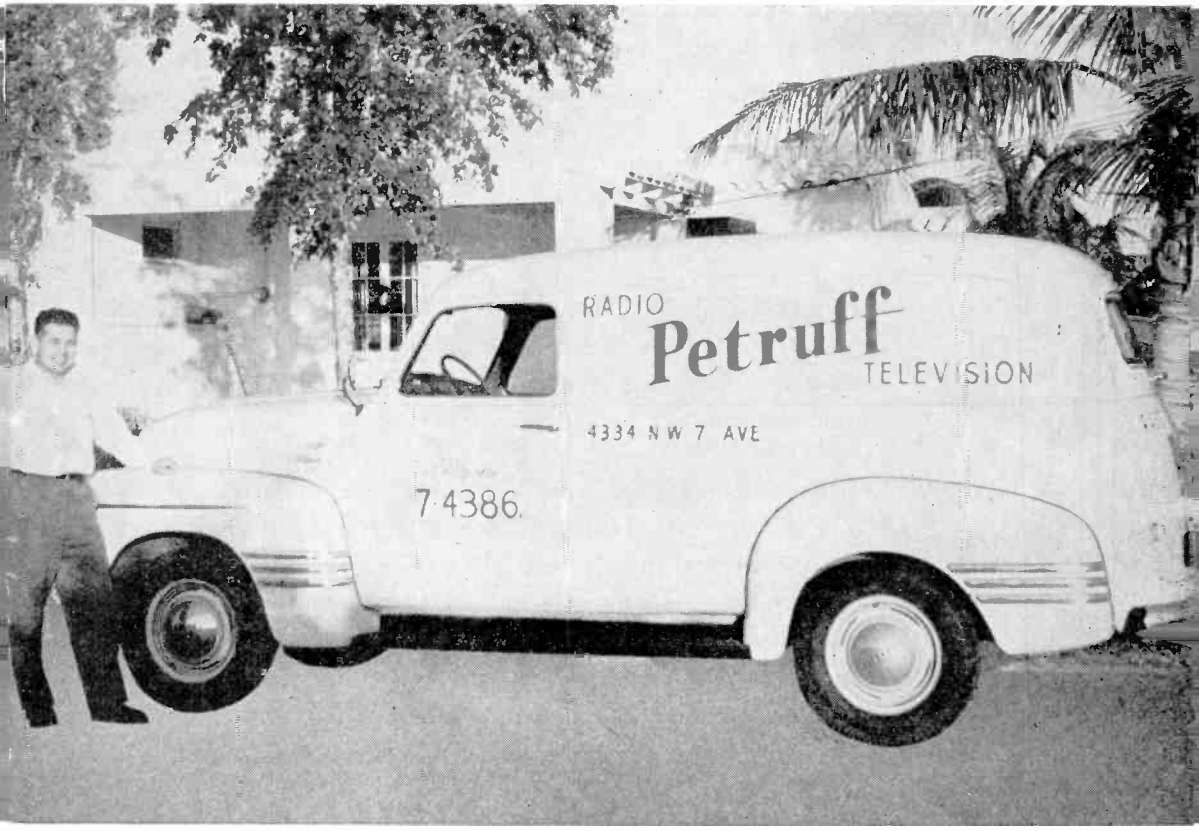
National RADIO-TV NEWS



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Jot It Down

EVERY MAN is ambitious. Every man wants to develop his mind. The great trouble with most of us is that we study hard but we do not do it systematically. We do not pause often enough or long enough in our reading to affix impressions upon our minds. We rely too much upon memory instead of stopping occasionally to make notes.

Robert Louis Stevenson carried two books with him always—one to read and the other to write in.

Keep a note-book. Jot down in it each idea, each thought you want to retain. The mere act of making a note tends to fix the thought permanently on our minds. Writing clarifies thinking and aids in concentrating on a subject.

Learning is essentially a process of transferring to the mind that which you read. But no mind can fully absorb everything in a text-book even when read several times in the ordinary manner. To read a text-book is one thing; to study a text-book is something entirely different. Each passage has one or more important facts; locate these, and jot them down in condensed form in your note-book. The act of condensing an idea into a few of your own words, then writing these words will invaribly fix the idea in your mind, there to stay for all time.

Memory is fickle—never rely entirely upon it for the preservation of important ideas. Try writing out things you want to remember; try this for a while, and see how much easier it becomes to master what you read.

J. E. SMITH, *President.*

J. B. Straughn

GENERAL TUBE INFORMATION

By J. B. STRAUGHN

NRI Assistant Director of Instruction

BEGINNERS in Radio and even experienced men often write in asking the meaning of the suffix on tube numbers such as G, GT and GT/G. A short review of pertinent facts about tubes will clear up this and other questions which naturally arise. Let's consider the various types of tubes usually encountered by servicemen.

Lock-in Type Tubes

Single ended tubes of lock-in construction have been used in special equipment for a number of years. These are small "All-glass" tubes, without the familiar bakelite base. The contact pins are sealed into the glass bottom, thus eliminating soldered connections. This type of construction permits single-ended operation, as no top cap connections are present, and provides compactness, suitable shielding, and a special lock-in feature. Numerous types are especially suitable for use in UHF applications because of low lead inductance, low inter-electrode capacitance, and low dielectric losses. The lower portion of the tube is fitted with a metal shell and guide pin. This unit acts as a shield and makes possible the lock-in feature by employing a groove around the bottom of the locating pin which fits into a catch on the socket.

A typical Loctal or Lock-In type tube. Note the metal base and locating lug.

The locking arrangement holds the tubes in the sockets securely, assuring good contact at all times. Removal of these tubes from their sockets may be somewhat difficult when done by direct upward pull. With a slight offside pressure, the socket lock is released and the tube is readily removed.

These tubes are not directly interchangeable with other designs of receiving tubes because of the socket requirements. In many instances the electrical characteristics and applications are similar to other well-known types.

This is a typical metal tube. A bakelite base and locating lug are used with a possible maximum of eight pins.

Lock-in tubes will be found in home receivers and in many three-way portable and auto receivers. They are particularly valuable in auto sets since the jarring received during operation in a car does not cause them to jump out of their sockets.

Metal Tubes

Metal tubes are somewhat smaller than the regular types of glass tubes. The bulb or shell diameter is 1" except at the base where the maximum diameter is 1 5/16". The shell is all metal and the lead wires are brought out through the "Header," which seals the shell at the bottom. The shell is connected to a base pin and operates at ground potential to eliminate any danger of electrical shocks. Also, the shell serves as a shield. An octal base is provided and the over-all length of the tube is reduced

This is a sample of a regular tube. A standard bakelite base is employed, and for this rectifier tube only four base prongs are required. In other regular tubes you may find five, six, or seven prongs on the tube base, depending on the number of tube electrodes.

over the similar, but not inter - changeable glass types which preceded them.

The octal base has provisions for eight pins uniformly spaced. Where fewer than eight pins are required, they are omitted and the spacing of the remaining pins is unchanged. The pin numbering is in accordance with the RTMA standard numbering system. In this system, numbers are assigned to each of the eight possible pin positions. Numbering begins at the shell connection, which is always the first pin to the left of the locating lug when the base is viewed with the bottom of the lug toward the observer. The direction of numbering is clockwise on the basis of possible pin position.

G, GT, And GT/G Tubes

Tubes are often classified according to their general design and construction. Lock-in and metal tubes have been briefly described. The so-called "Regular" glass types are characterized by the style of the glass envelope and particularly by the standard bakelite base equipped with 4, 5 or 7 pins as required, and the absence of any locating base lug.

G type tubes are glass tubes which are, in most cases, identical or very similar in operating characteristics to many of the regular types. The bases are of octal design with a bakelite locating lug while the top caps, if required, are of the miniature style. In these respects the G tubes resemble metal tubes.

A smaller version of the G tube is the GT style designed for use where tubes of this size are desired. For most GT tubes the characteristics are essentially the same as for the G type equivalent. All GT tubes are equipped with octal bases and a tubular bulb is employed. The suffix GT is derived from the base used on G tubes and the tubular T style bulb. Reduction in physical size is secured through the use of a shorter stem.

Because of the similarity in characteristics betwen G tubes and the corresponding GT types it is usually possible to inter-change GT for

This is a standard G type tube using a glass envelope and a bakelite octal base. This tube is interchangeable with its metal counterpart, the type 6L6.

G tubes and vice versa, if space permits. Consequently, many G types have been discontinued as such, the GT style adopted, and the tubes bulb-etched GT/G.

Two kinds of octal bases are employed on GT and GT/G types. Rectifier and output tubes are equipped with an all bakelite base as on G tubes. Converters, rf and i-f types have metal shell bases, that is, a combination of a bakelite wafer to which is fastened a metal shell which is cemented to the glass bulb. The metal shell serves as a part of the shielding and is connected to pin number 1. This arrangement often permits GT/G or GT tubes to be substituted for equivalent metal types. Slight re-alignment of tuned circuits may be required to secure correct performance. If oscillation occurs when GT/G tubes are substituted for their metal equivalents additional shielding may be necessary. This may be easily accomplished by slipping an external shield over the bulb so the shield is in contact with the metal shell. Other GT/G types may have one or the other style of base described above, this being optional with the manufacturer.

Miniature Tubes

One of the recent trends in radio tube manufacture is the reduction in size of the tube required for given performance. The group of tubes known as miniatures are good examples of the results which may be obtained with the new, small bulb. Many of these types are particularly useful at high frequencies because of the short leads and the absence of the old style insulation between the leads.

Battery Tubes

There are two general groups of battery tubes: The group designed for 2-volt operation and the newer group of 1.4 volt types. The former are now employed primarily for replacement purposes in older receivers. The latter both in GT/G and Lock-in construction are widely used in all forms of battery receivers and several of their special features are outlined below.

The 1.4 volt group of battery operated miniature type tubes is of particular interest because of the economy afforded in power supply requirements and the reduction in space which is

A GT type rectifier tube found in many AC-DC receivers. Although it uses the same type base as the type 6L6-G, note the difference in the envelopes.

possible. These tubes have been designed especially for economical operation, non-microphonic action and long life. With the exception of the output types, the tubes are designed for zero bias operation, simplifying circuit applications and reducing stray couplings to other circuits to some extent.

Since these tubes are of the directly heated filament type there may be some small variation in contact potential which, in some instances, may result in slight variations in sensitivity between tubes of the same type if the grid return is made directly to the negative side of the filament. It is recommended that a resistance of at least 0.5 megohm, suitably by-passed, be connected between the grid return and the negative side of the filament. If these tubes are employed so that avc voltage is applied to the grids, the resistors used for isolation and diode loading will be sufficient.

Since the filaments employed in these tubes are made of extremely small diameter wire, some precautions may be necessary to prevent vibration of the filament resulting from acoustic and

This handful of miniature tubes is used in a battery operated superheterodyne. With the addition of a selenium rectifier, AC-DC or battery operation is optional. The AC filament miniature tubes are the same size as the battery types shown here

mechanical feed-back from the loudspeaker through the chassis to the tubes. Because of this it is preferable not to mount the speaker directly on the chassis. A further point to bear in mind is the fact that the permanent magnet of the speaker may produce a strong magnetic field which can interfere with the electron stream in tubes that are in close proximity to the magnet. Set designers, of course, take this into consideration when laying out their chassis.

The information in this article is based on material appearing in the receiving tube manual published by Sylvania.

n r i

A Tip on Dial Cord Troubles

"I have been in the radio repair service for some time, even before my graduation from NRI in 1943, and I would like to tell of my experience with dial cords and belts, as it may be of some help to someone else.

"I keep a cake of beeswax on my bench, and before putting in a new dial cord, I draw the cord across the wax and also rub the wax on slipping dial cords and belts. I never have any trouble after this treatment and I have tried most of the commercial preparations without such good results. Another use I have found for the beeswax on my bench, is for holding small screws on the end of the screwdriver when reaching into out of the way places and holding nuts on spinnet wrenches, under the same circumstances. (Never use any wax but beeswax, as it is not the same.)"

GRAD. SAMUEL B. FOSTER
East Marion, L. I., N. Y.

n r i

Job Opportunity

We understand that a civil service position is open with the Treasury Department in Washington, for a person qualified to maintain an electronic machine used to count cancelled money. The job is a GS-7 grade, starting at $3795 a year. For further information write to Mr. O. L. Bush, Personnel Officer, Bureau of Public Department, Treasury Department, Washington, D. C.

n r i

TV Serviceman Wanted

A progressive RCA Dealer in Clarksville, Tenn. is very much in need of a steady, experienced Television serviceman. The job will pay about $500 a month, according to Graduate F. B. Roberts, P. O. Box 1030, Nashville 1, Tennessee, who will be glad to have interested and qualified men write to him.

B. van Sutphin

BUILDING AND USING A TV LINEARITY PATTERN GENERATOR

By

B. VAN SUTPHIN

NRI Consultant

IN the early days of Television broadcasting, most TV stations transmitted a test pattern four or five hours each day. There was no major network service for TV programs, and consequently the stations had lots of time for test patterns.

The picture has changed. Now that the TV "soap-operas," and daylight quiz shows have become the rage, the test pattern has been almost deleted from the program schedule. In some places it is virtually impossible to find a test pattern unless you get up at six o'clock on Sunday morning!

However, TV receivers still require adjustment, and some type of test pattern must be available to satisfactorily adjust the receivers. To solve this problem, various manufacturers are making linearity pattern generators. These generators give a pattern of vertical bars, or horizontal bars, on the screen of a TV receiver so that the horizontal adjustments and the vertical adjustments can be properly set.

This article describes a linearity pattern generator that can be easily constructed. It is not absolutely necessary to follow the somewhat unique panel arrangement suggested below for constructing this equipment. However, the author found that this lay-out gave best results with minimum inter-action of the operating controls.

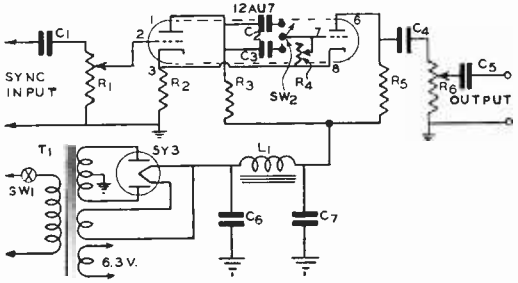

Fig. 1

Fig. 1 shows a schematic of the linearity pattern generator. Basically, the unit is a cathode-coupled multivibrator with two coarse frequency ranges. By changing the setting of switch SW_2, you can obtain either vertical bars, or horizontal bars. Also, you can vary the number of bars with the fine FREQUENCY control, resistor R_4.

The sync input circuit is provided to synchronize the generator frequency with that of the receiver under test. This is necessary in obtaining vertical (high frequency) bars. The "hot" lead of the sync input circuit is connected to the horizontal sweep chain of the receiver so that the two oscillators are locked together. This produces an unvarying pattern of vertical bars on the screen.

The basic stability of the oscillator used in the linearity pattern generator is sufficient to produce satisfactory horizontal (low frequency) bars on the screen of a TV receiver. It is not necessary to synchronize the receiver vertical sweep oscillator with the linearity pattern generator.

The mechanical arrangement of the panel and the chassis is somewhat unorthodox, and it would be well to discuss this further. No chassis —in the normal sense of the word—is used. Instead, two metal panels are mounted parallel, one behind the other with space between the two panels for all components. The circuit com-

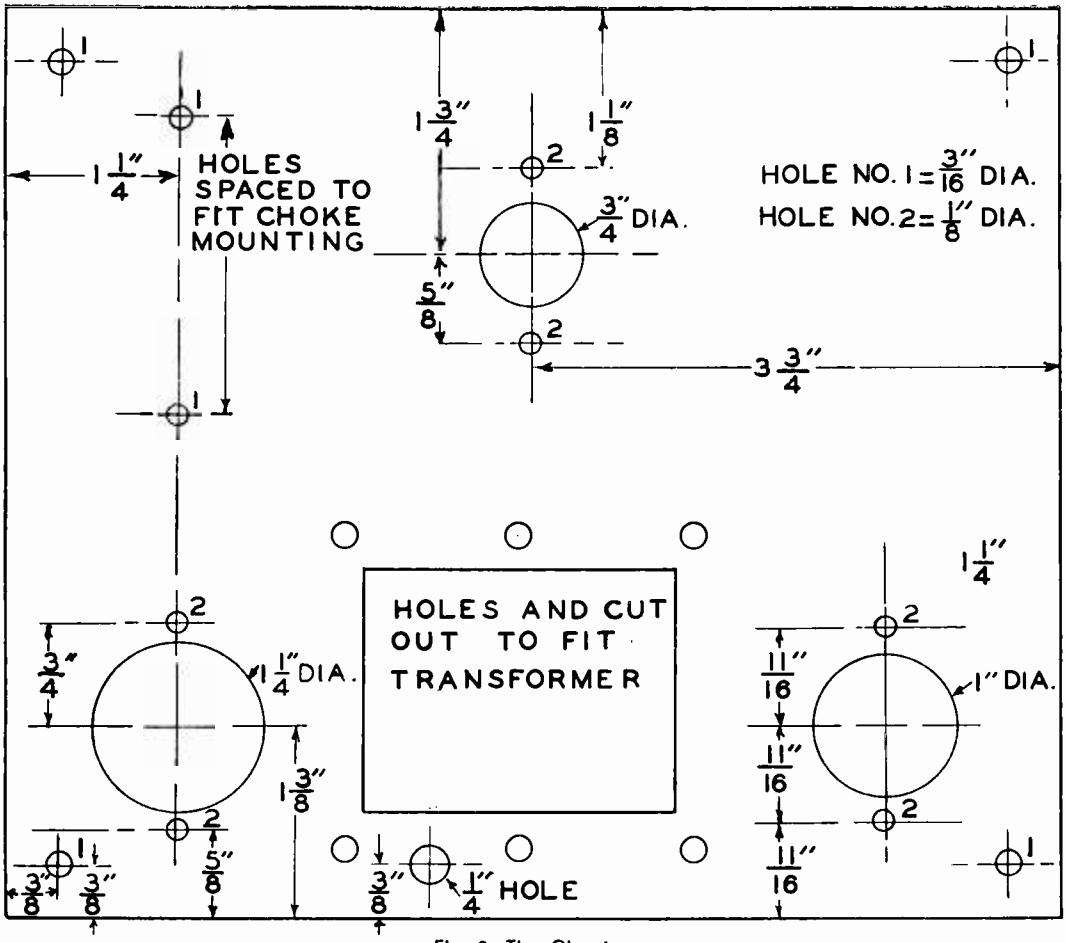

Fig. 2. The Chassis.

ponents are mounted on one of these metal panels; it is labeled "chassis" in the following drawings. The operating controls are brought out to the front of the other panel, and this is called the "panel." Special mounting procedures will be necessary for certain parts, but that will be discussed a little later.

First, obtain two 6½ by 7½ inch pieces of aluminum. One of these will be used for the chassis and the other for the panel.

Cut the chassis as shown in Fig. 2. You will have to check the mounting centers of the choke that you select for use in the device before drilling the mounting holes. Also, you will have to check the mounting centers on the transformer before drilling those holes, or making the cut-out. Make the transformer cut-out sufficiently large so that the winding of the transformer will fit through the hole when the cover of the transformer case is removed.

Be sure to check the position of every hole. The appearance of the finished product depends upon the care that you exercise in drilling and cutting the chassis and panel. When all of the holes in the chassis have been cut and checked, you are ready to begin constructing the unit. First, lay the chassis before you in the same position that is shown in Fig. 2. That is, the 1¼" diameter hole in the chassis should be on your left.

Mount the 9-pin socket in the ¾" hole with the blank space of the socket pointed down (solder lugs facing up toward you). Put an insulated single-lug terminal strip under the lower mounting bolt, and a solder lug under the upper

mounting bolt.

Mount the octal socket in the 1" hole with the key of the socket pointing down. Put a solder lug under the lower mounting bolt.

Mount the METAL wafer for the filter condenser in the 1¼" hole. Put an insulated single-lug terminal strip under the upper mounting bolt for the wafer, and a solder lug under the lower bolt. Be sure to use a METAL wafer in mounting the condenser.

Next, loosen the bolts on the transformer, and pry the cover from the transformer. (The cover is the metal shell through which the leads of the transformer DO NOT PASS.) Be careful not to pry the laminations apart.

Place the transformer on the chassis so that the leads are pointed at you, and the "hump" of the transformer protrudes through the cutout. Place the cover over the protruding section (on the other side of the chassis), and insert the mounting bolts. Position the transformer, and the cover, so that the mounting bolts will pass through the cover, the chassis, and the laminations of the transformer. Put the nuts on the mounting bolts and tighten them securely.

Put the electrolytic condenser in its proper place, and twist the tabs. All of the parts are now mounted, and you can begin wiring the unit.

Locate the 5 volt filament leads of the power transformer and connect them to pins 2 and 8 of the octal socket. Connect the plate leads from the power transformer to pins 4 and 6 of the octal socket.

Connect the 6.3 volt filament leads of the power transformer to pin 9 and pin 5 of the 9-pin socket. Connect pins 4 and 5 of the 9-pin socket together.

Connect the center tap of the high voltage winding to a solder lug that is mounted under one of the mounting bolts for the octal socket. Do not connect the primary of the power transformer. That will come later.

Connect a length of insulated wire from pin 2 of the octal socket to one of the lugs on the electrolytic condenser. Now connect the choke leads to each terminal of the condenser. The lug of the electrolytic condenser which is NOT CONNECTED to the rectifier will be called the filter output.

Connect pins 3 and 8 of the 9-pin socket together, and connect a 270 ohm/1 watt resistor between pin 3 and the grounded solder lug beside the socket.

Next, connect a 15K/5 watt resistor between pin 1 and the filter output. Also, connect a 10K ohm/5 watt resistor between pin 6 of the 12AU7 socket and the filter output.

Now, cut five 4 inch lengths of insulated wire. Connect the end of one of these leads to pin 8 of the 9-pin socket but leave the other end free. Connect one of the leads to pin 7 of the 9-pin socket. Leave the other end free. Connect one of these leads to pin 2. Leave the other end free. Connect one of the leads to the ground lug on the filter condenser. Leave the other end free. Connect one of the leads to the solder lug on the octal socket. Leave the other end free.

Connect one end of the 50-mmfd. ceramic condenser and one end of the .02-mfd./600 volt condenser to pin 1 of the 9-pin socket. Be sure that the leads are sufficiently long to reach the switch on the panel when the assembly is completed.

Next, connect a .1-mfd./600 volt condenser between pin 6 of the socket and the insulated lug of the terminal strip that is on the lower mounting bolt for the tube socket. Cut a 6 inch length of wire, and strip both ends. Connect one end to the lug of the terminal strip and leave the other end free.

Now, you are ready to work on the "panel." After the wiring on the panel itself is completed, the panel and the chassis will be bolted to one another, and the wiring completed between the two.

Place the panel before you in the same position that is shown in Fig. 3. Check the positioning to make certain that the ½ inch hole is on the right side of the panel. This is the BACK of the panel.

Mount the 1 megohm potentiometer with the switch attached in the ⅜" hole at the bottom right of the panel. Turn the potentiometer so that the three lugs are on the LEFT side. You will now be looking down on the potentiometer and switch with the shaft passing through the mounting hole, away from you.

Now pass the shaft of the remaining 1-megohm potentiometer through the ⅜" hole at the lower left of the panel and attach its mounting nut. Rotate this potentiometer so that the lugs are on the RIGHT, and tighten the mounting nut.

Next mount the tip jacks. Remove the fiber insulating washers from two of the tip jacks (the black ones) and mount these in the ¼-inch holes at the bottom of the panel. Then mount the red tip jacks in the the ⅜" holes, and be sure to use the insulating washers. After you have mounted these, use your ohmmeter to make certain that the red tip jacks are not grounded to the chassis.

Mount the remaining one megohm potentiometer

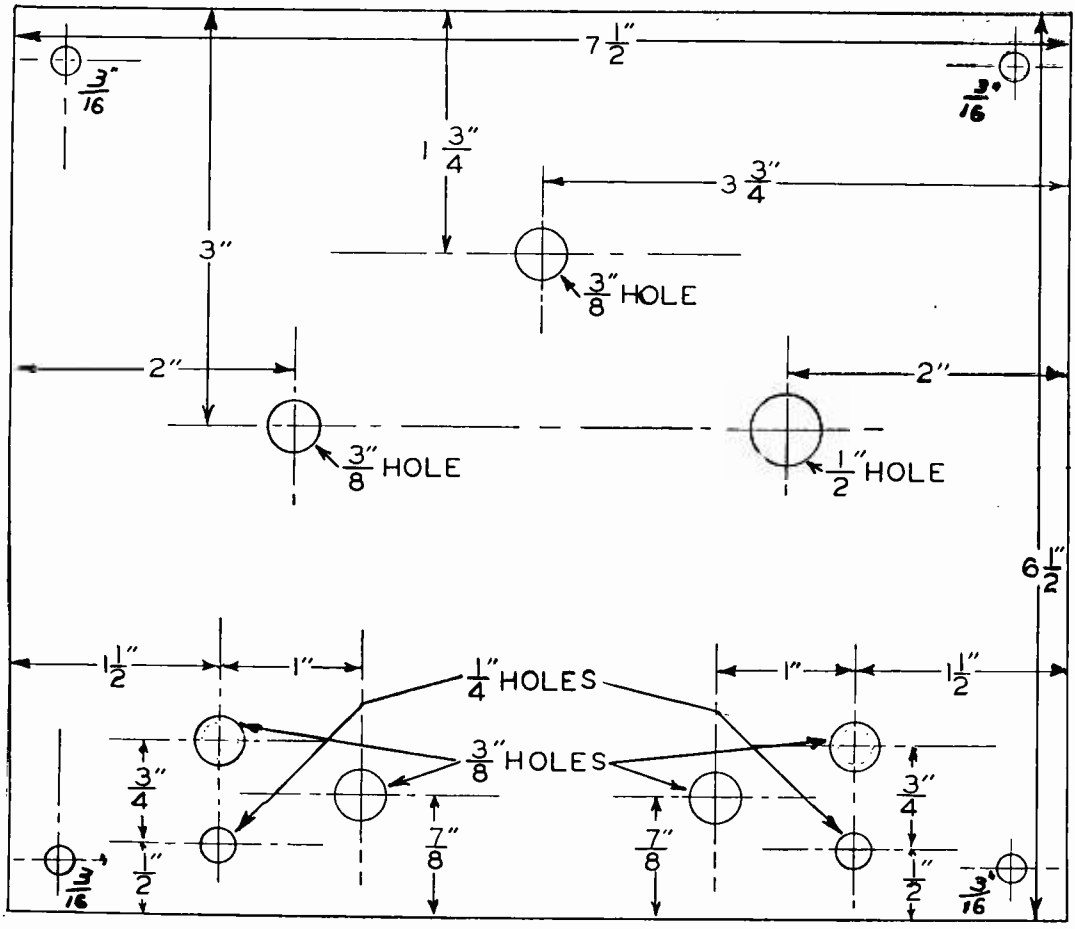

Fig. 3. The Panel.

in the ⅜" hole at the upper left of the panel. Turn the potentiometer so that the terminals are to the right.

Mount the pilot light bracket in the one-half inch hole so that the socket portion of the bracket is toward the bottom of the panel.

Mount the single-pole double-throw rotary switch at the top center of the panel. Rotate the switch so that the three lugs are at the top.

Now, check to make certain that you have the potentiometers and the switch mounted exactly as specified. The instructions for mounting the various parts will be given on the assumption that the potentiometers are properly oriented.

Connect a .1 mfd./600 volt condenser between the upper tip jack on the left of the panel, and the lower lug of the adjacent potentiometer. Then, connect the upper lug of this potentiometer to the lower tip jack.

Connect a .1-mfd/600 volt condenser between the center lug of the potentiometer on the right side of the panel, and the upper tip jack on that side. Then, connect a lead between the lower terminal of the potentiometer, and the lower tip jack.

Now, we are ready to mount the chassis and the panel. Obtain four 8-32 bolts 3-inches long, and four pieces of metal tubing, sufficiently large to fit over the bolts and 2¾-inches long. Be sure that the pieces of metal tubing are of the same length.

Turn the panel over so that the shafts of the various controls are pointed toward you, and

turn the chassis so that the lugs of the tube sockets are pointed toward the lugs of the panel controls. Then, put the bolts through the front of the panel, and put the tubing that will be used as spacers over these bolts after they have passed through the panel. Slide the tubing on to the bolt, and then run the end of the bolt through the corresponding holes in the chassis. Put a nut on each of the bolts and securely tighten all of them.

When the chassis and the panel are mounted together, the entire system should be rigid, and it should stand alone.

Now, look at the front of the panel for a moment, and mark the various controls according to the notations given in Fig. 4. The remainder of the construction data will refer to the controls according to their particular use.

Locate the lead that is connected to pin 8 of the 9-pin socket, and connect it to the bottom lug of the FREQUENCY control. Locate the lead that is connected to pin 7 of the 9-pin socket, and connect it to the center lug of the frequency control.

Locate the lead that is connected to pin 2 of the 9-pin socket. Connect it to the center terminal of the SYNC control. Locate the lead that is connected to the solder lug on the filter condenser. Connect it to the lower INPUT pin jack. Locate the lead that is connected to the solder lug on the octal socket. Connect it to the lower OUTPUT pin jack.

Bring the power cord through the ¼" hole that is under and to one side of the transformer mounting. Connect one of the ac input leads to the ON-OFF control that is on the back of the sync control. Connect the other lead to the lug of the insulated single-lug terminal strip that is mounted under one of the bolts of the electrolytic condenser wafer.

Now connect one of the primary leads of the transformer to the unused terminal of the ON-OFF switch and connect the other primary lead to the lug of the single-lug insulated terminal strip to which the power cord is connected.

Next, connect leads between the filament circuit of the 12AU7 (pins 4-5 and 9) and the terminals of the pilot light socket. Insert a 6.3 volt bulb into the socket.

Now, connect the free end of the 50-mfd. ceramic condenser to one of the remaining lugs on the VERTICAL-HORIZONTAL switch, and connect the free end of the .02-mfd./600 volt condenser to the other one. It is difficult to tell you which lug should be connected to each of these condensers because that will depend upon the particular switch that you use. However, you can

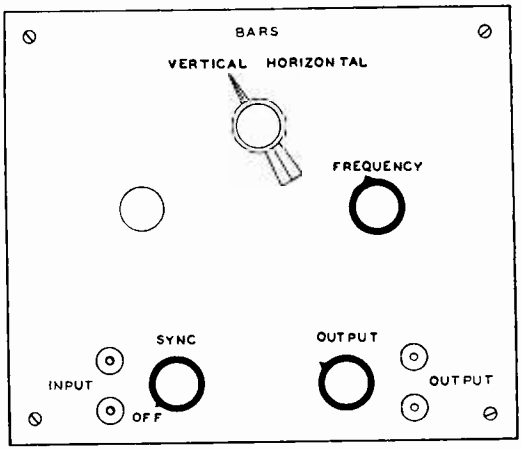

Fig. 4. Front view of panel.

easily change these two connections if you find that you have them connected backwards. If they are connected backwards, the HORIZONTAL position will produce vertical bars, and vice versa.

Now, you have completed the instrument itself. Check your work to make certain that all connections are securely soldered, and that you have not missed any connection. If you wish, you can check the actual circuit against the schematic given in Fig. 1. This is a sensible precaution in any construction project.

Using The Instrument

The fastest way of becoming familiar with the instrument is by actually connecting it to a TV receiver, and obtaining the necessary patterns.

Connect the ground lead of the instrument to the chassis of the TV set under test. Connect the "hot" OUTPUT lead to the input of the first video amplifier in the receiver.

Adjust the SYNC control of the generator to minimum; set the instrument to produce horizontal bars; adjust the output control until horizontal lines appear on the screen of the receiver.

You may find it necessary to adjust the FREQUENCY control of the instrument, or the vertical hold control of the TV receiver to obtain a steady pattern.

The number of lines obtained may be varied by adjusting the FREQUENCY control. When making vertical linearity adjustments on a TV receiver, you should use at least six lines, and preferably more.

To obtain vertical bars, leave the generator

connected as it was, and set the control to the "VERTICAL BARS" position. If you are unable to obtain a stable pattern by adjusting the frequency control of the instrument, or the horizontal hold control of the TV receiver, then a sync signal will be necessary for the linearity pattern generator.

Plug a lead into the "INPUT" jack of the instrument, and connect the other end of that lead to the grid of the horizontal output tube in the TV receiver. (This is not the top cap of the tube—the grid will be on the base of the tube socket, and can be located with the aid of a tube chart.) Now adjust the SYNC control and the FREQUENCY control of the pattern generator until a stable pattern is obtained on the TV receiver. By adjusting the FREQUENCY control, you can vary the number of bars.

Now that you have seen how the bars can be produced on the screen of a cathode ray tube, let's check the adjustment of the vertical sweep section in the receiver. Set the linearity pattern generator to produce horizontal bars (the sync input circuit will not be needed) and adjust the linearity pattern generator to produce seven or eight bars on the screen of the cathode ray tube.

If the height and vertical linearity controls of the TV receiver are properly adjusted, the bars will be evenly spaced.

If the bars are compressed or too widely spaced at the bottom of the picture, adjust the height control. If they are compressed or too widely spaced at the top, adjust the vertical linearity control.

By adjusting these two controls, you will be able to obtain a steady pattern having evenly spaced bars. If you wish, you can check the spacing with a ruler, but usually that is not required.

Now, set the instrument to produce vertical bars (as outlined previously) and notice the pattern that is produced. If the width control, the horizontal linearity control, and the horizontal drive control are properly adjusted, the bars will be evenly spaced across the screen of the cathode ray tube.

If the bars are not evenly spaced, it indicates that the width control, the horizontal linearity control, or the horizontal drive control is not properly set. Adjust the FREQUENCY control of the linearity pattern generator to produce about twenty bars on the screen. This large number of bars will make it easy for you to adjust the various controls.

If the left side of the pattern has the bars more widely spaced than the right side, it probably indicates that the horizontal drive control, or the horizontal linearity control needs adjustment.

Generally, adjusting the horizontal linearity control will affect only the left side of the picture. By adjusting that control, you can make the bars more widely spaced, or less widely spaced, on the left side of the picture. Also, the horizontal drive control will affect that side of the picture. Generally, adjusting the horizontal drive control will cause the first quarter of the picture to be wider, and the second quarter more narrow, or vice versa.

The width control primarily affects the right side of the picture. Adjusting this control will cause compression, or spreading of the bars on that side.

Video Testing

There are sets that use more than one stage of video amplification. When a complaint of "raster, no picture" is encountered on one of these sets, the trouble can be isolated to a specific stage by using the linearity pattern generator. By connecting the output of the generator to the plate, and then the grid of each of the video stages, you can check to make certain that a stage is operating.

If a pattern appears on the cathode ray tube when the output of the pattern generator is connected to the plate of a tube, but no pattern appears when the linearity pattern generator is connected to the grid, it indicates that stage is not operating. In this fashion, you can test all of the stages between the video detector and the cathode ray tube.

Generally, you can expect the instrument to have sufficient output to drive the cathode ray tube directly. This means that you can feed the output of the linearity pattern generator to the grid (or cathode) of the cathode ray tube and obtain a pattern. This is useful in checking a TV receiver when none of the video amplifier stages are operating, but a raster is obtained.

Also, you can check the screen by-pass condensers used in certain video amplifying stages by connecting the output of the pattern generator to the screen of the video amplifier tube. Generally, a pattern should not appear on the screen of the picture tube unless the output control is set to a very high level.

Gain Measurement

Relative gain measurements can be made in the video amplifier stages by using an ac voltmeter as an indicator, and the linearity pattern generator as the signal source. To do this, connect the output of the linearity pattern generator to the input of a stage, and use the ac voltmeter to check the output of the generator itself. Then connect the ac voltmeter to the output of the

amplifier stage, and again check the voltage. The output voltage divided by the input voltage gives the relative gain of the video amplifier at the frequency used. When making tests of this type, be sure that you do not overload video amplifier stages by setting the output control of the pattern generator too high.

Conclusion

This Instrument Will Be Useful to Anyone Who is Engaged in TV Service Work: Even those persons who do not regularly service TV receivers will find the instrument useful for those occasional jobs.

At the present time, it is frequently difficult to find a test pattern on the air. This instrument makes you free of test patterns. When you need a test pattern for adjusing a receiver, simply connect the linearity pattern generator to the receiver, and turn it on. It is as simple as that.

The parts necessary for building this unit can be obtained at your local wholesaler. NRI CANNOT FURNISH THESE PARTS. (See parts list below.)

Parts For Linearity-Pattern Generator

R_1—1 megohm potentiometer with SPST switch (sync)
R_2—270 ohms/1 watt
R_3—15K/5 watt
R_4—1 megohm potentiometer (frequency)
R_5—10K/5 watt
R_6—1 megohm potentiometer (output)
C_1, C_4, C_5—.1 mfd./600 volt
C_2—50 mmf ceramic condenser
C_3—.02 mfd./600 volt
C_6, C_7—10 mfd./450 volt
Sw, SPST switch (on R_1)
T_1—pri. 117 volts, 60 cycles; 235-0-235 volts, 40 ma.; 5 volts, 2 amp.; 6.3v, 2.0 amp. (Merit 2949 or Stancor PM8401)
L_1—8 hy, 40 ma. filter choke (Merit C-2976 or Stancor C-1277)

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"I thought you might like a QSL card from Texas way. Have seen two cards from Yankee Land in NATIONAL RADIO-TV NEWS. I sure didn't want TEXAS to go unnoticed!

"My transmitter is a converted BC-457 (Army Surplus). The receiver is a Hallicrafters SX-25. The Ant. is a ½ wave, end fed job. Would enjoy it very much if I could meet some other NRI Students or Grads. on the air."

JOE B. DORN
1206 South 15th St.
Temple, Texas

Is This Your Payment?

Express Money Order for $5, No. WU1536176, dated March 4, 1953, issued by the Western Union Telegraph Office at 62 John Street, New York.

This payment came to us in a plain envelope postmarked "Staten Island, N. Y." without any name, address, student number, or other means of identification whatsoever.

Please write us if you sent this payment.

Attention all NRI students and graduates:

Whenever you send us a payment *be sure* that you have your *name, address,* and *student number* enclosed. Be safe. Be certain. Get credit for every payment you send by including proper identification along with it.

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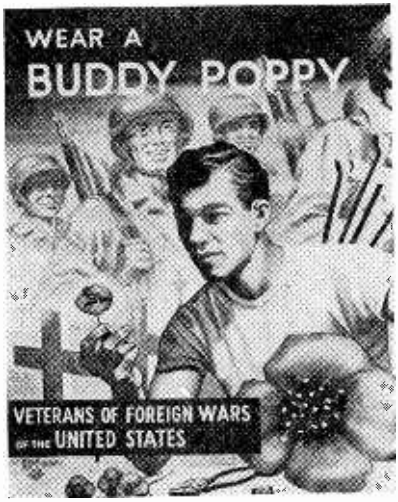

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Temple, Texas Radio NRI 1206 South 15th

WN5 VEX

'THE MOST ILLEGAL HAM IN TEXAS'
JOE BOB DORN

Recver SX-25 UR RST 599 X
X'MAR B.C.457 A @ 75 WATTS Date 10-20-52
Remarks TNX FER THE HELP, OM
PSE QSL. CU SOON OM

Attention, Owners of NRI Professional Tube Testers

New Tube Test Charts and TV Picture Tube Adapter Now Available from NRI.

A tube tester is no better than the tube test information which is available for it. Recognizing this very important factor, NRI tries to bring out freshly revised tube test information for *all models* as frequently as we can do so. For Models 66, 67 and 68, there is now available a supplemental tube chart. For Model 69 and 70 there is available a new Roll Chart. See order blank on right.

TV Picture Tube Adapter (Available May 15th)

In response to many inquiries from students and graduates, NRI has arranged for a Television Picture Tube Adapter which may be used with all NRI Professional Tube Testers, Models 66 through 70. (Not usable with NRI Model 1185.) This Adapter enables you to test a Television picture tube in a receiver, or in the original factory carton. The test includes a cathode emission check and a check for shorts between the various elements in the tube. Manufacturers do not claim that a Television Picture Tube Adapter is a fool-proof means of testing Television picture tubes. There are certain comparatively infrequent troubles in picture tubes which an Adapter will not detect. It is, nevertheless, a popular and useful accessory. Note: Factory production of these adapters is now in process. They are scheduled for delivery to NRI on or before May 15. Send your order now.

In ordering either a new tube test chart for your NRI Tube Tester, or a Television Picture Tube Adapter, please use the convenient order blank included on this page. Be sure to include the proper remittance, and *in ordering tube test charts, be absolutely certain to mention the model number of your tube tester.*

How to Install New Roll Chart in Model 70 Tube Tester. (Retain these instructions if you order a new Roll Chart.) First, remove the instrument from its wood case by taking out the eight Phillips wood screws from around the edge of the front panel. The panel will now be free and can be removed from the instrument case. For better accessibility, you can remove the complete Roll Chart mechanism from the instrument. However, this is not necessary.

The Roll Chart is held securely to the wooden rollers by means of three brass spring clips. These can easily be removed with the fingers, or by means of a pair of pliers. Note the amount of tension in the old paper Roll Chart before removing it. You will want to include the same amount of tension in the new Chart.

How to Install New Roll Chart in Model 69 Tube Tester. Remove the front panel of the instrument by taking out the screws found in the four corners of the panel. Closely observe the mechanical operation of the old Roll Chart and the tension of the paper before removing the old Roll Chart. Fasten the new Chart to the wooden rollers using scotch tape. Reassemble the instrument.

ORDER BLANK FOR OWNERS OF NRI PROFESSIONAL TUBE TESTERS

National Radio Institute, Supply Division
16th and U Streets, N.W.
Washington 9, D. C.

Enclosed is $..... for which send me the following material, as checked:

( ) Paper Roll Chart for Model 70 NRI Professional Tube Tester. (Will contain new tube listings only if your tube tester was purchased before March 12, 1953.) Price $1.25, postpaid.

( ) Paper Roll Chart for Model 69 NRI Professional Tube Tester. Revised early in 1953. Price $1.25, postpaid.

( ) Completely revised test data, in one booklet, for Models 67 and 68 NRI Professional Tube Testers. Revised early in 1953. Price $1, postpaid.

( ) Latest Supplemental data for Model 66 NRI Professional Tube Tester. Revised early in 1953. Price $1, postpaid.

( ) **Television Picture Tube Adapter.** May be used with all NRI Professional Tube Testers, Models 66 through 70. Includes instructions. Price $4.98, postpaid. Delivery, May 15 or sooner.

Name .....**Student No.**.....

Address .....

City .....**Zone** ....**State** .....

*If you live in Washington, D. C., add 2% for D. C. Sales Tax.

You Can Do What These NRI Graduates Are Doing

Passed FCC Examination With No Trouble

"Thank you for starting me on the road to success. I took both your Servicing and Communications Courses, and don't mind telling anyone that they are tops—they can't be beat, in my opinion!

"I passed the FCC exam for a first-class radiotelephone license with no trouble at all, thanks to NRI. Am now with Radio Station WCOC and very happy with my job.

"Also have a part-time radio repair shop. My customers say I am the best radio repairman that Meridian ever had."

JESSE W. PARKER
2603 22nd St.
Meridian, Miss.

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Has Part-Time Shop, Sets Keep Coming In For Repair

"I own a part-time shop. Get more work than I can do. The sets keep coming in. The work advertises itself.

"The NRI course is more than a Radio and Television course—it is a practical business course as well. Thanks for the help and assistance received from NRI and staff."

ALFRED H. CAMPBELL
RFD 5, Enka Highway
Morristown, Tenn.

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Successful Radio and Television Serviceman

"I was confined to a wheel chair due to a spine injury. My future looked dark. After I passed my 17th birthday, my parents decided I should have a trade. I chose Radio and enrolled with NRI. When I received my first kit, it was all new to me, I had never used a soldering iron.

"Several years have now passed. The story of my business is one of continued growth. In the last year I serviced over a hundred TV sets of all makes, besides over a thousand radios. In addition to my own service work, I handle repairs for eight other concerns. I am proud to say that I owe all of this to NRI."

CLARK F. CONAWAY
362 N. Jefferson St.
Knightstown, Ind.

Now Happy in Radio and Television Work

"I started your course at the same time I was manager of a meatmarket. After spending twenty-three years in the meat business, I came out to California and asked for a job in the meat field—nothing open for six months.

"Sent to NRI for some test equipment and started reviewing my lessons. Answered an ad for a Radio and Phono serviceman. Got the job. Started at $63 a week, and after eleven months was making $92 to $98 a week. And, deep down in my heart, this was just what I wanted to do. Also, I now service TV sets.

"I owe a lot to NRI, and to you Mr. Smith, for your remarks on the cover of each textbook. Many a time I was tempted to lay the books aside and go out with the boys."

CHURCHILL CARTER
3507 Pershing Ave.
San Bernardino, Calif.

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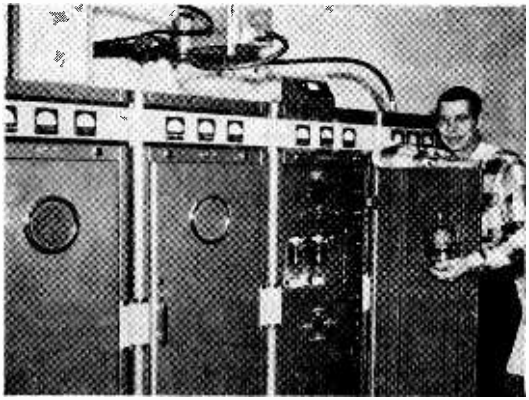

Has Gone Into Business For Himself

"I have now gone into Radio Servicing as a full-time job. I am doing the service work for two radio stores and auto radio installations and warranty work for local garages, as well as jobs that I get on my own.

"I can never thank NRI enough for the training I received which made it possible for me to go into business for myself."

PETER CAMERON
Box 12
Alliston, Ont., Can.

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Chief Engineer Radio Station—Also Does Service Work in Mobile Communications

"In addition to my full-time job as Chief Engineer of Radio Station KGCU, I find myself with all the spare-time work I can handle in servicing high-frequency two-way communication systems. Use the name 'West River Engineering Service' and have been appointed an authorized Motorola Service Station. Have contracts with several Motorola users. Haven't gone after this extra work. It has been forced upon me simply because I am able to handle it.

"The photograph shows the Bismarck base and repeater station of the North Dakota State Communications Dept. of which I am responsible for maintenance. Equipment is Motorola. Credit is due NRI for my being able to handle this type of work."

RAYMOND V. BARNETT
406 17th St.
Bismarck, N. Dak.

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As space permits, from time to time, we plan to devote a page or two in NR-TV News to short success stories such as above. They are taken from testimonial letters we have on file. Photographs and letters of this kind are always greatly appreciated by us. We feel we should pass them on to our readers for the inspiration to be gained from a reading of them.

LATE TELEVISION AND RADIO NEWS

By JOHN H. BATTISON

NRI Director of Education

John H. Battison

This looks like another big year for radio and television—and of course that includes the radio and television serviceman.

The Radio and Television Manufacturers' Association expects that over seven million television sets will be built this year, based on the record January output of 718,378 television sets. Also, 12,000,000 radio sets and 1,500,000 phonographs are expected to be built by the end of December 1953; plus, of course, public address and sound reinforcement systems and components. In 1952, 6,096,279 television sets, 9,711,236 radios, and 1,000,000 phonographs were produced. With all the new television stations which are going on the air almost weekly, there is no reason why our booming radio-television field should not surpass even the optimistic figures for 1953.

In the field of "bigness" we find that those lucky viewers who live in the Louisville, Kentucky, area should be able to receive WHAS-TV more clearly than they did before, and over a much greater service area. Beginning in February WHAS-TV increased its radiated power to 316 KW. This makes it the most powerful station in the world, and certainly the first station to go to the maximum radiated power allowed by the FCC. WHAS-TV (channel 11) has now increased its grade A (best) service radius from 24 to 35 miles and its grade B, from 43 to 52 miles. This means that its .1 MV/M (100 microvolt) contours goes as far north as Rushville, Indiana, south to Glasgow, Indiana, east to Paris, Kentucky and west to Jasper, Indiana. At the same time that WHAS-TV increased power to 316 KW it also changed from channel 9 to channel 11 in accordance with FCC instructions.

As many readers will probably recall, when the FCC removed the television freeze last year it also issued instructions for thirty television stations to change frequency. So far seven of these stations have changed frequency leaving twenty-three more to do so before too long a period. Here is a point which should result in increased income and business for the alert serviceman. A few of the stations have to change from the high band to the low band (channels 7 to 13 and channels 2 to 6, respectively) and vice versa.

In cases where the station has only to change from one channel to another in the low, or the high band, not much difficulty should normally be experienced. But however, when a station has to go from the low to the high band it is conceivable that a fair amount of difficulty may be experienced by viewers in receiving the station on its new frequency assignment. This is particularly true if there are no other high band stations in the area. This is where the alert service technician comes in and realigns the antenna—and tunes the receiver for optimum reception on the new channel. A call to the television station will often uncover the date on which the change is to be made, in any case it will be well publicized locally. It might even be worthwhile having some circulars, offering readjustments for some specified sum, printed and distributed.

By the time that this issue is in the hands of our readers everyone will be very much aware that the FCC has finally approved the proposed merger of the American Broadcasting Company and United Paramount Television. This is a case which has been pending before the FCC for well over a year, and one which has been contested by all members of the industry, and the theatrical and entertainment fields. A lot of people have complained bitterly that allowing the motion

picture company to control the broadcasting network will result in undue monopoly and restriction of programming and operation of the radio network.

I believe that the opposite is true and nothing but good can come of the merger of UPT and ABC.

The American Broadcasting Company has been putting up a magnificent struggle for business and expansion against the very firmly entrenched operations of CBS and NBC.

It may be of interest to go over the history of ABC very briefly for the benefit of our readers who are not familiar with the network setup. In the early days of radio NBC owned and operated two networks—the Red and the Blue. These networks duplicated ownership in many cities; for instance New York had two stations owned by NBC—WEAF and WJZ which are now respectively WNBC and WABC.

The same situation occurred in many of the big cities across the country. The Red and Blue networks were programmed differently, but the fact remained that they were owned by one company. In the early 40's the FCC decided that "duopoly" (ownership by one person of two stations serving the same area) was not good for the radio industry and ordered NBC to divest itself of either the Red or Blue network. In 1943, Mr. E. J. Noble bought the Blue network from NBC and renamed it the American Broadcasting Company after a short operation as the Blue network. Since then ABC has been improved out of all recognition. It now owns five AM, five FM and five TV stations in addition to having over 300 affiliated radio stations.

Now that the new blood of Paramount Pictures can be poured into the veins of ABC there is no doubt that the network will be able to make a very good showing against its competitors. Technically ABC has some of the finest television facilities in the world, and only its lack of money for program development has kept ABC from buying the name stars that its competitors have acquired.

In the motion picture field, theatre television is still being fought over before the FCC, and it is my guess that it will be six months to a year, at least, before any definite decision is arrived at regarding who will carry the theatre television programs—common carriers in the form of A. T. and T. and Western Union, or a special privately owned interstate relay system operated by the theatre television interests.

There is no doubt whatever today that television quality equal to that of a standard movie film can be transmitted with a slightly wider band than is commonly employed for TV. Color television for the theatre is here and ready in a very acceptable form—the Eidophor system, a combination cathode ray tube and projection system.

On February 6, as I am sure everyone knows, wholesale and retail price controls on television and radio parts were removed. However, at this time there is a little talk in the Washington area to the effect that some form of consumer credit controls similar to the unpopular regulation W might be revived to help fight inflation. According to the Federal Reserve Board every man, woman and child in the country has an installment debt which averages $100!! Probably the main change which might be made in any credit controls would be demand for a larger down payment, and restriction of time in which to pay it. However that may be nothing more than a rumor.

The price of radio or television sets continues to increase varying from $10 to $100 more depending on the price of the set. In UHF/VHF television receivers the turret type of tuner with replaceable strips continues to be the most popular, although indications are that eventually the combination UHF/VHF tuner will be used. This, of course, will be some time in the future.

In spite of all the work that is being done on continuous tuners prices are still high, and performance varies considerably. Also, in the smaller markets, where there may be only one or two UHF stations, the additional $50 or so, added to the purchase price of television sets, hardly seems worth it when strips at about $9 each will provide reception of each UHF station in the area.

Another possible source of income is the phonograph business. Today, more phonograph records than ever before are being made and sold. Here is a way to tie-in to the increasingly popular high fidelity sound reproduction craze. Service technicians can pick up some very welcome extra money by installing high quality sound reproducing systems and supplying their owners with phonograph records. The amount of money these enthusiasts are willing to pay is amazing—many of them think nothing of paying $200-$500 for a reproducing system!

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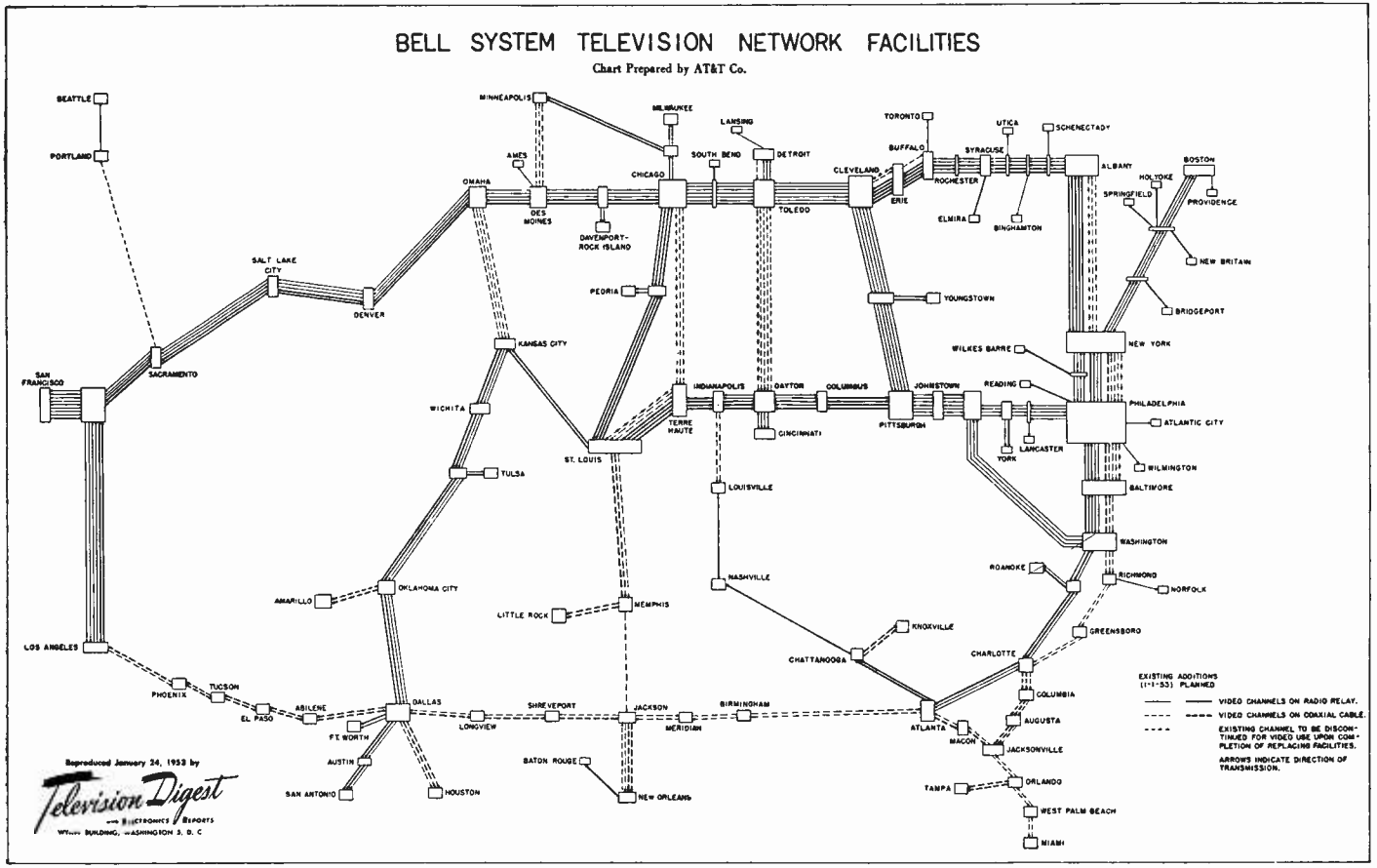
All-Out Kinescope Production And Steady Sales Seen In 1953

Harrison, N. J.—A year of all-out production and steady sales on TV picture tubes was forecast for the tube manufacturing industry recently by L. S. Thees, general sales manager of the Tube Department of RCA Victor Division, Radio Corporation of America. Demand will exceed the industry's production capacity, he predicted, and TV manufacturers can expect to face a serious shortage of Kinescopes this year.



We are pleased to reproduce the above Chart which we feel is of interest to National Radio-TV News readers. It is reprinted with permission of Television Digest, of Washington, D. C.

NRI Grad Stephen J. Petruff, of Miami, Florida, Develops Sensitive Ignition Cable Tester For Eastern Airlines

Stephen J. Petruff, of 4334 Northwest 7th Ave., Miami, Florida, is a man of many live activities. In addition to his work as an electrical specialist with the Eastern Airlines, he has his own successful Radio and Television Sales and Service business, and is also President of the Florida Radio and Television Technicians Guild. Petruff writes as follows in regard to the special instrument which he has developed for Eastern Airlines:

"The instrument is basically a low-range ohm meter, similar in design and circuitry to the common type available everywhere.

"In its construction however, it differs radically in that specially designed probes and specially constructed connections and resistances within the instrument were necessary to keep the errors down to a point where the normal accuracy of the meter movement was maintained.

"The scale was necessarily hand drawn, and the deflection had to be computed with extreme accuracy. The lower end of the scale is actually calibrated in thousandths of an ohm. Interpolating between these calibrations will give readings to .0002 ohms. The center of the scale is .2 ohms. Of course the scale is exponentially graduated.

"Here is a photograph of the Instrument in use at Eastern Air Lines. The reading on the instrument shows the resistance of the wire to be .036 ohms. A table of resistance values for each lead is compared with the readings obtained at the time of this check. If any of the conductors in the manifold have poor soldered joints or broken strands, the resistance will increase above our acceptable limits. Any normal continuity tests would show these wires to be okay. The instrument has thus picked out a number of defective conductors and connections that could not be located without disassembling the entire manifold."

This supersensitive ohmeter, designed by NRI Graduate Stephen J. Petruff for Eastern Airlines, is said to detect a single broken strand in an ignition cable.

According to the article appearing in "Aviation Age," this specialized piece of test equipment is saving over $4000 per year in labor alone at the Eastern Airlines Maintenance Base in Miami. Not content with present achievement, Petruff is now working on an even more sensitive instrument which will feature several improvements.

Our Cover Photograph

The attractive tropical setting shown on the front of this issue of NATIONAL RADIO-TV NEWS is a photograph which we have received from NRI Graduate Stephen J. Petruff. In addition to his many other activities, described on this page, Graduate Petruff operates a very successful Radio and Television servicing business.

The instrument in use at Eastern Airlines, checking the conductivity of the low-tension ignition Manifold of a Wright 3350 Engine from an Eastern Airline's Constellation.

Leo M. Conner

A Radio Control System for Model Builders

By LEO M. CONNER

NRI Consultant

THE control of model airplanes, model boats, or small automobiles by radio intrigues many people. Most model builders would like to control their models, but do not know how the radio control system operates.

In the simplest form, a radio control system is composed of a transmitter, a receiver, and a means of converting the radio signals into movement of the control mechanism. The control sequence may turn a rudder right or left or leave it in the neutral position. This is the system frequently used by beginners in both model airplane and model boat work. It is possible to include additional functions so that a model airplane can be made to "smoke write," to cut the engine speed to half-throttle and then back to full throttle or off. A model boat can be made to reverse engines, fire a gun, and do most of the maneuvers that any boat can do. Model cars may be made to turn right or left, stop, start, back up, and even "park" themselves all by remote control.

It must be remembered that the greater the number of control functions, the more the weight of the equipment and this is a real limitation in model aircraft.

Until recently an amateur station and operator's license was required for model control work. Model builders' groups felt that it was too much trouble to prepare for the examinations and proposed a "license free" provision for the specific use of model control enthusiasts.

The FCC finally recognized these groups and on June 1, 1949, announced the opening of the Citizens Band. This is a band of frequencies extending from 460 mc. to 470 mc. and the center frequency of 465 mc. has been set aside for model control work.

However, equipment designed for use on this frequency is subject to FCC "Type Approval" tests, and it is almost impossible for the average modeler to build equipment that will pass these tests. As a result the field was left to manufacturers who could meet the rigid specifications.

Only one, the Vernon C. Macnabb Company, 909 Westfield Boulevard, Indianapolis, Indiana, is offering type approved equipment for the 465 mc. frequency.

Many model builders felt that a situation of this sort restricted their choice of receivers, transmitters, and other control devices and they started a move for some changes in the rules. Specifically, they asked for a lowering of the frequency assigned for control purposes and a relaxation of the technical requirements so far as transmitters were concerned.

On March 24, 1952, the FCC modified the regulations in regard to the Citizens Band and established a provision for Class C stations. The Class C stations are solely for radio control. The frequency assigned is 27.255 mc. Actually, the tolerance set up allows a 50 kc. "band" centered on 27.255 mc. so that the output frequency could be any place between 27.23 and 27.28 mc. Type approval is not required for this frequency and the modeler can build his own transmitter if it uses crystal control.

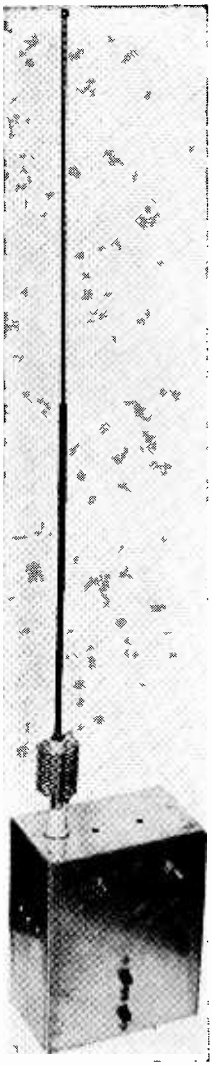


Fig. 1. The complete transmitter with bottom "loaded" antenna in place.

The procedure for obtaining a license has been simplified. The applicant should secure FCC Form 505 from the Federal Communications Commission, Washington 25, D. C. In filling in the form you state that the transmitter is crystal controlled, sign the form before a Notary Public, and send it to the nearest FCC Field Office. When you write for Form 505, ask for a list of field offices so that you can send your application to the one nearest your home. The Field Office will complete the form and mail the license back to you. That is all there is to it —no technical test and no code test.

There are certain provisions that must be followed in order to comply with all of the provisions of the law.

The power input to the final stage of a Class C transmitter is limited to 5 watts. However, less power is sufficient to give good control at distances up to one half mile or more. This is good enough because, after all, you must be able to see the model in order to keep it under control! Even a 5-foot wing span model airplane looks pretty small at a half-mile!

A transmitter licensed under these provisions cannot be used for communications. It is possible to use tone modulation for control functions, but this article will not go into anything but the simple, pulse type control.

In this system all control over movement of the model is obtained by sending a pulse or series of pulses. These pulses are obtained by keying the transmitter in much the same manner as a radiotelegraph transmitter is keyed.

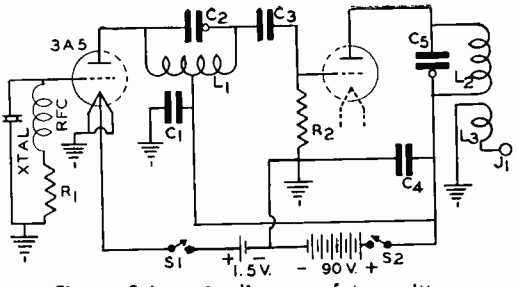


Fig. 2. Schematic diagram of transmitter.

Parts List for Transmitter

1—5"x7"x3" aluminum chassis. (ICA #29047)
1—aluminum bottom plate for chassis. (ICA #8729)
1—piece aluminum approx. 7"x7"—16 gauge.
1—13.6275 mc. crystal
2—680 mmfd. condenser—Type GP2K-681 Erie (C_1, C_4)
1—68 mmfd. condenser—Type GP1K-680 Erie (C_3)
2—3-30 mmfd. mica trimmer condenser. (National)
2—6800-ohm, 1/2 watt resistors. (R_1, R_2)
1—250 μ hy. r.f. choke—Millen #34300 (RFC)
2—Type XR-50, slug tuned coil forms (National) (L_1, L_2)
1—Millen crystal socket, 1/2 inch pin spacing.
1—roll #28dsc magnet wire.
1—roll #24dsc magnet wire.
1—miniature, shielded 7 pin tube socket.
1—3A5 miniature tube.
2—single pole slide switches.
2—type XX30-45 V. "B" batteries. (Burgess)
2—type D flashlight cells.
2—1/2"x1" thread end isolantite standoff insulators. (Millen 31001)
1—feed through insulator with banana plug jack. (Johnson 40J)
1—banana plug (Johnson #77)
1—B+W "miniductor" #3014
21—6-32x1/4" machine screws
13—6-32 hex. nuts
2—4-40x1/4" machine screws and nuts.
1—3/8" rubber grommet

The receiver used with a simple system is of the superregenerative type with a relay in the plate circuit of the tube. The relay and receiver are adjusted so that the relay contacts are open when no signal is being received. When a signal is picked up, the plate current of the tube changes and causes the relay contacts to close. This energizes a local mechanism which then operates the controls.

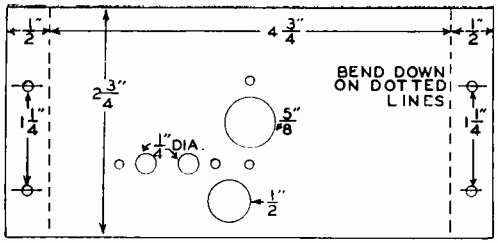


Fig. 3. Subchassis layout. No dimensions for crystal socket are shown. Drill holes to fit the socket you intend to use.

Most model builders have a favorite control system and no attempt will be made to go into the various types. Magazines such as Model Airplane News and others have carried many articles on radio control, and it is suggested that back issues of these magazines be consulted at your local library or the library in a nearby large city.

Building The Transmitter

The transmitter that is to be described is of simple design. If you decide to build this transmitter, the constructional information should be followed carefully. Be sure to use the exact parts values shown in the parts table. The National Radio Institute cannot supply any of the parts for either the transmitter or the receiver.

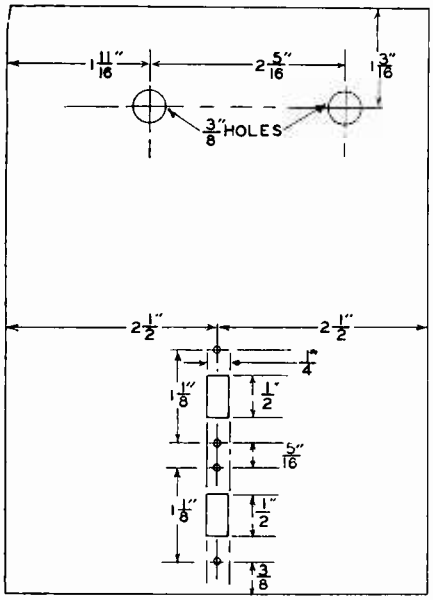


Fig. 4. Drilling dimensions for front panel.

You can obtain them at most large radio wholesalers or from one of the mail order supply firms.

Figure 1 shows the complete transmitter with the antenna in position. Fig. 2 shows the transmitter schematic. The transmitter is a battery operated, crystal controlled, two-stage unit. A twin triode tube (3A5) is used as a crystal oscillator and frequency doubler.

The first step in building the transmitter is to secure all of the parts. Then, the necessary metal work should be done. You will notice that an ICA No. 29047 chassis is listed. This 5 x 7 x 3 chassis is used as a cabinet for the transmitter and batteries. When you order the chassis, order an ICA No. 8729 bottom plate for it. The bottom plate forms the back of the cabinet.

A small subchassis is used and Figure 3 shows the dimensions and drilling data for this chassis. No dimensions are shown for the crystal socket because any socket with a half-inch spacing between the pins can be used. If your crystal has different pin spacing, then you would need a socket to fit that spacing. Figures 4, 5, and 6 show the drilling dimensions for the front, sides, and top of the chassis; Figure 7 shows the battery brackets.

Figure 8 shows the inside of the transmitter with all parts and batteries in place. Note that the tube and crystal are mounted "upside down." This is done to simplify the wiring and the only leads that come through the subchassis are the power leads.

The coils should be wound after all drilling has been completed. L_1 is composed of 34 turns of No. 28 dsc wire (double silk covered wire), close-wound on a National XR-50 slug tuned form. The winding is tapped at 17 turns. In making the coil, remove about one-half inch of insulation from the end of the wire and wrap it around the terminal at the end of the winding space. Solder the connection and then wind on 17 turns. Hold the wire so that it will not loosen and twist a one-inch long loop in the wire for a tap. Then, wind on the remaining 17 turns. The coil will not completely fill the winding space on the form but that is all right. Run the end over to the terminal at that end of the form and make the connection. After winding the coil, dope the turns with Duco household cement so that the turns will stay in place. The end of the tap can be prepared at this time. Remove the insulation, twist the leads tightly, and tin the end with solder.

The amplifier coil is wound next. This coil contains 12 turns of No. 24 dsc wire, close-wound on an XR-50 form. No tap is used on this coil. However, after securing the end of L_2 to the terminal, an additional 3-turn antenna coil should be wound on the form. This

coil (L_3) should be close-coupled to L_2. The ends should be left about six inches long and twisted so that the small coil will not come unwound. Dope both coils with Duco cement.

After the cement has dried, mount the trimmer condensers on the coil forms. The photograph of the inside of the cabinet shows how this is done. The lugs on the condensers can be bent to reach the coil terminals. Solder the condenser lugs to the coil lugs after putting the condensers in the correct position. Note that the condensers are adjusted through holes in the top of the cabinet.

The subchassis is wired next. The schematic diagram should be followed and parts should be connected in the circuit without using additional wire leads.

The leads to the batteries are the longest leads in the set. The wiring is straightforward and all ground connections should be made as close as possible to the part that is being grounded.

After the subchassis is wired, it should be mounted in the cabinet and the leads connected to the coils and the antenna feedthrough insulator. Do not connect the leads to the switches at this time because it is necessary to measure the plate current in tuning up the transmitter.

After the mechanical assembly is completed, insert the tube and crystal in their respective sockets and turn the slug in the oscillator coil out about half way. Connect a milliammeter in series with the B+ lead to the crystal oscillator and then apply filament and plate voltages. Tune the oscillator trimmer, using an insulated tool, for the dip in plate current that indicates oscillation has started. The meter should then be switched to the amplifier plate circuit and that stage adjusted for minimum plate current. The slug in the amplifier coil should be almost all of the way into the coil.

The minimum plate current setting for the amplifier will change when the antenna is connected, so leave the meter in the amplifier plate circuit for the time being.

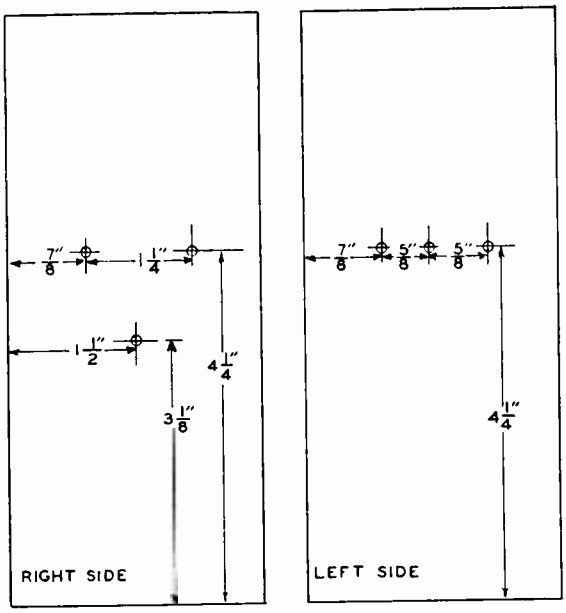


Fig. 5. Drilling data for sides of cabinet. Left and right refer to sides when you look at front of cabinet.

Preparing The Antenna

Since an antenna one-quarter wave length long at 27.255 mc. is rather long, it was decided to use a series coil to give bottom loading.

The antenna assembly is clearly shown in Figure 9. However, there are a couple of things that need explanation. The two one-inch insulators are fastened together with a short length of 6-32 threaded rod that is made by cutting off the head of a three-quarter inch by 6-32 screw.

Next, a solder lug is placed on the threaded

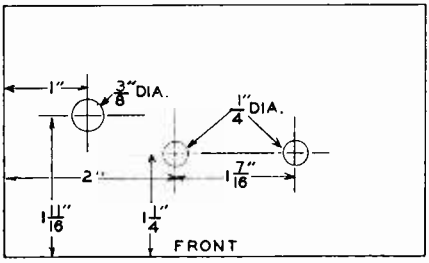


Fig. 6. Drilling data for top of cabinet.

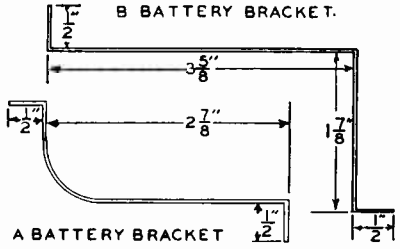


Fig. 7. Dimensions of battery brackets.

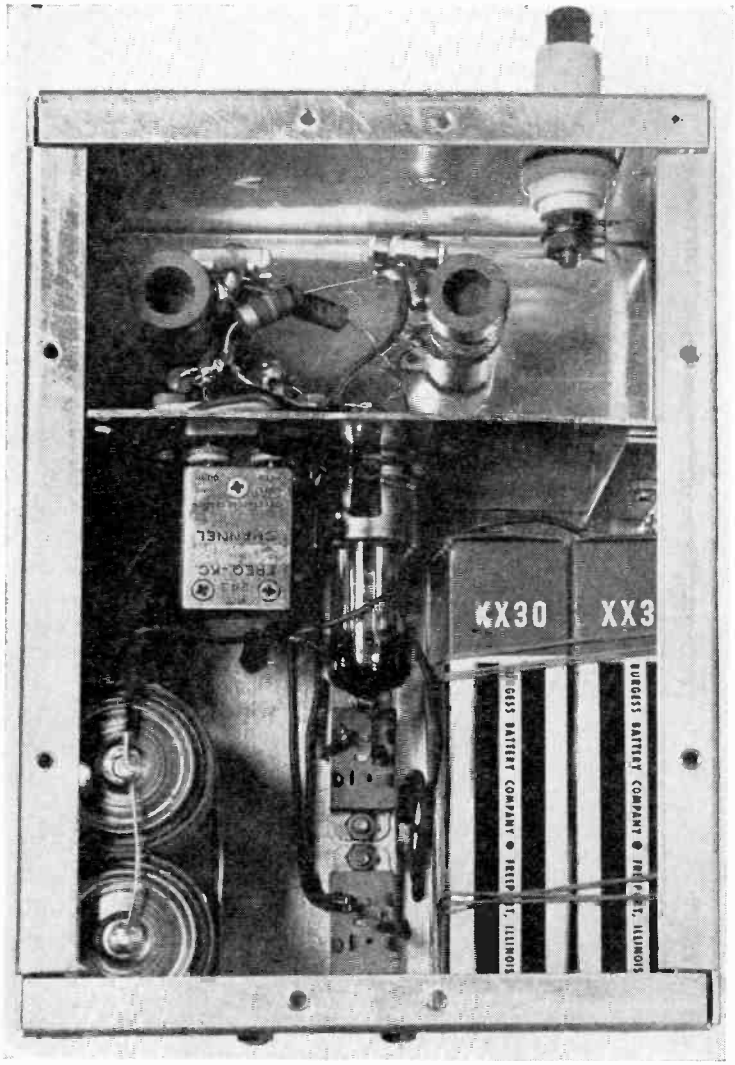


Fig. 8. The inside of cabinet with all parts and batteries in place.

shank of the banana plug and the nut tightened down on the lug. The screw end of the banana plug is then threaded into one end of the insulator assembly.

The collapsible section of the antenna is a replacement auto "whip." The second smallest section of the antenna is cut to a length of 10 inches. Be sure that the smaller section is pulled all the way out when you are cutting so as to avoid shortening the small section. After cutting to length, smooth the end with a file and then run a 6-32 tap into the end of the tube for a distance of about one-half inch. After tapping the tube, run a 6-32 screw into the antenna. Use a one-inch screw. After running the screw into the antenna, cut off the head and run a 6-32 nut down tight against the antenna.

Place a solder lug on the antenna screw, and then run the screw into the remaining end of the insulator assembly. The two solder lugs on this assembly should be positioned so that they are rotated about 90 degrees in relation to each other. This makes it easier to attach the coil.

The coil should be prepared by counting off 13 turns. A hack saw is then used to cut through the strips which form the coil supports. The 13-turn section is then prepared for mounting on the antenna.

Bend the end lead so that it will reach the hole in the solder lug. Center the insulator in the center of the coil and solder the connection. Then solder the connection at the other end of the coil, and the antenna is ready to plug into the transmitter. The photograph of the antenna coil shows the construction quite clearly, and you should have no difficulty in duplicating the assembly.

After the antenna is plugged into the jack on the stand-off insulator, the filament and plate voltages should again be applied to the transmitter. The amplifier plate current will, most likely, be higher than it was before the antenna was plugged in. The plate current should be adjusted for minimum value: While adjusting the plate tuning, watch to see if the position of your hands affects the plate current. If it does, practice tuning the transmitter so as to compensate for the hand capacity.

After the amplifier is tuned, the connections to the switches may be completed. The switch nearest the center of the front panel is the

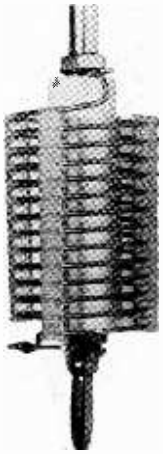


Fig. 9. Closeup of antenna loading coil assembly.

filament switch and the lower switch controls the plate supply voltage. If desired, this switch may be replaced with a "push-button" type of switch so that it will be easier to control the pulses.

The chassis that is used as a cabinet comes with holes drilled in the lip around the bottom. The holes were tapped out with a 6-32 tap, and the bottom is then held in place with 6-32 machine screws. The battery clamps shown in the drawings hold the batteries firmly in position.

The receiver is quite simple, and a type 3A5 tube is again used to make it simpler to keep replacement tubes on hand. Only one section of the tube is used.

Figure 10 shows the circuit for the receiver. The parts values are given in the caption.

When the proper relationship exists between the quench voltage and the rf voltage, the circuit is capable of large changes in plate current. The idling current is approximately 5 milliamperes which drops to about 3 milliamperes when a signal is picked up.

The receiver is reliable and has a long life. However, the adjustment of the antenna length is quite critical.

The 15,000 ohm resistor, shown as R2 on the diagram, may not be needed. If the idling current is above 5 ma., the resistor is not used.

The equipment that has been described here is not the most elaborate that could be used. However, the transmitter is capable of very excellent work and can be easily modified for tone modulation. If desired, the flashlight cells used for the filament battery may be replaced with any standard 1.5 volt battery that will fit into the space.

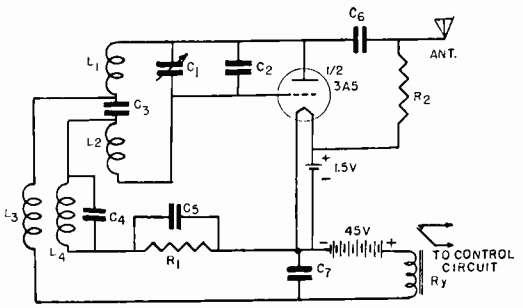


Fig. 10. Schematic diagram of receiver.

Parts List for Receiver

C_1—7 mmfd. ceramic trimmer
C_2, C_6—39 mmfd. ceramic
C_3—470 mmfd. ceramic
C_4—1500 mmfd. mica
C_5—.01 paper or ceramic
C_6—.1 paper
R_1—12000—ohms
R_2—15000—ohms
L_1 L_2—10 turns #22 enameled close wound on 1 watt 1 megohm resistor
L_3, L_4—Quench freq. coil (National OSR)
R_y—2400-ohm sensitive relay
Ant.=3 ft. wire

In passing, it is worth noting that the transmitter and receiver that have been described may be used for a garage door control system. The doors should be of the type that are electrically operated, and the control switch would be replaced by the relay contacts on the receiver. The transmitter would then control the door whenever the car was in range.

Politeness

If I could command the speech of twenty nations I would preach politeness in them all. It is the Aladdin's lamp of success. I do not speak idly in praise of politeness, for out of the experience of fifty-six years in the banking business it has been borne in upon me almost daily that courtesy is one of the prime factors in the building up of every character. It is the hallmark of the Christian gentleman and of the keen man of affairs.

—GEORGE G. WILLIAMS

NRI Graduate Received Army Citation For Outstanding Technical Work

Dear Mr. Smith:

"I received my Diploma yesterday and I am mighty proud to be a graduate of NRI, thanks to you and to all the staff there at NRI for all the good personal advice and training you gave to me during my course.

"I have been doing TV work for the past five months and doing very good, getting five or six jobs per week, and could have done better but I did not want to get in too deep until I completed my study. Now that I have completed the course I feel sure I will eventually get all the Radio and TV work that I can handle. So far all my work has come through people who I do a job for and they in turn recommend me to their friends.

"In October, 1936 I enrolled at NRI for a course in Radio repairing. I completed only thirty lessons then dropped out. June 18, 1942 I was inducted into the Army. After eight months in the service with no further training other than those thirty lessons and what experience I got repairing home receivers, I was put in Radio Communications as a repairman. I repaired all kinds of portable Transmitters, Receivers, and Power Plants, for two and one-half years, ten months of which was on the front line where both men and equipment got a bad time from the weather.

"I don't feel that I can add anything to the great name of NRI, but will try very hard not to do anything that would subtract from that great name, of which I am very proud."

JOSEPH H. HANKERSON
1818 N. Bouvier St.
Philadelphia 21, Penna.

We are very proud of the above letter, and although space does not permit publishing the entire citation, we wish to quote from a citation which originated in the office of the Commanding General, Headquarters XII Corps, US Army. The citation reads, in part, as follows:

"A Bronze Star Medal is awarded to Joseph H. Hankerson, Tec 4, who while serving with the Army of the United States distinguished himself by meritorious service during the period 1 July 1944 to 7 February 1945 in France and Luxembourg. As radio repairman in Battery B, 452d AAA-AW-Bn. (Mbl), Hankerson performed his duties in a superior manner. When he joined this battery at the beginning of this period, the condition of radio communication equipment left much to be desired. In a short time, by much intense effort, during long hours he succeeded in bringing this equipment to an excellent and efficient state of operation. In the highly mobile mission assigned to his unit, during much of this period, radio was the chief and sometimes only means of communication. His ability and unselfish devotion to duty proved invaluable in maintaining this essential channel of communication. He devoted long hours to the instruction of other radio personnel and his example has been an inspiration to them. Tec 4 Hankerson's services have contributed materially to the successful accomplishment of his battery's AA mission."

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Special Sale of "B" Batteries

We overestimated our need for 45 volt "B" batteries (size 5¼" high x 4⅛" x 2½", with 22½ v. tap). As a result we have several hundred extra "B" batteries in stock. We have tested these batteries and find that you can expect to get normal use from them. However, they are stamped "Install Before Jan. 1953." These batteries normally sell for $1.80, but because of the date, we are offering them postpaid for $1.00 East of the Mississippi, $1.15 West of the Mississippi. If you can use these in the near future this is a good buy. Use the below order blank to order as many as you want while they last. (Note: These are the regular "B" battery used in NRI testers)

45 Volt B Battery

National Radio Institute
16th & U Sts., N.W.
Washington 9, D. C.

Enclosed is $——* for which please send me —— "B" batteries, by parcel post, prepaid.

Name .....Student Number ...

Address .....

City .....Zone ....State .....

*If you live in Washington, D. C., please add 2% for District of Columbia Sales Tax.

N.R.I. ALUMNI NEWS

New Orleans Chapter

Members of New Orleans Chapter, assembled for their first formal meeting. Seated at the table are, on right, Chairman Louis E. Grossman; left center, Secretary C. E. Davidson, Jr., and left. L. L. Menne.

WE are pleased to announce a new chapter of the NRI Alumni Association, in the city of New Orleans, Louisiana.

This chapter was established through the initiative and earnest efforts of Mr. Louis E. Grossman, successful businessman of New Orleans and an NRI Graduate. He did all of the preliminary work by contacting other Alumni members in his city to see if they would be interested. A small group got together, discussed the matter and then arranged for a meeting which was attended by thirty-three members who there and then signed up as charter members.

At a subsequent meeting, at which thirty-eight were present, a charter was presented by L. L. Menne, Executive Secretary of the NRI Alumni Association. At that meeting Mr. Louis E. Grossman was elected permanent Chairman and Mr.

C. E. Davidson, owner of Columbia Radio and Supply Company in New Orleans, was elected Secretary.

For the present, the members voted to meet once a month, on the second Tuesday. A permanent meeting place is not available at this time but one will be secured in the near future. Notices of meetings are mailed in advance.

Mr. Davidson, who has had a wide experience in Radio and Television work, addressed the group on the subject "The Future of UHF." Already Mr. Grossman has found among the group some very talented members who have agreed to lead discussions at future meetings.

Students of NRI may join as Associate Members. If you live in the New Orleans area and desire information regarding meetings telephone to Chairman Louis E. Grossman, Jackson 3754 or Secretary C. E. Davidson, University 2731.

Chairman Grossman (left) of New Orleans Chapter receives the Charter from Exec. Sec'y. L. L. Menne.

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Chapter Chatter

Detroit Chapter has issued a calendar on which the dates of the meeting nights have been blocked out. The calendar will answer, at a glance, whether or not there will be a meeting next Friday night or whether it is the following Friday. A good idea and well prepared by one of the members.

Mr. Al Weiss of G and G Radio and Television Company was our guest at one of our meetings and spoke on "Practical Applications of Nuclear Energy." Following this talk Mr. Weiss also discussed a recent visit which he made with our Mr. Harold Chase to the David Sarnoff Laboratories of RCA where the manufacture and uses of the Transistor were demonstrated.

As this issue goes to press notice is received that Mr. Harold Heiple, a member of the staff of Chase Radio and TV Service, will address the Chapter on the subject "Effect to Cause Reasoning in TV Servicing." Members are invited to ask questions at the close of this talk. The talk will be directed at the level of those who do not possess too many service instruments.

Another meeting in the immediate future will be devoted to demonstrating Radio Servicing problems on the RCA Dynamic Demonstrator which is owned by the Chapter.

The officers recognize the need for maintaining a balance between Radio and Television subjects.

Detroit Chapter meets on the second and fourth Friday of each month at 29 Henry Street in Detroit. Students and Graduates in this area are invited to pay us a visit.

Detroit Chapter members at KLA Lab. study the equipment. Left to right is John Nagy, Charles Kelch, John Ryckewaert, and John Dabrowski.

Chicago Chapter is all pepped up under the leadership of Chairman Charles C. Mead and Secretary Frank Ziecina. These two make a mighty good team and they are ably assisted by other officers of the Chapter.

The question of whether or not Chicago chapter should have a new meeting place is still being discussed. Some members feel that present headquarters are entirely satisfactory and others think there might be advantages in making a change. Getting a good location, centrally located, with parking space available is not an

easy job in a city the size of Chicago.

Two members who will deliver talks on radio and television subjects, during the month of April, are Mrs. Ilamae Webber and Chairman Charles C. Mead.

In recent meetings we have had interesting talks and demonstrations on "Auto Radio Servicing" and "The Function and Use of the Oscilloscope." At other meetings we had discussions on general Radio Servicing and on Vacuum Tubes.. Leaders in these discussions were Mr. J. Hudson,. Mr. Guido Filipelli, Mr. Roy J. Graham, Mr. Raymond Siwek and Mr. Louis H. Schick. The talk by Mr. Filipelli on Auto Radio was particularly interesting and informative. Mr. Filipelli works daily in servicing auto radios and he spoke on power-pack troubles, vibrator defects, static performance, loose connections from vibration of car, converting to a home radio set, faulty tubes and their only reliable check by the substitution method which outwits the tube checker. Mr. Filipelli gave hints on what to do so that in many cases it is not necessary to remove the set from the car. Following this talk there were questions pertaining to weak sets, defective antenna, improperly operating sets, all of which were answered in some detail by Mr. Filipelli.

Following these interesting talks there is usually our Open Forum. Members are always invited to bring in a Radio or even Television set for servicing. Students and graduates of NRI in the Chicago area are invited to visit us as guests.. We meet on the second and fourth Wednesday of each month, thirty-third floor, Tower Space, in American Furniture Mart Building, 666 Lake Shore Drive, Chicago. Use West entrance.

Baltimore Chapter is experiencing a little housing trouble. For years meetings have been held at Redman's Hall, 745 W. Baltimore Street. Two meetings a month have been held but because of a raise in rent for the use of the hall the Chapter decided to hold only one meeting a month. Therefore Baltimore Chapter now meets on the second Tuesday of each month at 8 PM, until further notice.

New officers are Chairman Mr. R. F. Thompson,. 508 Rose Hill Terrace, Baltimore 18, Maryland. Vice Chairman Mr. E. Shue, Green Pasture Rd., Baltimore 4, Maryland, Secretary Mr. Jos. M. Nardi, 4157 Eierman Avenue, Baltimore 6, Maryland, Treasurer Mr. Jos. B. Dolivka, 717 N. Montford Avenue, Baltimore 5, Maryland, Librarian Mr. Wilbur L. Kidd, 3310 Beech Avenue, Baltimore 11, Maryland, Sergeant at Arms Mr. Henry C. Voelkel, 6 Queen Ann Rd., Marley Park, Glen Burnie, Maryland, Auditor Mr. H. J. Rathbun, 506 East 26th Street, Baltimore 18, Maryland.

Mr. Rathbun is known to members as "Old Faithful" because he is always present at every meeting and ready to give a talk on any subject. He usually conducts the question and answer part of each meeting covering both Radio and Television. These discussions permit all members to take part in the proceedings and they are extremely beneficial.

Secretary Joseph M. Nardi is taking a leading part in building up the membership of Baltimore Chapter. If you live in the vicinity of Baltimore, whether student or graduate, you will receive a most cordial welcome at any of the meetings. Mark the date and make it a point to attend.

Philadelphia-Camden Chapter is seething with activity. They vary the programs from Radio to Television, from Lectures to Films, and a great deal of time is spent in actual Radio and Television servicing.

Secretary Jules Cohen was able to rent a sound projector and screen from a local concern. He

A group of Phila.-Camden Chapter officers who served on the entertainment committee when the Chapter had visitors from Washington. Left to right, standing, J. Morrison Smith, Norman Kraft, Jules Cohen, Ray Stout, Al Lemper, L. L. Menne, and Laverne Kulp. Seated, Ray Weidner, Fred Seganti and Chas. Fehn. Mr. Serganti is 1953 Chairman.

then contacted some of the distributors for TV manufacturers and was able to arrange to have some very fine films shown. The Capehart TV Company was especially courteous in this connection. Philco Corporation also was very cooperative.

The Chapter has been able to purchase considerable new equipment making it necessary to provide for larger locker space. The officers emphasize that they are doing every thing possible for the benefit of members and greatly

appreciate the fine attendance they have been enjoying.

Harvey Morris, by the way, has gone into business for himself. Harvey is one of the top Radio and TV men in Philadelphia and should make good in a big way.

New members are George D. Lakata and George Mackanich of Philadelphia and Joseph Olden of Trenton.

The members of Phila-Camden Chapter plan a visit to Baltimore Chapter. Efforts are being made to arrange the date.

Meetings are held on the second and fourth Monday of each month at the K of C Hall, Tulip and Tyson Streets in Philadelphia. Students and graduates in Philadelphia and vicinity can get information regarding Chapter activities by telephoning Mr. Jules Cohen, FIdelity 2-8094 or writing to him at 7124 Souder Street.

New York Chapter is so well organized they always have three or four capable speakers on hand at every meeting. Recent speakers were Frank Manz, who related some of his experiences in repairing Radio receivers. Alex Remer continued his fine talks on "Simplified Television Servicing." Ted Durante delivered a very inspiring talk on "How to Advance in TV." Peter Guzy spoke on "Tearing TV Pictures" and Vice President Thomas Hull, Jr., chose as his subjects "Experiences in Radio" and "Signal Tracing."

Chairman Bert Wappler, who manufactures electronic, medical, dental, veterinary, beauty culture and epilation equipment has moved into his new factory at 27-10 Astoria Blvd., Long Island City, New York. Bert is bubbling over with enthusiasm and is looking forward to having his son with him in the business as soon as the young man is discharged from the Navy at the completion of his hitch, within a few months. Ralph Baer, of New York Chapter fame, also will rejoin Wappler—no wonder he is enthusiastic.

All officers were re-elected, as follows Chairman, Bert Wappler, Vice Chairman, Thomas Hull, Jr., Secretary-Treasurer, Louis Kunert, Assistant Secretary-Treasurer, Frank Zimmer.

Meetings are held on the first and third Thursday of each month, at St. Mark's Community Center, 12 St. Mark's Place, between Second and Third Ave., in New York City.

———— *n r i* ————

If it rained twenty-dollar gold pieces until noon every day, at night there would be some men begging for their suppers.

—LELAND STANFORD.

NRI Amateur Has Confirmed 31 States

"Thought you might like a picture of my ham station. I have always wanted to be a ham. The training of NRI has helped me build most of the equipment here, receivers and one transmitter, also other equipment. Have confirmed 31 states and received 102 cards in four months.

"I can say the NRI course is tops in preparing for the amateur field. The course makes it easy to build your own receivers and transmitters by schematics."

WESLEY CLAUSEN WNLGQ
1208 East Broadway
Council Bluffs, Iowa

———— *n r i* ————

LYNN, Mass.—An electronic "policeman" which automatically gives the right-of-way at a street intersection in accordance with the changing demands of traffic, may soon be standing on your street corner.

Developed by General Electric Company engineers, the new device is, in effect, an electronic brain with an IQ on the level of "genius." When it "sees" excessive traffic over a particular street leading into an intersection, it automatically holds the green light on a longer period of time for that street. A decrease in traffic, and the "brain" shortens the green light period.

Special vehicle detectors are placed under the pavement in all approaches to an intersection to evaluate the traffic flow.

Here And There Among Alumni Members

Congratulations are in order to Captain Warren P. Hoover, Jr., of Biloxi, Mississippi, a recent "second time" NRI graduate. He completed Radio and Television Communications, then enrolled for Radio and Television Servicing, and graduated in February 1953. Total training time for both courses was approximately twenty-one months. Captain Hoover did most of his work on both courses while stationed overseas.

———n r i———

C. E. Davidson, Jr., owner of Columbia Radio Supply Company, New Orleans, Louisiana, was elected President of the Broadmoor Businessmen's Association for the fifth straight time. Graduate Davidson is also Secretary of the New Orleans Chapter of our NRI Alumni Association.

———n r i———

Lucien Leblanc, of St. Simon de Drummond, P. Q., Canada, proudly writes that he is now "on his own" in full time Radio and TV Service. Future looks good.

———n r i———

We wish to thank Stanley E. Klibowski, of New Britain, Connecticut, for a group of super-duper photographs. What a shop this man has! If you live in that area, drop in on Mr. Klibowski some time, at 30 Erwin Place.

———n r i———

Jewell Walton, of Joliet, Illinois, also sends a picture of his shop. Plenty of TV sets in evidence. Nice layout.

———n r i———

Ray Luttrell, who is now attending the Naval Communications Technicians School, USNRS, Port Blakely, Washington, has just received General Class Amateur Call W4ZBK.

———n r i———

From overseas comes a letter from Timothy O'Brien, of Ennis, County Clare, Ireland. Mr. O'Brien was formerly Radio Operator aboard ship but now is part owner of Radio and Cycle Service Company in Ennis.

———n r i———

Lee Falwell, of Silver Spring, Maryland, is now "Motorola Regional Service Manager" for Communications and Electronics, Inc., Washington, D. C.

———n r i———

F. A. Criswell, of Childersburg, Alabama, has Amateur Call WN4YCO.

———n r i———

Luther L. Spain, Jr., AOC USN, is an instructor in Electronic Fire Control at Cherry Point, North Carolina. Says NRI helps a great deal.

———n r i———

About 35 Alumni members in Pittsburgh have expressed a desire to meet to discuss plans for organizing a local chapter in that city. Anyone who knows of a suitable place where such a meeting could be held in Pittsburgh will be able to do much toward furthering this movement if he will send information to headquarters. We need a hall that can seat about 50 people, to hold a preliminary meeting.

———n r i———

Graduate John L. Thiele, of Newburgh, New York, now has his second-class radiotelephone license and is handling all the mobile and station radio equipment in his subdistrict of the New York Telephone Company.

———n r i———

Charles L. Hays, of Pensacola, Florida, who owns the TV-Radio Fixit Shop, has just completed his first year of full time business. His wife does his bookkeeping and office work. He sends a nice picture of his shop.

———n r i———

Robert F. Davenport, of Klamath Falls, Oregon, is doing well. He has been with Station KFJI since 1945. KFJI expects to get a Television construction permit from FCC this summer.

———n r i———

News from Philadelphia-Camden Chapter is that Frank Benvenuto, of Paulsboro, New Jersey, passed out the cigars for the second time. His wife presented him with a new daughter.

———n r i———

Al Lemper, also of Philadelphia-Camden Chapter, has been promoted to Equipment Specialist for the Naval Submarine Supply Depot.

———n r i———

Alumnus Chester J. Gromacki, of Twin Falls, Idaho, now has the title of "Electronic Engineer." He has been with the FCC since 1941. Says NRI training is still helpful.

———n r i———

Graduate S. G. Philipowich, of Wawa, Ontario, Canada, has had some tough luck. He suffered an attack of polio in September 1952, and has been forced to close his thriving Radio Shop at Jamestown, Ontario, for the next year. However, his recent letter was very optimistic and we hope Graduate Philipowich will be back in action sooner than he thinks.

———n r i———

James E. McClung, of Clarksburg, West Virginia, who is making quite a name for himself in TV, writes describing an installation made recently in which he ran one-quarter mile of open line from the antenna on a hill top to the customer's home. Got good reception. Total charge including TV set was $531. Not a bad day's work!

———n r i———

C. W. Lewis, of Pensacola, Florida, has a very good spare time business including an RCA Victor dealership for Radio and TV. Lewis is employed full time as a Captain in the City of Pensacola Police.

NATIONAL RADIO-TV NEWS
16th & U Sts., N.W. Washington 9, D. C.

For:

Mr. Francis H. Fingado 25236
611 17th St.
Denver 2. Colo.

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