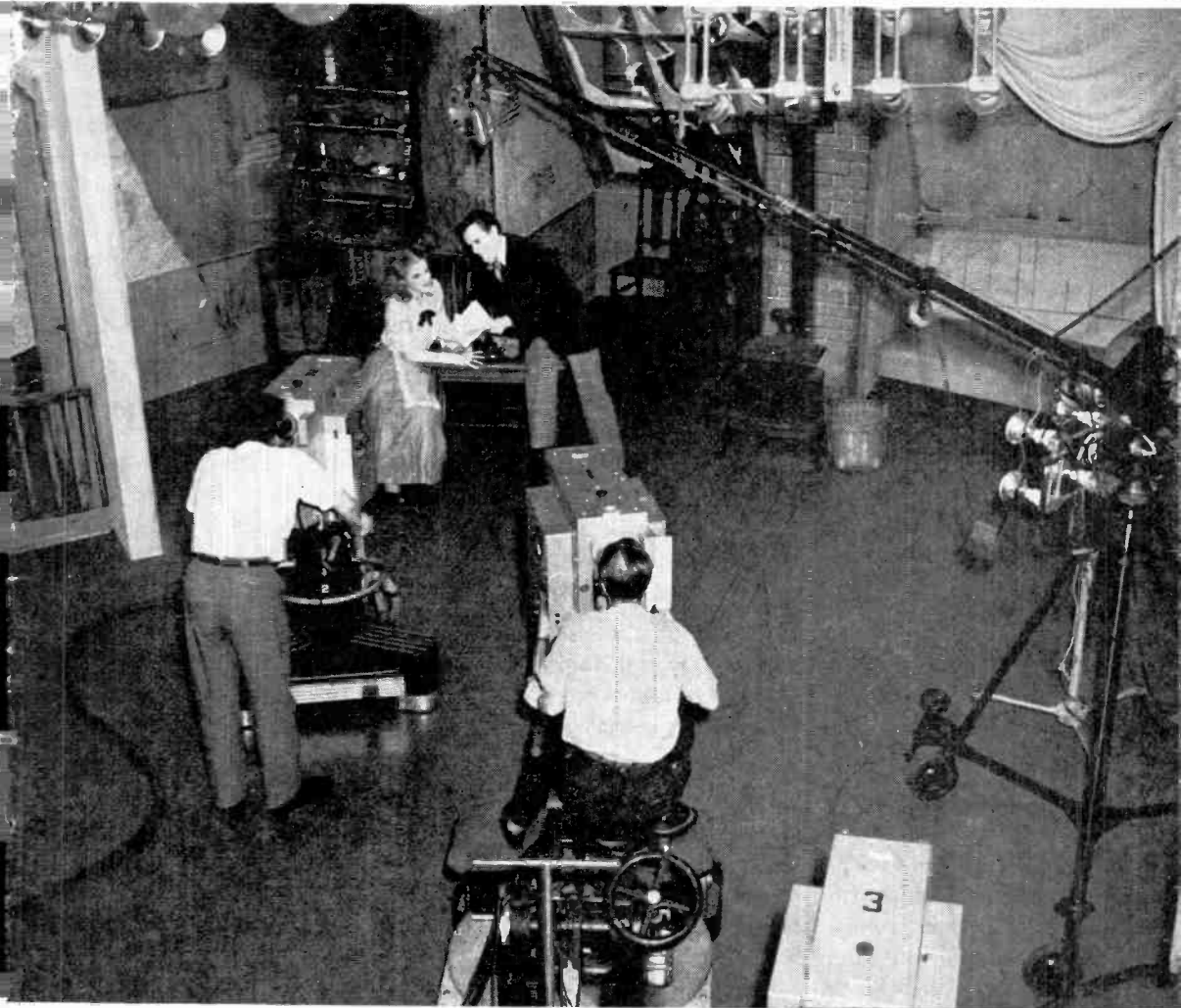


# NATIONAL RADIO NEWS



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Alumni Association News

JUNE-JULY  
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## TOMORROW NEVER COMES

I HAVE long felt that the fellow who coined the phrase, "Don't put off till tomorrow what you can do today," was one of the world's wisest wise men, for as a sure-fire formula for success, he certainly hit the nail on the head.

It has occurred to me that perhaps NRI men may sometimes wonder why I repeat this warning so often; this warning not to "put off." It is simply because of all the reasons for failure, this habit of "putting off" is, I am firmly convinced, the greatest — and one that we must continually be on our guard against.

Sure, we can always find a good excuse. We can easily convince ourselves that we are too tired (or lazy?), or that we don't feel well, or that it's too hot, or that we have too much to do, or use any of the thousand-and-one reasons to justify our not working now—or today. But the reason is not important. The fact that we are "putting off" is important.

This "putting off" is simply a habit; an attitude that, too oft-repeated, becomes a fixed state of mind. First you start by one day saying, "Oh, I don't have to do this or do that today. I'll do it tomorrow." A week later you'll say the same thing—and a little while after that you'll repeat the process. Soon, from habit, you'll promise yourself every day to do it "tomorrow"—and before long, "tomorrow" won't mean "the next day," but will really mean a day that will never come.

Everyone who ever undertook anything has been faced with this temptation to "do it later," or "some other time." Whether he was eventually a success or a failure, depends on whether the temptation was too much for him or whether he was too much for the temptation. Certainly it would be impossible for an individual to "arrive" unless he was of the latter class, regardless of what other conditions might be necessary for success.

The best—in fact, the only way—to master this temptation is never to succumb to it. The first time you find yourself saying, "Why bother with studying tonight—I'll skip tonight and do twice as much tomorrow evening," that is the very time to go right after your lesson and study twice as hard as you ordinarily would. Soon you'll find you no longer have to fight temptation; it will no longer exist; it just won't ever occur to you to say, "I'll do it tomorrow." Instead, you will find yourself automatically saying, "I'll do it now," and actually doing it.

E. R. HAAS, *Executive Vice-President.*

# NEW RECEIVERS FOR 1946

By J. A. Dowie

NRI Chief Instructor

THE new 1946 receivers for the most part use standard circuit designs and no radical departures from accepted practice have been observed. One reason for this is that manufacturers want to get back into production with a minimum of effort and at the same time they want to produce receivers which are reasonably reliable and satisfactory, and capable of providing good performance at a reasonable cost. Later, we may expect to see the results of wartime research and developmental work. New designs undoubtedly will make their appearance, but the initial production for the most part will be of standard radio receivers. Note that many of these sets either do not use an r.f. stage, or use an r.f. but an untuned mixer input circuit.

Let's examine a few of the typical circuits.

## A Portable Receiver

In Fig. 1, the circuit diagram of a Zenith 6G001 portable receiver is shown. In Fig. 2, a photograph of the set is given. The model number of the set is 6G001. The suffix Y indicates the cabinet style and the Zenith 6G001Y is shown in Fig. 2.

The radio uses six tubes, 1LN5 r.f. amplifier, 1LA6 converter, 1LN5 i.f. amplifier, 1LH4 detector and first audio, 3Q5GT power output tube, 117Z6GT half-wave rectifier.

The set may be operated on battery power or on a 115 volt a.c. or 115 volt d.c. line.

A loop antenna is used and the circuit design is straightforward. Instead of the usual condenser between the oscillator grid and the oscillator tank circuit, a small coupling coil, E, in series with R6, is used. This coil in effect permits capacitive coupling between the oscillator inductance and the grid circuit of the 1LA6 oscillator. There is another modification or change from usual circuit design in that the r.f. coil section A-C (L-2) in the mixer circuit has a tap on it which is connected to condenser C6. The condenser then connects to the mixer grid of the 1LA6. Not all of the resonant voltage developed across this secondary inductance is applied to the converter tube, only a portion of it, that section of the coil between B and C developing the potential.

This reduces the gain somewhat but helps in the improvement of selectivity. Thus less reaction of the mixer on the tuned circuit occurs.

Automatic grid leak bias on the i.f. amplifier tube is used. Note that R1 is connected in the grid return circuit of the 1LN5.

Another unique feature is that the trimmer marked C13 on the diagram is part of a multiple assembly. The usual practice is to connect a small mica condenser from the lower terminal of the secondary of T2 to the filament of the 1LH4 and from the opposite terminal of the 47,000 ohm resistor to the 1LH4 filament. However, in this set, (Fig. 1) the two condensers are made a part of the secondary tuning unit.



J. A. DOWIE

NRI Chief Instructor

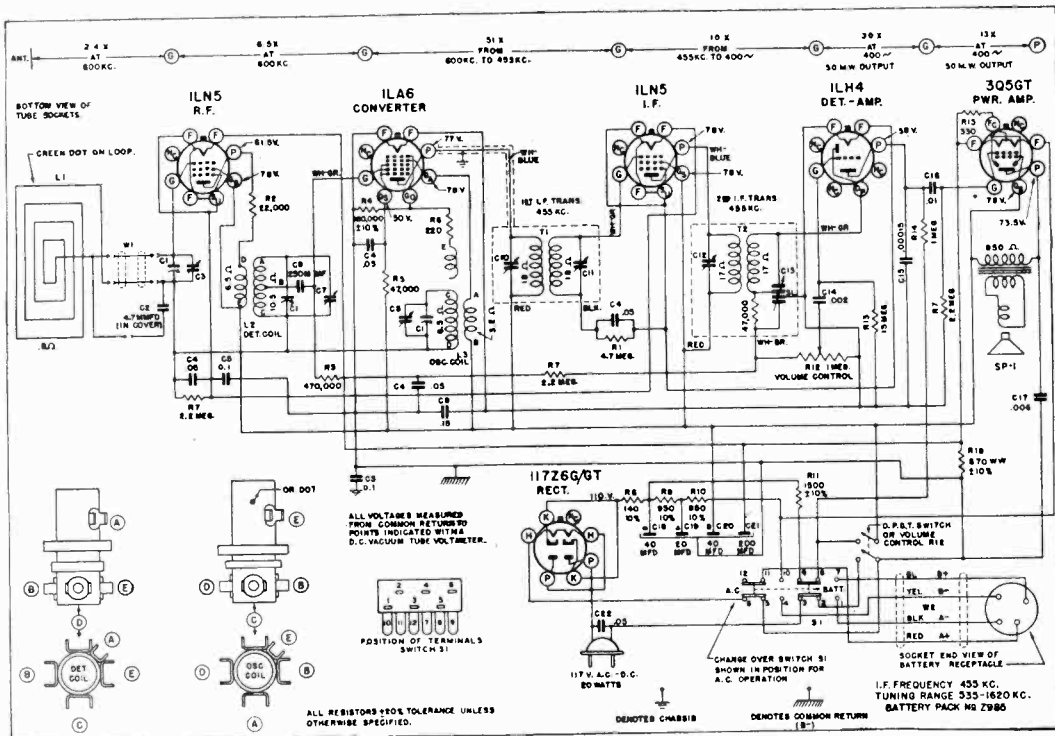


Fig. 1—Zenith 6G001 Circuit

Fig. 2—Zenith 6G001Y Portable

We have examined a typical portable receiver. Now let's see what one of the new 1946 a.c.-d.c. receivers looks like.

### An a.c.-d.c. Set

The Stromberg-Carlson 1100 chassis is shown in Figure 3. The "Newscaster" is shown in Figure 4 and uses the 1100 chassis.

This receiver is a 6-tube set using a 14A7 as an r.f. amplifier, 14Q7 as a mixer, 14A7 as an i.f. amplifier, 14B6 as a second detector, automatic volume control and a.f. amplifier, 35A5 as a power output tube and 35Y4 as a half-wave rectifier.

The set uses a loop antenna, permitting convenient operation of the receiver without the attachment of an outside wire. However, provision is made for the connection of an outside antenna to the set. The antenna is connected to the input of the receiver through C27.



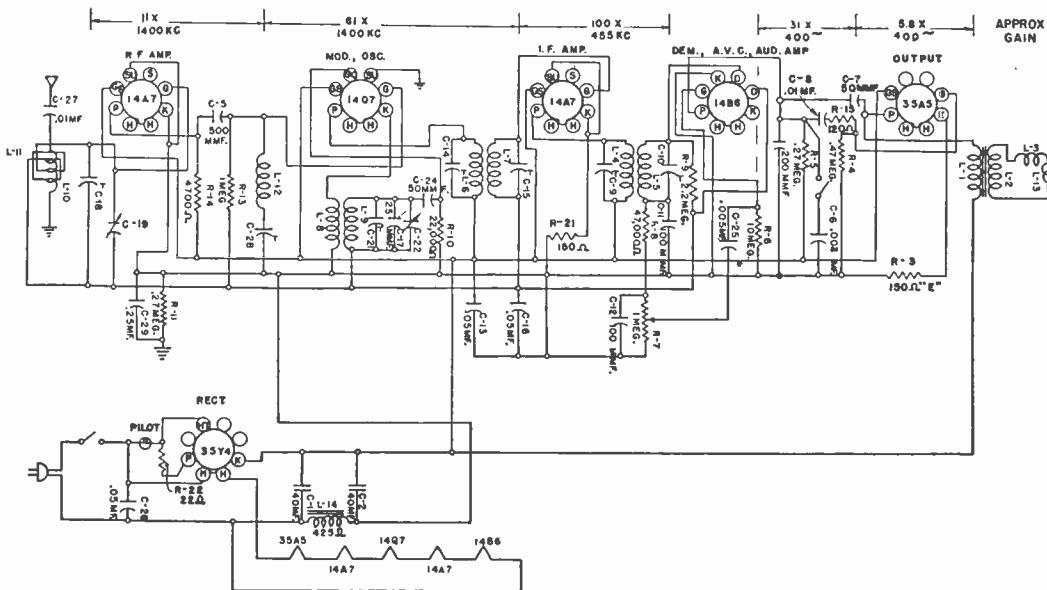


Fig. 3—Stromberg-Carlson 1100 Circuit

A tuned circuit is used in the input of the r.f. amplifier. The input of the mixer is not tuned but the r.f. amplifier is resistance-capacitance coupled to the mixer stage. The wave-trap, L-12 and C-28, forms a series resonant circuit across the input to the mixer, cutting down on code interference.

The volume is controlled by R-7 in the diode second detector circuit. Tone control is afforded by a switch in the plate circuit of the 14B6. When the switch is closed, condenser C6 is cut into the circuit and higher audio frequencies are attenuated.

A hum-bucking coil is used in series with the loudspeaker voice coil to cut down on hum.

The circuit design is straight-forward and no radical change from pre-war circuits is observed.

Another a.c.-d.c. receiver is shown in Figure 5. This is the Zenith chassis 6C05. The Zenith 6D030 table model receiver, a.c.-d.c., using the 6C05 chassis is shown in Figure 6.

This receiver, like the Stromberg-Carlson previously described, uses a loop antenna circuit and the r.f. tuned circuit is located in the grid circuit of the r.f. amplifier tube, while the mixer input is untuned. Resistance-capacitance coupling is used between the r.f. stage and mixer and



Fig. 4—Stromberg-Carlson 1100

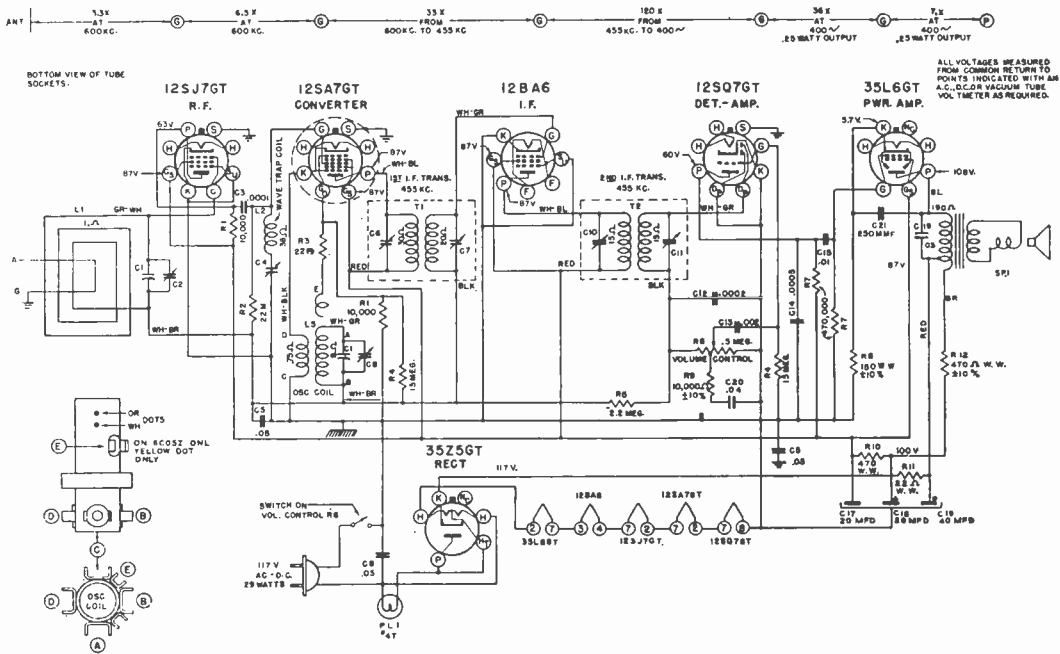


Fig. 5—Zenith 6C05 Circuit

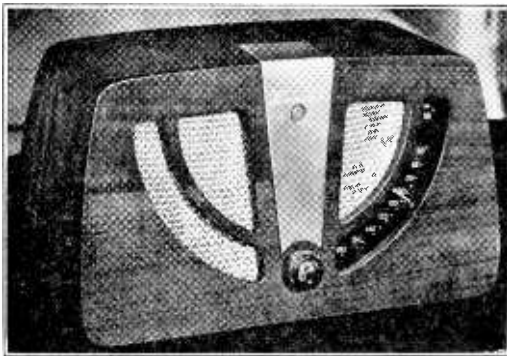


Fig. 6—Zenith 6D030

a series-resonant wave trap is connected across the input to the 12SA7GT mixer stage to cut down on code interference.

A "floating ground" is used in the set. The on-off switch is not connected directly to the chassis. It is isolated from the chassis by condenser C5.

A type 12SJ7GT functions as an r.f. amplifier, 12SA7GT as a converter or mixer, 12BA6 as an i.f. amplifier, 12SQ7GT as a second detector and first audio, 35L6GT as a power output tube and 35Z5GT as a half-wave rectifier.

Volume is controlled by R6 in the diode second detector circuit. Another a.c.-d.c. receiver is shown in Figure 7. This is the Zenith chassis 5C02-5C04. A Zenith 5R086 which uses the 5C02-5C04 chassis is shown in Figure 8. This is a table radio-phonograph with the new Silent Speed Record Changer which automatically plays and changes twelve 10- or ten 12-inch records and receives standard broadcasts. This receiver uses five tubes, a 12SA7GT functioning as a converter or mixer, 12SK7GT as an i.f. amplifier, 12SQ7GT as a diode second detector and first audio, 50L6GT as a power output tube and 35Z5GT as a half-wave rectifier.

Switch S1 permits changing over from radio to phonograph operation.

A loop antenna is used but provision is also made for connecting an outside antenna and ground, through the terminals marked A and G.

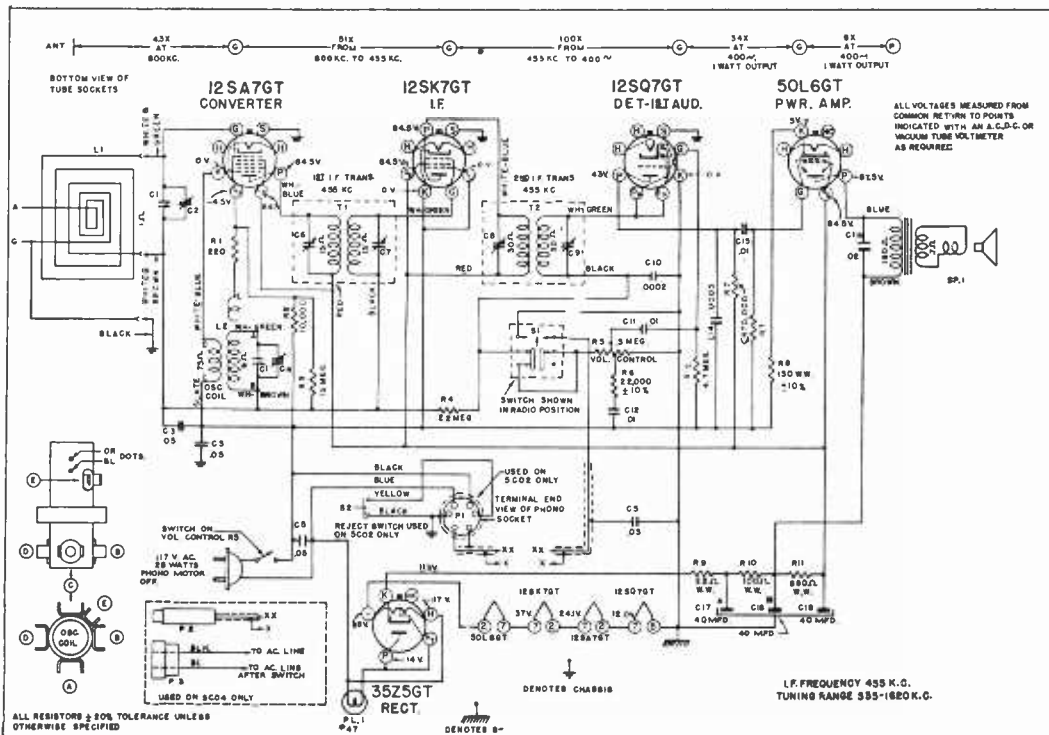


Fig. 7—Zenith 5C02-5C04 Circuit

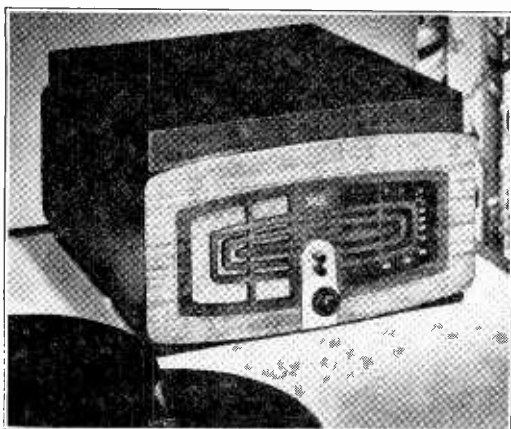


Fig. 8—Zenith 5R086

In Figure 9, another a.c.-d.c. set, the Fada 1001, is illustrated. The receiver uses six tubes, the 12BA6 functioning as an r.f. amplifier, 12SA7 as a mixer, 12SK7 as an i.f. amplifier, 12SQ7 as a diode second detector and first audio, 35L6GT as a power output tube, 35Z5GT as a half-wave rectifier. See Figure 10 for appearance of set.

Again, as in some of the preceding examples, resistance-capacitance coupling between the r.f. stage and mixer is used. The input to the mixer is untuned but an r.f. pre-selector circuit is used in the grid circuit of the 12BA6, consisting of the loop antenna and associated tuning condenser.

A resistance-capacitance filter is used in the power supply system for cutting down hum and filtering the output of the half-wave rectifier.

The volume is controlled by the variable resistance in the diode second detector circuit

Still another a.c.-d.c. receiver is shown in Figure

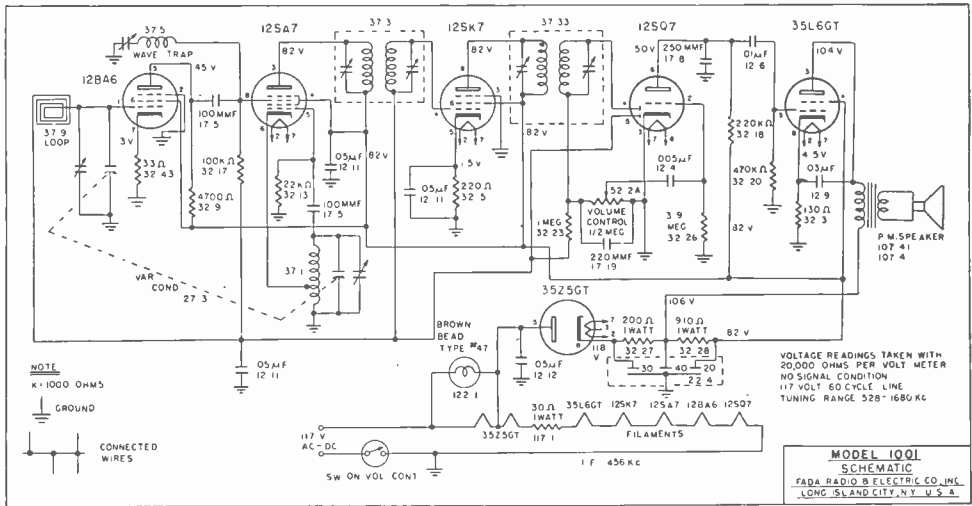


Fig. 9—Fada 1001 Circuit

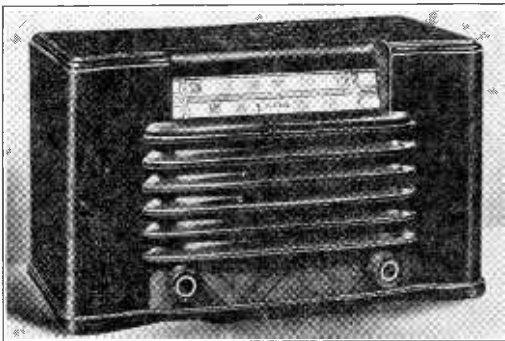


Fig. 10—Fada 1001



Fig. 12—Fada 652

11, the Fada 652. In Figure 12, the appearance of the set in its cabinet is seen.

This is a six tube set, using a 14A7 as an r.f. amplifier, 14Q7 as a mixer, 14A7 as an i.f. amplifier, 14B6 as a second detector and first audio, 35A5 as a power output tube and 35Y4 as a half-wave rectifier. The circuit is straight-forward and calls for no special comment.

In Figure 13, another a.c.-d.c. receiver, the Fada 1000 is illustrated. In Figure 14, the appearance of the set in its cabinet is shown. A large airplane type dial is used.

The radio is a six tube set, using a 12SK7 as an r.f. amplifier, 12SA7 as a mixer, 12SK7 as an i.f. amplifier, 12SQ7 second detector and first audio, 35L6GT power output tube and 35Z5GT half-wave rectifier.

Figure 15 shows the circuit diagram of the Fada 609. In Figure 16, a photograph of the set is shown.

The radio is a five tube set, using a 12SA7 as a



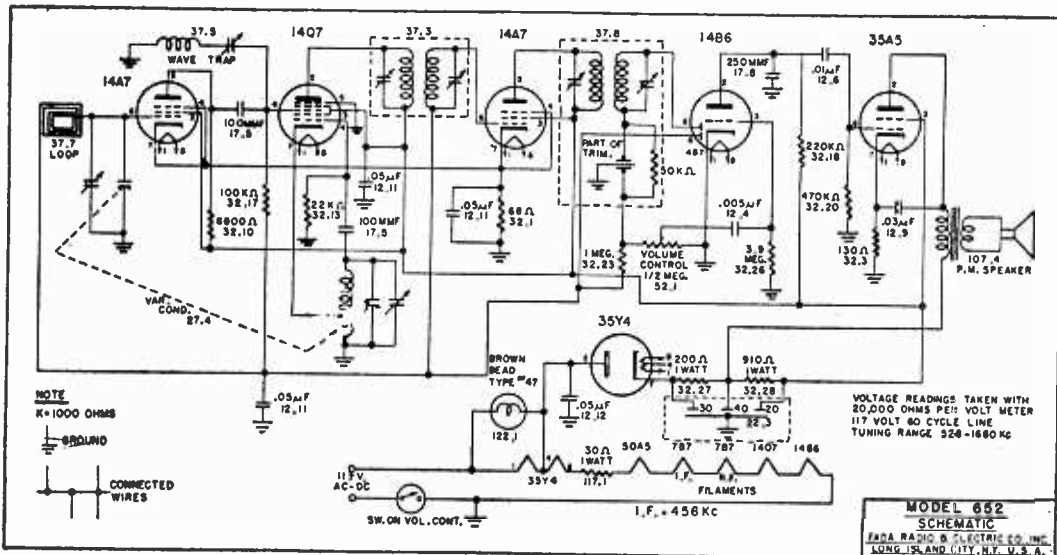


Fig. 11—Fada 652 Circuit

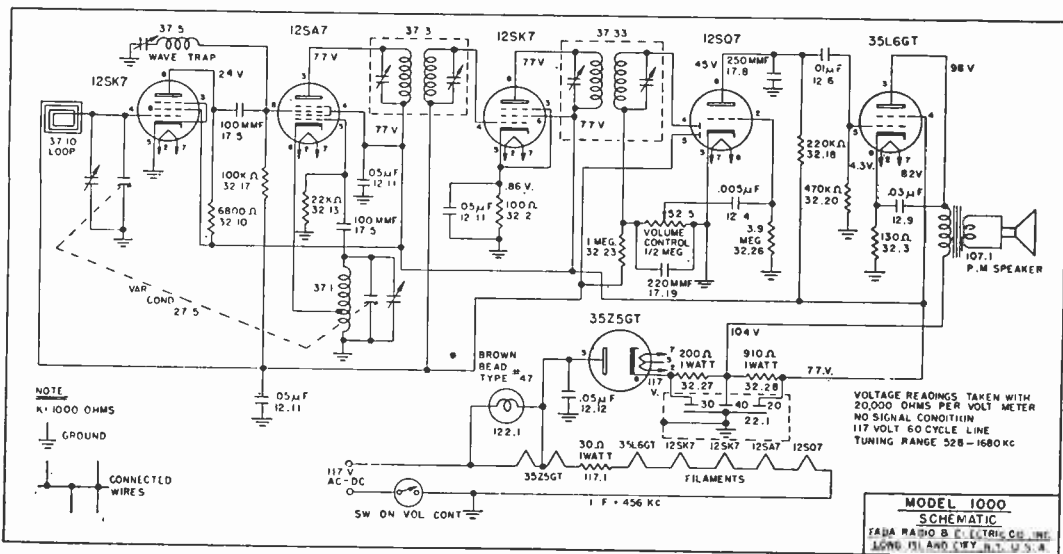


Fig. 13—Fada 1000 Circuit

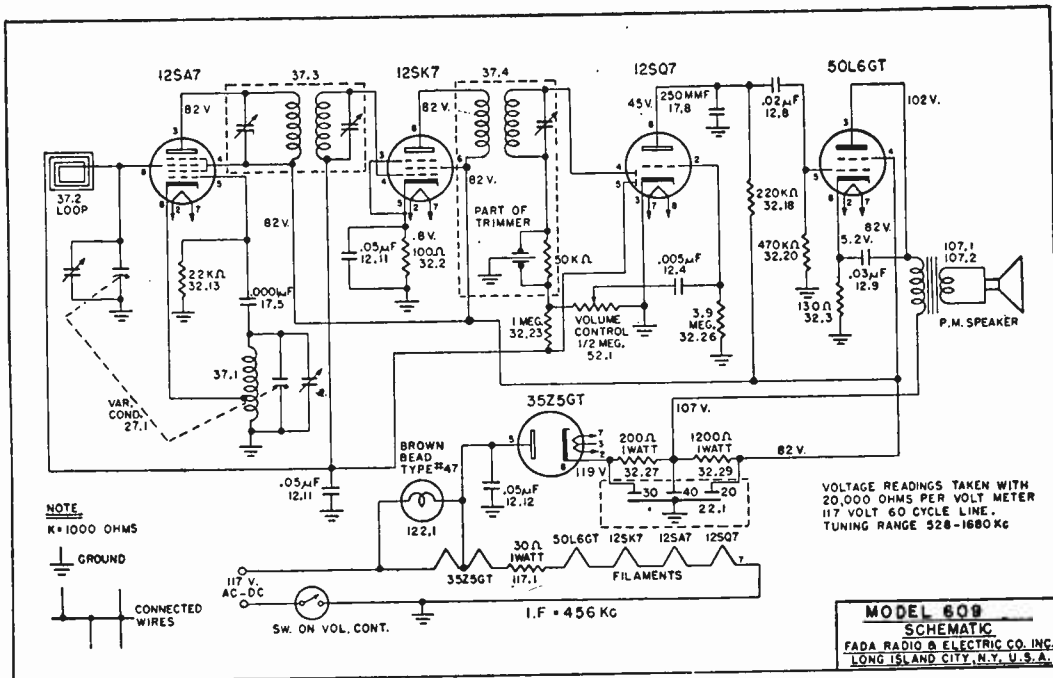
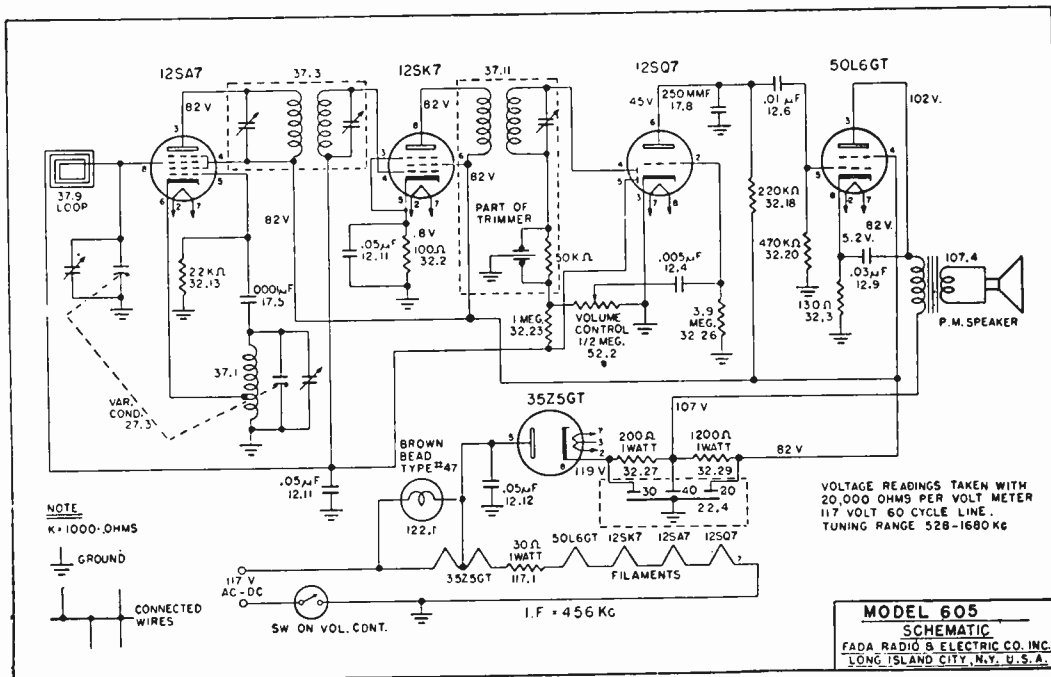


Fig. 15 (above)—Fada 609 Circuit Fig. 17 (below)—Fada 605W Circuit



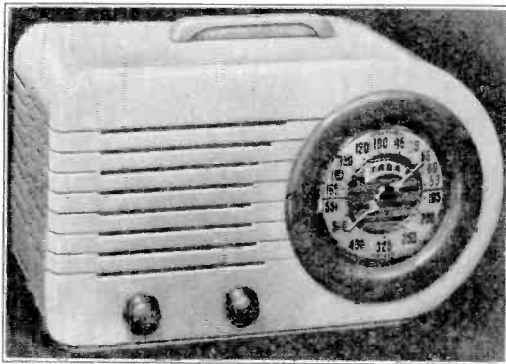


Fig. 14—Fada 1000

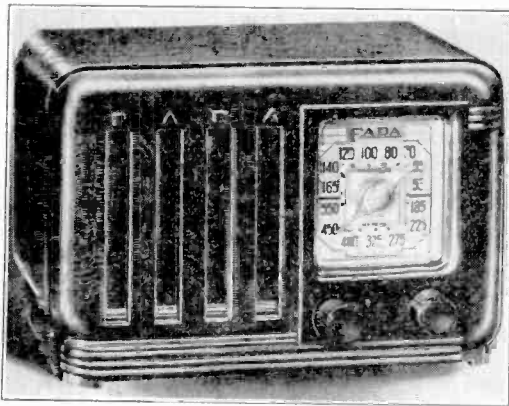


Fig. 16—Fada 609

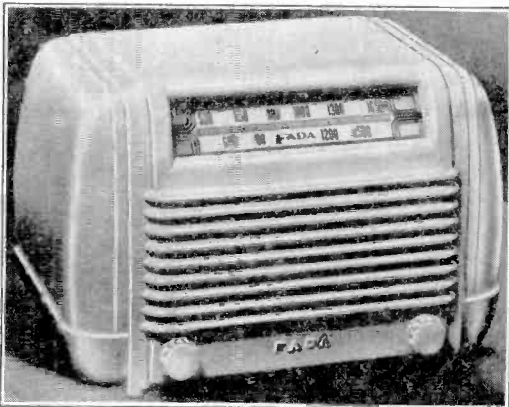


Fig. 18—Fada 605W

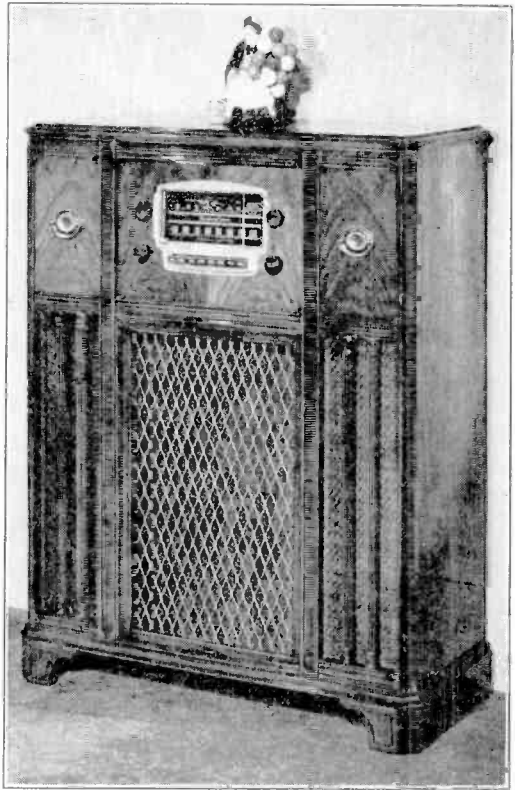


Fig. 19—Stromberg-Carlson 1120-LW

mixer, 12SK7 as an i.f. amplifier, 12SQ7 as a second detector and first audio tube, 50L6GT as a power output tube and 35Z5GT as a half-wave rectifier.

In Figure 17, the Fada 605W circuit is shown and in Figure 18 the appearance of the set is illustrated by a photograph.

The radio uses five tubes, 12SA7 mixer, 12SK7 i.f. amplifier, 12SQ7 second detector and first audio, 50L6GT power output tube, 35Z5GT half-wave rectifier.

We have seen a number of a.c.-d.c. receivers. Let's example a typical, modern a.c. console.

#### An a.c. Receiver

In Figure A the "Cavalier" 1120-LW Stromberg-Carlson is illustrated. The handsome appearance of the set augurs well for a bright 1946 radio future.

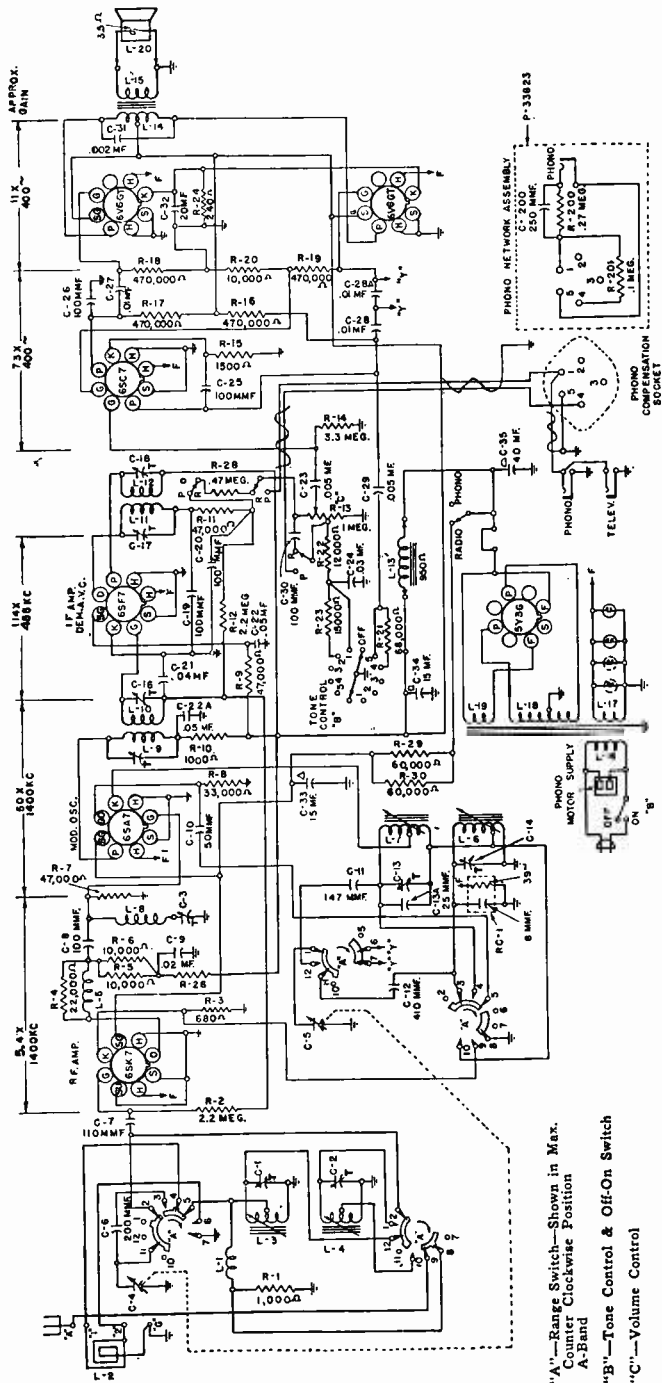


Fig. 20—Stromberg-Carlson 1020-1120 Series 10

- "A"—Range Switch—Shown in Max. Counter Clockwise Position
- A-Band
- "B"—Tone Control & Off-On Switch
- "C"—Volume Control

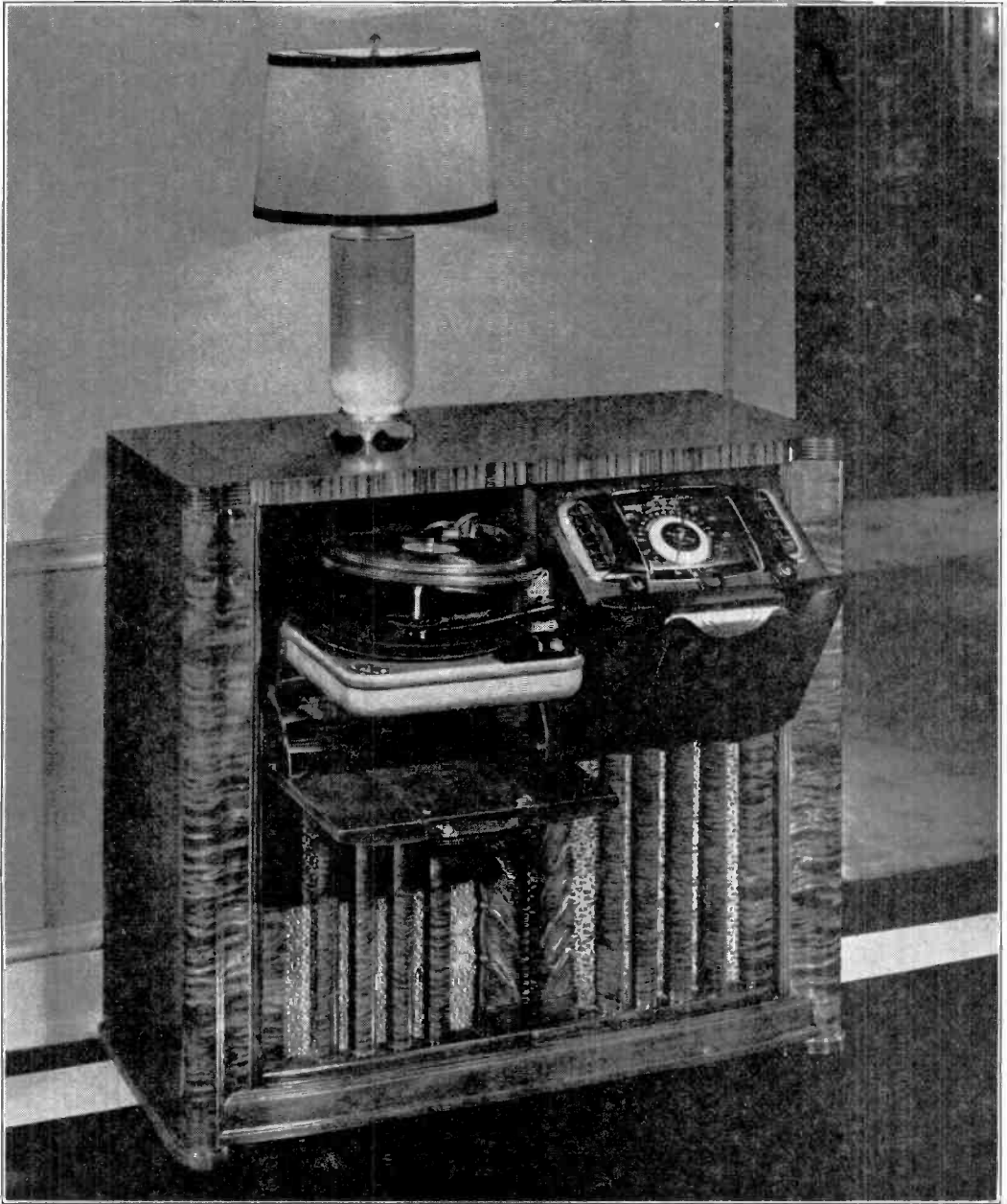


Fig. 21—Zenith 12H090. This attractive console combines record player, standard broadcast reception, FM reception and short wave performance. The cabinet is an effective conventional design in genuine walnut finish.

In Figure 20, the circuit diagram of the Stromberg-Carlson 1020-1120 series 10 is shown.

This receiver uses seven tubes, 6SK7 as an r.f. amplifier, 6SA7 as a mixer, 6SF7 as an i.f. amplifier, detector and automatic volume control tube, 6SC7 as an audio amplifier, 6V6GT (push-pull) tubes as output tubes, a 5Y3G functions in a full-wave rectifier circuit.

The receiver has two tuning ranges, 542-1600 kc. and 8.8 to 12 megacycles.

The power output is 10-watts at 10% distortion with a 12-watt maximum output.

A loop antenna is used but provision is made for connecting an outside antenna and ground to the set.

The 6SC7 is a twin triode amplifier tube. One section of it functions as a voltage amplifier and the other as a phase inverter to permit operation of the output tubes in push-pull fashion.

Jacks are provided for connecting a crystal pick-up record player to the audio amplifier section of the receiver or for feeding the output of a television tuner (sound) into the audio amplifier input.

The Zenith 12H090 combination radio-phonograph is illustrated in Figure 21. This is a very elaborate set using ten tubes and an additional 6AL7GT tuning eye tube.

A 6AG5 r.f. amplifier tube is used followed by a 6SB7 converter or mixer, 6SG7GT first i.f., 7W7 second i.f., 6SH7 limiter, 6SSGT discriminator, automatic volume control, detector and first audio, 6J5GT phase inverter, 6V6GT (two tubes for push-pull) output stage, 5Y3GT rectifier in a full-wave rectifier circuit.

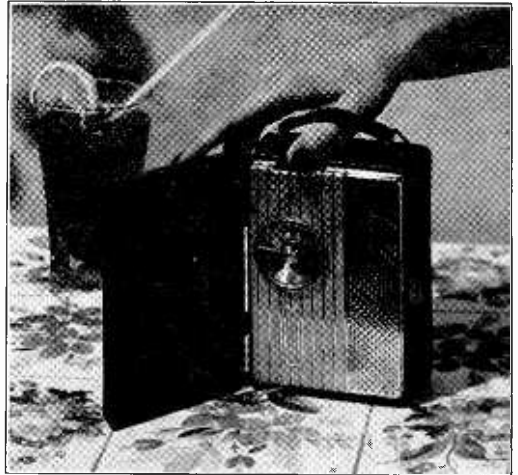
The circuit diagram is unusually large and complex and for that reason is not reproduced here.

Only very well trained professional servicemen will attempt to check a set of this type, combining as it does a.m. and f.m. circuits and using the rather complicated switching system in the wave-band switching section of the set.

— n r i —

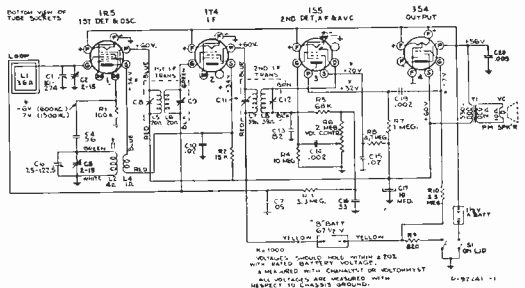
"Hello! Is this the Jones' apartment?... Well, I'm McTavish, in the apartment beneath you . . . Listen, it's three in the morning now, and your party has kept me awake all night . . . I don't mind the shrieking and pounding and music and stamping and singing and banging that's been going on over my head, but for Pete's sake put some more sugar in that Tom Collins that's dripping through the ceiling!"

## The New RCA Portable Receiver



The photograph shows the new RCA Victor personal radio. The radio is small enough to fit into a topcoat pocket, the miniature receiver weighing only three and a half pounds complete with batteries. It has sufficient volume for ordinary purposes and can fill a room of average size with sound. The radio is housed in a wear-resistant plastic case of simulated alligator hide and turns on automatically as the lid swings open. A circuit diagram of the set is shown.

The receiver uses four tubes, 1R5 as a mixer,



1T4 as an i.f. amplifier, 1S5 as a second detector, first audio and automatic volume control tube and a 3S4 as a power output tube driving the loudspeaker.

Receivers of this type have a great appeal to the radio buying public and should prove very popular. Production is still limited.



## From a Small Attic Shop to a Downtown Store in a Few Years

"I think it is time for me to write a personal letter to you and let you know how I've been getting along since I started my NRI Course. After I had finished my 20th lesson I started taking in a few small jobs using the attic of my home for a workshop. I kept studying on my course and reviewing until I could repair some tougher jobs. Soon my friends found out that I was repairing a few radios, then I really became busy. As I progressed in my NRI Course and gained more experience by working on various types of Radios, I began to charge regular prices for my services. That didn't stop anyone, in fact they were more anxious than ever that I repair their radios.

"Last March I enclosed the front porch of my home and set up a regular Radio repair shop. Had more business than I could handle in my spare time. I kept my eye open and watched my chances until I found a fellow wanting to sell out his entire Radio shop in another town. I bought him out completely and last July 1, 1945,

I opened my own shop at 912 W. Northern Ave., Pueblo. I had built up quite a business already and when I opened my shop in the business district I couldn't handle all of it alone. I now have two servicemen working for me and it keeps the three of us busy eight hours a day, six days a week.

"I have the reputation of being one of the best and most honest Radio repair men in the city of Pueblo. I do work for seven dealers and five other Radio men. I get some of the hardest jobs in town because other Radio men can't repair them. Last year I grossed \$4,900 worth of business with a clear profit of \$2,900, and six months of last year was a part time business. One month this year I grossed \$997. Of this \$473 was clear profits. In closing I will say that there is nothing like Radio nor the NRI."

B. F. HEADRICK,  
The Ideal Radio Service  
1706 Buelah Ave., Pueblo, Colorado.



# How To Service AC-DC Receivers

By J. B. Straughn  
Supervisor of Training

THE a.c.-d.c. receiver operates from either an a.c. or d.c. power line. When operating an a.c.-d.c. set on a d.c. power line, proper line voltage polarity must be observed. If the receiver fails to operate after the tubes have had time to warm up, reverse the power plug at the power outlet. One of the positions will permit applying a positive voltage to the tube plates.

The a.c.-d.c. receiver is generally in the midget

stage, a detector stage, and an audio output stage, as shown in Fig. 1. The R.F. amplifier tube is usually a super-control pentode such as the 78, 6D6 or 6K7, having a 6.3 volt filament, or a 12SK7 12 volt filament type. There are two tuned circuits, controlled by a two-gang variable condenser; one couples the antenna to the input of the R.F. stage, and the other couples the R.F. stage to the detector. The volume control circuit simultaneously varies the antenna input voltage

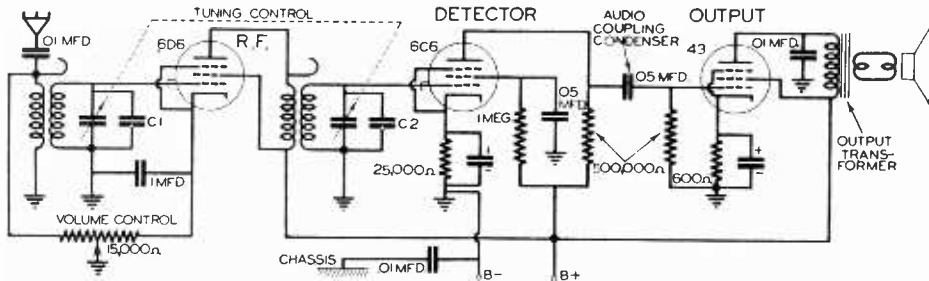


Fig. 1—Signal circuits of a typical universal T.R.F. receiver. Alignment simply involves tuning in the station, then adjusting trimmer condensers C1 and C2 (mounted on the gang tuning condenser) for maximum output volume.

and small table model class. There are two main types: TRF and Superheterodyne.

**TRF Circuits.** As a general rule, the circuits in a universal T.R.F. receiver are extremely simple; a typical circuit has one R.F. amplifier

and the gain of the R.F. tube. A sharp cut-off R. F. pentode tube such as the 6C6, 77, 6J7 or a 12SJ7 is used in the high-gain detector circuit. The detector feeds through resistance-capacitance coupling into a high-gain power audio amplifier tube, which may be a 38 or 43 pentode or a 25L6,



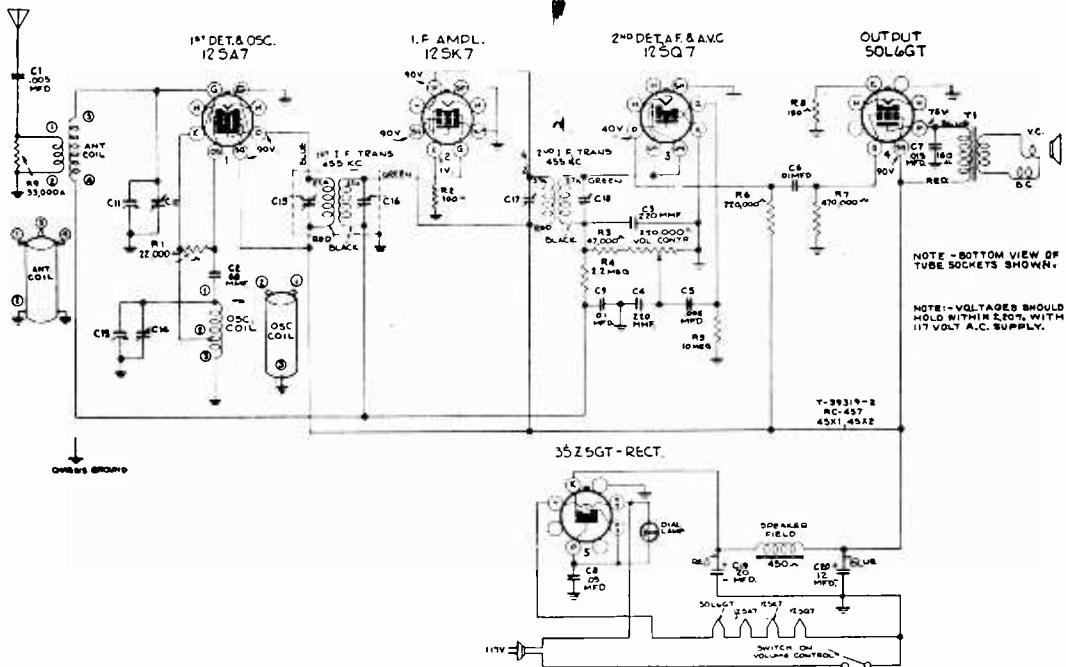


Fig. 2

35L6 or 50L6 beam amplifier tube. An electrodynamic loudspeaker coupled to the audio output by an impedance-matching transformer is most common, but you will also encounter magnetic loudspeakers which are connected directly into the plate circuit of the power tube.

Universal T.R.F. receivers usually have an antenna consisting of about twenty feet of flexible insulated wire which comes wound on a fiber card and is connected to the receiver input circuit through a small tubular or mica condenser; this wire should be unwound and dropped out of a window, tacked around a window or wall, or placed under a rug. Satisfactory reception can often be obtained simply by connecting this aerial wire to a radiator or other ground.

Two distinct types of grounding systems are employed in universal receivers. In the type represented by Fig. 1, the chassis is not an electrical part of the circuit; the ground symbols in the diagram simply indicate a connection to a common wire which serves as the return path for signal currents. In the second type of grounding system, the chassis is the common return path for signal currents. One side of the power line

is directly connected to the chassis, so, for one position of the power cord plug, the chassis will be "hot" (connected to the ungrounded side of the line). Under this condition a shock may be felt if some part of the body is grounded when the chassis is touched. Never connect the chassis to an external ground, for this may short-circuit the power line. In general this will not be possible, unless you do so deliberately, for no ground lead or terminal is provided.

**Superheterodyne Signal Circuits.** As in the case of the a.c.-d.c. T.R.F. receivers, the signal circuits of a universal superheterodyne are quite simple. The typical circuit shown in Fig. 2 has a frequency converter stage, an i.f. stage, a combination second detector first a.f. and a.v.c. stage followed by a single power output stage. The frequency converter tube is usually a pentagrid converter such as a 12A8 or 12SA7 while a super control pentode such as a 12K7 or 12SK7 is generally used in the i.f. stage. The second detector, first a.f. and a.v.c. tube is usually a 12Q7 or 12SQ7. A 35L6 or 50L6 is most often used in the power stage. It is seldom that you will find the 6 volt equivalents such as the 6A8, 6K7 or 6Q7 in a.c.-d.c. superhet receivers. Low filament

current to keep power drain low, high filament voltage so the string will approach the line voltage of 115 V is what is wanted for economy in use. These 6 volt types are used almost exclusively in power transformer type a.c. sets. Although for a short time, before special tubes

This is typical in the r.f. stages of a.c.-d.c. T.R.F. and a.c.-d.c. supers. High Q coils in the i.f. transformers account for the high sensitivity found in a.c.-d.c. supers.

**Replacements.** In servicing, replacement of parts is an important part of the work.

**Pilot Lamps.** Pilot lamps used in universal receivers are generally connected in series with the tube filaments; the lamps are not designed to handle the usual filament current, and hence are shunted by a resistor in the manner indicated in Fig. 3-A. When a ballast tube is used, a tap is provided at the proper point on its resistor for a pilot lamp connection, as indicated in Fig. 3-B. When a pilot lamp burns out, replace it with a lamp having the same voltage rating and the same color of glass bead around the filament supports. When a ballast tube burns out, replace it with one having the same code number. In receivers using a rectifier such as the 35Z5 a different pilot lamp circuit is often used. (See Fig. 8.)

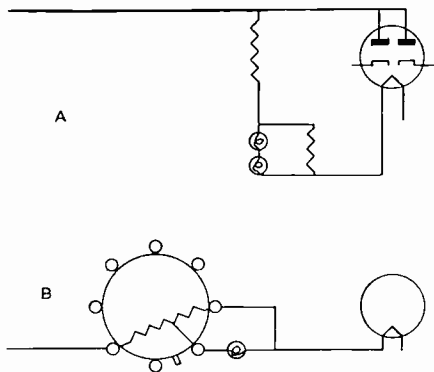


Fig. 3

were developed, T.R.F. and some superhet a.c.-d.c. sets were designed for their use.

In Fig. 2 an antenna type of R.F. transformer is employed to feed the signals, picked up by the "hank" antenna, to the 12SA7. Often a loop is used as the pick-up, the loop winding replacing the secondary of the antenna coil. A single turn around the loop may be used to couple the loop to an outside aerial and ground, if this form of pick-up is desired, although in most cases the loop itself suffices.

Note particularly in Fig. 2 that the screens and plates of the converter and i.f. tubes receive the same d.c. voltage. The screen voltage is not reduced as it is in a straight a.c. operated set.

**Replacing Filter Condensers.** Electrolytic filter condensers are more likely to become defective than any other part in a universal receiver. The usual symptoms are hum and perhaps a dead receiver. (In the latter case the d.c. plate voltage will be below normal.) All electrolytic filter condensers are usually grouped in a single block or container. When one condenser in a block becomes defective, it is advisable to replace the entire block, as the other sections will very likely fail in the near future. Whenever an exact replacement filter block can be obtained, without trouble, it should be used. Ordinarily there will be no identifying numbers on the condenser filter block and in this case the following procedure will enable you to order a suitable replacement.

Make a sketch of the old condenser block, showing all of its leads. Trace each of these leads in the receiver and determine the type of power pack circuit used. Now draw in the internal connections for the condenser block (this will be easy once you become familiar with the power

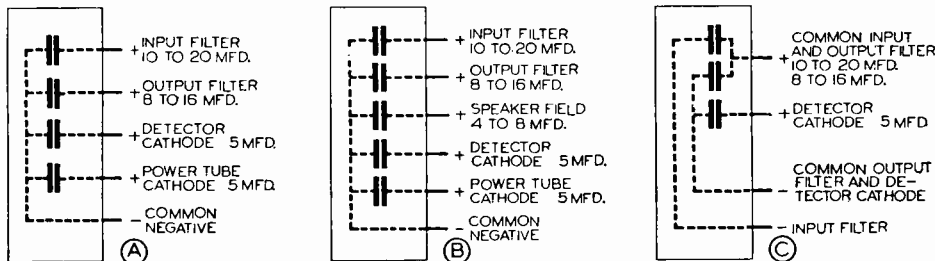


Fig. 4

supply circuits used in these sets), and indicate on your diagram the polarity of each lead and the condenser section to which it belongs. Now you can place on your condenser block sketch the approximate capacity values for each sec-

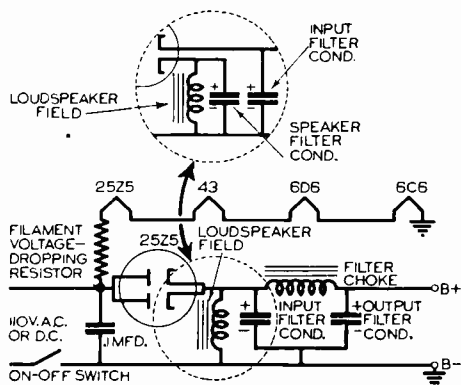


Fig. 5

tion. Use the following general rules as your guide:

**Input Filter Condenser.** Any value between 10 mfd. and 20 mfd., rated at 200 volts D.C. working voltage or higher; values up to 40 mfd. are used but only if there is a protective resistance of some sort in the rectifier plate circuit.

**Output Filter Condenser.** Any value between 16 mfd. and 40 mfd., rated at 200 volts D.C. working voltage or higher.

**Loudspeaker Field Coil Filter Condenser.** Between 4 mfd. and 8 mfd., rated at 200 volts D.C. working voltage or higher.

**Output Tube Cathode Resistor By-Pass Condensers.** About 5 to 25 mfd., rated at 25 volts D.C. working voltage or higher.

Your condenser block sketch now gives you the necessary data for ordering a replacement unit. First try to secure a single condenser block to replace the defective unit; if this cannot be secured, order a block to replace some sections and use individual midget electrolytics for the remaining sections, or build up the complete assembly with individual units. Before ordering, make sure the replacement units will fit in the available space. Three examples of condenser block sketches are shown in Fig. 4. That at A is for the power pack circuit in Fig. 5, while the diagram at B is for the circuit in Fig. 5 when the

loudspeaker connections are as indicated in the upper dotted circle. When the choke coil is in the negative power supply lead and provides C bias for the output tube, the condenser block diagram may take the form shown at C in Fig. 4.

In the later receivers the block idea has been dropped to some extent. For example, you will find the input and output condensers in a single container while separate electrolytics may be used for by-pass purposes. In this case you must decide whether the condensers have a common negative lead or a common positive lead. The two types are not interchangeable as you will see by examining Fig. 6. When you cannot get the right replacement, a block in which all the positive and all the negative leads are brought out will enable you to make the proper connection regardless of the circuit which is employed. Parts and tubes which fail may cause certain service troubles which we shall now consider.

**Service Hints for A.C.-D.C. Receivers.** Because of the limitations in size and circuit design of universal receivers, circuit defects tend to be concentrated in a few critical parts. Short-cut methods for locating these common defects will now be considered.

**Dead Receivers.** A break in the filament circuit is a common cause of a dead universal receiver, for a defect in one part or lead in this circuit will prevent filament current flow in all tubes.

Remove the tubes one at a time and check their

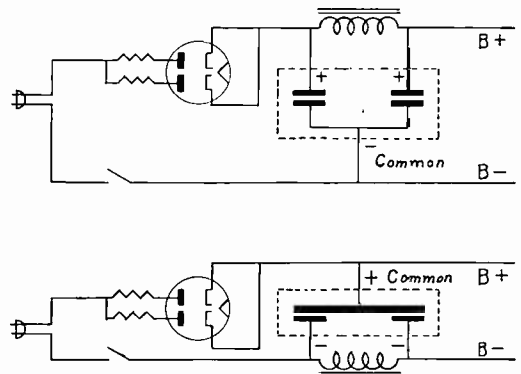


Fig. 6

filaments for continuity with your ohmmeter. If the filaments are all good, check the line cord and the on-off switch. You can determine which prongs of a ballast tube connect to the ballast resistor by an examination of the circuit wiring.

The various sections of the ballast should then be checked. A break in the filament circuit frequently occurs at the point where the rubber covered line cord enters the molded rubber power plug. Pull on the cord and plug. If one of the rubber covered leads seems to stretch, it contains the broken wire. These plugs cannot readily be repaired and it is best to install another plug of the type using screw terminals.

Frequently when a receiver is dead the pilot lamp will continuously blink on and off. This is a sure sign of a thermostatic make and break contact somewhere in the filament string, probably caused by opening and closing of a tube filament. This is most likely to occur in the rectifier and power output tubes although any tube can be at fault. You could remove each tube and check it with an ohmmeter to see if its filament was open. This procedure is not very satisfactory as the filament may be closed at the time you test its continuity. A better way of isolating the defective tube is to place the test probes of an a.c. voltmeter across each set of filament prongs in turn. Then wait for the pilot lamp to blink off. If the tube filament opens up the meter will indicate the full line voltage but if the open occurs in another tube the meter reading will drop to zero when the pilot lamp blinks off. When the meter reading goes up to the value of the line voltage, you have found the defective tube. *Be sure* to use a meter range which will enable you to measure the line voltage even though the tube filament under test is rated at 6 volts, 12 volts or 50 volts as the case may be.

A defective (open, leaky or shorted) electrolytic filter condenser is another common cause of a dead universal receiver. A shorted filter condenser can damage the rectifier tube, so check this tube after replacing a shorted or leaky filter condenser.

A measurement of the rectified output voltage of the rectifier tube will often give a clue to the trouble. With the set plugged into an A.C. outlet, the D.C. voltage as measured between the rectifier tube cathode (B+) and the tuning condenser (B-) should be between 90 and 120 volts; if lower, a filter condenser is very likely defective.

When making a circuit disturbance test to isolate the defective stage in a universal receiver, remember that you cannot pull tubes. Remove and replace each control grid cap or short the grid momentarily to the cathode to produce the disturbance. A voltmeter with its leads is a convenient way of doing this.

**Distortion.** Excessive distortion may be due to an off-center cone or an open field coil in a dynamic loudspeaker, to improper centering of the armature in a magnetic loudspeaker, to a leaky audio coupling condenser, or to a defective audio output tube.

Check for gas in the tube and leakage in the coupling condenser by measuring the voltage across the grid resistor as shown in Fig. 7. Normally no d.c. voltage should exist across this resistor. If you get a reading across  $R_1$ , tube  $VT_1$  is gassy or  $C_1$  is leaky. Now unsolder one

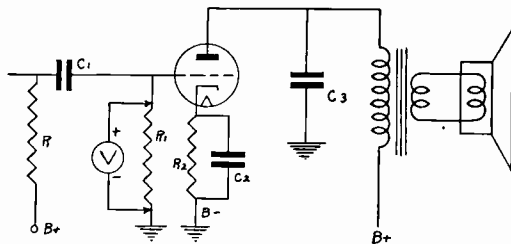


Fig. 7

end of  $C_1$ . If the voltage across  $R_1$  disappears  $C_1$  was leaky. If the voltage is still present  $VT_1$  is gassy.

Defective filter condensers can also cause distortion due to lowered d.c. operating voltages. When a groundstrap is used around a cardboard tubular electrolytic condenser to anchor it in place and you suspect the condenser, withdraw the condenser from the strap a short distance. If green spots are observed on the condenser case where it was covered by the strap leakage existed between the condenser plates, through the case, to the mounting strap. In this case replace the condenser.

**Low Volume.** Open filter condensers, defective volume controls, and inadequate antennas are common causes of low volume in a universal set. The antenna wire should be completely unrolled.

Improper alignment is also a frequent cause of trouble. Customers seem to have less hesitancy in tightening "loose" screws and nuts (alignment adjustments) in small midgets than in expensive console models.

Here is a defect peculiar to a.c.-d.c. sets. Frequently a partial short will develop in a tube filament. This usually occurs in high voltage filaments, such as those used in rectifier and power output tubes. The effect of this short is to reduce the tube plate current because of reduced filament voltage which causes reduced emission from the cathode. The voltage applied to the other tube filaments will be higher than normal. If a filament voltage check shows one tube has lower than normal filament voltage while the other filament voltages are high, replace the tube with low voltage. A tube tester will not ordinarily show up this trouble.

**Oscillation.** A certain amount of oscillation at high volume level is normal and unavoidable in some universal T.R.F. receivers, so if a reduction in volume control setting will stop the oscillation and allow the signals to come through clearly, nothing should be done. If the oscillation cannot be controlled or if the volume must be reduced too much in order to eliminate it, look for a defect. The most common defects are antenna wire not uncoiled, a misplaced control grid lead, an open by-pass condenser, a missing tube shield, or an open output filter condenser. If a check of all these fails to locate the trouble, try connecting the antenna wire to a radiator or other ground, or try detuning the trimmer condensers which are mounted on the gang tuning condenser.

The causes of oscillation in a.c.-d.c. superheterodynes are the same as those in a.c. sets. Be on the lookout for birdies when a long outside antenna is used. A long antenna will load the pre-

shunted across a tap on the rectifier filament and the rectifier plate current as well as the tube filament current flows through it, the tapped section of the rectifier may be open. In this case the pilot lamp will burn out as soon as the receiver is turned on and the tubes will not light. You can check the rectifier filament continuity with an ohmmeter after you remove the tube from its socket. If the rectifier tube is all right and the pilot lamp does not burn out until the tubes heat up, the trouble is due to excessive rectifier plate current. This can be the result of leakage in the filter condensers, a gassy output tube or a leaky a.f. coupling condenser.

In a few cases it may be well to make all connections to the rectifier cathode through a 25 ohm, 1 watt protective resistor. This will avoid the effect of excess rectifier plate current due to charging up of the input filter condenser when the set is snapped off and then on again.

### Precaution When Using A Test Condenser

When you suspect that an electrolytic filter condenser has opened, has dried out, or has developed a high power factor, you check for this condition by shunting the suspected condenser with another of about the same capacity and of equal working voltage. If the symptoms clear up, the original condenser is defective and must be replaced.

All too often, however, the rectifier tube will be ruined when you connect the test condenser across the input filter condenser (for example  $C_1$  in Fig. 8 or Fig. 9). This is due to the momentary shorting effect of the discharged test condenser and if the rectifier plate happens to be positive at the instant of the connection, even series plate resistors such as  $R_1$  and  $R_2$  in Fig. 9 may not reduce the surge current sufficiently to avoid rectifier tube damage. This can be prevented by

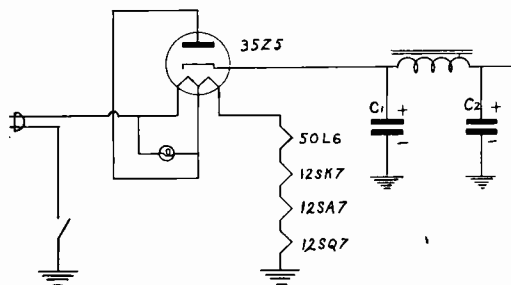


Fig. 8

selector and allow interfering signals to reach the mixer input. In receivers which use an r.f. stage the selectivity is sufficient to prevent this—a.c.-d.c. supers seldom have an r.f. stage.

**Intermittent Reception.** Experience has shown that the most common cause of intermittent trouble is a defective audio coupling condenser or a defective output tube, so check these parts first. Also check for intermittent breaks in the antenna cord.

**Pilot Lamp Burns Out.** If the pilot lamp burns out as soon as it is installed, the wrong lamp has been used or a circuit defect exists. First make sure by referring to the service diagram that the correct replacement lamp has been used. Then examine the wiring diagram to see how the lamp is wired up. If it is an older receiver and a shunt resistor is used across the lamp, check this resistor as it may be burned out. If the lamp is

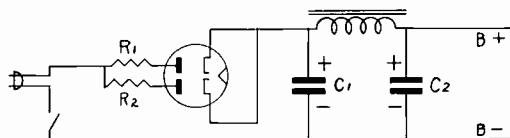


Fig. 9

first charging the test condenser at the filter output. Simply connect it to B+ and B— in Fig. 8 or Fig. 9. If this point cannot be readily found, charge the test condenser by connecting it between the screen or plate and the *cathode* of the power output tube. Be sure and observe the test condenser polarity markings—the negative lead goes to the cathode of the power output tube and the positive lead to its screen or plate. If this

clears up the trouble, replace the output filter condenser ( $C_2$  in Fig. 8 or Fig. 9). If the trouble continues the input filter condenser ( $C_1$ ) must be checked.

*Do not discharge the test condenser by touching its leads together.* Instead connect it across the input filter condenser, still observing its polarity markings. If the trouble clears up, now replace the input condenser.

**Hum.** Hum in a.c.-d.c. sets is due to the same causes as those found in straight a.c. receivers. However, the heat developed in the midgest chassis used with most a.c.-d.c. receivers causes the electrolytic filter condensers to deteriorate. Cathode to heater leakage in tubes is also an important source of hum and is particularly troublesome in a.c.-d.c. sets. A check in a tube tester will show up such leakage.

**Tubes Burn Out.** This is generally due to excess filament voltage. Make sure the right tubes are used. For example, someone may replace a 50L6 with a 35L6 tube. This would increase all the filament voltages.

Customers who object to the length of a power cord may have had an uninformed or careless serviceman cut off a section of a line cord resistance, resulting in burned out tubes.

If a customer asks you to shorten a line cord resistor, the answer is that it cannot be done. Neither may the line cord be bunched up and pushed into the cabinet. It must be out in the open where it can radiate heat as these cords normally become hot after the receiver has been turned on for some time.

**Troubles Due to Heat.** Lack of ventilation often causes the sealing compound on the end of paper condensers to melt. This allows the condensers to open electrically and intermittent reception may result. Excess heat will also cause drying out of the electrolyte in electrolytic condensers. As a result most troubles in a.c.-d.c. receivers can be traced to defective filter condensers. This is particularly true of the cardboard encased types mounted under the chassis. The condensers using metal cases are less likely to be affected. In a.c.-d.c. sets the chassis heat will sometimes cause drying out of the glue holding the cone rim to the loudspeaker frame. Distortion will result and the reproduction will sound as though someone is blowing on a comb through a piece of tissue paper. By pulling on the cone rim with your finger nail you can see if it is loose. In this case pull as much of the cone away from the rim as readily comes loose and refasten it with speaker cement.

In this article, servicing hints and information have been given. However, space limitations

made it impossible to consider all technical points of servicing universal receivers. Refer to your regular NRI lessons for information not found in the article.

— n r i —

## You Meet NRI Men Everywhere

You never know where or when you will meet one of the NRI family of students. The man next to you in the subway, street car, bus or theatre seat may be an NRI man. Usually, he has that neat, purposeful look common to all men who are determined to work hard and achieve success. And that was the case, recently, when an NRI instructor hailed a cab driven by a man who will eventually give up his taxi and go into the radio servicing business full time.

One of the advantages of home study is that it enables you to prepare for a better job while still continuing your old one. In this way, the gap between jobs and unemployment is bridged. You step into better, more enjoyable work when you are ready for it!

— n r i —



Courtesy of Radio-Craft Magazine

"Foul Ball!"

— n r i —

To hear always, to think always, to learn always it is thus that we live truly; he who aspires to nothing and learns nothing is worthy of nothing.

— n r i —

## Our Cover Photograph

Two iconoscope cameras and a beam microphone center on a scene from "La Boheme" as televised in NBC's studio in Radio City.

# Television Promises Rapid Expansion

Television at the present time must still be classed as experimental, but gives promise of rapid expansion and development in the future. Servicemen, therefore, should give some attention to this new medium of entertainment, a medium that may prove very lucrative so far as servicing is concerned.

Thirteen new channels have been assigned for television broadcasting, six between 44 and 88 megacycles, and seven between 174 and 216 megacycles. These channels are:

1, 44-50; 2, 54-60; 3, 60-66; 4, 66-72; 5, 76-82; 6, 82-88; 7, 174-180; 8, 180-186; 9, 186-192; 10, 192-198; 11, 198-204; 12, 204-210; 13, 210-216.

Thus far, the greatest number of station channels have been assigned to the New York-Northern New Jersey area, Los Angeles, and Chicago where seven channels each are available. Not all stations have shifted to the new channels, but will eventually.

Next in order comes San Francisco-Oakland with six and other large population areas with five channels. Present television receivers cannot receive stations assigned above 88 megacycles. In the New York area, only channels 2, 4 and 5 will be immediately available.

Community stations will be permitted a maximum radiated power of 1000 watts and metropolitan stations 50,000 watts at maximum antenna heights of 500 feet above the average terrain. Where television antennas are higher than 500 feet, the permissible power will be reduced so that the signal coverage will be equal to that of an antenna 500 feet high, with a signal strength of 50,000 watts. This would correspond to an average effective signal radius of approximately 35 miles.

The number of transmitting hours for each station will be approximately 6 hours per day. Television stations today transmit infrequently, for only a few hours at the most. Most transmissions occur after 8 P.M., except for week-end sporting events.

Predicting what the public will expect from television is difficult. Some receivers give excellent results in black and white images under ideal re-

ception conditions. From observation, however, many people will accept television even though it is imperfect. In other words, interest is of greater importance than technical superiority.

Audiences composed of men seem to react very favorably, particularly to sporting events such as boxing and football games. However, few television stations have made an effort to present well-staged studio programs for a variety of reasons.

For one thing, so far not many television receivers have been distributed and, until television receivers are in the hands of the public, there will not be a market for advertising of any great value. Without an audience, advertising cannot be effective.

From the serviceman's viewpoint, television antenna installations may be the biggest headache. Reflectors undoubtedly will be necessary. The problem of constructing an antenna with directional characteristics such that it can pick up signals from a number of different directions and spread out over a band extending from 44 to 216 megacycles is a tough problem and will require a lot of thought and ingenuity for solution. Further, ghosts and shielding effects will be difficult to eliminate. In apartment houses further complications will develop when numerous television antennas are installed on the same roof top, one interfering with another, unless some unique and unusual technique is devised to overcome the difficulty. Car ignition interference on receivers installed at street or second floor levels may be difficult to combat. Power and telephone line interference also may be noticeable.

Television does have its problems, but interest in this field is so great that it is likely rapid progress in the near future will be made.

The following stations are now in operation: WBKB, Balaban and Katz Corporation, Chicago, Illinois on 60-66 megacycles; WABD, Allen B. DuMont Labs., Inc., 78-84 megacycles; WCBW, Columbia Broadcasting System, Inc., New York 60-66 megacycles; WNBT, National Broadcasting Company, Inc., New York, 50-56 megacycles; WPTZ, Philco Radio and Television Corporation, Philadelphia, Pennsylvania, 60-66 megacycles; WRGB, General Electric Company, Schenectady, New York, 66-72 megacycles.

## A New Record Changer

Zenith has developed a new automatic record changer that will soon be on the market. It uses a motor which is said to be 80% more powerful than those previously used, giving faster, quieter and more dependable operation and ensuring constant speed, freedom from "wows" and tone changes resulting from varying turntable speeds. The changer is so designed that both sizes of records can be placed on the spindle at once. This is an important departure from previous design. The changer has a built-in automatic pilot which adjusts the tone arm as each record drops into playing position. As the tone arm on the record changer is not tied into the mechanism, accidental stopping or jamming in the middle of a change cycle will not strip gears, throw it out of adjustment or otherwise damage any part of the record changer. The time required for changing records is very little, three and a half seconds. An electronic method of eliminating the drag inherent in mechanical gears or plates is used and a remote control button on the radio panel starts or stops the mechanism, or rejects a record on the turntable when desired. The changer mechanism is concealed while playing a record.

The record changer was engineered to be a part of the radio set rather than just a unit added on to the set and it has only one spindle, is easy to load and unload, and has no knives or other gadgets to chip, bind or drop records to one side. The tone arm is called the "Cobra" and is dramatized for advertising purposes. Dealers should have these new record changers soon.

— n r i —

## New Publications Announced By G-E Tube Division

Two new publications (ETR-15 and ETR-16) on the essential characteristics and important ratings of General Electric and Ken-Rad receiving tubes have been announced by the Tube Division of the General Electric Company.

Each 40-page publication, complete with characteristics and ratings of receiving tube types, will be helpful to radio servicemen, radio technicians and electronic engineers.

The characteristics and ratings section presents electrical design characteristics, maximum ratings, and typical operation conditions for each tube type as well as references to the base connections and outline drawings located in the final section of the manual.

A copy of either of the receiving tube characteristics brochures may be obtained on request by writing to the Tube Division, Electronics Department, General Electric Co., Schenectady, N. Y.

Page Twenty-four

## How To Get Along With Others

By DR. JAMES F. BENDER,  
Director, The National Institute for Human Relations  
*Copyrighted*

### BE FRIENDLY

Friendliness UNLIMITED is what our old, tired world needs today if we are going to survive—friendliness among nations, in the neighborhood, on the job, within the family. Now, the best place to increase the precious store of friendliness is in the heart of each of us. For a nation or any other group reflects the spirit of its members. If the individuals are friendly, how can the group be otherwise.

Friendliness is many things. Beyond all else it is personal sacrifice in the little things of daily living; faithfulness in thinking of the other fellow's welfare.

There are times when all of us feel blue; when the sun forsakes our path. And friendliness leads forth those motives as nothing else does. Friendliness is also deep and abiding sympathy for those in misfortune.

Let's think of life, for the moment, in terms of the two tallest mountain peaks in the world. And stretched over the yawning chasm between them is a tight rope; and our journey from birth to death, a perilous balancing as we walk the tight rope. At any step fate may plunge us down. Sometimes we lose our balance momentarily, righting ourselves barely by the skin of our teeth or by a helping hand from the fellow in front or behind us.

Now our tight-rope journey is made a lot more comfortably, and certainly with fewer waverings and breath-taking escapes, if we are provided with the balancing pole of friendliness. In the years that lie ahead, starting right now, let us resolve to provide our brother wayfarers with this balancing pole of friendliness. It is as inexpensive as a toothpick yet it means so much.

And no one knows how soon or often he will need the same kind of help. *BE FRIENDLY* is a wonderful motto to follow every day of our lives.

— n r i —

## Easy Money

"I'll give you five dollars," said the artist, "if you'll let me paint you."

The old mountaineer shifted his tobacco from one cheek to the other and back again. "It's easy money," he replied, "hain't no question 'bout thet. I'se jest wondering how I'd get the paint off afterwards."



# Let Your Partner, The Manufacturer, Help Make Your Selling Job Easier

By H. G. Kronenwetter

Manager, Advertising Production, Sylvania Electric Products, Inc.  
Emporium, Pennsylvania

**W**HAT is a sale? Regardless of Mr. Webster's definition, sales are what will provide the 50 to 60 million jobs necessary for us Americans to maintain and better our present standard of living in the years ahead.

A manufacturer can only start a sale. As a radio service-dealer you make the sale. Most manufacturers recognize this fundamental principle, and constantly and consistently through sales and advertising campaigns make the consumer WANT their products and services so that it is easy for you to SELL them.

## A Real Partner of the Manufacturer

No longer need the radio service-dealer feel like the forgotten man, one who merely buys and resells goods. With carefully selected lines, backed up by advertising and point-of-sale promotion, he can profitably identify himself as a real partner of the manufacturer, a partner who is on the job, on location to serve the wants of the consumer.

The retailer who does not avail himself of the advertising and promotional material supplied by the manufacturer of the products he merchandises is without question selling the HARD way.

## Look For Point of Sale Promotion

Real point-of-sale promotion is the thing the radio service-dealer will look for in any dealer proposition. It is the extra something that some manufacturers take pride in giving the man who sells or services his product right through to the consumer. In the radio field, and in almost every other dealer-service field, point-of-sale promotion that sells the manufacturer's goods, will become increasingly important with the anticipated expansion in all service-dealer industries.

Point-of-sale promotion has never been produced by manufacturers out of mere kindness of heart. It has been conceived, designed and produced to sell more goods and service by boosting the ac-

ceptance of their product. They know they can't make a personal sales call on the set owner to sell tubes, products needed for repairs, or the new sets their ultimate customers need. But they do know they can help the service-dealer to do that job better. They accomplish this with point-of-sale material, the sales tool of many uses.

## Wise Service Dealers Use Manufacturers' Sales Tools

Service-dealers who are aware of their share in this activity are the ones who prosper by accepting and using these sales tools. They know that they are inexpensive, pay-as-you-profit tools. They know that manufacturers make them available on a shared-cost basis, that they are investments that earn increased profits . . . your full share of the fifty million radio service jobs predicted for the years just ahead.

You will find that point-of-sale promotion will do far more than the job of building general good will for your business. You will find that it gives you the sales tools for at least five specific things which will make your business prosper.

1. Professional Appearance
2. Attractive Display Material
3. Tested Promotional Items
4. Something to Really Remember You By
5. Time Saving Business Methods.

## Professional Appearance

Now let's take a longer look at those five things of major importance to your own business. Professional appearance includes not only testing equipment and some "jigs and fixtures" but your own personal appearance. Remember if you are selling service your customers look at the way their service is packaged. Attractive shop coats, the kind that give you a trim, professional look and inspire customer-confidence are one of the professional touches that cost little but will pay dividends. They suggest an orderly shop personality that probably will be reflected in a more efficient service job.

### Personal Appearance

When you make home calls your appearance counts too. Your customer and prospects know that your service is a combination of skill and tools. Make your tool kit into an attractive package, or use the kits which some manufacturers supply. Make it as neat and professional looking as a carrying case for a camera, medical or other professional instruments. Make it impress your customers favorably and give them the feeling that you have been careful to arrange everything needed to render the kind of professional service they want, the kind they will pay for willingly.

### Dress Your Store Attractively

Manufacturers can also help you dress your store more attractively. This means the use of colorful, appealing window displays for more attractive store front promotion. It means the full use of cards, posters, easels, booklets and other interesting informative and useful literature.

It is up to you to request the material and put it into use so your store is not only an example of good housekeeping but has a fresh, appealing atmosphere. After large cutouts have served in your windows use them inside the shop. This continuity of use tends to make your advertising more effective, particularly when windows and in-store displays feature the same line. Counter material may also be used with your windows to give a second message to your customers and prospects.

### Re-Dress Your Windows Once A Month

Take care to rearrange the material often. Discard old material when it has become shop worn and replace it with new display material. When a complete new window-dressing job cannot be done at least once a month, point up your windows with new posters or streamers. Then provide a new message, and, like newspaper headlines, change it frequently.

### Use Folders and Literature

It is always good business to offer something free to your customers. It may be descriptive literature about a new radio, a folder about some part of every radio set, or just an interesting printed piece dedicated to your interest. It should always carry your imprint. It may be an imprinted match pack, something that almost everyone is always glad to receive. But, whatever you have selected through the cooperation of the manufacturer, be sure to use it in over-the-counter transactions with customers.

### Use Direct Mail Consistently

With the use of attractive, colorful follow-up

post cards supplied by manufacturers you can make an easier, better approach to old and new customers. They are designed for you and bear your name and that of your partner, the recognized manufacturer. Regular follow-up with post cards pays good dividends. You need mail only a few each day to assure getting extra service jobs and other new sales next week. Manufacturers supply follow-up cards in sets so you never need to mail a duplicate message. The cost is usually the cost of the postage only. All you need to do is to address a few regularly and drop them in the mail box.

A few names from your regular list of customers and some good prospects should be addressed at least once a week and preferably every day. Remember it costs only a penny or two to hire the postman to open a door for you. Once the door is opened you may discover a new service job or a new set customer.

### Keep Regular Customers Sold

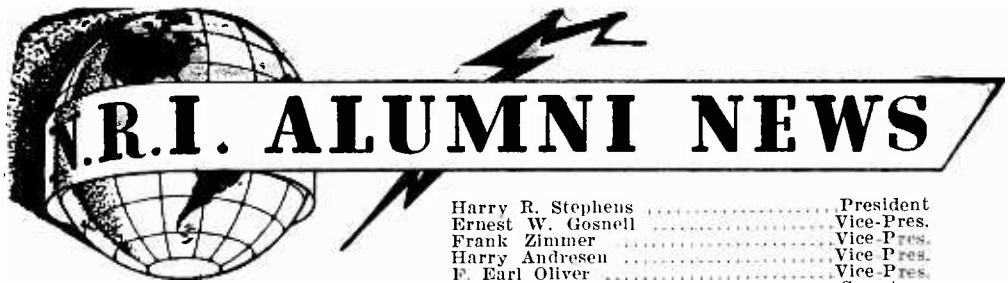
Send a cordial signed letter to all of your regular customers once or twice a year. In this way you can introduce something new in the service you offer. A letter designed to sell a full complement of new tubes will up your tube sales now. Cooperating manufacturers will be glad to have their advertising specialists suggest the kind of messages that are timely and sell goods and service.

### Leave Something To Remember You By

When you call on your customers in the home, make it a point to more than merely do your job and go. Always leave the customer with something else to remember you by. The possibilities include book matches, mechanical pencils, imprinted informative literature, imprinted calendars, and many other favors that will amply repay you in sustained good will and new business. Few people can resist the lure of something for nothing, particularly when it is useful. Favors help tear down sales-resistance and keep your name before the customer for months to come.

Let the manufacturer help you merchandise your goods and services in all of these five simple, basic ways. Look to him regularly for new ideas and attractive promotion material packed with "sell." Most of it is obtainable gratis or at very nominal cost. It will help you promote your business regularly and efficiently. Make that number one post war resolution now. Resolve to make the most of promotional material offered by your manufacturers and patterned to fit your business and the lines you feature.

*Editor's Note: Items referred to in this article are obtainable from Sylvania Electric Products, Inc., Emporium, Pa., and requests for free literature should be sent direct to Sylvania—not NRI.*



Harry R. Stephens .....	President
Ernest W. Gosnell .....	Vice-Pres.
Frank Zimmer .....	Vice Pres.
Harry Andresen .....	Vice Pres.
F. Earl Oliver .....	Vice Pres.
Earl Merryman .....	Secretary
Louis L. Menne .....	Executive Secretary

## Self Examination

**T**HOUSANDS of men breathe, move and live, pass off the stage of life and are heard of no more. Why? None were blessed by them; none could point to them as means of their redemption, not a line they wrote, not a word they spoke, not a deed they did could be recalled and so they perished. Their light went out in darkness and they were not remembered more than insects of yesterday.

Will you thus live and die : O man Immortal ! Live for something. Do good and leave behind you a moment of virtue that the storms of time can never destroy. Write your name in kindness, love and mercy on the hearts of thousands who come in contact with you year by year and you will never be forgotten. No, your name, your deeds will be as legible on the hearts you leave behind as the stars on the brow of evening. Good deeds will shine as brightly as the stars in heaven.—*Anon.*

## New York Chapter

Following is a resume of events at recent meetings of New York Chapter.

E. L. Williams designed and built a homemade tester which he explained in detail to members of the Chapter. Mr. Williams claims he can get all of the measurements he needs with this homemade instrument. It fits in his coat pocket and is very easy to handle. We have asked Mr. Williams to prepare a schematic so that we might send it to headquarters. It should be interesting to other members of the Alumni Association. Other speakers at this meeting were F. J. Nichols, H. Bockleman and C. Gomez—all members of our Chapter. They spoke on interesting Radio experiences. At this meeting it was decided to schedule a series of talks on troubles encountered in servicing record players, turn tables and record changers.

At another meeting James Newbeck, who has been ill for some time, resumed his talks on Frequency Modulation. E. L. Williams again spoke on his Radio experiences. Pete Peterson and Alexander Remer conducted the Questions and Answers part of our meeting. Mr. Remer injected a new idea—he called on two of the members to tell of their unusual experiences in Radio. These discussions were very interesting and upon conclusion of each, Mr. Remer presented the speakers with an envelope containing a small gift. The recipients were Lloyd Jonassen and Daniel Phillips, both very good speakers. The thought in back of this feature is to allow the members the opportunity to use the microphone and thus become accustomed to speaking to large groups. Incidentally our attendance during recent meetings has been from 49 to 60. At each meeting a number of new members are accepted.

We were delighted to have our former Chairman Ralph Baer visit with us. Mr. Baer is still in the service but expects his discharge very soon and will be back with us as a regular. It was good to see him again. In this connection it is nice to report that a considerable number of our members who have been in the service are now back with us.

At still another meeting Morris Friedman gave a talk on Routine Radio Servicing. Richard Patten, a recent graduate, gave a talk on adapting a Milliammeter for various purposes. William Fox entertained us with some amusing Radio servicing experiences.

At our most recent meeting Mr. N. Polsky, a member of the Alpha Meter Service, gave us a talk on Meters in General. Frank Nichols spoke on the importance of remembering faces and names. People like to be called by name. Mr. Nichols emphasized the good-will value of knowing our

customers and making them feel that their business is appreciated. At all meetings we conduct our Questions and Answers which is always very interesting, under the able leadership of Pete Peterson and Alexander Remer.

All students and graduates who live in the Metropolitan area are earnestly invited to attend our meeting and join our Chapter. The association with our members, in itself, is bound to be beneficial. We meet on the first and third Thursday of each month at 8:30 p.m., at St. Mark's Community Center, St. Mark's Place between 2nd and 3rd Aves., New York City. Do not confuse this street with one similarly named in Brooklyn. Remember we meet at 12 St. Mark's Place, in New York City.

LOUIS J. KUNERT, *Secretary.*

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## Baltimore Chapter

Larry Arthur our effervescent Vice Chairman, gave us a fine talk on the Oscilloscope and its uses in Radio servicing. He brought in his own "scope" and a Radio and put the instrument to work explaining all features as he went along.

At another of our meetings, Mr. John Gough, who is endeared to us through his long membership in our Chapter and his inspiring personality, acted as secretary, and did a good job of pinch-hitting. Mr. Gough can always be depended upon for a good talk.

Chairman Rathbun spoke on Colorama Tuning. After the talk Mr. Rathbun asked for questions and the discussion proved very interesting.

At each meeting, after the business is quickly disposed of, someone is selected to give a talk on some difficult Radio points. This paves the way for an informal discussion to follow. Usually these talks are built around a Radio receiver which is brought in for servicing.

We are very glad to report that a number of new members have joined our Chapter. Our attendance has been very satisfactory.

At our last meeting Chairman Rathbun talked on servicing AC-DC receivers.

There is no reason for any student or graduate to feel backward about paying us a visit or joining our Chapter. Our members are all regular fellows striving to further their Radio knowledge as well as to get some wholesome fun out of each meeting. There is strength in numbers, so why not come in, help our Chapter, and thereby help yourself.

P. E. MARSH, *Secretary.*

## Phila-Camden Chapter

For the most part our meetings have been devoted to actual radio servicing under the guidance of Harvey Morris, John Biaselli and Chairman Ed Rood. Our meeting place is usually filled with "ailing" Radios looking for the right doctor to get them in shape.

The Chapter is purchasing some new testing instruments. A committee is also looking into the possibility of getting a new metal cabinet to house our present and future equipment.

We have formed a Program Committee composed of Harvey Morris, Charles Fehn, John McCaffrey and John Biaselli. This committee will plan our programs and give us a good track to run on.

It should be mentioned that past President Charles Fehn is usually on hand doing whatever he can to help keep things moving. Charlie has been a great help to our Chapter as well as to our National Organization.

We shall be very glad indeed to have NRI men in this locality come to our meetings. They are held on the first and third Thursday of each month in the Post Office Building at 4706 Comly Street. Our meetings begin promptly at 8:30. Please remember the time, days and place.

F. ARMSTRONG, *Secretary.*

## Detroit Chapter

Floyd Buehler, recently returned from the Service, where he served as an instructor at a Radio Electronic and Television School, spoke on the subject "Radio as Used in The U. S. Navy." We are all happy to have Buehler back with us.

Lessons number seven and eight of the NRI Fundamental Course were discussed at some length. It is our program to discuss one or two lessons at each meeting until we have covered the entire Fundamental Course. These discussions are very interesting and beneficial.

Right here we want to mention that we have decided to hold our big annual party on Wednesday, June 19, at Huck's Inn, 25241 Grand River Ave., Detroit. Members will receive a written notice from the secretary. Our Executive Secretary, Mr. Menne will come from Washington to attend this party.

At another meeting we again discussed the lessons of the Fundamental Course. This time we were led by Messrs. Hazen, Clow, Upham and Paterson. We also showed three reels of movies—one explaining the use and manufacture of Radio tubes and the other two showed the use of Radar in the Army. These films were presented to our members through the courtesy of Engelman's Visual Educational Service.

Vice President F. Earl Oliver, one of our members of whom we are very proud, gave us a talk on Ohm's and Kirchoff's laws. Larry Upham, Homer Burns, Duncan Jacques and Chairman James Quinn also spoke at this meeting. Talks pertained to present Radio information in line with the subject matter of the NRI Course. This manner of handling Radios at each meeting is very beneficial to our members and is proving very popular.

The Committee on Arrangements for the annual party to be held on June 19 made a report. Look for further information by mail.

It is customary for Detroit Chapter to suspend meetings during the months of July and August. The last meeting in June will be held at our Headquarters, 2500 Joseph Campau, Northwest corner Vernor Highway, through the courtesy of our own John Stanish who conducts his business at this address.

V. O. GUYTON, *Secretary.*

## Chicago Chapter

Since our last report, Chicago Chapter held one of its social parties which, as usual, was a complete success.

Our meetings are being held at 100 North Central Park Ave. However, we are still in search of a more desirable meeting place. It is suggested therefore that those in this area who are interested in joining our Chapter or visiting with us, send a postcard with name and address to the undersigned Secretary so that they may be notified of date and meeting place. Meetings are held every month.

Vice President Harry Andresen is working very hard to solve the meeting place problem which will enable us to set up a work bench and thus do actual Radio servicing. Any NRI member in the Chicago area who knows of a store or hall which would make a good meeting place for our Chapter will do us a distinct favor by writing to the undersigned secretary or to National Headquarters. The secretary of the Chicago Chapter should be addressed at 1225 West Lunt Ave., Chicago 26, Ill.

HARRY COLTUN, *Secretary.*

## Let's Go, America

Through personal contact we know that Radio men have a good friend in Senator Alexander Wiley of Wisconsin. Senator Wiley is strong for the small business man and is giving his support toward breaking the bottleneck that is keeping supplies from moving to dealers' shelves. More power to him.



## Here And There Among Alumni Members

F. Stuart Godfrey who conducts Godfrey's Radio Service in St. Johns, Michigan, sponsored a bowling team in the city league. The Godfrey Radio Service rollers ended the season in third place. By the way, William Mueller of NRI Alumni is with Mr. Godfrey.

Speaking of teams, these two are going to town in a big way.

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*H. W. Thomas, who is affectionately called "Pop" by his many friends, is manager of the Amateur Department for Shuler Supply Co. in New Orleans, La. Pop Thomas spent three years and four months with the Army Air Corps as a Tech Sergeant, Radio repair man, on Air Borne equipment.*

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Joseph Damroth of New York City is back home after a long siege in the Pacific where he took part in several of the major campaigns. Damroth is a member of New York Chapter and says he came back to a bigger and better organization than when he left—at which time it was plenty good.

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*Joseph Bobalick of Weirton, West Virginia passed the examination for a Second Class Radiotelephone license and he is now preparing to take the exam for a First Class license.*

— n r i —

F. F. De Sano of Timmins, Ont., Canada, sent us an entire series of pictures showing his shop, his store front, some of his gals and pals, his mother with a pleasant smile, and De Sano, at play on a golf course. All very fine; know which we like best? Mother! It's Mother every time.

— n r i —

*Harold Durham, originally of Oklahoma City, Okla., has had quite an interesting experience. At Oklahoma City he was on the staff of KOCY. Later he went to WGRC at Louisville, Ky., as control operator. Then back to KOCY in Louisville as Chief Engineer. There he also served as Musical Director and Production Manager. With such a fine experience it is no surprise to have Mr. Durham pop up at Hollywood, Calif., as Studio Field Engineer for the American Broadcasting Co.*

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We were honored at NRI by Mr. Charles Williamson, who visited us while in Washington on business. Mr. Williamson was three times Mayor of Trenton, Michigan. He is well acquainted with Ray Fouke, who has a prosperous Radio business in Trenton. Also knows Val Guyton, Secretary and other members of Detroit Chapter. Mr. Williamson promised to attend a Detroit meeting, as a guest. A grand man who has done much for the State of Michigan.

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*Harold C. Miles of Lewis, Kansas, has been enjoying an ever-increasing Radio business in his full time shop. His parents were not able to help him, even through school. He worked one-half day and went to school one-half day, thus taking five years to graduate from senior high school. He wanted to be better than a common laborer. Applied himself just as diligently to the NRI Course. He is now able to hold his head high in the business world. You've got to hand it to a fellow like that.*

— n r i —

J. L. Daigle of Istrouma, La., a suburb of Baton Rouge, is in the Radio business with his brother E. J. Daigle. They have a very snappy business card, printed on both sides. One side is a "teaser" suggesting that the reader look on the other side, which he can hardly resist doing. There he finds the Daigle boys business card.

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*J. S. Kimball of Los Angeles, Calif., gets mention here for a much appreciated letter. Thinks we helped him a great deal. He made good use of his Radio training while in the service. Got several promotions. For all such letters—thanks fellows—our part was small. It was you who did the big job—and how.*

— n r i —

A grand snapshot from W. L. Hutchinson, jr., of Worcester, Mass. Doing a nice spare time Radio business. Good looking bench. You will hear more about this live wire.

— n r i —

*Arley Studyvin of De Soto, Mo., wrote to us about three years ago, regarding a building he was planning to put up. No further word from him until a few weeks ago. Has that fellow been doing things! A swell building, housing his Radio Servicing business, a gasoline station in connection, with ten acres of ground for expansion. All through the war Mr. Studyvin handled the business with only the aid of his wife. His son was a Radio Technician in the Navy. Mr. Studyvin serviced approximately 6,000 Radio receivers since Pearl Harbor. Knew nothing about Radio when he enrolled with NRI in 1935. And has he got plans for the future! Watch Studyvin of De Soto, Mo.*

— n r i —

From San Francisco comes a good report from C. E. Corbin, who has a full time Radio business. Riding high now but knows what it means to drift from job to job which is what he did for fifteen years. After completing the NRI Course he immediately took a full time Radio job. That was in March, 1942. In November, 1944, he started his own shop. Things look mighty good for Corbin.

— n r i —

*Chester J. Gromacki of Providence, R. I., is Monitoring Officer for F.C.C. Good booster for NRI.*

# NEWS OF THE RADIO WORLD

BY

*Willard R. Moody*

**A manufacturer of metal cabinets** recently installed resistance welding with electronic control—to replace other forms of fabrication. Here's what was saved out of the fabrication method in one year: 600 tons of steel, 10,000 man-hours of labor, 3000 pounds of welding rod. The total saving amounted to \$100,000. The resistance welding, with precision electronic control, permitted use of lighter gauge stock—with strength and power maintained. Resistance welding control is but one of the many ways electronics is serving industry as a production tool—aiding fabrication, cutting costs, improving products. Electronic control for resistance welding equipment provides accurate control of welds.

**Experiments have been carried out** to sterilize meats suspected of harboring virus of the hoof-and-mouth disease. Several schemes have been tried. Dielectric heating for a short time immediately prior to freezing seems to give satisfactory results. Bones, fats, sinews, and red meat, however, all have different dielectric qualities and so each of them have different heating requirements. If this hurdle can be overcome, we may see the pasteurizing of meat become another of the expanding electronic industries.

**DuMont Television Engineers**, who have designed and built more television stations than any other company, will soon complete the world's largest Television installation. They are now transforming more than five hundred thousand cubic feet of the great John Wanamaker Store in New York into the first "Television City."

**An interesting development** in emergency communications is a new mobile transmitter and receiver designed for selective calling operation. That is, each mobile receiver is equipped with a vibrating-reed relay which, when an audio note of its particular frequency is received, turns on the output tube. No signal, unless preceded by the transmission of the special audio note, can operate the loudspeaker.

**The General Electric Company** has developed a microwave relay system for television and F.M. operation on 2000 megacycles! The relay system eliminates costly wire lines. It uses a low-power microwave F.M. transmitter, a microwave F.M. receiver, and a highly directional transmitting-receiving antenna system which gives each watt

of transmitter power the effectiveness of approximately 1000 watts.

**A new RCA Electronic system**, using high frequency current for the bulk reduction of purified Penicillin, accomplishes in thirty minutes what formerly took twenty-four hours. The apparatus operates on the induction heating principle, using an r.f. power generator.

**New Electronic induction** heating equipment permits handling a wide range of material and work sizes for the heating of plastic, rubber, rubber substitutes, wood, glue, and permits defrosting frozen foods. The apparatus also has great possibilities in the sterilization of pharmaceutical and similar products.

**A 200 megacycle multiple relay television network** now connects Washington, D. C., and Philadelphia Tele-Broadcast Station WPTZ. The installation was made by Philco Engineers.

**Sound waves**, which have been used for various scientific jobs in the past, now are employed in modern Electronics to check the quality of women's hosiery yarns. The sound waves are used to check the elasticity of a yarn. A 10,000 cycle sound wave is used.

**Film companies** are interested in Television. Recently, the Twentieth Century Fox Film Corporation asked the Federal Communications Commission for permission to erect an experimental video station in Boston, Massachusetts.

**Doctor Morton C. Kahn** of Cornell Medical College, together with two associates, has investigated mosquito control. Unsuspecting female mosquitoes have had their private lives invaded. Their love call has been amplified in high gain audio amplifiers and permanently embedded in phonograph records! Loudspeakers placed in mosquito traps will blare forth this call, bringing all males within range into captivity and preventing further reproduction of the species.

**No wonder standard tubes were scarce** during the war. Toward the end, five tubes were going into each of the 100,000 proximity fuses being produced daily. That took about one-half of our total tube production.

## NRI Alumni Pin Again Available

In response to many requests from Alumni members, we arranged for a new supply of Alumni pins. During the war it was difficult to get these pins but now, after a long delay, a supply is again in stock.

This pin is made of gold plated brass and has a good safety clasp. It is well constructed. The design is a reproduction of the seal of the NRI Alumni Association. The pin may be worn on the coat or vest.

This pin may be purchased only by members of the Alumni Association. It is sent postpaid for \$1. To order, all you need to do is write a brief letter requesting that you be sent the Alumni pin and enclose \$1.

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## The Great American Family

The Father of Success is Work.

The Mother of Success is Ambition.

The Oldest son is Common Sense.

Some of the other boys are Perseverance, Honesty, Thoroughness, Foresight, Enthusiasm and Cooperation.

The oldest daughter is Character.

Some of her sisters are Cheerfulness, Loyalty, Courtesy, Care, Economy, Sincerity and Harmony.

The baby is Opportunity.

Get well acquainted with the "old man"—Work—and you will be able to get along pretty well with all the rest of the family.

From *The Management Review*, February, 1946.

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## Coming Events Cast Their Shadow



No, no, Mike, wait!—not yet.

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# NATIONAL RADIO NEWS

FROM N.R.I. TRAINING HEADQUARTERS

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