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

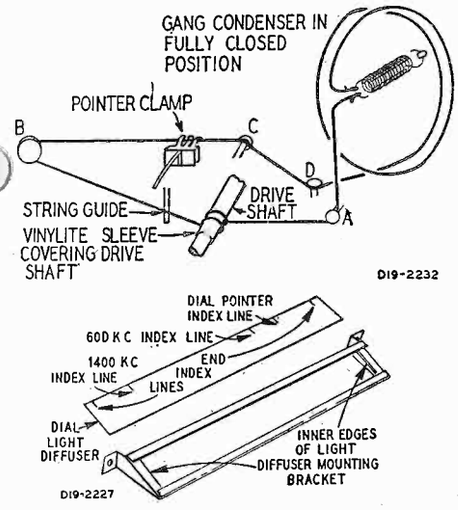
Please turn to page 6

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 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 (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 a ¾ 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

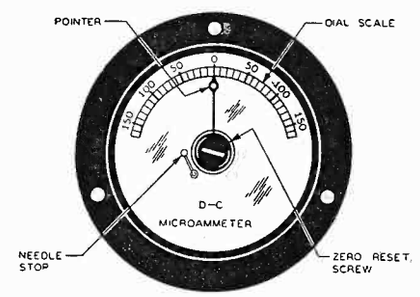
IN the August issue of SUCCESSFUL SERVICING, an article was published on an experiment of regenerative feedback that was performed in the John F. Rider Laboratories. The type of regenerative feedback was very simple; some of the output from the plate circuit of an audio power-amplifier tube was fed back 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



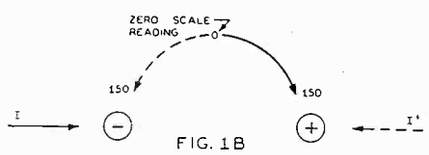


FIG. 1B

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 hook-up, 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

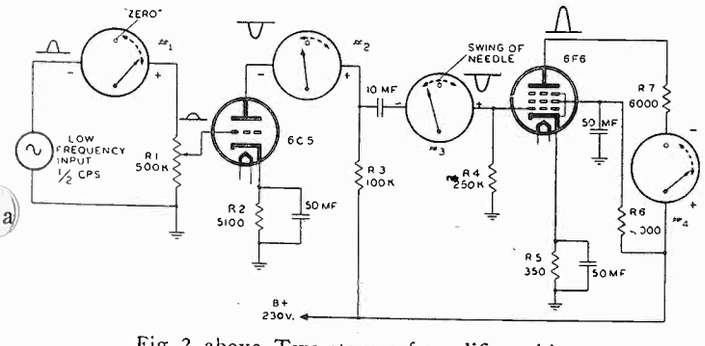
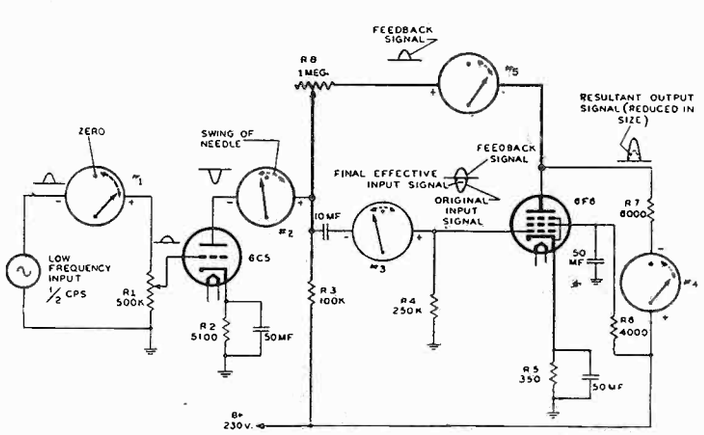


Fig. 2, above. Two-stage a-f amplifier without feedback showing current phase relationships. Fig. 3, right. The same circuit with degenerative feedback indicated on meter 5.



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

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

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.

•

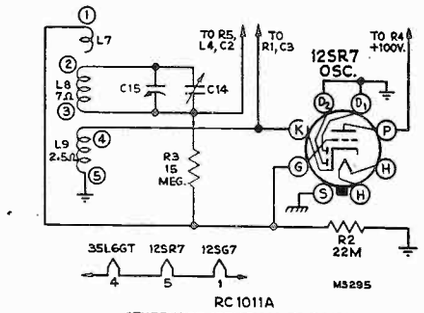
REMLER MP5-5-3

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-



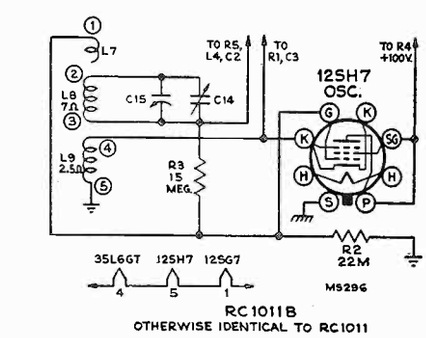
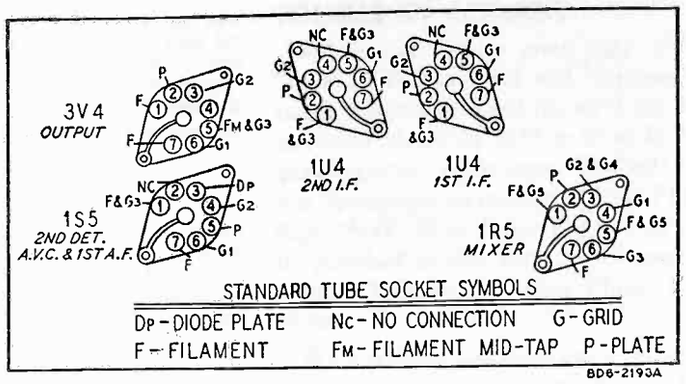


Fig. 1, above. Revised circuit with 12SR7 oscillator. Fig. 2, below, Second revision with 12SH7 oscillator.



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.

•

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.

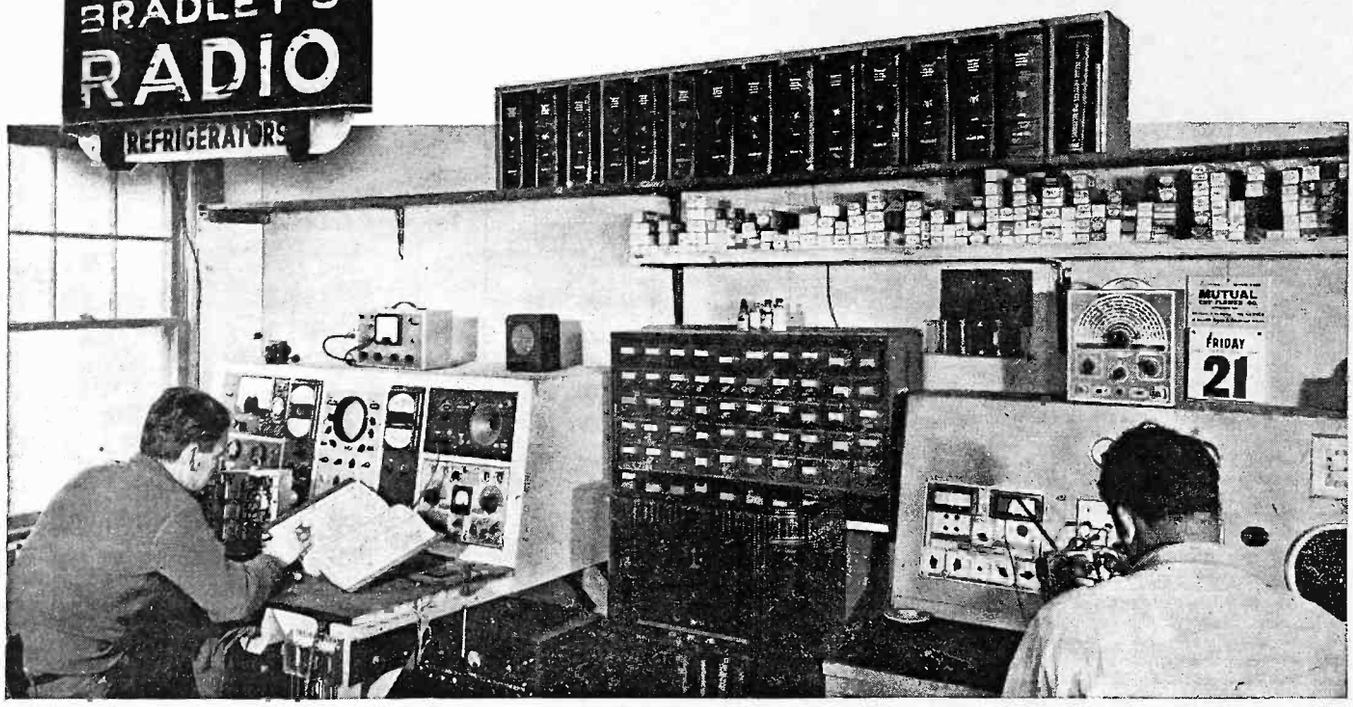
PHILCO RADIO & TELEVISION CORP.

46-1213
Code 121

RCA 59V1

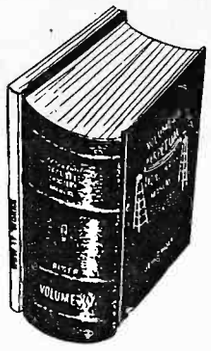
In RCA Model 59V1, found on *page 15-44 of Rider's Volume XV*, field coils stamped 94136-501A will have a minimum resistance of 1300 ohms at 25° C.

A SIGN OF SUCCESSFUL SERVICING



Bradley's has all fifteen RIDER MANUALS

RIDER MANUALS
Mean
Successful Servicing



VOLUME XV — JUST OUT!

2000 pages, plus 150 page "How It Works" Book
$18.00 complete

Volumes XIV to VII (each volume)	15.00
Volume VI	11.00
Abridged Manuals I to V (one volume)	17.50
Record Changers and Recorders	9.00

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.

In spite of greatly expanded production, demand for RIDER MANUALS still exceeds supply. Place your order today.

Order From Your Jobber Today!

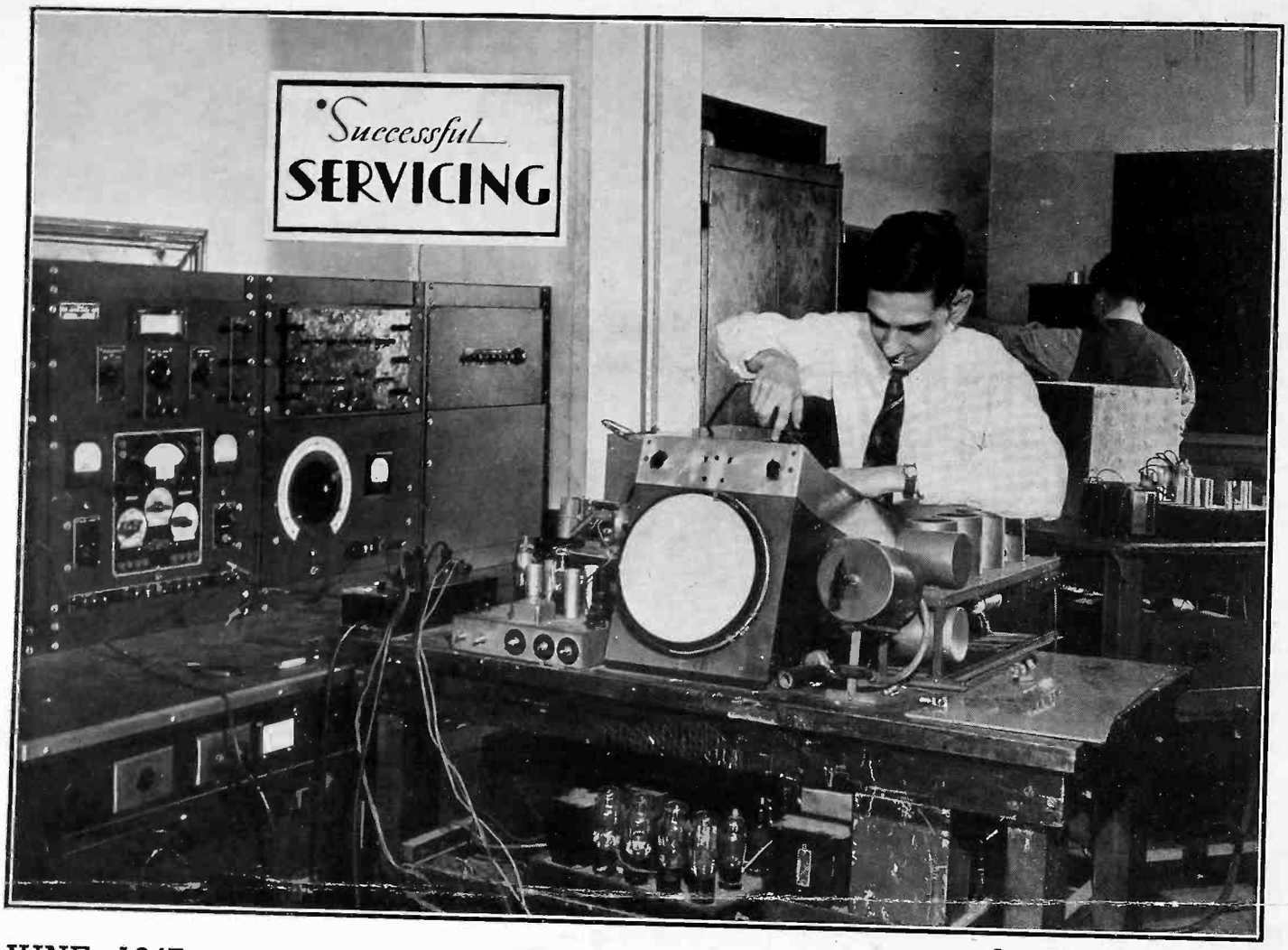
Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
NEW YORK, N. Y.
PERMIT No. 9427

From
JOHN F. RIDER PUBLISHER, Inc.
404 FOURTH AVE., NEW YORK 16, N. Y.
Return Postage Guaranteed

POSTMASTER: If addressee has moved and new address is known, notify sender on FORM 3547, postage for which is guaranteed.

ALBERT FABER
R.R.3
HUDSONVILLE, MICH.

Distribution of this issue — 27,000 copies



JUNE, 1947

Courtesy of RCA Institutes, Inc.

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.

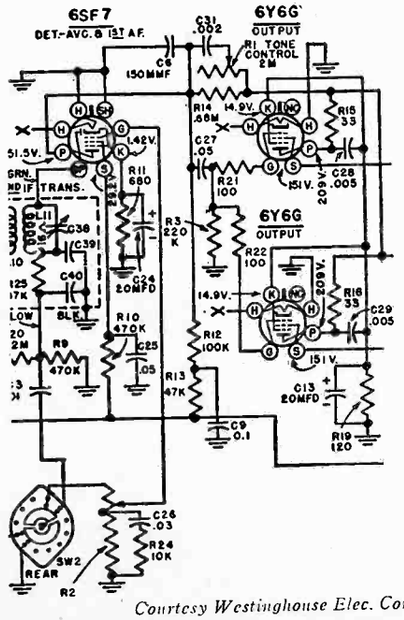
The schematic diagram for the original production runs is found on *page 15-2* of *Rider's Volume XV*.

•

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 8S473 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.

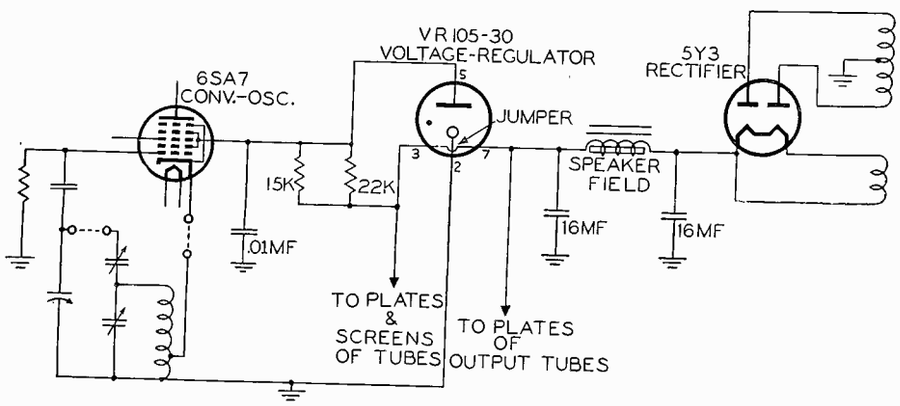


Fig. 1. The voltage-regulator circuit with the broadcast-band oscillator circuit used in Majestic Models 8S452 and 8S473.

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,

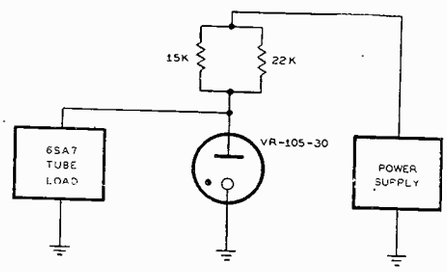


Fig. 2. The 15,000- and 22,000-ohm parallel resistors form a return path for the oscillator anode and converter screen as well as a series voltage dropping network for the VR-105-30 tube.

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.

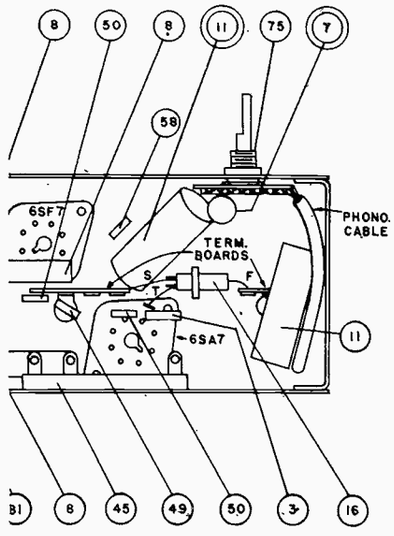
As far as national distribution is concerned, we are now opening up our individual diagram service by mail for all who desire it. Send a self-addressed envelope with your order. Prices as above.

•

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.



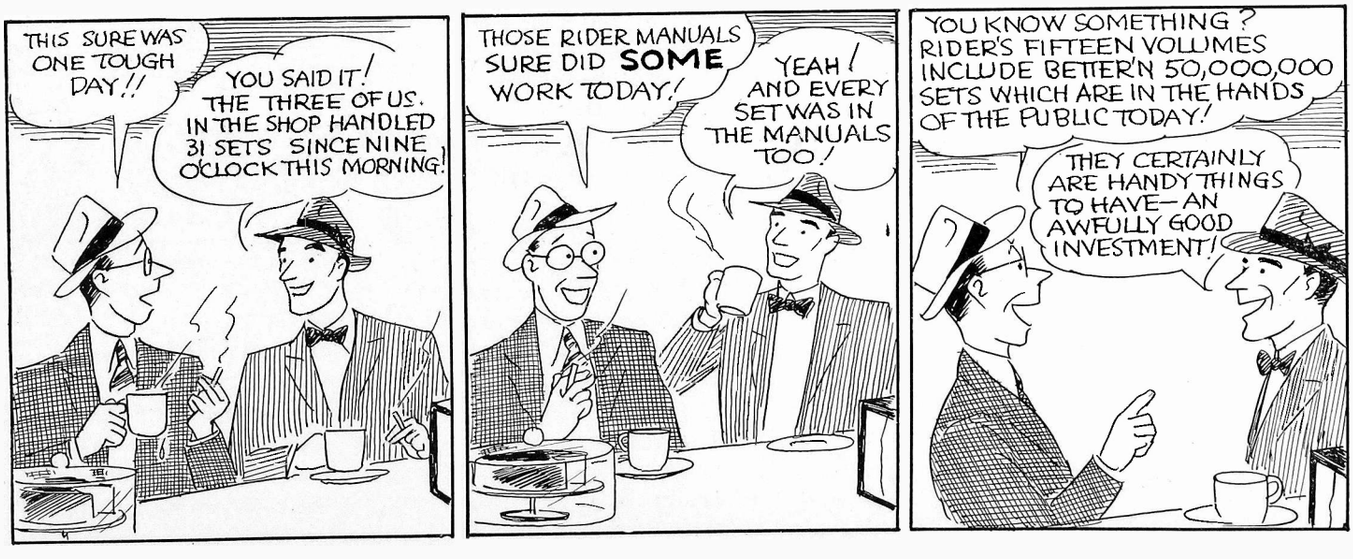
Courtesy Westinghouse Elec. Corp.

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

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

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

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

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 co-operate 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

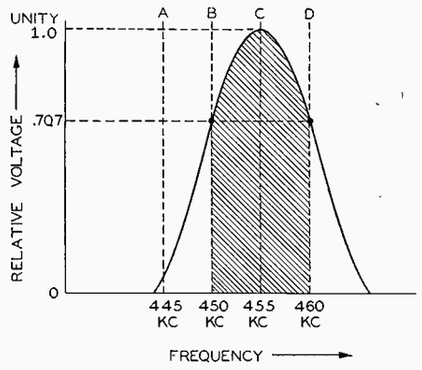


Fig. 3. The shaded area under this selectivity i-f transformer curve indicates portion where full reproduction of sidebands occurs.

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.

•

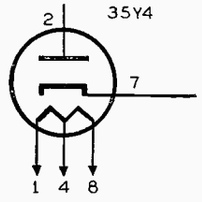
FARNSWORTH ET-069

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*.

•

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



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

•

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 I-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

•

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.

224 OPPORTUNITIES TO WIN!

$4,325.00 WORTH OF PRIZES

IN CASH and Servicing Equipment

JUST TELL WHY
(in 100 words or less)

"RIDER MANUALS *MEAN* SUCCESSFUL SERVICING"

Yes, that's all you need do. Nothing to buy, nothing on which to beat your brains out.

Anyone of the tens-of-thousands of servicemen who have enjoyed the many benefits of RIDER MANUALS during any of the past seventeen years has the answers at the end of his pencil, ready for placing on the official entry blank available at all jobbers. And, a newly established serviceman has an equally good chance of winning by merely going over RIDER MANUALS at his jobbers' and reading the RIDER MANUAL ads appearing in national radio publications every month. You don't need to be a fancy writer, even spelling and grammar are unimportant. Just, in plain, everyday conversational English, write us 100 words or less on why you believe "RIDER MANUALS *mean* SUCCESSFUL SERVICING." The first thing you write may win you one of the many substantial prizes.

SUCH EASY CONTEST RULES!

1. Nothing to buy. Just send in 100 words or less giving your reasons why "Rider Manuals mean Successful Servicing," and indicate on the official form, the name of your preferred parts jobber.

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!

For Contestants

1st Prize	**Cash**	**$500**
2nd Prize	Cash	300
3rd Prize	Cash	200
4th Prize	Cash	100
5th Prize	Cash	75
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

DON'T PUT IT OFF—WRITE IT DOWN! SEND IN YOUR ENTRY TODAY

Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
NEW YORK, N. Y.
PERMIT No. 9427

From
JOHN F. RIDER PUBLISHER, Inc.
404 FOURTH AVE., NEW YORK 16, N. Y.
Return Postage Guaranteed

POSTMASTER: If addressee has moved and new address is known, notify sender on FORM 3547, postage for which is guaranteed.

A. J. S. CERINO
2393 PITKIN AVE.
BROOKLYN 3, N. Y.

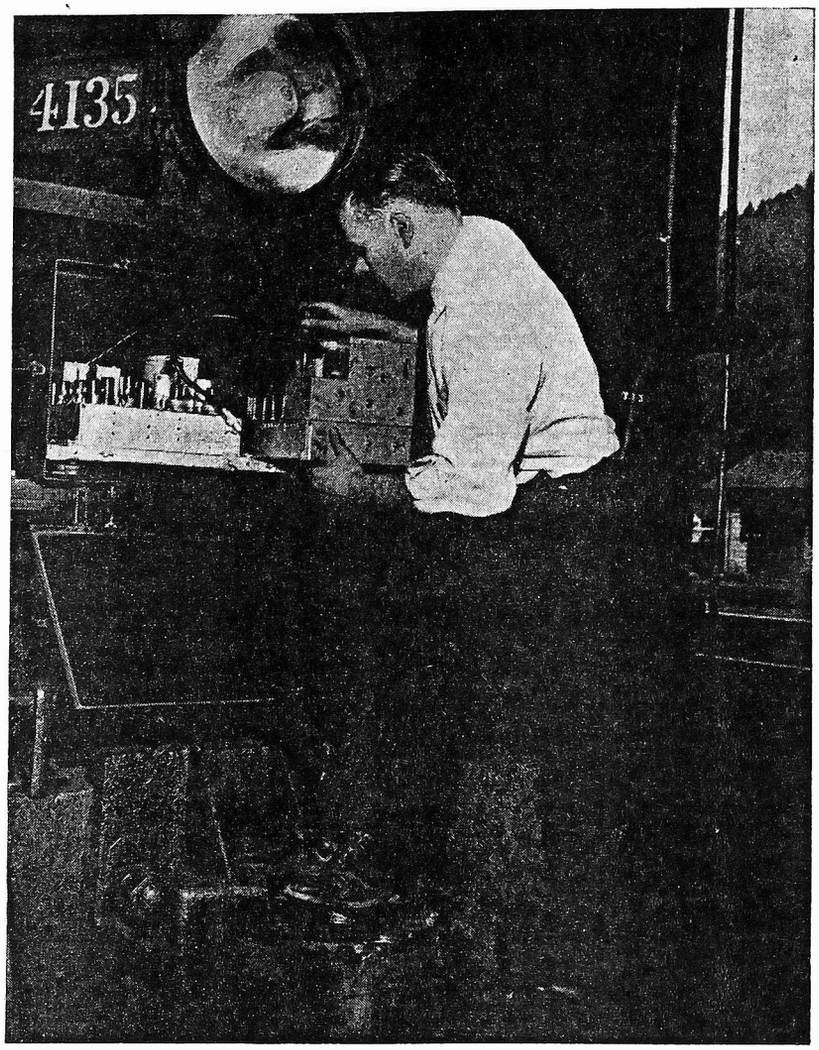
Distribution of This Issue — 27,500 Copies

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.

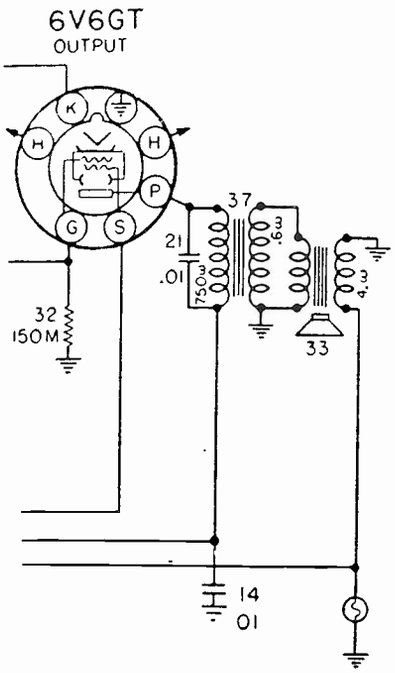
A simple mechanical "circuit" is illustrated in Fig. 1. The mass of the system, *M*, is represented by the weight immersed in oil. The thickness of the oil, which impedes the movement of the weight and is therefore in opposition to this movement, is the damping factor represented by *D*. The displacement 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

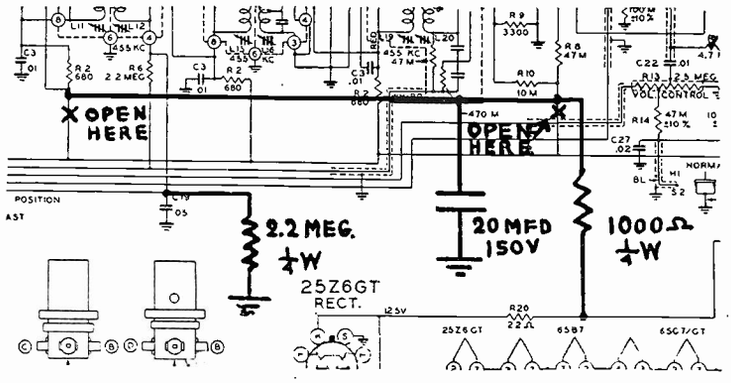
The value for capacitor C15 shown as 2-8 $\mu\mu$f, in the schematic found on *page 14-37* of *Rider's Volume XIV,* should be 2-12 $\mu\mu$f.

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!

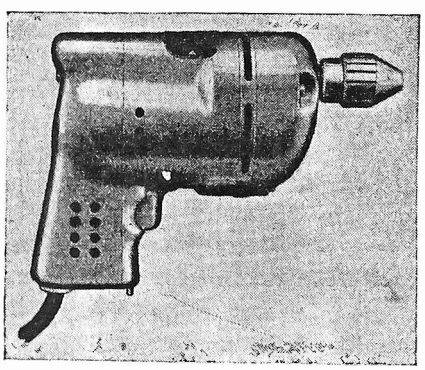
Already the early-bird contestants after those big cash and equipment prizes are sending in their entry blanks telling how "Rider Manuals mean successful servicing". . . . Those are smart boys for they now can go off on their vacations with nothing on their minds—nothing except which of the big prizes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



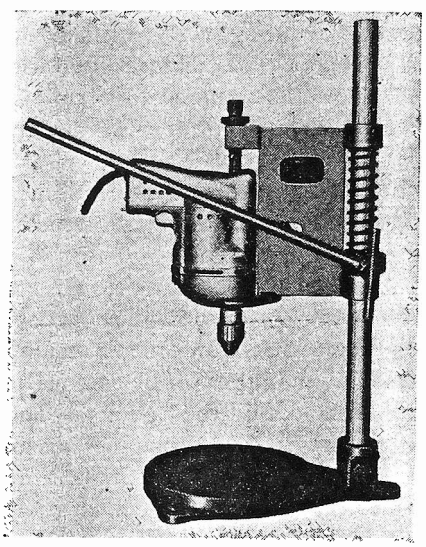
A portable electric drill—part of the 11th to 40th prizes.

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-$\mu\mu$f capacitor C22 is now connected from the junction of R7 and R8 to ground and a 100-$\mu\mu$f capacitor, C34, is connected from the other end of R8 to ground. The value of C32 is now 470 $\mu\mu$f instead of 330 $\mu\mu$f. 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 r-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, 5/8 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

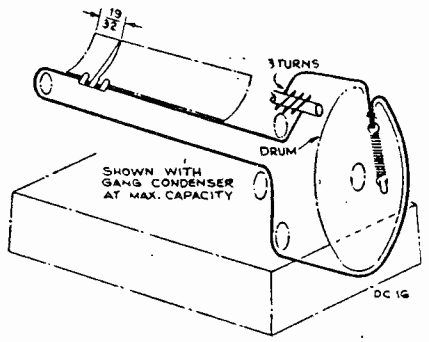
In the event that band 4 (15.7 to 43 mc) fails to operate at all times, but reception on other bands is normal, trouble is indicated in the oscillator circuit of this band, which in most cases can be traced to a weak 6SA7 oscillator tube or low line voltage. In those few cases where trouble persists, 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 $\mu\mu$f) to part #CC25UK680K, 68 $\mu\mu$f. 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.

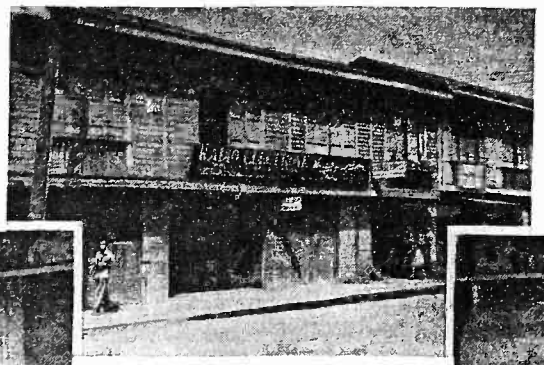
RCA 59VI

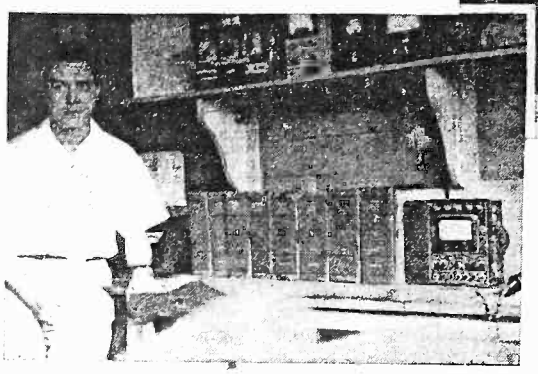
A speaker substitution has been made in some of the RCA Models 59VI, the circuit diagram of which appears on *page 15-54* of *Rider's Volume XV.* Speaker 92567-1 has been substituted for speaker 92513-1K. For replacement of speakers stamped 92567-1, order Stock No. 36330.

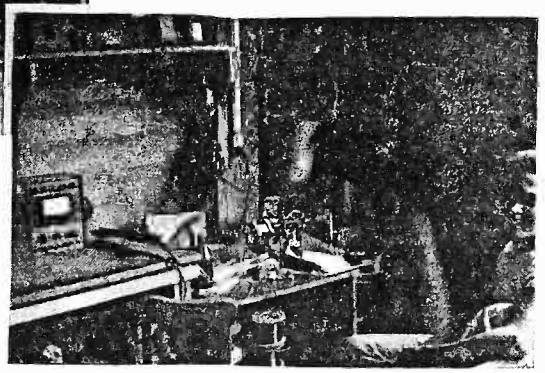
RCA Receiver Drive Cords

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.

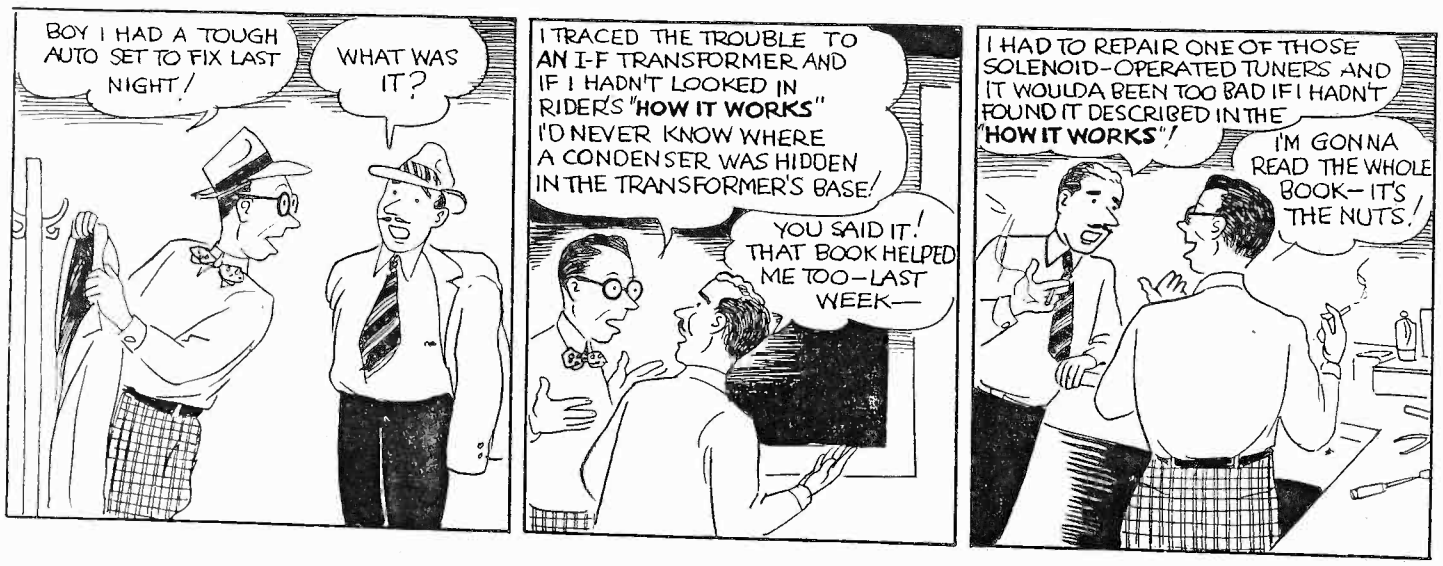
Radio servicing in the tropics is far from being a cinch. It's a long way to parts manufacturers and if a choke or transformer goes haywire, they rewind it right on the spot. One of the biggest headaches is getting the moisture out of the various components and they have to resort to all sorts of dehydrating 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 $\frac{3}{16}$-inch diameter and $\frac{5}{8}$-inch long; L1 and L2, ¼-inch-O.D. $\frac{7}{32}$-inch-I.D. silver-plated brass tubing, threaded 12/28 to receive Ceramicon condenser. The lamp load is the pilot light mentioned above. The tube voltages are as indicated.

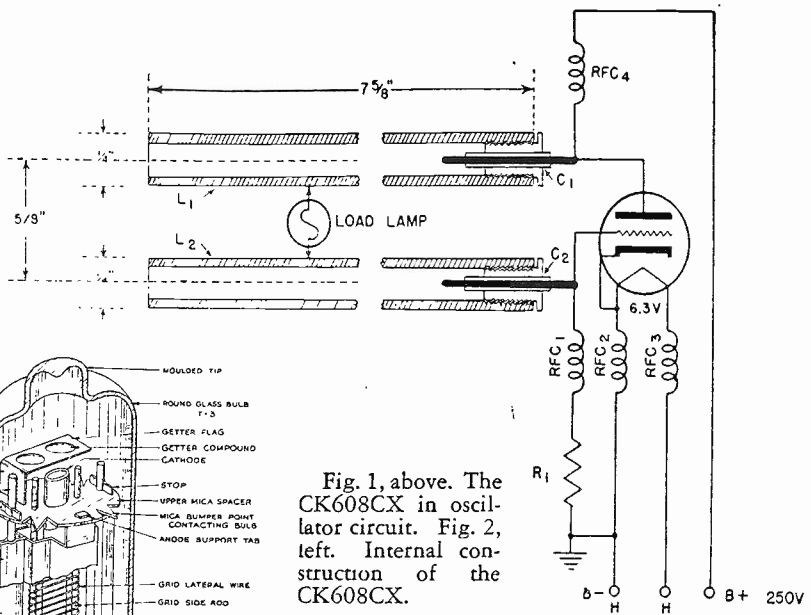
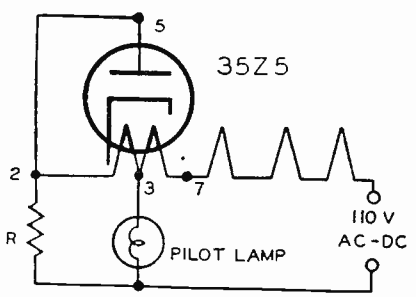


Fig. 1, above. The CK608CX in oscillator circuit. Fig. 2, left. Internal construction of the CK608CX.

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.

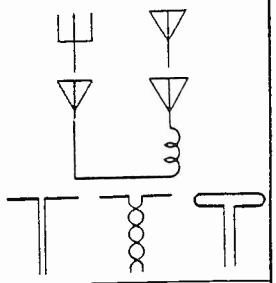
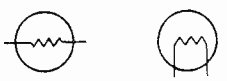
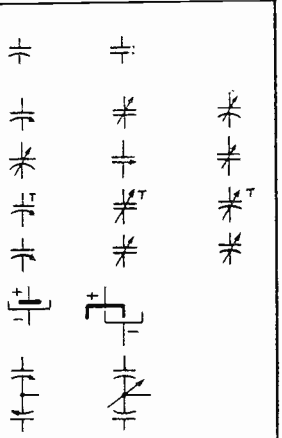
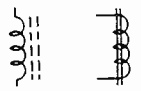
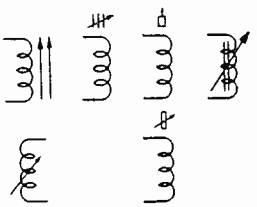
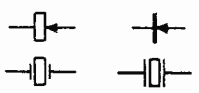
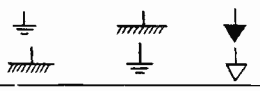
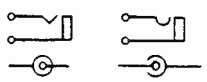
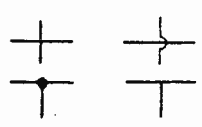
You will note that comparatively few television items are shown, except those which are common to regular a-m and f-m receivers. The reason for this is that, since the radio servicing industry as a whole has not as yet worked with television equipment, it seems needless to complicate the questionnaire. 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.

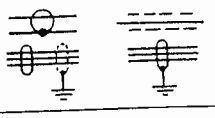
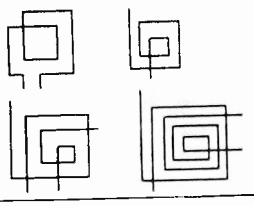
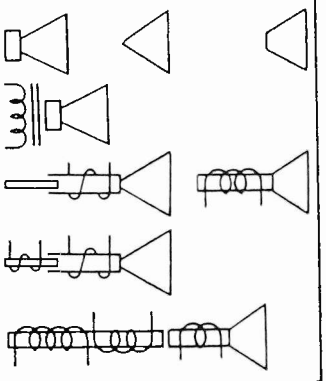
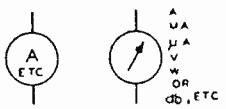
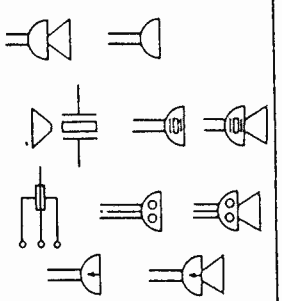
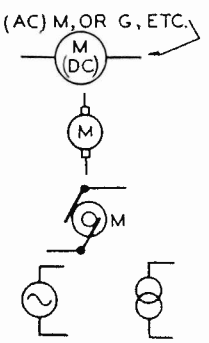
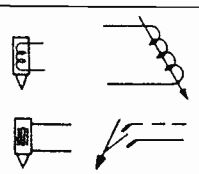
As a last and final thought, the matter of circuit representation is also important, although this is not being queried at this time. However, in the event that you have any ideas concerning circuit representation whereby you feel that increased comprehension could be accomplished, please submit your 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.

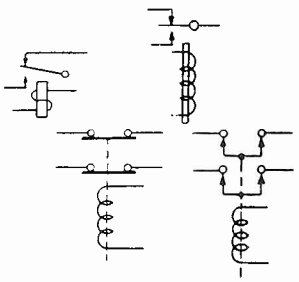
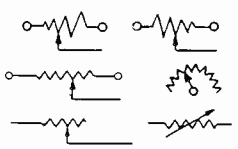
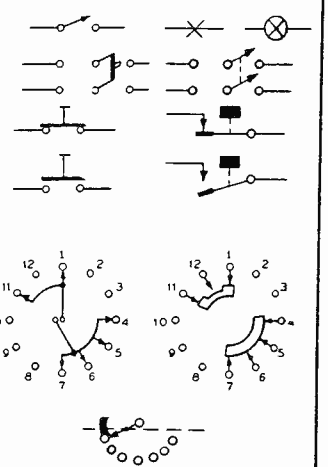
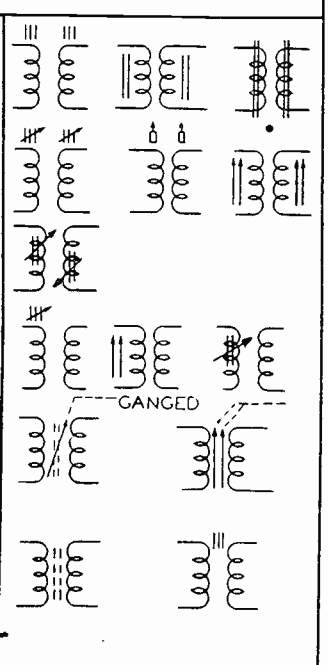
Again — thank you.

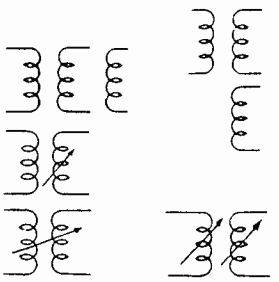
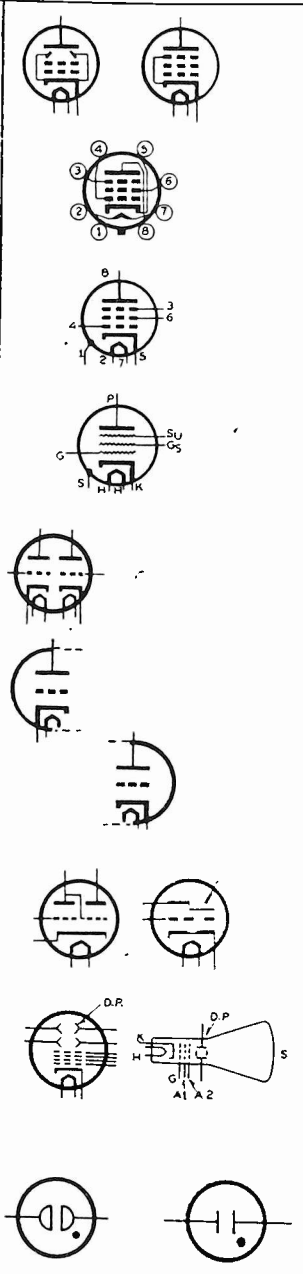
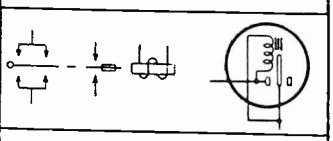
JOHN F. RIDER

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 ☐

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

Vol. 8 JULY, 1947 No. 6

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

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.

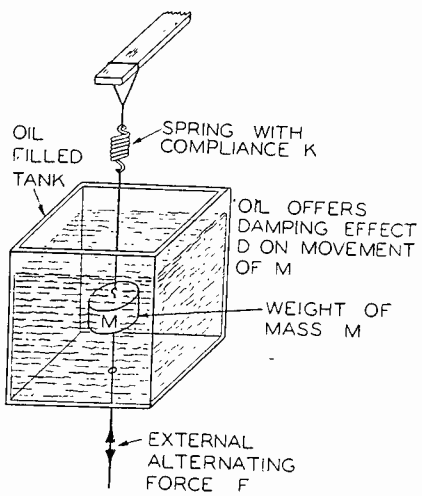


Fig. 1. A simple mechanical system represented by a spring, a weight immersed in oil, and an external alternating force. This system is equivalent to a series resonant circuit in the electrical system.

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 foreging 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.

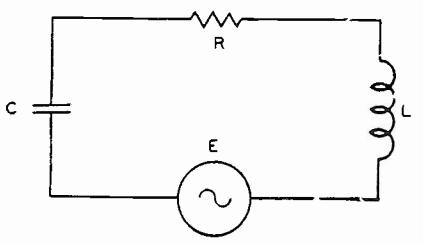


Fig. 2. This series tuned circuit is the electrical equivalent of the mechanical system in Fig. 1.

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

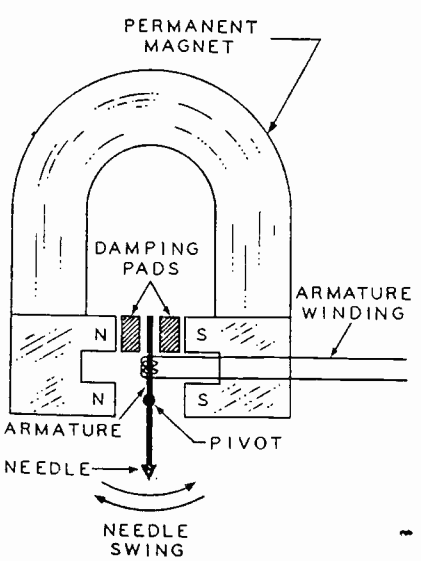


Fig. 3. Pickup assembly showing damping pads which absorb the strong vibrations of the armature, thereby reducing the effect of mechanical resonance.

and an explanation 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.

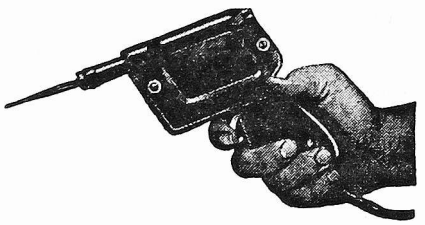
RIDER CONTEST

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 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.



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

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.

Rolling REPORTER

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? Soooooo, 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.

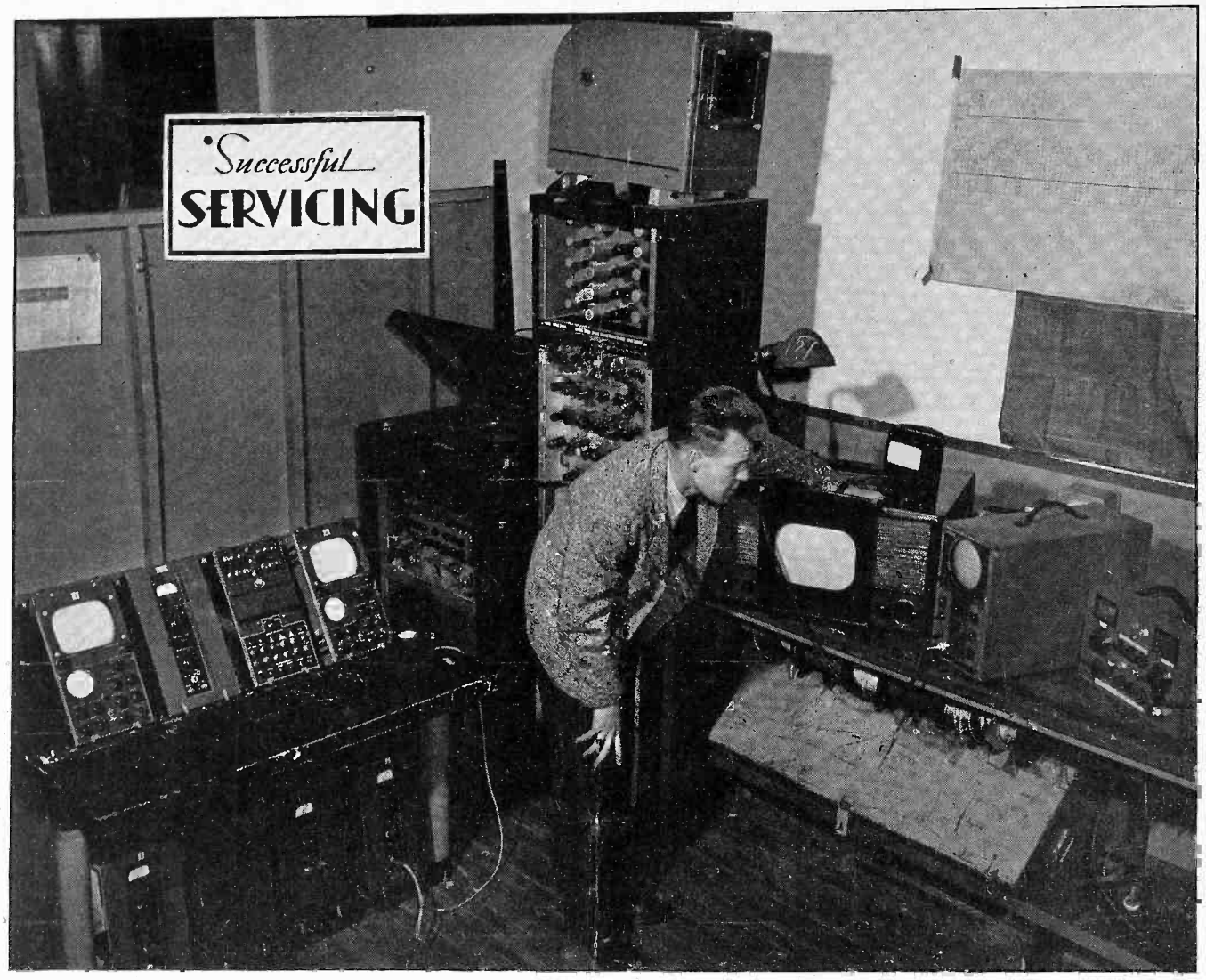
Rider Manuals have served the radio repair industry for nearly two decades. Those years of experience in the compilation and preparation of manufacturers' original service data for publication have made Rider Manuals what they are today . . . *the accepted standard of the radio repair industry the world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

RIDER MANUALS
Mean
Successful Servicing

Volume XV -- 2000 pages

and the 180-page "How It Works" . . .	$18.00
Volume XIV to VII (each)	15.00
Volume VI	11.00
Abridged Manuals I to V (one volume)	17.50
Record Changers & Recorders	9.00

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 eadily understand, forces beyond our ontrol may dictate some changes—we re ready to tell you just what is in the ffing from our organization. Here are ne texts and manuals now in work. After ou read these lines, you'll know as much bout what is listed as we do.

Rider's Manual Volume XVI

With this volume we are inaugurating new policy in the production of Rider Manuals. Whereas we used to publish a ider Manual ten to twelve months apart, e are now embarking upon a sequence f a new volume every four or five ionths. What dictated the change? . . . Suggestions from some of the receiver manufacturers' service managers hat they would like to see their data get ito the hands of servicemen somewhat nore 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.

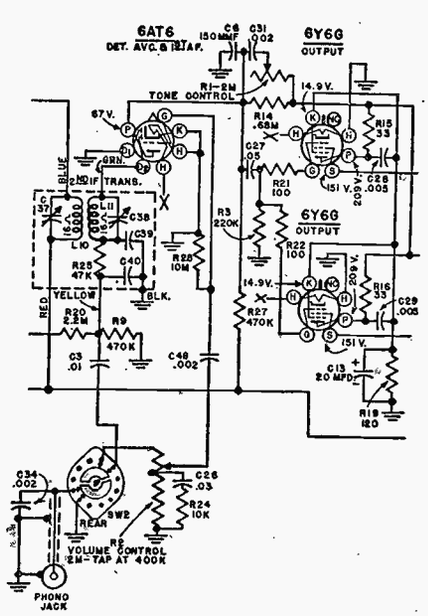
RCA 55F, 66-1

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

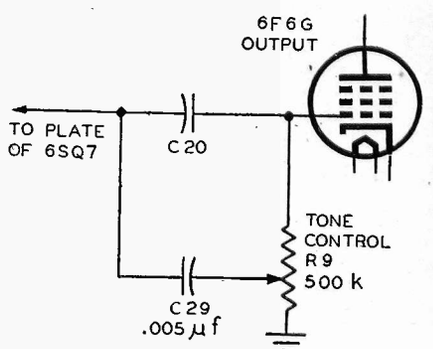
In the event that an a-c hum develops in this receiver, the schematic of which appears on *page 15-59 of Rider's Volume XV*, it has been found that the 35Z5GT is the cause of the trouble, even though the tube passes a normal test. Also, other tubes in this set have been known to cause hum. Try replacement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



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

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. . . .

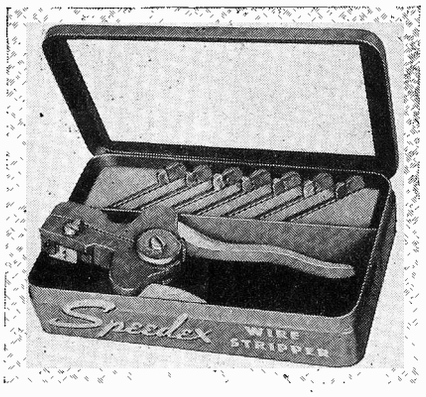
Winners of the 81st to 140th prizes of $10.00 value—that is 60 lucky contestants—will each be awarded a

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

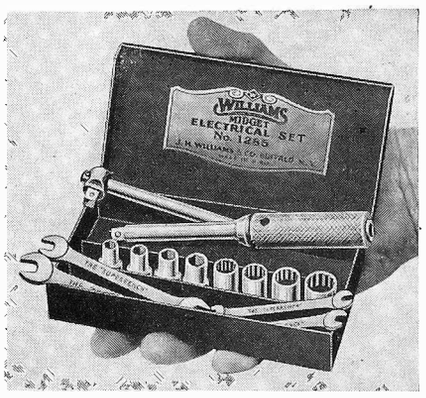
Midget Wrench Set with eight "Supersockets" and four "Superrenches" with a Sliding T Handle and Extension-Driver with Lock-Grip.

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, 3/8, 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 3/8 inches; a sliding T Handle, 4½ inches long; and an extension driver, 5 3/8 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 enclosed 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! . . .

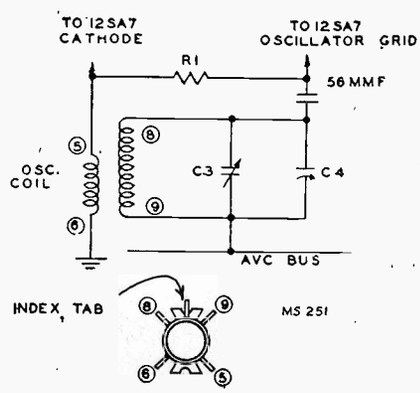
These Rider 99ers herald a new approach in technical radio books. . . . Authentic—up-to-the-minute—modern in every respect—yet above all economical to buy, they are the forerunners of a complete library. . . . Eventually there will be many titles—a sufficient number to cover the field and help prepare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

Rolling REPORTER

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 wiped 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 ripe 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" dots 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 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 *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 guarantee 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—33,500 Copies

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

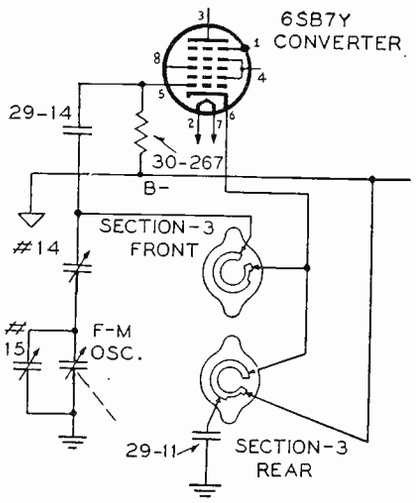


Fig. 1. The f-m oscillator "coil" portion of the schematic of Pilot model T521 receiver.

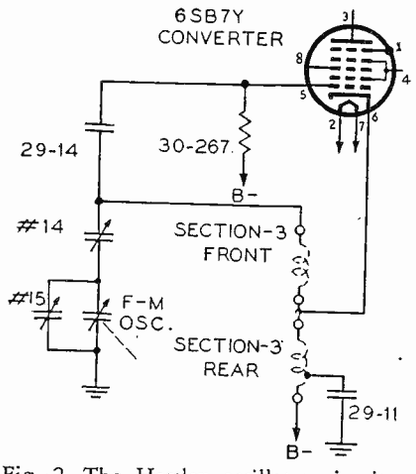


Fig. 2. The Hartley oscillator circuit with the effective coil drawn in dotted lines.

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 burnout 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

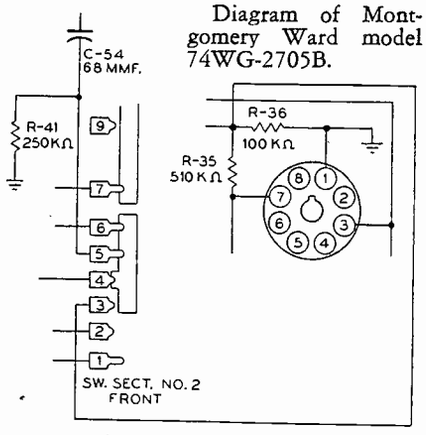


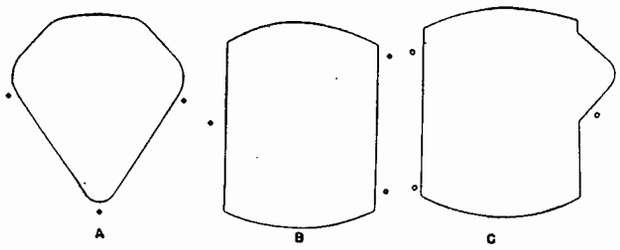
Diagram of Montgomery Ward model 74WG-2705B.

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.

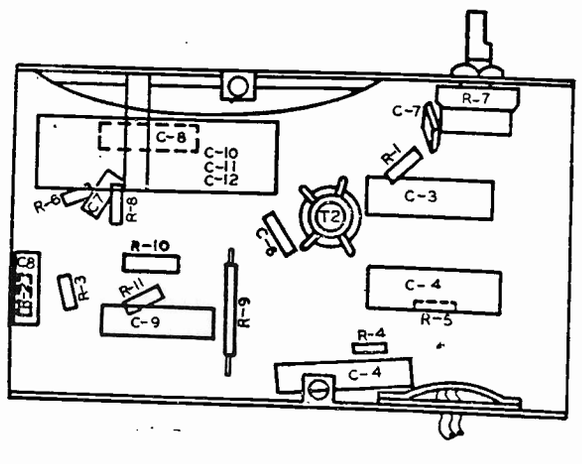
Emerson 550, Chassis 120,006

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

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

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

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.*

Distribution of This Issue—35,000 Copies

NOVEMBER - DECEMBER, 1947

RIDER MANUAL CONTEST AWARDS

By the time you read these lines ten letter-writers will be richer by sums from $500.00 down to $50.00. . . . Two hundred and fourteen other letter-writers will have new equipment in their shops. . . . All this because they were firmly convinced that in order to conduct a successful servicing business, Rider's Manuals are a *must*—that plus the fact that these men were able to put their convictions down on paper in 100 words in an interesting and intelligent way. And ten jobbers were made happier too because ten of their customers knew the value of Rider's Manuals and were able to write so well that their entries in the Rider Manual Contest were adjudged among the top ten. . . . It was our intention to publish some of the letters that were among the top money-winners, but space does not permit.

The winner of the first prize of $500.00, who is Albert N. Giddis of 362 Adams St., Lowell, Mass., came to the office of John F. Rider to receive his award. With him came Henri Jaffe, his Rider parts jobber, partner in the firm of Arthur W. Mayer Co. of Boston, Mass., to receive $100.00, his share of the awards for the jobbers. The presentation of the first-prize money was made to Mr. Giddis by John F. Rider, who also presented the $100.00 check to Mr. Jaffe. Among those present at the ceremony were the judges, John L. Stoutenburgh, Herman L. Finn, and Lansford F. King; Leo D. Gaumont of Gaumont Bros., Lowell, Mass., and representatives of the radio and electronic press.

Mr. Giddis is the Service Manager for Gaumont Bros. of Lowell. He has been with this firm since 1938, except during a "hitch" in the Navy where he was a radio warrant officer. He has been in the radio servicing field since 1925 and is a constant user of all sixteen of his Rider Manuals, each of which he gets as soon as a new one is off the press. In addition to his radio servicing activities, Mr. Giddis has a commercial ticket and has a ham rig, W1ABG, in Lowell.

THE FIRST PRIZE

The above scene was photographed in the office of John F. Rider on November 17, as he was about to sign the check for $500, the first prize in the Rider Manual Contest, which was won by Albert Giddis of Lowell, Mass. Behind Mr. Rider are standing, from left to right, Mr. Giddis; the three judges, John L. Stoutenburgh, Executive Editor of "Radio Retailing", Herman L. Finn, C.P.A., and Lansford F. King, Advertising Agent; and Henri Jappe of the A. W. Mayer Co., Boston, who came to New York to receive the $100 jobber award on behalf of his firm, which is Mr. Giddis' Rider parts jobber.

The winners of the next nine prizes received their checks from the head of the Rider parts jobber firm which they had designated on their contest entry blanks. These nine winners were:

$300.00—George F. Escher, 1205 Chestnut St., Alameda, Calif.

$200.00—Newell Terry, 350 S. Central Ave., Bartow, Fla.

$100.00—F. Dale McGinnis, Aurora, W. Va.

$75.00—William L. Vincent, 551A Dartmouth St., So. Dartmouth, Mass.

$50.00—C. A. Watson, 551 State St., Meadville, Pa.

$50.00—Charles S. Savin, 224 E. Main St., Ahoskie, N. C.

$50.00—R. F. Olson, 3556 Lime Ave., Long Beach, Calif. *Please turn to page 3*

Montgomery Ward 64BR-1051B

This model is similar to 64BR-1051A shown on *pages 15-61 to 15-63 of Rider's Volume XV,* except for the following changes:

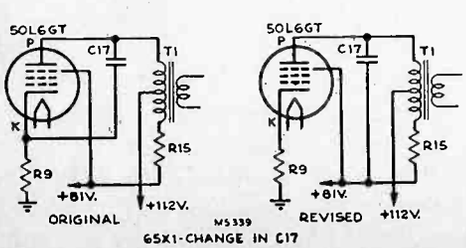
Ref. No.	*Part No.*	*Description*
R1	BEC-9B1-27	220,000 ohms, 20%, ½ watt
R2	BEC-9B1-16	3,300 ohms, 20%, ½ watt
R3	BEC-9B1-84	68,000 ohms, 10%, ½ watt
R4, R7	BEC-9B1-37	10 megohms, 20%, ½ watt
R5, R9	BEC-9B1-34	3.3 megohms, 20%, ½ watt
R8	BEC-9B1-31	1 megohm, 20%, ½ watt
R10	BEC-9B1-60	680 ohms, 10%, ½ watt
R11, R14	BEC-9B1-42	22 ohms, 10%, ½ watt
R12	BEC-9B1-66	2,200 ohms, 10%, ½ watt
	BE 120-145	Coiled tension spring for dial string

RCA 65X1, 65X2, 65X8 and 65X9, Chassis RC-1034

Models 65X8 and 65X9 are the same, except for the cabinets, as models 65X1 and 65X2, chassis RC-1034, shown on *pages 15-61 and 15-62 of Rider's Volume XV.* The following changes are applicable to all models. Capacitor C17, which was originally connected between plate and cathode of the 50L6GT output tube and later connected between plate and screen grid of the 50L6GT output tube, is now connected between plate of the 50L6GT output tube and center tap of the output transformer. These changes are shown in the accompanying schematic.

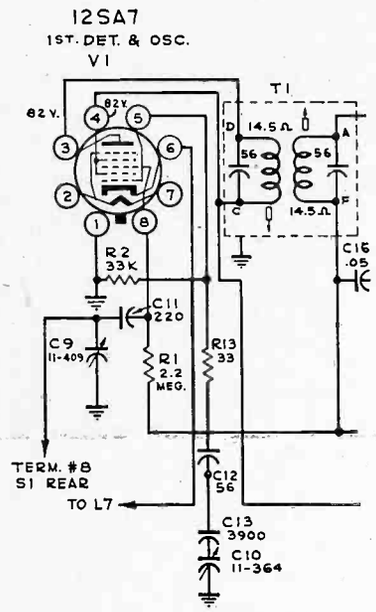
Some chassis use a part No. 71406 oscillator coil instead of the one indicated on the schematic. When this oscillator coil is used, a part No. 39622 mica capacitor (56 $\mu\mu$f) is used in place of the capacitance winding L4 (gimmick) shown in the schematic. This capacitor is connected between 7 and 8 of the oscillator coil.

The lead coloring of the output transformer may not correspond with the coloring given on the schematic. It is, therefore, necessary to rely on resistance measurements rather than the color coding given on the schematic to determine lead connections.



RCA Q103 Series, Chassis Nos. RC-1044, RC-1044 B

The following changes pertain to the Q103 series, chassis Nos. RC-1044 and RC-1044B appearing on *pages 16-8 to 16-13 of Rider's Volume XVI.* The capacitors in the 2d i-f transformer (T2) connected from A to F and D to C have been changed to 150 $\mu\mu$f. The capacitors connected from F-B and B to E have been changed to 105 $\mu\mu$f. A 33-ohm resistor (*R-13*) has been added to the oscillator circuit between the first grid of the 12SA7 pentagrid converter and *C12.* This is illustrated in the accompanying partial schematic.

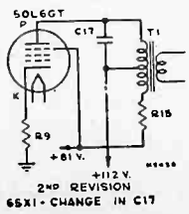


Changes in the 1st Detector-Oscillator circuit of the RCA Q103 Series.

A felt pad is cemented to the side of the 1st i-f transformer next to the 12SA7 1st Det-Osc. tube. A rubber band around the tube and transformer holds the tube against the felt and reduces the tendency to howl on high volume.

Additional precautionary lead dress for these models is as follows:

5. Maintain flexible loop in ground straps of tuning capacitor. Allow slack in leads to tuning capacitor stators.
6. All leads to 12SA7 socket must be dressed to insure flexibility of the socket.
7. Oscillator grid coupling capacitor *C12* should be cemented to chassis with wax or glyptal cement.
8. Dress tracking capacitor *C13* outside of the range switch assembly and cement it to the range switch spacer bar with wax or glyptal cement.



Partial schematics of the original, and first and second revisions in the output circuit of the RCA Chassis RC-1034.

Crosley 56PA, 56PB

Recently it has been discovered that some of the models 56PA and 56PB radios, shown on *page 15-29 of Rider's Volume XV,* are more efficient on power line operation than they are on battery operation. This condition may exist in certain areas, even though the batteries are in good condition.

If a condition of this nature is encountered in your area, it is suggested that one lead wire of the 0.05-μf capacitor, which is item 13 in the schematic, should be disconnected from the terminal strip. This lead wire should be extended, covered with sleeving, and attached to the red wire in the interlock switch, as shown in Fig. 1.

In a later production of these models, a 1U5 tube has been substituted for the 1S5 Det.-AVC, 1st A.F. Amp. tube. All components connecting to the tube remain the same; the only difference occurs in the wiring to the tube socket.

Capacitor (15) which was formerly connected across the output transformer (5), is now connected from the plate pin 2 to F+ pin 7 of the 3S4 output tube.

A 12-$\mu\mu$f capacitor (46) part No. C-137727-13 has been added across the oscillator tank circuit as shown in Fig. 2. The ground from this tank circuit was inadvertently omitted from the schematic diagram shown in Volume XV.

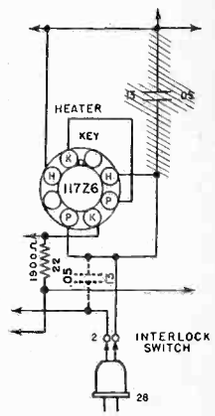
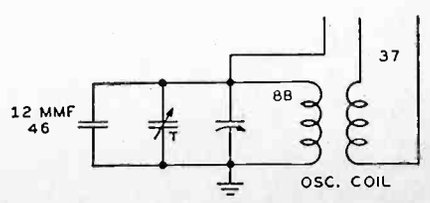


Fig. 1, right. The changing of a lead of item 13 in the Crosley 56PA, 56PB in some cases gives more efficient operation from power lines than from batteries. Fig. 2, below. The ground symbol in the oscillator tank circuit was omitted from the original schematic and should be inserted on Crosley *page 15-29* and also the added 12-$\mu\mu$f capacitor.



Contest Awards

Continued from page 1

$50.00—O. B. Miller, 416 Hudson Ave., Albuquerque, N. Mex.

$50.00—Tom Prickett, Mexia, Tex.

A portable electric drill and bench stand combination worth $25.00 is the award that goes to each of the winners of the 11th to 40th prizes. These are:

Lester G. Adams, 39 Pine St., Tremont, Pa.
Alvin Bock's Radio Service, 37 Huntington St., Springfield 7, Mass.
Everett Atkinson, 936 Washington Ave., Huntington 4, W. Va.
Arthur W. Daschke, RFD #2, Huntington, N. Y.
Norman E. Dauble, 363 Lincoln, Denver 9, Colo.
Lucian J. Derr, 4265 Washington Blvd., St. Louis 8, Mo.
L. Jack Duffy, 511 Georgia Ave., Chattanooga 3, Tenn.
Roland Evens, 409 Center St., Little Rock, Ark.
George G. Everhart, Box 1663, Los Alamos, N. Mex.
George Randolph Floyd, 3420 Dryades St., New Orleans 15, La.
Roy N. Hanson, 3001 Jay St., Sacramento 16, Calif.
M. L. Hart, 1110 E. Main, Alhambra, Calif.
Oscar R. Hoeritz, RFD #1, Randolph, Wis.
John A. Houser, 23 Washington St., Rensselaer, N. Y.
Joseph Keller, 156-10 Baisley Blvd., Jamaica, N. Y.
M. Karl Kerst, 137 N. Pine St., Lancaster, Pa.
Edward J. Klawien, 2367 S. 31st St., Milwaukee 7, Wis.
L. J. Lippiat, Jr., 6107 N. Willamette Blvd., Portland 3, Oreg.
Patrick J. Murphy, 9223—170th St., Jamaica, N. Y.
LeRoy Musselwhite, P. O. Box 438, China Grove, N. C.
Linwood W. Newman, 2023 N. Bambrey St., Philadelphia 21, Pa.
Edmund A. Parsons, Great Falls High School, 2nd Ave. South and 19th, Great Falls, Mont.
William L. Pearson, 10 Elm St., Cohoes, N. Y.
Frank L. Puciloski, Apt. A-9-2 Adair Village, Corvallis, Oreg.
Thomas A. Reid, 1025 S. Fountain Ave., Springfield, Ohio.
Edward A. Roletter, Jr., 806 Carey St., Chattanooga 4, Tenn.
Lowell E. Russell, 319—22nd St., Toledo 2, Ohio.
V. N. Wayman, 1030 N. Downey Ave., Indianapolis 19, Ind.
Lockett C. White, 3236 N. E. 63rd Ave., Portland 13, Oreg.
D. E. Wilkerson, 4008 W. Markham, Little Rock, Ark.

The award for each of the next best 40 letters is a modern Speed soldering iron worth $15.00. The winning contestants in this class are:

Roger M. Bacon, 2616 Barre St., Norfolk 8, Va.
Joseph A. Bartek, 1023 Delaware Ave., Bethlehem, Pa.
William R. Brown, 7818B Hampson St., New Orleans 18, La.
Edgar M. Carnes, 26 Montague Ave., South Zanesville, Ohio.
Frank L. Cavano, Jr., 1629 Doan Avenue, East Cleveland 12, Ohio.
Terence E. Coshin, 248-60 Jamaica Ave., Bellerose 6, N. Y.
J. A. Crawford, RDM 2C, U. S. S. LST 1126, c/o FPO San Francisco, Calif.
John A. Crocker, Hampden Highlands, Maine.
L. Glen Dearing, 420 N. Hudson, Oklahoma City 3, Okla.
Joseph E. Devin, 40 Perthshire Road, Brighton 35, Boston, Mass.
E. F. Dittmar, 3629 S. Broadway, St. Louis 18, Mo.
Richard F. Eagle, 1411 Beaver Ave., Orlando, Fla.
Albert Eckfeld, 1005 Second Street, Portsmouth, Ohio.
Jack Enteen, 614 Snediker Ave., Brooklyn 7, N. Y.
Robert J. Fulwiler, 3000 Windsor Ave., Waco, Tex.
Velmor J. Geiger, 621 E. 6th St., York, Nebr.
Fred E. Gonzales, 6028 S. Vermont Ave., Los Angeles, Calif.
Michael Gulkewicz, 113 Willow St., Allentown, Pa.
Philip R. Happel, 3324 Eighth Ave., Fort Worth 4, Tex.
Ralph Hunter, 450 Main St., Catskill, N. Y.
Felix F. Januss, 813½ Francisco St., Los Angeles, Calif.
Alexander S. Kapes, 614 McKinley St., Hazleton, Pa.
Ernest Lewis, 10385 Tache St., Montreal 12, Que., Canada.
Fred. McGinnis, 15½ Alder St., Oakland, Md.
Harold B. Madeen, 32 Woodlawn Ave., Jamestown, N. Y.
Meade L. Mellott, 6419 Cherry Ave., Long Beach 5, Calif.
Ralph H. Mercer, 1114—18th Ave., N., Lake Worth, Fla.
W. G. Metz, 162 Minot St., Romeo, Mich.
W. S. Moore, Box 203, Allen, Okla.
Henry Murray, Arlington, Wash.
John C. Pyle, 149 N. 7th St., Salina, Kans.
Cyrus Rohrer, Jr., 2903 Hauk Road, Peoria, Ill.
Harold J. Scott, R. D. #2, Conestoga, Pa.
Ernest Siegel, 181 Pacific St., Paterson, N. J.
Harold Siegel, 2324 Irving St., San Francisco, Calif.
Herschel L. Stark, 2707 Webster St., Mt. Rainier, Md.
Robert G. Unsworth, Route #1—Box 145, Sebastopol, Calif.
Russell D. Walters, 826 N. 4th Ave., Wausau, Wis.
William J. Yahnke, 227 Herrick St., Albion, N. Y.
Edward J. Ziha, 4038 Camellia Ave., St. Louis 15, Mo.

The next 60 prize winners were each awarded a DeLuxe Speedex Stripper worth $10.00. The contestants who won these 81st to 140th prizes are as follows:

Max Alth, 261 Riverdale Avenue, Yonkers, N. Y.
John R. Bastone, 3441—11th Avenue, Los Angeles 16, Calif.
J. A. Brundige, Room 1636, 2 Rector Street, New York 6, N. Y.
Charles H. Colquitt, 914 East Grand Boulevard, Detroit 7, Mich.
Frank A. Cote, Box 94, Dayton, Wash.
Ben L. Davis, 65-38 Booth Street, Forest Hills, N. Y.
J. G. Derrick, 358 Derrick Street, Jackson, Miss.
LeRoy Doellner, Maple Avenue, New City, N. Y.
Raymond H. Fox, 224 Melrose Street, Auburndale 66, Mass.
Edgar G. Gaskins, 2003 Alabama Avenue, S. E., Washington 20, D. C.
Paul Grauer, Wilson, Kans.
Mike Hammer, 1015 E. 156th Street, Bronx 55, N. Y.
Thomas A. Hanis, 521 Throop St., Dunmore 12, Pa.
Lincoln F. Hanson, 28 Linnaean Street, Cambridge 38, Mass.
Robert A. Heaton, 1198 Dennison Avenue, Columbus 1, Ohio.
Wayne E. Hite, 422 South 13th Street, Harrisburg, Pa.
Robert Kahn, 4307—8th Avenue, Brooklyn 32, N. Y.
Morris E. Katzeff, Morris Electric Co., 88A Dartmouth Street, Boston 16, Mass.
Harold E. LaFayette, Diamond Street, Plainville, Conn.
Glennis E. Learn, 1163 Nelson Ave., Jacksonville 5, Fla.
Katharine S. Maitland, WODCH, R. R. #2 Quivira Lakes, Kansas City 3, Kans.
Ralph Isler McGough, 1523 Methyl Street, Pittsburgh 16, Pa.
James C. McGuire, 214 So. Serrano Avenue, Los Angeles 4, Calif.
William MacGregor, Box 282, Santa Fe, N. M.
O. J. Mader, Jr., 1135 Crete Street, New Orleans 19, La.
Walter J. Manola, 147 No. Hanover Street, Carlisle, Pa.
Sidney Messer, 3931 Fall Street, Richmond, Calif.
Ben S. Mitchell, Comet Radio Shop, 2848 W. Palmer Ave., Chicago 47, Ill.
John A. Mulvey, 803 N. E. 53rd, Portland 13, Oreg.
Charles A. Munroe, 20630 Center Ridge Rd., Rocky River 16, Ohio.
Walter Muskat, 4218 West Cermak Road, Chicago 23, Ill.
John S. Petretich, 612 Wirt St., Youngstown 10, Ohio.
Frederic D. Rahr, 209 S. Water Street, Sparta, Wis.
D. J. Rankin, Manitoba Sanatorium, Ninette, Man., Canada.
Glenn L. Rasmussen, 9045 S. E. Alder St., Portland 16, Oreg.
Charles Ratsch, 308 North 62nd Street, Milwaukee 13, Wis.
John Repa, Jr., Main Street, Richlandtown, Pa.
Genevieve Richardson, 816 East Maple (Refrigeration Service Center), Enid, Okla.
Jim Richmond Radio Service, 124 Ninth Street, Mt. Vernon, Wash.
Harry Ringel, 3343 Decatur Ave., Bronx 67, New York, N. Y.
Philip M. Ross, 280 Wadsworth Avenue, New York 33, N. Y.
Mrs. Adele Saltzman, 299 Snediker Ave., Brooklyn 7, N. Y.
Melvin A. Shikes, c/o Star Radio Co., 156 Harvard Ave., Allston 34, Mass.
Enoch Smith, Jr., Rosewood Dr., Rt. 4, Columbia, S. C.
Ralph E. Smith, c/o Radio Service & Engineering, 70-10—52nd Ave., Maspeth, N. Y.
Geo. F. Stanley, c/o Knox Hardware Co., 420 E. 4th Street, Santa Anna, Calif.
Karl H. Stello, 12026 Peoria Street, Roscoe, Calif.
Lewis Stemple, Aurora, W. Va.
Malcolm Strong, 13424 Shaw Ave., E. Cleveland 12, Ohio.
Mary E. Tanner, 219 South 7th St., Clinton, Iowa.
Stanley M. Todd, 502 Sixth Avenue South, Great Falls, Mont.
Veto M. Twaska, 3321 West Carson Street, Pittsburgh 4, Pa.
Alfred Varasano, 1417—44tth Street, Brooklyn 19, N. Y.
James D. Vleck, 3384 Meadowbrook Blvd., Cleveland Heights 18, Ohio.
Robert G. Wells, Elizabethtown, N. Y.
George A. Whitten, 213 West Williams Street, Fort Wayne 6, Ind.
Roy Mitchell Wickliffe, 557 West Washington Street, Greenville, S. C.
John Wizemann, Callicoon, N. Y.
Josef Wopperer, 478 South Quaker Lane, West Hartford 10, Conn.
John L. Young, Sr., 217 South Moore Rd., Chattanooga 4, Tenn.

Eighty-four Midget wrench sets worth $7.50 have been sent as prizes to the contestants whose letters the Jury of Award placed in the 141st to 224th class. These winners are:

Please turn to page 6

Arvin 544R, 544AR

These models are the same as models 544 and 544A appearing on *pages 15-3 to 15-5 of Rider's Volume XV*, except for the changes following.

The variable capacitor has been changed. The antenna section of this variable capacitor now has a capacitance of 420-$\mu\mu$f. The loop inductance has been made less to match this larger capacity.

The parts list for the Arvin 544R and 544AR is the same as that enumerated on *page 15-5 of Rider's Volume XV* except for the following changes:

Part No.	*Description*
A18640-2	Dial scale
A19473	Dial pointer
AC19867-1	Antenna loop assembly
AC19866	Var. capacitor and pulley assy.

•

GE 417A

This model appears on *pages 16-17 to 16-20 of Rider's Volume XVI*. The i-f transformers T-8 and T-9 are indicated as having terminals. They actually have leads coming out. For T-8: blue goes to the plate of V4, red goes to B+, green goes to grid of V5, and black goes to ground. For T-9: blue goes to plate of V4, red goes to B+, green goes to grid of V6, orange goes to junction of R16 and R27, and black goes to ground.

•

Stewart-Warner 9017-A, B

These models are a later production of the 9017-A shown on *pages 15-49 to 15-52 of Rider's Volume XV*.

A 0.05-μf capacitor (61) part No. 502806, has been added from the avc bus (low side of secondary of 1st i-f transformer 33) to B— (cathode of the 12J5GT Osc. tube).

In some chassis of this model the short-wave oscillator trimmer 28 was ommitted in order to permit the use of gang capacitors with higher than normal capacity in the oscillator section. In these instances exact calibration is obtained without the use of the trimmer—merely tune receiver to 20-mc generator signal and adjust antenna trimmer 11.

•

Emersion 512, 515, 516, 550, Chassis 120006, 120056

These models incorporating the 120006 chassis are the same as model 512 shown on *page 15-11 of Rider's Volume XV*. These models using the 120056 chassis are the same as those mentioned above, except for the replacing of the octal tubes with the following loctal tubes:—7B7, 14B6, 14Q7, 50A5, and a 35Y4. The circuit diagram and the voltage readings remain the same, except for the base pin numbers.

•

Firestone 7423-6

This model is the same as model S7398-1 shown on *page 13-14 of Rider's Volume XIII.*

•

Fada 602

This model, shown on *page 15-1 of Rider's Volume XV*, also uses the Milwaukee-Erwood 10700 Series Record Changer, which is shown on *page RCD.CH. 15-1 of Rider's Volume XV.*

•

Farnsworth AC-55, Chassis C2-3

This model is the same as model ACL-55, Chassis C 2-3, shown on *pages 11-7 and 11-10 in Rider's Volume XI.*

•

Farnsworth ACL 55, ACL56, AKL58, AKL 59

These models shown on *pages 11-7 and 11-10 of Rider's Volume XI* are erroneously listed as ATL.

•

FOR SALE

General Radio Co., Model 603-A signal generator, having range 100 kc to 25 mc; complete set of eight coils and calibration charts. Fair condition; price $100.00. Apply Chief Engineer, John F. Rider Laboratories, 404 Fourth Ave., New York 16, N. Y.

•

Manufacturers' Data

Now there is a new way of getting service data between publication dates of the Rider Manuals! On November 30, 1947, we inaugurated our new photostat service to supply you with information on all receivers, new and old. Material that is scheduled for forthcoming manuals is included, as well as any data previously published. If we have the servicing data, we'll photostat it and send it off.

The page size of the photostats will be 8½ x 11 inches. A double page schematic spread will measure 17 x 11 inches.

For 10c (we'll accept stamps, too) we will send you the schematic, voltage data, parts list, and everything else which will fit on two pages. AND ALL IN 24 HOURS. Additional manufacturers' data, for everything up to seven pages, is 5c a page. If the manufacturers' data should require more than seven pages, each additional page costs you but 3c.

Since you cannot know how many pages your order will call for, we suggest that you send in 20c with your order. If the cost of the photostats is less, we will return the difference with your photostats. If the cost is more, we will let you know what you owe us when we send your photostats.

•

PUBLISHERS OF RIDER'S MANUALS AND OTHER RADIO SERVICE BOOKS

John F. Rider
PUBLISHER
·INC·
404 FOURTH AVENUE · NEW YORK 16, N.Y.
MURRAY HILL 3-6990

AN ANNOUNCEMENT TO THE USERS OF RIDER MANUALS

Dear Rider Manual User:

Have you ever been frustrated?

Have you ever tried to make a progressive move and in spite of every sincere desire have it boomerang on you?

If it has never happened to you--you are indeed a fortunate man.

However, it has happened to me! Just within the past few months, too!

When we set up Rider Manual Volume XVI, it was with the idea of providing you with servicing data faster, and also with the idea of making Rider Manuals easier on your pocketbook.

You know that with XVI we started the three-times-a-year policy, and Volume XVI sold and is now selling at $6.60 for a manual of 768 pages--less than a penny a page--and in addition we gave you a 48-page "How It Works" book on theory of new circuits.

Well, in the desire to give you the Rider Service that you are accustomed to, we set the $6.60 price of Volume XVI on the basis of firm quotations on labor, paper, printing, binding and other costs. It was assumed that these prices would be firm. Actually they were not!

Instead of getting lower prices, or at least firm prices, our costs have increased so much that it is impossible to continue producing Volume XVI at $6.60 and give you the fine printing, the fine paper and the excellent binding that are hallmarks of Rider Manuals.

Despite these problems we have filled all orders for Volume XVI--and we will fill all orders for Volume XVI at its current price of $6.60--until January 15, when we will have to raise the price to $8.40.

The usual practice is to suddenly announce a rise in prices.

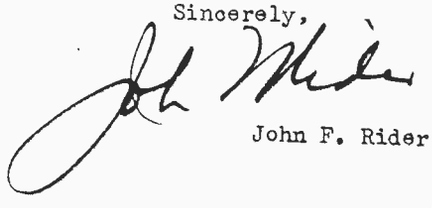
That is not our way. The men who have orders on hand with our jobbers for a Rider Manual Volume XVI at $6.60 are entitled to get it at that price, which will continue in effect until January 15, 1948.

Every Rider distributor should have Volume XVI in stock. If he does not, he can get your copy to you for $6.60, up to January 15, 1948. Our present supply will be exhausted by that time. The new printings must be at the higher price. We tried in our small way to knock prices down. It just did not work.

In new volumes, such as Volume XVII and subsequent ones, we shall continue supplying data at less than a penny a page as long as possible, but simple cost economics makes impossible the production of volumes of less than 1200 pages on such a basis and maintaining the same standards of high quality which have prevailed.

I know that you will understand and continue the support that you have given to me and my organization for almost twenty years--a long time in which we have made and kept many friends.

Sincerely,



John F. Rider

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

Vol. 9 NOVEMBER - DECEMBER, 1947 No. 2

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

ANSWER TO THE MYSTERY

BEFORE starting, we wish to express our sincere thanks for the tremendous response to our editorial "A Mystery" in the September-October issue of SUCCESSFUL SERVICING. The letters we received represent a cross section of the entire American servicing industry and some foreign countries, and they contain so many fertile ideas and honest expressions of opinion that saying thanks twice is not sufficient.

We believe that our readers have given the answer to the mystery, and we are certain that these answers will be of interest to the service managers for manufacturers of receivers and allied equipment. It would be illuminating to run some of the letters, but space does not permit. The issue is simple: why servicemen are reluctant to become part of a manufacturer's service net. There are three important reasons, but of these three one is of the greatest prominence.

The foremost is one of pure and simple economics. Opinions from the field are not based on theory but rather on actual experience—not always, but often enough, in the radio field, also in allied fields; not always in connection with radio receivers, sometimes with test equipment; not always in association with the manufacturer, many times with the distributor. But it all adds up to the fact that the prices allowed for such authorized service activity are not sufficient to justify the effort. Stated differently, there just isn't any money in the deal. Quite a number of the men who have had such experience in the radio receiver field, in the test equipment field, and in the refrigerator field are waiting for their contracts to expire and will not renew them on the present basis.

The service industry is daily becoming more clannish and, while there is competition between members of the industry, bad news travels fast. The fact that profitable operation is very difficult to attain in such manufacturers' nets is bad news and receives much word-of-mouth advertising. Just what effect this condition will have upon industrial electronic service nets is difficult to say, but a bad experience is not forgotten for a long time. Based upon the communications, one can conclude nothing but that an upward price adjustment is necessary to make such service nets successful.

It is unfortunate that such a situation exists, because it precludes participation by some of the finest shops, extremely competent technically and well fortified equipment-wise. Many such shops have answered the editorial, and being in good standing in their community, they feel that they can do without what they have not had. There is no doubt in our mind that, given the opportunity, these people would do a good job, but it is understandable that they refuse to operate on an unprofitable basis.

The second reason is again one of economics, this time as it relates to the willingness of the ham to pay a service charge commensurate with what operations are necessary to check a communication receiver thoroughly. There are a few hams who are willing to pay, but now the majority are definitely against paying the fee justified when a competent serviceman spends a great deal of time lining up a band, let us say a 10-meter band, so that the response is most uniform over the entire range of 28 to 30 megacycles. Such alignment cannot be done in one operation. We have seen it attempted, and the result was maximum response over a portion of the band and greatly reduced response over the remainder. This condition is highly undesirable from the ham's viewpoint, because it very greatly limits his operation, for "you can't work what you can't hear." We have personally witnessed the alignment of many receivers—in fact we have carried out such operations—and we know that 20 to 30 minutes spent repeating adjustments to attain a maximum tracking accuracy relative to the dial frequencies and most uniform sensitivity over the band, is not too long a time. We have seen how such painstaking effort increased sensitivity and reduced noise to a point where one receiver very greatly out-performed another of similar make and model, which was not aligned with equal care. Side by side and hooked to the same antenna, the carefully aligned receiver produced signals which were not even heard on the other.

Most hams realize the importance of good alignment, but unfortunately are not willing to pay for it.

The third reason is an unfortunate one. Many men admit that they are afraid to tackle the communication receiver because of a number of things. First, because they do not understand the operation of numerous circuits found in communication receivers. Second, they are not familiar with the means of determining selectivity and sensitivity. Third, they feel that their test equipment, while apparently adequate for home receiver servicing, is not adequate for communication receiver servicing, especially the signal sources.

As to not understanding receiver circuits, the remedy for that lies in the hands of the service industry. The same is true of the second reason, although such knowledge should have been in the possession of servicemen, because both sensitivity and selectivity are performance factors of great importance to home receivers. Admittedly, this kind of check is seldom made in the average service shop, but it is hoped that some day it will be. This writer has advocated its application time and time again, and such data are now beginning to appear in connection with home receiver specifications.

As to the signal sources, correction of many conditions is in the lap of the test

Please turn to page 6

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

Vol. 9 NOVEMBER - DECEMBER, 1947 No. 2

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

ANSWER TO THE MYSTERY

BEFORE starting, we wish to express our sincere thanks for the tremendous response to our editorial "A Mystery" in the September-October issue of SUCCESSFUL SERVICING. The letters we received represent a cross section of the entire American servicing industry and some foreign countries, and they contain so many fertile ideas and honest expressions of opinion that saying thanks twice is not sufficient.

We believe that our readers have given the answer to the mystery, and we are certain that these answers will be of interest to the service managers for manufacturers of receivers and allied equipment. It would be illuminating to run some of the letters, but space does not permit. The issue is simple: why servicemen are reluctant to become part of a manufacturer's service net. There are three important reasons, but of these three one is of the greatest prominence.

The foremost is one of pure and simple economics. Opinions from the field are not based on theory but rather on actual experience—not always, but often enough, in the radio field, also in allied fields; not always in connection with radio receivers, sometimes with test equipment; not always in association with the manufacturer, many times with the distributor. But it all adds up to the fact that the prices allowed for such authorized service activity are not sufficient to justify the effort. Stated differently, there just isn't any money in the deal. Quite a number of the men who have had such experience in the radio receiver field, in the test equipment field, and in the refrigerator field are waiting for their contracts to expire and will not renew them on the present basis.

The service industry is daily becoming more clannish and, while there is competition between members of the industry, bad news travels fast. The fact that profitable operation is very difficult to attain in such manufacturers' nets is bad news and receives much word-of-mouth advertising. Just what effect this condition will have upon industrial electronic service nets is difficult to say, but a bad experience is not forgotten for a long time. Based upon the communications, one can conclude nothing but that an upward price adjustment is necessary to make such service nets successful.

It is unfortunate that such a situation exists, because it precludes participation by some of the finest shops, extremely competent technically and well fortified equipment-wise. Many such shops have answered the editorial, and being in good standing in their community, they feel that they can do without what they have not had. There is no doubt in our mind that, given the opportunity, these people would do a good job, but it is understandable that they refuse to operate on an unprofitable basis.

The second reason is again one of economics, this time as it relates to the willingness of the ham to pay a service charge commensurate with what operations are necessary to check a communication receiver thoroughly. There are a few hams who are willing to pay, but now the majority are definitely against paying the fee justified when a competent serviceman spends a great deal of time lining up a band, let us say a 10-meter band, so that the response is most uniform over the entire range of 28 to 30 megacycles. Such alignment cannot be done in one operation. We have seen it attempted, and the result was maximum response over a portion of the band and greatly reduced response over the remainder. This condition is highly undesirable from the ham's viewpoint, because it very greatly limits his operation, for "you can't work what you can't hear." We have personally witnessed the alignment of many receivers—in fact we have carried out such operations—and we know that 20 to 30 minutes spent repeating adjustments to attain a maximum tracking accuracy relative to the dial frequencies and most uniform sensitivity over the band, is not too long a time. We have seen how such painstaking effort increased sensitivity and reduced noise to a point where one receiver very greatly out-performed another of similar make and model, which was not aligned with equal care. Side by side and hooked to the same antenna, the carefully aligned receiver produced signals which were not even heard on the other.

Most hams realize the importance of good alignment, but unfortunately are not willing to pay for it.

The third reason is an unfortunate one. Many men admit that they are afraid to tackle the communication receiver because of a number of things. First, because they do not understand the operation of numerous circuits found in communication receivers. Second, they are not familiar with the means of determining selectivity and sensitivity. Third, they feel that their test equipment, while apparently adequate for home receiver servicing, is not adequate for communication receiver servicing, especially the signal sources.

As to not understanding receiver circuits, the remedy for that lies in the hands of the service industry. The same is true of the second reason, although such knowledge should have been in the possession of servicemen, because both sensitivity and selectivity are performance factors of great importance to home receivers. Admittedly, this kind of check is seldom made in the average service shop, but it is hoped that some day it will be. This writer has advocated its application time and time again, and such data are now beginning to appear in connection with home receiver specifications.

As to the signal sources, correction of many conditions is in the lap of the test

Please turn to page 6

Answer to the Mystery

Continued from page 5

equipment manufacturer. Admittedly, a thousand-dollar piece of equipment cannot be sold for a hundred dollars, but neither can a piece of equipment, which, by all sound reasoning justifies a price of 150 or 200 or 250 dollars, be offered for less than a hundred and fill the bill. It is really unfortunate that the words "signal generator" are so loosely used. The problem is not so much the accuracy of frequency calibrations as it is the matter of signal output control. Some day this will be corrected.

The important thing at this time is that many of the men are now becoming conscious of the deficiencies in test equipment, and this is the very important thing for test equipment maufacturers to note. We can cite other reasons, but we feel that those we have mentioned are sufficient to explain what seems like an enigma. Let's hope that something will be done by all of those concerned to remedy the situation.

JOHN F. RIDER

•

Contest Awards

Continued from page 3

James W. Ackley, 740 Seneca Pkwy., Rochester 13, N. Y.
Frank Arbuckle, Met. P. O. Box 6350, Los Angeles, Calif.
B. H. Babigian, Radio Nook, 2805—38th Avenue, at Allendale, Oakland 2, Calif.
Sam M. Ball, 110 North 3rd Street, Muskogee, Okla.
V. M. Barry, 42 King Street, Christiansted, Virgin Islands.
James D. Berridge, 4601 Southern Parkway, Louisville 8, Ky.
Paul Blauth, Box 44, Tower Hill, Ill.
Lacy L. Bryant, RFD 7, Box 357, Atlanta, Ga.
F. R. Buckle, 1740 Gillette Crescent, South Pasadena, Calif.
Joe S. Byler, 3553 Kruger St., Memphis, Tenn.
Kenneth F. Conroy, 18030 Waltham Ave., Detroit 5, Mich.
William H. Cooley, 58 Queensberry St., Boston 15, Mass.
Wallace A. Copeland, 278 Beech Street, Roslindale 31, Mass.
James L. Cox, 918 Hagerer St., Racine, Wis.
John Daniel, Piedmont, Mo.
Lester M. Davis, Cobelen, Ill.
Frank DeCanio, 817—28th St., Union City, N. J.
Melvin P. DeJager, Box 357—93 Littleton Road, Chelmsford, Mass.
George J. Disney, 373 Farmington Ave., Plainville, Conn.
Harry Doster, Box 214, Fort Mill, S. C.
Stan. S. Dowgiala, 141 Hopkins Avenue, Jersey City 6, N. J.
Lee C. Doyel, 1410 W. Wabash Avenue, Crawfordsville, Ind.
Arthur Elliott, 19 West 91st St., New York 24, N. Y.
Foster Radio Service, 113 N. Iowa Ave., Washington, Iowa.
John T. Frye, 1810 Spear St., Logansport, Ind.
Mrs. Ralph B. Gaddy, 306 E. Harrison St., Dillon, S. C.
Lester F. Gares, 2800 Wm. Penn Hwy., Easton, Pa.
Robert T. Gates, 1357 West 23rd St., Los Angeles 7, Calif.
Robert E. George, 711 Ave. "F," Box 487, Bogalusa, La.
Joseph H. Gimse, Pennock, Minn.
Francois Gouin, 3291 Main Street, Springfield 7, Mass.
Leo O. Gray, 1166 West Farms Road, New York 59, N. Y.
Tony Grayson, 7214½ S. Broadway, Los Angeles 3, Calif.
Francis Guise, 450 Court Street, Elizabeth, N. J.
Delton B. Hadel, 307 N. Cedar St., Box 342, Abilene, Kans.
E. E. Hampton, 1617 Hampton St., Columbia, S. C.
Don G. Harmer, W 3 M O, 3542 S. Street N. W., Washington 7, D. C.
Robert O. Hedden, 2721 Ellendale Place, Los Angeles 7, Calif.
Carl B. Henning, Arlington, Vt.
Henning's Radio Repair, W. 7th & Bay Street, St. Paul 2, Minn.
A. H. Ismach, Manager, Beacon Radio, 946 East 181 Street, New York 60, N. Y.
Eugene Jackson, 260 Convent Avenue, Apt. 76, New York 31, N. Y.
M. Carroll Johnston, 146 Dayton Street, Yellow Springs, Ohio.
Elbert L. Jones, 126 N. Green Street, Winston-Salem, N. C.
Clyde D. Kiebach, 705—18th Street N. W., Washington 6, D. C.
Raymond E. Launer, 118 W. Chapman Ave., Fullerton, Calif.
Raymond G. McClain, 354 Sixth Ave., Newark 7, N. J.
W. E. McLain, 105 West Michigan Ave., Marshall, Mich.
Albert Marx, 286 Fort Washington Ave., New York 32, N. Y.
Arthur B. Moore, 616 E. Lincoln Ave., Mt. Vernon, N. Y.
Carl Mowery, 23 S. Market St., Shamokin, Pa.
Herbert Muth, 2317 W. Ohio St., Evansville 12, Ind.
J. Thomas Myers, 424 Elliot Ave., Alex. Park, Portsmouth, Va.
Haino W. Oinonen, 127 Pleasant St., Gardner, Mass.
Bennie V. Ondrak, 220 "C" St., Idaho Falls, Idaho.
Raymond C. Pearson, 600 West 138th St., New York 31, N. Y.
James W. Pinkerton, 201 South Broadway, Albuquerque, N. Mex.
N. B. Platt, 358 N. 4th Ave., Highland Park, N. J.
Mr. J. M. Pray, General Delivery, Alberni, B. C., Canada.
Jack Proctor, Benton, Ky.
Anthony Purcell, 347 Main St., East Orange, N. J.
Mrs. Cornellius Ranallo, 369 Schoonmaker Ave., Monessen, Pa.
Roland N. Richardson, P. O. Box 349, Griffin, Ga.
John Rugar, Jr., 304 E. Charleston Blvd., Las Vegas, Nev.
Elting C. Ryan, 122 Miller Avenue, Providence 5, R. I.
Elmer Sayers, 209 S. 9th St., Lewisburg, Pa.
Louis Bernard Schiltz, 2233 East Minnehaha Ave., St. Paul 6, Minn.
Robert G. Shaw, 1406 N. Benton Way, Los Angeles 26, Calif.
Cecil C. Sheets, 1410 Girard St. N. W., Apt. 2, Washington 9, D. C.
Ralph Shepard, 3817 East 67 Terrace, Kansas City 5, Mo.
Philip Shevick, 1233 S. St. Louis Ave., Chicago 23, Ill.
G. H. Sloker, 705 Loretta Ave., Winnipeg, Manitoba, Canada.
Michael Sortwell, 3064 Zephyr Ave., Pittsburgh 4, Pa.
R. de Q. Sullivan, 124 N. 20 Ave., Hollywood, Fla.
William R. Tucker, Jr., St. Simons Island, Ga.
Charlie F. Turner, P. O. Box 847, Winston-Salem, N. C.
R. D. Van Arnam, 757 Thayer St., Akron 10, Ohio.
Jack Virtudes, P. O. Box 288, Danbury, Conn.
Louis Wagner, 123 Adams Ave., Canonsburg, Pa.
Clarence E. Walter, Walter Radio Shop, Middleburg, Pa.
R. C. Willette, 114 E. 4th St., Blue Earth, Minn.
Walter Woerner, 73-40—70th St., Brooklyn 27, N. Y.
L. E. Wright, Crab Orchard, Box 1, W. Va.
Louis J. Zaydon, 1124-1126 Market St., Harrisburg, Pa.

We wish to take this opportunity to congratulate the winners whose names appear above and to thank the thousands of other contestants who also expressed their high regard for Rider Manuals in their contest entries.

•

NOTICE

Due to the necessity of publishing the winners' names and the usual amount of changes in manufacturers' data, space was unavailable to run "The Report on Television Servicing". This will appear in the next issue.—*Editor.*

Rolling REPORTER

Set Takes Pix

Think we're kiddin'? *Well, we aint!* Here's wot happened while we were vacationing among the beauties of upstate New York *(and we do mean the scenery!)*. We went into a service shop and were surprised by a torrent of very expressive and very choice invective. "Get hold of a tough one?" we asked the orator. "Naw, it's this" *(Business of waving a magazine.)* He pointed to an ad announcing the birth of a combination portable radio set AND CAMERA. "Now I gotta fix cameras too", he wailed, "as if there weren't enough headaches fixin' radios!" Yep, that's the way we met the latest brainchild of the AirKing engineers, but cheer up, youse guys, cameras don't have tubes and resistors and batteries that go sour. Besides you might get some interestin' (sic!) pix to develop as a side line in yer spare time. . . .

Future TV Homes

Just to show yuh that lotsa folks are lookin' ahead, RCA is suggestin' to anyone who is buildin' a home to pick a location in his future living room for their TV set and then to run a 300-ohm transmission line from that point up into the attic, leaving enuf line for hooking in the antenna wherever it might be. There's an idea for yuh—if there's some home buildin' goin' on in yer neighborhood, look up the owner and tell him about the advantages of bein' all wired up for TV. *It's an angle, bub, it's an angle.* . . .

More'n More FM

Almost every day one of Uncle Sam's helpers brings us a release from somebody telling that an f-m job was used for the first time in this or that way. The latest one to come in told about a two-way f-m installation on ferry boats on Chesapeake Bay, where there is plenty of heavy traffic and now and then some fogs of a particularly soupy variety. So, even if there isn't an f-m transmitter in your neck o' the woods, f.m. most likely is bein' used in *some way besides* shootin' out the trials of "Backstage Wife" or the doin's of "Superman" or "Capt. Midnight". *It will pay you to look into that.* . . . And if you want to get some of the latest dope on f.m.—*and a lotta you told us you do in the Rider Questionnaire*—'long about the last of the year ask yer jobber for our new book "FM Transmission and Reception." *Wotta gold mine of info that book is!!!*

Surgical TV

Naw, we don't mean excavatin' the innards of a TV set—we just wanted to put on the record that this fall several operations were telecast by RCA here in N. Y. The main idea was that when a big-shot sawbones makes with the scalpel on a tough job of innards-snatchin', lotsa dox like to get an eyeful of the doin's. It's hard for everyone to see in an operatin' theayter, so they figgered 'twould be simpler to let the TV camera do the lookin' for everybody and then let the spectators cuddle up to the screen of a TV receiver, *where they'd see all and get a runnin' play-by-play description.* We suppose that in the future, when a surgeon gets your ok to go on with his cuttin', he'll also sign yuh up for the broadcast and TV rights. . . .

St. Nick's Helper

Always anxious to get in right with the bewhiskered gent who appears 'long about this timea year, Aloysius Winenwiski suggests this one: if someone asks yuh, "Wadda want for Xmas?", just tell 'em, *"Well, there's a new book Rider's just put out that I'm sure would be just the thing!"* Or if you wanter to be sorta subtle, just check or ring the title of one or two books in one of our ads and leave it in a place where it'll be found by someone who'll be open to suggestions. . . .

New Style

Even with all this yippin' and yappin' about longer skirts for the gals, we were tossed for a loss when we heard this one—and the gal who told us swore it was true. . . . She was in a women's shop that specialized in garments for those in an interestin' condition, *(Know wot we mean?)* when a doll dashes in and asks a saleslady, "Have you a maternity wedding dress that will fit me?" Wonder if the ushers were gonna make an arch of shotguns instead of swords like they do at other military weddin's????? And, Gals, is this a new style? We wonder—*we wonder.* . . .

Got Your Vol. XVI?

It ain't gonna be our fault no more if youse guys dont have whatever service dope you need, right on tap. The Boss is puttin' out three *(count 'em)* THREE volumes per year and the first of these triple plays—Vol. XVI—should oughter be on your shelf right this minute, for your jobber's had 'em in stock since Oct. Just in case you haven't gotten around to gettin' yours yet, it has 768 pages along with a "How It Works" book and an index. . . . So multiply that number of pages by 3 and you'll know how many pages of the *real honest-to-gosh info* you'll be gettin' every year from now on. . . .

On Prancer, On Dancer

Yep, once more the old boy is limberin' up Dancer, Prancer, Vixen and the other five reindeer to make his annual visit to you and *you* and YOU. . . . (Incidentally, can you name *all eight* of those deer?) *(Editor's Note: Can you?)* *(Uh-huh, we kin)* Well, as is our looooooong established custom, we wishes you and yours the MERRIEST CHRISTMAS you've ever had and here's hopin' that 1948 will find your cash register ringin' out *all the time* just like the bells on New Year's Eve. . . . And lissen, if you meet up with the Merry Old Elf in your travels, will you please tell him not to forget to slow up when he gets to the East River in Brooklyn and then STOP when he gets to the backyard-on-a-roof of

The Rolling Reporter

•

A Rider's Television Manual

When Rider's Volume XVII is published a separate manual containing service data on television receivers only will also be published. This separation of television from the broadcast and communication receiver data into two manuals is made because, for the next year or so, a great many areas in this country will not be within range of television transmitters, and so servicemen in these areas will have no need for television receiver data. Since it would be unfair to penalize those users of Rider Manuals by including television receiver data in Rider's Volume XVII, thereby excluding many broadcast or communication receivers for lack of space, and since by the time television will be available in all areas, the present receivers may be obsolete, it was decided to publish the two groups of data in separate manuals. The date of publication will be announced early in 1948 and also the price.

•

F.M. Spreading

Frequency-modulated transmitters are now or very soon will be sending programs to 44 of the 48 states. In other words, practically all of the United States has or will have soon f-m coverage. This means that even if your particular locality is not yet served by an f-m transmitter, there is a good chance that it will be in the near future. Furthermore, it should be borne in mind that f-m transmissions have been picked up far beyond the expected line-of-sight distances from the transmitting antenna, so that although your community is considered to be beyond the service area of some f-m station, you may well be able to get f-m signals.

In the event that your locality is now definitely beyond the present service area of an f-m transmitter, there is no telling how soon such conditions will change and you may be called on to service f-m receivers. Certainly, it is good common sense and good business foresight to prepare yourself for what is coming. Don't miss the boat! Be ready to service f-m sets when they come to your shop. And there will be no better source of up-to-date information on the subject than Rider and Uslan's new book, "FM Transmission and Reception." It will be out soon and will have what you need to know.

NOTICE

The Federation of Radio Servicemen's Associations of Pennsylvania and the Town Meeting of Radio Technicians will hold simultaneous meetings at the Bellevue-Stratford Hotel in Philadelphia on January 11, 12, and 13, 1948. This is a cooperative venture of the N.E.D.A. distributors in that area; the Parts Division of the RMA; the Radio Sales Managers' Club; the Electronic Parts and Equipment Manufacturers, the Representatives, and the Philadelphia Radio Servicemen's Association. The program established for this Town Meeting is excellent and will be of value to all servicemen who can attend.

NEW RIDER BOOKS OPEN UP NEW OPPORTUNITIES FOR YOU!

Here is technical know-how that will enable you to benefit from the fast growing manpower needs of the electronic industries. Rider Radio Books have proved their practical value in servicing shops, "ham" shacks, engineering labs., public libraries, government and private schools and colleges. They are authoritative, and easily understood. Check the listing below. Order today — and begin to "Learn RIGHT with Rider."

OUT SOON! FM

by John F. Rider & Seymour D. Uslan

CHAPTER HEADS

- Fundamental Considerations
- Frequency Modulation
- Essentials of F-M Transmitters
- Transmitters of Today (Wide Band and Narrow Band)
- The Transmission of F-M Signals
- F-M Receiving Antennas
- The F-M Receiver
- Alignment of F-M Receivers
- Servicing of F-M Receivers

Over 300 Fact-Packed Pages

TWO EDITIONS: (Same but for covers)
Paper Cover Stock..... $1.80
Hard Back Cloth..... $2.70

TRANSMISSION AND RECEPTION

A thorough explanation of all manufacturers' products—transmitting and receiving; regular broadcasting, railroad, police, and "ham" equipment. Wide medium and narrow band is considered.

For radio servicemen, who can look to F-M as a big part of their future profits, for the "ham" who is considering narrow band F-M—for the student who is grooming himself for activity in the electronic field, this new book explains both the theory and servicing of F-M receivers. Its text provides an equally valuable hand-book for engineers.

OUT SOON! TWO NEW RIDER 99's

PA INSTALLATION AND SERVICING

Here is a book that provides the answers to characteristic problems met in low power public address installations . . . In short it tells what to do and what not to do with microphones, amplifiers, loud speakers, connecting cables—also how to service such P.A. systems.

UNDERSTANDING VECTORS AND PHASE

Considering the importance and wide use of vector presentations as a short-hand method of conveying the latest technical information in the radio field, it behooves every man in the technical branch of the industry to possess an appreciation of the significance of vectors. This book is a must for every student and serviceman if he is to keep pace with and understand advances in the radio art.

Each Over 130 Pages..... Each ONLY 99¢

WATCH FOR EARLY RELEASE OF ADDITIONAL RIDER 99'RS

OUT IN JANUARY!

BROADCAST OPERATORS HANDBOOK by HAROLD E. ENNES

A practical book written by a well known broadcast station operator for others who seek to attain high positions in that branch of electronics. 280 pages—$3.30.

INSIDE THE VACUUM TUBE

By John F. Rider. A new approach and technique that makes its message easy to understand. A solid, elementary concept of the theory and operation of the basic types of vacuum tubes based on the electro static field theory. The book, which covers diodes, triodes, tetrodes, and pentodes, presents a clear physical picture of exactly what is happening in a vacuum tube.

A goldmine for the student; a must for servicemen, amateurs and engineers. 425 Pages—$4.50.

SERVICING BY SIGNAL TRACING

Explains approved system of diagnosing faults in radio receivers and all kinds of communication systems. The method was introduced by the author of the book, John F. Rider. The system has won endorsement by individuals and associations the world over as well as technical branches of our government. 360 Pages—188 Illustrations—$4.00. Spanish edition—$4.00.

A-C CALCULATION CHARTS

By R. LORENZEN. Students and engineers will find this book invaluable. Simplifies and speeds work involving AC calculations. Contains 146 charts. Covers AC calculations from 10 cycles to 1000 megacycles. —$7.50

THE METER AT WORK

How each type of meter works and how each is used in the field to best advantage. Covers whichever phase of the subject the reader is interested in. 152 Pages—138 Illustrations—$2.00.

VACUUM TUBE VOLTMETERS

Explains the theory upon which the functioning of the different types of v-t voltmeters is based, and also the practical applications of these instruments. Includes a bibliography consisting of 145 international references. 180 Pages—111 Illustrations— $2.50.

THE CATHODE-RAY TUBE AT WORK

By JOHN F. RIDER. Presents a complete explanation of the various types of cathode-ray tubes and what role each element within the device plays in making voltages and currents visible. The only book of its kind! 338 Pages. 450 Illustrations—$4.00.

SERVICING RECEIVERS BY RESISTANCE MEASUREMENT

Discusses series and parallel combinations of resistances and the distribution of currents and voltages, providing the basis underlying the circuit arrangements used in various types of radio receivers. 203 Pages—94 Illustrations—$2.00.

ALIGNING PHILCO RECEIVERS

Complete and detailed information for aligning every Philco model from 1929 to 1941.
VOL. I —1929 to 1936—176 Pages.....$2.00
VOL. II—1937 to 1941—200 Pages.....$2.00

UNDERSTANDING MICROWAVES

By VICTOR J. YOUNG. Foundation for understanding microwave radio and radar. Explained simply. Design and Operation of waveguides, magnetrons, klystrons, antennas, etc. Section I covers theory; Section II, terms, ideas, and theorems. 385 Pages. Liberally Illustrated. $6.00.

RADAR

The complications have been removed in this entertaining book explaining Radar. Non-technical, but authentic. 80 pages, profusely illustrated, only $1.00.

THE OSCILLATOR AT WORK

Shows how various oscillator circuits function and methods to improve their performance. Also describes the r-f and a-f oscillators used as signal sources. Covers laboratory test methods, and other related tests. 256 Pages—167 Illustrations—$2.50.

AUTOMATIC FREQUENCY CONTROL SYSTEMS

Basic operation of discriminator and Automatic Frequency control circuits is detailed in first part of book. Descriptions of systems used in commercial receivers are fully described in second part. 144 Pages—102 Illustrations—$1.75.

JOHN F. RIDER PUBLISHER, Inc.

404 FOURTH AVENUE, NEW YORK 16, N. Y.

From
JOHN F. RIDER PUBLISHER, Inc.
404 FOURTH AVE., NEW YORK 16, N. Y.

Forwarding and Return Postage Guaranteed

A. J. S. CERINO
2393 PITKIN AVE.
BROOKLYN 3, N. Y.

Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
NEW YORK, N. Y.
PERMIT No. 9427