CAUTION

USE ONLY ON 105-125 VOLTS

Instruction Manual

FOR

50-60 CYCLES A. C.

ASSEMBLY AND OPERATION

NO. 10 A

TELEKIT

REG. U.S. PAT. OFF.

DESIGNED BY

TELEVISION TRAINING INSTITUTE

FOR

ELECTRO-TECHNICAL INDUSTRIES

1432 NORTH BROAD STREET

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INSTRUCTIONS FOR BUILDING THE NO. 10A THIRTEEN CHANNEL TELEKIT

General:

The #10A TELEKIT is an entirely new model television receiver in kit form and represents the most advanced ideas and trends in the reception of clear, stable television pictures. This instruction manual is provided with each TELEKIT to guide the constructor in the building of an electronic device which requires rugged construction in order to perform with delicate precision. The methods as outlined should be followed religiously if a satisfactory, trouble-free set is desired. The layout and step by step procedure in the building of this receiver is the result of a thorough program of research and development by the instruction and technical staff of Television Training Institute. All techniques other than those recommended should be avoided and any attempts at originality in layout will only result in unsatisfactory performance.

Method of Using Manual:

The manual is bound in such a manner that it may easily be disassembled and only the sheets being referred to at any one time need be used. It is good practice to cross out the steps as they are completed. This will prevent any possibility of errors of omission and will lend encouragement as the job proceeds.

Placement of Parts:

The physical placement of the condensers, resistors, coils, transformers, etc. should be exactly as shown in the illustration figures. This is necessary because of the high frequencies involved and of the extremely high voltages used. Ground connections should be made at the points indicated. The inclusion of ground lugs and long ground wires should be avoided. Every extra bit of wire used over the recommended amount adds inductance to the circuits and can detune them appreciably.

Contents of Packages:

The packages are numbered from #1 to #12 . The numbering system follows the construction outline so that when the operations are completed progressively the corresponding packages are emptied. This eliminates the cluttering of the workbench with partially emptied packages and as work progresses makes the job look less formidable. Resistors are color coded with the proper values and a familiarity with the color code or constant reference to the color code sheet is required. All condensers are identified as to proper value by being stamped. Controls are also stamped.

FINAL SUGGESTIONS PRIOR TO ACTUAL ASSEMBLY

1. Checking Packages

Remove the packages from the kit and arrange them in numerical sequence for easy checking. There should be a total of 12 packages.

2. Tools

Be sure to have these tools on hand:

1. A 100 Watt Soldering Iron
2. A 4 inch Screw Driver and an 8 inch Screw Driver
3. 1 pair long nosed pliers
4. 1 pair slip joint pliers
5. 1 pair 6 inch Diagonal Cutters
6. 1 piece Steel Wool
7. Emery cloth or medium sandpaper
8. 1 Medium file (for tinning iron)

3. Tinning Iron Tip

To tin iron, plug in and allow the iron to warm up for five minutes. File the tip until the bright metal appears. Apply rosin core solder to tip and allow to run over the bright metal. Wipe clean with steel wool.

4. Care in Selection of Proper Parts

Whenever more than one unit is contained in a package be very careful to return the unused units to the package immediately to avoid loss or mixing of units.

5. Cold Solder Joints

Avoid "cold" solder joints by applying plenty of heat to the joint before applying the solder. After the solder is applied, keep the iron on the joint until the vapor boils off. Use a minimum of solder and, above all, avoid large droplets of solder hanging on joints.

6. Lug Joints

When making joints to socket lugs, first lay the part in the proper spot and gauge the length of wire (pigtail) required to make the shortest connection. Allow a little for insertion into the socket lug hole and crimping. Snip off the unwanted wire and insert the wire into the top hole of the proper lug (away from socket). Bend the wire which protrudes through hole around lug and squeeze tight (crimp) with long-nosed pliers. The mechanical strength of the joint should depend more on the crimp than upon the solder. Apply solder to the joint.

7. Chassis Joints (grounds)

When making chassis connections (grounds) first select the spot on the chassis where the ground is to be made. When working on sockets, be sure to make grounds close to the sockets. With the emery cloth clean very vigorously the spot where the joint is to be made. Apply the iron tip to the cleaned spot and allow plenty of heat to flow into the area. When good and hot, apply solder to the spot at the junction of the hot iron tip and the chassis. Allow a more generous amount of solder to flow than when making a lug joint. Work solder into the spot by slightly moving iron tip under pressure. Remove iron and allow to cool. The spot is now tinned. Apply hot iron tip to wire and press firmly into tinned area. Apply a small amount of fresh solder to joint. Before removing iron tip from joint, press the wire into the joint with screw driver tip. Hold screw driver in this position for about 20 seconds after removing iron tip from joint.

This prevents wire from springing out of joint during cooling period.

8. Cleanliness

The importance of constantly wiping iron tip with steel wool to clean tip before making joints cannot be over-emphasized. Also, all wires must be cleaned with emery cloth before making joints. This is done to remove dirt, wax and oxidation. All of which contribute to the making of poor solder joints. Unless metals are cleaned before application of solder, poor electrical connections will result. Remember, WORK CLEAN!

9. Following Layout Diagrams

Although the schematic wiring diagram IS furnished, it is merely to check wiring. By following the instructions and referring to the layout diagrams for assembly information, a perfect job will be the result. When each step is completed, mark off the paragraph and proceed to next step. Take your time and check each step very carefully.

10. Push Back Wire

Wire furnished with the kit is the "push back" variety. To bare the wire it is merely necessary to push the insulation back from the end. Tin the bare end of wire with solder before connecting into circuit. This will prevent fraying out of the stranded ends of wire while making joints. To tin end, lay wire on clean tip of soldering iron and apply a small amount of solder to wire.

11. Hardware

All the necessary nuts, washers and self-tapping screws will be found in the kit. To use self-tapping screws properly, place the unit on the chassis over the screw holes which are drilled into the chassis. Using an 8 inch screw driver, drive screw very firmly into hole. The thread of the self-tapping screw will tap its way through the metal. Be sure to drive screw into hole STRAIGHT!

12. How To Use Master Sheet

Before beginning assembly, study the master sheet and locate each hole on the chassis. Since during practically the entire assembly you will be viewing the chassis from the underside, it will be necessary to particularly observe the underside designations. All small, medium and large sized holes have been numbered. Socket holes have been lettered alphabetically. These numbers and letters will be constantly referred to throughout the instructions. Socket lug designations have also been provided, giving a bottom view of the various sockets used in the television kit. It is good practice to transfer the numbers from the master sheet to the chassis itself by means of using a soft lead pencil or pen and ink (white is preferred).

13. A Word of Caution

Work slowly and carefully. Be sure to follow the instructions to the letter. The success of your construction job will depend entirely upon your patience and thoroughness. Your reward for a neat job will be a perfect, trouble-free television set, long hours of relaxed enjoyment in watching the television programs and a feeling of satisfaction in a job well done.

14. Universal Chassis

As the job progresses you will notice that some of the numbered holes are unused. This is because the chassis is a universal one which is used for various models. Merely use the holes which the instructions call for.

Operation #1

1. The first job to be undertaken will be the mounting of all sockets in the chassis. Remove contents from package #1 and check items with parts list. Study Figure #2 very carefully and note key position on sockets indicated. Also, observe the heater circuits and ground connections. The first sockets to be mounted will be the bantam sockets. Place one seven pin bantam socket in hole H and rotate until key is in position indicated in Figure #2. Force socket ring on socket with screw driver. Repeat with sockets K, L and M. Place the nine pin socket in hole I and after getting correct key position snap in with fingers.

2. The next group of sockets to be mounted are the octal sockets. Place one into opening J and rotate until key is in position indicated in Figure #2. Place ring over socket (underside) and force down over flange until ring engages slot around bottom of socket. A screw driver will assist in this operation. When ring snaps into slot it will secure socket snugly to chassis. Be sure ring is entirely in slot all around. Follow this same procedure with sockets N, O, P, R, F, D, C and Q.

3. The next socket to be mounted is the high voltage octal socket. This socket is mounted in an insulated wafer. Place in hole E and secure to chassis from bottom with self-tapping screws which utilize holes #55 and #56. Check figure #2 for proper key positioning.

4. After mounting all sockets, double check for proper key alignment. Proceed to tin spots on indicated sides of each socket on the chassis in accordance with Figure #2. Before tinning spot, clean with emery cloth. In soldering spots around octal sockets the ring should be included in the spot; therefore, that portion of the ring which falls in spot should also be sanded. Apply plenty of heat with the flat of the iron tip to entire spot. The more tip area in contact with the spot, the greater the transfer of heat to the metal. The object of tinning these spots is to secure the ring to the chassis and to form a foundation for ground connections. The spots should be smooth and firmly joined to chassis after cooling. It is permissable to use soldering paste in this operation provided that the excess is wiped away immediately with a cloth. Acid flux should <u>never</u> be used any place in the set.

5. After all spots are made and checked for quality (try to lift with screw driver tip) select ground wire and proceed with ground connections. Locate socket H. Thread end of ground wire through the top hole of lug #3 of socket H. Thread up through hole from bottom. Take end of wire to metal key post of socket H and solder. Take other end of wire to chassis at base of lug #3 and solder to chassis. Finally solder lug #3 where wire passes through hole. Move over to socket I and ground center key post and lugs #4 and #7. Below is a table which will give the complete information on ground connections.

5. Continued.

Socket	Grounded Lugs
H	Centerpost, 3
I	Centerpost, 4 and 7
K	Centerpost, 3
L	Centerpost, 3
M	Centerpost, 3
J	1, 2
N	8, 6
O	3, 4, 5, 8
P	8, 3, 6
Q	8, 6
R	2
F	8, 3

6. Be sure to check all ground connections for rigidness and to solder all lugs where wire passes through holes. Be particularly careful to see that the bare ground wire does not come close to, or touch adjacent lugs because short circuits would result.

7. After completion of this project you are now ready to install the heater circuits. Skin end of heater wire and tin end. Proceed to socket H and crimp tinned end into lug #4 but do not solder yet. Run same wire over to lug #5 of socket I. Gauge the length of wire required to reach lug #5 for skinning and crimping, and for pushing down on chassis before making cut. All heater wires must "hug" the chassis. Cut, tin and crimp into lug #5, but do not solder yet. Gauge another length of wire which will reach from lug #5 of socket I over to lug #7 of socket J. Cut and tin both ends. Crimp this wire into lug #5 of socket I and lug #7 of socket J. Solder lug #5 of socket I but not lug #7 of socket J as yet. Refer to Figure #2. Below is a table which will give the complete information on the heater circuits.

From	To
#4 of Socket H	#5 of Socket I
#5 of Socket I	#7 of Socket J
#7 of Socket J	#4 of Socket M
#4 of Socket M	#4 of Socket L
#4 of Socket L	#4 of Socket K

This completes the wiring of heater circuit #1.

Heater circuit #2 is now ready to be installed. The first crimp is into lug #7 of socket O. The following procedure will complete heater circuit #2.

From	To
#7 of socket O	#7 of socket N
#7 of socket N	#7 of socket P
#7 of socket P	#7 of socket Q
#7 of socket Q	#7 of socket R
#7 of socket R	#7 of socket F

Be sure to push all heater wire down close to chassis and double check with heater connections shown in Figure #2. Excess wire will be used in later operations.

Operation #2

1. Operation #2 shall consist of the mounting of power supply units, controls and deflection circuit transformers.

2. Select package #2 and remove the power choke. Place choke on topside of chassis over holes #1, #10 and #89 so that the choke leads go through hole #1. Fasten securely to chassis with self-tapping screws.

3. Select package #3 and withdraw power transformer, and three self-tapping screws. Place transformer on topside of chassis with the following wires going through hole #3, black and red, brown pair, green pair and yellow pair. The other wires will go through hole #70. Secure feet to chassis with self-tapping screws utilizing holes #90, #91 and #92.

4. Remove contents from package #4. Place one bathtub condenser underneath chassis over holes #57 and #58. Secure to chassis from underside with self-tapping screws. Place other bathtub condenser underneath chassis over holes #43 and #44. Secure to chassis in same manner.

5. Select the can condenser which is identified on the side as 20 MFD - 450 V, 20 MFD - 450 V, 20 MFD - 25 V and slip insulating wafer on base. Twist the mounting lugs so that the wafer is secure. Mount assembly in hole #4 and secure with bolts and nuts. The nuts will be on underside of chassis. These utilize hole #53 and #54. Select the can condenser which is identified as 30 MFD - 450 V, 30 MFD - 450 V, 20 MFD - 450 V and 40 MFD - 25 V. At this point it would be well to identify the lugs. Note that on the side of the can certain symbols precede the values. At the base of each condenser lug you will see these symbols once again. The symbols give the value of the condenser sections in the can. Do not get these lugs confused as extensive damage will result later when power is applied if mistakes are made. Place this condenser in hole #5 and rotate until the 40 MFD - 25 V lug faces socket F. Solder a chassis spot at the base of one of the mounting lugs. Carefully twist three of the mounting lugs with long nose pliers so that they engage chassis. Bend the fourth lug down over chassis spot and solder. If condenser is still not rigid another mounting lug must be soldered to chassis. Select a can condenser which contains four 10 MFD sections at 450 V and mount in hole #6 using above method. Mount the last can (4-10MFD - 450 V) in hole #8. This completes the mounting of all electrolytic can condensers. Refer to Figure #3.

6. The next step will be the installation of the vertical oscillator transformer. This is the small iron core transformer with the four colored leads emerging from the bottom. Run the wires through hole #9 from topside of chassis and secure with self-tapping screws in holes #59 and #60.

7. The next step will be the installation of the controls. First look for the four controls with the small ground lugs loosely attached. One is a 5000 ohm control, one is a 10,000 ohm control, one is 100,000 ohm control with A. C. switch, and one is a 500,000 ohm control. Before going further it would be advisable to study the lugs on the controls. The identity of the lugs shall be as follows; looking at the back of the control with the shaft pointing away from you and the lugs up, the one on your left shall be the low lug. The one on your right shall be the high lug and the center one is known as center lug. Select the 5000 ohm control with the ground lug and solder the ground lug to the low lug of the control. Then remove the nut and mount in hole #23 with the lugs up, that is, facing you in the inverted chassis. Mount the nut tightly with slip joint pliers or a wrench. Select the 10,000 ohm control. Solder the ground lug to the high lug of the control and mount in hole #30. Select the 500,000 ohm control. Solder ground lug to the low lug of the control and mount in hole #27. Select the 100,000 ohm control with A. C. switch. Solder the ground lug to the high lug of the control and mount in hole #31. The following table will locate the remainder

7. Continued.

Control	Mounting Hole
2000 ohm	#25
2,000,000 ohm (2 Megohm)	#22
2,000,000 ohm (2 Megohm)	#21
50,000 ohm	#20

This completes the mounting of all controls. The two holes on the front, which remain will accomodate the controls in the factory built TELEKIT tuner which will be installed later. Refer to Figure #3.

8. The next step to be performed will be the wiring of the power supply. Before wiring this circuit a point of caution is in order. All transformer wires must be cleaned thoroughly with emery cloth or sandpaper. This is necessary because a coating of enamel is put on the bare wires during the manufacture of the units and it must be removed before a joint can be made. First, skin off the insulation, then sand the wire. Take one choke lead over to socket C and crimp into lug #8. Do not solder yet. Crimp other choke lead into a 30 MFD lug of can condenser in hole #5. Do not solder yet. This joint shall be referred to in the future as B + Main Junction. Select the black pair of transformer wires which come through hole #70, and twist together. Run over to socket C. Crimp one lead into lug #2 and solder. Crimp other lead into lug #8 but do not solder as yet. Gauge a piece of hook-up wire which will reach from lug #8 of socket C to can condenser in hole #4. This wire should "hug" chassis. Crimp and solder one end into lug #8 of socket C. Thread other end through one 20 MFD - 450 V. lug and crimp into other 20 MFD - 450 V. lug of this condenser. Solder both lugs. Be very cautious not to make any errors on these connections. Take a piece of bare (ground) wire and ground the 20 MFD - 25 V. lug of the condenser in hole #4 to chassis. Take the red pair and twist. Run along chassis to socket C. Crimp one lead into lug #4. Solder. Crimp other lead into lug #6. Solder. Be sure to cut all wires to make the most direct connections. Take the red and yellow wire, run across chassis to the condenser in hole #1. Crimp to nearest can lug on this condenser. The can is insulated from chassis by the wafer. The last joint is made to the can of the condenser which is above ground. Do not solder yet. Select a piece of hook-up wire which will reach from this can lug over to the low lug of control in hole #26. Crimp into condenser can lug and solder the entire joint. Run along chassis to control and crimp into low lug. Crimp one end of the hank of hook-up wire into the low lug of control in hole #26. Solder. Run wire out hole #25 for a distance of 30 inches. Snip hank from wire. This will be one of the picture board leads. Take one lead from the green pair and one lead from the brown pair and twist. Cut, skin and clean wires very thoroughly and solder to chassis spot, in accordance with Figure #3. Take the other green lead along chassis to lug #4 of socket K. Crimp and solder to lug #4. Note; A splice may be necessary here. Clean end of green lead very thoroughly and splice a piece of hook-up wire to this lead in order to reach socket K. **Use the small rubber sleeve to insulate the splice** joint. This lead also must "hug" chassis. Take brown lead over to lug #7 of socket F. Clean, crimp and solder into lug #7. If a splice is necessary here use above procedure. Take the yellow pair, twist and run along chassis to socket D. Clean and crimp one lead into lug #7 of socket D. Clean and crimp other lead into lug #2 of socket D. Solder both lugs. Take one of the black and red wires and run along chassis to pin #3 of socket C. This is a "dead" lug on socket C, that is, it is not connected to any elements within the tube. In this application it is merely used as a tie point. Crimp into lug #3 but do not solder yet. Run other black and red lead along chassis and crimp into one side of the A.C. switch. Solder this joint. Keep all power supply wires down on chassis. You will note that the blue pair has been left unconnected for the present. This will be wired in a later operation. Check all connections with Figure #3. This completes operation #2.

lug #8 of socket D

Operation #3

1. The contents for operation #3 will be found in package #6. Remove the A. C. line cord from package. Tin one wire and run cord into hole #25 from outside of chassis. Crimp tinned side of the line cord into the open lug of the A. C. switch and solder. Cut, skin and tin other side of line cord so that it can be crimped into lug #3 of socket C. Solder lug #3.

2. The next step to be performed will be the wiring of the picture tube filament winding. Take blue pair of transformer leads and twist. Run along chassis, until socket C is reached. "Dead" lugs #1 and #7 shall be used as tie points. Skin, clean and crimp into these lugs. Do not solder yet. Gauge a piece of hook-up wire which shall crimp into lug #1 of socket C and run out hole #25 to end of previous wire which was left hanging (from low lug of control #26). Cut. Solder lug #1. Do likewise with wire in lug #7 of socket C. Solder. Refer to Figure #4.

3. Withdraw picture tube socket and hardware from packet. Take one clip and solder it to end of wire coming from lug #1. Repeat with wire from lug #7. Leave other wire open for present.

4. Remove the octal plug from package #6. Solder the wire from the low lug of control #26 into pin #6 of the octal plug. Before inserting the wire into the prongs skin off about $\frac{1}{2}$ inch of insulation and push into prong until hole is reached. Heat end of prong and apply solder. Do not allow droplets of solder to collect on end of prongs or plug will not fit socket. Refer to Figure #4.

5. Gauge another piece of hook-up wire which will reach from inside of hole #25 to plug. Solder one end to chassis and solder the other end into #5 prong on plug. Refer to Figure #4.

6. Remove one 50 ohm 1 watt and one 200 ohm 1 watt resistor from package #6. Put one lead from each unit together and twist. Solder other lead of the 200 ohm resistor to ground. Solder other lead of the 50 ohm resistor to center lug of control #26. Gauge another length of hook-up wire which will reach from the junction of these two resistors to prong #3 of octal plug. Run wire through hole #25 and solder both connections. Remove another 200 ohm 1 watt resistor from package #6. Crimp one lead into low lug of control #26. Solder. Crimp other lead to junction of the 50 and 200 ohm resistors. Solder.

7. Remove the 100 ohm 1 watt resistor from package #6. Crimp one lead into B+ Main Junction and crimp the other lead into an open 10 MFD - 450 V. section of can condenser in hole #6. Do not solder either joint yet. Remove a 50,000 ohm 1 watt resistor from package #6. Crimp one lead into the low lug of the control in hole #31. Solder. Solder hook-up wire to other end and gauge length necessary to run across chassis to the 10 MFD lug where the 100 ohm 1 watt resistor was previously crimped. Before crimping into this lug slip rubber sleeve over the junction of hook-up wire and resistor. Crimp into condenser lug but do not solder. (NOTE: The next connections is designated on circuit diagram as optional centering connection). (If picture does not center horizontally later it will be necessary to connect this wire directly to B+ Main Junction). Gauge a length of wire which will reach from the 10 MFD section utilized previously to prong #7 of octal plug. Crimp into 10 MFD lug but do not solder yet. Solder into #7 prong of plug. Gauge a hook-up wire which will reach from center lug of control in hole #31 to an open terminal lug of the bathtub condenser mounted in holes #43 and #44. Solder center lug. Crimp but do not solder bathtub connection. Gauge another length of hook-up wire which will reach from terminal lug of bathtub condenser out through hole #25 to another picture tube socket clip. Solder to clip. Keep all these leads even. Refer to Figure #4.

8. Remove the 1000 ohm 1 watt resistor from package #6. Crimp one lead into lug #8 of socket R. Gauge a piece of hook-up wire which will reach from other lead of this resistor to can condenser in hole #6. Cut and solder to other resistor lead. Insulate the joint with a rubber sleeve. Run wire over to the condenser lug which was previously utilized. Crimp into this lug and solder. Gauge another length of hook-up wire which will reach from lug #8 of socket R to the outside section of the bathtub condenser in holes #67 and #68. Solder the condenser lug but not the socket lug as yet. Gauge another length of hook-up wire which will reach from socket R out of chassis through hole #25 and to the end of the picture tube leads. Solder one end to lug #8 of socket R. Solder other end to a picture tube clip.

9. Skin and tin one end of your hank of hook-up wire. Solder a clip on this end and insert it in hole #2 of picture tube socket. The lead from lug #8 of socket R goes to hole #10 of picture tube socket. The lead from lug #1 of socket C goes to hole #1 of picture tube socket. The lead from lug #7 of socket C goes into hole #12 of socket. The lead from the bathtub condenser section goes into hole #11. Replace back cover on socket and tap small nails in with a hammer. Run the hank of hook-up wire over to hole #17 and gauge the length required to extend through this hole for a distance of one inch. Cut this wire and let hang until further notice.

10. Remove the vertical output transformer from package #6. Mount inside of side apron so that feet holes coincide with holes Nos. 33, 34, 35 and 36. The side from where the leads emerge should be toward the rear apron of chassis. Secure to chassis with hardware. Take the green lead, crimp into dead lug #5 of socket C. Take hank of hook-up wire, crimp end into same lug and run out of chassis to #1 of octal plug. Solder into #1 prong. Skin the blue lead and solder a small piece of hook-up wire to end. Insulate with rubber sleeve and run over to lug #5 of socket F. Crimp and solder into lug #6. Run both red and yellow leads over to an unused 10 MFD lug of the condenser in hole #6. Crimp both leads into this lug but do not solder. Skin the end of the hank of hook-up wire and crimp into this same lug. Solder entire lug. Run along chassis and out hole #25 to octal plug. Solder into #8 prong of plug.

11. Take hank of hook-up wire and solder into prong #2 of octal plug. Run into chassis through hole #25 and crimp into lug #5 of socket D. Do not solder yet. This completes the wiring of both plug and picture tube socket. This also completes operation #3. Refer to Figure #4. #6 of socket D

MEMO

Operation #4

1. This operation will consist of the wiring of the sound portion of the receiver and sockets H, I, and J will be utilized. The tuner will also be installed. Remove the discriminator can from package #7 and mount in hole #93 on topside of chassis using both holes #67 and #68. The soldering lugs identified as C, B, and A should face socket I. Place rubber grommet in hole #16. Refer to Figure #5.

2. Remove a 200 ohm $\frac{1}{2}$ watt resistor from package #7. Crimp to lug #2 of socket H. Crimp other lead into ground lug. Remove a .005 condenser and crimp into lug #2 of socket H. Ground other lead. Solder both connections. With hook-up wire join "D" lug of discriminator can to lug #5 of socket H. Solder both lugs. Connect "F" lug of discriminator to lug #6 of socket H. Solder "F" lug but not lug #6 as yet. Remove a .005 condenser. Crimp one lead into lug #6 of socket H and solder other lead into ground lugs. Remove a 30,000 ohm 1 watt resistor. Solder one lead to lug #6 of socket H, leave other lead open for the present. Join "A" lug of discriminator to lug #1 of socket I. Solder both connections. CAUTION! The zip-in sockets will melt when too much heat is applied. Solder all connections very carefully!

2. Continued.
If too much heat is applied the socket will also warp badly and a tube will not fit the socket. So watch your work very closely while on zip-in sockets. With hook-up wire connect "B" of discriminator to lug #2 of socket I. Solder both connections. Crimp a 500,000 ohm ½ watt resistor into "C" lug of discriminator. Solder other lead to ground.

3. Crimp another 500,000 ohm ½ watt resistor into "C" lug of discriminator and crimp other lead into lug #3 of socket I. Do not solder lug #3 as yet but solder "C" lug of discriminator. Crimp one lead of a .001 condenser to lug #3 of socket I. Do not solder yet. Solder other lead to ground. Twist one lead of a .01 condenser and 50,000 ohm ½ watt resistor together. Crimp the other lead of the .01 condenser into lug #8 of socket I. Do not solder yet. Crimp the other lead of the 50,000 ohm resistor into lug #3 of socket I. Solder. Remove a 10 megohm ½ watt resistor from package #7. Crimp one lead into lug #8 of socket I. Solder. Ground other lead of this resistor. Refer to Figure #6.

4. Remove a .01 condenser from package #7. Splice a 4 inch piece of hook-up wire to one lead of this condenser. Insulate with a rubber sleeve. Crimp other lead of the condenser into the high lug of control in hole #27. Solder. Crimp other end of hook-up wire into lug #9 of socket I. Do not solder yet. Crimp one lead of a 250,000 ohm ½ watt resistor into lug #9 of socket I. Solder. Crimp other lead into lug #4 of socket J. Do not solder. Crimp one end of a piece of hook-up wire into center lug of control in hole #27 and run into lug #6 of socket J. Solder both lugs. Crimp one lead of a 500 ohm ½ watt resistor into lug #8 of socket J. Do not solder yet. Solder other lead to ground. Crimp one end of a piece of hook-up wire into lug #8 of socket J. Solder. Run along chassis to an open 10 MFD lug of can condenser in hole #8. Solder. Refer to Figure #6.

5. Remove the red and blue speaker wires from package #7. Crimp one end of the blue wire into lug #3 of socket J. Run other end out of chassis through hole #16. Do not solder lug #3 as yet. Crimp the red wire into lug #4 of socket J. Do not solder. Run other end out of chassis through hole #16. Remove a .01 MFD condenser from package #7. Crimp one lead into lug #3 of socket J. Crimp other lead into lug #1 of socket J. Solder lug #3 but not lug #1 as yet. Remove the 1000 ohm 2 watt resistor from package #7. Crimp one lead into lug #1 of socket J. Do not solder as yet. Twist other lead of 1000 ohm resistor to the open lead of the 30,000 ohm 1 watt resistor which was previously left open. Do not solder. This forms the basis of B+ Junction #1. Crimp one end of hook-up wire into lug #4 of socket J. Solder. Run wire along chassis and crimp into another 10 MFD lug of can condenser in hole #8. Solder. Refer to Figure #6.

6. Remove tuner very carefully from box. During the installation of this unit do not touch or jar the coils around the switch as it will throw the unit out of alignment. Remove the knob and the dial plate from the front. Note the two red dots on the front and on the shaft. This indicates that the switch is in position for channel #1. Remove the extra nuts which are on the control shafts.

7. Fit the unit into the chassis so that the shafts come through shaft holes #28 and #29. A little gentle pressure is necessary to enable the threaded slug shaft on the first I. F. coil to come through the slot. Be sure also that the threaded bushings on the controls come through the front apron of the chassis as far as possible. After unit is snug in its place secure the rear flange to the main chassis with the self-tapping screw found in package #7. Replace the nuts on the controls and tighten.

8. You will notice a small enameled coil with an open lead emerging from the tuner. This is the filament choke. Scrape enamel off end and crimp into lug #1 of socket H. Solder. Run the red lead over to the connection designated as B+ Junction #1. Skin wire and twist to this junction. Crimp the open lead of the 200 MMF condenser emerging from the tuner into lug #1 of socket K. Do not solder. This completes operation #4. Refer to Figure #5.

Operation #5

1. Operation #5 will utilize the contents of package #8 and the sockets to be wired are K, L, M, N, and O. Remove a 5 MMF condenser and also an I. F. coil from package #8. Any I. F. coil will do as they are all identical. Solder the condenser across the active lugs of the coil, that is, the ones with the coil wires attached. (Some TELEKIT coils have three lugs, two active, and one dummy lug. A close inspection will reveal that the dummy lug is the one which has no coil wires attached. Also, the coils have no polarity, therefore either lug may be used for plate connections, grid connections, B+ connections, etc.) Keep leads short and keep condenser close to coil form. Insert in hole 11, with condenser facing socket H. Ground one lug of coil to chassis with bare wire. Solder hook-up wire to other lug of coil. Run wire directly over to lug #1 of socket H. Keep this wire above chassis. Solder lug #1.

2. Remove a 10,000 ohm $\frac{1}{2}$ watt resistor from package #8. Crimp into lug #1 of socket K. Ground other lead. Solder both joints. Remove a .005 MFD condenser from package #8. Crimp one lead into lug #2 of socket K. Do not solder. Solder. Ground other lead. Solder. Connect a 200 ohm $\frac{1}{2}$ watt resistor to lug #2 of socket K. Solder lug #2. Ground other lead. Solder.

3. Insert another I. F. coil into hole #12. Connect one lug of coil to lug #5 of socket K with bare wire. Solder coil lug but not lug #5 as yet. Crimp one lead of a .005 MFD into lug #6 of socket K. Do not solder. Ground other lead to chassis. Solder. Crimp hook-up wire into lug #5 of socket K. Do not solder. Run over to other lug of coil in hole #12 and solder. Crimp one lead of a 200 MMF condenser into lug #5 of socket K. Solder lug #5. Crimp other lead into lug #1 of socket L. Crimp but do not solder. Crimp one lead of a 30,000 ohm 1 watt resistor into lug #6 of socket K. Solder lug #6. Leave other lead of resistor open as it will start to form the B+ Junction #2. At this point it is necessary to install a coupling "gimmick" between the two coils. Cut a $3\frac{1}{4}$ inch piece of hook-up wire. Skin ends. Make a link around the tops of the two coil forms. Twist the bare wires together until the link is tight. Solder the joint. This completes wiring of socket K.

4. Remove a 10,000 ohm $\frac{1}{2}$ watt resistor. Crimp into lug #1 of socket L. Ground other lead. Solder both joints. Remove a .005 MFD condenser from package #8. Crimp one lead into lug #2 of socket L. Do not solder. Ground other lead. Solder. Connect a 200 ohm $\frac{1}{2}$ watt resistor to lug #2 of socket L. Solder lug #2. Solder hook-up wire to other lead of resistor and insulate with rubber sleeve. Run wire along chassis in accordance with Figure #6 and crimp into center lug of control in hole #30. Push wire down on chassis and against front apron of chassis. Solder. Crimp a 100,000 ohm $\frac{1}{2}$ watt resistor into the low lug of the control in hole #30. Solder. Solder hook-up wire to other lead of this resistor and insulate with sleeve. Run across chassis and crimp into B+ Main Junction. Refer to Figure #6.

5. Insert another I. F. coil into hole #13. Connect one lug of coil to lug #5 of socket L with bare wire. Solder coil lug but not lug #5. Crimp one lead of a 200 MMF condenser into lug #6 of socket L. Crimp one lead into lug #1 of socket M. Solder lug #6 of socket L but not lug #1 of socket M. Crimp one lead of a

5. Continued.
.005 MFD condenser into lug #6 of socket L. Do not solder. Ground other lead to chassis. Connect lug #6 of socket L to other lug of coil in hole #13 with bare wire. Solder coil lug but not lug #6. Crimp one lead of a 30,000 ohm 1 watt resistor to lug #6 of socket L. Solder lug #6. Twist other lead of resistor to open lead of the 30,000 ohm resistor which make up B+Junction #2. This completes entire socket L. Refer to Figure #6.

6. Remove a 10,000 ohm ½ watt resistor from package #8. Crimp into lug #1 of socket M. Solder. Ground other lead to chassis. Solder. Crimp one lead of a 5000 ohm ½ watt resistor to lug #5 of socket M. Crimp other lead into lug #6 of socket M. Do not solder yet. Crimp one lead of a .005 MFD condenser into lug #6 of socket M. Do not solder. Ground other lead. Solder. Insert another I. F. coil into hole #14. Ground one lug of coil to chassis with bare wire. Solder. Crimp lead of the 200 MMF condenser into lug #5 of socket M. Solder. Thread open condenser lead through other lug of I. F. coil in hole #14 and crimp into lug #3 of socket N. Solder coil lug and also lug #3 of socket N. Crimp one lead of a 30,000 ohm 1 watt resistor into lug #6 of socket M. Solder. Twist other lead to B+ Junction #2.

7. Remove cathode trap coil from package #8. This is the large coil with the condenser connected across two soldering lugs. You will also notice two lugs to which the enameled leads are attached. The lug which connects to the low side of the coil (closest to the mounting clip) we shall designate as low lug, the other is the high lug. Place the cathode trap in hole #14 from underside with low lug facing socket M. Connect low lug of coil to lug #2 of socket M. Solder both lugs. Take a .005 MFD condenser and a 200 ohm ½ watt resistor from package #8. Crimp one lead of each to high lug of coil. Solder. Ground other lead of each and solder. This completes wiring of socket M.

8. Remove one medium sized peaking coil. Thread one lead through lug #1 and crimp into lug #2 of socket N. Solder lugs #1 and #2. Crimp other lead into lug #4 of socket N. Do not solder lug #4 as yet. Remove a 2000 ohm ½ watt resistor from package #8. Crimp one lead into lug #4 of socket N. Solder lug #4. Ground other lead to chassis. Remove another peaking coil which is medium sized and a .1 MFD condenser. Twist one lead of each together and solder. Crimp the open end of the peaking coil into lug #5 of socket N. Do not solder lug #5. Crimp the open lead of the condenser into lug #1 of socket O. Do not solder lug #1.

9. Remove a 2000 ohm 1 watt resistor and crimp one lead into lug #5 of socket N. Crimp other lead into an open 10 MFD lug of condenser in hole #8. Take a 5000 ohm 1 watt resistor and crimp one lead into the same 10 MFD lug of can condenser in hole #8. Solder condenser lug. Twist other lead to B+ Junction #2. Remove a .01 MFD condenser and a 30,000 ohm ½ watt resistor from package #8. Twist one lead of each together and solder. Crimp the other lead of the resistor into lug #6 of socket N. Solder lug #5. Take a 10,000 ohm ½ watt and a 2 megohm ½ watt resistor and a 50 MMF condenser. Twist one lead of each together and twist to the open lead of the .01 MFD condenser. Solder. Ground open lead of the 2 megohm resitor. Ground open lead of the 50 MMF condenser. Crimp open lead of 10,000 ohm resistor to lug #1 of socket P. Solder. This completes wiring of socket N.

10. Remove a one megohm ½ watt resistor from package #8. Crimp one lead into lug #1 of socket O. Solder. Ground other lead to chassis. Crimp one lead of another one megohm ½ watt resistor into lug #6 of socket O. Do not solder yet. Ground other lead of this resistor. Remove the small peaking coil and one .1 MFD condenser and twist one lead of each together. Solder. Crimp the open lead of the peaking coil into lug #2 of socket O. Do not solder. Leave other lead of the.1 condenser open for the present. Remove a .005 condenser and a 10,000 ohm ½ watt resistor from package #8. Twist one lead of each together and solder. Crimp the

10. Continued.
open lead of the .005 condenser into lug #3 of socket O. Do not solder. Leave the other lead of the 10,000 ohm resistor open for the present time. Remove the large peaking coil from package #8. Crimp one lead into lug #2 of socket O and solder. Twist other lead to the open lead of the 10,000 ohm resistor. Do not solder yet. Remove a 500,000 ohm ½ watt resistor from package #8. Crimp one lead into lug #6 of socket O and solder. Twist other lead to the open lead of the .1 MFD condenser. Do not solder. Remove grommet from package #8. Place in hole #17. Run the open ended wire from picture tube socket (#2 of picture socket) through hole #17 and twist to junction of the 500,000 ohm resistor and the .1 MFD condenser. Solder.

11. Remove a 2000 ohm 1 watt resistor and a 5000 ohm 1 watt resistor from package #8. Also cut a three inch piece of hook-up wire. Twist one lead of each resistor, and also one end of the wire together and solder. Connect the open end of the 5000 ohm resistor to junction of the 10,000 ohm resistor and the peaking coil (large size). Solder. Crimp the open end of the hook-up wire into the last open 10 MFD lug of condenser in hole #8. Solder. Twist the open end of the 2000 ohm resistor to the B+ Junction #2. This completes operation #5. Refer to Figure #6.

Operation #6

1. This operation shall consist of the wiring of the deflection oscillators and associated circuits. Remove a one megohm ½ watt resistor from package #9. Crimp one lead into lug #1 of socket P. Solder other lead to ground. Remove a .01 MFD condenser and crimp one lead into lug #1. Solder lug #1. Crimp other lead into lug #2 of socket P. Do not solder. Crimp one lead of a 10,000 ohm ½ watt resistor into lug #2 of socket P. Solder other lead to ground. Remove a 250,000 ½ watt resistor from package #9. Crimp one lead into lug #2 of socket P. Solder lug #2. Crimp other lead to B+ Junction #2. Refer to Figure #7.

2. Remove a .01 MFD condenser from package #9. Crimp one lead into lug #5 of socket P. Do not solder. Leave other lead open for the present. Crimp one lead of a 5000 ohm 1 watt resistor into lug #5 of socket P. Solder. Leave other lead open for the present. Remove three .005 MFD condensers from package #9. Place side by side and lay in position as indicated in Figure #7. Ground one lead of each as indicated in Figure #7. Note that these condensers are indicated as "a", "b", and "c" on Figure #7. Remove a 20,000 ohm ½ watt resistor from package #9. Twist one lead to the open lead of the .01 condenser left open previously. Twist other lead of the resistor to the open lead of the condenser designated as "c". Do not solder either joint yet. Remove a 30,000 ½ watt resistor from package #9. Twist one lead to the junction of the .01 condenser and the 20,000 ohm resistor. Solder. Ground other lead of this resistor.

3. Remove a 5000 ohm ½ watt resistor from package #9. Twist one lead to junction of the 20,000 ohm resistor and the condenser designated as "c". Solder. Twist other lead to the open lead of condenser designated as "b". Do not solder. Remove another 5000 ohm ½ watt resistor from package #9. Twist one lead to junction of above resistor and condenser "b". Solder. Twist other lead to open lead of condenser "a". Do not solder. Take the yellow wire which comes through hole #9 and run along chassis to junction of condenser "a" and the 5000 ohm resistor. Clean and crimp to this junction. Solder. Refer to Figure #7.

4. Remove the strip of three trimmers from package #9. Take a piece of bare wire and thread through the three holes in the rotor terminals. (The rotor is the top or movable plate). Solder these holes and leave about three inches of bare wire over to solder to a ground spot on the chassis. Bend these terminals down until they are at right angles to the condensers. Place over holes #95 and #96 and fasten in with hardware so that the rotor terminals face front apron of chassis. Ground the piece of bare wire to a chassis spot. Refer to Figure #7.

5. Remove a 2000 ohm 1 watt resistor from package #9. Take hank of hook-up wire and solder to one end of this resistor. Insulate joint with a rubber sleeve. Twist other lead of this resistor to the open lead of the 5000 ohm resistor which connected to lug #5 of socket P. Run hook-up wire over to the open 20 Mfd. 450 volt lug of can condenser in hole #6. Crimp into lug but do not solder. Remove a 1000 ohm 1 watt resistor and crimp one lead into the 20 Mfd. section which was just utilized. Solder this joint. Crimp other lead of this resistor into the B + Main Junction. Solder. Refer to Figure #7.

6. Remove a 100 MMF. condenser from package #9. Crimp one lead into stator terminal of trimmer condenser "f". Do not solder. Twist other lead into the junction of the 2000 ohm and the 5000 ohm resistor previously connected. Solder the entire junction.

7. Remove the horizontal synchro-lock coil and one 10,000 ohm ½ watt resistor from package #9. Crimp one lead of resistor into the green lug of the coil Crimp the other lead of the resistor into the yellow lug of the coil. Keep leads short. Do not solder yet. Insert in hole #37 in accordance with Figure #7. Remove a 2 megohm ½ watt resistor from package #9. Crimp one lead into lug #1 of socket Q. Crimp other lead into lug #4 of socket Q. Do not solder. Remove a 500,000 ½ watt resistor and crimp one lead into lug #1 of socket Q. Crimp other lead into lug #3 of socket Q. Do not solder yet. Remove a .001 mfd. condenser. Crimp one lead into lug #1 of socket Q. Solder lug #1. Crimp other lead into stator lug of trimmer "f". Do not solder. Crimp one end of hook-up wire into lug #2 of socket Q. Do not solder. Run along chassis and crimp into the center lug of the bathtub condenser. Solder the condenser lug. Crimp one end of another piece of hook-up wire into lug #2 of socket Q. Solder lug #2. Run along chassis to center lug of control in hole #20. Solder.

8. Remove a .01 mfd. condenser from package #9. Crimp one lead into lug #3 of socket Q. Ground other lead to chassis. Crimp one lead of a 150,000 ½ watt resistor into lug #3 of socket Q. Crimp other lead into stator lug of trimmer "e". Do not solder either joint. Remove a .25 mfd. condenser and a 10,000 ½ watt resistor from package #9. Twist one lead of each together and solder. Solder other lead of the resistor to ground. Crimp other lead of condenser into lug #3 of socket Q and solder lug #3. Crimp one end of hook-up wire into lug #5 of socket Q. Run directly up to green lug of synchro-lock coil. Solder both connections.

9. Remove a 150,000 ohm ½ watt resistor. Crimp one lead into lug #4 of socket Q. do not solder yet. Crimp other lead into stator lug of trimmer "e". Do not solder yet. Remove a 100,000 ohm ½ watt resistor and crimp one lead into lug of trimmer "e". Solder lug "e". Ground other lead of resistor to chassis. Remove a .001 Mfd. condenser. Crimp one lead into yellow lug of synchro-lock coil. Ground other lead of this condenser. Do not solder yellow lug as yet. Remove a 200 MMF. condenser. Crimp one lead into lug #4 of socket Q. Solder lug #4. Crimp other lead into white lug of synchro-lock coil. Solder white lug. Remove a 150,000 ½ watt resistor from package #9. Crimp one lead into trimmer "f". Do not solder. Crimp other lead into yellow lug of coil. Do not solder. Remove a 500 MMF. condenser from package #9. Solder a piece of hook-up wire to joint and insulate with a rubber sleeve. Crimp one lead of condenser into yellow lug of synchro-lock coil. Run hook-up wire along chassis to condenser "d". Do not solder either joint as yet. Remove a one megohm ½ watt resistor from package #9. Crimp one lead of resistor into trimmer "d". Ground other lead to chassis. Remove a 50 ohm ½ watt resistor. Crimp one lead into trimmer "d". Solder this lug. Crimp other lead into lug #6 of socket R. Solder.

10. Remove a 5 MMF. condenser and a 500,000 ½ watt resistor. Twist one lead of each together and solder. Solder a piece of hook-up wire to one lead of the condenser. Insulate. Thread the open lead of the resistor through lug (#5) #6 and crimp into lug (#3) of socket D. #4 Run hook-up wire along chassis and crimp into trimmer condenser "f". Solder trimmer lug. Remove a 250,000 ohm ½ watt resistor and a 150,000 ohm ½ watt resistor. Twist one lead of each together. Now twist the end of the hank of hook-up wire to this junction. Solder and insulate with sleeve. Crimp other lead of the 250,000 ohm resistor into low lug of control in hole #20. Solder. Crimp the other lead of the 150,000 ohm resistor to the yellow lug of synchro-lock coil. Solder yellow lug. Run hook-up wire along chassis to a 10 MFD. lug of can condenser in hole #6. Crimp but do not solder. Refer to Figure #7. Remove a 150,000 ohm ½ watt resistor from package #9. Crimp one lead into high lug of control in hole #20. Ground other lead of resistor to chassis.

11. Crimp one end of hook-up wire into lug #3 of socket R. Do not solder. Run along chassis and crimp into the last open 10 MFD. lug of can condenser in hole #6. Solder. Remove a 50 ohm 1 watt resistor from package #9. Crimp one lead into lug #3 of socket R. Solder lug #3. Ground other lead of this resistor. Refer to Figure #7.

12. Remove a .005 MFD. condenser from package #9. Crimp one lead into lug #1 of socket F. Cut, skin and twist green lead of vertical oscillator, (Hole #9) transformer to the other lead of the .005 condenser. Solder. Remove a 1 megohm ½ watt resistor from package #9. Twist one lead of the resistor to one end of the hook-up wire. Solder. Insulate joint with rubber sleeve. Crimp open lead of resistor into lug #1 of socket F. Solder. Run hook-up wire along chassis, to center lug of control in hole #21. Crimp and solder.

13. Run blue lead of vertical oscillator transformer over to lug #2 of socket F. Crimp into this lug and solder. Remove a 2 megohm ½ watt resistor from package #9. Crimp one lead into lug #4 of socket F. Do not solder yet. Ground other lead to chassis. Remove a .25 MFD. condenser from package #9. Crimp one lead into lug #4 of socket F. Solder lug #4. Crimp other lead of condenser into last open lug of bathtub condenser. Do not solder yet. Take the red lead which comes through hole #9. Skin, run lead along chassis and crimp to the terminal of the bathtub condenser just utilized.

14. Remove a 100,000 ohm ½ watt resistor. Crimp one lead to high lug of control in hole #21. Do not solder. Ground other lead of this resistor. Remove a 50,000 ohm ½ watt resistor. Crimp one lead into low lug of control in hole #22. Solder. Ground other lead of this resistor. Remove a 2 megohm ½ watt resistor. Crimp one lead of resistor into high lug of control in hole #21. Solder. Crimp other lead into "dead" lug #6 of socket R. Do not solder. Remove a one megohm ½ watt resistor. Crimp one lead into center lug of control in hole #22. Solder. Crimp other lead into lug #6 of socket R. Do not solder. Crimp one end of hook-up wire into lug #6 of socket R. Solder. Run wire along chassis to junction of bathtub condenser terminal, the .25 MFD. condenser and the red wire. Crimp and solder.

15. Crimp one end of hook-up wire into lug #6 of socket F. Do not solder. Run hook-up wire along chassis to the 40 MFD. - 25 volt lug of condenser in hole #5. Solder. Remove a 500 ohm ½ watt resistor and a piece of hook-up wire. Twist one end of each together and solder. Insulate with rubber sleeve. Crimp open lead of 500 ohm resistor into lug #6 of socket F. Solder. Run hook-up wire along chassis in accordance with Figure #7 to center lug of control in hole #23. Solder. Caution; keep all wires away from the insulated high voltage socket and lugs. This area must be kept clear.

16. Remove the linearity coil from package #9. This is the coil with the soldering lugs close to the mounting clip. Mount coil in hole #98 in accordance with Figure #7. Crimp one end of hook-up wire into lug #8 of socket D. Do not solder. Crimp other end of hook-up wire into center lug of bathtub condenser. Solder. Crimp another piece of hook-up wire into lug #8 of socket D. Solder. Crimp other end into one active lug of linearity coil. Solder.

17. Remove the .02 MFD condenser from package #9. Note: this may be two units in parallel. Before making any connections to linearity coil examine the lugs. There are two active lugs and one dummy lug on this coil. Here again, there is no polarity on this coil and therefore the same procedure on making connections can be used as on the I. F. coils. Crimp one lead of the .02 condenser into other active lug of coil. Do not solder. Solder open lead of condenser to chassis. Crimp one lead of a 10,000 ohm 1 watt resistor into the 10 MFD - 450 volt lug of can condenser #6 shown in Figure #7. Solder. Crimp open lead of resistor to same lug of linearity coil just utilized for the condenser connection. Do not solder. Crimp one end of hook-up wire into high lug of control in hole #22. Solder. Run along chassis to the 10 MFD - 450 volt lug of condenser in hole #6 as shown in Figure #7. Do not solder. Remove a 1000 ohm 2 watt resistor and crimp into condenser lug just utilized. Solder. Crimp other lead of this resistor into coil lug opposite the .02 condenser connection.

18. Remove the high voltage box from kit. Place box on top of chassis so that the mounting bracket on front of box falls over hole #87A. Fasten back cover of box on rear apron of chassis using holes #37 and #38 with self-tapping screws. Remove box but leave rear cover mounted.

19. Remove the horizontal output transformer from box stamped #9. Inspect the terminal board closely. You will notice that the terminal posts are numbered. Cut three pieces of hook-up wire about one foot in length each. Crimp one lead to terminal lug #4 and solder. Crimp one lead to lug #1 and solder. Crimp the third lead to lug #5. Do not solder. Remove the diagonal bar from unit and lay aside. Insert the two plastic covered leads through the small holes in the insulated wafer which supports socket E. Place the transformer against rear cover of cage with terminal board facing cover and fasten to cover with the two bolts, which previously held diagonal bar. The top mounting bolt will be in the sixth vertical row of holes counting from your right as you face the rear of the chassis. Route the three hook-up wires down into chassis through hole #7.

20. Remove the width coil from package #9. Place the width coil in the rear cover of the high voltage case slightly above and to the right of the horizontal output transformer. This coil will utilized the fourth row of holes from the right three holes down. Enlarge this hole slightly. Clean one lead with emery cloth. Crimp into lug #6 of transformer and solder. Crimp other lead into lug #5 and solder.

21. Stand chassis on end (with power transformer down) and work on inside once again. Take lead from lug #4 of horizontal output transformer and crimp into lug #6 of socket D. Solder lug #6 and #3 of socket D. Take lead from lug #1 of transformer and crimp into one lug of linearity coil. Solder the lug. Take lead from lug #6 of transformer, run along chassis and crimp into B+ Main Junction. Do not solder. Crimp one end of hook-up wire to B+ Main Junction and solder entire junction. Run along chassis and crimp to B+ Junction #2. Keep wire down on chassis. Do not solder. Crimp end of another piece of hook-up wire to B+ Junction #2 and solder. Run wire along chassis and crimp into B+ Junction #1. Solder Junction #1.

22. Turn attention to plastic filament leads which were previously inserted through the wafer at socket E. Skin off insulation and crimp one lead into lug #2. Solder. Make this a smooth joint with no sharp points as it could cause interference with reception later if not carefully made. Crimp other lead into lug #7 of socket E but do not solder. Remove a 100,000 ohm ½ watt resistor from package #9. Crimp one lead into lug #7 of socket E and solder. Crimp other lead into lug # 4 of socket E but do not solder. Remove the piece of high voltage wire from package #9. Crimp one end into lug #4 of socket E and solder lug #4. Run other end out of chassis, through the large hole in the wafer of socket E. Remember! Make all of these joints very carefully. Enlarge one of the holes(to lower left of horizontal transformer) on the rear cover. Insert a grommet in the hole. Run high voltage wire through the cover.

23. Remove antenna post from package #9. Place over holes #63 and #99. Secure to chassis with self-tapping screws. Solder both leads of tuner lead-in to antenna post. Do not cut this lead-in as the tuning unit was aligned using this wire. Just allow the lead-in to be slack.

24. Remove high voltage picture tube pin from package #9. Take apart and slip heavy rubber sleeve on high voltage lead. Spread clip and remove rubber center. Skin and crimp into bottom hole of clip. Solder. Replace rubber center and squeeze clip together. Run rubber sleeve down on clip until about 1/8 inch of metal is visible. Refer to Figure #7.

25. Remove the two knobs from the tuner box and also the dial plate. Attach the dial plate temporarily on chassis front with scotch tape. This dial plate is to be attached to the front panel of your cabinet later. The reason for attaching it to chassis temporarily is to facilitate the tuning of the proper channels during the testing of the unit. Place on so that #6 is at highest point on dial and that #13 is on lowest point. Place knob with white dot on shaft of channel switch so that set screw engages flat of shaft. This will cause the white dot to point to the right channel number at all times. Place the other knobs on the other control shafts on front apron. This completes operation #6.

OPERATION #7

1. Open package #10 and remove speaker. In some kits output transformers will already be mounted on the speaker. In other kits output transformer will be packed in package #10 loosely. The following information will be for the latter type of speaker. Mount output directly on speaker using lugs provided for same or nuts and bolts. Be sure that enameled leads are toward cone and the insulated leads are away from cone. Clean enameled leads and solder to soldering lugs of speaker.

2. Place speaker over hole #32 on front apron of chassis and secure with self-tapping screw to chassis. Caution: Do not allow screw driver to slip out of screw slot, as it may damage cone. Pick up the red lead which comes through hole #16 and run over top of chassis, to meet the red lead of the output transformer. Slip rubber sleeve on wire and splice together. Solder and insulate with rubber sleeve. Twist blue lead of transformer around red wire and join to blue wire which comes through hole #16. Insulate with sleeve. Run speaker wire down from speaker to chassis and run along front of chassis to corner and then route to hole #16. This wire may be secured to chassis with scotch tape. Be sure that speaker is rigid and not allowed to vibrate. This completes operation #7.

Operation #8

1. This operation will include the wiring of the picture tube coils. Remove the yoke from package #11. If the yoke is designated as #1 remove rear cover and note the six soldering lugs. You will find a corresponding number for each lug on outside of the yoke case. Remove the 50 MMF condenser from the package. Crimp one lead into lug #1 of yoke. Do not solder yet. Crimp other lead into lug #2 and solder. Crimp end of hook-up wire into lug #1 and solder. Run wire out of yoke through hole provided. Cut this wire to be an overall length of fifteen inches. Remove wafer socket from package and crimp other end of hook-up wire into lug #2 of socket. Solder. Cut another 15 inch length of hook-up wire and crimp end into lug #3 of yoke. Solder. Run out hole and solder to lug #7 of wafer socket. Remove a 560 ohm resistor from package #11. Crimp one lead into lug #4 of yoke. Crimp other lead into lug #5 of yoke. Do not solder either lug yet. Keep these leads short so that resistor is close to lugs. Crimp one lead of other 560 ohm resistor to lug #5 of yoke. Solder. Crimp other lead into lug #6. Do not solder. Crimp one end of another 15 inch length of hook-up wire into lug #6 of yoke. Solder. Run out hole and solder to lug #8 of wafer socket. Do likewise with lug #4 of yoke and solder hook-up wire into lug #1 of wafer socket. Replace cardboard cover on yoke.

2. If the yoke in your kit is designated as #2, then you will not have a cardboard cover on the back. All of the above wiring instructions are the same. You will note an extra lug on this yoke. This is a ground connection which you may disregard as it does not enter into the functioning of the unit.

3. Remove the focus coil from package #11. The two leads are color coded, green and yellow. Crimp the green lead into lug #6 of wafer socket. Solder. Crimp the yellow lead into lug #3 of wafer socket. Do not solder. Remove the ion trap magnet from package #11. Crimp the black lead of magnet into lug #3 of wafer socket. Solder lug #3. Crimp red lead into lug #5 of wafer socket. Do not solder. Crimp one end of a 15 inch length of hook-up wire into lug #5 of wafer socket. Solder.

4. Remove yoke holder from package. Fasten the yoke into the yoke holder with the wing bolt which is found in the same package. The front of the yoke holder has the spring wires protruding. The front of the yoke has the coils exposed. Be sure to mount yoke into holder front to front. Later, when the picture tube is slipped into the yoke the spring will contact the outside of the tube bulb and ground the external coating which is necessary to complete the high voltage filter circuit.

5. Solder the other end of the 15 inch wire to the yoke holder. This completes the wiring of picture tube coil components.

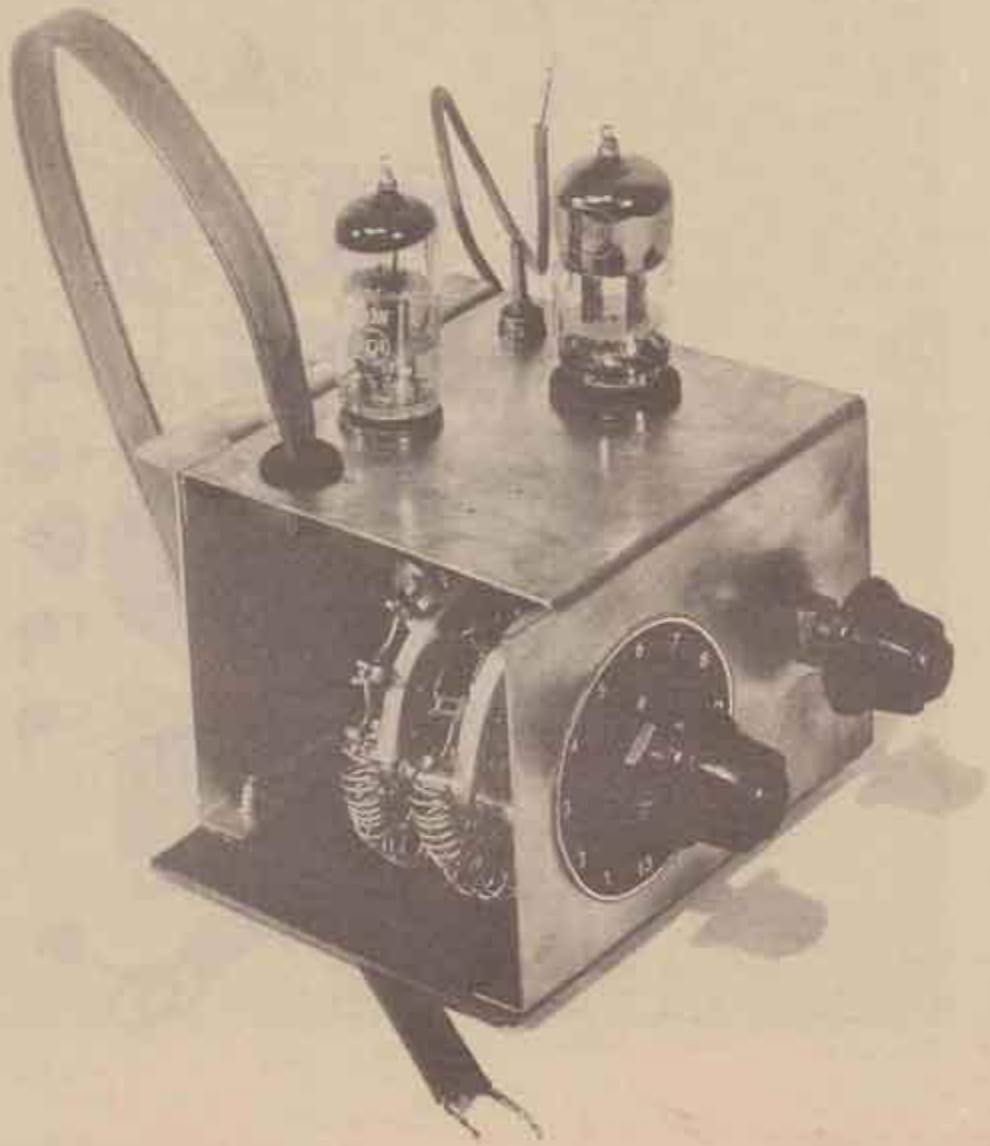
6. Some kits will include an ion trap magnet which has no leads attached. This is the permanent magnet type. If your kit contains a unit of this type then connect a piece of hook-up wire to lug #3 of the wafer socket. Solder. Run over to lug #5 of wafer socket and solder. This is a jumper wire necessary to complete the circuit in the absence of the electromagnet windings. This will complete operation #8. Refer to Figure #8.

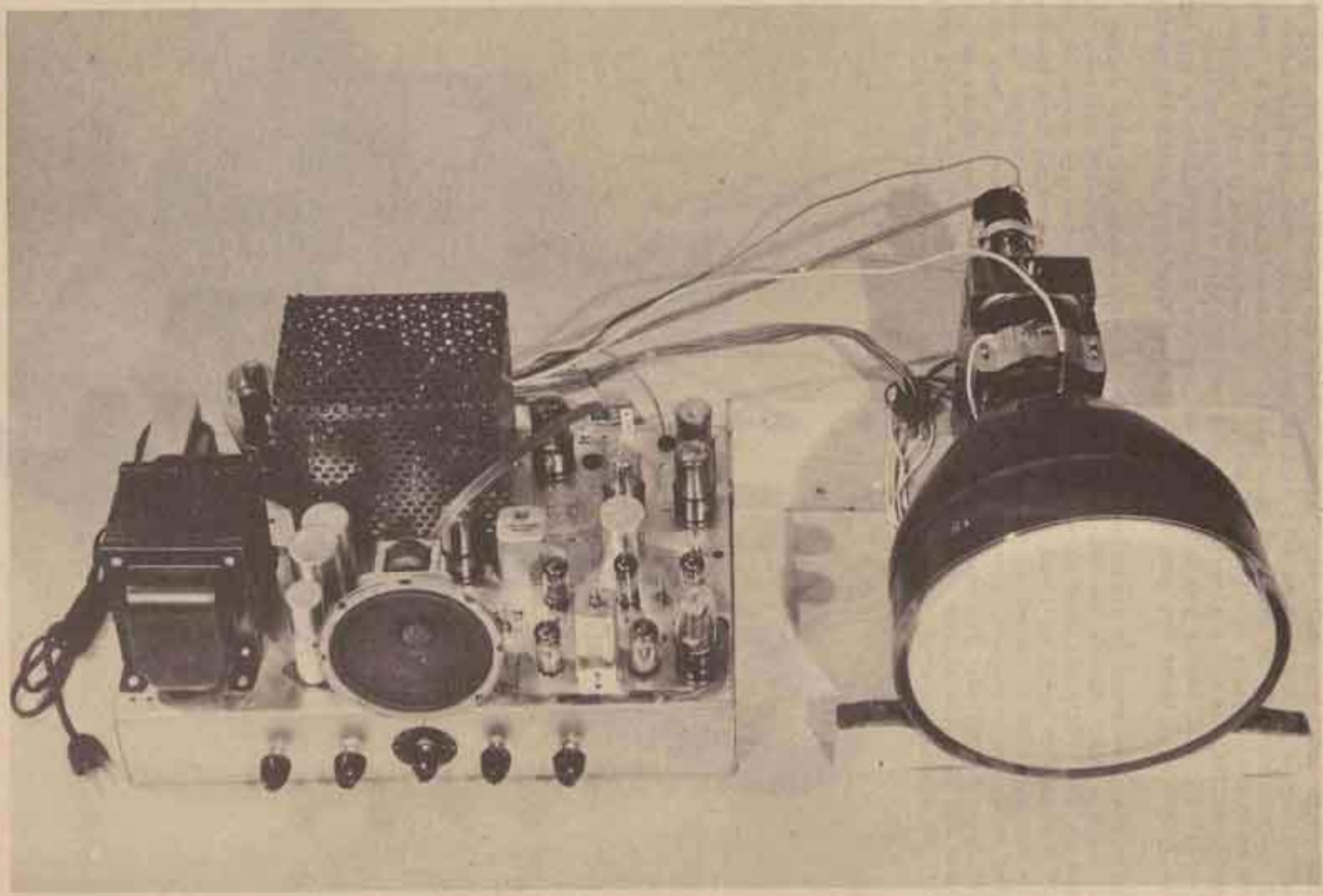
Operation #9

1. Remove the metal yoke mount and focus coil saddle from the kit. Place the yoke holder in the yoke mount so that the slots are over the two screw holes in the flanges. Fasten yoke holder to mount with the two large self-tapping screws with yoke toward the front. Slip focus coil bolt through saddle hole. Place large washer over bolt and secure with wing nut. Place saddle into yoke mount

1. Continued;
with smooth side of focus coil housing toward rear of yoke. Fasten saddle to yoke mount using the small self-tapping screws and washers. The ion trap magnet will ride on the picture tube neck directly behind this assembly after neck is slipped through the yoke and focus coil. The saddle will permit a forward and backward movement of the focus coil. The focus coil bolt and wing nut assembly will allow for a sidewise circular manipulation of the focus coil. This flexibility will enable you to center your picture both horizontally and vertically and eliminates the necessity of utilizing electrical centering controls.

2. After the yoke mount is assembled fasten on the board with the wood screws found in package #12. Remove the two large wood screws and stand-off bushings from package #12. Slip the wood screws through the wafer socket and mount on stand-off bushings on board at lower right rear of yoke mount looking from the back. The key position of socket is not critical. This socket will engage the octal plug which was previously wired and all later "hot checks" must be made with this plug connected. You have now completed the wiring of the entire set. Check all circuits against the schematic diagram. If everything checks properly, then you are ready for the "hot check" and alignment procedures.





PACKAGE PARTS LIST

Package #1

4 - Minature 7 prong sockets w/rings
2 - Octal sockets w/ rings
1 - Zip-in nine pin socket
1 - Zip-in octal socket (mounted)
5 ft. Bare (ground) wire
4 ft. Heater wire
25 ft. Solder
2 - Self-tapping screws

Package #2

1 - Power choke
2 - Self-tapping screws

Package #3

1 - Power transformer
3 - Self-tapping screws

Package #4

1 - Can condenser (2x20 at 450 V)
(1x20 at 25 V)
(with insulator)
2 - Can condenser (4x10 at 450 V)
1 - Can condenser (2x30 at 450 V)
(1x20 at 450 V)
(1x40 at 25 V)
2 - Bathtub condensers (3x.1 at 600 V)
2 - Bolts
2 - Nuts
4 - Self-tapping screws

Package #5

1 - 2000 ohm wire wound potentiometer
1 - 5000 ohm wire wound potentiometer
1 - 10,000 ohm potentiometer with ground lug
1 - 50,000 ohm potentiometer
1 - 100,000 ohm potentiometer w/switch & ground lug
1 - 500,000 ohm potentiometer with ground lug
2 - 2 megohm potentiometer
1 - Vertical oscillator transformer
2 - Self-tapping screws
2 - Rubber sleeves
60 ft. hook-up wire
Mounting nuts are to be found on control shafts.

Package #6

1 - 50 ohm 1 W. resistor
1 - 100 ohm 1 W. resistor
2 - 200 ohm 1 W. resistor
1 - 1000 ohm 1 W. resistor
1 - 50,000 ohm 1 W. resistor
1 - Ver. Output Transformer
w/hardware
1 - 8 prong plug
1 - Picture tube socket
1 - A.C. line cord & plug
4 - Rubber sleeves

Package #7

1 - 200 ohm $\frac{1}{2}$ W. resistor
1 - 500 ohm $\frac{1}{2}$ W. resistor
1 - 1000 ohm 2 W. resistor
1 - 50,000 ohm $\frac{1}{2}$ W. resistor
1 - 30,000 ohm 1 W. resistor
2 - 500,000 ohm $\frac{1}{2}$ W. resistors
1 - 250,000 ohm $\frac{1}{2}$ W. resistor
1 - 10 megohm $\frac{1}{2}$ W. resistor
1 - 1000 MMF. (.001) condenser
2 - 5000 MMF. (.005) condensers
3 - .01 MFD. condensers
1 - Sound discriminator can
1 - 30 inch length red wire
1 - 30 inch length blue wire
1 - Rubber grommet
1 - Rubber sleeve
1 - Self-tapping screw
1 - #13 TELEKIT tuner

Package #8

3 - 200 ohm $\frac{1}{2}$ W. resistors
1 - 2000 ohm $\frac{1}{2}$ W. resistor
2 - 2000 ohm 1 W. resistors
1 - 5000 ohm $\frac{1}{2}$ W. resistor
2 - 5000 ohm 1 W. resistors
5 - 10,000 ohm $\frac{1}{2}$ W. resistors
1 - 30,000 ohm $\frac{1}{2}$ W. resistor
3 - 30,000 ohm 1 W. resistors
1 - 100,000 ohm $\frac{1}{2}$ W. resistor
1 - 500,000 ohm $\frac{1}{2}$ W. resistor
2 - 1 megohm $\frac{1}{2}$ W. resistors
1 - 5 MMF. condenser
1 - 50 MMF. condenser
1 - 2 megohm $\frac{1}{2}$ W. resistor

PACKAGE PARTS LIST (Cont'd)

Package #8 Cont'd.

3 - 200 MMF. condensers
7 - 5000 MMF. (.005) condensers
1 - .01 MFD. condenser
2 - .1 MFD. condenser
4 - I. F. Coils
1 - Cathode Trap Transformer
1 - Peaking Coil (36 uh) Small size
2 - Peaking Coils (120 uh) Medium size
1 - Peaking Coil (180 uh) Large size
1 - Rubber grommet
2 - Rubber Sleeves

Package #9

1 - 50 ohm $\frac{1}{2}$ W. resistor
1 - 50 ohm 1 W. resistor
1 - 500 ohm $\frac{1}{2}$ W. resistor
1 - 1000 ohm 1 W. resistor
1 - 1000 ohm 2 W. resistor
1 - 2000 ohm 1 W. resistor
1 - 5000 ohm 1 W. resistor
2 - 5000 ohm $\frac{1}{2}$ W. resistors
3 - 10,000 ohm $\frac{1}{2}$ W. resistors
1 - 10,000 ohm 1 W. resistor
1 - 20,000 ohm $\frac{1}{2}$ W. resistor
1 - 30,000 ohm $\frac{1}{2}$ W. resistor
1 - 50,000 ohm $\frac{1}{2}$ W. resistor
3 - 100,000 ohm $\frac{1}{2}$ W. resistors
5 - 150,000 ohm $\frac{1}{2}$ W. resistors
2 - 250,000 ohm $\frac{1}{2}$ W. resistors
2 - 500,000 ohm $\frac{1}{2}$ W. resistors
4 - 1 megohm $\frac{1}{2}$ W. resistors
3 - 2 megohm $\frac{1}{2}$ W. resistors
1 - 5 MMF. condenser
1 - 100 MMF. condenser
1 - 200 MMF. condenser
1 - 500 MMF. condenser
2 - 1000 MMF. (.001) condensers
4 - 5000 MMF. (.005) condensers
3 - .01 MFD. condensers
1 - .02 MFD. condenser (or 2 - .01 in parallel)
2 - .25 MFD. condensers
3 - 40-370 MMF trimmers W/mounting bracket & hardware
1 - Horizontal synchro-lock coil
1 - Horizontal linearity coil
1 - Horizontal width coil
1 - Horizontal output & high voltage transformer
1 - High voltage case
1 - 30 inch length of high voltage wire
1 - Antenna post
1 - High voltage pin
1 - Rubber grommet

Package #9 Cont'd.

5 - Rubber sleeves
5 - Self-tapping screws
3 - Knobs

Package #10

1 - Speaker & Output Transformer
2 - Rubber sleeves
1 - Self-tapping screw

Package #11

1 - Yoke
1 - Yoke Hood
1 - Focus Coil
1 - Ion Trap Magnet
2 - 560 ohm resistors
1 - 50 MMF. condenser
1 - 8 prong wafer socket
1 - Wing bolt

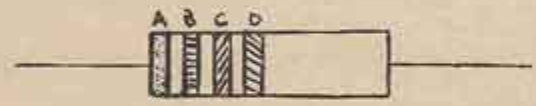
Package #12

1 - Metal Yoke Mount
1 - Mounting Board
1 - Focus Coil Saddle
1 - Wing Nut
3 - Woodscrews $\frac{1}{4}$"
2 - Self-tapping screws #6x3/8"
2 - Self-tapping #4x$\frac{1}{4}$"
1 - Large washer
2 - Small washers
2 - Stand-off bushings
2 - Wood screws (large)

RESISTOR COLOR CODE DATA

1. The assembly of the No. 10A TELEKIT requires a knowledge of the standard R. M. A. Resistor Color Code in order to avoid costly errors in construction. If you, as an experienced radio man, are thoroughly familiar with the color code, then you may regard this sheet as being for the amateur builder. However, our experience in servicing these kits and in answering queries from all types of builders has shown that even the experienced man slips up occasionally and installs the wrong unit in a critical circuit. We find that the vast majority of troubles encountered in these well designed TELEKITS can be traced to wrong values of resistance in one or more circuits. This does not mean, however, that precision resistors must be used. The set will perform just as well if the resistors are within 20% plus + or minus - of the value called for. This gives a very liberal 40% range of resistance. The usual errors are in reading the color of the third color band which gives the multiplying value of the resistor. For example: a 100,000 ohm resistor mistaken for a 10,000 ohm, or a 200 ohm mistaken for a 20 ohm, etc. As you can see, this type of error is far in excess of the tolerance allowed and can prevent the receiver from performing properly. Therefore, all builders should study this sheet thoroughly.

2. The following chart is the standard R. M. A. Resistor Color Code:



It will be noted upon observation that a resistor has certain colored bands of paint on its body. These bands are used for identification purposes. Holding the resistor in the position shown above with the first band "A" to the extreme left, we can "read" the numerical value of the resistor in ohms. The first three bands, "A", "B", "C", will tell us the value of the resistor in ohms, while the last band "D" will tell us the tolerance value of the resistor. The wattage rating is not identified by this method, therefore, a special paragraph is devoted to this subject.

"A" First Band		"B" Second Band		"C" Third Band (Number of Zeros)	"D" Fourth Band	
Black	0	Black	0	Black --------	Gold	± 5% Tolerance
Brown	1	Brown	1	Brown 1 Zero	Silver	" 10% Tolerance
Red	2	Red	2	Red 2 Zeros	No Band	" 20% Tolerance
Orange	3	Orange	3	Orange 3 "	(Blank)	
Yellow	4	Yellow	4	Yellow 4 "		
Green	5	Green	5	Green 5 "		
Blue	6	Blue	6	Blue 6 "		
Violet	7	Violet	7	Violet 7 "		
Grey	8	Gray	8	Gray 8 "		
White	9	White	9	White 9 "		

3. TYPICAL EXAMPLES

Colors	Value in Ohms	Tolerance
Red, Black, Black, Gold	20	- + 5%
Red, Red, Brown, Silver	220	- + 10%
Red, Red, Red, Gold	2200	- + 5%

TYPICAL EXAMPLES (cont'd.)

Colors	Value in Ohms	Tolerance
Red, Red, Orange, Blank	22,000	- + 20%
Green, Red, Yellow, Blank	520,000	- + 20%
Red, Red, Green, Silver	2.2 meg. (2,200,000)	- + 10%
Green, Black, Green, Blank	5 meg. (5,000,000)	- + 20%
Brown, Black, Blue, Blank	10 meg. (10,000,000)	- + 20%

(meg means 1,000,000)

4. Since the TELEKIT will perform satisfactorily with resistance within the 20% tolerance range, the fourth band may be disregarded; therefore, its presence or absence is relatively unimportant.

5.

WATTAGE RATINGS

You will observe that a wattage identification follows each resistor value in the instructions. The wattage rating is based upon the physical size of the unit.

ALIGNMENT & OPERATING INSTRUCTIONS FOR COMPLETED No. 10A THIRTEEN CHANNEL TELEKIT

Preliminary cHecks

1. Retrace all steps in the instruction sheets and layout figures.

2. Check all connections with the aid of the schematic diagram. Do not be alarmed when you find unused lugs on some tube sockets.

3. Be absolutely certain that there are no crossed bare wires and that all joints are securely soldered.

4. Turn set over, pick up and shake vigorously in order to remove all snippings of wire, bits of solder and other debris which accumulates during construction. These small bits are "poison" to a television receiver, because they can cause "shorts" when the power is applied and ruin expensive components.

5. Be sure that all controls are securely fastened to the chassis and that transformers, can condensers, coils, etc., are seated firmly in their respective places.

Placement of Receiving Tubes

1. The receiving tubes shall be placed in the following sockets:

Socket	Tube Type
C	5U4G L. V.
D	6X5 Damper
E	1B3/8016 H. V. Rectifier
F	6SN7 Vertical Amplifier
G	6J6 and 12AT7 (in tuner)
H	6AG5 Sound I. F.
I	6T8 Sound Discriminator
J	6V6GT Audio Output
K	6AG5 First Video I. F.
L	6AG5 Second Video I. F.
M	6AG5 Third Video I. F.
N	6SN7 Video detector
O	6SN7 Video Output -
P	6SN7 Separator and Vertical Oscillator

Preliminary Checks Cont'd.

Socket	Tube Type
Q	6SN7 Hor. Osc. and Discharge
R	6BG6 Horizontal Output

The picture tube used with this kit is the 10BP4 kinescope. Note: Leave high voltage case off for the present time. Before installing the picture tube, be sure that all tubes are in place and firmly seated in their sockets. The kinescope should be removed from its carton and handled carefully with both hands. Never attempt to pick up tube by its neck, as this is a dangerous practice. The greatest mass of the tube is at the screen end, therefore, when handling the picture tube always keep the screen end toward body and support the tube with both hands on the flared portion of the bulb. This precaution will minimize the possibility of slipping. Examination of the tube will show a recessed metal well in the side of the bulb. This is the second anode (high voltage) contact and the tube should be rotated to allow this contact to be approximately positioned at the top. Its position will be finally determined by the location of the ion trap flags. Looking at the electron gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small "L" shaped metal flanges which are mounted on opposite sides, of the cylinder. It is important that these flags be finally positioned so that they are in a plane parallel to the mounting board base. When the tube is in this position, the second anode contact will be approximately at the top of the bulb. The neck of the tube should now be inserted through the deflection yoke and focus coil, until the bulb is firmly seated against the rubber bumpers of the yoke hood. Be sure, also, that the small springs which are a part of the yoke hood are forced out of their normal position by the entry of the bulb. This will insure good spring contact and effectively keep the outside coating of the picture tube at ground potential when receiver is in operation. The yoke should be pushed toward the front of the tube as far as possible. The focus coil is mounted in back of the yoke. The ion trap magnet should now be slipped on the neck of the tube and positioned with the large coil toward socket end of the tube and the thumb adjustments up. Move magnet toward yoke until large coil is just below flags or slightly ahead of them. The thumb screws should be tightened enough to hold the magnet structure lightly in position for the present. Later, when testing for a raster of light on the picture tube screen, this adjustment will require changing in order to get brightest illumination. Insert the eight prong male plug of the receiver into the eight prong socket on the tube mounting board, but leave the socket off the picture tube base for the present time as well as the high voltage lead. Caution: Do not plug set into A. C. outlet yet!

Location and Function of Controls:

1. Sound Volume:
   This control is mounted in hole #27 on front apron and its function is identical to that on radio receivers. By turning knob clockwise, the volume of received sound will increase.

2. Contrast:
   This control is mounted in hole #30 on front apron and its function is to control picture gain. By advancing the control clockwise, the intensity of the picture elements (blacks and whites) will increase.

3. Station Selector:
   This control is mounted in hole #29 on the front apron and its function is to switch in the desired television channel. This receiver is equipped to receive the entire thirteen channels.

4. Fine Tuning:

This control is mounted in hole #28 on front apron and its function is to give fine adjustment to the particular channel selected by the station selector. This control will also center the sound properly. Any deviation in sound tuning will be evidenced by fuzzy or distorted sound reception, can be easily corrected by merely adjusting this control.

5. Brightness and A. C. Switch:

This control is mounted in hole #31 and its function is to adjust the overall brightness of the picture to the viewer's satisfaction. Whenever the contrast control is adjusted, the brightness control should also be adjusted. When contrast is advanced (clockwise), the brightness should be retarded (counter clockwise) and vice versa. The A. C. on and off switch for the entire set is also mounted on this control.

6. Focus:

This control is mounted in hole #26 on rear apron and its function is to sharpen the line formation of the raster which will insure clearest picture detail.

7. Horizontal Hold Control:

This control is mounted in hole #20 and its function is to provide a fine frequency adjustment for the horizontal line scans. The proper setting of this control can only be achieved while picture is being transmitted by the local station. When properly adjusted the picture elements will fall in their proper places and one picture will be observed. When out of adjustment the picture may slip to the right and part of the picture may appear on the left. After it is once set it will require no further attention.

8. Horizontal Drive:

This control is in the form of a trimmer condenser designated in the instructions as "d". When properly adjusted with blank raster it will provide maximum high voltage to picture tube. Picture will be smallest and very bright. When out of adjustment it will cause raster to be large and dim. Merely adjust until raster is brightest. All adjustments to this control require that picture be re-focussed. Once adjusted it will require no further attention.

9. Horizontal Speed:

This control is in the form of a trimmer condenser designated in the instructions as "e". Its function is to provide a coarse frequency adjustment for the horizontal line scans. In other words it works in conjunction with the hold control by bringing the horizontal oscillator speed into the proper range to synchronize with the transmitted picture rapidly. The hold control will then provide the fine adjustment.

10. Synchro-lock:

This control is in the form of a trimmer condenser designated in the instructions as "f". Its function is to bring the A.F.C. coil into resonance at the incoming horizontal frequency and thus provide the locking action to the horizontal osicllator. When properly adjusted this control will keep the picture synchronized horizontally regardless of the setting of the horizontal hold control. Once adjusted it will require no further attention.

11. Horizontal Width:

This control is in the form of a screw adjustment mounted up on the high voltage shield on rear of chassis. Its function is to vary the width of the picture by turning the slug. Once adjusted no further attention is required.

12. Horizontal Linearity:

This control is in the form of a screw adjustment and mounted in hole #98 on the underside of the chassis. Its function is to insure the proper distribution of horizontal picture elements. It is best adjusted when a test pattern is on the screen. Adjust for best round circles on pattern. Once set, no further adjustments are necessary.

13. Vertical Hold:

This control is mounted in hole #21 on rear apron and its function is to hold the picture in a vertical direction. When improperly adjusted, the picture will be observed to slip either upwards or downwards or perhaps fold back from the top so that many bright lines will appear on the picture. Adjust control until a stationary frame appears on screen.

14. Vertical Size:

This control is mounted in hole #22 on the rear apron and its function is to adjust the height of the picture. This control will work in conjunction with the vertical linearity control to secure both correct height and correct linearity (elimination of vertical stretching or crowding).

15. Vertical Linearity:

This control is mounted in hole #22 on the rear apron and its function is to adjust the linearity (vertically). It is used in conjunction with the vertical size control as mentioned above.

First Hot Check (Heaters) For all troubles refer to service notes in technical section.

Remove the 5U4G rectifier tube from its socket. Plug in A. C. cord to 110 V. A. C. 60 cycle outlet. Turn on A. C. switch on front apron. Observe the glass tubes closely and look for the heaters to light up. If a short circuit exists in the heater circuit, a sharp hum will be heard coming from the low voltage transformer and one of the heater wires may smoke and burn up. If so, turn set off immediately and check entire heater circuit. If everything is normal proceed to second hot check. Turn off switch.

Second Hot Check (B + Power Supply) For all troubles refer to service notes in technical section.

Remove the 1B3/8016 tube from its socket. Connect the octal male plug into the octal socket on picture tube board. Be sure that the speaker is connected. Advance volume control to maximum clockwise position and stand chassis on end in such a way that the underside components as well as the 5U4G tube can be seen at the same time. Replace the 5U4G tube in its socket. Be sure that the 8016 tube cap connector and wire are not touching anything metallic. Turn on A. C. switch and observe the 5U4G tube. Heaters inside glass envelope should light up, but heavy plates around the heaters should not begin to glow a cherry red. If plates begin to glow it indicates a short circuit in the B + circuit and the set should immediately be turned off or damage to the 5U4G tube will result. If any component under the chassis begins to smoke or sizzle, turn set off and find short circuit. Recheck entire circuit and find trouble before turning set on again. If all is normal and none of these signs occur, take screw driver and touch the grid (pin #1 of socket K) of first video I. F. tube. This should produce scratching sounds in the speaker and is an indication that part of the set is operating. You are now ready for the third hot check. Turn off switch.

Third Hot Check : (High Voltage)

You must be very careful with this check as there will be high voltage on the set and a burn will result if you make physical contact with any part of it. Proceed to connect picture tube socket to kinescope. Plug high voltage pin connector into receptacle on top of picture tube bulb. Insert the 8016 tube back into socket E. Be sure plate lead is on cap of tube (this is the tracer wire). Also, check plate lead to cap of 6BG6 tube to see if it is secure. Stand chassis on end to observe underside components. Do not mount high voltage case yet. Turn set on and wait a minute or so for it to warm up. Direct your attention to the socket in hole F which is the 8016 high voltage tube socket. If you find the socket dirty or have other wires too near this socket, you may experience an arcing at this point. If you do, refer to technical section after you turn set off. If all is normal up to this point, advance brightness control fully clockwise. Manipulate the ion trap on the neck of the tube as per technical section instructions, to secure maximum brightness on picture tube. Set horizontal and vertical hold controls to obtain a rectangular pattern of light. This is known as the raster. High voltage case may now be put in place. If any trouble is experienced in this operation, refer to the technical section. You are now ready for the alignment of sight and sound.

Alignment of Picture and Sound

Before attempting alignment, be sure that your antenna lead-in is connected.

1. Check with your local television station to find what hours during the day the static test pattern and sound signal is being transmitted. The station provides this service to assist in the alignment of receivers.

2. Procure these items:

   One (1) Pair Earphones
   One (1) .1 Condenser at 400 V.
   One (1) Tuning Stick (preferably plastic, non-metallic)

3. Proceed to Align Receiver as Follows:

   (a) Turn set off, connect the .1 condenser to one of the earphone leads. Leave the other lead of the condenser open. Attach an alligator or similar clip to the other earphone lead and clip to the open lead of the condenser. Clip the earphone lead to the chassis and the condenser lead to the #2 lug of socket O. Turn the channel selector to the number of your local television station. Turn on set. You can now "listen in" on the picture signal when it comes through. Be sure that volume control and contrast control are at full clockwise setting.

   (b) Rotate fine tuning condenser shaft and listen for buzz in earphones. If buzz gets too loud or blocks out reduce contrast control setting slightly. Keep brightness about halfway.

   (c) If no buzz is heard on this channel position of tuner, try same procedure on the channel above and channel below the channel number of your local station. If signal is heard there then it indicates that your I.F. Coils are set too high or too low. If results are negative then check antenna connections and positioning. If everything appears normal but still no buzz then check wiring and refer to technical section of your service notes.

3. Proceed to Align Receiver as Follows: (Cont'd)

(d) If buzz is heard picture content should appear on raster but probably will be streaking or jumping. Adjust vertical hold control to keep picture from jumping or sliding. If picture elements are streaking across screen then try to stop them with horizontal hold control. If this fails to stop the streaking then the correct setting is beyond the range of the control and your attention must be directed to the three trimmers (d, e, f) inside chassis. The correct adjusting procedure is as follows:

1. Reduce contrast control until picture appears washed-out. If necessary advance brightness control until picture can be seen dimly.

2. Turn horizontal hold control to full counter-clockwise position.

3. Adjust the trimmer designated as horizontal speed (e) until $3\frac{1}{2}$ to $4\frac{1}{2}$ horizontal bars appear sloping downward to the right. If this condition cannot be achieved then set the trimmer to mid-range and adjust iron core slug of synchro-lock coil until the condition is obtained.

4. Set horizontal hold control to maximum clockwise position. Switch channel selector switch off station momentarily and then back on station. Picture should reappear out of sync. Slowly turn the horizontal hold control counter-clockwise and note the least number of diagonal bars sloping upward from the left before locking in. If more than $4\frac{1}{2}$ bars appear then adjust the synchro-lock trimmer (f) slightly counter-clockwise. If less than $3\frac{1}{2}$ bars are present adjust the synchro-lock trimmer slightly clockwise. If picture keeps locking in before conclusive checks can be made keep throwing it out of synch by switching the channel selector off and on the station. When $3\frac{1}{2}$ to $4\frac{1}{2}$ bars are present before lock-in then the horizontal oscillator is functioning normally.

(e) If a vertical bright bar appears on the left side of picture then slowly adjust the horizontal drive trimmer (d) until it disappears. This trimmer also aids in adjusting for maximum high voltage. Adjust slowly until picture appears brightest. This adjustment should be clockwise.

(f) Adjust focus control until clearest line formation is obtained on picture. Adjust brightness control until satisfactory brilliance is achieved. Do not make too bright as it will impair picture quality.

(g) Remove earphone clip from set and locate the sound I. F. coil. This is the coil closest to front apron of the two adjacent link coupled coils. Rotate slug until sound is heard in speaker. Adjust for maximum volume. Adjust slug on top of discriminator can for maximum volume. Adjust slug which is mounted in the bottom of the can for best quality of sound with least incidental noise. For all difficulties encountered, refer to the technical section for service notes.

(h) After picture and sound have been received it is necessary to time the tuner to one "side" of the picture carrier to secure utmost detail. You will notice at a certain setting the picture will be strongest. Turning the fine tuning control one way will reduce the strength but will improve its quality tremendously. On the other hand, turning it the opposite way will also reduce its strength but not improve the quality of the picture detail. Find the sharpest side, and you will have found the desired point. When that point has been found it may be necessary to adjust the slug of the sound I. F. coil in order to bring in the sound. The slug on top of the discriminator can should then be adjusted for maximum volume and the slug on the bottom should be adjusted for best quality. This will enable you to secure the sound at that point on the fine tuning control which you have selected as being the most desirable setting. For more precise information on I. F. alignment look under "Alignment of TELEKIT with Instruments" in technical section.

(i) After all adjustments have been made on the I. F. coils, they should be locked with liquid cement or dope. This is important if the set is to be moved about much, as vibration will cause the slugs in the coils to change position.

(j) This television receiver will perform best with a television antenna kit and a 300 ohm lead in line. These may be purchased for a small cost from your jobber. For urban use, a single dipole kit or a folded dipole kit may be used. For suburban use, a multi-element antenna kit should be used. Antenna installations should be of sufficient height as to clear any "line of sight" obstacles between the transmitter and receiver. In some remote instances a "tower" may have to be used to secure satisfactory reception.

(k) Always locate your television receiver in a part of the room where no direct sunlight or window light falls on screen. After set is mounted in cabinet, it should be placed in its permanent place and should not be moved about. Always be sure to turn off your set when not in use. This will extend the life of your picture tube.

The following is a list of possible failures and an indication of procedure for their correction:

Indication	Possible Trouble
A. No raster on kinescope No light	(1) No high voltage - see notes on "Checking High Voltage". (2) Defective kinescope - heater open, open brightness control. (3) Incorrect adjustment of ion trap - coils reversed either front to back, or top to bottom. Ion trap open or negative bleeder open. (4) 6X5 tube. Damper inoperative. Check heater winding. (5) No B plus, shorted electrolytic or choke open.
B. Wrinkles on left side of raster:	(1) Resistors on yoke, or condenser in yoke wrong value or defective. (2) Defective yoke.
C. Trapezoid or non-symmetrical raster:	(1) Defective yoke. (2) Improper adjustment of focus coil or ion trap magnets.
D. Bright horizontal line No vertical sweep	(1) Defective 6SN7 vertical tube. (2) Vertical size control improperly set. (3) Check for voltages.
E. Poor vertical linearity: (See figure 41)	(1) Check value of 40 MFD condenser on cathode of vertical amplifier. (2) Check 10 MFD condenser at vertical output transformer. (3) Check .1 condenser in vertical oscillator plate circuit. (4) Check voltage on vertical oscillator section of tube. (5) Low B plus. Check rectifiers and capacitors in supply circuits.
F. Poor horizontal linearity: (See figure 61)	(1) Horizontal drive trimmer adjustment incorrectly set. (2) Horizontal linearity control incorrectly set. (3) Low B plus or line voltage. (4) Check voltages in horizontal circuit
G. Raster - no image, but accompanying sound: (See figure 39)	(1) No signal on kinescope grid, check for signal with earphones as explained in alignment procedure. Check I. F. amplifier tubes, second detector, video amplifier. (2) Bad contact on kinescope tube socket. (3) The stage by stage method of trouble shooting should be used to isolate the defective stage.

Indication	Possible Trouble
H. Signal on kinescope grid, but no sync: (Similar to figure 26)	(1) Check sync. amplifier tube and circuit. (2) Check voltages on above and associated circuits.
I. Signal on kinescope grid and horizontal sync. only: (See figure 28)	(1) Check vertical oscillator and associated circuit. Vertical oscillator transformers. Vertical oscillator grid input condensers.
J. Signal on kinescope grid and vertical sync. only: (see figure 26)	(1) Check horizontal hold control adjustment. (2) Check horizontal integrator circuit. (3) Check value of horizontal grid resistor to hold control. (4) Readjust trimmers e and f.
K. Picture out of phase horizontally:	(1) Incorrect value of horizontal oscillator plate resistors.
L. Picture stable, but poor resolution: (See figure 58)	(1) Check grid loading resistors on I. F. tubes. (2) Test all peaking coils for continuity. (3) Check plate loading resistor on detector and amplifier. (4) Measure all potentials on above tubes. (5) Check kinescope grid circuits. (6) Make sure that the focus control operates on both sides of proper focus. Check 200 ohm resistor across focus coil. (7) Realign I. F. circuits.
M. Picture smear: (See figure 59)	(1) This trouble can originate in either transmitter or signal source. Normally, smear can be attributed to phase shift at the low frequencies. This can be caused by improper values of R and C. Check for grid current on video amplifier tubes. (2) Improper alignment. Re-align (3) Open peaking coil.
N. Picture jumpy:	(1) If regular sections at the left of picture are displaced, check horizontal amplifier tube 6BG6. (2) Vertical instability may be due to loose connections or noise. (3) Vertical hold control not set properly. (4) Horizontal instability may be due to unstable transmitted sync. (5) Synchro-lock circuit improperly aligned.

Indication	Possible Trouble
O. Oscillation or interference in video output: Most noticeable when contrast controls are advanced.	(1) Improper alignment of I. F. tubes or cathode trap. (2) Condenser is open in screen grid of I. F. circuits; or (3) Condenser is open between 30,000 ohm resistor and ground in plate and screen circuits of the I. F.; or (4) Wrong value or defective resistor between grid and ground of video I. F. tubes; or (5) Open condenser between cathode and ground of the I. F. tubes; or (6) Outside interference, such as excessive ignition interference, diathermy or beat frequency interference.
P. When detail is milky or not sharp: NOTE: Before proceeding, make sure focus control is properly set.	(1) Loss of high video frequencies due to I. F. coils being tuned too sharply. Re-align. (2) Peaking coils in wrong places. (3) The resistors connected to the plate of the first and second video output tubes may be off value. The resistor to the plate of the first video output tube should be of 2000 ohm; to the plate of second video output tube should be of 5000 ohms. (4) Poor antenna installation or improper orientation.
Q. If focus control is set properly and symptom continues:	(1) Fine tuner improperly set. (2) Station switch on wrong channel.
R. If picture is too small horizontally only:	(1) Trouble is in horizontal oscillator or amplifier circuit. Check parts.
S. If picture is too large both horizontally and vertically:	(1) Indicates high voltage is not high enough - refer to notes on checking horizontal oscillator and high voltage circuit.
T. If sight and sound do not synchronize:	(1) Sight and sound I. F. frequencies may not be right. They should be separated by 4.5 megacycles. (2) TELEKIT tuner set on wrong channel. (3) Normal for remote or "fringe" areas. A more sensitive antenna or a booster required.

	Indications	Possible Trouble
U.	If picture is crowded top and bottom and spread in middle:	(1) Check 40 MFD condenser on cathode of vertical amplifier tube. (2) Defective yoke. (3) Check .25 MFD coupling condenser from vertical oscillator to vertical amplifier. (4) Check voltage on vertical oscillator.
V.	Picture cannot be centered: (Too far on left of tube - cannot be moved over to the right side with focus coil saddle manipulation)	(1) Change lead to B plus side of resistor on "Optional Centering Connection". (2) Reverse leads of focus coil that is yellow and green.

Remedies for Indicated Test Chart Faults

Figure 24	(a) Look for nearby high buildings or objects that would cause reflections of signal. (b) Installation of a reflector on dipole may improve condtion.
Figure 32	Set brightness control and contrast properly.
Figure 33	Turn fine tuning knob slightly or readjust I. F. tuning.
Figure 34	Turn yoke to properly orient picture.
Figure 35	Adjust width coil or adjust drive control.
Figure 36	Adjust focus coil or mounting.
Figure 37	Adjust vertical size control.
Figure 38	Adjust focus coil on mounting.
Figure 39	Correct raster.
Figure 41	Adjust vertical linearity.
Figure 42	Adjust contrast control.
Figure 56	(a) I. F. out of alignment. (b) R. F. out of alignment.
Figure 58	(a) Poor I. F. alignment. (b) Poor focus adjustment.
Figure 59	Leaking coupling condenser in video.
Figure 60	Bad 6X5 damper tube or drive condenser set wrong.
Figure 61	(a) Adjust drive condenser "d" and linearity coil. (b) Check damper tube 6X5.

Circuit Description of Horizontal Deflection & High-Voltage Circuits

A 6BG6 beam deflection tube is used for producing the necessary amplitude of the sawtooth currents in the deflection coils. The high voltage for the second anode supply is also produced from the energy stored in the deflection inductances during each horizontal scan. The sawtooth voltage applied to the grid of the 6BG6 deflection amplifier produces a sawtooth of current in its plate circuit. The plate of this tube is connected to the primary winding of the deflection transformer. A sudden change of current in the primary will produce a high inductive pulse on the plate of the tube 6BG6. The sudden ceasing of plate current caused by the cutoff of the tube during retrace will cause the circuit to oscillate. The voltage across the yoke must be maintained uniformly constant during trace. In order to obtain this uniformity the 6X5 damper tube is connected across the deflection coils to remove the oscillation following the retrace pulse. Thus, during the trace period, the voltage is constant across the yoke which produces the desired linear sawtooth of current

Circuit Description of Horizontal Deflection & High-Voltage Circuits (Cont'd)

through the yoke for deflection. The pulse voltage on the plate of 6BG6 is stepped up and rectified, and the rectified voltage is filtered and applied to the second anode of the kinescope.

Returning to the 6X5 damper, the B plus voltage is supplied to the 6BG6 through this tube which is conducting over the major portion of the trace. The condenser is fully charged during this period and at the time when the damper is not conducting, this charge is sufficient to supply the 6BG6 plate.

The width control functions to increase or decrease horizontal scanning as required by variations of tube and circuit constants. Capacitor on the horizontal yoke coil and the resistors across the vertical coil serve to decrease the effects of cross-talk between the horizontal and vertical yoke coils, eliminating the effect of ringing of the horizontal output transformer due to leakage reactance.

Checking Horizontal Oscillator and High Voltage

1. Equipment necessary:

   1 pair earphones
   1 .003 - 600 Volt condenser
   1 Neon test lamp (readily obtainable - 59¢ variety)
   1 1000 ohm per volt volt-ohm-meter (volt-meter scale to 600 volts)

2. The neon lamp will be used to test for high A. C. voltage. The lamp will glow because of the high frequency of this voltage (15,750 cycles). It is only necessary to hold lamp (glass end, not leads) within ¼ inch of terminal #2 on horizontal output transformer, being cautious not to get fingers near terminal, as your finger will draw an arc from the terminal if high voltage is present.

3. Assuming you have no light on picture tube and you have tried all preliminary adjustments of ion trap etc., it is necessary to determine whether or not you have high voltage. Use the above test with neon lamp to find out if high voltage is present.

4. If neon lamp does not glow at all when held close to this terminal, it is safe to assume that no high voltage is present. You must now determine the cause of the missing voltage. Referring to the circuit diagram, you will note that the development of high voltage depends upon the proper functioning of the horizontal oscillator and amplifier circuits. The pulses from the horizontal circuit produce the high voltage. It is necessary, therefore, to check each stage to see if it is operating correctly.

5. To determine if oscillator is working, connect a pair of earphones with a .006 MFD condenser in series with one lead to pin #5 of horizontal oscillator tube 6SN7. Connect the condenser end to pin #5 and the other end of earphones to chassis. Turn set on. If a high pitched squeal or note is heard and if it changes in frequency as horizontal oscillator hold control is varied, the horizontal oscillator tube is operating.

6. If you do not hear the above-mentioned note in your earphones, you have localized the trouble as being in the horizontal oscillator circuit. You should then check voltages on this tube (6SN7). Refer to voltage chart. If this fails to bring the trouble to light, it will be necessary to turn set off and check component parts of the circuit.

Checking Horizontal Oscillator and High Voltage (Cont'd.)

7. Assuming you have heard the note in the earphones, the next step in localizing the trouble is to remove the earphone lead (with condenser) from pin #6 of 6SN7. Connect lead to pin #6 of horizontal amplifier tube (6BG6). This check is to determine whether or not coupling condenser is functioning properly. Turn set on. The same note should be heard. If not, turn set off and replace coupling condenser.

8. After this procedure, earphones can no longer be used as a test instrument. Caution! Never connect earphones to plate of 6BG6 horizontal output tube, as there is high R. F. voltage present which would be dangerous to earphones as well as yourself!

9. Now that you have arrived at this point in the checking procedure and still have no high voltage as evidenced by the neon lamp not glowing (when held near #2 terminal on horizontal output transformer), proceed to the next step in trouble-shooting.

10. Turn set off and check component parts of horizontal output circuit and tube 6BG6. Make certain that circuit is wired properly according to wiring diagram. If all is well, turn set on and check for voltages on this tube (6BG6). There should be 300 volts on pin #8 of 6BG6 which is screen grid and 400 volts on plate cap of 6BG6. Take car in measuring these voltages, so as not to make physical contact with yourself and the voltage points.

11. To check damper circuit 6X5 take two voltage readings - one from terminal #6 on horizontal output transformer to ground (350 to 400 volts) and one from terminal #1 on horizontal output transformer to ground (chassis). This voltage should be about 50 volts more than the preceding measurement (400 to 450 volts). If not, the damper tube is not functioning properly and tube and circuit should be checked.

12. These are the usual sources of trouble in the high voltage circuits. The correction of these faults should produce high A. C. voltage.

13. To check presence of high A. C. voltage, again use the neon lamp tester, A glow should appear in the neon lamp when held close to terminal #2 of horizontal output transformer. The high A. C. voltage is then rectified in going through the 8016 tube and the resulting D. C. voltage is applied to the second anode of the picture tube. Note that there is no visible filter condenser for the high voltage. The reason is that the 10BP4 picture tube is so constructed as to contain its own capacitor. There is a sprayed metallic shield inside and outside the tube, forming the filter capacitor which is adequate for this high frequency (15,750 cycles). It might be suggested at this point that, while working on the set, it is desirable to discharge this condenser each time the set is turned off. With a screw driver, short one of the filament pins (2 or 7) of the 8016 tube to chassis. This capacity in the tube itself holds a charge for quite some time because the di-electric is glass. Shorting this out whenever the set is turned off, prevents an unpleasant shock if bodily contact is made between tube and chassis.

14. The only source of trouble encountered in the 8016 rectifier circuit will be:

(a) Bad rectifier tube.
(b) Leakage or arcing of high voltage from tube filament lugs to chassis.
(c) Corona effects.

Checking Horizontal Oscillator and High Voltage (Cont'd)

The first is self explanatory; check tube filament for continuity. The second case can be corrected by keeping maximum distance between filament pins on 8016 tube socket and chassis. If dirt grease or dampness accumulates on socket, it will provide a path for the high voltage to arc to chassis. Clean socket thoroughly with carbon tetrachloride. The third trouble, corona effects, will be noticed by turning off all lights in the room with set on and observing a blue glow existing on any of the wires in the high voltage circuits or coming from the filament pins of the 8016 tube itself. Pay particular attention to the filament pins. If the blue glow or corona discharge comes from these points, it can be prevented very simply by resoldering these pins, making sure that the finished pin is round and smooth and has not sharp, projecting points or edges. Corona effects will become apparent at these points if joints are not carefully made.

15. This brings you to the final check which includes the picture tube and associated coils. Assuming you have tried to position your ion trap coil to secure brightest illumination on screen, you should next check the voltages on the picture tube socket. Be sure the pins are connected properly. If you still have no light, remove cover from yoke housing and check wiring. Be sure there are no short circuits inside, due to burning of the insulation when soldering lugs. The last possibility is to check the ion trap for continuity. It should measure about 38 ohms and focus coil should be about 247 ohms.

16. We are quite sure any trouble originating in the horizontal oscillator, amplifier and high voltage circuits will be found if the above step by step procedure is followed.

Voltage Analysis

1. Do not attempt to read high voltage on the television receiver unless you are familiar with high tension circuits and have the proper equipment to do so. In order to get accurate readings in the high voltage circuits, it is essential that an extremely high resistance voltmeter be used (20,000 ohms per volt or more). A vacuum tube voltmeter is preferred. In our laboratories we use a 20,000 ohm per volt movement, in conjunction with a General Electric high voltage multiplier probe which has an internal resistance of 200 meg ohms.

2. Remember - DO NOT tamper unnecessaryily with the high voltage circuits because of the shock and burn hazard involved.

3. A low voltage chart is supplied with each TELEKIT for your convenience in locating trouble.

4. The readings for the voltage chart were taken under certain conditions. These conditions should be duplicated if identical results are to be obtained. The constructor should bear in mind that it is not necessary to obtain identical readings. All voltage readings are taken with a 20,000 ohm per volt meter which is readily obtainable. The readings are taken from the pin numbers to ground of chassis. Negative being chassis. The chart has been based on an A. C. line voltage of 110 volts. Consequently, if the line voltage is different, the entire set of voltages will be higher or lower in proportion to the line voltage change. All variable resistances (controls) should be turned in maximum clockwise direction (on full). No antenna or signal should be connected to the set.

Alignment of No. 10A Thirteen Channel TELEKIT

We have found through experience that it is relatively easy to align the video stages to get a preliminary picture as the video I.F. system is sufficiently broad to pass some signal at almost any setting.

Alignment of No. 10A Thirteen Channel TELEKIT (Cont'd)

It is, however, more difficult to adjust the sound channel because these circuits are sharply tuned. We, therefore, advise that a signal generator be used for this purpose. Our sound channel will be tuned to exactly 21.25 Mc. To simplify this adjustment it is recommended that the following procedure be used. Signal can be observed with either the speaker or output meter.

1. Tune signal generator to 21.25 Mc. (Using a 400 cycle note or tone).
2. Connect hot lead of generator through a .006 MFD condenser to grid of sound I. F. tube (#1pin). Connect ground lead to chassis.
3. Tune primary of F. M. Transformer, which is the upper slug, for maximum signal.
4. Tune secondary of F. M. Transformer by means of the lower slug mounted in the coil for null point. You will notice in making this adjustment that you will get maximum signal response from loud speaker or output meter on two settings of this slug very close together. Between these two settings there will be a null point; that is, a point that is considerably lower in intensity than on either side of this adjustment. It is this point that is desired. When this is found the operation is completed. Notice the signal will not completely disappear with this adjustment if the volume control is turned on full.

5. Move generator lead with condenser to top of Antenna post.
6. Adjust slug which controls tuning of the sound I. F. coil for maximum intensity of signal. This completes the sound adjustment. The video alignment will be found on the schematic diagram. This "stagger" tuned system will insure the maximum amount of detail and will prevent feedback between stages.

How to Secure Maximum Definition

It will be remembered from various text books, etc., that the video I. F. channel of a television receiver must not be tuned or peaked at only one particular frequency, but should be sufficiently broad over a certain band of frequencies.

When using single tuned coils for interstage coupling, it is necessary, therefor, to adopt "staggered tuning" to secure the necessary band width. This is the system which is used in our television chassis. No one coil is tuned to the same frequency.

When properly adjusted, the band width will extend from approximately 21.75 megacycles to 25.75 megacycles with more gain at the 21.75 megacycle end of the band.

All the above-mentioned adjustments to secure maximum definition should be attempted only while a test chart is being received. The vertical resolution wedges should be closely observed all the while. When you have them down as far as you can possible get them, you will have maximum definition.

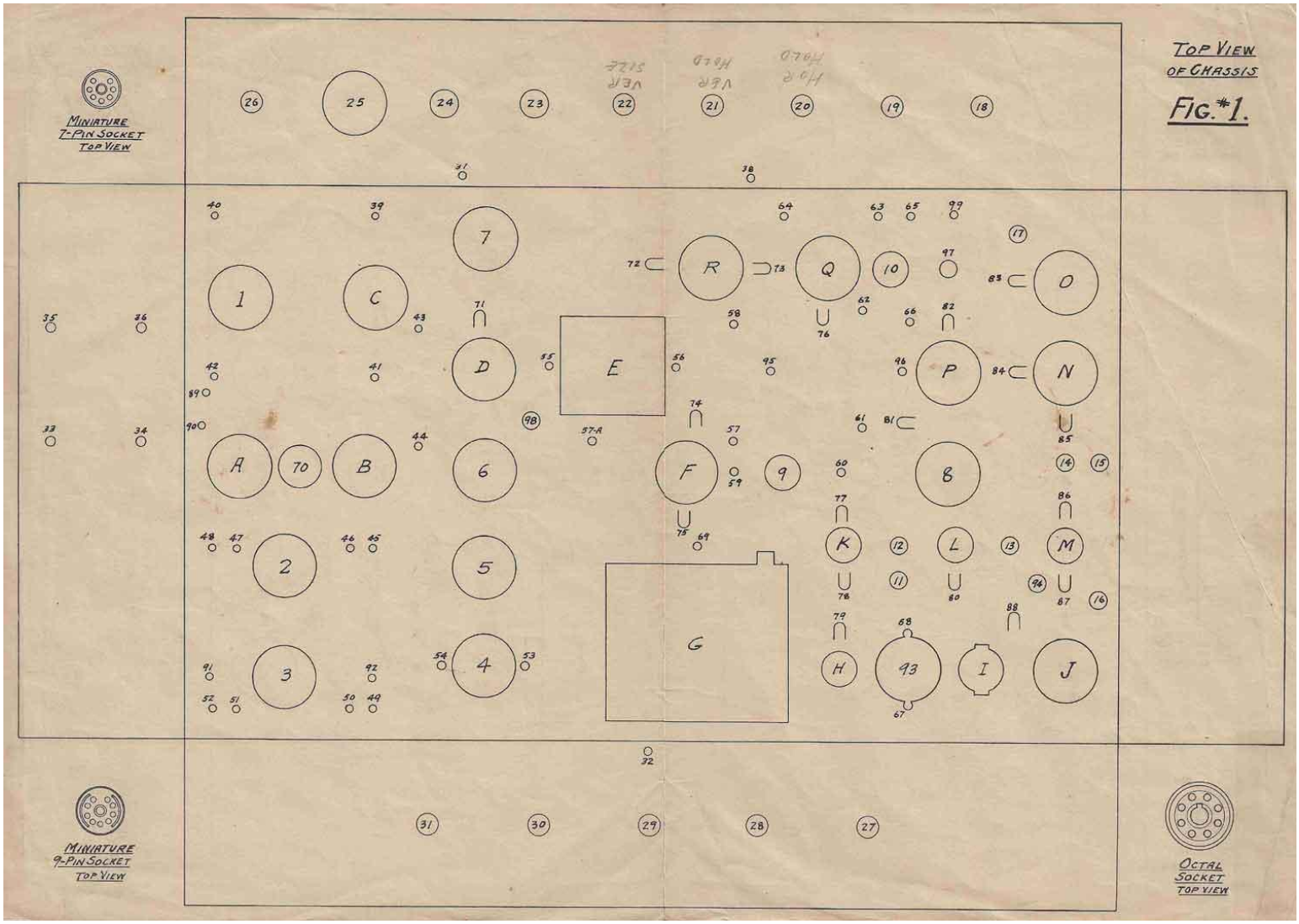
VOLTAGE CHART

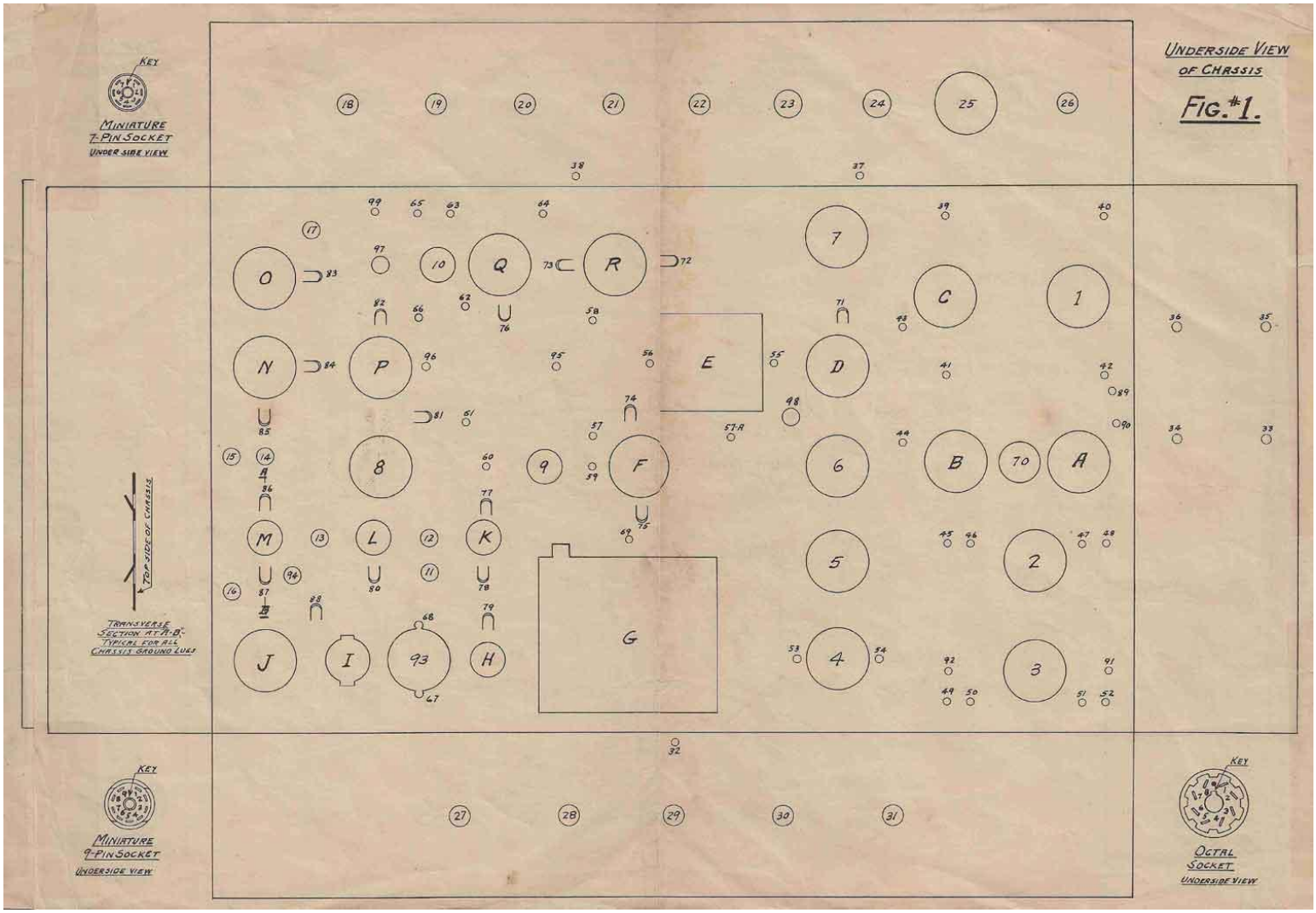
Controls all set clockwise
Readings taken with 20,000 ohm per volt movement

A.C. Voltage - 110 V. A. C.
60 Cycles

Tube Type	Purpose	Pin Number 1	2	3	4	5	6	7	8	9
6AG5	1st Video I. F.	0	1.6	0	6.3 A.C.	120	120	1.6		
6AG5	2nd Video I. F.	0	1.5	0	6.3 A.C.	120	120	1.6		
6AG5	3rd Video I. F.	0	1.5	0	6.3 A.C.	120	120	1.6		
6SN7	Video Det. and 1st Video Amp.	0	0	0	-3V	170	0	6.3V A.C.	0	
6SN7	2nd Video Amp.and D.C. Restorer	-1V	175	0	0	0	2V.	6.3V A.C.	0	
6SN7	Separator and Sync. Amplifier	-1V	10V	0	0	180	0	6.3V A.C.	0	
6AG5	Sound I. F.	0	7V		6.3V A.C.	120	120	1.5V	0	
6T8	Discriminator and 1st Audio	-.8V	-.8V	0	0	6.3	-.8V	0	-1	100V
6V6	Audio Output	0	0	290?	300V	0	0	6.3V A.C.	18V	
6SN7	Vertical Osc. and Amplifier	-35	100	0	0	400V	22V	6.3V A.C.	0	
6SN7	Horizontal Osc. and Discharge	-9	90V	3.6V	-40	135	0	6.3V A.C.	0	
6BG6	Horizontal Output	Tube Cap 400V	0	6V	0	-8	100	6.3V A.C.	300	
6X5	Damper	0	5V A.C.	340	0	340	0	5V A.C.	400	
5U4	Rectifier	0	380	0	340 A.C.	0	340 A.C.	-40V	380	

All D. C. Voltages unless otherwise indicated.


TOP VIEW OF CHASSIS
FIG. *1.
MINIATURE 7-PIN SOCKET TOP VIEW
MINIATURE 9-PIN SOCKET TOP VIEW
OCTAL SOCKET TOP VIEW


KEY
MINIATURE 7-PIN SOCKET
UNDER SIDE VIEW
UNDERSIDE VIEW OF CHASSIS
FIG. #1.
TOP SIDE OF CHASSIS
TRANSVERSE SECTION AT A-B. TYPICAL FOR ALL CHASSIS GROUND LUGS
KEY
MINIATURE 9-PIN SOCKET
UNDERSIDE VIEW
KEY
OCTAL SOCKET
UNDERSIDE VIEW

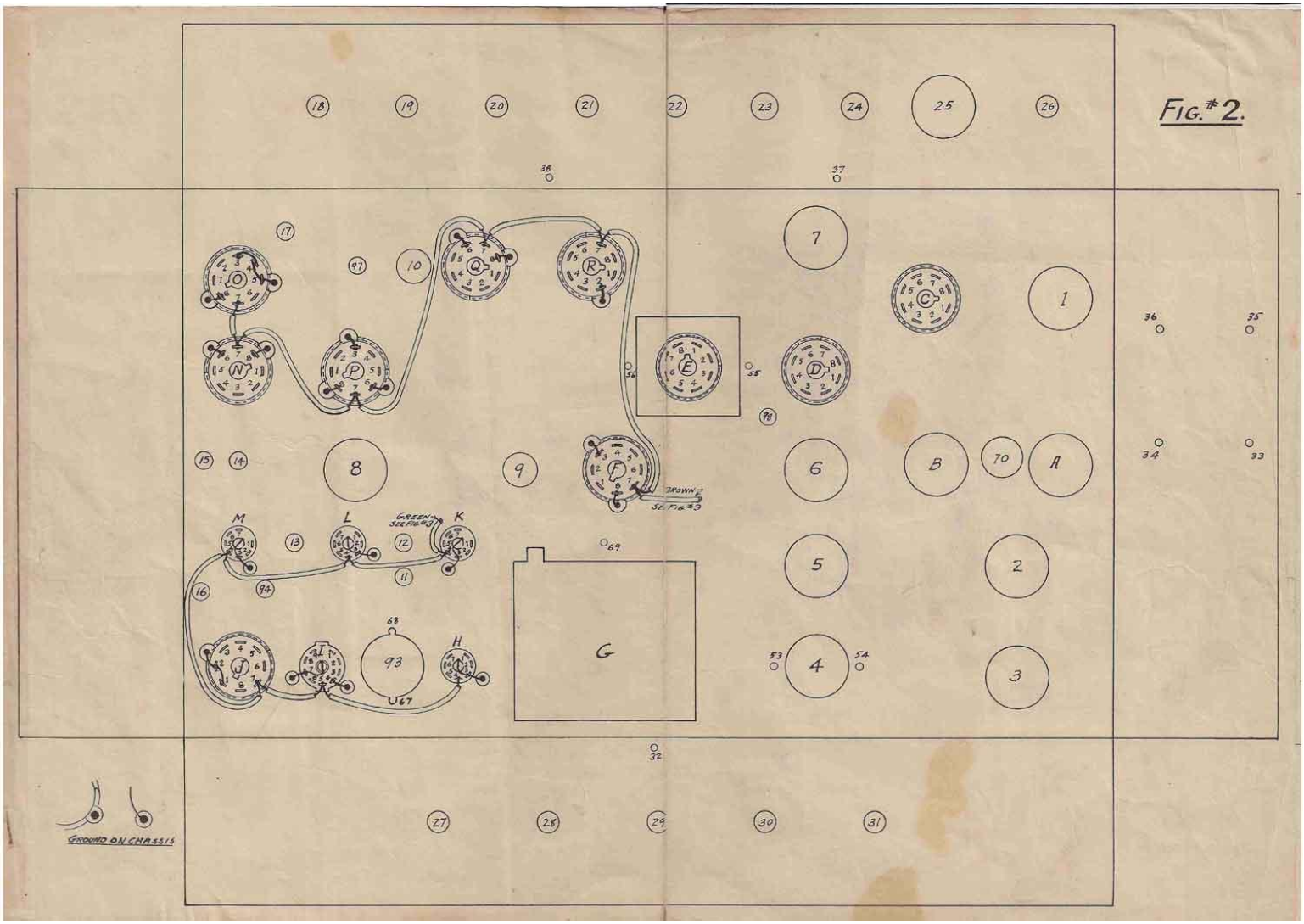
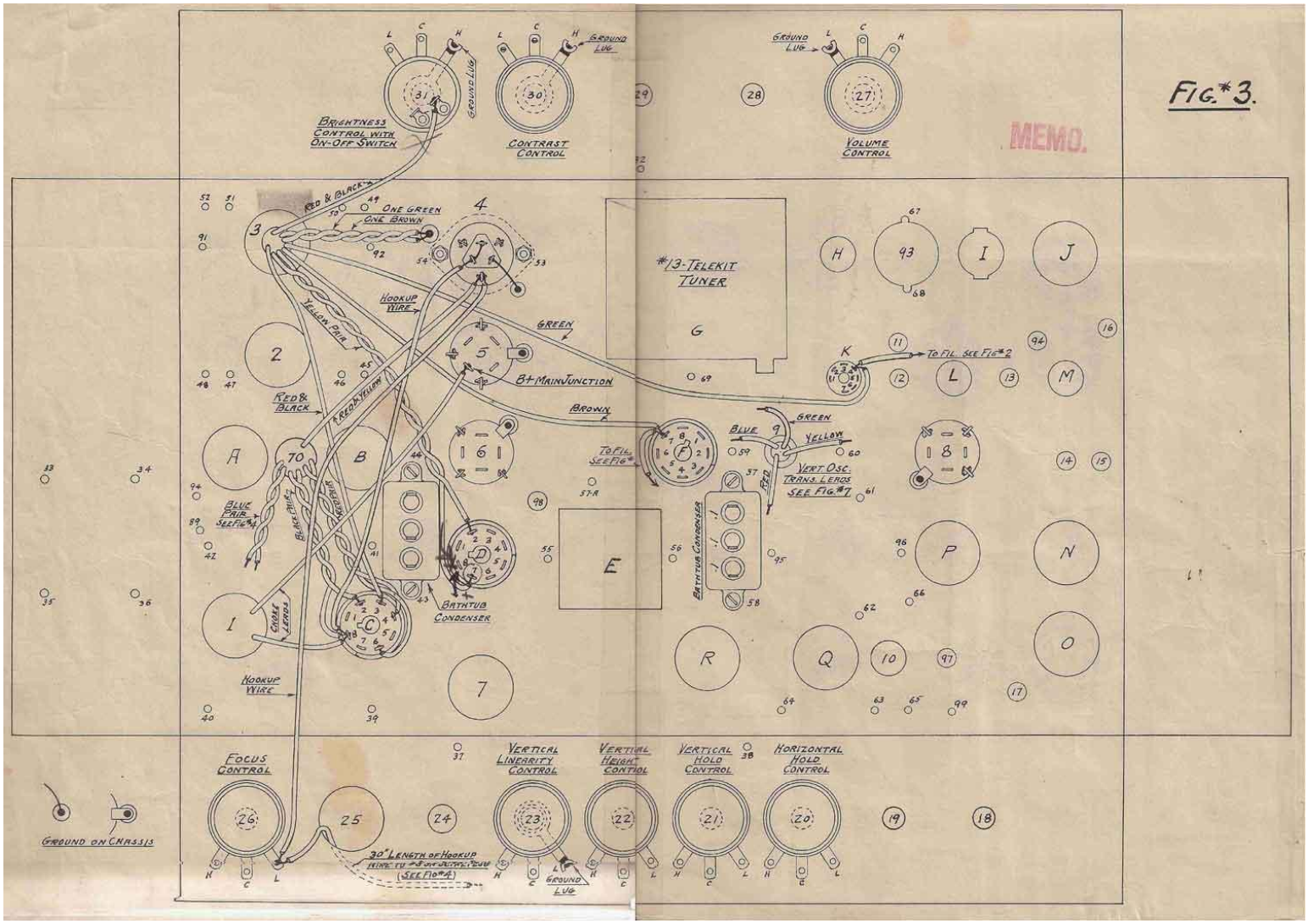


FIG. #2.
18
19
20
21
22
23
24
25
26
36
37
17
97
10
Q
R
7
C
1
O
N
P
E
D
56
55
98
36
35
15
14
8
9
F
6
B
70
A
34
33
BROWN SEE FIG #3
M
L
GREEN SEE FIG #3
K
13
12
11
16
94
69
5
2
68
93
67
H
G
4
3
53
54
32
27
28
29
30
31
GROUND ON CHASSIS

FIG.*3.


BRIGHTNESS CONTROL WITH ON-OFF SWITCH
GROUND LUG
CONTRAST CONTROL
VOLUME CONTROL
*13-TELEKIT TUNER
HOOKUP WIRE
YELLOW PAIR
RED & BLACK
ONE GREEN
ONE BROWN
GREEN
B+ MAIN JUNCTION
BROWN
BLUE
YELLOW
TO FIL. SEE FIG.*2
TO FIL. SEE FIG.*
VERT. OSC. TRANS. LEADS SEE FIG.*7
BLUE PAIR SEE FIG.*4
BLACK PAIR
YELLOW
CHOKE LEADS
BATHTUB CONDENSER
HOOKUP WIRE
GROUND ON CHASSIS
FOCUS CONTROL
VERTICAL LINEARITY CONTROL
VERTICAL HEIGHT CONTROL
VERTICAL HOLD CONTROL
HORIZONTAL HOLD CONTROL
30" LENGTH OF HOOKUP WIRE TO B+ JUNCTION (SEE FIG.*4)
MEMO.

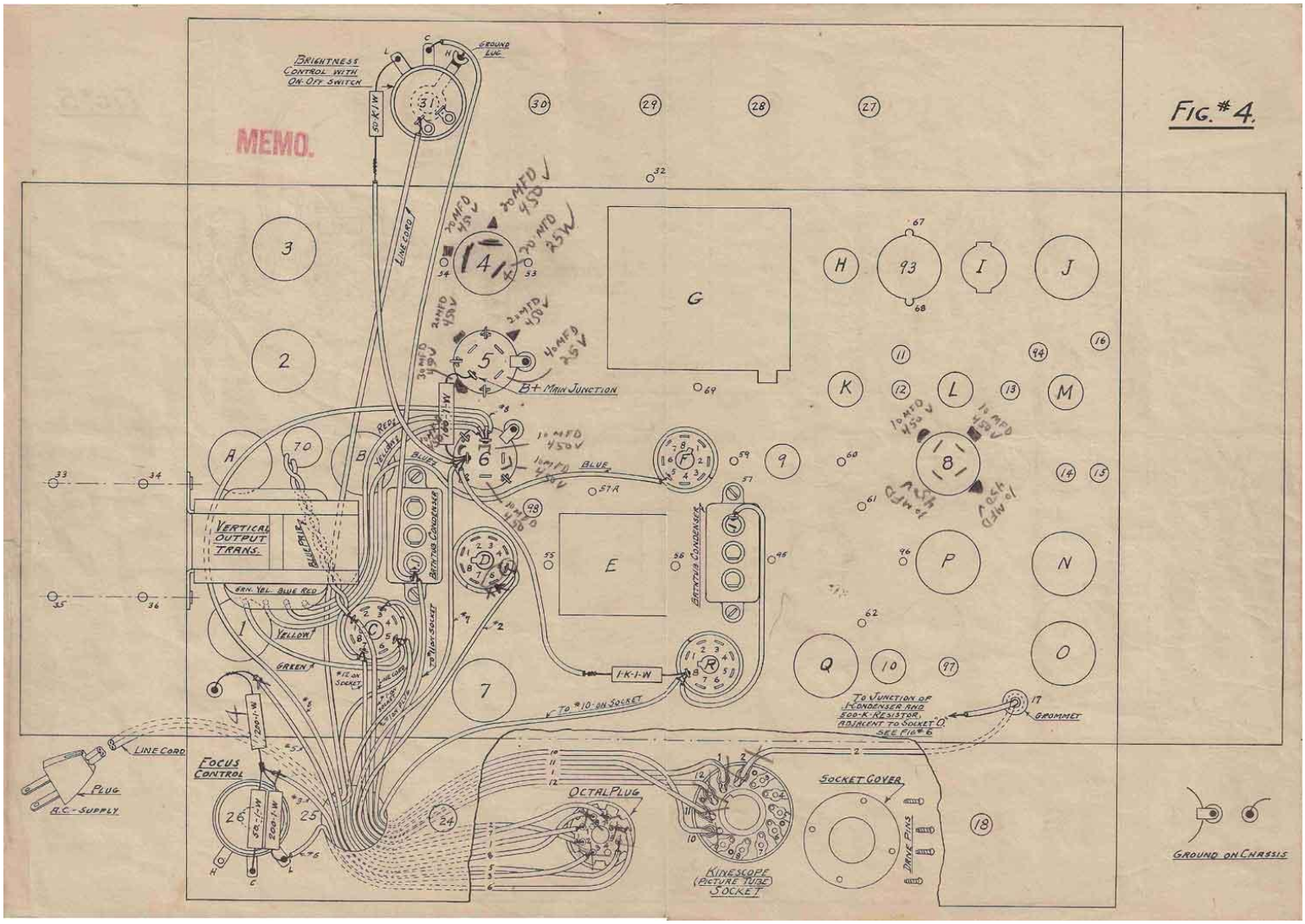


FIG. #4.
MEMO.
BRIGHTNESS CONTROL WITH ON-OFF SWITCH
GROUND LUG
50-K-1-W
LINE CORD
20 MFD 450 V
20 MFD 450 V
20 MFD 25 W
2 MFD 450 V
2 MFD 450 V
4 MFD 25 V
3 MFD 450 V
B+ MAIN JUNCTION
1 MEG 1-W
1 MFD 450 V
1 MFD 450 V BLUE
.1 MFD 450 V
VERTICAL OUTPUT TRANS.
BRN. YEL. BLUE RED
YELLOW
GREEN
BLUE PRIM.
BLUE SEC.
YELLOW
BLUES
RED
BYPASS CONDENSER
BYPASS CONDENSER
#12 GA SOCKET
#14 GA SOCKET
#16 GA SOCKET
F-K-1-W
TO #10 GA SOCKET
10 MFD 450 V
10 MFD 450 V
15 MFD 450 V
10 MFD 450 V
TO JUNCTION OF CONDENSER AND 500-K RESISTOR, ADJACENT TO SOCKET SEE FIG #6
GROMMET
LINE CORD
PLUG
A.C. SUPPLY
FOCUS CONTROL
1200-1-W
68-1-W
200-1-W
OCTAL PLUG
KINESCOPE (PICTURE TUBE) SOCKET
SOCKET COVER
DRIVE PINS
GROUND ON CHASSIS

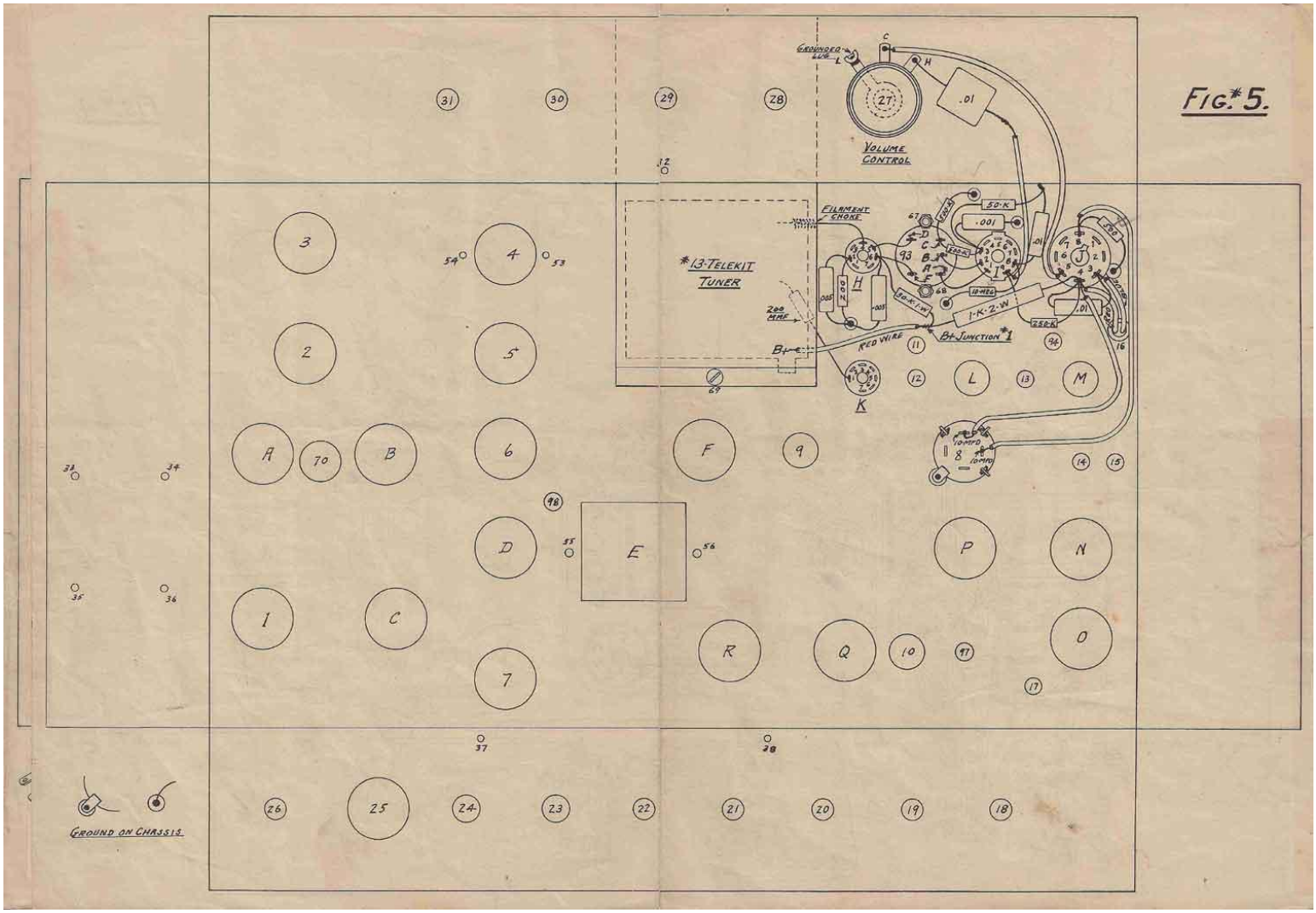


FIG.* 5.
GROUNDED LUG
VOLUME CONTROL
.01
50-K
.001
FILAMENT CHOKE
*13-TELEKIT TUNER
200 MFD
BLUE
RED WIRE
Bt. JUNCTION *1
1-K-2-W
250-K
10-MFD
10-MFD
GROUND ON CHASSIS.

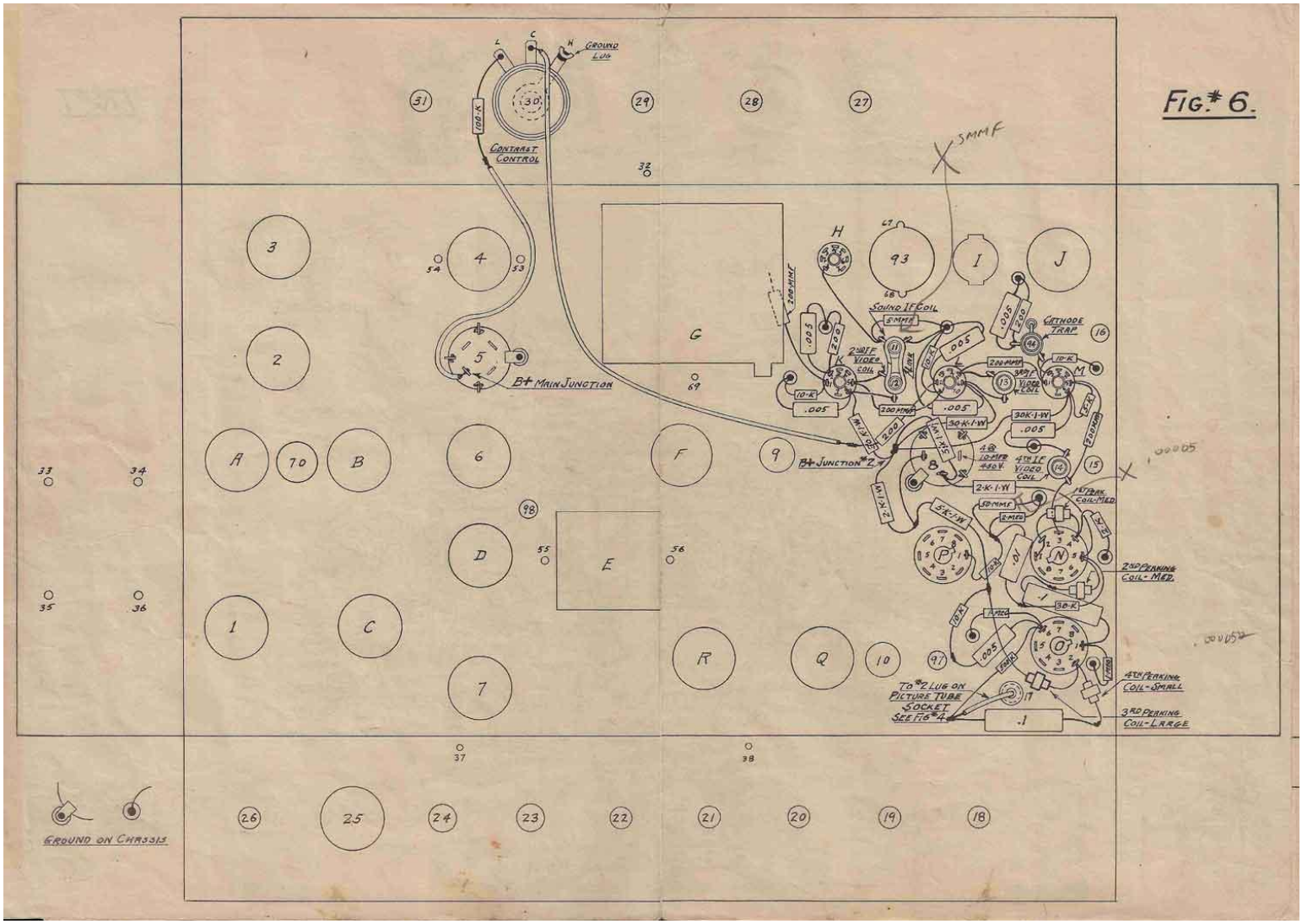


FIG.* 6.
GROUND LUG
CONTRAST CONTROL
100-K
B+ MAIN JUNCTION
B+ JUNCTION #2
SOUND IF COIL
5MMF
2ND IF VIDEO COIL
CATHODE TRAP
4TH IC VIDEO COIL
1ST PEAK COIL-MED.
2ND PEAKING COIL-MED.
4TH PEAKING COIL-SMALL
3RD PEAKING COIL-LARGE
TO #2 LUG ON PICTURE TUBE SOCKET SEE FIG #4
GROUND ON CHASSIS
.005
.1
.01
10-K
30-K
2-K-1-W
30-K-1-W
50-MMF
220 MMF
200 MMF
.00005

MEMO.

FIG. *7.

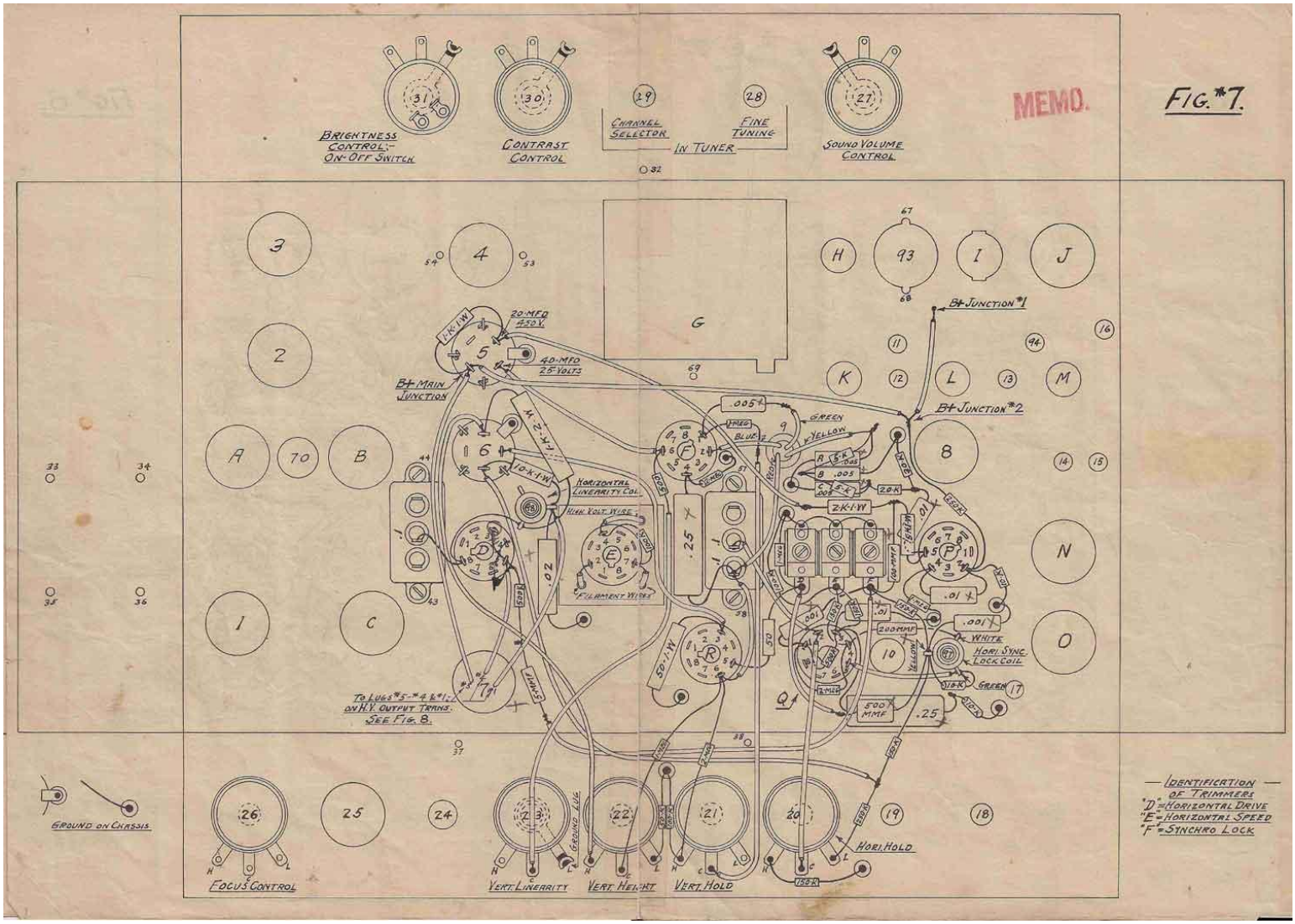
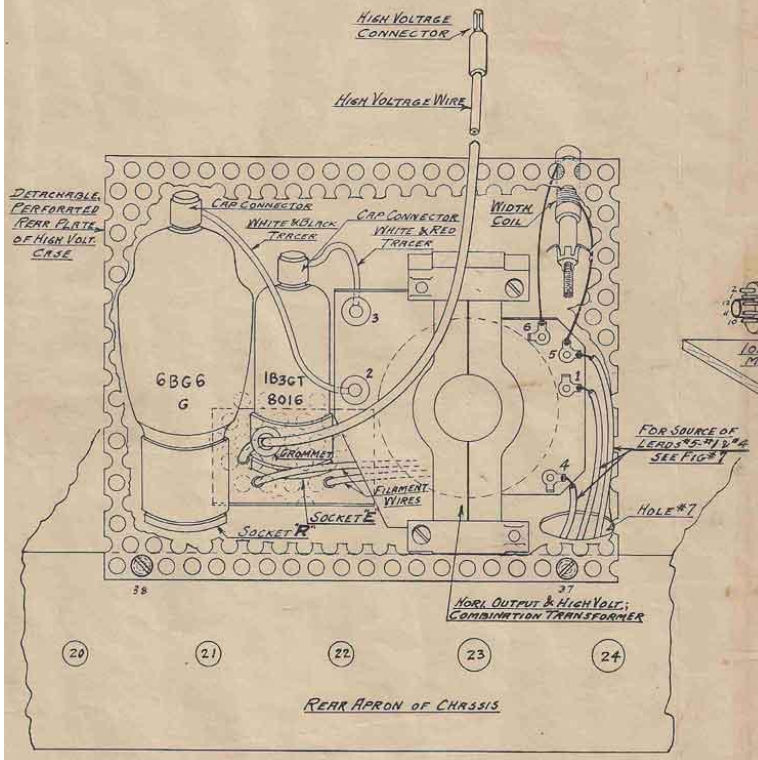
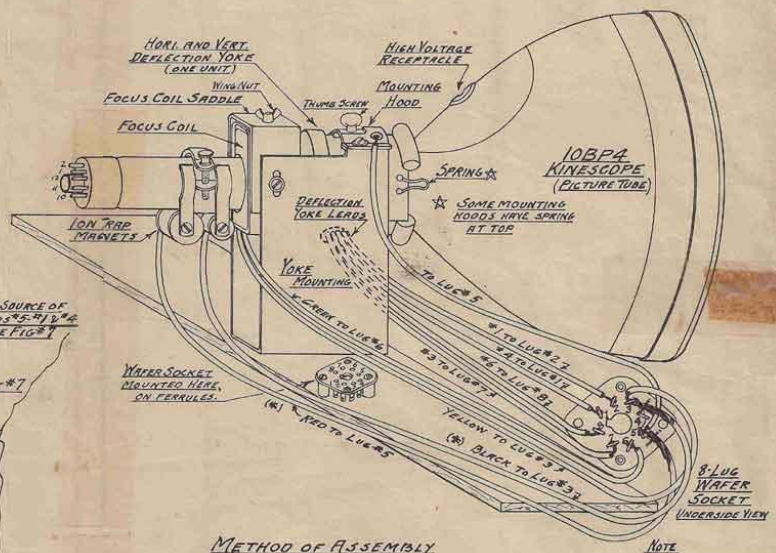

BRIGHTNESS CONTROL - ON-OFF SWITCH
CONTRAST CONTROL
CHANNEL SELECTOR
FINE TUNING
IN TUNER
SOUND VOLUME CONTROL
B+ JUNCTION *1
B+ JUNCTION *2
B+ MAIN JUNCTION
20-MFD 450 V.
40-MFD 25 VOLTS
HORIZONTAL LINEARITY COIL
HIGH VOLT. WIRE
FILAMENT WIRES
HORI. SYNC. LOCK COIL
To Lugs *5 - *4 & *1 on H.V. Output Trans. See Fig. 8.
GROUND ON CHASSIS
FOCUS CONTROL
VERT. LINEARITY
VERT. HEIGHT
VERT. HOLD
HORI. HOLD
GROUND LUG
IDENTIFICATION OF TRIMMERS
'D' = HORIZONTAL DRIVE
'E' = HORIZONTAL SPEED
'F' = SYNCHRO LOCK

FIG. #8.



NOTE:— POSITION OF TUBE 6BG6-TUBE 8016 AND HORI. OUTPUT TRANS. NOT IN ACCORDANCE WITH ACTUAL LAYOUT ON CHASSIS. SPACINGS EXTENDED FOR CLARITY. HOLES IN CHASSIS, DETERMINE THE RELATIVE POSITIONS OF THESE COMPONENTS.



METHOD OF ASSEMBLY OF PICTURE TUBE COMPONENTS

NOTE IF KIT IS SUPPLIED WITH A "PERMANENT MAGNET ION TRAP" ELIMINATE RED AND BLACK LEADS (*) ON WAFER SOCKET AND JOIN LUG #3 AND LUG #5 WITH HOOKUP WIRE.

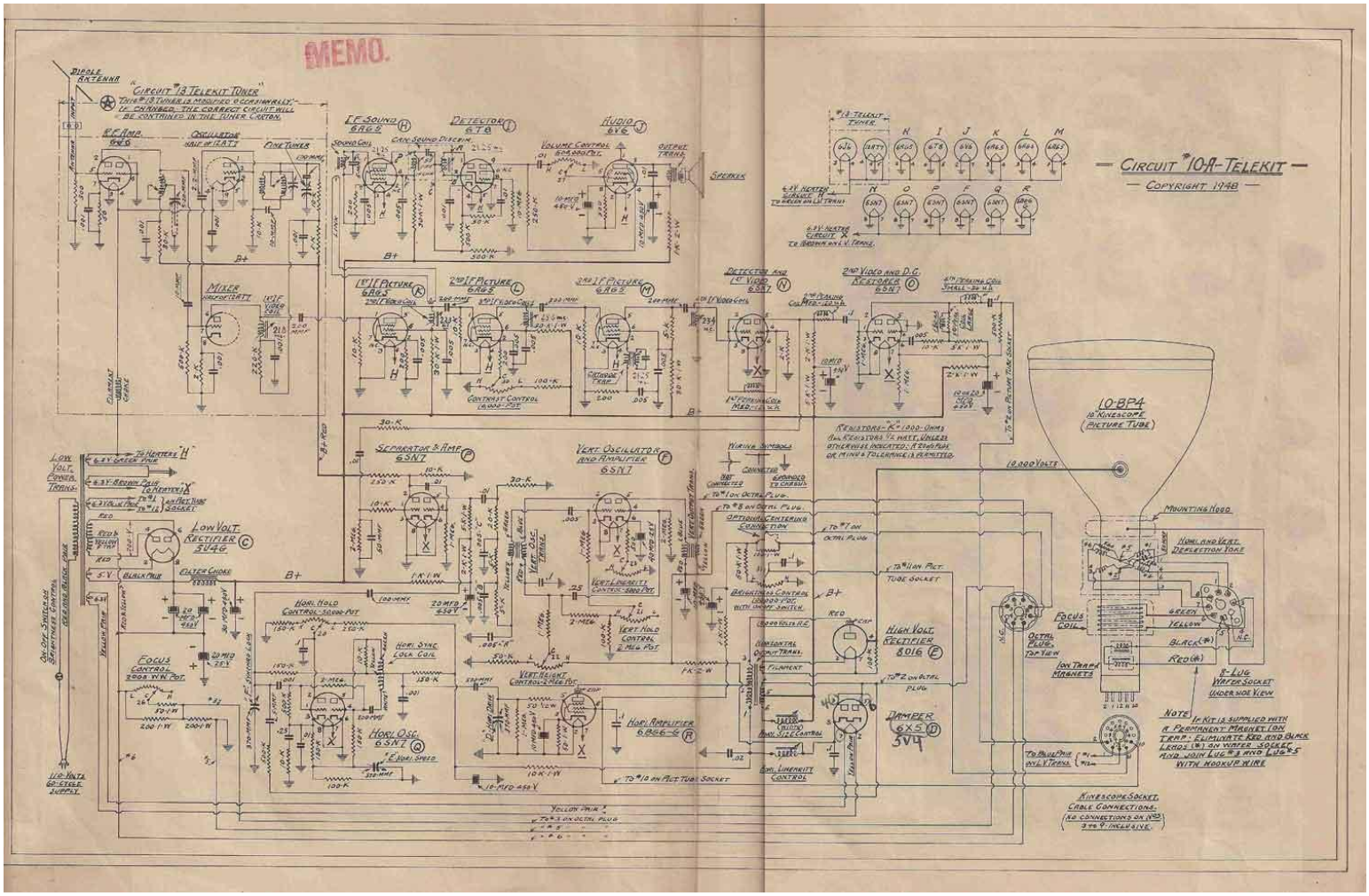

MEMO.
— CIRCUIT #10-A-TELEKIT —
— COPYRIGHT 1948 —
10-BP4
10" KINESCOPE (PICTURE TUBE)
CIRCUIT #13 TELEKIT TUNER
RF AMP. 6AK5
OSCILLATOR HALF OF 12AT7
MIXER 12AT7
1ST I.F. PICTURE 6AK5
2ND I.F. PICTURE 6AK5
3RD I.F. PICTURE 6AK5
I.F. SOUND 6AK5
DETECTOR 6T8
AUDIO 6V6
SEPARATOR & AMP. 6SN7
VERT. OSCILLATOR AND AMPLIFIER 6SN7
HORI. OSC. 6SN7
HORI. AMPLIFIER 6BG6-G
LOW VOLT. RECTIFIER 5U4G
HIGH VOLT. RECTIFIER 8016
DAMPER 6X5GT
2ND VIDEO AND D.C. RESTORER 6SN7
DETECTOR AND 1ST VIDEO 6SN7
HORIZ. AND VERT. DEFLECTION YOKE
FOCUS COIL
ION TRAP MAGNETS
8-LUG WAFER SOCKET UNDER SHOE VIEW
KINESCOPE SOCKET CABLE CONNECTIONS
NOTE: IF KIT IS SUPPLIED WITH A PERMANENT MAGNET ION TRAP, ELIMINATE RED 100 OHM LEADS (*) ON WAFER SOCKET AND JOIN LUG #3 AND LUG #5 WITH HOOKUP WIRE
12,000 VOLTS
115 VOLT 60-CYCLE SUPPLY

Figure 32—Contrast & Brightness Controls Incorrectly Set Showing Vertical Return Lines

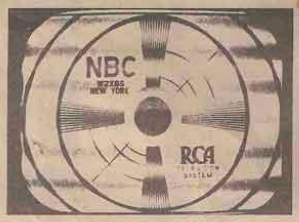


Figure 33—Sound Modulation in Picture

Figure 34—Piture Incorrectly Oriented

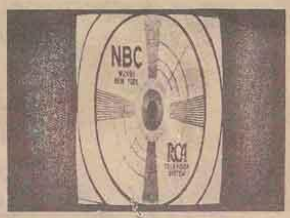


Figure 35—Horizontal Width Control Incorrectly Set

Figure 36—Horizontal Centering Control Incorrectly Set

Figure 37—Vertical Height Control Incorrectly Set

Figure 38—Vertical Centering Control Incorrectly Set

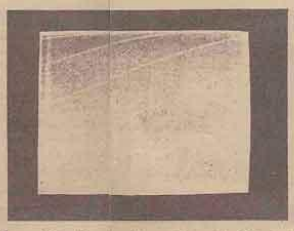


Figure 39—Scanning Raster Correctly Oriented

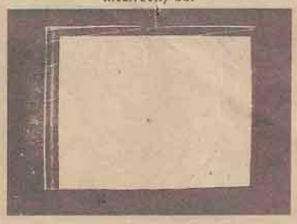


Figure 40—Action of Blanking on Picture Size

Figure 41—Vertical Linearity Control Incorrectly Set

Figure 42—Effect of Too Strong a Signal

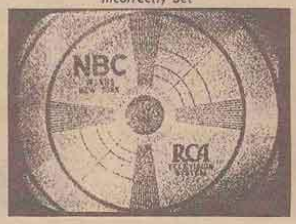


Figure 43—Effect of Too Weak a Signal

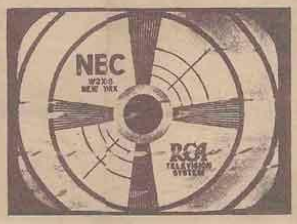


Figure 44—Excesive Auto Ignition Interference

Figure 45—Excessive Diathermy Interference

Figure 46—Beat Frequency Interference

Figure 47—Excessive Ripple in Horizontal Deflection

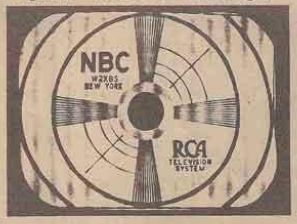


Figure 49—A 250 K.C. Sine Wave Signal with Test Pattern

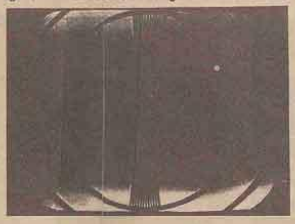


Figure 50—Excessive Ripple in Video Amplifier

Figure 51—Same as Figure 50 Except Opposite Phase

Figure 52—Unstable—"Tear-Out"—Horizontal Synchronization

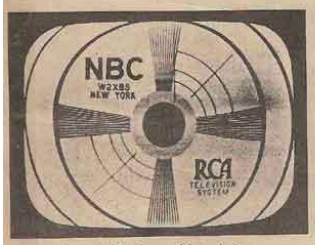


Figure 53—Loss of Interlacing

Figure 54—Excessive Ripple in Vertical Deflection

Figure 23—Normal Test Pattern

Figure 24—Test Pattern Marred by a Reflected or Multi-path Signal

Figure 55—Vertical Distortion Caused By Defective Peaking

Figure 56—Transients in Test Pattern

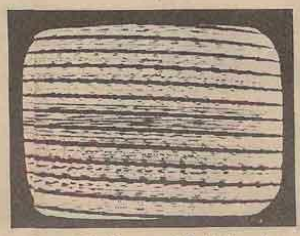


Figure 26—Horizontal Hold Control Incorrectly Set

Figure 27—Horizontal Hold Control Incorrectly Set

Figure 58—Loss of High Video Frequencies

Figure 59—Phase Shift and Loss of Low Video Frequencies

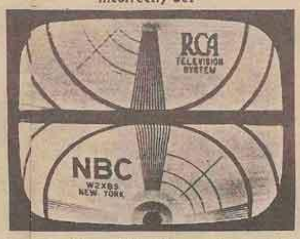


Figure 28—Vertical Hold Control Incorrectly Set

Figure 29—Focus Control Incorrectly Set

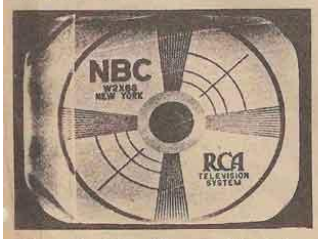


Figure 60—Effect of Damping Tube Failure

Figure 61—Non-Linear Horizontal Deflection

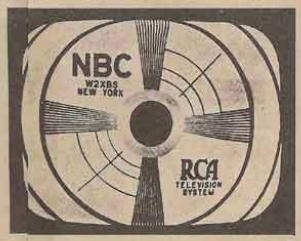


Figure 30—Contrast Control Advanced Too Far

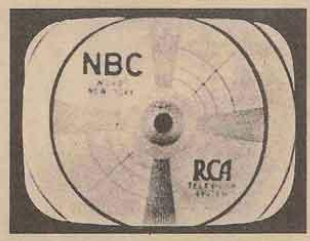


Figure 31—Brightness Control Advanced Too Far