SUCCESSFUL Servicing

DECEMBER, 1951

Fringe Area TV

ANTENNA TOWER

by Gerald Wilson

TV viewers in metropolitan centers do not appreciate their good fortune. Not only do they have numerous stations to choose from, but also the signal strength from all these stations is so high that elaborate antenna systems are not necessary. Occasionally some receiving difficulties do arise but, even in the worst cases, these cannot approach the varied situations that the fringe area viewer faces. Oftentimes for him to get decent reception in fringe areas, special antenna installations are necessary costing more than the tv receiver itself.

An antenna structure which is capable of consistent reception of stations within a 100 mile radius, is located in Jackson, Michigan. It has withstood the ravages of four very severe winters, standing up to some of the strongest winds in the United States. This point is not to be ignored; it is bad enough to be forced to lay out a substantial sum of money for a tower-type antenna installation, but it is doubly worse if inadequate planning necessitates replacement once a year or perhaps every two years. This well made and planned structure is shown in Fig. 1. It has on occasion picked up stations more than 1,000 miles away. The antenna is one that is capable of high gain over the desired tv channels and is used with a rotator for maximum directional response. As important as the antenna proper is to signal reception however, it is the tower upon which the antenna is mounted that is of paramount importance in fringe area reception.

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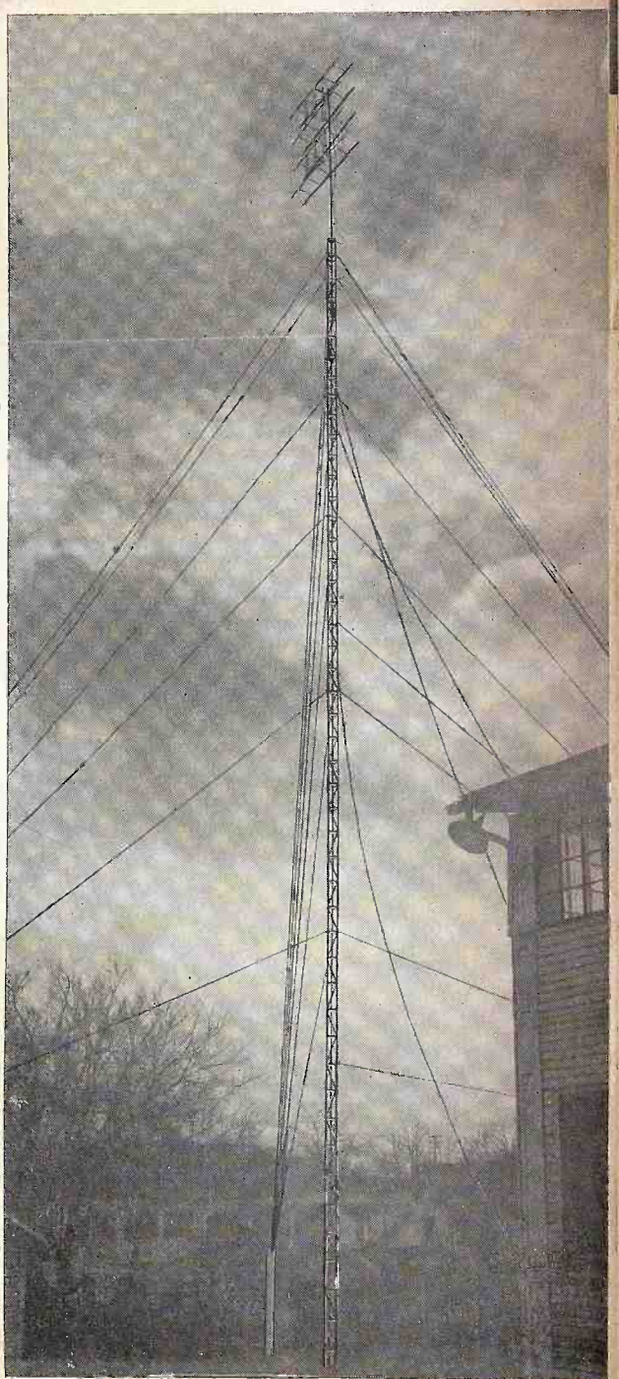

Fig. 1. Fringe area tv antenna tower located in Jackson, Michigan, showing the seven different sets of guy wires used to help support the structure.

To Our Readers:

.As evident herein, SUCCESSFUL SERVICING again is the house-organ of John F. Rider Publisher, Inc. and will continue to serve the servicing industry in that fashion.

Our desire to maintain a free circulation and so reach the greatest number of individuals concerned with radio and television servicing each month dictates the return to our original publishing policy. In view of the rapidly expanding circulation and other controlling factors, it is deemed impractical to continue publishing SUCCESSFUL SERVICING as a free circulation magazine with the format contained in the November issue. So, henceforth, it will continue as a free circulation house-organ.

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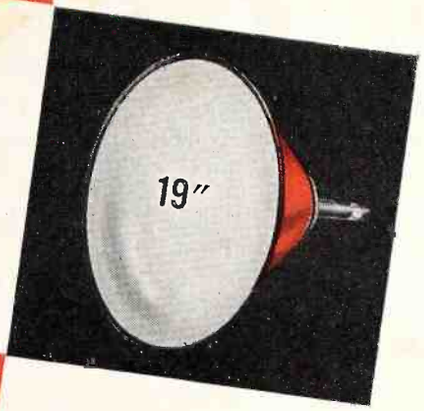

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20CP4;
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20JP4 (Selfocus)

21EP4;
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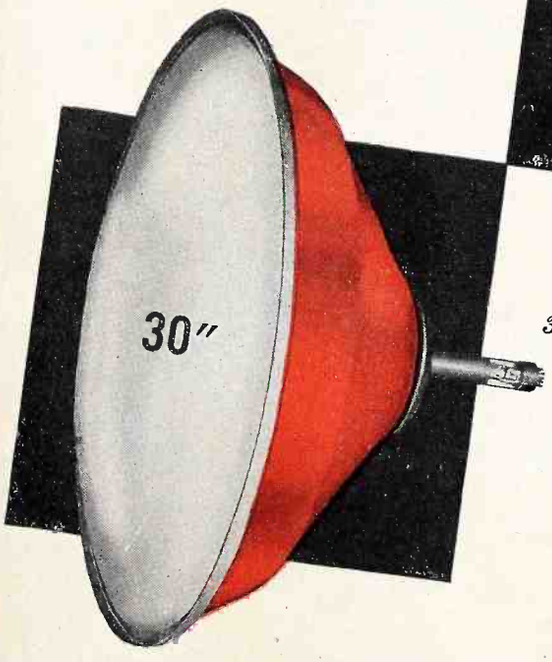

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Servicing Hints for TV RECEIVERS

by Bob Middleton

Phase Modulation of Picture and Sound Signals

Phase modulation (pm) and frequency modulation (fm) are two aspects of the same modulating process, and both are demodulated by the discriminator or ratio detector. In a properly adjusted tv receiver, pm of the received signals is negligible. The possibility however, of generation of spurious signals due to pm in a faulty receiver should not be disregarded. The following illustrations show the operating conditions which generate a maximum amount of pm.

The region at A in Fig. 1 (i-f response curve) is known as the sound shelf, and this is where the sound carrier should fall. The sound carrier rides too high on the curve at B, causing excessive buzz intermodulation with the picture carrier.

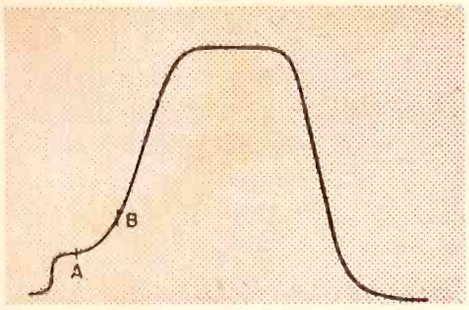

Fig. 1. Sound carrier should fall at A rather than B if amplitude and phase modulation are to be minimized.

From considerations of the seldom used method of slope detection of fm signals, it is known that the steeper the portion of the curve on which the carrier rides, the greater will be the conversion of fm to am. Less generally recognized, perhaps, is the fact that **placement of the carrier on a steep portion of the response curve gives rise to phase modulation.**

Four and one-half megacycles away, on the other side of the response curve, is the picture carrier, C, as indicated in Fig. 2.

As shown in the figure, the picture must necessarily ride on the side slope of the response curve. As a result, there is an irreducible minimum of phase modulation introduced into the picture signal, even when the receiver is aligned as well as possible. If the slope of the curve is gradual through C, the phase modulation will be sufficiently small so as to be down below the threshold of audibility. However, it is well to note that the amount of phase modulation can be made to rise without limit as the steepness of the slope through C is increased. In general, the limited number of tuned circuits provided in the intercarrier receiver make it unlikely that this slope will be excessive, *unless a misadjusted trap should cut a steep slope into the picture-carrier side of the curve.*

Buzz Due to Differential Signal Attenuation

Due to interfering reflections in the path of propagation, the transmitted tv signal may arrive at the receiving antenna with a picture carrier which is substantially attenuated with respect to the sound carrier. Such propagation phenomena can cause 60-cycle buzz, even in properly adjusted receivers.

The sound carrier is normally placed at 10% on the overall response curve so that the picture carrier will never fall below the level of the sound carrier during picture modulation. Consider, however, the situation which arises when the picture carrier is attenuated due to propagation effects. Under these conditions, if a modulation trough at the transmitter dips down to 10% of peak response, this trough will fall below 10% at the receiver. If the picture carrier should be attenuated 50% (as is not at all impossible), the troughs of picture modulation will then dip down to 5%, leaving severe troughs in the 4.5 mc beat signal. The obvious remedy is to place the sound carrier at 5%, or even lower, on the overall response curve.

Buzz Due to Intermodulation

An understanding of the process of intermodulation in the intercarrier receiver makes possible a more direct attack on sources of buzz. Because fm buzz cannot be eliminated from the sound signal by ordinary processes of limiting and fm detection, it is well to get at the source of fm buzz intermodulation in intercarrier receivers.

Buzz frequently results from consecutive intermodulation, that is, **the picture signal may intermodulate with the sound signal in the last i-f stage and again in the first or second video stage.** Not only is the am of the picture signal impressed upon the sound carrier during the first intermodulation, but the fm of the sound signal is also impressed upon the picture signal.

Here we have a situation which may lead to a 60-cycle fm buzz on the sound carrier, if a second intermodulation occurs. This is quite possible in present-day receivers. Although a limiter will remove the a-m buzz introduced in the first intermodulation, it is quite unable to cope with the fm buzz introduced in the second intermodulation. This shows the importance of confining nonlinear operation to one stage only if nonlinearity cannot be avoided.

Loss of Sync Due to Buzz

There is a common fallacy that if an i-f amplifier is generating buzz by limiting the sync pulse, then this production of buzz must be accompanied by a loss of sync. This is not necessarily true because partial limiting, in which perhaps one-third of the sync pulse is lost, permits the sync circuits to operate almost in normal fashion on strong signals. However, this partial limiting involves operation on the nonlinear portion of the i-f amplifier's characteristic curve.

Due to the fact that the vertical sync pulse is not amplified by a linear class A circuit, intermodulation of sound and picture signals occurs. Both amplitude and frequency intermodulation can occur under such conditions. The am can be removed by a good limiter,

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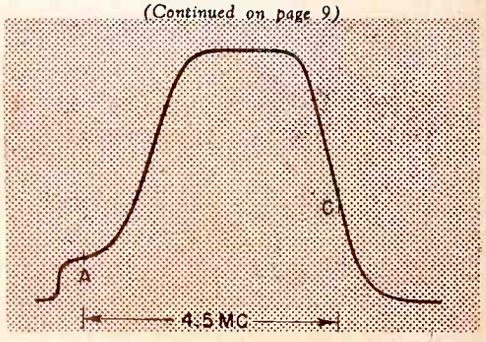

Fig. 2. Picture carrier C normally falls on the side slope of the i-f response curve.

Successful SERVICING
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Dedicated to the financial and technical advancement of electronic maintenance personnel

Volume 13 Number 2 December, 1951

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MEMBER

Curtain Time

Test Equipment Instruction Manuals

We had occasion recently to discuss service equipment instruction manuals with a test equipment manufacturer. He had received advice from several of his distributors that he should not make his instruction manuals too lengthy because they created the impression in the minds of the service technician that the equipment was difficult to handle. It was implied that a detailed manual acted as a deterrent to the sale of the device. With this we do not agree.

We feel that by and large, television and radio technicians want bigger and better test equipment instruction manuals. Admittedly some service technicians do not read the literature which accompanies the apparatus they buy. This does not justify instruction manuals of very limited scope. Maybe the buyer doesn't read everything immediately, but it is well known that the moment he runs into a snag he grabs for the instruction manual and looks for the answers. That is when the detail pays off.

Of course it's wrong not to read the instruction manual before using the equipment for the first time, especially when the equipment costs several hundred dollars or more. But regardless of the habits of the buyer — and these can not be dictated by the seller — the fact remains that each equipment instruction manual should be as complete as possible, whether it is or is not read by the buyer. He must have the information when he wants it.

We realize that instruction manuals are related to dollars and cents of costs; that every word and page represents money in writing, artwork, paper, printing, and binding. On the other hand, it is the contents of the manual which enable the equipment buyer to get the most out of his investment, this in turn means an enhancement of the product in the mind of the user. Quite frequently the information contained in a manual is the key to the solution of a problem, and in the mind of the equipment user, all the credit is reflected on the equipment. So a good equipment manual helps rather than hinders the reputation of a product.

Fighting Unfair Press

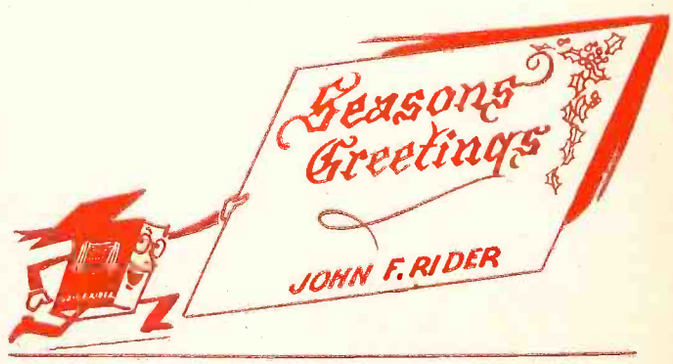
We have on hand a release from the advertising agency handling the Sprague Products account. It is a window streamer intended for service shop distribution, carrying a message to the public concerning the servicing industry. It is an attempt to fight back against unfair press. We hope that other manufacturers will see fit to take similar or other steps to wage this battle. This editorial page is open to all who do so, and we hope that these comments will not be construed as undue publicity for the manufacturer mentioned herein. The service industry need this and every other possible aid in their effort to build public confidence.

E. W. Merriam

The radio industry moves fast. Only last month we announced the appointment of "Al" Merriam as the service coordinator of the RTMA. Well, at the time of this writing he is no longer with the Manufacturer's Association. His replacement has not yet been announced. His new job is Service Manager for Sylvania Electric Products.

So once more, the best of luck to you, Al.

John F. Rider



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We Asked For It!

OUR READERS' VIEWS ON LICENSING.

The response to our request for letters in connection with the two articles we ran on tv service licensing in the November issue of Successful Servicing, was immediate. We cannot reprint all the letters we received, we don't have the space. However, here are some representative views, and we will print more from time to time.

George B. Weigel, Rome, N. Y.

In reference to the article "License TV Technician?" which appeared in the November issue of SUCCESSFUL SERVICING, I should like to register a negative vote. Following are a few of the reasons.

Licensing is just a step away from unionizing us, and that step will surely follow. The technician that doesn't sign up will have sets wrecked in his shop, equipment ruined, and possibly physical violence inflicted upon his self or family, until he does or will sign up.

A union can throw weight in many directions. The jobber and supplier to the servicing industry would certainly, sooner or later, feel adverse effects.

Tell me, what percentage of the pro's in the industry are actually thinking of CUSTOMER benefit? Stew it, boil it, dry it, and sift it, and it all comes down to elimination of competition.

What has become of the idea "There is plenty of room at the top?" Individuality would soon be lost. You are licensed and you are unionized, so you are as good as the next man. You can hire, but you get into difficulty when you fire.

As it is, who calls the technician or agency that has duped him or a friend on a previous service call? Who could afford to keep a technician who couldn't sell himself to a customer? *Under licensing and unionization which would follow, you would have no choice.*

No sir, let the serviceman stand on his own record and ability. Keep politicians and unions out of it.

We don't get a better haircut simply because the barber is licensed and unionized.

A Newark, N. J. Serviceman

It is heart warming that there is so much discussion among servicemen about licensing. If nothing else, it will set our fellow technicians to thinking. Naturally everyone has an axe to grind in this matter; I am trying to grind the axe of the individual serviceman.

We as a group are notoriously underpaid. *Therefore, because we will have a license in common and therefore be a recognized group, we will be able to form a union.* This will result in increased rates for the use of a personal car and tools, and an adequate wage in proportion to the cost of living.

At present there is only chaos. Look at the prices for the sets themselves in the stores! Compare the cost of repair parts to the initial cost of the set. Add the cost of labor to that of the parts and try to make the bill attractive to the customer.

Overselling of sets, and poor workmanship and parts in the factory also cry for policing, and licensing.

Licensing may not be the cure all, or even the best possible way out. However, we tried it the other way, why not give this a chance.

John J. Hancock, Union Supply Co., Burlington, Iowa

Having read both articles "Yes," and "No," on licensing of tv technicians, I must cast my vote as "Yes."

Mr. Haas expends a lot of good argument on the "No" side, but the whole question boils down to the incompetence of quacks and their curtailment, and the raising of public opinion of the electronic servicing industry. The only practical solution is licensing.

Too long the radio service man has been in the same category as the grocery delivery boy and the ditch digger, which though honorable endeavor, has relegated his compensation accordingly.

The advent of television has lifted the whole servicing industry to a higher plane, and no longer can the screw driver mechanic fool the public. *The public however, needs educating to the fact that today the radio-tv technician must be a highly trained individual,* with an expensive education, expensive equipment, and enormous endeavor to attain the necessary qualifications to service their electronic devices. He is entitled to equitable compensation.

Black's Radio Service, Burlington, Iowa

The November issue of SUCCESSFUL SERVICING was received today and both articles on the licensing of radio, television, and electronic service technicians were read. Both have presented very good points as they see it but I agree most heartily with Mr. Haas. I will touch on a few points.

Licensing will not assure the customer of a good job being done on his or her set.

Licensing will not keep the repair cost down as there is too much red tape to go through and that always increases the cost to the consumer.

A license does not necessarily build up one's reputation as a reliable technician. Quality workmanship and fair prices are more desirable than a license.

This letter may seem a little unusual from a territory that is not affected as yet by the threat of licensing, but I couldn't let this subject go unheeded.

D. L. Johnson, Commercial Trading Co., Tucson, Arizona

License TV technicians? My answer is NO! In the first place the plan proposed is undemocratic, nowhere does the serviceman have the right to elect his representative to the proposed board—the board members are all appointed by a political officer and the only purpose of this bill is to provise more plums for a political machine.

If it is desired to raise the general standard of ability it would be far wiser to institute a series of service training schools or classes and make them available at reasonable rates with competent staffs and up to date methods and materials.

I strongly suspect that the self employed technician would suffer from this measure.

Gilbert Grossinger, Brooklyn, N. Y.

Licensing may have its good points, but from my viewpoint the consumer will pay for it in the end.

Let us say that licensing will get rid of some, even many incompetent servicemen, by eliminating those unable to pass the exam or those who will not buy the license. Consequently, those of us who maintain our status will be busier; thus we will be able to charge more for a service call. After all, we now have a license and may feel we deserve more. Secondly, those men who would sell the consumer equipment he does not need will still do so, only this time they will have a license to do it. It's legal now?

It is my contention that those men who sell contracts should be required to maintain a minimum bank account to protect the consumer from fly-by-night businesses. Aside from this, the entire idea of licensing is ridiculous.

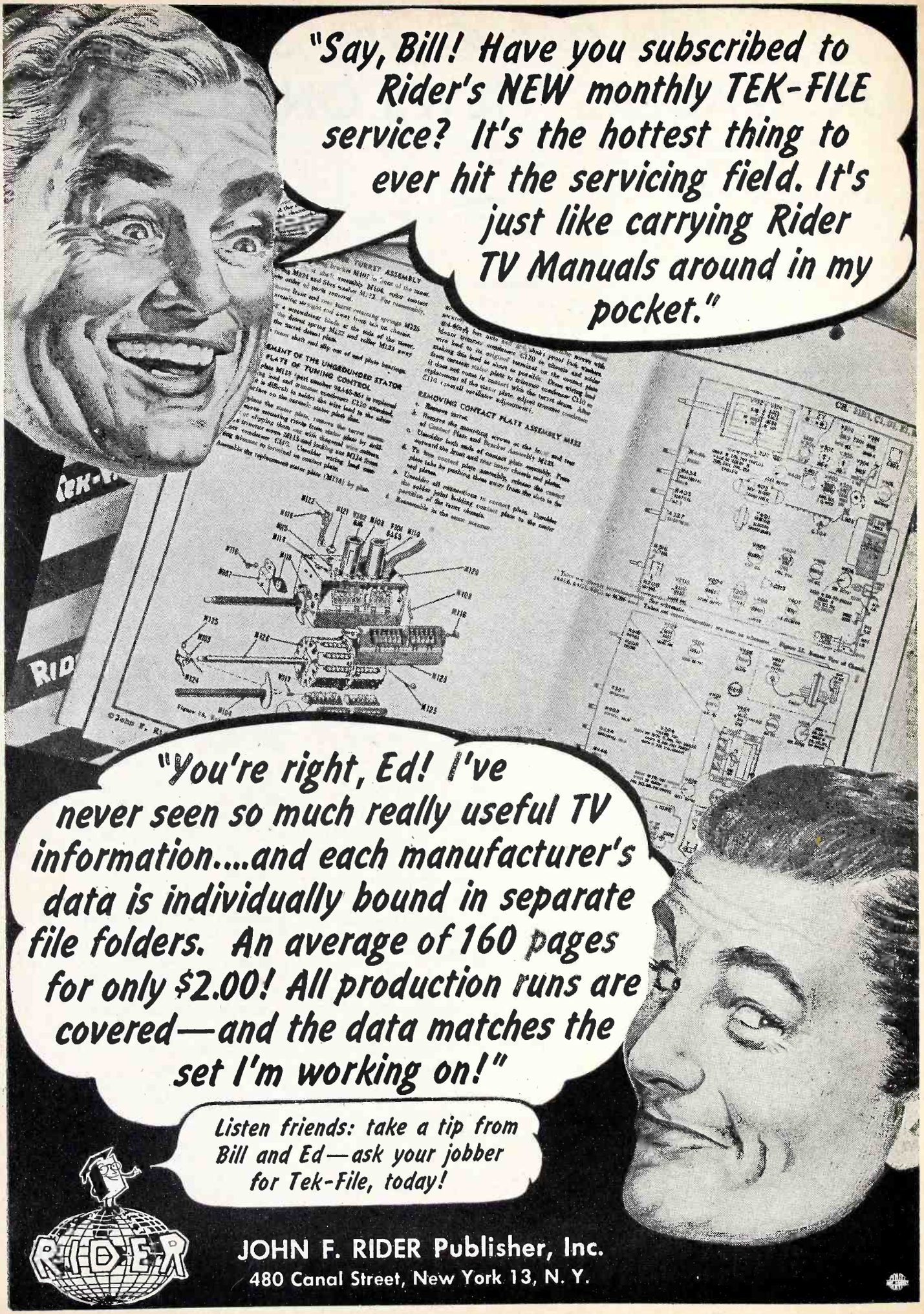
Leonard E. Markle, Mark's Radio Service, Greenfile, Indiana

In regard to the article on "License TV Technicians," I think the repairman or technician has beat himself over the head enough already with all the hellabeloo about the license. He can either fix a set or he can't—the customer will be the controlling factor in any town or city.

I do believe that all the technicians should get together once a month or so and talk over their problems and agree on service call prices, etc. This would work the same as the industry's Net and List prices.

I believe more pressure should be put on the manufacturers of tv sets. Sets should be designed so that they would be easier to work on. Some sets require that the chassis be pulled out simply to replace a tube. This costs the customer extra money and doesn't make for good technician-customer relations.

P.S. I still say **NO!**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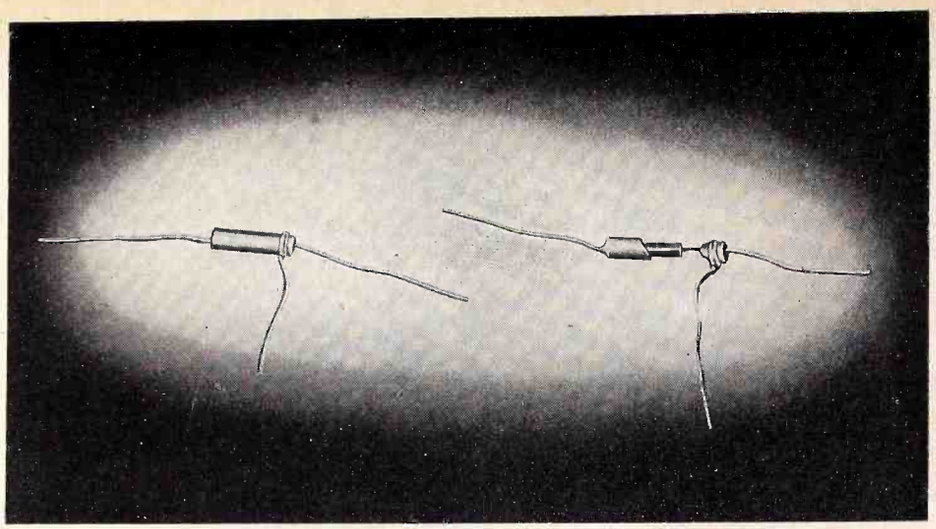

Fig. 2C. Photograph of a resistor-capacitor combination unit showing on the left, the whole unit, and on the right, a broken one with the resistor inside the ceramic capacitor.

COMPONENT COMBINATIONS in Radio Receivers

by Seymour D. Uslan

From the point of view of the man who traces out the troubles in radio receivers and repairs them, variations in electrical and mechanical design always present a problem. He must acquaint himself with these innovations so that he can do a better job. The trend toward the use of new circuit constructions in the electronic equipment of today is on the increase.

It is the purpose of this article to acquaint the reader with those special constructions that are used in the radio receivers of today.

In the Lear portable radio chassis P-10B for example, there are employed specially constructed resistance and capacitance units, called "C and R units." Most of these units are shown schematically as representing a single resistor and capacitor, but there are some that are shown representing two capacitors and one resistor. These units are not printed circuits but rather, separate resistors and ceramic capacitors so mechanically arranged into a single unit that it might at first be difficult for the radio serviceman to realize that more than one circuit element is represented by this unit.

The schematic diagram for a section of the P-10B chassis is illustrated in Fig. 1. The units of interest to us are shown enclosed in dashed boxes and are represented by the resistor-capacitor combinations of R8-C32, R12-C31, R14-C34, R15-C35, and R6-C29-C30. The relationship between the schematic representation and the physical unit is somewhat puzzling. In order to visualize the tie-in between the schematic drawing and the unit itself, we will study the construction of these units.

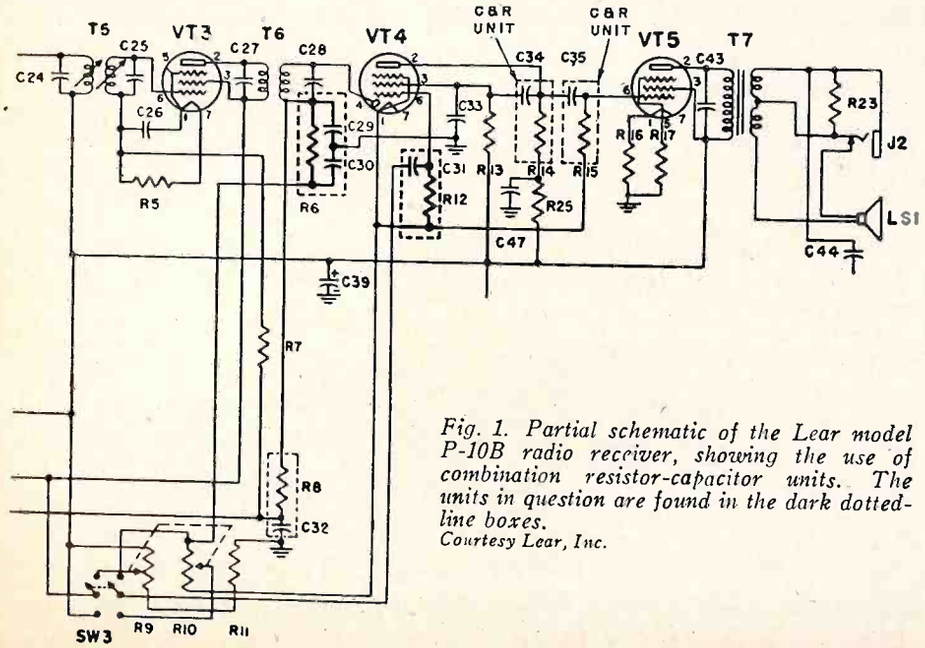

Fig. 1. Partial schematic of the Lear model P-10B radio receiver, showing the use of combination resistor-capacitor units. The units in question are found in the dark dotted-line boxes.
Courtesy Lear, Inc.

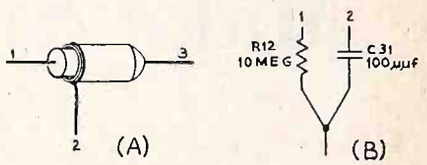

Fig. 2. (A) Drawing of the R12-C31 unit as it appears in the receiver. (B) Schematic representation of this unit.

Single Resistor-Capacitor Combinations

Each unit consists of a single carbon resistor in conjunction with a ceramic capacitor. A drawing of the R12-C31 unit (R8-C32, R12-C31, R14-C34, and R15-C35 are identical) as it appears in the receiver is illustrated in Fig. 2(A), and the schematic representation for this unit is shown in Fig. 2(B). An actual photograph of two of the units is shown in Fig. 2(C). This unit consists of a 10-megohm carbon resistor inserted inside a ceramic capacitor. One end of the resistor is soldered to one plate of the capacitor and this connection is brought out as a single lead, number 3 in Fig. 2(A). Lead number 1 acts as the other end of the resistor and lead number 2 is the other end of the capacitor.

In the circuit of Fig. 1 the common lead (3) of the R12-C31 unit is connected to the control grid of VT 4, the other end of the resistor is connected to the cathode of VT 4 and R15; the other end of the capacitor is connected to Switch 3 (Direction Finder

(*Continued on page 14.*)

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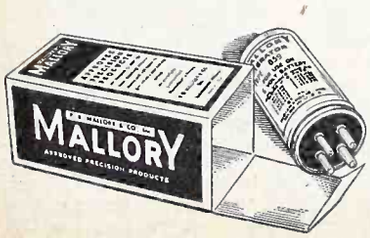

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Servicing Hints for TV RECEIVERS

(*Continued from page 3.*)

but the residual fm inevitably proceeds to the speaker as audible buzz.

Sync Pulse Normal But Retrace Lines Appear

If the sync pulse and blanking pedestals appear normal, visible retrace lines may be the result of a weak or misadjusted ion trap. This forces the brightness control to be set too high. If the ion trap is all right, check the high voltage. The filter resistor may be excessively high in value. Another cause is a faulty picture tube which may be gassy, have low beam current, or may have a failing screen.

The guiding thought behind these checks is that the brightness control is being advanced abnormally for some reason. As a result, the picture tube does not operate far enough down on its Eg-Ip characteristic. This causes black and blacker-than-black signals to appear as grays on the screen.

New Yoke Does Not Cure Keystoning

If a new yoke does not cure keystoning, the trouble may be caused by the use of the former capacitor and resistors across the yoke terminals (see Fig. 3).

It occasionally happens that an apparent short in the yoke is actually being caused by defective resistors or capacitors. *Check also the condition of the insulation on the yoke leads, especially where they come through the chassis.* Occasionally the insulation is frayed,

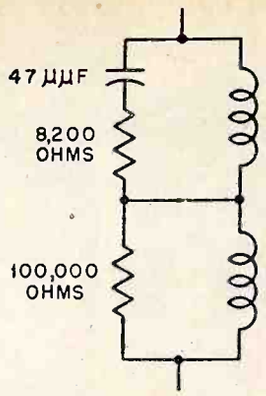

Fig. 3. RC circuit used in conjunction with horizontal deflection coils in yoke.

thus causing a partial or complete short at this point.

Readjust Ion Trap with Increase of High Voltage

Several methods are available to raise the high voltage supply to the second anode of the picture tube in order to obtain a brighter picture. It is worth noting that the optimum position of the ion trap changes with a change in accelerating potential. Accordingly, the adjustment of the ion trap should be checked if the high voltage is raised. This will not only insure the maximum brilliance of picture, but also will avoid possible damage to the picture tube.

Measurement of D-C Voltage with High A-C Voltage Present

Many technicians are familiar with the danger of damage to a multimeter or to a VTVM when an attempt is made to measure the plate voltage of the horizontal-output tube. The d-c voltage present at this point is about 300 volts. However, this is accompanied by a sharp pulse of approximately 6,000 volts peak-to-peak.

While the pulse voltage does not affect the indication on the d-c voltmeter directly, this pulse may draw a large current pulse through the attenuator of the voltmeter. This can cause serious damage by overheating or burning out of the precision resistors.

Now it is quite practical to measure the d-c plate voltage at the plate of the horizontal-output tube without damage to the voltmeter if a high-voltage probe is used. In this case, the probe is used not to attenuate the measured voltage, but to serve as a filter which keeps large pulse currents from flowing. The attenuation of the d-c voltage is incidental to the protection afforded.

Since about 300 volts are to be measured, a 100-to-1 high-voltage probe is most convenient. The range switch of the voltmeter can be turned to the 3-volt range, and the scale is then read as 300 volts, full scale.

Consider how much the pulse voltage is attenuated at the meter terminals. Assume that a VTVM having an input resistance of 12 megohms is used. The 100-to-1 multiplier resistor has a value of 1,188 megohms. Accordingly, 1/100 of the applied d-c voltage appears at the VTVM input terminals. However, the attenuation factor for the unwanted pulse voltage is very much greater. The total input capacitance of the shielded cable plus the VTVM input capacitance is typically 150 $\mu\mu$f. At the fundamental frequency of the pulse, this capacitance has a reactance of about 70,000 ohms. This causes a pulse attenuation of about 18,000-to-1. In other words, only 1/3 volt ac appears across the VTVM input terminals.

— END —

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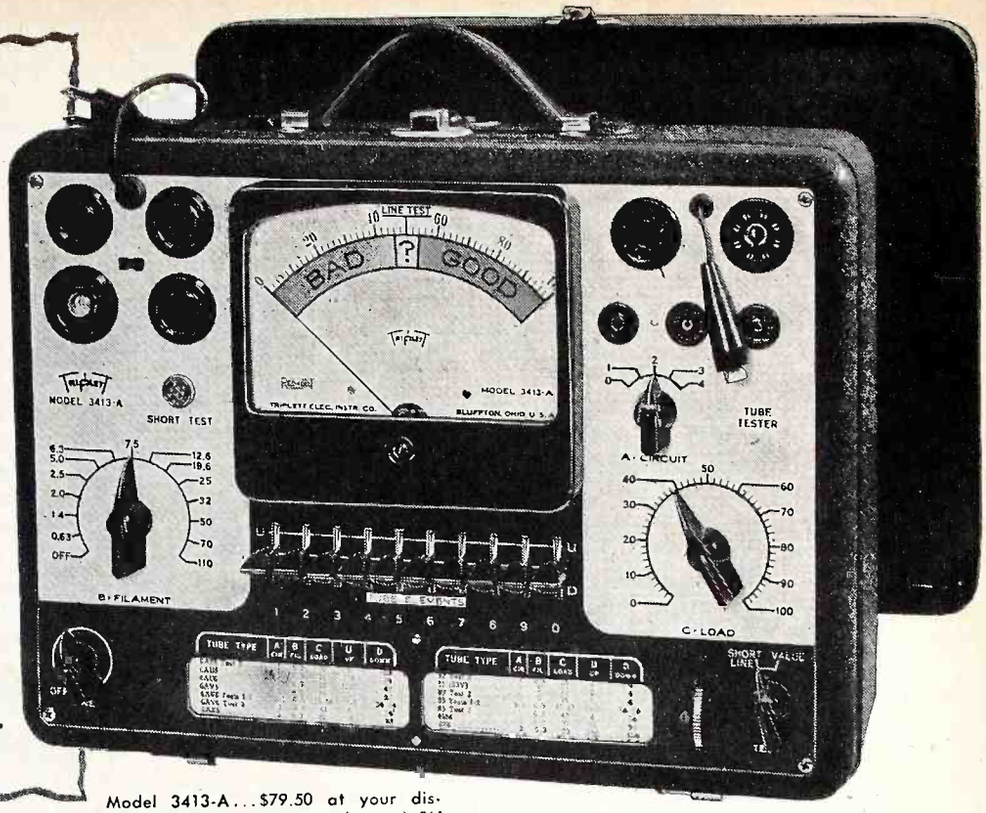

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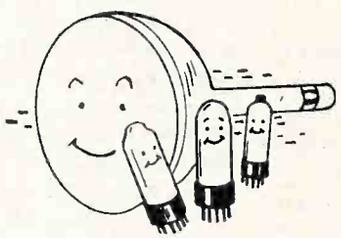
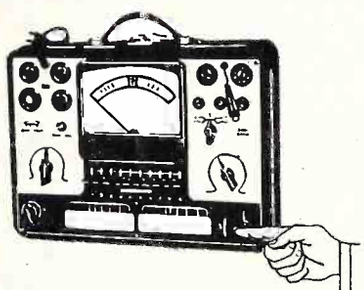
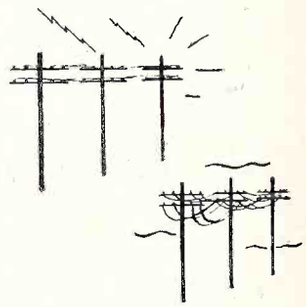


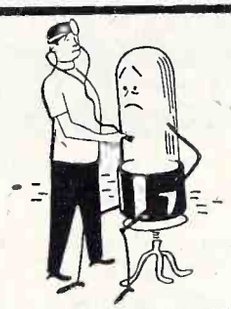
1. YOU CAN TEST MORE TYPES of tubes, also appliances, for shorts and open circuits.



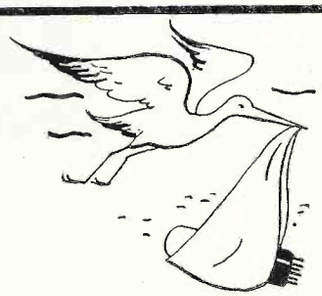
2. JUST SPIN THE KNOB—for correct, last-minute data, on the speed roll chart. Lists 700 tubes.



3. YOU CAN COMPENSATE for line voltage—just throw snap-action switch.



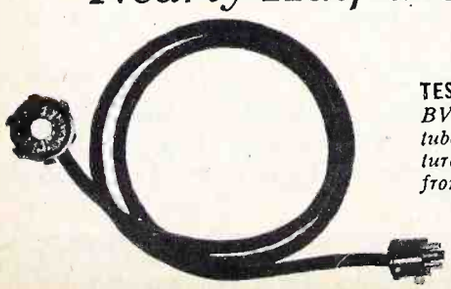
4. YOU CAN TEST EACH ELEMENT in each tube—by a simple flip of the switch.



5. YOU CAN TEST THE NEW TUBES—including those with low cathode current.

6. YOU GET NEW TUBE DATA—immediately, while it is still news. No waiting.

Nearly Half a Century of Service to the Service Man



TESTS PICTURE TUBES, TOO! *With this BV Adapter, Model 3413-A tests every tube in a TV receiver,* including *the Picture Tube—without even removing tube from receiver or carton! Saves time!*

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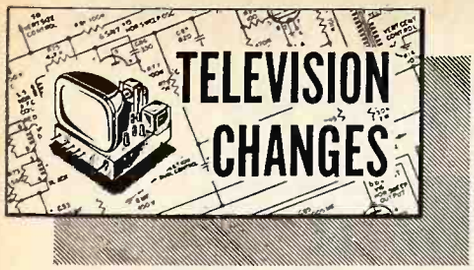


Sylvania 5130B, 5130M, 5130W, 5140B, 5140M, Ch. 1-290

The following changes with change codes as noted have been made in the 1-290 chassis.

Code 2. The value of R183, connected to pins 2 and 3 of V14 sync separator has been changed from 2.2 megohms to 1 megohm. The value of R192, connected to T60, has been changed from 1.5 megohms to 1.2 megohms. The value of R-193 is now 1.5 megohms.

Code 3. An audio socket has been added as shown in Fig. I to VII, the 6T8 ratio detector

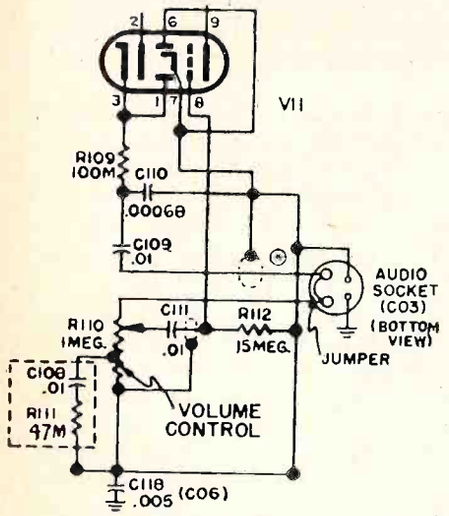


Fig. 1. Partial schematic of the Sylvania chassis 1-290 showing addition of audio socket.

and 1st a-f stage. Pin 3 goes to C106; pin 2 goes to T53; pin 9 goes to the junction of C112, C113 and R113; R111 and C118 go to the junction of C105, R108 and C107; C118 and R112 are connected to R119. R169, which was located from R168 to the –135-volt line, has been relocated and now goes from the –135-volt line to R164 (3,600 ohms). R168 is connected directly to the –135-volt line. The lead from the junction of C195 and the 6AU6 horizontal control pins 2 and 7 goes to the junction of R164 and R169. The value of R169 has been changed from 47 ohms to 180 ohms. The value of C146, connected to pin 6 of the 6BF5 video amplifier, has been changed from 0.1 μf to 0.005 μf, and C146 is connected to the junction of C147 and ground instead of to the –135-volt line. The value of C147 has been changed from 0.05 μf to 0.005 μf. Pin 2 of the video amplifier is connected to the junction of R145 (3,300 ohms), C145 and R146, instead of to the –135-volt line.

Code 4. This is a factory change and does not affect field service.

Code 5. Tubes V13 and V18 have been changed from 12AU7 to 6SN7GT. No wiring changes are necessary.

Code 6. A 0.005-μf capacitor C118 has been added from the junction of R110 (volume control), R119, and R111 to ground. C112, the 0.0001-μf capacitor connected to pin 9 of V11 6T8, and C116, the 0.005-μf capacitor connected to R116 in the audio output circuit, have been returned to ground.

●

Emerson Ch. 120134-H

With the exception of the tuner, chassis 120134-H and 120134-B are the same electrically. Chassis 120134-H uses continuous type tuner #470662. Video i-f and sound i-f alignment for chassis 120134-H is the same as that for models 661B, 667B and 668B using chassis 120134-B.

1. Disconnect the antenna hank by unsoldering. Connect the signal generator. The receiver connection is to the antenna; the ground connection, to B minus.

2. With the tuner rotor full open (plates out of mesh), apply a signal frequency of 1,650 kc and adjust first the r-f trimmer A2, then the antenna trimmer A1 to maximum output.

3. With the tuner adjusted to 1,500 kc, apply a signal frequency of 1,500 kc and again adjust the r-f trimmer A2, then the antenna trimmer A1 to maximum output. (Note that the seven markings on the dial bracket of the tuner represent respectively 550 kc, 660 kc, 700 kc, 900 kc, 1,000 kc, 1,400 kc, and 1,600 kc reading from left to right. These points are to be used for the alignment of the receiver.)

●

Du Mont RA-105B, RA-108A

In the grid (pin 1) circuit of the 1st video i-f tube V201, the 10,000-ohm resistor R208 and the video i-f coil L206, wired in parallel, have been inserted in the agc lead.

In the 1st sound amplifier stage, terminal 3 of the tone control R281 should be connected to the junction of the resistor R277 and the capacitor C252 in the volume control circuit.

●

North American Philips (Norelco) Model PA-2A Duovue

Figure 1 is a partial schematic diagram of this model showing the circuit changes made.

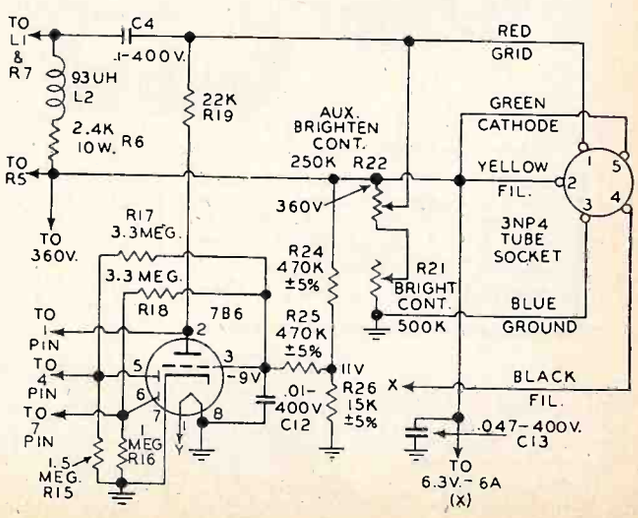


Fig. 1. Partial schematic of the North American Philips Model PA-2A tv receiver. This circuit incorporates the changes made in the most recent production models of this receiver.

Belmont Model 7DX21, Series C

The Series C model has the following changes from the Series B model.

The i-f amplifier tubes, V6, V7 and V8, have been changed from 6BA6s to 6AG5s. The 6AG5 tubes have the suppressor grid tied to the cathode internally so that R27 and C51, R32 and C54, R36 and C60, the components that formed the external connections of the suppressor grid (pin 2) to the cathode (pin 7) of the 6BA6s, have been deleted.

A choke, L27, has been added in the B+ supply for the 1st i-f amplifier, V6, and the tuner chassis; that is, the junction of the red lead from the tuner chassis, R23, and R29, is now wired to L27 which is connected to the B+ power supply.

A 10,000-ohm resistor, R36, has been added, connecting the suppressor grid (pin 6) to the plate (pin 5) of the 2nd i-f amplifier tube, V7. The part number of the new R36 is C-9B1-74.

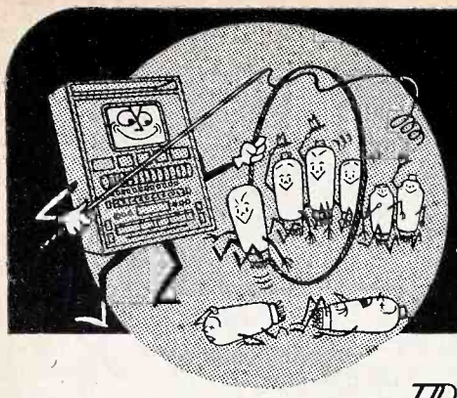
The resistor R108, the capacitor C115, and the choke coil L9, which formerly connected the plate (pin 6) of the 1st audio tube, V4, to the minus side of the capacitors C27 and C73, have been deleted.

The 2.2 megohm resistor, R95, has been deleted from the voltage divider system just before the focus control.

The capacitor C119, which connected the red lead from the transformer to the minus side of the capacitors C27 and C73, has been deleted.

The following resistors and capacitors were changed in value as shown below. The new parts numbers are also given.

Symbol	*Part Numbers*	*Description*
R24	C-9B1-56	Resistor, 3,300 ohms, ½ w, 10%
R26, 34, 35	C-9B1-127	Resistor, 47 ohms, ½ w, 5%
R31	C-9B1-83	Resistor, 56,000 ohms, ½ w, 10%
R78	C-9B1-90	Resistor, 220,000 ohms, ½ w, 10%
R80	C-9B1-100	Resistor, 1.5 megohms, ½ w, 10%
R82, 99	C-9B1-107	Resistor, 5.6 megohms, ½ w, 10%
R97	C-9B1-242	Resistor, 3 megohms, ½ w, 10%
R98	C-9B1-103	Resistor, 2.7 megohms, ½ w, 10%
R105	C-9B1-104	Resistor, 3.3 megohms, ½ w, 10%
R106	C-9B1-86	Resistor, 100,000 ohms, ½ w, 10%
C45, 46, 60 100, 113	A-8G-13962	Capacitor, 5,000 $\mu\mu$f, ceramic
C49	C-8G-17349	Capacitor, 330 $\mu\mu$f, ceramic
C93	C-8F3-241	Capacitor, 470 $\mu\mu$f, 500 v, 5%
C101	B-8D-17699	Capacitor, .04 μf, 1,600 v.
C102	C-8G-13201	Capacitor, 1,000 $\mu\mu$f, ceramic
C103	C-8D-17555	Capacitor, .08 μf, 400 v, 10%.



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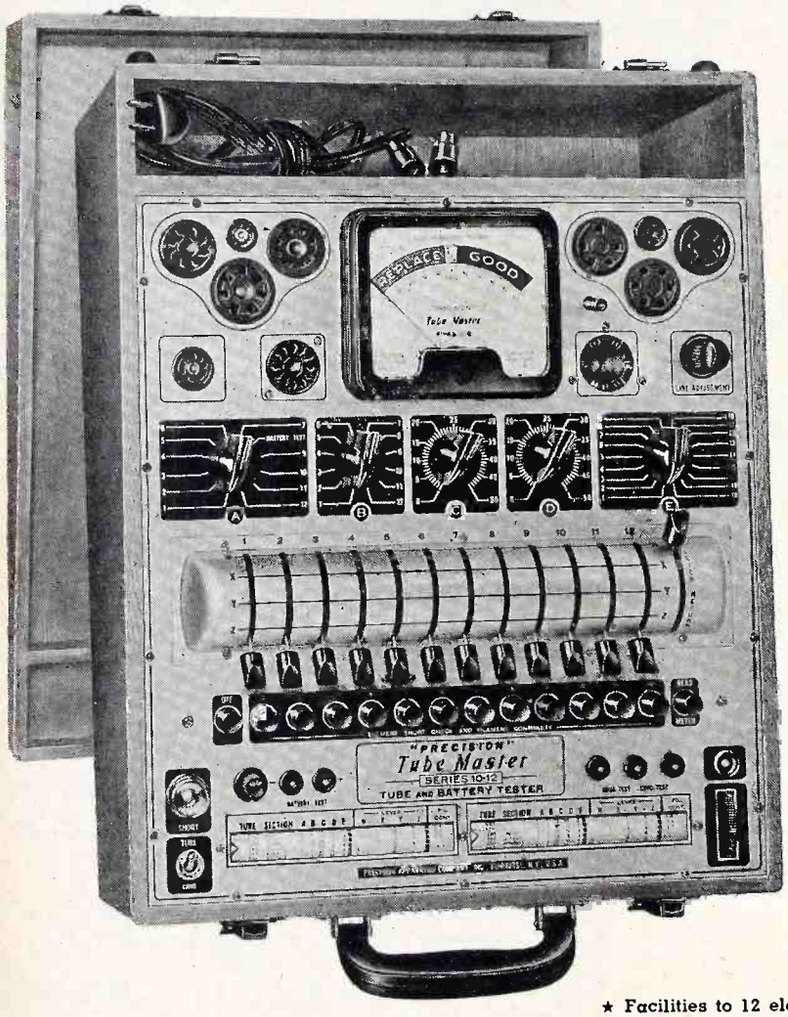

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Fringe Area TV ANTENNA TOWER

(*Continued from page 1.*)

The Tower

The overall height of the antenna tower plus the antenna mast is 101 feet. The tower proper rises to 85 feet above the ground surface, and is constructed of ten-foot sections. It is triangular in shape, using three 1" o.d. steel tubes with ⅛" walls as uprights on 9" centers. Steel straps ½" by ⅛" are welded crosswise and diagonally to the uprights.

The base of the tower extends for five feet into a sunken concrete block, 8 feet deep. This mounting block tapers from 30" by 30" at the bottom to 18" by 18" at the top (see Fig. 2). Approximately 2½ cubic yards of cement were used for this base.

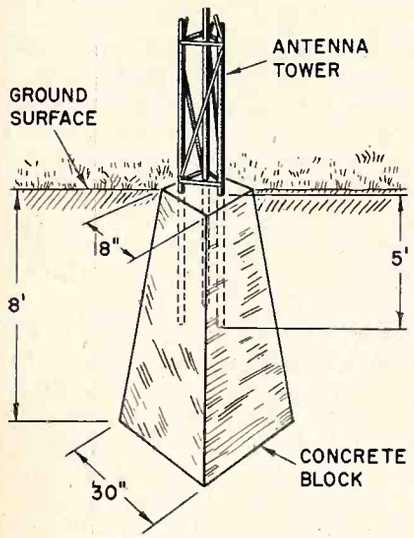


Fig. 2. Shown here is the concrete base into which the antenna tower is set. The concrete block itself is entirely under ground.

Guying

The tower under discussion in this article had to be built to withstand winds which may have a velocity of 100 to 125 miles per hour. Such velocities are not uncommon in Jackson, Michigan; it is interesting to note that the tower described here actually stayed up in storms which carried away the anemometers at nearby airports. The most important factor in keeping this tower up under severe windstorms and snowstorms is the guying.

Seven sets of guy wires are used; each guy wire is 7 x 36 Roebling steel bridge cable with 60,000 pounds strain rating. The first set (consisting of three guy wires, one from each upright) join the tower 30 feet above the ground level. Interlocking Johnny Balls are located at nonresonant lengths for the tv and f-m frequencies. The next six sets of guy wires are attached to the tower at seven foot intervals along its height. Each set consists of three guys segmented by additional interlocking Johnny Balls. The uppermost set of guys is attached to the tower ten feet from the top. The various sets of guys and their relative positions may be seen in Fig. 1. A total of 2,400 feet of guy wire is used with this tower.

The ground ends of the guys terminate in three anchor posts. These are located at the three apexes of an isosceles triangle, each apex 38 feet from the center of the tower. The plan is shown in Fig. 3. All guys from the same tower upright go to the same anchor post.

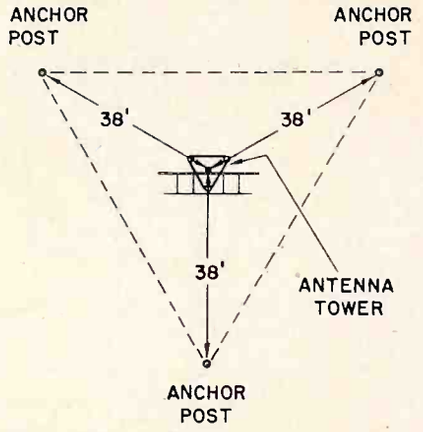


Fig. 3. Anchor post location plan, showing the equilateral triangle formed by the three anchor posts.

The anchor posts are 6" x 8" x ½" I beams, 16 feet long. Each post is buried 8 feet in a concrete anchor block. These blocks have the same dimensions as the one used for the tower base.

Each guy wire contains a turnbuckle near its anchor post; each turnbuckle is rated at 1,000 pound pull. Figure 4 shows one anchor post and the various guy wires connected to it.

Assembly of Tower

As was stated earlier, the tower is constructed of 10-foot sections. The sections are joined by means of 12" lengths of cold-rolled steel rods. These extend 6 inches into each of the uprights of the sections that are joined. The latter are kept in place by ¼" machine bolts inserted in holes through the tower uprights and connecting rods.

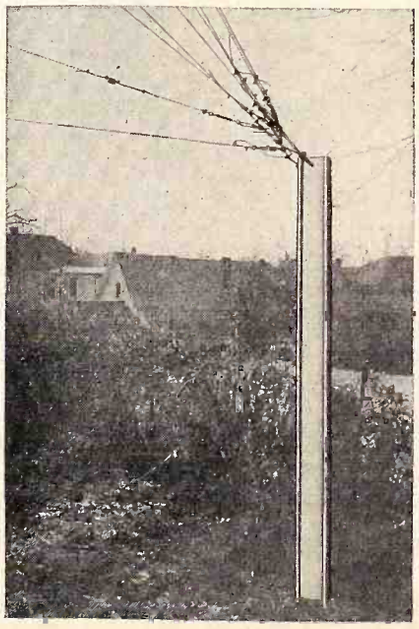


Fig. 4. Closeup of one of the anchor posts showing the turnbuckles found on each guy wire.

Actual erection of such towers depends upon the facilities available. In most cases one of two methods is used: either the tower is completely assembled on the ground (except for the bottom section) and then raised with a derrick and set upon the base section; or the tower is assembled one section at a time in the correct vertical position. The latter method requires the use of a steeplejack. As a matter of fact, the services of a steeplejack are required annually to clean and paint the tower with a rustproof paint.

The 85-foot height of the antenna tower was the result of a month of experimentation to find the exact height within practical limits which gave the maximum reception. Two hydrogen-filled balloons were used to keep aloft an experimental antenna. The height of this combination was raised from 10 feet above the ground to the 85-foot height in 1-foot steps. The antenna was kept at each testing height for about two hours, and a field strength test was made using a television receiver located on the ground.

Atop the antenna is a glass ball which serves as a light reflector to warn away approaching aircraft. From the ground it resembles an airplane beacon light. Two lightning arrestors are used: one is located where the leadin from the antenna approaches the tower; the other, at the point where the transmission line enters the house. Each leg of the tower is grounded and has ¼" drain holes drilled slightly above the ground level.

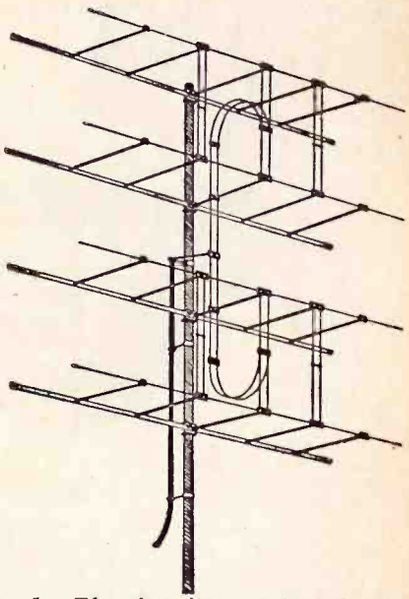


Fig. 5. The four-bay, co-lateral antenna mounted on the tower. Some such antenna is usually necessary in fringe areas to obtain maximum directional response.

The Antenna

The antenna proper is a Model 400 Finco co-lateral (see Fig. 5). It is a 4-bay array with 12 driven elements for the high band and 8 driven elements for the low band. It re-

(*Concluded on page 20.*)

Component Combinations in Radio Receivers

(Continued from page 7.)

switch). In order to understand fully the way the capacitor and resistor are combined, let us refer to the enlarged drawing of this C and R unit as illustrated in Fig. 3. From this isometric cross-sectional drawing the individual resistor and capacitor are readily evident.

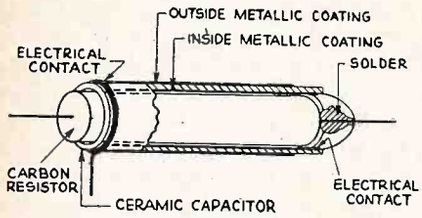


Fig. 3. Enlarged isometric cross-section of the R12-C13 unit.

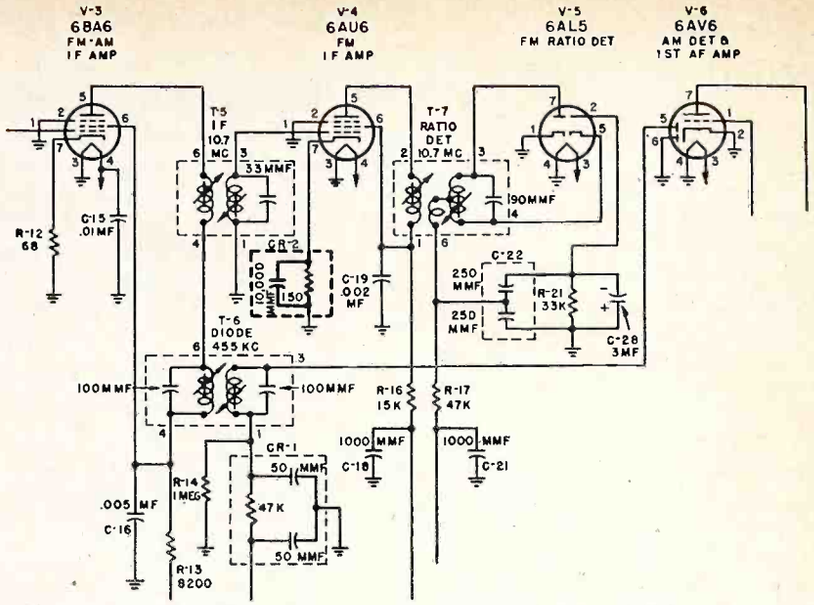


Fig. 4. Partial schematic of the Motorola radio chassis HS-211 and HS-230 with "CR" units. Courtesy Motorola, Inc.

The interesting constructional details of this unit, as well as of the others, is the ceramic capacitor. The capacitor has two separate metallic coatings. One coating is on the inside of the ceramic cylinder and the other coating on the outside of the ceramic. These two metallic coatings represent the plates of the capacitor. The exact amount of capacitance represented by this capacitor is determined by a number of factors. One factor is the dielectric material separating the two metallic coatings, which in this case is, of course, the ceramic material. The distance of separation between the metallic plates is another factor—the smaller the distance, the greater the capacitance. For the capacitor under discussion this means the smaller the thickness of the ceramic cylinder, the larger the capacitance. The final factor in determining the value of the capacitance is the common area between the two metallic plates; the greater this area, the higher the capacitance. Since we are dealing with a cylindrical capacitor, this area is dependent upon two dimensions—the length of the metallic coatings that are common to each other and the diameter of the ceramic cylinder. The greater this length and the larger the diameter, the greater the area will be and, hence, the larger the capacitance.

Coming back to Fig. 3, it can be seen that the resistor is not inserted all the way into the ceramic capacitor. At the right-hand end of the unit some solder is inserted into the ceramic cylinder and takes on the approximate shape shown in the drawing. This solder is used to make electrical contact between the metal end of the resistor and the inside metallic plate of the capacitor. In this manner one end of the resistor and one end of the capacitor are tied together. At the left-hand side of the ceramic, a piece of wire is wrapped around the outside of the capacitor a few times and then soldered to the outside metallic plate of the ceramic cylinder. This connection serves as the other lead of the capacitor. The metallic plates do not necessarily cover the whole length of the ceramic. The exact length is determined by the amount of capacitance desired.

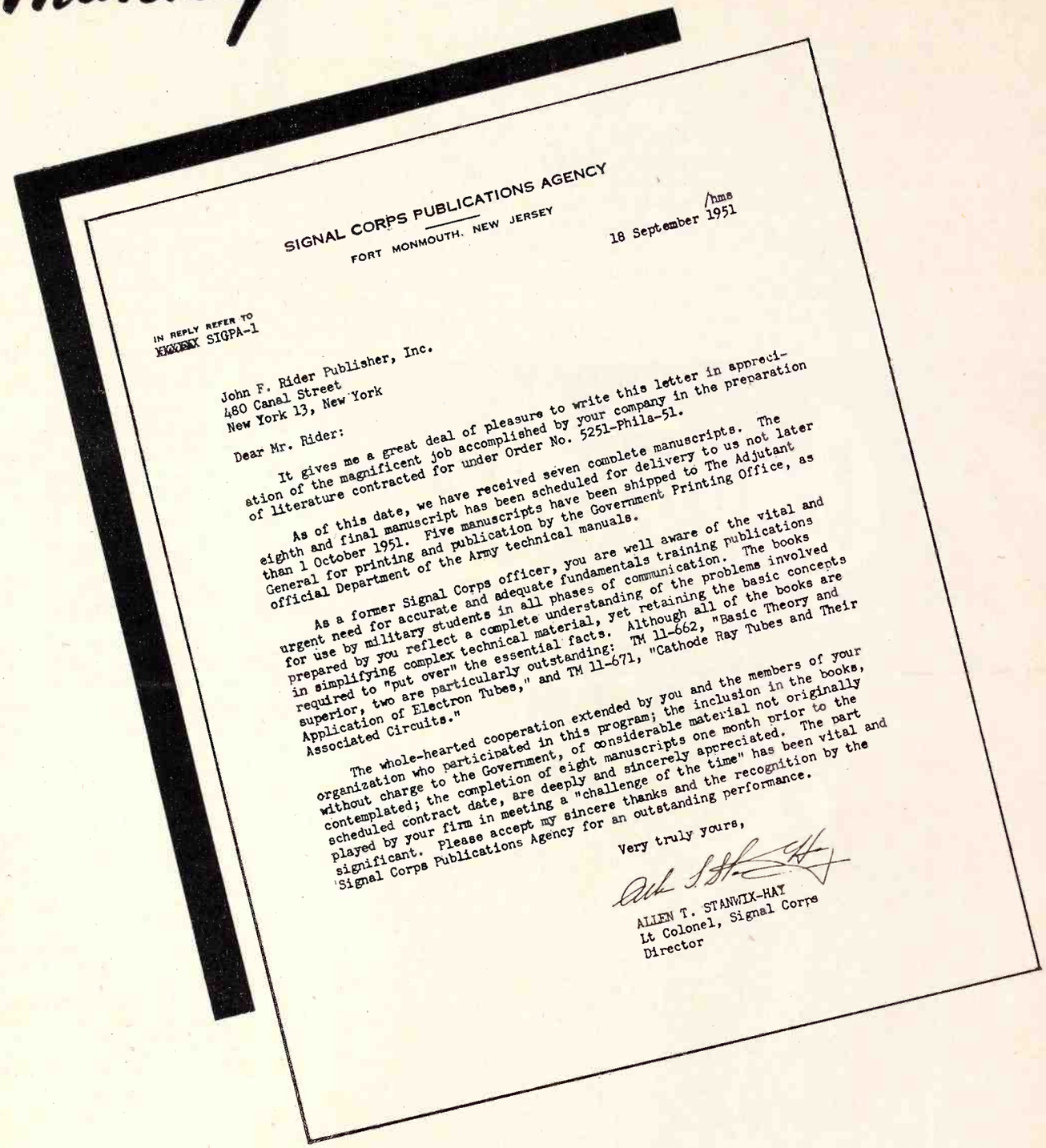
In the drawing of Fig. 3, the heavy lines indicate the metallic coatings of the capacitor. After assembly this completed C and R unit is covered with a white coating of some insulating material.

Two Capacitor—One Resistor Combinations

The second unit of interest to us electrically consists of two capacitors and one resistor composing *CR-1*, in the partial schematic of the Motorola radio chassis HS-211 and HS-230 shown in Fig. 4. From the drawing of this unit as shown in Fig. 5(A), and the photograph shown in Fig. 5(C), it is difficult

(Continued on page 16.)

Thank you



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Component Combinations in Radio Receivers

(*Continued from page 14.*)

to conceive how it is equivalent to these three circuit components. The schematic diagram of this unit appears in Fig. 5(B). This three-element unit only has three external leads. Lead number 1, around the middle of the unit, represents the common connection between the two capacitor components. Each of the other two leads represents the connection between one end of the resistor and one plate of the capacitor. Thus, there is a capacitance of 50 $\mu\mu$f between leads 1 and 2 and also between leads 1 and 3 of the drawing of Fig. 5(A). A 47,000-ohm resistance can be measured between leads 2 and 3.

This unit is employed as the diode filter in the a-m detector circuit of the receiver, as

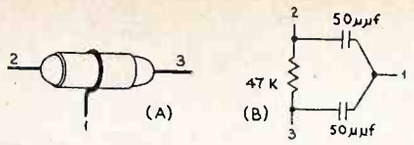
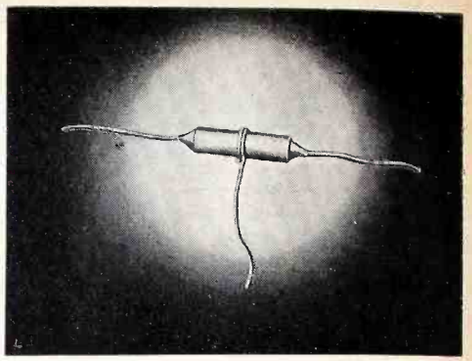


Fig. 5. (A) Drawing of a unit composed of two capacitors and one resistor. (B) Schematic representation of this unit. (C) Photograph of this unit.

can be seen in Fig. 4. When wiring this special construction into the circuit, lead number 1 must be grounded. Since each capacitor is 50 $\mu\mu$f in value, it does not matter which of the other leads is connected to the detector transformer; even if leads 2 and 3 were interchanged, the circuit of this unit would still be the same.

Let us examine the construction of this



double capacitor and resistor combination. A detailed isometric cross-sectional drawing appears in Fig. 6. A single carbon resistor and one ceramic cylinder is used to form this special filter network. The interesting thing about this unit is the method of plating the ceramic.

The outside of the ceramic is covered with a metallic coating, as shown by the heavy solid line in the drawing. The inside of the ceramic also has a metallic coating, as indicated by the heavy lines; however, this coating is not continuous but is split at the center. Considering the ceramic capacitor as is we find that we have three separate plates.

Centered inside the ceramic cylinder is the carbon resistor. At each end of the unit some solder is inserted. Each end of the resistor, therefore, makes electrical contact with a separate metallic plate at the inside of the ceramic. A piece of wire is wound around the outside of the ceramic and soldered to the metallic coating. This latter wire is centered on the unit. From the drawing of Fig. 6 we find:

1. That the outside metallic coating represents the common plate of the two capacitors, with the center wound wire as its connecting lead.
2. That a capacitance exists between either end of the unit (which represents a connection between one end of the resistor and one of the other plates of the capacitor) and the center lead. This capacitance is determined primarily by the common area of the two metallic plates of the capacitor, the distance between the plates, and the length of the inside metallic plate.

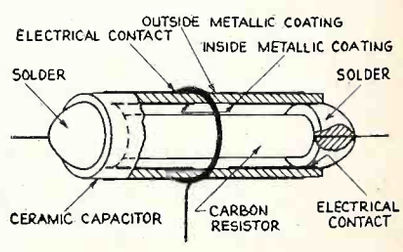


Fig. 6. Detailed isometric cross-section of the unit composed of two capacitors and one resistor.

After assembly this unit is covered with a white insulating coating similar to the other C and R unit.

Parallel Capacitor-Resistor Unit

A drawing of the *CR-2* unit in the Motorola schematic as it normally appears is shown at (A) in Fig. 7, in conjunction with its schematic diagram which appears in part (B). It consists of a single carbon resistor inserted

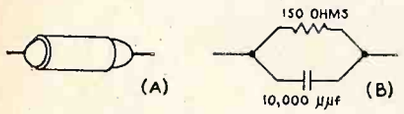


Fig. 7. Drawing and schematic of the Motorola CR-2 unit.

inside a ceramic capacitor. In this unit, however, there are only two exposed leads indicating that the resistor and capacitor are already in parallel. Each end of the resistor is soldered to a different plate of the capacitor. A detailed isometric cross-sectional drawing of this unit appears in Fig. 8. The heavy lines on the ceramic indicate the metallic plate of the capacitor. The interesting detail about this unit is the method of making contact between each end of the resistor and the plates of the capacitor.

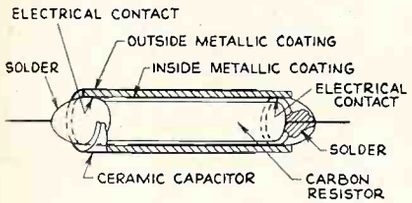


Fig. 8. Cross-sectional diagram of the CR-2 unit.

At the right-hand end, the solder which is inserted inside the capacitor makes electrical contact between the inside plate of the capacitor and the resistor. The left-hand end of the unit has the same physical appearance as the right end. However, from Fig. 8 we see that the outside metallic plate of the capacitor is *flush* to the left-hand end of the ceramic and continues for a short distance on the inside of the ceramic, but does not make contact with the inside metallic coating. By placing some solder inside this end of the capacitor, there is effectively an electrical contact between the outside plate and the other end of the resistor. The capacitance of the capacitor is determined in the same manner as that of Fig. 3.

Units such as these will probably be used in greater quantities as time goes on. From the manufacturing viewpoint, their use saves time in assembly operations. For example, the three components of the diode filter of Fig. 5 would normally require 6 separate connections, 2 for each component; but only 3 are required with this special unit.

This also means that the serviceman would have less work to do if all of the components have to be changed. However, this is not the usual case. Thus, if any one element in these special C and R units were to become defective, the complete unit would have to be changed. If these special units are not available, then standard components of proper size and ratings can be used if there is enough space for them.

— END —

How to Save on Aspirin in TV Servicing

What protection exists for the tv service shop when, after it pulls a defective tv chassis containing an old picture tube, the picture tube burns out while the set is being serviced, without any negligence on the part of the service technician. How can the shop owner convince the set owner that the tube went West, and still be free from responsibility? It's going to take a lot of arguing to convince the customer who must buy a new tube that the shop is not at fault.

Maybe these incidents do not occur too frequently, but even isolated cases may be extremely annoying, if not expensive. If possible every tv shop should carry insurance against costs of this kind. Insurance is a part of the overhead and should be figured as such. Another protective measure is the use of a release form which the set owner signs when the chassis is taken to the shop. This in turn means giving the customer a receipt for the chassis showing the serial number of the picture tube.

Records for the Customers

While on the subject of receipts, it may be wise to give some thought to a receiver operating record which is left with the customer at the time the receiver is pulled. Many service calls are made to remedy defects in the receiver which show up on a single tv channel while the receiver operates satisfactorily on the other channels. In such cases, much future argument can be avoided by checking the performance of the set on all available channels and leaving a written record of the performance with the customer. A duplicate is delivered to the service department with the defective chassis.

When the receiver is returned and installed the improvements in reception are called to the attention of the set owner. If the receiving conditions are such that the pictures on some channels are not all they should be because of effects external to the receiver, the written record left with the customer will prove that this condition existed before servicing and is not attributable to the serviceman.

Understandably, such records can not be left when the receiver is completely dead, but even then it does no harm to leave a report of the condition of the set. Such a report would state which tubes indicate active heaters by glowing or a rise in temperature of the metal housing, and which do not.

In recording the preserviced condition of a receiver make certain to examine the picture-tube screen for ion spots and record the visible condition of the screen. Somehow or other the public is always more critical after a repair job than before the service technician is called. In more than one case, the customer will notice a brown spot on the tube of his set after it has been serviced and accuse the serviceman of switching his tube, when in reality the spot had been there all the time.

It is also wise to record any damage that is noticed on the cabinet or the receiver housing, even if only the chassis is pulled. Why make repairs on the cabinet if they are not brought on by your handling?

There are several methods by which the details of record making may be handled; whichever way is selected depends upon personal preference. The important point is to leave some sort of a record. Incidentally, the record should show the serial number of the receiver, and the manufacturer.

Above all, the service shop should absolve itself of all responsibility relative to the condition of any of the components contained within the chassis at the time that the chassis is pulled. A word-of-mouth statement is insufficient protection against future difficulties. Have everything in writing, if possible. It requires a few more minutes of time in the home but it's worth it in the long run.

Techni-Quiz

Here are some questions you may use to test yourself on your electronics know how. The correct answers to these questions are on page 20.

1. Appearance of a scanning raster on the tv picture tube but no image, accompanied by sound from the loudspeaker, indicates probable failure in the:
   (a) r-f stages
   (b) vertical sync system
   (c) video i-f system
   (d) low-voltage supply.
2. When the background shading of the picture becomes darker and the larger objects smear, first check the:
   (a) video low-frequency compensating network
   (b) high-frequency compensating network
   (c) horizontal sync system
   (d) video i-f system.
3. If a choice must be made it is preferable to match a transmission line to the antenna rather than to the receiver. True or False?
4. A light vertical strip down the left hand edge of the picture probably means a:
   (a) bad horizontal output tube
   (b) defective damping tube
   (c) faulty horizontal drive control.
5. To what frequency should the signal generator be adjusted when aligning the limiter stage of an f-m receiver?
6. The minimum required bandwidth of the i-f circuits of an f-m receiver is:
   (a) 50 kc (b) 4 mc (c) 150 kc.

Fringe Area TV ANTENNA TOWER

(*Continued from page 13.*)

ceives channels 2, 4, and 7 from Detroit, channel 3 from Kalamazoo, channel 5 from Chicago, channel 6 from Lansing, channel 9 from Cleveland, and channel 13 from Toledo.

The transmission line feeding the antenna is home-constructed open-wire line designed for three-hundred ohms.

The antenna mast is approximately 24 feet long and is made of 1½" o.d. spring steel tubing, the type used for making still coils.

A rotator is used with the antenna to obtain the maximum directional response. This rotator is located 4 feet below the top of the tower, on a shelf welded to the tower inside the triangle formed by the uprights. A thrust bearing located at the top of the tower supports the weight of the antenna mast. The shell of the antenna rotator is grounded.

— END —

AIEE to Present Basic TV Lectures

The American Institute of Electrical Engineers (AIEE) will present a series of six lectures on "TV Servicing Fundamentals for Engineers," in New York City on Monday evenings at 7 P.M. starting on January 14, 1952. The course will be given on a basic level and is intended primarily for engineers with a slight knowledge of electronics who wish to learn about television receivers and home servicing.

Each lecture will be presented by a different speaker who is well qualified on his subject. The speakers are Mr. Seymour D. Uslan, Managing Editor of John F. Rider Publisher, Inc.; Mr. Eugene Anthony, Products Service Manager, General Electric Co.; Mr. Archer H. Smith, Senior Instructor, RCA Institutes, Inc.; Mr. Carl J. Quirk, Technical Supervisor, Allen B. Du Mont Laboratories, Inc.; Mr. Bron Kutny, Assistant Manager Field Engineering, Emerson Television Corp.; and Mr. Walter H. Buchsbaum, TV Consultant, "Radio and Television News."

The individual topics to be discussed at the various meetings and the speakers presenting them are listed below:

General tv receiver, block diagram (Mr. Anthony)
Antennas, transmission lines, front end and sound system (Mr. Uslan)
Video i-f, detector, and amplifier circuits (Mr. Kutny)
Sync, sweep, and power supply circuits and picture tube (Mr. Buchsbaum)
TV receiver troubles (Mr. Smith)
Troubleshooting external interference, UHF and color television (Mr. Quirk).

For further information regarding this course write to Mr. R. Y. Atlee, Engineering Supervisor, A.D.T. Company, Inc., 155 Sixth Avenue, N. Y., N. Y.

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The Rider Manual Page Numbers given under Radio Changes are for Rider AM-FM Manuals. The volume number is the number preceding the dash.

Please mention Successful Servicing when answering advertising.

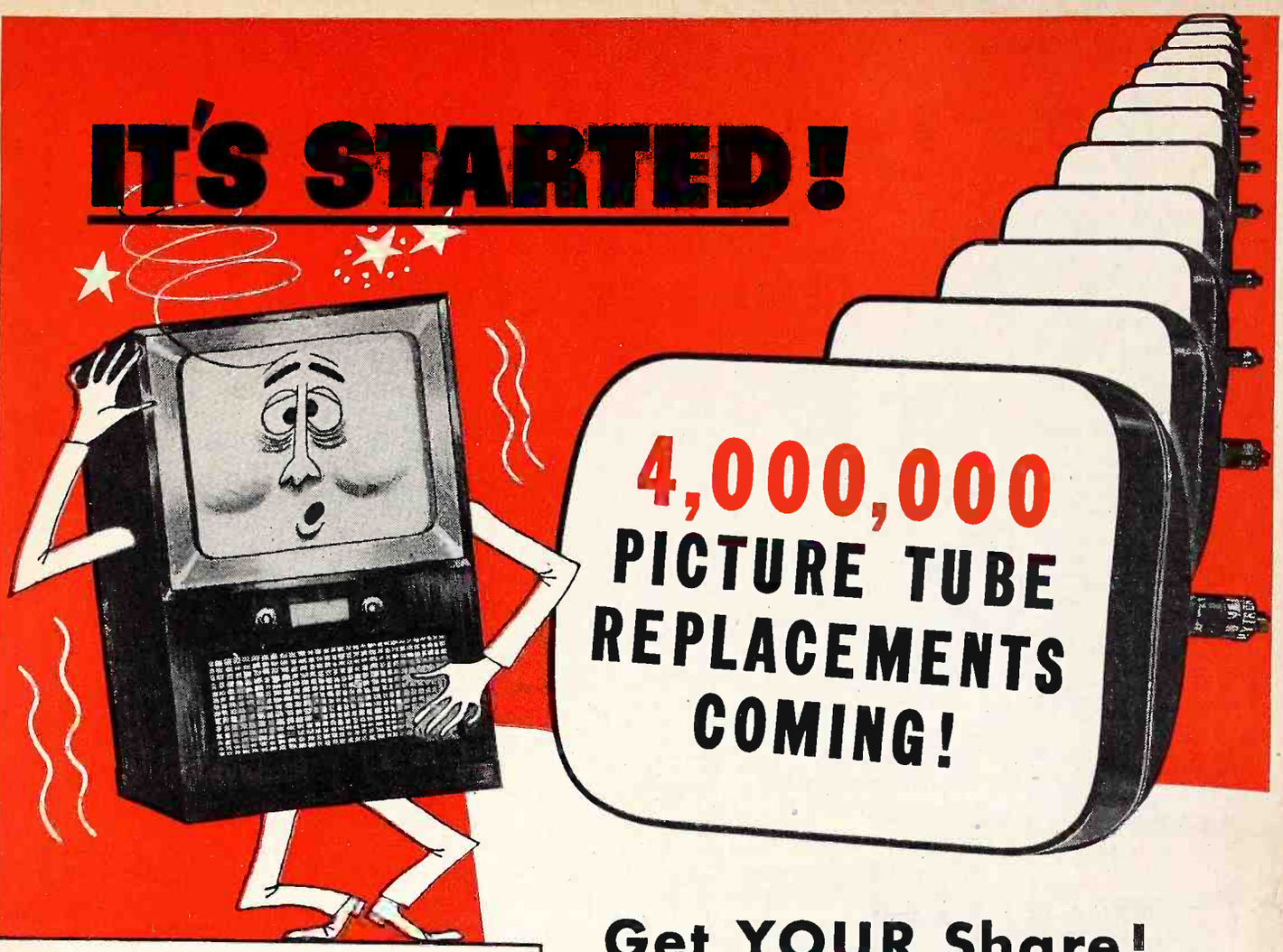
Answers to TECHNI-QUIZ on page 19.

1. (c)
2. (a)
3. False
4. (b)
5. i-f of receiver
6. (c)

High-Voltage Tubular Ceramic Capacitors

Electrical Reactance Corporation (an Aerovox subsidiary) has just added a new type of high-voltage tubular ceramic capacitor to their Hi-Q brand line. The type name of these new capacitors is SI-TV. They are available in eleven capacitance values from 4.7 to 47 $\mu\mu$f, all with a 6,000 volt rating.

IT'S STARTED!



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C-1104B, THE CONSOLE (CH. 12AX27)
C-1401 (CH. 14AX21)
C-1602 (CH. 16AX23, 16AX25, 16AX26)
C-1602, SERIES C (CH. 16AX29)
M-1105B, THE SUBURBAN (CH. 12AX27)
M-1106, THE ROVER (CH. 12AX27)
M-1107, THE BELMONT (CH. 12AX27)
M-1402, M-1403, M-1404 (CH. 14AX21)
M-1601 (CH. 16AX23, 16AX25, 16AX26)
P-301, SERIES B (CH. 7DX22P)
RC-1405 (CH. 14AX21)

BENDIX
Model — Pack 27
T170, 2051, 2060, 2070, 3051, 6001, 6003, 6100, 7001

CAPEHART
Model — Pack 27
3005-M (CH. C-279, CX-32)
3008-M (CH. C-278, CX-32)
3011-B, 3011-M, 3012-B, 3012-M (CH. C-281, CX-33)
CT-27, CT-37, CT-38, CT-39, CT-45 (CH. CX-33DX)

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3000, Booster

EMERSON
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GENERAL ELECTRIC
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12K1, 12T1, 12T3, 12T4; 12T3, 12T4 (B VERSION)
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50-T1630 (CODE 121)
50-T1630 (CODE 122)
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51-T1443PL, 51-T1443PM, 51-T1443PW
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RCA
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9T256 (CH. KCS38C)
9TW309 (CH. KCS41-1)
9TW390 (CH. KCS31-1)
S1000 (CH. KCS31-1)

SPARTON
Model — Pack 24
5025, 5026, 5076 (CH. 26SS160)
5025BA, 5075BA (CH. 26SS170)
5029, 5030 (CH. 26SD160)
5035, 5036, 5037 (CH. 26SS160L)
5076BA, 5077BA (CH. 26SS170)
5076BB (CH. 26SS160B)
5077 (CH. 26SS160)
5077B (CH. 26SS160B)
5078BB, 5079BB, 5080BB (CH. 26SD170, DELUXE)
5079, 5080 (CH. 26SD160)
5079B (CH. 26SD170, DELUXE)
5082, 5083 (CH. 26SD170)
5082, 5083 (CH. 26SD170X, 26SD170XP)
5085, 5086 (CH. 25RD190)
5088, THE WESTMONT (CH. 26SD170)
5089 (CH. 26SD170)
5090, THE SPARCRAFT (CH. 26SD170)
5101, 5102, 5103 (CH. 26SS170, 26SS170P)
5104, 5105 (CH. 26SS170D, 26SS170DP)
5152, 5153, 5154 (CH. 26SS170, 26SS170P)
5155, 5156, 5157 (CH. 26SD170X, 26SD170XP)
5158 (CH. 26SD170, 26SD170P)
5170, 5171 (CH. 25SD201)
5182, 5183, 5188, 5189 (CH. 26SD170, 26SD170P)

STEWART-WARNER
Model — Pack 24
9120-A, 9120-B, 9120-C, 9120-D, 9120-E, 9120-F
9121-A, 9121-B
Model — Pack 25
9203-A

STROMBERG-CARLSON
Model — Pack 23
24C, 24CM (CH. 112126)
24RP, 24RPM, 24 SERIES (CH. 112119)
119CM, 119CDM (CH. 112107)
119M5A, 119M5D, 119M5G, 119M5I, 119M5M, 119M5R (CH. 112114)
119M5I, 119M5M, 119M5R
321CD2M, 321CD20, FUTURA, 321 SERIES (CH. 112127)
321CF, 321C2M, CAVALIER (CH. 112127)
RCD. CH. WEBSTER 100

SYLVANIA
Model — Pack 25
25M (CH. 1-387-1)
71M-1, 72B-1, 72M-1 (CH. 1-502-1)
74B-1, 74M-1 (CH. 1-437-1)
75B, 75M (CH. 1-437-1)
RCD. CH. VM-950
Model — Pack 23
72M, 73M (CH. 1-366)
4120M, 4130B (CH. 1-260, 1-261)
4130E (CH. 1-260)
4130M, 4130W (CH. 1-260, 1-261)
6110X (CH. 1-261)
6120B, 6120M, 6120W (CH. 1-260, 1-261)
6130B, 6130M, 6130W (CH. 1-260, 1-261)
7110X (CH. 1-366)
7110XB (CH. 1-441)
7110XF (CH. 1-366-66)
7110XFA (CH. 1-442)
7111M (CH. 1-441)
7111MA (CH. 1-366)
7120B, 7120M, 7120W (CH. 1-366)
7120BF, 7120MF, 7120WF (CH. 1-366-66)
7120MFA (CH. 1-442)
7130B, 7130M, 7130W (CH. 1-366)
7130BF, 7130MF, 7130WF (CH. 1-366-66)
7130MFA (CH. 1-442)
7140MA, 7140WA (CH. 1-437)

WESTINGHOUSE
Model — Pack 21
H-618T16 (CH. V-2150-186, V-2150-186A, V-2150-186C, V-2150-186CA)
H-620K16, H-622K16 (CH. V-2150-186, V-2150-186A, V-2150-186C, V-2150-186CA)
H-625T12 (CH. V-2150-197)
H-626T16 (CH. V-2172)
H-627K16, H-628K16, H-629K16 (CH. V-2171)
H-630T14 (CH. V-2176)
H-636T17 (CH. V-2175)
H-637T14 (CH. V-2177)
H-638K20 (CH. V-2178)
H-643K16 (CH. V-2179, V-2179-1)
H-648T20, H-652K20 (CH. V-2201-1)
H-660C17, H-661C17 (CH. V-2203-1)
H-662K20 (CH. V-2201-1)

ZENITH
Model — Pack 21
J2026R (CH. 20J22)
J2027E, J2027R, J2029E, J2029R, J2030E, J2030R (CH. 20J21)
J2040E, J2042R, J2043R, J2044E, J2044R (CH. 20J21)
J2051E, J2053R, J2054R, J2055R (CH. 20J22)
J2126R (CH. 21J21)
J2127E, J2127R, J2129E, J2129R, J2130E, J2130R (CH. 21J20)
J2140E, J2142R, J2143R, J2144E, J2144R (CH. 21J20)
J2151E, J2153R, J2154R, J2155R (CH. 21J21)
J2868R, J3069E (CH. 20J21)
J2968R, J3169E (CH. 21J20)
RCD. CH. S14029

A monthly summary of the price changes of electronic components and materials on the market, as well as information about new and discontinued items. These reports are supplied by RADIO'S MASTER, published by the United Catalog Publishers, Inc., New York City. These reports are furnished in the hope that they may help you in purchasing, and in keeping your inventory up to date. A complete description of each product is found in RADIO'S MASTER 16th Edition.

Price Increases

ALTEC LANSING—Price increase on their items in following categories: racks; blank panels; transformers; diapragm & voice coil assemblies; horn throats; "Voice of the Theatre" speaker systems; amplifiers; low frequency horns; high frequency multicellular horns (less speaker) and power supplies.

SCHAUER MFG. CORP.—Advised of a rise in price on most of their line.

SYLVANIA ELECTRIC—Increased prices of all sub-miniature tubes except 6AD4, 6BA5, and 6K4.

TRIAD TRANSFORMER—G-2 Input Geoformers, increased to $20.08 Net.

Price Decreases

ALTEC LANSING—21B Microphone and 28A Lapel Microphone reduced in price.

AMERICAN PHENOLIC CORP.—Lightning arrestors No. 155-338 reduced to $1.50 each.

DUOTONE CO.—Reduced shockproof nylon needles No. 25 to $10.50, and No. 25M (micro-groove) to $8.75, both dealer price.

G. E.—Reduced receiving tube 6BF5 to $2.00 List, and tv picture tube 24AP4 to $76.00 Net.

HYTRON RADIO—Reduced prices on tv picture tubes 17BP4A, 20CP4, and 20DP4A.

NATIONAL UNION—Reduced prices on Videotron picture tubes as noted: 17" rectangular to $27.25 Net; 19FP4 to $49.00 Net; 20" rectangular to $41.00 Net and 21" rectangular to $43.25 Net.

RAULAND CORP.—TV tubes 17AP4, 17BP4A, 17HP4, 20CP4, and 20HP4 reduced.

REINER ELECTRONICS CO.—Advised reduction of No. 5 Type Z, and No. 7 Type Z "Leads" to $9.95 Net.

SYLVANIA ELECTRIC—Reduced 5 tv picture tubes. 6AG5 radio receiving tube reduced to $2.40 list.

TUNG-SOL ELECTRIC—Reduced prices about 20% on cathode-ray picture tubes 16RP4, 17BP4A, and 20DP4A.

VAN CLEEF BROS.—Reduced prices on quantity purchases of 30 and over for No. 10 plastic electrical tape.

WEBSTER-CHICAGO CORP.—Nylon phonograph needles Model NE-37 reduced to $.80 Catalog Price.

New Items

CENTRALAB—Added trimmer 822-EZ at $.90 Net; controls BB-105 at $1.50 Net and capacitors TV4-502 and TV5-502 at $1.35 Net.

CLAROSTAT MFG. CO.—Introduced new Belmont tv ballast tube No. B917571 at $1.80 Net, 2 watt rating wire wound controls, No. 43-1500 & 43-2500 at $1.25 and No. 43S-1500 & 43S-2500 (with switch) at $1.85. Also added 3 watt rating wire wound controls, No. 58-1500 & 58-2500 at $1.25 and 58S-1500 & 58S-2500 (with switch) at $1.85. All prices are Net.

ELECTRONIC MEASUREMENTS CORP.—Added Tube, Battery, Ohm and Capacity Tester, Model 204 at $55.90 and Vacuum-Tube Volt-Ohmeter, Model 106 at $35.90.

ELECTRO-VOICE—Model 3002 self-tuning tv booster introduced at $23.70 Net.

FEDERAL TELEPHONE—Added complete new line of selenium rectifier stacks.

GARRARD SALES CORP.—3-Speed record players, Model "M" and "MC" added at $24.50 and $29.65 Net respectively.

GENERAL CONTROL CO.—To their line of switches and controls have been added No. A.C.O. at $10.00 Net and DU.OP at $1.90 Net.

G. E.—Added dual stylus assembly No. RPJ-013 at $18.60 Net for use with G. E. triple-play cartridges, and I.F. interference eliminator model RLW-008 at $4.50 Dealer Net. Also added glass rectangular tv tubes: 17VP4 at $36.50 list; 20LP4 at $54.50 list; 21EP4, with cylindrical face at $57.50 list and 21LP4, with cylindrical face at $57.50 list. "Inasmuch as there has been very little, if any, sales to set manufacturers of the above 4 new types, there will be undoubtedly little demand for replacement business in the next few months."

HYTRON RADIO—Added new tv picture tubes: 17HP4A; 19QP4; 20HP4A; 21EP4A and 21FP4A.

INDUSTRIAL PRODUCTS SUPPLIERS — Now marketing 6 new tv glare reducers.

INSULINE CORP.—Added No. 424 silver-plated beryllium plug; No. 327 & 328 Clip-on, and 329 Prod Test Leads; #867 insulated spade lugs; #1899 high voltage tip jack; #4086 rack dolly, and #6113 and #6114 lightning arrestors.

JFD—For use with open wire transmission lines, a new lightning arrestor No. AT 107 at $2.25 Net.

LANSING SOUND—9 new cabinets added to their "C" series, and Model 1217-1290 horn-lens assembly added at $31.50 Net and Model 175 DLH, a complete driver, lens, and horn assembly added at $114.00 Net.

POTTER & BRUMFIELD—5 new "MT" relays added to their line.

RCA—Added test and measuring equipment types WG-220, direct probe cable at $3.75; WG-291, crystal diode demodulator probe at $7.95; WP-25A, tv Isotop, topped auto-isolation transformer at $17.95; WV-77A, Junior Voltohmyst at $47.50, all suggested dealer prices. Also added No. 213A1, Antenna Harness Kit at $1.20; No. 215A1, tv antenna (channel 2-13) less mast $8.10; 215X1, lightning arrestor (outdoor and indoor) at $.75 each; 229A1, FM folded dipole antenna and reflector (less mast) $4.56 all suggested dealer prices. Added tubes 6BQ7 at $3.20 list, 6X8 at $2.65 list and kinescope 19AP4-A at $65.00 list.

RIDER, John F.—Introduced TEK-FILE, new monthly data service, at $2.00 per Pack.

SYLVANIA ELECTRIC—Added 7 tv picture tubes to their line.

TRICRAFT PRODUCTS CO.—Antenna T-52 introduced at $9.95 list.

TV DEVELOPMENT CORP.—Added to their line of conversion mask escutcheons and kits, model ME-20 at $4.87 Net and MEK-20 at $12.26 Net.

WEBSTER-CHICAGO — Added recording wire album Model 2916 at $.60 Catalog Price.

WESTINGHOUSE—Added electronic tubes WL-5934 at $15.00 Net and WL-5974 at $220.00 Net.

Discontinued Items

BAKER MFG. CO.—TV self-supporting towers No. 22, 35, 48, 62 have been discontinued due to difficulty in securing materials.

BELDEN MFG. CO.—Temporarily discontinued the following items for the duration of the emergency. 8000 and 8002, bare aerial wire; 8008 and 8009 solid beld aerial; 8011, 8012 and 8013 solid tinned; 8200, leadin wire, 8235, 300 Ohm (heavy duty) transmission line and 8782 and 8783, juke box cable.

CENTRALAB—Discontinued dual concentric controls SBB-518-S.

G. E.—Due to a lack of demand, discontinued picture tubes 8AP4, 12LP4, 12KP4, 16AP4 and 19AP4.

HYTRON RADIO—Discontinued special purpose tubes 10Y and 864.

INDUSTRIAL PRODUCTS SUPPLIERS—4 TV "Gla-Reducer" models discontinued.

LANSING SOUND—Discontinued Model 175H high frequency unit and horn.

PENN BOILER & BURNER—Telecote paint has been dropped from their line.

POTTER & BRUMFIELD—Discontinued relays SM5DG and SM5LG.

REK-O-KUT — Temporarily discontinued Models T-12H and T-43H, dual speed 12" transcription turntables due to lack of materials.

TRIMM, INC.—Discontinued 26 items on their line of headsets and accessories. Also discontinued their complete line in their "V" series of wire wound controls.

WEBSTER-CHICAGO—Discontinued 5 items in their line of phonographic equipment.

Miscellaneous Changes

EBY SALES CO.—Revised their entire line of radio, television and electronic products adding items and revising prices.

JFD—Revised their line of mounts, accessories and wire to include new items and price revisions.

MIDDLETOWN MFG. CO.—Revised their entire price line of metal products.

PENN BOILER & BURNER—Prices revised on their Penn Teletowers.

WESTINGHOUSE—Revised prices on 25 industrial replacement tubes.

Rider TV TEK-FILE Cumulative Index Now Available!

The Rider TV TEK-FILE Cumulative Index, a FREE, 8-page, 8½ x 11 inch booklet listing the tv receiver manufacturers and models in TEK-FILE with their pack and file numbers, is now available at radio and tv

parts distributors all over the country. The index, which is just as easy to use as the Rider radio and tv indexes, also lists for each model its Rider Manual page number.

In addition to the TEK-FILE listing, the index contains simplified instructions on how to file TEK-FILE in a filing cabinet or binder.

Emerson 646A, 646B

Figure 1 is a schematic diagram showing the circuit modifications to be made, when a 5-pole, 2-position power transfer switch is used instead of the original 6-pole, 2-position switch.

●

General Electric Models 600, 601, 603, 604

On early receivers, oscillator instability may be caused by the defective coupling winding on the L2 oscillator transformer. To remedy this, connect C15, a 56-$\mu\mu$f capacitor, as shown by the dotted line in the schematic to replace coupling winding, which should be disconnected.

Loose speakers which are due to broken cabinet studs may be repaired by heating the ends of the studs with a soldering iron and spreading them against the speaker frame.

●

General Electric, 740

In the schematic diagram, add an antenna primary to loop L1, connecting it to the external antenna terminal through a 0.005-μf capacitor, C23, and to the chassis through another 0.005-μf capacitor, C33. A convenient chassis connection for C33 is the chassis ground terminal on the phono jack. Item RLL-041 (L1, loop) which is no longer available, should be deleted from the Replacements Parts List, and item RLL-044, (L1 loop with antenna primary) added. The symbols C-23 and C-33 should be added under the stock item UCC-039.

●

General Electric, 752, 753

In the schematic diagram, add an antenna primary to loop, L3. One side of this loop is connected to the chassis ground and the other side to the antenna terminal. Item RLL-039 (L3, loop) which is no longer available, should be deleted from the Replacement Parts List and RLL-042 (L3, loop with antenna primary) added in its place.

●

RCA 8V90, Ch. RC-618; RC-618A, 8V91, Ch. RC-616A, RC-616H

A resistor R35 has been added in the mixer grid circuit, inserted between pin 3 of the selector switch (S2 front) and connection F of the A oscillator coil. For chassis RC-618 and RC-618A, the resistor is 560 ohms (in some sets, two 1,000-ohm resistors in parallel). For chassis RC-616A and RC-616H, the resistor is 390 ohms.

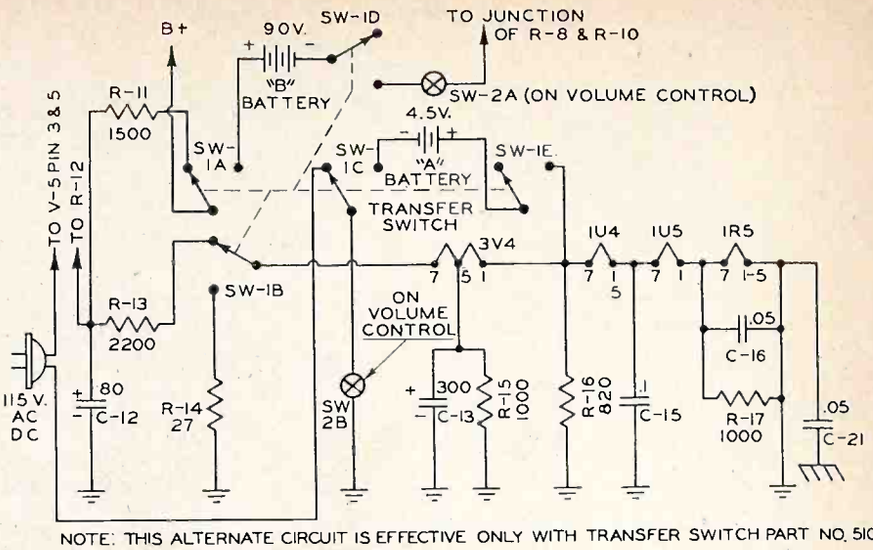


Fig. 1. Circuit of the Emerson 646A and 646B, showing modifications required when changing the power transfer switch.

Westinghouse H-316C7, H-317C7, H-326C7, H-328C7, Service Hint

The above models are equipped with built-in antennas for a-m and f-m reception and terminals are provided for connecting an external antenna for f-m reception in weak signal areas. In special cases where it is desired to receive weak a-m signals, an external a-m antenna can be connected as follows.

Solder a 3-lug terminal board (part no. V-3376) to the r-f tuner plate so that new components will not extend beyond rear of chassis.

Connect a 2,200-ohm, ½-watt resistor (part no. RC20AE222M) and a .0005-μf capacitor (part no. RCM20A501K) in series as shown in Fig. 1.

Connect the resistor to terminal 3 on the chassis with a rubber or thermoplastic covered wire of suitable length.

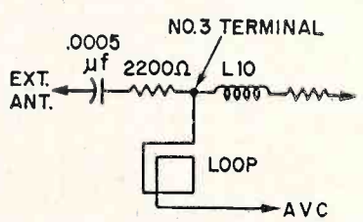
Connect approximately 9" of the same kind of wire to the capacitor as shown in Fig. 2.

Tie knot #1 approximately 3" from the capacitor.

Run a lead through a hole near the left end of the back cover and tie knot #2 close to cover. (The knots are for strain relief).

Below, Fig. 1. Circuit required for reception of weak a-m signals on Westinghouse H-316C7, H-317C7, H-326C7, and H-328C7.

Right, Fig. 2. Actual method for adding circuit.



United Motors, 416387 Packard

The value of the cathode resistor grounding the cathode of the i-f amplifier tube, 6SK7, has been changed from 390 ohms to 270 ohms. In the Service Parts list, the service part number should now read A271 and the description is now 270 ohms, ½ watt insulated resistor. The illustration number is still 48.

United Motors Service (Delco), R-1408, R-1409, R-1410

Although the dry cell batteries for the Delco household radios models R-1408, R-1409, and R-1410 are no longer available through United Motors Service, a satisfactory service battery is available from other sources for each of the models.

For the R-1408 and R-1409 models the Eveready battery 754 or the Ray-o-vac battery AB878 will adequately provide the voltages required and mount in the cabinet. In the case of the R-1410 radio the Eveready battery 753 or the Ray-o-vac battery AB878 is a satisfactory replacement.