can be connected to one antenna is limited by the signal strength available, the maximum being four for two television receivers, the available signal voltage is cut 2 to 1; for three sets, it is cut 3 to 1, and for four sets, 4 to 1.

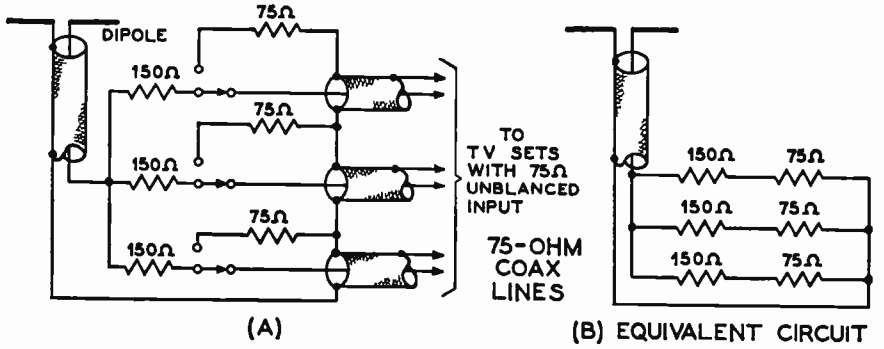


Fig. 3. Connections for two, three, or four television sets with 75-ohm unbalanced inputs to a dipole. Note that the value of the series resistors changes with the number of sets used.

Two methods of connections are shown in Figs. 2 and 3, the former being that employed with receivers with a balanced input and the latter with unbalanced-input sets. It goes without saying that in order for the signal to be a maximum at the receiver input, the impedance match between the antenna, the lead, and the input should be as nearly perfect as possible. In Fig. 2(A), a folded dipole is indicated (this has a 300-ohm impedence) and it is connected to the resistors and switches by a twin lead with the same impedance. In Fig. 3(A) a half-wave dipole is indicated, this having an impedance of 75 ohms and a coaxial line of the same impedance being employed.

You will note that in Fig. 2 there are two double pole-double throw switches connected in parallel through series resistors to the twin-lead line from the antenna. The number of receivers connected to the antenna determine the value of these series resistors: for two receivers, the value is 150 ohms; for three receivers, 300 ohms; and for four receivers, 450 ohms. It is important to use carbon and not wire-wound resistors, as the latter may unbalance the system. Of course, the dummy load in each case remains 300 ohms, thus matching the input of the set and providing a balance in the event the set is removed from the system.

With receivers having an unbalanced input of 75 ohms, single pole-double throw switches are used with series resistors connected to the center lead of the coaxial line from the antenna. Here again the value of these series resistors changes with the number of sets connected in the system. In the case of two sets in the system, the value of each series resistor is 75 ohms; if three sets are used, the value becomes 150 ohms; and when four receivers are used, the value becomes 225 ohms. Carbon resistors must be used here also. In the event that a set is disconnected, then the switch in that circuit is thrown to the dummy load.

The equivalent circuits of each of these methods of connection are shown in Figs. 2 and 3 (B). In the former, the two 150-ohm resistors in series with the 300 ohms of either the set input or the dummy load, give two parallel circuits of 600 ohms each.

Please turn to page 6

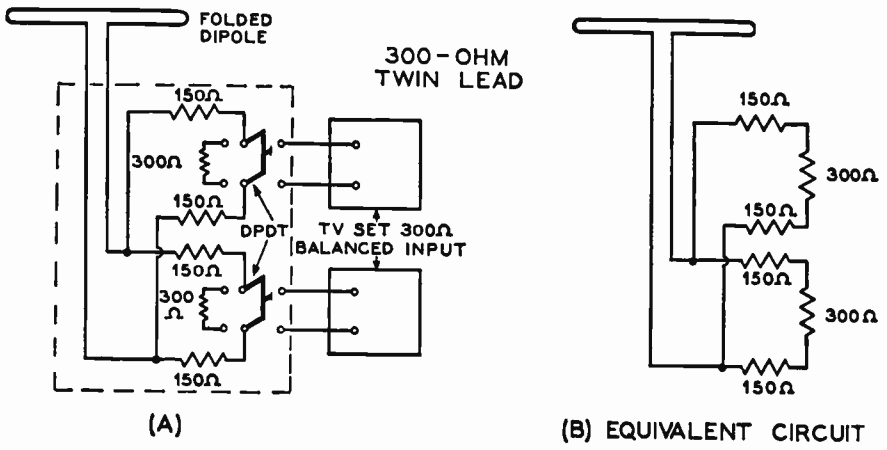


Fig. 2. Connections for two, three, or four television receivers with 300-ohm balanced inputs to a folded dipole. The value of the series resistors must be changed with the number of sets, as explained in the text.

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TELEVISION SERVICE PROBLEMS

NOW that almost two years of post-war television are behind us, it is possible to review some of the service problems. No one is surprised that they are numerous—entirely too many of varied sorts to permit editorial coverage during one issue. So we will comment on just one portion of the complete picture. One hears a great deal about alignment and the sweep generator necessary for such operation. Strangely enough, alignment is not the major television service problem. Of course the alignment of the r-f and video and sound i-f systems is a paramount detail during manufacture, but if service records are analyzed, this alignment is not found to be a commonplace fault. The far more frequent complaint is the garden variety failure of components—especially resistors; the type of trouble which has been experienced for more than a generation with the conventional home receiver.

Just why this is so is not important at the moment. Let us simply say that the stable alignment is due to the know-how on the part of the manufacturers. Of much greater importance, there is a lesson to be learned from the analysis of service records. Personnel of the repair industry who are looking forward to operations on television receivers, should realize that whatever the fault is, it is not always misalignment. Moreover, if this alignment is checked and found satisfactory, very little improvement in picture or sound detail will be accomplished by a "touch up" of the alignment controls. It might be well to establish a cardinal rule relative to alignment:—check it—if it is all right, leave it alone!

In line with this thinking, we suggest that the press tone down the importance of alignment and place more emphasis on the service troubles which are born daily in television receivers—defects associated with electrical focusing, creeping oscillator capacitors, non-linearities in vertical and horizontal sweep, Barkenhausen oscillation, and finally, that very troublesome antenna. Twenty years of disregard of the antenna must be overcome in the mind of the servicing industry. The orthodox outdoor dipole is simple in appearance and erection— but its location and orientation to serve the television set owner properly, is much more complex. A thorough understanding of not only the orthodox outdoor unit, but the unorthodox indoor system is vital. As to alignment — it is important, very much so, in its place, but it can prove very troublesome if performed when not required.

JOHN F. RIDER

TV Receiving Antennas

Continued from page 4

Hence, the impedence of the combination is 300 ohms, providing the proper match for the twin-lead line. In the event that three sets are connected to the same folded dipole, the 150-ohm series resistors are changed to 300 ohms each, making each parallel branch circuit 900 ohms. The total resistance of three 900-ohm circuits in parallel is again 300 ohms, providing the required impedance match for the line.

The same reasoning can be applied to Fig. 3(B). Here but one resistor is needed in series with the 75-ohm unbalanced input of the receiver to provide the impedance match. The total resistance of each series circuit is 225 ohms and the total resistance of the three parallel circuits is 75 ohms. If four 75-ohm receivers are to be connected to the one dipole, the series resistances are changed from 150 to 225 ohms, the total resistance of each series circuit being 300 ohms. Therefore, the total resistance of four 300-ohm parallel circuits would again be 75 ohms, giving the correct match.

Another Bouquet for "FM Transmission and Reception"

In the "Val-Tech News" published by the Valparaiso Technical Institute, Dr. J. B. Hershman has this to say about Rider and Uslan's "FM Transmission and Reception":

"The best book that we have seen to date for the beginner. Four hundred pages of text material with six pages of bibliography on the subject; all references to periodical literature with the exception of three books . . . The text is well illustrated with graphs, diagrams and circuit drawings . . . This book is especially recommended as an introductory text on FM. If studied carefully and methodically, we believe it will give excellent basic background for further advanced study."

And "Radio News" has the following to say about this book: "This book has been divided into two main sections dealing with FM transmission and FM reception. The authors have provided a detailed explanation of the equipment and techniques used in transmitting FM program material including transmitting antennas.

"While this material provides an excellent background for the all-around technician, servicemen will undoubtedly find the section dealing with FM receiving equipment of more immediate value. Receiving antennas are covered in some detail in a separate chapter . . .

"Servicemen will welcome the chapters dealing with the alignment and servicing of FM receivers. Procedures are carefully outlined and complete details for performing the various operations are given. An appendix covering vectors, powers of ten, FM ground wave signal range, i-f response curves, and a reactance tube chart provide a handy reference for the serviceman.

Every serviceman in America — everyone interested in radio — should have this book. Order from your jobber or directly from us.

●

Regal Electronics 208

This model is the same as models 800 and 801 shown on *page* 16-1 *of Rider's Volume XVI.*

●

Motorola 402

This model is the same as the Motorola shown on *pages* 12-62 *and* 12-65 *of Rider's Volume XII.*

Rolling REPORTER

500 Watter

Gotta news release from RCA today tellin' about their new 500-watt TV xmitter. Jobs of that size mean that cities of around 50,000 pop. can have a TV station which can act as a network outlet or can put on their own programs. We're tellin' you this now so you can get set for what's on the way; for come the fall when these transmitters will be ready, *places that aren't on the TV map now, will be then* . . . An' do we need to tell you where you can get yourself the kinda TV dope yer gonna find useful? No? Well, we will enyhoo—grab a **Rider's "Television—How It Works"** and learn how to tie up theory and practice . . .

Shows

The **1948 Radio Parts and Electronic Equipment Show** at Chicago, May 10-13th was a record-breaker. The Boss and the two Bills—Hynes and Marcus—said the crowds were *terrific* and did those crowds like the **Rider Television Manual Vol. 1** that we had in our booth!! Youse guys who live out where west is really near the Pacific had better plan on attending the *Pacific Electronics Exhibit that's to be held Sept. 30-Oct. 2 at the Biltmore Hotel in Los Angeles.* We will be represented there too . . . More on this later . . .

Election Year

Do we need to remind you that from now on until after the first Tuesday after the first Monday in next November there's gonna be a whale of a lot of gum-beatin' in front of mikes that practically every guy and gal who admits he or she is 21+, will wanna pick up on their blooper. They'll be palpitatin' to know what their favorite candidate has to say about the other guy. And if there's TV in your home-town, boy-ah-boy, will those receivers work overtime! All this adds up to: contact your customers and give 'em the old sales talk on how you can give 'em service *but fast* if their set goes bye-bye so as they won't miss a single syllable of any speech . . . Or they won't miss a single grin or twitch of an eyebrow if they're on the receivin' end of a telecast. And, of course, you lads with a p-a job—*well, what more do you want?*

Rider Lab Moves

The present space here at 404 that the Rider Lab occupies is too cramped for the present activities and as there's an enlargement of those above-mentioned workin's in the offing, the Boss decided to get more men and *more* equipment and **more space to put 'em in.** Soooooo—the Lab's gonna move downtown to **480 Canal Street,** where there's about 11,000 sq. ft for the boys to spread out their scopes and oscillators and amplifiers and about 25 grand worth of new equipment.

Rose in Chicago

Joe Rose, who for about 13 years was service mgr. of Wells Gardner, has been appointed head of our Chicago office. He's gonna do some liaisoning betwixt the mfrers and us that'll mean *better-than-ever service to you* . . . Joe can be reached at 6240 North Francisco Ave., Chicago 45.

Summer???

According to the calendar, the hand on our thermometer at the back door should be hovering very much clockwise, but it ain't, *for the which we're thankful* . . . Mebbe it's on accounta that thermo was a Xmas present and it just ain't got the idea yet that it's summer. Enyhoo, the iris has busted out, the zinnias need thinnin', but you should oughter see our *real* garden up Conn. way . . . Didja ever hear tell of Egyptian onions? We never did either, but last Sun, when we was paintin' a pic of a gorgeous- plus 18th century house and garden, our hostess gave us an armful of them lilies to plant—they's about 3 ft long *and edible* . . . Gosh, that garden was a pip—over 150 different kindsa herbs—and *wot flowers ! !* Our garden is a' comin', but **the Battle of the Weeds vs Us** is terrific . . . Soooooo, if you're passin' through Noo Lunnon and see a *weary,* sore-handed guy yankin' out wot he *hopes* are just weeds, have a heart, willya, and stop and give a helpin' hand to

The Rolling Reporter

●

The Cover

On page 1 is shown the radar antenna installation on a tanker, the *S.S. Atlantic Mariner,* which recently established a record for the run between Corpus Christi, Texas, and Philadelphia. The maintenance of the 16-knot average speed was attributed to the fact that the surface-search radar equipment provided five-mile "visibility" during foggy weather encountered off Delaware Bay. This Raytheon equipment is of the 10-cm type and the 12-foot antenna reflector shown provides the definition usually obtained with the 3-cm system while retaining the all-weather dependability of 10-cm systems.

●

Magnavox FM Chassis

We have been requested by The Magnavox Company to state that all of their models as sold have the chassis pan already installed to accomodate their f-m chassis CR-189, 2 band, or CR-192, 1 band. The only exceptions to this are the 138 series Duette and the 132 series chairside.

●

Setchell Carlson 416

This model appears on *Misc. page 15-19 of Rider's Volume XV.* The i-f transformers were coated with a low melting point wax (yellow wax). If this wax runs, the trimmers will not stay adjusted. The only remedy is to replace the transformer.

●

Montgomery Ward 64WG-2500A

This model is similar to the 54WG-2500A, shown on *pages* 15-1 *and* 15-31 *to* 15-35 *of Rider's Volume XV,* except for the speaker replacement data in the Replacement Parts List.

Speaker replacement data for Model 64WG-2500A is given below:

Part No.	*Description*
12A398	8" Electrodynamic Speaker
or	
12A401	8" Electrodynamic Speaker

Either speaker may be used, as they are electrically identical.

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MARCH, APRIL, MAY, 1948

LOCAL TELEVISION LECTURES

By JOHN F. RIDER

ARE you planning television lectures in anticipation of the arrival of television in your area? If so, our "Television—How it Works" book, described elsewhere in this issue, is ideal as lecture material because, as you can see by examining the table of contents, it combines the theoretical with the practical—it presents theory exactly as it has been used in the receivers on the market. Furthermore, all of this material is immediately available.

We are formulating plans for a lecture series on television, frequency modulation, and public-address systems that will be of interest to servicemen throughout the nation. While we are planning for all, it is best to start such a venture in conjunction with association activity; therefore, we are greatly interested in hearing from the secretaries of servicemen's associations whose members are desirous of obtaining such information through a program like this. As mentioned above, we are planning these lectures for all; so if you are not affiliated with any association activity, write us yourself. Please drop us a post card indicating whether you are or are not interested in such a program, stating your preference of subject matter and your address. Of primary importance is your willingness to devote the necessary time per month—perhaps two evenings—to attend these lectures. It will cost you no money to participate in this activity.

Local jobber—local servicemen and local school cooperation afford a perfect setup for the dissemination of technical information to those radio servicemen of this nation who are so located that they cannot attend the regular television school classes.

With television the hottest thing on the grill—now is the time for men in those areas where television is as yet unavailable to get acquainted with the subject. Cooperate with us and we will get the information to you. The first step is to mail us a card—the sooner we get your reaction, the sooner will the series of lectures and demonstrations start.

SUCCESSFUL SERVICING ON REGULAR SCHEDULE

Beginning with this issue Successful Servicing will go on a regular monthly schedule just as we were years ago. . . . Each month you will receive information about the changes made in receiver equipment—radio and television, and public address equipment, thus keeping your Rider Manuals up to date. . . . Also other technical information and various facts pertaining to our publications. . . . So in addition to the Rider Manuals—the individual diagram service—we now add another step in the "Continuous Service to the Radio Servicing Industry."

John F. Rider Publisher, Inc.

Montgomery Ward 64WG-1807B, 74WG-1807B

These models are the same as model 64WG-1807A, shown on *pages 15-91 to 15-94 in Rider's Volume XV*, except for the following changes. A 0.2-μf bypass capacitor (C-35) has been connected between ground and the screen grid of the 6V6GT output tube, resistor R-14, resistor R-12, the red lead of the second i-f transformer (T-3), resistor R-5, resistor R-4, the red lead of the first i-f transformer (T-2), and resistor R-2. The 0.004-μf capacitor (C-31) is now connected from the plate lead of the 6V6GT output tube to the cathode of this tube. No counterpoise foil antenna is used.

●

Firestone 7423-5

This model is the same as model S7402-5 shown on *page 13-38 of Rider's Volume XIII.*

Automatic 650

This model is similar to the 650 shown on *pages 15-4 and 15-7 of Rider's Volume XV* except for the following change: The 20,000 resistor in the oscillator grid circuit of the 12SA7GT now is connected directly to ground instead of to the cathode of that tube.

●

Truetone D1118B

This model is similar to the D1118A model, shown on *pages 13-68 and 13-69 of Rider's Volume XIII* except for the following changes: The antenna trimmer (C2), part number 17A1116, mounted on the loop aerial assembly in the issue A model has been removed. The 1400-kc adjustment as given in the alignment procedure is omitted. The 1400-kc adjustment is made at the factory and need not be made in the field.

Remler Model 5100

This model appears on *Misc. page 16-9 in Rider's Volume XVI.* The external resistor connected from the suppressor grid (pin 3) to the cathode (pin 5) of the 6SK7 i-f amplifier has been changed from 100 ohms to 220 ohms. The 1-meg resistor connected from the plate (pin 3) of the 6V6GT audio amplifier to the junction of the 0.01-μf coupling capacitor and the 220,000-ohm plate load resistor of the 6SQ7 detector, has been removed. A 0.05-μf filter capacitor has been connected from each side of the a-c power line to ground.

●

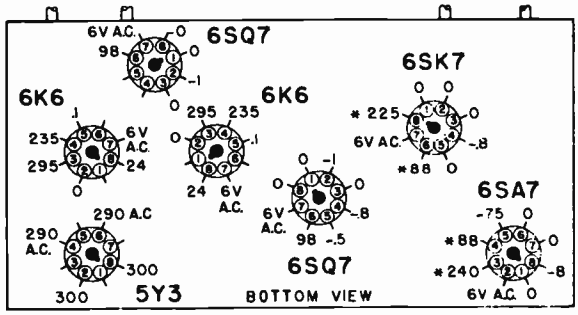
Sears-Roebuck 4518, Chassis 101.393

This model is the same as model 4500, chassis 101.393 shown on *page 8-15 of Riders Volume VIII.*

Admiral 7C65

The voltage data and parts list of model 7C65, chassis 7E1 were omitted from *page 17-3 of Rider's Volume XVII* and are here reproduced for inclusion in that Manual. The record changer for this receiver is the Admiral model RC170 or RC170A, the data for which will be found on *RCD.CH. page 16-1 of Rider's Volume XVI.*

VOLTAGE DATA — "Radiophone" switch in "Radio" position. Readings made between point indicated and chassis. Measured on 117-volt a-c line. Dial turned to low-frequency end, no signal. Voltages measured with a vacuum-tube voltmeter. If voltage readings are taken with "Radio-Phono" switch in "Phono" position, readings will be zero or practically zero.



RESISTORS

Symbol		Part No.
R1	22,000 Ohms, ½ Watt	60B 8-223
R2	15,000 Ohms, 2 Watt	60B 20-153
R3	47,000 Ohms, ½ Watt	60B 8-473
R4	4.7 Megohms, ½ Watt	60B 8-475
R5	270,000 Ohms, ½ Watt	60B 8-274
R6	270,000 Ohms, ½ Watt	60B 8-274
R7	1 Megohm, ½ Watt	60B 8-105
R8	220,000 Ohms, ½ Watt	60B 8-224
R9	4.7 Megohms, ½ Watt	60B 8-475
R10	270,000 Ohms, ½ Watt	60B 8-274
R11	270,000 Ohms, ½ Watt	60B 8-274
R12	680 Ohms, 2 Watt	60B 20-681
R13	2 Megohms, Tone Control	75B 1-8
R14	27,000 Ohms, ½ Watt	60B 8-273
R15	1 Megohm, Volume Control and Switch (SW2) Tapped at 500,000 Ohms	75B 2-2
R16	270,000 Ohms, ½ Watt	60B 8-274
R17	100,000 Ohms, ½ Watt	60B 8-104
R18	1,800 Ohms, 2 Watt	60B 20-182
R19	50 Ohms, 5 Watt	61A 1-6
R20	120,000 Ohms, ½ Watt	60B 8-124
R21	1,000 Ohms, ½ Watt	60B 8-102

CONDENSERS

Symbol		Part No.
C1	50 mmfd., Ceramic	65B 6-4
C2	20 mmfd., Ceramic (used only in early production)	65B 6-26
C3	.1 mfd., 400 Volts, Paper	64B 1-20
C4	.05 mfd., 400 Volts, Paper	64B 1-22
C5	100 mmfd., Ceramic	65B 6-3
C6	250 mmfd., Ceramic	65B 6-5
C7	.02 mfd., 400 Volts, Paper	64B 1-24
C8	.1 mfd., 200 Volts, Paper	64B 1-30
C9	.002 mfd., 600 Volts, Paper	64B 1-14
C10	.002 mfd., 600 Volts, Paper	64B 1-14
C11	.02 mfd., 400 Volts, Paper	64B 1-24
C12	.02 mfd., 400 Volts, Paper	64B 1-24
C13	.001 mfd., 600 Volts, Paper	64B 1-15
C14	.25 mfd., 200 Volts, Paper	64B 1-28
C15	.02 mfd., 400 Volts, Paper	64B 1-24
C16a	30 mfd., 350 Volts, Elect.	57C 6-22
C16b	30 mfd., 350 Volts, Elect.	
C17a	0-420 mmfd. (RF section)	
C17b	0-162 mmfd. (Osc. section) Gang and drum assembly A1550† (used in later production)	
C18	.002 mfd., 600 Volts, Paper	64B 1-14
C19	10 mmfd., Ceramic (used only in early production)	65B 6-24

CONDENSERS

Symbol		Part No.
C20a	4-70 mmfd. Dual Trimmer (used with A1550 gang in later production	66A 1-10†
C20b	4-70 mmfd.	
C21	500 mmfd., Ceramic	65B 6-6

† If early type tuning gang (with trimmers attached) must be replaced, use gang assembly A1550 and separate trimmer 66A1-10, and remove C2 and C19 from circuit.

COILS AND TRANSFORMERS

L1	Loop Antenna (11')	95A 18-2
L2	Coil, Loop Loading	69A 26-1
L3	Coil, Oscillator	69A 14
T1	Transformer, 1st IF (Slug tuned)	72B 46
T2	Transformer, 2nd IF (Slug tuned)	72B 47

T1 & T2 were trimmer-tuned in early production.

T3	Transformer, Power	80B 1
T4	Transformer, Output	98A 34-10

DIAL AND TUNING DRIVE PARTS

"C" Washer (used with tuning shaft)	4A 4-1
Crystal, Dial (for 7C65W & 7C65M)	24B 7
Crystal, Dial (for 7C65B cabinet)	24B 7-1
Cord, Dial Drive (30½")	50A 1-3
Dial Drum and Hub Assembly	A1380
Dial Scale Assembly	A1530
Pointer, Dial	A1303
Shaft, Pointer	28A 16
Shaft, Tuning	28A 10-1
Snap Button, Dial Crystal Fastening (used on 7C65B cabinet only)	13A 1-3-21
Socket, Pilot Light, with leads	82A 8-3
Spring, Dial Cable Tension	19B 1-5
Spring, Hairpin (for pointer shaft)	19A 2-4
Spring, on Tuning Shaft	19A 18
Spring Washer (for pointer shaft)	4A 6-9-0
Spring Washer (for tuning shaft)	4A 6-5-0

MISCELLANEOUS

SW1	Switch, Radio-Phono	77A 16-2
SW2	Switch, AC power	Part of R15
SW3	Switch and Lever, part of record changer assembly)	G400A 162
M1	Socket, Speaker	87A 6-1
M2	Speaker, includes M3 and T4	78B 29
M3	Plug, Speaker	88A 4-4

MISCELLANEOUS

Description	Part No.
Grommet, Condenser Gang Mounting	12A 1-2
Socket, Octal Tube	87A 5-1

PHONOGRAPH PARTS

Note: See record changer manual for complete parts list.

M4	Socket and Leads	89A 6-6
M5	Socket, Phono Pickup	88A 5-8
M6	Pickup Cable & Plug	A1415
M7	Cartridge & Needle, Pickup	A1372
M8	Motor	407B 3-2
M9	Plug, Motor (Male)	88A 8-1
	Centerpost	G400B 137-1
	Drive Disc (under Turntable)	G400A 179
	Eye Bolt (for Tilt-Out Spring)	1A 87-1
	Idler Wheel (407B3 Motor)	G400A 23
	Idler Wheel (407B1 Motor)	G400A 57
	Nut, Wing (for fastening record changer during shipment)	2A 5-9-2
	Strip, Sponge Rubber (1/16x¼x1")	12A 5-5
	Tilt-Out Hinge Assembly (Pickup Arm Side)	AC118-2
	Tilt-Out Hinge Assembly (Record Support Side)	AC118-1
	Tilt-Out Spring (2¼" long)	19A 15-1
	Tilt-Out Tie Bar	15B 126
	Tilt-Out Tie Rod	28A 22

CABINET PARTS

*Cabinet	Walnut (7C65W)	35E 67-1
	Mahogany (7C65M)	35E 67-2
	Blond (7C65B)	35E 67-3
	Door Catch and Strike Plate	98A 34-9
*Door, Radio and Phono Tilt-Out	pair for 7C65W	98A 34-1
	pair for 7C65M	98A 34-2
	pair for 7C65B	98A 34-3
Door Handle, Radio or Phono Comp.	for 7C65W, 7C65M	98A 34-4
	for 7C65B	98A 34-5
	Grille Cloth	98A 34-8
Hinge, Radio Door	pair for 7C65W, 7C65M	98A 34-6
	pair for 7C65B	98A 34-7
	Knob	33A 13-3
	Washer, Felt (used under tuning knobs)	5A 4-4

* Supplied only if old part cannot be repaired. When ordering, describe condition of old part in detail.

FM Specialties Model Fidelotuner

This model is shown on *pages 17-1 to 17-4 of Rider's Volume XVII.* Three terminals are shown in Fig. 5, page 17-4; the first labelled 3, and the third terminal (not labelled in this figure) should be labelled 4. The ground from the phonograph connection to the receiver should be made to this third terminal (terminal 4).

●

RCA Record Changer Model 960015

This model is shown on *RCD.CH. Page 15-11 of Rider's Volume XV.* If binding or freezing of turntable bearing occurs, the turntable shaft should be removed and polished with very fine emery cloth or crocus cloth. Clean off any bearing metal or foreign particles from the shaft, including the set-screw burr. Next, bevel the top edge of the top bearing slightly, with a knife or scraper. Clean the shaft and the bearing with carbon tetrachloride, removing oil and grease and being certain to clean out any chips which may have dropped into the bottom bearing. Lubricate all moving surfaces with a light coating of a very light-bodied grease.

If records do not separate properly and it is found necessary to adjust record slide actuating lever, proceed as follows:

1. Rotate separator shelf to 10" position.
2. Remove 10" landing adjustment bolt.
3. Press down on reject button and rotate turntable by hand in the normal direction until a "click" is heard (reject actuating slide latching).
4. Loosen set screws "G" and set record actuating lever ⅜ inch from bracket as indicated in Fig. 2 of service data.
5. Tighten set screws "G" and replace landing adjustment bolt.
6. Make necessary landing adjustment as described in service data.

NOTE: This method just described makes the set screw "G" more accessible and is therefore found more convenient. This method can be substituted for step No. 9 under Preliminary Adjustments.

●

Montgomery Ward 64WG-2500B, 74WG-2500B

These models are similar to the 64WG-2500A, shown on *pages 15-1 and 15-31 to 15-35 of Rider's Volume XV,* except for the following changes: The 64WG-2500B has a 10" electrodynamic speaker in place of an 8" electrodynamic speaker used in the issue A models. The part number and description of the new speaker is as follows:

Part No.	*Description*
12A399	10" Electrodynamic Speaker

Two types of speaker assemblies are used in the 74WG-2500B receiver. These are listed below and are directly interchangeable, both electrically and mechanically.

Part No.	*Description*
12A399	10" Electrodynamic Speaker
or	
12A455	10" Electrodynamic Speaker

●

Crosley Model 66CS(0)

This model is the same as Model 66CS (s) appearing on *pages 16-16 to 16-19 of Rider's Volume XVI,* except for the cabinet and the following changes:

Item	*Part No.*	*Description*
44*	39368-10	Control, Tone
45*	39368-18	Control, Volume
	39369-1	Switch, Power
	39370-1	Shaft, Plug In
	R-139206	Cabinet
	D-137057	Record Changer
	AC-137885	Lid Support, Cabinet
	W-138330	Hinge, Cabinet Lid

* These parts replace the original equipment parts.

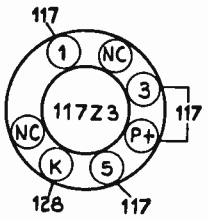
The record changer (Part No. D-137057) is Oak Model 6666 shown on *RCD.CH. pages 15-1 to 15-7 of Rider's Volume XV.*

●

Sentinel Model 286P

In this model (*pages 16-14 to 16-16 of Rider's Volume XVI*) all factory wiring connections were made to the 117Z3 tube socket at pin number 1. The 117Z3 tube, as originally produced, had an internal connection to pins 1, 3, and 5. Therefore, the foregoing connection was satisfactory, and no jumper was provided.

When a new type 117Z3 is used in the Sentinel model 286P, pins 1, 3, and 5 must be externally connected. Voltages are here shown.



The new production of 117Z3 tubes provides no internal connection between the number 1 pin and the number 3 and 5 pins. Therefore, it is necessary to wire the 1, 3, and 5 socket connections together, so that this receiver will operate when the original 117Z23 tube is replaced with a recent production tube.

RCA QB55, Chassis RC-563A

The following changes pertain to RCA QB55, chassis RC-563A appearing on *pages 15-27 to 15-28 of Rider's Volume XV.* In some chassis the 12-μμf section (C20) of the electrolytic capacitor has been changed to 20-μμf and the 20-μμf section (C22) has been changed to 30-μμf. C12 has been changed to 0.03μf and C18 to 0.003-μf.

●

Admiral Models 7RT41, 7RT42, 7RT43

These models are shown on *pages 16-11 and 16-2 of Rider's Volume XVI.* An error has been found in the part number of the SW2 radio-phono switch in the service information on these models. The part number of this switch should be 77A16-1 instead of 77A16-2.

●

Montgomery Ward 64WG-2700B

This model is similar to the 54WG-2500A, shown on *pages 15-1 and 15-32 to 15-35 of Rider's Volume XV,* except for the following change: This receiver has a 10" electrodynamic speaker in place of the 8" electrodynamic speaker used in the issue A models. The part number and description of the new speaker is as follows:

Part No.	*Description*
12A455	10" Electrodynamic Speaker

●

Sears-Roebuck 7080, Chassis 101.809; 7100, Chassis 101.811

These models, shown on *page 16-4 of Rider's Volume XVI,* use The General Instrument model 205 record changer which is shown on *page RCD.CH.15-5 of Rider's Volume XV.*

●

General Electric A51, A56

These models are the same as model A54 shown on *pages 7-4 to 7-6 of Rider's Volume VII.*

FLASH

The answers to our survey concerning the Rider Public Address Amplifier Service Manual are arriving in such quantities as to permit the statement that the candidate wins by a 5 to 1 plurality. We will shortly announce a 2000-page public-address manual covering the years 1938 to date. Everything will be like the regular Rider Manuals. More information later.

TELEVISION "HOW IT WORKS"

THE interest in television is as "hot" today as radio was back in the very early 1920's when it first came to the attention of the American public. Furthermore, many areas in this nation are now going through the throes of planning for television transmitters—and the radio repairing industry in those areas is vitally concerned with the subject. . . . The men are anxious to know what makes the system tick—what is in the television receivers now being sold in and around many large cities in the Northern part of the country—what the theories are surrounding the operation of these systems which are native to television equipment. . . .

The answer for those interested in present-day television from the combined theoretical and practical viewpoint is **"Television—How It Works"**—a 203-page book, 8½ x 11 inches in size, which is a part of *Rider's Television Manual Volume 1*—but ALSO AVAILABLE SEPARATELY at $2.70. . . . *Your jobber has it—or you can order it directly from us.* . . . So that you will have an idea of what is contained in this text, here is the Table of Contents. . . .

CHAPTER 1. GENERAL ASPECTS OF THE TELEVISION SYSTEM

Comparison with Sound Broadcasting—Scanning—Number of Elements Required—Need for Scanning—THE CAMERA AND PICTURE TUBES—The Picture Tube—The Camera Tube—SCANNING AND SYNCHRONIZATION — The Scanning Pattern—Flicker and Hum on the Raster—Scanning Waveform—Overall View of a Television System—THE TELEVISION SIGNAL—The Video Signal—Signal and Sync Pulses—Standard Television Signal—Horizontal Blanking and Synchronization—Vertical Blanking and Synchronization—Range of Frequencies in Video Signal—The Modulated Wave—Positive and Negative Modulation—RECEIVER CIRCUITS: GENERAL.

CHAPTER 2. FREQUENCY CHARACTERISTICS OF THE TELEVISION SIGNAL

Television Channels—Video Signal Characteristics — Vestigial-Sideband Transmission—Operating Bandwidth Characteristics—The Carrier and Intermediate Frequencies.

CHAPTER 3. TELEVISION RECEIVING ANTENNAS

The Transmitted Television Signal—Horizon Range and Line of Sight—The Television Signal at the Receiver—Voltage and Current Distribution—The (Half-Wave) Dipole Antenna—Antenna Resistances—Resonance and Impedance—Transmission Lines—Impedance Matching—Q of Antenna—The Folded Dipole—Length of the Half-Wave Antenna—Indoor Antennas—Dipole with a Reflector—Direct, Reflected, and Blocked Waves—Ghosts or Multiple Images—Maximum Voltage Input—Noise Reduction—Installation and Orientation of Antennas—Other Types of Antennas.

CHAPTER 4. R-F AMPLIFIER, OSCILLATOR, AND MIXER CIRCUITS

The R-F Amplifier—Input Circuits—Frequency Converters—High-Frequency Oscillators—Belmont Model 21A21—General Electric Model 802-61. RCA Model 621TS—Du Mont Model RA-103—Westinghouse Model H-181.

CHAPTER 5. THE F-M SOUND CHANNEL

THE I-F SYSTEM—The I.F.'s and Image Frequency Interference—I-F Stages—Detection of the F-M Signal—THE LIMITER SYSTEM—Analysis of Limiting Action—AVC from Limiters—Input Voltage Considerations—THE DISCRIMINATOR SYSTEM—Circuit Analysis—Resonance Condition in the Phase Discriminator—Applied Frequency Higher Than Resonance — Applied Frequency Lower Than Resonance—Summary—The Discriminator Output Curve—Pre-emphasis and De-emphasis—Modifications of the Discriminator Network—THE RATIO DETECTOR—Simplified Ratio Detector—Practical Radio Detector—AVC From Ratio Detectors—Ratio Detector Modifications—Slope Detection.

CHAPTER 6. THE VIDEO I-F AND DETECTOR SECTION

The Video I-F System—Bandwidth Requirements—Overcoupled I-F Transformers—Resistance Loading—Typical Overcoupled Circuits Employing Resistance Loading—Stagger-Tuned I-F Transformers—The Need for Sound and Video I-F Traps—Practical I-F Traps—Contrast Control—Automatic Gain Control (agc)—Video I-F Amplifier Tubes—VIDEO DETECTOR—Phasing of the Picture Signal—Detector and Amplifier Action—Detector Loading—Garod Model 3912—TVFMP—Belmont Model 21A21—General Electric Model 802—Consolidated Television Model 2315—Television Assembly Model F1-101—Hallicrafters Model T-54.

CHAPTER 7. VIDEO AMPLIFIERS AND D-C RESTORERS

Requirements of a Video Amplifier—Basic Circuit for Video Amplifier—Low-Frequency Compensation — High-Frequency Compensation — AVERAGE BRIGHTNESS AND D-C RESTORER CIRCUIT—D-C Restorer Circuits—Basic D-C Restorer Circuits—Brightness Control — Grid-Leak Capacitor Restorer — The Contrast Control.

CHAPTER 8. SYNCHRONIZING CIRCUITS

General Requirements—Sync Methods—Instantaneous Locking Versus AFC—Sync Separation — AFC Circuits — Reactance Tube Operation—Sweep AFC Circuit in RCA Model 630TS—Additional Circuit Features.

CHAPTER 9. SWEEP CIRCUITS

Electrostatic Versus Magnetic Sweep — Sweep Oscillators—The Blocking Oscillator — Required Sweep Waveforms — Sweep Circuits—Typical Sweep Circuits for Magnetic Deflection.

CHAPTER 10. THE PICTURE TUBE

Screens—Persistency of Vision—Focusing—Optical Analogy of Focusing—Electrostatic Focusing—Magnetic Focusing—Deflection of the Beam—Electrostatic Deflection—Magnetic Deflection—Combined Methods of Focusing and Deflection—ION SPOT — Ion Trap Methods — PROJECTION TUBES.

CHAPTER 11. POWER SUPPLIES

Low-Voltage Power Supplies—High-Voltage Power Supplies—Typical Circuits.

CHAPTER 12. ALIGNMENT AND SERVICING

ALIGNMENT — Equipment Required — Alignment Procedures—Sound I-F Section—Trap Circuits—Video I-F Section—Local Oscillator—R-F Amplifier and Mixer—TROUBLESHOOTING—Localizing the Trouble — Troubleshooting Chart.

●

The Cover

On page 1 is shown a portion of the audience of 1500 servicemen who attended the illustrated discussion on p-a systems, f.m., and television on May 20th, held by the Associated Radio Servicemen of New York under the sponsorship of John F. Rider, Publisher, in the Grand Ballroom of Manhattan Center. The speakers were M. Plotkin, of RCA Institutes; C. A. Tuthill, sound engineer and author of "Loudspeakers," a forthcoming Rider book; John Meagher, engineer with the Tube Division of RCA; and Seymour D. Uslan, technical editor of the Rider organization and co-author with Rider of "Understanding Vectors and Phase" and "FM Transmission and Reception." Mr. Rider, who led the discussion, was awarded a plaque by the A.R.S.N.Y. with the following inscription, "In grateful appreciation of his meritorious achievement in behalf of the radio service industry—1921-1948."

Successful
SERVICING
REG. U. S. PAT. OFF.
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THE CLOUDS ARE PASSING

THERE was a time in the not too distant past when the status of the servicing industry relative to television was very much in doubt. . . . Many plans and methods of operation were discussed, and none was too favorable to the radio repairman. . . . But as time passed many changes in thinking developed. . . . By far the most numerous of these were favorable to the independent radio serviceman. . . . Today the panorama of television servicing is growing wider and wider, so that it is pretty much of a certainty that television servicing will be an independent activity.

Frankly, the conversion of ideas took place much more rapidly than was anticipated. Originally, it seemed destined to be a long, drawn-out affair—perhaps because no one dreamed that television would take hold as rapidly as it has. . . . In the opinion of this writer the interest in television today is greater than the interest in radio back in the early 1920's. . . . That the part to be played by the inde pendent radio serviceman in television was recognized so rapidly reflects a great deal of credit upon the television receiver manufacturers—the service managers and sales executives—both of whom have a major stake in any servicing program.

Everything is not yet cut and dried, of course. . . . There are still numerous questions which must be answered—availability of test equipment—the development of the most satisfactory techniques—the education of the radio repairing industry along television lines—and many more—all of which will be answered in time. . . . In the meantime the servicing industry is given the opportunity of thinking more clearly without a sword of Damocles hanging over its head. The fact that the receiver manufacturers are releasing data on their television receivers means a great deal to the servicing industry—even if many of its members are not doing television work at the moment. . . . At least the systems being used—the innovations introduced by the design engineers—are becoming known and permit explanations of the theories involved, thus fostering the all-important requirement of familiarity.

JOHN F. RIDER

FM Transmission and Reception

It is with considerable gratification that we are able to quote from an unsolicited letter written to us by M. R. Briggs, who is the Division Engineer of the Westinghouse Industrial Electronics Division, Broadcast Equipment Engineering, "The book ('FM Transmission and Reception') is extremely interesting and certainly contains much information that cannot be found in any other publication. I have recommended it to our Sales Department for use by all of our electronic sales personnel. I am sure that this new publication will find ready acceptance in the Electronics Industry."

And from all parts of the country we have received compliments from readers on the nature of the book's contents and the consensus certainly is that "FM Transmission and Reception" is the kind of a book on frequency modulation that was needed in the industry to clarify and make the subject easily understandable. *Have you got your copy yet?*

Rider Television Manual, Volume 1

BECAUSE of the rapid expansion of television throughout the country's major cities—New York, Chicago, Washington, Philadelphia, Boston, Los Angeles, and many others—many manufacturers are marketing their television receivers and kits at an accelerated pace. It was estimated last year that there were about 17,000 receivers in the United States —at this writing there are approximately 350,000. At the rate sets are coming off the manufacturers' production lines, it has been predicted that by the end of 1948 from 900,000 to 1,000,000 sets will be in use and over 100 more transmitters than the present 23 will be telecasting programs to an estimated audience greater than 50,000,000 in 1950.

All this brings the man who performs installation and maintenance operations on television receivers very definitely into the picture. That in turn brings us into the same picture, for when servicemen require technical data—installation or maintenance —they naturally turn to Rider.

And as usual—*Rider comes through with another first!*

The Rider Television Manual, Volume 1, will contain approximately 1400 pages according to the folios on the pages, but in reality there will be more than 1000 sheets of paper, which, if they were all paged or folioed, would make it a 2000-page book. Here is the reason for this . . .

When we received some of the schematics from the manufacturers, it was found that there were too many tubes, coils, transformers, and all the other components on the huge drawings to reduce even to our double-spread-page size. The reduction necessary would have made the lettering so small that it would have been impossible to read—some of the symbols would have filled in and become illegible. The answer was a larger page size—a page so big that everything printed on it could be easily read. Then the question arose—how big could these pages be made? Then, how could they be put in the binder so that they would be usable and part of them not be hidden when the single pages were turned?

Returning to the question of size, we were guided by the size of the sheet on which are printed 32 regular manual pages; this was 35 by 45 inches. To make a long story short, it was decided to use one half of each of these sheets to make one of the new pages; that is, they would have an over-all size of 35 by 22½ inches.

Please turn to page 6

Television Manual

Continued from page 5

Of course, these pages must be bound in the loose-leaf binder and so space has to be allowed for the holes through which the binder posts go. In order that all parts of the material printed on the large page be visible when single pages are turned, the part of the paper that would be covered is left blank; that is, the left-hand 8½ inches of the page has nothing printed on it—all the material appears on the remaining 26½ inches, which extends beyond the right-hand edges of the single pages. In order to fold this huge sheet down to 8½ by 11 inches, the lower half of the left-hand blank strip has to be cut away after the pages are printed. This is done by die-cutting and as you doubtless know, this is a costly operation. Making allowances for trimming the pages and everything else, we found that the usual double border could be made a maximum size of 451 square inches. And what a difference those extra 318 square inches make compared with the 133 square inches total area of the double spreads!

Thus you see each of these 36 giant-size pages in this first Television Manual is really the equivalent of 16 ordinary pages but to keep the page numbering simple, they bear only a double folio such as has been employed on double-page spreads. For example, a giant page may be folioed "FARNSWORTH TV PAGE 1-15, 16." Furthermore, where it is necessary to place one of these giants in the midst of the ordinary sized pages carrying the data on one model, the same material is repeated on the reverse of the page, so that as you read the pages toward the rear of the manual, past the giant, you can refer to the diagram printed on the back without the bother of turning to its front side.

Needless to say, an over-size binder had to be specially made to accommodate all these pages, so that when they were inserted in their places in the Manual along with the double spreads, the front cover of the binder would be horizontal. This necessitated a departure from our regular procedure of using the same size binder for as many manuals as possible in order to keep the binder cost to a minimum.

But notwithstanding all this added manufacturing expense, the price of Rider Television Manual, Volume 1, will be as announced—$15.

Now a word about the servicing material of the 34 manufacturers' receivers covered in the Rider Television Manual. You will find everything which the manufacturers gave us, and in a number of instances we contacted the makers of the sets when we felt that additional data should be furnished for you. This information was added when we were able to procure it. You will find circuit descriptions, adjustments of various trimmers, traps, transformers, etc., voltage and resistance readings, complete alignment instructions, parts lists—in fact, everything possible to make your servicing job easier.

To make it as easy as possible for you to find some particular portion of the data on one model, we have made the index to the Manual much more comprehensive than ordinarily is done with the regular manuals. The reason for this is that although the alignment for even a five-band broadcast receiver can be run on one Manual page, the alignment for a television receiver and its attendant sound channel covers two, three, or even more pages, and so they are individually indexed. This was also done with the circuit description installation notes, trouble-shooting procedure, etc. The same applies to the necessarily extended nature of television service data as a whole.

In addition to the actual Manual itself and its separate Index, there will be a "How It Works" book of about 200 pages. It was felt that because of the complicated nature of the subject, it should be covered as thoroughly as possible. The opening chapter deals with the transmission and reception of television signals in general, so that you can gain a true over-all idea. The second chapter deals with frequency standards, the next with antennas—their theory and installation—and then come descriptions of the various portions of a television receiver: the r-f, oscillator, and converter circuits in the front end, the sound channel, the video i-f system and detector, the video amplifier and d-c restorer, the sync and sweep circuits, picture tubes, power supplies, and the book concludes with a consideration of the problems involved in the alignment and servicing of television receivers in general. Throughout the "How It Works" book the practical is stressed along with the theoretical, so that when you do a certain operation or make an adjustment on a set, you will know why you are doing it.

The Rider Television Manual, Volume 1, its Index of 16 pages, and the "How It Works" book will be in your jobber's hands in June. Its country-wide representation of television manufacturers gives you the best coverage and that is what you need in any kind of a service manual and that is what Rider always provides for you. Whether or not television has reached your locality yet, here is a Rider Manual that you should have, for as we mentioned at the outset, television is spreading to all parts of the country. Order your copy of the Rider Television Manual, Volume 1, today—you will need it. ●

RIDER MANUAL

We have consistently said that Rider Manuals give the service industry the greatest coverage of American-made receivers. As one example of the fact that nowhere—nowhere else can you find equivalent coverage, we quote some figures concerning the last three Rider Manuals which have been published—the three Manuals which have appeared since the end of the war—Volumes XV, XVI, and XVII.

The receivers which pose a problem to the serviceman with respect to time, are those which have more than one band. In addition to 1415 models of single-band receivers contained in these volumes, we have published in these volumes as of this date

387 Two-band Receivers
172 Three-band Receivers
41 Four-band Receivers
61 Five-band Receivers
27 Six-band Receivers
15 Seven-band Receivers

Now, knowing that the breakdown of the switching and the components in each comprise a time-consuming process, we also published in these same three Manuals, approximately 1000 clarified schematics of these multi-band receivers.

Check any single source you wish and nowhere will you find this representation — nowhere else will you find these time-saving and therefore these money-saving clarified schematics. We repeat—Rider Manuals are the world's greatest compilation of service data on radio receivers and allied equipment.

General Electric 219, 220, 221

A few cases of hum which cannot be reduced in the normal manner from these models shown on *pages 15-28 to 15-31 of Rider's Volume XV,* may be corrected by cathode degeneration in the output tube, 35L6GT/G, cathode circuit. Remove R17 and C29-C from the circuit. This can be done by disconnecting one end of R17. ●

WE'RE HERE AGAIN

Didya miss us when we didn't show as usual? Well, it's a long yarn so we'll only give with the high spots. . . . First of all we had to give the Editorial Dept. a hand to get Vol. XVII out so the Boss could keep his promise to yuh about shipping the books before the end of March. . . . Then we apparently helped so nicely with XVII that we were drafted to do a job with the *FIRST AND FOREMOST* **Television Manual.** . . . And when we were all set to start battin' out our col. on Qwerty, our printer was closed down and that, boys and gals, is why we cannot imitate four Hawaiians. . . . (*With apologies to Joe Cook*).

VOL. 1 TV

By now you have heard tell that the Boss is gonna give with a manual on the whys and hows of fixin' TV sets. Remember that card you got sayin' that Vol. 1 was gonna have a thousand pages? Well, we'll let you in on something—we found that 1,000 pages weren't enough and when you get your copy, you'll find that there'll be nearer 1,400 pages!!! How many manufacturers are represented? **Thirty-four** (*count 'em!*) 34. . . . And that doesn't take in Webster, Seeburg, and other record-changer mfrers. . . . 34 *Television Mfrers!!!!* We could go on and on telling you about all the descriptions of circuits, test patterns, trouble-shootin' and alignment charts, and **the new "giant" schematic pages,** but there just ain't room here. All we can tell yuh, get yer order in to yer jobber *but fast* or you'll be outa luck.

10 YEARS

Yep, it's been that long since we helped pack up all our records, and service data, and books and magazines, and all the other stuff around the office at 1440 B'way and made the trek down here to 28th St. What changes that decade has seen! Less than a dozen people on the force then—now there's nearly 40. . . . Up at 1440 B'way three offices and a room for shipping—now we have a whole floor and could use another! Back there *Miss Schneider* was the accounting dept.—*Lou Prior* was the art dept.—*Bill Marcus* saw to it that the books went on their way to you—*Shad Rowe* did the proofreadin' and make-up and *the Boss* did a little of everything. And wot did we do in those good old days? Well, we pedaled the old chariot around and about gatherin' news and doin' anything in the office that nobody else wanted to do.

POINTER

Do you remember that Survey we sent yuh last June? Well, about 15% of you who helped us out by answering, said you were hams. So, W2RID (*the Boss to you*) has put out a **RADIO AMATEUR'S BEAM POINTER GUIDE.** Any of you hams gotta antenna that you can aim? Well, if you have, that's the book for you. For a *buck,* you can get the bearing in degrees from north *for any country on the earth* where there's a brother (or sister) ham, and if you aim your antenna as per the degrees reading, *your beam will follow a great-circle route* smack-dab to PK5, ZE, LU, or anywhere else.

ON DECK

An' speakin' of books for hams and for any of youse guys who are hankerin' after some good dope on microwaves, there's a MS in the house called **"Microwaves in the Ham Shack"** that's the result of the experience and skull-work of Samuel Freedman, W6YUQ and ex-W2CPS, W2BCD, etc., etc. . . . Then we've another book that's waiting for us to get at it—that one's about *loudspeakers.* It's written by C. A. Tuthill, who was the Supervisory Engineer of the Lake Success United Nations building a-f channels and who engineered the a-f end of the p-a, TV, radio, and recording channels in the United Nations General Assembly Bldg. in Flushing. We dunno when you'll be able to grab yourself these books, but it'll most likely be sometime this summer. . . . And don't think we've forgotten about that p-a book. You'll like it when you see it.

WE EXPAND

We'd just batted out the paragraph above labeled "10 Years," when the Boss came along and told us he'd decided to expand and move some of us downtown. We don't know when the trek will occur, but it will be in the not too distant future—we'll let yuh know.

NYC NIXES LICENSING

Servicers in New York City might be interested in learning about the Boss's appearing at the conferences of the Commerce and Industry Assoc. of New York relative to the licensing of radio repairmen here in town. He showed that you fellows in NYC were charging very close to the average nationwide charges and he proved his points in the main from the replies you made to the Rider Survey last year. . . . And so there's to be no further action until next Fall when the situation may or may not be reviewed, depending on the success of the Associated Radio Servicemen of N. Y. who so far have done a terrific job of cleaning house. That's not only going to bat for you, but cloutin' out a beaut!!!!

OURS ARE PICKED

Since the first of the year, the Boss has been getting quite a few jolts of happiness because more and more schools throughout the country have been picking **"FM Transmission and Reception"** and **"Broadcast Operations Handbook"** as textbooks. In fact, one school in Chicago sent in an SOS for 500 copies of the Handbook—send 'em *rush* and all that sort of thing . . . And our export agents have arranged to furnish a copy of the Handbook to the chief engineer of the 500 leading broadcast stations throughout the world!!! Well, they MUST be good. . . . *By the way, have you got your copy yet?*

THE SHOW

If you're gonna be at the show in Chicago, be sure to stop in at BOOTH 141. *There will be a preview that you'll want to see.* . . . The Boss—Bill Hynes—Bill Marcus—from the office here will be there to welcome you. . . . *Look for the flashing red light!!*

The Rolling Reporter

TELEVISION HOW IT WORKS BOOK AVAILABLE SEPARATELY

The HOW IT WORKS book that will be published simultaneously with the Rider Television Manual Volume 1, will be a comprehensive discussion of television as it is today. The opening chapter deals with an over-all picture of the transmission and reception of television signals; then frequency standards and receiving antennas are discussed, followed by thorough explanations of each section of a television receiver. The last portion of the book covers the servicing and aligning of television sets. The book will have approximately 200 pages, each 8½ x 11 inches.

The HOW IT WORKS book can be purchased separately from the Television Manual either at your jobbers or directly from this office. The price is $2.70.

RIDER'S *Continuing* LEADERSHIP MEANS CONTINUING PROFITS FOR YOU!

Anticipating the Servicing Industry's Needs has resulted in an important chain of Rider "Firsts"

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During eighteen years of continuing service to the servicing industry, the leadership of Rider has been constantly maintained by regular releases of new books *anticipating* the *needs* of the industry. New books, of new ideas, timed for the greatest profit to all concerned.

That is our record. That record we intend to maintain! The books shown on this page demonstrate that policy in action. All these titles were released within the past few months!

VOLUME 1

RIDER *Television* MANUAL

Publication date June 1st

Here is a companion volume to the famous Rider Manuals—This time on television receivers. Everything that must be known about the 1946-1947 television receivers produced by the industry's leading manufacturers. Complete and kit receivers are covered.

APPROXIMATELY 1350 PAGES—Circuit Descriptions—Schematics—Patterns—Alignment—Voltage and Resistance Tables—Chassis Views—Parts Lists—Double-Spread and Giant Pages—Standard Rider Looseleaf Binder.

Separate "HOW IT WORKS" BOOK (about 200 pages) Explanation of the theory of Antennas—R-F Sections—Sound and Video Channels—Sync and Sweep Circuits—Waveforms in Circuits—Power Supplies—Alignment and Servicing.

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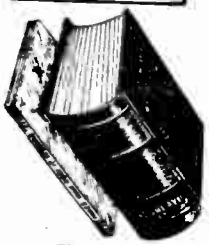
RIDER MANUALS NOW IN 17 VOLUMES

Within the past two months we released

RIDER MANUAL VOL. XVII

The latest addition to the "The World's Greatest Compilation of Radio Servicing Data."



Here are 1648 pages of authentic servicing information, factory-facts on the products of 115 manufacturers. Here, Rider-exclusive "clarified-schematics" break down every multi-band job into individual schematics of each circuit as it exists with each turn of the wave band or equipment switch. The circuit analysis has been done by Rider.

The "How It Works" book and the cumulative index covering Vols. XVI and XVII, are included at no extra cost. "How It Works," clarifies the underlying theories of new radio circuits and the mechanical innovations of the latest sets.

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The serviceman or student will have difficulty in furthering his knowledge if he does not understand vectorial presentations in technical articles and books. These illustrations—the engineer's shorthand—are explained simply and understandably. This book is equally valuable to servicemen, students or anyone who wants to get the most from information contained in radio books and periodicals.

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tells how to operate a radio station and keep it in operation. Transmitter operation and maintenance, what to do and how to operate the central room, the master and remote controls. Written in operater's language by an operating staff engineer. 288 pages—profusely illustrated

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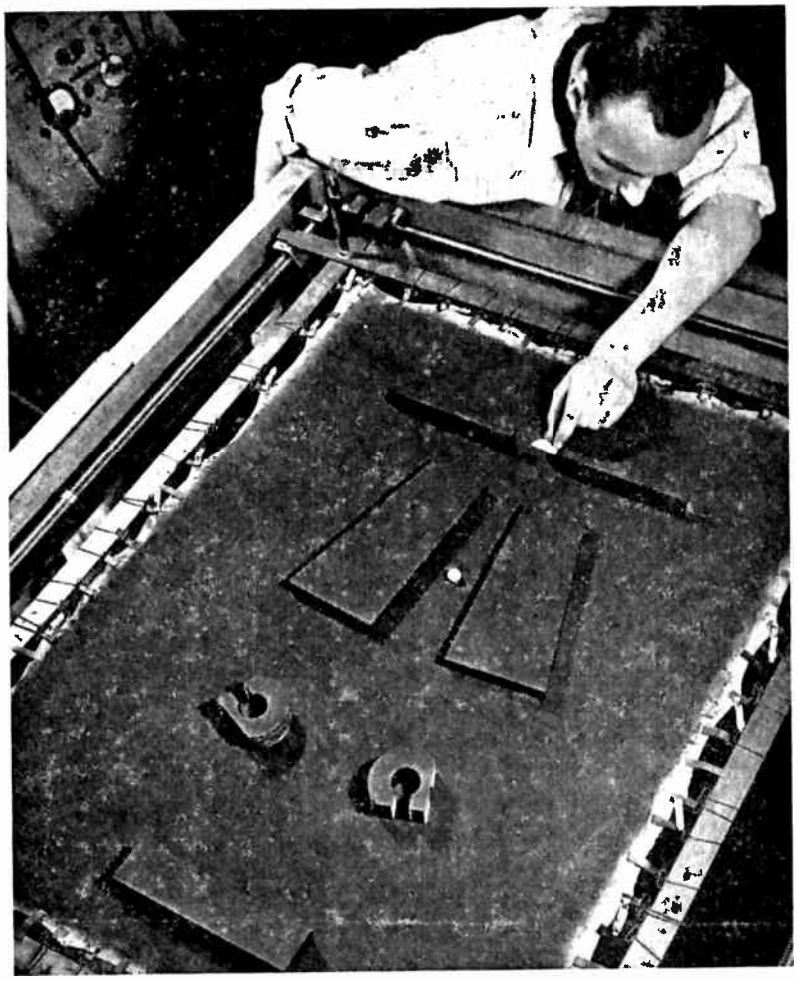
Successful SERVICING

JANUARY - FEBRUARY
1948



Courtesy Westinghouse Elec. Corp.

REPORT ON TELEVISION SERVICING

By
JOHN F. RIDER

FAR and wide among servicemen you may hear the question, "What is happening in television servicing?" In fact, even the men who are far removed from television transmitters are asking such questions as: "What will the independent serviceman do when television becomes an actuality in his area? What has been the success of factory service branches? Does their existence forestall the possibility of successful private enterprise?" These and many more problems plague the independent who is looking towards the future.

We shall try in the limited space available in this issue to examine the past year of television servicing activity and to render a report. From recent experience it is possible to hazard a conclusion about what may happen in the next year or two—not longer—provided there is no major recession, which economists seem to feel will not occur within that time.

The past year has demonstrated the relative merits of four different arrangements of television servicing:

1. The factory service branch.
2. The distributor - operated service facility.
3. The large independent service shop, which is also a television set dealer.
4. The independent service shop operating under a television servicing contract issued by either the manufacturer or his distributor.

Each of these means imposes a limitation on more than just television servicing operations by the average small independent service shop, primarily because some television sets have more than just television receiving equipment in the cabinet, and secondarily, because the public will call on the television servicing outfit for the repair of other radio and allied equipment.

At the outset of the activity, the entire servicing industry looked askance at such television servicing planning, because it threatened the very life of the nationwide independent repair field—not so much because of the immediate limitation, but because of the general belief that the short-term need would be the basis for long-term planning. Fortunately a year of effort has demonstrated not only the weakness of the short-term need as a long-term plan, but also the benefit which can be derived from open thinking and the manufacturers' attempt to resolve the problem by the appreciation of different methods of serving the public.

In this connection it is interesting to note that Belmont, which is announcing the lower-priced television receiver, does not contemplate contract service; instead the company will establish a chain of authorized independent service stations with both educational and equipment requirements. So here is the first step towards that ultimate goal of television service by authorized independent stations without service contracts. It is likely that some sort of uniform price structure for different types of installation and service operations will develop, but at least, the trend is in the proper direction.

Much more can be said, but unfortunately space does not allow it; however, let it suffice to say that in the opinion of the writer, the contract service arrangement as used at present will decline in importance within a year or perhaps 18 months, and more and more noncontract

Please turn to page 4

RCA QU61

The following circuit modifications have been made in RCA Model QU61, the schematic of which appears in *Rider's Volume XV on page 15-55:*

1. In some sets, a modification has been made in the "Radio-Phono Switch and Tone Control Strip," the diagram of which appears on *page 15-58*. The modified diagram appears in Fig. 1. In these sets, R9 (Stock No. 30648) has been omitted and C57, 120 μμf (Stock No. 39630) has been changed to 47μμf (Stock No. 35644). A 220,000-ohm resistor (R33, Stock No. 14583) has been added from terminal 12 of S7 to the ground terminal of R11.

2. In some sets, a modification has been made in the bias supply to the output tubes. The schematic for the unmodified diagram appears on *page 15-55 of Rider's Volume XV*, and the modified diagram is shown in Fig. 2. A 120,000-ohm resistor (R25, Stock No. 30180) has been added in series with the supply and a 0.05 μf capacitor (C56, Stock No. 70615) has been added from the output tube side of the 120,000-ohm resistor to ground.

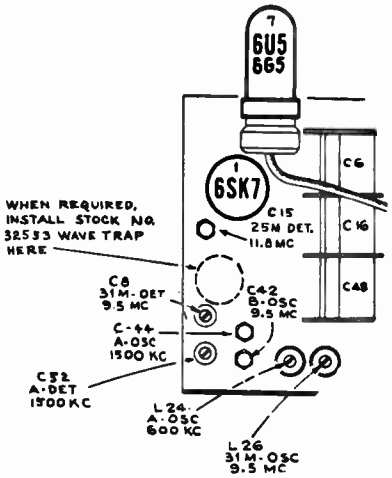


Fig. 3. In case of interference, a wave trap can be installed as shown in the RCA model QU61.

3. Should interference from a powerful near-by station require the use of a wave trap, install RCA Stock No. 32553 trap as illustrated in Fig. 3. The complete chassis view is found on *page 15-58 of Rider's Volume XV*. Connect the coil lug to the receiver antenna connection; ground connection is made to the chassis through coil mounting foot. Adjust the capacitor mounted on top of the coil for minimum signal from the interfering station.

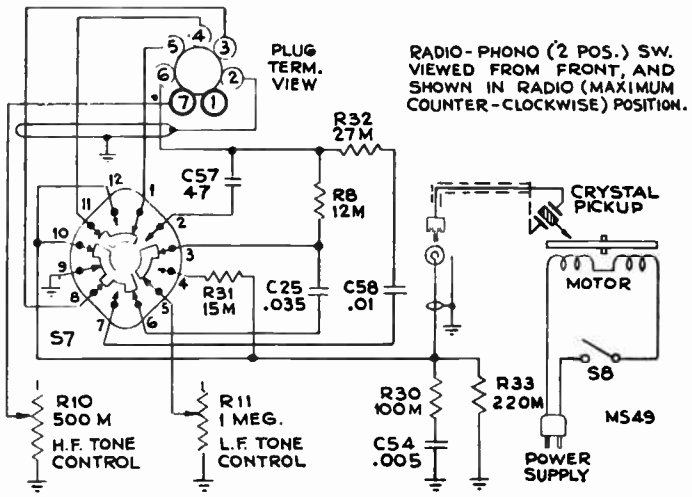
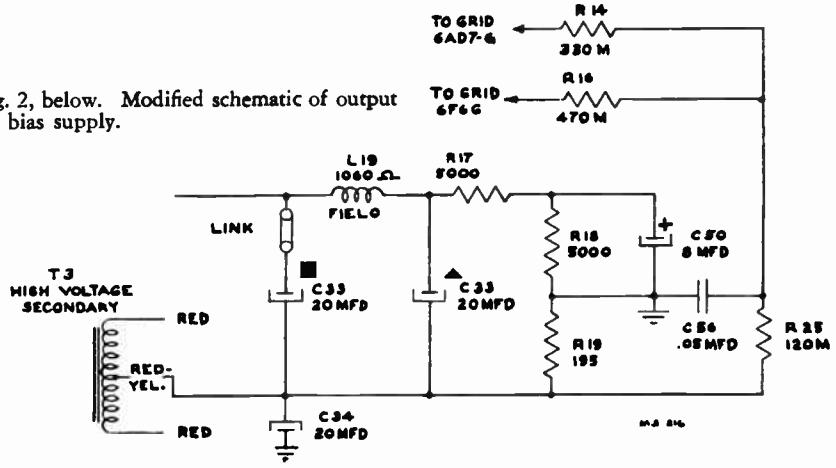
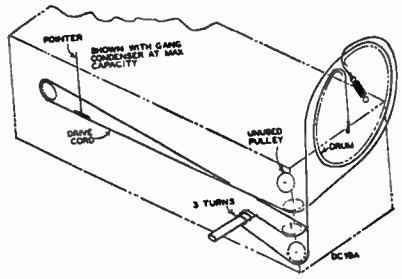


Fig. 1, above. Modified schematic of phono switch and tone control strip in RCA model QU61.

Fig. 2, below. Modified schematic of output tubes bias supply.





Revised method for dial cord stringing in RCA models 68R series.

rather than the original 80 inches. See accompanying illustration for method of restringing.

•

DeWald 418

This model is the same as model 414 appearing on *page 11-2 of Rider's Volume XI.*

•

Montgomery Ward 74WG-2711

This model is similar to model 74WG-2705B described in SUCCESSFUL SERVICING for September-October 1947, except for the addition of twin doors on the cabinet covering the dial panel.

•

GE YRB 60-12

This receiver is the same electrically as the YRB 60-2 appearing on *page 15-5 of Rider's Volume XV* but the cabinet is different.

•

GE YRB 92-2 and 81-3

These models are the same electrically as the YRB 82-1 appearing on *pages 15-53 to 15-54 of Rider's Volume XV*, but they have different cabinets.

•

GE 254

This model is illustrated on *pages 16-3 to 16-5 of Rider's Volume XVI.* The suffix letters after 254 indicate only the cabinet styling. All versions are electrically identical.

RCA 68R1, 68R2, 68R3, 68R4, Chassis RC-608

These models are the same as those illustrated on *pages 16-39 to 16-43 of Rider's Volume XVI*, except that the dial cord assembly has been redesigned. The revised design uses a simpler method, and the length of the dial cord has been reduced to approximately 67 inches

Arvin 544 and 544R (Noblitt-Sparks)

The following changes have been made in the circuit appearing on *pages 15-3 to 15-5 of Rider's Volume XV* to reduce low level hum and hum modulation.

1. The capacity of the electrolytic capacitor A19136 (C7) is changed from 40-20$\mu\mu$f, 150v, 20$\mu\mu$f, 25v, to 50-20$\mu\mu$f, 150C, 20$\mu\mu$f, 25c.
2. The rotor of the variable capacitor is now connected to AVC instead of to chassis. (This is the same circuit that was used in sets built previous to March 1946.)
3. C11 0.1μf, 400v, capacitor from AVC to chassis is deleted.
4. The bypass capacitor from B+ to chassis is changed from C9, 0.05μf, 400v, to C11, 0.1μf, 400v, to prevent oscillation.
5. A fiber washer part 20198 ¼ inch ID, ½ inch OD, ⅛ inch thick, is added under the pointer to prevent the pointer from touching the dial and shorting AVC to the chassis.
6. The floating ground wiring is changed; the jumper from the oscillator coil to the #3 lug on the 12SK7 socket is removed and replaced by a jumper from the ground side of the volume control to the a-c switch lug.
7. The top of the dial scale backing plate has been cut off even with the top of the dial, to allow the dial to set in a more vertical position. The part number remains the same, and the old and new plates are interchangeable.

The parts list for these models remains the same as that enumerated on *page 15-5 of Rider's Volume XV* except for the changes noted.

Part No.	*Description*
A19136	Capacitor, electrolytic 50-30$\mu\mu$f, 150v. 20$\mu\mu$f, 25v.
A20198	Washer, fiber

•

Montgomery Ward 74WG-1801C

This model is similar to 64WG-1801C shown on *pages 15-27 to 15-29 in Rider's Volume XV*, except for the following changes. The frequency range has been slightly contracted to 540 to 1600 kc. The dial cord length has been increased, and the following dial cord replacement data should be used.

Turn the gang capacitor to the fully closed position. Use a new drive cord 18 inches in length and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive-pulley rim and continue around pulley one-half turn, counterclockwise. Wind 3½ turns counterclockwise (from front of chassis) around tuning shaft. Turns should progress toward rear of chassis. See accompanying illustration.

Wind cord counterclockwise around drive pulley in back of previous ½ turn. Pass cord through the slot in the pulley rim. Stretch tension spring and tie free end of cord to the spring. Cut off any excess string.

New dial cord stringing for Montgomery Ward model 74WG-1801C.

The components used in the 74WG-1801C are the same as those listed for the 64WG-1801A on *page 15-29 of Rider's Volume XV*, except as noted below.

Ref. No.	*Part No.*	*Description*
C-15	B67204	0.20 μf 200 V tubular
C-16	D67104	0.10 μf 400 V tubular
C-18	D67102	0.001 μf 400 V tubular
C-19	17A123	1.5-12 $\mu\mu$f trimmer
T-1	26A467	"B" band loop antenna assembly
T-3	9A1775	1st i-f transformer and can assembly

•

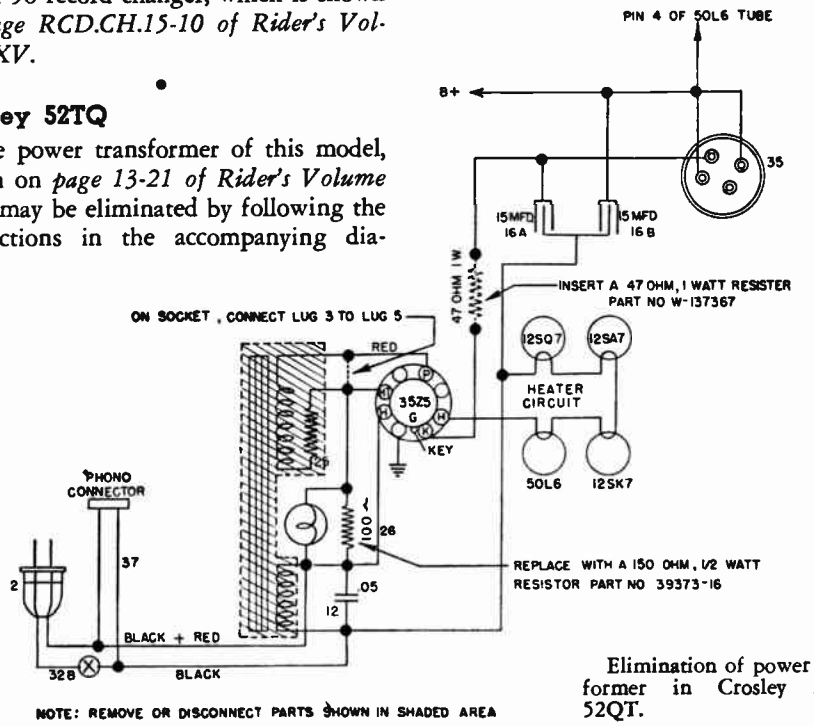
Electronic Laboratories 2811

This model, shown on *page 16-8 of Rider's Volume XVI*, uses the Webster model 56 record changer, which is shown on *page RCD.CH.15-10 of Rider's Volume XV*.

•

Crosley 52TQ

The power transformer of this model, shown on *page 13-21 of Rider's Volume XIII*, may be eliminated by following the instructions in the accompanying diagram.



Elimination of power transformer in Crosley model 52QT.

Stewart-Warner 61TR36 (9029-B), 61TR46 (9029-H), 61TR56 (9029-J), 61TR66 (9029-K), 61TR76 (9029-L)

These models are the same as the 61TR36 shown on *pages 15-9 and 15-10 of Rider's Volume XV*, except for the addition of a 0.0008-μf capacitor 52 part No. 502470. This is connected at the junction of resistor 27 and the phono-pickup cable socket to ground when an L-70-Z cartridge is contained in the tone arm used with the DT-505049 changer.

•

Belmont 8A510

This model is the same as the 8A59 shown on *pages 15-8 to 15-12 of Rider's Volume XV*, except for the addition of four parts.

The two miscellaneous parts of the removable tuner assembly are:

1. Part No. A-2J-7176—cam locking spring.
2. Part No. A-2J-7627-1—retainer spring.

The miscellaneous part added to the main chassis is part A-19A-11539 which is a plug on the speaker leads.

The final addition is an alternate record changer which can be used with this model. Part C-201-12545-1 is a Detrola changer model 550, which is shown on *pages RCD.CH.15-1 to 15-10 of Rider's Volume XV.*

•

Firestone 7402-4

This model is the same as model S7426-6 shown on *page 10-5 of Rider's Volume X.*

•

Television Servicing

(Continued from page 1)

service work will be done by the smaller independent shops. No doubt, they will be authorized shops bearing the emblems of *more than one* television receiver manufacturer, but be that as it may, the smaller independent will not be out in the cold.

It seems to be almost a good thing that television servicing is developing as it is, for it gives the smaller outfit a better and longer opportunity to become acquainted with the art, to acquire the necessary equipment. Both are important, although even today a very great discrepancy exists in the thinking of those who should know concerning the amount of money which will have to be spent for equipment. Some manufacturers talk in terms of thousands of dollars, whereas here and there, one hears very much lower figures—in fact, below 1,000 dollars. Maybe it will go much lower, for like everything else which is new, obstacles as well as requirements always seem greater than they really are. Moreover, the greater the familiarity with the test equipment and the television receivers to which they are applied, the more that can be accomplished with less.

Educational Efforts Important

So as we see it, the display of patience by the independent servicing group; the display of perseverance in the effort to gain the knowledge, and the realization that the success of the future depends on the educational efforts of the present, without any doubt, will bear healthy and luscious fruit. The independent servicing industry, is still far from being relegated to a has-been.

Before discussing the results, it is necessary to make an important comment: the independent servicing industry as a whole has displayed sound and sensible judgment when considering the various servicing plans employed by the television-receiver manufacturers during the first year of operation; the absence of any condemnation of these manufacturers for not throwing television servicing wide open to all independent service stations on a catch-as-catch-can basis at the start, is to be lauded. It was sane reasoning.

As a matter of fact it was a fortunate circumstance that small operators could not get in on the so-called television installation and servicing "gravy," during the first year. The service contract seemed to be framed with gold. Actually it was just the opposite. Giving the television-receiver buying public an unlimited-call service contract on an annual basis has proved to be a revelation. So much so that we doubt if *any organization* rendering service on such a contract has shown a profit on its service operations. It may have shown a profit on sales—but *not service.* And it is important to bear in mind that this was the condition for volume service contracts. Where comparatively few contracts existed, the problem was not profit—but, how to keep the loss low.

Problems to Be Solved

The radio manufacturing industry has progressed very far in its knowledge of radio wave propagation; in the techniques of receiver design and construction, and in the design of components, yet it has not a complete knowledge of every possible condition which may arise in the development of the proper television signal at random locations where a purchaser may live. Nor can it be said that the numerous conditions associated with the performance of the receiver in any location—landlord reactions to antennas, intervening obstructions, ham interference, f-m interference, diathermy, and so forth—have been fully resolved. All this takes time and experience. Finally, make the service call dependent *on the option* of the receiver customer and a real problem is born. Such has been television servicing during the first year.

Despite all of this, television is doing a job; it has been well received. The public wants it and will continue wanting it more and more. Whatever are its difficulties, television receiver engineers, service personnel, and programming personnel will solve them, and it will become a nation-wide facility of gigantic proportions. In the meantime, what about the future of the independent serviceman?

Based upon past performance, it is only logical to assume that servicing during the year 1948 will be in the main a repetition of what transpired in 1947. The producers of television receivers in the price class of those manufactured in 1947 will continue their present service practices. Complete and final conclusions based on experience cannot yet be drawn —the period of trial and error has been too short. No call-limit service contracts with the public will continue, even for those who have had their receivers for a year, for the buyers of these receivers are in the income group that is earning $7,500 a year or more. There are about a million such earners, which means a like number of families and a like number of higher-priced television receivers, exclusive of bars and hotels, of course. Members of this group wish to be freed from the responsibility of seeking servicing facilities—they desire to follow the path of least resistance when a service facility is needed. Only an unlimited-call contract would appeal to them. So they sign a contract for the first year and have expressed a willingness to sign for the second year. Whether or not they will sign a contract for the third year, by which time the cost for service will amount to a reasonable share of the sales price of the receiver—well, that is doubtful. And whether or not a service facility can afford to cut its contract price for the third year, which cut would be expected by the customer, bearing in mind that the possibility of trouble is more likely in the third year than in the second, that too is very doubtful.

But television cannot be successful unless it has mass acceptance, which means that it must be marketed at prices lower than those at present. One such completed receiver is already on the market! The possible success of unlimited-call contract service for a low-priced television receiver, that is, a contract price which is less than the average being asked today, is unlikely on two counts: First, because it becomes a substantial fraction of the sales price, and second, the possible problems which may be experienced at present during installation and service are no fewer on the cheapest television receiver than on the present higher-priced receivers. Consequently, a natural conclusion would be that contract service—even a limited-call contract—would not be viewed favorably by either the customer or the repair facility.

•

General Electric 202

This receiver is the same electrically as the model 200 as shown on *pages 15-54 to 15-56 in Rider's Volume XV,* except that it has a different cabinet.

You didn't know it – did you ?

Successful
SERVICING
REG. U. S. PAT. OFF.

Vol. 9 **JANUARY - FEBRUARY, 1948** **No. 3**

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

Published by

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JOHN F. RIDER, Editor **G. C. B. Rowe, Associate Editor**

NEW FIELDS TO CONQUER

This is not the first time we have used this title for an editorial. As each day passes new openings for activity are developing. To ignore them is foolish, because it means the loss of opportunity—technically and financially.

We realize that all men are not equally capable of taking advantage of opportunity, but we would be derelict in our duty if we failed to call to the attention of the personnel in the servicing industry new activities which either do, or will in the immediate future, require the talents of these men. In the final analysis those capable of doing a special type of work will be the first in the field—in time the rest will follow. But someone must start it.

In this issue is a request from the Federal Telephone and Radio Corporation. They are seeking men for a field service chain. Certain questions are asked, and the answers to them will determine the organizations chosen. We hope that the response will be adequate to take care of their needs. Also that the basis of operation—and in this respect we do not know what the FT & R have to offer financially—will be such that participation by members of the radio servicing industry will be justified.

JOHN F. RIDER

Federal Telephone and Radio Expands Field Service Chain

The Federal Telephone and Radio Corporation of 100 Kingsland Road, Clifton, N. J., is seeking the facilities of radio service shops as members of a field service chain for the maintenance of their mobile radio equipment. This covers radio transmitters and receivers used in point-to-point communication, both in present and new territories. The organizations which are accepted will be appointed as Authorized Service Stations.

Here is the information desired by Federal, and it should be contained in the responses forwarded to the company:

(*a*) *The number of service men employed.*

(*b*) *How many employees are now thoroughly experienced in two-way mobile communication and central station equipment?*

(*c*) *Would you be willing to send some of your men to the Federal factory at Clifton, N. J., for training on the mobile equipment? The instruction would be free.*

(*d*) *What territory could you handle efficiently and expeditiously? Indicate specific Towns, Cities, Counties, or States.*

(*e*) *What other manufacturers' intercommunication two-way mobile equipment are you now authorized to install, service, or maintain.*

(*f*) *Applications considered for appointment will be sent further particulars.*

Address your responses direct to

Mr. A. R. Lallone
Installation and Field Service
Federal Telephone and Radio Corp.
100 Kingsland Road
Clifton, New Jersey

Rider's Volume XVII Is on Its Way

The second Rider Manual in the three-a-year plan is now at the printer and will be delivered to jobbers in March 1948. This is Volume XVII (17). We had hoped that the three-volumes-a-year series could be carried on with each volume containing less than 800 pages. Such is not possible if complete distribution of service data covering American-made radio receivers, is to be made to the servicing industry.

The output of American radio factories during the past eight months has been terrific. Statistics indicate 1947 production as 17,000,000 receivers. That is why Rider's Manual Volume XVII contains slightly more than 1600 pages and the products of more than 100 manufacturers. These sets include single and multiband receivers, with each multiband job presented in "clarified schematic" form—record changers used in these receivers, and the wire recorders which are used in these receivers.

The magnitude of service data essential to the servicing industry is determined by the output of the receiver and allied equipment manufacturers. Never before in the history of the radio industry were there so many manufacturing organizations in business. Dissemination of the service data on these products is the function of the Rider organization. With the release of Rider's Manual Volume XVII, more than 23,300 pages have been released.

Dollar for dollar Rider's Manuals give you the greatest coverage of service material of American-made radio receivers. For example, in the postwar Volumes XV, XVI, and XVII are more than 4400 pages of service data—complete data—accurate data—offered at less than 1 cent per page . . . In addition, three "How It Works" books totaling more than 250 pages—three books which give you the latest theories embodied in the newest receivers. . . . Also "clarified schematics," breakdowns of each band in multiband receivers . . . And finally, changes in sets published in the free house organ "Successful Servicing" . . . Nowhere—we repeat, *nowhere else is such value available to the radio servicing industry!* Rider's seventeen volumes is the world's great compilation of servicing data on radio receivers and allied equipment.

RCA Record Changers 960001 Series

These changers are the same as Model 960001-1 on *RCD. CH. page 15-1 of Rider's Volume XV* except for the following changes:

960001-4 Uses L230270 Motor. Has additional pickup shorting switch that shorts out pickup arm when in the rest position.

960001-5 Uses pickup cable 72583 of different length.

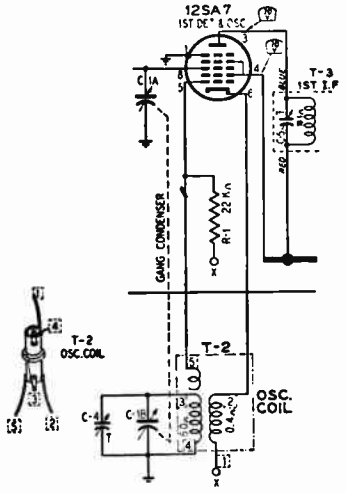
960001-6 Same as 960001-5 except for color of knobs, arm, etc.

•

Montgomery Ward 74WG-1801D

This model is similar to the 64WG-1801C shown on *pages 15-27 to 15-29 in Rider's Volume XV,* except for the changes listed below. This model incorporates all the changes previously listed for the 74WG-1801C.

The grid resistor (R-1) of the 12SA7 det. and osc. tube has been changed to 22,000 ohms. The oscillator coil has been changed and capacitance coupling to the tube is now obtained through



First detector and oscillator circuits of the Montgomery Ward model 74WG-1801D.

the use of a "gimmick," as shown in the accompanying drawing. The components used in the 74WG-1801D are the same as those listed for the 64WG-1801C on *page 15-29* except for the changes previously noted for the 74WG-1801C and those below.

Ref. No.	*Part No.*	*Description*
R-1	B84223	22,000 ohms 0.5 watt, carbon
R-4	36X368	0.5 megohm volume control and switch
R-8	B84151	150 ohms 0.5 watt, carbon
T-2	9a1911	Oscillator coil assembly
	13X546	Line cord and plug assembly
	10X45	Drive cord assembly

To replace the dial cord, use either a new 10 x 45 drive-cord assembly or a piece of cord 18 inches long. See replacement instructions under Model 74WG-1801C.

•

Montgomery Ward 74WG-1054A and 74WG-1054B

These models are similar to 64WG-1054A shown on *pages 15-82 to 15-84 of Rider's Volume XV,* except for the following changes. The terminals of the oscillator coil are reversed. The high side of the 2.2-ohm winding goes to the first grid of the 1R5 mixer tube and the high side of the 6.4-ohm winding goes to grids 2 and 4 of the same tube. The low side of the 2.2-ohm winding is grounded and the low side of the 6.4-ohm winding is connected to R-7. These models also incorporate the changes noted on page 6 of the May 1947 issue of SUCCESSFUL SERVICING.

It has been called to our attention that misinterpretations are possible of the statements made in the May 1947 issue about wiring changes. The wiring of the set does not change, as no components are changed; but the wiring of the *socket* of the output tube changes as indicated in the afore-mentioned issue.

In model 74WG-1054B, in addition to the changes listed above, a 2.2-megohm resistor (R24) in parallel with a 100-$\mu\mu$f capacitor (C24) is connected from the antenna to grid 3 of the 1R5 mixer tube.

•

Montgomery Ward 64WG-1050D, 74WG-1050B

These models are similar to the 64WG-1050A shown on *pages 15-75 to 15-77 of Rider's Volume XV* with the following changes. The 0.1-μf capacitor (C-11) is connected to B— from pin 1 of the 1R5 socket instead of to chassis ground. A 1000-ohm resistor (R-13) is connected from pin 7 of the 3S4 output tube to B—.

•

The Cover

A "make believe" model for testing tube designs has been developed by the research engineers of the Westinghouse Electric Corporation. This model enables engineers to test tube designs in one day that formerly required up to three months.

The model consists of a very thin sheet of rubber stretched across a frame about four feet by six feet. Wooden blocks of various sizes and shapes act as the tube elements. Hills and valleys in the rubber simulate electric voltages. Bronze balls the size of BB shot represent electrons.

PRICE CHANGE IN DIAGRAM SERVICE

Because of the many problems which have developed since we started the continuous Rider Diagram Service in between the publication of Rider Manuals, we are forced to make changes in this program.

1. A flat rate of 35c will be charged for all the available data on any receiver model up to and including 6 pages. Each page thereafter will be 10c.

2. If additional money is required to cover the data requested, you will be notified. We cannot forward data without receiving your remittance.

3. This does not include data on television receivers, which cannot as yet be made generally available.

4. ***Be sure to enclose a self-addressed envelope bearing a 3-cent stamp.***

The hills and valleys in the thin rubber sheet direct a ball and control its velocity, much as the various electrode voltages control the velocity and direction of an electron. Engineers can calculate the speed of electrons in the actual tube merely by measuring the time a ball takes to roll from one part of the rubber sheet to another. The necessary voltages for optimum operation are then easily determined. If the size and shapes and spacing of the wooden blocks representing the tube elements are varied, the tube design engineer can select the combination that results in the best focusing of the electrons.

The illustration on page 1 shows a Westinghouse engineer using this model to test the design of a new television tube. A white marble is here used as an electron, rather than the bronze ball normally used, to make the "electron" stand out in the illustration. The wooden blocks represent the various focusing and accelerating electrodes.

Dear R.R.—

Why is it every time you go out of town we always have lousy wether here? You go away after Xmas and wat do we have? the worsest snowstorm *since you was a boy* or maybe that was when your father was a boy—I dont remember wich wen you told me about the blizzard of 88. I was on the subway so long that night I got madder and mader so that I forgot to be hungry. Their was a dame hada portable radio with her and she tuned in some guy telling how bad the snow was and how high it was getting to be so that I got madder than ever. Finally she tuned in some danse music but the only dancing we could do in that crowded car was up and down not round and round, but that got me warmed up even though the dame I got danceing with was cockeyed. You should of seen the kid from the printers who came up to pick up the pages for Vol. XVII (17 to you). *I thought he was a walking snowman.* And just so's youll be happy down ther amung the shltering palms wen you get this, practickly all the Vol. 17 pages will be printed, and so you can tell any guys you see that it wont be long before they can be flipping through them 1648 pages and getting the latest dope *just as easy as you can find a martini market.* And speaking of new books, you should see that new one by the Boss and Si Uslan. Not their book on vectors, I mean the one on FM. Since you been out of here i've had to do some of yur proofreading and while I was going through most of them *416 pages* with the gals in the editorial dept I learned lots. *About FM I mean.* I suppose youre thinking that if I can get an explaination out of a book without you telling me all about it, the book must be good. Well, i aint the only one that says its good—one of your boy freinds at the printers phoned you and said that hes been wondering about fm for a long time and he had to read proof and could we please dummy the pages up faster because he was at a vital (*thats what he said, vital*) part and he wanted to find out the rest of the explination. Later he said thanks he understood it now. And speaking of fm, a job just was sent into the office by Dewald that you'd like for the most work youd have to do is turn it on and twirl a dial or two. Remember the wireless record players? *Well this is a wireless fm tuner.* All you got to do is tune the output of the tuner to a dead spot on the dial of your blooper and I bet that wouldnt be hard to do with that junkodyne you admit you own and then tune in the fm job. No wires nor nothing for you to get messed up. Youve been yipping for a fm job—well here you are. *Shall I order you one?* While youre pedaling around down there and on your way back home, you might tell any of the gang you see that television is coming along faster than ever. Several mfrers have announced their going to put out TV recievers thatll *sell for between $190 and $220 installed* and that means a lot of customers are going to be buying sets that never thought of doing it before. And I overheard someone saying that nearly 200 thousand TV sets were made last year, that there was more than 140 thousand in homes and about those in bars and places like that, didnt you tell me you counted more than 25,000? Anyhow theres a lot of sets that will need servicing now and then so the boys better get busy and find out what its all about before its two late. And wile youre on the subject ask how the boys would like a manual with nothing but TV sets in it. We're working on a manual now with all sorts of tele sets but i dont know when itll be out—most likely this spring sometime. And speaking of spring are you planing to stay away until you get a slant at the spring training of some baseballers specially the Bums? I think you should oughter as I may be able to get a bet down if you get me some decent dope on how they look. . . . By the way, your wife phoned me yesterday and wanted to know where you were. Why dont you send her a postal at least once a week? And speaking of writeing, why dont you send something more than directives in collect telegrams? How about sending some nice picture postcards with cheesecake for the collection of yours truely,

Aloysius Winenwiski
Asst. Colyumist

Where Is Michael Gulkewicz?

We have been unable to deliver the prize Mr. Gulkewicz won in the Rider Manual Contest. His entry stated that his home was at 113 Willow St., but he gave no town. As the entry bore the imprint of Radio Electric Service, Allentown, Pa., we sent the prize to that city, but it came back. Radio Electric told us they had his address as Bethlehem, Pa., but we tried that town too—unsuccessfully. So if Mr. Gulkewicz will let us know where he lives, we'll send him his prize.

Public Address Installation and Service Book

No doubt many are wondering why the "Public Address Installation and Service Book" has not yet made its appearance. We don't mind explaining the situation.

The manuscript was ready in time for the initial publication date. Final critical reading showed that information which would answer the question "How much acoustical power do I need to fill a certain space?" was missing. It is true, we had general information on the ratings of amplifiers normally recommended for certain types of installations, but we felt that more data than this were required in such a book for it to be useful, especially for someone interested in the difference in requirements for speech and music.

Then there is the question of low-power outdoor installations—the correlation between "How much power is needed to reach a certain distance?" and, in both outdoor and indoor installations, 'How much acoustical power is needed to override certain noise levels?" These questions were finally answered, and now the book is in process.

For the first time, a book which answers many different questions in practical and definite terms will soon be available. Examples of actual installations are covered, and these should prove of great value for technicians working with this low-power public address work.

We are sorry it is late, but what you want to know about low-power public address systems is in this book and it appears at this writing that it will be ready in May.

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Successful SERVICING

SEPTEMBER-OCTOBER
1947

Raytheon Photo

THE FIX-IT-YOURSELF RADIO RECEIVER

By
JOHN F. RIDER

BY the time these lines appear in print perhaps 20,000,000 people, or whatever is the number of readers of *Life* magazine, will have read about the radio set which is so designed mechanically that it can be fixed by the owner—at least, that is the news value of the story. And no doubt many individuals who may have had a brush with some serviceman, are rubbing their hands in glee, happy in the thought that finally that unsavory character, the radio serviceman, will receive his just deserts. No longer will it be necessary to call a radio repairman to fix a faulty set! Buy one of these new jobs and that's all, brother. . . . Doubtless, many servicemen will be queried about this "new" receiver.

Let's look at this situation. . . . Just what does it mean?

First of all, the plug-in feature as applied to the radio tubes means nothing, because radio tubes have been plugged into sockets ever since the Moorhead valves and DeForest Audions appeared in a new dress, that is, with bases. For those who are unfamiliar with these tubes, they go back quite a few years prior to what we now call commercial broadcasting.

So having had plug-in tubes, many set owners removed the tubes and carefully carried them to a radio store for checking and purchased replacements for those that were bad, returned the tubes to their allotted places in the receiver, and—temporarily—the set was fixed. Of course, and as an incidental matter, they did raise a squawk that a charge was made for checking the tubes—they sometimes claimed that more than the necessary number of tubes were declared defective and replacements sold. At any rate, they did their own servicing—that is, if servicing consists of removing all the tubes from a set, having someone else indicate which are good and which bad, and then returning the tubes to their sockets.

According to the description of this new receiver in *Life,* the other components will also be of the plug-in type, which may be an excellent thing from the point of view of the serviceman—that is, if the socket contacts remain free from oxidation and other similar problems are solved. The plan of the originator is that the set owner will, when the receiver goes bad, take it to a store—and we quote—"interchange its components with new ones until he locates the trouble himself, then pay a modest $1.85 for a new component, tube, or speaker."

All of which raises some interesting thoughts. . . .

Let's say that Mr. Owner takes his set into a store that stocks the various components. He asks for a set of these so that he can try them in his set and determine the one at fault. It is supposed that these components will be properly identified with the sockets on the chassis so that no mistake could be made by plugging in the wrong component in the wrong socket, with perhaps disastrous results. Nevertheless, the clerk will more than likely keep a watchful eye on Mr. Owner to see that he is doing his "trouble shooting"

Please turn to page 4

Here Is a Honey!

In the Pilot model T-521 receiver the locating of the f-m oscillator coil in either the schematic or the chassis itself will prove rather difficult inasmuch as the designers of the set have incorporated an ingenious idea. The f-m oscillator coil portion of the schematic is shown in Fig. 1, which was redrawn from the original.

If the connections be traced through

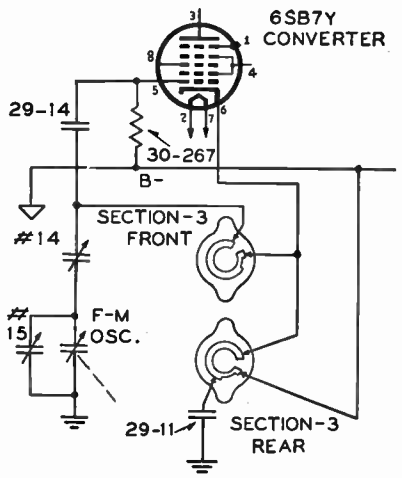


Fig. 1. The f-m oscillator "coil" portion of the schematic of Pilot model T521 receiver.

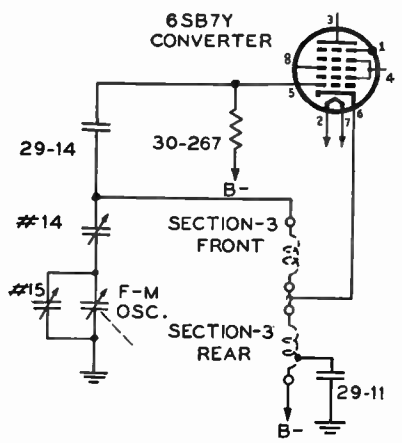


Fig. 2. The Hartley oscillator circuit with the effective coil drawn in dotted lines.

the front and rear wafers of section *3* of the band switch, it will appear as though the cathode of the 6SB7Y tube and the high side of the f-m oscillator capacitors are returned to –B. This would be normal if we were dealing with low frequencies, but it must be remembered that in the circuit under consideration the higher frequencies of f.m. are flowing through it—frequencies between 88 and 108 mc. In the actual chassis, the rotating contacts (wipers) of the wafers of the front and rear of sections *3* of the band switch are silver-plated, and the inductance of these wipers comprises the f-m oscillator coil! Fig. 2 shows the oscillator circuit with the effective coil drawn in dotted lines. This circuit may now be identified as a Hartley oscillator, the functioning of which may be found in the Volume XV "How It Works" book on page 52.

Be on the lookout for more of these innovations in design in the higher-frequency receivers, especially when you are unable to find a coil or a capacitor which "is supposed to be there."

Zenith Chassis 6C40

The On-Off switch of this set must be in the "Off" position whenever the line plug is inserted into the changeover switch on the rear of the chassis. Failure to do this may cause flashing and possible burn-out of the output tubes. In the event the set cuts out, the loop snap connectors may be sprung causing a poor contact; also there may be poor contact through the cabinet hinge. The letter "X" after the model number (6G001YX) indicates that an aluminum cabinet is used. The schematic diagram of this receiver will be found on *page 15-30 of Rider's Volume XV*.

Rider Manual Contest

As the Rider Manual Contest closed (midnight, September 15) and the entries went to the judges, it was gratifying to find that the response had run into the thousands.

As soon as judges John L. Stoutenburgh, Herman L. Finn, and Lansford F. King decide on the 224 contestants who will divide the $4,325 worth of prizes, the winners of the first ten cash prizes and their jobbers will be notified of their success by telegram. Prizes will be distributed through the jobbers.

All winners will be listed in the November issue of SUCCESSFUL SERVICING. In addition, the November issue will carry the texts of the top five prize-winning letters (those which earned their writers $500, $300, $200, $100, and $75, respectively).

The publisher wants to thank all those who expressed their praise and appreciation of the Rider Manuals by entering the contest. Everyone likes to be told, now and then, that he is doing a good job, and skimming the contents of the letters is enough to make us wish that there was a prize for each contestant.

General Electric 250

To reduce the hum in this model, which is found on *pages 15-32 to 15-36 of Rider's Volume XV,* it is suggested that the following change be made.

Resistor R16 (2200 ohms) should be removed from the negative battery terminal lug, lengthen pigtail, insulate with a spaghetti covering, and solder to the ground lug of the terminal board located at socket saddle of the 1LH4 tube.

An appreciable increase in duration of operation from a fully charged battery in this model can be effected in the following manner, realizing, however, that some degree of performance is sacrificed in regard to sensitivity and power output. Replace power-supply filter resistor, R17 (1500 ohms) with one of 4700 ohms, 1 watt, carbon. This change should be made only when the customer demands a longer duration of operation to one battery charge.

Montgomery Ward 74WG-2705B

This model is similar to the 74-WG2705A, shown on *pages 16-16 and 16-22 to 16-26 of Rider's Volume XVI* except for the following changes:

R-3 in the screen-grid circuit of the 6BA6 f-m r-f tube has been changed from 15,000 ohms to 27,000 ohms. The part

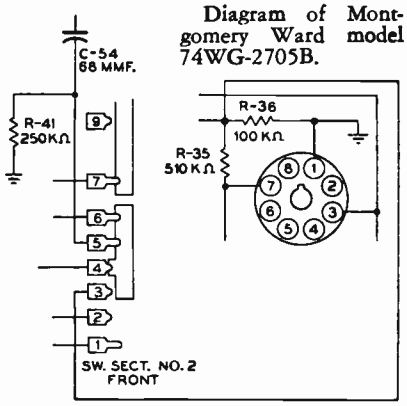


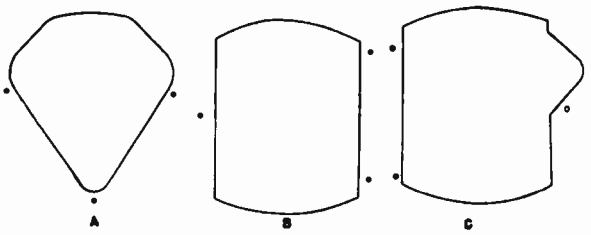
Diagram of Montgomery Ward model 74WG-2705B.

number is B85273, and it is a 0.5-watt carbon resistor.

R-41, a 250,000-ohm, 0.5-watt carbon resistor, part B83254 has been added to the oscillator grid circuit of the 6BE6 a-m r-f converter, and wiring has been added from contact 3 of switch section 2 front to the junction of *R-35* and *R-36* as shown in the accompanying diagram.

Meissner 6D

This model number is Meissner's new designation for models 9-1084 and 9-1086 which are shown on *pages 15-1 and 15-2 of Rider's Volume XV.*



Sketch of different cutouts used in the motor board of the cabinet of model 558, chassis RE-204.

Noblitt-Sparks 558, Chassis RE-204

This model, which is on *pages 15-7 to 15-9 of Rider's Volume XV,* uses two different cutouts in the motor board of the cabinets; it is therefore necessary to use the correct part numbers when ordering replacement cabinet, motor, and turntable assembly or any part thereof.

Part E21004 Ballentine phono-motor and turntable assembly is used with part 19573-1 cabinet which has a cutout A, the outline being shown in the accompanying sketch. Part E19475 Alliance phono-motor and turntable assembly is used with part R19573 cabinet with cutout B or C.

C motor cutout is the result of reworking R19573-1 cabinets to be used as R19573 cabinets with E19475 motor and turntable assembly.

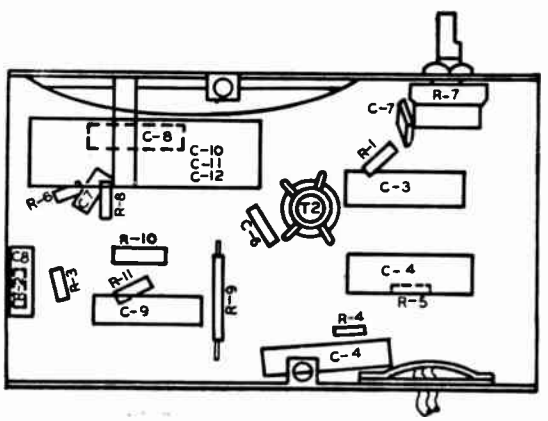
Emerson 550, Chassis 120,006

This model is the same as models 512, 515, and 516, chassis 120,006, shown on *pages 15-11 and 15-12 of Rider's Volume XV.*

Noblitt-Sparks 444M, 444AM, Chassis RE-200M

The schematic for this model is the same as the 444,444A, chassis RE-200 shown on *page 15-1 of Rider's Volume XV* except for the substitution of miniature tubes for the regular metal and GT tubes. This set uses the 12BE6, 12AT6, 50B5, and 35W4 in place of the 12SA7, 12SQ7, 50L6GT, and 35Z5GT.

The location of parts under chassis has been reoriented as shown in the accompanying sketch.



Location of reoriented parts under chassis for Noblitt-Sparks model 444M, 444AM, chassis RE-200.

RCA 66BX

The following changes pertain to RCA Model 66BX which appears on *page 15-87 of Rider's Volume XV:*

1. Change Stock No. 71229—Transformer—First i-f transformer (L6, L7, C13, C14), to Stock No. 71399.
2. Add Stock No. 72541 — Socket — Tube socket — miniature — bottom mounted.

Gamble-Skogmo 43-7601, 43-7601A, 43-7601B

These models, shown on *pages 16-1 to 16-5 of Rider's Volume XVI,* use the General Instrument Record Changer model 205, which can be found on *pages RCD.CH. 15-5 to 15-8 of Rider's Volume XV.*

Electronic Laboratories 2701, ISSUE B

This model from serial number 211,-001 and up, is similar to the 2701 receiver shown on *pages 15-1 and 15-2 of Rider's Volume XV,* except for the following changes:

A 27-ohm 10-watt wire-wound resistor, part W-284C has been added to the filament line, between pin 7 of the 35Z5GT/G rectifier and pin 2 of the 50L6GT/G output tubes.

In the alignment procedure for a frequency setting of 700 kc, the following note has been added in the last column: If more than one turn is required, the trimming 1400 kc should be repeated and the 700 kc padding of the tuning core also repeated until correct alignment has been reached.

FIXIT-YOURSELF RADIO RECEIVER

Continued from page 1

without damage to the replacements. . . . Remember—the set is bad when the replacement component is being tried:

It may be of course, that when the first component is plugged in, the set will start off as good as new, but it is just as likely that the trouble will be in the last component tried. . . . And that consumes time. . . . Or it may well be that the trouble lies in *two* or even more, of the components at once, which means that when one of the defective components is replaced with a good one, the set still will be silent. Then when the light finally dawns on the busy plugger-inner that he is up against a double defect and must do a twin elimination, we foresee an exasperated atmosphere gathering. We leave it to your imagination to see the ultimate outcome after a very possible lengthy session of this push-in-and-pull-out routine.

And do we need to mention that after all this, it may be a defective tube?

Now where does the store owner come into the picture? Or what is more likely, the service-shop owner, for it seems plausible to think of Mr. Set Owner going to a radio serviceman to get his set fixed—by himself! (He'll show that no-good guy that he can get along without him!!) Whether it be clerk or serviceman, is he going to stand idly by while his merchandise is being subjected to this trial-and-error treatment in the inexperienced hands of the set owner? His time is worth something, and even if the owner does luckily hit on the defective component in a reasonably short time, *will the profit that the store makes on a $1.85 item, really pay?* And, as is much more to the point, suppose that it takes a long time for him to find the one or more bad parts? Will the profit be commensurate with the time spent with the customer? We doubt it.

Alignment

While the *Life* story does not specify if the set is a trf or superheterodyne, there is the matter of alignment, which goes without saying, is far, far beyond the capabilities of Mr. Set Owner. It is unbelievable that parts assembled in the components can be so uniform and held to such close tolerances that the substitution of one component for a defective one can be effected and no realignment of the set be required. Needless to say, here is a job for the serviceman, of course at an appropriate fee, not to mention the checking for a bad tube.

It is not impractical to imagine that the instructions which accompany the receiver will be so illustrated as to identify definitely the position of every component, so that no case of mistaken identity can occur during the checking process by the set owner. It seems that by and large, the chances are pretty good that the owner is going to toss the set in the serviceman's lap and tell him to fix it. The result: a charge would be made for checking the components, so that this cost, plus the cost of the parts, plus the time spent in the trip to and from the store will all involve time and money out of proportion to what may be expected by the owner of such a set. In short, this idea of the owner being his own serviceman would not be as Utopian as it seems on the surface—he would find it more than a nuisance.

Diagnosis

What happens if the fault is such that it is not reflected in defective parts? Since many different faults will give rise to the same sympton, instructions to the customer, relative to the correlation between the fault and the sympton and the location of the defective component, will require a tome instead of a service manual of a few pages . . . Let's not even discuss the time which will elapse before the customer locates the fault. How much is that time worth?

Salvage

Then here is another angle. . . .

It may well be that a resistor or capacitor costing a comparatively few pennies has gone west, putting the whole component in the discard. Of course, the customer is unaware of this, but the serviceman may well suspect it, but still Mr. Set Owner pays $1.85—or perhaps more—for a job equivalent to replacing, say, a resistor. Rather hard on the owner?

When a defective "can" has been found and replaced, what happens to the defective one? Is it heaved out in the junk heap? Does the maker want it back? Does it have some salvage value? These questions were not answered in the *Life* article, so we are unable to tell what the ultimate disposal of the discarded "can" may be—since it may contain good elements in addition to the bad one.

Don't think for a moment that we have completely dismissed possible changes in the servicing industry. We have given thought to the possibility of someone dreaming up a design for a radio set of such low cost to the public that service will not be justified. We have even pondered the possibility that someone will produce a receiver in which the parts will disintegrate after a year, so that servicing is totally eliminated. Perhaps it is foolish to think about such a thing, but a set sold in tremendous volume for a very low price, so that a year's operation may satisfy the public, is not so ridiculous.

As matters stand today, we belive that such a low-priced receiver is out of the question. In fact, a set selling for as low as $5 or $10 would be expected to give more than one year's performance, so that service would be in order. Similarly, under no circumstances can we see any more service by the owner on his receiver than he performs on other devices in his possession.

Radio Not Simplest Home Device

As a matter of fact, a radio receiver is far more complicated than many mechanical devices being used in the home; moreover, it requires a much more specialized knowledge to perform maintenance. Maybe the receiver with the sprayed-on circuits and plug-in elements may cause some service complications, but most certainly this idea of "fixit-yourself" is so full of loopholes that it closely resembles the genuine Swiss cheese.

The entire situation strikes us as being very strange. Why single out radio receivers for the "fixit-yourself" program? The vacuum cleaner is much simpler and a toaster even more so. Have you ever seen vacuum cleaners or toasters advertised on that basis? Being a prognosticator is not our business, but somehow or other we cannot see public acceptance of this idea, even though servicemen have "relied on customer's ignorance of electronics to foist huge repair bills on him," to quote *Life* again. It may be of interest to all concerned that this huge, colossal, stupendous sum which the average serviceman is paid by the public, according to a recent survey, is $6 per set *including parts* and in the course of a year this average serviceman repairs 918 sets—an annual *gross* income of about $5500!

Servicing Yet to Be Outmoded

No one can say we are against progress, but is progress epitomized by thinking up something technical, regardless of its constructional features, and telling the public to do its own servicing, when to perfrom that service, *the services of others are required* We cannot see it that way at all. Frankly, the servicing industry can continue its efforts towards improvement of its technical level without worrying about this "new" idea as an obstacle in its path. What the public does not appreciate about service work in general is that technical knowledge is essential during diagnosis. Anyone who can handle a soldering iron can replace components, but to locate a fault—that demands theoretical knowledge.

Successful
SERVICING
REG U. S. PAT. OFF.
Vol. 9 SEPTEMBER-OCTOBER, 1947 No. 1
Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel
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A Mystery

SOMETIMES things happen which are understandable; othertimes the reason behind the occurrence is completely enigmatical. Such is the case of a recent request printed in SUCCESSFUL SERVICING for servicemen who were interested in becoming part of a communication receiver and transmitter manufacturer's service net. This manufacturer desired the names of service shops which had adequate equipment to service ham and other types of receivers. Out of a total serviceman distribution of 24,000 copies of SUCCESSFUL SERVICING only 19, and we repeat 19, service organizations responded.

Is this almost insignificant number of interested individuals a sign of complete disinterest to this fast developing field of activity? We wonder if the individuals who read that announcement and did not respond realized that such a relationship was a perfect stepping stone to familiarity with high frequency equipments, let alone additional income. Our recent survey shows us that almost 25 per cent of the men in the servicing business today have been in it for ten years or more. What happened to that group in connection with this request? They, the more experienced, should have flooded the manufacturer with at least requests for information—even if they never resulted in completed negotiations.

Does this mean that the servicing business enjoys more work than it can handle? Does it mean that the industry as a whole is disinterested in activity of this kind? Does it mean that the communication receiver is considered so complex that it frightens the men? The latter we just refuse to believe—for technically it is not so, especially in the light of the fact that more than 10 per cent of the nation's servicemen have "ham" tickets. What then does it mean? The more we think about it, the more confusing does the whole thing become.

Another detail which seems very upsetting is that only one out of the 19 replies was from a well-populated area—where the greatest concentration of hams is to be expected. Not a single reply from areas near the largest cities of the United States . . . Perhaps this can be explained by the fact that shops in this service net exist in those areas . . . That may be true, but in well-populated areas there is room for more than one shop—yet no response . . .

Perhaps the men's minds are occupied with FM and television, but even so, any well-equipped shop manned by competent personnel is capable of handling the communication receiver right in stride . . . That is the specific detail which is so hard to understand . . . Maybe some of the men who read

Please turn to page 6

The Cover

An aid in charting the course of the S.S. *America* is Raytheon Manufacturing Company's Mariners Pathfinder radar located in the chart room of the vessel. The *America* is one of 20 ships of the United States Lines to be equipped with radar.

●

Service Net for Electronic Control Equipment

With the increased distribution and use of industrial electronic control equipment throughout the country, the need for adequate servicing facilities has increased proportionately. One manufacturer of this type of equipment has requested our cooperation in placing his need before the readers of SUCCESSFUL SERVICING.

The Raytheon Mfg. Co., which produces electronic welding controls, motor controls, dielectric heating equipment, electrostatic precipitators, etc., desires to establish service facilities in the following key cities: Syracuse, N. Y., Pittsburgh, Pa.; Cincinnati, Ohio; St. Louis, and Kansas City, Mo.; Denver, Colo.; Minneapolis, Minn.; Memphis and Knoxville, Tenn.; and Dallas, Tex.

To meet its future servicing needs in these cities, the Raytheon Co. wishes to establish as its representatives, suitable firms already in the servicing business. The type of arrangement which it contemplates is one whereby servicing of Raytheon equipment will be performed at a fixed price per hour plus actual travel expense. Parts would be supplied from one of the company's present branch store locations throughout the United States.

In making this announcement, the Raytheon Company expressed the belief that there are continually arising new opportunities for the individual serviceman who is well equipped and well trained technically and who keeps abreast of the new developments and rapidly changing requirements in the electronic servicing field. It was stated that there must be many companies whose servicing needs can be met better and more economically by local service representatives than by full-time company service crews.

Inquiries about the Raytheon Co.'s new service network should be addressed to: Service Manager, Raytheon Manufacturing Company, Waltham 54, Mass. Letters should contain the fullest possible information about your educational background, electronic experience, available equipment, and size of shop.

Farnsworth P-51 Record Changer

The following procedure is required if it is desired to convert a 60-cycle-operated record player to 50-cycle operation:

50-cycle wire drive pulley #64401 replaces the 60-cycle metal pulley #55274 on the General Industries motor.

50-cycle wire drive pulley #64402 replaces 60-cycle wire pulley #64415 on General Industries motor.

50-cycle wire pulley #64399 is placed over 60-cycle nonremovable metal pulley on the Alliance motor.

50-cycle wire pulley #64410 replaces 60-wire pulley 64414 on Russell motor.

There have been many questions asked in reference to some suggestions pertaining to the satisfactory operation of this record changer. Below is a compiled list of service hints that may help you to understand and to correct certain faults in the operation of this changer:

Oversize Record Problems

An oversize record may bind between record plunger and spindle during changer cycle. To correct this condition to enable playing oversize records, loosen the three screws which hold the record support post to base plate and insert a 0.042 shim, #37269 underneath the front edge of the record support post (the edge toward turntable). The mounting screws may then be tightened.

If, after making sure the 10- and 12-inch needle landing adjustments are set correctly, the needle when moving in strikes the edge of the stack (especially when there are 6 or 8 records on the turntable), the tone arm lift rod adjustment is set too low to clear the record stack. Setting this adjustment to clear 12 records will eliminate this trouble.

On the early production run of P-51 changers, the plastic record support post was molded with a decorative ridge running vertical with the record support post. It was found that an oversize 12-inch record would rub this ridge. Two methods are suggested to correct this condition.

1. A small portion of the ridge may be removed with a file.

2. A part #36118 washer may be placed under the turntable. This positions the turntable slightly higher, thus clearing the ridge. The later production changer has a portion of this ridge removed.

Some complaints have been received of more than one record dropping at a time. Two causes can be attributed to this condition.

1. Failure of customer to lift the record stack clear of spindle, thus not allowing latch to drop down before setting records back over spindle.

2. When the record stack is removed, the spindle latch may remain in the up position due to a burr on the latch, insufficient lubrication of latch, latch pin fitting too snug, or latch itself being bent. To function correctly the latch must always point down when records are placed over the spindle.

"Wows" may be caused by (1) worn idler pulley, (2) C-washer under turntable slipped to one side, (3) insufficient lubrication between turntable spindle and turntable drive shaft, (4) bent spindle or bent turntable drive shaft.

The correct spacing for the friction trip assembly is 0.012 inch. The spacing between #50204 and the underside of the base plate should be 0.008 inch. Although in actual operation this spacing is between the under side of the base plate and the upper cork washer, it is important that the adjustment be made by inserting an 0.008 feeler gauge on top of the tone arm support post and under the tone arm support bracket.

Excessive click may usually be stopped by using an extra part #60438 spacer on the starting lever assembly. This should be installed on the under side of the starting lever assembly making a total of two washers on the under side and one on the upper side of the starting lever assembly. A part #62086 starting lever bumper that is worn down to the metal, will also cause click. This may be corrected by replacing with #07329 starting lever assembly.

NOTICE TO SERVICEMEN

As promised, Volumes XIII and XIV are once again available at your jobber.

Other Rider Manuals are being reprinted, the tentative dates of availability of these volumes are:

Abridged I-IV ....October
Volume VI .....October

Other volumes of Rider Manuals are now at your jobber.

A Mystery

Continued from page 5

these lines have the answer? . . . Would a few of the men who read the original announcement and decided not to communicate with the manufacturer please write to us and tell us why? . . . We're very much interested . . . And if you don't want to, you need not sign your name, but please tell us why!

Those whose interest may be revived by this editorial can still write the manufacturer. Look in the July 1947 issue of this publication for the details. Bear in mind that service operations must expand in accordance with the nature of equipment reaching the hands of the public. Many communication receivers are in the hands of people who are avid short wave listeners; some day they may get their tickets—today they derive enjoyment listening to the international operations of the amateur radio operator. But many, many times more receivers are used in the ham field, and this is a swell opportunity to break into those ranks. It's a shame to miss it.

Now for something else. This issue contains a notice concerning service operations in the industrial electronic field. Are there any takers?

JOHN F. RIDER

Rolling REPORTER

Random thoughts of a guy trying to bat out a "colyum" . . . I wonder if this hot weather is ever gonna quit and go back to Florida? They like it down there and *they're welcome to it.* . . . What to write—what to write on a day like this? Oh yeah, that reminds me—when the Legion descended on the town a bit ago they were all set for any heat casualties during the parades. They had a radio station rigged in HQ and a gang of portable xmitters along the route. If anyone passed out due to the heat (*or otherwise*) one of the mobile jobs was used to notify HQ the location of the casualty; then HQ radioed the first-aiders who quickied to the spot. . . . Heard too they had a bunch of ham rigs (K2AL) working so the Legionaires could keep in touch with the home front—and vice versa—with a minimum of effort. And speakin' of xmitters, there's a good hunka of our new f-m book that's explains that part of the job. . . . That's a tip for you hams and for a lotta servicers too for it's a good bet that in the not-too-distant future there'll be f-m xmitters used in places you never dreamed would have 'em. . . . *And you'll be asked to work on 'em.* . . . I wonder if some brain didn't give forth with something about prepare for the future today and to-morrow you'll hear the merry tinkle of the cash register. . . .well if someone didn't, he should had oughter. . . . What's next? I suppose I could do some poetry. Let's see. . . . There was a young gent from Lahore. . . . No, not that. . . . This is a colyum for home consumption. . . . Mebbe poetry ain't so good on a hot day. . . . I suppose I could tell about how the weather dopsters are using radar for finding out the whys and wherefores of hurricanes—how they fly radar-equipped planes right into the storm and take pix of the scope indications and from them they dope out all sorta things. . . . well, the war developments are sure being put to good peacetime use what with this and other things they're doing with radar. Gotta release from RCA a day or so ago telling about their new TV job with a screen 15x30 inches. . . . It'll be out among yuh before you realize it. . . .Let's see . . . what else can I tell you. . . . Honestly, gang, thinkin' on a day like this is sumpin I'd just as soon leave to someone else. . . . If that guy Aloysius W. only would use what the Lord gave him for a brain, I'd elect him chief thinker-up of things to write about here, *but I gave up anything like that looooong ago.* . . . But speakin' of doing other peoples' thinking for 'em, that's wot the Boss has been doin' for quite a spell when he started clarifying the schematix. . . . When you get your Vol. XVI in October, you'll find that the gang here has done its stuff once more and every multiband job is all nicely unbuttoned for you. . . . Wonder if the makers of asperin will get after the Boss for takin' away so many headaches by way of those clarifieds????? And there's another headache that's gone kapoot—now you can look up the whereabouts of some service dope in a Rider's Manual in just one index—the Master Index—instead of hunting through two or three indexes. . . . Gotta news release from Westinghouse telling about their model H-171, which is an arm-chair model set with phono. . . . The interesting thing is that the receiver can be lifted outa the cabinet and carried to any place where there's either a.c. or d.c.—"That's swell" was Aloysius' comment, *"but do they supply someone to carry the set for you?"* Oh, well—some folks ain't never satisfied. . . . Wandered down to the editorial dept. just now to see if they had anything I could use in here. . . . Saw a bunch of dummy pages getting readied and they were labeled **Vol. XVII!!!!** Just thought we'd tell yuh this so you'll know that already the boys are gettin' set to push out the next Manual for you. . . . Memo to myself: *steer clear of the editorial dept. from now on or they might try to put me to work.* . . . Did any of yuh get to the radio shows in Frisco or St. Louis? I had an awful time gettin' across the desert on the bicycle and I'm tellin' you now—that's the last time I do a stunt like that. . . . I haven't gotten the dust outa my throat yet *but I've been tryin'.* . . . By the way, you might be interested in knowing that the questionnaire in the July issue of S.S. stirred up lotsa interest. . . . We got a letter from the editor of an English radio magazine and apparently there's a similar mixup in symbols across the Atlantic. . . . We'll let you know the results as soon as we know ourselves. . . . Just gotta letter from **C. Thomas of Santa Cruz, Cal.** saying how much he likes S.S. and our books and Manuals. . . . Thanx, fer them kind words, Mr. T. I don't think we'll follow all your suggestions, though. . . . We've been able to send S.S. out for *13 years* now without charging and I don't think the Boss will change his policy now . . . however, with printing costs, paper and everything else imitating skyrockets these days you never can tell what things will be necessary to do—maybe double an issue, like this one. . . . Well, it looks as if this was enough to fill the colyum for this time. . . . Mebbe I'm so lacking in ideas right because my vacation is in the offing—about all I can think about is gettin' back to nature—somewhere that is practically *soundproof*—where they never heard of a pile-driver or air drill—and, of course, plenty of nice scenery with mebbe a placid lake in the foreground, autum foliage, and other things that a would-be artist likes to have handy—and say, if you've got any sort of a drag with the weatherman will you ask him to bust out some cool, sunny days long about the first of the month for the benefit of

The Rolling Reporter

Farnsworth P-51 Record Changer

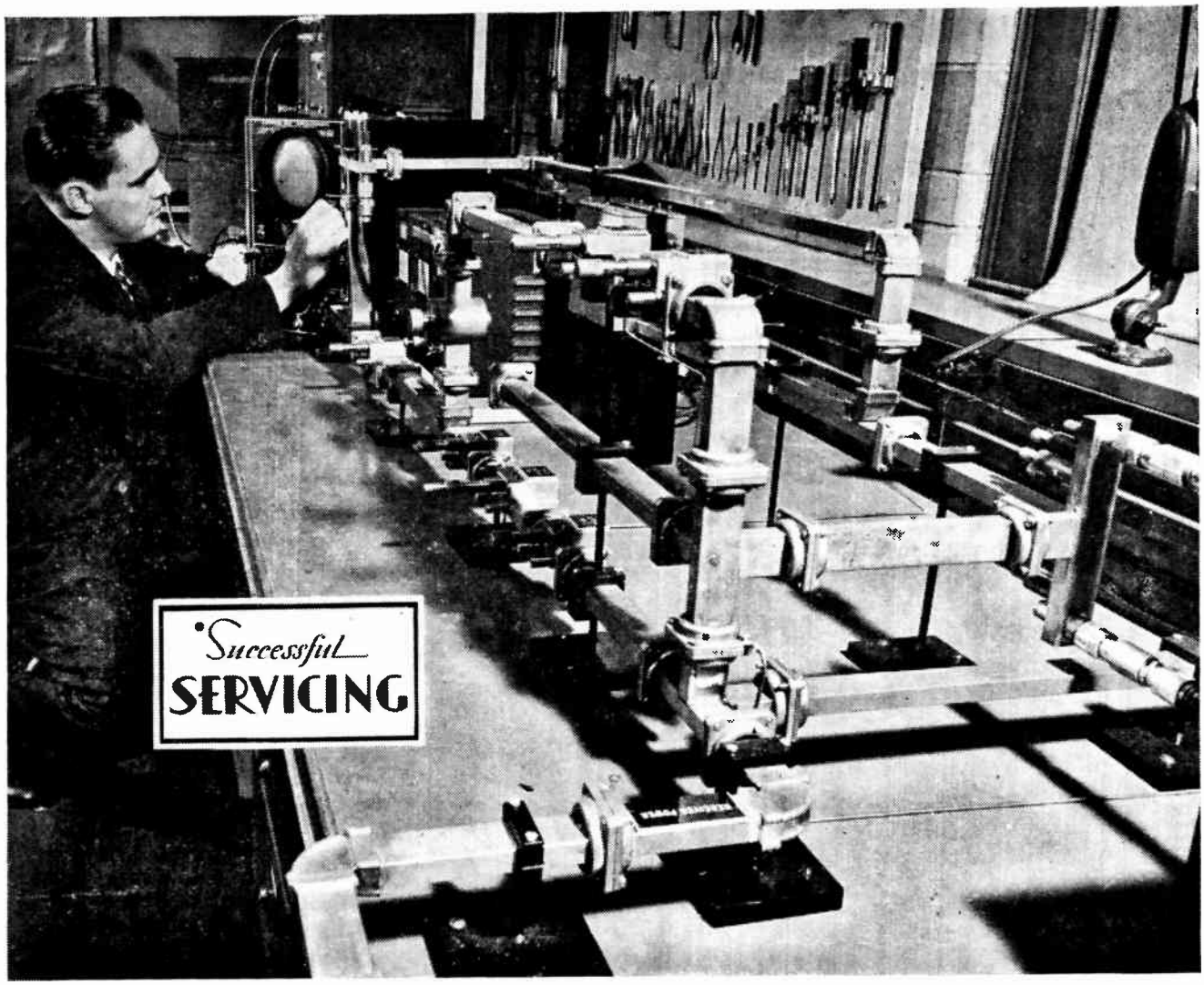
Continued from page 6

If changer fails to trip or reject a record, when record selector switch is placed in reject position, the following parts should be checked:

1. Check trip lever for position in relation to trip finger spring. The trip lever should be on the left side of the spring as viewed from underneath changer and with record support post nearest you.

2. If insufficient tension is applied to friction trip assembly, the trip finger may assume a position low enough to strike the ejector pin. This pin is located on the edge of main cam and is the pin with the largest diameter. Adjustment of tension on friction trip assembly should correct this condition. If, however, the trip finger has become bent, it will require reforming before satisfactory operation is obtained. When set correctly, the trip finger will clear the ejector pin but will strike the starting lever bumper.

All necessary notes and pictures pertaining to this Farnsworth record changer are found in *Rider's Volume XV,* beginning with *RCD. CH. page 15-1.*



OCTOBER-NOVEMBER, 1948

Courtesy Westinghouse Electric Corp.

A WORD OF CAUTION

By John F. Rider

TELEVISION is on everybody's tongue —inside and outside of the servicing industry... That is all well and good but it behooves the men who make their living servicing this nation's radio and allied equipments to take stock and grab that pendulum of interest and pull it down to a rational level . . . It has swung too far in one direction!

Understandably, the radio servicing industry cannot *change* the public's reaction to television. There is no doubt in anyone's mind that TV is one of science's greatest developments—a wonder of the ages. The public is eating it up and it is the serviceman's responsibility to be able to cope with the situation. That is something no one can deny . . . But is it sound to think of conventional radio as being dead duck? . . . Even so, thinking is one thing and doing is another—especially when the day the last small a-m receiver is junked because there will be no more a-m broadcast stations, is a long way off. Honestly, I'd hate to refrain from shaving until that day. I think I'd have a beard which could be used for a ski jump.

Everybody appreciates that the public is TV-minded and is not taking too keenly to console type receivers which cost several hundreds of dollars . . . That is an open secret in all places where TV exists or where it is expected to exist . . . It is also true that in many homes where several a-m receivers were in use, the present interest is the TV receiver recently purchased . . . The other receivers are not seeing the usual amount of use—in fact, it is entirely plausible that where each room contained its own receiver, the failure of one of these will not result in a rush call for a serviceman . . .

But don't kid yourself into believing that the intense interest being displayed by the TV-receiver owner at present is going to be maintained forever . . . Of course, TV is here to stay . . . It is a new member of society . . . Once a family has owned a TV receiver they will never give it up and eventually we shall see two or more receivers in a home, but that will be a long time off—many years in fact . . . The industry as a whole has much ground to cover before blanketing the nation with transmitters and receivers . . .

But the families who have TV are already feeling a sense of confusion—of restraint—of confinement and even frustration . . . The women are beginning to object to staying in every night, although they are the ones who want to see the program . . . Believe it or not, bridge playing has suffered and so has gin rummy and mah jong . . . With one set in the home and two excellent programs to watch, both being televised at the same

Please turn to page 4

RCA 54B1, 54B2, 54B3

These models appear on *pages 15-22 to 15-24 of Rider's Volume XV*. The position of the green and black leads of the second i-f transformer (stamped (922246-2) have been transposed to facilitate assembly. This change affects only the wiring, not the schematic.

●

Sears Roebuck 7056

This model appears on *pages 13-75 and 13-76 of Rider's Volume XIII*. The Astatic L-40A crystal cartridge should be used as a replacement cartridge for the phonograph pickup.

Noblitt-Sparks 664 and 664A

These models are the same as Model 6640, Chassis RE-206-1, appearing on *pages 17-16 to 17-18 of Rider's Volume XVII*, except that the loop assembly has been changed. The part number is AC18579-1.

●

Stewart Warner VM-506261 Record Changer

This model is the same as Model VM-505339, appearing on *pages RCD.CH. 17-14 to RCD.CH. 17-19 of Rider's Volume XVII*, except for color.

●

Wilcox-Gay 6B10, 6B20, 6B30, 6B40, and 6B42

These models are the same as Model 6B10, Late, *on page 15-4 of Rider's Volume XV*, except for the following changes. a 0.00005-μf capacitor (C34) has been connected across R38.

A 6E5 tube has been substituted for the 6U5; the socket connections are the same. A 6SJ7GT tube has been substituted for the 6J7GT formerly used. The socket connections for the 6SJ7GT are:

1 No connection	5 Cathode
2 Heater	6 Screen Grid
3 Suppressor Grid	7 Heater
4 Grid	8 Plate

Tie points are utilized for voltage measurements, see the accompanying voltage chart.

Arvin 140P, Chassis RE-209

This model appears on *pages 17-1 through 17-4 of Rider's Volume XVII*. The volume control mounting has been revised to prevent the dial-indicator eccentric mounted on the volume-control shaft from binding in its bracket. The mounting bushing on the control is slotted instead of threaded, and the control is mounted with a C20227 Speed Clip, instead of a 3/8-inch nut.

The following changes have been made in the oscillator circuit to increase the sensitivity. The 0.05-μf capacitor (C5) formerly located between the bottom of the oscillator tickler coil (L3) and floating ground, has been connected from the second grid of the 1R5 converter tube (pin 3) to the junction of the top of the tickler coil to the bottom of the primary of T1. The 22,000-ohm resistor (R3) is now connected in parallel with C5 instead of from the bottom of the tickler coil to the bottom of the primary of T1. The top of the tickler coil is connected to the bottom of the primary of T1 instead of to the second grid of the 1R5 converter tube. The 1R5 plate current as well as the screen current thus passes through the tickler coil.

To prevent audio oscillation, a 0.00025-μf bypass capacitor (C10) has been added from the plate to the positive filament of the 1S5 tube. The plate load of the 1S5 tube (R9) has been changed from 330,000 to 470,000 ohms. The value of R21 has been changed from 6.8 to 15 megohms. The value of C13 has been changed from 0.05μf to 0.02μf. The 0.05-μf capacitor (C19) has been changed from the input side to the plate side of L4 to reduce hash.

Since the clinch nuts in the top of the loop shield, which hold the screw in the top of the cabinet, have at times come loose, a brass extruded nut, part number A21681, has been made available for replacing these clinch nuts when they come loose.

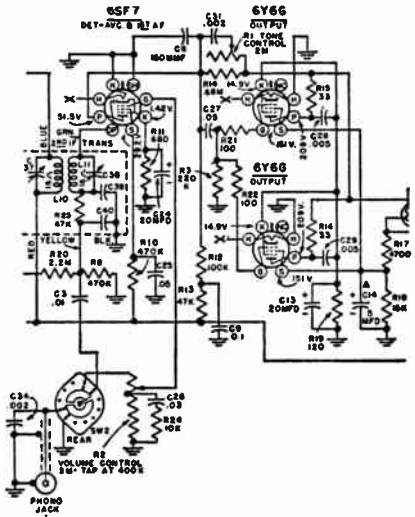
In the note under the resistance chart on *page 17-4 of Rider's Volume XVII*, K was shown as equalling 100 ohms. This note should read K equals 1000 ohms. The parts numbers given in the parts list on *page 17-2* for the miniature tube sockets were A21032-1 and A21032-2. These should have been A20132-1 and A20132-2.

A slide switch, part number A21051, has been added to the parts list.

●

Westinghouse H-110, H-111, H-137, and H-138, Chassis V-2102-1

These models are the same as Model H-104 on *pages 15-1 to 15-4 of Rider's Volume XV*, except that the tone control circuit has been modified. This change is illustrated in the accompanying diagram.



The modified tone control circuit of the Westinghouse Chassis V-2102-1.

Sonora RMR-219, RMR-220, RMR-245, 402A Mahogany and Prima Vera

These models are the same as Model RMR appearing on *pages 17-6 to 17-8 of Rider's Volume XVII.*

RCA 66X1, 66X2, RC-1038, 66X3, 66X4, 66X7, 66X8, 66X9, Chassis RC-1038A

These models are similar to Model 66X1, Chassis RC-1038, appearing on *pages 15-89 through 15-91 of Rider's Volume XV*. The following additions have been made to the parts list.

Stock No.	*Description*
72753	Plate—dial back plate complete with four (4) pulleys less dial for models 66X3, 66X4, 66X7, 66X8, 66X9
6134	Resistor—1200 ohms, 1 watt, (R11)
72514	Back—cabinet back for 66X7 and 66X9
72721	Back—cabinet back for 66X8
X1627	Baffle—baffle board and grill cloth for 66X7, 66X8, 66X9
Y1423	Cabinet—catalin (black) cabinet for 66X7
Y1408	Cabinet—catalin (red) cabinet for 66X8
Y1393	Cabinet—catalin (black and white) cabinet for 66X9
72822	Dial—glass dial scale for 66X3, 66X7, 66X8, 66X9
72678	Knob—control knob (black) for 66X7 and 66X9
71821	Knob—control knob (maroon) for 66X8
72295	Socket—phono

TYPICAL VOLTAGE CHART

TUBE	VOLTAGE TO GROUND PIN NO.							
	1	2	3	4	5	6	7	8
6A8	0	13	240	80	-10	156	13	2.6
6SK7	0	13	3.3		3.3	80	13	240
6SN7	0	232	6.5	0	55	1.6	13	13
6SQ7	0	0	1.5	0	0	68	13	13
6V6	0	13	225	240	0	240	13	13
6SJ7	0	13	0	0	0	3.3	13	80
5Y3	0	280		275AC		275AC		280
6E5	13	6	0	240	1	13		

MEASURED WITH 1000 OHMS PER VOLT METER.
SCALES USED -3-30-150-300

ALL PLUNGERS IN RELEASED POSITION.

Typical voltage chart for the Wilcox-Gay 6B10. 6B20, 6B30, 6B40, and 6B42.

Sentinel 1U286

This model is the same as Model 286PR on *pages 16-14 to 16-16 of Rider's Volume XVI*, except for the following changes.

A 0.1-μf capacitor (46) has been placed between pin number 6 of the 1R5 oscillator-modulator tube and the top side of the ganged tuning capacitor. A 470,000-ohm resistor (48) has been connected in the avc line between the top of the 0.05-μf capacitor (14) and the 4,700,000-ohm resistor (35). A 0.05-μf capacitor (47) has been connected from the junction of resistors 48 and 35 and ground. Two interlock plugs have been added in the power line. The i-f transformers (2 and 3) may either be the transformers listed in the parts list on page 16-16, or they may be part number 20E299.

The following parts should be deleted from the parts list shown on page 16-16.

Illus. No.	Part. No.	Description
8	23E2014-6	Capacitor, tubular, 0.01 μf, 150 V.
10	23E2014-6	Capacitor, tubular, 0.01 μf, 150 V.
11	23E2014-6	Capacitor, tubular, 0.01 μf, 150 V.
12	23E2014-6	Capacitor, tubular, 0.01 μf, 150 V.
13	23E2014-6	Capacitor, tubular, 0.01 μf, 150 V.
14	23E2014-8	Capacitor, tubular, 0.05 μf, 150 V.
16	23E2014-12	Capacitor, tubular, 0.002 μf, 150 V.
17	23E2014-9	Capacitor, tubular, 0.01 μf, 150 V.
46	23E2014-9	Capacitor, tubular, 0.1 μf, 150 V.
23	23E680-3	Resistor, carbon, 68 ohm, ½ W.
	20E128	"A" battery con. bracket assembly, with 4 No. 10E43 trimount studs
	20E130-1	Complete cabinet assembly, with lid and loop, handle, lid catch and pushbutton assembly and bottom assembly
	20E134	Top lid assembly with loop and hinges
	20E135-1	Bottom assembly with locking slotted head stud
	30E25-1	Cabinet center section, less lid and bottom assemblies, with handle, speaker screen, lid catch and pushbutton
	20E136-1	Hinge and spring assembly with two No. 82E36-F10 No. 4-24 x ¼ mounting screws
	55E22-1	Handle, leather
	71E42-F10	Screw, No. 4-40 x 3/16 slot B.H.I.M.

The following parts should be added to the parts list.

Illus. No.	Part. No.	Description
8	23E2004-5	Capacitor, tubular, 0.01 μf, 200 V.
10	23E2004-5	Capacitor, tubular, 0.01 μf, 200 V.
11	23E2004-5	Capacitor, tubular, 0.01 μf, 200 V.
12	23E2004-5	Capacitor, tubular, 0.01 μf, 200 V.
13	23E2004-5	Capacitor, tubular, 0.01 μf, 200 V.
14	23E2004-7	Capacitor, tubular, 0.05 μf, 200 V.
16	23E2004-2	Capacitor, tubular, 0.002 μf, 400 V.
17	23E2004-8	Capacitor, tubular, 0.01 μf, 200 V.
23	27E680-3	Resistor, carbon, 68 ohm, 1 W.
44	20E280-2	Switch, lid operated, mounted on "A" battery bracket assembly
45	20E284	Interlock, socket assembly
46	23E2014-9	Capacitor, tubular, 0.1 uf, 200 V.
47	23E2014-8	Capacitor, tubular, 0.05 μf, 200 V.
48	27E47-7	Resistor, carbon, 470,000 ohm, ¼ W.
48	20E284	Interlock, socket assembly
	20E130-3	Complete cabinet assembly with lid and loop, handle, lid catch and pushbutton assembly and bottom assembly
	20E134-3	Top lid assembly with loop and hinges
	30E25-3	Cabinet center section, less lid and bottom assemblies, but with handle, speaker screen, lid catch and pushbutton assembly.
	20E136-2	Hinge, right hinge and spring assembly with two No. 82E36-F10 No. 4-24 x ¼ mounting screws
	20E136-3	Left hinge and spring assembly with two No. 82E36-F10 No. 4-24 x ¼ mounting screws
	20E280-2	Complete "A" battery bracket assembly with lid operated switch assembly
	20E288	"A" battery contact plate assembly
	52E23	Plastic covered handle
	55E39	Handle strap, clock spring steel
	85E4-21	Screw, No. 4-40 x 3/16 Slot headless cup point for control knobs
	82E2004	Screw, for adjusting lid switch shaft

Arvin 150TC, 151TC, Chassis RE-228-1

These models are the same as Model 150TC appearing on pages *17-5 to 17-8 of Rider's Volume XVII*, except for the following changes. The 35W4 rectifier tube has been replaced with a 100-ma selenium rectifier. The 35B5 output tube has been replaced with a 50L6 output tube. A negative temperature coefficient resistor has been added in the filament line. The filter choke has been replaced by a 1200-ohm resister and a tap on the output transformer. The 0.005-μf tone capacitor has been replaced with an 0.003-μf capacitor.

DELETE

REF. NO.	PART NO.	DESCRIPTION
	A19141	Terminal Strip, Double
	B21123-1	Tube retainer Spring, long
R13	C20060-331	Resistor 330 ohm ¼
R14	C20070-123	Resistor 11,000 ohm ¼ W
R15	C20060-104	Resistor 0.1 Megohm ¼ W
L3	AE21107-1	Filter Choke Assembly
T3	AE21099-1	Output Transformer

ADD

REF. NO.	PART NO.	DESCRIPTION
	A19140	Terminal Strip, Single left hand
	A18254-1	Socket, tube wafer octal
SR	A20207-2	Selenium Rectifier
T3	AC21494-1	Output Transformer
NTCR	AC21489-1	N.T.C. Resistor and Can Assy.
C10	C20069-302	Capacitor 0.003 μf 600 V P.T.
R13	C20223-122	Resistor 1200 ohm, 2W. ± 10%

Montgomery Ward 74BR-1812B

This model is the same as Model 74BR-1812A appearing on *pages 16-17 through 16-21 of Rider's Volume XVI.*

Wells-Gardner 7A41-593

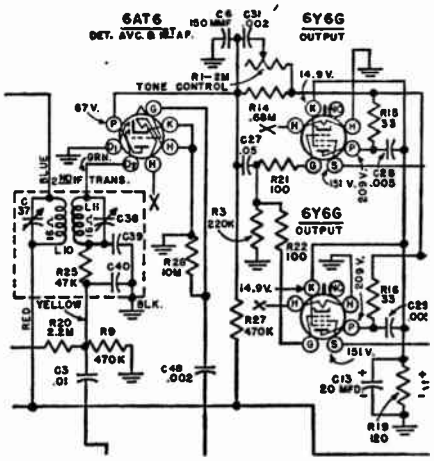
This model is the same as Model 7A41-704 appearing on *pages 12-8 to 12-11* of *Rider's Volume XII.*

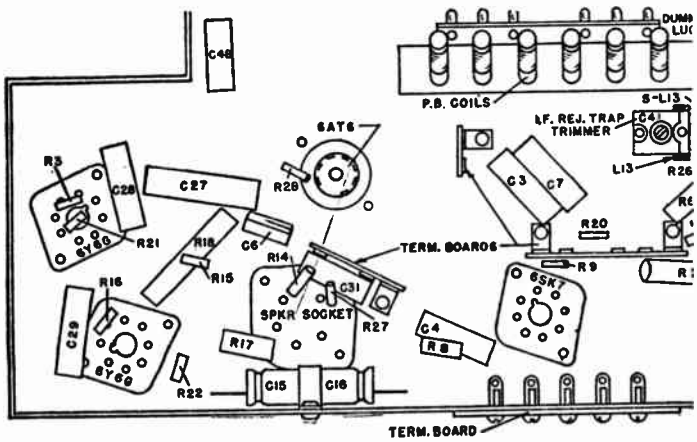
Westinghouse H-110A, H-111A, H-137A, and H-138A, Chassis V-2102-2

These models are the same as Model H-104 on *pages 15-1 to 15-4 of Rider's Volume XV*, except that the tone control circuit has been modified and a 6AT6 miniature tube replaces the 6SF7 tube used originally. The tube layout is the same, but certain components have been added, as may be seen in the accompanying diagrams.

The following parts should be added to the parts list.

Part No.	Description
RCP10W6202A	Capacitor, 0.002 μf, 600 v. (C48)
RC10AE474M	Resistor, 470K ¼ w, (R27)
RC10AE106M	Resistor, 10M ¼ w. (R28)





Changes in the tone control circuit, above, and in the parts layout, left, of the Westinghouse Chassis V-2102-2.

A Word of Caution

Continued from page 1

time from different stations, a difficult problem is posed . . . Which one to watch is a problem, so much so that many people are becoming very highly selective.

TV Effects on Family Life

As a facility, TV is changing peoples' lives—changing the way they live in their homes . . . At the outset people stay in and watch everything which can be seen on a single receiver, but after a while they have not done the normal amount of reading—they don't get together with their friends (who also have TV receivers) until comparatively late in the evening . . . Yes, people are watching TV but they also realize that they have lost the independence of action in the home because of the attraction of TV.

The net result is that in homes where TV receivers have been in use for several months, members of the family are beginning to return to normalcy little by little . . . They are becoming more and more critical and selective of TV programs—and use their a-m receivers more than they did shortly after they acquired the TV receiver . . . This is no reflection on the merits of TV, instead it is habit fighting back . . . In our opinion it is even more than habit—it is a way of life which is striving to stave off a transition . . . Ultimately—many years in the future—this way of life, which was born of what we can call blind radio, will go down to defeat, but for years to come it will survive.

This reaction I am describing is not a figment of imagination—it is the reaction of the members of my family and the families of my friends . . . And not only in New York, but in Philly and Washington as well—wherever there is a choice of stations with a representative number of hours on the air . . .

The Feminine Angle

The response by women to radio broadcasting over the past 28 years is the reason for its success. Everything will be done to accomplish the same thing with TV, but to do so means that more than one TV receiver will be needed in every home—conceivably as many as there are a-m receivers today . . . Moreover, the development of such programming for feminine appeal as will permit turning off the video and listening to the sound alone, is a herculean task; that is, if leaving the picture on and having such dialogue, sound effects, side comments and the like—all the things which stir the imagination in blind radio, will make the telecast childish, if not foolish . . . The woman must be served . . . If she wishes, she can listen while cooking the dinner in the kitchen—reclining on the sofa in the living room or turning over the mattress in the bedroom . . . She can't be bothered *looking* while she is working . . . Neither will she accept a blasting radio in one room while she is working in another . . .

Where does all of this lead us? . . . It leads to the conclusion that a-m radio is far from being dead even in the towns where TV now is plentiful—let alone all those parts of the country where TV is not yet available and may not be for a long time to come . . . As we said before, the public in TV areas may be shying away from the expensive a-m and f-m consoles—not because a.m. is finished, but because they feel that for the money involved, they want TV . . .

A. M. Still a Factor

The serviceman who thinks that a.m. is gone forever is making a bad mistake . . . It is fine to prepare for TV but to cease actively soliciting a-m receiver repair by focusing every minute of thinking upon TV, is not sound business . . . In fact, it is aiding and abetting a situation which is pouring oil on a fire . . . The power of suggestion contained in the various forms of advertising and sales and service solicitation should never cease functioning . . .

Admittedly, a thorough understanding of the operation of the TV receiver automatically means a thorough grounding in the operation of a-m and f-m receivers, but to permit the mind to dwell *only* on TV and to lose sight of the bread-and-butter a-m business, is all wrong. TV repair should be taken in your stride and since there is no home with TV which does not have one or more a-m receivers, *these receivers, which are far from being has-beens, should not be neglected.*

Perhaps a few years from now, the existing service potential of 70,000,000 a-m and f-m receivers in use will dwindle to perhaps one half or even one third, but even a few years is still a long way off . . . Perhaps the acceleration of the defense program with inevitable contraction of available supplies of hard goods, may tend to limit TV receiver production so that it will take longer than the anticipated time to blanket the nation . . . *Will the servicing industry give up its possible a-m and f-m receiver income awaiting the arrival of TV?* It is sound to visualize the destiny of the servicing business being in the lap of TV, yet it is equally sound to take advantage of every opportunity to do business—and very unsound to think that something which is still necessary to the completion of this nation's people's everyday life, will just shrink of nothingness overnight.

Please turn to page 9

Successful SERVICING
REG. U. S. PAT. OFF.

Vol. 10 OCTOBER-NOVEMBER, 1948 No. 2

Dedicated to the financial and technical advancement of the Electronic Maintenance Personnel

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JOHN F. RIDER, Editor G. C. B. Rowe, Associate Editor

CURTAIN TIME

A New Wrinkle for TV

We hear that those homes with television find it very easy to get baby sitters . . . In fact, competition is developing between the professional watchers of the infant and the neighbors who do not own TV receivers . . . Maybe that feature should be advertised more—especially if sandwiches, beer and candy also are furnished.

Factory TV Service

We saw a release which stated that RCA has ceased the mandatory factory service during the first year after the purchase of a TV receiver. *Now it is optional on the part of the set buyer* . . . We are not certain that the mandatory service program was national in scope, but having been dropped in Metropolitan N.Y. and Philadelphia, it is probably true in Chi and wherever else it may have existed . . . May we refer you to *Service* Magazine page 14, November, 1946 and SUCCESSFUL SERVICING page 5 May, 1948! . . . Stewart-Warner has opened TV servicing on their products to the independent serviceman. Replacement parts also are available.

A Reminder . . . Read the feature article in this month's SUCCESSFUL SERVICING once more . . . Maybe you read it too rapidly or were interrupted . . . We've been writing that story since December, 1947 and even if it is our own, we think that it deserves at least *30* minutes of your thinking—no matter where you are in the nation.

We Are

Just Wondering . . . What's the difference between the sound channel in a TV receiver and an f-m receiver? . . . Nothing much—higher frequencies—somewhat differently shaped i-f response curves . . . The over-all basis of operation is the same . . . But do you know your FM? . . . What's the difference between the pix system in a TV receiver, (exclusive of the sweep circuits and the picture tube) and the conventional receiver? . . . Basically, that is superheterodynewise speaking—nothing much . . . Higher frequencies, shaped i-f response curves—wider bandpass . . . But do you know the meaning of bandpass and how it is accomplished in different types of coupling systems? . . . One TV receiver manufacturer employs bridge-T coupling circuits in the pix i-f amp—something which is well-known in engineering circles, but we have not seen it used in any other home receiver of any kind . . .

Then come the sync and sweep circuits and the picture tube . . . There's the rub in TV servicing . . . Learn the facts about these parts of the TV receiver and you'll find TV servicing just as easy as any other type of receiver! . . . TV isn't tough . . . Every serious minded serviceman who desires to learn the theory can do so . . .

Just Suggesting . . . Many good test oscillators are in the hands of the servicing industry . . . It is not beyond the realm of good engineering to produce an f-m oscillator and marker-frequency source WHICH CAN BE USED WITH EXISTING TEST OSCILLATORS or SIGNAL GENERATORS which service stations now possess . . .

Service Associations . . . Those of you who sent us their names should have received our contribution to your association library by the time you read these lines . . . Those of you who wonder what the previous sentence meant, please refer to the August issue of SS Curtain Time page . . .

JOHN F. RIDER

MORE PAGES

In line with the Rider policy of giving the readers of SUCCESSFUL SERVICING up-to-the-minute data on changes made in the course of receiver manufacturing as well as articles of timely interest to the service industry, we have enlarged this issue by four pages to accomodate the changes made in television receivers, whose data have been published in Rider's TV Manual Volume 1.

Association Libraries

In accordance with the offer which was made in the editorial of the August, 1948 issue of SUCCESSFUL SERVICING, we have presented "FM Transmission and Reception", "Understanding Vectors and Phase", and "Television—How It Works" to the following associations for their libraries:

If your organization is not listed below, it is because we have not received your name and address.

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Howard Claiss, Pres., Radio Serv. Assn. of Tucson, Tucson, Ariz.
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Television Changes

Transvision 12-Inch Kit

This model appears on *pages 1-51 to 1-53 of Rider's TV Manual, Vol. 1.* In cases where the horizontal hold control when set to the extreme position still does not result in proper locking, the 470,000-ohm resistor from pin #1 of the 6SN7 horizontal oscillator tube, X-6, to ground should be removed.

At certain times radiation of approximately 175 mc has been found to originate in the horizontal flyback circuit. This condition can be corrected by placing a 50-ohm, ½-watt resistor in the plate lead of the 6BG6G tube, X-4. This resistor will act as a parasitic suppressor.

In cases where the picture width is not sufficient and replacement of the sweep tubes, has not corrected this condition, the 680,000-ohm resistor connected from pin #2 of the 6SN7 horizontal oscillator, X-6, to ground should be checked and replaced if necessary.

Philco 48-2500-5 (50 Cycles), Code 122, Run 1

This model is the same as Model 48-2500, Code 122, appearing on *pages 1-23 to pages 1-43,44 of Rider's TV Manual, Volume 1,* except for the following changes. An additional 30-μf capacitor, part number 30-2568-19 has been added in parallel with C100. The power transformer has been physically repositioned.

General Electric 901 & 910

These models are shown on *pages 1-75 to 1-81, 82 of Riders TV Manual, Volume 1.* The input transformer, Stock No. RLA-033 is made available for addition to the Models 901 and 910 television receiver to provide a balanced input to ground for the transmission line. This eliminates direct pickup on the transmission line, of noise pulses and also video i-f harmonics radiated from the receiver.

PROCEDURE:

(See Figures for Reference)

1. Unsolder C1, 300-ohm transmission line and green lead from terminal board on top-rear of r-f head-end unit.

2. Remove two screws holding terminal board. Save two brass grounding straps, discard terminal board along with L2 and C2.

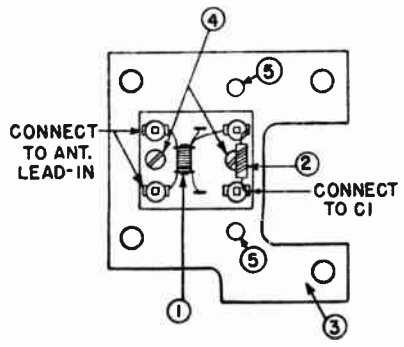


FIGURE 1

The parts layout necessary to provide a balanced input to ground in the GE television receivers 901 and 910.

MATERIAL REQUIRED:

Description	*Stock No.*	*Fig. 1 Reference*
1—Antenna Input Transformer	RLA-033	1
1—Series Choke	RLI-037	2
1—Mounting Plate	RAP-008	3
4—#4-40 x 5/16" Screws, Nuts, & Lockwashers	.....	4

3. Remove green wire and 1.0-megohm resistor R175 from BC and SW external antenna terminal board, and discard parts. The green lead is end of lead removed in step (1).

4. Remove two screws holding the terminal board mounting plate to the r-f head-end unit. Remove the screw and two spacers which support this plate to main chassis. Discard mounting plate.

5. Asemble transformer (1) Stock No. RLA-033 to mounting plate (3), Stock No. RAP-008, using two #4-40 x 5/16" screws, nuts, and lockwashers. Solder choke (2), Stock No. RLI-037, as shown in schematic, Figure 3, and mechanically mount as shown in Figure 1. Also, fasten the two brass ground straps, removed in step (2), to the holes (5) shown in Figure 1, using two #4-40 x 5/16" screws, nuts, and lockwashers.

6. Re-assemble mounting plate and transformer assembly to the head-end unit, using the same self-tapping screws removed from original mounting plate.

7. Solder C1 to choke as shown in Figures 1 and 3.

8. Re-connect antenna input transmission line to terminals as shown in Figure 1.

9. The label on the cabinet back under the hole through which connections are made to the terminal board for "external antenna for broadcast and short wave" must be changed. The change consists of blocking out with black ink, the link connection shown for dipole antenna. Provision is still provided for using an external antenna on BC and SW, but it must be independent of the television dipole and transmission line.

Prevention of L-F Rumble.

To prevent low-frequency rumble on the f-m band of Models 901 and 910 when squelch is in operation, the following procedure should be followed.

Remove the receiver chassis from cabinet. View the squelch switch, S4, with the receiver chassis upside down and with operating controls toward observer. The lower right-hand terminal on squelch switch has connected to it a green wire, the other end of which connects to the junction of a 1.0-megohm resistor, R111, and a 1500-$\mu\mu$f ceramic capacitor, C105. Between this switch terminal and the nearest ground tab on an adjacent electrolytic capacitor, solder the 0.25-μf, 400 V paper capacitor, Stock No. UCC-442.

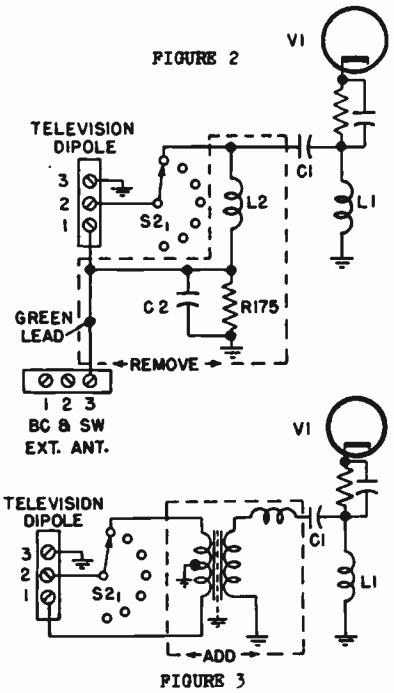


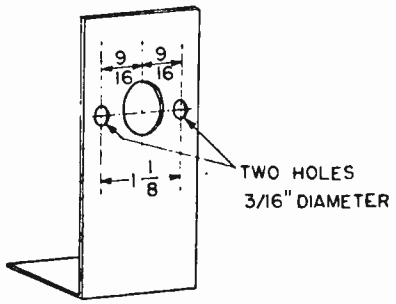
FIGURE 2

FIGURE 3

Schematic of unbalanced input to ground of GE 901 and 910, above, showing parts to be removed. Schematic of balanced input to ground, below, showing parts that were added.

Crosley 307TA

This model appears on *pages 1-1 to 1-17, 18 of Rider's TV Manual, Volume 1.* To substitute the original e-m speaker (part no. 139199) with a p-m speaker (part no. 134942), disconnect the two secondary leads of the output transformer from the original speaker. Do not disconnect the field coil.



The holes that must be drilled in the speaker bracket of the Crosley 307TA to accomodate a p-m speaker.

Fasten the original speaker to the right hand side (facing front) of the cabinet with two small wood screws. Make certain that these screws are not long enough to protrude through the cabinet.

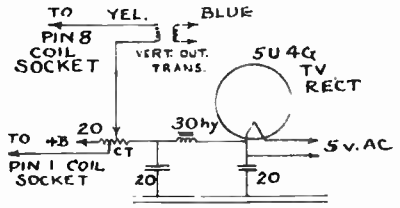
To mount the p-m speaker (part no. 134942), it is suggested that two 3/16 inch holes be drilled in the speaker bracket, as illustrated:

These holes will line up with the two holes on the rear of the speaker and will permit the voice coil lugs to be in a position that will allow the output transformer leads to be easily attached and soldered.

Television Changes

Remington Radio 80, 130

The following changes have been made in these Rembrandt models which appear on *pages 17-1 to 17-9, 10 of Rider's Television Manual, Volume 1.* The horizontal linearity control at the rear of the chassis has been replaced with a 500,000-ohm fixed resistor and the space has been utilized for a vertical centering control. This control is a 20-ohm center-tapped potentiometer. The television rectifier



The change in the power supply of the Remington 80 and 130 to produce the necessary centering voltages.

feeds the entire television section through this control. The two remaining taps on the control are wired in series with the vertical output transformer secondary after the ground has been removed from this secondary. This arrangement allows the B-plus current of the television section either to oppose or aid the vertical sweep voltages, thus producing the necessary centering voltages. This is shown in the accompanying diagram.

The horizontal hold control has been changed to one of a lower value (25,000 ohms), resulting in a less critical adjustment for the holding voltage. Full rotation of this new control will produce very little horizontal tearing at the extreme settings, if the circuit is properly balanced. A 100,000-ohm screwdriver-type control placed in series with the hold control, allows proper balancing of this circuit. This control has been placed approximately in the top center of the chassis.

Admiral 30A15, 30A16

Damage to circuit components (such as horizontal output transformer T402) may result from failure of the 6BG6G horizontal output tube (V407), which is shown in *Rider's TV Manual, Vol. 1 on page 1-11, 1-12.* A minor circuit change is necessary in order to provide adequate fuse protection. The modified circuit results in improved horizontal centering as well as fuse protection. Present production now incorporates this circuit modification.

The following circuit modification should always be made when major repairs are made on a television receiver chassis which does not already have a fused circuit.

Fuse Protection Conversion Kit 98A50-8 contains the following parts and material:

C426	0.5 mfd., 200 Volts, Paper	64B 6-27
M402	Fuse, Cartridge, 0.25A/ 250 Volts.	84A 4-2
	Fuse Holder	84A 5-1
	S. T. Screw, #6x½"	1A 51-6-2
	Spaghetti tubing, 1-¼" length	96A 2-5
	Hook-up wire, glass braid, white, 7" length	95B 10-20-20-92

The circuit modifications are made as follows:

1. Remove C426 and R436.
2. Clip out jumper wire betwen terminals 1 and 2 on tie-strip "A".
3. Remove lead on R432 from terminal 3 of tie-strip "B" and reconnect to terminal 2 of tie-strip "A".
4. Disconnect red wire from terminal 1 of tie-strip "A" and reconnect to terminal 3 of tie-strip "B".
5. Disconnect deflection yoke lead (yellow) from terminal 5 and reconnect to terminal 1 on tie-strip "A". Do not disconnect yellow lead from focus coil (this lead must remain connected to terminal 5).
6. Insulate one lead of a 0.5-μf capacitor (64B6-27) with a 1-¼" length of spaghetti tubing (96A2-5). Solder capacitor mounting strap to chassis next to terminal 3 of tie-strip "A". Connect capacitor between terminals 1 and 2 of tie-strip "A", insulated lead on terminal 2. See Fig. 2.
7. Connect a 7" length of wire (95B10-20-20-92, white with red tracer) to terminal 1 of tie-strip "C". Insert free end through nearest hole at rear of chassis (for connection to fuse holder in 9-kv rectifier compartment).
8. Use a #36 drill bit to drill a hole 1-⅛" from rear of chassis and 2-¼" from left side of chassis. Since there is not too much room to work in the 9-kv rectifier compartment, it is convenient to dismount R435 and remove V409 from its socket while drilling the hole as described above. This hole permits mounting the fuse holder with a #6 self-tapping screw (1A51-6-2). See Fig. 3.
9. Cut lead (white with yellow tracer) 2-¾" from terminal #5 on horizontal output transformer T402. Skin back the two ends ¼" and tin. Solder both wires to the fuse holder terminal nearest rear of chassis.
10. Connect white wire red tracer (see step 7) to other terminal of fuse holder.
11. Press 0.25-amp fuse (84A4-2) into the fuse holder clips. Check lead dress to avoid possible shorts before placing receiver chassis in operation.

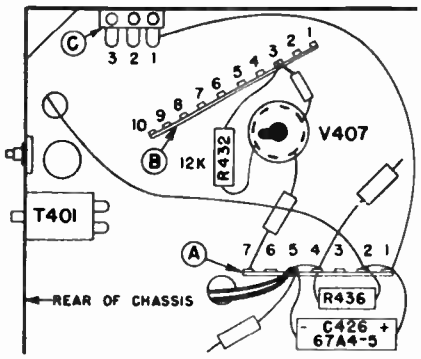


Fig. 1 ORIGINAL CIRCUIT

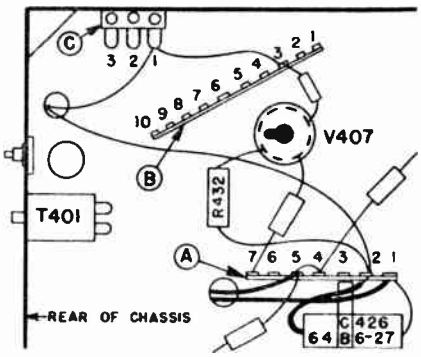


Fig. 2 MODIFIED CIRCUIT

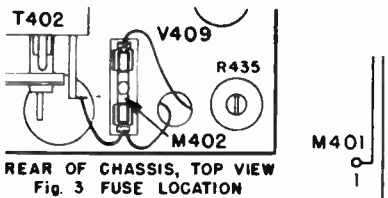


Fig. 3 FUSE LOCATION

Figure 4

Changes in the Admiral television receivers 30A15 and 30A16.

Television Changes

General Electric 801, & 802

Models 801 and 802, appearing on *pages 1-28 to 1-72 of Rider's TV Manual, Volume 1,* using the 48-square-inch mask may be converted to the larger size 52-square-inch mask by replacing it with mask, Cat. No. RDM-011. In some cases to get the additional width, it may be necessary to replace the original horizontal sweep output transformer with a new horizontal sweep output transformer, Cat. No. RT0-048.

Picture Tubes

Picture tubes 10FP4 and 10BP4 are interchangeable mechanically. Electrically, these tubes may be interchanged by adding an ion trap assembly, Cat. No. RET-001, to the 10BP4 tube, as explained in the service notes for these models. The 10FP4 does not require the ion trap. Therefore, when the 10FP4 replaces a 10BP4, it is only necessary to discard the ion trap assembly.

●

Hallicrafters T-54, 505

The following chances have been made in these models during production. The complete schematic appears on *TV page 1-29, 1-30 in Rider TV Manual Vol. 1.*

Resistor R9 (3300 ohms, 2 w) in the plate circuit of the 6C4 oscillator tube, has been replaced with two 6800-ohm 2-w carbon resistors in parallel.

The two 47,000-ohm resistors, R41 and R42, in the plate circuits of the 12SN7 horizontal amplifier, have been changed from 1 watt to 2 watts each, the resistance value remaining the same.

A further reduction of residual hum is effected by adding a 1000-$\mu\mu$f ceramic capacitor to bypass the plate circuit of the 6C4 oscillator and one of the same value in the filament of the 6X5 rectifier. This hum is most apparent on the higher frequency channels with the volume control turned to minimum. These capacitors have been added as follows:

A 1000-$\mu\mu$f, 150 v, ceramic capacitor is connected from the filter capacitor side of the 100-ohm oscillator plate resistor R8 to ground. This capacitor is to be installed at the terminal strip which is just below the 6C4 oscillator tube socket.

A 1000-$\mu\mu$f, 150 v, ceramic capacitor is now connected from the filament pin 2 of the 6×5 rectifier socket to ground.

The position of the 7JP4 in the heater string has been changed to provide additional protection for this tube. It is now connected in series with the 6X5 rectifier filament from the high side of the 1000-$\mu\mu$f capacitor mentioned in the preceding paragraph, and the junction of pin 3 of the 6AG5-1 mixer and pin 7 of the 6SH7-5 audio amplifier. Resistor R92 (18 ohms) is now connected to the high side of the 0.1-μf capacitor, C36.

In certain installations, such as those in office buildings, stores, and large hotels, there is generally a large amount of hum and low-frequency noise, appearing on the television antenna lead-in. This hum and noise tends to cause intermodulation in the r-f stages and is most noticeable when the receiver fails to sync properly, with the picture erratically jumping across the face of the picture tube. In most cases, this trouble may be cured by grounding the shield or one side of the antenna lead-in.

On all T-54 and 505 Television Chassis, Serial No. 61436 and higher, a change has been made in the antenna circuit to minimize the effects of hum and low frequency noise as described above, and may be simply made on all chassis previous to Serial No. 61436, as follows:

Install a 1000-$\mu\mu$f ceramic capacitor in series with each side of the antenna lead, on the antenna side of the antenna coil. These capacitors should be installed under the chassis at the antenna coil terminal strip.

Remove the 47-$\mu\mu$f ceramic capacitor C3 in series with the antenna coil center-tap, and connect the center-tap directly to the chassis ground.

The first television models T-54 and 505 had a tendency to arc between the high voltage pins in the viewing tube socket and the metal bracket holding the socket. As a temporary expedient, the tube socket recesses were filled with wax to offer insulation between the pins and the bracket. This insulation was found to be unsatisfactory. As a temporary expedient, the tube socket recesses are now filled with Dow-Corning Compound No. 4 Ignition Seal, available from any automotive house.

As a permanent correction, the tube socket metal mounting bracket is being re-designed with cutouts giving space separation between the five high voltage pins and the metal mounting bracket.

In some cases, cathode to filament leakage develops in the 6SH7 tube first audio stage after some usage. When this happens, hum is encountered. It is suggested that the 6SH7 be replaced with a 6SJ7 tube, which has a lower leakage characteristic. No modification of the chassis whatever is required for this change. This change is being made in production in the very near future.

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Admiral Television Interference Trap A1711

Due to the broad bandwidth requirements, television receivers are inherently susceptible to image and beat frequency interference. Such interference is frequently caused by f.m. and other radio services using the frequencies in the 109-mc band. The trap herein described is for the purpose of eliminating such interference.

Solder two short pieces of tinned copper wire to the antenna lugs of the RF tuner unit. The trap mounting position is just above the antenna lugs and so oriented that the 6J6 r-f tube is midway between the two coils in the trap. Bolt the trap to the chassis using the rear tuner mounting bolt. Solder the front leg of the trap assembly to the chassis using a heavy soldering iron. Solder the two tinned leads, previously connected to the tuner terminal lugs, to the trap terminals.

If the sound or video interference is of unknown origin and frequency, the two slug adjustments on the trap must be alternately adjusted in small steps starting at the fully counter-clockwise setting of the slug adjust screws. Continue this process until the interference is completely eliminated or reduced as much as possible. If no change in the interference condition can be effected, the interference frequency must be outside of the trap tuning range. It cannot then be eliminated by the use of this trap.

The above process can be used in an attempt to eliminate audio or video interference without test equipment. The following procedure may be used when the interfering signal can be identified and its frequency determined.

1. Set a Measurements Model 80 signal generator to the frequency of the interfering signal.
2. Connect the generator to the antenna terminals using a 150-ohm series resistor in each lead.
3. Adjust the tuning of the trap so that it eliminates the interference caused by the generator signal.
4. Disconnect the signal generator from the television receiver antenna terminals.
5. Connect an antenna to the receiver.
6. Make a fine adjustment of the trap for maximum rejection of the interference signal. Little adjustment should now be necessary since the trap has been pre-set using the signal generator signal.

The approximate range of this trap is from 94 to 113 mc.

●

A Word of Caution

Continued from page 4

Other Business Opportunities

Then again, how about the numerous other electronic devices which are making their appearance and are within the servicing province of the radio repair industry? Electronically heated blankets, and public-address systems, wire recorders, photoelectric control devices used by the public, citizen's radio, private marine radio, private aircraft radio, intercommunication systems and others . . . How about auto radio? Many shops which have felt a let-down in home a-m set servicing, have picked up business in auto radio sets — even in electronically controlled toy trains. These equipments require servicing . . . Will all of this business as well as a-m and f-m receivers and record players be neglected —just because TV is hot?

It's grand to be enthused about something new, but so much enthusiasm that the standby income is voluntarily permitted to shrink, is bad . . . All of this is just a word of caution . . . It is just a suggestion to consider all the facts and not to lose sight of all the things in view, just because one glitters more brilliantly than the rest.

Showing Printed Circuits Elements

The representation of printed circuits on receiver schematics is becoming a subject for discussion. At present the manner of showing such elements on schematics leaves room for doubt. In line with the effort to clarify the issue, we make the following suggestions.

1. Since the elements are inseparably associated with a strip or mount of some kind—the surface on which the elements are printed, these should be shown. One possible arrangement is shown in Fig. 1. Inductance, resistance and capacitance are symbolized, all being joined to a vertical line which indicates that the elements are part of the mounting plate or strip. The cross-hatch representation for the supporting block is quite commonplace. Frankly this form of representation is not the best and leaves much to be desired.

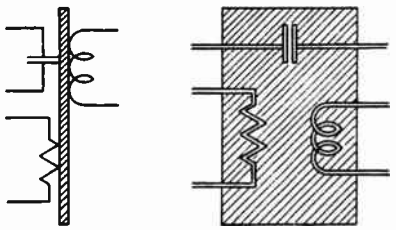


Fig. 1, left, and Fig. 2, right, show two possible methods of representing printed circuit elements.

2. The method of presentation in Fig. 2 seems to be more in line with the actual physical arrangement. The assembly of components which are printed are shown in double lines, and shown resting on a cross-hatched block. The general impression one gleans from even the first view of this illustration is that all the parts of the illustration are one and the same. In fact the use of the double lines for the elements gives the impression of location right on the mounting plate or block, which is actually the case . . . We vote for the second method of representation.

Inasmuch as such printed circuits are assembly of components, it would be wrong to omit the mounting strip or base on which the elements are printed. It seems that showing assemblies of elements is better than some special form of symbolization for each printed element and wide separation of the elements in the circuit. The arrangement shown in Fig. 2 permits spotting the entire assembly and making the connections without confusing the schematic diagram.

Any comments?

●

Associated Libraries

Continued from page 5

M. Salines, Radio Research Club of Portland, Ore., Portland, Ore.
Charles Coluich, Radio Servicemen's Assn. of Pittsburgh, Pittsburgh, Pa.
Stephen Urbanski, Secy., Lackawanna Radio Serv. Assn., Scranton, Pa.
Fred Neil, Pres., Assoc. Radio Techns. of Alberta, Edmonton, Alberta, Can.
Harry Fletcher, Pres., Belleville Radio Electronics Techns. Assn., Belleville, Ontario, Can.
Wilber Maisoll, Secy., Radio Servicemen's Assn. of Hot Springs, Natl. Park, Hot Springs Natl. Park, Ark.
Seth E. Lover, Past Secy., Kalamazoo, Mich.
David C. Marshall, Hon. Secy., Guild of Radio Service Engineers, Hollan-on-Sea, Edinburg, Scotland
Green Bay Electronics Servicemen's Assn., Green Bay, Wis.
Kingston Radio Service Men's Assn., Port Ewen, N. Y.
T. M. Duffield, Pres., Lincoln Electronics Service Assn., Lincoln Neb.
E. Y. Perlman, TV, Radio & Appliance Dealers Assn., Brooklyn, N. Y.
Homer L. Davidson, Pres., Assoc. of Radio Technicians, Ft. Dodge, Iowa.
John E. Lackman, Pres., Indiana Radio-Elec. Tech's Assn. Inc., South Bend, Ind.

●

The Cover

The maze of wave-guide shown on page 1 aids Westinghouse research workers investigating the effect of rain on radar waves. Ultra-short waves are guided in their path from transmitter to target and back to the receiver. Using synthetic raindrops made for the tests, the scattering of 1.25-cm waves by rain and snow is studied. The experimental waves are beamed from a transmitter, strike the target "raindrops" of ceramic powder and carbon black about 20 feet distant, and are reflected into the nearby receiver. The echo is then carried by the wave-guide system to sensitive measuring instruments, which must be capable of detecting and measuring changes as small as 10^{-14} watt. The primary object is to determine the weather-forecasting possibilities of ultra-short waves.

TELL YOUR FRIENDS

"Every man who is actively engaged in the servicing of radio and television receivers should read Successful Servicing from front page to back." That's the gist of thousands of letters we have received and we want every man to get it. Do you know anyone who isn't receiving it regularly? Ask your friends—tell them how it has helped you—tell them it's free—a post card with their name and address will bring it to them . . . Thanks for cooperating.

Lofty TV

Naw, we ain't talkin' about whether or not telecasts are of silk topper variety —we ain't seen enuf of 'em to set ourself as a judge—we're referrin' to the fact that American Airline's been doin' some high-up experimentin' . . . To keep the payin' guests all happy and contented, A.A. installed a TV set in a cloud scraper and whenever the p.g's got bored lookin' down at the landscape under 'em or at the whoo-whoo stewardess up there with 'em, *they could glimpse the prancin' pix on a TV screen.* One thing sure—they didn't have to worry none about the height of the receivin' antenna. Results? *Swelegant*—passengers and engineers and everyone else very happy about it all . . .

3rd Printing

The one thing any publisher dreams about gettin' is a best seller and we'll let you in on a secret—the Boss has one in the *"TV—How It Works"* . . . Bill Marcus passed the Word that since the "TV-H.I.W." book went out to youse guys in June, two printin's were exhausted so quick, our shippin dept was in the same state packin' 'em and shippin' 'em. We just got delivery on the *third* output from the printer and so there's no excuse now for you and *you* and YOU not to have the correct TV how and why right where you need it—**inside your skull . . .** Remember the motto of the Boy Scouts . . .

P.A.

We got some news for you P-Aers—Rider's P-A Manual is practically ready to be sent out and it won't be long after you read these here words that you'll be able to get yours from yer jobber . . . And that ain't all either . . . Rider's **"Installation and Servicing of Low-Power P-A Systems"** is also very much in the works and the next time we bat out this here colyum, we'll tell you when you can get your copy . . . Take our word for it, this book gives the low down on P-A stuff the like of which you've never seen before!!!! And there's another on deck that we're bettin' you'll be likin' too . . . More of that one anon . . .

Growin'

T'other afternoon when we was returnin' to the old home town from up Conn way on the New Haven's *Yankee Clipper,* we overheard a gent in the seat ahead say, "Dammit, I forgot to tell my wife to mail those papers! I gotta phone her" and he got up and went outa the car. After a short absence, he returned with 'Well, *that's* off my mind. Great thing—the telephone". Bein' almost as curious as the w.k. kitty, we did some askin' and found that you can phone anywhere in the U.S.A. while the *Clipper* is chargin' across the countryside and—you guessed it—**it's done with f.m.** Just another use to which this brainchild is bein' put . . . And are *you* keepin' up with the times? It's made easy for you—just get outside of the facts in our "F M Transmission and Reception" . . . Nuff said . . .

Fall an' Winter

Well, now that we've got the World's Series outa the way, there's nawthin but football, Thanksgiving, Christmas, and Noo Years on deck and we'd like to go on record that we are thankful that the hot weather is over—*or a long way off*—you takes yer choice. Just to make sure we don't forget, here are the *first holiday greetin's of this lovely cool season* from

The Rolling Reporter

ESFETA Formed

About fifty radio servicemen representing five existing New York state radio service associations, met in the Hotel Arlington, Binghamton, N.Y. on October 31 for organizing and electing officers of the Empire State Federation of Electronic Technicians Associations, to which only associations not individuals, may belong.

The following officers were elected or appointed: *President,* T. Lawrence Raymo, Rochester. *Vice President.* Max Leibowitz, N.Y.C. *Secretary*: Wayne Shaw, Binghamton. *Treasurer,* Ben DeYoung, Poughkeepsie. *Board of Directors*: Herb Snyder, Binghamton, Robert A. Bryan, Rochester, Fred Booth, Poughkeepsie, Morris Noss, Cortland, Jack Edell, N.Y.C. *Chairman of Publicity Bureau*: Ed Fisk, who has asked each association in ESFETA to appoint a publicity bureau to assist him.

It was decided that each member association will have two delegates for the time being. The dues will be **$20.00** per association per annum and the expenses of the delegates will be arranged for by their local associations. Four meetings per year are contemplated, with the meeting places being changed to the different chapters of the federation.

Pennsylvania Lectures

John F. Rider gave a series of talks to Pennsylvania servicemen under the auspices of the local serviceman associations shown below, all of which are affiliated with the Federation of Radio Servicemen's Associations of Penna. The cities in which he spoke and the associations are as follows:

Nov. 8—Wilkes-Barre, Scranton — Radio Servicemen's Assn. of Luzerne Co. and the Lackawanna Radio Technicians Assn.

Nov. 9 Philadelphia—Philadelphia Radio Servicemen's Assn.

Nov. 10. Reading—Reading Radio Servicemen's Assn.

Nov. 12. Allentown, Bethelehem, Easton, Phillipsburg—Lehigh Valley Radio Service Assn.

Nov. 15. Harrisburg—Mid-State Radio Servicemen of Central Penna.

Nov. 16. Williamsport—Associated Radio Servicemen's Assn. of Penna.

RCA 56X, 56X2, 56X3, Chassis RC-1011, A, B

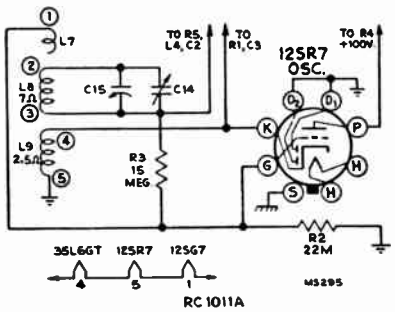
These models are the same as Model 56X on *pages 15-31 and 15-26 of Rider's Volume XV*, except for the following changes. Some sets have a 220,000-ohm resistor in shunt with the primary of the first i-f transformer. The replacement transformers may not need this resistor if the i-f amplifier seems stable.

Some sets have a 22-ohm, 1-watt resistor as a fuse in series with the electrolytic capacitor.

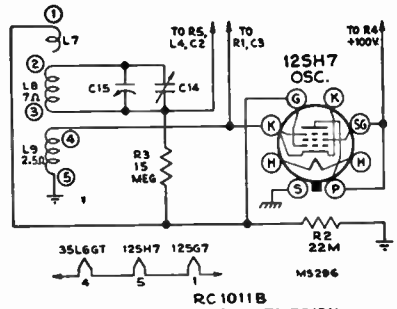
Some sets have a 56-$\mu\mu$f capacitor from terminal 1 of the oscillator coil to terminal 2. This is not necessary on replacement coils as they have a built-in capacity winding.

On some models the 500,000-ohm volume control is not furnished with a stop 50,000 ohms from the high end of the control. Controls having no stop can be identified by a dot of red lacquer on the left side of the control, viewing the shaft end with terminals up. In models using this completely covered with spaghetti tubing, is connected between the high end of the control and the yellow lead on the second i-f transformer.

Replacement controls equipped with a stop do not need this external 56,000-ohm resistor, so when replacing a volume control, check the resistance between the arm and the high end of the replacement control with the arm turned fully clockwise. A reading of 50,000 ohms will indicate that the control is equipped with a stop and that the 56,000-ohm resistor should be removed before installing the new control.



RC 1011A
OTHERWISE IDENTICAL TO RC1011



RC 1011B
OTHERWISE IDENTICAL TO RC1011

Changes in the oscillator circuit of RCA Chassis RC1011A, above, and Chassis RC1011B, below.

In chassis RC 1011A and chassis RC 1011B, the 12J5GT oscillator tube has been replaced with a 12SR7 in the former and a 12SH7 in the latter. The wiring changes in respect to these tube changes are shown in the accompanying partial schematics. Otherwise chassis RC 1011A and RC 1011B are identical to chassis RC 1011.